Purchasing Division
Finance Department

Room 120
411 West First Street
Duluth, Minnesota 55802

218-730-5340
purchasing@duluthmn.gov

Addendum 4
Solicitation 24-4403
RFP for Construction Mgr at Risk for Air Traffic Control Tower and Base Building

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. Please see the attached information for this Addendum 4.

Please acknowledge receipt of this Addendum within the submitted proposal.

Posted: **January 26, 2024**

DOCUMENT 00 00 14

ADDENDUM NO. 4
Janaury 26, 2024

RFP for Construction Mgr at Risk for Air Traffic Control Tower and Base Building
24-4403
Dululth Airport Authority

From: City of Duluth – Purchasing Office

To: Document Holders

DOCUMENT HOLDERS on the above-named project are hereby notified that this document shall be appended to, take precedence over and become part of the original bidding documents dated January 4, 2024 for this work. Proposals submitted for the construction of this work shall conform to this document.

This addendum consists of one page and attached 10% Drawings for ATCT Facility (30 pages), Basis of Design for ATCT Facility (61 pages), Cost Estimate (12 pages), Schedule (2 pages), Geotechnical Report (59 pages), Phase 2 ESA Report (244 pages), Electrical Load Calculations (3 pages), LEED Checklist (1 page), and Energy Modeling and LCCA Report (197 pages).

Changes to Request for Proposal:

1. The following new documents are attached for reference to the Request for Proposal:

    - 10% Drawings for ATCT Facility
    - Basis of Design for ATCT Facility
    - Cost Estimate
    - Schedule
    - Geotechnical Report
    - Phase 2 ESA Report
    - Electrical Load Calculations
    - LEED Checklist
    - Energy Modeling and LCCA Report

    The 10% documents provided as part of this addendum are for reference only to gain a better understanding of the proposed project, are in draft format, and have not been reviewed by the Airport/FAA. All documents are subject to change.

2. A copy of the recently completed Environmental Assessment for the Air Traffic Control Tower development can be found at the following website: NOTICE OF ENVIRONMENTAL ASSESSMENT – Construction of an Airport-owned Air Traffic Control Tower and Enabling Projects - Duluth International Airport (duluthairport.com)

Note: Receipt of this Addendum No. 4, dated Janaury 26, 2024 shall be acknowledged in the submitted proposal. Failure to do so may subject Bidder to disqualification.

END OF ADDENDUM

10% Drawings for ATCT Facility



DULUTH INTERNATIONAL AIRPORT

DULUTH, MINNESOTA

AIR TRAFFIC CONTROL TOWER AND BASE BUILDING

PROJECT PLANNING DOCUMENT / 10%

JANUARY 26, 2024

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REV	APPROVED DATE	DESCRIPTION		REDLINE DATE	APVD
1	01/26/24	ISSUED FOR PPD / 10%	23980071		

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

COVER SHEET

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

REVIEWED BY	SUBMITTED BY	APPROVED BY
	SUBMITTER'S TITLE	APPROVER'S TITLE

DESIGNED	A.M.P.	ISSUED BY	DATE 01/26/24	JCN 23980071
DRAWN	P.S.	TERMINAL ENGINEERING CENTER, CHICAGO	DRAWING NO	REV
CHECKED	S.G.		DLH-E-ATCT-G000	

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SHEET INDEX	
SHEET NUMBER	SHEET NAME
GENERAL	
G000	COVER SHEET
G001	SHEET INDEX
G101	EXITING PLAN - LEVEL 1
G102	FIRE RATING PLAN - LEVEL 1
G104	LIFE SAFETY PLANS - AREA A - LEVELS 2-3
G105	LIFE SAFETY PLANS - AREA A - LEVELS 4-7
G106	LIFE SAFETY PLANS - AREA A - LEVELS 8-9
DEMOLITION	
D001	EXISTING SITE AND DEMOLITION PLAN MAIN PROJECT LOCATION
D002	EXISTING SITE AND DEMOLITION PLAN EXISTING TOWER LOCATION
CIVIL	
C001	LEGENDS
C002	GENERAL LOCATION PLAN / MAP
C003	TOPOGRAPHICAL AND SITE SURVEY
C004	BORING LOG
C005	SITE LAYOUT PLAN
C006	SITE LAYOUT ELECTRICAL PLAN
C007	EXISTING AIRFIELD ELECTRICAL PLAN
C008	PROPOSED AIRFIELD ELECTRICAL PLAN
ARCHITECTURE	
A101	OVERALL FLOOR PLAN - LEVEL 1
A104	FLOOR PLANS - AREA A - LEVELS 1-4
A105	FLOOR PLANS - AREA A - LEVELS 5-8
A106	FLOOR PLANS - AREA A - WALKWAY & CAB LEVELS
A141	ROOF PLAN - BASE BUILDING
A142	ROOF PLAN - TOWER
A201	OVERALL ELEVATIONS - BASE BUILDING
A202	OVERALL ELEVATIONS - TOWER
A301	OVERALL SECTIONS - BASE BUILDING
A302	OVERALL SECTIONS - TOWER
A901	ARCHITECTURAL PERSPECTIVE VIEWS
STRUCTURAL	
S110	OVERALL ROOF FRAMING PLAN
ELECTRICAL	
E701	ELECTRICAL SINGLE LINE DIAGRAM

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DEPARTMENT OF TRANSPORTATION
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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

SHEET INDEX

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BASE BUILDING CORRIDOR TRAVEL DISTANCES

TECH OPS SSC MANAGER B0126 TO EXIT #7: 146'- 1"
SMALL CONFERENCE ROOM B0146 TO EXIT #2: 114'- 0"
AT COACH B0119 TO EXIT #1: 148'- 2"

OCCUPANT LOAD CALCULATIONS

STORAGE / MECHANICAL EQUIPMENT ROOMS = 300 SF/PERSON
INDUSTRIAL = 100 SF/PERSON
BUSINESS = 150 SF/PERSON
ASSEMBLY = 15 SF/PERSON
LOCKER ROOMS = 50 SF/PERSON
EXERCISE = 50 SF/PERSON
CONTROL TOWER OBSERVATION LEVEL = 40 SF/PERSON

TOTAL BASE BUILDING OCCUPANT LOAD = 157
TOTAL TOWER OCCUPANT LOAD = 41

AREA CALCULATION - NET SF

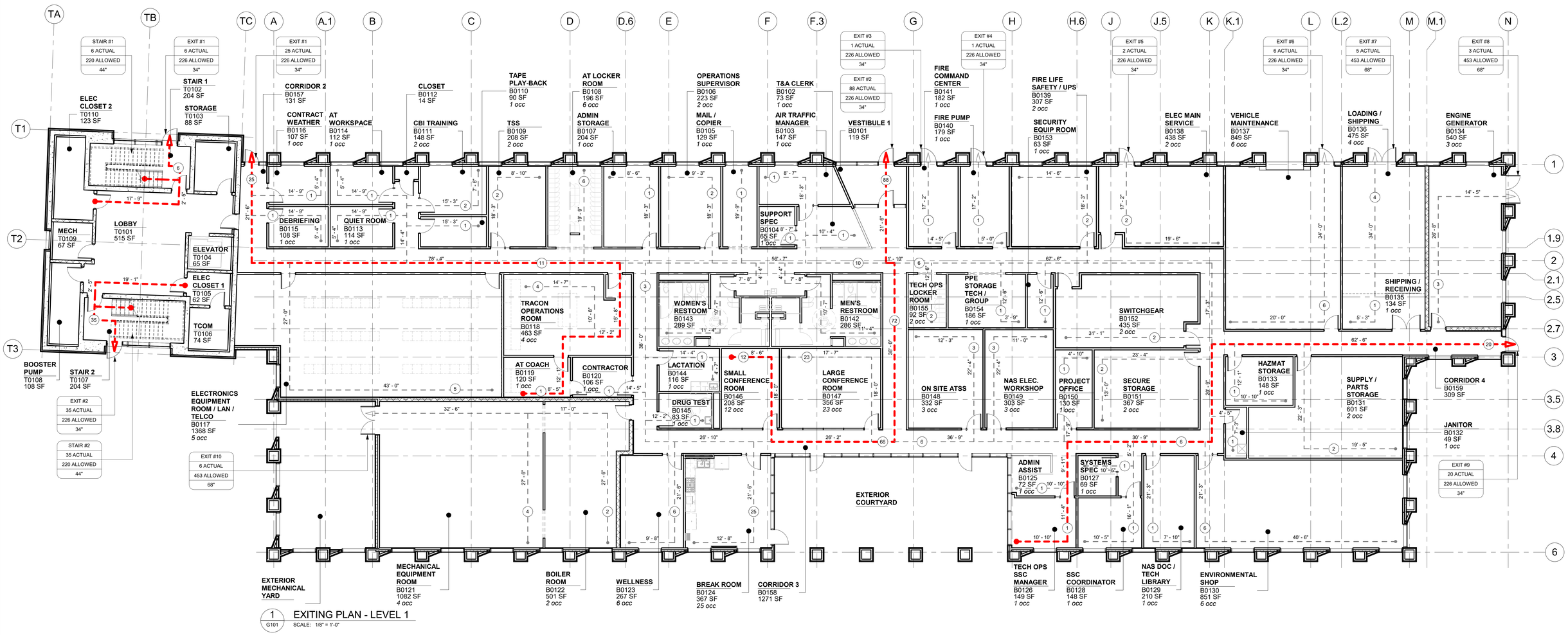
BASE BUILDING: 18,013 SF
TOWER: 11,363 SF

LIFE SAFETY LEGEND

- DIRECTION OF OCCUPANT FLOW AND DIMENSIONED MAXIMUM TRAVEL DISTANCE ALONG ROUTE
- XX — NUMBER OF OCCUPANTS ADVANCING ALONG EGRESS ROUTE
- EXIT SIGN
- WALL MOUNTED FIRE EXTINGUISHER (FE)
- FULLY RECESSED FIRE EXTINGUISHER CABINET (FEC)
- REF SPECIFICATION FOR LIST OF FIRE EXTINGUISHER TYPES
- EXIT XX" / XX ACTUAL / XX ALLOWED / XX" — EXIT LABEL; ACTUAL NUMBER OF OCCUPANTS; ALLOWED NUMBER OF OCCUPANTS; EGRESS WIDTH AT EXIT
- **ROOM NAME** / 101 / 150 SF / *XXXX occ* — ROOM NAME LABEL; ROOM NUMBER; ROOM AREA; OCCUPANCY OF ROOM

SHEET GENERAL NOTES

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1 G101 EXITING PLAN - LEVEL 1
SCALE: 1/8" = 1'-0"

0 8' 16'
SCALE: 1/8"=1'-0"



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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

EXITING PLAN - LEVEL 1

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

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LIFE SAFETY LEGEND

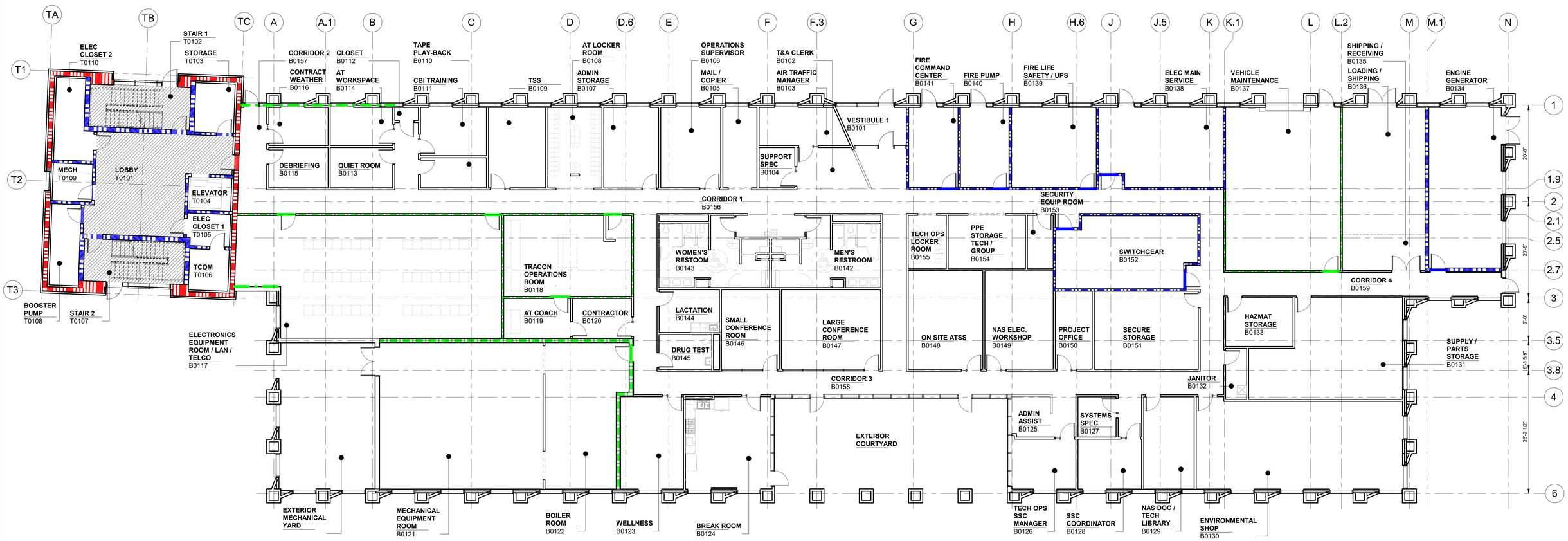
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3 HR RATED WALL	REF SPECIFICATION FOR LIST OF FIRE EXTINGUISHER TYPES
AREA OF SMOKEPROOF ENCLOSURE	EXIT LABEL ACTUAL NUMBER OF OCCUPANTS ALLOWED NUMBER OF OCCUPANTS EGRESS WIDTH AT EXIT
NUMBER OF OCCUPANTS ADVANCING ALONG EGRESS ROUTE	ROOM NAME LABEL ROOM NUMBER ROOM AREA OCCUPANCY OF ROOM

EXIT XX"
XX ACTUAL
XX ALLOWED
XX"

ROOM NAME
101
150 SF
XXXX occ

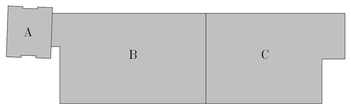
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1 G102 FIRE RATING PLAN - LEVEL 1
SCALE: 1/8" = 1'-0"

0 8' 16'
SCALE: 1/8"=1'-0"



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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

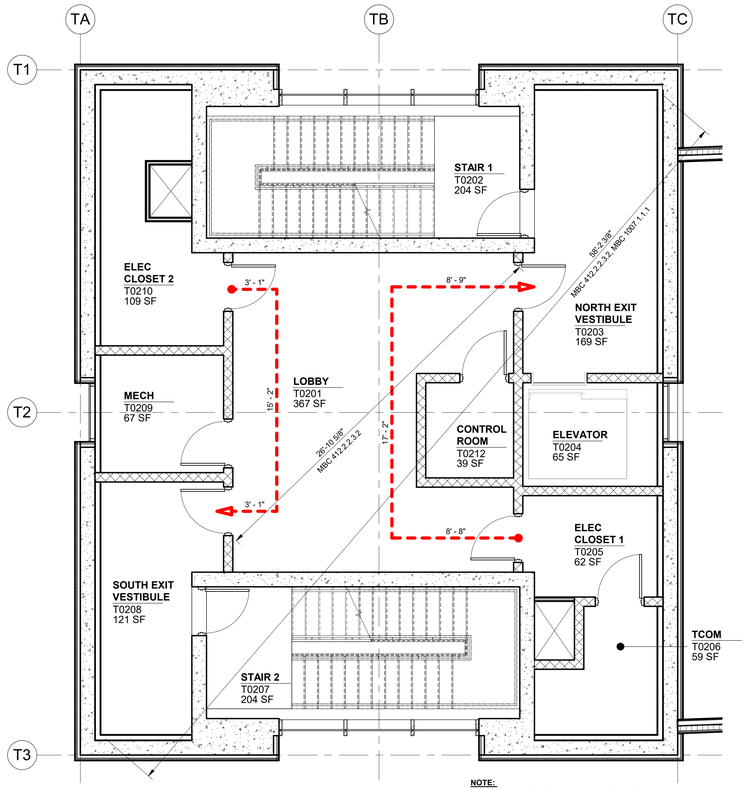
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FIRE RATING PLAN - LEVEL 1

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

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	DESIGNED A.M.P.	ISSUED BY TERMINAL ENGINEERING CENTER, CHICAGO	DATE 01/26/24 JCN 23980071
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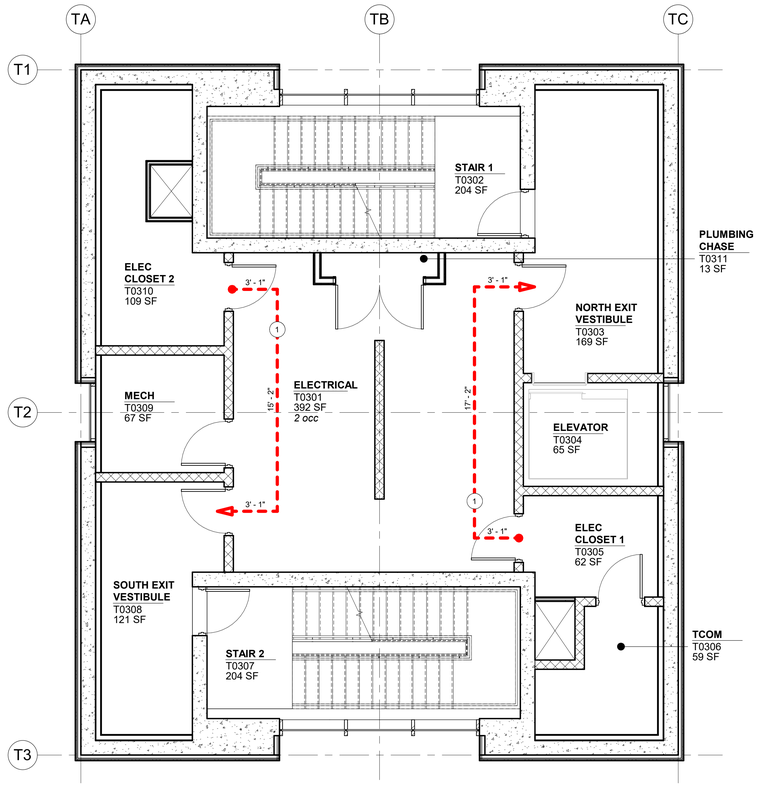
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1 G104 EXITING PLAN - AREA A - LEVEL 2

SCALE: 1/4" = 1'-0"

NOTE:
PER 2020 MINNESOTA BUILDING CODE SECTION 412.2.2.3.2, WHERE AN AIRPORT CONTROL TOWER IS EQUIPPED THROUGHOUT WITH AN AUTOMATIC SPRINKLET SYSTEM, THE EXIT SEPARATION DISTANCE SHALL NOT BE LESS THAN ONE-FOURTH THE LENGTH OF THE MAXIMUM OVERALL DIMENSION OF THE AREA SERVED.



2 G104 EXITING PLAN - AREA A - LEVEL 3

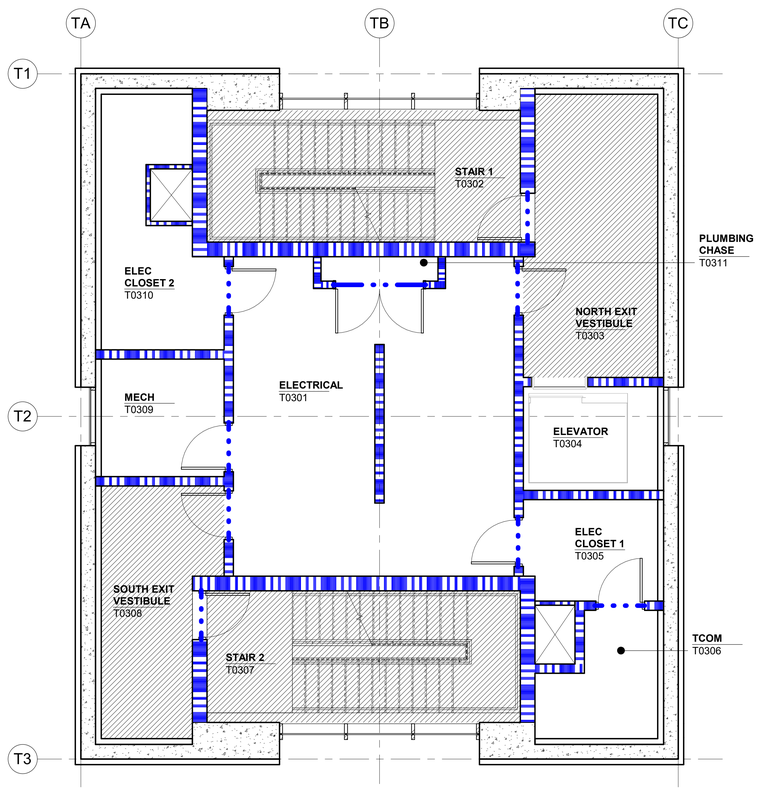
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LIFE SAFETY LEGEND

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- 2 HR RATED WALL
- 3 HR RATED WALL
- AREA OF SMOKEPROOF ENCLOSURE
- (XX) NUMBER OF OCCUPANTS ADVANCING ALONG EGRESS ROUTE
- EXIT SIGN
- WALL MOUNTED FIRE EXTINGUISHER (FE)
- FULLY RECESSED FIRE EXTINGUISHER CABINET (FEC) REF SPECIFICATION FOR LIST OF FIRE EXTINGUISHER TYPES
- EXIT XX" / XX ACTUAL / XX ALLOWED / XX" — EXIT LABEL, ACTUAL NUMBER OF OCCUPANTS, ALLOWED NUMBER OF OCCUPANTS, EGRESS WIDTH AT EXIT
- **ROOM NAME** 101 150 SF *XXXX occ* — ROOM NAME LABEL, ROOM NUMBER, ROOM AREA, OCCUPANCY OF ROOM



3 G104 FIRE RATING PLAN - AREA A - LEVEL 2

SCALE: 1/4" = 1'-0"

4 G104 FIRE RATING PLAN - AREA A - LEVEL 3

SCALE: 1/4" = 1'-0"

0 4' 8'

SCALE: 1/4"=1'-0"



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NEW ATCT & BASE BUILDING

LIFE SAFETY PLANS - AREA A - LEVELS 2-3

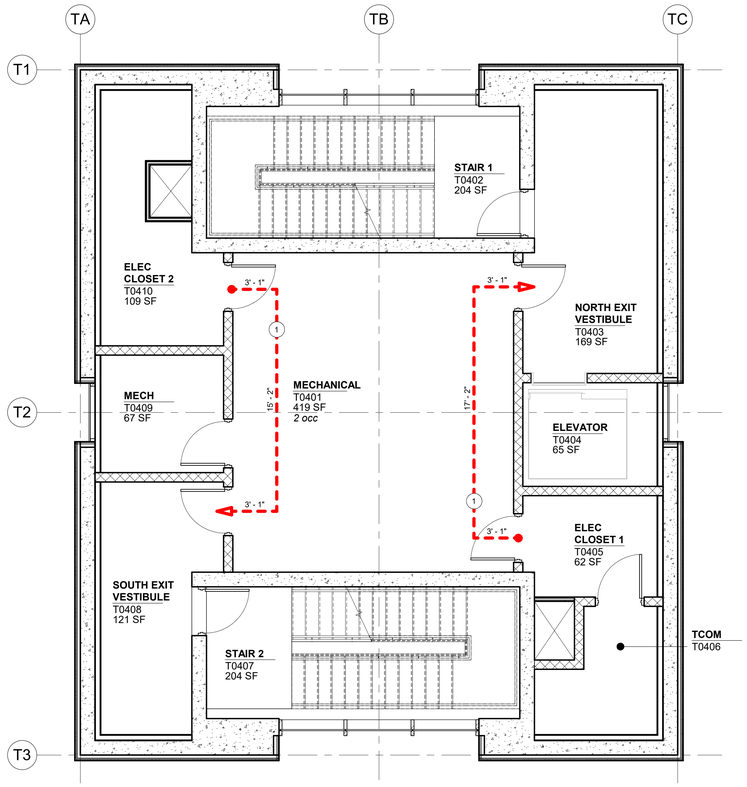
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CHECKED	S.G.			

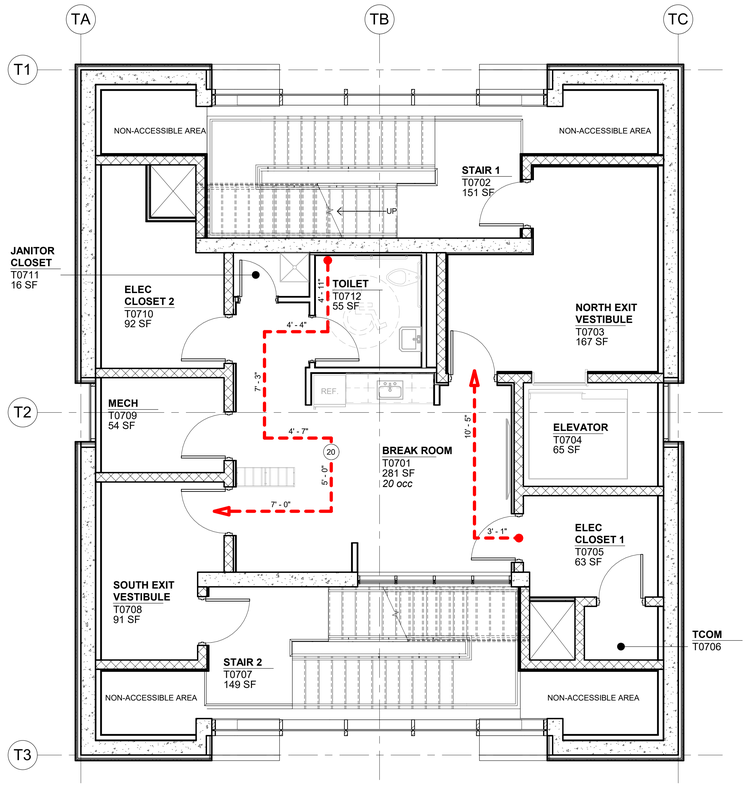
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1 G105 EXITING PLAN - AREA A - LEVELS 4-6

SCALE: 1/4" = 1'-0"



2 G105 EXITING PLAN - AREA A - LEVEL 7

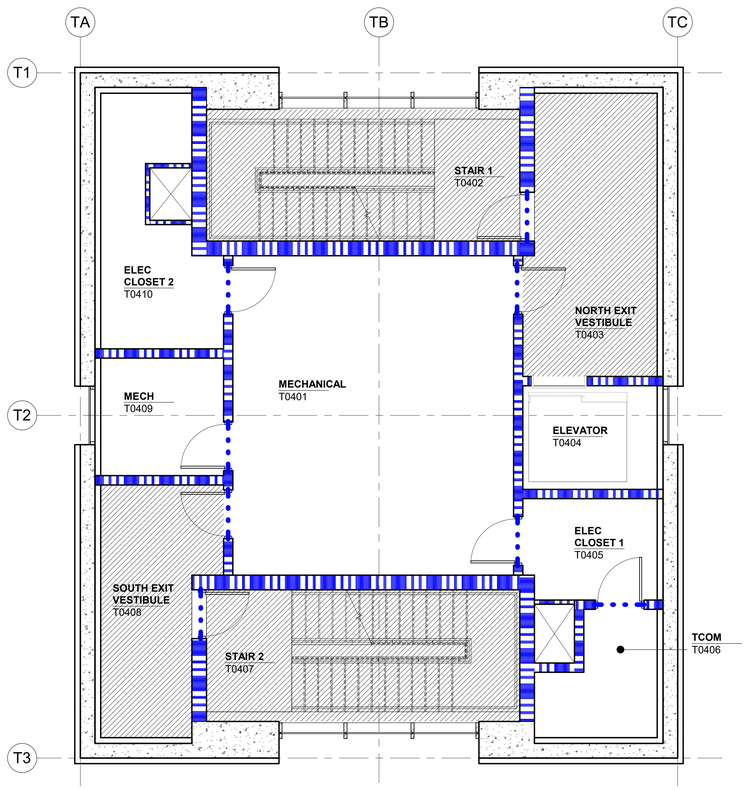
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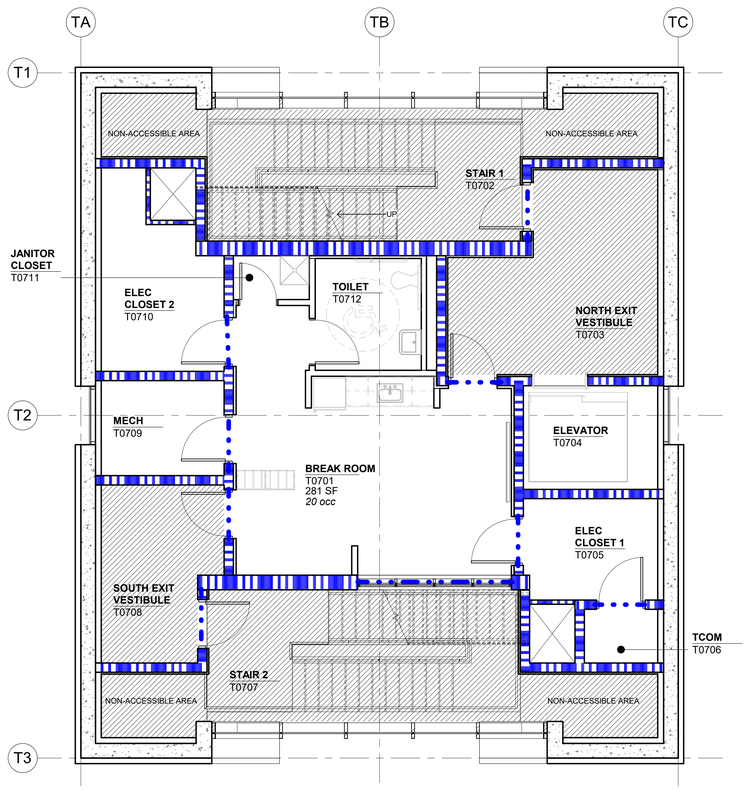
LIFE SAFETY LEGEND

- DIRECTION OF OCCUPANT FLOW AND DIMENSIONED MAXIMUM TRAVEL DISTANCE ALONG ROUTE
- 1 HR RATED WALL
- 2 HR RATED WALL
- 3 HR RATED WALL
- AREA OF SMOKEPROOF ENCLOSURE
- XX — NUMBER OF OCCUPANTS ADVANCING ALONG EGRESS ROUTE
- EXIT SIGN
- WALL MOUNTED FIRE EXTINGUISHER (FE)
- FULLY RECESSED FIRE EXTINGUISHER CABINET (FEC) REF SPECIFICATION FOR LIST OF FIRE EXTINGUISHER TYPES
- EXIT XX" / XX ACTUAL / XX ALLOWED / XX" — EXIT LABEL, ACTUAL NUMBER OF OCCUPANTS, ALLOWED NUMBER OF OCCUPANTS, EGRESS WIDTH AT EXIT
- **ROOM NAME** / 101 / 150 SF / *XXXX occ* — ROOM NAME LABEL, ROOM NUMBER, ROOM AREA, OCCUPANCY OF ROOM



3 G105 FIRE RATING PLAN - AREA A - LEVELS 4-6

SCALE: 1/4" = 1'-0"



4 G105 FIRE RATING PLAN - AREA A - LEVEL 7

SCALE: 1/4" = 1'-0"

0 4' 8'

SCALE: 1/4"=1'-0"



KEY PLAN

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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

LIFE SAFETY PLANS - AREA A - LEVELS 4-7

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

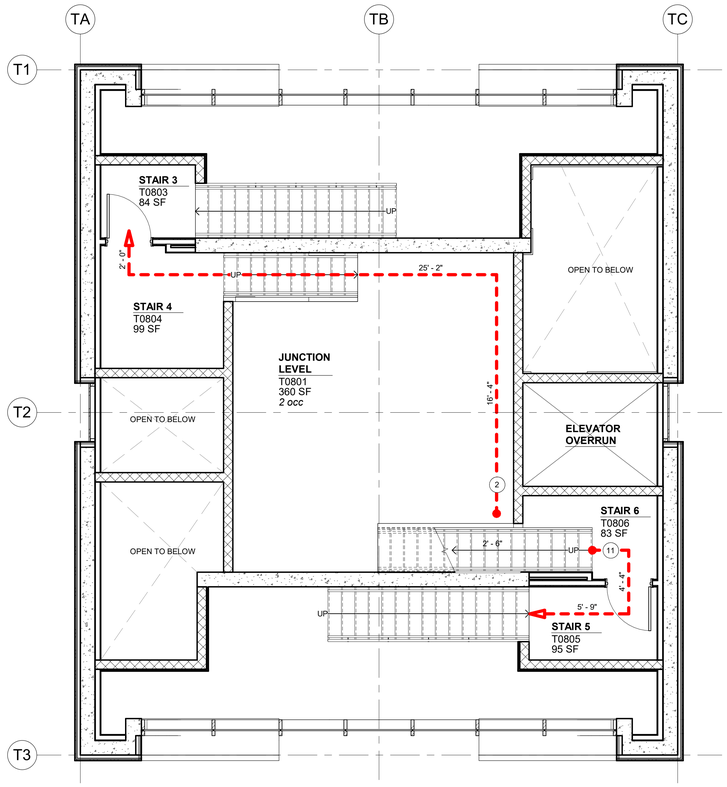
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SUBMITTER'S TITLE	APPROVER'S TITLE

DESIGNED	A.M.P.	ISSUED BY	DATE 01/26/24 JCN 23980071
DRAWN	P.S.	TERMINAL ENGINEERING CENTER, CHICAGO	DRAWING NO DLH-E-ATCT-G105 REV
CHECKED	S.G.		

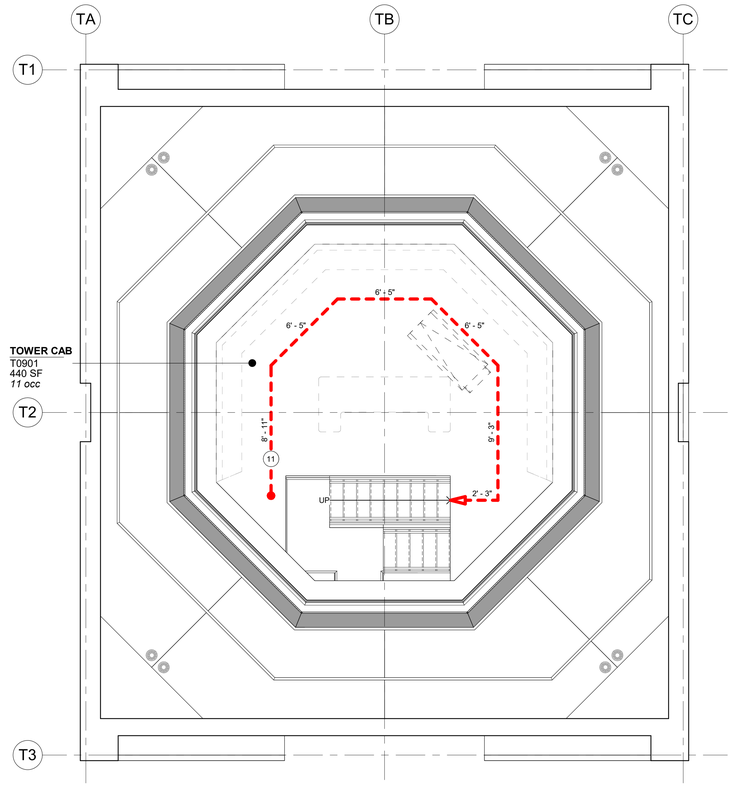
exp PROJECT NO. CHI-230105144-A0

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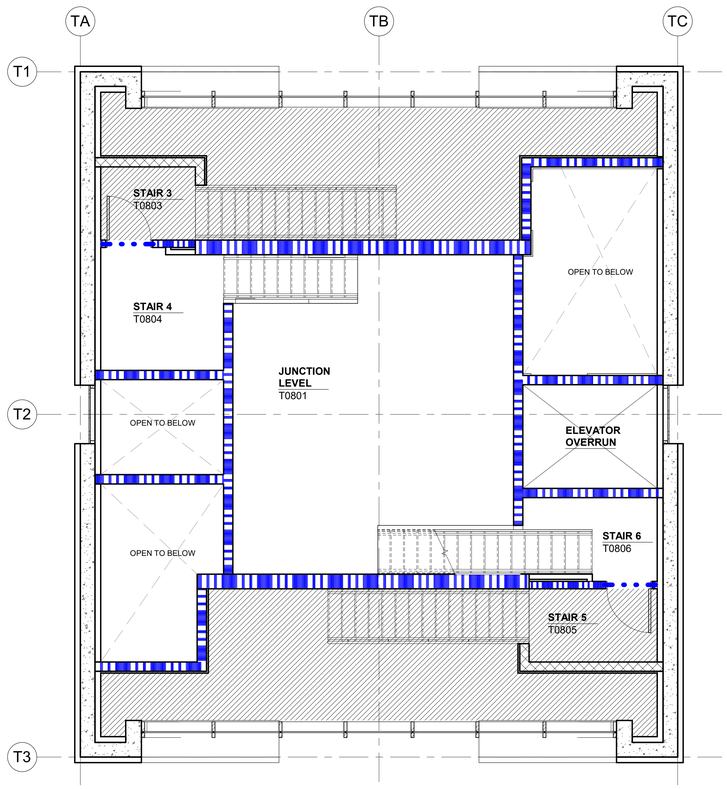
1 G106 EXITING PLAN - AREA A - LEVEL 8 - JUNCTION

SCALE: 1/4" = 1'-0"



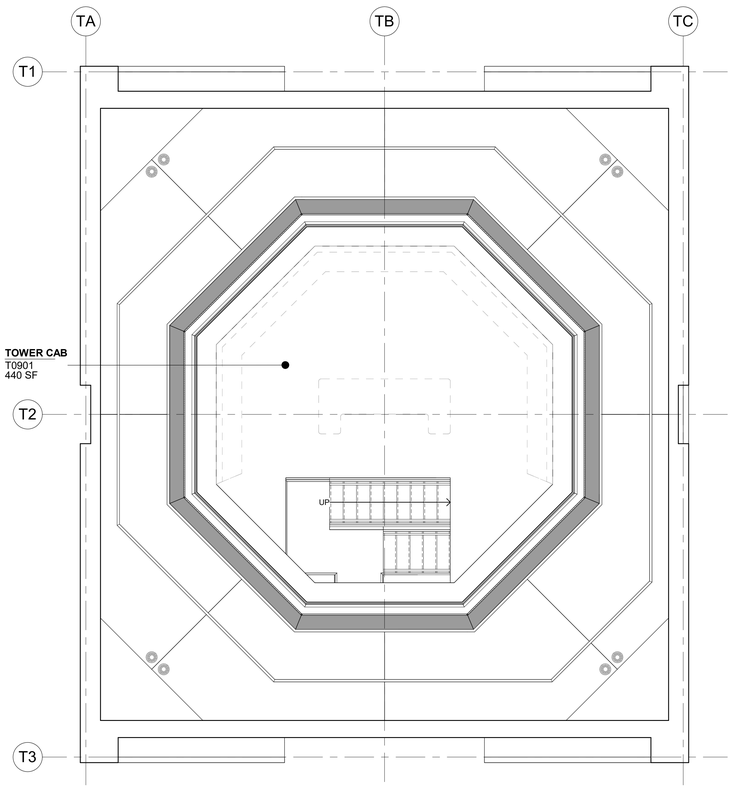
2 G106 EXITING PLAN - AREA A - LEVEL 9 - CAB

SCALE: 1/4" = 1'-0"



3 G106 FIRE RATING PLAN - AREA A - LEVEL 8 - JUNCTION

SCALE: 1/4" = 1'-0"



4 G106 FIRE RATING PLAN - AREA A - LEVEL 9 - CAB

SCALE: 1/4" = 1'-0"

0 4' 8'

SCALE: 1/4"=1'-0"

SHEET GENERAL NOTES

1. PER 2020 MBC 412.2.2.3, NOT LESS THAN ONE EXIT STAIRWAY SHALL BE PERMITTED FOR AIRPORT TRAFFIC CONTROL TOWERS OF ANY HEIGHT PROVIDED THAT THE OCCUPANT LOAD PER FLOOR IS NOT GREATER THAN 15 AND THE AREA DOES NOT EXCEED 1,500 SQUARE FEET.
2. PER 2020 MBC 1017.2, MAXIMUM TRAVEL DISTANCE IN A BUILDING EQUIPPED WITH A SPRINKLER IS 300'-0".
3. PER 2020 MBC 1020.5.2, THE MAXIMUM DEAD-END CORRIDOR TRAVEL DISTANCE IS 50'-0".
4. PER TFDS 12.7.D OCCUPANT LOADS FOR BASE BUILDING AND ATCT TO BE CALCULATED SEPARATELY. ONLY THE LARGEST EQUIPMENT SPACE SHOULD BE INCLUDED IN THE TOTAL TOWER CALCULATED BUILDING OCCUPANT LOAD.
5. REFERENCE MECHANICAL DRAWINGS FOR LOCATIONS OF FIRE DAMPER REQUIREMENTS IN DUCTWORK.
6. REFERENCE ELECTRICAL DRAWINGS FOR LOCATION OF FIRE ALARM SYSTEM.
7. REFERENCE REFLECTED CEILING PLANS AND ELECTRICAL DRAWINGS FOR EXIT LIGHT LOCATIONS.
8. REFERENCE FIRE ALARM AND FIRE SPRINKLER DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO THE AUTOMATIC SPRINKLER SYSTEM.
9. SQUARE FOOTAGE INDICATED ON THE LIFE SAFETY PLAN RELATES TO OCCUPANT LOAD ONLY AND SHALL NOT BE USED FOR ANY OTHER PURPOSE.
10. ALL FIRE WALLS, FIRE BARRIERS, FIRE PARTITIONS, SMOKE BARRIERS, AND SMOKE PARTITIONS ARE REQUIRED TO BE PERMANENTLY IDENTIFIED WITH STENCILING PER 2020 MBC 703.5. IDENTIFICATION MUST BE LOCATED WITHIN 15 FEET OF THE END OF EACH WALL AND AT INTERVALS NOT EXCEEDING 30 FEET. LETTERING MUST NOT BE LESS THAN 3 INCHES IN HEIGHT WITH A MINIMUM 3/8 INCH STROKE IN CONTRASTING COLOR.

LIFE SAFETY LEGEND

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DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

LIFE SAFETY PLANS - AREA A - LEVELS 8-9

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

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CHECKED	S.G.		DLH-E-ATCT-G106		

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4875 MALMSTROM STREET

MALSTROM STREET

4550 STEBNER ROAD

JET DULUTH
4913 AIRPORT ROAD

STEBNER ROAD

LACKLAND STREET

AIRPORT ROAD

REMOVE CONC. SLAB

REMOVE BOLLARDS (2)

REMOVE CONC. SLAB

REMOVE HYDRANT ASSEMBLY

REMOVE BOLLARDS (2)

REMOVE EXISTING ABOVE GROUND TANK AND RETURN TO OWNER

REMOVE GAS MAIN (TYP.)

REMOVE FENCE

REMOVE GAS VALVE

CONSTRUCTION LIMITS

REMOVE STUMP (TYP.)

REMOVE MANHOLE

REMOVE 8" VCP SANITARY PIPE

REMOVE HYDRANT ASSEMBLY

OVERHEAD POWER LINES AND POWER POLES TO BE REMOVED PRIOR TO CONSTRUCTION (TYP.) (N.I.C.)

REMOVE GATE VALVE

REMOVE BITUMINOUS PAVEMENT (TYP.)

REMOVE WATER SERVICE

REMOVE 3'x3' CONC. FOUNDATION (TYP.)

REMOVE MANHOLE

REMOVE 3' DIA. CONC. FOUNDATION (TYP.)

REMOVE CURB & GUTTER

SAWCUT BITUMINOUS PAVEMENT (FULL DEPTH) (TYP.)

KEYMAP

scale 10: 20 0 20 40 feet

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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

EXISTING SITE AND DEMOLITION PLAN
MAIN PROJECT LOCATION

REV

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TOWER RAMP

REMOVE BUILDING

REMOVE BUILDING

EXISTING AIR TRAFFIC CONTROL TOWER

20 0 20 40
scale 10 feet

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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

EXISTING SITE AND DEMOLITION PLAN
EXISTING TOWER LOCATION

REV

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EXISTING

- RIGHT OF WAY
- PERMANENT EASEMENT
- PROPERTY LINE
- HORIZONTAL CONTROL POINT
- BENCHMARK
- SURVEY MARKER
- SOIL BORING
- SANITARY SEWER AND MANHOLE
- FORCE MAIN AND LIFT STATION
- SANITARY SEWER SERVICE & CLEANOUT
- WATER MAIN, HYDRANT, VALVE AND MANHOLE
- WATER SERVICE AND CURB STOP BOX
- STORM SEWER, MANHOLE AND CATCH BASIN
- CULVERT AND APRON ENDWALL
- GAS MAIN, VALVE, VENT AND METER
- HANDHOLE
- BURIED FIBER OPTIC CABLE AND MANHOLE
- BURIED PHONE CABLE, PEDESTAL AND MANHOLE
- BURIED TV CABLE, PEDESTAL AND MANHOLE
- BURIED ELECTRIC MANHOLE, CABLE, PEDESTAL, TRANSFORMER AND METER
- OVERHEAD WIRE, POLE AND GUY WIRE
- LIGHT POLE
- STREET NAME SIGN
- SIGN (NON STREET NAME)
- DECIDUOUS AND CONIFEROUS TREE
- BUSH / SHRUB AND STUMP
- EDGE OF WOODED AREA
- BUILDING
- BARBED WIRE FENCE
- CHAIN LINK FENCE
- POST / BOLLARD
- BURIED FIBER OPTIC DUCT AND VAULT
- BURIED PHONE DUCT AND VAULT
- BURIED ELECTRIC DUCT AND VAULT
- PETROLEUM PIPELINE
- UNDERGROUND STEAM
- OIL PIPELINE
- FLAG POLE
- MAIL BOX
- SPRINKLER
- EDGE OF VEGETATION OR LANDSCAPING

REMOVALS

- BITUMINOUS PAVEMENT MILLING
- BITUMINOUS PAVEMENT REMOVAL
- CONCRETE PAVEMENT REMOVAL
- SAWCUT
- XXXX CULVERT REMOVAL (INCLUDES APRONS)
- CLEARING AND GRUBBING
- CURB & GUTTER REMOVAL
- SIDEWALK REMOVAL

PAVING

- BITUMINOUS
- CONCRETE
- GRAVEL
- 20' CLEAR ZONES
- CONCRETE CURB AND GUTTER

NEW

- STREET CENTERLINE
- RIGHT-OF-WAY
- PERMANENT EASEMENT
- TEMPORARY EASEMENT
- CONSTRUCTION LIMITS
- SANITARY SEWER, BULKHEAD AND MANHOLE
- FORCE MAIN
- SANITARY SERVICE AND CLEANOUT
- WATER MAIN, TEE, HYDRANT, BULKHEAD AND VALVE
- WATER VALVE MANHOLE, REDUCER, BEND AND CROSS
- WATER SERVICE AND CURB STOP BOX
- STORM SEWER, MANHOLE AND CATCH BASIN
- CULVERT AND APRON ENDWALL
- DRAIN TILE
- DITCH / SWALE
- RIPRAP
- STREET NAME SIGN
- SIGN (NON STREET NAME)
- RETAINING WALL
- PARKING METER, E911 SIGN, AIRCRAFT TIE-DOWN
- PHONE DUCT
- PHONE CONDUIT
- PHONE OVERHEAD
- NATURAL GAS MAIN
- FIBER OPTIC DUCT
- FIBER OPTIC CONDUIT

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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

LEGENDS

REV

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DESIGNED Designer
DRAWN Author
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ISSUED BY
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DATE Issue Date JCN 23980071

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100 0 100 200
scale 50 feet

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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

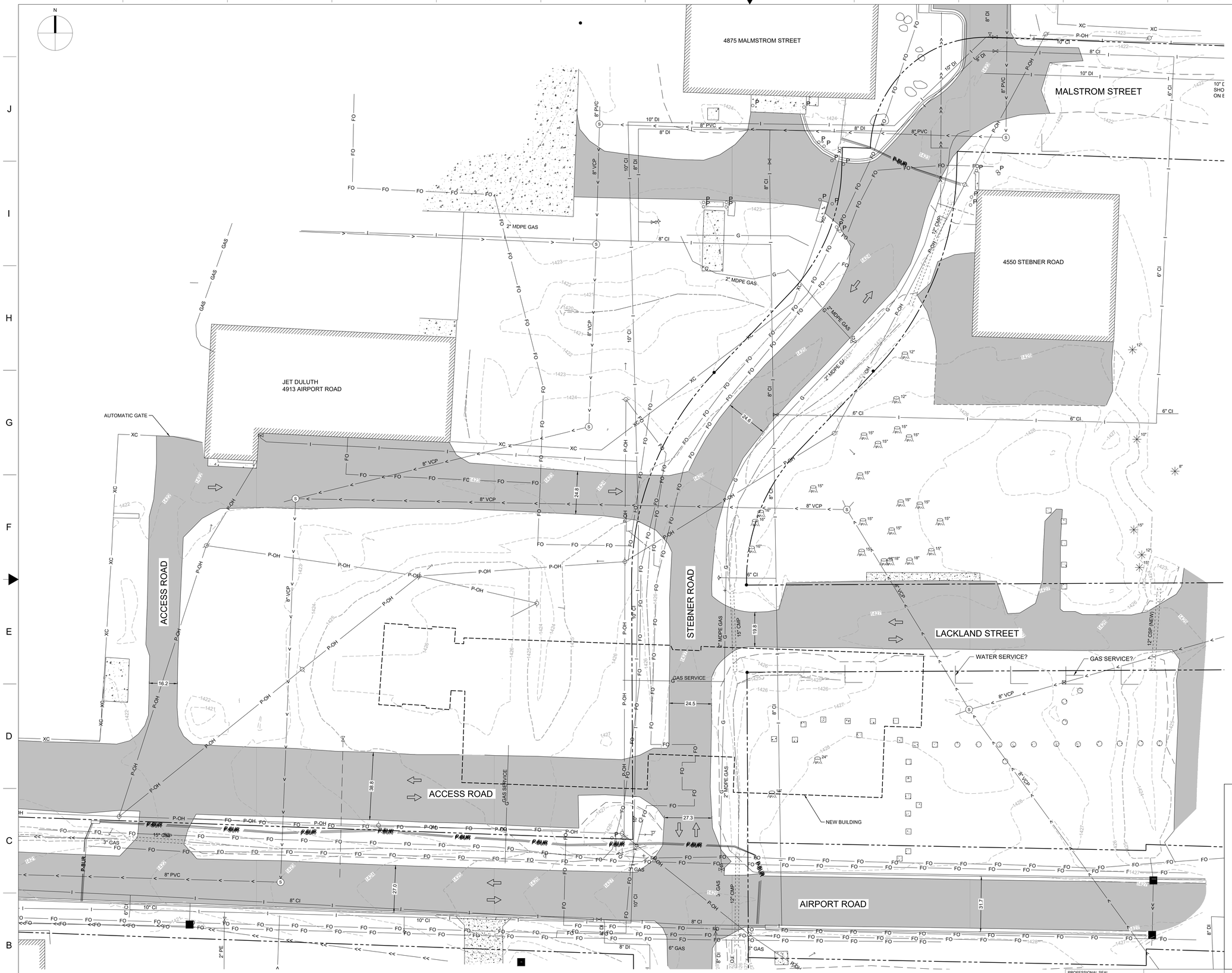
GENERAL LOCATION PLAN / MAP

REV

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LEGEND

- FOUND IRON MONUMENT, CAST IRON MONUMENT, RANGE POINT AND SECTION CORNER (WR)
- SET 1/2" IRON PIPE WITH CAP STAMPED ----, SET MAG NAIL
- SURVEY CONTROL POINT, BENCHMARK
- SANITARY MANHOLE, CLEAN OUT, LIFT STATION AND FORCE MAIN MANHOLE
- SANITARY GRAVITY MAINLINE
- SANITARY FORCE MAIN
- SANITARY SERVICE LINE
- STORM MANHOLE AND CATCH BASIN
- STORM SEWER GRAVITY MAINLINE
- STORM SEWER FORCE MAIN
- CULVERT
- TILE LINE
- WATER MANHOLE, GATE VALVE, HYDRANT, CURB STOP AND METER
- WATER MAIN LINE
- WATER SERVICE
- POWER POLE, ANCHOR, LIGHT POLE AND ELECTRIC METER
- BURIED ELECTRIC CABLE
- ELECTRIC PEDESTAL, MANHOLE, SIGN AND VAULT
- OVERHEAD POWER
- TELEPHONE PEDESTAL, SIGN, MANHOLE AND VAULT
- BURIED TELEPHONE CABLE
- CABLE TV PEDESTAL, MANHOLE, SIGN AND VAULT
- BURIED CABLE TV CABLE
- FIBER OPTIC PEDESTAL AND SIGN
- BURIED FIBER OPTIC CABLE
- GAS SIGN, METER, VALVE, RISER AND VAULT
- BURIED GAS LINE
- MAILBOX, FLAG POLE, POST/BOLLARD, PARKING METER
- ROAD SIGN, STREET NAME SIGN, SIGNAL BOX, AND E911 SIGN
- UNIDENTIFIED PEDESTAL, MANHOLE, HAND HOLE AND VAULT
- DECIDUOUS TREE, CONIFEROUS TREE, STUMP AND BUSH
- TREE LINE
- BOUNDARY LINE
- ADJACENT DEED OR PLAT LINE
- ROAD RIGHT OF WAY LINE
- SECTION LINE
- QUARTER SECTION LINE
- QUARTER-QUARTER SECTION LINE
- PERMANENT EASEMENT LINE
- UTILITY EASEMENT LINE
- FENCE LINE
- CHAIN LINK FENCE
- MAJOR CONTOUR LINE AND LABEL
- MINOR CONTOUR LINE AND LABEL
- BITUMINOUS SURFACE
- CONCRETE SURFACE
- GRAVEL SURFACE
- BUILDING

FLOOD PLAIN

OFFICIAL FEMA MAP PANEL 2704210020 B (NOT PRINTED) EFF. DATE 2/1/1980

UNOFFICIAL PRELIMINARY FEMA MAP PANEL 27137C3754E EFF. DATE - PRELIMINARY ZONE "X (UN-SHADED) - "AREAS OF MINIMAL FLOOD HAZARD"

HORIZONTAL DATUM

SURVEY BASED ON THE OLMSTED COUNTY COORDINATE SYSTEM (NAD 83-2011 ADJ.) WHEREIN THE S. LINE OF THE SE 1/4 , SEC. 2, T50N, R15W, BEARS S 89°51'44" W

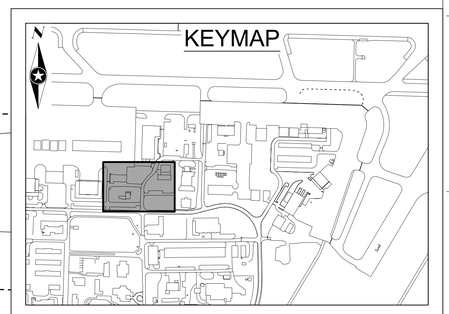
VERTICAL DATUM

THE ELEVATIONS ON THIS PLAN ARE BASED ON THE NAVD 1988 DATUM, AND WERE OBTAINED VIA GPS UTILIZING GEOD 12A

BENCHMARKS

BM1 -

scale 20 0 20 40 feet



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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

TOPOGRAPHICAL AND SITE SURVEY

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

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LOG OF BORING

BRAUN INTERTEC — The Science You Build On.

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

SB-1

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188451.5 EASTING: 563422.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1426.8 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1425.6 / 0.3		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, trace roots, reddish brown and dark brown, moist		9-9-11 (20) 12"			
				2-4-4 (8) 10"			
1418.3 / 7.5		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff (GLACIAL TILL)		2-3-6 (9) 12"	1		
1415.3 / 10.5		POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, with Gravel, reddish brown, wet, medium dense (GLACIAL OUTWASH)		5-12-6 (20) 8"			
1414.0 / 11.5	▼			4-4-3 (7) 12"			
1411.8 / 14.0		SILT (ML), with Sand, reddish brown, moist to wet, loose (GLACIAL TILL)		4-10-11 (21) 15"			
		SANDY SILT (ML), with Gravel, reddish brown, moist, medium-dense to very dense (GLACIAL TILL)		5-12-20 (32) 15"			
				11-21-25 (46) 12"			Auger refusal encountered at 26.2 feet
1399.5 / 26.3		END OF BORING		50/1" (REF) 0"			Water observed at 10.5 feet with 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 12.0 feet at end of drilling.

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SB-2

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188640.9 EASTING: 563638.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1424.2 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1423.7 / 0.5		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, reddish brown, moist to stiff (GLACIAL TILL)		2-3-4 (7) 15"			
1421.2 / 3.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff (GLACIAL TILL)		3-4-10 (14) 16"	3		
		Hard drilling at 6.5 feet; possible cobbles or boulders		5-7-5 (12) 10"	1.5		
1415.2 / 9.0		POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, reddish brown, wet, loose to medium dense (GLACIAL OUTWASH)		3-4-5 (9) 12"			
				7-6-8 (16) 2"			
1410.2 / 14.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, stiff (GLACIAL TILL)		3-6-9 (15) 16"	3		
1401.2 / 23.0		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, wet, medium dense to very dense (GLACIAL TILL)		1-4-11 (15) 18"	2.5		
				4-6-7 (13) 3"			Auger refusal encountered at 27.5 feet
1396.6 / 27.6		END OF BORING		50/1" (REF) 1"			Water observed at 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 21.4 feet at end of drilling.

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SB-3

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188598.3 EASTING: 563471.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1423.9 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1423.6 / 0.3		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium to stiff (GLACIAL TILL)		3-4-4 (8) 12"	1.5		
1417.4 / 6.5		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, reddish brown, wet, medium dense (GLACIAL OUTWASH)		2-3-4 (7) 12"	2		
1413.9 / 10.0		SANDY SILT (ML), with Gravel, reddish brown, moist, dense (GLACIAL TILL)		3-4-8 (12) 12"			
		Hard drilling at 11 feet, possible cobbles or boulders		6-18-14 (32) 12"			
1409.9 / 14.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, very stiff (GLACIAL TILL)		7-12-18 (30) 4"			
		SILT (ML), trace Sand, reddish brown, moist to wet, medium dense (GLACIAL TILL)		6-8-15 (23) 18"	3.5		
1405.9 / 18.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		9-12-10 (22) 12"			
		Hard drilling at 18 feet, possible cobbles or boulders		50/2" (REF) 2"			
1401.7 / 22.2		END OF BORING					Auger refusal encountered at 22 feet
		Boring immediately backfilled with bentonite grout					Water observed at 7.5 feet with 7.0 feet of tooling in the ground while drilling.
							Water observed at 18.2 feet at end of drilling.

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SB-4

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188967.3 EASTING: 563395.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1424.6 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1423.8 / 0.8		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY, CLAYEY SAND (SC-SM), fine to coarse-grained, trace Gravel, reddish brown with brown, moist		2-6-9 (15) 12"			
1418.1 / 6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, dense (GLACIAL TILL)		7-10-9 (19) 10"			
		Hard drilling at 11 feet, possible cobbles or boulders		6-10-21 (31) 10"			
1413.1 / 11.5		POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, with Gravel, reddish brown, wet, loose (GLACIAL OUTWASH)		8-12-20 (32) 15"			
1410.6 / 14.0		SILT (ML), trace Sand, reddish brown, moist to wet, medium dense (GLACIAL TILL)		3-3-5 (8) 9"			
				3-7-7 (14) 18"			
1406.6 / 18.0		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)		20-16-11 (27) 12"			
				15-21-50 (71) 6"			
				45-70-50/4" (REF) 12"			

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SB-5

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188606.6 EASTING: 563353.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1422.3 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1422.0 / 0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown with brown, moist		5-7-7 (14) 10"			
				6-27-11 (38) 9"			
1413.3 / 9.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, very stiff to hard (GLACIAL TILL)		5-14-7 (21) 9"			
				4-18-12 (30) 10"	3.5		
1409.3 / 13.0		SANDY SILT (ML), with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)		6-21-14 (35) 10"	4.5		
1405.1 / 17.2		END OF BORING		6-18-12 (28) 12"			
		Boring immediately backfilled with bentonite grout		50/2" (REF) 2"			
							Auger refusal encountered at 17 feet
							Water observed at 15.0 feet with 14.5 feet of tooling in the ground while drilling.
							Water observed at 13.2 feet at end of drilling.

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SB-6

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188469.3 EASTING: 563353.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1422.8 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1422.0 / 0.8		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, trace roots, reddish brown and dark brown, moist		3-6-7 (13) 12"			
1418.8 / 4.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium (GLACIAL TILL)		3-3-5 (8) 15"	1		
1416.3 / 6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		4-10-15 (25) 18"			
		with Cobbles or boulders at 9.5 feet		38-20-12 (34) 15"			
				5-12-19 (31) 12"			
				6-13-16 (29) 15"			
1402.2 / 20.6		END OF BORING		40-30-50/1" (REF) 6"			Auger refusal encountered at 20.6 feet
		Boring immediately backfilled with bentonite grout					Water not observed while drilling.
							Water observed at 13.2 feet at end of drilling.

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SB-7

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188514.8 EASTING: 563646.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.3 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1425.5 / 0.8		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium (ALLUVIUM)		3-3-3 (6) 12"	0.75		
1422.3 / 4.0		SILT (ML), trace Sand, trace organic, reddish brown with dark gray, moist, loose (ALLUVIUM)		2-3-5 (8) 10"			
1419.8 / 6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		3-5-16 (21) 12"			
1418.3 / 8.0		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		13-33-13 (26) 10"			
1414.8 / 11.5		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, hard (GLACIAL TILL)		9-14-28 (42) 10"	4.5		
1411.9 / 14.4		*1-inch Sand seam at 13 feet*		50/5" (REF) 2"			
		END OF BORING					Auger refusal encountered at 14.4 feet
		Boring then backfilled with auger cuttings					Water observed at 9.5 feet with 9.5 feet of tooling in the ground while drilling.
							Water observed at 13.0 feet at end of drilling.

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SB-8

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188563.4 EASTING: 563544.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1425.7 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1425.2 / 0.5		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SILT (ML), trace Sand, slightly organic, reddish brown with dark gray, moist, loose (ALLUVIUM)		2-2-4 (6) 18"			
1418.2 / 7.5		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist, dense (GLACIAL TILL)		7-19-20 (39) 12"			
1416.2 / 9.5		SANDY SILT (ML), with Gravel, reddish brown, moist to wet, very dense (GLACIAL TILL)		9-23-35 (58) 10"			
1414.1 / 11.6		END OF BORING		50/1" (REF) 0"			
		Boring immediately backfilled with bentonite grout					Water observed at 10.0 feet while drilling.
							Water observed at 10.9 feet at end of drilling.

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SB-9

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188648.0 EASTING: 563568.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1424.7 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1424.4 / 0.3		SILTY SAND (SM), fine to coarse-grained, trace Gravel, dark brown, moist (TOPSOIL)		AU			
		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		3-4-5 (9) 10"			
1418.2 / 6.5		SANDY SILT (ML), with Gravel, with Cobbles, reddish brown, moist, very dense to dense (GLACIAL TILL)		4-7-6 (13) 9"			
		Hard drilling at 7 feet, possible cobbles or boulders		4-6-10 (16) 12"			
				16-40-50/3" (REF) 9"			
				6-34-21 (55) 15"			
				5-13-25 (38) 15"			
				13-21-37 (58) 18"			
				9-46-38 (84) 15"			
1398.7 / 26.0		END OF BORING		20-31-40 (71) 6"			
		Boring immediately backfilled with bentonite grout					Water observed at 19.5 feet of tooling in the ground while drilling.
							Water observed at 10.5 feet at end of drilling.

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SB-10

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188866.6 EASTING: 563646.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1424.2 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1423.5 / 0.7		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff to medium (GLACIAL TILL)		3-3-4 (7) 12"	1		
1416.2 / 8.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		5-6-15 (21) 12"	1		
		with cobbles at 12 feet		9-24-21 (45) 15"			
1407.7 / 16.5		END OF BORING		11-38-50/4" (REF) 15"			
		Boring immediately backfilled with bentonite grout		22-48-49 (97) 6"			
				50/1" (REF) 0"			
							Auger refusal encountered at 16.4 feet
							Water observed at 14.5 feet with 14.5 feet of tooling in the ground while drilling.
							Water observed at 12.5 feet at end of drilling.

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SB-11

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188870.4 EASTING: 563570.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.6 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1426.4 / 0.2		SILTY SAND (SM), fine to coarse-grained, trace Gravel, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown with brown, moist		3-3-3 (6) 8"			
1421.1 / 5.5		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		2-2-2 (4) 10"			
		1-inch Sand seam at 10-feet		5-11-10 (21) 15"			
		Hard drilling at 11.5 feet, possible cobbles or boulders		10-10-14 (24) 10"			
				5-10-13 (23) 12"			
1411.0 / 15.6		END OF BORING		8-30-50/1" (REF) 12"			Auger refusal encountered at 15.6 feet
		Boring immediately backfilled with bentonite grout					Water observed at 10.0 feet with 8.5 feet of tooling in the ground while drilling.
							Water observed at 14.2 feet at end of drilling.

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SB-12

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188451.2 EASTING: 563629.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/26/23 END DATE: 10/26/23
SURFACE ELEVATION: 1426.4 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1425.6 / 0.8		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SANDY LEAN CLAY (CL), trace Gravel, reddish brown with dark brown, moist		3-3-6 (9) 12"			
1421.4 / 5.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		4-9-10 (19) 4"			
				16-50/4" (REF) 8"			
1414.9 / 11.5		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist to wet, dense (GLACIAL TILL)		48-26-26 (81) 12"			
1411.4 / 15.0		SANDY SILT (ML), with Gravel, reddish brown, moist, very dense (GLACIAL TILL)		18-22-25 (47) 12"			
1408.9 / 17.6		END OF BORING		14-33-40 (73) 12"			
		Boring immediately backfilled with bentonite grout		50/1" (REF) 0"			Auger refusal encountered at 17.5 feet
							Water observed at 14.5 feet with 14.5 feet of tooling in the ground while drilling.
							Water observed at 13.5 feet at end of drilling.

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SB-13A

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188469.0 EASTING: 563633.0
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.8 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1425.9 / 0.7		CLAYEY SAND (SC), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown with dark brown, moist		3-4-8 (14) 10"			
1422.6 / 4.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		6-13-15 (28) 12"			
		END OF BORING		6-12-16 (28) 18"			
		Boring immediately backfilled with bentonite grout		5-18-24 (42) 15"			
1415.0 / 11.6				50/1" (REF) 0"			
							Auger refusal encountered at 11.5 feet
							Water not observed while drilling.
							Water not observed at end of drilling.

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SB-13B

BORING:
LOCATION: Captured with RTK GPS. Boring offset 5 feet E due to boulder
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188469.0 EASTING: 563633.0
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.8 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
		See Boring SB-13A		AU			
1414.6 / 12.0		SANDY SILT (ML), with Gravel, reddish brown, moist, very dense (GLACIAL TILL)		14-26-33 (59) 15"			
		END OF BORING		15-36-42 (78) 15"			
		Boring immediately backfilled with bentonite grout		23-40-49 (89) 12"			
1404.6 / 22.0				50/1" (REF) 0"			
							Auger refusal encountered at 21.9 feet
							Water not observed while drilling.
							Water not observed at end of drilling.

B2309475 Braun Intertec Corporation Print Date:11/08/2023 SB-13B page 1 of 1

SB-14

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188465.6 EASTING: 563662.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/26/23 END DATE: 10/26/23
SURFACE ELEVATION: 1426.5 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Cloudy, 40°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1426.2 / 0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown with dark brown, moist		4-4-4 (8) 12"			
1422.2 / 4.3		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		5-8-9 (17) 5"			
		END OF BORING		4-4-7 (11) 15"			
1417.7 / 8.8		Boring then backfilled with auger cuttings		6-7-9 (16) 16"			
							Water not observed while drilling.
							Water not observed at end of drilling.

B2309475 Braun Intertec Corporation Print Date:11/08/2023 SB-14 page 1 of 1

SB-15

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188530.3 EASTING: 563692.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1426.7 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Cloudy, 40°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1426.5 / 0.2		CLAYEY SAND (SC), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, reddish brown with brown, moist		2-3-4 (7) 12"			
1422.7 / 4.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, medium to very stiff (GLACIAL TILL)		4-5-4 (9) 6"	1.5		
1417.7 / 9.0		SANDY SILT (ML), trace Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		5-11-8 (19) 10"	3		
1415.7 / 11.0		END OF BORING		6-31-9 (20) 18"			
		Boring then backfilled with auger cuttings					Water not observed while drilling.
							Water not observed at end of drilling.

B2309475 Braun Intertec Corporation Print Date:11/08/2023 SB-15 page 1 of 1

SB-16

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188487.3 EASTING: 563570.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1426.9 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Grass WEATHER: Cloudy, 40°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1426.6 / 0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown with brown, moist		6-6-6 (12) 16"			
				10-12-6 (20) 6"			
1419.8 / 6.5		SILT (ML), with Sand, reddish brown, moist, medium dense (ALLUVIUM)		7-9-9 (18) 14"			
1417.3 / 9.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, very stiff (GLACIAL TILL)		6-11-8 (19) 10"	2.5		
1415.3 / 11.0		END OF BORING		8-11-8 (19) 15"			
		Boring then backfilled with auger cuttings					Water not observed while drilling.
							Water not observed at end of drilling.

B2309475 Braun Intertec Corporation Print Date:11/08/2023 SB-16 page 1 of 1

SB-17

BORING:
LOCATION: Captured with RTK GPS. Boring offset 10 feet N due to utilities
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188602.4 EASTING: 563433.8
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1422.4 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Bituminous WEATHER: Cloudy, 40°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1422.1 / 0.3		BITUMINOUS, 4 inches		AU			
1421.1 / 1.3		APPARENT AGGREGATE BASE, 12 inches		5-4-4 (8) 12"			
1418.4 / 4.0		SILT (ML), with Sand, reddish brown, moist, loose (ALLUVIUM)		5-4-5 (11) 14"			
		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to dense (GLACIAL TILL)		6-30-19 (49) 12"			
1411.4 / 11.0		END OF BORING		5-7-7 (14) 15"			
		Boring then backfilled with auger cuttings					Water not observed while drilling.
							Water not observed at end of drilling.

B2309475 Braun Intertec Corporation Print Date:11/08/2023 SB-17 page 1 of 1

SB-18

BORING:
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 188456.1 EASTING: 563485.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson
START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1425.2 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Bituminous WEATHER: Cloudy, 40°

Elev / Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	% tsf	MC %	Tests or Remarks
1424.9 / 0.3		BITUMINOU

4875 MALMSTROM STREET

MALSTROM STREET

4550 STEBNER ROAD

JET DULUTH
4913 AIRPORT ROAD

16' DOUBLE SWING GATE

HYDRANT ASSEMBLY

GRAVEL ACCESS ROAD

16.0'

SNOW STORAGE

SNOW STORAGE

SNOW STORAGE

9.0' (TYP.)

18.0' (TYP.)

24.0'

24.0'

24.0'

28 PARKING STALLS

31 PARKING STALLS

R40.0'

R15.0'

8" WATER MAIN

10" WATER MAIN

R50.0'

CONSTRUCTION LIMITS

R74.0'

R20.0'

R15.0'

R3.0'

AUTOMATIC GATE

28.0'

AUTOMATIC GATE

LACKLAND STREET

DUMPSTER ENCLOSURE

FUEL PUMP

FUEL TANK

TRANS. PAD (10'-2"x7'-4")

AUTOMATIC GATE

28.00'

8' PEDESTRIAN GATE

R45.0'

SCISSOR LIFT (6'x8')

R65.0'

R20.0'

NEW BUILDING

DRAINAGE BASIN

24.0'

30.0'

STEBNER ROAD

R45.0'

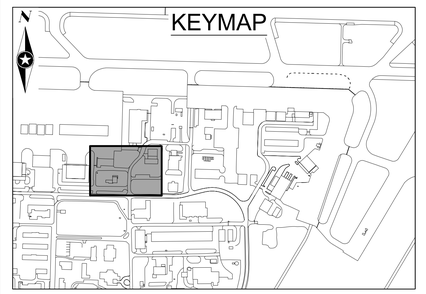
R40.0'

R40.0'

AIRPORT ROAD

20 0 20 40
scale 10 feet

KEYMAP



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FEDERAL AVIATION ADMINISTRATION

ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

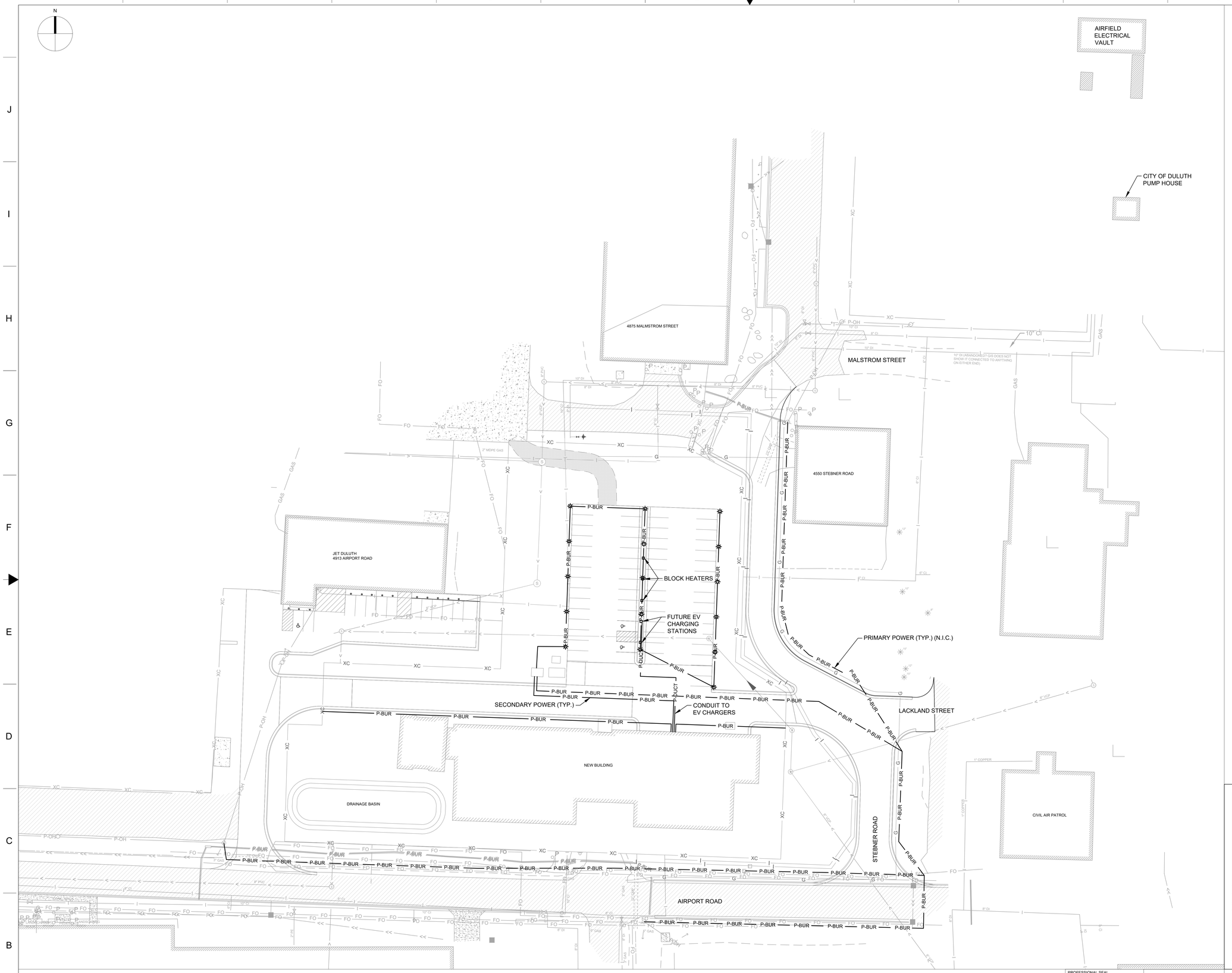
SITE LAYOUT PLAN

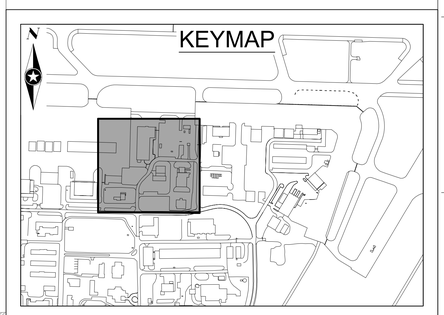
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DESIGNED Designer	ISSUED BY TERMINAL ENGINEERING CENTER, CHICAGO	DATE Issue Date	JCN 23980071
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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

SITE LAYOUT ELECTRICAL PLAN

REV

DULUTH — (DULUTH INTERNATIONAL AIRPORT) — MN

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EXISTING NAVAID COMM DUCTBANK

EXISTING NAVAID COMM HOMERUN MANHOLE

EXISTING NAVAID COMM DUCTBANK

EXISTING NAVAID COMM HOMERUN DUCTBANK

EXISTING ATCT BUILDING

AIRFIELD ELECTRICAL VAULT

4875 MALMSTROM STREET

MALSTROM STREET

4550 STEBNER ROAD

JET DULUTH
4913 AIRPORT ROAD

STEBNER ROAD

LACKLAND STREET

AIRPORT ROAD

NOTES:

1. REFER TO TABLE 1 FOR AN INVENTORY OF FAA-OWNED NAVAIDS AND ASSOCIATED CABLE TYPES THAT WILL BE ROUTED TO THE PROPOSED ATCT.

TABLE 1

SYSTEM	CABLE AND TYPE
Standard Radios & ASR	100-PR #19AWG PE-39 TELEPHONE CABLE
ALS	12-PR #19AWG PE-39 TELEPHONE CABLE
27LOC	12-PR #19AWG PE-39 TELEPHONE CABLE
9GS	12-PR #19AWG PE-39 TELEPHONE CABLE
27GS, 27MALSR, 9LOC	25-PR #19AWG PE-39 TELEPHONE CABLE
Main Radios RTR	50-PR #19AWG PE-39 TELEPHONE CABLE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE

50 0 50 100
scale 25 feet

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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

EXISTING AIRFIELD ELECTRICAL PLAN

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

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EXISTING NAVAID COMM DUCTBANK

EXISTING NAVAID COMM HOMERUN MANHOLE

EXISTING NAVAID COMM DUCTBANK

EXISTING NAVAID COMM HOMERUN DUCTBANK

EXISTING ATCT BUILDING

AIRFIELD ELECTRICAL VAULT

MALSTROM STREET

4875 MALSTROM STREET

4550 STEBNER ROAD

JET DULUTH 4913 AIRPORT ROAD

LACKLAND STREET

STEBNER ROAD

PROPOSED BUILDING

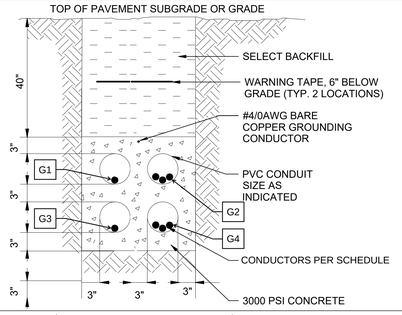
DRAINAGE BASIN

AIRPORT ROAD

KEYED NOTES:

1. PROVIDE 4-4" CONCRETE ENCASED FAA COMMUNCATIONS DUCTBANK FROM PROPOSED ATCT BUILDING TO AIRFIELD. SEE SCHEDULE FOR CABLE TYPES.
2. DIRECTIONAL BORE 1-2" HDPE CONDUIT WITH FIBER OPTIC CABLE FROM PROPOSED ATCT BUILDING TO EXISTING AIRFIELD ELECTRICAL VAULT BUILDING.
3. COMMUNICATION LINES FOR FAA NAVAIDS WILL BE EXTENDED TO A CENTRAL LOCATION ON THE AIRFIELD AND ROUTED TO THE PROPOSED ATCT BUILDING.

TOP OF PAVEMENT SUBGRADE OR GRADE



SCHEDULE G1

SYSTEM	CABLE AND TYPE
Standard Radios & ASR	100-PR #19AWG PE-39 TELEPHONE CABLE

SCHEDULE G2

SYSTEM	CABLE AND TYPE
ALS	12-PR #19AWG PE-39 TELEPHONE CABLE
27LOC	12-PR #19AWG PE-39 TELEPHONE CABLE
9GS	12-PR #19AWG PE-39 TELEPHONE CABLE
27GS, 27MALSR, 9LOC	25-PR #19AWG PE-39 TELEPHONE CABLE

SCHEDULE G3

SYSTEM	CABLE AND TYPE
Main Radios RTR	50-PR #19AWG PE-39 TELEPHONE CABLE

SCHEDULE G4

SYSTEM	CABLE AND TYPE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE
ASR	12-PR #19AWG PE-39 TELEPHONE CABLE

30 0 30 60
scale 15 feet

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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

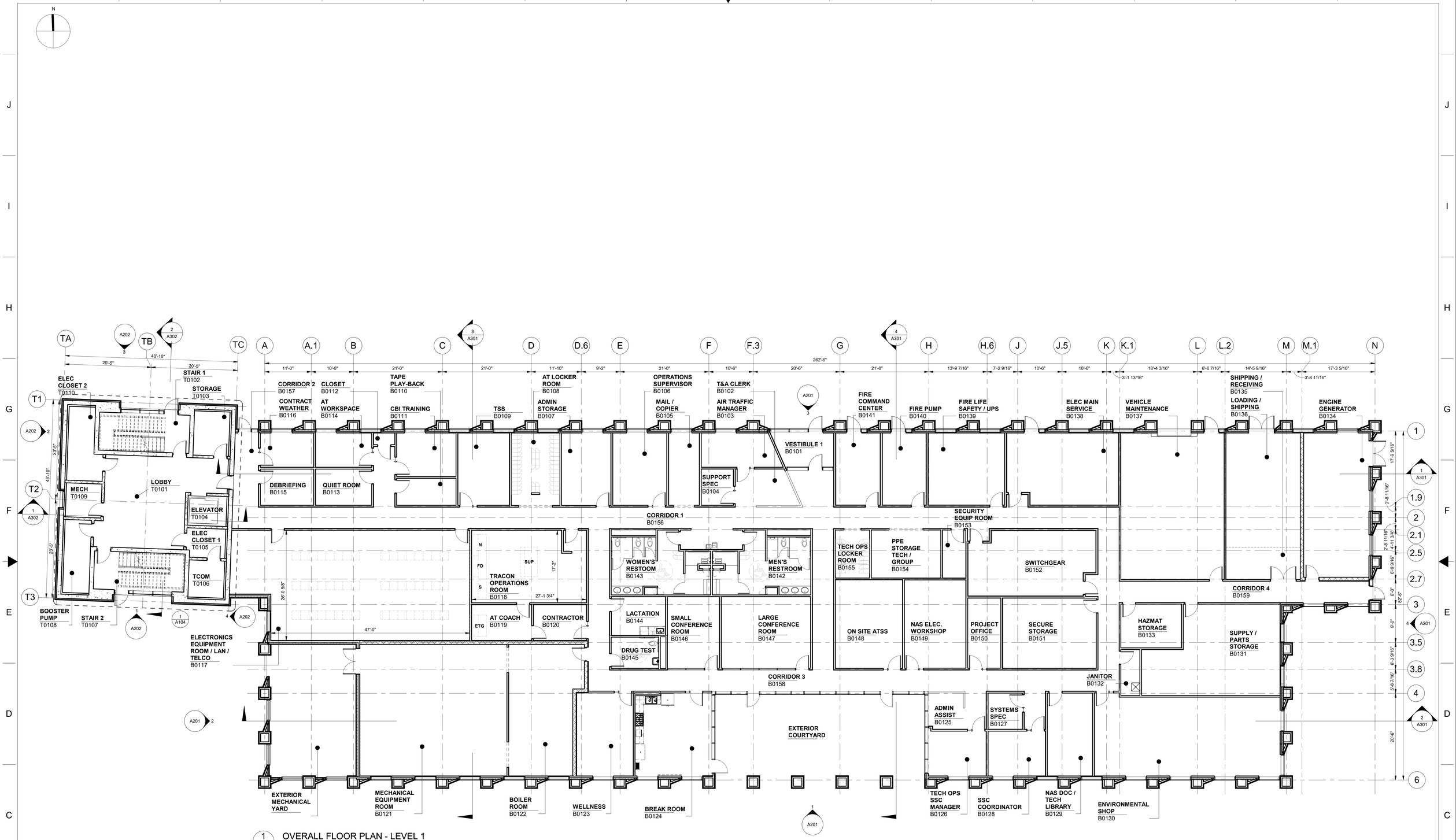
PROPOSED AIRFIELD ELECTRICAL PLAN

DULUTH (DULUTH INTERNATIONAL AIRPORT) MN

REVIEWED BY	SUBMITTED BY	APPROVED BY

SUBMITTER'S TITLE		APPROVER'S TITLE	
DESIGNED Designer	ISSUED BY TERMINAL ENGINEERING CENTER, CHICAGO	DATE Issue Date	JCN 23980071
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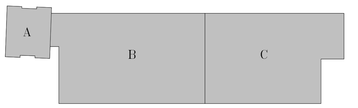
1 A101 OVERALL FLOOR PLAN - LEVEL 1

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

NOTE: CENTER POINT OF CAB
LATITUDE: 46°-50'-15.3900" N
LONGITUDE: 92°-11'-47.5600" W

0 8' 16'

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



KEY PLAN

LEVEL 01 - BASE BUILDING - ROOM SCHEDULE

ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
B0101	VESTIBULE 1	119 SF	122 SF
B0102	T&A CLERK	73 SF	83 SF
B0103	AIR TRAFFIC MANAGER	147 SF	185 SF
B0104	SUPPORT SPEC	65 SF	76 SF
B0105	MAIL / COPIER	129 SF	145 SF
B0106	OPERATIONS SUPERVISOR	223 SF	257 SF
B0107	ADMIN STORAGE	204 SF	231 SF
B0108	AT LOCKER ROOM	196 SF	228 SF
B0109	TSS	208 SF	241 SF
B0110	TAPE PLAY-BACK	90 SF	104 SF
B0111	CBI TRAINING	148 SF	180 SF
B0112	CLOSET	14 SF	24 SF
B0113	QUIET ROOM	114 SF	129 SF
B0114	AT WORKSPACE	112 SF	137 SF
B0115	DEBRIEFING	108 SF	122 SF
B0116	CONTRACT WEATHER	107 SF	136 SF
B0117	ELECTRONICS EQUIPMENT ROOM / LAN / TELCO	1368 SF	1468 SF

LEVEL 01 - BASE BUILDING - ROOM SCHEDULE

ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
B0118	TRACON OPERATIONS ROOM	463 SF	496 SF
B0119	AT COACH	120 SF	134 SF
B0120	CONTRACTOR	106 SF	121 SF
B0121	MECHANICAL EQUIPMENT ROOM	1082 SF	1199 SF
B0122	BOILER ROOM	501 SF	559 SF
B0123	WELLNESS	267 SF	309 SF
B0124	BREAK ROOM	367 SF	415 SF
B0125	ADMIN ASSIST	72 SF	88 SF
B0126	TECH OPS SSC MANAGER	149 SF	188 SF
B0127	SYSTEMS SPEC	69 SF	81 SF
B0128	SSC COORDINATOR	148 SF	172 SF
B0129	NAS DOC / TECH LIBRARY	210 SF	244 SF
B0130	ENVIRONMENTAL SHOP	851 SF	946 SF
B0131	SUPPLY / PARTS STORAGE	601 SF	655 SF
B0132	JANITOR	49 SF	57 SF
B0133	HAZMAT STORAGE	148 SF	164 SF
B0134	ENGINE GENERATOR	540 SF	643 SF
B0135	SHIPPING / RECEIVING	134 SF	146 SF

LEVEL 01 - BASE BUILDING - ROOM SCHEDULE

ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
B0136	LOADING / SHIPPING	475 SF	523 SF
B0137	VEHICLE MAINTENANCE	849 SF	912 SF
B0138	ELEC MAIN SERVICE	438 SF	505 SF
B0139	FIRE LIFE SAFETY / UPS	307 SF	355 SF
B0140	FIRE PUMP	179 SF	207 SF
B0141	FIRE COMMAND CENTER	182 SF	217 SF
B0142	MEN'S RESTROOM	286 SF	344 SF
B0143	WOMEN'S RESTOOM	289 SF	349 SF
B0144	LACTATION	116 SF	129 SF
B0145	DRUG TEST	83 SF	108 SF
B0146	SMALL CONFERENCE ROOM	208 SF	223 SF
B0147	LARGE CONFERENCE ROOM	356 SF	382 SF
B0148	ON SITE ATSS	332 SF	355 SF
B0149	NAS ELEC. WORKSHOP	303 SF	323 SF
B0150	PROJECT OFFICE	130 SF	142 SF
B0151	SECURE STORAGE	367 SF	393 SF
B0152	SWITCHGEAR	435 SF	472 SF
B0153	SECURITY EQUIP ROOM	63 SF	72 SF

LEVEL 01 - BASE BUILDING - ROOM SCHEDULE

ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
B0154	PPE STORAGE TECH / GROUP	186 SF	204 SF
B0155	TECH OPS LOCKER ROOM	92 SF	102 SF
B0156	CORRIDOR 1	1325 SF	1327 SF
B0157	CORRIDOR 2	131 SF	138 SF
B0158	CORRIDOR 3	1271 SF	1277 SF
B0159	CORRIDOR 4	309 SF	341 SF

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ATO - TECHNICAL OPERATIONS — CENTRAL SERVICE AREA

NEW ATCT & BASE BUILDING

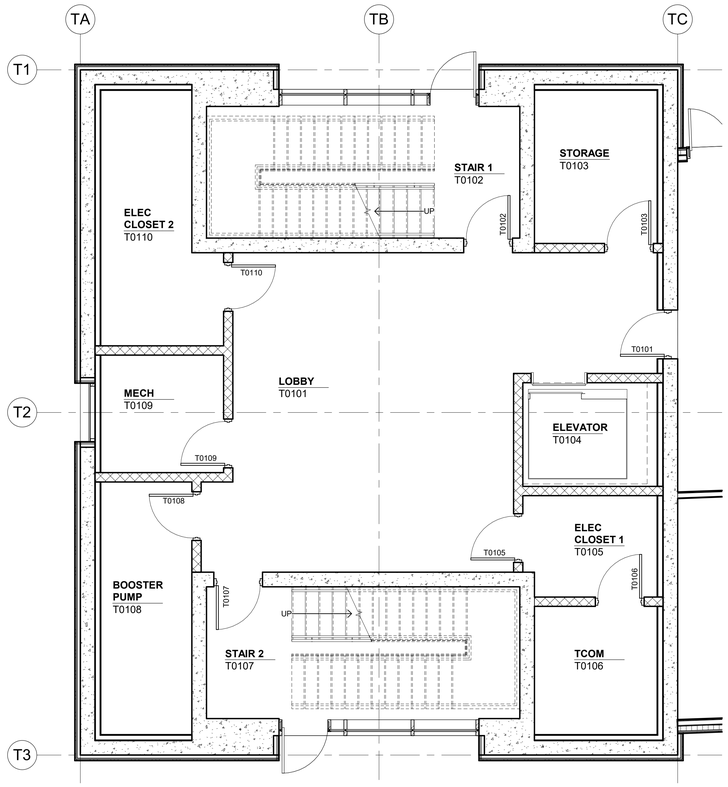
OVERALL FLOOR PLAN - LEVEL 1

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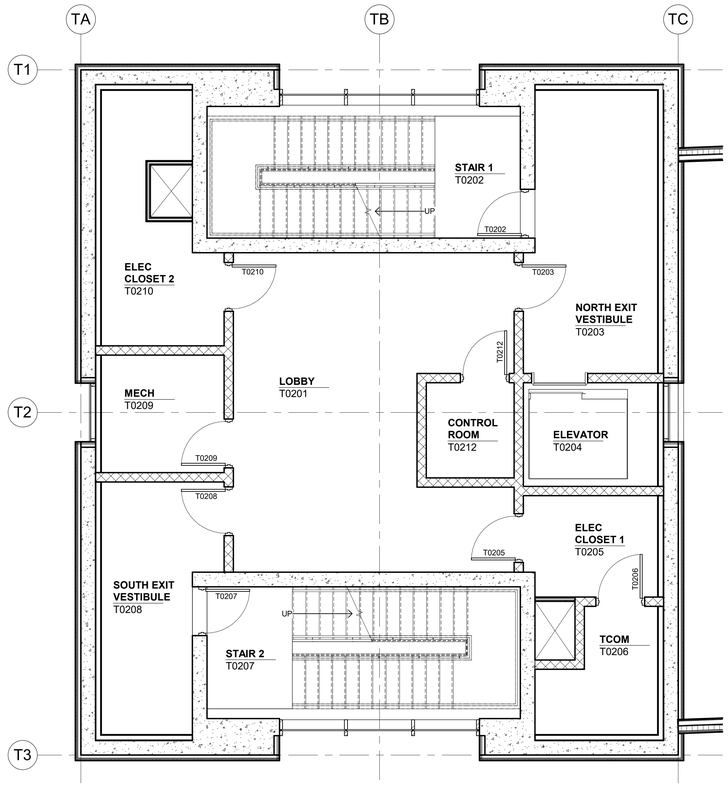
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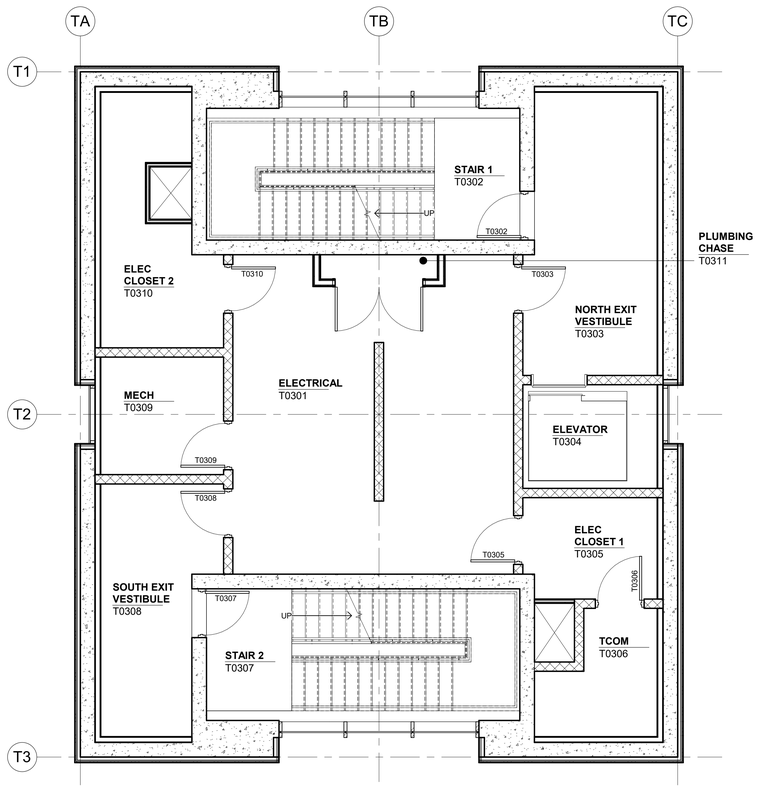
1 A104 FLOOR PLAN - AREA A - LEVEL 1

SCALE: 1/4" = 1'-0"



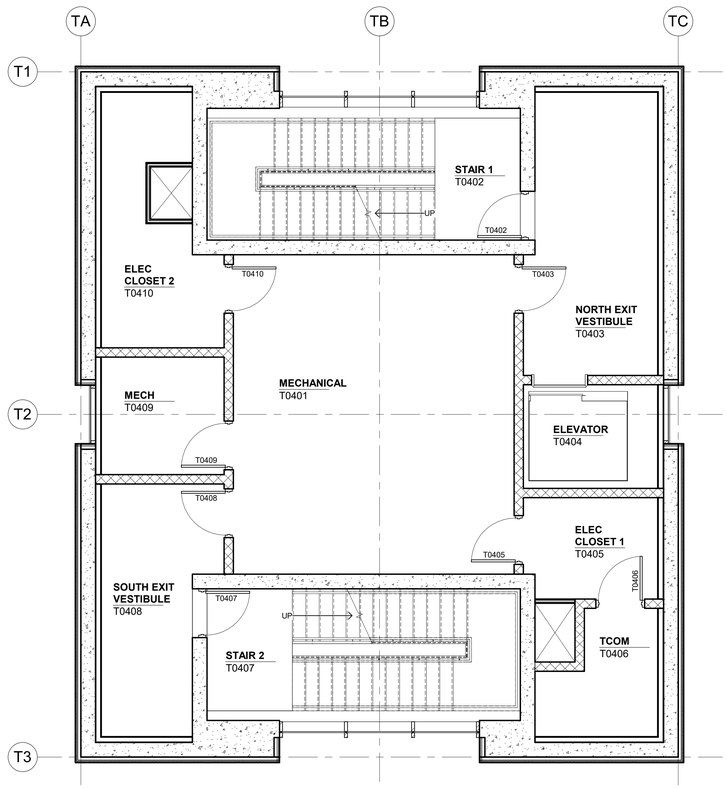
2 A104 FLOOR PLAN - AREA A - LEVEL 2

SCALE: 1/4" = 1'-0"



3 A104 FLOOR PLAN - AREA A - LEVEL 3

SCALE: 1/4" = 1'-0"



4 A104 FLOOR PLAN - AREA A - LEVEL 4

SCALE: 1/4" = 1'-0"

0 4' 8'

SCALE: 1/4"=1'-0"

LEVEL 01 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0101	LOBBY	515 SF	591 SF
T0102	STAIR 1	204 SF	226 SF
T0103	STORAGE	88 SF	138 SF
T0104	ELEVATOR	65 SF	75 SF
T0105	ELEC CLOSET 1	62 SF	86 SF
T0106	TCOM	74 SF	118 SF
T0107	STAIR 2	204 SF	226 SF
T0108	BOOSTER PUMP	108 SF	169 SF
T0109	MECH	67 SF	87 SF
T0110	ELEC CLOSET 2	123 SF	187 SF

LEVEL 02 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0201	LOBBY	367 SF	425 SF
T0202	STAIR 1	204 SF	240 SF
T0203	NORTH EXIT VESTIBULE	169 SF	238 SF
T0204	ELEVATOR	65 SF	75 SF
T0205	ELEC CLOSET 1	62 SF	86 SF
T0206	TCOM	59 SF	103 SF
T0207	STAIR 2	204 SF	241 SF
T0208	SOUTH EXIT VESTIBULE	121 SF	185 SF
T0209	MECH	67 SF	87 SF
T0210	ELEC CLOSET 2	109 SF	174 SF
T0212	CONTROL ROOM	39 SF	50 SF

LEVEL 03 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0301	ELECTRICAL	392 SF	450 SF
T0302	STAIR 1	204 SF	240 SF
T0303	NORTH EXIT VESTIBULE	169 SF	238 SF
T0304	ELEVATOR	65 SF	75 SF
T0305	ELEC CLOSET 1	62 SF	86 SF
T0306	TCOM	59 SF	103 SF
T0307	STAIR 2	204 SF	241 SF
T0308	SOUTH EXIT VESTIBULE	121 SF	185 SF
T0309	MECH	67 SF	87 SF
T0310	ELEC CLOSET 2	109 SF	174 SF
T0311	PLUMBING CHASE	13 SF	25 SF

LEVEL 04 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0401	MECHANICAL	419 SF	475 SF
T0402	STAIR 1	204 SF	240 SF
T0403	NORTH EXIT VESTIBULE	169 SF	238 SF
T0404	ELEVATOR	65 SF	75 SF
T0405	ELEC CLOSET 1	62 SF	86 SF
T0406	TCOM	59 SF	103 SF
T0407	STAIR 2	204 SF	241 SF
T0408	SOUTH EXIT VESTIBULE	121 SF	185 SF
T0409	MECH	67 SF	87 SF
T0410	ELEC CLOSET 2	109 SF	174 SF



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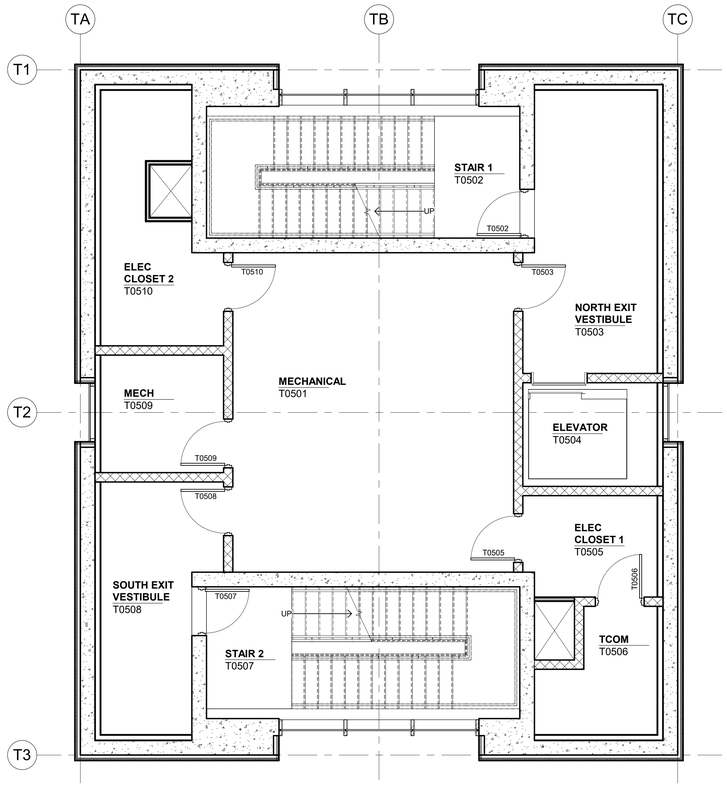
FLOOR PLANS - AREA A - LEVELS 1-4

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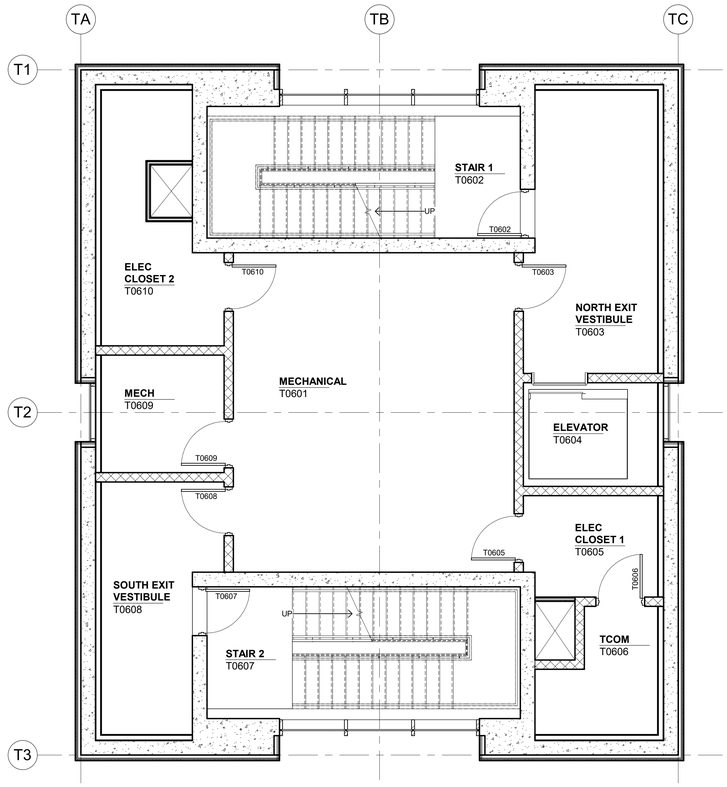
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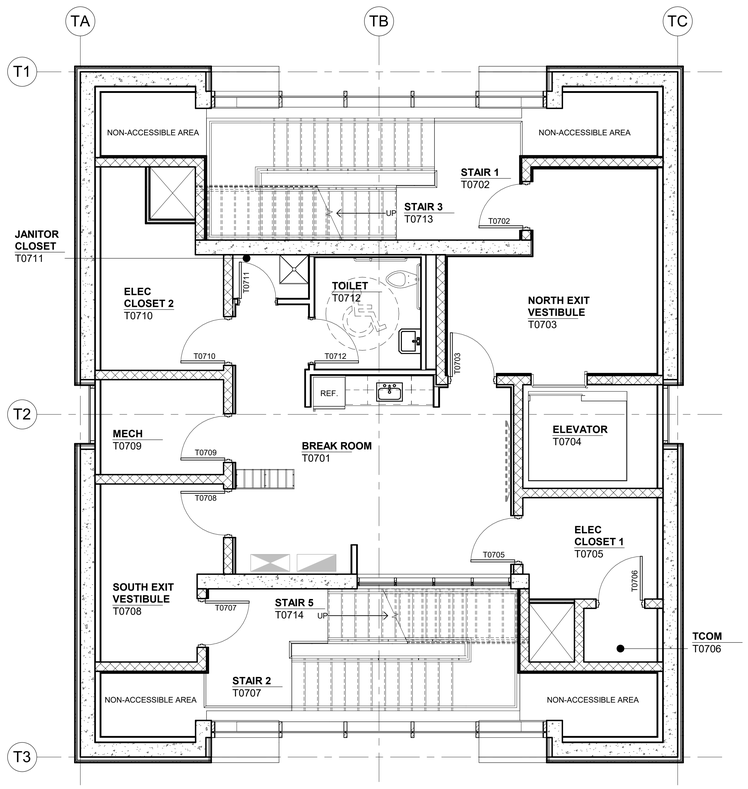
1 A105 FLOOR PLAN - AREA A - LEVEL 5

SCALE: 1/4" = 1'-0"



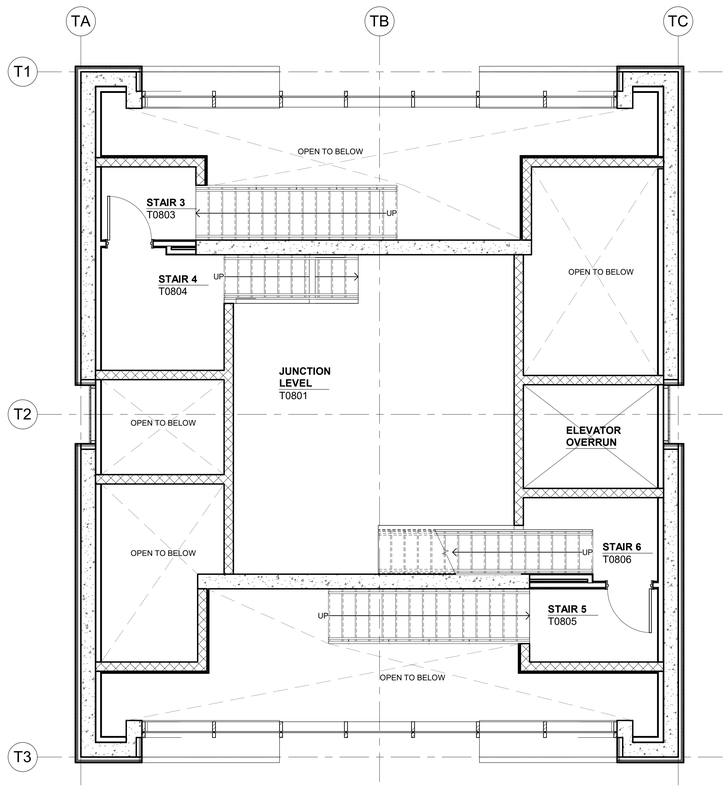
2 A105 FLOOR PLAN - AREA A - LEVEL 6

SCALE: 1/4" = 1'-0"



3 A105 FLOOR PLAN - AREA A - LEVEL 7

SCALE: 1/4" = 1'-0"



4 A105 FLOOR PLAN - AREA A - LEVEL 8 - JUNCTION

SCALE: 1/4" = 1'-0"

0 4' 8'

SCALE: 1/4"=1'-0"

LEVEL 05 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0501	MECHANICAL	419 SF	475 SF
T0502	STAIR 1	204 SF	240 SF
T0503	NORTH EXIT VESTIBULE	169 SF	238 SF
T0504	ELEVATOR	65 SF	75 SF
T0505	ELEC CLOSET 1	62 SF	86 SF
T0506	TCOM	59 SF	103 SF
T0507	STAIR 2	204 SF	241 SF
T0508	SOUTH EXIT VESTIBULE	121 SF	185 SF
T0509	MECH	67 SF	87 SF
T0510	ELEC CLOSET 2	109 SF	174 SF

LEVEL 06 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0601	MECHANICAL	419 SF	475 SF
T0602	STAIR 1	204 SF	240 SF
T0603	NORTH EXIT VESTIBULE	169 SF	238 SF
T0604	ELEVATOR	65 SF	75 SF
T0605	ELEC CLOSET 1	62 SF	86 SF
T0606	TCOM	59 SF	103 SF
T0607	STAIR 2	204 SF	241 SF
T0608	SOUTH EXIT VESTIBULE	121 SF	185 SF
T0609	MECH	67 SF	87 SF
T0610	ELEC CLOSET 2	109 SF	174 SF

LEVEL 07 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0701	BREAK ROOM	281 SF	320 SF
T0702	STAIR 1	151 SF	173 SF
T0703	NORTH EXIT VESTIBULE	167 SF	289 SF
T0704	ELEVATOR	65 SF	75 SF
T0705	ELEC CLOSET 1	63 SF	86 SF
T0706	TCOM	18 SF	103 SF
T0707	STAIR 2	149 SF	173 SF
T0708	SOUTH EXIT VESTIBULE	91 SF	185 SF
T0709	MECH	54 SF	71 SF
T0710	ELEC CLOSET 2	92 SF	190 SF
T0711	JANITOR CLOSET	16 SF	24 SF
T0712	TOILET	55 SF	80 SF
T0713	STAIR 3	58 SF	67 SF
T0714	STAIR 5	64 SF	69 SF

LEVEL 08 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0801	JUNCTION LEVEL	360 SF	403 SF
T0803	STAIR 3	84 SF	110 SF
T0804	STAIR 4	99 SF	129 SF
T0805	STAIR 5	95 SF	123 SF
T0806	STAIR 6	83 SF	110 SF



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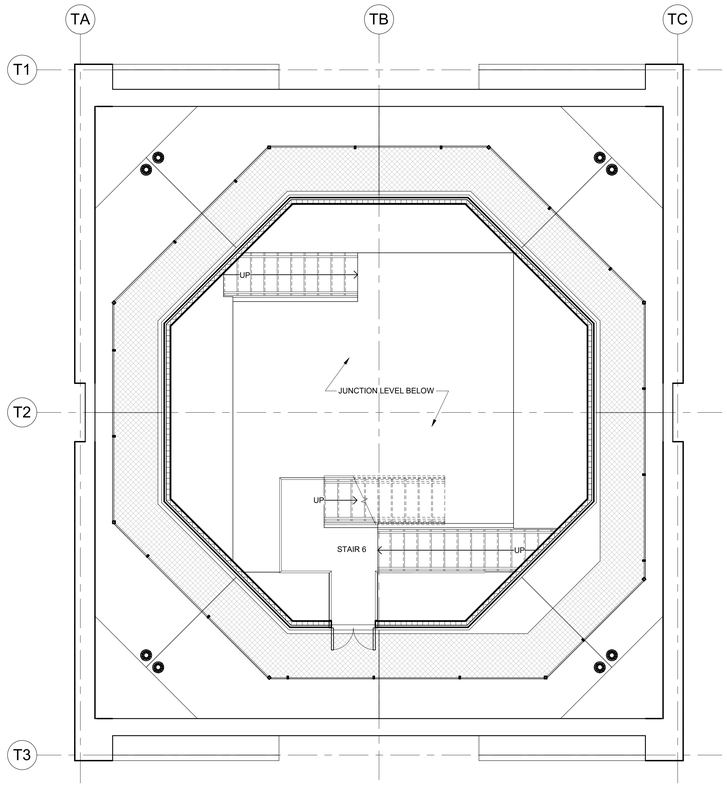
FLOOR PLANS - AREA A - LEVELS 5-8

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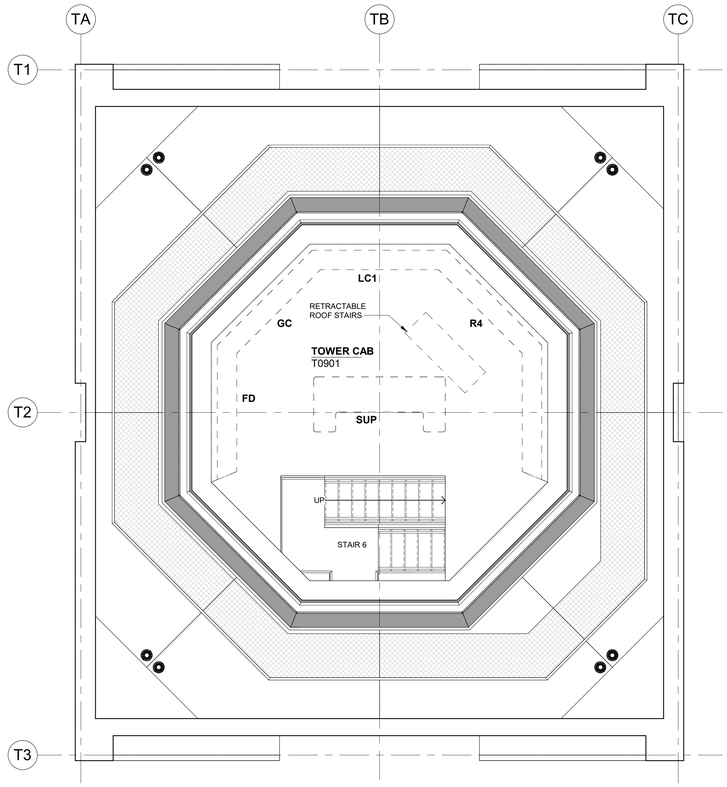
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1 A106 FLOOR PLAN - AREA A - WALKWAY LEVEL

SCALE: 1/4" = 1'-0"



2 A106 FLOOR PLAN - AREA A - LEVEL 9 - CAB

SCALE: 1/4" = 1'-0"
NOTE: CENTER POINT OF CAB
LATITUDE: 46°-50'-15.3900" N
LONGITUDE: 92°-11'-47.5600" W

LEVEL 09 - TOWER - ROOM SCHEDULE			
ROOM NO.	ROOM NAME	NET AREA	GROSS AREA
T0901	TOWER CAB	440 SF	715 SF



KEY PLAN

0 4' 8'

SCALE: 1/4"=1'-0"

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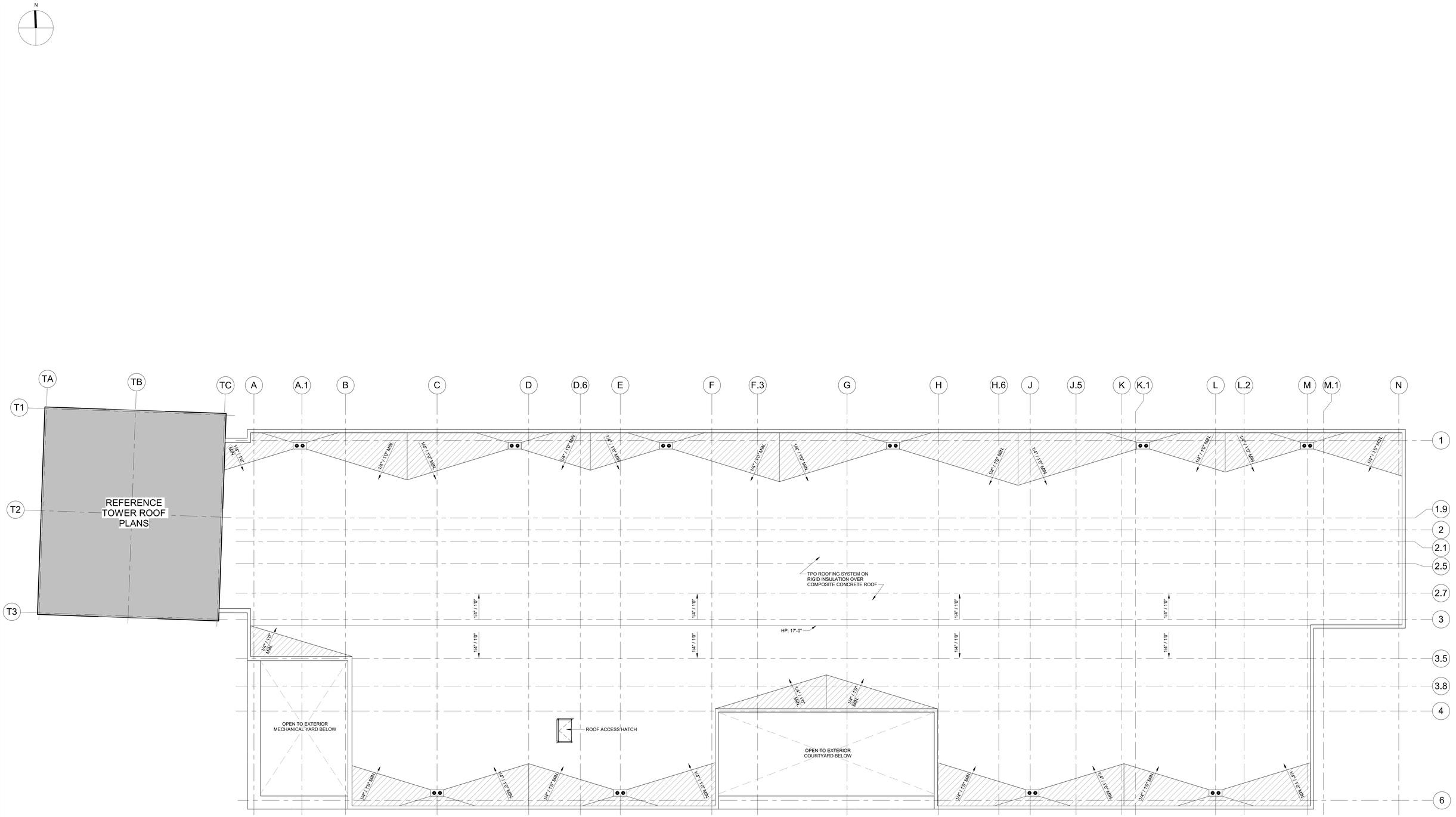
FLOOR PLANS - AREA A - WALKWAY & CAB LEVELS

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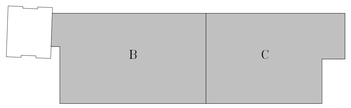
1 / A141 OVERALL ROOF PLAN - BASE BUILDING

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

TAPERED INSULATION CRICKETS

0 8' 16'

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



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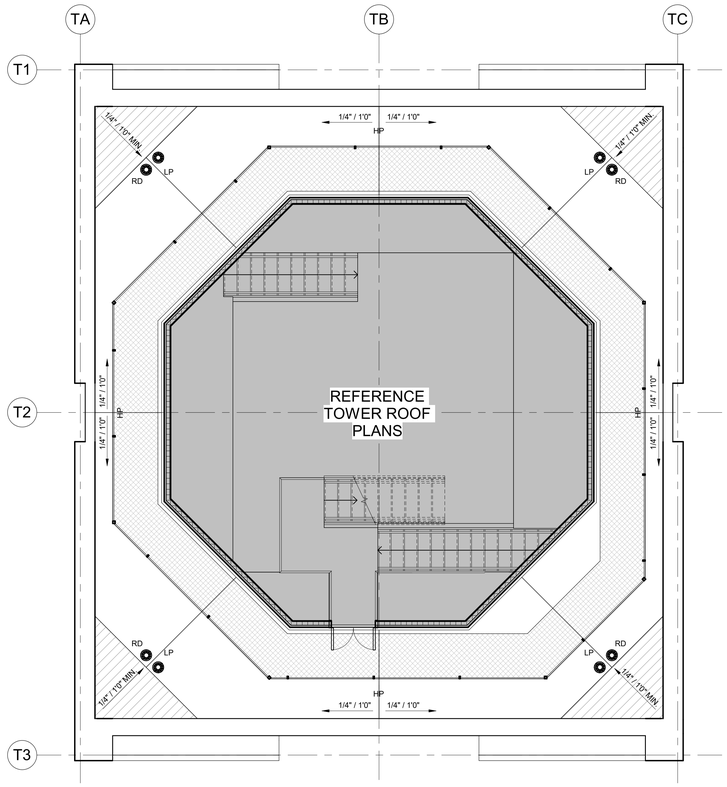
ROOF PLAN - BASE BUILDING

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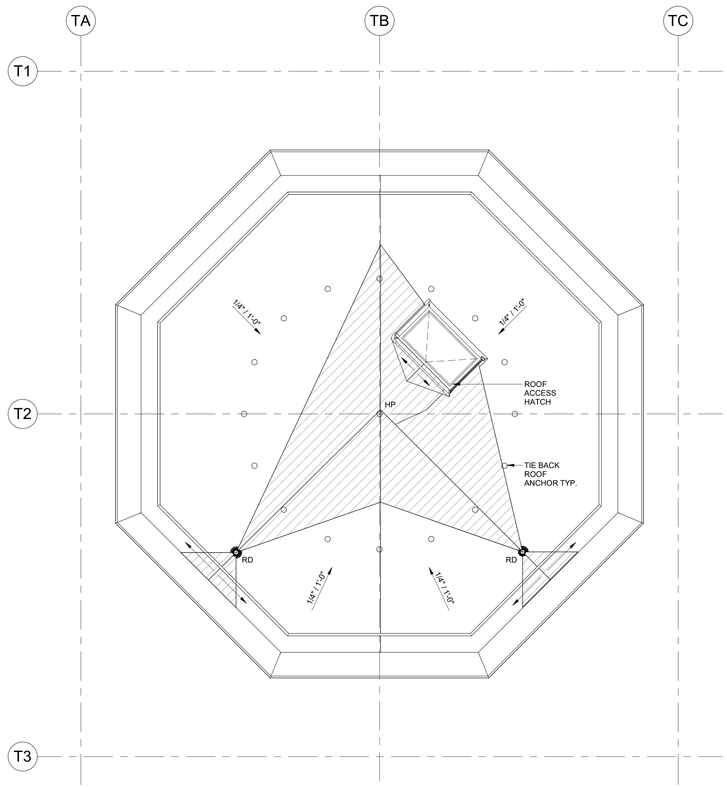
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1 A142 ROOF PLAN - TOWER

SCALE: 1/4" = 1'-0"

TAPERED INSULATION CRICKETS



2 A142 ROOF PLAN - TOWER

SCALE: 1/4" = 1'-0"

TAPERED INSULATION CRICKETS

0 8' 16'

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



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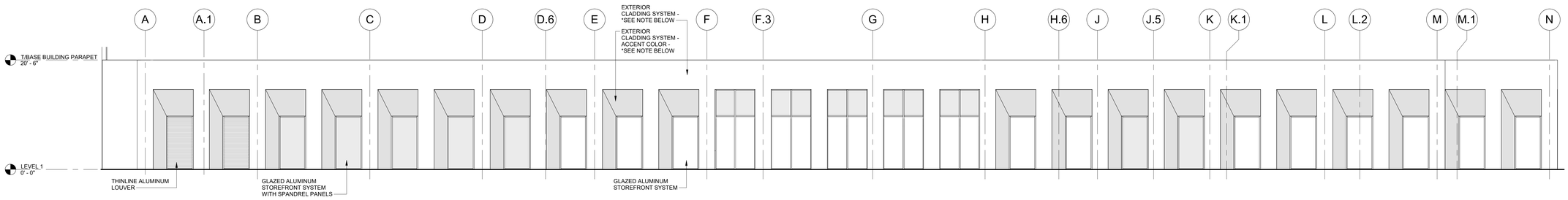
ROOF PLAN - TOWER

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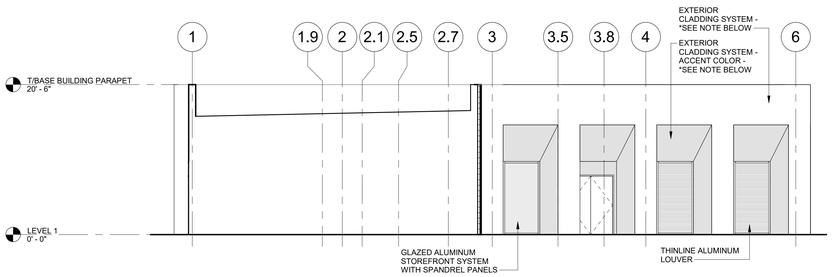


1 A201 **BASE BUILDING - SOUTH ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

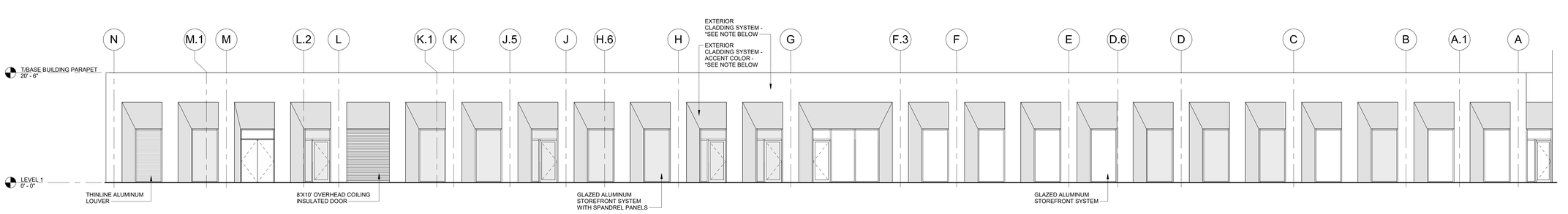


2 A201 **BASE BUILDING - WEST ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

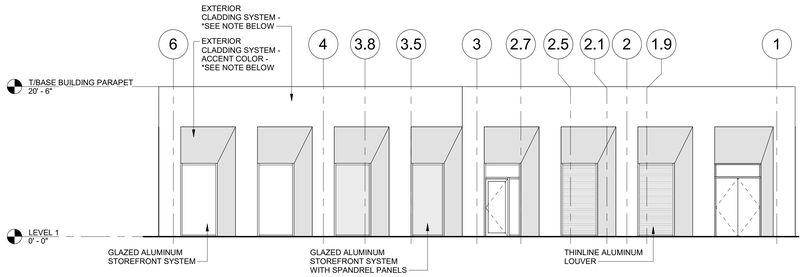


3 A201 **BASE BUILDING - NORTH ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR



4 A201 **BASE BUILDING - EAST ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

0 8' 16'

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

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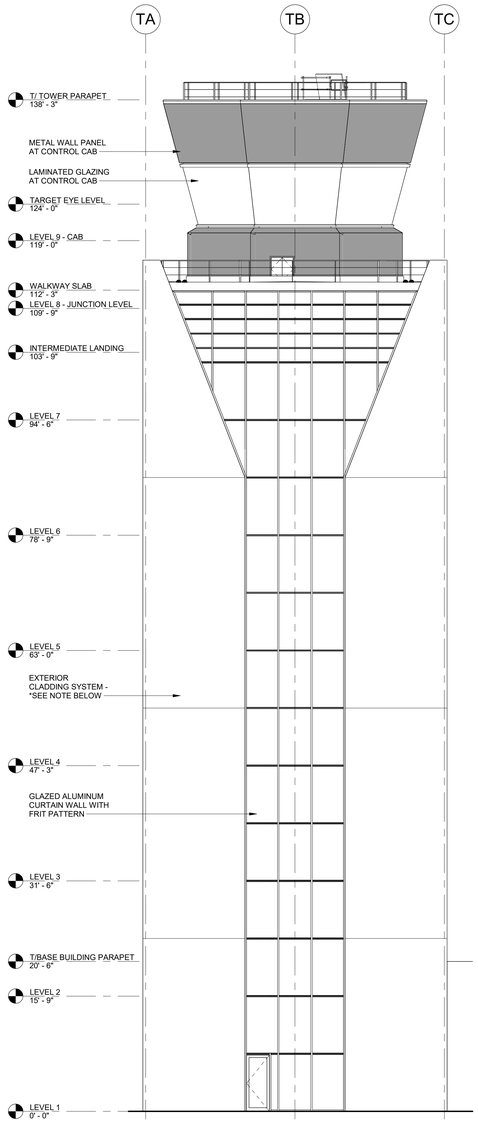
OVERALL ELEVATIONS - BASE BUILDING

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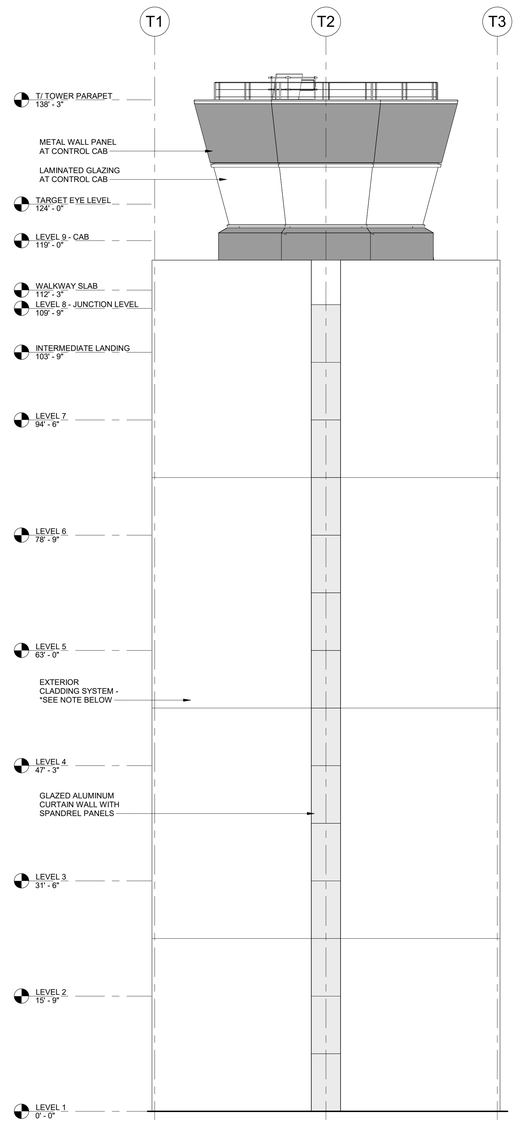


1 A202 **TOWER - SOUTH ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

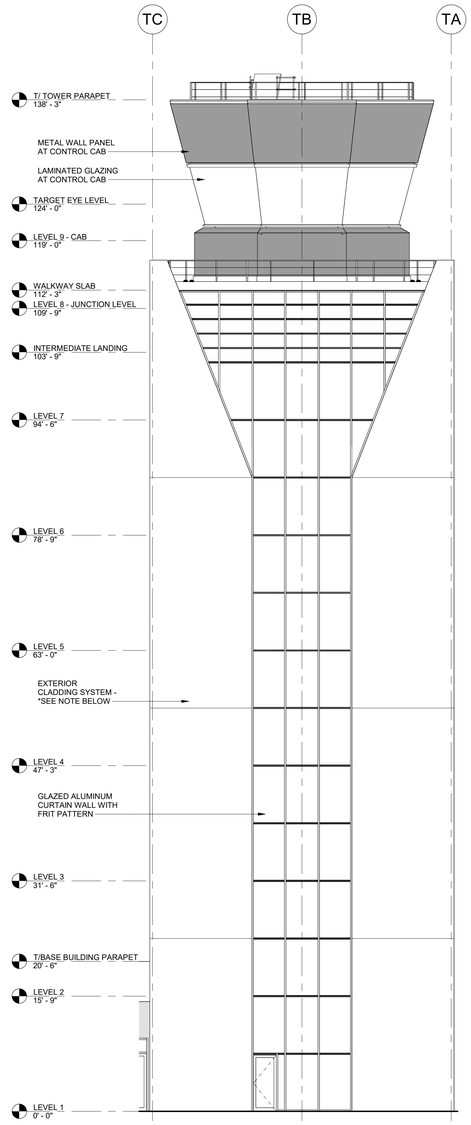


2 A202 **TOWER - WEST ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

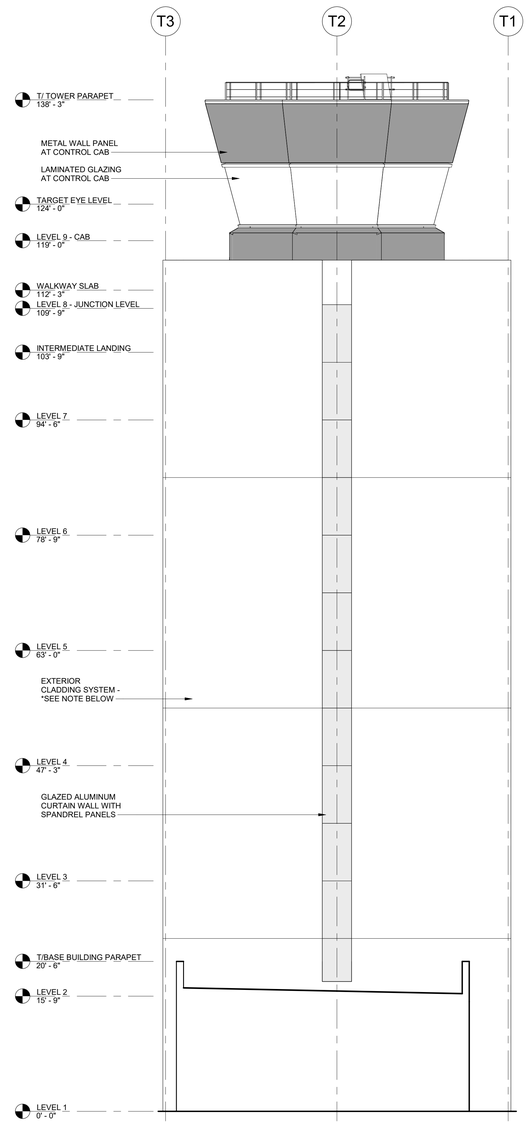


3 A202 **TOWER - NORTH ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR



4 A202 **TOWER - EAST ELEVATION**

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

EXTERIOR MATERIAL OPTIONS

OPT 1: METAL PANEL CLADDING SYSTEM
OPT 2: GFRC PANEL CLADDING SYSTEM
OPT 3: CAST-IN-PLACE CONCRETE WITH INTEGRAL COLOR

0 8' 16'
SCALE: 1/8"=1'-0"

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NEW ATCT & BASE BUILDING

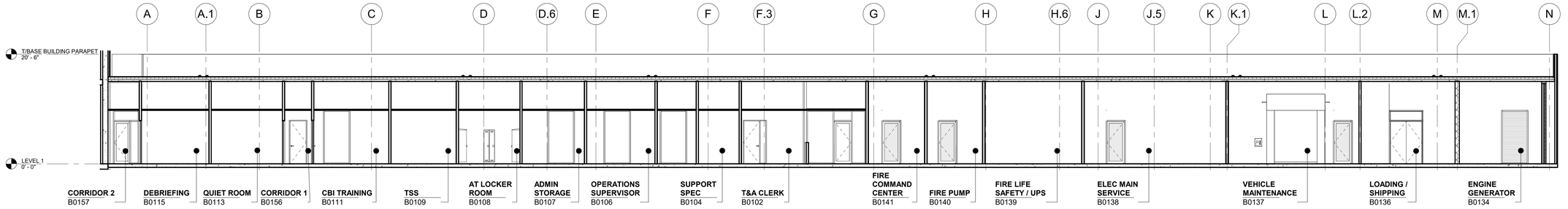
OVERALL ELEVATIONS - TOWER

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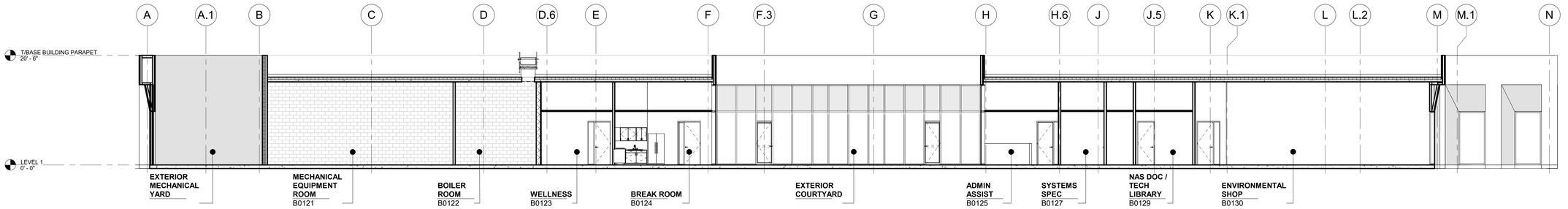
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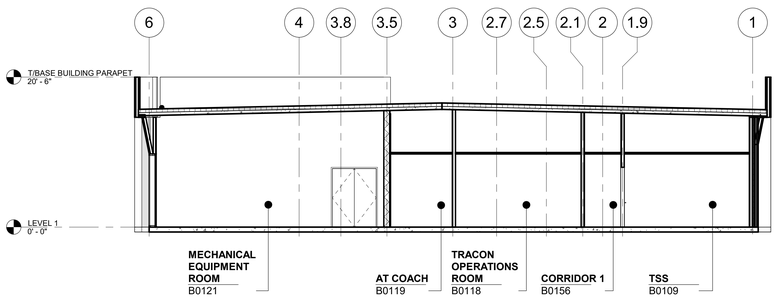
1 A301 OVERALL SECTION AT BASE BUILDING - LOOKING NORTH

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



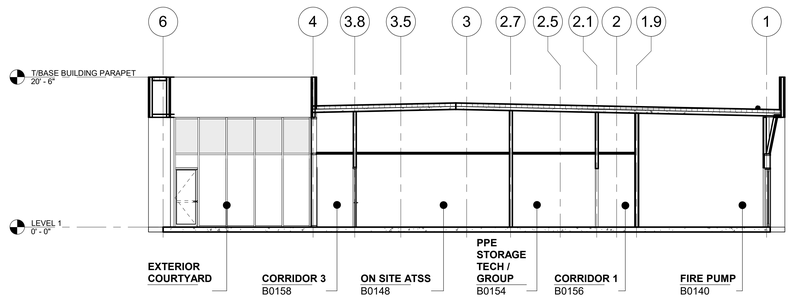
2 A301 OVERALL SECTION AT BASE BUILDING - LOOKING NORTH

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



3 A301 OVERALL SECTION AT BASE BUILDING - LOOKING WEST

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



4 A301 OVERALL SECTION AT BASE BUILDING - LOOKING WEST

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

0 8' 16'

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

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OVERALL SECTIONS - BASE BUILDING

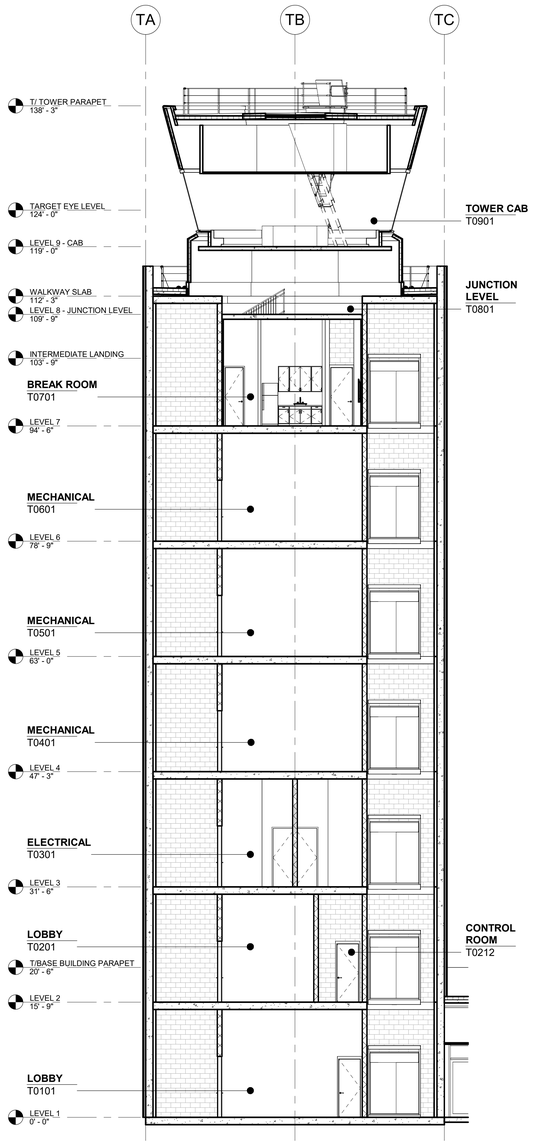
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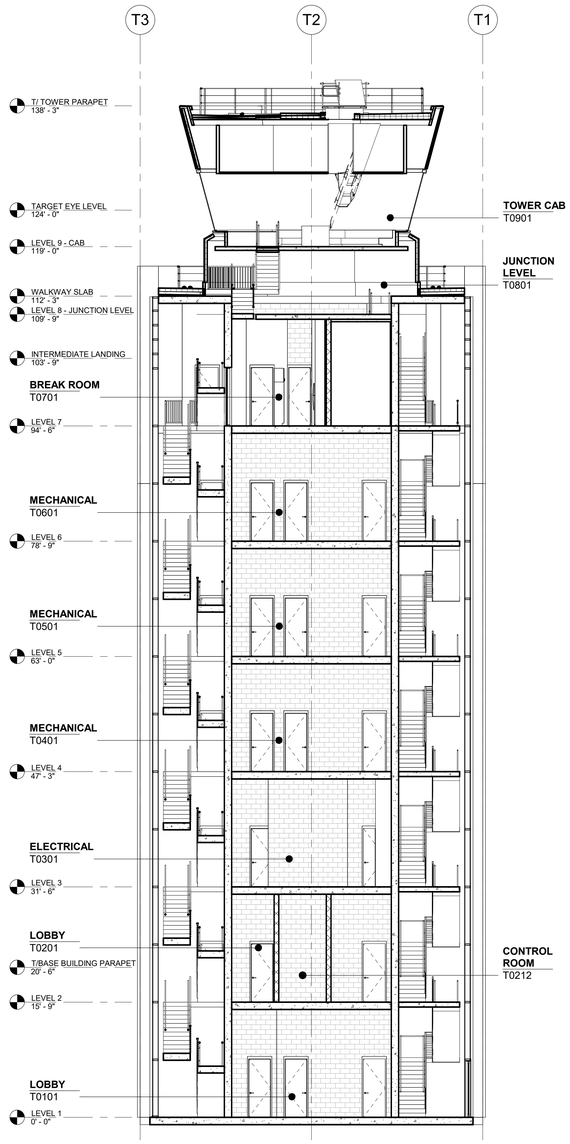
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1 A302 OVERALL SECTION AT TOWER - LOOKING NORTH

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



2 A302 OVERALL SECTION AT TOWER - LOOKING WEST

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

0 8' 16'

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

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OVERALL SECTIONS - TOWER

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1 A901 VIEW FROM SOUTH
NOT TO SCALE



2 A901 VIEW FROM NORTH EAST
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ARCHITECTURAL PERSPECTIVE VIEWS

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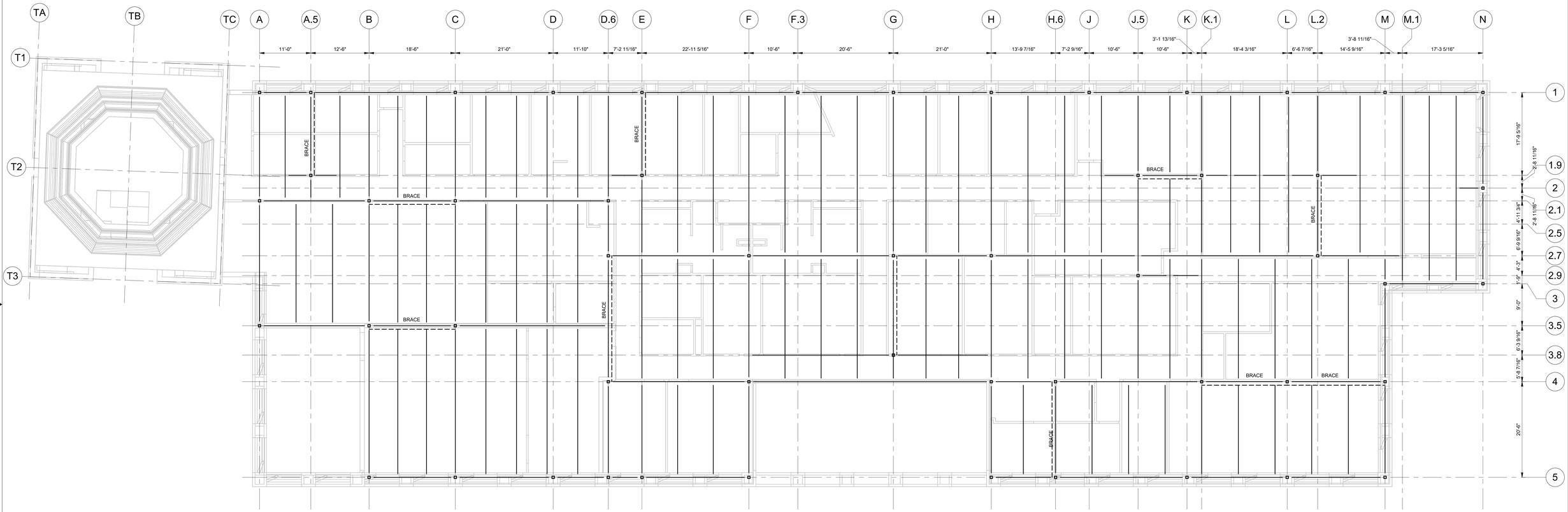
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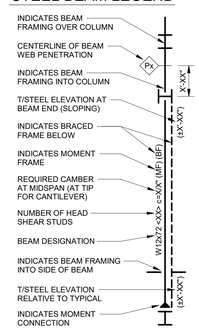
SHEET GENERAL NOTES:

1. REFER TO SHEET S001 FOR STRUCTURAL GENERAL NOTES
2. T/STEEL = TBD

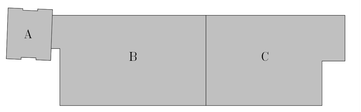


1 S110 OVERALL ROOF FRAMING PLAN - BASE BUILDING
SCALE: 1/8" = 1'-0"

STEEL BEAM LEGEND



0 8' 16'
SCALE: 1/8" = 1'-0"



KEY PLAN

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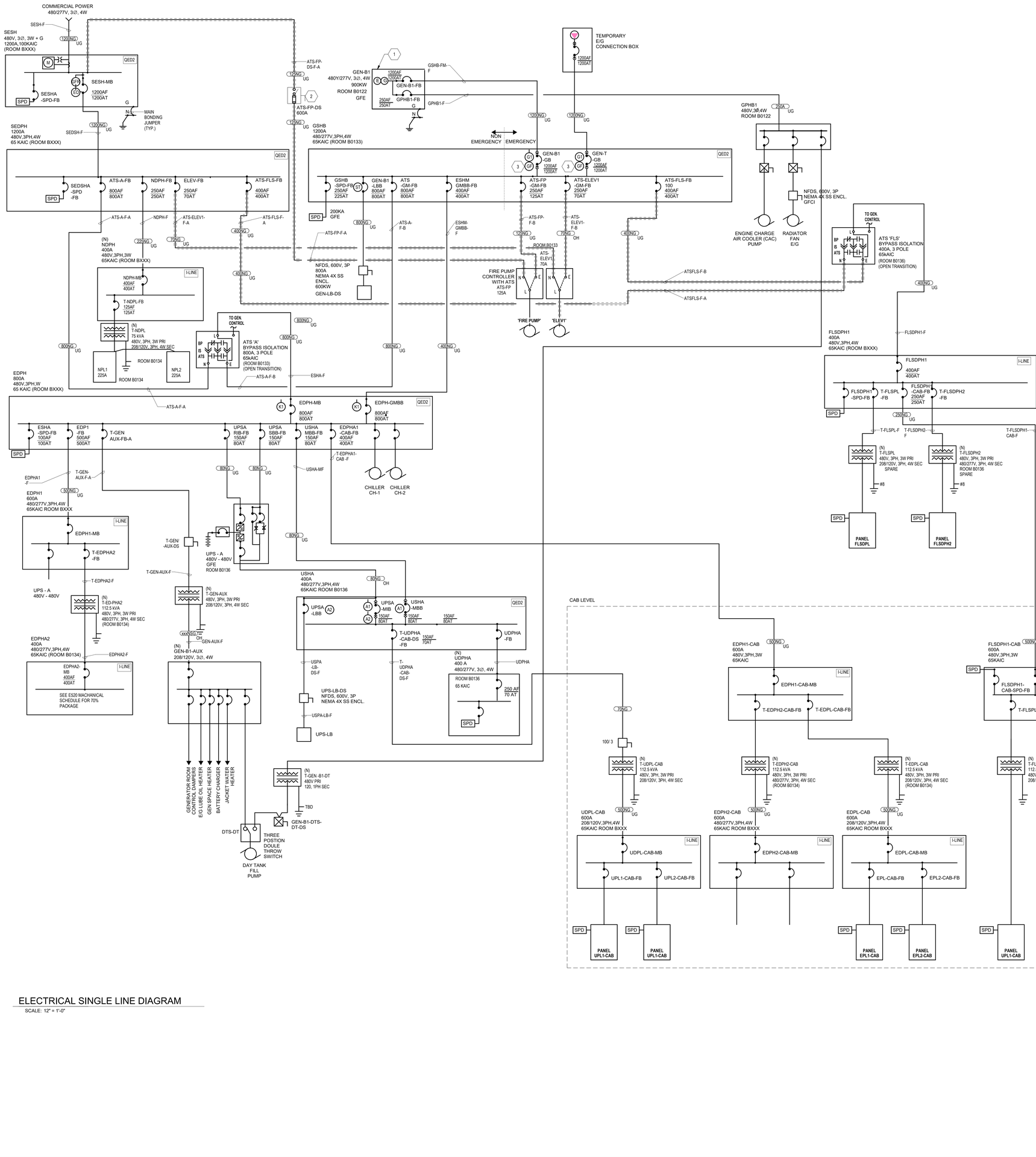
OVERALL ROOF FRAMING PLAN

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GENERAL SHEET NOTES

A. REFER TO ATCT-E000 FOR SYMBOLS AND ABBREVIATIONS.

B. REFER TO ATCT-E0001 FOR GENERAL NOTES.

C. REFER TO ATCT-E700 SERIES SHEETS FOR RISER DIAGRAMS.

D. ALL TRANSFORMERS SHOULD BE K-13 RATED.

E. ALL EQUIPMENT ARE CFE, UNLESS OTHERWISE NOTED.

F. ASSIGN 25% SPARE TO ALL PANELBOARD AND SWITCHBOARD, SEE PANEL SCHEDULE FOR DETAIL.

G. FOR 70% PACKAGE, REFER TO MECHANICAL EQUIPMENT SCHEDULE E-020 & E521 FOR MECHANICAL EQUIPMENT FEEDER BREAKER FRAME AND SIZE.

H. FOR SPARE PANEL WITHOUT PANEL LOCATION INDICATED IN 70% PACKAGE, LOCATION WILL BE DETERMINDED IN FUTURE SUBMITTAL. FOR SPARE BREAKERS, FRAME AND TRIP SIZE WILL BE INDICATED IN FUTURE SUBMITTAL.

I. PROVIDE 2 HOUR FEEDER RATINGS FOR CONSTRUCTION AND FEEDER PROTECTION ON FEEDERS TO FIRE PUMP ATS, FIRE-LIFE-SAFETY ATS, AND ELEVATOR ATS. ALSO, PROVIDE 2 HOUR FEEDER RATINGS BETWEEN ELEVATOR ATS AND FIRE SERVICE ELEVATOR.

SHEET KEYNOTES

Keynote Number	Keynote Text

ELECTRICAL SINGLE LINE DIAGRAM

SCALE: 12" = 1'-0"

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ELECTRICAL SINGLE LINE DIAGRAM

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DRAWN Author
CHECKED Checker

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Basis of Design for ATCT Facility

Basis of Design Report

Federal Aviation Administration
Duluth Airport Authority

Project Planning Document (10% Design)

A&E Services for the Design of the Airport Traffic Control Tower (ATCT) and TRACON Base Building Facility, Duluth International Airport (DLH), Duluth, Minnesota

FAA Reference: DTFASA-17-D0009/697DCK-23-F-00324

January 26, 2024

Prepared and Reviewed By:
EXP U.S. Services, Inc.
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1 Introduction

This Basis of Design Report establishes the basis design for the new Air Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) Base Building Facility at the Duluth International Airport (DLH) in Duluth, Minnesota.

1.1 Summary of Work

This report is a summary of understanding for the project titled Airport Traffic Control Tower (ATCT) and TRACON Base Building at the Duluth International Airport (DLH) in Duluth, Minnesota. The ATCT and TRACON facility will be designed as a combined facility in accordance with the following requirements:

- Requirements Document, dated October 2023
- Executed Contract between EXP and Duluth Airport, dated July 05, 2033 and subsequent executed Work Orders
- Airport Traffic Control Tower Siting Report, dated July 24, 2023
- The Terminal Facilities Standard Designs Manual, version 2.1, dated December 13, 2022
- FAA Minimum Building Information Modeling (BIM) Requirements, dated September 2022
- Minimum Wind Tunnel Test Requirements, dated September 22, 2021

The Air Traffic Control Tower will utilize an eight (8) sided, 440 SF FAA standard design cab with eight (8) mullions and slat wall consoles and an Intermediate Activity Level, square shaft with one (1) elevator and (2) two stairs. For room adjacencies, building egress and similar requirements, the TRACON Base Building Facility will be based on the 11,000 SF TRACON Standard Design, with modified rooms per the Requirements Document, the DLH Space Allocation Table, and feedback from Concept Layout reviews. (Note that the current building layout agreed to by the Airport and the FAA is approximately 19,000 SF).

1.2 Siting Location

Per the Siting Report, the final recommended site for the replacement of the ATCT at DLH is Site 6. The estimated ground elevation at site 6 is 1,424 feet above mean sea level (AMSL). The proposed tower cab floor elevation is 119 feet above ground level (AGL)/1,543 feet AMSL. This is the shortest possible ATCT that meets all siting criteria and is deemed safe under the Safety Management System (SMS). DLH Airport has agreed to provide approximately three acres for the ATCT and base building construction for Site 6.

1.3 Tower Location

The design data for the center of the tower to establish its exact location per the siting report is as follows:

- Latitude: 46° 50’ 15.3900” N
- Longitude: 92° 11’ 47.5600” W
- Cab Floor Elevation: 119 feet AGL/1,543 feet AMSL
- Highest Point on the Structure: not to exceed 153 feet AGL/1,577 feet AMSL

1.4 Tower Floor Heights

The tower key elevations are as follows:

	Height (AGL)	Elevation (AMSL)
First Floor:	0’-0”	1424.00’
Second Floor:	15’-9”	1439.75’
Third Floor – Elec:	31’-6”	1455.50’
Fourth Floor – Mech:	47’-3”	1471.25’
Fifth Floor – Mech:	63’-0”	1487.00’
Sixth Floor – Mech:	78’-9”	1502.75’
Junction Level:	109’-9”	1533.75’
Walkway Level:	112’-3”	1536.25
Cab Floor Level:	119’-0”	1543.00’
Eye Level:	124’-0”	1548.00’
Top of Tower Maximum:	153’-0”	1577.00’

1.5 Impacts

The proposed tower structure at Site 6 will exceed the RWY 09/27 Part 77 Transitional surface and must be lighted with red obstruction lights in accordance with FAA Advisory Circular 70/7460-1, Obstruction Marking and Lighting Chapters 4,5, and 12.

The proposed ATCT will have an impact on Instrument Flight Rules (IFR) operations and the final design of the ATCT and base building will have to be evaluated for impacts to the 09 CAT II Localizer as detailed in Appendix F of the Siting Report. The Duluth Airport Authority has been notified of these impacts and has acknowledged the required actions in the Airport Concurrence Letter (included in Appendix A of the Siting Report).

To obtain a favorable determination of the airspace case for the recommended site (Site 6) it was necessary to lower the top of the tower by 1 foot from that assumed during AFTIL siting. The cab floor and eye level heights do not change. When designing the ATCT, this restriction must be met and the maximum tower structure height, including antennas and appurtenances, must not exceed 153 feet AGL/1,577 feet AMSL. Exceeding this height will cause the structure to be a hazard to air navigation.

1.6 ATCT Classification

Air Traffic Control Towers are classified into twelve (12) main categories designated by activity level. These levels are based upon the quantity and type of air traffic controlled by the ATCT. The new DLH ATCT will have the following classification:

Facility Type: Non-Standard ATCT/TRACON
Facility Status: Leased
Hours of Operation: 24-hours a Day, 7-Days a week
ATC Level: 5
Current Positions: 5/Cab; 4/TRACON
Automation: STARS
Siting: AFTIL

1.7 AJT Operational Positions

OPERATIONAL POSITIONS	Current	Future	Comments
Duluth, MN Tower/TRACON (DLH), Type Combined Tower/TRACON, level 5, Hrs of Op 0000-2359 LCL, Technical Requirements & Forecasting, AJG-P24, 05/24/2022	**Existing Positions**	**Future Positions**	
Tower Control Positions			
LOCAL CONTROL	1	1	Open every day 24 hrs. RADAR is also worked from this position on the 8 hrs of the mid-shift
GROUND CONTROL	1	1	Due to staffing shortage, this is only open every day for 6.5 hrs
TOWER RADAR	1	1	**Worked in the tower most every day for 16 hrs**
Total Control Positions	3	3	
Tower Support Positions			
TOWER FLIGHT DATA	1	1	Due to staffing shortage, this is only open every day for 6.5 hrs
OPERATIONAL SUPERVISOR/CONTROLLER-IN-CHARGE	1	1	Staffed every day 24 hrs
Total Support Positions	2	2	
Total Tower Positions	5	5	

OPERATIONAL POSITIONS	Current	Future	Comments
Duluth, MN Tower/TRACON (DLH), Type Combined Tower/TRACON, level 5, Hrs of Op 0000-2359 LCL, Technical Requirements & Forecasting, AJG-P24, 05/24/2022	**Existing Positions**	**Future Positions**	
TRACON RADAR Positions			
SOUTH RADAR	1	1	Due to staffing shortage, we are unable to open TRACON more. Normal staffing, it would be appx. 10 hours per day
NORTH RADAR	1	1	This position is used for Air Show operations and used as a training simulator.
Total RADAR Positions	2	2	
TRACON Support Positions			
APPROACH DATA	1	1	This position is used during Air Show or Special Events.
OPERATION MANAGER-IN-CHARGE (Position Log Only)	1	1	Due to staffing shortage, we are unable to open TRACON more. Normal staffing, it would be appx. 10 hours per day
Total Support Positions	2	2	
Total TRACON Positions	4	4	

1.8 AJT Staffing

AJT Authorized Staffing Numbers	Current		Future
Duluth, MN Tower/TRACON (DLH), Type Combined Tower/TRACON, level 5, Hrs of Op 0000-2359 LCL, Technical Requirements & Forecasting, AJG-P24, 05/24/2022	**FY22 Auth AT Staffing**	**Max Shift Count**	**Future Auth AT Staffing**
AIR TRAFFIC PERSONNEL			
Air Traffic Manager	1		1
Staff Manager	0		0
Support Manager	0		0
Operational Manager	0		0
Operations Supervisor	3		3
Support Specialist	1		1
Air Traffic Control Specialist	20		20
ATCS Staffing Range (Min/Max)	0		0
	0		0
Administrative Officer	0		0
Personnel Specialist	0		0
T&A Clerk	1		1
Clerical	0		0
	0		0
Traffic Management Officer	0		0
Supervisory Traffic Management Coordinator	0		0
Traffic Management Coordinator	0		0
Traffic Management Analyst	0		0
Traffic Management Specialist	0		0
Total Air Traffic Personnel	**26**		**26**
CONTRACT PERSONNEL	0		0
Contract Weather Observers	6		6
US Customs Staff	0		0
Contractor Training manager	0		0
Contractors for Training	1		1
Contractor Administrative	0		0
Total Contract Personnel	7		7
Total Facility Personnel	**33**	**25**	**33**

1.9 AJR Staffing

Currently, DLH does not have a Traffic Management Unit (TMU). AJR, Systems Operations Services, does not anticipate any requirement for a TMU within this facility at the present time.

1.10 AJW Staffing

DLH ATCT/TRACON Verified by Resource Management Group, CSA, 05/25/2022	Staffing		Final Validated	
	Current Staff Hrs of Ops = 24	New Proposed Hrs of Ops = 24	Max Shift Count	Staffing
Facility Manager	0		0	0
SSC Manager	1		1	1
SSC Coordinator	1		1	1
Systems Specialist	1		1	1
Air Traffic System Specialist	11		11	11
General Maintenance Mechanic (GMM)	0		0	0
Engineering Technician	0		0	0
Electronics Technician	0		0	0
Administrative Support Personnel	1		1	1
Total Tech Ops Personnel	**15**		**15**	**15**

1.11 Space Allocation

1.11.1 Requirements Document

For room adjacencies, building egress and similar requirements, the Base Building/TRACON must be similar to FAA Standard TRACON Designs, modified to accommodate the room sizes per the RDWB spaces tab.

A Vehicle Maintenance Shop is necessary for the below listed and other similar equipment. In addition, there is limited outside storage space due to size constraints of the preferred site.

- Honda ATV with attached tank and sprayer for herbicide
- Large (10 ton) rooftop type air conditioning unit mounted on 14 ft dual axle trailer
- DR walk behind mower
- DR pull behind mower
- 8KW diesel generator
- 3 GOV mounted snowplows (SSC is responsible for mounting, dismounting, storage and maintenance)

Per the Requirements Document Workbook, a smoking room was to be included as part of the design of the building; however, during the kickoff meeting local FAA personnel as well as Union representatives indicated that they would prefer that the space designated for the smoking room be allocated to a Tech Ops locker room.

TRACON/BASE BUILDING SPACE ALLOCATION				
ROOM FUNCTION	Allow. Space per Staff	Final Validated		Allowable Space
		Max Shift Count	New Staffing	
TERMINAL PERSONNEL				
Air Traffic Manager	150	1	[redacted]	150
Operations Supervisor	75	3	[redacted]	225
Support Specialist	64	1	[redacted]	64
T&A Clerk	64	1	[redacted]	64
Air Traffic Workspace	100	1	[redacted]	100
Air Traffic Control Specialists	0	20	[redacted]	0
Subtotal				**603**
TECHNICAL OPERATIONS PERSONNEL				
Tech Ops SSC Manager	150	1	[redacted]	150
Admin Assistant	64	1	[redacted]	64
SSC Coordinator	150	1	[redacted]	150
Systems Specialist	64	1	[redacted]	64
On Site ATSS	32	11	[redacted]	352
Subtotal				**780**
OTHER PERSONNEL ADMIN. SPACE				
CBI Training Room	200	1	[redacted]	200
Contractor for Training	64	1	[redacted]	64
Contract Weather Observers	64	3	[redacted]	192
Subtotal				**456**
AIR TRAFFIC SPACES				
Debriefing Room	100	[redacted]	[redacted]	100
Drug Testing Room	70	[redacted]	[redacted]	70
Quiet Room	100	[redacted]	[redacted]	100
Tape Play-Back	80	[redacted]	[redacted]	80
TRACON Operations Room	704	[redacted]	[redacted]	704
Subtotal				**1,054**

TECHNICAL OPERATIONS REQUIREMENTS			
Electronics Equipment Rooms	1,203		1,203
TELCO	100		100
LAN Room	150		150
Subtotal			**1,453**
ENVIRONMENTAL SUPPORT - MECH/ELEC SPACE			
Electrical Switchgear Room	500		500
Engine Generator Equipment Room	150		150
Electrical Room - Administrative Space	170		170
NAS Electronic Workshop	300		300
Environmental Shop	800		800
Fire Control Room	150		150
Fire Pump Room	200		200
Fire Life Safety Electrical Room	200		200
HAZMAT Storage Room	150		150
Mechanical Equipment Room	1,677		1,677
PPE Storage - Technician	3.75	14	53
PPE Storage Group	150		150
Supply / Parts Storage	600		600
Secure Storage Area	400		400
Security Equipment Room	50		50
Shipping / Receiving	140		140
UPS Room	150		150
Vehicle Maintenance Shop - see special considerations	900		900
Subtotal			**6,740**

JOINT USE & MISC. SUPPORT AREAS			
Wellness Room	225		225
Mail Room / File Copier	100		100
Project Office / RE space	100		100
Lactation Room (with sink)	100		100
Smoking Room	100		100
Large Conference Room	300		300
Small Conference Room	150		150
Janitor Closet	30		30
Locker Room	200		200
Administrative Storage	200		200
NAS Documentation Area / Tech Library	200		200
Break Room / Seating Area	15	30	450
Loading Dock / Shipping / Receiving	500		500
Subtotal			**2,655**
20% Planning Factor (restrooms / corridors, etc.)			**2,748**
TOTAL TRACON/ BASE BUILDING SPACE			**16,489**

1.12 Delivery Method

The Airport, in conjunction with the design team and the FAA have determined that a Construction Manager at Risk (CMaR) project delivery method is the most advantageous delivery method for the DLH ATCT project. A CMaR delivery method results in one entity managing the construction for the entire project, despite the potential for multiple bid packages to align with multiple funding sources. The use of a CMaR will reduce potential project/construction scope gaps and will streamline overall project communication. The CMaR delivery method also allows the Airport to receive a guaranteed maximum price (GMP) based on 70% documents, which will meet the requirements of the funding process as a GMP is considered a “bid”. The CMaR Request for Proposals is currently live, and CMaR proposals are due February 02, 2024.

1.13 Project Schedule

At the start of the project, the design team developed an expedited design schedule to align with Federal Funding deadlines and requirements.

FAA Review Time: The design schedule includes an expedited FAA review period. FAA review time would be limited to a 5 working day review period at each submittal (10%, 35%, 70%, 100%, Final). This expedited FAA review period was discussed with the FAA at various meetings and was agreed to. The current schedule indicates an Issue for Final Design / Issue for Bid in October of 2024.

A copy of the Design Schedule has been included as part of this submittal for reference.

END OF SECTION

2 Civil Design Basis

2.1 Site Information

The existing site is currently occupied by a one-story brick building, as well as a bituminous driveway/parking area. This building is occupied by Hermantown Hydraulics but is anticipated to be removed prior to the construction of the new Air Traffic Control Tower (ATCT) and base building as a separate project, potentially as soon as April, 2024. Another airport tenant, Jet Duluth, has a hangar located to the north of the site, a vacant lot is located to the west of the site, and the Civil Air Patrol building is located east of the site.

Existing topography indicates the site runoff and drainage patterns travel to the south of the site along Airport Road. The existing drainage pattern will adequately accommodate a filtration basin to treat storm water runoff south of the site. The proposed base (finished floor elevation) of the tower and base building is 1,424 feet. The final size of the construction grading limits, as well as the final site is still undetermined, as the parcel size and dimensions need to be coordinated with the City of Duluth. This process is ongoing.

2.2 Land Surveying

The proposed Air Traffic Control Tower (ATCT) site will be designed using the North American Datum of 1983 (NAD 83) as the horizontal control datum, and the North American Vertical Datum of 1988 (NAD 88) as the vertical datum. Mean sea level (MSL) will be used as the base elevation.

The proposed site is located on the corner of Airport Road and Stebner Road. Ground survey on the site was performed using NAD 83 and NAD 88 datum. Existing ground, building, pavement, structures, and utilities were captured in the survey.

2.3 Earthwork and Site Preparation

2.3.1 Investigations

2.3.1.1 General Soil Conditions

The geotechnical report is not yet complete, and analysis is still ongoing, however, draft logs show a large portion of the site is covered in silty sand or clayey sand while the bituminous areas are 4 inches of bituminous over 9-12” of aggregate.

A Phase I Environmental Site Assessment (ESA) identified Recognized Environmental Conditions (RECs) present and a Phase II ESA was performed to identify if those RECs impacted soil, soil vapor, or groundwater. The Phase II ESA report is included as part of this submittal for reference. A soil vapor investigation revealed no VOCs detected exceeding regulations. Additional soil vapor testing will be conducted in the next few months. Any contaminated soils or groundwater will be handled in accordance with the recommendations given in the Phase II ESA including:

- Prior to redevelopment of the Subject Property, the project should be enrolled in the Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) Program and the Petroleum Brownfields Program (PBP) to request the appropriate approvals and liability assurances including a Retroactive No Association Determination for the Identified Release in soil vapor and groundwater at the Subject Property (i.e., trichloroethene and tetrachloroethene). Please note because the tenant at the Subject Property likely caused or contributed to the impacts detected below the floor slab, the Owner (Duluth Airport Authority) would not be eligible for a Retroactive No Association Determination for the Polynuclear Aromatic Hydrocarbon (PAH) impacts to soil.

- A Response Action Plan (RAP) should also be prepared and submitted for VIC Program and PBP for review and approval prior to the start of construction. The RAP will describe the proposed project, identify the various parties involved with the project, outline the procedures that will be used to manage soil and groundwater impacts that will be encountered during construction. The RAP should also include contingencies that will be implemented in the event previously unidentified conditions are encountered such as underground storage tanks, potential asbestos-containing materials or contamination that differs from that encountered during the Phase II ESA.
- During construction, environmental monitoring as outlined in the RAP should be conducted to document the field conditions and response actions that are implemented.
- Following construction, a RAP Implementation Report should be prepared and submitted to the MPCA to request approval of response actions, a No Further Action Determination and approval of response actions, as appropriate.

2.3.1.2 Existing Utilities

Preliminary on-site utility investigations and survey were completed on December 12-14, 2023. Appropriate utility companies were notified so their infrastructure could be located and characterized. 15 locations were potholed through hydro-excavation to identify depths and sizes of underground infrastructure to validate and inform record drawings.

There is sanitary, overhead electric, gas, telephone, and fiber optic lines running through the proposed site. These utilities are required to be relocated to accommodate the new building, site layout, and Stebner Road relocation. More will be known about utility relocation as the design progresses and details will be included on future submittals. Communication with utility companies has commenced.

2.3.1.3 Existing Air Traffic Control Tower

The existing ATCT and base building at the Duluth International Airport is located on the Tower Ramp to the south of Runway 9-27 and the west of Runway 3-21 (See Figure 1 below). The existing ATCT and base building will be demolished as a part of this project. The future plan for this site is green space for snow storage.

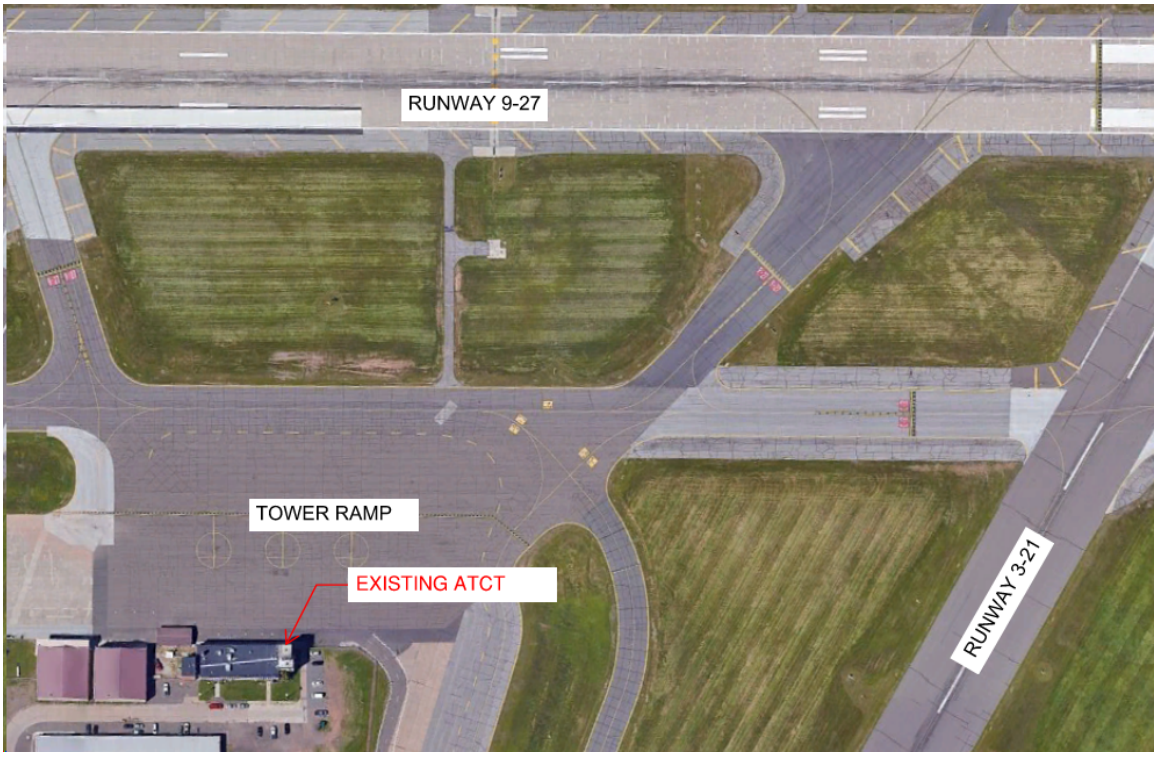


Figure 1 – Existing ATCT Site

2.3.2 Grading

A grading plan has not been developed at the time of this submittal and more information will be added as the design of the site progresses. Required cut and fill will be balanced where possible and grading on site will be done in accordance with recommendations from the geotechnical report. Structural fill will be used under structures, roadways, parking areas, site structures, walkways, and any other areas prone to deleterious effects or differential settlement.

The finished elevation of the ground (first) level will be a minimum of 6 inches above the finished exterior grade elevation. Planted and turf areas adjacent to the building will slope away from the building at a minimum 5% slope for a distance not less than 10 feet.

2.4 Storm Drainage

All storm drainage will be designed in accordance with FAA Advisory Circular 150/5320-5D, Airport Drainage Design, applicable federal storm runoff requirements, State, Local, and EPA and State Best Management Practices for storm water control.

Storm water runoff on the site will be managed using inlets and pipes that will guide the water to a filtration basin, which will treat the water before it's released into the City of Duluth storm water system. The basin design will, at a minimum, be based on the maximum rainfall intensity-frequency of a 1-hour rainfall, in inches, to be expected once in 100 years. The basin is planned to be located on the southwest portion of the site, south of the access drive. The size of the catch basins, pipes, and filtration basin will be determined as the site design progresses. Figure 2 shows the preliminary size and location of the filtration basin.

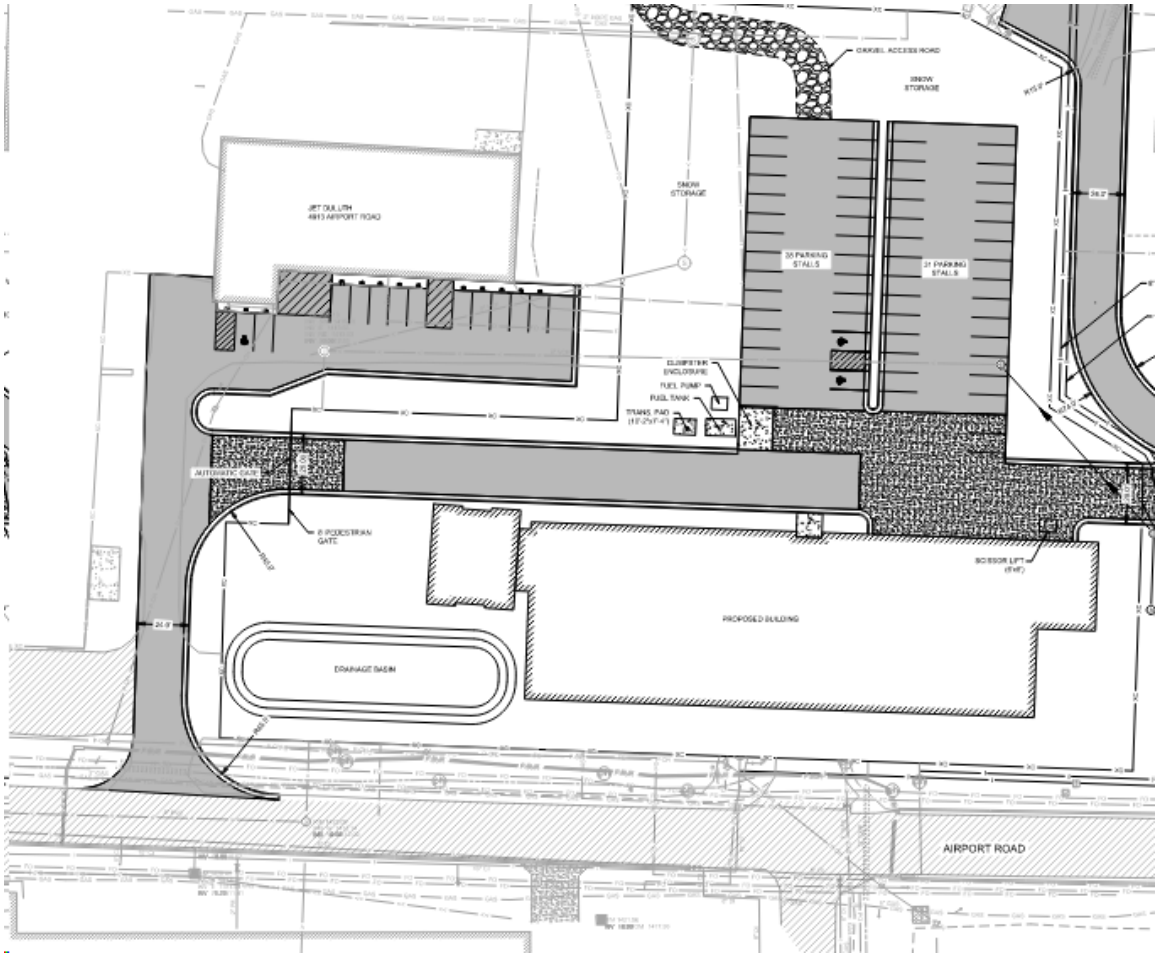


Figure 2 – Drainage Basin on Site

A detailed erosion control plan will be developed in accordance with the Federal, State, and Local requirements.

Currently, the parking area does not have exterior curb and gutter. This is to allow for more efficient snow removal operations. However, the parking areas will be graded to drain to inlets in the grass surrounding the pavement. Curb and gutter will be included on the access drive throughout the site and curb inlets will be constructed to direct the flow of water to the filtration basin.

2.5 Geometric Design

2.5.1 Site Accessibility

The site will be accessible via two access roads. Primary access to the site will be from Stebner Road which is

located to the East of the site. The access road will be 20’ wide with a 5’ shoulder on each side. Design of this access will be in accordance with the AASHTO GDHS-7, Green Book and follow the design parameters given in the TFDS Table 4-1 (See below).

Functional Classification	Local
Category	Rural or urban per population density
Traffic Volume (AADT)	Facility Level 3–5: 150 vehicles per day (vpd) Facility Level 6–9: 350 vpd Facility Level 10–12: 500 vpd
Design Vehicle	WB-65 tractor trailer
Pavement Classification	High-type
Minimum Design Speed	Facility Level 3–5: 30 mph Facility Level 6–12: 40 mph
Longitudinal Grades	Per AASHTO GDHS-7 or state DOT requirements, whichever is more stringent
Cross-Slope	Maximum 2%
Rock and Grass Swales	Minimum 1% longitudinal
Minimum Travel Way Width	20 feet
Number of Lanes	2
Minimum Shoulder Width	5 feet
Minimum Vertical Clearance	14 feet 3 inches or fire department requirements, whichever is greater

Figure 1 - Table 4-1. Access Road Design Type and Requirements (Source: FAA TFDS Version 2.1)

There will be a secondary access point on the west side of the site from the existing road. This existing road will require some widening and modification to accommodate the WB-65 truck traffic exiting the site.

The site design and development will conform to the requirements listed in the Americans with Disabilities Act (ADA) and will comply with the security requirements listed in the FAA Order 1600.69.

2.5.2 Site Structures

The site will include a dumpster enclosure, an above ground fuel storage tank, an electrical transformer, facility signage, a flagpole, engine block heater outlets for nine government vehicles, electrical vehicle charging station infrastructure for two future dual-port charging stations as required per the RDWB, and site lighting. More information on these structures will be provided with future submittals.

2.5.3 Site Circulation and Parking Lot Design

Normal site traffic will be facility employees and maintenance personnel. Occasional heavier traffic will include facility deliveries, fuel deliveries, mail, package services, garbage pickup, meter-reading, equipment services, janitorial, landscape maintenance, and emergency services. As required by the Requirements Design Workbook (RDWB), the following parking stalls will be provided:

- 7 government Owned Vehicles (GOV) parking stalls
- 2 ADA compliant parking stalls
- 50 employee/visitor parking stalls

There will be a total of 59 parking stalls. The GOV parking stalls will be equipped with infrastructure and duplex outlets for plug-in of vehicle block heaters as well as conduit infrastructure for charging stations for future EV charging.

4’ wide unobstructed pedestrian walkways will be provided from main entrances to parking areas and to all exterior doors with complete circulation around the perimeter of the facility, where possible. At minimum,

paved access will be provided from the loading areas to the exterior doors of the mechanical, electrical, fire pump, electronic equipment room, and similar areas. Sidewalks that are adjacent to curb will be increased to 6' in width or offset from curb. Accessible ramps with tactile warning strips will be provided at all curb cubs to sidewalk.

A loading area will be provided. This loading area is located at the northeast corner of the building near the loading shipping area and vehicle maintenance. The loading area will have a load capacity of at least 5,000 lbs. and a scissor lift platform size of 72" wide by 96" long.

2.6 Pavement Type and Design

Pavement areas will be designed for AASHTO HS-20 loading constructed of reinforced or plain concrete or bituminous concrete in accordance with the recommendations for pavement type, subbase, subgrade and compaction requirements contained in the geotechnical report. Concrete pavement will be mandatory for the dumpster approach, loading and mechanical areas, truck turn around areas, if applicable , and entrance and exit gates. Concrete curbing will be included on driveway and road pavement.

All areas will be designed for a distributed load of 250 pounds per square foot (psf).

2.7 Gates and Fencing

Gates and fencing will be designed in accordance with the requirements listed in FAA Order 1600.69 and AC 150-5370-10, Standard Specifications for Construction of Airports.

A 7' galvanized chain link security fence will surround the site. The fence will consist of 9-gauge galvanized steel wire fabric, posts spaced a maximum of 10' apart and embedded in concrete footings to a depth of not less than 3 feet.

There is a 20' buffer on both sides of the fence and there will be no structure higher than finished grade inside the buffer.

Two motorized 28' gates will be provided on the east and west side of the site for vehicular access. One pedestrian gate will be provided on the west side of the site, south of the vehicular gate.

2.8 Utilities

See the existing utilities paragraph above for existing utility information. All utilities will be protected by underground installation, marked for recognition using locally accepted utility marking procedures, and readily accessible for maintenance. The layout and location of the services will take into consideration future expansion of the facility and airport master plan.

All electric and telecommunication service lines to the facility, including FAA communication cables, will be concrete encased. A handhole/manhole will be provided within 25 feet of the building for all underground FAA services. All manhole, handhole, or pull-boxes will be located so top/lid elevations are below building(s) finished floor elevation or, if applicable, below the elevation of the conduits from the structure entering into the open space under raised access floors. If this cannot be accomplished, a drainage system will be provided in the structures below the finished floor or

conduit penetration elevations as discussed above, ensuring water does not enter the facility when structures fill with water.

2.8.1 Water

A new water service line will be provided to the facility utilizing the existing water main currently running parallel to Airport Road. The final service line sizing will be determined by the mechanical and plumbing needs of the building. A shut off valve will be located on the service line on the exterior of the building.

2.8.2 Sanitary Sewer and Treatment

Existing sanitary sewer infrastructure is on site servicing surrounding buildings. The existing infrastructure will need to be removed, relocated, and replaced so that the new building and site layout can be sufficiently serviced. The new sanitary sewer will link into the City of Duluth sanitary main that is located under Airport Road. Pipes and manholes will be sized as site design progresses. The design plan will be included in future submittals.

2.8.3 Fire Protection

Fire protection will be accessed from an existing water main located to the south of the site within the City of Duluth Airport Road right of way.

2.8.4 Telecommunications

CenturyLink will provide the telephone utility service. New telecommunications lines will be concrete encased.

2.8.5 Power

An on-site meeting was held on December 22, 2023 with Minnesota Power (MP) regarding the relocation of the existing overhead electrical lines on site. Initial feedback from MP is that they can remove existing overhead infrastructure and move these lines underground. More details will be provided as the design progresses. Minnesota Power will provide the transformer size needed for the site and future submittals will include that information.

Underground electrical lines will be concrete encased from the building to the edge of the site. At that point, the electrical line will be directionally bored to the existing electrical vault location. The existing electrical vault is located to the northeast of the site.

2.8.6 Fiber Optic Line

Fiber Optic service is currently on site and will be relocated to provide service to the new building.

2.8.7 Airfield Cabling

The electrical airfield cabling servicing the existing tower at Duluth International Airport is routed from the infield area south of Runway 9-27 and north of Taxiway A, between Taxiway C and A4. These services will have to rerouted for the new ATCT. It is expected the services will route from the same infield area but further discussion on routing and requirements with the FAA is needed and more information will be provided in future submittals.

2.9 Landscaping

Landscaping for this site is not developed at the time of this submittal but will be included in future submittals. Landscaping design will be in accordance with the FAA requirements and the City of Duluth recommendations. The City of Duluth and the Duluth International Airport have an executed airport specific landscaping plan that will be reviewed.

2.10 Zoning

Zoning and permit requirements will be coordinated with the City of Duluth as design progresses.

The proposed site will need to be rezoned from Mixed Use-Business (MU-B) to Airport (AP). Additionally, with the proposed realignment of Stebner Road, the existing Stebner Road will need to go through a vacating process. Preliminary discussions have taken place with the City of Duluth to get these processes started.

END OF SECTION

3 Architectural Design Basis

3.1 Introduction

The purpose of this project is to construct a new Air Traffic Control Tower (ATCT) Facility and TRACON Base Building at the Duluth International Airport in Duluth, Minnesota. The facility will be based on the South Air Traffic Control Tower at O'Hare International Airport, will use the FAA Standard TRACON Base Building Template, and will include all required facility support spaces, Air Traffic and Tech Operation office spaces, with edits directed by the Requirements Document and supplemental information provided by the Airport and the FAA.

3.2 Architectural Compatibility

The primary architectural consideration for this facility is to provide a durable low maintenance facility which meets the operational requirements and complements the surrounding local environment and aesthetic. Due to its height, the facility will be a strong visual element in and around the airport area.

The tower shaft will be structural cast in place concrete and will have a floorplan that inverts conventional solid-core tower plans, pushing "core" elements (elevator/stairs/shaft) to the perimeter, thereby opening the center for equipment feeds directly up to the cab.

The base building will be a steel frame structure for both the gravity and lateral system. The base building is organized in a linear rectangle that responds to the site constraints. Joint use and support areas are located primarily at the center of the building with an exterior courtyard to the south, adjacent to the break room, to take advantage of the site's southern exposure. Environmental support and mechanical/electrical spaces are located primarily to the east, adjacent to Technical Operation spaces, and the Terminal personnel spaces are located at the west, closer to the tower. The electronics equipment room/Telco/LAN is located furthest to the west to allow for the closest proximity to the tower. The main entrance to the base building is located at the center of the north façade with a direct view of the southern courtyard.

The design team is currently preparing an analysis of exterior finish materials for both the tower and the base building. Material considerations include integrally colored concrete, glass fiber reinforced concrete (GFRC) cladding system or a metal panel cladding system. The analysis will include a comparison of first cost and life cycle costs as well as maintenance requirements for all three systems. The cost estimate included as part of this submittal assumes a metal panel cladding system. Aesthetic considerations beyond these preliminary assumptions have not yet been vetted with the Airport. Future design submittals will include details for the aesthetic and governing requirements.

3.3 Building Codes

The design of the ATCT Facility will be in accordance with the following building codes as required by the TFDS v2.1 (not all required codes are listed. For a full list refer to Appendix F of the TFDS v2.1), and in accordance with the local requirements:

- Minnesota Building Code 2020
- Minnesota Fire Code, 2020
- Structural Design Loads: Minimum Design Loads for Buildings and Other Structures, 2016 (ASCE 7-16)
- Plumbing Code: Minnesota Plumbing Code 2020

- Mechanical Code: Minnesota Mechanical and Fuel Gas Code, 2020
- Electrical Code: National Electrical Code, 2023
- Fire/Life Safety Code: Life Safety Code (NFPA 101-12)
- Accessibility Code: ADA Standards for Accessible Design, 2010
- Energy Code: Minnesota Energy Code, 2020

3.4 Type of Construction

The facility is to be of permanent type construction, type 1B. Proposed structural materials for the ATCT and base building will be non-combustible steel and concrete. The tower shaft will be of structural cast-in-place concrete to the tower walkway level. Steel frame construction will be utilized to support the Cab Level. The tower will include two stairs for egress and a single side opening machine room less (MRL) 3,500 lb capacity elevator. The tower shaft floor construction will consist of cast-in-place concrete construction. The cab floor will be a composite cast-in-place concrete slab using a composite steel deck. The steel framed portion of the tower will be clad in metal wall panels.

Base building floor slabs will be slab-on-grade. The base building will be a steel framed structure with either a glass fiber reinforced concrete (GFRC) cladding system or a metal panel cladding system on the exterior, articulated to provide a dynamic appearance and break up the mass of the building. The interior of the base building will consist of metal studs, batt insulation and gypsum board in occupied rooms and painted concrete masonry unit walls in mechanical rooms Ceiling tile will be designed to be at 9’-0” above finish floor, minimum, except where required to be 10’-0”. The roof construction will consist of a concrete slab on composite steel deck with rigid insulation and single ply roofing membrane, with a minimum roof slope of 1/4” per foot. Future design submittals will include details for this design and governing requirements.

3.5 Building Insulation

Per ASHRAE 90.1 International Energy Conservation Code, Duluth International Airport is located in Climate Zone 3A. The exterior walls are required to have a minimum R-value of R-15.2ci and the roof is to have a minimum R-value of R-35ci.

3.6 Physical Site Security

The proposed DLH ATCT and base building facility will be designed as a security level 2 facility (SL2). For this reason, it will not be subject to setbacks and blast protective requirements per FAA Order 1600.69C & D and Job Aid Document AXF-2023-JA-05, Critical Infrastructure Facility Baseline Requirements.

Physical Site Security requirements will include the following:

- Signage:
    - Signage identification as a federal facility.
    - Signage identifying visitor parking.
    - “No Weapons” signs at all gates and building entry points.
    - “Notice of inspection” signs posted at all public gates and entry points.
    - VSS warning signs where VSS is in use.
    - “Restricted Area” signs at interior entrances into critical areas.
    - “Closed Area” signs at interior entrances to closed areas.

- Landscaping
    - Landscaping will be designed to minimize areas of concealment in and around the facility.
    - No landscaping will be placed within a 20-foot clear zone inside or outside of the fence.

- Security Fencing
    - 7-foot tall, 9-gauge woven galvanized steel wire fabric with mesh openings not greater than 2-inches per side, and 1-foot-high outward facing top guard with 3-strands of galvanized barbed wire set at 45 degrees.

- Vehicle Access
    - Motorized 28’ gates will be provided on the east and west sides of the site, requiring card reader access to provide access control.
    - The quantity of vehicle access points has been minimized to reduce points of vulnerability, yet also allow a smooth flow of vehicles.
    - Access points will be monitored with VSS (procedural).
    - All deliveries will be to the loading area located at the northeast corner of the building.

- Site Lighting
    - Site lighting has been located to provide minimum required footcandle levels for entrances and exits to the building and site, as well as parking areas.

- Maintain Restricted Areas, Significant Areas, and Assets
    - Unauthorized entry is prevented by inclusion of keycard access for vehicle gates or FAA-only padlocks for pedestrian gates.
    - There are no exterior critical cables hung less than 12 feet from the ground.
    - There are no exterior ladders that would allow access to critical equipment, roofs, or facility access points.

- HAZMAT Storage
    - Storage for HAZMAT materials is provided in a dedicated room, away from the building entrances and any uncontrolled parking.

- Building Structure Security
    - All windows within 16 feet of ground level are either lockable or inoperable.
    - Air intake grilles within an accessible reach are protected from tampering or removal.
    - All ventilation equipment, controls and systems are within controlled areas, preventing unauthorized access or tampering.
    - The trash dumpster enclosure is located away from building entrances and other vulnerable locations.
    - Barriers are provided, where necessary, to restrict pedestrian access to authorized entry points.

- Emergency Generator Security
    - The EG is located within the controlled facility perimeter, and fuel tank is within this same area, preventing access from unauthorized users.

- Employee Access Control
    - PACS is included in the design to control access to employee entrance doors.
    - PIV card readers are provided on exterior doors.
    - PIV card readers are provided on vehicle access gates.

- Perimeter Doors and Door Locks
    - The number of access doors to the facility has been minimized to those required to support operations.
    - Perimeter doors are specified to be of solid, close, or tight grained wood, steel or employ sheet metal/metal clad 14-gauge (.0747 inches) or thicker.
    - Doors are specified to be tempered or American National Standards Institute rated burglary resistant glass used or an equivalent film or laminate applied.
    - Door frames are specified to be consistent with door construction.
    - BHMA Grade 1 door hardware is specified.
    - Interior mounted hinges are specified to prevent removal on exterior doors.
    - Perimeter doors and critical operational area doors are equipped with latch guards or astragals.
    - All doors are equipped with FAA standard locking system.
    - Egress doors are specified with request-to-exit devices.
    - Code compliant life-safety emergency exit hardware is specified.
    - Emergency exits are specified to be monitored with visual, electronic, or audible alarms.

- Interior Security Criteria
    - Access to critical areas is limited via electronic security.
    - FAA standard locks are specified on critical area doors.
    - PACS is specified to control access to control room doors.

- Building Systems and Roof Access
    - Access into utility, mechanical, electrical, and telecom rooms is limited by card key access.
    - FAA standard locks are specified on utility, mechanical, electrical, and telecom room doors.
    - Access ladders are secured from unintended use.

- Security System/VSS Coverage
    - All perimeter doors are alarmed.
    - All windows are alarmed.

- Access Screening
    - Entry Control Video is provided at all main visitor doors, Tower Cab/Control room doors, and access gates.

- Security Monitoring and Recording
    - VSS is specified to be recorded on digital medium.
    - Intrusion Detection System (IDS) monitoring is by Local Annunciation

- Intrusion Detection System (IDS) Coverage
    - Provided on perimeter doors.
    - There are no operable ground floor windows.
    - There are no open storage secure areas.

3.7 ADA Compliance

The base building will be ADA complaint. All operational levels of the ATCT up to the junction level will be ADA compliant. The tower cab will not be ADA accessible due to operational requirements of the FAA. Future design submittals will include details for this design and governing requirements.

3.8 ATCT Space Requirements

The Air Traffic Control Tower will consist of the following levels:

	Height (AGL)	Elevation (AMSL)
First Floor:	0’-0”	1424.00’
Second Floor:	15’-9”	1439.75’
Third Floor – Elec:	31’-6”	1455.50’
Fourth Floor – Mech:	47’-3”	1471.25’
Fifth Floor – Mech:	63’-0”	1487.00’
Sixth Floor – Mech:	78’-9”	1502.75’
Junction Level:	109’-9”	1533.75’
Walkway Level:	112’-3”	1536.25
Cab Floor Level:	119’-0”	1543.00’
Eye Level:	124’-0”	1548.00’
Top of Tower Maximum:	153’-0”	1577.00’

3.9 ATCT Electrical and Mechanical Room Level

The Control Tower Mechanical and Electrical Rooms provide space for the HVAC Systems for the ATCT Cab. A majority of the control tower electrical systems are housed within the electrical room within the base building; however, the mechanical/electrical room also provides space for electrical systems that cannot be serviced by the base building systems.

3.10 ATCT Junction Level

The Control Tower Junction Level, located on level 8, provides space for slatwalls for the cab consoles.

3.10.1 ATCT Console Area

The cab layout is designed to accommodate the console slatwall layout provided by the siting report and refined by FAA during console coordination efforts.

3.10.2 ATCT Cab Level

The cab is an eight (8) sided cab with mullions. Access to the cab is via stairs from the Junction Level. The cab consoles are designed for seating operation, and the cab is designed for a minimum of 440 square feet. The cab glass will be 15 degree (as required by the TFDS) laminated glazing. Laminated glazing was selected in lieu of insulated glazing due to considerations of warranty, glazing system lifespans, and modes of failure. The HVAC design will include provisions to limit condensation at the interior of the cab glazing.

3.11 LEED

The LEED goal for this project is yet to be confirmed. LEED v4.0 for BD+C New Construction and Major Renovation is based on a 110-point rating system. Initial scoring indicates that 45 points (Certified level) can be achieved with 28 additional points possible depending on further design development and FAA and Airport feedback. Future design submittals will include details for this design and governing requirements.

A copy of the Draft LEED Checklist has been included as part of this submittal for reference.

END OF SECTION

4 Structural Design Basis

4.1 General

The new Duluth International Airport (DLH) Air Traffic Control Tower and Base Building will be designed in accordance with the following design publications:

- Minnesota Building Code – Edition 2020
- International Building Code, 2018 (IBC-18)
- Structural Design Loads: Minimum Design Loads for Buildings and Other Structures, 2016 (ASCE 7-16)
- Terminal Facilities Design Standard, Version 2.1 (TFDS v2.1)
- Building Code Requirements for Structural Concrete, 2019 (ACI 318-19)
- Steel Construction Manual, 15th Edition (AISC 15th Edition)
- Specification for Structural Steel Buildings, 2016 (AISC 360-16)
- Structural Welding Code - Steel, 2015 (AWS D1.1-15)
- Specification for Structural Joints Using High-Strength Bolts, 2014 (RCSC 2014)
- Building Code Requirements and Specifications for Masonry Structures, 2016 (TMS 402/602-16)
- Standard for Non-composite Steel Floor Deck (SDI-NC-2017)
- Standard for Steel Roof Deck (SDI-RD-2017)
- Standard for Composite Steel Floor Deck – Slabs (SDI-C-2017)
- ATCT Facility Design Guide, FAA 6480.7E

The design and analysis will be performed using acceptable engineering practices, including but not limited to hand calculations, finite element models, and industry software. Drawing production will utilize building information modeling (BIM) three-dimensional computer models in accordance with the BIM execution plan. Cast-in-place concrete will be designed in accordance with ACI 318-19 as stated above. Structural steel will be designed in accordance with the AISC Steel Construction Manual, 15th Edition. Roof deck, composite and non-composite floor deck will conform to SDI Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck.

4.2 Structural Design Loading

4.2.1 Live Loads

Load definitions defined by latest building code requirements, local design requirements and FAA Design requirements are as follows for Live Loads:

- Cab Floor (and Walkway): 150 PSF
- TRACON Room Floor: 150 PSF
- Mechanical & Electrical Areas: 250 PSF
- Electronic and Telephone Rooms: 150 PSF
- Cable Plumbing and Access Levels: 250 PSF
- Elevator Lobbies: 150 PSF
- Storage Rooms: 150 PSF
- Loading Dock: 250 PSF
- Stairs and landings: 100 PSF
- Public Areas (Lobbies, Corridors) 100 PSF

4.2.2 Dead Loads

Actual weights of building materials to be used to calculate dead loads for the tower and base building designs. This will include the weight of permanent partitions, weight of permanent equipment, antenna weight, weight of fire proofing and cladding systems, and impact forces caused by elevators. Future design submittals will include details for this design and governing requirements.

4.2.3 Snow Loads

Snow loads will comply with ASCE 7-16. The ground snow load for Duluth, MN is 60 psf. Appropriate drift and flat roof snow loads will be calculated per the requirements of Chapter 7 and incorporated into the design as applicable. Future design submittals will include details for this design and governing requirements.

4.2.1 Wind Loads

Wind loading shall comply with ASCE 7-16, with a 3-second gust wind speed of 119 mph and an exposure category “C”. However, the code mandated wind force design is supplementary, as a computer and wind tunnel analyses are required. A wind tunnel test will be conducted for the DLH ATCT which will more accurately reflect the cladding pressures and mainframe forces than those derived from the prescriptive procedures per ASCE 7 and IBC. The tower shaft shall be designed for H/600 (for overall lateral drift) for a 100-year mean recurrence interval (MRI). Future design submittals will include details for this design and governing requirements.

4.2.2 Seismic Loads

The DLH Facility is categorized as a Risk Category IV facility with an Importance Factor of 1.5 by the TFDS . Although geotechnical investigations are still ongoing, the Geotechnical Engineer stated that based on initial findings and experience at nearby sites, the soil will likely be classified as a Site Class D, but final classifications and recommendations will be further developed after the submittal of this report. It is assumed that the response accelerations will place the buildings in a Seismic Risk Category of A. As a result, the tower shaft will be designed to limit lateral drift to H/100 for a maximum considered earthquake (MCE) with a 2,500-year MRI. Future design submittals will include details for this design and governing requirements.

4.2.3 Special Loadings

The walk and roof levels of the tower will be designed to accommodate the weight of the cab glass, automated window condensation removal system, and other loads associated with the maintenance or replacement of the cab glass. The elevator manufacturer’s load data with an appropriate impact factor governed by IBC will be used in the design of the elevator supports within the Tower. Future design submittals will include details for this design and governing requirements.

4.2.4 Load Combinations

All building components will be designed to resist the most critical effect resulting from the combination of dead loads, live loads, and lateral loads in accordance with ASCE-7 and IBC. The combining methods and load factors will be dictated by the most stringent of the design codes listed above. Load combinations for steel design will be in accordance with those stated in Section 4.1. Future design submittals will include details for this design and governing requirements.

4.3 Strength of Materials

4.3.1 Materials Summary

The following is a list of structural material and the corresponding strengths that will be used for the facility design. As design develops, the selection of materials and their strengths will be revised as required to mee the needs of the design.

Structural Steel:

- W-Shapes: ASTM A992, Grade 50
- WT-Shapes: ASTM A992, Grade 50
- Round HSS: ASTM A500, Grade C (Fy = 46ksi)
- Rectangular HSS: ASTM A500, Grade C (Fy = 50ksi)
- Structural Pipe: ASTM A53, Grade b (Fy = 35ksi)
- Plates, Caps, C, L-Shapes: ASTM A36
- Welding: E70XX, ¼" Min. Weld per AWS D1.1
- Steel Deck: ASTM A653 (Fy = 33 ksi), Gr. 90

Hardware:

- Bolts: ASTM F3125, Grade A325 or A490
- Washers: F436
- Anchor Bolts: ASTM F3125, Grade 55

Concrete:

- Normal Weight CIP Concrete: 4,000 psi (Density: 145 to 150 pcf)
- Tower walls, slabs, stairs: 6,000 psi (Density 145 to 150 pcf)
- Structural Grout: Non-Shrink, Non-Metallic, 5,000 psi
- Reinforcing Bars: ASTM A615, Grade 60 (Fy = 60 ksi)
- Welded Wire Fabric: ASTM A185

Masonry:

- Concrete Masonry Units: ASTM C90

4.4 Structural Material Selection

4.4.1 Airport Traffic Control Tower (ATCT)

The structural system for the ATCT will satisfy the structural, aesthetic, and functional requirements of the finished structure while minimizing projected construction costs. In addition to all FAA TFDS requirements, the design development will consider material availability, common structural practices, and erection methods available in Minnesota, as well as seasonal construction windows. The tower structure will be constructed from cast-in-place structural concrete, which will form a continuous structural shell from ground level to just below the cab level. Intermediate floors of the shaft will be made from cast-in-place floor panels and/or cast-in-place concrete supported by composite steel deck. A cladding system will likely be utilized at the tower façade; however the design team is currently analyzing which cladding system would be most appropriate.

The structure of the tower cab will transition to steel framing, however the details of that structural transition require further development. Floor framing shall consist of concrete on steel deck with steel beams, girders and trusses framing into either moment resisting, or braced frame connections as permitted by the clearances and openings required. The cab mullions will be designed to act as columns to support the cab roof and will be

located at all the corners of the cab glass (eight (8) locations total). Mullion size shall be limited to maximize the view from the cab and will be based on the AFTIL tested results. The minimum interior space on the mullions will be determined as design progresses, considering final wind design, glass loading, and other imposed loads.

The tower foundations will consist of a cast-in-place mat slab foundation placed on a subgrade prepared to meet the geotechnical recommendations for bearing capacity and settlement. Final foundation configuration, capacity and installation requirements will be provided by the Geotechnical Evaluation that is still ongoing.

4.4.2 Base Building

The structural system for the facility Base Building will satisfy the structural, aesthetic, and functional requirements of the finished structure while minimizing projected construction costs. The roof system will be cast-in-place concrete on a composite steel deck supported on a system of partially composite structural steel beams and girders. The lateral stability of the building will be provided from the rigid concrete diaphragm and steel braced frames strategically located to work with the desired floor plan.

The base building will be supported on shallow spread footing foundations. The anticipated allowable bearing capacity is still under development by the Geotechnical Engineer, therefore minimum spread and strip footing dimensions will be developed as design progresses. Regardless of foundation size, minimum recommended frost depth requirements indicated in the geotechnical report will be followed with strict adherence. The site may require areas of fill, and the foundation design will follow the Geotechnical recommendations for in situ soil condition and requirements for fill replacement, should it be required.

END OF SECTION

5 Mechanical Design Basis

5.1 HVAC System Alternatives

A Life-Cycle Cost Analysis (LCCA) was performed for the new ATCT Facility. A minimum of three (3) HVAC systems were researched and analyzed, and the final selection of an HVAC system will be based on sustainability implications and the lowest life-cycle cost of the three evaluated systems.

5.1.1 Alternative 1: Air-Cooled Chiller and Natural Gas Heating

The first alternative includes a modular air-cooled chiller plant, located on the grade level at the exterior of the building. A variable primary pump will distribute chilled water to the central air handling unit with a fan-array that will supply cold air to multiple terminal units. The hot water will be distributed from two active gas-fired hot water boilers fueled by natural gas, and a third boiler will be on standby. A variable primary pump will supply hot water to the central air handling unit, with hot water coils, and to the terminal units for reheating needs. The boilers will be sized to handle the total load for the base building and tower to meet redundancy requirements. The boilers, pumps and associated hydronic equipment shall be located in the mechanical room and boiler room respectively. Computer and server rooms shall be conditioned using the computer room air handling units. The computer room air handling units will be equipped with electric re-heating coils and chilled water coils.

The cab, junction level, and the mechanical/electrical level within the tower will be temperature controlled using chilled water air handling units and hot-water heating. All other areas in the tower will remain uncontrolled except the elevator lobby, stairs, cable chase, and plumbing chase. These areas will be provided with hot water heating to prevent any negative effects from cold weather including damage from freezing.

5.1.2 Alternative 2: Water-Cooled Chiller with Cooling Tower and Natural Gas Heating

The second alternative includes a water-cooled chiller plant and associated cooling tower, that is located on grade level at the exterior of the building. A variable primary pump will distribute chilled water to a central air handling unit with a fan-array, that will supply cold air to multiple terminal units. The hot water will be distributed from two active gas-fired hot water boilers fueled by natural gas, and a third boiler will be on standby. A variable primary pump will supply hot water to the central air handling unit, with hot water coils, and to the terminal units for reheating needs. The boilers will be sized to handle the total load for the base building and tower to meet redundancy requirements. The boilers, pumps and associated hydronic equipment shall be located in the mechanical room and boiler room respectively. A set of condenser water pumps will circulate water between the condenser bundle and the cooling tower. Computer and server rooms shall be conditioned using the computer room air handling units. The computer room air handling units will be equipped with electric re-heating coils and chilled water coils.

The cab, junction level, and the mechanical/electrical level within the tower will be temperature controlled using chilled water air handlining units and hot-water heating. All other areas on the tower will remain uncontrolled except the elevator lobby, stairs, cable chase, and plumbing chase. These areas will be provided with hot water heating to prevent any negative effects from cold weather including damage from freezing.

5.1.3 Alternative 3: Air cooled Chiller with water side economizer and Natural Gas Heating

The third alternative includes an air-cooled chiller with water side economizer to utilize free cooling when the conditions are permissible. Due to extreme weather conditions a mixture of water and glycol solution will be required to circulate between the air-cooled chiller and the heat exchanger. In the water side economizer mode, the glycol/water solution will bypass the evaporator bundle and run through an economizer coil and distribute cool water to the base building and tower through a set of heat exchangers and secondary pumps. The secondary side of the heat exchanger will not include glycol solution.

A variable secondary pump will distribute chilled water to the central air handling unit with a fan-array that will supply cold air to multiple terminal units. The hot water will be distributed from two active gas-fired hot water boilers fueled by natural gas, and a third boiler will be on standby. The hot water heating distribution system will be a primary-secondary system with primary pumps circulating hot water through the boiler. The variable secondary pumps will supply hot water to the central air handling unit, with hot water coils, baseboard radiation at the perimeter and to the terminal units for reheating needs. The boilers will be sized to handle the total load for the base building and tower to meet redundancy requirements. The boilers, pumps and associated hydronic equipment shall be located in the mechanical room and boiler room respectively. Computer and server rooms shall be conditioned using the computer room air handling units. The computer room air handling units will be equipped with electric re-heating coils and chilled water coils.

The cab, junction level, and the mechanical/electrical level within the tower will be temperature controlled using chilled water air handling units and hot-water heating. All other areas in the tower will remain uncontrolled except the elevator lobby, stairs, cable chase, and plumbing chase. These areas will be provided with hot water heating to prevent any negative effects from cold weather including damage from freezing.

5.2 HVAC System Alternatives

The following is a tabulation of the estimated HVAC construction cost estimates and life cycle costs of the three (3) alternatives presented above:

HVAC System Alternatives	Estimated Initial Cost (One-Time, Initial)	Estimated Life-Cycle Cost (LCC period of 40 years)
Air-Cooled Chiller and Natural Gas Heating	**$667,631**	**$2,327,479 ***
Water-Cooled Chiller with Cooling Tower and Natural Gas Heating	**$888,246**	**$2,941,513**
Air- Cooled chiller with water side economizer and natural gas heating	**$729,067**	**$2,480,910**

Based on the result of the Life Cycle Cost Analysis, it is recommended that the ATCT facility implement the ***Alternative 1** HVAC system configuration. Details of the LCCA can be found in the Mechanical LCCA report.

5.3 HVAC Design Parameters

- Tower Design Occupancy
    - Hours Occupied: 24-hours per day, 7-days a week.

- Base Building Occupancy
    - Hours Occupied: 24-hours per day, 7-days a week.

- Cooling and heating Design Conditions:
    - Degree Days Annual: Heating (HDD 18.3) = 5096, Cooling (CDD 23.3) = 1069

- Summer Outside Design Temperatures:
    - 29.1.° F DB (0.4% Annual)
    - 19.7° F WB (0.4% Annual Mean Coincident WB)

- Winter Outside Design Temperatures:
    - – 27.4° F DB (99.6% Annual)

- Wind (Heating Design Conditions):
    - Winter: 4.6 Miles per hour Mean Wind Speed, (99.6% Annual)
    - Coldest Month: Wind Speed 11.6 mph (0.4% Annual), -30.8° F WB (Mean Coincident, Annual)
    - Extreme Wind Speed: 11.1 mph (1% Annual)

- Annual Daily Extreme Temperatures:
    - Maximum: 32.2° F DB summer
    - Minimum: -30.7° F DB winter

- Precipitation:
    - 4.1 inches per hour design rainfall rate.

- Site Location:
    - Latitude: 46.83 ° N
    - Longitude: 92.183 ° W
    - Base Tower Elevation: 437 feet.

- Interior Design Temperatures (HVAC):
    - General Spaces (Office, Administrative and Common Spaces)
        - Winter / Summer: 75° (±3°) F, Dry Bulb
        - Winter Humidity Requirements: 40% to 55% RH
        - Summer Humidity Requirements: 50% Maximum RH
    - Mechanical Equipment Rooms
        - Normal Operations: 55° F to 85° F (+3°F), Dry Bulb
        - Winter Humidity Requirements: 95% Maximum
        - Summer Humidity Requirements: 5% - 95% Critical Spaces
    - Electrical Equipment Rooms (UPS, Battery Room, etc.)
        - Normal Operation: 55°F to 75°F (+3°F), Dry Bulb
        - Winter Humidity Requirements: 30% - 60%
        - Summer Humidity Requirements: 30% - 60%

- Critical Spaces
    - 73°F stable (+2°F) for periods of 6 hours minimum
    - 50% relative humidity stable +5% for periods of 6 hours minimum

- Ventilation:
    - The design will adhere to ANSI/ASHRAE 62.1-2019, Ventilation and Acceptable Indoor Air Quality in Residential Buildings, for calculations of air requirements.
    - Janitors Closets will be exhausted to achieve a minimum of 8 air-exchanges per hour (2 CFM per square foot).
    - Toilet Rooms will be exhausted at a rate of 75 CFM per water closet or urinal, and 50 CFM per shower.

5.4 Design Description – HVAC System

5.4.1 Entire Facility

Based on the analysis performed, it is recommended that the primary HVAC system for the ATCT Facility be an air-cooled chilled water system for cooling and hydronic hot water boilers for heating.

To satisfy the requirements for redundancy in critical spaces, both air-cooled chiller systems incorporating free cooling sections will be utilized, and the second air-cooled chiller module will be made available all times on standby and sized to handle the 100% load. The chiller will be configured to automatically rotate duty cycle between the modules and to isolate modules in the event of failure without shutting down the entire system.

5.4.2 Base Building

The Base Building design will incorporate one variable air volume (VAV) central station air handling unit serving multiple VAV terminal units and will provide approximately 17,500 CFM. The air handler will be horizontal draw through with filter banks and coils. The chilled water coils shall be each sized to provide approximately 85% of peak load. The VAV supply fan array will be controlled by multiple variable frequency drives. The air handling unit and associated terminals will be DDC controlled, and the building automation system will be BACnet.

The terminal units will provide cooling to the individual spaces based on load requirements by modulating the amount of conditioned air to the space. Heat will be provided by individually controlled hot water coils in each terminal unit. Terminal units serving interior spaces with high internal cooling loads will provide cooling only. Building humidification will be provided by a duct-mounted steam generating humidifier located in the mechanical room.

The critical electrical spaces such as UPS room, battery room and storage, electrical switchgear and main service rooms, and fire command center will be served by a separate air handling unit, two units stacked one over the other, in the base building. The stacked units have one air handling unit on standby to satisfy the redundancy criterion, and it will provide 3950 CFM. The fire pump room will be provided with unit heaters and ventilation as required for temperature control and/or freeze protection.

Ventilation shall be provided by outdoor air supplied to the VAV air handling unit. Outdoor air quantity shall be determined in accordance with ASHRAE standard 62.1 for variable air volume applications.

The Telecommunication rooms will have their own computer room air handling units, where one unit will be active and the other available on standby for redundancy.

5.4.3 Tower

The Tower will incorporate two air handlers and multiple fan coil units as required. The design will include two air handlers serving Cab level, one active and one on standby. The fan coil units will serve the Electrical level, to provide redundancy one unit will be on standby, whereas the other fan coil units will serve the lobby and break room levels. The fan coil unit utilizes chilled water for cooling and hot water for heating respectively. Dehumidification and humidification will be included in the cab system with a humidity monitoring system.

The air handlers serving the cab will have a redundant unit with separate filter banks and coils. The chilled water coils shall be each sized to provide approximately 100% of peak load. The air handlers will be located in the mechanical room on the mechanical levels.

The stair shafts (both sides) will be provided with wall or cabinet heaters for freeze protection.

The plumbing chase and cable chase will be provided with unit heaters for freeze protection.

The egress stairways of the ATCT will be pressurized for smoke control with supply fans providing unconditioned outdoor air.

Fuel oil transfer pumps will be located outdoors in an enclosed structure near the above ground fuel oil storage tank (AST). This is required due to the distance of the AST from the engine generator. The fuel oil pumps will draw fuel from the AST and distribute fuel oil to the day tank located in the generator room. Excess fuel will return back to the AST.

END OF SECTION

6 Electrical Design Basis

6.1 General

The electrical engineering for the new ATCT and base building will be designed in accordance with the following codes:

- Minnesota Building Code – Edition 2020 (2018 International Building Code (IBC) with amendments)
- Minnesota Electrical Code (2023 National Electrical Code (NEC) (NFPA 70) without amendment)
- Minnesota Fire Code – Edition 2020 (2018 International Fire Code (IFC) with amendments)
- Minnesota Energy Code – Edition 2020 (2018 International Energy Conservation Code (IECC) with 2016 ANSI/ASHRAE/IES Standard 90.1 with amendments)
- National Fire Protection Association 20 (NFPA) Standard for the Installation of Stationary Pumps for Fire Protection – Edition 2016
- National Fire Protection Association 72 (NFPA) National Fire Alarm and Signaling Code – Edition 2016
- National Fire Protection Association 75 (NFPA) Standard for the Protection of Information Technology Equipment – Edition 2020
- National Fire Protection Association 101 (NFPA) Life Safety Code – Edition 2018
- National Fire Protection Association 110 (NFPA) Standard for Emergency and Standby Power Systems, Edition 2016
- FAA Order 6480.7E, Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) Design Policy
- FAA Order 6030.20G, Electrical Power Policy
- FAA Order 6950.2E (CHG-2), Electrical Power Policy Implementation at National Airspace System Facilities Terminal Facility Design Standards – Version 2.1, dated December 13, 2022
- ATCT Site Selection Evaluation

The Electrical power distribution system, Grounding system and Lightning Protection system will be designed in accordance with FAA requirements and the International Code Council 2018 Building standards requirements.

6.2 Electrical Systems

6.2.1 Primary Distribution System

The Electric Utility provides service to Duluth International Airport. Service to the ATCT and base building will originate at a spare fuse position in existing Minnesota Power switchgear and feed, via duct bank, a new Utility Transformer. Minnesota Power will proceed with design once the proposed building connected load information is established, as required for a new service.

- Minnesota Power Contact and Project Reference Info:

  Jennifer Dennis

  Distribution Service Representative|Customer Service

  ALLETE | Minnesota Power

  218-355-2643 Jdennis@mnpower.com

  Job No: 41189

- The primary utility scheme selected is:

- Critical Power Distribution System (CPDS) Radial.

- This service will be further developed by the utility for:
  - Selection of utility equipment and installation details
  - Power Quality
  - Availability to meet the schedule of the ATCT and TRACON Construction
  - Construction Cost to the Project

- Location of the Source of Power:
  - Medium Voltage service utility circuits are shared with other customers and originate from off-airfield substations.
  - The utility will furnish and maintain the utility transformer and related equipment near the ATCT. No other customers or airfield loads will be fed from the secondary side of these transformers. This equipment shall be outdoor pad mounted, within the security fence.
  - The design team shall locate this equipment for physical protection, service access, and maintainability in accordance with Minnesota Power requirements.

- The utility will be asked to provide reliability data for quantification of service history for submittal to FAA.

- Available Short Circuit Current
  - Available short circuit current will be provided by the utility.

- Estimate of Total Connected Load
  - Refer to Load Analysis Section 6.2.3 of this report.

  - Distribution – Overhead or Underground
    - A new 1-way, Duct bank will be run from the proposed utility transformer location to the switchgear.

  - Type of Conduit or Duct
    - For Medium Voltage service to the transformer, the cables will be provided and maintained by the utility. Offsite, the ducts are owned and maintained by the utility in the public way. It is common for feeds to be direct buried. The details of the feed routing are pending from the utility.

6.2.2 Secondary Power Distribution System

The architecture and the function of the power system will be single source radial, in accordance with the Terminal Facilities Design Standards (TFDS), v2.1.

The main electrical service for the building will be 1200A [NOTE: SERVICE SIZE WILL BE ADJUSTED AS LOADS BECOME FINALIZED] Primary 480V Delta, Secondary 120/208V, 3 Phase, 4 wire, wye with neutral and equipment ground bonded at the service disconnect. A few 480V-277/480V transformers will be included to feed 277V lighting and equipment.

Delta primary is preferred to reduce utility harmonics which improves overall power quality supplied to ATCT. The secondary voltage selected is the nominal distribution voltage throughout the United States.

There will be one service switchboard feeding all tower and base building loads.

The generator switchboard will have separate vertical sections as outlined in article 700 of the NEC. To comply with the NEC, legally required standby systems (Essential), life safety systems (FLS), and optional standby systems will have their own ATS's, as well as the Fire Pump and Fire Service Elevator.

All distribution switchboards (Square D, QED style or approved equal) are 480V, 3 phase, 3 wire with min 25% spare capacity. GFI protection will be provided where required by code.

All distribution panels are Square D, I-Line Style or approved equal.

Short circuit analysis and selective coordination study will be done as per FAA Order 6950.27. Study will be completed for the 70% design submittal, per the A/E Project Manual.

All design with respect to voltage drop, physical characteristics of circuits, clearances, etc. will be in accordance with the National Electrical Code (NFPA 70).

Feeders that serve electronic loads shall have voltage drop no greater than 2% under connected load condition- Branch circuit voltage drop serving sensitive loads will be no more than 1%.

6.2.3 Load Analysis

Preliminary load analysis indicates that the building service is to be 1200A, 480V Delta, 3 phase, 3 wire [NOTE: SERVICE SIZE WILL BE ADJUSTED AS LOADS BECOME FINALIZED]. More thorough analysis shall be performed given the building mechanical loads, refined lighting and receptacle loads, and the FAA provided electronic equipment loads. Electrical equipment for the building has been sized based on the anticipated peak electrical load when the largest mechanical loads are in operation.

Given the load analysis, the switchboard for the building will be based on an 1200A, 480V, 3 phase, 3 wire unit.

Operation of the fire pump will be in conjunction with a fire alarm condition. Fire pump load (full load amps) has been considered in the emergency generator sizing calculations. Transient response of the generator during fire pump start-up is also considered.

6.2.4 Lighting Systems

Lighting design will comply with IESNA recommendations for lighting quantity and quality based on IESNA Lighting Handbook (latest edition).

ASHRAE / IESNA 90.1 - will be complied with, for energy efficient design and to meet New Construction High Performance Sustainable Buildings Guiding Principles requirements.

Luminaires will be LED with minimum Color Rendering Index (CRI) of 85 and Color temperature of 4100K.

EMI/RFI suppression will be provided at selected electronic equipment locations.

Lighting control systems - occupancy sensors and time control - will be implemented to ensure that no-unoccupied areas are illuminated unnecessarily.

LED Obstruction lights will be provided as per Document AC70/7460-1.Airfield Lighting Control Panel (furnished by others) will be installed in cab console.

6.2.5 Site Lighting

The Light source will be compatible with adjacent areas.

Design will limit ambient light on the control tower cab windows to no more than 0.1 fc and as per guidelines in the IESNA handbook.

- Roadways minimum – 0.6 to 2.0fc average maintained (3:1 uniformity).
- Parking / sidewalk – minimum – 0.8 fc.
- Values indicated may be superseded by security requirements.

Site lighting will comply with FAA Order 1600.6.

LED sources are specified in the recommended applications.

Photocell control for parking and walkways.

6.2.6 Emergency Lighting Systems

The selected luminaires will be connected to separate circuits in the FLS distribution system to ensure recommended illumination of the means of egress.

Emergency lighting units will be provided in the means of egress areas, stairwell, fire command center, generator room, switchboard, and transfer switch room in the event of the generator failing to start on normal power failure. Exit signs shall be specified with LED sources.

Emergency lighting in stairwells, generator room, electrical rooms, and UPS room, along with Exit signs, shall be provided with battery backup.

6.2.7 Power Systems

The building loads will be divided into essential, UPS, and life safety. The essential service will feed the UPS system. The UPS distribution panel will also be fed from the generator for maintenance purposes. The fire pump and the life safety system, which includes the stair pressurization system and elevator, will each have their own transfer switch.

A diesel-fired 900kW generator [NOTE: SERVICE SIZE WILL BE ADJUSTED AS LOADS BECOME FINALIZED] will be provided for emergency power for the building. Output from this generator will be supplied to the main distribution via a 1200A transfer switch as well as to the fire pump via its dedicated transfer switch. Fire/Life Safety system, stair pressurization system, and legally required loads will have their own 400A transfer switch that is fed from a separate vertical section of the Generator Switchboard (GSHB). The elevator will be a Fire Service Elevator and will have its own transfer switch. Feeders run under the base building slab from GSHB to the fire pump controller and life safety ATS (ATS-FLS1) will be encased in concrete as required by the Fire/Life Safety Report. Per this report, feeders to the stair pressurization equipment and the elevator equipment are also required to be 2-hour fire rated. For constructability and cost-effectiveness, these feeders will be provided with UL listed 2-hour fire rated cable and not encased in concrete. The fire life safety ATS and fire life safety distribution equipment will all be located in a room with 2-hour fire rated construction.

The generator will be installed within the building. Fuel supply will be for 72 hours as per FAA Order 6950.2D. There will be no load shedding for the generator.

UPS will be 80kVA, 480 volt, 3-phase, double conversion system using valve regulated lead acid batteries in a cabinet [NOTE: SERVICE SIZE WILL BE ADJUSTED AS LOADS BECOME FINALIZED]. An exterior load bank will also be specified. Maintenance bypass switches with key-interlocks will be provided for the UPS system. This system will be provided with a separate feeder from the main (essential) distribution.

Solenoid Key Release Units (SKU's) will not be used.

6.2.8 Grounding Systems

Project will comply with FAA Standard 019F, Change 3- Lightning and Surge Protection, Grounding, Bonding and Shielding requirements for Facilities and Electronic Equipment.

Systems to include:

- Surge and Transient protection (SPD)
- Lightning protection
- Earth Electrode system (EES)
- Signal Reference Structures
- Electrostatic discharge (ESD) minimization
- NEC grounding compliance

The ATCT is 153' tall. The Lightning standards shall be rounded up to a 160-foot tower. Given this height, 4 down conductors (minimum 4 plus 1 for every 60' above 180') are required with equalization rings spaced every 60 feet vertically. The air terminals on the tower will be placed such that a 150-foot diameter sphere cannot touch anywhere on the tower except an air terminal. This 150-foot rolling ball sphere requirement is listed in FAA STD 019f and NFPA 780.

Signal reference plane will be provided for the Cab only. Copper sheet is the standard, but the FAA requested copper conductors, eight (8) #4/0, instead of the copper sheet.

Grounding systems are multi point ground (MPG).

EES goes around the building and shall be connected to the site fence EES at eight (8) points. One at each corner and one at halfway on the sides of the fence.

6.2.9 Fire Alarm System

The fire alarm system (Class A) will comply with NFPA 72 2022 fire alarm system requirements and FAA standards. The following will be provided:

- Manual pull stations
- Audible (temporal-3 horns) and Visual (strobe) notification appliances.
- Provisions to accommodate fire department radio systems.
- Notification by audible and visual strobe units; only visible notification in the cab level spaces.

- Remote annunciator at the entrance and at the cab level.
- Smoke detection throughout the base building in all rooms and throughout the tower, but not full smoke detection as defined by NFPA 72.
- Smoke detectors in the electrical rooms.
- Smoke detector in the elevator machine room.
- Heat detection within generator room, break rooms.
- Duct detectors within AHUs and FSDs as required.

Fire alarm system shall interface with building monitoring and supervision systems.

6.2.10 Power Monitoring

A full electrical power monitoring system (EPMS) will be provided, including Sequence of Events recorder at each distribution panel.

6.2.11 Government Furnished Equipment (GFE)

Per FAA direction, the UPS and electrical power monitoring system (EPMS) will be government furnished. All other equipment is to be provided by the contractor except as noted. The FAA does not currently have a supplier contract with a generator manufacturer. The contract expired at the end of 2023. If there is a new contract, the Generator may also be Government Furnished.

END OF SECTION

7 Plumbing Design Basis

Plumbing and drainage systems shall be designed in accordance with the Minnesota Plumbing Code, 2020/UPC and supplemented with local City of Duluth requirements.

7.1 Domestic Water Supply System

Operating Pressures will be a minimum of 30 pounds per square inch, maximum 80 psi.

Maximum Pressure Drop in piping due to friction losses:

- 2 pounds per square inch per 100 feet of run, for system utilizing city pressure.
- 3 psi per 100-feet of run for system utilizing a booster pump.

Maximum Velocity in Copper Piping:

- Water Service Entrance, 5 feet per second (utilizing booster pump system for the tower)
- Cold Water Distribution on Mains, Branches and Risers, 6 fps.
- Cold Water Branches to Fixtures 6 fps.
- Hot Water Distribution Mains, Branches and Risers, 5 fps.
- Hot Water Branches to Fixtures, 5 fps.
- Hot Water Return Branches, Risers and Mains to Heater, 4 fps.

Pipe sizing shall be in accordance with the Hazen-Williams formulae. The “C” factor utilized shall be as follows:

- Copper 150

Hot-Water System Temperatures:

- Minimum Temperature: 110° F
- Maximum Temperature: 125° F

Water flow quantity requirements will be developed in accordance with the Hunter’s Curve Fixture Unit method as indicated in the Plumbing Code. Pressure of the municipal water main shall be boosted throughout the tower by a duplex domestic water booster pumping system located in the tower pump room.

Hot water for the base building toilet rooms, showers, janitor’s closets, pantry sinks, shall be generated to 140 degrees Fahrenheit via high efficiency storage type hot water heater(s) and reduced to 125° F through a thermostatic mixing valve assembly, for distribution to the fixtures and re-circulated back to the hot water heater by an all-bronze in-line circulating pump. Domestic hot water shall be further reduced to 110° F maximum for lavatories, by a mechanical mixing valve located under the fixture.

Tower fixtures requiring hot water shall be supplied by localized, a point of use electric/tankless instantaneous water heater with a mechanical mixing valve arrangement located under the fixture, to reduce temperature to 110 deg. F maximum.

Backflow preventers, atmospheric vacuum breakers and/or pressure vacuum breakers, shall be provided at all interconnections between the potable water systems and points of possible contamination by backflow or back siphonage from the drainage system.

Cold water hose bibbs shall be provided as a minimum in the following locations:

- Mechanical equipment rooms
- Boiler room
- Vehicle/ Maintenance Shop
- Loading/ Receiving

Wall hydrants of a non-freeze type shall be provided at a minimum in the following locations:

- 100-foot intervals around the perimeter of the base building.
- Cab Walkway Levels

Vertical piping in tower shaft shall include provisions for expansion and contraction in piping with telescoping type mechanical fittings of appropriate differential compensation and pressure rating.

Special shock absorbent mounting brackets, flexible connectors, and flexible hangers shall be utilized to isolate and reduce piping system noise, in areas where noise problems are critical.

A 3” domestic water service entrance from the nearest water utility will be provided into the mechanical room. Approved backflow prevention assembly and a water meter will be provided. The service will supply the base building, and feed a 2.5” copper suction supply to the tower booster pump assembly, located in the Booster Pump room located in the tower.

- A 1” copper cold water supply line, protected by a reduced pressure type back flow preventer, shall make-up to the mechanical equipment of the base building. Water softening shall be provided if required by humidification equipment.
- A 1” copper cold water supply line, protected by a reduced pressure type back flow preventer, supplied from the tower booster pump system, shall make-up to the mechanical equipment of the tower. Water softening shall be provided if required by humidification equipment.

A duplex variable speed domestic booster pumping system, utilizing vertical multi-stage stainless steel pumps, shall supply pressurized domestic water to all plumbing fixtures and equipment requiring cold water in the tower.

- A 45 gallon, 125lb ASME rated vertical diaphragm accumulator tank shall be utilized to control and sequence the booster pump assembly and store water for use between pump off cycling operations.
- A separate domestic water distribution system utilizing the residual water main pressure (city water pressure) alone, without pumping equipment, shall distribute water throughout the single-story base building portion of the facility.

7.2 Waste, Sanitary Drainage and Vent System

Horizontal drainage piping for sanitary and waste system shall be installed at uniform slopes not less than the following:

- Piping less than 3” diameter = 1/4” fall per foot
- Piping 3” and greater in diameter = 1/8” fall per foot

All floor drains shall be provided with trap primer connections supplied from the domestic water system.

Floor drains shall be provided as a minimum in the following locations:

- Public Toilet Rooms
- Mechanical Equipment Rooms
- Water Heater T&P Discharge Pipes
- Equipment Requiring Drainage

Soil and vent stacks in tower shaft shall include provisions for expansion and contraction compensation in bell and spigot cast iron piping with dissolvable cork spacing gaskets installed at alternate joints in piping during construction, or mechanical fittings designed for axial deflection.

A complete underground soil, waste, and vent system from plumbing fixtures toilet room and mechanical room floor drains, shall be provided, and arranged for gravity flow, to drain all levels to a buried horizontal collection system below the lowest level, and run to a point of connection with the site sanitary sewer outside of the building.

7.3 Storm Drain System

Horizontal Storm drainage piping shall be installed at uniform slopes not less than the following:

- Piping 3” and less in diameter = 1/4” fall per foot
- Piping 4” and greater in diameter = 1/8” fall per foot

Storm drainage piping shall be designed for 2.71-inch of rainfall per hour minimum based on the 100 year storm event.

All horizontal storm drainage and overflow piping, including drain bodies shall be insulated with ½” sectional foam rubber, with remaining tube void filled with foam insulation.

Roof drains and overflow drains shall be provided at all roof and area drains at the walkway areas receiving rainwater.

Vertical storm drainage piping in tower shaft shall include provisions for expansion and contraction with mechanical fittings of appropriate differential compensation and pressure rating.

A complete storm drainage system from all roofs and walkway levels, arranged for gravity flow is planned, collecting rainwater, and dropping to a buried, horizontal collection system below the lowest level. Storm drains shall be run to the point of connection with the site storm sewer outside of the building, and overflow drainage piping shall daylight the exterior walls above grade.

Area drains shall be provided at all areas within the building open to above, such as fresh air intakes below grade. and interior courtyards.

7.4 Plumbing Fixtures

Chrome plated, heavy duty cast brass, loose key fixture supply stops shall be provided at each plumbing fixture. Expected fixtures include the following:

- Lavatories
- Water Closets

- Urinal
- Showers
- Kitchen/Pantry Sinks
- Mop Basins
- Electric Water Coolers, Drinking Fountains, Bottle Fillers
- Emergency Shower & Eyewash

Proposed Fixture Descriptions:

- All plumbing fixtures to be high-efficiency and meet EPA WaterSense® performance criteria.
- Water Closet: Wall hung with carrier, white vitreous china, elongated bowl, siphon jet with exposed electronic, battery-operated hands free 1.28 gpf 1.1 gpf Dual flush valve, and white open front seat with self-sustaining check hinge, less cover. Mounted at ADA height where required.
- Lavatory: Oval, white vitreous china, 20" countertop mounted, with electronic, battery-operated hands-free center set 0.25 gpm metering faucet, chrome plated loose key angle stops/supply risers, chrome plated 18 ga., cast brass P-trap and waste arm to wall. Mounted at ADA height where required.
- Urinals: Wall hung with carrier, siphon jet, white vitreous china with extended lip, exposed, electronic, battery operated, hands free, 0.125 gpf Flush valve. Fixtures will be mounted at ADA height where required.
- Showers: Wall mounted head and valve, with pressure balanced single handle valve, 1.5 gpm flow restrictor. Hose with handheld showerhead on sliding rod will be provided where required for ADA accessibility.
- Kitchen/Pantry Sinks: Countertop mounted, 18 ga., 302 stainless steel, single bowl or double bowl with sound deadening coated underside, 1.5 gpm center set swing-arm faucet with separate handheld spray and hose, chrome plated loose key angle stops/supply risers, chrome plated 18 ga., cast brass P-trap and waste arm to wall. Mounted at handicapped accessible height where required.
- Mop Basin: Floor mounted, terrazzo or molded stone with 3" dia. waste, faucet with vacuum breaker and pail hook.
- Pressure Water Cooler: Dual High/Low level accessible unit with stainless steel bowl with chrome plated loose key angle stops/supply riser, chrome plated 18 ga., cast brass P-trap and waste arm to wall. Water cooler will include bottle filler.
- Emergency Shower and Eyewash: Safety station arrangement with thermostatic mixing valve shall provide tepid water requirements per ANSI Z358.1 Standard.
- Drains: Floor drains shall have coated cast iron body, seepage flange, clamping device and hub outlet. Roof drains and overflow roof drains shall have cast-iron body and dome, gravel stop.

END OF SECTION

8 Telecommunications Design Basis

8.1 General

The Communications Engineering for the DLH ATCT Facility will be designed in accordance with the following codes and standards:

- Minnesota Building Code – Edition 2020 (2018 International Building Code (IBC) with amendments)
- Minnesota Electrical Code (2023 National Electrical Code (NEC) (NFPA 70) without amendment)
- Minnesota Fire Code – Edition 2020 (2018 International Fire Code (IFC) with amendments)
- National Fire Protection Association 72 (NFPA) National Fire Alarm and Signaling Code – Edition 2016
- National Fire Protection Association 75 (NFPA) Standard for the Protection of Information Technology Equipment – Edition 2020
- National Fire Protection Association 101 (NFPA) Life Safety Code – Edition 2012
- BICSI Telecommunications Distribution Methods Manual (TDMM) – 14th Edition
- ANSI/TIA-568-E, Commercial Building Telecommunications Cabling Standards
- ANSI/TIA-569-E, Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA-606-D, Administration Standard for Commercial Telecommunications Infrastructure
- ANSI/TIA-607-D, Commercial Building Grounding and Bonding Requirements for Telecommunications
- FAA Order 1600.6E, Facility Security Policy
- FAA Order 1600.69B, FAA Facility Security Management Program
- FAA Order 6480.7E, Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control (TRACON) Design Policy
- FAA-STD-019F, Lighting and Surge Protection, Grounding, Bonding, and Shielding Requirements for Facilities and Electronic Equipment
- FAA-STD-032, Design Standards for National Airspace System Physical Facilities
- FAA-STD-061, Airport Fiber Optic Transmission System (FOTS)
- FAA-C-1391E, Installation and Splicing of Underground Cable

8.2 Facility Fiber and Copper Communications Systems

EXP will coordinate with FAA Communications for requirements of the telephone utility service (local exchange carrier (LEC)) and FAA cabling. Redundant routes consisting of telecom manholes and concrete-encased underground duct banks will be provided from the property line into the Electronics Equipment Room and Telco / LAN room. A physical separation of 25’-0” minimum between the two redundant routes will be maintained into the building.

EXP will coordinate with civil engineering design subconsultant, FAA Communications, and DLH Airport to design a Cabling Plan to splice into the existing cable routes to connect existing and planned airfield facilities to the new ATCT.

EXP will coordinate with civil engineering design subconsultant for manholes and handholes for communication system for easy access and continued maintenance.

8.3 Design of Electrical Service to Equipment

EXP will coordinate with the electrical engineers to assure each rack / cabinet and equipment receives the correct electrical service as well as the correct plug or hard-wired service to the rack or cabinet per equipment requirements.

EXP will coordinate equipment cabinets in the TRACON base building so that there is 5 feet of clear space in front and rear of equipment racks.

EXP will coordinate overhead location of Primary and Secondary power feeds to each rack / cabinet.

EXP will work with the electrical engineers to estimate present and future electrical load within the tower equipment and base building equipment and supply that electrical load with the design.

EXP will coordinate with the electrical engineers for UPS load and/or identify specified network electronics that will be on UPS power.

8.4 Communication Cable Routing / Cable Tray Routing

Multiple cable tray systems will be designed for routing and managing low voltage cables in the TRACON base building and tower. The use of a 4" high aluminum ladder tray system of varying widths will be incorporated in both the building and tower cable management system.

Cable tray systems will be coordinated with power bus duct, ceilings, light fixtures, HVAC ductwork, and overhead piping to provide one foot clearance above the tray and three feet clearance on either side of the tray. Locations will be coordinated to avoid piping directly over cable trays.

Each cable tray system will be grounded and bonded per the FAA standards.

The cable tray systems will be coordinated with the following systems:

- Surge and Transient protection
- Lightning protection
- Earth Electrode System (EES)
- Signal Reference Structures
- Electrostatic Discharge (ESD) Minimization
- NEC Grounding Compliance

8.5 Communication Systems

The installed communication systems will be for telephone and computer (LAN) based systems. Each workstation will be equipped with (2) Category 6A cables that can be used for voice or data applications. The cables will home run back to the LAN room.

A paging system shall be installed and used for paging throughout the TRACON base building and tower. Zones will be assigned to isolate paging to pre-programmed areas.

An intercom system will be designed into the gates at the fence line and the base building and the tower at entry doorways to announce persons that request entry.

The electronics equipment room will house cabinets and open relay racks of network electronics. The design will incorporate cold and hot aisles and be coordinated with HVAC ductwork. The fiber optic cable plant will enter this room at two different locations for redundancy and shall be protected in wall mounted cabinets.

Overhead cable trays will be hung from the building structure to route communications, grounding, and controls cables throughout the room as well as into the corridors and riser system up the tower. This room will accommodate desks and counter space for technicians to work within the room.

Special attention will be given to grounding of all components within the Telco / LAN rooms, the TRACON, and the Electronics Equipment room to create the same potential within the building.

Conference rooms will be equipped with AV equipment consisting of either wall-mounted display or pull down projector screen and ceiling projector for presentation purposes. Large floor boxes with power and communications connections will be located under conference tables, with cable management provided to route cabling up to the tabletop. Cable management will be designed so that cabling and connections are out of the way and not seen.

8.6 Security Systems

EXP will meet and coordinate with the FAA Security Contact (SSE) for the facility regarding floor plan, site plan, doors, and entry gates for their design for security systems requirements.

EXP will coordinate device locations on the drawings and provide all raceways with pull strings for installation by others. EXP will coordinate power, mechanical, and architectural requirements for the security elements for adherence to project requirements and site operational parameters.

Door elevations shall be a part of the drawing set to aid the electrical contractors for placement of the card readers and other security devices.

EXP will coordinate placement of security equipment in the Security Equipment room and LAN / Security room.

END OF SECTION

9 Fire Protection Design Basis

9.1 General

The design for Fire Protection for the DLH ATCT Facility will be designed in accordance with the following codes:

- 2020 Minnesota Building Code (2018 International Building Code (IBC) with amendments)
- 2020 Minnesota Fire Code (2018 International Fire Code (IFC) with amendments)
- National Fire Protection Association 10 (NFPA) Standard for Portable Fire Extinguishers – Edition 2016
- National Fire Protection Association 13 (NFPA) Standard for the Installation of Sprinkler Systems – Edition 2016
- National Fire Protection Association 14 (NFPA) Standard for the Installation of Standpipe and Hose Systems – Edition 2016
- National Fire Protection Association 20 (NFPA) Standard for the Installation of Stationary Pumps for Fire Protection – Edition 2016
- National Fire Protection Association 24 (NFPA) Standard for the Installation of Private Fire Service Mains and Their Appurtenances – Edition 2022
- National Fire Protection Association 70 (NFPA) National Electric Code (NEC) – Edition 2017
- National Fire Protection Association 72 (NFPA) National Fire Alarm and Signaling Code – Edition 2016
- National Fire Protection Association 75 (NFPA) Standard for the Fire Protection of Information Technology Equipment – Edition 2020
- National Fire Protection Association 101 (NFPA) Life Safety Code – Edition 2018
- National Fire Protection Association 110 (NFPA) Standard for Emergency and Standby Power Systems, Edition 2016

9.2 Combined Automatic Sprinkler/Standpipe System

The Facility will be protected throughout by an electronically supervised fully automatic fire sprinkler system. The system shall be hydraulically calculated for light and ordinary hazard occupancies at densities and areas listed in the NFPA, IBC and shall be in complete accordance with all the Authority having Jurisdiction's requirements for the type of facility.

Velocity in sprinkler/standpipe piping design shall be limited to a maximum of 20 feet per second.

The application of water density to the hydraulically most remote areas shall be a minimum of 100% of the required density. All areas of the base building and tower shall be sprinklered except as excluded below.

The maximum combined pressure of the static city water pressure and the no flow churn pressure of the fire pump selection shall not exceed 200 psig. The fire pump's pressure rise to the churn condition, from the pump's primary rating point, shall be no greater than 20%.

Selection of the flow capacity and total dynamic head of the fire pump shall meet with the approval of the City of Duluth's Fire Department.

9.3 Automatic Sprinkler / Standpipe System

The following building areas used exclusively for electrical equipment shall omit sprinkler protection, in accordance with the building codes:

- Service Entrance Switchgear, Input Switchgear and Generator Switchgear Rooms.
- Fire Electronic Room
- Elevator Machine Room and Top of Elevator Hoist Way.

An 8” fire water service originated from fire loop located around the building shall be provided. It will enter the Fire Pump Room from the north. A PIV valve with a tamper switch will be provided on incoming underground line.

Each level of the facility shall be fully protected, with automatic wet sprinkler systems supplied from a combined automatic wet sprinkler/standpipe system.

- Sprinkler/standpipe system shall be pressure boosted by electric driven horizontal split case fire pump.
- The pump shall be controlled by a U.L. Listed - Factory Mutual approved, combined manual/automatic, auto-transformer type reduced voltage starting, automatic transfer switch fire pump controller that is connected to an alternate emergency generator source of power.
- Each level will have separate floor an electronic supervised control valve, waterflow alarm switch and an inspector’s test and drain assembly at each sprinkler system connection to the combined riser.
- Automatic sprinkler systems piping to be Schedule 40 black steel piping. Threaded thin wall piping shall not be used.

Water flow alarm switches shall indicate the individual sprinkler systems in alarm to an addressable fire alarm panel, which reports to a central station. Inspector’s test and drain connections at each level shall be drained to a drain riser at the ending of the combined sprinkler/standpipe riser.

Pre-action Sprinkler System

Cross zoned photoelectric and ionization smoke detectors shall actuate double interlocked, pre-action sprinkler systems of galvanized steel, threaded or cut grooved. Schedule 40 piping in tree system configurations, supplied from pre-manufactured, cabinet enclosed assemblies will be used. This will include pre-action valves and integral release panels, with alarm pressure switches indicating the individual systems in alarm to an addressable building fire alarm panel, that will report to a central station. Systems shall be isolated from the bulk supply main or combined riser with electronically supervised control valves. The internal corrosion in pre-action sprinkler systems will be mitigated using black steel piping with bottled nitrogen or stationary nitrogen generator units in pre-manufactured cabinet enclosures, to maintained supervisory pressure. Each system shall include an end of line inspector’s test connection, with drum drips at piping low points for condensate drainage. Where sprinklers are required to be installed in the pendent position they shall utilize top take-off arm-overs or top take-off flexible drop connections, with dry pendent type sprinklers. The following base building and tower areas are proposed to be protected by a double pre-action sprinklers system:

- Base building TRACON operational and equipment areas
- Cab electric room.
- Optional, per FAA by reference to NFPA 13 requirements, sprinkler protection of Elevator machine room and top of elevator hoist way, arranged per ASME A17.1 requirements with smoke detector, heat detector and shunt trip for power shut down of elevator equipment prior to sprinkler discharge.
- Optional, per FAA by reference to NFPA 13 requirements, sprinkler protection of emergency generator room and generator switchgear room.

Systems shall include the following accessories, attachments, and alarms:

- Two (2) wall mounted Fire Department Connections (one at Base Building and one at Control Tower) shall be provided as approved shall be provided as approved by the City of Duluth Fire Department, in a location adjacent to the fire truck access, for water supply to the sprinkler/standpipe system by arriving fire vehicles. FDC to be located within 100-feet of the fire hydrant.
- If required, the Fire Department connection(s) shall be provided with an 8” electric bell, and/or visual strobe, in locations approved by the authority having jurisdiction.
- A fire pump test header with 2.5” hose valves fed from an increased supply pipe, shall be provided for testing, at a location that is adequate to receive water discharge at 1.5 times the primary rating point of the fire pump, that will not create flooding of the facilities during testing operations.
- Fire extinguishers in cabinets shall be provided in the stairwells as required to cover all areas of the building with not more than 75 feet travel distance to any extinguisher. Appropriately rated, wall mounted fire extinguishers shall be provided inside all locked mechanical, electrical, storage rooms and other locations as required.

END OF SECTION

10 Fire Safety Design Basis

10.1 General

The design and construction of the DLH ATCT will comply with the requirements of the 2020 Minnesota Building Code (MBC) and NFPA 101, Life Safety Code 2012 edition. Where the Minnesota Building Code and NFPA 101 have conflicting requirements, the more restrictive requirements shall take precedence. The following documents will provide the criteria which will govern the fire protection and life safety design of the facility:

- ADA, Americans With Disabilities Act
- Minnesota Building Code, 2020
- Minnesota Fire Code, 2020
- Minnesota Mechanical and Fuel Gas Code, 2020
- NFPA 10, Standard for Portable Fire Extinguishers, 2018
- NFPA 13, Standard for the Installation of Sprinkler Systems, 2016
- NFPA 14, Standard for the Installation of Standpipe and Hose Systems, 2016
- NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection, 2016
- NFPA 24, Standard for the Installation of Private Fire Service Mains, 2016
- NEC, National Electrical Code®, 2023 edition
- NFPA 72, National Fire Alarm and Signaling Code®, 2016 edition.
- NFPA 75, Standard for the Protection of Information Technology Equipment, 2024
- NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, 2024
- NFPA 92A, Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences, 2009
- NFPA 101, Life Safety Code®, 2012 edition
- NFPA 110, Standard for Emergency and Standby Power Systems, 2016
- NFPA 111, Standard for Stored Electrical Energy Emergency and Standby Power Systems, 2013
- Applicable FAA Orders and Standards

10.2 ATCT and Base Building Fire Safety Basis of Design

10.2.1 Facility Definition

The Base Building includes a TRACON, operational and general administration offices of airport traffic, airway facilities as well as mechanical/electrical support and equipment areas with shop and storage.

10.2.2 Use and Occupancy

The proposed building is defined as a “Business Group B” occupancy per MBC Section 304.1 and a “New Business” for NFPA 101, Section 38.1.1.1.

10.2.3 Occupancy Definition

The proposed building is classified as Business Occupancy in accordance with MBC Section 304.1 and NFPA 101, Section 38.1.1.1.

10.2.4 General Building Height and Area

Allowable Height for Group B (MBC Table 504.4):

- Maximum Permitted: 12-Stories
- Proposed TRACON Base Building: 1-Story; 20'-6"
- Proposed Tower: 9-Stories; 138'-3"

Allowable Area (MBC Table 506.2, Footnote S1):

- Maximum permitted: Unlimited.
- Proposed: Base Building: 19,700 SF

10.2.5 Type of Construction

Construction Type per MBC Table 503:

- Minimum Required: Type IB
- Proposed: Type IB

10.2.6 Type of Construction

Construction is intended to be unprotected, non-combustible.

- Fire Separation between Base Building and Tower
    - Adjoining buildings will be separated by a 3-Hour fire wall per MBC Table 706.4)
- Exposure Protection (MBC Table 602):
    - Required: 1-Hour
    - Proposed: 3-Hour
- Structural Frame, Including Columns, Girders and Trusses, per MBC Table 601.
    - Required: 2-Hour, where supporting a roof only may be reduced by 1-Hour
    - Proposed: 2-Hour, 1-Hour where supporting a roof only
- Floors, including supporting beams and joists (MBC Table 601).
    - Required: 2-Hour
    - Proposed: 2-Hour
- Roof, including supporting beams and joists (MBC Table 601).
    - Required: 1-Hour
    - Proposed: 1-Hour
- Interior fire resistance separations will be in accordance with the MBC and applicable NFPA standards.

- Tower to base building (MBC Section 706)
    - Required: 3-hour (buildings separated by a fire wall, IBC Table 706.4)
    - Proposed: 3-hour
- Stair and shaft enclosures (MBC Section 707.4)
    - Required: 2-hour fire resistance separation
    - Proposed: 2-Hour
- Mechanical room (NFPA 101 Section 38.3.2.1)
    - Required: 1-Hour
    - Proposed: 1-hour fire resistance rated separation
- Switchgear/UPS Room (NFPA 110, NFPA 111 & FAA Order 6480.7)
    - Required: 2-hour fire resistance rated separation
- Proposed: 2-hour fire resistance rated separationCorridors: Not required to be fire resistance rated per NFPA 101 Section 38.3.6.1(3) in new business occupancies protected throughout by a supervised automatic sprinkler system.
- Storage rooms: Not required to be separated by smoke or fire resistance rated construction in accordance with MBC, as these spaces store routine office supplies.
- Fire Pump Room:
    - Required: 2-hour fire resistance rated separation
    - Proposed: 2-hour fire resistance rated separation
- Opening protection in 1-hour walls excluding shaft, exit enclosure and exit passageway walls (MBC Section 716.1(2))
    - Required: 1-hour fire doors
    - Proposed: 1-hour fire doors
- Opening protection in 2-hour walls excluding shaft, exit enclosure and exit passageway walls (MBC Section 716.1(2))
    - Required: 1 1/2-hour fire doors
    - Proposed: 1 1/2-hour fire doors

10.2.7 Interior Finishes

Interior finish will be in accordance with the requirements of NFPA 101 Chapter 10 and MBC Chapter 8.

- Minimum of class A or B interior wall finish will be provided in exits and exit access corridors (NFPA 101 Section 38.3.3.2.1)
- All finishes in electronic equipment rooms to be minimum of class A (NFPA 75 Section 5.3.1)
- All other areas, interior wall and ceiling finishes are required to be a minimum of class C (NFPA 101 Section 38.3.3.2.2). Typically, interior wall finish will be paint.
- Interior floor finish will be a minimum of class II finish (NFPA 101 Section 38.3.3.3.2)

- Typically, interior floor finish will consist of carpet, vinyl tile, ceramic tile and sealed concrete and comply with the requirements of NFPA 101 Section 10.2.7.
- Specific wall and floor finishes will be shown on the building's interior finish schedule.

10.2.8 Interior Finishes & Egress Lighting

Means of Egress for the Base Building will be in accordance with NFPA 101. As of the submission of this PPD Report, an in-depth analysis of the base building layout egress has not yet been performed. Future design submittals will include details for this design. Below is a series of code requirements for means of egress, and attributed of the design that EXP is proposing to meet or exceed the specific code requirement.

- Number of exits (NFPA 101 Section 38.2.4.1(2).
    - Required: 2
    - Proposed: +5
- Separation of Exits:
    - Required: 1/3 diagonal (86.8 feet)
    - Proposed: +150 feet
- Corridor capacity (NFPA 101 Section 38.2.3.1)
    - Required: 44 inches
    - Proposed: 60 inches
- Exit doors (NFPA 101 Section 38.2.2.2)
    - Minimum width: 32 inches (per door)
    - Proposed: 34 to 48 inches (per door, clear)
- Travel distance (NFPA 101 Section 38.2.6)
    - Permitted: 300 feet (maximum)
    - Proposed: ±100 feet
- Common path (NFPA 101 Section 38.2.5.3.2)
    - Permitted: 100 feet (maximum)
    - Proposed: ±40 feet
- Dead-end corridor (NFPA 101 Section 38.2.5.2)
    - Required: 50 feet (maximum)
    - Proposed: ±30 feet

Exit Signs will be internally illuminated, LED type. Backup power to the exit signs will be via a centralized inverter system connected to the emergency circuit. Signs will be located at all building exit doors and whenever the direction to the exit is not readily apparent.

Emergency Lighting for egress will be provided for all exit access corridors and exit discharges, with standard fixtures on the emergency power system connected to a centralized inverter system. Emergency lighting will be provided for a minimum of 1 1/2 hours in the event of internal power failure. Backup power is provided by both the engine generator and battery backup. Illumination requirements for emergency lighting will be detailed in future submittals.

10.2.9 ADA Accessibility

The base building will be ADA complaint. All operational levels of the ATCT up to the Junction Level will be ADA compliant. The tower cab will not be ADA accessible due to operational requirements of the FAA.

END OF SECTION

11 Drawings and BIM Project Requirements

11.1 Drawings, Project Specifications

11.1.1 Drawings

The following are the requirements for the preparation of the drawings:

- The drawing will be prepared in accordance with FAA-STD-002H, FAA Standard Engineering Drawing Preparation and Support document, Terminal Facilities Design Standard (TFDS) v2.1, and will be compatible with AutoCAD DWG files set to use Imperial Units (feet and inches). The FAA Title block and CAD Template will be furnished by FAA.

11.1.2 Building Information Modeling (BIM) Requirements

EXP will develop the model with facility data for the purposes of coordination between various disciplines (also known as clash detection) and developing 2-dimensional extractions generated from the model to produce accurate construction contract drawings required by Scope and the TFDS v2.1. The use of BIM does not negate the need for delivery of CAD files used for the creation of the construction contract drawings. EXP will provide 3D BIM for all building disciplines, with the exception of the Civil Design.

EXP will provide a written report with each future design submittal, confirming that the Quality Control checks have been completed for the design submittal. This report shall be discussed as part of each design review meeting and shall address cross-discipline interferences. With each design future submittal, EXP will provide the Airport a 3D interactive visualization from the Model.

11.1.3 Specifications

Deltek MasterSpec® is the required specification format. The FAA will provide several model specifications for use in the project. Sections that require coordination with the City of Duluth will be edited as required. Front end specifications will be developed in conjunction with the FAA and the Airport.

END OF SECTION

12 Cost Estimate

12.1 Summary

The current cost estimate has been based off of the 10% design drawings. Pricing reflects probable construction costs obtained in the State of Minnesota in 2023 and assumes a 24 month construction period. An annual rate of escalation of 3.6% (applied across all 9 quarters) has been included assuming mid-point of construction will occur approximately May of 2026.

A copy of the 10% cost estimate has been included as part of this submittal for reference.

END OF SECTION

Cost Estimate

DOT/ Federal Aviation Administration
Federal Aviation Administration

ESTIMATORS STATEMENT OF PROBABLE CONSTRUCTION COSTS

AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY

Duluth International Airport
Duluth, MN

10% CD Estimate
1/24/2024

Vistara Construction Services, Inc.
728 West Jackson Boulevard, Suite 526
Chicago, IL 60661
www.vistara.com

ESTIMATOR'S STATEMENT OF PROBABLE CONSTRUCTION COSTS

DOT/ Federal Aviation Administration	**Control Tower (SF)**	**14,974**
Duluth International Airport	**Tracon Building (SF)**	**19,050**
Duluth, MN	**Total (SF)**	**34,024**
	Site Area (SF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

DIV	Description	Administration Building + Tower	
1	GENERAL REQUIREMENTS/ CONDITIONS	$	4,596,000.00
2	DEMOLITION / REMEDIATION	$	40,000.00
3	CONCRETE	$	4,975,000.00
4	MASONRY	$	430,900.00
5	METALS	$	1,869,700.00
6	WOOD, PLASTICS & COMPOSITES	$	126,800.00
7	THERMAL & MOISTURE PROTECTION	$	2,816,900.00
8	OPENINGS	$	1,570,500.00
9	FINISHES	$	1,250,300.00
10	SPECIALTIES	$	178,100.00
11	EQUIPMENT	$	58,000.00
12	FURNISHINGS	$	186,000.00
13	SPECIAL CONSTRUCTION	$	-
14	CONVEYING SYSTEMS	$	1,201,000.00
21	FIRE SUPPRESSION	$	287,200.00
22	PLUMBING	$	513,300.00
23	HEATING, VENTILATING AND AIR CONDITIONING	$	2,881,600.00
26	ELECTRICAL	$	2,404,600.00
27	COMMUNICATIONS	$	510,400.00
28	ELECTRONIC SAFETY AND SECURITY	$	705,600.00
31	EARTHWORK	$	2,177,800.00
32	EXTERIOR IMPROVEMENTS	$	1,481,700.00
33	UTILITIES	$	1,265,000.00
34	TRANSPORTATION	$	-
	SUB-TOTAL	**$**	**31,526,000.00**
	BOND & INSURANCE	$	945,800.00
	OVERHEAD & PROFIT	$	1,298,900.00
	ESCALATION	$	2,797,200.00
	PHASING	$	731,400.00
	TOTAL	**$**	**37,299,000.00**
	DESIGN CONTINGENCY	$	5,595,000.00
	CONSTRUCTION TOTAL	**$**	**42,894,000.00**

ESTIMATOR'S STATEMENT OF PROBABLE CONSTRUCTION COST

DOT/ Federal Aviation Administration
Duluth International Airport
Duluth, MN

AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY | **10% CD Estimate** | **1/24/2024**

NOTES:

1 This estimate is based in the 10% CD report/drawings received on 2024-0109
2 Pricing is current as of 4th Qtr 2023 and suitable contingencies are included for escalation/ phasing
3 Construction Start Spring 2025 with a 24 month construction period.
4 The labor rates included are based on prevailing wages in MN and conform to the Davis Bacon Act.
5 The pricing is based on multiple bids to General Contractors. Sole source procurement is not included.
6 Permit Fee is included
7 The structural foundation for the tower is priced as a mat foundation. (A geo technical report is still pending)
8

EXCLUSIONS:

1 Professional Design Fees
2 Owner Required Testing
3 Owner's Contingency/ Scope changes
4 Construction Contingency
5 Finance and Legal Charges
6 Loose Furniture
7 Equipment unless noted
8 Artwork
9 Non-Fixed AV Equipment
10 Computers/ Telephone/ Data / Security Equipment/
11 Abatement / Mitigation and Disposal of Hazardous materials, soils
12 Relocation costs
13 FF&E
14 Bridge/ Roadway construction beyond the property line unless noted
15 Demolition of Existing Structures, etc.

BIDDING PROCESS/ MARKET CONDITIONS

1 Pricing reflects probable construction costs obtained in the State of Minnesota in 2023, Qtr 4. the estimate is a fair determination of market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for each trade and includes a minimum of 3 bids per sub contracted work. Our experience indicates that the fewer the number of bids, the higher the possibility of a higher total cost.

2 Vistara has no control over the cost of labor, material, equipment, productivity or the Contractors method of determining prices and this statement of probable construction costs is based on industry practice, professional experience and qualifications. It represents out best judgement as a professional cost estimator familiar with the construction industry. Vistara does not and cannot guaranty that the bids received will not vary from this opinion of costs prepared by them.

ABBREVIATIONS

AL = Allowance, CF = Cubic Feet, CY = Cubic Yards, EA = Each, Excl. = Excluded, ETR = Existing to Remain, GSF = Gross Square Feet, HDS = Sprinkler Heads, Incl. = Included, INST = Instance, Int. = Interior, LDS = Loads, LF = Linear Feet, LS = Lump Sum, MH = Manhours, MTL = Metal, N/A = Not Applicable, NIC = Not in Contract, OSCI = Owner Supplied/ Contractor Installed, OPOI = Owner Procured and Installed, PR = Pair, Rem. = Remove, Repl.= Replace, Sec. = Security, SF = Square Foot, TBD = To be determined, TNS = Tons, u.n.o. = Unless Noted Otherwise, VSF = Vertical square feet (surface area)

ESTIMATOR'S STATEMENT OF PROBABLE CONSTRUCTION COST

DOT/ Federal Aviation Administration	**Control Tower (GSF)**	**14,974**
Duluth International Airport	**Tracon Building (GSF)**	**19,050**
Duluth, MN	**Total (GSF)**	**34,024**
	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
1000	**GENERAL REQUIREMENTS**					**$ 4,596,000.00**
	General Conditions/ Requirements				$ 4,596,355.00	
01.57.19	Temporary Environmental Controls				Incl. below	
01.71.33	Protection of Work and Property				Incl. below	
01.81.13	Sustainable Design Requirements				Excluded	
01.91.13	General Commissioning Requirements				Incl. below	
2000	**DEMOLITION / REMEDIATION**					**$ 40,000.00**
	Environmental Remediation/ Abatement & Disposal of Hazardous Materials, soils				Excluded	
	Dewatering	1	AL	$ 40,000.00	$ 40,000.00	
02.41.00	Demolition (Remove Existing Paving)				See Site Demolition	
3000	**CONCRETE**					**$ 4,975,000.00**
	Foundation					
	Base Building					
	Shallow Foundations					
	Spread Footings (12' x 12')	41	EA	$ 7,600.00	$ 311,600.00	
	Excavation				See Division 31000	
	Foundation Wall/ Strip Footing	549	CY	$ 650.00	$ 356,778.00	
	Slab on Grade - Building Footprint	19,050	SF	$ 16.00	$ 304,800.00	
	Slab on Grade - Exterior Areas	4,275	SF	$ 18.00	$ 76,950.00	
	Tower					
	Drilled Piers (4' Dia. x 60' Deep)	45	EA	$ 16,500.00	$ 742,500.00	
	Pile Cap (8' Thick)	606	CY	$ 1,250.00	$ 757,407.00	
	Spoils Disposal	1	LS	$ 150,000.00	$ 150,000.00	
	Superstructure					
	Base Building					
	Metal Panel Cladding (20'-6" H)	14,350	SF	$ 60.00	$ 861,000.00	
	Exterior Column Cladding	68	INST		See below	
	Tower					
	Concrete - Exterior Wall (Sq. Section) - 14" Thk.	18,210	VSF	$ 38.00	$ 691,980.00	
	Concrete - Interior Walls (Sq. Section) - 12" Thk.	11,175	VSF	$ 35.00	$ 391,125.00	
	Elevated Slabs	12,929	SF	$ 22.00	$ 284,438.00	
	Roof Walkway	810	SF	$ 22.00	$ 17,820.00	
	Housekeeping Pads/ Misc.	19,050	GSF	$ 1.50	$ 28,575.00	

DOT/ Federal Aviation Administration	**Control Tower (GSF)**	**14,974**
Duluth International Airport	**Tracon Building (GSF)**	**19,050**
Duluth, MN	**Total (GSF)**	**34,024**
	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
4000	**MASONRY**					**$ 430,900.00**
04.20.00	**Unit Masonry:**					
	Base Building					
	CMU Partitions - 15'H	1,650	SF	$ 19.00	$ 31,350.00	
	Tower					
	CMU Partitions (Grouted Solid)	18,160	SF	$ 22.00	$ 399,515.00	
5000	**METALS**					**$ 1,869,700.00**
05.12.00	**Structural Steel Framing**					
	Base Building					
	Structural Steel Frame	19,050	GSF	$ 28.00	$ 533,400.00	
	Steel Deck	19,050	GSF	$ 7.50	$ 142,875.00	
	Tower					
	Structural Steel	14,974	GSF	$ 48.00	$ 718,752.00	
	Steel Deck	12,929	SF	$ 9.50	$ 122,826.00	
	Metal Stairs x2ea Main Stairs + 2 @ Junction Level + 1 to Cab	14,974	GSF	$ 17.50	$ 262,045.00	
	Metal Pan, Sealed Treads				Incl.	
	Misc. Metal Fabrications	14,974	GSF	$ 6.00	$ 89,844.00	
6000	**WOOD, PLASTICS, AND COMPOSITES**					**$ 126,800.00**
06.10.00	**Rough Carpentry**					
	Base Building	19,050	GSF	$ 1.25	$ 23,813.00	
	Tower	14,974	GSF	$ 0.65	$ 9,733.00	
	Finish Carpentry					
	Base Building	19,050	GSF	$ 1.75	$ 33,338.00	
	Tower	14,974	GSF	$ 4.00	$ 59,896.00	

DOT/ Federal Aviation Administration	**Control Tower (GSF)**	**14,974**
Duluth International Airport	**Tracon Building (GSF)**	**19,050**
Duluth, MN	**Total (GSF)**	**34,024**
	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
7000	**THERMAL AND MOISTURE PROTECTION**					**$ 2,816,900.00**
07.54.00	**Roofing**					
	Base Building (Single Ply EPDM)	19,050	GSF	$ 15.00	$ 285,750.00	
	Coping				Incl	
	Tower	14,974	GSF	$ 2.25	$ 33,692.00	
	Coping				Incl	
	Exterior Cladding					
	Base Building					
	Metal Panels - 2 colors + Column Cladding + Soffits	15,622	VSF	$ 75.00	$ 1,171,678.00	
	Tower					
	Metal Panels + Soffits - 2 colors	16,298	VSF	$ 75.00	$ 1,222,369.00	
	Joint Sealants/ Roofing Accessories/ Expansion Control					
	Base Building	19,050	GSF	$ 1.50	$ 28,575.00	
	Tower	14,974	GSF	$ 5.00	$ 74,870.00	
8000	**OPENINGS**					**$ 1,570,500.00**
	Exterior Doors					
	Base Building					
	Double	5	PR	$ 5,200.00	$ 26,000.00	
	Single	4	EA	$ 3,600.00	$ 14,400.00	
	Loading Dock/ Vehicle Maintenance Shop	1	LS	$ 90,000.00	$ 90,000.00	
	Tower					
	Double	0	PR	$ 5,200.00	$ -	
	Single	4	EA	$ 3,600.00	$ 14,400.00	
	Interior Doors					
	Base Building					
	Double	10	PR	$ 4,200.00	$ 42,000.00	
	Single	45	EA	$ 3,100.00	$ 139,500.00	
	Tower					
	Single	56	EA	$ 3,100.00	$ 173,600.00	

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
	Glazed Openings					
	Base Building					
	Windows	19,050	GSF	$ 1.50	$ 28,575.00	
	Entry Vestibules	1	EA	$ 40,000.00	$ 40,000.00	
	Interior Glazing	1	AL	$ 75,000.00	$ 75,000.00	
	Louvers/ Vents	19,050	GSF	$ 3.00	$ 57,150.00	
	Tower					
	Cab Glazing	1,404	SF	$ 250.00	$ 351,000.00	
	Glazing @ Tower Facades	4,151	SF	$ 125.00	$ 518,875.00	
9000	**FINISHES**					**$ 1,250,300.00**
	Base Building					
	Flooring					
	Sealed Concrete	3,780	SF	$ 5.00	$ 18,900.00	
	Vinyl Tile	4,685	SF	$ 7.00	$ 32,795.00	
	Dissipative Tile	2,200	SF	$ 9.00	$ 19,800.00	
	Epoxy Floor	3,430	SF	$ 14.00	$ 48,020.00	
	Rubber Floor Tile (Wellness Room)	285	SF	$ 12.00	$ 3,420.00	
	Porcelain Tile (Locker Rms/ Shower/ Restrooms/ Drug Test)	1,295	SF	$ 24.00	$ 31,080.00	
	Carpet	3,380	SF	$ 7.00	$ 23,660.00	
	Recessed Walk-off Mat	80	SF	$ 35.00	$ 2,800.00	
	Walls					
	Drywall Partitions	31,626	SF	$ 16.00	$ 506,016.00	
	Furr Out Exterior Walls	9,781	SF	$ 7.00	$ 68,465.00	
	Paint	19,050	GSF	$ 2.50	$ 47,625.00	
	Ceramic Tile	2,600	SF	$ 24.00	$ 62,400.00	
	Ceiling					
	ACT	7,930	SF	$ 6.50	$ 51,545.00	
	Gypsum Board	1,795	SF	$ 11.00	$ 19,745.00	
	Exposed (Painted)	9,410	SF		Incl.	

DOT/ Federal Aviation Administration	Control Tower (GSF)	14,974
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AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	10% CD Estimate	1/24/2024

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
	Tower					
	Flooring					
	Sealed Concrete	11,165	GSF	$ 5.00	$ 55,825.00	
	Ceramic Tile - Restroom	49	SF	$ 24.00	$ 1,176.00	
	Epoxy - Mechanical / Electrical Closets	1,360	SF	$ 14.00	$ 19,040.00	
	Vinyl Tile - Lobby Level 1 + Break Room	2,400	SF	$ 7.00	$ 16,800.00	
	Walls					
	Drywall Partitions	810	SF	$ 16.00	$ 12,960.00	
	Furr Out Exterior Walls	15,369	SF	$ 7.00	$ 107,583.00	
	Paint	14,974	GSF	$ 2.50	$ 37,435.00	
	Intumescent Paint @ Cab	800	GSF	$ 18.00	$ 14,400.00	
	Ceramic Tile	512	SF	$ 24.00	$ 12,288.00	
	Ceiling					
	ACT - Lobby Level 1 + Breakroom +Cab	3,200	SF	$ 6.50	$ 20,800.00	
	Gypsum Board - Toilet Room	64	SF	$ 11.00	$ 704.00	
	Misc. Soffits / Ceilings	1	AL	$ 15,000.00	$ 15,000.00	
10000	**SPECIALITIES**					**$ 178,100.00**
	Base Building					
	Toilet Accessories	19,050	GSF	$ 2.00	$ 38,100.00	
	Shower Accessories	19,050	GSF	$ 1.00	$ 19,050.00	
	Signage	19,050	GSF	$ 2.25	$ 42,863.00	
	Wall Protection	19,050	GSF	$ 1.60	$ 30,480.00	
	Lockers	19,050	GSF	$ 1.50	$ 28,575.00	
	Flag Pole	1	EA	$ 10,000.00	$ 10,000.00	
	Tower					
	Toilet Accessories	14,974	GSF	$ 0.20	$ 2,995.00	
	Signage	14,974	GSF	$ 0.15	$ 2,246.00	
	Wall Protection	14,974	GSF	$ 0.25	$ 3,744.00	
11000	**EQUIPMENT**					**$ 58,000.00**
	Base Building					
	Loading Dock Equipment	1	AL	$ 28,000.00	$ 28,000.00	
	Appliances	1	AL	$ 8,000.00	$ 8,000.00	
	Equipment				By Owner	
	Tower					
	Fall Protection System	1	LS	$ 20,000.00	$ 20,000.00	
	Appliances	1	AL	$ 2,000.00	$ 2,000.00	
	Equipment				By Owner	

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	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
12000	**FURNISHINGS**					**$ 186,000.00**
	Base Building					
	Blinds/ Shades	19,050	GSF	$ 2.50	$ 47,625.00	
	Countertops/ Casework	19,050	GSF	$ 1.50	$ 28,575.00	
	Site Furnishings	1	AL	$ 20,000.00	$ 20,000.00	
	Tower					
	Blinds/ Shades	14,974	GSF	$ 5.00	$ 74,870.00	
	Casework	14,974	GSF	$ 1.00	$ 14,974.00	
					$ -	
13000	**SPECIAL CONSTRUCTION**					**$ -**
13.85.00	Seismic Protection				N/A	
	(Bracing only for HVAC / Electrical, Plumbing / Fire Protection)					
	Butler Storage + Pad				N/A	
	Add for Ventilation				N/A	
	Special Vehicle Equipment/ Maintenance + Pad				N/A	
14000	**CONVEYING EQUIPMENT**					**$ 1,201,000.00**
14.21.00	Electric Traction Elevators (7 stop), 4,500lbs	2	EA	$ 600,500.00	$ 1,201,000.00	
21000	**FIRE SUPPRESSION**					**$ 287,200.00**
	Base Building					
	Dry/ Wet Pipe System	19,050	GSF	$ 8.00	$ 152,400.00	
	Tower					
	Wet Pipe System	14,974	GSF	$ 9.00	$ 134,766.00	
22000	**PLUMBING**					**$ 513,300.00**
	Base Building					
	Plumbing Fixtures					
	Toilet	8	EA	$ 1,350.00	$ 10,800.00	
	Sink	6	EA	$ 1,150.00	$ 6,900.00	
	Urinal	2	EA	$ 850.00	$ 1,700.00	
	Shower	2	EA	$ 2,800.00	$ 5,600.00	
	Large Sink	2	EA	$ 1,350.00	$ 2,700.00	
	Janitor Mop Sink	1	EA	$ 1,200.00	$ 1,200.00	
	Drinking Water Fountains	2	EA	$ 3,500.00	$ 7,000.00	
	Domestic Water System	19,050	GSF	$ 5.60	$ 106,680.00	
	Sanitary Waste/ Vent Piping	19,050	GSF	$ 6.75	$ 128,588.00	
	Storm Water Systems	19,050	GSF	$ 3.10	$ 59,055.00	

DOT/ Federal Aviation Administration	**Control Tower (GSF) 14,974**
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AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate 1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
	Tower					
	Plumbing Fixtures					
	Toilet	2	EA	$ 1,350.00	$ 2,700.00	
	Sink	3	EA	$ 1,150.00	$ 3,450.00	
	Janitor Mop Sink	1	EA	$ 1,200.00	$ 1,200.00	
	Drinking Water Fountains	1	EA	$ 3,500.00	$ 3,500.00	
	Domestic Water System	14,974	GSF	$ 3.25	$ 48,666.00	
	Sanitary Waste/ Vent Piping	14,974	GSF	$ 4.25	$ 63,640.00	
	Storm Water Systems	14,974	GSF	$ 4.00	$ 59,896.00	
23000	**HEATING, VENTILATING AND AIR CONDITIONING**					**$ 2,881,600.00**
	Base Building					
	Energy Supply	19,050	GSF	$ 4.25	$ 80,963.00	
	Heat/ Cooling Generating Systems	19,050	GSF	$ 50.00	$ 952,500.00	
	Distribution Systems	19,050	GSF	$ 26.00	$ 495,300.00	
	Terminal/ Package Units	19,050	GSF	$ 12.00	$ 228,600.00	
	Insulation	19,050	GSF	$ 5.00	$ 95,250.00	
	Controls	19,050	GSF	$ 19.00	$ 361,950.00	
	Testing / Balancing/ Commissioning	19,050	GSF	$ 2.00	$ 38,100.00	
	Tower					
	Energy Supply	14,974	GSF	$ 3.00	$ 44,922.00	
	Heat/ Cooling Generating Systems	14,974	GSF		In Base	
	Distribution Systems	14,974	GSF	$ 24.00	$ 359,376.00	
	Terminal/ Package Units	14,974	GSF		In Base	
	Insulation	14,974	GSF	$ 5.00	$ 74,870.00	
	Controls	14,974	GSF	$ 8.00	$ 119,792.00	
	Testing / Balancing/ Commissioning	14,974	GSF	$ 2.00	$ 29,948.00	

DOT/ Federal Aviation Administration	**Control Tower (GSF)**	**14,974**
Duluth International Airport	**Tracon Building (GSF)**	**19,050**
Duluth, MN	**Total (GSF)**	**34,024**
	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

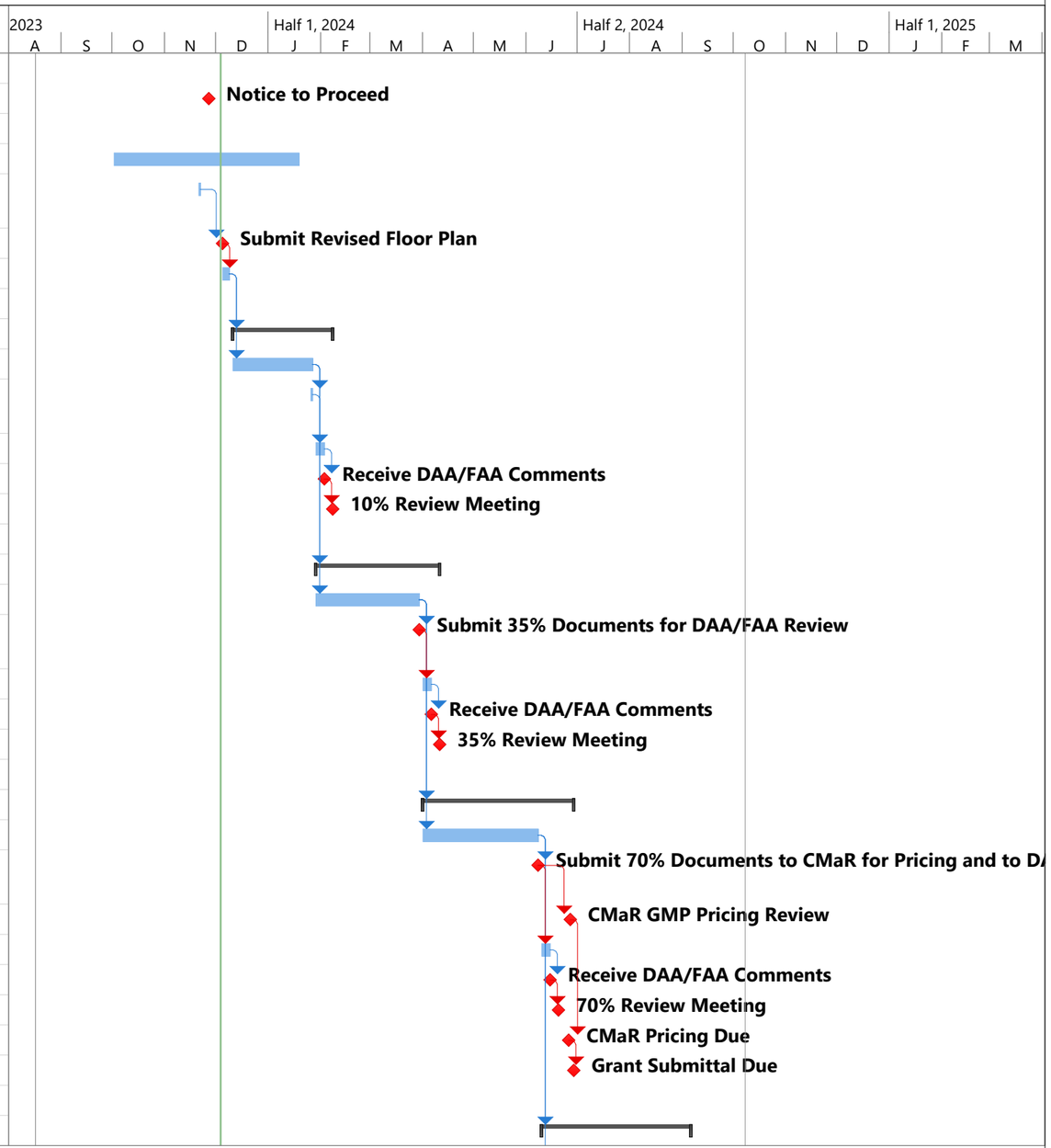
	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
26000	**ELECTRICAL**					**$ 2,404,600.00**
	Base Building					
	Service/ Distribution	19,050	GSF	$ 35.00	$ 666,750.00	
	Power Systems	19,050	GSF	$ 15.00	$ 285,750.00	
	Lighting/ Branch Wiring	19,050	GSF	$ 23.00	$ 438,150.00	
	Emergency Power Systems	19,050	GSF	$ 21.00	$ 400,050.00	
	Tower					
	Service/ Distribution	14,974	GSF	$ 7.75	$ 116,049.00	
	Power Systems	14,974	GSF	$ 5.25	$ 78,614.00	
	Lighting/ Branch Wiring	14,974	GSF	$ 14.00	$ 209,636.00	
	Lightning Protection System	14,974	GSF	$ 14.00	$ 209,636.00	
	Emergency Power Systems	14,974	GSF		In Base	
27000	**COMMUNICATIONS**					**$ 510,400.00**
	Base Building					
	Communication Systems	19,050	GSF	$ 15.00	$ 285,750.00	
	Tower					
	Communication Systems	14,974	GSF	$ 15.00	$ 224,610.00	
28000	**ELECTRONIC SAFETY AND SECURITY**					**$ 705,600.00**
	Base Building					
28.16.16	Intrusion Detection	19,050	GSF	$ 16.00	$ 304,800.00	
28.30.00	Master Fire Alarm System	19,050	GSF	$ 6.50	$ 123,825.00	
	Tower					
28.16.16	Intrusion Detection	14,974	GSF	$ 12.00	$ 179,688.00	
28.30.00	Master Fire Alarm System	14,974	GSF	$ 6.50	$ 97,331.00	
31000	**EARTHWORK**					**$ 2,177,800.00**
31.10.00	Site Clearing / Demo	155,000	GSF	$ 6.50	$ 1,007,500.00	
31.23.16	Mass / Structural Excavation/ Backfill/ Haul	155,000	GSF	$ 7.25	$ 1,123,750.00	
31.25.00	Erosion Sedimentation Control	155,000	GSF	$ 0.30	$ 46,500.00	

DOT/ Federal Aviation Administration	**Control Tower (GSF)**	**14,974**
Duluth International Airport	**Tracon Building (GSF)**	**19,050**
Duluth, MN	**Total (GSF)**	**34,024**
	Area - Construction (GSF)	**155,000**
AIRPORT TRAFFIC CONTROL TOWER (ATCT) FACILITY	**10% CD Estimate**	**1/24/2024**

	DESCRIPTION	QTY.	UNIT	UNIT COST	COST	SUB-TOTAL
32000	**EXTERIOR IMPROVEMENTS**					**$ 1,481,700.00**
32.12.16	Asphalt Paving (40%)	18,708	SF	$ 7.00	$ 130,956.00	
32.13.13	Concrete Paving (60%)	28,062	SF	$ 18.00	$ 505,116.00	
	Asphalt Paving Beyond Site (Relocate Stebner Road)	14,770	SF	$ 15.00	$ 221,550.00	
32.16.00	Curbs & Gutters	2,000	LF	$ 21.00	$ 42,000.00	
	Gravel Access Path	1,730	SF	$ 5.00	$ 8,650.00	
32.17.23	Pavement Marking	1	AL	$ 10,000.00	$ 10,000.00	
32.31.19	Fencing					
	Security Fencing (Site)	1,520	LF	$ 190.00	$ 288,800.00	
	Double Swing Gates	1	PR	$ 3,600.00	$ 3,600.00	
	24' Electric Sliding Gate w/ Loop Detector	2	EA	$ 10,500.00	$ 21,000.00	
	Landscaping/ Site Restoration/ Courtyard	1	AL	$ 250,000.00	$ 250,000.00	
	Demolition of Existing Structures, etc.				Excluded	
33000	**UTILITIES**					**$ 1,265,000.00**
33.10.00	Water Utilities	1	AL	$ 75,000.00	$ 75,000.00	
33.30.00	Sanitary Sewage Utilities	1	AL	$ 150,000.00	$ 150,000.00	
33.40.00	Storm Drainage	1	AL	$ 50,000.00	$ 50,000.00	
	Storm Detention	1	AL	$ 250,000.00	$ 250,000.00	
33.41.16	Traffic Control Equipment	1	AL	$ 50,000.00	$ 50,000.00	
33.50.00	Fuel Distribution Utilities				N/A	
33.51.13	Natural-Gas Piping	1	AL	$ 40,000.00	$ 40,000.00	
	Site Lighting	1	AL	$ 150,000.00	$ 150,000.00	
33.70.00	Electrical	1	AL	$ 200,000.00	$ 200,000.00	
33.80.00	Telecom Utilities	1	AL	$ 100,000.00	$ 100,000.00	
	Relocation of Utilities	1	AL	$ 200,000.00	$ 200,000.00	
34000	**TRANSPORTATION**					**$ -**
34.40.00	Transportation Signaling & Control Equipment				NIC	
	SUB TOTAL					**$31,526,000.00**
	BOND & INSURANCE	3.0%				$ 945,800.00
	OVERHEAD & PROFIT	4.0%				$ 1,298,900.00
	ESCALATION (Mid Point of Construction - May 2026)	3.6%				$ 2,797,200.00
	PHASING	2.0%				$ 731,400.00
	TOTAL					**$37,299,000.00**
	DESIGN CONTINGENCY	15%				$ 5,595,000.00
	CONSTRUCTION TOTAL					**$42,894,000.00**

Schedule

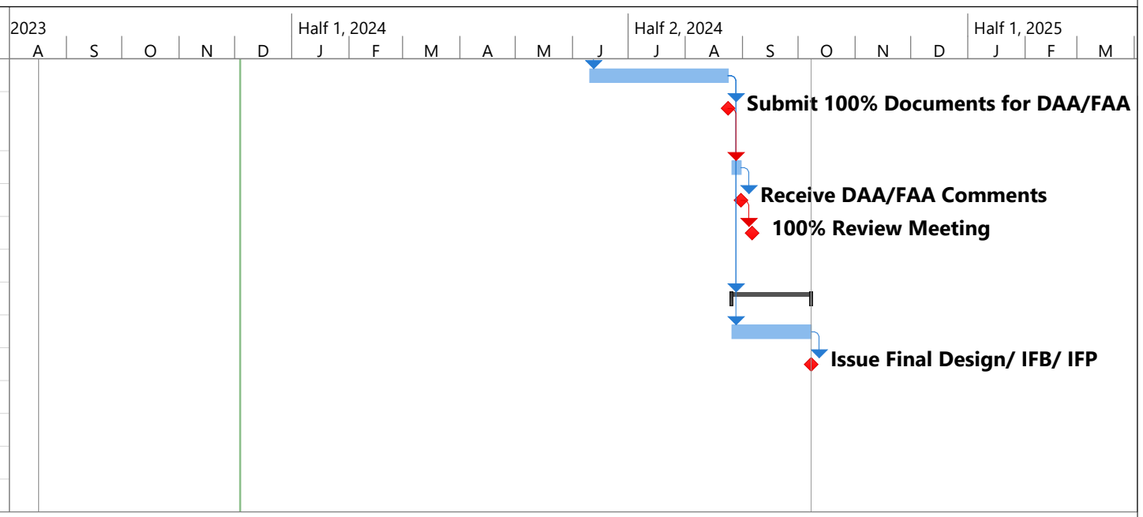
ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1						
2	**Notice to Proceed**	0 days	Mon 11/27/23	Mon 11/27/23		
3						
4	Pre-Design	75 days	Mon 10/2/23	Thu 1/18/24		
5	Base Building Review Meeting/ Tower Design Review Meeting	1 day	Tue 11/21/23	Tue 11/21/23		
6	Submit Revised Floor Plan	0 days	Tue 12/5/23	Tue 12/5/23	5	
7	DAA/FAA Review	4 days	Tue 12/5/23	Fri 12/8/23	6	
8						
9	**10% Design**	**41 days**	**Mon 12/11/23**	**Wed 2/7/24**	**7**	
10	10% Design	33 days	Mon 12/11/23	Fri 1/26/24	7	
11	Submit 10% Documents for DAA/FAA Review	1 day	Fri 1/26/24	Fri 1/26/24	10FS-1 day	
12	DAA/FAA Review	5 days	Mon 1/29/24	Fri 2/2/24	11	
13	Receive DAA/FAA Comments	0 days	Fri 2/2/24	Fri 2/2/24	12	
14	10% Review Meeting	0 days	Wed 2/7/24	Wed 2/7/24	13FS+3 days	
15						
16	**35% Design**	**53 days**	**Mon 1/29/24**	**Wed 4/10/24**	**10**	
17	35% Design	45 days	Mon 1/29/24	Fri 3/29/24	10	
18	Submit 35% Documents for DAA/FAA Review	0 days	Fri 3/29/24	Fri 3/29/24	17	
19	DAA/FAA Review	5 days	Mon 4/1/24	Fri 4/5/24	18	
20	Receive DAA/FAA Comments	0 days	Fri 4/5/24	Fri 4/5/24	19	
21	35% Review Meeting	0 days	Wed 4/10/24	Wed 4/10/24	20FS+3 days	
22						
23	**70% Design**	**64 days**	**Mon 4/1/24**	**Fri 6/28/24**	**17**	
24	70% Design	49 days	Mon 4/1/24	Fri 6/7/24	17	
25	Submit 70% Documents to CMaR for Pricing and to DAA/FAA	1 day	Fri 6/7/24	Fri 6/7/24	24FS-1 day	
26	CMaR GMP Pricing Review	13 days	Mon 6/10/24	Wed 6/26/24	25	
27	DAA/FAA Review	5 days	Mon 6/10/24	Fri 6/14/24	25	
28	Receive DAA/FAA Comments	0 days	Fri 6/14/24	Fri 6/14/24	27	
29	70% Review Meeting	0 days	Wed 6/19/24	Wed 6/19/24	28FS+3 days	
30	**CMaR Pricing Due**	**0 days**	**Wed 6/26/24**	**Wed 6/26/24**	**26FS-1 day**	
31	**Grant Submittal Due**	**0 days**	**Fri 6/28/24**	**Fri 6/28/24**	**30FS+3 days**	
32						
33	**100% Design**	**62 days**	**Mon 6/10/24**	**Thu 9/5/24**	**24**	



DLH Project ScheduleR1
Date: Mon 12/4/23

Task	Project Summary	Manual Task	Start-only	Deadline
Split	Inactive Task	Duration-only	Finish-only	Progress
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress
Summary	Inactive Summary	Manual Summary	External Milestone	

ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
34	100% Design	54 days	Mon 6/10/24	Fri 8/23/24	24	
35	Submit 100% Documents for DAA/FAA Review	1 day	Fri 8/23/24	Fri 8/23/24	34FS-1 day	
36	DAA/FAA Review	5 days	Mon 8/26/24	Fri 8/30/24	35	
37	Receive DAA/FAA Comments	0 days	Fri 8/30/24	Fri 8/30/24	36	
38	100% Review Meeting	0 days	Thu 9/5/24	Thu 9/5/24	37FS+3 days	
39						
40	**Final Design**	**30 days**	**Mon 8/26/24**	**Mon 10/7/24**	**34**	
41	Final Design	30 days	Mon 8/26/24	Mon 10/7/24	34	
42	Issue Final Design/ IFB/ IFP	0 days	Mon 10/7/24	Mon 10/7/24	41	
43						
44	**Bid & Award Phase**					
45						
46	**Construction Start**					



DLH Project ScheduleR1
Date: Mon 12/4/23

Task	Project Summary	Manual Task	Start-only	Deadline			
Split	Inactive Task	Duration-only	Finish-only	Progress			
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress			
Summary	Inactive Summary	Manual Summary	External Milestone				

Geotechnical Report

Geotechnical Evaluation Report

Proposed Base Building and Air Traffic Control Tower
Duluth International Airport
4701 Grinden Drive
Duluth, Minnesota

Prepared for

EXP U.S. Services, Inc.

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Colin L. Anderson, PE
Project Engineer
License Number: 60501
January 24, 2024

Project B2309475

Braun Intertec Corporation

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Braun Intertec Corporation
4511 West First Street, Suite 4
Duluth, MN 55807

Phone: 218.624.4967
Fax: 218.624.0196
Web: braunintertec.com

January 24, 2024 Project B2309475

Ms. Horeya Czaplewski
EXP U.S. Services, Inc.
205 North Michigan Avenue, Suite 3600
Chicago, IL 60601

Re: Geotechnical Evaluation
Proposed Base Building and Air Traffic Control Tower
Duluth International Airport
4701 Grinden Drive
Duluth, Minnesota

Dear Ms. Czaplewski:

We are pleased to present this Geotechnical Evaluation Report for the proposed base building and Air Traffic Control Tower (ATCT) at the above referenced site.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Colin Anderson at 320.305.0628 (coanderson@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

Colin L. Anderson, PE
Project Engineer

Joseph C. Butler, PE
Business Unit Leader, Senior Engineer

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Appendix

Soil Boring Location Sketch
ATCT Building Site Layout
Fence Diagrams (3 pages)
Log of Boring Sheets SB-1 to SB-18
Descriptive Terminology of Soil

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A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the proposed design and construction of the new base building, Air Traffic Control Tower (ATCT), pavements, and drainage basin at the Duluth International Airport located at 4701 Grinden Drive in Duluth, Minnesota. Specifically, at the airport, the base building and ATCT are planned to be located near the existing Hermantown Hydraulics building, located at 4905 Airport Road. We understand the base building will be a single-story, slab-on-grade structure supported on frost depth footings. Table 1 provides additional project details.

Table 1. Building and ATCT Description

Aspect	Description
Approximate building footprint (square feet)	18,000 (Provided)
Below grade levels	None (Provided)
Above grade levels	Single-story (Provided)
Lowest level floor elevation (feet)	1418 (Assumed)
Wall loads (kips per foot)	5.22 (Provided)
Column loads (kips)	162.5 (Provided)
Tolerable building settlement	1 inch (Assumed)
ATCT height (feet)	156 (Provided)
Total ATCT load (kips)	15,000 (Provided)

The project will include the realignment of Stebner Road, construction of new parking lot pavements, and a drainage basin on the southeast side of the site. The figure below shows an illustration of the proposed site layout.

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Figure 1. Site Layout

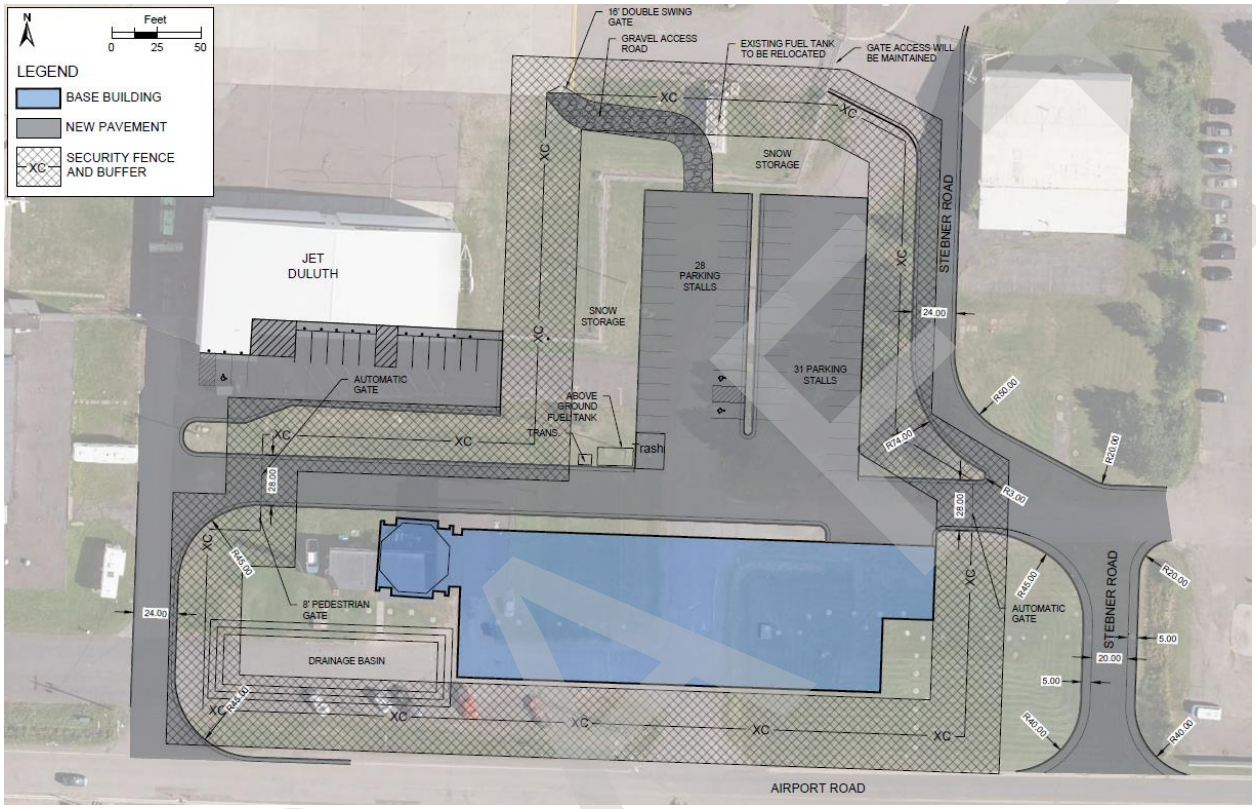


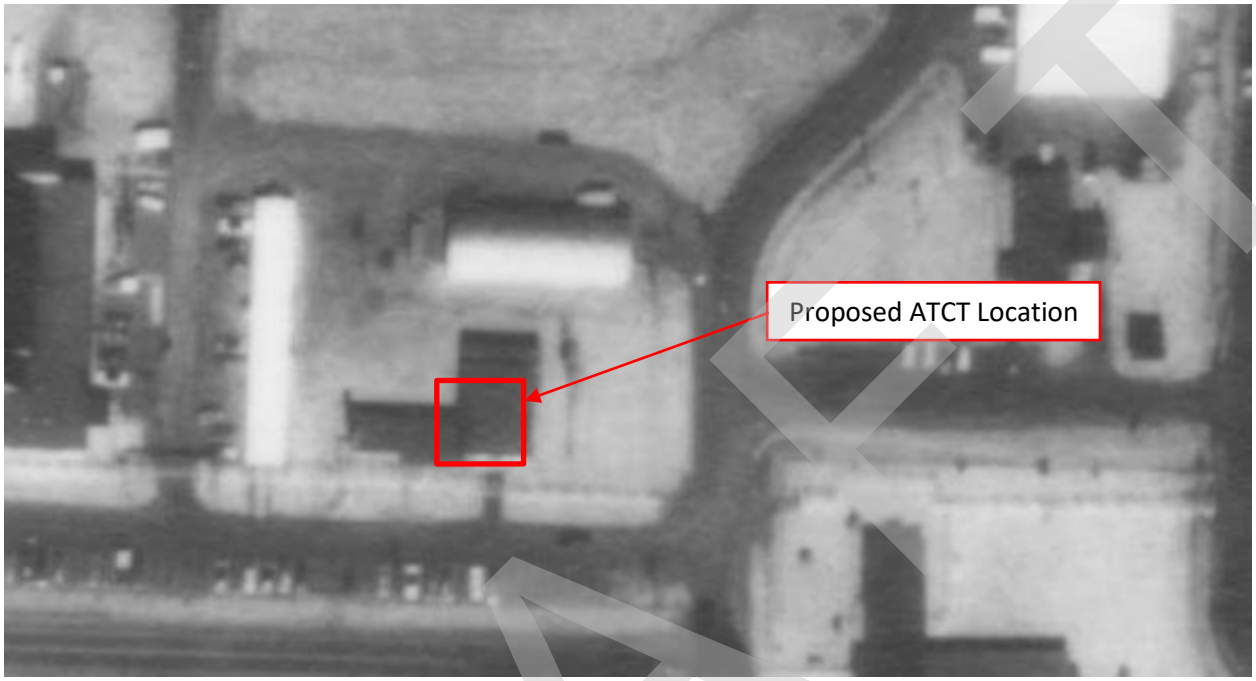
Figure provided by SEH, Inc. dated December 18, 2023.

A.2. Site Conditions and History

A small building currently sits at the proposed ATCT site. The remaining site where the base building, pavements, and drainage basin will be constructed is surfaced with turf and bituminous pavement. The site is generally flat with elevations ranging from approximately 1422 to 1429 feet. Historically, structures, which appear similar to storage sheds, were constructed to the north and west of the existing building in the 1960s and were demolished in the 1990s. Figure 2 shows a historic aerial photograph of the site and Figure 3 presents an aerial photograph of the site in May of 2023.

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Figure 2. Aerial Photograph of the Site in 1972



Photograph obtained from Minnesota Historical Aerial Photographs Online (MHAPO).

Figure 3. Aerial Photograph of the Site in 2023



Photograph obtained from Google Earth.

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A.3. Purpose

The purpose of our geotechnical evaluation is to characterize subsurface geologic conditions at selected exploration locations, evaluate their impact on the project, and provide geotechnical recommendations for the design and construction of the building foundation and slab, ATCT foundation, pavements, and drainage basin.

A.4. Background Information and Reference Documents

We reviewed the following information:

- An ATCT Building Site Layout provided by SEH, Inc., dated December 18, 2023.
- A Geologic Map of Minnesota, prepared by Morey, G.B. and Meints, J.P., 2000.
- Aerial photographs of the project area using Google Earth® and Minnesota Historical Aerial Photographs Online (MHAPO).
- Communications with the EXP project team regarding the scope of the proposed project.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB182804 to Horeya Czaplewski, EXP, dated October 6, 2023. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. We selected and staked the new exploration locations. SEH, Inc. acquired the surface elevations and locations

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with GPS technology. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.

- Performing 19 standard penetration test (SPT) borings, denoted as SB-1 to SB-18 (and including SB-13B), to depths of 7.8 to 32.9 feet below grade.

- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.

- Performing engineering analysis including bearing capacity and settlement calculations.

- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for structure and pavement subgrade preparation, the design of foundations concrete slabs, and the design of foundations for the base building and ATCT.

Our scope of services did not include environmental services or testing and our geotechnical personnel performing this evaluation are not trained to provide environmental services or testing. We can provide environmental services or testing at your request.

B. Results

B.1. Geologic Overview

We based the geologic origins used in this report on the soil types, laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Boring Results

Table 2 provides a summary of the soil boring results in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details. The Descriptive Terminology sheets in the Appendix include definitions of abbreviations used in Table 2.

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Table 2. Subsurface Profile Summary

Strata	Soil and Rock Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Pavement	---	---	▪ Encountered at Borings SB-17 and SB-18. ▪ Bituminous thicknesses are approximately 4 inches. ▪ Apparent aggregate base ranged from 9 to 12 inches.
Topsoil	SM, SC	---	▪ Encountered at the surface of the other 17 borings. ▪ Dark brown in color. ▪ Moisture condition generally moist. ▪ Thicknesses at boring locations varied from 2 to 10 inches.
Fill	SM, SC, SC-SM, ML, CL	---	▪ Encountered in 12 borings beneath the topsoil or pavement. ▪ Brown, dark brown, and reddish brown in color. ▪ Moisture condition generally moist. ▪ Extended to depths of 3 to 9 feet.
Alluvial	ML, CL	6 to 18 BPF	▪ Encountered in 4 borings. ▪ General penetration resistances indicated that the silts are generally loose to medium dense, and the clays are medium. ▪ Reddish brown and dark gray in color. ▪ Possible organics in alluvial soil encountered in Borings SB-7 and SB-8. ▪ Moisture condition generally moist.
Glacial outwash	SP-SM	8 to 20 BPF	▪ Encountered in 4 borings. ▪ General penetration resistances indicated that the glacial sands are generally loose to medium dense. ▪ Reddish brown in color. ▪ Moisture condition generally wet.
Glacial till	SM, ML, CL-ML, CL	7 BPF to Refusal*	▪ General penetration resistances indicated that the silts and silty sands are generally medium dense to very dense, and the clays are stiff to hard. ▪ Varying amounts of gravel and cobbles. ▪ Generally reddish brown in color. ▪ Moisture condition generally moist to wet. ▪ Auger refusal encountered in 14 borings at elevations that ranged from 1391 1/2 to 1417 1/2 feet.

*Refusal is defined as the sampler not being driven through a full 6-inch interval by 50 blows.

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We did not perform gradation analysis on the apparent aggregate base material encountered as part of the pavement section, in accordance with our scope of work. Therefore, we cannot conclusively determine if the encountered material satisfies a particular specification, and it should not be assumed it is suitable for reuse.

For simplicity in this report, we define fill to mean existing, uncontrolled or undocumented fill.

B.3. Auger Refusal

Auger refusal was encountered at boring locations SB-1 to SB-8, SB-10 to SB-12, SB-13A, SB-13B, and SB-18. Table 3 summarizes the depths where we encountered auger refusal while performing the soil borings. The refusal elevations are rounded to the nearest half foot.

Auger refusal is defined as the depth that the auger could not be advanced further without excessive force. Refusal can be caused by hardpan, cobbles and boulders, detached rock pieces (“floats”) as well as bedrock. Based on the depth of refusal and our knowledge of the area, we suspect the refusals were caused by bedrock. Bedrock in the area is likely igneous Basalt or Gabro, and is likely of high quality. Coring would be required to positively identify the cause for auger refusal.

Table 3. Auger Refusal Summary

Location	Surface Elevation (ft)	Approximate Depth to Auger Refusal (ft)	Corresponding Refusal Elevation (ft)
SB-1	1425.8	26 1/2	1399 1/2
SB-2	1424.2	27 1/2	1396 1/2
SB-3	1423.9	22	1401 1/2
SB-4	1424.6	33	1391 1/2
SB-5	1422.3	17	1405
SB-6	1422.8	20 1/2	1402
SB-7	1426.3	14 1/2	1412
SB-8	1425.7	11 1/2	1414
SB-9	1424.7	Not encountered	---
SB-10	1424.2	16 1/2	1407 1/2
SB-11	1426.6	15 1/2	1411
SB-12	1426.4	17 1/2	1409

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Location	Surface Elevation (ft)	Approximate Depth to Auger Refusal (ft)	Corresponding Refusal Elevation (ft)
SB-13A	1426.6	11 1/2	1415
SB-13B	1426.6	22	1404 1/2
SB-14	1428.7	Not encountered	---
SB-15	1426.7	Not encountered	---
SB-16	1426.3	Not encountered	---
SB-17	1422.5	Not encountered	---
SB-18	1425.2	8	1417 1/2

B.4. Groundwater

Table 4 summarizes the depths where we observed groundwater; the attached Log of Boring sheets in the Appendix also include this information and additional details.

Table 4. Groundwater Summary

Location	Surface Elevation (ft)	Measured or Estimated Depth to Groundwater (ft)	Corresponding Groundwater Elevation (ft)
SB-1	1425.8	10 1/2	1415
SB-2	1424.2	9 1/2	1414 1/2
SB-3	1423.9	7 1/2	1416 1/2
SB-4	1424.6	12	1412 1/2
SB-5	1422.3	13	1409 1/2
SB-6	1422.8	13	1410
SB-7	1426.3	9 1/2	1417
SB-8	1425.7	10	1415 1/2
SB-9	1424.7	10 1/2	1414
SB-10	1424.2	12 1/2	1411 1/2
SB-11	1426.6	10	1416 1/2
SB-12	1426.4	13 1/2	1413
SB-13A	1426.6	Not Observed	---

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Location	Surface Elevation (ft)	Measured or Estimated Depth to Groundwater (ft)	Corresponding Groundwater Elevation (ft)
SB-13B	1426.6	Not Observed	---
SB-14	1428.7	Not Observed	---
SB-15	1426.7	Not Observed	---
SB-16	1426.3	Not Observed	---
SB-17	1422.5	Not Observed	---
SB-18	1425.2	Not Observed	---

At the time of our observation, the groundwater surface elevation appeared to range from approximately 1409 1/2 to 1417 feet. The soil borings indicate a layered soil profile that is conducive for encountering perched water conditions. Groundwater may take days or longer to reach equilibrium in the boreholes and we backfilled the boreholes immediately after completion or after groundwater samples were taken, in accordance with our scope of work. If the project team identifies a need for more accurate determination of groundwater depth, we can install piezometers. Project planning should anticipate seasonal and annual fluctuations of groundwater.

B.5. Laboratory Test Results

The boring logs show the results of laboratory testing we performed, next to the tested sample depths. Table 5 also presents the results of our laboratory tests.

Table 5. Laboratory Classification Test Results

Location	Sample Depth (ft)	Classification	Moisture Content (w, %)	Percent Passing a #200 Sieve	Liquid Limit	Plastic Index
SB-1	2 – 3 1/2	SM (Fill)	9	21	---	---
SB-1	7 – 8 1/2	CL	14	---	---	---
SB-1	9 1/2 – 11	CL	18	---	---	---
SB-1	14 1/2 – 16	CL-ML	15	---	16	4
SB-2	7 – 8 1/2	CL	13	---	---	---
SB-2	9 1/2 – 11	SP-SM	20	10	---	---

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Location	Sample Depth (ft)	Classification	Moisture Content (w, %)	Percent Passing a #200 Sieve	Liquid Limit	Plastic Index
SB-2	14 1/2 – 16	CL-ML	11	---	18	5
SB-2	19 1/2 – 21	CL-ML	11	---	---	---
SB-3	4 1/2 – 6	CL-ML	12	---	17	4
SB-3	12 – 13 1/2	ML	13	---	---	---
SB-3	14 1/2 – 16	CL	14	73	---	---
SB-4	4 1/2 – 6	SC-SM (Fill)	7	36	---	---
SB-4	7 – 8 1/2	CL-ML	16	---	---	---
SB-4	9 1/2 – 11	CL-ML	11	---	17	5
SB-4	14 1/2 – 16	ML	18	---	---	---
SB-5	9 1/2 – 11	CL	16	---	---	---
SB-6	7 – 8 1/2	ML	14	64	---	---
SB-7	4 1/2 – 6	ML	18	---	---	---
SB-8	4 1/2 – 6	ML	21	93	---	---
SB-9	4 1/2 – 6	ML	10	---	15	3
SB-12	9 1/2 – 11	CL-ML	10	---	17	4
SB-14	4 1/2 – 6	CL (Fill)	20	---	---	---
SB-17	2 – 3 1/2	ML	17	---	---	---

C. Recommendations

C.1. Design and Construction Discussion

C.1.a. Foundations – Base Building and ATCT

The borings encountered fill soils over existing native alluvial and glacial soils composed of sand, silt, and clay soils. The existing fill was not homogeneous in composition or compactive effort. Based on the borings, it appears the fill was not placed with the intention of supporting large structures. We recommend the existing fill soils, topsoil, and pavements, not be relied upon for structural support of foundations.

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We recommend all existing fill, topsoil (filled, buried, or surficial), pavements, existing utilities and utility backfill, and native alluvial soils be removed from below the proposed base building and ATCT footings and their oversize areas. Structural fill can then be placed to proposed footing grades. After soil corrections, the base building and ATCT can be constructed on spread footing foundations.

C.1.b. Construction Disturbance

The contractor should note the on-site clay and silt soils, at the base of excavations are susceptible to disturbance, due to repeated construction traffic. Disturbance of these soils may cause areas that were previously prepared, or that were suitable for pavement or structure support, to become unstable and require subcutting and replacing the disturbed material with crushed, coarse gravel, free of fines. The contractor should use means and methods to limit disturbance of the soils.

C.2. Site Grading and Subgrade Preparation

C.2.a. Base Building – Subgrade Excavations

We recommend removing unsuitable materials from below the planned building foundations and interior slabs and their oversizing areas. We define unsuitable materials as topsoil, pavements, existing fill, native alluvial soils, frozen materials, organic soils, existing structures, and existing utilities. Table 6 shows the anticipated excavation depths and bottom elevations for each of the base building borings.

Table 6. Building Excavation Depths

Location	Approximate Surface Elevation (ft)	Anticipated Excavation Depth (ft)	Anticipated Bottom Elevation (ft)
SB-2	1424.2	3	1421
SB-7	1426.3	6 1/2	1420
SB-8	1425.7	7 1/2	1418
SB-11	1426.6	5 1/2	1421
SB-12	1426.4	5	1421 1/2
SB-13A	1426.6	4	1422 1/2
SB-14	1428.7	6 1/2	1422
SB-15	1426.7	4	1422 1/2

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Excavation depths will vary between the borings. Portions of the excavations may also extend deeper than indicated by the borings. A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

C.2.a.1. Base Building – Spread Footings

Table 7 below contains our recommended parameters for foundation design of the base building.

Table 7. Recommended Spread Footing Design Parameters

Item	Description
Maximum net allowable bearing pressure (psf)	3,000
Minimum factor of safety for bearing capacity failure	3.0
Minimum embedment below final exterior grade for heated structures (inches)	60
Total estimated settlement (inches)	Less than 1 inch
Differential settlement	Typically about 2/3 of total settlement*

* Actual differential settlement amounts will depend on final loads and foundation layout. We can evaluate differential settlement based on final foundation plans and loadings.

Sliding resistance between the bottom of the footing and the soil can also resist lateral pressures. We recommend assuming a sliding coefficient equal to 0.35 between the concrete and soil.

The values presented in this section are un-factored.

C.2.b. ATCT – Subgrade Excavations

We recommend removing unsuitable materials from below the planned building foundations and interior slabs and their oversizing areas. We define unsuitable materials as topsoil, pavements, existing fill, native alluvial soils, frozen materials, organic soils, existing structures, and existing utilities. Prior to placement of the mat foundation, we recommend surface compacting the exposed that foundation subgrade with a large vibratory compactor. We recommend a minimum of two overlapping passes in each of 2 perpendicular directions.

Additionally, we recommend the footing bear a minimum of 10 feet below final exterior grades. Additional embedment may be necessary to resist overturning and accommodate the electrical and communication utilities.

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Excavation depths will vary between the borings. If soft or loose soils are encountered, portions of the excavations may also extend deeper than indicated by the borings. A geotechnical representative should observe the excavations to make the necessary field judgments regarding the suitability of the exposed soils.

C.2.b.1. ATCT Mat Foundation - Modulus of Subgrade Reaction

Determining the subgrade modulus below a mat foundation is complicated due to the interaction between the mat and the soil. A single value is used for the mat even if the soil conditions are variable. Based on NAVFAC Design Manual 7.02, which uses values for a 1-foot square plate, we recommend a using a modulus of subgrade reaction (K_{v1}) of 100 pounds per square inch/inch (psi/inch) to evaluated shear and bending moments. Unless the value is modified by the design software, the value used for design should be modified based on the following equation:

$$K_b = K_{v1}\left(\frac{b+1}{2b}\right)^2$$

Where:
K_b = design value (pci)
b = footing width (feet)
K_{v1} = modulus of subgrade reaction (psi/in)

C.2.b.2. Settlement

We understand that the mat foundation will support total load of 15,000 kips. We recommend the maximum net bearing pressure on the supporting soil to be 4,000 psf. We estimate that this stress will induce total and differential settlements in the underlying soils on the order of 1 and 1/2 inches, respectively.

C.2.b.3. ATCT – Below-Grade Walls

For walls with unbalanced fill loads, we recommend the engineered fill located within 5 feet of the walls consist of structural fill as defined in Table 10. The project documents should indicate if walls need bracing prior to filling and allowable unbalanced fill heights.

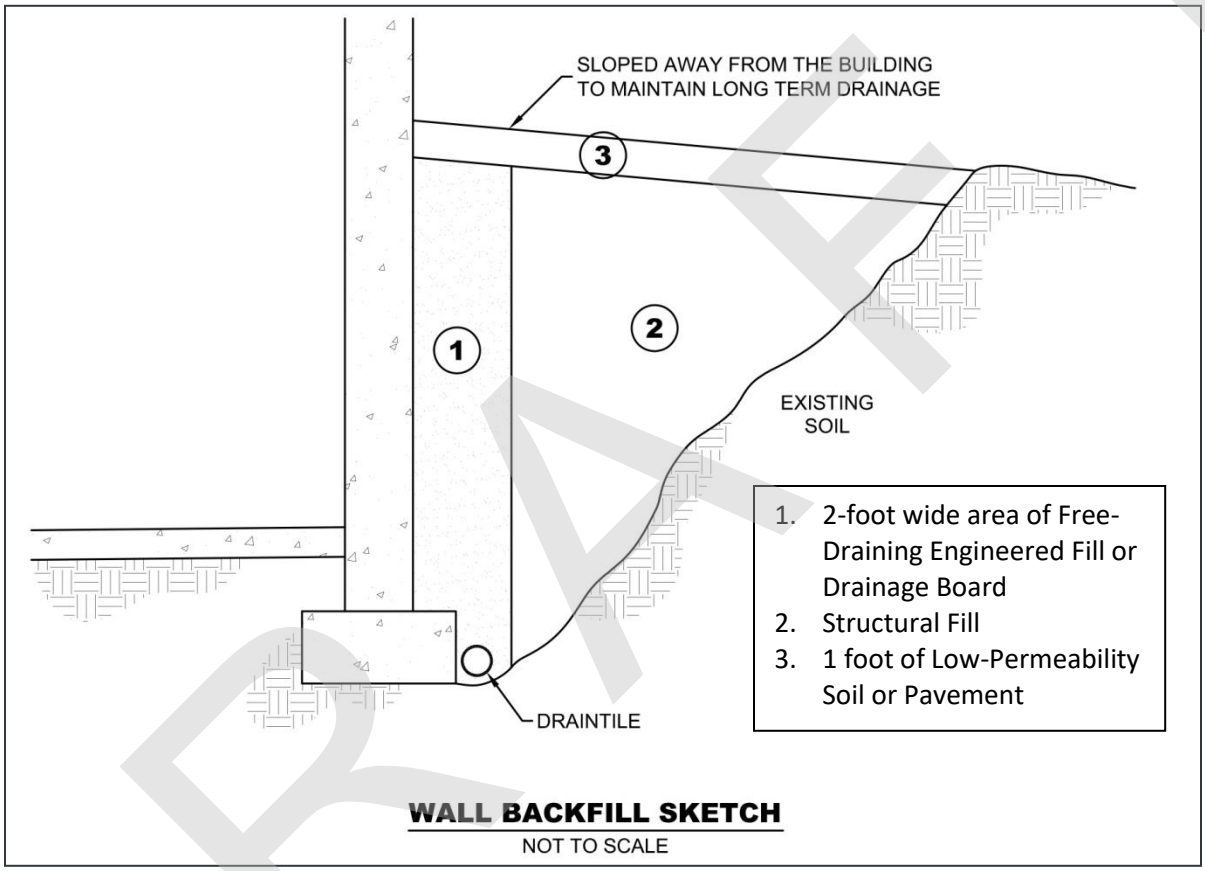
C.2.b.4. Drainage Control

We recommend installing drain tile to remove water behind the below-grade walls, at the location shown in Figure 4. The below-grade wall drainage system should also incorporate free-draining, engineered fill or a drainage board placed against the wall and connected to the drain tile.

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Even with the use of free-draining, engineered fill, we recommend general waterproofing of below-grade walls that surround occupied or potentially occupied areas because of the potential cost impacts related to seepage after construction is complete.

Figure 4. Generalized Illustration of Wall Engineered Fill



The materials listed in the sketch should meet the definitions in Section C.2.f. Low-permeability material is capable of directing water away from the wall, like clay, topsoil or pavement. The project documents should indicate if the contractor should brace the walls prior to filling and allowable unbalanced fill heights.

C.2.b.5. Configuring and Resisting Lateral Loads

Below-grade wall design can use active earth pressure conditions, if the walls can rotate slightly. If the wall design cannot tolerate rotation, then design should use at-rest earth pressure conditions. Rotation up to 0.002 times the wall height is generally required for walls supporting sand.

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Table 8 presents our recommended lateral coefficients and equivalent fluid pressures for wall design of active, at-rest and passive earth pressure conditions. The table also provides recommended wet unit weights and internal friction angles. Designs should also consider the slope of any engineered fill and dead or live loads placed behind the walls within a horizontal distance that is equal to the height of the walls. Our recommended values assume the wall design provides drainage so water cannot accumulate behind the walls. The construction documents should clearly identify what soils the contractor should use for engineered fill of walls.

Table 8. Recommended Below-Grade Wall Design Parameters – Drained Conditions

Retained Soil	Wet Unit Weight (pcf)	Friction Angle (degrees)	Active Lateral Equivalent Fluid Pressure (pcf)	At-Rest Lateral Equivalent Fluid Pressure (pcf)	Passive Lateral Equivalent Fluid Pressure* (pcf)
Structural Fill	120	30	40	60	---
Native Clay Soil	120	25	---	69	295

* Based on Rankine model for soils in a region behind the wall extending at least 2 horizontal feet beyond the bottom outer edges of the wall footings and then rising upward and away from the wall at an angle no steeper than 60 degrees from horizontal.

Sliding resistance between the bottom of the footing and the soil can also resist lateral pressures. We recommend assuming a sliding coefficient equal to 0.35 between the concrete and soil.

The values presented in this section are un-factored.

C.2.b.6. ATCT – Overturning

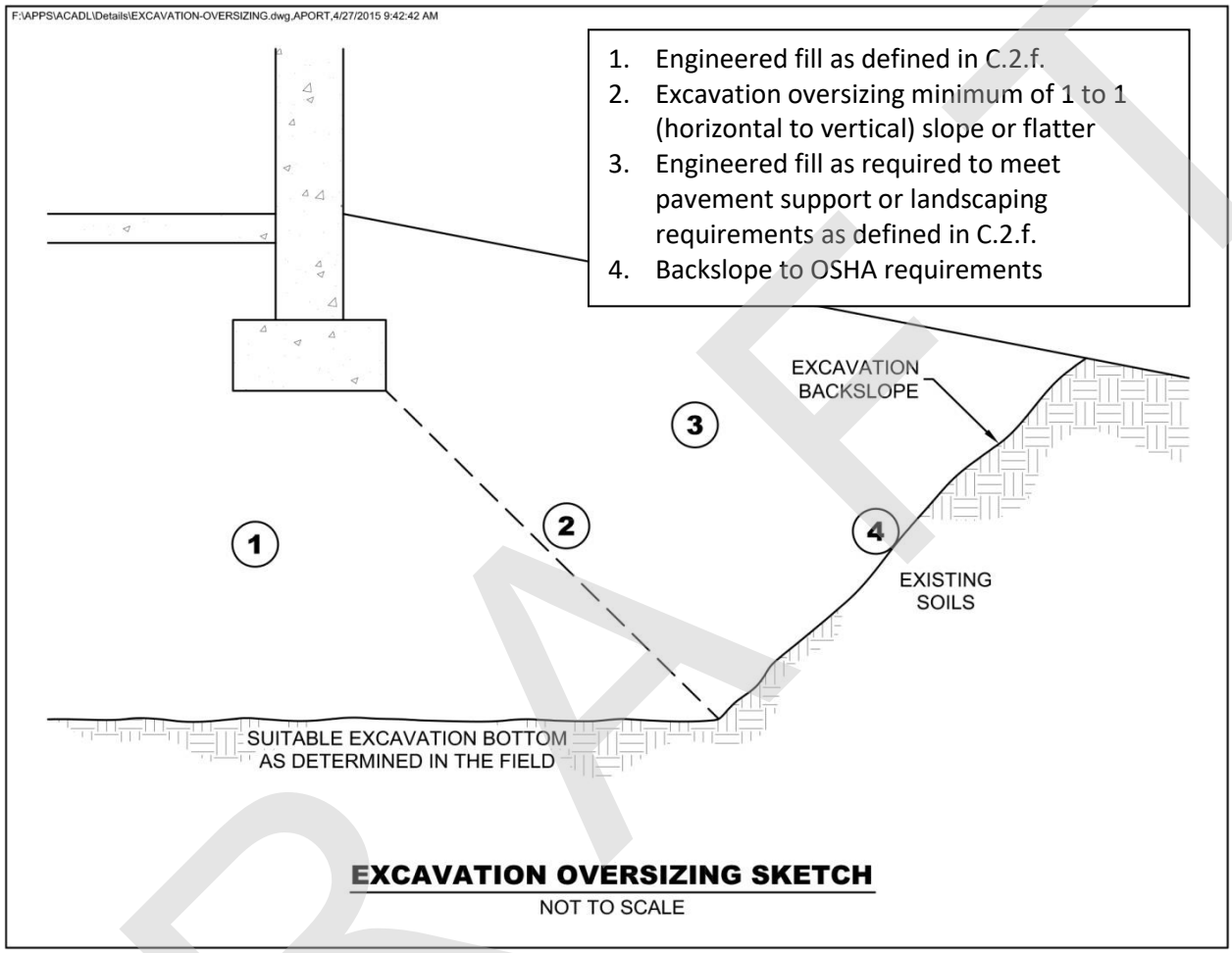
For calculating resistance to overturning, it is our opinion a unit weight of 120 pounds per cubic foot may be used for the onsite soils as backfill over the footing.

C.2.c. Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or flatter. See Figure 5 for an illustration of excavation oversizing.

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Figure 5. Generalized Illustration of Oversizing



C.2.d. Excavated Slopes

Based on the borings, we anticipate on-site alluvial and glacial soils in excavations will consist of sand, silt, and clay soils. The glacial clay soils are typically considered Type B Soil under OSHA (Occupational Safety and Health Administration) guidelines, unless the soils have been previously disturbed or water is observed to be seeping from the sidewalls of the excavations, in which case they will be considered Type C soils. The sand and silt soils are typically considered Type C Soil under OSHA guidelines. OSHA guidelines indicate unsupported excavations in Type B soils should have a gradient no steeper than 1H:1V and Type C soils should have a gradient no steeper than 1 1/2H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches.” This

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document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

C.2.e. Excavation Dewatering

We encountered water at depths of 7 to 14 feet in the borings. If water collects in the excavation during construction (either from groundwater, precipitation or surface water flowing into it) we recommend removing groundwater from the excavations promptly. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as silts and clays.

C.2.f. Engineered Fill Materials and Compaction

The silt soils (USCS designation "ML") will be difficult to re-place and compact, and therefore should not be placed as fill in the building pad. Furthermore, the silt soils will be particularly sensitive to disturbance and strength loss.

Table 9 below contains our recommendations for engineered fill materials.

Table 9. Engineered Fill Materials*

Locations To Be Used	Engineered Fill Classification	Possible Soil Type Descriptions	Gradation	Additional Requirements
▪ Below foundations ▪ Below interior slabs ▪ Wall and foundation backfill ▪ Utility backfill	Structural Fill	SP, SW, SP-SM, SW-SM, SM	100% passing 2-inch sieve < 20% passing #200 sieve	< 2% Organic Content (OC)
▪ Exterior slabs ▪ Drainage layers	Non-frost-susceptible	SP, SW, SP-SM, SW-SM	100% passing 1-inch sieve < 50% passing #40 sieve < 7% passing #200 sieve	< 2% OC
Below landscaped surfaces, where subsidence is not a concern	Non-structural fill	All	100% passing 6-inch sieve	< 10% OC

* More select soils comprised of coarse sands with < 5% passing #200 sieve may be needed to accommodate work occurring in periods of wet or freezing weather.

We recommend spreading engineered fill in loose lifts of approximately 8 inches thick. We recommend compacting engineered fill in accordance with the criteria presented below in Table 10. The project

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documents should specify relative compaction of engineered fill, based on the structure located above the engineered fill, and vertical proximity to that structure.

Table 10. Compaction Recommendations Summary

Reference	Relative Compaction, percent (ASTM D698 – Standard Proctor)	Moisture Content Variance from Optimum, percentage points	
		< 10% Passing #200 Sieve (typically SP, SP-SM)	> 10% Passing #200 Sieve (typically SM)
Below foundations, interior slabs, and oversizing areas	98	±3	-1 to +3
Backfill adjacent to walls	98	±3	-1 to +3
Utility Backfill	95	±3	-1 to +3
Within 3 feet of pavement subgrade	100	±3	-1 to +3
More than 3 feet below pavement subgrade	95	±3	±3
Below landscaped surfaces	90	±5	±4

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

We recommend performing density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

C.2.g. Special Inspections of Soils

We recommend including the site grading and placement of engineered fill within the building pad under the requirements of Special Inspections, as provided in Chapter 17 of the International Building Code, which is part of the Minnesota State Building Code. Special Inspection requires observation of soil conditions below engineered fill or footings, evaluations to determine if excavations extend to the anticipated soils, and if engineered fill materials meet requirements for type of engineered fill and compaction condition of engineered fill. A licensed geotechnical engineer should direct the Special

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Inspections of site grading and engineered fill placement. The purpose of these Special Inspections is to evaluate whether the work is in accordance with the approved Geotechnical Report for the project. Special Inspections should include evaluation of the subgrade, observing preparation of the subgrade (surface compaction or dewatering, excavation oversizing, placement procedures and materials used for engineered fill, etc.) and compaction testing of the engineered fill.

C.3. Interior Slabs

C.3.a. Subgrade Modulus

The anticipated floor subgrade will consist of sandy fill. We recommend using a modulus of subgrade reaction, k, of 200 pounds per square inch per inch of deflection (pci) to design the slabs. If the slab design requires placing 6 inches of compacted crushed aggregate base immediately below the slab, the slab design may increase the k-value by 50 pci. We recommend that the aggregate base materials be free of bituminous. In addition to improving the modulus of subgrade reaction, an aggregate base facilitates construction activities and is less weather sensitive.

C.3.b. Moisture Vapor Protection

Excess transmission of water vapor could cause floor dampness, certain types of floor bonding agents to separate, or mold to form under floor coverings. If project planning includes using floor coverings or coatings, we recommend placing a vapor retarder or vapor barrier immediately beneath the slab. We also recommend consulting with floor covering manufacturers regarding the appropriate type, use and installation of the vapor retarder or barrier to preserve warranty assurances.

C.4. Exterior Slabs and Pavements - Frost Protection

Silty sand soils will underlie exterior slabs, as well as pavements. We consider the silty sands to be moderately to highly frost susceptible. Soils of this type can retain moisture and heave upon freezing. In general, this characteristic is not an issue unless these soils become saturated, due to surface runoff or infiltration, or are excessively wet in situ. Once frozen, unfavorable amounts of general and isolated heaving of the soils and the surface structures supported on them could develop. This type of heaving could affect design drainage patterns and the performance of exterior slabs and pavements, as well as any isolated exterior footings and piers.

Note that general runoff and infiltration from precipitation are not the only sources of water that can saturate subgrade soils and contribute to frost heave. Roof drainage and irrigation of landscaped areas in close proximity to exterior slabs, pavements, and isolated footings and piers, contribute as well.

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C.4.a. Frost Heave Mitigation

To address most of the heave related issues, we recommend setting general site grades and grades for exterior surface features to direct surface drainage away from buildings, across large, paved areas and away from walkways. Such grading will limit the potential for saturation of the subgrade and subsequent heaving. General grades should also have enough "slope" to tolerate potential larger areas of heave, which may not fully settle after thawing.

Even small amounts of frost-related differential movement at walkway joints or cracks can create tripping hazards. Project planning can explore several subgrade improvement options to address this condition.

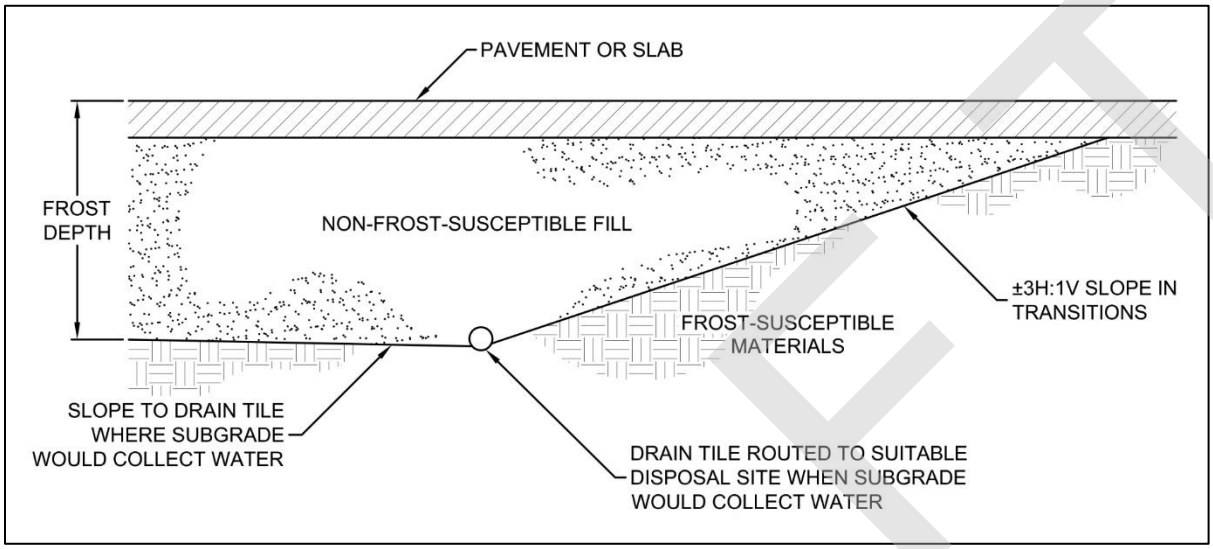
One of the more conservative subgrade improvement options to mitigate potential heave is removing any frost-susceptible soils present below the building footprint and exterior slab areas down to a minimum depth of 6 feet below subgrade elevations, or to a depth of 2 feet if 4 inches of extruded polystyrene foam insulation is installed beneath the slabs. We recommend filling the resulting excavation with non-frost-susceptible fill. We also recommend sloping the bottom of the excavation toward one or more collection points to remove any water entering the engineered fill. This approach will not be effective in controlling frost heave without removing the water.

An important geometric aspect of the excavation and replacement approach described above is sloping the banks of the excavations to create a more gradual transition between the unexcavated soils considered frost susceptible and the engineered fill in the excavated area, which is not frost susceptible. The slope allows attenuation of differential movement that may occur along the excavation boundary. We recommend slopes that are 3H:1V, or flatter, along transitions between frost-susceptible and non-frost-susceptible soils.

Figure 6 shows an illustration summarizing some of the recommendations.

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Figure 6. Frost Protection Geometry Illustration



Another option is to limit frost heave in critical areas, such as doorways and entrances, via frost-depth footings or localized excavations with sloped transitions between frost-susceptible and non-frost-susceptible soils, as described above.

Over the life of slabs and pavements, cracks will develop, and joints will open up, which will expose the subgrade and allow water to enter from the surface and either saturate or perch atop the subgrade soils. This water intrusion increases the potential for frost heave or moisture-related distress near the crack or joint. Therefore, we recommend implementing a detailed maintenance program to seal and/or fill any cracks and joints. The maintenance program should give special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

C.5. Pavements and Exterior Slabs

C.5.a. Pavement and Exterior Slab Subgrade Preparation

We recommend the following steps for pavement and exterior slab subgrade preparation, understanding the site will have a grade change of 2 feet or less. Note that project planning may need to require additional subcuts to limit frost heave.

1. Subcut to a minimum depth of 2 feet below the pavement and exterior slab section.

2. Have a geotechnical representative observe the excavated subgrade to evaluate if additional subgrade improvements are necessary.

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3. Slope subgrade soils to areas of sand or drain tile to allow the removal of accumulating water.

4. Moisture condition the exposed subgrade soils to within 0 to 4 percentage points above the soils' optimum moisture content.

5. Compact the subgrade soils to a minimum of 100 percent of the material's standard Proctor maximum dry density (determined in accordance with ASTM D698).

6. Proofroll the exterior pavement subgrade as described below.

7. Place geotextile fabric between prepared subgrade soil and sand subbase layer.

To improve long-term pavement performance, we recommend incorporating 12 inches of non-frost susceptible soil in paved areas, in addition to the recommendations above, as a sand subbase. Note, we recommend sloping subgrade soils to promote drainage and removal of accumulated water.

C.5.b. Pavement Subgrade Proofroll

After preparing the subgrade as described above and prior to the placement of the sand subbase or aggregate base, we recommend proofrolling the subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the proofroll. Areas that fail the proofroll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the proofroll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, chemical stabilization and/or geotextiles. We recommend performing a second proofroll after the aggregate base material is in place, and prior to placing concrete pavement.

C.5.c. Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar silty sand soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of 30. Note the contractor may need to perform limited removal of unsuitable or less suitable soils to achieve this value. Table 11 provides recommended pavement sections, based on the soils support and traffic loads.

We based the concrete exterior slab designs on a modulus of subgrade reaction (k) of 200 pci.

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Table 11. Recommended Parking Lot and Exterior Slab Sections

Use	Light Duty Parking Lot	Exterior Slabs
Minimum asphalt thickness (inches)	4	---
Minimum concrete thickness (inches)	---	6
Minimum aggregate base thickness (inches)	8	6
Optional granular subbase (inches)	12	12

C.5.d. Concrete Exterior Slabs

We assumed the concrete pavement sections in Table 11 will have edge support. Appropriate mix designs, panel sizing, jointing, doweling and edge reinforcement are critical to performance of rigid pavements.

C.5.e. Bituminous Pavement Materials

Appropriate mix designs are critical to the performance of flexible pavements. We can provide recommendations for pavement material selection during final pavement design.

C.5.f. Subgrade Drainage

We recommend installing perforated drainpipes throughout pavement areas at low points, around catch basins, and behind curb in landscaped areas. We also recommend installing drainpipes along pavement and exterior slab edges where exterior grades promote drainage toward those edge areas. The contractor should place drainpipes in small trenches, extended at least 8 inches below the granular subbase layer, or below the aggregate base material where no subbase is present.

C.5.g. Performance and Maintenance

We based the above pavement designs on a 20-year performance life for both bituminous and concrete. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

Many conditions affect the overall performance of the exterior slabs and pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. With regard to bituminous pavements in particular, it is common to have thermal cracking develop within the first few years of placement and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting

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and softening of the subgrade.

C.6. Utilities

C.6.a. Subgrade Stabilization

Earthwork activities associated with utility installations located inside the building area should adhere to the recommendations in Section C.2.f.

For exterior utilities, we anticipate the soils at typical invert elevations will be suitable for utility support. However, if construction encounters unfavorable conditions such as soft clay or silt, organic soils or perched water at invert grades, the unsuitable soils may require some additional subcutting and replacement with sand or crushed rock to prepare a proper subgrade for pipe support. Project design and construction should not place utilities within the 1H:1V oversizing of foundations.

C.6.b. Corrosion Potential

Based on our experience, the soils encountered by the borings are moderately corrosive to metallic conduits, but only marginally corrosive to concrete. We recommend specifying non-corrosive materials or providing corrosion protection, unless project planning chooses to perform additional tests to demonstrate the soils are not corrosive.

C.7. Drainage Basin

A drainage basin is planned to be constructed near the location where Boring SB-6 was performed. We estimated infiltration rates for some of the soils we encountered in our soil borings, as listed in Table 12. These infiltration rates represent the long-term infiltration capacity of a practice and not the capacity of the soils in their natural state. We recommend adjusting field test rates by the appropriate correction factor, as provided for in the Minnesota Stormwater Manual or as allowed by the local watershed. We recommend consulting the Minnesota Stormwater Manual for stormwater design.

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Table 12. Estimated Design Infiltration Rates Based on Soil Classification

Soil Type	Infiltration Rate * (inches/hour)
Silty sands, silty gravelly sands	0.45
Silts, very fine sands, silty or clayey fine sands	0.2
Clayey sands and clays	0.06

* From Minnesota Stormwater Manual. Rates may differ at individual sites.

Fine-grained soils (silts and clays), topsoil or organic matter that mixes into or washes onto the soil will lower the permeability. The contractor should maintain and protect infiltration areas during construction. Furthermore, organic matter and silt washed into the system after construction can fill the soil pores and reduce permeability over time. Proper maintenance is important for long-term performance of infiltration systems.

This geotechnical evaluation does not constitute a review of site suitability for stormwater infiltration or evaluate the potential impacts, if any, from infiltration of large amounts of stormwater.

D. Procedures

D.1. Penetration Test Borings

We drilled the penetration test borings with a float tire-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance with ASTM D1586. The boring logs show the actual sample intervals and corresponding depths.

D.2. Exploration Logs

D.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.

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We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

D.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

D.3. Material Classification and Testing

D.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

D.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM or AASHTO procedures.

D.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes or allowed them to remain open for an extended period of observation, as noted on the boring logs.

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E. Qualifications

E.1. Variations in Subsurface Conditions

E.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

E.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

E.2. Continuity of Professional Responsibility

E.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

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E.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

E.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

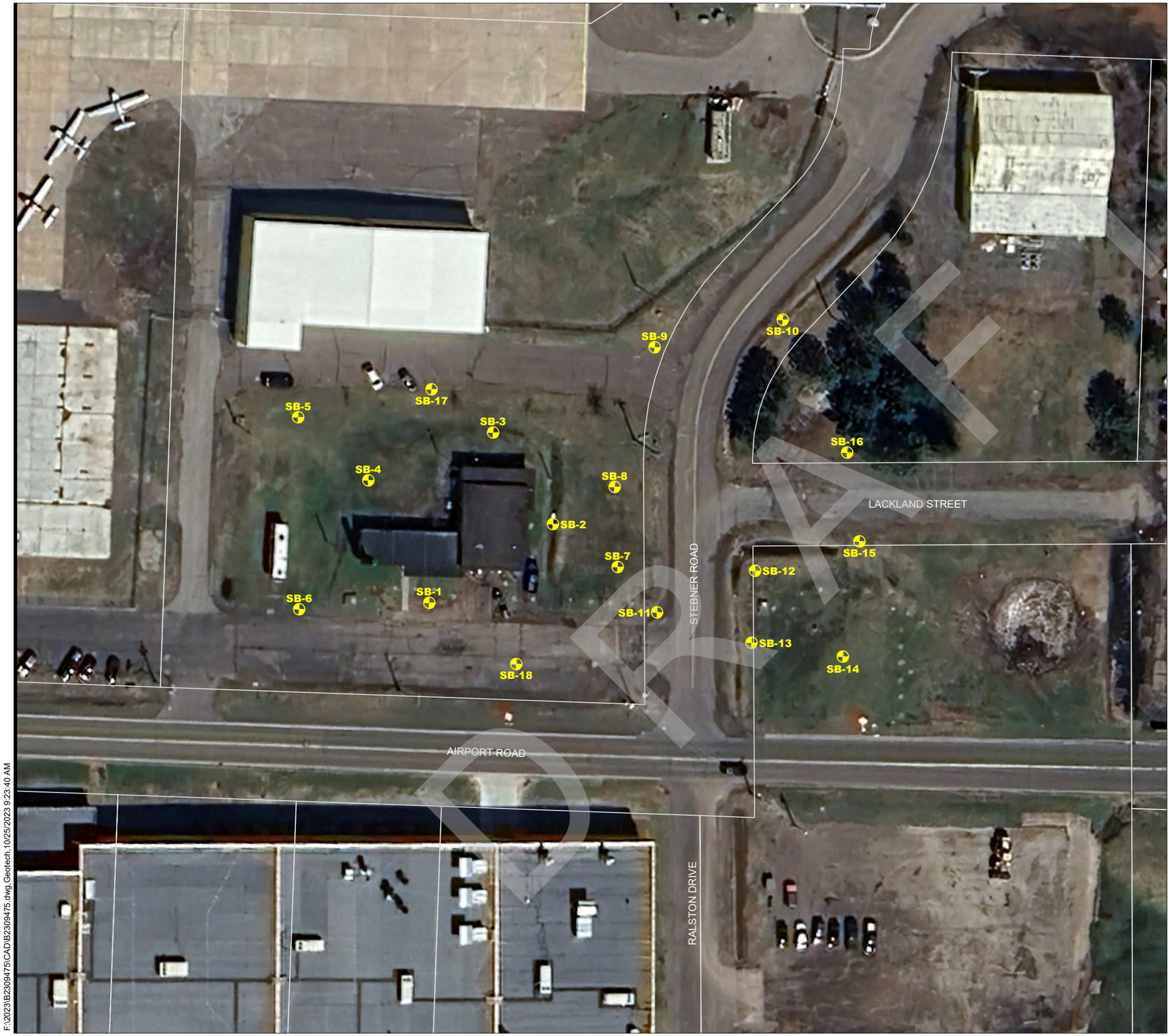
E.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

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Appendix

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DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

30' 0 60'

SCALE: 1"= 60'

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Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No:	B2309475
Drawing No:	B2309475
Drawn By:	JAG
Date Drawn:	10/24/23
Checked By:	CA
Last Modified:	10/25/23

Project Information

Duluth International Airport Proposed Base Building and ATCT

4905 Airport Road

Duluth, Minnesota

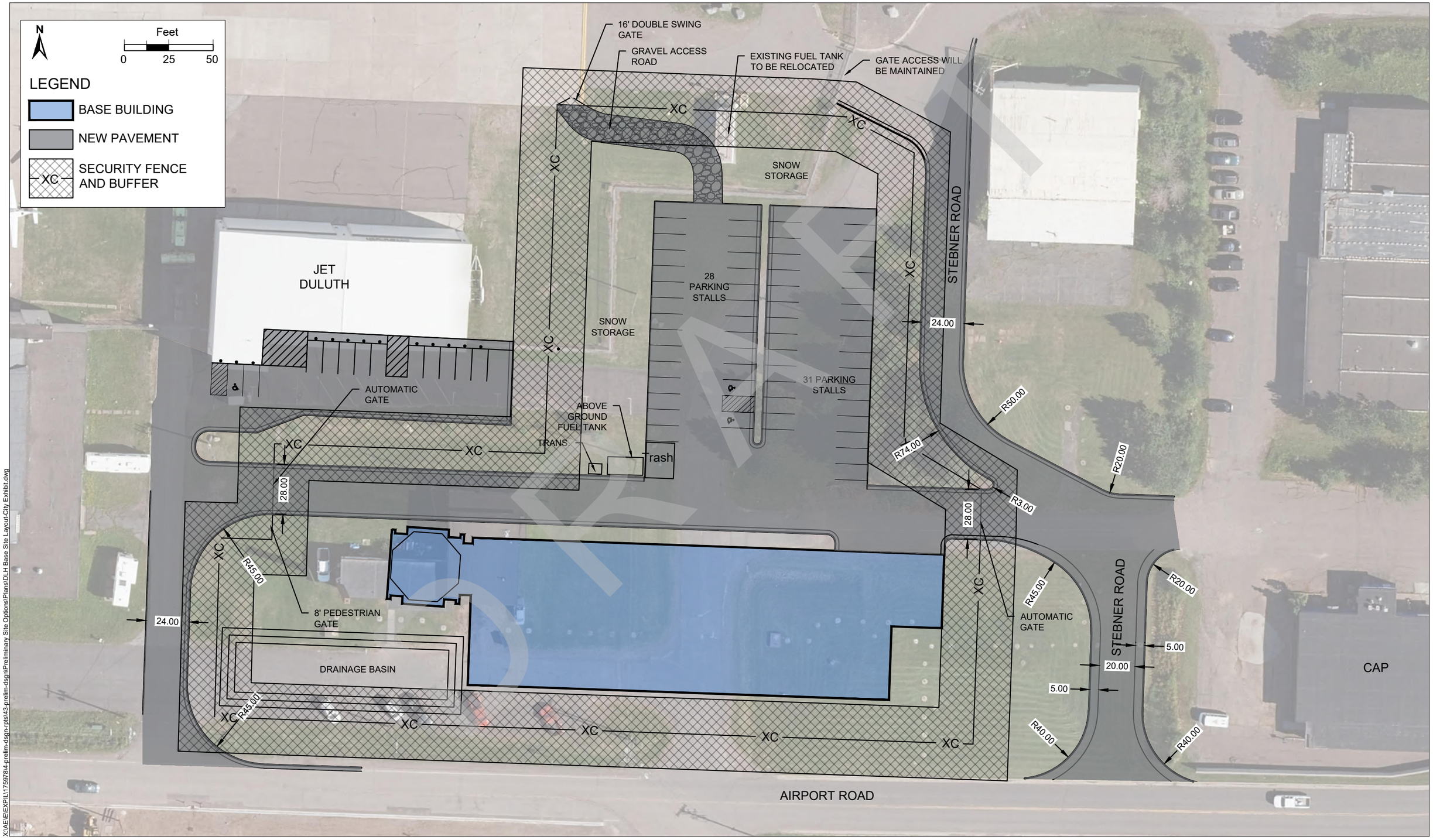
Soil Boring Location Sketch

ATCT Building

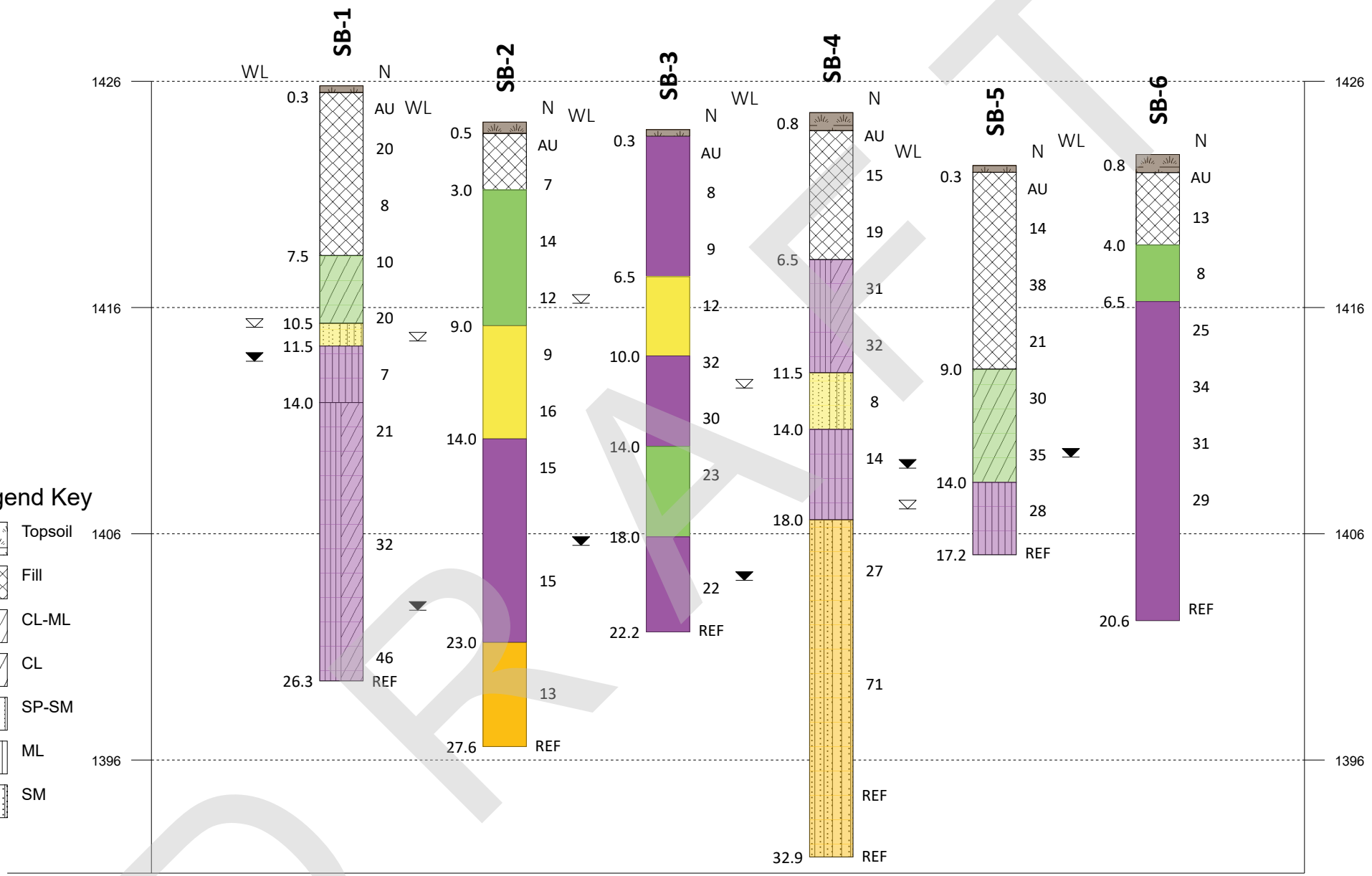
Duluth International Airport (DLH)
Duluth, Minnesota

Figure 1

Site Layout
12/18/2023; 175978



X:\AE\IE\EXP\IL\175978\4-prelim-dsgn-rpts\43-prelim-dsgn\Preliminary Site Options\Plans\DLH Base Site Layout-City Exhibit.dwg

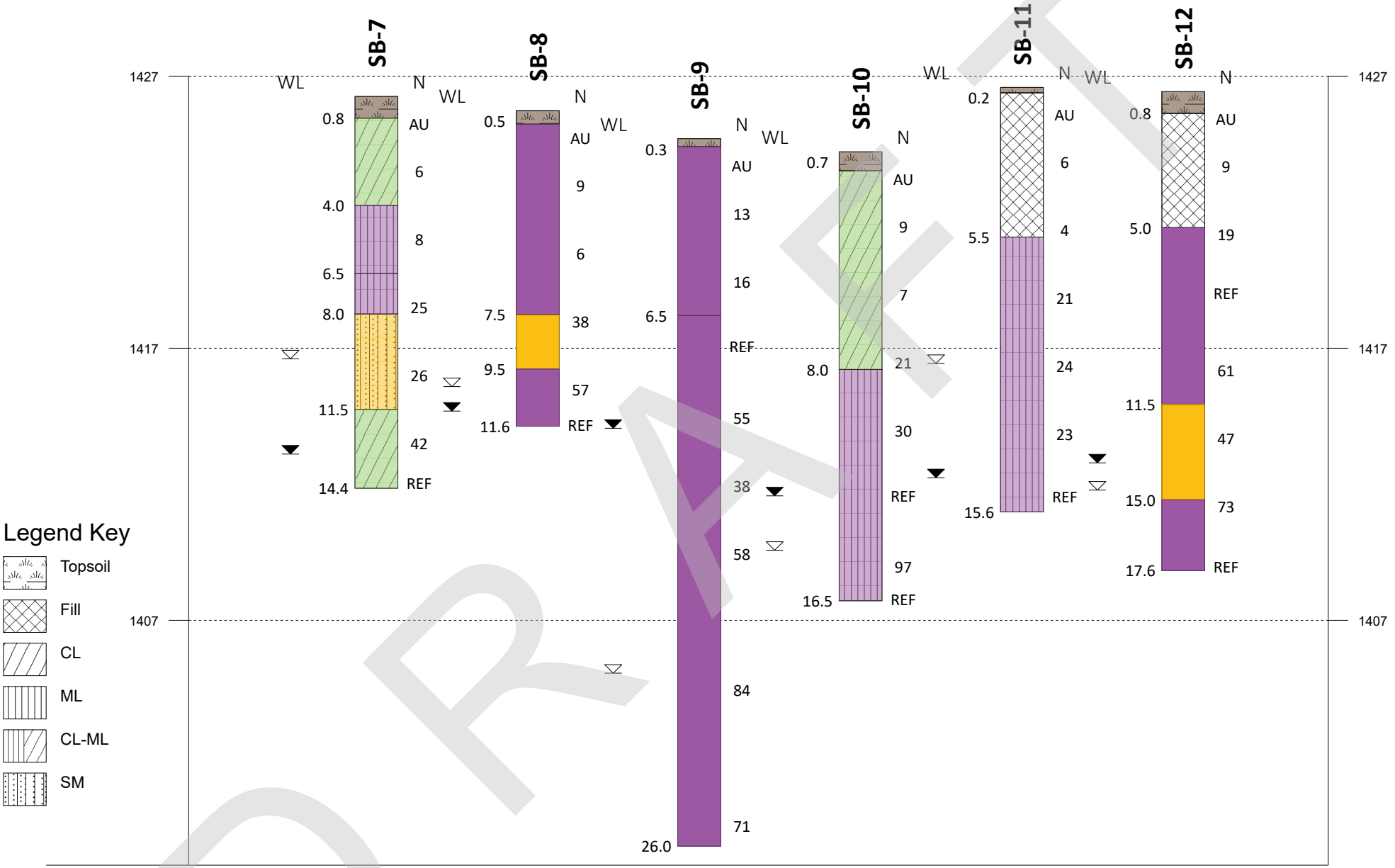


DRAFT

Project ID: B2309475
Vert. Scale: 1"= 7'
Hor. Scale: NTS
Date: 01/18/2024

Fence Diagram
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

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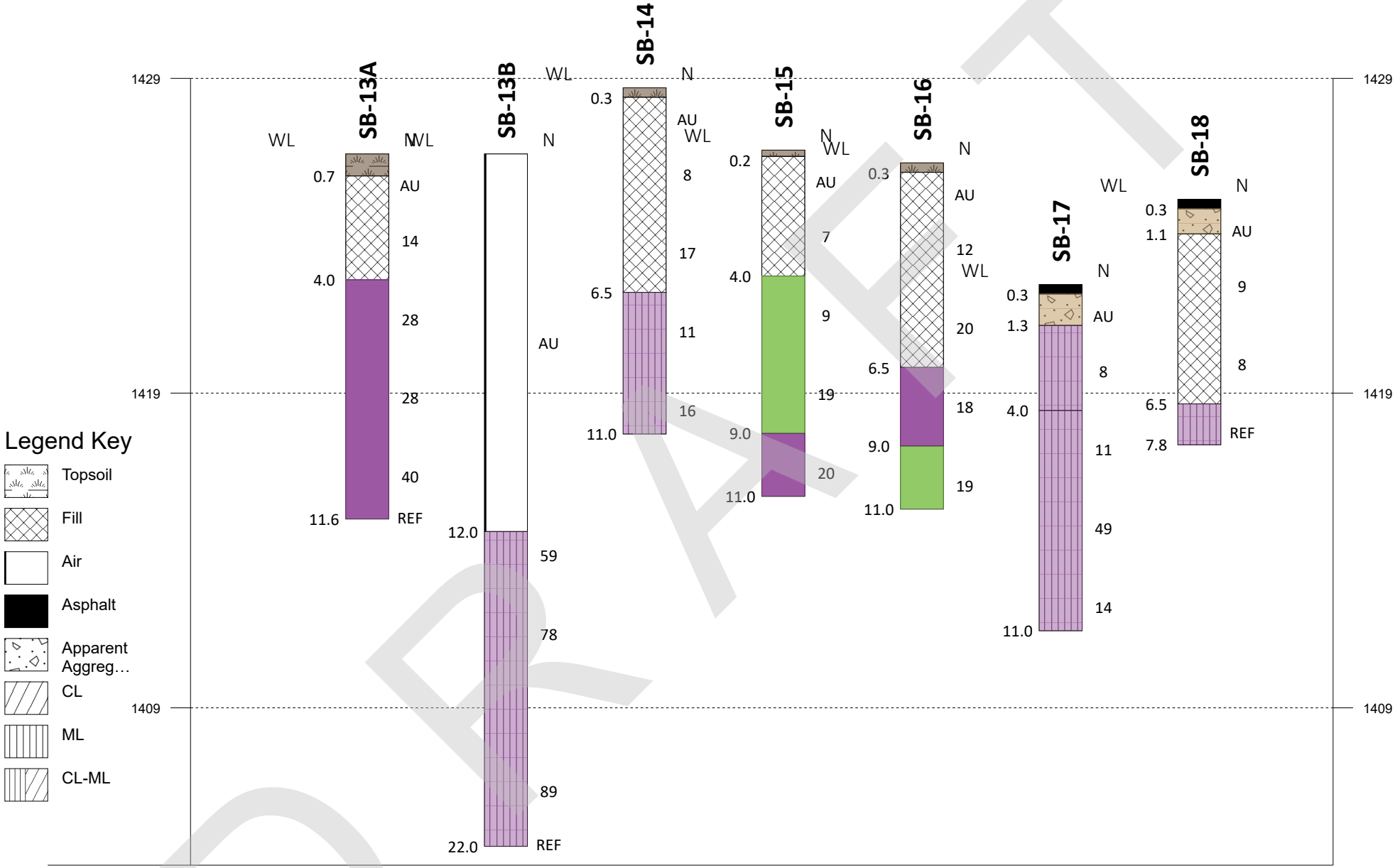


DRAFT

Project ID: B2309475
Vert. Scale: 1"= 7'
Hor. Scale: NTS
Date: 01/18/2024

Fence Diagram
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

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DRAFT

Project ID: B2309475
Vert. Scale: 1"= 7'
Hor. Scale: NTS
Date: 01/18/2024

Fence Diagram
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-1**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168493.1 EASTING: 563432.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1425.8 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1425.5~~ 0.3		SILTY SAND (SM), fine to medium-grained, trace Gravel, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, trace roots, reddish brown and dark brown, moist		9-9-11 (20) 12"		9	P200=21%
			5	2-4-4 (8) 15"			
1418.3				2-4-6 (10) 12"			
7.5		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff (GLACIAL TILL)			1	14	
1415.3			10	5-12-8 (20) 8"		18	
10.5	▽	POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, with Gravel, reddish brown, wet, medium dense (GLACIAL OUTWASH)		4-4-3 (7) 12"			
~~1414.3~~ 11.5	▼						
1411.8		SILT (ML), with Sand, reddish brown, moist to wet, loose (GLACIAL TILL)					
14.0		SANDY SILTY CLAY (CL-ML), with Gravel, reddish brown, moist, very stiff to hard (GLACIAL TILL)	15	4-10-11 (21) 15"		15	LL=16, PL=12, PI=4
			20	5-12-20 (32) 15"			
			25	11-21-25 (46) 12"			Auger refusal encountered 26.2 feet
1399.5				50/1" (REF) 0"			
26.3		END OF BORING					Water observed at 10.5 feet with 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 12.0 feet at end of drilling.
			30				

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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
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Hermantown, Minnesota

BORING: **SB-2**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168540.9 EASTING: 563507.3
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1424.2 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1423.7							
0.5		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, reddish brown with brown, moist, stiff		2-3-4 (7) 15"			
1421.2							
3.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff (GLACIAL TILL)	5	3-4-10 (14) 16"	3		
		Hard drilling at 6.5 feet; possible cobbles or boulders		6-7-5 (12) 10"	1.5	13	
1415.2							
9.0	▽	POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, reddish brown, wet, loose to medium dense (GLACIAL OUTWASH)	10	3-4-5 (9) 12"		20	P200=10%
				7-8-8 (16) 2"			
1410.2							
14.0		SANDY SILTY CLAY (CL-ML), with Gravel, reddish brown, moist, stiff (GLACIAL TILL)	15	3-6-9 (15) 16"	3	11	LL=18, PL=13, PI=5
	▼		20	1-4-11 (15) 18"	2.5	11	
1401.2							
23.0		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, wet, medium dense to very dense (GLACIAL TILL)	25	4-6-7 (13) 3"			Auger refusal encountered at 27.5 feet
1396.6							
27.6		END OF BORING		50/1" (REF) 1"			Water observed at 9.5 feet with 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout	30				Water observed at 21.4 feet at end of drilling.

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Project Number B2309475
Geotechnical Evaluation
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BORING: **SB-3**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168596.3 EASTING: 563471.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1423.9 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1423.6~~ 0.3		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SANDY SILTY CLAY (CL-ML), trace Gravel, reddish brown, moist, medium to stiff (GLACIAL TILL)		3-4-4 (8) 12"	1.5		
1417.4			5	2-5-4 (9) 15"	2	12	LL=17, PL=13, PI=4
6.5	▽	POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, reddish brown, wet, medium dense (GLACIAL OUTWASH)		2-4-8 (12) 12"			
1413.9			10	6-18-14 (32) 12"			
10.0		SANDY SILT (ML), with Gravel, reddish brown, moist, dense (GLACIAL TILL)		7-12-18 (30) 4"		13	
1409.9							
14.0		LEAN CLAY (CL), with Sand, trace Gravel, reddish brown, moist, very stiff (GLACIAL TILL)	15	6-8-15 (23) 16"	3.5	14	P200=73%
1405.9							
18.0	▼	SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL) *Hard drilling at 18 feet, possible cobbles or boulders*	20	9-12-10 (22) 12"			Auger refusal encountered at 22 feet
1401.7				50/2" (REF) 2"			Water observed at 7.5 feet with 7.0 feet of tooling in the ground while drilling.
22.2		END OF BORING Boring immediately backfilled with bentonite grout	25				Water observed at 18.2 feet at end of drilling.
			30				

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BORING: **SB-4**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168567.3 EASTING: 563395.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1424.6 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1423.8		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
0.8		FILL: SILTY, CLAYEY SAND (SC-SM), fine to coarse-grained, trace Gravel, reddish brown with brown, moist		2-6-9 (15) 12"			
			5	7-10-9 (19) 10"		7	P200=36%
1418.1							
6.5		SANDY SILTY CLAY (CL-ML), with Gravel, reddish brown, moist, hard (GLACIAL TILL)		6-10-21 (31) 10"		16	
		Hard drilling at 11 feet, possible cobbles or boulders	10	8-12-20 (32) 15"		11	LL=17, PL=12, PI=5
1413.1							
11.5	▽	POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, with Gravel, reddish brown, wet, loose (GLACIAL OUTWASH)		3-3-5 (8) 6"			
1410.6							
14.0		SILT (ML), trace Sand, reddish brown, moist to wet, medium dense (GLACIAL TILL)	15	3-7-7 (14) 18"		18	
1406.6							
18.0	▽	SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)	20	20-16-11 (27) 12"			
			25	15-21-50 (71) 6"			
			30	45-70-50/4" (REF) 12"			

Continued on next page

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Project Number B2309475
Geotechnical Evaluation
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4905 Airport Road
Hermantown, Minnesota

BORING: **SB-4**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168567.3 EASTING: 563395.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1424.6 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1391.7 32.9		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)		50/1" (REF) 1"			Auger refusal encountered at 32.8 feet Water observed at 12.0 feet with 12.0 feet of tooling in the ground while drilling. Water observed at 20.5 feet at end of drilling.
		END OF BORING					
		Boring immediately backfilled with bentonite grout					

35
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50
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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-5**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168605.5 EASTING: 563353.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/23/23 END DATE: 10/23/23
SURFACE ELEVATION: 1422.3 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1422.0~~ 0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)	AU				
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown with brown, moist		5-7-7 (14) 10"			
			5	6-27-11 (38) 1"			
				8-14-7 (21) 0"			
1413.3 9.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, very stiff to hard (GLACIAL TILL)	10	4-18-12 (30) 12"	3.5	16	
	▼			6-21-14 (35) 10"	4.5		
1408.3 14.0	▽	SANDY SILT (ML), with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)	15	6-16-12 (28) 12"			Auger refusal encountered at 17 feet
1405.1 17.2		END OF BORING		50/2" (REF) 2"			Water observed at 15.0 feet with 14.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout	20				Water observed at 13.2 feet at end of drilling.
			25				
			30				

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LOG OF BORING

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Project Number B2309475
Geotechnical Evaluation
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4905 Airport Road
Hermantown, Minnesota

BORING: **SB-6**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168489.3 EASTING: 563353.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1422.8 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1422.0		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
0.8		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, reddish brown with dark brown, moist		3-6-7 (13) 12"			
1418.8							
4.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium (GLACIAL TILL)	5	3-3-5 (8) 15"	1		
1416.3							
6.5	▼	SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		4-10-15 (25) 18"		14	P200=64%
		with Cobbles or boulders at 9.5 feet	10	38-22-12 (34) 15"			
				5-12-19 (31) 12"			
			15	6-13-16 (29) 15"			
							Auger refusal encountered at 20.6 feet
1402.2			20	40-30-50/1" (REF) 6"			
20.6		END OF BORING					Water not observed while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 13.2 feet at end of drilling.
			25				
			30				

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-7**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168514.8 EASTING: 563546.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.3 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1425.5		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
0.8		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, medium (ALLUVIUM)		2-3-3 (6) 8"	0.75		
1422.3							
4.0		SILT (ML), trace Sand, trace organic, reddish brown with dark gray, moist, loose (ALLUVIUM)	5	2-3-5 (8) 18"		18	
1419.8							
6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		2-9-16 (25) 12"			
1418.3							
8.0	▽	SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)	10	12-13-13 (26) 15"			
1414.8							
11.5	▼	SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, hard (GLACIAL TILL) *1-inch Sand seam at 13 feet*		9-14-28 (42) 10"	4.5		Auger refusal encountered at 14.4 feet
1411.9							
14.4		END OF BORING	15	50/5" (REF) 2"			Water observed at 9.5 feet with 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 13.0 feet at end of drilling.
			20				
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-8**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168563.4 EASTING: 563544.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/24/23 END DATE: 10/24/23
SURFACE ELEVATION: 1425.7 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1425.2							
0.5		SILTY SAND (SM), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SILT (ML), little Sand, slightly organic, reddish brown with dark gray, moist, loose (ALLUVIUM)		2-4-5 (9) 15"			
			5	2-2-4 (6) 18"		21	P200=93%
1418.2				7-18-20 (38) 12"			
7.5		SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist, dense (GLACIAL TILL)					
1416.2				9-22-35 (57) 10"			
9.5	▽	SANDY SILT (ML), with Gravel, reddish brown, moist to wet, very dense (GLACIAL TILL)	10				
1414.1	▼			50/1" (REF) 0"			Water observed at 10.0 feet while drilling.
11.6		END OF BORING					Water observed at 10.9 feet at end of drilling.
		Boring immediately backfilled with bentonite grout	15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-9**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168648.0 EASTING: 563568.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1424.7 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1424.4~~ 0.3		SILTY SAND (SM), fine to coarse-grained, trace Gravel, dark brown, moist (TOPSOIL)		AU			
		SANDY SILT (ML), trace Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		4-7-6 (13) 8"			
1418.2			5	4-6-10 (16) 12"		10	LL=15, PL=12, PI=3
6.5		SANDY SILT (ML), with Gravel, with Cobbles, reddish brown, moist, very dense to dense (GLACIAL TILL)		16-40-50/3" (REF) 8"			
		Hard drilling at 7 feet, possible cobbles or boulders	10	6-34-21 (55) 15"			
				5-13-25 (38) 15"			
			15	13-21-37 (58) 18"			
		Hard drilling at 17.5 feet, possible cobbles or boulders					
			20	9-46-38 (84) 15"			
			25	20-31-40 (71) 6"			
1398.7 26.0		END OF BORING					Water observed at 19.5 feet with 19.6 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 10.5 feet at end of drilling.
			30				

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Project Number B2309475
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4905 Airport Road
Hermantown, Minnesota

BORING: **SB-10**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168664.5 EASTING: 563646.5
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1424.2 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1423.5							
0.7		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, stiff to medium (GLACIAL TILL)		3-4-5 (9) 10"	1		
			5	3-3-4 (7) 12"	1		
1416.2				1-6-15 (21) 12"			
8.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)	10	5-9-21 (30) 15"			
	▼	*with cobbles at 12 feet*		11-38-50/4" (REF) 15"			
	▽		15	22-48-49 (97) 6"			Auger refusal encountered at 16.4 feet
1407.7				50/1" (REF) 0"			
16.5		END OF BORING					Water observed at 14.5 feet with 14.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout	20				Water observed at 12.5 feet at end of drilling.
			25				
			30				

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Project Number B2309475
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BORING: **SB-11**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168487.3 EASTING: 563570.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.6 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1426.4 0.2		SILTY SAND (SM), fine to coarse-grained, trace Gravel, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, trace Gravel, brown and dark brown, moist		3-3-3 (6) 6"			
1421.1 5.5		SANDY SILT (ML), with Gravel, reddish brown, moist to wet, medium dense to very dense (GLACIAL TILL)	5	2-2-2 (4) 10"			
	▽	*1-inch Sand seam at 10-feet*		5-11-10 (21) 15"			
		Hard drilling at 11.5 feet, possible cobbles or boulders	10	10-10-14 (24) 10"			
	▼			5-10-13 (23) 12"			Auger refusal encountered at 15.6 feet
1411.0 15.6		END OF BORING	15	8-30-50/1" (REF) 12"			Water observed at 10.0 feet with 9.5 feet of tooling in the ground while drilling.
		Boring immediately backfilled with bentonite grout					Water observed at 14.2 feet at end of drilling.
			20				
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
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Hermantown, Minnesota

BORING: **SB-12**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168512.5 EASTING: 563629.7
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/26/23 END DATE: 10/26/23
SURFACE ELEVATION: 1426.4 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1425.6		CLAYEY SAND (SC), fine to medium-grained, dark brown, moist (TOPSOIL)		AU			
0.8		FILL: SANDY LEAN CLAY (CL), trace Gravel, reddish brown with dark brown, moist		3-3-6 (9) 12"			
1421.4			5	4-9-10 (19) 4"			
5.0		SANDY SILTY CLAY (CL-ML), with Gravel, reddish brown, moist, very stiff to hard (GLACIAL TILL)		16-50/4" (REF) 8"			
1414.9			10	48-35-26 (61) 12"		10	LL=17, PL=13, PI=4
11.5	▼	SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown, moist to wet, dense (GLACIAL TILL)		18-22-25 (47) 15"			
1411.4			15	14-33-40 (73) 12"			
15.0		SANDY SILT (ML), with Gravel, reddish brown, moist, very dense (GLACIAL TILL)					Auger refusal encountered at 17.5 feet
1408.8				50/1" (REF) 0"			
17.6		END OF BORING Boring immediately backfilled with bentonite grout	20				Water observed at 14.5 feet with 14.5 feet of tooling in the ground while drilling. Water observed at 13.5 feet at end of drilling.
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
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4905 Airport Road
Hermantown, Minnesota

BORING: **SB-13A**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168469.0 EASTING: 563628.0
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.6 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1425.9		CLAYEY SAND (SC), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
0.7		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown with dark brown, moist		3-6-8 (14) 10"			
1422.6							
4.0		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense to very dense (GLACIAL TILL)		8-13-15 (28) 12"			
			5	8-12-16 (28) 18"			
			10	5-16-24 (40) 15"			Auger refusal encountered at 11.5 feet
1415.0				50/1" (REF) 0"			
11.6		END OF BORING					Water not observed while drilling.
		Boring immediately backfilled with bentonite grout					Water not observed at end of drilling.
			15				
			20				
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-13B**
LOCATION: Captured with RTK GPS. Boring offset 5 feet E due to boulder
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168469.0 EASTING: 563633.0
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/25/23 END DATE: 10/25/23
SURFACE ELEVATION: 1426.6 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Mostly Cloudy, 50°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		See Boring SB-13A					
			5	AU			
			10				
1414.6							
12.0		SANDY SILT (ML), with Gravel, reddish brown, moist, very dense (GLACIAL TILL)		14-26-33 (59) 15"			
			15	15-36-42 (78) 15"			
			20	23-40-49 (89) 12"			Auger refusal encountered at 21.9 feet
1404.6							
22.0		END OF BORING		50/1" (REF) 0"			Water not observed while drilling.
		Boring immediately backfilled with bentonite grout					Water not observed at end of drilling.
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
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Hermantown, Minnesota

BORING: **SB-14**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168460.6 EASTING: 563682.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/26/23 END DATE: 10/26/23
SURFACE ELEVATION: 1428.7 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Cloudy, 40°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1428.4~~ 0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)	AU				
		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown with dark brown, moist		4-4-4 (8) 13"			
5				5-8-9 (17) 5"		20	
1422.2 6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		4-4-7 (11) 15"			
10				5-7-9 (16) 16"			
1417.7 11.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling. Water not observed at end of drilling.
15							
20							
25							
30							

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Project Number B2309475
Geotechnical Evaluation
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Hermantown, Minnesota

BORING: **SB-15**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168530.3 EASTING: 563692.9
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1426.7 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Cloudy, 40°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1426.5 0.2		CLAYEY SAND (SC), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: CLAYEY SAND (SC), fine to coarse-grained, trace Gravel, reddish brown with brown, moist		2-3-4 (7) 12"			
1422.7 4.0		SANDY LEAN CLAY (CL), with Gravel, reddish brown, moist, medium to very stiff (GLACIAL TILL)	5	4-5-4 (9) 6"	1.5		
				15-11-8 (19) 10"	3		
1417.7 9.0		SANDY SILT (ML), trace Gravel, reddish brown, moist, medium dense (GLACIAL TILL)	10	8-11-9 (20) 16"			
1415.7 11.0		END OF BORING Boring then backfilled with auger cuttings					Water not observed while drilling. Water not observed at end of drilling.
			15				
			20				
			25				
			30				

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Project Number B2309475
Geotechnical Evaluation
Proposed Base Building & ATCT
4905 Airport Road
Hermantown, Minnesota

BORING: **SB-16**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168584.1 EASTING: 563685.4
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1426.3 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Cloudy, 40°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1426.0~~							
0.3		SILTY SAND (SM), fine to coarse-grained, dark brown, moist (TOPSOIL)		AU			
		FILL: SILTY SAND (SM), fine to coarse-grained, with Gravel, reddish brown with brown, moist		6-6-6 (12) 16"			
			5	10-12-8 (20) 6"			
1419.8							
6.5		SILT (ML), with Sand, reddish brown, moist, medium dense (ALLUVIUM)		7-9-9 (18) 14"			
1417.3							
9.0		SANDY LEAN CLAY (CL), trace Gravel, reddish brown, moist, very stiff (GLACIAL TILL)	10	8-11-8 (19) 15"	2.5		
1415.3							
11.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					Water not observed at end of drilling.
			15				
			20				
			25				
			30				

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Project Number B2309475
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BORING: **SB-17**
LOCATION: Captured with RTK GPS. Boring offset 10 feet N due to utilities
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168622.4 EASTING: 563433.8
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1422.4 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Cloudy, 40°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1422.1~~		BITUMINOUS, 4 inches					
0.3		APPARENT AGGREGATE BASE, 12 inches		AU			
1421.1		SILT (ML), with Sand, reddish brown, moist,		5-4-4			
1.3		loose (ALLUVIUM)		(8) 12"		17	
1418.4							
4.0		SANDY SILT (ML), with Gravel, reddish brown,		5-6-5			
		moist, medium dense to dense (GLACIAL TILL)	5	(11) 14"			
				9-30-19			
				(49) 12"			
			10	9-7-7			
1411.4				(14) 15"			
11.0		END OF BORING					Water not observed while drilling.
		Boring then backfilled with auger cuttings					Water not observed at end of drilling.
			15				
			20				
			25				
			30				

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Project Number B2309475
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BORING: **SB-18**
LOCATION: Captured with RTK GPS.
DATUM: NAD 1983 HARN Adj MN St Louis South (US Feet)
NORTHING: 168456.1 EASTING: 563485.1
DRILLER: M. Heinzen LOGGED BY: C. Anderson START DATE: 10/27/23 END DATE: 10/27/23
SURFACE ELEVATION: 1425.2 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Bituminous WEATHER: Cloudy, 40°

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1424.9~~ 0.3		BITUMINOUS, 4 inches					
		APPARENT AGGREGATE BASE, 9 inches		AU			
1424.1 1.1		FILL: SANDY SILT (ML), with Gravel, brown and dark brown, moist		3-6-3 (9) 8"			
			5	3-5-3 (8) 7"			
1418.7 6.5		SANDY SILT (ML), with Gravel, reddish brown, moist, very dense (GLACIAL TILL)		4-50/4" (REF) 7"			
1417.4 7.8		END OF BORING					Auger refusal encountered at 7.8 feet
		Boring then backfilled with auger cuttings					Water not observed while drilling.
			10				Water not observed at end of drilling.
			15				
			20				
			25				
			30				

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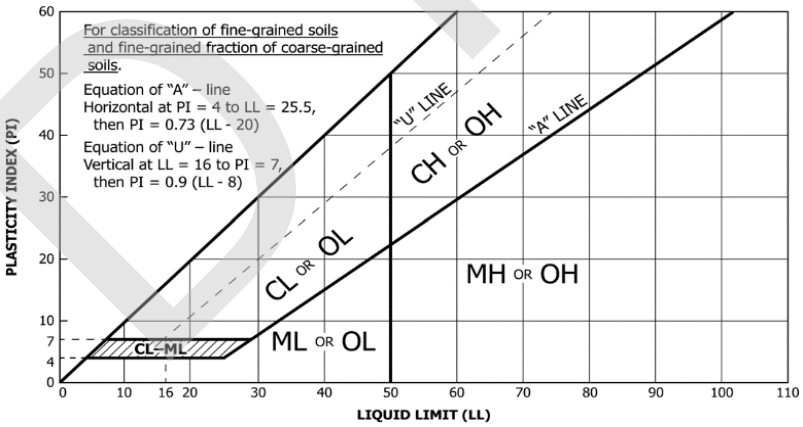
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Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▼).

Laboratory Tests

DD	Dry density, pcf	**OC**	Organic content, %	**LL**	Liquid limit
WD	Wet density, pcf	**q_p**	Pocket penetrometer strength, tsf	**PL**	Plastic limit
P200	% Passing #200 sieve	**MC**	Moisture content, %	**PI**	Plasticity index
		q_U	Unconfined compression test, tsf		

DRAFT

12/2020

Phase 2 ESA Report

Phase II Environmental Site Assessment

Site 6 - Proposed Air Traffic Control Tower

Duluth, Minnesota

DULAI 171568 | April 5, 2023

SEH

Building a Better World for All of Us®

Engineers | Architects | Planners | Scientists

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April 5, 2023

RE: Site 6 - Proposed Air Traffic Control Tower
Phase II Environmental Site Assessment
Portions of Parcel ID Numbers: 010-0148-00200, 010-0148-00080, and 010-0148-00020
Duluth International Airport
Duluth, Minnesota
SEH No. DULAI 171568

Mr. Mark Papko
Duluth Airport Authority
4701 Grinden Drive
Duluth, MN 55811

Dear Mr. Papko:

Please find enclosed the Phase II Environmental Site Assessment for the Site 6 - Proposed Air Traffic Control Tower site located at the Duluth International Airport (herein referred to as the Subject Property). The Subject Property includes portions of Parcel ID Numbers: 010-0148-00200 (4913 Airport Road), 010-0148-00080 (4550 Stebner Road), and 010-0148-00020 and is generally located north of the intersection of Airport and Stebner Roads in Duluth, Minnesota. Thank you for choosing SEH to complete this assessment. Please feel free to contact me at 612.839.2430 if you have any questions or comments.

Sincerely,

Jennifer Force, PG
Senior Scientist II
(Lic. MN)

ea

Certification

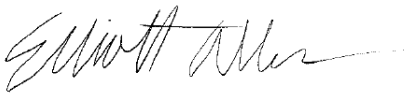
Phase II Environmental Site Assessment
Site 6 - Proposed Air Traffic Control Tower
Duluth, Minnesota

SEH No. DULAI 171568

April 5, 2023



Jennifer Force, PG
Senior Scientist II



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Distribution

No. of Copies	Sent to
1	Mark Papko Duluth Airport Authority 4701 Grinden Drive Duluth, MN 55811

Executive Summary

Phase II Environmental Investigation

Short Elliott Hendrickson Inc. (SEH®) was retained by the Duluth Airport Authority to conduct a Phase II Environmental Site Assessment (ESA) of Site 6 for the proposed air traffic control tower at the Duluth International Airport. Site 6 consists of portions of Parcel ID Numbers: 010-0148-00200 (4913 Airport Road), 010-0148-00080 (4550 Stebner Road), and 010-0148-00020 and is generally located north of the intersection of Airport and Stebner Roads in Duluth, Minnesota (herein referred to as "Subject Property").

This investigation was performed for the following purposes.

- To evaluate if Recognized Environmental Conditions (RECs) identified by the Phase I ESA recently completed for the Subject Property by Federal Aviation Administration have impacted soil, soil vapor or groundwater.
- To evaluate if nearby former Formerly Used Defense Sites operations have impacted the Subject Property.
- To obtain data needed to prepare a Response Action Plan (RAP) for the project, if needed.

As part of the Phase II ESA, SEH advanced eight, exterior soil borings and two hand augers within the Subject Property building to collect soil and groundwater samples. Four sub-slab soil vapor pins were also installed through the building floor slab to collect soil vapor samples.

Fill soils were encountered from the ground surface to depths ranging from 2 to 5 feet and generally consisted of silty sand with gravel, clayey sand with gravel, and silt. Native soils beneath fill soils extended to the termination depths of each of the borings. Native soils generally consisted of silt and sandy lean clay interbedded with silty sand with gravel and poorly graded sand. Groundwater was encountered in five of the eight soil borings at depths ranging from 8.5 to 9.67 feet below ground surface (bgs).

Indications of contamination, including photoionization detector (PID) readings greater than background, were not observed in the soil and groundwater samples. A slightly elevated PID reading was recorded in soil vapor sample SSV-03, which was located in the shop area of the Subject Property Building. Concentrations of volatile organic compounds (VOCs) detected in the soil vapor sample collected at this location did not exceed 33 times the Commercial/Industrial Intrusion Screening Values (ISVs) – the concentration at which vapor mitigation would be needed for the proposed project; however, the concentration of tetrachloroethene detected in SSV-03 exceeded 33 times the Residential ISV.

Based on the analytical testing results, diesel range organic- (DRO-) and polynuclear aromatic hydrocarbon- (PAH-) impacted soil was identified below the building floor slab in the shop area. Impacted soil relative to regulatory criteria was not identified outside of the building footprint at the Subject Property.

DRO and trichloroethene were detected in the groundwater sample collected from B-01W (9.67) on the north-central portion of the Subject Property, cross-gradient to the Subject Property building, at concentrations exceeding drinking water criteria.

No exceedances relative to 33 times the Commercial/Industrial ISVs were detected in sub-slab vapor samples.

Executive Summary (continued)

Recommendations

Based on the Phase II ESA, SEH recommends the following:

- To further evaluate if vapor intrusion is a concern for the Subject Property, a second round of soil vapor testing should be conducted in accordance with MPCA Best Management Practices during the non-heating season (i.e., from April to October).
- Prior to redevelopment of the Subject Property, the project should be enrolled in the MPCA VIC Program and the Petroleum Brownfields Program (PBP) to request the appropriate approvals and liability assurances including a Retroactive No Association Determination for the Identified Release in soil vapor and groundwater at the Subject Property (i.e., trichloroethene and tetrachloroethene). Please note because the tenant at the Subject Property likely caused or contributed to the impacts detected below the floor slab, the Duluth Airport Auth would not be eligible for a Retroactive No Association Determination for the PAH impacts to soil.
- A RAP should also be prepared and submitted for VIC Program and PBP for review and approval prior to the start of construction. The RAP will describe the proposed project, identify the various parties involved with the project, outline the procedures that will be used to manage soil and groundwater impacts that will be encountered during construction. The RAP should also include contingencies that will be implemented in the event previously unidentified conditions are encountered such as underground storage tanks, potential asbestos-containing materials or contamination that differs from that encountered during the Phase II ESA.
- During construction, environmental monitoring as outlined in the RAP should be conducted to document the field conditions and response actions that are implemented.
- Following construction, a RAP Implementation Report should be prepared and submitted to the MPCA to request approval of response actions, a No Further Action Determination and approval of response actions, as appropriate.

List of Abbreviations

Abbreviation	Meaning
ACM	Asbestos Containing Material
amsl	Above Mean Sea Level
BaP	Benzo(a)pyrene Equivalents
bgs	Below Ground Surface
BTV	Background Threshold Value
DRO	Diesel Range Organics
EISV	Expedited Intrusion Screening Value
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
Eurofins	Eurofins Environment Testing North Central, LLC
eV	Electron Volt
FAA	Federal Aviation Administration
FUDS	Formerly Used Defense Sites
GPL	General Permit Limit
GRO	Gasoline Range Organics
HBG	Health Based Guidance
HRL	Health Risk Limit
HBV	Health Based Value
HREC	Historic Recognized Environmental Condition
ISV	Intrusion Screening Value
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDH	Minnesota Department of Health
MGS	Minnesota Geological Survey
mg/kg	milligram per kilogram
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic Aromatic Hydrocarbon
PBP	Petroleum Brownfields Program
PEF	Potency Equivalency Factor
PID	Photoionization Detector
ppm	parts per million
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAA	Risk Assessment Advice
RAP	Response Action Plan
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SEH	Short Elliott Hendrickson Inc.
SLV	MPCA Screening Soil Leaching Value
SRV	MPCA Soil Reference Value
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbons
VIC	Voluntary Investigation and Clean-up
VOC	Volatile Organic Compound
UFC	Unregulated Fill Criteria
ug/L	Micrograms per liter
USAF	United States Air Force

List of Abbreviations (continued)

Abbreviation	Meaning
UST	Underground Storage Tank
33X	33 times

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Phase II Environmental Site Assessment

Site 6 - Proposed Air Traffic Control Tower

Prepared for The Duluth Airport Authority

1 Introduction

Short Elliott Hendrickson Inc. (SEH®) was retained by the Duluth Airport Authority to conduct a Phase II Environmental Site Assessment (ESA) of Site 6 for the proposed air traffic control tower at the Duluth International Airport. Site 6 consists of portions of Parcel ID Numbers: 010-0148-00200 (4913 Airport Road), 010-0148-00080 (4550 Stebner Road), and 010-0148-00020 and is generally located north of the intersection of Airport and Stebner Roads in Duluth, Minnesota (herein referred to as "Subject Property"). The Subject Property location is depicted on **Figure 1**. The project is described in further detail in **Section 2**.

1.1 Project Description

The Duluth Airport Authority is planning to replace the existing air traffic control tower at the Duluth International Airport and is currently considering two replacement sites for the tower, one of which includes Site 6.

1.2 Purpose of Investigation

This investigation was performed for the following purposes.

- To evaluate if Recognized Environmental Conditions (RECs) identified by the Phase I ESA recently completed for the Subject Property by Federal Aviation Administration (FAA) have impacted soil, soil vapor or groundwater.
- To evaluate if nearby former Formerly Used Defense Sites (FUDS) operations have impacted the Subject Property.
- To obtain data needed to prepare a Response Action Plan (RAP) for the project, if needed.

1.3 Scope of Work and Limitations

The following scope of services was performed to evaluate potential impacts at the Subject Property.

- Advancement of eight soil borings (B-01 through B-08) to depths ranging between 13 and 15 feet below ground surface (bgs).
- Installation of temporary wells in five of the soil borings where groundwater was encountered (B-01, B-02, B-06, B-07, and B-08).
- Advancement of two hand auger samples inside the hydraulic shop in the building on the Subject Property in areas where oil-stained concrete was observed (HA-1 and HA-2).
- Collection and analysis of soil and groundwater samples.

- Field Screening, geological logging, and photoionization detector (PID) soil headspace screening.
- Collection of four sub-slab soil vapor samples (SSV-01 through SSV-04) below the floor slab of the Subject Property building.
- Evaluation of data and report preparation.

1.4 User Reliance

The Phase II ESA and all reports, verbal and written, are solely for the use of the Duluth Airport Authority. Any third party may have different interests, purposes, and motives than the Duluth Airport Authority with regard to this assessment and report. Any reliance on the Phase II by any other party shall be at such party's sole risk, unless that party has written authorization from SEH, and the Duluth Airport Authority, and is a party to the Agreement between SEH and the Duluth Airport Authority.

2 Subject Property Background

2.1 Subject Property Location and Description

The Subject Property consists of portions of Parcel ID Numbers: 010-0148-00200 (4913 Airport Road), 010-0148-00080 (4550 Stebner Road), and 010-0148-00020 and is generally located north of the intersection of Airport and Stebner Roads in Duluth, St. Louis County, Minnesota. The portion of the Subject Property located at 4913 Airport Road is developed with a single-story, slab on grade building with a shop area that is currently occupied by Hermantown Hydraulics, a hydraulics repair company. The remainder of the Subject Property is vacant, grass-covered land or includes portions of Stebner Road. The Subject Property location is shown on **Figure 1** and the Subject Property features are shown on **Figure 2**.

2.2 History of the Subject Property

The Duluth International Airport was dedicated in 1930 as the Williamson-Johnson Municipal Airport; it was later renamed the Duluth International Airport in 1963. Historically, the Duluth International Airport was jointly operated by the City of Duluth, the United States Air Force (USAF), and the Minnesota Air National Guard. The USAF ceased operations at the Duluth International Airport in 1982.

The Subject Property was undeveloped until the 1930s when a residential structure was visible on the aerial photographs. By the early 1950s, the USAF constructed the current Subject Property building, which was referred to as Building s100 and used as a flight simulator building (EMR, 2004).

Nearby FUDS operations included the following:

- Building 306 is located northeast and adjoining the Subject Property and was identified as the B E Laboratory and fuel oil tank building in the 2004 Site Research Report prepared by EMR Inc. for the United States Army Corps of Engineers, the lead agency evaluating FUDS (EMR, May 2004). Details regarding laboratory operations or materials used were not provided, but the laboratory operations include two fuel oil tanks of unknown capacity and construction.
- Building 305 is located east of Subject Property and was referred to as the rocket check/assembly building. Specific operations in Building 305 are not known.

- The 2004 Site Research Report also indicated a former underground storage (UST) was located north of the Subject Property.
- Hangar 101, which is part of the Lot 3 FUDS Project Area, adjoins the Subject Property to the west. Hangar 101 was constructed in the early 1950s and was used by the USAF until the early 1980s for airplane maintenance. Little documentation was found regarding material handling or usage at Hangar 101, but suspected materials included solvents and new or used fuels and oils. The report indicates a fuel oil UST was removed in the vicinity and northwest of Hangar 101 and a petroleum release as well as chlorinated solvent impacts were detected. Additional investigation of Hangar 101 and surrounding areas to the west and north have been conducted since 2007 and have identified petroleum and solvent impacted groundwater and soil vapor on the western portion of the Hangar 101 site. Groundwater flow direction in the vicinity of Hangar 101 is to the west/northwest; however, groundwater flow on the western side of the Hangar 101 site is locally influenced by stormwater drains and has a stronger westerly flow direction.

The FUDS program has not conducted investigations at Building 305, Building 306 or the former UST located north of the Subject Property.

2.3 Previous Environmental Investigations

2.3.1 October 2019 Phase I ESA

SEH conducted a Phase I ESA of the 100 Building located at 4905 Airport Road in Duluth, Minnesota on behalf of the Duluth Airport Authority in October 2019 (SEH, October 2019). At the time of the Phase I ESA, the 100 Building was occupied by Hermantown Hydraulics. According to the Phase I ESA, Hermantown Hydraulics had occupied the Subject Property since 2009. The Phase I ESA identified several closed leak sites or inactive Voluntary Investigation and Cleanup (VIC) Program sites as Historical Recognized Environmental Conditions (HRECs) for the Subject Property. Please note at the time of the 2019 Phase I ESA, information regarding the FUDS investigations was not available for review.

2.3.2 January 2023 Phase I ESA

Booz Allen Hamilton conducted a Phase I ESA of the Subject Property in January 2023 on behalf of the FAA (Booz Allen Hamilton, January 2023). The Phase I ESA indicates the far western portion of Subject Property was initially developed by at least 1939 through the early 1950s with a residence, which was removed as the Duluth Air Force Base was developed. The current building was constructed by at least 1961 and is currently occupied by Hermantown Hydraulics. During the site reconnaissance, multiple buckets and drums of oils and hydraulic fluid were observed in the shop area. Petroleum staining was observed on the concrete floor near the oil and hydraulic fluid and was observed to be wicking into the foundation.

The Phase I ESA identified the following RECs for the Subject Property including:

- *Based on the age of the facility and operations observed during the site reconnaissance, this staining and potential impact to soils below the building is believed to present a Recognized Environmental Condition (REC) for the subject property.*
- *Based on its current regulatory status as an active remediation site, the former U.S. AFB Duluth is believed to present a REC for the subject property.*

The Phase I ESA identified two adjoining properties with closed regulatory statuses, Duluth International Airport – Site #102 and Duluth International Airport – Block 5, as HRECs.

2.4 Regional Physical Setting

The Subject Property is generally flat on the United States Geological Survey (USGS) *7.5-minute Duluth Heights, MN* topographic map (USGS, 2019). The Subject Property has an elevation of approximately 1,420 feet above mean sea level (amsl). (DNR, 2022). Topography is depicted on **Figure 1**.

2.4.1 Regional Geology

Published geology indicates surficial deposits in the vicinity of the Subject Property consist of glacial lake deposits of the Cromwell Formation of the Wrenshall Member of the Michigan Sub-episode and consist of brown silt and clay with minor sand (MGS, 2019).

The uppermost bedrock unit is the Gabbroic zone of the Duluth Complex at approximately 1320 to 1370 feet above amsl or around 50 to 100 feet bgs. The Gabbroic zone of the Duluth Complex is described as medium-grained, intergranular, foliated and locally layered olivine oxide gabbro. The Gabbroic zone of the Duluth Complex ranges from 2,300 to 5,000 feet thick (MGS, 2008).

2.4.2 Regional Hydrogeology

Based on previous investigations conducted at the airport, shallow groundwater flow direction in the vicinity of Subject Property is to the west/northwest; however, groundwater flow on the western side of the Hangar 101 site is locally influenced by stormwater drains and has a stronger westerly flow direction.

Groundwater depths were observed and measured during the Phase II ESA. Groundwater was measured between 8.5 and 9.67 feet bgs. Depths to groundwater are recorded on boring logs (**Appendix A**).

3 Overview of the Phase II ESA

The following sections describe the scope and goals of the Phase II ESA. Also included is methodology, quality assurance/quality control information and regulatory/guidance levels. The Phase II Investigation area is depicted on **Figure 2**. Results of the Phase II ESA are discussed in **Section 4**. Completed borings, field screening results, and soil and groundwater sample locations and results are captured on attached figures and tables.

3.1 Field Investigation and Sampling Methods

Field work for the Phase II ESA was completed between February 27 and March 7, 2023 and included collection of soil, soil vapor and groundwater samples for field screening and chemical analyses. Soil borings were completed by Range Environmental. Laboratory analyses was completed by Eurofins Environment Testing North Central, LLC (Eurofins).

3.1.1 Soil Sampling

Soil samples were collected from hand auger borings advanced below the floor slab of the shop area of the Subject Property building using hand equipment, which was decontaminated between boring location. Prior to advancing the hand auger borings, a concrete core was advanced through the floor slab and was replaced and sealed in place following sampling.

Soil samples were also collected from soil borings advanced using push-probe drilling techniques using a five-foot long macro-core sampler with an acetate liner that was advanced at continuous intervals to the bottom of the soil boring.

Lubricants or solvents with petroleum products or hazardous substances were not used for downhole drilling or on sampling equipment. Each borehole was properly abandoned in accordance with local regulations. The location of each borehole is depicted on **Figure 2**.

Soil samples were collected for field screening from each boring by placing soil into a new, clean, quart-size, labeled, resealable bag. The bags used for field screening were used for one sample only. Soil clumps were manually agitated and the bags were shaken vigorously at the beginning and end of the headspace development period. The bags were placed in a warm location. Weather conditions at the time of the investigation were sunny and clear.

PID headspace readings were collected in general accordance with Minnesota Pollution Control Agency (MPCA) guidelines. A MiniRae PID with a 10.6 electron volt (eV) bulb calibrated to isobutylene was inserted through a small opening in the bag and the highest reading was recorded. Empty bag readings were recorded periodically throughout the investigation and are considered “background.” The results of the headspace readings are summarized on **Table 1** and on boring logs in **Appendix A**.

A portion of each sample was reserved for description in the field in general conformance with ASTM D 2488-17 (ASTM, 2017).

The SEH scientist wore a new clean pair of disposable Nitrile® gloves while collecting each sample. Soil samples from select intervals were placed into the appropriate jars for laboratory analyses and preserved, as appropriate. Sample containers were placed in coolers with ice and were protected from sunlight. Samples were transported to Eurofins within 48 hours of their collection with proper chain-of-custody documentation.

Analytical samples collected were labeled corresponding to the boring number from which they were collected (for example B-01 or HA-01). Additionally, soil samples were labeled for the depth from which they were collected. For example, a sample collected from a depth of five to six feet bgs in B-01 is labeled B-01 (5-6).

3.1.2 Groundwater Sampling

Groundwater samples were collected from soil borings where groundwater was encountered through new polyvinyl chloride (PVC) well screen with polyethylene tubing and a check ball valve. The SEH scientist wore a new clean pair of disposable Nitrile® gloves while collecting each groundwater sample. The groundwater samples were placed in the appropriate laboratory containers in accordance with the laboratory’s specifications and preserved. The sample containers were placed in a cooler with ice and protected from sunlight. The samples were then transported to Eurofins within 48 hours of their collection with proper chain-of-custody documentation.

Samples collected were labeled corresponding to the boring number from which they were collected (for example B-01) followed by the letter “w”. Additionally, groundwater samples were labeled with the water level measured after drilling (in feet bgs) to groundwater. For example, for a sample collected from B-01 and a water level measured during drilling of 9.67 feet bgs, the sample is labeled B-01w (9.67).

3.1.3 Sub-Slab Soil Vapor Sampling

Sub-slab soil vapor samples were collected from Cox-Colvin vapor pins, which were installed through the concrete floor slab of the Subject Property building. Each vapor pin was equipped with a self-sealing silicone sleeve. The number of soil vapor samples collected followed MPCA Best Management Practices regarding the recommended samples for a building measuring 2,501 to 5,000 square feet (MPCA, April 2020). Sample locations are shown in **Exhibit 2**.

Using a section of PVC pipe and non-VOC containing putty, a water dam was constructed around the vapor pins to evaluate potential short-circuiting/leakage between the sub-slab and ambient air. The water dam was filled with distilled water and water levels were monitored during shut-in testing, sample train purging and sample collection. If water levels dropped, the water dam was checked, and if required, the vapor pin was removed and re-installed.

To collect the samples, a sampling train was constructed with new, inert materials. A shut-in test was then performed to detect leaks in the connections in the sampling train (i.e., sample tubing, valves and moisture filter). To conduct the shut-in test, the valve leading to the sampling pin was closed, and air was drawn out of the sampling train until a vacuum of about 25 inches of mercury was read on the canister gauge. The gauge was then monitored for a minimum of 60 seconds to ensure pressure in sampling train remains consistent. If pressure was lost, fittings were checked and re-established before performing an additional shut-in test.

A minimum of two air volumes was evacuated from the sampling pin and tubing prior to sampling. Each of the soil vapor samples were collected using a batch-certified, 1-liter air sampling canister equipped with a valve and a 200 milliliter per minute flow controller with tubing assembly. To collect the sample, the valve on the canister was opened. The initial vacuum reading, as well as the initial time, were recorded in the field notes and on the chain-of-custody. The vacuum gauge was observed until it read approximately 5 inches of mercury, at which point the canister valve was closed and the time and final vacuum reading were recorded in the field notes and on the chain-of-custody. After the canister valve was closed, a PID with a 10.6 eV lamp was connected to the tubing and organic measurements were recorded for about 1 minute.

The soil vapor samples were then transported to the laboratory with proper chain-of-custody documentation.

3.1.4 Chemical Analytical Methodologies

Soil sample analytes included:

- Diesel range organics (DRO - Wisconsin Method DRO)
- Gasoline Range Organics (GRO – Wisconsin Method GRO)
- Volatile organic compounds (VOCs - United States Environmental Protection Agency [EPA] Method 8260B)
- Polycyclic Aromatic Hydrocarbons (PAHs - (EPA Method 8270D by SIM)
- Resource Conservation and Recovery Act (RCRA) 8 Metals (EPA Methods 7471A/6010B)

Groundwater sample analytes included:

- DRO (Wisconsin Method DRO)
- GRO (Wisconsin Method GRO)

- VOCs (EPA Method 8260)

Soil vapor analytes included:

- VOCs (EPA Method TO-15)

3.2 Notes on Analytical Methods

The following descriptions provide background information and terminology for DRO, GRO, and benzo(a)pyrene (BaP) equivalents. Also included is a discussion of common laboratory contaminants under VOC and Semi-Volatile Organic Compounds (SVOC) analyses of which PAH analyses is a sub-set.

3.2.1 DRO

The Wisconsin DRO Method is designed to measure mid-range petroleum products such as diesel or fuel oil. This method provides gas chromatographic conditions for the detection of semi-volatile petroleum fractions such as diesel, fuel oil #2, or kerosene. DRO analysis includes hydrocarbons within the range of C10 – C28 and a boiling point range between approximately 170°Celsius I and 430°C. Quantitation is based on a direct comparison of the total area within this range to the total area of the Diesel Component Standard. As defined in the method, other organic compounds, including chlorinated hydrocarbons, phenols, phthalate esters, PAHs, kerosene, fuel oils and heavier oils are measurable within the range of C10 – C28. DRO results may include these compounds/products. Components greater than C28 present in products such as motor oils or lubricating oils are detectable under the conditions of the method (Wisconsin DNR, September 1995).

3.2.2 GRO

The Wisconsin GRO Method is designed to measure the concentration of GRO in water and soil. GRO analysis includes hydrocarbon within the range of C6 – C10 and a boiling point range between approximately 60°C and 220°C. All the chromatographic response falling between the onset of the methyl-tertiary-butyl ether peak and the conclusion of the naphthalene peak is measured with the GRO window. Quantitation is based on a direct comparison of the total area within this range to the total area of the Gasoline Component Standard.

As defined in the method, other organic compounds including chlorinated solvents, ketones, ethers, mineral spirits, Stoddard solvents, and naphthas are measurable within the range of C6 – C10. High levels of heavier petroleum products such as diesel fuel may contain some volatile components producing a response within the retention time range for GRO. As defined in the method, results for GRO include petroleum fractions such as gasoline, Stoddard solvent, or mineral spirits as well as other measurable organic compounds such as chlorinated solvents, ketones, and ethers (Wisconsin DNR, September 1995 [a]).

3.2.3 BaP Equivalents

The MPCA uses Potency Equivalency Factors (PEFs) to evaluate toxicity and to assess risks of carcinogenic PAHs. A PEF is a relative estimate of toxicity of chemical compared to a reference chemical. BaP was chosen as a reference chemical for carcinogenic PAHs because its toxicity is well characterized. A table developed by the MPCA used to calculate BaP equivalents is used in this report. Per MPCA recommendation, “zero” is used for non-detected analytes in the BaP calculation (MPCA, April 2022).

3.2.4 Common Laboratory Contaminants

In the process of having samples prepared and tested in a laboratory, contaminants may be introduced in the process resulting in false positive results for select organic compounds (EPA, November 2020). These compounds may be introduced into the sample by several different means including, but not limited to, laboratory cleaning methods and sample preparation procedures. If detected in samples, these compounds should be compared to corresponding blank sample results to ensure that the compound detected is a valid detection.

3.3 Quality Assurance/Quality Control

Eurofins is a Minnesota-certified laboratory and has a current Quality Assurance/Quality Control (QA/QC) manual on file with the Minnesota Department of Health (MDH) and the MPCA. A Case Narrative is attached near the beginning of each laboratory report (**Appendix B**). The QA/QC report includes:

- General information
- Hold time
- Sample preparation
- Initial calibrations
- Continuing calibrations
- Surrogates
- Method blanks
- Laboratory control spikes
- Matrix spikes
- Duplicate samples
- Additional comments

Samples were received in acceptable condition with the following exceptions:

- Trip blanks associated with the soil and groundwater samples collected from soil borings B-01 through B-08 were broken in transport and could not be analyzed.
- VOC and GRO aliquots for the groundwater samples were collected in appropriately preserved sampling vials; however, pH was outside of the required criteria upon receipt. The higher pH is possibly due to sediment in the sample, which can buffer the acid preservative. The samples were analyzed within the 7-day holding time for unpreserved samples; therefore, sample results are considered usable.
- Headspace was observed in the container for VOC analyses for sample B-02W (8.50) and in the containers for GRO analyses in samples B-02W (8.50) and B-08W (9.00) and may have been caused by effervescent between the acid preservative and sediment in the sample; therefore, sample results may be biased low.

Samples were analyzed within the method required holding times.

The following observations are provided regarding the analytical results:

- Surrogate recovery for the PAH aliquot for sample HA-1 (1.5-2) was greater than the percent recovery limits and indications of matrix interference were observed; therefore, PAH results for sample HA-1 (1.5-2) may be biased high.
- The concentrations of analytes detected in the soil vapor samples at concentrations above the method detection limit but below the method reporting limit are considered estimates and are qualified with a "J".
- Several analytes were detected in the method blank associated with the soil vapor samples. The concentrations of VOCs detected in the method blank were above the method detection limit but below the method reporting limit. The concentrations of VOCs detected in the investigative samples, which were also detected in the method blank, were at least two times higher than those detected in the blank. Concentrations of VOCs detected in the investigative samples, which were also detected in the blank, may be biased high; however, detected concentrations of VOCs were well below regulatory criteria and the data is considered usable.

Eurofins reviewed the data packages for the samples for quality and completeness and approved the data for review.

3.4 Regulatory and Guidance Levels

To evaluate the magnitude of impacts, MPCA, MDH, and EPA regulatory levels and guidelines, where established, are compared to analytical results for detected chemicals.

3.4.1 Soil

Soil results are compared to MPCA Residential/Recreational Soil Reference Values (SRVs), Industrial/Commercial SRVs, Screening Soil Leaching Values (SLVs), and MPCA unregulated fill criteria (UFC).

3.4.1.1 Soil Reference Values

Revised Residential/Recreational and Commercial/Industrial SRVs were published by the MPCA in March 2023 and are incorporated into this report (MPCA, March 2023). The MPCA SRVs are intended to be risk-based screening values and were derived using methodology from the EPA's Superfund Program, exposure parameters based on land use categories, contaminants toxicity values, and a contaminant's chemical-specific parameters.

3.4.1.2 Screening Soil Leaching Values

The MPCA has established SLVs that provide a conservative estimate of whether groundwater contaminant concentrations could result from leaching to groundwater from contaminated soils in direct contact with groundwater. The current Screening SLVs were established in 2013 (as discussed in MPCA Guidance Document c-r1-04 [MPCA, May 2013]) and are referenced in the MPCA Guidance Document c-rem1-01, Best Management Practices for the Off-Site Reuse of Unregulated Fill (MPCA, February 2012).

3.4.1.3 MPCA Unregulated Fill Criteria

The MPCA has defined limits for DRO and GRO of 100 milligrams per kilogram (mg/kg) in soil in MPCA Guidance Document c-rem1-01, Best Management Practices for the Off-Site Reuse of Unregulated Fill (MPCA, February 2012). The guidance document defines soil that meets these

limits, is free from solid waste, debris, asbestos-containing material (ACM), visual staining and odors, and has organic vapors less than 10 parts per million (ppm) (measured using a PID) is considered unregulated fill. ACM is material containing greater than 1% asbestos, as defined in Minnesota Statutes, Section 326.71, Subdivision 3. To assess the potential for unregulated off-site use of excess excavated material from the project, Phase II ESA results are evaluated using this guidance.

3.4.1.4 Notes on Regulatory Levels for Metals in Soil

In some cases, naturally occurring metals in soil are present and often exceed the action levels set in the MPCA Screening SLVs, Residential/Recreational SRVs and/or Commercial/Industrial SRVs.

The following table summarizes the generalized naturally occurring levels of metals in soil as defined by the EPA and MGS in mg/kg or ppm in comparison the MPCA Screening SLVs and current SRVs. The common range and average values reported by the EPA Office of Solid Waste and Emergency Response, *Hazardous Waste and Land Treatment* (EPA, April 1983). The EPA values summarized below are generalized ranges throughout the United States. Variations occur across soil types and parent material (EPA, April 1983).

The MGS more recently released a study titled *Minnesota Soil, Till, and Ground-Water Geochemical Data* (MGS, 2009). This study assembled three geochemical data sets for soil and groundwater as a basis for an atlas that provides an overview of geochemical patterns, and a reference that places more thorough environmental geochemical surveys into a context. Data contributed were derived from soil, soil parent material, and well water samples.

The MPCA has also published a *Background Threshold Values (BTV) Evaluation* (MPCA, April 2021). The 2021 BTVs are depicted below. Soil and/or groundwater geochemistry data in the vicinity of the project corridor, where applicable, are compared to analytical results in **Section 4**.

Analyte	Common Range (EPA)	Average (EPA)	2021 MPCA BTV	Parent Material (2009 MGS)	Soil (2009 MGS)	2023 MPCA Res/Rec SRVs	2023 MPCA Com/Ind SRV	MPCA Screening SLVs
Arsenic	1-50	10	9	1.7-26	0.3-85	9	9	5.8
Barium	100-3000	430	210	250-690	125-852	260	41000	1700
Cadmium	0.01-0.7	0.06	-	0.03-1.13	1-2	1.6	23	8.8
Chromium	1-1000	100	27	18-183	4.5-458	2.3 / 23000*	62 / 10000*	36 / 1000000000*
Lead	2-200	10	-	5.7-86.7	2-84	200	460	2700
Mercury	0.01-0.3	0.03	-	2-8.9	0.01-0.2	2.7	3.1	3.3

All units reported in mg/kg or ppm

*Total Chromium does not have an established MPCA regulatory limit. Chromium III and VI SRVs are depicted.

^Total Chromium value depicted except for MPCA SLVs and 2021 MPCA SRVs.

The MPCA BTV Evaluation was established using only soil samples from the upper 0 to 2 inches from the surface as their determination was that likeliness of exposure is the greatest near the surface. The MPCA BTV Evaluation states site specific BTVs should be established if an

exposure concern is at depths deeper than 2 inches. Specific to arsenic, concentrations varied across the state and higher concentrations were present generally in the southern portion of the state. The evaluation concludes that “a reasonable statewide default BTV for arsenic is 9 mg/kg”. The MPCA defined Residential/Recreational SRV and Commercial/Industrial SRV for arsenic at 9 mg/kg. The MPCA also previously defined the SLV for arsenic at 5.8 mg/kg.

3.4.2 Groundwater

Groundwater results are compared to MDH Health Based Guidance (HBGs) that have been established to evaluate drinking water. These values include Health Risk Limits (HRLs), Health Based Values (HBVs), and Risk Assessment Advice (RAA) levels. The MDH developed guidance (published in November 2018) for petroleum contaminated drinking water wells which supersedes guidance of total petroleum hydrocarbons (TPH) criteria developed in 2000. Petroleum products contain many chemicals and drinking water criteria are available for only a small fraction of them. This guidance provides a margin of safety in situations where drinking water is contaminated with petroleum residuals that do not exceed individual chemical criteria. The MDH recommends a RAA of 50 micrograms per liter (ug/L) TPH which is based on a pyrene surrogate. The MDH guidance indicates that the DRO and GRO values should be added and other volatile petroleum concentrations should be subtracted from the cumulative total. For the purpose of this Phase II Environmental Investigation, these values are used as a proxy for evaluating the chemicals detected in groundwater. A simplified approach of using 50 ug/L as the MDH HBG for DRO and GRO without the calculation and subtraction is being utilized. It should also be noted that reporting limits for this project are greater than 50 ug/L for DRO and GRO (MDH, November 2018).

The National Pollutant Discharge Elimination System (NPDES) general permit (MNG790000) identifies discharge limits for contaminated groundwater discharges. The general permit regulates the discharge of groundwater extracted at cleanup and redevelopment sites. This includes discharges which have been contaminated by past or present activities, from both known and unknown sources of contamination. General Permit Limits (GPLs) are used in this report as a comparison for groundwater contaminant concentrations.

The EPA Maximum Contaminant Level (MCL) is defined as the highest level of a contaminant that is allowed in drinking water. Additionally, the level of a contaminant in drinking water in which there is no known or expected risk to health is known as Maximum Contaminant Level Goal (MCLG). MCLs are set as close to MCLGs as feasible considering variables such as available treatment and cost. MCLGs allow for a margin of safety and are non-enforceable public health goals while MCLs are enforceable standards.

The MDH HBGs, NPDES GPLs, and EPA MCL are used as a proxy for evaluating the chemicals detected in groundwater; however, for construction purposes the treatment limits for groundwater dewatering discharge would be established in the individually issued discharge permit for the project. Results for this project are compared to both MDH HBGs and NPDES GPLs on **Table 3**.

3.4.3 Soil Vapor

Soil vapor results were compared to the Intrusion Screening Values (ISVs). The ISVs were developed by the MPCA in coordination with the MDH to be used as screening values in evaluating risks posed by the volatile compounds in indoor air (MPCA, January 2021). The potential for indoor air to be impacted by soil vapor intrusion can also be assessed using the ISVs. Per MPCA guidance, soil vapor results should be compared to 33 times (33X) the ISVs to

assess vapor intrusion risk when a competent floor is present (MPCA, January 2021 [a]). Soil vapor concentrations greater than 33x the ISV indicate a higher potential for risk associated with vapor intrusion, and a site with contaminants greater than 33x the ISV could require mitigation of soil vapor to limit the potential for vapors to enter the building. For certain compounds, the MPCA has also established Expedited ISVs (EISVs), and in the event contaminant concentrations exceed 33x the EISV or in the event concentrations of trichloroethene exceed 33x the ISV and a pregnant woman is present, expedited action (i.e., within 30 days of receipt of laboratory data) may be necessary.

3.4.4 Regulatory Levels vs. Laboratory Reporting Limits

Tables of analytical results attached to this report include only detected parameters. In some cases, laboratory reporting limits are greater than the regulatory limits. If a parameter is not detected above the reporting limit in any sample, the parameter is not included on the attached tables. In most cases, the elevated reporting limit is due to sample dilution (required by high level of target, non-target analytes or matrix interferences) so the reporting limits exceed regulatory levels for other parameters.

4 Phase II Investigation Results

As part of the Phase II ESA, SEH advanced eight, exterior soil borings to depths ranging from 13 to 15 feet bgs to collect soil and groundwater samples. Two hand auger borings were also advanced to 2 feet bgs to collect soil samples from below the floor slab in the shop area. In addition, four sub-slab soil vapor samples were collected by installing vapor pins through the building floor slab. **Figure 2** depicts boring and sample locations. **Figure 3** summarizes the soil, soil vapor and groundwater data. A summary of the boring depths, soil types, sampling intervals and results is provided on **Table 1**. PID soil headspace readings and other field indications of contamination are summarized on **Table 2**. Detected soil and groundwater sample analytical results are summarized on **Table 3** and **Table 4**, respectively. Soil vapor results are summarized on **Table 5**. Boring logs and laboratory reports are included as **Appendix A** and **Appendix B**, respectively.

4.1 Geologic, Hydrogeologic, and Field Screening Results

Fill soils were encountered from the ground surface to depths ranging from 2 to 5 feet and generally consisted of silty sand with gravel, clayey sand with gravel, and silt. Native soils beneath fill soils extended to the termination depths of each of the borings. Native soils generally consisted of silt and sandy lean clay interbedded with poorly graded sand and silty sand.

PID headspace readings were recorded between 0.0 to 1.9 ppm, within background levels. No visual or olfactory indications of contamination in the soil samples were observed.

PID readings in sub-slab soil vapor samples were generally within background levels with the exception of one PID reading of 8.6 ppm detected at sample locations SSV-03, which was located in the shop area of the Subject Property Building. Concentrations of VOCs detected in the soil vapor sample collected at this location did not exceed 33x the Commercial/Industrial ISVs – the concentration at which vapor mitigation would be needed for the proposed project; however, the concentration of tetrachloroethene detected in SSV-03 exceeded 33 times the Residential ISV. PID soil headspace readings are summarized on **Table 1 and Table 2**.

Groundwater was encountered in five of the eight borings with depths to groundwater ranging from 8.5 to 9.67 feet bgs. Depths to groundwater are recorded on boring logs (**Appendix A**). No visual or olfactory indications of contamination in groundwater were observed.

4.2 Results of Subsurface Investigation

4.2.1 Soil Analytical Results

Eight soil borings (B-01 through B-08) and two hand augers (HA-1 and HA-2) were completed throughout the project area and ten soil samples were collected for chemical analyses. In soil borings, one soil sample for chemical analyses was collected from the upper six feet with sampling intervals targeted to zones where indications of contamination were observed, if applicable, to evaluate potential impacts in soil that will likely be excavated during redevelopment. Hand auger samples were collected from the base depth of the hand auger.

DRO was detected in HA-1 (1.5-2) at 570 mg/kg, exceeding the UFC of 100 mg/kg. BaP in HA-1 (1.5-2) was detected at 12.1 mg/kg, exceeding the Screening SLV.

The BaP equivalents in HA-1 (1.5-2) were detected at 17.32 mg/kg, exceeding the Residential/Recreational SRV and Screening SLV.

With the exception of chromium, metals, PAHs, and VOCs were detected in samples at levels below regulatory criteria. GRO was not detected at concentrations greater than the reporting limits.

Total chromium exceeded the Residential/Recreational SRV for hexavalent chromium (2.3 mg/kg) and/or the Screening SLV for hexavalent chromium (36 mg/kg) but not the Residential/Recreational SRV for trivalent chromium (23,000 mg/kg) or the Screening SLV for trivalent chromium (1,000,000,000). In addition, the concentration of total chromium detected (22.4 to 35.3 mg/kg) is similar to the concentration considered by MPCA to be representative of naturally occurring conditions (27 mg/kg). Hexavalent chromium is not naturally occurring and is associated with specific industrial sources, which are not associated with the Subject Property. Because it is unlikely that any, much less all, of the chromium in the sample is hexavalent chromium, the chromium detected is not attributable to a release and is not considered a contaminant of concern for the Subject Property.

4.2.2 Groundwater Analytical Results

Five groundwater samples (B-01W (9.67), B-02W (8.50), B-06W (8.75), B-07W (9.10), and B-08W (9.00)) were collected from the borings to evaluate groundwater conditions across the Subject Property.

DRO was detected at 442 ug/L in B-01W (9.67), exceeding the MDH HBG and NPDES GPL. DRO was also detected at lower concentrations in B-02W (8.50) (109 ug/L), B-07W (9.10) (155 ug/L), and B-08W (9.00) (198 ug/L) at levels exceeding the MDH HBG but below the NPDES GPL. Trichloroethene was detected in B-01W (9.67) at 5.62 ug/L, exceeding the EPA MCL and the MDH HBG.

4.2.3 Soil Vapor Analytical Results

Four sub-slab vapor samples were collected inside the building on the Subject Property (SSV-01 through SSV-04).

No exceedances relative to 33 times the Commercial/Industrial ISVs were detected in sub-slab vapor samples.

5 Conclusions and Recommendations

Short Elliott Hendrickson Inc. (SEH®) was retained by the Duluth Airport Authority to conduct a Phase II ESA of Site 6 for the proposed air traffic control tower at the Duluth International Airport. Site 6 consists of portions of Parcel ID Numbers: 010-0148-00200 (4913 Airport Road), 010-0148-00080 (4550 Stebner Road), and 010-0148-00020 and is generally located north of the intersection of Airport and Stebner Roads in Duluth, Minnesota.

This investigation was performed for the following purposes.

- To evaluate if RECs identified by the Phase I ESA recently completed for the Subject Property by FAA have impacted soil, soil vapor or groundwater.
- To evaluate if nearby former FUDS operations have impacted the Subject Property.
- To obtain data needed to prepare a RAP for the project, if needed.

As part of the Phase II ESA, SEH advanced eight, exterior soil borings and two hand augers within the Subject Property building to collect soil and groundwater samples. Four sub-slab soil vapor pins were also installed through the building floor slab to collect soil vapor samples.

Fill soils were encountered from the ground surface to depths ranging from 2 to 5 feet and generally consisted of silty sand with gravel, clayey sand with gravel, and silt. Native soils beneath fill soils extended to the termination depths of each of the borings. Native soils generally consisted of silt and sandy lean clay interbedded with silty sand with gravel and poorly graded sand. Groundwater was encountered in five of the eight soil borings at depths ranging from 8.5 to 9.67 feet bgs.

Indications of contamination, including PID readings greater than background, were not observed in the soil and groundwater samples. A slightly elevated PID reading was recorded in soil vapor sample SSV-03, which was located in the shop area of the Subject Property Building. Concentrations of VOCs detected in the soil vapor sample collected at this location did not exceed 33x the Commercial/Industrial ISVs – the concentration at which vapor mitigation would be needed for the proposed project; however, the concentration of tetrachloroethene detected in SSV-03 exceeded 33 times the Residential ISV.

Based on the analytical testing results, DRO- and PAH-impacted soil was identified below the building floor slab in the shop area. Impacted soil relative to regulatory criteria was not identified outside of the building footprint at the Subject Property.

DRO and trichloroethene were detected in the groundwater sample collected from B-01W (9.67) on the north-central portion of the Subject Property, cross-gradient to the Subject Property building, at concentrations exceeding drinking water criteria. Lower concentrations of DRO (i.e., 109 to 198 ug/L), which don't necessarily indicate a release has occurred were at other locations on the subject Property.

No exceedances relative to 33 times the Commercial/Industrial ISVs were detected in sub-slab vapor samples.

Recommendations

Based on the Phase II ESA, SEH recommends the following:

- To further evaluate if vapor intrusion is a concern for the Subject Property, a second round of soil vapor testing should be conducted in accordance with MPCA Best Management Practices during the non-heating season (i.e., from April to October).
- Prior to redevelopment of the Subject Property, the project should be enrolled in the MPCA VIC Program and the Petroleum Brownfields Program (PBP) to request the appropriate approvals and liability assurances including a Retroactive No Association Determination for the Identified Release in soil vapor and groundwater at the Subject Property (i.e., trichloroethene and tetrachloroethene). Please note because the tenant at the Subject Property likely caused or contributed to the impacts detected below the floor slab, the Duluth Airport Auth would not be eligible for a Retroactive No Association Determination for the PAH impacts to soil.
- A RAP should also be prepared and submitted for VIC Program and PBP for review and approval prior to the start of construction. The RAP will describe the proposed project, identify the various parties involved with the project, outline the procedures that will be used to manage soil and groundwater impacts that will be encountered during construction. The RAP should also include contingencies that will be implemented in the event previously unidentified conditions are encountered such as underground storage tanks, potential asbestos-containing materials or contamination that differs from that encountered during the Phase II ESA.
- During construction, environmental monitoring as outlined in the RAP should be conducted to document the field conditions and response actions that are implemented.
- Following construction, a RAP Implementation Report should be prepared and submitted to the MPCA to request approval of response actions, a No Further Action Determination and approval of response actions, as appropriate.

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Tables

Table 1 – Sampling Location Summary
Table 2 – Photoionization Detector Field Screening Results
Table 3 – Soil Analytical Results
Table 4 – Groundwater Analytical Results
Table 5 – Soil Vapor Analytical Results

Abbreviations and Descriptions

Abbreviations:

BaP - Benzo(a)pyrene equivalent
BRL - No detections above laboratory reporting limits
BTEX - Benzene, toluene, ethylbenzene, and xylenes
DRO - Diesel Range Organics
EOB - End of Boring
EPA - Environmental Protection Agency
ft bgs - feet below ground surface
GW - groundwater
GP - GeoProbe boring
GPL - General Permit Limits
GRO - Gasoline Range Organics
HBG - Health Based Guidance
MDA - Minnesota Department of Agriculture
MDH - Minnesota Department of Health
SS - Surface Sample
SVOC - Semi-Volatile Organic Compounds
MPCA - Minnesota Pollution Control Agency
mg/kg - milligrams per kilogram
ug/L - micrograms per liter
<x - indicates analyte concentration not detected above the laboratory reporting limit
MCL - Maximum Contaminant Level
NC - Non Carcinogenic
NM - analysis not performed
NPDES - National Pollutant Discharge Elimination System
PAH - Polycyclic Aromatic Hydrocarbon
PCB - Polychlorinated biphenyl
PID - Photoionization Detector
ppm - parts per million
RCRA - Resource Conservation and Recovery Act
SIM - Selected Ion Monitoring
SLV - MPCA Screening Soil Leaching Values
SP - State Project
SRV - MPCA Soil Reference Values
SVOC - Semi Volatile Organic Compound
TCLP - Toxicity Characteristic Leaching Procedure
TO - Geotechnical boring
TP - Test Pit
UFC - MPCA Unregulated Fill Criteria
UTM - Universal Tranverse Mercator
VOC - Volatile Organic Compounds

Lab Report Qualifiers:

Exceeds DRO/GRO MPCA UFC	DRO/GRO Exceeds MPCA UFC
Exceeds 2013 Screening SLV	Screening SLV - MPCA Screening Soil Leaching Values
Exceeds Residential/Recreational SRV	Minnesota Pollution Control Agency (MPCA) Soil Reference Values for Residential/Recreational properties
Exceeds Commercial/Industrial SRV	MPCA Soil Reference Values for Commerical/Industrial properties
NPDES Discharge General Permit Limits	NPDES Discharge General Permit Limits MNG790000 (surface waters designated as drinking water)
Exceeds 2023 MDH HBG	MDH HBG - Minnesota Department of Health (MDH) Health Based Guidance (HBGs) for drinking water
Exceeds EPA MCLs	EPA MCLs - Environmental Protection Agency (EPA) Maximum Concentration Levels (MCLs) for drinking water
Residential 33X ISVs	Residential 33x Intrusion Screening Values (MPCA)
Residential 33X EISVs	Residential 33x Expedited Intrusion Screening Values (MPCA)
Commercial Industrial 33x ISVs	Commercial/Industrial 33x Intrusion Screening Values (MPCA)
Commercial Industrial 33x EISVs	Commercial/Industrial 33x Expedited Intrusion Screening Values (MPCA)

Notes:

Sample ID is listed as: investigation type - identification number - depth
All depths are reported in feet below ground surface (bgs) and listed after the boring identification number

Soil analytical methods include:

Diesel Range Organics by Wisconsin Method DRO
DRO Silica Gel Cleanup by WIDRO GCS Silica Gel
Gasoline Range Organics by Wisconsin Method GRO
Volatile Organic Compounds (VOCs) by EPA Method 8260C
Low-level VOCs by EPA Method 8260D
Mercury by EPA Method 7471B
Polychlorinated Biphenyls (PCBs) by EPA Method 8082A
MDA List 1 and 2 Pesticides by EPA Method 8270D
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA Method 8270E by SIM
Resource Conservation and Recovery Act (RCRA) 8 Metals by EPA Method 7471B/6020B
Nitrate/Nitrite by EPA Method E353.2
Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270E
TCLP Lead by 6010D
Total Kjeldahl Nitrogen by EPA Method A4500-NH3 G-11
· Minnesota Department of Agriculture (MDA) List 1 Pesticides (EPA Method 8270D)

Groundwater analytical methods include:

DRO by Wisconsin Method DRO
DRO Silica Gel Cleanup by WIDRO GCS Silica Gel
Gasoline Range Organics by Wisconsin Method GRO
GRO by Wisconsin Method GRO
VOC by EPA Method 8260C
Low-level VOCs by EPA Method 8260D
SVOCs by EPA Method 8270E
PCBs by EPA Method 8082A
RCRA 8 Metals by EPA Method 7471/6010B (field filtered)
Mercury by EPA Method 7470A
MDA List 1 Pesticides by EPA Method 8270D

Soil Vapor analytical methods include:

VOCs vy TO-15

Table 1
Sampling Locations Summary
Phase II ESA
Hangar 101
Duluth, Minnesota

Boring ID	Total Boring Depth (ft bgs)	Field Notes (EOB=Boring Termination Depth)	Maximum PID Reading	Sample Depth(s) (ft bgs) s - soil, w - groundwater, v - vapor	Depth to Groundwater Recorded While Drilling (feet bgs)	Soil Analytical Summary (mg/kg)	Groundwater Analytical Summary (ug/L)	Vapor Analytical Summary (ug/m3)
B-01	15.0	Sandy lean clay (SC) fill to 5.0 ft bgs. Silty sand (SM) and sandy lean clay (SC) glacial till to EOB.	0.2	5-6s, 9.67w	9.67	All below MPCA UFC, SLVs, SRVs.	(9.67w) DRO - 442 > MDH HBG and NPDES GPL; 1,2,4-Trimethylbenzene - 5.62 > EPA MCL, MDH HBG, and NPDES GPL	NM
B-02	15.0	Gravelly silt (ML) fill to 5.0 ft bgs. Clayey sand with gravel (SC), gravelly silt (ML), and poorly graded sand (SP) glacial till to EOB.	0.6	3-4s, 8.50w	8.50	All below MPCA UFC, SLVs, SRVs.	(8.50w) DRO - 109 > MDH HBG	NM
B-03	15.0	Silty sand with gravel (SM) fill to 5.0 ft bgs. Clayey sand with gravel (SC) glacial till to EOB.	0.3	1.5-2.5s	Groundwater not encountered	All below MPCA UFC, SLVs, SRVs.	No groundwater sample	NM
B-04	15.0	Clayey sand with gravel (SC) fill to 2.0 ft bgs. Gravelly silt (ML), poorly graded sand (SP), and gravelly silt with sand (ML) glacial till to EOB.	1.9	2-3s	Groundwater not encountered	All below MPCA UFC, SLVs, SRVs.	No groundwater sample	NM
B-05	13.0	Silty sand with gravel (SM) fill to 5.0 ft bgs. Clayey sand with gravel (SC) glacial till to EOB.	0.2	1.5-2.5s	Groundwater not encountered	All below MPCA UFC, SLVs, SRVs.	No groundwater sample	NM
B-06	13.0	Sandy silt with gravel (ML) fill to 5.0 ft bgs. Clayey sand with gravel (SC), gravelly silt with sand (ML), and silty sand with gravel (SM) glacial till to EOB.	0.3	5-6s, 8.75w	8.75	All below MPCA UFC, SLVs, SRVs.	All below EPA MCLs, NDPES GPLs and MDH HBGs	NM
B-07	15.0	Clayey sand with gravel (SC), poorly graded sand (SP), and gravelly silt with sand (ML) fill to 5.0 ft bgs. Gravelly silt with sand (ML), clayey sand with gravel (SC), poorly graded sand with gravel (SP), and gravelly silt with sand (ML) glacial till to EOB.	0.8	2.5-3.5s, 9.10w	9.10	All below MPCA UFC, SLVs, SRVs.	(9.10w) DRO - 155 > MDH HBG	NM
B-08	14.0	Silty sand with gravel (SM) fill to 5.0 ft bgs. Clayey sand with gravel (SC) and silty sand with gravel (SM) glacial till to EOB.	0.3	3-4s, 9.00w	9.00	All below MPCA UFC, SLVs, SRVs.	(9.00w) DRO - 198 > MDH HBG	NM
HA-1	2.0	Concrete slab to 0.5 ft bgs. Poorly graded sand (SP) fill to EOB.	0.1	1.5-2s	Groundwater not encountered	(1.5-2s) DRO - 570 > UFC; BaP - 12.1 > SLV; BaP Equiv. - 17.32 > Rec. SRV	No groundwater sample	NM
HA-2	2.0	Concrete slab to 0.5 ft bgs. Poorly graded sand (SP) fill to EOB.	0.1	1.5-2s	Groundwater not encountered	All below MPCA UFC, SLVs, SRVs.	No groundwater sample	NM
SSV-01	n/a	n/a	2.5	n/a	Groundwater not encountered	NM	NM	All below Commercial/Industrial 33x ISVs
SSV-02	n/a	n/a	2.1	n/a	Groundwater not encountered	NM	NM	All below Commercial/Industrial 33x ISVs

Table 1
Sampling Locations Summary
Phase II ESA
Hangar 101
Duluth, Minnesota

Boring ID	Total Boring Depth (ft bgs)	Field Notes (EOB=Boring Termination Depth)	Maximum PID Reading	Sample Depth(s) (ft bgs) s - soil, w - groundwater, v - vapor	Depth to Groundwater Recorded While Drilling (feet bgs)	Soil Analytical Summary (mg/kg)	Groundwater Analytical Summary (ug/L)	Vapor Analytical Summary (ug/m3)
SSV-03	n/a	n/a	8.6	n/a	Groundwater not encountered	NM	NM	All below Commercial/Industrial 33x ISVs
SSV-04	n/a	n/a	3.9	n/a	Groundwater not encountered	NM	NM	All below Commercial/Industrial 33x ISVs

For a full list of table acronyms, see the glossary

SEH

Table 2
Photoionization Detector Results
Phase II ESA
Hangar 101
Duluth, Minnesota

Depth	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	HA-1	HA-2
0 to 2	0.1	0.6	0.2	0.1	0.1	0.1	0.1	0.0	0.1, 0.1	0.1, 0.0
2 to 4	-	0.3	-	0.4	0.2	-	0.8	0.1		
4 to 6	0.2	0.4	0.2	1.9	0.2	0.3	0.4	0.3		
6 to 8	0.2	0.1	-	0.1	0.1	-	0.1	0.1		
8 to 10	▽ -	0.2	0.3	0.2	-	-	▽ -	▽ -		
10 to 12	0.1	0.1	-	-	0.1	0.1	0.0	0.1		
12 to 14	-	-	-	-	-	-	0.1	-		
14 to 16	-	-	-	-						

Notes:

▽ Water table (recorded at time of drilling)

For a full list of acronyms, see the table glossary

Table 3
Soil Analytical Results
Phase II Environmental Site Assesment
Hangar 101
Duluth, Minnesota

					Push-Probe Borings								Hand Augers	
Boring ID	Units	*Screening SLV (2014)*	Residential and Recreational Chronic SRV	**Commercial and Industrial Chronic SRV**	**B-01**	**B-02**	**B-03**	**B-04**	**B-05**	**B-06**	**B-07**	**B-08**	**HA-1**	**HA-2**
Field Sample ID					B-01 (5-6)	B-02 (3-4)	B-03 (1.5-2.5)	B-04 (2-3)	B-05 (1.5-2.5)	B-06 (5-6)	B-07 (2.5-3.5)	B-08 (3-4)	HA-1 (1.5-2)	HA-2 (1.5-2)
Laboratory ID					310-250925-9	310-250925-10	310-250925-7	310-250925-8	310-250925-6	310-250925-12	310-250925-11	310-250925-13	310-250462-1	310-250462-2
Sample Date					3/6/2023	3/6/2023	3/6/2023	3/6/2023	3/6/2023	3/6/2023	3/6/2023	3/6/2023	2/27/2023	2/27/2023
Diesel Range Organics (DRO) and Gasoline Range Organics (GRO)														
Diesel Range Organics	mg/kg	The MPCA UFC for DRO is <100 mg/kg			<5.15	<5.94	<5.36	<6.18	<6.59	<4.60	<3.93	<5.43	570	28.5
Gasoline Range Organics	mg/kg				<11.9	<11.3	<9.68	<11.4	<12.2	<11.0	<11.4	<9.72	<10.4	<9.69
Metals														
Arsenic	mg/kg	5.8	9	9	2.49	3.38	3.05	2.99	2.90	2.02	1.97	2.59	2.74	2.56
Barium	mg/kg	1700	260	41000	57.2	67.5	52.3	54.2	52.6	40.6	46.6	51.6	48.3	42.1
Chromium (Total)*	mg/kg	36 / 1000000000	2.3 / 23000	62 / 100000	28.6	29.4	27	25.7	32.4	22.7	26.7	35.3	33	22.4
Lead	mg/kg	2700	200	460	5.72	11.9	7.10	5.11	6.52	5.98	5.22	4.72	6.61	4.26
Mercury	mg/kg	3.3	2.7	3.1	<0.0218	<0.0217	0.0195	<0.0194	<0.0208	<0.0203	<0.0214	<0.0196	<0.0176	<0.0193
Selenium	mg/kg	2.6	78	1200	<1.61	<1.36	<1.56	<1.37	1.50	<1.33	<1.38	<1.56	1.50	1.29
Semi-VOCs														
Acenaphthene	mg/kg	81	460	6800	<0.0118	<0.0573	<0.0102	<0.0111	0.0525	0.0135	<0.0107	<0.0108	3.99	0.157
Acenaphthylene	mg/kg	-	-	-	<0.0118	<0.0573	<0.0102	<0.0111	<0.0113	<0.0106	<0.0107	0.0138	<0.543	<0.0523
Anthracene	mg/kg	1300	2800	42000	<0.0118	<0.0573	<0.0102	<0.0111	0.0513	0.0194	<0.0107	0.0361	6.29	0.233
Benz(a)anthracene	mg/kg	-	-	-	<0.0118	0.116	0.0155	<0.0111	0.117	0.0536	<0.0107	0.0922	12.6	0.505
Benzo(a)pyrene	mg/kg	1.4	-	-	<0.0118	0.126	0.0155	<0.0111	0.114	0.0502	<0.0107	0.0691	*12.1*	0.473
Benzo(b)fluoranthene	mg/kg	-	-	-	<0.0118	0.198	0.0224	<0.0111	0.147	0.0639	0.0107	0.0876	15.7	0.618
Benzo(g,h,i)perylene	mg/kg	-	-	-	<0.0118	0.101	<0.0102	<0.0111	0.0617	0.0284	<0.0107	0.0278	7.59	0.271
Benzo(k)fluoranthene	mg/kg	-	-	-	<0.0118	0.0736	<0.0102	<0.0111	0.0476	0.0237	<0.0107	0.0289	5.71	0.251
Chrysene	mg/kg	-	-	-	<0.0118	0.147	0.0181	<0.0111	0.120	0.0570	<0.0107	0.0761	14.7	0.570
Dibenz(a,h)anthracene	mg/kg	-	-	-	<0.0118	<0.0573	<0.0102	<0.0111	0.0149	<0.0106	<0.0107	<0.0108	1.50	0.0593
Fluoranthene	mg/kg	670	210	2700	<0.0118	0.228	0.0310	<0.0111	0.264	0.0989	0.0126	0.155	36.7	1.23
Fluorene	mg/kg	110	390	5800	<0.0118	<0.0573	<0.0102	<0.0111	0.0428	<0.0106	<0.0107	0.0254	3.26	0.125
Indeno(1,2,3-cd)pyrene	mg/kg	-	-	-	<0.0118	0.120	0.0117	<0.0111	0.0732	0.0354	<0.0107	0.0395	8.06	0.305
Phenanthrene	mg/kg	-	-	-	<0.0118	0.124	0.0199	<0.0111	0.271	0.0825	<0.0107	0.165	27.7	1.01
Pyrene	mg/kg	440	220	3200	<0.0118	0.174	0.0235	<0.0111	0.204	0.0774	<0.0107	0.115	29.5	0.977
BaP Equiv result														
Benzo(a)pyrene Equivalents	mg/kg	1.4	2	23	0.0000	0.178	0.0206	0.0000	0.1624	0.0685	0.0011	0.0948	*17.32*	0.680
VOCs														
1,2,4-Trimethylbenzene	mg/kg	2.7	140	220	<0.138	<0.130	<0.105	0.274	<0.142	0.298	<0.125	0.205	<0.113	<0.106
Naphthalene	mg/kg	4.5	81	280	<0.345	<0.325	<0.263	<0.0111	<0.354	<0.305	<0.314	<0.271	0.968	<0.265
Toluene	mg/kg	2.5	820	820	<0.138	<0.130	<0.105	0.251	<0.142	<0.122	0.310	0.210	<0.113	<0.106
Xylene (Total)	mg/kg	5.4	260	260	<0.207	<0.195	<0.158	0.484	<0.213	0.185	<0.188	0.300	<0.169	<0.159

Notes:

* = Total Chromium does not have establish MPCA regulatory limits. Chromium III and VI regulatory limts are depicted.

For a full list of acronyms, see the table glossary

Table 4
Groundwater Analytical Results
Phase II ESA
Hangar 101
Duluth, Minnesota

Boring ID	Units	EPA MCL 2022	2023 MDH Health Based Guidance			MPCA NPDES General Permit Limits [MNG790000, issued 2022]			B-01	B-02	B-06	B-07	B-08
Field Sample ID			Health Based Values	Health Risk Limits	Risk Assesment Advice	Land Application (non surface water discharge)	Trout/ surface waters designated as drinking water	surface waters not designated as drinking water	B-01W (9.67)	B-02W (8.50)	B-06W (8.75)	B-07W (9.10)	B-08W (9.00)
Laboratory ID									310-250925-1	310-250925-2	310-250925-4	310-250925-3	310-250925-5
Sample Date									3/6/2023	3/6/2023	3/6/2023	3/6/2023	3/6/2023
DRO and GRO													
Diesel Range Organics	ug/l	-	-	-	50	200	200	200	442	109	<111	155	198
Gasoline Range Organics	ug/l	-	-	-	50	200	200	200	<100	<500	<500	<100	<500
VOCs													
Trichloroethene	ug/l	5	-	0.4	-	0.4	5	5	5.62	<5.00	<5.00	<1.00	<5.00
All other VOCs	ug/l	Varies	Varies	Varies	Varies	Varies	Varies	Varies	ND	ND	ND	ND	ND

Notes:

For a full list of acronyms, see the table glossary

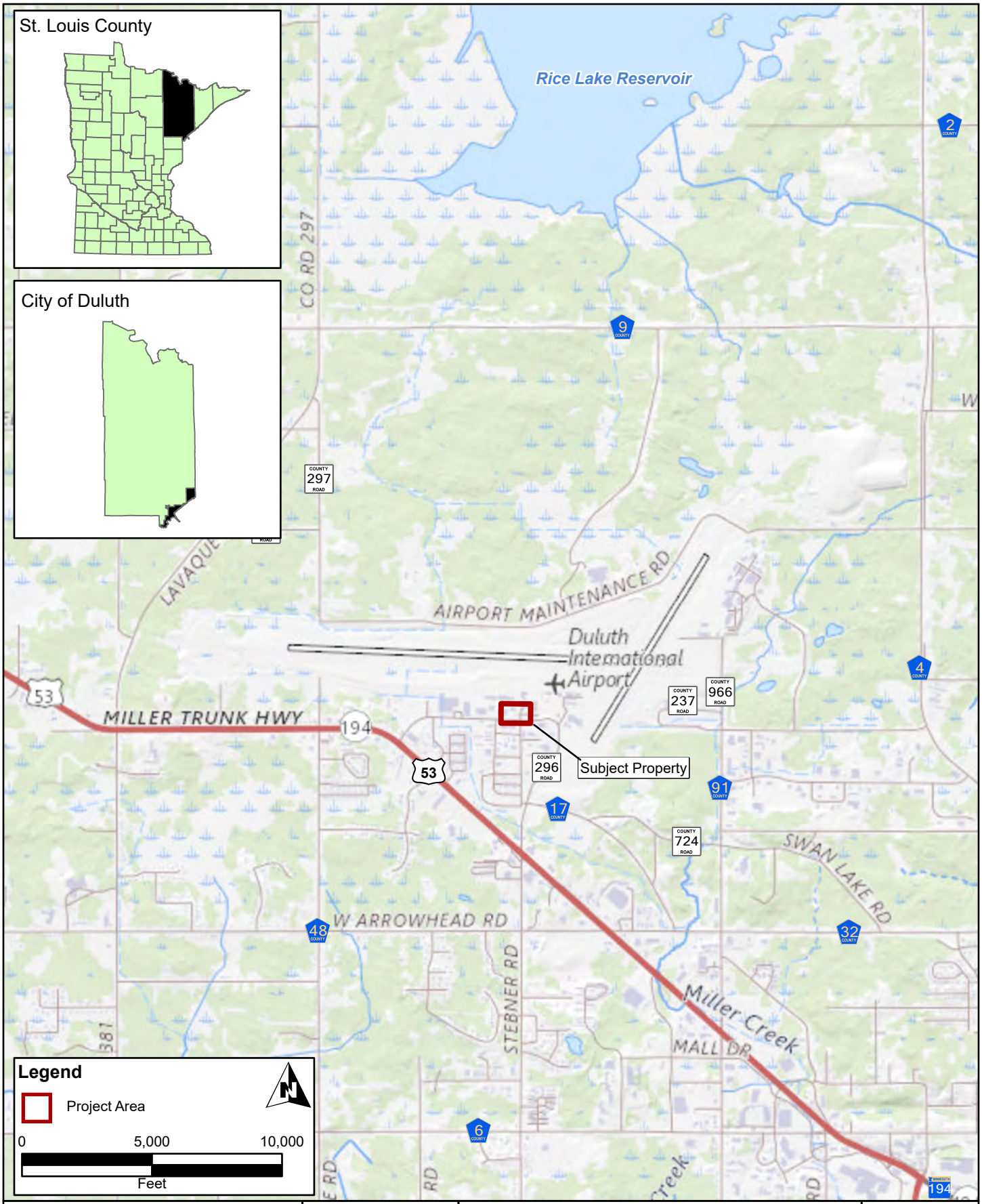
Table 5
Soil Vapor Analytical Results
Phase II ESA
Hangar 101
Duluth, Minnesota

Field Sample ID	Units	Commercial Industrial 33x ISVs	Commercial Industrial 33x EISVs	SSV-01	SSV-02	SSV-03	SSV-04
Laboratory ID				200-67180-1	200-67180-2	200-67180-3	200-67180-4
Sample Date				3/7/2023	3/7/2023	3/7/2023	3/7/2023
VOCs							
1,2,4-Trimethylbenzene	ug/m3	7000	21000	4.5 J,B	<9.8	<9.8	<9.8
Acetone	ug/m3	3700000	1.1E+07	140	170	160	340
Benzene	ug/m3	370	1100	2.8 J,B	4.8 J,B	1.9 J,B	1.8 J,B
Cyclohexane	ug/m3	700000	2100000	15 B	4.5 J,B	230 B	13 B
Ethyl alcohol (Ethanol)	ug/m3	-	-	84 J	93	80 J	63 J
Ethylbenzene	ug/m3	1300	13000	10 B	4.8 J,B	3.0 J,B	2.9 J,B
Hexane	ug/m3	83000	250000	8.0 J	4.8 J	110	7.1 J
Isopropyl alcohol	ug/m3	-	-	68 J	43 J	1900 E	110 J
m&p-Xylene	ug/m3	12000	37000	15 J,B	14 J,B	11 J,B	10 J,B
Naphthalene	ug/m3	1100	3200	29	<26	<26	<26
n-Heptane	ug/m3	47000	140000	91 B	24 B	1400 B	81 B
o-Xylene	ug/m3	12000	37000	7.0 J,B	5.5 J,B	4.6 J,B	4.1 J,B
Tetrachloroethene	ug/m3	1100	5300	43 B	17 B	98 B	290 B
Toluene	ug/m3	470000	1400000	37 B	26 B	21 B	14 B
Trichlorofluoromethane	ug/m3	120000	370000	8.0 J,B	<11	<11	<11
All other VOCs	ug/m3	Varies	Varies	ND	ND	ND	ND

Notes:
For a full list of acronyms, see the table glossary

Figures

Figure 1 – Subject Property Location
Figure 2 – Sample Locations
Figure 3 – Select Analytical Results



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3535 VADNAIS CENTER DR.
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Project: DULAI 171568
Print Date: 3/22/2023

User Name: rhawkins
Projection: UTM NAD 83 Zone 15N
Source: ESRI, MnDOT, SEH Digi, St. Louis County

Subject Property Location

Phase II Environmental Site Assessment
Site 6 - Proposed Air Traffic Control Tower
Duluth, Minnesota

Figure 1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



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Project: DULAI 171568
Print Date: 4/5/2023

User Name: rhawkins
Projection: UTM NAD 83 Zone 15N
Source: ESRI, MnDOT, SEH Digi, St. Louis County

Sample Locations

Phase II Drilling Investigation
Site 6 - Proposed Air Traffic Control Tower
Duluth, Minnesota

Figure 2

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Legend

Exterior Sampling Locations:

- Boring Location

Interior Sampling Locations:

- Hand Auger Location
- Sub-Slab Soil Vapor Probe

- Building Layout
- Subject Property
- County Parcel Boundaries

Boring (B)/Hand Auger (HA)/Sub-Slab Soil Vapor Probe (SSV)

B-01
EOB = 10 (1.0s, 15s, 18w)
Soil Analytical Results
(1.0) Diesel Range Organics - 108
Groundwater Analytical Results
(9.50) Diesel Range Organics - 208
Soil Vapor Analytical Results
Diesel Range Organics - 208
Soil Observation Summary
0.5 ppm
Fill to EOB

Termination Depth (ft)
Sample Depth (ft)
Maximum PID Measurement
Sample Depths
s - soil sample
w - water sample
Analytical Result (mg/kg) (ug/L) (ug/m^3)
Soil description

Soil
- Soil parameter concentrations shown exceed Minnesota Pollution Control Agency (MPCA) unregulated fill criteria (UFC), Residential Soil Reference Values (SRVs), and Commercial/Industrial SRVs.
- Soil Results are reported in milligrams per kilogram (mg/kg).

Groundwater
- Groundwater parameter concentrations shown exceed MDH Health Based Guidance (HBG), MPCA National Pollutant Discharge Elimination System (NPDES) General Permit Limits (GPLs), and Environmental Protection Agency (EPA Maximum Contaminant Levels (MCLs).
- Groundwater results are reported in micrograms per liter (ug/L).

Sub-Slab Soil Vapor
- Soil Vapor concentrations shown exceed MPCA 33x Intrusion Screening Values (33x ISVs) and 33x Expedited ISVs (EISVs).
- Soil Vapor results are reported in micrograms per cubic meter (ug/m^3).

Notes
- Depth = Sample depth in feet below ground surface (bgs).
- EOB = End of Boring (Termination Depth of soil Boring).
- ppm = parts per million

B-07
EOB=15 (2.5-3.5s, 9.10w)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
(9.10) DRO - 155
Soil Observation Summary
0.8 ppm
Clayey sand with gravel, poorly graded sand and gravelly silt with sand fill to 5 feet bgs. Poorly graded sand with gravel outwash and gravelly silt with sand, clayey sand with gravel, and gravelly silt with sand till to EOB.

B-06
EOB=13 (5-6s, 8.75w)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
All below EPA MCLs, MDH HBGs, and NPDES GPLs.
Soil Observation Summary
0.3 ppm
Sand silt with gravel fill to 5 feet bgs. Clayey sand with gravel, gravelly silt with sand, and silty sand with gravel till to EOB.

B-01
EOB=15 (5-6s, 9.67w)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
(9.67) DRO - 442
(9.67) 1,2,4-Trimethylbenzene - 5.62
Soil Observation Summary
0.1 ppm
Sandy lean clay fill to 5 feet bgs. Silty sand and sandy lean clay till to EOB.

B-02
EOB=15 (3-4s, 8.50w)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
(8.50) DRO - 109
Soil Observation Summary
0.6 ppm
Gravelly silt fill to 5 feet bgs. Poorly graded sand outwash and clayey sand with gravel and gravelly silt till to EOB

B-04
EOB=15 (2-3s)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
No sample.
Soil Observation Summary
1.9 ppm
Clayey sand with gravel fill to 2 feet bgs. Poorly graded sand outwash and gravelly silt/gravelly silt with sand till to EOB

SSV-4
Maximum Soil PID Headspace Reading
2.5 ppm
Soil Vapor Analytical Results
All below MPCA Commercial/Industrial 33X ISVs and 33X EISVs.

SSV-3
Maximum Soil PID Headspace Reading
8.6 ppm
Soil Vapor Analytical Results
All below MPCA Commercial/Industrial 33X ISVs and 33X EISVs.

SSV-2
Maximum Soil PID Headspace Reading
2.1 ppm
Soil Vapor Analytical Results
All below MPCA Commercial/Industrial 33X ISVs and 33X EISVs.

SSV-1
Maximum Soil PID Headspace Reading
2.5 ppm
Soil Vapor Analytical Results
All below MPCA Commercial/Industrial 33X ISVs and 33X EISVs.

B-05
EOB=13 (1.5-2.5s)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
No sample.
Soil Observation Summary
0.2 ppm
Silty sand with gravel fill to 5 feet bgs. Clayey sand with gravel till to EOB.

B-03
EOB=15 (1.5-2.5s)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
No sample.
Soil Observation Summary
0.3 ppm
Silty sand with gravel fill to 5 feet bgs. Clayey sand with gravel till to EOB.

B-08
EOB=14 (3-4s, 9.00w)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Groundwater Aalytical Results
(9.00) DRO - 198
Soil Observation Summary
0.3 ppm
Silty sand with gravel fill to 5 feet bgs. Clayey sand with gravel and silty sand with gravel till to EOB.

HA-2
EOB=2 (1.5-2s)
Soil Analytical Results
All below MPCA UFC, SLVs, and SRVs.
Soil Observation Summary
0.1 ppm
Poorly graded sand fill to EOB.

HA-1
EOB=2 (1.5-2s)
Soil Analytical Results
(1.5-2) DRO - 570
(1.5-2) BaP - 17.32
Soil Observation Summary
0.1 ppm
Poorly graded sand fill to EOB.

Ralston Dr
Lackland St

0 25 50 Feet
N

Path: X:\AE\D\DULA\171568\99-GIS\APRX\DULAI 171568\DULAI 171568.aprx

SEH
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: DULAI 171568
Print Date: 4/5/2023

User Name: rhawkins
Projection: UTM NAD 83 Zone 15N
Source: ESRI, MnDOT, SEH Digi, St. Louis County

Select Analytical Results

Phase II Drilling Investigation
Site 6 - Proposed Air Traffic Control Tower
Duluth, Minnesota

Figure 3

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Appendix A

Boring Logs

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-01

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe ▽ **AT TIME OF DRILLING** 11.00 ft

LOGGED BY E. Allen **CHECKED BY** J. Force ▼ **AT END OF DRILLING** 9.67 ft

NOTES Started: 11:30, Ended: 1215 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5	
5	GP	50	SC		Brown, SANDY LEAN CLAY, (SC) moist, with fine to coarse gravel, (FILL)	PID = 0.1
10	GP	80	SM		5.0 Brown, SILTY SAND, (SM) moist, with fine to coarse gravel, (GLACIAL TILL)	PID = 0.2 PID = 0.2
15	GP	80	SC		11.0 ▽ Brown, SANDY LEAN CLAY, (SC) moist, with fine to coarse gravel, (GLACIAL TILL) 15.0	PID = 0.1

Bottom of borehole at 15.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\1715683-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-02

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** 10.00 ft

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** 8.50 ft

NOTES Started: 1215, Ended: 1300 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5	
	GP	80	ML		Brown, GRAVELLY SILT, (ML) moist, (FILL)	PID = 0.6
5					5.0	PID = 0.3
	GP	80	SC		Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.4
			ML		7.0 Reddish brown, GRAVELLY SILT, (ML) moist, (GLACIAL TILL)	
			SC		8.5 ▼ 9.0 Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.1
10						
	GP	80	SP		▽ Light brown, POORLY GRADED SAND, (SP) wet, (GLACIAL TILL)	PID = 0.2
			SC		11.5 Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.1
15					15.0	

Bottom of borehole at 15.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-03

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** ---

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** ---

NOTES Started: 945, Ended: 1030 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5 (TOPSOIL)	
	GP	50	SM		Brown, SILTY SAND WITH GRAVEL, (SM) moist, (FILL)	PID = 0.2
5					5.0	
	GP	60	SC		Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.2
10						
	GP	80				PID = 0.3
15					15.0	

Bottom of borehole at 15.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-04

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** ---

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** ---

NOTES Started: 1045, Ended: 1115 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5 (TOPSOIL)	
	GP	70	SC		Brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (FILL)	PID = 0.1
					2.0 Reddish brown, GRAVELLY SILT, (ML) moist, (GLACIAL TILL)	PID = 0.4
5			ML			
	GP	80			6.0 Brown, POORLY GRADED SAND, (SP) moist, (GLACIAL TILL)	PID = 1.9
			SP		7.5 Brown, GRAVELLY SILT WITH SAND, (ML) moist, (GLACIAL TILL)	PID = 0.1
10						
	GP	20	ML			PID = 0.2
15					15.0	

Bottom of borehole at 15.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\1715683-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-05

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** ---

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** ---

NOTES Started: 915, Ended: 945 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5 (TOPSOIL)	
	GP	70	SM		Reddish brown, SILTY SAND WITH GRAVEL, (SM) moist, (FILL)	PID = 0.1
5					5.0	PID = 0.2
	GP	100	SC		Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.2
10						PID = 0.1
	GP	100				PID = 0.1
					13.0	

Bottom of borehole at 13.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-06

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe ▽ **AT TIME OF DRILLING** 10.00 ft

LOGGED BY E. Allen **CHECKED BY** J. Force ▼ **AT END OF DRILLING** 8.75 ft

NOTES Started: 1330, Ended: 1415 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0	GP	50	ML		Brown, SANDY SILT WITH GRAVEL, (ML) moist, (FILL)	PID = 0.1
5					5.0	
	GP	50	SC		Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.3
10					10.0 ▽	
	GP	100	ML		Reddish brown, GRAVELLY SILT WITH SAND, (ML) wet, (GLACIAL TILL)	PID = 0.1
					11.5	
			SM		Reddish brown, SILTY SAND WITH GRAVEL, (SM) wet, (GLACIAL TILL)	
					13.0	

Bottom of borehole at 13.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-07

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** ---

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** 9.10 ft

NOTES Started: 1300, Ended: 1330 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0					0.5 (TOPSOIL)	
	GP	70	SC		1.5 Brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (FILL)	PID = 0.1
			SP		2.0 Brown, POORLY GRADED SAND, (SP) moist, and fine to coarse gravel, (FILL)	
			ML		Brown, GRAVELLY SILT WITH SAND, (ML) moist, (FILL)	PID = 0.8
5					5.0	
	GP	70	ML		Brown, GRAVELLY SILT WITH SAND, (ML) moist, (GLACIAL TILL)	PID = 0.4
						PID = 0.1
10					10.0	
	GP	100	SC		10.5 Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	
			SP		11.5 Brown, POORLY GRADED SAND WITH GRAVEL, (SP) moist, (GLACIAL TILL)	PID = 0
			ML		Reddish brown, GRAVELLY SILT WITH SAND, (ML) moist, (GLACIAL TILL)	PID = 0.1
15					15.0	

Bottom of borehole at 15.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Short Elliott Hendrickson, Inc.
3535 Vadnias Center Drive
St. Paul, Minnesota 55110
Telephone: 651.490.2000
Fax: 651.490.2150

BORING NUMBER B-08

CLIENT _____ **PROJECT NAME** ATCT Site 6

PROJECT NUMBER DULAI 171568 **PROJECT LOCATION** _____

DATE STARTED 3/7/23 **COMPLETED** 3/7/23 **GROUND ELEVATION (ft msl)** _____ **HOLE SIZE** inches

DRILLING CONTRACTOR Range Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Geoprobe **AT TIME OF DRILLING** ---

LOGGED BY E. Allen **CHECKED BY** J. Force **AT END OF DRILLING** 9.00 ft

NOTES Started: 1445, Ended: 1530 **AFTER DRILLING** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	ENVIRONMENTAL DATA
0	GP	100	SM		Brown, SILTY SAND WITH GRAVEL, (SM) moist, (FILL)	PID = 0
5					5.0	PID = 0.1
	GP	60	SC		Reddish brown, CLAYEY SAND WITH GRAVEL, (SC) moist, (GLACIAL TILL)	PID = 0.3
10					10.0	PID = 0.1
	GP	100	SM		Reddish brown, SILTY SAND WITH GRAVEL, (SM) moist, (GLACIAL TILL)	PID = 0.1
					14.0	

Bottom of borehole at 14.0 feet.

FINAL GENERAL BH/TP/WELL - GINT STD US LAB.GDT - 4/5/23 10:26 - X:\AE\D\DULAI\171568\3-ENV-STDY-REGS\30-ENV-DOC\16-PHASE2\FIELD\3.6.23_DRILLING\BORING LOGS.GPJ

Appendix B

Laboratory Reports

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Jennifer Force
Short Elliott Hendrickson, Inc. dba SEH
3535 Vadnais Center Drive
St. Paul, Minnesota 55110

Generated 3/10/2023 1:22:03 PM

JOB DESCRIPTION

Proposed Air Traffic Control Tower - Site G
SDG NUMBER Duluth 171568

JOB NUMBER

310-250462-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

myEOL

Job Notes

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. This report is confidential and is intended for the sole use of Eurofins Environment Testing North Central, LLC and its client. All questions regarding this report should be directed to the Eurofins Environment Testing North Central, LLC Project Manager who has signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization



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Authorized for release by
Zach Bindert, Project Manager I
Zach.Bindert@et.eurofinsus.com
(319)277-2401

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Receipt Checklists 34

Job ID: 310-250462-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-250462-1

Comments
No additional comments.

Receipt
The samples were received on 3/1/2023 9:15 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.9º C.

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 310-380301 recovered outside the control limit for 4-Methyl-2-pentanone(-22.1%D). The LCS associated with this CCV passes CCV criteria for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCV 310-380301/3).

Method 8260D: The continuing calibration verification (CCV) associated with batch 310-380301 recovered above the upper control limit for Vinyl chloride(26.5%D). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCV 310-380301/4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270E SIM: Surrogate recovery for the following samples were outside control limits: HA-1 (1.5-2) (310-250462-1), (310-250462-B-1-E MS) and (310-250462-B-1-F MSD). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Method 8270E SIM: The following samples were diluted due to the nature of the sample matrix: HA-1 (1.5-2) (310-250462-1), HA-2 (1.5-2) (310-250462-2), (310-250462-B-1-E MS) and (310-250462-B-1-F MSD). Elevated reporting limits (RLs) are provided.

Method 8270E SIM: Surrogate recovery for the following sample was outside control limits: HA-1 (1.5-2) (310-250462-1). Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method WI-DRO: Significant peaks, readily distinguished from background, were detected in the following sample within five minutes after the end of the analytical window defined by the last component eluting in the Diesel Range Organics (DRO) mix (i.e., n-Octacosane): HA-1 (1.5-2) (310-250462-1).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-250462-1	HA-1 (1.5-2)	Solid	02/27/23 09:30	03/01/23 09:15
310-250462-2	HA-2 (1.5-2)	Solid	02/27/23 09:45	03/01/23 09:15
310-250462-3	Trip Blank	Solid	02/27/23 00:00	03/01/23 09:15

Detection Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-1 (1.5-2) — Lab Sample ID: 310-250462-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	0.968		0.281		mg/Kg	1	☼	8260D	Total/NA
Acenaphthene	3.99		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Anthracene	6.29	F2	0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Benzo(a)anthracene	12.6		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Benzo(a)pyrene	12.1		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	15.7		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	7.59		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	5.71		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Chrysene	14.7		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Dibenz(a,h)anthracene	1.50		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Fluoranthene	36.7		5.43		mg/Kg	500	☼	8270E SIM	Total/NA
Fluorene	3.26		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	8.06		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Naphthalene	1.34		0.543		mg/Kg	50	☼	8270E SIM	Total/NA
Phenanthrene	27.7		5.43		mg/Kg	500	☼	8270E SIM	Total/NA
Pyrene	29.5		5.43		mg/Kg	500	☼	8270E SIM	Total/NA
Diesel Range Organics (DRO)	570		51.9		mg/Kg	10	☼	WI-DRO	Total/NA
Arsenic	2.74		0.938		mg/Kg	5	☼	6020B	Total/NA
Barium	48.3		0.938		mg/Kg	5	☼	6020B	Total/NA
Chromium	33.0		1.41		mg/Kg	5	☼	6020B	Total/NA
Lead	6.61		2.34		mg/Kg	5	☼	6020B	Total/NA
Selenium	1.50		1.41		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: HA-2 (1.5-2) — Lab Sample ID: 310-250462-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.157		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Anthracene	0.233		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(a)anthracene	0.505		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.473		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.618		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	0.271		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	0.251		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Chrysene	0.570		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Dibenz(a,h)anthracene	0.0593		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Fluoranthene	1.23		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Fluorene	0.125		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	0.305		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Naphthalene	0.0527		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Phenanthrene	1.01		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Pyrene	0.977		0.0523		mg/Kg	5	☼	8270E SIM	Total/NA
Diesel Range Organics (DRO)	28.5		5.30		mg/Kg	1	☼	WI-DRO	Total/NA
Arsenic	2.56		0.807		mg/Kg	5	☼	6020B	Total/NA
Barium	42.1		0.807		mg/Kg	5	☼	6020B	Total/NA
Chromium	22.4		1.21		mg/Kg	5	☼	6020B	Total/NA
Lead	4.26		2.02		mg/Kg	5	☼	6020B	Total/NA
Selenium	1.29		1.21		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: Trip Blank — Lab Sample ID: 310-250462-3

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Cedar Falls

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-1 (1.5-2)
Date Collected: 02/27/23 09:30
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-1
Matrix: Solid
Percent Solids: 92.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.563		0.563		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Allyl chloride	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Benzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Bromobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Bromochloromethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Bromodichloromethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Bromoform	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Bromomethane	<0.563		0.563		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
2-Butanone (MEK)	<0.844		0.844		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Carbon tetrachloride	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Chlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Chlorodibromomethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Chloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Chloroform	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Chloromethane	<0.281		0.281		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
2-Chlorotoluene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
4-Chlorotoluene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
cis-1,2-Dichloroethene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
cis-1,3-Dichloropropene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2-Dibromo-3-chloropropane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2-Dibromoethane (EDB)	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Dibromomethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2-Dichlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,3-Dichlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,4-Dichlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Dichlorodifluoromethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1-Dichloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2-Dichloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1-Dichloroethene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Dichlorofluoromethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2-Dichloropropane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,3-Dichloropropane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
2,2-Dichloropropane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1-Dichloropropene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Diethyl ether	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Ethylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Hexachlorobutadiene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Isopropylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Methylene chloride	<0.281		0.281		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
4-Methyl-2-pentanone (MIBK)	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Methyl tert-butyl ether	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Naphthalene	**0.968**		0.281		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
n-Butylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
n-Propylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
p-Isopropyltoluene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
sec-Butylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Styrene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
tert-Butylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1,1,2-Tetrachloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-1 (1.5-2)
Date Collected: 02/27/23 09:30
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-1
Matrix: Solid
Percent Solids: 92.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Tetrachloroethene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Tetrahydrofuran	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Toluene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
trans-1,2-Dichloroethene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
trans-1,3-Dichloropropene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2,3-Trichlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2,4-Trichlorobenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1,1-Trichloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1,2-Trichloroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Trichloroethene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Trichlorofluoromethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2,3-Trichloropropane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,1,2-Trichlorotrifluoroethane	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,2,4-Trimethylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
1,3,5-Trimethylbenzene	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Vinyl chloride	<0.113		0.113		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1
Xylenes, Total	<0.169		0.169		mg/Kg	☼	03/02/23 06:29	03/02/23 11:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:24*	*1*
Dibromofluoromethane (Surr)	*112*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:24*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:24*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**3.99**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Acenaphthylene	<0.543		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Anthracene	**6.29**	**F2**	0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Benzo(a)anthracene	**12.6**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Benzo(a)pyrene	**12.1**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Benzo(b)fluoranthene	**15.7**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Benzo(g,h,i)perylene	**7.59**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Benzo(k)fluoranthene	**5.71**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Chrysene	**14.7**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Dibenz(a,h)anthracene	**1.50**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Fluoranthene	**36.7**		5.43		mg/Kg	☼	03/06/23 13:48	03/10/23 10:20	500
Fluorene	**3.26**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Indeno(1,2,3-cd)pyrene	**8.06**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
2-Methylnaphthalene	<0.543		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Naphthalene	**1.34**		0.543		mg/Kg	☼	03/06/23 13:48	03/08/23 16:54	50
Phenanthrene	**27.7**		5.43		mg/Kg	☼	03/06/23 13:48	03/10/23 10:20	500
Pyrene	**29.5**		5.43		mg/Kg	☼	03/06/23 13:48	03/10/23 10:20	500

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*123*	*S1+*	*20 - 110*	*03/06/23 13:48*	*03/08/23 16:54*	*50*
2-Fluorobiphenyl (Surr)	*127*	*S1+*	*20 - 110*	*03/06/23 13:48*	*03/10/23 10:20*	*500*
Nitrobenzene-d5 (Surr)	*87*		*11 - 116*	*03/06/23 13:48*	*03/08/23 16:54*	*50*
Nitrobenzene-d5 (Surr)	*84*		*11 - 116*	*03/06/23 13:48*	*03/10/23 10:20*	*500*
Terphenyl-d14 (Surr)	*172*	*S1+*	*18 - 110*	*03/06/23 13:48*	*03/08/23 16:54*	*50*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-1 (1.5-2)
Date Collected: 02/27/23 09:30
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-1
Matrix: Solid
Percent Solids: 92.0

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Terphenyl-d14 (Surr)	*170*	*S1+*	*18 - 110*	*03/06/23 13:48*	*03/10/23 10:20*	*500*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<10.4		10.4		mg/Kg	☼	03/06/23 06:55	03/06/23 13:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*	*03/06/23 06:55*	*03/06/23 13:38*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**570**		51.9		mg/Kg	☼	03/02/23 09:41	03/07/23 11:08	10

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.74**		0.938		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Barium	**48.3**		0.938		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Cadmium	<0.469		0.469		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Chromium	**33.0**		1.41		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Lead	**6.61**		2.34		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Selenium	**1.50**		1.41		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5
Silver	<0.234		0.234		mg/Kg	☼	03/08/23 10:05	03/08/23 15:57	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0176		0.0176		mg/Kg	☼	03/07/23 14:36	03/08/23 14:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**8.0**		0.1		%			03/01/23 10:29	1
Percent Solids (EPA Moisture)	**92.0**		0.1		%			03/01/23 10:29	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-2 (1.5-2)
Date Collected: 02/27/23 09:45
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-2
Matrix: Solid
Percent Solids: 91.6

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.531		0.531		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Allyl chloride	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Benzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Bromobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Bromochloromethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Bromodichloromethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Bromoform	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Bromomethane	<0.531		0.531		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
2-Butanone (MEK)	<0.796		0.796		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Carbon tetrachloride	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Chlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Chlorodibromomethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Chloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Chloroform	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Chloromethane	<0.265		0.265		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
2-Chlorotoluene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
4-Chlorotoluene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
cis-1,2-Dichloroethene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
cis-1,3-Dichloropropene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2-Dibromo-3-chloropropane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2-Dibromoethane (EDB)	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Dibromomethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2-Dichlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,3-Dichlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,4-Dichlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Dichlorodifluoromethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1-Dichloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2-Dichloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1-Dichloroethene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Dichlorofluoromethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2-Dichloropropane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,3-Dichloropropane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
2,2-Dichloropropane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1-Dichloropropene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Diethyl ether	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Ethylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Hexachlorobutadiene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Isopropylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Methylene chloride	<0.265		0.265		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
4-Methyl-2-pentanone (MIBK)	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Methyl tert-butyl ether	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Naphthalene	<0.265		0.265		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
n-Butylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
n-Propylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
p-Isopropyltoluene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
sec-Butylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Styrene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
tert-Butylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1,1,2-Tetrachloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1

Client Sample ID: HA-2 (1.5-2)
Date Collected: 02/27/23 09:45
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-2
Matrix: Solid
Percent Solids: 91.6

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Tetrachloroethene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Tetrahydrofuran	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Toluene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
trans-1,2-Dichloroethene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
trans-1,3-Dichloropropene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2,3-Trichlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2,4-Trichlorobenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1,1-Trichloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1,2-Trichloroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Trichloroethene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Trichlorofluoromethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2,3-Trichloropropane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,1,2-Trichlorotrifluoroethane	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,2,4-Trimethylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
1,3,5-Trimethylbenzene	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Vinyl chloride	<0.106		0.106		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1
Xylenes, Total	<0.159		0.159		mg/Kg	☼	03/02/23 06:29	03/02/23 11:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:48*	*1*
Dibromofluoromethane (Surr)	*103*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:48*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*	*03/02/23 06:29*	*03/02/23 11:48*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.157**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Acenaphthylene	<0.0523		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Anthracene	**0.233**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Benzo(a)anthracene	**0.505**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Benzo(a)pyrene	**0.473**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Benzo(b)fluoranthene	**0.618**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Benzo(g,h,i)perylene	**0.271**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Benzo(k)fluoranthene	**0.251**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Chrysene	**0.570**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Dibenz(a,h)anthracene	**0.0593**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Fluoranthene	**1.23**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Fluorene	**0.125**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Indeno(1,2,3-cd)pyrene	**0.305**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
2-Methylnaphthalene	<0.0523		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Naphthalene	**0.0527**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Phenanthrene	**1.01**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5
Pyrene	**0.977**		0.0523		mg/Kg	☼	03/06/23 13:48	03/08/23 17:14	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*107*		*20 - 110*	*03/06/23 13:48*	*03/08/23 17:14*	*5*
Nitrobenzene-d5 (Surr)	*81*		*11 - 116*	*03/06/23 13:48*	*03/08/23 17:14*	*5*
Terphenyl-d14 (Surr)	*106*		*18 - 110*	*03/06/23 13:48*	*03/08/23 17:14*	*5*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-2 (1.5-2)

Date Collected: 02/27/23 09:45
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-2

Matrix: Solid
Percent Solids: 91.6

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.69		9.69		mg/Kg	☼	03/06/23 06:55	03/06/23 14:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*	*03/06/23 06:55*	*03/06/23 14:09*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**28.5**		5.30		mg/Kg	☼	03/02/23 09:41	03/06/23 12:55	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.56**		0.807		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Barium	**42.1**		0.807		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Cadmium	<0.404		0.404		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Chromium	**22.4**		1.21		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Lead	**4.26**		2.02		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Selenium	**1.29**		1.21		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5
Silver	<0.202		0.202		mg/Kg	☼	03/08/23 10:05	03/08/23 16:00	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0193		0.0193		mg/Kg	☼	03/07/23 14:36	03/08/23 14:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**8.4**		0.1		%			03/01/23 10:29	1
Percent Solids (EPA Moisture)	**91.6**		0.1		%			03/01/23 10:29	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: Trip Blank
Date Collected: 02/27/23 00:00
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-3
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.500		0.500		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Allyl chloride	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Benzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Bromobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Bromochloromethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Bromodichloromethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Bromoform	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Bromomethane	<0.500		0.500		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
2-Butanone (MEK)	<0.750		0.750		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Carbon tetrachloride	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Chlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Chlorodibromomethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Chloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Chloroform	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Chloromethane	<0.250		0.250		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
2-Chlorotoluene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
4-Chlorotoluene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
cis-1,2-Dichloroethene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
cis-1,3-Dichloropropene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2-Dibromo-3-chloropropane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2-Dibromoethane (EDB)	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Dibromomethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2-Dichlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,3-Dichlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,4-Dichlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Dichlorodifluoromethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1-Dichloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2-Dichloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1-Dichloroethene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Dichlorofluoromethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2-Dichloropropane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,3-Dichloropropane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
2,2-Dichloropropane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1-Dichloropropene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Diethyl ether	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Ethylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Hexachlorobutadiene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Isopropylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Methylene chloride	<0.250		0.250		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
4-Methyl-2-pentanone (MIBK)	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Methyl tert-butyl ether	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Naphthalene	<0.250		0.250		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
n-Butylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
n-Propylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
p-Isopropyltoluene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
sec-Butylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Styrene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
tert-Butylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1,1,2-Tetrachloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: Trip Blank
Date Collected: 02/27/23 00:00
Date Received: 03/01/23 09:15

Lab Sample ID: 310-250462-3
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Tetrachloroethene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Tetrahydrofuran	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Toluene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
trans-1,2-Dichloroethene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
trans-1,3-Dichloropropene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2,3-Trichlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2,4-Trichlorobenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1,1-Trichloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1,2-Trichloroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Trichloroethene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Trichlorofluoromethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2,3-Trichloropropane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,1,2-Trichlorotrifluoroethane	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,2,4-Trimethylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
1,3,5-Trimethylbenzene	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Vinyl chloride	<0.100		0.100		mg/Kg		03/02/23 06:29	03/02/23 09:49	1
Xylenes, Total	<0.150		0.150		mg/Kg		03/02/23 06:29	03/02/23 09:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*	*03/02/23 06:29*	*03/02/23 09:49*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*	*03/02/23 06:29*	*03/02/23 09:49*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*	*03/02/23 06:29*	*03/02/23 09:49*	*1*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<10.0		10.0		mg/Kg		03/06/23 06:55	03/06/23 14:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*	*03/06/23 06:55*	*03/06/23 14:40*	*1*

Definitions/Glossary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F2	MS/MSD RPD exceeds control limits
S1+	Surrogate recovery exceeds control limits, high biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Surrogate Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-120)	(80-120)
310-250462-1	HA-1 (1.5-2)	95	112	96
310-250462-2	HA-2 (1.5-2)	98	103	95
310-250462-3	Trip Blank	101	95	96
LCS 310-380299/2-A	Lab Control Sample	98	109	97
MB 310-380299/1-A	Method Blank	95	101	93

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		FBP	NBZ	TPHL
Lab Sample ID	Client Sample ID	(20-110)	(11-116)	(18-110)
310-250462-1	HA-1 (1.5-2)	123 S1+	87	172 S1+
310-250462-1	HA-1 (1.5-2)	127 S1+	84	170 S1+
310-250462-1 MS	HA-1 (1.5-2)	115 S1+	80	110
310-250462-1 MSD	HA-1 (1.5-2)	119 S1+	59	141 S1+
310-250462-2	HA-2 (1.5-2)	107	81	106
LCS 310-380587/2-A	Lab Control Sample	60	69	93
MB 310-380587/1-A	Method Blank	82	81	97

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-120)
310-250462-1	HA-1 (1.5-2)	104
310-250462-2	HA-2 (1.5-2)	104
310-250462-3	Trip Blank	108
LCS 310-380496/2-A	Lab Control Sample	111
LCSD 310-380496/25-A	Lab Control Sample Dup	115
MB 310-380496/1-A	Method Blank	88

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 310-380299/1-A
Matrix: Solid
Analysis Batch: 380301

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380299

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.494		0.494		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Allyl chloride	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Benzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Bromobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Bromochloromethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Bromodichloromethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Bromoform	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Bromomethane	<0.494		0.494		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
2-Butanone (MEK)	<0.741		0.741		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Carbon tetrachloride	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Chlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Chlorodibromomethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Chloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Chloroform	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Chloromethane	<0.247		0.247		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
2-Chlorotoluene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
4-Chlorotoluene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
cis-1,2-Dichloroethene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
cis-1,3-Dichloropropene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2-Dibromo-3-chloropropane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2-Dibromoethane (EDB)	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Dibromomethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2-Dichlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,3-Dichlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,4-Dichlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Dichlorodifluoromethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1-Dichloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2-Dichloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1-Dichloroethene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Dichlorofluoromethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2-Dichloropropane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,3-Dichloropropane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
2,2-Dichloropropane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1-Dichloropropene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Diethyl ether	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Ethylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Hexachlorobutadiene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Isopropylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Methylene chloride	<0.247		0.247		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
4-Methyl-2-pentanone (MIBK)	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Methyl tert-butyl ether	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Naphthalene	<0.247		0.247		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
n-Butylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
n-Propylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
p-Isopropyltoluene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
sec-Butylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Styrene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
tert-Butylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-380299/1-A
Matrix: Solid
Analysis Batch: 380301

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380299

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1,2,2-Tetrachloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Tetrachloroethene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Tetrahydrofuran	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Toluene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
trans-1,2-Dichloroethene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
trans-1,3-Dichloropropene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2,3-Trichlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2,4-Trichlorobenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1,1-Trichloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1,2-Trichloroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Trichloroethene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Trichlorofluoromethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2,3-Trichloropropane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,1,2-Trichlorotrifluoroethane	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,2,4-Trimethylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
1,3,5-Trimethylbenzene	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Vinyl chloride	<0.0988		0.0988		mg/Kg		03/02/23 06:29	03/02/23 08:38	1
Xylenes, Total	<0.148		0.148		mg/Kg		03/02/23 06:29	03/02/23 08:38	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*	*03/02/23 06:29*	*03/02/23 08:38*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*	*03/02/23 06:29*	*03/02/23 08:38*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*	*03/02/23 06:29*	*03/02/23 08:38*	*1*

Lab Sample ID: LCS 310-380299/2-A
Matrix: Solid
Analysis Batch: 380301

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380299

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acetone	1.96	1.916		mg/Kg		98	50 - 150
Allyl chloride	0.980	1.122		mg/Kg		114	50 - 150
Benzene	0.980	1.016		mg/Kg		104	80 - 130
Bromobenzene	0.980	1.036		mg/Kg		106	76 - 124
Bromochloromethane	0.980	1.041		mg/Kg		106	78 - 141
Bromodichloromethane	0.980	0.8894		mg/Kg		91	74 - 129
Bromoform	0.980	0.7985		mg/Kg		81	63 - 128
2-Butanone (MEK)	1.96	1.904		mg/Kg		97	50 - 150
Carbon tetrachloride	0.980	1.069		mg/Kg		109	75 - 136
Chlorobenzene	0.980	0.9466		mg/Kg		97	79 - 125
Chlorodibromomethane	0.980	0.8403		mg/Kg		86	73 - 125
Chloroform	0.980	1.098		mg/Kg		112	74 - 133
2-Chlorotoluene	0.980	0.9302		mg/Kg		95	77 - 125
4-Chlorotoluene	0.980	0.9572		mg/Kg		98	76 - 124
cis-1,2-Dichloroethene	0.980	1.094		mg/Kg		112	76 - 136
cis-1,3-Dichloropropene	0.980	0.9105		mg/Kg		93	78 - 129
1,2-Dibromo-3-chloropropane	0.980	0.7696		mg/Kg		79	50 - 150
1,2-Dibromoethane (EDB)	0.980	0.9208		mg/Kg		94	77 - 130

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380299/2-A
Matrix: Solid
Analysis Batch: 380301

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380299

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Dibromomethane	0.980	1.004		mg/Kg		102	77 - 135
1,2-Dichlorobenzene	0.980	0.9838		mg/Kg		100	74 - 123
1,3-Dichlorobenzene	0.980	0.9653		mg/Kg		98	75 - 123
1,4-Dichlorobenzene	0.980	0.9662		mg/Kg		99	76 - 123
1,1-Dichloroethane	0.980	1.097		mg/Kg		112	74 - 139
1,2-Dichloroethane	0.980	1.096		mg/Kg		112	73 - 138
1,1-Dichloroethene	0.980	1.071		mg/Kg		109	62 - 144
1,2-Dichloropropane	0.980	1.043		mg/Kg		106	79 - 130
1,3-Dichloropropane	0.980	1.008		mg/Kg		103	76 - 133
2,2-Dichloropropane	0.980	1.155		mg/Kg		118	50 - 150
1,1-Dichloropropene	0.980	1.056		mg/Kg		108	78 - 136
Diethyl ether	0.980	1.001		mg/Kg		102	64 - 145
Ethylbenzene	0.980	0.9442		mg/Kg		96	80 - 128
Hexachlorobutadiene	0.980	1.054		mg/Kg		108	50 - 150
Isopropylbenzene	0.980	0.9663		mg/Kg		99	80 - 125
Methylene chloride	0.980	1.080		mg/Kg		110	50 - 150
4-Methyl-2-pentanone (MIBK)	1.96	1.646		mg/Kg		84	64 - 138
Methyl tert-butyl ether	0.980	1.044		mg/Kg		107	70 - 138
Naphthalene	0.980	0.7963		mg/Kg		81	50 - 150
n-Butylbenzene	0.980	0.9126		mg/Kg		93	73 - 126
n-Propylbenzene	0.980	0.9491		mg/Kg		97	79 - 126
p-Isopropyltoluene	0.980	0.9083		mg/Kg		93	75 - 126
sec-Butylbenzene	0.980	0.9148		mg/Kg		93	75 - 126
Styrene	0.980	0.9695		mg/Kg		99	79 - 122
tert-Butylbenzene	0.980	0.9190		mg/Kg		94	76 - 125
1,1,1,2-Tetrachloroethane	0.980	0.9124		mg/Kg		93	78 - 127
1,1,2,2-Tetrachloroethane	0.980	0.8675		mg/Kg		89	70 - 129
Tetrachloroethene	0.980	1.058		mg/Kg		108	77 - 133
Tetrahydrofuran	1.96	1.736		mg/Kg		89	67 - 142
Toluene	0.980	0.9862		mg/Kg		101	80 - 127
trans-1,2-Dichloroethene	0.980	1.068		mg/Kg		109	70 - 136
trans-1,3-Dichloropropene	0.980	0.8839		mg/Kg		90	74 - 129
1,2,3-Trichlorobenzene	0.980	0.9152		mg/Kg		93	50 - 150
1,2,4-Trichlorobenzene	0.980	0.9891		mg/Kg		101	67 - 131
1,1,1-Trichloroethane	0.980	1.089		mg/Kg		111	77 - 136
1,1,2-Trichloroethane	0.980	0.9501		mg/Kg		97	74 - 130
Trichloroethene	0.980	0.9999		mg/Kg		102	80 - 131
1,2,3-Trichloropropane	0.980	0.8546		mg/Kg		87	69 - 133
1,1,2-Trichlorotrifluoroethane	0.980	0.9871		mg/Kg		101	59 - 149
1,2,4-Trimethylbenzene	0.980	0.8857		mg/Kg		90	76 - 129
1,3,5-Trimethylbenzene	0.980	0.8861		mg/Kg		90	76 - 127
Xylenes, Total	1.96	1.929		mg/Kg		98	80 - 128

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*109*		*80 - 120*
Toluene-d8 (Surr)	*97*		*80 - 120*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 310-380587/1-A
Matrix: Solid
Analysis Batch: 380960

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380587

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Acenaphthylene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Anthracene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Benzo(a)anthracene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Benzo(a)pyrene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Benzo(b)fluoranthene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Benzo(g,h,i)perylene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Benzo(k)fluoranthene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Chrysene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Dibenz(a,h)anthracene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Fluoranthene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Fluorene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Indeno(1,2,3-cd)pyrene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
2-Methylnaphthalene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Naphthalene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Phenanthrene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1
Pyrene	<0.00939		0.00939		mg/Kg		03/06/23 13:48	03/10/23 09:42	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*82*		*20 - 110*	*03/06/23 13:48*	*03/10/23 09:42*	*1*
Nitrobenzene-d5 (Surr)	*81*		*11 - 116*	*03/06/23 13:48*	*03/10/23 09:42*	*1*
Terphenyl-d14 (Surr)	*97*		*18 - 110*	*03/06/23 13:48*	*03/10/23 09:42*	*1*

Lab Sample ID: LCS 310-380587/2-A
Matrix: Solid
Analysis Batch: 380960

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380587

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	0.0317	0.02653		mg/Kg		84	30 - 110
Acenaphthylene	0.0317	0.02583		mg/Kg		82	31 - 110
Anthracene	0.0317	0.02627		mg/Kg		83	32 - 110
Benzo(a)anthracene	0.0317	0.02676		mg/Kg		84	36 - 110
Benzo(a)pyrene	0.0317	0.02534		mg/Kg		80	36 - 110
Benzo(b)fluoranthene	0.0317	0.02580		mg/Kg		81	37 - 110
Benzo(g,h,i)perylene	0.0317	0.02409		mg/Kg		76	22 - 110
Benzo(k)fluoranthene	0.0317	0.02972		mg/Kg		94	35 - 110
Chrysene	0.0317	0.03010		mg/Kg		95	35 - 110
Dibenz(a,h)anthracene	0.0317	0.02505		mg/Kg		79	23 - 110
Fluoranthene	0.0317	0.02956		mg/Kg		93	30 - 110
Fluorene	0.0317	0.02808		mg/Kg		89	30 - 110
Indeno(1,2,3-cd)pyrene	0.0317	0.02229		mg/Kg		70	23 - 110
2-Methylnaphthalene	0.0317	0.02012		mg/Kg		64	30 - 110
Naphthalene	0.0317	0.01849		mg/Kg		58	31 - 110
Phenanthrene	0.0317	0.02543		mg/Kg		80	32 - 110
Pyrene	0.0317	0.02931		mg/Kg		93	28 - 110

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*60*		*20 - 110*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: LCS 310-380587/2-A
Matrix: Solid
Analysis Batch: 380960

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380587

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5 (Surr)	*69*		*11 - 116*
Terphenyl-d14 (Surr)	*93*		*18 - 110*

Lab Sample ID: 310-250462-1 MS
Matrix: Solid
Analysis Batch: 380784

Client Sample ID: HA-1 (1.5-2)
Prep Type: Total/NA
Prep Batch: 380587

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	3.99		0.0359	1.426	4	mg/Kg	☼	-7146	21 - 110
Acenaphthylene	<0.543		0.0359	<0.538		mg/Kg	☼	NC	22 - 110
Anthracene	6.29	F2	0.0359	1.842	4	mg/Kg	☼	-12388	20 - 110
Benzo(a)anthracene	12.6		0.0359	4.912	4	mg/Kg	☼	-21510	20 - 110
Benzo(a)pyrene	12.1		0.0359	4.727	4	mg/Kg	☼	-20644	16 - 115
Benzo(b)fluoranthene	15.7		0.0359	6.210	4	mg/Kg	☼	-26369	18 - 115
Benzo(g,h,i)perylene	7.59		0.0359	2.653	4	mg/Kg	☼	-13770	14 - 110
Benzo(k)fluoranthene	5.71		0.0359	2.527	4	mg/Kg	☼	-8870	24 - 110
Chrysene	14.7		0.0359	5.617	4	mg/Kg	☼	-25374	18 - 110
Dibenz(a,h)anthracene	1.50		0.0359	0.5474	4	mg/Kg	☼	-2648	21 - 110
Fluoranthene	32.9	F2 E	0.0359	9.806	4	mg/Kg	☼	-64478	10 - 110
Fluorene	3.26		0.0359	1.136	4	mg/Kg	☼	-5914	16 - 110
Indeno(1,2,3-cd)pyrene	8.06		0.0359	2.837	4	mg/Kg	☼	-14560	16 - 110
2-Methylnaphthalene	<0.543		0.0359	<0.538	4	mg/Kg	☼	-602	18 - 110
Naphthalene	1.34		0.0359	<0.538	4	mg/Kg	☼	-2683	18 - 110
Phenanthrene	26.1	E	0.0359	8.939	4	mg/Kg	☼	-47811	13 - 110
Pyrene	26.8	F2 E	0.0359	7.859	4	mg/Kg	☼	-52839	15 - 110

Surrogate	MS %Recovery	MS Qualifier	Limits
2-Fluorobiphenyl (Surr)	*115*	*S1+*	*20 - 110*
Nitrobenzene-d5 (Surr)	*80*		*11 - 116*
Terphenyl-d14 (Surr)	*110*		*18 - 110*

Lab Sample ID: 310-250462-1 MSD
Matrix: Solid
Analysis Batch: 380784

Client Sample ID: HA-1 (1.5-2)
Prep Type: Total/NA
Prep Batch: 380587

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acenaphthene	3.99		0.0357	1.684	4	mg/Kg	☼	-6465	21 - 110	17	40
Acenaphthylene	<0.543		0.0357	<0.535		mg/Kg	☼	NC	22 - 110	NC	40
Anthracene	6.29	F2	0.0357	2.797	4 F2	mg/Kg	☼	-9785	20 - 110	41	39
Benzo(a)anthracene	12.6		0.0357	6.210	4	mg/Kg	☼	-17999	20 - 110	23	39

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: 310-250462-1 MSD
Matrix: Solid
Analysis Batch: 380784

Client Sample ID: HA-1 (1.5-2)
Prep Type: Total/NA
Prep Batch: 380587

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzo(a)pyrene	12.1		0.0357	5.958	4	mg/Kg	☼	-17316	16 - 115	23	40
Benzo(b)fluoranthene	15.7		0.0357	7.605	4	mg/Kg	☼	-22615	18 - 115	20	40
Benzo(g,h,i)perylene	7.59		0.0357	3.628	4	mg/Kg	☼	-11118	14 - 110	31	38
Benzo(k)fluoranthene	5.71		0.0357	3.025	4	mg/Kg	☼	-7527	24 - 110	18	39
Chrysene	14.7		0.0357	7.087	4	mg/Kg	☼	-21401	18 - 110	23	38
Dibenz(a,h)anthracene	1.50		0.0357	0.7515	4	mg/Kg	☼	-2092	21 - 110	31	36
Fluoranthene	32.9	F2 E	0.0357	16.02	4 F2	mg/Kg	☼	-47450	10 - 110	48	40
Fluorene	3.26		0.0357	1.357	4	mg/Kg	☼	-5331	16 - 110	18	40
Indeno(1,2,3-cd)pyrene	8.06		0.0357	3.882	4	mg/Kg	☼	-11716	16 - 110	31	38
2-Methylnaphthalene	<0.543		0.0357	<0.535	4	mg/Kg	☼	-688	18 - 110	15	40
Naphthalene	1.34		0.0357	<0.535	4	mg/Kg	☼	-2672	18 - 110	3	40
Phenanthrene	26.1	E	0.0357	11.58	4	mg/Kg	☼	-40703	13 - 110	26	40
Pyrene	26.8	F2 E	0.0357	13.18	4 F2	mg/Kg	☼	-38248	15 - 110	51	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*119*	*S1+*	*20 - 110*
Nitrobenzene-d5 (Surr)	*59*		*11 - 116*
Terphenyl-d14 (Surr)	*141*	*S1+*	*18 - 110*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Lab Sample ID: MB 310-380496/1-A
Matrix: Solid
Analysis Batch: 380499

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380496

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.65		9.65		mg/Kg		03/06/23 06:55	03/06/23 07:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*	*03/06/23 06:55*	*03/06/23 07:00*	*1*

Lab Sample ID: LCS 310-380496/2-A
Matrix: Solid
Analysis Batch: 380499

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380496

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Wisconsin GRO			19.5	21.70		mg/Kg		111	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: LCSD 310-380496/25-A
Matrix: Solid
Analysis Batch: 380499

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 380496

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Wisconsin GRO			19.7	20.78		mg/Kg		105	80 - 120	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*115*		*80 - 120*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Lab Sample ID: MB 310-380333/1-A
Matrix: Solid
Analysis Batch: 380501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380333

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<6.81		6.81		mg/Kg		03/02/23 09:41	03/06/23 09:24	1

Lab Sample ID: LCS 310-380333/2-A
Matrix: Solid
Analysis Batch: 380501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380333

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Diesel Range Organics (DRO)			97.1	94.71		mg/Kg		98	70 - 120		

Lab Sample ID: LCSD 310-380333/3-A
Matrix: Solid
Analysis Batch: 380501

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 380333

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics (DRO)			96.6	95.24		mg/Kg		99	70 - 120	1	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-380579/1-A ^5
Matrix: Solid
Analysis Batch: 380884

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380579

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.964		0.964		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Barium	<0.964		0.964		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Cadmium	<0.482		0.482		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Chromium	<1.45		1.45		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Lead	<2.41		2.41		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Selenium	<1.45		1.45		mg/Kg		03/08/23 10:05	03/08/23 15:12	5
Silver	<0.241		0.241		mg/Kg		03/08/23 10:05	03/08/23 15:12	5

Lab Sample ID: LCS 310-380579/2-A ^20
Matrix: Solid
Analysis Batch: 380884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380579

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			191	211.4		mg/Kg		111	80 - 120		
Barium			95.3	109.7		mg/Kg		115	80 - 120		

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-380579/2-A ^20
Matrix: Solid
Analysis Batch: 380884

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380579

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Cadmium			95.3	110.6		mg/Kg		116	80 - 120		
Chromium			95.3	101.0		mg/Kg		106	80 - 120		
Lead			191	213.2		mg/Kg		112	80 - 120		
Selenium			381	422.1		mg/Kg		111	80 - 120		
Silver			95.3	114.1		mg/Kg		120	80 - 120		

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 310-380705/1-A
Matrix: Solid
Analysis Batch: 380827

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380705

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0174		0.0174		mg/Kg		03/07/23 14:36	03/08/23 13:57	1

Lab Sample ID: LCS 310-380705/2-A
Matrix: Solid
Analysis Batch: 380827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380705

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.162	0.1563		mg/Kg		97	80 - 120		

Lab Sample ID: 310-250462-1 MS
Matrix: Solid
Analysis Batch: 380827

Client Sample ID: HA-1 (1.5-2)
Prep Type: Total/NA
Prep Batch: 380705

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	<0.0176		0.137	0.1387		mg/Kg	☼	93	80 - 120		

Lab Sample ID: 310-250462-1 MSD
Matrix: Solid
Analysis Batch: 380827

Client Sample ID: HA-1 (1.5-2)
Prep Type: Total/NA
Prep Batch: 380705

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.0176		0.164	0.1684		mg/Kg	☼	96	80 - 120	19	20

GC/MS VOA

Prep Batch: 380299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	5035	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	5035	
310-250462-3	Trip Blank	Total/NA	Solid	5035	
MB 310-380299/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-380299/2-A	Lab Control Sample	Total/NA	Solid	5035	

Analysis Batch: 380301

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	8260D	380299
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	8260D	380299
310-250462-3	Trip Blank	Total/NA	Solid	8260D	380299
MB 310-380299/1-A	Method Blank	Total/NA	Solid	8260D	380299
LCS 310-380299/2-A	Lab Control Sample	Total/NA	Solid	8260D	380299

GC/MS Semi VOA

Prep Batch: 380587

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	3546	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	3546	
MB 310-380587/1-A	Method Blank	Total/NA	Solid	3546	
LCS 310-380587/2-A	Lab Control Sample	Total/NA	Solid	3546	
310-250462-1 MS	HA-1 (1.5-2)	Total/NA	Solid	3546	
310-250462-1 MSD	HA-1 (1.5-2)	Total/NA	Solid	3546	

Analysis Batch: 380784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	8270E SIM	380587
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	8270E SIM	380587
310-250462-1 MS	HA-1 (1.5-2)	Total/NA	Solid	8270E SIM	380587
310-250462-1 MSD	HA-1 (1.5-2)	Total/NA	Solid	8270E SIM	380587

Analysis Batch: 380960

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	8270E SIM	380587
MB 310-380587/1-A	Method Blank	Total/NA	Solid	8270E SIM	380587
LCS 310-380587/2-A	Lab Control Sample	Total/NA	Solid	8270E SIM	380587

GC VOA

Prep Batch: 380496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	WI GRO	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	WI GRO	
310-250462-3	Trip Blank	Total/NA	Solid	WI GRO	
MB 310-380496/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-380496/2-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 310-380496/25-A	Lab Control Sample Dup	Total/NA	Solid	5035	

Analysis Batch: 380499

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	WI-GRO	380496

GC VOA (Continued)

Analysis Batch: 380499 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	WI-GRO	380496
310-250462-3	Trip Blank	Total/NA	Solid	WI-GRO	380496
MB 310-380496/1-A	Method Blank	Total/NA	Solid	WI-GRO	380496
LCS 310-380496/2-A	Lab Control Sample	Total/NA	Solid	WI-GRO	380496
LCSD 310-380496/25-A	Lab Control Sample Dup	Total/NA	Solid	WI-GRO	380496

GC Semi VOA

Prep Batch: 380333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	WI DRO PREP	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	WI DRO PREP	
MB 310-380333/1-A	Method Blank	Total/NA	Solid	WI DRO PREP	
LCS 310-380333/2-A	Lab Control Sample	Total/NA	Solid	WI DRO PREP	
LCSD 310-380333/3-A	Lab Control Sample Dup	Total/NA	Solid	WI DRO PREP	

Analysis Batch: 380501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	WI-DRO	380333
MB 310-380333/1-A	Method Blank	Total/NA	Solid	WI-DRO	380333
LCS 310-380333/2-A	Lab Control Sample	Total/NA	Solid	WI-DRO	380333
LCSD 310-380333/3-A	Lab Control Sample Dup	Total/NA	Solid	WI-DRO	380333

Analysis Batch: 380617

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	WI-DRO	380333

Metals

Prep Batch: 380579

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	3050B	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	3050B	
MB 310-380579/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 310-380579/2-A ^20	Lab Control Sample	Total/NA	Solid	3050B	

Prep Batch: 380705

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	7471B	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	7471B	
MB 310-380705/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 310-380705/2-A	Lab Control Sample	Total/NA	Solid	7471B	
310-250462-1 MS	HA-1 (1.5-2)	Total/NA	Solid	7471B	
310-250462-1 MSD	HA-1 (1.5-2)	Total/NA	Solid	7471B	

Analysis Batch: 380827

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	7471B	380705
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	7471B	380705
MB 310-380705/1-A	Method Blank	Total/NA	Solid	7471B	380705
LCS 310-380705/2-A	Lab Control Sample	Total/NA	Solid	7471B	380705
310-250462-1 MS	HA-1 (1.5-2)	Total/NA	Solid	7471B	380705

Metals (Continued)

Analysis Batch: 380827 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1 MSD	HA-1 (1.5-2)	Total/NA	Solid	7471B	380705

Analysis Batch: 380884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	6020B	380579
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	6020B	380579
MB 310-380579/1-A ^5	Method Blank	Total/NA	Solid	6020B	380579
LCS 310-380579/2-A ^20	Lab Control Sample	Total/NA	Solid	6020B	380579

General Chemistry

Analysis Batch: 380248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250462-1	HA-1 (1.5-2)	Total/NA	Solid	Moisture	
310-250462-2	HA-2 (1.5-2)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-1 (1.5-2)

Lab Sample ID: 310-250462-1

Date Collected: 02/27/23 09:30
Matrix: Solid
Date Received: 03/01/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380248	DGU1	EET CF	03/01/23 10:29

Client Sample ID: HA-1 (1.5-2)

Lab Sample ID: 310-250462-1

Date Collected: 02/27/23 09:30
Matrix: Solid
Date Received: 03/01/23 09:15
Percent Solids: 92.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380299	MZR8	EET CF	03/02/23 06:29
Total/NA	Analysis	8260D		1	380301	MZR8	EET CF	03/02/23 11:24
Total/NA	Prep	3546			380587	GW4G	EET CF	03/06/23 13:48
Total/NA	Analysis	8270E SIM		50	380784	D2YP	EET CF	03/08/23 16:54
Total/NA	Prep	3546			380587	GW4G	EET CF	03/06/23 13:48
Total/NA	Analysis	8270E SIM		500	380960	V7YZ	EET CF	03/10/23 10:20
Total/NA	Prep	WI GRO			380496	MZR8	EET CF	03/06/23 06:55
Total/NA	Analysis	WI-GRO		1	380499	MZR8	EET CF	03/06/23 13:38
Total/NA	Prep	WI DRO PREP			380333	GW4G	EET CF	03/02/23 09:41
Total/NA	Analysis	WI-DRO		10	380617	C3AA	EET CF	03/07/23 11:08
Total/NA	Prep	3050B			380579	KCK5	EET CF	03/08/23 10:05
Total/NA	Analysis	6020B		5	380884	A6US	EET CF	03/08/23 15:57
Total/NA	Prep	7471B			380705	XXW3	EET CF	03/07/23 14:36
Total/NA	Analysis	7471B		1	380827	DHM5	EET CF	03/08/23 14:06

Client Sample ID: HA-2 (1.5-2)

Lab Sample ID: 310-250462-2

Date Collected: 02/27/23 09:45
Matrix: Solid
Date Received: 03/01/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380248	DGU1	EET CF	03/01/23 10:29

Client Sample ID: HA-2 (1.5-2)

Lab Sample ID: 310-250462-2

Date Collected: 02/27/23 09:45
Matrix: Solid
Date Received: 03/01/23 09:15
Percent Solids: 91.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380299	MZR8	EET CF	03/02/23 06:29
Total/NA	Analysis	8260D		1	380301	MZR8	EET CF	03/02/23 11:48
Total/NA	Prep	3546			380587	GW4G	EET CF	03/06/23 13:48
Total/NA	Analysis	8270E SIM		5	380784	D2YP	EET CF	03/08/23 17:14
Total/NA	Prep	WI GRO			380496	MZR8	EET CF	03/06/23 06:55
Total/NA	Analysis	WI-GRO		1	380499	MZR8	EET CF	03/06/23 14:09
Total/NA	Prep	WI DRO PREP			380333	GW4G	EET CF	03/02/23 09:41
Total/NA	Analysis	WI-DRO		1	380501	C3AA	EET CF	03/06/23 12:55
Total/NA	Prep	3050B			380579	KCK5	EET CF	03/08/23 10:05
Total/NA	Analysis	6020B		5	380884	A6US	EET CF	03/08/23 16:00

Lab Chronicle

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Client Sample ID: HA-2 (1.5-2)

Lab Sample ID: 310-250462-2

Date Collected: 02/27/23 09:45
Matrix: Solid
Date Received: 03/01/23 09:15
Percent Solids: 91.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7471B			380705	XXW3	EET CF	03/07/23 14:36
Total/NA	Analysis	7471B		1	380827	DHM5	EET CF	03/08/23 14:12

Client Sample ID: Trip Blank

Lab Sample ID: 310-250462-3

Date Collected: 02/27/23 00:00
Matrix: Solid
Date Received: 03/01/23 09:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380299	MZR8	EET CF	03/02/23 06:29
Total/NA	Analysis	8260D		1	380301	MZR8	EET CF	03/02/23 09:49
Total/NA	Prep	WI GRO			380496	MZR8	EET CF	03/06/23 06:55
Total/NA	Analysis	WI-GRO		1	380499	MZR8	EET CF	03/06/23 14:40

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Job ID: 310-250462-1
Project/Site: Proposed Air Traffic Control Tower - Site G
SDG: Duluth 171568

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Minnesota	NELAP	019-999-319	12-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260D	5035	Solid	Dichlorofluoromethane
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

North Dakota	State	R-186	09-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
WI-DRO	WI DRO PREP	Solid	Diesel Range Organics (DRO)
WI-GRO	WI GRO	Solid	Wisconsin GRO

Method Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: Proposed Air Traffic Control Tower - Site G

Job ID: 310-250462-1
SDG: Duluth 171568

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET CF
8270E SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	EET CF
WI-GRO	Wisconsin - Gasoline Range Organics (GC)	WI-GRO	EET CF
WI-DRO	Wisconsin - Diesel Range Organics (GC)	WI-DRO	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7471B	Mercury (CVAA)	SW846	EET CF
Moisture	Percent Moisture	EPA	EET CF
3050B	Preparation, Metals	SW846	EET CF
3546	Microwave Extraction	SW846	EET CF
5035	Closed System Purge and Trap	SW846	EET CF
7471B	Preparation, Mercury	SW846	EET CF
WI DRO PREP	Wisconsin Extraction (Diesel Range Organics)	WI-DRO	EET CF
WI GRO	Closed System Purge and Trap	WI-GRO	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

WI-DRO = "Modified DRO: Method For Determining Diesel Range Organics", Wisconsin DNR, Publ-SW-141, September, 1995.

WI-GRO = "Modified GRO: Method For Determining Gasoline Range Organics", Wisconsin DNR, Publ-SW-140, September, 1995.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

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310-250462 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SEH

City/State: CITY | STATE: MN | Project:

Receipt Information

Date/Time Received: DATE: 3-1-23 | TIME: 915 | Received By: MC

Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☒ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☒ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

ALL

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R | Correction Factor (°C): +0.2

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 0.7 | Corrected Temp (°C): 0.9

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

Eurofins Duluth SC 269

eurofins Environment Test America

Client Information	Sampler: Elliott Allen	Lab PM	Carrier Tracking No(s)	COC No:
Client Contact: Jennifer Force	Phone: 651-426-5335	E-Mail:	State of Origin:	Page: Page __ of __
Company: SEH	PWSID:	Analysis Requested		Job #:
Address: 3535 Labore Center Dr	Due Date Requested:			Preservation Codes: A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Y - Trizma; Z - other (specify); Other:
City: St Paul	TAT Requested (days): Standard			
State, Zip: MN 55110	Compliance Project: Δ Yes Δ No			
Phone:	PO #:			
Email: jforce@seh.com	WO #:			
Project Name: Proctor Air Traffic Control Tower-SH6	Project #: Duluth 171568			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	VOC	GRO	DRO	PAH	RCRA8	Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
HA-1 (1.5-2)	2/27	930	G	S			X	X	X	X	X	X		
HA-2 (1.5-2)	2/27	945	G	S			X	X	X	X	X	X		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I, II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Elliott Allen	2/27 1500			2/27/23 1520	Eurofins
2		2/27/23 1530		MC	3-1-23 915	
3		Date/Time			Date/Time:	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No | Cooler Temperature(s) °C and Other Remarks.

Ver: 01/15/2019

Login Sample Receipt Checklist

Client: Short Elliott Hendrickson, Inc. dba SEH

Job Number: 310-250462-1
SDG Number: Duluth 171568

Login Number: 250462
List Number: 1
Creator: Costello, Mackenzie K

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Jennifer Force
Short Elliott Hendrickson, Inc. dba SEH
3535 Vadnais Center Drive
St. Paul, Minnesota 55110

Generated 3/15/2023 3:50:55 PM

JOB DESCRIPTION

ATCT Site 6
SDG NUMBER 171568

JOB NUMBER

310-250925-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

my EOL

Job Notes

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Authorization



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Job ID: 310-250925-1

Laboratory: Eurofins Cedar Falls

Narrative

Job Narrative
310-250925-1

Comments
No additional comments.

Receipt
The samples were received on 3/8/2023 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 2.2º C and 5.2º C.

GC/MS VOA
Method 8260D: The following sample(s) was collected in a properly preserved vial; however, the pH was outside the required criteria when verified by the laboratory. The samples were analyzed within the 7-day holding time specified for unpreserved samples: B-01W (9.67) (310-250925-1), B-02W (8.50) (310-250925-2), B-07W (9.10) (310-250925-3), B-06W (8.75) (310-250925-4) and B-08W (9.00) (310-250925-5).

Method 8260D: The following samples were diluted due to the nature of the sample matrix: B-02W (8.50) (310-250925-2), B-06W (8.75) (310-250925-4) and B-08W (9.00) (310-250925-5). Elevated reporting limits (RLs) are provided.

Method 8260D: The method requirement for no headspace was not met. The following volatile sample was analyzed with headspace in the sample container(s): B-02W (8.50) (310-250925-2).

Method 8260D: The following sample(s) was collected in a properly preserved vial; however, the pH was outside the required criteria when verified by the laboratory. The sample was analyzed within the 7-day holding time specified for unpreserved samples: B-01W (9.67) (310-250925-1).

Method 8260D: The continuing calibration verification (CCV) associated with batch 310-380856 recovered above the upper control limit for Dibromomethane (23.1%D), Dichlorobromomethane (22.6%D), Chlorodibromomethane (20.6%D) and 1,1,2-Trichlorotrifluoroethane (20.4%D). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCV 310-380856/3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270E SIM: The following sample was diluted due to the nature of the sample matrix: B-02 (3-4) (310-250925-10). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA
Method WI-GRO: The following samples were collected in properly preserved vials; however, the pH was outside the required criteria when verified by the laboratory. The samples were analyzed within the 7-day holding time specified for unpreserved samples: B-01W (9.67) (310-250925-1), B-02W (8.50) (310-250925-2), B-06W (8.75) (310-250925-4) and B-08W (9.00) (310-250925-5).

Method WI-GRO: Surrogate recovery for the following sample was outside the upper control limit: B-01W (9.67) (310-250925-1). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Method WI-GRO: The continuing calibration verification (CCV) associated with batch 310-380821 recovered above the upper control limit for Wisconsin GRO and 4-Bromofluorobenzene (Surrogate). The LCS passed under CCV criteria and was used to qualify the beginning of this batch. The associated sample is impacted: (CCV 310-380821/2).

Method WI-GRO: The following samples were diluted due to the nature of their sample matrix: B-02W (8.50) (310-250925-2), B-06W (8.75) (310-250925-4) and B-08W (9.00) (310-250925-5). Elevated reporting limits (RLs) are provided. Samples had excessive sediment.

Method WI-GRO: The method requirement for no headspace was not met. The following volatile samples were analyzed with headspace

Job ID: 310-250925-1 (Continued)

Laboratory: Eurofins Cedar Falls (Continued)

in the sample containers: B-02W (8.50) (310-250925-2) and B-08W (9.00) (310-250925-5). The sample containers were received with headspace.

Method WI-GRO: Significant peaks, readily distinguished from background, were detected in the following sample within five minutes after the end of the analytical window defined by the last component eluting in the Gasoline Range Organics (GRO) mix (i.e., Naphthalene): B-05 (1.5-2.5) (310-250925-6).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA
Method WI-DRO: Significant peaks, readily distinguished from background, were detected in the following samples within five minutes after the end of the analytical window defined by the last component eluting in the Diesel Range Organics (DRO) mix (i.e., n-Octacosane): B-01W (9.67) (310-250925-1), B-02W (8.50) (310-250925-2), B-07W (9.10) (310-250925-3) and B-08W (9.00) (310-250925-5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
Method 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 310-380796.The laboratory control sample (LCS) was performed in duplicate (LCSD) to provide precision data for this batch.

Method 3510C: Elevated reporting limits are provided for the following sample(s) due to insufficient sample provided for preparation.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Sample Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-250925-1	B-01W (9.67)	Water	03/06/23 12:15	03/08/23 09:30
310-250925-2	B-02W (8.50)	Water	03/06/23 13:15	03/08/23 09:30
310-250925-3	B-07W (9.10)	Water	03/06/23 14:00	03/08/23 09:30
310-250925-4	B-06W (8.75)	Water	03/06/23 14:20	03/08/23 09:30
310-250925-5	B-08W (9.00)	Water	03/06/23 15:45	03/08/23 09:30
310-250925-6	B-05 (1.5-2.5)	Solid	03/06/23 09:30	03/08/23 09:30
310-250925-7	B-03 (1.5-2.5)	Solid	03/06/23 10:00	03/08/23 09:30
310-250925-8	B-04 (2-3)	Solid	03/06/23 11:00	03/08/23 09:30
310-250925-9	B-01 (5-6)	Solid	03/06/23 12:00	03/08/23 09:30
310-250925-10	B-02 (3-4)	Solid	03/06/23 12:30	03/08/23 09:30
310-250925-11	B-07 (2.5-3.5)	Solid	03/06/23 13:20	03/08/23 09:30
310-250925-12	B-06 (5-6)	Solid	03/06/23 14:15	03/08/23 09:30
310-250925-13	B-08 (3-4)	Solid	03/06/23 15:00	03/08/23 09:30
310-250925-15	Trip Blank (Soil)	Solid	03/06/23 00:00	03/08/23 09:30

Detection Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01W (9.67) — Lab Sample ID: 310-250925-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichloroethene	5.62		1.00		ug/L	1		8260D	Total/NA
Diesel Range Organics (DRO)	442		100		ug/L	1		WI-DRO	Total/NA

Client Sample ID: B-02W (8.50) — Lab Sample ID: 310-250925-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics (DRO)	109		104		ug/L	1		WI-DRO	Total/NA

Client Sample ID: B-07W (9.10) — Lab Sample ID: 310-250925-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics (DRO)	155		104		ug/L	1		WI-DRO	Total/NA

Client Sample ID: B-06W (8.75) — Lab Sample ID: 310-250925-4

No Detections.

Client Sample ID: B-08W (9.00) — Lab Sample ID: 310-250925-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics (DRO)	198		179		ug/L	1		WI-DRO	Total/NA

Client Sample ID: B-05 (1.5-2.5) — Lab Sample ID: 310-250925-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0525		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Anthracene	0.0513		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)anthracene	0.117		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.114		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.147		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	0.0617		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	0.0476		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Chrysene	0.120		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Dibenz(a,h)anthracene	0.0149		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Fluoranthene	0.264		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Fluorene	0.0428		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	0.0732		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Naphthalene	0.0267		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Phenanthrene	0.271		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Pyrene	0.204		0.0113		mg/Kg	1	☼	8270E SIM	Total/NA
Arsenic	2.90		0.883		mg/Kg	5	☼	6020B	Total/NA
Barium	52.6		0.883		mg/Kg	5	☼	6020B	Total/NA
Chromium	32.4		1.33		mg/Kg	5	☼	6020B	Total/NA
Lead	6.52		2.21		mg/Kg	5	☼	6020B	Total/NA
Selenium	1.50		1.33		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-03 (1.5-2.5) — Lab Sample ID: 310-250925-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo(a)anthracene	0.0155		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.0155		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.0224		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Chrysene	0.0181		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Fluoranthene	0.0310		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-03 (1.5-2.5) (Continued)

Lab Sample ID: 310-250925-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno(1,2,3-cd)pyrene	0.0117		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Phenanthrene	0.0199		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Pyrene	0.0235		0.0102		mg/Kg	1	☼	8270E SIM	Total/NA
Arsenic	3.05		1.04		mg/Kg	5	☼	6020B	Total/NA
Barium	52.3		1.04		mg/Kg	5	☼	6020B	Total/NA
Chromium	27.0		1.56		mg/Kg	5	☼	6020B	Total/NA
Lead	7.10		2.61		mg/Kg	5	☼	6020B	Total/NA
Mercury	0.0195		0.0170		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: B-04 (2-3)

Lab Sample ID: 310-250925-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.251		0.129		mg/Kg	1	☼	8260D	Total/NA
1,2,4-Trimethylbenzene	0.274		0.129		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	0.484		0.194		mg/Kg	1	☼	8260D	Total/NA
Arsenic	2.99		0.911		mg/Kg	5	☼	6020B	Total/NA
Barium	54.2		0.911		mg/Kg	5	☼	6020B	Total/NA
Chromium	25.7		1.37		mg/Kg	5	☼	6020B	Total/NA
Lead	5.11		2.28		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-01 (5-6)

Lab Sample ID: 310-250925-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	2.49		1.07		mg/Kg	5	☼	6020B	Total/NA
Barium	57.2		1.07		mg/Kg	5	☼	6020B	Total/NA
Chromium	28.6		1.61		mg/Kg	5	☼	6020B	Total/NA
Lead	5.72		2.68		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-02 (3-4)

Lab Sample ID: 310-250925-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo(a)anthracene	0.116		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.126		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.198		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	0.101		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	0.0736		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Chrysene	0.147		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Fluoranthene	0.228		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	0.120		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Phenanthrene	0.124		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Pyrene	0.174		0.0573		mg/Kg	5	☼	8270E SIM	Total/NA
Arsenic	3.38		0.908		mg/Kg	5	☼	6020B	Total/NA
Barium	67.5		0.908		mg/Kg	5	☼	6020B	Total/NA
Chromium	29.4		1.36		mg/Kg	5	☼	6020B	Total/NA
Lead	11.9		2.27		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-07 (2.5-3.5)

Lab Sample ID: 310-250925-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.310		0.125		mg/Kg	1	☼	8260D	Total/NA
Benzo(b)fluoranthene	0.0107		0.0107		mg/Kg	1	☼	8270E SIM	Total/NA
Fluoranthene	0.0126		0.0107		mg/Kg	1	☼	8270E SIM	Total/NA
Arsenic	1.97		0.917		mg/Kg	5	☼	6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: B-07 (2.5-3.5) (Continued)

Lab Sample ID: 310-250925-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	46.6		0.917		mg/Kg	5	☼	6020B	Total/NA
Chromium	26.7		1.38		mg/Kg	5	☼	6020B	Total/NA
Lead	5.22		2.29		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-06 (5-6)

Lab Sample ID: 310-250925-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,2,4-Trimethylbenzene	0.298		0.122		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	0.185		0.183		mg/Kg	1	☼	8260D	Total/NA
Acenaphthene	0.0135		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Anthracene	0.0194		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)anthracene	0.0536		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.0502		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.0639		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	0.0284		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	0.0237		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Chrysene	0.0570		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Fluoranthene	0.0989		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	0.0354		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Phenanthrene	0.0825		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Pyrene	0.0774		0.0106		mg/Kg	1	☼	8270E SIM	Total/NA
Arsenic	2.02		0.889		mg/Kg	5	☼	6020B	Total/NA
Barium	40.6		0.889		mg/Kg	5	☼	6020B	Total/NA
Chromium	22.7		1.33		mg/Kg	5	☼	6020B	Total/NA
Lead	5.98		2.22		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: B-08 (3-4)

Lab Sample ID: 310-250925-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.210		0.108		mg/Kg	1	☼	8260D	Total/NA
1,2,4-Trimethylbenzene	0.205		0.108		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	0.300		0.163		mg/Kg	1	☼	8260D	Total/NA
Acenaphthylene	0.0138		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Anthracene	0.0361		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)anthracene	0.0922		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(a)pyrene	0.0691		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(b)fluoranthene	0.0876		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(g,h,i)perylene	0.0278		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Benzo(k)fluoranthene	0.0289		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Chrysene	0.0761		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Fluoranthene	0.155		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Fluorene	0.0254		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Indeno(1,2,3-cd)pyrene	0.0395		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Phenanthrene	0.165		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Pyrene	0.115		0.0108		mg/Kg	1	☼	8270E SIM	Total/NA
Arsenic	2.59		1.04		mg/Kg	5	☼	6020B	Total/NA
Barium	51.6		1.04		mg/Kg	5	☼	6020B	Total/NA
Chromium	35.3		1.56		mg/Kg	5	☼	6020B	Total/NA
Lead	4.72		2.60		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: Trip Blank (Soil)

Lab Sample ID: 310-250925-15

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01W (9.67)
Date Collected: 03/06/23 12:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-1
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			03/09/23 13:13	1
Allyl chloride	<2.00		2.00		ug/L			03/08/23 15:15	1
Benzene	<0.500		0.500		ug/L			03/08/23 15:15	1
Bromobenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Bromochloromethane	<5.00	F2	5.00		ug/L			03/08/23 15:15	1
Bromodichloromethane	<1.00		1.00		ug/L			03/08/23 15:15	1
Bromoform	<5.00		5.00		ug/L			03/08/23 15:15	1
Bromomethane	<4.00		4.00		ug/L			03/08/23 15:15	1
2-Butanone (MEK)	<10.0		10.0		ug/L			03/08/23 15:15	1
Carbon tetrachloride	<2.00		2.00		ug/L			03/08/23 15:15	1
Chlorobenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Chlorodibromomethane	<5.00		5.00		ug/L			03/08/23 15:15	1
Chloroethane	<4.00		4.00		ug/L			03/08/23 15:15	1
Chloroform	<3.00		3.00		ug/L			03/08/23 15:15	1
Chloromethane	<3.00		3.00		ug/L			03/08/23 15:15	1
2-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 15:15	1
4-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 15:15	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 15:15	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 15:15	1
1,2-Dibromo-3-chloropropane	<5.00		5.00		ug/L			03/08/23 15:15	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			03/08/23 15:15	1
Dibromomethane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			03/08/23 15:15	1
1,1-Dichloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,2-Dichloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,1-Dichloroethene	<2.00		2.00		ug/L			03/08/23 15:15	1
Dichlorofluoromethane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,2-Dichloropropane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,3-Dichloropropane	<1.00		1.00		ug/L			03/08/23 15:15	1
2,2-Dichloropropane	<4.00		4.00		ug/L			03/08/23 15:15	1
1,1-Dichloropropene	<1.00		1.00		ug/L			03/08/23 15:15	1
Diethyl ether	<2.00		2.00		ug/L			03/08/23 15:15	1
Ethylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Hexachlorobutadiene	<5.00		5.00		ug/L			03/08/23 15:15	1
Isopropylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Methylene chloride	<5.00		5.00		ug/L			03/08/23 15:15	1
4-Methyl-2-pentanone (MIBK)	<10.0		10.0		ug/L			03/08/23 15:15	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			03/08/23 15:15	1
Naphthalene	<5.00		5.00		ug/L			03/08/23 15:15	1
n-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
n-Propylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
p-Isopropyltoluene	<1.00		1.00		ug/L			03/08/23 15:15	1
sec-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Styrene	<1.00		1.00		ug/L			03/08/23 15:15	1
tert-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01W (9.67)
Date Collected: 03/06/23 12:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-1
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1
Tetrachloroethene	<1.00		1.00		ug/L			03/08/23 15:15	1
Tetrahydrofuran	<10.0		10.0		ug/L			03/08/23 15:15	1
Toluene	<1.00		1.00		ug/L			03/08/23 15:15	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 15:15	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 15:15	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:15	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:15	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			03/08/23 15:15	1
Trichloroethene	**5.62**		1.00		ug/L			03/08/23 15:15	1
Trichlorofluoromethane	<4.00		4.00		ug/L			03/08/23 15:15	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			03/08/23 15:15	1
1,1,2-Trichlorotrifluoroethane	<2.00		2.00		ug/L			03/08/23 15:15	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 15:15	1
Vinyl chloride	<1.00		1.00		ug/L			03/08/23 15:15	1
Xylenes, Total	<3.00		3.00		ug/L			03/08/23 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*03/08/23 15:15*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*03/09/23 13:13*	*1*
Dibromofluoromethane (Surr)	*100*		*80 - 128*		*03/08/23 15:15*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 128*		*03/09/23 13:13*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*03/08/23 15:15*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*03/09/23 13:13*	*1*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<100		100		ug/L			03/08/23 21:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*141*	*S1+*	*80 - 120*		*03/08/23 21:42*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**442**		100		ug/L		03/08/23 12:32	03/13/23 09:28	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-02W (8.50)
Date Collected: 03/06/23 13:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-2
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<50.0		50.0		ug/L			03/08/23 15:35	5
Allyl chloride	<10.0		10.0		ug/L			03/08/23 15:35	5
Benzene	<2.50		2.50		ug/L			03/08/23 15:35	5
Bromobenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Bromochloromethane	<25.0		25.0		ug/L			03/08/23 15:35	5
Bromodichloromethane	<5.00		5.00		ug/L			03/08/23 15:35	5
Bromoform	<25.0		25.0		ug/L			03/08/23 15:35	5
Bromomethane	<20.0		20.0		ug/L			03/08/23 15:35	5
2-Butanone (MEK)	<50.0		50.0		ug/L			03/08/23 15:35	5
Carbon tetrachloride	<10.0		10.0		ug/L			03/08/23 15:35	5
Chlorobenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Chlorodibromomethane	<25.0		25.0		ug/L			03/08/23 15:35	5
Chloroethane	<20.0		20.0		ug/L			03/08/23 15:35	5
Chloroform	<15.0		15.0		ug/L			03/08/23 15:35	5
Chloromethane	<15.0		15.0		ug/L			03/08/23 15:35	5
2-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 15:35	5
4-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 15:35	5
cis-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 15:35	5
cis-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 15:35	5
1,2-Dibromo-3-chloropropane	<25.0		25.0		ug/L			03/08/23 15:35	5
1,2-Dibromoethane (EDB)	<5.00		5.00		ug/L			03/08/23 15:35	5
Dibromomethane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,2-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
1,3-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
1,4-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Dichlorodifluoromethane	<15.0		15.0		ug/L			03/08/23 15:35	5
1,1-Dichloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,2-Dichloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,1-Dichloroethene	<10.0		10.0		ug/L			03/08/23 15:35	5
Dichlorofluoromethane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,2-Dichloropropane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,3-Dichloropropane	<5.00		5.00		ug/L			03/08/23 15:35	5
2,2-Dichloropropane	<20.0		20.0		ug/L			03/08/23 15:35	5
1,1-Dichloropropene	<5.00		5.00		ug/L			03/08/23 15:35	5
Diethyl ether	<10.0		10.0		ug/L			03/08/23 15:35	5
Ethylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Hexachlorobutadiene	<25.0		25.0		ug/L			03/08/23 15:35	5
Isopropylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Methylene chloride	<25.0		25.0		ug/L			03/08/23 15:35	5
4-Methyl-2-pentanone (MIBK)	<50.0		50.0		ug/L			03/08/23 15:35	5
Methyl tert-butyl ether	<5.00		5.00		ug/L			03/08/23 15:35	5
Naphthalene	<25.0		25.0		ug/L			03/08/23 15:35	5
n-Butylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
n-Propylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
p-Isopropyltoluene	<5.00		5.00		ug/L			03/08/23 15:35	5
sec-Butylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Styrene	<5.00		5.00		ug/L			03/08/23 15:35	5
tert-Butylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
1,1,1,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-02W (8.50)
Date Collected: 03/06/23 13:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-2
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5
Tetrachloroethene	<5.00		5.00		ug/L			03/08/23 15:35	5
Tetrahydrofuran	<50.0		50.0		ug/L			03/08/23 15:35	5
Toluene	<5.00		5.00		ug/L			03/08/23 15:35	5
trans-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 15:35	5
trans-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 15:35	5
1,2,3-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 15:35	5
1,2,4-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 15:35	5
1,1,1-Trichloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,1,2-Trichloroethane	<5.00		5.00		ug/L			03/08/23 15:35	5
Trichloroethene	<5.00		5.00		ug/L			03/08/23 15:35	5
Trichlorofluoromethane	<20.0		20.0		ug/L			03/08/23 15:35	5
1,2,3-Trichloropropane	<5.00		5.00		ug/L			03/08/23 15:35	5
1,1,2-Trichlorotrifluoroethane	<10.0		10.0		ug/L			03/08/23 15:35	5
1,2,4-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
1,3,5-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 15:35	5
Vinyl chloride	<5.00		5.00		ug/L			03/08/23 15:35	5
Xylenes, Total	<15.0		15.0		ug/L			03/08/23 15:35	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/08/23 15:35*	*5*
Dibromofluoromethane (Surr)	*103*		*80 - 128*		*03/08/23 15:35*	*5*
Toluene-d8 (Surr)	*102*		*80 - 120*		*03/08/23 15:35*	*5*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<500		500		ug/L			03/08/23 23:25	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*		*03/08/23 23:25*	*5*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**109**		104		ug/L		03/08/23 12:32	03/13/23 09:39	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-07W (9.10)
Date Collected: 03/06/23 14:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-3
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			03/08/23 15:56	1
Allyl chloride	<2.00		2.00		ug/L			03/08/23 15:56	1
Benzene	<0.500		0.500		ug/L			03/08/23 15:56	1
Bromobenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Bromochloromethane	<5.00		5.00		ug/L			03/08/23 15:56	1
Bromodichloromethane	<1.00		1.00		ug/L			03/08/23 15:56	1
Bromoform	<5.00		5.00		ug/L			03/08/23 15:56	1
Bromomethane	<4.00		4.00		ug/L			03/08/23 15:56	1
2-Butanone (MEK)	<10.0		10.0		ug/L			03/08/23 15:56	1
Carbon tetrachloride	<2.00		2.00		ug/L			03/08/23 15:56	1
Chlorobenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Chlorodibromomethane	<5.00		5.00		ug/L			03/08/23 15:56	1
Chloroethane	<4.00		4.00		ug/L			03/08/23 15:56	1
Chloroform	<3.00		3.00		ug/L			03/08/23 15:56	1
Chloromethane	<3.00		3.00		ug/L			03/08/23 15:56	1
2-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 15:56	1
4-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 15:56	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 15:56	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 15:56	1
1,2-Dibromo-3-chloropropane	<5.00		5.00		ug/L			03/08/23 15:56	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			03/08/23 15:56	1
Dibromomethane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			03/08/23 15:56	1
1,1-Dichloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,2-Dichloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,1-Dichloroethene	<2.00		2.00		ug/L			03/08/23 15:56	1
Dichlorofluoromethane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,2-Dichloropropane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,3-Dichloropropane	<1.00		1.00		ug/L			03/08/23 15:56	1
2,2-Dichloropropane	<4.00		4.00		ug/L			03/08/23 15:56	1
1,1-Dichloropropene	<1.00		1.00		ug/L			03/08/23 15:56	1
Diethyl ether	<2.00		2.00		ug/L			03/08/23 15:56	1
Ethylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Hexachlorobutadiene	<5.00		5.00		ug/L			03/08/23 15:56	1
Isopropylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Methylene chloride	<5.00		5.00		ug/L			03/08/23 15:56	1
4-Methyl-2-pentanone (MIBK)	<10.0		10.0		ug/L			03/08/23 15:56	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			03/08/23 15:56	1
Naphthalene	<5.00		5.00		ug/L			03/08/23 15:56	1
n-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
n-Propylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
p-Isopropyltoluene	<1.00		1.00		ug/L			03/08/23 15:56	1
sec-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Styrene	<1.00		1.00		ug/L			03/08/23 15:56	1
tert-Butylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-07W (9.10)
Date Collected: 03/06/23 14:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-3
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1
Tetrachloroethene	<1.00		1.00		ug/L			03/08/23 15:56	1
Tetrahydrofuran	<10.0		10.0		ug/L			03/08/23 15:56	1
Toluene	<1.00		1.00		ug/L			03/08/23 15:56	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 15:56	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 15:56	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:56	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 15:56	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			03/08/23 15:56	1
Trichloroethene	<1.00		1.00		ug/L			03/08/23 15:56	1
Trichlorofluoromethane	<4.00		4.00		ug/L			03/08/23 15:56	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			03/08/23 15:56	1
1,1,2-Trichlorotrifluoroethane	<2.00		2.00		ug/L			03/08/23 15:56	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 15:56	1
Vinyl chloride	<1.00		1.00		ug/L			03/08/23 15:56	1
Xylenes, Total	<3.00		3.00		ug/L			03/08/23 15:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*03/08/23 15:56*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 128*		*03/08/23 15:56*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*03/08/23 15:56*	*1*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<100		100		ug/L			03/08/23 22:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*		*03/08/23 22:08*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**155**		104		ug/L		03/08/23 12:32	03/13/23 09:50	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-06W (8.75)
Date Collected: 03/06/23 14:20
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-4
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<50.0		50.0		ug/L			03/08/23 16:16	5
Allyl chloride	<10.0		10.0		ug/L			03/08/23 16:16	5
Benzene	<2.50		2.50		ug/L			03/08/23 16:16	5
Bromobenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Bromochloromethane	<25.0		25.0		ug/L			03/08/23 16:16	5
Bromodichloromethane	<5.00		5.00		ug/L			03/08/23 16:16	5
Bromoform	<25.0		25.0		ug/L			03/08/23 16:16	5
Bromomethane	<20.0		20.0		ug/L			03/08/23 16:16	5
2-Butanone (MEK)	<50.0		50.0		ug/L			03/08/23 16:16	5
Carbon tetrachloride	<10.0		10.0		ug/L			03/08/23 16:16	5
Chlorobenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Chlorodibromomethane	<25.0		25.0		ug/L			03/08/23 16:16	5
Chloroethane	<20.0		20.0		ug/L			03/08/23 16:16	5
Chloroform	<15.0		15.0		ug/L			03/08/23 16:16	5
Chloromethane	<15.0		15.0		ug/L			03/08/23 16:16	5
2-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 16:16	5
4-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 16:16	5
cis-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 16:16	5
cis-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 16:16	5
1,2-Dibromo-3-chloropropane	<25.0		25.0		ug/L			03/08/23 16:16	5
1,2-Dibromoethane (EDB)	<5.00		5.00		ug/L			03/08/23 16:16	5
Dibromomethane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,2-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
1,3-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
1,4-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Dichlorodifluoromethane	<15.0		15.0		ug/L			03/08/23 16:16	5
1,1-Dichloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,2-Dichloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,1-Dichloroethene	<10.0		10.0		ug/L			03/08/23 16:16	5
Dichlorofluoromethane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,2-Dichloropropane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,3-Dichloropropane	<5.00		5.00		ug/L			03/08/23 16:16	5
2,2-Dichloropropane	<20.0		20.0		ug/L			03/08/23 16:16	5
1,1-Dichloropropene	<5.00		5.00		ug/L			03/08/23 16:16	5
Diethyl ether	<10.0		10.0		ug/L			03/08/23 16:16	5
Ethylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Hexachlorobutadiene	<25.0		25.0		ug/L			03/08/23 16:16	5
Isopropylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Methylene chloride	<25.0		25.0		ug/L			03/08/23 16:16	5
4-Methyl-2-pentanone (MIBK)	<50.0		50.0		ug/L			03/08/23 16:16	5
Methyl tert-butyl ether	<5.00		5.00		ug/L			03/08/23 16:16	5
Naphthalene	<25.0		25.0		ug/L			03/08/23 16:16	5
n-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
n-Propylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
p-Isopropyltoluene	<5.00		5.00		ug/L			03/08/23 16:16	5
sec-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Styrene	<5.00		5.00		ug/L			03/08/23 16:16	5
tert-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
1,1,1,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-06W (8.75)
Date Collected: 03/06/23 14:20
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-4
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5
Tetrachloroethene	<5.00		5.00		ug/L			03/08/23 16:16	5
Tetrahydrofuran	<50.0		50.0		ug/L			03/08/23 16:16	5
Toluene	<5.00		5.00		ug/L			03/08/23 16:16	5
trans-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 16:16	5
trans-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 16:16	5
1,2,3-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 16:16	5
1,2,4-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 16:16	5
1,1,1-Trichloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,1,2-Trichloroethane	<5.00		5.00		ug/L			03/08/23 16:16	5
Trichloroethene	<5.00		5.00		ug/L			03/08/23 16:16	5
Trichlorofluoromethane	<20.0		20.0		ug/L			03/08/23 16:16	5
1,2,3-Trichloropropane	<5.00		5.00		ug/L			03/08/23 16:16	5
1,1,2-Trichlorotrifluoroethane	<10.0		10.0		ug/L			03/08/23 16:16	5
1,2,4-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
1,3,5-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 16:16	5
Vinyl chloride	<5.00		5.00		ug/L			03/08/23 16:16	5
Xylenes, Total	<15.0		15.0		ug/L			03/08/23 16:16	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*03/08/23 16:16*	*5*
Dibromofluoromethane (Surr)	*99*		*80 - 128*		*03/08/23 16:16*	*5*
Toluene-d8 (Surr)	*103*		*80 - 120*		*03/08/23 16:16*	*5*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<500		500		ug/L			03/08/23 23:50	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*		*03/08/23 23:50*	*5*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<111		111		ug/L		03/08/23 12:32	03/13/23 10:02	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-08W (9.00)
Date Collected: 03/06/23 15:45
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-5
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<50.0		50.0		ug/L			03/08/23 16:36	5
Allyl chloride	<10.0		10.0		ug/L			03/08/23 16:36	5
Benzene	<2.50		2.50		ug/L			03/08/23 16:36	5
Bromobenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Bromochloromethane	<25.0		25.0		ug/L			03/08/23 16:36	5
Bromodichloromethane	<5.00		5.00		ug/L			03/08/23 16:36	5
Bromoform	<25.0		25.0		ug/L			03/08/23 16:36	5
Bromomethane	<20.0		20.0		ug/L			03/08/23 16:36	5
2-Butanone (MEK)	<50.0		50.0		ug/L			03/08/23 16:36	5
Carbon tetrachloride	<10.0		10.0		ug/L			03/08/23 16:36	5
Chlorobenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Chlorodibromomethane	<25.0		25.0		ug/L			03/08/23 16:36	5
Chloroethane	<20.0		20.0		ug/L			03/08/23 16:36	5
Chloroform	<15.0		15.0		ug/L			03/08/23 16:36	5
Chloromethane	<15.0		15.0		ug/L			03/08/23 16:36	5
2-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 16:36	5
4-Chlorotoluene	<5.00		5.00		ug/L			03/08/23 16:36	5
cis-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 16:36	5
cis-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 16:36	5
1,2-Dibromo-3-chloropropane	<25.0		25.0		ug/L			03/08/23 16:36	5
1,2-Dibromoethane (EDB)	<5.00		5.00		ug/L			03/08/23 16:36	5
Dibromomethane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,2-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
1,3-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
1,4-Dichlorobenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Dichlorodifluoromethane	<15.0		15.0		ug/L			03/08/23 16:36	5
1,1-Dichloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,2-Dichloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,1-Dichloroethene	<10.0		10.0		ug/L			03/08/23 16:36	5
Dichlorofluoromethane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,2-Dichloropropane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,3-Dichloropropane	<5.00		5.00		ug/L			03/08/23 16:36	5
2,2-Dichloropropane	<20.0		20.0		ug/L			03/08/23 16:36	5
1,1-Dichloropropene	<5.00		5.00		ug/L			03/08/23 16:36	5
Diethyl ether	<10.0		10.0		ug/L			03/08/23 16:36	5
Ethylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Hexachlorobutadiene	<25.0		25.0		ug/L			03/08/23 16:36	5
Isopropylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Methylene chloride	<25.0		25.0		ug/L			03/08/23 16:36	5
4-Methyl-2-pentanone (MIBK)	<50.0		50.0		ug/L			03/08/23 16:36	5
Methyl tert-butyl ether	<5.00		5.00		ug/L			03/08/23 16:36	5
Naphthalene	<25.0		25.0		ug/L			03/08/23 16:36	5
n-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
n-Propylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
p-Isopropyltoluene	<5.00		5.00		ug/L			03/08/23 16:36	5
sec-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Styrene	<5.00		5.00		ug/L			03/08/23 16:36	5
tert-Butylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
1,1,1,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-08W (9.00)
Date Collected: 03/06/23 15:45
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-5
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5
Tetrachloroethene	<5.00		5.00		ug/L			03/08/23 16:36	5
Tetrahydrofuran	<50.0		50.0		ug/L			03/08/23 16:36	5
Toluene	<5.00		5.00		ug/L			03/08/23 16:36	5
trans-1,2-Dichloroethene	<5.00		5.00		ug/L			03/08/23 16:36	5
trans-1,3-Dichloropropene	<25.0		25.0		ug/L			03/08/23 16:36	5
1,2,3-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 16:36	5
1,2,4-Trichlorobenzene	<25.0		25.0		ug/L			03/08/23 16:36	5
1,1,1-Trichloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,1,2-Trichloroethane	<5.00		5.00		ug/L			03/08/23 16:36	5
Trichloroethene	<5.00		5.00		ug/L			03/08/23 16:36	5
Trichlorofluoromethane	<20.0		20.0		ug/L			03/08/23 16:36	5
1,2,3-Trichloropropane	<5.00		5.00		ug/L			03/08/23 16:36	5
1,1,2-Trichlorotrifluoroethane	<10.0		10.0		ug/L			03/08/23 16:36	5
1,2,4-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
1,3,5-Trimethylbenzene	<5.00		5.00		ug/L			03/08/23 16:36	5
Vinyl chloride	<5.00		5.00		ug/L			03/08/23 16:36	5
Xylenes, Total	<15.0		15.0		ug/L			03/08/23 16:36	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*03/08/23 16:36*	*5*
Dibromofluoromethane (Surr)	*98*		*80 - 128*		*03/08/23 16:36*	*5*
Toluene-d8 (Surr)	*100*		*80 - 120*		*03/08/23 16:36*	*5*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<500		500		ug/L			03/09/23 00:16	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*		*03/09/23 00:16*	*5*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	**198**		179		ug/L		03/08/23 12:32	03/13/23 10:43	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-05 (1.5-2.5)
Date Collected: 03/06/23 09:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-6
Matrix: Solid
Percent Solids: 83.7

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.709		0.709		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Allyl chloride	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Benzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Bromobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Bromochloromethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Bromodichloromethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Bromoform	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Bromomethane	<0.709		0.709		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
2-Butanone (MEK)	<1.06		1.06		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Carbon tetrachloride	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Chlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Chlorodibromomethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Chloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Chloroform	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Chloromethane	<0.354		0.354		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
2-Chlorotoluene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
4-Chlorotoluene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
cis-1,2-Dichloroethene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
cis-1,3-Dichloropropene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2-Dibromo-3-chloropropane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2-Dibromoethane (EDB)	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Dibromomethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2-Dichlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,3-Dichlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,4-Dichlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Dichlorodifluoromethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1-Dichloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2-Dichloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1-Dichloroethene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Dichlorofluoromethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2-Dichloropropane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,3-Dichloropropane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
2,2-Dichloropropane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1-Dichloropropene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Diethyl ether	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Ethylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Hexachlorobutadiene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Isopropylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Methylene chloride	<0.354		0.354		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
4-Methyl-2-pentanone (MIBK)	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Methyl tert-butyl ether	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Naphthalene	<0.354		0.354		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
n-Butylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
n-Propylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
p-Isopropyltoluene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
sec-Butylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Styrene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
tert-Butylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1,1,2-Tetrachloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-05 (1.5-2.5)
Date Collected: 03/06/23 09:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-6
Matrix: Solid
Percent Solids: 83.7

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Tetrachloroethene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Tetrahydrofuran	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Toluene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
trans-1,2-Dichloroethene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
trans-1,3-Dichloropropene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2,3-Trichlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2,4-Trichlorobenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1,1-Trichloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1,2-Trichloroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Trichloroethene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Trichlorofluoromethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2,3-Trichloropropane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,1,2-Trichlorotrifluoroethane	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,2,4-Trimethylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
1,3,5-Trimethylbenzene	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Vinyl chloride	<0.142		0.142		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1
Xylenes, Total	<0.213		0.213		mg/Kg	☼	03/09/23 06:45	03/10/23 17:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:02*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:02*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:02*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0525**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Acenaphthylene	<0.0113		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Anthracene	**0.0513**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Benzo(a)anthracene	**0.117**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Benzo(a)pyrene	**0.114**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Benzo(b)fluoranthene	**0.147**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Benzo(g,h,i)perylene	**0.0617**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Benzo(k)fluoranthene	**0.0476**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Chrysene	**0.120**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Dibenz(a,h)anthracene	**0.0149**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Fluoranthene	**0.264**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Fluorene	**0.0428**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Indeno(1,2,3-cd)pyrene	**0.0732**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
2-Methylnaphthalene	<0.0113		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Naphthalene	**0.0267**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Phenanthrene	**0.271**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1
Pyrene	**0.204**		0.0113		mg/Kg	☼	03/09/23 09:21	03/15/23 13:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*54*		*20 - 110*	*03/09/23 09:21*	*03/15/23 13:02*	*1*
Nitrobenzene-d5 (Surr)	*69*		*11 - 116*	*03/09/23 09:21*	*03/15/23 13:02*	*1*
Terphenyl-d14 (Surr)	*64*		*18 - 110*	*03/09/23 09:21*	*03/15/23 13:02*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-05 (1.5-2.5)

Date Collected: 03/06/23 09:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-6

Matrix: Solid
Percent Solids: 83.7

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<12.2		12.2		mg/Kg	☼	03/09/23 17:36	03/10/23 00:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*03/09/23 17:36*	*03/10/23 00:53*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<6.59		6.59		mg/Kg	☼	03/09/23 09:19	03/13/23 09:55	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.90**		0.883		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Barium	**52.6**		0.883		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Cadmium	<0.442		0.442		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Chromium	**32.4**		1.33		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Lead	**6.52**		2.21		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Selenium	**1.50**		1.33		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5
Silver	<0.221		0.221		mg/Kg	☼	03/14/23 10:30	03/14/23 16:59	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0208		0.0208		mg/Kg	☼	03/13/23 12:01	03/14/23 15:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**16.3**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**83.7**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-03 (1.5-2.5)
Date Collected: 03/06/23 10:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-7
Matrix: Solid
Percent Solids: 92.1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.527		0.527		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Allyl chloride	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Benzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Bromobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Bromochloromethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Bromodichloromethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Bromoform	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Bromomethane	<0.527		0.527		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
2-Butanone (MEK)	<0.790		0.790		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Carbon tetrachloride	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Chlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Chlorodibromomethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Chloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Chloroform	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Chloromethane	<0.263		0.263		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
2-Chlorotoluene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
4-Chlorotoluene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
cis-1,2-Dichloroethene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
cis-1,3-Dichloropropene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2-Dibromo-3-chloropropane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2-Dibromoethane (EDB)	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Dibromomethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2-Dichlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,3-Dichlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,4-Dichlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Dichlorodifluoromethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1-Dichloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2-Dichloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1-Dichloroethene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Dichlorofluoromethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2-Dichloropropane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,3-Dichloropropane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
2,2-Dichloropropane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1-Dichloropropene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Diethyl ether	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Ethylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Hexachlorobutadiene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Isopropylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Methylene chloride	<0.263		0.263		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
4-Methyl-2-pentanone (MIBK)	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Methyl tert-butyl ether	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Naphthalene	<0.263		0.263		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
n-Butylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
n-Propylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
p-Isopropyltoluene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
sec-Butylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Styrene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
tert-Butylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1,1,2-Tetrachloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-03 (1.5-2.5)
Date Collected: 03/06/23 10:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-7
Matrix: Solid
Percent Solids: 92.1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Tetrachloroethene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Tetrahydrofuran	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Toluene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
trans-1,2-Dichloroethene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
trans-1,3-Dichloropropene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2,3-Trichlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2,4-Trichlorobenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1,1-Trichloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1,2-Trichloroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Trichloroethene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Trichlorofluoromethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2,3-Trichloropropane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,1,2-Trichlorotrifluoroethane	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,2,4-Trimethylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
1,3,5-Trimethylbenzene	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Vinyl chloride	<0.105		0.105		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1
Xylenes, Total	<0.158		0.158		mg/Kg	☼	03/09/23 06:45	03/10/23 17:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:26*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:26*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:26*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Acenaphthylene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Anthracene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Benzo(a)anthracene	**0.0155**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Benzo(a)pyrene	**0.0155**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Benzo(b)fluoranthene	**0.0224**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Benzo(g,h,i)perylene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Benzo(k)fluoranthene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Chrysene	**0.0181**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Dibenz(a,h)anthracene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Fluoranthene	**0.0310**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Fluorene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Indeno(1,2,3-cd)pyrene	**0.0117**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
2-Methylnaphthalene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Naphthalene	<0.0102		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Phenanthrene	**0.0199**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1
Pyrene	**0.0235**		0.0102		mg/Kg	☼	03/09/23 09:21	03/14/23 19:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*65*		*20 - 110*	*03/09/23 09:21*	*03/14/23 19:34*	*1*
Nitrobenzene-d5 (Surr)	*79*		*11 - 116*	*03/09/23 09:21*	*03/14/23 19:34*	*1*
Terphenyl-d14 (Surr)	*73*		*18 - 110*	*03/09/23 09:21*	*03/14/23 19:34*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-03 (1.5-2.5)

Date Collected: 03/06/23 10:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-7

Matrix: Solid
Percent Solids: 92.1

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.68		9.68		mg/Kg	☼	03/09/23 17:36	03/10/23 01:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 17:36*	*03/10/23 01:24*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<5.36		5.36		mg/Kg	☼	03/09/23 09:19	03/13/23 10:07	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.05**		1.04		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Barium	**52.3**		1.04		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Cadmium	<0.521		0.521		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Chromium	**27.0**		1.56		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Lead	**7.10**		2.61		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Selenium	<1.56		1.56		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5
Silver	<0.261		0.261		mg/Kg	☼	03/14/23 10:30	03/14/23 17:02	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0195**		0.0170		mg/Kg	☼	03/13/23 12:01	03/14/23 15:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**7.9**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**92.1**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-04 (2-3)
Date Collected: 03/06/23 11:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-8
Matrix: Solid
Percent Solids: 87.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.645		0.645		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Allyl chloride	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Benzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Bromobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Bromochloromethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Bromodichloromethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Bromoform	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Bromomethane	<0.645		0.645		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
2-Butanone (MEK)	<0.968		0.968		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Carbon tetrachloride	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Chlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Chlorodibromomethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Chloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Chloroform	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Chloromethane	<0.323		0.323		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
2-Chlorotoluene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
4-Chlorotoluene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
cis-1,2-Dichloroethene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
cis-1,3-Dichloropropene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2-Dibromo-3-chloropropane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2-Dibromoethane (EDB)	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Dibromomethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2-Dichlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,3-Dichlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,4-Dichlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Dichlorodifluoromethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1-Dichloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2-Dichloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1-Dichloroethene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Dichlorofluoromethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2-Dichloropropane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,3-Dichloropropane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
2,2-Dichloropropane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1-Dichloropropene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Diethyl ether	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Ethylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Hexachlorobutadiene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Isopropylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Methylene chloride	<0.323		0.323		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
4-Methyl-2-pentanone (MIBK)	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Methyl tert-butyl ether	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Naphthalene	<0.323		0.323		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
n-Butylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
n-Propylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
p-Isopropyltoluene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
sec-Butylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Styrene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
tert-Butylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1,1,2-Tetrachloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1

Client Sample ID: B-04 (2-3)
Date Collected: 03/06/23 11:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-8
Matrix: Solid
Percent Solids: 87.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Tetrachloroethene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Tetrahydrofuran	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Toluene	**0.251**		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
trans-1,2-Dichloroethene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
trans-1,3-Dichloropropene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2,3-Trichlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2,4-Trichlorobenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1,1-Trichloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1,2-Trichloroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Trichloroethene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Trichlorofluoromethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2,3-Trichloropropane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,1,2-Trichlorotrifluoroethane	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,2,4-Trimethylbenzene	**0.274**		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
1,3,5-Trimethylbenzene	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Vinyl chloride	<0.129		0.129		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1
Xylenes, Total	**0.484**		0.194		mg/Kg	☼	03/09/23 06:45	03/10/23 17:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:51*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:51*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*	*03/09/23 06:45*	*03/10/23 17:51*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Acenaphthylene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Anthracene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Benzo(a)anthracene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Benzo(a)pyrene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Benzo(b)fluoranthene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Benzo(g,h,i)perylene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Benzo(k)fluoranthene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Chrysene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Dibenz(a,h)anthracene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Fluoranthene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Fluorene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Indeno(1,2,3-cd)pyrene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
2-Methylnaphthalene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Naphthalene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Phenanthrene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1
Pyrene	<0.0111		0.0111		mg/Kg	☼	03/09/23 09:21	03/14/23 19:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*54*		*20 - 110*	*03/09/23 09:21*	*03/14/23 19:53*	*1*
Nitrobenzene-d5 (Surr)	*67*		*11 - 116*	*03/09/23 09:21*	*03/14/23 19:53*	*1*
Terphenyl-d14 (Surr)	*65*		*18 - 110*	*03/09/23 09:21*	*03/14/23 19:53*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-04 (2-3)

Date Collected: 03/06/23 11:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-8

Matrix: Solid
Percent Solids: 87.0

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<11.4		11.4		mg/Kg	☼	03/09/23 17:36	03/10/23 01:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 17:36*	*03/10/23 01:54*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<6.18		6.18		mg/Kg	☼	03/09/23 09:19	03/13/23 10:45	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.99**		0.911		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Barium	**54.2**		0.911		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Cadmium	<0.455		0.455		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Chromium	**25.7**		1.37		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Lead	**5.11**		2.28		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Selenium	<1.37		1.37		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5
Silver	<0.228		0.228		mg/Kg	☼	03/14/23 10:30	03/14/23 17:07	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0194		0.0194		mg/Kg	☼	03/13/23 12:01	03/14/23 15:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**13.0**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**87.0**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01 (5-6)
Date Collected: 03/06/23 12:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-9
Matrix: Solid
Percent Solids: 83.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.690		0.690		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Allyl chloride	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Benzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Bromobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Bromochloromethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Bromodichloromethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Bromoform	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Bromomethane	<0.690		0.690		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
2-Butanone (MEK)	<1.04		1.04		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Carbon tetrachloride	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Chlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Chlorodibromomethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Chloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Chloroform	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Chloromethane	<0.345		0.345		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
2-Chlorotoluene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
4-Chlorotoluene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
cis-1,2-Dichloroethene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
cis-1,3-Dichloropropene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2-Dibromo-3-chloropropane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2-Dibromoethane (EDB)	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Dibromomethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2-Dichlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,3-Dichlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,4-Dichlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Dichlorodifluoromethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1-Dichloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2-Dichloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1-Dichloroethene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Dichlorofluoromethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2-Dichloropropane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,3-Dichloropropane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
2,2-Dichloropropane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1-Dichloropropene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Diethyl ether	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Ethylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Hexachlorobutadiene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Isopropylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Methylene chloride	<0.345		0.345		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
4-Methyl-2-pentanone (MIBK)	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Methyl tert-butyl ether	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Naphthalene	<0.345		0.345		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
n-Butylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
n-Propylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
p-Isopropyltoluene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
sec-Butylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Styrene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
tert-Butylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1,1,2-Tetrachloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1

Client Sample ID: B-01 (5-6)
Date Collected: 03/06/23 12:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-9
Matrix: Solid
Percent Solids: 83.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Tetrachloroethene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Tetrahydrofuran	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Toluene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
trans-1,2-Dichloroethene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
trans-1,3-Dichloropropene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2,3-Trichlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2,4-Trichlorobenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1,1-Trichloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1,2-Trichloroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Trichloroethene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Trichlorofluoromethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2,3-Trichloropropane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,1,2-Trichlorotrifluoroethane	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,2,4-Trimethylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
1,3,5-Trimethylbenzene	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Vinyl chloride	<0.138		0.138		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1
Xylenes, Total	<0.207		0.207		mg/Kg	☼	03/09/23 06:45	03/10/23 18:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:15*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:15*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Acenaphthylene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Anthracene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Benzo(a)anthracene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Benzo(a)pyrene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Benzo(b)fluoranthene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Benzo(g,h,i)perylene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Benzo(k)fluoranthene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Chrysene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Dibenz(a,h)anthracene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Fluoranthene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Fluorene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Indeno(1,2,3-cd)pyrene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
2-Methylnaphthalene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Naphthalene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Phenanthrene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1
Pyrene	<0.0118		0.0118		mg/Kg	☼	03/09/23 09:21	03/14/23 20:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*20 - 110*	*03/09/23 09:21*	*03/14/23 20:12*	*1*
Nitrobenzene-d5 (Surr)	*88*		*11 - 116*	*03/09/23 09:21*	*03/14/23 20:12*	*1*
Terphenyl-d14 (Surr)	*84*		*18 - 110*	*03/09/23 09:21*	*03/14/23 20:12*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01 (5-6)

Date Collected: 03/06/23 12:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-9

Matrix: Solid
Percent Solids: 83.9

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<11.9		11.9		mg/Kg	☼	03/09/23 17:36	03/10/23 02:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 17:36*	*03/10/23 02:25*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<5.15		5.15		mg/Kg	☼	03/09/23 09:19	03/13/23 10:56	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.49**		1.07		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Barium	**57.2**		1.07		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Cadmium	<0.536		0.536		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Chromium	**28.6**		1.61		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Lead	**5.72**		2.68		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Selenium	<1.61		1.61		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5
Silver	<0.268		0.268		mg/Kg	☼	03/14/23 10:30	03/14/23 17:10	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0218		0.0218		mg/Kg	☼	03/13/23 12:01	03/14/23 15:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**16.1**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**83.9**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-02 (3-4)
Date Collected: 03/06/23 12:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-10
Matrix: Solid
Percent Solids: 85.3

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.650		0.650		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Allyl chloride	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Benzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Bromobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Bromochloromethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Bromodichloromethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Bromoform	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Bromomethane	<0.650		0.650		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
2-Butanone (MEK)	<0.975		0.975		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Carbon tetrachloride	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Chlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Chlorodibromomethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Chloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Chloroform	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Chloromethane	<0.325		0.325		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
2-Chlorotoluene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
4-Chlorotoluene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
cis-1,2-Dichloroethene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
cis-1,3-Dichloropropene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2-Dibromo-3-chloropropane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2-Dibromoethane (EDB)	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Dibromomethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,3-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,4-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Dichlorodifluoromethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1-Dichloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2-Dichloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1-Dichloroethene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Dichlorofluoromethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2-Dichloropropane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,3-Dichloropropane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
2,2-Dichloropropane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1-Dichloropropene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Diethyl ether	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Ethylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Hexachlorobutadiene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Isopropylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Methylene chloride	<0.325		0.325		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
4-Methyl-2-pentanone (MIBK)	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Methyl tert-butyl ether	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Naphthalene	<0.325		0.325		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
n-Butylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
n-Propylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
p-Isopropyltoluene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
sec-Butylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Styrene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
tert-Butylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1,1,2-Tetrachloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-02 (3-4)
Date Collected: 03/06/23 12:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-10
Matrix: Solid
Percent Solids: 85.3

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Tetrachloroethene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Tetrahydrofuran	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Toluene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
trans-1,2-Dichloroethene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
trans-1,3-Dichloropropene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2,3-Trichlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2,4-Trichlorobenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1,1-Trichloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1,2-Trichloroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Trichloroethene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Trichlorofluoromethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2,3-Trichloropropane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,1,2-Trichlorotrifluoroethane	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,2,4-Trimethylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
1,3,5-Trimethylbenzene	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Vinyl chloride	<0.130		0.130		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1
Xylenes, Total	<0.195		0.195		mg/Kg	☼	03/09/23 06:45	03/10/23 18:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:39*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:39*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*	*03/09/23 06:45*	*03/10/23 18:39*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Acenaphthylene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Anthracene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Benzo(a)anthracene	**0.116**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Benzo(a)pyrene	**0.126**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Benzo(b)fluoranthene	**0.198**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Benzo(g,h,i)perylene	**0.101**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Benzo(k)fluoranthene	**0.0736**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Chrysene	**0.147**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Dibenz(a,h)anthracene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Fluoranthene	**0.228**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Fluorene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Indeno(1,2,3-cd)pyrene	**0.120**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
2-Methylnaphthalene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Naphthalene	<0.0573		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Phenanthrene	**0.124**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5
Pyrene	**0.174**		0.0573		mg/Kg	☼	03/09/23 09:21	03/14/23 18:55	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*68*		*20 - 110*	*03/09/23 09:21*	*03/14/23 18:55*	*5*
Nitrobenzene-d5 (Surr)	*73*		*11 - 116*	*03/09/23 09:21*	*03/14/23 18:55*	*5*
Terphenyl-d14 (Surr)	*78*		*18 - 110*	*03/09/23 09:21*	*03/14/23 18:55*	*5*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-02 (3-4)

Date Collected: 03/06/23 12:30
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-10

Matrix: Solid
Percent Solids: 85.3

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<11.3		11.3		mg/Kg	☼	03/09/23 17:36	03/10/23 02:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 17:36*	*03/10/23 02:55*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<5.94		5.94		mg/Kg	☼	03/09/23 09:19	03/13/23 11:08	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.38**		0.908		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Barium	**67.5**		0.908		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Cadmium	<0.454		0.454		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Chromium	**29.4**		1.36		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Lead	**11.9**		2.27		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Selenium	<1.36		1.36		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5
Silver	<0.227		0.227		mg/Kg	☼	03/14/23 10:30	03/14/23 17:13	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0217		0.0217		mg/Kg	☼	03/13/23 12:01	03/14/23 16:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**14.7**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**85.3**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-07 (2.5-3.5)
Date Collected: 03/06/23 13:20
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-11
Matrix: Solid
Percent Solids: 89.5

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.627		0.627		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Allyl chloride	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Benzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Bromobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Bromochloromethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Bromodichloromethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Bromoform	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Bromomethane	<0.627		0.627		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
2-Butanone (MEK)	<0.941		0.941		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Carbon tetrachloride	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Chlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Chlorodibromomethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Chloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Chloroform	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Chloromethane	<0.314		0.314		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
2-Chlorotoluene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
4-Chlorotoluene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
cis-1,2-Dichloroethene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
cis-1,3-Dichloropropene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2-Dibromo-3-chloropropane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2-Dibromoethane (EDB)	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Dibromomethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2-Dichlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,3-Dichlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,4-Dichlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Dichlorodifluoromethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1-Dichloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2-Dichloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1-Dichloroethene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Dichlorofluoromethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2-Dichloropropane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,3-Dichloropropane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
2,2-Dichloropropane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1-Dichloropropene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Diethyl ether	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Ethylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Hexachlorobutadiene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Isopropylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Methylene chloride	<0.314		0.314		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
4-Methyl-2-pentanone (MIBK)	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Methyl tert-butyl ether	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Naphthalene	<0.314		0.314		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
n-Butylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
n-Propylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
p-Isopropyltoluene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
sec-Butylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Styrene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
tert-Butylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1,1,2-Tetrachloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1

Client Sample ID: B-07 (2.5-3.5)
Date Collected: 03/06/23 13:20
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-11
Matrix: Solid
Percent Solids: 89.5

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Tetrachloroethene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Tetrahydrofuran	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Toluene	**0.310**		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
trans-1,2-Dichloroethene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
trans-1,3-Dichloropropene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2,3-Trichlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2,4-Trichlorobenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1,1-Trichloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1,2-Trichloroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Trichloroethene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Trichlorofluoromethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2,3-Trichloropropane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,1,2-Trichlorotrifluoroethane	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,2,4-Trimethylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
1,3,5-Trimethylbenzene	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Vinyl chloride	<0.125		0.125		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1
Xylenes, Total	<0.188		0.188		mg/Kg	☼	03/09/23 06:45	03/10/23 19:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:03*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:03*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:03*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Acenaphthylene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Anthracene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Benzo(a)anthracene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Benzo(a)pyrene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Benzo(b)fluoranthene	**0.0107**		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Benzo(g,h,i)perylene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Benzo(k)fluoranthene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Chrysene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Dibenz(a,h)anthracene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Fluoranthene	**0.0126**		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Fluorene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Indeno(1,2,3-cd)pyrene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
2-Methylnaphthalene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Naphthalene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Phenanthrene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1
Pyrene	<0.0107		0.0107		mg/Kg	☼	03/09/23 09:21	03/15/23 13:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*60*		*20 - 110*	*03/09/23 09:21*	*03/15/23 13:22*	*1*
Nitrobenzene-d5 (Surr)	*71*		*11 - 116*	*03/09/23 09:21*	*03/15/23 13:22*	*1*
Terphenyl-d14 (Surr)	*63*		*18 - 110*	*03/09/23 09:21*	*03/15/23 13:22*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-07 (2.5-3.5)

Date Collected: 03/06/23 13:20
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-11

Matrix: Solid
Percent Solids: 89.5

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<11.4		11.4		mg/Kg	☼	03/09/23 17:36	03/10/23 03:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 17:36*	*03/10/23 03:26*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<3.93		3.93		mg/Kg	☼	03/09/23 09:19	03/13/23 11:19	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.97**		0.917		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Barium	**46.6**		0.917		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Cadmium	<0.458		0.458		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Chromium	**26.7**		1.38		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Lead	**5.22**		2.29		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Selenium	<1.38		1.38		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5
Silver	<0.229		0.229		mg/Kg	☼	03/14/23 10:30	03/14/23 17:17	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0214		0.0214		mg/Kg	☼	03/13/23 12:01	03/14/23 16:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**10.5**		0.1		%			03/08/23 17:30	1
Percent Solids (EPA Moisture)	**89.5**		0.1		%			03/08/23 17:30	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-06 (5-6)
Date Collected: 03/06/23 14:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-12
Matrix: Solid
Percent Solids: 88.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.610		0.610		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Allyl chloride	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Benzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Bromobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Bromochloromethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Bromodichloromethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Bromoform	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Bromomethane	<0.610		0.610		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
2-Butanone (MEK)	<0.916		0.916		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Carbon tetrachloride	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Chlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Chlorodibromomethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Chloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Chloroform	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Chloromethane	<0.305		0.305		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
2-Chlorotoluene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
4-Chlorotoluene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
cis-1,2-Dichloroethene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
cis-1,3-Dichloropropene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2-Dibromo-3-chloropropane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2-Dibromoethane (EDB)	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Dibromomethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2-Dichlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,3-Dichlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,4-Dichlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Dichlorodifluoromethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1-Dichloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2-Dichloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1-Dichloroethene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Dichlorofluoromethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2-Dichloropropane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,3-Dichloropropane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
2,2-Dichloropropane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1-Dichloropropene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Diethyl ether	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Ethylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Hexachlorobutadiene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Isopropylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Methylene chloride	<0.305		0.305		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
4-Methyl-2-pentanone (MIBK)	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Methyl tert-butyl ether	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Naphthalene	<0.305		0.305		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
n-Butylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
n-Propylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
p-Isopropyltoluene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
sec-Butylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Styrene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
tert-Butylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1,1,2-Tetrachloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-06 (5-6)
Date Collected: 03/06/23 14:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-12
Matrix: Solid
Percent Solids: 88.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Tetrachloroethene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Tetrahydrofuran	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Toluene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
trans-1,2-Dichloroethene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
trans-1,3-Dichloropropene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2,3-Trichlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2,4-Trichlorobenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1,1-Trichloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1,2-Trichloroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Trichloroethene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Trichlorofluoromethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2,3-Trichloropropane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,1,2-Trichlorotrifluoroethane	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,2,4-Trimethylbenzene	**0.298**		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
1,3,5-Trimethylbenzene	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Vinyl chloride	<0.122		0.122		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1
Xylenes, Total	**0.185**		0.183		mg/Kg	☼	03/09/23 06:45	03/10/23 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:27*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:27*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:27*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0135**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Acenaphthylene	<0.0106		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Anthracene	**0.0194**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Benzo(a)anthracene	**0.0536**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Benzo(a)pyrene	**0.0502**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Benzo(b)fluoranthene	**0.0639**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Benzo(g,h,i)perylene	**0.0284**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Benzo(k)fluoranthene	**0.0237**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Chrysene	**0.0570**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Dibenz(a,h)anthracene	<0.0106		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Fluoranthene	**0.0989**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Fluorene	<0.0106		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Indeno(1,2,3-cd)pyrene	**0.0354**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
2-Methylnaphthalene	<0.0106		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Naphthalene	<0.0106		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Phenanthrene	**0.0825**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1
Pyrene	**0.0774**		0.0106		mg/Kg	☼	03/09/23 09:21	03/15/23 13:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*64*		*20 - 110*	*03/09/23 09:21*	*03/15/23 13:41*	*1*
Nitrobenzene-d5 (Surr)	*77*		*11 - 116*	*03/09/23 09:21*	*03/15/23 13:41*	*1*
Terphenyl-d14 (Surr)	*66*		*18 - 110*	*03/09/23 09:21*	*03/15/23 13:41*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-06 (5-6)

Date Collected: 03/06/23 14:15
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-12

Matrix: Solid
Percent Solids: 88.9

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<11.0		11.0		mg/Kg	☼	03/09/23 17:36	03/10/23 03:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*	*03/09/23 17:36*	*03/10/23 03:56*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<4.60		4.60		mg/Kg	☼	03/09/23 09:19	03/13/23 11:31	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.02**		0.889		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Barium	**40.6**		0.889		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Cadmium	<0.444		0.444		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Chromium	**22.7**		1.33		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Lead	**5.98**		2.22		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Selenium	<1.33		1.33		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5
Silver	<0.222		0.222		mg/Kg	☼	03/14/23 10:30	03/14/23 17:20	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0203		0.0203		mg/Kg	☼	03/13/23 12:01	03/14/23 16:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**11.1**		0.1		%			03/09/23 06:48	1
Percent Solids (EPA Moisture)	**88.9**		0.1		%			03/09/23 06:48	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-08 (3-4)
Date Collected: 03/06/23 15:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-13
Matrix: Solid
Percent Solids: 89.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.542		0.542		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Allyl chloride	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Benzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Bromobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Bromochloromethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Bromodichloromethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Bromoform	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Bromomethane	<0.542		0.542		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
2-Butanone (MEK)	<0.814		0.814		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Carbon tetrachloride	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Chlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Chlorodibromomethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Chloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Chloroform	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Chloromethane	<0.271		0.271		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
2-Chlorotoluene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
4-Chlorotoluene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
cis-1,2-Dichloroethene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
cis-1,3-Dichloropropene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2-Dibromo-3-chloropropane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2-Dibromoethane (EDB)	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Dibromomethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2-Dichlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,3-Dichlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,4-Dichlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Dichlorodifluoromethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1-Dichloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2-Dichloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1-Dichloroethene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Dichlorofluoromethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2-Dichloropropane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,3-Dichloropropane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
2,2-Dichloropropane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1-Dichloropropene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Diethyl ether	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Ethylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Hexachlorobutadiene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Isopropylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Methylene chloride	<0.271		0.271		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
4-Methyl-2-pentanone (MIBK)	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Methyl tert-butyl ether	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Naphthalene	<0.271		0.271		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
n-Butylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
n-Propylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
p-Isopropyltoluene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
sec-Butylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Styrene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
tert-Butylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1,1,2-Tetrachloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-08 (3-4)
Date Collected: 03/06/23 15:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-13
Matrix: Solid
Percent Solids: 89.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Tetrachloroethene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Tetrahydrofuran	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Toluene	**0.210**		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
trans-1,2-Dichloroethene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
trans-1,3-Dichloropropene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2,3-Trichlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2,4-Trichlorobenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1,1-Trichloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1,2-Trichloroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Trichloroethene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Trichlorofluoromethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2,3-Trichloropropane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,1,2-Trichlorotrifluoroethane	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,2,4-Trimethylbenzene	**0.205**		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
1,3,5-Trimethylbenzene	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Vinyl chloride	<0.108		0.108		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1
Xylenes, Total	**0.300**		0.163		mg/Kg	☼	03/09/23 06:45	03/10/23 19:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:51*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:51*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*	*03/09/23 06:45*	*03/10/23 19:51*	*1*

Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0108		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Acenaphthylene	**0.0138**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Anthracene	**0.0361**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Benzo(a)anthracene	**0.0922**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Benzo(a)pyrene	**0.0691**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Benzo(b)fluoranthene	**0.0876**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Benzo(g,h,i)perylene	**0.0278**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Benzo(k)fluoranthene	**0.0289**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Chrysene	**0.0761**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Dibenz(a,h)anthracene	<0.0108		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Fluoranthene	**0.155**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Fluorene	**0.0254**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Indeno(1,2,3-cd)pyrene	**0.0395**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
2-Methylnaphthalene	<0.0108		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Naphthalene	<0.0108		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Phenanthrene	**0.165**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1
Pyrene	**0.115**		0.0108		mg/Kg	☼	03/09/23 09:21	03/15/23 14:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*62*		*20 - 110*	*03/09/23 09:21*	*03/15/23 14:01*	*1*
Nitrobenzene-d5 (Surr)	*76*		*11 - 116*	*03/09/23 09:21*	*03/15/23 14:01*	*1*
Terphenyl-d14 (Surr)	*69*		*18 - 110*	*03/09/23 09:21*	*03/15/23 14:01*	*1*

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-08 (3-4)

Date Collected: 03/06/23 15:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-13

Matrix: Solid
Percent Solids: 89.8

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.72		9.72		mg/Kg	☼	03/09/23 17:36	03/10/23 04:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*	*03/09/23 17:36*	*03/10/23 04:27*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<5.43		5.43		mg/Kg	☼	03/09/23 09:19	03/13/23 12:05	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.59**		1.04		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Barium	**51.6**		1.04		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Cadmium	<0.519		0.519		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Chromium	**35.3**		1.56		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Lead	**4.72**		2.60		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Selenium	<1.56		1.56		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5
Silver	<0.260		0.260		mg/Kg	☼	03/14/23 10:30	03/14/23 17:23	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0196		0.0196		mg/Kg	☼	03/13/23 12:01	03/14/23 16:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**10.2**		0.1		%			03/09/23 06:48	1
Percent Solids (EPA Moisture)	**89.8**		0.1		%			03/09/23 06:48	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: Trip Blank (Soil)
Date Collected: 03/06/23 00:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-15
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.500		0.500		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Allyl chloride	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Benzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Bromobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Bromochloromethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Bromodichloromethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Bromoform	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Bromomethane	<0.500		0.500		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
2-Butanone (MEK)	<0.750		0.750		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Carbon tetrachloride	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Chlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Chlorodibromomethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Chloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Chloroform	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Chloromethane	<0.250		0.250		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
2-Chlorotoluene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
4-Chlorotoluene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
cis-1,2-Dichloroethene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
cis-1,3-Dichloropropene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2-Dibromo-3-chloropropane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2-Dibromoethane (EDB)	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Dibromomethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2-Dichlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,3-Dichlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,4-Dichlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Dichlorodifluoromethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1-Dichloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2-Dichloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1-Dichloroethene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Dichlorofluoromethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2-Dichloropropane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,3-Dichloropropane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
2,2-Dichloropropane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1-Dichloropropene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Diethyl ether	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Ethylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Hexachlorobutadiene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Isopropylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Methylene chloride	<0.250		0.250		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
4-Methyl-2-pentanone (MIBK)	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Methyl tert-butyl ether	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Naphthalene	<0.250		0.250		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
n-Butylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
n-Propylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
p-Isopropyltoluene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
sec-Butylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Styrene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
tert-Butylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1,1,2-Tetrachloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: Trip Blank (Soil)
Date Collected: 03/06/23 00:00
Date Received: 03/08/23 09:30

Lab Sample ID: 310-250925-15
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Tetrachloroethene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Tetrahydrofuran	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Toluene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
trans-1,2-Dichloroethene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
trans-1,3-Dichloropropene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2,3-Trichlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2,4-Trichlorobenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1,1-Trichloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1,2-Trichloroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Trichloroethene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Trichlorofluoromethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2,3-Trichloropropane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,1,2-Trichlorotrifluoroethane	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,2,4-Trimethylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
1,3,5-Trimethylbenzene	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Vinyl chloride	<0.100		0.100		mg/Kg		03/09/23 06:45	03/10/23 20:15	1
Xylenes, Total	<0.150		0.150		mg/Kg		03/09/23 06:45	03/10/23 20:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*	*03/09/23 06:45*	*03/10/23 20:15*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*	*03/09/23 06:45*	*03/10/23 20:15*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*	*03/09/23 06:45*	*03/10/23 20:15*	*1*

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
F2	MS/MSD RPD exceeds control limits

GC VOA

Qualifier	Qualifier Description
S1+	Surrogate recovery exceeds control limits, high biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Surrogate Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-120)	(80-120)
310-250925-6	B-05 (1.5-2.5)	98	99	102
310-250925-7	B-03 (1.5-2.5)	99	102	99
310-250925-8	B-04 (2-3)	94	102	100
310-250925-9	B-01 (5-6)	100	98	101
310-250925-10	B-02 (3-4)	102	99	100
310-250925-11	B-07 (2.5-3.5)	101	104	100
310-250925-12	B-06 (5-6)	100	101	99
310-250925-13	B-08 (3-4)	103	102	98
310-250925-15	Trip Blank (Soil)	101	98	103
LCS 310-380853/2-A	Lab Control Sample	103	102	103
MB 310-380853/1-A	Method Blank	97	95	102

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-128)	(80-120)
310-250925-1	B-01W (9.67)	99	100	105
310-250925-1	B-01W (9.67)	97	99	100
310-250925-1 MS	B-01W (9.67)	99	101	100
310-250925-1 MSD	B-01W (9.67)	99	101	96
310-250925-2	B-02W (8.50)	98	103	102
310-250925-3	B-07W (9.10)	100	102	102
310-250925-4	B-06W (8.75)	96	99	103
310-250925-5	B-08W (9.00)	99	98	100
LCS 310-380785/6	Lab Control Sample	96	108	104
LCS 310-380785/7	Lab Control Sample	102	102	105
LCS 310-380873/6	Lab Control Sample	98	98	106
LCS 310-380873/7	Lab Control Sample	97	103	98
MB 310-380785/5	Method Blank	98	101	104
MB 310-380873/5	Method Blank	98	98	101

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		FBP	NBZ	TPHL
Lab Sample ID	Client Sample ID	(20-110)	(11-116)	(18-110)
310-250925-6	B-05 (1.5-2.5)	54	69	64
310-250925-7	B-03 (1.5-2.5)	65	79	73

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		FBP	NBZ	TPHL
Lab Sample ID	Client Sample ID	(20-110)	(11-116)	(18-110)
310-250925-8	B-04 (2-3)	54	67	65
310-250925-9	B-01 (5-6)	74	88	84
310-250925-10	B-02 (3-4)	68	73	78
310-250925-11	B-07 (2.5-3.5)	60	71	63
310-250925-12	B-06 (5-6)	64	77	66
310-250925-13	B-08 (3-4)	62	76	69
LCS 310-380889/2-A	Lab Control Sample	55	79	64
MB 310-380889/1-A	Method Blank	67	97	82

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-120)
310-250925-6	B-05 (1.5-2.5)	98
310-250925-7	B-03 (1.5-2.5)	100
310-250925-8	B-04 (2-3)	100
310-250925-9	B-01 (5-6)	100
310-250925-10	B-02 (3-4)	100
310-250925-11	B-07 (2.5-3.5)	100
310-250925-12	B-06 (5-6)	98
310-250925-13	B-08 (3-4)	97
LCS 310-380939/1-A	Lab Control Sample	101
LCSD 310-380939/26-A	Lab Control Sample Dup	106
MB 310-380939/2-A	Method Blank	97

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-120)
310-250925-1	B-01W (9.67)	141 S1+
310-250925-2	B-02W (8.50)	108
310-250925-3	B-07W (9.10)	110
310-250925-4	B-06W (8.75)	106
310-250925-5	B-08W (9.00)	108
LCS 310-380821/4	Lab Control Sample	111
LCSD 310-380821/27	Lab Control Sample Dup	109
MB 310-380821/5	Method Blank	113

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 310-380785/5
Matrix: Water
Analysis Batch: 380785

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			03/08/23 13:53	1
Allyl chloride	<2.00		2.00		ug/L			03/08/23 13:53	1
Benzene	<0.500		0.500		ug/L			03/08/23 13:53	1
Bromobenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Bromochloromethane	<5.00		5.00		ug/L			03/08/23 13:53	1
Bromodichloromethane	<1.00		1.00		ug/L			03/08/23 13:53	1
Bromoform	<5.00		5.00		ug/L			03/08/23 13:53	1
Bromomethane	<4.00		4.00		ug/L			03/08/23 13:53	1
2-Butanone (MEK)	<10.0		10.0		ug/L			03/08/23 13:53	1
Carbon tetrachloride	<2.00		2.00		ug/L			03/08/23 13:53	1
Chlorobenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Chlorodibromomethane	<5.00		5.00		ug/L			03/08/23 13:53	1
Chloroethane	<4.00		4.00		ug/L			03/08/23 13:53	1
Chloroform	<3.00		3.00		ug/L			03/08/23 13:53	1
Chloromethane	<3.00		3.00		ug/L			03/08/23 13:53	1
2-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 13:53	1
4-Chlorotoluene	<1.00		1.00		ug/L			03/08/23 13:53	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 13:53	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 13:53	1
1,2-Dibromo-3-chloropropane	<5.00		5.00		ug/L			03/08/23 13:53	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			03/08/23 13:53	1
Dibromomethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			03/08/23 13:53	1
1,1-Dichloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,2-Dichloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,1-Dichloroethene	<2.00		2.00		ug/L			03/08/23 13:53	1
Dichlorofluoromethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,2-Dichloropropane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,3-Dichloropropane	<1.00		1.00		ug/L			03/08/23 13:53	1
2,2-Dichloropropane	<4.00		4.00		ug/L			03/08/23 13:53	1
1,1-Dichloropropene	<1.00		1.00		ug/L			03/08/23 13:53	1
Diethyl ether	<2.00		2.00		ug/L			03/08/23 13:53	1
Ethylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Hexachlorobutadiene	<5.00		5.00		ug/L			03/08/23 13:53	1
Isopropylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Methylene chloride	<5.00		5.00		ug/L			03/08/23 13:53	1
4-Methyl-2-pentanone (MIBK)	<10.0		10.0		ug/L			03/08/23 13:53	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			03/08/23 13:53	1
Naphthalene	<5.00		5.00		ug/L			03/08/23 13:53	1
n-Butylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
n-Propylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
p-Isopropyltoluene	<1.00		1.00		ug/L			03/08/23 13:53	1
sec-Butylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Styrene	<1.00		1.00		ug/L			03/08/23 13:53	1
tert-Butylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-380785/5
Matrix: Water
Analysis Batch: 380785

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
Tetrachloroethene	<1.00		1.00		ug/L			03/08/23 13:53	1
Tetrahydrofuran	<10.0		10.0		ug/L			03/08/23 13:53	1
Toluene	<1.00		1.00		ug/L			03/08/23 13:53	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			03/08/23 13:53	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			03/08/23 13:53	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 13:53	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			03/08/23 13:53	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			03/08/23 13:53	1
Trichloroethene	<1.00		1.00		ug/L			03/08/23 13:53	1
Trichlorofluoromethane	<4.00		4.00		ug/L			03/08/23 13:53	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			03/08/23 13:53	1
1,1,2-Trichlorotrifluoroethane	<2.00		2.00		ug/L			03/08/23 13:53	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			03/08/23 13:53	1
Vinyl chloride	<1.00		1.00		ug/L			03/08/23 13:53	1
Xylenes, Total	<3.00		3.00		ug/L			03/08/23 13:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/08/23 13:53*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 128*		*03/08/23 13:53*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*03/08/23 13:53*	*1*

Lab Sample ID: LCS 310-380785/6
Matrix: Water
Analysis Batch: 380785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acetone	40.0	34.58		ug/L		86	50 - 150
Allyl chloride	20.0	17.34		ug/L		87	50 - 150
Benzene	20.0	18.31		ug/L		92	73 - 122
Bromobenzene	20.0	17.39		ug/L		87	67 - 124
Bromochloromethane	20.0	20.47		ug/L		102	68 - 132
Bromodichloromethane	20.0	18.38		ug/L		92	72 - 121
Bromoform	20.0	16.98		ug/L		85	55 - 129
2-Butanone (MEK)	40.0	35.26		ug/L		88	50 - 150
Carbon tetrachloride	20.0	15.57		ug/L		78	67 - 132
Chlorobenzene	20.0	18.55		ug/L		93	69 - 121
Chlorodibromomethane	20.0	18.37		ug/L		92	69 - 122
Chloroform	20.0	18.43		ug/L		92	72 - 120
2-Chlorotoluene	20.0	18.47		ug/L		92	66 - 122
4-Chlorotoluene	20.0	18.08		ug/L		90	65 - 122
cis-1,2-Dichloroethene	20.0	18.68		ug/L		93	74 - 120
cis-1,3-Dichloropropene	20.0	17.79		ug/L		89	71 - 126
1,2-Dibromo-3-chloropropane	20.0	20.44		ug/L		102	50 - 150
1,2-Dibromoethane (EDB)	20.0	19.25		ug/L		96	73 - 125

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380785/6
Matrix: Water
Analysis Batch: 380785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Dibromomethane	20.0	20.11		ug/L		101	72 - 123
1,2-Dichlorobenzene	20.0	19.23		ug/L		96	68 - 120
1,3-Dichlorobenzene	20.0	16.96		ug/L		85	67 - 123
1,4-Dichlorobenzene	20.0	18.22		ug/L		91	67 - 120
1,1-Dichloroethane	20.0	18.55		ug/L		93	71 - 123
1,2-Dichloroethane	20.0	18.83		ug/L		94	70 - 124
1,1-Dichloroethene	20.0	14.80		ug/L		74	61 - 129
1,2-Dichloropropane	20.0	16.97		ug/L		85	73 - 121
1,3-Dichloropropane	20.0	19.10		ug/L		95	72 - 124
2,2-Dichloropropane	20.0	17.87		ug/L		89	50 - 150
1,1-Dichloropropene	20.0	17.54		ug/L		88	70 - 131
Diethyl ether	20.0	17.45		ug/L		87	59 - 136
Ethylbenzene	20.0	17.77		ug/L		89	69 - 122
Hexachlorobutadiene	20.0	17.09		ug/L		85	49 - 150
Isopropylbenzene	20.0	16.84		ug/L		84	66 - 126
Methylene chloride	20.0	16.48		ug/L		82	50 - 150
4-Methyl-2-pentanone (MIBK)	40.0	34.65		ug/L		87	62 - 130
Methyl tert-butyl ether	20.0	19.04		ug/L		95	68 - 127
Naphthalene	20.0	18.57		ug/L		93	50 - 150
n-Butylbenzene	20.0	17.52		ug/L		88	54 - 138
n-Propylbenzene	20.0	17.34		ug/L		87	65 - 127
p-Isopropyltoluene	20.0	17.53		ug/L		88	61 - 128
sec-Butylbenzene	20.0	16.22		ug/L		81	62 - 132
Styrene	20.0	17.55		ug/L		88	67 - 125
tert-Butylbenzene	20.0	16.68		ug/L		83	64 - 127
1,1,1,2-Tetrachloroethane	20.0	17.94		ug/L		90	68 - 123
1,1,2,2-Tetrachloroethane	20.0	19.48		ug/L		97	64 - 124
Tetrachloroethene	20.0	16.64		ug/L		83	69 - 131
Tetrahydrofuran	40.0	37.37		ug/L		93	62 - 132
Toluene	20.0	18.36		ug/L		92	72 - 121
trans-1,2-Dichloroethene	20.0	18.53		ug/L		93	68 - 125
trans-1,3-Dichloropropene	20.0	19.70		ug/L		99	68 - 124
1,2,3-Trichlorobenzene	20.0	16.54		ug/L		83	50 - 150
1,2,4-Trichlorobenzene	20.0	16.86		ug/L		84	61 - 124
1,1,1-Trichloroethane	20.0	17.51		ug/L		88	71 - 128
1,1,2-Trichloroethane	20.0	18.73		ug/L		94	70 - 124
Trichloroethene	20.0	16.43		ug/L		82	73 - 126
1,2,3-Trichloropropane	20.0	20.11		ug/L		101	64 - 125
1,1,2-Trichlorotrifluoroethane	20.0	15.89		ug/L		79	51 - 150
1,2,4-Trimethylbenzene	20.0	17.35		ug/L		87	65 - 125
1,3,5-Trimethylbenzene	20.0	17.63		ug/L		88	65 - 124
Xylenes, Total	40.0	35.74		ug/L		89	68 - 124

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*
Dibromofluoromethane (Surr)	*108*		*80 - 128*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380785/7
Matrix: Water
Analysis Batch: 380785

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Bromomethane			20.0	16.40		ug/L		82	24 - 150		
Chloroethane			20.0	18.39		ug/L		92	51 - 137		
Chloromethane			20.0	17.37		ug/L		87	37 - 150		
Dichlorodifluoromethane			20.0	17.69		ug/L		88	37 - 150		
Dichlorofluoromethane			20.0	16.27		ug/L		81	55 - 138		
Trichlorofluoromethane			20.0	18.71		ug/L		94	56 - 144		
Vinyl chloride			20.0	15.53		ug/L		78	57 - 136		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 128*
Toluene-d8 (Surr)	*105*		*80 - 120*

Lab Sample ID: 310-250925-1 MS
Matrix: Water
Analysis Batch: 380785

Client Sample ID: B-01W (9.67)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Acetone	16.9		50.0	39.39		ug/L		45	35 - 150		
Allyl chloride	<2.00		25.0	15.07		ug/L		60	35 - 150		
Benzene	<0.500		25.0	21.10		ug/L		83	47 - 130		
Bromobenzene	<1.00		25.0	21.85		ug/L		87	52 - 130		
Bromochloromethane	<5.00	F2	25.0	27.80		ug/L		111	54 - 132		
Bromodichloromethane	<1.00		25.0	18.48		ug/L		74	58 - 130		
Bromoform	<5.00		25.0	19.05		ug/L		76	42 - 130		
2-Butanone (MEK)	<10.0		50.0	42.58		ug/L		85	47 - 150		
Carbon tetrachloride	<2.00		25.0	17.29		ug/L		69	45 - 132		
Chlorobenzene	<1.00		25.0	21.74		ug/L		87	54 - 130		
Chlorodibromomethane	<5.00		25.0	19.54		ug/L		78	53 - 130		
Chloroform	<3.00		25.0	20.09		ug/L		80	55 - 130		
2-Chlorotoluene	<1.00		25.0	19.16		ug/L		77	51 - 130		
4-Chlorotoluene	<1.00		25.0	19.04		ug/L		76	46 - 130		
cis-1,2-Dichloroethene	<1.00		25.0	22.12		ug/L		88	52 - 130		
cis-1,3-Dichloropropene	<5.00		25.0	19.52		ug/L		78	55 - 130		
1,2-Dibromo-3-chloropropane	<5.00		25.0	20.30		ug/L		81	45 - 150		
1,2-Dibromoethane (EDB)	<1.00		25.0	24.04		ug/L		96	59 - 130		
Dibromomethane	<1.00		25.0	22.85		ug/L		91	61 - 130		
1,2-Dichlorobenzene	<1.00		25.0	21.66		ug/L		87	53 - 130		
1,3-Dichlorobenzene	<1.00		25.0	20.91		ug/L		84	54 - 130		
1,4-Dichlorobenzene	<1.00		25.0	21.08		ug/L		84	53 - 130		
1,1-Dichloroethane	<1.00		25.0	21.37		ug/L		85	53 - 130		
1,2-Dichloroethane	<1.00		25.0	19.27		ug/L		77	57 - 130		
1,1-Dichloroethene	<2.00		25.0	16.82		ug/L		67	39 - 130		
1,2-Dichloropropane	<1.00		25.0	20.72		ug/L		83	60 - 130		
1,3-Dichloropropane	<1.00		25.0	20.68		ug/L		83	57 - 130		
2,2-Dichloropropane	<4.00		25.0	21.30		ug/L		85	28 - 150		
1,1-Dichloropropene	<1.00		25.0	19.90		ug/L		80	50 - 131		
Diethyl ether	<2.00		25.0	22.05		ug/L		88	50 - 136		

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-250925-1 MS
Matrix: Water
Analysis Batch: 380785

Client Sample ID: B-01W (9.67)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Ethylbenzene	<1.00		25.0	19.72		ug/L		79	48 - 130
Hexachlorobutadiene	<5.00		25.0	14.99		ug/L		60	27 - 150
Isopropylbenzene	<1.00		25.0	18.84		ug/L		75	43 - 130
Methylene chloride	<5.00		25.0	16.36		ug/L		65	50 - 150
4-Methyl-2-pentanone (MIBK)	<10.0		50.0	44.18		ug/L		88	46 - 132
Methyl tert-butyl ether	<1.00		25.0	20.94		ug/L		84	57 - 130
Naphthalene	<5.00		25.0	25.03		ug/L		100	33 - 150
n-Butylbenzene	<1.00		25.0	16.75		ug/L		67	37 - 138
n-Propylbenzene	<1.00		25.0	18.57		ug/L		74	42 - 130
p-Isopropyltoluene	<1.00		25.0	17.60		ug/L		70	43 - 130
sec-Butylbenzene	<1.00		25.0	17.67		ug/L		71	41 - 132
Styrene	<1.00		25.0	20.35		ug/L		80	46 - 130
tert-Butylbenzene	<1.00		25.0	18.47		ug/L		74	45 - 130
1,1,1,2-Tetrachloroethane	<1.00		25.0	19.57		ug/L		78	52 - 130
1,1,2,2-Tetrachloroethane	<1.00		25.0	21.64		ug/L		87	51 - 130
Tetrachloroethene	<1.00		25.0	21.80		ug/L		87	42 - 131
Tetrahydrofuran	<10.0		50.0	40.39		ug/L		81	40 - 137
Toluene	<1.00		25.0	21.57		ug/L		86	48 - 130
trans-1,2-Dichloroethene	<1.00		25.0	23.03		ug/L		92	54 - 130
trans-1,3-Dichloropropene	<5.00		25.0	21.42		ug/L		86	51 - 130
1,2,3-Trichlorobenzene	<5.00		25.0	22.73		ug/L		91	46 - 150
1,2,4-Trichlorobenzene	<5.00		25.0	21.73		ug/L		87	45 - 130
1,1,1-Trichloroethane	<1.00		25.0	18.81		ug/L		75	49 - 130
1,1,2-Trichloroethane	<1.00		25.0	21.10		ug/L		84	56 - 130
Trichloroethene	5.62		25.0	26.51		ug/L		84	55 - 130
1,2,3-Trichloropropane	<1.00		25.0	21.83		ug/L		87	50 - 130
1,1,2-Trichlorotrifluoroethane	<2.00		25.0	19.80		ug/L		79	20 - 150
1,2,4-Trimethylbenzene	<1.00		25.0	19.13		ug/L		77	45 - 130
1,3,5-Trimethylbenzene	<1.00		25.0	19.09		ug/L		76	44 - 130
Xylenes, Total	<3.00		50.0	42.16		ug/L		84	44 - 130

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 128*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: 310-250925-1 MSD
Matrix: Water
Analysis Batch: 380785

Client Sample ID: B-01W (9.67)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acetone	16.9		50.0	37.55		ug/L		41	35 - 150	5	26
Allyl chloride	<2.00		25.0	13.13		ug/L		53	35 - 150	14	35
Benzene	<0.500		25.0	19.72		ug/L		78	47 - 130	7	20
Bromobenzene	<1.00		25.0	21.11		ug/L		84	52 - 130	3	20
Bromochloromethane	<5.00	F2	25.0	20.31	F2	ug/L		81	54 - 132	31	20
Bromodichloromethane	<1.00		25.0	18.15		ug/L		73	58 - 130	2	20
Bromoform	<5.00		25.0	19.61		ug/L		78	42 - 130	3	20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-250925-1 MSD
Matrix: Water
Analysis Batch: 380785

Client Sample ID: B-01W (9.67)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
2-Butanone (MEK)	<10.0		50.0	42.59		ug/L		85	47 - 150	0	20
Carbon tetrachloride	<2.00		25.0	15.88		ug/L		64	45 - 132	9	20
Chlorobenzene	<1.00		25.0	20.45		ug/L		82	54 - 130	6	20
Chlorodibromomethane	<5.00		25.0	20.00		ug/L		80	53 - 130	2	20
Chloroform	<3.00		25.0	19.03		ug/L		76	55 - 130	5	20
2-Chlorotoluene	<1.00		25.0	18.42		ug/L		74	51 - 130	4	20
4-Chlorotoluene	<1.00		25.0	18.06		ug/L		72	46 - 130	5	20
cis-1,2-Dichloroethene	<1.00		25.0	20.38		ug/L		82	52 - 130	8	20
cis-1,3-Dichloropropene	<5.00		25.0	18.99		ug/L		76	55 - 130	3	20
1,2-Dibromo-3-chloropropane	<5.00		25.0	19.01		ug/L		76	45 - 150	7	20
1,2-Dibromoethane (EDB)	<1.00		25.0	22.87		ug/L		91	59 - 130	5	20
Dibromomethane	<1.00		25.0	21.89		ug/L		88	61 - 130	4	20
1,2-Dichlorobenzene	<1.00		25.0	21.27		ug/L		85	53 - 130	2	20
1,3-Dichlorobenzene	<1.00		25.0	19.74		ug/L		79	54 - 130	6	20
1,4-Dichlorobenzene	<1.00		25.0	20.07		ug/L		80	53 - 130	5	20
1,1-Dichloroethane	<1.00		25.0	19.42		ug/L		78	53 - 130	10	20
1,2-Dichloroethane	<1.00		25.0	18.67		ug/L		75	57 - 130	3	21
1,1-Dichloroethene	<2.00		25.0	16.07		ug/L		64	39 - 130	5	28
1,2-Dichloropropane	<1.00		25.0	19.71		ug/L		79	60 - 130	5	31
1,3-Dichloropropane	<1.00		25.0	20.73		ug/L		83	57 - 130	0	20
2,2-Dichloropropane	<4.00		25.0	21.16		ug/L		85	28 - 150	1	20
1,1-Dichloropropene	<1.00		25.0	18.44		ug/L		74	50 - 131	8	20
Diethyl ether	<2.00		25.0	21.85		ug/L		87	50 - 136	1	25
Ethylbenzene	<1.00		25.0	18.14		ug/L		73	48 - 130	8	20
Hexachlorobutadiene	<5.00		25.0	13.56		ug/L		54	27 - 150	10	22
Isopropylbenzene	<1.00		25.0	18.33		ug/L		73	43 - 130	3	20
Methylene chloride	<5.00		25.0	14.37		ug/L		57	50 - 150	13	24
4-Methyl-2-pentanone (MIBK)	<10.0		50.0	44.19		ug/L		88	46 - 132	0	20
Methyl tert-butyl ether	<1.00		25.0	20.87		ug/L		83	57 - 130	0	20
Naphthalene	<5.00		25.0	24.10		ug/L		96	33 - 150	4	30
n-Butylbenzene	<1.00		25.0	16.24		ug/L		65	37 - 138	3	20
n-Propylbenzene	<1.00		25.0	17.91		ug/L		72	42 - 130	4	20
p-Isopropyltoluene	<1.00		25.0	17.69		ug/L		71	43 - 130	1	20
sec-Butylbenzene	<1.00		25.0	17.01		ug/L		68	41 - 132	4	20
Styrene	<1.00		25.0	19.51		ug/L		76	46 - 130	4	20
tert-Butylbenzene	<1.00		25.0	18.06		ug/L		72	45 - 130	2	20
1,1,1,2-Tetrachloroethane	<1.00		25.0	19.45		ug/L		78	52 - 130	1	20
1,1,2,2-Tetrachloroethane	<1.00		25.0	21.38		ug/L		86	51 - 130	1	20
Tetrachloroethene	<1.00		25.0	20.91		ug/L		84	42 - 131	4	20
Tetrahydrofuran	<10.0		50.0	45.09		ug/L		90	40 - 137	11	30
Toluene	<1.00		25.0	20.01		ug/L		80	48 - 130	8	20
trans-1,2-Dichloroethene	<1.00		25.0	20.37		ug/L		81	54 - 130	12	24
trans-1,3-Dichloropropene	<5.00		25.0	21.46		ug/L		86	51 - 130	0	20
1,2,3-Trichlorobenzene	<5.00		25.0	22.02		ug/L		88	46 - 150	3	23
1,2,4-Trichlorobenzene	<5.00		25.0	21.79		ug/L		87	45 - 130	0	20
1,1,1-Trichloroethane	<1.00		25.0	17.36		ug/L		69	49 - 130	8	20
1,1,2-Trichloroethane	<1.00		25.0	20.56		ug/L		82	56 - 130	3	20
Trichloroethene	5.62		25.0	23.96		ug/L		73	55 - 130	10	20
1,2,3-Trichloropropane	<1.00		25.0	21.25		ug/L		85	50 - 130	3	20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-250925-1 MSD
Matrix: Water
Analysis Batch: 380785

Client Sample ID: B-01W (9.67)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1,2-Trichlorotrifluoroethane	<2.00		25.0	18.04		ug/L		72	20 - 150	9	21
1,2,4-Trimethylbenzene	<1.00		25.0	18.48		ug/L		74	45 - 130	3	20
1,3,5-Trimethylbenzene	<1.00		25.0	18.50		ug/L		74	44 - 130	3	20
Xylenes, Total	<3.00		50.0	39.23		ug/L		78	44 - 130	7	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 128*
Toluene-d8 (Surr)	*96*		*80 - 120*

Lab Sample ID: MB 310-380853/1-A
Matrix: Solid
Analysis Batch: 380856

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380853

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.470		0.470		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Allyl chloride	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Benzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Bromobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Bromochloromethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Bromodichloromethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Bromoform	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Bromomethane	<0.470		0.470		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
2-Butanone (MEK)	<0.704		0.704		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Carbon tetrachloride	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Chlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Chlorodibromomethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Chloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Chloroform	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Chloromethane	<0.235		0.235		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
2-Chlorotoluene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
4-Chlorotoluene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
cis-1,2-Dichloroethene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
cis-1,3-Dichloropropene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2-Dibromo-3-chloropropane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2-Dibromoethane (EDB)	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Dibromomethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2-Dichlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,3-Dichlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,4-Dichlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Dichlorodifluoromethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1-Dichloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2-Dichloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1-Dichloroethene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Dichlorofluoromethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2-Dichloropropane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,3-Dichloropropane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
2,2-Dichloropropane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-380853/1-A
Matrix: Solid
Analysis Batch: 380856

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380853

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloropropene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Diethyl ether	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Ethylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Hexachlorobutadiene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Isopropylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Methylene chloride	<0.235		0.235		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
4-Methyl-2-pentanone (MIBK)	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Methyl tert-butyl ether	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Naphthalene	<0.235		0.235		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
n-Butylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
n-Propylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
p-Isopropyltoluene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
sec-Butylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Styrene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
tert-Butylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1,1,2-Tetrachloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1,2,2-Tetrachloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Tetrachloroethene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Tetrahydrofuran	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Toluene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
trans-1,2-Dichloroethene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
trans-1,3-Dichloropropene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2,3-Trichlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2,4-Trichlorobenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1,1-Trichloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1,2-Trichloroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Trichloroethene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Trichlorofluoromethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2,3-Trichloropropane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,1,2-Trichlorotrifluoroethane	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,2,4-Trimethylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
1,3,5-Trimethylbenzene	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Vinyl chloride	<0.0939		0.0939		mg/Kg		03/09/23 06:45	03/10/23 12:15	1
Xylenes, Total	<0.141		0.141		mg/Kg		03/09/23 06:45	03/10/23 12:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*	*03/09/23 06:45*	*03/10/23 12:15*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*	*03/09/23 06:45*	*03/10/23 12:15*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*	*03/09/23 06:45*	*03/10/23 12:15*	*1*

Lab Sample ID: LCS 310-380853/2-A
Matrix: Solid
Analysis Batch: 380856

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380853

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Acetone			1.85	2.489		mg/Kg		135	50 - 150		
Allyl chloride			0.924	1.233		mg/Kg		133	50 - 150		
Benzene			0.924	1.102		mg/Kg		119	80 - 130		

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380853/2-A
Matrix: Solid
Analysis Batch: 380856

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380853

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromobenzene	0.924	1.081		mg/Kg		117	76 - 124
Bromochloromethane	0.924	1.201		mg/Kg		130	78 - 141
Bromodichloromethane	0.924	1.150		mg/Kg		124	74 - 129
Bromoform	0.924	0.9150		mg/Kg		99	63 - 128
2-Butanone (MEK)	1.85	2.284		mg/Kg		124	50 - 150
Carbon tetrachloride	0.924	1.056		mg/Kg		114	75 - 136
Chlorobenzene	0.924	1.050		mg/Kg		114	79 - 125
Chlorodibromomethane	0.924	1.058		mg/Kg		114	73 - 125
Chloroform	0.924	1.087		mg/Kg		118	74 - 133
2-Chlorotoluene	0.924	1.094		mg/Kg		118	77 - 125
4-Chlorotoluene	0.924	1.025		mg/Kg		111	76 - 124
cis-1,2-Dichloroethene	0.924	1.099		mg/Kg		119	76 - 136
cis-1,3-Dichloropropene	0.924	1.056		mg/Kg		114	78 - 129
1,2-Dibromo-3-chloropropane	0.924	1.304		mg/Kg		141	50 - 150
1,2-Dibromoethane (EDB)	0.924	1.126		mg/Kg		122	77 - 130
Dibromomethane	0.924	1.224		mg/Kg		132	77 - 135
1,2-Dichlorobenzene	0.924	1.033		mg/Kg		112	74 - 123
1,3-Dichlorobenzene	0.924	1.017		mg/Kg		110	75 - 123
1,4-Dichlorobenzene	0.924	1.009		mg/Kg		109	76 - 123
1,1-Dichloroethane	0.924	1.106		mg/Kg		120	74 - 139
1,2-Dichloroethane	0.924	1.161		mg/Kg		126	73 - 138
1,1-Dichloroethene	0.924	1.045		mg/Kg		113	62 - 144
1,2-Dichloropropane	0.924	1.171		mg/Kg		127	79 - 130
1,3-Dichloropropane	0.924	1.125		mg/Kg		122	76 - 133
2,2-Dichloropropane	0.924	0.9297		mg/Kg		101	50 - 150
1,1-Dichloropropene	0.924	1.066		mg/Kg		115	78 - 136
Diethyl ether	0.924	1.127		mg/Kg		122	64 - 145
Ethylbenzene	0.924	1.062		mg/Kg		115	80 - 128
Hexachlorobutadiene	0.924	1.018		mg/Kg		110	50 - 150
Isopropylbenzene	0.924	1.068		mg/Kg		116	80 - 125
Methylene chloride	0.924	1.094		mg/Kg		118	50 - 150
4-Methyl-2-pentanone (MIBK)	1.85	2.136		mg/Kg		116	64 - 138
Methyl tert-butyl ether	0.924	1.154		mg/Kg		125	70 - 138
Naphthalene	0.924	1.006		mg/Kg		109	50 - 150
n-Butylbenzene	0.924	0.9940		mg/Kg		108	73 - 126
n-Propylbenzene	0.924	1.047		mg/Kg		113	79 - 126
p-Isopropyltoluene	0.924	1.014		mg/Kg		110	75 - 126
sec-Butylbenzene	0.924	1.016		mg/Kg		110	75 - 126
Styrene	0.924	1.018		mg/Kg		110	79 - 122
tert-Butylbenzene	0.924	1.054		mg/Kg		114	76 - 125
1,1,1,2-Tetrachloroethane	0.924	1.065		mg/Kg		115	78 - 127
1,1,2,2-Tetrachloroethane	0.924	1.154		mg/Kg		125	70 - 129
Tetrachloroethene	0.924	1.047		mg/Kg		113	77 - 133
Tetrahydrofuran	1.85	2.220		mg/Kg		120	67 - 142
Toluene	0.924	1.067		mg/Kg		116	80 - 127
trans-1,2-Dichloroethene	0.924	1.059		mg/Kg		115	70 - 136
trans-1,3-Dichloropropene	0.924	1.061		mg/Kg		115	74 - 129
1,2,3-Trichlorobenzene	0.924	1.041		mg/Kg		113	50 - 150
1,2,4-Trichlorobenzene	0.924	1.032		mg/Kg		112	67 - 131

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380853/2-A
Matrix: Solid
Analysis Batch: 380856

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380853

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1,1-Trichloroethane	0.924	1.123		mg/Kg		122	77 - 136
1,1,2-Trichloroethane	0.924	1.127		mg/Kg		122	74 - 130
Trichloroethene	0.924	1.098		mg/Kg		119	80 - 131
1,2,3-Trichloropropane	0.924	1.141		mg/Kg		124	69 - 133
1,1,2-Trichlorotrifluoroethane	0.924	1.121		mg/Kg		121	59 - 149
1,2,4-Trimethylbenzene	0.924	1.004		mg/Kg		109	76 - 129
1,3,5-Trimethylbenzene	0.924	1.016		mg/Kg		110	76 - 127
Xylenes, Total	1.85	2.123		mg/Kg		115	80 - 128

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Lab Sample ID: MB 310-380873/5
Matrix: Water
Analysis Batch: 380873

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<10.0		10.0		ug/L			03/09/23 09:40	1
Allyl chloride	<2.00		2.00		ug/L			03/09/23 09:40	1
Benzene	<0.500		0.500		ug/L			03/09/23 09:40	1
Bromobenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Bromochloromethane	<5.00		5.00		ug/L			03/09/23 09:40	1
Bromodichloromethane	<1.00		1.00		ug/L			03/09/23 09:40	1
Bromoform	<5.00		5.00		ug/L			03/09/23 09:40	1
Bromomethane	<4.00		4.00		ug/L			03/09/23 09:40	1
2-Butanone (MEK)	<10.0		10.0		ug/L			03/09/23 09:40	1
Carbon tetrachloride	<2.00		2.00		ug/L			03/09/23 09:40	1
Chlorobenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Chlorodibromomethane	<5.00		5.00		ug/L			03/09/23 09:40	1
Chloroethane	<4.00		4.00		ug/L			03/09/23 09:40	1
Chloroform	<3.00		3.00		ug/L			03/09/23 09:40	1
Chloromethane	<3.00		3.00		ug/L			03/09/23 09:40	1
2-Chlorotoluene	<1.00		1.00		ug/L			03/09/23 09:40	1
4-Chlorotoluene	<1.00		1.00		ug/L			03/09/23 09:40	1
cis-1,2-Dichloroethene	<1.00		1.00		ug/L			03/09/23 09:40	1
cis-1,3-Dichloropropene	<5.00		5.00		ug/L			03/09/23 09:40	1
1,2-Dibromo-3-chloropropane	<5.00		5.00		ug/L			03/09/23 09:40	1
1,2-Dibromoethane (EDB)	<1.00		1.00		ug/L			03/09/23 09:40	1
Dibromomethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,2-Dichlorobenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
1,3-Dichlorobenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
1,4-Dichlorobenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Dichlorodifluoromethane	<3.00		3.00		ug/L			03/09/23 09:40	1
1,1-Dichloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,2-Dichloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,1-Dichloroethene	<2.00		2.00		ug/L			03/09/23 09:40	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-380873/5
Matrix: Water
Analysis Batch: 380873

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorofluoromethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,2-Dichloropropane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,3-Dichloropropane	<1.00		1.00		ug/L			03/09/23 09:40	1
2,2-Dichloropropane	<4.00		4.00		ug/L			03/09/23 09:40	1
1,1-Dichloropropene	<1.00		1.00		ug/L			03/09/23 09:40	1
Diethyl ether	<2.00		2.00		ug/L			03/09/23 09:40	1
Ethylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Hexachlorobutadiene	<5.00		5.00		ug/L			03/09/23 09:40	1
Isopropylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Methylene chloride	<5.00		5.00		ug/L			03/09/23 09:40	1
4-Methyl-2-pentanone (MIBK)	<10.0		10.0		ug/L			03/09/23 09:40	1
Methyl tert-butyl ether	<1.00		1.00		ug/L			03/09/23 09:40	1
Naphthalene	<5.00		5.00		ug/L			03/09/23 09:40	1
n-Butylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
n-Propylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
p-Isopropyltoluene	<1.00		1.00		ug/L			03/09/23 09:40	1
sec-Butylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Styrene	<1.00		1.00		ug/L			03/09/23 09:40	1
tert-Butylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
1,1,1,2-Tetrachloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,1,2,2-Tetrachloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
Tetrachloroethene	<1.00		1.00		ug/L			03/09/23 09:40	1
Tetrahydrofuran	<10.0		10.0		ug/L			03/09/23 09:40	1
Toluene	<1.00		1.00		ug/L			03/09/23 09:40	1
trans-1,2-Dichloroethene	<1.00		1.00		ug/L			03/09/23 09:40	1
trans-1,3-Dichloropropene	<5.00		5.00		ug/L			03/09/23 09:40	1
1,2,3-Trichlorobenzene	<5.00		5.00		ug/L			03/09/23 09:40	1
1,2,4-Trichlorobenzene	<5.00		5.00		ug/L			03/09/23 09:40	1
1,1,1-Trichloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,1,2-Trichloroethane	<1.00		1.00		ug/L			03/09/23 09:40	1
Trichloroethene	<1.00		1.00		ug/L			03/09/23 09:40	1
Trichlorofluoromethane	<4.00		4.00		ug/L			03/09/23 09:40	1
1,2,3-Trichloropropane	<1.00		1.00		ug/L			03/09/23 09:40	1
1,1,2-Trichlorotrifluoroethane	<2.00		2.00		ug/L			03/09/23 09:40	1
1,2,4-Trimethylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
1,3,5-Trimethylbenzene	<1.00		1.00		ug/L			03/09/23 09:40	1
Vinyl chloride	<1.00		1.00		ug/L			03/09/23 09:40	1
Xylenes, Total	<3.00		3.00		ug/L			03/09/23 09:40	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*03/09/23 09:40*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 128*		*03/09/23 09:40*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*03/09/23 09:40*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380873/6
Matrix: Water
Analysis Batch: 380873

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acetone	40.0	38.59		ug/L		96	50 - 150
Allyl chloride	20.0	17.19		ug/L		86	50 - 150
Benzene	20.0	17.85		ug/L		89	73 - 122
Bromobenzene	20.0	19.30		ug/L		97	67 - 124
Bromochloromethane	20.0	19.06		ug/L		95	68 - 132
Bromodichloromethane	20.0	17.95		ug/L		90	72 - 121
Bromoform	20.0	15.36		ug/L		77	55 - 129
2-Butanone (MEK)	40.0	32.57		ug/L		81	50 - 150
Carbon tetrachloride	20.0	16.37		ug/L		82	67 - 132
Chlorobenzene	20.0	19.22		ug/L		96	69 - 121
Chlorodibromomethane	20.0	16.75		ug/L		84	69 - 122
Chloroform	20.0	18.18		ug/L		91	72 - 120
2-Chlorotoluene	20.0	19.10		ug/L		95	66 - 122
4-Chlorotoluene	20.0	19.74		ug/L		99	65 - 122
cis-1,2-Dichloroethene	20.0	18.56		ug/L		93	74 - 120
cis-1,3-Dichloropropene	20.0	17.93		ug/L		90	71 - 126
1,2-Dibromo-3-chloropropane	20.0	16.42		ug/L		82	50 - 150
1,2-Dibromoethane (EDB)	20.0	18.56		ug/L		93	73 - 125
Dibromomethane	20.0	18.95		ug/L		95	72 - 123
1,2-Dichlorobenzene	20.0	18.96		ug/L		95	68 - 120
1,3-Dichlorobenzene	20.0	19.34		ug/L		97	67 - 123
1,4-Dichlorobenzene	20.0	19.42		ug/L		97	67 - 120
1,1-Dichloroethane	20.0	17.75		ug/L		89	71 - 123
1,2-Dichloroethane	20.0	18.64		ug/L		93	70 - 124
1,1-Dichloroethene	20.0	18.11		ug/L		91	61 - 129
1,2-Dichloropropane	20.0	17.09		ug/L		85	73 - 121
1,3-Dichloropropane	20.0	18.34		ug/L		92	72 - 124
2,2-Dichloropropane	20.0	18.61		ug/L		93	50 - 150
1,1-Dichloropropene	20.0	17.32		ug/L		87	70 - 131
Diethyl ether	20.0	18.95		ug/L		95	59 - 136
Ethylbenzene	20.0	19.53		ug/L		98	69 - 122
Hexachlorobutadiene	20.0	19.11		ug/L		96	49 - 150
Isopropylbenzene	20.0	19.43		ug/L		97	66 - 126
Methylene chloride	20.0	17.28		ug/L		86	50 - 150
4-Methyl-2-pentanone (MIBK)	40.0	42.80		ug/L		107	62 - 130
Methyl tert-butyl ether	20.0	16.96		ug/L		85	68 - 127
Naphthalene	20.0	17.75		ug/L		89	50 - 150
n-Butylbenzene	20.0	20.39		ug/L		102	54 - 138
n-Propylbenzene	20.0	19.77		ug/L		99	65 - 127
p-Isopropyltoluene	20.0	19.76		ug/L		99	61 - 128
sec-Butylbenzene	20.0	19.69		ug/L		98	62 - 132
Styrene	20.0	19.65		ug/L		98	67 - 125
tert-Butylbenzene	20.0	19.26		ug/L		96	64 - 127
1,1,1,2-Tetrachloroethane	20.0	16.78		ug/L		84	68 - 123
1,1,2,2-Tetrachloroethane	20.0	18.69		ug/L		93	64 - 124
Tetrachloroethene	20.0	19.18		ug/L		96	69 - 131
Tetrahydrofuran	40.0	35.93		ug/L		90	62 - 132
Toluene	20.0	20.36		ug/L		102	72 - 121

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-380873/6
Matrix: Water
Analysis Batch: 380873

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
trans-1,2-Dichloroethene	20.0	18.34		ug/L		92	68 - 125
trans-1,3-Dichloropropene	20.0	17.44		ug/L		87	68 - 124
1,2,3-Trichlorobenzene	20.0	18.12		ug/L		91	50 - 150
1,2,4-Trichlorobenzene	20.0	17.89		ug/L		89	61 - 124
1,1,1-Trichloroethane	20.0	18.01		ug/L		90	71 - 128
1,1,2-Trichloroethane	20.0	18.18		ug/L		91	70 - 124
Trichloroethene	20.0	17.09		ug/L		85	73 - 126
1,2,3-Trichloropropane	20.0	19.31		ug/L		97	64 - 125
1,1,2-Trichlorotrifluoroethane	20.0	19.73		ug/L		99	51 - 150
1,2,4-Trimethylbenzene	20.0	19.82		ug/L		99	65 - 125
1,3,5-Trimethylbenzene	20.0	19.86		ug/L		99	65 - 124
Xylenes, Total	40.0	38.37		ug/L		96	68 - 124

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 128*
Toluene-d8 (Surr)	*106*		*80 - 120*

Lab Sample ID: LCS 310-380873/7
Matrix: Water
Analysis Batch: 380873

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Bromomethane	20.0	16.96		ug/L		85	24 - 150
Chloroethane	20.0	19.09		ug/L		95	51 - 137
Chloromethane	20.0	16.80		ug/L		84	37 - 150
Dichlorodifluoromethane	20.0	19.50		ug/L		97	37 - 150
Dichlorofluoromethane	20.0	19.22		ug/L		96	55 - 138
Trichlorofluoromethane	20.0	21.60		ug/L		108	56 - 144
Vinyl chloride	20.0	19.24		ug/L		96	57 - 136

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*80 - 128*
Toluene-d8 (Surr)	*98*		*80 - 120*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 310-380889/1-A
Matrix: Solid
Analysis Batch: 381367

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380889

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Acenaphthylene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Anthracene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Benzo(a)anthracene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Benzo(a)pyrene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: MB 310-380889/1-A
Matrix: Solid
Analysis Batch: 381367

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380889

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzo(b)fluoranthene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Benzo(g,h,i)perylene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Benzo(k)fluoranthene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Chrysene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Dibenz(a,h)anthracene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Fluoranthene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Fluorene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Indeno(1,2,3-cd)pyrene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
2-Methylnaphthalene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Naphthalene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Phenanthrene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1
Pyrene	<0.00947		0.00947		mg/Kg		03/09/23 09:21	03/15/23 12:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*20 - 110*	*03/09/23 09:21*	*03/15/23 12:23*	*1*
Nitrobenzene-d5 (Surr)	*97*		*11 - 116*	*03/09/23 09:21*	*03/15/23 12:23*	*1*
Terphenyl-d14 (Surr)	*82*		*18 - 110*	*03/09/23 09:21*	*03/15/23 12:23*	*1*

Lab Sample ID: LCS 310-380889/2-A
Matrix: Solid
Analysis Batch: 381367

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380889

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	0.0323	0.02481		mg/Kg		77	30 - 110
Acenaphthylene	0.0323	0.02542		mg/Kg		79	31 - 110
Anthracene	0.0323	0.02387		mg/Kg		74	32 - 110
Benzo(a)anthracene	0.0323	0.02802		mg/Kg		87	36 - 110
Benzo(a)pyrene	0.0323	0.02466		mg/Kg		76	36 - 110
Benzo(b)fluoranthene	0.0323	0.02542		mg/Kg		79	37 - 110
Benzo(g,h,i)perylene	0.0323	0.02025		mg/Kg		63	22 - 110
Benzo(k)fluoranthene	0.0323	0.02316		mg/Kg		72	35 - 110
Chrysene	0.0323	0.02387		mg/Kg		74	35 - 110
Dibenz(a,h)anthracene	0.0323	0.02281		mg/Kg		71	23 - 110
Fluoranthene	0.0323	0.02391		mg/Kg		74	30 - 110
Fluorene	0.0323	0.02493		mg/Kg		77	30 - 110
Indeno(1,2,3-cd)pyrene	0.0323	0.02348		mg/Kg		73	23 - 110
2-Methylnaphthalene	0.0323	0.02373		mg/Kg		73	30 - 110
Naphthalene	0.0323	0.02267		mg/Kg		70	31 - 110
Phenanthrene	0.0323	0.02440		mg/Kg		76	32 - 110
Pyrene	0.0323	0.02298		mg/Kg		71	28 - 110

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*55*		*20 - 110*
Nitrobenzene-d5 (Surr)	*79*		*11 - 116*
Terphenyl-d14 (Surr)	*64*		*18 - 110*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Lab Sample ID: MB 310-380821/5
Matrix: Water
Analysis Batch: 380821

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<100		100		ug/L			03/08/23 16:09	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*113*		*80 - 120*		*03/08/23 16:09*	*1*

Lab Sample ID: LCS 310-380821/4
Matrix: Water
Analysis Batch: 380821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Wisconsin GRO			800	892.0		ug/L		111	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*111*		*80 - 120*

Lab Sample ID: LCSD 310-380821/27
Matrix: Water
Analysis Batch: 380821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Wisconsin GRO			800	854.1		ug/L		107	80 - 120	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*109*		*80 - 120*

Lab Sample ID: MB 310-380939/2-A
Matrix: Solid
Analysis Batch: 380938

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380939

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.77		9.77		mg/Kg		03/09/23 17:36	03/09/23 19:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*	*03/09/23 17:36*	*03/09/23 19:48*	*1*

Lab Sample ID: LCS 310-380939/1-A
Matrix: Solid
Analysis Batch: 380938

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380939

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Wisconsin GRO			37.8	40.10		mg/Kg		106	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: LCSD 310-380939/26-A
Matrix: Solid
Analysis Batch: 380938

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 380939

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Wisconsin GRO			39.4	41.87		mg/Kg		106	80 - 120	4	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Lab Sample ID: MB 310-380796/1-A
Matrix: Water
Analysis Batch: 381063

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380796

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<100		100		ug/L		03/08/23 12:32	03/13/23 09:05	1

Lab Sample ID: LCS 310-380796/2-A
Matrix: Water
Analysis Batch: 381063

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380796

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Diesel Range Organics (DRO)			5000	4479		ug/L		90	75 - 115		

Lab Sample ID: LCSD 310-380796/3-A
Matrix: Water
Analysis Batch: 381063

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 380796

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics (DRO)			5000	4553		ug/L		91	75 - 115	2	20

Lab Sample ID: MB 310-380888/1-A
Matrix: Solid
Analysis Batch: 381062

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380888

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics (DRO)	<6.74		6.74		mg/Kg		03/09/23 09:19	03/13/23 09:21	1

Lab Sample ID: LCS 310-380888/2-A
Matrix: Solid
Analysis Batch: 381062

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380888

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Diesel Range Organics (DRO)			99.5	104.4		mg/Kg		105	70 - 120		

Lab Sample ID: LCSD 310-380888/3-A
Matrix: Solid
Analysis Batch: 381062

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 380888

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics (DRO)			98.2	98.01		mg/Kg		100	70 - 120	6	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-380992/1-A ^5
Matrix: Solid
Analysis Batch: 381311

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 380992

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.803		0.803		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Barium	<0.803		0.803		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Cadmium	<0.401		0.401		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Chromium	<1.20		1.20		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Lead	<2.01		2.01		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Selenium	<1.20		1.20		mg/Kg		03/14/23 10:30	03/14/23 15:25	5
Silver	<0.201		0.201		mg/Kg		03/14/23 10:30	03/14/23 15:25	5

Lab Sample ID: LCS 310-380992/2-A ^20
Matrix: Solid
Analysis Batch: 381311

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 380992

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	170	176.0		mg/Kg		103	80 - 120
Barium	85.0	88.46		mg/Kg		104	80 - 120
Cadmium	85.0	89.01		mg/Kg		105	80 - 120
Chromium	85.0	88.58		mg/Kg		104	80 - 120
Lead	170	182.2		mg/Kg		107	80 - 120
Selenium	340	353.1		mg/Kg		104	80 - 120
Silver	85.0	92.81		mg/Kg		109	80 - 120

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 310-381144/1-A
Matrix: Solid
Analysis Batch: 381310

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 381144

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0157		0.0157		mg/Kg		03/13/23 12:01	03/14/23 15:27	1

Lab Sample ID: LCS 310-381144/2-A
Matrix: Solid
Analysis Batch: 381310

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 381144

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.125	0.1275		mg/Kg		102	80 - 120

GC/MS VOA

Analysis Batch: 380785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-1	B-01W (9.67)	Total/NA	Water	8260D	
310-250925-2	B-02W (8.50)	Total/NA	Water	8260D	
310-250925-3	B-07W (9.10)	Total/NA	Water	8260D	
310-250925-4	B-06W (8.75)	Total/NA	Water	8260D	
310-250925-5	B-08W (9.00)	Total/NA	Water	8260D	
MB 310-380785/5	Method Blank	Total/NA	Water	8260D	
LCS 310-380785/6	Lab Control Sample	Total/NA	Water	8260D	
LCS 310-380785/7	Lab Control Sample	Total/NA	Water	8260D	
310-250925-1 MS	B-01W (9.67)	Total/NA	Water	8260D	
310-250925-1 MSD	B-01W (9.67)	Total/NA	Water	8260D	

Prep Batch: 380853

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	5035	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	5035	
310-250925-8	B-04 (2-3)	Total/NA	Solid	5035	
310-250925-9	B-01 (5-6)	Total/NA	Solid	5035	
310-250925-10	B-02 (3-4)	Total/NA	Solid	5035	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	5035	
310-250925-12	B-06 (5-6)	Total/NA	Solid	5035	
310-250925-13	B-08 (3-4)	Total/NA	Solid	5035	
310-250925-15	Trip Blank (Soil)	Total/NA	Solid	5035	
MB 310-380853/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-380853/2-A	Lab Control Sample	Total/NA	Solid	5035	

Analysis Batch: 380856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	8260D	380853
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	8260D	380853
310-250925-8	B-04 (2-3)	Total/NA	Solid	8260D	380853
310-250925-9	B-01 (5-6)	Total/NA	Solid	8260D	380853
310-250925-10	B-02 (3-4)	Total/NA	Solid	8260D	380853
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	8260D	380853
310-250925-12	B-06 (5-6)	Total/NA	Solid	8260D	380853
310-250925-13	B-08 (3-4)	Total/NA	Solid	8260D	380853
310-250925-15	Trip Blank (Soil)	Total/NA	Solid	8260D	380853
MB 310-380853/1-A	Method Blank	Total/NA	Solid	8260D	380853
LCS 310-380853/2-A	Lab Control Sample	Total/NA	Solid	8260D	380853

Analysis Batch: 380873

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-1	B-01W (9.67)	Total/NA	Water	8260D	
MB 310-380873/5	Method Blank	Total/NA	Water	8260D	
LCS 310-380873/6	Lab Control Sample	Total/NA	Water	8260D	
LCS 310-380873/7	Lab Control Sample	Total/NA	Water	8260D	

GC/MS Semi VOA

Prep Batch: 380889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	3546	

GC/MS Semi VOA (Continued)

Prep Batch: 380889 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	3546	
310-250925-8	B-04 (2-3)	Total/NA	Solid	3546	
310-250925-9	B-01 (5-6)	Total/NA	Solid	3546	
310-250925-10	B-02 (3-4)	Total/NA	Solid	3546	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	3546	
310-250925-12	B-06 (5-6)	Total/NA	Solid	3546	
310-250925-13	B-08 (3-4)	Total/NA	Solid	3546	
MB 310-380889/1-A	Method Blank	Total/NA	Solid	3546	
LCS 310-380889/2-A	Lab Control Sample	Total/NA	Solid	3546	

Analysis Batch: 381208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	8270E SIM	380889
310-250925-8	B-04 (2-3)	Total/NA	Solid	8270E SIM	380889
310-250925-9	B-01 (5-6)	Total/NA	Solid	8270E SIM	380889
310-250925-10	B-02 (3-4)	Total/NA	Solid	8270E SIM	380889

Analysis Batch: 381367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	8270E SIM	380889
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	8270E SIM	380889
310-250925-12	B-06 (5-6)	Total/NA	Solid	8270E SIM	380889
310-250925-13	B-08 (3-4)	Total/NA	Solid	8270E SIM	380889
MB 310-380889/1-A	Method Blank	Total/NA	Solid	8270E SIM	380889
LCS 310-380889/2-A	Lab Control Sample	Total/NA	Solid	8270E SIM	380889

GC VOA

Analysis Batch: 380821

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-1	B-01W (9.67)	Total/NA	Water	WI-GRO	
310-250925-2	B-02W (8.50)	Total/NA	Water	WI-GRO	
310-250925-3	B-07W (9.10)	Total/NA	Water	WI-GRO	
310-250925-4	B-06W (8.75)	Total/NA	Water	WI-GRO	
310-250925-5	B-08W (9.00)	Total/NA	Water	WI-GRO	
MB 310-380821/5	Method Blank	Total/NA	Water	WI-GRO	
LCS 310-380821/4	Lab Control Sample	Total/NA	Water	WI-GRO	
LCSD 310-380821/27	Lab Control Sample Dup	Total/NA	Water	WI-GRO	

Analysis Batch: 380938

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	WI-GRO	380939
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	WI-GRO	380939
310-250925-8	B-04 (2-3)	Total/NA	Solid	WI-GRO	380939
310-250925-9	B-01 (5-6)	Total/NA	Solid	WI-GRO	380939
310-250925-10	B-02 (3-4)	Total/NA	Solid	WI-GRO	380939
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	WI-GRO	380939
310-250925-12	B-06 (5-6)	Total/NA	Solid	WI-GRO	380939
310-250925-13	B-08 (3-4)	Total/NA	Solid	WI-GRO	380939
MB 310-380939/2-A	Method Blank	Total/NA	Solid	WI-GRO	380939
LCS 310-380939/1-A	Lab Control Sample	Total/NA	Solid	WI-GRO	380939

GC VOA (Continued)

Analysis Batch: 380938 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 310-380939/26-A	Lab Control Sample Dup	Total/NA	Solid	WI-GRO	380939

Prep Batch: 380939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	WI GRO	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	WI GRO	
310-250925-8	B-04 (2-3)	Total/NA	Solid	WI GRO	
310-250925-9	B-01 (5-6)	Total/NA	Solid	WI GRO	
310-250925-10	B-02 (3-4)	Total/NA	Solid	WI GRO	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	WI GRO	
310-250925-12	B-06 (5-6)	Total/NA	Solid	WI GRO	
310-250925-13	B-08 (3-4)	Total/NA	Solid	WI GRO	
MB 310-380939/2-A	Method Blank	Total/NA	Solid	5035	
LCS 310-380939/1-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 310-380939/26-A	Lab Control Sample Dup	Total/NA	Solid	5035	

GC Semi VOA

Prep Batch: 380796

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-1	B-01W (9.67)	Total/NA	Water	3510C	
310-250925-2	B-02W (8.50)	Total/NA	Water	3510C	
310-250925-3	B-07W (9.10)	Total/NA	Water	3510C	
310-250925-4	B-06W (8.75)	Total/NA	Water	3510C	
310-250925-5	B-08W (9.00)	Total/NA	Water	3510C	
MB 310-380796/1-A	Method Blank	Total/NA	Water	3510C	
LCS 310-380796/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 310-380796/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Prep Batch: 380888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	WI DRO PREP	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	WI DRO PREP	
310-250925-8	B-04 (2-3)	Total/NA	Solid	WI DRO PREP	
310-250925-9	B-01 (5-6)	Total/NA	Solid	WI DRO PREP	
310-250925-10	B-02 (3-4)	Total/NA	Solid	WI DRO PREP	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	WI DRO PREP	
310-250925-12	B-06 (5-6)	Total/NA	Solid	WI DRO PREP	
310-250925-13	B-08 (3-4)	Total/NA	Solid	WI DRO PREP	
MB 310-380888/1-A	Method Blank	Total/NA	Solid	WI DRO PREP	
LCS 310-380888/2-A	Lab Control Sample	Total/NA	Solid	WI DRO PREP	
LCSD 310-380888/3-A	Lab Control Sample Dup	Total/NA	Solid	WI DRO PREP	

Analysis Batch: 381062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	WI-DRO	380888
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	WI-DRO	380888
310-250925-8	B-04 (2-3)	Total/NA	Solid	WI-DRO	380888
310-250925-9	B-01 (5-6)	Total/NA	Solid	WI-DRO	380888
310-250925-10	B-02 (3-4)	Total/NA	Solid	WI-DRO	380888
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	WI-DRO	380888

GC Semi VOA (Continued)

Analysis Batch: 381062 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-12	B-06 (5-6)	Total/NA	Solid	WI-DRO	380888
310-250925-13	B-08 (3-4)	Total/NA	Solid	WI-DRO	380888
MB 310-380888/1-A	Method Blank	Total/NA	Solid	WI-DRO	380888
LCS 310-380888/2-A	Lab Control Sample	Total/NA	Solid	WI-DRO	380888
LCSD 310-380888/3-A	Lab Control Sample Dup	Total/NA	Solid	WI-DRO	380888

Analysis Batch: 381063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-1	B-01W (9.67)	Total/NA	Water	WI-DRO	380796
310-250925-2	B-02W (8.50)	Total/NA	Water	WI-DRO	380796
310-250925-3	B-07W (9.10)	Total/NA	Water	WI-DRO	380796
310-250925-4	B-06W (8.75)	Total/NA	Water	WI-DRO	380796
310-250925-5	B-08W (9.00)	Total/NA	Water	WI-DRO	380796
MB 310-380796/1-A	Method Blank	Total/NA	Water	WI-DRO	380796
LCS 310-380796/2-A	Lab Control Sample	Total/NA	Water	WI-DRO	380796
LCSD 310-380796/3-A	Lab Control Sample Dup	Total/NA	Water	WI-DRO	380796

Metals

Prep Batch: 380992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	3050B	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	3050B	
310-250925-8	B-04 (2-3)	Total/NA	Solid	3050B	
310-250925-9	B-01 (5-6)	Total/NA	Solid	3050B	
310-250925-10	B-02 (3-4)	Total/NA	Solid	3050B	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	3050B	
310-250925-12	B-06 (5-6)	Total/NA	Solid	3050B	
310-250925-13	B-08 (3-4)	Total/NA	Solid	3050B	
MB 310-380992/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 310-380992/2-A ^20	Lab Control Sample	Total/NA	Solid	3050B	

Prep Batch: 381144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	7471B	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	7471B	
310-250925-8	B-04 (2-3)	Total/NA	Solid	7471B	
310-250925-9	B-01 (5-6)	Total/NA	Solid	7471B	
310-250925-10	B-02 (3-4)	Total/NA	Solid	7471B	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	7471B	
310-250925-12	B-06 (5-6)	Total/NA	Solid	7471B	
310-250925-13	B-08 (3-4)	Total/NA	Solid	7471B	
MB 310-381144/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 310-381144/2-A	Lab Control Sample	Total/NA	Solid	7471B	

Analysis Batch: 381310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	7471B	381144
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	7471B	381144
310-250925-8	B-04 (2-3)	Total/NA	Solid	7471B	381144
310-250925-9	B-01 (5-6)	Total/NA	Solid	7471B	381144

Metals (Continued)

Analysis Batch: 381310 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-10	B-02 (3-4)	Total/NA	Solid	7471B	381144
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	7471B	381144
310-250925-12	B-06 (5-6)	Total/NA	Solid	7471B	381144
310-250925-13	B-08 (3-4)	Total/NA	Solid	7471B	381144
MB 310-381144/1-A	Method Blank	Total/NA	Solid	7471B	381144
LCS 310-381144/2-A	Lab Control Sample	Total/NA	Solid	7471B	381144

Analysis Batch: 381311

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	6020B	380992
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	6020B	380992
310-250925-8	B-04 (2-3)	Total/NA	Solid	6020B	380992
310-250925-9	B-01 (5-6)	Total/NA	Solid	6020B	380992
310-250925-10	B-02 (3-4)	Total/NA	Solid	6020B	380992
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	6020B	380992
310-250925-12	B-06 (5-6)	Total/NA	Solid	6020B	380992
310-250925-13	B-08 (3-4)	Total/NA	Solid	6020B	380992
MB 310-380992/1-A ^5	Method Blank	Total/NA	Solid	6020B	380992
LCS 310-380992/2-A ^20	Lab Control Sample	Total/NA	Solid	6020B	380992

General Chemistry

Analysis Batch: 380837

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-6	B-05 (1.5-2.5)	Total/NA	Solid	Moisture	
310-250925-7	B-03 (1.5-2.5)	Total/NA	Solid	Moisture	
310-250925-8	B-04 (2-3)	Total/NA	Solid	Moisture	
310-250925-9	B-01 (5-6)	Total/NA	Solid	Moisture	
310-250925-10	B-02 (3-4)	Total/NA	Solid	Moisture	
310-250925-11	B-07 (2.5-3.5)	Total/NA	Solid	Moisture	

Analysis Batch: 380854

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-250925-12	B-06 (5-6)	Total/NA	Solid	Moisture	
310-250925-13	B-08 (3-4)	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Client Sample ID: B-01W (9.67)

Lab Sample ID: 310-250925-1

Date Collected: 03/06/23 12:15
Matrix: Water
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	380873	WSE8	EET CF	03/09/23 13:13
Total/NA	Analysis	8260D		1	380785	WSE8	EET CF	03/08/23 15:15
Total/NA	Analysis	WI-GRO		1	380821	ZB9H	EET CF	03/08/23 21:42
Total/NA	Prep	3510C			380796	Y6AF	EET CF	03/08/23 12:32
Total/NA	Analysis	WI-DRO		1	381063	C3AA	EET CF	03/13/23 09:28

Client Sample ID: B-02W (8.50)

Lab Sample ID: 310-250925-2

Date Collected: 03/06/23 13:15
Matrix: Water
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	380785	WSE8	EET CF	03/08/23 15:35
Total/NA	Analysis	WI-GRO		5	380821	ZB9H	EET CF	03/08/23 23:25
Total/NA	Prep	3510C			380796	Y6AF	EET CF	03/08/23 12:32
Total/NA	Analysis	WI-DRO		1	381063	C3AA	EET CF	03/13/23 09:39

Client Sample ID: B-07W (9.10)

Lab Sample ID: 310-250925-3

Date Collected: 03/06/23 14:00
Matrix: Water
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	380785	WSE8	EET CF	03/08/23 15:56
Total/NA	Analysis	WI-GRO		1	380821	ZB9H	EET CF	03/08/23 22:08
Total/NA	Prep	3510C			380796	Y6AF	EET CF	03/08/23 12:32
Total/NA	Analysis	WI-DRO		1	381063	C3AA	EET CF	03/13/23 09:50

Client Sample ID: B-06W (8.75)

Lab Sample ID: 310-250925-4

Date Collected: 03/06/23 14:20
Matrix: Water
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	380785	WSE8	EET CF	03/08/23 16:16
Total/NA	Analysis	WI-GRO		5	380821	ZB9H	EET CF	03/08/23 23:50
Total/NA	Prep	3510C			380796	Y6AF	EET CF	03/08/23 12:32
Total/NA	Analysis	WI-DRO		1	381063	C3AA	EET CF	03/13/23 10:02

Client Sample ID: B-08W (9.00)

Lab Sample ID: 310-250925-5

Date Collected: 03/06/23 15:45
Matrix: Water
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	380785	WSE8	EET CF	03/08/23 16:36
Total/NA	Analysis	WI-GRO		5	380821	ZB9H	EET CF	03/09/23 00:16
Total/NA	Prep	3510C			380796	Y6AF	EET CF	03/08/23 12:32
Total/NA	Analysis	WI-DRO		1	381063	C3AA	EET CF	03/13/23 10:43

Client Sample ID: B-05 (1.5-2.5)

Lab Sample ID: 310-250925-6

Date Collected: 03/06/23 09:30

Matrix: Solid

Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-05 (1.5-2.5)

Lab Sample ID: 310-250925-6

Date Collected: 03/06/23 09:30

Matrix: Solid

Date Received: 03/08/23 09:30

Percent Solids: 83.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 17:02
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381367	V7YZ	EET CF	03/15/23 13:02
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 00:53
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 09:55
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 16:59
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 15:53

Client Sample ID: B-03 (1.5-2.5)

Lab Sample ID: 310-250925-7

Date Collected: 03/06/23 10:00

Matrix: Solid

Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-03 (1.5-2.5)

Lab Sample ID: 310-250925-7

Date Collected: 03/06/23 10:00

Matrix: Solid

Date Received: 03/08/23 09:30

Percent Solids: 92.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 17:26
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381208	V7YZ	EET CF	03/14/23 19:34
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 01:24
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 10:07
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:02
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 15:55

Client Sample ID: B-04 (2-3)

Lab Sample ID: 310-250925-8

Date Collected: 03/06/23 11:00
Matrix: Solid
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-04 (2-3)

Lab Sample ID: 310-250925-8

Date Collected: 03/06/23 11:00
Matrix: Solid
Date Received: 03/08/23 09:30
Percent Solids: 87.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 17:51
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381208	V7YZ	EET CF	03/14/23 19:53
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 01:54
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 10:45
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:07
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 15:57

Client Sample ID: B-01 (5-6)

Lab Sample ID: 310-250925-9

Date Collected: 03/06/23 12:00
Matrix: Solid
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-01 (5-6)

Lab Sample ID: 310-250925-9

Date Collected: 03/06/23 12:00
Matrix: Solid
Date Received: 03/08/23 09:30
Percent Solids: 83.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 18:15
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381208	V7YZ	EET CF	03/14/23 20:12
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 02:25
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 10:56
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:10
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 15:59

Client Sample ID: B-02 (3-4)

Lab Sample ID: 310-250925-10

Date Collected: 03/06/23 12:30

Matrix: Solid

Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-02 (3-4)

Lab Sample ID: 310-250925-10

Date Collected: 03/06/23 12:30

Matrix: Solid

Date Received: 03/08/23 09:30

Percent Solids: 85.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 18:39
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		5	381208	V7YZ	EET CF	03/14/23 18:55
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 02:55
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 11:08
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:13
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 16:01

Client Sample ID: B-07 (2.5-3.5)

Lab Sample ID: 310-250925-11

Date Collected: 03/06/23 13:20

Matrix: Solid

Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380837	A3GU	EET CF	03/08/23 17:30

Client Sample ID: B-07 (2.5-3.5)

Lab Sample ID: 310-250925-11

Date Collected: 03/06/23 13:20

Matrix: Solid

Date Received: 03/08/23 09:30

Percent Solids: 89.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 19:03
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381367	V7YZ	EET CF	03/15/23 13:22
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 03:26
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 11:19
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:17
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 16:04

Client Sample ID: B-06 (5-6)

Lab Sample ID: 310-250925-12

Date Collected: 03/06/23 14:15
Matrix: Solid
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380854	DGU1	EET CF	03/09/23 06:48

Client Sample ID: B-06 (5-6)

Lab Sample ID: 310-250925-12

Date Collected: 03/06/23 14:15
Matrix: Solid
Date Received: 03/08/23 09:30
Percent Solids: 88.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 19:27
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381367	V7YZ	EET CF	03/15/23 13:41
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 03:56
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 11:31
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:20
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 16:06

Client Sample ID: B-08 (3-4)

Lab Sample ID: 310-250925-13

Date Collected: 03/06/23 15:00
Matrix: Solid
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	380854	DGU1	EET CF	03/09/23 06:48

Client Sample ID: B-08 (3-4)

Lab Sample ID: 310-250925-13

Date Collected: 03/06/23 15:00
Matrix: Solid
Date Received: 03/08/23 09:30
Percent Solids: 89.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 19:51
Total/NA	Prep	3546			380889	GW4G	EET CF	03/09/23 09:21
Total/NA	Analysis	8270E SIM		1	381367	V7YZ	EET CF	03/15/23 14:01
Total/NA	Prep	WI GRO			380939	ZB9H	EET CF	03/09/23 17:36
Total/NA	Analysis	WI-GRO		1	380938	ZB9H	EET CF	03/10/23 04:27
Total/NA	Prep	WI DRO PREP			380888	GW4G	EET CF	03/09/23 09:19
Total/NA	Analysis	WI-DRO		1	381062	C3AA	EET CF	03/13/23 12:05
Total/NA	Prep	3050B			380992	DHM5	EET CF	03/14/23 10:30
Total/NA	Analysis	6020B		5	381311	A6US	EET CF	03/14/23 17:23
Total/NA	Prep	7471B			381144	DHM5	EET CF	03/13/23 12:01
Total/NA	Analysis	7471B		1	381310	XXW3	EET CF	03/14/23 16:08

Lab Chronicle

Client: Short Elliott Hendrickson, Inc. dba SEH
Job ID: 310-250925-1
Project/Site: ATCT Site 6
SDG: 171568

Client Sample ID: Trip Blank (Soil)
Lab Sample ID: 310-250925-15

Date Collected: 03/06/23 00:00
Matrix: Solid
Date Received: 03/08/23 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			380853	MZR8	EET CF	03/09/23 06:45
Total/NA	Analysis	8260D		1	380856	FE5V	EET CF	03/10/23 20:15

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Job ID: 310-250925-1
Project/Site: ATCT Site 6
SDG: 171568

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Minnesota	NELAP	019-999-319	12-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260D		Water	Dichlorofluoromethane
8260D	5035	Solid	Dichlorofluoromethane
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Authority	Program	Identification Number	Expiration Date
North Dakota	State	R-186	09-29-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
WI-DRO	3510C	Water	Diesel Range Organics (DRO)
WI-DRO	WI DRO PREP	Solid	Diesel Range Organics (DRO)
WI-GRO		Water	Wisconsin GRO
WI-GRO	WI GRO	Solid	Wisconsin GRO

Method Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 310-250925-1
SDG: 171568

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET CF
8270E SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	EET CF
WI-GRO	Wisconsin - Gasoline Range Organics (GC)	WI-GRO	EET CF
WI-DRO	Wisconsin - Diesel Range Organics (GC)	WI-DRO	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7471B	Mercury (CVAA)	SW846	EET CF
Moisture	Percent Moisture	EPA	EET CF
3050B	Preparation, Metals	SW846	EET CF
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EET CF
3546	Microwave Extraction	SW846	EET CF
5030B	Purge and Trap	SW846	EET CF
5035	Closed System Purge and Trap	SW846	EET CF
7471B	Preparation, Mercury	SW846	EET CF
WI DRO PREP	Wisconsin Extraction (Diesel Range Organics)	WI-DRO	EET CF
WI GRO	Closed System Purge and Trap	WI-GRO	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

WI-DRO = "Modified DRO: Method For Determining Diesel Range Organics", Wisconsin DNR, Publ-SW-141, September, 1995.

WI-GRO = "Modified GRO: Method For Determining Gasoline Range Organics", Wisconsin DNR, Publ-SW-140, September, 1995.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

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310-250925 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: SEH			
City/State:	CITY St. Paul	STATE MN	Project:
Receipt Information			
Date/Time Received:	DATE 3/8/23	TIME 0930	Received By: JJ

Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers		
Sample(s) received in Cooler?	☒ Yes ☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☒ Yes ☐ No	*If yes:* Cooler # 1 of 2
Cooler Custody Seals Present?	☐ Yes ☒ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No
Sample Custody Seals Present?	☐ Yes ☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☒ Yes ☐ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record				
Coolant:	☒ Wet ice	☐ Blue ice	☐ Dry ice	☐ Other:_____ ☐ NONE
Thermometer ID: T		Correction Factor (°C): +0.1		

Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 2.1	Corrected Temp (°C): 2.2

Sample Container Temperature

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

rcvd 2 broken trip blanks received 2 empty Amb 250 HCL bottles

eurofins | Environment Testing America

Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: SEH

City/State: CITY St. Paul | STATE MN | Project:

Receipt Information

Date/Time Received: DATE 3/8/23 | TIME 0930 | Received By: JJ

Delivery Type: ☐ UPS ☒ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 2

Cooler Custody Seals Present? ☐ Yes ☒ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☒ Yes ☐ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: T | Correction Factor (°C): T01

Temp Blank Temperature – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 5.2 | Corrected Temp (°C): 5.2

Sample Container Temperature

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

Eurofins Duluth SC 269

eurofins Environment Test America

Client Information	Sampler: Elliott Allen	Lab PM	Carrier Tracking No(s)	COC No:
Client Contact: Jennifer force	Phone: 218.343.0488	E-Mail: eallen@seh.inc.com	State of Origin:	Page: Page 1 of 2
Company: SEH	PWSID:	Analysis Requested		Job #:
Address: 3535 Vadnais Center Dr	Due Date Requested:			Preservation Codes. A HCL; B NaOH; C Zn Acetate; D Nitric Acid; E NaHSO4; F MeOH; G Amchlor; H Ascorbic Acid; I Ice; J DI Water; K EDTA; L EDA; M Hexane; N None; O AsNaO2; P Na2O4S; Q Na2SO3; R Na2S2O3; S H2SO4; T TSP Dodecahydrate; U Acetone; V MCAA; W pH 4-5; Y Trizma; Z other (specify); Other:
City: St. Paul	TAT Requested (days): 5 days			
State, Zip: MN 55110	Compliance Project: Δ Yes Δ No			
Phone: 651.424 0535	PO #:			
Email: jforce@sehinc com	WO #:			
Project Name: ATCT Site 6	Project #: Dula, 171568			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	VOCs	LL20	DRO	PAHs	RCRA 8 metals	Moisture	Total Number of containers	Special Instructions/Note
			Preservation Code:											
B-01w (9.67)	3/6	1215	G	W			X	X	X					
B-02w (8.50)		1315												
B-07w (9.10)		1400												
B-06w (8.75)		1420												
B-04w (9.00)		1545												
B-05 (1.5-2.5)		930		S						X	X	X		
B-03 (1.5-2.5)		1000												
B-04 (2-3)		1100												
B-01 (5-6)		1200												
B-02 (3-4)		1230												
B-07 (2.5-3.5)		1320												

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date:	Time.	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Elliott Allen	3/7 1600				
				3/8/23 0930	

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.

Ver: 01/16/2019

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

TestAmerica Duluth SC
260

eurofins Environment Testing Amer ca

Client Information	Sampler	Lab PM	Carrier Tracking No(s).	COC No
Client Contact: Jennifer force	Phone:	E-Mail:	State of Origin:	Page: Page 2 of 2
Company: SEH	PWSID:			Job #:

Address:	Due Date Requested:
City:	TAT Requested (days):
State, Zip:	Compliance Project: Δ Yes Δ No
Phone:	PO #:
Email:	WO #:
Project Name: ATCT Site 6	Project #: Duluth 171568
Site:	SSOW#:

Analysis Requested

Preservation Codes.

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	VOCs	GRO	DRO	PAHs	RCRA 8 metals	Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code											
B-06 (5-6)	3/6	1415	G	S			X	X	X	X	X	X		
B-04 (3-4)	↓	1500	↓	↓			↓	↓	↓	↓	↓	↓		
Trip blank (water)														
Trip blank (soil)														

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I II III IV Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3/9/23 0930	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.

Ver 01/16/2019

3/15/2023

Login Sample Receipt Checklist

Client: Short Elliott Hendrickson, Inc. dba SEH

Job Number: 310-250925-1
SDG Number: 171568

Login Number: 250925
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Jennifer Force
Short Elliott Hendrickson, Inc. dba SEH
3535 Vadnais Center Drive
St. Paul, Minnesota 55110

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JOB DESCRIPTION

ATCT Site 6
SDG NUMBER 200-67180

JOB NUMBER

200-67180-1

Eurofins Burlington
530 Community Drive
Suite 11
South Burlington VT 05403

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report relate only to sample(s) as received by the laboratory. These test results were derived under a quality system that adheres to the requirements of NELAC. Pursuant to NELAC, this report may not be produced in full without written approval from the laboratory

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

Authorization



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Authorized for release by
Kathryn Kelly, Project Manager II
Kathryn.Kelly@et.eurofinsus.com
(802)923-1021

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Definitions/Glossary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Qualifiers

Air - GC/MS VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
E	Result exceeded calibration range.
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
U	Indicates the analyte was analyzed for but not detected.

Air - GC/MS VOA TICs

Qualifier	Qualifier Description
J	Indicates an Estimated Value for TICs
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
N	This flag indicates the presumptive evidence of a compound.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 200-67180-1

Laboratory: Eurofins Burlington

Narrative

CASE NARRATIVE

Client: Short Elliott Hendrickson, Inc. dba SEH

Project: ATCT Site 6

Report Number: 200-67180-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 03/08/2023; the samples arrived in good condition.

VOLATILE ORGANIC COMPOUNDS
Samples SSV-01, SSV-02, SSV-03 and SSV-04 were analyzed for Volatile Organic Compounds in accordance with EPA Method TO-15. The samples were analyzed on 03/17/2023 and 03/18/2023.

Several analytes were detected in method blank MB 200-189444/5 at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Trichlorofluoromethane exceeded the RPD limit for the duplicate of sample SSV-01DU. Refer to the QC report for details.

Samples SSV-01[10X], SSV-02[10X], SSV-03[10X] and SSV-04[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Client Sample ID: SSV-01 — Lab Sample ID: 200-67180-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichlorofluoromethane	1.4	J B	2.0	0.50	ppb v/v	10		TO-15	Total/NA
Ethanol	45	J	50	26	ppb v/v	10		TO-15	Total/NA
Acetone	59		50	16	ppb v/v	10		TO-15	Total/NA
Isopropyl alcohol	28	J	50	16	ppb v/v	10		TO-15	Total/NA
n-Hexane	2.3	J	5.0	1.1	ppb v/v	10		TO-15	Total/NA
Cyclohexane	4.4	B	2.0	0.58	ppb v/v	10		TO-15	Total/NA
Benzene	0.87	J B	2.0	0.44	ppb v/v	10		TO-15	Total/NA
n-Heptane	22	B	2.0	0.55	ppb v/v	10		TO-15	Total/NA
Toluene	9.9	B	2.0	0.42	ppb v/v	10		TO-15	Total/NA
Tetrachloroethene	6.3	B	2.0	0.21	ppb v/v	10		TO-15	Total/NA
Ethylbenzene	2.3	B	2.0	0.52	ppb v/v	10		TO-15	Total/NA
m,p-Xylene	3.5	J B	5.0	0.95	ppb v/v	10		TO-15	Total/NA
Xylene, o-	1.6	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA
1,2,4-Trimethylbenzene	0.92	J B	2.0	0.80	ppb v/v	10		TO-15	Total/NA
Naphthalene	5.5		5.0	3.0	ppb v/v	10		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Trichlorofluoromethane	8.0	J B	11	2.8	ug/m3	10		TO-15	Total/NA
Ethanol	84	J	94	49	ug/m3	10		TO-15	Total/NA
Acetone	140		120	38	ug/m3	10		TO-15	Total/NA
Isopropyl alcohol	68	J	120	39	ug/m3	10		TO-15	Total/NA
n-Hexane	8.0	J	18	3.9	ug/m3	10		TO-15	Total/NA
Cyclohexane	15	B	6.9	2.0	ug/m3	10		TO-15	Total/NA
Benzene	2.8	J B	6.4	1.4	ug/m3	10		TO-15	Total/NA
n-Heptane	91	B	8.2	2.3	ug/m3	10		TO-15	Total/NA
Toluene	37	B	7.5	1.6	ug/m3	10		TO-15	Total/NA
Tetrachloroethene	43	B	14	1.4	ug/m3	10		TO-15	Total/NA
Ethylbenzene	10	B	8.7	2.3	ug/m3	10		TO-15	Total/NA
m,p-Xylene	15	J B	22	4.1	ug/m3	10		TO-15	Total/NA
Xylene, o-	7.0	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA
1,2,4-Trimethylbenzene	4.5	J B	9.8	3.9	ug/m3	10		TO-15	Total/NA
Naphthalene	29		26	16	ug/m3	10		TO-15	Total/NA

Client Sample ID: SSV-02 — Lab Sample ID: 200-67180-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	50		50	26	ppb v/v	10		TO-15	Total/NA
Acetone	72		50	16	ppb v/v	10		TO-15	Total/NA
Isopropyl alcohol	17	J	50	16	ppb v/v	10		TO-15	Total/NA
n-Hexane	1.4	J	5.0	1.1	ppb v/v	10		TO-15	Total/NA
Cyclohexane	1.3	J B	2.0	0.58	ppb v/v	10		TO-15	Total/NA
Benzene	1.5	J B	2.0	0.44	ppb v/v	10		TO-15	Total/NA
n-Heptane	5.8	B	2.0	0.55	ppb v/v	10		TO-15	Total/NA
Toluene	7.0	B	2.0	0.42	ppb v/v	10		TO-15	Total/NA
Tetrachloroethene	2.5	B	2.0	0.21	ppb v/v	10		TO-15	Total/NA
Ethylbenzene	1.1	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA
m,p-Xylene	3.3	J B	5.0	0.95	ppb v/v	10		TO-15	Total/NA
Xylene, o-	1.3	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	93		94	49	ug/m3	10		TO-15	Total/NA
Acetone	170		120	38	ug/m3	10		TO-15	Total/NA
Isopropyl alcohol	43	J	120	39	ug/m3	10		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SSV-02 (Continued) — Lab Sample ID: 200-67180-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
n-Hexane	4.8	J	18	3.9	ug/m3	10		TO-15	Total/NA
Cyclohexane	4.5	J B	6.9	2.0	ug/m3	10		TO-15	Total/NA
Benzene	4.8	J B	6.4	1.4	ug/m3	10		TO-15	Total/NA
n-Heptane	24	B	8.2	2.3	ug/m3	10		TO-15	Total/NA
Toluene	26	B	7.5	1.6	ug/m3	10		TO-15	Total/NA
Tetrachloroethene	17	B	14	1.4	ug/m3	10		TO-15	Total/NA
Ethylbenzene	4.8	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA
m,p-Xylene	14	J B	22	4.1	ug/m3	10		TO-15	Total/NA
Xylene, o-	5.5	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA

Client Sample ID: SSV-03 — Lab Sample ID: 200-67180-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	42	J	50	26	ppb v/v	10		TO-15	Total/NA
Acetone	66		50	16	ppb v/v	10		TO-15	Total/NA
Isopropyl alcohol	760	E	50	16	ppb v/v	10		TO-15	Total/NA
n-Hexane	33		5.0	1.1	ppb v/v	10		TO-15	Total/NA
Cyclohexane	68	B	2.0	0.58	ppb v/v	10		TO-15	Total/NA
Benzene	0.60	J B	2.0	0.44	ppb v/v	10		TO-15	Total/NA
n-Heptane	340	B	2.0	0.55	ppb v/v	10		TO-15	Total/NA
Toluene	5.5	B	2.0	0.42	ppb v/v	10		TO-15	Total/NA
Tetrachloroethene	15	B	2.0	0.21	ppb v/v	10		TO-15	Total/NA
Ethylbenzene	0.69	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA
m,p-Xylene	2.5	J B	5.0	0.95	ppb v/v	10		TO-15	Total/NA
Xylene, o-	1.1	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	80	J	94	49	ug/m3	10		TO-15	Total/NA
Acetone	160		120	38	ug/m3	10		TO-15	Total/NA
Isopropyl alcohol	1900	E	120	39	ug/m3	10		TO-15	Total/NA
n-Hexane	110		18	3.9	ug/m3	10		TO-15	Total/NA
Cyclohexane	230	B	6.9	2.0	ug/m3	10		TO-15	Total/NA
Benzene	1.9	J B	6.4	1.4	ug/m3	10		TO-15	Total/NA
n-Heptane	1400	B	8.2	2.3	ug/m3	10		TO-15	Total/NA
Toluene	21	B	7.5	1.6	ug/m3	10		TO-15	Total/NA
Tetrachloroethene	98	B	14	1.4	ug/m3	10		TO-15	Total/NA
Ethylbenzene	3.0	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA
m,p-Xylene	11	J B	22	4.1	ug/m3	10		TO-15	Total/NA
Xylene, o-	4.6	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA

Client Sample ID: SSV-04 — Lab Sample ID: 200-67180-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	33	J	50	26	ppb v/v	10		TO-15	Total/NA
Acetone	140		50	16	ppb v/v	10		TO-15	Total/NA
Isopropyl alcohol	45	J	50	16	ppb v/v	10		TO-15	Total/NA
n-Hexane	2.0	J	5.0	1.1	ppb v/v	10		TO-15	Total/NA
Cyclohexane	3.9	B	2.0	0.58	ppb v/v	10		TO-15	Total/NA
Benzene	0.57	J B	2.0	0.44	ppb v/v	10		TO-15	Total/NA
n-Heptane	20	B	2.0	0.55	ppb v/v	10		TO-15	Total/NA
Toluene	3.6	B	2.0	0.42	ppb v/v	10		TO-15	Total/NA
Tetrachloroethene	43	B	2.0	0.21	ppb v/v	10		TO-15	Total/NA
Ethylbenzene	0.68	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: SSV-04 (Continued)
Lab Sample ID: 200-67180-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m,p-Xylene	2.4	J B	5.0	0.95	ppb v/v	10		TO-15	Total/NA
Xylene, o-	0.94	J B	2.0	0.52	ppb v/v	10		TO-15	Total/NA

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethanol	63	J	94	49	ug/m3	10		TO-15	Total/NA
Acetone	340		120	38	ug/m3	10		TO-15	Total/NA
Isopropyl alcohol	110	J	120	39	ug/m3	10		TO-15	Total/NA
n-Hexane	7.1	J	18	3.9	ug/m3	10		TO-15	Total/NA
Cyclohexane	13	B	6.9	2.0	ug/m3	10		TO-15	Total/NA
Benzene	1.8	J B	6.4	1.4	ug/m3	10		TO-15	Total/NA
n-Heptane	81	B	8.2	2.3	ug/m3	10		TO-15	Total/NA
Toluene	14	B	7.5	1.6	ug/m3	10		TO-15	Total/NA
Tetrachloroethene	290	B	14	1.4	ug/m3	10		TO-15	Total/NA
Ethylbenzene	2.9	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA
m,p-Xylene	10	J B	22	4.1	ug/m3	10		TO-15	Total/NA
Xylene, o-	4.1	J B	8.7	2.3	ug/m3	10		TO-15	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Client Sample ID: SSV-01

Date Collected: 03/07/23 13:39
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-1

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	50	U	50	12	ppb v/v			03/17/23 21:26	10
Dichlorodifluoromethane	5.0	U	5.0	1.1	ppb v/v			03/17/23 21:26	10
1,2-Dichlorotetrafluoroethane	2.0	U	2.0	0.48	ppb v/v			03/17/23 21:26	10
Chloromethane	5.0	U	5.0	1.5	ppb v/v			03/17/23 21:26	10
Vinyl chloride	2.0	U	2.0	0.21	ppb v/v			03/17/23 21:26	10
1,3-Butadiene	2.0	U	2.0	0.39	ppb v/v			03/17/23 21:26	10
Bromomethane	2.0	U	2.0	0.71	ppb v/v			03/17/23 21:26	10
Chloroethane	5.0	U	5.0	1.8	ppb v/v			03/17/23 21:26	10
Trichlorofluoromethane	**1.4**	**J B**	2.0	0.50	ppb v/v			03/17/23 21:26	10
Ethanol	**45**	**J**	50	26	ppb v/v			03/17/23 21:26	10
Freon TF	2.0	U	2.0	0.53	ppb v/v			03/17/23 21:26	10
1,1-Dichloroethene	2.0	U	2.0	0.26	ppb v/v			03/17/23 21:26	10
Acetone	**59**		50	16	ppb v/v			03/17/23 21:26	10
Isopropyl alcohol	**28**	**J**	50	16	ppb v/v			03/17/23 21:26	10
Carbon disulfide	5.0	U	5.0	1.3	ppb v/v			03/17/23 21:26	10
Methylene Chloride	5.0	U	5.0	1.8	ppb v/v			03/17/23 21:26	10
Methyl tert-butyl ether	2.0	U	2.0	0.36	ppb v/v			03/17/23 21:26	10
trans-1,2-Dichloroethene	2.0	U	2.0	0.23	ppb v/v			03/17/23 21:26	10
n-Hexane	**2.3**	**J**	5.0	1.1	ppb v/v			03/17/23 21:26	10
1,1-Dichloroethane	2.0	U	2.0	0.25	ppb v/v			03/17/23 21:26	10
Ethyl acetate	50	U	50	16	ppb v/v			03/17/23 21:26	10
Methyl Ethyl Ketone	5.0	U	5.0	4.9	ppb v/v			03/17/23 21:26	10
cis-1,2-Dichloroethene	2.0	U	2.0	0.21	ppb v/v			03/17/23 21:26	10
Chloroform	2.0	U	2.0	0.41	ppb v/v			03/17/23 21:26	10
Tetrahydrofuran	50	U	50	13	ppb v/v			03/17/23 21:26	10
1,1,1-Trichloroethane	2.0	U	2.0	0.44	ppb v/v			03/17/23 21:26	10
Cyclohexane	**4.4**	**B**	2.0	0.58	ppb v/v			03/17/23 21:26	10
Carbon tetrachloride	2.0	U	2.0	0.22	ppb v/v			03/17/23 21:26	10
Benzene	**0.87**	**J B**	2.0	0.44	ppb v/v			03/17/23 21:26	10
1,2-Dichloroethane	2.0	U	2.0	0.93	ppb v/v			03/17/23 21:26	10
n-Heptane	**22**	**B**	2.0	0.55	ppb v/v			03/17/23 21:26	10
Trichloroethene	2.0	U	2.0	0.25	ppb v/v			03/17/23 21:26	10
1,2-Dichloropropane	2.0	U	2.0	0.94	ppb v/v			03/17/23 21:26	10
Bromodichloromethane	2.0	U	2.0	0.50	ppb v/v			03/17/23 21:26	10
cis-1,3-Dichloropropene	2.0	U	2.0	0.45	ppb v/v			03/17/23 21:26	10
Methyl isobutyl ketone	5.0	U	5.0	1.3	ppb v/v			03/17/23 21:26	10
Toluene	**9.9**	**B**	2.0	0.42	ppb v/v			03/17/23 21:26	10
trans-1,3-Dichloropropene	2.0	U	2.0	0.54	ppb v/v			03/17/23 21:26	10
1,1,2-Trichloroethane	2.0	U	2.0	0.74	ppb v/v			03/17/23 21:26	10
Tetrachloroethene	**6.3**	**B**	2.0	0.21	ppb v/v			03/17/23 21:26	10
Methyl Butyl Ketone (2-Hexanone)	5.0	U	5.0	1.5	ppb v/v			03/17/23 21:26	10
1,2-Dibromoethane	2.0	U	2.0	0.42	ppb v/v			03/17/23 21:26	10
Chlorobenzene	2.0	U	2.0	0.44	ppb v/v			03/17/23 21:26	10
Ethylbenzene	**2.3**	**B**	2.0	0.52	ppb v/v			03/17/23 21:26	10
m,p-Xylene	**3.5**	**J B**	5.0	0.95	ppb v/v			03/17/23 21:26	10
Xylene, o-	**1.6**	**J B**	2.0	0.52	ppb v/v			03/17/23 21:26	10
Styrene	2.0	U	2.0	0.59	ppb v/v			03/17/23 21:26	10
Bromoform	2.0	U	2.0	1.2	ppb v/v			03/17/23 21:26	10

Client Sample ID: SSV-01

Date Collected: 03/07/23 13:39
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-1

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	2.0	U	2.0	0.43	ppb v/v			03/17/23 21:26	10
4-Ethyltoluene	2.0	U	2.0	0.49	ppb v/v			03/17/23 21:26	10
1,3,5-Trimethylbenzene	2.0	U	2.0	0.47	ppb v/v			03/17/23 21:26	10
1,2,4-Trimethylbenzene	**0.92**	**J B**	2.0	0.80	ppb v/v			03/17/23 21:26	10
1,3-Dichlorobenzene	2.0	U	2.0	0.74	ppb v/v			03/17/23 21:26	10
1,4-Dichlorobenzene	2.0	U	2.0	0.89	ppb v/v			03/17/23 21:26	10
Benzyl chloride	2.0	U	2.0	0.88	ppb v/v			03/17/23 21:26	10
1,2-Dichlorobenzene	2.0	U	2.0	0.66	ppb v/v			03/17/23 21:26	10
1,2,4-Trichlorobenzene	5.0	U	5.0	3.3	ppb v/v			03/17/23 21:26	10
Hexachlorobutadiene	2.0	U	2.0	1.1	ppb v/v			03/17/23 21:26	10
Naphthalene	**5.5**		5.0	3.0	ppb v/v			03/17/23 21:26	10
Dibromochloromethane	2.0	U	2.0	0.63	ppb v/v			03/17/23 21:26	10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	86	U	86	21	ug/m3			03/17/23 21:26	10
Dichlorodifluoromethane	25	U	25	5.4	ug/m3			03/17/23 21:26	10
1,2-Dichlorotetrafluoroethane	14	U	14	3.4	ug/m3			03/17/23 21:26	10
Chloromethane	10	U	10	3.1	ug/m3			03/17/23 21:26	10
Vinyl chloride	5.1	U	5.1	0.54	ug/m3			03/17/23 21:26	10
1,3-Butadiene	4.4	U	4.4	0.86	ug/m3			03/17/23 21:26	10
Bromomethane	7.8	U	7.8	2.8	ug/m3			03/17/23 21:26	10
Chloroethane	13	U	13	4.7	ug/m3			03/17/23 21:26	10
Trichlorofluoromethane	**8.0**	**J B**	11	2.8	ug/m3			03/17/23 21:26	10
Ethanol	**84**	**J**	94	49	ug/m3			03/17/23 21:26	10
Freon TF	15	U	15	4.1	ug/m3			03/17/23 21:26	10
1,1-Dichloroethene	7.9	U	7.9	1.0	ug/m3			03/17/23 21:26	10
Acetone	**140**		120	38	ug/m3			03/17/23 21:26	10
Isopropyl alcohol	**68**	**J**	120	39	ug/m3			03/17/23 21:26	10
Carbon disulfide	16	U	16	4.0	ug/m3			03/17/23 21:26	10
Methylene Chloride	17	U	17	6.3	ug/m3			03/17/23 21:26	10
Methyl tert-butyl ether	7.2	U	7.2	1.3	ug/m3			03/17/23 21:26	10
trans-1,2-Dichloroethene	7.9	U	7.9	0.91	ug/m3			03/17/23 21:26	10
n-Hexane	**8.0**	**J**	18	3.9	ug/m3			03/17/23 21:26	10
1,1-Dichloroethane	8.1	U	8.1	1.0	ug/m3			03/17/23 21:26	10
Ethyl acetate	180	U	180	58	ug/m3			03/17/23 21:26	10
Methyl Ethyl Ketone	15	U	15	14	ug/m3			03/17/23 21:26	10
cis-1,2-Dichloroethene	7.9	U	7.9	0.83	ug/m3			03/17/23 21:26	10
Chloroform	9.8	U	9.8	2.0	ug/m3			03/17/23 21:26	10
Tetrahydrofuran	150	U	150	38	ug/m3			03/17/23 21:26	10
1,1,1-Trichloroethane	11	U	11	2.4	ug/m3			03/17/23 21:26	10
Cyclohexane	**15**	**B**	6.9	2.0	ug/m3			03/17/23 21:26	10
Carbon tetrachloride	13	U	13	1.4	ug/m3			03/17/23 21:26	10
Benzene	**2.8**	**J B**	6.4	1.4	ug/m3			03/17/23 21:26	10
1,2-Dichloroethane	8.1	U	8.1	3.8	ug/m3			03/17/23 21:26	10
n-Heptane	**91**	**B**	8.2	2.3	ug/m3			03/17/23 21:26	10
Trichloroethene	11	U	11	1.3	ug/m3			03/17/23 21:26	10
1,2-Dichloropropane	9.2	U	9.2	4.3	ug/m3			03/17/23 21:26	10
Bromodichloromethane	13	U	13	3.4	ug/m3			03/17/23 21:26	10
cis-1,3-Dichloropropene	9.1	U	9.1	2.0	ug/m3			03/17/23 21:26	10

Client Sample ID: SSV-01

Lab Sample ID: 200-67180-1

Date Collected: 03/07/23 13:39
Matrix: Air
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methyl isobutyl ketone	20	U	20	5.3	ug/m3			03/17/23 21:26	10
Toluene	**37**	**B**	7.5	1.6	ug/m3			03/17/23 21:26	10
trans-1,3-Dichloropropene	9.1	U	9.1	2.5	ug/m3			03/17/23 21:26	10
1,1,2-Trichloroethane	11	U	11	4.0	ug/m3			03/17/23 21:26	10
Tetrachloroethene	**43**	**B**	14	1.4	ug/m3			03/17/23 21:26	10
Methyl Butyl Ketone (2-Hexanone)	20	U	20	6.1	ug/m3			03/17/23 21:26	10
1,2-Dibromoethane	15	U	15	3.2	ug/m3			03/17/23 21:26	10
Chlorobenzene	9.2	U	9.2	2.0	ug/m3			03/17/23 21:26	10
Ethylbenzene	**10**	**B**	8.7	2.3	ug/m3			03/17/23 21:26	10
m,p-Xylene	**15**	**J B**	22	4.1	ug/m3			03/17/23 21:26	10
Xylene, o-	**7.0**	**J B**	8.7	2.3	ug/m3			03/17/23 21:26	10
Styrene	8.5	U	8.5	2.5	ug/m3			03/17/23 21:26	10
Bromoform	21	U	21	12	ug/m3			03/17/23 21:26	10
1,1,2,2-Tetrachloroethane	14	U	14	3.0	ug/m3			03/17/23 21:26	10
4-Ethyltoluene	9.8	U	9.8	2.4	ug/m3			03/17/23 21:26	10
1,3,5-Trimethylbenzene	9.8	U	9.8	2.3	ug/m3			03/17/23 21:26	10
1,2,4-Trimethylbenzene	**4.5**	**J B**	9.8	3.9	ug/m3			03/17/23 21:26	10
1,3-Dichlorobenzene	12	U	12	4.4	ug/m3			03/17/23 21:26	10
1,4-Dichlorobenzene	12	U	12	5.4	ug/m3			03/17/23 21:26	10
Benzyl chloride	10	U	10	4.6	ug/m3			03/17/23 21:26	10
1,2-Dichlorobenzene	12	U	12	4.0	ug/m3			03/17/23 21:26	10
1,2,4-Trichlorobenzene	37	U	37	24	ug/m3			03/17/23 21:26	10
Hexachlorobutadiene	21	U	21	12	ug/m3			03/17/23 21:26	10
Naphthalene	**29**		26	16	ug/m3			03/17/23 21:26	10
Dibromochloromethane	17	U	17	5.4	ug/m3			03/17/23 21:26	10

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Pentane, 3,3-dimethyl-	*10*	*J N*	*ppb v/v*		*11.46*	*562-49-2*		*03/17/23 21:26*	*10*
Hexane, 2-methyl-	*75*	*J N*	*ppb v/v*		*11.72*	*591-76-4*		*03/17/23 21:26*	*10*
Pentane, 2,3-dimethyl-	*30*	*J N*	*ppb v/v*		*11.88*	*565-59-3*		*03/17/23 21:26*	*10*
Hexane, 3-methyl-	*94*	*J N*	*ppb v/v*		*12.04*	*589-34-4*		*03/17/23 21:26*	*10*

Client Sample ID: SSV-02

Lab Sample ID: 200-67180-2

Date Collected: 03/07/23 14:01
Matrix: Air
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	50	U	50	12	ppb v/v			03/17/23 23:10	10
Dichlorodifluoromethane	5.0	U	5.0	1.1	ppb v/v			03/17/23 23:10	10
1,2-Dichlorotetrafluoroethane	2.0	U	2.0	0.48	ppb v/v			03/17/23 23:10	10
Chloromethane	5.0	U	5.0	1.5	ppb v/v			03/17/23 23:10	10
Vinyl chloride	2.0	U	2.0	0.21	ppb v/v			03/17/23 23:10	10
1,3-Butadiene	2.0	U	2.0	0.39	ppb v/v			03/17/23 23:10	10
Bromomethane	2.0	U	2.0	0.71	ppb v/v			03/17/23 23:10	10
Chloroethane	5.0	U	5.0	1.8	ppb v/v			03/17/23 23:10	10
Trichlorofluoromethane	2.0	U	2.0	0.50	ppb v/v			03/17/23 23:10	10
Ethanol	**50**		50	26	ppb v/v			03/17/23 23:10	10

Client Sample ID: SSV-02

Date Collected: 03/07/23 14:01
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-2

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Freon TF	2.0	U	2.0	0.53	ppb v/v			03/17/23 23:10	10
1,1-Dichloroethene	2.0	U	2.0	0.26	ppb v/v			03/17/23 23:10	10
Acetone	**72**		50	16	ppb v/v			03/17/23 23:10	10
Isopropyl alcohol	**17**	**J**	50	16	ppb v/v			03/17/23 23:10	10
Carbon disulfide	5.0	U	5.0	1.3	ppb v/v			03/17/23 23:10	10
Methylene Chloride	5.0	U	5.0	1.8	ppb v/v			03/17/23 23:10	10
Methyl tert-butyl ether	2.0	U	2.0	0.36	ppb v/v			03/17/23 23:10	10
trans-1,2-Dichloroethene	2.0	U	2.0	0.23	ppb v/v			03/17/23 23:10	10
n-Hexane	**1.4**	**J**	5.0	1.1	ppb v/v			03/17/23 23:10	10
1,1-Dichloroethane	2.0	U	2.0	0.25	ppb v/v			03/17/23 23:10	10
Ethyl acetate	50	U	50	16	ppb v/v			03/17/23 23:10	10
Methyl Ethyl Ketone	5.0	U	5.0	4.9	ppb v/v			03/17/23 23:10	10
cis-1,2-Dichloroethene	2.0	U	2.0	0.21	ppb v/v			03/17/23 23:10	10
Chloroform	2.0	U	2.0	0.41	ppb v/v			03/17/23 23:10	10
Tetrahydrofuran	50	U	50	13	ppb v/v			03/17/23 23:10	10
1,1,1-Trichloroethane	2.0	U	2.0	0.44	ppb v/v			03/17/23 23:10	10
Cyclohexane	**1.3**	**J B**	2.0	0.58	ppb v/v			03/17/23 23:10	10
Carbon tetrachloride	2.0	U	2.0	0.22	ppb v/v			03/17/23 23:10	10
Benzene	**1.5**	**J B**	2.0	0.44	ppb v/v			03/17/23 23:10	10
1,2-Dichloroethane	2.0	U	2.0	0.93	ppb v/v			03/17/23 23:10	10
n-Heptane	**5.8**	**B**	2.0	0.55	ppb v/v			03/17/23 23:10	10
Trichloroethene	2.0	U	2.0	0.25	ppb v/v			03/17/23 23:10	10
1,2-Dichloropropane	2.0	U	2.0	0.94	ppb v/v			03/17/23 23:10	10
Bromodichloromethane	2.0	U	2.0	0.50	ppb v/v			03/17/23 23:10	10
cis-1,3-Dichloropropene	2.0	U	2.0	0.45	ppb v/v			03/17/23 23:10	10
Methyl isobutyl ketone	5.0	U	5.0	1.3	ppb v/v			03/17/23 23:10	10
Toluene	**7.0**	**B**	2.0	0.42	ppb v/v			03/17/23 23:10	10
trans-1,3-Dichloropropene	2.0	U	2.0	0.54	ppb v/v			03/17/23 23:10	10
1,1,2-Trichloroethane	2.0	U	2.0	0.74	ppb v/v			03/17/23 23:10	10
Tetrachloroethene	**2.5**	**B**	2.0	0.21	ppb v/v			03/17/23 23:10	10
Methyl Butyl Ketone (2-Hexanone)	5.0	U	5.0	1.5	ppb v/v			03/17/23 23:10	10
1,2-Dibromoethane	2.0	U	2.0	0.42	ppb v/v			03/17/23 23:10	10
Chlorobenzene	2.0	U	2.0	0.44	ppb v/v			03/17/23 23:10	10
Ethylbenzene	**1.1**	**J B**	2.0	0.52	ppb v/v			03/17/23 23:10	10
m,p-Xylene	**3.3**	**J B**	5.0	0.95	ppb v/v			03/17/23 23:10	10
Xylene, o-	**1.3**	**J B**	2.0	0.52	ppb v/v			03/17/23 23:10	10
Styrene	2.0	U	2.0	0.59	ppb v/v			03/17/23 23:10	10
Bromoform	2.0	U	2.0	1.2	ppb v/v			03/17/23 23:10	10
1,1,2,2-Tetrachloroethane	2.0	U	2.0	0.43	ppb v/v			03/17/23 23:10	10
4-Ethyltoluene	2.0	U	2.0	0.49	ppb v/v			03/17/23 23:10	10
1,3,5-Trimethylbenzene	2.0	U	2.0	0.47	ppb v/v			03/17/23 23:10	10
1,2,4-Trimethylbenzene	2.0	U	2.0	0.80	ppb v/v			03/17/23 23:10	10
1,3-Dichlorobenzene	2.0	U	2.0	0.74	ppb v/v			03/17/23 23:10	10
1,4-Dichlorobenzene	2.0	U	2.0	0.89	ppb v/v			03/17/23 23:10	10
Benzyl chloride	2.0	U	2.0	0.88	ppb v/v			03/17/23 23:10	10
1,2-Dichlorobenzene	2.0	U	2.0	0.66	ppb v/v			03/17/23 23:10	10
1,2,4-Trichlorobenzene	5.0	U	5.0	3.3	ppb v/v			03/17/23 23:10	10
Hexachlorobutadiene	2.0	U	2.0	1.1	ppb v/v			03/17/23 23:10	10

Client Sample ID: SSV-02

Date Collected: 03/07/23 14:01
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-2

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	5.0	U	5.0	3.0	ppb v/v			03/17/23 23:10	10
Dibromochloromethane	2.0	U	2.0	0.63	ppb v/v			03/17/23 23:10	10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	86	U	86	21	ug/m3			03/17/23 23:10	10
Dichlorodifluoromethane	25	U	25	5.4	ug/m3			03/17/23 23:10	10
1,2-Dichlorotetrafluoroethane	14	U	14	3.4	ug/m3			03/17/23 23:10	10
Chloromethane	10	U	10	3.1	ug/m3			03/17/23 23:10	10
Vinyl chloride	5.1	U	5.1	0.54	ug/m3			03/17/23 23:10	10
1,3-Butadiene	4.4	U	4.4	0.86	ug/m3			03/17/23 23:10	10
Bromomethane	7.8	U	7.8	2.8	ug/m3			03/17/23 23:10	10
Chloroethane	13	U	13	4.7	ug/m3			03/17/23 23:10	10
Trichlorofluoromethane	11	U	11	2.8	ug/m3			03/17/23 23:10	10
Ethanol	**93**		94	49	ug/m3			03/17/23 23:10	10
Freon TF	15	U	15	4.1	ug/m3			03/17/23 23:10	10
1,1-Dichloroethene	7.9	U	7.9	1.0	ug/m3			03/17/23 23:10	10
Acetone	**170**		120	38	ug/m3			03/17/23 23:10	10
Isopropyl alcohol	**43**	**J**	120	39	ug/m3			03/17/23 23:10	10
Carbon disulfide	16	U	16	4.0	ug/m3			03/17/23 23:10	10
Methylene Chloride	17	U	17	6.3	ug/m3			03/17/23 23:10	10
Methyl tert-butyl ether	7.2	U	7.2	1.3	ug/m3			03/17/23 23:10	10
trans-1,2-Dichloroethene	7.9	U	7.9	0.91	ug/m3			03/17/23 23:10	10
n-Hexane	**4.8**	**J**	18	3.9	ug/m3			03/17/23 23:10	10
1,1-Dichloroethane	8.1	U	8.1	1.0	ug/m3			03/17/23 23:10	10
Ethyl acetate	180	U	180	58	ug/m3			03/17/23 23:10	10
Methyl Ethyl Ketone	15	U	15	14	ug/m3			03/17/23 23:10	10
cis-1,2-Dichloroethene	7.9	U	7.9	0.83	ug/m3			03/17/23 23:10	10
Chloroform	9.8	U	9.8	2.0	ug/m3			03/17/23 23:10	10
Tetrahydrofuran	150	U	150	38	ug/m3			03/17/23 23:10	10
1,1,1-Trichloroethane	11	U	11	2.4	ug/m3			03/17/23 23:10	10
Cyclohexane	**4.5**	**J B**	6.9	2.0	ug/m3			03/17/23 23:10	10
Carbon tetrachloride	13	U	13	1.4	ug/m3			03/17/23 23:10	10
Benzene	**4.8**	**J B**	6.4	1.4	ug/m3			03/17/23 23:10	10
1,2-Dichloroethane	8.1	U	8.1	3.8	ug/m3			03/17/23 23:10	10
n-Heptane	**24**	**B**	8.2	2.3	ug/m3			03/17/23 23:10	10
Trichloroethene	11	U	11	1.3	ug/m3			03/17/23 23:10	10
1,2-Dichloropropane	9.2	U	9.2	4.3	ug/m3			03/17/23 23:10	10
Bromodichloromethane	13	U	13	3.4	ug/m3			03/17/23 23:10	10
cis-1,3-Dichloropropene	9.1	U	9.1	2.0	ug/m3			03/17/23 23:10	10
Methyl isobutyl ketone	20	U	20	5.3	ug/m3			03/17/23 23:10	10
Toluene	**26**	**B**	7.5	1.6	ug/m3			03/17/23 23:10	10
trans-1,3-Dichloropropene	9.1	U	9.1	2.5	ug/m3			03/17/23 23:10	10
1,1,2-Trichloroethane	11	U	11	4.0	ug/m3			03/17/23 23:10	10
Tetrachloroethene	**17**	**B**	14	1.4	ug/m3			03/17/23 23:10	10
Methyl Butyl Ketone (2-Hexanone)	20	U	20	6.1	ug/m3			03/17/23 23:10	10
1,2-Dibromoethane	15	U	15	3.2	ug/m3			03/17/23 23:10	10
Chlorobenzene	9.2	U	9.2	2.0	ug/m3			03/17/23 23:10	10
Ethylbenzene	**4.8**	**J B**	8.7	2.3	ug/m3			03/17/23 23:10	10
m,p-Xylene	**14**	**J B**	22	4.1	ug/m3			03/17/23 23:10	10

Client Sample ID: SSV-02

Lab Sample ID: 200-67180-2
Matrix: Air
Date Collected: 03/07/23 14:01
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylene, o-	**5.5**	**J B**	8.7	2.3	ug/m3			03/17/23 23:10	10
Styrene	8.5	U	8.5	2.5	ug/m3			03/17/23 23:10	10
Bromoform	21	U	21	12	ug/m3			03/17/23 23:10	10
1,1,2,2-Tetrachloroethane	14	U	14	3.0	ug/m3			03/17/23 23:10	10
4-Ethyltoluene	9.8	U	9.8	2.4	ug/m3			03/17/23 23:10	10
1,3,5-Trimethylbenzene	9.8	U	9.8	2.3	ug/m3			03/17/23 23:10	10
1,2,4-Trimethylbenzene	9.8	U	9.8	3.9	ug/m3			03/17/23 23:10	10
1,3-Dichlorobenzene	12	U	12	4.4	ug/m3			03/17/23 23:10	10
1,4-Dichlorobenzene	12	U	12	5.4	ug/m3			03/17/23 23:10	10
Benzyl chloride	10	U	10	4.6	ug/m3			03/17/23 23:10	10
1,2-Dichlorobenzene	12	U	12	4.0	ug/m3			03/17/23 23:10	10
1,2,4-Trichlorobenzene	37	U	37	24	ug/m3			03/17/23 23:10	10
Hexachlorobutadiene	21	U	21	12	ug/m3			03/17/23 23:10	10
Naphthalene	26	U	26	16	ug/m3			03/17/23 23:10	10
Dibromochloromethane	17	U	17	5.4	ug/m3			03/17/23 23:10	10

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Hexane, 2-methyl-	*18*	*J N*	*ppb v/v*		*11.72*	*591-76-4*		*03/17/23 23:10*	*10*
Hexane, 3-methyl-	*23*	*J N*	*ppb v/v*		*12.04*	*589-34-4*		*03/17/23 23:10*	*10*

Client Sample ID: SSV-03

Lab Sample ID: 200-67180-3
Matrix: Air
Date Collected: 03/07/23 14:26
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	50	U	50	12	ppb v/v			03/18/23 00:02	10
Dichlorodifluoromethane	5.0	U	5.0	1.1	ppb v/v			03/18/23 00:02	10
1,2-Dichlorotetrafluoroethane	2.0	U	2.0	0.48	ppb v/v			03/18/23 00:02	10
Chloromethane	5.0	U	5.0	1.5	ppb v/v			03/18/23 00:02	10
Vinyl chloride	2.0	U	2.0	0.21	ppb v/v			03/18/23 00:02	10
1,3-Butadiene	2.0	U	2.0	0.39	ppb v/v			03/18/23 00:02	10
Bromomethane	2.0	U	2.0	0.71	ppb v/v			03/18/23 00:02	10
Chloroethane	5.0	U	5.0	1.8	ppb v/v			03/18/23 00:02	10
Trichlorofluoromethane	2.0	U	2.0	0.50	ppb v/v			03/18/23 00:02	10
Ethanol	**42**	**J**	50	26	ppb v/v			03/18/23 00:02	10
Freon TF	2.0	U	2.0	0.53	ppb v/v			03/18/23 00:02	10
1,1-Dichloroethene	2.0	U	2.0	0.26	ppb v/v			03/18/23 00:02	10
Acetone	**66**		50	16	ppb v/v			03/18/23 00:02	10
Isopropyl alcohol	**760**	**E**	50	16	ppb v/v			03/18/23 00:02	10
Carbon disulfide	5.0	U	5.0	1.3	ppb v/v			03/18/23 00:02	10
Methylene Chloride	5.0	U	5.0	1.8	ppb v/v			03/18/23 00:02	10
Methyl tert-butyl ether	2.0	U	2.0	0.36	ppb v/v			03/18/23 00:02	10
trans-1,2-Dichloroethene	2.0	U	2.0	0.23	ppb v/v			03/18/23 00:02	10
n-Hexane	**33**		5.0	1.1	ppb v/v			03/18/23 00:02	10
1,1-Dichloroethane	2.0	U	2.0	0.25	ppb v/v			03/18/23 00:02	10
Ethyl acetate	50	U	50	16	ppb v/v			03/18/23 00:02	10
Methyl Ethyl Ketone	5.0	U	5.0	4.9	ppb v/v			03/18/23 00:02	10

Client Sample ID: SSV-03

Date Collected: 03/07/23 14:26
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-3

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	2.0	U	2.0	0.21	ppb v/v			03/18/23 00:02	10
Chloroform	2.0	U	2.0	0.41	ppb v/v			03/18/23 00:02	10
Tetrahydrofuran	50	U	50	13	ppb v/v			03/18/23 00:02	10
1,1,1-Trichloroethane	2.0	U	2.0	0.44	ppb v/v			03/18/23 00:02	10
Cyclohexane	**68**	**B**	2.0	0.58	ppb v/v			03/18/23 00:02	10
Carbon tetrachloride	2.0	U	2.0	0.22	ppb v/v			03/18/23 00:02	10
Benzene	**0.60**	**J B**	2.0	0.44	ppb v/v			03/18/23 00:02	10
1,2-Dichloroethane	2.0	U	2.0	0.93	ppb v/v			03/18/23 00:02	10
n-Heptane	**340**	**B**	2.0	0.55	ppb v/v			03/18/23 00:02	10
Trichloroethene	2.0	U	2.0	0.25	ppb v/v			03/18/23 00:02	10
1,2-Dichloropropane	2.0	U	2.0	0.94	ppb v/v			03/18/23 00:02	10
Bromodichloromethane	2.0	U	2.0	0.50	ppb v/v			03/18/23 00:02	10
cis-1,3-Dichloropropene	2.0	U	2.0	0.45	ppb v/v			03/18/23 00:02	10
Methyl isobutyl ketone	5.0	U	5.0	1.3	ppb v/v			03/18/23 00:02	10
Toluene	**5.5**	**B**	2.0	0.42	ppb v/v			03/18/23 00:02	10
trans-1,3-Dichloropropene	2.0	U	2.0	0.54	ppb v/v			03/18/23 00:02	10
1,1,2-Trichloroethane	2.0	U	2.0	0.74	ppb v/v			03/18/23 00:02	10
Tetrachloroethene	**15**	**B**	2.0	0.21	ppb v/v			03/18/23 00:02	10
Methyl Butyl Ketone (2-Hexanone)	5.0	U	5.0	1.5	ppb v/v			03/18/23 00:02	10
1,2-Dibromoethane	2.0	U	2.0	0.42	ppb v/v			03/18/23 00:02	10
Chlorobenzene	2.0	U	2.0	0.44	ppb v/v			03/18/23 00:02	10
Ethylbenzene	**0.69**	**J B**	2.0	0.52	ppb v/v			03/18/23 00:02	10
m,p-Xylene	**2.5**	**J B**	5.0	0.95	ppb v/v			03/18/23 00:02	10
Xylene, o-	**1.1**	**J B**	2.0	0.52	ppb v/v			03/18/23 00:02	10
Styrene	2.0	U	2.0	0.59	ppb v/v			03/18/23 00:02	10
Bromoform	2.0	U	2.0	1.2	ppb v/v			03/18/23 00:02	10
1,1,2,2-Tetrachloroethane	2.0	U	2.0	0.43	ppb v/v			03/18/23 00:02	10
4-Ethyltoluene	2.0	U	2.0	0.49	ppb v/v			03/18/23 00:02	10
1,3,5-Trimethylbenzene	2.0	U	2.0	0.47	ppb v/v			03/18/23 00:02	10
1,2,4-Trimethylbenzene	2.0	U	2.0	0.80	ppb v/v			03/18/23 00:02	10
1,3-Dichlorobenzene	2.0	U	2.0	0.74	ppb v/v			03/18/23 00:02	10
1,4-Dichlorobenzene	2.0	U	2.0	0.89	ppb v/v			03/18/23 00:02	10
Benzyl chloride	2.0	U	2.0	0.88	ppb v/v			03/18/23 00:02	10
1,2-Dichlorobenzene	2.0	U	2.0	0.66	ppb v/v			03/18/23 00:02	10
1,2,4-Trichlorobenzene	5.0	U	5.0	3.3	ppb v/v			03/18/23 00:02	10
Hexachlorobutadiene	2.0	U	2.0	1.1	ppb v/v			03/18/23 00:02	10
Naphthalene	5.0	U	5.0	3.0	ppb v/v			03/18/23 00:02	10
Dibromochloromethane	2.0	U	2.0	0.63	ppb v/v			03/18/23 00:02	10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	86	U	86	21	ug/m3			03/18/23 00:02	10
Dichlorodifluoromethane	25	U	25	5.4	ug/m3			03/18/23 00:02	10
1,2-Dichlorotetrafluoroethane	14	U	14	3.4	ug/m3			03/18/23 00:02	10
Chloromethane	10	U	10	3.1	ug/m3			03/18/23 00:02	10
Vinyl chloride	5.1	U	5.1	0.54	ug/m3			03/18/23 00:02	10
1,3-Butadiene	4.4	U	4.4	0.86	ug/m3			03/18/23 00:02	10
Bromomethane	7.8	U	7.8	2.8	ug/m3			03/18/23 00:02	10
Chloroethane	13	U	13	4.7	ug/m3			03/18/23 00:02	10
Trichlorofluoromethane	11	U	11	2.8	ug/m3			03/18/23 00:02	10

Client Sample ID: SSV-03

Date Collected: 03/07/23 14:26
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-3

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethanol	**80**	**J**	94	49	ug/m3			03/18/23 00:02	10
Freon TF	15	U	15	4.1	ug/m3			03/18/23 00:02	10
1,1-Dichloroethene	7.9	U	7.9	1.0	ug/m3			03/18/23 00:02	10
Acetone	**160**		120	38	ug/m3			03/18/23 00:02	10
Isopropyl alcohol	**1900**	**E**	120	39	ug/m3			03/18/23 00:02	10
Carbon disulfide	16	U	16	4.0	ug/m3			03/18/23 00:02	10
Methylene Chloride	17	U	17	6.3	ug/m3			03/18/23 00:02	10
Methyl tert-butyl ether	7.2	U	7.2	1.3	ug/m3			03/18/23 00:02	10
trans-1,2-Dichloroethene	7.9	U	7.9	0.91	ug/m3			03/18/23 00:02	10
n-Hexane	**110**		18	3.9	ug/m3			03/18/23 00:02	10
1,1-Dichloroethane	8.1	U	8.1	1.0	ug/m3			03/18/23 00:02	10
Ethyl acetate	180	U	180	58	ug/m3			03/18/23 00:02	10
Methyl Ethyl Ketone	15	U	15	14	ug/m3			03/18/23 00:02	10
cis-1,2-Dichloroethene	7.9	U	7.9	0.83	ug/m3			03/18/23 00:02	10
Chloroform	9.8	U	9.8	2.0	ug/m3			03/18/23 00:02	10
Tetrahydrofuran	150	U	150	38	ug/m3			03/18/23 00:02	10
1,1,1-Trichloroethane	11	U	11	2.4	ug/m3			03/18/23 00:02	10
Cyclohexane	**230**	**B**	6.9	2.0	ug/m3			03/18/23 00:02	10
Carbon tetrachloride	13	U	13	1.4	ug/m3			03/18/23 00:02	10
Benzene	**1.9**	**J B**	6.4	1.4	ug/m3			03/18/23 00:02	10
1,2-Dichloroethane	8.1	U	8.1	3.8	ug/m3			03/18/23 00:02	10
n-Heptane	**1400**	**B**	8.2	2.3	ug/m3			03/18/23 00:02	10
Trichloroethene	11	U	11	1.3	ug/m3			03/18/23 00:02	10
1,2-Dichloropropane	9.2	U	9.2	4.3	ug/m3			03/18/23 00:02	10
Bromodichloromethane	13	U	13	3.4	ug/m3			03/18/23 00:02	10
cis-1,3-Dichloropropene	9.1	U	9.1	2.0	ug/m3			03/18/23 00:02	10
Methyl isobutyl ketone	20	U	20	5.3	ug/m3			03/18/23 00:02	10
Toluene	**21**	**B**	7.5	1.6	ug/m3			03/18/23 00:02	10
trans-1,3-Dichloropropene	9.1	U	9.1	2.5	ug/m3			03/18/23 00:02	10
1,1,2-Trichloroethane	11	U	11	4.0	ug/m3			03/18/23 00:02	10
Tetrachloroethene	**98**	**B**	14	1.4	ug/m3			03/18/23 00:02	10
Methyl Butyl Ketone (2-Hexanone)	20	U	20	6.1	ug/m3			03/18/23 00:02	10
1,2-Dibromoethane	15	U	15	3.2	ug/m3			03/18/23 00:02	10
Chlorobenzene	9.2	U	9.2	2.0	ug/m3			03/18/23 00:02	10
Ethylbenzene	**3.0**	**J B**	8.7	2.3	ug/m3			03/18/23 00:02	10
m,p-Xylene	**11**	**J B**	22	4.1	ug/m3			03/18/23 00:02	10
Xylene, o-	**4.6**	**J B**	8.7	2.3	ug/m3			03/18/23 00:02	10
Styrene	8.5	U	8.5	2.5	ug/m3			03/18/23 00:02	10
Bromoform	21	U	21	12	ug/m3			03/18/23 00:02	10
1,1,2,2-Tetrachloroethane	14	U	14	3.0	ug/m3			03/18/23 00:02	10
4-Ethyltoluene	9.8	U	9.8	2.4	ug/m3			03/18/23 00:02	10
1,3,5-Trimethylbenzene	9.8	U	9.8	2.3	ug/m3			03/18/23 00:02	10
1,2,4-Trimethylbenzene	9.8	U	9.8	3.9	ug/m3			03/18/23 00:02	10
1,3-Dichlorobenzene	12	U	12	4.4	ug/m3			03/18/23 00:02	10
1,4-Dichlorobenzene	12	U	12	5.4	ug/m3			03/18/23 00:02	10
Benzyl chloride	10	U	10	4.6	ug/m3			03/18/23 00:02	10
1,2-Dichlorobenzene	12	U	12	4.0	ug/m3			03/18/23 00:02	10
1,2,4-Trichlorobenzene	37	U	37	24	ug/m3			03/18/23 00:02	10

Client Sample ID: SSV-03

Lab Sample ID: 200-67180-3

Date Collected: 03/07/23 14:26
Matrix: Air
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hexachlorobutadiene	21	U	21	12	ug/m3			03/18/23 00:02	10
Naphthalene	26	U	26	16	ug/m3			03/18/23 00:02	10
Dibromochloromethane	17	U	17	5.4	ug/m3			03/18/23 00:02	10

Tentatively Identified Compound	*Est. Result*	*Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Pentane, 2,2-dimethyl-	*120*	*J N*	*ppb v/v*		*10.33*	*590-35-2*		*03/18/23 00:02*	*10*
Pentane, 2,4-dimethyl-	*170*	*J N*	*ppb v/v*		*10.49*	*108-08-7*		*03/18/23 00:02*	*10*
Cyclopentane, methyl-	*100*	*J N*	*ppb v/v*		*10.63*	*96-37-7*		*03/18/23 00:02*	*10*
Unknown	*180*	*J*	*ppb v/v*		*11.46*	*N/A*		*03/18/23 00:02*	*10*
Hexane, 2-methyl-	*1200*	*J N*	*ppb v/v*		*11.73*	*591-76-4*		*03/18/23 00:02*	*10*
Pentane, 2,3-dimethyl-	*500*	*J N*	*ppb v/v*		*11.89*	*565-59-3*		*03/18/23 00:02*	*10*
Hexane, 3-methyl-	*1500*	*J N*	*ppb v/v*		*12.04*	*589-34-4*		*03/18/23 00:02*	*10*
Pentane, 3-ethyl-	*130*	*J N*	*ppb v/v*		*12.42*	*617-78-7*		*03/18/23 00:02*	*10*
Cyclopentane, 1,2-dimethyl-, trans-	*42*	*J N*	*ppb v/v*		*12.67*	*822-50-4*		*03/18/23 00:02*	*10*
Cyclohexane, methyl-	*52*	*J N*	*ppb v/v*		*13.90*	*108-87-2*		*03/18/23 00:02*	*10*

Client Sample ID: SSV-04

Lab Sample ID: 200-67180-4

Date Collected: 03/07/23 14:38
Matrix: Air
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	50	U	50	12	ppb v/v			03/18/23 00:54	10
Dichlorodifluoromethane	5.0	U	5.0	1.1	ppb v/v			03/18/23 00:54	10
1,2-Dichlorotetrafluoroethane	2.0	U	2.0	0.48	ppb v/v			03/18/23 00:54	10
Chloromethane	5.0	U	5.0	1.5	ppb v/v			03/18/23 00:54	10
Vinyl chloride	2.0	U	2.0	0.21	ppb v/v			03/18/23 00:54	10
1,3-Butadiene	2.0	U	2.0	0.39	ppb v/v			03/18/23 00:54	10
Bromomethane	2.0	U	2.0	0.71	ppb v/v			03/18/23 00:54	10
Chloroethane	5.0	U	5.0	1.8	ppb v/v			03/18/23 00:54	10
Trichlorofluoromethane	2.0	U	2.0	0.50	ppb v/v			03/18/23 00:54	10
Ethanol	**33**	**J**	50	26	ppb v/v			03/18/23 00:54	10
Freon TF	2.0	U	2.0	0.53	ppb v/v			03/18/23 00:54	10
1,1-Dichloroethene	2.0	U	2.0	0.26	ppb v/v			03/18/23 00:54	10
Acetone	**140**		50	16	ppb v/v			03/18/23 00:54	10
Isopropyl alcohol	**45**	**J**	50	16	ppb v/v			03/18/23 00:54	10
Carbon disulfide	5.0	U	5.0	1.3	ppb v/v			03/18/23 00:54	10
Methylene Chloride	5.0	U	5.0	1.8	ppb v/v			03/18/23 00:54	10
Methyl tert-butyl ether	2.0	U	2.0	0.36	ppb v/v			03/18/23 00:54	10
trans-1,2-Dichloroethene	2.0	U	2.0	0.23	ppb v/v			03/18/23 00:54	10
n-Hexane	**2.0**	**J**	5.0	1.1	ppb v/v			03/18/23 00:54	10
1,1-Dichloroethane	2.0	U	2.0	0.25	ppb v/v			03/18/23 00:54	10
Ethyl acetate	50	U	50	16	ppb v/v			03/18/23 00:54	10
Methyl Ethyl Ketone	5.0	U	5.0	4.9	ppb v/v			03/18/23 00:54	10
cis-1,2-Dichloroethene	2.0	U	2.0	0.21	ppb v/v			03/18/23 00:54	10
Chloroform	2.0	U	2.0	0.41	ppb v/v			03/18/23 00:54	10
Tetrahydrofuran	50	U	50	13	ppb v/v			03/18/23 00:54	10
1,1,1-Trichloroethane	2.0	U	2.0	0.44	ppb v/v			03/18/23 00:54	10

Client Sample ID: SSV-04

Date Collected: 03/07/23 14:38
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-4

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyclohexane	**3.9**	**B**	2.0	0.58	ppb v/v			03/18/23 00:54	10
Carbon tetrachloride	2.0	U	2.0	0.22	ppb v/v			03/18/23 00:54	10
Benzene	**0.57**	**J B**	2.0	0.44	ppb v/v			03/18/23 00:54	10
1,2-Dichloroethane	2.0	U	2.0	0.93	ppb v/v			03/18/23 00:54	10
n-Heptane	**20**	**B**	2.0	0.55	ppb v/v			03/18/23 00:54	10
Trichloroethene	2.0	U	2.0	0.25	ppb v/v			03/18/23 00:54	10
1,2-Dichloropropane	2.0	U	2.0	0.94	ppb v/v			03/18/23 00:54	10
Bromodichloromethane	2.0	U	2.0	0.50	ppb v/v			03/18/23 00:54	10
cis-1,3-Dichloropropene	2.0	U	2.0	0.45	ppb v/v			03/18/23 00:54	10
Methyl isobutyl ketone	5.0	U	5.0	1.3	ppb v/v			03/18/23 00:54	10
Toluene	**3.6**	**B**	2.0	0.42	ppb v/v			03/18/23 00:54	10
trans-1,3-Dichloropropene	2.0	U	2.0	0.54	ppb v/v			03/18/23 00:54	10
1,1,2-Trichloroethane	2.0	U	2.0	0.74	ppb v/v			03/18/23 00:54	10
Tetrachloroethene	**43**	**B**	2.0	0.21	ppb v/v			03/18/23 00:54	10
Methyl Butyl Ketone (2-Hexanone)	5.0	U	5.0	1.5	ppb v/v			03/18/23 00:54	10
1,2-Dibromoethane	2.0	U	2.0	0.42	ppb v/v			03/18/23 00:54	10
Chlorobenzene	2.0	U	2.0	0.44	ppb v/v			03/18/23 00:54	10
Ethylbenzene	**0.68**	**J B**	2.0	0.52	ppb v/v			03/18/23 00:54	10
m,p-Xylene	**2.4**	**J B**	5.0	0.95	ppb v/v			03/18/23 00:54	10
Xylene, o-	**0.94**	**J B**	2.0	0.52	ppb v/v			03/18/23 00:54	10
Styrene	2.0	U	2.0	0.59	ppb v/v			03/18/23 00:54	10
Bromoform	2.0	U	2.0	1.2	ppb v/v			03/18/23 00:54	10
1,1,2,2-Tetrachloroethane	2.0	U	2.0	0.43	ppb v/v			03/18/23 00:54	10
4-Ethyltoluene	2.0	U	2.0	0.49	ppb v/v			03/18/23 00:54	10
1,3,5-Trimethylbenzene	2.0	U	2.0	0.47	ppb v/v			03/18/23 00:54	10
1,2,4-Trimethylbenzene	2.0	U	2.0	0.80	ppb v/v			03/18/23 00:54	10
1,3-Dichlorobenzene	2.0	U	2.0	0.74	ppb v/v			03/18/23 00:54	10
1,4-Dichlorobenzene	2.0	U	2.0	0.89	ppb v/v			03/18/23 00:54	10
Benzyl chloride	2.0	U	2.0	0.88	ppb v/v			03/18/23 00:54	10
1,2-Dichlorobenzene	2.0	U	2.0	0.66	ppb v/v			03/18/23 00:54	10
1,2,4-Trichlorobenzene	5.0	U	5.0	3.3	ppb v/v			03/18/23 00:54	10
Hexachlorobutadiene	2.0	U	2.0	1.1	ppb v/v			03/18/23 00:54	10
Naphthalene	5.0	U	5.0	3.0	ppb v/v			03/18/23 00:54	10
Dibromochloromethane	2.0	U	2.0	0.63	ppb v/v			03/18/23 00:54	10

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	86	U	86	21	ug/m3			03/18/23 00:54	10
Dichlorodifluoromethane	25	U	25	5.4	ug/m3			03/18/23 00:54	10
1,2-Dichlorotetrafluoroethane	14	U	14	3.4	ug/m3			03/18/23 00:54	10
Chloromethane	10	U	10	3.1	ug/m3			03/18/23 00:54	10
Vinyl chloride	5.1	U	5.1	0.54	ug/m3			03/18/23 00:54	10
1,3-Butadiene	4.4	U	4.4	0.86	ug/m3			03/18/23 00:54	10
Bromomethane	7.8	U	7.8	2.8	ug/m3			03/18/23 00:54	10
Chloroethane	13	U	13	4.7	ug/m3			03/18/23 00:54	10
Trichlorofluoromethane	11	U	11	2.8	ug/m3			03/18/23 00:54	10
Ethanol	**63**	**J**	94	49	ug/m3			03/18/23 00:54	10
Freon TF	15	U	15	4.1	ug/m3			03/18/23 00:54	10
1,1-Dichloroethene	7.9	U	7.9	1.0	ug/m3			03/18/23 00:54	10
Acetone	**340**		120	38	ug/m3			03/18/23 00:54	10

Client Sample ID: SSV-04

Date Collected: 03/07/23 14:38
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-4

Matrix: Air

Method: EPA TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Isopropyl alcohol	**110**	**J**	120	39	ug/m3			03/18/23 00:54	10
Carbon disulfide	16	U	16	4.0	ug/m3			03/18/23 00:54	10
Methylene Chloride	17	U	17	6.3	ug/m3			03/18/23 00:54	10
Methyl tert-butyl ether	7.2	U	7.2	1.3	ug/m3			03/18/23 00:54	10
trans-1,2-Dichloroethene	7.9	U	7.9	0.91	ug/m3			03/18/23 00:54	10
n-Hexane	**7.1**	**J**	18	3.9	ug/m3			03/18/23 00:54	10
1,1-Dichloroethane	8.1	U	8.1	1.0	ug/m3			03/18/23 00:54	10
Ethyl acetate	180	U	180	58	ug/m3			03/18/23 00:54	10
Methyl Ethyl Ketone	15	U	15	14	ug/m3			03/18/23 00:54	10
cis-1,2-Dichloroethene	7.9	U	7.9	0.83	ug/m3			03/18/23 00:54	10
Chloroform	9.8	U	9.8	2.0	ug/m3			03/18/23 00:54	10
Tetrahydrofuran	150	U	150	38	ug/m3			03/18/23 00:54	10
1,1,1-Trichloroethane	11	U	11	2.4	ug/m3			03/18/23 00:54	10
Cyclohexane	**13**	**B**	6.9	2.0	ug/m3			03/18/23 00:54	10
Carbon tetrachloride	13	U	13	1.4	ug/m3			03/18/23 00:54	10
Benzene	**1.8**	**J B**	6.4	1.4	ug/m3			03/18/23 00:54	10
1,2-Dichloroethane	8.1	U	8.1	3.8	ug/m3			03/18/23 00:54	10
n-Heptane	**81**	**B**	8.2	2.3	ug/m3			03/18/23 00:54	10
Trichloroethene	11	U	11	1.3	ug/m3			03/18/23 00:54	10
1,2-Dichloropropane	9.2	U	9.2	4.3	ug/m3			03/18/23 00:54	10
Bromodichloromethane	13	U	13	3.4	ug/m3			03/18/23 00:54	10
cis-1,3-Dichloropropene	9.1	U	9.1	2.0	ug/m3			03/18/23 00:54	10
Methyl isobutyl ketone	20	U	20	5.3	ug/m3			03/18/23 00:54	10
Toluene	**14**	**B**	7.5	1.6	ug/m3			03/18/23 00:54	10
trans-1,3-Dichloropropene	9.1	U	9.1	2.5	ug/m3			03/18/23 00:54	10
1,1,2-Trichloroethane	11	U	11	4.0	ug/m3			03/18/23 00:54	10
Tetrachloroethene	**290**	**B**	14	1.4	ug/m3			03/18/23 00:54	10
Methyl Butyl Ketone (2-Hexanone)	20	U	20	6.1	ug/m3			03/18/23 00:54	10
1,2-Dibromoethane	15	U	15	3.2	ug/m3			03/18/23 00:54	10
Chlorobenzene	9.2	U	9.2	2.0	ug/m3			03/18/23 00:54	10
Ethylbenzene	**2.9**	**J B**	8.7	2.3	ug/m3			03/18/23 00:54	10
m,p-Xylene	**10**	**J B**	22	4.1	ug/m3			03/18/23 00:54	10
Xylene, o-	**4.1**	**J B**	8.7	2.3	ug/m3			03/18/23 00:54	10
Styrene	8.5	U	8.5	2.5	ug/m3			03/18/23 00:54	10
Bromoform	21	U	21	12	ug/m3			03/18/23 00:54	10
1,1,2,2-Tetrachloroethane	14	U	14	3.0	ug/m3			03/18/23 00:54	10
4-Ethyltoluene	9.8	U	9.8	2.4	ug/m3			03/18/23 00:54	10
1,3,5-Trimethylbenzene	9.8	U	9.8	2.3	ug/m3			03/18/23 00:54	10
1,2,4-Trimethylbenzene	9.8	U	9.8	3.9	ug/m3			03/18/23 00:54	10
1,3-Dichlorobenzene	12	U	12	4.4	ug/m3			03/18/23 00:54	10
1,4-Dichlorobenzene	12	U	12	5.4	ug/m3			03/18/23 00:54	10
Benzyl chloride	10	U	10	4.6	ug/m3			03/18/23 00:54	10
1,2-Dichlorobenzene	12	U	12	4.0	ug/m3			03/18/23 00:54	10
1,2,4-Trichlorobenzene	37	U	37	24	ug/m3			03/18/23 00:54	10
Hexachlorobutadiene	21	U	21	12	ug/m3			03/18/23 00:54	10
Naphthalene	26	U	26	16	ug/m3			03/18/23 00:54	10
Dibromochloromethane	17	U	17	5.4	ug/m3			03/18/23 00:54	10

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Client Sample ID: SSV-04
Date Collected: 03/07/23 14:38
Date Received: 03/08/23 10:30
Sample Container: Summa Canister 1L

Lab Sample ID: 200-67180-4
Matrix: Air

Tentatively Identified Compound	Est. Result	Qualifier	Unit	D	RT	CAS No.	Prepared	Analyzed	Dil Fac
Unknown	11	J	ppb v/v		10.49	N/A		03/18/23 00:54	10
Unknown	10	J	ppb v/v		11.46	N/A		03/18/23 00:54	10
Hexane, 2-methyl-	69	J N	ppb v/v		11.72	591-76-4		03/18/23 00:54	10
Pentane, 2,3-dimethyl-	28	J N	ppb v/v		11.88	565-59-3		03/18/23 00:54	10
Hexane, 3-methyl-	87	J N	ppb v/v		12.04	589-34-4		03/18/23 00:54	10
Cyclotrisiloxane, hexamethyl-	22	J N	ppb v/v		16.51	541-05-9		03/18/23 00:54	10

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 200-189444/5
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	5.0	U	5.0	1.2	ppb v/v			03/17/23 11:26	1
Dichlorodifluoromethane	0.50	U	0.50	0.11	ppb v/v			03/17/23 11:26	1
1,2-Dichlorotetrafluoroethane	0.0769	J	0.20	0.048	ppb v/v			03/17/23 11:26	1
Chloromethane	0.50	U	0.50	0.15	ppb v/v			03/17/23 11:26	1
Vinyl chloride	0.0594	J	0.20	0.021	ppb v/v			03/17/23 11:26	1
1,3-Butadiene	0.0664	J	0.20	0.039	ppb v/v			03/17/23 11:26	1
Bromomethane	0.20	U	0.20	0.071	ppb v/v			03/17/23 11:26	1
Chloroethane	0.50	U	0.50	0.18	ppb v/v			03/17/23 11:26	1
Trichlorofluoromethane	0.0745	J	0.20	0.050	ppb v/v			03/17/23 11:26	1
Ethanol	5.0	U	5.0	2.6	ppb v/v			03/17/23 11:26	1
Freon TF	0.0739	J	0.20	0.053	ppb v/v			03/17/23 11:26	1
1,1-Dichloroethene	0.0682	J	0.20	0.026	ppb v/v			03/17/23 11:26	1
Acetone	5.0	U	5.0	1.6	ppb v/v			03/17/23 11:26	1
Isopropyl alcohol	5.0	U	5.0	1.6	ppb v/v			03/17/23 11:26	1
Carbon disulfide	0.50	U	0.50	0.13	ppb v/v			03/17/23 11:26	1
Methylene Chloride	0.50	U	0.50	0.18	ppb v/v			03/17/23 11:26	1
Methyl tert-butyl ether	0.0750	J	0.20	0.036	ppb v/v			03/17/23 11:26	1
trans-1,2-Dichloroethene	0.0612	J	0.20	0.023	ppb v/v			03/17/23 11:26	1
n-Hexane	0.50	U	0.50	0.11	ppb v/v			03/17/23 11:26	1
1,1-Dichloroethane	0.0604	J	0.20	0.025	ppb v/v			03/17/23 11:26	1
Ethyl acetate	5.0	U	5.0	1.6	ppb v/v			03/17/23 11:26	1
Methyl Ethyl Ketone	0.50	U	0.50	0.49	ppb v/v			03/17/23 11:26	1
cis-1,2-Dichloroethene	0.0635	J	0.20	0.021	ppb v/v			03/17/23 11:26	1
Chloroform	0.0720	J	0.20	0.041	ppb v/v			03/17/23 11:26	1
Tetrahydrofuran	5.0	U	5.0	1.3	ppb v/v			03/17/23 11:26	1
1,1,1-Trichloroethane	0.0737	J	0.20	0.044	ppb v/v			03/17/23 11:26	1
Cyclohexane	0.0677	J	0.20	0.058	ppb v/v			03/17/23 11:26	1
Carbon tetrachloride	0.0610	J	0.20	0.022	ppb v/v			03/17/23 11:26	1
Benzene	0.0713	J	0.20	0.044	ppb v/v			03/17/23 11:26	1
1,2-Dichloroethane	0.20	U	0.20	0.093	ppb v/v			03/17/23 11:26	1
n-Heptane	0.0648	J	0.20	0.055	ppb v/v			03/17/23 11:26	1
Trichloroethene	0.0732	J	0.20	0.025	ppb v/v			03/17/23 11:26	1
1,2-Dichloropropane	0.20	U	0.20	0.094	ppb v/v			03/17/23 11:26	1
Bromodichloromethane	0.0702	J	0.20	0.050	ppb v/v			03/17/23 11:26	1
cis-1,3-Dichloropropene	0.0628	J	0.20	0.045	ppb v/v			03/17/23 11:26	1
Methyl isobutyl ketone	0.50	U	0.50	0.13	ppb v/v			03/17/23 11:26	1
Toluene	0.0846	J	0.20	0.042	ppb v/v			03/17/23 11:26	1
trans-1,3-Dichloropropene	0.0550	J	0.20	0.054	ppb v/v			03/17/23 11:26	1
1,1,2-Trichloroethane	0.0816	J	0.20	0.074	ppb v/v			03/17/23 11:26	1
Tetrachloroethene	0.0944	J	0.20	0.021	ppb v/v			03/17/23 11:26	1
Methyl Butyl Ketone (2-Hexanone)	0.50	U	0.50	0.15	ppb v/v			03/17/23 11:26	1
1,2-Dibromoethane	0.0831	J	0.20	0.042	ppb v/v			03/17/23 11:26	1
Chlorobenzene	0.102	J	0.20	0.044	ppb v/v			03/17/23 11:26	1
Ethylbenzene	0.0948	J	0.20	0.052	ppb v/v			03/17/23 11:26	1
m,p-Xylene	0.204	J	0.50	0.095	ppb v/v			03/17/23 11:26	1
Xylene, o-	0.0926	J	0.20	0.052	ppb v/v			03/17/23 11:26	1
Styrene	0.0714	J	0.20	0.059	ppb v/v			03/17/23 11:26	1
Bromoform	0.20	U	0.20	0.12	ppb v/v			03/17/23 11:26	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 200-189444/5
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	0.0974	J	0.20	0.043	ppb v/v			03/17/23 11:26	1
4-Ethyltoluene	0.0938	J	0.20	0.049	ppb v/v			03/17/23 11:26	1
1,3,5-Trimethylbenzene	0.106	J	0.20	0.047	ppb v/v			03/17/23 11:26	1
1,2,4-Trimethylbenzene	0.0988	J	0.20	0.080	ppb v/v			03/17/23 11:26	1
1,3-Dichlorobenzene	0.124	J	0.20	0.074	ppb v/v			03/17/23 11:26	1
1,4-Dichlorobenzene	0.120	J	0.20	0.089	ppb v/v			03/17/23 11:26	1
Benzyl chloride	0.20	U	0.20	0.088	ppb v/v			03/17/23 11:26	1
1,2-Dichlorobenzene	0.129	J	0.20	0.066	ppb v/v			03/17/23 11:26	1
1,2,4-Trichlorobenzene	0.50	U	0.50	0.33	ppb v/v			03/17/23 11:26	1
Hexachlorobutadiene	0.137	J	0.20	0.11	ppb v/v			03/17/23 11:26	1
Naphthalene	0.50	U	0.50	0.30	ppb v/v			03/17/23 11:26	1
Dibromochloromethane	0.0809	J	0.20	0.063	ppb v/v			03/17/23 11:26	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Propylene	8.6	U	8.6	2.1	ug/m3			03/17/23 11:26	1
Dichlorodifluoromethane	2.5	U	2.5	0.54	ug/m3			03/17/23 11:26	1
1,2-Dichlorotetrafluoroethane	0.538	J	1.4	0.34	ug/m3			03/17/23 11:26	1
Chloromethane	1.0	U	1.0	0.31	ug/m3			03/17/23 11:26	1
Vinyl chloride	0.152	J	0.51	0.054	ug/m3			03/17/23 11:26	1
1,3-Butadiene	0.147	J	0.44	0.086	ug/m3			03/17/23 11:26	1
Bromomethane	0.78	U	0.78	0.28	ug/m3			03/17/23 11:26	1
Chloroethane	1.3	U	1.3	0.47	ug/m3			03/17/23 11:26	1
Trichlorofluoromethane	0.418	J	1.1	0.28	ug/m3			03/17/23 11:26	1
Ethanol	9.4	U	9.4	4.9	ug/m3			03/17/23 11:26	1
Freon TF	0.567	J	1.5	0.41	ug/m3			03/17/23 11:26	1
1,1-Dichloroethene	0.270	J	0.79	0.10	ug/m3			03/17/23 11:26	1
Acetone	12	U	12	3.8	ug/m3			03/17/23 11:26	1
Isopropyl alcohol	12	U	12	3.9	ug/m3			03/17/23 11:26	1
Carbon disulfide	1.6	U	1.6	0.40	ug/m3			03/17/23 11:26	1
Methylene Chloride	1.7	U	1.7	0.63	ug/m3			03/17/23 11:26	1
Methyl tert-butyl ether	0.270	J	0.72	0.13	ug/m3			03/17/23 11:26	1
trans-1,2-Dichloroethene	0.242	J	0.79	0.091	ug/m3			03/17/23 11:26	1
n-Hexane	1.8	U	1.8	0.39	ug/m3			03/17/23 11:26	1
1,1-Dichloroethane	0.245	J	0.81	0.10	ug/m3			03/17/23 11:26	1
Ethyl acetate	18	U	18	5.8	ug/m3			03/17/23 11:26	1
Methyl Ethyl Ketone	1.5	U	1.5	1.4	ug/m3			03/17/23 11:26	1
cis-1,2-Dichloroethene	0.252	J	0.79	0.083	ug/m3			03/17/23 11:26	1
Chloroform	0.352	J	0.98	0.20	ug/m3			03/17/23 11:26	1
Tetrahydrofuran	15	U	15	3.8	ug/m3			03/17/23 11:26	1
1,1,1-Trichloroethane	0.402	J	1.1	0.24	ug/m3			03/17/23 11:26	1
Cyclohexane	0.233	J	0.69	0.20	ug/m3			03/17/23 11:26	1
Carbon tetrachloride	0.384	J	1.3	0.14	ug/m3			03/17/23 11:26	1
Benzene	0.228	J	0.64	0.14	ug/m3			03/17/23 11:26	1
1,2-Dichloroethane	0.81	U	0.81	0.38	ug/m3			03/17/23 11:26	1
n-Heptane	0.266	J	0.82	0.23	ug/m3			03/17/23 11:26	1
Trichloroethene	0.394	J	1.1	0.13	ug/m3			03/17/23 11:26	1
1,2-Dichloropropane	0.92	U	0.92	0.43	ug/m3			03/17/23 11:26	1
Bromodichloromethane	0.470	J	1.3	0.34	ug/m3			03/17/23 11:26	1
cis-1,3-Dichloropropene	0.285	J	0.91	0.20	ug/m3			03/17/23 11:26	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: MB 200-189444/5
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methyl isobutyl ketone	2.0	U	2.0	0.53	ug/m3			03/17/23 11:26	1
Toluene	0.319	J	0.75	0.16	ug/m3			03/17/23 11:26	1
trans-1,3-Dichloropropene	0.250	J	0.91	0.25	ug/m3			03/17/23 11:26	1
1,1,2-Trichloroethane	0.445	J	1.1	0.40	ug/m3			03/17/23 11:26	1
Tetrachloroethene	0.640	J	1.4	0.14	ug/m3			03/17/23 11:26	1
Methyl Butyl Ketone (2-Hexanone)	2.0	U	2.0	0.61	ug/m3			03/17/23 11:26	1
1,2-Dibromoethane	0.639	J	1.5	0.32	ug/m3			03/17/23 11:26	1
Chlorobenzene	0.468	J	0.92	0.20	ug/m3			03/17/23 11:26	1
Ethylbenzene	0.412	J	0.87	0.23	ug/m3			03/17/23 11:26	1
m,p-Xylene	0.885	J	2.2	0.41	ug/m3			03/17/23 11:26	1
Xylene, o-	0.402	J	0.87	0.23	ug/m3			03/17/23 11:26	1
Styrene	0.304	J	0.85	0.25	ug/m3			03/17/23 11:26	1
Bromoform	2.1	U	2.1	1.2	ug/m3			03/17/23 11:26	1
1,1,2,2-Tetrachloroethane	0.669	J	1.4	0.30	ug/m3			03/17/23 11:26	1
4-Ethyltoluene	0.461	J	0.98	0.24	ug/m3			03/17/23 11:26	1
1,3,5-Trimethylbenzene	0.523	J	0.98	0.23	ug/m3			03/17/23 11:26	1
1,2,4-Trimethylbenzene	0.486	J	0.98	0.39	ug/m3			03/17/23 11:26	1
1,3-Dichlorobenzene	0.743	J	1.2	0.44	ug/m3			03/17/23 11:26	1
1,4-Dichlorobenzene	0.722	J	1.2	0.54	ug/m3			03/17/23 11:26	1
Benzyl chloride	1.0	U	1.0	0.46	ug/m3			03/17/23 11:26	1
1,2-Dichlorobenzene	0.773	J	1.2	0.40	ug/m3			03/17/23 11:26	1
1,2,4-Trichlorobenzene	3.7	U	3.7	2.4	ug/m3			03/17/23 11:26	1
Hexachlorobutadiene	1.46	J	2.1	1.2	ug/m3			03/17/23 11:26	1
Naphthalene	2.6	U	2.6	1.6	ug/m3			03/17/23 11:26	1
Dibromochloromethane	0.690	J	1.7	0.54	ug/m3			03/17/23 11:26	1

Tentatively Identified Compound	*MB Est. Result*	*MB Qualifier*	*Unit*	*D*	*RT*	*CAS No.*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromomethane	*0.0850*	*J*	*ppb v/v*		*14.07*	*74-95-3*		*03/17/23 11:26*	*1*
n-Nonane	*0.0811*	*J*	*ppb v/v*		*19.09*	*111-84-2*		*03/17/23 11:26*	*1*
Isopropylbenzene	*0.0971*	*J*	*ppb v/v*		*20.51*	*98-82-8*		*03/17/23 11:26*	*1*
N-Propylbenzene	*0.0966*	*J*	*ppb v/v*		*21.26*	*103-65-1*		*03/17/23 11:26*	*1*
2-Chlorotoluene	*0.115*	*J*	*ppb v/v*		*21.41*	*95-49-8*		*03/17/23 11:26*	*1*
tert-Butylbenzene	*0.106*	*J*	*ppb v/v*		*22.05*	*98-06-6*		*03/17/23 11:26*	*1*
sec-Butylbenzene	*0.0977*	*J*	*ppb v/v*		*22.38*	*135-98-8*		*03/17/23 11:26*	*1*
4-Isopropyltoluene	*0.0887*	*J*	*ppb v/v*		*22.60*	*99-87-6*		*03/17/23 11:26*	*1*

Lab Sample ID: LCS 200-189444/4
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Propylene	10.0	10.4		ppb v/v		104	50 - 158
Dichlorodifluoromethane	10.0	10.9		ppb v/v		109	61 - 142
1,2-Dichlorotetrafluoroethane	10.0	9.95		ppb v/v		100	71 - 141
Chloromethane	10.0	9.81		ppb v/v		98	56 - 141
Vinyl chloride	10.0	9.66		ppb v/v		97	61 - 135
1,3-Butadiene	10.0	9.52		ppb v/v		95	58 - 139
Bromomethane	10.0	10.1		ppb v/v		101	72 - 124

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 200-189444/4
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloroethane	10.0	9.88		ppb v/v		99	68 - 130
Trichlorofluoromethane	10.0	9.60		ppb v/v		96	70 - 129
Ethanol	14.7	12.1		ppb v/v		83	50 - 150
Freon TF	10.0	9.38		ppb v/v		94	70 - 121
1,1-Dichloroethene	10.0	9.18		ppb v/v		92	68 - 120
Acetone	10.0	9.43		ppb v/v		94	54 - 154
Isopropyl alcohol	10.0	10.5		ppb v/v		105	53 - 142
Carbon disulfide	10.0	9.31		ppb v/v		93	71 - 138
Methylene Chloride	10.0	8.10		ppb v/v		81	59 - 137
Methyl tert-butyl ether	10.0	8.91		ppb v/v		89	70 - 127
trans-1,2-Dichloroethene	10.0	9.03		ppb v/v		90	69 - 137
n-Hexane	10.0	8.52		ppb v/v		85	63 - 138
1,1-Dichloroethane	10.0	8.34		ppb v/v		83	66 - 130
Ethyl acetate	10.0	9.60		ppb v/v		96	70 - 131
Methyl Ethyl Ketone	10.0	8.81		ppb v/v		88	72 - 124
cis-1,2-Dichloroethene	10.0	8.97		ppb v/v		90	72 - 121
Chloroform	10.0	8.90		ppb v/v		89	73 - 124
Tetrahydrofuran	10.0	8.55		ppb v/v		86	60 - 149
1,1,1-Trichloroethane	10.0	9.23		ppb v/v		92	72 - 127
Cyclohexane	10.0	9.08		ppb v/v		91	76 - 124
Carbon tetrachloride	10.0	9.41		ppb v/v		94	71 - 133
Benzene	10.0	8.83		ppb v/v		88	73 - 119
1,2-Dichloroethane	10.0	8.77		ppb v/v		88	68 - 135
n-Heptane	10.0	7.61		ppb v/v		76	60 - 142
Trichloroethene	10.0	8.96		ppb v/v		90	73 - 122
1,2-Dichloropropane	10.0	8.22		ppb v/v		82	69 - 128
Bromodichloromethane	10.0	9.11		ppb v/v		91	75 - 127
cis-1,3-Dichloropropene	10.0	9.16		ppb v/v		92	74 - 125
Methyl isobutyl ketone	10.0	8.05		ppb v/v		80	58 - 144
Toluene	10.0	9.18		ppb v/v		92	75 - 122
trans-1,3-Dichloropropene	10.0	9.30		ppb v/v		93	74 - 128
1,1,2-Trichloroethane	10.0	9.41		ppb v/v		94	75 - 126
Tetrachloroethene	10.0	9.79		ppb v/v		98	70 - 125
Methyl Butyl Ketone (2-Hexanone)	10.0	9.93		ppb v/v		99	57 - 143
1,2-Dibromoethane	10.0	10.1		ppb v/v		101	78 - 122
Chlorobenzene	10.0	9.49		ppb v/v		95	76 - 119
Ethylbenzene	10.0	9.10		ppb v/v		91	74 - 122
m,p-Xylene	20.0	19.0		ppb v/v		95	76 - 121
Xylene, o-	10.0	10.4		ppb v/v		104	73 - 123
Styrene	10.0	10.9		ppb v/v		109	74 - 125
Bromoform	10.0	12.2		ppb v/v		122	53 - 149
1,1,2,2-Tetrachloroethane	10.0	9.19		ppb v/v		92	74 - 126
4-Ethyltoluene	10.0	9.98		ppb v/v		100	75 - 129
1,3,5-Trimethylbenzene	10.0	9.90		ppb v/v		99	72 - 126
1,2,4-Trimethylbenzene	10.0	10.0		ppb v/v		100	71 - 129
1,3-Dichlorobenzene	10.0	10.6		ppb v/v		106	69 - 131
1,4-Dichlorobenzene	10.0	10.8		ppb v/v		108	67 - 132
Benzyl chloride	10.0	10.1		ppb v/v		101	60 - 136

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 200-189444/4
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,2-Dichlorobenzene	10.0	10.6		ppb v/v		106	68 - 129
1,2,4-Trichlorobenzene	10.0	12.3		ppb v/v		123	50 - 150
Hexachlorobutadiene	10.0	11.3		ppb v/v		113	58 - 130
Naphthalene	10.0	12.5		ppb v/v		125	50 - 150
Dibromochloromethane	10.0	10.3		ppb v/v		103	73 - 125

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Propylene	17	17.9		ug/m3		104	50 - 158
Dichlorodifluoromethane	49	53.7		ug/m3		109	61 - 142
1,2-Dichlorotetrafluoroethane	70	69.6		ug/m3		100	71 - 141
Chloromethane	21	20.3		ug/m3		98	56 - 141
Vinyl chloride	26	24.7		ug/m3		97	61 - 135
1,3-Butadiene	22	21.1		ug/m3		95	58 - 139
Bromomethane	39	39.1		ug/m3		101	72 - 124
Chloroethane	26	26.1		ug/m3		99	68 - 130
Trichlorofluoromethane	56	53.9		ug/m3		96	70 - 129
Ethanol	28	22.8		ug/m3		83	50 - 150
Freon TF	77	71.9		ug/m3		94	70 - 121
1,1-Dichloroethene	40	36.4		ug/m3		92	68 - 120
Acetone	24	22.4		ug/m3		94	54 - 154
Isopropyl alcohol	25	25.7		ug/m3		105	53 - 142
Carbon disulfide	31	29.0		ug/m3		93	71 - 138
Methylene Chloride	35	28.1		ug/m3		81	59 - 137
Methyl tert-butyl ether	36	32.1		ug/m3		89	70 - 127
trans-1,2-Dichloroethene	40	35.8		ug/m3		90	69 - 137
n-Hexane	35	30.0		ug/m3		85	63 - 138
1,1-Dichloroethane	40	33.8		ug/m3		83	66 - 130
Ethyl acetate	36	34.6		ug/m3		96	70 - 131
Methyl Ethyl Ketone	29	26.0		ug/m3		88	72 - 124
cis-1,2-Dichloroethene	40	35.6		ug/m3		90	72 - 121
Chloroform	49	43.5		ug/m3		89	73 - 124
Tetrahydrofuran	29	25.2		ug/m3		86	60 - 149
1,1,1-Trichloroethane	55	50.4		ug/m3		92	72 - 127
Cyclohexane	34	31.3		ug/m3		91	76 - 124
Carbon tetrachloride	63	59.2		ug/m3		94	71 - 133
Benzene	32	28.2		ug/m3		88	73 - 119
1,2-Dichloroethane	40	35.5		ug/m3		88	68 - 135
n-Heptane	41	31.2		ug/m3		76	60 - 142
Trichloroethene	54	48.2		ug/m3		90	73 - 122
1,2-Dichloropropane	46	38.0		ug/m3		82	69 - 128
Bromodichloromethane	67	61.0		ug/m3		91	75 - 127
cis-1,3-Dichloropropene	45	41.6		ug/m3		92	74 - 125
Methyl isobutyl ketone	41	33.0		ug/m3		80	58 - 144
Toluene	38	34.6		ug/m3		92	75 - 122
trans-1,3-Dichloropropene	45	42.2		ug/m3		93	74 - 128
1,1,2-Trichloroethane	55	51.4		ug/m3		94	75 - 126
Tetrachloroethene	68	66.4		ug/m3		98	70 - 125
Methyl Butyl Ketone (2-Hexanone)	41	40.7		ug/m3		99	57 - 143

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: LCS 200-189444/4
Matrix: Air
Analysis Batch: 189444

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,2-Dibromoethane	77	77.3		ug/m3		101	78 - 122
Chlorobenzene	46	43.7		ug/m3		95	76 - 119
Ethylbenzene	43	39.5		ug/m3		91	74 - 122
m,p-Xylene	87	82.4		ug/m3		95	76 - 121
Xylene, o-	43	45.1		ug/m3		104	73 - 123
Styrene	43	46.5		ug/m3		109	74 - 125
Bromoform	100	126		ug/m3		122	53 - 149
1,1,2,2-Tetrachloroethane	69	63.1		ug/m3		92	74 - 126
4-Ethyltoluene	49	49.1		ug/m3		100	75 - 129
1,3,5-Trimethylbenzene	49	48.7		ug/m3		99	72 - 126
1,2,4-Trimethylbenzene	49	49.2		ug/m3		100	71 - 129
1,3-Dichlorobenzene	60	63.9		ug/m3		106	69 - 131
1,4-Dichlorobenzene	60	65.1		ug/m3		108	67 - 132
Benzyl chloride	52	52.2		ug/m3		101	60 - 136
1,2-Dichlorobenzene	60	64.0		ug/m3		106	68 - 129
1,2,4-Trichlorobenzene	74	91.2		ug/m3		123	50 - 150
Hexachlorobutadiene	110	121		ug/m3		113	58 - 130
Naphthalene	52	65.7		ug/m3		125	50 - 150
Dibromochloromethane	85	87.8		ug/m3		103	73 - 125

Lab Sample ID: 200-67180-1 DU
Matrix: Air
Analysis Batch: 189444

Client Sample ID: SSV-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Propylene	50	U	50	U	ppb v/v		NC	25
Dichlorodifluoromethane	5.0	U	5.0	U	ppb v/v		NC	25
1,2-Dichlorotetrafluoroethane	2.0	U	2.0	U	ppb v/v		NC	25
Chloromethane	5.0	U	5.0	U	ppb v/v		NC	25
Vinyl chloride	2.0	U	2.0	U	ppb v/v		NC	25
1,3-Butadiene	2.0	U	2.0	U	ppb v/v		NC	25
Bromomethane	2.0	U	2.0	U	ppb v/v		NC	25
Chloroethane	5.0	U	5.0	U	ppb v/v		NC	25
Trichlorofluoromethane	1.4	J B	0.502	J F5	ppb v/v		96	25
Ethanol	45	J	47.3	J	ppb v/v		5	25
Freon TF	2.0	U	2.0	U	ppb v/v		NC	25
1,1-Dichloroethene	2.0	U	2.0	U	ppb v/v		NC	25
Acetone	59		62.5		ppb v/v		5	25
Isopropyl alcohol	28	J	29.1	J	ppb v/v		4	25
Carbon disulfide	5.0	U	5.0	U	ppb v/v		NC	25
Methylene Chloride	5.0	U	5.0	U	ppb v/v		NC	25
Methyl tert-butyl ether	2.0	U	2.0	U	ppb v/v		NC	25
trans-1,2-Dichloroethene	2.0	U	2.0	U	ppb v/v		NC	25
n-Hexane	2.3	J	2.38	J	ppb v/v		4	25
1,1-Dichloroethane	2.0	U	2.0	U	ppb v/v		NC	25
Ethyl acetate	50	U	50	U	ppb v/v		NC	25
Methyl Ethyl Ketone	5.0	U	5.0	U	ppb v/v		NC	25
cis-1,2-Dichloroethene	2.0	U	2.0	U	ppb v/v		NC	25
Chloroform	2.0	U	2.0	U	ppb v/v		NC	25

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: 200-67180-1 DU
Matrix: Air
Analysis Batch: 189444

Client Sample ID: SSV-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Tetrahydrofuran	50	U	50	U	ppb v/v		NC	25
1,1,1-Trichloroethane	2.0	U	2.0	U	ppb v/v		NC	25
Cyclohexane	4.4	B	4.87		ppb v/v		9	25
Carbon tetrachloride	2.0	U	2.0	U	ppb v/v		NC	25
Benzene	0.87	J B	0.905	J	ppb v/v		4	25
1,2-Dichloroethane	2.0	U	2.0	U	ppb v/v		NC	25
n-Heptane	22	B	24.2		ppb v/v		8	25
Trichloroethene	2.0	U	2.0	U	ppb v/v		NC	25
1,2-Dichloropropane	2.0	U	2.0	U	ppb v/v		NC	25
Bromodichloromethane	2.0	U	2.0	U	ppb v/v		NC	25
cis-1,3-Dichloropropene	2.0	U	2.0	U	ppb v/v		NC	25
Methyl isobutyl ketone	5.0	U	5.0	U	ppb v/v		NC	25
Toluene	9.9	B	10.7		ppb v/v		8	25
trans-1,3-Dichloropropene	2.0	U	2.0	U	ppb v/v		NC	25
1,1,2-Trichloroethane	2.0	U	2.0	U	ppb v/v		NC	25
Tetrachloroethene	6.3	B	6.82		ppb v/v		7	25
Methyl Butyl Ketone (2-Hexanone)	5.0	U	5.0	U	ppb v/v		NC	25
1,2-Dibromoethane	2.0	U	2.0	U	ppb v/v		NC	25
Chlorobenzene	2.0	U	2.0	U	ppb v/v		NC	25
Ethylbenzene	2.3	B	2.50		ppb v/v		6	25
m,p-Xylene	3.5	J B	3.92	J	ppb v/v		13	25
Xylene, o-	1.6	J B	1.79	J	ppb v/v		10	25
Styrene	2.0	U	2.0	U	ppb v/v		NC	25
Bromoform	2.0	U	2.0	U	ppb v/v		NC	25
1,1,2,2-Tetrachloroethane	2.0	U	2.0	U	ppb v/v		NC	25
4-Ethyltoluene	2.0	U	2.0	U	ppb v/v		NC	25
1,3,5-Trimethylbenzene	2.0	U	2.0	U	ppb v/v		NC	25
1,2,4-Trimethylbenzene	0.92	J B	1.04	J	ppb v/v		13	25
1,3-Dichlorobenzene	2.0	U	2.0	U	ppb v/v		NC	25
1,4-Dichlorobenzene	2.0	U	2.0	U	ppb v/v		NC	25
Benzyl chloride	2.0	U	2.0	U	ppb v/v		NC	25
1,2-Dichlorobenzene	2.0	U	2.0	U	ppb v/v		NC	25
1,2,4-Trichlorobenzene	5.0	U	5.0	U	ppb v/v		NC	25
Hexachlorobutadiene	2.0	U	2.0	U	ppb v/v		NC	25
Naphthalene	5.5		6.97		ppb v/v		24	25
Dibromochloromethane	2.0	U	2.0	U	ppb v/v		NC	25

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Propylene	86	U	86	U	ug/m3		NC	25
Dichlorodifluoromethane	25	U	25	U	ug/m3		NC	25
1,2-Dichlorotetrafluoroethane	14	U	14	U	ug/m3		NC	25
Chloromethane	10	U	10	U	ug/m3		NC	25
Vinyl chloride	5.1	U	5.1	U	ug/m3		NC	25
1,3-Butadiene	4.4	U	4.4	U	ug/m3		NC	25
Bromomethane	7.8	U	7.8	U	ug/m3		NC	25
Chloroethane	13	U	13	U	ug/m3		NC	25
Trichlorofluoromethane	8.0	J B	2.82	J F5	ug/m3		96	25
Ethanol	84	J	89.1	J	ug/m3		5	25

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: 200-67180-1 DU
Matrix: Air
Analysis Batch: 189444

Client Sample ID: SSV-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Freon TF	15	U		15	U	ug/m3				NC	25
1,1-Dichloroethene	7.9	U		7.9	U	ug/m3				NC	25
Acetone	140			148		ug/m3				5	25
Isopropyl alcohol	68	J		71.4	J	ug/m3				4	25
Carbon disulfide	16	U		16	U	ug/m3				NC	25
Methylene Chloride	17	U		17	U	ug/m3				NC	25
Methyl tert-butyl ether	7.2	U		7.2	U	ug/m3				NC	25
trans-1,2-Dichloroethene	7.9	U		7.9	U	ug/m3				NC	25
n-Hexane	8.0	J		8.40	J	ug/m3				4	25
1,1-Dichloroethane	8.1	U		8.1	U	ug/m3				NC	25
Ethyl acetate	180	U		180	U	ug/m3				NC	25
Methyl Ethyl Ketone	15	U		15	U	ug/m3				NC	25
cis-1,2-Dichloroethene	7.9	U		7.9	U	ug/m3				NC	25
Chloroform	9.8	U		9.8	U	ug/m3				NC	25
Tetrahydrofuran	150	U		150	U	ug/m3				NC	25
1,1,1-Trichloroethane	11	U		11	U	ug/m3				NC	25
Cyclohexane	15	B		16.8		ug/m3				9	25
Carbon tetrachloride	13	U		13	U	ug/m3				NC	25
Benzene	2.8	J B		2.89	J	ug/m3				4	25
1,2-Dichloroethane	8.1	U		8.1	U	ug/m3				NC	25
n-Heptane	91	B		99.1		ug/m3				8	25
Trichloroethene	11	U		11	U	ug/m3				NC	25
1,2-Dichloropropane	9.2	U		9.2	U	ug/m3				NC	25
Bromodichloromethane	13	U		13	U	ug/m3				NC	25
cis-1,3-Dichloropropene	9.1	U		9.1	U	ug/m3				NC	25
Methyl isobutyl ketone	20	U		20	U	ug/m3				NC	25
Toluene	37	B		40.3		ug/m3				8	25
trans-1,3-Dichloropropene	9.1	U		9.1	U	ug/m3				NC	25
1,1,2-Trichloroethane	11	U		11	U	ug/m3				NC	25
Tetrachloroethene	43	B		46.2		ug/m3				7	25
Methyl Butyl Ketone (2-Hexanone)	20	U		20	U	ug/m3				NC	25
1,2-Dibromoethane	15	U		15	U	ug/m3				NC	25
Chlorobenzene	9.2	U		9.2	U	ug/m3				NC	25
Ethylbenzene	10	B		10.8		ug/m3				6	25
m,p-Xylene	15	J B		17.0	J	ug/m3				13	25
Xylene, o-	7.0	J B		7.77	J	ug/m3				10	25
Styrene	8.5	U		8.5	U	ug/m3				NC	25
Bromoform	21	U		21	U	ug/m3				NC	25
1,1,2,2-Tetrachloroethane	14	U		14	U	ug/m3				NC	25
4-Ethyltoluene	9.8	U		9.8	U	ug/m3				NC	25
1,3,5-Trimethylbenzene	9.8	U		9.8	U	ug/m3				NC	25
1,2,4-Trimethylbenzene	4.5	J B		5.12	J	ug/m3				13	25
1,3-Dichlorobenzene	12	U		12	U	ug/m3				NC	25
1,4-Dichlorobenzene	12	U		12	U	ug/m3				NC	25
Benzyl chloride	10	U		10	U	ug/m3				NC	25
1,2-Dichlorobenzene	12	U		12	U	ug/m3				NC	25
1,2,4-Trichlorobenzene	37	U		37	U	ug/m3				NC	25
Hexachlorobutadiene	21	U		21	U	ug/m3				NC	25

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Lab Sample ID: 200-67180-1 DU
Matrix: Air
Analysis Batch: 189444

Client Sample ID: SSV-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Naphthalene	29			36.6		ug/m3				24	25
Dibromochloromethane	17	U		17	U	ug/m3				NC	25

QC Association Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Air - GC/MS VOA

Analysis Batch: 189444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
200-67180-1	SSV-01	Total/NA	Air	TO-15	
200-67180-2	SSV-02	Total/NA	Air	TO-15	
200-67180-3	SSV-03	Total/NA	Air	TO-15	
200-67180-4	SSV-04	Total/NA	Air	TO-15	
MB 200-189444/5	Method Blank	Total/NA	Air	TO-15	
LCS 200-189444/4	Lab Control Sample	Total/NA	Air	TO-15	
200-67180-1 DU	SSV-01	Total/NA	Air	TO-15	

Lab Chronicle

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Client Sample ID: SSV-01
Date Collected: 03/07/23 13:39
Date Received: 03/08/23 10:30

Lab Sample ID: 200-67180-1
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	TO-15		10	189444	A1B	EET BUR	03/17/23 21:26

Client Sample ID: SSV-02
Date Collected: 03/07/23 14:01
Date Received: 03/08/23 10:30

Lab Sample ID: 200-67180-2
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	TO-15		10	189444	A1B	EET BUR	03/17/23 23:10

Client Sample ID: SSV-03
Date Collected: 03/07/23 14:26
Date Received: 03/08/23 10:30

Lab Sample ID: 200-67180-3
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	TO-15		10	189444	A1B	EET BUR	03/18/23 00:02

Client Sample ID: SSV-04
Date Collected: 03/07/23 14:38
Date Received: 03/08/23 10:30

Lab Sample ID: 200-67180-4
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	TO-15		10	189444	A1B	EET BUR	03/18/23 00:54

Laboratory References:

EET BUR = Eurofins Burlington, 530 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990

Accreditation/Certification Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Laboratory: Eurofins Burlington

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Minnesota	NELAP	050-999-436	12-31-23

Method Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	EET BUR

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

EET BUR = Eurofins Burlington, 530 Community Drive, Suite 11, South Burlington, VT 05403, TEL (802)660-1990

Sample Summary

Client: Short Elliott Hendrickson, Inc. dba SEH
Project/Site: ATCT Site 6

Job ID: 200-67180-1
SDG: 200-67180

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
200-67180-1	SSV-01	Air	03/07/23 13:39	03/08/23 10:30	Air Canister (1-Liter) #4843
200-67180-2	SSV-02	Air	03/07/23 14:01	03/08/23 10:30	Air Canister (1-Liter) #34000964
200-67180-3	SSV-03	Air	03/07/23 14:26	03/08/23 10:30	Air Canister (1-Liter) #34001136
200-67180-4	SSV-04	Air	03/07/23 14:38	03/08/23 10:30	Air Canister (1-Liter) #6461

Post-Sampling Air Canister Pressure Check Record

Login # (w/ Location Code)	Date	Time (Military)	Lab BP ("Hg)	Lab Temp (°C)	Pressure Gauge ID	Analyst
200-67180	03/09/23	9:39	29.9	24	G34	ZK

Sampling Information and Return Equipment Check	Yes	N o	Comments
(1) Is a Field Test Data Sheet (FTDS) or similar sampling documentation present?	Yes		
(2) Is the flow controller ID used for each canister recorded?	Yes		
(3) MA MCP & NJ DKQP: Check return flow rate for flow controllers		N o	
(4) Is visible sign of damage to canister and/or flow controller (FC) present?		N o	
If damage observed, list equipment IDs and describe condition:			

Post-Sampling Return Pressure Check

Lab ID	Canister ID	Pressure[1] ("Hg)	Anomaly[2] (Y/N)	FC ID[3]	FC Check[4] Reference	FC Return (Y/N)	Can Cert Batch ID	Comments
200-67180-A-1	4843	-4.0	N	6618	94/10	N	34001973-54139	
200-67180-A-2	34000964	-4.0	N	6606	95/12	N	6449-54304	
200-67180-A-3	34001136	-2.4	N	6633	95/11	N	4850-54412	
200-67180-A-4	6461	-1.1	N	6636	94/15	N	6449-54304	

[1] Criteria: Return Pressure should be between -1 and -10 ("Hg) with the exception of grab samples or those using 100 or 200mL/minute flow controllers. These samples must be returned at no lower than -10"Hg, but have no specific criteria otherwise.

[2] If return pressure is not within criteria, initiate Non-Conformance Memo.

[3] Record the ID of the FC used for sampling if information is provided, otherwise leave blank.

[4] Record the Flow Controller Set Flow Rate Logbook ID and Page number in which the original FC Check was recorded

Eurofins Minneapolis SC
213

Eurofins TestAmerica, Burlington
530 Community Drive
Suite 11
South Burlington, VT 05403-6809
phone 802.660.1990 fax 802.660.1919

Canister Samples Chain of Custody Record

eurofins | Environment Testing America

TestAmerica Laboratories, Inc. d/b/a Eurofins TestAmerica

Client Contact Information	Client Project Manager: Jennifer force	Samples Collected By: Elliott Allen	COC No:
Company Name: SEH	Phone: 612.839.2430		of COCs
Address: 3535 Vadnais Center Dr	Email: jforce@sehinc.com		TALS Project #:
City/State/Zip: St. Paul, MN			For Lab Use Only:
Phone: 651 424 0535	Site Contact:		Walk-in Client:
FAX:	Tel/Fax		Lab Sampling:
Project Name: ATCT Site 6	Analysis Turnaround Time		Job / SDG No.:
Site/Location: Dilai 171568	Standard (Specific): 5 day		(See below for Add'l Items)
P O #	Rush (Specifiy).		

Sample Identification	Sample Start Date	Time Start	Sample End Date	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-14/15 (Standard / Low Level)	TO-15 SIM	EPA 3C	EPA 25C	ASTM D-1946	FPA 15/16	Other (Please specify in notes section)	Sample Type	Indoor Air/Ambient Air	Sub-Slab	Soil Gas	Soil Vapor Extraction (SVE)	Landfill Gas	Other (Please specify in notes section)	Sample Specific Notes:
SSV-01	3/7	1332	3/7	1339	-29	-4	6618	4843	X														
SSV-02	"	1356	"	1401	-30	-4	6606	3400664	"														
SSV-03	"	1420	"	1426	-29	-4	6633	34001136	"														
SSV-04	"	1432	"	1438	-28	-4	6636	6461	"														

200-67180 Chain of Custody

Temperature (Fahrenheit)	Interior	Ambient
Start		
Stop		

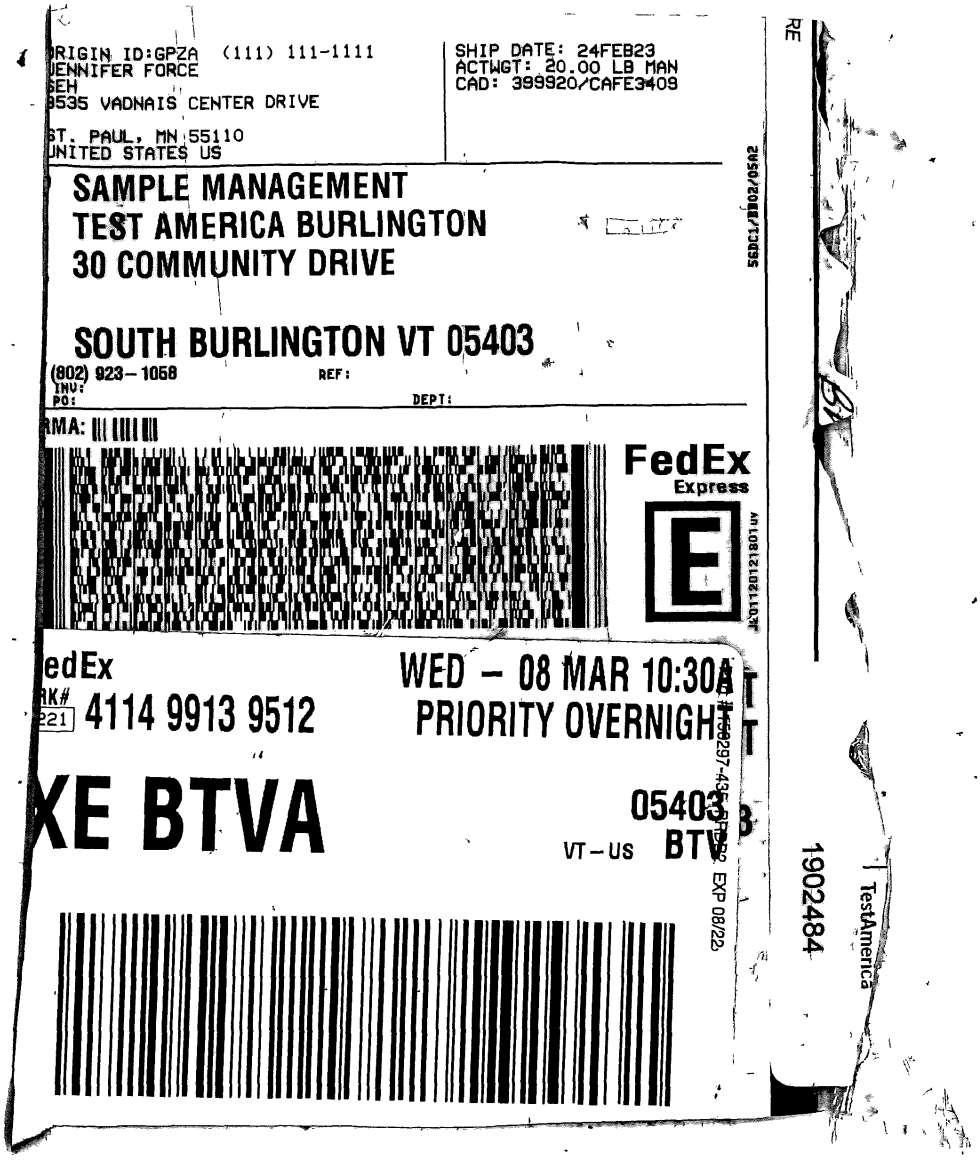
Pressure (inches of Hg)	Interior	Ambient
Start		
Stop		

Special Instructions/QC Requirements & Comments:

Samples Shipped by:	Date / Time:	Samples Received by:	
Samples Relinquished by: Elliott Allen	Date / Time: 3/7 1600	Received by: ETA'Boil	3/8/23 1030
Relinquished by:	Date / Time:	Received by:	
Lab Use Only: Shipper Name:	Opened by:	Condition:	

Form No. CA-C-WI-003, Rev. 2.28, dated 1/8/2021

3/20/2023


ORIGIN ID:GPZA (111) 111-1111
JENNIFER FORCE
SEH
9535 VADNAIS CENTER DRIVE
ST. PAUL, MN 55110
UNITED STATES US
SHIP DATE: 24FEB23
ACTWGT: 20.00 LB MAN
CAD: 399920/CAFE3409
SAMPLE MANAGEMENT
TEST AMERICA BURLINGTON
30 COMMUNITY DRIVE
SOUTH BURLINGTON VT 05403
(802) 923-1058
REF:
INV:
PO:
DEPT:
RMA:
FedEx
Express
edEx
RK#
221
4114 9913 9512
WED - 08 MAR 10:30A
PRIORITY OVERNIGH
XE BTVA
05403
VT-US
BTV
EXP 08/22
1902484
TestAmerica

Login Sample Receipt Checklist

Client: Short Elliott Hendrickson, Inc. dba SEH

Job Number: 200-67180-1
SDG Number: 200-67180

Login Number: 67180
List Number: 1
Creator: Khudaier, Zahraa

List Source: Eurofins Burlington

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	1902484
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	Thermal preservation not required.
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	N/A	Thermal preservation not required.
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	N/A	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Pre-Shipment Clean Canister Certification Report

Canister Cleaning & Pre-Shipment Leak Test

System ID	Max DF#	# Cycles	Cleaning Start Date/Time		System Start Temp(s):		Technician	Can Size	Certification Type:
Oven 1/2	400	300	1/21/2023	1543	22	22	SML	1 liter	batch

						Initial Reading					Final Reading				
Port	Can ID	Initial[1] (psia)	Final (psia)	Diff[3]	Final ("Hg)	Gauge:	Date:	Time:	Tech:	Temp:	Gauge:	Date:	Time:	Tech:	Temp:
1	4954	-.08	-.08	0	29.8	G26	1/22/23	1322	←	22.0	G26	2/1/23	1531	←	22.0
2	5969		-.08	0		G26					G26				
3	5854		-.19	-.11		G26					G26				
4	34001973	-.08	-.08	0		G26	2/1/23	1531	←	22.0	G26				
5	8468	-.08	-.08	0		G26	1/23/23	1322	←	22.0	G26				
6	5859		-.08	0		G26					G26				
7	6360		-.08	0		G26					G26				
8	3579		-.08	0		G26					G26				
9	4843		-.08	0		G26					G26				
10	6438		-.08	0		G26					G26				
11	2980		-.08	0		G26					G26				
12	6355	←	-.22	-.14	←	G26	←	←	←	←	G26	←	←	←	←

[1] Batch Certification: The reading is taken on the "batch" canister and this value is used as the initial pressure for all canisters in the batch.

[3] Difference = Final Pressure - Initial Pressure . Acceptance Criteria: (1) The difference must be less than or equal to + 0.25psi. (2) Pressure readings must be at least 24 hours apart.

If time frame was not met, the PM must authorize shipment of canister **PM Authorization** **Date:**

Clean Canister Certification Analysis & Authorization of Release to Inventory

Test Method: ☐TO15 Routine ☐ TO15 LL

				Inventory Level				Secondary Review		
Can ID	Date	Sequence	Analyst	1	2	3	4	Limited	Review Date	Revi
34001973	1/30/23	54139	ABL			XXXXXXX			1/30/23	ABL

Inventory Level 1: Individual Canister Certification (TO15LL 0.01).

Inventory Level 2: Individual or Batch Certification (TO15 0.04 ppbv).

Inventory Level 3: Individual or Batch Certification (TO15 0.2 ppbv).

Inventory Level Limited: Canisters may only be used for certain projects.

Dup Tees/Vac gauges (enter IDs if included):

Comments: NC

3/20/2023

Form ID: FAI023:12
Revision Date: 12/18/2018

TestAmerica Burlington

200-66552-A-4
34001973
Location: Air-Storage
Bottle: Summa Canister 1L
Sampled: 1/21/2023 12:00 AM 200-1697385

Loc: 200
66552
#4 A
Air-Storag

Pre-Shipment Clean Canister Certification Report

Canister Cleaning & Pre-Shipment Leak Test

System ID	Max DF#	# Cycles	Cleaning Start Date/Time		System Start Temp(s):		Technician	Can Size	Certification Type:
Oven 3/4	10	32	2/10/2023	1324	22	22	SML	1 liter	batch

						Initial Reading					Final Reading				
Port	Can ID	Initial[1] (psia)	Final (psia)	Diff.[3]	Final ("Hg)	Gauge:	Date:	Time:	Tech:	Temp:	Gauge:	Date:	Time:	Tech:	Temp:
1	8440	.08	1.08	0	29.6	G26	2/14/23	1251	—	22.0	G26	2/14/23	1178	—	22.0
2	4965		1.08	0		G26					G26				
3	3585		1.08	0		G26					G26				
4	34000995		.08	0		G26					G26				
5	6461		1.08	0		G26					G26				
6	34000735		1.14	1.06		G26					G26				
7	6406		1.08	0		G26					G26				
8	6469	"	1.08	0		G26	"	"	"	"	G26				
9	6449	.08	1.08	0		G26	2/14/23	1148	—	22.0	G26				
10	5918	.08	.08	0		G26	2/14/23	1251	—	22.0	G26				
11	34000964		1.08	0		G26					G26				
12	8316	"	1.08	0	"	G26	"	"	"	"	G26	"	"	"	"

[1] Batch Certification: The reading is taken on the "batch" canister and this value is used as the initial pressure for all canisters in the batch.

[3] Difference = Final Pressure - Initial Pressure . Acceptance Criteria: (1) The difference must be less than or equal to + 0.25psi. (2) Pressure readings must be at least 24 hours apart.

If time frame was not met, the PM must authorize shipment of canister **PM Authorization** **Date:**

Clean Canister Certification Analysis & Authorization of Release to Inventory

Test Method: ☐TO15 Routine ☐ TO15 LL

				Inventory Level				Secondary Review		
Can ID	Date	Sequence	Analyst	1	2	3	4	Limited	Review Date	Review
6449	2/14/23	54306	KPT			XXXXXX			7/14/23	DH

Inventory Level 1: Individual Canister Certification (TO15LL 0.01).

Inventory Level 2: Individual or Batch Certification (TO15 0.04 ppbv).

Inventory Level 3: Individual or Batch Certification (TO15 0.2 ppbv).

Inventory Level Limited: Canisters may only be used for certain projects.

Dup Tees/Vac gauges (enter IDs if included):

Comments:

ND

Form ID: FAI023:12
Revision Date: 12/18/2018

TestAmerica Burlington

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3/20/2023

200-66791-A-9
6449
Location: Air-Storage
Bottle: Summa Canister 1L
Sampled: 2/10/2023 12:00 AM 200-1703483

Loc: 200
66791
#9 A
Air-Storag

Pre-Shipment Clean Canister Certification Report

Canister Cleaning & Pre-Shipment Leak Test

System ID	Max DF#	# Cycles	Cleaning Start Date/Time		System Start Temp(s):		Technician	Can Size	Certification Type:
Oven 3/4	10	32	2/16/2023	1415	22	22	SML	1 liter	batch

Port	Can ID	Initial[1] (psia)	Final (psia)	Diff.[3]	Final ("Hg)	Initial Reading Gauge:	Date:	Time:	Tech:	Temp:	Final Reading Gauge:	Date:	Time:	Tech:	Temp:
1	4850	1.08	1.08	0	29.2	G26	2/21/23	1133	~	22.0	G26	2/21/23	1133	~	22.0
2	6479	1.08	1.08	0		G26	2/17/23	1356	~	22.0	G26				
3	4664		1.08	0		G26					G26				
4	34001649		1.08	0		G26					G26				
5	34001136		1.08	0		G26					G26				
6	34000729		1.13	1.05		G26					G26				
7	4864		1.08	0		G26					G26				
8	6376		1.08	0		G26					G26				
9	34000655		1.08	0		G26					G26				
10	6483		1.08	0		G26					G26				
11	5945		1.08	0		G26					G26				
12	34001949	~	1.08	0	~	G26	~	~	~	~	G26	~	~	~	~

[1] Batch Certification: The reading is taken on the "batch" canister and this value is used as the initial pressure for all canisters in the batch.

[3] Difference = Final Pressure - Initial Pressure . Acceptance Criteria: (1) The difference must be less than or equal to + 0.25psi. (2) Pressure readings must be at least 24 hours apart.

If time frame was not met, the PM must authorize shipment of canister **PM Authorization** **Date:**

Clean Canister Certification Analysis & Authorization of Release to Inventory

Test Method: ☒ TO15 Routine ☐ TO15 LL

Can ID	Date	Sequence	Analyst	Inventory Level 1	2	3	4	Secondary Review Limited	Review Date	Review
4850	2/21/23	54412	KPJ			XXXXXXXXX			2/21/23	PB

Inventory Level 1: Individual Canister Certification (TO15LL 0.01).

Inventory Level 2: Individual or Batch Certification (TO15 0.04 ppbv).

Inventory Level 3: Individual or Batch Certification (TO15 0.2 ppbv).

Inventory Level Limited: Canisters may only be used for certain projects.

Dup Tees/Vac gauges (enter IDs if included):

Comments:

3/20/2023

Form ID: FAI023:12
Revision Date: 12/18/2018

200-66886-A-1
4850
Location: Air-Storage
Bottle: Summa Canister 1L
Sampled: 2/17/2023 12:00 AM 200-1705357
Loc: 200
66886
#1 A
Air-Storag

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66552-1

SDG No.:

Client Sample ID: 34001973 Lab Sample ID: 200-66552-4

Matrix: Air Lab File ID: 54139-006.d

Analysis Method: TO-15 Date Collected: 01/21/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 01/27/2023 12:12

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 187889 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
100-41-4	Ethylbenzene	0.20	U	0.20	0.052
100-42-5	Styrene	0.20	U	0.20	0.059
10061-01-5	1,3-Dichloropropene, cis-	0.20	U	0.20	0.045
10061-02-6	1,3-Dichloropropene, trans-	0.20	U	0.20	0.054
106-46-7	1,4-Dichlorobenzene	0.20	U	0.20	0.089
106-93-4	1,2-Dibromoethane	0.20	U	0.20	0.042
106-99-0	1,3-Butadiene	0.20	U	0.20	0.039
107-05-1	Allyl chloride	0.50	U	0.50	0.12
107-06-2	1,2-Dichloroethane	0.20	U	0.20	0.093
108-10-1	Methyl isobutyl ketone (MIBK)	0.50	U	0.50	0.13
108-67-8	1,3,5-Trimethylbenzene	0.20	U	0.20	0.047
108-88-3	Toluene	0.20	U	0.20	0.042
108-90-7	Chlorobenzene	0.20	U	0.20	0.044
109-99-9	Tetrahydrofuran	5.0	U	5.0	1.3
110-54-3	Hexane	0.50	U	0.50	0.11
110-82-7	Cyclohexane	0.20	U	0.20	0.058
120-82-1	1,2,4-Trichlorobenzene	0.50	U	0.50	0.33
123-91-1	1,4-Dioxane	0.20	U	0.20	0.078
124-48-1	Dibromochloromethane	0.20	U	0.20	0.063
127-18-4	Tetrachloroethene	0.20	U	0.20	0.021
142-82-5	n-Heptane	0.20	U	0.20	0.055
156-59-2	1,2-Dichloroethene, cis-	0.20	U	0.20	0.021
156-60-5	1,2-Dichloroethene, trans-	0.20	U	0.20	0.023
1634-04-4	Methyl tert-butyl ether	0.20	U	0.20	0.036
179601-23-1	m,p-Xylene	0.50	U	0.50	0.095
540-84-1	2,2,4-Trimethylpentane	0.20	U	0.20	0.038
541-73-1	1,3-Dichlorobenzene	0.20	U	0.20	0.074
56-23-5	Carbon tetrachloride	0.20	U	0.20	0.022
593-60-2	Vinyl bromide	0.20	U	0.20	0.050
622-96-8	4-Ethyltoluene	0.20	U	0.20	0.049
64-17-5	Ethanol	5.0	U	5.0	2.6
67-63-0	Isopropanol	5.0	U	5.0	1.6
67-64-1	Acetone	5.0	U	5.0	1.6
67-66-3	Chloroform	0.20	U	0.20	0.041

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66552-1

SDG No.:

Client Sample ID: 34001973 Lab Sample ID: 200-66552-4

Matrix: Air Lab File ID: 54139-006.d

Analysis Method: TO-15 Date Collected: 01/21/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 01/27/2023 12:12

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 187889 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	0.20	U	0.20	0.044
71-55-6	1,1,1-Trichloroethane	0.20	U	0.20	0.044
74-83-9	Bromomethane	0.20	U	0.20	0.071
74-87-3	Chloromethane	0.50	U	0.50	0.15
75-00-3	Chloroethane	0.50	U	0.50	0.18
75-01-4	Vinyl chloride	0.20	U	0.20	0.021
75-09-2	Methylene Chloride	0.50	U	0.50	0.18
75-15-0	Carbon disulfide	0.50	U	0.50	0.13
75-25-2	Bromoform	0.20	U	0.20	0.12
75-27-4	Bromodichloromethane	0.20	U	0.20	0.050
75-34-3	1,1-Dichloroethane	0.20	U	0.20	0.025
75-35-4	1,1-Dichloroethene	0.20	U	0.20	0.026
75-65-0	tert-Butyl alcohol	5.0	U	5.0	1.2
75-69-4	Trichlorofluoromethane	0.20	U	0.20	0.050
75-71-8	Dichlorodifluoromethane	0.50	U	0.50	0.11
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	U	0.20	0.053
76-14-2	1,2-Dichlorotetrafluoroethane	0.20	U	0.20	0.048
78-87-5	1,2-Dichloropropane	0.20	U	0.20	0.094
78-93-3	Methyl ethyl ketone (MEK)	0.50	U	0.50	0.49
79-00-5	1,1,2-Trichloroethane	0.20	U	0.20	0.074
79-01-6	Trichloroethene	0.20	U	0.20	0.025
79-34-5	1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.043
80-62-6	Methyl methacrylate	0.50	U	0.50	0.14
87-68-3	Hexachlorobutadiene	0.20	U	0.20	0.11
91-20-3	Naphthalene	0.50	U	0.50	0.30
95-47-6	Xylene, o-	0.20	U	0.20	0.052
95-49-8	2-Chlorotoluene	0.20	U	0.20	0.046
95-50-1	1,2-Dichlorobenzene	0.20	U	0.20	0.066
95-63-6	1,2,4-Trimethylbenzene	0.20	U	0.20	0.080
591-78-6	2-Hexanone	0.50	U	0.50	0.15

Eurofins Burlington
Target Compound Quantitation Report

Data File: \\chromfs\Burlington\ChromData\CHW.i\20230127-54139.b\54139-006.d
Lims ID: 200-66552-A-4
Client ID: 34001973
Sample Type: Client
Inject. Date: 27-Jan-2023 12:12:30 ALS Bottle#: 5 Worklist Smp#: 6
Purge Vol: 200.000 mL Dil. Factor: 1.0000
Sample Info: 200-0054139-006
Misc. Info.: 66552-4
Operator ID: wrd Instrument ID: CHW.i

Method: \\chromfs\Burlington\ChromData\CHW.i\20230127-54139.b\TO15_TO3_MasterMethod_W.m
Limit Group: AI_TO15_ICAL
Last Update: 30-Jan-2023 08:04:35 Calib Date: 08-Jan-2023 00:10:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\chromfs\Burlington\ChromData\CHW.i\20230107-53923.b\53923-014.d

Column 1 : RTX-624 (0.32 mm) Det: MS SCAN
Process Host: CTX1623

First Level Reviewer: BKZ7 Date: 27-Jan-2023 13:17:42

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
	1 Propene	41		4.094				ND	7
	2 Dichlorodifluoromethane	85		4.185				ND	7
	3 Chlorodifluoromethane	51		4.223				ND	MU
	4 1,2-Dichloro-1,1,2,2-tetrafluoro	85		4.522				ND	
	5 Chloromethane	50		4.640				ND	7
	6 Vinyl chloride	62		4.939				ND	
	7 Butane	43		4.939				ND	7
	8 Butadiene	54		5.052				ND	
	9 Bromomethane	94		5.747				ND	
	10 Chloroethane	64		6.009				ND	
	13 Vinyl bromide	106		6.427				ND	
	14 Trichlorofluoromethane	101		6.587				ND	
	16 Ethanol	45		6.951				ND	
	20 1,1-Dichloroethene	96		7.636				ND	
	21 1,1,2-Trichloro-1,2,2-trifluoroe	101		7.678				ND	
	22 Acetone	43		7.711				ND	7
	23 Isopropyl alcohol	45		8.010				ND	
	24 Carbon disulfide	76	8.042	8.042	0.000	94	1842	0.0380	
	26 3-Chloro-1-propene	41		8.326				ND	
	27 Methylene Chloride	49		8.556				ND	7
	28 2-Methyl-2-propanol	59		8.775				ND	
	30 trans-1,2-Dichloroethene	61		9.053				ND	
	31 Methyl tert-butyl ether	73		9.064				ND	
	32 Hexane	57		9.556				ND	
	33 1,1-Dichloroethane	63		9.802				ND	
	34 Vinyl acetate	43		9.818				ND	
S	35 1,2-Dichloroethene, Total	61		10.200				ND	7
	36 2-Butanone (MEK)	72		10.765				ND	
	37 cis-1,2-Dichloroethene	96		10.787				ND	
	38 Ethyl acetate	88		10.851				ND	
*	39 Chlorobromomethane	128	11.198	11.199	-0.001	91	108418	10.0	

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
	40 Tetrahydrofuran	42		11.247				ND	
	41 Chloroform	83		11.375				ND	
	42 1,1,1-Trichloroethane	97		11.675				ND	
	43 Cyclohexane	84		11.819				ND	
	44 Carbon tetrachloride	117		11.958				ND	
	45 Benzene	78		12.301				ND	MU
	46 1,2-Dichloroethane	62		12.375				ND	
	47 Isooctane	57		12.520				ND	
	48 n-Heptane	43		12.830				ND	7
*	49 1,4-Difluorobenzene	114	13.039	13.039	0.000	94	573471	10.0	
	51 Trichloroethene	95		13.467				ND	
	53 1,2-Dichloropropane	63		13.916				ND	
	54 Methyl methacrylate	69		14.018				ND	
	55 1,4-Dioxane	88		14.061				ND	
	57 Dibromomethane	174		14.077				ND	
	58 Dichlorobromomethane	83		14.387				ND	
	59 cis-1,3-Dichloropropene	75		15.189				ND	
	61 4-Methyl-2-pentanone (MIBK)	43		15.452				ND	
	62 Toluene	92		15.826				ND	7
	66 trans-1,3-Dichloropropene	75		16.243				ND	
	67 1,1,2-Trichloroethane	83		16.618				ND	
	68 Tetrachloroethene	166		16.816				ND	
	69 2-Hexanone	43		17.035				ND	
	70 Chlorodibromomethane	129		17.351				ND	
	71 Ethylene Dibromide	107		17.591				ND	
*	73 Chlorobenzene-d5	117	18.501	18.501	0.000	86	474252	10.0	
	74 Chlorobenzene	112		18.560				ND	7
	75 Ethylbenzene	91		18.758				ND	7
	76 m-Xylene & p-Xylene	106		19.020				ND	7
	78 o-Xylene	106		19.790				ND	
	79 Styrene	104		19.828				ND	
S	80 Xylenes, Total	106		20.100				ND	7
	81 Bromoform	173		20.186				ND	
	82 Isopropylbenzene	105		20.518				ND	7
	83 1,1,2,2-Tetrachloroethane	83		21.053				ND	7
	85 N-Propylbenzene	91		21.261				ND	7
	86 2-Chlorotoluene	91		21.406				ND	7
	87 4-Ethyltoluene	105		21.465				ND	7
	88 1,3,5-Trimethylbenzene	105		21.561				ND	7
	91 tert-Butylbenzene	119		22.053				ND	7
	92 1,2,4-Trimethylbenzene	105		22.139				ND	7
	93 sec-Butylbenzene	105		22.385				ND	7
	94 1,3-Dichlorobenzene	146	22.561	22.551	0.010	81	546	0.0111	
	95 4-Isopropyltoluene	119		22.604				ND	7
	96 1,4-Dichlorobenzene	146	22.700	22.695	0.005	87	577	0.0121	
	97 Benzyl chloride	91		22.845				ND	7
	98 n-Butylbenzene	91		23.160				ND	7
	99 1,2-Dichlorobenzene	146	23.192	23.182	0.010	88	552	0.0118	
	102 1,2,4-Trichlorobenzene	180	25.573	25.557	0.016	70	493	0.0171	
	103 Hexachlorobutadiene	225		25.803				ND	
	104 Naphthalene	128		26.017				ND	MU

QC Flag Legend

Processing Flags

7 - Failed Limit of Detection

Review Flags

U - Marked Undetected

Reagents:

ATTO15WISs_00010	Amount Added: 20.00	Units: mL	Run Reagent

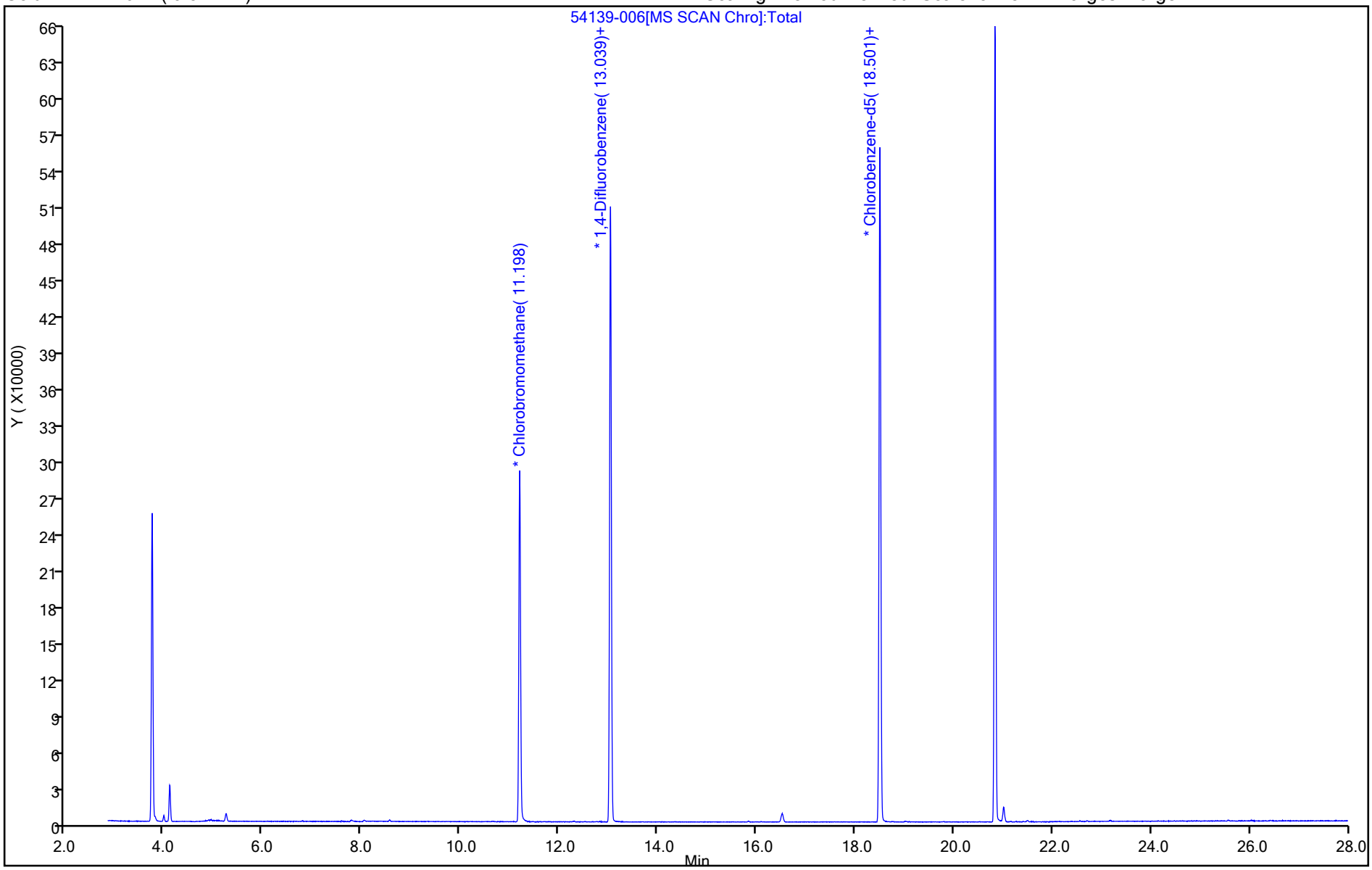
Report Date: 30-Jan-2023 08:04:36 Chrom Revision: 2.3 28-Jan-2023 14:03:14

Eurofins Burlington

Data File: \\chromfs\Burlington\ChromData\CHW.i\20230127-54139.b\54139-006.d

Injection Date:	27-Jan-2023 12:12:30	Instrument ID:	CHW.i	Operator ID:	wrd
Lims ID:	200-66552-A-4	Lab Sample ID:	200-66552-4	Worklist Smp#:	6
Client ID:	34001973				
Purge Vol:	200.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	5
Method:	TO15_TO3_MasterMethod_W	Limit Group:	AI_TO15_ICAL		

Column: RTX-624 (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Target: 1



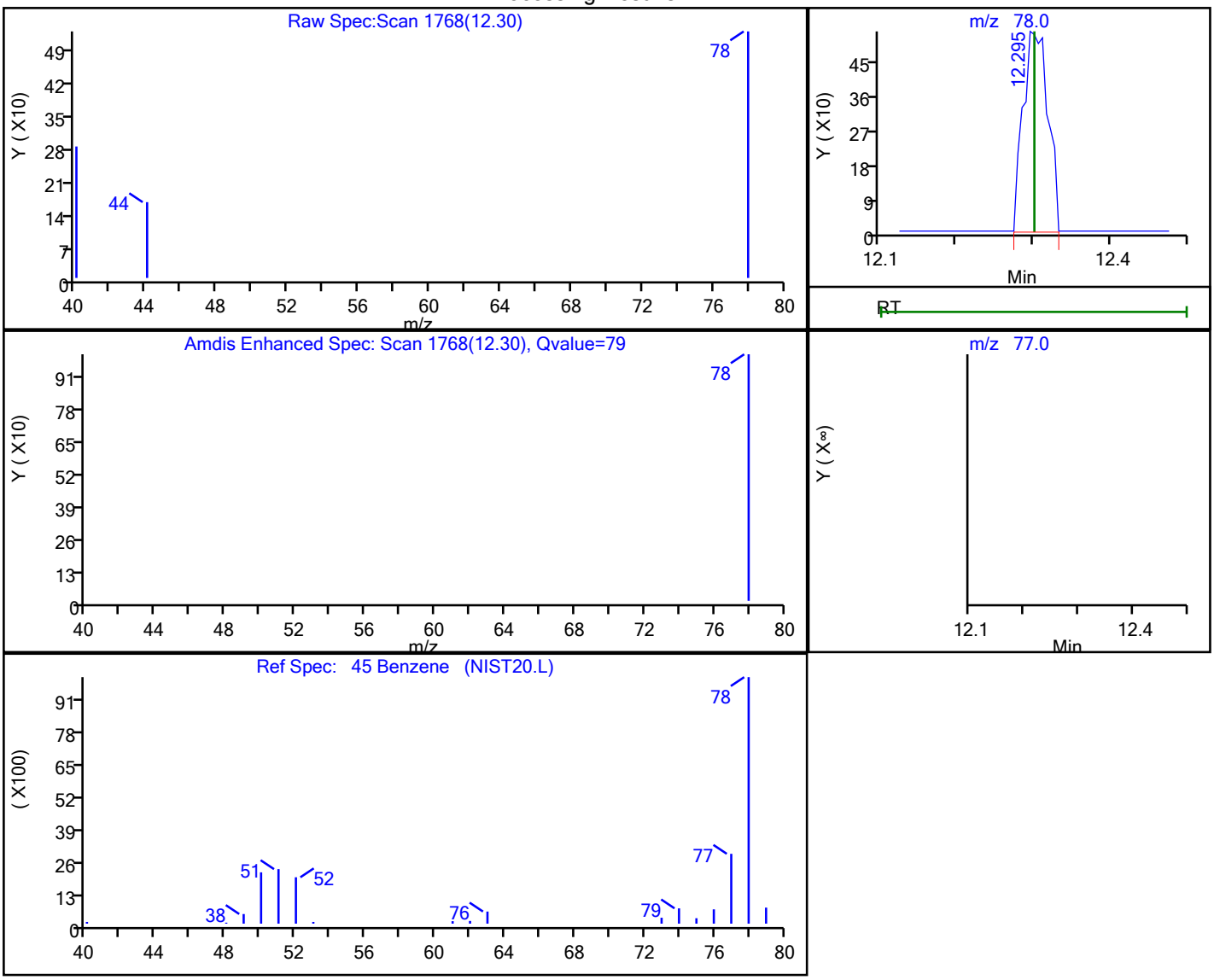
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHW.i\20230127-54139.b\54139-006.d				
Injection Date:	27-Jan-2023 12:12:30	Instrument ID:	CHW.i		
Lims ID:	200-66552-A-4	Lab Sample ID:	200-66552-4		
Client ID:	34001973				
Operator ID:	wrd	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_TO3_MasterMethod_W	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

45 Benzene, CAS: 71-43-2

Processing Results



RT	Mass	Response	Amount
12.30	78.00	1195	0.022172
12.30	77.00	0	

Reviewer: BKZ7, 27-Jan-2023 13:16:31

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

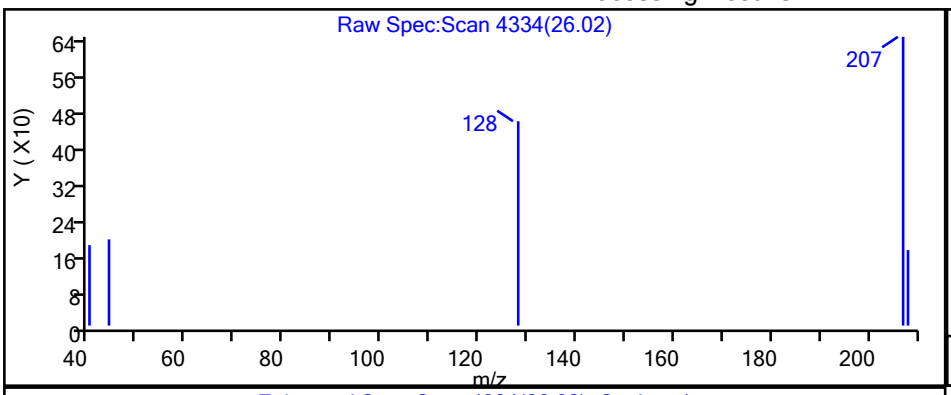
User Disabled Compound Report

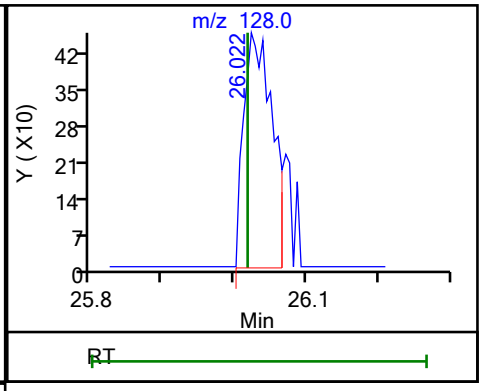
Eurofins Burlington

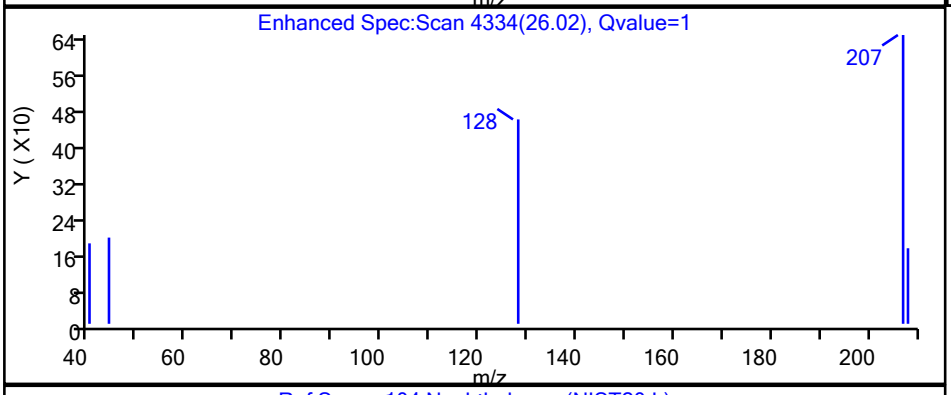
Data File:	\\chromfs\Burlington\ChromData\CHW.i\20230127-54139.b\54139-006.d				
Injection Date:	27-Jan-2023 12:12:30	Instrument ID:	CHW.i		
Lims ID:	200-66552-A-4	Lab Sample ID:	200-66552-4		
Client ID:	34001973				
Operator ID:	wrd	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_TO3_MasterMethod_W	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

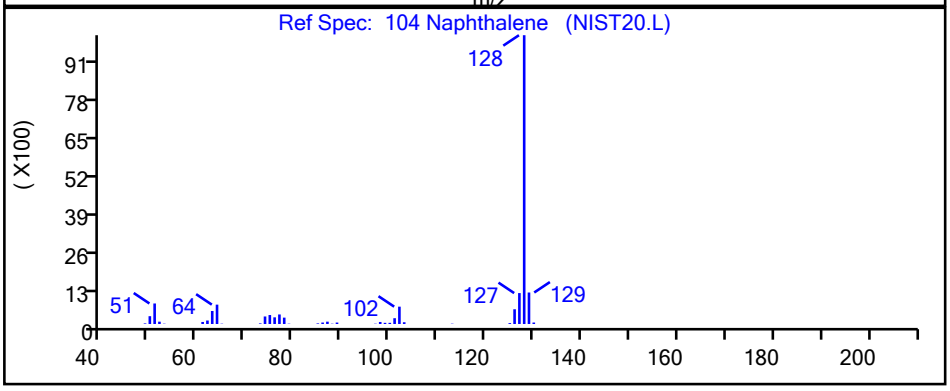
104 Naphthalene, CAS: 91-20-3

Processing Results









RT	Mass	Response	Amount
26.02	128.00	1276	0.021781

Reviewer: bunmaa, 30-Jan-2023 08:04:31

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66791-1

SDG No.:

Client Sample ID: 6449 Lab Sample ID: 200-66791-9

Matrix: Air Lab File ID: 54304-005.d

Analysis Method: TO-15 Date Collected: 02/10/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 02/13/2023 11:45

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 188374 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
100-41-4	Ethylbenzene	0.20	U	0.20	0.052
100-42-5	Styrene	0.20	U	0.20	0.059
10061-01-5	1,3-Dichloropropene, cis-	0.20	U	0.20	0.045
10061-02-6	1,3-Dichloropropene, trans-	0.20	U	0.20	0.054
106-46-7	1,4-Dichlorobenzene	0.20	U	0.20	0.089
106-93-4	1,2-Dibromoethane	0.20	U	0.20	0.042
106-99-0	1,3-Butadiene	0.20	U	0.20	0.039
107-05-1	Allyl chloride	0.50	U	0.50	0.12
107-06-2	1,2-Dichloroethane	0.20	U	0.20	0.093
108-10-1	Methyl isobutyl ketone (MIBK)	0.50	U	0.50	0.13
108-67-8	1,3,5-Trimethylbenzene	0.20	U	0.20	0.047
108-88-3	Toluene	0.20	U	0.20	0.042
108-90-7	Chlorobenzene	0.20	U	0.20	0.044
109-99-9	Tetrahydrofuran	5.0	U	5.0	1.3
110-54-3	Hexane	0.50	U	0.50	0.11
110-82-7	Cyclohexane	0.20	U	0.20	0.058
120-82-1	1,2,4-Trichlorobenzene	0.50	U	0.50	0.33
123-91-1	1,4-Dioxane	0.20	U	0.20	0.078
124-48-1	Dibromochloromethane	0.20	U	0.20	0.063
127-18-4	Tetrachloroethene	0.20	U	0.20	0.021
142-82-5	n-Heptane	0.20	U	0.20	0.055
156-59-2	1,2-Dichloroethene, cis-	0.20	U	0.20	0.021
156-60-5	1,2-Dichloroethene, trans-	0.20	U	0.20	0.023
1634-04-4	Methyl tert-butyl ether	0.20	U	0.20	0.036
179601-23-1	m,p-Xylene	0.50	U	0.50	0.095
540-84-1	2,2,4-Trimethylpentane	0.20	U	0.20	0.038
541-73-1	1,3-Dichlorobenzene	0.20	U	0.20	0.074
56-23-5	Carbon tetrachloride	0.20	U	0.20	0.022
593-60-2	Vinyl bromide	0.20	U	0.20	0.050
622-96-8	4-Ethyltoluene	0.20	U	0.20	0.049
64-17-5	Ethanol	5.0	U	5.0	2.6
67-63-0	Isopropanol	5.0	U	5.0	1.6
67-64-1	Acetone	5.0	U	5.0	1.6
67-66-3	Chloroform	0.20	U	0.20	0.041

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66791-1

SDG No.:

Client Sample ID: 6449 Lab Sample ID: 200-66791-9

Matrix: Air Lab File ID: 54304-005.d

Analysis Method: TO-15 Date Collected: 02/10/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 02/13/2023 11:45

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 188374 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	MDL
71-43-2	Benzene	0.20	U	0.20	0.044
71-55-6	1,1,1-Trichloroethane	0.20	U	0.20	0.044
74-83-9	Bromomethane	0.20	U	0.20	0.071
74-87-3	Chloromethane	0.50	U	0.50	0.15
75-00-3	Chloroethane	0.50	U	0.50	0.18
75-01-4	Vinyl chloride	0.20	U	0.20	0.021
75-09-2	Methylene Chloride	0.50	U	0.50	0.18
75-15-0	Carbon disulfide	0.50	U	0.50	0.13
75-25-2	Bromoform	0.20	U	0.20	0.12
75-27-4	Bromodichloromethane	0.20	U	0.20	0.050
75-34-3	1,1-Dichloroethane	0.20	U	0.20	0.025
75-35-4	1,1-Dichloroethene	0.20	U	0.20	0.026
75-65-0	tert-Butyl alcohol	5.0	U	5.0	1.2
75-69-4	Trichlorofluoromethane	0.20	U	0.20	0.050
75-71-8	Dichlorodifluoromethane	0.50	U	0.50	0.11
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	U	0.20	0.053
76-14-2	1,2-Dichlorotetrafluoroethane	0.20	U	0.20	0.048
78-87-5	1,2-Dichloropropane	0.20	U	0.20	0.094
78-93-3	Methyl ethyl ketone (MEK)	0.50	U	0.50	0.49
79-00-5	1,1,2-Trichloroethane	0.20	U	0.20	0.074
79-01-6	Trichloroethene	0.20	U	0.20	0.025
79-34-5	1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.043
80-62-6	Methyl methacrylate	0.50	U	0.50	0.14
87-68-3	Hexachlorobutadiene	0.20	U	0.20	0.11
91-20-3	Naphthalene	0.50	U	0.50	0.30
95-47-6	Xylene, o-	0.20	U	0.20	0.052
95-49-8	2-Chlorotoluene	0.20	U	0.20	0.046
95-50-1	1,2-Dichlorobenzene	0.20	U	0.20	0.066
95-63-6	1,2,4-Trimethylbenzene	0.20	U	0.20	0.080
591-78-6	2-Hexanone	0.50	U	0.50	0.15

Eurofins Burlington
Target Compound Quantitation Report

Data File: \\chromfs\Burlington\ChromData\CHW.i\20230213-54304.b\54304-005.d
Lims ID: 200-66791-A-9
Client ID: 6449
Sample Type: Client
Inject. Date: 13-Feb-2023 11:45:30 ALS Bottle#: 4 Worklist Smp#: 5
Purge Vol: 200.000 mL Dil. Factor: 1.0000
Sample Info: 200-0054304-005
Operator ID: wrd Instrument ID: CHW.i

Method: \\chromfs\Burlington\ChromData\CHW.i\20230213-54304.b\TO15_TO3_MasterMethod_W.m
Limit Group: AI_TO15_ICAL
Last Update: 13-Feb-2023 15:10:58 Calib Date: 01-Feb-2023 00:48:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\chromfs\Burlington\ChromData\CHW.i\20230131-54170.b\54170-013.d

Column 1 : RTX-624 (0.32 mm) Det: MS SCAN
Process Host: CTX1648

First Level Reviewer: bunmaa Date: 14-Feb-2023 07:37:41

	Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
	1 Propene	41		4.164				ND	
	2 Dichlorodifluoromethane	85		4.255				ND	
	3 Chlorodifluoromethane	51		4.297				ND	
	4 1,2-Dichloro-1,1,2,2-tetrafluoro	85		4.597				ND	
	5 Chloromethane	50		4.709				ND	7
	6 Vinyl chloride	62		5.004				ND	
	7 Butane	43		5.009				ND	7
	8 Butadiene	54		5.116				ND	
	9 Bromomethane	94		5.806				ND	
	10 Chloroethane	64		6.068				ND	
	13 Vinyl bromide	106		6.480				ND	
	14 Trichlorofluoromethane	101		6.635				ND	
	16 Ethanol	45		7.042				ND	
	20 1,1-Dichloroethene	96		7.673				ND	
	21 1,1,2-Trichloro-1,2,2-trifluoroe	101		7.716				ND	
	22 Acetone	43		7.785				ND	
	24 Carbon disulfide	76	8.047	8.063	-0.027	94	1030	0.0207	
	23 Isopropyl alcohol	45		8.122				ND	
	26 3-Chloro-1-propene	41		8.358				ND	
	27 Methylene Chloride	49		8.583				ND	7
	28 2-Methyl-2-propanol	59		8.930				ND	
	30 trans-1,2-Dichloroethene	61		9.080				ND	
	31 Methyl tert-butyl ether	73		9.144				ND	
	32 Hexane	57		9.578				ND	
	33 1,1-Dichloroethane	63		9.824				ND	
	34 Vinyl acetate	43		9.856				ND	
S	35 1,2-Dichloroethene, Total	61		10.200				ND	7
	37 cis-1,2-Dichloroethene	96		10.803				ND	
	36 2-Butanone (MEK)	72		10.813				ND	
	38 Ethyl acetate	88		10.899				ND	
*	39 Chlorobromomethane	128	11.193	11.209	-0.016	93	106748	10.0	
	40 Tetrahydrofuran	42		11.306				ND	

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
41 Chloroform	83		11.386				ND	
42 1,1,1-Trichloroethane	97		11.691				ND	
43 Cyclohexane	84		11.830				ND	
44 Carbon tetrachloride	117		11.969				ND	
45 Benzene	78		12.306				ND	
46 1,2-Dichloroethane	62		12.381				ND	
47 Isooctane	57		12.531				ND	
48 n-Heptane	43		12.841				ND	
* 49 1,4-Difluorobenzene	114	13.033	13.044	-0.011	95	575884	10.0	
51 Trichloroethene	95		13.472				ND	
53 1,2-Dichloropropane	63		13.922				ND	
54 Methyl methacrylate	69		14.034				ND	
57 Dibromomethane	174		14.077				ND	
55 1,4-Dioxane	88		14.141				ND	
58 Dichlorobromomethane	83		14.387				ND	
59 cis-1,3-Dichloropropene	75		15.189				ND	
61 4-Methyl-2-pentanone (MIBK)	43		15.521				ND	
62 Toluene	92		15.826				ND	
66 trans-1,3-Dichloropropene	75		16.243				ND	
67 1,1,2-Trichloroethane	83		16.618				ND	
68 Tetrachloroethene	166		16.816				ND	
69 2-Hexanone	43		17.163				ND	
70 Chlorodibromomethane	129		17.351				ND	
71 Ethylene Dibromide	107		17.586				ND	
* 73 Chlorobenzene-d5	117	18.501	18.496	0.005	87	463737	10.0	
74 Chlorobenzene	112		18.554				ND	
75 Ethylbenzene	91		18.752				ND	
76 m-Xylene & p-Xylene	106		19.014				ND	
78 o-Xylene	106		19.785				ND	
79 Styrene	104		19.822				ND	
S 80 Xylenes, Total	106		20.100				ND	7
81 Bromoform	173		20.181				ND	
82 Isopropylbenzene	105		20.512				ND	
83 1,1,2,2-Tetrachloroethane	83		21.047				ND	
85 N-Propylbenzene	91		21.256				ND	7
86 2-Chlorotoluene	91		21.400				ND	7
87 4-Ethyltoluene	105		21.459				ND	
88 1,3,5-Trimethylbenzene	105		21.556				ND	
91 tert-Butylbenzene	119		22.048				ND	
92 1,2,4-Trimethylbenzene	105		22.139				ND	
93 sec-Butylbenzene	105		22.379				ND	
94 1,3-Dichlorobenzene	146		22.551				ND	7
95 4-Isopropyltoluene	119		22.599				ND	
96 1,4-Dichlorobenzene	146		22.695				ND	7
97 Benzyl chloride	91		22.845				ND	7
98 n-Butylbenzene	91		23.155				ND	
99 1,2-Dichlorobenzene	146		23.182				ND	7
102 1,2,4-Trichlorobenzene	180		25.557				ND	
103 Hexachlorobutadiene	225		25.798				ND	
104 Naphthalene	128		26.017				ND	7

QC Flag Legend

Processing Flags

7 - Failed Limit of Detection

Reagents:

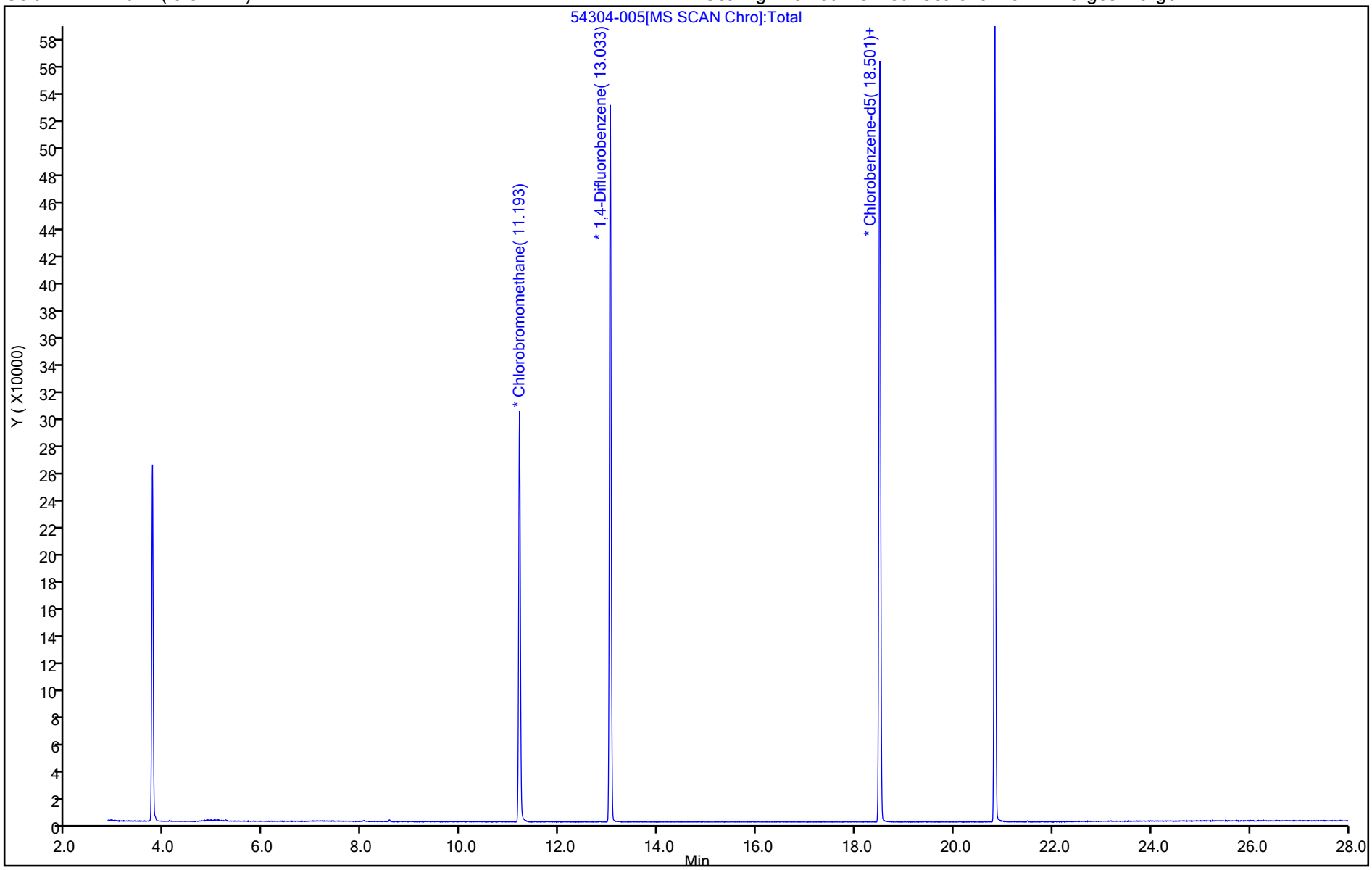
ATTO15WISs_00010 Amount Added: 20.00 Units: mL Run Reagent

Report Date: 14-Feb-2023 07:37:41 Chrom Revision: 2.3 01-Feb-2023 13:23:06

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHW.i\20230213-54304.b\54304-005.d				
Injection Date:	13-Feb-2023 11:45:30	Instrument ID:	CHW.i	Operator ID:	wrd
Lims ID:	200-66791-A-9	Lab Sample ID:	200-66791-9	Worklist Smp#:	5
Client ID:	6449				
Purge Vol:	200.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	4
Method:	TO15_TO3_MasterMethod_W	Limit Group:	AI_TO15_ICAL		

Column: RTX-624 (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Target: 1



FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66886-1

SDG No.:

Client Sample ID: 4850 Lab Sample ID: 200-66886-1

Matrix: Air Lab File ID: 200-54412-006.D

Analysis Method: TO-15 Date Collected: 02/17/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 02/20/2023 11:36

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 188630 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	RL
115-07-1	Propylene	5.0	U	5.0	5.0
75-71-8	Dichlorodifluoromethane	0.50	U	0.50	0.50
75-45-6	Freon 22	0.50	U	0.50	0.50
76-14-2	1,2-Dichlorotetrafluoroethane	0.20	U	0.20	0.20
74-87-3	Chloromethane	0.50	U	0.50	0.50
106-97-8	n-Butane	0.50	U	0.50	0.50
75-01-4	Vinyl chloride	0.20	U	0.20	0.20
106-99-0	1,3-Butadiene	0.20	U	0.20	0.20
74-83-9	Bromomethane	0.20	U	0.20	0.20
75-00-3	Chloroethane	0.50	U	0.50	0.50
593-60-2	Bromoethene(Vinyl Bromide)	0.20	U	0.20	0.20
75-69-4	Trichlorofluoromethane	0.20	U	0.20	0.20
64-17-5	Ethanol	5.0	U	5.0	5.0
76-13-1	Freon TF	0.20	U	0.20	0.20
75-35-4	1,1-Dichloroethene	0.20	U	0.20	0.20
67-64-1	Acetone	5.0	U	5.0	5.0
67-63-0	Isopropyl alcohol	5.0	U	5.0	5.0
75-15-0	Carbon disulfide	0.50	U	0.50	0.50
107-05-1	3-Chloropropene	0.50	U	0.50	0.50
75-09-2	Methylene Chloride	0.50	U	0.50	0.50
75-65-0	tert-Butyl alcohol	5.0	U *+	5.0	5.0
1634-04-4	Methyl tert-butyl ether	0.20	U	0.20	0.20
156-60-5	trans-1,2-Dichloroethene	0.20	U	0.20	0.20
110-54-3	n-Hexane	0.50	U	0.50	0.50
75-34-3	1,1-Dichloroethane	0.20	U	0.20	0.20
108-05-4	Vinyl acetate	5.0	U	5.0	5.0
141-78-6	Ethyl acetate	5.0	U	5.0	5.0
78-93-3	Methyl Ethyl Ketone	0.50	U	0.50	0.50
156-59-2	cis-1,2-Dichloroethene	0.20	U	0.20	0.20
540-59-0	1,2-Dichloroethene, Total	0.40	U	0.40	0.40
67-66-3	Chloroform	0.20	U	0.20	0.20
109-99-9	Tetrahydrofuran	5.0	U	5.0	5.0
71-55-6	1,1,1-Trichloroethane	0.20	U	0.20	0.20
110-82-7	Cyclohexane	0.20	U	0.20	0.20

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66886-1

SDG No.:

Client Sample ID: 4850 Lab Sample ID: 200-66886-1

Matrix: Air Lab File ID: 200-54412-006.D

Analysis Method: TO-15 Date Collected: 02/17/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 02/20/2023 11:36

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 188630 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	RL
56-23-5	Carbon tetrachloride	0.20	U	0.20	0.20
540-84-1	2,2,4-Trimethylpentane	0.20	U	0.20	0.20
71-43-2	Benzene	0.20	U	0.20	0.20
107-06-2	1,2-Dichloroethane	0.20	U	0.20	0.20
142-82-5	n-Heptane	0.20	U	0.20	0.20
79-01-6	Trichloroethene	0.20	U	0.20	0.20
80-62-6	Methyl methacrylate	0.50	U	0.50	0.50
78-87-5	1,2-Dichloropropane	0.20	U	0.20	0.20
123-91-1	1,4-Dioxane	5.0	U	5.0	5.0
75-27-4	Bromodichloromethane	0.20	U	0.20	0.20
10061-01-5	cis-1,3-Dichloropropene	0.20	U	0.20	0.20
108-10-1	methyl isobutyl ketone	0.50	U	0.50	0.50
108-88-3	Toluene	0.20	U	0.20	0.20
10061-02-6	trans-1,3-Dichloropropene	0.20	U	0.20	0.20
79-00-5	1,1,2-Trichloroethane	0.20	U	0.20	0.20
127-18-4	Tetrachloroethene	0.20	U	0.20	0.20
591-78-6	Methyl Butyl Ketone (2-Hexanone)	0.50	U	0.50	0.50
124-48-1	Dibromochloromethane	0.20	U	0.20	0.20
106-93-4	1,2-Dibromoethane	0.20	U	0.20	0.20
108-90-7	Chlorobenzene	0.20	U	0.20	0.20
100-41-4	Ethylbenzene	0.20	U	0.20	0.20
179601-23-1	m,p-Xylene	0.50	U	0.50	0.50
95-47-6	Xylene, o-	0.20	U	0.20	0.20
1330-20-7	Xylene (total)	0.70	U	0.70	0.70
100-42-5	Styrene	0.20	U	0.20	0.20
75-25-2	Bromoform	0.20	U	0.20	0.20
98-82-8	Cumene	0.20	U	0.20	0.20
79-34-5	1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.20
103-65-1	n-Propylbenzene	0.20	U	0.20	0.20
622-96-8	4-Ethyltoluene	0.20	U	0.20	0.20
108-67-8	1,3,5-Trimethylbenzene	0.20	U	0.20	0.20
95-49-8	2-Chlorotoluene	0.20	U	0.20	0.20
98-06-6	tert-Butylbenzene	0.20	U	0.20	0.20
95-63-6	1,2,4-Trimethylbenzene	0.20	U	0.20	0.20

FORM I
AIR - GC/MS VOA ORGANICS ANALYSIS DATA SHEET

Lab Name: Eurofins Burlington Job No.: 200-66886-1

SDG No.:

Client Sample ID: 4850 Lab Sample ID: 200-66886-1

Matrix: Air Lab File ID: 200-54412-006.D

Analysis Method: TO-15 Date Collected: 02/17/2023 00:00

Sample wt/vol: 200(mL) Date Analyzed: 02/20/2023 11:36

Soil Aliquot Vol: Dilution Factor: 1

Soil Extract Vol.: GC Column: RTX-624 ID: 0.32(mm)

Purge Volume: Heated Purge: (Y/N) pH:

% Moisture: % Solids: Level: (low/med) Low

Analysis Batch No.: 188630 Units: ppb v/v

CAS NO.	COMPOUND NAME	RESULT	Q	RL	RL
135-98-8	sec-Butylbenzene	0.20	U	0.20	0.20
99-87-6	4-Isopropyltoluene	0.20	U	0.20	0.20
541-73-1	1,3-Dichlorobenzene	0.20	U	0.20	0.20
106-46-7	1,4-Dichlorobenzene	0.20	U	0.20	0.20
100-44-7	Benzyl chloride	0.20	U	0.20	0.20
104-51-8	n-Butylbenzene	0.20	U	0.20	0.20
95-50-1	1,2-Dichlorobenzene	0.20	U	0.20	0.20
120-82-1	1,2,4-Trichlorobenzene	0.50	U	0.50	0.50
87-68-3	Hexachlorobutadiene	0.20	U	0.20	0.20
91-20-3	Naphthalene	0.50	U	0.50	0.50

Eurofins Burlington
Target Compound Quantitation Report

Data File: \\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D
Lims ID: 200-66886-A-1
Client ID: 4850
Sample Type: Client
Inject. Date: 20-Feb-2023 11:36:30 ALS Bottle#: 5 Worklist Smp#: 6
Purge Vol: 200.000 mL Dil. Factor: 1.0000
Sample Info: 200-0054412-006
Misc. Info.: 66886-1
Operator ID: vtp Instrument ID: CHG.i

Method: \\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\TO15_MasterMethod_(v1)_G.m
Limit Group: AI_TO15_ICAL
Last Update: 21-Feb-2023 09:59:29 Calib Date: 09-Feb-2023 01:11:30
Integrator: RTE ID Type: Deconvolution ID
Quant Method: Internal Standard Quant By: Initial Calibration
Last ICal File: \\chromfs\Burlington\ChromData\CHG.i\20230208-54269.b\200-54269-013.D

Column 1 : RTX-624 (0.32 mm) Det: MS SCAN
Process Host: CTX1604

First Level Reviewer: puangmaleek Date: 21-Feb-2023 09:59:29

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
1 Propene	41		3.110				ND	7
2 Dichlorodifluoromethane	85		3.169				ND	7
3 Chlorodifluoromethane	51		3.190				ND	7
4 1,2-Dichloro-1,1,2,2-tetrafluoro	85		3.393				ND	7
5 Chloromethane	50		3.468				ND	7
6 Vinyl chloride	62		3.672				ND	
7 Butane	43		3.677				ND	MU
8 Butadiene	54		3.747				ND	
9 Bromomethane	94		4.244				ND	
10 Chloroethane	64		4.437				ND	
12 Vinyl bromide	106		4.763				ND	
13 Trichlorofluoromethane	101		4.886				ND	7
15 Ethanol	45		5.180				ND	MU
18 1,1-Dichloroethene	96		5.785				ND	
21 1,1,2-Trichloro-1,2,2-trifluoroe	101		5.817				ND	
19 Acetone	43		5.849				ND	7
22 Isopropyl alcohol	45		6.111				ND	7
23 Carbon disulfide	76		6.165				ND	
25 3-Chloro-1-propene	41		6.416				ND	7
26 Methylene Chloride	49		6.630				ND	7
27 2-Methyl-2-propanol	59		6.844				ND	
29 trans-1,2-Dichloroethene	61		7.117				ND	
30 Methyl tert-butyl ether	73		7.138				ND	
31 Hexane	57		7.620				ND	7
32 1,1-Dichloroethane	63		7.860				ND	
33 Vinyl acetate	43		7.876				ND	
34 2-Butanone (MEK)	72		8.834				ND	
35 cis-1,2-Dichloroethene	96		8.845				ND	
36 Ethyl acetate	88		8.920				ND	
* 37 Chlorobromomethane	128	9.262	9.262	0.000	93	136911	10.0	
38 Tetrahydrofuran	42		9.337				ND	7

Compound	Sig	RT (min.)	Adj RT (min.)	Dlt RT (min.)	Q	Response	OnCol Amt ppb v/v	Flags
39 Chloroform	83		9.444				ND	
S 43 1,2-Dichloroethene, Total	61		9.665				ND	7
40 1,1,1-Trichloroethane	97		9.770				ND	
41 Cyclohexane	84		9.920				ND	
42 Carbon tetrachloride	117		10.070				ND	
44 Benzene	78		10.439				ND	MU
45 1,2-Dichloroethane	62		10.514				ND	
46 Isooctane	57		10.696				ND	
47 n-Heptane	43		11.038				ND	7
* 48 1,4-Difluorobenzene	114	11.252	11.252	0.000	97	698803	10.0	
50 Trichloroethene	95		11.728				ND	
51 1,2-Dichloropropane	63		12.242				ND	
54 Methyl methacrylate	69		12.376				ND	
53 Dibromomethane	174		12.413				ND	
55 1,4-Dioxane	88		12.413				ND	
56 Dichlorobromomethane	83		12.761				ND	
58 cis-1,3-Dichloropropene	75		13.649				ND	
59 4-Methyl-2-pentanone (MIBK)	43		13.970				ND	7
60 Toluene	92		14.355				ND	7
65 trans-1,3-Dichloropropene	75		14.799				ND	
66 1,1,2-Trichloroethane	83		15.200				ND	
67 Tetrachloroethene	166		15.420				ND	
68 2-Hexanone	43		15.682				ND	7
69 Chlorodibromomethane	129		15.987				ND	
70 Ethylene Dibromide	107		16.233				ND	
* 71 Chlorobenzene-d5	117	17.212	17.212	0.000	97	539109	10.0	
72 Chlorobenzene	112		17.276				ND	
73 Ethylbenzene	91	17.506	17.490	0.016	91	3620	0.0578	
74 m-Xylene & p-Xylene	106		17.773				ND	
76 o-Xylene	106	18.581	18.581	0.000	89	1179	0.0537	
77 Styrene	104		18.613				ND	
78 Bromoform	173		18.982				ND	
79 Isopropylbenzene	105		19.346				ND	7
S 82 Xylenes, Total	106				0		0.0537	
80 1,1,2,2-Tetrachloroethane	83		19.892				ND	7
83 N-Propylbenzene	91		20.111				ND	7
84 2-Chlorotoluene	91		20.261				ND	7
85 4-Ethyltoluene	105		20.325				ND	7
86 1,3,5-Trimethylbenzene	105		20.427				ND	7
89 tert-Butylbenzene	119		20.930				ND	7
90 1,2,4-Trimethylbenzene	105		21.021				ND	MU
91 sec-Butylbenzene	105		21.267				ND	7
92 1,3-Dichlorobenzene	146		21.438				ND	MU
93 4-Isopropyltoluene	119		21.497				ND	7
94 1,4-Dichlorobenzene	146		21.588				ND	MU
95 Benzyl chloride	91		21.738				ND	MU
97 n-Butylbenzene	91		22.064				ND	7
96 1,2-Dichlorobenzene	146		22.080				ND	MU
100 1,2,4-Trichlorobenzene	180		24.541				ND	MU
101 Hexachlorobutadiene	225		24.792				ND	7
102 Naphthalene	128	25.012	25.017	0.000	95	3571	0.0712	

QC Flag Legend

Processing Flags

7 - Failed Limit of Detection

Review Flags

U - Marked Undetected

Reagents:

ATTO15GIS_00019	Amount Added:	20.00	Units: mL	Run Reagent

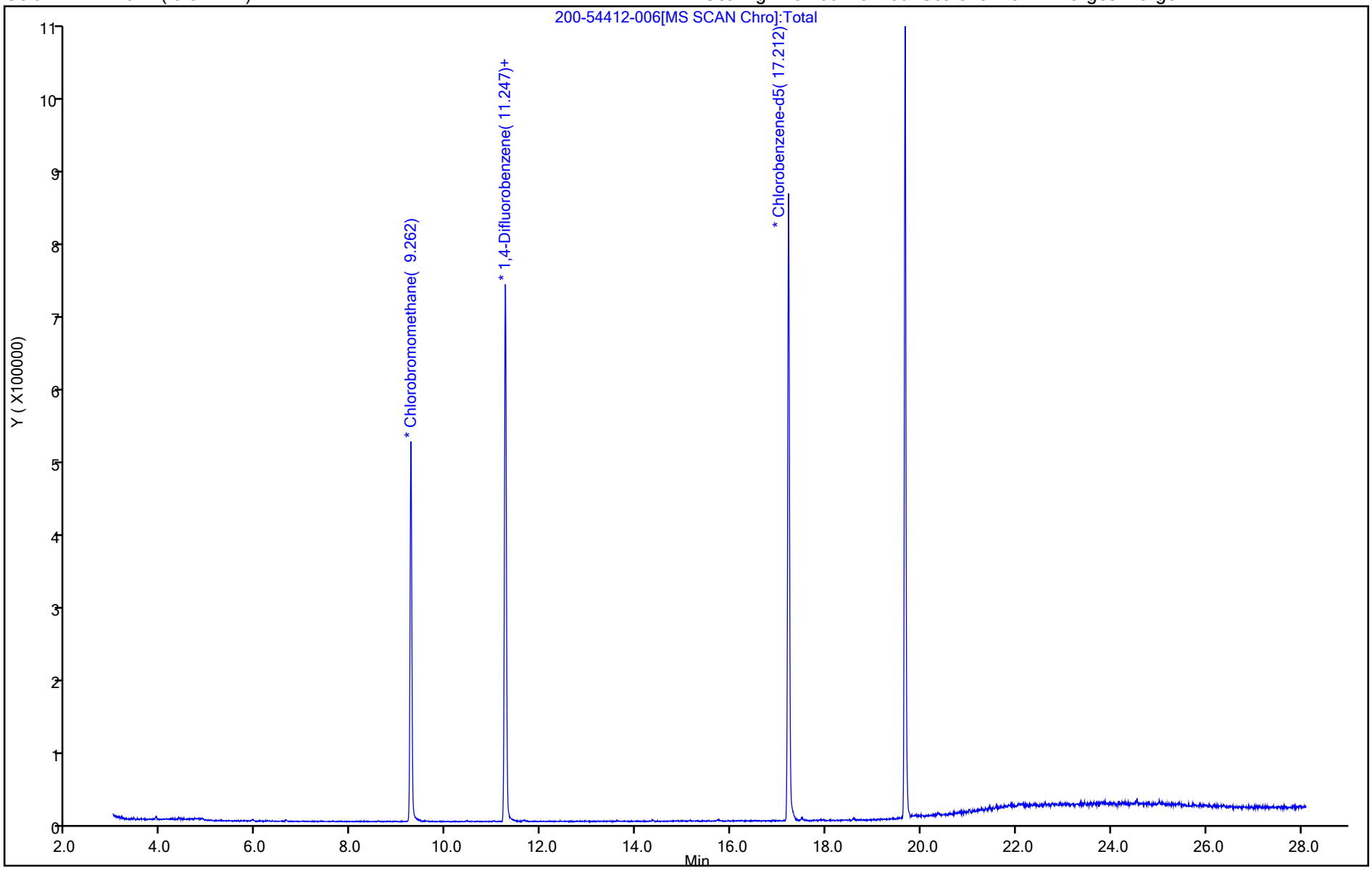
Report Date: 21-Feb-2023 09:59:29 Chrom Revision: 2.3 15-Feb-2023 20:44:50

Eurofins Burlington

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Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i	Operator ID:	vtp
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1	Worklist Smp#:	6
Client ID:	4850				
Purge Vol:	200.000 mL	Dil. Factor:	1.0000	ALS Bottle#:	5
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		

Column: RTX-624 (0.32 mm) Y Scaling: Method Defined: Scale to the Nth Largest Target: 1



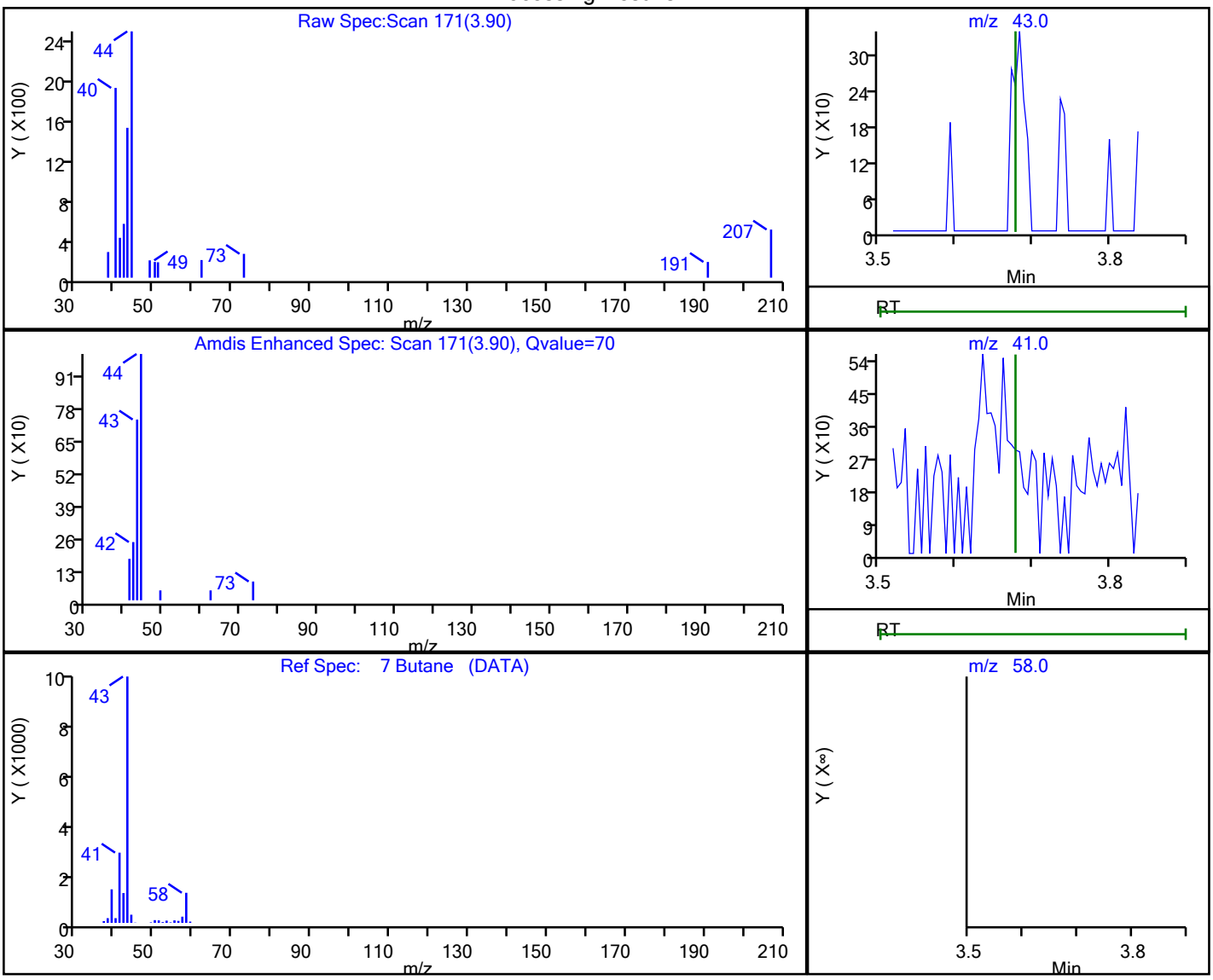
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

7 Butane, CAS: 106-97-8

Processing Results



RT	Mass	Response	Amount
3.90	43.00	2350	0.126738
3.91	41.00	611	
3.68	58.00	0	

Reviewer: puangmaleek, 21-Feb-2023 09:57:36

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

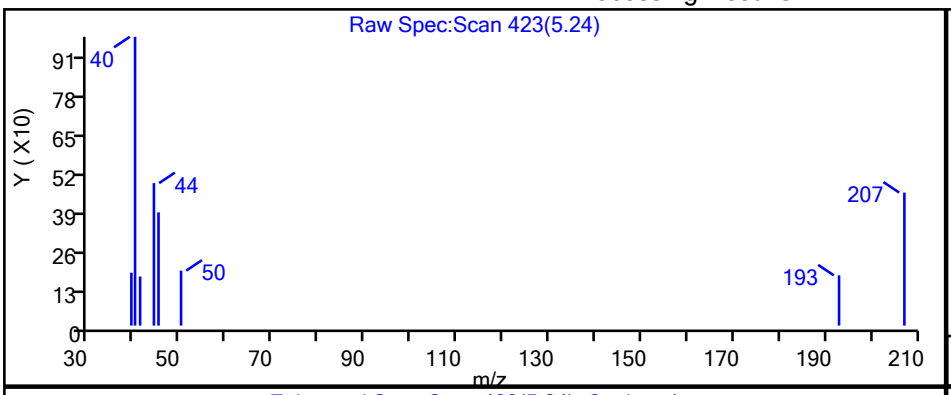
User Disabled Compound Report

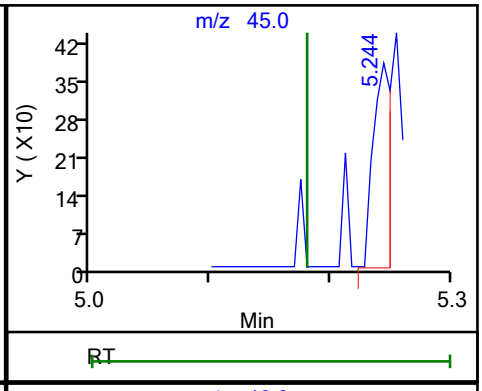
Eurofins Burlington

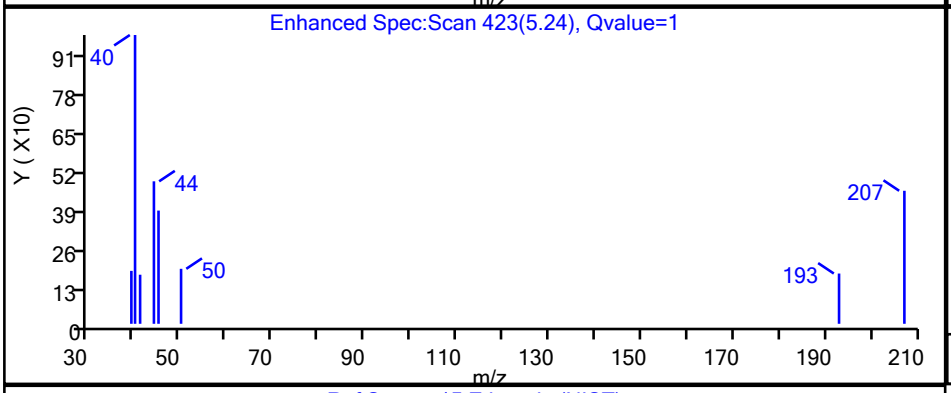
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Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

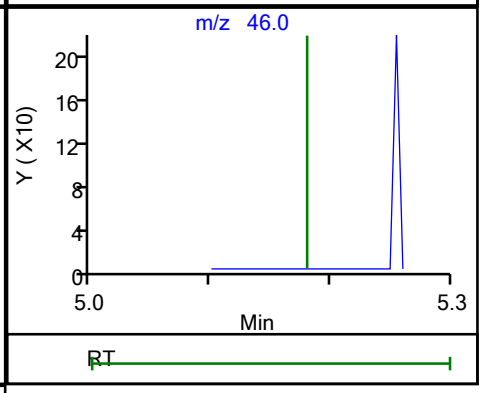
15 Ethanol, CAS: 64-17-5

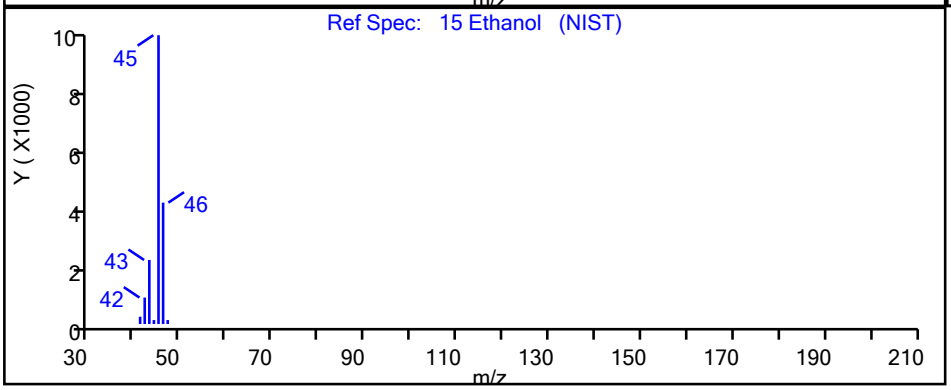
Processing Results











RT	Mass	Response	Amount
5.24	45.00	394	0.076794
5.18	46.00	0	

Reviewer: puangmaleek, 21-Feb-2023 09:57:41

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

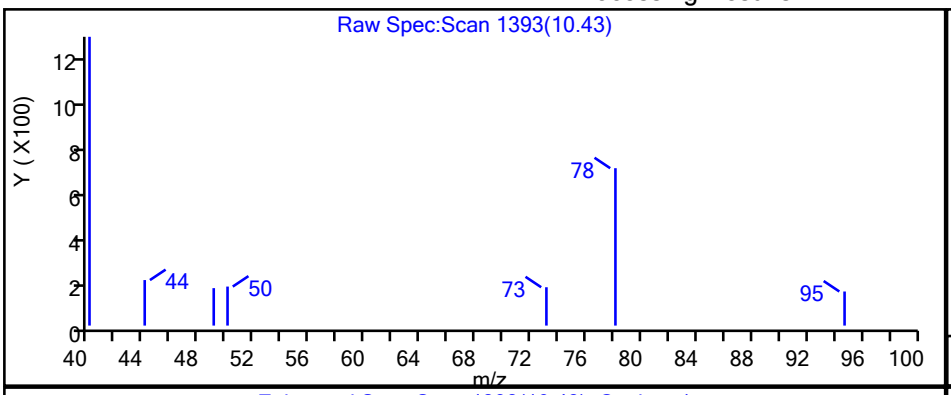
User Disabled Compound Report

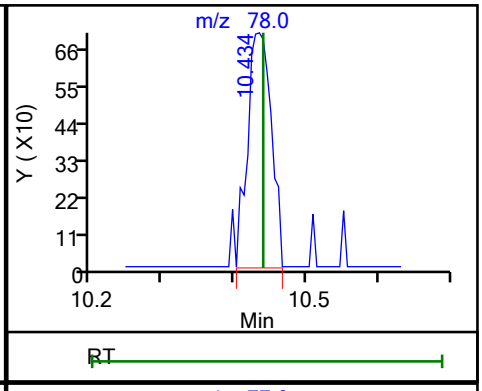
Eurofins Burlington

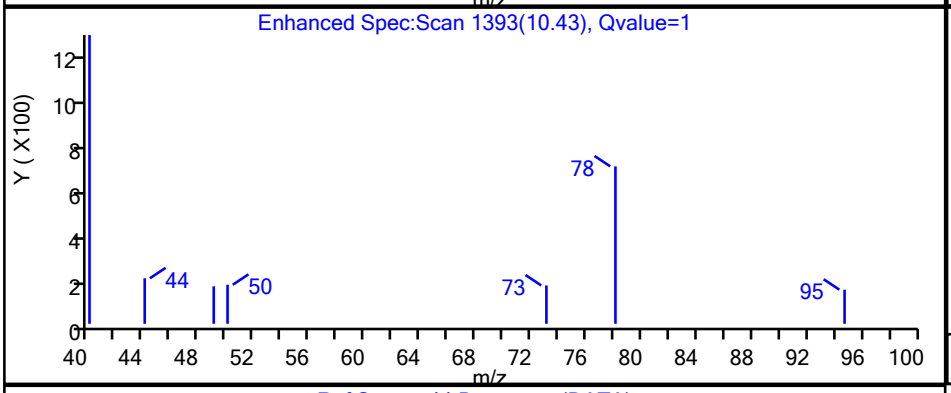
Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

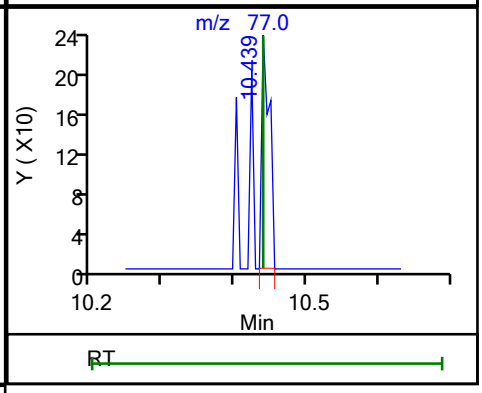
44 Benzene, CAS: 71-43-2

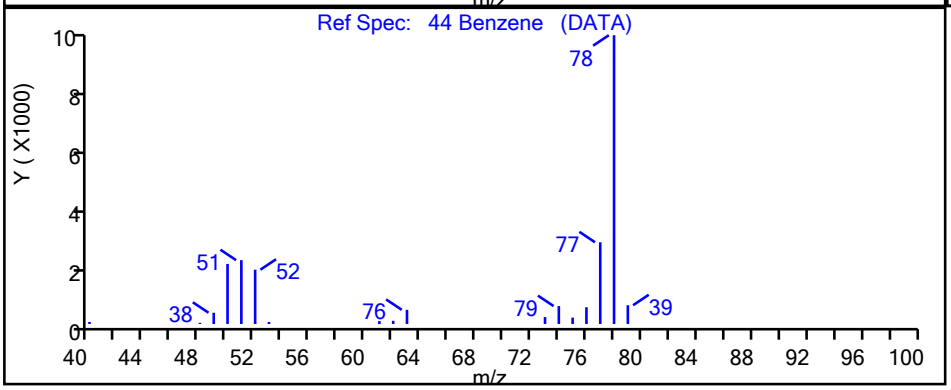
Processing Results











RT	Mass	Response	Amount
10.43	78.00	1624	0.036553
10.44	77.00	180	

Reviewer: puangmaleek, 21-Feb-2023 09:58:05

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

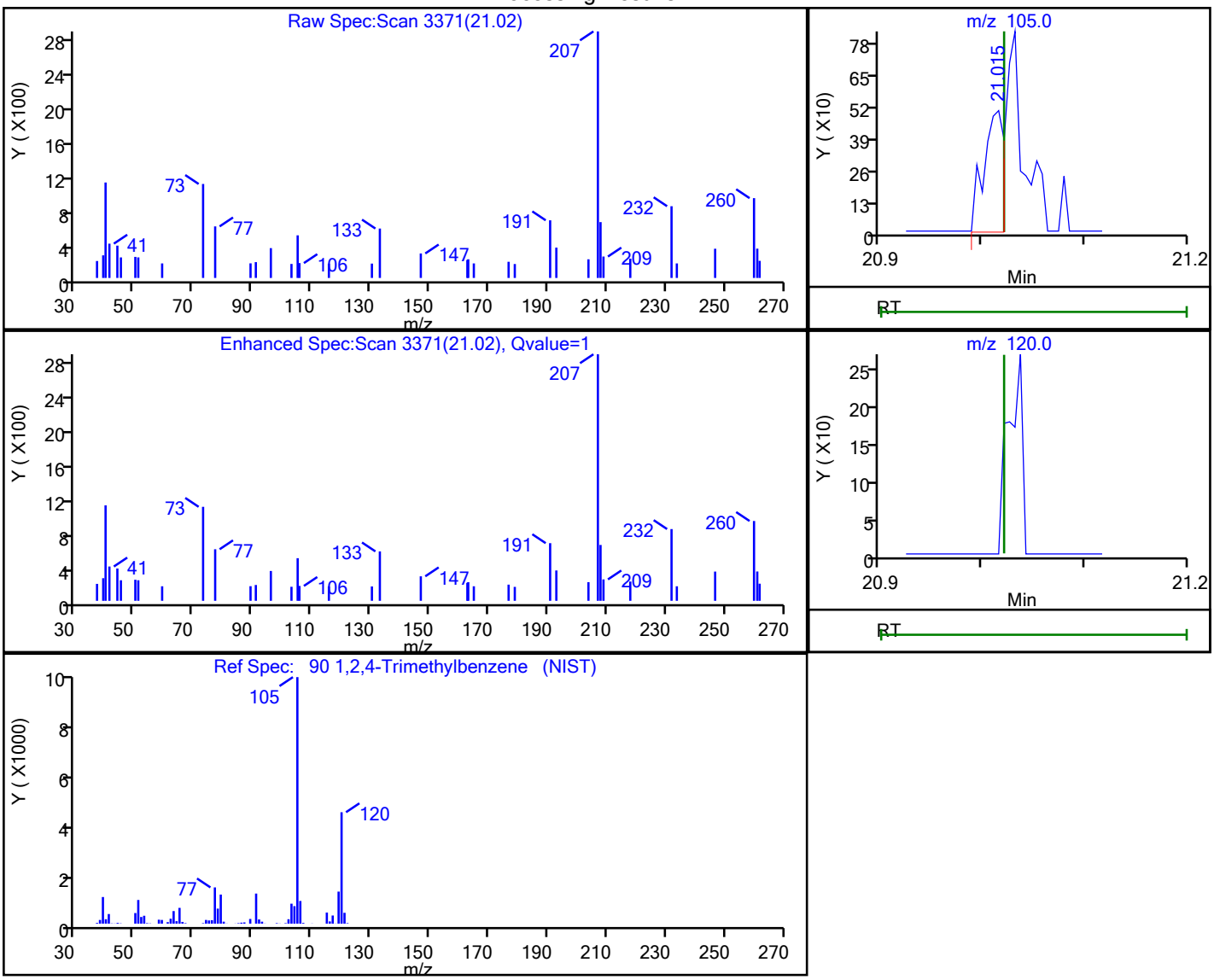
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

90 1,2,4-Trimethylbenzene, CAS: 95-63-6

Processing Results



RT	Mass	Response	Amount
21.02	105.00	689	0.013609
21.02	120.00	0	

Reviewer: puangmaleek, 21-Feb-2023 09:59:12

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

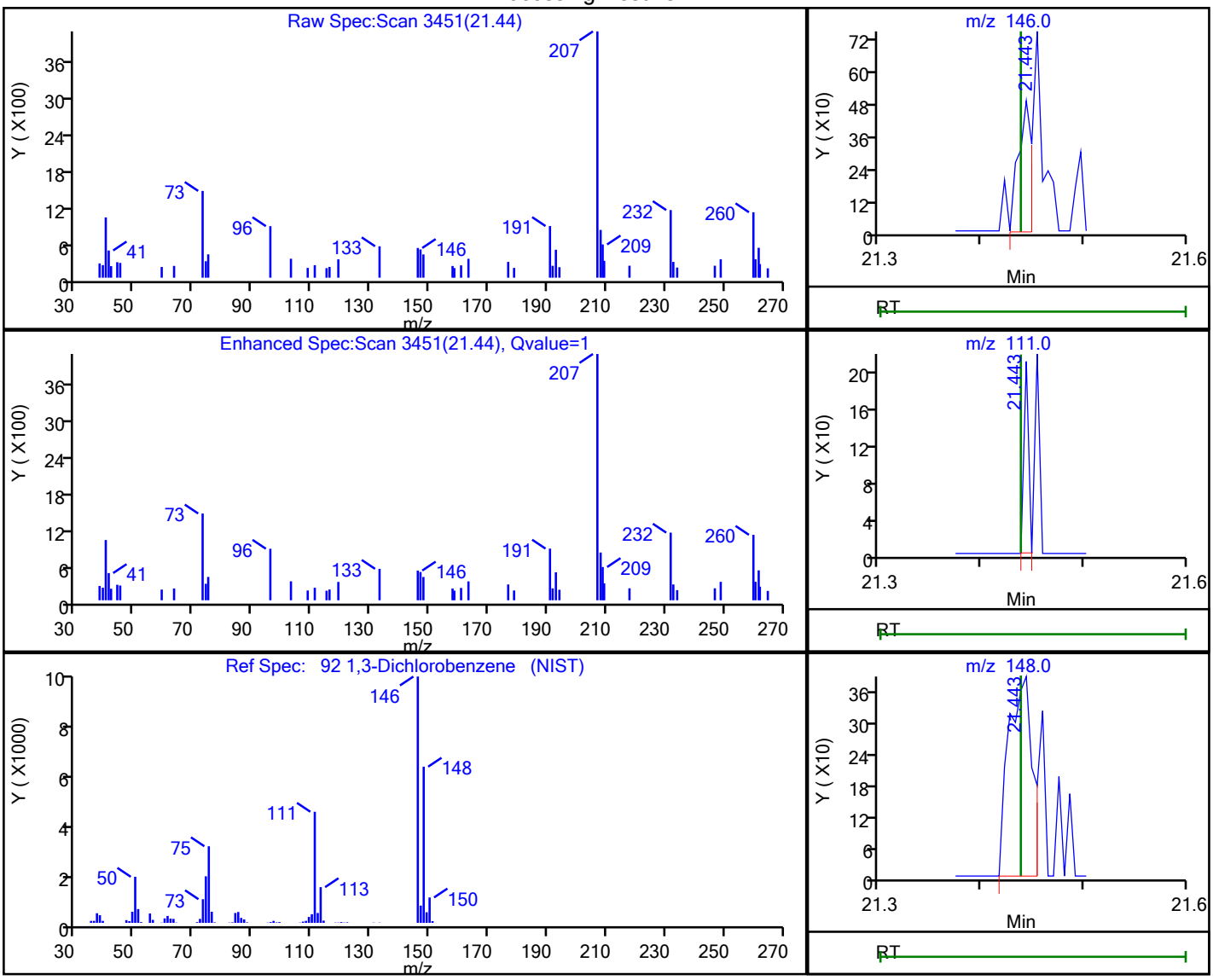
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

92 1,3-Dichlorobenzene, CAS: 541-73-1

Processing Results



RT	Mass	Response	Amount
21.44	146.00	442	0.011837
21.44	111.00	66	
21.44	148.00	622	

Reviewer: puangmaleek, 21-Feb-2023 09:59:15

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

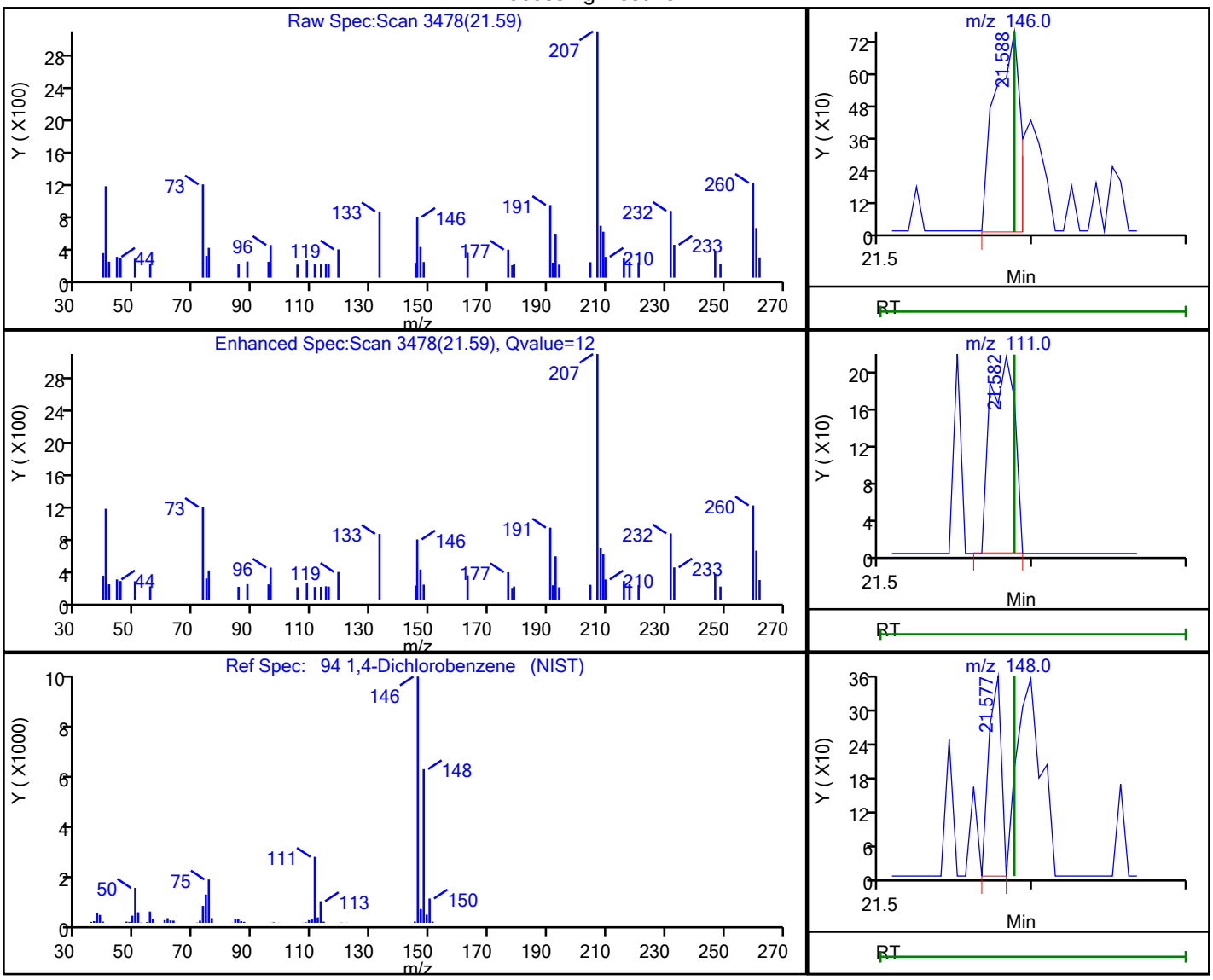
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

94 1,4-Dichlorobenzene, CAS: 106-46-7

Processing Results



RT	Mass	Response	Amount
21.59	146.00	865	0.022998
21.58	111.00	230	
21.58	148.00	202	

Reviewer: puangmaleek, 21-Feb-2023 09:59:18

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

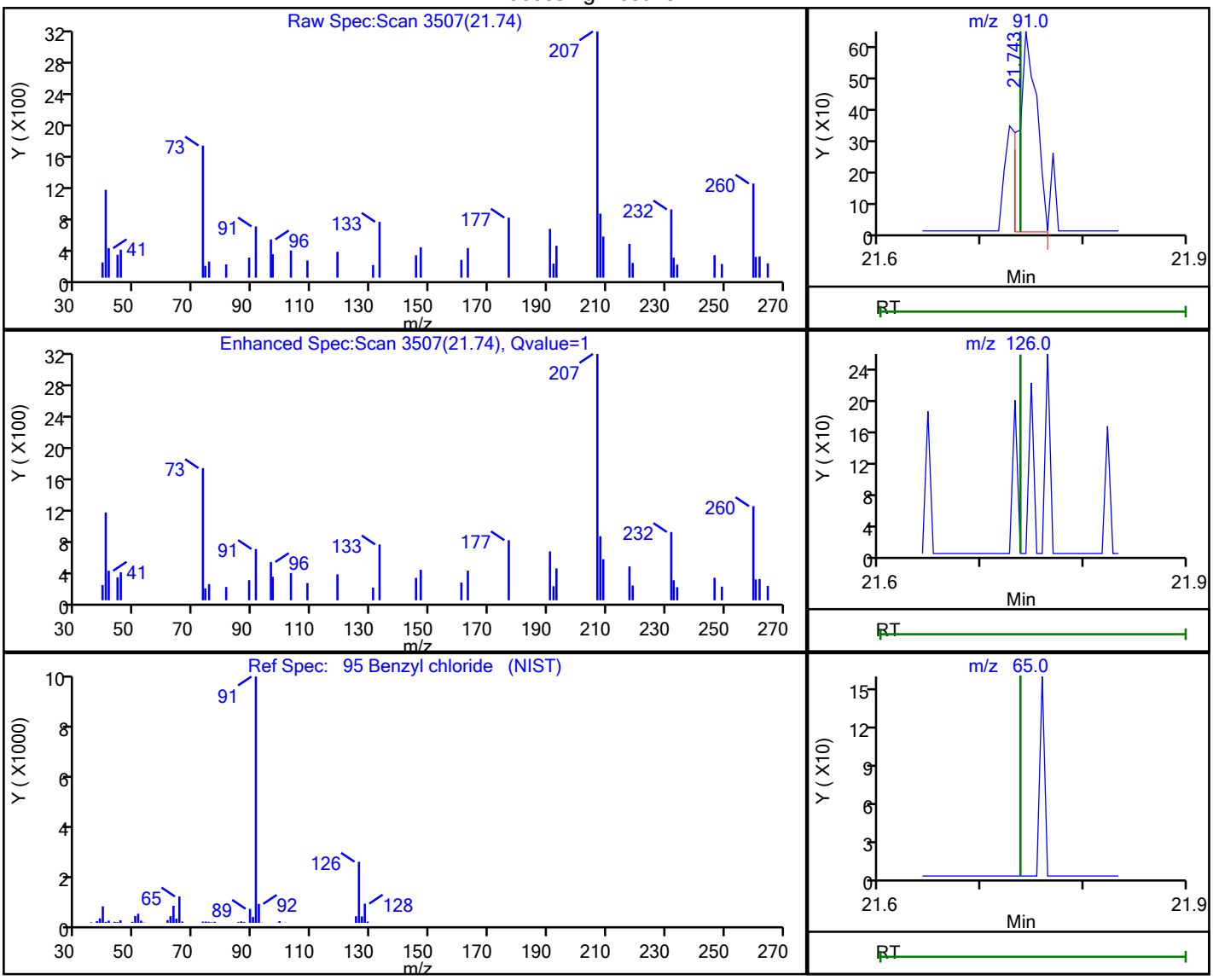
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

95 Benzyl chloride, CAS: 100-44-7

Processing Results



RT	Mass	Response	Amount
21.74	91.00	778	0.014805
21.74	126.00	0	
21.74	65.00	0	

Reviewer: puangmaleek, 21-Feb-2023 09:59:20

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

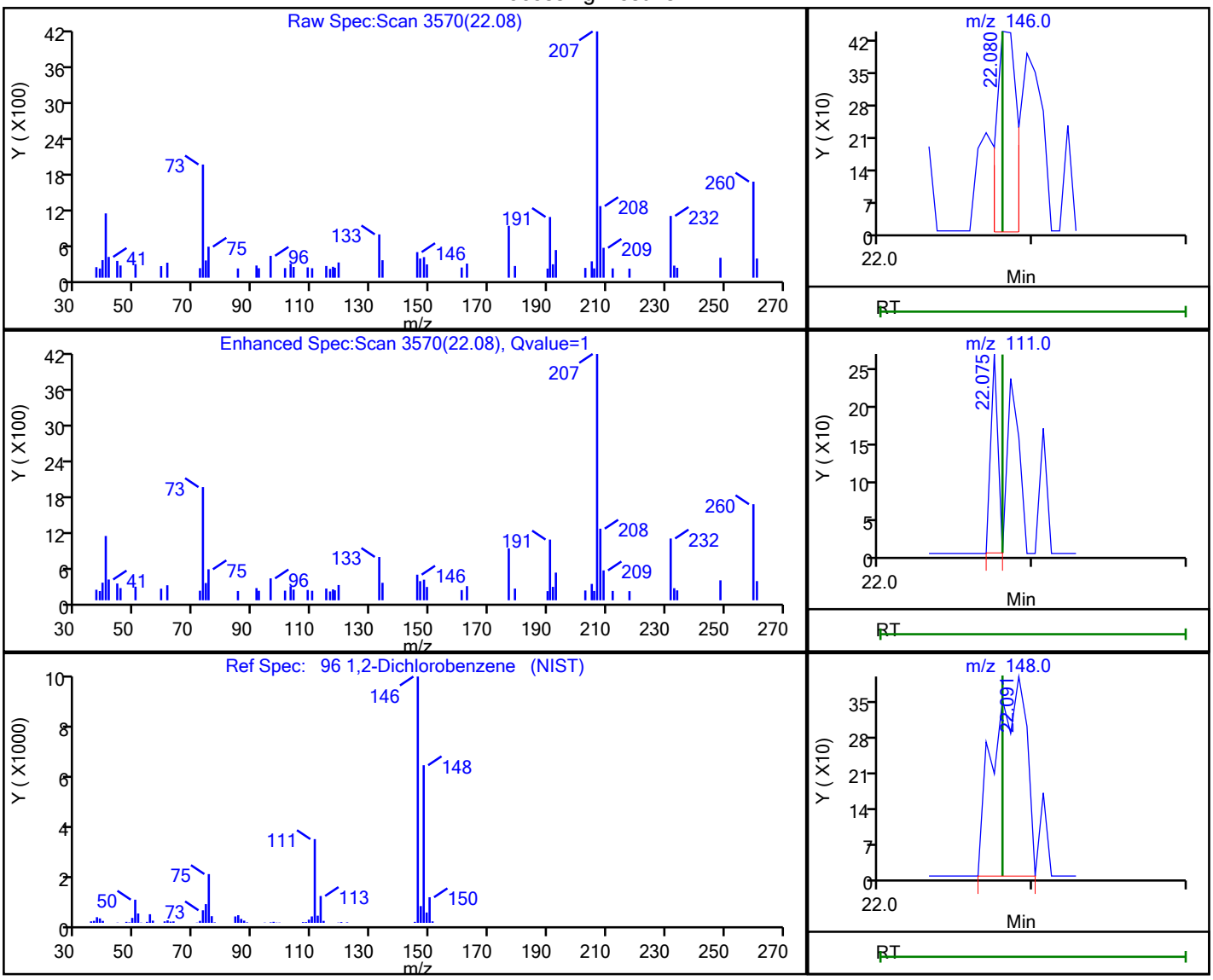
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

96 1,2-Dichlorobenzene, CAS: 95-50-1

Processing Results



RT	Mass	Response	Amount
22.08	146.00	409	0.011118
22.07	111.00	86	
22.09	148.00	576	

Reviewer: puangmaleek, 21-Feb-2023 09:59:22

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

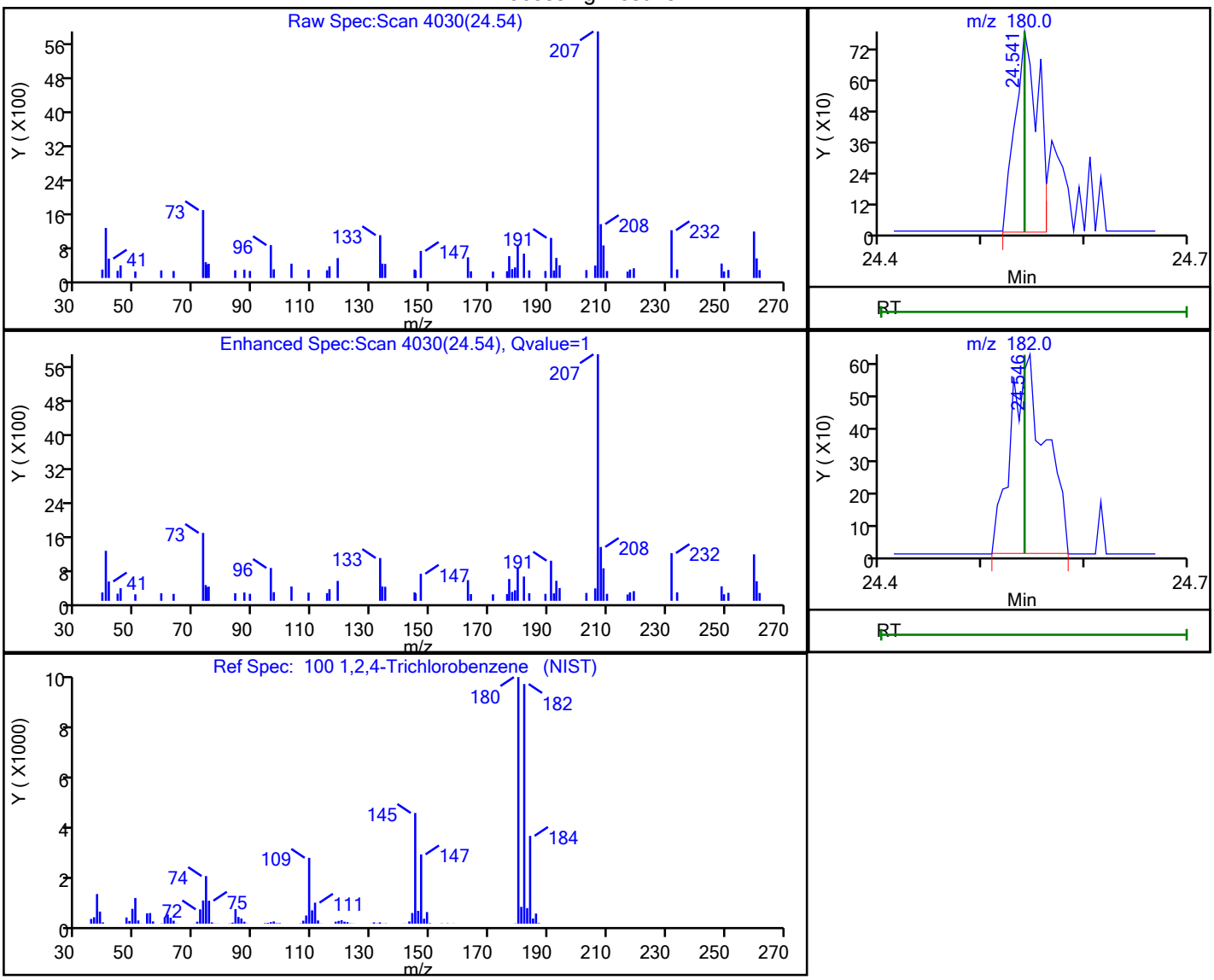
User Disabled Compound Report

Eurofins Burlington

Data File:	\\chromfs\Burlington\ChromData\CHG.i\20230220-54412.b\200-54412-006.D				
Injection Date:	20-Feb-2023 11:36:30	Instrument ID:	CHG.i		
Lims ID:	200-66886-A-1	Lab Sample ID:	200-66886-1		
Client ID:	4850				
Operator ID:	vtp	ALS Bottle#:	5	Worklist Smp#:	6
Purge Vol:	200.000 mL	Dil. Factor:	1.0000		
Method:	TO15_MasterMethod_(v1)_G	Limit Group:	AI_TO15_ICAL		
Column:	RTX-624 (0.32 mm)	Detector	MS SCAN		

100 1,2,4-Trichlorobenzene, CAS: 120-82-1

Processing Results



RT	Mass	Response	Amount
24.54	180.00	1242	0.051906
24.55	182.00	1481	

Reviewer: puangmaleek, 21-Feb-2023 09:59:24

Audit Action: Marked Compound Undetected Audit Reason: Invalid Compound ID

Building a Better World for All of Us®

Sustainable buildings, sound infrastructure, safe transportation systems, clean water, renewable energy and a balanced environment. Building a Better World for All of Us communicates a company-wide commitment to act in the best interests of our clients and the world around us.

We're confident in our ability to balance these requirements.

JOIN OUR SOCIAL COMMUNITIES

Tables

Table 1 – Sampling Location Summary
Table 2 – Photoionization Detector Field Screening Results
Table 3 – Soil Analytical Results
Table 4 – Groundwater Analytical Results
Table 5 – Soil Vapor Analytical Results

Figures

Figure 1 – Subject Property Location
Figure 2 – Sample Locations
Figure 3 – Select Analytical Results

Appendix A

Boring Logs

Appendix B

Laboratory Reports

Building a Better World for All of Us®

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Electrical Load Calculations

DLH New Connected Load Calculation

BASE BUILDING SF: 19,647sf
ATCT SF: 13,879sf
TOTAL SF: 33,526sf

			Volt-Amps
1	Receptacle Load (noncontinuous) 220.14 (I) Multiply each single or multiple receptacle on one strap by 180 volt-amperes. Multiply each single piece of equipment comprised of four or more receptacles by 90 VA per receptacle.	1	33526
2	Fixed Multioutlet Assemblies (noncontinuous) 220.14(H) Where not likely to be used simultaniously, multiply each 5' section by 180VA Where likely to be used simultaniously, multiply each 1' section by 180VA	2	0
3	Receptacle Load Demand Factor (for non-dwelling receptacles) 220.44 (1 V-A/SF for Offices) If the receptacle load is more than 10,000 VA, apply the demand factor from Table 220.44. Add lines 1 and 2. Multiply the first 10kVA or less by 100%. Multiply remainder by 50%.	3	21763
4	Receptacle Load (office buildings) 220.14 (K) (1) Calculate the demand in line 3. (2) Multiply 1 VA per sq. ft. by outside dimensions and add to line 4. (3) Compare lines 3 and 4 and omit the smaller.	4	NA
5	General Lighting Load Table 220.12 (3.5 V-A / SF for Offices, 22,832 SF) Multiply the VA unit load (for the type of occupancy) by the sq. ft. outside dimensions.	5	117341
6	Lighting Load Demand Factors 220.42	6	100%
7	Track Lighting (in addition to general lighting) 220.43 (B) Include 150 VA for every 2 ft or fraction thereof, of lighting track (3106 lf)	7	0
8	Sign or Outline Lighting Outlet (where required) 220.14 (F) Each comercial building (or occupancy) accessible to pedestrians must have at least one outlet per tenant space entrance. 600.5 (A) Each outlet must be at least 1200VA.	8	0
9	Show Window Lighting 220.43 (A) Include at least 200 volt-amperes for each linear foot measured horizontally along the show window's base. (200lf)	9	0
10	Continuous Loads 215.2(A), 215.3, and 230.42(A) Multiply the continuous load VA (listed above) by 25%. (General-purpose receptacles are not considered continuous)	10	29335.25
11	Kitchen Equipment 220.56 Multiply three or more pieces of equipment by Table 220.56 demand factor (%). Use Table 220.55 for household cooking equipment unsed in instructional programs. Table 220.55, Note 5.	11	0
12	Noncoincident Loads 220.60. The smaller of two (or more) noncoincident loads can be omitted. Calculate fixed electric space-heating loads at 100% of the total connected load 220.51.	12	0
13	Motor Loads 220.18(A),430.24, 430.25, 430.26 and Article 440. Motor-driven air conditioning and refrigeration equipment is found in Article 440. Multiply the loargest motor (one motor only) by 25% and add it to the load.	13	550000
14	All Other Loads. Add all other noncontinuous loads into the calculation at 100%. Multiply all other continuous loads (operating at 3 hours or more) by 125%.	14	100000
15	Total Volt-Amp (VA) Demand Load Add lines 3 through 14 to find the minimum required volt-amperes.	15	818439.25
16	Minimum Amps 480 Divide total volt-amperes by (voltage * 1.73)	16	984.43

To accommodate future expansions, a 1200A 480V Main Distribution Panel will be provided.

DLH Fire/Life Safety Load Calculation

BASE BUILDING SF: 19,647sf
ATCT SF: 13,879sf
TOTAL SF: 33,526sf

			Volt-Amps
1	(1) ELEVATOR	1	6000
2	EGRESS LIGHTING (ASSUME 25%); ELEVATOR CAB LIGHTING	2	29335.25
3	FIRE SMOKE DAMPERS	3	2000
4	FIRE ALARM/MISC CONTROL PANELS	4	8000
	Total Volt-Amp (VA) Demand Load Add lines 1 through 4 to find the minimum required volt-amperes.	0	45335.25
	Minimum Amps 480 Divide total volt-amperes by (voltage * 1.73)	0	54.53

To accommodate future expansions, Provide a 200A Life Safety Distribution Panel
The elevator and the Life Safety Panel will be fed from its own Automatic Transfer Switch

DLH Critical (UPS) Load Calculation

BASE BUILDING SF: 19,647sf
ATCT SF: 13,879sf
TOTAL SF: 33,526sf

			Volt-Amps
1	BUS DUCT	1	8000
2	WORK STATIONS	2	10000
3	EPMS RACKS/DDC CONTORL PANELS	3	4000
4	MISC CRITICAL LOADS	4	8000
5	ATCT CONSOLES	5	10000
	Total Volt-Amp (VA) Demand Load Add lines 1 through 5 to find the minimum required volt-amperes.	0	40000
	Minimum Amps 480 Divide total volt-amperes by (voltage * 1.73)	0	48.11

To accommodate future expansions, an 80kva UPS will be provided.

LEED Checklist

LEED v4 for BD+C: New Construction and Major Renovation

Project Checklist

Project Name: DLH ATCT and TRACON Base Building

Date: 01/26/2024

Y	?	N			
1			Credit	Integrative Process	1

2	3	27	Location and Transportation		16
		16	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
		2	Credit	High Priority Site	2
	1	4	Credit	Surrounding Density and Diverse Uses	5
		5	Credit	Access to Quality Transit	5
1			Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
	1		Credit	Green Vehicles	1

4	4	2	Sustainable Sites		10
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
2	1		Credit	Rainwater Management	3
	2		Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

6	5	0	Water Efficiency		11
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1	1		Credit	Outdoor Water Use Reduction	2
3	3		Credit	Indoor Water Use Reduction	6
1	1		Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

10	7	16	Energy and Atmosphere		33
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
		6	Credit	Enhanced Commissioning	6
8	5	5	Credit	Optimize Energy Performance	18
1			Credit	Advanced Energy Metering	1
	2		Credit	Demand Response	2
		3	Credit	Renewable Energy Production	3
1			Credit	Enhanced Refrigerant Management	1
		2	Credit	Green Power and Carbon Offsets	2

5	2	6	Materials and Resources		13
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Management Planning	Required
1		4	Credit	Building Life-Cycle Impact Reduction	5
1	1		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
1	1		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
		2	Credit	Building Product Disclosure and Optimization - Material Ingredients	2
2			Credit	Construction and Demolition Waste Management	2

13	3	0	Indoor Environmental Quality		16
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
2			Credit	Enhanced Indoor Air Quality Strategies	2
2	1		Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management Plan	1
2			Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
2			Credit	Interior Lighting	2
2	1		Credit	Daylight	3
	1		Credit	Quality Views	1
1			Credit	Acoustic Performance	1

4	1	1	Innovation		6
3	1	1	Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

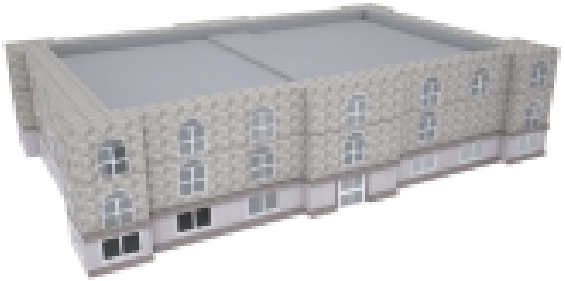
0	3	1	Regional Priority		4
		1	Credit	Regional Priority: Renewable Energy	1
	1		Credit	Regional Priority: Rainwater Management	1
	1		Credit	Regional Priority: Optimize Energy Performance	1
	1		Credit	Regional Priority: Protect or Restore Habitat	1

45	28	53	TOTALS	Possible Points:	110

Certified: 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

Energy Modeling and LCCA Report

Project Summary



Building Summary

Building Type	
Conditioned Floor Area	6,550 ft²
Total Building Area	6,550 ft²
Gross Wall Area	7,377 ft²
Window-Wall Ratio	12.82 %
Gross Roof Area	8,013 ft²
Skylight-Roof Ratio	0 %
Average Plug Load Density	0 W/ft²
Average Lighting Density	1.11 W/ft²
Peak Occupancy	33
Site Ventilation	1,485 ft³/min
Cooling Specific Air Flow	4,858 ft³/min
Heating Specific Air Flow	24,354 ft³/min
Site Peak Cooling Load	432 tons
Site Peak Heating Load	3,475 MBh

Weather Summary

Location	Duluth International Arpt MN USA
Weather File	USA_MN_Duluth.Intl.AP.727450
Latitude	N 46° 49
Longitude	W 92° 13
Time Zone	GMT -6.0 Hours
Summer Design Dry Bulb Temperature (1%)	81.3
Winter Design Dry Bulb Temperature (99%)	-12.5
User Defined	
Summer Design Day Dry Bulb Temperature	84.3
Coincident Design Day Wet Bulb Temperature	69.6
Winter Design Day Dry Bulb Temperature	-17.9

Project Information

Project Name	DULUTH, MN ATCT - Base Building model_Recovery_2024-01-23-025246
Building Owner	FAA
Location	Grand Folks, North Dakota
Program User	EXP
Company	EXP

Site Performance

Net Source Energy Use Intensity (EUI)	392.2 kBtu/ft²
Annual Electrical Consumption	159,117 kWh
Annual Peak Electrical Demand	467 kW
Annual Gas Consumption	784 MMBtu
Annual Water Consumption	0 gal

Building Performance

Unmet cooling load hours (Occupied) — This Building: 5 hours (Coincident)

Less hours — More hours

0 hours — 300 hours

Unmet heating load hours (Occupied) — This Building: 0 hours (Coincident)

Less hours — More hours

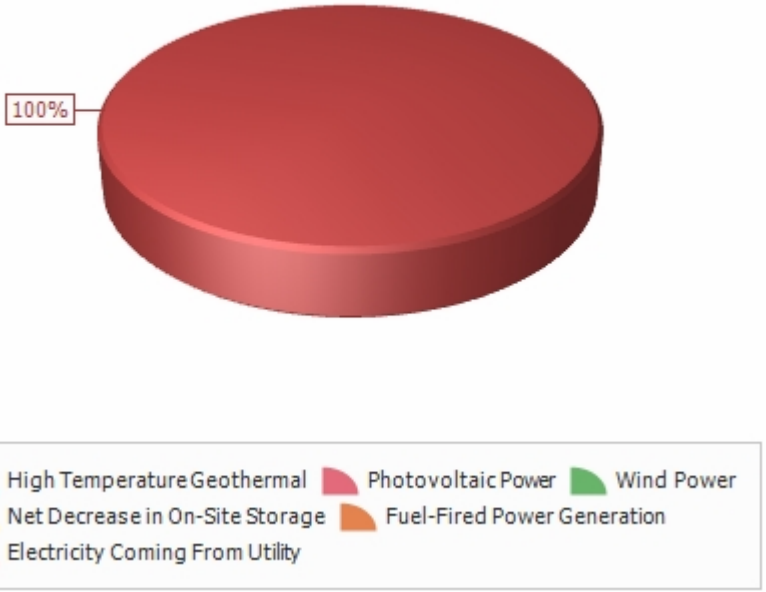
0 hours — 300 hours

Net Site Energy Intensity — This Building: 202.56 kBtu/ft²

Uses less energy — Uses more energy

0 kBtu/ft² — 349.89 kBtu/ft²

Site Power Generation

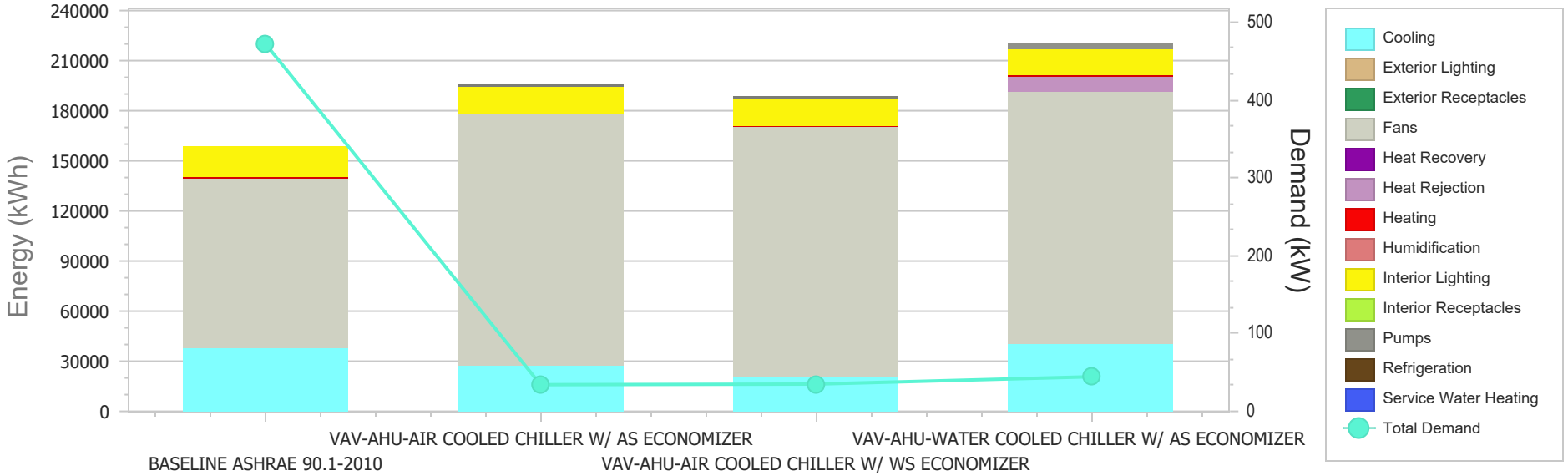


Fuel-Fired Power Generation	0 kWh
High Temperature Geothermal	0 kWh
Photovoltaic Power	0 kWh
Wind Power	0 kWh
Net Decrease in On-Site Storage	0 kWh
Sub-Total On Site Electricity	0 kWh
Electricity Coming From Utility	159,116 kWh
Surplus Electricity To Utility	0 kWh
Net Electricity From Utility	159,116 kWh
Total Electric Sources	159,116 kWh

Site Thermal Energy Recovery

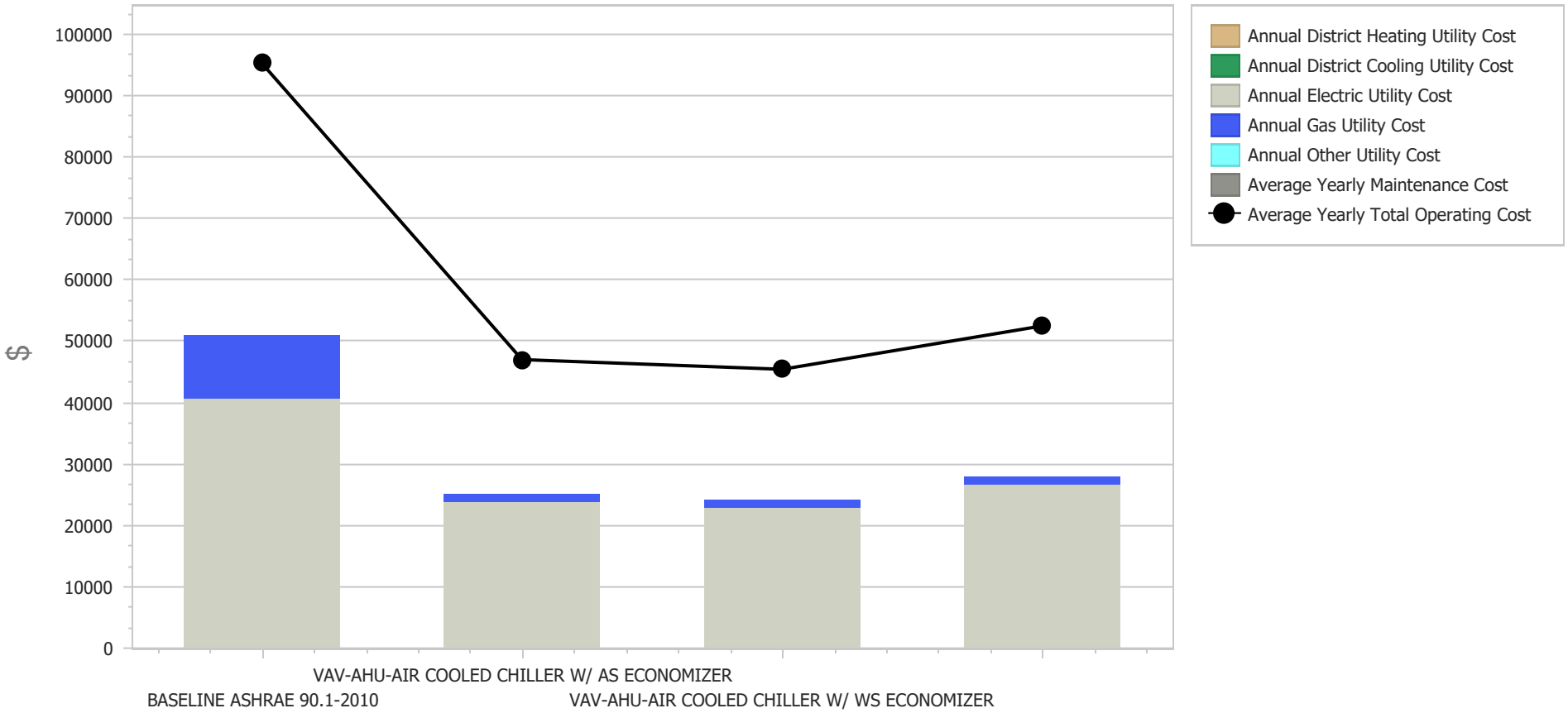
Water-Side Heat Recovery	0 kWh
Air to Air Heat Recovery Cooling	0 kWh
Air to Air Heat Recover Heating	0 kWh
High-Temperature Geothermal	0 kWh
Solar Water Thermal	0 kWh
Solar Air Thermal	0 kWh
Total On-Site Thermal Sources	0 kWh

Alternative Annual Electricity End Use and Demand Comparison



	BASELINE ASHRAE 90.1-2010		HU-AIR COOLED CHILLER W/ AS ECONC		HU-AIR COOLED CHILLER W/ WS ECONC		-WATER COOLED CHILLER W/ AS ECON	
	Energy (kWh)	Demand (kW)	Energy (kWh)	Demand (kW)	Energy (kWh)	Demand (kW)	Energy (kWh)	Demand (kW)
Cooling	37,926.55	448.88	27,391.88	9.78	20,790.12	10.50	40,577.66	11.93
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Exterior Receptacles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fans	101,914.10	15.91	151,302.60	17.29	150,439.80	17.31	151,259.30	17.29
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00	9,477.26	7.51
Heating	784.31	1.04	330.95	1.55	329.31	1.55	330.95	1.55
Humidification	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interior Lighting	18,491.75	6.18	15,659.68	5.23	15,659.68	5.23	15,659.68	5.23
Interior Receptacles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	1,437.56	0.34	1,706.01	0.36	3,126.67	0.85
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Service Water Heating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total	**159,116.71**	**472.01**	**196,122.66**	**34.19**	**188,924.92**	**34.96**	**220,431.51**	**44.36**

Economic Alternative Comparison



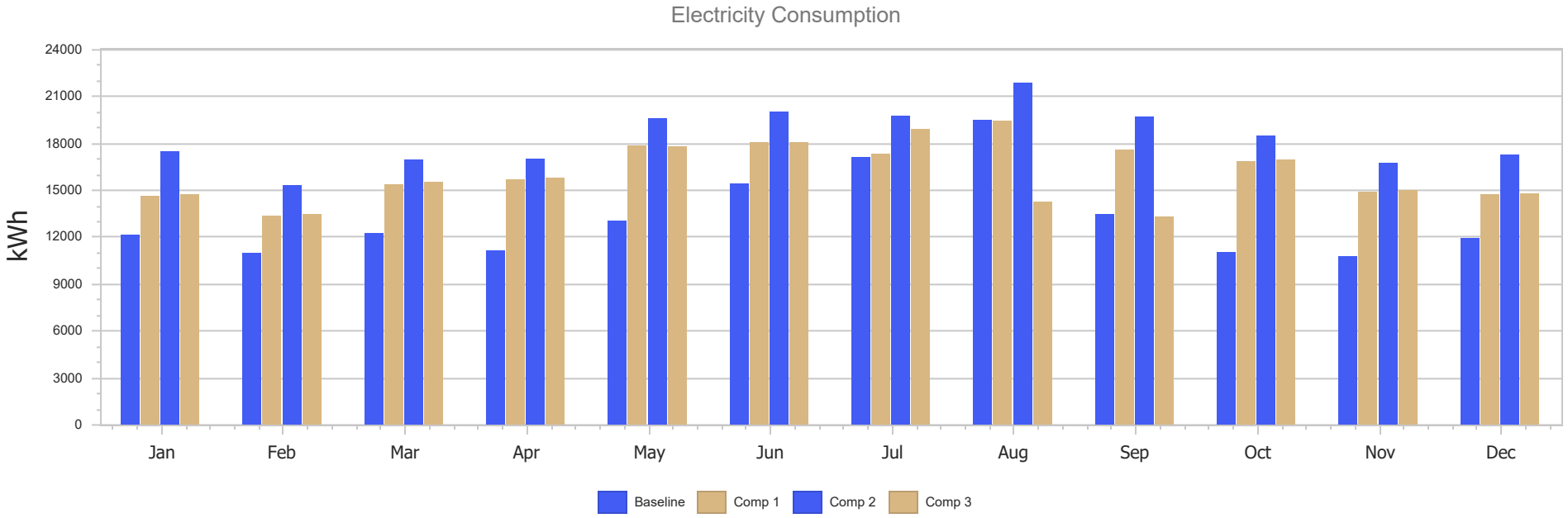
	BASELINE ASHRAE 90.1-2010	J-AIR COOLED CHILLER W/ AS ECON	-AIR COOLED CHILLER W/ WS ECO	VATER COOLED CHILLER W/ AS EC
Annual District Cooling Utility Cost	0	0	0	0
Annual District Heating Utility Cost	0	0	0	0
Annual Electric Utility Cost	40,742	23,771	22,923	26,691
Annual Gas Utility Cost	10,254	1,290	1,288	1,290
Annual Other Utility Cost	0	0	0	0
Average Yearly Maintenance Cost	0	0	0	0
Average Yearly Total Operating Cost	95,312	47,015	45,434	52,503

Alternative Comparison

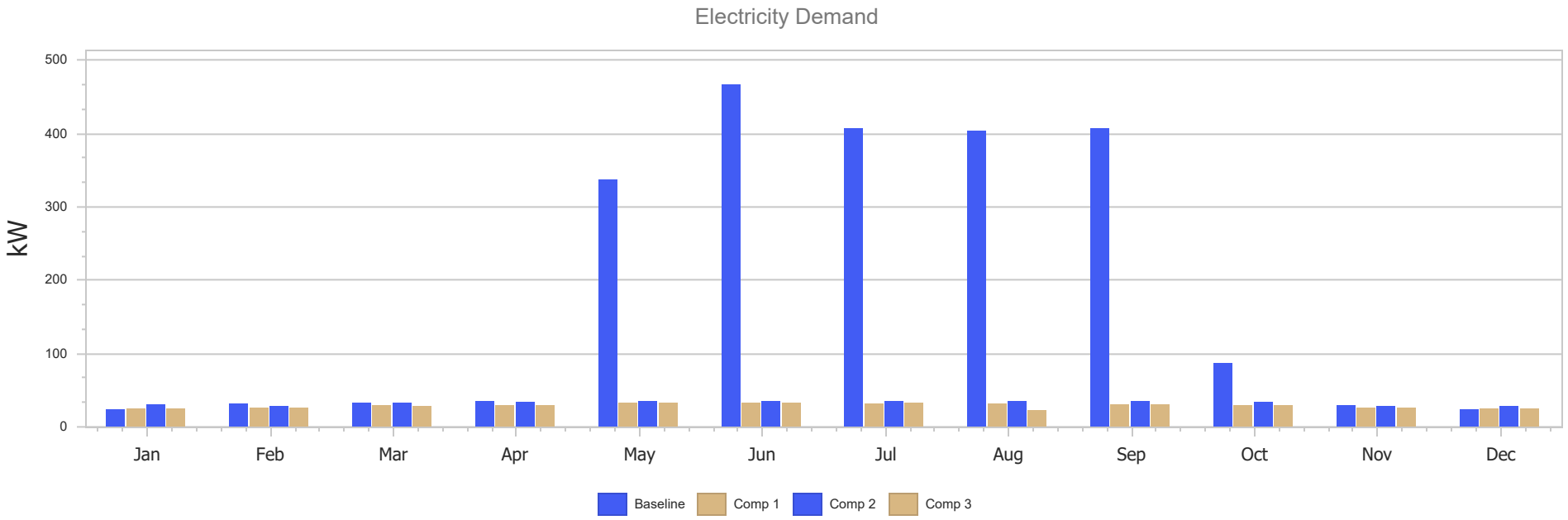
Energy End Use Comparison

		Baseline		Comparison 1		Comparison 2		Comparison 3	
		BASELINE ASHRAE 90.1-2010		VAV-AHU-AIR COOLED CHILLER W/ AS ECONOMIZER		VAV-AHU-WATER COOLED CHILLER W/ AS ECONOMIZER		VAV-AHU-AIR COOLED CHILLER W/ WS ECONOMIZER	
		Energy (kBTU)	% of Total	Energy (kBTU)	% Improve	Energy (kBTU)	% Improve	Energy (kBTU)	% Improve
Heating	*Electricity*	2,673	0%	1,128	58%	1,128	58%	1,128	58%
	Natural Gas	784,281	59%	30,870	96%	30,870	96%	30,719	96%
Cooling	*Electricity*	129,405	10%	93,464	28%	138,457	-7%	70,935	45%
Interior Lighting	*Electricity*	63,096	5%	53,428	15%	53,428	15%	53,428	15%
Exterior Lighting	-	-	-	-	-	-	-	-	-
Interior Equipment	-	-	-	-	-	-	-	-	-
Exterior Equipment	-	-	-	-	-	-	-	-	-
Fans	*Electricity*	347,745	26%	516,257	-48%	516,115	-48%	513,319	-48%
Pumps	*Electricity*	-	-	4,910	NA	10,672	NA	5,820	NA
Heat Rejection	*Electricity*	-	-	-	-	32,340	NA	-	-
Humidification	-	-	-	-	-	-	-	-	-
Air-Side Heat Recovery	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-
Generators	-	-	-	-	-	-	-	-	-
Summary	*Electricity*	542,919	41%	669,187	-23%	752,140	-39%	644,629	-19%
	Natural Gas	784,281	59%	30,870	96%	30,870	96%	30,719	96%
	Total	1,327,200	100%	700,058	47%	783,011	41%	675,348	49%

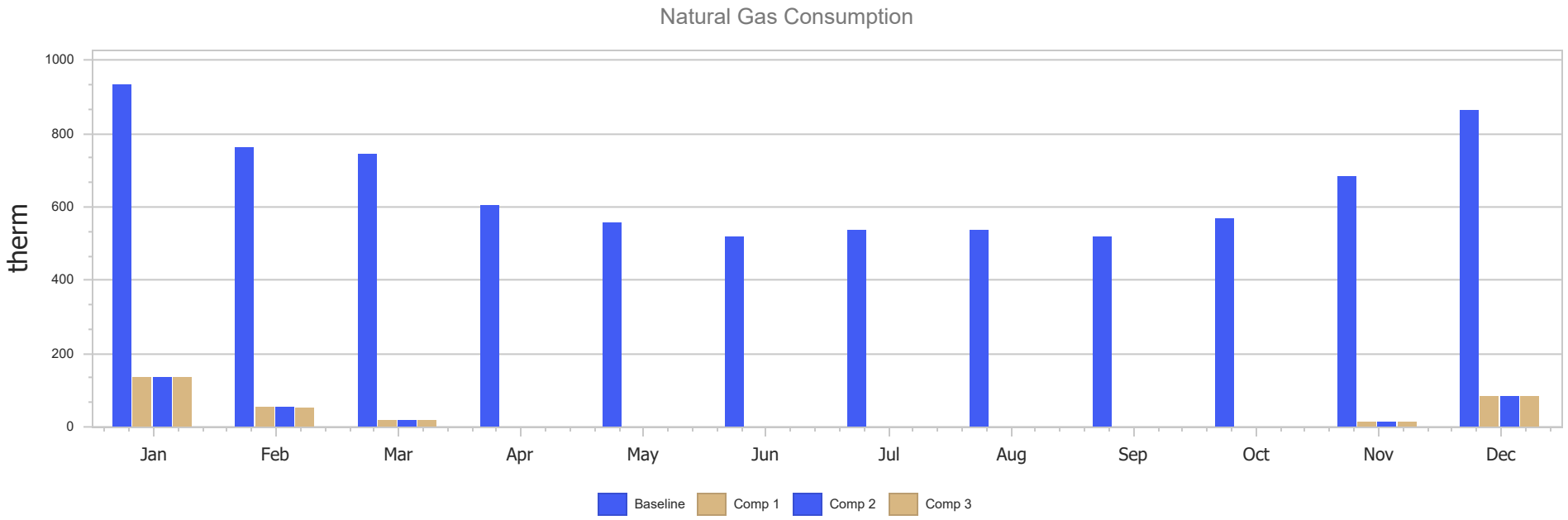
Monthly Utility Use Comparison



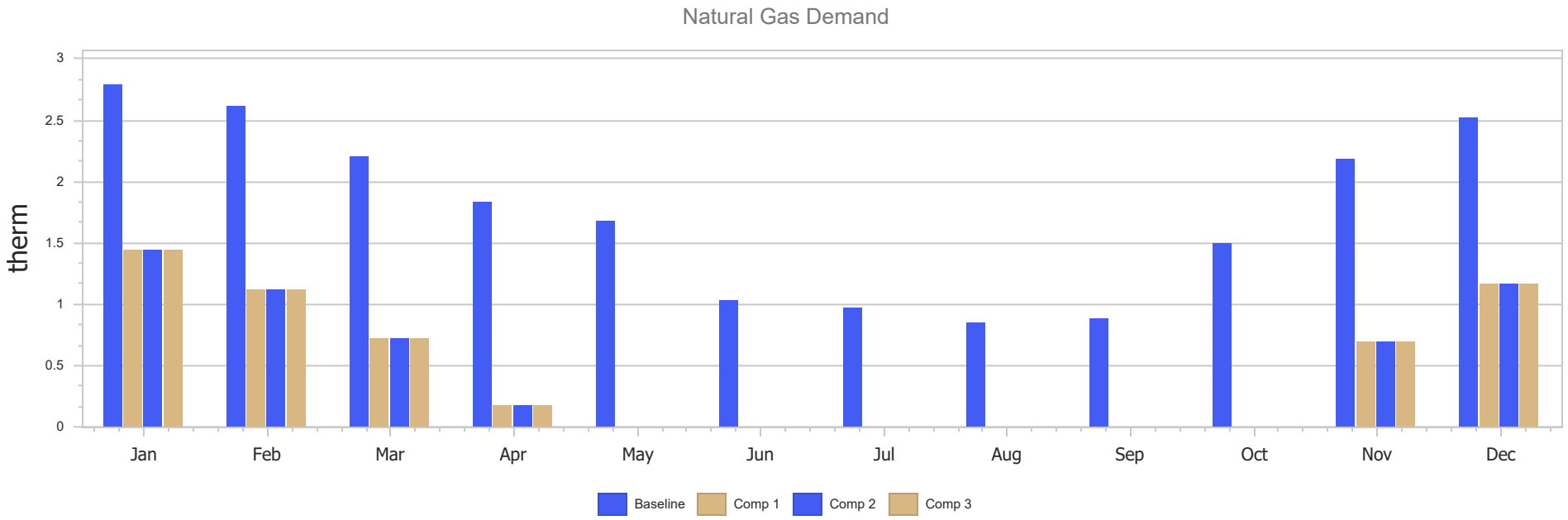
	Jan (kWh)	Feb (kWh)	Mar (kWh)	Apr (kWh)	May (kWh)	Jun (kWh)	Jul (kWh)	Aug (kWh)	Sep (kWh)	Oct (kWh)	Nov (kWh)	Dec (kWh)
Baseline	12,152	10,998	12,298	11,167	13,053	15,443	17,147	19,531	13,490	11,072	10,818	11,945
Comparison 1	14,680	13,411	15,407	15,689	17,854	18,107	17,345	19,484	17,624	16,876	14,907	14,737
Comparison 2	17,485	15,326	16,989	17,012	19,646	20,031	19,798	21,909	19,702	18,498	16,750	17,285
Comparison 3	14,762	13,509	15,540	15,811	17,805	18,094	18,938	14,260	13,357	16,971	15,044	14,833



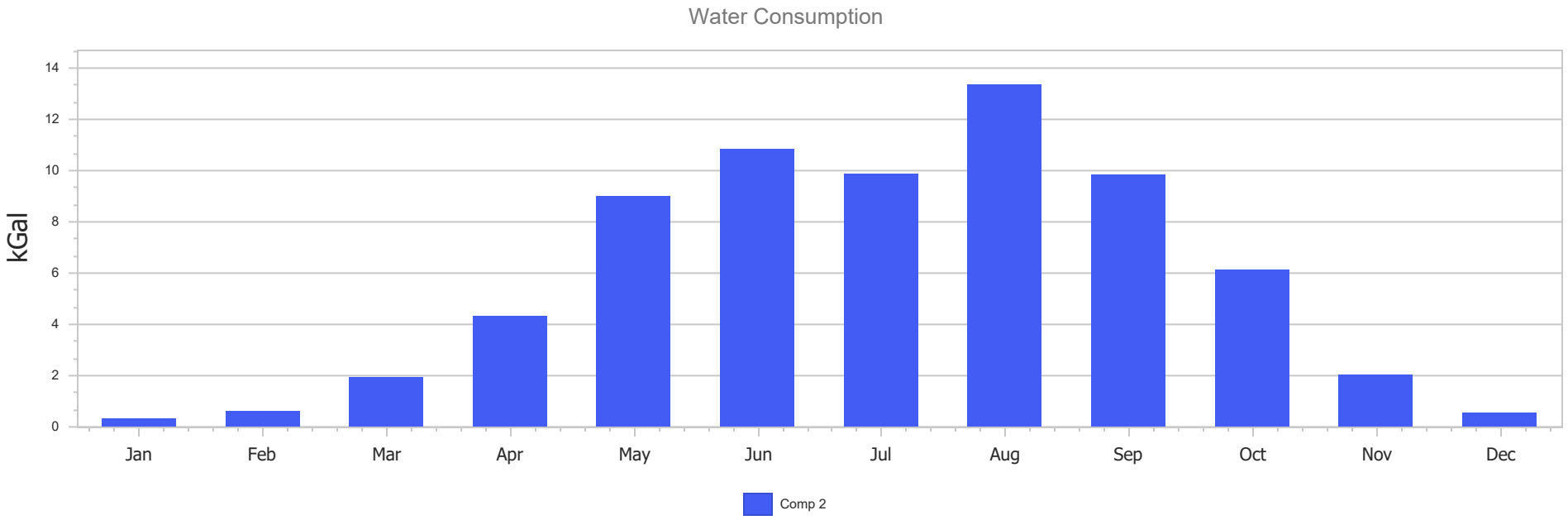
	Jan (kW)	Feb (kW)	Mar (kW)	Apr (kW)	May (kW)	Jun (kW)	Jul (kW)	Aug (kW)	Sep (kW)	Oct (kW)	Nov (kW)	Dec (kW)
Baseline	24	32	33	35	337	467	407	403	407	87	30	24
Comparison 1	25	26	30	30	33	33	32	32	31	30	26	25
Comparison 2	30	29	33	34	35	35	35	35	35	34	28	29
Comparison 3	25	27	28	29	33	33	33	23	30	29	26	26



	Jan (therm)	Feb (therm)	Mar (therm)	Apr (therm)	May (therm)	Jun (therm)	Jul (therm)	Aug (therm)	Sep (therm)	Oct (therm)	Nov (therm)	Dec (therm)
Baseline	935	763	745	606	557	520	536	537	520	569	684	864
Comparison 1	137	54	18	1	0	0	0	0	0	0	14	84
Comparison 2	137	54	18	1	0	0	0	0	0	0	14	84
Comparison 3	136	54	18	1	0	0	0	0	0	0	14	84

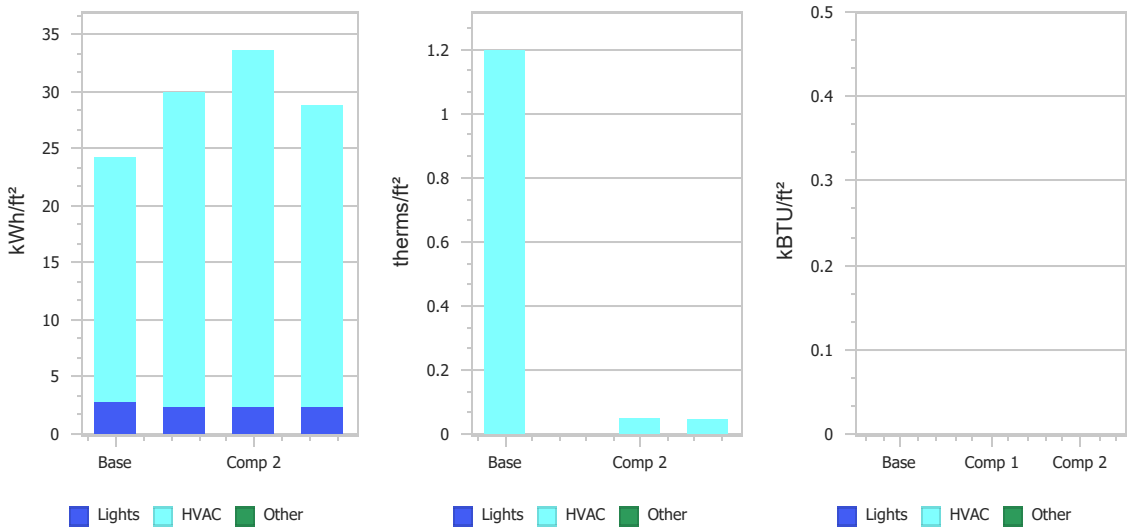


	Jan (therm)	Feb (therm)	Mar (therm)	Apr (therm)	May (therm)	Jun (therm)	Jul (therm)	Aug (therm)	Sep (therm)	Oct (therm)	Nov (therm)	Dec (therm)
Baseline	3	3	2	2	2	1	1	1	1	2	2	3
Comparison 1	1	1	1	0	0	0	0	0	0	0	1	1
Comparison 2	1	1	1	0	0	0	0	0	0	0	1	1
Comparison 3	1	1	1	0	0	0	0	0	0	0	1	1

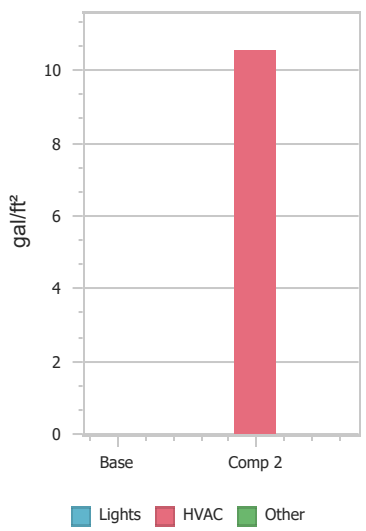


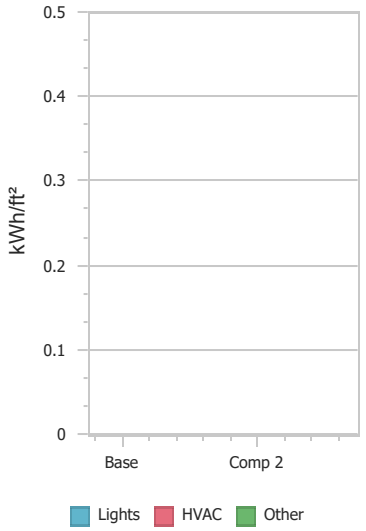
	Jan (kGal)	Feb (kGal)	Mar (kGal)	Apr (kGal)	May (kGal)	Jun (kGal)	Jul (kGal)	Aug (kGal)	Sep (kGal)	Oct (kGal)	Nov (kGal)	Dec (kGal)
Comparison 2	0	1	2	4	9	11	10	13	10	6	2	1

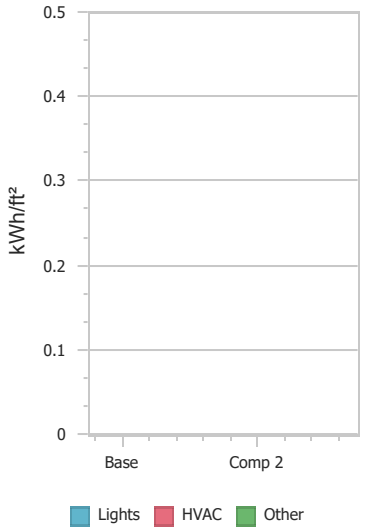
Energy Intensity Comparison



		Electricity Intensity (kWh/ft²)	Natural Gas Intensity (therms/ft²)	Additional Fuel Intensity (kBTU/ft²)
Baseline	*Lighting*	2.82	-	-
BASELINE ASHRAE 90.1-2010	*HVAC*	21.46	1.20	-
	Other	-	-	-
Comparison 1	*Lighting*	2.39	-	-
VAV-AHU-AIR COOLED CHILLER W/ AS ECONOMIZER	*HVAC*	27.54	-	4.71
	Other	-	-	-
Comparison 2:	*Lighting*	2.39	-	-
VAV-AHU-WATER COOLED CHILLER W/ AS ECONOMIZER	*HVAC*	31.25	0.05	-
	Other	-	-	-
Comparison 3:	*Lighting*	2.39	-	-
VAV-AHU-AIR COOLED CHILLER W/ WS ECONOMIZER	*HVAC*	26.44	0.05	-
	Other	-	-	-

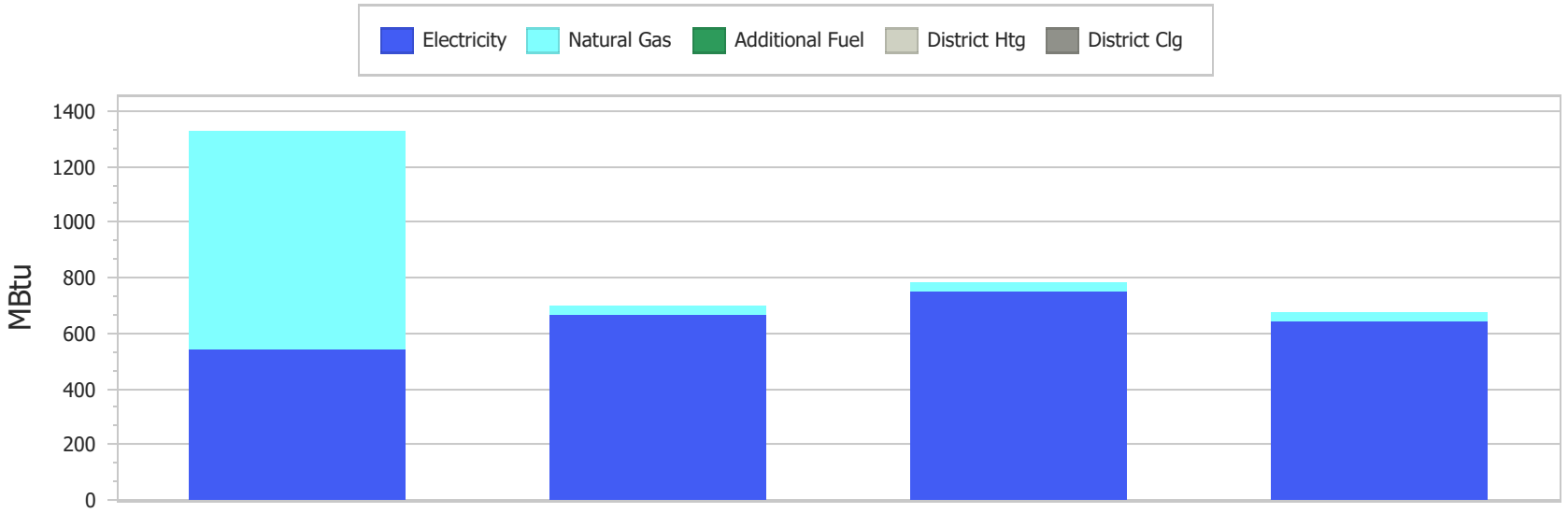






		Water Intesity (gal/ft²)	District Cooling Intensity (kWh/ft²)	District Heating Intensity (kWh/ft²)
Baseline	*Lighting*	-	-	-
BASELINE ASHRAE 90.1-2010	*HVAC*	-	-	-
	Other	-	-	-
Comparison 1	*Lighting*	-	-	-
VAV-AHU-AIR COOLED CHILLER W/ AS ECONOMIZER	*HVAC*	-	-	-
	Other	-	-	-
Comparison 2:	*Lighting*	-	-	-
VAV-AHU-WATER COOLED CHILLER W/ AS ECONOMIZER	*HVAC*	10.55	-	-
	Other	-	-	-
Comparison 3:	*Lighting*	-	-	-
VAV-AHU-AIR COOLED CHILLER W/ WS ECONOMIZER	*HVAC*	-	-	-
	Other	-	-	-

Overall Annual Energy Consumption



	Baseline: BASELINE ASHRAE 90.1-2010	Comparison 1: VAV-AHU-AIR COOLED CHILLER W/ AS ECONOMIZER	Comparison 2: VAV-AHU-WATER COOLED CHILLER W/ AS ECONOMIZER	Comparison 3: VAV-AHU-AIR COOLED CHILLER W/ WS ECONOMIZER
Electricity (MBtu)	543	669	752	645
Natural Gas (MBtu)	784	31	31	31
Additional Fuel (MBtu)	0	0	0	0
District Cooling (MBtu)	0	0	0	0
District Heating (MBtu)	0	0	0	0
Water (kGal)	0	0	69	0

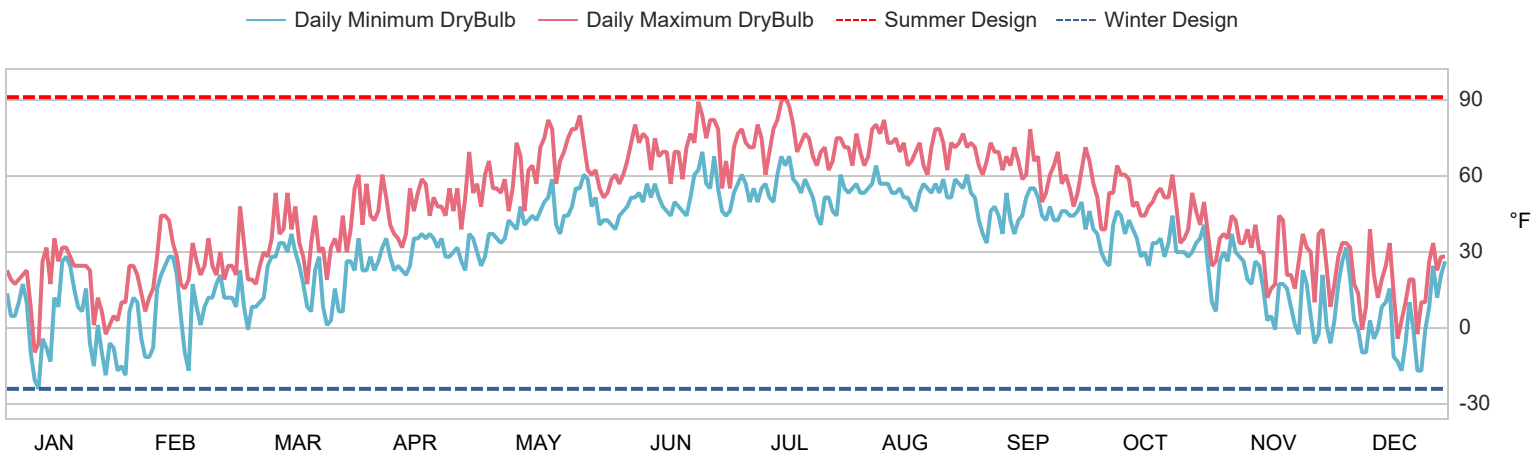
Climatic Summary

Overview

Location	Duluth International Arpt MN USA
Weather File	USA_MN_Duluth.Intl.AP.727450
Weather File Source	TMY3
WMO Station	727450
Latitude	N 46° 49
Longitude	W 92° 13
Time Zone	GMT -6.0 Hours
Elevation	1,421 ft
Standard Pressure	0.96 Bar
Heating Degree Days (base 65°F)	9,371
Cooling Degree Days (base 50°F)	1,570

Peaks

	Dry Bulb Temp. [F]	Dew Point Temp. [F]
Maximum	91	73.9
Date	Jul 17	Jul 16
Minimum	-23.1	-34.1
Date	Jan 9	Jan 9



Design Day Data

	ASHRAE Design Conditions %	Design Temperature [F]	Daily Temperature Range [ΔF]	Humidity Value	Humidity Type	Wind Speed [mph]	Wind Direction deg.
Heating	99.6	-17.9	0	-18.4	Wetbulb[F]	26.3	300 °
Cooling	0.4	84.3	19.3	69.6	Wetbulb[F]	11.7	230 °

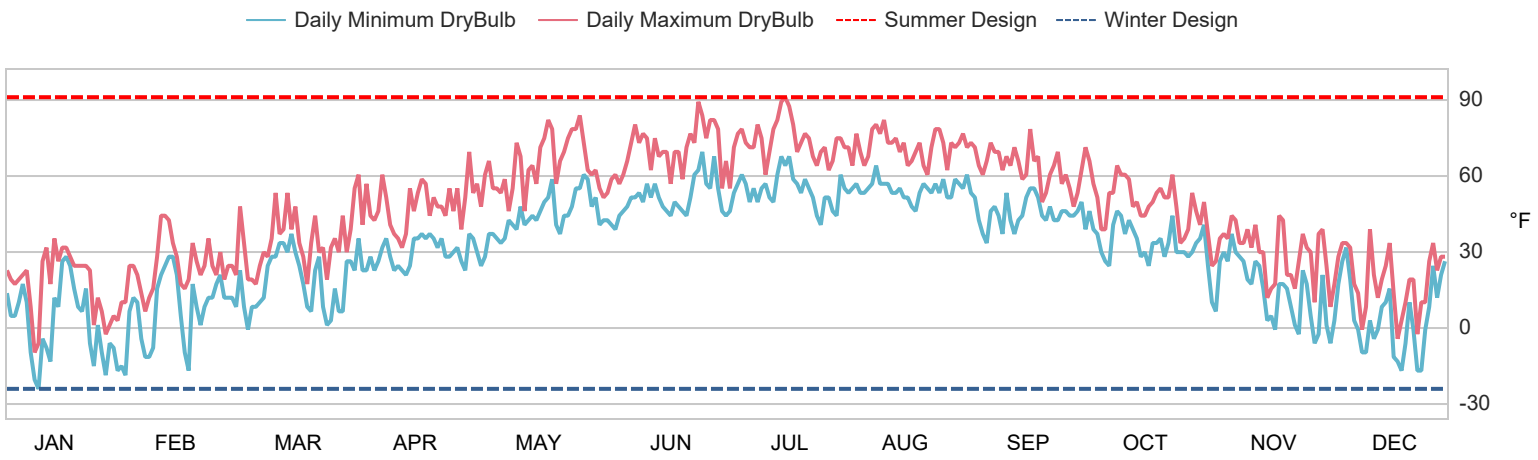
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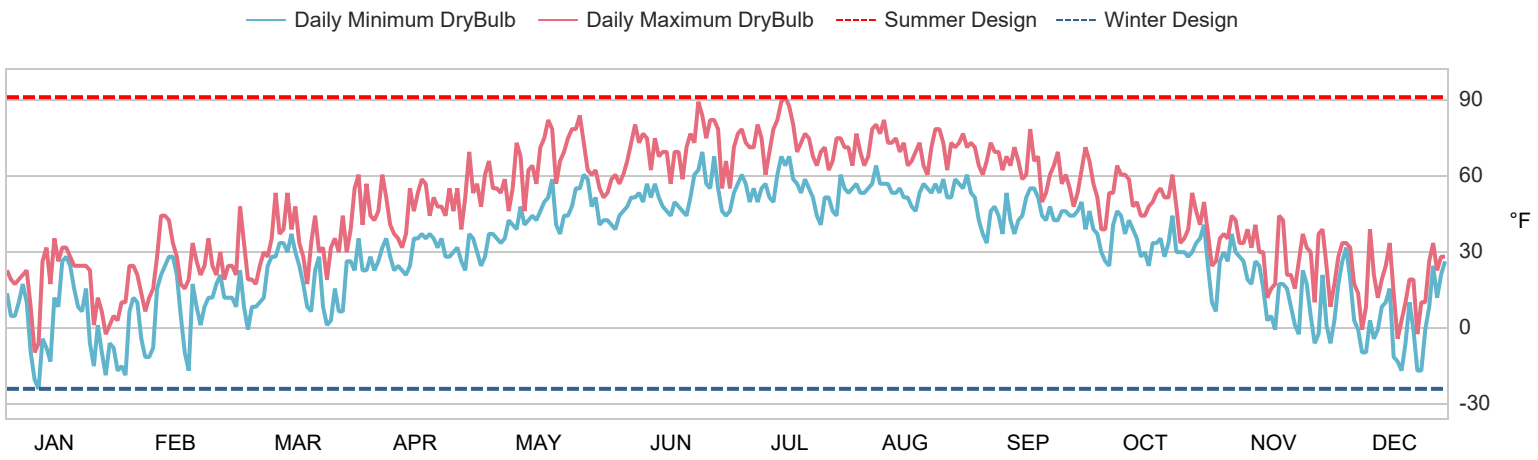
Climatic Summary

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Date	Jan 9	Jan 9



Design Day Data

	ASHRAE Design Conditions %	Design Temperature [F]	Daily Temperature Range [ΔF]	Humidity Value	Humidity Type	Wind Speed [mph]	Wind Direction deg.
Heating	99.6	-17.9	0	-18.4	Wetbulb[F]	26.3	300 °
Cooling	0.4	84.3	19.3	69.6	Wetbulb[F]	11.7	230 °

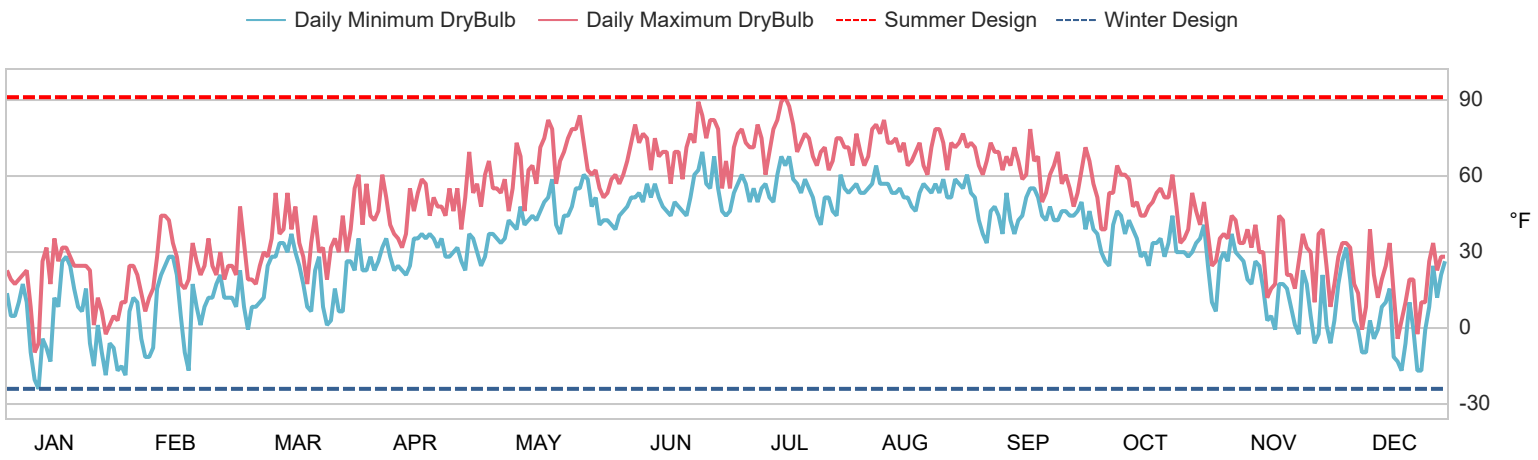
Climatic Summary

Overview

Location	Duluth International Arpt MN USA
Weather File	USA_MN_Duluth.Intl.AP.727450
Weather File Source	TMY3
WMO Station	727450
Latitude	N 46° 49
Longitude	W 92° 13
Time Zone	GMT -6.0 Hours
Elevation	1,421 ft
Standard Pressure	0.96 Bar
Heating Degree Days (base 65°F)	9,371
Cooling Degree Days (base 50°F)	1,570

Peaks

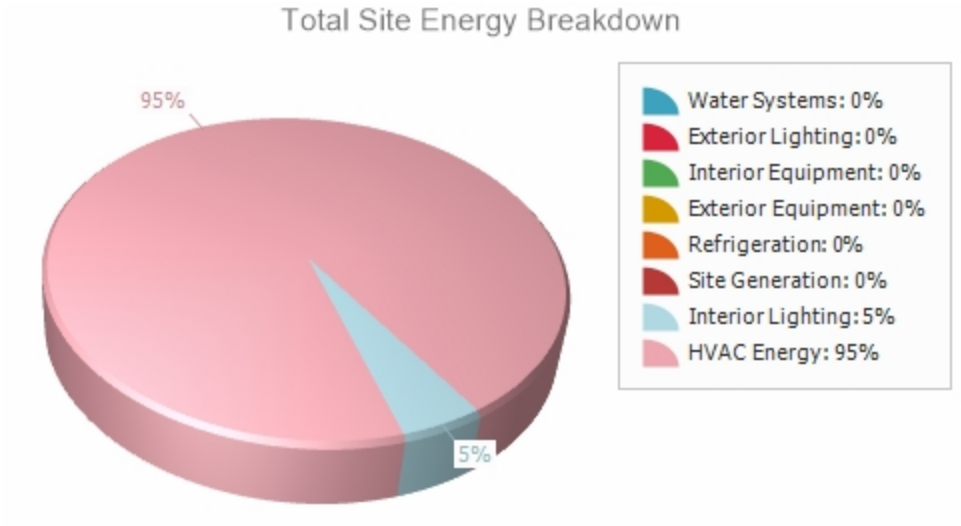
	Dry Bulb Temp. [F]	Dew Point Temp. [F]
Maximum	91	73.9
Date	Jul 17	Jul 16
Minimum	-23.1	-34.1
Date	Jan 9	Jan 9



Design Day Data

	ASHRAE Design Conditions %	Design Temperature [F]	Daily Temperature Range [ΔF]	Humidity Value	Humidity Type	Wind Speed [mph]	Wind Direction deg.
Heating	99.6	-17.9	0	-18.4	Wetbulb[F]	26.3	300 °
Cooling	0.4	84.3	19.3	69.6	Wetbulb[F]	11.7	230 °

Lighting and Daylighting Summary



Window Area

	Units	North	East	South	West	Total
Window Opening Area	ft²	412	124	362	48	946
Gross Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82
Gross Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82

SkyLight Area

	Units	Total
Gross Roof Area	ft²	8,013
Skylight Area	ft²	0
Skylight-Roof Ratio	%	0

SkyLight Area

	Units	Total

Lighting

Component	Electricity (kWh)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)
Interior Lighting	18,492	63,096	9.63	199,826	30.5
Exterior Lighting	0	0	0	0	0

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
TECHNICAL OPERATIONS	Admin Assist B123_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	44	0.31	113	48.78
JOINT USE & MISC. SUPPORT	Admin Storage B107_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	72	0.31	182	48.78
TERMINAL PERSONNEL	Air Traffic Mng B104_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.16	47	0.31	120	48.78
TERMINAL SPACES	At Coach B118_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	46	0.31	116	48.78
TERMINAL SPACES	At Locker Room B108_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	86	0.31	219	48.78
TERMINAL PERSONNEL	At Workspace B113_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	41	0.31	105	48.78
ENVIRONMENTAL SUPPORT	Boiler Room B120a_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	217	0.31	553	48.78
JOINT USE & MISC. SUPPORT	Break Room B122_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	153	0.31	390	48.78
JOINT USE & MISC. SUPPORT	Cbi Training B111_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	57	0.31	146	48.78
TERMINAL PERSONNEL	Closet B161_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	4	0.31	10	48.78
TERMINAL PERSONNEL	Contract Weather B115_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	40	0.31	101	48.78
TERMINAL PERSONNEL	Contractor B119_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	40	0.31	102	48.78
CORRIDORS	Corridor 1 To 4_Light Load #001_Template	Lights - Low-Rise Office - Lighting	1.07	1,079	0.31	2,745	48.78
TERMINAL SPACES	Debriefing B114_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	40	0.31	103	48.78
TERMINAL SPACES	Drug Test B144_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	28	0.31	72	48.78
ENVIRONMENTAL SUPPORT	Elec Main Service B135_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	185	0.31	471	48.78

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Elec Switchgear B151._Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	180	0.31	457	48.78
TECHNICAL OPS SPACES	Electronics Equip Room / Lan / Telco B116_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.73	542	0.31	1,377	48.78
ENVIRONMENTAL SUPPORT	Engine Generator B131_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	238	0.31	605	48.78
ENVIRONMENTAL SUPPORT	Environmental Shop B128_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	400	0.31	1,018	48.78
ENVIRONMENTAL SUPPORT	Fire Command Center B138_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	72	0.31	182	48.78
ENVIRONMENTAL SUPPORT	Fire Life Safety / Ups B136_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	128	0.31	326	48.78
ENVIRONMENTAL SUPPORT	Fire Pump B137_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	70	0.31	177	48.78
ENVIRONMENTAL SUPPORT	Hazmat Storage B129_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	50	0.31	128	48.78
JOINT USE & MISC. SUPPORT	Lactation B143_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	54	0.31	138	48.78
JOINT USE & MISC. SUPPORT	Large Conference Room B146_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	149	0.31	379	48.78
JOINT USE & MISC. SUPPORT	Loading / Shipping B133_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.16	168	0.31	427	48.78
JOINT USE & MISC. SUPPORT	Mail/Copier B103_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	52	0.31	132	48.78
ENVIRONMENTAL SUPPORT	Mech Equip Room B120_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.18	483	0.31	1,229	48.78
JOINT USE & MISC. SUPPORT	Mens Restroom B140_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	128	0.31	326	48.78
TECHNICAL OPS SPACES	Nas Doc / Tech Library B127_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.1	76	0.31	194	48.78
TECHNICAL OPS SPACES	Nas Elec Workshop B148_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	124	0.31	315	48.78
TECHNICAL OPERATIONS	On Site Atss B147_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.47	136	0.31	346	48.78
TERMINAL PERSONNEL	Operations Supervisor B106_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.31	88	0.31	224	48.78
ENVIRONMENTAL SUPPORT	Ppe Storage Tech / Group B153_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	73	0.31	185	48.78
TECHNICAL OPS SPACES	Project Office B149_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	48	0.31	122	48.78
TERMINAL SPACES	Quiet Room B112_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	42	0.31	106	48.78
ENVIRONMENTAL SUPPORT	Secure Storage B150_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	152	0.31	386	48.78
ENVIRONMENTAL SUPPORT	Security Equip Room B152_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	22	0.31	55	48.78

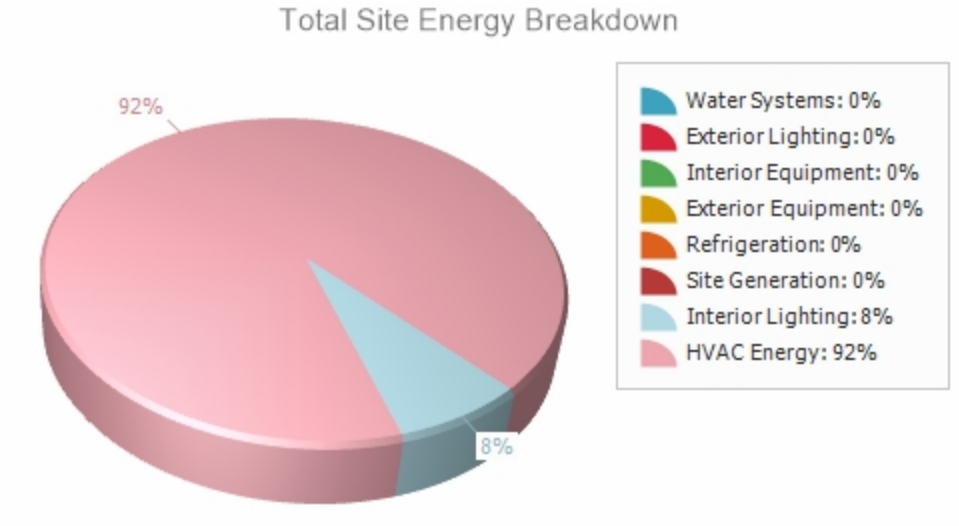
Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Shipping / Receiving B132_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	79	0.31	200	48.78
JOINT USE & MISC. SUPPORT	Small Conference Room B145_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	82	0.31	209	48.78
TECHNICAL OPERATIONS	Ssc Coordinator B126_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.2	59	0.31	150	48.78
ENVIRONMENTAL SUPPORT	Supply / Parts Storage B130_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.1	267	0.31	678	48.78
TERMINAL PERSONNEL	Support Spec B105_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	22	0.31	56	48.78
TECHNICAL OPERATIONS	Systems Spec B125_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	25	0.31	64	48.78
TERMINAL PERSONNEL	T&A Clerk B102_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	38	0.31	97	48.78
TERMINAL SPACES	Tape Play-Back B110_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	31	0.31	78	48.78
TECHNICAL OPS SPACES	Tech Ops Locker Room B154_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	33	0.31	84	48.78
TECHNICAL OPERATIONS	Tech Ops Ssc Mng B124_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.2	59	0.31	150	48.78
TERMINAL SPACES	Tracon Opt Room B117_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.39	193	0.31	491	48.78
TERMINAL SPACES	Tss B109_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	83	0.31	212	48.78
ENVIRONMENTAL SUPPORT	Vehicle Maintenance B134_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	362	0.31	921	48.78
CORRIDORS	Vestibule 1 B101_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	39	0.31	100	48.78
JOINT USE & MISC. SUPPORT	Wellness B121_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	113	0.31	288	48.78
JOINT USE & MISC. SUPPORT	Womens Restroom B141_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	130	0.31	331	48.78

Daylighting

Daylighting Reference Point	Zone Name	Control Type	Control Type	Fraction of Lighting Controlled	Installed Lighting Power (W)	Controlled Lighting Power (W)	Window Area (ft²)	Average Visible Transmittance
None					0	0	0	0

Lighting and Daylighting Summary



Window Area

	Units	North	East	South	West	Total
Window Opening Area	ft²	412	124	362	48	946
Gross Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82
Gross Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82

SkyLight Area

	Units	Total
Gross Roof Area	ft²	8,013
Skylight Area	ft²	0
Skylight-Roof Ratio	%	0

SkyLight Area

	Units	Total

Lighting

Component	Electricity (kWh)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)
Interior Lighting	15,658	53,428	8.15	169,208	25.82
Exterior Lighting	0	0	0	0	0

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
TECHNICAL OPERATIONS	Admin Assist B123_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	38	0.31	96	48.78
JOINT USE & MISC. SUPPORT	Admin Storage B107_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	61	0.31	154	48.78
TERMINAL PERSONNEL	Air Traffic Mng B104_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	40	0.31	101	48.78
TERMINAL SPACES	At Coach B118_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	39	0.31	98	48.78
TERMINAL SPACES	At Locker Room B108_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	73	0.31	185	48.78
TERMINAL PERSONNEL	At Workspace B113_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	35	0.31	89	48.78
ENVIRONMENTAL SUPPORT	Boiler Room B120a_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	184	0.31	468	48.78
JOINT USE & MISC. SUPPORT	Break Room B122_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	130	0.31	330	48.78
JOINT USE & MISC. SUPPORT	Cbi Training B111_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	49	0.31	124	48.78
TERMINAL PERSONNEL	Closet B161_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	3	0.31	8	48.78
TERMINAL PERSONNEL	Contract Weather B115_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	34	0.31	86	48.78
TERMINAL PERSONNEL	Contractor B119_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	34	0.31	87	48.78
CORRIDORS	Corridor 1 To 4_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.91	914	0.31	2,324	48.78
TERMINAL SPACES	Debriefing B114_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	34	0.31	87	48.78
TERMINAL SPACES	Drug Test B144_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	24	0.31	61	48.78
ENVIRONMENTAL SUPPORT	Elec Main Service B135_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	157	0.31	399	48.78

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Elec Switchgear B151._Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	152	0.31	387	48.78
TECHNICAL OPS SPACES	Electronics Equip Room / Lan / Telco B116_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.62	459	0.31	1,166	48.78
ENVIRONMENTAL SUPPORT	Engine Generator B131_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	202	0.31	513	48.78
ENVIRONMENTAL SUPPORT	Environmental Shop B128_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	339	0.31	862	48.78
ENVIRONMENTAL SUPPORT	Fire Command Center B138_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	155	48.78
ENVIRONMENTAL SUPPORT	Fire Life Safety / Ups B136_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	109	0.31	276	48.78
ENVIRONMENTAL SUPPORT	Fire Pump B137_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	59	0.31	150	48.78
ENVIRONMENTAL SUPPORT	Hazmat Storage B129_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	42	0.31	108	48.78
JOINT USE & MISC. SUPPORT	Lactation B143_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	46	0.31	117	48.78
JOINT USE & MISC. SUPPORT	Large Conference Room B146_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	126	0.31	321	48.78
JOINT USE & MISC. SUPPORT	Loading / Shipping B133_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	142	0.31	361	48.78
JOINT USE & MISC. SUPPORT	Mail/Copier B103_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	44	0.31	112	48.78
ENVIRONMENTAL SUPPORT	Mech Equip Room B120_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	409	0.31	1,041	48.78
JOINT USE & MISC. SUPPORT	Mens Restroom B140_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.1	109	0.31	276	48.78
TECHNICAL OPS SPACES	Nas Doc / Tech Library B127_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	65	0.31	164	48.78
TECHNICAL OPS SPACES	Nas Elec Workshop B148_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	105	0.31	267	48.78
TECHNICAL OPERATIONS	On Site Atss B147_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.39	115	0.31	293	48.78
TERMINAL PERSONNEL	Operations Supervisor B106_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.26	75	0.31	190	48.78
ENVIRONMENTAL SUPPORT	Ppe Storage Tech / Group B153_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	156	48.78
TECHNICAL OPS SPACES	Project Office B149_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	41	0.31	104	48.78
TERMINAL SPACES	Quiet Room B112_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	35	0.31	90	48.78
ENVIRONMENTAL SUPPORT	Secure Storage B150_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	128	0.31	326	48.78
ENVIRONMENTAL SUPPORT	Security Equip Room B152_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	18	0.31	47	48.78

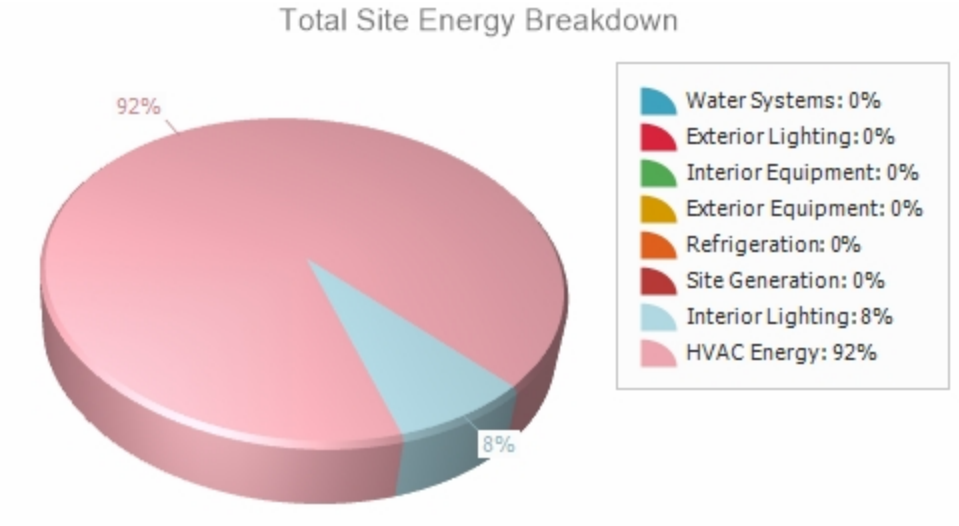
Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Shipping / Receiving B132_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	67	0.31	170	48.78
JOINT USE & MISC. SUPPORT	Small Conference Room B145_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	70	0.31	177	48.78
TECHNICAL OPERATIONS	Ssc Coordinator B126_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
ENVIRONMENTAL SUPPORT	Supply / Parts Storage B130_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	226	0.31	574	48.78
TERMINAL PERSONNEL	Support Spec B105_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	19	0.31	47	48.78
TECHNICAL OPERATIONS	Systems Spec B125_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	21	0.31	54	48.78
TERMINAL PERSONNEL	T&A Clerk B102_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	32	0.31	82	48.78
TERMINAL SPACES	Tape Play-Back B110_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	26	0.31	66	48.78
TECHNICAL OPS SPACES	Tech Ops Locker Room B154_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	28	0.31	71	48.78
TECHNICAL OPERATIONS	Tech Ops Ssc Mng B124_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
TERMINAL SPACES	Tracon Opt Room B117_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.33	163	0.31	415	48.78
TERMINAL SPACES	Tss B109_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	71	0.31	180	48.78
ENVIRONMENTAL SUPPORT	Vehicle Maintenance B134_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	307	0.31	780	48.78
CORRIDORS	Vestibule 1 B101_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	33	0.31	85	48.78
JOINT USE & MISC. SUPPORT	Wellness B121_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	96	0.31	244	48.78
JOINT USE & MISC. SUPPORT	Womens Restroom B141_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	110	0.31	281	48.78

Daylighting

Daylighting Reference Point	Zone Name	Control Type	Control Type	Fraction of Lighting Controlled	Installed Lighting Power (W)	Controlled Lighting Power (W)	Window Area (ft²)	Average Visible Transmittance
None					0	0	0	0

Lighting and Daylighting Summary



Window Area

	Units	North	East	South	West	Total
Window Opening Area	ft²	412	124	362	48	946
Gross Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82
Gross Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82

SkyLight Area

	Units	Total
Gross Roof Area	ft²	8,013
Skylight Area	ft²	0
Skylight-Roof Ratio	%	0

SkyLight Area

	Units	Total

Lighting

Component	Electricity (kWh)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)
Interior Lighting	15,658	53,428	8.15	169,208	25.82
Exterior Lighting	0	0	0	0	0

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
TECHNICAL OPERATIONS	Admin Assist B123_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	38	0.31	96	48.78
JOINT USE & MISC. SUPPORT	Admin Storage B107_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	61	0.31	154	48.78
TERMINAL PERSONNEL	Air Traffic Mng B104_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	40	0.31	101	48.78
TERMINAL SPACES	At Coach B118_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	39	0.31	98	48.78
TERMINAL SPACES	At Locker Room B108_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	73	0.31	185	48.78
TERMINAL PERSONNEL	At Workspace B113_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	35	0.31	89	48.78
ENVIRONMENTAL SUPPORT	Boiler Room B120a_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	184	0.31	468	48.78
JOINT USE & MISC. SUPPORT	Break Room B122_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	130	0.31	330	48.78
JOINT USE & MISC. SUPPORT	Cbi Training B111_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	49	0.31	124	48.78
TERMINAL PERSONNEL	Closet B161_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	3	0.31	8	48.78
TERMINAL PERSONNEL	Contract Weather B115_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	34	0.31	86	48.78
TERMINAL PERSONNEL	Contractor B119_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	34	0.31	87	48.78
CORRIDORS	Corridor 1 To 4_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.91	914	0.31	2,324	48.78
TERMINAL SPACES	Debriefing B114_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	34	0.31	87	48.78
TERMINAL SPACES	Drug Test B144_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	24	0.31	61	48.78
ENVIRONMENTAL SUPPORT	Elec Main Service B135_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	157	0.31	399	48.78

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Elec Switchgear B151._Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	152	0.31	387	48.78
TECHNICAL OPS SPACES	Electronics Equip Room / Lan / Telco B116_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.62	459	0.31	1,166	48.78
ENVIRONMENTAL SUPPORT	Engine Generator B131_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	202	0.31	513	48.78
ENVIRONMENTAL SUPPORT	Environmental Shop B128_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	339	0.31	862	48.78
ENVIRONMENTAL SUPPORT	Fire Command Center B138_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	155	48.78
ENVIRONMENTAL SUPPORT	Fire Life Safety / Ups B136_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	109	0.31	276	48.78
ENVIRONMENTAL SUPPORT	Fire Pump B137_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	59	0.31	150	48.78
ENVIRONMENTAL SUPPORT	Hazmat Storage B129_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	42	0.31	108	48.78
JOINT USE & MISC. SUPPORT	Lactation B143_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	46	0.31	117	48.78
JOINT USE & MISC. SUPPORT	Large Conference Room B146_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	126	0.31	321	48.78
JOINT USE & MISC. SUPPORT	Loading / Shipping B133_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	142	0.31	361	48.78
JOINT USE & MISC. SUPPORT	Mail/Copier B103_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	44	0.31	112	48.78
ENVIRONMENTAL SUPPORT	Mech Equip Room B120_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	409	0.31	1,041	48.78
JOINT USE & MISC. SUPPORT	Mens Restroom B140_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.1	109	0.31	276	48.78
TECHNICAL OPS SPACES	Nas Doc / Tech Library B127_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	65	0.31	164	48.78
TECHNICAL OPS SPACES	Nas Elec Workshop B148_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	105	0.31	267	48.78
TECHNICAL OPERATIONS	On Site Atss B147_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.39	115	0.31	293	48.78
TERMINAL PERSONNEL	Operations Supervisor B106_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.26	75	0.31	190	48.78
ENVIRONMENTAL SUPPORT	Ppe Storage Tech / Group B153_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	156	48.78
TECHNICAL OPS SPACES	Project Office B149_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	41	0.31	104	48.78
TERMINAL SPACES	Quiet Room B112_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	35	0.31	90	48.78
ENVIRONMENTAL SUPPORT	Secure Storage B150_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	128	0.31	326	48.78
ENVIRONMENTAL SUPPORT	Security Equip Room B152_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	18	0.31	47	48.78

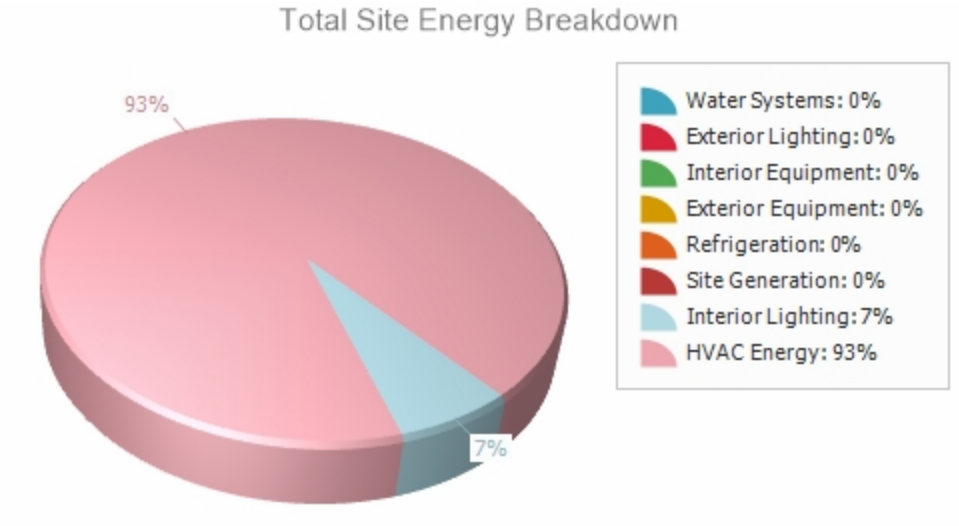
Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Shipping / Receiving B132_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	67	0.31	170	48.78
JOINT USE & MISC. SUPPORT	Small Conference Room B145_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	70	0.31	177	48.78
TECHNICAL OPERATIONS	Ssc Coordinator B126_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
ENVIRONMENTAL SUPPORT	Supply / Parts Storage B130_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	226	0.31	574	48.78
TERMINAL PERSONNEL	Support Spec B105_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	19	0.31	47	48.78
TECHNICAL OPERATIONS	Systems Spec B125_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	21	0.31	54	48.78
TERMINAL PERSONNEL	T&A Clerk B102_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	32	0.31	82	48.78
TERMINAL SPACES	Tape Play-Back B110_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	26	0.31	66	48.78
TECHNICAL OPS SPACES	Tech Ops Locker Room B154_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	28	0.31	71	48.78
TECHNICAL OPERATIONS	Tech Ops Ssc Mng B124_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
TERMINAL SPACES	Tracon Opt Room B117_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.33	163	0.31	415	48.78
TERMINAL SPACES	Tss B109_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	71	0.31	180	48.78
ENVIRONMENTAL SUPPORT	Vehicle Maintenance B134_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	307	0.31	780	48.78
CORRIDORS	Vestibule 1 B101_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	33	0.31	85	48.78
JOINT USE & MISC. SUPPORT	Wellness B121_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	96	0.31	244	48.78
JOINT USE & MISC. SUPPORT	Womens Restroom B141_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	110	0.31	281	48.78

Daylighting

Daylighting Reference Point	Zone Name	Control Type	Control Type	Fraction of Lighting Controlled	Installed Lighting Power (W)	Controlled Lighting Power (W)	Window Area (ft²)	Average Visible Transmittance
None					0	0	0	0

Lighting and Daylighting Summary



Window Area

	Units	North	East	South	West	Total
Window Opening Area	ft²	412	124	362	48	946
Gross Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82
Above Ground Wall Area	ft²	2,637	1,042	2,660	1,038	7,377
Above Ground Window-Wall Ratio	%	15.61	11.9	13.61	4.62	12.82
Gross Wall Area	ft²	2,637	1,042	2,660	1,038	7,377

SkyLight Area

	Units	Total
Gross Roof Area	ft²	8,013
Skylight Area	ft²	0
Skylight-Roof Ratio	%	0

SkyLight Area

	Units	Total

Lighting

Component	Electricity (kWh)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)
Interior Lighting	15,658	53,428	8.15	169,208	25.82
Exterior Lighting	0	0	0	0	0

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
TECHNICAL OPERATIONS	Admin Assist B123_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	38	0.31	96	48.78
JOINT USE & MISC. SUPPORT	Admin Storage B107_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	61	0.31	154	48.78
TERMINAL PERSONNEL	Air Traffic Mng B104_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	40	0.31	101	48.78
TERMINAL SPACES	At Coach B118_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	39	0.31	98	48.78
TERMINAL SPACES	At Locker Room B108_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	73	0.31	185	48.78
TERMINAL PERSONNEL	At Workspace B113_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	35	0.31	89	48.78
ENVIRONMENTAL SUPPORT	Boiler Room B120a_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	184	0.31	468	48.78
JOINT USE & MISC. SUPPORT	Break Room B122_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	130	0.31	330	48.78
JOINT USE & MISC. SUPPORT	Cbi Training B111_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	49	0.31	124	48.78
TERMINAL PERSONNEL	Closet B161_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	3	0.31	8	48.78
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TERMINAL PERSONNEL	Contractor B119_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	34	0.31	87	48.78
CORRIDORS	Corridor 1 To 4_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.91	914	0.31	2,324	48.78
TERMINAL SPACES	Debriefing B114_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	34	0.31	87	48.78
TERMINAL SPACES	Drug Test B144_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	24	0.31	61	48.78
ENVIRONMENTAL SUPPORT	Elec Main Service B135_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	157	0.31	399	48.78

Interior Lighting

Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Elec Switchgear B151._Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	152	0.31	387	48.78
TECHNICAL OPS SPACES	Electronics Equip Room / Lan / Telco B116_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.62	459	0.31	1,166	48.78
ENVIRONMENTAL SUPPORT	Engine Generator B131_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	202	0.31	513	48.78
ENVIRONMENTAL SUPPORT	Environmental Shop B128_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.13	339	0.31	862	48.78
ENVIRONMENTAL SUPPORT	Fire Command Center B138_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	155	48.78
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ENVIRONMENTAL SUPPORT	Fire Pump B137_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	59	0.31	150	48.78
ENVIRONMENTAL SUPPORT	Hazmat Storage B129_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	42	0.31	108	48.78
JOINT USE & MISC. SUPPORT	Lactation B143_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	46	0.31	117	48.78
JOINT USE & MISC. SUPPORT	Large Conference Room B146_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.12	126	0.31	321	48.78
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JOINT USE & MISC. SUPPORT	Mail/Copier B103_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	44	0.31	112	48.78
ENVIRONMENTAL SUPPORT	Mech Equip Room B120_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.15	409	0.31	1,041	48.78
JOINT USE & MISC. SUPPORT	Mens Restroom B140_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.1	109	0.31	276	48.78
TECHNICAL OPS SPACES	Nas Doc / Tech Library B127_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	65	0.31	164	48.78
TECHNICAL OPS SPACES	Nas Elec Workshop B148_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	105	0.31	267	48.78
TECHNICAL OPERATIONS	On Site Atss B147_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.39	115	0.31	293	48.78
TERMINAL PERSONNEL	Operations Supervisor B106_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.26	75	0.31	190	48.78
ENVIRONMENTAL SUPPORT	Ppe Storage Tech / Group B153_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	61	0.31	156	48.78
TECHNICAL OPS SPACES	Project Office B149_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	41	0.31	104	48.78
TERMINAL SPACES	Quiet Room B112_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	35	0.31	90	48.78
ENVIRONMENTAL SUPPORT	Secure Storage B150_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	128	0.31	326	48.78
ENVIRONMENTAL SUPPORT	Security Equip Room B152_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.01	18	0.31	47	48.78

Interior Lighting

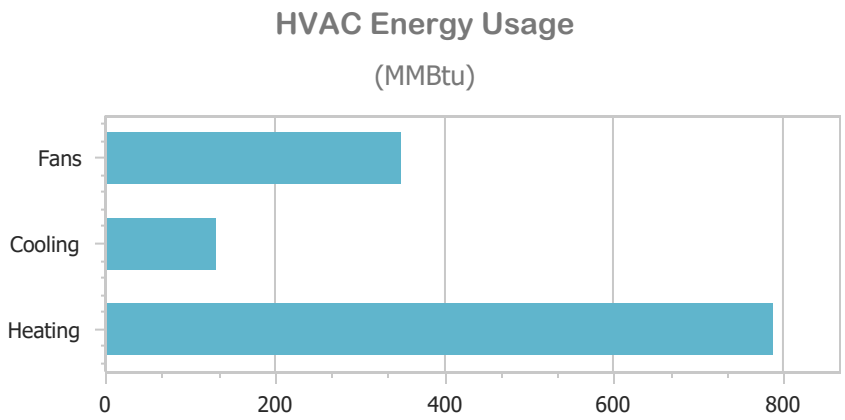
Zone Name	Zone Lighting Library Entry (Libraries>InternalLoads>Lights)	Schedules (Libraries>Schedules>Lighting)	Lighting Power Density (W/ft²)	Installed Lighting Power (W)	Fraction of Lighting Energy to Return Air	Lighting Consumption (kWh)	Full Load Hours per Week
ENVIRONMENTAL SUPPORT	Shipping / Receiving B132_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.02	67	0.31	170	48.78
JOINT USE & MISC. SUPPORT	Small Conference Room B145_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	70	0.31	177	48.78
TECHNICAL OPERATIONS	Ssc Coordinator B126_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
ENVIRONMENTAL SUPPORT	Supply / Parts Storage B130_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.08	226	0.31	574	48.78
TERMINAL PERSONNEL	Support Spec B105_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.06	19	0.31	47	48.78
TECHNICAL OPERATIONS	Systems Spec B125_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.07	21	0.31	54	48.78
TERMINAL PERSONNEL	T&A Clerk B102_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	32	0.31	82	48.78
TERMINAL SPACES	Tape Play-Back B110_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.05	26	0.31	66	48.78
TECHNICAL OPS SPACES	Tech Ops Locker Room B154_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.04	28	0.31	71	48.78
TECHNICAL OPERATIONS	Tech Ops Ssc Mng B124_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.17	50	0.31	127	48.78
TERMINAL SPACES	Tracon Opt Room B117_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.33	163	0.31	415	48.78
TERMINAL SPACES	Tss B109_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.14	71	0.31	180	48.78
ENVIRONMENTAL SUPPORT	Vehicle Maintenance B134_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.11	307	0.31	780	48.78
CORRIDORS	Vestibule 1 B101_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.03	33	0.31	85	48.78
JOINT USE & MISC. SUPPORT	Wellness B121_Light Load #001_Template	Lights - Low-Rise Office - Lighting	0.09	96	0.31	244	48.78
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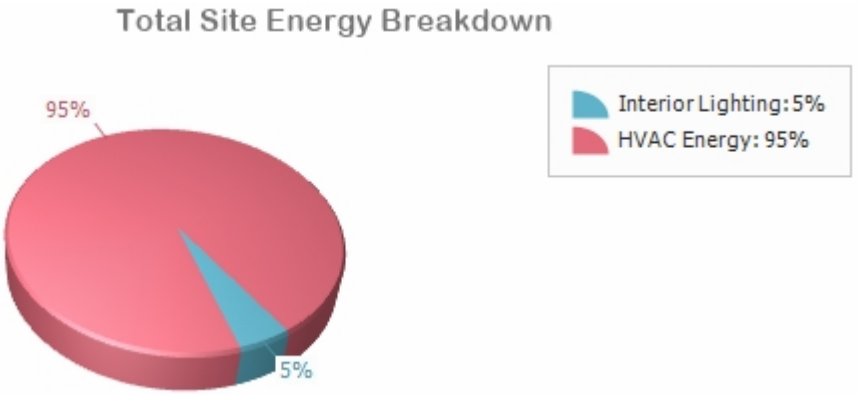
Daylighting

Daylighting Reference Point	Zone Name	Control Type	Control Type	Fraction of Lighting Controlled	Installed Lighting Power (W)	Controlled Lighting Power (W)	Window Area (ft²)	Average Visible Transmittance
None					0	0	0	0

Site Consumption Summary

Energy Consumption



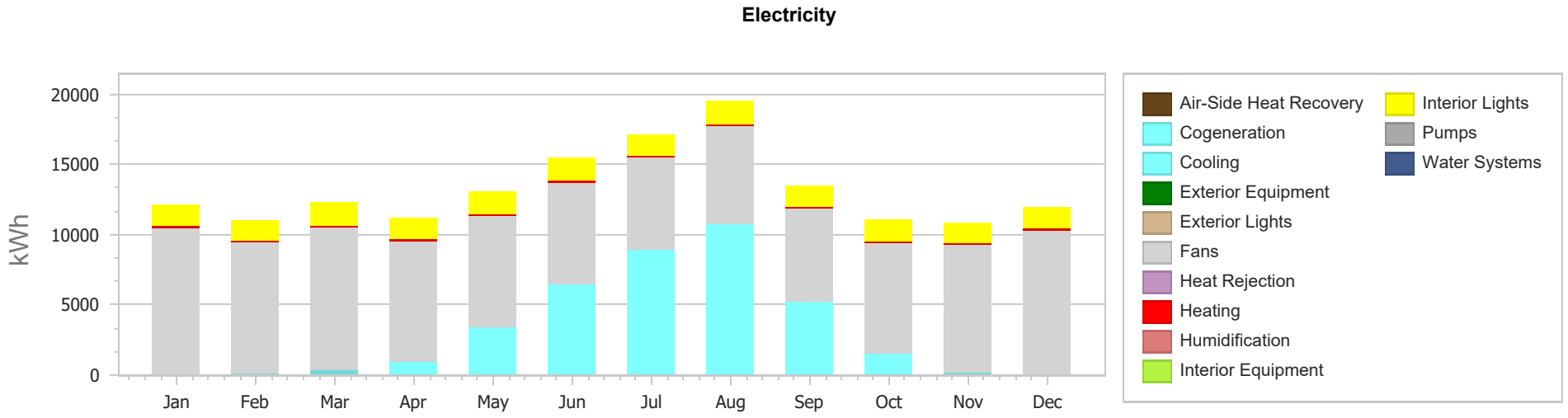


Component	Electricity (kWh)	Gas (MMBtu)	District Cooling (MMBtu)	District Heating (MMBtu)	Other Utilities (MMBtu)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)	Water (gal)
Heating	783	784	0	0	0	786,954	120.11	858,625	131.04	0
Cooling	37,925	0	0	0	0	129,405	19.75	409,827	62.55	0
Fans	101,914	0	0	0	0	347,745	53.07	1,101,307	168.08	0
Pumps	0	0	0	0	0	0	0	0	0	0
Heat Rejection	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0
HVAC	140,622	784	0	0	0	1,264,104	192.93	2,369,760	361.68	0
Water Systems	0	0	0	0	0	0	0	0	0	0
Interior Lighting	18,492	0	0	0	0	63,096	9.63	199,826	30.5	0
Exterior Lighting	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0
Non-HVAC	18,492	0	0	0	0	63,096	9.63	199,826	30.5	0
Generators	0	0	0	0	0	0	0	0	0	0
Site Generation	0	0	0	0	0	0	0	0	0	0
Grand Total	159,114	784	0	0	0	1,327,200	202.56	2,569,585	392.17	0

Gross Floor Area: 6,550 ft² | Region: Midwest | Building Type: Office | CBECS Survey Year: 2012 | Benchmark EUI: 80.0 kBtu/ft²/yr

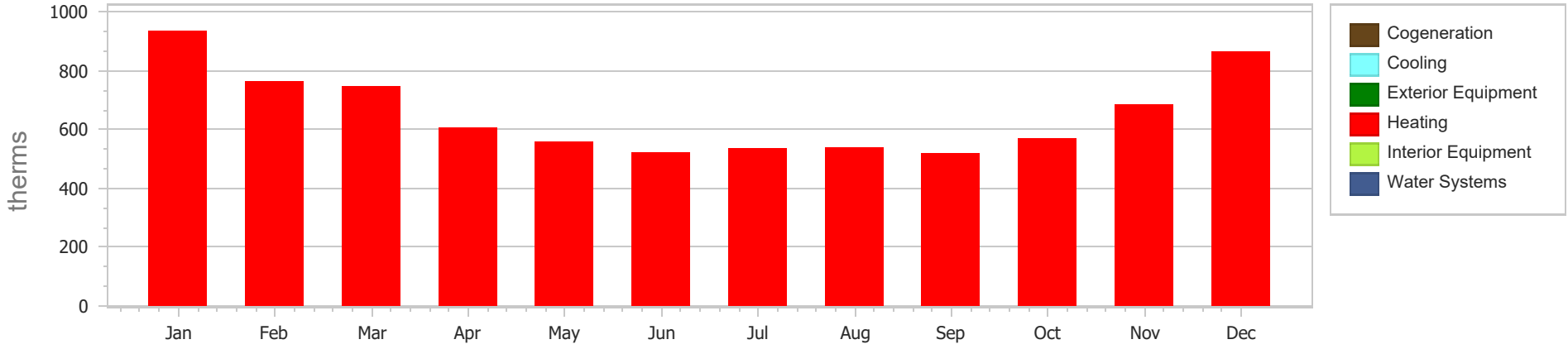
If the region reports as "All US" it means the data for the particular region was withheld because the Relative Standard Error was greater than 50 percent or fewer than 20 buildings were sampled.

Monthly Energy End Use



	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	13	121	329	958	3,421	6,481	8,930	10,755	5,198	1,549	159	12	37,926
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0	0
Fans	10,440	9,324	10,188	8,663	8,004	7,353	6,704	7,099	6,789	7,948	9,144	10,257	101,913
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	201	141	106	45	12	2	2	3	2	18	84	166	784
Humidification	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Lights	1,498	1,413	1,674	1,501	1,616	1,607	1,510	1,674	1,501	1,557	1,430	1,510	18,492
Pumps	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	12,152	10,998	12,298	11,167	13,053	15,443	17,147	19,531	13,490	11,072	10,818	11,945	159,116

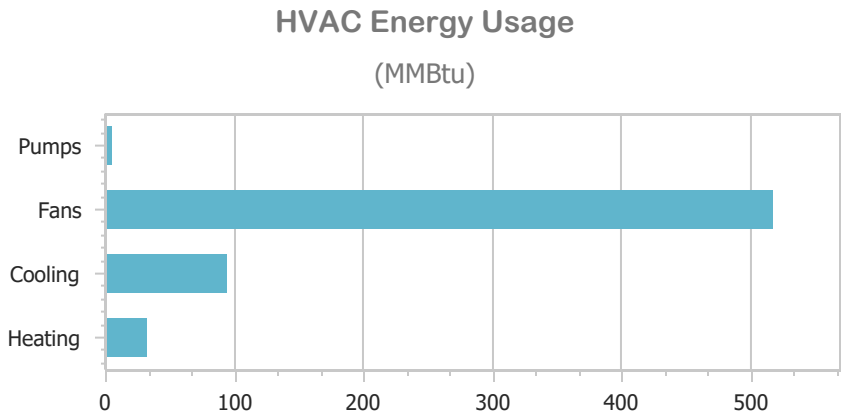
Natural Gas

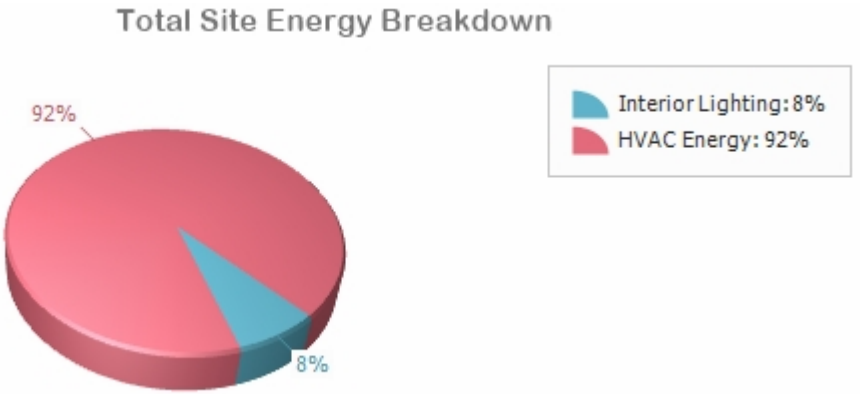


	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	936	764	746	606	558	521	537	538	520	569	685	865	7,845
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	936	764	746	606	558	521	537	538	520	569	685	865	7,845

Site Consumption Summary

Energy Consumption



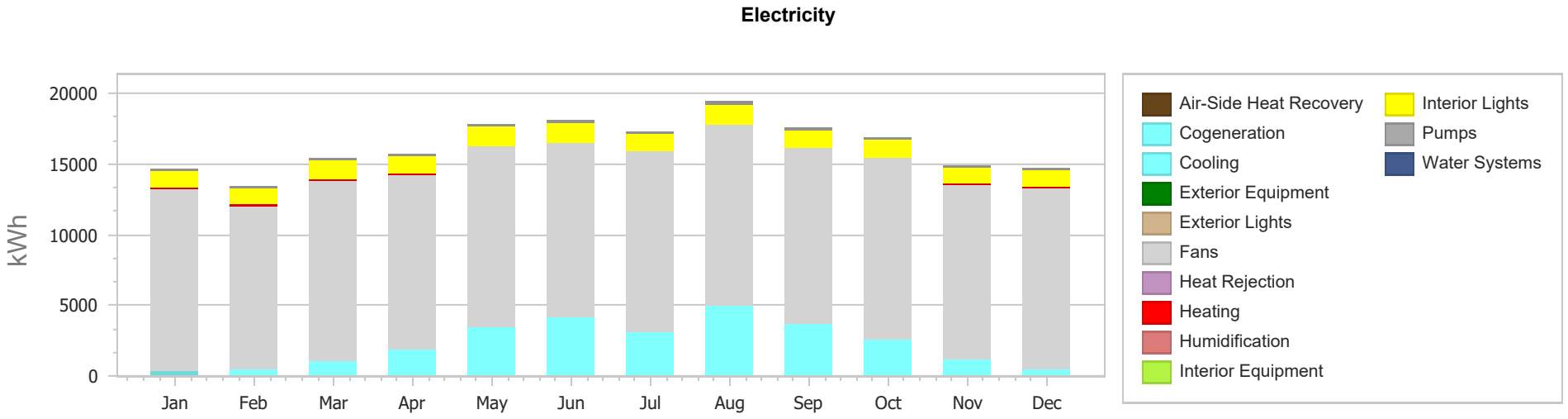


Component	Electricity (kWh)	Gas (MMBtu)	District Cooling (MMBtu)	District Heating (MMBtu)	Other Utilities (MMBtu)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)	Water (gal)
Heating	331	31	0	0	0	31,998	4.88	37,036	5.65	0
Cooling	27,392	0	0	0	0	93,464	14.26	296,001	45.18	0
Fans	151,300	0	0	0	0	516,257	78.79	1,634,986	249.53	0
Pumps	1,439	0	0	0	0	4,910	0.75	15,549	2.37	0
Heat Rejection	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0
HVAC	180,461	31	0	0	0	646,629	98.69	1,983,572	302.74	0
Water Systems	0	0	0	0	0	0	0	0	0	0
Interior Lighting	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Exterior Lighting	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0
Non-HVAC	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Generators	0	0	0	0	0	0	0	0	0	0
Site Generation	0	0	0	0	0	0	0	0	0	0
Grand Total	196,119	31	0	0	0	700,058	106.84	2,152,780	328.56	0

Gross Floor Area: 6,550 ft²	Region: Midwest	Building Type: Office	CBECS Survey Year: 2012	Benchmark EUI: 80.0 kBtu/ft²/yr

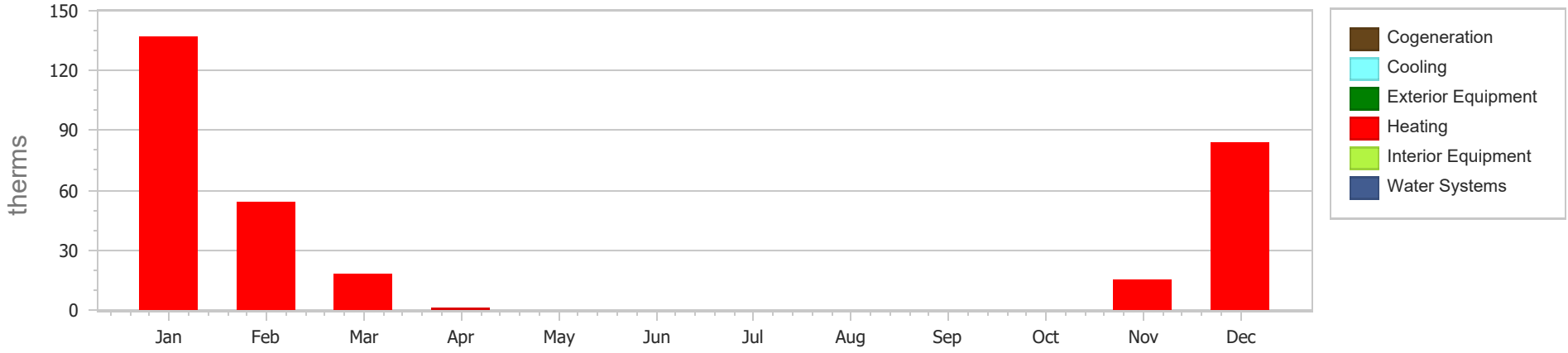
If the region reports as "All US" it means the data for the particular region was withheld because the Relative Standard Error was greater than 50 percent or fewer than 20 buildings were sampled.

Monthly Energy End Use



	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	349	496	1,053	1,892	3,456	4,148	3,114	4,959	3,708	2,578	1,182	455	27,392
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0	0
Fans	12,861	11,616	12,861	12,446	12,861	12,394	12,790	12,861	12,446	12,861	12,446	12,861	151,302
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	147	58	20	1	0	0	0	0	0	0	16	90	331
Humidification	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Lights	1,268	1,196	1,418	1,271	1,368	1,361	1,279	1,418	1,271	1,318	1,211	1,279	15,660
Pumps	55	44	55	79	168	204	162	247	199	119	52	52	1,438
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	14,680	13,411	15,407	15,689	17,854	18,107	17,345	19,484	17,624	16,876	14,907	14,737	196,121

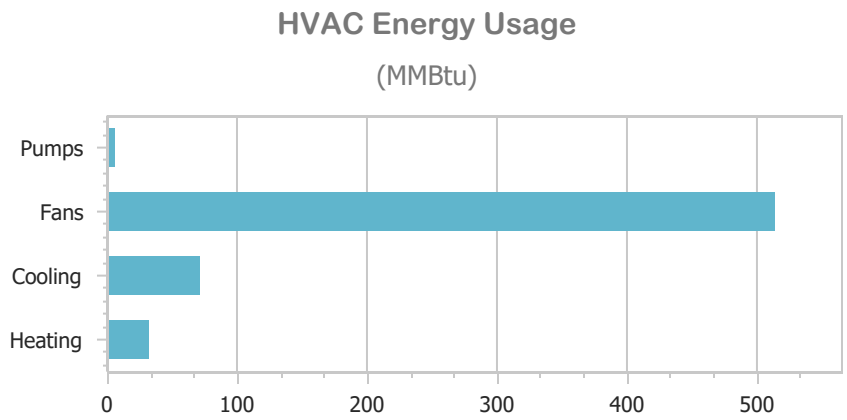
Natural Gas

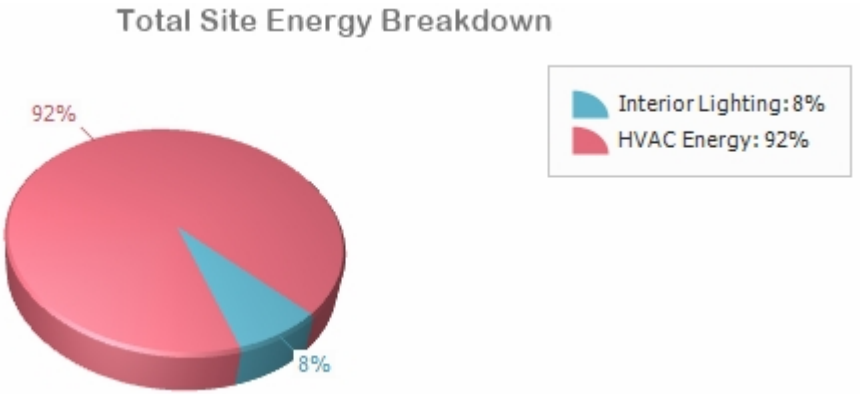


	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	137	54	18	1	0	0	0	0	0	0	15	84	309
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	137	54	18	1	0	0	0	0	0	0	15	84	309

Site Consumption Summary

Energy Consumption



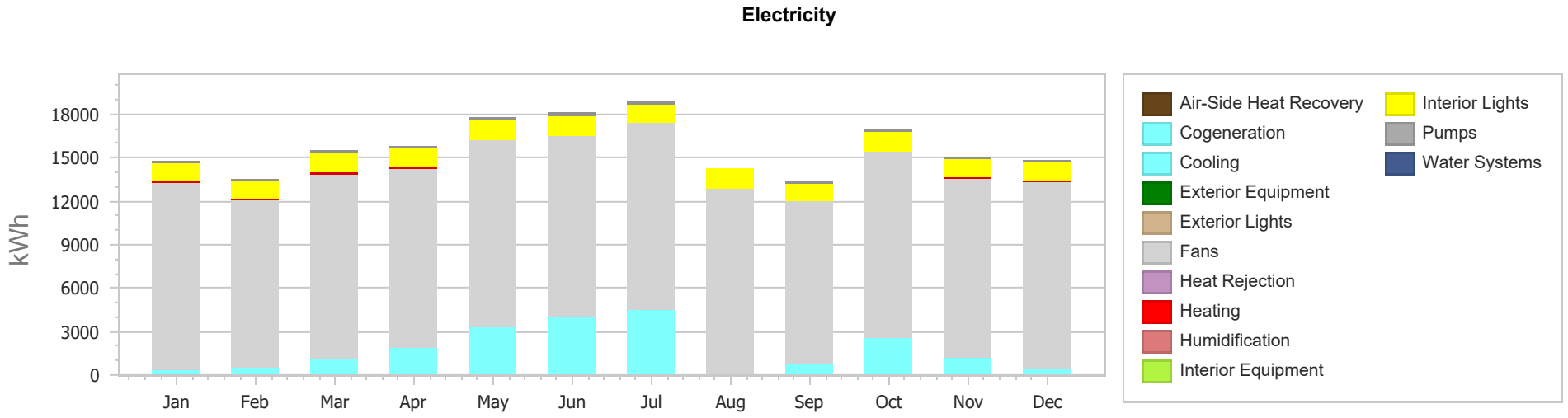


Component	Electricity (kWh)	Gas (MMBtu)	District Cooling (MMBtu)	District Heating (MMBtu)	Other Utilities (MMBtu)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)	Water (gal)
Heating	331	31	0	0	0	31,847	4.86	36,871	5.63	0
Cooling	20,789	0	0	0	0	70,935	10.83	224,650	34.29	0
Fans	150,439	0	0	0	0	513,319	78.34	1,625,681	248.11	0
Pumps	1,706	0	0	0	0	5,820	0.89	18,431	2.81	0
Heat Rejection	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0
HVAC	173,264	31	0	0	0	621,920	94.92	1,905,633	290.84	0
Water Systems	0	0	0	0	0	0	0	0	0	0
Interior Lighting	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Exterior Lighting	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0
Non-HVAC	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Generators	0	0	0	0	0	0	0	0	0	0
Site Generation	0	0	0	0	0	0	0	0	0	0
Grand Total	188,922	31	0	0	0	675,348	103.07	2,074,841	316.66	0

Gross Floor Area: 6,550 ft² | Region: Midwest | Building Type: Office | CBECS Survey Year: 2012 | Benchmark EUI: 80.0 kBtu/ft²/yr

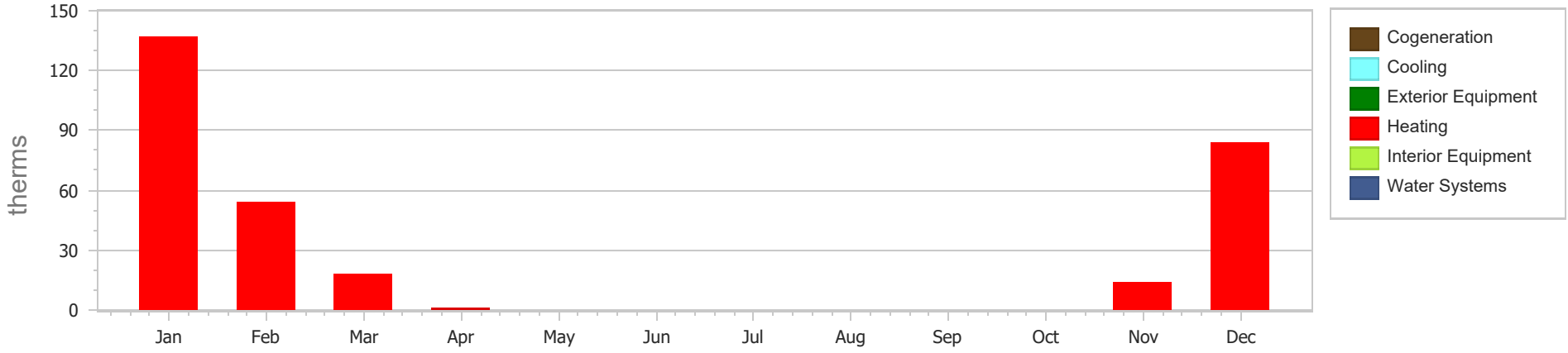
If the region reports as "All US" it means the data for the particular region was withheld because the Relative Standard Error was greater than 50 percent or fewer than 20 buildings were sampled.

Monthly Energy End Use



	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	363	514	1,083	1,908	3,338	4,032	4,527	0	764	2,578	1,212	472	20,790
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0	0
Fans	12,881	11,635	12,881	12,466	12,881	12,466	12,881	12,842	11,278	12,881	12,466	12,881	150,439
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	146	57	19	1	0	0	0	0	0	0	15	90	329
Humidification	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Lights	1,268	1,196	1,418	1,271	1,368	1,361	1,279	1,418	1,271	1,318	1,211	1,279	15,660
Pumps	103	106	138	165	218	236	251	0	44	194	140	111	1,706
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	14,762	13,509	15,540	15,811	17,805	18,094	18,938	14,260	13,357	16,971	15,044	14,833	188,924

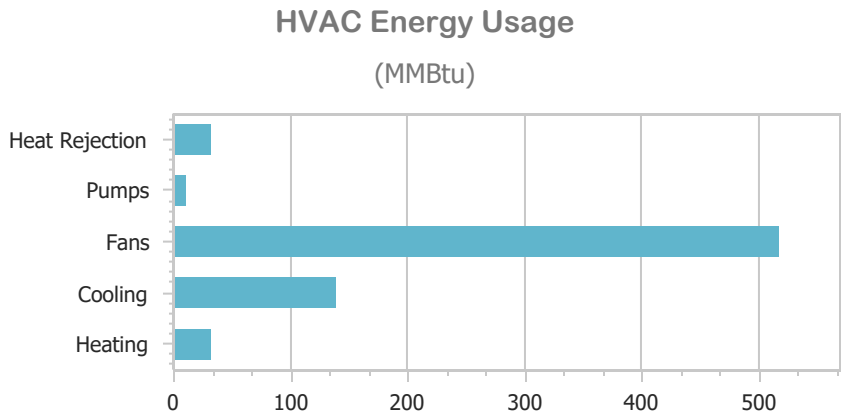
Natural Gas

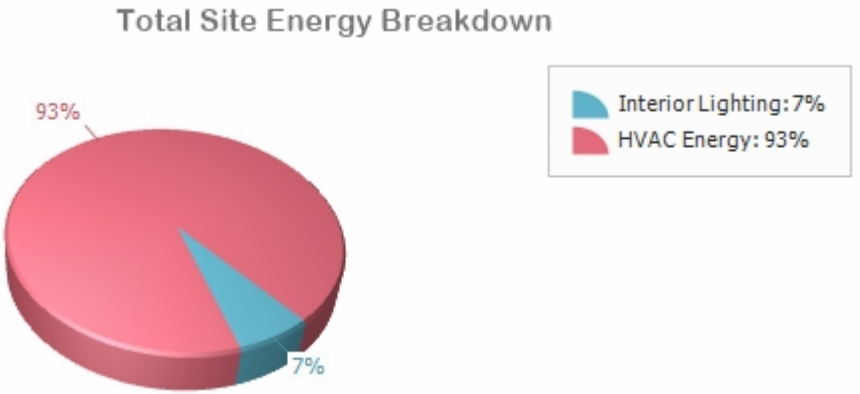


	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	137	54	18	1	0	0	0	0	0	0	14	84	307
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	137	54	18	1	0	0	0	0	0	0	14	84	307

Site Consumption Summary

Energy Consumption



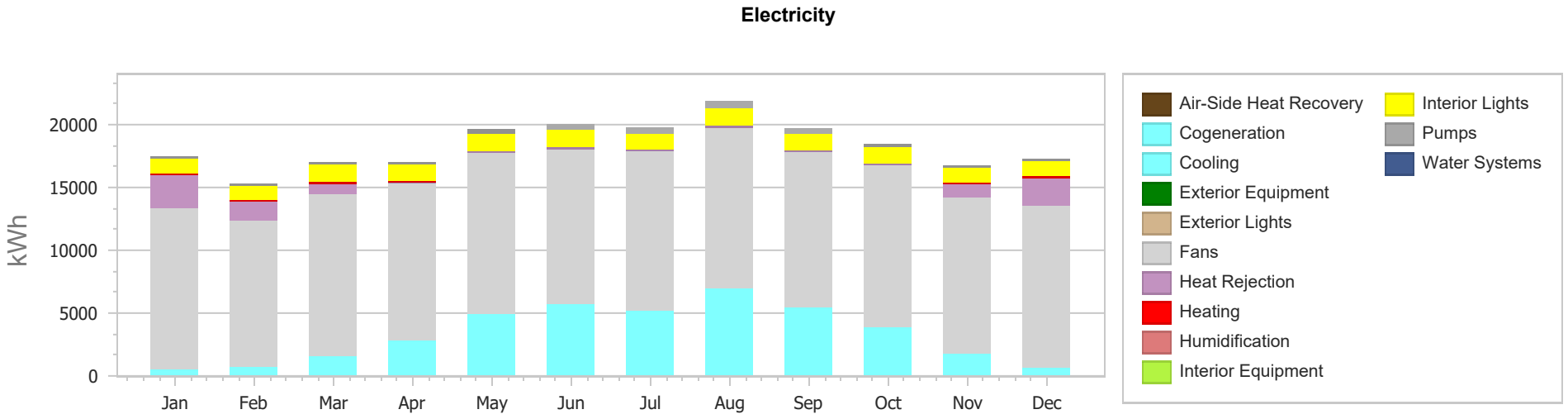


Component	Electricity (kWh)	Gas (MMBtu)	District Cooling (MMBtu)	District Heating (MMBtu)	Other Utilities (MMBtu)	Site Energy (kBtu)	Site Energy Use Intensity (kBtu/ft²)	Source Energy (kBtu)	Source Energy Use Intensity (kBtu/ft²)	Water (gal)
Heating	331	31	0	0	0	31,998	4.88	37,036	5.65	0
Cooling	40,578	0	0	0	0	138,457	21.13	438,494	66.92	0
Fans	151,258	0	0	0	0	516,115	78.77	1,634,536	249.46	0
Pumps	3,128	0	0	0	0	10,672	1.63	33,800	5.16	0
Heat Rejection	9,478	0	0	0	0	32,340	4.94	102,419	15.63	68,930
Humidification	0	0	0	0	0	0	0	0	0	0
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0
HVAC	204,772	31	0	0	0	729,582	111.35	2,246,284	342.83	68,930
Water Systems	0	0	0	0	0	0	0	0	0	0
Interior Lighting	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Exterior Lighting	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0
Non-HVAC	15,658	0	0	0	0	53,428	8.15	169,208	25.82	0
Generators	0	0	0	0	0	0	0	0	0	0
Site Generation	0	0	0	0	0	0	0	0	0	0
Grand Total	220,431	31	0	0	0	783,011	119.5	2,415,492	368.66	68,930

Gross Floor Area: 6,550 ft²	Region: Midwest	Building Type: Office	CBECS Survey Year: 2012	Benchmark EUI: 80.0 kBtu/ft²/yr

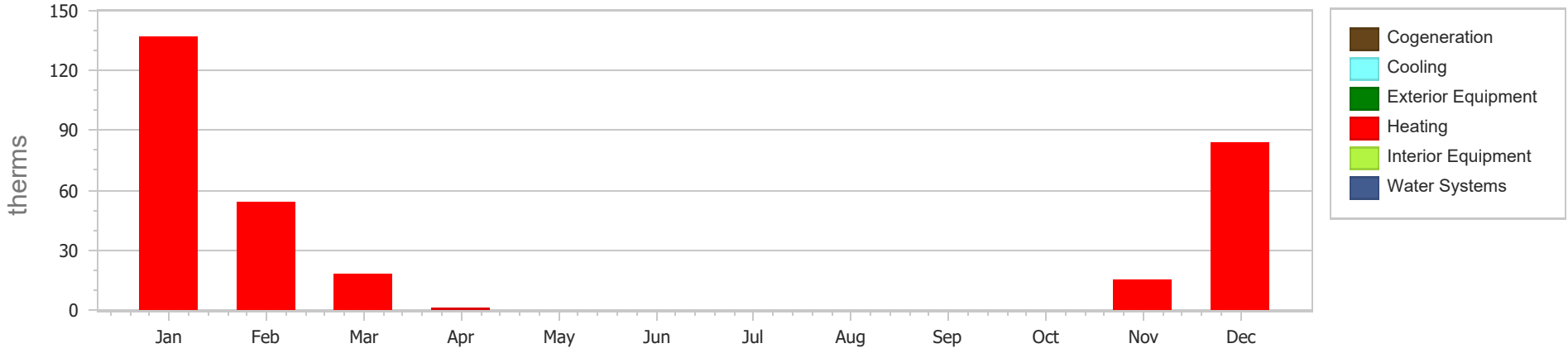
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Monthly Energy End Use



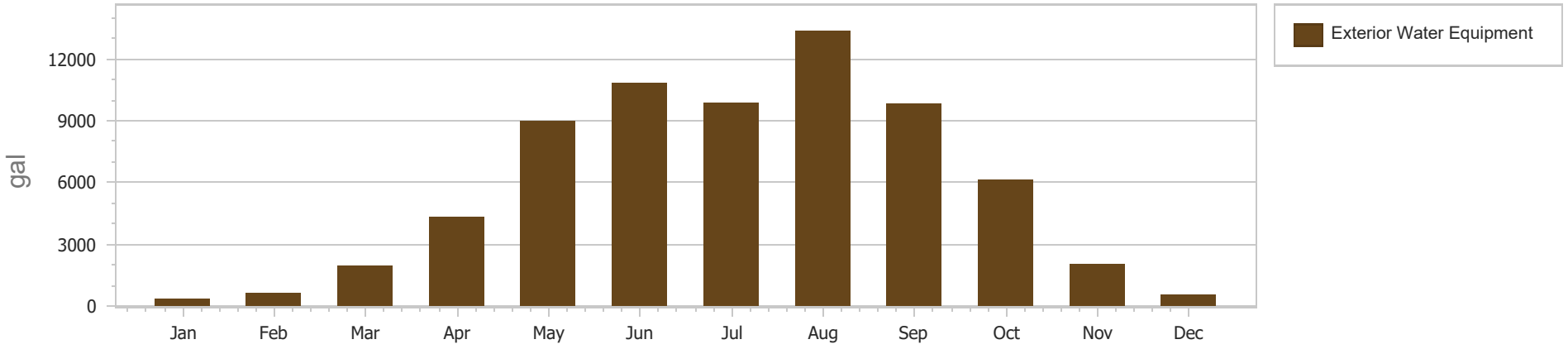
	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Air-Side Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0	0
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	533	758	1,603	2,875	4,963	5,747	5,227	6,985	5,486	3,914	1,792	694	40,577
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0	0
Fans	12,861	11,616	12,861	12,446	12,861	12,394	12,747	12,861	12,446	12,861	12,446	12,861	151,258
Heat Rejection	2,589	1,613	973	256	102	84	72	89	85	169	1,176	2,270	9,477
Heating	147	58	20	1	0	0	0	0	0	0	16	90	331
Humidification	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Interior Lights	1,268	1,196	1,418	1,271	1,368	1,361	1,279	1,418	1,271	1,318	1,211	1,279	15,660
Pumps	87	85	115	163	352	446	473	557	413	236	110	90	3,127
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	17,485	15,326	16,989	17,012	19,646	20,031	19,798	21,909	19,702	18,498	16,750	17,285	220,430

Natural Gas



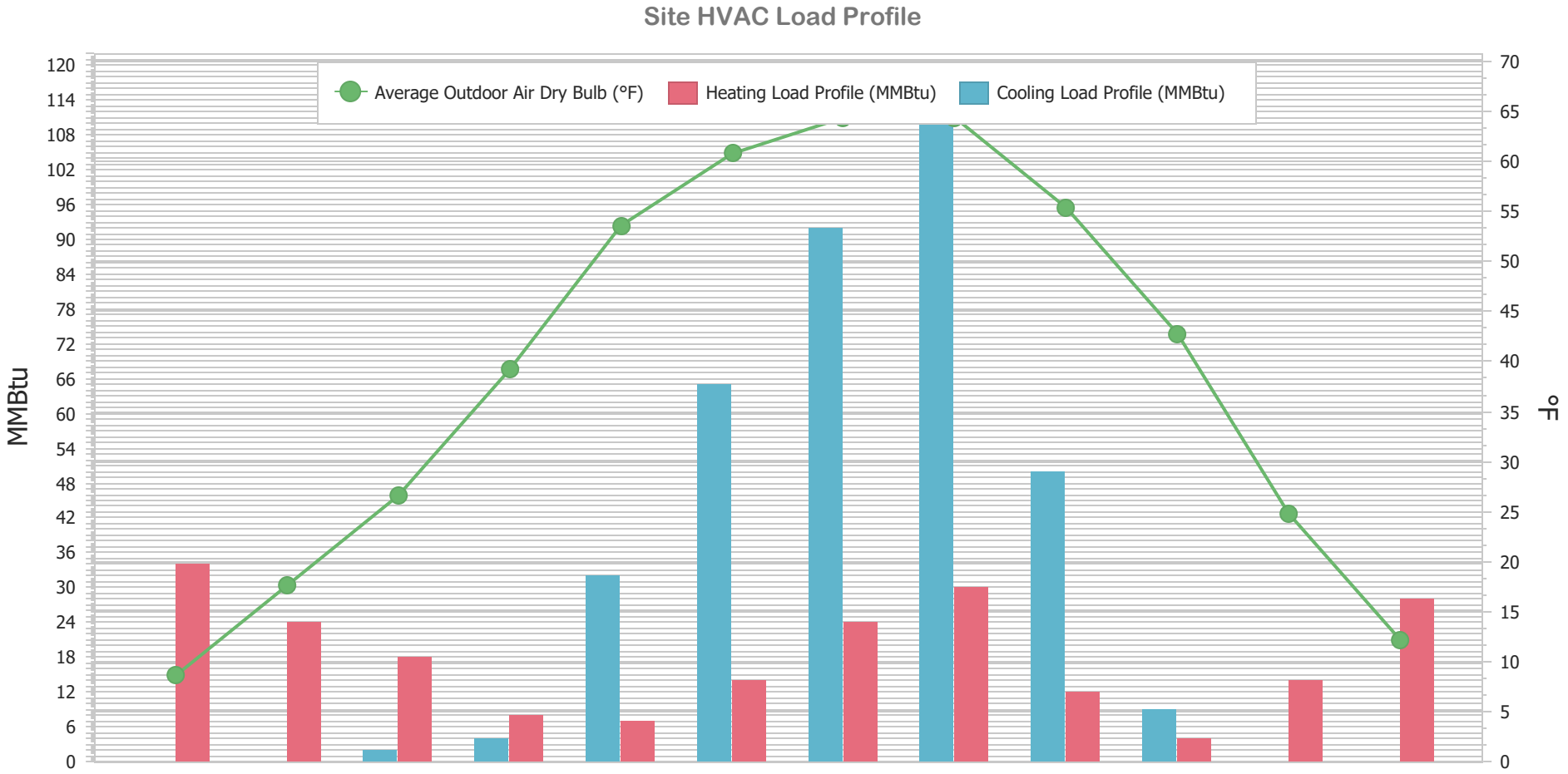
	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Cogeneration	0	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Heating	137	54	18	1	0	0	0	0	0	0	15	84	309
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	137	54	18	1	0	0	0	0	0	0	15	84	309

Water



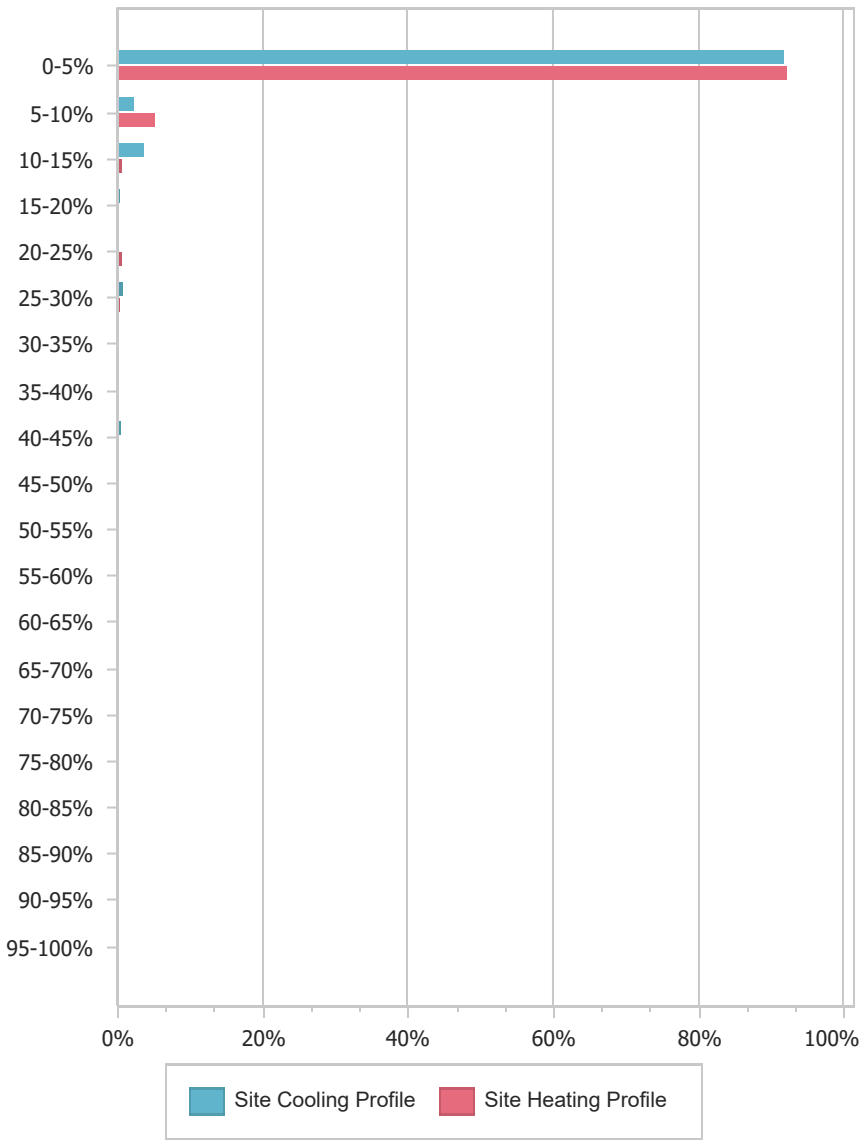
	January	February	March	April	May	June	July	August	September	October	November	December	Grand Total
Exterior Water Equipme	335	637	1,950	4,338	8,996	10,838	9,891	13,374	9,847	6,147	2,030	546	68,931

Site Load Profile



	January	February	March	April	May	June	July	August	September	October	November	December
Cooling Load	0	0	2	4	32	65	92	111	50	9	0	0
Heating Load	34	24	18	8	7	14	24	30	12	4	14	28
Average OADB	8.6	17.2	27.3	39.2	54.3	61.2	64.1	63.5	55.2	42.9	23.9	12

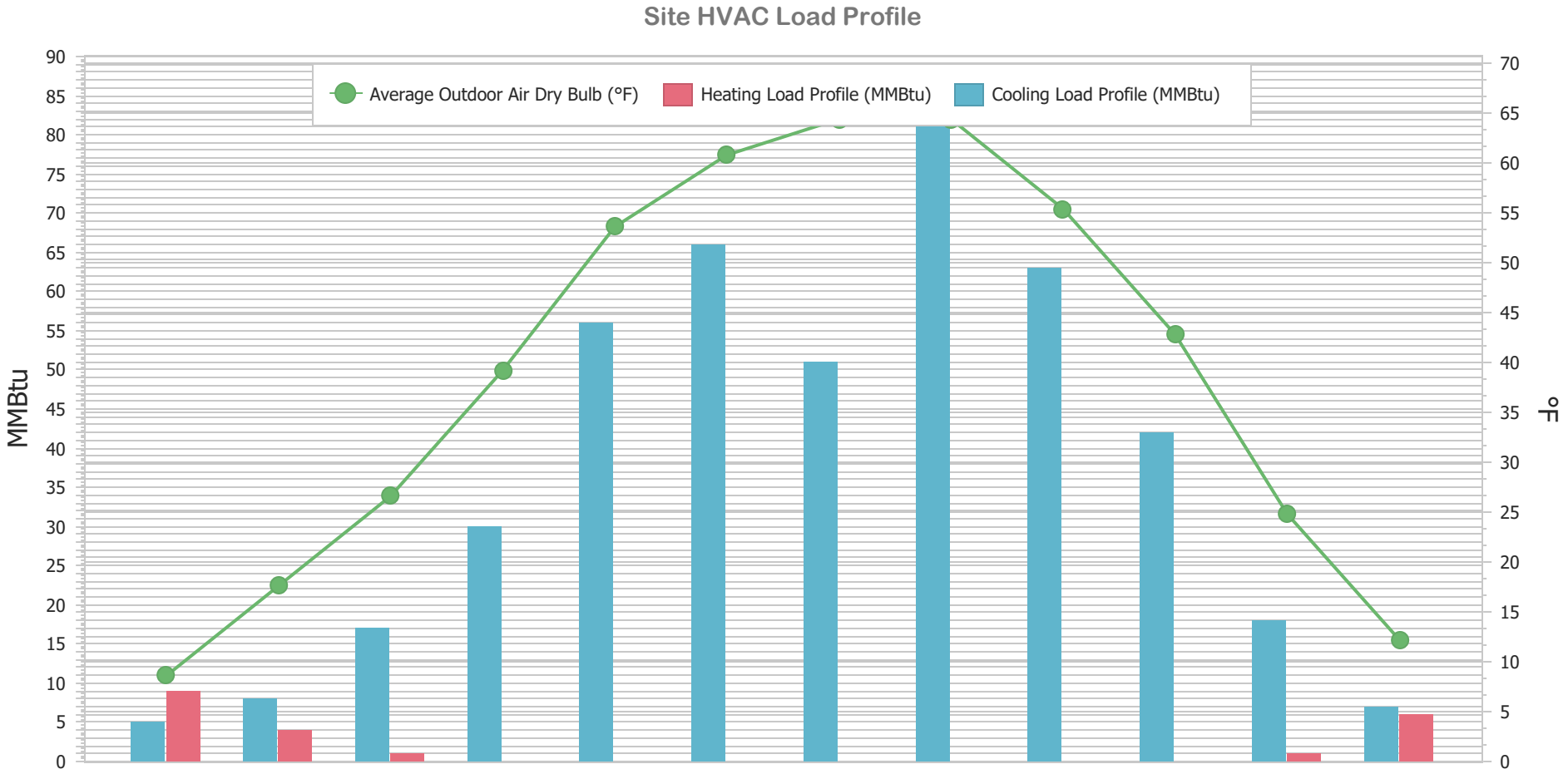
Site HVAC Hourly Load Distribution



	Cooling			Heating		
% Load	Cutoff (tons)	% Hours	Hours	Cutoff (MBtuh)	% Hours	Hours
0-5	20.5	92%	2,454	96.8	92%	4,249
5-10	41.1	2%	60	193.6	5%	237
10-15	61.6	4%	96	290.5	1%	31
15-20	82.1	0%	8	387.3	0%	11
20-25	102.6	0%	5	484.1	1%	30
25-30	123.2	1%	22	580.9	0%	17
30-35	143.7	0%		677.7	0%	12
35-40	164.2	0%		774.6	0%	4
40-45	184.7	1%	14	871.4	0%	4
45-50	205.3	0%		968.2	0%	2
50-55	225.8	0%		1,065	0%	1
55-60	246.3	0%	4	1,161.8	0%	1
60-65	266.9	0%		1,258.7	0%	4
65-70	287.4	0%		1,355.5	0%	3
70-75	307.9	0%	7	1,452.3	0%	1
75-80	328.4	0%		1,549.1	0%	2
80-85	349	0%		1,646	0%	
85-90	369.5	0%	3	1,742.8	0%	3
90-95	390	0%		1,839.6	0%	1
95-100	410.5	0%	1	1,936.4	0%	1

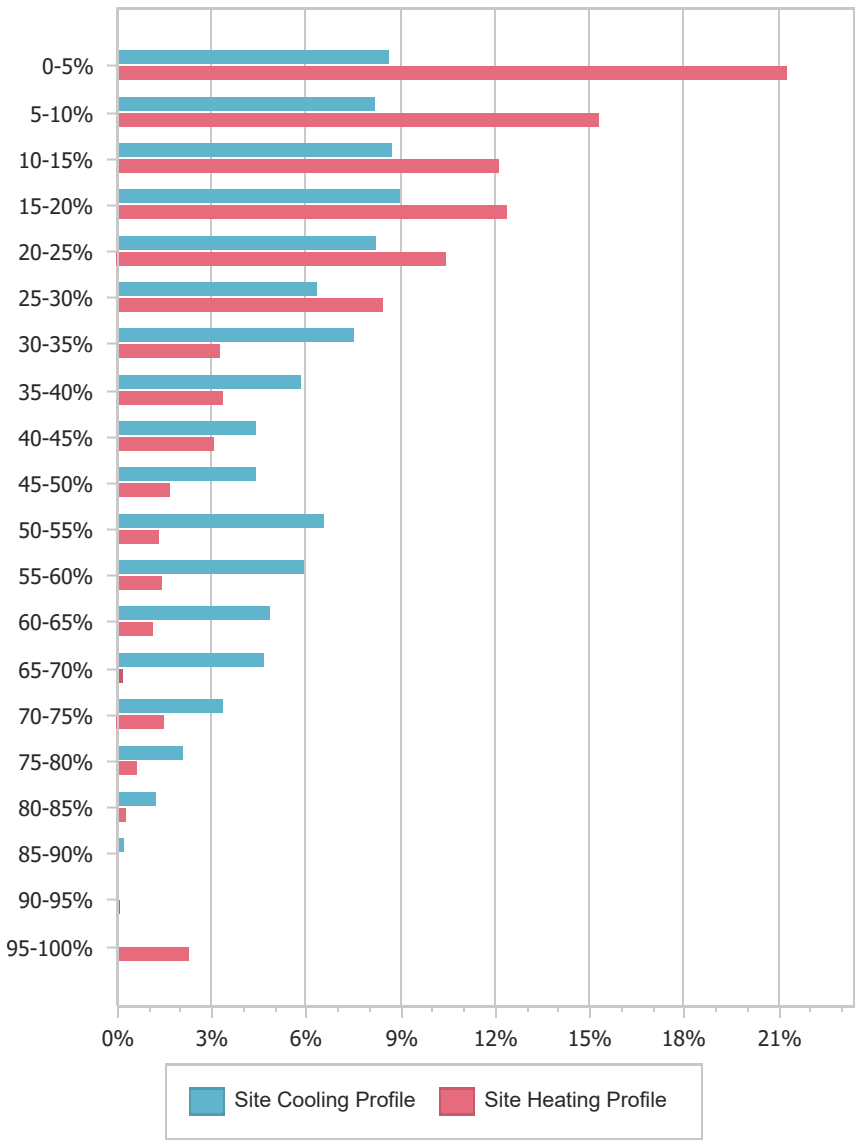
Cooling hours off: 6,086 (69%) Heating hours off: 4,146 (47%)

Site Load Profile



	January	February	March	April	May	June	July	August	September	October	November	December
Cooling Load	5	8	17	30	56	66	51	82	63	42	18	7
Heating Load	9	4	1	0	0	0	0	0	0	0	1	6
Average OADB	8.6	17.2	27.3	39.2	54.3	61.2	64.1	63.5	55.2	42.9	23.9	12

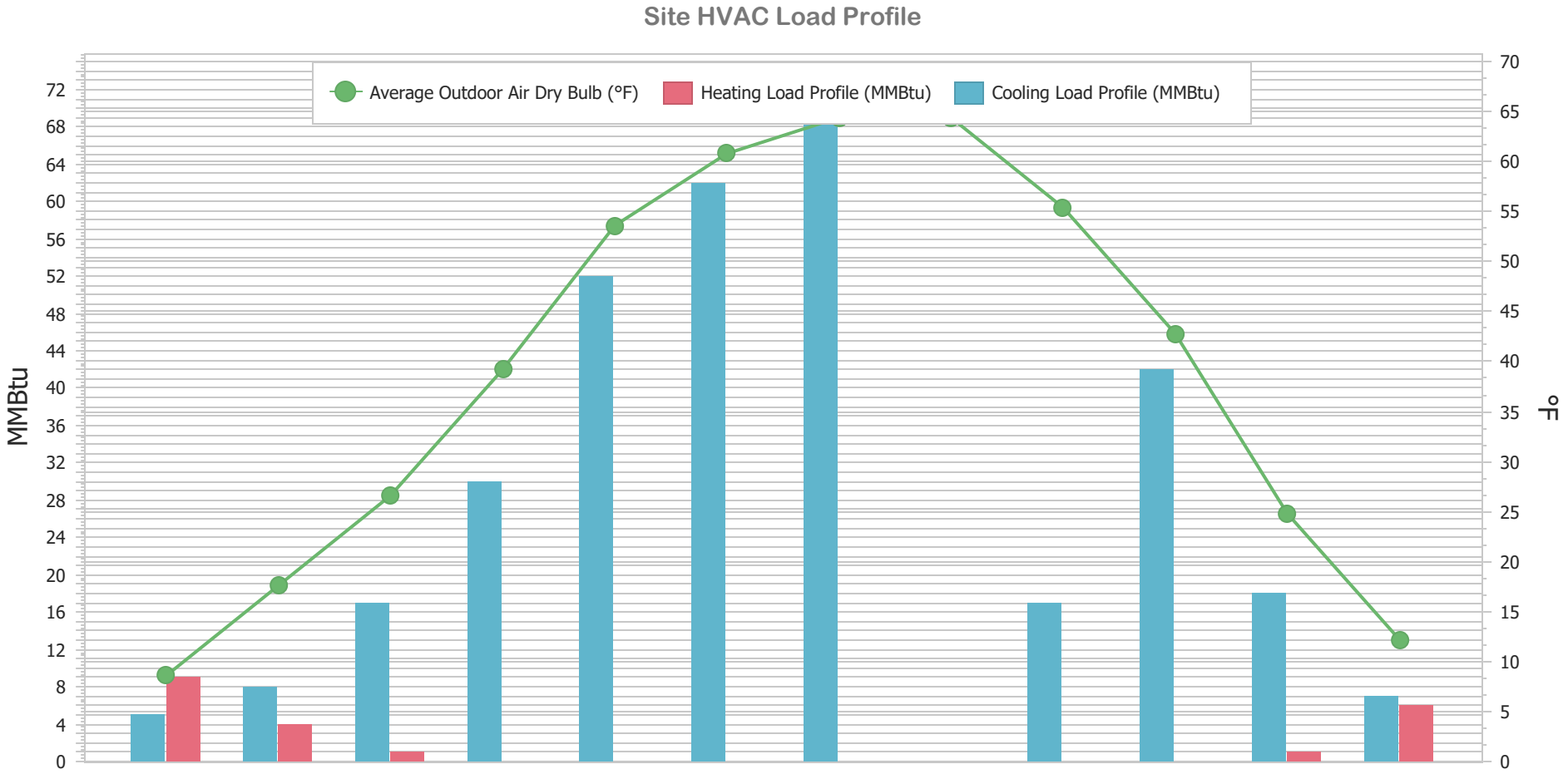
Site HVAC Hourly Load Distribution



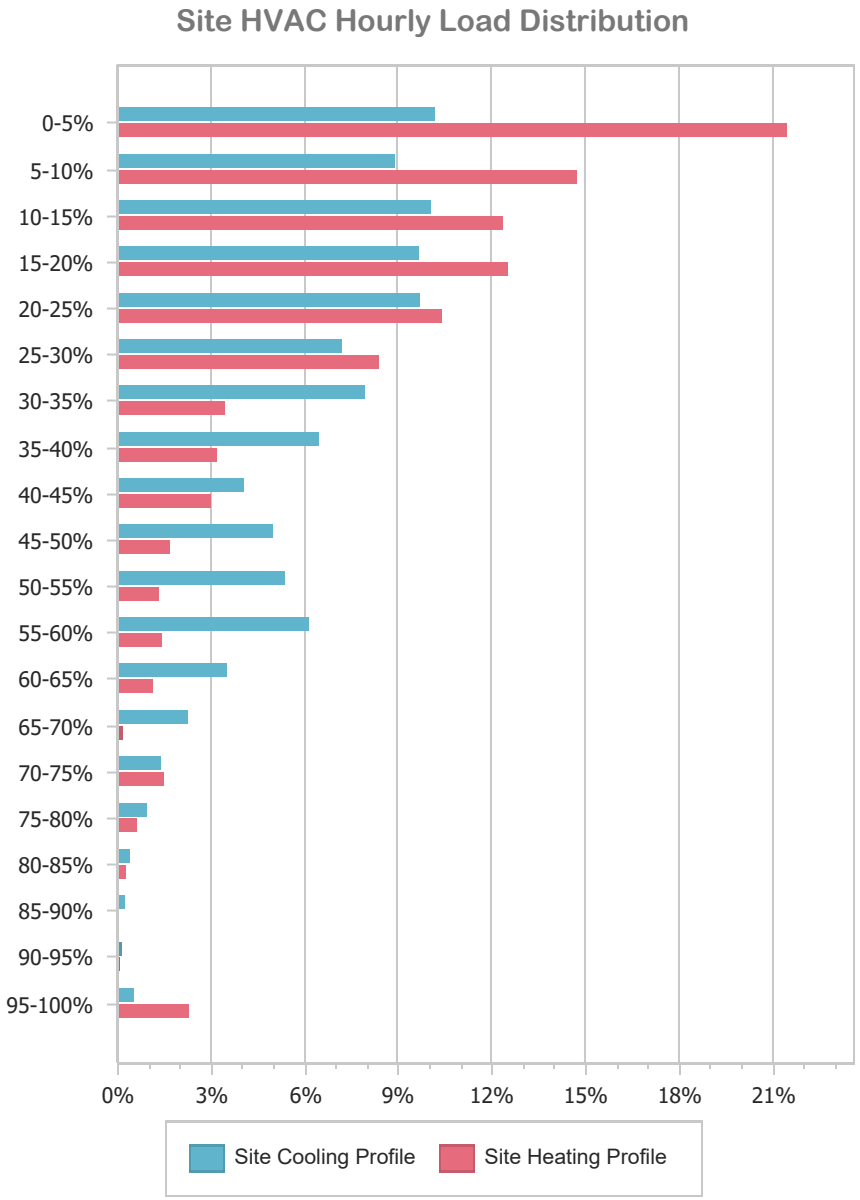
	Cooling			Heating		
% Load	Cutoff (tons)	% Hours	Hours	Cutoff (MBtuh)	% Hours	Hours
0-5	0.7	9%	671	5	21%	242
5-10	1.5	8%	635	10	15%	174
10-15	2.2	9%	678	14.9	12%	138
15-20	3	9%	698	19.9	12%	141
20-25	3.7	8%	639	24.9	10%	119
25-30	4.5	6%	493	29.9	8%	96
30-35	5.2	7%	583	34.8	3%	37
35-40	6	6%	452	39.8	3%	38
40-45	6.7	4%	342	44.8	3%	35
45-50	7.5	4%	341	49.8	2%	19
50-55	8.2	7%	510	54.7	1%	15
55-60	9	6%	461	59.7	1%	16
60-65	9.7	5%	377	64.7	1%	13
65-70	10.4	5%	362	69.7	0%	2
70-75	11.2	3%	260	74.6	1%	17
75-80	11.9	2%	161	79.6	1%	7
80-85	12.7	1%	95	84.6	0%	3
85-90	13.4	0%	15	89.6	0%	
90-95	14.2	0%		94.6	0%	1
95-100	14.9	0%	2	99.5	2%	26

Cooling hours off: 985 (11%) Heating hours off: 7,621 (87%)

Site Load Profile



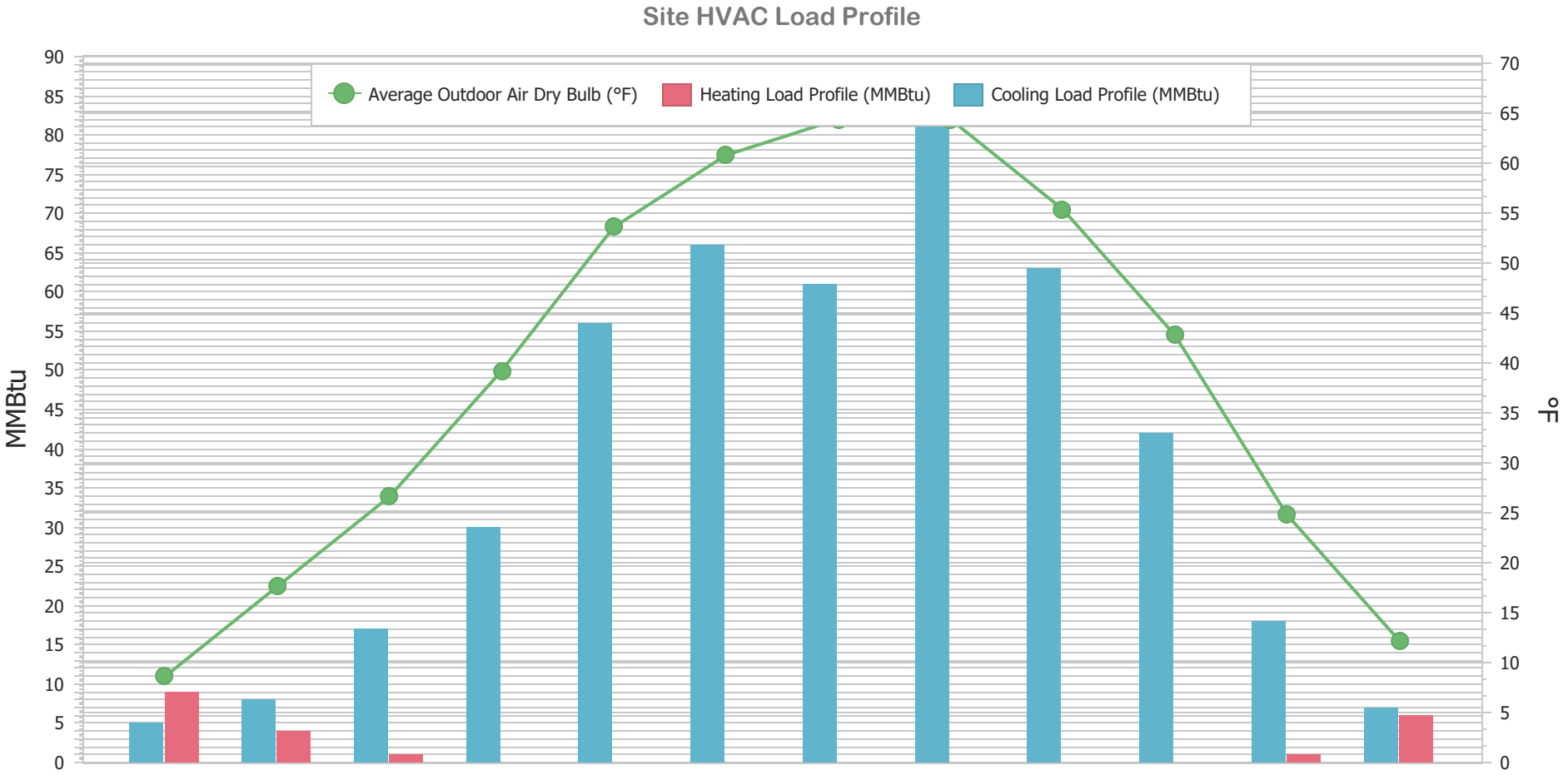
	January	February	March	April	May	June	July	August	September	October	November	December
Cooling Load	5	8	17	30	52	62	69	0	17	42	18	7
Heating Load	9	4	1	0	0	0	0	0	0	0	1	6
Average OADB	8.6	17.2	27.3	39.2	54.3	61.2	64.1	63.5	55.2	42.9	23.9	12



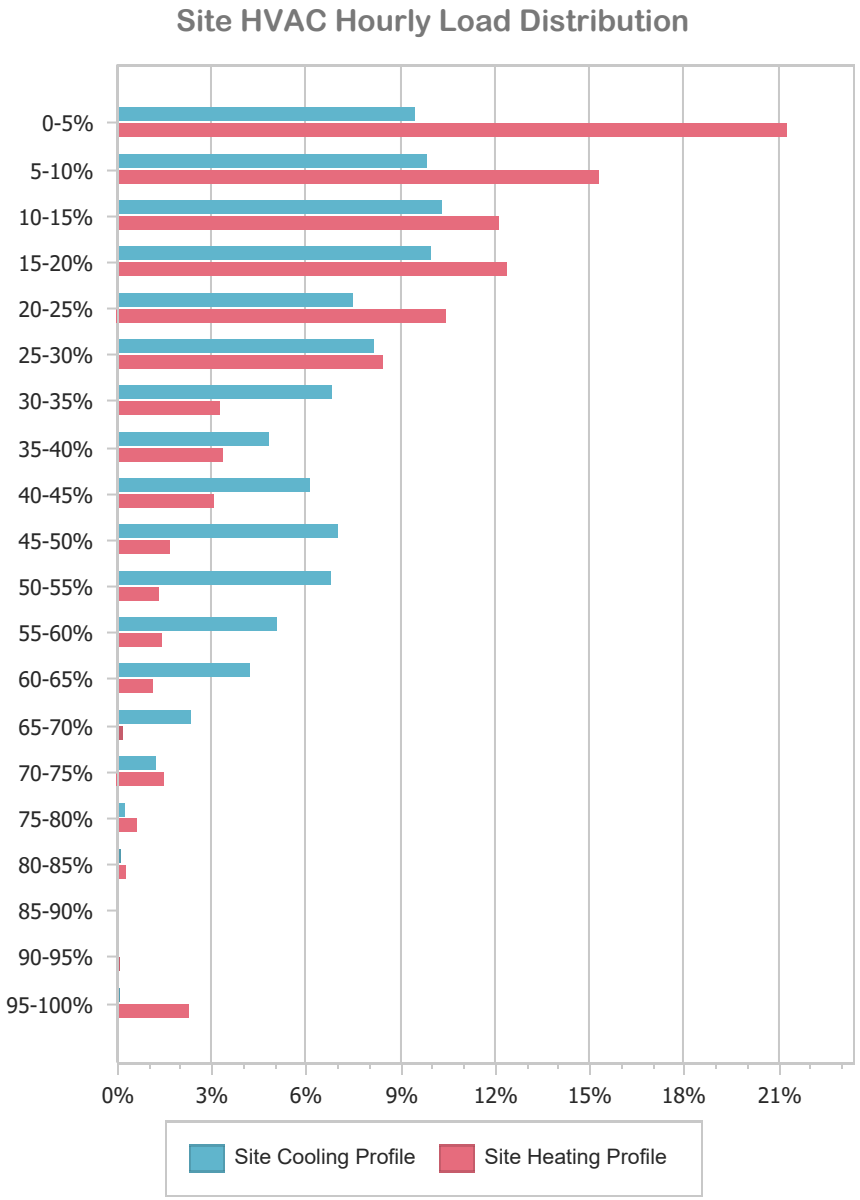
	Cooling			Heating		
% Load	Cutoff (tons)	% Hours	Hours	Cutoff (MBtuh)	% Hours	Hours
0-5	0.7	10%	683	5	21%	243
5-10	1.4	9%	598	9.9	15%	167
10-15	2.2	10%	674	14.9	12%	140
15-20	2.9	10%	649	19.9	13%	142
20-25	3.6	10%	650	24.9	10%	118
25-30	4.3	7%	484	29.8	8%	95
30-35	5.1	8%	532	34.8	3%	39
35-40	5.8	6%	433	39.8	3%	36
40-45	6.5	4%	272	44.7	3%	34
45-50	7.2	5%	334	49.7	2%	19
50-55	8	5%	360	54.7	1%	15
55-60	8.7	6%	411	59.7	1%	16
60-65	9.4	4%	235	64.6	1%	13
65-70	10.1	2%	152	69.6	0%	2
70-75	10.8	1%	93	74.6	2%	17
75-80	11.6	1%	64	79.5	1%	7
80-85	12.3	0%	27	84.5	0%	3
85-90	13	0%	16	89.5	0%	
90-95	13.7	0%	10	94.5	0%	1
95-100	14.5	1%	35	99.4	2%	26

Cooling hours off: 2,048 (23%) Heating hours off: 7,627 (87%)

Site Load Profile



	January	February	March	April	May	June	July	August	September	October	November	December
Cooling Load	5	8	17	30	56	66	61	82	63	42	18	7
Heating Load	9	4	1	0	0	0	0	0	0	0	1	6
Average OADB	8.6	17.2	27.3	39.2	54.3	61.2	64.1	63.5	55.2	42.9	23.9	12

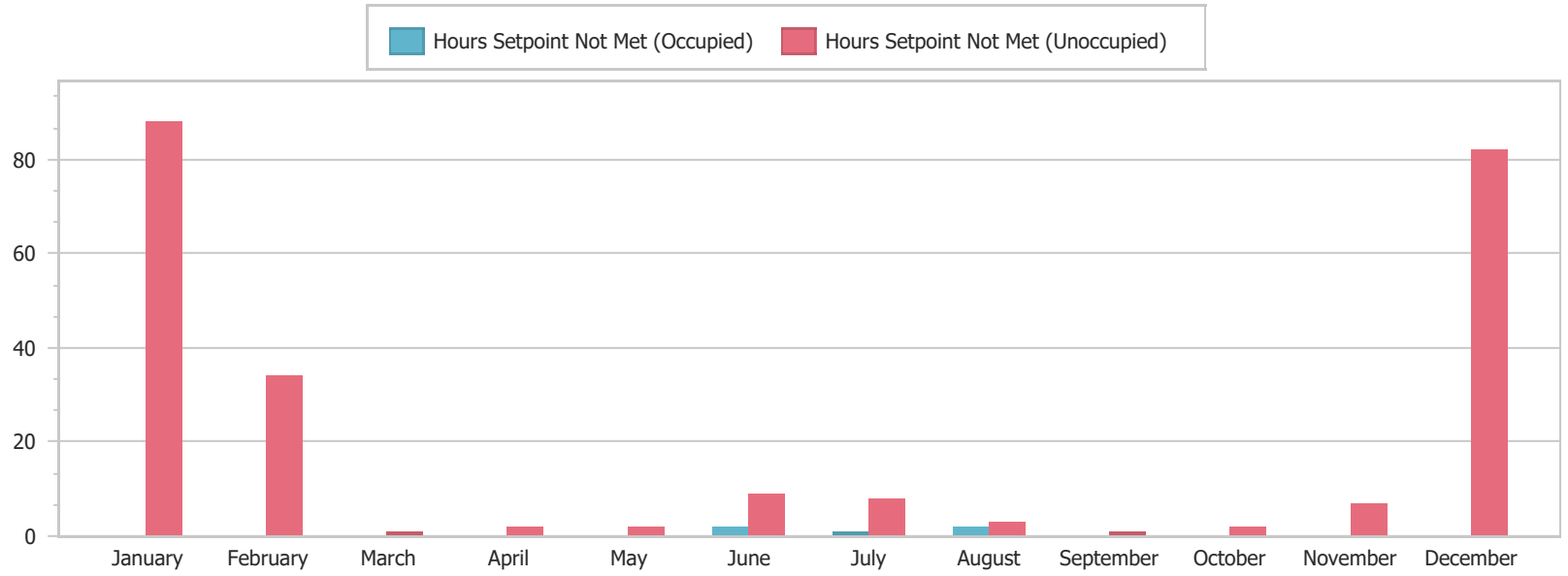


	Cooling			Heating		
% Load	Cutoff (tons)	% Hours	Hours	Cutoff (MBtuh)	% Hours	Hours
0-5	0.9	9%	743	5	21%	242
5-10	1.7	10%	773	10	15%	174
10-15	2.6	10%	809	14.9	12%	138
15-20	3.4	10%	782	19.9	12%	141
20-25	4.3	7%	588	24.9	10%	119
25-30	5.1	8%	640	29.9	8%	96
30-35	6	7%	535	34.8	3%	37
35-40	6.9	5%	379	39.8	3%	38
40-45	7.7	6%	481	44.8	3%	35
45-50	8.6	7%	551	49.8	2%	19
50-55	9.4	7%	532	54.7	1%	15
55-60	10.3	5%	398	59.7	1%	16
60-65	11.1	4%	331	64.7	1%	13
65-70	12	2%	183	69.7	0%	2
70-75	12.8	1%	96	74.6	1%	17
75-80	13.7	0%	18	79.6	1%	7
80-85	14.6	0%	8	84.6	0%	3
85-90	15.4	0%	3	89.6	0%	
90-95	16.3	0%	3	94.6	0%	1
95-100	17.1	0%	7	99.5	2%	26

Cooling hours off: 900 (10%) Heating hours off: 7,621 (87%)

Setpoint Not Met Summary

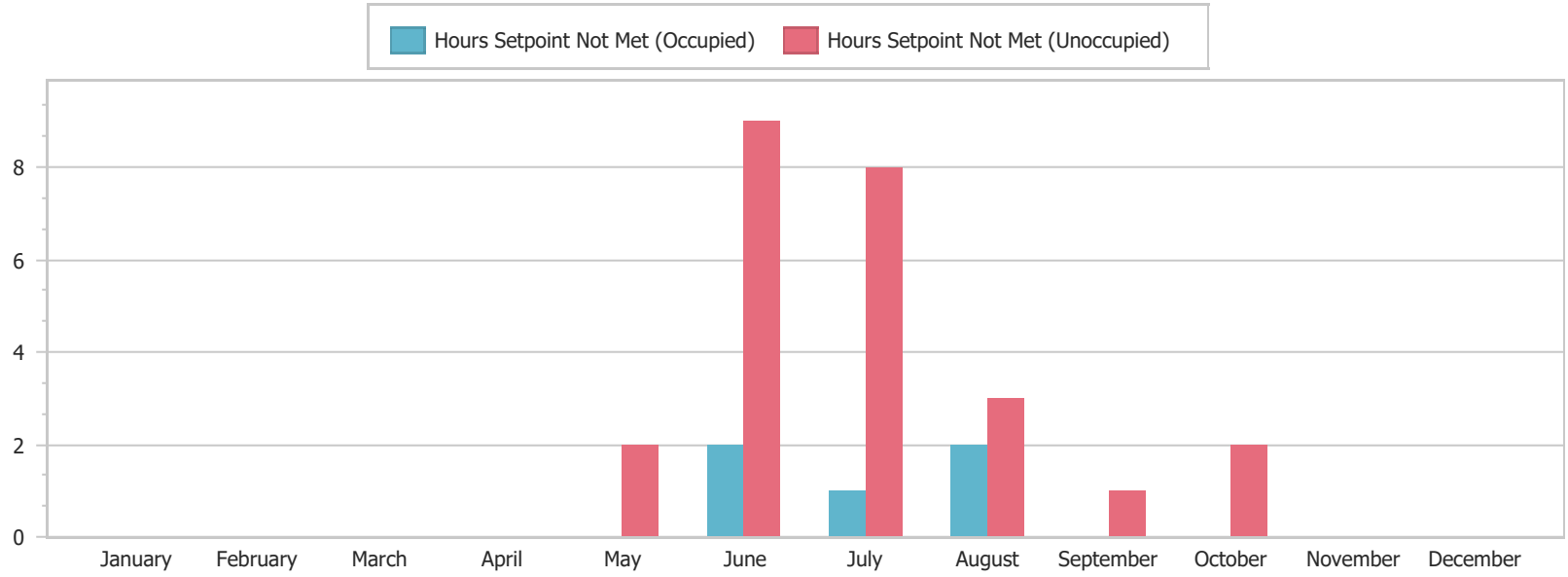
Total Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
System 3 - 2007/2010/2013																										
Zone Group 00																										
TERMINAL PERSONNEL	61.7	0	33	0	16	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	33	77.1
CORRIDORS	62.6	0	10	0	4	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	8	81.9
TECHNICAL OPS SPACES	63.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75.5
TECHNICAL OPERATIONS	62.4	0	13	0	3	0	0	0	0	0	0	2	6	1	2	1	2	0	0	0	0	0	0	0	12	108.6
TERMINAL SPACES	63.4	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	96.6
ENVIRONMENTAL SUPPORT	62.3	0	19	0	6	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	15	78.1

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
JOINT USE & MISC. SUPPORT	62.4	0	13	0	5	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	2	0	0	0	14	91.8
Total (Non-coincident)		0	88	0	34	0	1	0	2	0	2	2	9	1	8	2	3	0	1	0	2	0	7	0	82	

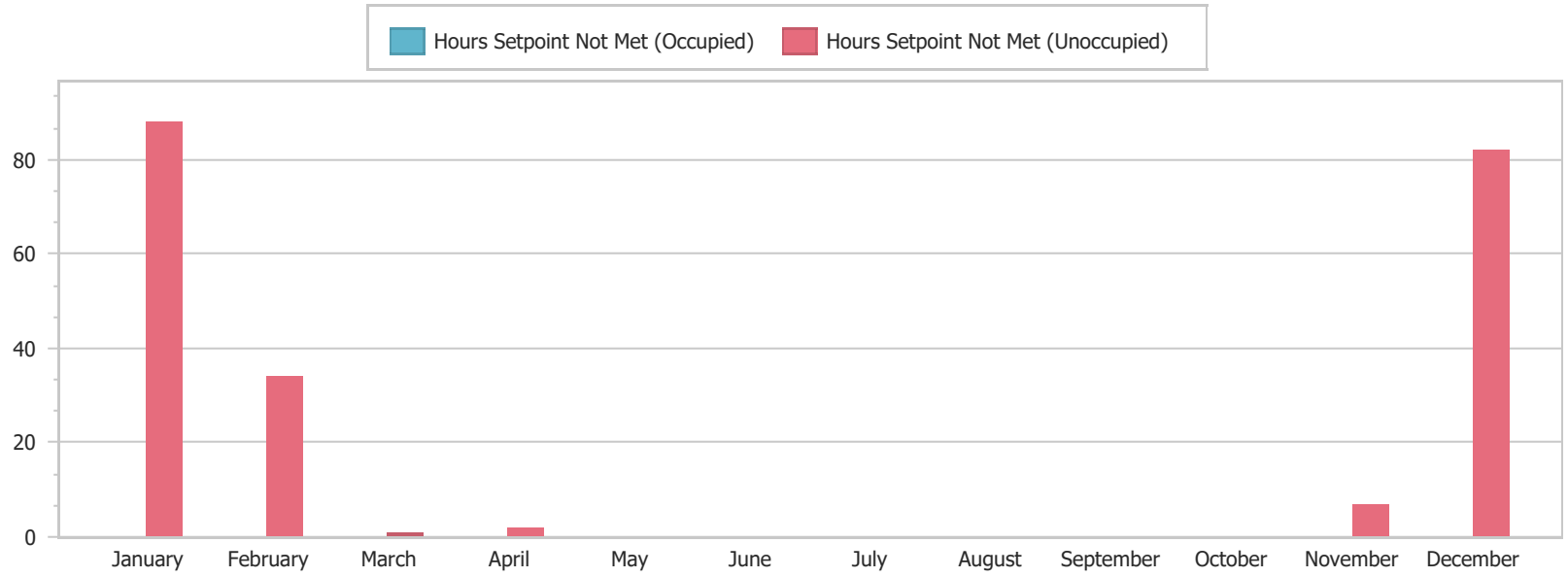
Cooling Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
System 3 - 2007/2010/2013																										
Zone Group 00																										
TERMINAL PERSONNEL	61.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77.1
CORRIDORS	62.6	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	81.9

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
TECHNICAL OPS SPACES	63.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75.5
TECHNICAL OPERATIONS	62.4	0	0	0	0	0	0	0	0	0	0	2	6	1	2	1	2	0	0	0	0	0	0	0	0	108.6
TERMINAL SPACES	63.4	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	96.6
ENVIRONMENTAL SUPPORT	62.3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	78.1
JOINT USE & MISC. SUPPORT	62.4	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	2	0	0	0	0	91.8
Total (Non-coincident)		0	0	0	0	0	0	0	0	0	2	2	9	1	8	2	3	0	1	0	2	0	0	0	0	

Heating Setpoint Not Met Summary

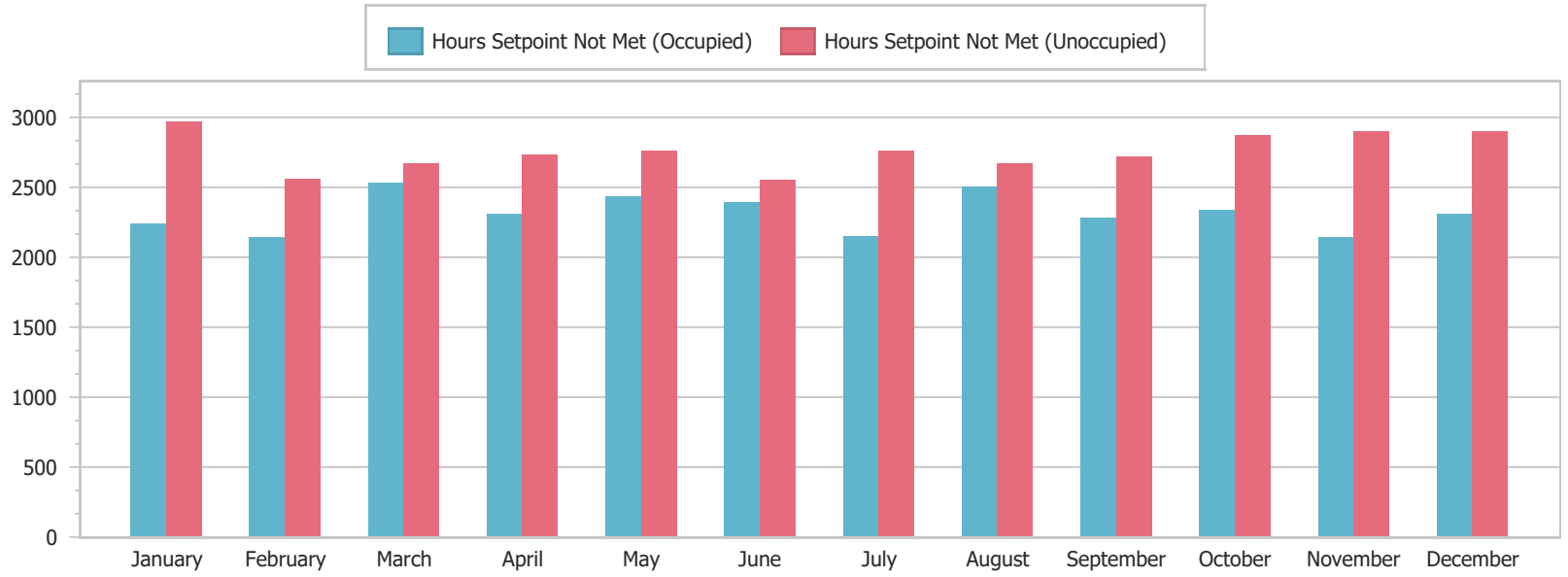


Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
System 3 - 2007/2010/2013																										
Zone Group 00																										
TERMINAL PERSONNEL	61.7	0	33	0	16	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	33	77.1
CORRIDORS	62.6	0	10	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	81.9
TECHNICAL OPS SPACES	63.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75.5
TECHNICAL OPERATIONS	62.4	0	13	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	108.6
TERMINAL SPACES	63.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	96.6
ENVIRONMENTAL SUPPORT	62.3	0	19	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	78.1
JOINT USE & MISC. SUPPORT	62.4	0	13	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	91.8
Total (Non-coincident)		0	88	0	34	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	82	

Setpoint Not Met Summary

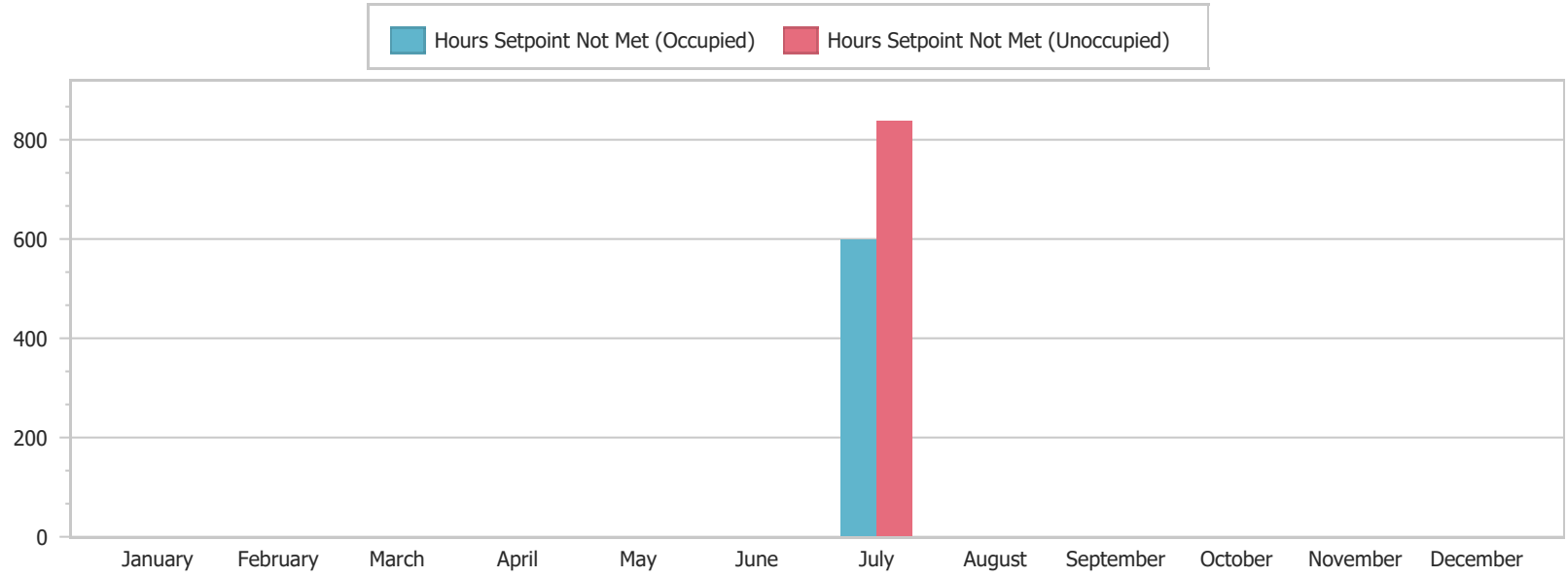
Total Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
VAV RH (30% Min Default) (CW) (HWRH) - Copy																										
Zone Group 00																										
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	393	343	365	311	383	359	381	329	388	334	410	306	414	330	414	101.7
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	393	341	365	306	396	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	342	365	310	387	358	382	326	389	334	410	306	414	330	414	102.2
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	341	365	306	395	357	382	324	390	334	410	306	414	330	414	102.6
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	341	365	308	402	357	382	326	388	334	410	306	414	330	414	102.4

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	393	341	365	304	398	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	393	341	365	305	397	357	381	324	388	334	410	306	414	330	414	102.7
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,760	2,390	2,555	2,150	2,758	2,502	2,670	2,279	2,721	2,338	2,870	2,142	2,898	2,310	2,898	

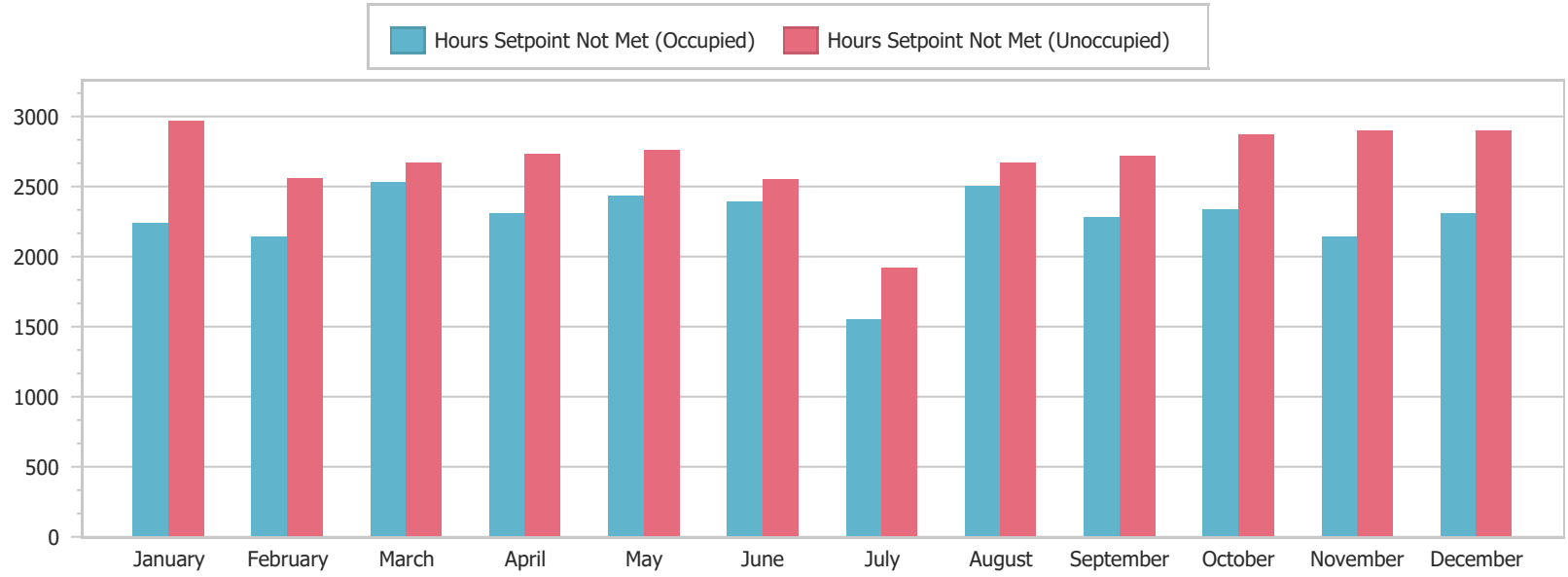
Cooling Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
VAV RH (30% Min Default) (CW) (HWRH) - Copy																										
Zone Group 00																										
TERMINAL SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	89	111	0	0	0	0	0	0	0	0	0	0	101.7

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
JOINT USE & MISC. SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	84	123	0	0	0	0	0	0	0	0	0	0	102.5
TECHNICAL OPS SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	89	111	0	0	0	0	0	0	0	0	0	0	102.2
ENVIRONMENTAL SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	84	118	0	0	0	0	0	0	0	0	0	0	102.6
CORRIDORS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	86	125	0	0	0	0	0	0	0	0	0	0	102.4
TERMINAL PERSONNEL	51.4	0	0	0	0	0	0	0	0	0	0	0	0	82	124	0	0	0	0	0	0	0	0	0	0	102.5
TECHNICAL OPERATIONS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	83	124	0	0	0	0	0	0	0	0	0	0	102.7
Total (Non-coincident)		0	0	0	0	0	0	0	0	0	0	0	0	597	836	0	0	0	0	0	0	0	0	0	0	

Heating Setpoint Not Met Summary

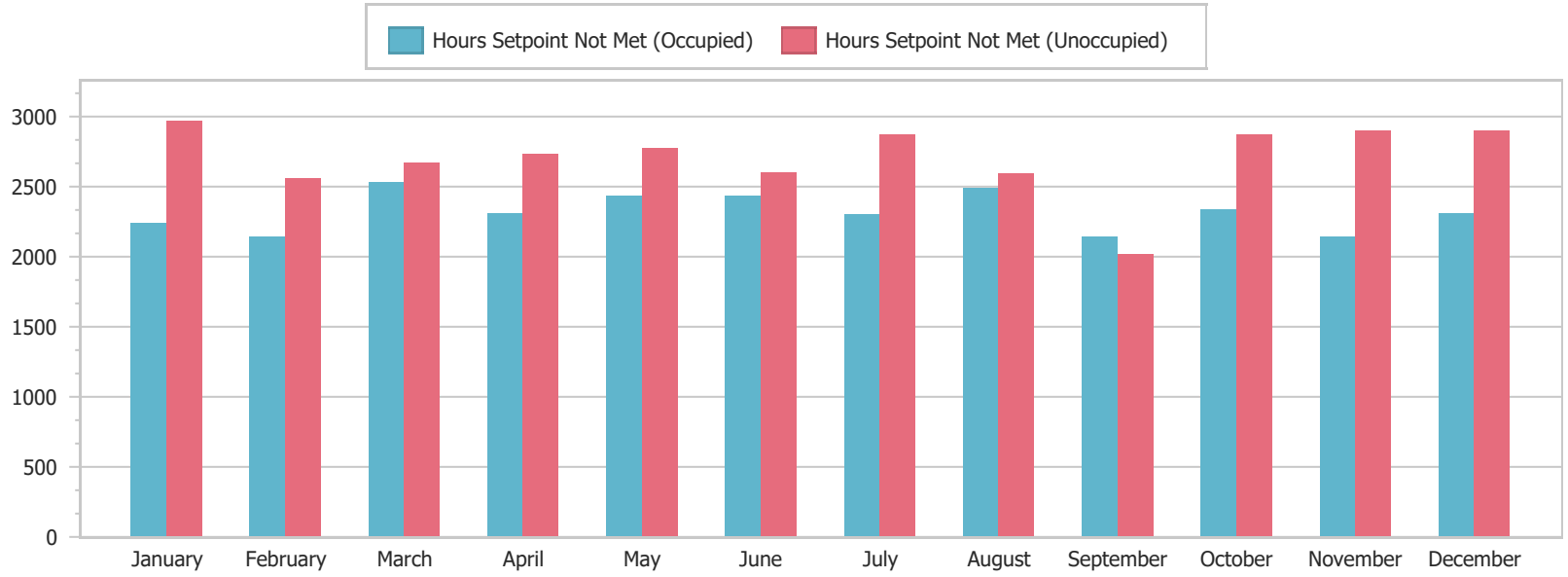


	Min.	January	February	March	April	May	June	July	August	September	October	November	December	Max

Zone Name	Temp. (°F)	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Temp. (°F)
VAV RH (30% Min Default) (CW) (HWRH) - Copy																												
Zone Group 00																												
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	393	343	365	222	272	359	381	329	388	334	410	306	414	330	414	101.7
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	393	341	365	222	273	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	342	365	221	276	358	382	326	389	334	410	306	414	330	414	102.2
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	341	365	222	277	357	382	324	390	334	410	306	414	330	414	102.6
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	341	365	222	277	357	382	326	388	334	410	306	414	330	414	102.4
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	393	341	365	222	274	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	393	341	365	222	273	357	381	324	388	334	410	306	414	330	414	102.7
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,760	2,390	2,555	1,553	1,922	2,502	2,670	2,279	2,721	2,338	2,870	2,142	2,898	2,310	2,898	

Setpoint Not Met Summary

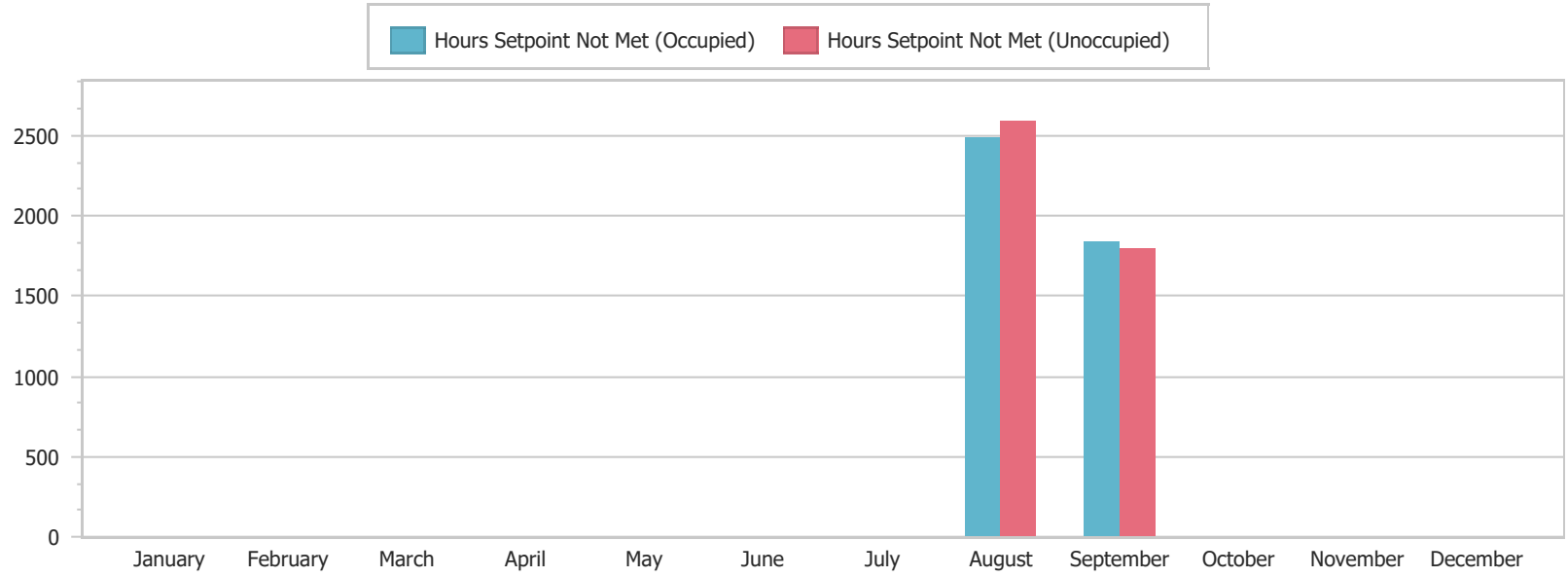
Total Setpoint Not Met Summary



Zone Name	Min.	January		February		March		April		May		June		July		August		September		October		November		December		Max
	Temp. (°F)	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Temp. (°F)
VAV RH (30% Min Default) (CW) (HWRH)																										
Zone Group 00																										
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	396	348	372	328	410	355	368	300	282	334	410	306	414	330	414	106.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	348	372	330	414	356	373	307	298	334	410	306	414	330	414	106.1
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	348	372	328	410	356	372	307	298	334	410	306	414	330	414	106.5
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	348	372	329	410	356	368	307	282	334	410	306	414	330	414	106.4
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	396	348	372	328	410	356	369	308	282	334	410	306	414	330	414	106.8

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	396	348	372	330	410	355	369	306	281	334	410	306	414	330	414	105.7
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	348	372	330	410	355	373	305	296	334	410	306	414	330	414	106.4
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,772	2,436	2,604	2,303	2,874	2,489	2,592	2,140	2,019	2,338	2,870	2,142	2,898	2,310	2,898	

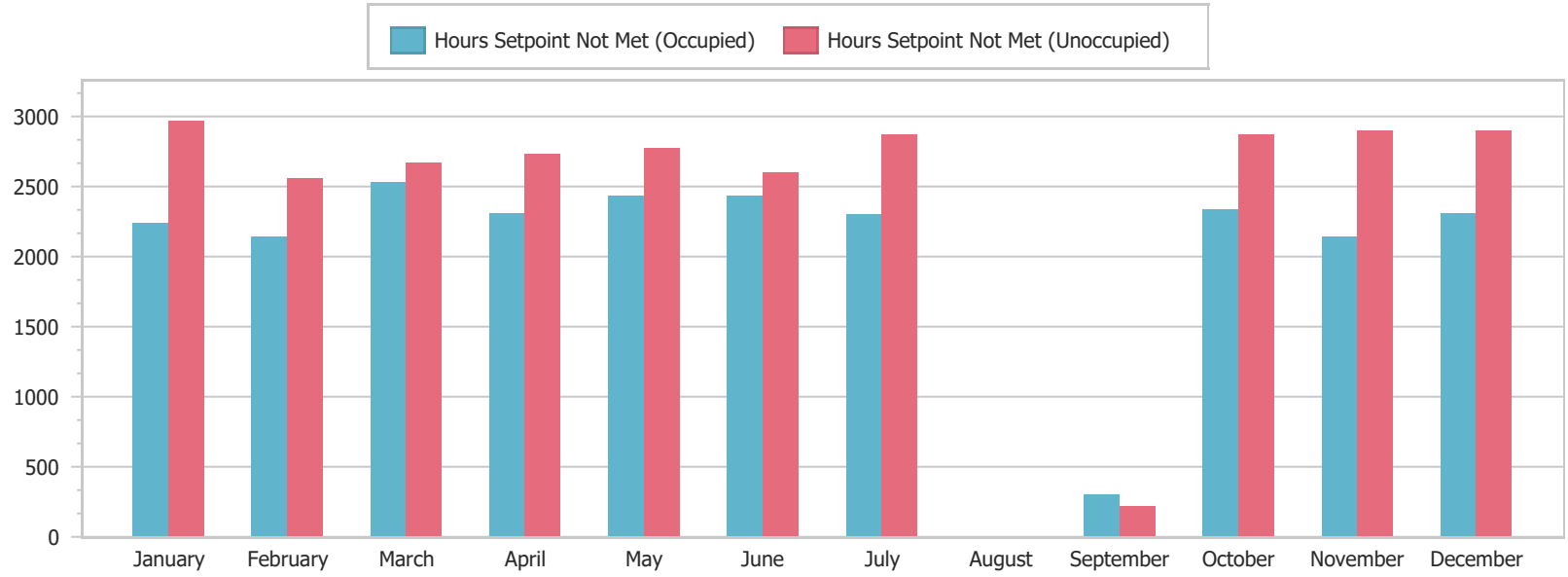
Cooling Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
VAV RH (30% Min Default) (CW) (HWRH)																										
Zone Group 00																										
TERMINAL PERSONNEL	51.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	355	368	255	251	0	0	0	0	0	0	106.5

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
TECHNICAL OPS SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	355	372	266	265	0	0	0	0	0	0	106.1
ENVIRONMENTAL SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	356	372	264	261	0	0	0	0	0	0	106.5
JOINT USE & MISC. SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	356	368	263	252	0	0	0	0	0	0	106.4
TECHNICAL OPERATIONS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	356	369	265	252	0	0	0	0	0	0	106.8
TERMINAL SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	354	368	264	254	0	0	0	0	0	0	105.7
CORRIDORS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	355	373	261	262	0	0	0	0	0	0	106.4
Total (Non-coincident)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,487	2,590	1,838	1,797	0	0	0	0	0	0	

Heating Setpoint Not Met Summary

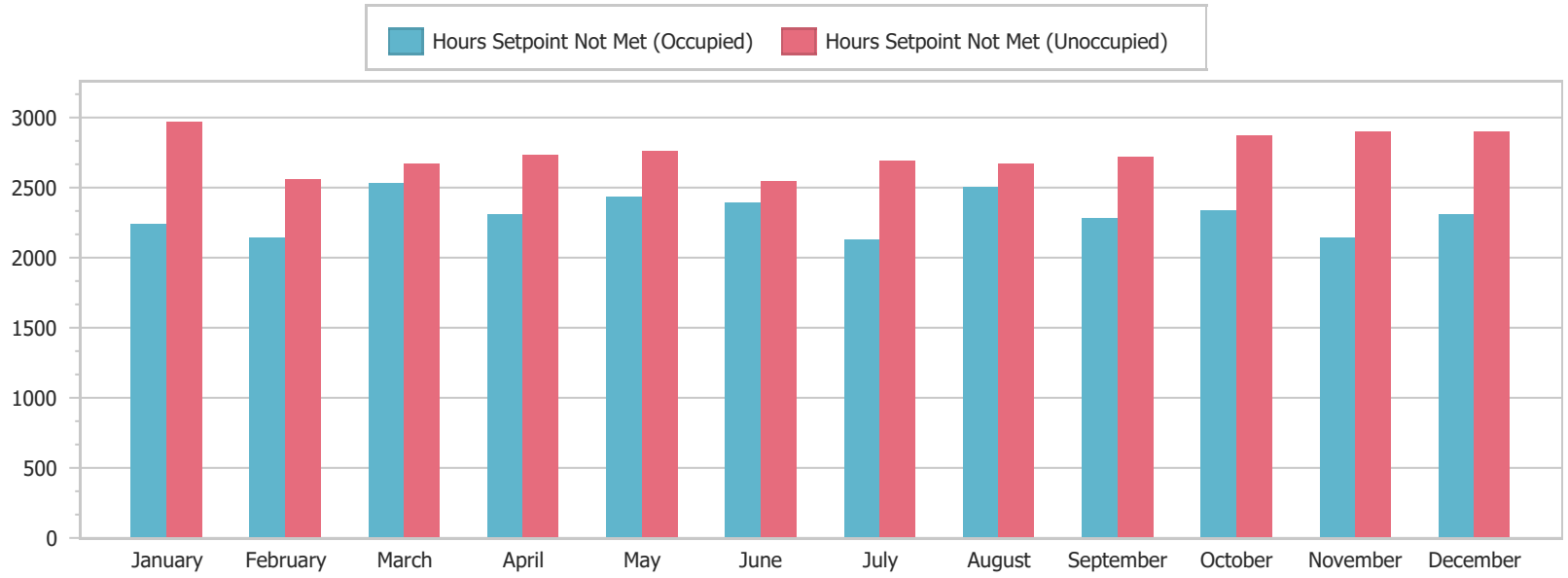


	Min.	January	February	March	April	May	June	July	August	September	October	November	December	Max

Zone Name	Temp. (°F)	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Temp. (°F)
VAV RH (30% Min Default) (CW) (HWRH)																												
Zone Group 00																												
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	396	348	372	328	410	0	0	45	31	334	410	306	414	330	414	106.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	348	372	330	414	1	1	41	33	334	410	306	414	330	414	106.1
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	348	372	328	410	0	0	43	37	334	410	306	414	330	414	106.5
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	348	372	329	410	0	0	44	30	334	410	306	414	330	414	106.4
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	396	348	372	328	410	0	0	43	30	334	410	306	414	330	414	106.8
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	396	348	372	330	410	1	1	42	27	334	410	306	414	330	414	105.7
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	348	372	330	410	0	0	44	34	334	410	306	414	330	414	106.4
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,772	2,436	2,604	2,303	2,874	2	2	302	222	2,338	2,870	2,142	2,898	2,310	2,898	

Setpoint Not Met Summary

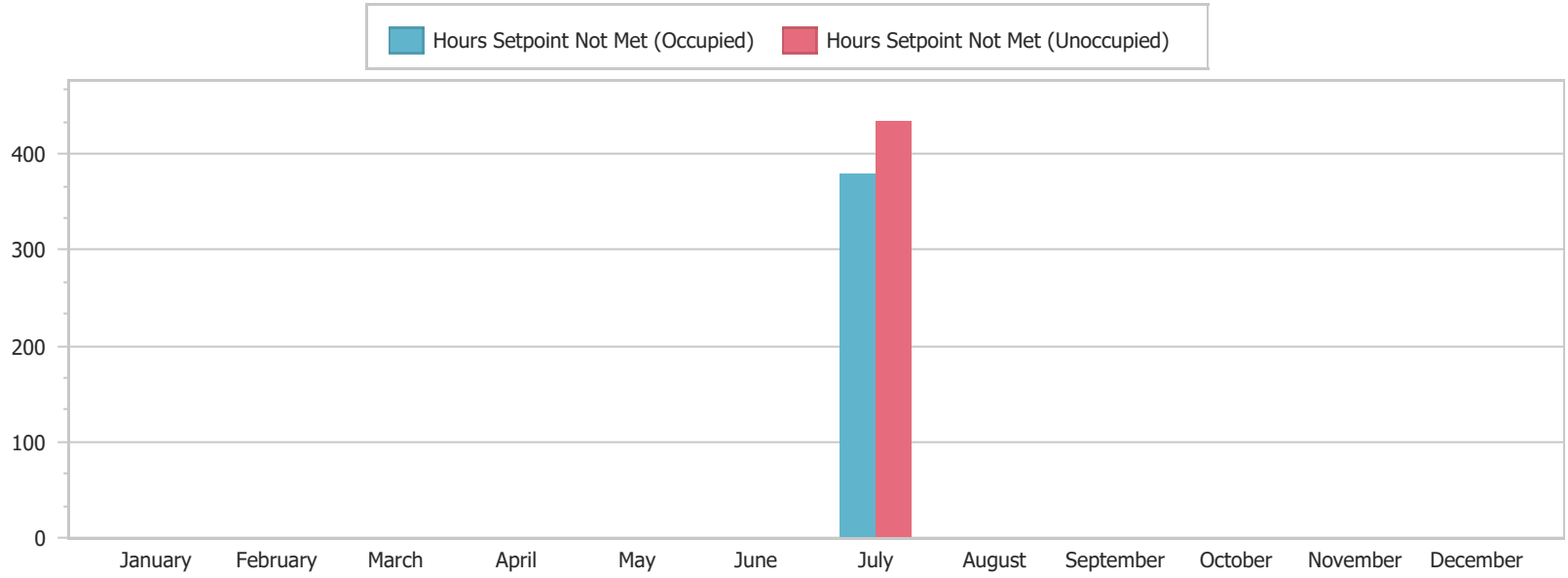
Total Setpoint Not Met Summary



Zone Name	Min.	January		February		March		April		May		June		July		August		September		October		November		December		Max
	Temp. (°F)	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Temp. (°F)
VAV RH (30% Min Default) (CW) (HWRH) - Copy																										
Zone Group 00																										
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	341	364	303	391	357	382	326	388	334	410	306	414	330	414	102.4
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	393	341	364	303	389	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	342	364	306	376	358	382	326	389	334	410	306	414	330	414	102.2
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	393	341	364	302	387	357	381	324	388	334	410	306	414	330	414	102.7
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	341	364	301	385	357	382	324	390	334	410	306	414	330	414	102.6

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	393	341	364	310	390	357	381	325	389	334	410	306	414	330	414	102.5
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	393	343	364	307	374	359	381	329	388	334	410	306	414	330	414	101.7
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,760	2,390	2,548	2,132	2,692	2,502	2,670	2,279	2,721	2,338	2,870	2,142	2,898	2,310	2,898	

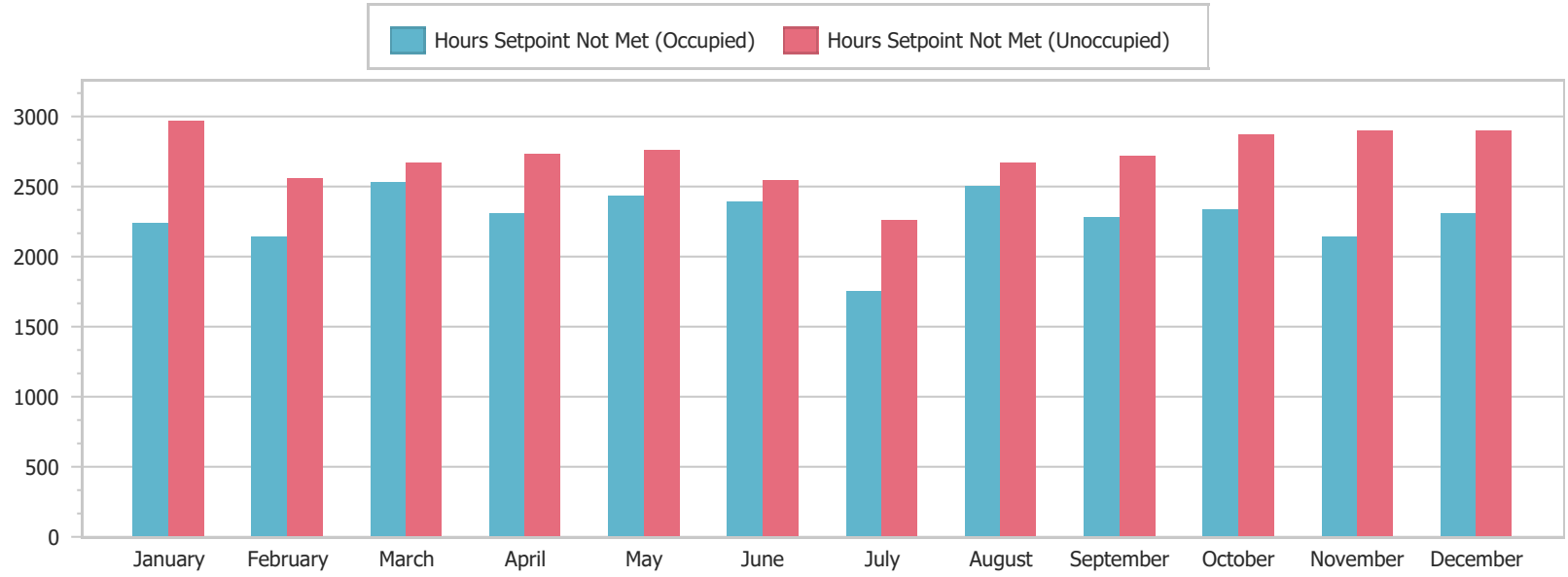
Cooling Setpoint Not Met Summary



Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
VAV RH (30% Min Default) (CW) (HWRH) - Copy																										
Zone Group 00																										
CORRIDORS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	52	67	0	0	0	0	0	0	0	0	0	0	102.4

Zone Name	Min. Temp. (°F)	January		February		March		April		May		June		July		August		September		October		November		December		Max Temp. (°F)
		Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	
JOINT USE & MISC. SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	53	66	0	0	0	0	0	0	0	0	0	0	102.5
TECHNICAL OPS SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	59	53	0	0	0	0	0	0	0	0	0	0	102.2
TECHNICAL OPERATIONS	51.5	0	0	0	0	0	0	0	0	0	0	0	0	52	67	0	0	0	0	0	0	0	0	0	0	102.7
ENVIRONMENTAL SUPPORT	51.5	0	0	0	0	0	0	0	0	0	0	0	0	53	60	0	0	0	0	0	0	0	0	0	0	102.6
TERMINAL PERSONNEL	51.4	0	0	0	0	0	0	0	0	0	0	0	0	52	67	0	0	0	0	0	0	0	0	0	0	102.5
TERMINAL SPACES	51.6	0	0	0	0	0	0	0	0	0	0	0	0	58	54	0	0	0	0	0	0	0	0	0	0	101.7
Total (Non-coincident)		0	0	0	0	0	0	0	0	0	0	0	0	379	434	0	0	0	0	0	0	0	0	0	0	

Heating Setpoint Not Met Summary



	Min.	January	February	March	April	May	June	July	August	September	October	November	December	Max

Zone Name	Temp. (°F)	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Occ	Un	Temp. (°F)
VAV RH (30% Min Default) (CW) (HWRH) - Copy																												
Zone Group 00																												
CORRIDORS	51.5	320	424	306	366	362	382	330	390	348	396	341	364	251	324	357	382	326	388	334	410	306	414	330	414	102.4
JOINT USE & MISC. SUPPORT	51.5	320	424	306	366	362	382	330	390	348	393	341	364	250	323	357	381	325	389	334	410	306	414	330	414	102.5
TECHNICAL OPS SPACES	51.6	320	424	306	366	362	382	330	390	348	396	342	364	247	323	358	382	326	389	334	410	306	414	330	414	102.2
TECHNICAL OPERATIONS	51.5	320	424	306	366	362	382	330	390	348	393	341	364	250	320	357	381	324	388	334	410	306	414	330	414	102.7
ENVIRONMENTAL SUPPORT	51.5	320	424	306	366	362	382	330	390	348	396	341	364	248	325	357	382	324	390	334	410	306	414	330	414	102.6
TERMINAL PERSONNEL	51.4	320	424	306	366	362	382	330	390	348	393	341	364	258	323	357	381	325	389	334	410	306	414	330	414	102.5
TERMINAL SPACES	51.6	320	424	306	366	362	382	330	390	348	393	343	364	249	320	359	381	329	388	334	410	306	414	330	414	101.7
Total (Non-coincident)		2,240	2,968	2,142	2,562	2,534	2,674	2,310	2,730	2,436	2,760	2,390	2,548	1,753	2,258	2,502	2,670	2,279	2,721	2,338	2,870	2,142	2,898	2,310	2,898	

Site Temperature Profile

Zone Name	Unmet Heating Hours	Minimum Temperature (°F)	Time spent in each temperature range (°F)										Unmet Cooling Hours	Maximum Temperature (°F)	Mean Temperature (°F)
			< 50°F	50°F ≤ 55°F	55°F ≤ 60°F	60°F ≤ 65°F	65°F ≤ 70°F	70°F ≤ 75°F	75°F ≤ 80°F	80°F ≤ 85°F	85°F ≤ 90°F	90°F ≤ 95°F	> 95°F			
System 3 - 2007/2010/2013															
Zone Group 00															
TERMINAL PERSONNEL	92	61.7	0	0	0	1,229	2,578	4,938	15	0	0	0	0	0	77.1	69.5
CORRIDORS	22	62.6	0	0	0	920	1,951	5,878	10	1	0	0	0	2	81.9	70.0
TECHNICAL OPS SPACES	0	63.2	0	0	0	841	1,971	5,943	5	0	0	0	0	0	75.5	69.9
TECHNICAL OPERATIONS	28	62.4	0	0	0	996	2,563	5,163	30	3	0	0	5	14	108.6	69.7
TERMINAL SPACES	0	63.4	0	0	0	845	2,655	5,258	0	0	0	1	1	4	96.6	69.6
ENVIRONMENTAL SUPPORT	40	62.3	0	0	0	887	2,024	5,834	15	0	0	0	0	3	78.1	70.0
JOINT USE & MISC. SUPPORT	32	62.4	0	0	0	1,052	2,623	5,069	12	1	2	1	0	7	91.8	69.5

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Temperature Profile

Zone Name	Unmet Heating Hours	Minimum Temperature (°F)	Time spent in each temperature range (°F) < 50°F	50°F ≤ 55°F	55°F ≤ 60°F	60°F ≤ 65°F	65°F ≤ 70°F	70°F ≤ 75°F	75°F ≤ 80°F	80°F ≤ 85°F	85°F ≤ 90°F	90°F ≤ 95°F	> 95°F	Unmet Cooling Hours	Maximum Temperature (°F)	Mean Temperature (°F)
VAV RH (30% Min Default) (CW) (HWRH) - Copy																
Zone Group 00																
TERMINAL SPACES	8488	51.6	0	5,002	3,025	452	38	36	22	21	42	71	51	200	101.7	56.2
JOINT USE & MISC. SUPPORT	8482	51.5	0	5,012	3,004	459	36	45	11	26	39	61	67	207	102.5	56.2
TECHNICAL OPS SPACES	8491	51.6	0	4,824	3,167	484	38	41	14	26	40	68	58	200	102.2	56.3
ENVIRONMENTAL SUPPORT	8490	51.5	0	4,981	3,024	469	36	46	10	27	39	61	67	202	102.6	56.2
CORRIDORS	8490	51.5	0	5,018	2,996	463	33	45	11	27	40	62	65	211	102.4	56.2
TERMINAL PERSONNEL	8483	51.4	0	5,275	2,770	431	37	43	10	27	39	58	70	206	102.5	56.1
TECHNICAL OPERATIONS	8480	51.5	0	4,792	3,184	499	33	48	9	28	39	60	68	207	102.7	56.3

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Temperature Profile

Zone Name	Unmet Heating Hours	Minimum Temperature (°F)	Time spent in each temperature range (°F)										Unmet Cooling Hours	Maximum Temperature (°F)	Mean Temperature (°F)
			< 50°F	50°F ≤ 55°F	55°F ≤ 60°F	60°F ≤ 65°F	65°F ≤ 70°F	70°F ≤ 75°F	75°F ≤ 80°F	80°F ≤ 85°F	85°F ≤ 90°F	90°F ≤ 95°F	> 95°F			
VAV RH (30% Min Default) (CW) (HWRH)															
Zone Group 00															
TERMINAL PERSONNEL	7366	51.4	0	5,411	1,882	72	47	99	70	103	186	86	804	1229	106.5	60.6
TECHNICAL OPS SPACES	7372	51.6	0	5,060	2,211	84	41	94	92	110	176	93	799	1258	106.1	60.7
ENVIRONMENTAL SUPPORT	7370	51.5	0	5,161	2,122	80	44	87	86	104	181	90	805	1253	106.5	60.7
JOINT USE & MISC. SUPPORT	7365	51.5	0	5,198	2,088	77	43	93	82	106	178	90	805	1239	106.4	60.7
TECHNICAL OPERATIONS	7363	51.5	0	4,980	2,305	78	40	87	90	104	179	92	805	1242	106.8	60.8
TERMINAL SPACES	7363	51.6	0	5,240	2,040	74	40	101	88	118	172	89	798	1240	105.7	60.6
CORRIDORS	7370	51.5	0	5,217	2,065	78	44	93	84	106	181	88	804	1251	106.4	60.7

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Temperature Profile

Zone Name	Unmet Heating Hours	Minimum Temperature (°F)	Time spent in each temperature range (°F)										Unmet Cooling Hours	Maximum Temperature (°F)	Mean Temperature (°F)
			< 50°F	50°F ≤ 55°F	55°F ≤ 60°F	60°F ≤ 65°F	65°F ≤ 70°F	70°F ≤ 75°F	75°F ≤ 80°F	80°F ≤ 85°F	85°F ≤ 90°F	90°F ≤ 95°F	> 95°F			
VAV RH (30% Min Default) (CW) (HWRH) - Copy															
Zone Group 00															
CORRIDORS	8565	51.5	0	5,021	3,056	471	47	47	7	20	21	12	58	119	102.4	55.9
JOINT USE & MISC. SUPPORT	8559	51.5	0	5,015	3,059	471	52	46	6	20	21	11	59	119	102.5	55.9
TECHNICAL OPS SPACES	8563	51.6	0	4,826	3,232	491	48	45	9	19	21	15	54	112	102.2	56.0
TECHNICAL OPERATIONS	8554	51.5	0	4,795	3,243	507	49	49	5	21	21	10	60	119	102.7	56.0
ENVIRONMENTAL SUPPORT	8563	51.5	0	4,984	3,083	477	52	47	5	21	21	11	59	113	102.6	55.9
TERMINAL PERSONNEL	8567	51.4	0	5,280	2,821	445	52	45	5	21	21	8	62	119	102.5	55.8
TERMINAL SPACES	8562	51.6	0	5,003	3,097	451	51	41	16	12	20	18	51	112	101.7	55.9

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Humidity Profile

Zone Name	Minimum % Relative Humidity	Time spent in each humidity range												Maximum % Relative Humidity	Mean % Relative Humidity
		< 30%	30% ≤ 35%	35% ≤ 40%	40% ≤ 45%	45% ≤ 50%	50% ≤ 55%	55% ≤ 60%	60% ≤ 65%	65% ≤ 70%	70% ≤ 75%	75% ≤ 80%	> 80%		
System 3 - 2007/2010/2013															
Zone Group 00															
TERMINAL PERSONNEL	4.1	5,162	871	679	763	643	393	157	78	11	4	0	0	74.0	28.3
CORRIDORS	4.2	5,538	615	658	1,045	603	126	40	81	30	26	0	0	73.9	24.9
TECHNICAL OPS SPACES	5.3	5,323	797	708	923	479	197	76	96	51	62	36	12	84.3	25
TECHNICAL OPERATIONS	0.1	5,312	973	656	769	526	216	141	119	41	8	0	0	74.7	27.5
TERMINAL SPACES	0.1	5,128	979	766	753	558	255	88	72	66	79	17	0	79.1	27.3
ENVIRONMENTAL SUPPORT	5.9	5,296	746	748	819	471	258	175	97	84	66	0	0	74.9	25.5
JOINT USE & MISC. SUPPORT	0.1	5,166	983	738	803	502	239	134	105	66	22	3	0	76.8	27.6

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Humidity Profile

Zone Name	Minimum % Relative Humidity	Time spent in each humidity range												Maximum % Relative Humidity	Mean % Relative Humidity
		< 30%	30% ≤ 35%	35% ≤ 40%	40% ≤ 45%	45% ≤ 50%	50% ≤ 55%	55% ≤ 60%	60% ≤ 65%	65% ≤ 70%	70% ≤ 75%	75% ≤ 80%	> 80%		
VAV RH (30% Min Default) (CW) (HWRH) - Copy															
Zone Group 00															
TERMINAL SPACES	18.3	1,820	1,192	652	713	487	404	410	214	381	348	433	1,706	100.0	54.4
JOINT USE & MISC. SUPPORT	18.1	1,908	1,136	667	672	508	409	381	227	350	355	416	1,732	100.0	54.2
TECHNICAL OPS SPACES	18	1,876	1,152	658	705	491	419	389	221	372	343	444	1,691	100.0	54.2
ENVIRONMENTAL SUPPORT	18.1	1,905	1,140	670	667	511	410	380	234	348	352	422	1,722	100.0	54.2
CORRIDORS	18.1	1,908	1,138	664	672	508	415	376	230	358	352	428	1,712	100.0	54.2
TERMINAL PERSONNEL	18.3	1,866	1,170	665	672	502	393	396	224	358	362	375	1,778	100.0	54.4
TECHNICAL OPERATIONS	17.5	1,960	1,102	672	668	502	422	365	244	349	347	446	1,683	100.0	54

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

Site Humidity Profile

Zone Name	Minimum % Relative Humidity	Time spent in each humidity range												Maximum % Relative Humidity	Mean % Relative Humidity
		< 30%	30% ≤ 35%	35% ≤ 40%	40% ≤ 45%	45% ≤ 50%	50% ≤ 55%	55% ≤ 60%	60% ≤ 65%	65% ≤ 70%	70% ≤ 75%	75% ≤ 80%	> 80%		
VAV RH (30% Min Default) (CW) (HWRH)															
Zone Group 00															
TERMINAL PERSONNEL	18.3	2,743	905	506	946	508	446	427	121	159	150	508	1,341	88.3	47.2
TECHNICAL OPS SPACES	18	2,762	896	482	949	543	438	418	145	141	158	540	1,289	88.1	47.1
ENVIRONMENTAL SUPPORT	18.1	2,782	875	516	941	519	449	411	133	146	164	519	1,306	88.3	47
JOINT USE & MISC. SUPPORT	18.1	2,787	870	511	939	522	451	412	131	147	153	526	1,311	88.2	47
TECHNICAL OPERATIONS	17.5	2,830	838	543	914	524	452	396	130	146	183	545	1,260	88.2	46.9
TERMINAL SPACES	18.3	2,718	929	477	947	547	443	427	140	143	147	522	1,321	87.8	47.2
CORRIDORS	18.1	2,787	869	513	932	529	447	415	129	148	165	522	1,305	88.1	47

0 Hours
1 - 100 Hours
100 - 4000 Hour
4000+ Hours

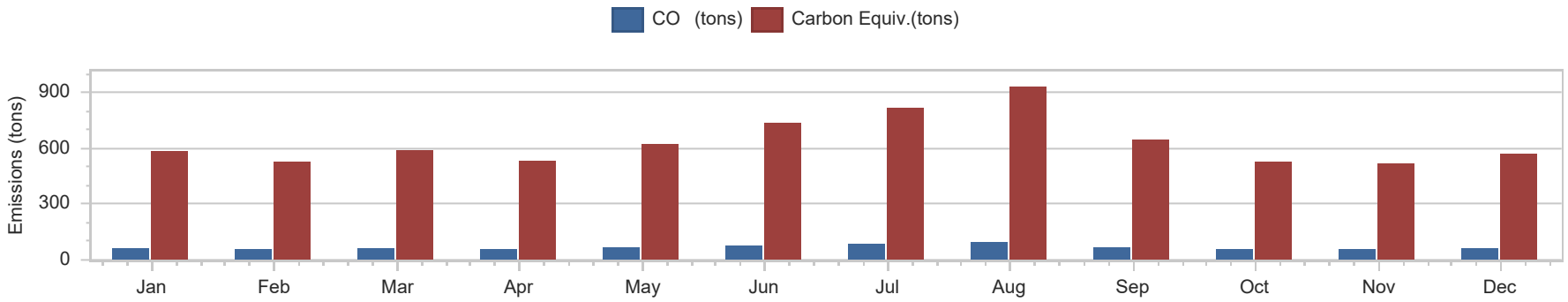
Site Humidity Profile

Zone Name	Minimum % Relative Humidity	Time spent in each humidity range												Maximum % Relative Humidity	Mean % Relative Humidity
		< 30%	30% ≤ 35%	35% ≤ 40%	40% ≤ 45%	45% ≤ 50%	50% ≤ 55%	55% ≤ 60%	60% ≤ 65%	65% ≤ 70%	70% ≤ 75%	75% ≤ 80%	> 80%		
VAV RH (30% Min Default) (CW) (HWRH) - Copy															
Zone Group 00															
CORRIDORS	18.1	1,901	1,102	633	662	499	412	367	230	366	373	478	1,739	100.0	54.8
JOINT USE & MISC. SUPPORT	18.1	1,900	1,099	636	663	500	404	375	225	356	374	461	1,767	100.0	54.8
TECHNICAL OPS SPACES	18	1,871	1,114	626	694	482	416	379	223	381	370	490	1,715	100.0	54.8
TECHNICAL OPERATIONS	17.5	1,951	1,066	641	659	493	419	359	245	353	367	496	1,711	100.0	54.6
ENVIRONMENTAL SUPPORT	18.1	1,897	1,102	640	658	504	404	375	231	353	374	466	1,755	100.0	54.8
TERMINAL PERSONNEL	18.3	1,857	1,135	635	663	494	388	394	209	371	379	412	1,824	100.0	55
TERMINAL SPACES	18.3	1,820	1,152	620	698	478	399	400	214	395	375	480	1,730	100.0	55



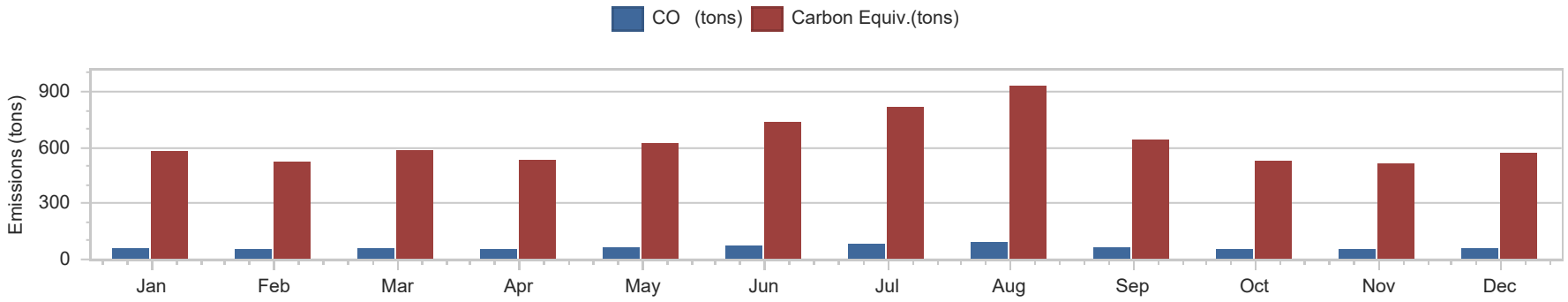
Carbon Footprint and Renewable Energy Summary

Total Emissions



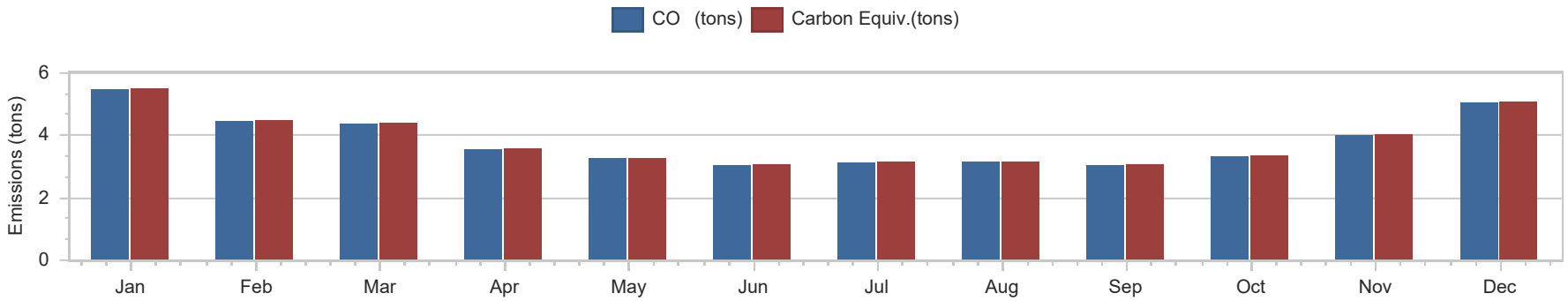
Emissions Data of Total Emissions		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	64.24	57.65	63.83	57.55	66.39	77.73	86.06	97.60	68.28	56.87	56.32	62.82	815.34
CH_4	(tons)	7.68	6.95	7.77	7.06	8.25	9.76	10.83	12.34	8.52	7.00	6.83	7.55	100.53
N_2O	(lbs)	2,200.96	1,991.96	2,227.35	2,022.50	2,364.06	2,796.89	3,105.32	3,537.12	2,443.14	2,005.24	1,959.20	2,163.42	28,817.22
NO_x	(lbs)	103.53	92.88	102.80	92.68	106.86	125.07	138.45	156.97	109.88	91.56	90.72	101.24	1,312.70
SO_2	(lbs)	99.78	90.30	100.97	91.69	107.14	126.77	140.74	160.30	110.74	90.90	88.82	98.06	1,306.24
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.68	0.57	0.55	0.44	0.42	0.37	0.40	0.40	0.37	0.42	0.51	0.64	5.80
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	584.13	528.18	589.96	535.30	624.82	738.40	819.59	933.13	645.39	530.53	519.10	573.85	7,622.39

Source Emissions



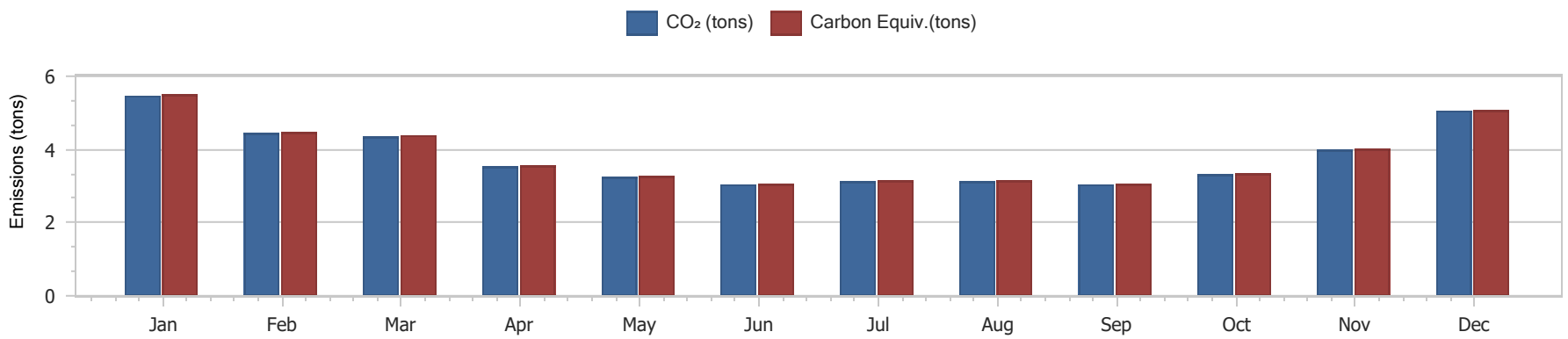
Emission Data for Source Electricity		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	58.77	53.19	59.48	54.01	63.13	74.69	82.92	94.46	65.24	53.55	52.32	57.77	769.52
CH_4	(tons)	7.68	6.95	7.77	7.06	8.25	9.76	10.83	12.34	8.52	7.00	6.83	7.55	100.53
N_2O	(lbs)	2,200.76	1,991.81	2,227.20	2,022.37	2,363.95	2,796.78	3,105.21	3,537.01	2,443.03	2,005.10	1,959.05	2,163.24	28,815.54
NO_x	(lbs)	94.42	85.45	95.55	86.77	101.43	120.00	133.23	151.74	104.81	86.02	84.06	92.81	1,236.33
SO_2	(lbs)	99.74	90.26	100.93	91.65	107.12	126.74	140.72	160.28	110.72	90.85	88.78	98.02	1,305.78
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	578.64	523.69	585.58	531.73	621.54	735.34	816.44	929.96	642.33	527.19	515.08	568.77	7,576.30

Site Emissions



Emission Data for Total Site		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	5.47	4.46	4.36	3.54	3.26	3.04	3.14	3.14	3.04	3.33	4.00	5.05	45.82
CH_4	(tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N_2O	(lbs)	0.20	0.15	0.15	0.13	0.11	0.11	0.11	0.11	0.11	0.13	0.15	0.18	1.68
NO_x	(lbs)	9.11	7.43	7.25	5.91	5.42	5.07	5.22	5.22	5.07	5.53	6.66	8.42	76.37
SO_2	(lbs)	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.46
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.68	0.57	0.55	0.44	0.42	0.37	0.40	0.40	0.37	0.42	0.51	0.64	5.80
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	5.50	4.48	4.38	3.56	3.28	3.06	3.15	3.16	3.06	3.35	4.02	5.08	46.09

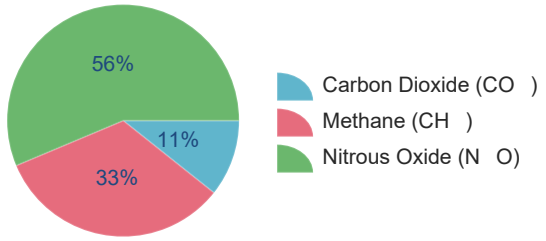
NATURALGAS



Emissions Data for Natural Gas		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CO_2	(tons)	5.47	4.46	4.36	3.54	3.26	3.04	3.14	3.14	3.04	3.33	4.00	5.05	45.82
CH_4	(tons)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N_2O	(lbs)	0.20	0.15	0.15	0.13	0.11	0.11	0.11	0.11	0.11	0.13	0.15	0.18	1.65
NO_x	(lbs)	9.11	7.43	7.25	5.91	5.42	5.07	5.22	5.22	5.07	5.53	6.66	8.42	76.32
SO_2	(lbs)	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.42
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.68	0.57	0.55	0.44	0.42	0.37	0.40	0.40	0.37	0.42	0.51	0.64	5.78
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	5.50	4.48	4.38	3.56	3.28	3.06	3.15	3.16	3.06	3.35	4.02	5.08	46.09

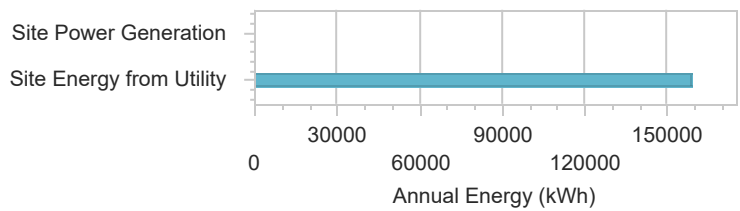
Greenhouse Gas Equivalence

Greenhouse Gas	Annual Total (kg)	Carbon Dioxide Equivalent (kg)	Percent of Total (%)
Carbon Dioxide (CO)	739,662.53	739,662.53	5.35 %
Methane (CH)	91,201.05	2,280,026.25	16.49 %
Nitrous Oxide (N O)	13,071.27	3,895,238.46	28.17 %
Total		6,914,927.24	* Conversion factors from US EPA



On-Site and Renewable Energy Contribution Summary

Electric Load Satisfied	Energy (kWh)	Percent Electricity (%)
Site Power Generation	0	0%
Site Energy from Utility	159,167	100%



On-Site and Renewable Energy Systems

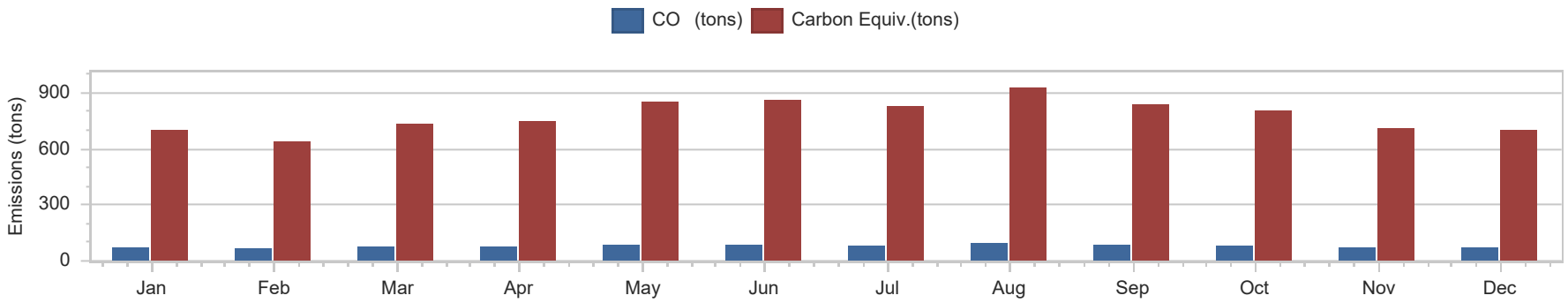
Electric Loads Satisfied	Electricity Used (kWh)	Percent Electricity (%)
Fuel-Fired Power Generation	0	0 %
Photovoltaic Power	0	0 %
Wind Power	0	0 %
Net Decrease in On-Site Storage	0	0 %
Total On-Site Electric Sources	0	0 %
Electricity Coming From Utility	159,167	100 %
Surplus Electricity Going To Utility	0	0 %
Net Electricity From Utility	159,167	100 %
Total On-Site and Utility Electric Sources	159,167	100 %
Total Electricity End Uses	159,167	100 %

Thermal Sources	Heat (Btu)	Percent Heat (%)
Water-Side Heat Recovery	0	0 %
Air to Air Heat Recovery for Cooling	0	0 %
Air to Air Heat Recovery for Heating	0	0 %
Total Thermal Sources	0	0 %

Monthly On-Site Generation

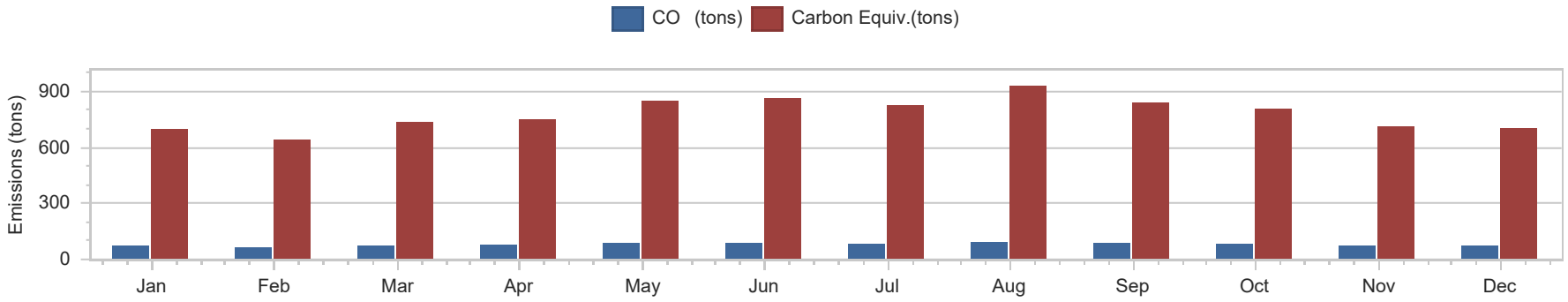
On-Site and Renewables (kWh)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Photovoltaics	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal Combustion Engine	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbine	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Emissions



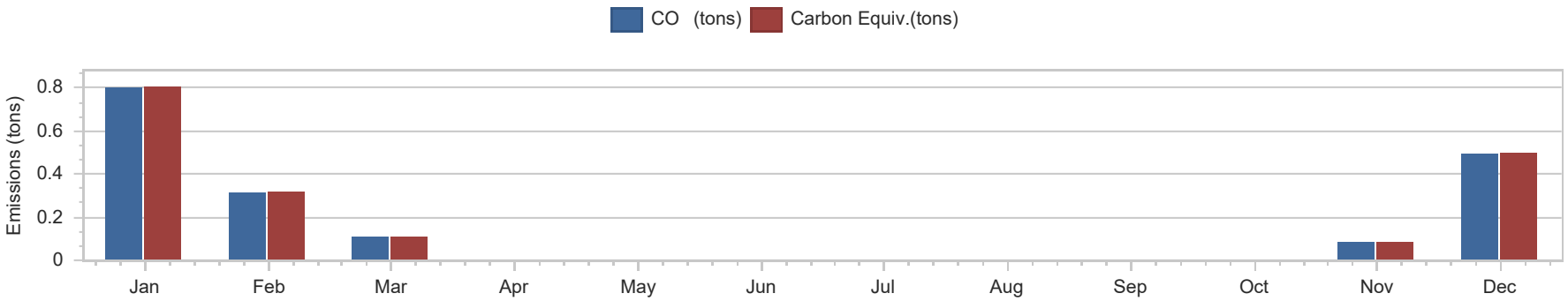
Emissions Data of Total Emissions		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	71.80	65.17	74.62	75.88	86.34	87.57	83.89	94.23	85.23	81.61	72.18	71.77	950.29
CH_4	(tons)	9.27	8.47	9.73	9.91	11.28	11.44	10.96	12.31	11.14	10.66	9.42	9.31	123.91
N_2O	(lbs)	2,658.51	2,428.72	2,790.15	2,841.32	3,233.23	3,279.13	3,141.23	3,528.50	3,191.70	3,056.14	2,699.65	2,668.94	35,517.26
NO_x	(lbs)	115.41	104.74	119.89	121.92	138.71	140.70	134.77	151.39	136.93	131.13	115.96	115.32	1,526.86
SO_2	(lbs)	120.46	110.05	126.44	128.75	146.52	148.59	142.35	159.90	144.62	138.49	122.33	120.95	1,609.48
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	699.79	638.88	733.71	747.06	850.10	862.16	825.91	927.73	839.18	803.53	709.89	702.22	9,340.14

Source Emissions



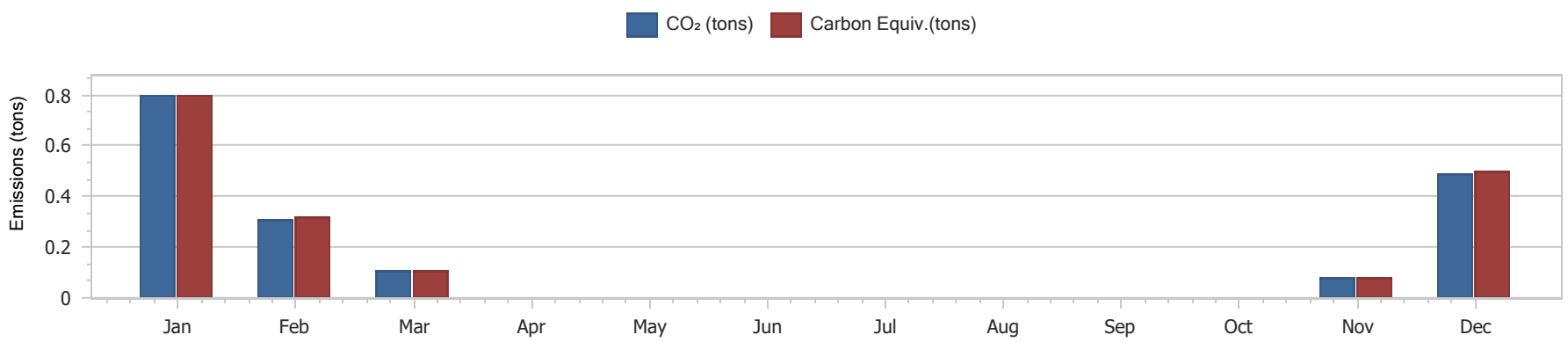
Emission Data for Source Electricity		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	71.00	64.86	74.51	75.88	86.34	87.57	83.89	94.23	85.23	81.61	72.09	71.27	948.49
CH_4	(tons)	9.27	8.47	9.73	9.91	11.28	11.44	10.96	12.31	11.14	10.66	9.42	9.31	123.91
N_2O	(lbs)	2,658.49	2,428.70	2,790.15	2,841.32	3,233.23	3,279.13	3,141.23	3,528.50	3,191.70	3,056.14	2,699.65	2,668.92	35,517.20
NO_x	(lbs)	114.07	104.21	119.71	121.92	138.71	140.70	134.77	151.39	136.93	131.13	115.83	114.51	1,523.86
SO_2	(lbs)	120.46	110.05	126.44	128.75	146.52	148.59	142.35	159.90	144.62	138.49	122.33	120.95	1,609.46
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	698.98	638.56	733.60	747.05	850.10	862.16	825.91	927.73	839.18	803.53	709.80	701.72	9,338.32

Site Emissions



Emission Data for Total Site		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.80
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.34	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	3.00
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0.02
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.50	1.81

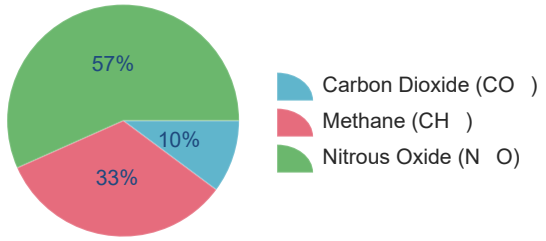
NATURALGAS



Emissions Data for Natural Gas		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.80
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.34	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	3.00
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.24
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.50	1.81
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0

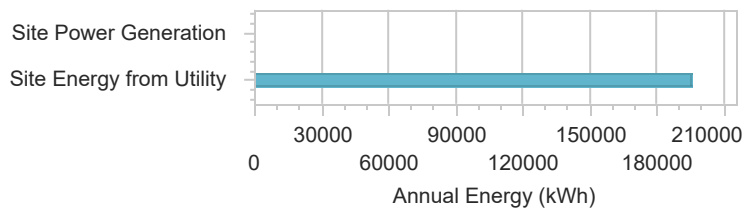
Greenhouse Gas Equivalence

Greenhouse Gas	Annual Total (kg)	Carbon Dioxide Equivalent (kg)	Percent of Total (%)
Carbon Dioxide (CO)	862,088.47	862,088.47	5.09 %
Methane (CH)	112,410.83	2,810,270.75	16.58 %
Nitrous Oxide (N O)	16,110.36	4,800,887.28	28.33 %
Total		8,473,246.50	* Conversion factors from US EPA



On-Site and Renewable Energy Contribution Summary

Electric Load Satisfied	Energy (kWh)	Percent Electricity (%)
Site Power Generation	0	0%
Site Energy from Utility	196,111	100%



On-Site and Renewable Energy Systems

Electric Loads Satisfied	Electricity Used (kWh)	Percent Electricity (%)
Fuel-Fired Power Generation	0	0 %
Photovoltaic Power	0	0 %
Wind Power	0	0 %
Net Decrease in On-Site Storage	0	0 %
Total On-Site Electric Sources	0	0 %
Electricity Coming From Utility	196,111	100 %
Surplus Electricity Going To Utility	0	0 %
Net Electricity From Utility	196,111	100 %
Total On-Site and Utility Electric Sources	196,111	100 %
Total Electricity End Uses	196,111	100 %

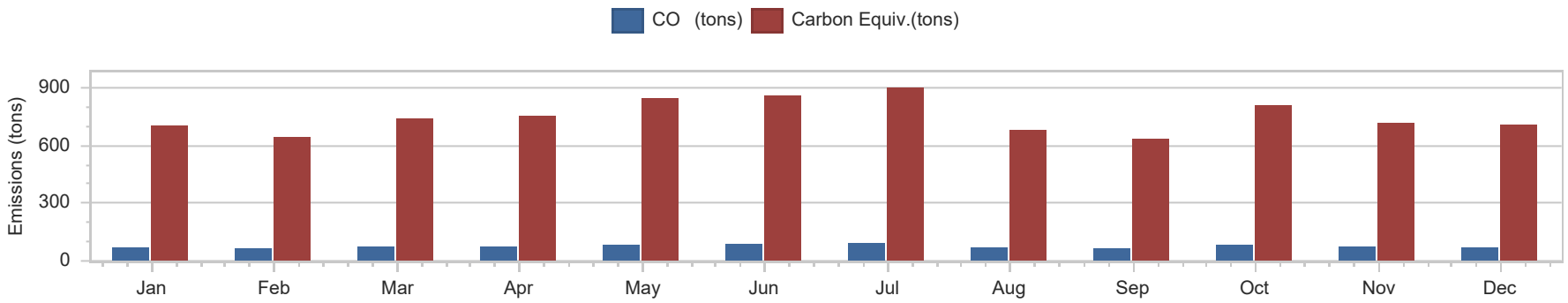
Thermal Sources	Heat (Btu)	Percent Heat (%)
Water-Side Heat Recovery	0	0 %
Air to Air Heat Recovery for Cooling	0	0 %
Air to Air Heat Recovery for Heating	0	0 %
Total Thermal Sources	0	0 %

Monthly On-Site Generation

On-Site and Renewables (kWh)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Photovoltaics	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal Combustion Engine	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbine	0	0	0	0	0	0	0	0	0	0	0	0	0

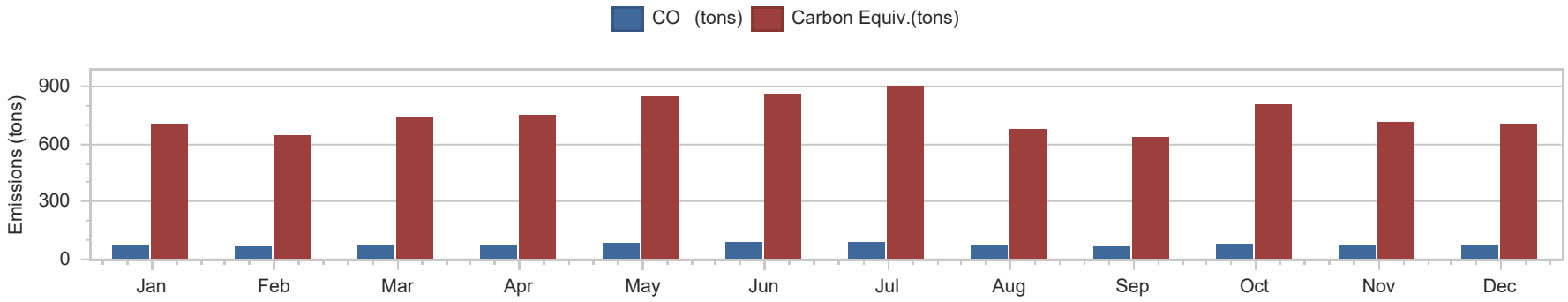
Carbon Footprint and Renewable Energy Summary

Total Emissions



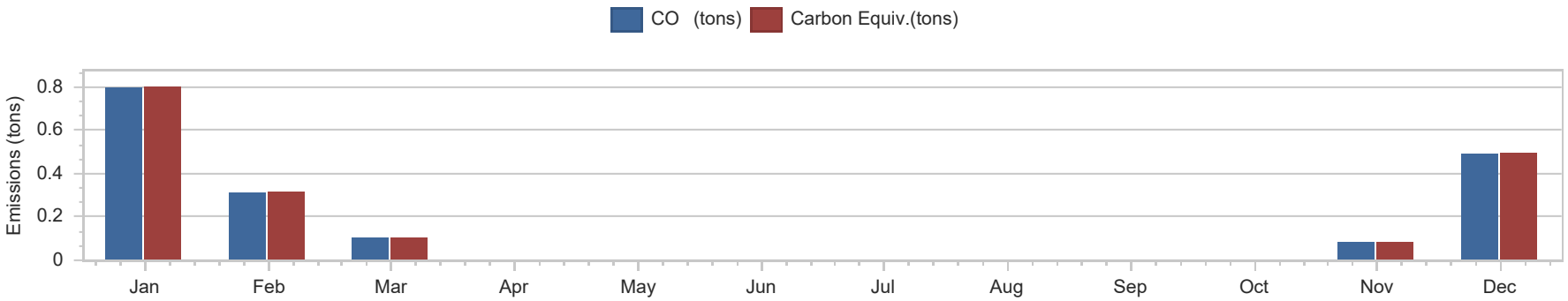
Emissions Data of Total Emissions		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	72.19	65.64	75.26	76.47	86.11	87.51	91.59	68.96	64.60	82.08	72.84	72.22	915.47
CH_4	(tons)	9.33	8.53	9.82	9.99	11.25	11.43	11.97	9.01	8.44	10.72	9.50	9.37	119.36
N_2O	(lbs)	2,673.39	2,446.38	2,814.22	2,863.34	3,224.53	3,276.86	3,429.64	2,582.38	2,418.89	3,073.46	2,724.43	2,686.18	34,213.78
NO_x	(lbs)	116.03	105.49	120.92	122.84	138.34	140.59	147.16	110.80	103.77	131.86	117.02	116.07	1,470.92
SO_2	(lbs)	121.14	110.85	127.54	129.74	146.12	148.48	155.43	117.02	109.61	139.27	123.46	121.72	1,550.42
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	703.70	643.52	740.04	752.84	847.81	861.57	901.74	678.97	635.99	808.09	716.40	706.75	8,997.42

Source Emissions



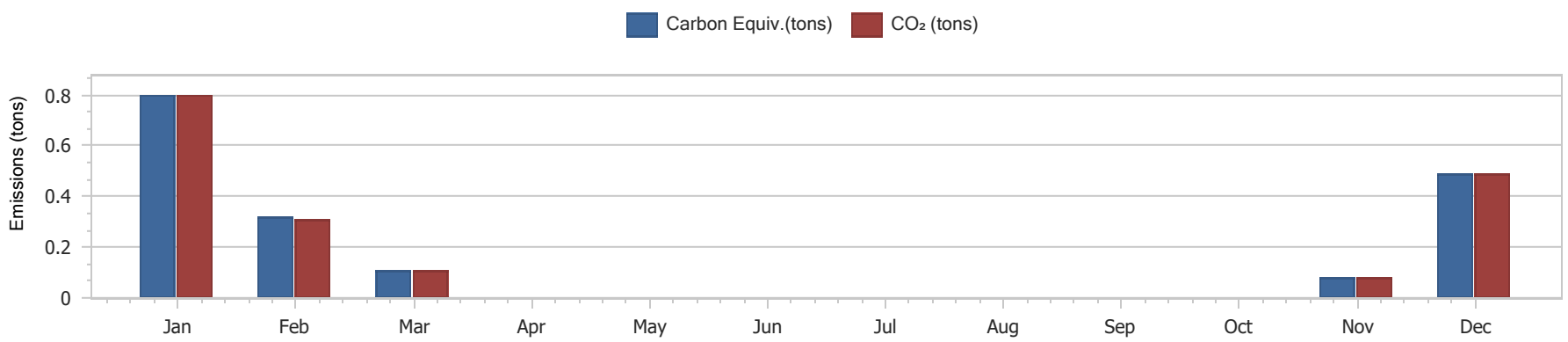
Emission Data for Source Electricity		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	71.39	65.33	75.15	76.47	86.11	87.51	91.59	68.96	64.60	82.08	72.76	71.73	913.68
CH_4	(tons)	9.33	8.53	9.82	9.99	11.25	11.43	11.97	9.01	8.44	10.72	9.50	9.37	119.36
N_2O	(lbs)	2,673.37	2,446.36	2,814.22	2,863.34	3,224.53	3,276.86	3,429.64	2,582.38	2,418.89	3,073.46	2,724.43	2,686.16	34,213.71
NO_x	(lbs)	114.71	104.96	120.75	122.84	138.34	140.59	147.16	110.80	103.77	131.86	116.89	115.26	1,467.93
SO_2	(lbs)	121.14	110.85	127.54	129.74	146.12	148.48	155.43	117.02	109.61	139.27	123.46	121.72	1,550.40
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	702.89	643.21	739.93	752.84	847.81	861.57	901.74	678.97	635.99	808.09	716.32	706.26	8,995.60

Site Emissions



Emission Data for Total Site		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.79
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.32	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	3.00
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0.02
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.81

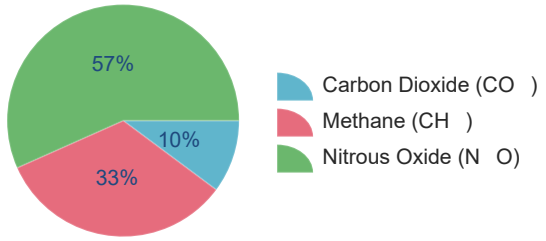
NATURALGAS



Emissions Data for Natural Gas		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.24
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.81
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.79
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.32	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	2.98
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0

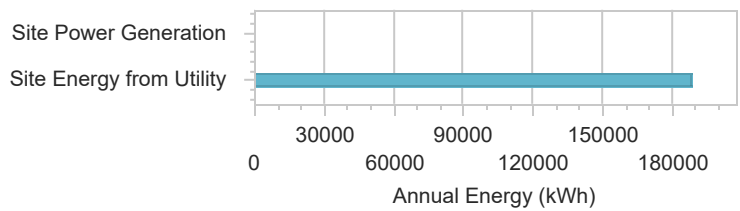
Greenhouse Gas Equivalence

Greenhouse Gas	Annual Total (kg)	Carbon Dioxide Equivalent (kg)	Percent of Total (%)
Carbon Dioxide (CO)	830,501.78	830,501.78	5.09 %
Methane (CH)	108,285.35	2,707,133.75	16.58 %
Nitrous Oxide (N O)	15,519.11	4,624,694.78	28.33 %
	Total	8,162,330.31	* Conversion factors from US EPA



On-Site and Renewable Energy Contribution Summary

Electric Load Satisfied	Energy (kWh)	Percent Electricity (%)
Site Power Generation	0	0%
Site Energy from Utility	188,889	100%



On-Site and Renewable Energy Systems

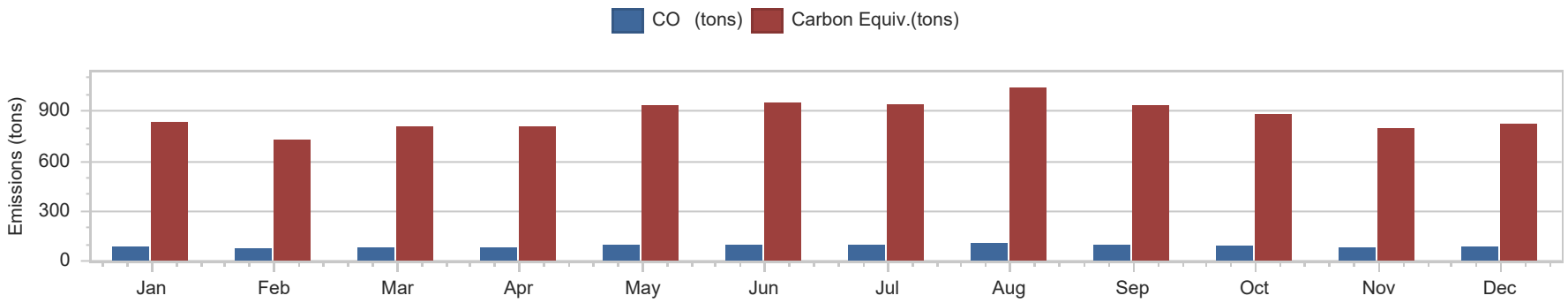
Electric Loads Satisfied	Electricity Used (kWh)	Percent Electricity (%)
Fuel-Fired Power Generation	0	0 %
Photovoltaic Power	0	0 %
Wind Power	0	0 %
Net Decrease in On-Site Storage	0	0 %
Total On-Site Electric Sources	0	0 %
Electricity Coming From Utility	188,889	100 %
Surplus Electricity Going To Utility	0	0 %
Net Electricity From Utility	188,889	100 %
Total On-Site and Utility Electric Sources	188,889	100 %
Total Electricity End Uses	188,889	100 %

Thermal Sources	Heat (Btu)	Percent Heat (%)
Water-Side Heat Recovery	0	0 %
Air to Air Heat Recovery for Cooling	0	0 %
Air to Air Heat Recovery for Heating	0	0 %
Total Thermal Sources	0	0 %

Monthly On-Site Generation

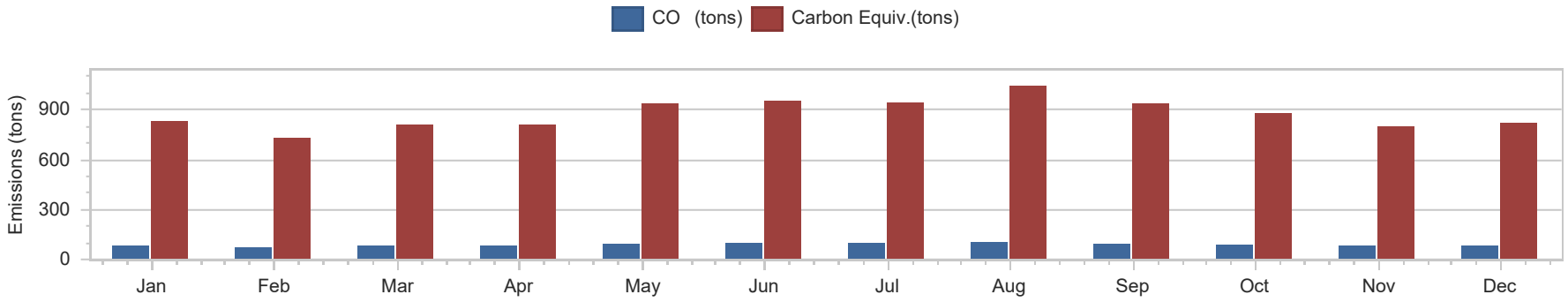
On-Site and Renewables (kWh)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Photovoltaics	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal Combustion Engine	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbine	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Emissions



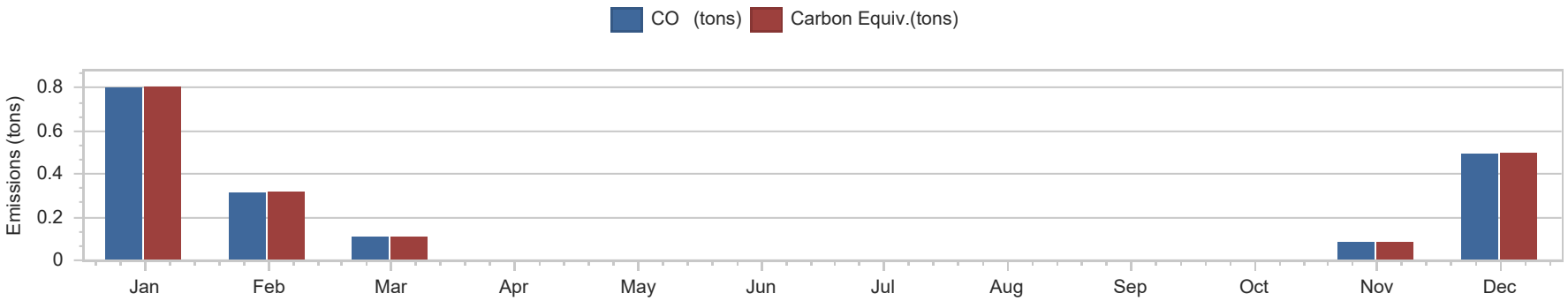
Emissions Data of Total Emissions		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	85.36	74.43	82.27	82.28	95.01	96.88	95.75	105.96	95.28	89.46	81.09	84.09	1,067.85
CH_4	(tons)	11.05	9.68	10.73	10.75	12.41	12.66	12.51	13.84	12.45	11.69	10.58	10.92	139.27
N_2O	(lbs)	3,166.57	2,775.47	3,076.73	3,080.76	3,557.80	3,627.62	3,585.38	3,967.64	3,567.96	3,349.95	3,033.41	3,130.28	39,919.52
NO_x	(lbs)	137.22	119.60	132.19	132.19	152.65	155.65	153.84	170.24	153.09	143.72	130.27	135.12	1,715.73
SO_2	(lbs)	143.50	125.77	139.42	139.60	161.22	164.38	162.48	179.79	161.69	151.81	137.46	141.85	1,808.98
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	833.37	730.05	809.05	810.01	935.43	953.79	942.68	1,043.19	938.11	880.78	797.64	823.51	10,497.60

Source Emissions



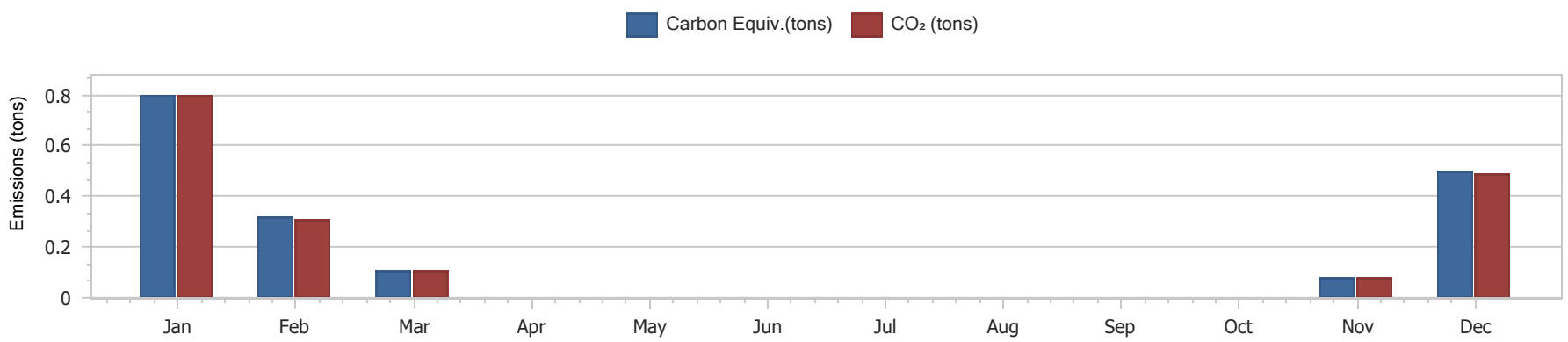
Emission Data for Source Electricity		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	84.56	74.12	82.16	82.27	95.01	96.88	95.75	105.96	95.28	89.46	81.01	83.59	1,066.05
CH_4	(tons)	11.05	9.68	10.73	10.75	12.41	12.66	12.51	13.84	12.45	11.69	10.58	10.92	139.27
N_2O	(lbs)	3,166.54	2,775.44	3,076.73	3,080.76	3,557.80	3,627.62	3,585.38	3,967.64	3,567.96	3,349.95	3,033.41	3,130.26	39,919.45
NO_x	(lbs)	135.87	119.07	132.01	132.19	152.65	155.65	153.84	170.24	153.09	143.72	130.14	134.31	1,712.73
SO_2	(lbs)	143.50	125.77	139.42	139.60	161.22	164.38	162.48	179.79	161.69	151.81	137.46	141.85	1,808.96
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	832.56	729.73	808.95	810.01	935.43	953.79	942.68	1,043.19	938.10	880.78	797.56	823.02	10,495.79

Site Emissions



Emission Data for Total Site		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.80
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.34	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	3.00
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0.02
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.22
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.50	1.81

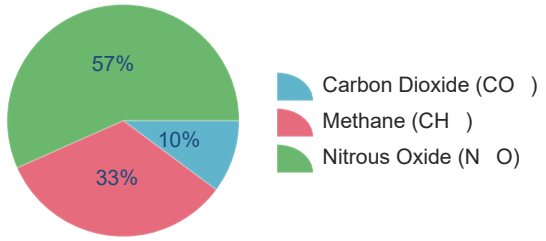
NATURALGAS



Emissions Data for Natural Gas		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
PM	(lbs)	0.11	0.04	0.02	0	0	0	0	0	0	0	0	0.07	0.24
Water Consum.	(gal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Equiv.	(tons)	0.80	0.32	0.11	0.00	0	0	0	0	0	0	0.08	0.50	1.81
CO_2	(tons)	0.80	0.31	0.11	0.00	0	0	0	0	0	0	0.08	0.49	1.80
CH_4	(tons)	0.00	0.00	0	0	0	0	0	0	0	0	0	0.00	0.00
N_2O	(lbs)	0.02	0.02	0	0	0	0	0	0	0	0	0	0.02	0.07
NO_x	(lbs)	1.34	0.53	0.18	0	0	0	0	0	0	0	0.13	0.82	3.00
SO_2	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg	(lbs)	0	0	0	0	0	0	0	0	0	0	0	0	0

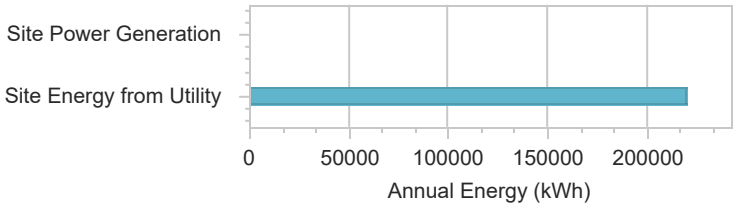
Greenhouse Gas Equivalence

Greenhouse Gas	Annual Total (kg)	Carbon Dioxide Equivalent (kg)	Percent of Total (%)
Carbon Dioxide (CO)	968,739.18	968,739.18	5.09 %
Methane (CH)	126,343.84	3,158,596.00	16.58 %
Nitrous Oxide (N O)	18,107.19	5,395,942.62	28.33 %
Total		9,523,277.80	* Conversion factors from US EPA



On-Site and Renewable Energy Contribution Summary

Electric Load Satisfied	Energy (kWh)	Percent Electricity (%)
Site Power Generation	0	0%
Site Energy from Utility	220,556	100%



On-Site and Renewable Energy Systems

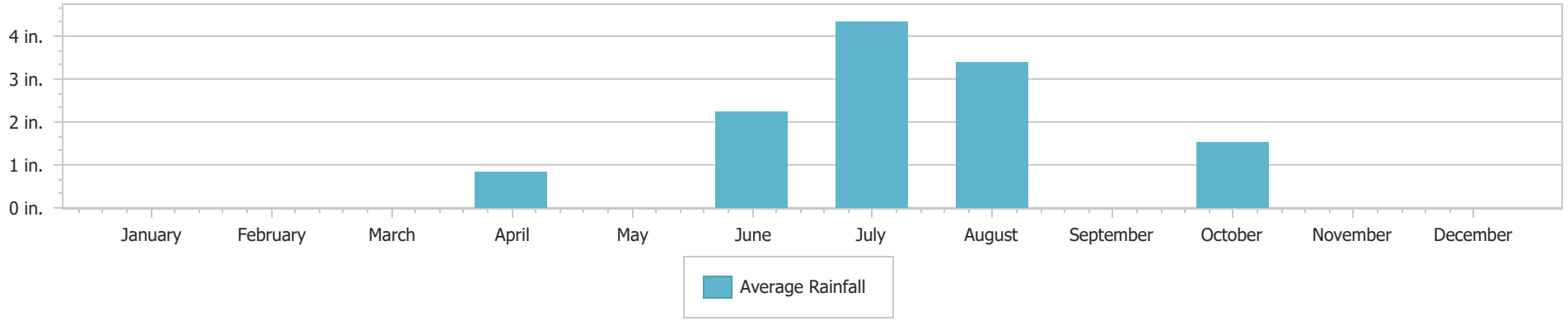
Electric Loads Satisfied	Electricity Used (kWh)	Percent Electricity (%)
Fuel-Fired Power Generation	0	0 %
Photovoltaic Power	0	0 %
Wind Power	0	0 %
Net Decrease in On-Site Storage	0	0 %
Total On-Site Electric Sources	0	0 %
Electricity Coming From Utility	220,556	100 %
Surplus Electricity Going To Utility	0	0 %
Net Electricity From Utility	220,556	100 %
Total On-Site and Utility Electric Sources	220,556	100 %
Total Electricity End Uses	220,556	100 %

Thermal Sources	Heat (Btu)	Percent Heat (%)
Water-Side Heat Recovery	0	0 %
Air to Air Heat Recovery for Cooling	0	0 %
Air to Air Heat Recovery for Heating	0	0 %
Total Thermal Sources	0	0 %

Monthly On-Site Generation

On-Site and Renewables (kWh)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Photovoltaics	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal Combustion Engine	0	0	0	0	0	0	0	0	0	0	0	0	0
Combustion Turbine	0	0	0	0	0	0	0	0	0	0	0	0	0

Water Summary



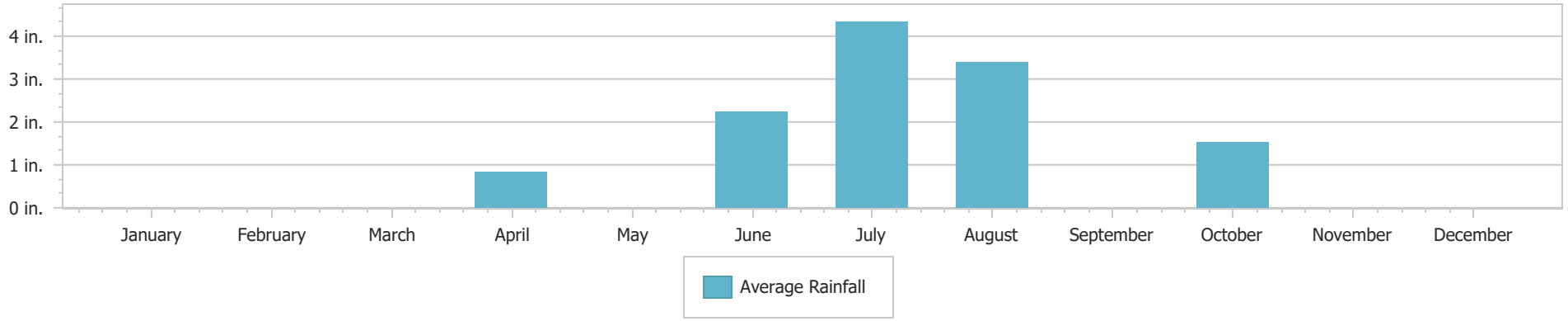
If the weather file contains erroneous or incomplete rainfall data, the data here will be erroneous or incomplete as well.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Rainfall	in.	0.00	0.00	0.00	0.83	0.00	2.24	4.33	3.39	0.00	1.54	0.00	0.00	12.32
Average Gallons of H2O	gal	0.00	0.00	0.00	4,129.87	0.00	11,209.64	21,632.63	16,912.78	0.00	7,669.75	0.00	0.00	61,554.66

Gross Roof Area: 8,013 ft²

	Water (gal)	Percent Water (%)
Rainwater Collection	0	0
Condensate Collection	0	0
Groundwater Well	0	0
Total On Site Water Sources	0	0
Initial Storage	0	0
Final Storage	0	0
Change in Storage	0	0
Water Supplied by Utility	0	0
Total On Site, Change in Storage, and Utility Water Sources	0	0
Total Water End Uses	0	0

Water Summary



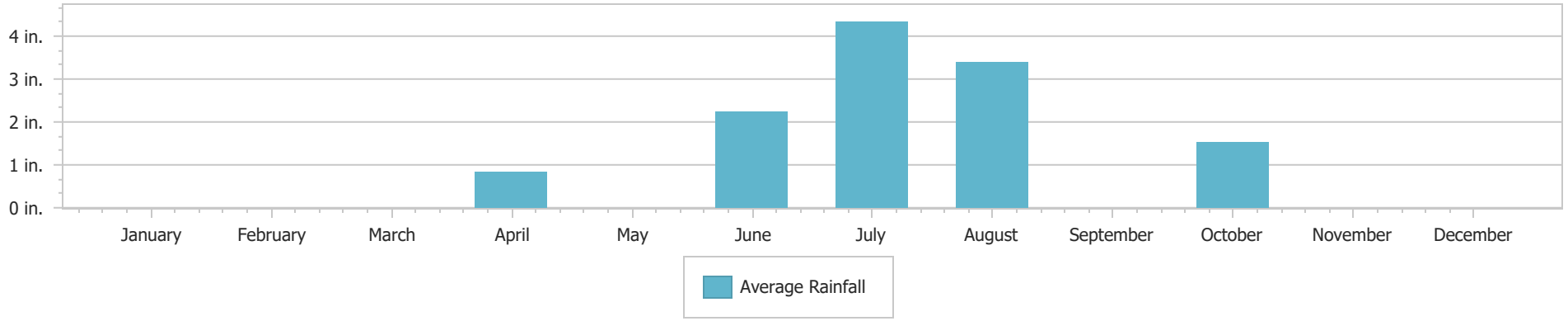
If the weather file contains erroneous or incomplete rainfall data, the data here will be erroneous or incomplete as well.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Rainfall	in.	0.00	0.00	0.00	0.83	0.00	2.24	4.33	3.39	0.00	1.54	0.00	0.00	12.32
Average Gallons of H2O	gal	0.00	0.00	0.00	4,129.87	0.00	11,209.64	21,632.63	16,912.78	0.00	7,669.75	0.00	0.00	61,554.66

Gross Roof Area: 8,013 ft²

	Water (gal)	Percent Water (%)
Rainwater Collection	0	0
Condensate Collection	0	0
Groundwater Well	0	0
Total On Site Water Sources	0	0
Initial Storage	0	0
Final Storage	0	0
Change in Storage	0	0
Water Supplied by Utility	0	0
Total On Site, Change in Storage, and Utility Water Sources	0	0
Total Water End Uses	0	0

Water Summary



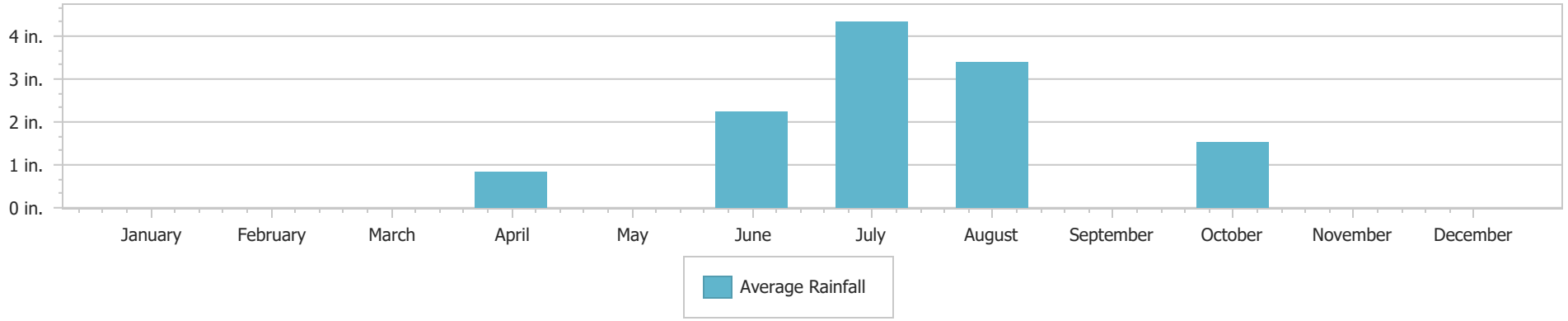
If the weather file contains erroneous or incomplete rainfall data, the data here will be erroneous or incomplete as well.

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Rainfall	in.	0.00	0.00	0.00	0.83	0.00	2.24	4.33	3.39	0.00	1.54	0.00	0.00	12.32
Average Gallons of H2O	gal	0.00	0.00	0.00	4,129.87	0.00	11,209.64	21,632.63	16,912.78	0.00	7,669.75	0.00	0.00	61,554.66

Gross Roof Area: 8,013 ft²

	Water (gal)	Percent Water (%)
Rainwater Collection	0	0
Condensate Collection	0	0
Groundwater Well	0	0
Total On Site Water Sources	0	0
Initial Storage	0	0
Final Storage	0	0
Change in Storage	0	0
Water Supplied by Utility	0	0
Total On Site, Change in Storage, and Utility Water Sources	0	0
Total Water End Uses	0	0

Water Summary



If the weather file contains erroneous or incomplete rainfall data, the data here will be erroneous or incomplete as well.

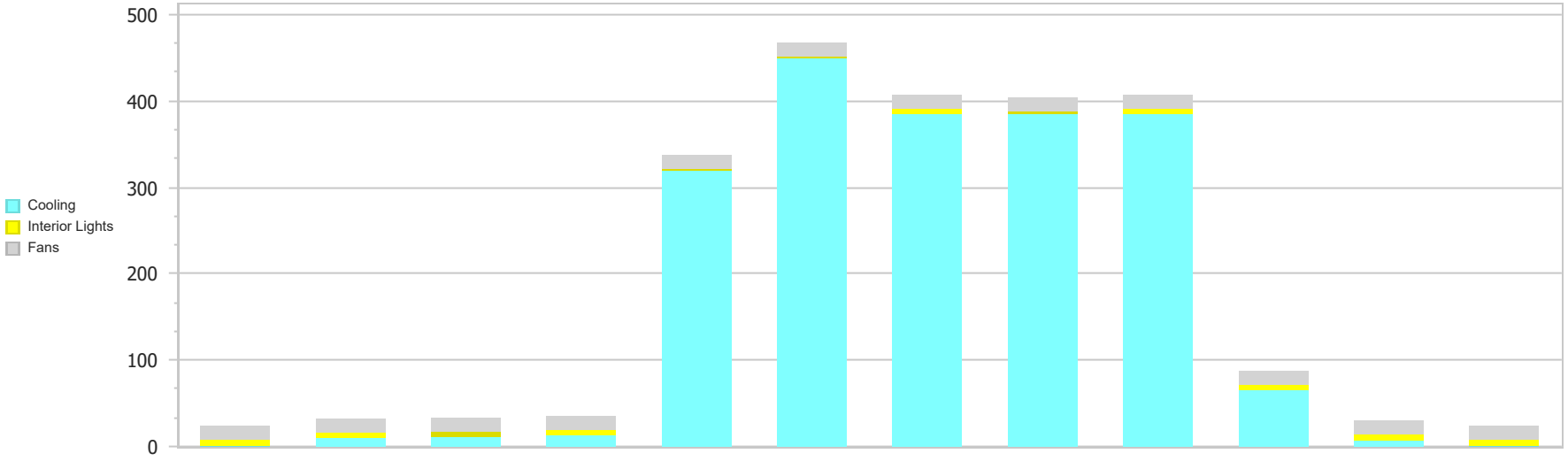
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Rainfall	in.	0.00	0.00	0.00	0.83	0.00	2.24	4.33	3.39	0.00	1.54	0.00	0.00	12.32
Average Gallons of H2O	gal	0.00	0.00	0.00	4,129.87	0.00	11,209.64	21,632.63	16,912.78	0.00	7,669.75	0.00	0.00	61,554.66

Gross Roof Area: 8,013 ft²

	Water (gal)	Percent Water (%)
Rainwater Collection	0	0
Condensate Collection	0	0
Groundwater Well	0	0
Total On Site Water Sources	0	0
Initial Storage	0	0
Final Storage	0	0
Change in Storage	0	0
Water Supplied by Utility	68930	100
Total On Site, Change in Storage, and Utility Water Sources	68930	100
Total Water End Uses	68930	100

Utility Peak Demand Summary

Electricity (kW)



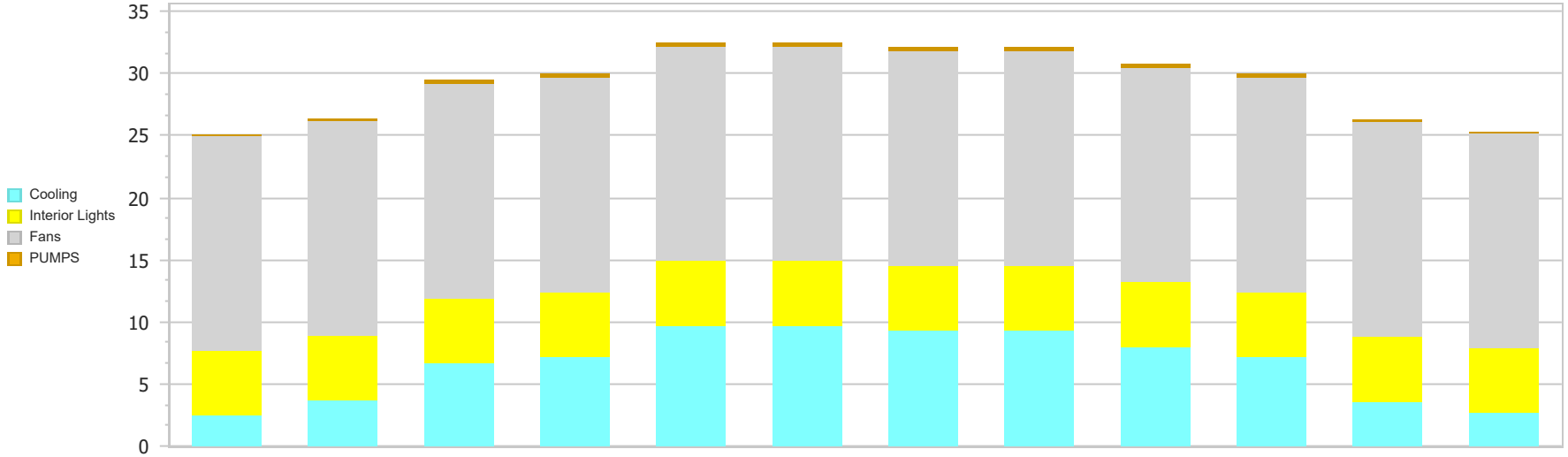
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	23.6	32.4	32.9	35.5	337.4	467.3	406.9	403.4	407.1	87.4	29.7	23.6
Time of Peak (Day/Hour)	20/14:00	09/15:00	10/17:00	28/13:00	24/19:00	08/18:00	11/14:00	29/18:00	11/16:00	02/16:00	08/11:00	12/13:00
Heating	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	1.5	10.3	11.2	13.4	320.8	448.9	384.8	385	385	65.2	7.6	1.5
Interior Lights	6.2	6.2	5.8	6.2	0.7	2.5	6.2	2.5	6.2	6.2	6.2	6.2
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Fans	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0	0	0
Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0	0	0
Generators	0	0	0	0	0	0	0	0	0	0	0	0
Electricity Produced	0	0	0	0	0	0	0	0	0	0	0	0
PUMPS	0	0	0	0	0	0	0	0	0	0	0	0

Gas (therms/hr)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	2.8	2.6	2.2	1.8	1.7	1	1	0.9	0.9	1.5	2.2	2.5
Time of Peak (Day/Hour)	09/06:00	06/06:00	06/06:00	10/06:00	01/06:00	05/06:00	03/06:00	22/13:00	06/06:00	16/06:00	28/06:00	20/06:00
Heating	2.8	2.6	2.2	1.8	1.7	1	1	0.9	0.9	1.5	2.2	2.5

Utility Peak Demand Summary

Electricity (kW)



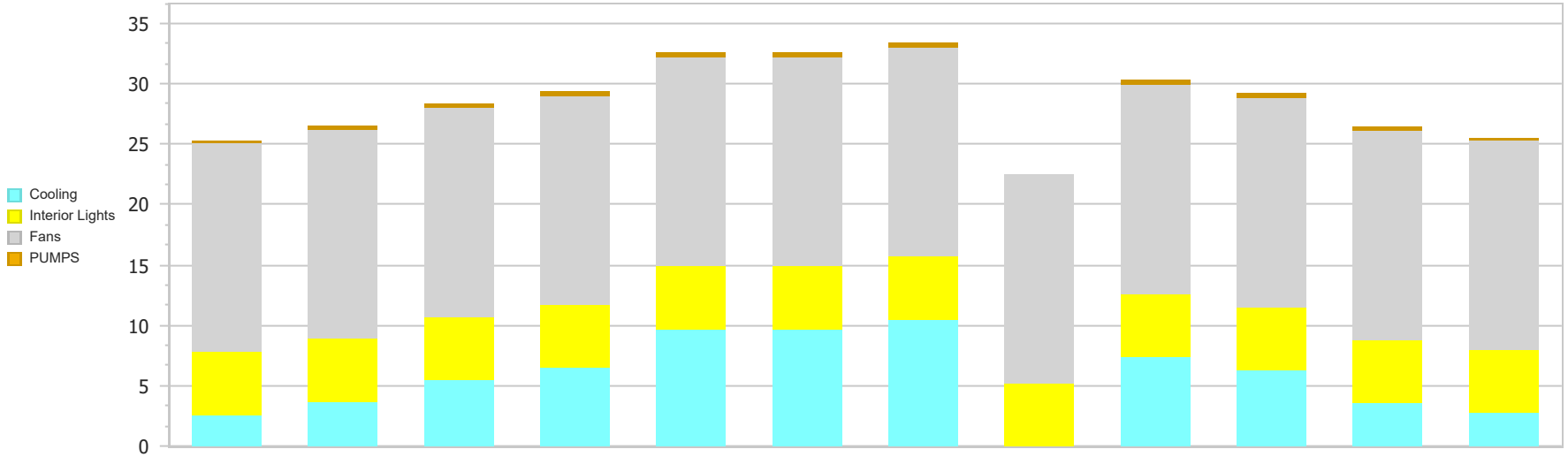
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	25.1	26.4	29.6	30.1	32.5	32.5	32.1	32.2	30.9	30.1	26.2	25.3
Time of Peak (Day/Hour)	13/15:00	10/15:00	31/15:00	28/14:00	26/14:00	26/12:00	10/15:00	11/13:00	01/15:00	02/11:00	07/15:00	12/14:00
Heating	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	2.5	3.7	6.7	7.2	9.7	9.7	9.3	9.3	8	7.2	3.6	2.7
Interior Lights	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Fans	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0	0	0
Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0	0	0
Generators	0	0	0	0	0	0	0	0	0	0	0	0
Electricity Produced	0	0	0	0	0	0	0	0	0	0	0	0
PUMPS	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1

Gas (therms/hr)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2
Time of Peak (Day/Hour)	09/06:00	06/06:00	23/06:00	12/06:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	28/07:00	20/06:00
Heating	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2

Utility Peak Demand Summary

Electricity (kW)



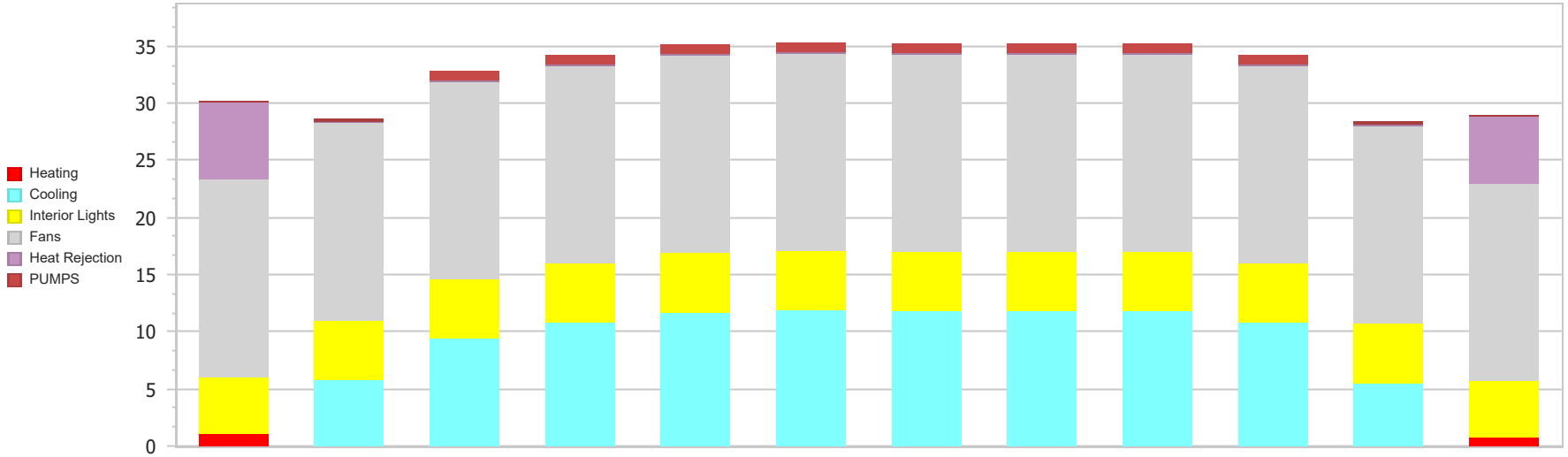
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	25.4	26.6	28.4	29.4	32.6	32.6	33.4	22.5	30.3	29.2	26.4	25.5
Time of Peak (Day/Hour)	13/15:00	10/15:00	31/16:00	28/13:00	26/14:00	26/12:00	17/13:00	01/11:00	11/13:00	02/14:00	07/15:00	12/14:00
Heating	0	0	0	0	0	0	0	0	0	0	0	0
Cooling	2.6	3.7	5.5	6.5	9.7	9.7	10.5	0	7.4	6.3	3.6	2.8
Interior Lights	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Fans	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Heat Rejection	0	0	0	0	0	0	0	0	0	0	0	0
Humidification	0	0	0	0	0	0	0	0	0	0	0	0
Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0	0	0
Generators	0	0	0	0	0	0	0	0	0	0	0	0
Electricity Produced	0	0	0	0	0	0	0	0	0	0	0	0
PUMPS	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0	0.4	0.4	0.3	0.2

Gas (therms/hr)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2
Time of Peak (Day/Hour)	09/06:00	06/06:00	23/06:00	12/06:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	28/07:00	20/06:00
Heating	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2

Utility Peak Demand Summary

Electricity (kW)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	30.3	28.7	32.8	34.2	35.2	35.4	35.3	35.3	35.3	34.3	28.5	29
Time of Peak (Day/Hour)	09/10:00	10/15:00	31/15:00	28/14:00	25/11:00	26/16:00	21/14:00	30/13:00	19/14:00	02/11:00	07/15:00	19/10:00
Heating	1.1	0	0	0	0	0	0	0	0	0	0	0.8
Cooling	0	5.8	9.4	10.8	11.7	11.9	11.8	11.8	11.8	10.8	5.5	0
Interior Lights	4.9	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	4.9
Exterior Lights	0	0	0	0	0	0	0	0	0	0	0	0
Interior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Exterior Equipment	0	0	0	0	0	0	0	0	0	0	0	0
Fans	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Heat Rejection	6.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5.9
Humidification	0	0	0	0	0	0	0	0	0	0	0	0
Heat Recovery	0	0	0	0	0	0	0	0	0	0	0	0
Water Systems	0	0	0	0	0	0	0	0	0	0	0	0
Refrigeration	0	0	0	0	0	0	0	0	0	0	0	0
Generators	0	0	0	0	0	0	0	0	0	0	0	0
Electricity Produced	0	0	0	0	0	0	0	0	0	0	0	0
PUMPS	0.1	0.3	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.3	0.1

Gas (therms/hr)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Peak Facility Demand	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2
Time of Peak (Day/Hour)	09/06:00	06/06:00	23/06:00	12/06:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	01/00:00	28/07:00	20/06:00
Heating	1.4	1.1	0.7	0.2	0	0	0	0	0	0	0.7	1.2

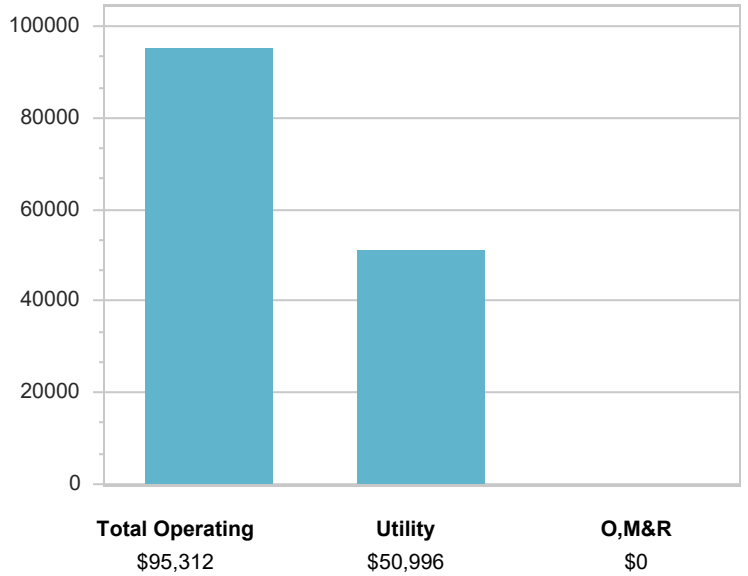
Economic Summary

Economic Summary and Calculation Parameters

Life Cycle and Costing Parameters

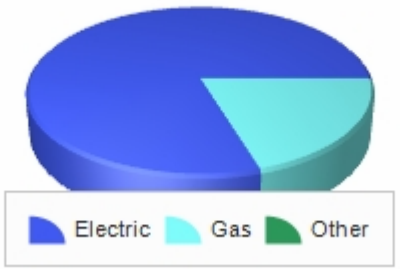
Length of Study	30 years
Inflation Approach	CurrentDollar
Discounting Convention	BeginningOfYear
Real Discount Rate	-- N/A --
Nominal Discount Rate	5.00%
Inflation Rate	4.00%
Tax Rate	0.00%
Depreciation Method	ModifiedAcceleratedCostRecoverySystem-15year
Base Date	June 2023
Service Date	March 2024
Building Area	6,550 (ft²)
Net Conditioned Building Area	6,550 (ft²)
Initial Capital Investment Cost	$0

Average Costs

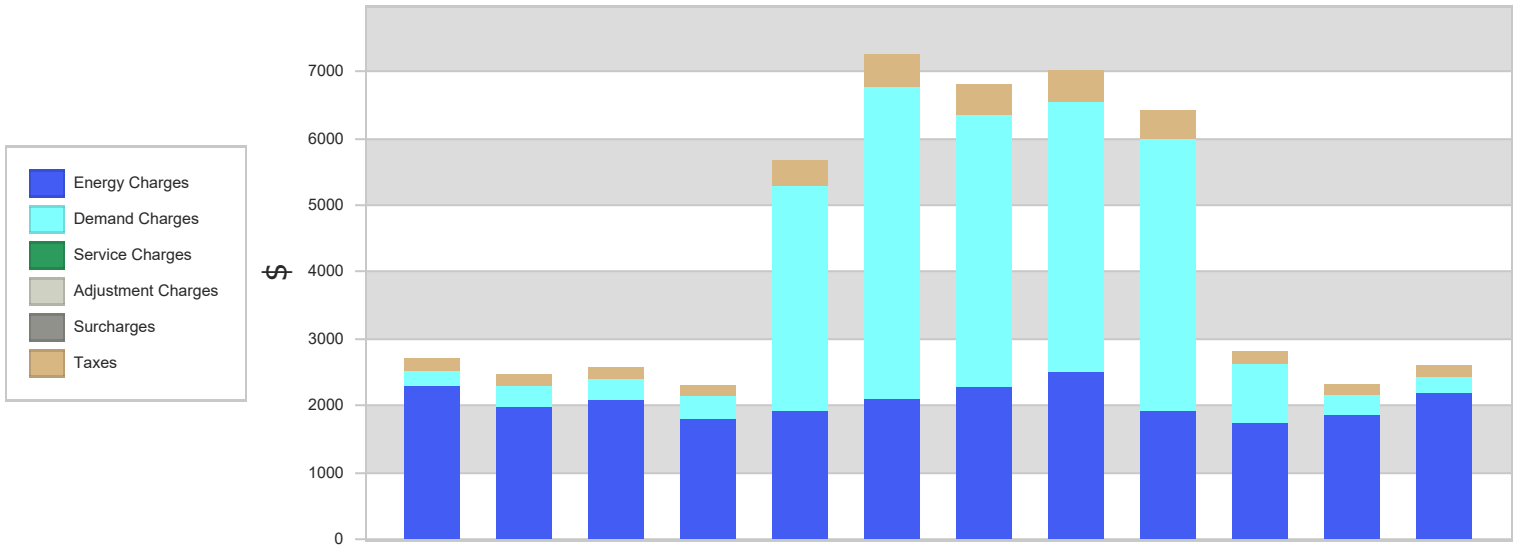


Energy Cost Summary

Name	Electricity	Gas	Other	Total
Energy Cost (Net)	$40,742	$10,254	$0	$50,996
Renewables Offset	$0	$0	$0	$0
Energy Cost (Total)	$40,742	$10,254	$0	$50,996
Cost per Building Area	$6.22	$1.57	$0.00	$7.79
Cost per Net Cond. Bldg Area	$6.22	$1.57	$0.00	$7.79

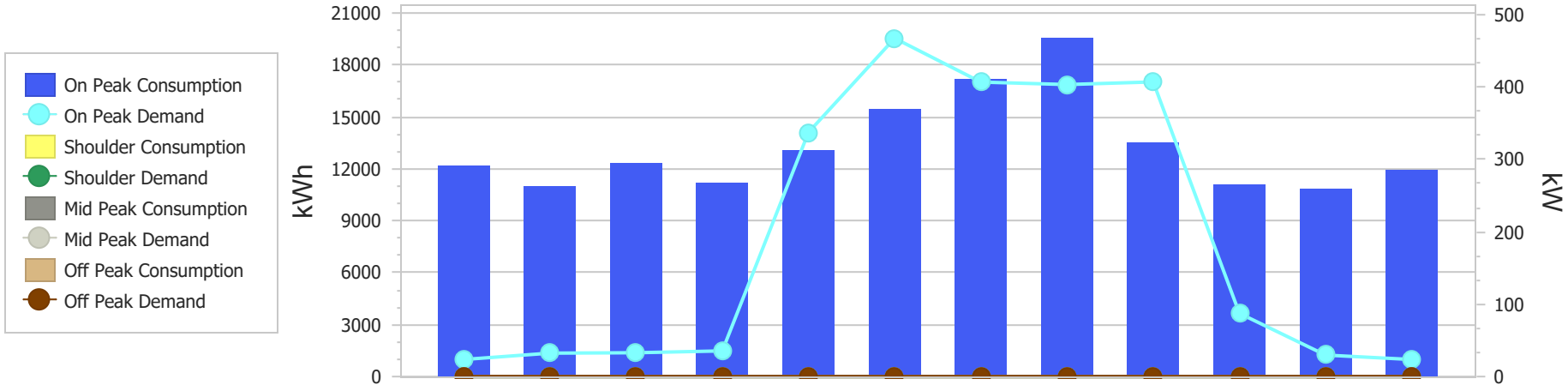


Monthly Utilities Cost Summary



Tariff Catagory	Fuel Type	Jan ($)	Feb ($)	Mar ($)	Apr ($)	May ($)	Jun ($)	Jul ($)	Aug ($)	Sep ($)	Oct ($)	Nov ($)	Dec ($)	Annual Total ($)	% of Total
Consumption Charges	Natural Gas	1,140	930	909	739	680	634	654	656	634	694	835	1,054	9,560	18.75%
	Electricity	1,155	1,045	1,168	1,061	1,240	1,467	1,629	1,856	1,282	1,052	1,028	1,135	15,117	29.64%
Demand Charges	Electricity	236	324	329	355	3,374	4,673	4,069	4,034	4,071	874	297	236	22,871	44.85%
ServiceCharges	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Basis	All	2,531	2,299	2,406	2,155	5,294	6,775	6,352	6,546	5,987	2,619	2,159	2,425	47,548	93.24%
Adjustment	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Surcharge	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Subtotal	All	2,531	2,299	2,406	2,155	5,294	6,775	6,352	6,546	5,987	2,619	2,159	2,425	47,548	93.24%
Taxes	All	183	167	174	156	384	491	461	475	434	190	157	176	3,447	6.76%
	Total	2,714	2,466	2,581	2,311	5,678	7,266	6,813	7,020	6,421	2,809	2,316	2,601	50,996	

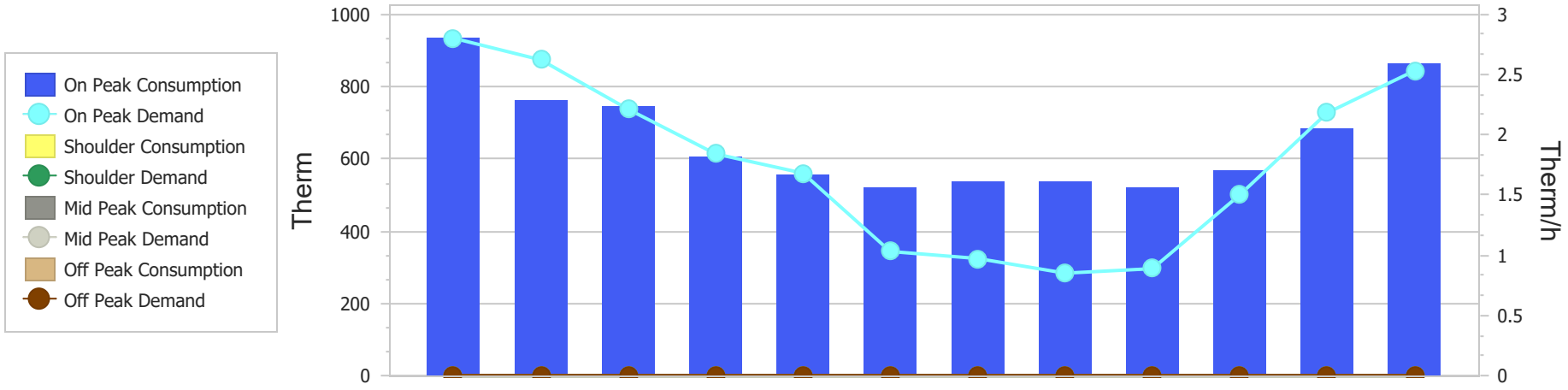
Monthly Utility Details



Electricity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption kWh	12,153	10,999	12,299	11,168	13,054	15,445	17,148	19,532	13,491	11,073	10,818	11,946	159,128
On Peak Demand kW	24	32	33	35	337	467	407	403	407	87	30	24	467

Monthly Utility Details

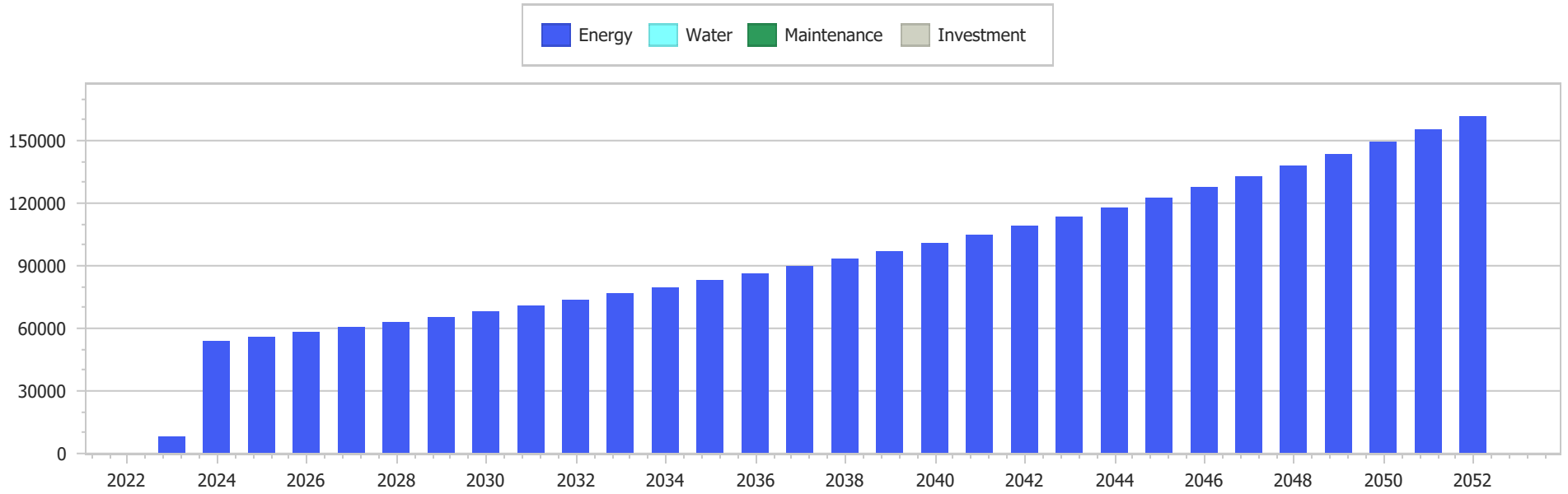


Natural Gas	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption Therm	936	763	745	606	558	520	537	538	520	569	685	865	7,843
On Peak Demand Therm/h	3	3	2	2	2	1	1	1	1	2	2	3	3

Tariff Details

Tariff Name	Selected	Qualified	Meter Name	Buy or Sell	Group	Total Annual Cost
GFK ATCT _NGAS	Yes	Yes	BUILDING NATURAL GAS	Buy	(none)	$10,254
GFK ATCT _ELEC	Yes	Yes	BUILDING ELECTRICITY	Buy	(none)	$40,742

Life Cycle Operating Cash Flow (without escalation)



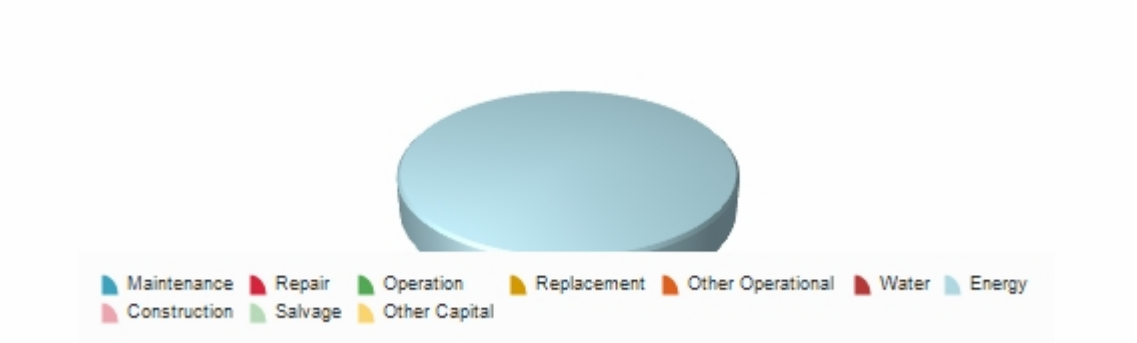
Year	Energy	Water	Maintenance	Investment	Total
2023	8,018	0	0	0	8,018
2024	53,833	0	0	0	53,833
2025	55,987	0	0	0	55,987
2026	58,226	0	0	0	58,226
2027	60,555	0	0	0	60,555
2028	62,977	0	0	0	62,977
2029	65,496	0	0	0	65,496

Year	Energy	Water	Maintenance	Investment	Total
2030	68,116	0	0	0	68,116
2031	70,841	0	0	0	70,841
2032	73,675	0	0	0	73,675
2033	76,622	0	0	0	76,622
2034	79,686	0	0	0	79,686
2035	82,874	0	0	0	82,874
2036	86,189	0	0	0	86,189
2037	89,636	0	0	0	89,636
2038	93,222	0	0	0	93,222
2039	96,951	0	0	0	96,951
2040	100,829	0	0	0	100,829
2041	104,862	0	0	0	104,862
2042	109,056	0	0	0	109,056
2043	113,419	0	0	0	113,419
2044	117,956	0	0	0	117,956
2045	122,674	0	0	0	122,674
2046	127,581	0	0	0	127,581
2047	132,684	0	0	0	132,684
2048	137,991	0	0	0	137,991
2049	143,511	0	0	0	143,511
2050	149,251	0	0	0	149,251
2051	155,221	0	0	0	155,221
2052	161,430	0	0	0	161,430

Present Value Analysis (Without Escalation)

Present Value By Year

Year	Total Cost	Present Value
2023	8,018.47	8,018.47
2024	53,833.33	51,269.84
2025	55,986.66	50,781.55
2026	58,226.13	50,297.92
2027	60,555.17	49,818.89
2028	62,977.38	49,344.42
2029	65,496.47	48,874.48
2030	68,116.33	48,409.01
2031	70,840.99	47,947.97
2032	73,674.63	47,491.32
2033	76,621.61	47,039.02
2034	79,686.48	46,591.03
2035	82,873.93	46,147.31
2036	86,188.89	45,707.81
2037	89,636.45	45,272.50
2038	93,221.91	44,841.33
2039	96,950.78	44,414.27
2040	100,828.80	43,991.28
2041	104,862.00	43,572.31
2042	109,056.40	43,157.34
2043	113,418.70	42,746.32
2044	117,955.50	42,339.21
2045	122,673.70	41,935.98
2046	127,580.60	41,536.59
2047	132,683.80	41,141.00
2048	137,991.20	40,749.18
2049	143,510.80	40,361.09
2050	149,251.30	39,976.70
2051	155,221.30	39,595.97
2052	161,430.20	39,218.87
Total Life Cycle Cost		1,312,588.98



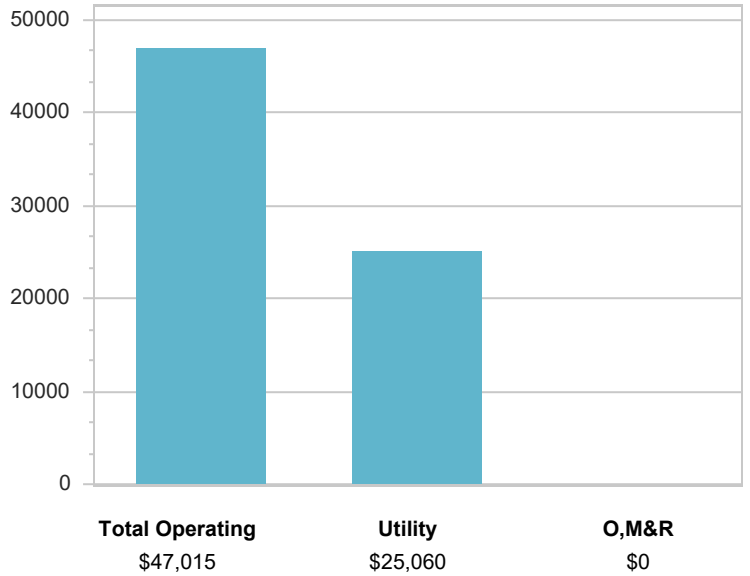
Category	Present Value	
Maintenance	$0.00	0%
Repair	$0.00	0%
Operation	$0.00	0%
Replacement	$0.00	0%
Other Operational	$0.00	0%
Water	$0.00	0%
Energy	$1,312,589.00	100%
Total Operation	$1,312,589.00	
Construction	$0.00	0%
Salvage	$0.00	0%
Other Capital	$0.00	0%
Total Capital	$0.00	
Total Energy	$1,312,589.00	
Grand Total	$1,312,589.00	

Economic Summary and Calculation Parameters

Life Cycle and Costing Parameters

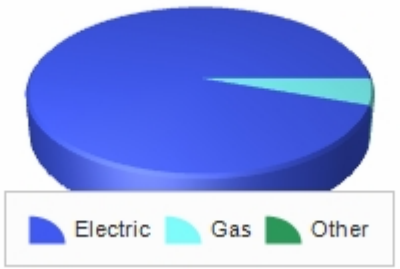
Length of Study	30 years
Inflation Approach	CurrentDollar
Discounting Convention	BeginningOfYear
Real Discount Rate	-- N/A --
Nominal Discount Rate	5.00%
Inflation Rate	4.00%
Tax Rate	0.00%
Depreciation Method	ModifiedAcceleratedCostRecoverySystem-15year
Base Date	June 2023
Service Date	March 2024
Building Area	6,550 (ft²)
Net Conditioned Building Area	6,550 (ft²)
Initial Capital Investment Cost	$0

Average Costs

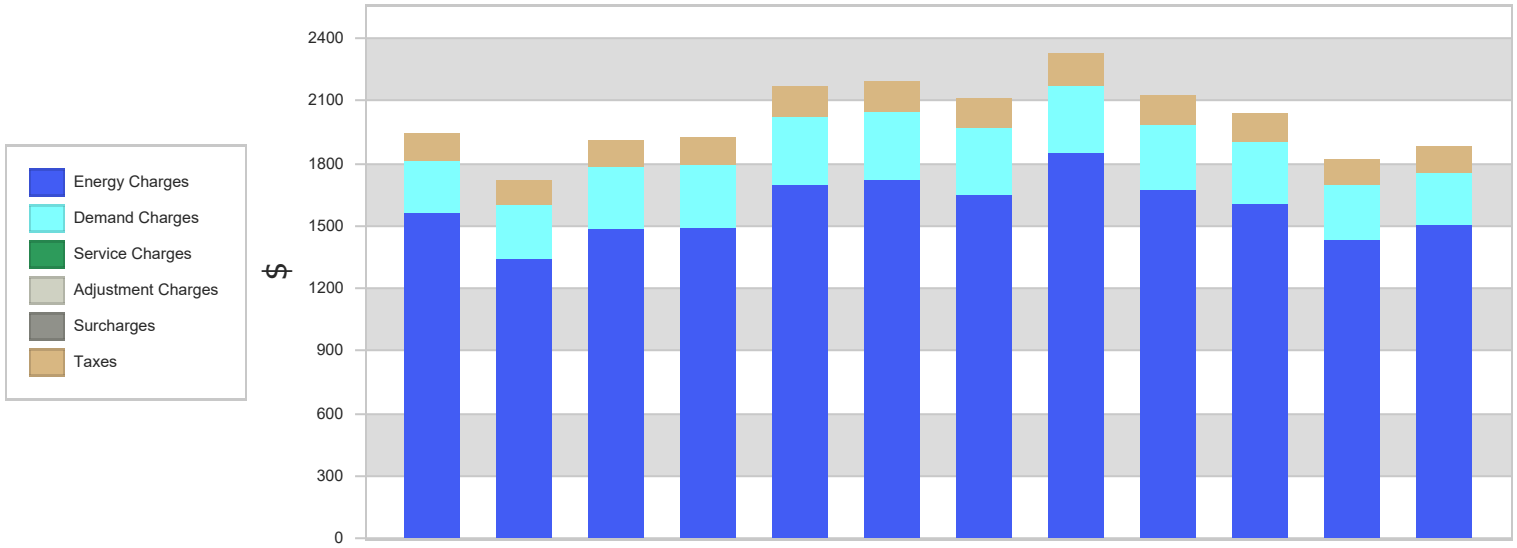


Energy Cost Summary

Name	Electricity	Gas	Other	Total
Energy Cost (Net)	$23,771	$1,290	$0	$25,060
Renewables Offset	$0	$0	$0	$0
Energy Cost (Total)	$23,771	$1,290	$0	$25,060
Cost per Building Area	$3.63	$0.20	$0.00	$3.83
Cost per Net Cond. Bldg Area	$3.63	$0.20	$0.00	$3.83

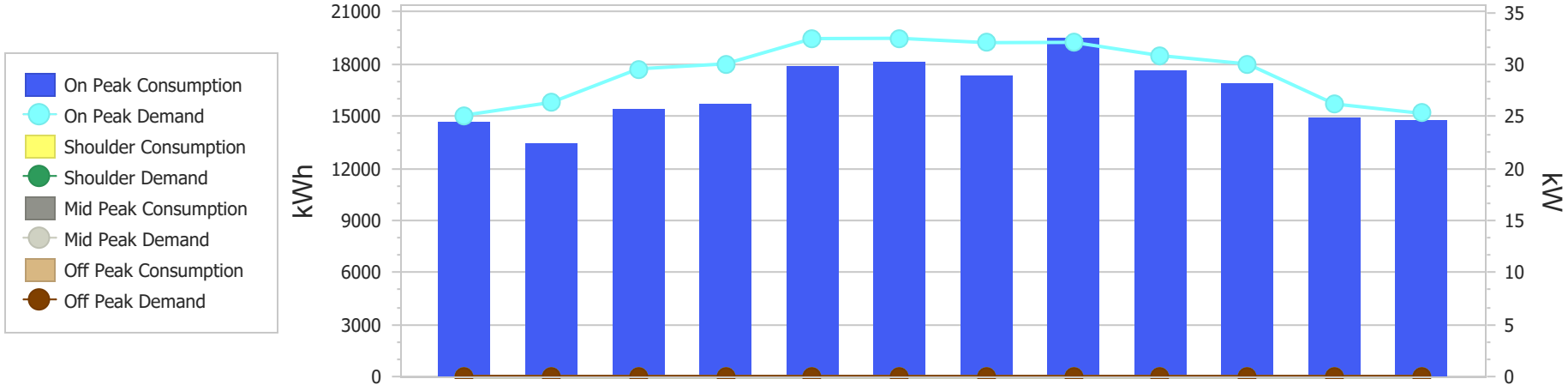


Monthly Utilities Cost Summary



Tariff Catagory	Fuel Type	Jan ($)	Feb ($)	Mar ($)	Apr ($)	May ($)	Jun ($)	Jul ($)	Aug ($)	Sep ($)	Oct ($)	Nov ($)	Dec ($)	Annual Total ($)	% of Total
Consumption Charges	Electricity	1,395	1,274	1,464	1,491	1,696	1,720	1,648	1,851	1,674	1,603	1,416	1,400	18,633	74.35%
	Natural Gas	167	66	22	1	0	0	0	0	0	0	18	103	376	1.50%
Demand Charges	Electricity	251	264	296	301	325	325	321	322	309	301	262	253	3,531	14.09%
ServiceCharges	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Basis	All	1,813	1,604	1,782	1,792	2,021	2,046	1,969	2,173	1,983	1,904	1,696	1,756	22,540	89.94%
Adjustment	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Surcharge	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Subtotal	All	1,813	1,604	1,782	1,792	2,021	2,046	1,969	2,173	1,983	1,904	1,696	1,756	22,540	89.94%
Taxes	All	131	116	129	130	147	148	143	158	144	138	123	127	1,634	6.52%
	Total	1,945	1,749	1,987	2,021	2,268	2,294	2,212	2,430	2,227	2,142	1,900	1,884	25,060	

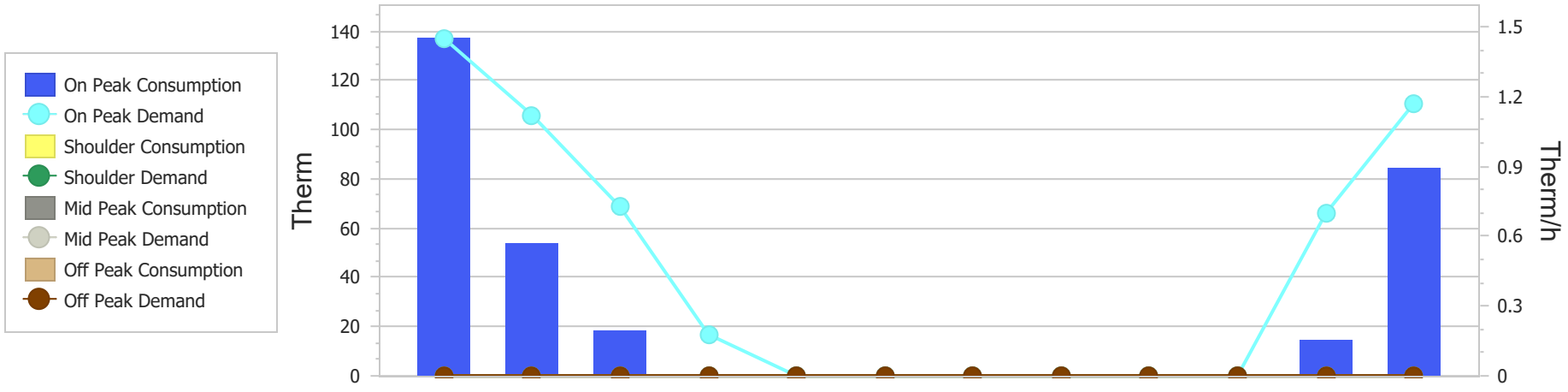
Monthly Utility Details



Electricity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption kWh	14,681	13,412	15,408	15,691	17,855	18,108	17,347	19,486	17,626	16,877	14,908	14,739	196,137
On Peak Demand kW	25	26	30	30	33	33	32	32	31	30	26	25	33

Monthly Utility Details



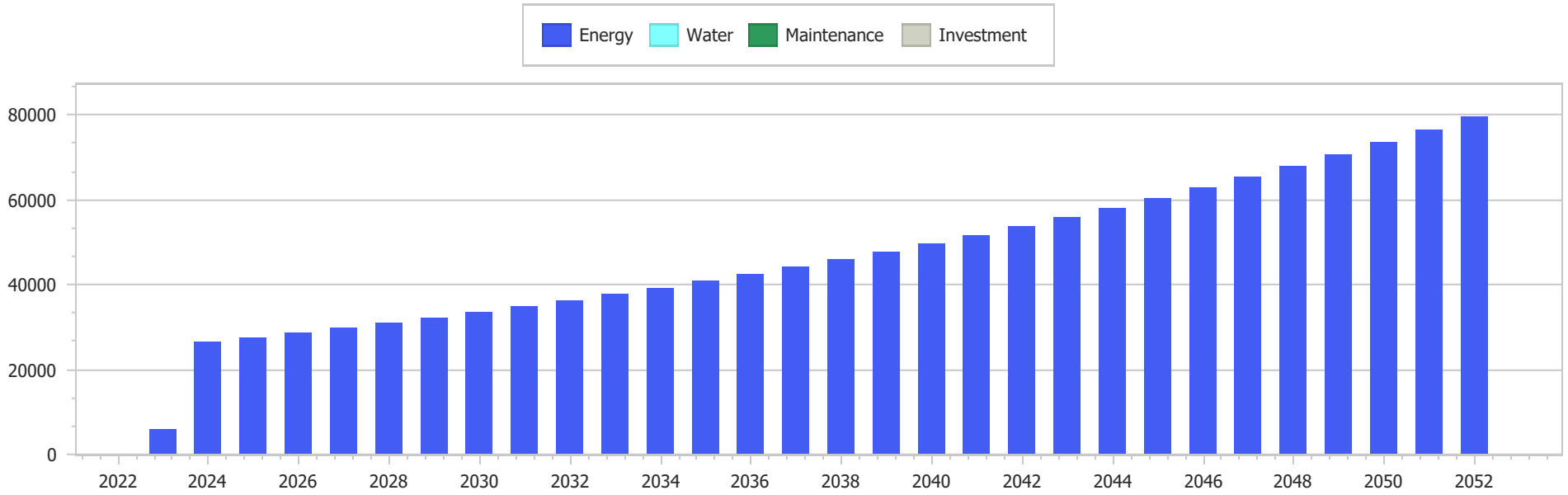
Natural Gas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption Therm	137	54	18	1	0	0	0	0	0	0	15	84	309
On Peak Demand Therm/h	1	1	1	0	0	0	0	0	0	0	1	1	1

Tariff Details

Tariff Name	Selected	Qualified	Meter Name	Buy or Sell	Group	Total Annual Cost
GFK ATCT _ELEC	Yes	Yes	BUILDING ELECTRICITY	Buy	(none)	$23,771
GFK ATCT _NGAS	Yes	Yes	NATURALGAS:FACILITY	Buy	(none)	$1,290

Life Cycle Operating Cash Flow (without escalation)



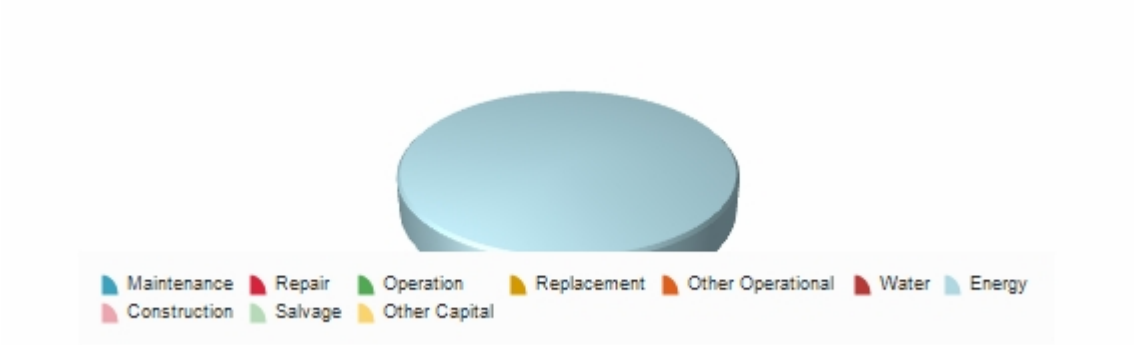
Year	Energy	Water	Maintenance	Investment	Total
2023	5,871	0	0	0	5,871
2024	26,519	0	0	0	26,519
2025	27,579	0	0	0	27,579
2026	28,683	0	0	0	28,683
2027	29,830	0	0	0	29,830
2028	31,023	0	0	0	31,023
2029	32,264	0	0	0	32,264

Year	Energy	Water	Maintenance	Investment	Total
2030	33,554	0	0	0	33,554
2031	34,897	0	0	0	34,897
2032	36,293	0	0	0	36,293
2033	37,744	0	0	0	37,744
2034	39,254	0	0	0	39,254
2035	40,824	0	0	0	40,824
2036	42,457	0	0	0	42,457
2037	44,155	0	0	0	44,155
2038	45,922	0	0	0	45,922
2039	47,758	0	0	0	47,758
2040	49,669	0	0	0	49,669
2041	51,656	0	0	0	51,656
2042	53,722	0	0	0	53,722
2043	55,871	0	0	0	55,871
2044	58,105	0	0	0	58,105
2045	60,430	0	0	0	60,430
2046	62,847	0	0	0	62,847
2047	65,361	0	0	0	65,361
2048	67,975	0	0	0	67,975
2049	70,694	0	0	0	70,694
2050	73,522	0	0	0	73,522
2051	76,463	0	0	0	76,463
2052	79,521	0	0	0	79,521

Present Value Analysis (Without Escalation)

Present Value By Year

Year	Total Cost	Present Value
2023	5,870.56	5,870.56
2024	26,518.58	25,255.79
2025	27,579.32	25,015.26
2026	28,682.50	24,777.02
2027	29,829.80	24,541.05
2028	31,022.99	24,307.32
2029	32,263.91	24,075.82
2030	33,554.46	23,846.53
2031	34,896.64	23,619.42
2032	36,292.51	23,394.47
2033	37,744.21	23,171.67
2034	39,253.98	22,950.99
2035	40,824.14	22,732.41
2036	42,457.10	22,515.91
2037	44,155.38	22,301.47
2038	45,921.60	22,089.07
2039	47,758.46	21,878.70
2040	49,668.80	21,670.33
2041	51,655.56	21,463.95
2042	53,721.78	21,259.53
2043	55,870.65	21,057.06
2044	58,105.47	20,856.52
2045	60,429.69	20,657.88
2046	62,846.88	20,461.14
2047	65,360.76	20,266.27
2048	67,975.19	20,073.26
2049	70,694.19	19,882.09
2050	73,521.96	19,692.73
2051	76,462.84	19,505.18
2052	79,521.35	19,319.42
Total Life Cycle Cost		648,508.82



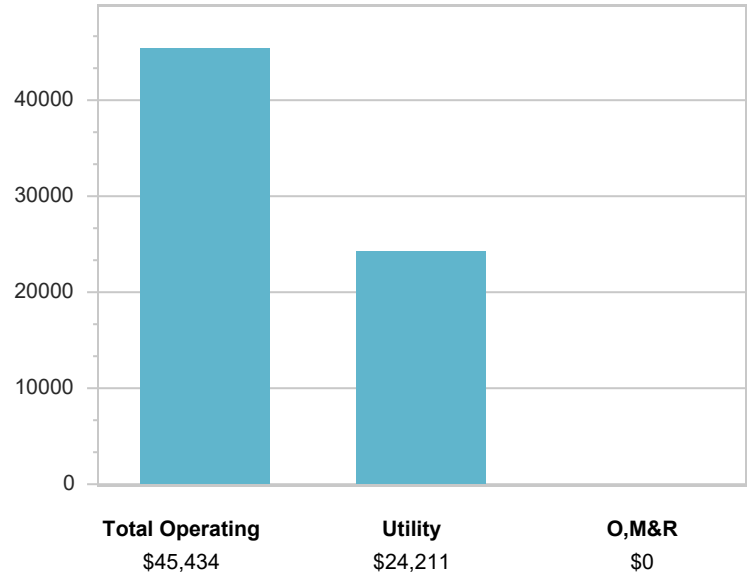
Category	Present Value	
Maintenance	$0.00	0%
Repair	$0.00	0%
Operation	$0.00	0%
Replacement	$0.00	0%
Other Operational	$0.00	0%
Water	$0.00	0%
Energy	$648,508.80	100%
Total Operation	$648,508.80	
Construction	$0.00	0%
Salvage	$0.00	0%
Other Capital	$0.00	0%
Total Capital	$0.00	
Total Energy	$648,508.80	
Grand Total	$648,508.80	

Economic Summary and Calculation Parameters

Life Cycle and Costing Parameters

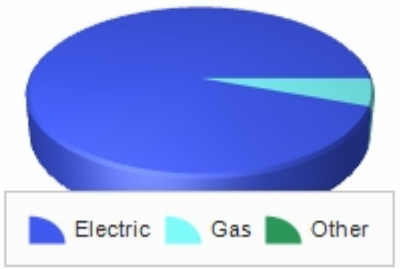
Length of Study	30 years
Inflation Approach	CurrentDollar
Discounting Convention	BeginningOfYear
Real Discount Rate	-- N/A --
Nominal Discount Rate	5.00%
Inflation Rate	4.00%
Tax Rate	0.00%
Depreciation Method	ModifiedAcceleratedCostRecoverySystem-15year
Base Date	June 2023
Service Date	March 2024
Building Area	6,550 (ft²)
Net Conditioned Building Area	6,550 (ft²)
Initial Capital Investment Cost	$0

Average Costs

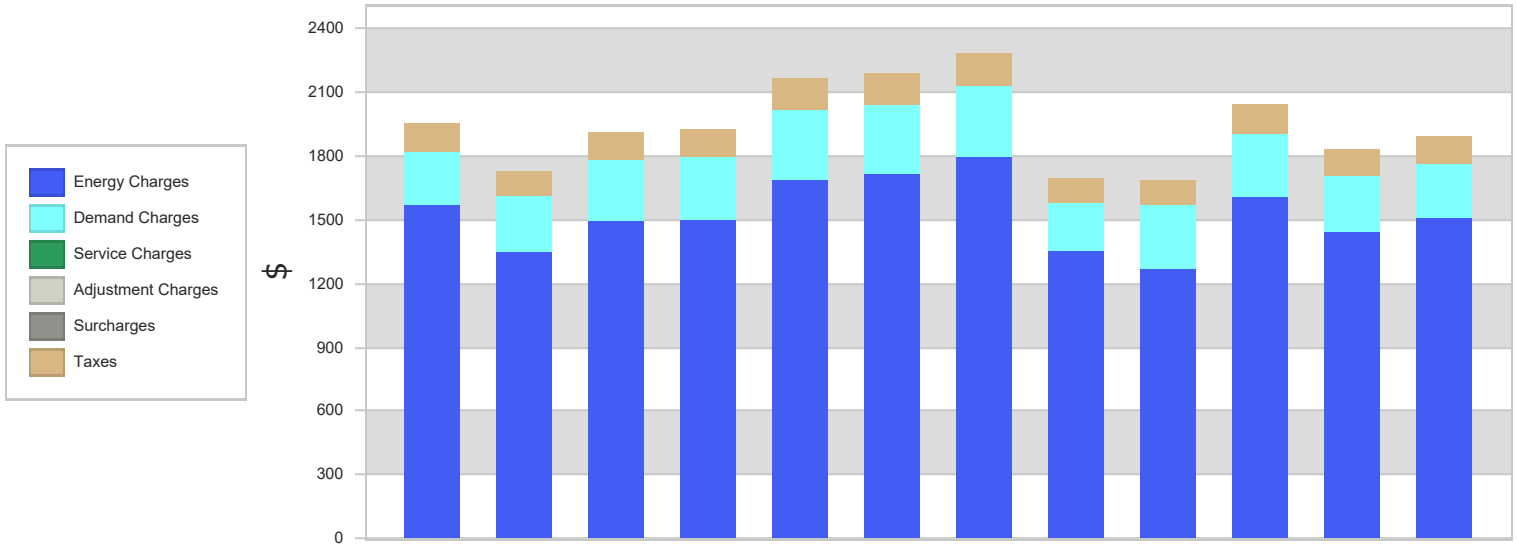


Energy Cost Summary

Name	Electricity	Gas	Other	Total
Energy Cost (Net)	$22,923	$1,288	$0	$24,211
Renewables Offset	$0	$0	$0	$0
Energy Cost (Total)	$22,923	$1,288	$0	$24,211
Cost per Building Area	$3.50	$0.20	$0.00	$3.70
Cost per Net Cond. Bldg Area	$3.50	$0.20	$0.00	$3.70

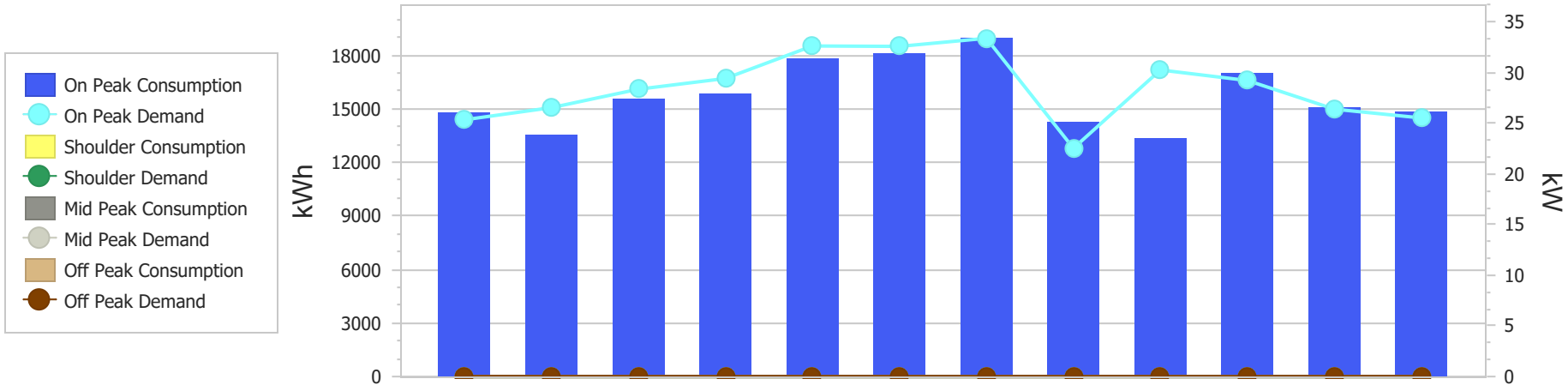


Monthly Utilities Cost Summary



Tariff Catagory	Fuel Type	Jan ($)	Feb ($)	Mar ($)	Apr ($)	May ($)	Jun ($)	Jul ($)	Aug ($)	Sep ($)	Oct ($)	Nov ($)	Dec ($)	Annual Total ($)	% of Total
Consumption Charges	Natural Gas	166	65	22	1	0	0	0	0	0	0	18	102	374	1.55%
	Electricity	1,403	1,283	1,476	1,502	1,692	1,719	1,799	1,355	1,269	1,612	1,429	1,409	17,949	74.14%
Demand Charges	Electricity	254	266	284	294	326	326	334	225	303	292	264	255	3,424	14.14%
ServiceCharges	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Basis	All	1,823	1,614	1,782	1,797	2,018	2,045	2,133	1,580	1,572	1,905	1,711	1,767	21,748	89.83%
Adjustment	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Surcharge	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Subtotal	All	1,823	1,614	1,782	1,797	2,018	2,045	2,133	1,580	1,572	1,905	1,711	1,767	21,748	89.83%
Taxes	All	132	117	129	130	146	148	155	115	114	138	124	128	1,577	6.51%
	Total	1,955	1,761	1,988	2,027	2,264	2,293	2,388	1,795	1,786	2,143	1,916	1,895	24,211	

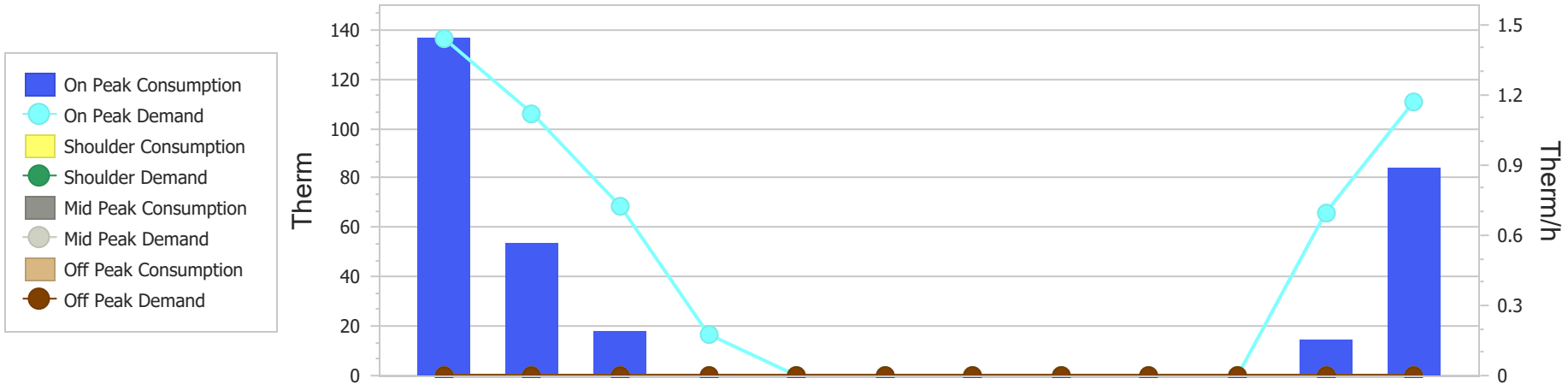
Monthly Utility Details



Electricity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption kWh	14,763	13,510	15,541	15,812	17,807	18,096	18,940	14,261	13,358	16,973	15,045	14,834	188,939
On Peak Demand kW	25	27	28	29	33	33	33	23	30	29	26	26	33

Monthly Utility Details



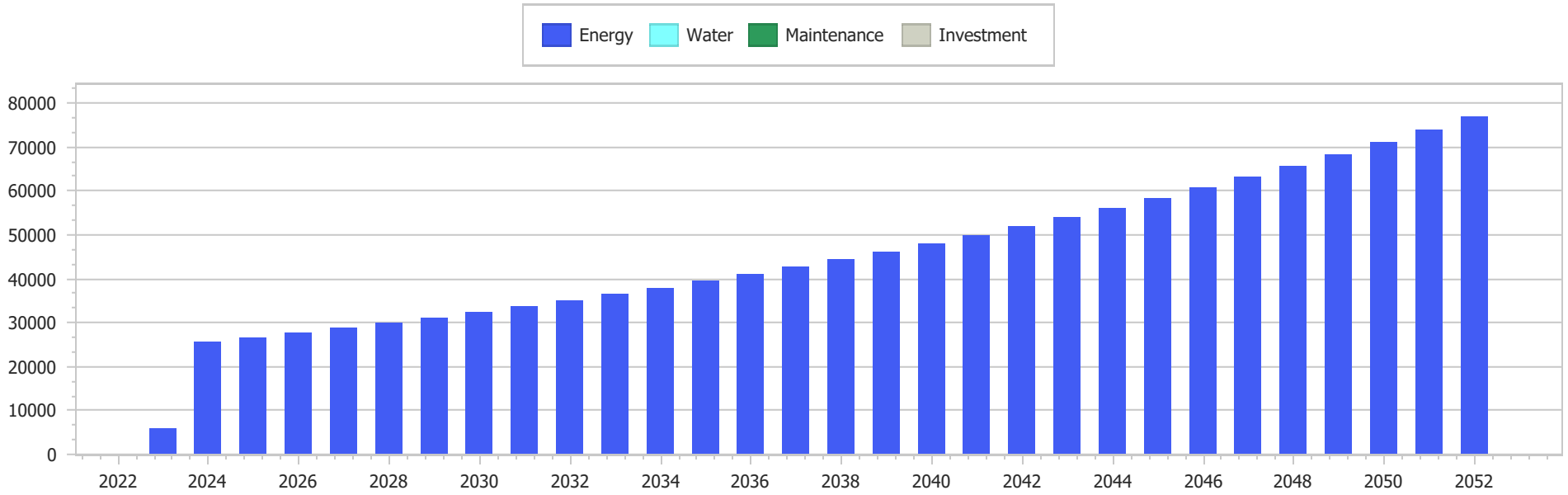
Natural Gas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption Therm	137	54	18	1	0	0	0	0	0	0	14	84	307
On Peak Demand Therm/h	1	1	1	0	0	0	0	0	0	0	1	1	1

Tariff Details

Tariff Name	Selected	Qualified	Meter Name	Buy or Sell	Group	Total Annual Cost
GFK ATCT _NGAS	Yes	Yes	NATURALGAS:FACILITY	Buy	(none)	$1,288
GFK ATCT _ELEC	Yes	Yes	BUILDING ELECTRICITY	Buy	(none)	$22,923

Life Cycle Operating Cash Flow (without escalation)



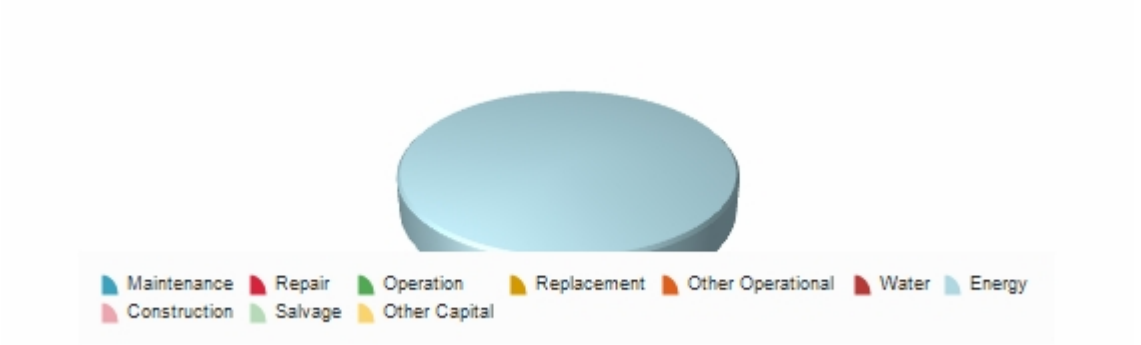
Year	Energy	Water	Maintenance	Investment	Total
2023	5,893	0	0	0	5,893
2024	25,622	0	0	0	25,622
2025	26,647	0	0	0	26,647
2026	27,713	0	0	0	27,713
2027	28,822	0	0	0	28,822
2028	29,975	0	0	0	29,975
2029	31,174	0	0	0	31,174

Year	Energy	Water	Maintenance	Investment	Total
2030	32,421	0	0	0	32,421
2031	33,717	0	0	0	33,717
2032	35,066	0	0	0	35,066
2033	36,469	0	0	0	36,469
2034	37,927	0	0	0	37,927
2035	39,445	0	0	0	39,445
2036	41,022	0	0	0	41,022
2037	42,663	0	0	0	42,663
2038	44,370	0	0	0	44,370
2039	46,145	0	0	0	46,145
2040	47,990	0	0	0	47,990
2041	49,910	0	0	0	49,910
2042	51,906	0	0	0	51,906
2043	53,983	0	0	0	53,983
2044	56,142	0	0	0	56,142
2045	58,388	0	0	0	58,388
2046	60,723	0	0	0	60,723
2047	63,152	0	0	0	63,152
2048	65,678	0	0	0	65,678
2049	68,305	0	0	0	68,305
2050	71,037	0	0	0	71,037
2051	73,879	0	0	0	73,879
2052	76,834	0	0	0	76,834

Present Value Analysis (Without Escalation)

Present Value By Year

Year	Total Cost	Present Value
2023	5,893.44	5,893.44
2024	25,622.44	24,402.33
2025	26,647.34	24,169.92
2026	27,713.23	23,939.73
2027	28,821.76	23,711.74
2028	29,974.63	23,485.91
2029	31,173.62	23,262.23
2030	32,420.56	23,040.69
2031	33,717.39	22,821.25
2032	35,066.08	22,603.91
2033	36,468.72	22,388.63
2034	37,927.47	22,175.41
2035	39,444.57	21,964.21
2036	41,022.36	21,755.03
2037	42,663.25	21,547.84
2038	44,369.78	21,342.62
2039	46,144.57	21,139.36
2040	47,990.35	20,938.03
2041	49,909.97	20,738.62
2042	51,906.37	20,541.11
2043	53,982.62	20,345.48
2044	56,141.93	20,151.72
2045	58,387.60	19,959.79
2046	60,723.11	19,769.70
2047	63,152.03	19,581.42
2048	65,678.11	19,394.93
2049	68,305.24	19,210.22
2050	71,037.45	19,027.26
2051	73,878.94	18,846.05
2052	76,834.10	18,666.56
Total Life Cycle Cost		626,815.14



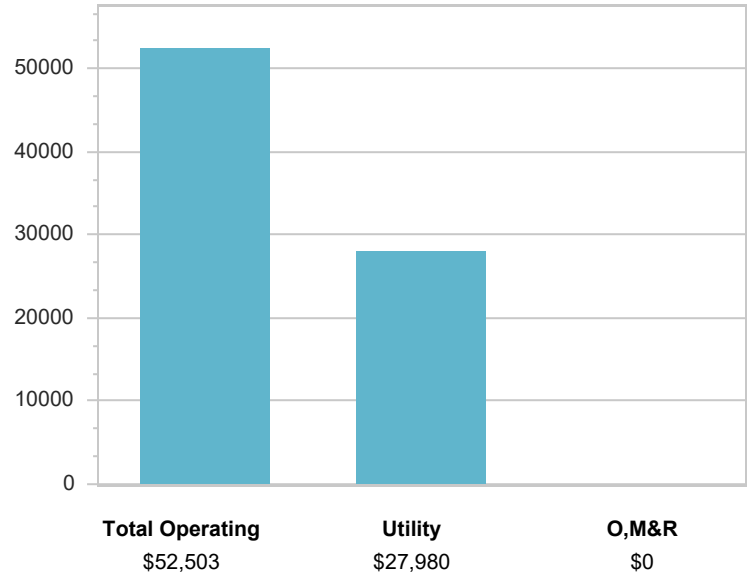
Category	Present Value	
Maintenance	$0.00	0%
Repair	$0.00	0%
Operation	$0.00	0%
Replacement	$0.00	0%
Other Operational	$0.00	0%
Water	$0.00	0%
Energy	$626,815.20	100%
Total Operation	$626,815.20	
Construction	$0.00	0%
Salvage	$0.00	0%
Other Capital	$0.00	0%
Total Capital	$0.00	
Total Energy	$626,815.20	
Grand Total	$626,815.20	

Economic Summary and Calculation Parameters

Life Cycle and Costing Parameters

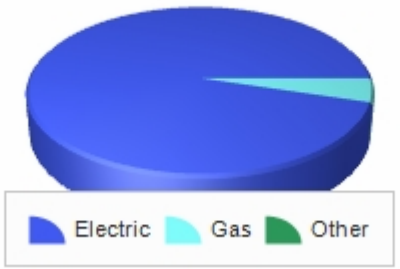
Length of Study	30 years
Inflation Approach	CurrentDollar
Discounting Convention	BeginningOfYear
Real Discount Rate	-- N/A --
Nominal Discount Rate	5.00%
Inflation Rate	4.00%
Tax Rate	0.00%
Depreciation Method	ModifiedAcceleratedCostRecoverySystem-15year
Base Date	June 2023
Service Date	March 2024
Building Area	6,550 (ft²)
Net Conditioned Building Area	6,550 (ft²)
Initial Capital Investment Cost	$0

Average Costs

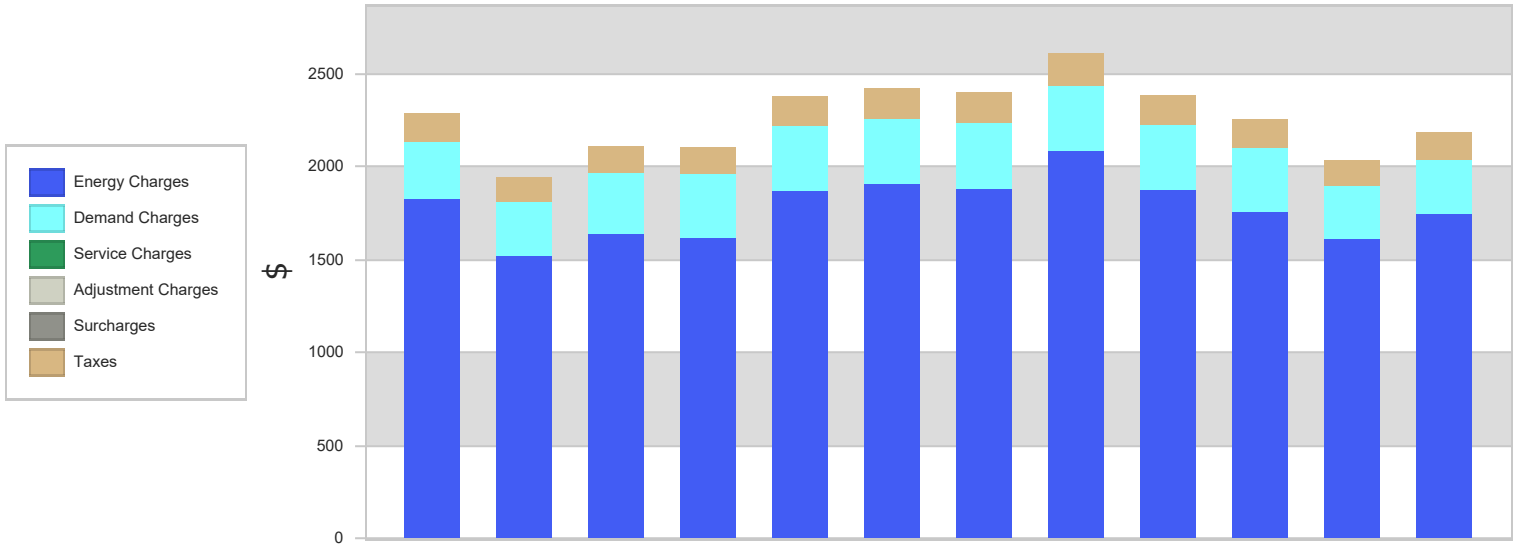


Energy Cost Summary

Name	Electricity	Gas	Other	Total
Energy Cost (Net)	$26,691	$1,290	$0	$27,980
Renewables Offset	$0	$0	$0	$0
Energy Cost (Total)	$26,691	$1,290	$0	$27,980
Cost per Building Area	$4.07	$0.20	$0.00	$4.27
Cost per Net Cond. Bldg Area	$4.07	$0.20	$0.00	$4.27

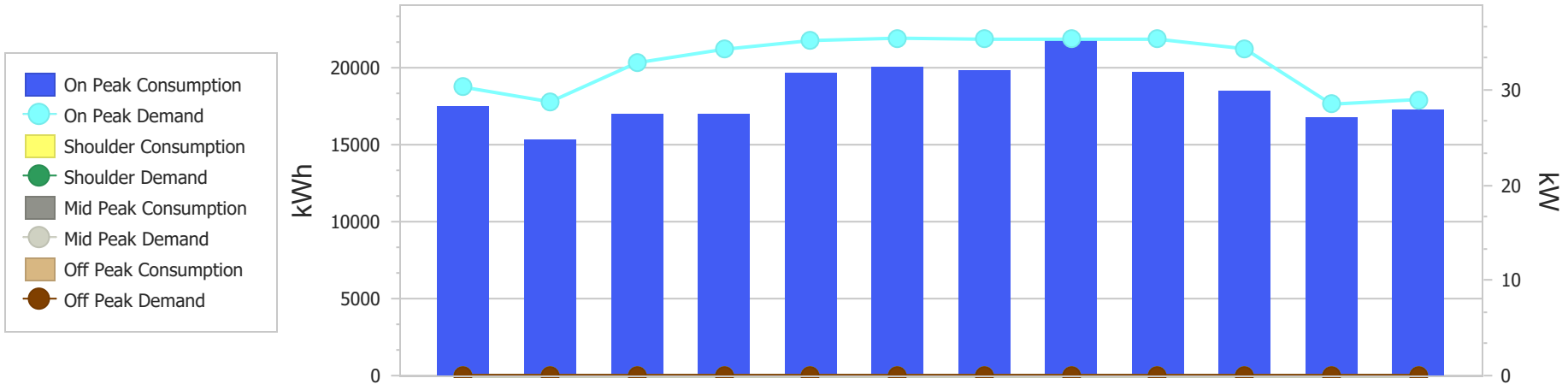


Monthly Utilities Cost Summary



Tariff Catagory	Fuel Type	Jan ($)	Feb ($)	Mar ($)	Apr ($)	May ($)	Jun ($)	Jul ($)	Aug ($)	Sep ($)	Oct ($)	Nov ($)	Dec ($)	Annual Total ($)	% of Total
Consumption Charges	Natural Gas	167	66	22	1	0	0	0	0	0	0	18	103	376	1.34%
	Electricity	1,661	1,456	1,614	1,616	1,866	1,903	1,881	2,081	1,872	1,757	1,591	1,642	20,942	74.85%
Demand Charges	Electricity	303	287	328	342	352	354	353	353	353	343	285	290	3,944	14.10%
ServiceCharges	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Basis	All	2,131	1,809	1,965	1,959	2,218	2,257	2,234	2,435	2,225	2,101	1,894	2,035	25,263	90.29%
Adjustment	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Surcharge	All	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00%
Subtotal	All	2,131	1,809	1,965	1,959	2,218	2,257	2,234	2,435	2,225	2,101	1,894	2,035	25,263	90.29%
Taxes	All	155	131	142	142	161	164	162	177	161	152	137	148	1,832	6.55%
	Total	2,286	1,970	2,183	2,201	2,479	2,521	2,496	2,711	2,486	2,353	2,112	2,182	27,980	

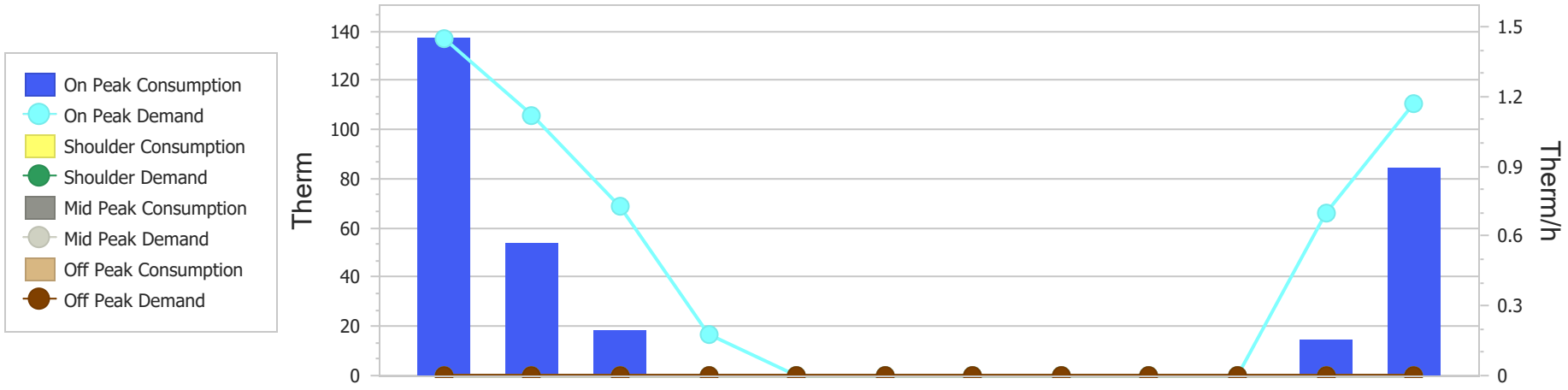
Monthly Utility Details



Electricity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption kWh	17,487	15,327	16,991	17,013	19,647	20,033	19,800	21,910	19,703	18,499	16,751	17,286	220,447
On Peak Demand kW	30	29	33	34	35	35	35	35	35	34	28	29	35

Monthly Utility Details



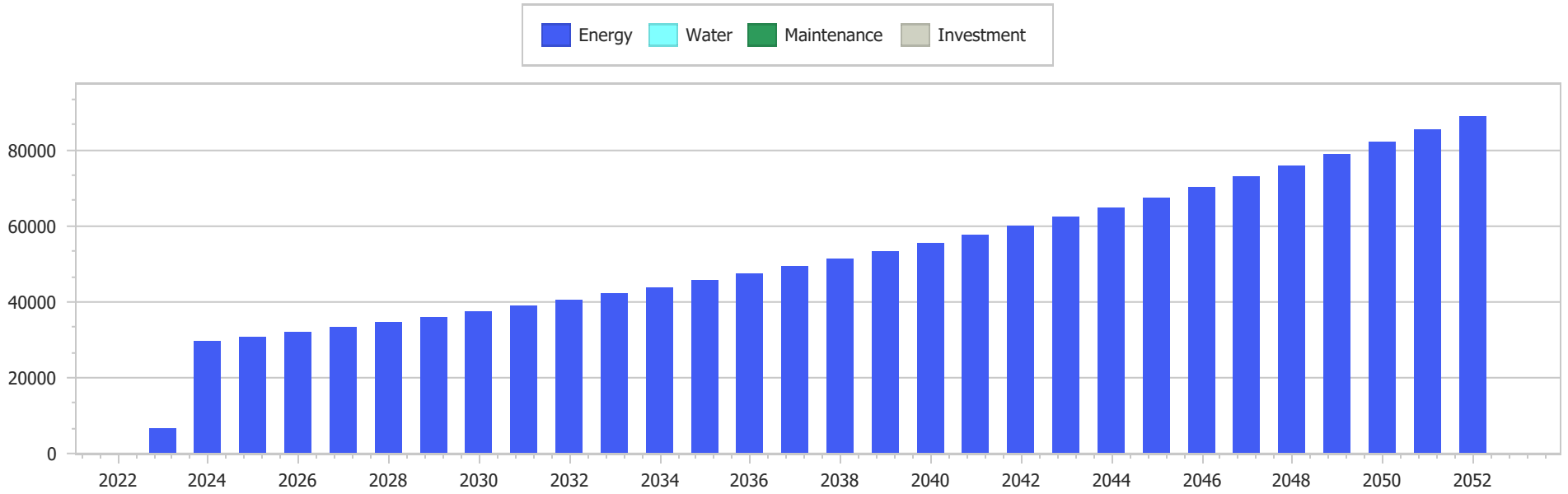
Natural Gas

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals
On Peak Consumption Therm	137	54	18	1	0	0	0	0	0	0	15	84	309
On Peak Demand Therm/h	1	1	1	0	0	0	0	0	0	0	1	1	1

Tariff Details

Tariff Name	Selected	Qualified	Meter Name	Buy or Sell	Group	Total Annual Cost
GFK ATCT _NGAS	Yes	Yes	NATURALGAS:FACILITY	Buy	(none)	$1,290
GFK ATCT _ELEC	Yes	Yes	BUILDING ELECTRICITY	Buy	(none)	$26,691

Life Cycle Operating Cash Flow (without escalation)



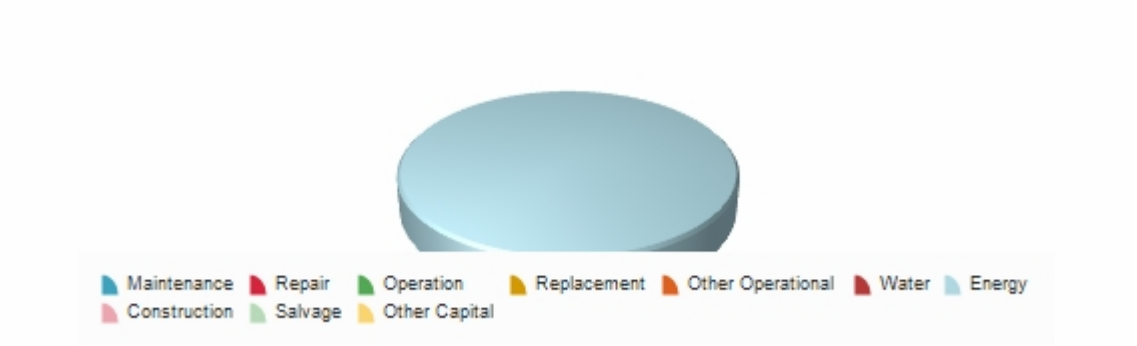
Year	Energy	Water	Maintenance	Investment	Total
2023	6,653	0	0	0	6,653
2024	29,612	0	0	0	29,612
2025	30,797	0	0	0	30,797
2026	32,029	0	0	0	32,029
2027	33,310	0	0	0	33,310
2028	34,642	0	0	0	34,642
2029	36,028	0	0	0	36,028

Year	Energy	Water	Maintenance	Investment	Total
2030	37,469	0	0	0	37,469
2031	38,968	0	0	0	38,968
2032	40,526	0	0	0	40,526
2033	42,147	0	0	0	42,147
2034	43,833	0	0	0	43,833
2035	45,587	0	0	0	45,587
2036	47,410	0	0	0	47,410
2037	49,306	0	0	0	49,306
2038	51,279	0	0	0	51,279
2039	53,330	0	0	0	53,330
2040	55,463	0	0	0	55,463
2041	57,682	0	0	0	57,682
2042	59,989	0	0	0	59,989
2043	62,388	0	0	0	62,388
2044	64,884	0	0	0	64,884
2045	67,479	0	0	0	67,479
2046	70,178	0	0	0	70,178
2047	72,986	0	0	0	72,986
2048	75,905	0	0	0	75,905
2049	78,941	0	0	0	78,941
2050	82,099	0	0	0	82,099
2051	85,383	0	0	0	85,383
2052	88,798	0	0	0	88,798

Present Value Analysis (Without Escalation)

Present Value By Year

Year	Total Cost	Present Value
2023	6,652.53	6,652.53
2024	29,612.19	28,202.08
2025	30,796.67	27,933.49
2026	32,028.54	27,667.46
2027	33,309.68	27,403.96
2028	34,642.07	27,142.97
2029	36,027.75	26,884.46
2030	37,468.86	26,628.42
2031	38,967.62	26,374.82
2032	40,526.32	26,123.63
2033	42,147.38	25,874.83
2034	43,833.27	25,628.41
2035	45,586.60	25,384.33
2036	47,410.07	25,142.57
2037	49,306.47	24,903.12
2038	51,278.73	24,665.94
2039	53,329.88	24,431.03
2040	55,463.07	24,198.35
2041	57,681.59	23,967.89
2042	59,988.86	23,739.63
2043	62,388.41	23,513.54
2044	64,883.95	23,289.60
2045	67,479.31	23,067.79
2046	70,178.48	22,848.10
2047	72,985.62	22,630.50
2048	75,905.04	22,414.97
2049	78,941.24	22,201.49
2050	82,098.89	21,990.05
2051	85,382.85	21,780.62
2052	88,798.16	21,573.19
Total Life Cycle Cost		724,259.77



Category	Present Value	
Maintenance	$0.00	0%
Repair	$0.00	0%
Operation	$0.00	0%
Replacement	$0.00	0%
Other Operational	$0.00	0%
Water	$0.00	0%
Energy	$724,259.80	100%
Total Operation	$724,259.80	
Construction	$0.00	0%
Salvage	$0.00	0%
Other Capital	$0.00	0%
Total Capital	$0.00	
Total Energy	$724,259.80	
Grand Total	$724,259.80	

Entered Values Envelope

Linked Alternatives Are Not Shown In Entered Values

Exterior Walls

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	C-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Azimuth	Cardinal Direction	Adiabatic
ADMIN ASSIST B123 - Wall 357	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		89.8	270.0	W	☐
ADMIN STORAGE B107 - Wall 218	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		108.6	360.0	N	☐
AIR TRAFFIC MNG B104 - Wall 204	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		27.6	59.7	NE	☐
AIR TRAFFIC MNG B104 - Wall 205	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		127.4	360.0	N	☐
AT LOCKER ROOM B108 - Wall 222	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		127.5	360.0	N	☐
AT WORKSPACE B113 - Wall 239	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		134.9	360.0	N	☐
BOILER ROOM B120A - Wall 06	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		155.4	180.0	S	☐
BREAK ROOM B122 - Wall 30	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		184.2	180.0	S	☐
BREAK ROOM B122 - Wall 356	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		204.2	90.0	E	☐
CBI TRAINING B111 - Wall 230	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		141.9	360.0	N	☐
CLOSET B161 - Wall 243	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		53.8	360.0	N	☐
CONTRACT WEATHER B115 - Wall 255	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		130.8	360.0	N	☐
CORRIDOR 1 TO 4 - Wall 339	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		69.3	180.0	S	☐
CORRIDOR 1 TO 4 - Wall 340	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		203.6	180.0	S	☐
CORRIDOR 1 TO 4 - Wall 341	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		58.2	90.0	E	☐
CORRIDOR 1 TO 4 - Wall 342	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		59.5	.1	N	☐
CORRIDOR 1 TO 4 - Wall 343	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		288.9	271.9	W	☐
CORRIDOR 1 TO 4 - Wall 355	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		496.1	180.0	S	☐
ELEC MAIN SERVICE B135 - Wall 171	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		266.7	360.0	N	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116 - Wall 149	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		18.7	180.0	S	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116 - Wall 150	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		202.5	270.0	W	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116 - Wall 359	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		213.6	180.0	S	☐
ENGINE GENERATOR B131 - Wall 155	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		344.6	90.0	E	☐

Exterior Walls

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	C-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Azimuth	Cardinal Direction	Adiabatic
ENGINE GENERATOR B131 - Wall 156	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		165.6	360.0	N	☐
ENVIRONMENTAL SHOP B128 - Wall 61	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		456.0	180.0	S	☐
ENVIRONMENTAL SHOP B128 - Wall 62	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		204.2	90.0	E	☐
FIRE COMMAND CENTER B138 - Wall 184	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		108.8	360.0	N	☐
FIRE COMMAND CENTER B138 - Wall 185	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		23.8	270.0	W	☐
FIRE LIFE SAFETY / UPS B136 - Wall 176	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		182.5	360.0	N	☐
FIRE PUMP B137 - Wall 180	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		106.0	360.0	N	☐
LOADING / SHIPPING B133 - Wall 160	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		178.5	360.0	N	☐
MAIL/COPIER B103 - Wall 210	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		83.0	360.0	N	☐
MECH EQUIP ROOM B120 - Wall 13	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		346.4	180.0	S	☐
MECH EQUIP ROOM B120 - Wall 360	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		319.0	270.0	W	☐
NAS DOC / TECH LIBRARY B127 - Wall 57	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		99.3	180.0	S	☐
OPERATIONS SUPERVISOR B106 - Wall 214	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		130.0	360.0	N	☐
SSC COORDINATOR B126 - Wall 52	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		139.0	180.0	S	☐
SUPPLY / PARTS STORAGE B130 - Wall 66	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		203.0	90.0	E	☐
TECH OPS SSC MNG B124 - Wall 358	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		114.4	270.0	W	☐
TECH OPS SSC MNG B124 - Wall 39	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		138.9	180.0	S	☐
TSS B109 - Wall 226	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		124.0	360.0	N	☐
VEHICLE MAINTENANCE B134 - Wall 164	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		243.9	360.0	N	☐
VESTIBULE 1 B101 - Wall 190	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		163.4	360.0	N	☐
WELLNESS B121 - Wall 26	90.1-10 Min Wall, Wood Framed Zone 3	☐	0.089		140.0	180.0	S	☐

Above Grade Wall Areas

Total Area (ft²)	North Facing Area (ft²)	East Facing Area (ft²)	South Facing Area (ft²)	West Facing Area (ft²)
7,377.2	2,636.6	1,014.2	2,660.4	1,038.4

Roofs

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Reflectivity	Adiabatic
ADMIN ASSIST B123 - Roof 09-09	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	54.0	0.30	☐
ADMIN STORAGE B107 - Roof 44-44	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	82.2	0.30	☐
AIR TRAFFIC MNG B104 - Roof 41-41	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	57.5	0.30	☐
AT COACH B118 - Roof 03-03	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	55.4	0.30	☐
AT LOCKER ROOM B108 - Roof 45-45	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	96.4	0.30	☐
AT WORKSPACE B113 - Roof 49-49	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	50.7	0.30	☐
BOILER ROOM B120A - Roof 01-01	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	227.7	0.30	☐
BREAK ROOM B122 - Roof 06-06	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	162.8	0.30	☐
CBI TRAINING B111 - Roof 47-47	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	67.3	0.30	☐
CLOSET B161 - Roof 50-50	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	8.2	0.30	☐
CONTRACT WEATHER B115 - Roof 53-53	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	49.2	0.30	☐
CONTRACTOR B119 - Roof 00-00	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	49.5	0.30	☐
CORRIDOR 1 TO 4 - Roof 54-54	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	1,336.0	0.30	☐
DEBRIEFING B114 - Roof 52-52	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	49.8	0.30	☐
DRUG TEST B144 - Roof 28-28	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	37.7	0.30	☐
ELEC MAIN SERVICE B135 - Roof 34-34	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	195.0	0.30	☐
ELEC SWITCHGEAR B151. - Roof 18-18	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	191.2	0.30	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116 - Roof 30-30	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	536.2	0.30	☐
ENGINE GENERATOR B131 - Roof 31-31	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	247.0	0.30	☐
ENVIRONMENTAL SHOP B128 - Roof 13-13	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	402.9	0.30	☐
FIRE COMMAND CENTER B138 - Roof 37-37	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	82.3	0.30	☐
FIRE LIFE SAFETY / UPS B136 - Roof 35-35	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	138.1	0.30	☐
FIRE PUMP B137 - Roof 36-36	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	80.2	0.30	☐
HAZMAT STORAGE B129 - Roof 15-15	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	60.0	0.30	☐
LACTATION B143 - Roof 27-27	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	64.0	0.30	☐
LARGE CONFERENCE ROOM B146 - Roof 24-24	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	158.4	0.30	☐
LOADING / SHIPPING B133 - Roof 32-32	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	177.0	0.30	☐
MAIL/COPIER B103 - Roof 42-42	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	62.8	0.30	☐
MECH EQUIP ROOM B120 - Roof 02-02	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	478.2	0.30	☐
MEN'S RESTROOM B140 - Roof 25-25	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	140.1	0.30	☐
NAS DOC / TECH LIBRARY B127 - Roof 12-12	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	87.8	0.30	☐
NAS ELEC WORKSHOP B148 - Roof 23-23	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	134.2	0.30	☐
ON SITE ATSS B147 - Roof 22-22	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	145.8	0.30	☐
OPERATIONS SUPERVISOR B106 - Roof 43-43	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	98.4	0.30	☐

Roofs

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Reflectivity	Adiabatic
PPE STORAGE TECH / GROUP B153 - Roof 20-20	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	82.9	0.30	☐
PROJECT OFFICE B149 - Roof 17-17	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	58.7	0.30	☐
QUIET ROOM B112 - Roof 51-51	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	51.3	0.30	☐
SECURE STORAGE B150 - Roof 16-16	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	161.2	0.30	☐
SECURITY EQUIP ROOM B152 - Roof 19-19	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	30.0	0.30	☐
SHIPPING / RECEIVING B132 - Roof 55-55	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	89.4	0.30	☐
SMALL CONFERENCE ROOM B145 - Roof 29-29	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	92.6	0.30	☐
SSC COORDINATOR B126 - Roof 11-11	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	68.8	0.30	☐
SUPPLY / PARTS STORAGE B130 - Roof 14-14	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	277.9	0.30	☐
SUPPORT SPEC B105 - Roof 40-40	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	29.7	0.30	☐
SYSTEMS SPEC B125 - Roof 10-10	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	33.3	0.30	☐
T&A CLERK B102 - Roof 39-39	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	47.7	0.30	☐
TAPE PLAY-BACK B110 - Roof 48-48	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	40.3	0.30	☐
TECH OPS LOCKER ROOM B154 - Roof 21-21	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	41.8	0.30	☐
TECH OPS SSC MNG B124 - Roof 08-08	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	68.7	0.30	☐
TRACON OPT ROOM B117 - Roof 04-04	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	202.0	0.30	☐
TSS B109 - Roof 46-46	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	93.8	0.30	☐
VEHICLE MAINTENANCE B134 - Roof 33-33	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	363.8	0.30	☐
VESTIBULE 1 B101 - Roof 38-38	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	49.3	0.30	☐
WELLNESS B121 - Roof 05-05	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	123.7	0.30	☐
WOMEN'S RESTROOM B141 - Roof 26-26	90.1-10 Min Roof Insulation Entirely Above Deck Zone 3	☐	0.047	142.1	0.30	☐

Total Roof Area (ft²) 8,013.1

Exterior Slabs

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	F-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Adiabatic
ADMIN ASSIST B123 - Slab 09	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	54.0	☐
ADMIN STORAGE B107 - Slab 44	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	82.2	☐

Exterior Slabs

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	F-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Adiabatic
AIR TRAFFIC MNG B104 - Slab 41	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	57.5	☐
AT COACH B118 - Slab 03	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	55.4	☐
AT LOCKER ROOM B108 - Slab 45	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	96.4	☐
AT WORKSPACE B113 - Slab 49	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	50.7	☐
BOILER ROOM B120A - Slab 01	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	227.7	☐
BREAK ROOM B122 - Slab 06	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	162.8	☐
CBI TRAINING B111 - Slab 47	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	67.3	☐
CLOSET B161 - Slab 50	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	8.2	☐
CONTRACT WEATHER B115 - Slab 53	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	49.2	☐
CONTRACTOR B119 - Slab 00	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	49.5	☐
CORRIDOR 1 TO 4 - Slab 54	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	1,336.0	☐
DEBRIEFING B114 - Slab 52	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	49.8	☐
DRUG TEST B144 - Slab 28	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	37.7	☐
ELEC MAIN SERVICE B135 - Slab 34	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	195.0	☐
ELEC SWITCHGEAR B151. - Slab 18	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	191.2	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116 - Slab 30	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	536.2	☐
ENGINE GENERATOR B131 - Slab 31	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	247.0	☐
ENVIRONMENTAL SHOP B128 - Slab 13	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	402.9	☐
FIRE COMMAND CENTER B138 - Slab 37	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	82.3	☐
FIRE LIFE SAFETY / UPS B136 - Slab 35	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	138.1	☐
FIRE PUMP B137 - Slab 36	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	80.2	☐
HAZMAT STORAGE B129 - Slab 15	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	60.0	☐
LACTATION B143 - Slab 27	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	64.0	☐
LARGE CONFERENCE ROOM B146 - Slab 24	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	158.4	☐
LOADING / SHIPPING B133 - Slab 32	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	177.0	☐
MAIL/COPIER B103 - Slab 42	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	62.8	☐
MECH EQUIP ROOM B120 - Slab 02	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	478.2	☐
MEN'S RESTROOM B140 - Slab 25	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	140.1	☐
NAS DOC / TECH LIBRARY B127 - Slab 12	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	87.8	☐
NAS ELEC WORKSHOP B148 - Slab 23	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	134.2	☐
ON SITE ATSS B147 - Slab 22	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	145.8	☐
OPERATIONS SUPERVISOR B106 - Slab 43	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	98.4	☐
PPE STORAGE TECH / GROUP B153 - Slab 20	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	82.9	☐
PROJECT OFFICE B149 - Slab 17	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	58.7	☐

Exterior Slabs

Name	Construction Type	Below Grade	U-Factor (BTU/h--ft²--°F)	F-Factor (BTU/h--ft²--°F)	Gross Area (ft²)	Adiabatic
QUIET ROOM B112 - Slab 51	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	51.3	☐
SECURE STORAGE B150 - Slab 16	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	161.2	☐
SECURITY EQUIP ROOM B152 - Slab 19	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	30.0	☐
SHIPPING / RECEIVING B132 - Slab 55	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	89.4	☐
SMALL CONFERENCE ROOM B145 - Slab 29	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	92.6	☐
SSC COORDINATOR B126 - Slab 11	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	68.8	☐
SUPPLY / PARTS STORAGE B130 - Slab 14	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	277.9	☐
SUPPORT SPEC B105 - Slab 40	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	29.7	☐
SYSTEMS SPEC B125 - Slab 10	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	33.3	☐
T&A CLERK B102 - Slab 39	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	47.7	☐
TAPE PLAY-BACK B110 - Slab 48	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	40.3	☐
TECH OPS LOCKER ROOM B154 - Slab 21	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	41.8	☐
TECH OPS SSC MNG B124 - Slab 08	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	68.7	☐
TRACON OPT ROOM B117 - Slab 04	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	202.0	☐
TSS B109 - Slab 46	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	93.8	☐
VEHICLE MAINTENANCE B134 - Slab 33	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	363.8	☐
VESTIBULE 1 B101 - Slab 38	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	49.3	☐
WELLNESS B121 - Slab 05	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	123.7	☐
WOMEN'S RESTROOM B141 - Slab 26	90.1-10 Min Slab on Grade Unheated Floor, Zone 1-5	☐		0.730	142.1	☐

* Interzone slabs are not included in the Exterior Slabs subsection. Exposed and Ground Contact Slabs will be shown.

Glass Doors

Name	Construction Type	U-Factor (BTU/h--ft²--°F)	SHGC	Visible Transmitance	Shade Control	Area (ft²)	Azimuth	Cardinal Direction
BREAK ROOM B122 - Wall 356 - Door 30	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	90.0	E
CORRIDOR 1 TO 4 - Wall 341 - Door 55	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	90.0	E
CORRIDOR 1 TO 4 - Wall 342 - Door 06	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	.1	N
CORRIDOR 1 TO 4 - Wall 343 - Door 07	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	271.9	W
CORRIDOR 1 TO 4 - Wall 355 - Door 28	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	180.0	S
CORRIDOR 1 TO 4 - Wall 355 - Door 31	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	180.0	S
ELEC MAIN SERVICE B135 - Wall 171 - Door 46	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	360.0	N

Glass Doors

Name	Construction Type	U-Factor (BTU/h--ft²--°F)	SHGC	Visible Transmitance	Shade Control	Area (ft²)	Azimuth	Cardinal Direction
ENGINE GENERATOR B131 - Wall 155 - Door 03	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	32.0	90.0	E
FIRE COMMAND CENTER B138 - Wall 184 - Door 40	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	360.0	N
FIRE PUMP B137 - Wall 180 - Door 41	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	360.0	N
LOADING / SHIPPING B133 - Wall 160 - Door 02	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	32.0	360.0	N
MECH EQUIP ROOM B120 - Wall 360 - Door 05	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	32.0	270.0	W
VEHICLE MAINTENANCE B134 - Wall 164 - Door 52	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	16.0	360.0	N
VEHICLE MAINTENANCE B134 - Wall 164 - Door 63	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	57.5	360.0	N
VESTIBULE 1 B101 - Wall 190 - Door 00	90.1-10 Zone 3A/B Metal Frame Entrance Door	0.900	0.252	0.3180	☐	32.0	360.0	N

Exterior Windows

Name	Construction Type	U-Factor (BTU/h--ft²--°F)	SHGC	Visible Transmitance	Shade Control	Area (ft²)	Azimuth	Cardinal Direction
ADMIN STORAGE B107 - Wall 218 - Window 03	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
AIR TRAFFIC MNG B104 - Wall 205 - Window 06	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
AT WORKSPACE B113 - Wall 239 - Window 01	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
BREAK ROOM B122 - Wall 30 - Window 17	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
BREAK ROOM B122 - Wall 30 - Window 18	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
CBI TRAINING B111 - Wall 230 - Window 02	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
CONTRACT WEATHER B115 - Wall 255 - Window 00	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
CORRIDOR 1 TO 4 - Wall 340 - Window 07	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
CORRIDOR 1 TO 4 - Wall 340 - Window 08	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
ENVIRONMENTAL SHOP B128 - Wall 61 - Window 11	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
ENVIRONMENTAL SHOP B128 - Wall 61 - Window 12	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
ENVIRONMENTAL SHOP B128 - Wall 61 - Window 13	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
ENVIRONMENTAL SHOP B128 - Wall 61 - Window 14	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
ENVIRONMENTAL SHOP B128 - Wall 62 - Window 09	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	90.0	E
ENVIRONMENTAL SHOP B128 - Wall 62 - Window 10	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	90.0	E
MAIL/COPIER B103 - Wall 210 - Window 05	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N
OPERATIONS SUPERVISOR B106 - Wall 214 - Window 04	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	360.0	N

Exterior Windows

Name	Construction Type	U-Factor (BTU/h--ft²--°F)	SHGC	Visible Transmitance	Shade Control	Area (ft²)	Azimuth	Cardinal Direction
SSC COORDINATOR B126 - Wall 52 - Window 16	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
TECH OPS SSC MNG B124 - Wall 39 - Window 15	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S
WELLNESS B121 - Wall 26 - Window 19	90.1-10 Window Zone 3A/B Metal Frame All Other	0.651	0.254	0.3181	☐	30.0	180.0	S

Vertical Glazing Areas

Total Area (ft²)	North Facing Area (ft²)	East Facing Area (ft²)	South Facing Area (ft²)	West Facing Area (ft²)
945.5	411.5	124.0	362.0	48.0

Entered Values Envelope

Linked Alternatives Are Not Shown In Entered Values

Entered Values Envelope

Linked Alternatives Are Not Shown In Entered Values

Room Information Entered Values

Room Type Templates

Room Type: Low-rise Office - Enclosed Office - PROPOSED

People Load Name: People Load #001 **Type:** Office

Activity: Moderately Active Office Work **Schedule:** Low-rise Office - Occupancy

Percent Floor Area: 100% **Sensible Load (Btuh):** 250 **Latent Load (Btuh):** 200 **Sensible Radiant:** 58%

Density (ft²/person): 200

Light Load Name: Light Load #001 **Type:** 90.1-10 Office - Enclosed - PROPOSED

Configuration: Recessed Fluorescent, Parabolic Louver, Non-Vented, T8 **Schedule:** Low-rise Office - Lighting

Percent Floor Area: 100% **Heat into Return Air:** 31% **Thermal Radiation:** 22% **Visible Radiation** 20%

Density (W/ft²): 0.94 **Number of Fixtures:**

Ventilation Type: 62.1-13 Office Buildings - Office Space **Schedule:** Available (100%)

Standard: ASHRAE 62.1 and 170 **People Based Rate:** 5.0 cfm/person **Area Based Rate:** 0.06 cfm/ft²

Infiltration: **Flow Rate:** 0.0 ACH **Schedule:** Available (100%)

Room Exhaust: **Flow Rate:** 0.0 cfm **Schedule:** Available (100%)

Design Airflow: **Cooling Supply Flow Rate:** Auto-Sized **Heating Design Flow Rate:** Auto-Sized

Unmodified Rooms(55):

ADMIN ASSIST B123
ADMIN STORAGE B107
AIR TRAFFIC MNG B104
AT COACH B118
AT LOCKER ROOM B108
AT WORKSPACE B113
BOILER ROOM B120A
BREAK ROOM B122
CBI TRAINING B111
CLOSET B161
CONTRACT WEATHER B115
CONTRACTOR B119
CORRIDOR 1 TO 4
DEBRIEFING B114
DRUG TEST B144
ELEC MAIN SERVICE B135
ELEC SWITCHGEAR B151.
ELECTRONICS EQUIP ROOM / LAN / TELCO B116
ENGINE GENERATOR B131
ENVIRONMENTAL SHOP B128
FIRE COMMAND CENTER B138
FIRE LIFE SAFETY / UPS B136
FIRE PUMP B137
HAZMAT STORAGE B129
LACTATION B143
LARGE CONFERENCE ROOM B146
LOADING / SHIPPING B133
MAIL/COPIER B103
MECH EQUIP ROOM B120
MEN'S RESTROOM B140
NAS DOC / TECH LIBRARY B127
NAS ELEC WORKSHOP B148
ON SITE ATSS B147
OPERATIONS SUPERVISOR B106
PPE STORAGE TECH / GROUP B153
PROJECT OFFICE B149
QUIET ROOM B112
SECURE STORAGE B150
SECURITY EQUIP ROOM B152
SHIPPING / RECEIVING B132
SMALL CONFERENCE ROOM B145
SSC COORDINATOR B126
SUPPLY / PARTS STORAGE B130
SUPPORT SPEC B105
SYSTEMS SPEC B125
T&A CLERK B102
TAPE PLAY-BACK B110
TECH OPS LOCKER ROOM B154

TECH OPS SSC MNG B124
VEHICLE MAINTENANCE B134
WOMEN'S RESTROOM B141

TRACON OPT ROOM B117
VESTIBULE 1 B101

TSS B109
WELLNESS B121

Room Information Entered Values

Room Type Templates

Room Type: Low-rise Office - Enclosed Office - PROPOSED

People Load Name: People Load #001 **Type:** Office

Activity: Moderately Active Office Work **Schedule:** Low-rise Office - Occupancy

Percent Floor Area: 100% **Sensible Load (Btuh):** 250 **Latent Load (Btuh):** 200 **Sensible Radiant:** 58%

Density (ft²/person): 200

Light Load Name: Light Load #001 **Type:** 90.1-10 Office - Enclosed - PROPOSED

Configuration: Recessed Fluorescent, Parabolic Louver, Non-Vented, T8 **Schedule:** Low-rise Office - Lighting

Percent Floor Area: 100% **Heat into Return Air:** 31% **Thermal Radiation:** 22% **Visible Radiation** 20%

Density (W/ft²): 0.94 **Number of Fixtures:**

Ventilation Type: 62.1-13 Office Buildings - Office Space **Schedule:** Available (100%)

Standard: ASHRAE 62.1 and 170 **People Based Rate:** 5.0 cfm/person **Area Based Rate:** 0.06 cfm/ft²

Infiltration: **Flow Rate:** 0.0 ACH **Schedule:** Available (100%)

Room Exhaust: **Flow Rate:** 0.0 cfm **Schedule:** Available (100%)

Design Airflow: **Cooling Supply Flow Rate:** Auto-Sized **Heating Design Flow Rate:** Auto-Sized

Unmodified Rooms(55):

ADMIN ASSIST B123	ADMIN STORAGE B107	AIR TRAFFIC MNG B104
AT COACH B118	AT LOCKER ROOM B108	AT WORKSPACE B113
BOILER ROOM B120A	BREAK ROOM B122	CBI TRAINING B111
CLOSET B161	CONTRACT WEATHER B115	CONTRACTOR B119
CORRIDOR 1 TO 4	DEBRIEFING B114	DRUG TEST B144
ELEC MAIN SERVICE B135	ELEC SWITCHGEAR B151.	ELECTRONICS EQUIP ROOM / LAN / TELCO B116
ENGINE GENERATOR B131	ENVIRONMENTAL SHOP B128	FIRE COMMAND CENTER B138
FIRE LIFE SAFETY / UPS B136	FIRE PUMP B137	HAZMAT STORAGE B129
LACTATION B143	LARGE CONFERENCE ROOM B146	LOADING / SHIPPING B133
MAIL/COPIER B103	MECH EQUIP ROOM B120	MEN'S RESTROOM B140
NAS DOC / TECH LIBRARY B127	NAS ELEC WORKSHOP B148	ON SITE ATSS B147
OPERATIONS SUPERVISOR B106	PPE STORAGE TECH / GROUP B153	PROJECT OFFICE B149
QUIET ROOM B112	SECURE STORAGE B150	SECURITY EQUIP ROOM B152
SHIPPING / RECEIVING B132	SMALL CONFERENCE ROOM B145	SSC COORDINATOR B126
SUPPLY / PARTS STORAGE B130	SUPPORT SPEC B105	SYSTEMS SPEC B125
T&A CLERK B102	TAPE PLAY-BACK B110	TECH OPS LOCKER ROOM B154

TECH OPS SSC MNG B124
VEHICLE MAINTENANCE B134
WOMEN'S RESTROOM B141

TRACON OPT ROOM B117
VESTIBULE 1 B101

TSS B109
WELLNESS B121

Room Information Entered Values

Room Type Templates

Room Type: Low-rise Office - Enclosed Office - PROPOSED

People Load Name: People Load #001 **Type:** Office

Activity: Moderately Active Office Work **Schedule:** Low-rise Office - Occupancy

Percent Floor Area: 100% **Sensible Load (Btuh):** 250 **Latent Load (Btuh):** 200 **Sensible Radiant:** 58%

Density (ft²/person): 200

Light Load Name: Light Load #001 **Type:** 90.1-10 Office - Enclosed - PROPOSED

Configuration: Recessed Fluorescent, Parabolic Louver, Non-Vented, T8 **Schedule:** Low-rise Office - Lighting

Percent Floor Area: 100% **Heat into Return Air:** 31% **Thermal Radiation:** 22% **Visible Radiation** 20%

Density (W/ft²): 0.94 **Number of Fixtures:**

Ventilation Type: 62.1-13 Office Buildings - Office Space **Schedule:** Available (100%)

Standard: ASHRAE 62.1 and 170 **People Based Rate:** 5.0 cfm/person **Area Based Rate:** 0.06 cfm/ft²

Infiltration: **Flow Rate:** 0.0 ACH **Schedule:** Available (100%)

Room Exhaust: **Flow Rate:** 0.0 cfm **Schedule:** Available (100%)

Design Airflow: **Cooling Supply Flow Rate:** Auto-Sized **Heating Design Flow Rate:** Auto-Sized

Unmodified Rooms(55):

ADMIN ASSIST B123
ADMIN STORAGE B107
AIR TRAFFIC MNG B104
AT COACH B118
AT LOCKER ROOM B108
AT WORKSPACE B113
BOILER ROOM B120A
BREAK ROOM B122
CBI TRAINING B111
CLOSET B161
CONTRACT WEATHER B115
CONTRACTOR B119
CORRIDOR 1 TO 4
DEBRIEFING B114
DRUG TEST B144
ELEC MAIN SERVICE B135
ELEC SWITCHGEAR B151.
ELECTRONICS EQUIP ROOM / LAN / TELCO B116
ENGINE GENERATOR B131
ENVIRONMENTAL SHOP B128
FIRE COMMAND CENTER B138
FIRE LIFE SAFETY / UPS B136
FIRE PUMP B137
HAZMAT STORAGE B129
LACTATION B143
LARGE CONFERENCE ROOM B146
LOADING / SHIPPING B133
MAIL/COPIER B103
MECH EQUIP ROOM B120
MEN'S RESTROOM B140
NAS DOC / TECH LIBRARY B127
NAS ELEC WORKSHOP B148
ON SITE ATSS B147
OPERATIONS SUPERVISOR B106
PPE STORAGE TECH / GROUP B153
PROJECT OFFICE B149
QUIET ROOM B112
SECURE STORAGE B150
SECURITY EQUIP ROOM B152
SHIPPING / RECEIVING B132
SMALL CONFERENCE ROOM B145
SSC COORDINATOR B126
SUPPLY / PARTS STORAGE B130
SUPPORT SPEC B105
SYSTEMS SPEC B125
T&A CLERK B102
TAPE PLAY-BACK B110
TECH OPS LOCKER ROOM B154

TECH OPS SSC MNG B124
VEHICLE MAINTENANCE B134
WOMEN'S RESTROOM B141

TRACON OPT ROOM B117
VESTIBULE 1 B101

TSS B109
WELLNESS B121

Room Information Entered Values

Room Type Templates

Room Type: Low-rise Office - Enclosed Office - PROPOSED

People Load Name: People Load #001 **Type:** Office

Activity: Moderately Active Office Work **Schedule:** Low-rise Office - Occupancy

Percent Floor Area: 100% **Sensible Load (Btuh):** 250 **Latent Load (Btuh):** 200 **Sensible Radiant:** 58%

Density (ft²/person): 200

Light Load Name: Light Load #001 **Type:** 90.1-10 Office - Enclosed - PROPOSED

Configuration: Recessed Fluorescent, Parabolic Louver, Non-Vented, T8 **Schedule:** Low-rise Office - Lighting

Percent Floor Area: 100% **Heat into Return Air:** 31% **Thermal Radiation:** 22% **Visible Radiation** 20%

Density (W/ft²): 0.94 **Number of Fixtures:**

Ventilation Type: 62.1-13 Office Buildings - Office Space **Schedule:** Available (100%)

Standard: ASHRAE 62.1 and 170 **People Based Rate:** 5.0 cfm/person **Area Based Rate:** 0.06 cfm/ft²

Infiltration: **Flow Rate:** 0.0 ACH **Schedule:** Available (100%)

Room Exhaust: **Flow Rate:** 0.0 cfm **Schedule:** Available (100%)

Design Airflow: **Cooling Supply Flow Rate:** Auto-Sized **Heating Design Flow Rate:** Auto-Sized

Unmodified Rooms(55):

ADMIN ASSIST B123
ADMIN STORAGE B107
AIR TRAFFIC MNG B104
AT COACH B118
AT LOCKER ROOM B108
AT WORKSPACE B113
BOILER ROOM B120A
BREAK ROOM B122
CBI TRAINING B111
CLOSET B161
CONTRACT WEATHER B115
CONTRACTOR B119
CORRIDOR 1 TO 4
DEBRIEFING B114
DRUG TEST B144
ELEC MAIN SERVICE B135
ELEC SWITCHGEAR B151.
ELECTRONICS EQUIP ROOM / LAN / TELCO B116
ENGINE GENERATOR B131
ENVIRONMENTAL SHOP B128
FIRE COMMAND CENTER B138
FIRE LIFE SAFETY / UPS B136
FIRE PUMP B137
HAZMAT STORAGE B129
LACTATION B143
LARGE CONFERENCE ROOM B146
LOADING / SHIPPING B133
MAIL/COPIER B103
MECH EQUIP ROOM B120
MEN'S RESTROOM B140
NAS DOC / TECH LIBRARY B127
NAS ELEC WORKSHOP B148
ON SITE ATSS B147
OPERATIONS SUPERVISOR B106
PPE STORAGE TECH / GROUP B153
PROJECT OFFICE B149
QUIET ROOM B112
SECURE STORAGE B150
SECURITY EQUIP ROOM B152
SHIPPING / RECEIVING B132
SMALL CONFERENCE ROOM B145
SSC COORDINATOR B126
SUPPLY / PARTS STORAGE B130
SUPPORT SPEC B105
SYSTEMS SPEC B125
T&A CLERK B102
TAPE PLAY-BACK B110
TECH OPS LOCKER ROOM B154

TECH OPS SSC MNG B124
VEHICLE MAINTENANCE B134
WOMEN'S RESTROOM B141

TRACON OPT ROOM B117
VESTIBULE 1 B101

TSS B109
WELLNESS B121

Room Geometries Entered Values

Linked Alternatives Are Not Shown In Entered Values

Room Geometries Entered Values

Room Name	Flr to Flr Height (ft)	Top of Flr Elevation (ft)	Ceiling Elevation (ft)	Occupied Floor Area (ft^2)	Internal Volume (ft^3)	Dropped Ceiling	Raised Floor
ADMIN ASSIST B123	15.2	0.0	0.0	40	607.3	☐	☐
ADMIN STORAGE B107	15.2	0.0	0.0	65	980.6	☐	☐
AIR TRAFFIC MNG B104	15.2	0.0	0.0	42	644.2	☐	☐
AT COACH B118	15.2	0.0	0.0	41	624.2	☐	☐
AT LOCKER ROOM B108	15.2	0.0	0.0	78	1,178.6	☐	☐
AT WORKSPACE B113	15.2	0.0	0.0	37	564.5	☐	☐
BOILER ROOM B120A	15.2	0.0	0.0	196	2,975.8	☐	☐
BREAK ROOM B122	15.2	0.0	0.0	138	2,101.2	☐	☐
CBI TRAINING B111	15.2	0.0	0.0	52	786.6	☐	☐
CLOSET B161	15.2	0.0	0.0	3	51.2	☐	☐
CONTRACT WEATHER B115	15.2	0.0	0.0	36	545.1	☐	☐
CONTRACTOR B119	15.2	0.0	0.0	36	550.0	☐	☐
CORRIDOR 1 TO 4	15.2	0.0	0.0	972	14,778.4	☐	☐
DEBRIEFING B114	15.2	0.0	0.0	36	552.8	☐	☐
DRUG TEST B144	15.2	0.0	0.0	26	388.4	☐	☐
ELEC MAIN SERVICE B135	15.2	0.0	0.0	167	2,537.1	☐	☐
ELEC SWITCHGEAR B151.	15.2	0.0	0.0	162	2,463.1	☐	☐
ELECTRONICS EQUIP ROOM / LAN / TELCO B116	15.2	0.0	0.0	488	7,415.3	☐	☐
ENGINE GENERATOR B131	15.2	0.0	0.0	214	3,260.0	☐	☐
ENVIRONMENTAL SHOP B128	15.2	0.0	0.0	361	5,479.8	☐	☐
FIRE COMMAND CENTER B138	15.2	0.0	0.0	65	982.6	☐	☐
FIRE LIFE SAFETY / UPS B136	15.2	0.0	0.0	116	1,756.4	☐	☐
FIRE PUMP B137	15.2	0.0	0.0	63	953.0	☐	☐
HAZMAT STORAGE B129	15.2	0.0	0.0	45	686.9	☐	☐

Room Name	Flr to Flr Height (ft)	Top of Flr Elevation (ft)	Ceiling Elevation (ft)	Occupied Floor Area (ft²)	Internal Volume (ft³)	Dropped Ceiling	Raised Floor
LACTATION B143	15.2	0.0	0.0	49	743.7	☐	☐
LARGE CONFERENCE ROOM B146	15.2	0.0	0.0	134	2,037.9	☐	☐
LOADING / SHIPPING B133	15.2	0.0	0.0	151	2,297.4	☐	☐
MAIL/COPIER B103	15.2	0.0	0.0	47	711.6	☐	☐
MECH EQUIP ROOM B120	15.2	0.0	0.0	435	6,619.0	☐	☐
MEN'S RESTROOM B140	15.2	0.0	0.0	116	1,756.4	☐	☐
NAS DOC / TECH LIBRARY B127	15.2	0.0	0.0	69	1,045.8	☐	☐
NAS ELEC WORKSHOP B148	15.2	0.0	0.0	112	1,697.7	☐	☐
ON SITE ATSS B147	15.2	0.0	0.0	122	1,860.7	☐	☐
OPERATIONS SUPERVISOR B106	15.2	0.0	0.0	79	1,205.4	☐	☐
PPE STORAGE TECH / GROUP B153	15.2	0.0	0.0	65	994.1	☐	☐
PROJECT OFFICE B149	15.2	0.0	0.0	43	659.1	☐	☐
QUIET ROOM B112	15.2	0.0	0.0	38	572.4	☐	☐
SECURE STORAGE B150	15.2	0.0	0.0	137	2,075.6	☐	☐
SECURITY EQUIP ROOM B152	15.2	0.0	0.0	19	295.8	☐	☐
SHIPPING / RECEIVING B132	15.2	0.0	0.0	71	1,079.4	☐	☐
SMALL CONFERENCE ROOM B145	15.2	0.0	0.0	74	1,126.2	☐	☐
SSC COORDINATOR B126	15.2	0.0	0.0	53	807.8	☐	☐
SUPPLY / PARTS STORAGE B130	15.2	0.0	0.0	240	3,652.0	☐	☐
SUPPORT SPEC B105	15.2	0.0	0.0	20	300.9	☐	☐
SYSTEMS SPEC B125	15.2	0.0	0.0	23	346.0	☐	☐
T&A CLERK B102	15.2	0.0	0.0	34	521.6	☐	☐
TAPE PLAY-BACK B110	15.2	0.0	0.0	28	419.5	☐	☐
TECH OPS LOCKER ROOM B154	15.2	0.0	0.0	30	452.0	☐	☐
TECH OPS SSC MNG B124	15.2	0.0	0.0	53	806.9	☐	☐
TRACON OPT ROOM B117	15.2	0.0	0.0	174	2,641.5	☐	☐

Room Name	Flr to Flr Height (ft)	Top of Flr Elevation (ft)	Ceiling Elevation (ft)	Occupied Floor Area (ft^2)	Internal Volume (ft^3)	Dropped Ceiling	Raised Floor
TSS B109	15.2	0.0	0.0	75	1,142.3	☐	☐
VEHICLE MAINTENANCE B134	15.2	0.0	0.0	326	4,957.1	☐	☐
VESTIBULE 1 B101	15.2	0.0	0.0	35	538.3	☐	☐
WELLNESS B121	15.2	0.0	0.0	102	1,551.1	☐	☐
WOMEN'S RESTROOM B141	15.2	0.0	0.0	117	1,784.2	☐	☐

Room Geometries Entered Values

Linked Alternatives Are Not Shown In Entered Values

Room Geometries Entered Values

Linked Alternatives Are Not Shown In Entered Values

Entered Values Zone Information

Linked Alternatives Are Not Shown In Entered Values

Entered Values Zone Information

Zone Type Section

Zone Type: Office

Supply Path:	RoomDirect		**Return Path:**	RoomDirect	
Cstat Schedule:	Based On Occupancy		**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:** 78 °F
Hstat Schedule	Based On Occupancy		**Heating Dry Bulb:**	70 °F	**Heating Drift Point:** 64 °F
Humidifying Schedule:	Based On Occupancy		**Humidifying Set Point:**	40 %	**Humidifying Drift Point:** 35 %
Dehumidifying Schedule:	Based On Occupancy		**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:** 55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Zones Section

**** Information for unmodified zones is in the Zone Type Section.**

Zone Name: CORRIDORS **Zone Type:** Office **Modified:** ☑

Comfort Height:	48.0 in	**Supply Path:** RoomDirect	**Return Path:**	RoomDirect	
Cstat Schedule:	Based On Occupancy		**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:** 78 °F
Hstat Schedule:	Based On Occupancy		**Heating Dry Bulb:**	70 °F	**Heating Drift Point:** 64 °F
Humidifying Schedule:	Based On Occupancy		**Humidifying Set Point:**	40 %	**Humidifying Drift Point:** 35 %
Dehumidifying Schedule:	Based On Occupancy		**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:** 55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(2):

CORRIDOR 1 TO 4 VESTIBULE 1 B101

Zone Name: ENVIRONMENTAL SUPPORT **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(16):

MECH EQUIP ROOM B120	BOILER ROOM B120A	FIRE COMMAND CENTER B138
FIRE PUMP B137	FIRE LIFE SAFETY / UPS B136	ELEC MAIN SERVICE B135
VEHICLE MAINTENANCE B134	SHIPPING / RECEIVING B132	ENGINE GENERATOR B131
HAZMAT STORAGE B129	SUPPLY / PARTS STORAGE B130	ENVIRONMENTAL SHOP B128
SECURE STORAGE B150	PPE STORAGE TECH / GROUP B153	SECURITY EQUIP ROOM B152
ELEC SWITCHGEAR B151.		

Zone Name: JOINT USE & MISC. SUPPORT **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(11):

LOADING / SHIPPING B133	WELLNESS B121	BREAK ROOM B122
WOMEN'S RESTROOM B141	LACTATION B143	SMALL CONFERENCE ROOM B145
LARGE CONFERENCE ROOM B146	MEN'S RESTROOM B140	MAIL/COPIER B103
ADMIN STORAGE B107	CBI TRAINING B111	

Zone Name: TECHNICAL OPERATIONS **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(5):

ON SITE ATSS B147
SSC COORDINATOR B126
ADMIN ASSIST B123
TECH OPS SSC MNG B124
SYSTEMS SPEC B125

Zone Name: TECHNICAL OPS SPACES **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(5):

ELECTRONICS EQUIP ROOM / LAN / TELCO B116
TECH OPS LOCKER ROOM B154
NAS ELEC WORKSHOP B148
PROJECT OFFICE B149
NAS DOC / TECH LIBRARY B127

Zone Name: TERMINAL PERSONNEL **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(8):

T&A CLERK B102	AIR TRAFFIC MNG B104	SUPPORT SPEC B105
OPERATIONS SUPERVISOR B106	CONTRACTOR B119	AT WORKSPACE B113
CONTRACT WEATHER B115	CLOSET B161	

Zone Name: TERMINAL SPACES **Zone Type:** Office **Modified:** ☑

Comfort Height: 48.0 in **Supply Path:** RoomDirect **Return Path:** RoomDirect

Cstat Schedule:	Based On Occupancy	**Cooling Dry Bulb:**	72 °F	**Cooling Drift Point:**	78 °F
Hstat Schedule:	Based On Occupancy	**Heating Dry Bulb:**	70 °F	**Heating Drift Point:**	64 °F
Humidifying Schedule:	Based On Occupancy	**Humidifying Set Point:**	40 %	**Humidifying Drift Point:**	35 %
Dehumidifying Schedule:	Based On Occupancy	**Dehumidifying Set Point:**	50 %	**Dehumidifying Drift Point:**	55 %

Cooling Ez:	Ceiling supply, ceiling return	100 %
Heating Ez:	Ceiling supply < trm+15° (8°C), ceiling return, high velocity	100 %
Er:	Default based on system type	

Assigned Rooms(8):

DEBRIEFING B114	QUIET ROOM B112	TAPE PLAY-BACK B110
TSS B109	AT LOCKER ROOM B108	TRACON OPT ROOM B117
AT COACH B118	DRUG TEST B144	

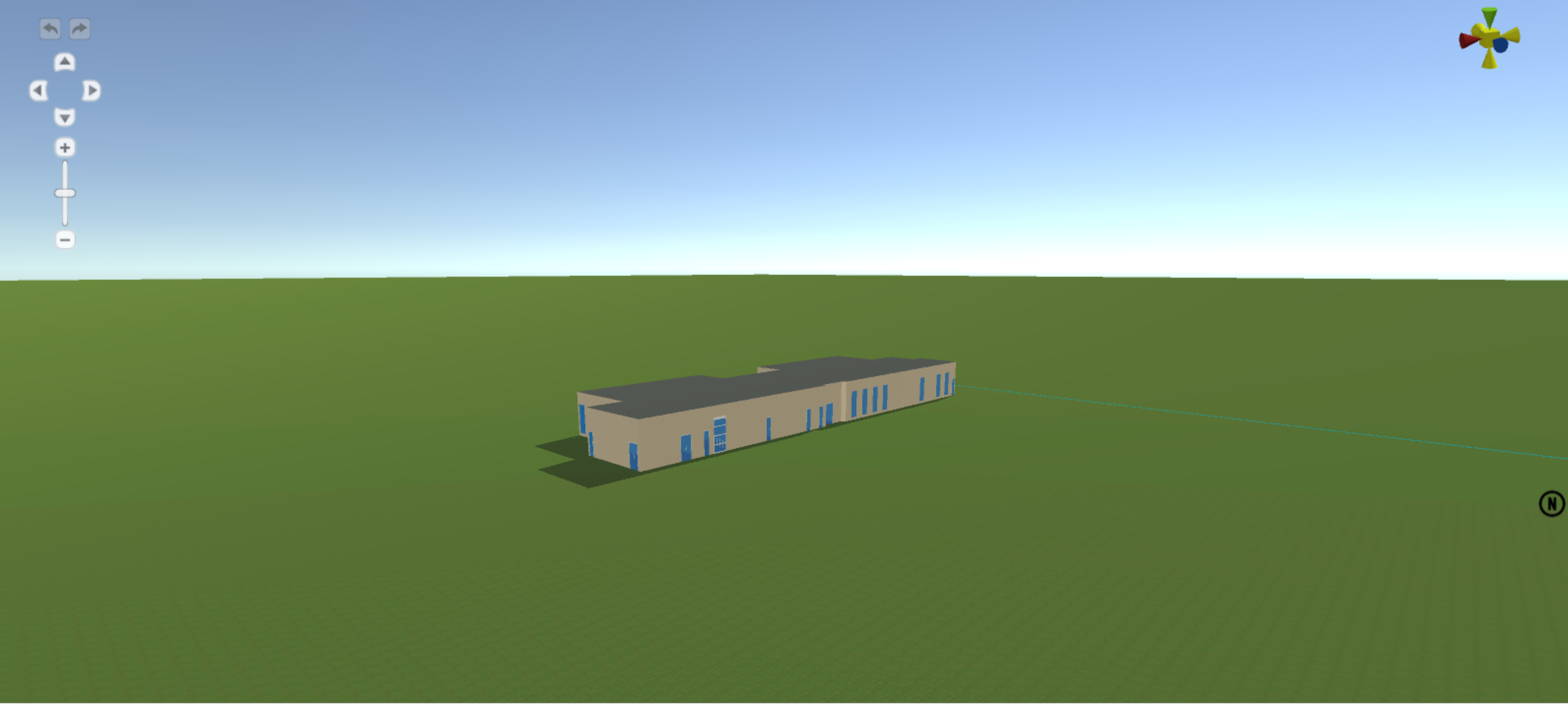
Entered Values Zone Information

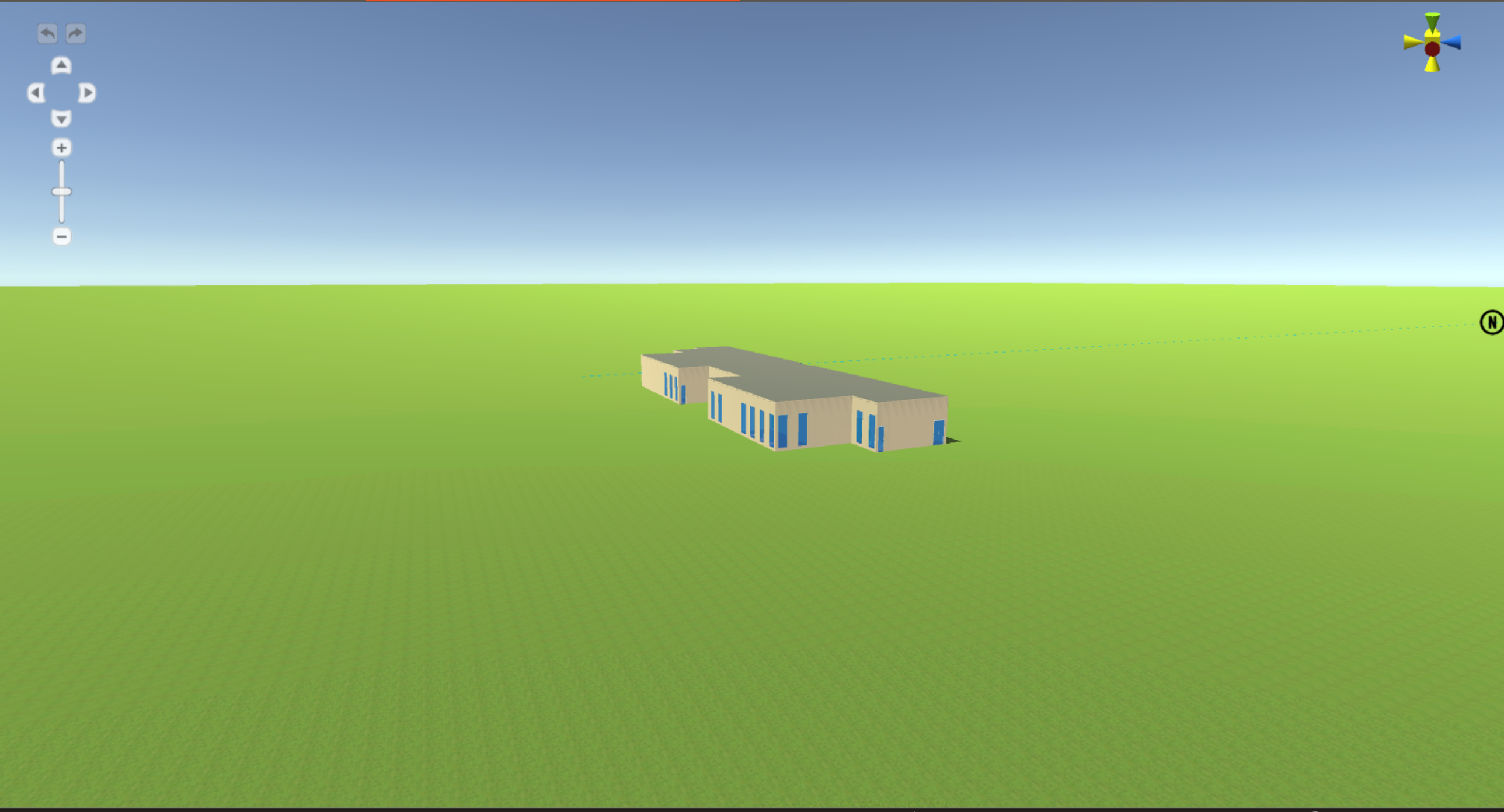
Linked Alternatives Are Not Shown In Entered Values

Entered Values Zone Information

Linked Alternatives Are Not Shown In Entered Values


N
Show Shadows
12:00 AM
11:59 PM
J F M A M J J A S O N D


N


N
Show Shadows
12:00 AM
11:59 PM
J F M A M J J A S O N D

NIST BLCC 5.3-22: Summary LCC

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\patelbh\OneDrive - EXP\Desktop\DULUTH, MN ATCT\ENERGY MODELING & LCCA\LCCA\BLCC\BLCC - LCCA - DULUTH ATCT.xml
Date of Study:	Tue Jan 23 16:31:44 CST 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	DULUTH, MN ATCT
Project Location:	Minnesota
Analyst:	EXP U.S. Services Inc.
Comment:	LCCA analysis
Base Date:	March 1, 2023
Service Date:	March 1, 2023
Study Period:	40 years 0 months (March 1, 2023 through February 28, 2063)
Discount Rate:	4%
Discounting Convention:	End-of-Year

Discount and Escalation Rates are NOMINAL (inclusive of general inflation)

Alternative: VAV-AHU-AIR COOLED CHILLER W/ AIRSIDE ECONOMIZER

LCC Summary

	Present Value	Annual Value
Initial Cost	$667,631	$33,732
Energy Consumption Costs	$300,036	$15,159
Energy Demand Costs	$149,403	$7,549
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$626,040	$31,631
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$723,481	$36,554
Less Remaining Value	-$139,111	-$7,029
Total Life-Cycle Cost	$2,327,479	$117,596

Alternative: VAV-AHU-WATER COOLED CHILLER W/ AIRSIDE ECONOMIZER

LCC Summary

	Present Value	Annual Value
Initial Cost	$888,246	$44,879
Energy Consumption Costs	$336,448	$16,999
Energy Demand Costs	$152,316	$7,696
Energy Utility Rebates	$0	$0
Water Usage Costs	$22,472	$1,135
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$764,560	$38,629
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$962,552	$48,633
Less Remaining Value	-$185,080	-$9,351
Total Life-Cycle Cost	$2,941,513	$148,620

Alternative: VAV-AHU-AIR COOLED CHILLER W/ WATERSIDE ECONOMIZER

LCC Summary

	Present Value	Annual Value
Initial Cost	$729,067	$36,836
Energy Consumption Costs	$289,257	$14,615
Energy Demand Costs	$187,882	$9,493
Energy Utility Rebates	$0	$0
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Annually Recurring OM&R Costs	$636,560	$32,162
Non-Annually Recurring OM&R Costs	$0	$0
Replacement Costs	$790,056	$39,917
Less Remaining Value	-$151,912	-$7,675
Total Life-Cycle Cost	$2,480,910	$125,348

NIST BLCC 5.3-22: Detailed LCC Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\patelbh\OneDrive - EXP\Desktop\DULUTH, MN ATCT\ENERGY MODELING & LCCA\LCCA\BLCC\BLCC - LCCA - DULUTH ATCT.xml
Date of Study:	Tue Jan 23 16:31:16 CST 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	DULUTH, MN ATCT
Project Location:	Minnesota
Analyst:	EXP U.S. Services Inc.
Comment:	LCCA analysis
Base Date:	March 1, 2023
Service Date:	March 1, 2023
Study Period:	40 years 0 months (March 1, 2023 through February 28, 2063)
Discount Rate:	4%
Discounting Convention:	End-of-Year

Discount and Escalation Rates are NOMINAL (inclusive of general inflation)

Alternative: VAV-AHU-AIR COOLED CHILLER W/ AIRSIDE ECONOMIZER

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $667,631

Component:

Cost-Phasing

Date	Portion	Yearly Cost
March 1, 2023	100%	$667,631
Total (for Component)		$667,631

Energy Costs: Natural Gas

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
31,000.0 MBtu	$0.01219	$378	$1,200	$0

Energy Costs: Electricity

(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
196,119.0 kWh	$0.09500	$18,631	$8,206	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$667,631	$33,732
Energy Costs		
Energy Consumption Costs	$300,036	$15,159
Energy Demand Charges	$149,403	$7,549
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$449,438	$22,708
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	$626,040	$31,631
Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$626,040	$31,631
Replacements to Capital Components		
Component:	$723,481	$36,554
Subtotal (for Replacements):	$723,481	$36,554
Residual Value of Original Capital Components		
Component:	-$66,763	-$3,373
Subtotal (for Residual Value):	-$66,763	-$3,373
Residual Value of Capital Replacements		
Component:	-$72,348	-$3,655
Subtotal (for Residual Value):	-$72,348	-$3,655
Total Life-Cycle Cost	$2,327,479	$117,596

Emissions Summary

Energy Name	Annual	Life-Cycle
Natural Gas:		
CO2	1,637,411.43 kg	65,491,974.24 kg
SO2	13,214.43 kg	528,540.90 kg
NOx	228.96 kg	9,157.89 kg
Electricity:		
CO2	88,556.85 kg	3,542,031.52 kg
SO2	49.43 kg	1,976.88 kg
NOx	62.84 kg	2,513.46 kg
Total:		
CO2	1,725,968.28 kg	69,034,005.76 kg
SO2	13,263.85 kg	530,517.78 kg
NOx	291.80 kg	11,671.35 kg

Alternative: VAV-AHU-WATER COOLED CHILLER W/ AIRSIDE ECONOMIZER

Initial Cost Data (not Discounted)

Initial Capital Costs

(adjusted for price escalation)

Initial Capital Costs for All Components: $888,246

Component:

Cost-Phasing

Date	Portion	Yearly Cost
March 1, 2023	100%	$888,246
Total (for Component)		$888,246

Energy Costs: Electricity
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
220,431.0 kWh	$0.09500	$20,941	$8,390	$0

Energy Costs: Natural Gas
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
31,000.0 MBtu	$0.01219	$378	$1,200	$0

Water Costs: Water
(base-year dollars)

Water	Average Annual Usage Units/Year	Price/Unit	Units/Year	Average Annual Disposal Price/Unit	Average Annual Cost
@ Summer Rates	68.9 ThousGal	$8.15000	0.0 ThousGal	$0.00000	$562
@ Winter Rates	0.0 ThousGal	$8.15000	0.0 ThousGal	$0.00000	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value
Initial Capital Costs	$888,246	$44,879
Energy Costs		
Energy Consumption Costs	$336,448	$16,999
Energy Demand Charges	$152,316	$7,696
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$488,764	$24,695
Water Usage Costs	$22,472	$1,135
Water Disposal Costs	$0	$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	$764,560	$38,629
Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$764,560	$38,629
Replacements to Capital Components		
Component:	$962,552	$48,633
Subtotal (for Replacements):	$962,552	$48,633
Residual Value of Original Capital Components		
Component:	-$88,825	-$4,488
Subtotal (for Residual Value):	-$88,825	-$4,488
Residual Value of Capital Replacements		
Component:	-$96,255	-$4,863
Subtotal (for Residual Value):	-$96,255	-$4,863
Total Life-Cycle Cost	$2,941,513	$148,620

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	99,534.85 kg	3,981,121.41 kg
SO2	55.55 kg	2,221.94 kg
NOx	70.63 kg	2,825.04 kg
Natural Gas:		
CO2	1,637,411.43 kg	65,491,974.24 kg
SO2	13,214.43 kg	528,540.90 kg
NOx	228.96 kg	9,157.89 kg
Total:		
CO2	1,736,946.28 kg	69,473,095.65 kg
SO2	13,269.98 kg	530,762.85 kg
NOx	299.59 kg	11,982.93 kg

Alternative: VAV-AHU-AIR COOLED CHILLER W/ WATERSIDE ECONOMIZER

Initial Cost Data (not Discounted)

Initial Capital Costs
(adjusted for price escalation)

Initial Capital Costs for All Components: $729,067

Component:
Cost-Phasing

Date	Portion	Yearly Cost
March 1, 2023	100%	$729,067
Total (for Component)		$729,067

Energy Costs: Electricity
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
188,922.0 kWh	$0.09500	$17,948	$10,646	$0

Energy Costs: Natural Gas
(base-year dollars)

Average Annual Usage	Average Price/Unit	Average Annual Cost	Average Annual Demand	Average Annual Rebate
31,000.0 MBtu	$0.01219	$378	$1,200	$0

Life-Cycle Cost Analysis

	Present Value	Annual Value

	Present Value	Annual Value
Initial Capital Costs	$729,067	$36,836
Energy Costs		
Energy Consumption Costs	$289,257	$14,615
Energy Demand Charges	$187,882	$9,493
Energy Utility Rebates	$0	$0
Subtotal (for Energy):	$477,139	$24,107
Water Usage Costs	$0	$0
Water Disposal Costs	$0	$0
Operating, Maintenance & Repair Costs		
Component:		
Annually Recurring Costs	$636,560	$32,162
Non-Annually Recurring Costs	$0	$0
Subtotal (for OM&R):	$636,560	$32,162
Replacements to Capital Components		
Component:	$790,056	$39,917
Subtotal (for Replacements):	$790,056	$39,917
Residual Value of Original Capital Components		
Component:	-$72,907	-$3,684
Subtotal (for Residual Value):	-$72,907	-$3,684
Residual Value of Capital Replacements		
Component:	-$79,006	-$3,992
Subtotal (for Residual Value):	-$79,006	-$3,992
Total Life-Cycle Cost	$2,480,910	$125,348

Emissions Summary

Energy Name	Annual	Life-Cycle
Electricity:		
CO2	85,307.07 kg	3,412,049.21 kg
SO2	47.61 kg	1,904.33 kg
NOx	60.53 kg	2,421.22 kg
Natural Gas:		
CO2	1,637,411.43 kg	65,491,974.24 kg
SO2	13,214.43 kg	528,540.90 kg
NOx	228.96 kg	9,157.89 kg
Total:		
CO2	1,722,718.50 kg	68,904,023.45 kg
SO2	13,262.04 kg	530,445.24 kg
NOx	289.50 kg	11,579.11 kg

NIST BLCC 5.3-22: Input Data Listing

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

General Information

File Name:	C:\Users\patelbh\OneDrive - EXP\Desktop\DULUTH, MN ATCT\ENERGY MODELING & LCCA\LCCA\BLCC\BLCC - LCCA - DULUTH ATCT.xml
Date of Study:	Tue Jan 23 16:30:42 CST 2024
Analysis Type:	FEMP Analysis, Energy Project
Project Name:	DULUTH, MN ATCT
Project Location:	Minnesota
Analyst:	EXP U.S. Services Inc.
Comment:	LCCA analysis
Base Date:	March 1, 2023
Service Date:	March 1, 2023
Study Period:	40 years 0 months (March 1, 2023 through February 28, 2063)
Discount Rate:	4%
Discounting Convention:	End-of-Year

Discount and Escalation Rates are NOMINAL (inclusive of general inflation)

Alternative: VAV-AHU-AIR COOLED CHILLER W/ AIRSIDE ECONOMIZER

Comment: ALTERNATIVE 1

Energy: Natural Gas

Annual Consumption:	31,000.0 MBtu
Price per Unit:	$0.01219
Demand Charge:	$1,200
Utility Rebate:	$0
End-Use:	Commercial Boiler, controlled-low NOx burners
Rate Schedule:	Commercial
State:	Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-2.14%
April 1, 2023	1 year 0 months	-5.36%
April 1, 2024	1 year 0 months	-3.95%
April 1, 2025	1 year 0 months	-2.24%
April 1, 2026	1 year 0 months	-1%
April 1, 2027	1 year 0 months	0.4%
April 1, 2028	1 year 0 months	1.49%
April 1, 2029	1 year 0 months	0.21%
April 1, 2030	1 year 0 months	0.2%
April 1, 2031	1 year 0 months	-0.47%
April 1, 2032	1 year 0 months	0.05%
April 1, 2033	1 year 0 months	-0.61%
April 1, 2034	1 year 0 months	-1.39%
April 1, 2035	1 year 0 months	-1%
April 1, 2036	1 year 0 months	-0.61%
April 1, 2037	1 year 0 months	-0.61%
April 1, 2038	1 year 0 months	-0.74%
April 1, 2039	1 year 0 months	-0.74%
April 1, 2040	1 year 0 months	-0.62%
April 1, 2041	1 year 0 months	-0.87%
April 1, 2042	1 year 0 months	-0.75%
April 1, 2043	1 year 0 months	-1.25%
April 1, 2044	1 year 0 months	-1%
April 1, 2045	1 year 0 months	-0.87%
April 1, 2046	1 year 0 months	-0.87%
April 1, 2047	1 year 0 months	-1%
April 1, 2048	1 year 0 months	-0.75%
April 1, 2049	1 year 0 months	-0.75%
April 1, 2050	1 year 0 months	-1%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-0.9%

Energy: Electricity

Annual Consumption:	196,119.0 kWh
Price per Unit:	$0.09500
Demand Charge:	$8,206
Utility Rebate:	$0
Location:	Minnesota
Rate Schedule:	Commercial
State:	Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-3.48%
April 1, 2023	1 year 0 months	-3.04%
April 1, 2024	1 year 0 months	-1.78%
April 1, 2025	1 year 0 months	-1.79%
April 1, 2026	1 year 0 months	-1.87%
April 1, 2027	1 year 0 months	-1.38%
April 1, 2028	1 year 0 months	-1.49%
April 1, 2029	1 year 0 months	-0.36%
April 1, 2030	1 year 0 months	-0.68%
April 1, 2031	1 year 0 months	-1%
April 1, 2032	1 year 0 months	-1.31%
April 1, 2033	1 year 0 months	-1.67%
April 1, 2034	1 year 0 months	-1.71%
April 1, 2035	1 year 0 months	-1.57%
April 1, 2036	1 year 0 months	-1.57%
April 1, 2037	1 year 0 months	-1.61%
April 1, 2038	1 year 0 months	-1.43%
April 1, 2039	1 year 0 months	-1.18%

April 1, 2040	1 year 0 months	-1.33%
April 1, 2041	1 year 0 months	-1.62%
April 1, 2042	1 year 0 months	-1.7%
April 1, 2043	1 year 0 months	-1.67%
April 1, 2044	1 year 0 months	-1.45%
April 1, 2045	1 year 0 months	-1.34%
April 1, 2046	1 year 0 months	-1.3%
April 1, 2047	1 year 0 months	-1.34%
April 1, 2048	1 year 0 months	-1.49%
April 1, 2049	1 year 0 months	-1.57%
April 1, 2050	1 year 0 months	-1.15%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-1.31%

Component:

Initial Investment

Initial Cost (base-year $):	$667,631
Annual Rate of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Cost-Phasing

Cost Adjustment Factor: 2%

Years/Months (from Date)	Date	Portion
0 years 0 months	March 1, 2023	100%

Replacement: Replacement Cost

Years/Months:	0 years 0 months
Amount:	$723,481
Annual Rate Of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Recurring OM&R: Non - Fuel Operational Cost

Amount:	$9,905
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Recurring OM&R: Maintenance Cost

Amount:	$3,540
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Recurring OM&R: Repair Cost

Amount:	$2,206
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Alternative: VAV-AHU-WATER COOLED CHILLER W/ AIRSIDE ECONOMIZER

Comment: ALTERNATIVE 2

Energy: Electricity

Annual Consumption:	220,431.0 kWh
Price per Unit:	$0.09500
Demand Charge:	$8,390
Utility Rebate:	$0
Location:	Minnesota
Rate Schedule:	Commercial
State:	Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-3.48%
April 1, 2023	1 year 0 months	-3.04%
April 1, 2024	1 year 0 months	-1.78%
April 1, 2025	1 year 0 months	-1.79%
April 1, 2026	1 year 0 months	-1.87%
April 1, 2027	1 year 0 months	-1.38%
April 1, 2028	1 year 0 months	-1.49%
April 1, 2029	1 year 0 months	-0.36%
April 1, 2030	1 year 0 months	-0.68%
April 1, 2031	1 year 0 months	-1%
April 1, 2032	1 year 0 months	-1.31%
April 1, 2033	1 year 0 months	-1.67%
April 1, 2034	1 year 0 months	-1.71%
April 1, 2035	1 year 0 months	-1.57%
April 1, 2036	1 year 0 months	-1.57%
April 1, 2037	1 year 0 months	-1.61%
April 1, 2038	1 year 0 months	-1.43%
April 1, 2039	1 year 0 months	-1.18%
April 1, 2040	1 year 0 months	-1.33%
April 1, 2041	1 year 0 months	-1.62%
April 1, 2042	1 year 0 months	-1.7%
April 1, 2043	1 year 0 months	-1.67%
April 1, 2044	1 year 0 months	-1.45%
April 1, 2045	1 year 0 months	-1.34%
April 1, 2046	1 year 0 months	-1.3%
April 1, 2047	1 year 0 months	-1.34%

April 1, 2048	1 year 0 months	-1.49%
April 1, 2049	1 year 0 months	-1.57%
April 1, 2050	1 year 0 months	-1.15%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-1.31%

Energy: Natural Gas

Annual Consumption:	31,000.0 MBtu
Price per Unit:	$0.01219
Demand Charge:	$1,200
Utility Rebate:	$0
End-Use:	Commercial Boiler, controlled-low NOx burners
Rate Schedule:	Commercial
State:	Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-2.14%
April 1, 2023	1 year 0 months	-5.36%
April 1, 2024	1 year 0 months	-3.95%
April 1, 2025	1 year 0 months	-2.24%
April 1, 2026	1 year 0 months	-1%
April 1, 2027	1 year 0 months	0.4%
April 1, 2028	1 year 0 months	1.49%
April 1, 2029	1 year 0 months	0.21%
April 1, 2030	1 year 0 months	0.2%
April 1, 2031	1 year 0 months	-0.47%
April 1, 2032	1 year 0 months	0.05%
April 1, 2033	1 year 0 months	-0.61%
April 1, 2034	1 year 0 months	-1.39%
April 1, 2035	1 year 0 months	-1%
April 1, 2036	1 year 0 months	-0.61%
April 1, 2037	1 year 0 months	-0.61%
April 1, 2038	1 year 0 months	-0.74%
April 1, 2039	1 year 0 months	-0.74%
April 1, 2040	1 year 0 months	-0.62%
April 1, 2041	1 year 0 months	-0.87%
April 1, 2042	1 year 0 months	-0.75%
April 1, 2043	1 year 0 months	-1.25%
April 1, 2044	1 year 0 months	-1%
April 1, 2045	1 year 0 months	-0.87%
April 1, 2046	1 year 0 months	-0.87%
April 1, 2047	1 year 0 months	-1%
April 1, 2048	1 year 0 months	-0.75%
April 1, 2049	1 year 0 months	-0.75%
April 1, 2050	1 year 0 months	-1%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-0.9%

Water: Water

	Annual Usage		Annual Disposal	
	Units/Year	Price/Unit	Units/Year	Price/Unit
@Summer Rates	68.9 ThousGal	$8.15000	0.0 ThousGal	$0.00000
@Winter Rates	0.0 ThousGal	$8.15000	0.0 ThousGal	$0.00000

Escalation Rates - Usage

From Date	Duration	Usage Cost Escalation
March 1, 2023	Remaining	4%

Escalation Rates - Disposal

From Date	Duration	Disposal Cost Escalation
March 1, 2023	Remaining	0%

Usage Indices - Usage

From Date	Duration	Index
March 1, 2023	Remaining	100%

Usage Indices - Disposal

From Date	Duration	Index
March 1, 2023	Remaining	100%

Component:

Initial Investment

Initial Cost (base-year $):	$888,246
Annual Rate of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Cost-Phasing

Cost Adjustment Factor: 2%

Years/Months (from Date)	Date	Portion
0 years 0 months	March 1, 2023	100%

Replacement: Replacement Cost

Years/Months:	0 years 0 months
Amount:	$962,552
Annual Rate Of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Recurring OM&R: Non - Fuel Operational Cost

Amount:	$11,990
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

March 1, 2023 Remaining 100%

Recurring OM&R: Maintenance Cost

Amount: $4,190

Annual Rate of Increase: 4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Recurring OM&R: Repair Cost

Amount: $2,934

Annual Rate of Increase: 4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Alternative: VAV-AHU-AIR COOLED CHILLER W/ WATERSIDE ECONOMIZER

Comment: ALTERNATIVE 3

Energy: Electricity

Annual Consumption: 188,922.0 kWh

Price per Unit: $0.09500

Demand Charge: $10,646

Utility Rebate: $0

Location: Minnesota

Rate Schedule: Commercial

State: Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-3.48%
April 1, 2023	1 year 0 months	-3.04%
April 1, 2024	1 year 0 months	-1.78%
April 1, 2025	1 year 0 months	-1.79%
April 1, 2026	1 year 0 months	-1.87%
April 1, 2027	1 year 0 months	-1.38%
April 1, 2028	1 year 0 months	-1.49%
April 1, 2029	1 year 0 months	-0.36%
April 1, 2030	1 year 0 months	-0.68%
April 1, 2031	1 year 0 months	-1%
April 1, 2032	1 year 0 months	-1.31%
April 1, 2033	1 year 0 months	-1.67%
April 1, 2034	1 year 0 months	-1.71%
April 1, 2035	1 year 0 months	-1.57%
April 1, 2036	1 year 0 months	-1.57%
April 1, 2037	1 year 0 months	-1.61%
April 1, 2038	1 year 0 months	-1.43%
April 1, 2039	1 year 0 months	-1.18%
April 1, 2040	1 year 0 months	-1.33%
April 1, 2041	1 year 0 months	-1.62%
April 1, 2042	1 year 0 months	-1.7%
April 1, 2043	1 year 0 months	-1.67%
April 1, 2044	1 year 0 months	-1.45%
April 1, 2045	1 year 0 months	-1.34%
April 1, 2046	1 year 0 months	-1.3%
April 1, 2047	1 year 0 months	-1.34%
April 1, 2048	1 year 0 months	-1.49%
April 1, 2049	1 year 0 months	-1.57%
April 1, 2050	1 year 0 months	-1.15%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-1.31%

Energy: Natural Gas

Annual Consumption: 31,000.0 MBtu

Price per Unit: $0.01219

Demand Charge: $1,200

Utility Rebate: $0

End-Use: Commercial Boiler, controlled-low NOx burners

Rate Schedule: Commercial

State: Minnesota

Usage Indices

From Date	Duration	Usage Index
March 1, 2023	Remaining	100%

Escalation Rates

From Date	Duration	Escalation
April 1, 2022	1 year 0 months	-2.14%
April 1, 2023	1 year 0 months	-5.36%
April 1, 2024	1 year 0 months	-3.95%
April 1, 2025	1 year 0 months	-2.24%
April 1, 2026	1 year 0 months	-1%
April 1, 2027	1 year 0 months	0.4%
April 1, 2028	1 year 0 months	1.49%
April 1, 2029	1 year 0 months	0.21%
April 1, 2030	1 year 0 months	0.2%
April 1, 2031	1 year 0 months	-0.47%
April 1, 2032	1 year 0 months	0.05%
April 1, 2033	1 year 0 months	-0.61%
April 1, 2034	1 year 0 months	-1.39%
April 1, 2035	1 year 0 months	-1%
April 1, 2036	1 year 0 months	-0.61%
April 1, 2037	1 year 0 months	-0.61%
April 1, 2038	1 year 0 months	-0.74%
April 1, 2039	1 year 0 months	-0.74%
April 1, 2040	1 year 0 months	-0.62%

April 1, 2040	1 year 0 months	-0.62%
April 1, 2041	1 year 0 months	-0.87%
April 1, 2042	1 year 0 months	-0.75%
April 1, 2043	1 year 0 months	-1.25%
April 1, 2044	1 year 0 months	-1%
April 1, 2045	1 year 0 months	-0.87%
April 1, 2046	1 year 0 months	-0.87%
April 1, 2047	1 year 0 months	-1%
April 1, 2048	1 year 0 months	-0.75%
April 1, 2049	1 year 0 months	-0.75%
April 1, 2050	1 year 0 months	-1%
April 1, 2051	1 year 0 months	-1%
April 1, 2052	Remaining	-0.9%

Component:

Initial Investment

Initial Cost (base-year $):	$729,067
Annual Rate of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Cost-Phasing

Cost Adjustment Factor: 2%

Years/Months (from Date)	Date	Portion
0 years 0 months	March 1, 2023	100%

Replacement: Replacement Cost

Years/Months:	0 years 0 months
Amount:	$790,056
Annual Rate Of Increase:	4%
Expected Asset Life:	20 years 0 months
Residual Value Factor:	10%

Recurring OM&R: Non - Fuel Operational Cost

Amount:	$9,905
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Recurring OM&R: Maintenance Cost

Amount:	$3,600
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Recurring OM&R: Repair Cost

Amount:	$2,409
Annual Rate of Increase:	4%

Usage Indices

From Date	Duration	Factor
March 1, 2023	Remaining	100%

Life Cycle Cost Analysis - Summary

PROJECT NAME:	DULUTH INTL ATCT
PROJECT #	CHI-23010514
PREPARED FOR:	FAA
PREPARED BY:	EXP U.S. SERVICES INC.
Study Period:	40
Discount Rate:	4.00%

Life Cycle Costs of Project Alternatives

	Alternate #1	Alternate #2	Alternate #3
INITIAL COSTS	$667,631	$888,246	$729,067
FUEL & NON-FUEL OPERATIONAL COSTS	$758,459	$849,090	$793,235
MAINTENANCE & REPAIR COSTS	$113,726	$141,018	$118,931
REPLACEMENT COSTS	$723,481	$962,552	$790,056
SALVAGE COSTS	$100,705	$133,982	$109,972

NOTE:

1. Refer the BLCC reports for actual LCC analysis. Refer the Costworks results for detailed cost of items.
2. The assumptions considered for preparing this analysis are listed below:
   A. Acquisition Cost = 2% of PV (PV = Present Value)
   B. Routine upkeeping and waste disposal costs of HVAC system are calculated based on daily and weekly basis respectively.
   C. Annual seasonal HVAC system maintenance and entire HVAC system inspection require two and one visits respectively.
   D. Repair Labor Cost = 2.5% of PV once every 10 year period.
   E. Repair Parts Cost = 5% of PV once every 10 year period.
   F. Replacement Cost = 2.19 x PV (2.19 is the 'i' value).
   G. Salvage Value = PV - (Depreciation annually x Life Span) = PV - (4.5% PV x 20) = 0.10 x PV.
   H. Estimated life of the HVAC system = 20 years.

Life Cycle Cost Analysis - Alternate #1

PROJECT NAME: DULUTH INTL ATCT
PROJECT # CHI-23010514
PREPARED FOR: FAA
PREPARED BY: EXP U.S. SERVICES INC.
GSF: 8,728 GSF
Alternative 1: VAV-AHU-AIR-COOLED CHILLER W/ AIRSIDE ECONOMIZER

	Quantity	Unit	Unit Cost	Total Cost	Years	Present Value
Initial Expenses						
Initial Investment Cost (one time start-up costs)						
Purchase (HVAC equipment)	1	LPSM	$294,110	$294,110	40	$294,110
Acquisition	1	LPSM	$5,882	$5,882	40	$5,882
Construction (Material and Labor)	1	LPSM	$367,638	$367,638	40	$367,638
					TOTAL	**$667,631**
Future Expenses						
Fuel Operational Cost (estimated on annual costs)						
Electricty	1	LPSM	$26,837	$26,837	40	$531,179
Natural Gas	1	LPSM	$1,578	$1,578	40	$31,233
Water	1	LPSM	$0	$0	40	$0
					TOTAL	**$562,412**
Non-Fuel Operational Cost (estimated on annual costs)						
Routine Upkeep (Labor)	365	EA	$25	$9,125	40	$180,609
HVAC Waste Disposal	52	EA	$15	$780	40	$15,438
					TOTAL	**$196,047**
Maintenance & Repair Cost (estimated on annual basis)						
Seasonal HVAC Maintenance (Labor)	2	EA	$1,200	$2,400	40	$47,503
HVAC Functional Requirements (filters, coolants, lubrications, etc.)	1	LPSM	$640	$640	40	$12,667
HVAC Equipment Inspection (Labor)	1	LPSM	$500	$500	40	$9,896
Equipment and Specific Component Repair (Labor)	1	LPSM	$735	$735	40	$14,553
Component Replacement Parts for Repair	1	LPSM	$1,471	$1,471	40	$29,106
					TOTAL	**$113,726**
Replacement Cost (replacement of major components of HVAC system)						
HVAC Equipment	1	LPSM	$36,553	$36,553	40	$723,481
					TOTAL	**$723,481**
Residual Value (value of HVAC system at end of study period)						
HVAC Equipment	1	LPSM	$5,088	$5,088	40	$100,705
					TOTAL	**$100,705**

Life Cycle Cost Analysis - Alternate #2

PROJECT NAME: DULUTH INTL ATCT
PROJECT # CHI-23010514
PREPARED FOR: FAA
PREPARED BY: EXP U.S. SERVICES INC.
GSF: 8,728 GSF
Alternative 2: VAV-AHU-WATER-COOLED CHILLER W/ AIRSIDE ECONOMIZER

	Quantity	Unit	Unit Cost	Total Cost	Years	Present Value
Initial Expenses						
Initial Investment Cost (one time start-up costs)						
Purchase (HVAC equipment)	1	LPSM	$391,298	$391,298	40	$391,298
Acquisition	1	LPSM	$7,826	$7,826	40	$7,826
Construction (Material and Labor)	1	LPSM	$489,122	$489,122	40	$489,122
					TOTAL	**$888,246**
Future Expenses						
Fuel Operational Cost (estimated on annual costs)						
Electricty	1	LPSM	$29,331	$29,331	40	$580,542
Natural Gas	1	LPSM	$1,578	$1,578	40	$31,233
Water	1	LPSM	$0	$0	40	$0
					TOTAL	**$611,775**
Non-Fuel Operational Cost (estimated on annual costs)						
Routine Upkeep (Labor)	365	EA	$30	$10,950	40	$216,731
HVAC Waste Disposal	52	EA	$20	$1,040	40	$20,584
					TOTAL	**$237,315**
Maintenance & Repair Cost (estimated on annual basis)						
Seasonal HVAC Maintenance (Labor)	2	EA	$1,500	$3,000	40	$59,378
HVAC Functional Requirements (filters, coolants, lubrications, etc.)	1	LPSM	$640	$640	40	$12,667
HVAC Equipment Inspection (Labor)	1	LPSM	$550	$550	40	$10,886
Equipment and Specific Component Repair (Labor)	1	LPSM	$978	$978	40	$19,362
Component Replacement Parts for Repair	1	LPSM	$1,956	$1,956	40	$38,724
					TOTAL	**$141,018**
Replacement Cost (replacement of major components of HVAC system)						
HVAC Equipment	1	LPSM	$48,631	$48,631	40	$962,552
					TOTAL	**$962,552**
Residual Value (value of HVAC system at end of study period)						
HVAC Equipment	1	LPSM	$6,769	$6,769	40	$133,982
					TOTAL	**$133,982**

Life Cycle Cost Analysis - Alternate #3

PROJECT NAME: DULUTH INTL ATCT
PROJECT # CHI-23010514
PREPARED FOR: FAA
PREPARED BY: EXP U.S. SERVICES INC.
GSF: 8,728 GSF
Alternative 3: VAV-AHU-AIR-COOLED CHILLER W/ WATERSIDE ECONOMIZER

	Quantity	Unit	Unit Cost	Total Cost	Years	Present Value
Initial Expenses						
Initial Investment Cost (one time start-up costs)						
Purchase (HVAC equipment)	1	LPSM	$321,175	$321,175	40	$321,175
Acquisition	1	LPSM	$6,423	$6,423	40	$6,423
Construction (Material and Labor)	1	LPSM	$401,468	$401,468	40	$401,468
					TOTAL	**$729,067**
Future Expenses						
Fuel Operational Cost (estimated on annual costs)						
Electricty	1	LPSM	$28,594	$28,594	40	$565,955
Natural Gas	1	LPSM	$1,578	$1,578	40	$31,233
Water	1	LPSM	$0	$0	40	$0
					TOTAL	**$597,188**
Non-Fuel Operational Cost (estimated on annual costs)						
Routine Upkeep (Labor)	365	EA	$25	$9,125	40	$180,609
HVAC Waste Disposal	52	EA	$15	$780	40	$15,438
					TOTAL	**$196,047**
Maintenance & Repair Cost (estimated on annual basis)						
Seasonal HVAC Maintenance (Labor)	2	EA	$1,250	$2,500	40	$49,482
HVAC Functional Requirements (filters, coolants, lubrications, etc.)	1	LPSM	$650	$650	40	$12,865
HVAC Equipment Inspection (Labor)	1	LPSM	$450	$450	40	$8,907
Equipment and Specific Component Repair (Labor)	1	LPSM	$803	$803	40	$15,892
Component Replacement Parts for Repair	1	LPSM	$1,606	$1,606	40	$31,785
					TOTAL	**$118,931**
Replacement Cost (replacement of major components of HVAC system)						
HVAC Equipment	1	LPSM	$39,916	$39,916	40	$790,056
					TOTAL	**$790,056**
Residual Value (value of HVAC system at end of study period)						
HVAC Equipment	1	LPSM	$5,556	$5,556	40	$109,972
					TOTAL	**$109,972**

	Source	Line Number	Description	Crew	Daily Output	Labor Hours	Quantity	Unit	Ext. Material	Ext. Labor	Ext. Equipment	Ext. Total	Ext. Total Incl O&P	Zip Code Prefix	Type	Release
	Unit	233616105520	Duct accessories, mixing box, variable air volume, cool only, pneumatic pressure independent, 800 to 1,600 CFM, includes electric or pneumatic motor	Q9	9.00	1.778	19.000	Ea.	$19,950.00	$2,147.00		$22,097.00	$25,174.09	558	Union	2023
	Unit	237313102334	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 11,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.00	24.000	2.000	Ea.	$60,600.00	$3,300.00		$63,900.00	$71,600.10	558	Union	2023
	Unit	237313102322	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 6,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.30	18.462	2.000	Ea.	$38,600.00	$2,550.00		$41,150.00	$46,399.75	558	Union	2023
	Unit	236213101000	Condensing unit, air cooled, compressor, 80 ton, includes standard controls	Q6	0.12	200.000	2.000	Ea.	$63,600.00	$27,200.00		$90,800.00	$111,004.80	558	Union	2023
	Unit	235223202180	Boiler, gas fired, natural or propane, cast iron, steam, gross output, 400 MBH, includes standard controls and insulated jacket, packaged	Q7	0.56	56.838	2.000	Ea.	$11,500.00	$7,850.00		$19,350.00	$24,401.45	558	Union	2023
	Unit	232120462020	Expansion tanks, steel, liquid expansion, painted, 24 gallon capacity, ASME	Q5	14.00	1.143	2.000	Ea.	$1,560.00	$148.00		$1,708.00	$1,930.01	558	Union	2023
	Unit	232123131300	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/2 H.P., 3" size	Q1	4.00	4.000	2.000	Ea.	$6,350.00	$516.00		$6,866.00	$7,700.18	558	Union	2023
	Unit	232123131180	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/4 H.P., 2-1/2" size	Q1	5.00	3.200	2.000	Ea.	$4,850.00	$414.00		$5,264.00	$5,900.11	558	Union	2023
									$207,010.00	**$44,125.00**		**$251,135.00**	**$294,110.49**			

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	Source	Line Number	Description	Crew	Daily Output	Labor Hours	Quantity	Unit	Ext. Material	Ext. Labor	Ext. Equipment	Ext. Total	Ext. Total Incl O&P	Zip Code Prefix	Type	Release
	Unit	233616105520	Duct accessories, mixing box, variable air volume, cool only, pneumatic pressure independent, 800 to 1,600 CFM, includes electric or pneumatic motor	Q9	9.00	1.778	19.000	Ea.	$19,950.00	$2,147.00		$22,097.00	$25,174.09	558	Union	2023
	Unit	237313102334	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 11,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.00	24.000	2.000	Ea.	$60,600.00	$3,300.00		$63,900.00	$71,600.10	558	Union	2023
	Unit	237313102322	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 6,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.30	18.462	2.000	Ea.	$38,600.00	$2,550.00		$41,150.00	$46,399.75	558	Union	2023
	Unit	236426100210	Water chiller, screw liquid chiller, packaged unit, water cooled, 80 ton, includes standard controls, excludes water tower	Q7	0.14	224.000	2.000	Ea.	$113,000.00	$31,400.00		$144,400.00	$170,991.80	558	Union	2023
	Unit	236513102720	Cooling tower, packaged unit, galvanized steel, axial fan, induced draft, 75 ton, includes standard controls, excludes pumps and piping	Q6	1.52	15.789	2.000	Ea.	$31,000.00	$2,150.00		$33,150.00	$37,200.30	558	Union	2023
	Unit	235223202180	Boiler, gas fired, natural or propane, cast iron, steam, gross output, 400 MBH, includes standard controls and insulated jacket, packaged	Q7	0.56	56.838	2.000	Ea.	$11,500.00	$7,850.00		$19,350.00	$24,401.45	558	Union	2023
	Unit	232120462020	Expansion tanks, steel, liquid expansion, painted, 24 gallon capacity, ASME	Q5	14.00	1.143	2.000	Ea.	$1,560.00	$148.00		$1,708.00	$1,930.01	558	Union	2023
	Unit	232123131300	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/2 H.P., 3" size	Q1	4.00	4.000	2.000	Ea.	$6,350.00	$516.00		$6,866.00	$7,700.18	558	Union	2023
	Unit	232123131180	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/4 H.P., 2-1/2" size	Q1	5.00	3.200	2.000	Ea.	$4,850.00	$414.00		$5,264.00	$5,900.11	558	Union	2023
									$287,410.00	**$50,475.00**		**$337,885.00**	**$391,297.79**			

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	Source	Line Number	Description	Crew	Daily Output	Labor Hours	Quantity	Unit	Ext. Material	Ext. Labor	Ext. Equipment	Ext. Total	Ext. Total Incl O&P	Zip Code Prefix	Type	Release
	Unit	233616105520	Duct accessories, mixing box, variable air volume, cool only, pneumatic pressure independent, 800 to 1,600 CFM, includes electric or pneumatic motor	Q9	9.00	1.778	19.000	Ea.	$19,950.00	$2,147.00		$22,097.00	$25,174.09	558	Union	2023
	Unit	237313102334	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 11,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.00	24.000	2.000	Ea.	$60,600.00	$3,300.00		$63,900.00	$71,600.10	558	Union	2023
	Unit	237313102322	Air-handling unit, built-up, horizontal or vertical, blow-thru fan, multizone, 6,500 CFM, with cooling/heating coil section, filters, mixing box	Q6	1.30	18.462	2.000	Ea.	$38,600.00	$2,550.00		$41,150.00	$46,399.75	558	Union	2023
	Unit	236213101000	Condensing unit, air cooled, compressor, 80 ton, includes standard controls	Q6	0.12	200.000	2.000	Ea.	$63,600.00	$27,200.00		$90,800.00	$111,004.80	558	Union	2023
	Unit	235223202180	Boiler, gas fired, natural or propane, cast iron, steam, gross output, 400 MBH, includes standard controls and insulated jacket, packaged	Q7	0.56	56.838	2.000	Ea.	$11,500.00	$7,850.00		$19,350.00	$24,401.45	558	Union	2023
	Unit	232120462020	Expansion tanks, steel, liquid expansion, painted, 24 gallon capacity, ASME	Q5	14.00	1.143	2.000	Ea.	$1,560.00	$148.00		$1,708.00	$1,930.01	558	Union	2023
	Unit	232123131300	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/2 H.P., 3" size	Q1	4.00	4.000	2.000	Ea.	$6,350.00	$516.00		$6,866.00	$7,700.18	558	Union	2023
	Unit	232123131180	Pump, circulating, bronze, heated or chilled water application, in line, flanged joints, 1/4 H.P., 2-1/2" size	Q1	5.00	3.200	2.000	Ea.	$4,850.00	$414.00		$5,264.00	$5,900.11	558	Union	2023
	Unit	238146102310*	Water side economizer package, 25 ton cooling, 100 MBH heat @ 55Deg.F	Q6	0.32	75.000	1.000	Ea.	$17,550.00	$5,125.00		$22,675.00	$27,064.25	558	Union	2023
									$224,560.00	**$49,250.00**		**$273,810.00**	**$321,174.74**			

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