Evanston Animal Shelter

Bid # 22-70

ADDENDUM No. 4

January 11, 2023

Any and all changes to the Contract Document are valid only if they are included by written addendum to all potential respondents, which will be mailed, emailed and/or faxed prior to the proposal due date to all who are known to have received a complete bid document. Each respondent must acknowledge receipt of any addenda by indicating on the Bid Form. Each respondent, by acknowledging receipt of any addenda, is responsible for the contents of the addenda and any changes to the bid proposal therein. Failure to acknowledge receipt of any addenda may cause the proposal to be rejected. If any language or figures contained in this addendum are in conflict with the original document, this addendum shall prevail.

This addendum consists of the following:

1. Addendum Number Four (4) is attached and consists of a total of one hundred seventy-one (171) pages including this cover sheet. Any changes to the drawings or specifications noted within Addendum Number Four (4) will be reflected in subsequent drawing issues.

Please feel free to call (847-866-2971) or email (johngonzalez@cityofevanston.org) with any questions or comments.

Sincerely,

John Gonzalez
Purchasing Specialist

Evanston Animal Shelter

Bid # 22-70

ADDENDUM No. 4

January 11, 2023

This addendum forms a part of the Specifications and Bid Documents for Bid # 22-70 and modifies these documents. This addendum consists of this letter and the following re-issued drawings and specifications:

Announcement:

The bid submission due date has been extended. The deadline will be as follows:

- Bid Due Date: 2:00 P.M., January 24, 2023.

The date for submission of questions has NOT been extended. Questions received after January 6, 2023 will NOT be given consideration.

Drawings:

DRAWINGS ISSUED WITH THIS ADDENDUM

SM-1 – SOIL MANAGEMENT & REMEDIATION PLAN

DRAWINGS RE-ISSUED WITH THIS ADDENDUM

G0-0 – GENERAL INFORMATION & DRAWING INDEX
FFE2-1 – EQUIPMENT SCHEDULE & PLAN

S0.2 – GENERAL NOTES AND SYMBOLS
S1.1 – UPPER ROOF LEVEL

M1-1 - FIRST FLOOR – MECHANICAL
M6-0 - MECHANICAL CONTROL DIAGRAMS
M6-1 - MECHANICAL CONTROL DIAGRAMS
M6-2 - MECHANICAL CONTROL DIAGRAMS
M6-3 - MECHANICAL CONTROL DIAGRAMS
M7-0 - MECHANICAL SCHEDULES
M7-1 - MECHANICAL SCHEDULES

P1-1 - FIRST FLOOR – PLUMBING
P4-0 - PLUMBING ENLARGED PLANS

P7-0 - PLUMBING MATERIAL LISTS

F1-1 – FIRST FLOOR – FIRE PROTECTION
F5-0 – FIRE PROTECTION DETAILS

E0-1 - SITE PLAN – ELECTRICAL
E1-1 - FIRST FLOOR – LIGHTING
E2-1 - FIRST FLOOR - POWER
E2-2 - ROOF – ELECTRICAL
E3-1 - FIRST FLOOR – SYSTEMS
E6-0 - ELECTRICAL DIAGRAMS
E7-0 - ELECTRICAL SCHEDULES
E7-1 - ELECTRICAL SCHEDULES

T0-0 - TECHNOLOGY COVERSHEET
T1-0 - SITE PLAN – TECHNOLOGY
T2-0 - TECHNOLOGY ROOM ENLARGEMENTS

Specifications:

07 54 23 – Themoplastic-Polyolefin (TPO) Roofing

2.7. D. Cover Board: Provide one of the following:

1. Glass-Mat: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, ~~1/2~~ **1/4** inch thick.

SPECIFICATIONS ISSUED WITH THIS ADDENDEM

02 116 UNDERGROUND STORAGE TANK REMOVAL
02 316 SOIL HANDLING AND MANAGEMENT
02 318 ACCEPTANCE OF BACKFILL, TOP SOIL & CU STRUCTURAL SOIL

SPECIFICATIONS RE-ISSUED WITH THIS ADDENDEM

00 0010 TABLE OF CONTENTS
01 9113 GENERAL COMMISSIONING REQUIREMENTS
21 0553 FIRE SUPPRESSION IDENTIFICATION
21 1300 FIRE PROTECTION SYSTEMS
28 1300 ELECTRONIC ACCESS CONTROL

SPECIFICATIONS REMOVED WITH THIS ADDENDEM

~~274100 - PROFESSIONAL AUDIO/VIDEO SYSTEM~~

Clarifications to Questions Received:

1. Question: Plan on Spec Vol 3 page 685 shows a different building footprint than the civil drawings Pg C200 by Terra.
   i) Will there be an updated version?
   ii) Can we assume that the Engineered Barrier excavations will be applied to the new surface treatment alignment by type described?

   Response: i) Yes, see soil remediation plan issued with this Addendum.
   ii) Reference soil remediation plan and spec issued with this Addendum.

2. Question: When will hazardous waste extent be determined? Do you have a spec for on-site remediation?

   Response: Hazardous waste is identified as Lead contamination. See remediation spec issued with this Addendum.

3. Question: Do you have a spec for the geo-fabric liner?
   Response: Yes, see soil remediation spec issued with this Addendum.

4. Question: Do you have a spec for the geo-fabric barrier?
   Response: Yes, see soil remediation spec issued with this Addendum.

5. Question: In the specifications section for the General Commissioning Requirements 019113, A CM Construction Manager) is mentioned. Will CM be needed and who is the CM?

   Response: No CM in this project. Spec section 019113 is revised and reissued with this Addendum.

6. Question: Door #C1 and 03.2 are shown as sliding doors. Specification has no indication of glass thickness, hardware or manufacturer. Are they all glass doors?

   Response: Yes, both doors are sliding glass doors per specification 08 3213. Manufacturers, glazing requirements, and manufacturer standard hardware are indicated in the specification. Glazing section 08 8000 includes requirements for safety glazing (16 CFR 1201, Category II).

7. Question: Is there a manufacturer for door #'s X.08, X.15, X.16, X.16A, X.16B and X.16C? These doors are indicated as flush doors, A-1.

   Response: Per specification 08 4113, Aluminum Frames and Entances, provide flush aluminum doors from one of the listed manufacturers.

8. Question: I just want to be clear. Is the low voltage (voice/data and security) being bid with the electrical package? I've been getting a few calls asking that question and want to be sure.

Response: Low voltage needs to be included in the bid. Its in the GC's court to determine if its included in the electrical package or by a separate sub.

9. Question: On page A2.1 what type of demising wall is column 3.5 row 6.6?
   Response: Reference the graphic legend on sheet A2-1 - the hatched walls see structural drawing Sheet S1.1.

10. Question: May we use all steel beams instead of bar joists?
    Response: No.

11. Question: On Sheet FFE2-1, what is required for items 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, and 1.10?
    Response: FFE 2-1 noting 1.0 items is reissued with this addendum. See also specification section 13 1913 .

12. Question: The misc. equipment schedule on Sheet FFE2-1 refers to the specifications for product/manufacturer for the heavy-duty utility shelving. Specification section 105613 2.2 A.6. refers to the plans for shelf quantity. Can you confirm the shelf quantity for the units shown on the drawings?
    Response: Refer to equipment sheet FFE2-1 for items 5.10 thru 5.12.

13. Question: Roofing specification 075423 TPO Roofing calls out use of vector mapping grid at 1.1 A. 6. & 2.3 H. Typical roof assembly drawing A2-3 R1 does not include vector mapping grid nor do drawings show electrical connection. Please Advise.
    Response: Per spec section noted EFVM is required. Per 2.3H, Vector Mappiing Grid per manufacturer’s standard with connection kit.

14. Question: Spec section 274100 – Professional Audio/ Video System calls out room types such as “Large Conference Room”, “Medium Conference Room”, “Huddle Space”, and “Classroom”. None of the previous stated spaces seem to be shown on the T-set drawings. In addition, there is no specified equipment, one-line diagrams, and/or room quantities regarding the Audio/Video systems. Assuming this specification section is included in this project, will further information be provided regarding the Audio/Video systems?
    Response: As part of addendum #4, AV spec section is removed from documents.

15. Question: Sheet FFE2-1 lists all the specialty equipment required for the animal shelter. Who is providing and installing these items? Is allowance 03 on the bid form in place to cover this scope? Please confirm.
    Response: See General Notes on Sheet FFE2-1.

16. Question: Please confirm if the 25% M/W/EBE participation for the project is a requirement or goal.
    Response: Goal

17. Question: Please confirm if the 15% Evanston City Resident workforce participation is a requirement or goal.
    Response: Requirement, see Local Employment Program Requirements and Exhibit F in the bid document.

18. Question: Please confirm that the new utility transformer is NOT included and the GC is only responsible for the transformer pad.
    Response: The transformer will be provided by ComEd, and GC is responsible for the pad and the coordination.

19. Question: Roof spec 07 5423/2.7 – D notes ½" thick coverboard; Typical Roof Assembly – note R1 / A2.3 indicates ¼" thick coverboard. Can you please clarify intent?
    Response: Detail R1/A2-3 takes precedence – Spec section is revised as noted above.

20. Question: Aggregate Paving Type 2. L-603 lists the aggregate type 2 as pea gravel. However, the detail on L-503 indicates the aggregate as stabilized decomposed granite. Which is it?
    Response: Aggregate Type 2 is intended to be pea gravel located at the outdoor dog runs. L-603 Schedule is correct.

21. Question: It appears the square footages of seed areas provided do not match the plan. I need clarification on the areas for "Native Seed" and "No Mow Seed".
    Response: a. SEED MIX, TYPE 1(Native Seed) = 2,035 SF
    b. SEED MIX, TYPE 2 (No Mow Seed) = 2,465 SF

22. Question: Exterior dimensional letters: Is there a height for these letters?
    Response: Exterior signage design is TBD and the cost is covered by the allowance.

23. Question: Vinyl Address numbers: Is there a height for these numbers?
    Response: 9" tall house numbers.

24. Question: Regarding the Glue Lam Scope of Work, please provide clarification to the questions below.
    a. The Plans call for Douglas Fir. Southern Yellow Pine is a better alternative. Is this acceptable?
    b. Some of the Glue-Lam is exposed and to weather and should be treated. Please ask the designer to specify which Glue-Lam

Members are treated or if all are to be treated. Note: Douglas Fir can not be treated without incising.

c. Is FSC required? If So can SFI be substituted. FSC is not available in SYP.
d. Does the Glue-Lam Supplier need to provide stamped P.E. Shop Drawings?
e. Spec calls for both stainless steel and galvanized connections. Will Galvanized connections be accepted?
f. LOW VOC per California standards is mentioned in the specification. Is this required?
g. Spec calls for 2 coats of Varnish. This is not recommended for Exterior Glue-Lam. Is this required? If so it should be in the Painters spec and applied after the Glue-Lam is installed.

Response: See answers below:

a. It is structurally acceptable to substitute Douglas Fir with Southern Yellow Pine or Southern Pine (24F-V4 (SP/SP).
b. Glulam members at the canopy area (alt) and the entrance porch area are exposed to weather and should be treated per spec.
c. Yes. FSC is required for LEED. As FSC and SFI are both for sustainability criteria requirements, if Douglas Fir is substituted with Southern Yellow Pine, SFI should be the criteria.
d. Shop drawings are required by specs. It is not required to be stamped by P.E. since it is not delegated design.
e. Galvanized is acceptable.
f. Yes. It is required for LEED.
g. For exterior exposed glulam members in the entrance canopy and porch, varnishing is not required.

25. Question: Please verify that this will be a voice evac system. Symbols legend state audio/visual devices (voice). It seems odd to have a voice evac system on a bldg. like this.

Response: A voice fire alarm system has been specified to be used as a better system than horn annunciation for dog/cat sensitivity to noise concerns.

26. Question: Please provide the expectations for AV. Specs call out for large conference room, medium conference room, classroom, and Huddle room. Plans only show a AV-R1 l ocation in the education/training room. There are no large conference, medium conference, classroom and huddle room that we can find on the prints.

Response: See response to Question 14.

27. Question: Education and training room displays symbol AV-R1 however there is no designation on the t drawings for what this is. I assume it may

be just a AV rough in location to p rovide (1) 2” conduit up the wall but the call out says to AFC and I don’t see a AFC listed on the drawings.

Response: Yes, AV-R1 is rough-in only. “AFC” refer to “above finished ceiling”.

28. Question: The audio/visual spec section 27 4100 has (4) rooms listed for AV. It calls out a large conference room, medium conference room, huddle room, and classroom. Where are they on the drawings? The only thing close is the education & training room 01. Can you confirm which room is which please.

Response: See response to Question 14.

29. Question: A2-3 detail 2 shows foam around roof drains.

Response: Spray foam insulation around roof drain is to improve thermal performance at penetration on roof.

30. Question: A5-5 detail 2 has a note to fill 6" structural stud with spray foam insulation. ---The wall assembly will be batt insulation. Is the foam in this detail only the underside of the window sill? Please see attached markup for detail in question.

Response: Yes. Spray foam provided at the underside of window sills.

31. Question: CFS framed shear walls are shown on sheet S1.1, but I do not find a schedule giving loads or shear wall types. This information is the responsibility of the EOR”. We need engineered plans for this project and our structural engineer needs this info for that proposal.

Response: For CFMF Framed Shearwalls, see SHEARWALL ELEVATION Detail 3/S4.3. For design of jamb studs, used min in-plane design lateral force: SW-A, B, C, D =4.0 kips (service-seismic) and SW-E, F. G = 4.5 kips (service-seismic).
(Revised drawings issued to indicate these forces).

32. Question: Sheet C400 shows the proposed electrical service going to a power pole in the north right of way while sheet E0-1 shows the proposed service calls for a 4” directional bore going towards the northwest corner of the property. Please confirm which is the correct location and if the 4” directional bore is the correct size.

Response: 4” conduit shall be directional bore or in trench (contractor’s option) to the north site property line. Exact primary connection location to utility pole shall be determined by utility engineer at the start of the project.

33. Question: The following spec sections do not call out manufacturers/suppliers: 27 1343.53, 27 4100, 28 1300 & 28 2300. Does the City have a preferred vendor/installer/manufacturer?

Response: a. 271342.53 (CATV) – Blonder Tongue

b. 274100 (AV System) - AV is removed. See response to Question 14.
c. 281300 (Access Control) – Software House
d. 282300 (Video Surveillance) – Milestone software, & HikVision Cameras

34. Question: In spec section 27 4100, Part 1, 1.1, I calls out spec section 27 4200 – Electronic Digital Signage Systems. This is not in the spec manual. Will this be removed or added through an addendum?
Response: Spec section 27 4100 Professional AV system is removed from contract complete, including Digital Signage in this Addendum.

35. Question: In spec section 28 1300, Part 1, 1.1, N calls out spec section 28 2613 – Infant Protection System. This is not in the spec manual. Will this be removed or added through an addendum.
Response: Reference to Infant protection is removed from specs in this Addendum.

36. Question: I'm currently working on the cages (Section 13 19 20) for this project and wanted to verify that I have the correct configurations listed on FFE2-1. I could not find any elevations of the cages in the drawings that show actual sizes of cages. Also wanted to verify that cage assemblies 2.05 & 2.08 do not have a mobile platform and that the contractor will build a raised platform onsite
Response: Model #s provide cage size. They are not mobile. Elevation is on 1/A8-12. Platform detail is on A9-1. Coordinate with contractor.

37. Question: Also, for the kennel runs (Section 13 19 20) I cannot find any information on the run gates or panels. These are listed as 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07 & 1.08 on drawing FFE2-1 & A8-3. I need to know if the gate is wire or glass & stainless steel or galvanized steel frame. Also need to know if the kennel divider panels are full isolation or partial isolation w/ wire as well as stainless steel vs galvanized steel.
Response: FFE 2-1 noting 1.0 items is reisued with this addendum. See also specification section 13 1913

38. Question: Please confirm if a moisture mitigation system is to be included in the base bid under all flooring areas.
Response: Yes. See detail 5/A5-7.

39. Question: The spec calls for Schneider BAC controls. Is the City open to a Trane control system since the equipment is all Trane?
Response: No.

40. Question: The roof plans call for an R-30 insulation value. Is this to be a "minimum" R-30, or an "average" R-30? The plans show an outside perimeter high point of the insulation as being 5-1/4", which is approximately 5.2", which = R-30, or 2-layers of 2.6" isocyanurate insulation (please see attached photo of a portion of the roof plan.). If we install a "minimum" R-30, after installing the ¼" tapered system on top of the (2) base layers the heights of the insulation at the outside perimeter would be closer to approximately 10". In short, should we be installing the ¼" to-the-foot sloped tapered insulation system as an "average" R-30 system or a "minimum" R-30 system?

    Response: R-30 refers to minimum, with the only exception at roof drains - At roof drains, the insulation can taper down from the minimum thickness (R-value) within the area of the drain sump. On the roof plan 1/A2-3, at the high point along the perimeter of the roof, it indicates additional depth of rigid insulation to the minimum R-value.

41. Question: Will the City of Evanston permit require a construction management plan?

    Response: Yes, the General Contractor will be required to prepare a construction management plan as a part of the required submissions for a building permit. At a minimum, the construction management plan will be required to contain sections describing; storm water pollution prevention plan, staging & logistics, truck routes with map, schedule, emergency contacts, and work site communication.

Attachments:

(List of drawings and specs noted at beginning)

Note: Acknowledgment of this Addendum is required in the Bid.

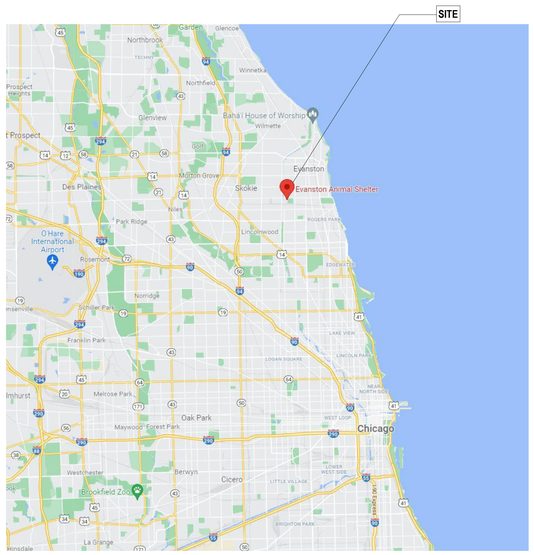
ISSUANCE

ADDENDM #4
JANUARY 11, 2023 2

PROJECT

EVANSTON ANIMAL SHELTER

2310 OAKTON STREET
EVANSTON, IL 60202



LOCATION DIAGRAM (WITHIN NORTH SHORE REGION)
N.T.S.

LOCATION DIAGRAM (WITHIN IMMEDIATE SITE)
N.T.S.

DESIGN TEAM

ARCHITECT / INTERIOR DESIGNER

HOLABIRD & ROOT

HOLABIRD & ROOT
140 SOUTH DEARBORN STREET
SUITE 500
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DRAWING INDEX

GENERAL NOTES

1. REFER TO DEMOLITION DRAWINGS FOR ADDITIONAL GENERAL REQUIREMENTS.
2. CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING ITS BID TO DETERMINE ACTUAL FIELD CONDITIONS PRESENTLY EXISTING, AND IDENTIFY ANY SUCH CONDITIONS WHICH MAY AFFECT ITS BID. THE SUBMITTING OF A BID FOR THE PROJECT WILL SERVE AS NOTICE THAT THE CONTRACTOR HAS MADE THE AFORESAID DETERMINATIONS AS NO ADDITIONAL SUMS WILL BE ALLOWED FOR FAILURE TO DO SO.
3. CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS FOR COORDINATION OF ALL TRADES & SUBCONTRACTORS & REPORT ANY CONFLICTS OR DISCREPANCIES TO THE ARCHITECT.
4. CONTRACTOR SHALL EXERCISE CARE TO AVOID DAMAGE TO EXISTING WORK, ADJACENT SURFACES AND ADJOINING AREAS INCLUDING BUT NOT LIMITED TO THE PORTION OF THE WORK THAT IS TO REMAIN AS PART OF THE COMPLETED CONSTRUCTION. CONTRACTOR SHALL BE REQUIRED TO REPAIR OR OTHERWISE RESTORE ANY SUCH AREAS OR SURFACES THAT BECOME DAMAGED OR REMOVED ON ACCOUNT OF THE DEMOLITION WORK.
5. THE CONTRACTOR SHALL PROVIDE TEMPORARY BRACING AND SHORING WITH CONNECTIONS OF SUFFICIENT STRENGTH TO BEAR IMPOSED LOADS, AND TO PROTECT ALL PERSONS & PROPERTY TO ENSURE PROPER ALIGNMENT. THE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR PROVIDING ADEQUATE REINFORCEMENT DUE TO LATERAL LOADS AND CONSTRUCTION IMPACTS. CONTRACTOR SHALL ASSUME ALL RESPONSIBILITY FOR ANY DAMAGES DUE TO HIS FAILURE TO TAKE SUCH PRECAUTIONS.
6. PROVIDE & MAINTAIN SHORING, BRACING, & STRUCTURAL SUPPORTS AS REQUIRED TO PRESERVE STABILITY & PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF CONSTRUCTION OR FINISHES THAT ARE TO REMAIN. PREVENT UNEXPECTED OR UNCONTROLLED MOVEMENT OR COLLAPSE OF CONSTRUCTION BEING DEMOLISHED.
7. CONTRACTOR SHALL ANTICIPATE AND MAKE ANY AND ALL ARRANGEMENTS WITH LOCAL GOVERNMENT AGENCIES SHOULD ENTRY ONTO OR OBSTRUCTION OF A PUBLIC WAY BE NECESSARY IN CONNECTION WITH THE WORK.
8. GENERAL CONTRACTOR TO OBTAIN ALL NECESSARY PERMITS AND LICENSING REQUIRED BY GOVERNING BODIES. CONTRACTORS WILL BE REQUIRED TO PAY FOR ALL LICENSE REQUIREMENTS. ALL PERMITTING FEES BY THE CITY OF EVANSTON WILL BE WAIVED.
9. ALL WORK TO BE DONE IN ACCORDANCE WITH APPLICABLE BUILDING CODES & ALL OTHER CODES THAT HAVE AUTHORITY OVER THIS PROJECT. SECURE REQUIRED PERMITS, PROVIDE ALL NECESSARY SAFEGUARDS, BARRIERS, TEMPORARY POWER, LIGHTING, FIRE PROTECTION, ETC. AS REQUIRED.
10. CONTRACTOR SHALL INSTALL MATERIALS & SYSTEMS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND REVIEWED SUBMITTALS.

Permit Stamp

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Tel: 312 357 1771 Fax: 312 357 1909
www.holabird.com

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No.	Date	Issue
2	01/11/2022	ADDENDUM #4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	L. YUAN
Checked	K. BOYER
Proj. Arch./Eng.	L. YUAN

EVANSTON animal shelter · City of Evanston

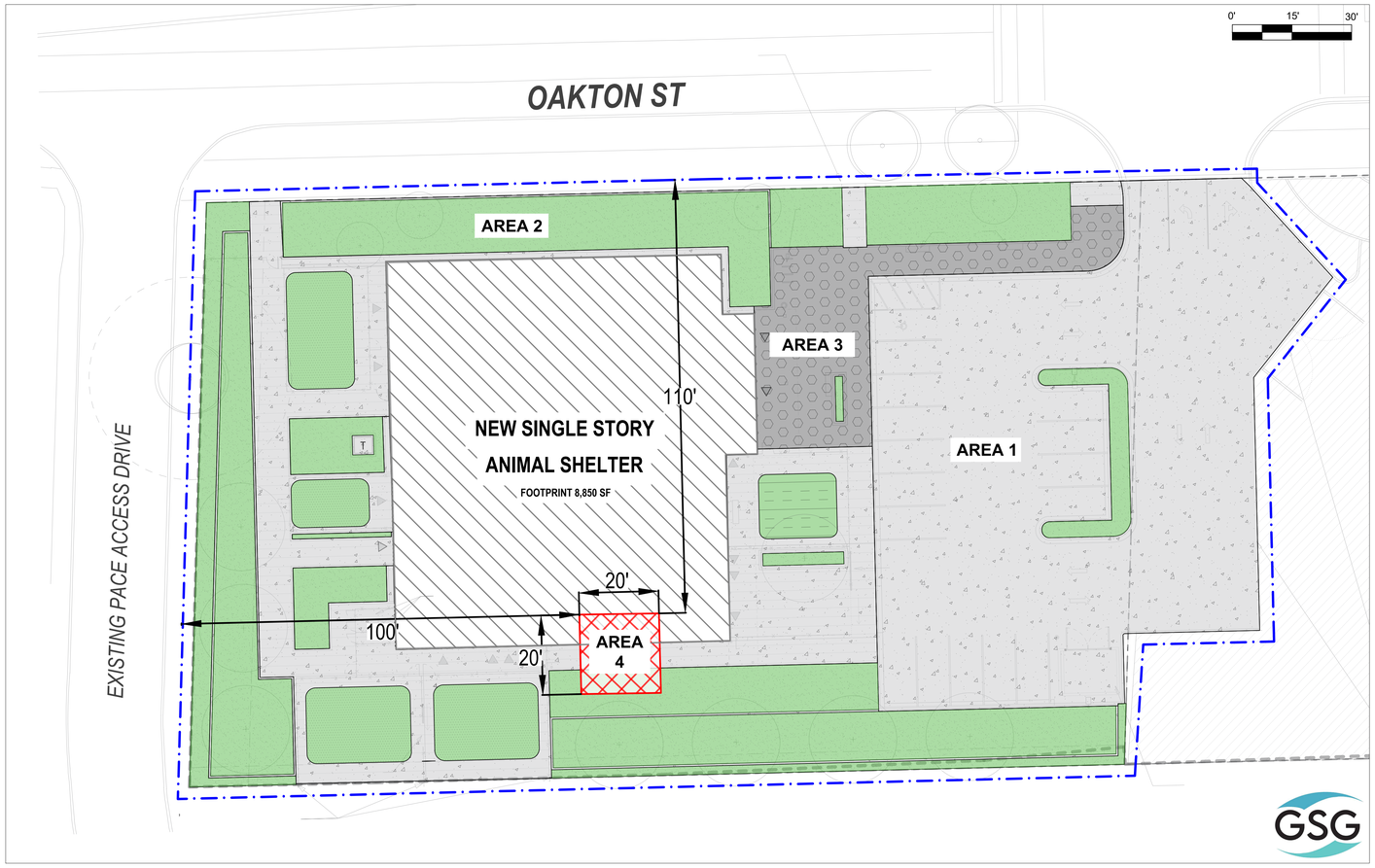
EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

GENERAL INFORMATION & DRAWING INDEX

Sheet Name

Drawing No. **G0-0**



LEGEND

PROPERTY BOUNDARY

ENGINEERED BARRIERS

PROPOSED CONCRETE BUILDING SLAB

AREA 1 - ASPHALT/CONCRETE. IF NECESSARY REMOVE SOIL TO A DEPTH SHOWN ON THE ARCHITECTURAL/ENGINEERING PLANS AND BACKFILL WITH CLEAN FILL FOR INSTALLATION OF NEW ASPHALT/CONCRETE PAVEMENT

AREA 2 - LANDSCAPED AREAS. REMOVE SOIL TO EIGHTEEN (18) INCHES BELOW FINISHED GRADE, PLACE GEOTEXTILE FABRIC LINER, AND BACKFILL WITH CLEAN FILL TO FINISHED GRADE.

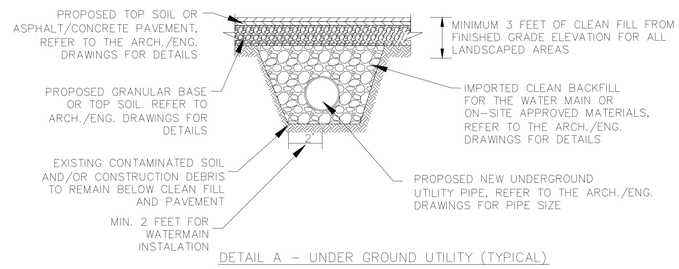
AREA 3 - UNIT PAVERS. REMOVE SOIL TO EIGHTEEN (18) INCHES BELOW FINISHED GRADE, PLACE GEOTEXTILE FABRIC LINER, AND BACKFILL WITH CLEAN FILL TO FINISHED GRADE.

REMEDIATION AREAS

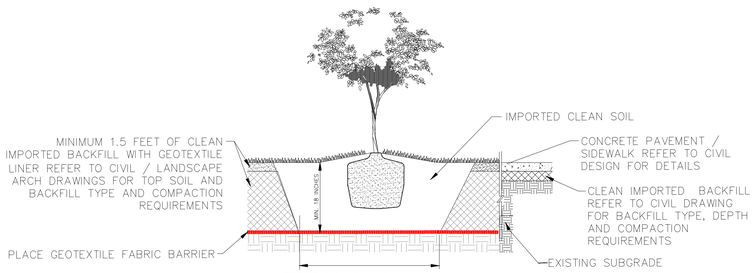
AREA 4 - SOIL CLASSIFIED AS HAZARDOUS WASTE. REMOVE AN APPROXIMATE AREA OF 20 X 20 FEET TO A MINIMUM DEPTH OF FIVE (5) FEET BELOW EXISTING GRADE. DISPOSE OF EXCAVATED SOIL AT A SUBTITLE C LANDFILL. IF SOILS FROM AREA 4 ARE TREATED IN-SITU AND RENDERED NON-HAZARDOUS CONFIRMED THROUGH TCLP LEAD TESTING, THEY SHALL BE DISPOSED OF AT A SUBTITLE D LANDFILL.

NOTES:

1. THIS DRAWING IS ONLY FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL REFER TO PROPOSED SITE DEVELOPMENT ARCHITECT/ENGINEER DRAWINGS FOR CONSTRUCTION DETAILS AND DIMENSIONS.
2. ALL SOILS AND BURIED CONSTRUCTION DEBRIS PRESENT AND GENERATED AT THE SITE ARE CLASSIFIED AS NON-HAZARDOUS NON-SPECIAL WASTE AND/OR GENERAL CONSTRUCTION DEMOLITION DEBRIS AND SHALL BE DISPOSED AT A SUBTITLE D LANDFILL WITH THE EXCEPTION OF SOILS FROM REMEDIATION AREA 4. SOILS FROM REMEDIATION AREA 4 ARE CLASSIFIED AS HAZARDOUS WASTE AND SHALL BE DISPOSED OF AT A SUBTITLE C LANDFILL. IF SOILS FROM REMEDIATION AREA 4 ARE TREATED IN-SITU BY A QUALIFIED REMEDIATION CONTRACTOR WITH ADDITIVES AND RENDERED NON-HAZARDOUS CONFIRMED THROUGH TCLP LEAD TESTING, THEY SHALL BE DISPOSED OF AT A SUBTITLE D LANDFILL.
3. ALL SOIL REMOVAL, HANDLING AND DISPOSAL ACTIVITIES SHOULD BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATION SECTION 02316 AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS.
4. REMEDIATION WORK SHALL INCLUDE PERFORMING THE FOLLOWING:
   - A. EXCAVATE AND DISPOSE OF UNSUITABLE MATERIALS AND EXCESS SOILS AT A SUBTITLE D LANDFILL EXCEPT FOR HAZARDOUS SOILS WHICH SHALL BE DISPOSED OF OFF-SITE AT A SUBTITLE C LANDFILL.
   - B. BURIED CONCRETE SLABS AND ASPHALT CAN BE RECYCLED. CONCRETE AND ASPHALT TO BE RECYCLED MUST NOT BE STAINED AND MUST BE FREE OF SOIL.
   - C. THE CONTRACTOR SHALL PERFORM ALL REQUIRED ANALYTICAL TESTING TO SECURE ALL REQUIRED PERMITS AND WASTE STREAM AUTHORIZATION FROM SUBTITLE D AND/OR SUBTITLE C LANDFILLS.
   - D. IN THE PROPOSED LANDSCAPED AREAS (AREA 2) AND THE PROPOSED UNIT PAVERS (AREA 3), THE CONTRACTOR SHALL EXCAVATE CONTAMINATED SOIL AND CONSTRUCTION DEBRIS TO A DEPTH OF EIGHTEEN (18) INCHES BELOW THE PROPOSED FINISHED GRADE, PLACE IEPA APPROVED GEOTEXTILE FABRIC, AND BACKFILL WITH CLEAN SOIL EIGHTEEN (18) INCHES BELOW FINISHED GRADE TO THE ELEVATIONS SHOWN IN THE ARCHITECTURAL DRAWINGS.
   - E. EXCAVATE AND DISPOSE OF CONTAMINATED SOILS IN REMEDIATION AREA 4 (ESTIMATED 20 FT X 20 FT) TO A DEPTH OF FIVE (5) FEET BELOW EXISTING GRADE AND BACKFILL WITH CLEAN FILL.
   - F. IN THE PROPOSED UNDERGROUND UTILITY TRENCHING AREAS, EXCLUDING WATER MAINS, THE CONTRACTOR SHALL EXCAVATE CONTAMINATED SOIL TO A DEPTH REQUIRED BY THE NEW DEVELOPMENT.
   - G. MATERIALS FROM THE SITE, EXCEPT FROM AREA 4, CAN BE USED AS BACKFILL TO A DEPTH UP TO 3 FEET BELOW FINISHED GRADE IN THE UTILITY TRENCHES. CLEAN FILL WILL BE NECESSARY FROM FINISHED GRADE TO AT LEAST THREE (3) FEET BELOW FINISHED GRADE.
   - H. FOR THE WATER MAIN CONNECTION, EXCAVATE CONTAMINATED SOIL TO A DEPTH OF 2 FEET BELOW THE WATER MAIN INVERT ELEVATION AND BACKFILL WITH CLEAN FILL. THE WIDTH OF THE WATER MAIN TRENCH SHOULD BE AT LEAST 4 FEET LARGER THAN THE PIPE DIAMETER. A MINIMUM OF 2 FEET OF CLEAN FILL SHOULD BE PLACED AT EACH SIDE OF THE WATER MAIN.
5. ALL PROJECT BACKFILL MATERIALS SHALL MEET THE ENVIRONMENTAL REQUIREMENTS OF SPECIFICATION SECTION 02318.
6. THE CONTRACTOR SHALL PREPARE A SITE-SPECIFIC HEALTH AND SAFETY PLAN AND PERFORM ALL WORK IN ACCORDANCE WITH ALL APPLICABLE OSHA REGULATIONS.
7. THE CONTRACTOR SHALL SLOPE THE SIDE OF EXCAVATIONS TO COMPLY WITH THE CITY OF EVANSTON AND OSHA REQUIREMENTS. THE CONTRACTOR SHALL SECURE, SHORE AND BRACE EXCAVATIONS WHERE SLOPING IS NOT POSSIBLE DUE TO SPACE RESTRICTION OR STABILITY OF MATERIAL.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MANAGEMENT AND REMOVAL OF WATER FROM THE SITE IN ACCORDANCE WITH THE CITY OF EVANSTON AND MWRDGC REQUIREMENTS AND REGULATIONS.
9. IF ANY USTs ARE DISCOVERED ON SITE DURING SITE DEVELOPMENT ACTIVITIES, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO ANY REMOVAL ACTIVITY IN ACCORDANCE WITH THE PROJECT SPECIFICATION SECTION 02116.



DETAIL A – UNDER GROUND UTILITY (TYPICAL)



DETAIL B – LANDSCAPE AREA REMEDIATION PLAN (TYPICAL)
SCALE: NTS

Permit Stamp

HOLABIRD & ROOT
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No.	Date	Issue
1	01/11/2023	ADDENDUM #4

Project Number	16015
Drawn	E. McGONIGLE
Checked	R. SCHNEIDER
Proj. Arch./Eng.	R. SCHNEIDER

EVANSTON animal shelter
City of Evanston

EVANSTON ANIMAL SHELTER
16015
2310 Oakton St, Evanston, IL 60202

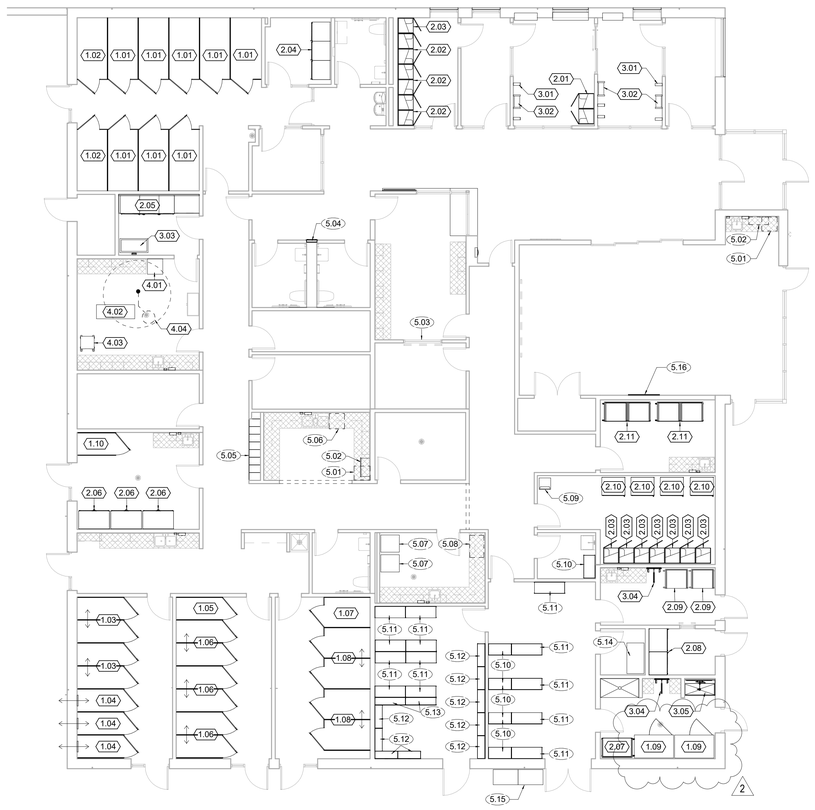
Project Name

SOIL MANAGEMENT & REMEDIATION PLAN

Sheet Name

Drawing No. **SM-1**

3/4" = 1'- 0" 1'- 0" 0'- 9" 0'- 6" 0'- 3" 0'- 0"
1" = 1'- 0" 3'- 0" 2'- 0" 1'- 0" 0'- 0"
1/2" = 1'- 0" 6'- 0" 4'- 0" 2'- 0" 0'- 0"
1/4" = 1'- 0" 12'- 0" 8'- 0" 4'- 0" 0'- 0"
1/8" = 1'- 0" 24'- 0" 16'- 0" 8'- 0" 0'- 0"
1/16" = 1'- 0" 48'- 0" 32'- 0" 16'- 0" 0'- 0"
1" = 30'- 0" 120'- 0" 90'- 0" 60'- 0" 30'- 0" 0'- 0"



1 FFE FLOORPLAN

FFE2-1 1/8" = 1'-0"

SYMBOLS: EQUIPMENT

X.XX — SPECIALTY EQUIPMENT TAG
ITEM NUMBER- SEE EQUIPMENT SCHEDULE

5.XX — MISC. EQUIPMENT TAG
ITEM NUMBER- SEE EQUIPMENT SCHEDULE

GENERAL NOTES: EQUIPMENT

1. ALL ITEMS TO BE CONTRACTOR PROVIDED AND INSTALLED U.N.O.
2. PRODUCT / MANUFACTURER REFERENCED AS BASIS OF DESIGN.
3. SEE SPECIFICATION SECTIONS:
   11 700 - MEDICAL EQUIPMENT
   13 1913 - KENNEL ENCLOSURES AND GATES,
   13 1920 - CAGES

2

X.XX SPECIALTY EQUIPMENT SCHEDULE

KENNEL ENCLOSURES & GATES
NOTE: REFERENCE SPEC SECTION 13 1913 FOR ALL ITEMS.

ITEM#: 1.01
DESCRIPTION: SINGLE KENNEL, DOG ADOPTION
SIZE: 4'W X 8'D
PRODUCT/MFR: SEE SPECS
LOCATION: DOG ADOPTION 08
NOTES: INCLUDES (1) STANDARD RUN CLEAR GLASS DOOR, (1) FRP/WIRE SIDE PANEL

ITEM#: 1.02
DESCRIPTION: SINGLE KENNEL, DOG ADOPTION
SIZE: 4'W X 8'D
PRODUCT/MFR: SEE SPECS
LOCATION: DOG ADOPTION 08
NOTES: INCLUDES (1) STANDARD RUN CLEAR GLASS DOOR

ITEM#: 1.03
DESCRIPTION: 3'X6' SINGLE KENNEL
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16A
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR, (1) FRP/WIRE SIDE PANEL/TRANSFER DOOR

ITEM#: 1.04
DESCRIPTION: 3'X6' SINGLE KENNEL W/ EXTERIOR ACCESS
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16B
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR, (1) FRP SIDE PANEL, (1) INSULATED GUILLOTINE DOOR

ITEM#: 1.05
DESCRIPTION: 3'X6' SINGLE KENNEL
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16B
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR, (1) FRP/WIRE SIDE PANEL

ITEM#: 1.06
DESCRIPTION: 3'X6' SINGLE KENNEL W/ EXTERIOR ACCESS
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16B
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR, (1) FRP/WIRE SIDE TRANSFER PANEL

ITEM#: 1.07
DESCRIPTION: 4'X6' SINGLE KENNEL, LARGE DOGS
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16C
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR

ITEM#: 1.08
DESCRIPTION: 4'X6' SINGLE KENNEL W/ TRANSFER DOOR
PRODUCT/MFR: SEE SPECS
LOCATION: DOG HOLDING 16C
NOTES: INCLUDES (1) STANDARD RUN WIRE MESH DOOR (1) FRP/WIRE SIDE TRANSFER PANEL

ITEM#: 1.09
DESCRIPTION: 3'X5' DOG INTAKE KENNEL
PRODUCT/MFR: SEE SPECS
LOCATION: DOG INTAKE & GROOMING
NOTES: INCLUDES STANDARD RUN FROSTED GLASS DOOR AND FRP SIDE PANEL

ITEM#: 1.10
DESCRIPTION: 3'X5' DOG ISOLATION KENNEL
PRODUCT/MFR: SEE SPECS
LOCATION: DOG ISOLATION
NOTES: INCLUDES STANDARD RUN FROSTED GLASS DOOR AND FRP SIDE PANEL

CAGES

ITEM#: 2.01
DESCRIPTION: FIXED CAT CAGES
PRODUCT/MFR: MASON CO, RAINTREE CAT CONDO
MODEL: QUAD UNIT
QTY: 1
LOCATION: CAT COLONY 1
SPEC#: 13 1920
NOTES: GLASS FRONT PANEL

ITEM#: 2.02
DESCRIPTION: FIXED CAT CAGES
PRODUCT/MFR: MASON CO, RAINTREE CAT CONDO
MODEL: QUAD UNIT
SIZE: 48"W X 24"D
QTY: 3
LOCATION: CAT CAGES
SPEC#: 13 1920
NOTES:GLASS FRONT PANEL, OPTION FOR PASS THRU PORTAL

ITEM#: 2.03
DESCRIPTION: FIXED CAT CAGES
PRODUCT/MFR: MASON CO, RAINTREE CAT CONDO
MODEL: DOUBLE STACK UNIT
SIZE: 24"W X 24"D
QTY: 8
LOCATION: (1) CAT CAGES, (7) CAT HOLDING
SPEC#: 13 1920
NOTES:GLASS FRONT PANEL, PASS THRU PORTAL

ITEM#: 2.04
DESCRIPTION: STAINLESS STEEL CAGE BANK
PRODUCT/MFR: MIDMARK PRE-CONFIGURED STAINLESS STEEL CAGE BANKS
MODEL: 6-UNIT ASSEMBLY, OPTION 2
QTY: 1
LOCATION: SMALL DOG ADOPTION
SPEC#: 13 1920
NOTES: ON 30"D MOBILE PLATFORM

ITEM#: 2.05
DESCRIPTION: FIXED STAINLESS STEEL CAGE BANK
PRODUCT/MFR: MIDMARK PRE-CONFIGURED STAINLESS STEEL CAGE BANKS
MODEL: 6-UNIT ASSEMBLY, OPTION 3
QTY: 1
LOCATION: PRE/POST-OP
SPEC#: 13 1920
NOTES:

ITEM#: 2.06
DESCRIPTION: STAINLESS STEEL MOBILE CAGE, SINGLE TEIR
PRODUCT/MFR: MIDMARK STAINLESS STEEL CAGE BANKS
SIZE: 48"W X 36" H X 24"D
QTY: 3
LOCATION: (3) DOG ISOLATION
SPEC#: 13 1920
NOTES: ON MOBILE PLATFORM

ITEM#: 2.07
DESCRIPTION: STAINLESS STEEL MOBILE CAGE, SINGLE TEIR
PRODUCT/MFR: MIDMARK STAINLESS STEEL CAGE BANKS
SIZE: 48"W
QTY: 1
LOCATION: DOG INTAKE & GROOMING
SPEC#: 13 1920
NOTES:

ITEM#: 2.08
DESCRIPTION: STAINLESS STEEL CAGE BANK, DOUBLE TEIR
PRODUCT/MFR: MIDMARK PRE-CONFIGURED STAINLESS STEEL CAGE BANKS
QTY: 1
LOCATION: WILDLIFE
SPEC#: 13 1920
NOTES:

ITEM#: 2.09
DESCRIPTION: MOBILE CAGE BANK W/ PARTITION
PRODUCT/MFR: MASON CO QUIET COTTAGE
MODEL: #5
QTY: 2
LOCATION: (2) CAT INTAKE
SPEC#: 13 1920
NOTES:

ITEM#: 2.10
DESCRIPTION: STAINLESS STEEL MOBILE CAGE BANK W/ PARTITION PANEL
PRODUCT/MFR: SHOR-LINE
QTY: 4
LOCATION: (4) CAT HOLDING
SPEC#: 13 1920
NOTES: OWNER PROVIDED

MISC. ANIMAL EQUIPMENT

ITEM#: 3.01
DESCRIPTION: CAT CLIMBING POSTS
PRODUCT/MFR: CATASTROPHIC CREATIONS
QUANTITY: 40
LOCATION: CAT COLONY 1, CAT COLONY 2, CAT GA1, CAT GA2
NOTES: SEE INTERIOR ELEVATIONS

ITEM#: 3.02
DESCRIPTION: CAT HAMMOCK - 18"
PRODUCT/MFR: CATASTROPHIC CREATIONS
QUANTITY: 6
LOCATION: CAT COLONY 1, CAT COLONY 2, CAT GA1, CAT GA2
NOTES: SEE INTERIOR ELEVATIONS

ITEM#: 3.03
DESCRIPTION: MIDMARK PLATFORM SCALE
SIZE: 22" X 60"
QUANTITY: 1
LOCATION: PRE/POST-OP
NOTES:

ITEM#: 3.04
DESCRIPTION: FOLD-UP EXAM TABLE
PRODUCT/MFR: MIDMARK FOLD-UP WALL MNT EXAM TABLE
SIZE: 38"
QUANTITY: 2
LOCATION: (1) DOG INTAKE & GROOMING, (1) CAT INTAKE
NOTES:

ITEM#: 3.05
DESCRIPTION: GROOMING TUB
PRODUCT/MFR: MIDMARK ADJUSTABLE HT GROOMING TUB
SIZE: 48"
QUANTITY: 1
LOCATION: (1) DOG INTAKE & GROOMING, (1) CAT INTAKE
NOTES:

MEDICAL EQUIPMENT

ITEM#: 4.01
SPEC#: 11 7000
DESCRIPTION: MEDICAL REFRIGERATOR WITH FREEZER
PRODUCT/MFR: FRIDGIDAIRE 11.6 CU FT MFR
MODEL: FFET1222UV
SIZE: 23.75X28.75X60
QUANTITY: 1
LOCATION: MEDICAL SUITE
NOTES: SEE SPECS

ITEM#: 4.02
SPEC#: 11 7000
DESCRIPTION: MEDICAL EXAM / PROCEDURE TABLE
PRODUCT: FLAT-TOP SURGERY TABLE HYDRAULIC
MFR: MIDMARK
SIZE: 22" X 60"
QUANTITY: 1
LOCATION: MEDICAL SUITE
NOTES: SEE SPECS

ITEM#: 4.03
SPEC#: 11 7000
DESCRIPTION: MEDICAL CART
PRODUCT: MOBILE PROCEDURE CART
MFR: MIDMARK
QUANTITY: 1
LOCATION: MEDICAL SUITE
NOTES: SEE SPECS

ITEM#: 4.04
SPEC#: 11 7000
DESCRIPTION: CEILING-MOUNTED PROCEDURE LIGHT
PRODUCT: MIDMARK 255 LED PROCEDURE LIGHT
QUANTITY: 1
LOCATION: MEDICAL SUITE
NOTES: SEE SPECS AND A3-1

5.XX EQUIPMENT SCHEDULE - MISC.

MISC EQUIPMENT:

ITEM#: 5.01
DESCRIPTION: UNDER-COUNTER REFRIGERATOR
PRODUCT/MFR: WHIRLPOOL WUR50X24HZ
MODEL: WUR50X24HZ
QNTY: 2
LOCATION: (1) EDUCATION & TRAINING, (1) FOOD PREP
NOTES:

ITEM#: 5.02
DESCRIPTION: MICROWAVE
PRODUCT/MFR: LG NEOCHEF
MODEL: LMC1575BD
QNTY: 2
LOCATION: (1) EDUCATION & TRAINING, (1) FOOD PREP
NOTES

ITEM#: 5.03
DESCRIPTION: WALL CLOCK
QNTY: 1
LOCATION: (1) OFFICE - 07

ITEM#: 5.04
DESCRIPTION: AUTOMATED EXTERNAL DEFIBRILLATOR
PRODUCT/MFR: SEMI-RECESSED AED CABINET (180SR3)
QNTY: 1
LOCATION: (1) LOBBY
NOTES:

ITEM#: 5.05
DESCRIPTION: DOUBLE TEIR STAFF LOCKERS
PRODUCT/MFR: SEE SPECS
SIZE: 12"W X 6'H X 1'-6"D
QNTY: 8
LOCATION: (8) CORRIDOR C3
NOTES:

ITEM#: 5.06
DESCRIPTION: DISHWASHER
PRODUCT/MFR: WHIRLPOOL HEAVY DUTY
MODEL: WDF330PAHS
QNTY: 1
LOCATION: (1) FOOD PREP
NOTES:

ITEM#: 5.07
DESCRIPTION: STACKED WASHER DRYER
PRODUCT/MFR: CROSSOVER 2.0 STACKED WASHER & DRYER
MODEL: ELECTRIC WDHLPS817EDC
QUANTITY: (2)
LOCATION: (2) LAUNDRY
NOTES:

ITEM#: 5.08
DESCRIPTION: LAUNDRY UTILITY CART
PRODUCT/MFR: TBD
QUANTITY: (1)
LOCATION: (1) LAUNDRY
NOTES:

ITEM#: 5.09
DESCRIPTION: MOBILE WASTE RECEPTACLE CART
PRODUCT/MFR: TBD
QUANTITY: (1)
LOCATION: (1) CAT HOLDING
NOTES:

ITEM#: 5.10
DESCRIPTION: HEAVY DUTY UTILITY SHELVING
PRODUCT/MFR: SEE SPECS
SIZE: 36"W X 18"D X 84" H
QUANTITY: 5
LOCATION: (1) UTILITY, (4) RECEIVING
NOTES:

ITEM#: 5.11
DESCRIPTION: HEAVY DUTY UTILITY SHELVING
PRODUCT/MFR: SEE SPECS
SIZE: 48"W X 18"D X 84" H
QUANTITY: 13
LOCATION: (8) FOOD PANTRY, (5) RECEIVING
NOTES:

ITEM#: 5.12
DESCRIPTION: HEAVY DUTY UTILITY SHELVING
PRODUCT/MFR: SEE SPECS
SIZE: 36"W X 12"D X 84" H
QUANTITY: 9
LOCATION: (9) FOOD PANTRY

ITEM#: 5.13
DESCRIPTION: HEAVY DUTY UTILITY SHELVING
PRODUCT/MFR: SEE SPECS
SIZE: 48"W X 12"D X 84" H
QUANTITY: 2
LOCATION: (2) FOOD PANTRY
NOTES:

ITEM#: 5.14
DESCRIPTION: FREE STANDING CHEST FREEZER
PRODUCT/MFR:
SIZE: 48" X 27"
QUANTITY: 1
LOCATION: FREEZER RM
NOTES: NOT IN SCOPE, CHEST FREEZER PROVIDED BY DISPOSAL SERVICE

ITEM#: 5.15
DESCRIPTION: OUTDOOR PARCEL LOCKERS
PRODUCT/MFR: SEE SPECS
MODEL: ELOM10A
QUANTITY: 1
LOCATION: AT SOUTH ENTRY TO RECEIVING
NOTES: FOR FOOD PANTRY USE

ITEM #: 5.16
DESCRIPTION: WALL MOUNTED VIDEO MONITOR
QUANTITY: 1
LOCATION: EDUCATION & TRAINING ROOM
NOTES: OWNER PROVIDED

Permit Stamp

HOLABIRD & ROOT
140 South Dearborn Chicago, IL 60603
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STATE OF ILLINOIS
GREGORY B. COOK
001-011968
LICENSED ARCHITECT

No.	Date	Issue
2	01/11/2022	ADDENDUM #4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	E. STUDNEY
Checked	K. BOYER
Proj. Arch./Eng.	L. YUAN

EVANSTON animal shelter
City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

EQUIPMENT SCHEDULE & PLAN

Sheet Name

Drawing No. **FFE2-1**

ABBREVIATIONS & SYMBOLS

AB	ANCHOR BOLT	MAX	MAXIMUM
ADJ	ADJACENT	MECH	MECHANICAL
ADDL	ADDITIONAL	MEP	MECHANICAL, ELECTRICAL & PLUMBING
AFF	ABOVE FINISHED FLOOR	MFR	MANUFACTURER
AR	ANCHOR ROD	MIN	MINIMUM
ARCH	ARCHITECTURAL		
		N/A	NOT APPLICABLE
		NIC	NOT IN CONTRACT
BAL	BALANCE	NS	NEAR SIDE
BM	BEAM	NTS	NOT TO SCALE
BLDG	BUILDING	NWC	NORMAL WEIGHT CONCRETE
BOT	BOTTOM		
BOD	BOTTOM OF DECK	OC	ON CENTER(S)
B/BM	BOTTOM OF BEAM	OF	OUTSIDE FACE
B/FTG	BOTTOM OF FOOTING	OH	OPPOSITE HAND
BS	BOTH SIDES	OPP	OPPOSITE
BSMT	BASEMENT	OPNG	OPENING
CANT	CANTILEVER	PCC	PORTLAND CEMENT CONCRETE
CBC	CHICAGO BUILDING CODE	PJF	PREMOLDED JOINT FILLER
CCD	CHICAGO CITY DATUM	PL	PLATE
C/C OR CC	CENTER TO CENTER	PROP	PROPOSED
CJ	CONSTRUCTION JOINT	PSI	POUNDS PER SQUARE INCH
CL	CENTER LINE	PSF	POUNDS PER SQUARE FOOT
CLR	CLEAR	PT	POST-TENSION(ED)
COL	COLUMN	PVC	POLYVINYL CHLORIDE
CONC	CONCRETE	PVMT	PAVEMENT
CONNX	CONNECTION	R	RADIUS
CONST	CONSTRUCTION	RD	ROOF DRAIN
CONT	CONTINUOUS	REINF	REINFORCING
COORD	COORDINATE	REM	REMOVAL
		REPL	REPLACE, REPLACEMENT
DBA	DEFORMED BAR ANCHOR (NELSON)	REQD	REQUIRED
DET	DETAIL	RET	RETAINING
DIA	DIAMETER	SCHD	SCHEDULE(D)
DIP	DUCTILE IRON PIPE	SIM	SIMILAR
DN	DOWN	SOG	SLAB-ON-GRADE
DWG	DRAWING(S)	SPA	SPACING
DWL	DOWEL	SPEC	SPECIFICATIONS
		SQ	SQUARE
		SS	STAINLESS STEEL
EA	EACH	STD	STANDARD
EF	EACH FACE	STL	STEEL
EJ	EXPANSION JOINT	STR	STRUCTURE, STRUCTURAL
EL	ELEVATION		
ELEV	ELEVATION	TEMP	TEMPORARY
EOD	EDGE OF DECK	TG	TRANSFER GIRDER
EOS	EDGE OF SLAB	THK	THICK
EQUIP	EQUIPMENT	THD	THREAD
EW	EACH WAY	TD	TRENCH DRAIN
EXIST. (E)	EXISTING	TSF	TONS PER SQUARE FOOT
EXP	EXPANSION	TYP	TYPICAL
EXT	EXTERIOR	T&B	TOP AND BOTTOM
		T/BM	TOP OF BEAM
FBO	FURNISHED BY OTHERS	T/COL	TOP OF BEAM
FD	FLOOR DRAIN	T/FLR	TOP OF FLOOR
FDN	FOUNDATION	T/FTG	TOP OF FOOTING
FIN	FINISHED	T/STL	TOP OF STEEL
FLR	FLOOR	T/SLAB	TOP OF SLAB
FS	FAR SIDE	T/WALL	TOP OF WALL
FT	FOOT OR FEET		
FTG	FOOTING	UNO	UNLESS NOTED OTHERWISE
GALV	GALVANIZED	VERT	VERTICAL
GC	GENRAL CONTRACTOR	VIF	VERIFY IN FIELD
GEN	GENERAL		
		W/	WITH
HCA	HEADED CONCRETE ANCHOR	W/O	WITHOUT
HDPE	HIGH DENSITY POLYETHYLENE	WP	WORKING POINT
HEX	HEXAGONAL	WS	WATER STOP
HORIZ	HORIZONTAL	WWF	WELDED WIRE FABRIC
HP	HIGH POINT		
HS	HIGH STRENGTH	@	AT
		&	AND
ID	INSIDE DIAMETER	%	PERCENT
IN	INCH OR INCHES	#	POUND, NUMBER
INFO	INFORMATION		ELEVATION TARGET
INV	INVERT		
			SECTION NUMBER
JT	JOINT		SHEET NUMBER
			ELEVATION NUMBER
K	KIP (ONE THOUSAND POUNDS)		SHEET NUMBER
KSF	KIPS PER SQUARE FOOT		SIMPLE SHEAR CONNECTION
KSI	KIPS PER SQUARE INCH		FULL MOMENT CONNECTION
L	ANGLE	( ) DESIGNATES NUMBER OF SHEAR CONNECTORS	
LOC	LOCATION	[ ] DESIGNATES CONNECTION REACTION	
LNG	LONGITUDINAL	< > DESIGNATES CAMBER	
LP	LOW POINT		
LTWT	LIGHT WEIGHT		
LWC	LIGHTWEIGHT CONCRETE		

3" = 1'- 0" | 1" = 1'- 0" | 1/2" = 1'- 0" | 1/4" = 1'- 0" | 1/8" = 1'- 0" | 1/16" = 1'- 0" | 1" = 30'- 0"

TABLE 2: CONCRETE REINFORCING BAR SPLICE AND DEVELOPMENT LENGTH (Ld) [f'c = 4.0 ksi & fy = 60 ksi

BAR SIZE	CLASS "A" SPLICE OR Ld (IN)		CLASS "B" LAP SPLICE (IN)	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
1.5 INCH CONCRETE COVER (0.75 INCH CONC COVER)				
#4	20 (20)	12 (15)	25 (32)	16 (20)
#5	25 (28)	15 (21)	32 (47)	20 (27)
#6	30 (37)	18 (29)	39 (63)	24 (38)
#7	48 (60)	30 (46)	63 (101)	38 (60)
#8	61 (74)	36 (57)	79 (125)	48 (74)
#9	74 (90)	44 (69)	96 (152)	57 (90)
#10	90 (138)	53 (81)	117 (179)	69 (105)
#11	104 (159)	62 (94)	135 (206)	81 (122)
2.0 INCH AND 3.0 INCH CONCRETE COVER				
#4	20	12	25	16
#5	25	15	32	20
#6	30	18	39	24
#7	43	26	56	33
#8	48	30	63	38
#9	60	36	78	48
#10	73	43	95	56
#11	86	51	112	66

NOTES:
1. TABULATED STRAIGHT DEVELOPMENT AND CLASS "B" SPLICE ARE BASED ON UNCOATED BARS AND NORMAL WEIGHT CONCRETE.
2. FOR ALL TOP EPOXY-COATED BARS WITH COVER LESS THAN 3xBAR DIA OR CLEAR SPACING LESS THAN 6xBAR DIA, INCREASE TABULATED VALUES BY 50% (1.50). INCREASE BY 20% (1.20) FOR ALL OTHER EPOXY-COATED BARS.
3. ALL SPLICES SHOWN ON DRAWINGS SHALL BE CLASS "B" UNO.
4. TOP BARS ARE DEFINED AS HORIZONTAL BARS WITH MORE THAN 12 INCHES OF FRESH CONCRETE CAST BELOW THE DEVELOPMENT LENGTH ON SPLICE.

STANDARD HOOK DETAILS

BAR SIZE	D (INCH)	H (INCH)	Ldh (INCH)
#4	3	8	8
#5	3 3/4	10	10
#6	4 1/2	12	12
#7	5 1/4	14	14
#8	6	16	16
#9	9 1/2	19	18
#10	10 3/4	22	19

TABLE 1705.6 REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS	PERIODIC	REFERENCE STANDARD
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	-	X	
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X	
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X	
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-	
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X	

TABLE 1705.3 REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS	PERIODIC	REFERENCE STANDARD	IBC REFERENCE
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	-	X	ACI 318: CH. 20, 25.2, 25.3, 26.6.1-26.6.3	
2. REINFORCING BAR WELDING:				
A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706;	-	X	AWS D1.4, ACI 318: 26.6.4	
B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16";	-	X		
C. INSPECT ALL OTHER WELDS.	X	-		
3. INSPECT ANCHORS CAST IN CONCRETE.	-	X	ACI 318: 17.8.2	
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS:				
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS	X	-	ACI 318: 17.8.2.4	
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	-	X	ACI 318: 17.8.2	
5. VERIFY USE OF REQUIRED DESIGN MIX.	-	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-	ASTM C172, ASTM C31, ACI 318: 26.5, 26.12	1908.10
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X	ACI 318: 26.5.3-26.5.5	1908.9
9. INSPECT PRESTRESSED CONCRETE FOR:				
A. APPLICATION OF PRESTRESSING FORCES;	X	-	ACI 318: 26.9	
B. GROUTING OF BONDED PRESTRESSING TENDONS.	X	-		
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	-	X	ACI 318: 17.8.2	
11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	-	X	ACI 318: 26.11.2	
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.11.1.2(b)	

TIMBER NOTES:

1. PROVIDE STRUCTURAL GLUED-LAMINATED TIMBER THAT COMPLIES WITH THE CURRENT "AMERICAN INSTITUTE OF TIMBER CONSTRUCTION (AITC) TIMBER CONSTUCTION STANDARDS".
2. ALLOWABLE STRESSES IN GLUED-LAMINATED MEMBERS ARE PER THE LATEST VERSION OF AITC 117.
3. PROVIDE DOUGLAS FIR-LARCH GLUED-LAMINATED BEAMS ACCORDING TO COMBINATION SYMBOL 24F-V4 (DF/DF) WITH THE FOLLOWING PROPERTIES:
   a. EXTREME FIBER IN BENDING, F bx=2400 PSI.
   b. SHEAR PARALLEL TO GRAIN, F vx=265 PSI.
   c. MODULUS OF ELASTICITY, Ex=1800000 PSI.
   ALTERNATE SPECIES: SOUTHERN PINE, COMBINATION:24F-V4(SP/SP)
   F bx=2,400 PSI
   F vx=210 PSI
   Ex=1,800,000 PSI
4. PROVIDE DOUGLAS FIR-LARCH GLUED-LAMINATED COLUMNS ACCORDING TO COMBINATION #3, GRADE L2 WITH THE FOLLOWING PROPERTIES:
   a. MODULUS OF ELASTICITY =1700000 PSI.
   b. COMPRESSION PARALLEL TO GRAIN=1950 PSI.
   c. TENSION PARALLEL TO GRAIN=1250 PSI.
   d. SHEAR PARALLEL TO GRAIN=265 PSI.
   ALTERNATE SPECIES: SOUTHERN PINE, COMBINATION:48/GRADE N2D12
   E axial=1,800,000 PSI
   COMPRESSION PARALLEL TO GRAIN=2,200 PSI
   TENSION PARALLEL TO GRAIN=1,400 PSI
   SHEAR PARALLEL TO GRAIN=260 PSI
5. PROVIDE 7/16" ROOF SHEATHING WITH APA STRUCTURAL RATED SHEATHING, EXPOSURE 1 WITH 8d NAILS SPACED AT 6" O.C AT PANEL EDGES AND 12" O.C AT INTERMEDIATE SUPPORTS OR BODY.
6. PROVIDE 7/16" OSB SHEARWALL SHEATHING WITH APA STRUCTURAL RATED SHEATHING WITH NO. 8x1 INCH FLAT HEAD, SHARP POINT, SELF-DRILLING SCREWS SPACED AT 6" O.C. AT PANEL EDGES AND SPACED AT 12" O.C. AT OTHER THAN EDGES.
7. PLYWOOD SHEATHING PANELS SHALL BE INSTALLED WITH FACE GRAIN ACROSS (PERPENDICULAR) TO THE SUPPORT WITH STAGGER PANEL END JOINTS.
8. PLYWOOD SHEATHING SHALL BE INSTALLED WITH 1/8" SPACE AT ALL PLYWOOD END AND EDGE JOINTS.
9. TONGUE AND GROOVE DECKING SHALL COMPLY WITH STANDARDS OF AITC 112.
   a. TONGUE AND GROVE SHALL BE 2" THICK, SELECT QUALITY AND SHALL BE INSTALLED IN CONTROLLED RANDOM LAYUP. SPECIES SHALL BE DOUGLAS FIR/LARCH OR SOUTHERN PINE.
   b. TONGUE AND GROVE WOOD DECKING SHALL BE INSTALLED WITH TONGUES UP ON SLOPED ROOFS AND OUTWARD IN DIRECTION OF LAYING ON FLAT ROOFS WITH PATTERN FACES DOWN AND EXPOSED ON THE UNDERSIDE.
   c. TONGUE AND GROOVE WOOD DECKING SHALL BE INSTALLED WITH 1-16d TOENAIL ALONG COURSES THROUGH TONGUE AND FACE NAIL TO SUPPORT WITH 1-16d COMMON NAIL PER COURSE.
10. EXPOSED GLULAM MEMBER AT THE ENTRANCE PORCH AND CANOPY AREA (ALT) SHALL RECEIVE PRESERVATIVE TREATMENT PER SPECIFICATIONS.

MASONRY NOTES:

1. MASONRY SHALL BE IN ACCORDANCE WITH THE ACI/ASCE/TMS "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES" (TMS 402-16) AND "SPECIFICATIONS FOR MASONRY STRUCTURES" (TMS 602-16).
2. MASONRY UNIT MATERIALS SHALL BE CONCRETE MASONRY UNITS: MEDIUM WEIGHT, ASTM C-90 OR ASTM C-55 WITH AVERAGE NET AREA COMPRESSIVE STRENGTH OF CONCRETE MASONRY UNITS:
   A. 2,800 PSI FOR 8", 10" & 12" WIDE CMU (TYPE "S" 1,800 PSI COMPRESSIVE STRENGTH MORTAR)
   B. 1,900 PSI FOR 6" WIDE AND SMALLER CMU (TYPE "N" 750 PSI COMPRESSIVE STRENGTH MORTAR)
   C. BRICK UNITS: ASTM C 216, AVERAGE NET AREA COMPRESSIVE STRENGTH 4,150 PSI.
3. MORTAR FOR ALL MASONRY SHALL CONFORM TO ASTM C270 TYPE "S" (1,800 PSI COMPRESSIVE STRENGTH) FOR EXTERIOR CMU AND TYPE "N" (750 PSI COMPRESSIVE STRENGTH) FOR BRICK & INTERIOR CMU:
   A. NET AREA COMPRESSIVE ASSEMBLY STRENGTH OF MASONRY F'M = 2,000 PSI OR GREATER FOR WALLS WITH 8", 10" & 12" CMU
   B. NET AREA COMPRESSIVE ASSEMBLY STRENGTH OF MASONRY F'M = 1,500 PSI OR GREATER FOR ALL OTHER WALLS.
4. GROUT FOR MASONRY SHALL CONFORM TO ASTM C476 AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI.
5. ALL MASONRY UNITS SHALL BE LAID WITH FULL BED & HEAD JOINTS OF MORTAR.
6. REINFORCEMENT BARS FOR MASONRY SHALL CONFORM TO ASTM SPECIFICATION A615, GRADE 60. DEFORMED WIRE USED AS TIES IN CMU PIERS SHALL CONFORM TO ASTM A496.
7. WHERE REQUIRED, VERTICAL REINFORCEMENT SHALL BE LAP SPLICED WITH A MINIMUM LENGTH OF 48 BAR DIAMETERS. CMU PIER CELLS WITH DOUBLE REINFORCEMENT SHALL HAVE MECHANICAL OR WELDED SPLICES WHICH SHALL DEVELOP AT LEAST 125% OF SPECIFIED YIELD STRENGTH.
8. PROVIDE REBAR POSITIONERS 4'-0" ON CENTERS VERTICALLY IN GROUTED CELLS TO ASSURE PROPER PLACEMENT OF REINFORCING BARS.
9. ALL REINFORCING BARS SHALL BE COMPLETELY EMBEDDED IN GROUT WITH A MINIMUM 1/2" CLEAR FROM INSIDE OF FACE SHELL OR 2" CLEAR FROM THE OUTSIDE OF THE FACE SHELL WHICHEVER IS GREATER.
10. FOR ANCHORAGE OF VENEER TO CMU BACKUP OR STRUCTURAL CONCRETE MEMBERS, SEE ARCHITECTURAL DRAWINGS. HORIZONTAL JOINT REINFORCEMENT AND ANCHORS BETWEEN VENEER AND BACKUP NOT TO EXCEED 16" ON CENTER VERTICALLY AND HORIZONTALLY. FOR HORIZONTAL BED JOINT REINFORCEMENT SEE ARCHITECTURAL DRAWINGS.
11. VERTICAL CELLS IN RUNNING BOND CMU BLOCKS SHALL BE ALIGNED SO AS TO HAVE REINFORCING CONTINUE IN WALL WITHOUT INTERRUPTION AND PROVIDE CONTINUOUS GROUTING. STACK BOND OF MASONRY UNITS SHALL NOT BE ALLOWED.
12. GROUT FOR FILLING REINFORCED OR NON-REINFORCED CELLS SHALL BE PLACED IN MAXIMUM FIVE FEET FOUR INCHES (5'-4") GROUT LIFTS AND CONSOLIDATED IN PLACE BY VIBRATION OR OTHER METHODS WHICH INSURE COMPLETE FILLING OF THE CELLS.
13. FOR ALL GROUT LIFTS EXCEPT THE FINAL, STOP THE LEVEL OF GROUT 1" TO 1 1/2" BELOW THE TOP BED JOINT.
14. THE REINFORCING IN THE MASONRY WALLS SHALL RUN FULL HEIGHT OF WALL AND BE GROUTED SOLID. PROVIDE DOWELS AT FOUNDATION OR FLOOR SLABS TO MATCH SIZE AND SPACING OF WALL REINFORCING. REINFORCEMENT SHALL BE SET IN CENTER OF FULLY GROUTED CELL (UNO).
15. FOR LOCATION OF CONTROL AND/OR EXPANSION JOINTS SEE ARCHITECTURAL DRAWINGS.
16. SHORE CMU WALLS UNTIL LATERAL SUPPORT IS PROVIDED BY FLOORS AND ROOF LEVELS.
17. NO CONTROL JOINTS IN CMU WALL SHALL BE LOCATED LESS THAN 24" FROM THE FACE OF A MASONRY OPENING.
18. CONTRACTOR TO SUBMIT TO ENGINEER COMPLETE SHOP DRAWINGS SHOWING WALL REINFORCING AND ALL OPENINGS WITH LINTELS AND CONTROL JOINT LOCATIONS.
19. FOR ADDITIONAL REINFORCEMENT NOTES SEE TYPICAL MASONRY DETAILS, ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.

POST-INSTALLED ANCHORS NOTES:

1. EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSISTS OF THE FOLLOWING TYPES AS PROVIDED BY HILTI:
   A. ANCHORAGE TO CONCRETE:
      a. ADHESIVE ANCHORS HILTI HIT-HY 200 SAFESET SYSTEM WITH HILTI HIT-Z ROD.
      b. ADHESIVE ANCHORS HILTI HIT-HY 200 SAFESET SYSTEM HILTI HOLLOW DRILL BIT AND VC 20/40 VACUUM WITH HAS-E THREADED RODS.
      c. MECHANICAL ANCHORS HILTI KWIK BOLT-TZ EXPANSION ANCHORS FOR SOFFIT OF CONCRETE OVER STEEL COMPOSITE DECK.
   B. REBAR DOWELLING INTO CONCRETE:
      a. ADHESIVE ANCHORS HILTI HIT-HY 200 SAFESET SYASTEM HILTI HOLLOW DRILL BIT AND VC 20/40 VACUUM.
      b. EPOXY SYSTEM HILTI HIT-RE 500 V3 SAFESET SYSTEM WITH HILTI HOLLOW DRILL BIT AND HILTI VC 20/40 VACUUM.
   C. ANCHORAGE TO SOLID GROUTED MASONRY.
      a. ADHESIVE ANCHORS HILTI HIT-HY 70 ANCHORING SYSTEM. THE APPROPRIATE SIZE SCREEN TUBE SHALL BE USED PER ADHESIVE MANUFACTURER'S RECOMMENDATION.
      b. MECHANICAL ANCHORS HILTI KWIK BOLT-TZ EXPANSION ANCHORS.
2. INSTALL ANCHORS PER THE MANUFACTURER INSTRUCTION. THE CONTRACTOR SHALL ARRAHNGE AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ONSITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCT SPECIFIED. TEST 10% OF CHEMICAL ANCHORS AND MUST BE PROOF LOADED BY INDEPENDENT TESTING LABORATORY. TENSION TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH ASTM E488.
3. EXISTING REINFORCING BARS IN THE CONCRETE SUBSTRATE MAY CONFLICT WITH SPECIFIED ANCHOR LOCATIONS. UNLESS NOTED ON THE DRAWINGS THAT THE BARS CAN BE CUT, THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE TO LOCATE THE POSITION OF THE REINFORCING BARS AT THE LOCATION OF THE ANCHORS BY HILTI FERROSCAN, GPR, X-RAY, CHIPPING OR OTHER MEANS.
4. ALL POST-INSTALLED ANCHORS IN CONCRETE AND MASONRY SHALL HAVE CURRENT PUBLISHED ICC-ES EVALUATION REPORT.
5. PROVIDE A COPY OF THE CURRENT ACI/CRSI "ADHESIVE ANCHOR INSTALLER" CERTIFICATION CARD FOR ALL INSTALLERS WHO WILL BE INSTALLING ADHESIVE ANCHORS IN THE HORIZONTALLY TO VERTICALLY OVERHEAD ORIENTATION.

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LICENSED STRUCTURAL ENGINEER

No.	Date	Issue
2	01/11/2023	ISSUE FOR ADDENDUM #4
1	12/01/2022	ISSUE FOR BID/PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter
City of Evanston

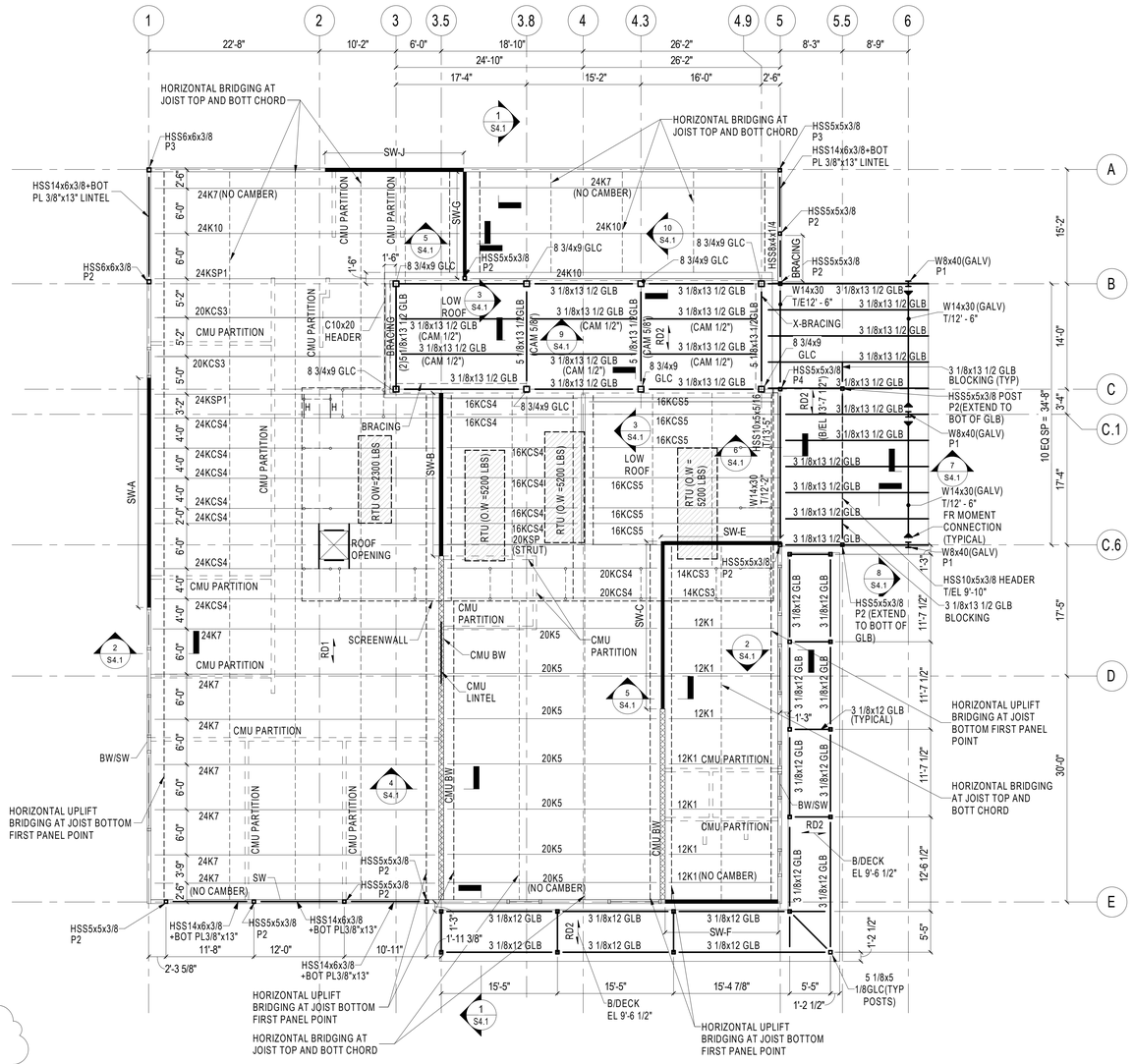
EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

GENERAL NOTES AND SYMBOLS

Sheet Name

Drawing No. **S0.2**



SHEAR WALL/BRACING SCHEDULE					
MARK	LENGTH	REFERENCED DETAIL	IN-PLANE LATERAL FORCES		REMARKS
			SEISMIC	WIND	
SW-A	31'-6" (W/OPENINGS)	DETAIL 3/S4.3	4.0 KIPS	3.5 KIPS	SEE CRITERIA IN S0.1 FOR OUT-OF PLANE LATERAL FORCES FOR CFMF.
SW-B	22'-0"	DETAIL 3/S4.3	4.0 KIPS	3.5 KIPS	MIN 5 PSF FOR OUT-OF PLANE LATERAL FORCES FOR CFMF.
SW-C	22'-0" (W/OPENINGS)	DETAIL 3/S4.3	4.0 KIPS	3.5 KIPS	MIN 5 PSF FOR OUT-OF PLANE LATERAL FORCES FOR CFMF.
SW-E	15'-7 1/2"	DETAIL 3/S4.3	4.5 KIPS	4.2 KIPS	MIN 5 PSF FOR OUT-OF PLANE LATERAL FORCES FOR CFMF.
SW-F	15'-7 1/2" (W/OPENINGS)	DETAIL 3/S4.3	4.5 KIPS	3.0 KIPS	SEE CRITERIA IN S0.1 FOR OUT-OF PLANE LATERAL FORCES.
SW-G	14'-6"	DETAIL 3/S4.3	4.5 KIPS	3.0 KIPS	SEE CRITERIA IN S0.1 FOR OUT-OF PLANE LATERAL FORCES.
SW-J	19'-10" (W/OPENINGS)	DETAIL 3/S4.3	4.0 KIPS	3.5 KIPS	SEE CRITERIA IN S0.1 FOR OUT-OF PLANE LATERAL FORCES.
BRACING	GRID LINE-5	DETAIL 1/S4.3	2.0 KIPS	2.0 KIPS	

NOTES:
1. TABULATED LATERAL FORCES ARE UNFACTORED.
2. LATERAL FORCES ARE APPLIED AT TOP OF SHEARWALLS OR BRACING.

1 ROOF FRAMING PLAN

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

PLAN NOTES:

1. RD1 = 1 1/2" - 18 GAGE WIDE RIB, GALVANIZED STEEL ROOF DECK. BOTTOM OF DECK...EL 12'-4 1/2"
2. RD2 = 7/16" THICK PLYWOOD SHEATHING NAILED TO 2" T&G WOOD DECK. BOTTOM OF DECK...EL 17'-5 9/16" (UNO)
3. CMU/BW...DENOTES CONCRETE MASONRY BEARING WALL.
4. STUD/BW/SW...DENOTES STEEL STUDS (CFMF) BEARING WALL AND SHEAR WALL.
5. "H" INDICATE THE HEADER (2L5x3x1/4)

EL. 0'-0" = EL 19.10 (NAVD88)

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EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

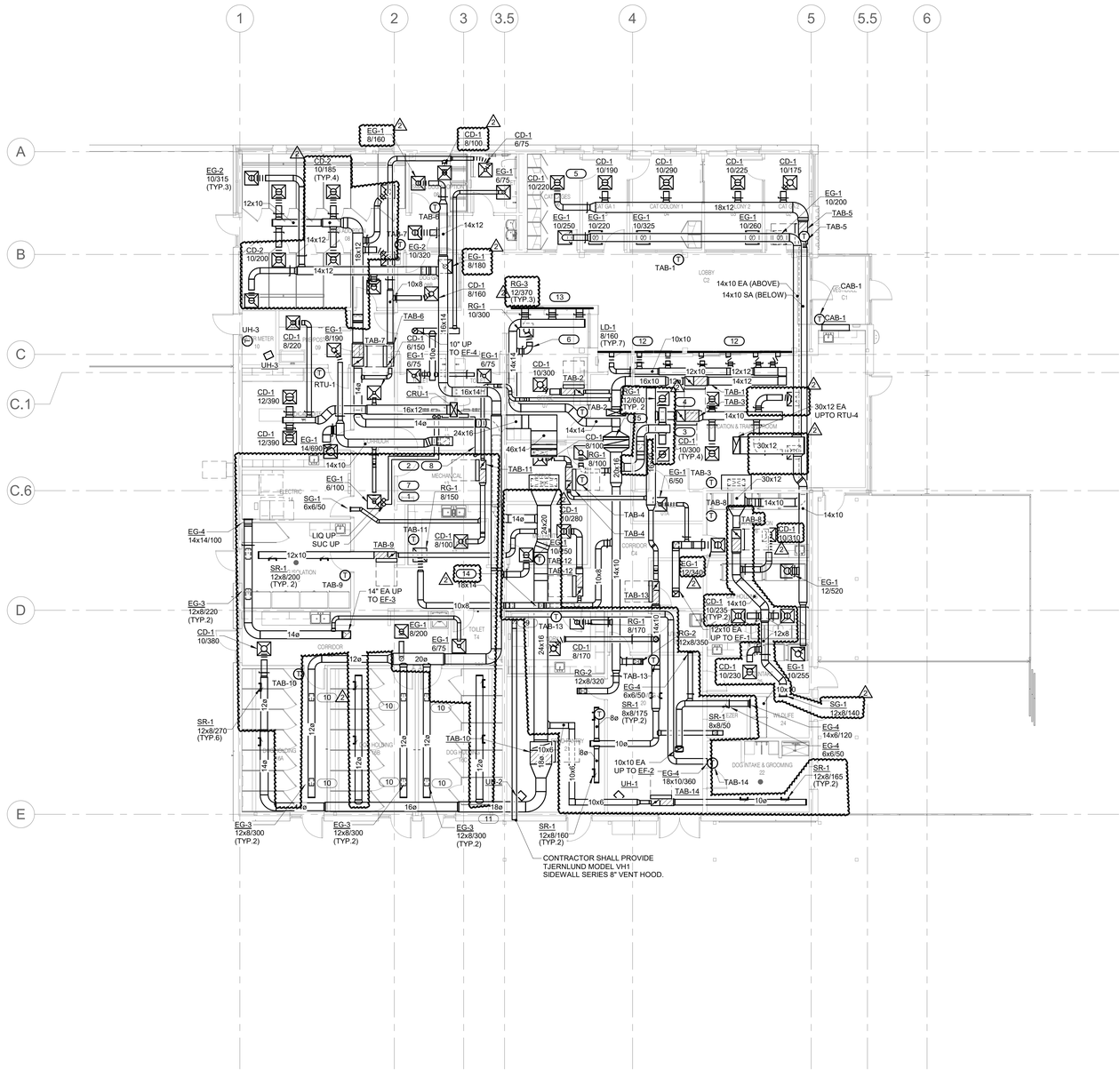
2310 Oakton St, Evanston, IL 60202

Project Name

UPPER ROOF LEVEL

Sheet Name

Drawing No. **S1.1**



GENERAL SHEET NOTES:

1. ALL EXPOSED SUPPLY AND EXHAUST DUCTWORK SHALL BE ALUMINUM CONSTRUCTION.

KEYNOTES: #

1. REFER TO 1/M5.0 FOR PIPE SUPPORT DETAIL.
2. REFER TO 2/M5.0 FOR WALL PENETRATION - NON-FIRE RATED DETAIL.
3. REFER TO 3/M5.0 FOR TERMINAL AIR BOX - SINGLE DUCT - WRAPPED DETAIL (TYP.)
4. REFER TO 4/M5.0 FOR BRANCH CONNECTION DETAIL. (TYP.)
5. REFER TO 1/M5.1 FOR DIFFUSER CONNECTION DETAIL. (TYP.)
6. REFER TO 2/M5.1 FOR ELBOW CONSTRUCTION DETAIL. (TYP.)
7. CONTRACTOR TO PROVIDE REFRIGERANT LIQ AND SUC PIPING. PIPING TO BE SIZED PER MANUFACTURER RECOMMENDATION.
8. CONTRACTOR TO PROVIDE 3/4" CONDENSATE DRAIN PIPE FROM SPLIT SYSTEM EVAPORATOR DOWN TO FLOOR DRAIN IN MECHANICAL ROOM.
9. 8" EA TO SERVE DRYER.
10. INSTALL BALANCING DAMPER IN THE DUCTWORK CONNECTING THE EXHAUST GRILLE TO THE EXHAUST MAIN.
11. EXPOSED ROUND DUCTWORK IN DOG HOLDING 16A, 16B & 16C SHALL BE SPIRAL DUCT.
12. LINEAR DIFFUSER TO RUN CONTINUOUS FROM COLUMN TO COLUMN AND END WALL.
13. LD-2 TO RUN CONTINUOUS FOR THE LENGTH OF THE WALL.
14. TAB-12 SHALL CONNECT TO THE SUPPLY MAIN APPROXIMATELY AT THIS LOCATION.
15. RETURN DUCT FITTING FROM RTU-3 SHALL BE A PANTS FITTING.

2

1 FIRST FLOOR - MECHANICAL

1/8" = 1'-0"

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2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT
No.	Date	Issue

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

FIRST FLOOR - MECHANICAL

Sheet Name

Drawing No. M1-1

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0 1 2 3

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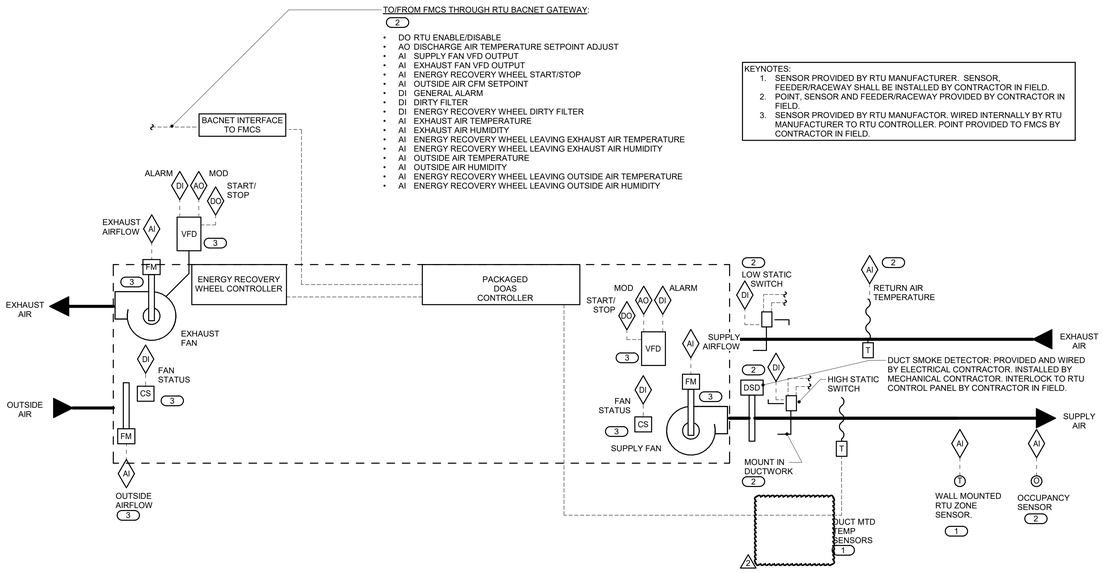
PROJECT #22000606.00



KEYNOTES:
1. SENSOR PROVIDED BY RTU MANUFACTURER. SENSOR, FEEDER/RACEWAY SHALL BE INSTALLED BY CONTRACTOR IN FIELD.
2. POINT, SENSOR AND FEEDER/RACEWAY PROVIDED BY CONTRACTOR IN FIELD.
3. SENSOR PROVIDED BY RTU MANUFACTOR. WIRED INTERNALLY BY RTU MANUFACTURER TO RTU CONTROLLER. POINT PROVIDED TO FMCS BY CONTRACTOR IN FIELD.

CONTROLS PROVIDED BY CONTRACTOR IN THE FIELD:
THE TCC SHALL EXTEND THE FMCS NETWORK TO THE RTU UNITARY CONTROLLER PER THE PROTOCOL SPECIFIED IN SECTION 23 09 00.

WHEN RTU IS INDEXED TO RUN, THE FOLLOWING SHALL OCCUR:
- OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL OPEN.
- AFTER A 30 SECOND DELAY TO ALLOW FOR OPENING OF DAMPERS. THE FMCS SHALL SEND A SIGNAL TO INDEX THE RTU TO START.
- WHEN THE RTU SUPPLY FAN HAS STARTED THE EXHAUST FAN SHALL START. 2

BUILDING OCCUPANCY SCHEDULING:
ENABLE RTU TO RUN BASED ON THE FOLLOWING OCCUPANCY SCHEDULE:

• MORNING START-UP MODE:	MONDAY THROUGH FRIDAY	5:00AM-6:00AM (ADJ
	SATURDAY THROUGH SUNDAY	7:00AM-8:00AM (ADJ.)
• OCCUPIED MODE:	MONDAY THROUGH FRIDAY	6:00AM-9:00PM (ADJ.)
	SATURDAY THROUGH SUNDAY	8:00AM-6:00PM (ADJ.)
• UNOCCUPIED MODE:	MONDAY THROUGH FRIDAY	9:00PM-5:00AM (ADJ.)
	SATURDAY THROUGH SUNDAY	6:00PM-7:00AM (ADJ.)

UNIT SHALL BE ENABLE BASED ON THE SCHUDULE ABOVE AND SHALL OPERATE AT THE CFM BASED ON THE ROOM OCCUPANCY AIRFLOW SCHEDULE. OCCUPANCY SHALL BE DETECTED VIA A ROOM OCCUPANCY SENSOR.

CONTRACTOR SHALL FIELD INSTALL THE FOLLOWING MANUFACTURER PROVIDED EXTERNAL SENSORS AND WIRE BACK TO RTU CONTROLLER:
- SUPPLY AIR TEMPERATURE IN SUPPLY DUCT.

EXTERNAL CONTROLS PROVIDED BY AND/OR WIRED BY TCC:
- DUCT SMOKE DETECTOR
- DUCT STATIC SWITCHES
- ALL INDICATED POINTS FROM DOAS CONTROLLER TO FMCS
- ALL REQUIRED POINTS FROM FMCS TO DOAS CONTROLLER

ALARMS, INTERLOCKS AND SAFETIES:
WHEN FIRE ALARM CONTROL PANEL INDICATES AN ALARM CONDITION, FMCS SHALL SEND A SIGNAL TO DOAS TO SHUTDOWN UNIT.

THE FOLLOWING SAFETIES SHALL BE INSTALLED AND WIRED IN THE FIELD AND SHALL DISABLE DOAS.
- HIGH STATIC SWITCH (WIRED TO UNIT/DISABLE TO TURN FANS OFF)
- LOW STATIC SWITCH (WIRED TO UNIT/DISABLE TO TURN FANS OFF)
- FIRE ALARM RELAY (WIRED TO UNIT/DISABLE TO TURN FANS OFF)

CONTROLS PROVIDED BY PACKAGED EQUIPMENT MANUFACTURER:

PACKAGE ROOFTOP UNIT SYSTEM DESCRIPTION:
REFER TO SECTION 23 74 11 FOR A DESCRIPTION OF THE RTU AND THE CONTROLS PROVIDED BY THE RTU MANUFACTURER.

RTU CONTROL PANEL SEQUENCE OF OPERATION:
THE FMCS SHALL SEND A SIGNAL TO START THE RTU.

SUPPLY FAN OPERATION:
RTU CONTROL PANEL SHALL MODULATE SIGNAL TO SUPPLY FAN VFD AS REQUIRED TO MAINTAIN OCCUPANCY SCHEDULE SUPPLY AIR CFM AS MEASURED BY SUPPLY FAN MOUNTED AIRFLOW MEASURING STATION.

EXHAUST FAN OPERATION:
EXHAUST FAN SHALL BE INDEXED TO RUN WHENEVER THE SUPPLY FAN IS INDEXED TO RUN. DOAS CONTROL PANEL SHALL MODULATE SIGNAL TO EXHAUST FAN VFD AS REQUIRED TO MAINTAIN THE AIRFLOW OFFSET AS INDICATED IN THE OCCUPANCY AIRFLOW SCHEDULE.

VENTILATION CONTROL:
WHENEVER THE UNIT IS IN OCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL BE FULLY OPEN.

HEAT PUMP AND ELECTIC COIL CONTROL:
RTU SHALL INCLUDE A HEAT PUMP AND SUPPLEMENTARY ELECTRIC COIL FOR HEATING. THE HEAT PUMP AND ELECTRIC COIL SHALL NEVER WORK IN CONJUNCTION. THE HEAT PUMP SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS ABOVE 0°F (ADJ.). 1

THE ELECTRIC COIL SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 0°F (ADJ.) OR AIR SOURCE HEAT PUMP CAN NOT MAINTAIN ROOM TEMPERATURE SETPOINT WITHIN 5°F (ADJ) FOR 15 MIN (ADJ.)

THE HEAT PUMP SHALL ALWAYS BE THE FIRST STAGE OF HEATING UNLESS TEMPERATURE SETPOINT CAN NOT BE MAINTAINED.

DISCHARGE AIR TEMPERATURE CONTROL:
THE DISCHARGE SHALL BE BETWEEN 50°F (ADJ.) AND 95°F (ADJ.) TO MAINTAIN ROOM TEMPERATURE SETPOINT AS MEASURED BY WALL MOUNTED ROOFTOP UNIT ZONE SENSOR. ROOFTOP UNIT ZONE SENSOR SHALL BE SET TO 70°(ADJ.) AND RESET DURING MORNING STARTUP TO SETPOINT.

AT FULL HEATING THE ENERGY RECOVERY WHEEL SHALL BE ROTATING AT FULL SPEED WITH THE BYPASS DAMPERS CLOSED AND THE HEATPUMP OR ELECTRIC COIL MODULATING TO MAINTAIN SETPOINT. WHENEVER THE DISCHARGE AIR TEMPERATURE IS ABOVE SETPOINT THE FOLLOWING SHALL OCCUR:
- MODULATE HEAT PUMP OR ELECTIC COIL OFF.
- MODULATE ENERGY RECOVERY WHEEL SPEED TO MAINTAIN SETPOINT.
- THE ENERGY RECOVERY WHEEL SHALL BE DISABLED AND THE BYPASS DAMPERS SHALL OPEN.
- MODULATE HEAT PUMP COMPRESSORS.
- THE ENERGY RECOVERY WHEEL SHALL TURN ON TO FULL SPEED.
- THE RTU HEAT PUMP COMPRESSORS SHALL BE ENABLED AND MFR SHALL MODULATE COMPRESSOR CAPACITY REQUIRED TO MAINTAIN SETPOINT.

AT FULL COOLING THE ENERGY RECOVERY WHEEL SHALL BE ROTATING AT FULL SPEED WITH THE BYPASS DAMPERS CLOSED AND THE RTU COMPRESSORS MODULATING TO MAINTAIN SETPOINT. WHENEVER THE DISCHARGE AIR TEMPERATURE IS BELOW SETPOINT THE FOLLOWING SHALL OCCUR:
- MODULATE COMPRESSORS TO MAINTAIN SETPOINT.
- DISABLE THE ENERGY RECOVERY WHEEL AND BYPASS DAMPERS SHALL OPEN WHEN THE TEMPERATURE DIFFERENCE FROM THE RETURN AIR AND OUTSIDE AIR IS 5°F (ADJ.) OR LESS.
- THE ENERGY RECOVERY WHEEL SHALL BE ENABLED AND THE BYPASS DAMPERS SHALL CLOSE.
- THE ENERGY RECOVERY WHEEL SHALL MODULATE SPEED OF WHEEL TO MAINTAIN SETPOINT.
- ONCE THE ENERGY RECOVERY WHEEL IS AT FULL SPEED THE HEAT PUMP OR ELECTRIC COIL SHALL MODULATE TO MAINTAIN SETPOINT.

WHILE THE SPACE IS UNOCCUPIED UNIT SHALL NOT ALLOW SPACE TEMPERATURE TO EXCEED 78° F (ADJ). DURING THE COOLING SEASON AND GO BELOW 60°F(ADJ) DURING THE HEATING SEASON. 2

ENERGY RECOVERY WHEEL CONTROL:
THE MANUFACTURER SHALL CONTROL PREHEAT AND WHEEL SPEED TO PREVENT FROST FROM ON THE WHEEL.

ECONOMIZER OPERATION: 3

WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS LESS THAN THE RETURN AIR DRY BULB TEMPERATURE THE FMCS SH ALL ENABLE ECONOMIZER CONTROLS. WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS GREATER THAN THE RETURN AIR DRY BULB TEMPERATURE FO R 10 MINUTES THE FMCS SHALL DISABLE ECONOMIZER CONTROLS AND SHALL RETURN THE UNIT TO MINIMUM OUTSIDE AIR MODE. ONCE ECONOMIZER CONTROLS HAVE BEEN ENABLED OR DISABLED, THE UNIT SHALL CONTINUE TO OPERATE IN THAT MODE FOR A MINIMUM OF 10 MINUTES (ADJ.) BEFORE BEING ALLOWED TO SWITCH BACK (TO PREVENT SHORT CYCLING).IN ECONOMIZER MODE THE FMCS SHALL MODULATE THE RETU RN AND RELIEF DAMPERS TO MAINTAIN DISCHARGE AIR TEM PERATURE SETPOINT

ALARMS, INTERLOCKS AND SAFETIES:
SEND AN ALARM TO THE CONTROLER INTERFACE [FMCS] FOR THE FOLLOWING:
- SUPPLY FAN FAULT (AIRFLOW, CURRENT OR VFD)
- EXHAUST FAN FAULT (AIRFLOW, CURRENT OR VFD)
- DIFFERENTIAL PRESSURE SWITCH ACROSS ANY FILTER (30%) BANK EXCEEDS 0.6 INCHES W.G. (ADJ.)
- IF DISCHARGE AIR TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
- EMERGENCY STOP
- DIRTY FILTERS (WHEN FILTER PRESSURE DROP EXCEEDS 0.6" W.C. (ADJ.)

WHENEVER RTU IS SHUTDOWN THE RTU CONTROLLER SHALL COMMAND THE FOLLOWING TO OCCUR:
- SUPPLY FAN AND EXHAUST FAN VFDS SHALL BE DE-ENERGIZED.
- OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL FULLY CLOSE. THE RETURN AIR DAMPER SHALL FULLY OPEN.
- HEATING AND COOLING SHALL BE DISABLED.
- THE ENERGY RECOVERY WHEEL SHALL STOP.

UNOCCUPIED MODE:
FMCS SHALL PROVIDE TIME OF DAY SCHEDULE TO ALLOW RTU TO ENTER UNOCCUPIED MODE PER SCHEDULE.
- THE SUPPLY AND EXHAUST FANS SHALL TURN OFF.
- THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL CLOSE.

DOAS REPORT GENERATION:
DDC FMCS SHALL MONITOR THE FOLLOWING POINTS ON 10 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND. THE TREND SHALL RUN FOR A 365-DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL AUTOMATICALLY OVERWRITE THE OLDEST VALUES:

PROVIDED BY PACKAGED MANUFACTURER THROUGH GATEWAY TO FMCS:
- SUPPLY AIR TEMP SETPOINT [°F]
- SUPPLY AIR TEMP (SAT) [°F]
- SUPPLY AIR RELATIVE HUMIDITY [%]
- SUPPLY AIR DEWPOINT [°F]
- ENERGY RECOVERY WHEEL EXHAUST AIR LEAVING AIR TEMPERATURE [°F]
- ENERGY RECOVERY WHEEL EXHAUST AIR LEAVING RELATIVE HUMIDITY [°F]
- EXHAUST FILTER LOADING [STATUS]
- SUPPLY FILTER LOADING [STATUS]
- SUPPLY FAN VFD OUTPUT [% FULL SPEED]
- EXHAUST FAN VFD OUTPUT [% FULL SPEED]
- OUTSIDE AIR DAMPER POSITION [% OPEN]
- EXHAUST AIR DAMPER POSITION [% OPEN]
- ENERGY RECOVERY WHEEL VFD OUTPUT [% FULL SPEED]
- BYPASS DAMPER POSITION [% OPEN]
- SUPPLY FAN VFD OUTPUT
- EXHAUST FAN VFD OUTPUT
- GENERAL ALARM
- OUTSIDE AIR FLOW
- EXHAUST AIR TEMPERATURE
- EXHAUST AIR HUMIDITY
- OUTSIDE AIR FLOW
- OUTSIDE AIR TEMPERATURE
- OUTSIDE AIR HUMIDITY
- ENERGY RECOVERY WHEEL LEAVING OUTSIDE AIR TEMPERATURE
- ENERGY RECOVERY WHEEL LEAVING OUTSIDE AIR HUMIDITY

POINTS PROVIDED BY FMCS AND SYSTEM:
- DATE
- TIME
- GLOBAL OUTSIDE AIR TEMP [°F]
- GLOBAL OUTSIDE AIR HUMIDITY [%RH]
- EXHAUST AIRFLOW [CFM]]
- OUTSIDE AIRFLOW [CFM]
- SUPPLY AIRFLOW [CFM]
- RTU ENABLE/DISABLE
- ROOM TEMPERATURE SETPOINT
- SUPPLY AIR HUMIDITY
- FIRE ALARM

THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION.

ONCE PER MONTH, THE DDC FMCS SHALL RECORD THE LARGEST DOAS AIRFLOW WHICH OCCURED DURING THAT MONTH. THE DATE, TIME, OUTSIDE AIR TEMPERATURE (AND ALL OTHER VALUES LISTED ABOVE) THAT COINCIDED WITH THAT EVENT SHALL ALSO BE RECORDED. THIS INFORMATION SHALL BE STORED TO A MEMORY LOCATION ON THE FMCS OPERATOR WORKSTATION THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN).

RTU REPORT GENERATION

TYPICAL FOR RTU-1

RTU-1 FAN OCCUPANCY AIRFLOW SCHEDULE

OCCUPANCY	SUPPLY CFM	EXHAUST CFM	PRESSURIZATION CFM	REMARKS
OCCUPIED	1,000	880	+120	NOTES 1,2,3
UNOCCUPIED	600	480	+120	NOTES 1,2,3

1 PACKAGED ROOFTOP UNIT WITH ENERGY RECOVERY WHEEL CONTROL - RTU-1

12" = 1'-0"

NORTH

HOLABIRD & ROOT
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Permit Stamp

No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

MECHANICAL CONTROL DIAGRAMS

Sheet Name

Drawing No. **M6-0**

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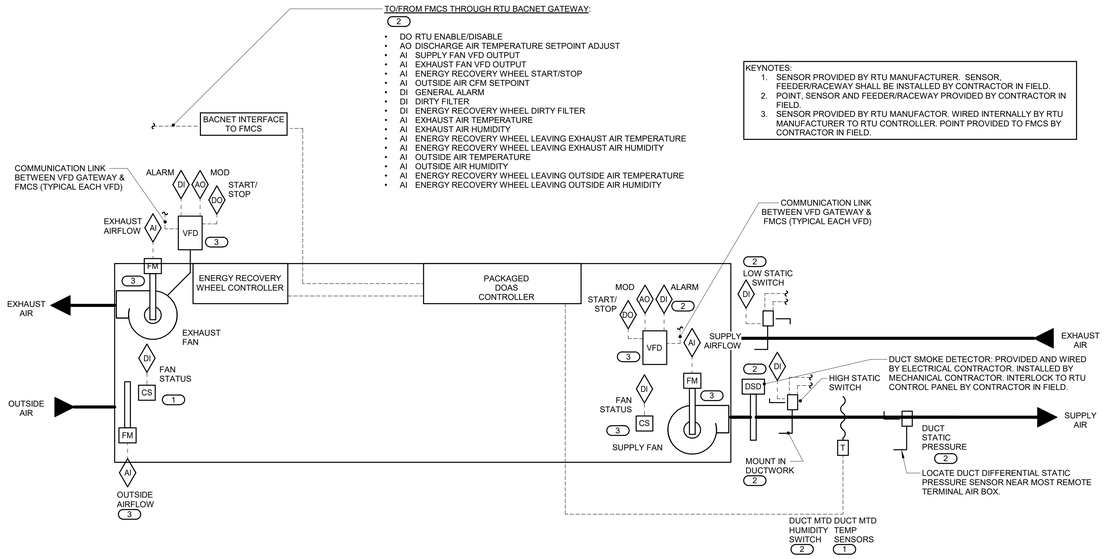
Illinois Design Firm Registration #184.007637-0014

REF. SCALE IN INCHES 0 1 2 3

PROJECT #22000606.00

1/2" = 1'-0" 0'-0" 1'-0" 0'-9" 0'-6" 0'-3" 0'-0"
3" = 1'-0" 0'-0" 3'-0" 2'-0" 1'-0" 0'-0"
1" = 1'-0" 0'-0" 6'-0" 4'-0" 2'-0" 0'-0"
1/4" = 1'-0" 0'-0" 12'-0" 8'-0" 4'-0" 0'-0"
1/8" = 1'-0" 0'-0" 24'-0" 16'-0" 8'-0" 0'-0"
1/16" = 1'-0" 0'-0" 48'-0" 32'-0" 16'-0" 0'-0"
1" = 30'-0" 0'-0" 120'-0" 90'-0" 60'-0" 30'-0" 0'-0"



KEYNOTES:
1. SENSOR PROVIDED BY RTU MANUFACTURER. SENSOR, FEEDER/RACEWAY SHALL BE INSTALLED BY CONTRACTOR IN FIELD.
2. POINT, SENSOR AND FEEDER/RACEWAY PROVIDED BY CONTRACTOR IN FIELD.
3. SENSOR PROVIDED BY RTU MANUFACTOR. WIRED INTERNALLY BY RTU MANUFACTURER TO RTU CONTROLLER. POINT PROVIDED TO FMCS BY CONTRACTOR IN FIELD.

DOAS REPORT GENERATION:
DDC FMCS SHALL MONITOR THE FOLLOWING POINTS ON 10 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND. THE TREND SHALL RUN FOR A 365-DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL AUTOMATICALLY OVERWRITE THE OLDEST VALUES:

PROVIDED BY PACKAGED MANUFACTURER THROUGH GATEWAY TO FMCS:
- SUPPLY AIR TEMP SETPOINT [°F]
- SUPPLY AIR TEMP (SAT) [°F]
- SUPPLY AIR RELATIVE HUMIDITY [%]
- SUPPLY AIR DEWPOINT [°F]
- SUPPLY AIR DEWPOINT SETPOINT [°F]
- ENERGY RECOVERY WHEEL EXHAUST AIR LEAVING AIR TEMPERATURE [°F]
- ENERGY RECOVERY WHEEL EXHAUST AIR LEAVING RELATIVE HUMIDITY [°F]
- EXHAUST FILTER LOADING [STATUS]
- SUPPLY FILTER LOADING [STATUS]
- SUPPLY FAN VFD OUTPUT [% FULL SPEED]
- EXHAUST FAN VFD OUTPUT [% FULL SPEED]
- OUTSIDE AIR DAMPER POSITION [% OPEN]
- EXHAUST AIR DAMPER POSITION [% OPEN]
- ENERGY RECOVERY WHEEL VFD OUTPUT [% FULL SPEED]
- BYPASS DAMPER POSITION [% OPEN]
- SUPPLY FAN VFD OUTPUT
- EXHAUST FAN VFD OUTPUT
- GENERAL ALARM
- EXHAUST AIR TEMPERATURE
- EXHAUST AIR HUMIDITY
- OUTSIDE AIR TEMPERATURE
- OUTSIDE AIR HUMIDITY
- ENERGY RECOVERY WHEEL LEAVING OUTSIDE AIR TEMPERATURE
- ENERGY RECOVERY WHEEL LEAVING OUTSIDE AIR HUMIDITY

POINTS PROVIDED BY FMCS AND SYSTEM:
- DATE
- TIME
- GLOBAL OUTSIDE AIR TEMP [°F]
- GLOBAL OUTSIDE AIR HUMIDITY [%RH]]
- OUTSIDE AIRFLOW [CFM]
- DOAS ENABLE/DISABLE
- DISCHARGE AIR TEMPERATURE SETPOINT ADJUST
- DUCT STATIC PRESSURE SETPOINT
- SUPPLY AIR HUMIDITY
- FIRE ALARM

THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION.

ONCE PER MONTH, THE DDC FMCS SHALL RECORD THE LARGEST DOAS AIRFLOW WHICH OCCURED DURING THAT MONTH. THE DATE, TIME, OUTSIDE AIR TEMPERATURE (AND ALL OTHER VALUES LISTED ABOVE) THAT COINCIDED WITH THAT EVENT SHALL ALSO BE RECORDED. THIS INFORMATION SHALL BE STORED TO A MEMORY LOCATION ON THE FMCS OPERATOR WORKSTATION THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN).

CONTROLS PROVIDED BY CONTRACTOR IN THE FIELD:
THE TCC SHALL EXTEND THE FMCS NETWORK TO THE RTU UNITARY CONTROLLER PER THE PROTOCOL SPECIFIED IN SECTION 23 09 00.

WHEN DOAS IS INDEXED TO RUN, THE FOLLOWING SHALL OCCUR:
- OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL OPEN.
- AFTER A 30 SECOND DELAY TO ALLOW FOR OPENING OF DAMPERS. THE FMCS SHALL SEND A SIGNAL TO INDEX THE RTU TO START.
- WHEN THE RTU SUPPLY FAN HAS STARTED THE EXHAUST FAN SHALL START.

BUILDING OCCUPANCY SCHEDULING:
ENABLE RTU TO RUN BASED ON THE FOLLOWING OCCUPANCY SCHEDULE:
- MORNING START-UP MODE: MONDAY THROUGH FRIDAY 5:00AM-6:00AM (ADJ / SATURDAY THROUGH SUNDAY 7:00AM-8:00AM (ADJ.)
- OCCUPIED MODE: MONDAY THROUGH FRIDAY 6:00AM-9:00PM (ADJ.) / SATURDAY THROUGH SUNDAY 8:00AM-6:00PM (ADJ.)
- UNOCCUPIED MODE: MONDAY THROUGH FRIDAY 9:00PM-5:00AM (ADJ.) / SATURDAY THROUGH SUNDAY 6:00PM-7:00AM (ADJ.)

CONTRACTOR SHALL FIELD INSTALL THE FOLLOWING MANUFACTURER PROVIDED EXTERNAL SENSORS AND WIRE BACK TO RTU CONTROLLER:
- SUPPLY AIR TEMPERATURE IN SUPPLY DUCT.

EXTERNAL CONTROLS PROVIDED BY AND/OR WIRED BY TCC:
- DUCT SMOKE DETECTOR
- DUCT STATIC SWITCHES
- ALL REQUIRED POINTS FROM DOAS CONTROLLER TO FMCS
- ALL REQUIRED POINTS FROM FMCS TO DOAS CONTROLLER

ALARMS, INTERLOCKS AND SAFETIES:
WHEN FIRE ALARM CONTROL PANEL INDICATES AN ALARM CONDITION, FMCS SHALL SEND A SIGNAL TO DOAS TO SHUTDOWN UNIT.

THE FOLLOWING SAFETIES SHALL BE INSTALLED AND WIRED IN THE FIELD AND SHALL DISABLE DOAS.
- HIGH STATIC SWITCH (WIRED TO UNIT/DISABLE TO TURN FANS OFF)
- LOW STATIC SWITCH (WIRED TO UNIT/DISABLE TO TURN FANS OFF)
- FIRE ALARM RELAY (WIRED TO UNIT/DISABLE TO TURN FANS OFF)

CONTROLS PROVIDED BY PACKED EQUIPMENT MANUFACTURER:

PACKAGE ROOFTOP UNIT SYSTEM DESCRIPTION:
REFER TO SECTION 23 74 11 FOR A DESCRIPTION OF THE RTU AND THE CONTROLS PROVIDED BY THE RTU MANUFACTURER.

DOAS CONTROL PANEL SEQUENCE OF OPERATION:
THE FMCS SHALL SEND A SIGNAL TO START THE DOAS.

SUPPLY FAN CONTROL:
RESET SUPPLY DUCT STATIC PRESSURE SETPOINT AS REQUIRED TO MAINTAIN AT LEAST ONE SUPPLY TAB DAMPER 95% (ADJ.) OPEN. FMCS SHALL UTILIZE COMMAND TO ALL SUPPLY TERMINAL AIRBOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE.

EXHAUST FAN OPERATION:
EXHAUST FAN SHALL BE INDEXED TO RUN WHENEVER THE SUPPLY FAN IS INDEXED TO RUN. RTU CONTROL PANEL SHALL MODULATE SIGNAL TO EXHAUST FAN VFD AS REQUIRED TO MAINTAIN THE AIRFLOW OFFSET AS INDICATED IN THE EXHAUST FAN AIRFLOW SCHEDULE.

VENTILATION CONTROL:
WHENEVER THE UNIT IS IN OCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL BE FULLY OPEN.

4 HEAT PUMP AND ELECTIC COIL CONTROL:
RTU SHALL INCLUDE A HEAT PUMP AND SUPPLEMENTARY ELECTRIC COIL FOR HEATING. THE HEAT PUMP AND ELECTRIC COIL SHALL NEVER WORK IN CONJUNCTION. THE HEAT PUMP SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS ABOVE 0°F (ADJ.).

THE ELECTRIC COIL SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 0°F (ADJ.) OR AIR SOURCE HEAT PUMP CAN NOT MAINTAIN ROOM TEMPERATURE SETPOINT WITHIN 5°F (ADJ) FOR 15 MIN (ADJ.)

THE HEAT PUMP SHALL ALWAYS BE THE FIRST STAGE OF HEATING UNLESS TEMPERATURE SETPOINT CAN NOT BE MAINTAINED.

SUPPLY AIR TEMPERATURE CONTROL:
DISCHARGE AIR TEMPERATURE SHALL BE 55°F (ADJ.).

WHENEVER THE SUPPLY AIR TEMPERATURE IS ABOVE SETPOINT, THE FOLLOWING SHALL OCCUR IN SEQUENCE:
- HEAT PUMP / ELECTRIC COIL HEATING SHALL BE OFF.
- THE COMPRESSORS SHALL BE ENABLED AND MFR SHALL MODULATE COMPRRESSOR CAPACITY AS REQUIRED TO MAINTAIN SET POINT.

WHENEVER THE SUPPLY AIR TEMPERATURE IS BELOW SETPOINT, THE FOLLOWING SHALL OCCUR IN SEQUENCE:
- MODULATE HEATPUMP COOLING OFF.
- HEAT PUMP HEATING OR ELECTRIC COIL SHALL BE ENABLED AND MFR SHALL MODULATE COMPRRESSOR CAPACITY AS REQUIRED TO MAINTAIN SET POINT.

DISCHARGE AIR TEMPERATURE CONTROL:

AT FULL HEATING THE ENERGY RECOVERY WHEEL SHALL BE ROTATING AT FULL SPEED WITH THE BYPASS DAMPERS CLOSED AND THE HEATPUMP OR ELECTRIC COIL MODULATING TO MAINTAIN SETPOINT. WHENEVER THE DISCHARGE AIR TEMPERATURE IS ABOVE SETPOINT THE FOLLOWING SHALL OCCUR:
- MODULATE HEAT PUMP OR ELECTIC COIL OFF.
- MODULATE ENERGY RECOVERY WHEEL SPEED TO MAINTAIN SETPOINT.
- THE ENERGY RECOVERY WHEEL SHALL BE DISABLED AND THE BYPASS DAMPERS SHALL OPEN.
- MODULATE HEAT PUMP COMPRESSORS.
- THE ENERGY RECOVERY WHEEL SHALL TURN ON TO FULL SPEED.
- THE RTU HEAT PUMP COMPRESSORS SHALL BE ENABLED AND MFR SHALL MODULATE COMPRESSOR CAPACITY REQUIRED TO MAINTAIN SETPOINT.

AT FULL COOLING THE ENERGY RECOVERY WHEEL SHALL BE ROTATING AT FULL SPEED WITH THE BYPASS DAMPERS CLOSED AND THE RTU COMPRESSORS MODULATING TO MAINTAIN SETPOINT. WHENEVER THE DISCHARGE AIR TEMPERATURE IS BELOW SETPOINT THE FOLLOWING SHALL OCCUR:
- MODULATE COMPRESSORS TO MAINTAIN SETPOINT.
- DISABLE THE ENERGY RECOVERY WHEEL AND BYPASS DAMPERS SHALL OPEN WHEN THE TEMPERATURE DIFFERENCE FROM THE RETURN AIR AND OUTSIDE AIR IS 5°F (ADJ.) OR LESS.
- THE ENERGY RECOVERY WHEEL SHALL BE ENABLED AND THE BYPASS DAMPERS SHALL CLOSE.
- THE ENERGY RECOVERY WHEEL SHALL MODULATE SPEED OF WHEEL TO MAINTAIN SETPOINT.
- ONCE THE ENERGY RECOVERY WHEEL IS AT FULL SPEED THE HEAT PUMP OR ELECTRIC COIL SHALL MODULATE TO MAINTAIN SETPOINT.

ENERGY RECOVERY WHEEL CONTROL:
THE MANUFACTURER SHALL CONTROL PREHEAT AND WHEEL SPEED TO PREVENT FROST FROM ON THE WHEEL.

ALARMS, INTERLOCKS AND SAFETIES:
SEND AN ALARM TO THE CONTROLER INTERFACE [FMCS] FOR THE FOLLOWING:
- SUPPLY FAN FAULT (AIRFLOW, CURRENT OR VFD)
- EXHAUST FAN FAULT (AIRFLOW, CURRENT OR VFD)
- DIFFERENTIAL PRESSURE SWITCH ACROSS ANY FILTER (30%) BANK EXCEEDS 0.6 INCHES W.G. (ADJ.)
- IF DISCHARGE AIR TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
- EMERGENCY STOP
- DIRTY FILTERS (WHEN FILTER PRESSURE DROP EXCEEDS 0.6" W.C. (ADJ.)

WHENEVER DOAS IS SHUTDOWN THE RTU CONTROLLER SHALL COMMAND THE FOLLOWING TO OCCUR:
- SUPPLY FAN AND EXHAUST FAN VFDS SHALL BE DE-ENERGIZED.
- OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL FULLY CLOSE. THE RETURN AIR DAMPER SHALL FULLY OPEN.
- HEATING AND COOLING SHALL BE DISABLED.
- THE ENERGY RECOVERY WHEEL SHALL STOP.

UNOCCUPIED MODE:
FMCS SHALL PROVIDE TIME OF DAY SCHEDULE TO ALLOW DOAS TO ENTER UNOCCUPIED MODE PER SCHEDULE.
- THE SUPPLY AND EXHAUST FANS SHALL TURN OFF.
- THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL CLOSE.

RTU REPORT GENERATION
TYPICAL FOR RTU-2

RTU-2 FAN AIRFLOW SCHEDULE

SYSTEM	RTU SUPPLY FAN CFM	RTU EXHAUST FAN CFM	REMARKS
RTU-2	4,595	4195	
RTU-4	2,250	2,150	

DOAS FAN INTERLOCK SCHEDULE

SYSTEM	INTERLOCKED EXHAUST FANS	REMARKS
RTU-2	EF-2, EF-3	NOTE 1
RTU-4	EF-1	NOTE 1

NOTES:
1. **INTERLOCK EXHAUST FAN OPERATION THROUGH THE FMCS WITH RESPECTIVE RTU IN ACCORDANCE WITH RTU SEQUENCE OF OPERATION.**

1 NORTH
PACKAGED ROOFTOP UNIT WITH ENERGY RECOVERY WHEEL CONTROL - RTU-2 & RTU-4
12" = 1'-0"

Permit Stamp

HOLABIRD & ROOT
140 South Dearborn Chicago, IL 60603
Tel: 312 357 1771 Fax: 312 357 1909
www.holabird.com

No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter
City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

MECHANICAL CONTROL DIAGRAMS

Sheet Name

Drawing No. **M6-1**

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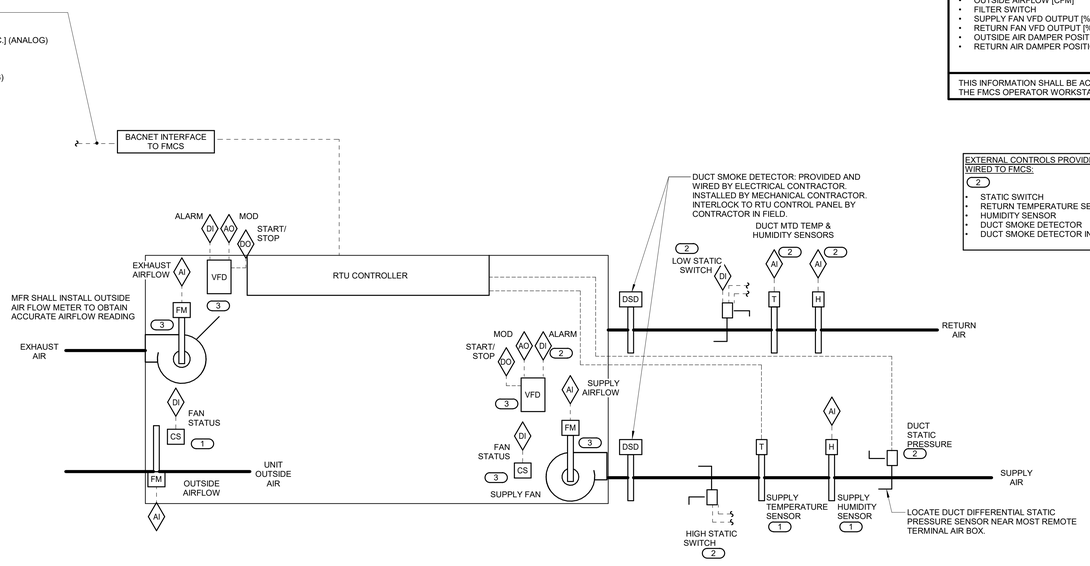
Illinois Design Firm Registration #184.007637-0014

0 1 2 3
REF. SCALE IN INCHES
PROJECT #220006606.00

3" = 1'-0" | 1" = 1'-0" | 1/2" = 1'-0" | 1/4" = 1'-0" | 1/8" = 1'-0" | 1/16" = 1'-0" | 1" = 30'-0"

TO/FROM FMCS THROUGH RTU BACNET GATEWAY:
(2)

- DUCT DIFFERENTIAL STATIC PRESSURE SET POINT ["W.C.] (ANALOG)
- DUCT STATIC PRESSURE ["W.C.]
- DISCHARGE TEMP SETPOINT ADJUST [°F] (ANALOG)
- SUPPLY AIR TEMPERATURE [°F] (ANALOG)
- BUILDING STATIC PRESSURE SETPOINT ["W.C.] (ANALOG)
- RTU ENABLE/DISABLE
- OA SETPOINT (CFM) (ANALOG)
- OA AIRFLOW (CFM) (ANALOG)
- GENERAL ALARM
- BYPASS DAMPERS (DIGITAL)
- OUTSIDE AIR DAMPER (DIGITAL)
- RELIEF AIR DAMPER (DIGITAL)



AHU REPORT GENERATION:
DDC FMCS SHALL MONITOR THE FOLLOWING POINTS ON 10 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND. THE TREND SHALL RUN FOR 365 DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL AUTOMATICALLY OVERWRITE THE OLDEST VALUES.

PROVIDED BY PACKAGED MANUFACTURER THROUGH GATEWAY TO FMCS:	POINTS PROVIDED BY FMCS AND SYSTEM:
• SUPPLY AIR TEMP (SAT) [°F] • OUTSIDE AIRFLOW [CFM] • FILTER SWITCH • SUPPLY FAN VFD OUTPUT [% FULL SPEED] • RETURN FAN VFD OUTPUT [% FULL SPEED] • OUTSIDE AIR DAMPER POSITION [% OPEN] • RETURN AIR DAMPER POSITION [% OPEN]	• DATE • TIME • GLOBAL OUTSIDE AIR TEMP [°F] • GLOBAL OUTSIDE AIR DEWPOINT [°F] GLOBAL OUTSIDE AIR HUMIDITY [%RH] • SUPPLY AIR RELATIVE HUMIDITY [%] • ROOM AIR TEMP SETPOINT [°F] • RETURN AIR TEMP (RAT) [°F] • RETURN AIR RELATIVE HUMIDITY [%] • SUPPLY AIRFLOW [CFM]

THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN EITHER TABULAR OR GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION.

EXTERNAL CONTROLS PROVIDED BY CONTROLS CONTRACTOR AND WIRED TO FMCS:
(2)

- STATIC SWITCH
- RETURN TEMPERATURE SENSOR
- HUMIDITY SENSOR
- DUCT SMOKE DETECTOR
- DUCT SMOKE DETECTOR INTERLOCK

FAN INTERLOCK SCHEDULE

SYSTEM	INTERLOCKED EXHAUST FANS	REMARKS
RTU-3	EF-4 (2)	NOTE 1

NOTES:

1. **INTERLOCK EXHAUST FAN OPERATION THROUGH THE FMCS WITH RESPECTIVE AHU IN ACCORDANCE WITH AHU SEQUENCE OF OPERATION.**

KEYNOTES:
1. SENSOR PROVIDED BY RTU MANUFACTURER. SENSOR, FEEDER/RACEWAY SHALL BE INSTALLED BY CONTRACTOR IN FIELD.
2. POINT, SENSOR AND FEEDER/RACEWAY PROVIDED BY CONTRACTOR IN FIELD.
3. SENSOR PROVIDED BY RTU MANUFACTOR. WIRED INTERNALLY BY RTU MANUFACTURER TO RTU CONTROLLER. POINT PROVIDED TO FMCS BY CONTRACTOR IN FIELD.

CONTROLS SEQUENCE PROVIDED BY CONTRACTOR IN FEILD:

SEQUENCE OF OPERATION:
THE TCC SHALL EXTEND THE FMCS NETWORK TO THE RTU BACNET INTERFACE PER THE PROTOCOL SPECIFIED IN SECTION 23 09 00.

WHEN RTU IS INDEXED TO RUN, THE FOLLOWING SHALL OCCUR:
- SMOKE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS SHALL OPEN.
- AFTER A 30 SECOND DELAY TO ALLOW FOR OPENING OF COMBINATION FIRE/SMOKE DAMPERS. SUPPLY FAN SHALL BE ENABLED TO RUN.
- WHEN THE SUPPLY FAN HAS STARTED THE INTERLOCKED EXHAUST FANS SHALL START AS SHOWN IN THE FAN INTERLOCK SCHEDULE.

BUILDING OCCUPANCY SCHEDULING:
ENABLE RTU TO RUN BASED ON THE FOLLOWING OCCUPANCY SCHEDULE:

• MORNING START-UP MODE:	MONDAY THROUGH FRIDAY	5:00AM-6:00AM (ADJ
	SATURDAY THROUGH SUNDAY	7:00AM-8:00AM (ADJ.)
• OCCUPIED MODE:	MONDAY THROUGH FRIDAY	6:00AM-9:00PM (ADJ.)
	SATURDAY THROUGH SUNDAY	8:00AM-6:00PM (ADJ.)
• UNOCCUPIED MODE:	MONDAY THROUGH FRIDAY	9:00PM-5:00AM (ADJ.)
	SATURDAY THROUGH SUNDAY	6:00PM-7:00AM (ADJ.)

CONTRACTOR SHALL FIELD INSTALL THE FOLLOWING MANUFACTURER PROVIDED EXTERNAL SENSORS AND WIRE BACK TO RTU CONTROLLER:
- DUCT STATIC PRESSURE SENSOR IN SUPPLY DUCT.
- SUPPLY AIR TEMERATURE IN SUPPLY DUCT.

ALARMS, INTERLOCKS AND SAFETIES:
THE FOLLOWING SAFETIES SHALL BE INSTALLED AND WIRED IN THE FIELD.
- HIGH STATIC SWITCH (WIRED TO UNIT ENABLE/DISABLE TO TURN FANS OFF)
- LOW STATIC SWITCH (WIRED TO UNIT ENABLE/DISABLE TO TURN FANS OFF)
- FIRE ALARM RELAY (WIRED TO UNIT ENABLE/DISABLE TO TURN FANS OFF)

CONTROLS PROVIDED BY PACKED EQUIPMENT MANUFACTURER:

PACKAGE ROOFTOP UNIT SYSTEM DESCRIPTION:
REFER TO SECTION 23 74 11 FOR A DESCRIPTION OF THE RTU AND THE CONTROLS PROVIDED BY THE RTU MANUFACTURER.

SUPPLY FAN CONTROL:
RTU CONTROLLER SHALL MODULATE SIGNAL TO SUPPLY FAN VFD AS REQUIRED TO MAINTAIN DUCT STATIC PRESSURE SETPOINT AS MEASURED BY STATIC PRESSURE TRANSMITTER. FMCS SHALL RESET SUPPLY DUCT STATIC PRESSURE SETPOINT AS REQUIRED TO MAINTAIN AT LEAST ONE SUPPLY TAB DAMPER 95% (ADJ.) OPEN. FMCS SHALL UTILIZE COMMAND TO ALL SUPPLY TERMINAL AIRBOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE

EXHAUST FAN CONTROL:
RTU CONTROLLER SHALL MONITOR BUILDING PRESSURE SIGNAL. MODULATE SIGNAL TO EXHAUST FAN VFD AS REQUIRED TO MAINTAIN +0.05" (ADJ.) W.C..

VENTILATION CONTROL:
WHENEVER THE UNIT IS IN OCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN MINIMUM OUTSIDE AIR CFM BASED ON QUANTITY OF AIR FROM UNIT MOUNTED AIRFLOW MEASURING STATION.

HEATING CONTROL:
RTU SHALL INCLUDE A HEAT PUMP AND SUPPLEMENTARY ELECTRIC COIL FOR HEATING. THE HEAT PUMP AND ELECTRIC COIL SHALL NEVER WORK IN CONJUNCTION. THE HEAT PUMP SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS ABOVE 0°F (ADJ.).

THE ELECTRIC COIL PUMP SHALL OPERATE IN A CALL FOR HEATING WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 0°F (ADJ.) OR AIR SOURCE HEAT PUMP CAN NOT MAINTAIN DISCHARGE AIR SETPOINT WITHIN 5°F (ADJ) FOR 15 MIN (ADJ.)

SUPPLY AIR TEMPERATURE CONTROL:
DISCHARGE AIR TEMPERATURE SHALL BE 55°F (ADJ.).

WHENEVER THE SUPPLY AIR TEMPERATURE IS ABOVE SETPOINT, THE FOLLOWING SHALL OCCUR IN SEQUENCE:
- HEAT PUMP / ELECTRIC COIL HEATING SHALL BE OFF.
- THE COMPRESSORS SHALL BE ENABLED AND MFR SHALL MODULATE COMPRRESSOR CAPACITY AS REQUIRED TO MAINTAIN SET POINT.

WHENEVER THE SUPPLY AIR TEMPERATURE IS BELOW SETPOINT, THE FOLLOWING SHALL OCCUR IN SEQUENCE:
- MODULATE HEATPUMP COOLING OFF.

HEAT PUMP HEATING OR ELECTRIC COIL SHALL BE ENABLED AND MFR SHALL MODULATE COMPRRESSOR CAPACITY AS REQUIRED TO MAINTAIN SET POINT

ECONOMIZER OPERATION:

WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS LESS THAN THE RETURN AIR DRY BULB TEMPERATURE THE FMCS SH ALL ENABLE ECONOMIZER CONTROLS. WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS GREATER THAN THE RETURN AIR DRY BULB TEMPERATURE FO R 10 MINUTES THE FMCS SHALL DISABLE ECONOMIZER CONTROLS AND SHALL RETURN THE UNIT TO MINIMUM OUTSIDE AIR MODE. ONCE ECONOMIZER CONTROLS HAVE BEEN ENABLED OR DISABLED, THE UNIT SHALL CONTINUE TO OPERATE IN THAT MODE FOR A MINIMUM OF 10 MINUTES (ADJ.) BEFORE BEING ALLOWED TO SWITCH BACK (TO PREVENT SHORT CYCLING).
IN ECONOMIZER MODE THE FMCS SHALL MODULATE THE RETU RN AND RELIEF DAMPERS TO MAINTAIN DISCHARGE AIR TEM PERATURE SETPOINT

ENERGY RECOVERY WHEEL/BYPASS DAMPER/FROST PREVENTION CONTROL:
WHEEL ON:
- OCCUPIED AND IN HEATING MODE
- OCCUPIED AND IN COOLING MODE

WHEEL OFF:
- UNOCCUPIED MODE
- ECONOMIZER MODE (EITHER OCCUPIED OR UNOCCUPIED)

FROST/LOW AMBIENT MODE:
- THE MANUFACTURER SHALL CONTROL PREHEAT TO PREVENT FROST FROM FORMING ON THE WHEEL

SEND AN ALARM TO THE CONTROLER INTERFACE [FMCS] FOR THE FOLLOWING:
- SUPPLY FAN FAULT (AIRFLOW, CURENT OR VFD)
- EXHAUST FAN FAULT (AIRFLOW, CURENT OR VFD)
- DIRTY FILTERS (WHEN FILTER PRESSURE DROP EXCEEDS 0.6" W.C. (ADJ.)
- IF DISCHARGE AIR TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
- EMERGENCY STOP

WHENEVER RTU IS SHUTDOWN THE RTU CONTROLLER SHALL COMMAND THE FOLLOWING TO OCCUR:
- SUPPLY FAN AND EXHAUST FAN SHALL STOP.
- OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL FULLY CLOSE. THE RETURN AIR DAMPER SHALL FULLY OPEN.
- HEATING AND COOLING SHALL BE DISABLED.
- THE ENERGY RECOVERY WHEEL SHALL STOP.
- OUTSIDE AIR AND RELIEF AIR DAMPER SHALL REMAIN CLOSED. RETURN AIR DAMPER SHALL BE 100% OPEN

UN-OCCUPIED MODE OPERATION:
- OUTSIDE AIR AND RELIEF AIR DAMPER SHALL REMAIN CLOSED. RETURN AIR DAMPER SHALL BE 100% OPEN.

1 PACKAGED ROOFTOP UNIT CONTROL MULTI-ZONE VAV WITH EXHAUST FAN - RTU-3

12" = 1'-0"

NORTH

Permit Stamp

HOLABIRD & ROOT

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

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2310 Oakton St, Evanston, IL 60202

Project Name

MECHANICAL CONTROL DIAGRAMS

Sheet Name

Drawing No. **M6-2**

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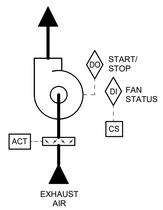
Illinois Design Firm Registration #184.007637-0014

REF. SCALE IN INCHES 0 1 2 3

PROJECT #22000606.00

1/2" = 1'-0" | 0'-0" | 0'-6" | 1'-0"
3/4" = 1'-0" | 0'-0" | 0'-3" | 0'-6" | 0'-9" | 1'-0"
1" = 1'-0" | 0'-0" | 1'-0" | 2'-0" | 3'-0"
1/2" = 1'-0" | 0'-0" | 2'-0" | 4'-0" | 6'-0"
1/4" = 1'-0" | 0'-0" | 4'-0" | 8'-0" | 12'-0"
1/8" = 1'-0" | 0'-0" | 8'-0" | 16'-0" | 24'-0"
1/16" = 1'-0" | 0'-0" | 16'-0" | 32'-0" | 48'-0"
1" = 30'-0" | 0'-0" | 30'-0" | 60'-0" | 90'-0" | 120'-0"

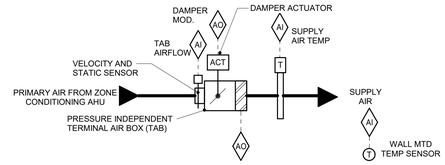


SEQUENCE OF OPERATION:
EXHAUST FAN SHALL BE INTERLOCKED TO RUN CONTINUOUSLY WHEN RESPECTIVE AHU IS OPERATING.

2-POSITION DAMPER SHALL FULLY OPEN WHEN FAN IS ENERGIZED. WHEN FAN IS DE-ENERGIZED, 2-POSITION DAMPER SHALL FULLY CLOSE.

ALARMS, INTERLOCKS AND SAFETIES:
AN ALARM SHALL BE GENERATED AT THE FMCS OPERATOR WORKSTATION IN THE EVENT THE FMCS COMMANDS THE EXHAUST FAN TO OPERATE AND THE CURRENT SENSING RELAY DETECTS INSUFFICIENT CURRENT DRAW.

1 EXHAUST FAN CONTROL - AHU INTERLOCK
NO SCALE



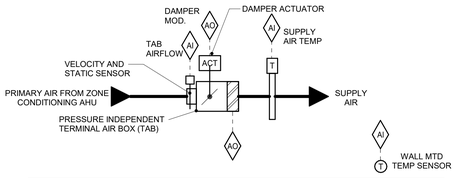
SEQUENCE OF OPERATION:

- FMCS TAB CONTROLLER SHALL MODULATE THE TAB DAMPER TO MAINTAIN CONSTANT SUPPLY AIRFLOW TO THE ROOM.
- FMCS TAB CONTROLLER SHALL MODULATE TAB ELECTRIC REHEAT COIL TO MAINTAIN SPACE TEMPERATURE OF 72°F (ADJ.) WITH 5°F (ADJ.) DEAD BAND BASED ON A SIGNAL FROM A WALL MOUNTED TEMPERATURE SENSOR. SEE DRAWINGS FOR TEMPERATURE SENSOR REQUIREMENTS. SPACES WITH ADJUSTABLE THERMOSTATS WILL ALLOW A +/- 3°F (ADJ.) OFFSET FROM THE DDC SETPOINT.
- THE FMCS SHALL UTILIZE OUTPUT FROM ALL TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE.

ALARMS, INTERLOCKS & SAFETIES:

- SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE SPACE TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
- IF THE HIGH TEMPERATURE SAFETY DEVICE EXCEEDS MANUFACTURER'S SETPOINT, AN ALARM SHALL BE SENT TO THE OPERATOR INTERFACE.

2 TAB CONTROL CONSTANT VOLUME W/ ELECTRIC REHEAT
NO SCALE



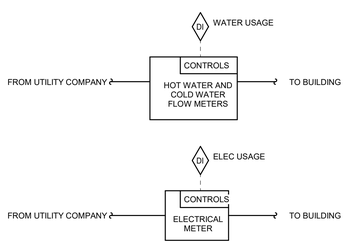
SEQUENCE OF OPERATION:

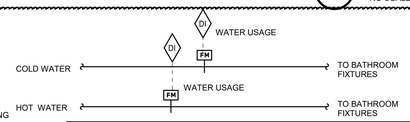
- FMCS TAB CONTROLLER SHALL MODULATE THE TAB DAMPER AND TAB ELECTRIC REHEAT COIL TO MAINTAIN SPACE TEMPERATURE OF 72°F (ADJ.) WITH 5°F (ADJ.) DEAD BAND BASED ON A SIGNAL FROM A WALL MOUNTED TEMPERATURE SENSOR. SEE DRAWINGS FOR TEMPERATURE SENSOR REQUIREMENTS. SPACES WITH ADJUSTABLE THERMOSTATS WILL ALLOW A +/- 3°F (ADJ.) OFFSET FROM THE DDC SETPOINT.
- AT FULL COOLING, THE TAB SHALL BE OPEN TO MAXIMUM CFM POSITION. THE REHEAT COIL SHALL BE DE-ENERGIZED.
- UPON A FALL IN SPACE TEMPERATURE, THE TAB SHALL MODULATE CLOSED UNTIL SPACE SETPOINT IS MAINTAINED, OR UNTIL IT REACHES ITS MINIMUM SCHEDULED CFM POSITION PER THE TAB SCHEDULE. THE REHEAT COIL SHALL REMAIN DE-ENERGIZED.
- UPON A FURTHER FALL IN SPACE TEMPERATURE, THE ELECTRIC REHEAT COIL AND TAB SHALL MODULATE OPEN IN UNISON TO MAINTAIN SPACE SETPOINT UNTIL TAB AIR FLOW REACHES ITS MAXIMUM HEATING SETTING.
- THE FMCS SHALL UTILIZE OUTPUT FROM ALL TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE.

ALARMS, INTERLOCKS & SAFETIES:

- SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE SPACE TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
- IF THE HIGH TEMPERATURE SAFETY DEVICE EXCEEDS MANUFACTURER'S SETPOINT, AN ALARM SHALL BE SENT TO THE OPERATOR INTERFACE.

3 TAB CONTROL W/ ELECTRIC REHEAT
NO SCALE





UTILITY METERING REPORT GENERATION:

- FMCS SHALL MONITOR THE FOLLOWING POINTS ON 5 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND. THE TREND SHALL RUN FOR A 14-DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL OVERWRITE THE OLDEST VALUES:
  - DATE
  - TIME
  - GLOBAL OUTSIDE AIR TEMP. (°F)
  - GLOBAL OUTSIDE AIR DEWPOINT TEMP. (°F)
  - WATER USE (GALLONS)
  - ELECTRICAL USE (KW)
- THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN EITHER TABULAR OR GRAPHICAL FORM ON THE FMCS OPERATOR INTERFACE.
- ONCE PER MONTH, THE FMCS SHALL RECORD THE LARGEST WATER USE (IN GALLONS), AND ELECTRICAL USE (IN KW) WHICH OCCURRED DURING THAT MONTH. THE DATE AND TIME THAT COINCIDED WITH THAT EVENT SHALL ALSO BE RECORDED. THIS INFORMATION SHALL BE STORED TO A MEMORY LOCATION ON THE FMCS OPERATOR INTERFACE THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN).

SEQUENCE OF OPERATION:

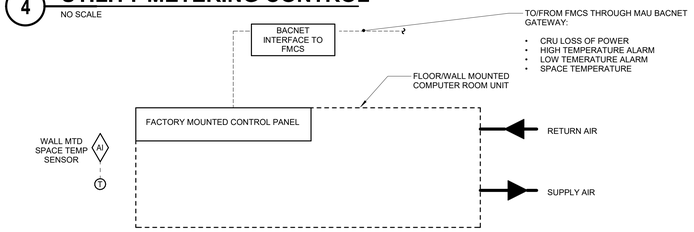
GENERAL:
THE UTILITIES ARE METERED THROUGH THE DDC VIA THE FMCS.

UTILITY METERING CONTROL:

- WATER METERING:
  REFER TO DETAIL 5/P5-1. CONTRACTOR TO PROVIDE TWO WATER FLOW METERS TO COLLECT DATA FOR COLD WATER AND HOT WATER USAGE.
- PROCESS WATER METERING:
  THE TCC SHALL CONNECT (8) FLOW METERS TO THE BRANCHES SERVING RESTROOM GROUPS. THE TOTAL FLOWS SHALL BE DEDUCTED FROM THE TOTALS MEASURE AT THE BUILDING FLOW METERS TO PROVIDE PROCESS WATER USAGE IN GALLONS.
- ELECTRIC METERING:

THE TCC SHALL CONNECT THE FMCS TO EACH ELECTRICAL METER WITHIN ELECTRICAL ROOM ON EACH PANEL FOR A TOTAL OF (3) PANELS FOR ELECTRICAL USAGE INFORMATION.

4 UTILITY METERING CONTROL
NO SCALE



CRU SEQUENCE OF OPERATION GENERAL: (CONTROLS PROVIDED WITH UNIT)

THE CRU IS CONTROLLED BY A FACTORY ASSEMBLED AND MOUNTED MICROPROCESSOR BASED CONTROL SYSTEM AND CONNECTED TO THE FACILITY MANAGEMENT CONTROL SYSTEM (FMCS) FOR MONITORING PURPOSES.

THE MICROPROCESSOR CONTROL SYSTEM SHALL MONITOR THE SPACE TEMPERATURE. THE MICROPROCESSOR CONTROL SYSTEM SHALL AUTOMATICALLY HEAT, COOL, TO MAIN SPACE TEMPERATURE SETPOINT.

THE SPACE SETPOINTS ARE 68°F (ADJ.).

THE MICROPROCESSOR CONTROL SYSTEM SHALL BE PROGRAMMABLE ON A DAILY BASIS PROGRAM SCHEDULE AND SHALL AUTOMATICALLY RESTART FOLLOWING A POWER FAILURE.

ALARMS, INTERLOCKS, AND SAFETIES AT UNIT:

ACTIVATE AN AUDIBLE AND VISUAL ALARM UPON THE OCCURRENCE OF ANY OF THE FOLLOWING MICROPROCESSOR CONTROL SYSTEM ALARM CONDITIONS:

- HIGH TEMPERATURE
- LOW TEMPERATURE
- CRU LOSS OF POWER

MICROPROCESSOR CONTROL SYSTEM SHALL BE CAPABLE OF DISABLING ANY ALARM IF REQUIRED.

FMCS SEQUENCE OF OPERATION (CONTROLS PROVIDED BY TCC)

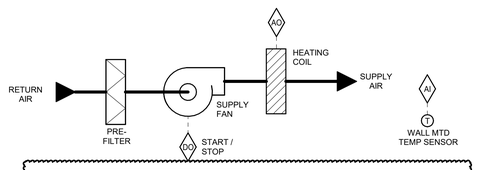
THE TCC SHALL EXTEND THE FMCS NETWORK TO THE CRU MICROPROCESSOR CONTROLLER PER THE PROTOCOL SPECIFIED IN SECTION 23 09 00. THE FMCS SHALL MONITOR THE OPERATING PARAMETERS AND ALARM CONDITIONS INDICATED BY THE CRU.

ALARMS, INTERLOCKS AND SAFETIES AT FMCS:

SEND AN ALARM TO THE FMCS OPERATOR INTERFACE UPON THE OCCURRENCE OF ANY OF THE FOLLOWING MICROPROCESSOR CONTROL SYSTEM ALARM CONDITIONS:

- LOSS OF POWER TO CRU
- HIGH TEMPERATURE
- LOW TEMPERATURE

5 CABINET HEATER CONTROL - ELECTRIC
NO SCALE



SEQUENCE OF OPERATION:

THE CABINET HEATER SHALL BE FURNISHED WITH A UNIT MOUNTED FAN SPEED SELECTOR SWITCH (OFF-HIGH-MED-LOW). THE UNIT SHALL MAINTAIN A SPACE TEMPERATURE OF NO MORE THAN 60°F

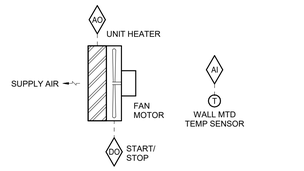
WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 45°F, CABINET HEATER SHALL BE DISABLED

WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 45°F, CABINET HEATER SHALL BE ENABLED TO MAINTAIN A ROOM SETPOINT OF 60

ALARMS, INTERLOCKS & SAFETIES:

- SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF SPACE TEMPERATURE FALLS 10°F (ADJ.) BELOW SETPOINT.

6 UNIT HEATER CONTROL - ELECTRIC
NO SCALE



SEQUENCE OF OPERATION:

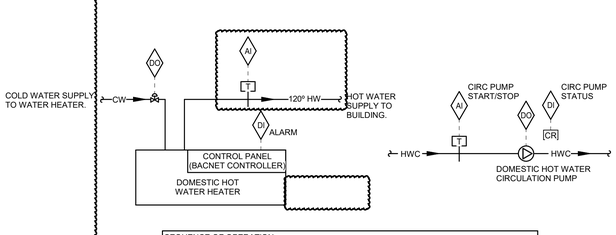
WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 40°F (ADJ.), TEMPERATURE SENSOR SHALL ENERGIZE FAN AND MODULATE THE ELECTRIC COIL TO MAINTAIN A SPACE TEMPERATURE OF 70°F (ADJ.). WHEN SPACE TEMPERATURE IS SATISFIED THE FAN SHALL TURN OFF.

WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 40°F (ADJ.), TEMPERATURE SENSOR SHALL MODULATE THE ELECTRIC COIL TO MAINTAIN A SPACE TEMPERATURE OF 70°F (ADJ.) AND THE UNIT FAN SHALL RUN CONTINUOUSLY.

ALARMS, INTERLOCKS & SAFETIES:

SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF SPACE TEMPERATURE FALLS 10°F (ADJ.) BELOW SETPOINT.

7 COMPUTER ROOM UNIT CONTROL
NO SCALE



SEQUENCE OF OPERATION:
DOMESTIC WATER HEATER CONTROL PANEL (BACNET COMPATIBLE) SHALL MAINTAIN 140°F (ADJ.) DOMESTIC HOT WATER.

FMCS SHALL MONITOR THE TEMPERATURE AT THE 120°F CIRCULATION PUMP. THE CIRCULATION PUMP SHALL TURN ON WHEN THE TEMPERATURE FALLS BELOW 112°F (ADJ.) AND SHALL TURN OFF WHEN THE TEMPERATURE RISES ABOVE 118°F (ADJ.)

FMCS SHALL MONITOR THE OUTPUT TEMPERATURE OF THE WATER HEATERS AND THE OUTPUT TEMPERATURE DOWNSTREAM OF THE MIXING VALVES.

FMCS SHALL MONITOR AND RECORD THE FOLLOWING INFORMATION FROM THE WATER HEATER:

- DISPLAY THE TEMPERATURES ONCE EVERY 5 MINUTE (ADJ.) TIME INTERVAL AND RECORD IN A TREND THAT MAINTAINS DATA FOR A 7 DAY (ADJ.) PERIOD. AT THE END OF THE 7 DAY (ADJ.) PERIOD THE TREND SHALL AUTOMATICALLY OVERWRITE THE EARLIEST RECORDED DATA. TREND DATA SHALL INCLUDE DATE AND TIME STAMPS. THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN EITHER TABULAR OR GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION.
- ONCE PER MONTH, THE FMCS SHALL RECORD THE FOLLOWING INFORMATION TO A MEMORY LOCATION ON THE FMCS OPERATOR WORKSTATION THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN)

FMCS SHALL MONITOR AND RECORD THE FOLLOWING INFORMATION FROM THE CIRCULATION PUMPS:

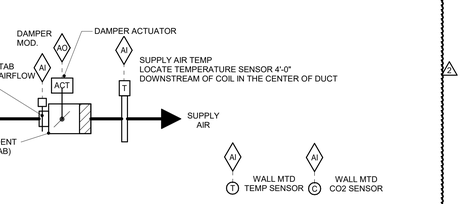
- TOTAL RUN TIME ON EACH PUMP SHOWN IN THE DIAGRAM. COORDINATE FINAL RECORDING, DISPLAY, AND ARCHIVING REQUIREMENTS WITH THE OWNER.

OPERATOR WORKSTATION SHALL DISPLAY PUMP CURRENT STATUS AND ALLOW OPERATOR TO ENABLE/DISABLE THE CIRCULATION PUMP FOR EITHER THE 110°F OR 140°F SYSTEM.

ALARMS, INTERLOCKS & SAFETIES:
FMCS SHALL TIE INTO BACNET CONTROLLER AND INDICATE AN ALARM TO THE FMCS OPERATOR WORKSTATION IN THE EVENT THE FOLLOWING OCCUR:

- ANY WATER HEATER INDICATES AN ALARM CONDITION.
- ANY HOT WATER CIRCULATION PUMP INDICATES AN ALARM CONDITION.
- THE LEAVING HOT WATER TEMPERATURE IS ABOVE 145°F (ADJ.) OR BELOW 135°F (ADJ.) FOR MORE THAN 5 MINUTES.(ADJ.)

8 DOMESTIC HOT WATER CONTROL
NO SCALE



SEQUENCE OF OPERATION:

- FMCS TAB CONTROLLER SHALL MODULATE THE TAB DAMPER AND TAB ELECTRIC COIL TO MAINTAIN SPACE TEMPERATURE OF 72°F (ADJ.) WITH 5°F (ADJ.) DEAD BAND BASED ON A SIGNAL FROM A WALL MOUNTED TEMPERATURE SENSOR. SEE DRAWINGS FOR TEMPERATURE SENSOR REQUIREMENTS. SPACES WITH ADJUSTABLE THERMOSTATS WILL ALLOW A +/- 3°F (ADJ.) OFFSET FROM THE DDC SETPOINT.
- AT FULL COOLING, THE TAB SHALL BE OPEN TO MAXIMUM CFM POSITION. THE ELECTRIC REHEAT COIL SHALL BE OFF.
- UPON A FALL IN SPACE TEMPERATURE, THE TAB SHALL MODULATE CLOSED UNTIL SPACE SETPOINT IS MAINTAINED, OR UNTIL IT REACHES ITS MINIMUM SCHEDULED CFM POSITION PER THE TAB SCHEDULE. THE ELECTRIC COIL SHALL BE OFF.
- UPON A FURTHER FALL IN SPACE TEMPERATURE, THE ELECTRIC REHEAT COIL SHALL MODULATE ON TO MAINTAIN SPACE SETPOINT UNTIL THE SUPPLY AIR TEMPERATURE IS 20°F ABOVE ROOM TEMPERATURE SETPOINT.
- UPON A FURTHER FALL IN SPACE TEMPERATURE, TAB SHALL OPEN TO MAINTAIN SETPOINT UNTIL TAB AIRFLOW REACHES ITS MAXIMUM HEATING SETTING. THE REHEAT COIL SHALL CONTINUE TO MODULATE OPEN TO MAINTAIN MAXIMUM DELTA T LISTED ABOVE.
- THE FMCS SHALL UTILIZE OUTPUT FROM ALL TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE.
- WHEN FLOATING CV'S ARE USED, FMCS SHALL PERFORM AN AUTO-ZERO FUNCTION EVERY NIGHT DURING UNOCCUPIED TIMES. THE FMCS SHALL STAGGER AUTO-ZERO SEQUENCES SO THAT ALL VALVES DO NOT SIMULTANEOUSLY CLOSE.

CO2 SENSOR-BASED DEMAND CONTROL VENTILATION:

DURING OCCUPIED HOURS, THE FMCS SHALL RESET THE ZONE MINIMUM AIRFLOW SETTING BASED ON THE ZONE CO2 SENSOR INPUT SIGNAL:

- WHEN THE ZONE CO2 SENSOR READS [AMBIENT CO2 LEVEL] PPM (ADJ.) PLUS 300 PPM (ADJ.) OR LESS, THE TAB MINIMUM AIRFLOW SETTING SHALL BE EQUAL TO THE MINIMUM SPECIFIED IN THE TAB SCHEDULE.
- WHEN THE ZONE CO2 SENSOR IS AT THE CO2 SETPOINT IN THE TAB SCHEDULE OR HIGHER, THE TAB MINIMUM AIRFLOW SETTING SHALL BE EQUAL TO THE TAB MAXIMUM AIRFLOW SETTING SPECIFIED IN THE TAB SCHEDULE.
- WHEN THE ZONE CO2 LEVEL IS BETWEEN [AMBIENT CO2 LEVEL] PPM + 300 PPM (ADJ.) AND THE ZONE CO2 SETPOINT, THE TAB MINIMUM AIRFLOW SHALL VARY PROPORTIONALLY BETWEEN THE SCHEDULED TAB MINIMUM AIRFLOW AND MAXIMUM AIRFLOW.

ALARMS, INTERLOCKS & SAFETIES:

SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE SPACE TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.
SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE SPACE CO2 CONCENTRATION IS ABOVE THE SCHEDULED SETPOINT FOR MORE THAN 60 MINUTES (ADJ.)

9 TAB CONTROL W/ ELECTRIC REHEAT AND CO2-BASED DEMAND CONTROL VENTILATION
NO SCALE

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0" 1" 2" 3"
REF. SCALE IN INCHES
PROJECT #22000606.00

Permit Stamp

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter
City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

MECHANICAL CONTROL DIAGRAMS

Sheet Name

Drawing No. **M6-3**

ROOFTOP AIR HANDLING UNIT SCHEDULE - GAS/ELECTRIC

SYMBOL	RTU-1	RTU-2	RTU-3	RTU-4
SERVICE	MEDICAL SUITE	DOG SPACES	HUMAN SPACES	CAT SPACES
SUPPLY FAN				
CFM	1,000	4,680	3,840	2,250
MINIMUM CFM	1,000	4,680	1,260	2,250
EXTERNAL STATIC PRESSURE	1.50	2.00	2.00	2.00
TYPE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
FAN RPM (NOTE D)	2,170	2,074	1,830	2,179
BHP (NOTE E)	0.52	4.06	2.75	1.42
MHP (NOTE E)	1	5	5	2
POWERED EXHAUST FAN				
CFM	1,000	4,680	3,840	2,250
MINIMUM CFM	1,000	4,680	1,260	2,250
EXTERNAL STATIC PRESSURE	1.00	2.00	2.00	1.50
TYPE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE	DIRECT DRIVE
FAN RPM (NOTE D)	1,670	1,926	1,926	1,933
BHP (NOTE E)	0.43	3.28	0.66	1.68
MHP (NOTE E)	1	5	2	2
MINIMUM OUTSIDE AIR CFM	1,000	4,680	1,075	2,250
HEATING - ELECTRIC				
CAPACITY kW	15	99	32	32
ENTERING AIR DB	43.4	32.9	66.8	51.3
LEAVING AIR DB	90.8	99.7	93.1	96.2
COIL P.D IN WC.	0.01	0.01	0.01	0.01
ENERGY RECOVERY WHEEL COOLING				
OUTSIDE EAT °F DB	95	95	95	95
OUTSIDE EAT °F WB	78	78	78	78
RETURN EAT °F DB	75	75	75	75
RETURN EAT °F WB	63	63	63	63
EXHAUST LAT °F DB	90.3	87	92	88.8
EXHAUST LAT °F WB	74.7	72.4	76	73.6
SUPPLY LAT °F DB	81.4	83.80	79.00	79.60
SUPPLY LAT °F WB	68.7	70.5	66.8	67.4
TOTAL CAPACITY	37.0	138.9	46.6	93.6
SENSIBLE CAPACITY	14.3	54.09	18.02	36.37
LATENT CAPACITY CAPACITY	22.72	84.78	28.59	57.22
SENSIBLE / LATENT EFFECTIVENESS	0.76 / 0.72	0.6 / 0.56	0.87 / 0.82	0.77 / 0.72
ENERGY RECOVERY WHEEL HEATING				
OUTSIDE EAT °F DB	-10	-10	-10	-10
OUTSIDE EAT °F WB	-10	-10	-10	-10
RETURN EAT °F DB	72	72	72	72
RETURN EAT °F WB	51	51	51	51
EXHAUST LAT °F DB	7.9	21.2	0	14.5
EXHAUST LAT °F WB	7.4	18.7	0	13
SUPPLY EAT °F DB	43.4	32.90	53.50	51.3
SUPPLY EAT °F WB	33.9	26.8	40.4	39.1
TOTAL CAPACITY	69.5	263.7	86.7	176.7
SENSIBLE CAPACITY	60.48	229.62	75.22	253.37
LATENT CAPACITY CAPACITY	9.03	34.07	11.51	23.37
SENSIBLE / LATENT EFFECTIVENESS	0.78 / 0.72	0.62 / 0.57	0.87 / 0.82	0.74 / 0.7
COOLING COIL - DX HEAT PUMP				
EAT °F DB	81.4	83.8	76.1	79.6
EAT °F WB	68.7	70.5	64.1	67.4
MAX. LAT °F DB	50.3	53.8	53.1	49.6
LAT °F WB	50	53.6	52.8	49
TOTAL MBH	56.6	254	53	121
MRC	40.94	168.18	142.78	94.63
AMBIENT TEMPERATURE °F	95.00	95.00	95.00	95.00
MAX. A.P.D. IN. W.C.	0.13	0.32	0.42	0.23
REFRIGERANT	R-410a	R-410a	R-410a	R-410a
MINIMUM EFFICIENCY	18.5 EER	17 EER	14.2 EER	18.5 EER
HEATING COIL - DX HEAT PUMP				
EAT °F DB	43.4	32.9	66.8	51.3
MAX. LAT °F DB	74.0	56.8	82.7	78.7
TOTAL MBH	34.3	129.9	70	68.4
AMBIENT TEMPERATURE °F	0.00	0	0	0
COEFFICIENT OF PERFORMANCE	3.00	3.1	2.3	2.70
PRE-FILTER / FINAL FILTER				
TYPE	2" MERV 8 / 2" MERV 13	2" MERV 8 / 2" MERV 13	2" MERV 8 / 2" MERV 13	2" MERV 8 / 2" MERV 13
ROOF CURB (NOTE G)	MFR	MFR	MFR	MFR
ELECTRICAL				
VOLT-PHASE	208-3	208-3	208-3	208-3
FLA/RLA	68	359.5	145	139.6
MCA	82.60	366.5	172.10	166.7
MOCP AMPS	90	400	175	175
DISCONNECT BY (NOTE A)	MFR	MFR	MFR	MFR
DISCONNECT TYPE (NOTE B)	VFD	VFD	VFD	VFD
CONTROLLER/STARTER BY (NOTE A)	MFR	MFR	MFR	MFR
CONTROLLER/STARTER TYPE (NOTE C)	VFD	VFD	VFD	VFD
SCCR				
MANUFACTURER	TRANE	TRANE	TRANE	TRANE
MODEL NUMBER	HORIZON	HORIZON	HORIZON	HORIZON
REMARKS	NOTE 1,2,3,4,5,6,7,8,9, 10	NOTE 1,2,3,4,5,6,7,8,9	NOTE 1,2,3,4,5,6,7,8,9	NOTE 1,2,3,4,5,6,7,8,9

NOTES:
1. LAT LISTED IS AT LEAVING SIDE OF COOLING COIL.
2. PROVIDE SHAFT GROUNDING ON ALL MOTORS THAT ARE DRIVEN BY VARIABLE FREQUENCY DRIVES. ALL SUPPLY AND POWERED EXHAUST FANS SHALL...
3. FILTER LOADING STATIC PRESSURE OF 0.5"W.C. HAS BEEN INCLUDED IN EXTERNAL STATIC PRESSURE VALUE NOTED ABOVE.
4. COOLING COIL AND HEATING COIL SELECTION ARE BASED ON AN OPERATIONAL ENERGY RECOVERY WHEEL.
5. ROOFTOP UNIT SHALL HAVE A CONVENIENCE OUTLET POWERED BY A SINGLE POINT POWER CONNECTION.
6. UNIT INCLUDES AN AIR SOURCE HEAT PUMP TO OPERATE IN HEATING WHEN OUTSIDE AIR IS 0°F. BASIS OF DESIGN HEAT PUMP CAN OPERATE AT 0°F, ALTERNATIVE MANUFACTURER'S WILL BE REQUIRED TO PROVIDE ADDITIONAL ELECTRICAL HEAT IF THEY CAN NOT MEET INTENT OF DESIGN. ANY ADDITIONAL COST ASSOCIATED WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. SUPPLY AND EXHAUST FANS TO BE PROVIDED WITH FAN PIEZO RINGS.
8. UNITS TO BE PROVIDED WITH MODULATING OA & RA DAMPERS W/ ECONOMIZER CONTROLS.
9. ALL UNIT DAMPERS TO BE CLASS 1A LEAKGE CLASSIFICATION.
10. UNIT OPERATES AS A SINGLE ZONE UNIT TO MAINTAIN ROOM TEMPERATURE SETPOINT AND SHALL BE PROVIDED WITH MFR ZONE SENSOR.

CABINET HEATER SCHEDULE - ELECTRIC

SYMBOL	SERVICE	TYPE	NOMINAL CFM	CONTROL	CABINET			ELECTRICAL							MANUFACTURER	MODEL	REMARKS
					H	W	D	FAN HP	RPM	ELEMENT KW	VOLT/ PHASE/ WIRE	FLA/ RLA	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/ STARTER BY (NOTE A)	CONTROLLER/ STARTER SCCR			
CAB-1	VESTIBULE	VERTICAL...	580	5/M6-3	30"	51"	10"	0.25	1,725	7.9	208/3	21.9	MFR	NF	MFR	-	TRANE	FF06	NOTE 1

NOTES:
1. COORDINATE COLOR SELECTION WITH ARCHITECT.
2. UNIT TO BE PROVIDED WITH FRONT STAMPED LOUVER INLET AND FRONT STAMPED LOUVER OULET.

COMPUTER ROOM UNIT SCHEDULE - DIRECT EXPANSION

SYMBOL	SERVICE	CFM	REFRIGERANT COOLING COIL						FILTERS						MANUFACTURER	MODEL	REMARKS
			COIL TYPE & REFRIGERANT	# OF CIRCUITS	EAT °FDB	EAT °FWB	MBH TOTAL	MBH SENSIBLE	TYPE	VOLT-PHASE	MCA	DISCONNECT BY (NOTE A)	CONTROLLER/STARTER BY (NOTE A)	CONTROLLER/STARTER SCCR			
CRU-1	IDF	700	R-410A	1	80	67	24	19	WASHABLE	208-1	1.0	MFR	MFR	-	MITSUBISHI	PKA	NOTES 1, 2, 3

NOTES:
1. PROVIDE SINGLE POINT ELECTRICAL CONNECTION TO OUTDOOR CONDENSING UNIT. E.C. TO WIRE FROM OUTDOOR CONDENSING UNIT TO INDOOR UNIT.
2. PROVIDE UNIT WITH MANUFCTURER RECOMMENDED WALL MOUNTED THERMOSTAT.
3. PROVIDE UNIT WITH CONDENSATE LIFT PUMP. PUMP TO BE POWERED BY EVAPORATOR UNIT.

FAN SCHEDULE

SYMBOL	SERVICE	CFM	S.P. IN. W.C.	WHEEL DIA. INCHES	FAN RPM (NOTE F)	DRIVE	MAX. AMCA SONES	BACKDRAFT DAMPER	CURB TYPE (NOTE G)	MHP (NOTE E)	VOLT-PHASE	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/STARTER BY (NOTE A)	CONTROLLER/STARTER TYPE (NOTE C)	CONTROLLER/STARTER SCCR	MANUFACTURER	MODEL	REMARKS
EF-1	CAT ISOLATION	400	0.5	13.5	1,750	ECM	12.4	GRAVITY	MFR	0.250	120-1	MFR	NF	MFR	1/M6-3	5K	COOK	ACED-VF	
EF-2	WILDLIFE	220	0.5	13.5	1,750	ECM	14.3	GRAVITY	MFR	0.500	120-1	MFR	NF	MFR	1/M6-3	5K	COOK	ACED-VF	
EF-3	DOG ISOLATION	615	0.75	13.5	1,750	ECM	14.3	GRAVITY	MFR	0.500	120-1	MFR	NF	MFR	1/M6-3	5K	COOK	ACED-VF	
EF-4	TOILET ROOMS	225	1	13.5	1,750	ECM	11.3	GRAVITY	MFR	0.250	120-1	MFR	NF	MFR	1/M6-3	5K	COOK	ACED-VF	

CONDENSING UNIT SCHEDULE

SYMBOL	SERVICE	NOMINAL DESIGN TONS	REFRIGERANT	AMBIENT TEMP. °F	MINIMUM AMBIENT TEMP. °F	NUMBER OF COMPRESSORS	NUMBER OF STAGES	NUMBER OF CIRCUITS	NUMBER OF FANS	ELECTRICAL							MANUFACTURER	MODEL	REMARKS
										VOLT-PHASE	MCA	MOCP AMPS	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/STARTER BY (NOTE A)	CONTROLLER/STARTER SCCR			
CU-1	CRU-1	2	R-410A	95	-20	1	MODULATING	1	1	208-1	13.0	28.0	EC	NF	MFR	-	MITSUBISHI	PUZ	NOTE 1, 2, 3, 4

NOTES:
1. PROVIDE SINGLE POINT ELECTRICAL CONNECTION TO OUTDOOR CONDENSING UNIT. E.C. TO WIRE FROM OUTDOOR CONDENSING UNIT TO INDOOR UNIT.
2. UNIT SHALL BE CAPABLE OF OPERATING AT A MINIMUM OF -20 DEGREES F DB.
3. CONDENSING UNIT SHALL BE SAME MANUFACTURER AS ASSOCIATED INDOOR EVAPORATOR UNIT.
4. REFER TO SPECIFICATION SECTION 23 81 26.

LINEAR DIFFUSER SCHEDULE

SYMBOL	MATERIAL	SLOT WIDTH	NO. SLOTS	BAR WIDTH	BAR SPACING	WIDTH INCHES	LENGTH FEET	PLENUM REQUIRED	PLENUM INSULATION	PLENUM INLET SIZE	PATTERN CONTROL REQUIRED	BALANCING DAMPER REQUIRED	FINISH	MANUFACTURER	MODEL	REMARKS
LD-1	ALUMINUM	1"	2	N/A	N/A	4.5	4	YES	LINED	SEE DWG.	YES	NO	WHITE	TITUS	TBD	NOTE 1, 2 & 3
RG-3	ALUMINUM	1"	2	N/A	N/A	4.5	4	YES	LINED	SEE DWG.	YES	NO	WHITE	TITUS	TBD	NOTE 1, 2 & 3

NOTES:
1. CONTRACTOR SHALL DETERMINE PROPER MARGIN STYLE TO MATCH CEILING...
2. PROVIDE WITH CONCEALED...
3. DIFFUSERS WITH MULTIPLE SLOTS SHALL HAVE THE INNER MOST SLOT DIRECTED TOWARDS THE INTERIOR OF THE BUILDING, THE REMAINING SHALL BE DIRECTED TOWARDS THE EXTERIOR UNLESS...

GRILLES REGISTERS & DIFFUSERS SCHEDULE

SYMBOL	MAT'L	TYPE	MARGIN (NOTE 1)	INLET SIZE (INCH)	FACE SIZE (INCH)	VOLUME DAMPER REQ'D	FINISH	MANUFACTURER	MODEL	REMARKS
CD-1	STEEL	PANEL FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	OMNI	FLUSH FACE PANEL
CD-2	ALUMINUM	PANEL FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	OMNI-AA	FLUSH FACE PANEL, NOTE 3.
RG-1	STEEL	PERFORATED FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	PAR	DUCTED RETURN
RG-2	STEEL	35° DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	350R	FACE ONLY - NON DUCTED
SG-1	STEEL	DOUBLE DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	300R	FRONT BLADES VERTICAL UNLESS NOTED OTHERWISE
SR-1	ALUMINUM	DOUBLE...	1 1/4"	SEE DWG.	INLET +2	YES	WHITE	TITUS	S300FL	BLADES VERTICAL UNLESS NOTED OTHERWISE
EG-1	STEEL	PERFORATED FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	PAR	DUCTED RETURN / EXHAUST
EG-2	ALUMINUM	PERFORATED FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	PAR	DUCTED EXHAUST
EG-3	ALUMINUM	PERFORATED FACE	SPIRAL	SEE DWG.	INLET +2	YES	WHITE	TITUS	S8F	PERFORATED SPIRAL EXHAUST
EG-4	STEEL	35° DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	350R	

NOTES:
1. CONTRACTOR SHALL DETERMINE PROPER MARGIN STYLE TO MATCH CEILING...

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Permit Stamp

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

MECHANICAL SCHEDULES

Sheet Name

Drawing No. **M7-0**

3" = 1'- 0" | 1" = 1'- 0" | 1/2" = 1'- 0" | 1/4" = 1'- 0" | 1/8" = 1'- 0" | 1/16" = 1'- 0" | 1" = 30'- 0"

SCHEDULE GENERAL NOTES:

A. DISCONNECT AND CONTROLLER STARTER FURNISHED AND INSTALLED BY:
- MFR = MANUFACTURER
- EC = ELECTRICAL CONTRACTOR.
- MC = FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR
- MFR/EC = FURNISHED LOOSE BY MANUFACTURER INSTALLED BY ELECTRICAL CONTRACTOR
- ATC = AUTOMATIC TEMPERATURE CONTROL CONTRACTOR

B. DISCONNECT TYPE:
- F = FUSED
- NF = NON-FUSED

C. CONTROLLER STARTER TYPE:
- FV = FULL VOLTAGE
- WYE = WYE-DELTA
- SS = SOLID STATE (SOFT START)
- MS = MANUAL STARTER
- VFD = VARIABLE FREQUENCY DRIVE
- VFD/B = VARIABLE FREQUENCY DRIVE WITH BYPASS

D. FAN RPM SHALL NOT EXCEED 110% OF SCHEDULED VALUE, WITH THE SCHEDULED WHEEL TYPE. SUBSTITUTION OF BI OR BIA FANS FANS FOR FC IS ACCEPTABLE IF EFFICIENCY IS NOT LOWER.

E. NO EQUIPMENT SHALL BE SELECTED ABOVE 90% OF MOTOR NAME PLATE RATING.

F. MUST BE WITHIN +/- 10% OF SCHEDULED RPM.

G. CURB TYPE:
- MFR = STANDARD CURB BY MANUFACTURER
- GC = BY GENERAL CONTRACTOR
- SAC = SOUND ATTENUATOR CURB

UNIT HEATER SCHEDULE - ELECTRIC

SYMBOL	SERVICE	TYPE	CFM	STAGES	KW PER STAGE	FAN HP	RPM	KW	VOLT/ PHASE/ WIRE	ELECTRICAL				CONTROL	MANUFACTURER	MODEL	REMARKS
										DISCONNECT		CONTROLLER/STARTER					
										BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	SCCR				
UH-1	RECEIVING	HORIZONTAL	400	1	5.0	0.125	1,550	5.0	208/3	EC	NF	MFR	5K	5/M6-3	TRANE	UHEC	NOTE 1
UH-2	FOOD PANTRY	HORIZONTAL	400	1	3.3	0.125	1,550	3.3	208/3	EC	NF	MFR	5K	5/M6-3	TRANE	UHEC	NOTE 1
UH-3	WATER METER	HORIZONTAL	400	1	5.0	0.125	1,550	5.0	208/3	EC	NF	MFR	5K	5/M6-3	TRANE	UHEC	NOTE 1

NOTES:
1. UNIT TO BE PROVIDED WITH MANUFACTURER THERMOSTAT.

TERMINAL AIR BOX SCHEDULE - SINGLE DUCT ELECTRIC REHEAT

SYMBOL TAB-#	AREA SERVED	CFM			HEATING COIL								MIN. INLET SIZE (IN.)	CONTROL TYPE (NOTE 3)	SENSOR TYPE (NOTE 4)	MANUFACTURER	MODEL	REMARKS
		COOLING MAX.	HEATING MAX.	MIN.	EAT °F	LAT °F	KW	VOLT/ PHASE/ WIRE	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	NO. OF STEPS	SCCR						
TAB-1	LOBBY	1,100	800	800	55	95	11.0	208-3	MFR	NF	1	5k	10	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-2	OFFICE 07	300	100	100	55	80	1.0	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-3	EDUCATION...	1,200	550	550	55	95	7.0	208-3	MFR	NF	1	5k	10	9/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-4	OFFICE 20	100	50	50	55	80	1.0	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-5	CAT CAGES	1,100	1,100	1,100	55	90	13.0	208-3	MFR	NF	1	5k	10	2/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-6	DOG GA 08B	420	420	420	55	80	3.5	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-7	DOG ADOPTION	1,125	1,125	1,125	55	90	13.0	208-3	MFR	NF	1	5k	12	2/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-8	CAT ISOLATION	1,150	1,150	1,150	55	80	9.0	208-3	MFR	NF	1	5k	12	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-9	DOG ISOLATION	400	400	400	55	80	3.5	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-10	DOG HOLDING	2,000	2,000	2,000	55	80	15.0	208-3	MFR	NF	1	5k	24x16	2/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-11	FOOD PREP	150	75	75	55	80	1.0	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-12	MATERNITY	280	280	280	55	80	3.0	208-3	MFR	NF	1	5k	6	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-13	LAUNDRY	890	290	290	55	85	3.0	208-3	MFR	NF	1	5k	8	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2
TAB-14	DOG INTAKE	330	330	330	55	80	3.0	208-3	MFR	NF	1	5k	8	3/M6.3	2	TRANE	VCEF	NOTE 1 & 2

NOTES:
1. NEITHER RADIATED NOR DISCHARGE SOUND LEVELS SHALL EXCEED NC 35 AT 1.5" INLET STATIC PRESSURE WHEN TESTED PER AHRI STANDARD 885-2008 USING 5/8" 20-LB DENSITY MINERAL FIBER CEILING TILE.
2. TOTAL AIR PRESSURE DROP OF TAB AND REHEAT COIL SHALL NOT EXCEED 0.50" WC.
3. REFER TO CONTROL DRAWINGS FOR DESCRIPTION OF CONTROL TYPE.
4. SENSOR TYPES: 1 - SENSOR ONLY, 2 - SENSOR WITH ADJUSTMENT, 3 - SENSOR WITH OVERRIDE, 4 - SENSOR WITH ADJUSTMENT AND OVERRIDE.

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Permit Stamp

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12/01/2022
EXP: 11/30/2023

No.	Date	Issue
2	01/11/2023	ADDENDUM 4

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

2310 Oakton St, Evanston, IL 60202

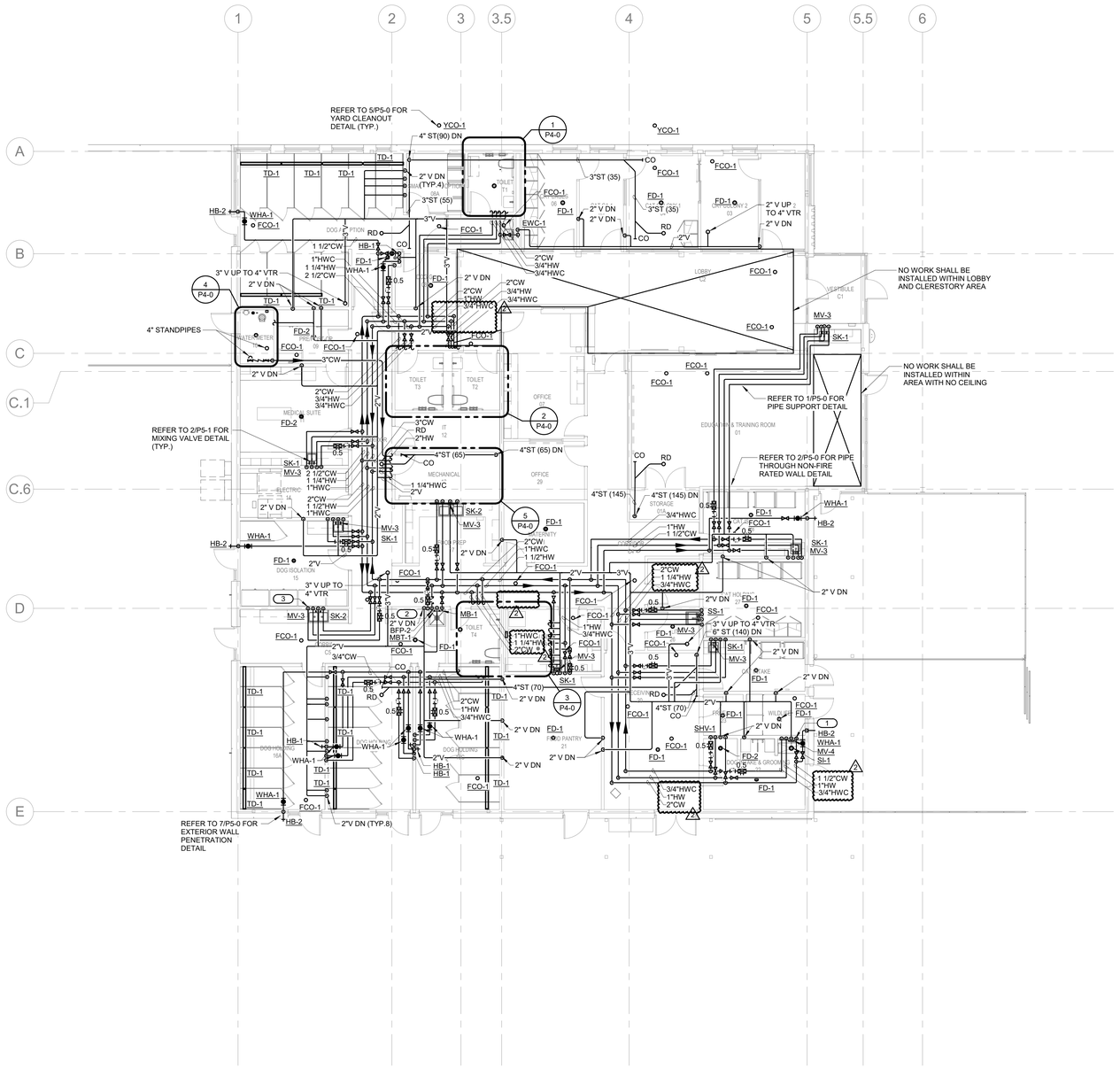
Project Name

MECHANICAL SCHEDULES

Sheet Name

Drawing No. **M7-1**

3" = 1'- 0" | 1" - 0" | 0' - 9" | 0' - 6" | 0' - 3" | 0' - 0"
1" = 1'- 0" | 3' - 0" | 2' - 0" | 1' - 0" | 0' - 0"
1/2" = 1'- 0" | 6' - 0" | 4' - 0" | 2' - 0" | 0' - 0"
1/4" = 1'- 0" | 12' - 0" | 8' - 0" | 4' - 0" | 0' - 0"
1/8" = 1'- 0" | 24' - 0" | 16' - 0" | 8' - 0" | 0' - 0"
1/16" = 1'- 0" | 48' - 0" | 32' - 0" | 16' - 0" | 0' - 0"
1" = 30' - 0" | 120' - 0" | 90' - 0" | 60' - 0" | 30' - 0" | 0' - 0"



FIRST FLOOR - PLUMBING

1/8" = 1'-0"

KEYNOTES: (#)

1. DOGWASH STATION PROVIDED BY OTHERS. CONTRACTOR IS RESPONSIBLE FOR ALL ROUGH-INS AND FINAL CONNECTIONS FOR DOMESTIC WATER, SANITARY, AND VENT. COORDINATE WITH EQUIPMENT CUTSHEET AND PROVIDE MIXING VALVE MV-4 TO TEMPER HOT WATER DOWN TO 110°F.
2. CONTRACTOR SHALL CONNECT MBT-1 TO THE VERTICAL PIPING FEEDING THE MOP BASIN TRIM. THE CONTRACTOR SHALL ALSO INSTALL BFP-2 ON THE WALL CLOSE TO THE MOP BASIN FOR EASY ROUTING OF THE DRAIN PIPING. THE CONTRACTOR SHALL PROVIDE A HOSE TO CONNECT MBT-1 TO BFP-2, AS WELL AS A HOSE TO THE CHEMICAL FEED STATION FROM BFP-2. THE CONTRACTOR SHALL VERIFY WITH THE OWNER EXACTLY WHAT CHEMICAL FEED STATION WILL BE PROVIDED. REFER TO DETAIL 4/P5-1 - MOP BASIN FOR ADDITIONAL INFORMATION.
3. HWC PIPING SHALL CONNECT WITHIN 3 FEET OF HW PIPING CONNNECTION TO FIXTURE.

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	DH
Checked	JMO
Proj. Arch./Eng.	TD

EVANSTON ANIMAL SHELTER

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Project Name

FIRST FLOOR - PLUMBING

Sheet Name

Drawing No. **P1-1**

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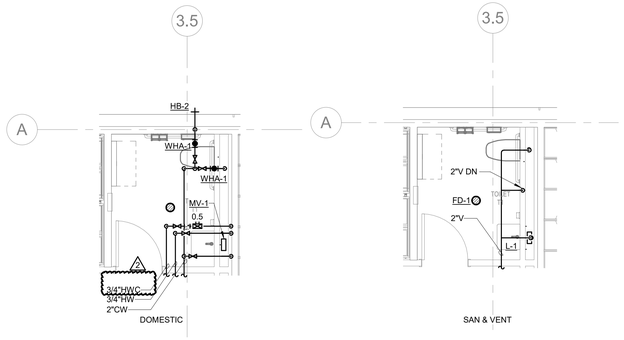
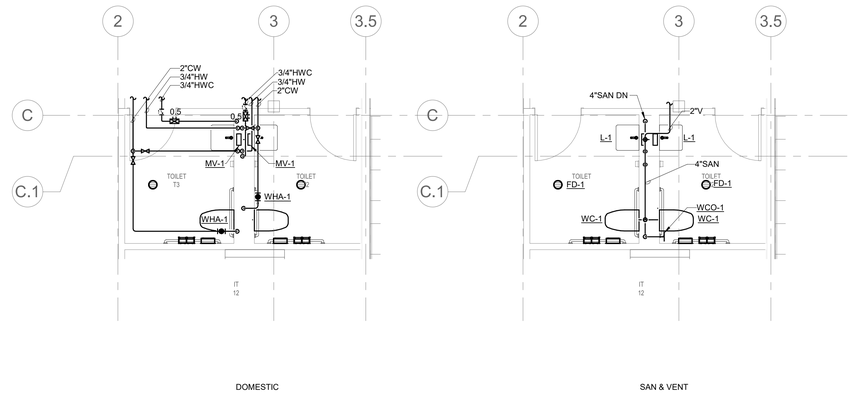
REF. SCALE IN INCHES 0 1 2 3

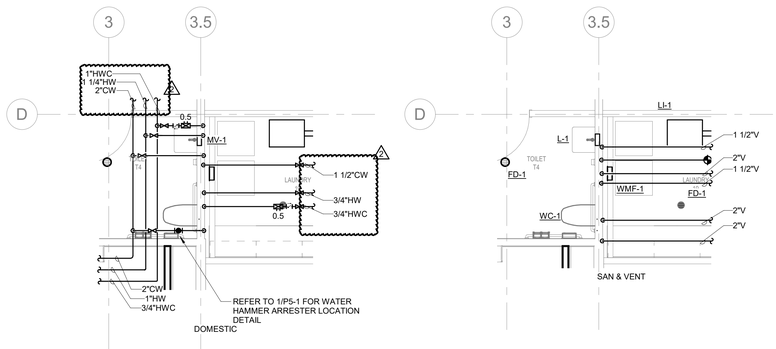
PROJECT #220006606.00



1 ENLARGED PLAN - RR R1 - PLUMBING
1/4" = 1'-0"



2 ENLARGED PLAN - RR R2 & R3 - PLUMBING
1/4" = 1'-0"



3 ENLARGED PLAN - RR R4 - PLUMBING
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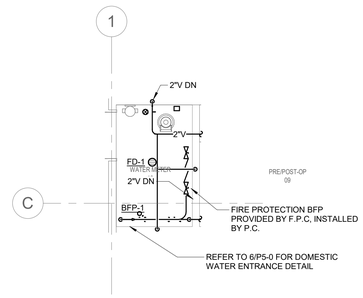
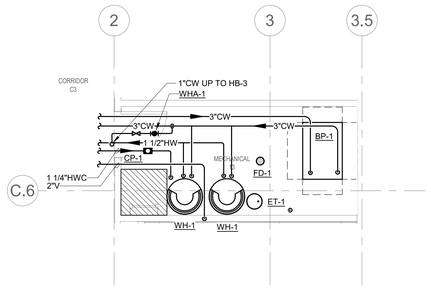


4 ENLARGED PLAN - WATER ROOM
1/4" = 1'-0"



5 ENLARGED PLAN - MECHANICAL ROOM
1/4" = 1'-0"

Permit Stamp

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140 South Dearborn Chicago, IL 60603
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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	DH
Checked	JMO
Proj. Arch./Eng.	TD

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

PLUMBING ENLARGED PLANS

Sheet Name

Drawing No. **P4-0**

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PROJECT #22000606.00

1/4" = 1'-0" 3" = 1'-0" 1" = 1'-0" 1/2" = 1'-0" 1/8" = 1'-0" 1/16" = 1'-0" 1" = 30'-0"

PLUMBING MATERIAL LIST

TAG NAME	DESCRIPTION	MANUFACTURER AND MODEL
AGF-1	AIR GAP FITTING - CAST IRON CONSTRUCTION, SET SCREW OR THREADED INLET, SELECT SIZE TO MATCH INDIRECT WASTE LINE INLET AND STANDPIPE OUTLET.	ZURN (Z1025), JOSAM (88900), SMITH (3955), WADE (W-2490)
BFP-1	REDUCED PRESSURE ZONE, STAINLESS STEEL CONSTRUCTION, SIZE SAME AS PIPE 3", NON-CORROSIVE INTERNAL PARTS, STAINLESS STEEL SPRINGS, DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN SPRING-LOADED CHECK VALVES, GATE STYLE SHUT-OFF VALVES ON INLET AND OUTLET OF UNIT, AIR GAP DRAIN FITTING, TEST PORTS WITH SHUT-OFF VALVES, RATED FOR 175 PSI AT 33°F TO 140°F, 15 PSI (MAXIMUM) PRESSURE DROP AT 10 FPS, FACTORY TESTED, ALL PARTS TO BE SERVICEABLE WITHOUT REMOVING UNIT FROM LINE, APPROVED BY USC FCCC & HR, AWWA C511-92, ASSE 1013, IAPMO AND SBCCI LISTED. MOUNT WITHIN 60" OF FINISHED FLOOR. ROUTE DRAIN PIPE FROM AIR GAP FITTING TO FLOOR DRAIN. PROVIDE AND INSTALL BRONZE OR EPOXY COATED STRAINER UPSTREAM OF EACH UNIT AND ADDITIONAL VALVE UPSTREAM OF EACH STRAINER. FLOW PRESSURE DROP CURVES SHALL BE SUBMITTED.	WATTS (957), APOLLO (RPLF4A), WILKINS (375AST), MIFAB (BEECO BARRACUDA 40 FRP SS)
BFP-2	REDUCED PRESSURE ZONE, LEAD FREE BRONZE CONSTRUCTION, SIZE SAME AS PIPE 3/4", NON-CORROSIVE INTERNAL PARTS, STAINLESS STEEL SPRINGS, DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN SPRING-LOADED CHECK VALVES, BALL STYLE SHUT-OFF VALVES ON INLET AND OUTLET OF UNIT, AIR GAP DRAIN FITTING, TEST PORTS WITH SHUT-OFF VALVES, RATED FOR 175 PSI AT 33°F TO 140°F, 15 PSI (MAXIMUM) PRESSURE DROP AT 10 FPS, FACTORY TESTED, ALL PARTS TO BE SERVICEABLE WITHOUT REMOVING UNIT FROM LINE, APPROVED BY USC FCCC & HR, AWWA C511-92, ASSE 1013, IAPMO AND SBCCI LISTED. MOUNT WITHIN 60" OF FINISHED FLOOR. ROUTE DRAIN PIPE FROM AIR GAP FITTING TO MOP BASIN. FLOW PRESSURE DROP CURVES SHALL BE SUBMITTED.	APOLLO (RPLF4A), WATTS (LF919), WILKINS (975XL2)
BP-1	BOOSTER PUMP - DUPLEX VARIABLE SPEED PUMP SYSTEM DESIGNED TO MEET THE FOLLOWING REQUIREMENTS. SYSTEM SHALL BE SKID MOUNTED, FULLY ASSEMBLED AND TESTED AT FACTORY BY MANUFACTURER. REFER TO SPECIFICATION SECTION 22 30 00 FOR ADDITIONAL INFORMATION. AREA SERVED - DOMESTIC COLD WATER INLET PRESSURE - 42.8 OUTLET PRESSURE - 68 GPM - 80 HYDROPNEUMATIC TANK SIZE - 45 VIBRATION ISOLATION TYPE - FLEXIBLE CONNECTOR ELECTRICAL REQUIREMENTS HORSEPOWER (EACH PUMP) - 3 PUMP RPM - 3450 VOLTAGE - 208 PHASE - 3 DISCONNECT BY - MFR DISCONNECT TYPE - NON-FUSED CONTROLLER/STARTER BY - MFR MANUFACTURER - US PUMP CORP MODEL - IBE2-SE20-GC25AG	BOOSTER PUMP - XYLEM B&G, GRUNDFOS, GOULDS, METROPOLITAN, HYFAB, QUANTUMFLO, US PUMP CORP
CP-1	CIRCULATING PUMP - VARIABLE SPEED, LEAD FREE BRONZE OR STAINLESS STEEL CONSTRUCTION, PERMANENTLY LUBRICATED SEALED BEARINGS, MECHANICAL SEAL, OIL LUBRICATED, ECM MOTOR WITH INTEGRATED VARIABLE SPEED CONTROL AND THERMAL OVERLOAD PROTECTION, ONE SET OF DRY CONTACTS FOR STATUS OUTPUT TO BMS, FLANGED CONNECTIONS, RATED FOR 125 PSIG AT 225°F, MANUFACTURER PROVIDED PUMP BODY INSULATION KIT, UL LISTED. 12 GPM @ 15 FEET OF HEAD. MOTOR SHALL BE 0.5 HP. ELECTRICAL REQUIREMENTS - 208V, 1 PHASE (HARD-WIRE)	PUMP - B&G (ECOCIRC XL SERIES), GRUNDFOS (MAGNA SERIES), WILO (STRATOS Z SERIES)
ET-1	EXPANSION TANK - WELDED STEEL CONSTRUCTION, GUARANTEED AIRTIGHT AND LEAKPROOF, STAINLESS STEEL SYSTEM CONNECTION, HEAVY DUTY BUTYL DIAPHRAGM AND RIGID POLYPROPYLENE LINER MECHANICALLY BONDED TO TANK TO PROVIDE A 100% NON-CORROSIVE WATER RESERVOIR, DIAPHRAGM AND LINER SHALL BE APPROVED FOR USE IN POTABLE WATER SYSTEMS, ALL WETTED COMPONENTS OF FDA APPROVED MATERIALS. PROVIDE STANDARD SCHRADER AIR VALVE FOR FIELD CHARGING. TANK SHALL COMPLY WITH FEDERAL ACT S.3874. MINIMUM TANK VOLUME TO BE 16 GALLONS MINIMUM ACCEPTING VOLUME TO BE 11 GALLONS TANK SHALL HAVE A WORKING TEMPERATURE OF 200°F AND A WORKING PRESSURE OF 125 PSIG. FACTORY PRE-CHARGED FOR SHIPPING. FIELD CHARGE TANK TO 55 PSIG.	EXPANSION TANK - AMTROL (THERM-X-TROL ST), B&G (PT), FLEXTRON (FTT), WATTS (PLT), WESSELS (T)
EWC-1	ELECTRIC WATER COOLER - WALL HUNG, RECESSED CHILLER, ADA COMPLIANT WITH MATCHING STAINLESS STEEL APRON INSTALLED UNDER UPPER UNIT, BI-LEVEL STAINLESS STEEL ROUND BASINS WITH STAINLESS STEEL FINISH, PERFORATED DRAINS, STREAM PROJECTORS WITH PROTECTIVE HOODS, PUSH BUTTON OPERATING CONTROLS ON FRONT, BUILT-IN FLOW REGULATORS, PLASTIC P-TRAP ASSEMBLIES, ACCESS PANEL, HERMETIC COMPRESSOR TO OPERATE ON HFC-134a REFRIGERANT, CONCEALED ELECTRICAL CONNECTIONS, ADJUSTABLE THERMOSTAT, CONFORM TO LATEST ANSI A117.1 AND ADA STANDARDS. UNIT SHALL COMPLY WITH FEDERAL ACT S.3874. BOTTLE FILLING STATION - RECESSED MOUNTED INTEGRAL TO WATER COOLER, STAINLESS STEEL CONSTRUCTION AND FINISH, ELECTRICAL AND COLD WATER SUPPLIED FROM COOLER CHILLING UNIT, SENSOR OPERATED WITH AUTOMATIC SHUTOFF, REPLACEABLE LEAD-CHLORINE-TASTE-ODOR WATER FILTER, BOTTLE COUNTER, ADJUSTABLE THERMOSTAT, FILTER REPLACEMENT INDICATOR. UNIT SHALL PROVIDE 8.0 GPH OF WATER FROM 80°F TO 50°F AT 90°F AMBIENT. WATER SYSTEM SHALL BE OF LEAD FREE CONSTRUCTION. TANK SHALL BE TESTED TO 125 PSIG. ORIFICE SHALL BE AT 36" (MAXIMUM) ABOVE FINISHED FLOOR ON LOWER UNIT AND 40" ABOVE FINISHED FLOOR ON UPPER UNIT. BOTTOM OF APRON SHALL BE 27" ABOVE FINISHED FLOOR ON LOWER UNIT IN COMPLIANCE WITH LATEST ADA STANDARDS. ELECTRICAL REQUIREMENTS - 1/2 HP MOTOR, 120V-1 PHASE, CORD AND PLUG, PLAIN RECEPTACLE MOUNTED WITHIN EWC LOWER ENCLOSURE, GFCI BREAKER. BOTTLE FILLING STATION WILL PIGGYBACK INTO ELECTRICAL CONNECTION TO WATER COOLER.	ELECTRIC WATER COOLER -ELKAY (LZWS-LRPBM28K), HALSEY TAYLOR (HTHBWF-OVLSER-1)
FCO-1	ADJUSTABLE, CAST IRON HOUSING, ANCHOR FLANGE, TAPERED THREAD PLUG, SECURED NICKEL BRONZE TOP. TOP STYLE SHALL MATCH FLOOR FINISH AS FOLLOWS: UNFINISHED FLOOR - ROUND SOLID SCORIATED TOP TILE OR TERRAZZO - ROUND RECESSED TOP CARPET - ROUND TOP WITH CARPET FLANGE.	ZURN (Z1400), JOSAM (55000), MIFAB (C1100), SMITH (4000), WADE (6000), WATTS (CO-200)
FD-1	CAST IRON BODY, NICKEL BRONZE ADJUSTABLE TOP, 5" ROUND, 4" BOTTOM OUTLET, FLASHING COLLAR. TRAP SEAL - 4", PLASTIC HOUSING WITH FLEXIBLE DIAPHRAGM, SEALING GASKETS, RECLOSES AND SEALS WHEN DISCHARGE IS COMPLETED, ASSE 1072.	FLOOR DRAIN - ZURN (Z-415), SMITH (2005), WADE (1100), JOSAM (30000), WATTS (FD-100), MIFAB (F1100), SUN (FD1000) TRAP SEAL - SURE SEAL (SS), PROVENT (TRAP GUARD), SMITH (QUAD CLOSE), GREEN DRAIN, MIFAB (MI-GARD)
FD-2	CAST IRON BODY, STAINLESS STEEL ADJUSTABLE TOP, 5" ROUND, 4" BOTTOM OUTLET, FLASHING COLLAR. TRAP SEAL - 4", PLASTIC HOUSING WITH FLEXIBLE DIAPHRAGM, SEALING GASKETS, RECLOSES AND SEALS WHEN DISCHARGE IS COMPLETED, ASSE 1072.	FLOOR DRAIN - ZURN (Z-415), SMITH (2005), WADE (1100), JOSAM (30000), WATTS (FD-100), MIFAB (F1100), SUN (FD1000) TRAP SEAL - SURE SEAL (SS), PROVENT (TRAP GUARD), SMITH (QUAD CLOSE), GREEN DRAIN, MIFAB (MI-GARD)
HB-1 2	8" WALL MOUNT MIXING FAUCET WITH POLISHED CHROME PLATED BRASS BODY, CERAMIC CARTRIDGES WITH CHECK VALVES, LEVER HANDLES, 1/2" NPT FEMALE INLETS, 16" RISER, CONTROL VALVE, WALL BRACKETS, CONTINUOUSPRESSURE VACUUM BREAKER, 36" FLEXIBLE WATER HOSE CONNECTOR WITH STAINLESS STEEL QUICK DISCONNECT, OPEN STAINLESS STEEL HOSE REEL WITH 3/8" X 35' HEAVY-DUTY NON-MARKING HOSE, RATCHETING SYSTEM,HIGH FLOW (2.84 GPM) STAINLESS STEEL REAR TRIGGER WATER GUN WITH QUICK-DISCONNECT, MULTI-FIT BRACKET AND ADJUSTABLE HOSE BUMPER. CERTIFIED TO ASSE 1056.	T&S (B-1433-713202QD) OR APPROVED EQUAL
HB-2 2	FREEZELESS WALL HYDRANT, BRASS VALVE BODY AND SEAT, STANDARD FINISH, NON-FERROUS METAL STEM, AUTOMATIC DRAINING, VACUUM BREAKER, 1" MALE HOSE THREAD, 1" INLET, WALL CLAMP, CONCEALED IN FLUSH MOUNTED LOCKABLE WALL BOX, KEY OPERATED, ASSE 1019 OR 1052 LISTED AND APPROVED. VERIFY NUMBER OF KEY OPERATORS TO BE PROVIDED WITH OWNER. BOX COVER AND HYDRANT SHALL USE A COMMON KEY. MOUNT AT 18" ABOVE GRADE UNLESS NOTED OTHERWISE ON DRAWINGS.	PRIER (C-634BX), WOODFORD (67), ZURN (Z1300), WATTS (HY-725), MIFAB (MHY-20), SMITH (5509QT), WADE (8700)
HB-3	FREEZELESS ROOF HYDRANT, ONE PIECE VARIABLE FLOW PLUNGER WITH ROD GUIDE, BUILT-IN STORAGE RESEVOIR AND VENTURI SYSTEM TO EVACUATE WATER AND ALLOW DRAIN BACK OPERATION FOR FREEZE PROOF WINTERIZATION WITHOUT A DRAIN CONNECTION, CAST IRON FLANGED HYDRANT SUPPORT WITH UNDER-DECK FLANGE, WELL SEAL BETWEEN SUPPORT AND HYDRANT PIPE WITH EDPM BOOT COVER. PROVIDE WITH ASSE 1052 OR 1057 APPROVED, FIELD TESTABLE, DOUBLE CHECK VALVE BACK FLOW PREVENTER WITH 3/4" THREADED HOSE CONNECTION AT HYDRANT OUTLET.	WOODFORD (SRH-MS), PRIER (P-RH4), FREEZE FLOW (2131RE)

PLUMBING MATERIAL LIST

TAG NAME	DESCRIPTION	MANUFACTURER AND MODEL
L-1	LAVATORY - ACCESSIBLE, WALL MOUNTED, WHITE VITREOUS CHINA, 20"x18", 4" HIGH CONTOURED BACKSPLASH, SINGLE FAUCET HOLE, DRILLED FOR CONCEALED ARM CARRIER. LAVATORY TRIM - SENSOR ACTIVATED NON-MIXING FAUCET, HARD WIRED, BRASS CONSTRUCTION, CHROME-PLATED FINISH, SPOUT WITH AERATOR, SINGLE HOLE INSTALLATION, INTEGRAL CHECK VALVES, PERFORATED GRID STRAINER WITH 1-1/4" 17 GAUGE TAILPIECE. ELECTRICAL REQUIREMENTS - 120 VAC INPUT MOUNT CONTROLS IN WATERPROOF VANDAL-RESISTANT ENCLOSURE BELOW LAVATORY. PROVIDE TRANSFORMER WITH CABLE EXTENSIONS (AS REQUIRED) OR PLUG-IN TRANSFORMER. MOUNT TRANSFORMER ABOVE CEILING OR IN ACCESSIBLE PIPE CHASE. COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR. SELECT TRANSFORMER TO SERVE MAXIMUM NUMBER OF ELECTRONIC VALVES TO REDUCE AMOUNT OF TRANSFORMERS. MAXIMUM FLOW TO BE 0.35 GPM IN COMPLIANCE WITH ENERGY POLICY ACT OF 2005 AND ASME/ANSI STANDARD A112.18.1M AND WATERSENSE LABELED PER LEED REQUIREMENTS. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AS REQUIRED. MOUNT MIXING VALVE UNDER COUNTER/LAVATORY. MIXING VALVE SHALL NOT BE WYE PATTERN STYLE. REFER TO MV-1 FOR MIXING VALUE DESCRIPTION INSULATION KIT - PRE-MANUFACTURED FOR P-TRAP, STOP VALVES AND SUPPLY LINES. ACCESSORIES - QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLY LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES, DRAIN AND OFFSET TAILPIECE, 1-1/4" 17 GAUGE CAST BRASS P-TRAP, SUPPORT CARRIER. MOUNT LAVATORY WITH SUPPORT CARRIER BOLTED SECURELY TO FLOOR. TOP OF RIM SHALL BE AT 34" ABOVE FLOOR IN COMPLIANCE WITH LATEST ADA STANDARD. PROVIDE 29" MINIMUM CLEARANCE FROM FLOOR TO BOTTOM OF APRON IN COMPLIANCE WITH LATEST ANSI A117.1 AND ADA STANDARDS. ARMAFLEX WITH TAPE IS NOT ACCEPTABLE IN LIEU OF INSULATION KIT.	LAVATORY - AMERICAN STANDARD (0356.421), KOHLER (K-2007), LAVATORY TRIM - SLOAN EAS-200 INSULATION KIT - TRUEBRO (LAV-GUARD), BROCAR PRODUCTS (TRAP WRAP), MCGUIRE (PROWRAP), PLUMBEREX (PRO-EXTREME)
LI-1	SOLIDS INTERCEPTOR - ACID RESISTANT COATED STEEL BODY, RECESSED INSTALLATION, REMOVABLE STAINLESS STEEL SEDIMENT BASKET, GASKETED COVER, 3" SIDE INLET AND OUTLET. MINIMUM CAPACITY 6 GALLONS MAINTAIN REQUIRED CLEARANCE ABOVE INTERCEPTOR FOR REMOVAL OF SEDIMENT BUCKET. PROVIDE EXTENSIONS AS REQUIRED FOR IN-FLOOR INSTALLATIONS.	ZURN (Z-1181), JOSAM (61040), MIFAB (MI-SOLID-L), SMITH (8715), WADE (5740L), WATTS (SI-742-L)
MB-1	MOP BASIN - 316 STAINLESS STEEL, 16 GAUGE, 24"x24"x10", COORDINATE RIGHT/LEFT CORNER WITH DOCUMENTS, STAINLESS STEEL DRAIN WITH GRID STRAINER, 2" OUTLET, VINYL BUMPER GUARD ON EXPOSED SIDES. TRIM - EXPOSED TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, SINGLE WING HANDLES, 1/4 TURN CERAMIC DISC CARTRIDGE, 3/4" HOSE THREAD SPOUT WITH ASSE 1053 RATED INTEGRAL VACUUM BREAKER, WALL BRACE, PAIL HOOK, CHECK STOPS OR INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. ACCESSORIES - MOP HANGER, HOSE AND HOSE BRACKET, TRAP TWO 24" WIDE STAINLESS STEEL WALL GUARD	MOP BASIN - FRANKE COMMERCIAL (FSS222210/316-1) TRIM - CHICAGO FAUCETS (897-CP), VACUUM BREAKER - WATTS (8A), OR APPROVED EQUAL
MBT-1	MOP BASIN TRIM - EXPOSED TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, SINGLE WING HANDLES, 1/4 TURN CERAMIC DISC CARTRIDGE, 3/4" HOSE THREAD SPOUT, INTEGRAL VACUUM BREAKER, WALL BRACE, PAIL HOOK, CHECK STOPS OR INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. MOUNT AT 30" ABOVE FLOOR.	CHICAGO FAUCETS (897-CP)
MV-1	MIXING VALVE - POINT-OF-USE ANTI-SCALD THERMOSTATIC MIXING VALVE FOR TEMPERED WATER CONTROL, ALL BRONZE/BRASS CONSTRUCTION, ROUGH FINISH, THREADED INLETS, TAMPER RESISTANT SETPOINT, 3/8" COMPRESSION INLETS AND OUTLETS, COLD WATER BYPASS IF USED WITH MIXING FAUCET. CABINET - SEMI-RECESSED 18 GAUGE PAINTED STEEL CABINET WITH 16 GAUGE LOCKING DOOR TO ENCLOSE VALVE, INLET STOPS, OUTLET THERMOMETER, AND OUTLET VALVES. 0.5 GPM OUTPUT. UNIT TO MIX 120 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 110 DEGREE F OUTLET. UNIT SHALL BE ASSE 1070 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874.	WATTS (LFUSG-B), LEONARD (170D-LF), LAWLER (TMM-1070T), ACORN CONTROLS (ST70), APOLLO (34DLF), POWERS (LFE480), SLOAN (MIX-135-A), SYMMONS (8210CK), WILKINS (ZW3870XLT)
MV-2	MIXING VALVE - SINGLE MASTER THERMOSTATIC MIXING VALVE ARRANGEMENT FOR TEMPERED WATER CONTROL, ALL BRONZE/BRASS CONSTRUCTION, ROUGH BRASS FINISH, UNION INLETS WITH STRAINERS, COMBINATION CHECK STOPS OR SEPARATE SUPPLY CHECK VALVES AND SHUT OFF VALVES, DIAL THERMOMETER ON OUTLET AND INLETS. RATED FOR GPM OUTPUT MAXIMUM AT 5 PSI DIFFERENTIAL AND 35 GPM OUTPUT MINIMUM BASED UPON CONTINUOUS RECIRCULATION. UNIT TO MIX 140 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 120 DEGREE F OUTLET. PROVIDE FIELD ADJUSTMENT BY FACTORY AUTHORIZED REPRESENTATIVE. UNIT SHALL BE ASSE 1017 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874. CABINET - SEMI-RECESSED 18 GAUGE PAINTED STEEL CABINET WITH 16 GAUGE LOCKING DOOR TO ENCLOSE VALVE, INLET STOPS, OUTLET THERMOMETER, AND OUTLET VALVES. UNIT SHALL BE ASSE 1070 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874.	LEONARD (XL-LF SERIES), ACORN CONTROLS (MV17 SERIES), BRADLEY (TMV SERIES), LAWLER (800 SERIES), POWERS (LFMM430 SERIES), SYMMONS (TEMPCONTROL SERIES 7)
MV-3	MIXING VALVE - POINT-OF-USE ANTI-SCALD THERMOSTATIC MIXING VALVE ARRANGEMENT FOR TEMPERED WATER CONTROL, ALL BRONZE/BRASS CONSTRUCTION, ROUGH FINISH, UNION/THREADED INLETS WITH STRAINERS, COMBINATION CHECK STOPS OR SEPARATE SUPPLY CHECK VALVES AND SHUT OFF VALVES. RATED FOR 1.5 GPM OUTPUT MAXIMUM AT 10 PSI DIFFERENTIAL AND 0.5 GPM OUTPUT MINIMUM. UNIT TO MIX 120 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 110 DEGREE F OUTLET. UNIT SHALL BE ASSE 1070 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874.	LEONARD (170-LF/270-LF/370-LF), ACORN CONTROLS (ST7069), APOLLO (34BLF), BRADLEY (S59 SERIES), LAWLER (310/570), POWERS (SERIES LFLM495), SYMMONS (8210CK MAXLINE SERIES), WATTS (LFMMV), WILKINS (ZW1070XL)
MV-4	MIXING VALVE - POINT-OF-USE ANTI-SCALD THERMOSTATIC MIXING VALVE ARRANGEMENT FOR TEMPERED WATER CONTROL, ALL BRONZE/BRASS CONSTRUCTION, ROUGH FINISH, UNION/THREADED INLETS WITH STRAINERS, COMBINATION CHECK STOPS OR SEPARATE SUPPLY CHECK VALVES AND SHUT OFF VALVES. CABINET - SURFACE MOUNTED 18 GAUGE STAINLESS STEEL CABINET WITH 16 GAUGE LOCKING DOOR TO ENCLOSE VALVE, INLET STOPS, OUTLET THERMOMETER, AND OUTLET VALVES. RATED FOR 6 GPM OUTPUT MAXIMUM AT 10 PSI DIFFERENTIAL AND 0.5 GPM OUTPUT MINIMUM. UNIT TO MIX 120 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 110 DEGREE F OUTLET. UNIT SHALL BE ASSE 1070 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874.	LEONARD (170-LF/270-LF/370-LF), ACORN CONTROLS (ST7069), APOLLO (34BLF), BRADLEY (S59 SERIES), LAWLER (310/570), POWERS (SERIES LFLM495), SYMMONS (8210CK MAXLINE SERIES), WATTS (LFMMV), WILKINS (ZW1070XL)
RD-1	ROOF DRAIN - CAST IRON BODY, SECURED CAST IRON DOME, 15" ROUND, BOTTOM OUTLET, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, BEARING PAN, ADJUSTABLE EXTENSION TO MATCH INSULATION THICKNESS, OUTLET SIZE AS LISTED ON DRAWINGS.	ZURN (Z-100), SMITH (1010), WADE (3000), JOSAM (21500), WATTS (RD-300), MIFAB (R1200), SUN (RD4000), FROET (200C)

PLUMBING MATERIAL LIST

TAG NAME	DESCRIPTION	MANUFACTURER AND MODEL
SHV-1	SHOWER VALVE - ACCESSIBLE, SINGLE HANDLE THERMOSTATIC MIXING FAUCET, BRASS OR BRONZE CONSTRUCTION, WASHERLESS DESIGN, OFF-COLD-HOT TEMPERATURE RANGE INDICATOR DIAL, POLISHED CHROME CAST METAL LEVER HANDLE, INTEGRAL CHECK-STOPS, ADJUSTABLE SAFETY LIMIT STOP, ASSE 1016 LISTED. ACCESSORIES - ADJUSTABLE SPRAY HAND HELD SHOWER WITH 1.5 GPM FLOW AND 72" CHROME-PLATED METAL HOSE AND QUICK DISCONNECT, CHROME-PLATED BRASS SHOWERHEAD WITH SWIVEL BALL JOINT ADJUSTABLE SPRAY, CHROME-PLATED BRASS ARM AND FLANGE, CHROME-PLATED BRASS SWIVEL CONNECTOR, 36" CHROME-PLATED MOUNTING RAIL, CHROME-PLATED BRASS SUPPLY ELBOW FLANGE, CHROME-PLATED IN-LINE VACUUM BREAKER WITH CHROME-PLATED PIPING AND FLANGES, CHROME-PLATED BRASS DIVERTER. INSTALL ALL CONTROLS BETWEEN 38" AND 48" ABOVE FINISHED FLOOR IN COMPLIANCE WITH LATEST ADA STANDARDS. INSTALL BOTTOM OF SHOWERHEAD AT 72" ABOVE FINISHED FLOOR. MAXIMUM FLOW TO BE 1.5 GPM WATERSENSE LABELED PER LEED REQUIREMENTS. SET SAFETY LIMIT STOP TO 110 DEGREE F DISCHARGE.	POWERS (E420), DELTA (R10000-UNWS/T17TH155-20[R 10700-UNWS/T17TH325-20]), LAWLER (3800), LEONARD (7600)
SI-1	SOLIDS INTERCEPTOR - FRONT ACCESS, CLEAR POLYCARBONATE VIEW INSIDE WITH INTEGRAL SEDIMENT BASKET, QUARTER TURN REMOVAL, PVC BODY, TOP INLET, BOTTOM OR EITHER SIDE OUTLET, GASKETED CLEANOUT COVER, 2" SIDE INLET AND OUTLET. MAINTAIN REQUIRED CLEARANCE IN FRONT OF INTERCEPTOR FOR REMOVAL OF BASKET.	STRIEM (SIDEKICK)
SK-1	SINK - ACCESSIBLE, SELF-RIMMING SINGLE COMPARTMENT WITH FAUCET DECK, 18 GAUGE TYPE 304 STAINLESS STEEL, 19-1/2" (SIDE-TO-SIDE) x 19" (FRONT-TO-BACK) OVERALL SIZE, 16" x 13-1/2" x 5 1/2" DEEP BOWL, COMPLETELY UNDERCOATED, 3-1/2" DIAMETER DRAIN OUTLET LOCATION CENTERED IN BOWL, PERFORATED TYPE 304 STAINLESS STEEL GRID STRAINER. SINK TRIM - TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, INTEGRAL CAST BODY, CHROME-PLATED FINISH, GOOSENECK SWING SPOUT, NOMINAL 6" REACH, AERATOR, LEVER BLADE HANDLES AT 8" CENTERS, 1/4-TURN OPERATION CERAMIC DISC CARTRIDGE. MAXIMUM FLOW TO BE 1.5 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED. ACCESSORIES - OFFSET 1-1/2" 17 GAUGE CHROME-PLATED BRASS TAILPIECE AND P-TRAP, QUARTER-TURN BALL VALVE TYPE 3/8" CHROME-PLATED BRASS ANGLE SUPPLIES WITH LOOSE KEY STOPS, CHROME-PLATED SOFT COPPER SUPPLY LINES.	SINK - ELKAY (LRAD/LKAD18 LKAD35 LR/LK18B LK99), JUST (SL-ADA/J-ADA-35-FS J-ADA-35/SL/J-35-SSF JB-99), FRANKE (ALBS LBS) SINK TRIM - CHICAGO FAUCET (1100)
SK-2	SINK - ACCESSIBLE, SELF-RIMMING DOUBLE COMPARTMENT WITH FAUCET DECK, 18 GAUGE TYPE 304 STAINLESS STEEL, COMPLETELY UNDERCOATED, 37" (SIDE-TO-SIDE) x 22" (FRONT-TO-BACK) OVERALL SIZE, EACH COMPARTMENT 16" x 16" x 7-5/8" DEEP, 3-1/2" DIAMETER DRAIN OUTLET LOCATION CENTERED IN EACH BOWL, PERFORATED TYPE 304 STAINLESS STEEL GRID STRAINER. SINK TRIM - SINK TRIM - TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, INTEGRAL CAST BODY, CHROME-PLATED FINISH, GOOSENECK SWING SPOUT, NOMINAL 6" REACH, AERATOR, LEVER BLADE HANDLES AT 8" CENTERS, 1/4-TURN OPERATION CERAMIC DISC CARTRIDGE. MAXIMUM FLOW TO BE 1.5 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AND ESCUTCHEON PLATE AS REQUIRED. ACCESSORIES - OFFSET 1-1/2" 17 GAUGE CHROME-PLATED BRASS TAILPIECE AND P-TRAP, QUARTER-TURN BALL VALVE TYPE 3/8" CHROME-PLATED BRASS ANGLE SUPPLIES WITH LOOSE KEY STOPS, CHROME-PLATED SOFT COPPER SUPPLY LINES.	SINK - ELKAY (LRAD/LKAD18 LKAD35 LR/LK18B LK99), JUST (DL-ADA/J-ADA-35-FS J-ADA-35 DL/J-35-SSF JB-99), FRANKE (ALBD LBD) SINK TRIM - CHICAGO FAUCET (1100)
SS-1	SINGLE TUB, POLYPROPYLENE CONSTRUCTION, 20"x24", 14" DEEP BOWL, BAKED ENAMEL LEGS, FAUCET SHELF. SINK TRIM - TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, DOMED SINGLE WING HANDLES, 4" CENTERS, 8" SWING SPOUT, AERATOR. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. ACCESSORIES - REMOVABLE STRAINER PLATE AND NEOPRENE STOPPER, 1-1/2" 17 GAUGE CHROME PLATED BRASS TAILPIECE, CHROME PLATED CAST BRASS P-TRAP, QUARTER-TURN 3/8" CHROME PLATED BRASS ANGLE SUPPLIES WITH LOOSE KEY STOPS, INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER, CHROME PLATED SOFT COPPER SUPPLY LINES. SINK TRIM - TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, DOMED SINGLE WING HANDLES, 4" CENTERS, 8" SWING SPOUT, AERATOR. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. ACCESSORIES - REMOVABLE STRAINER PLATE AND NEOPRENE STOPPER, 1-1/2" 17 GAUGE CHROME PLATED BRASS TAILPIECE, CHROME PLATED CAST BRASS P-TRAP, QUARTER-TURN 3/8" CHROME PLATED BRASS ANGLE SUPPLIES WITH LOOSE KEY STOPS, INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER, CHROME PLATED SOFT COPPER SUPPLY LINES.	SINK - FIAT (P-1), MUSTEE (14) TRIM - CHICAGO FAUCET (1891-XKABCP)
TD-1	TRENCH DRAIN - TRENCH DRAIN CHANNEL SHALL BE SLOPED (0.75%) OR NEUTRAL AND SEAMLESSLY MOLDED FROM LIGHTWEIGHT, DURABLE, CHEMICAL-RESISTANT MATERIAL. CHANNEL SHALL INCLUDE CONSTRUCTION COVERS (2), STAINLESS STEEL GRATE ANCHORS (6), AND INTEGRAL BOTTOM OUTLET FOR OPTIONAL CONNECTION. CHANNEL SHALL BE DESIGNED WITH STRUCTURE-REINFORCING RIBS AND SIDE ANCHORS (12 PER CHANNEL) FOR SECURING CHANNEL TO RE-BAR (½" #4). CHANNELS SHALL CONNECT END-TO-END, IN PROPER SEQUENCE, WITH MECHANICAL, TONGUE-IN-GROOVE STYLE JOINT. CHANNEL SHALL HAVE A MODIFIED BOTTOM RADIUS TO IMPROVE FLOW RATE AND REDUCE SEDIMENT BUILDUP. DESIGNED IN ACCORDANCE WITH ASME A112.6.3-01) CHANNEL: HIGH DENSITY POLYETHYLENE GRATE ANCHORS: STAINLESS STEEL CONSTRUCTION COVER: HIGH DENSITY POLYETHELYNE SCREWS: STAINLESS STEEL LENGTH SEGMENTS: 72" (MAXIMUM) CONTRACTOR TO FIELD COORDINATE TRENCH DRAIN SIZES FOR WALL TO WALL KENNEL INSTALLATION. OVERALL WIDTH 9.75" CHANNEL WIDTHL: 4.5" COVER WIDTH: 6" FINISH GRATE: PERFORATED STAINLESS CORROSION-RESISTANT 304 STAINLESS STEEL (16 GAUGE) MATERIAL. GRATE TO BE RATED FOR DIN CLASS A LOADING.	DURA TRENCH (DTPF4), SMITH, ABT, WATTS, ACO

PLUMBING MATERIAL LIST

TAG NAME	DESCRIPTION	MANUFACTURER AND MODEL
WC-1	WATER CLOSET - ACCESSIBLE, WALL MOUNTED, FLUSH VALVE TYPE, WHITE VITREOUS CHINA, SIPHON JET, WATER SAVING, ELONGATED BOWL, 1-1/2" TOP SPUD. FLUSH VALVE - EXPOSED, WALL MOUNTED SENSOR OPERATION, HARDWIRED, 1.28 GALLONS PER FLUSH, 11-1/2" ROUGH IN, CHROME PLATED 1" I.P.S. SCREWDRIVER STOP-CHECK VALVE WITH VANDAL RESISTANT CAP, HIGH BACK PRESSURE VACUUM BREAKER, ADJUSTABLE TAILPIECE, SPUD COUPLING AND FLANGE, WALL FLANGE WITH SET SCREW, MECHANICAL OVER-RIDE BUTTON, RANGE ADJUSTMENT SCREW, CHLORAMINE RESISTANT MATERIALS, CHROME PLATED COVER PLATE WITH TAMPER-PROOF SCREWS, TRANSFORMER AND LOW VOLTAGE WIRING, TRANSFORMER CAPABLE OF OPERATING UP TO 10 UNITS, LOW VOLTAGE WIRING FROM TRANSFORMER TO EACH FLUSH VALVE, ADA COMPLIANT, 3 YEAR WARRANTY, WATERSENSE LABELED PER LEED REQUIREMENTS. ELECTRICAL REQUIREMENTS - 120VAC INPUT SEAT - WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED SOLID ANTI-MICROBIAL PLASTIC, SELF-SUSTAINING HINGE, STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS. CONTRACTOR OPTION: COMBINATION WATER CLOSET/FLUSH VALVE PACKAGED SYSTEM BY AMERICAN STANDARD, KOHLER, SLOAN, OR ZURN ACCESSORIES - WATER CLOSET SUPPORT CARRIER RATED FOR 500 LBS. MOUNT WATER CLOSET WITH CARRIER BOLTED SECURELY TO FLOOR. TOP OF SEAT SHALL BE AT 17"-19" ABOVE FINISHED FLOOR (VERIFY EXACT MOUNTING HEIGHT WITH MANUFACTURER). FLUSH HANDLE SHALL BE LOCATED ON THE WIDE SIDE OF THE TOILET STALL AND BE AT 12" (MAXIMUM) ABOVE BOWL RIM AND OPERATE WITH NO GREATER THAN 5 LB FORCE IN COMPLIANCE WITH LATEST ADA STANDARDS. VERIFY EQUIPMENT REQUIREMENTS AND ROUGH-IN LOCATIONS.	WATER CLOSET - AMERICAN STANDARD (2257.101),KOHLER (K-84325) FLUSH VALVE -SLOAN (SOLIS 8111) SEAT - BEMIS (3155SSCT), CHURCH (3155C), BENEKE (533PC), OLSONITE (95), SAME AS WATER CLOSET MANUFACTURER
WCO-1	END CAP, CAST IRON ACCESS BODY, GAS AND WATERTIGHT BRONZE OR BRASS THREADED PLUG, ROUND STAINLESS STEEL ACCESS COVER, EXTENDED MACHINE SCREW.	ZURN (Z-1441), SMITH (4422), WADE (W-8480-R/8550), JOSAM (58600-CO), WATTS (CO-380-RD), MIFAB (C1450-RD)
WH-1	WATER HEATER - ELECTRIC, VERTICAL, METAL CABINET, BAKED ENAMEL FINISH, GLASS-LINED ASME STAMPED WELDED STEEL TANK, 150 PSI WORKING PRESSURE, FIBERGLASS OR FOAM INSULATION, BRASS WATER CONNECTIONS AND DRAIN VALVE, ASME APPROVED T&P RELIEF VALVE, MAGNESIUM ANODE ROD, INDIVIDUAL FLANGE-MOUNTED IMMERSION HEATING ELEMENTS SHEATHED WITH CORROSION-RESISTANT METAL ALLOY, EXTERNALLY ADJUSTABLE AUTOMATIC IMMERSION WATER THERMOSTAT, MANUAL RESET HIGH TEMPERATURE CUTOFF SWITCH, ENCLOSED CONTROLS, VENTILATED CONTROL CABINET, PILOT LIGHTS INDICATING MAIN POWER AND HEATING STEPS, CONTROL CIRCUIT TOGGLE SWITCH, SEQUENCING STEP CONTROLLER, CONTROL TRANSFORMER, POWER CIRCUIT FUSES, MAGNETIC CONTACTORS, CERAMIC TERMINAL BLOCK, FACTORY ASSEMBLED AND WIRED, 3-YEAR WARRANTY, UL LISTED, NEC COMPLIANT ELECTRICAL COMPONENTS, COMPLIANT TO NAECA, ASHRAE 90.1 AND ASHRAE 90A. 120 GALLON CAPACITY, 36 KW ELEMENT(S), 148 GPH RECOVERY RATE AT 100°F TEMPERATURE RISE. HEATING ELEMENTS RATED FOR LESS THAN 75 WATTS PER SQUARE INCH. ELECTRICAL REQUIREMENTS - 208V-3 PHASE HEATING CIRCUIT, 120V CONTROL CIRCUIT. SET WATER TEMPERATURE AT 140°F.	A.O. SMITH (DVE), AMERICAN (ITCE31), BOCK (F SERIES), BRADFORD WHITE (M-II), RHEEM/RUUD (E SERIES), STATE (SSE), HTP (CGE SERIES HEAVY DUTY)
WHA-1	WATER HAMMER ARRESTOR - BELLOWS TYPE, PRE-CHARGED, ALL LEAD FREE STAINLESS STEEL CONSTRUCTION, ASSE 1010 APPROVED, PDI CERTIFIED, RATED FOR 1-11 FIXTURE UNITS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.	ZURN (Z1700), JR SMITH (5005-5050), WADE (W5-100), JOSAM (75000 SERIES), WATTS (SS), MIFAB (WHB)
WMF-1	PVC/PLASTIC ENCLOSURE, 2" CENTER DRAIN AND TRAP (LOCATED 18"-30" BELOW BOX) , INLET STRAINER, SCREEN OR SEDIMENT BASKET, TWO QUARTER-TURN ANGLE VALVES WITH 1/2" THREADED OUTLETS AND INTEGRAL WATER HAMMER ARRESTORS.	WATER-TITE (4700 HA SERIES), OATEY (38000 SERIES), GUY GRAY
YCO-1	ROUND, DURA-COATED CAST IRON, SIZE AS LISTED ON DRAWINGS, DOUBLE FLANGED HOUSING, HEAVY DUTY SECURED SCORIATED DURA-COATED CAST IRON COVER, LIFTING DEVICE, BRONZE CLEANOUT PLUG WITH GAS/WATER-TIGHT SEAL.	ZURN (Z1474), SMITH (4261), WADE (8401), JOSAM (58680), WATTS (CO-300-MF), MIFAB (C1300-MF)

3" = 1'-0"
1" = 1'-0"
1/2" = 1'-0"
1/4" = 1'-0"
1/8" = 1'-0"
1/16" = 1'-0"
1" = 30'-0"

Permit Stamp

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	DH
Checked	JMO
Proj. Arch./Eng.	TD

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202
Project Name

PLUMBING MATERIAL LISTS
Sheet Name

Drawing No. **P7-0**

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Illinois Design Firm Registration #184.007637-0014

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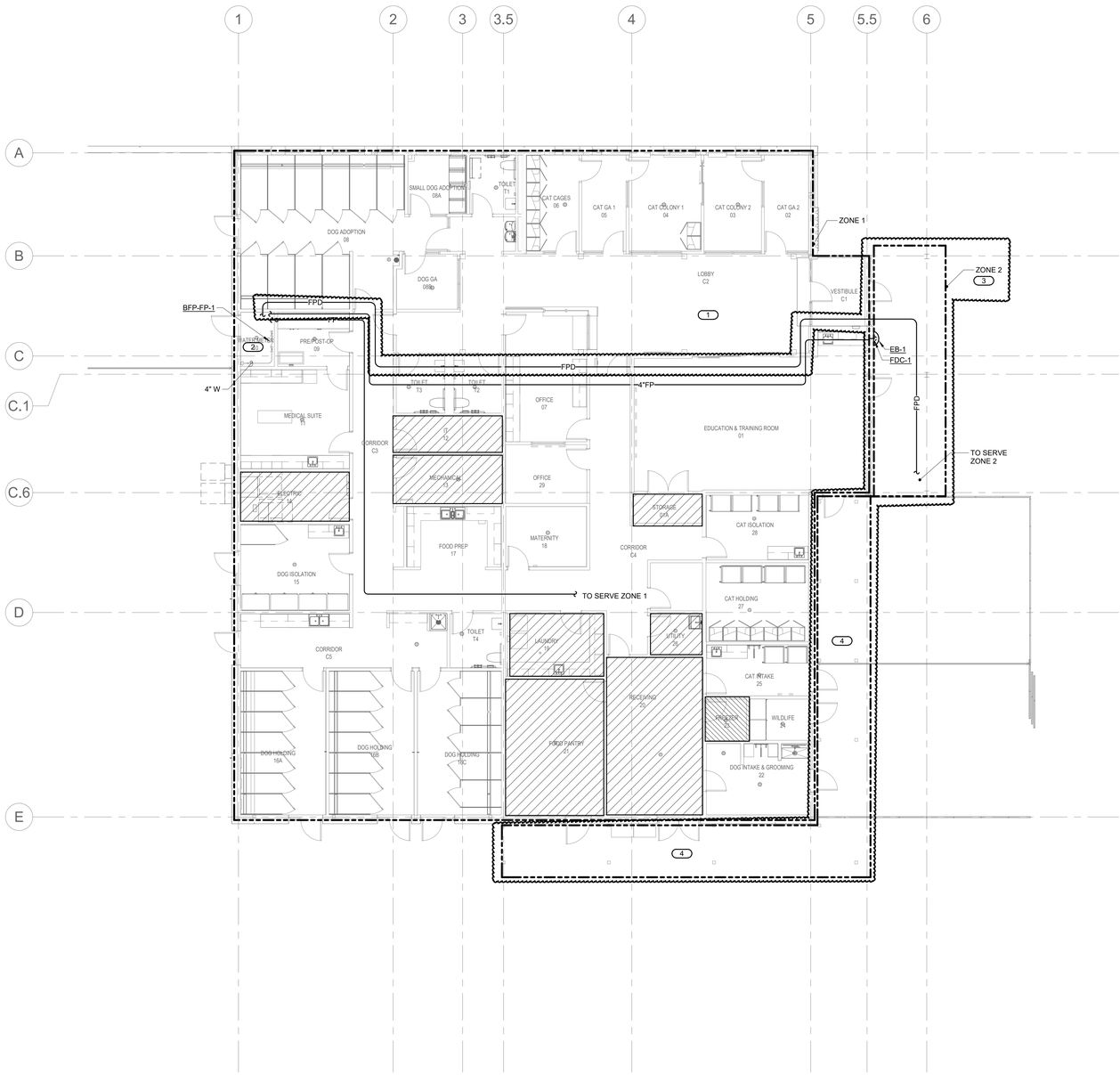
REF. SCALE IN INCHES
PROJECT #22000606.00



NORTH

1 FIRST FLOOR - FIRE PROTECTION

1/8" = 1'-0"

GENERAL SHEET NOTES:

1. PROVIDE SPRINKLER COVERAGE IN ALL SPACES AS PER NFPA 13.
2. SPRINKLER MAIN GENERAL ROUTING IS SHOWN WITHIN CORRIDORS. ROUTING SHALL BE VERIFIED BY FIRE PROTECTION CONTRACTOR IN COORDINATION WITH MECHANICAL CONTRACTOR AND COORDINATION DRAWINGS.
3. FIRE PROTECTION SPRINKLER PIPING SHALL BE RELOCATED TO ACCOMODATE OTHER TRADES AND WORK. ALL OTHER TRADES AND WORK SHALL TAKE PRECEDENCE FOR COORDINATION.
4. FIRE SPRINKLER PIPING SHALL NOT BE INSTALLED UNTIL MECHANICAL VENTILATION WORK IS COMPLETED UNLESS ALL WORK IS COORDINATED PRIOR DURING COORDINATION MODEL PROCESS.
5. REFER TO 1/F5-0 FOR PIPE SUPPORT DETAIL.
6. REFER TO 1/F5-0 FOR PIPE THROUGH NON-FIRE RATED WALL DETAIL.
7. REFER TO 3/F5-0 FOR SPRINKLER HEAD MOUNTING DETAIL.

KEYNOTES: (#)

1. LOBBY AND CLERESTORY SHALL BE SERVED BY SIDEWALL SPRINKLER HEADS ON EITHER SIDE OF LOBBY. NO PIPING OR EXPOSED SPRINKLERS SHALL BE ALLOWED. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL DETAIL.
2. REFER TO 4/F5-0 FOR FIRE SPRINKLER RISER DIAGRAM.
3. AREA SHALL BE SERVED BY DRY PIPE SPRINKLER SYSTEM DUE TO CANOPY BEING PROVIDED IS CONSTRUCTED OF FLAMMABLE MATERIAL. ALL SPRINKLER HEADS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS. ALL EXPOSED PIPING SHALL BE PAINTED, COLOR TO BE PROVIDED BY ARCHITECT.
4. ADD ALTERNATE #1: AREA SHALL BE SERVED BY DRY PIPE SPRINKLER SYSTEM DUE TO CANOPY BEING PROVIDED IS CONSTRUCTED OF FLAMMABLE MATERIAL. ALL SPRINKLER HEADS SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS. ALL EXPOSED PIPING SHALL BE PAINTED, COLOR TO BE PROVIDED BY ARCHITECT. REFER TO ARCHITECTURAL DRAWINGS A4-3 FOR ADDITIONAL DETAILS ON AREA WITHIN ALTERNATE #1.

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON ANIMAL SHELTER

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Project Name

FIRST FLOOR - FIRE PROTECTION

Sheet Name

Drawing No. **F1-1**

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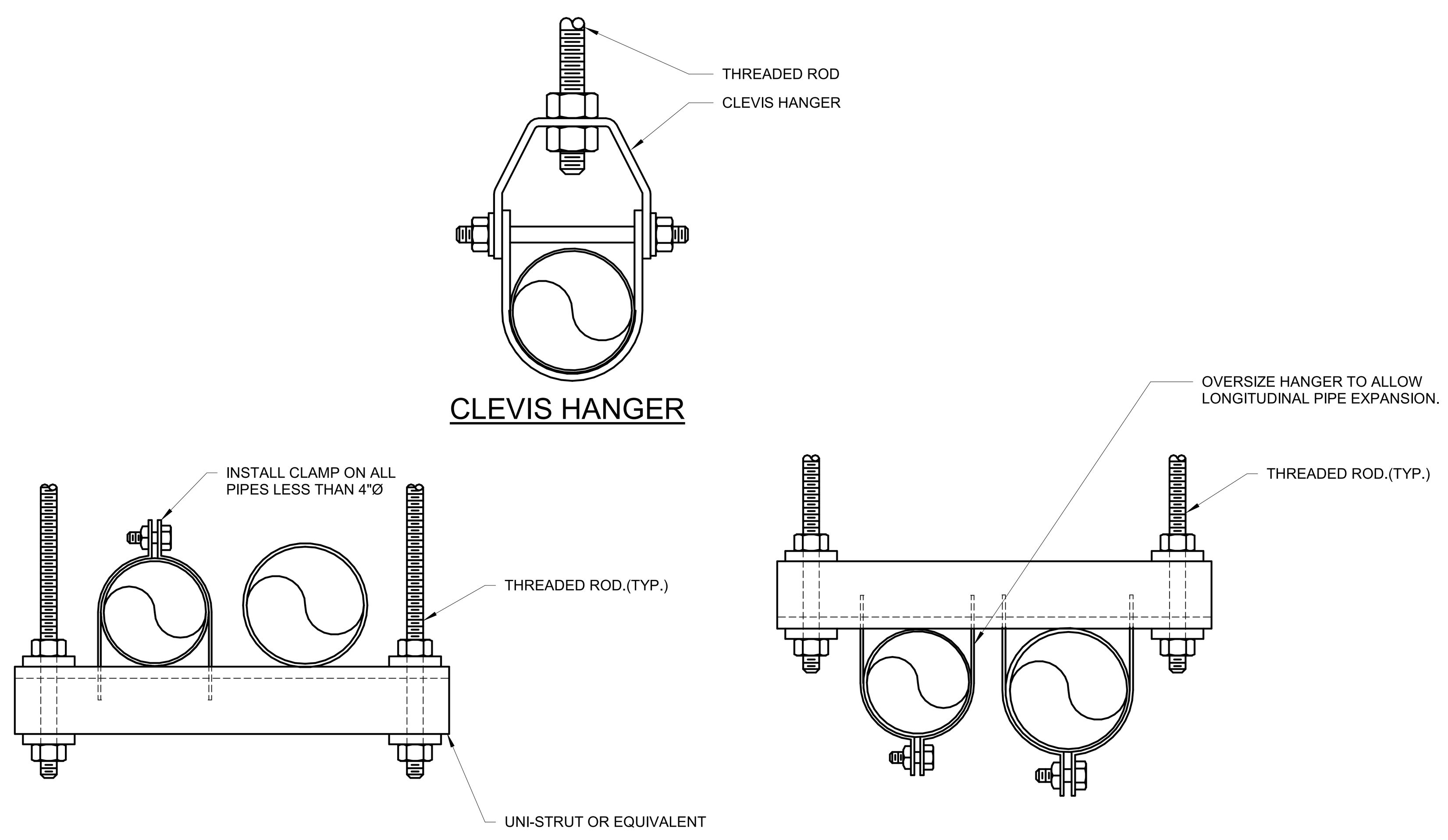
REF. SCALE IN INCHES

PROJECT #220006.00

3" = 1'- 0" | 1" = 1'- 0" | 1/2" = 1'- 0" | 1/4" = 1'- 0" | 1/8" = 1'- 0" | 1/16" = 1'- 0" | 1" = 30' - 0"

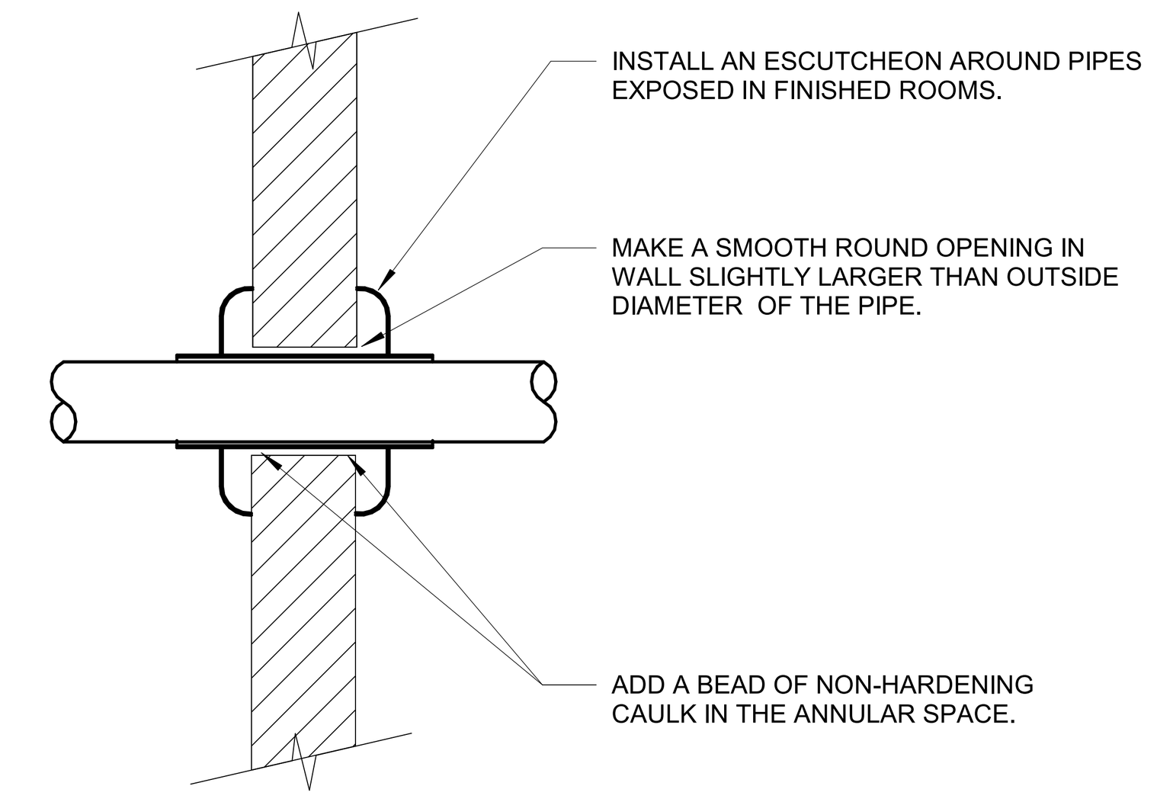


1 PIPE SUPPORT DETAIL

NO SCALE

NOTES:

1. REFER TO SPECIFICATION SECTION 21 05 29.



2 PIPE THROUGH NON-FIRE RATED WALL

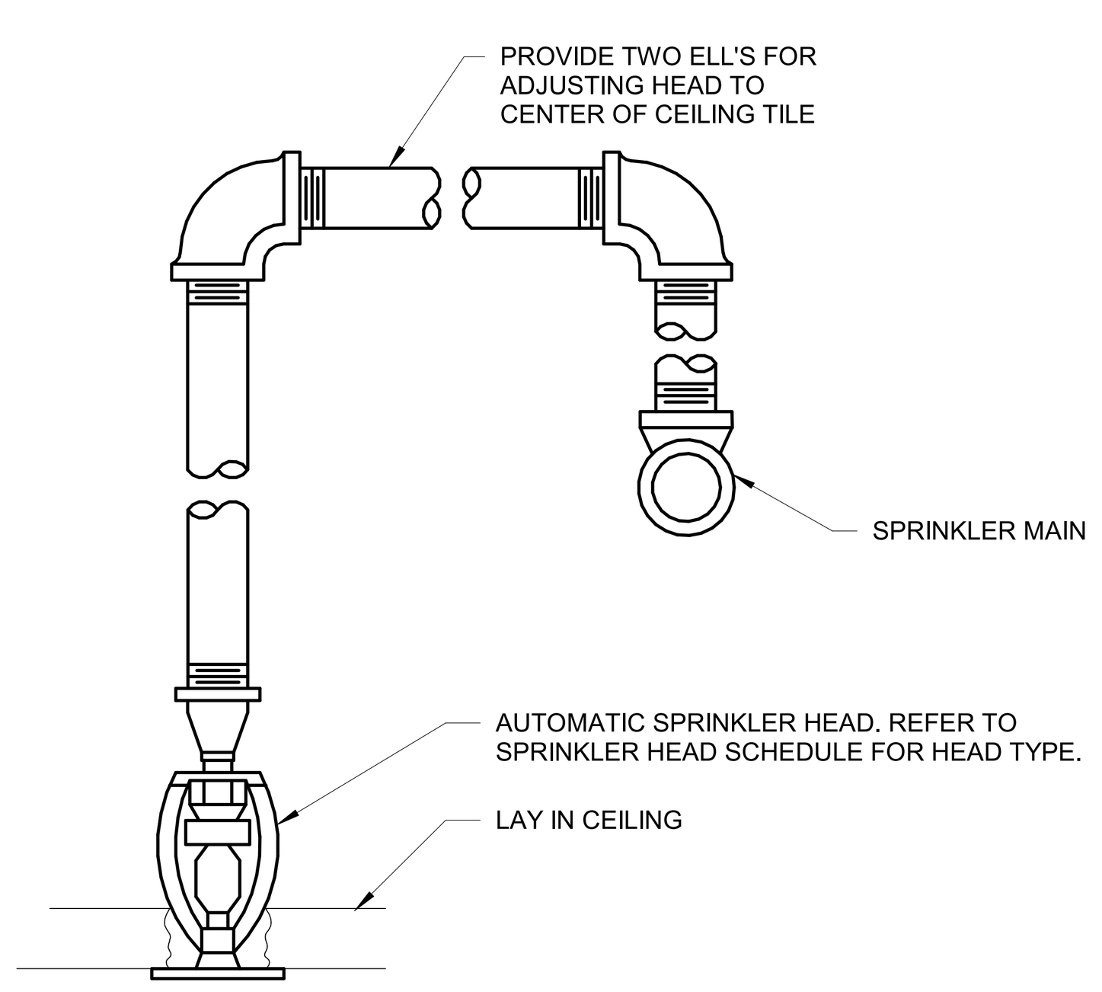
NO SCALE

NOTES:

1. THIS DETAIL APPLIES TO ALL PIPES. THE INTENTION IS TO PERMIT THERMAL EXPANSION AND TO SEAL AIRTIGHT AROUND PIPES FOR NOISE TRANSMISSION CONTROL.
2. SEE SPECIFICATION SECTION 21 05 03 - FIRE PROTECTION FOR ADDITIONAL INFORMATION.

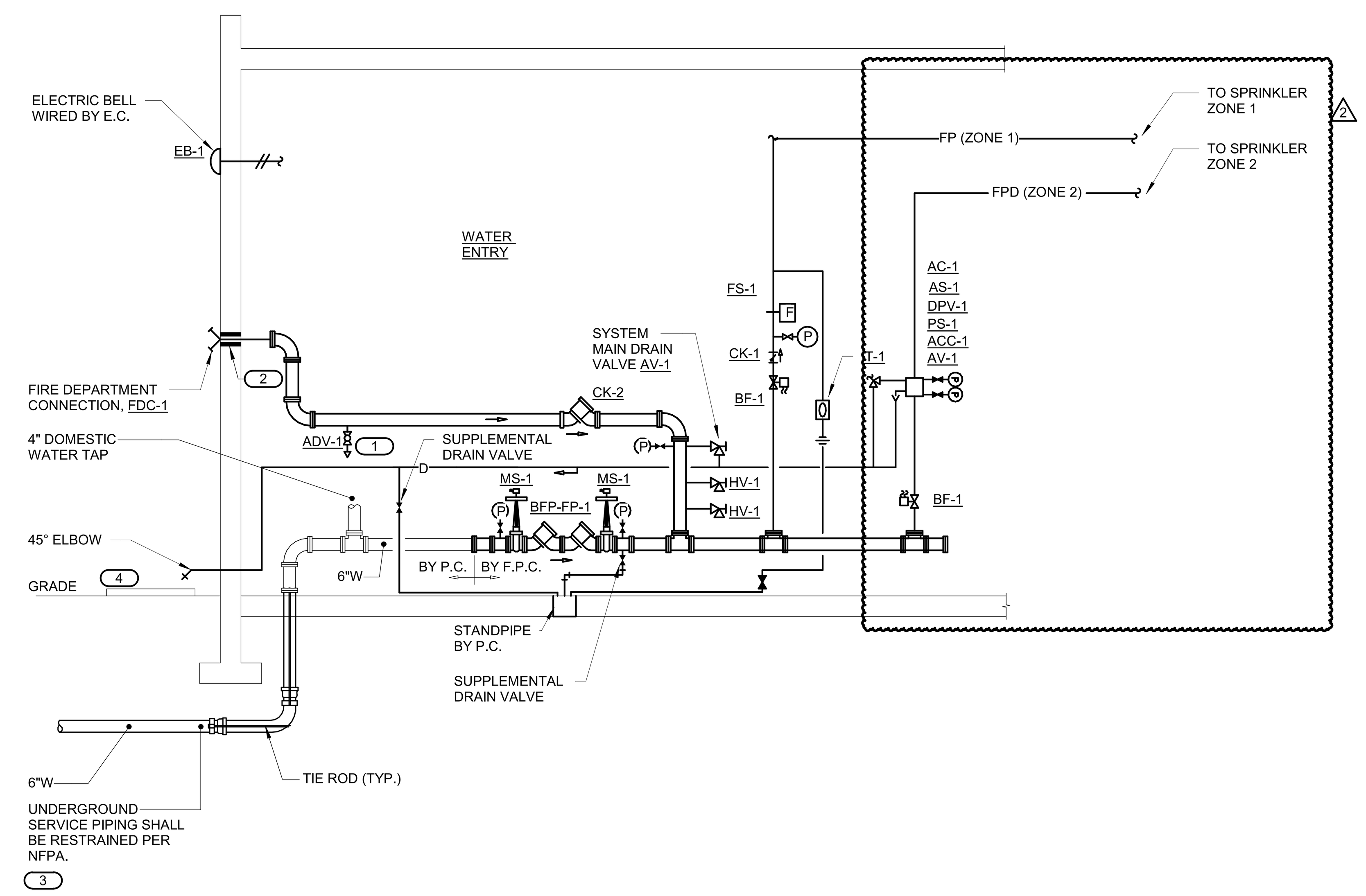
FIRE PROTECTION MATERIAL LIST

TAG NAME	DESCRIPTION	MANUFACTURER AND MODEL
AC-1	RISER MOUNTED AIR COMPRESSOR, FULLY AUTOMATIC, DIRECT DRIVE, OIL LESS PISTON COMPRESSOR, SINGLE STAGE, AIR COOLED, UL LISTED FIELD ADJUSTABLE PRESSURE SWITCH, PRESSURE GAUGE, PRESSURE RELIEF VALVE, BUBBLE TIGHT CHECK VALVE, INTAKE FILTER, RISER MOUNTING BRACKET, STAINLESS STEEL FLEXIBLE HOSE, UL 1450 FOR USE WITH FIRE SPRINKLER SYSTEMS. CAPACITY: SIZED TO FILL SPRINKLER SYSTEM TO 40 PSI WITHIN 30 MINUTES PER NFPA 13 REQUIREMENTS. ELECTRICAL CHARACTERISTICS: 1/3 HP, 115 V, 1 PHASE.	GENERAL AIR PRODUCTS OL PLUS SERIES, GAST
ACC-1	ACCELERATOR, 250 PSI, PILOT OPERATED, 1500 GALLON MAXIMUM SYSTEM CAPACITY, AUTOMATIC OR MANUAL RESET, INTEGRAL OR EXTERNAL ANTI-FLOOD DEVICE, UL/FM. ACCELERATOR SHALL BE THE SAME MFR. OF DRY PIPE VALVE. PROVIDE ALL REQUIRED TRIM FOR PROPER SYSTEM OPERATION.	VIKING E-1/B-1, TYCO ACC-1, RELIABLE B-1, VICTUALIC SERIES 746-LPA, GLOBE MODEL C/D
ADV-1	AUTOMATIC DRIP VALVE, FOR USE ON INLET SIDE OF FDC OR PUMPER CONNECTION, 175 PSI, BRASS OR BRONZE BODY, STAINLESS STEEL OR BERYLLIUM COPPER SPRING AND RETAINING RING, MIN. CLOSING PRESSURE 7 PSI WITH INCREASING PRESSURE, MIN OPENING PRESSURE 5 PSI WITH DECREASING PRESSURE, 1/2" NPT INLET AND 1/4" NPT DRAIN OUTLET. VALVE ORIENTATION SHALL BE INSTALLED ACCORDING TO MFR. RECOMMENDATIONS, UL/FM	VIKING B-1, TYCO AD-2, RELIABLE MODEL C
AS-1	HIGH/LOW AIR SUPERVISORY PRESSURE SWITCH, 250 PSI, 10 TO 100 PSI FIELD ADJUSTABLE PRESSURE RANGE, 2 TO 5 PSI ACTUATION DIFFERENTIAL, TWO SINGLE POLE DOUBLE THROW CONTACTS, NEMA 4 INDOOR/OUTDOOR RATED METAL HOUSING, BLEEDER VALVE, UL/FM.	POTTER PS40, SYSTEM SENSOR EPS40
AV-1	ANGLE VALVE, 1/2" TO 2", 175 PSI, RISING STEM, BRASS/BRONZE BODY, BRASS/BRONZE BONNET, INTEGRAL SEAT, SOFT DISC, HANDWHEEL, THREADED. UL.	UNITED BRASS WORKS 126SUL, NIBCO T-301-W, FPPI 06-800
BF-1	INDICATING BUTTERFLY VALVE, NORMALLY OPEN, 175 PSI WWP, GROOVED TYPE, DUCTILE IRON BODY WITH PROTECTIVE COATING, ELECTROLESS NICKEL OR EPDM COATED DUCTILE IRON DISC, STAINLESS STEEL STEM AND SCREWS, CAST OR DUCTILE IRON HANDWHEEL, EPDM SEAT, INDICATOR FLAG, FACTORY MOUNTED INTEGRAL MONITOR SWITCHES, UL/FM. LUGGED OR WAFER VALVES ARE ACCEPTABLE PROVIDED THEY HAVE THE FEATURES LISTED ABOVE.	NIBCO GD-4765-8N, VICTAULIC SERIES 705, TYCO BFV-300, KENNEDY G300, GLOBE GLR300G, REL-BFG-300
BFP-FP-1	REDUCED PRESSURE ZONE BACK FLOW PREVENTER - LISTED FOR USE IN FIRE PROTECTION SYSTEM, 175 PSI WWP AT 33°F TO 140°F, STAINLESS STEEL CONSTRUCTION, SIZE SAME AS PIPE 4", LEAD FREE, NON-CORROSIVE INTERNAL PARTS, STAINLESS STEEL SPRINGS, DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN SPRING-LOADED CHECK VALVES, GATE STYLE SHUT-OFF VALVES ON INLET AND OUTLET OF UNIT, AIR GAP DRAIN FITTING, TEST PORTS WITH SHUT-OFF VALVES, 15 PSI (MAXIMUM) PRESSURE DROP AT 10 FPS, FACTORY TESTED, ALL PARTS TO BE SERVICEABLE WITHOUT REMOVING UNIT FROM LINE, APPROVED BY USC FCCC & HR, AWWA C511-92, ASSE 1013, IAPMO AND SBCCI LISTED. MOUNT WITHIN 60" OF FINISHED FLOOR. ROUTE DRAIN PIPE FROM AIR GAP FITTING TO FLOOR DRAIN. FLOW PRESSURE DROP CURVES SHALL BE SUBMITTED.	AMES C400, ZURN WILKINS 375AST, APOLLO RPLF4A
CK-1	SWING CHECK VALVE, 300 PSI WWP, GROOVED/FLANGED TYPE, DUCTILE IRON BODY, STAINLESS STEEL HINGE ASSOCIATED WITH RUBBER FACED CLAPPER, BRASS SEAT RING, ACCESS COVER, 1/2" OR 3/4" TAPPED BOSSES, VALVE LISTED FOR HORIZONTAL OR VERTICAL INSTALLATION, UL/FM. FLANGED TYPE IS ACCEPTABLE PROVIDED VALVE HAS THE FEATURES LISTED ABOVE.	VIKING G-1, TYCO CV-1F
CK-2	SWING CHECK VALVE, MIN. 250 PSI WWP, GROOVED/FLANGED TYPE, DUCTILE IRON BODY, STAINLESS STEEL HINGE ASSOCIATED WITH RUBBER FACED CLAPPER, BRASS SEAT RING, 1/2" TAPPED BOSS UPSTREAM OF SEAT, VALVE LISTED FOR HORIZONTAL OR VERTICAL INSTALLATION, UL/FM.	VIKING M-2, TYCO CV-300B, RELIABLE MODEL G, VICTAULIC 717
DPV-1	DRY PIPE VALVE, LATCHING DIFFERENTIAL TYPE VALVE, GROOVED/FLANGED INLET/OUTLET, 175 PSI RATING, DUCTILE IRON BODY AND VALVE COVER, LATCHING SPRING LOADED CLAPPER ASSEMBLY, EXTERNAL RESET CAPABILITY, AIR TO WATER PRESSURE AREA DIFFERENTIAL OF APPROXIMATELY 6 TO 1, TAPPED OUTLET FOR DRAIN VALVE, UL/FM. VALVE TRIM PIPE AND FITTINGS SHALL BE GALVANIZED. PROVIDE AIR AND WATER GAUGES, ISOLATION VALVES, DRIP CUP, AND DRAIN VALVE AS REQUIRED FOR PROPER SYSTEM OPERATION.	TYCO DPV-1, VIKING G, RELIABLE DDX-LP, VICTAULIC 768N, GLOBE MODEL RCW
EB-1	FIRE SPRINKLER ELECTRIC BELL - 10" GONG SIZE, RATED FOR INDOOR OR OUTDOOR USE, WEATHERPROOF RED STEEL COVER AND BACKBOX, 120VAC, UL/FM.	POTTER PBA120, SYSTEM SENSOR SSV
FDC-1	FLUSH TWO WAY FIRE DEPT. INLET CONNECTION, CAST BRASS BODY WITH POLISHED BRASS FINISH, 4" OR 6" OUTLET WITH TWO 2-1/2" INLETS AND DROP CLAPPERS, DOUBLE FEMALE SNOOTS WITH RIGID END N.P.T. X PIN LUG HOSE THREAD SWIVELS, PLUGS AND CHAINS, WALL PLATE WITH SAME FINISH AS BODY LABELED "AUTO SPKR", UL. HOSE THREAD TYPE SHALL MATCH LOCAL FIRE DEPARTMENT REQUIREMENTS. CONTRACTOR TO COORDINATE PURCHASE OF LOCKING CAPS WITH LOCAL FIRE DEPARTMENT.	FDC: POTTER ROEMER 5020 SERIES, ELKHART BRASS MODEL 166, CROKER SERIES 6010/6020, GUARDIAN SERIES 6020 LOCKING CAP: KNOX COMPANY 3041
FS-1	FLOW SWITCH - VANE TYPE, 450 PSI, FLOW SENSITIVITY OF 4-10 GPM, TWO SINGLE POLE DOUBLE THROW SWITCHES, PNEUMATIC RETARD ADJUSTABLE FROM 0-90 SECONDS WITH AUTOMATIC RESET, NEMA 4 INDOOR/OUTDOOR RATED METAL HOUSING, UL/FM.	POTTER VSR, SYSTEM SENSOR WFD
HV-1	2-1/2" HOSE VALVE, 300 PSI, ANGLE TYPE, FEMALE x MALE THREADED INLET/OUTLET, CAST BRASS BODY AND TRIM, RISING STEM, RED HAND WHEEL, POLISHED BRASS BODY, UL/FM. 2 1/2" CAP AND CHAIN, PIN LUGS, FINISH TO MATCH VALVE BODY. HOSE THREAD TYPE SHALL MATCH LOCAL FIRE DEPARTMENT REQUIREMENTS.	HOSE VALVE: POTTER ROEMER 4065, ELKHART BRASS U-25-2.5, CROKER 5015, ZURN WILKINS 212-F100, DIXON AV250-I CAP AND CHAIN: POTTER ROEMER 4625, ELKHART 310, CROKER 5713, ZURN WILKINS C/C, DIXON FC250
IT-1	COMBINATION INSPECTOR'S TEST AND DRAIN VALVE, 300 PSI, INTEGRAL SIGHT GLASS, BALL VALVE PLATE INDICATING OFF-TEST-DRAIN POSITIONS, FURNISHED WITH TEST ORIFICE GIVING FLOW EQUIVALENT TO ONE SPRINKLER OF A TYPE HAVING THE SMALLEST ORIFICE INSTALLED ON THE SYSTEM, PRESSURE RELIEF VALVE, UL/FM.	AGF M1011A, RELIABLE MODEL TD, VICTAULIC TESTMASTER, GLOBE UTD W/ MODEL ARV PRV
MS-1	OS&Y SUPERVISORY SWITCH, FOR USE ON VALVES 2" TO 12" IN SIZE, TWO SINGLE POLE DOUBLE THROW CONTACTS, NEMA 3R DIE CAST ENCLOSURE WITH CORROSION RESISTANT PARTS, TAMPER RESISTANT, KNOCKOUTS FOR 1/2" CONDUIT, UL/FM.	POTTER OSYSU, SYSTEM SENSOR OSY2
PS-1	WATERFLOW PRESSURE SWITCH, 250 PSI, 4 TO 15 PSI FIELD ADJUSTABLE PRESSURE RANGE, 2 PSI ACTUATION DIFFERENTIAL, TWO SINGLE POLE DOUBLE THROW CONTACTS, NEMA 4 INDOOR/OUTDOOR RATED METAL HOUSING, BLEEDER VALVE, UL/FM.	POTTER PS10, SYSTEM SENSOR EPS10



3 SPRINKLER HEAD MOUNTING DETAIL

NO SCALE



4 FIRE PROTECTION RISER DIAGRAM

NO SCALE

#	KEYNOTES
1.	DISCHARGE DOWN OVER NEAREST FLOOR DRAIN.
2.	SEAL WALL PENETRATION WATERTIGHT.(TYPICAL)
3.	REFER TO 4/P5-0 FOR UNDERGROUND WATER MAIN ANCHORING DETAIL.
4.	PROVIDE CONCRETE SPLASHBLOCK AT GRADE.
5.	SPRINKLERS AT TOP OF ELEVATOR SHAFT.

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Project Number	16015
Drawn	Author
Checked	Checker
Proj. Arch./Eng.	Approver

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

2310 Oakton St, Evanston, IL 60202

Project Name

FIRE PROTECTION DETAILS

Sheet Name

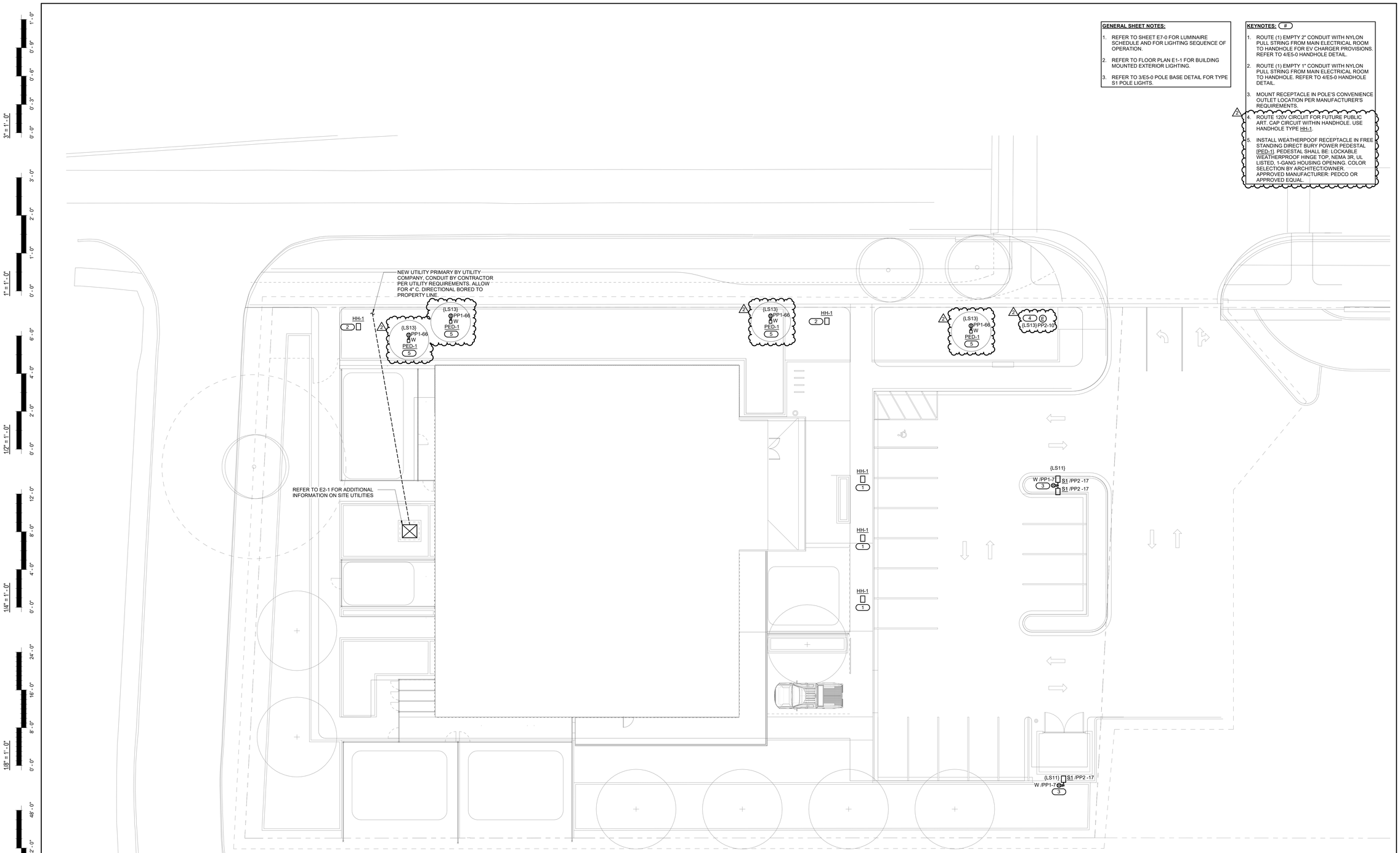
Drawing No. **F5-0**

GENERAL SHEET NOTES:

1. REFER TO SHEET E7-0 FOR LUMINAIRE SCHEDULE AND FOR LIGHTING SEQUENCE OF OPERATION.
2. REFER TO FLOOR PLAN E1-1 FOR BUILDING MOUNTED EXTERIOR LIGHTING.
3. REFER TO 3/E5-0 POLE BASE DETAIL FOR TYPE S1 POLE LIGHTS.

KEYNOTES: (#)

1. ROUTE (1) EMPTY 2" CONDUIT WITH NYLON PULL STRING FROM MAIN ELECTRICAL ROOM TO HANDHOLE FOR EV CHARGER PROVISIONS. REFER TO 4/E5-0 HANDHOLE DETAIL.
2. ROUTE (1) EMPTY 1" CONDUIT WITH NYLON PULL STRING FROM MAIN ELECTRICAL ROOM TO HANDHOLE. REFER TO 4/E5-0 HANDHOLE DETAIL.
3. MOUNT RECEPTACLE IN POLE'S CONVENIENCE OUTLET LOCATION PER MANUFACTURER'S REQUIREMENTS.
4. ROUTE 120V CIRCUIT FOR FUTURE PUBLIC ART. CAP CIRCUIT WITHIN HANDHOLE. USE HANDHOLE TYPE HH-1.
5. INSTALL WEATHERPOOF RECEPTACLE IN FREE STANDING DIRECT BURY POWER PEDESTAL (PED-1). PEDESTAL SHALL BE: LOCKABLE WEATHERPROOF HINGE TOP, NEMA 3R, UL LISTED, 1-GANG HOUSING OPENING. COLOR SELECTION BY ARCHITECT/OWNER. APPROVED MANUFACTURER: PEDCO OR APPROVED EQUAL.



1 SITE PLAN - ELECTRICAL

3/32" = 1'-0"

NORTH

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Project Name

SITE PLAN - ELECTRICAL

Sheet Name

Drawing No. **E0-1**

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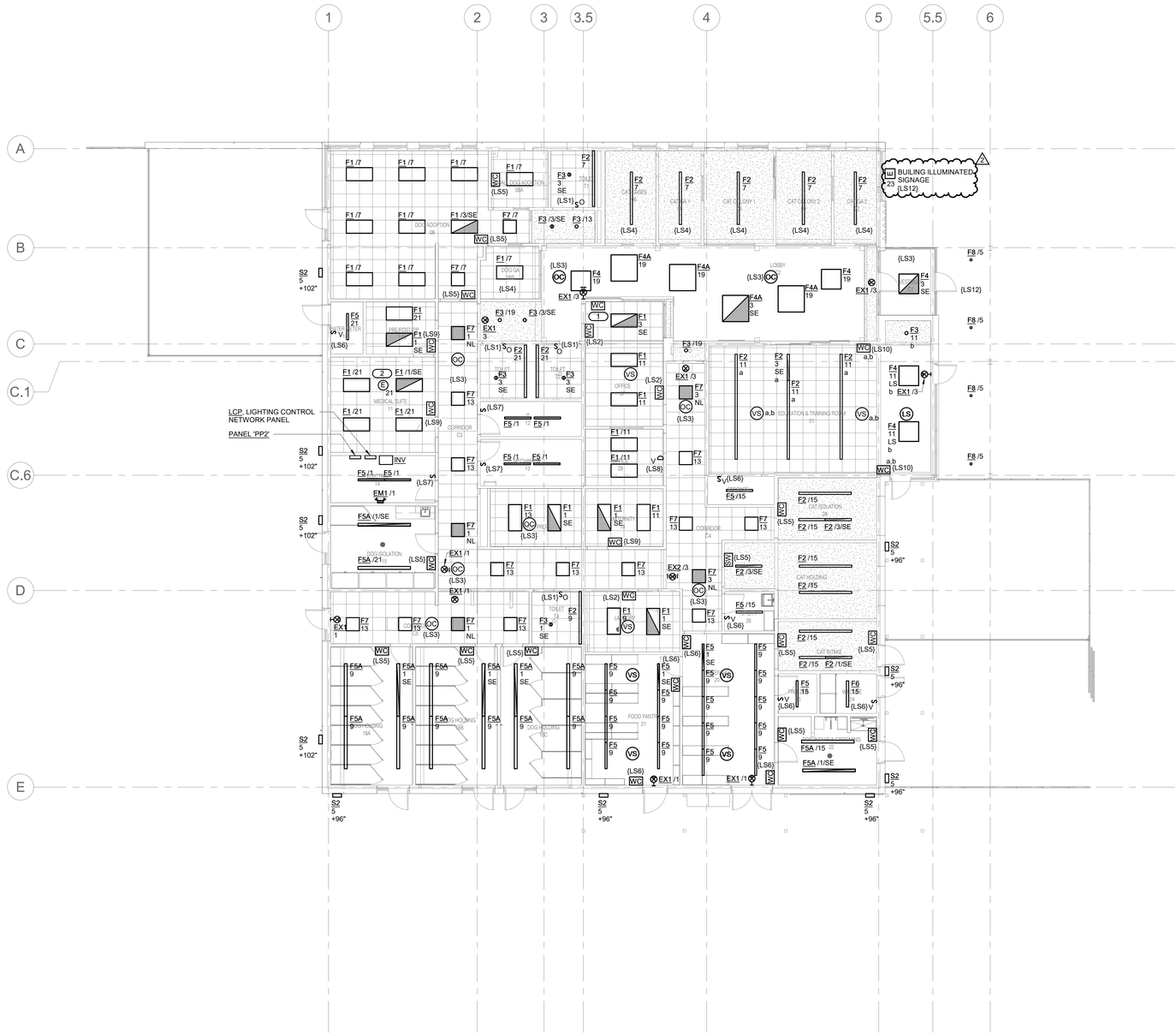
REF. SCALE IN INCHES 0 1 2 3

PROJECT #220006.00

3" = 1'-0" 1" = 1'-0" 1/2" = 1'-0" 1/4" = 1'-0" 1/8" = 1'-0" 1/16" = 1'-0" 1" = 30'-0"



1 FIRST FLOOR - LIGHTING

1/8" = 1'-0"

NORTH

GENERAL SHEET NOTES:

1. REFER TO SHEET E7-0 FOR LUMINAIRE SCHEDULE AND FOR LIGHTING SEQUENCE OF OPERATION.
2. REFER TO SITE PLAN E0-1 FOR EXTERIOR POLE LIGHTS.
3. ALL LIGHTING SHALL BE CIRCUITED TO PANEL 'PP2', UNO.
4. EXIT SIGNS, SWITCHED EMERGENCY ('SE') LUMINAIRES, NIGHT LIGHT ('NL') LUMINAIRES, AND EXTERIOR BUILDING LUMINAIRES CIRCUITS SHALL BE ROUTED THROUGH A SINGLE EMERGENCY LIGHTING INVERTER, INV, WITH MULTIPLE OUTPUTS. REFER TO PANEL SCHEDULE AND SPECIFICATION SECTION 26 52 15.
5. EXTERIOR BUILDING LIGHTING SHALL BE CONTROLLED BY LIGHTING SEQUENCE (LS12).

KEYNOTES: (#)

1. WALL CONTROLLER TO PROVIDE TIME SCHEDULE OVERRIDE FOR COLONY ROOMS. PROVIDE 1-GANG DEVICE WITH 4 BUTTONS ENGRAVED WITH "COLONIES ON", COLONIES OFF", "50% ON", AND "100% ON". REFER TO (LS4) FOR ADDITIONAL INFORMATION.
2. CEILING MOUNTED EXAM LIGHT (WALDMANN), FURNISHED BY OWNER, INSTALLED AND WIRED BY E.C. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER. LIGHT TO BE PROVIDED WITH INTEGRAL ON/OFF AND DIMMING CONTROLS.

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Project Name

FIRST FLOOR - LIGHTING

Sheet Name

Drawing No. **E1-1**

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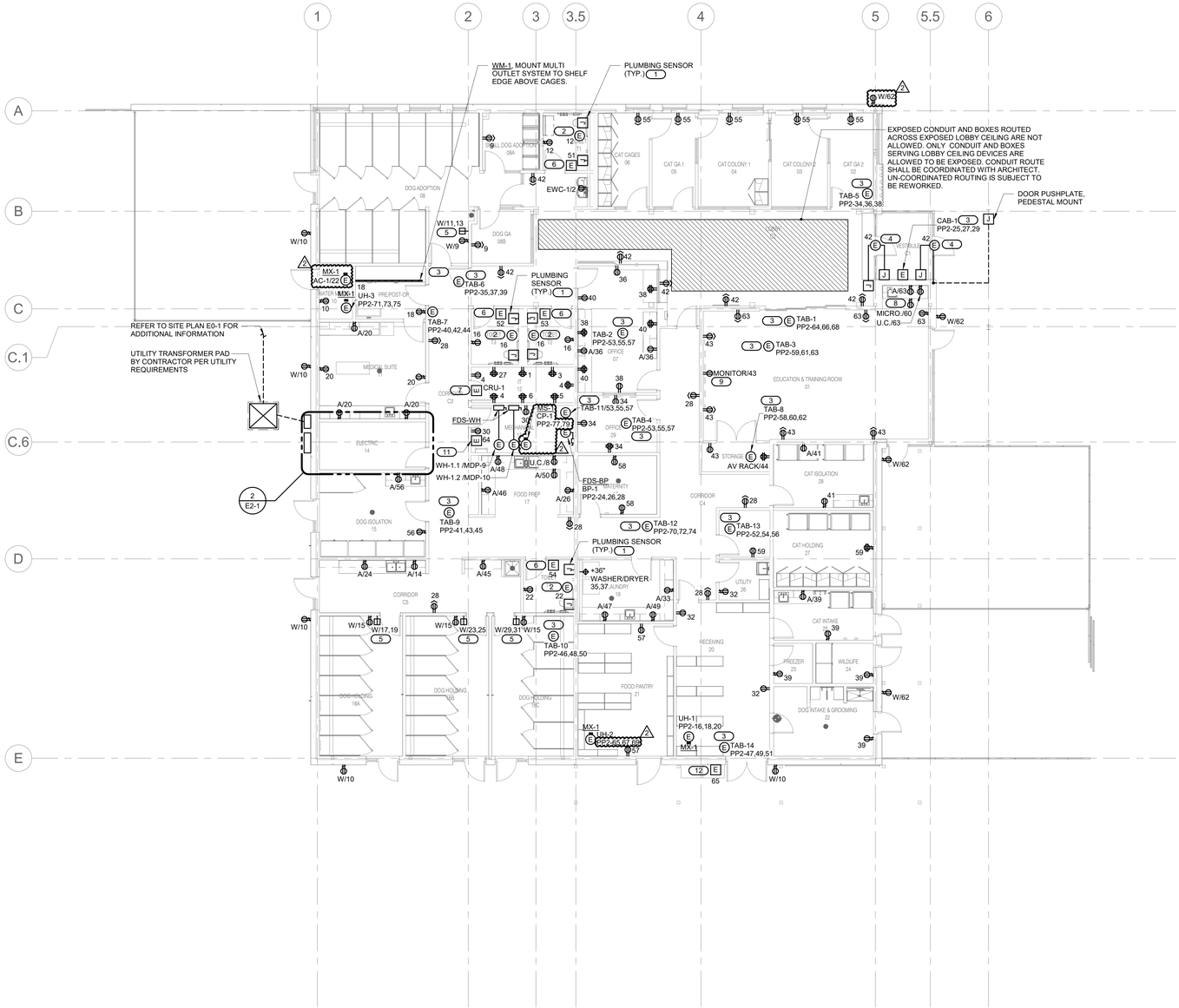
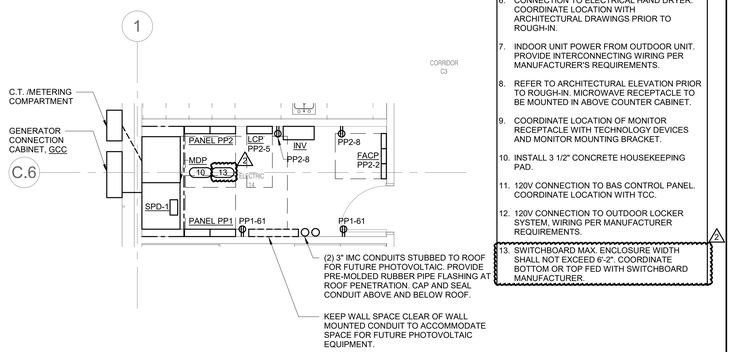
1" = 30'-0" 1/16" = 1'-0" 1/8" = 1'-0" 1/4" = 1'-0" 1/2" = 1'-0" 1" = 1'-0" 3" = 1'-0"



1 FIRST FLOOR - POWER
1/8" = 1'-0"



2 ENLARGED MAIN ELECTRICAL ROOM
1/4" = 1'-0"

GENERAL SHEET NOTES:

1. ALL DEVICES AND ELECTRICAL CONNECTIONS SHALL BE CIRCUITED TO PANEL 'PP1', UNO.

KEYNOTES: (#)

1. JUNCTION BOX FOR PLUMBING SENSOR. ROUTE 1/2" C. FROM PLUMBING SENSOR TO TRANSFORMER LOCATED ABOVE THE CEILING. WIRING PER MANUFACTURER'S REQUIREMENTS. COORDINATE WORK AND CONDUIT ROUTE FROM SENSOR WITH P.C.
2. CONNECT TO PLUMBING SENSOR TRANSFORMER LOCATED ABOVE THE CEILING. COORDINATE QUANTITY AND LOCATION WITH P.C.
3. DISCONNECT/STARTER PROVIDED WITH EQUIPMENT, WIRED BY E.C.
4. CONNECTION TO DOOR OPERATOR. WIRING PER MANUFACTURER'S REQUIREMENTS.
5. PROVIDE NEMA 5-20R CONVENIENCE RECEPTACLE AND NEMA 6-20R POWER WASHER CONNECTION. COORDINATE EXACT POWER WASHER RECEPTACLE CONFIGURATION WITH FURNISHED EQUIPMENT. PROVIDE BOTH RECEPTACLES WITH WEATHERPROOF COVERS. REFER TO SPECIFICATION SECTION 26 27 26 FOR ADDITIONAL INFORMATION.
6. CONNECTION TO ELECTRICAL HAND DRYER. COORDINATE LOCATION WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH-IN.
7. INDOOR UNIT POWER FROM OUTDOOR UNIT. PROVIDE INTERCONNECTING WIRING PER MANUFACTURER'S REQUIREMENTS.
8. REFER TO ARCHITECTURAL ELEVATION PRIOR TO ROUGH-IN. MICROWAVE RECEPTACLE TO BE MOUNTED IN ABOVE COUNTER CABINET.
9. COORDINATE LOCATION OF MONITOR RECEPTACLE WITH TECHNOLOGY DEVICES AND MONITOR MOUNTING BRACKET.
10. INSTALL 3 1/2" CONCRETE HOUSEKEEPING PAD.
11. 120V CONNECTION TO BAS CONTROL PANEL. COORDINATE LOCATION WITH TCC.
12. 120V CONNECTION TO OUTDOOR LOCKER SYSTEM. WIRING PER MANUFACTURER REQUIREMENTS.
13. SWITCHBOARD MAX. ENCLOSURE WIDTH SHALL NOT EXCEED 6'-2". COORDINATE BOTTOM OR TOP FED WITH SWITCHBOARD MANUFACTURER.

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EVANSTON ANIMAL SHELTER

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Project Name

FIRST FLOOR - POWER

Sheet Name

Drawing No. **E2-1**

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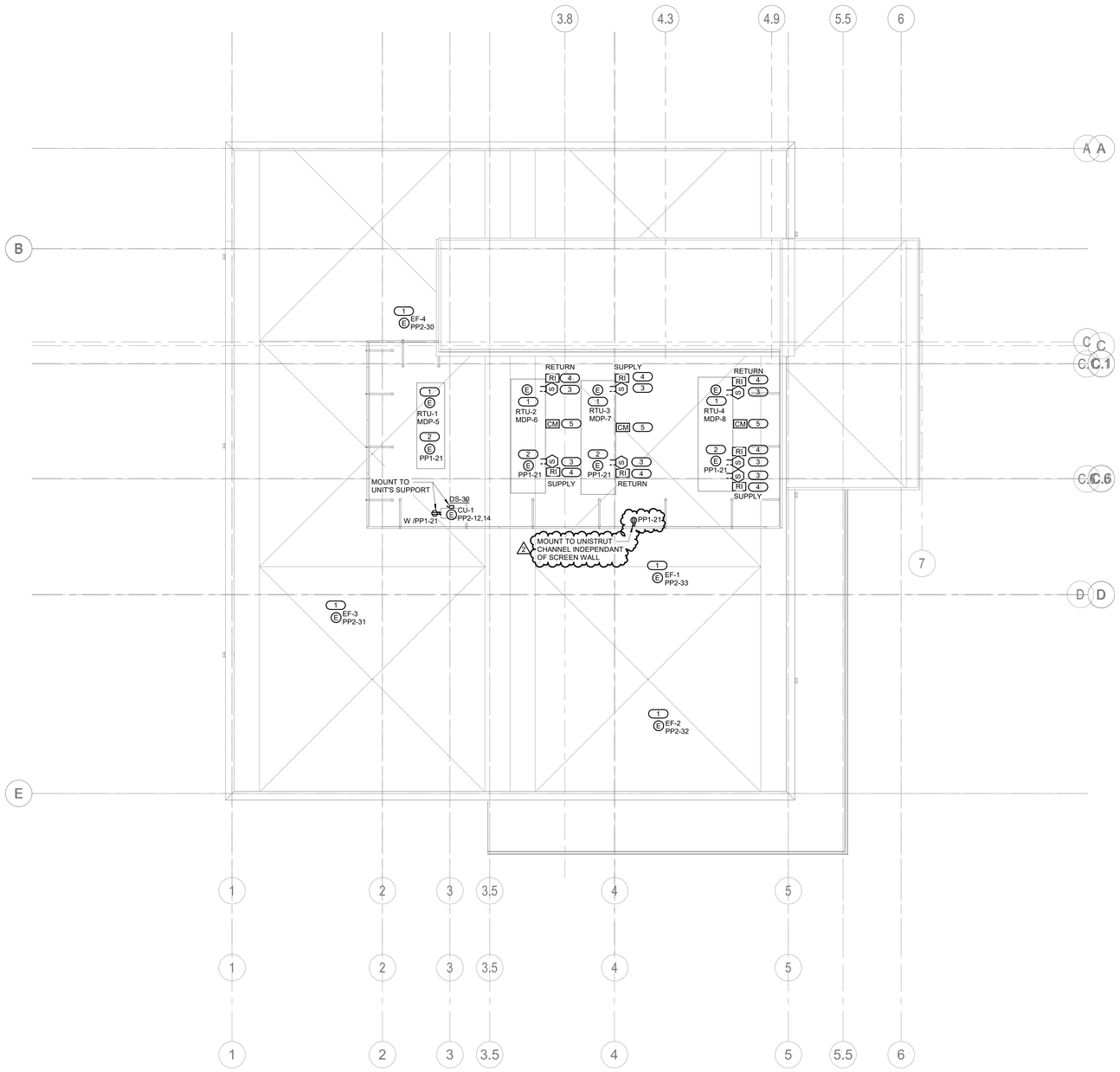

ROOF - ELECTRICAL

1/8" = 1'-0"

KEYNOTES: (#)

1. DISCONNECT/STARTER PROVIDED WITH EQUIPMENT, WIRED BY E.C.
2. CONNECT TO MANUFACTURER PROVIDED UNIT RECEPTACLE.
3. DUCT TYPE SMOKE DETECTOR. INSTALL SAMPLING TUBES IN STRAIGHT RUN OF DUCT, DOWNSTREAM OF FILTERS AND AHEAD OF BRANCH DUCTS. COORDINATE INSTALLATION WITH M.C. PRIOR TO ROUGH-IN, SEAL ALL PENETRATIONS AIR-TIGHT.
4. INSTALL REMOTE INDICATOR IN MECHANICAL ROOM. LABEL WITH LOCATION AND ADDRESS OF ASSOCIATED DETECTOR.
5. COORDINATE CONNECTION TO MOTOR CONTROLLER FOR FAN SHUTDOWN. MOUNT RELAY WITHIN 3'-0" OF CONTROLLER.

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Project Name

ROOF - ELECTRICAL

Sheet Name

Drawing No. **E2-2**

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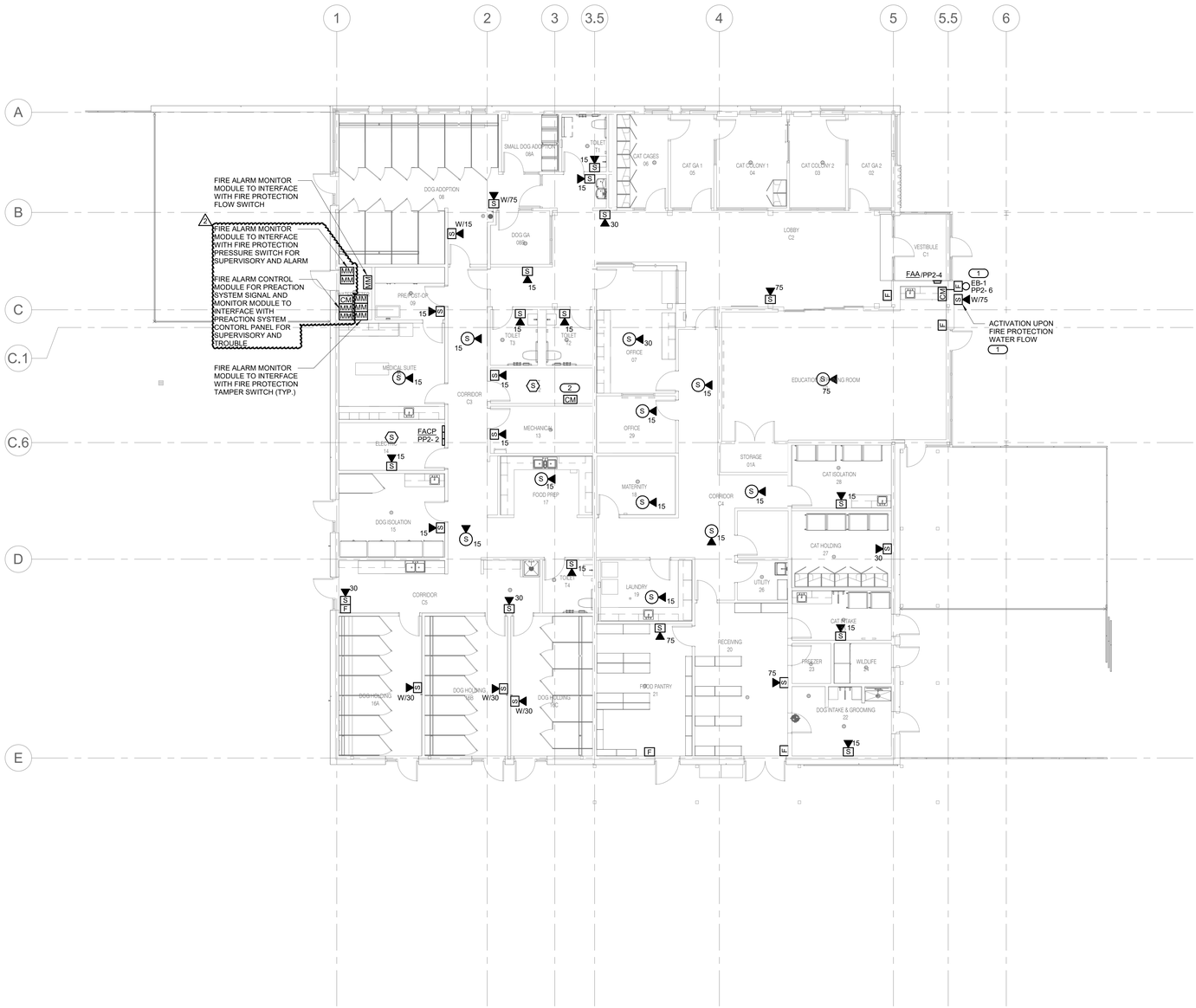
PROJECT #22000606.00

GENERAL SHEET NOTES:

1. REFER TO SHEET E5-0 FOR FIRE ALARM OPERATION MATRIX AND RISER DIAGRAM DETAILS.

KEYNOTES: (#)

1. COORDINATE DEVICE LOCATION WITH ARCHITECTURAL ELEVATION PRIOR TO ROUGH-IN.
2. FIRE ALARM CONTROL MODULE FOR ACCESS CONTROL PANEL OVERRIDE.



1 FIRST FLOOR - SYSTEMS

1/8" = 1'-0"

NORTH

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FIRST FLOOR - SYSTEMS

Sheet Name

Drawing No. **E3-1**

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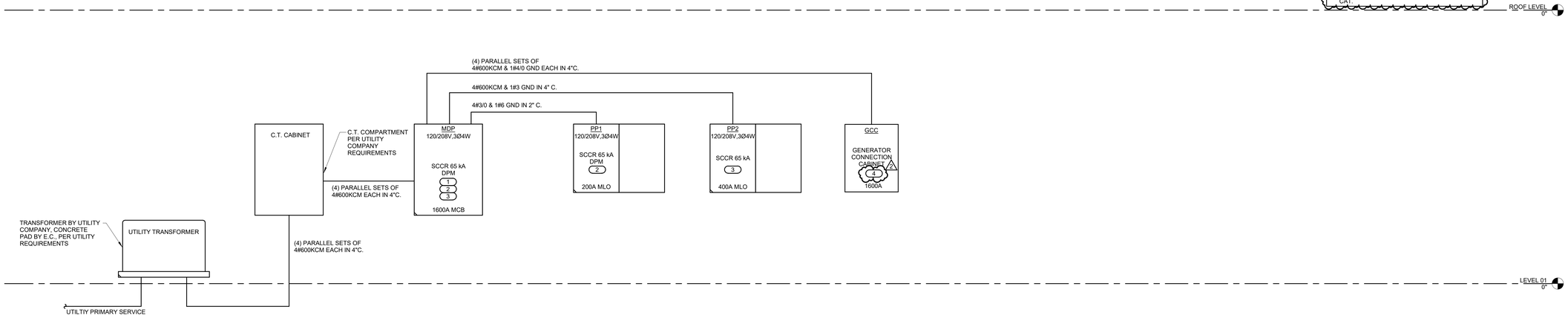
ELECTRICAL - RISER DIAGRAM NOTES:

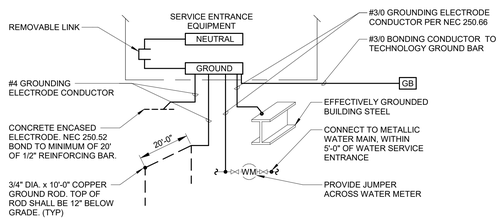
1. THE RISER DIAGRAM IS INTENDED TO CONVEY THE COMPONENTS OF THE ELECTRICAL DISTRIBUTION SYSTEM. REFER TO ELECTRICAL DRAWINGS, DETAILS, DISTRIBUTION / PANEL / EQUIPMENT / EQUIPMENT CONNECTION SCHEDULES, AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. AIC RATINGS FOR EQUIPMENT ARE MINIMUM REQUIREMENTS FOR BUSS BRACING AND DEVICE RATING. ALL EQUIPMENT SHALL BE FULLY RATED UNLESS SPECIFICALLY NOTED AS SERIES RATED.
3. THE BASIS OF DESIGN: THE CONTRACTOR SHALL BE RESPONSIBLE FOR DERATING AND SIZING CONDUCTORS AND CONDUITS TO EQUAL OR EXCEED AMPACITY OF THE BASIS OF DESIGN CIRCUITS WHEN ALTERNATIVE METHODS OR MATERIALS OTHER THAN THE BASIS OF DESIGN ARE APPLIED.
4. DPM: INDICATES DIGITAL POWER MONITOR.

KEYNOTES: (#)

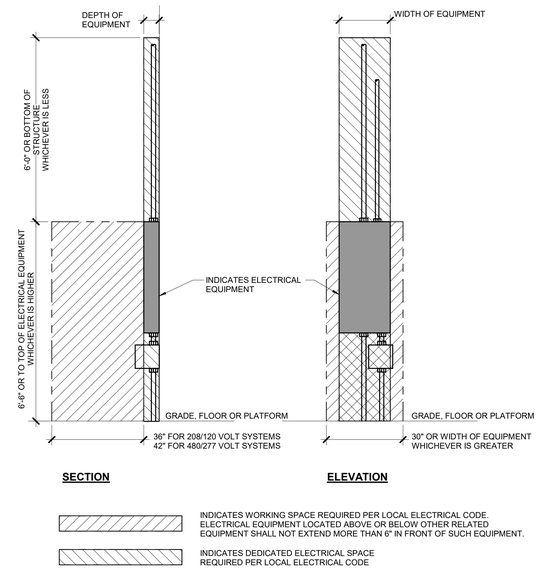
1. REFER TO 2/E6-0 SERVICE ENTRANCE GROUNDING DETAIL.
2. PROVIDE DIGITAL POWER METER. REFER TO 26 09 13 FOR ADDITIONAL INFORMATION.
3. REFER TO PANEL SCHEDULE. PROVIDE INDIVIDUAL BRANCH CURRENT POWER METERING CAPABILITY. REFER TO 26 09 13 FOR ADDITIONAL INFORMATION.
4. 1600 AMP, 3-PHASE, GENERATOR CONNECTION CABINET, NEMA 3R ENCLOSURE. APPROVED MANUFACTURERS: ASCO, EATON, KOHLER, CAT.



1 ELECTRICAL RISER DIAGRAM
NO SCALE



2 SERVICE ENTRANCE GROUNDING DETAIL
NO SCALE



3 PANELBOARD EQUIPMENT CLEARANCES
NO SCALE

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Project Name

ELECTRICAL DIAGRAMS

Sheet Name

Drawing No. **E6-0**

1" = 30' - 0" | 1/16" = 1' - 0" | 1/8" = 1' - 0" | 1/4" = 1' - 0" | 1/2" = 1' - 0" | 1" = 1' - 0" | 3" = 1' - 0"

LED LUMINAIRE SCHEDULE

(DESC) DOOR:	**DISTRIBUTION:**	**BEAMWIDTH:**	**(L/L) LENS/LOUVER:**	K19 - KSH19 .156" ACRYLIC
FA - FLAT ALUMINUM	II - ANSI/IES TYPE 2 DISTRIBUTION	NSP - VERY NARROW SPOT	A - .125" ACRYLIC	M - MATTE DIFFUSE CLEAR
FS - FLAT STEEL	III - ANSI/IES TYPE 3 DISTRIBUTION	SP - SPOT	B - BAFFLE/LOUVER	N - NONE
RA - REGRESSED ALUMINUM	IV - ANSI/IES TYPE 4 DISTRIBUTION	MD - MEDIUM	C - CLEAR ALZAK	P - POLYCARBONATE
RS - REGRESSED STEEL	V - ANSI/IES TYPE 5 DISTRIBUTION	WD - WIDE	F - FROSTED ACRYLIC	R - HIGH IMPACT DR ACRYLIC
FINISH:		VWD - VERY WIDE	G - TEMPERED GLASS	SS - SEMI-SPECULAR CLEAR
PAF - PAINT AFTER FABRICATION		WW - WALL WASH	K - KSH12 .125" ACRYLIC	O - OTHER (SEE DESCRIPTION)
CFSA - COLOR-FINISH SELECTION BY ARCHITECT				[DESIGN SPECIFIC BLANKS]

(MTG) MOUNTING:	RE - RECESSED	**(WATT) PER:**	FIX - FIXTURE, FT - FOOT, LAMP
CL - CEILING SURFACE	SP - SUSPENDED	**(TYPE) LED**	RGB - COLOR CHANGING LED
CV - COVE	SU - SURFACE	LED - LIGHT EMITTING DIODE	RGBW - COLOR CHANGING + WHITE
FR - FLANGED RECESSED	UC - UNDER CABINET	TLED - TUBULAR LED LAMP	RGBA - COLOR CHANGING + AMBER
P - PERIMETER	WL - WALL	OLED - ORGANIC LED	RLED - RETROFIT LED
PL - POLE	O - OTHER (SEE DESCRIPTION)	DLED - DYNAMIC TUNABLE LED	WLED - WARM DIM LED
		O - OTHER	

(TYPE) DRIVER:			
0-10V - 0-10V DIMMING	EB - ELECTRONIC	HL - HIGH/LOW (100%/50%) STEP DIM	MV - MULTI-VOLTAGE ELECTRONIC
DALI - DIGITAL ADDRESSABLE	ELV - ELECTRONIC LOW VOLTAGE	LINE - LINE VOLTAGE DIMMING	REM - REMOTE
DMX - DIGITAL MULTIPLEX	EM - EMERGENCY BATTERY	ML - MULTI-LEVEL SWITCHING	O - OTHER (SEE DESCRIPTION)

CATALOG NUMBER SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND CATALOG NUMBER ONLY. THE COMPLETE DESCRIPTION AND THE SPECIFICATION SHALL BE COORDINATED WITH THE CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED.

VERIFY AND COORDINATE ALL CEILING TYPES WITH LUMINAIRE MOUNTING AND TRIM REQUIREMENTS PRIOR TO THE RELEASE OF THE LUMINAIRE ORDER.
CONFIRM ALL COLORS AND FINISHES OF ALL LUMINAIRE COMPONENTS WITH ARCHITECT AND INTERIOR DESIGNER PRIOR TO THE RELEASE OF THE LUMINAIRE ORDER.
UNLESS INDICATED ON LIGHTING PLANS OR BELOW, REFER TO ARCHITECTURAL AND INTERIOR DESIGN ELEVATIONS, SECTIONS AND DETAILS FOR ALL SUSPENDED AND WALL MOUNTED LUMINAIRE MOUNTING HEIGHTS.

REFER TO SPECIFICATION SECTIONS LIGHTING 26 51 00 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
INTERIOR CORRELATED COLOR TEMPERATURE 3500K, COLOR RENDERING INDEX (CRI) AT OR ABOVE 90, UNLESS NOTED OTHERWISE.
EXTERIOR CORRELATED COLOR TEMPERATURE 3000K, COLOR RENDERING INDEX (CRI) AT OR ABOVE 80, UNLESS NOTED OTHERWISE.

				DIMENSIONS				WATT		LED			DRIVER		
ITEM	DESCRIPTION	L/L	MTG	L	W	H	DIA.	ANSI WATTS	PER	TYPE	QTY	DELIVERED LUMENS (MIN)	VOLTS	TYPE	MANUFACTURER AND MODEL
EM1	EMERGENCY UNIT, WHITE THERMOPLASTIC HOUSING, SELF TEST & DIAGNOSTICS OF INVERTER AND LAMPS.	O	WL	1'-2"	6"	3 205/256"		3 W	FIX	LED	1	LED	120 V	EM	LITHONIA ELM2 DUAL-LITE SURELITES MCPHERSON CHLORIDE ⚠3
EX1	EDGE-LIT SINGLE FACED EXIT SIGN, INJECTION MOLDED ACRYLIC MIRROR LENS AND EXTRUDED ALUMINUM HOUSING. HOUSING FINISH AND COLORS SELECTED BY ARCHITECT. VERFIY RECESSED END, BACK OR CEILING MOUNTING AND ARROWS WITH PLANS.	O	CL/WL	1'-1"	2"	9"		3 W	FIX	LED	1	LED	120 V	EM	LITHONIA LRP DUAL-LITE SURELITES MCPHERSON CHLORIDE ⚠3
EX2	EDGE-LIT DOUBLE FACED EXIT SIGN, INJECTION MOLDED ACRYLIC MIRROR LENS AND EXTRUDED ALUMINUM HOUSING. HOUSING FINISH AND COLORS SELECTED BY ARCHITECT. VERFIY RECESSED END, BACK OR CEILING MOUNTING AND ARROWS WITH PLANS.	O	CL	1'-1"	2"	9"		3 W	FIX	LED	1	L.E.D.	120 V	EM	LITHONIA LRP DUAL-LITE SURELITES MCPHERSON CHLORIDE ⚠3
F1	LOW PROFILE LED EDGE-LIT FLAT PANEL WITH SATIN WHITE LENS. DAMP LOCATION LISTED.	O	RE	4'-0"	2'-0"	2 3/8"		43 W	FIX	LED	1	6000 LM	120 V	0-10V	LITHONIA EPANL LED HUBBELL MCPHERSON DAY-BRITE ⚠3
F2	LINEAR LOW PROFILE RECESSED SLOT LED WITH FLUSH LENS. VARYING LENGTHS. REFER TO FLOOR PLAN. PROVIDE MOUNTING HARDWARE FOR HARD CEILING AND ACT CEILING. REFER TO ARCHITECTURAL PLANS FOR COORDINATON OF CEILING SYSTEM.	F	RE		4"	4 1/2"		10 W	FT	LED	1	800 LM/FT	120 V	0-10V	CORONET LSR4 LUMENWERX FOCAL POINT AXIS FINELITE
F3	6" OPEN ROUND DOWNLIGHT. MEDIUM DISTRIBUTION (1.0 SC). PROVIDE ALL MOUNTING HARDWARE FOR HARD CEILING INSTALLATION. ENERGY STAR LISTED.	SS	RE			9 1/2"	6"	15 W	FIX	LED	1	1500 LM	120 V	0-10V	GOTHAM EVO6 FOCAL POINT LIGHTOLIER HEW 6DR PRESCOLITE PORTFOLIO
F4	SUSPENDED SQUARE PATTERN INDIRECT/DIRECT LUMINAIRE. REGRESSED, 105-DEGREE BEAM LENS. PROVIDE SUSPENSION AIRCRAFT CABLE. COORDINATE SUSPENSION HEIGHT WITH ARCHITECTURAL ELEVATIONS. COORDINATE HOUSING FINISH WITH ARCHITECT.	O	SP	3'-0"	3'-0"	4 13/128"		108 W	FIX	LED	1	5640 LM OR LINEAR PATTERN: 500 LM/FT	120 V	0-10V	ARANCIA LIGHTING MJ POLY LUMENWERX AXIS FINELITE ⚠2
F4A	SIMILAR TO F4, PROVIDE DIFFERENT SQUARE DIMMENSIONS.	O	SP	4'-0"	4'-0"	4 13/128"		114 W	FIX	LED	1	7520 LM	120 V	0-10V	ARANCIA LIGHTING MJ POLY LUMENWERX AXIS FINELITE ⚠2
F5	LED SUSPENDED STRIP LUMINAIRE. FLAT DIFFUSE LENS.	O	SP	4'-0"	3 113/256"	2 37/128"		35 W	FIX	LED	1	5000 LM	120 V	0-10V	LITHONIA CLX HUBBELL DAY-BRITE HE WILLIAMS COLUMBIA
F5A	LED SUSPENDED STRIP LUMINAIRE. DAMP LOCATION LISTED, WIDE DIFFUSE LENS, HIGH AMBIENT TEMPERATURE RATED. PROVIDE MOUNTING HARDWARE FOR CONTINUOUS ROW MOUNTING.	O	SP	8'-0"	5 69/256"	4"		38 W	FIX	LED	1	6000 LM	120 V	0-10V	LITHONIA CLX HUBBELL DAY-BRITE HE WILLIAMS COLUMBIA
F6	LINEAR LED STRIP. GASKETED LUMINAIRE, WET LOCATION LISTED. PROVIDE ALL MOUNTING HARDWARE.	O	CL/SP	4'-0"	4 1/4"	4 3/8"		41 W	FIX	LED	1	5000 LM	120 V	0-10V	HUBBELL LXEM LITHONIA DAY-BRITE HE WILLIAMS
F7	LOW PROFILE LED EDGE-LIT FLAT PANEL WITH SATIN WHITE LENS. DAMP LOCATION LISTED.	O	RE	2'-0"	2'-0"	2 3/8"		37 W	FIX	LED	1	4000 LM	120 V	0-10V	LITHONIA EPANL LED HUBBELL MCPHERSON DAY-BRITE ⚠2
F8	4" LOW PROFILE ROUND DOWNLIGHT. MEDIUM DISTRIBUTION (1.0 SC). WET LOCATION LISTED. SELF-FLANGED.	SS	RE			3"	4"	14 W	FIX	LED	1	1500 LM	120 V	0-10V	LITHONIA LLP4 LIGHTOLIER HEW PRESCOLITE PORTFOLIO
S1	POLE MOUNTED LED SITE LUMINAIRE, TWO LIGHT SQUARES WITH TYPE 4 WIDE OPTICAL DISTRIBUTION. PROVIDE GLARE REDUCING SHIELD. INTEGRAL DIMMING OCCUPANCY SENSOR WITH BLUETOOTH INTERFACE. POWDER COATED BLACK FINISH. 10KV SURGE PROTECTION. MOUNT ON 18' ROUND STRAIGHT ALUMINUM POLE, 5" SHAFT SIZE. PROVIDE POLE WITH CONVENIENCE RECEPTACLE PROVISIONS (RECEPTACLE SHALL BE FIELD INSTALLED AND WIRED).LUMINAIRE SHALL BE DARK SKY APPROVED.	O	PL	1'-10"	1'-3"	5 1/2"		85 W	FIX	LED	1	11763 LM	120 V	0-10V	MCGRAW-EDISON GLEON BEACON TRP2 SIGNIFY GARDCO ⚠2
S2	WALL MOUNTED EXTERIOR ARCHITECTURAL TRAPEZOID STYLING LUMINAIRE. DIE-CAST ALUMINUM HOUSING. WET-LOCATION LISTED. FINISH SELECTION COORDINATED WITH PROJECT ARCHITECT. LUMINAIRE SHALL BE DARK SKY APPROVED.	O	WL	1'-4"	10"	10 1/2"		51 W	FIX	LED	1	6500 LM	120 V	0-10V	MCGRAW-EDISON IST BEACON TRP2 LITHONIA ARS2 SIGNIFY GARDCO ⚠2

LIGHTING SEQUENCE OF OPERATION

PLAN ID	LIGHTING SWITCHED
{LS1}	Sequence: Switched lights are occupancy controlled in this space. ON: The lights are turned on by an occupancy sensor or manually by wall switch. OFF: After the space has been vacant for 15 minutes, the lights will automatically turn off or manually by wall switch. EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow full control during normal operation (if applicable).
{LS2}	Sequence: Dimmed lights are vacancy controlled in this space. ON: The lights are turned on using a wall controller. ADJUST: The lights are raised/lowered using a wall controller. OFF: The lights are turned off using a wall controller. After the space has been vacant for 15 minutes, the lights automatically turn off via vacancy sensor. EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow full control during normal operation (if applicable).
{LS3}	Sequence: Corridor lighting is time scheduled and dimmed by lighting control system. (Coordinate schedule with Owner) ON: Corridor lights are automatically turned on based on schedule. Occupancy sensors shall provide override of time schedule. OFF: The lights are turn off automatically based on schedule. During off-hours occupancy sensor control the lights automatically to turn off after the space has been vacant for 15 minutes. The lighting control system shall allow 'SE' corridor luminaires to remain on at a specific dim level after time schedules have expired (coordinate dim level with Owner during programming). EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow for control during normal operation. Unswitched 'NL' luminaries shall remain on at all times and provide emergency lighting upon loss of normal power.
{LS4}	Sequence: Animal colony lighting is time scheduled and dimmed by lighting control system. (Coordinate schedule with Owner) ON: Colony room lights are automatically turned on based on schedule. "ON" button on wall controller in OFFICE 07, noted on drawings, shall provide 2-hour override of time schedule. ADJUST: Wall controller shall uniformly dim all colony lights to 50% or 100% outputs. Each colony room shall be a zone and individually dimmable by lighting control system. OFF: The lights are turn off automatically based on schedule or by "OFF" button on wall controller
{LS5}	Sequence: Adoption and animal holding room lighting is time scheduled and dimmed by lighting control system. (Coordinate schedule with Owner) ON: Lights are automatically turned on based on schedule. "ON" button on wall controller shall provide 2-hour override of time schedule. ADJUST: Wall controller shall uniformly dim all lights to 50% or 100% outputs via wall controller push buttons. OFF: The lights are turn off automatically based on schedule or by "OFF" button on wall controller. The lighting control system shall allow 'SE' luminaires to remain on at a specific dim level after time schedules have expired (coordinate dim level with Owner during programming). EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow for control during normal operation.
{LS6}	Sequence: Switched lights are vacancy controlled in this space. ON: The lights are turn on using a wall switch. OFF: The lights are turn off using a wall switch or automatically after the space has been vacant for 15 minutes via wall sensor.

LIGHTING SEQUENCE OF OPERATION

PLAN ID	LIGHTING SWITCHED
{LS7}	Sequence: Switched lights are controlled in this space. ON: The lights turn on using a wall switch. OFF: The lights turn off using a wall switch EMERGENCY: Emergency lighting units shall turn on upon loss of power (if applicable). Room luminaires shall provide emergency lighting upon loss of normal power.
{LS8}	Sequence: Dimmed lights are vacancy controlled in this space. ON: The lights are turn on using a wall dimmer. ADJUST: The lights are raised / lowered using a wall dimmer. OFF: The lights are turn off using a wall dimmer or automatically after the space has been vacant for 15 minutes via wall sensor.
{LS9}	Sequence: Dimmed lights are controlled in this space (sensors are not provided for safety concerns). ON: The lights are turned on using a wall controller. ADJUST: The lights are raised/lowered using a wall controller. OFF: The lights are turned off using a wall controller. EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow full control during normal operation.
{LS10}	Sequence: Dimmed lights are vacancy controlled in this space. ON: The lights are turned on using a wall controller. ADJUST: Each zone is individually raised/lowered using wall controller. DAYLIGHT: Lights within daylight zone (indicated on floor plan with subscript 'LS') shall continuously dim to maintain 40 FC at 30" AFF. OFF: The lights are turned off using a wall controller or automatically after the space has been vacant for 15 minutes via vacancy sensor. EMERGENCY: 'SE' luminaires shall turn on to 100% when power is lost. Provide a shunt relay to allow full control during normal operation.
{LS11}	Sequence: Exterior site pole lighting is dimmed and time scheduled by lighting control system. Pole lighting circuit and convenience receptacle circuit shall be controlled by separate lighting control relay. (Coordinate schedule with Owner prior to programming). ON: The lights are automatically turned on based on schedule and lighting control system photocell. ADJUST: The fixture output shall be reduced to 50% after the space has been vacant for 15 minutes via fixture's integral occupancy sensor. Sensors shall be interconnected to reduce fixture output in conjunction with all fixtures and not separately. OFF: The lights are automatically turned off based on schedule and lighting control system photocell.
{LS12}	Sequence: Exterior building lighting is time scheduled by lighting control system. Exterior building lighting circuit shall be controlled by a separate lighting control relay. (Coordinate schedule with Owner prior to programming). ON: The lights are automatically turned on based on schedule and lighting control system photocell. OFF: The lights are automatically turned off based on schedule and lighting control system photocell. EMERGENCY: Luminaires are fed from battery backup circuit.
{LS13}	Sequence: Exterior tree receptacles and public art 120V circuit shall be time scheduled by lighting control system. Provide a separate control relay for each circuit. (Coordinate schedule with Owner prior to programming). ON: The circuits are energized automatically by schedule and lighting control system photocell. OFF: The circuits are de-energized automatically by schedule and lighting control system photocell.

DISCONNECT AND STARTER SCHEDULE

NOTE: ALL DISCONNECTS (EXCEPT MANUAL STARTERS) SHALL BE HEAVY DUTY TYPE.

DISCONNECT TYPE:	**ACCESSORIES & OPTIONS**	
FU - FUSED	SA - STANDARD ACCESSORIES (INCLUDES * ITEMS)	PF - PHASE LOSS PROTECTION (5 HP OR GREATER, 3 PHASE...
NF - NON-FUSED	*CT - CONTROL TRANSFORMER, FUSED 120V	TO - MELTING THERMAL OVERLOADS (1 PHASE)
CB - CIRCUIT BREAKER	*EO - ELECTRONIC OVERLOAD (3 PHASE MOTORS)	TS - 2 SPEED SELECTOR SWITCH IN DOOR
	*HA - HAND-OFF-AUTO IN DOOR	GP - GREEN (OFF) PILOT LIGHT IN DOOR
STARTER TYPE:	*RP - RED (RUN) PILOT LIGHT IN DOOR	FA - 4-CONVERTIBLE AUXILIARY CONTACTS
FV - FULL VOLTAGE	*TA - TWO CONVERTIBLE AUXILIARY CONTACTS	EI - ELECTRICAL INTERLOCK (2)-N.O. & (2)-N.C.
YD - WYE - DELTA	S/N - INSULATED NEUTRAL ASSEMBLY	SS - START-STOP PUSHBUTTON IN DOOR
RE - REVERSING		HL - HANDLE PADLOCK HASP
TW - 2 SPEED, 2 WINDING		
SW - 2 SPEED, 1 WINDING		
RV - REDUCED VOLTAGE AUTOXFMR		
SS - SOLID STATE		
MS - MANUAL STARTER		
MX - MANUAL SWITCH		
FS - FUSED SWITCH		
AMS - ASSEMBLED MOTOR STARTER		

ITEM	DISCONNECT TYPE & RATING: TYPE	RATING	TRIP RATING	CIRCUIT VOLTAGE	POLES	STARTER: NEMA SIZE	STARTER: TYPE	ENCLOSURE	REQUIRED ACCESSORIES & OPTIONS	COMMENTS
MS-1		16 A		120 V	1	0	MS	NEMA 1	TO, HL	
MX-1		30 A		208 V	3	0	MX	NEMA 1	HL	
FDS-BP	FU	30 A	20 A	208 V	3			NEMA 1		
FDS-WH	FU	200 A	125 A	208 V	3			NEMA 1		
DS-30	NF	30 A		208 V	2			NEMA 3R		

Permit Stamp

HOLABIRD & ROOT

140 South Dearborn Chicago, IL 60603
Tel: 312 357 1771 Fax: 312 357 1909

www.holabird.com

No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	PAS
Checked	JML
Proj. Arch./Eng.	PAS

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

2310 Oakton St, Evanston, IL 60202

Project Name

ELECTRICAL SCHEDULES

Sheet Name

Drawing No. **E7-0**

IMEG

263 SHUMAN BOULEVARD
SUITE 550
NAPERVILLE, IL 60563
P: 630.753.8607

www.imegcorp.com

Illinois Design Firm Registration #184.007637-0014

REF. SCALE IN INCHES 0 1 2 3

PROJECT #220006.00

1" = 30' - 0"
1/16" = 1' - 0"
1/8" = 1' - 0"
1/4" = 1' - 0"
1/2" = 1' - 0"
1" = 1' - 0"
3" = 1' - 0"

DISTRIBUTION PANEL MDP

ENCLOSURE: NEMA PB 1
FED FROM: UTILITY TRANSFORMER
LOCATION: ELECTRIC 14

METER: DPM

SOLID NEUTRAL GROUND BUS

MAIN: 1,600 A MCB
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
SCCR: 65 kA
ISC UNKNOWN 0 A

NOTES: PROVIDE MAIN CIRCUIT BREAKER WITH [LSI] SOLID STATE CIRCUIT BREAKER AND [AER] ARC ENERGY REDUCTION SYSTEM.

CKT	LOAD DESCRIPTION	Load	POLES	FRAME	TRIP	TYPE	ACC.	WIRE AND RACEWAY	CIRCUIT KEY
1	SPD-1	0 kVA	3	100 A	60 A	MCCB		4#6 & 1#10 GND IN 1" C.	
2	PANEL PP1	43.42 kVA	3	200 A	200 A	MCCB		REFER TO RISER DIAGRAM	
3	PANEL PP2	133.66 kVA	3	400 A	400 A	MCCB	100%	REFER TO RISER DIAGRAM	
4	GCC	0 kVA	3	1,600 A	1,600 A	MCCB	LSI, AER	REFER TO RISER DIAGRAM	*KEY
5	RTU-1	24.48 kVA	3	100 A	90 A	MCCB		3#3 & 1#8 GND IN 1" C.	*PM
6	RTU-2	125 kVA	3	400 A	400 A	MCCB		3#600KCM &1#3 GND IN 3" C.	*PM
7	RTU-3	50 kVA	3	200 A	175 A	MCCB		3#3/0 & 1#6 IN 1 1/2" C.	*PM
8	RTU-4	52.2 kVA	3	200 A	175 A	MCCB		3#2/0 & 1#6 GND IN 1 1/2" C.	*PM
9	WH-1.1	36 kVA	3	200 A	125 A	MCCB		3#1 &1#6 GND IN 1 1/4" C.	*PM
10	WH-1.2	36 kVA	3	200 A	125 A	MCCB		3#1 &1#6 GND IN 1 1/4" C.	*PM
11	SPACE [250A FRAME]	0 kVA	--	--	--	--	--	--	--
12	SPACE [250A FRAME]	0 kVA	--	--	--	--	--	--	--
13	SPACE [250A FRAME]	0 kVA	--	--	--	--	--	--	--
14	SPACE [250A FRAME]	0 kVA	--	--	--	--	--	--	--

LOAD SUMMARY (INCLUDES ALL TUBS IN THIS PANEL)

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND
HVAC	440.614 kVA	100.00%	440.614 kVA
Lighting	7.912 kVA	100.00%	7.912 kVA
Other	0.1 kVA	100.00%	0.1 kVA
Power	8.16 kVA	100.00%	8.16 kVA
Receptacles	43.42 kVA	61.52%	26.71 kVA

TOTALS*

TOTAL CONNECTED LOAD:	500.21 kVA
TOTAL ESTIMATED DEMAND LOAD:	483.496 kVA
TOTAL CONNECTED AMPS:	1388.43 A
TOTAL ESTIMATED DEMAND AMPS:	1,342.1 A

*TOTAL DEMAND CALCS SUBTRACT ANY REDUNDANT LOAD AND THE SMALLER OF ANY NONCOINCIDENT HVAC LOADS. THIS CALC IS DONE AT EACH PANEL.

CIRCUIT KEY... *PM = CIRCUIT POWER METERING CAPABILITY, *KEY = PROVIDE GCC CIRCUIT BREAKER AND MAIN CIRCUIT BREAKER WITH KEY INTERLOCK.

PANEL PP1

MOUNTING: SURFACE
ENCLOSURE: NEMA PB 1
FED FROM: 200 A/3P MCCB @ MDP
LOCATION: ELECTRIC 14

METER: DPM

SOLID NEUTRAL GROUND BUS

MAIN: 200 A MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
SCCR: 65 kA
ISC UNKNOWN 0.00 kA

NOTES:

KEY	CKT NO.	LOAD DESCRIPTION	OCPD AMPS	P	WIRE SIZE H	WIRE SIZE N	WIRE SIZE G	VD %	A		B		C		VD %	WIRE SIZE G	WIRE SIZE N	WIRE SIZE H	P	OCPD AMPS	LOAD DESCRIPTION	CKT NO.	KEY
	1	Receptacles	20 A	1	12	12	12	0.54	0.36	0.6					1.46	12	12	12	1	20 A	EWC	2	
	3	Receptacles	20 A	1	12	12	12	0.58			0.36	0.9			1.05	12	12	12	1	20 A	Receptacles	4	
	5	Receptacles	20 A	1	12	12	12	0.53					0.36	0.36	0.49	12	12	12	1	20 A	Receptacles	6	
	7	Receptacles	20 A	1	10	10	10	1.31	0.36	0.18					0.23	12	12	12	1	20 A	Receptacles	8	
	9	Receptacles	20 A	1	12	12	12	0.84			0.54	1.08			2.41	10	10	10	1	20 A	Exterior Receptacles	10	
	11	Receptacles	20 A	2	12	--	12	0.6					0.5	0.42	0.91	12	12	12	1	20 A	Receptacles	12	
--	13	--	--	--	--	--	--	--	0.5	0.18					0.18	12	12	12	1	20 A	Receptacles	14	
	15	Receptacles	20 A	1	12	12	12	0.54			0.54	0.84			1.1	12	12	12	1	20 A	Receptacles	16	
	17	Receptacles	20 A	2	12	--	12	0.37					0.5	1.18	1.07	12	12	12	1	20 A	Receptacles	18	
--	19	--	--	--	--	--	--	--	0.5	0.9					0.83	12	12	12	1	20 A	Receptacles	20	
	21	Roof Receptacles	20 A	1	12	12	12	1.72			1.08	0.18			0.21	12	12	12	1	20 A	Receptacles	22	
	23	Receptacles	20 A	2	12	--	12	0.48					0.5	0.18	0.1	12	12	12	1	20 A	Receptacles	24	
--	25	--	--	--	--	--	--	--	0.5	0.18					0.19	12	12	12	1	20 A	Receptacles	26	
	27	Receptacles	20 A	1	12	12	12	0.5			0.36	1.08			1.96	10	10	10	1	20 A	Receptacles	28	
	29	Receptacles	20 A	2	12	--	12	0.54					0.5	0.36	0.3	12	12	12	1	20 A	Receptacles	30	
--	31	--	--	--	--	--	--	--	0.5	0.54					1.2	12	12	12	1	20 A	Receptacles	32	
	33	Receptacles	20 A	1	12	12	12	0.33			0.18	0.72			0.97	12	12	12	1	20 A	Receptacles	34	
	35	Receptacles	30 A	2	10	10	10	1.7					2.5	0.9	1.56	12	12	12	1	20 A	Receptacles	36	
--	37	--	--	--	--	--	--	--	2.5	0.9					1.7	12	12	12	1	20 A	Receptacles	38	
	39	Receptacles	20 A	1	12	12	12	2.69			0.9	0.9			1.48	12	12	12	1	20 A	Receptacles	40	
	41	Receptacles	20 A	1	12	12	12	0.77					0.36	1.28	2.18	10	10	10	1	20 A	Receptacles	42	
	43	Receptacles	20 A	1	12	12	12	2.41	1.08	0.36					0.75	12	12	12	1	20 A	Receptacles	44	
	45	Receptacles	20 A	1	12	12	12	0.22			0.18	0.18			0.2	12	12	12	1	20 A	Receptacles	46	
	47	Receptacles	20 A	1	12	12	12	0.35					0.18	0.18	0.18	12	12	12	1	20 A	Receptacles	48	
	49	Receptacles	20 A	1	12	12	12	0.38	0.18	0.18					0.21	12	12	12	1	20 A	Receptacles	50	
	51	HAND DRYER, *P, *GFI	20 A	1	10	10	10	2.15			1.5	1.5			2.4	12	12	12	1	20 A	HAND DRYER, *P, *GFI	52	
	53	HAND DRYER, *P, *GFI	20 A	1	12	12	12	2.62					1.5	1.5	2.25	12	12	12	1	20 A	HAND DRYER, *P, *GFI	54	
	55	Receptacles	20 A	1	12	12	12	2.62	0.9	0.36					0.18	12	12	12	1	20 A	Receptacles	56	
	57	Receptacles	20 A	1	12	12	12	0.74			0.36	0.36			0.45	12	12	12	1	20 A	Receptacles	58	
	59	Receptacles	20 A	1	12	12	12	0.8					0.36	1	1.93	10	10	10	1	20 A	Receptacles	60	
	61	Receptacles	20 A	1	12	12	12	0.07	0.36	0.72					1.04	10	10	10	1	20 A	Receptacles	62	
	63	Receptacles	20 A	1	10	10	10	1.52			0.9	0.1			0.1	12	12	12	1	15 A	BAS CONTROLLER	64	2
	65	EXTERIOR LOCKERS	15 A	1	12	12	12	1.45					0.5	0.72	1.22	10	10	10	1	20 A	Tool Receptacles	66	
--	67	SPARE	20 A	1	--	--	--	--	0	0					--	--	--	--	1	20 A	SPARE	68	--
--	69	SPARE	20 A	1	--	--	--	--			0	0			--	--	--	--	1	20 A	SPARE	70	--
--	71	SPARE	20 A	1	--	--	--	--					0	0	--	--	--	--	1	20 A	SPARE	72	--
--	73	SPARE	20 A	1	--	--	--	--	0	0					--	--	--	--	1	20 A	SPARE	74	--
--	75	SPARE	20 A	1	--	--	--	--			0	0			--	--	--	--	1	20 A	SPARE	76	--
--	77	SPACE	--	--	--	--	--	--					0	0	--	--	--	--	--	--	SPACE	78	--
--	79	SPACE	--	--	--	--	--	--	0	0					--	--	--	--	--	--	SPACE	80	--
--	81	SPACE	--	--	--	--	--	--			0	0			--	--	--	--	--	--	SPACE	82	--
--	83	SPACE	--	--	--	--	--	--					0	0	--	--	--	--	--	--	SPACE	84	--
								Total Load:	12.84 kVA		14.74 kVA		15.84 kVA									
								Total Amps:	107.00		125.27		134.44									

LOAD SUMMARY

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND
Receptacles	43.42 kVA	61.52%	26.71 kVA

TOTALS*

TOTAL CONNECTED LOAD:	43.42 kVA
TOTAL ESTIMATED DEMAND LOAD:	26.71 kVA
TOTAL CONNECTED AMPS:	120.52 A
TOTAL ESTIMATED DEMAND AMPS:	74.1 A

*TOTAL DEMAND CALCS SUBTRACT ANY REDUNDANT LOAD AND THE SMALLER OF ANY NONCOINCIDENT HVAC LOADS. THIS CALC IS DONE AT EACH PANEL.

CIRCUIT KEY NOTES: *P = PROVIDE CIRCUIT BREAKER WITH PADLOCK HASP. *GFI = PROVIDE CIRCUIT BREAKER AS GFCI TYPE.

PANEL PP2

MOUNTING: SURFACE
ENCLOSURE: NEMA PB 1
FED FROM: 400 A/3P MCCB @ MDP
LOCATION: ELECTRIC 14

SOLID NEUTRAL GROUND BUS

MAIN: 400 A MLO
VOLTS: 120/208 Wye
PHASE: 3
WIRE: 4
SCCR: 65 kA
ISC UNKNOWN 0.00 kA

NOTES: PROVIDE PANEL WITH INDIVIDUAL BRANCH CURRENT POWER METERING CAPABILITY. REFER TO 26 09 13 FOR ADDITIONAL INFORMATION.

KEY	CKT NO.	LOAD DESCRIPTION	OCPD AMPS	P	WIRE SIZE H	WIRE SIZE N	WIRE SIZE G	VD %	A		B		C		VD %	WIRE SIZE G	WIRE SIZE N	WIRE SIZE H	P	OCPD AMPS	LOAD DESCRIPTION	CKT NO.	KEY
INV	1	Lighting	20 A	1	10	10	10	2.95	0.96	0.5					12	12	12	1	20 A	FACP - Fire Alarm Control Panel	2	
INV	3	Lighting	20 A	1	10	10	10	2.03			0.65	0.05			12	12	12	1	20 A	FAA - Fire Alarm Annunciator	4	
INV	5	Lighting	20 A	1	10	10	10	1.37					0.63	0.1	0.33	12	12	12	1	20 A	FP ELECTRIC BELL	6	
	7	Lighting	20 A	1	10	10	10	2.13	1.05	0.36					0.07	12	12	12	1	20 A	ELEC RM. Receptacles	8	2
	9	Lighting	20 A	1	10	10	10	2.59			1.14	0.1				10	10	10	--	20 A	PUBLIC ART	10	
	11	Lighting	20 A	1	10	10	10	1.62					0.98	1.98	1.4	10	--	10	2	30 A	CU-1	12	
	13	Lighting	20 A	1	10	10	10	1.22	0.56	1.98					--	--	--	--	--	--	--	14	--
	15	Lighting	20 A	1	12	12	12	1.95			0.65	1.67			0.91	8	8	8	3	35 A	UH-1	16	
	17	Site Lighting	20 A	1	8	8	8	0.47					0.19	1.67	--	--	--	--	--	--	--	18	--
	19	Lighting	20 A	1	10	10	10	0.97	0.65	1.67					--	--	--	--	--	--	--	20	--
	21	Lighting	20 A	1	10	10	10	0.53			0.55	0.83			1.38	12	--	12	1	20 A	AC-1	22	
	23	BUILDING SIGNAGE	20 A	1	10	10	10	--					1	2.64	1	8	--	8	3	40 A	BP-1	24	
	25	CAB-1	30 A	3	10	10	10	2.26	2.5	2.64					--	--	--	--	--	--	--	26	--
--	27	--	--	--	--	--	--	--			2.5	2.64			--	--	--	--	--	--	--	28	--
--	29	--	--	--	--	--	--	--					2.5	0.67	1.26	12	12	12	1	15 A	EF-4	30	
	31	EF-3	20 A	1	12	12	12	1.93	1.13	1.13					2.3	10	10	10	1	20 A	EF-2	32	
	33	EF-1	15 A	1	12	12	12	1.87			0.67	4.33			2.65	8	8	8	3	50 A	TAB-5	34	
	35	TAB-6	15 A	3	10	10	10	0.42					1.17	4.33	--	--	--	--	--	--	--	36	--
--	37	--	--	--	--	--	--	--	1.17	4.33					--	--	--	--	--	--	--	38	--
--	39	--	--	--	--	--	--	--			1.17	4.33			0.93	8	8	8	3	50 A	TAB-7	40	
	41	TAB-9	15 A	3	12	12	12	0.57					1.17	4.33	--	--	--	--	--	--	--	42	--
--	43	--	--	--	--	--	--	--	1.17	4.33					--	--	--	--	--	--	--	44	--
--	45	--	--	--	--	--	--	--			1.17	5			1.19	6	6	6	3	60 A	TAB-10	46	
	47	TAB-14	15 A	3	12	12	12	1.46					1	5	--	--	--	--	--	--	--	48	--
--	49	--	--	--	--	--	--	--	1	5					--	--	--	--	--	--	--	50	--
--	51	--	--	--	--	--	--	--			1	1			1.06	12	12	12	3	15 A	TAB-13	52	
	53	TAB-11, TAB-4, TAB-2	15 A	3	12	12	12	0.69					1	1	--	--	--	--	--	--	--	54	--
--	55	--	--	--	--	--	--	--	1	1					--	--	--	--	--	--	--	56	--
--	57	--	--	--	--	--	--	--			1	3			1.15	8	8	8	3	35 A	TAB-8	58	
	59	TAB-3	30 A	3	10	10	10	1.51					2.33	3	--	--	--	--	--	--	--	60	--
--	61	--	--	--	--	--	--	--	2.33	3					--	--	--	--	--	--	--	62	--
	63	--	--	--	--	--	--	--			2.33	3.67			1.69	8	8	8	3	40 A	TAB-1	64	
	65	UH-2	15 A	3	12	12	12	--							1.1	3.67	--	--	--	--	--	66	--
--	67	--	--	--	--	--	--	--	1.1	3.67					--	--	--	--	--	--	--	68	--
	69										1.1	1			0.89	12	12	12	3	15 A	TAB-12	70	
	71	UH-3	15 A	3	12	12	12	0.39					1.1	1	--	--	--	--	--	--	--	72	--
--	73	--	--	--	--	--	--	--	1.1	1					--	--	--	--	--	--	--	74	--
--	75	--	--	--	--	--	--	--			1.1	0			--	--	--	--	1	20 A	SPARE	76	--
	77	CP-1	20 A	2	12	--	12	--							0.57	0	--	--	--	--	SPARE	78	--
	79												0.57	0	--	--	--	--	--	--	SPACE	80	--
--	81	SPACE	--	--	--	--	--	--			0	0			--	--	--	--	--	--	SPACE	82	--
--	83	SPACE	--	--	--	--	--	--					0	0	--	--	--	--	--	--	SPACE	84	--
								Total Load:	46.89 kVA		42.65 kVA		44.12 kVA									
								Total Amps:	392.64		355.38		369.57									

LOAD SUMMARY

LOAD CLASSIFICATION	CONNECTED LOAD	DEMAND FACTOR	ESTIMATED DEMAND
HVAC	116.934 kVA	100.00%	116.934 kVA
Lighting	7.912 kVA	100.00%	7.912 kVA
Other	0.1 kVA	100.00%	0.1 kVA
Power	8.16 kVA	100.00%	8.16 kVA

TOTALS*

TOTAL CONNECTED LOAD:	133.11 kVA
TOTAL ESTIMATED DEMAND LOAD:	133.106 kVA
TOTAL CONNECTED AMPS:	369.47 A
TOTAL ESTIMATED DEMAND AMPS:	369.5 A

*TOTAL DEMAND CALCS SUBTRACT ANY REDUNDANT LOAD AND THE SMALLER OF ANY NONCOINCIDENT HVAC LOADS. THIS CALC IS DONE AT EACH PANEL.

CIRCUIT KEY NOTES: *INV = ROUTE CIRCUIT THROUGH EMERGENCY LIGHTING INVERTER [INV], EACH CIRCUIT SHALL BE FED FROM AN INDEPENDANT OUTPUT CIRCUIT BREAKER IN THE INVERTER.

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REF. SCALE IN INCHES 0 1 2 3

PROJECT #22000606.00

Permit Stamp

HOLABIRD & ROOT
140 South Dearborn Chicago, IL 60603
Tel: 312 357 1771 Fax: 312 357 1909
www.holabird.com

No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	PAS
Checked	JML
Proj. Arch./Eng.	PAS

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER
2310 Oakton St, Evanston, IL 60202

Project Name

ELECTRICAL SCHEDULES

Sheet Name

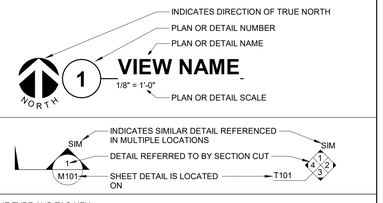
Drawing No. **E7-1**

3" = 1'- 0" | 1" = 1'- 0" | 1/2" = 1'- 0" | 1/4" = 1'- 0" | 1/8" = 1'- 0" | 1/16" = 1'- 0" | 1" = 30'- 0"

VIEW KEY

NAME — LEVEL NAME
10'-0" — HEIGHT ABOVE PROJECT 0'-0"

1 — INDICATES NOTE USED TO DESCRIBE ADDITIONAL INFORMATION ABOUT WORK REQUIRED, SPECIFIC TO THE SHEET AND/OR DETAIL



LINE TYPE AND TAG KEY:

NEW WORK BY THIS CONTRACTOR (WIDE LINE)
NEW

HALFTONING DOES NOT MODIFY SCOPE.

TAG-1 — UNDERLINED TAG INDICATES OBJECT IS IN-SCOPE. IF NEW, ADDITIONAL INFORMATION IS AVAILABLE IN A SCHEDULE, MATERIAL LIST, OR SYMBOL LIST

APPLICABLE CODES

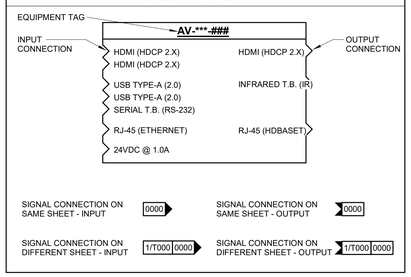
CONTRACTOR SHALL COMPLY WITH APPLICABLE CODES AND LOCAL AMENDMENTS.

BUILDING CODE:	IBC 2015 EDITION
FIRE CODE:	IFC 2009 EDITION
PLUMBING CODE:	IPC 2021 EDITION
MECHANICAL CODE:	IMC 2019 EDITION
ELECTRICAL CODE:	NFPA 70 (NEC) 2017 EDITION
LIFE SAFETY CODE:	NFPA 101 2015 EDITION
ENERGY CONSERVATION CODE:	IECC 2022 ASHRAE 90.1 20**
HEALTH DEPARTMENT CODE:	CURRENT EDITION
LOCAL BUILDING CODE:	CURRENT EDITION

CONTRACTOR ABBREVIATION KEY

ABBR:	DESCRIPTION:
C.C.	CIVIL CONTRACTOR
C.M.	CONSTRUCTION MANAGER
E.C.	ELECTRICAL CONTRACTOR
F.P.C.	FIRE PROTECTION CONTRACTOR
G.C.	GENERAL CONTRACTOR
M.C.	MECHANICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
S.C.	SECURITY CONTRACTOR
T.C.	TECHNOLOGY CONTRACTOR
T.C.C.	TEMPERATURE CONTROLS CONTRACTOR

AV FUNCTIONAL DIAGRAM KEY



TECHNOLOGY SYMBOL LIST

SYMBOL:	EQUIPMENT LIST ABBREV.:	DESCRIPTION:	NOTE:
CR1	AC-CR1-W	CREDENTIAL READER - TYPE 1	2.
CSS	AC-CSS	CONTROLLED SECURITY SCHEME SCHEDULE IDENTIFIER	2.
DC	AC-DC	DOOR CONTACT	2.
C#	SC-IO-W	INFORMATION OUTLET (WALL)	1.
C#-WAP	SC-WAP-C	WIRELESS ACCESS POINT WITH ENCLOSURE (CEILING)	.
IM1	IC-IM1-W	INTERCOM MASTER STATION (WALL) TYPE 1	.
IS1	IC-IS1-W	INTERCOM STATION (WALL) TYPE 1	.
CM-#	VS-CM-3	VIDEO SURVEILLANCE CAMERA 270° FOV (WALL/VERTICAL SURFACE)	3.
CM-#	VS-CM-4	VIDEO SURVEILLANCE CAMERA 360° FOV (CEILING/HORIZONTAL SURFACE)	3.
AV-RI	AV-RI-W	AV WALLPLATE/BACKBOX (WALL)	
WIDTH X HEIGHT		CABLE TRAY, CHANNEL TRAY, BASKET TRAY	
WIDTH X HEIGHT		LADDER RACK	
DIAMETERø C		CONDUIT	
		CONDUIT DOWN	
		CONDUIT UP OR UP/DOWN	
		CONDUIT SLEEVE	
		CONTINUATION	

GENERAL NOTES:

1. ALL SYMBOLS AND ABBREVIATIONS LISTED MAY NOT BE APPLICABLE TO THIS PROJECT. REFER TO THE GENERAL TECHNOLOGY EQUIPMENT SCHEDULE FOR MORE COMPLETE DESCRIPTION AND ITEMS.
2. ALL SYMBOLS AND ABBREVIATIONS REFER TO TECHNOLOGY SHEETS ONLY AS DEFINED ON THE SHEET INDEX. REFER TO THE TECHNOLOGY NOTES FOR ADDITIONAL INFORMATION.
3. ALL SYMBOLS LISTED ABOVE ARE FOR REFERENCE ONLY. REFER TO PLANS AND LINE TYPE KEY FOR NEW, EXISTING TO REMAIN AND TO BE REMOVED ITEMS FOR ADDITIONAL INFORMATION.
4. REFER TO RISERS ON SHEET(S): T2-0, T4-0.

TECHNOLOGY SYMBOL NOTES:

1. "C#" INDICATES INFORMATION OUTLET FACEPLATE CONFIGURATION. REFER TO INFORMATION OUTLET SCHEDULE ON T6-0 FOR ADDITIONAL INFORMATION.
2. REFER TO CONTROLLED SECURITY SCHEME (CSS) TYPE SCHEDULE ON T4-0 FOR ADDITIONAL INFORMATION.
3. "CM-#" ON FLOOR PLANS INDICATES CAMERA TYPE AND IS ASSOCIATED WITH THE CORRESPONDING "VS-CM-#" EQUIPMENT SCHEDULE ABBREVIATION. "###-##" SUBSCRIPT INDICATES FLOOR NUMBER-CAMERA NUMBER. REFER TO INDIVIDUAL CAMERA REQUIREMENT SCHEDULE FOR ADDITIONAL INFORMATION.

TECHNOLOGY ABBREVIATION KEY

ABBR:	DESCRIPTION:
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
BFC	BELOW FINISHED CEILING
C	CONDUIT
DE	DELAYED EGRESS
DPDT	DOUBLE POLE DOUBLE THROW
FOV	FIELD OF VIEW
J-BOX	JUNCTION BOX
POE	POWER OVER ETHERNET
PTZ	PAN TILT ZOOM
SIM	SIMILAR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
+#	MOUNTING HEIGHT ABOVE FINISHED FLOOR
EF-#	ENTRANCE FACILITY
MC-#	MAIN CROSS-CONNECT
TR-#	TELECOMMUNICATIONS ROOM

SUGGESTED MATRIX OF RESPONSIBILITY

ITEM:	SHOWN ON:	FURNISHED BY:	INSTALLED BY:	NOTES:
TECHNOLOGY ROUGH-IN, REFER TO TECHNOLOGY EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR DEFINITION	T-SERIES	E.C.	E.C.	3. 4.
INFORMATION OUTLET FACEPLATES, JACKS, AND TERMINATIONS	T-SERIES	T.C.	T.C.	
CONDUIT SLEEVES (WHEN SHOWN ON DRAWINGS)	T-SERIES	E.C.	E.C.	
CONDUIT SLEEVES (NOT SHOWN BUT REQUIRED FOR PROPER INSTALLATION OF SYSTEM)	N/A	T.C. (A)	T.C.	2. 4.
TELECOMMUNICATION SYSTEMS ROUGH-IN	T-SERIES	E.C.	E.C.	1.
TELECOMMUNICATION EQUIPMENT, CABLING, AND TERMINATIONS	T-SERIES	T.C.	T.C.	
CABLE TRAY (INCLUDING WIRE BASKET TRAY) REFER TO SPECIFICATION SECTION 27 05 28 FOR DEFINITION	T-SERIES	E.C.	E.C.	
LADDER RACK	T-SERIES	T.C.	T.C.	5.
GROUNDING LUGS ON TECHNOLOGY EQUIPMENT	T-SERIES	T.C.	E.C.	6.
BONDING SYSTEM FOR TECHNOLOGY SYSTEM, REFER TO SPECIFICATION SECTION 27 05 26 FOR DEFINITION	T-SERIES	E.C.	E.C.	7. 8.
CONNECTION OF TECHNOLOGY BONDING SYSTEM TO THE ELECTRICAL GROUND SYSTEM	T-SERIES	E.C.	E.C.	
LINE VOLTAGE POWER (+120V OR GREATER)	E-SERIES	E.C.	E.C.	
LINE VOLTAGE POWER (NOT SHOWN BUT REQUIRED FOR PROPER INSTALLATION OF SYSTEM)	N/A	T.C.	E.C.	2. 4.
LINE VOLTAGE POWER FOR DOOR HARDWARE POWER SUPPLIES	ARCH SPEC	E.C.	E.C.	
LOW VOLTAGE CABLING FOR TECHNOLOGY SYSTEMS	T-SERIES	T.C.	T.C.	
CABLE HANGERS AND SUPPORTS OR OTHER CABLE ROUTING METHODS (OTHER THAN CONDUIT AND CABLE TRAY)	T-SERIES	T.C.	T.C.	5.
TECHNOLOGY SERVICE ENTRANCE CONDUITS, HANDHOLES, AND MANHOLES	[E]T-SERIES	E.C.	E.C.	
FLOOR BOX (ROUGH-IN)	T & E SERIES	E.C.	E.C.	

SUGGESTED MATRIX OF RESPONSIBILITY NOTES

1. LOCATIONS OF TELECOMMUNICATIONS ROUGH-INS SHALL BE INDICATED BY THE INFORMATION OUTLET SYMBOLS ON THE DRAWINGS. REFER TO THE TECHNOLOGY SYMBOL LIST FOR ADDITIONAL INFORMATION.
2. BASED ON THE INHERENT DIFFERENCES IN PRODUCTS FROM VARIOUS MANUFACTURERS, ALL REQUIRED EQUIPMENT MAY NOT BE SHOWN ON THE DRAWINGS FOR ALL ACCEPTABLE MANUFACTURERS.
3. INCLUDES BACKBOXES AND CONDUIT REQUIRED FOR THE TECHNOLOGY SYSTEMS INSTALLATION. THE E.C. SHALL BASE THE BID ON THE BASIS OF DESIGN SHOWN ON THE CONTRACT DOCUMENTS.
4. ALL CHANGES TO THE SLEEVES, BACKBOXES, CONDUITS, AND POWER REQUIRED BECAUSE OF THE T.C.'S SELECTION OF AN ALTERNATE ACCEPTABLE MANUFACTURER OR FROM SYSTEM CONFIGURATIONS THAT ARE LEFT TO THE CHOICE OF THE CONTRACTOR SHALL BE INCLUDED IN THE T.C.'S BID. THIS BID SHALL INCLUDE INSTALLATION BY A LICENSED ELECTRICIAN.
5. UNLESS TRADE RULES DICTATE OTHERWISE.
6. FURNISHED AS PART OF THE EQUIPMENT WHEN POSSIBLE, OR FURNISHED TO THE E.C. FOR INSTALLATION IN THE FIELD.
7. INCLUDES ALL CONDUCTORS, GROUND BARS, AND TERMINATIONS FOR THE COMPLETE BONDING SYSTEM REQUIRED BY THE SPECIFICATIONS.
8. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS OF PANELS AND SWITCHBOARDS SHOWN IN THE TECHNOLOGY BONDING RISER DIAGRAM AND TYPICAL TELECOM ROOM BONDING FLOW DIAGRAM.

TELECOM ROOM REFERENCES

TELECOM ROOM	DETAIL / SHEET REFERENCE	FLOOR PLAN REFERENCE	ARCH ROOM NUMBER
TR-1	1/T2-0	T1-1	04B

TECHNOLOGY SHEET INDEX

TECHNOLOGY GENERAL NOTES:

1. ###-### INDICATES TECHNOLOGY EQUIPMENT SCHEDULE ITEM LABELED AS "EQUIPMENT LIST ABBREVIATION"
2. REFER TO TECHNOLOGY EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR FULL DESCRIPTIONS AND MANUFACTURERS OF ALL DEVICES.

TECHNOLOGY MOUNTING SUBSCRIPT KEY:
- A — MOUNT AT +6" TO CENTERLINE ABOVE COUNTER OR BACKSPLASH
- H — MOUNT ORIENTED HORIZONTALLY
- L — MOUNT IN CASEWORK
- M — MOUNT IN MODULAR FURNITURE
- S — MOUNT IN SURFACE RACEWAY

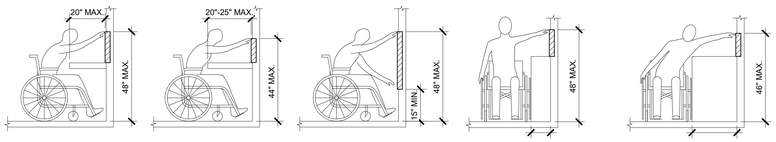
A SLASH IS USED BETWEEN TWO SUBSCRIPTS, E.G., A/H.

TECHNOLOGY INSTALLATION NOTES:

1. THE COMPLETE INSTALLATION SHALL BE IN ACCORDANCE WITH THE ADA STANDARDS FOR ACCESSIBLE DESIGN. REFER TO THE ADA GUIDELINES FOR ALL CONFIGURATION DETAILS ON THIS PAGE FOR ADDITIONAL INFORMATION.
2. CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING, IN FLOOR SLAB, ETC. UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS. CONDUIT IN MECHANICAL ROOMS AND STORAGE ROOMS WITHOUT CEILINGS MAY BE EXPOSED ON BUILDING STRUCTURE.
3. BOXES LOCATED ON OPPOSITE SIDES OF NON-RATED WALLS SHALL BE OFFSET A MINIMUM OF 6" HORIZONTALLY. BOXES ON OPPOSITE SIDES OF FIRE RATED WALLS SHALL BE OFFSET A MINIMUM OF 24" HORIZONTALLY. "THRU-THE-WALL" BOXES SHALL NOT BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE ARCHITECT/ENGINEER.
4. VERIFY ALL FURNITURE, MODULAR FURNITURE, AND EQUIPMENT LOCATIONS WITH ARCHITECTURAL PLANS, ELEVATIONS, AND REVIEWED SHOP DRAWINGS. PRIOR TO MAKING THE ACTUAL TELECOMMUNICATIONS INSTALLATION, ADJUST OUTLETS OR CONNECTION LOCATIONS TO ACCOMMODATE FURNITURE AND/OR EQUIPMENT.
5. TELECOMMUNICATIONS EQUIPMENT SHALL BE MOUNTED TO ALLOW ACCESS TO ELECTRICAL AND MECHANICAL EQUIPMENT. ALL MOUNTING OF TELECOMMUNICATION DEVICES ON EQUIPMENT SUPPLIED BY ANOTHER CONTRACTOR SHALL BE APPROVED IN ADVANCE BY THE OTHER CONTRACTOR.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
7. ALL MATERIALS USED TO SEAL PENETRATIONS OF FIRE RATED WALLS AND FLOORS SHALL BE TESTED AND CERTIFIED AS A SYSTEM PER ASTM E814 STANDARDS FOR FIRE TESTS OF THROUGH-PENETRATION FIRESTOPS. REFER TO 27 05 03 AND 28 05 03 03 FOR ADDITIONAL INFORMATION AND REQUIREMENTS SPECIFIC TO FIRESTOPPING.
8. THE TECHNOLOGY CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF THE CEILINGS, CEILING TILES, AND CEILING GRID ASSOCIATED WITH THE AREAS OF WORK BY ALL CONTRACTORS.
9. ALL LADDER RACK SIZES ARE AS DEFINED ON THE DRAWINGS. REFER TO SPECIFICATION SECTION 27 05 28 FOR APPROVED MANUFACTURERS AND INSTALLATION REQUIREMENTS.
10. FLUSH MOUNT ALL TELECOMMUNICATION OUTLETS AT +18" FROM FLOOR (CENTERLINE DIMENSION), EXCEPT WHERE OTHERWISE NOTED. OUTLETS MAY BE SURFACE MOUNTED WHEN CONDUIT IS SPECIFIED EXPOSED.
11. EACH CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED BY THEIR ACTIONS TO THE WALLS, FLOORS, CEILINGS, AND ROOFS. THE CONTRACTOR WHOSE WORK CAUSES DAMAGE IS RESPONSIBLE FOR PATCHING TO MATCH ORIGINAL CONSTRUCTION, FIRE RATING, AND FINISH.

TECHNOLOGY OUTSIDE PLANT NOTES

1. THE LOCATION OF THE CONDUIT, HAND HOLES AND/OR MAINTENANCE HOLES SHOWN ARE APPROXIMATE LOCATIONS. FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIVATE AND/OR PUBLIC PRIOR TO THE INSTALLATION OF THE COMPONENT. FIELD COORDINATE THE FINAL LOCATION WITH THE OWNER AND ENGINEER PRIOR TO INSTALLATION.
2. POTHOLING TO LOCATE EXISTING UNDERGROUND UTILITIES, IF APPLICABLE, SHALL BE INCLUDED IN THE CONTRACTOR'S BID. CONTRACTOR IS RESPONSIBLE FOR FINAL PLACEMENT OF HAND HOLES AND/OR MAINTENANCE HOLES AND SHALL NOTIFY THE ENGINEER OF FINAL LOCATIONS PRIOR TO INSTALLATION.
3. HAND HOLES AND/OR MAINTENANCE HOLES SHALL BE CONSTRUCTED SO THAT THE TOP OF THE FRAME WILL BE FLUSH WITH THE GROUND LINE.
4. REMOVAL AND REPLACEMENT OF THE EXISTING UNDERGROUND UTILITIES THAT ARE REQUIRED TO COMPLETE THE INSTALLATION SHALL BE INCLUDED IN THE CONTRACTOR'S BID.
5. CONTRACTOR SHALL INCLUDE IN THEIR BID ANY REMOVAL AND REPLACEMENT OF EXISTING SIDEWALK, PAVEMENT, GRASS, SHRUBS, TREES, ETC. THAT WILL BE IMPACTED BY THE INSTALLATION OF THE NEW CONDUITS SHOWN ON THE DRAWINGS. IF TREES ARE REQUIRED TO BE REMOVED THE CONTRACTOR SHALL CONTACT THE OWNER AND DISCUSS OPTIONS PRIOR TO CUTTING DOWN ANY TREE OR SHRUB OVER 5" IN HEIGHT.
6. NO ADDITIONAL COST SHALL BE APPROVED FOR PLACING CONDUITS DEEPER THAN REQUIRED MINIMUM DEPTH TO AVOID EXISTING UNDERGROUND UTILITIES.
7. PROVIDE A MINIMUM OF 25'-0" SLACK LOOP WITHIN EACH HAND HOLES AND/OR MAINTENANCE HOLES. SLACK LOOP SHALL BE SECURE SO COPPER OR FIBER IS NOT RESTING ON EARTH AFTER FINAL INSTALLATION.



INSTALL ABOVE COUNTER DEVICE AT 44" ABOVE FINISHED FLOOR.

INSTALL ABOVE COUNTER DEVICE AT 40" ABOVE FINISHED FLOOR.

INSTALL DEVICE AT 18" ABOVE FINISHED FLOOR.

ADA GUIDELINES - FRONT ACCESS

INSTALL DEVICE AT 44" ABOVE FINISHED FLOOR.

INSTALL DEVICE AT 42" ABOVE FINISHED FLOOR.

ADA GUIDELINES - SIDE ACCESS

ADA STANDARDS FOR ACCESSIBLE DESIGN

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Illinois Design Firm Registration #184.007637-0014

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No.	Date	Issue
2	01/11/2023	ADDENDUM 4
1	12/08/2022	ISSUE FOR BID / PERMIT

Project Number	16015
Drawn	ECW
Checked	ACA
Proj. Arch./Eng.	ECW

EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

2310 Oakton St, Evanston, IL 60202

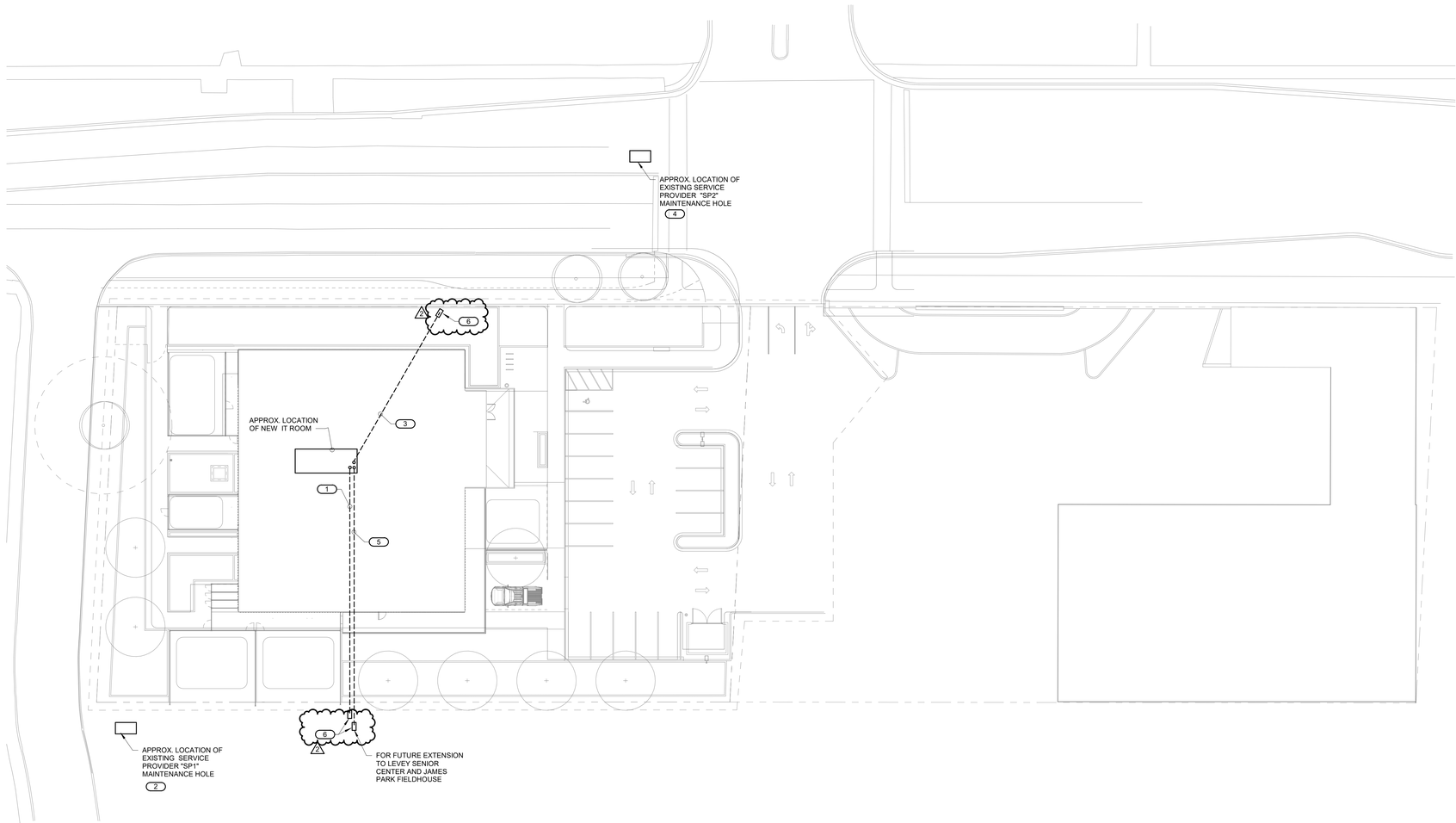
Project Name

TECHNOLOGY COVERSHEET

Sheet Name

Drawing No. **T0-0**

3" = 1'- 0" 1" = 1'- 0" 1/2" = 1'- 0" 1/4" = 1'- 0" 1/8" = 1'- 0" 1/16" = 1'- 0" 1" = 30'- 0"



KEYNOTES:

1. CONTRACTOR SHALL PROVIDE 4" CONDUIT WITH PULLWIRE AND (3) MAXCELL CELL PACKS INNERDUCTS STUBBED UP IN IT ROOM AND ROUTED BELOW GRADE TO NEW HANDHOLE IN LANDSCAPE AREA FOR SERVICE PROVIDER "SP1".
2. UNDER SEPARATE CONTRACT, SERVICE PROVIDER "SP1" WILL PROVIDE PATHWAY AND OPTICAL FIBER CABLES TO HANDHOLE AND ROUTE INTO IT ROOM.
3. CONTRACTOR SHALL PROVIDE 4" CONDUIT WITH PULLWIRE AND (3) MAXCELL CELL PACKS INNERDUCTS STUBBED UP IN IT ROOM AND ROUTED BELOW GRADE TO NEW HANDHOLE IN LANDSCAPE AREA FOR SERVICES PROVIDER "SP2".
4. UNDER SEPARATE CONTRACT, SERVICE PROVIDER "SP2" WILL PROVIDE PATHWAY AND OPTICAL FIBER CABLES TO HANDHOLE AND ROUTE INTO IT ROOM.
5. CONTRACTOR SHALL PROVIDE 4" CONDUIT WITH PULLWIRE AND (3) MAXCELL CELL PACK INNERDUCTS STUBBED UP INTO IT ROOM AND ROUTED BELOW GRADE TO HANDHOLE LANDSCAPE AREA FOR FUTURE EXTENSION TO LEVEY SENIOR CENTER AND JAMES PARK FIELDHOUSE.
6. CONTRACTOR SHALL PROVIDE NEW 17" x 30" QUAZITE #PG SERIES HANDHOLES

1 SITE PLAN - TECHNOLOGY

1" = 20'-0"

NORTH

1" = 30'-0" | 1/16" = 1'-0" | 1/8" = 1'-0" | 1/4" = 1'-0" | 1/2" = 1'-0" | 1" = 1'-0" | 3" = 1'-0"

Permit Stamp

HOLABIRD & ROOT

140 South Dearborn Chicago, IL 60603
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EVANSTON animal shelter

City of Evanston

EVANSTON ANIMAL SHELTER

2310 Oakton St, Evanston, IL 60202

Project Name

SITE PLAN - TECHNOLOGY

Sheet Name

Drawing No. **T1-0**

IMEG

263 SHUMAN BOULEVARD
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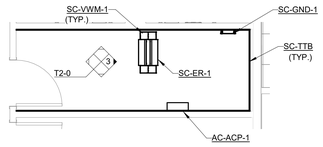
Illinois Design Firm Registration #184.007637-0014

0 1 2 3

REF. SCALE IN INCHES

PROJECT #22000606.00

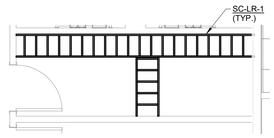


1 EQUIPMENT ROOM LAYOUT - TR-1

1/4" = 1'-0"

NOTES:

1. REFER TO 4/T2-0 FOR CONNECTIVITY RISER DIAGRAM-TR-1.
2. REFER TO 1/T3-0 FOR BONDING BUS BAR DETAIL.
3. REFER TO T6-0 FOR GENERAL TECHNOLOGY EQUIPMENT SCHEDULE.

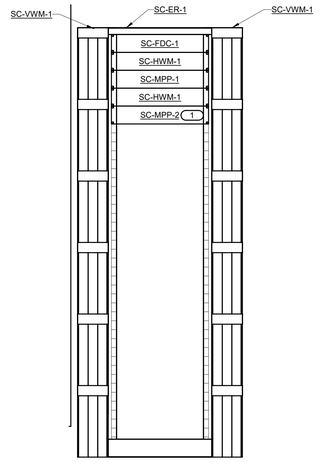


2 EQUIPMENT ROOM PATHWAY - TR-1

1/4" = 1'-0"

NOTES:

1. INSTALL LADDER RACK AT 7'6" AFF.
2. REFER TO T6-0 FOR GENERAL TECHNOLOGY EQUIPMENT SCHEDULE.



3 EQUIPMENT RACK ELEVATION - TR-1

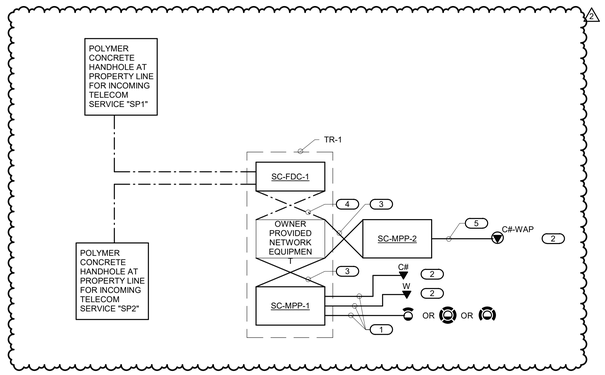
1" = 1'-0"

NOTES:

1. REFER TO 4/T2-0 FOR CONNECTIVITY RISER DIAGRAM-TR-1.
2. REFER TO T6-0 FOR GENERAL TECHNOLOGY EQUIPMENT SCHEDULE.

KEYNOTES: (#)

1. DEDICATED PATCH PANEL PROVIDED FOR WIRELESS ACCESS POINTS.



4 CONNECTIVITY RISER DIAGRAM TR-1

NO SCALE

NOTES:

1. THIS RISER IS DIAGRAMMATIC AND MAY NOT SHOW ACTUAL ROUTING OR QUANTITIES OF MATERIALS SHOWN. THIS RISER IS SHOWN FOR CLARIFICATION OF CONNECTION LOCATIONS AND CABLE TYPE. ALL INFORMATION OUTLETS ARE TYPICAL OF THE OUTLETS IN THE AREA SHOWN. REFER TO FLOOR PLANS FOR MORE SPECIFIC ROUTING AND QUANTITY INFORMATION. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. REFER TO T6-0 FOR TECHNOLOGY EQUIPMENT SCHEDULE.

KEYNOTES: (#)

1. 23 GAUGE, 4-PAIR, CATEGORY 6, UNSHIELDED TWISTED PAIR CABLE, SEE SPECIFICATIONS.
2. REFER TO INFORMATION OUTLET SCHEDULE ON T6-0 AND THE FLOOR PLANS FOR QUANTITY OF CABLES AND JACKS TO BE INSTALLED AT EACH INFORMATION OUTLET.
3. RJ-45 TO RJ-45 CATEGORY CAT 6 UTP PATCH CORD. SEE SPECIFICATIONS.
4. FIBER PATCH CORD. SEE SPECIFICATIONS.
5. 23 GAUGE, 4-PAIR, CATEGORY 6A, UNSHIELDED TWISTED PAIR CABLE, SEE SPECIFICATIONS.

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0 1 2 3

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Project Name

TECHNOLOGY ROOM ENLARGEMENTS

Sheet Name

Drawing No. **T2-0**

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EVANSTON ANIMAL SHELTER

The following listed documents comprise the project manual for the project listed above. Where numerical sequence of sections is interrupted, such interruptions are intentional.

The complete Project Manual for this project consists of these entire Volumes 1, 2 and 3, which must not be separated for any reason. The Architect and Owner disclaim any responsibility for any assumptions made by a contractor or subcontractor who does not receive a complete Project Manual, including all sections listed in the Table of Contents.

23 0800	Commissioning of HVAC	dbHMS	12/08/22
23 0900	Controls	IMEG	12/08/22
23 3100	Ductwork	IMEG	12/08/22
23 3300	Ductwork Accessories	IMEG	12/08/22
23 3423	Power Ventilators	IMEG	12/08/22
23 3600	Air Terminal Units	IMEG	12/08/22
23 3700	Air Inlets and Outlets	IMEG	12/08/22
23 7416.12	Packaged Rooftop Air Conditioning Units 25 Ton and Below	IMEG	12/08/22
23 8126	Split System Air Conditioning Units	IMEG	12/08/22
23 8200	Terminal Heat Transfer Units	IMEG	12/08/22

DIVISION 26 – ELECTRICAL

26 0500	Basic Electrical Requirements	IMEG	12/08/22
26 0503	Through Penetration Firestopping	IMEG	12/08/22
26 0513	Wire and Cable	IMEG	12/08/22
26 0526	Grounding and Bonding	IMEG	12/08/22
26 0527	Supporting Devices	IMEG	12/08/22
26 0533	Conduit and Boxes	IMEG	12/08/22
26 0553	Electrical Identification	IMEG	12/08/22
26 0800	Commissioning of Electrical	dbHMS	12/08/22
26 0913	Power Monitoring and Control System	IMEG	12/08/22
26 0933	Lighting Control Systems	IMEG	12/08/22
26 2000	Service Entrance	IMEG	12/08/22
26 2413	Switchboards	IMEG	12/08/22
26 2416	Panelboards	IMEG	12/08/22
26 2419	Motor Control	IMEG	12/08/22
26 2726	Wiring Devices	IMEG	12/08/22
26 2816	Disconnect Switches	IMEG	12/08/22
26 4300	Surge Protection Devices	IMEG	12/08/22
26 5119	LED Lighting	IMEG	12/08/22
26 5215	Emergency Lighting Inverter	IMEG	12/08/22

DIVISION 27 – COMMUNICATIONS

27 0500	Basic Communications Systems Requirements	IMEG	12/08/22
27 0503	Through Penetration Firestopping	IMEG	12/08/22
27 0526	Communications Bonding	IMEG	12/08/22
27 0528	Interior Communication Pathways	IMEG	12/08/22
27 0543	Exterior Communication Pathways	IMEG	12/08/22
27 0553	Identification and Administration	IMEG	12/08/22
27 1100	Communication Equipment Rooms (CER)	IMEG	12/08/22
27 1343.53	Television Distribution System	IMEG	12/08/22
27 1500	Horizontal Cabling Requirements	IMEG	12/08/22

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Commissioning: Commissioning (Cx) is a systematic documented process of verifying that building systems perform interactively according to the design intent and the Owner's operational needs. Commissioning during the construction phase is intended to achieve the following specific objectives:

1. Review of the Engineer's drawings and specifications during design development and construction document phases.
2. Review of submittals related to the building equipment and systems forwarded to the CxA by the General Contractor (GC).
3. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by installing contractors.
4. Verify that systems are installed in accordance with the Owner's Project Requirements (OPR).
5. Verify and document proper performance of equipment and systems.
6. Verify that operating and maintenance (O&M) documentation is complete.
7. Verify that the Owner's operating personnel are adequately trained.
8. Verify and complete appropriate initial performance tests and documentation, and schedule seasonal tests. Verify seasonal testing and deferred testing is complete.
9. Review building operations 10 months after substantial completion.
10. Develop an ongoing commissioning plan.

B. Commissioning shall comply with and follow ASHRAE Guideline 0 and 1.

C. This project is pursuing a LEED v4 Silver Certification.

D. Systems to be commissioned: Refer to related sections for a listing of the commissioned systems.

E. Commissioning requires the participation of affected Division contractors (Subs) to ensure that all systems are operating in a manner consistent with the Contract Documents. All affected Division contractors shall be familiar with:

1. All parts of the commissioning plan issued by the Commissioning Authority (CxA)
2. The Owner's Project Requirements (OPR)

F. Commissioning Team: The members of the commissioning team consist of the following:

1. Commissioning Authority (CxA)
2. The designated representative of the Owner
3. The General Contractor (GC)
4. The Subcontractor (Sub)
5. The Architect (A/E)
6. The design engineers or Engineer of Record (EOR), particularly the mechanical engineer
7. The Mechanical Contractor (MC)
8. The Electrical Contractor (EC)
9. The Testing, Adjusting and Balancing (TAB) representative
10. The Controls Contractor (CC) installing the Energy Management System (EMS) or Building Management and Control System (BMCS)
11. Any other installing subcontractors or suppliers of equipment
12. The Owner's building or plant operator/engineer

1.3 RELATED SECTIONS

A. The Work of this section applies to all commissioning Work listed in all divisions of these specifications and particularly to the following:

1. 22 08 00 – Commissioning of Plumbing
2. 23 05 93 – Testing, Adjusting and Balancing for HVAC
3. 23 08 00 – Commissioning of HVAC
4. 26 08 00 – Commissioning of Electrical Systems

1.4 DEFINITIONS AND ABBREVIATIONS

A. Terms used in this section shall have the following meanings:

1. "As Built" drawings – Fully dimensioned, to-scale, drawings that present an accurate representation of the components and assemblies as they exist in the built Work; where allowed by other Division 1 specification sections these can be legible hand marks on hard copies of drawings kept on the job site.
2. "Basis of Design" (BOD) – A document developed by the design team that details all assumptions made during the creation of the construction documents to meet the Owner's Project Requirements (OPR).
3. "Commissioning" – A quality assurance process to provide documented verification that the building equipment and systems function in compliance with criteria established in the project documents to satisfy the Owner's operational needs. Commissioning begins prior to the design phase and is continuous through the life of the facility.
4. "Equipment" or "Systems" – Collectively or separately these are part of the Work consisting of materials, systems, components, and assemblies intended or designed to be part of the building and include any labor or process required by the Contract Documents related to that part.
5. "Contractor's Equipment" – All or any apparatus, machinery, equipment, vehicles, materials, plant tools and all other items required for the Work, design services,

procurement activities, or the remedying of defects but not to become part of the finished Work.

6. "Contractor Start-up" – The original check by the contractor and/or manufacturer's representative of the installation and operation of a component or system. This is often completed with the aid of checklists provided by the installing contractor or manufacturer.
7. "Corrective Action" – An activity intended to correct a non-conforming item or action, or to prevent further recurrences of non-conformities.
8. "Functional Performance Testing" – Tests to confirm the proper operation of a fully installed system for operation. Tests verify operation both individually and in conjunction with other systems.
9. "Inspection" – Any activity taken in accordance with project documents to formally or officially view, examine, measure, test, or gauge one or more characteristics of an approved material, procedure, product, or service against the specified requirements.
10. "Material Test Certificate" – An approved test result document from either the source of materials or directly from the manufacturer or an independent agency.
11. "Non-Destructive Test" means any test whereby the integrity or conformity of a material item can be assessed without resorting to a destructive procedure for analysis.
12. "Owners Project Requirements" (OPR) – A document developed by the Owner design team that details all assumptions made during the creation of the construction documents to meet the Owner Requirements.
13. "Pre-Functional Checklist (Construction Checklist)" – On-site verification of the existence and installation of equipment, materials, and or systems as required in the contract documents. The checklists serve as written notification from the contractor to the CxA that the related piece of equipment is ready for functional testing.
14. "Review" – Verification of documents, reports, work, or any item submitted for approval in accordance with Technical Specifications Schedule 6 [Review Procedure] as called for in the Contract or as Owner's Representative may require.
15. "Sampling Rate" – The percentage or quantity of components, equipment, or systems that will be witnessed by the Owner and or Commissioning Authority to ensure compliance with the Owner's Project Requirements and contract documents.
16. "Short-Term Diagnostic Testing" – The use of short term or temporary testing to verifying system operation through sampling a systems ability to perform as designed.
17. "Third Party Inspection" – A service provided by a recognized independent agency employed by the Owner or project team to oversee inspections and tests of materials, as required by the customer or his representative.
18. "Witness" – The authorized and/or nominated personnel from the Subcontractor, Contractor, Owner, Third Party Inspector, or vendor representative who observes or participates in the inspection and/or testing of an item to determine acceptability, in accordance with the Accepted and Endorsed Inspection & Test Procedure (ITP).

B. The following is a list of abbreviations:

1. BOD: Basis of Design
2. CxA: Commissioning Authority
3. GC: General Contractor
4. Cx: Commissioning
5. EOR: Engineer of Record
6. FPT: Functional Performance Test
7. FTS: Functional (Performance) Test Script

8. O&M: Operations and Maintenance
9. OPR: Owner's Project Requirements
10. PFC: Pre-Functional Checklist
11. SOR: Site Observation Report
12. TAB: Testing, Adjusting, and Balancing
13. TS: Technical Specifications

1.5 REFERENCE STANDARDS: The referenced sections of the following publications form a part of these Specifications; comply with provisions of these publications except as otherwise indicated or specified:

A. ASHRAE Guideline 0 and Guideline 1

B. Green Building Design and Construction; LEED Reference Guide for Green Building Design and Construction, published by the U.S. Green Building Council.

1.6 COMMISSIONING AUTHORITY (CxA)

A. The commissioning authority and/or agency will be selected and employed by the building owner. The commissioning authority shall not be associated with or employed by the Architect, the GC, or a sub-contractor

B. The Commissioning Authority for this project is dbHMS.

C. The CxA will create the following deliverables:

1. A Commissioning Plan
2. Pre-functional Checklists for specific systems and equipment
3. Function Performance Test Procedures for specific systems and equipment.
4. Issues Log in on-line or other form
5. Final Commissioning Report

D. The primary role of the CxA is to write a commissioning plan and coordinate the execution of it. In doing so the CxA will observe and document equipment installation and performance and note when systems are not functioning in accordance with the OPR and Contract Documents.

E. The CxA is not responsible for design concepts, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management.

F. The CxA may assist with problem solving, non-conformance or deficiencies, but ultimately the responsibility to clarify the design intent lies with the EOR. The responsibility to solve deficiencies or non-conformance with the Contract Documents resides with the GC.

G. The CxA shall attend and record results for up to two (2) FPTs for any given system or piece of equipment. The cost for the CxA's time for attending and recording results for tests beyond two tests shall be charged to the GC by Change Order when those costs meet the criteria set forth in Part 3 of this specification under "Cost of Re-testing".

H. Limits to the responsibility of the CxA:

1. Nothing stated in this section shall be construed to transfer responsibility for the design of the building to the CxA nor to relieve the EOR of responsibility for the design.
2. Nothing stated in this section shall be construed to relieve the General Contractor of responsibility for the means and methods of construction, scheduling and coordination of construction activates, and on-the-job safety.

1.7 COMMISSIONING PLAN:

A. The commissioning plan is prepared by CxA and expands and makes more specific the information contained here. The commissioning plan is issued by the CxA prior to or at the Kickoff Meeting. Contractor and sub-contractors shall comply with the provisions of the Commission Plan. In the event of a conflict between the Commissioning Plan and these specifications, the Specifications shall govern.

B. Schedule dates provided in the Commissioning Plan are tentative and shall be confirmed by the General Contractor and the responsible sub-contractors by inclusion in the project master schedule.

1.8 SUBMITTALS

A. Comply with the Division One Submittals section of these specifications.

B. Obtain from the CxA a list of submittals required by the CxA for review.

C. Maintain a submittal log and copy the CxA on the log at least once every two weeks.

D. Provide submittals that are specific to this Work and that are marked to show actual materials, methods, options, dimensions, formulas, and other characteristics to be provided. “Generic” web-based PDF files without the appropriate marks and un-edited sales brochures, etc. will be returned by the CxA with the recommendation that they be rejected.

E. Ensure concurrent submittals for related equipment; that is, equipment that relies on controls or interaction with other equipment shall be submitted for review at the same time as that equipment. In that way, the CxA and the EOR can review each component while having access to information for related systems.

F. For re-submittals comply with the following. (Re-Submittals that do not comply will be returned by the CxA with the recommendation that they be rejected.):

1. “Bubble” or “cloud” all changes from the previous submittal to clearly indicate what has changed.
2. Keep all sheet numbers the same.
3. It is permitted to omit sheets that have not changed but do not re-number sheets.
4. Keep all drawings, schedules, and detail numbers the same.
5. Keep all drawings and details on the same sheet as they were originally issued.

G. Submit installation instructions and maintenance manuals. (These can inform the installation and performance of systems and are necessary for the CxA to get a complete picture.)

H. The CxA will review submittals related to the commissioned systems only, and only with regard to the following aspects:

1. Conformance to the contract Documents as they relate to the commissioning process.
2. The functional performance of the systems as they relate to the OPR.
3. The adequacy of the components and arrangements for developing test procedures for the commissioning process.

I. The review by the CxA of submittals is intended only to aid in verifying compliance with the OPR and for the development of functional testing procedures. The review by the CxA does not verify compliance with the EOR's design intent, the specifications, or Contract Documents. The CxA will not stamp, sign or return hard copies of submittals but will mark submittals showing any items missing, any issues found, or areas that are not adequate for commission purposes and which require resubmission and will return electronic copies through the established channels.

J. Submit Installation Instructions and O & M manuals for the commissioned components within 60 days of their acceptance by the EOR, not at the end of the project. (These are necessary for system commissioning) Provide the following:

1. Full warranty information, including clear identification of the Owner's responsibilities to keep the warranty in force.
2. The installation instructions and safety sheets that are shipped with the equipment or systems.
3. O&M manual requirements for Cx do not replace O&M manual documentation requirements listed elsewhere in these specifications.

PART 2 - EQUIPMENT

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested.

B. Special equipment, tools and instruments (only available from the vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site.

C. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in the Owner's Project Requirements document. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have resolution of 0.1 degrees F and calibration within 6 months of use to an accuracy of ±0.5 degrees F. Pressure sensors shall have been calibrated within 6 months of use to an accuracy of ±3.0% of the value being measured (not full range of device).

1. All calibration shall be to NIST traceable standards. (National Institute of Standards and Technology - www.nist.gov, 301-975-6478).
2. All equipment shall be calibrated according to the manufacturer's recommended intervals and immediately after being dropped or damaged.
3. Calibration tags shall be affixed or certificates readily available.

D. Access to the buildings Wi-Fi connection for functional testing and documentation download/upload (if available).

2.2 EQUIPMENT FOR ACCESS

A. Provide means for the CxA to access, observe, touch, and visually confirm proper operation of all equipment and systems. These means shall follow all OSHA and job-site safety regulations.

PART 3 - EXECUTION

3.1 GENERAL

A. Execute the Work of this section and allocate work to GC, sub-contractors, and suppliers as appropriate and at the discretion of the GC, understanding that ultimate responsibility lies with the GC.

B. Provide coordination between all construction and supply entities to provide a complete and functional commissioning as required here and in conformance with the referenced standards.

C. Any References to "sub-contractor" or "supplier" responsibilities are for convenience in dividing and organizing language and are not intended to allocate Work and shall not remove ultimate responsibility from the GC.

3.2 SCHEDULING COMMISSIONING

A. Maintain a master project schedule as specified in other Division One sections and ensure, in coordination with the Cx Plan and CxA, that Cx activities are included in detail. Inform the CxA of discrepancies between the project schedule and the Cx Plan.

B. Integrate all commissioning activities into the master schedule. Obtain sufficient notice of schedule changes from the CxA to update the commissioning activities schedule.

C. At least once a month, publish an overall project schedule with the commissioning milestones included.

1. Ensure that the schedule includes the steps that must proceed and follow the system installation.
2. Ensure that all systems tests are included in the schedule.

D. Notify the CxA when commissioning activities, not yet performed or scheduled, will delay construction.

E. Inform the CxA in writing on a weekly basis of the status of activities that affect the commissioning process; this may be accomplished by copying the CxA on job meeting minutes – provided they have the necessary detail.

3.3 RESPONSIBILITIES

A. General Contractor (GC)

1. Include the cost of commissioning in the contract price.
2. Ensure that sub-contractors perform their commissioning responsibilities.
3. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings, related to commissioned equipment, to the CxA.
4. Attend commissioning meetings as required by the CxA.
5. In each purchase order or subcontract written, include the requirements for submittal data, O&M data, commissioning tasks and training.
6. Responsible for ensuring that all Subcontractors, suppliers, and manufacturers execute their commissioning responsibilities, according to the Contract Documents and schedule.
7. Prepare O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
8. Submit O&M manuals to the CxA for review **within 60 days** of acceptance of equipment submittals by EOR.
9. Designate a representative who shall attend a commissioning kickoff meeting and other necessary meetings scheduled by the CxA to facilitate the Commissioning process.
10. Verify that Test and Balance has been completed in accordance with Division 23 specifications and submit a test and balance report to the EOR and CxA for review.
11. Coordinate the training of Owner operations and User personnel.

Warranty Period

12. Ensure that Subs correct items of non-compliance and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing or the 10-month review, and as noted by LEED criteria.

Change Orders for Commissioning Costs

13. Prepare a deduct Change Order to the Owner for the cost incurred by the CxA for attending and recording results of field testing when those costs meet the criteria set forth in Part 3 of this specification under “Cost of Re-testing”.

B. Sub-Contractors

1. The commissioning responsibilities applicable to each of the subcontractors are generally as follows (all references apply to commissioned equipment only). Specific requirements may be shown in the appropriate Divisions.
2. Construction and Acceptance Phases
    a. Include the cost of commissioning work in the contract price.
    b. In each purchase order or subcontract written, include requirements for submittal data, commissioning documentation, O&M data, and training.

c. Attend a commissioning kickoff meeting and other meetings necessary to facilitate the Commissioning process.
d. Subcontractors shall provide the GC with shop submittals of commissioned equipment, as part of the normal submittal process, for distribution to the CxA as specified in Part 1 of this section.
e. Deliver O & M manuals within 60 days of acceptance of equipment by the EOR in accordance with the submittal requirements in Part 1 of this section.
f. Provide further documentation necessary for the commissioning process when requested by the CxA.
g. Subcontractors shall assist, along with the EOR, in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation are not sufficient for writing detailed testing procedures.
h. Assist the CxA in preparing the specific functional performance test procedures.
i. Review test procedures prepared by the CxA to ensure feasibility, safety, and equipment protection and provide necessary written alarm limits to be used during the tests.
j. Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the pre-functional checklists from the CxA for all commissioned equipment. Submit the plan to CxA for review prior to startup.
k. During the startup and initial checkout process, execute the pre-functional checklists for all commissioned equipment. Submit Construction (Pre-functional) checklists a minimum of five days prior to the start of functional performance testing. Note: If for whatever reason, Pre-functional checklists are not complete, written verification that equipment is ready for functional performance testing is required.
l. Perform and clearly document the completed startup and system operational checkout procedures, providing a copy to the CxA.
m. Address current A/E punch list items before functional testing.
n. Provide skilled technicians to execute starting the equipment and to execute the functional performance tests. Ensure that the individuals are available and present during the agreed-upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem solving.
o. Provide all tools or the use of tools to start, checkout and functionally test equipment and systems, except for testing equipment supplied and installed by the CxA.
p. Perform functional performance testing under the direction of the CxA for specified equipment. Assist the CxA in interpreting the monitoring data, as necessary.
q. Correct deficiencies, differences between specified, and observed performance, as reported by the CxA to the A/E and as directed by the Owner's representative. Retest the equipment.
r. Update O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions. Submit a copy of the complete O&M manual to the CxA for review and approval prior to the final submission to the owner.
s. Prepare redline as-built drawings for all design drawings and final as-builds for contractor-generated coordination drawings.

t. Prepare a training outline and submit to CxA for comment and approval as described in division 01. Provide training of the Owner's operating personnel as specified in division 01.
u. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

3. Warranty Period
   a. Execute seasonal or deferred functional performance testing, witnessed by the CxA, when specified as part of the commissioning process or called for in the Commissioning Plan.
   b. Correct issues of non-compliance and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

C. Equipment Suppliers

1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Subs.
3. Include all special tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment according to these Contract Documents in the base bid price to the Contractor, except for stand-alone data logging equipment that may be used by the CxA.
4. Provide information requested by CxA regarding equipment sequence of operation and testing procedures.
5. Review test procedures provided by factory representatives and deliver to CxA.
6. Deliver factory representative test result reports to the CxA.

3.4 TEST AND BALANCE VERIFICATION

A. Provide the labor and test equipment necessary to demonstrate to the CxA that the air and water systems have been properly balanced. This is required prior to the start of functional performance testing of balanced equipment.

B. The CxA will randomly select devices, equipment and systems for verification purposes.

C. The GC shall regard this verification process as a functional performance test for purposes of time allowed to correct deficiencies and requirements regarding retesting if major problems are discovered.

3.5 START-UP AND PRE-FUNCTIONAL CHECK LISTS

A. Prepare a start-up plan for each piece of equipment including the following:

1. The manufacturer's standard start-up and check out procedures copied from the installation instructions.
2. The subcontractor's standard start-up and check out procedures.
3. Construction (Pre-functional) checklists provided by the CxA.
4. Checklists and procedures with specific spaces for recording and documenting the inspection of each procedure and a summary block for deficiencies and explanations.

B. Submit startup plan to CxA for review and obtain approval before proceeding. Include final startup report signature block provided by CxA.

C. Incorporate this equipment start-up date in overall start-up schedule for the project.

D. Perform start-up testing for each piece of equipment to ensure that the equipment and systems are properly installed and ready for turnover to the Owner.

E. The CxA and/or Owner may be present for the start-up of the equipment. For lower-level components of equipment or for similar equipment present in large quantities, the CxA may observe a sampling of the pre-functional and start-up procedures. The sampling procedures are identified in the commissioning plan.

F. Identify individuals that have direct knowledge of, and have witnessed, that a line item task on the pre-functional checklist was actually performed. Ensure that these individuals, and only these individuals, are the ones to initial or check-off that item on the pre-functional checklist.

G. Ensure that start-up and pre-functional checklists are completed on the job-site concurrent with the activities being documented. Checklists that are found to have undergone remedial documentation either off-site or after the procedures have been completed will be rejected by the CxA.

H. Ensure that checklists are complete, accurate, and fully legible to the CxA's satisfaction.

I. Where checklists are rejected by the CxA due to non-compliance with "G" and "H" above, repeat the procedure or test and prepare new checklists at no additional cost to the Owner.

J. Submit the completed start-up checklists, reports and equipment pre-functional checklists to the CxA for review. Note all noncompliance items on these checklists. Notify the CxA when outstanding items have been corrected.

K. Submit satisfactory completed start-up checklists to the CxA a minimum of five working days prior to the start of functional performance testing.

3.6 FUNCTIONAL TESTING PREPARATION

A. GC's signature on the final start-up checklists signature block shall constitute certification by the GC that:

1. The commissioned systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
2. The commissioned instrumentation and control systems have been completed and calibrated, are operating according to the Contract Documents, and pretest set points have been recorded.
3. Testing, adjusting, and balancing procedures have been completed and reports of same have been submitted, discrepancies corrected, and corrective work approved.
4. GC agrees to a deduct change order as follows:

    a. In the event that the CxA arrives on site and determines that equipment and systems are not in the condition certified, the CxA shall inform the Owner of a wasted trip and provide an itemized list of expenses associated with the trip. The Owner shall prepare a deduct Change Order to the Contract for costs incurred by the CxA and execute it under the provisions of other Division One sections.
5. GC agrees to commencement of procedures listed below under "Cost of Retesting"

3.7 FUNCTIONAL PERFORMANCE TESTING

A. Provide all documentation as requested to the CxA for development of functional performance testing procedures. This documentation shall include, at a minimum, manufacturer's installation, start-up, operation and maintenance procedures. The CxA may request further documentation as necessary for the development of functional performance tests.

B. Review the functional performance test scripts developed by the CxA.

1. Respond in writing to the CxA regarding the acceptability of the proposed test scripts.
2. Note any necessary modifications to the scripts due to the actual equipment/systems or safety concerns and submit these to the CxA for consideration.

C. Place equipment and systems into operation and continue the operation as required during each working day of the testing activities.

D. Accomplish the functional performance testing of equipment based on scripts developed by the CxA and as reviewed by the GC.

1. Provide access to the equipment in compliance with OSHA regulations.
2. Provide, to the CxA, access to The Building Automation System by way of passwords, web-based access, and access on site via temporary or permanent front-end computer and equipment.
3. Provide skilled technicians to operate the systems during functional performance testing. The CxA reserves the right to determine if the technician is not suitable for testing and has the authority to request a more experienced technician.
4. Correct any deficiencies identified during testing and retest equipment as required.

5. For lower-level components of equipment or for similar equipment present in large quantities, the CxA may perform functional testing of a sampling of equipment. The sampling procedures are identified in the commissioning plan.

E. Functional performance testing is intended to begin upon completion and proper startup (dictated by the manufacturer) of a system. Functional testing may proceed prior to the completion of the system at the discretion of the CxA only.

F. Verify all sequences of operation defined in the Contract Documents for the commissioned equipment and systems.

1. Perform testing by overriding set points or sensor readings at the DDC System or by other means mutually agreed to by the Contractor, the CxA and the owner, to initiate sequences of operation and verifying the response of the system.

G. Upon successful completion of all functional performance tests, perform Integrated Systems Testing. The testing shall document and verify the proper response of the overall HVAC systems.

H. Provide technicians, instrumentation, and tools to perform commissioning tests at the direction of the CxA.

I. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

J. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

K. The CxA along with the Contractors, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.

L. Tests will be performed using design conditions whenever possible.

M. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.

N. The CxA may direct that set points be altered when simulating conditions is not practical.

O. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.

P. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.

Q. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.8 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation. The CxA shall witness and document the results of functional tests using the specific Functional Test Scripts (FTS) developed for that purpose. Prior to testing, these scripts are provided to the GC for review and approval and to the Subs for review. The CxA will include the filled-out scripts in the Commissioning Report.

B. Non-Conformance.

1. The CxA will record the results of the functional test on the FTS form. All issues of non-conformance shall be noted.
2. Corrections of minor issues of non-conformance identified may be made during the tests at the discretion of the CxA. In such cases the issues of non-conformance and resolution will be documented on the FTS form.
3. Make every effort to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
4. As tests progress and non-conformance issues are identified, the CxA will discuss and log issues.
    a. When there is no dispute on the non-conformance issue and the Sub accepts responsibility to correct it:
        1) The CxA documents the deficiency and the Sub's response and intentions, then go on to another test or sequence.

    b. If there is a dispute about a non-conformance issue, regarding whether it is a non-conformance issue or who is responsible:
        1) The non-conformance issue shall be documented as an issue and assigned to an assumed responsible party.
        2) Resolutions shall be made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
        3) The CxA documents the resolution process in the Issues Log.
        4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency and provides a written response in the Issues Log documenting the resolution. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.

5. Provide written response to each issue recorded in the Issue Log provided by the CxA. Update these responses at least as often as commissioning meetings are scheduled. Outline the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.

6. The CxA retains the original FTS forms until the end of the project.

C. Failure Due to Manufacturer Defect. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the Contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable. In such case, the GC shall provide the Owner with the following:

1. Within one week of notification, the GC or manufacturer's representative shall examine all other identical units making a record of the findings. The findings shall be provided within two weeks of the original notice.
2. Within two weeks of the original notification, the GC or manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc. and all proposed solutions which shall include full equipment submittals. The proposed solutions shall not significantly differ from the specification requirements of the original installation.
3. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
4. Upon acceptance, the GC and/or manufacturer shall replace or repair all identical items, at their expense and extend the warranty accordingly, if the original equipment warranty had begun. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts can be obtained.

D. Approval. The CxA notes each satisfactorily demonstrated function and recommends acceptance of each test on the FTS form. The Owner gives final approval on each test using the same form, providing a signed copy to the CxA and the Contractor.

3.9 TRACKING OF ISSUES – ISSUES LOG

A. The CxA will create and maintain a log of issues related to the building systems in an on-line web site or other means that allows all members of the team to:

1. View the issues and related photos and documents
2. Read any responses
3. Write responses when the issue is assigned to them

B. All issues will be assigned to a member (or members) of the team by the CxA in a way that will allow them to respond in writing to the issue and provide photos and documents as part of their response.

C. For those issues assigned to the GC, sub-contractor or supplier:

1. Respond in writing to the issue, as a minimum, within 10 working days of its published date or the date of any subsequent comment by the CxA.
2. If work on resolving an issue is in progress, indicate this in writing.
3. Ensure the sub-contractors provide information required to solve the issue.

D. Periodically, all issues open and not responded to within 10 working days will be submitted to the Owner as delinquent. The CxA reserves sole discretion in determining the status of issues, e.g. “open”, “ready for verification”, or “closed”.

E. The Owner may increase the retainage percentage for sub-contractors with an unacceptable number of open issues where written responses are not up to date.

F. The final Cx Report will contain a copy of the issues log identifying the status of all issues.

3.10 COST OF RETESTING

A. The cost for the Subcontractor to retest a pre-functional or functional test, if they are responsible for the non-conformance issue, shall be theirs.

B. First two functional tests: The CxA shall attend and record results for up to two (2) functional tests for any given piece of equipment as part of the CxA’s normal scope.

C. Beyond two tests: The cost for the CxA’s time for attending and recording results for tests beyond two tests shall be charged to the General Contractor by Change Order when:

1. The deficiency is due to deficient work by responsible contractors and
2. That work has been recorded as deficient by the CxA and
3. That work remains uncorrected, or the contractor has failed to adequately respond to commissioning comments after the first two tests.

3.11 OPERATION AND MAINTENANCE (O&M) MANUALS

A. The following O&M manual requirements do not replace O&M manual documentation requirements elsewhere in these specifications.

B. Each Division shall compile and prepare documentation for all equipment and systems covered in that Division and deliver this documentation to the GC for inclusion in the O&M manuals.

1. Field checkout sheets and logs should be provided to the CxA.
2. All documentation shall be made specific to this project by permanently marking “generic” manufacturer’s O&M manuals to indicate exactly which models and options are included in the Work of this project.

C. Deliver the O&M manuals to the CxA for review within 60 days of final review of the submittals of the equipment.

D. Review and Approvals. Review of the commissioning-related sections of the O&M manuals shall be made by the A/E and by the CxA.

3.12 TRAINING OF OWNER PERSONNEL

A. Coordinate and schedule training and ensure that training is completed.

B. The CxA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment.

C. Prepare a training outline and submit to CxA for comment and approval. Provide training of the Owner's operating personnel.

3.13 DEFERRED FUNCTIONAL PERFORMANCE TESTING

A. Perform any deferred testing as required to properly demonstrate successful operation to the owner.

1. Some test conditions may not be able to be simulated and thus require the actual conditions to be present, to implement and test.
2. A mutually convenient time to owner, CxA, and Contractor will be scheduled when these test conditions will be present, to conduct this deferred testing.
3. Perform these tests as indicated in the functional performance test procedures.

B. Correct any deficiencies or failures identified in the process of performing these tests.

END OF SECTION

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SECTION 02116 – UNDERGROUND STORAGE TANK REMOVAL

PART 1 – GENERAL

1.1 SUMMARY

A. Work Summary: The work under this section consists of the removal, decommissioning, and destruction of underground storage tanks (USTs), if discovered on site during demolition/construction activities. The Contractor shall perform the work under this section in accordance with all Federal, State, County, and Local Rules and Regulations including but not limited to Illinois EPA, United States Environmental Protection Agency (USEPA), Illinois Office of the State Fire Marshal (OSFM), and Occupational Safety and Health Agency (OSHA) regulations. Based on the investigations conducted, UST(s) are not expected to be present; however, if any USTs are discovered during demolition/construction activities, the Contractor shall perform the following:

1. Submit the UST removal application to the Illinois OSFM within 48-hours of discovering the UST(s). The Owner's Representative will provide the Contractor with all required information to secure the UST removal permit.
2. Coordinate the UST removal schedule with the Illinois OSFM.
3. Pump-out and dispose of product and sludge prior to removal of the UST from the site. Pump-out contaminated water and other miscellaneous liquids that may be present in the UST basin.
4. Remove and dispose of all of the UST piping, equipment, electric conduit, and accessories related to the UST.
5. Clean tank interior and dispose of tank washwater as special waste.
6. Excavate and stockpile materials that may be present around the UST. The Contractor may temporarily store excavated materials at the site. Such material may not be stored on site for more than 30 days unless directed otherwise by the Owner's Representative. Regardless of the duration that excavated materials are stockpiled, excavated materials shall be placed on and covered by 6-mil polyethylene visqueen. The Contractor shall also provide a 12" to 18" berm around the stockpile.
7. If excavated material or soil requires off-site disposal, the Contractor shall collect and analyze representative soil sample for waste stream authorization. The sample shall be analyzed for the parameters required by the disposal facility. The Contractor shall secure all required permits for excavated material and soil disposal at a permitted Subtitle D Landfill site within 10 calendar days of the UST removal.
8. The Contractor shall prepare waste manifests for the Owner's Representative signature prior to loading excavated materials and soils into hauling trucks. The Contractor shall provide copies of all daily reports, weight tickets, receipts, and waste manifests for the contaminated soil removal to the Owner's Representative within 7 days of removing excavated materials and soils from the site.
9. Backfill and compact the UST excavation and other related excavation areas using approved backfill material in accordance with project engineering specifications. Excavated materials determined to be suitable for backfill could be used as backfill in the vicinity of the UST basin excavation. The Contractor shall refer to the Architect/Engineer specifications for definition of suitable backfill materials. Copies of environmental analytical results of all imported backfill material verifying that these materials were analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target

Compound List (TCL) parameters, and do not exceed the parameter values as listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For imported materials from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. A copy of the analytical results shall be submitted at least one week prior to importing backfill or top soil to the site. The date of the analysis shall be within 60 days of importing such material to the site.

B. Related Work:

1. Section 02316 – Soil Handling and Management Plan

2. Section 02318 – Acceptance of Backfill, Top Soil & CU Structural Soil

1.2 DEFINITIONS

A. IEPA: Illinois Environmental Protection Agency.

B. Backfill: Granular or cohesive material that is utilized to backfill the UST excavation to grade prior to the replacement of the paved surface, and which were analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters and do not exceed the parameter values as listed in Appendix B, Section 742, Table A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742

C. Owner's Representative – means the entity (Environmental Consultant) that will perform oversight on the behalf of the Owner during the UST removal activities.

D. Connected Piping: All underground piping including valves, elbows, joints, flanges, and flexible connectors attached to the UST system through which regulated substances flow.

E. Excavation Zone: The volume containing the tank system and backfill material bounded by the ground surface, walls, and floor of the pit and trenches into which the UST system is placed at the time of removal.

F. Hazardous Substance UST System: An underground storage tank system that contains a hazardous substance defined in section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (but not including any such substance regulated as a hazardous waste under subtitle C) or any mixture of such substances and petroleum, and which is not a petroleum UST system.

G. Hazardous Waste: as defined by:

1. 40 CFR Part 261;
2. Illinois Environmental Protection Act 415 ILCS 5/3.220; and Section 809.103 of Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board.
3. Section 3001 of the Resource Conservation and Recovery Act of 1976, P.L. 94-580,

H. Heating Oil: Petroleum that is No. 1, No. 2, No. 4-light, No. 4-heavy, No. 5-light, No. 5-heavy, and No. 6 technical grades of fuel oil; other residual fuel oils (including Navy Special Fuel Oil and Bunker C); and other fuels when used as substitutes for one of these fuel oils. Heating oil is typically used in the operation of heating equipment, boilers, or furnaces.

I. IDOT: Illinois Department of Transportation.

J. Liquid Trap: Sumps, well cellars, and other traps used in association with oil and gas production, gathering, and extraction operations (including gas production plants), for the purpose of collecting oil, water, and other liquids. These liquid traps may temporarily collect liquids or subsequent disposition or re-injection into a production or pipeline stream, or may collect and separate liquids from a gas stream.

K. Manifest: Manifest means the form provided or prescribed by IEPA and used for identifying name, quality, routing, and destination of special waste during its transportation from point of generation to the point of disposal, treatment, or storage.

L. Motor Fuel: Petroleum or a petroleum-based substance that is motor gasoline, aviation gasoline, No. 1 or No. 2 diesel fuel, or any grade of gasohol, and is typically used in the operation of a motor engine.

M. Noncommercial Purposes: With respect to motor fuel means not for resale.

N. Non-hazardous Special Waste: as defined in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter i: Solid Waste and Special Waste Hauling; Part 809: Non-Hazardous Special Waste Classifications; Subpart A: General Provisions; Section 809.103.

O. OSHA: Occupational Safety and Health Administration.

P. Operator: Any person in control of, or having responsibility for, the daily operation of the UST system.

Q. Petroleum UST System: An underground storage tank system that contains petroleum or a mixture of petroleum with *de minimis* quantities of other regulated substances. Such systems include those containing heating oils, motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils.

R. Pipe or Piping: A hollow cylinder or tubular conduit that is constructed of non-earthen materials.

S. Pipeline Facilities (including Gathering Lines): New and existing pipe rights-of-way and any associated equipment, facilities, or buildings.

T. Regulated Substance: includes but is not limited to petroleum and petroleum-based substances comprised of a complex blend of hydrocarbons derived from crude oil through processes of separation, conversion, upgrading, and finishing, such as motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils. This includes:

1. Any substance defined in section 101(14) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 (but not including any substance regulated as a hazardous waste under subtitle C), and
2. Petroleum, including crude oil or any fraction thereof that is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute).

U. Remediation Area: Remediation Area means any area on-site where underground storage tanks, special waste and/or non-hazardous special waste or soils that were analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) and exceed the parameters listed in Appendix B, Section 742, Table A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742, are present.

V. Release: Any spilling, leaking, emitting, discharging, escaping, leaching or disposing from an UST into surface/subsurface soils, groundwater or the environment.

W. Residential Tank: A heating oil tank located on residential property used primarily consumptive use.

1.3 SUBMITTALS

A. The Contractor shall submit copies of the following to the Owner's Representative a minimum seven (7) calendar days prior to scheduling a UST removal:

1. Equipment and methods for adjacent structure protection and UST removal procedures prior to start of any Work.
2. Proof of OSHA training in compliance with the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) for workers who will be involved in the UST and contaminated soil removal.
3. Name and address of the Illinois Environmental Protection Agency certified laboratory which will be used by the Contractor to perform the analytical testing prior to starting work.
4. Contractor's Site-Specific Health and Safety Plan. The plan shall comply with all OSHA requirements. The plan must be submitted to the Owner's Representative within 10 calendar days of issuance of the Notice-to-Proceed (NTP). The work shall be performed under the direct supervision of a trained experienced site supervisor. The plan should at a minimum include the following:

    a. Name key personnel and alternates responsible for site safety.
    b. Describe the risks associated with each operation conducted.
    c. Type of personnel training and responsibilities and to handle the specific hazardous situations they may encounter.
    d. Describe the protective clothing and equipment to be worn by personnel during various site operations.
    e. Describe any site-specific medical surveillance requirements.
    f. Describe the program for the periodic air monitoring, personnel monitoring, and environmental sampling if needed.
    g. Describe the actions to be taken to mitigate existing hazards to make the work environment less hazardous.

h. Define site control measures including a site map.
i. Establish procedures for personnel and equipment and transporting trucks to ensure that impacted soils are not tracked off site on to non-impacted areas of the site.
j. Set forth the site Standard Operating Procedures (SOPs). SOPs are those activities that can be standardized (i.e., decontamination procedures and respirator fit testing).
k. Set forth a Contingency Plan for the safe and effective response to emergencies.

5. Operating licenses and permits for each special waste hauler and details of hauling routes from the site to the disposal facilities.
6. Copies of all daily reports, transport manifests, disposal receipts and treatment records. Copies will be required on a weekly basis.
7. Any air sampling data collected during the course of the Work, including OSHA compliance air monitoring.
8. Disposal information for any soil, product, sludge, tank washwater, and liquid removed from the site. This information should include, at a minimum, the following:
   a. Facility name, address, and telephone Number.
   b. Site Contact.
   c. Permit Number.
9. Copies of UST(s) removal permit.
10. Copies of waste characterization analytical results for disposal of contaminated soil, product, sludge, tank washwater, and contaminated groundwater within one calendar day.
11. Certificate of Destruction from a steel reclamation facility within seven (7) calendar days after the tank removal.
12. Prior to backfilling, provide copies of analytical results of backfill materials verifying that the backfill was analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters and that the backfill does not contain contaminant values that exceed the parameters listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742.

1.4 PROJECT CONDITIONS

A. Conditions of USTs: The Owner assumes no responsibility for actual condition of the storage tank to be removed. Location and conditions of existing USTs are unknown at this time.

B. Condition of Piping and Conduit: The Owner assumes no responsibility for actual condition of piping and conduit to be removed.

C. Contractor is totally responsible for handling and removal of all materials associated with UST(s) removal as required by Federal, State and local regulations.

D. Salvage Items: Reuse of items is not allowed unless specified otherwise. Storage tanks are to be rendered unusable before removing from job site.

E. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from the applicable governing agency and the Board Authorized Representative. Provide alternate routes around closed or obstructed traffic ways if required by the governing agency.

F. Damages: Promptly replace or repair any damage caused to adjacent pavement, utilities or facilities by removal operations at no additional cost. Work shall be performed to the satisfaction of Owner's Representative.

G. Utility Services: Maintain existing utilities and protect against damage during removal operations. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Owner's Representative. Provide temporary services during interruptions to existing utilities as acceptable to the site owner, Owner, and Owner's Representative.

1.5 QUALITY CONTROL

A. The removal of UST system(s) is governed by local, state and federal regulations and/or guidelines, which include, but are not necessarily limited to, the following:

1. City of Evanston Code and Regulations, if applicable.
2. USEPA, 40 CFR Part 280, Vol.53 No. 185, dated September 23, 1988 or latest version.
3. Title 41: Fire Protection Chapter I: State Fire Marshal, Parts 160, 170 and 180, Subpart A, dated April 1990 or latest version
4. National Fire Protection Association Code.
5. All other USEPA, IEPA, Illinois Department of Transportation (IDOT), and OSHA regulations.

1.6 RECORDKEEPING

A. The Contractor shall provide documentation of labor, equipment, materials, and laboratory analysis used for the removal and disposal of soils and liquids to the Owner's Representative on a weekly basis.

1.7 COORDINATION OF WORK

A. The Contractor shall coordinate and schedule the performance of work with the least disruption as possible to the daily site activities.

B. The Contractor shall obtain a permit to remove the tank from the site from the Illinois OSFM within 48-hours of the discovery of any UST(s). The Contractor shall also schedule and coordinate the presence of the Illinois OSFM's representative on site the scheduled day of tank removal. The tank must not be removed from the ground without the Illinois OSFM representative being present on site.

C. The Contractor shall provide the Owner's Representative advance written notice (minimum 48-hours) of the anticipated removal date. The Contractor must coordinate all UST removal activities with the Owner's Representative.

D. The Contractor shall cooperate with and coordinate work progress with the Owner's Representative. Soils excavated from the UST basin shall be stockpiled near the excavation or at an area deemed suitable by the Owner's Representative. The Owner's Representative will inspect the stockpile soil and determine if the soil will be removed from the site or used as backfill. The Contractor shall assist the Owner's Representative with the use of its machinery and operator to inspect and obtain soil samples from the open excavation beneath or adjacent to the former location of the underground tank. The Contractor shall also visually inspect the underground storage tank for his own records. The Contractor shall record or otherwise document the closure activities. The cavity will be backfilled with excavated soil and/or gravel the same day after removal and sampling activities unless directed by Board Authorized Representative to do otherwise. All backfill must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters and can not exceed the parameters values listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742.

1.8 SPECIAL REQUIREMENTS

A. Qualifications

1. The UST Contractor(s) shall be fully experienced and knowledgeable in the safe work procedures and regulatory requirements for removing, cleaning and disposal of underground storage tanks in accordance with all applicable Federal, State, and Local regulations.
2. The UST Contractor(s) shall be capable of performing all work including providing necessary services, equipment, tools, labor and material for the removal, cleansing and disposal of underground storage tank and piping containing heating oil, and or petroleum, including the restoration of the site work area. The Contractor shall be capable of providing contingency services upon encountering soils or liquids that exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters when so directed by the Owner's Representative.
3. The UST Contractor(s), Subcontractor(s) and their employees shall be thoroughly trained in safe work practices, procedures and regulatory requirements applicable to the removal, cleaning and disposal of underground storage tank systems containing heating oil and/or petroleum. The UST Contractor(s), Subcontractor(s) and their employees will be responsible for removal, cleaning and disposal of tanks and associated soils, liquids and piping shall be properly trained and hold current certifications. The UST Contractor(s), Subcontractor(s) and their employees on site shall have received a minimum of 40 hours of health and safety instruction in accordance with OSHA 29 CFR part 1910.120(e).
4. The UST Contractor(s) must be currently registered with the Office of the Illinois State Fire Marshal as a Remover of Underground Storage Tanks (DeOwnering) in accordance with Illinois Administrative Code, Title 41: Fire Protection, Chapter 1:

Office of the State Fire Marshal, Part 170: Storage, Transportation, Sale and Use of Petroleum and Other Regulated Substances, as amended.

1.9 PROTECTION OF FACILITIES

1. The Contractor shall protect existing structures, services and utilities against damage. Exercise care to protect any and all of the Owner's, Property Owner's and adjacent property including equipment, buildings, landscaping and fencing. Any damage shall be repaired to the satisfaction of the Owner, Property Owner or the Owner of the adjacent property at the Contractor's expense.
2. The Contractor shall, in writing, bring to the attention of the Owner's Representative any obstacles, impairments or other items that may prohibit the performance of work at least 72-hours prior to the start of work,
3. The Contractor shall take all necessary precautions to protect structures, equipment, pavement, walks, utilities, etc. against movement or settlement during the course of work.

PART 2 - PRODUCTS

2.1 REMOVAL OF TANK CONTENTS

A. The Contractor shall furnish all necessary materials and equipment complying with Federal, State County, and Local Rules and Regulations to fulfill the scope of work described herein.

2.2 TANK REMOVAL

A. The Contractor shall furnish all necessary materials and equipment complying with Federal, State County, and Local Rules and Regulations to fulfill the scope of work described herein.

2.3 REMOVAL AND DISPOSAL OF CONTAMINATED SOILS AT A PERMITTED SUBTITLE D LANDFILL SITE

B. The Contractor shall furnish all necessary means, products, tools, and equipment required to fulfill the scope of work described in Sections 02316 and/or 02317 as applicable for this Project.

2.4 BACKFILL MATERIALS

A. The backfill material shall be consistent with the requirements of the Architect/Engineer specifications. The backfill material shall not exceed the parameter values as listed in Appendix B, Section 742, Table A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for any 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740

APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the analytical results shall be within 60 day of importing such material to the site.

PART 3 - EXECUTION

3.1 UST CONTENTS REMOVAL PROCEDURES

A. Pump out tank contents:

1. Drain product from piping back into the tank, taking care to avoid spilling product. Use only explosion proof pumps or hand pumps.
2. Pump any existing fuel into temporary aboveground storage tanks. Do not pump sludge or water into temporary aboveground storage tanks.
3. Remove petroleum products, sludge, water, and liquid wastes from the tank. The suction hose shall be maneuvered along the tank bottom so that the maximum possible quantity of liquid is stripped from the interior.
4. Liquids shall be temporarily stored in above ground IDOT-approved containers or may be pumped directly into a tank truck for immediate disposal if the determination is made in advance. Waste removal from the site shall be performed only by properly licensed waste haulers in strict accordance with IEPA guidelines, including requirements for testing, laboratory analysis and manifesting. Coordinate location of temporary storage with the Owner's Representative.
5. Residue from tanks, which may have contained leaded gasoline, shall be treated with caution. Tank residues shall be disposed of in accordance with all applicable state and federal laws and regulations. Provide documentation of the proper disposal of all tank product and wastes to the Owner's Representative.

3.2 UST REMOVAL PROCEDURES

A. Purge storage tanks of flammable and combustible gases:

1. Observing all required safety precautions, disconnect all piping and compounds, except for the vent pipe which is to remain connected until purging is completed. Temporarily plug all other openings so that all vapors will be forced through the vent opening. Vapors shall be purged by one of the several methods listed in API/1604-87.
2. Instrument for detecting and measuring Low Explosion Limits (LEL) and oxygen levels shall be maintained and operated continuously at the job site at all times when work is being performed in areas which are or may become hazardous. Instrument shall be properly calibrated according to the manufacturer's specifications and checked and maintained accordingly.
3. OSHA standards for confined space entry and hazardous material regulations shall be strictly followed.
4. Disconnect and remove existing electrical lines to USTs pumps.

B. Excavate above and around the UST(s):

1. Remove and dispose of all pavement, concrete and debris associated with the UST.
2. The Contractor shall be responsible for locating all existing utilities, which will be encountered during removal operations. The Contractor shall protect the utilities as required to complete the work.
3. Excavate soil above and around tanks. Excavating area shall be large enough to uncover the profile of the tank and piping to complete removal.
4. Soils that exceed Appendix B, Section 742, Table A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters shall be disposed of in accordance with Section 02316 and/or 02317 as applicable.

C. Storage tank removal:

1. Check tank(s) for combustible gases. Purge tanks again as necessary.
2. Remove all associated tank piping, and tank hold down components including straps and concrete dead-man.
3. Remove tank(s) in accordance with API recommended practice 1604.
4. After tank(s) have been removed from the ground, place the tank(s) on a stable level surface for inspection.

D. Storage tank cleaning:

1. Cut holes in tank(s) using non-sparking tools to facilitate tank cleaning. Only cold cut equipment shall be used. The total surface area of all the holes shall be a minimum of 2% of the total surface area of the tank, or minimum of 9 square feet each opposite side or end. The Contractor shall have fire extinguishers on-site during cutting of tanks.
2. Clean tank(s) in accordance with API recommended practice 2015.
3. UST(s) removed from the excavation zone shall be cleaned on-site the day of removal. The tank will then be temporarily stored on-site until proper disposal arrangements are made.

E. Disposal of tank cleaning washwater:

1. The Contractor shall submit samples of tank cleaning washwater and sludge to an independent laboratory for analysis as required by disposal facility. Submit copies of the analytical report and chain-of-custody form to the Owner’s Representative.
2. Transporter of tank cleaning washwater and sludge shall be an Illinois licensed special waste hauler. The disposal facility shall be approved by the IEPA.
3. The Contractor shall prepare manifests required for transportation and disposal of washwaters and sludge. Submit copies of manifests to the Owner’s Representative.

F. Disposal of storage tanks:

1. All tanks will be taken to an appropriate disposal facility (e.g. scrap steel reclaimed or landfill). Tanks will not be retained by the Contractor or reused in any manner.
2. Tanks shall be labeled with legible letters at least two inches high, as follow: TANK HAS CONTAINED (name of product)

NOT VAPOR FREE
NOT SUITABLE FOR STORAGE OF FOOD
OR LIQUIDS INTENDED FOR HUMAN
OR ANIMAL CONSUMPTION
DATE OF REMOVAL: (month/day/year)

In addition, tanks which have or may have contained leaded fuels shall be labeled as:

TANK HAS CONTAINED LEADED GASOLINE
LEAD VAPORS MAY BE RELEASED IF
HEAT IS APPLIED TO TANK SHELL

3. Tanks, piping and components shall be removed from the site on the same day the site is excavated. If transportation on the day of removal is not possible, materials shall be secured on-site until disposal agreements are made.
4. Provide a certificate of destruction signed by the Contractor and a representative of the disposal/recycling facility to the Owner's Representative.
5. The excavation must be securely fenced to prevent access by unauthorized personnel until backfilled per Section 02318.

G. Storm Water Run-on/Run-off and Dewatering

1. The Contractor shall implement surface grading, pumping and/or combination of silt fence, sandbags, tarpaulins, plastic sheeting, and movable straw bales, as approved by the Owner's Representative, to prevent storm water runoff from entering the Tank Remediation Area.

2. Storm water that has come in contact with any portion of the contaminated soil as a result of the Contractor's failure to prevent contact with excavated soils or the excavation will be collected and disposed of at the Contractor's own expense.

H. Soil Removal and Disposal

1. All excavation shall be performed in accordance with OSHA requirements and guidelines.
2. The Contractor shall excavate a maximum 2 feet around the USTs basin for the UST removal. The Owner's Representative will determine the extent of soils present that exceed Appendix B, Section 742, Table A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters, if present, at each UST basin. The extent of soil removal shall not extend beyond the proposed construction limit.
3. The Contractor shall collect a sufficient amount of representative soil samples for laboratory analysis to obtain a waste stream authorization from the disposal facility.
4. The Contractor shall submit the soil samples to the laboratory and pay for the cost of analyzing the constituents required by the disposal facility.
5. The Owner's Representative may collect soil samples for laboratory analysis or field Photo- ionization Detector (PID) screening. The Contractor shall provide the

necessary equipment and manpower to assist the Owner's Representative in collecting soil samples at no additional cost to the Owner.

3.3 DISPOSAL OF MATERIALS

A. General: Remove daily from site accumulated debris, rubbish, and other materials resulting from piping and dispenser removal activities.

B. Removal: Dispose of materials removed from site in accordance with the 35 IAC regulations. Transport and legally dispose of all materials and equipment. Comply with manifest regulations of all removed and disposed equipment and materials. Materials that shall be removed include, but are not limited to, the following:

1. Underground Storage Tanks.
2. Piping.
3. Soils and sludges.
4. Paving materials, including but not limited to concrete and asphalt.
5. Product from storage tank and piping, and tank cleaning washwater.
6. Free product and liquids if encountered during the USTs removal process.
7. Liquids /water from excavation and dewatering operations.

3.4 SITE ASSESSMENT

A. Upon removal of the UST(s), the Owner's Representative may conduct a site assessment and collect soil samples as needed. A representative of the City of Chicago Department of Environment (CDOE) will also render an opinion as to whether a release has occurred.

B. In the event that no release is confirmed, the Contractor shall complete removal of the tank, disposal of the tank, and backfill the excavation.

C. In the event that a release is confirmed, the Contractor shall complete removal of the tank, dispose of the tank and excavate contaminated soil as determined by the Board Authorized Representative.

D. The excavation shall remain open until the sampling is completed. The Contractor is responsible for providing fencing and access control to prevent unauthorized access to the excavation by unauthorized personnel in accordance with applicable rules and regulations.

3.5 BACKFILLING OF THE EXCAVATION

A. The Contractor shall not backfill excavation areas without approval of the Owner's Representative. If the Contractor backfills the excavation area without obtaining approval from the Owner's Representative, the backfill materials shall be excavated, transported and disposed of at a permitted Subtitle D Landfill, if required, at the Contractor's own expense.

B. The UST basin shall be backfilled in accordance with the project specifications or as directed by the Owner's Representative. The Contractor shall utilize imported granular CA-6 stone consistent with Illinois DOT gradation that does not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. Compact backfill materials in accordance with the project specification.

C. For each off-site source of backfill materials, the Contractor shall provide to the Owner's Representative laboratory analyses and certification that the imported materials do not contain contaminant values above APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 1,000 tons of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the analytical results shall be within 60 day of importing such material to the site.

D. Site Restoration: Restore the site according to the Architect/Engineer design plan, or as directed by the Owner's Representative.

3.6 DUST CONTROL

A. The Contractor shall control dust by all necessary means, including but not limited to covering trucks, stockpiles and open materials, watering haul roads, sweeping paved roads, and limiting the speed of all on-site vehicles.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Volume determination and pricing shall be in accordance with the contract documents.

END SECTION

SECTION 02316

SOIL HANDLING AND MANAGEMENT

PART 1 - GENERAL

1.1 INTRODUCTION

A. Related Documents: All terms and conditions of the Contract apply to this Section.

B. Work included: This specification is for the excavation, stockpiling, permitting, loading, hauling, importing, exporting and disposal of materials according to the scope of work or as directed by the Owner's Representative. All soils and buried construction debris generated from the site are classified as non-hazardous non-special waste with the exception of soils that have been classified as hazardous waste. Attached Sheet SM-1 "Soil Management & Remediation Plan" provides the locations and classifications of soils on site. Dispose of all materials removed from the site at a licensed landfill/permitted Subtitle D landfill with the exception of soils that had been classified as hazardous waste and shall be disposed at a Subtitle C landfill, unless treated onsite to meet non-hazardous levels prior to disposal. This includes soils generated from all site construction activities including proposed building excavation/demolition/renovation, the installation of any underground detention basins, sewer installation, and utility installations. Clean (not stained) concrete and asphalt, free of soil may be transported to a recycling facility. The Contractor shall perform the work under this section in accordance with all applicable local, county, IEPA, US EPA, and OSHA regulations and shall perform the following:

1. Soil Removal

   a. Dispose of all excess and unsuitable materials generated and removed from the site as either non-hazardous non-special waste soils for disposal at a licensed/permitted Subtitle D landfill and/or as hazardous waste for disposal at a licensed/permitted Subtitle C landfill.

   b. Collect representative soil samples from the site and perform required analysis for waste stream authorization for one or more permitted Subtitle D and Subtitle C landfills approved by the Owner's Representative for the disposal of non-hazardous non-special waste and/or hazardous waste. For non-hazardous non-special waste, perform required analysis for materials transport for disposal at a Subtitle D landfill. For hazardous waste, perform required analysis (TCLP Lead) for materials transport for disposal at a Subtitle C landfill.

   c. Prior to excavation of any soil (including non-special waste soils and non-hazardous special waste soils), fill, backfill, top soil, CU Structural Soil, and general construction and demolition debris material, obtain authorization for ultimate disposition of materials from an open and active Subtitle D facility approved by the owner's authorized representative. The Subtitle D facility shall be permitted to accept both Non-Hazardous Special Waste and Special Waste. Prior to excavation of any materials classified as hazardous waste obtain authorization from an open and licensed Subtitle C facility approved by the owner's representative.

   d. Obtain Landfill Authorization Acceptance Letter from a licensed, permitted, open and active Permitted Subtitle D and/or Subtitle C landfill indicating acceptance of materials at

the facility. The Landfill Acceptance Letter must be signed by the owner of the Permitted Subtitle D or Subtitle C landfill and state that the facility complies with all local zoning codes and all local, State, and Federal rules and regulations, that all required laboratory analyses has been received by the facility, and that the facility has agreed to accept the soils (including non-special waste soils, and non-hazardous special waste soils), fill, backfill, top soil, CU Structural Soil, and general construction and demolition debris materials. The Landfill Acceptance Letter shall further state that the soils (including non-special waste soils and non-hazardous special waste soils), fill, backfill, topsoil, CU Structural Soil, general construction and demolition debris materials are being accepted for permanent placement on site, and that the material will not be removed from the site unless required by a local, State, or Federal Authority.

e. Contractor shall prepare and submit waste profile to Owner's Representative for review and signature at least one week before starting any soil removal from the site.

f. Prepare waste manifests prior to starting any soil excavation activities.

g. Excavate soil to depths shown in the Architect/Engineer plans to complete the proposed construction work at the site and:

1. Over the proposed building slab and Area 1 (asphalt/concrete hardscape) that require engineered barriers as shown in the Soil Management & Remediation Plan (SM-1) if existing asphalt/concrete surface is to be removed and/or replaced, excavate to a depth shown on Architectural/Engineering Plans, backfill with clean fill, and cover with asphalt/concrete to finished grade. Soils excavated from Area 1 as shown in the Soil Management & Remediation Plan (SM-1) shall be disposed off-site at a Subtitle D landfill.

2. Over Area 2 (landscape areas) that require engineered barriers as shown in the Soil Management & Remediation Plan (SM-1) excavate to a minimum depth of 18 inches below finished grade, place geomembrane fabric liner within the excavation, and backfill with clean fill to finished grade. Soils excavated from the Remediation Area shown in the Soil Management & Remediation Plan (SM-1) shall be disposed off-site at a Subtitle D landfill.

3. Over Area 3 (unit paver areas) that require engineered barriers as shown in the Soil Management & Remediation Plan (SM-1) excavate to a minimum depth of 18 inches below finished grade, place geomembrane fabric liner within the excavation, and backfill with clean fill to finished grade. Soils excavated from the Remediation Area shown in the Soil Management & Remediation Plan (SM-1) shall be disposed off-site at a Subtitle D landfill.

4. Over Area 4 (Remediation Area measuring approximately 20-foot by 20-foot) as shown in the Soil Management & Remediation Plan (SM-1), either perform in-situ treatment of hazardous soils by a qualified remediation contractor to a minimum depth of 5 feet below existing grade to render as non-hazardous (confirmed through TCLP Lead analysis) for subsequent off-site disposal at a Subtitle D landfill or excavate to a minimum depth of 5 feet below existing grade and dispose at a Subtitle C landfill as Hazardous Waste.

h. All excess excavated materials to be disposed shall be either directly loaded into hauling trucks or temporary stockpiled for future disposal. All soil excavation and handling and management shall be coordinated with the Owner's Representative.

i. Load and transport all materials to the pre-approved disposal facilities in tarp covered hauling trucks. No soil shall be removed from the site without the presence of the Owner's Representative. Contact the Owner's Representative forty-eight (48) hours in advance to schedule a soil hauling and disposal meeting. All transporting trucks shall hold, and present upon request, a current valid Commercial Driver's License (CDL).

j. Provide copies of all daily reports, transport manifests, weight tickets, and disposal receipts to the Owner's Representative on a daily basis.

k. The Contractor shall comply with all applicable regulatory requirements and other federal, state or local laws, codes and ordinances that govern or regulate the handling, transportation and disposal of nonhazardous special waste and hazardous waste soils. The Contractor shall mark, label, placard, package and manifest non-hazardous special waste soils as necessary in accordance with all applicable state, federal and local regulations. The Contractor shall ensure protection against spillage of non-hazardous special waste soils. The Contractor shall handle and dispose all non-hazardous special waste soils in accordance with all applicable federal, state and local laws, regulations and ordinance.

2. Groundwater and Stormwater Management, if required

a. Contractor must obtain a water discharge permit from the City of Evanston prior to pumping clean groundwater or rainwater into the City of Evanston sewer system.

b. If contaminated water is encountered during site excavation, Contractor shall collect and analyze water sample in accordance with the MWRDGC Environmental Remediation Wastewater (ERW) Ordinance requirements.

c. If the analytical result of the water sample is below the maximum concentrations acceptable for discharge of ERW into sewerage system, the Contractor shall apply and secure a special discharge authorization permit from MWRDGC for discharging contaminated water into the sewer system.

d. If the concentration of chemicals in the water sample is above the ERW's requirements, the Contractor shall transport and dispose of contaminated water as non-hazardous special waste at a licensed treatment facility.

3. Placement of backfill materials:

a. Refer to Sheet SM-1 (Soil Management & Remediation Plan) and Section 02318, "Acceptance of Backfill, Top Soil, & CU Structural Soil" for details on backfill materials and on-site placement locations.

b. Place and maintain a minimum of eighteen (18) inches cover consisting of imported clean fill/topsoil over IEPA approved geotextile fabric per Attachment 3 over all landscape areas at the site that require engineered barriers per Sheet SM-1. This includes, but not limited to landscape areas and tree planting areas, and unit pavers areas that require engineered barriers per Sheet SM-1. Place and maintain imported clean fill/topsoil over

the Remediation Area shown in Sheet SM-1 (Soil Management & Remediation Plan). Areas planned to be covered by concrete/asphalt shall be excavated and backfilled to a depth indicated in the architectural and/or engineering plans in order to complete the proposed construction work at the site.

c. Place and compact backfill materials at all excavation areas using approved materials in accordance with the Architectural/Engineering specifications.

d. All project backfill materials shall meet the environmental requirements of specification Section 02318.

e. All imported backfill materials shall not contain any chemicals that exceed the parameter values as listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For imported materials from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the environmental analysis of any backfill, topsoil shall be within 60 days of importing such material to the site.

f. Place backfill material over IEPA-approved geotextile fabric shown in SM-1 in landscape and unit pavers areas (Area 2 and Area 3) that require engineered barriers.

4. Related Documents: All terms and conditions of the Contract apply to this Section.

1.2 DEFINITIONS

A. Agency: Illinois Environmental Protection Agency (IEPA).

B. ASTM: American Society for Testing and Materials.

C. Backfill means granular or cohesive material used to fill the excavation to design grade as referenced in design plans and specifications, and which does not exceed the parameter values as listed in Title 35: Environmental Protection Subtitle G: Waste Disposal Chapter I: Pollution Control Board Subchapter F: Risk Based Cleanup Objectives, Part 742, Tiered Approach To Corrective Action Objectives, Appendix B.

D. CU Structural Soil means a uniformly blended mixture of crushed stone, clay, loam and hydrogel by weight consisting of approximately 83% crushed limestone (3/4 to 1.5 inch, highly angular with limited fines), 17% clay loam and hydrogel (1 oz. per 200 pounds of stone).

E. CDL: Commercial driver's License.

F. CFR: Code of Federal Regulations.

G. Fill means any earthen or non-earthen materials including but not limited to any sediment, granular or cohesive non-native earthen materials, cinders, ash, wood, and brick, concrete, and asphalt fragments,

glass, and building debris encountered above naturally occurring undisturbed soils or bedrock in built-up areas.

H. General Construction and Demolition (C&D) Debris means non-hazardous, uncontaminated materials resulting from construction, remodeling, repair, and demolition of utilities, structures, and roads as defined in Public Act 92-0574, The Environmental Protection Act, 415 ILCS 5 Section 3.160 and regulated under Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter i: Solid Waste and Special Waste Hauling. General Construction and demolition (C&D) debris may include soil, wall coverings, reclaimed asphalt pavement, rock, plaster, glass, non-hazardous painted wood, drywall, plastics, non-hazardous coated wood, non-asbestos insulation, bricks, wood products, roofing shingles, concrete, and general roof coverings.

I. Geotextile: A permeable textile used with foundation, soil, rock, earth, or any other geotechnical material, as an integral part of man-made product, structure, or system meeting the product specifications in Attachment 3.

J. Hazardous Waste means a waste, or combination of wastes, which has been identified by characteristics or listing as hazardous pursuant to Section 3001 of the Resource Conservation and Recovery Act of 1976, P.L. 94-580, 40 CFR part 261, Illinois Environmental protection Act 415 ILCS 5/3.220, and Section 809.103 of Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board. A waste is classified as hazardous if it exhibits any of the following characteristics: 1) ignitability, 2) corrosivity, 3) reactivity, or 4) toxicity, and as defined in Illinois Administrative Code Title 35, Section 721.103 (35 IAC 721.103). There are no hazardous wastes present within the proposed project area at the site.

K. IDOT: Illinois Department of Transportation.

L. IEPA: Illinois Environmental Protection Agency.

M. Licensed Disposal Facility: means any landfill licensed/permitted by Illinois EPA, US. EPA, other states approving agencies, or local government agencies to accept non-hazardous special waste, or general construction and demolition debris. Non-Hazardous special waste shall be disposed of at only state permitted facilities authorized to accept Non-Hazardous Special Waste licensed pursuant to Subtitle D of RCRA.

N. Manifest: The form provided or prescribed by IEPA and used for identifying name, quality, routing, and destination of non-hazardous special waste, and hazardous waste soils during its transportation from point of generation to the point of disposal, treatment, or storage.

O. MSDS means Material Safety Data Sheet, required by OSHA for any substances that are toxic, caustic, or otherwise potentially hazardous to workers.

P. MWRDGC: Metropolitan Water Reclamation District of Greater Chicago

Q. Normal Direction: Direction perpendicular to the plane of a geotextile fabric

R. Non-Hazardous Special Waste means any wastes as defined in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter i: Solid Waste and Special Waste Hauling; Part 808: Special Waste Classifications; Subpart A: General Provisions; Section 808.110,

AND

Any wastes as defined in Title 35: Environmental Protection; Subtitle G: Waste Disposal; Chapter I: Pollution Control Board; Subchapter i: Solid Waste and Special Waste Hauling; Part 809: Non-Hazardous Special Waste Classifications; Subpart A: General Provisions; Section 809.103

S. Open and active Permitted Subtitle D landfill means any open and active solid waste landfill facility in any state licensed and permitted to accept non-hazardous waste including both non-special waste soils and non-hazardous special waste soils, fill, general construction and demolition debris are to be deposited. If the landfill facility is located in Illinois, the landfill must be licensed/ open, active and permitted by the Illinois Environmental Protection Agency and other applicable local regulatory agencies as applicable. If the landfill is located outside of Illinois, the landfill facility must be open, active and permitted by applicable state and local regulatory agencies.

T. Owner: City of Evanston

U. Owner's Representative: means the entity that will perform oversight on the behalf of the Owner.

V. OSHA means Occupational Safety and Health Administration.

W. Permittivity: Volumetric flow rate of water per unit cross sectional area per unit head under laminar flow conditions, in the normal direction through a geotextile.

X. Permeability: Rate of flow of a liquid under a differential pressure through a material.

Y. Remediation Area: Areas on the site where underground storage tanks, or contaminated soil is present as shown in the Remediation Plan.

Z. Soil means any granular or cohesive materials designated for removal as specified in the Architect/Engineer drawings and specifications and includes soils that are determined to be non-special or special waste.

AA. SROs: Soil remediation objectives for various exposure routes identified in 35 Illinois Administrative Code 742: Tiered Approach To Corrective Action Objectives (TACO), or site specific approved by the Illinois EPA

BB. Storm water means water deposited at the site in the form of rain, snow or other natural weather event.

CC. TACO: 35 Illinois Administrative Code 742: TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO).

DD. TCLP: Toxicity Characteristic Leaching Procedure

EE. Tier 1 SROs: Means Tier 1 SROs for the most restrictive values for residential properties use as listed in PART 742, APPENDIX B, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742.

FF. USEPA - United States Environmental Protection Agency.

1.3 SITE ASSESSMENT

Several environmental site assessments and a site investigation have been completed at the site. The following is a summary of the site environmental investigation findings:

A. Phase II Environmental Site Assessment (ESA). A Phase II ESA was completed for the Site in February 2022. According to the findings of a review of Sanborn Maps, aerial photos, and available environmental database information, the Site was identified as a Brownfields site and that contaminated soils were discovered onsite during a USEPA soil sampling investigation. In addition, former USTs and Leaking Underground Storage Tank (LUST) incidents were identified on the north, east, and west adjacent properties. The Phase II ESA investigation activities included advancing six (6) soil borings to a maximum depth of 10 feet below ground surface (bgs), collected surface and subsurface soil samples, and analyzed selected samples for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Polynuclear Aromatic Hydrocarbons (PNAs), Polychlorinated Biphenyls (PCBs), Resource Conservation and Recovery Act (RCRA) Metals, Toxicity Characteristic Leaching Procedure (TCLP) Metals (Arsenic, Iron, and Lead). The results of the Phase II ESA investigation identified the presence of soils above Tiered Approach to Corrective Action Objectives (TACO) Tier 1 soil remediation objectives (SROs) throughout the entire site and TCLP Lead concentrations above hazardous levels at SB-06.

B. Supplemental Site Investigation – Lead Delineation. Further investigation to delineate Lead impacts in soil were performed in April 2022. Soil samples collected from six (6) soil borings advanced around SB-06 and south of SB-06 at the southern property line. Hazardous soil Lead impacts were delineated to a 20-foot by 20-foot area to a depth of approximately 5 feet depth.

The Contractor shall be responsible for reviewing all reports provided and understanding all data associated with these reports.

1.4 SUBMITTALS

A. Prior to removal of any soils from the site or backfilling any areas, the Contractor shall provide the Owner's Representative with copies of the following submittals:

1. Name, address and telephone number of the Permitted Subtitle D landfill, or Permitted Subtitle C landfill if hazardous waste is present, where excavated materials are to be deposited. This information shall include, at a minimum, the following:
   a. Name
   b. Address
   c. Telephone Number
   d. Site Contact
   e. Illinois Facility Identification Number
   f. USEPA Disposal Site ID numbers (for Hazardous Waste Sites only)
   g. State and Local Operational Permit Number(s)

2. Letter of authorization from the landfills/treatment facilities where excavated materials are to be disposed of. The authorization must be signed by the landfill or treatment facility representative and state that the facility complies with all local zoning codes and all local, State, and Federal rules and regulations, that all required laboratory analyses has been received by the facility, and that the facility has agreed to accept non-special waste soils, and non-hazardous special waste, and/or hazardous waste.

3. Copies of analytical results of backfill materials verifying that the backfill does not exceed Title 35: Environmental Protection Subtitle G: Waste Disposal Chapter I: Pollution Control Board Subchapter F: Risk Based Cleanup Objectives, Part 742, Tiered Approach To Corrective Action Objectives, Appendix B, Table A values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the analysis shall be within 60 days of importing such material.

4. Name and address and telephone number of the laboratory that will be used by the Contractor to perform the analytical testing for waste characterization and backfill samples prior to starting work.

5. Contractor's Site-Specific Health and Safety Plan for all workers engaged in construction activities in the vicinity of contaminated soils above the IEPA Soil Remediation Objectives (SROs) for Construction Workers. The plan shall comply with all OSHA requirements. The plan shall at a minimum include the following:
   a) Name of key personnel and alternates responsible for site safety.
   b) Describe the risks associated with each operation conducted.
   c) Type of personnel training and responsibilities and to handle the specific hazardous situations they may encounter.
   d) Describe the protective clothing and equipment to be worn by personnel during various site operations.
   e) Describe any site-specific medical surveillance requirements.
   f) Describe the program for the periodic air monitoring, personnel monitoring, and environmental sampling if needed.
   g) Describe the actions to be taken to mitigate existing hazards to make the work environment less hazardous.
   h) Define site control measures including a site map.
   i) Establish procedures for personnel and equipment and transporting trucks to ensure that impacted soils are not tracked off site on to non-impacted areas of the site.
   j) Set forth the site Standard Operating Procedures (SOPs). SOPs are those activities that can be standardized (i.e., decontamination procedures and respirator fit testing).
   k) Set forth a Contingency Plan for the safe and effective response to emergencies.

6. Proof of OSHA training in compliance with the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) for applicable workers.

7. Operating licenses and special waste or hazardous waste hauler permits for each proposed transporter. A copy of the license shall be maintained in all trucks leaving the site at all times.

8. Details of haul routes from site to the disposal facilities.

9. Copies of waste stream authorizations and permits as applicable.

10. Copies of all daily reports, transport manifests, weight tickets and disposal receipts to the Owner's Representative on a daily basis.

11. Any air sampling data collected during the course of the Work, including OSHA compliance air monitoring.

12. Copies of equipment decontamination procedures for equipment and vehicles utilized to excavate and remove non-hazardous special waste, or hazardous waste soils form the site.

13. Soil Management Plan outlining proposed excavation work sequences and procedures to separate each type of material to be removed from the site. The Soil Management Plan shall show the locations of each type of material to be stored on site and the materials to be stored at the site for reuse, and location of material to be stored on site for future disposal.

14. Decontamination Plan outlining decontamination procedures, dust control, and mud cleaning from all field equipment and trucks prior to leaving the site.

15. Copies of analytical results for each waste stream to be removed from the site as applicable. The name and address and telephone number of the laboratory that will be used by the Contractor to perform analytical testing for waste stream authorization.

16. Storm Water Management Plan - prior to commencing work, the contractor shall provide a Storm Water Management Plan stipulating provisions for dewatering, pumping, collection, temporary storage, and discharge or disposal of storm water, perched water and other liquids, contaminated and/or uncontaminated, at the site so as to facilitate soil removal and minimize disposal costs for contaminated fluids. The Plan shall also include provisions for control rainwater run-off from entering excavation areas. This may include, but not limited to, surface grading, pumping and/or combination of silt fence, sandbags, tarpaulins, plastic sheeting, and movable straw bales.

17. Prior to importing any backfill to the site, provide copies of analytical results of for each source of backfill materials verifying that the backfill does not exceed the values listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the environmental analysis of any backfill, top soil shall be within 60 days of importing such material to the project site. This shall include all topsoil, cohesive, granular, and other fills. The Contractor shall collect sufficient number of conformation soil samples throughout the backfilling activities to verify that all imported soils do not exceed the TACO values.

18. Any sampling data collected during the course of the Work.

19. Submittal Review: Review of submittals or any comments made does not relieve the Contractor from compliance with the requirements of the drawings and specifications. The purpose of this check is to review for general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; electing techniques of construction; coordinating the Work; and performing the Work in a safe and satisfactory manner.

1.5 NOTIFICATIONS

A. The Contractor shall notify the Owner's Representative no less than forty-eight (48) business hours prior to loading and transporting soils form the site.

1.6 RECORD KEEPING

A. The Contractor shall provide documentation of labor, equipment, materials and laboratory analysis used for the removal and disposal of non-hazardous special waste or hazardous waste soils when requested by the Owner's Representative.

PART 2 - PRODUCTS

2.1 REMOVAL AND DISPOSAL OF SOILS

A. The Contractor shall furnish all necessary means, products, tools, and equipment required to fulfill the scope of work described in the Specifications and Drawings for this Project.

PART 3 - EXECUTION

3.1 AUTHORIZATIONS

A. The Contractor shall obtain written authorization from the Permitted Subtitle D landfills for the disposal of non-hazardous special waste, prior to starting any soil excavation activities.

B. Haulers for transportation of non-hazardous special waste soils shall hold a current, valid waste hauling permit pursuant to 35 IAC 809.

3.2 MATERIAL SAMPLING

A. The Contractor shall, at contractors' own cost, collect sufficient amount of representative soils sample from the site for analysis to obtain authorization for the ultimate disposition of non-hazardous special waste soils.

C. The Contractor shall submit the soils samples to the laboratory and pay for the cost of analyzing the constituents required for the ultimate disposition of non-hazardous special waste, or hazardous waste soils. The contractor is responsible for acquisition all required permits and for payment of all sampling, analysis costs and permitting fees.

D. The Owner's Representative may collect soils samples for laboratory analysis or field Photo-ionization Detector (PID) screening. The Contractor shall provide the necessary equipment and manpower to assist the Owner's Representative collecting soils samples at no additional cost to the Owner.

E. The Contractor shall immediately notify the Owner's Representative if soils and/or materials requiring special handling are encountered in areas not identified in site drawings.

F. All excavated non-hazardous special waste or hazardous waste soils shall be removed from the site in accordance with applicable federal, state and local regulations.

3.3 EXCAVATION

A. Prior to starting any excavation work at the site, the contractor shall layout an alpha-numeric grid in 25-foot intervals which designates rows and columns around the perimeter of the site. Columns

shall be labeled numerically along the east fence line, beginning on the north side of the site, in 25-foot intervals towards the south side of the site. Rows shall be labeled alphabetically along the north fence line, beginning on the east side of the site, in 25-foot intervals towards the west side of the site. 12”x12”, waterproof placards, showing the row number or column letter shall be placed on fence posts at the 25-foot intervals around the perimeter of the site. Placards shall be secured at a height of 4 feet above the ground and shall be maintained throughout the duration of the project. The contractor shall repair or replace placards if they become damaged or illegible.

B. The Contractor shall perform excavation of materials in accordance with all applicable regulations and project specifications. All excavation shall be performed in accordance with OSHA requirements and guidelines.

C. The Contractor shall coordinate all soil excavation and hauling from the site activities with the Owner’s Representative. The Contractor must provide a written notification to the Owner’s Representative at least 48-hour prior to starting any soil excavation or hauling from the site.

D. Excavate materials in accordance with the Sheet SM-1, “Soil Management Plan” and the Architect/Engineer plans to complete the proposed construction work at the site.

E. The contractor shall excavate and remove contaminated soil at the site to the depth and locations shown in the Soil Management & Remediation Plan (SM-1). The Contractor shall then perform the following:

1 Contaminated soil shall be loaded directly into hauling trucks for transportation to the approved Subtitle C or Subtitle D landfills. If contaminated soil is to be stored on site, it can be stored for a maximum of 5 working days prior to its disposal and must meet the stockpile requirements per item E.2.

2 Hazardous soil shall not be stockpiled onsite and shall be loaded directly into hauling trucks for transportation to the approved Subtitle C landfill.

3 All contaminated soil stockpiles shall be placed upon and covered by 6-mil polyethylene sheeting (visqueen) at all times. The integrity of the visqueen shall be inspected at the end of each working day and corrective measures shall be implemented to ensure no portion of stockpiled soil is exposed at the end of each working day.

4 Maintain a minimum of eighteen (18) inches of cover consisting of imported clean fill/topsoil placed over geotextile fabric over all landscaped and unit pavers areas on the site that require engineered barriers as shown in Sheet SM-1. Place and maintain imported clean fill/topsoil over Area 4 as shown in Sheet SM-1 up to proposed finished grade. Areas planned to be covered by concrete/ asphalt shall be excavated and backfilled to a depth indicated in the architectural and/or engineering plans in order to complete the proposed construction work at the site with the exception of Area 4 which will be excavated to the depth indicated in Sheet SM-1 (5 feet).

5 In the proposed underground utilities sewer trenching areas, the contractor shall excavate contaminated soil to a depth required by the new development. Contaminated suitable backfill materials could be used as backfill to a depth up to 3 feet below finished grade.

6 For the water main connection, excavate contaminated soil to a depth of 2 feet below the water main invert and backfill with clean fill. The width of the water main trench shall be at

least 4 feet larger than the pipe diameter. A minimum of 2 feet of clean fill shall be placed at each side of the water main.

7 Geotextile Installation

a. The Contractor shall install the geotextile fabric type and material shown in Attachment 3.
b. The Contractor shall install the geotextile fabric in accordance with the manufacturer's specifications and instructions.
c. The Contractor shall install the geotextile fabric over the landscaped areas requiring engineered barriers as indicated in Sheet SM-1 at a minimum elevation of eighteen (18) inches below finished grade.
d. The site should be cleared of any debris (large stones, tree stumps, and vegetation) to prevent puncture or damage of the fabric. This step is mandatory, regardless of the subgrade.
e. Fabric of insufficient width or length to fully cover the specified area shall be lapped or sewn. The minimum laps for lap only areas are 12 in. (300 mm) and for sewn areas are 4 in. (100 mm). When sewn, the fabric shall be stitched at a minimum rate of four stitches per 1 in. (25 mm) with high-strength polyester, polypropylene, or kevlar thread. The seam strength shall be equal to or more than the minimum grab tensile strength of the fabric when tested wet according to ASTM D 4632.
f. Securing pins for anchoring filter fabric shall be nominally 3/16 in. (5 mm) diameter steel bars, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of not less than 1 1/2 in. (40 mm). The length of the pin shall not be less than 12 in. (300 mm). Securing pins shall be inserted through both strips of overlapped cloth at not greater than the following intervals along a line through the midpoint of the overlap. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the surface. Additional pins, regardless of location, shall be installed as necessary to prevent any slippage of the filter fabric. When the Engineer determines that the proper lap is not being maintained by the use of pins, the fabric shall be sewn according to Article 282.05.
g. The fabric shall be protected during construction from contamination by surface runoff, and any fabric so contaminated shall be removed and replaced. Fabric damaged during its installation or during placement of riprap shall be replaced or repaired. Repairs shall be made by removing the material around the damage and covering it with a patch of fabric using an overlap of 4 ft (1.2 m) in each direction. The patch shall be held in position with securing pins.
h. The geotextile fabric shall be protected at all at all time from exposure to sunlight and moisture until installed and covered. During the construction, the geotextile fabric shall not be left exposed to direct sunlight for more than five days, nor to subject to direct travel on fabric by construction equipment.
i. The geotextile fabric shall be puncture resistant and protected as recommended by the manufacturer during the soil barrier installation construction activities.
j. Construction activities following the geotextile fabric installation do not damage, puncture or tear the geotextile fabric or otherwise compromise its structure.
k. Should the geotextile fabric be damaged during installation by tearing or puncturing, the damaged section shall be cut out and replaced completely or repaired by placing a piece of geotextile that is large enough to cover the damaged area and provide a sufficient overlap on all sides to fasten.

F. All excavated materials from the site shall be classified as non-hazardous special waste. The Owner’s Representative will determine the extent of materials to be considered as special waste.

G. All materials removed from the site shall be transported to a permitted Subtitle D landfill and disposed of in accordance with their classification.

H. The contractor shall excavate each type of contaminated soil separately and shall keep each type of waste stream separated. If the contaminated soil comes in contact with the clean soil, then the entire soils will be considered non-hazardous special waste soils. In the event of mixing soils, then all soil will be disposed of as non-hazardous special waste soil.

I. The Contractor shall retain the services of an independent Illinois Licensed Surveyor to record the original ground topography, the after excavation (pre- engineered barrier installation) topography and the final grade (post- engineered barrier installation) topography for the site. The Licensed Surveyor shall measure elevations using 30-feet grid to produce data to verify the size and depth of excavation areas for each type of material excavated from the site. The Licensed Surveyor shall provide a minimum of 5 survey points for each excavation area less than 30 feet long (one at each corner and one point at the center). The original ground and after excavation survey data with copies of all applicable field notes and survey readings as backup, shall be submitted to the Environmental Consultant for approval within ten (10) working days of conducting the survey. All survey data shall be sealed and signed by an Illinois Licensed Surveyor. The Contractor shall also provide an electronic copy of all topographic surveys in AutoCAD format.

J. The Owner's Representative may collect soil samples for laboratory analysis or field Photo-ionization Detector (PID) screening, or liquid samples for laboratory analysis during site excavation activities. Contractor shall provide all necessary equipment and manpower to assist the Owner's Representative in collecting all required samples at no additional cost to the Owner.

K. If contaminated soil is discovered during excavation work in areas not identified in the Drawings, the Contractor shall stop excavation work and immediately inform the Owner's Representative. The Owner's Representative will assess the site conditions and instruct the Contractor how to proceed with the work.

L. The Contractor shall be responsible for maintaining the structural integrity of all surrounding streets, underground utilities, buildings, and structures (walkways, sidewalks, underground tunnels, etc.)

M. Secure, shore, and brace where sloping is not possible either because of space restrictions or stability of material excavated. Excavations shall be braced or sloped in compliance to the latest Occupational Safety and Health Administration (OSHA) requirements and shall comply with local codes, authorities having jurisdiction, and the City of Evanston, and maintain same. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, in good serviceable conditions. Maintain shoring and bracing in excavations regardless of the time period excavations will remain open. Carry down shoring and bracing as the excavation progresses.

3.4 DECONTAMINATION

A. The Contractor shall remove soils, dusts, rocks, etc. from the exterior of trucks, trailers, or other heavy equipment leaving the site.

B. The Contractor shall clean the tractor-trailers or trucks that are loaded with materials for disposal/salvage by removing clinging soils, rocks from the exterior of the equipment.

C. The Contractor shall not allow equipment or trucks to leave the site with water leaking or mud dripping or caked to the equipment or trucks.

D. The Contractor shall clean and/or decontaminate excavation equipment (tools, shovels, backhoes, etc.) with a jet washer or steam cleaner after completing excavation work in the non-hazardous special waste or hazardous waste areas and prior to start working in the clean soil areas. All cleaning and/or decontamination residuals must be collected and disposed of in accordance with applicable federal, state and local regulations.

E. The Contractor must transport all materials in covered trailers.

3.5 STOCKPILING

A. Contractor may stockpile/pile non-hazardous special waste, or general construction and demolition debris/materials on site for a maximum of five (5) working days. The location of the stockpile/pile area shall be coordinated with the Owner's Representative and it shall be in accordance with the City of Evanston requirements. The maximum height of the stockpile/pile shall not exceed ten (10) feet. The Contractor shall place non-hazardous special waste soils on 6-mil polyethylene visqueen and keep non-hazardous special waste soils covered with 6-mil polyethylene visqueen or containerized until subsequent loading, transportation and disposal. For stockpiled soils, provide a 12" to 18" high berm around the stockpile with the base sheeting overlapping the berm.

B. The Contractor shall be responsible for keeping such soil separated from soils that are not designated as non-hazardous special waste soils. If non-hazardous special waste or hazardous waste soil comes in contact with soils that are not designated as non-hazardous special waste, or hazardous waste, the former non-special waste soils will now be considered non-hazardous special waste or hazardous waste soils, and the Contractor shall dispose of newly designated soils as non-hazardous special waste or hazardous waste soils at his own expense. The Contractor will be responsible for sampling analysis costs associated with characterization of newly designated soils as non-hazardous special waste or hazardous waste soil/materials.

C. The Contractor shall not allow runoff from stockpiled soil/materials to enter storm drains or leave the site

3.6 LOADING

A. The Contractor shall notify the Owner's Representative forty-eight (48) hours in advance of soil loading and hauling activities. No soil shall be removed from the site without the presence of the Owner's Representative.

B. The Contractor shall prepare waste manifests prior to starting any soil loading activities. The Contractor shall provide completed copies of waste manifests to the Owner's Representative for review and signature prior to loading trucks.

C. The Contractor shall excavate non-hazardous special waste and hazardous waste soils to the extent provided by the Owner's Representative.

D. The Contractor shall load non-hazardous special waste or hazardous waste soil/materials directly from the site or from temporary stockpiles into tarp covered hauling trucks for subsequent transportation and ultimate disposition.

E. Traffic: Conduct non-hazardous special waste or hazardous waste soil/materials removal to ensure minimum interference with roads, streets, walks and other adjacent occupied and used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the applicable governing agency and the Owner's Representative. Provide alternate routes around closed or obstructed traffic ways if required by the governing agency.

F. The Contractor is responsible for complying with State and local Road/Street weight limits.

3.7 TRANSPORTATION

A. The non-hazardous special or hazardous waste soil shall be transported by a licensed hauler, licensed in the state of Illinois to transport site non-hazardous special waste and/or hazardous waste, as applicable. The transporter shall present evidence of special waste and/or hazardous waste hauling permits upon request of the Owner's Representative.

B. All materials shall be transported using only tarp covered trucks. Truck must be covered prior to leaving the site. All soils must be transported directly to the disposal site from the construction site. Intermediate storage is not permitted.

C. All transporting trucks shall hold, and present upon request by the Owner's Representative, a current valid Commercial Driver's License (CDL).

D. The Contractor shall provide copies of completed transport manifests executed by transporter and the landfill accepting materials removed from the site to the Owner's Representative within seven (7) business days.

3.8 DISPOSAL

A. The Contractor shall provide copies of weight tickets and/or volume (cubic yards, tons or gallons) receipts from the Permitted Subtitle D landfill facility accepting non-hazardous special within three (3) business days.

B. The Contractor shall provide copies of weight tickets and/or volume (cubic yards, tons or gallons) receipts from the approved treatment facility or Subtitle C landfill for the disposal of hazardous waste to the Owner's Representative within three (3) business days.

C. The Contractor shall provide copies of completed daily reports, transport manifests, weight tickets and receipts (as applicable) executed by transporter and the Subtitle D landfill accepting the non-hazardous special, or treatment facility/Subtitle C landfill accepting the hazardous waste to the Owner's Representative within seven (7) business days.

3.9 DUST CONTROL

A. The Contractor shall control dust by all necessary means, including but not limited to covering trucks, stockpiles and open materials, watering haul roads, sweeping paved roads, and limiting the speed of all on-site vehicles.

3.10 STORM WATER RUNOFF AND GROUNDWATER MANAGEMENT

A. The Contractor shall furnish all necessary means, products, tools, and equipment required to fulfill the scope of work described in the Specifications and Drawings for this Project.

B. The Contractor shall have access to a weather notification system and manage the work so as not to accumulate storm water on the site during excavation.

C. Storm Water Run-on/Run-off and Dewatering: Contractor shall implement the approved Storm Water Management Plan as condition warranted or directed by the Owner Representative.

D. The Contractor shall manage and remove water from site excavations in accordance with the City of Evanston requirements. The Contractor shall not discharge onsite water into the City of Evanston sewer without first obtaining all required permits from the City of Evanston.

E. The Contractor shall prevent storm water, groundwater water or perched water from entering the Remediation Area. Incorporate preventative measures to avoid contact of such liquid with Special Waste or Hazardous Waste, if present on site. Earthen berms, plastic (polyethylene) sheeting, pumping, and other such means, as specified in the approved Storm Water Management Plan, shall be used.

F. If the Contractor, through negligence, allows storm water to contact non-hazardous special or hazardous waste soils (if present on site) and thereby contaminates the storm water so that the water must be disposed of as non-hazardous special or hazardous waste, the Contractor will be responsible for the additional costs incurred.

G. Stormwater Run-on/Run-off and Dewatering: Contractor shall manage and remove water from site excavation, if encountered, in accordance with the City of Evanston requirements. The Contractor shall not discharge onsite water into the City of Evanston sewer without first obtaining all required permits.

3.11 QUALITY CONTROL

A. The Contractor shall perform the following quality control measures to fulfill the scope of work described in the Specifications and Drawings for this Project:

1. Visual inspections and damage repairs shall be made daily by the Contractor and/or as directed by the Owner’s Representative to assure that erosion, drainage and containment control measures are functioning properly.

2. The Contractor shall take all necessary precautions to protect structures, equipment, pavement, walks and utilities against movement or settlement during the course of work.

3. Damages: Promptly replace or repair any damage caused to adjacent pavement, utilities or facilities by removal operations at no additional cost. Work shall be performed to the satisfaction of the Owner’s Representative.

4. Utility Services: Maintain existing utilities and protect against damage during removal operations.

3.12 BACKFILL

A. Prior to importing any backfill materials, the Contractor shall provide the name and location of all sources to be used to import the backfill.

B. Place a minimum of eighteen (18) inches of backfill cover consisting of imported clean fill/topsoil placed over geotextile fabric over all proposed landscaped and unit pavers areas on the site that require engineered barriers as shown in Sheet SM-1 and over the Remediation Area shown in SM-1 up to proposed finished grade, except where existing underground utilities are present.

C. For each off-site source of imported materials, including top soil, cohesive, granular and other fill materials; the Contractor shall provide to the Owner's Representative certification and IEPA-approved laboratory analyses showing that all imported materials do not exceed the values listed in APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The Contractor shall collect sufficient number of conformation soil samples throughout the backfilling activities to verify that all imported soils do not exceed the TACO values. The date of the analytical testing of all imported materials shall not be more than 60 days from the date of importing such material to the site. For virgin materials, provide one set of analytical results from each source of materials. For recycled materials, provide one set of analytical result for each 500 cubic yards of imported materials.

D. The Contractor shall coordinate with the Owner's Representative regarding backfilling activities. If the Contractor backfills areas without obtaining approval from the Environmental Consultant, the backfill materials shall be excavated, if required, at the Contractor's expense. All backfill placement and compaction shall be performed in accordance with project specifications.

E. The Owner's Representative may collect confirmation samples of materials imported and placed at the site. The Contractor will be required to remove and replace any materials found to contain chemicals exceeding the Tier 1 SROs for residential properties at the Contractor's own expense.

PART 4 - MEASUREMENT AND PAYMENT

Volume determination and pricing shall be in accordance with the contract documents.

ATTACHMENTS

1. Exhibit 1 - Boring location Plan
2. Tables – Soil Analytical Results
3. Geotextile Fabric – Manufacturer and Product Specifications

Sheet SM-1 - Soil Management Plan

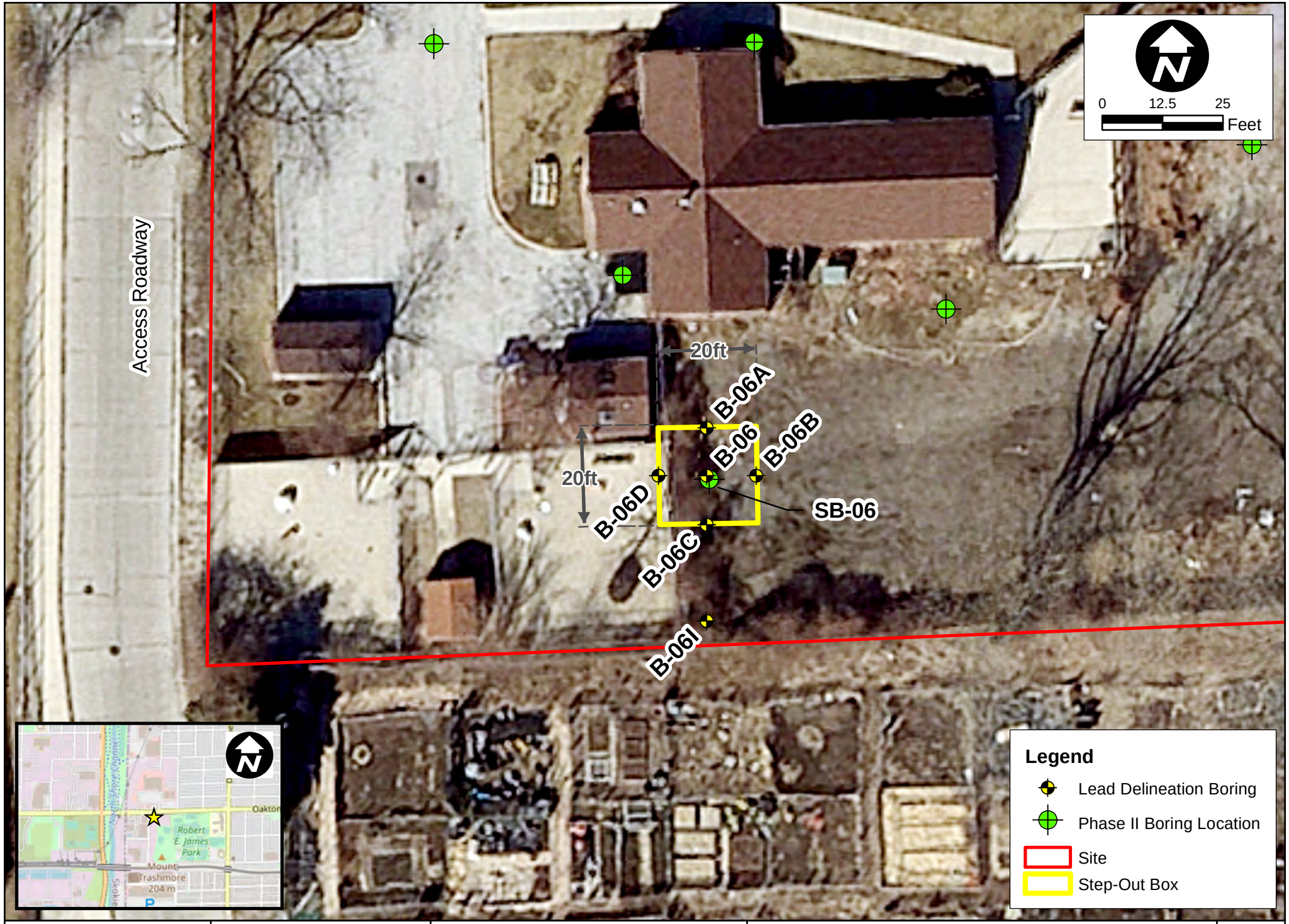
END OF SECTION

DRAWN BY NJB	DATE 1/28/2022	GSG CONSULTANTS, INC. 735 Remington Road, Schaumburg, IL 60173 Tel: 630.994.2600, www.gsg-consultants.com	HOLABIRD & ROOT
CHECKED BY GK	DATE 1/28/2022		

EXHIBIT 1 - BORING LOCATION MAP

EVANSTON ANIMAL SHELTER SITE
2310 OAKTON STREET, EVANSTON, IL

SHEET NO. 1 OF 1



DRAWN BY	NJB	DATE	4/15/2022	GSG CONSULTANTS, INC. 735 Remington Road, Schaumburg, IL 60173 Tel: 630.994.2600, www.gsg-consultants.com	HOLABIRD & ROOT
CHECKED BY	GK	DATE	4/15/2022		

EXHIBIT 1 - BORING LOCATION MAP

EVANSTON ANIMAL SHELTER SITE
2310 OAKTON STREET, EVANSTON, IL

SHEET NO. 1 OF 1

TABLE 1a
Soil Analytical Results
VOCs Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4
VOCs											
Acetone	70,000	100,000	25		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	NA	< 0.091
Benzene	12	0.8	0.17		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Bromodichloromethane	10	3,000	0.6		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Bromoform	81	53	0.8		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Bromomethane	110	10	1.2		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA	< 0.012
2-Butanone (Methyl Ethyl Ketone)	NC	NC	NC		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	NA	< 0.091
Carbon disulfide	7,800	720	160		< 0.092	< 0.065	< 0.054	< 0.076	< 0.080	NA	< 0.061
Carbon tetrachloride	44	0.64	0.33		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Chlorobenzene	1,600	130	6.5		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Chloroethane	NC	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA	< 0.012
Chloroform	100	0.3	2.9		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Chloromethane	NC	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA	< 0.012
Dibromochloromethane	1,600	1,300	0.4		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,1-Dichloroethane	7,800	1,300	110		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,2-Dichloroethane	7	0.4	0.1		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,1-Dichloroethene	3,900	290	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
cis-1,2-Dichloroethene	780	1,200	1.1		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
trans-1,2-Dichloroethene	1,600	3,100	3.4		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,2-Dichloropropane	9	15	0.15		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
cis-1,3-Dichloropropene	6.4	1.1	0.02		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	NA	< 0.0024
trans-1,3-Dichloropropene	6.4	1.1	0.02		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	NA	< 0.0024
Ethylbenzene	7,800	400	19		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
2-Hexanone	NC	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	NA	< 0.024
4-Methyl-2-pentanone	NC	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	NA	< 0.024
Methylene chloride	85	13	0.2		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA	< 0.012
Methyl tert-butyl ether	780	8,800	0.32		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Styrene	16,000	1,500	18		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,1,2,2-Tetrachloroethane	NC	NC	NC		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Tetrachloroethene	12	11	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Toluene	16,000	650	29		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,1,1-Trichloroethane	NC	1,200	9.6		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
1,1,2-Trichloroethane	310	1,800	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Trichloroethene	58	5	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Vinyl chloride	0.46	0.28	0.07		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA	< 0.0061
Xylenes, Total	16,000	320	150		< 0.028	< 0.019	< 0.016	< 0.023	< 0.024	NA	< 0.018

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. SCGW = Soil Component of the Groundwater

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 1b
Soil Analytical Results
SVOCs Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	2-3	3-4	4-5	3-4	3-4
SVOCs									
Aniline	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzidine	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzoic acid	310,000	NC	400 to 440*		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
Benzyl alcohol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethoxy)methane	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethyl)ether	0.6	0.2	0.0004		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-ethylhexyl)phthalate	46	31,000	31,000		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
4-Bromophenyl phenyl ether	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Butyl benzyl phthalate	16,000	930	930		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Carbazole	32	NC	2.8		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloroaniline	310	NC	0.7		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloro-3-methylphenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2-Chloronaphthalene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Chlorophenol	390	53,000	1.5 to 20*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chlorophenyl phenyl ether	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dibenzofuran	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,2-Dichlorobenzene	7,000	560	43		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,3-Dichlorobenzene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,4-Dichlorobenzene	NC	11,000	11		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3,3´-Dichlorobenzidine	1	NC	0.033		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dichlorophenol	230	NC	0.48 to 1*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Diethyl phthalate	63,000	2,000	470		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dimethylphenol	1,600	NC	9		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dimethyl phthalate	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4,6-Dinitro-2-methylphenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2,4-Dinitrophenol	160	NC	0.2		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
2,4-Dinitrotoluene	0.9	NC	0.0008		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2,6-Dinitrotoluene	0.9	NC	0.0007		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Di-n-butyl phthalate	7,800	2,300	2,300		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Di-n-octyl phthalate	1,600	10,000	10,000		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobenzene	0.4	1	11		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobutadiene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorocyclopentadiene	550	10	2,200		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachloroethane	78	NC	2.6		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Isophorone	15,600	4,600	8		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylnaphthalene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylphenol	3,900	NC	15		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Methylphenol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitrophenol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitrophenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Nitrobenzene	39	92	0.1		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodi-n-propylamine	0.09	NC	0.00005		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodimethylamine	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
N-Nitrosodiphenylamine	130	NC	5.6		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2, 2'-oxybis(1-Chloropropane)	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pentachlorophenol	3	NC	0.1 to 2.7*		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Phenol	23,000	NC	100		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pyridine	NC	NC	NC		< 0.95	< 0.81	< 0.84	< 0.82	< 7.7
1,2,4-Trichlorobenzene	780	3,200	53		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,5-Trichlorophenol	7,800	NC	26 to 2000*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,6-Trichlorophenol	58	200	0.07 to 1.9*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Appendix B, Table C, pH specific SROs
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 1b
Soil Analytical Results
SVOCs Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW	Sample	SB-05-02	SB-06-01
				Date	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	6-7	3-4
SVOCs						
Aniline	NC	NC	NC		NA	< 0.44
Benzidine	NC	NC	NC		NA	< 0.44
Benzoic acid	310,000	NC	400 to 440*		NA	< 1.1
Benzyl alcohol	NC	NC	NC		NA	< 0.23
Bis(2-chloroethoxy)methane	NC	NC	NC		NA	< 0.23
Bis(2-chloroethyl)ether	0.6	0.2	0.0004		NA	< 0.23
Bis(2-ethylhexyl)phthalate	46	31,000	31,000		NA	< 1.1
4-Bromophenyl phenyl ether	NC	NC	NC		NA	< 0.23
Butyl benzyl phthalate	16,000	930	930		NA	< 0.23
Carbazole	32	NC	2.8		NA	< 0.23
4-Chloroaniline	310	NC	0.7		NA	< 0.23
4-Chloro-3-methylphenol	NC	NC	NC		NA	< 0.44
2-Chloronaphthalene	NC	NC	NC		NA	< 0.23
2-Chlorophenol	390	53,000	1.5 to 20*		NA	< 0.23
4-Chlorophenyl phenyl ether	NC	NC	NC		NA	< 0.23
Dibenzofuran	NC	NC	NC		NA	< 0.23
1,2-Dichlorobenzene	7,000	560	43		NA	< 0.23
1,3-Dichlorobenzene	NC	NC	NC		NA	< 0.23
1,4-Dichlorobenzene	NC	11,000	11		NA	< 0.23
3,3´-Dichlorobenzidine	1	NC	0.033		NA	< 0.23
2,4-Dichlorophenol	230	NC	0.48 to 1*		NA	< 0.23
Diethyl phthalate	63,000	2,000	470		NA	< 0.23
2,4-Dimethylphenol	1,600	NC	9		NA	< 0.23
Dimethyl phthalate	NC	NC	NC		NA	< 0.23
4,6-Dinitro-2-methylphenol	NC	NC	NC		NA	< 0.44
2,4-Dinitrophenol	160	NC	0.2		NA	< 1.1
2,4-Dinitrotoluene	0.9	NC	0.0008		NA	< 0.044
2,6-Dinitrotoluene	0.9	NC	0.0007		NA	< 0.044
Di-n-butyl phthalate	7,800	2,300	2,300		NA	< 0.23
Di-n-octyl phthalate	1,600	10,000	10,000		NA	< 0.23
Hexachlorobenzene	0.4	1	11		NA	< 0.23
Hexachlorobutadiene	NC	NC	NC		NA	< 0.23
Hexachlorocyclopentadiene	550	10	2,200		NA	< 0.23
Hexachloroethane	78	NC	2.6		NA	< 0.23
Isophorone	15,600	4,600	8		NA	< 0.23
2-Methylnaphthalene	NC	NC	NC		NA	< 0.23
2-Methylphenol	3,900	NC	15		NA	< 0.23
4-Methylphenol	NC	NC	NC		NA	< 0.23
2-Nitroaniline	NC	NC	NC		NA	< 0.23
3-Nitroaniline	NC	NC	NC		NA	< 0.23
4-Nitroaniline	NC	NC	NC		NA	< 0.23
2-Nitrophenol	NC	NC	NC		NA	< 0.23
4-Nitrophenol	NC	NC	NC		NA	< 0.44
Nitrobenzene	39	92	0.1		NA	< 0.044
N-Nitrosodi-n-propylamine	0.09	NC	0.00005		NA	< 0.044
N-Nitrosodimethylamine	NC	NC	NC		NA	< 0.23
N-Nitrosodiphenylamine	130	NC	5.6		NA	< 0.044
2, 2'-oxybis(1-Chloropropane)	NC	NC	NC		NA	< 0.23
Pentachlorophenol	3	NC	0.1 to 2.7*		NA	< 0.044
Phenol	23,000	NC	100		NA	< 0.23
Pyridine	NC	NC	NC		NA	< 0.89
1,2,4-Trichlorobenzene	780	3,200	53		NA	< 0.23
2,4,5-Trichlorophenol	7,800	NC	26 to 2000*		NA	< 0.23
2,4,6-Trichlorophenol	58	200	0.07 to 1.9*		NA	< 0.23

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Appendix B, Table C, pH specific SROs
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 1c
Soil Analytical Results
PNAs Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4
PNAs											
Acenaphthene	4,700	NC	2900		< 0.047	0.044	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Acenaphthylene	NC	NC	NC		< 0.047	< 0.041	< 0.041	0.082	< 0.38	< 0.040	< 0.044
Anthracene	23,000	NC	59,000		< 0.047	0.18	0.065	0.12	0.65	< 0.040	< 0.044
Benzo(a)anthracene	1.8*	NC	8		0.099	0.82	0.17	0.29	***2***	< 0.040	< 0.044
Benzo(a)pyrene	2.1*	NC	82		0.095	0.77	0.16	0.34	1.9	< 0.040	< 0.044
Benzo(b)fluoranthene	2.1*	NC	25		0.074	0.68	0.15	0.35	1.6	< 0.040	< 0.044
Benzo(g,h,i)perylene	NC	NC	NC		0.057	0.52	0.1	0.24	1	< 0.040	< 0.044
Benzo(k)fluoranthene	9	NC	250		0.076	0.51	0.12	0.33	1.7	< 0.040	< 0.044
Chrysene	88	NC	800		0.11	0.86	0.18	0.4	1.9	< 0.040	0.052
Dibenzo(a,h)anthracene	0.42*	NC	7.6		< 0.047	0.24	0.05	0.1	***0.67***	< 0.040	< 0.044
Fluoranthene	3,100	NC	21,000		0.14	1.6	0.37	0.86	3.8	< 0.040	0.057
Fluorene	3,100	NC	2800		< 0.047	0.049	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Indeno(1,2,3-cd)pyrene	0.9	NC	69		< 0.047	0.44	0.091	0.23	***0.92***	< 0.040	< 0.044
Naphthalene	1,600	270	18		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Phenanthrene	NC	NC	NC		0.12	0.97	0.31	0.46	2	< 0.040	0.072
Pyrene	2,300	NC	21,000		0.14	1.7	0.32	0.79	3.3	< 0.040	0.067

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Location specific background value
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 1d
Soil Analytical Results
Inorganics and pH Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW (CLASS II)				Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01	SB-06-02
							Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
Inorganics (mg/kg)	*Ingestion*	*Inhalation*	*pH 7.75 to 8.24*	*pH 8.25 to 8.74*	*pH 8.75 to 9.0*	*mg/L*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4	7-8
Aluminum	NC	NC	NC	NC	NC	NC		7300	6600	8800	12000	5500	NA	5400	NA
Antimony	31	NC	20	20	20	NC		< 2.7	***150***	< 2.5	< 2.2	< 2.3	NA	***32***	NA
Arsenic	13	750	120	130	130	NC		9.9	***150***	12	13	***15***	3.1	***17***	NA
Barium	5,500	690,000	2,100	NC	NC	NC		86	95	190	46	140	NA	1200	NA
Beryllium	160	1,300	1,000,000	NC	NC	NC		3.2	1	< 0.61	0.87	1.1	NA	1.3	NA
Cadmium	78	1,800	4,300	NC	NC	NC		< 0.65	0.78	1.5	0.97	1.8	NA	29	NA
Calcium	NC	NC	NC	NC	NC	NC		19000	57000	71000	47000	38000	NA	16000	NA
Chromium	230	270	28**	24**	21**	NC		9.4	19	22	***26***	18	NA	18	NA
Cobalt	4,700	NC	NC	NC	NC	NC		7.8	6.6	10	16	8.2	NA	4.9	NA
Copper	2,900	NC	330,000	NC	NC	NC		25	56	41	85	300	NA	***6700***	NA
Cyanide	1,600	NC	120	120	120	NC		< 0.71	< 0.62	< 0.62	< 0.61	< 0.57	NA	< 0.67	NA
Iron	NC	NC	NC	NC	NC	NC		17000	24000	20000	30000	23000	NA	20000	NA
Lead	400	NC	1,420	1,420	3,760	NC		64	***31000***	***550***	100	270	7.7	***13000***	NA
Magnesium	325,000	NC	NC	NC	NC	NC		8200	30000	39000	27000	17000	NA	2600	NA
Manganese	1,600	91,000	NC	NC	NC	NC		240	440	470	440	250	NA	180	NA
Mercury[c]	23	10	40	NC	NC	NC		0.11	0.25	0.26	0.19	0.26	NA	0.13	NA
Nickel	1,600	13,000	76,000	NC	NC	NC		40	21	25	52	26	NA	38	NA
Potassium	NC	NC	NC	NC	NC	NC		770	910	1500	2200	820	NA	640	NA
Selenium	390	NC	2.4	1.8	1.3	NC		< 1.3	< 1.1	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Silver	390	NC	110**	110**	110**	NC		< 1.3	1.3	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Sodium	NC	NC	NC	NC	NC	NC		3100	240	1700	1900	640	NA	460	NA
Thallium	6.3	NC	38	44	49	NC		< 1.3	< 22	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Vanadium	550	NC	980**	980**	980**	NC		25	31	37	35	24	NA	24	NA
Zinc	23,000	NC	110,000	NC	NC	NC		100	160	370	170	560	NA	5700	NA
pH	NC	NC	NC	NC	NC	NC		8.04	8.60	8.08	9.43	8.77	NA	8.17	NA
TCLP (mg/L)															
Arsenic	NC	NC	NC	NC	NC	0.05		NA	< 0.010	NA	NA	NA	NA	NA	NA
Iron	NC	NC	NC	NC	NC	5		<0.25	NA	NA	NA	NA	NA	NA	NA
Lead	NC	NC	NC	NC	NC	0.0075		NA	***0.023***	NA	NA	NA	NA	***38***	0.007

NOTES

1. Total Metal results expressed in milligrams per kilogram (mg/kg). TCLP/SPLP results expressed in milligrams per kilogram (mg/L).
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. SCGW = Soil Component of the Groundwater
5. c = Inhalation Exposure Routes for Mercury excluded under footnote s of TACO Section 742, Appendix B, Table B. Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.
6. * = SCGW exposure route excluded under footnote "*m*" of TACO Section 742, Appendix B, Table B.

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 1e
Soil Analytical Results
Pesticides, Herbicides, and PCBs Compared to TACO Tier I Residential and SCGW Class I
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	RESIDENTIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class I*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
Pesticides										
4,4´-DDD	3	NC	16		< 0.0023	< 0.0020	< 0.0020	0.01	< 0.0018	< 0.0021
4,4´-DDE	2	NC	54		< 0.0023	< 0.0020	< 0.0020	0.023	< 0.0018	< 0.0021
4,4´-DDT	2	1,500	32		< 0.0023	< 0.0020	< 0.0020	0.035	< 0.0018	< 0.0021
Aldrin	0.04	3	0.5		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-BHC	0.1	0.8	0.0005		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-Chlordane	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
beta-BHC	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Chlordane	1.8	72	10		< 0.023	< 0.020	< 0.020	< 0.020	< 0.018	< 0.021
delta-BHC	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Dieldrin	0.04	1	0.004		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan I	470	NC	18		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan II	470	NC	18		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan sulfate	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin	23	NC	1		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin aldehyde	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin ketone	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-BHC	0.5	NC	0.009		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-Chlordane	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor	0.1	0.1	23		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor epoxide	0.07	5	0.7		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Methoxychlor	390	NC	160		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Toxaphene	0.6	89	31		< 0.047	< 0.041	< 0.041	< 0.040	< 0.038	< 0.044
PCBs										
Aroclor 1016	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1221	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1232	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1242	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1248	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1254	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1260	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Total PCBs	1	NC	NC		ND	ND	ND	ND	ND	ND

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. ND = Not Detected at the reporting limit
5. * = Appendix B, Table C, pH specific SROs
6. SCGW = Soil Component of the Groundwater

Sample result above TACO Residential Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class I Ingestion Exposure Route screening criteria. Does not exceed TACO Residential.

TABLE 2a
Soil Analytical Results
VOCs Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW	Sample Date	SB-01-01 12/29/2021	SB-02-01 12/29/2021	SB-03-01 12/29/2021	SB-04-01 12/29/2021	SB-05-01 12/29/2021	SB-06-01 12/29/2021
	Ingestion	*Inhalation*	*Class II*	**Depth (ft)**	2-3	3-4	4-5	3-4	3-4	3-4
VOCs										
Acetone	NC	100,000	25		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	< 0.091
Benzene	100	1.6	0.17		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromodichloromethane	92	3,000	0.6		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromoform	720	100	0.8		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromomethane	2,900	15	1.2		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
2-Butanone (Methyl Ethyl Ketone)	NC	NC	NC		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	< 0.091
Carbon disulfide	200,000	720	160		< 0.092	< 0.065	< 0.054	< 0.076	< 0.080	< 0.061
Carbon tetrachloride	44	0.64	0.33		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chlorobenzene	41,000	210	6.5		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chloroethane	NC	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Chloroform	940	0.54	2.9		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chloromethane	NC	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Dibromochloromethane	41,000	1,300	0.4		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1-Dichloroethane	200,000	1,700	110		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,2-Dichloroethane	63	0.7	0.1		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1-Dichloroethene	100,000	470	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
cis-1,2-Dichloroethene	20,000	1,200	1.1		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
trans-1,2-Dichloroethene	41,000	3,100	3.4		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,2-Dichloropropane	84	23	0.15		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
cis-1,3-Dichloropropene	57	2.1	0.02		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	< 0.0024
trans-1,3-Dichloropropene	57	2.1	0.02		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	< 0.0024
Ethylbenzene	200,000	400	19		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
2-Hexanone	NC	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	< 0.024
4-Methyl-2-pentanone	NC	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	< 0.024
Methylene chloride	760	24	0.2		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Methyl tert-butyl ether	20,000	8,800	0.32		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Styrene	410,000	1,500	18		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,2,2-Tetrachloroethane	NC	NC	NC		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Tetrachloroethene	110	20	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Toluene	410,000	650	29		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,1-Trichloroethane	NC	1,200	9.6		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,2-Trichloroethane	8,200	1,800	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Trichloroethene	520	8.9	0.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Vinyl chloride	7.9	1.1	0.07		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Xylenes, Total	410,000	320	150		< 0.028	< 0.019	< 0.016	< 0.023	< 0.024	< 0.018

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. SCGW = Soil Component of the Groundwater

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 2b
Soil Analytical Results
SVOCs Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW	Sample Date	SB-01-01 12/29/2021	SB-02-01 12/29/2021	SB-03-01 12/29/2021	SB-04-01 12/29/2021	SB-05-01 12/29/2021
	Ingestion	*Inhalation*	*Class II*	**Depth (ft)**	2-3	3-4	4-5	3-4	3-4
SVOCs									
Aniline	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzidine	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzoic acid	1,000,000	NC	400 to 440*		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
Benzyl alcohol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethoxy)methane	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethyl)ether	5	0.47	0.0004		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-ethylhexyl)phthalate	410	31,000	31,000		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
4-Bromophenyl phenyl ether	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Butyl benzyl phthalate	410,000	930	930		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Carbazole	290	NC	2.8		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloroaniline	8,200	NC	0.7		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloro-3-methylphenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2-Chloronaphthalene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Chlorophenol	10,000	53,000	1.5 to 20*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chlorophenyl phenyl ether	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dibenzofuran	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,2-Dichlorobenzene	180,000	560	43		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,3-Dichlorobenzene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,4-Dichlorobenzene	NC	17,000	11		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3,3´-Dichlorobenzidine	13	NC	0.033		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dichlorophenol	6,100	NC	0.48 to 1*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Diethyl phthalate	1,000,000	2,000	470		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dimethylphenol	41,000	NC	9		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dimethyl phthalate	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4,6-Dinitro-2-methylphenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2,4-Dinitrophenol	4,100	NC	0.2		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
2,4-Dinitrotoluene	8.4	NC	0.0008		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2,6-Dinitrotoluene	8.4	NC	0.0007		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Di-n-butyl phthalate	200,000	2,300	2,300		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Di-n-octyl phthalate	41,000	10,000	10,000		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobenzene	4	1.8	11		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobutadiene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorocyclopentadiene	14,000	16	2,200		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachloroethane	2,000	NC	2.6		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Isophorone	410,000	4,600	8		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylnaphthalene	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylphenol	100,000	NC	15		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Methylphenol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitroaniline	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitrophenol	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitrophenol	NC	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Nitrobenzene	1,000	140	0.1		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodi-n-propylamine	0.8	NC	0.00005		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodimethylamine	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
N-Nitrosodiphenylamine	1,200	NC	5.6		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2, 2'-oxybis(1-Chloropropane)	NC	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pentachlorophenol	24	NC	0.1 to 2.7*		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Phenol	610,000	NC	100		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pyridine	NC	NC	NC		< 0.95	< 0.81	< 0.84	< 0.82	< 7.7
1,2,4-Trichlorobenzene	20,000	3,200	53		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,5-Trichlorophenol	200,000	NC	26 to 2000*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,6-Trichlorophenol	520	390	0.07 to 1.9*		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Appendix B, Table C, pH specific SROs
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 2b
Soil Analytical Results
SVOCs Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW	Sample	SB-06-01
				Date	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	3-4
SVOCs					
Aniline	NC	NC	NC		< 0.44
Benzidine	NC	NC	NC		< 0.44
Benzoic acid	1,000,000	NC	400 to 440*		< 1.1
Benzyl alcohol	NC	NC	NC		< 0.23
Bis(2-chloroethoxy)methane	NC	NC	NC		< 0.23
Bis(2-chloroethyl)ether	5	0.47	0.0004		< 0.23
Bis(2-ethylhexyl)phthalate	410	31,000	31,000		< 1.1
4-Bromophenyl phenyl ether	NC	NC	NC		< 0.23
Butyl benzyl phthalate	410,000	930	930		< 0.23
Carbazole	290	NC	2.8		< 0.23
4-Chloroaniline	8,200	NC	0.7		< 0.23
4-Chloro-3-methylphenol	NC	NC	NC		< 0.44
2-Chloronaphthalene	NC	NC	NC		< 0.23
2-Chlorophenol	10,000	53,000	1.5 to 20*		< 0.23
4-Chlorophenyl phenyl ether	NC	NC	NC		< 0.23
Dibenzofuran	NC	NC	NC		< 0.23
1,2-Dichlorobenzene	180,000	560	43		< 0.23
1,3-Dichlorobenzene	NC	NC	NC		< 0.23
1,4-Dichlorobenzene	NC	17,000	11		< 0.23
3,3´-Dichlorobenzidine	13	NC	0.033		< 0.23
2,4-Dichlorophenol	6,100	NC	0.48 to 1*		< 0.23
Diethyl phthalate	1,000,000	2,000	470		< 0.23
2,4-Dimethylphenol	41,000	NC	9		< 0.23
Dimethyl phthalate	NC	NC	NC		< 0.23
4,6-Dinitro-2-methylphenol	NC	NC	NC		< 0.44
2,4-Dinitrophenol	4,100	NC	0.2		< 1.1
2,4-Dinitrotoluene	8.4	NC	0.0008		< 0.044
2,6-Dinitrotoluene	8.4	NC	0.0007		< 0.044
Di-n-butyl phthalate	200,000	2,300	2,300		< 0.23
Di-n-octyl phthalate	41,000	10,000	10,000		< 0.23
Hexachlorobenzene	4	1.8	11		< 0.23
Hexachlorobutadiene	NC	NC	NC		< 0.23
Hexachlorocyclopentadiene	14,000	16	2,200		< 0.23
Hexachloroethane	2,000	NC	2.6		< 0.23
Isophorone	410,000	4,600	8		< 0.23
2-Methylnaphthalene	NC	NC	NC		< 0.23
2-Methylphenol	100,000	NC	15		< 0.23
4-Methylphenol	NC	NC	NC		< 0.23
2-Nitroaniline	NC	NC	NC		< 0.23
3-Nitroaniline	NC	NC	NC		< 0.23
4-Nitroaniline	NC	NC	NC		< 0.23
2-Nitrophenol	NC	NC	NC		< 0.23
4-Nitrophenol	NC	NC	NC		< 0.44
Nitrobenzene	1,000	140	0.1		< 0.044
N-Nitrosodi-n-propylamine	0.8	NC	0.00005		< 0.044
N-Nitrosodimethylamine	NC	NC	NC		< 0.23
N-Nitrosodiphenylamine	1,200	NC	5.6		< 0.044
2, 2'-oxybis(1-Chloropropane)	NC	NC	NC		< 0.23
Pentachlorophenol	24	NC	0.1 to 2.7*		< 0.044
Phenol	610,000	NC	100		< 0.23
Pyridine	NC	NC	NC		< 0.89
1,2,4-Trichlorobenzene	20,000	3,200	53		< 0.23
2,4,5-Trichlorophenol	200,000	NC	26 to 2000*		< 0.23
2,4,6-Trichlorophenol	520	390	0.07 to 1.9*		< 0.23

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Appendix B, Table C, pH specific SROs
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 2c
Soil Analytical Results
PNAs Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4
PNAs											
Acenaphthene	120,000	NC	2900		< 0.047	0.044	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Acenaphthylene	NC	NC	NC		< 0.047	< 0.041	< 0.041	0.082	< 0.38	< 0.040	< 0.044
Anthracene	610,000	NC	59,000		< 0.047	0.18	0.065	0.12	0.65	< 0.040	< 0.044
Benzo(a)anthracene	8	NC	8		0.099	0.82	0.17	0.29	2	< 0.040	< 0.044
Benzo(a)pyrene	2.1*	NC	82		0.095	0.77	0.16	0.34	1.9	< 0.040	< 0.044
Benzo(b)fluoranthene	8	NC	25		0.074	0.68	0.15	0.35	1.6	< 0.040	< 0.044
Benzo(g,h,i)perylene	NC	NC	NC		0.057	0.52	0.1	0.24	1	< 0.040	< 0.044
Benzo(k)fluoranthene	78	NC	250		0.076	0.51	0.12	0.33	1.7	< 0.040	< 0.044
Chrysene	780	NC	800		0.11	0.86	0.18	0.4	1.9	< 0.040	0.052
Dibenzo(a,h)anthracene	0.8	NC	7.6		< 0.047	0.24	0.05	0.1	0.67	< 0.040	< 0.044
Fluoranthene	82,000	NC	21,000		0.14	1.6	0.37	0.86	3.8	< 0.040	0.057
Fluorene	82,000	NC	2800		< 0.047	0.049	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Indeno(1,2,3-cd)pyrene	8	NC	69		< 0.047	0.44	0.091	0.23	0.92	< 0.040	< 0.044
Naphthalene	41,000	270	18		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Phenanthrene	NC	NC	NC		0.12	0.97	0.31	0.46	2	< 0.040	0.072
Pyrene	61,000	NC	21,000		0.14	1.7	0.32	0.79	3.3	< 0.040	0.067

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. * = Location specific background value
5. SCGW = Soil Component of the Groundwater

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 2d
Soil Analytical Results
Inorganics and pH Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW (CLASS II)				Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01	SB-06-02
							Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
Inorganics (mg/kg)	*Ingestion*	*Inhalation*	*pH 7.75 to 8.24*	*pH 8.25 to 8.74*	*pH 8.75 to 9.0*	*mg/L*	**Depth (ft)**	2-3	3-4	4-5	3-4	3-4	6-7	3-4	7-8
Aluminum	NC	NC	NC	NC	NC	NC		7300	6600	8800	12000	5500	NA	5400	NA
Antimony	820	NC	20	20	20	NC		< 2.7	***150***	< 2.5	< 2.2	< 2.3	NA	***32***	NA
Arsenic	13	1,200	120	130	130	NC		9.9	***150***	12	13	***15***	3.1	***17***	NA
Barium	140,000	910,000	2,100	NC	NC	NC		86	95	190	46	140	NA	1200	NA
Beryllium	4,100	2,100	1,000,000	NC	NC	NC		3.2	1	< 0.61	0.87	1.1	NA	1.3	NA
Cadmium	2,000	2,800	4,300	NC	NC	NC		< 0.65	0.78	1.5	0.97	1.8	NA	29	NA
Calcium	NC	NC	NC	NC	NC	NC		19000	57000	71000	47000	38000	NA	16000	NA
Chromium	6,100	420	28**	24**	21**	NC		9.4	19	22	***26***	18	NA	18	NA
Cobalt	120,000	NC	NC	NC	NC	NC		7.8	6.6	10	16	8.2	NA	4.9	NA
Copper	82,000	NC	330,000	NC	NC	NC		25	56	41	85	300	NA	6700	NA
Cyanide	41,000	NC	120	120	120	NC		< 0.71	< 0.62	< 0.62	< 0.61	< 0.57	NA	< 0.67	NA
Iron	NC	NC	NC	NC	NC	NC		17000	24000	20000	30000	23000	NA	20000	NA
Lead	800	NC	1,420	1,420	3,760	NC		64	***31000***	550	100	270	7.7	***13000***	NA
Magnesium	NC	NC	NC	NC	NC	NC		8200	30000	39000	27000	17000	NA	2600	NA
Manganese	41,000	91,000	NC	NC	NC	NC		240	440	470	440	250	NA	180	NA
Mercury[c]	610	16	40	NC	NC	NC		0.11	0.25	0.26	0.19	0.26	NA	0.13	NA
Nickel	41,000	21,000	76,000	NC	NC	NC		40	21	25	52	26	NA	38	NA
Potassium	NC	NC	NC	NC	NC	NC		770	910	1500	2200	820	NA	640	NA
Selenium	10,000	NC	2.4	1.8	1.3	NC		< 1.3	< 1.1	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Silver	10,000	NC	110**	110**	110**	NC		< 1.3	1.3	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Sodium	NC	NC	NC	NC	NC	NC		3100	240	1700	1900	640	NA	460	NA
Thallium	160.0	NC	38	44	49	NC		< 1.3	< 22	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Vanadium	14,000	NC	980**	980**	980**	NC		25	31	37	35	24	NA	24	NA
Zinc	610,000	NC	110,000	NC	NC	NC		100	160	370	170	560	NA	5700	NA
pH	NC	NC	NC	NC	NC	NC		8.04	8.60	8.08	9.43	8.77	NA	8.17	NA
TCLP (mg/L)															
Arsenic	NC	NC	NC	NC	NC	0.2		NA	< 0.010	NA	NA	NA	NA	NA	NA
Iron	NC	NC	NC	NC	NC	5		<0.25	NA	NA	NA	NA	NA	NA	NA
Lead	NC	NC	NC	NC	NC	0.1		NA	0.023	NA	NA	NA	NA	***38***	0.007

NOTES

1. Total Metal results expressed in milligrams per kilogram (mg/kg). TCLP/SPLP results expressed in milligrams per kilogram (mg/L).
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. SCGW = Soil Component of the Groundwater
5. c = Inhalation Exposure Routes for Mercury excluded under footnote s of TACO Section 742, Appendix B, Table B. Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.
6. * = SCGW exposure route excluded under footnote "*m*" of TACO Section 742, Appendix B, Table B.

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 2e
Soil Analytical Results
Pesticides, Herbicides, and PCBs Compared to TACO Tier I Industrial/Commercial and SCGW Class II
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	INDUSTRIAL/ COMMERCIAL		SCGW	Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
				Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	*Class II*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
Pesticides										
4,4´-DDD	24	NC	80		< 0.0023	< 0.0020	< 0.0020	0.01	< 0.0018	< 0.0021
4,4´-DDE	17	NC	270		< 0.0023	< 0.0020	< 0.0020	0.023	< 0.0018	< 0.0021
4,4´-DDT	17	1,500	160		< 0.0023	< 0.0020	< 0.0020	0.035	< 0.0018	< 0.0021
Aldrin	0.3	6.6	2.5		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-BHC	0.9	1.5	0.003		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-Chlordane	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
beta-BHC	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Chlordane	16	140	48		< 0.023	< 0.020	< 0.020	< 0.020	< 0.018	< 0.021
delta-BHC	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Dieldrin	0.4	2.2	0.02		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan I	12,000	NC	90		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan II	12,000	NC	90		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan sulfate	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin	610	NC	5		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin aldehyde	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin ketone	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-BHC	4	NC	0.047		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-Chlordane	NC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor	1	11	110		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor epoxide	0.6	9.2	3.3		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Methoxychlor	10,000	NC	780		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Toxaphene	5.2	170	150		< 0.047	< 0.041	< 0.041	< 0.040	< 0.038	< 0.044
PCBs										
Aroclor 1016	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1221	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1232	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1242	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1248	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1254	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1260	NC	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Total PCBs	1	NC	NC		ND	ND	ND	ND	ND	ND

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. ND = Not Detected at the reporting limit
5. * = Appendix B, Table C, pH specific SROs
6. SCGW = Soil Component of the Groundwater

Sample result above TACO Industrial/Commercial Ingestion and/or Inhalation. Sample may also exceed SCGW.

Sample result above TACO SCGW Class II Ingestion Exposure Route screening criteria. Does not exceed TACO Industrial/Commercial.

TABLE 3a
Soil Analytical Results
VOCs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values			Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
				Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7
VOCs										
Acetone	25				< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	NA
Benzene	0.03				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Bromodichloromethane	0.6				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Bromoform	0.8				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Bromomethane	0.2				< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA
2-Butanone (Methyl Ethyl Ketone)	17				< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	NA
Carbon disulfide	9				< 0.092	< 0.065	< 0.054	< 0.076	< 0.080	NA
Carbon tetrachloride	0.07				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Chlorobenzene	1				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Chloroethane	NC				< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA
Chloroform	0.3				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Chloromethane	NC				< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA
Dibromochloromethane	0.4				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,1-Dichloroethane	23				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,2-Dichloroethane	0.02				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,1-Dichloroethene	0.06				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
cis-1,2-Dichloroethene	0.4				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
trans-1,2-Dichloroethene	0.7				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,2-Dichloropropane	0.03				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
cis-1,3-Dichloropropene	0.005				< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	NA
trans-1,3-Dichloropropene	0.005				< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	NA
Ethylbenzene	13				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
2-Hexanone	NC				< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	NA
4-Methyl-2-pentanone	NC				< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	NA
Methylene chloride	0.02				< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	NA
Methyl tert-butyl ether	0.32				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Styrene	4				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,1,2,2-Tetrachloroethane	NC				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Tetrachloroethene	0.06				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Toluene	12				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,1,1-Trichloroethane	2				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
1,1,2-Trichloroethane	0.02				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Trichloroethene	0.06				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Vinyl chloride	0.01				< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	NA
Xylenes, Total	5.6				< 0.028	< 0.019	< 0.016	< 0.023	< 0.024	NA

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.

TABLE 3a
Soil Analytical Results
VOCs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values			Sample	SB-06-01	SB-06-02
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021	12/29/2021
				Depth (ft)	3-4	7-8
VOCs						
Acetone	25				< 0.091	NA
Benzene	0.03				< 0.0061	NA
Bromodichloromethane	0.6				< 0.0061	NA
Bromoform	0.8				< 0.0061	NA
Bromomethane	0.2				< 0.012	NA
2-Butanone (Methyl Ethyl Ketone)	17				< 0.091	NA
Carbon disulfide	9				< 0.061	NA
Carbon tetrachloride	0.07				< 0.0061	NA
Chlorobenzene	1				< 0.0061	NA
Chloroethane	NC				< 0.012	NA
Chloroform	0.3				< 0.0061	NA
Chloromethane	NC				< 0.012	NA
Dibromochloromethane	0.4				< 0.0061	NA
1,1-Dichloroethane	23				< 0.0061	NA
1,2-Dichloroethane	0.02				< 0.0061	NA
1,1-Dichloroethene	0.06				< 0.0061	NA
cis-1,2-Dichloroethene	0.4				< 0.0061	NA
trans-1,2-Dichloroethene	0.7				< 0.0061	NA
1,2-Dichloropropane	0.03				< 0.0061	NA
cis-1,3-Dichloropropene	0.005				< 0.0024	NA
trans-1,3-Dichloropropene	0.005				< 0.0024	NA
Ethylbenzene	13				< 0.0061	NA
2-Hexanone	NC				< 0.024	NA
4-Methyl-2-pentanone	NC				< 0.024	NA
Methylene chloride	0.02				< 0.012	NA
Methyl tert-butyl ether	0.32				< 0.0061	NA
Styrene	4				< 0.0061	NA
1,1,2,2-Tetrachloroethane	NC				< 0.0061	NA
Tetrachloroethene	0.06				< 0.0061	NA
Toluene	12				< 0.0061	NA
1,1,1-Trichloroethane	2				< 0.0061	NA
1,1,2-Trichloroethane	0.02				< 0.0061	NA
Trichloroethene	0.06				< 0.0061	NA
Vinyl chloride	0.01				< 0.0061	NA
Xylenes, Total	5.6				< 0.018	NA

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.

TABLE 3b
Soil Analytical Results
SVOCs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values			Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
				Depth (ft)	2-3	3-4	4-5	3-4	3-4
SVOCs									
Aniline	NC				< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzidine	NC				< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Benzoic acid	400				< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
Benzyl alcohol	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethoxy)methane	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-chloroethyl)ether	0.66				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Bis(2-ethylhexyl)phthalate	46				< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
4-Bromophenyl phenyl ether	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Butyl benzyl phthalate	930				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Carbazole	0.6				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloroaniline	0.7				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chloro-3-methylphenol	NC				< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2-Chloronaphthalene	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Chlorophenol	1.5				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Chlorophenyl phenyl ether	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dibenzofuran	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,2-Dichlorobenzene	17				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,3-Dichlorobenzene	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
1,4-Dichlorobenzene	2				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3,3´-Dichlorobenzidine	1.3				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dichlorophenol	0.48				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Diethyl phthalate	470				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4-Dimethylphenol	9				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Dimethyl phthalate	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4,6-Dinitro-2-methylphenol	NC				< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
2,4-Dinitrophenol	3.3				< 1.2	< 1.0	< 1.0	< 1.0	< 9.5
2,4-Dinitrotoluene	0.25				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2,6-Dinitrotoluene	0.26				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Di-n-butyl phthalate	2300				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Di-n-octyl phthalate	1600				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobenzene	0.4				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorobutadiene	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachlorocyclopentadiene	1.1				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Hexachloroethane	0.5				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Isophorone	8				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylnaphthalene	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Methylphenol	15				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Methylphenol	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitroaniline	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
3-Nitroaniline	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitroaniline	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2-Nitrophenol	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
4-Nitrophenol	NC				< 0.47	< 0.41	< 0.41	< 0.40	< 3.8
Nitrobenzene	0.26				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodi-n-propylamine	0.0018				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
N-Nitrosodimethylamine	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
N-Nitrosodiphenylamine	1				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
2, 2'-oxybis(1-Chloropropane)	NC				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pentachlorophenol	0.02				< 0.047	< 0.041	< 0.041	< 0.040	< 0.38
Phenol	100				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
Pyridine	NC				< 0.95	< 0.81	< 0.84	< 0.82	< 7.7
1,2,4-Trichlorobenzene	5				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,5-Trichlorophenol	26				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9
2,4,6-Trichlorophenol	0.66				< 0.24	< 0.21	< 0.21	< 0.21	< 1.9

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.

TABLE 3b
Soil Analytical Results
SVOCs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values			Sample	SB-06-01
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021
				Depth (ft)	3-4
SVOCs					
Aniline	NC				< 0.44
Benzidine	NC				< 0.44
Benzoic acid	400				< 1.1
Benzyl alcohol	NC				< 0.23
Bis(2-chloroethoxy)methane	NC				< 0.23
Bis(2-chloroethyl)ether	0.66				< 0.23
Bis(2-ethylhexyl)phthalate	46				< 1.1
4-Bromophenyl phenyl ether	NC				< 0.23
Butyl benzyl phthalate	930				< 0.23
Carbazole	0.6				< 0.23
4-Chloroaniline	0.7				< 0.23
4-Chloro-3-methylphenol	NC				< 0.44
2-Chloronaphthalene	NC				< 0.23
2-Chlorophenol	1.5				< 0.23
4-Chlorophenyl phenyl ether	NC				< 0.23
Dibenzofuran	NC				< 0.23
1,2-Dichlorobenzene	17				< 0.23
1,3-Dichlorobenzene	NC				< 0.23
1,4-Dichlorobenzene	2				< 0.23
3,3´-Dichlorobenzidine	1.3				< 0.23
2,4-Dichlorophenol	0.48				< 0.23
Diethyl phthalate	470				< 0.23
2,4-Dimethylphenol	9				< 0.23
Dimethyl phthalate	NC				< 0.23
4,6-Dinitro-2-methylphenol	NC				< 0.44
2,4-Dinitrophenol	3.3				< 1.1
2,4-Dinitrotoluene	0.25				< 0.044
2,6-Dinitrotoluene	0.26				< 0.044
Di-n-butyl phthalate	2300				< 0.23
Di-n-octyl phthalate	1600				< 0.23
Hexachlorobenzene	0.4				< 0.23
Hexachlorobutadiene	NC				< 0.23
Hexachlorocyclopentadiene	1.1				< 0.23
Hexachloroethane	0.5				< 0.23
Isophorone	8				< 0.23
2-Methylnaphthalene	NC				< 0.23
2-Methylphenol	15				< 0.23
4-Methylphenol	NC				< 0.23
2-Nitroaniline	NC				< 0.23
3-Nitroaniline	NC				< 0.23
4-Nitroaniline	NC				< 0.23
2-Nitrophenol	NC				< 0.23
4-Nitrophenol	NC				< 0.44
Nitrobenzene	0.26				< 0.044
N-Nitrosodi-n-propylamine	0.0018				< 0.044
N-Nitrosodimethylamine	NC				< 0.23
N-Nitrosodiphenylamine	1				< 0.044
2, 2'-oxybis(1-Chloropropane)	NC				< 0.23
Pentachlorophenol	0.02				< 0.044
Phenol	100				< 0.23
Pyridine	NC				< 0.89
1,2,4-Trichlorobenzene	5				< 0.23
2,4,5-Trichlorophenol	26				< 0.23
2,4,6-Trichlorophenol	0.66				< 0.23

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.

TABLE 3c
Soil Analytical Results
PNAs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values				Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01	SB-06-02
	Populated MSA [4]	*City of Chicago* [5]	*Populated Non-MSA* [6]	*Non-Populated* [7]	**Date**	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
					Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4	7-8
PNAs													
Acenaphthene	570					< 0.047	0.044	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044	NA
Acenaphthylene	85					< 0.047	< 0.041	< 0.041	0.082	< 0.38	< 0.040	< 0.044	NA
Anthracene	12,000					< 0.047	0.18	0.065	0.12	0.65	< 0.040	< 0.044	NA
Benzo(a)anthracene	1.8	1.1	0.9			0.099	0.82	0.17	0.29	***2***	< 0.040	< 0.044	NA
Benzo(a)pyrene	2.1	1.3	0.98	0.09		***0.095***	***0.77***	***0.16***	***0.34***	**1.9**	< 0.040	< 0.044	NA
Benzo(b)fluoranthene	2.1	1.5	0.9			0.074	0.68	0.15	0.35	**1.6**	< 0.040	< 0.044	NA
Benzo(g,h,i)perylene	2,300					0.057	0.52	0.1	0.24	1	< 0.040	< 0.044	NA
Benzo(k)fluoranthene	9					0.076	0.51	0.12	0.33	1.7	< 0.040	< 0.044	NA
Chrysene	88					0.11	0.86	0.18	0.4	1.9	< 0.040	0.052	NA
Dibenzo(a,h)anthracene	0.42	0.2	0.15	0.09		< 0.047	**0.24**	0.05	***0.1***	***0.67***	< 0.040	< 0.044	NA
Fluoranthene	3,100					0.14	1.6	0.37	0.86	3.8	< 0.040	0.057	NA
Fluorene	560					< 0.047	0.049	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044	NA
Indeno(1,2,3-cd)pyrene	1.6	0.9				< 0.047	0.44	0.091	0.23	**0.92**	< 0.040	< 0.044	NA
Naphthalene	1.8					< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044	NA
Phenanthrene	210					0.12	0.97	0.31	0.46	2	< 0.040	0.072	NA
Pyrene	2,300					0.14	1.7	0.32	0.79	3.3	< 0.040	0.067	NA

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. Populated MSA = populated area in a MSA excluding Chicago
5. City of Chicago = Chicago corporate limits
6. Populated Non-MSA = populated area in a non-MSA county
7. Non-Populated = outside a populated area
8. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Populated Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Italicized	Sample result above CCDD Populated Non-MSA County MAC Values.
Bold Italicized	Sample result above CCDD Non-Populated Area MAC Values.

TABLE 3d
Soil Analytical Results
Inorganics and pH Compared to CCDD MAC Values

	CCDD MAC Values			Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01	SB-06-02
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
				Depth (ft)	2-3	3-4	4-5	3-4	3-4	6-7	3-4	7-8
Inorganics (mg/kg)												
Aluminum	9,500		9,200		7300	6600	8800	***12000***	5500	NA	5400	NA
Antimony	5				< 2.7	***150***	< 2.5	< 2.2	< 2.3	NA	***32***	NA
Arsenic	13		11.3		9.9	***150***	***12***	***13***	***15***	3.1	***17***	NA
Barium	1,500				86	95	190	46	140	NA	1200	NA
Beryllium	22				3.2	1	< 0.61	0.87	1.1	NA	1.3	NA
Cadmium	5.2				< 0.65	0.78	1.5	0.97	1.8	NA	***29***	NA
Calcium	NC				19000	57000	71000	47000	38000	NA	16000	NA
Chromium	21				9.4	19	***22***	***26***	18	NA	18	NA
Cobalt	20				7.8	6.6	10	16	8.2	NA	4.9	NA
Copper	2,900				25	56	41	85	300	NA	***6700***	NA
Cyanide	40				< 0.71	< 0.62	< 0.62	< 0.61	< 0.57	NA	< 0.67	NA
Iron	15,900		15,000		**17000***	***24000***	***20000***	***30000***	***23000***	NA	***20000***	NA
Lead	107				64	***31000***	***550***	100	***270***	7.7	***13000***	NA
Magnesium	325,000				8200	30000	39000	27000	17000	NA	2600	NA
Manganese	636		630		240	440	470	440	250	NA	180	NA
Mercury (Total)	0.89				0.11	0.25	0.26	0.19	0.26	NA	0.13	NA
Nickel	100				40	21	25	52	26	NA	38	NA
Potassium	NC				770	910	1500	2200	820	NA	640	NA
Selenium	1.3				< 1.3	< 1.1	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Silver	4.4				< 1.3	1.3	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Sodium	NC				3100	240	1700	1900	640	NA	460	NA
Thallium	2.6				< 1.3	< 22	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Vanadium	550				25	31	37	35	24	NA	24	NA
Zinc	5,100				100	160	370	170	560	NA	***5700***	NA
pH	6.25-9.0				8.04	8.60	8.08	9.43	8.77	NA	8.17	NA
TCLP (mg/L)												
Arsenic	0.05				NA	< 0.010	NA	NA	NA	NA	NA	NA
Iron	5				<0.25	NA	NA	NA	NA	NA	NA	NA
Lead	0.0075				NA	***0.023***	NA	NA	NA	NA	***38***	0.007

NOTES

1. NC = No toxicity criteria for this exposure route
2. NA = Not Analyzed
3. **Bold*** = Excluded under footnote m of the MAC Table
4. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.
	Sample result out of pH range for CCDD MAC Values.

TABLE 3e
Soil Analytical Results
Pesticides, Herbicides, and PCBs Compared to CCDD MAC Values
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CCDD MAC Values			Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
	MSA County	*City of Chicago*	*Non-MSA County*	**Date**	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
				Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
Pesticides										
4,4´-DDD	3				< 0.0023	< 0.0020	< 0.0020	0.01	< 0.0018	< 0.0021
4,4´-DDE	2				< 0.0023	< 0.0020	< 0.0020	0.023	< 0.0018	< 0.0021
4,4´-DDT	2				< 0.0023	< 0.0020	< 0.0020	0.035	< 0.0018	< 0.0021
Aldrin	0.94				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-BHC	0.0074				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-Chlordane	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
beta-BHC	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Chlordane	1.8				< 0.023	< 0.020	< 0.020	< 0.020	< 0.018	< 0.021
delta-BHC	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Dieldrin	0.603				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan I	18				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan II	18				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan sulfate	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin	1				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin aldehyde	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin ketone	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-BHC	0.009				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-Chlordane	NC				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor	0.871				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor epoxide	1.005				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Methoxychlor	160				< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Toxaphene	0.6				< 0.047	< 0.041	< 0.041	< 0.040	< 0.038	< 0.044
PCBs										
Aroclor 1016	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1221	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1232	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1242	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1248	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1254	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1260	NC				< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Total PCBs	1				ND	ND	ND	ND	ND	ND

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. ND = Not Detected at the reporting limit
5. Metropolitan Statistical Areas (MSA) as defined in Board Note, 35 IAC 742. Appendix A, Table G)

Bold Italicized	Sample result above CCDD Metropolitan Statistical Areas (MSA) County MAC Values.
Bold	Sample result above CCDD City of Chicago MAC Values.
Bold Italicized	Sample result above CCDD Non-MSA County MAC Values.

TABLE 4a
Soil Analytical Results
VOCs Compared to Construction Worker SROs
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CONSTRUCTION WORKER		Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
			Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
VOCs									
Acetone	NC	100,000		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	< 0.091
Benzene	2,300	2.2		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromodichloromethane	2,000	3,000		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromoform	16,000	140		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Bromomethane	1,000	3.9		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
2-Butanone (Methyl Ethyl Ketone)	NC	NC		< 0.14	< 0.097	< 0.081	< 0.11	< 0.12	< 0.091
Carbon disulfide	20,000	9		< 0.092	< 0.065	< 0.054	< 0.076	< 0.080	< 0.061
Carbon tetrachloride	410	0.9		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chlorobenzene	4,100	1.3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chloroethane	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Chloroform	2,000	0.76		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Chloromethane	NC	NC		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Dibromochloromethane	41,000	1,300		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1-Dichloroethane	200,000	130		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,2-Dichloroethane	1,400	0.99		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1-Dichloroethene	10,000	3		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
cis-1,2-Dichloroethene	20,000	1,200		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
trans-1,2-Dichloroethene	41,000	3,100		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,2-Dichloropropane	1,800	0.5		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
cis-1,3-Dichloropropene	1,200	0.39		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	< 0.0024
trans-1,3-Dichloropropene	1,200	0.39		< 0.0037	< 0.0026	< 0.0021	< 0.0031	< 0.0032	< 0.0024
Ethylbenzene	20,000	58		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
2-Hexanone	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	< 0.024
4-Methyl-2-pentanone	NC	NC		< 0.037	< 0.026	< 0.021	< 0.031	< 0.032	< 0.024
Methylene chloride	12,000	34		< 0.018	< 0.013	< 0.011	< 0.015	< 0.016	< 0.012
Methyl tert-butyl ether	2,000	140		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Styrene	41,000	430		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,2,2-Tetrachloroethane	NC	NC		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Tetrachloroethene	2,400	28		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Toluene	410,000	42		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,1-Trichloroethane	NC	1,200		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
1,1,2-Trichloroethane	8,200	1,800		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Trichloroethene	1,200	12		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Vinyl chloride	170	1.1		< 0.0092	< 0.0065	< 0.0054	< 0.0076	< 0.0080	< 0.0061
Xylenes, Total	41,000	5.6		< 0.028	< 0.019	< 0.016	< 0.023	< 0.024	< 0.018

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed

Sample result above TACO Construction Worker Ingestion and/or Inhalation.

TABLE 4b
Soil Analytical Results
SVOCs Compared to Construction Worker SROs

	CONSTRUCTION WORKER		Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
			Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
SVOCs									
Aniline	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8	< 0.44
Benzidine	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8	< 0.44
Benzoic acid	820,000	NC		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5	< 1.1
Benzyl alcohol	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Bis(2-chloroethoxy)methane	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Bis(2-chloroethyl)ether	75	0.66		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Bis(2-ethylhexyl)phthalate	4,100	31,000		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5	< 1.1
4-Bromophenyl phenyl ether	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Butyl benzyl phthalate	410,000	930		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Carbazole	6,200	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Chloroaniline	820	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Chloro-3-methylphenol	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8	< 0.44
2-Chloronaphthalene	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2-Chlorophenol	10,000	53,000		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Chlorophenyl phenyl ether	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Dibenzofuran	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
1,2-Dichlorobenzene	18,000	310		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
1,3-Dichlorobenzene	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
1,4-Dichlorobenzene	NC	340		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
3,3´-Dichlorobenzidine	280	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2,4-Dichlorophenol	610	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Diethyl phthalate	1,000,000	2,000		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2,4-Dimethylphenol	41,000	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Dimethyl phthalate	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4,6-Dinitro-2-methylphenol	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8	< 0.44
2,4-Dinitrophenol	410	NC		< 1.2	< 1.0	< 1.0	< 1.0	< 9.5	< 1.1
2,4-Dinitrotoluene	180	NC		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
2,6-Dinitrotoluene	180	NC		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
Di-n-butyl phthalate	200,000	2,300		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Di-n-octyl phthalate	4,100	10,000		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Hexachlorobenzene	78	2.6		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Hexachlorobutadiene	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Hexachlorocyclopentadiene	14,000	1.1		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Hexachloroethane	2,000	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Isophorone	410,000	4,600		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2-Methylnaphthalene	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2-Methylphenol	100,000	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Methylphenol	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2-Nitroaniline	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
3-Nitroaniline	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Nitroaniline	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2-Nitrophenol	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
4-Nitrophenol	NC	NC		< 0.47	< 0.41	< 0.41	< 0.40	< 3.8	< 0.44
Nitrobenzene	1,000	9.4		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
N-Nitrosodi-n-propylamine	18	NC		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
N-Nitrosodimethylamine	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
N-Nitrosodiphenylamine	25,000	NC		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
2, 2'-oxybis(1-Chloropropane)	NC	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Pentachlorophenol	520	NC		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.044
Phenol	61,000	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
Pyridine	NC	NC		< 0.95	< 0.81	< 0.84	< 0.82	< 7.7	< 0.89
1,2,4-Trichlorobenzene	2,000	920		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2,4,5-Trichlorophenol	200,000	NC		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23
2,4,6-Trichlorophenol	11,000	540		< 0.24	< 0.21	< 0.21	< 0.21	< 1.9	< 0.23

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed

Sample result above TACO Construction Worker Ingestion and/or Inhalation.

TABLE 4c
Soil Analytical Results
PNAs Compared to Construction Worker SROs
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CONSTRUCTION WORKER		Sample Date	SB-01-01 12/29/2021	SB-02-01 12/29/2021	SB-03-01 12/29/2021	SB-04-01 12/29/2021	SB-05-01 12/29/2021	SB-05-02 12/29/2021	SB-06-01 12/29/2021
	Ingestion	*Inhalation*	**Depth (ft)**	2-3	3-4	4-5	3-4	3-4	6-7	3-4
PNAs										
Acenaphthene	120,000	NC		< 0.047	0.044	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Acenaphthylene	NC	NC		< 0.047	< 0.041	< 0.041	0.082	< 0.38	< 0.040	< 0.044
Anthracene	610,000	NC		< 0.047	0.18	0.065	0.12	0.65	< 0.040	< 0.044
Benzo(a)anthracene	170	NC		0.099	0.82	0.17	0.29	2	< 0.040	< 0.044
Benzo(a)pyrene	17	NC		0.095	0.77	0.16	0.34	1.9	< 0.040	< 0.044
Benzo(b)fluoranthene	170	NC		0.074	0.68	0.15	0.35	1.6	< 0.040	< 0.044
Benzo(g,h,i)perylene	NC	NC		0.057	0.52	0.1	0.24	1	< 0.040	< 0.044
Benzo(k)fluoranthene	1,700	NC		0.076	0.51	0.12	0.33	1.7	< 0.040	< 0.044
Chrysene	17,000	NC		0.11	0.86	0.18	0.4	1.9	< 0.040	0.052
Dibenzo(a,h)anthracene	17	NC		< 0.047	0.24	0.05	0.1	0.67	< 0.040	< 0.044
Fluoranthene	82,000	NC		0.14	1.6	0.37	0.86	3.8	< 0.040	0.057
Fluorene	82,000	NC		< 0.047	0.049	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Indeno(1,2,3-cd)pyrene	170	NC		< 0.047	0.44	0.091	0.23	0.92	< 0.040	< 0.044
Naphthalene	4,100	1.8		< 0.047	< 0.041	< 0.041	< 0.040	< 0.38	< 0.040	< 0.044
Phenanthrene	NC	NC		0.12	0.97	0.31	0.46	2	< 0.040	0.072
Pyrene	61,000	NC		0.14	1.7	0.32	0.79	3.3	< 0.040	0.067

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed

Sample result above TACO Construction Worker Ingestion and/or Inhalation.

TABLE 4d
Soil Analytical Results
Inorganics and pH Compared to Construction Worker SROs
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CONSTRUCTION WORKER		Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-05-02	SB-06-01	SB-06-02
			Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
Inorganics (mg/kg)	*Ingestion*	*Inhalation*	**Depth (ft)**	2-3	3-4	4-5	3-4	3-4	6-7	3-4	7-8
Aluminum	NC	NC		7300	6600	8800	12000	5500	NA	5400	NA
Antimony	82	NC		< 2.7	***150***	< 2.5	< 2.2	< 2.3	NA	32	NA
Arsenic	61	25,000		9.9	***150***	12	13	15	3.1	17	NA
Barium	14,000	870,000		86	95	190	46	140	NA	1200	NA
Beryllium	410	44,000		3.2	1	< 0.61	0.87	1.1	NA	1.3	NA
Cadmium	200	59,000		< 0.65	0.78	1.5	0.97	1.8	NA	29	NA
Calcium	NC	NC		19000	57000	71000	47000	38000	NA	16000	NA
Chromium	4,100	690		9.4	19	22	26	18	NA	18	NA
Cobalt	12,000	NC		7.8	6.6	10	16	8.2	NA	4.9	NA
Copper	8,200	NC		25	56	41	85	300	NA	6700	NA
Cyanide	4,100	NC		< 0.71	< 0.62	< 0.62	< 0.61	< 0.57	NA	< 0.67	NA
Iron	NC	NC		17000	24000	20000	30000	23000	NA	20000	NA
Lead	700	NC		64	***31000***	550	100	270	7.7	***13000***	NA
Magnesium	730,000	NC		8200	30000	39000	27000	17000	NA	2600	NA
Manganese	4,100	8,700		240	440	470	440	250	NA	180	NA
Mercury[c]	61	0.1		***0.11***	***0.25***	***0.26***	***0.19***	***0.26***	NA	***0.13***	NA
Nickel	4,100	440,000		40	21	25	52	26	NA	38	NA
Potassium	NC	NC		770	910	1500	2200	820	NA	640	NA
Selenium	1,000	NC		< 1.3	< 1.1	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Silver	1,000	NC		< 1.3	1.3	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Sodium	NC	NC		3100	240	1700	1900	640	NA	460	NA
Thallium	160	NC		< 1.3	< 22	< 1.2	< 1.1	< 1.1	NA	< 1.2	NA
Vanadium	1,400	NC		25	31	37	35	24	NA	24	NA
Zinc	61,000	NC		100	160	370	170	560	NA	5700	NA
pH	NC	NC		8.04	8.60	8.08	9.43	8.77	NA	8.17	NA
TCLP (mg/L)											
Arsenic	NC	NC		NA	< 0.010	NA	NA	NA	NA	NA	NA
Iron	NC	NC		<0.25	NA	NA	NA	NA	NA	NA	NA
Lead	NC	NC		NA	0.023	NA	NA	NA	NA	38	0.007

NOTES

1. Total Metal results expressed in milligrams per kilogram (mg/kg). TCLP/SPLP results expressed in milligrams per kilogram (mg/L).
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed
4. [c] = Inhalation Exposure Routes for Mercury excluded under footnote s of the TACO Appendix B Table B of Section 742. Inhalation remediation objective only applies at sites where elemental mercury is a contaminant of concern.

Sample result above TACO Construction Worker Ingestion and/or Inhalation.

TABLE 4e
Soil Analytical Results
Pesticides, Herbicides, and PCBs Compared to Construction Worker SROs
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

	CONSTRUCTION WORKER		Sample	SB-01-01	SB-02-01	SB-03-01	SB-04-01	SB-05-01	SB-06-01
			Date	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021	12/29/2021
	Ingestion	*Inhalation*	Depth (ft)	2-3	3-4	4-5	3-4	3-4	3-4
Pesticides									
4,4´-DDD	520	NC		< 0.0023	< 0.0020	< 0.0020	0.01	< 0.0018	< 0.0021
4,4´-DDE	370	NC		< 0.0023	< 0.0020	< 0.0020	0.023	< 0.0018	< 0.0021
4,4´-DDT	100	2,100		< 0.0023	< 0.0020	< 0.0020	0.035	< 0.0018	< 0.0021
Aldrin	6.1	9.3		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-BHC	20	2.1		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
alpha-Chlordane	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
beta-BHC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Chlordane	100	22		< 0.023	< 0.020	< 0.020	< 0.020	< 0.018	< 0.021
delta-BHC	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Dieldrin	7.8	3.1		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan I	1,200	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan II	1,200	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endosulfan sulfate	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin	61	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin aldehyde	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Endrin ketone	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-BHC	96	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
gamma-Chlordane	NC	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor	28	16		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Heptachlor epoxide	2.7	13		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Methoxychlor	1,000	NC		< 0.0023	< 0.0020	< 0.0020	< 0.0020	< 0.0018	< 0.0021
Toxaphene	110	240		< 0.047	< 0.041	< 0.041	< 0.040	< 0.038	< 0.044
PCBs									
Aroclor 1016	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1221	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1232	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1242	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1248	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1254	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Aroclor 1260	NC	NC		< 0.11	< 0.098	< 0.10	< 0.098	< 0.091	< 0.11
Total PCBs	1	NC		ND	ND	ND	ND	ND	ND

NOTES

1. All results expressed in milligrams per kilogram (mg/kg)
2. NC = No toxicity criteria for this exposure route
3. NA = Not Analyzed

Sample result above TACO Construction Worker Ingestion and/or Inhalation.

TABLE 1
Soil Analytical Results
TCLP Inorganics (LEAD)
Evanston Animal Shelter, 2310 Oakton Street, Evanston, IL 60202

Inorganics	Toxicity Concentration / Hazardous	Sample Date	B-06-01 4/6/2022	B-06A-01 4/6/2022	B-06B-01 4/6/2022	B-06C-01 4/6/2022	B-06D-01 4/6/2022	B-06I-01 4/6/2022
		Depth (ft)	4-5	3-4	3-4	3-4	3-4	3-4
TCLP (mg/L)								
Lead	5		0.029	0.014	0.069	0.017	< 0.0050	0.00969

NOTES
1. Total Metal results expressed in milligrams per kilogram (mg/kg). TCLP/SPLP results expressed in milligrams per kilogram (mg/L).

PHYSICAL PROPERTIES OF THE GEOTEXTILE FABRIC

Physical Property	Test Method	Minimum Average Value
Grab Tensile Strength	ASTM D4632	205 lbs
Grab Tensile Elongation @ Break %	ASTM D4632	50%
Trapezoid Tear Strength	ASTM D4533	80 lbs
CBR Puncture Strength	ASTM D6241	500 lbs
Apparent Opening Size	ASTM D4751	0.180 mm
Permittivity	ASTM D4491	1.4 sec^{-1}
Flow Rate	ASTM D4491	95 $gal/min/ft^2$
UV Resistance (at 500 hours)	ASTM D4355	70% strength retained

SECTION 02318 – ACCEPTANCE OF BACKFILL, TOP SOIL & CU STRUCTURAL SOIL

PART 1 - GENERAL

1.1 APPLICABILITY

A. This specification is for the historical review, collection and laboratory analysis of representative samples, and presentation of information for all off-site fill (cohesive and granular) sources to be utilized at the project site.

1.2 DEFINITIONS

A. Agency means Illinois Environmental Protection Agency (IEPA).

B. Backfill means any granular or cohesive material used to fill an excavation or bring property to design grade as specified in the Architect/Engineer drawings and specifications.

C. CU Structural Soil means a uniformly blended mixture of crushed stone, clay, loam and hydrogel by weight consisting of approximately 83% crushed limestone (3/4 to 1.5 inch, highly angular with no fines), 17% clay loam and hydrogel (1 oz. per 200 pounds of stone).

D. IEPA means Illinois Environmental Protection Agency

E. Owner: City of Evanston.

F. Owner’s Authorized Representative means the person designated as the official representative of the owner in connection with a project.

H. Environmental Consultant (EC) means the entity with overall responsibility for the direction and control of the environmental investigations, assessments, designs, and supervision of remediation work typically hired by the Owner.

I. Top Soil means any soils placed to design grade and used to promote vegetative growth and which meets Top Soil criteria (percentages of organic matter, inorganic matter (silt, clay, and sand)), deleterious material, pH, and mineral and plant-nutrient content as referenced in the contract specifications and drawings.

1.3 SUBMITTALS

A. Copies of environmental analytical results of all backfill material, top soil and CU Structural Soil verifying that these materials do not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed parameters know as PNAs, Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. For samples from virgin sources,

one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. A copy of the analytical results shall be submitted at least one week prior to depositing backfill or top soil on site. The date of the analysis shall be within 60 days of importing such material to the project.

B. For granular materials originating from a licensed stone quarry (virgin source) a source certification letter from the quarry owner/operator may be substituted instead of laboratory analysis, at the sole discretion of the owner.

C. A summary of the sample collection and data analysis. The report should include a tabulation of sampling results compared to applicable Tier 1 remediation objectives for residential properties.

D. Name and address and telephone number of the analytical testing laboratory that will be used by the Contractor to perform the environmental analytical testing for backfill, top soil and CU Structural Soil samples prior to starting work. The laboratory performing the analysis must be an IEPA accredited laboratory.

E. Name, Company, Address and Telephone number of consultant who performed sampling analysis and their specific handling criteria for each sample collected.

F. Source of all imported materials including but not limited to the address of the source site, the name of the owner of the source materials, the location where the source materials derived from at the source site, phone number of the owner of the source materials, history of the site usage (i.e. farm, residential, industrial/commercial, etc.)

G. Report defining the current and historic uses of the clean soil source material to determine if the potential for any source contamination is present.

H. Copies of all daily reports, transport records and receipts to the owner Authorized Representative on a daily basis.

1.4 SUBMITTAL REVIEW

A. Review of submittals or any comments made does not relieve the Contractor from compliance with the requirements of the drawings and specifications. The purpose of this check is to review for general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions; electing techniques of construction; coordinating the Work; and performing the Work in a safe and satisfactory manner.

B. The Contractor must not begin any Work applicable to this section until all required submittals have been reviewed and accepted by the owner Authorized representative.

PART 2 - PRODUCTS

2.1. BACKFILL, TOP SOIL, CU STRUCTURAL SOIL

A. The contractor shall supply only backfill, top soil and CU Structural Soil that does not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed parameters known as PNAs Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the environmental analysis of any backfill, top soil or CU Structural Soil shall be within 60 days of importing such material to the project site.

B. A summary of the sample collection and data analysis. The report should include a tabulation of sampling results compared to applicable Tier 1 remediation objectives for residential properties.

PART 3 - EXECUTION

3.1 AUTHORIZATIONS

A. Haulers for transportation of backfill, top soil or CU Structural Soil shall hold and present upon request a current, valid Commercial Driver's License (CDL).

B. Contractor shall have written approval from the owner Authorized Representative prior to importing any backfill, top soil, or CU Structural Soil to the site.

3.2 MATERIAL SAMPLING

A. The Contractor shall collect sufficient amount of representative (no composite samples) backfill, top soil and CU Structural Soil sample(s) for analytical testing sufficient to verify that these materials do not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed parameters known as PNAs, Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. The contractor is responsible for payment of all backfill, top soil and CU Structural Soil sampling and analytical fees.

B. The EC may collect backfill, top soil or CU Structural Soil samples for laboratory analysis on behalf of the contractor at no additional cost to the project.

C. The EC may need to collect samples for laboratory analysis or field Photo-ionization Detector (PID) screening, or liquid samples for laboratory analysis (as required by the owner in special circumstances.) The Contractor shall provide the necessary equipment and manpower to assist the EC to collect materials to be sampled at no additional cost to the project and in compliance with OSHA and all other Rules and Regulations.

3.3 HAULING

A. The Contractor shall not create dust and shall maintain adequate dust suppression equipment on site if conditions warrant.

B. The Contractor shall maintain streets clean and free of mud and dirt.

C. The Contractor shall place backfill, top soil and CU Structural Soil to ensure minimum interference with roads; streets, walks and other adjacent occupied and used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the applicable governing agency and the owner Authorized Representative. Provide alternate routes around closed or obstructed traffic ways if required by the governing agency.

3.4 TRANSPORTATION

A. The Contractor shall provide and complete copies of all daily reports, weight tickets and receipts (as applicable) for transportation and ultimate placement of the backfill, top soil, and CU Structural Soil to the owner Authorized Representative, Project Manager and/or EC for review and signature within five (5) business days or as directed by the owner Authorized Representative.

B. The Contractor shall maintain all applicable or potentially affected streets from their operations clean and free of mud and dirt.

C. The Contractor shall schedule placement of backfill, top soil, and CU Structural Soil to ensure minimum interference with roads; streets, walks and other adjacent occupied and used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the applicable governing agency and the Owner. Provide alternate routes around closed or obstructed traffic ways if required by the governing agency.

3.5 BACKFILL

A. The backfill material shall be granular or cohesive material that meets the project specified requirements.

B. For each off-site source of backfill materials, the Contractor shall provide to the owner Authorized Representative, Project Manager and/or EC as required, environmental laboratory analyses and certification that the imported backfill does not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed PNAs known as PNAs, Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. For samples from virgin sources, one representative sample must be analyzed for Appendix B, Section 742 Table A parameters. For samples from recycled sources, one sample per

500 cubic yards of material must be analyzed for Appendix B, Section 742 Table A parameters. The date of the analysis of any backfill shall be within sixty (60) days of importing such material to the project site.

C. The contractor shall not import and/or place backfill material without approval of the owner Authorized Representative. If the Contractor imports backfill material and/or backfills the excavation area without obtaining approval from the owner Authorized Representative, the backfill materials shall be excavated and disposed off site as per project specifications Section 02316, if required, at the Contractor's expense.

3.6 TOP SOIL

A. The Top Soil material shall meet the project specified requirements as referenced in the project documents

B. For each off-site source of top soil, the Contractor shall provide to the owner Authorized Representative as required, environmental laboratory analyses and certification that the imported top soil does not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed PNAs known as PNAs, Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. For samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the analysis of any backfill top soil shall be within sixty (60) days of importing such material to the project site.

C. The contractor shall not import and/or place top soil without approval of the owner Authorized Representative. If the Contractor imports and/or places top soil without obtaining approval from the owner Authorized Representative, the top soil shall be excavated and disposed off site as per project specifications Section 02316, if required, at the Contractor's expense.

3.7 CU STRUCTURAL SOIL

A. CU Structural Soil shall consist of a uniformly blended mixture of crushed stone, clay, loam and hydrogel by weight consisting of approximately 83% crushed limestone (3/4 to 1.5 inch, highly angular with no fines), 17% clay loam and hydrogel (1 oz. per 200 pounds of stone).

B. For each off-site source of CU Structural Soil, the Contractor shall provide to the owner Authorized Representative, Project Manager and/or EC, as required, environmental laboratory analyses and certification that the imported materials do not exceed APPENDIX B, SECTION 742, TABLE A; TIERED APPROACH TO CORRECTIVE ACTION OBJECTIVES (TACO): 35 ILL. ADM. CODE 742 values for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For Target Compound Listed PNAs known as PNAs, Appendix A Table H (Concentrations of Polynuclear Hydrocarbon Chemicals in background Soils) values may be used. For

samples from virgin sources, one representative sample must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. For samples from recycled sources, one sample per 500 cubic yards of material must be analyzed for 35 ILL. ADM CODE 740 APPENDIX A Target Compound List (TCL) parameters. The date of the analysis of any CU Structural Soil shall be within sixty (60) days of importing such material to the project site.

C. The contractor shall not import and/or place CU Structural Soil without approval of the owner Authorized Representative. If the Contractor imports and/or places CU Structural Soil without obtaining approval from the owner Authorized Representative, the CU Structural Soil shall be excavated and disposed off site as per project specifications Section 02316, if required, at the Contractor's expense.

3.8 DUST CONTROL

A. The Contractor shall control dust by all necessary means, including but not limited to covering trucks, stockpiles and open materials, watering haul roads, sweeping paved roads, and limiting the speed of all on-site vehicles.

B. The Contractor shall prevent vehicles from tracking mud off site. Contractor shall perform all necessary activities to keep roadways clean throughout each day and for the duration of the project.

3.9 QUALITY CONTROL

A. The Contractor shall take all necessary precautions to protect structures, equipment, pavement, walks and utilities against movement or settlement during the course of work.

B. Damages: Promptly replace or repair any damage caused to adjacent pavement, utilities or facilities by removal operations at no additional cost. Work shall be performed to the satisfaction of the OWNER Authorized Representative.

C. Utility Services: Maintain existing utilities and protect against damage during placement of backfill, top soil and CU Structural Soil.

D. Visual Inspections: Perform visual inspections of each load of imported material to ensure that it is in conformance with the approved source and reject any material that has not been approved.

E. Submittal Timeframe Compliance: Ensure that approved source data submitted is in compliance with time frames specified.

F. Imported Material Inspections: Perform periodic checks of fill source locations to identify any change in material characteristics, as applicable.

END OF SECTION 02318

SECTION 21 0553 - FIRE SUPPRESSION IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Identification of products installed under Division 21.

1.2 REFERENCES

A. ANSI/ASME A13.1 - Scheme for the Identification of Piping Systems.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. 3M

B. Bunting

C. Calpico

D. Craftmark

E. Emedco

F. Kolbi Industries

G. Seton

H. W.H. Brady

I. Marking Services.

2.2 MATERIALS

A. All pipe markers (purchased or stenciled) shall conform to ANSI A13.1. Marker lengths and letter sizes shall be at least the following:

OD of Pipe or Insulation	Marker Length	Size of Letters
Up to and including 1-1/4"	8"	1/2"
1-1/2" to 2"	8"	3/4"
2-1/2" to 6"	12"	1-1/4"
8" to 10"	24"	2-1/2"
Over 10"	32"	3-1/2"

Plastic tags may be used for outside diameters under 3/4"

B. Plastic Nameplates: Laminated three-layer phenolic with engraved black, 1/4" minimum letters on light contrasting background.

C. Plastic Tags: Minimum 1-1/2" square or round laminated three-layer phenolic with engraved, 1/4" minimum black letters on light contrasting background.

D. Plastic Pipe Markers: Semi-rigid plastic, preformed to fit around pipe or pipe covering; indicating flow direction and fluid conveyed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all products per manufacturer's recommendations.

B. Degrease and clean surfaces to receive adhesive for identification materials.

C. Valves:

1. All valves (except shutoff valves at equipment) shall have numbered tags.
2. Provide or replace numbered tags on all existing valves that are connected to new systems or that have been revised.
3. Provide all existing valves used to extend utilities to this project with numbered tags. Review tag numbering sequence with the Owner prior to ordering tags.
4. Secure tags with heavy duty key chain and brass "S" link or with mechanically fastened plastic straps.
5. Attach to handwheel or around valve stem. On lever operated valves, drill the lever to attach tags.
6. Number all tags and show the service of the pipe.
7. Provide one Plexiglas framed valve directory listing all valves, with respective tag numbers, uses and locations. Mount directory in location chosen by the Architect/Engineer.

D. Pipe Markers:

1. Snap-on Markers: Use Seton "Setmark" on pipes up to 5-7/8" OD. Use Seton "Setmark" with nylon or Velcro ties for pipes 6" OD and over. Similar styles by other listed manufacturers are acceptable.

2. Apply markers and arrows in the following locations where clearly visible:

   a. At each valve.
   b. On both sides of walls that pipes penetrate.
   c. At least every 20 feet along all pipes.
   d. On each riser and each leg of each "T" joint.
   e. At least once in every room and each story traversed.

E. Equipment:

1. All equipment not easily identifiable such as controls, relays, gauges, etc.; and all equipment in an area remote from its function shall have nameplates or plastic tags listing name, function, and drawing symbol. Do not label exposed equipment in public areas.
2. Fasten nameplates or plastic tags with stainless steel self-tapping screws or permanently bonding cement.
3. Mechanical equipment that is not covered by the U.S. National Appliance Energy Conservation Act (NAECA) of 1987 shall carry a permanent label installed by the manufacturer stating that the equipment complies with the requirements of ASHRAE 90.1.

3.2 SCHEDULE

A. Pipes to be marked shall be labeled with text shown as follows, regardless of which method or material is used:

1. FIRE PROTECTION WATER: White lettering; red background
2. SPRINKLER WATER: White lettering; red background
3. DRY PIPE SYSTEM: White lettering; red background

B. All piping downstream of the fire protection backflow preventer, upstream of sprinkler zone valves, standpipe piping, and combination sprinkler standpipe piping shall be labeled Fire Protection Water. All piping downstream of sprinkler zone valves shall be labeled Sprinkler Water.

END OF SECTION

SECTION 21 1302 - FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe, Fittings, Valves, and Connections for Fire Protection System.

B. Wet-Pipe Sprinkler System.

C. Dry-Pipe Sprinkler System.

1.2 QUALITY ASSURANCE

A. Welding Materials and Procedures: Conform to ASME Code.

B. Equipment and Components: Bear UL label or marking.

C. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body. Pressure rating shall match specified pipe system pressure rating. Remanufactured valves are not acceptable.

D. Specialist Firm: Company specializing in sprinkler systems with minimum three years' experience.

E. Sprinkler design drawings submitted by the Contractor shall be prepared by a NICET Water-Based Fire Protection Systems Layout Level III or Level IV designer or PE.

1.3 REFERENCES

A. ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.

B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings, Class 150 and 300.

C. ANSI/ASME B16.4 - Cast Iron Threaded Fittings, Class 125 and 250.

D. ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings.

E. ANSI/ASME B16.9 - Factory-made Wrought Steel Butt-Welding Fittings.

F. ANSI/ASME B16.11 - Forged Steel Fittings, Socket-Welding and Threaded.

G. ANSI/ASME B16.25 - Butt-Welding Ends.

H. ANSI/ASME B36.10 - Welded and Seamless Wrought Steel Pipe.

I. ANSI/ASME Section 9 - Welding and Brazing Qualifications.

J. ANSI/ASTM A47 - Malleable Iron Castings.

K. ANSI/ASTM A135 - Electric-Resistance-Welded Steel Pipe.

L. ANSI/AWWA C110 - Ductile Iron and Gray Iron Fittings.

M. ANSI/AWWA C151 - Ductile Iron Pipe, Centrifugally Cast.

N. ASME - Boiler and Pressure Vessel Code - Section IX, Welding and Brazing Requirements.

O. ASTM A153 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless.

P. AWS B2.2 - Standard for Brazing Procedure and Performance Qualification.

Q. AWS D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

R. IBC - International Building Code.

S. MSS SP-73 - Brazing Joints for Wrought and Cast Copper Alloy Solder Joint and Pressure Fittings.

T. NFPA 101 - Life Safety Code,

U. NFPA 13 - Standard for the Installation of Sprinkler Systems.

V. NFPA 25 - Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

W. UL - Underwriter's Laboratory Fire Protection Equipment Directory.

1.4 SUBMITTALS

A. Submit shop drawings per Section 21 0500. Indicate pipe materials, joining methods, supports, floor and wall penetration seals, sprinklers, equipment data and ratings, and hydraulic calculations.

B. Submit detailed pipe and sprinkler layout and other calculations and forms as described in NFPA 13.

C. Submit detailed working drawings and obtain review of them in the following order:
1. Engineer/Architect/State Fire Marshal/Authority Having Jurisdiction
2. Owner's Insurance Company

D. Working drawings shall include piping and sprinkler layout, sprinkler types and ratings, sections and elevations at critical points. Show coordination with lighting, ductwork, and diffusers, and indicate basic flow and hydraulic design information, including main location and date that the test was taken.

E. Submit dry-pipe calculations including water delivery time and air supply refill defined in NFPA 13. Water delivery time and air supply shall meet the requirements set forth in NFPA 13.

F. Submit electrical power/controls wiring diagrams and product data indicating general assembly, components, safety controls, and service connections.

G. Provide the Owner with one copy of NFPA 25. Standard for the Inspection Testing and Maintenance of Water-based Fire Protection Systems.

1.5 EXTRA STOCK

A. Provide metal storage cabinet, wrenches for each sprinkler type, and extra sprinklers per NFPA 13 and applicable building code.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store valves and sprinklers in shipping containers, with labels in place.

B. Provide temporary protective coating on iron and steel valves.

C. Maintain temporary end caps and closures in place until installation.

1.7 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

A. Furnish sleeves to General Contractor for placement in walls and floors. Sleeve location to be determined by the Fire Protection Contractor prior to construction. If additional sleeves are required, they shall be core drilled by the Fire Protection Contractor.

1.8 SYSTEM DESCRIPTION

A. Contractor shall design and install the following water-based fire protection systems for the areas noted on the contract documents:

1. Wet pipe sprinkler systems
2. Dry pipe sprinkler systems

B. Sprinkler systems shall be designed and installed according to the following standard(s):

1. NFPA 13 - Standard for the Installation of Sprinkler Systems

C. System design and installation shall include all requirements by the Authority Having Jurisdiction, local and state building codes, and Owner's insurance company in addition to the previously listed design standard(s). Those requirements shall take precedence over the contract documents in the case of discrepancies.

D. Systems shall be hydraulically calculated in accordance with the applicable design standard(s). Contractor is responsible for final pipe sizing based on results from hydraulic calculations. Pipe sizing shown on drawings for service entrance and main risers is preliminary and for coordination purposes only.

E. The water supply source for this project is the following:

1. Public waterworks system.
2. The system design shall be based on water supply information provided on the contract drawings. Supply shall be presumed to be at the point of connection to existing water supply infrastructure unless noted otherwise. The Fire Protection Contractor is responsible to verify this information and conduct all tests required. Base all pipe sizing and hydraulic calculations on flow test data no older than 6 months.
3. System design shall be based on the following water supply information. Supply shall be presumed to be at the point of connection to existing water supply infrastructure unless noted otherwise. The Fire Protection Contractor is responsible to verify this information and conduct all tests required. Base all pipe sizing and hydraulic calculations on flow test data no older than 6 months.

    a. Date of Test: 3/2/2022
    b. Static Pressure: 43 psig
    c. Residual Pressure: 41 psig
    d. Flow at Residual Pressure: 944 GPM

4. System design shall provide a safety factor when comparing available water supply pressure versus system design pressure at design flow rate (including hose streams). The safety factor shall be the following:

    a. 5 psig

F. Coordinate with Plumbing Contractor for installation of a standpipe with collection funnel below the backflow preventer.

1.9 COORDINATION DRAWINGS

A. Reference Coordination Drawings article in Section 21 0500 for required fire protection systems electronic CAD drawings to be provided to Coordinating Contractor for inclusion into composite coordination drawings.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit manufacturers' operation and maintenance data. Include written maintenance data on components of system, servicing requirements, and record drawings.

1.11 JOB CONDITIONS

A. Fire Protection Contractor shall determine the flow and pressure available at the service connection. The Fire Protection Contractor is responsible to verify this information and make all tests required. Base all pipe sizing and hydraulic calculations on flow test data no older than 18 months.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS - WET PIPE SPRINKLER SYSTEMS

A. Piping - 2" and Under (Steel Pipe):

1. Design Pressure: 175 psig
2. Pipe: Schedule 40, black steel, ASTM A53, ASTM A795, UL. Inner wall shall be coated with an anti-MIC (microbiologically influenced corrosion) coating.
3.
4. Fittings:

a. Grooved:

1) Ductile iron housing ASTM A-536, Grade 65-45-12, UL, enamel coating, Grade E (Type A) EPDM molded pressure-responsive gaskets suited for 40°F to 150°F. Carbon steel bolts and nuts.

B. Piping - 2-1/2" and Above (Steel Pipe):

1. Design Pressure: 175 psig
2. Pipe: Schedule 10, black steel, ASTM A135, ASTM A795, UL. Inner wall shall be coated with an anti-MIC (microbiologically influenced corrosion) coating.
3. Joints: Grooved.
4. Fittings:

a. Grooved:

1) Ductile iron housing ASTM A-536, Grade 65-45-12, UL, enamel coating, Grade E (Type A) EPDM molded pressure-responsive gaskets suited for 40°F to 150°F. Carbon steel bolts and nuts.

2.2 FLEXIBLE FIRE SPRINKLER CONNECTIONS

A. Flexible Connection: Stainless steel hose, 175 psig max working pressure, fully welded non-mechanical fittings, stainless steel braid, maximum of 6' hose length, leak-tested with a minimum 7/8" internal corrugated hose diameter made of 304 stainless steel, end fittings made of carbon or stainless steel. Outlet of end fittings shall be 1/2" or 3/4" to match sprinkler connection. UL.

B. Ceiling Bracket: G90 galvanized steel, direct attachment type, integrated snap-on clip ends, tamper resistance screws, removable attachment hub with set screw for attachment and adjustment of stainless steel hose.

1. Manufacturers:

a. Flexhead Industries
b. Victaulic VicFlex,
c. Sprinkflex
d. or approved equal.

2.3 PIPE AND FITTINGS - DRY PIPE SPRINKLER SYSTEMS

A. Piping - 2" and Under (Steel):
1. Design Pressure: 175 psig
2. Pipe: Schedule 40, galvanized, ANSI/ASTM A153, ASTM A795, UL[/FM]. Inner wall shall be coated with an anti-MIC (microbiologically influenced corrosion) coating.
3. Joints: Threaded or roll grooved.
4. Fittings:

a. Threaded:

1) Cast iron, Class 125, galvanized, UL, ANSI/ASME B16.4ASTM A153.
2) Malleable iron, Class 150 galvanized, UL, ANSI/ASME B16.3ASTM A153.
3) Ductile iron, Class 150, galvanized, UL, ANSI/ASME B16.3ASTM A153.

b. Grooved:

1) Ductile iron housing ASTM A-536, Grade 65-45-12, UL, galvanized coating, Grade E (Type A) EPDM molded pressure-responsive gaskets suited for 40°F to 150°F. Stainless steel bolts and nuts. Provide flush gap style gasket. Lubricate gasket according to manufacturer recommendations.

5. Unions: Class 150 malleable iron, ANSI B16.39, ground joint with copper or copper alloy-to-iron seat.

B. Piping - 2-1/2" and Above:

1. Design Pressure: 175 psig
2. Pipe: Schedule 10, galvanized ASTM A135, ASTM A795, UL.
3. Fittings:

a. Grooved:

1) Ductile iron housing ASTM A-536 Grade 65-45-12, UL, galvanized coating, Grade E (Type A) EPDM molded pressure-responsive gaskets suited for 40°F to 150°F. Stainless steel bolts and nuts.

2.4 PIPE AND FITTINGS - DRY STANDPIPE SYSTEM

A. Refer to Article 2.2 PIPE AND FITTINGS - DRY PIPE SYSTEMS.

2.5 VALVES

A. Provide handwheels for gate valves. Provide gear operators for butterfly valves.

B. Provide all connections to match pipe joints. Valves shall be same size as pipe.

2.6 BACKFLOW PREVENTERS

A. Provide backflow preventers as required by code and as specified on the drawings.

2.7 EQUIPMENT

A. Equipment shall be as scheduled on the drawings.

2.8 RISER LABELING AND IDENTIFICATION

A. Hydraulic nameplates shall be affixed to each riser and shall include the following minimum information:

1. Installation contractor
2. Date installed
3. Riser location
4. Number of sprinklers
5. Basis of design (density GPM/ft2 and area of coverage ft2
6. Water flow rate (GPM) and residual pressure (psi) at the base of riser
7. Hose stream allowance (GPM).
8. Occupancy classification
9. Commodity classification (If applicable)
10. Maximum storage height (if applicable)

2.9 PIPE LABELING AND IDENTIFICATION

A. Provide additional identification as described in Section 21 0553.

PART 3 - EXECUTION

3.1 INSTALLATION - PIPING

A. General Installation Requirements:

1. Coordinate piping and sprinkler locations with all other trades. Ductwork, diffusers and light fixture locations shall have priority over sprinkler piping and sprinklers.
2. Ream pipe and tube ends to full inside diameter. Remove burrs. Remove scale and foreign material, inside and outside, before assembly.
3. Die cut screw joints with full cut standard taper pipe threads.
4. Coat threads with pipe joint compound or wrap with Teflon tape.
5. Locate piping to minimize obstruction of other work.
6. Route piping in concealed spaces above finished ceiling.
7. Use full and double lengths of pipe wherever possible.
8. Slope all piping for complete drainage. Install auxiliary drains for all trapped piping per NFPA 13.
9. Reducers are generally not shown. Where pipe sizes change at tee, the tee shall be the size of the largest pipe shown connecting to it.
10. Comply with manufacturer's installation instructions.

B. Steel Piping:

1. In steel piping, main sized saddle branch connections or direct connection of branches to main is permitted if main is one pipe size larger than the branch for up to 6" mains and if main is two pipe sizes larger than branch for 8" and larger mains. Do not project branch pipes into main pipes.

C. Wall/Floor Penetration:

1. Provide sleeves when penetrating floors and walls.
2. Seal pipes passing through exterior walls with a wall seal per Section 21 0529. Provide Schedule 40 galvanized sleeve at least 2 pipe sizes larger than the pipe. Sleeves through floors shall extend minimum 1.5" above finished floor.
3. Fire seal all pipe and sleeve penetrations (both wall and floor) to maintain fire separation required without restraining pipe.

D. Installation Requirements in Electrical Rooms:

1. Do not install piping or other equipment above electrical switchboards or panelboards. This includes a dedicated space extending 25 feet from the floor to the structural ceiling with width and depth equal to the equipment. Fire protection equipment dedicated to the electrical equipment room or space may be installed above equipment if other alternatives are not available.

E. Hangers and Supports:

1. Provide hangers and supports as required by NFPA 13 and UL, with the following exceptions:

   a. Do not use powder driven devices, explosive devices, wooden plugs, or plastic inserts.
   b. Do not install fasteners to carry the load in tension, unless absolutely necessary.

F. Exposed Piping:

1. Install chrome plated steel escutcheons where exposed pipes penetrate walls or floors.
2. Remove all scale, rust, dirt, oils, stickers and thoroughly clean exterior of all bare metal exposed piping, hangers, and accessories.

G. Dry Pipe System:

1. All fire protection piping within rooms served by dry pipe valves systems shall be downstream of dry pipe valve. Wet piping upstream of these devices shall not be installed above these rooms.

3.2 INSTALLATION - VALVES

A. Install gate valves with stems upright or horizontal, not inverted.

B. Backflow Preventer:

1. Provide an air gap fitting and piping to drain. On 2-1/2" and larger units, install a tail piece from air gap fitting to drain to prevent water from spraying out of drain air gap receptor. Maintain air gap distance required by Code.
2. Units shall be field tested and tagged in accordance with manufacturer's instructions by a certified tester before initial operation.
3. Install unit between 12" and 60" above finish floor.
4. Provide monitor switches on all shutoff valves.

C. Dry Pipe Valve:

1. Install dry pipe valve in heated area to prevent mechanical damage.
2. Provide all required trim and accessories for a fully functioning dry pipe valve system.

D. Shutoff Valve:

1. Install buried shutoff valves in valve boxes. Provide post indicators.
2. Provide drain valves at main shutoff valves, low points of piping and apparatus.
3. Provide monitor switches on all shutoff valves.

3.3 INSTALLATION - EQUIPMENT

A. Coordinate piping and sprinkler locations with all other trades. Ductwork, diffusers and light fixture locations shall have priority over system equipment and sprinklers.

B. Fire Department Connection:

1. Locate fire department connection in an accessible location as approved by the local fire department with sufficient clearance from walls, obstructions, and adjacent Siamese connectors to allow full swing of fire department wrench handle.

C. Alarm Bell:

1. Locate outside alarm bell on building wall as shown on drawings.
2. Wire all bells, flow switches and supervisory switches to fire alarm system. All wiring shall be in conduit and meet the requirements of the electrical specifications.

D. Test Valves:

1. Install test valves where required. Pipe to outdoors or drain. Test connection shall have flow equivalent to the smallest K-factor sprinkler.

E. Sprinklers:

1. Locate sprinklers to clear lights, ducts and diffusers. Do not run sprinkler pipes through ducts. Ductwork has priority over sprinkler pipes. Offset pipes as needed.
2. Center sprinklers in two directions in ceiling tiles and provide offsets as required.
3. Do not allow concealed sprinkler cover plates to be painted. Sprinkler cover plates are to be factory painted only. Do not field paint.

4. Apply strippable or paper covers so concealed sprinkler cover plates do not receive field paint finish.

3.4 SYSTEMS CLEANING AND TESTING

A. General Requirement:

1. All water used for testing and remaining in the piping system shall be obtained from a potable water source.

B. Underground Piping:

1. Flush all underground piping with minimum flow equal to the system design flow but not less than the following:

a. 390 gpm for 4" pipes.
b. 880 gpm for 6" pipes.

2. Branches from existing or new underground mains to sprinkler risers shall be flushed out through two 2-1/2" hoses (with flow through open hose butts) attached to the riser with 4" temporary piping. Flushing through the drain of an alarm check or dry pipe valve is not acceptable.

C. Interior Piping:

1. Verify adequate water flow at the inspector's test connection.
2. Flush all interior piping to remove scale and other foreign material before placing system into service.
3. Hydrostatically test the entire interior piping system at a minimum of 200 psig or 50 psig more than the normal system working pressure for systems subjected to pressures more than 150 psig. Maintain test pressure for 2 hours without loss of pressure. Test shall be performed with dry pipe valves in open position to prevent valve damage.

D. Dry Piping:

1. On dry-pipe systems, also test the interior piping with an air pressure of 40 psi for 24 hours. Pressure loss shall not exceed 1-1/2 psi in 24 hours with allowance made for temperature change. An odorant, such as oil of wintergreen, may be added to help locate leaks.

E. Fire Alarm System:

1. Test the alarm system by operating the inspector's test connection or the alarm test valves. Verify that the building fire alarm system activates.
2. Adjust all monitor switches for proper operation.

END OF SECTION

SECTION 28 1300 - ELECTRONIC ACCESS CONTROL

PART 1 - GENERAL

1.1 RELATED WORK

A. Section 08 7100 - Door Hardware

B. Section 26 0513 - Wire and Cable

C. Section 26 0533 - Conduits and Boxes

D. Section 26 0535 - Surface Raceways

E. Section 27 0526 - Communications Bonding

F. Section 27 0528 - Interior Communication Pathways

G. Section 27 0543 - Exterior Communication Pathways

H. Section 27 0553 - Identification and Administration

I. Section 27 1500 - Horizontal Cabling Requirements

J. Section 28 0500 - Basic Electronic Safety and Security System Requirements.

K. Section 28 0503 - Through Penetration Fire stopping.

L. Section 28 1600 - Intrusion Detection System

M. Section 28 2300 - Video Surveillance

N. Section 28 2613 - Infant Protection System

O. Section 28 3100 - Fire Detection and Alarm Systems.

1.2 QUALITY ASSURANCE

A. Manufacturer: The manufacturer shall have a minimum of ten (10) years documented experience in the development and manufacture of access control software and hardware. The software developer shall be, at a minimum, a Microsoft Silver Certified Integrator and Partner for those systems that reside in a Microsoft environment.

B. Contractor:

1. Shall be a factory-authorized installation, service and support company specializing in the selected manufacturer's product, with demonstrated prior experience of a minimum of ten (10) years installing, programming and supporting the selected manufacturer's system.

2. Shall have been in business for a minimum of ten (10) years and shall have installed a minimum of three (3) similar or larger sized systems. Contractor shall have a minimum of two (2) service technicians who are certified in the proposed manufacturer's system.
3. Shall have as a regular, full time employee a minimum of one employee with the following certification(s) or education Should more than one certification be required, one employee may maintain multiple certifications.

    a. A certification of RCDD from BICSI or CNIDP from CNet.
    b. A certification of MCSA: Server or MCSE: Server Infrastructure from Microsoft.
    c. A certification of CCENT or CCNA from CISCO. CCNP certification satisfies either of these requirements.

C. Material:

1. All material which is Contractor furnished shall be new, unused and free from defects.
2. Where more than one of any specified item of equipment or material is used, all such items shall be the same product from the same manufacturer.

1.3 REFERENCES

A. International Building Code

B. NFPA 70 - National Electrical Code.

C. The BOCA National Building Code

D. UL 294 - Standard for Access Control Systems.

E. UL 365 - Standard for Police Station Connected Burglar Alarm Units and Systems.

F. UL 464 - Standard for Audible Signal Appliances.

G. UL 603 - Standard for Power Supplies for Use with Burglar Alarm Systems.

H. UL 609 - Standard for Local Burglar Alarm Units and Systems

I. UL 634 - Standard for Connectors and Switches for Use with Burglar Alarm Systems.

J. UL 827 - Standard for Central Station Alarm Services.

K. UL 1076 - Standard for Proprietary Burglar Alarm Units and Systems.

L. UL 1449 - Standard for Surge Protective Devices.

M. UL 1635 - Standard for Digital Alarm Communicator Systems.

N. UL 1638 - Standard for Visual Signaling Appliances – Private Mode Emergency and General Utility Signaling.

O. UL 1778 - Uninterruptible Power Systems.

1.4 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 28 0500.

B. Product Data Submittal: Provide manufacturer's technical product specification sheet for each individual component type. Submitted data shall show the following:

1. Compliance with each requirement of these documents. The submittal shall acknowledge each requirement of this section, item-by-item.
2. All component options and accessories specific to this project.
3. Electrical power consumption rating and voltage including UPS sizing.
4. Heat generation for all power consuming devices.
5. Wiring requirements.
6. Server processor(s), workstation configurations, total and available disk space, and memory size.
7. All network bandwidth, latency and reliability requirements.
8. Backup/archive system size and configuration.
9. Submit two of each type of credential to be used (access card, key fob, etc.).

C. System Drawings: Project-specific system CAD drawings shall be provided as follows:

1. Provide a system block diagram noting system components and interconnection between components. The interconnection of components shall clearly indicate all wiring required in the system. When multiple pieces of equipment are required in the exact same configuration (e.g., multiple identical controllers), the diagram may show one device and refer to the others as "typical" of the device shown. The diagram shall list room numbers where each controller will be located. This block diagram shall be provided in Adobe PDF.
2. Provide a schedule of all controllers and the doors/points each controller controls. This schedule shall be provided in Adobe PDF.
3. Provide schedules describing each system input location by an architecturally familiar reference, e.g., Door 312A. The architectural door schedule shall be used as the basis. These schedules shall be provided in Adobe PDF

D. Submit sample format of site specific programming guides to be used for system planning/programming conference with Owner. These guides shall be provided in Adobe PDF.

E. So that required Owner personnel are present at the planning/programming conference required in Part 3 of this section, submit meeting agenda for the conference a minimum of two weeks prior to the conference.

F. Submit detailed description of Owner training to be conducted at project end, including specific training times. Refer to Part 3 of this section for details.

G. IP Addresses: Contractor shall provide to Owner, in a documented transmittal and in Microsoft Excel format, the names and locations of devices which require an IP address. An authorized representative of the Owner shall furnish the addresses for the associated devices in Microsoft Excel format in a documented transmittal. Should Owner change the IP address structure after approval of the list, Owner may be responsible for additional fees involved with reprogramming.

1.5 SYSTEM DESCRIPTION

A. This section describes the furnishing, installation, programming and commissioning of a complete, turnkey access control system. The terms "access control system" and "security management system", or SMS, may be used interchangeably herein.

B. The company, manufacturer, and product names used in this section are for identification purposes only. All trademarks and registered trademarks are the property of their respective owners.

C. Performance Statement: This section and the accompanying access control-specific design documents are performance based, describing the minimum material quality, required features, and operational requirements of the system. These documents do not convey every wire that must be installed and every equipment connection that must be made. Based on the equipment constraints described and the performance required of the system, as presented in these documents, the vendor and the Contractor are solely responsible for determining all wiring, programming, and miscellaneous equipment required. The Contractor shall be responsible for determining quantities of materials required for a complete and operational system. Floor plan drawings and schedules have been developed to aid the Contractor in determining device quantities and installation locations, but, where discrepancies between floor plans and schedules arise, the greater number shall govern.

D. Basic System Description:

1. The access control system shall provide the following functionality:

a. Electronic control access to designated areas.
b. Validation of cardholder credentials by use of personnel database, card formats. The system shall compare the time, location, and unique credentials of an attempted entry with information stored in the database.
c. Access to designated areas will be validated only when a user's credential has a valid number for its facility and the number is valid for the current time and for the reader where it is used.
d. The system software shall access the hardware that validates the person and monitors the security of a building by use of intelligent system controllers, reader interfaces, locks, readers, inputs and outputs. When access has been validated, a signal to the portal locking device shall be activated to enable alarm free access at that location.
e. The system shall be configured by use of application software.
f. The system shall monitor activities using operator monitoring software which includes graphical maps which display alarms, status and activity.
g. The system shall differentiate and restrict administrative and operational access through use of password authentication.
h. The system shall report on various aspects of the system by use of reports, both default and customizable. Reports shall be able to be printed.
i. The system shall have the capability to report alarms both audibly and visually.
j. The system shall control hardware from the monitoring station by use of manual actions and events.

k. The system shall provide record and data management by use of journals. There shall be a full audit trail.
l. The system shall allow for data to be imported from other products by use of database migration tools. These products may include Human Resources databases for name and/or time and attendance information, information from previous access control systems consisting of badge numbers from credentials that will be re-used, Microsoft Excel spreadsheets, or other systems as defined herein.
m. The system shall allow access using a web interface or a mobile application for use on the iOS and Android operating systems.

E. Integrations, Software Development Kit (SDK) and Application Programming Interface (API):

1. The manufacturers of the systems that are integrated shall make an SDK available to other manufacturers.
2. Prior to the release of this section, the manufacturers of the systems that are to be integrated shall have made available to each other all APIs to perform the specific integrated functions required in this section.
3. The integrations shall be completed and tested, and shall have been implemented on at least one system of similar size prior to the release of this section. The integrations shall not be accomplished for the first time for this project unless written pre-approval has been granted by Owner to Contractor prior to bid deadline.
4. During the warranty period, should a new API or version of software be released by the SMS manufacturer or any of the manufacturers of systems or devices that are integrated, that API or version of software shall be installed in the appropriate system or device defined in this section at no charge to Owner. Should any loss of functionality in the integration be exposed through this installation, as compared to the accepted system, Contractor shall correct the functionality at no charge to Owner.
5. Any and all development costs for specified functionality or inter-system integrations shall be included in the Contractor's bid. No additional costs or fees for the integrations shall be charged to Owner from the time of notice to proceed through system acceptance.

1.6 OWNER FURNISHED MATERIAL

A. Telephone service

B. Data circuit / internet service

C. Active telephone service equipment, such as key system, PBX or VOIP switch equipment

D. Active computer network equipment:

1. Routers
2. Switches
3. Hubs
4. Wireless access points
5. Uninterruptible power supplies for Owner furnished products

E. Active computer equipment:

1. SMS server - refer to Part 2 for details
2. SMS workstation(s) - refer to Part 2 for details
3. SMS badging station(s) - refer to Part 2 for details
4. Uninterruptible power supplies for Owner furnished products

F. Credentials:

1. Badges
2. Key fobs

1.7 LICENSING REQUIREMENTS

A. All user licenses required for system operation shall be included in the Contractor's bid. User licenses shall include server and workstation software, network controllers, card readers, printers, badging stations, and any other licensing that is required by the manufacturer for operation of any system component.

1. Licenses shall be provided on a one-to-one basis. One license shall be provided for each device requiring a license. In the event the manufacturer requires the purchase of a block of licenses, license blocks provided shall be no greater than what is required for the number of devices in this project. Contractor shall document the number of remaining licenses in the project record documents and Operations and Maintenance data.
2. In addition to the licensing requirements listed above, provide licensing and configuration of system administration/operation software for workstations. The workstation licenses shall be concurrent use seats, and the client software shall be able to be loaded on an unlimited number of workstations at no extra cost to the Owner. Contractor shall install client software on the same number of machines as licenses provided. As part of the training, Contractor shall demonstrate to Owner how to install client software on additional workstations.
3. All Contractor-furnished software shall contain a perpetual, permanent license in which no other fees beyond the single payment for the work of this section are required in order to use the proposed software indefinitely. Owner understands that, after the initial warranty period has expired, maintenance and technical support fees may be required annually, quarterly, or monthly in order to receive software updates and technical support. However, it remains the option of Owner to purchase or decline this service. If Owner chooses to discontinue or never purchase this service, the software shall continue to be legally licensed for use. All software shall be the latest version released, and all Contractor-furnished servers and workstations shall be current on all patches and updates for all software on the machines at the time of acceptance of the associated systems.
4. The SMS shall require only a single license key present on the server for the SMS to operate. The key shall be a physical device or a software key. License keys shall not be required at the client workstations.

1.8 PROJECT RECORD DOCUMENTS

A. Submit documents under the provisions of Section 28 0500.

B. Provide final system block diagram showing any deviations from shop drawing submittal.

C. Provide statement that system checkout test, as outlined in the shop drawing submittal, is complete and satisfactory.

D. Provide schedules documenting:

1. Controller installation locations including specific door numbers being controlled.
2. All terminal block wiring, including cable numbers.

E. Warranty: Submit written warranty and complete all Owner registration forms.

F. Complete all operation and maintenance data manuals as described below.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit documents under the provisions of Section 28 0500.

B. Manuals: Final copies of the manuals shall be delivered within 30 days after completing the installation test. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of the contractor responsible for the installation and maintenance of the system, and the factory representatives for each item of equipment for each system. The manuals shall have a table of contents and labeled sections. The final copies delivered after completion of the installation test shall include all modifications made during installation, checkout, and acceptance testing. Manuals shall be submitted in both hardcopy and electronic format The manuals shall consist of the following:

1. Hardware Manual: The manual shall describe all equipment furnished including:

   a. General description and specifications.
   b. Installation and check out procedures.
   c. System and equipment layout and electrical schematics to the control board and field device level. For multiple devices wired identically, only one wiring diagram is required per door configuration, to be labeled "TYPICAL".
   d. Alignment and calibration procedures.
   e. Manufacturers repair parts list indicating sources of supply.

2. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:

   a. Definition of terms and functions.
   b. System use and application software.
   c. Initializations, startup, and shutdown procedures.
   d. Reports generation.
   e. Details on forms customization and field parameters.

3. Operator's Manual: The operator's manual shall fully explain all procedures and instructions for the operation of the system including:

   a. Computers and peripherals.

b. Log in/Log out procedures.
c. Use of system, command, and applications software.
d. Recovery and restart procedures.
e. Graphic alarm presentation.
f. Use of report generator and generation of reports.
g. Data entry.
h. Operator commands.
i. Alarm messages.
j. System permissions functions and requirements.

4. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, cleaning, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.

1.10 WARRANTY

A. Unless otherwise noted, provide warranty for one (1) year after date of Substantial Completion for all materials and labor.

B. Onsite Work During Warranty Period: This work shall be included in the Contractor's bid and performed during regular working hours, Monday through Friday.

1. Inspections: The Contractor shall perform two minor inspections at six-month intervals (or more often if required by the manufacturer), and two major inspections offset equally between the minor inspections to effect quarterly inspection of alternating magnitude.
2. Minor Inspections: These inspections shall include:

a. Visual checks and operational tests of all equipment, field hardware, and electrical and mechanical controls.
b. Mechanical adjustments if required on any mechanical or electromechanical devices.

3. Major Inspections: These inspections shall include all work described under paragraph Minor Inspections and the following work:

a. Clean all equipment, including exterior surfaces and accessible and serviceable interior surfaces.
b. Perform diagnostics on all equipment.
c. Check, test, and calibrate (if required) all sensors.
d. Run all system software diagnostics and correct all diagnosed problems.

C. Operation: Upon the completion of any scheduled adjustments or repairs, Contractor shall verify operation of the SMS.

D. Service: The Owner will initiate service calls when the SMS is not functioning properly. If requested by the Owner, the Contractor shall respond or remain at the site after normal business hours, and the Owner shall reimburse the Contractor for the incremental cost difference between premium labor rates and standard labor rates. This reimbursement applies to premium labor rates that do not exceed time-and-one-half rates after normal business hours and double-time rates for Sundays and holidays. The Owner shall be furnished with telephone number(s) where service personnel can be reached 24/7/365. Qualified service personnel shall be at the site within 24 hours after receiving a request for service.

E. Records, Logs and Work Requests: Contractor shall keep records and logs of each task completed under and outside of warranty. These logs shall be maintained in Microsoft Word or Excel. The log shall include the model and serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, description of work performed, the amount and nature of the material used, and the time and date of commencement and completion of the work. Complete logs shall be kept and shall be available for review on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the SMS. The Contractor shall deliver a record of the work performed within three (3) business days after work is completed. Defective items that have been replaced shall be given to the Owner. Should the replacement item be a temporary replacement until the removed item is repaired, Contractor shall retain possession of the defective item for repair and subsequent re-installation.

F. System Modifications: Modifications by the Contractor are allowed after system acceptance. Contractor shall make recommendations for system modification in writing to the Owner. No system modifications shall be made without prior, written approval of the Owner. Any modifications made to the system shall be incorporated into the Operations and Maintenance Manuals, and other documentation affected. The Owner shall be provided with electronic restorable versions of all configurations prior to the modifications being made.

G. Software: At no charge, the Contractor shall provide to Owner all updates released by the manufacturer during the period of the warranty and verify operation of the system upon installation. These updates include system software updates, patches, bug fixes and revisions, as well as firmware updates. These updates shall be accomplished in a timely manner, fully coordinated with SMS administrators and operators, shall include training for the new changes/features, and shall be incorporated into the Operations and Maintenance Manuals and software documentation.

H. Refer to the individual product sections for further warranty requirements of individual system components.

1.11 ANNUAL SERVICE CONTRACT

A. Provide annual cost for extended service and maintenance agreement after the first year for the access control system according to the following terms:

1. The term of the warranty shall begin on the system acceptance date and shall continue for one (1) year. The extended service and maintenance warranty shall begin following this first year if accepted by the Owner. The term shall be automatically renewed for successive one-year periods unless canceled in writing by the Owner with Contractor confirmed receipt, up to the date of expiration. The service and maintenance agreement shall include the following basic services to the Owner, including all necessary parts, labor and service equipment:

    a. Repair or replace any security equipment item that fails to perform as initially installed, as specified, or as determined per the manufacturer's performance criteria.
    b. Perform preventive maintenance on the security equipment during the 6th month and 12th month of the service contract. This preventive maintenance shall include cleaning, realignment, inspection, and testing of security devices. The Owner shall receive a written report of these inspections that identifies the security system's status and, if required, a list of all necessary repairs or replacements.
    c. Provide maintenance on the SMS system software. At no charge, the Contractor shall provide to Owner all updates released by the manufacturer during the period of the service contract and verify operation of the system upon installation. These updates include system software updates, patches, bug fixes and revisions, as well as firmware updates. These updates shall be accomplished in a timely manner, fully coordinated with SMS administrators and operators, shall include training for the new changes/features, and shall be incorporated into the Operations and Maintenance Manuals and software documentation. Contractor shall not be responsible for maintenance of Owner data.

2. The Contractor shall be compensated for any repairs or maintenance provided as a result of Owner abuse, misuse, intentional damage, accidental damage, or power fluctuations exceeding specified equipment tolerances.
3. Service: The Owner will initiate service calls when the SMS is not functioning properly. If requested by the Owner, the Contractor shall respond or remain at the site after normal business hours, and the Owner shall reimburse the Contractor for the incremental cost difference between premium labor rates and standard labor rates. This reimbursement applies to premium labor rates that do not exceed time-and-one-half rates after normal business hours and double-time rates for Sundays and holidays. The Owner shall be furnished with telephone number(s) where service personnel can be reached 24/7/365. Qualified service personnel shall be at the site within hours after receiving a request for service.

B. Provide complete terms and conditions of warranty and service.

C. The Owner will enter into a contract directly with the vendor. This specification section is not a contract between the Owner and the vendor to perform these services.

PART 2 - PRODUCTS

2.1 ELECTRONIC ACCESS CONTROL SYSTEM MANUFACTURERS

A. Software House C-Cure 9000

B. Should the access control manufacturer offer, as an option, the use of hardware by Mercury Security, the Contractor proposed solution shall utilize this hardware. Contractor shall state whether or not the software is compatible with the SCP, AP and EP families of Mercury Security hardware. For future additions or defective hardware replacements, the system shall not be "locked" to require Mercury Security hardware be purchased only from the access control software manufacturer or from the original Installing Contractor.

C. Approval of Alternate Manufacturers:

1. Contractors seeking approval for alternate manufacturers for any devices or software in this section shall submit requests for approved equals as defined by Division 1 in addition to submitting:

a. Bill of materials for each piece of hardware and software proposed.
b. Manufacturer's data sheet for each piece of equipment proposed.
c. Line-by-line typewritten statement of compliance or non-compliance comparing Part 2 of this section with the published specifications of the proposed alternate products. This compliance statement shall be signed by an officer of the local contractor branch office that proposes to install the alternate product and either an officer of the manufacturer or an officer of the manufacturer's representative.

2. Refer to the project drawings for manufacturer and model numbers for the Basis of Design products.

2.2 SERVER

A. The system shall not be required to have a traditional or virtual server and, instead, may be provided with embedded server functionality integral to the controller if the following three (3) conditions are met. The server specified below shall apply if the system does not meet these three (3) conditions:

1. The network controller is a distributed architecture, native IP network appliance.
2. The network appliance contains an onboard, embedded operating system (e.g., Linux-based), web server, ODBC-compliant database engine, data storage device and application logic controller.
3. The network appliance contains onboard SSL communications.

B. If the system architecture utilizes traditional servers, the system shall be a true multi-tasking, multi-threading application system architecture designed specifically for the Windows environment. All modules, including access control, alarm monitoring, credential management, etc., shall be built from a single unified 32-bit source code set.

C. The system shall communicate on a TCP/IP based Ethernet LAN capable of utilizing 10/100/1000 BaseT.

D. The system shall be functional in a virtual server environment.

E. Provisioning:

1. The server shall be furnished by the Owner and shall meet the specifications defined by the SMS software manufacturer to meet or exceed the functionality and performance specifications of the system and integrations defined in this and related sections. Contractor shall furnish specifications to the Owner in writing as part of the submittals. Owner furnished server may be traditional or may be virtual.
2. Acceptable manufacturers of Contractor-furnished server are:

    a. Dell -Basis of Design Power Edge R730 Series
    b. HP
    c. Approval of Alternate Manufacturers:

        1) Contractors seeking approval for alternate manufacturers for the server in this section shall submit requests for approved equals as defined by Division 1 in addition to submitting:

            a) Bill of materials for each piece of hardware proposed.
            b) Line-by-line typewritten statement of compliance or non-compliance comparing Part 2 of this section with the published specifications of the proposed alternate products. This compliance statement shall be signed by an officer of the local contractor branch office that proposes to install the alternate product and either an officer of the manufacturer or an officer of the manufacturer's representative.

        2) Refer to the project drawings for manufacturer and model numbers for the Basis of Design products.

F. Hardware:

1. Enterprise class server.
2. Rack mount configuration.
3. Six (6) USB 2.0 ports, one (1) two port 10/100/1000 Ethernet NIC.
4. Dual, redundant, hot swappable power supplies.
5. RAID Level 5 configuration with separate drives for data base, 500GB, and operating system, 500GB. One spare hot swappable hard drive for the database and one for the operating system.
6. Enterprise class hard drives, minimum 7200 RPM, 3.5" SATA, minimum mean time between failure, MTBF, 1.2 M hours, 100% duty cycle 24x7.
7. 8 GB RAM.
8. Internal DVD+/- RW ROM SATA drive.
9. On board HDMI video card.
10. Predictive failure analysis.

11. Two (2) cooling fan modules, each with two fans, hot swappable.
12. Rack mount LCD monitor with integrated keyboard, touchpad and KVM switch. This monitor, keyboard and touchpad may also serve the video management system server, if present, through the KVM switch.
13. Redundant Server: The system shall maintain a primary server and a redundant backup server with mirrored database. Should the primary server fail, system control shall be automatically switched to the backup server without operator intervention. All access control field hardware shall be configured for communication with both primary and backup servers. Both primary and backup servers shall recognize the same TCP/IP address on the network. This system feature shall require two identical servers with minimum configurations as defined above.
14. Backup Power:

    a. Owner-furnished uninterruptible power supply (UPS) with surge suppression.
    b. Contractor-Furnished Uninterruptible Power Supply (UPS):

        1) Line interactive, simulated or true sine wave.
        2) The critical load is normally supplied by utility power, and internal batteries are simultaneously float charged. The UPS shall boost or buck the voltage as needed, caused by fluctuations in utility voltage. Upon utility power failure, the UPS shall automatically switch to supplying load power from the batteries and internal inverter.
        3) Manufacturers:

            a) APC: Smart UPS Series

        4) Compliance:

            a) Surge Suppression: ANSI C62.41
            b) Safety: UL 1778
            c) EMC: FCC Part 15

        5) Output rated for 3 5kVA.
        6) Hot swappable batteries.
        7) Battery Capacity: Capable of operating at full load for 30 minutes.
        8) Rack mount.
        9) Input of 120 VAC, single phase, two wire plus ground.
        10) Supports external battery pack.
        11) Outlet Receptacles: Minimum six (6) NEMA 5-15R receptacles.
        12) Web browser or SNMP monitoring.
        13) Operating ambient temperature of 32°F to 104°F.
        14) Relative humidity 0% to 95% non-condensing.
        15) Internal input circuit breaker.
        16) Audible alarms for low battery warning, internal faults, overload, weak/dead battery.
        17) Transfer time of 6 m sec typical.
        18) Emergency Power Off (EPO) switch.
        19) Modes of Operation:

a) Normal/On-line - critical load is supplied by AC source, harmonics are filters and batteries are float charged
b) Boost - with a sag in utility power from 90 VAC to 105 VAC, UPS shall boost the voltage until AC source rises to 112 VAC
c) Buck - with a swell in utility power ranging from 130 VAC to 150 VAC, UPS shall buck the voltage until AC source drops to 125 VAC
d) Battery - upon failure, brownout or overvoltage of AC power, the load shall be supplied power from the UPS batteries and inverter
e) Recharge - batteries shall be recharged to 90% capacity within 8 hours after return of normal AC power from low battery cut off
f) DC start - UPS shall start and operate without AC power applied

G. Operating System:

1. Windows Server 2003 SP2 or higher

H. Database:

1. SQL Server 2008 R2 Express Edition

I. The SMS software shall utilize the native Windows security features and be registered with the Windows operating system as a service. The security features shall be configured with the following layers:

1. Workstation: Prohibits non-operators from accessing the system.
2. Desktop: Controls which applications a given operator can run.
3. Applications Commands: Controls which commands within an application a given operator can perform.
4. Files: Controls an operator's read/write access rights to individual files.
5. Breakthrough Alarms: The operating system shall allow high priority alarm condition notification regardless of the application software currently opened.

J. Upgrades or expansion of the SMS to a larger size system in scale shall not require installation of a different and/or new SMS application or require the administrator/operator to learn a different and/or new interface from the previous version.

K. Associated Software:

1. Support for web client.
2. Support for mobile client.

2.3 CLIENT WORKSTATIONS

A. Provisioning:

1. The workstation(s) shall be furnished by the Owner and shall meet the specifications defined by the SMS software manufacturer to meet or exceed the functionality and performance specifications of the system and integrations defined in this and related sections. Contractor shall furnish specifications to the Owner in writing as part of the submittals.

B. Hardware:

1. Rack mount configuration
2. Pentium 4 Dual Core CPU, 2.5 GHz or greater
3. 4 GB RAM
4. 100GB hard drive, 7200 RPM
5. Four (4) USB 2.0 ports, dual 10/100/1000 network interface card
6. Audio with integrated speakers.
7. One (1) 19" flat screen LCD monitor(s)
8. NVIDIA graphics dual output board, PCI Express x 16 graphics bus, 512 MB DDR3 memory buffer, 1280 x 1024 resolution
9. 16x DVD/CD RW drive

C. Operating System:

1. Windows 10 Professional

2.4 FIELD CONTROL HARDWARE

A. Interior Control Panels:

1. Control boards, power distribution and terminals shall be enclosed in a NEMA 1 rated enclosure that is key lockable. Contractor shall not furnish padlock. All enclosures that are part of this project shall be keyed alike. Contractor shall furnish and install a mechanically fastened tamper switch on the interior of the enclosure.
2. Control boards are allowed to be in an enclosure separate from the power supplies/power distribution. Should they be in separate enclosures, the interface wiring shall be in rigid metallic conduit, RMC, with Myers hubs at both ends of the conduit.
3. Control panels shall be rack mountable in an enclosure specifically for rack mounting. Control boards and power supplies shall be located in the enclosure. The enclosure shall have screw or compression terminals on the rear panel for connection of field devices.
4. Intra-enclosure wiring shall be dressed using tie wraps and/or covered plastic wire way. Hook-up wires for identical purposes shall have the same color insulation. For example, if one input pair utilizes green and white insulated conductors, all similar inputs shall use green and white insulated conductors. The same color scheme shall be followed for all access control panels that are part of this project.
5. Cabling from field devices such as readers, door position switches, request-to-exit devices and locking devices shall not be directly terminated to the control boards and power supplies. The field devices shall be terminated to terminals located on the left side, right side or both sides of the enclosure back panel. Intra-enclosure wiring shall be routed from the terminals to the control boards and power distribution. Quantity and functional sequence of the terminals shall be identical portal to portal.

6. All devices inside the enclosure, less cabling and batteries, shall be mechanically fastened to a removable solid or perforated metal back panel with either:

    a. Metal or plastic standoffs
    b. DIN rail

7. Hook and loop fasteners, double sided tape or adhesives are not allowed to attach devices to the back panel. Mounting devices to the interior of the door shall only be allowed when the following two (2) conditions are met:

    a. The access control hardware manufacturer offers prefabricated enclosures with devices mounted to the interior of the door.
    b. Only the same devices that the access control manufacturer mounts to the interior of the door are allowed to be mounted in a different enclosure, and those devices shall be mounted in an identical manner.

8. 120V 20A input power shall be hard wired to a circuit breaker disconnect and to one duplex receptacle on the interior of the enclosure. Should devices in the enclosures require plug-in transformers/power supplies, the receptacle shall be utilized. One (1) power strip with integrated circuit breaker shall be located in the bottom of the enclosure as needed.
9. Power to the locking devices shall be provided by a power distribution board with no fewer than four (4) outputs. Each lock shall be individually protected. The power distribution board shall:

    a. Provide protection with fuses or positive temperature coefficient (PTC) devices.
    b. Provide control so that each output is individually selectable as latching or non-latching with fire alarm activation.
    c. Provide control so that each output shall have Fail Safe and Fail Secure terminals.
    d. Provide a fire alarm input with associated trigger LED.
    e. Provide an individual LED per output to indicate when an input has been triggered and the associated output has been activated.
    f. Accept a dry, closed contact input to activate the individual lock outputs.
    g. Provide a dry, Form C relay that energizes on activation of the fire alarm input. This output may then be used as a fire alarm input to other power distribution boards in the same or a different enclosure, or may provide input to another device such as a multi-pole relay.

10. A minimum of four (4) 12V 7 AH rechargeable, sealed, lead acid batteries shall be located in the bottom of the enclosure. Two of the batteries shall be connected in series for 24V devices, and two batteries shall be connected in parallel for 12V devices. Contractor shall provide additional batteries as needed to power all devices for a minimum of 8 hours. Connections to the batteries shall be made with appropriate terminals crimped on the connecting conductors. Batteries shall be clearly labeled in a permanent manner with the date of installation.
11. Power to control boards, readers and auxiliary devices such as request-to-exit motion detectors shall be provided by a power distribution board with no fewer than four (4) outputs. All devices powered by the same voltage at an individual portal shall be protected by the same fuse or PTC unless current requirements dictate otherwise. Individual fuses or PTCs may protect more than one control board.

12. All access control panels, when populated with control boards and power supplies, shall have the following capacities:

    a. Control of a minimum of two (2) portals.
    b. Spare capacity of a minimum of one (1) access control portal, two (2) auxiliary inputs and two (2) auxiliary outputs greater than the requirements of the project at the time of system specification.
    c. Five (5) spare fuses of each type used, to be in their original packaging, to be located in each power supply enclosure.
    d. 50% spare current capacity on all power supplies located in unconditioned spaces and 40% spare capacity for those in conditioned spaces. Lower spare capacities are allowable based on prior approval of Contractor-provided power calculations.

13. Locations where enclosures may be mounted are shown on the plans. Final location, with approval of Owner's representative, shall be selected by Contractor based on distribution of controlled portals and devices.
14. At time of Substantial Completion, Contractor shall furnish a schematic diagram of intra-enclosure wiring and a complete bill of materials for the enclosures and the devices located within. This documentation shall include a schedule of fuses and the device(s) that each fuse protects. This documentation shall be placed by Contractor in a Contractor-furnished print pocket located on the inside of the enclosure door.

B. Intelligent System Controllers (ISC):

1. The controller shall communicate with the host via an on board 10/100 Base T Ethernet port.
2. The controllers shall be a distributed architecture with full peer-to-peer networking capability. Parent/Child controller configurations are not acceptable. All controllers in the system shall be capable of operating in a standalone mode if communication is lost with the server or main controller. In no case shall a controller depend on communication with an upstream controller for proper standalone operation.
3. The communications bus shall be supervised for wiring integrity. If a communication failure is detected, the system shall report the loss. All controllers unable to receive communication shall operate as standalone devices including grant/deny decisions, complete with event buffers. All events shall be uploaded to the server upon restoration of communications.
4. Controllers shall be AES 128-bit symmetrical block encryption devices conforming to FIPS-197.
5. Controllers shall support SHA-1 authentication security.
6. The controllers shall utilize flash memory or similar technology, allowing program updates to be downloaded from the server. Program storage shall be in ROM.
7. The controllers shall have the capacity for 15,000 cardholders and 45,000 transactions. All access decisions involving these cardholders shall be made at the lowest controller level without communication to the server.
8. 32-bit microprocessor controlled.
9. Handle all non-host related access control monitoring and decision making.
10. LED indicators for power, fault and communications.
11. Provide for local and global input/output linking:

a. The SMS shall support a global linkage feature whereby any input/output/event shall be linked to any other input/output/event in the SMS. Input/output linkages shall be able to span across intelligent system controllers.
b. System administrators shall be able to create global input/output function lists, each consisting of a sequence of actions to be performed, such as changing card reader modes, activating outputs, and opening or closing anti-pass back areas. Each function list may include up to six actions.

12. Reporting of transactions and status information to the server.
13. Interface with standard reader technologies without special interface hardware, additional logic panels or other integrators. Supported technologies shall include:

    a. 13.56 MHz Contactless Smart with or without biometrics or keypad

C. Reader Interface Module (RIM):

1. Reader interface modules are not shown on the plans. Refer to the installation section of this specification for allowable equipment mounting locations. It is the responsibility of the Contractor to determine the number and configuration of reader interface modules required based on the inherent characteristics of each product line and the requirements and restrictions described in this document.
2. RIM shall interface with and accept data from TTL, Wiegand and RS-485 type readers and door hardware.
3. RIM shall provide a minimum of three (3) inputs per portal for portal position, request to exit and auxiliary input.
4. RIM shall provide a minimum of two (2) outputs per portal for locking device and auxiliary output. Each output shall be Form C and shall be rated at 3A at 28VDC.

D. Input Control Module (ICM):

1. The input control module shall provide supervised and non-supervised alarm input zones and monitor/report line fault conditions, alarm conditions, power faults and tampers.
2. Input control modules are not shown on the plans. Refer to the installation section of this specification for allowable equipment mounting locations. It is the responsibility of the Contractor to determine the number and configuration of input control modules required, based on the inherent characteristics of each product line and the requirements and restrictions described in this document.
3. UL 294 and 1076 listed.
4. Each input configurable for normally open or normally closed.
5. Each input configurable for timing.
6. Each input configurable for end of line resistance.
7. Status LEDs for communication to the host, heartbeat and input status.
8. Communications line supervision.
9. AES 128 bit encryption.
10. 2-wire RS485 communications.
11. No fewer than eight (8) inputs per board/control module.
12. Assignment of unit addresses and communications speed.
13. Alarm Masking: The ability to mask the alarm input on a time zone basis.

14. Activate Output: The ability for any input to activate any output.
15. Configuration of Debounce Time: The ability to control the amount of time that an input state change must remain consistent in order for it to be considered a real change of state.
16. Noise rejection filtering to prevent false alarms.
17. Global Linkage: The ability to link outputs with inputs that are attached to any ICM/output control module (OCM).
18. Checkpoint: The ability to configure an input as a designated stop on one or more guard tours.
19. Entry/Exit Delay: The ability to set up entry/exit delays for inputs that are attached to any ICM. This shall include:

    a. Non-Latched Entry: When an input activates, the alarm will not be reported until the entry delay expires. If the input is still active when the entry delay expires, the alarm will be reported. If the input is not active when the entry delay expires, then the alarm will not report.
    b. Latched Entry: When an input activates, the alarm will not be reported until the entry delay expires. If the input is still active when the entry delay expires and the alarm has not been masked, the alarm will be reported. If the input has been masked when the entry delay expires, then the alarm will not report.
    c. Exit Delay: When an input activates, the alarm will not be reported (operates as if masked) until the exit delay expires. If the input is still active when the exit delay expires, the alarm will be reported. If the input is not active when the exit delay expires, the alarm will not be reported.

E. Output Control Module (OCM) and Functionality:

1. Output control modules are not shown on the plans. Refer to the installation section of this specification for allowable equipment mounting locations. It is the responsibility of the Contractor to determine the number and configuration of output control modules required, based on the inherent characteristics of each product line and the requirements and restrictions described in this document.
2. The output control module(s) shall provide Form C relay contacts for load switching, rated at 3A at 28VDC.
3. Each relay shall support "On" "Off" and "Pulse."
4. Outputs can be pulsed from 0.1 seconds to 24 hours.
5. Status LEDs for communication to the host, heartbeat and relay status.
6. 2-wire RS485 communications.
7. No fewer than eight (8) outputs per board/control module.
8. Communications line supervision.

2.5 APPLICATION SOFTWARE

A. General Performance:

1. The application software, in conjunction with the associated hardware, shall have the following features, functionality and capabilities. The functions that are to be implemented shall be determined in the planning conference between Contractor and Owner referenced in Part 3 of this section.
2. All Users:

a. All users shall be capable of being authenticated against Active Directory using LDAP before being granted system access. Should the Owner not use Active Directory, the system shall provide a built-in login and credential management tool to permit rules-based access rights on a per-user basis.
b. The access rights shall be selectable on a per-user basis. In addition, user groups shall be capable of being assigned whereby each user group has a common set of access rights. Users shall be capable of being assigned to these user groups by the system administrator.

3. Operators:

a. The SMS operator interface shall be standard Windows style graphical interface allowing point and click access to features such as drop-down menus, radio buttons, check boxes, list boxes and other standard Windows components.
b. On-line Context Sensitive Help: The SMS shall provide on-line context sensitive help files to guide system administrators and system operators in the configuration and operation of the SMS. The help menu shall be available from any window in the SMS by pressing one function key or clicking on the "HELP" icon/selection in the toolbar. Help windows shall be context sensitive so operators and system administrators can move from form to form without leaving the help window. The SMS shall come with complete on-line documentation on CD or the ability to offload the documentation to removable media.
c. Operator Groups: A minimum of 32 operator groups, allowing specific system module privileges to be accessed with each module being granted specific views, edit and execute privileges.
d. Operator Levels: System access shall require a valid operator name and password, governing a specific operator's level of access to each menu item.
e. The SMS shall allow a system operator to login over another system operator who is already logged into the same client workstation without the need to reboot the system. This process shall log the first system operator off alarm monitoring and log the new system operator on, changing any permission necessary for that system operator.

4. Logs, Status, Maintenance, Diagnostics:

a. Historical Log: The system shall allow event history to be written to the hard disk in an archive format. At a minimum, the system shall support 500,000 transactions. Warning messages shall be generated at a user defined level of capacity. The system shall have the ability to offload the archive files to removable media automatically or manually.
b. System Status: The system shall query the status of any or all of the system's access control points, inputs and outputs.
c. System Maintenance/Diagnostics: The system shall provide for remote diagnostic capabilities. In addition, online diagnostics and communications maintenance shall be able to be activated from the operator interface.

5. Administrator:

a. The SMS shall provide system administrators with the ability to segment their access control SMS field hardware devices into various zones or areas where alarm monitoring client workstations will monitor. These zones shall be assigned an alphanumeric name using up to a minimum of 64 characters.
b. The SMS shall allow other devices such as card readers, input and output modules and intelligent system controllers to be automatically part of the monitoring zone when an intelligent system controller is selected, and it shall allow the system administrator to define which devices such as card readers, etc. belong to that monitor zone.
c. Updating of monitor zones shall take place in real time and without requiring operators to re-login.

6. General:

a. Elevator control support for the number of floors and cabs shown on the drawings.
b. The SMS software shall be written to Microsoft's published standards for user interface design, secure coding practices and database implementation guidelines such as Microsoft Open Database Connectivity (ODBC) interface.
c. All tasks shall be accessible from any compatible client workstation on the network using one or all of the following:

1) Traditional client/server architecture.
2) N-Tier architecture where the SMS shall support the expansion of the system architecture and allow for end-user deployment. The SMS shall allow, but not require, the separation of the database, application server, web server and client interface. The system shall require that all connections to the database be performed through a trusted link from the client or internet browser interface.
3) Centralized publishing of applications using Windows Terminal Server and Citrix through any compatible internet browser application and/or by mobile computer including tablet PC.

d. The SMS shall use an open architecture where all data must reside on a single database and must be accessible in real time to every SMS workstation or web-based client connected to the network. The system database shall be used to create and maintain the cardholder database. A screen designer module shall allow the creation and editing of custom database tables and data entry screens.
e. The SMS shall be able to connect to and interface bi-directionally with external data sources using all of the following methods:

1) ASCII with support for XML-formatted text exchange of data activated both manually and automatically.
2) ASCII with support for XML-formatted text exchange of data using a direct table interface activated both manually and automatically.

3) Real time exchange of data via Active Directory/LDAP utilizing an API supported by the SMS manufacturer. The live exchange of data shall permit exposure of SMS events and transactions to other data sources in real time and allow for receipt of data into the SMS, permitting this data to be acted upon and trigger linked events in the SMS in real time.

f. Security: Access privileges within the application software shall be permitted by use of a password protection system. The cardholder database shall have the following password security levels.

1) A minimum of six (6) unique operator access levels
2) Ability to view only the database fields
3) Ability to restrict operator viewing to any of the individual database screens within a record
4) Ability to restrict operator viewing to any of the database partitions

g. Cardholder Configurations: The system shall have the capacity to support a minimum of 25,000 cardholder files. Each cardholder shall be capable of having up to five (5) access levels actively assigned to their account.

h. The system shall have cardholder identifications for "Visitor" and "Escort", with an associated optional validity period assignable with an activation and deactivation date.

i. The cardholder database screen shall have the following data associated with each cardholder:

1) Last edit by operator with edited date and time
2) Last date/time card was used
3) Last reader giving valid access
4) Last reader denying access
5) Anti-pass back status

7. Access Levels:

a. The SMS shall be capable of defining a minimum of 32,000 access levels with a minimum of 32 access levels per cardholder per database segment. Access levels shall consist of a combination of card readers and time zones.

b. Each access level shall be assignable to an alphanumeric name.

c. Card readers shall have the ability to be assigned to any or all access levels defined in the SMS. Individual card readers shall be capable of having a distinct time zone assigned to it.

d. The SMS shall allow an 'Allow User Commands' option to be assigned on a per access level basis where keypad readers are in use.

e. The SMS shall allow a 'First Card Unlock' option to be assigned on a per access level basis. First Card Unlock feature, when configured, retards a pre-determined time zone activated unlock command until a valid credential has been presented and granted access to the portal.

8. Field Hardware Communications:

a. The SMS shall support communications with the intelligent system controllers (ISCs) by the following protocols:

1) RS-485
2) TCP/IP

b. Communication baud rate shall be system selectable with a range between 1,200- to 115,200 bits per second.
c. Download communication between the SMS and the ISC shall be fully multi-tasking and shall not interfere with operational functions.
d. Upon loss of communications between the SMS server and the ISC, an alarm shall be created with a time stamp. Upon re-established communication, the SMS and the ISC shall automatically re-synchronize from the point of communication loss without operator intervention.

9. Dual Path Field Hardware Communication:

a. The SMS shall support dual path communications between the SMS server and the ISCs. This shall allow for a redundant communication path in the event the primary path fails. The secondary path shall support all primary path protocols.
b. In the event of a communication failure of the primary path, the ISC shall initiate a switchover to the secondary path. During this fail switchover period, the ISC shall periodically check to see if the primary path has been re-established and will automatically switch back upon a successful connection. Alarms shall be generated upon loss or restoration of communications.

10. Intelligent System Controller Remote Support:

a. The SMS shall support remote operations to and from the intelligent system controller (ISC). The remote connection shall be either a constant connection or a scheduled connection. If the connection is constant, then every panel shall have its own connection at the host. If the connection is scheduled, then all panels using remote connections shall have the ability to share the same host connection(s).
b. System administrators shall have the ability to define the remote connections available in the pool. For each connection, system administrators shall be able to define the connection type and the client workstation to which it is installed.
c. Remote sessions shall occur under any of the user defined scenarios:

1) On Demand Connection: A system operator shall have the ability to automatically initiate a remote session to an ISC via the alarm monitoring module.
2) Scheduled Connection: System administrators shall have the ability to configure the SMS so that the ISC remotes into the SMS at pre-determined times through use of time zones.
3) Critical Alarm Activated: System administrators shall have the ability to configure the SMS so that the ISC initiates a remote session with the SMS when a critical alarm is activated in the field.

4) Buffer Threshold: System administrators shall have the ability to configure the SMS so that the ISC initiates a remote session with the SMS when a pre-determined number of events are stored in the ISC memory buffer.

2.6 CREDENTIALS AND BADGING

A. Credentials:

1. [Multi-Technology][Contactless Smart] Cards: 13.56 MHz radio frequency identification electronics, passive design. Card shall meet ISO 15693 and ISO 14443B2 standards.

a. Maximum Dimensions: CR 79: 3.313" x 2.063" x 0.04", CR 80: 3.375" x 2.125" x 0.04".
b. Construction to be of PVC or polyester laminate[with a high coercivity magnetic stripe rated 4000 Oersted.]
c. Each card shall contain a unique serial number.
d. Cards shall contain options for various memory capacities of 2k, 16k or 32k with a fixed number of application areas or areas which are sized by dynamic allocation.
e. Each application area shall contain a unique authentication key. The card and reader shall require matching keys in order to function together. All RF communication between card and reader shall be encrypted using a secure algorithm.
f. The card shall be protected with DES or 3DES encryption algorithms.
g. The cards shall be provided with custom keys uniquely matched to individual sites/customers to allow a non-interchangeable, high level of security through the use of formatting programs such as HID iClass Elite or Corporate 1000.
h. Cards shall be encoded with bit lengths that are compatible with all other components of the SMS.
i. Application areas shall be reserved for cashless vending applications.
j. Cards shall support programming and updating of custom applications after issue.
k. Cards shall be capable of having a photo and/or other graphical images printed directly on the surface of the card.
l. Provide optional slot punch-outs on the short and long edge of the card.
m. Provide multi-technology cards. Cards shall be individually numbered with sequential matching of internal and external numbers.
n. Cards shall be provided with a lifetime warranty; 15 months for the magnetic stripe.

2.7 PORTAL DEVICES

A. Credential Readers:

1. Manufacturers:

a. HID Multiclass SE

2. Multi-Technology:

a. Compatible with 125 kHz proximity, 13.56 MHz Contactless Smart card, MIFARE, DESFire EV1.

3. Card readers manufactured specifically for non-access control applications shall not be acceptable.
4. FIPS 201 compliant.
5. Provide compatibility with most access control systems by providing card data outputs in Wiegand and Clock/Data.
6. Allow the firmware to be updated in the field without the need to remove the reader from the wall.
7. Secure mounting methods using tamper resistant screws.
8. An audio beeper that provides various tones to signify access granted, access denied, power up and diagnostics.
9. Tri-color LED or three (3) LEDs for visual notification of various conditions.
10. ISO1443A, 1443B and 15693 compliant.
11. The ability to transmit an alarm from an integrated tamper switch.
12. Support dual authentication of identity through the combined use of access badge and personal identification number (PIN) on an integrated 12 key keypad.
13. PBT polymer or UL94 polycarbonate.
14. Read Range:

    a. Using 125 kHz cards or 13.56 MHz Contactless Smart cards, minimum operational read range shall not be less than one (1) inch after the readers have been installed in their permanent locations.

15. Operational voltage of 5-16 VDC, with operating temperature range of -31° F to 150° F, and rated for outdoor use with a minimum rating of IP55.
16. Readers and credentials shall be compatible with each other and shall be from the same manufacturer.
17. Available in sizes to be mounted to a standard single gang box or to a mullion. Maximum sizes:

    a. Single gang box mount, with or without keypad: 5.1" x 3.1" x 1.1"
    b. Mullion mount: 6.0" x 1.9" x 0.9"

18. Lifetime warranty against defects in material and workmanship.

B. Request-To-Exit Motion Detector:

1. Manufacturers:

    a. Bosch DS 160 Series

C. Request-To-Exit Button:

1. Manufacturers:

    a. Dynalock 6290 Series

D. Door Position Switch:

1. Manufacturers:

a. GE
b. GRI
c. Honeywell

2. Interior or Perimeter Door:

a. One (1) inch or 0.75 (3/4) inch diameter, recessed
b. 0.75" to 1.25" (3/4" to 1-1/4") gap for wood door
c. Maximum 0.375" to 0.625" (3/8" to 5/8") gap for steel door
d. Basis of Design: UTC/GE/Sentrol 1076D

E. Cable:

1. Composite cable is allowed, although sufficient conductors may not be available in composite cables for all portal configurations. Contractor shall be responsible for additional required cables beyond one composite cable to each portal to meet functional requirements of the system.

a. Reader: 22 AWG, 3 pair, stranded, overall shield. Shield shall be grounded at control panel end only.
b. Request to Exit Motion Detector: 22 AWG, 4 conductor, stranded.
c. Door Position Switch: 22 AWG, 2 conductor, stranded.
d. Request to Exit Button: 18 AWG, 4 conductor, stranded.
e. Lock: Minimum 18 AWG, 4 conductor, stranded.

1) Lock may require heavier gauge cable depending on door hardware solution power requirements. Contractor shall coordinate with door hardware provider for higher current devices and shall adjust the gauge of the lock cable accordingly.

f. Auxiliary Devices: Refer to plans for requirements.

F. Locks and Door Hardware:

1. Electric/electronic locks shall be furnished and installed by the door hardware provider.
2. Access Control Contractor shall interface with and terminate cables to locks.
3. Access Control Contractor shall coordinate with door hardware provider for specified sequences of operation at the various portals.
4. Electrified cylindrical and electrified mortise locks shall have an integrated request-to-exit device.
5. Electric strikes shall have an integrated latch bolt monitor, and the dead latch shall be seated properly so that the strike cannot be defeated by manipulation.
6. Magnetic locks shall have a magnetic bond sensor.
7. Refer to architectural specifications and/or the architectural door schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with the manufacturer's instructions and recommendations for installation of all products.

B. Provide all system wiring between all components as shown on the project drawings or as directed by the manufacturer, whichever is the more stringent requirement.

C. Network controllers shall be installed centralized in the nearest telecommunications room(s). Mount controllers to the structural walls in a location coordinated with other utilities. Coordinate exact location with Architect/Engineer prior to installation. Provide dedicated +120 VAC emergency power circuit to the controllers using #12 AWG wiring from the nearest emergency electrical power distribution panel board.

D. Provide wiring and connection to all electrified locking hardware devices. Complete programming and testing of all electrified locking hardware devices.

E. Install all credential readers in accordance with manufacturer's instructions where shown on floor plans, in accordance with the Americans with Disabilities Act (ADA) requirements. Provide wiring and connection to all credential readers. Complete programming, adjustment, and testing of all credential readers.

F. Provide wiring and connection to all hardware request-to-exit devices that are integral to electrified door hardware. Provide wiring and connection to all request-to-exit motion detectors. Complete programming and testing of all integrated request-to-exit devices. Where possible, avoid false activation by persons passing by but not exiting.

G. Install all request-to-exit motion detectors in accordance with manufacturer's instructions directly above the door frame, centered on the door opening. Adjust sensitivity to permit operation on motion of persons within 2'-0" of door. Avoid false activation by persons passing by where possible.

H. Install all request-to-exit pushbuttons in accordance with manufacturer's instructions where shown on floor plans, in accordance with the Americans with Disabilities Act (ADA) requirements. Provide wiring and connection to all request-to-exit pushbuttons. Complete programming, adjustment and testing of all request-to-exit pushbuttons.

I. Install all door alarm contacts in accordance with manufacturer's instructions either recessed in the door header or surface mounted as required. Provide wiring and connection to door alarm contact devices. Complete programming, adjustment and testing of all door alarm contacts.

J. Install all duress switches in accordance with manufacturer's instructions, surface mounted under counter in locations shown on plans. Verify exact mounting location with Owner prior to cable rough-in or installation. For hard wired devices, provide wiring and connection to duress switch devices. For wireless duress switch devices, mount receivers in accessible locations. Complete programming, adjustment and testing of all duress switch devices. Wireless testing shall include signal reception when transmitter is in all sections of the area in which it will be used in normal operations.

K. Install, wire, configure, adjust, program and test all access control system servers, workstations, badging workstations and other user interfaces.

L. Install, wire, configure, adjust, program, and test all specified interfaces and integrations between access control and other systems. Contractor shall provide all cabling, wiring, terminations, components, devices, accessories, hardware, software and other material and accessories necessary to complete all specified interfaces and integrations and make them fully operational.

M. All low voltage access control cabling shall be routed and supported completely separate from any and all other telecommunications or other low voltage system cabling.

N. Electronic access control system cabling shall not be spliced.

O. Flexible conduit is not allowed except with prior approval. Refer to Section 26 0533 for conduit requirements. Refer to Section 27 0528 for cable hanger and support requirements.

P. Each cable shall be appropriately identified, as defined on the record documents, at each end's termination point using pressure sensitive label strips.

Q. The conductor color code used in terminating system cabling at system devices shall remain consistent from device to device for each unique device type throughout the project.

R. Install and tighten all connectors in accordance with manufacturer's instructions using the appropriately designed tools recommended by the manufacturer for that purpose. Do not strip or damage connectors, terminals, or equipment by over tightening termination fasteners.

S. Grounding and Bonding Requirements:

1. Provide a minimum of 6AWG bonding conductor from each electronic access control system control panel, power supply and surge suppression device to the nearest telecommunications grounding busbar. Actual bonding conductor size is determined by its length; refer to Section 27 0526 for grounding and bonding conductor sizing criteria.

T. Coordinate installation of all devices with other trades and utilities in the vicinity.

U. Cabling shall be plenum rated when installed outside conduit in plenum ceilings.

3.2 FIELD QUALITY CONTROL

A. Where these specifications require a product or assembly without the use of a brand or trade name, provide a product that meets the requirements of the specifications as supplied and warranted by the system vendor. If the product or assembly is not available from the system vendor, provide product or assembly as recommended by the system vendor.

B. Periodic observations will be performed during construction to verify compliance with the requirements of the specifications. These services do not relieve the Contractor of responsibility for compliance with the contract documents.

C. Furnish products listed and classified by Underwriters Laboratories, Inc. (UL) as suitable for purpose specified and indicated.

3.3 MANUFACTURER AND INTEGRATOR COMBINED FIELD SERVICES

A. Installation shall be performed by a factory-trained and certified Contractor.

B. The Contractor shall provide a comprehensive, site-specific customer planning guide for the system. The Contractor shall conduct conference(s) with the Owner prior to any installation to discuss the programming and configuration options of the system and the planning guide.

C. The Contractor shall include labor for all planning and all programming activities required to implement the Owner's access policies for each system point and each operator and administrator. Any software programmable access policy, within the bounds of the hardware specified, shall be included.

D. It shall be the responsibility of the Contractor to provide a complete, functional system as described by the design documents. These responsibilities include:

1. Complete hardware setup, installation, wiring and software configuration of the system server, all workstations and all peripheral hardware.
2. Complete programming of all operator software in accordance with the Owner's access policies determined by the planning guide conference(s).
3. Manual data entry of cardholders based on a printed roster provided by the Owner.
4. Configuration of the network software for operation of the system. Templates shall be established representative of all user access right levels.
5. Programming of all cardholder database screens including cardholder information screens, report templates, queries, etc. Encoding of proximity cards shall be included.
6. Programming of all custom graphic GUI screens including devices.
7. Complete system diagnostic verification.

E. The SMS Installation Contractor shall be present at meetings to coordinate all door hardware requirements with the door hardware vendor.

3.4 SYSTEM DOCUMENTATION

A. Complete documentation shall be provided for the system. The documentation shall describe:

1. All operational parameters of the system
2. Complete documentation of programming and access policies
3. Complete operating instructions for all hardware and software

B. The following sections shall be provided in the system documentation:

1. System Administrator Manual: Provides an overview and a step-by-step guide and instructions detailing all system administrator responsibilities and functions.
2. User Manual: A step-by-step guide and instructions detailing all system user functions.
3. Alarm Monitoring Manual: A step-by-step guide and instructions detailing all alarm monitoring system functions and responsibilities.
4. Technical Maintenance Manual: A comprehensive document providing all maintenance actions, system testing schedules, troubleshooting flowcharts, functional system layout, wiring diagrams, block diagrams and schematic diagrams.
5. Refer to Part 1 for details.

3.5 SYSTEM TRAINING

A. All labor and materials required for on-site system training by a certified representative of the system manufacturer shall be provided. Training shall be conducted at the project site using the project equipment.

B. Coordinate training days and times with Owner.

C. Provide a training outline agenda describing the subject matter and the recommended audience for each topic.

D. At a minimum, the following training shall be conducted:

1. System Administrators: A course detailing the system functions, configurations and operations. Provide training on all aspects of the system including data import/export, report, cardholder management, system workstation and server configuration and maintenance, software and hardware configuration and peripheral hardware operation.
2. Operators: A course detailing the operational features of all aspects of the user interface. Topics shall include alarm monitoring functions, reports, error handling, alarm handling, output relay control, operation of integrated systems interface, and general overview of the report hardware.
3. GUI Editing: Conduct detailed training on using the GUI editing software. Topics shall include the editing of existing graphical maps and the creation of new graphical maps.

E. Minimum on-site training times shall be:

1. System Administrators: Eight (8) hours.
2. Operators: Eight (8) hours.
3. GUI Editing: Eight (8) hours.
4. Integrations : Eight (8) hours.
5. Badging System: Eight (8) hours.

6. Four (4) additional hours of training each quarter for the 12-month period of the project warranty shall be provided. A minimum of half of this additional training shall be on site; the remainder may be support by telephone or email. Contractor shall document this training, including dates performed, trainer and Owner representative(s) present. Each phone call or email shall be documented as a minimum of 15 minutes duration.
7. Operators and administrators are present 24 hours a day, 7 days a week. Contractor shall coordinate with Owner to provide training for all appropriate personnel, which may require Contractor to be present on site during non-business hours. Therefore, the hours in any or all categories defined above may be divided among the various shifts.

3.6 SYSTEM ACCEPTANCE

A. The SMS vendor shall submit for review a formal acceptance and system checkout program. The system checkout procedures shall include all system components, software and functionality. The Contractor shall perform the tests and document all results under the supervision of the manufacturer's systems engineer.

B. All operational scenarios, as defined by the customer planning guide, shall be tested to simulate the actual use of the system in the normal operating environment. The successful completion of these operational scenarios shall be documented.

C. The system shall not be accepted until all requirements of system documentation and training have been completed.

END OF SECTION