June 27, 2023

Jennifer Gonzalez
NYSDEC – Region 2
1 Hunter's Point Plaza
47-40 21st Street,
Long Island City, NY 11101

RE: Remedial Design Workplan
1057 Atlantic Avenue, Brooklyn, NY
BCP #C224305

Dear Ms. Gonzalez:

P.W. Grosser Consulting Engineer & Hydrogeologist, P.C. (PWGC) has prepared this Remedial Design Workplan for the above referenced Site to further detail the remedial elements identified in the Remedial Action Work Plan (RAWP) prepared by PWGC in February 2023 and approved by the New York State Department of Environmental Conservation (NYSDEC) in February 2023.

This Remedial Design Workplan is focused on the installation of a sub-slab depressurization system (SSDS) and soil vapor extraction (SVE) system.

A Site Location Map is included as **Figure 1** and a Site Plan is included as **Figure 2**. The SSDS and SVE design details are included as **Appendix A**.

Sub-Slab Depressurization System:
A SSDS will be installed beneath the new building footprint to mitigate potential soil vapor intrusion into the new building. The SSDS will be installed in a trench format beneath the cellar and the portion of the first floor that is in contact with the soil and the riser will be routed through the building to above the roofline to vent the vapor space beneath the building.

The SSDS piping will consist of Geovent material placed within a 4-inch thick layer of ½-inch to 1-inch crushed stone beneath the basement slab and first floor slabs that are in contact with the soil. A non-woven geotextile fabric will be placed beneath the stone layer to reduce fines from entering the system. The Geovent will be connected to galvanized closed duct riser piping that will be routed through the building and to the roof. The sub-cellar Geovent will be connected to 6-inch diameter galvanized closed duct piping which increases to an 8-inch and then a 10-inch duct as it manifolds together. To transition from beneath the mat slab area and the slab-on-grade area, a section of solid 4-inch diameter Schedule 80 PVC will be connected to a 90 degree elbow on each end which will connect to the sections of Geovent beneath the mat slab and the slab-on-grade. The sub-first-floor Geovent on the west side of the property will be connected to 8-inch diameter galvanized closed duct piping and on the east side of the property it will be connected to 6-inch diameter schedule 80 PVC beneath the ramp and then 8-inch diameter galvanized closed duct piping as it penetrates the cellar wall; this duct piping will

be routed through the top of the cellar and will be manifolded to the riser piping from the sub-cellar SSDS piping and will continue up to above the roofline through 10-inch diameter closed duct piping. The SSDS riser piping will be connected to a Cincinnati Fan model HP-8B18, 5.0 horse power, three-phase, 230 volt blower. The discharge point of the SSDS will be located above the eave of the roof, a minimum of 10 feet from any opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

Effluent sampling ports will be located on each riser section of the SSDS legs prior to their union and a combined effluent sampling point will be located on the riser pipe above the roof. A total of nine vacuum monitoring points will be installed, seven beneath the cellar and two beneath the first floor. The vacuum monitoring points will be constructed of a low profile stainless steel vapor pin with a 1.5-inch diameter schedule 40 PVC open ended pipe the will terminate in the gravel layer.

The manufacturer specifications for the Cincinnati Fan blower are included as **Appendix B**.

Since the SSDS is not proposed to begin operation with carbon treatment, a DAR-1 analysis has been performed and is included as **Appendix C**. The DAR-1 analysis was focused on the two contaminants of concern, tetrachloroethene (PCE) and trichloroethene (TCE), and the specifications of the proposed system and stack height. A conservative approach was utilized for the PCE analysis, using the maximum concentration detected at the site, 42,200 µg/m^3 (SV006 at 10 feet below sidewalk grade). The DAR-1 analysis provided estimated emission rates of 2.63 µg/m^3 for the 1-hour scenario and 0.263 µg/m^3 for the annual scenario, both of which are less than the DAR-1 Guideline concentrations of 300 µg/m^3 for the 1-hour scenario and 3.8 µg/m^3 for the annual scenario. For TCE, a composite concentration was utilized which included the maximum concentration of 194,000 µg/m^3 (SV015 at 21 feet below sidewalk grade) and other concentrations throughout the site, including other soil vapor concentrations at 21 feet below grade throughout the western and northern portions of the site and sub-slab soil vapor concentrations in the southeastern portion of the site (the list of each sample and concentration utilized in this composite sample is included in **Appendix C**). This method is still conservative as the source material above 21 feet is anticipated to be removed as part of remediation and construction. The DAR-1 analysis for this composite concentration provided estimated TCE emission rates for the 1-hour (1.90 µg/m^3) and annual (0.190 µg/m^3) scenarios that were less than the DAR-1 Guideline concentrations of 20 µg/m^3 and 0.21 µg/m^3, respectively.

In addition, it is intended that the SVE system operation will begin once feasible while the SSDS operation may not begin until the building is closer to occupation. Prior to full-time operation of the SSDS, an effluent sample will be collected to confirm that discharge treatment is not required.

Soil Vapor Extraction System:

A SVE system will be installed beneath the cellar and will be focused in the area of elevated chlorinated solvent impact observed in the soil vapor. Two of the SVE wells will be located in the

suspected source area of the contamination and the other six wells will be located north of this area, spaced approximately 20 feet on center from each other, to prevent off-site migration north of the subject property.

The system has been designed to overcome the adsorption of the volatile contaminants of concern mainly through applying a vacuum of at least 0.1-inch of water column (w.c.) to the impacted soils. A total system vacuum of approximately 15 inches of water column (in. w.c.) at a design flow rate of 375 CFM was utilized for the basis of design in fan selection. This estimates that each well will operate at approximately 75 CFM and 3 in. w.c. while considering head losses through wells and ducting system. While these are the anticipated operational parameters, the fan and variable frequency drive (VFD) have been selected to provide up to 33 in. w.c. at a flow rate of 700 CFM, providing approximately 140 CFM and 5 in. w.c. at each well if necessary to achieve remedial goals. Operating temperature is expected to be roughly equal to ground temperature of approximately 54 to 60 degrees F. As mentioned above, a VFD is provided to adjust operating speed as necessary for efficient operation. Based on these system operating parameters and the soil characteristics (medium sands), a radius of influence of approximately 25 feet was determined. Verification of system effectiveness will be determined through effluent sampling analysis during system operation.

Each SVE well point will be installed to elevation 24 feet (approximately 56 feet below sidewalk grade). The SVE wells will be constructed of 4-inch diameter schedule 40 PVC with 35 feet of 20-slot screen and riser to just below the top of slab. Each well head will be finished with a j-plug and a flush mounted manhole cover at the slab. The well annulus will be backfilled with #00 gravel to 2-feet above the top of the well screen and then a bentonite seal to the bottom of the sub-slab gravel layer. The six north SVE wells will be interconnected to each other and the two middle SVE wells will be interconnected to each other with 6-inch diameter schedule 80 solid PVC and will then be manifolded together and connected to 8-inch diameter galvanized closed duct piping. The duct piping will be routed to above the roofline. The SVE will be connected to a Cincinatti fan model HP-8D22, 7.5 horse power, three-phase, 230 volt blower. Two 55-gallon drums of granulated activated carbon to filter will be plumbed in parallel on the effluent discharge for the SVE. The discharge point of the SVE will be located above the eave of the roof, a minimum of 10 feet from any opening that is less than 2 feet below the exhaust point, and a minimum of 10 feet from any adjoining or adjacent buildings or HVAC intakes or supply registers.

Effluent sampling ports will be located on each riser section of the SVE legs prior to their union and a combined effluent sampling point will be located on the riser pipe above the roof.

To demonstrate sufficient ROI of the SVE system, an SVE well from the northern cluster will be temporarily utilized as a SVE vacuum monitoring point by the following process:

- Tubing will be installed through a sanitary grommet and the penetration will be sealed.
- The selected SVE well will be isolated by lowering the sanitary grommet in-place at the top of the well, below the manifold piping, utilizing an extension rod. This will prevent the well from receiving vacuum from the manifold piping.

- The extension rod will be secured in place.
- A manometer will be connected to the tubing at the top of the well head to measure the vacuum in the SVE well during SVE system operation.

The manufacturer specifications for the SVE blower are included as **Appendix B**.

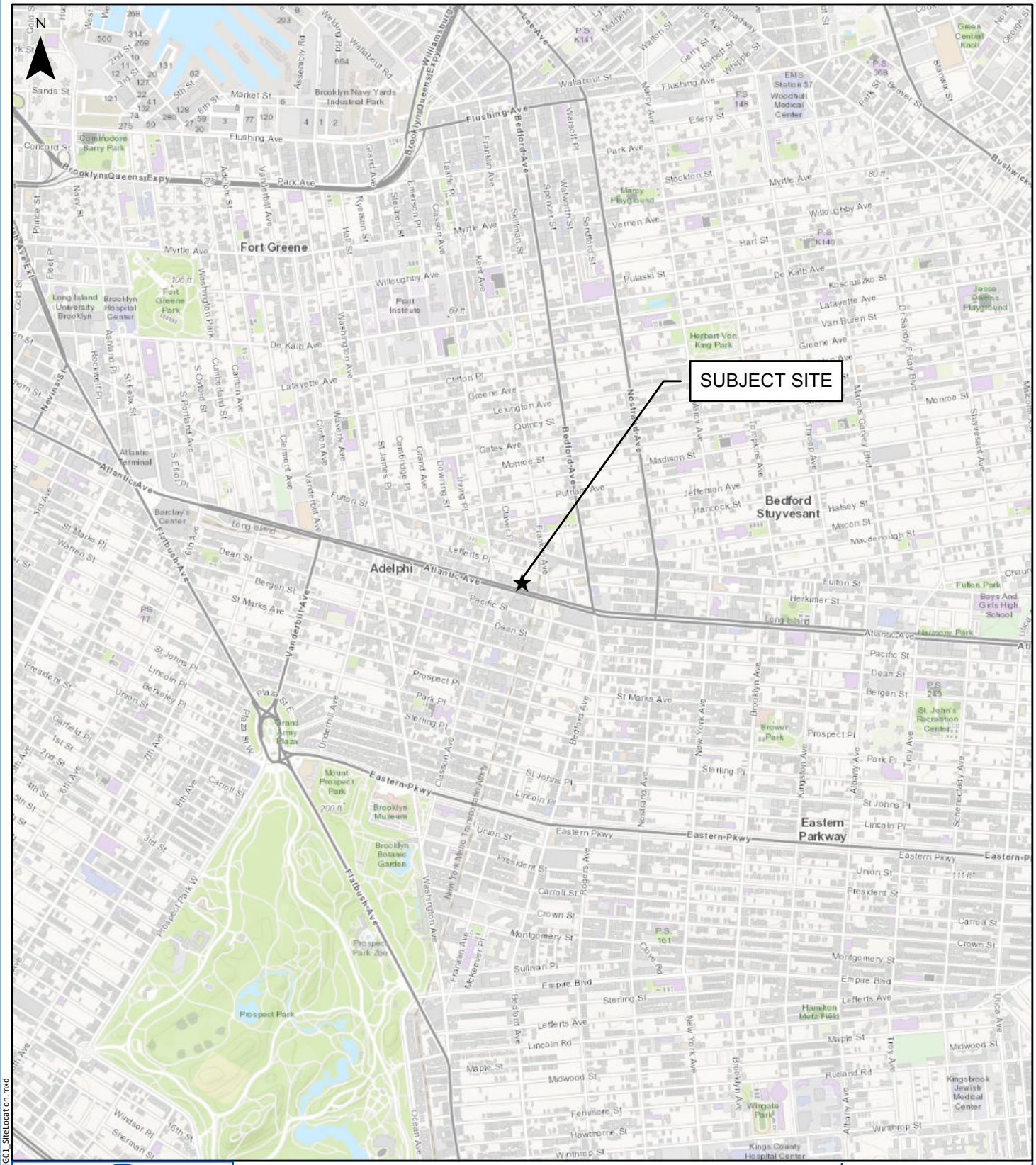
I, Michael Scanlon, PE, certify that I am currently a New York State registered professional engineer (PE) and that this Remedial Design Work Plan (RDWP) was prepared in accordance with applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation's (NYSDEC's) Division of Environmental Remediation's (DER's) Technical Guidance for Site Investigation and Remediation (DER-10).

I certify that the information and statements in this certification are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

103321	2023-06-27	Michael Scanlon
New York State PE #	Date	Signature

It is a violation of Article 145 of the New York State Education Law for any person to alter this document in any way without the express written verification of adoption by any New York State licensed engineer in accordance with Section 7209(2), Article 145, New York State Education Law.

Figures



SITE LOCATION

1045 - 1065 Atlantic Avenue
Brooklyn, NY

0 ¼ ½ ¾ 1 Miles

PWGC
CLIENT DRIVEN SOLUTIONS
P.W. Grosser Consulting Engineer & Hydrogeologist, PC
630 Johnson Ave., Suite 7
Bohemia, NY 11716
Ph: 631-589-6353 • Fax: 631-589-8705
pwgc.info@pwgrosser.com

Project:	TOT1903
Date:	2/11/2019
Designed by:	HRM
Drawn by:	TS
Approved by:	HRM
Figure No:	1

Document Path: W:\Projects\S-Z\TOT\1901\maps\FIG01_SiteLocation.mxd

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DRAWING PREPARED FOR:

1065 Atlantic Avenue LLC
42-09 235th Street
Douglaston, New York 10363

REVISION	DATE	INITIAL	COMMENTS

DRAWING INFORMATION:

Project:	TOT1903	Designed by:	JL
Date:	1/26/2023	Drawn by:	FT
Scale:	AS SHOWN	Approved by:	JL

Site Plan

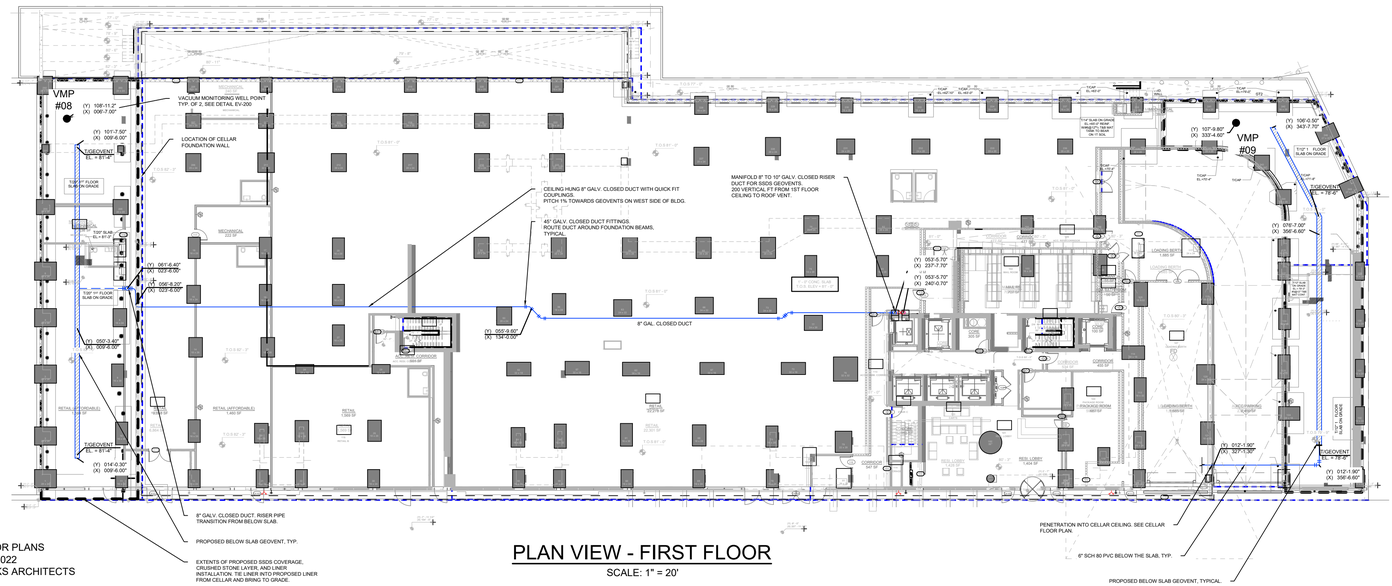
1045 - 1065 Atlantic Avenue
Brooklyn, NY

FIGURE NO:

2

Document Path: W:\Projects\S-Z\TOT\1903\ProjectFiles\RI_Figures\RI_Figures_v3.aprx

Appendix A



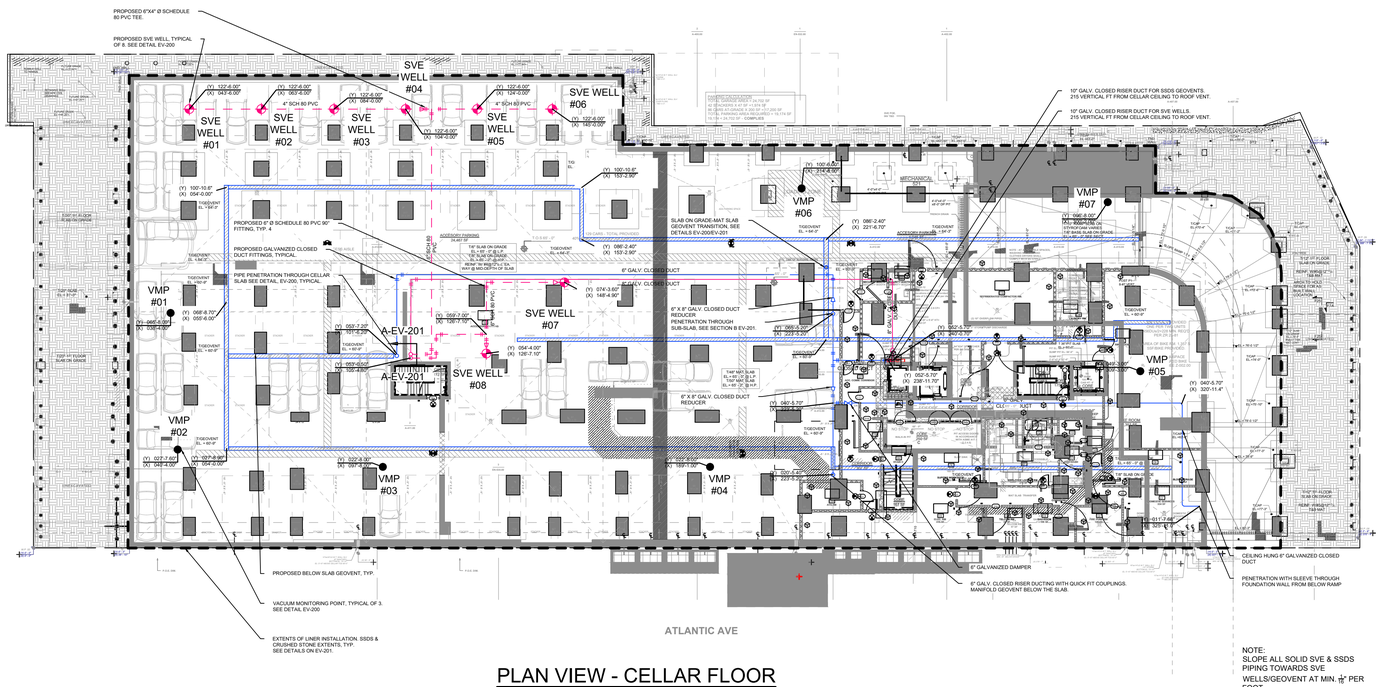
BASEMAP REFERENCE:
1041-1065 ATLANTIC AVE FLOOR PLANS
PREPARED ON OCTOBER 01, 2022
PREPARED BY DENCITY WORKS ARCHITECTS

PLAN VIEW - FIRST FLOOR

SCALE: 1" = 20'

0 20 40

SCALE: 1" = 20'



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PLAN VIEW - CELLAR FLOOR

SCALE: 1" = 20'

0 20 40

SCALE: 1" = 20'

NOTE:
SLOPE ALL SOLID SVE & SSDS PIPING TOWARDS SVE WELLS/GEOVENT AT MIN. 1/8" PER FOOT

Scope of Work

INSTALLATION OF ACTIVE SUB-SLAB DEPRESSURIZATION SYSTEM (SSDS) AND SOIL VAPOR EXTRACTION SYSTEM (SVE) AT PROJECT SITE AS SHOWN ON THESE PLANS AND SPECIFICATIONS INCLUDING:

1. INSTALLATION OF SUB-SLAB PIPING AND MATERIAL
2. INSTALLATION OF SVE WELLS
3. INSTALLATION OF RISER PIPING AND EQUIPMENT
4. INSTALLATION OF FANS AND APPURTANCES
5. INSTALLATION OF VAPOR BARRIER BELOW ENTIRE BUILDING SLAB TO GRADE
6. INSTALLATION OF CRUSHED STONE LAYER BELOW SLAB
7. INSTALLATION OF ELECTRICAL WORK
8. FACILITATION OF WORK AS SPECIFIED

General Notes

1. DRAWING NOT TO BE USED FOR STRUCTURAL, ARCHITECTURAL OR OTHER REFERENCE EXCEPT FOR SUB-SLAB DEPRESSURIZATION SYSTEM AND VAPOR BARRIER.
2. COORDINATE ALL WORK FOR SUB-SLAB DEPRESSURIZATION SYSTEM, VAPOR BARRIER AND ROOF PENETRATION WITH OTHER TRADES PRIOR TO INSTALLATION.
3. COORDINATE LOCATION OF RISER WITH ARCHITECT.
4. FIELD CONDITIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO ANY WORK.
5. SLOPE ALL SOLID PIPING DOWNWARD TOWARDS SSDS GEOVENT OR SVE WELLS AT MIN. 1/16" PER FT OF PIPING.
6. ALL DUCTING AND FITTINGS TO BE GALVANIZED CLOSED DUCTING NORDFAB WITH AIR TIGHT QUICK FIT COUPLINGS OR APPROVED EQUIVALENT. INSTALL APPROVED DUCT TAPE BELOW ALL FITTINGS.
7. GRAVEL LAYER TO BE ¾" - 1" CRUSHED STONE WITH LESS THAN 10% PASSING #100 SIEVE.
8. SOIL VAPOR EXHAUST VENT SHALL BE
   - 8.1. ABOVE THE EAVE OF THE ROOF (PREFERABLY, ABOVE THE HIGHEST EAVE OF THE BUILDING AT LEAST 12 INCHES ABOVE THE SURFACE OF THE ROOF),
   - 8.2. AT LEAST 10 FEET ABOVE GROUND LEVEL,
   - 8.3. AT LEAST 10 FEET AWAY FROM ANY OPENING THAT IS LESS THAN 2 FEET BELOW THE EXHAUST POINT, AND 10 FEET FROM ANY ADJOINING OR ADJACENT BUILDINGS, OR HVAC INTAKES OR SUPPLY REGISTERS.
9. ALL ELECTRICAL TO BE INSTALLED BY LICENSED ELECTRICIAN.
10. PROVIDE DESIGNATED CIRCUITS FOR BLOWERS AND APPURTENANCES.
11. ALL EXTERIOR PENETRATIONS FOR ELECTRICAL & PIPING TO BE BOOTED AND WATER TIGHT.
12. COMPACT CRUSHED STONE PER GEOTECHNICAL REQUIREMENTS.
13. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR ENGINEERS APPROVAL, INCLUDING BUT NOT LIMITED TO;
    - 13.1. PIPING MATERIALS AND FITTINGS
    - 13.2. FAN MAKE AND MANUFACTURER
    - 13.3. VACUUM MONITORING POINT & FITTINGS
    - 13.4. DUCT SUPPORTS
14. ELEVATIONS PROVIDED IN NAVD 88.
15. SSDS LINER TO BE STEGO WRAP 20 MIL. AND STEGO MASTIC, OR ENGINEER APPROVED EQUIVALENT.

LEGEND

Proposed	Notes
SOIL VAPOR MITIGATION	
	SSDS SUB-SLAB SOLID PIPING
	SVE SUB-SLAB SOLID PIPING
	SSDS ABOVE-SLAB CLOSED DUCTING
	SVE ABOVE-SLAB CLOSED DUCTING
	EXTENTS OF GRAVEL LAYER
	GEOVENT
	VACUUM MONITORING POINT
	SVE WELL
	REDUCER
	DAMPER
	SLAB PENETRATION
	90 DEGREE FITTING
	TEE FITTING

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CONSULTANTS

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Number	Revision Description	Revision Date
7		
6		
5		
4		
3	DEC REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

Designed By | Date Submitted
Drawn By | Date Created
Approved By | Scale

Client:
1065 ATLANTIC AVENUE, LLC
7 PENN PLAZA, SUITE 600
NEW YORK, NY 10001

Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

Project Address:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

County Tax Map Number: | Contract Number:
Regulatory Reference Number:

Title of Drawing:

SSDS & SVE PLANS

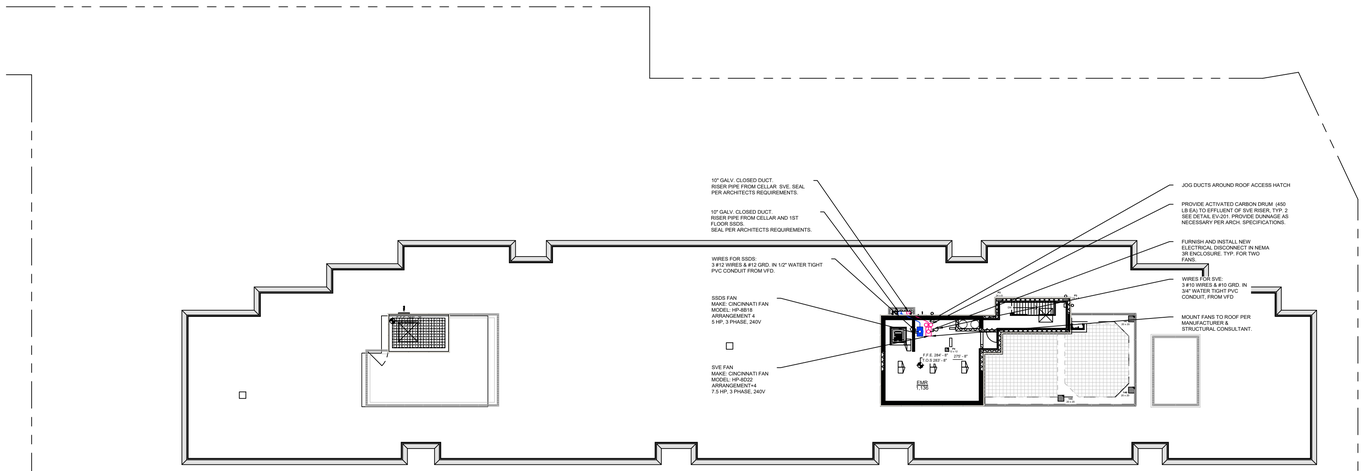
Drawing Number:

EV-100

Sheet 1 of 6

PWGC Project Number:

TOT1903



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PARTIAL PLAN VIEW - ROOF PLAN

SCALE: 1" = 20'

0 20 40

SCALE: 1" = 20'

LEGEND

Proposed	Notes
SOIL VAPOR MITIGATION	
	SSDS SUB-SLAB SOLID PIPING
	SVE SUB-SLAB SOLID PIPING
	SSDS ABOVE-SLAB CLOSED DUCTING
	SVE ABOVE-SLAB CLOSED DUCTING
	EXTENTS OF GRAVEL LAYER
	GEOVENT
	VACUUM MONITORING POINT
	SVE WELL
	REDUCER
	DAMPER
	SLAB PENETRATION
	90 DEGREE FITTING
	TEE FITTING

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Designed By:
Date Submitted:
Drawn By:
Date Created:
Approved By:
Scale:

Client:
TOTEM BKLYN
55 WASHINGTON ST. SUITE #710
BROOKLYN, NY 11201

Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

Project Address:
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BROOKLYN, NY 11238

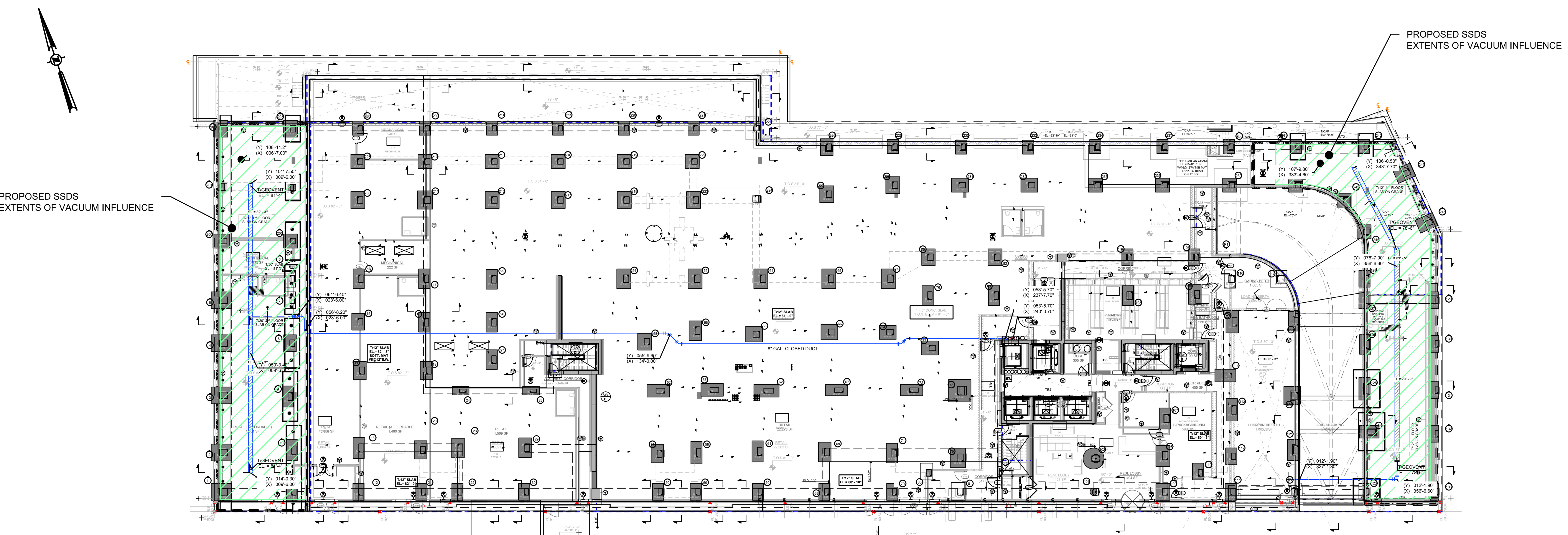
County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:

SSDS & SVE ROOF PLAN

Drawing Number:
EV-101
Sheet 2 of 6
PWGC Project Number:
TOT1903

PROJECT NAME: J:\Projects 4-21\TOT - Totem Brooklyn\1903 - Atlantic Ave - BCP\CAD\SSDS & SVE\2023\06-14 - 90% CD Submission - RSE Reviewed\TOT1903 Atlantic Ave - SSDS & SVE Plan Set.dwg (EV-101)
PLOT DATE/TIME: Jun 14, 2023 4:53pm By: ssanton



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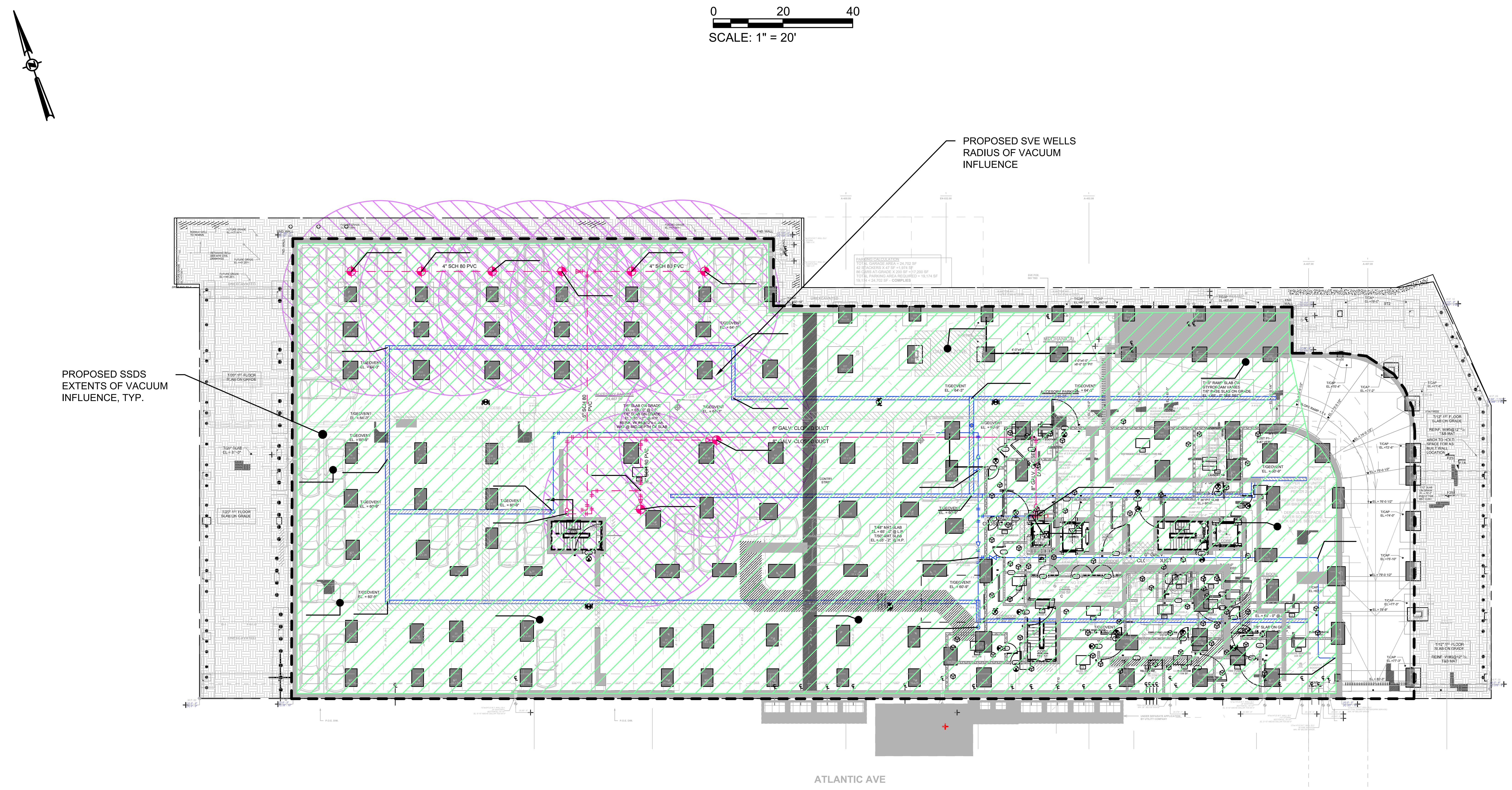
PLAN VIEW - FIRST FLOOR - PROPOSED SYSTEM RADIUS OF INFLUENCE

SCALE: 1" = 20'

0 20 40
SCALE: 1" = 20'



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PLAN VIEW - CELLAR FLOOR - PROPOSED SYSTEM RADIUS OF INFLUENCE

SCALE: 1" = 20'

0 20 40
SCALE: 1" = 20'

LEGEND

Proposed	Notes
SOIL VAPOR MITIGATION	
— — — —	SSDS SUB-SLAB SOLID PIPING
- - - -	SVE SUB-SLAB SOLID PIPING
——	SSDS ABOVE-SLAB CLOSED DUCTING
——	SVE ABOVE-SLAB CLOSED DUCTING
— — —	EXTENTS OF GRAVEL LAYER
▨	GEOVENT
●	VACUUM MONITORING POINT
⊕	SVE WELL
▽	REDUCER
⋈	DAMPER
○	SLAB PENETRATION
┘	90 DEGREE FITTING
┴	TEE FITTING
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7		
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3	DEC REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

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BROOKLYN, NY 11238

County Tax Map Number:
Contract Number:
Regulatory Reference Number:

Title of Drawing:

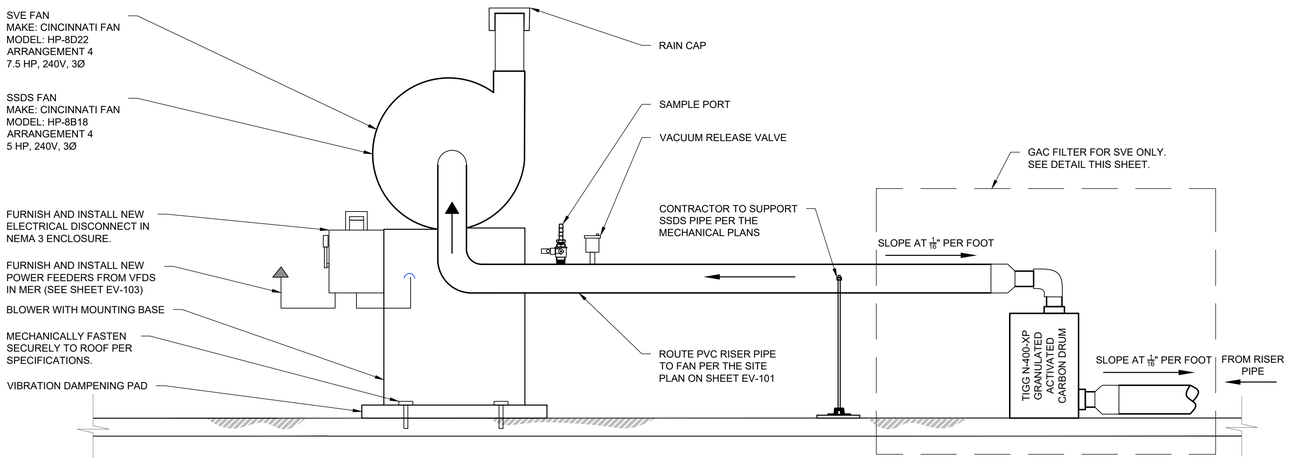
SSDS & SVE PLANS

Drawing Number: EV-102

Sheet 3 of 6

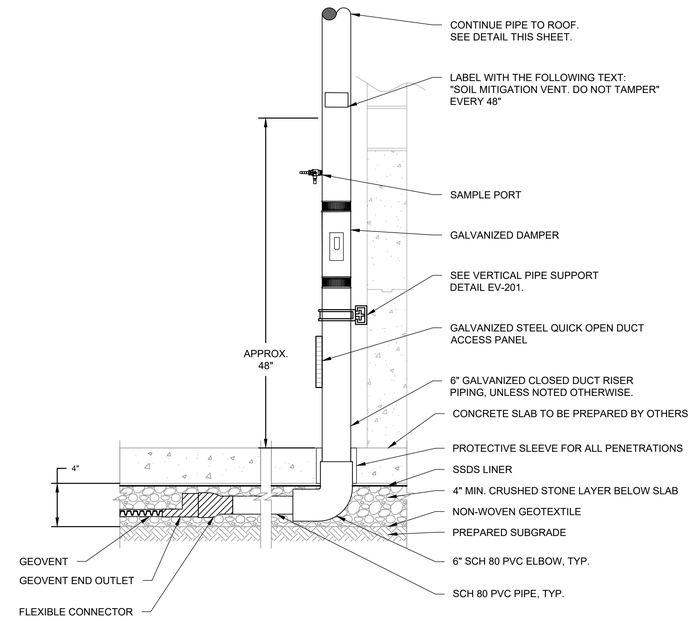
PWGC Project Number: **TOT1903**

PWGC FILE NAME: J:\Projects S-Z\TOT - Totem Brooklyn\1903 - Atlantic Ave - BCP\CAD\SSDS & SVE\2023-06-14 - 90% CD Submission - DEC Revisions\TOT1903 Atlantic Ave - SSDS & SVE Plan Set.dwg (EV-102)
PLOT DATE/TIME: Jun 14, 2023-4:43pm By: scanlon



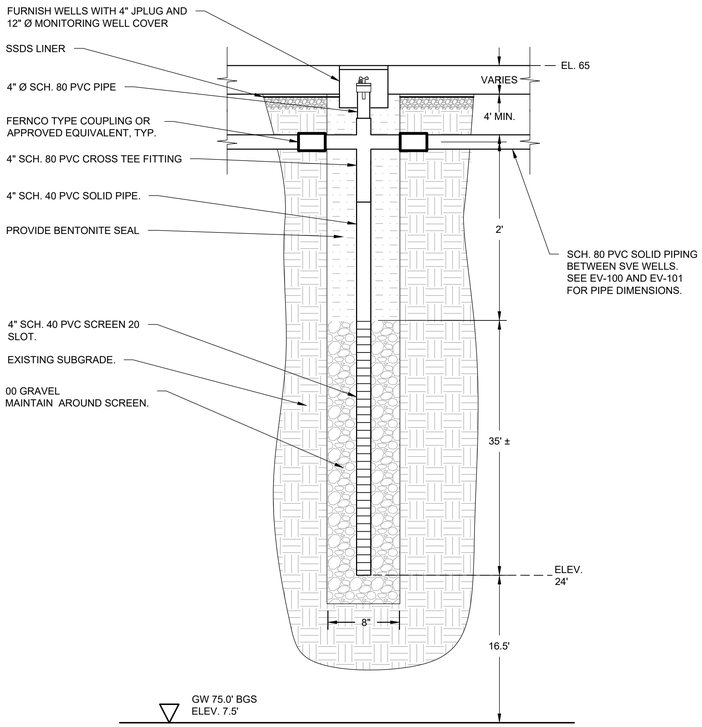
BLOWER DETAIL

SCALE: NOT TO SCALE



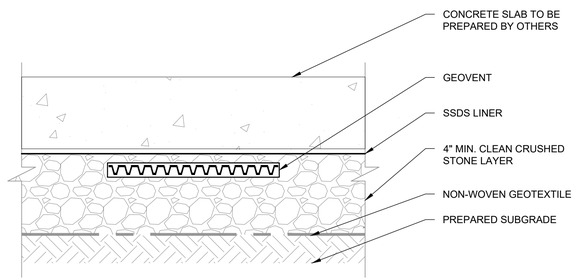
TYPICAL SUB-SLAB PENETRATION DETAIL

SCALE: NOT TO SCALE



SVE WELL - INTERIOR OF BUILDING - DETAIL

SCALE: NOT TO SCALE



GEOVENT INSTALLATION DETAIL

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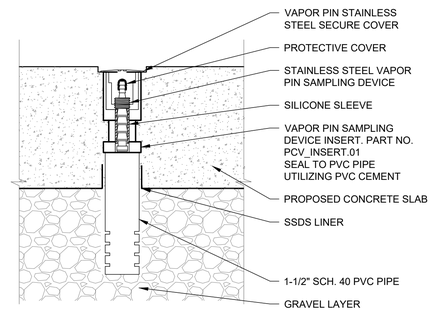

TYPICAL SUB-SLAB MONITORING POINT

SCALE: NOT TO SCALE

NOTE(S):
1. REFER TO VAPOR PIN STANDARD OPERATING PROCEDURE INSTALLATION OF THE VAPOR PIN SAMPLING DEVICE INSERT FOR FULL INSTALLATION INSTRUCTIONS.
2. VAPOR PIN SAMPLING DEVICE INSERT CAP (PART NO. PVC_INSERT_CAP.01) AND ¼"-13 THREADED ROD MAY BE REQUIRED DURING INSTALLATION IF INSTALLED PRIOR TO NEW CONCRETE SLABS.

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BROOKLYN, NY 11238

County Tax Map Number: | Contract Number:
Regulatory Reference Number:
Title of Drawing:

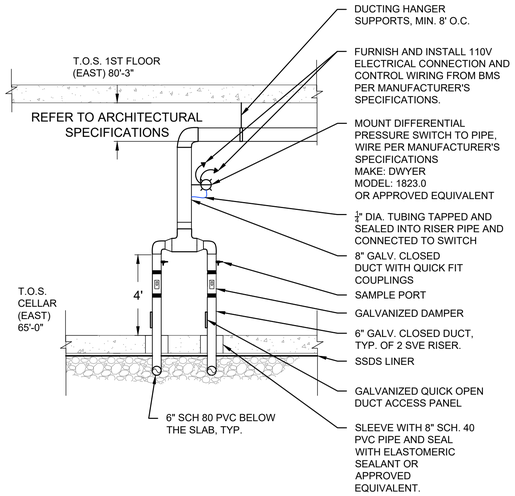
SSDS & SVE DETAILS-1

Drawing Number:
EV-200

Sheet 4 of 6

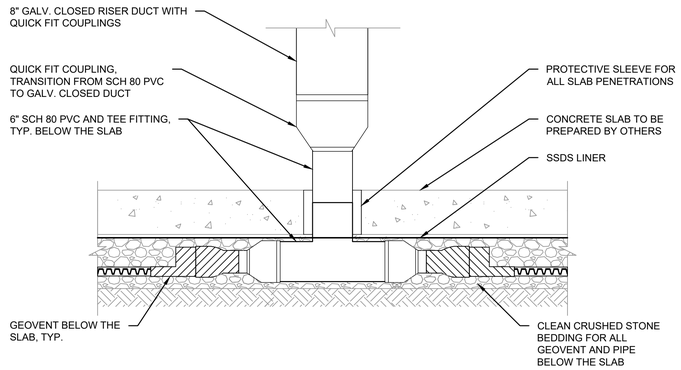
PWGC Project Number:
TOT1903

PWGC FILE NAME: J:\Projects\2-2021 - Town Boxes\1920 - Atlantic Ave - BCP\ACAD\2023 & 01\2023\06-01 - 60% CD Submission - DEC Review\EV200 Atlantic Ave - SSDS & SVE Plan Set.dwg (30.00)
PLOT DATE/TIME: Jun 14, 2023 4:50pm By: ivanson



SECTION: SVE MANIFOLD DETAIL

SCALE: NOT TO SCALE



RISER SLAB TRANSITION DETAIL

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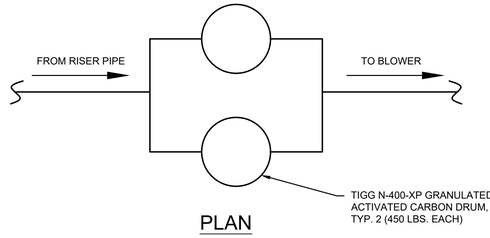
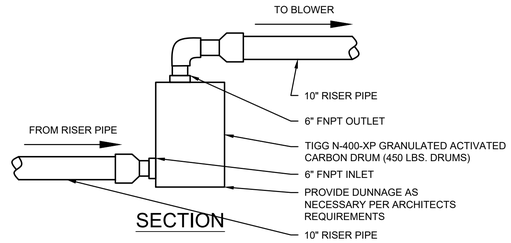


PLAN



SECTION

SVE CARBON FILTRATION DETAIL

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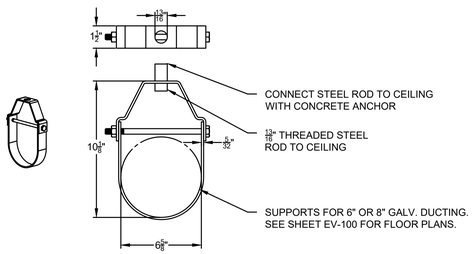

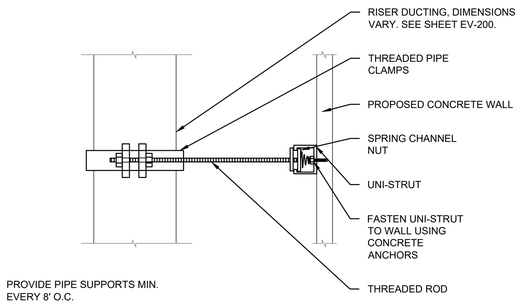

DUCT HANGER SUPPORT DETAILS

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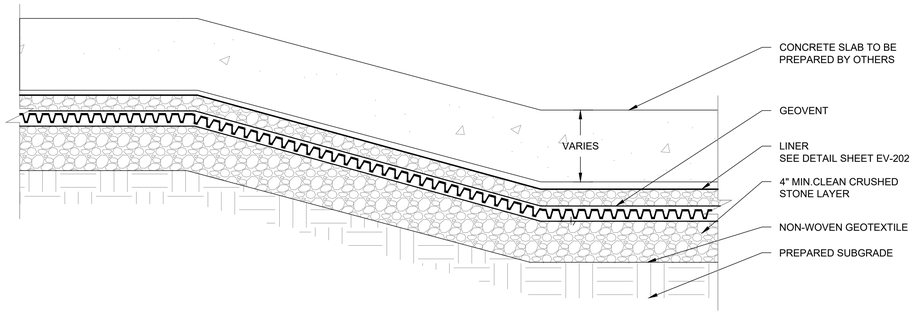

GEOVENT SLAB THICKNESS TRANSITION DETAILS

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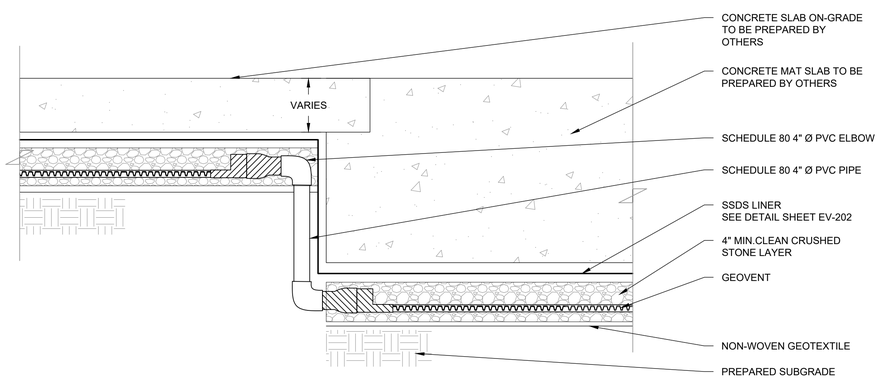

GEOVENT SLAB ON GRADE-MAT SLAB TRANSITION DETAIL

SCALE: NOT TO SCALE

PWGC
CLIENT DRIVEN SOLUTIONS
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Number	Revision Description	Revision Date
7		
6		
5		
4		
3	DEC REVIEW	05/30/2023
2	FOUNDATION BID SET REVISIONS	11/18/2022
1	100% DESIGN DEVELOPMENT	10/01/2022

Designed By | Date Submitted
Drawn By | Date Created
Approved By | Scale

Client:
TOTEM BKLYN
55 WASHINGTON ST. SUITE #710
BROOKLYN, NY 11201

Project:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

Project Address:
1041-1065 ATLANTIC AVE
BROOKLYN, NY 11238

County Tax Map Number: | Contract Number:
Regulatory Reference Number:

Title of Drawing:

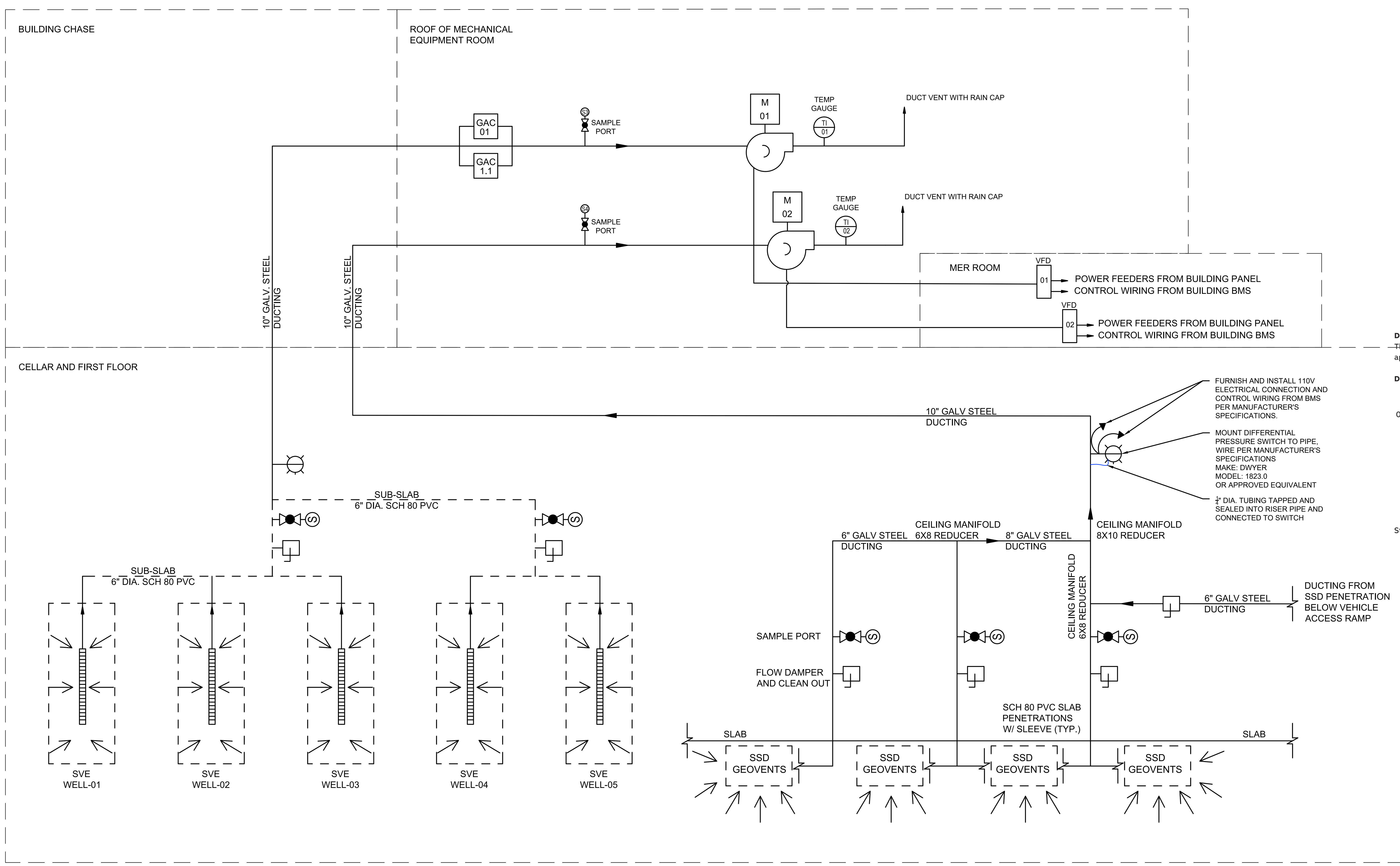
SSDS & SVE DETAILS-2

Drawing Number:
EV-201

Sheet 5 of 6

PWGC Project Number:
TOT1903

PWGC FILE NAME: - P:\Projects 3-2020\TOT1903 - Totem Brooklyn\2022 - Atlantic Ave - ISCP\CAD\SSDS & SVE\EV201.dwg 14 - 100% DD Submission - DEC Revisions\07/19/23 Atlantic Ave. - SSDS & SVE Plan Set.dwg [5 of 6]
PLOT DATE/TIME: - Jun 14, 2023 4:42pm By: cranton


BUILDING CHASE
ROOF OF MECHANICAL EQUIPMENT ROOM
GAC 01
GAC 1.1
SAMPLE PORT
M 01
TEMP GAUGE
TI 01
DUCT VENT WITH RAIN CAP
M 02
TEMP GAUGE
TI 02
DUCT VENT WITH RAIN CAP
10" GALV. STEEL DUCTING
MER ROOM
VFD 01
POWER FEEDERS FROM BUILDING PANEL
CONTROL WIRING FROM BUILDING BMS
VFD 02
POWER FEEDERS FROM BUILDING PANEL
CONTROL WIRING FROM BUILDING BMS
CELLAR AND FIRST FLOOR
10" GALV STEEL DUCTING
FURNISH AND INSTALL 110V ELECTRICAL CONNECTION AND CONTROL WIRING FROM BMS PER MANUFACTURER'S SPECIFICATIONS.
MOUNT DIFFERENTIAL PRESSURE SWITCH TO PIPE, WIRE PER MANUFACTURER'S SPECIFICATIONS
MAKE: DWYER
MODEL: 1823.0
OR APPROVED EQUIVALENT
¼" DIA. TUBING TAPPED AND SEALED INTO RISER PIPE AND CONNECTED TO SWITCH
SUB-SLAB 6" DIA. SCH 80 PVC
SUB-SLAB 6" DIA. SCH 80 PVC
6" GALV STEEL DUCTING
CEILING MANIFOLD 6X8 REDUCER
8" GALV STEEL DUCTING
CEILING MANIFOLD 8X10 REDUCER
CEILING MANIFOLD 6X8 REDUCER
6" GALV STEEL DUCTING
DUCTING FROM SSD PENETRATION BELOW VEHICLE ACCESS RAMP
SAMPLE PORT
FLOW DAMPER AND CLEAN OUT
SCH 80 PVC SLAB PENETRATIONS W/ SLEEVE (TYP.)
SLAB
SLAB
SSD GEOVENTS
SSD GEOVENTS
SSD GEOVENTS
SSD GEOVENTS
SVE WELL-01
SVE WELL-02
SVE WELL-03
SVE WELL-04
SVE WELL-05

PROCESS AND INSTRUMENTATION DIAGRAM

SCALE: NOT TO SCALE

LEGEND

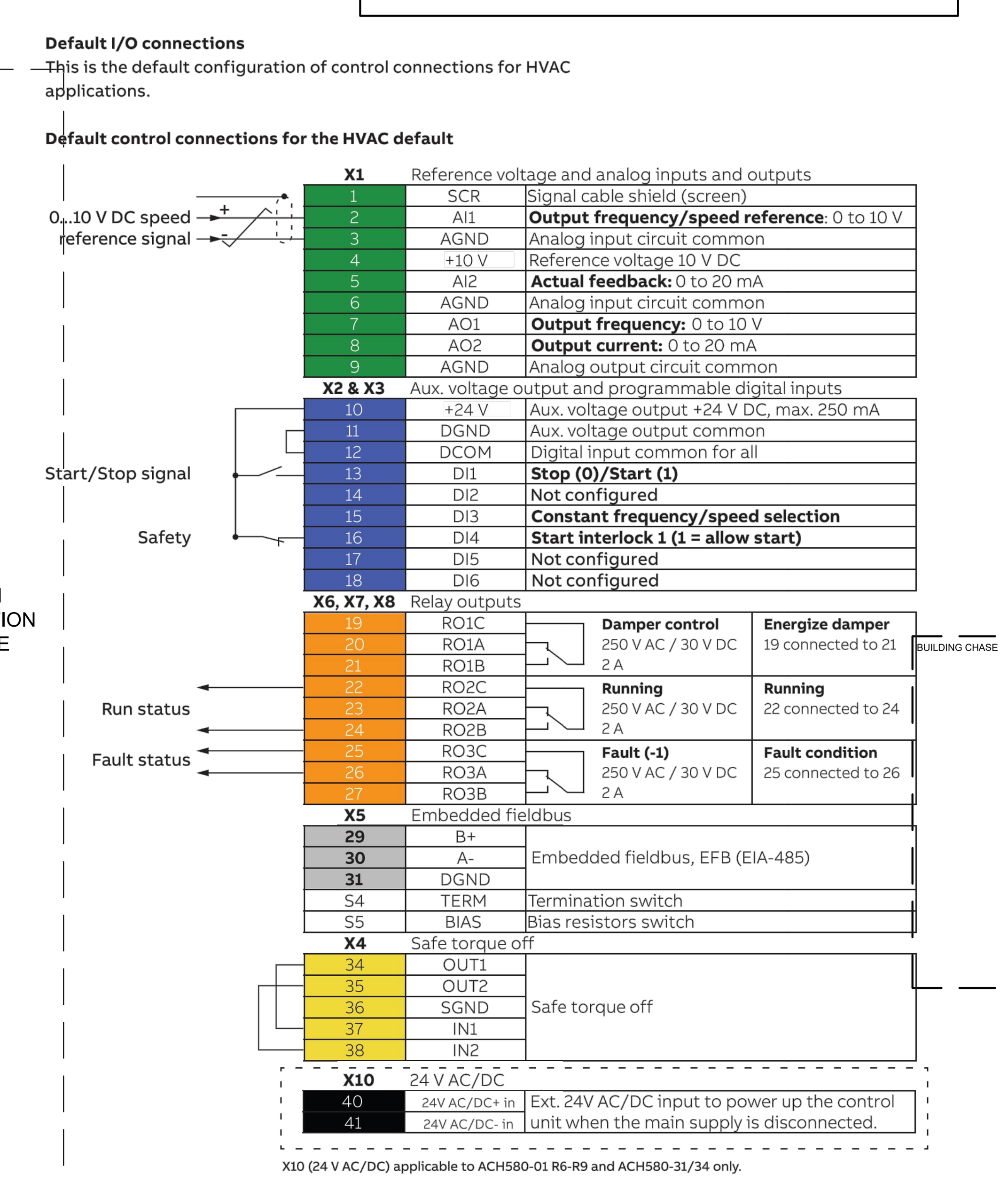
BALL VALVE
SAMPLE PORT
PRESSURE RELIEF VALVE
VACUUM RELIEF VALVE
CAMLOCK CONNECTION
DAMPER
PARTICULATE FILTER (DRAIN)
PITOT TUBE

INDICATING INSTRUMENT (LOCAL)
ALARM

EXAMPLE
SETPOINT OF INSTRUMENT
INSTRUMENT DESIGNATION (PRESSURE SWITCH)
INSTRUMENT TYPE
SYSTEM POSITION NUMBER

CENTRIFUGAL, REGENERATIVE BLOWER

FI - FLOW INDICATOR
M - MOTOR
PI - PRESSURE INDICATOR
TI - TEMPERATURE INDICATOR
VA - VACUUM ALARM
VI - VACUUM INDICATOR


Default I/O connections
This is the default configuration of control connections for HVAC applications.
Default control connections for the HVAC default
X1 Reference voltage and analog inputs and outputs
0...10 V DC speed reference signal
1 SCR Signal cable shield (screen)
2 AI1 Output frequency/speed reference: 0 to 10 V
3 AGND Analog input circuit common
4 +10 V Reference voltage 10 V DC
5 AI2 Actual feedback: 0 to 20 mA
6 AGND Analog input circuit common
7 AO1 Output frequency: 0 to 10 V
8 AO2 Output current: 0 to 20 mA
9 AGND Analog output circuit common
X2 & X3 Aux. voltage output and programmable digital inputs
10 +24 V Aux. voltage output +24 V DC, max. 250 mA
11 DGND Aux. voltage output common
12 DCOM Digital input common for all
Start/Stop signal
13 DI1 Stop (0)/Start (1)
14 DI2 Not configured
15 DI3 Constant frequency/speed selection
Safety
16 DI4 Start interlock 1 (1 = allow start)
17 DI5 Not configured
18 DI6 Not configured
X6, X7, X8 Relay outputs
19 RO1C
20 RO1A
21 RO1B
Damper control 250 V AC / 30 V DC 2 A
Energize damper 19 connected to 21
BUILDING CHASE
Run status
22 RO2C
23 RO2A
24 RO2B
Running 250 V AC / 30 V DC 2 A
Running 22 connected to 24
Fault status
25 RO3C
26 RO3A
27 RO3B
Fault (-1) 250 V AC / 30 V DC 2 A
Fault condition 25 connected to 26
X5 Embedded fieldbus
29 B+
30 A-
31 DGND
Embedded fieldbus, EFB (EIA-485)
S4 TERM Termination switch
S5 BIAS Bias resistors switch
X4 Safe torque off
34 OUT1
35 OUT2
36 SGND
37 IN1
38 IN2
Safe torque off
X10 24 V AC/DC
40 24V AC/DC+ in
41 24V AC/DC- in
Ext. 24V AC/DC input to power up the control unit when the main supply is disconnected.
X10 (24 V AC/DC) applicable to ACH580-01 R6-R9 and ACH580-31/34 only.

VARIABLE FREQUENCY DRIVE (VFD) WIRING DIAGRAM

PWGC
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BROOKLYN, NY 11238

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BROOKLYN, NY 11238

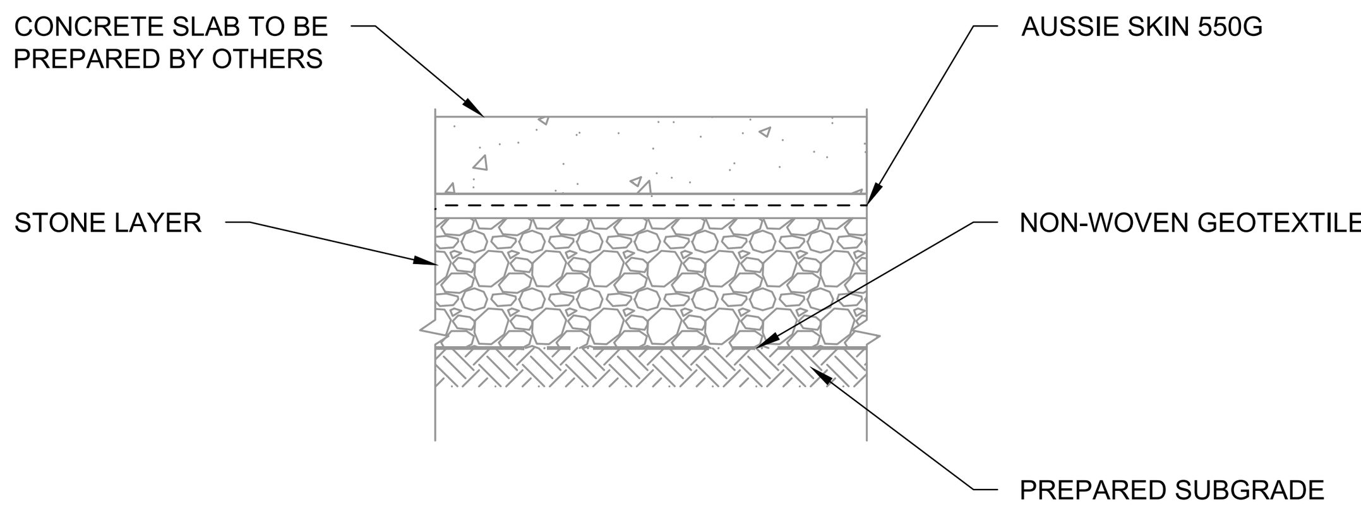
County Tax Map Number: | Contract Number:
Regulatory Reference Number:

Title of Drawing
SSDS & SVE PROCESS & INSTRUMENTATION DIAGRAM

Drawing Number
EV-300

Sheet 6 of 6

PWGC Project Number
TOT1903



TYPICAL AUSSIE 550G DETAIL

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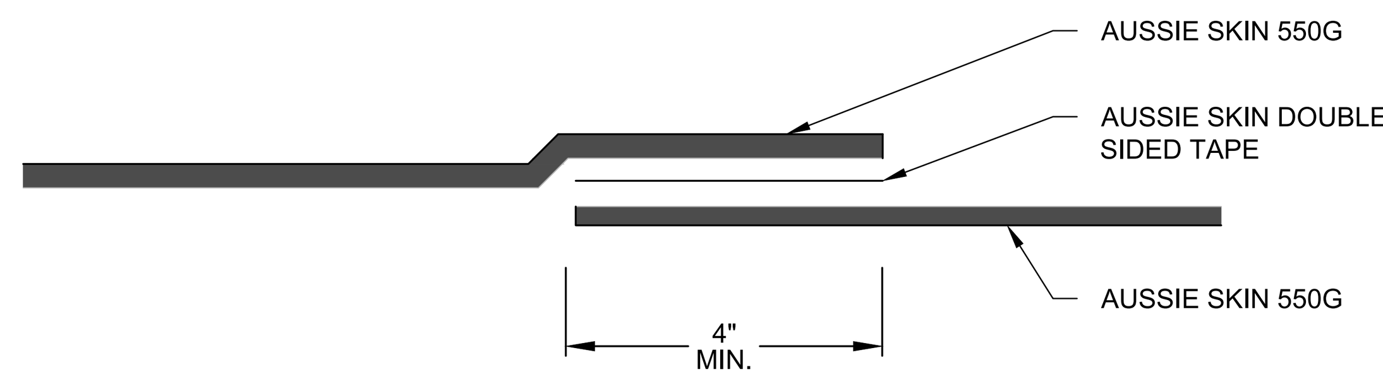


NOTES:

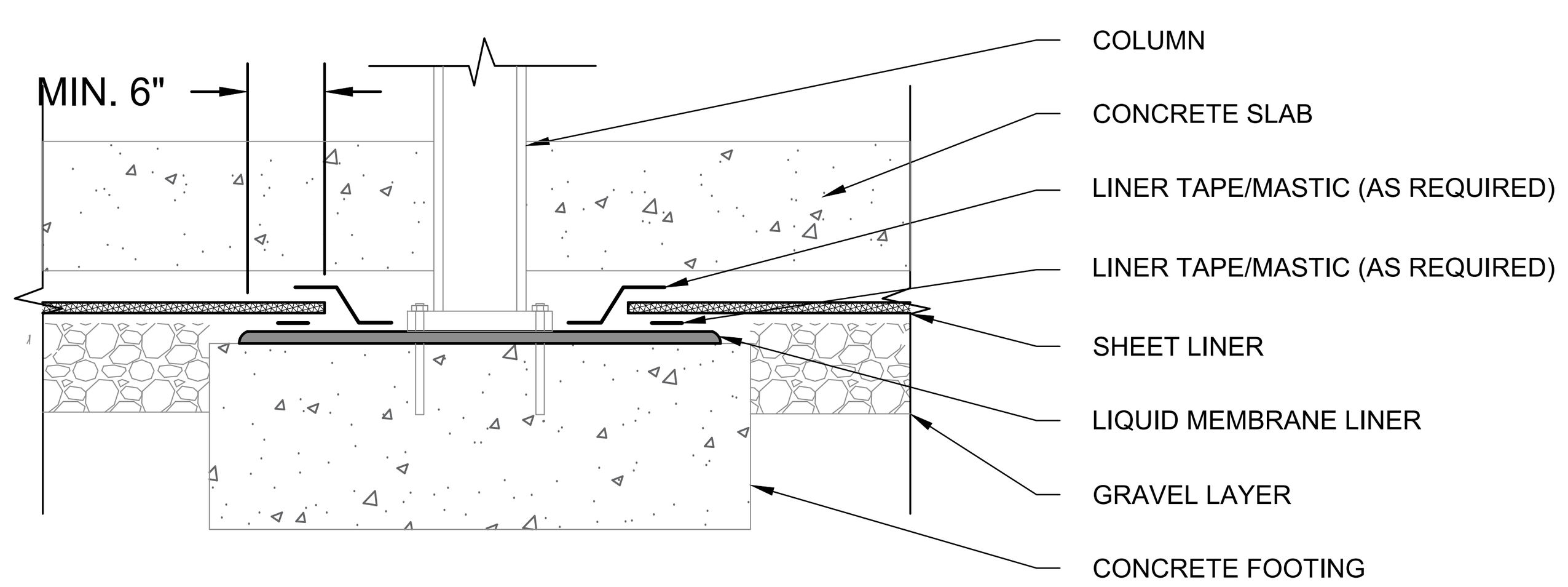
1. ALL SURFACES MUST BE CLEAN AND SOUND BEFORE INSTALLING THE LAP JOINTS
2. DOUBLE SIDED TAPE MUST BE USED AS SUPPLIED (MIN. 4" WIDE)
3. BELOW THE WATER TABLE, DRAIN BOARD MAY BE SUBSTITUTED WITH APPROVED PROTECTION LAYER

TYPICAL AVM AUSSIE SKIN 550G OVERLAP DETAIL

SCALE: NOT TO SCALE

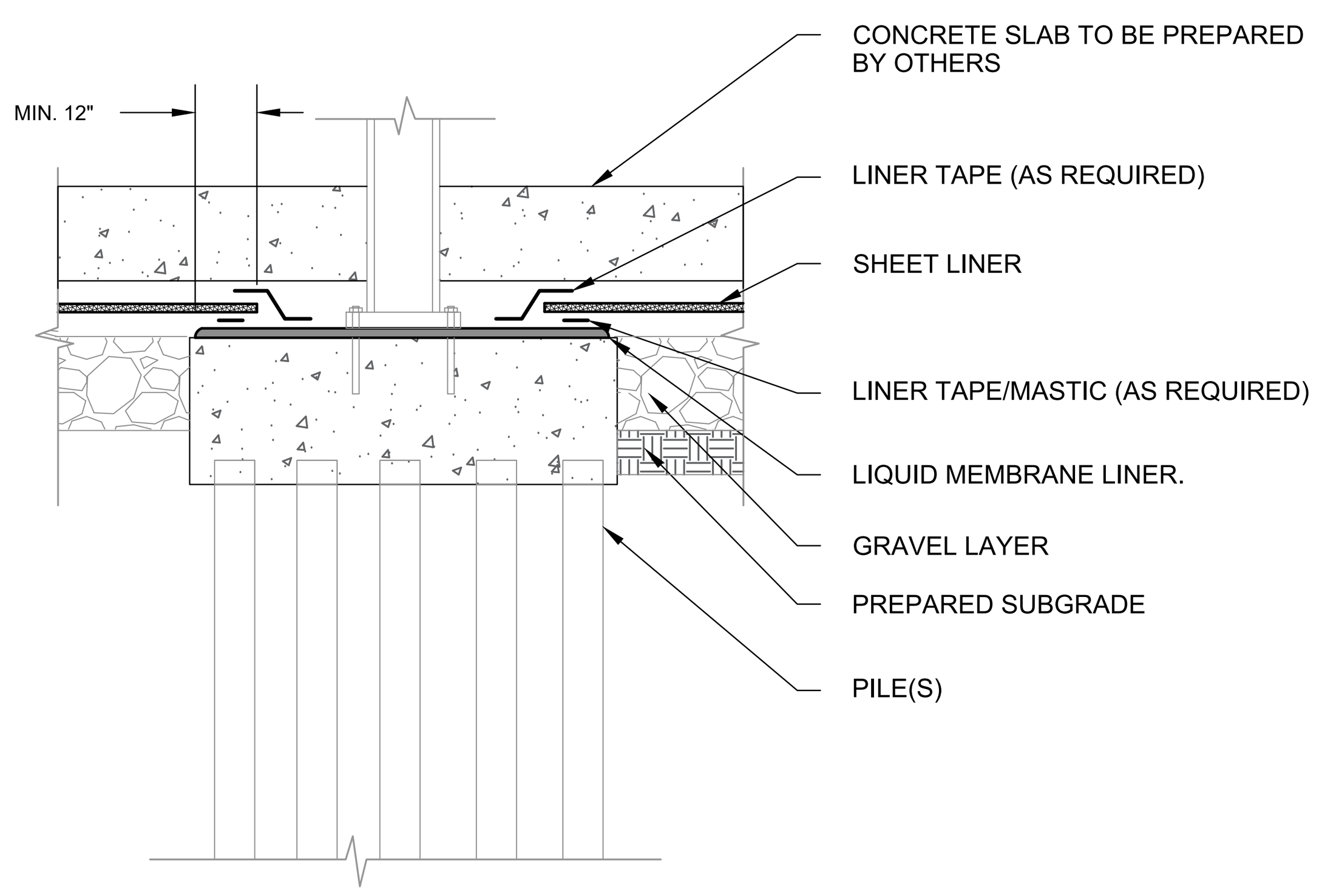
NOTE(S):

1. LINER TO BE GRACE PREPRUFE 300R (HORIZONTAL APPLICATION) AND GRACE PREPRUFE 160R (VERTICAL APPLICATION) OR ENGINEER APPROVED EQUIVALENT.
2. LINER PRODUCTS SHOULD BE INSTALLED PER ASTM E1993 - SPECIFICATION FOR BITUMINOUS WATER VAPOR RETARDERS USED IN CONTACT WITH SOIL OR GRANULAR FILL UNDER CONCRETE SLABS AND ASTM E1745-11 - STANDARD SPECIFICATION FOR PLASTIC WATER VAPOR RETARDERS USED IN CONTACT WITH SOIL OR GRANULAR FILL UNDER CONCRETE SLABS AND MEET THE SPECIFICATIONS OF A "CLASS A" LINER, OR ENGINEER APPROVED EQUIVALENT.
3. WHERE THESE SPECIFICATIONS DIFFER WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL TAKE PRECEDENCE.
4. LINER INSTALLATIONS SHALL BE INSPECTED BY ENVIRONMENTAL PROFESSIONAL OR ENGINEER PRIOR TO COVERING.
5. MINIMUM LINER THICKNESS TO BE 20 MILS.
6. ALL DAMAGE, PUNCTURES, AND PENETRATIONS SHALL BE SEALED PER MANUFACTURER'S SPECIFICATIONS.



LINER OVER FOOTING AT COLUMN DETAIL

SCALE: NOT TO SCALE



LINER OVER PILE CAP DETAIL

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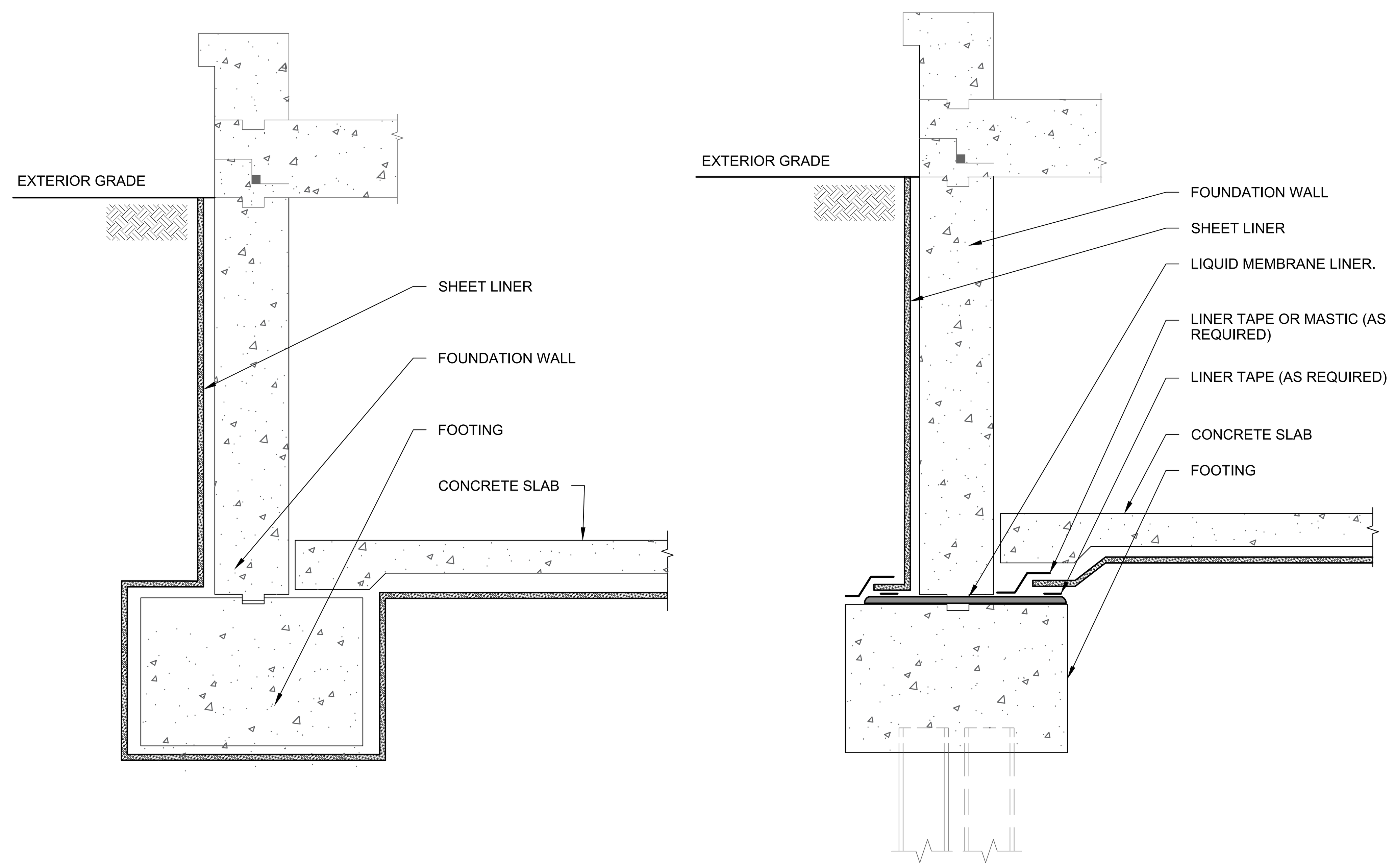

LINER AT EXTERIOR FOOTING DETAIL

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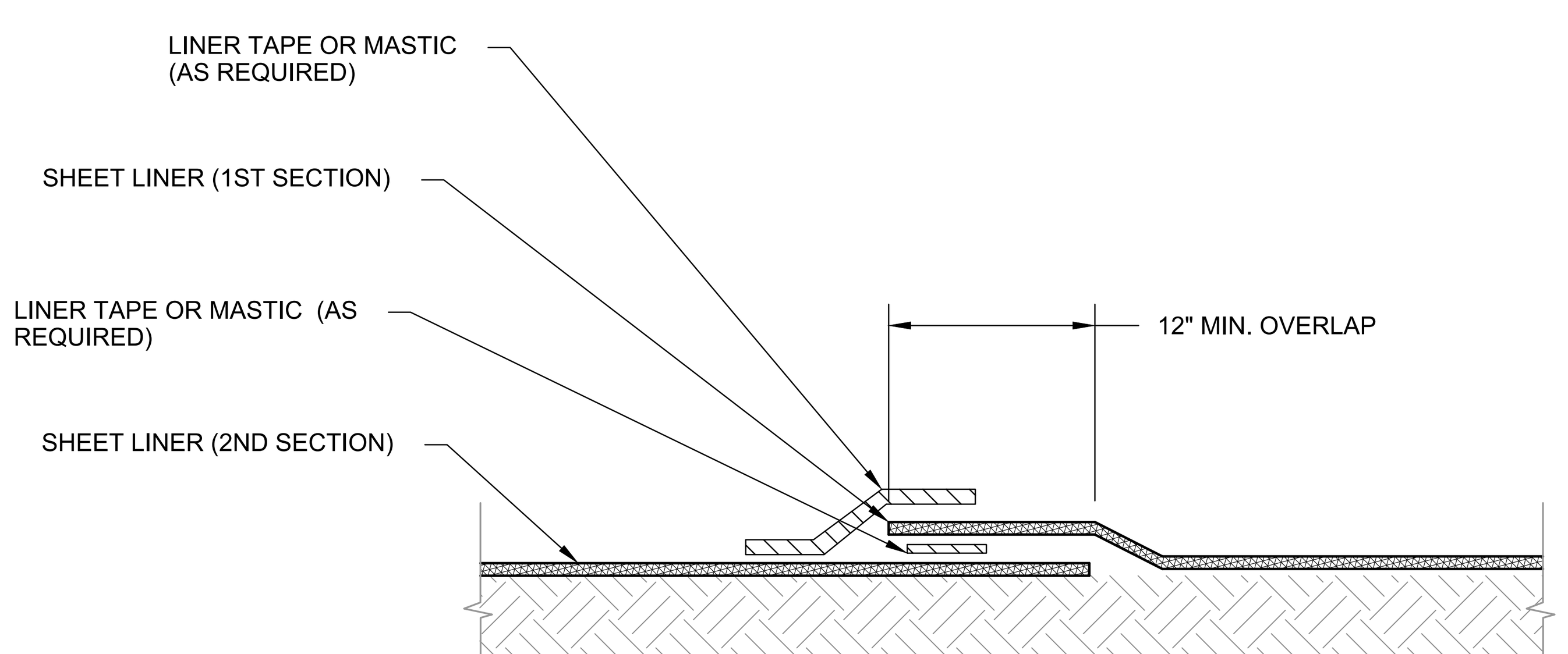

TYPICAL LINER OVERLAP DETAIL

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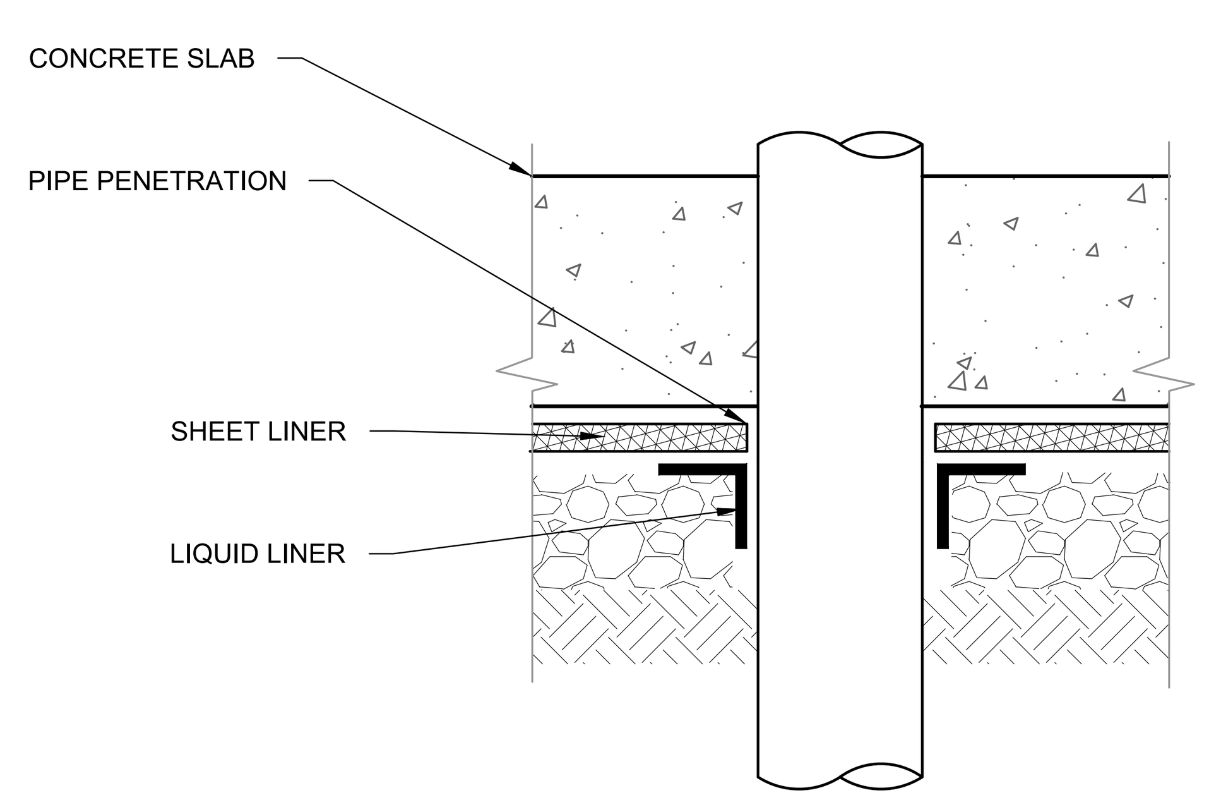
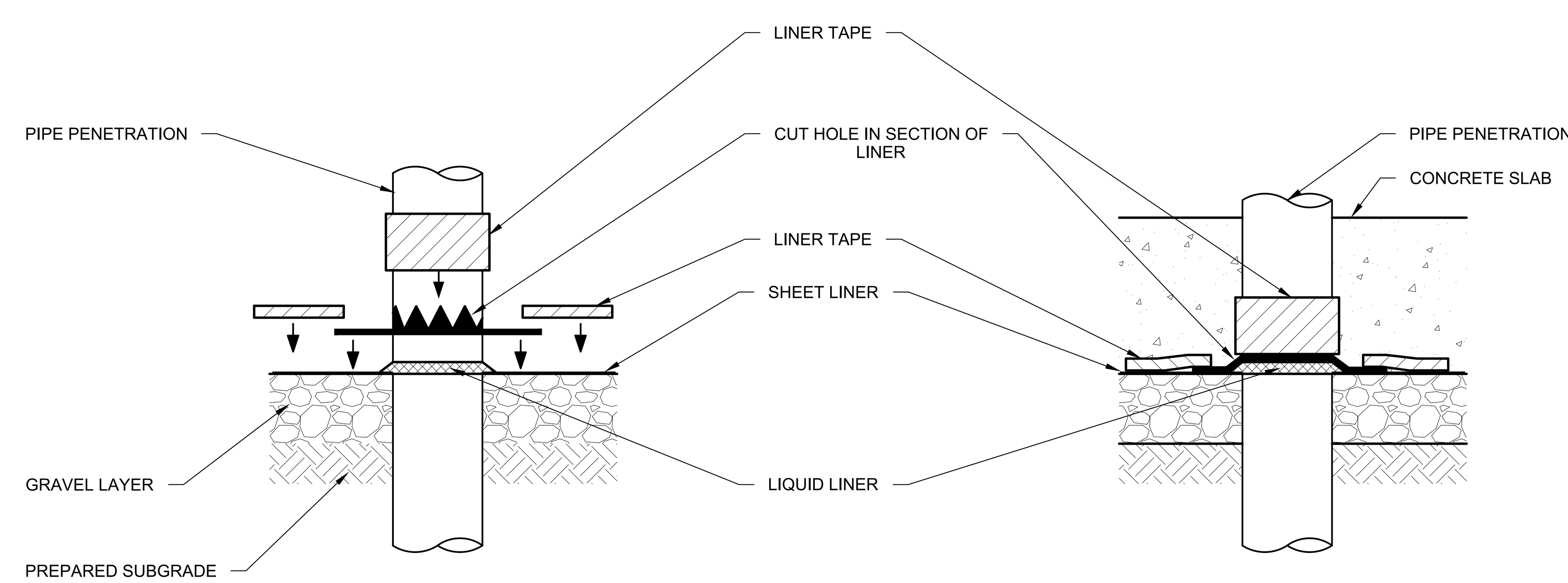


NOTE:
PATCH FOR LINER SHALL OVERLAP IN PLACE LINER BY MINIMUM SIX INCHES.



TYPICAL LINER PENETRATION DETAIL

SCALE: NOT TO SCALE

PWGC

CLIENT DRIVEN SOLUTIONS

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Designed By / Date Submitted

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BROOKLYN, NY 11238

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BROOKLYN, NY 11238

County Tax Map Number: / Contract Number:

Regulatory Reference Number:

Title of Drawing:

DETAILS

Drawing Number:

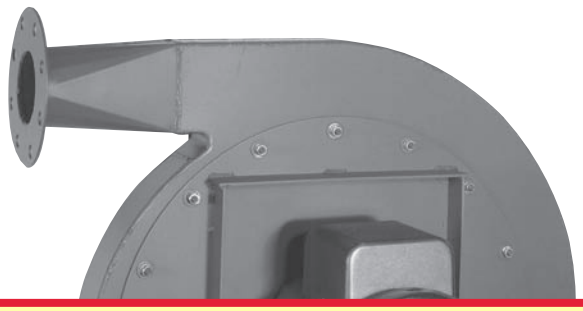
EV-102

Sheet 3 of 4

PWGC Project Number:
TOT1903

Appendix B

cincinnati fan



HP
SERIES II

PWGC SVE FAN SELECTION:
HP-8D22
ARRANGEMENT 4
7.5 HP 240 Volts 3 phase

PWGC SSDS FAN SELECTION:
HP-8B18
ARRANGEMENT 4
5 HP 240 Volts 3 phase

*See page 14 for additional details

HIGH PRESSURE BLOWERS

7697 Snider Road, Mason, OH 45040-9135

Telephone: 513-573-0600

Visit us at www.cincinnatifan.com for more information.

Cat. No. HP-II-908
Supersedes HP-II-1104

cincinnati fan

A Company That Stands Behind Its Product

Since the founding of **Cincinnati Fan** in 1956, the company's mission has been to provide quality products at competitive prices, backed by dependable service.

This mission is carried out by specializing in the market for industrial air handling products up to 125 HP. But specialization does not mean the product line is small. **Cincinnati Fan** offers a wide variety of standard and customized products, production flexibility, and customer responsiveness.

Cincinnati Fan has over 170 experienced sales engineers across the U.S. and Canada ready to serve your air handling needs.

Cincinnati Fan can provide:

- Technical evaluation for correct performance conditions.
- Review of air stream and ambient conditions that require special attention.
- Selection of proper components to meet required design specifications.
- Selection of proper accessories.

Cincinnati Fan operates in a modern facility specifically designed for world class manufacturing enabling us to build standard products to order, including accessories, and ship within 10-15 working days.

With support like this, you can be sure your **Cincinnati Fan** product will be well-built and will provide maximum dependability and longevity.

Visit us at www.cincinnatifan.com for more information.

SPECIFICATIONS FOR HP SERIES II BLOWERS

Radial bladed pressure blowers shall be Cincinnati Fan HP, Series II, Model _____, Arrangement _____ Capacity: _____ CFM, _____ Static Pressure at standard conditions. Operating conditions: _____°F, _____Ft. Altitude.

Wheels shall be dynamically balanced to assure smooth operation. Fan motor and bearing vibration levels shall not exceed 1.5 mils displacement at 3500 RPM. Shafts shall be turned, ground and polished steel (or stainless steel). All fan shafts shall receive a rust preventive coating prior to shipment. All fans shall be test run at factory before shipping.

All construction gauges shall be as shown in Cincinnati Fan's HP, Series II catalog, page 16. The blower housing shall be continuously welded and supported to minimize pulsation at all conditions. Fan bearings shall be grease-lubricated, heavy-duty, self-aligning ball bearings mounted in cast iron pillow blocks. V-belt drives shall be selected for a minimum of 1.3 times nominal horsepower.

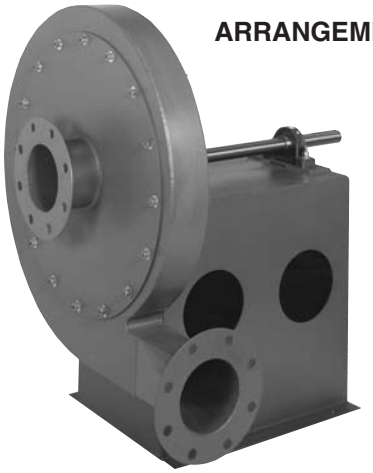
All parts in contact with airstream shall be standard steel, aluminum or stainless steel as specified.

Before painting, steel parts shall be cleaned by detergent wash, phosphatized and painted with oven cured gray enamel.

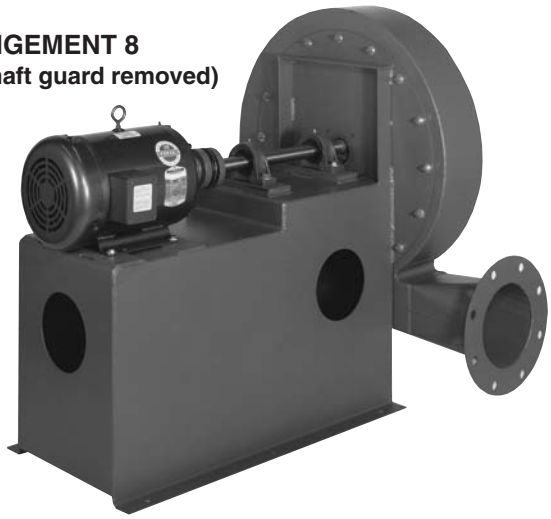
The following accessories shall be included: (See page 5 for optional accessories).

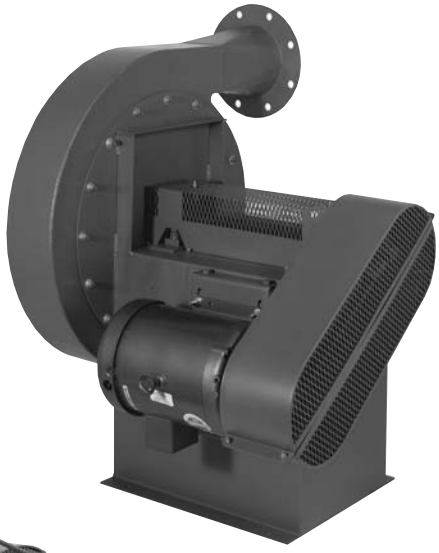
SIX STANDARD ARRANGEMENTS

ARRANGEMENT 1

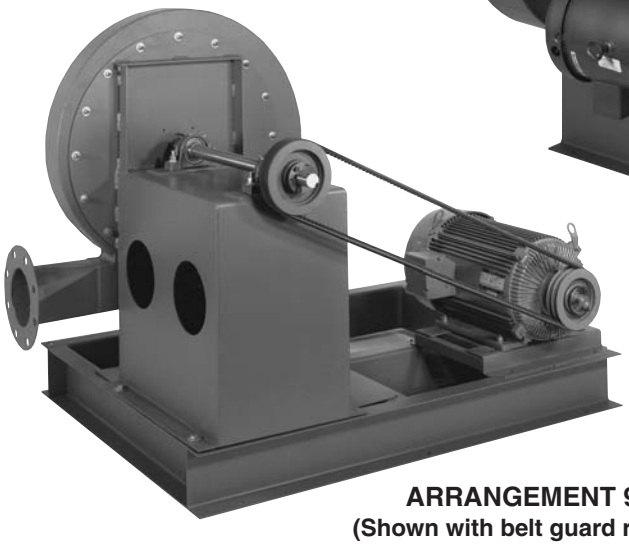


ARRANGEMENT 8
(Shown with shaft guard removed)





ARRANGEMENT 9
(Shown with optional shaft guard)



ARRANGEMENT 9CB
(Shown with belt guard removed)

ARRANGEMENT 4
(Arrangement 4HM not shown)

ARRANGEMENT 1 (V-BELT DRIVE)

- Motor not mounted on bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 8 (DIRECT DRIVE)

- Motor mounted on motor base extending beyond the bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.
- For dimensions, contact your local Cincinnati Fan sales office.

ARRANGEMENT 9 (V-BELT DRIVE)

- Motor mounted on an adjustable slide base on the side of the bearing base.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 9CB (V-BELT DRIVE)

- Same as Arrangement 9 except motor and fan are mounted on a common channel base.
- Maximum temperature of standard design: 300°F; high temperature design: 750°F.

ARRANGEMENT 4 & 4HM (DIRECT DRIVE)

- Motor mounted on motor base.
- Wheel mounted on motor shaft.
- Maximum temperature of standard design: 200°F; high temperature design: 400°F.
- For arrangement 4HM, see page 16.

HP SERIES II FEATURES

A) Wheels are fabricated of heavy-gauge, high-strength steel to assure long lasting, efficient operation. (Not shown.)

B) Turned, ground and polished shafting assures smooth operation. A rust preventative coating is applied prior to shipment.

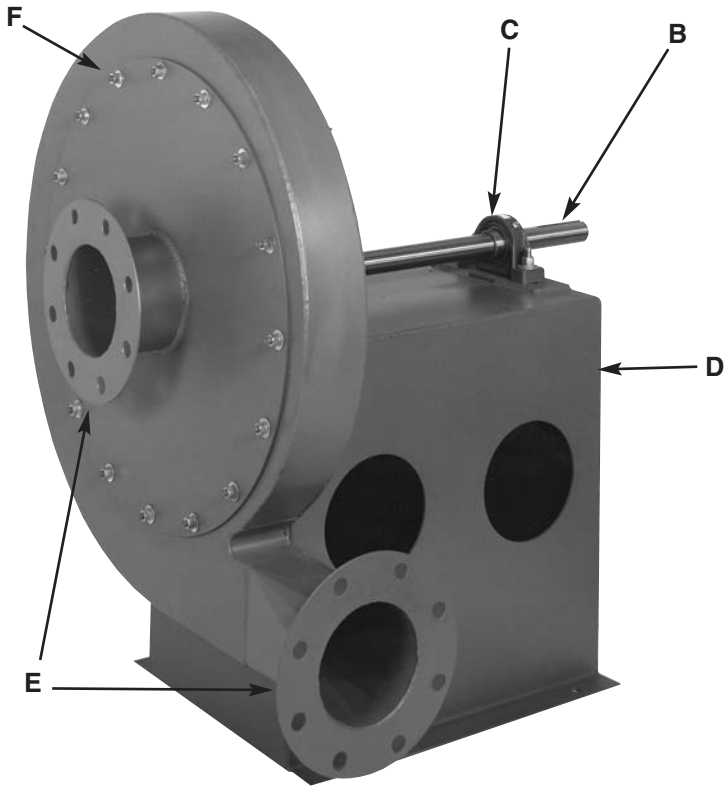
C) Heavy-duty, self-aligning ball bearings in relubricatable cast-iron pillow blocks. Bearings are selected for optimal performance depending on fan size.

D) Bearing base is heavy steel construction with internal supports to maximize rigidity and assure long equipment life. Arrangement #1 fans can be converted to Arrangement #9 with the addition of the motor slide base.

E) Flanged inlet and outlet standard. Drilled per ANSI 125 pound and ASA 150 pound specifications with holes straddling centers. See ★ note on page 18.

F) Reversible housing provides increased configuration flexibility. Removable side plates allow the wheel to be removed from the motor or inlet side of the housing. Housings are rotatable in 45 degree increments.

G) Teflon shaft seal is standard. Ceramic seal is used for applications above 400°F. (Not shown.)



SPARK-RESISTANT CONSTRUCTION

Type A: All parts in contact with airstream are of nonferrous material. **Maximum temperature 200°F.** Consult factory.

Type B: Aluminum wheel and aluminum rubbing ring for motor shaft or fan shaft. **Maximum temperature 200°F.**

Type C: Consists of an aluminum plate on drive side of the fan and aluminum inlet plate assembly. **Maximum temperature 750°F.**

⚠ WARNING

The use of aluminum or aluminum alloys in the presence of steel which has been allowed to rust requires special consideration. Research by the U.S. Bureau of Mines and others has shown that aluminum impellers rubbing on rusty steel may cause high intensity sparking.

The use of the above construction in no way implies a guarantee of safety for any level of spark resistance. Spark resistant construction also does not protect against ignition of explosive gases caused by catastrophic failure or from any airstream material that may be present in a system.

OPTIONAL ACCESSORIES

Belt Guard
Belt guard standard on Arrangement 9 and 9CB only. **Painted safety yellow.**

Drain Connection
3/4" pipe coupling welded to lowest point of housing. Not required on BH discharge position.

Inspection Door
Inspection door available on all sizes except 4A, 4C and 6C. Rubber gasket standard to 250°F. Silicone gasket standard at temperatures of 250°F. to 750°F.

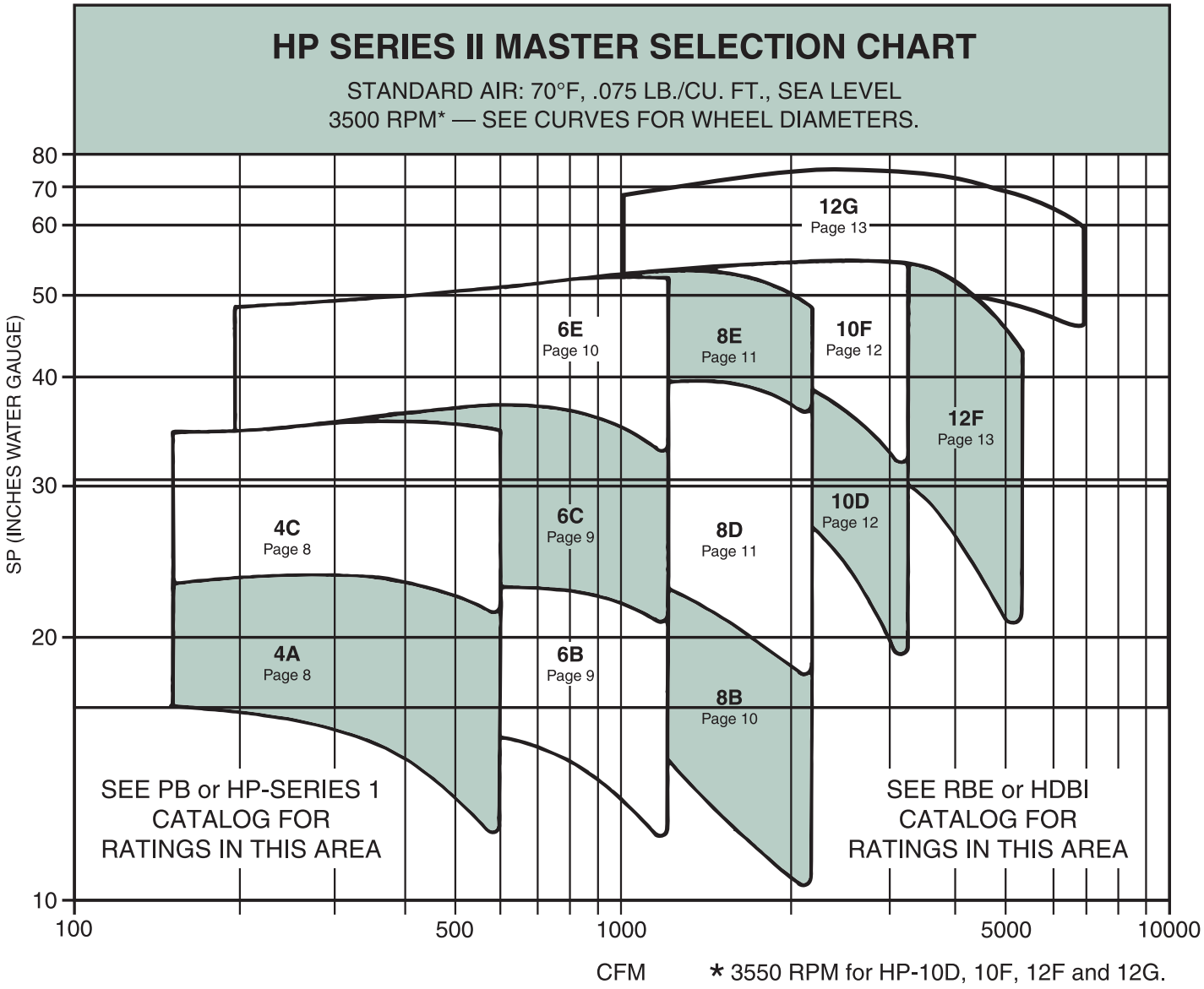
Inlet Bell
With OSHA type guard.

Outlet Guard
OSHA type.

Shaft and/or Heat Slinger Guard
Guard available on Arrangement 1, 9 and 9CB. Standard on Arrangement 8. Covers bearings and shaft between fan housing and belt guard. Bearings relubricatable through guard. **Painted safety yellow.**

⚠ DANGER

All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected or locked out from its power source. Read operating instructions.



HOW TO USE THE MASTER SELECTION CHART

The above chart is intended to guide you to the correct fan for a desired performance rating. This chart was prepared for standard air (70° F., 29.92" Hg barometric pressure and .075 lbs. per cubic foot density.)

All fans were tested with an inlet bell. All performance curves in this catalog are for standard air, at the fan inlet, entering the inlet (whether belled or ducted) with static pressure measured at the discharge.

Corrections are required for temperature and/or altitude and rarefication. See page 7 for correction factors.

Rarefication: When air is pulled into a blower inlet (negative pressure) the air molecules are “stretched out”, or rarefied, and become less dense than at the blower discharge where the air is compressed.

Catalog ratings may be used directly, without correction, for static pressures defined at the fan discharge. For static pressures defined at the fan inlet (i.e., negative pressures), a correction is typically only made for inlet suction pressures greater than 15" W.G. See page 7 for details.

HIGH TEMPERATURE CONSTRUCTION

Arrangements 4 and 4 HM

Up to 200°F. **Standard fan construction.**

201°- 400°F. Standard fan with shaft seal, heat slinger, slinger guard and external hub on wheel.

Arrangements 1, 8, 9 and 9CB

Up to 300°F. **Standard fan construction.**

301°- 400°F. Standard fan with heat slinger and shaft/slinger guard.

401°- 600°F. Standard fan with heat slinger, shaft/slinger guard and high temperature shaft seal, gasketing and paint.

601°- 750°F. Standard fan with heat slinger, shaft/slinger guard, 316SS fan shaft and high temperature shaft seal, gasketing and paint.

TEMPERATURE RANGE	MAXIMUM RPM REDUCTION FACTOR†
Up to 175°F.	0%
176°-200°	2%
201°-300°	4%
301°-400°	7%
401°-500°	11%
501°-600°	15%
601°-700°	20%
701°-750°	30%

† Steel wheels only.

TEMPERATURE - ALTITUDE CONVERSIONS

AIR TEMP. F°	ALTITUDE IN FEET ABOVE SEA LEVEL										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
0°	.87	.91	.94	.98	1.01	1.05	1.09	1.13	1.17	1.22	1.26
40°	.94	.98	1.02	1.06	1.10	1.14	1.19	1 23	1.28	1.32	1.36
70°	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30	1.35	1.40	1.45
80°	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48
100°	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48	1.54
120°	1.09	1.14	1.18	1.23	1.28	1.32	1.38	1.43	1.48	1.53	1.58
140°	1.13	1.18	1.22	1.27	1.32	1.37	1.42	1.48	1.54	1.58	1.65
160°	1.17	1.22	1.26	1.31	1.36	1.42	1.47	1.53	1.59	1.64	1.70
180°	1.21	1.26	1.30	1.36	1.41	1.46	1.52	1.58	1.64	1.70	1.75
200°	1.25	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.69	1.75	1.81
250°	1.34	1.39	1.45	1.50	1.56	1.62	1.68	1.74	1.82	1.88	1.94
300°	1.43	1.49	1.55	1.61	1.67	1.74	1.80	1.87	1.94	2.00	2.08
350°	1.53	1.59	1.65	1.72	1.78	1.85	1.92	2.00	2.07	2.14	2.22
400°	1.62	1.69	1.75	1.82	1.89	1.96	2.04	2.12	2.20	2.27	2.35
450°	1.72	1.79	1.86	1.93	2.00	2.08	2.16	2.24	2.33	2.41	2.50
500°	1.81	1.88	1.96	2.03	2.11	2.19	2.28	2.36	2.46	2.54	2.62
550°	1.91	1.98	2.06	2.14	2.22	2.30	2.40	2.49	2.58	2.68	2.77
600°	2.00	2.08	2.16	2.24	2.33	2.42	2.50	2.61	2.71	2.80	2.90
650°	2.10	2.18	2.26	2.35	2.44	2.54	2.63	2.74	2.84	2.94	3.04
700°	2.19	2.27	2.36	2.46	2.55	2.65	2.75	2.86	2.97	3.06	3.18
750°	2.28	2.37	2.47	2.56	2.66	2.76	2.87	2.98	3.10	3.19	3.31

Fan performance tables are developed using standard air which is 70°F., 29.92" barometric pressure and .075 lbs. per cubic foot. Density changes resulting from temperature or barometric pressure variations (such as high altitudes) must be corrected to standard conditions before selecting a fan based on standard performance data.

Temperature and/or altitude conversion factors are used in making corrections to standard conditions.

EXAMPLE:

Select an HP Series II fan to deliver 4800 CFM at 30" SP at 160°F., and 7000' altitude.

STEP 1. From the table, conversion factor is 1.53.

STEP 2. Correct static pressure is:
1.53 x 30" SP = 45.9" SP at standard conditions.

STEP 3. Check HP, Series II catalog for 4800 CFM at 45.9" SP. We select a HP12F with a 26" diameter wheel at 3500 RPM and 56 BHP.

STEP 4. Correct the BHP for the lighter air:
56 ÷ 1.53 = 36.6 BHP. A 40 HP motor will suffice at 160° F., and 7000' but not at standard conditions. Special motor insulation may be required above 3500 feet altitude. Consult factory.

SUCTION PRESSURE CORRECTIONS

The two tables at the right give corrected static pressures for suction pressure (rarefication). These corrected static pressures are for standard air (70°F., 29.92" Hg barometric pressure and .075 lbs. per cubic foot density) at the blower inlet.

If the inlet air temperature and/or altitude are different, make those corrections as shown above and then correct for rarefication.

Suction Pressure in Inches W.G.	Corrected Static Pressure
16	16.7
18	18.8
20	21.0
22	23.3
24	25.5
26	27.8
28	30.1
30	32.4
32	34.7
34	37.1
36	39.5
38	41.9
40	44.4
42	46.8

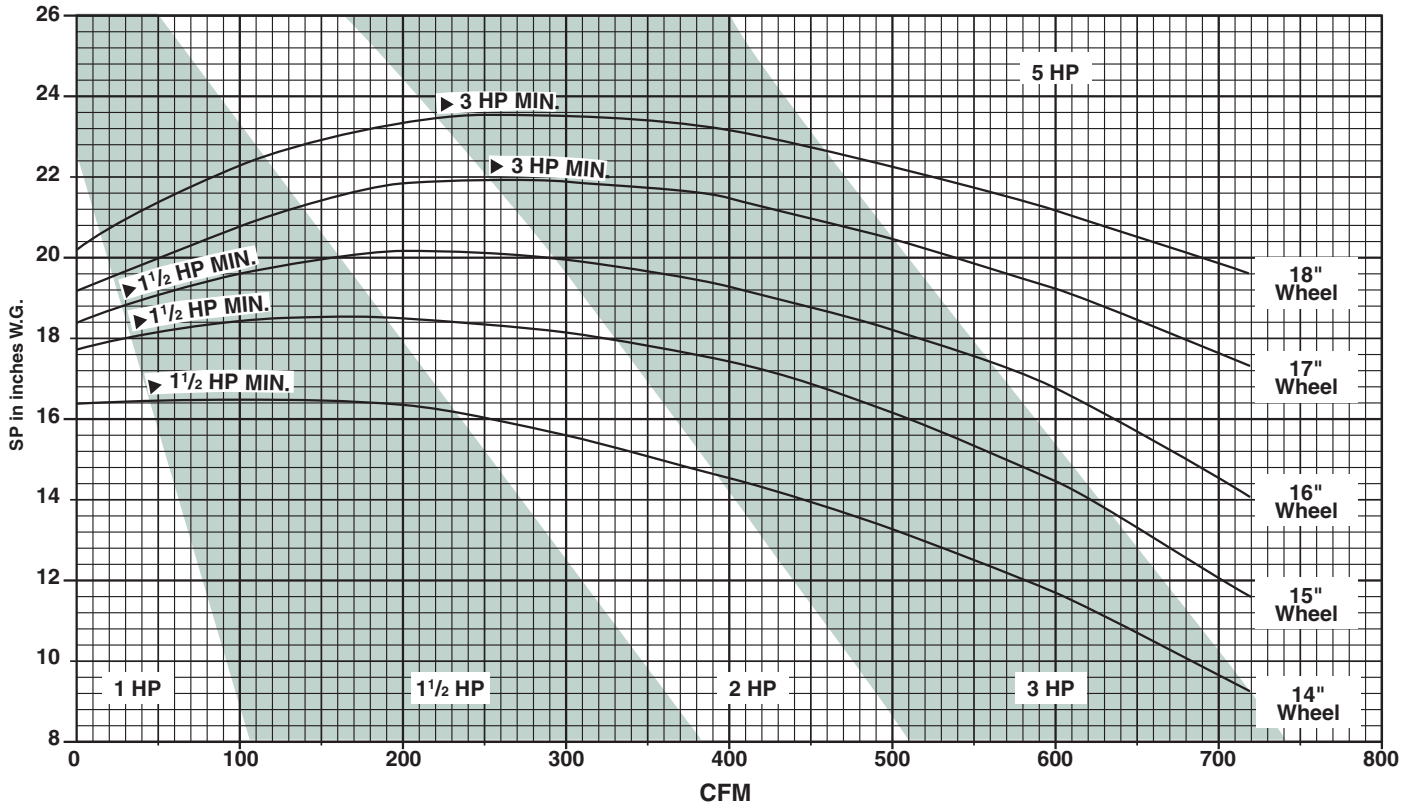
Suction Pressure in Inches W.G.	Corrected Static Pressure
44	49.3
46	51.9
48	54.4
50	57.0
52	59.6
54	62.2
56	64.9
58	67.6
60	70.4
62	73.2
64	75.9
66	78.8
68	81.6
70	84.5

DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

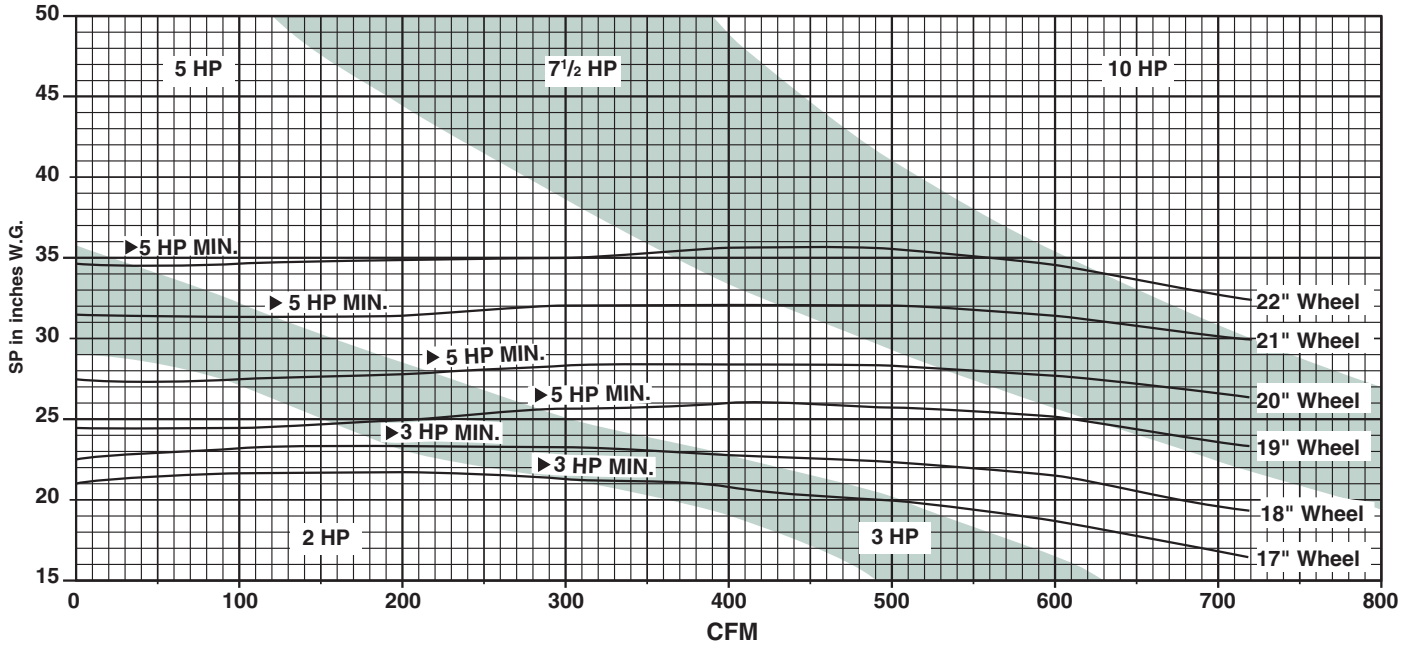
Model HP-4A

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-4C

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.

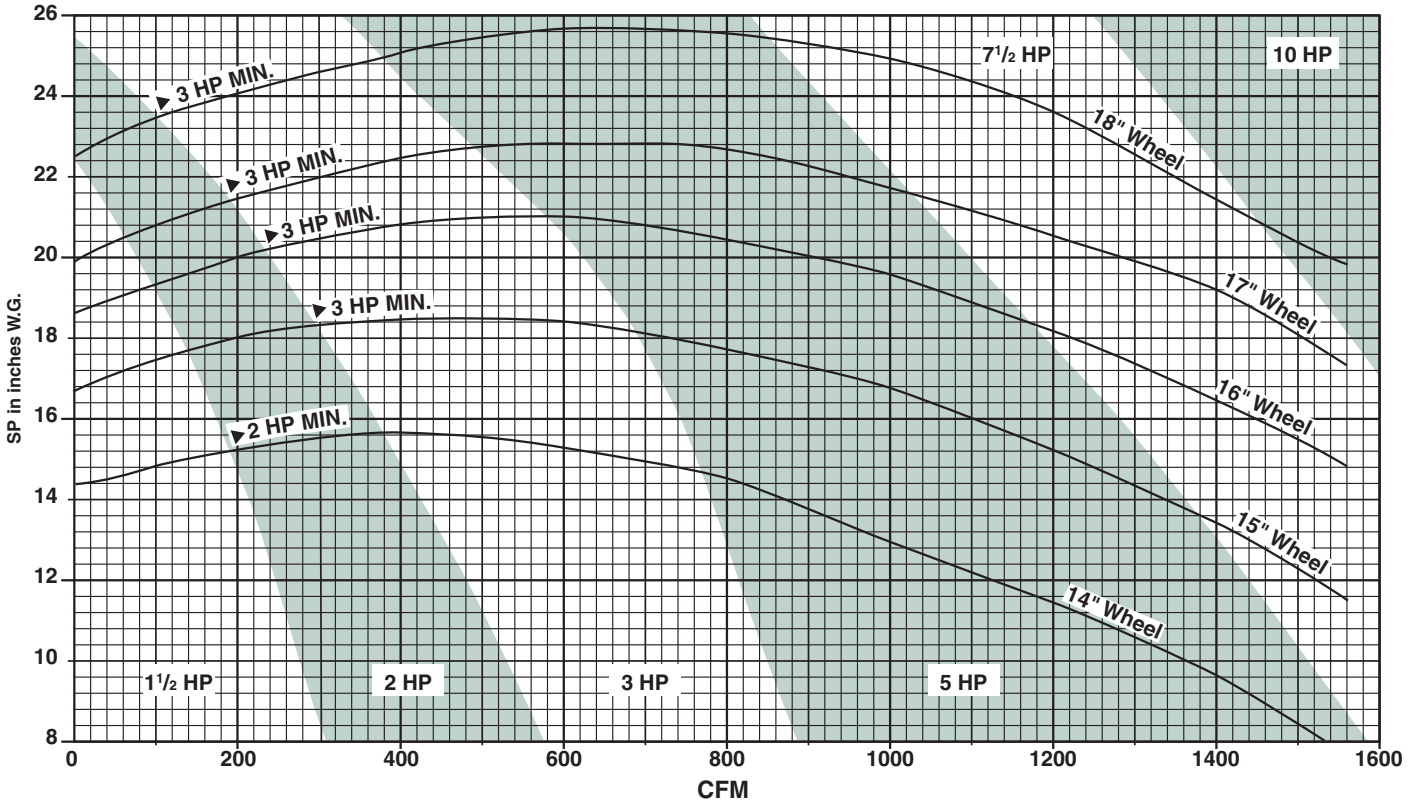


DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

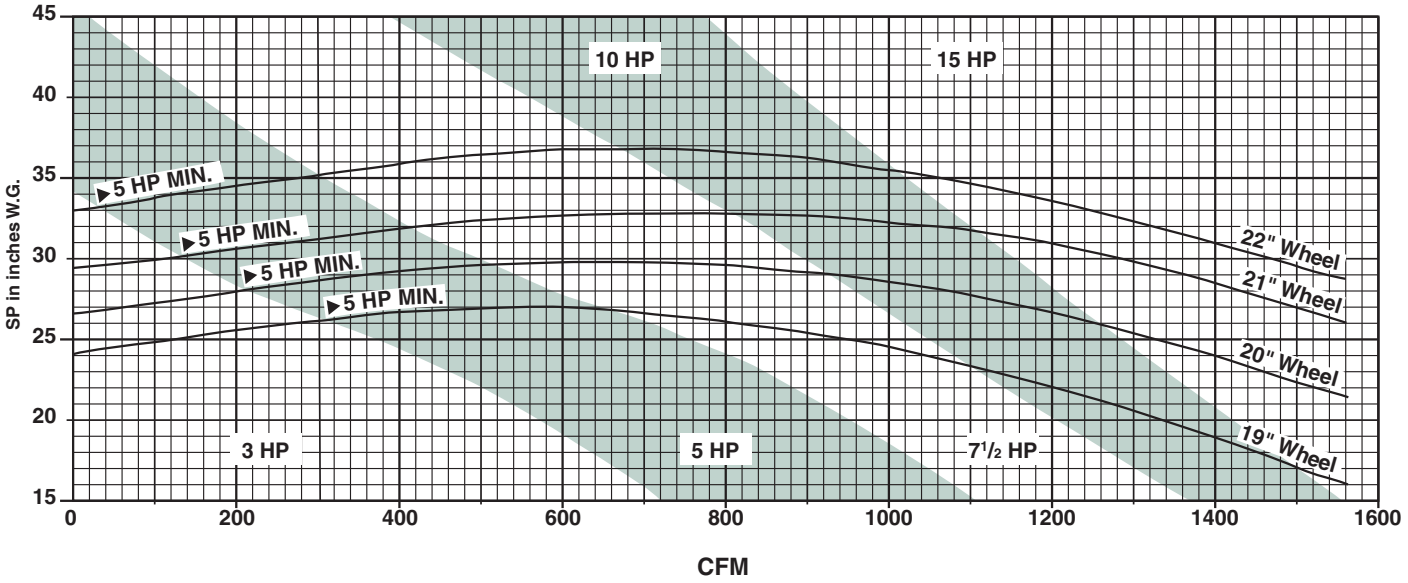
Model HP-6B

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-6C

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.

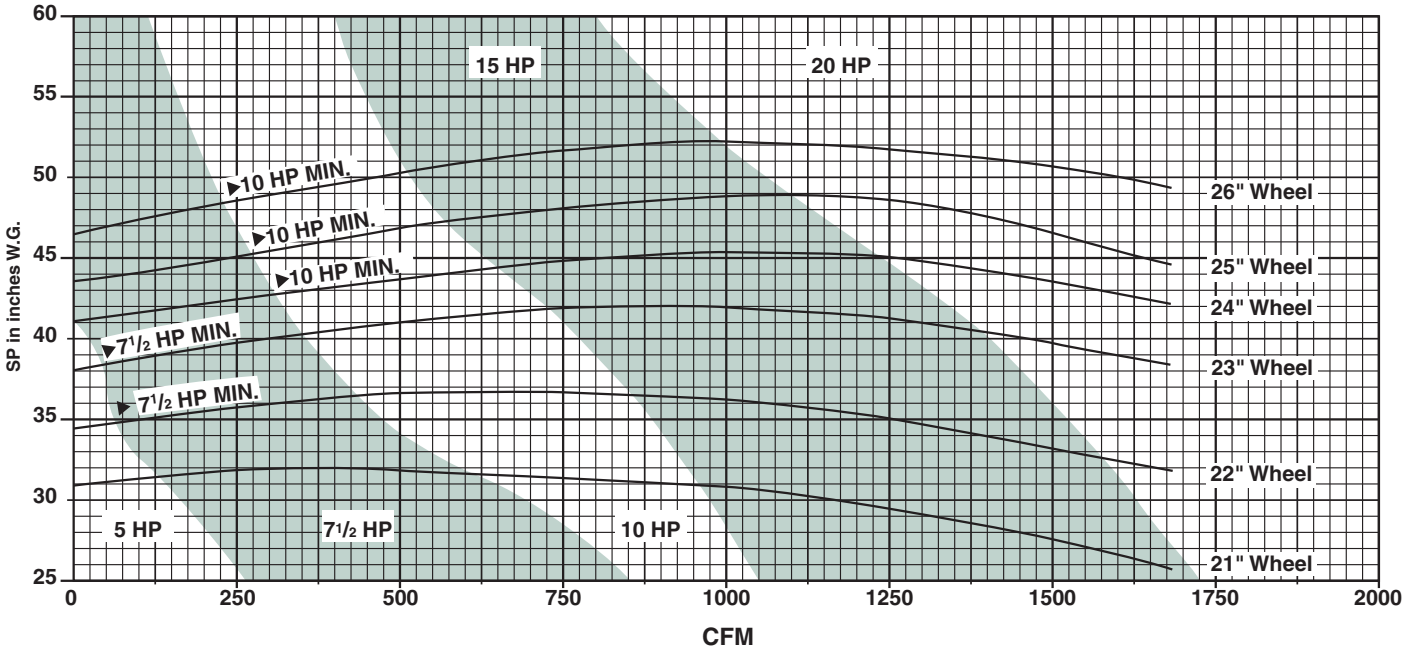


DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

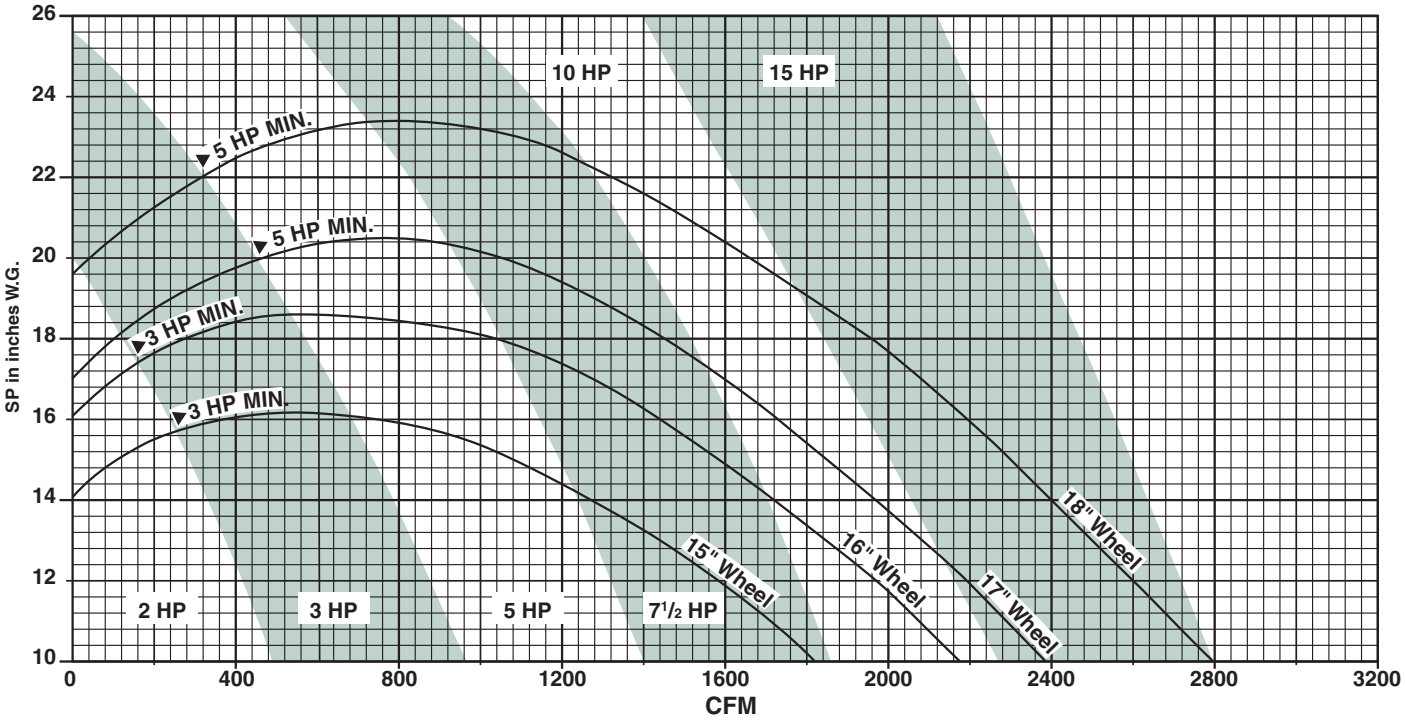
Model HP-6E

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-8B

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.

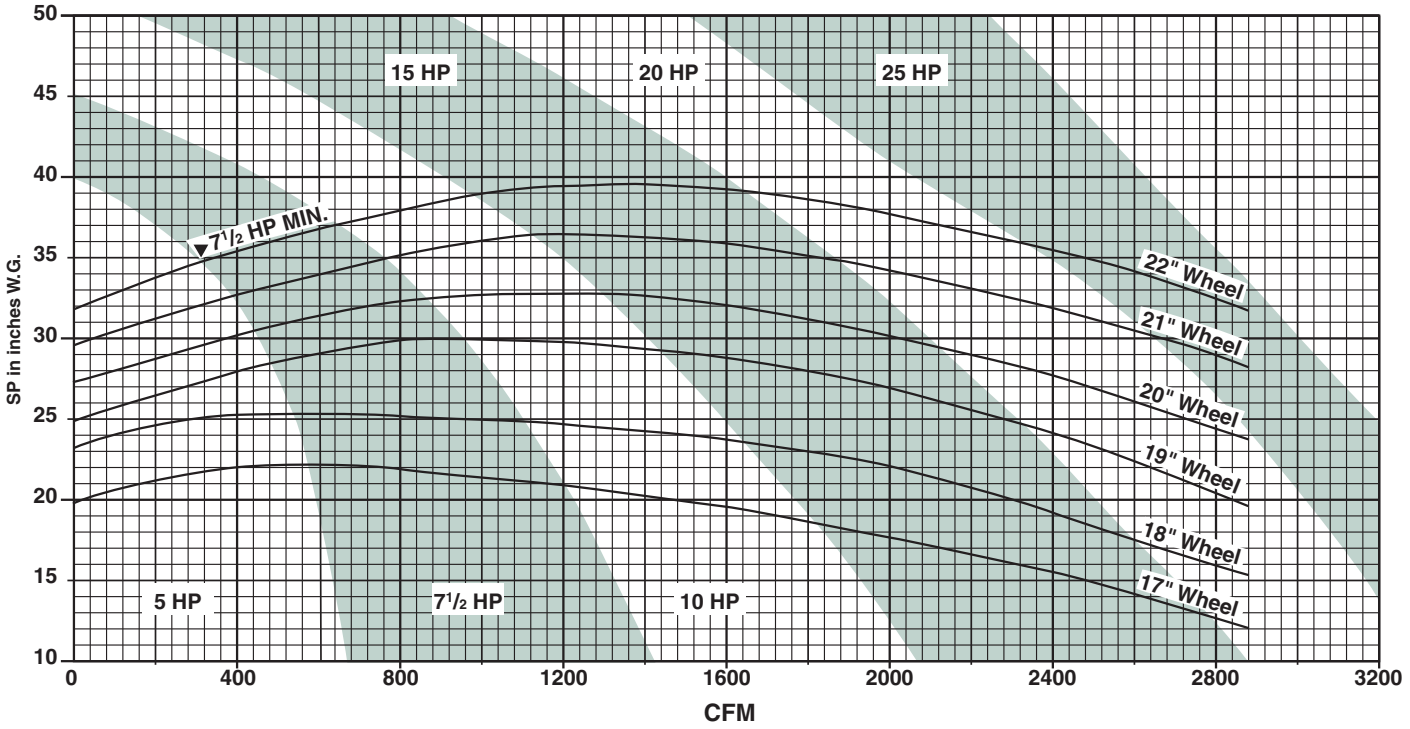


DIRECT DRIVE RATINGS @ 3500 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

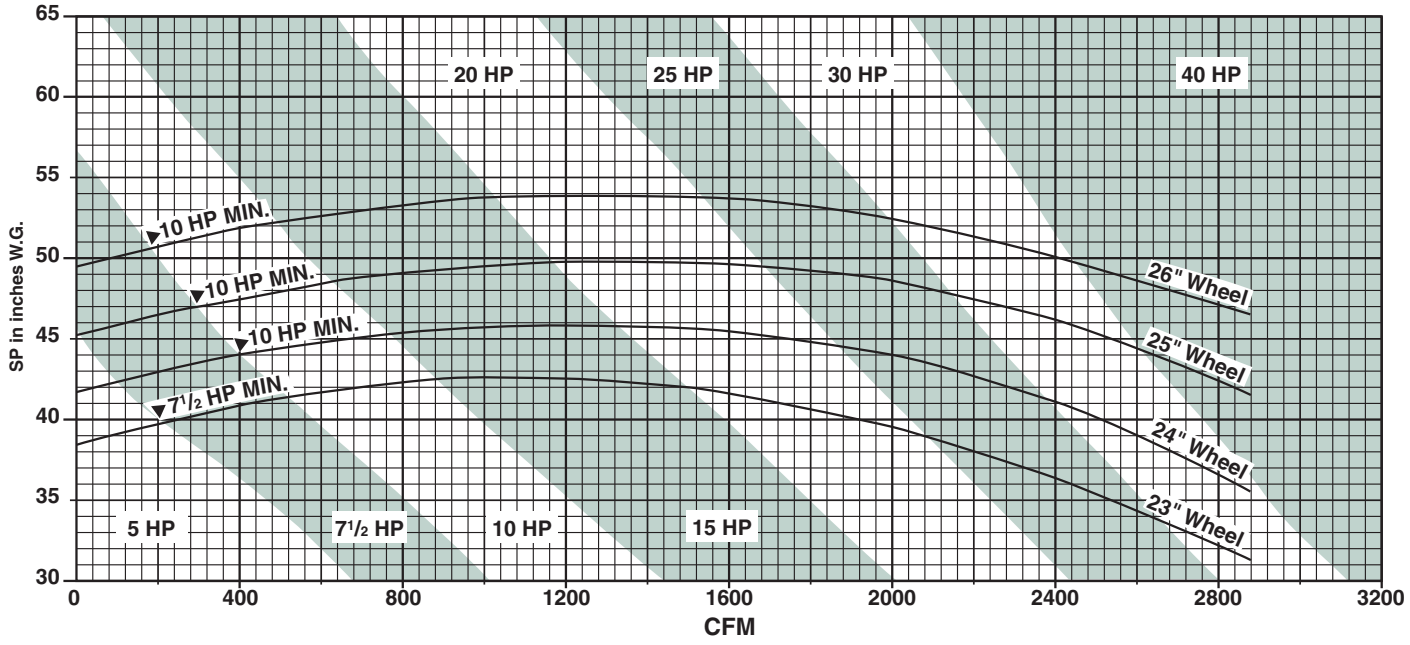
Model HP-8D

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-8E

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.

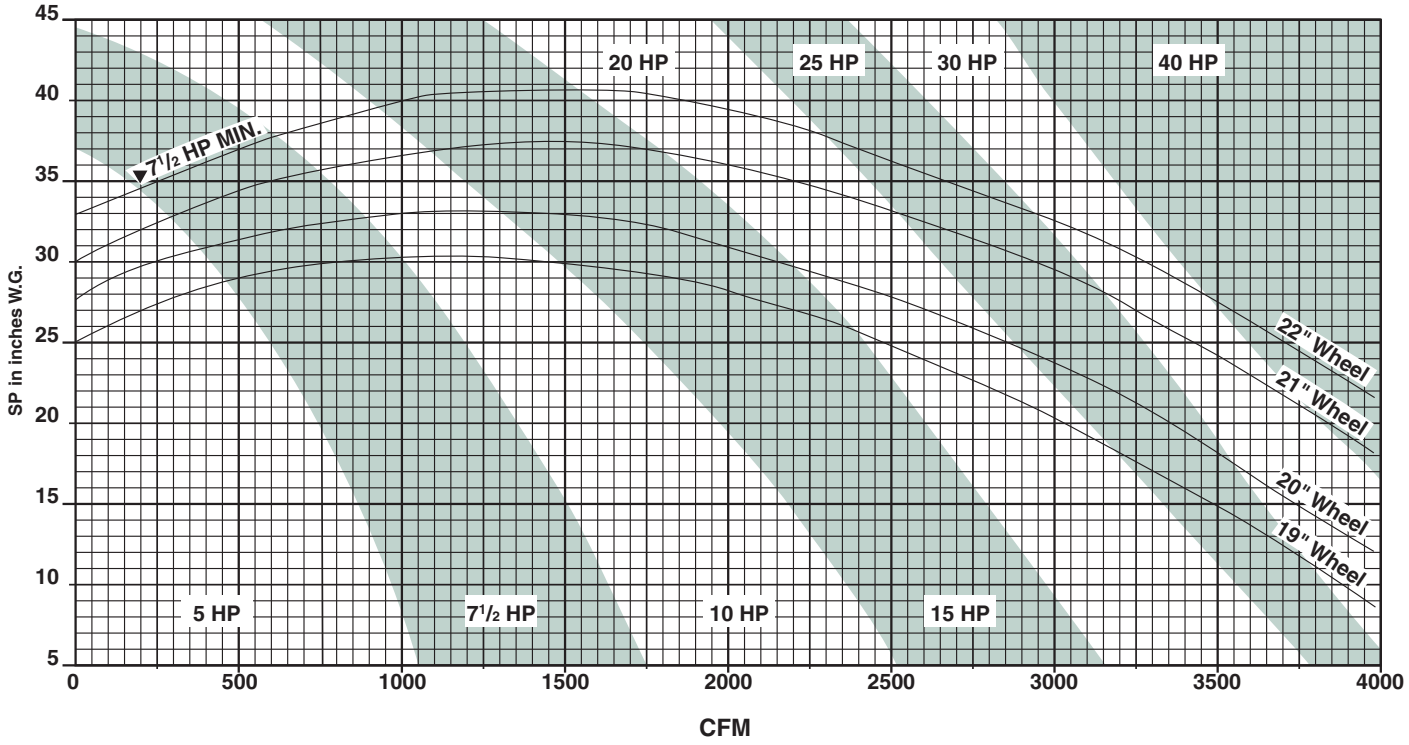


DIRECT DRIVE RATINGS @ 3550 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

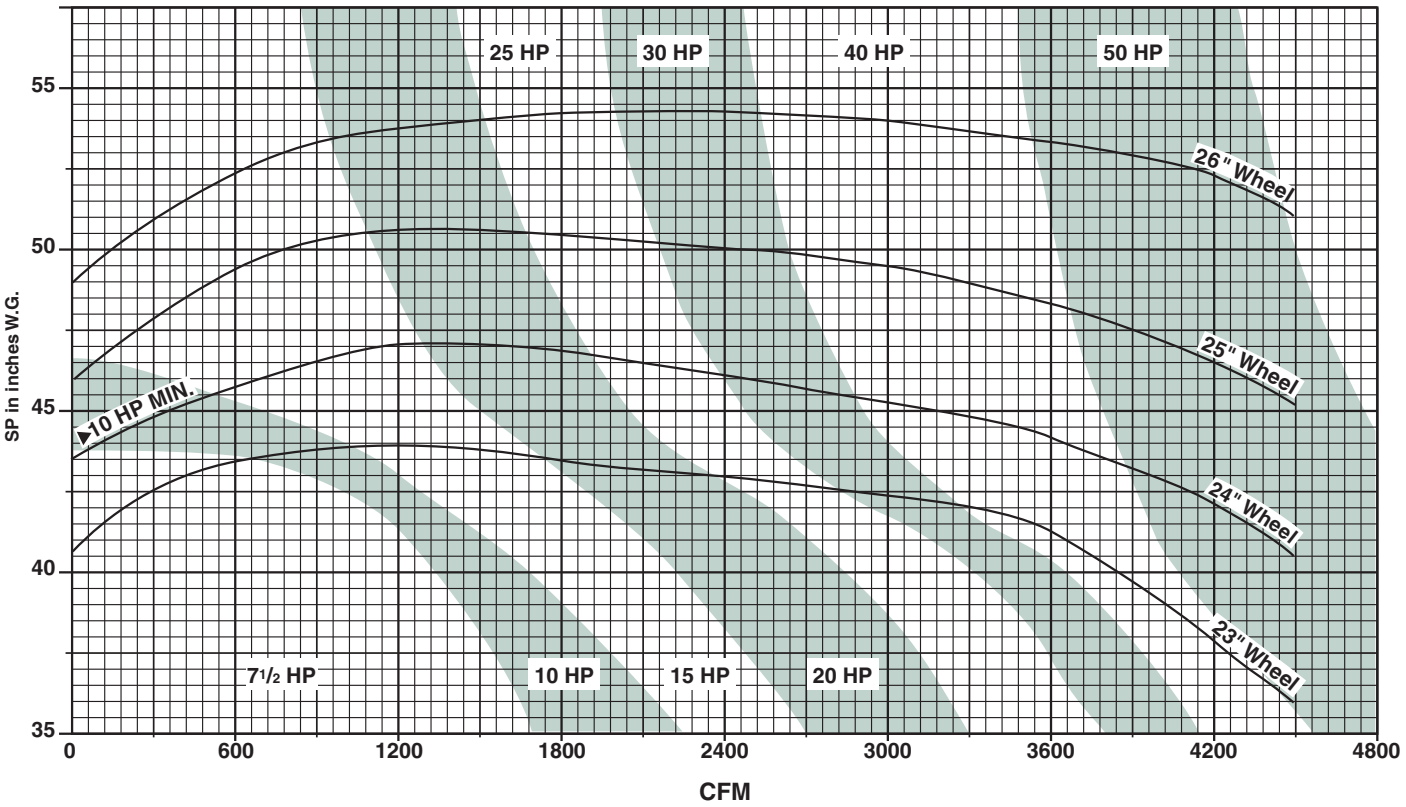
Model HP-10D

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-10F

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.

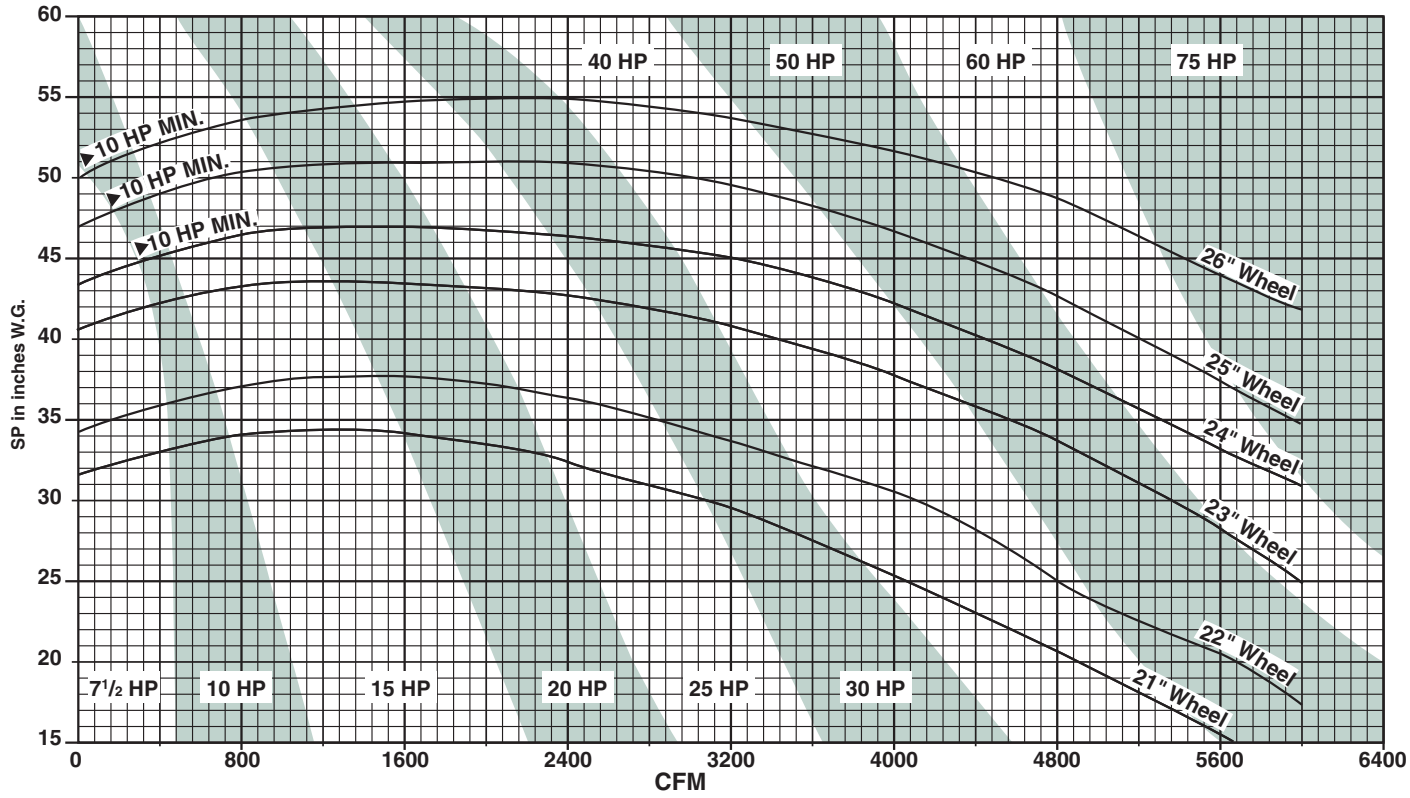


DIRECT DRIVE RATINGS @ 3550 RPM

CFM and BHP at Static Pressure Shown • Ratings at 70°F., .075 Density, Sea Level

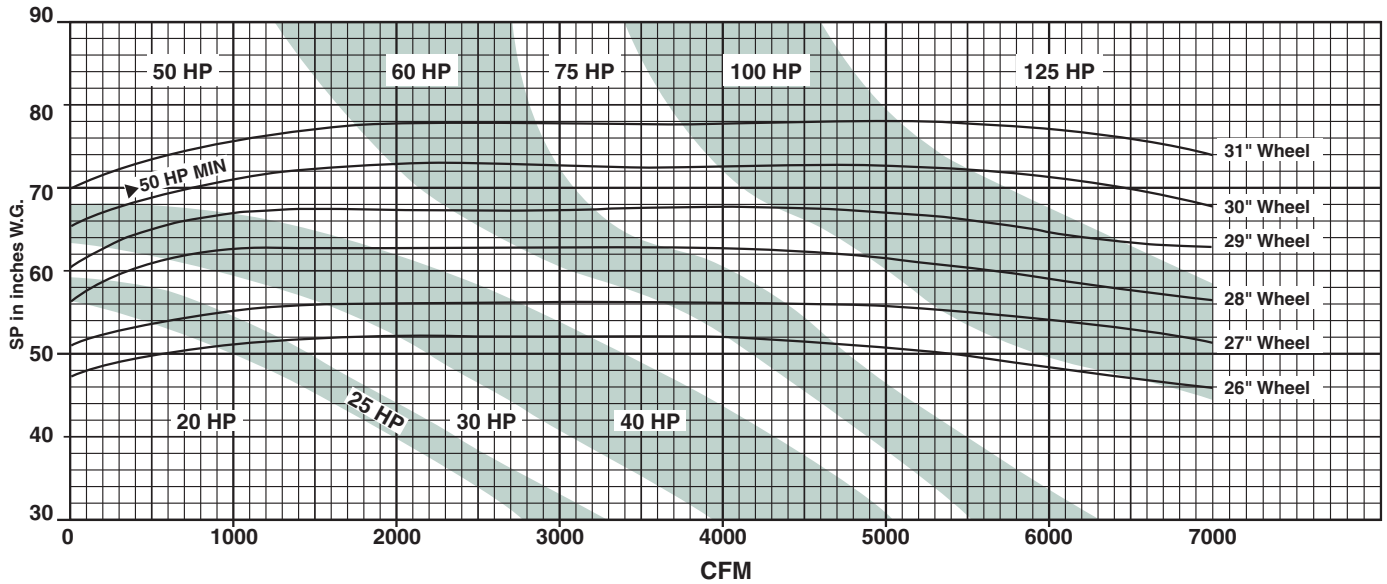
Model HP-12F

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



Model HP-12G

BHP values are shown. Note "▶" is minimum HP motor needed for required starting torque (WR^2) for steel wheels. See page 14.



DESIGN SPECIFICATIONS

HP STEEL WHEEL WR² VALUES AND MINIMUM MOTOR HORSEPOWER

Model	WR²(lb.-FT.²)	Min. HP*
HP-4A14	3.4	1 1/2
HP-4A15	4.4	1 1/2
HP-4A16	5.7	1 1/2
HP-4A17	7.2	3
HP-4A18	9.0	3
HP-4C17	7.2	3
HP-4C18	9.0	3
HP-4C19	11.0	5
HP-4C20	13.5	5
HP-4C21	16.2	5
HP-4C22	19.4	5
HP-6B14	3.5	2
HP-6B15	4.6	3
HP-6B16	6.0	3
HP-6B17	7.6	3
HP-6B18	9.6	3
HP-6C19	11.0	5
HP-6C20	13.5	5
HP-6C21	16.2	5
HP-6C22	19.4	5
HP-6E21	19.1	5
HP-6E22	22.2	7 1/2
HP-6E23	23.8	7 1/2
HP-6E24	28.1	10
HP-6E25	32.9	10
HP-6E26	38.3	10
HP-8B15	4.6	3
HP-8B16	6.0	3
HP-8B17	7.6	5
HP-8B18	9.6	5

Model	WR²(lb.-FT.²)	Min. HP*
HP-8D17	7.6	5
HP-8D18	9.6	5
HP-8D19	11.9	5
HP-8D20	14.5	5
HP-8D21	17.6	5
HP-8D22	21.0	7 1/2
HP-8E23	23.8	7 1/2
HP-8E24	28.0	10
HP-8E25	32.9	10
HP-8E26	38.3	10
HP-10D19	11.9	5
HP-10D20	14.5	5
HP-10D21	17.6	5
HP-10D22	21.1	7 1/2
HP-10F23	26.7	7 1/2
HP-10F24	31.5	10
HP-10F25	36.8	10
HP-10F26	42.7	15
HP-12F21	19.0	5
HP-12F22	23.0	7 1/2
HP-12F23	26.7	7 1/2
HP-12F24	31.5	10
HP-12F25	36.8	10
HP-12F26	42.7	15
HP-12G26	72.0	20
HP-12G27	83.0	20
HP-12G28	95.0	20
HP-12G29	108.0	25
HP-12G30	123.0	50
HP-12G31	138.0	50

***Min. HP:** This is the suggested minimum motor horsepower for Arrangement 4 fans with a nominal 3500 RPM motor speed. In a few situations motors suitable for the fan *operating point* BHP may not have sufficient torque to start the fan as *quickly* as desired. Therefore, use a motor horsepower at least as large as those listed in the tables to the left. The suggested motor horsepower values are based on typical Baldor three phase motors. Motor starting torques from other vendors will vary. These tables do not apply to Arrangement 4 fans with 1750 RPM and 2850 RPM motors, and any belt driven fans. A smaller horsepower motor may be acceptable for some of these applications.

DIMENSIONS and SPECIFICATIONS

NOTE: The table below contains blower housing dimensions common to all arrangements on pages 15, 17 and 18.

DIMENSIONS IN INCHES ± 1/8" DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

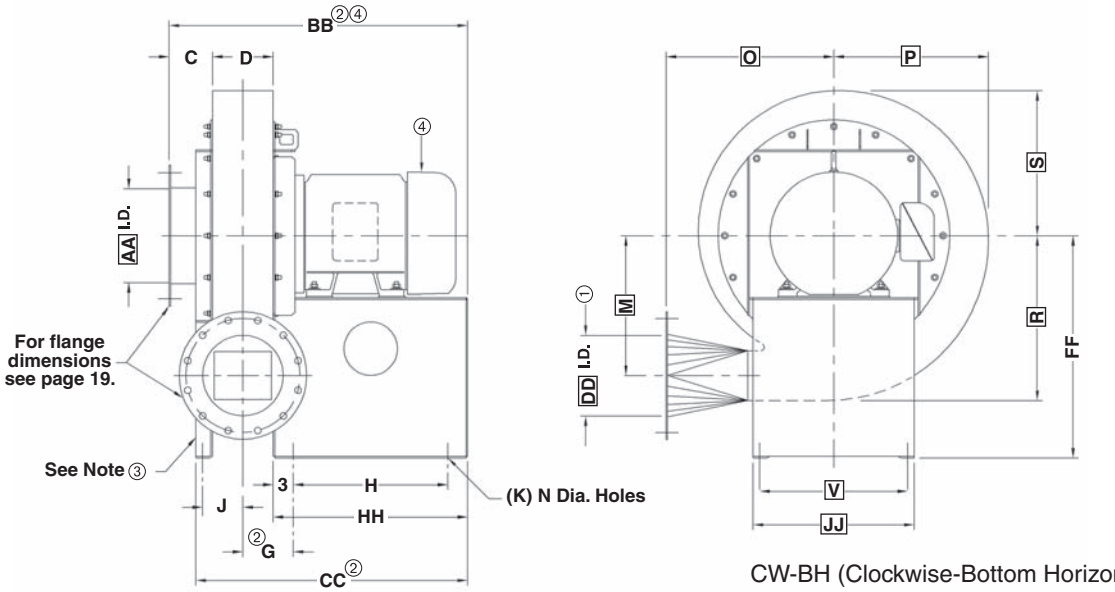
MODEL*	D	M	O	P	R	S	AA	DD①
HP-4A	4	11 3/4	18	13 9/16	14 3/8	12 3/4	6	4
HP-4C	4	14 13/16	17 7/8	16 7/16	17 7/16	15 7/16	6	4
HP-6B	6 3/8	11 3/4	18	13 9/16	14 3/8	12 3/4	8	6
HP-6C	4	14 13/16	17 7/8	16 7/16	17 7/16	15 7/16	6	6
HP-6E	5 3/8	17 7/16	19 1/8	19 3/8	20 9/16	18 3/16	8	6
HP-8B	6 3/8	11 3/4	19 13/16	13 9/16	14 3/8	12 3/4	8	8
HP-8D	6 3/8	14 13/16	19 3/4	16 7/16	17 7/16	15 7/16	8	8
HP-8E	5 3/8	17 7/16	21	19 3/8	20 9/16	18 3/16	8	8
HP-10D	6 3/8	14 13/16	21 3/4	16 7/16	17 7/16	15 7/16	8	10
HP-10F	7 3/8	17 7/16	23	19 3/8	20 9/16	18 3/16	10	10
HP-12F	7 3/8	17 7/16	23	19 3/8	20 9/16	18 3/16	10	12
HP-12G	9	20 3/4	24 15/16	23 1/16	24 7/16	21 5/8	14	12

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

① Discharge flange not available with downblast discharge on models HP-8B, HP-10D, HP-12F and HP-12G.

DIMENSIONS and SPECIFICATIONS

Arrangement #4, Direct Drive



CW-BH (Clockwise-Bottom Horizontal Shown)

Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES ± 1/8" DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	C	② G	H	③ J	K	N	V	②④ BB	②④ CC	FF	HH	JJ
HP-4A	143T-184T	4 1/2	5	6 3/4	—	9/16	4	14 3/4	21 1/4	—	21	12 3/4	16 3/4
HP-4C	143T-215T	4 1/2	5	9	—	9/16	4	17	23 1/2	—	25	15	19
	254T-256T			14					28 1/2			20	
HP-6B	143T-184T	4 1/2	6 3/16	6 3/4	—	9/16	4	14 3/4	23 5/8	—	21	12 3/4	16 3/4
	213T-215T			12 1/2					29 5/8			18 1/2	
HP-6C	143T-215T	4 1/2	5	9	—	9/16	4	17	23 1/2	—	25	15	19
	254T-256T			14					28 1/2			20	
HP-6E	184T-256T	4 1/2	5 11/16	13	—	9/16	4	19	28 7/8	—	29	19	21
HP-8B	143T- 184T	4 1/2	6 3/16	6 3/4	—	9/16	4	14 3/4	23 5/8	—	21	12 3/4	16 3/4
	213T-256T			12 1/2					29 3/8			18 1/2	
HP-8D	182T-215T	4 1/2	6 3/16	9	—	9/16	4	17	25 7/8	—	25	15	19
	254T-286TS			14					30 7/8			20	
HP-8E	184T-256T	4 1/2	5 11/16	13	—	9/16	4	19	28 7/8	—	29	19	21
	284TS-286TS			15 1/2					31 3/8			21 1/2	
HP-10D	184T-215T	4 1/2	6 3/16	9	—	9/16	4	17	25 7/8	—	25	15	19
	254T-286TS			14					30 7/8			20	
HP-10F	215T-256T	4 1/2	6 11/16	13	—	9/16	4	19	30 7/8	—	29	19	21
	284TS-326TS			15 1/2					33 3/8			21 1/2	
	364TS-365TS			22					39 7/8			28	
HP-12F	184T-256T	4 1/2	6 11/16	13	—	9/16	4	19	30 7/8	—	29	19	21
	284TS-326TS			15 1/2					33 3/8			21 1/2	
	364TS-365TS			22					39 7/8			28	
HP-12G	254T-256T	6 1/2	7 1/2	13	6	3/4	6	22	34 1/2	30 1/2	33	19	24
	284T-326T			21					42 1/2	38 1/2		27	
	364T-365T			23					44 1/2	40 1/2		29	
	404T-405T			26					47 1/2	43 1/2		32	
	444TS			30					51 1/2	47 1/2		36	

* COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER. Fan housings are reversible and rotatable in 45° increments.

① Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.

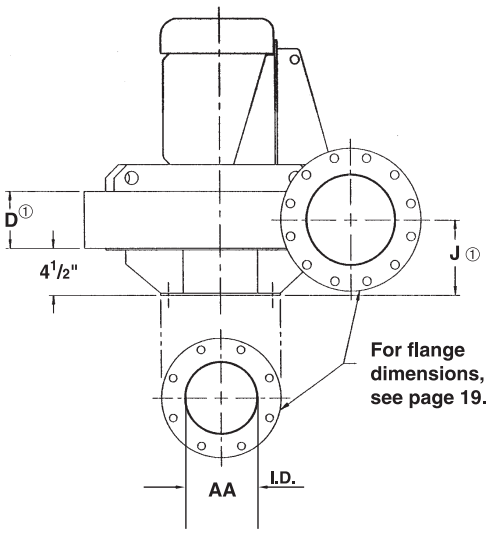
② For AMCA Type "C" spark resistant construction, add 1/8 inch to dimensions "G", "BB" and "CC".

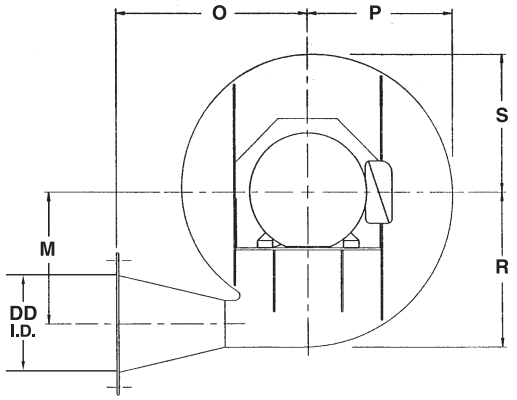
③ Inlet side support plate is only included on model HP-12G.

④ On some models, motor may extend past end of motor base.

DIMENSIONS and SPECIFICATIONS

Arrangement #4HM, Direct Connected





CW-BH (Clockwise-Bottom Horizontal Shown)

DIMENSIONS IN INCHES ± 1/8"

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	① D	① J	M	O	P	R	S	AA	DD
HP-4A	143T-184T	4	6 1/2	11 3/4	18	13 9/16	14 3/8	12 3/4	6	4
HP-4C	143T-256T	4	6 1/2	14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	6	4
HP-6B	143T-215T	6 3/8	7 11/16	11 3/4	18	13 9/16	14 3/8	12 3/4	8	6
HP-6C	143-256T	4	6 1/2	14 13/16	17 15/16	16 7/16	17 7/16	15 7/16	6	6
HP-6E	184T-256T	5 3/8	7 3/16	17 7/16	19 3/16	19 3/8	20 9/16	18 3/16	8	6
HP-8B	143T-254T	6 3/8	7 11/16	11 3/4	19 13/16	13 9/16	14 3/8	12 3/4	8	8
HP-8D	182T-286TS	6 3/8	7 11/16	14 13/16	19 3/4	16 7/16	17 7/16	15 7/16	8	8
HP-8E	213T-286TS	5 3/8	7 3/16	17 7/16	21	19 3/8	20 9/16	18 3/16	8	8
HP-10D	184T-286TS	6 3/8	7 11/16	14 13/16	21 3/4	16 7/16	17 7/16	15 7/16	8	10
HP-10F	215T-326TS	7 3/8	8 3/16	17 7/16	23	19 3/8	20 9/16	18 3/16	10	10
HP-12F	184T-326TS	7 3/8	8 3/16	17 7/16	23	19 3/8	20 9/16	18 3/16	10	12

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

① For AMCA "C", add: 1/8 inch to dimension "J" and 1/4 inch to dimension "D".

FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.

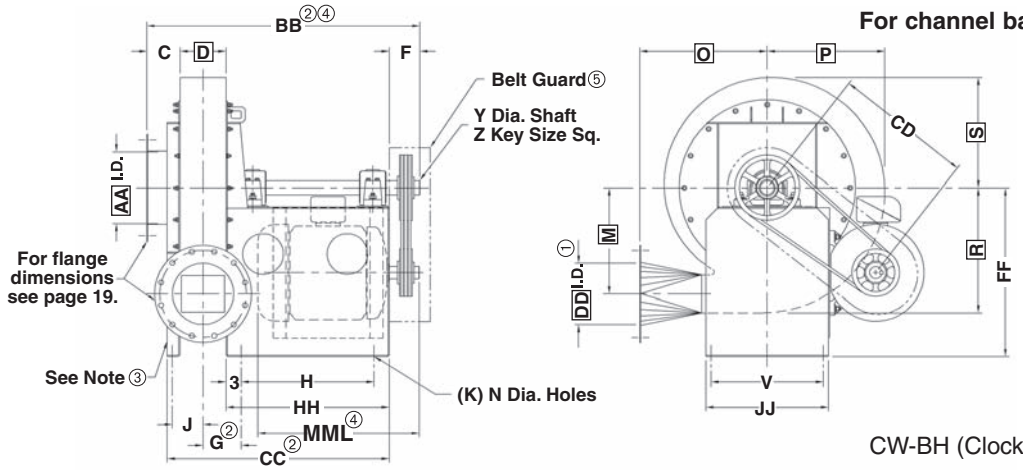
CONSTRUCTION GAUGES

MODEL	Inlet			Outlet Flange	Housing			Wheel			All Bases
	Side Plate	Inlet Collar	Inlet Flange		Side Plates	Scroll	Transition	Back Plate	Shroud	Blades	
HP-4A & HP-4C	7	10	10	10	7	10	14	7	7	10	7
HP-6B & HP-6E	7	10	7	10	7	10	14	7	7	10	7
HP-6C	7	10	10	10	7	10	14	7	7	10	7
HP-6E	7	10	7	10	7	10	14	7	7	10	7
HP-8B through HP-12F	7	10	7	10	7	10	14	7	7	10	7
HP-12G	1/4"	10	7	7	1/4"	10	14	1/4"	1/4"	10	7

DIMENSIONS and SPECIFICATIONS

Arrangement #1 and #9, Belt Drive (specify 9R or 9L)

For channel base dimensions, see page 18.



Unit shown is Arrangement 9R (motor on right side.) For motor on left side, specify Arrangement 9L.

CW-BH (Clockwise-Bottom Horizontal Shown)

Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES ± 1/8"

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	C	F	② G	H	②③ J	K	N	V	Y	Z	② BB	② CC	FF	HH	JJ	④ MML
HP-4A	143T-215T	4 1/2	4	5	12 13/16	—	4	9/16	14 3/4	1 7/16	3/8	31 5/16	—	21	18 13/16	16 3/4	21 1/2
HP-4C	143T-256T	4 1/2	5	5	17 1/16	—	4	9/16	17	1 7/16	3/8	36 9/16	—	25	23 1/16	19	26 1/4
HP-6B	143T-215T	4 1/2	4	6 3/16	12 13/16	—	4	9/16	14 3/4	1 7/16	3/8	33 11/16	—	21	18 13/16	16 3/4	21 1/2
HP-6C	143T-256T	4 1/2	5	5	17 1/16	—	4	9/16	17	1 11/16	3/8	36 9/16	—	25	23 1/16	19	26 1/4
HP-6E	184T-286T	4 1/2	5	5 11/16	21	—	4	9/16	19	1 15/16	1/2	41 7/8	—	29	27	21	30 1/4
HP-8B	143T-215T	4 1/2	4	6 3/16	12 13/16	—	4	9/16	14 3/4	1 7/16	3/8	33 11/16	—	21	18 13/16	16 3/4	21 1/2
	254T-256T		5		17 1/16					1 11/16	3/8	38 15/16			23 1/16		26 1/4
HP-8D	184T-256T	4 1/2	5	6 3/16	17 1/16	—	4	9/16	17	1 11/16	3/8	38 15/16	—	25	23 1/16	19	26 1/4
HP-8E	182T- 286T	4 1/2	5	5 11/16	21	—	4	9/16	19	1 15/16	1/2	41 7/8	—	29	27	21	30 1/4
HP-10D	184T-256T	4 1/2	5	6 3/16	17 1/16	—	4	9/16	17	1 11/16	3/8	38 15/16	—	25	23 1/16	19	26 1/4
HP-10F	215T-324T	4 1/2	6	6 11/16	21	—	4	9/16	19	2 3/16	1/2	44 7/8	—	29	27	21	30 1/4
HP-12F	215T-324T	4 1/2	6	6 11/16	21	—	4	9/16	19	2 3/16	1/2	44 7/8	—	29	27	21	30 1/4
HP-12G	213T-365T	6 1/2	6	7 1/2	26	6	6	3/4	22	2 11/16	5/8	53 1/2	43 1/2	33	32	24	32 1/8

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

FAN HOUSINGS ARE REVERSIBLE AND ROTATABLE IN 45° INCREMENTS.

① Discharge flange not available with Downblast (DB) discharge position on models HP-8B, HP-10D, HP-12F and HP-12G.

② For "AMCA Type "C" spark resistant construction, add 1/8 inch to dimensions "G", "BB" and "CC".

③ Inlet side support plate is only included on model HP-12G.

④ "MML" is the Maximum Motor Length (for maximum motor frame size listed) on customer supplied motor. Motor manufacturers "C" dimension cannot exceed "MML" without a special base.

⑤ Belt guard is standard on Arrangement 9 blowers. Arrangement 1 blowers do not include motor, motor slide base, belt guard, sheaves or belts.

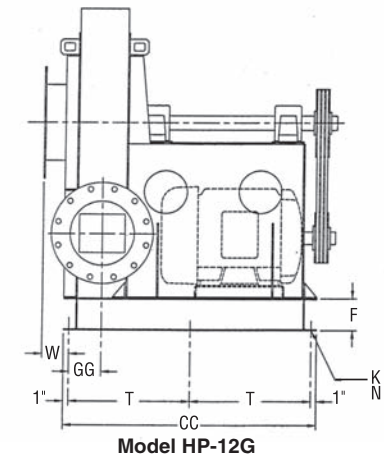
C.D. BELT CENTER DISTANCE

DIMENSIONS IN INCHES

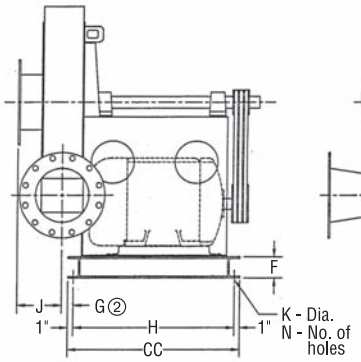
MODEL	MOTOR FRAME SIZE													
	143T-145T		182T-184T		213T-215T		254T-256T		284T-286T		324T-326T		364T-365T	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
HP-4A & HP-6B	12 5/8	14 1/16	14 3/8	15 7/8	15 11/16	17 3/8	—	—	—	—	—	—	—	—
HP-4C & HP-6C	13 11/16	15	15 7/16	16 7/8	16 3/4	18 7/16	18 7/8	20 3/4	—	—	—	—	—	—
HP-6E & HP-8E	—	—	15	16 1/2	16 3/8	18 3/8	18	20 7/16	18 15/16	21 15/16	—	—	—	—
HP-8B	12 5/8	14 1/16	14 3/8	15 7/8	15 11/16	17 1/2	17 3/8	19 1/4	—	—	—	—	—	—
HP-8D & HP-10D	—	—	15 7/16	16 7/8	16 3/4	18 7/16	18 7/8	20 3/4	—	—	—	—	—	—
HP-10F & HP-12F	—	—	—	—	16 3/8	18 3/8	18	20 7/16	18 15/16	21 15/16	19 5/8	23 1/4	—	—
HP-12G	—	—	—	—	19 3/4	21	21 1/2	23	22 1/2	24 3/8	24 3/8	26 3/4	25 3/4	27 1/2

DIMENSIONS and SPECIFICATIONS

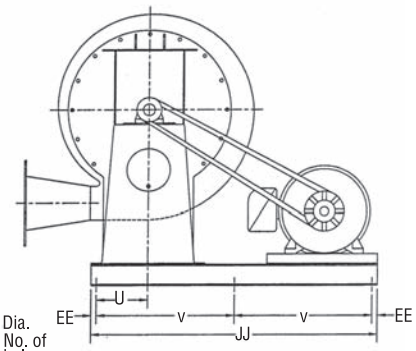
Arrangement #9RCB or #9LCB Channel Base, Belt Drive



Model HP-12G



Models HP-4A thru HP-12F



All Models
Clockwise Bottom Horizontal Discharge and arrangement 9RCB shown.

Note: For common boxed blower housing dimensions, see bottom of Page 14.

DIMENSIONS IN INCHES ± 1/8"

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL*	MOTOR FRAME	F	② G	H	J	K	N	T	U	V	W	CC	EE	GG	JJ
HP-4A	182T - 215T	4	3	16 13/16	6 1/2	9/16	6	--	7 3/8	21 1/2	—	18 13/16	1	—	45
HP-4C	182T - 256T	4	3	21 1/16	6 1/2	9/16	6	—	8 1/2	22 1/2	—	23 1/16	1	—	47
HP-6B	182T - 215T	4	4 3/16	16 13/16	7 11/16	9/16	6	—	7 3/8	21 1/2	—	18 13/16	1	—	45
HP-6C	213T - 256T	4	3	21 1/16	6 1/2	9/16	6	—	8 1/2	22 1/2	—	23 1/16	1	—	47
HP-6E	213T - 286T	4	1 3/16	30	7 3/16	9/16	6	—	9 1/2	25 1/2	—	32	1	—	53
HP-8B	213T - 256T	4	4 3/16	21 1/16	7 11/16	9/16	6	—	7 3/8	21 1/2	—	23 1/16	1	—	45
HP-8D	213T - 286T	4	4 3/16	21 1/16	7 11/16	9/16	6	—	8 1/2	22 1/2	—	23 1/16	1	—	47
HP-8E	213T - 326T	4	1 3/16	30	7 3/16	9/16	6	—	9 1/2	25 1/2	—	32	1	—	53
HP-10D	213T - 326T	4	4 3/16	21 1/16	7 11/16	9/16	6	—	8 1/2	22 1/2	—	23 1/16	1	—	47
HP-10F	213T - 364T	4	2 3/16	30	8 3/16	9/16	6	—	9 1/2	25 1/2	—	32	1	—	53
HP-12F	213T - 364T	4	2 3/16	30	8 3/16	9/16	6	—	9 1/2	25 1/2	—	32	1	—	53
HP-12G	284T- 444T	6	—	—	—	3/4	8	22 1/2	7	28 3/16	5	47	5	6	66 3/8

② For AMCA "C", add: 1/8 inch to dimensions "G".

*COMPLETE MODEL NUMBER INCLUDES WHEEL DIAMETER.

16 DISCHARGE POSITIONS AVAILABLE. 45° DISCHARGE POSITIONS NOT SHOWN.
Discharges shown are determined by viewing fan from motor or drive side.

CW-TH

Clockwise Top Horizontal Discharge ★

CW-DB

Clockwise Down-Blast Discharge

CW-BH

Clockwise Bottom Horizontal Discharge

CW-UB

Clockwise Up-Blast Discharge

CCW-TH

Counter-Clockwise Top Horizontal Discharge

CCW-DB

Counter-Clockwise Down-Blast Discharge ★

CCW-BH

Counter-Clockwise Bottom Horizontal Discharge

CCW-UB

Counter-Clock-wise Up-Blast Discharge

★ Discharge flange not available with downblast discharge on models HP-8B, HP-10D, HP-12F and HP-12G.

⚠ DANGER

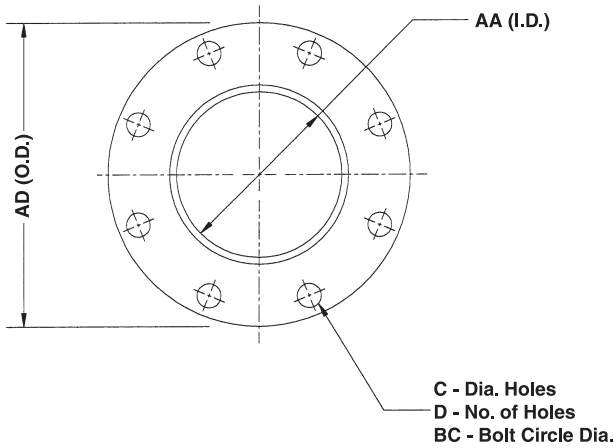
All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected or locked out from its power source.

Read operating instructions.

DIMENSIONS and SPECIFICATIONS

INLET AND DISCHARGE FLANGES

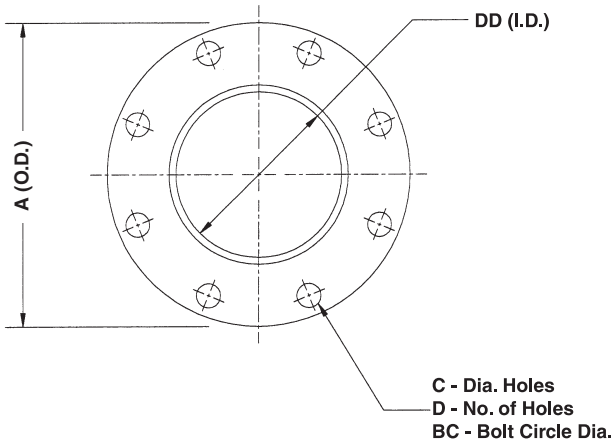
INLET FLANGE



DIMENSIONS IN INCHES ± 1/8"

MODEL	AA I.D.	AD O.D.	BC B.C.	C Dia.	D
HP-4A, 4C and 6C	6	11	9 1/2	7/8	8
HP-6B, 6E, 8B, 8D, 8E and 10D	8	13 1/2	11 3/4	7/8	8
HP-10F and 12F	10	16	14 1/4	1	12
HP-12G	14	21	18 3/4	1 1/8	12

DISCHARGE FLANGE ★



DIMENSIONS IN INCHES ± 1/8"

MODEL	DD I.D.	A O.D.	BD B.C.	C Dia.	D
HP-4A and 4C	4	9	7 1/2	3/4	8
HP-6B, 6C and 6E	6	11	9 1/2	7/8	8
HP-8B, 8D and 8E★	8	13 1/2	11 3/4	7/8	8
HP-10D and 10F★	10	16	14 1/4	1	12
HP-12F and 12G★	12	19	17	1	12

★See note under discharge positions available on page 18

All dimensions except flange thickness meet ANSI-125 lb. and ASA-150 lb. specifications. Standard orientation is holes straddling major center lines. Holes may be specified to be on center lines at no additional cost.

APPROXIMATE SHIPPING WEIGHTS LESS MOTOR

MODEL	MOTOR FRAME	Fan Arrangement			
		4	8	1 & 9	9CB
HP-4A	143T - 184T	190	265	—	—
	143T - 215T	—	—	220	—
	182T - 213T	—	—	—	315
HP-4C	143T - 215T	250	335	—	—
	254T	260	350	—	—
	143T - 256T	—	—	280	—
	182T - 254T	—	—	—	380
HP-6B	143T - 184T	210	285	—	—
	213T - 215T	240	315	—	—
	143T - 215T	—	—	270	—
	182T - 215T	—	—	—	365
HP-6C	143T - 215T	270	355	—	—
	254T	300	385	—	—
	143T - 256T	—	—	310	—
	213T - 256T	—	—	—	410
HP-6E	184T - 256T	350	445	—	—
	184T - 286T	—	—	400	—
	213T - 286T	—	—	—	510
HP-8B	143T - 184T	215	—	—	—
	213T - 254T	245	—	—	—
	143T - 215T	—	290	275	—
	254T - 256T	—	320	300	—
	213T - 256T	—	—	—	395
HP-8D	182T - 215T	280	365	—	—
	254T - 286TS	300	—	—	—
	254T - 256T	—	385	—	—
	184T - 256T	—	—	340	—
	213T - 286T	—	—	—	440

MODEL	MOTOR FRAME	Fan Arrangement			
		4	8	1 & 9	9CB
HP-8E	213T - 256T	360	455	—	—
	284T - 324T	380	—	—	—
	284TS - 326TS	—	475	—	—
	182T - 286T	—	—	430	—
	213T - 326T	—	—	—	540
HP-10D	184T - 215T	290	375	—	—
	184T - 256T	—	—	350	—
	254T - 286TS	310	395	370	—
	213T - 326T	—	—	—	470
HP-10F	215T - 256T	380	475	—	—
	284TS - 326TS	395	490	—	—
	215T - 324T	—	—	445	—
	213T - 364T	—	—	—	565
HP-12F	184T - 256T	380	—	—	—
	215T - 256T	—	475	—	—
	284TS - 364TS	400	495	—	—
	215T - 324T	—	—	465	—
	213T - 364T	—	—	—	595
HP-12G	254T - 256T	712	—	—	—
	284T - 326T	766	—	—	—
	364T - 365T	787	—	—	—
	404T - 405T	802	—	—	—
	444TS	856	—	—	—
	213T - 365T	—	—	1080	—
	284T - 444T	—	—	—	1400

Appendix C

TOT2201
1057 Atlantic Ave.
Brooklyn, NY 11238

SUB-SLAB DEPRESSURIZATION SYSTEM

TOT2201 - 1057 Atlantic Avenue Brooklyn, NY 11238

Contaminant	CAS #	Mol Weight (g)	Soil Vapor Sampling Results (ug/m^3)	Emission Rates				DAR-1 Guideline Concentrations			
				Active (AERSCREEN Input)		Est. Ambient Air Conc. (µg/m^3) Short-term[2]	Est. Ambient Air Conc. (µg/m^3) Annual[2]	SGC (µg/m^3)[3]	AGC (µg/m^3)[3]		
				lbs/hour[1]	lbs/year	Active System				Above air permitting thresholds?	g/s (for AERSCREEN data entry)
Tetrachloroethene	127-18-4	165.8	42200.00	6.436E-02	563.79	2.63E+00	2.63E-01	**300**	**3.80E+00**	**NO**	0.0081164
Trichloroethene	79-01-6	131.38	30511.45	4.653E-02	407.63	1.90E+00	1.90E-01	**20**	**2.10E-01**	**NO**	0.0058683
TOTAL VOC/HAP					**971.42**						

[1]Air Flow Rate (cfm): 400 Based on Cincinnati Fan Model HP-8B18 - 240V, Direct Drive Arrangement 4 (Rated at 1,000 cfm / running at 400 cfm in conjunction with VFD).

[2]Estimated short-term (1-hr) and annual emission concentration calculated with AERSCREEN Screening Software.

[3]SCG/ACG - NYSDEC Division of Air Resources **Short-term Guideline Concentration/Annual Guideline Concentration**

Note: The contaminants of interest emission rates were run through AERSCREEN software for ambient air concentration values. Since they are well within NYSDEC Ambient Air Guidance Values, it is implied that the remaining contaiminants also fall with permitted guidelines.

SAMPLE ID	TCE SAMPLE RESULT ug/m^3
SV011	6030
SV012	1750
SV013	15300
SV014	13100
SV015	194000
SV016	99900
SV017	2390
SV018	2090
SS008	508
SS012	269
SS013	289
AVERAGE	**30511.45**

TCE trichlorethylene
PCE Tetrachlorethylene

1 lb mole of ideal gas occupies 385.4 ft3 (rounded to 385)
8.3144 = Ideal Gas Constant

Values in Shaded area:	8/19/21 sample
Values in Shaded area:	8/15/22 sample combined

Hrly processing rate 24000 cfh
Annual processing rate 210,240,000 cfy

$$ppbV = \frac{\mu g}{m^3} \times \frac{l}{Molecular\ Weight_{contaminant}\ [g/mole]} \times 8.3144 \left[\frac{L \cdot kPa}{mol \cdot K}\right] \times T_{air}[K] \times \frac{1}{P_{air}[kPa]}$$

AERSCREEN 21112 / AERMOD 21112 05/30/23
17:08:01

TITLE: TRICHLOROETHENE

********** POINTCAP PARAMETERS **********

SOURCE EMISSION RATE:	0.587E-02	g/s	0.466E-01 lb/hr
STACK HEIGHT:	62.48	meters	205.00 feet
STACK INNER DIAMETER:	0.203	meters	8.00 inches
PLUME EXIT TEMPERATURE:	Ambient		
PLUME EXIT VELOCITY:	5.815	m/s	19.08 ft/s
STACK AIR FLOW RATE:	400	ACFM	
RURAL OR URBAN:	URBAN		
POPULATION:	200000		
INITIAL PROBE DISTANCE =	1000.	meters	3281. feet

********** BUILDING DOWNWASH PARAMETERS **********

BUILDING HEIGHT:	62.5	meters	205.0 feet
MAX BUILDING DIMENSION:	83.8	meters	275.0 feet
MIN BUILDING DIMENSION:	182.9	meters	600.0 feet
BUILDING ORIENTATION TO NORTH:	22.	degrees	
STACK DIRECTION FROM CENTER:	320.	degrees	
STACK DISTANCE FROM CENTER:	64.0	meters	210.0 feet

********** FLOW SECTOR ANALYSIS **********
25 meter receptor spacing: 1. meters - 1000. meters

FLOW SECTOR	BUILD WIDTH	BUILD LENGTH	XBADJ	YBADJ	MAX 1-HR CONC	DIST (m)	TEMPORAL PERIOD
10	196.32	120.02	-101.15	-49.03	1.074	175.0	SPR
20	185.70	90.15	-77.08	-55.43	1.113	175.0	SPR
30	192.77	108.46	-76.12	-60.15	0.9944	50.0	WIN
40	199.84	136.24	-79.23	-63.04	1.124	200.0	AUT

50	200.83	159.87	-79.94	-64.01	0.9563	225.0	AUT
60	195.72	178.65	-78.21	-63.04	1.085	225.0	SPR
70	184.67	192.00	-74.11	-60.15	0.8437	250.0	SPR
80	168.00	199.52	-67.75	-55.43	0.9588	250.0	SPR
90	146.23	200.97	-59.34	-49.03	1.019	250.0	SPR
100	120.02	196.32	-49.12	-41.15	1.041	150.0	SUM
110	90.15	185.70	-37.42	-32.01	1.391	225.0	SUM
120	108.46	192.77	-36.24	-21.89	1.189	175.0	SPR
130	136.24	199.84	-36.88	-11.12	1.059	175.0	SUM
140	159.87	200.83	-36.41	0.00	0.9539	175.0	SPR
150	178.65	195.72	-34.82	11.12	0.8916	175.0	SPR
160	192.00	184.67	-32.18	21.89	0.8852	175.0	SPR
170	199.52	168.00	-28.57	32.01	0.9216	150.0	AUT
180	200.97	146.23	-24.08	41.15	0.9105	125.0	SUM
190	196.32	120.02	-18.86	49.03	0.8477	125.0	SUM
200	185.70	90.15	-13.07	55.43	0.7680	100.0	WIN
210	192.77	108.46	-32.34	60.15	1.091	225.0	SPR
220	199.84	136.24	-57.00	63.04	1.040	225.0	AUT
230	200.83	159.87	-79.94	64.01	0.9563	225.0	AUT
240	195.72	178.65	-100.44	63.04	1.150	200.0	SPR
250	184.67	192.00	-117.89	60.15	1.066	200.0	SPR
260	168.00	199.52	-131.76	55.43	1.262	175.0	SUM
270	146.23	200.97	-141.63	49.03	1.183	175.0	SUM
280	120.02	196.32	-147.19	41.15	1.431	50.0	SUM
290*	90.15	185.70	-148.28	32.01	1.902	50.0	SUM
300	108.46	192.77	-156.54	21.89	1.714	50.0	WIN
310	136.24	199.84	-162.96	11.12	1.384	50.0	SPR
320	159.87	200.83	-164.43	0.00	1.170	50.0	WIN
330	178.65	195.72	-160.90	-11.12	1.046	50.0	WIN
340	192.00	184.67	-152.48	-21.89	0.9973	50.0	WIN
350	199.52	168.00	-139.44	-32.01	1.015	175.0	AUT
360	200.97	146.23	-122.15	-41.15	1.048	175.0	AUT

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Average Moisture

DOMINANT SEASON: Summer

ALBEDO: 0.16
BOWEN RATIO: 2.00
ROUGHNESS LENGTH: 1.000 (meters)

SURFACE FRICTION VELOCITY (U*) ADJUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	01	04	4	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
3.98	0.112	0.300	0.020	233.	86.	-30.3	1.000	2.00	0.16	0.50

HT	REF TA	HT
10.0	280.0	2.0

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR	MO	DY	JDY	HR
10	01	04	4	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
3.98	0.112	0.300	0.020	233.	86.	-30.3	1.000	2.00	0.16	0.50

HT	REF TA	HT
10.0	280.0	2.0

****

********** AERSCREEN AUTOMATED DISTANCES **********

OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

****

DIST	MAXIMUM 1-HR CONC	DIST	MAXIMUM 1-HR CONC

(m)	(ug/m3)	(m)	(ug/m3)
1.00	1.529	525.00	0.5324
25.00	1.775	550.00	0.5157
50.00	1.902	575.00	0.4997
75.00	1.902	600.00	0.4844
100.00	1.902	625.00	0.4697
125.00	1.630	650.00	0.4556
150.00	1.431	675.00	0.4422
175.00	1.262	700.00	0.4293
200.00	1.251	725.00	0.4173
225.00	1.391	750.00	0.4062
250.00	1.123	775.00	0.3955
275.00	0.9259	800.00	0.3852
300.00	0.7093	825.00	0.3753
325.00	0.6880	850.00	0.3658
350.00	0.6669	875.00	0.3567
375.00	0.6461	900.00	0.3479
400.00	0.6256	925.00	0.3394
425.00	0.6057	950.00	0.3313
450.00	0.5864	975.00	0.3235
475.00	0.5677	1000.00	0.3158
500.00	0.5497		

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	1.902	1.902	1.712	1.141	0.1902

DISTANCE FROM SOURCE 38.00 meters directed toward 290 degrees

IMPACT AT THE AMBIENT BOUNDARY	1.529	1.529	1.376	0.9176	0.1529

DISTANCE FROM SOURCE 1.00 meters directed toward 290 degrees

AERSCREEN 21112 / AERMOD 21112 05/30/23
17:12:06

TITLE: TETRACHLOROETHYLENE

********** POINTCAP PARAMETERS **********

SOURCE EMISSION RATE:	0.812E-02	g/s	0.644E-01 lb/hr
STACK HEIGHT:	62.48	meters	205.00 feet
STACK INNER DIAMETER:	0.203	meters	8.00 inches
PLUME EXIT TEMPERATURE:	Ambient		
PLUME EXIT VELOCITY:	5.815	m/s	19.08 ft/s
STACK AIR FLOW RATE:	400	ACFM	
RURAL OR URBAN:	URBAN		
POPULATION:	200000		
INITIAL PROBE DISTANCE =	1000.	meters	3281. feet

********** BUILDING DOWNWASH PARAMETERS **********

BUILDING HEIGHT:	62.5	meters	205.0 feet
MAX BUILDING DIMENSION:	83.8	meters	275.0 feet
MIN BUILDING DIMENSION:	182.9	meters	600.0 feet
BUILDING ORIENTATION TO NORTH:	22.	degrees	
STACK DIRECTION FROM CENTER:	320.	degrees	
STACK DISTANCE FROM CENTER:	64.0	meters	210.0 feet

********** FLOW SECTOR ANALYSIS **********

25 meter receptor spacing: 1. meters - 1000. meters

FLOW SECTOR	BUILD WIDTH	BUILD LENGTH	XBADJ	YBADJ	MAX 1-HR CONC	DIST (m)	TEMPORAL PERIOD
10	196.32	120.02	-101.15	-49.03	1.485	175.0	SPR
20	185.70	90.15	-77.08	-55.43	1.540	175.0	SPR
30	192.77	108.46	-76.12	-60.15	1.375	50.0	WIN
40	199.84	136.24	-79.23	-63.04	1.554	200.0	AUT

50	200.83	159.87	-79.94	-64.01	1.323	225.0	AUT
60	195.72	178.65	-78.21	-63.04	1.501	225.0	SPR
70	184.67	192.00	-74.11	-60.15	1.167	250.0	SPR
80	168.00	199.52	-67.75	-55.43	1.326	250.0	SPR
90	146.23	200.97	-59.34	-49.03	1.409	250.0	SPR
100	120.02	196.32	-49.12	-41.15	1.440	150.0	SUM
110	90.15	185.70	-37.42	-32.01	1.925	225.0	SUM
120	108.46	192.77	-36.24	-21.89	1.644	175.0	SPR
130	136.24	199.84	-36.88	-11.12	1.464	175.0	SUM
140	159.87	200.83	-36.41	0.00	1.319	175.0	SPR
150	178.65	195.72	-34.82	11.12	1.233	175.0	SPR
160	192.00	184.67	-32.18	21.89	1.224	175.0	SPR
170	199.52	168.00	-28.57	32.01	1.275	150.0	AUT
180	200.97	146.23	-24.08	41.15	1.259	125.0	SUM
190	196.32	120.02	-18.86	49.03	1.173	125.0	SUM
200	185.70	90.15	-13.07	55.43	1.062	100.0	WIN
210	192.77	108.46	-32.34	60.15	1.509	225.0	SPR
220	199.84	136.24	-57.00	63.04	1.439	225.0	AUT
230	200.83	159.87	-79.94	64.01	1.323	225.0	AUT
240	195.72	178.65	-100.44	63.04	1.590	200.0	SPR
250	184.67	192.00	-117.89	60.15	1.474	200.0	SPR
260	168.00	199.52	-131.76	55.43	1.745	175.0	SUM
270	146.23	200.97	-141.63	49.03	1.637	175.0	SUM
280	120.02	196.32	-147.19	41.15	1.979	50.0	SUM
290*	90.15	185.70	-148.28	32.01	2.631	50.0	SUM
300	108.46	192.77	-156.54	21.89	2.371	50.0	WIN
310	136.24	199.84	-162.96	11.12	1.914	50.0	SPR
320	159.87	200.83	-164.43	0.00	1.619	50.0	WIN
330	178.65	195.72	-160.90	-11.12	1.447	50.0	WIN
340	192.00	184.67	-152.48	-21.89	1.379	50.0	WIN
350	199.52	168.00	-139.44	-32.01	1.404	175.0	AUT
360	200.97	146.23	-122.15	-41.15	1.450	175.0	AUT

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Average Moisture

DOMINANT SEASON: Summer

ALBEDO: 0.16
BOWEN RATIO: 2.00
ROUGHNESS LENGTH: 1.000 (meters)

SURFACE FRICTION VELOCITY (U*) ADJUSTED

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	01	04	4	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
3.98	0.112	0.300	0.020	233.	86.	-30.3	1.000	2.00	0.16	0.50

HT	REF TA	HT
10.0	280.0	2.0

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR	MO	DY	JDY	HR
10	01	04	4	12

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS
3.98	0.112	0.300	0.020	233.	86.	-30.3	1.000	2.00	0.16	0.50

HT	REF TA	HT
10.0	280.0	2.0

****

********** AERSCREEN AUTOMATED DISTANCES **********

OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

****

DIST	MAXIMUM 1-HR CONC	DIST	MAXIMUM 1-HR CONC

(m)	(ug/m3)	(m)	(ug/m3)
1.00	2.115	525.00	0.7363
25.00	2.455	550.00	0.7133
50.00	2.631	575.00	0.6912
75.00	2.631	600.00	0.6700
100.00	2.631	625.00	0.6497
125.00	2.255	650.00	0.6302
150.00	1.979	675.00	0.6116
175.00	1.745	700.00	0.5938
200.00	1.730	725.00	0.5771
225.00	1.925	750.00	0.5618
250.00	1.553	775.00	0.5470
275.00	1.281	800.00	0.5327
300.00	0.9811	825.00	0.5191
325.00	0.9516	850.00	0.5059
350.00	0.9224	875.00	0.4933
375.00	0.8936	900.00	0.4812
400.00	0.8653	925.00	0.4695
425.00	0.8378	950.00	0.4582
450.00	0.8111	975.00	0.4474
475.00	0.7852	1000.00	0.4368
500.00	0.7603		

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	2.631	2.631	2.368	1.579	0.2631

DISTANCE FROM SOURCE 38.00 meters directed toward 290 degrees

IMPACT AT THE AMBIENT BOUNDARY	2.115	2.115	1.904	1.269	0.2115

DISTANCE FROM SOURCE 1.00 meters directed toward 290 degrees