

Shop Drawing Transmittal

July 22, 2022

Mr. Peter Kamel
Jim Myers & Sons, Inc.
P.O. Box 38778
Charlotte, NC 28278

RE: City of Jefferson, GA I-85 Water Reclamation Facility Submittal Review

Dear Mr. Kamel:

CEC has reviewed the Low Profile Cascade Aerator equipment submittal. The submittal is approved with no comment. Please see enclosed submittal.

Very truly yours,
CIVIL ENGINEERING CONSULTANTS, Inc.



C.K. Butterfield, P.E.

Enclosures: AS-22031-46_51_53-EA1-A - CEC Approved.pdf
cc: Priscilla A. Murphy, City Manager, City of Jefferson

CIVIL ENGINEERING CONSULTANTS, INC. MARIETTA, GEORGIA 30068			
No Exceptions Taken	No Exceptions Taken With Comment	Make Corrections Noted	Rejected
			
DATE Jul 22, 2022			
BY 			
APPROVED FOR DESIGN ONLY. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND QUANTITIES.			

S:\21093 - Jefferson I-85 WWTP\Construction Administration\Submittals\Manufacturer Equipment Submittals\Equipment Submittals -Cascade Aerator.docx



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P.O. Box 38778, Charlotte, North Carolina 28278

Phone: 704-554-8397, Fax: 704-554-9113, www.jmsequipment.com

LETTER OF TRANSMITTAL

To: City of Jefferson, GA
4994 Lower Roswell Road, Suite 18
Marietta, GA 30068

Date: 06/28/2022
 Job No. 22031
 Attention: CEC Engineers - Chuck Butterfield
 Re: Eco-AIR (LPCA)
PO: 0000000502
Spec Section: 46 51 53

We are sending:

Approval Submittals Training Information
 Operation & Maintenance Misc

COPIES	DATE	DESCRIPTION
1	6/28/2022	22031 Jefferson GA LPCA Approval Submittal

These are transmitted as checked below:

For Approval Return Approved copies
 For Re-Approval Resubmit Copies for approval
 For Review and Comment Submit Copies for distribution

Comments:

Copy To: Priscilla Murphy, City Manager

Signed: Peter Kamel, Jim Myers & Sons, Inc.



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Approval Submittal

Equipment: Low Profile Cascade Aerator (LPCA)
Specification: 46 51 53
Customer: City of Jefferson, GA

Plant Name: I-85 1.0 MGD Water Reclamation Facility
Location: Jefferson, GA

Engineer: Civil Engineering Consultants
PO/Ref: 0000000502

JMS Project 22031
Issue Date 06/28/2022
Revision A



J I M M Y E R S & S O N S , I N C .

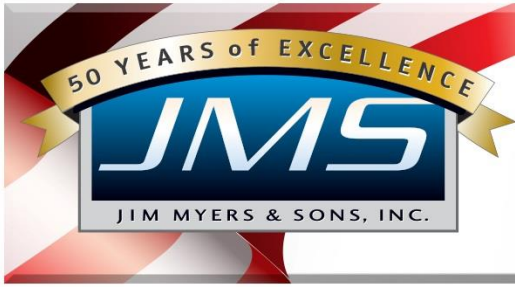
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SUBMITTAL REVISION LOG

Revision	Revision Date	Comments
A	06/28/2022	Original Issue





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Introduction

Our mission at Jim Myers & Sons, Inc. is to be the preferred supplier of water and wastewater treatment equipment by providing superior product quality in design and manufacture, sales support, field service and customer-focused business practices.

Feedback Welcome and Appreciated

JMS is constantly researching and enhancing the quality of all product lines. JMS's goal is to provide superior equipment as well as assist the consumer in becoming more informed and knowledgeable about the water and wastewater industry.

We welcome your comments and suggestions. Please call or write to JMS at the address listed below.

Jim Myers & Sons, Inc.

P.O. Box 38778

Charlotte, NC 28278

Phone: 704-554-8397

Fax: 704-554-9113



Schedule a JMS Field Service Visit

Not all JMS projects include a service visit. If a service visit is included in the purchase of JMS equipment, contact the Service Manager to schedule a service visit for inspection, startup and/or testing. Provide at least a two week notice for service visits.

For Field Service Contact: CustSvc@jmsequipment.com

For After Market parts Contact: AMP@jmsequipment.com

JMS Representative:

Jon Baker
jon@templeton-associates.com
Templeton and Associates
4324 Brogdon Exchange
Suwanee, GA 30024
Phone: (404)219-1547

JMS Project Manager:

Peter Kamel
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Jim Myers & Sons, Inc.
PO Box 38778
Charlotte, NC 28278
Phone: (704)554-8397
Fax: (704)554-9113



Section 1

Scope Summary

Scope Summary

Section 46 51 53 Low Profile Cascade Aeration (LPCA):

The post aerator is a current, standard product of this manufacturer and we are regularly engaged in the production of this equipment. The post aerator supplied shall be as specified and shall be the patented Low-Profile Cascade Aerator (LPCA) by Jim Myers and Sons Inc. (JMS). The unit shall be the last piece of process equipment at the plant located prior to the outfall/discharge, and shall be a rectangular, open channel type, low profile, free flowing aerator with hydraulic loading capacity in accordance with the following:

Peak maximum daily flow of **10.0 MGD**, an average daily flow of **4.0 MGD**, and a minimum daily flow of **208 GPM (0.30 MGD)**. The minimum influent DO to the LPCA shall be 2 mg/l. The effluent from the LPCA shall yield a minimum DO reading of 6.0 mg/L.

The insert LPCA provided will be **17' wide x 24' long** and will be anchored in a concrete basin (by others).

Our performance guarantee is based on the following conditions (Memo: All the figures below - temp, flow, & DO - are as specified in Sec 46 51 53):

Based on installation and maintenance per the Manufacturer's requirements, and with the LPCA system as the last piece of process equipment at the Plant prior to outfall/discharge to a body of water, and based on the influent stream to the LPCA meeting the Plant's effluent NPDES permit limits except dissolved oxygen, and, as specified, a maximum temperature of 23°C, and for the full range of flow a peak of 10.0 MGD and to a minimum instantaneous flow of 208 GPM (0.30 MGD), and with a minimum influent DO of 2 mg/l, the DO at the immediate effluent of the LPCA system shall be a minimum of 6 mg/l. Performance to obtain 6 mg/l for flows less than 208 GPM may occur, but are not guaranteed.

Clarifications:

- Field service:
 - We include one (1) trip, one day on site

The patented aeration equipment shall consist of a plurality of channel dividers with inlet flow control gates and weirs. The Inlet Flow Control Gate shall be of trapezoidal design for flow control and shall increase in height from one (or more) channels to the next. Each channel shall be provided with a plurality of low head aeration baffles spaced as shown on plans. Each aeration baffle shall be provided with air infusion plates and shall be trapezoidal in shape to provide optimum transfer efficiency at minimum flow and to maximum flow. The LPCA will be complete and all aeration equipment shall be fabricated of type 304 stainless steel and shall include all necessary stainless-steel anchor bolts, epoxy, sealant, gaskets and accessories. The Low-Profile Cascade Aerator shall be fabricated for insertion in a concrete channel/basin (by others).

Excluding

- Installation and field assembly
 - An Energy Dissipation Device (EDD) is NOT included in our Scope:
 - Any probes, sensors, handrails, grating, energy dissipation device, or supports for same are not included. Any items required for system competition not listed on the Scope of Supply are considered exclusions
-

Spares

- Spare parts included are 10% extra sealant material.

Policies

Warranty

All JMS equipment and/or materials are of high quality and are manufactured in conformity with the best commercial practices. We guarantee all equipment / materials, manufactured or supplied by us, to be free from defects in material and workmanship at the time of start-up for a period of one (1) year, not to exceed eighteen (18) months from date of shipment. We will furnish without charge, but will not install, replacements for such parts/materials as we find to be defective.

This guarantee shall not apply to any equipment which has been improperly handled or stored, improperly lubricated, subjected to misuse or neglect, misapplied with reference to the engineer's specifications, altered or tampered with, or damaged by corrective work performed without our specific written consent. No allowances will be made for such corrective work done without such consent. Deterioration by chemical action, improper maintenance, or normal wear does not constitute defects and are therefore not covered by this warranty. Consumable items are not covered by this warranty. All warranty claims must be submitted within ten (10) calendar days of discovery of defects or it shall be deemed waived. The foregoing is in lieu of all other warranties, whether expressed or implied.

Returns

All returns must be authorized by Jim Myers & Sons, Inc., and no credit will be allowed for returned items that are damaged in transit, incomplete or received in an unsatisfactory condition. All items that are not eligible for credit will be returned to customer via freight collect or discarded upon customer's instructions.

Delivery

Delivery dates represent only our best estimate of the time required to complete the work and ship the material from our plant. All orders are accepted with the understanding that shipping dates are approximate and subject to change because of factory conditions, fires, strikes, material shortages, civil or military authority, acts of God or other causes beyond our knowledge or control.

Back charges against JMS for alterations, shortages, damage repair and or discrepancies will be accepted only with written prior approval from a duly authorized representative of Jim Myers & Sons, Inc.

Anti-Seize Information

All JMS bolts and anchors are stainless steel material unless otherwise specified. Without an anti-seize application, bolting materials may become seized together. Therefore, JMS strongly recommends the use of anti-seize spray on all stainless-steel bolts and anchors.



Section 2

Clarifications

Clarifications

Jim Myers & Sons, Inc. is a supplier of Low Profile Cascade Aerators (LPCA) and other equipment as detailed in the Scope of Supply. The equipment is designed based on our years of experience and our standard means of manufacture and supply. The equipment meets or exceeds the requirements of the specifications in terms of performance, quality workmanship and materials. Listed below are specific features of the proposed equipment that differs from the specifications or where a clarification is made regarding the specifications.

No clarifications.



Section 3

Calculations



Eco-AIR
Low Profile Cascade Aerator

Proven ... Process ... Performance

Date:	6/7/2022	Equipment:	LPCA
Project:	22031	Spec. Section:	46 51 53
Customer:	City of Jefferson	Engineer:	CEC, INC.
Location:	Jefferson, GA	Job Number:	22031

Influent D.O.	2.00 mg/l	Min Channel	0.30	MGD (208.3 GPM)
		Min-Avg Channel	2.15	MGD (1493 GPM)
Effluent D.O.	6.00 mg/l	Avg Channel	4.00	MGD (2777.7 GPM)
		Avg-Max Channel	0.00	MGD (0 GPM)
D.O. Increase	4.00 mg/l	Max Channel	10.00	MGD (6944.4 GPM)

LPCA Overall Length (ft)	24.00
LPCA Overall Width (ft)	17.00
Min Channel Width (ft)	3.00
Min-Avg Channel Width (ft)	2.00
Avg Channel Width (ft)	8.00
Avg-Max Channel Width (ft)	--
Max Channel Width (ft)	4.00
LPCA Exit Elevation (ft)	774.83
LPCA Entry Elevation (ft)	776.83
LPCA Elevation Drop (ft)	2.00
LPCA Slope (deg)	4.8
LPCA H @ Min Flow (Weir Flow Height - in)	2.10
LPCA H @ Min-Avg Flow (Weir Flow Height - in)	5.36
LPCA H @ Avg Flow (Weir Flow Height - in)	4.41
LPCA H @ Avg-Max Flow (Weir Flow Height - in)	
LPCA H @ Max Flow (Weir Flow Height - in)	6.41
Maximum Influent Water Elevation(ft)	777.96
Water Elevation at Max Flow (ft)	777.64

Design calculations prepared by: AGB

Submittal

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Section 4

Catalog Cuts

KWIK Bolt 3 Expansion Anchor 3.3.6

3.3.6.1 Product Description

The KWIK Bolt 3 (KB3) is a torque controlled expansion anchor, which provides consistent performance for a wide range of mechanical anchor applications. This anchor series is available in carbon steel with zinc electroplated coating, carbon steel with hot-dip galvanized coating, 304 stainless steel and 316 stainless steel versions. The threaded stud version of the anchor is available in a variety of diameters ranging from 1/4-in. to 1-in. depending on the steel and coating type. Applicable base materials include normal-weight concrete, structural lightweight concrete, lightweight concrete over metal deck, and grout filled concrete masonry.

Guide Specifications

Torque controlled expansion anchors shall be KWIK Bolt 3 supplied by Hilti meeting the description in Federal Specification A-A 1923A, Type 4. The anchor bears a length identification mark embossed into the impact section (dog point) of the anchor identifying the anchor as a Hilti KWIK Bolt 3 in the installed condition. Anchors are manufactured to meet one of the following conditions:

1. The carbon steel anchor body, nut and washer have an electroplated zinc coating conforming to ASTM B 633 to a minimum thickness of 5 µm.
2. The carbon steel hot-dip galvanized anchor body, nut, and washer conform to ASTM A 153. The stainless steel expansion elements conform to either type 304 or type 316.
3. The stainless steel anchor body, nut, and washer conform to type 304. The stainless steel expansion elements conform to either type 304 or type 316.
4. The stainless steel anchor body, nut, and washer conform to type 316. The stainless steel expansion elements conform to type 316.

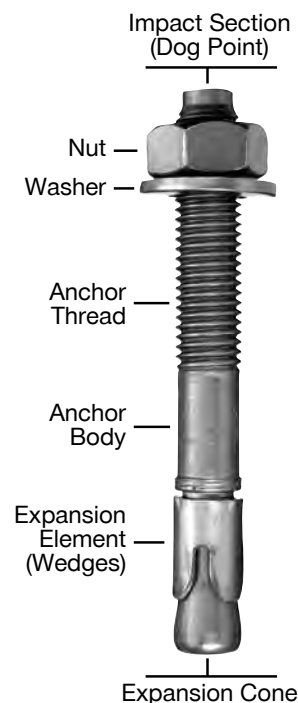
Product Features

- Length identification code facilitates quality control and inspection after installation.
- Through fixture installation and variable thread lengths improve productivity and accommodate various base plate thicknesses.
- Raised impact section (Dog Point) prevents thread damage during installation.
- Anchor size is same as drill bit size for easy installation. For temporary applications anchors may be driven into drilled holes after usage.
- Mechanical expansion allows immediate load application.

Installation

Drill hole in concrete, structural lightweight concrete, or grout filled concrete masonry using a Hilti carbide tipped drill bit and a Hilti rotary hammer drill. Remove dust from the hole with oil free compressed air or vacuum. Alternately for 1/2-, 5/8-, 3/4- and 1-inch diameter KWIK Bolt 3 anchors, the hole may be drilled using a matched tolerance Hilti DD-C wet diamond core bit for anchoring applications. The slurry must be flushed from the diamond cored hole prior to anchor installation. The minimum hole depth must exceed the anchor embedment prior to torquing by at least by one hole diameter. Drive the anchor into the hole using a hammer. A minimum of six threads must be below the surface of the fixture. Tighten the nut to the installation torque.

3.3.6.1	Product Description
3.3.6.2	Material Specifications
3.3.6.3	Strength Design (LRFD)
3.3.6.4	Allowable Stress Design (ASD)
3.3.6.5	Installation Instructions
3.3.6.6	Ordering Information



Listings/Approvals

ICC-ES (International Code Council)
ESR-2302

ICC-ES ESR-1385
Grout filled concrete masonry

City of Los Angeles
Research Report No. 25577
Research Report No. 25577M
for masonry

FM (Factory Mutual)
Pipe Hanger Components for
Automatic Sprinkler (3/8" - 3/4")

UL (Underwriters Laboratories)
UL 203 Pipe Hanger Equipment for Fire
Protection Services (3/8" - 3/4")

Miami-Dade County
NOA No. 06-0810.13
Qualified under an NQA-1 Nuclear
Quality Program



*Please refer to the reports to verify that the type and diameter specified is included

Independent Code Evaluation

IBC® / IRC® 2009
(AC 193 / ACI 355.2, AC 01)

IBC® / IRC® 2006
(AC 193 / ACI 355.2, AC 01)

IBC® / IRC® 2003
(AC 193 / ACI 355.2)

3.3.6 KWIK Bolt 3 Expansion Anchor

3.3.6.2 Material Properties

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]
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[REDACTED]
[REDACTED]
[REDACTED]

Stainless Steel

Anchor bodies smaller than 3/4-inch, excluding all Countersunk KWIK Bolt 3 anchors, are produced from type 304 or type 316 stainless steel having the bolt fracture loads shown in Table 5.

Anchor bodies 3/4-inch and larger, and all stainless steel Countersunk KWIK Bolt 3 anchor bodies, are produced from AISI 304 or 316 stainless steel having the mechanical properties shown in Table 5.

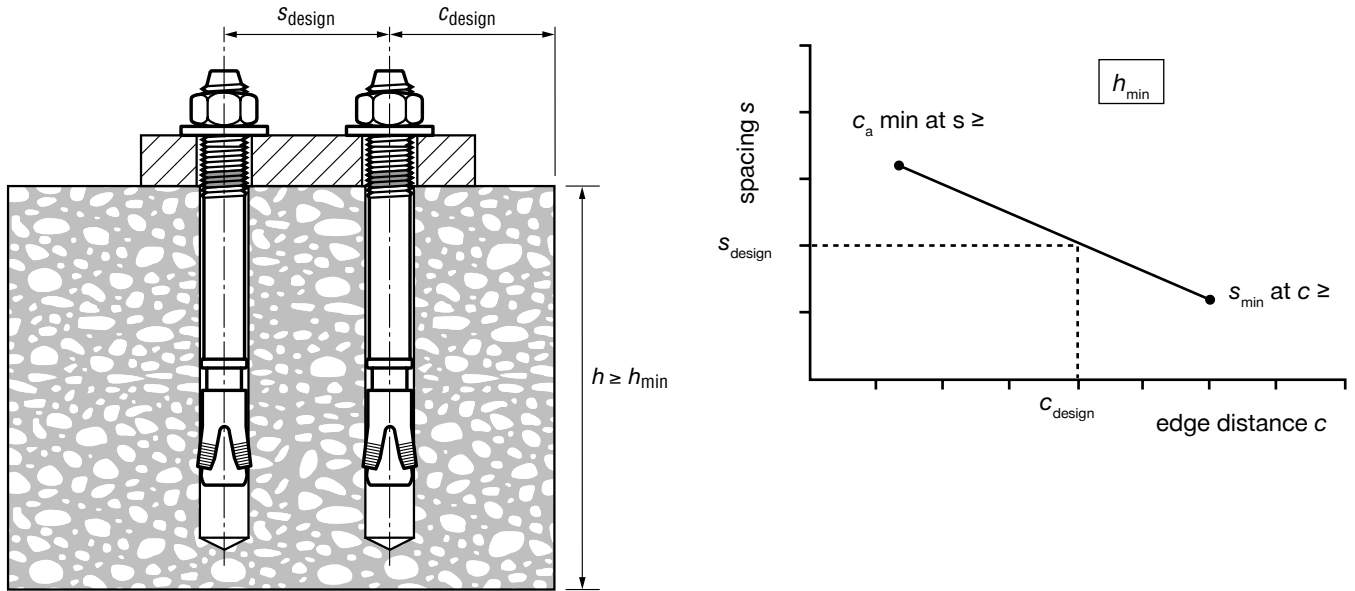
Nuts meet the dimensional requirements of ASTM F 594.

Washers meet the dimensional requirements of ANSI B18.22.1, Type A, plain.

Stainless steel expansion elements for type 304 anchors are made from either type 304 or type 316. Stainless steel expansion elements for type 316 anchors are made from type 316. All stainless steel nuts and washers for type 304 and type 316 anchors are manufactured from type 304 and type 316, respectively.

KWIK Bolt 3 Expansion Anchor 3.3.6

Figure 2 - Interpolation of Minimum Edge Distance and Anchor Spacing



Length Identification System

Length ID marking on bolt head		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Length of anchor, (in.)	From	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6	6-1/2	7	7-1/2	8	8-1/2	9	9-1/2	10	11	12
	Up to but not including	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6	6-1/2	7	7-1/2	8	8-1/2	9	9-1/2	10	11	12	13



Length Identification Mark

3.3.6 KWIK Bolt 3 Expansion Anchor

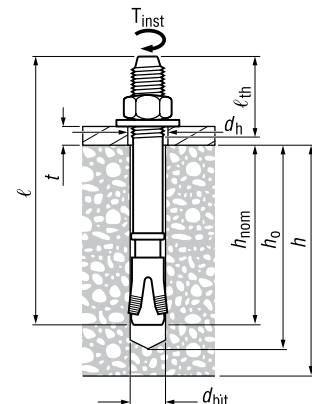
3.3.6.4 Allowable Stress Design

Table 5 - KWIK Bolt 3 Specifications and Properties¹

Details		Bolt Size	in. (mm)	3/8 (9.5)			
d_{bit}	nominal bit diameter ²		in.	3/8			
$h_{min}/h_{nom}/h_{deep}$	depth of embedment		in. (mm)	1-5/8 (41)	2-1/2 (64)	3-1/2 (89)	
h_o	minimum/standard/deep hole depth		in. (mm)	2 (51)	2-7/8 (73)	3-7/8 (89)	
d_h	fixture hole		in. (mm)	7/16 (11)			
T_{inst} Installation Torque	Normal weight & Light weight Concrete	Carbon Steel	ft-lb (Nm)	20 (27)			
		HDG					
		Stainless Steel	ft-lb (Nm)	20 (27)			
	Grout Filled Block	Carbon Steel	ft-lb (Nm)	15 (20)			
h	min. base material thickness		in.	3 inch (76 mm) or 1.3 times embedment, whichever number is greater			
Bolt Fracture Load	Carbon Steel			7200 lb ^{4,6}			
	HDG			no offering			
	Stainless Steel			7200 lb ^{4,7}			

Details		Bolt Size	in. (mm)	3/4 (19.1)			
d_{bit}	nominal bit diameter ²		in.	3/4			
$h_{min}/h_{nom}/h_{deep}$	depth of embedment		in. (mm)	3-1/4 (83)	4-3/4 (121)	6-1/2 ³ (165)	
h_o	minimum/standard/deep hole depth		in. (mm)	4 (102)	5-1/2 (140)	7 (178)	
d_h	fixture hole		in. (mm)	13/16 (21)			
T_{inst} Installation Torque	Normal weight & Light weight Concrete	Carbon Steel	ft-lb (Nm)	110 (149)			
		HDG					
		Stainless Steel	ft-lb (Nm)	110 (149)			
	Grout Filled Block	Carbon Steel	ft-lb (Nm)	120 (163)			
h	min. base material thickness		in.	3 inch (76 mm) or 1.3 times embedment, whichever number is greater			
Bolt Fracture Load	Carbon Steel			28700 lb ^{4,8}			
	HDG			28700 lb ⁴			
	Stainless Steel			$f_{ut} \geq 76 \text{ ksi}, f_y \geq 64 \text{ ksi}^5$			

- 1 See KWIK Bolt 3 Product Line Table in Section 3.3.6.6 for a full list and anchor length and thread length configurations.
- 2 Loads for KWIK Bolt 3 are applicable for both carbide drill bits and matched tolerance Hilti DD-B or DD-C diamond core bits in sizes ranging from 1/2 inch to 1 inch.
- 3 The deep embedment depth for stainless steel KWIK Bolt 3 anchors is 8 inch (203 mm).
- 4 Bolt fracture loads are determined by testing in a jig as part of product quality control. These values are not intended for design purposes.
- 5 Bolt strength specified by minimum tensile and yield strength. Bolt fracture load not applicable.
- 6 Bolt fracture load not applicable to carbon steel Countersunk KWIK Bolt 3. The tensile and yield strengths are $f_{ut} \geq 105 \text{ ksi}$ and $f_y \geq 90 \text{ ksi}$.
- 7 Bolt fracture load not applicable to stainless steel Countersunk KWIK Bolt 3. The tensile and yield strengths are $f_{ut} \geq 90 \text{ ksi}$ and $f_y \geq 76 \text{ ksi}$.
- 8 For 3/4 x 12, $f_{ut} \geq 88 \text{ ksi}$ and $f_y \geq 75 \text{ ksi}$. Bolt fracture load not applicable.



KWIK Bolt 3 Expansion Anchor 3.3.6

Table 8 - Stainless Steel KWIK Bolt 3 Allowable Loads in Normal-Weight Concrete¹

Anchor Diameter in. (mm)	Embedment Depth in. (mm)	$f'_c = 2000$ psi (13.8 MPa)		$f'_c = 3000$ psi (20.7 MPa)		$f'_c = 4000$ psi (27.6 MPa)		$f'_c = 6000$ psi (41.4 MPa)	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
1/4 [Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
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3/8 (9.5)	1-5/8 (41)	605 (2.7)	880 (3.9)	670 (3.0)	1110 (4.9)	730 (3.2)	1345 (6.0)	950 (4.2)	1690 (7.5)
	2-1/2 (64)	1285 (5.7)	1570	1430 (6.4)	1570 (7.0)	1575 (7.0)	1590 (7.1)	1940 (8.6)	1590 (7.1)
	3-1/2 (89)	1620 (7.2)	(7.0)	1755 (7.8)	(7.0)	1885 (8.4)	(7.1)	2035 (9.1)	
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¹ Intermediate load values for other concrete strengths and embedments can be calculated by linear interpolation.

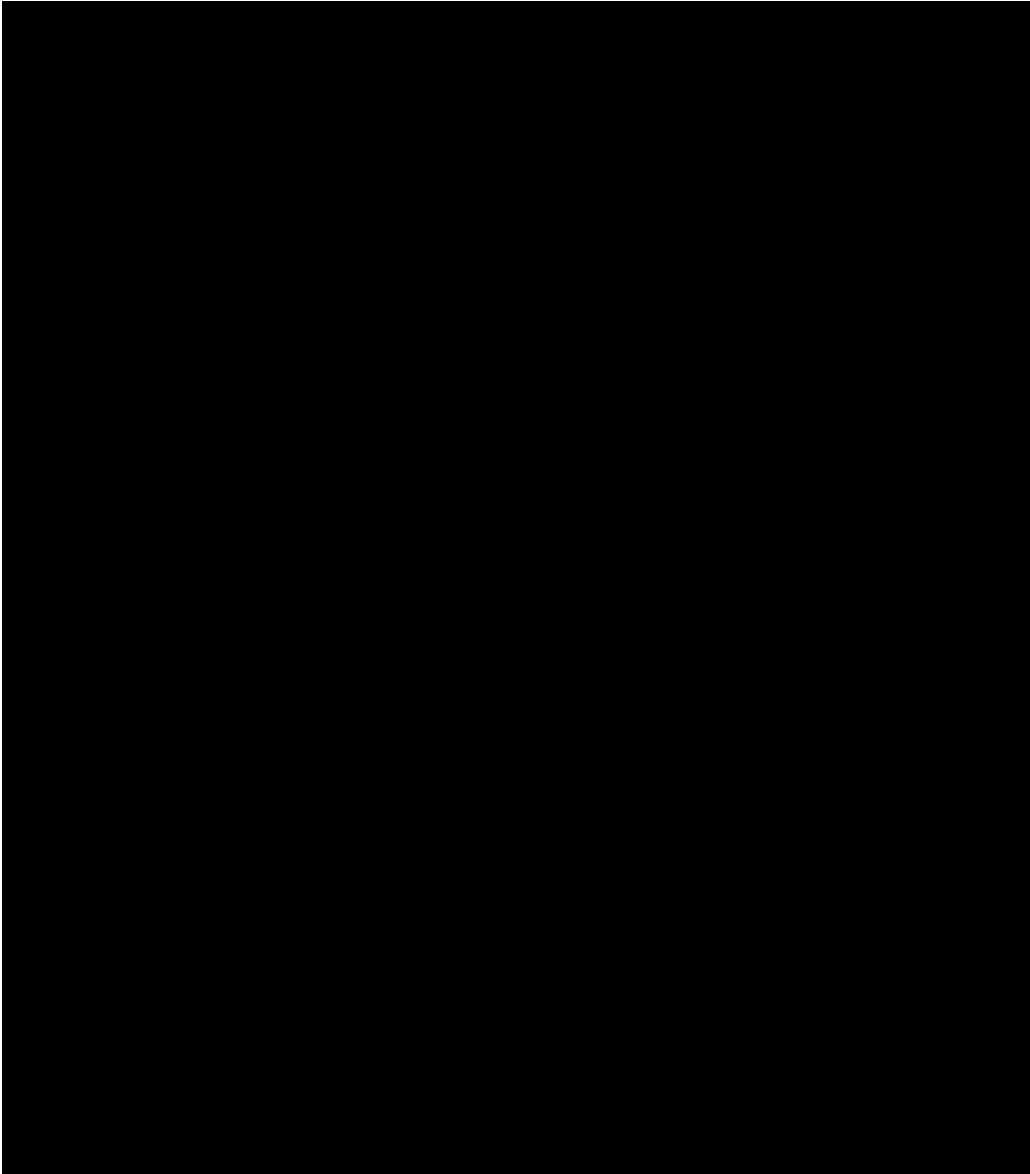
3.3.6 KWIK Bolt 3 Expansion Anchor

Table 9 - Stainless Steel KWIK Bolt 3 Ultimate Loads in Normal-Weight Concrete¹

Anchor Diameter in. (mm)	Embedment Depth in. (mm)	$f'_c = 2000$ psi (13.8 MPa)		$f'_c = 3000$ psi (20.7 MPa)		$f'_c = 4000$ psi (27.6 MPa)		$f'_c = 6000$ psi (41.4 MPa)	
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
1/4	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
3/8 (9.5)	1-5/8 (41)	2275 (10.1)	3300 (14.7)	2505 (11.1)	4175 (18.6)	2735 (12.2)	5045 (22.4)	3560 (15.8)	6015 (26.8)
	2-1/2 (64)	4825 (21.5)	5900 (26.2)	5365 (23.9)	5900 (26.2)	5905 (26.3)	5954 (26.5)	7270 (32.3)	5954 (26.5)
	3-1/2 (89)	6075 (27.0)		6575 (29.2)		7075 (31.5)		7625 (33.9)	
1/2	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
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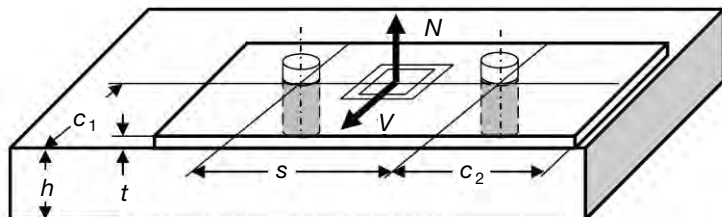
¹ Intermediate load values for other concrete strengths and embedments can be calculated by linear interpolation.

KWIK Bolt 3 Expansion Anchor 3.3.6



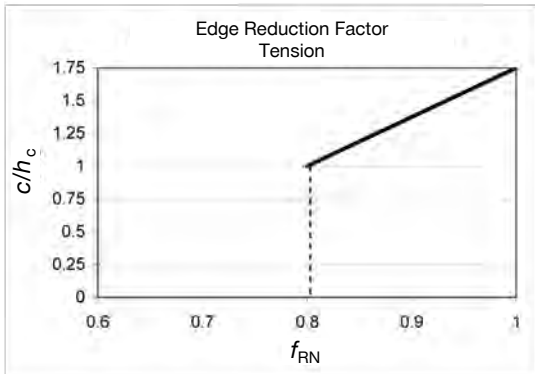
Anchor Spacing and Edge Distance Guidelines

1. s = on-center fastening spacing
 c = edge distance from center of bolt.
2. Apply appropriate load reduction factors for tension and shear if anchor spacing and/or edge distance is less than the critical spacing (s_{cr}) or edge distance (c_{cr}).
3. See Section 3.1.8 for determining compounded spacing and edge distance reduction as well as intermediate load values for concrete strengths and embedments.

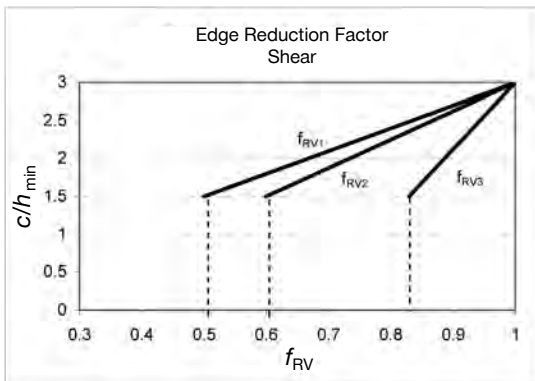


3.3.6 KWIK Bolt 3 Expansion Anchor

Edge Distance Adjustment Factors

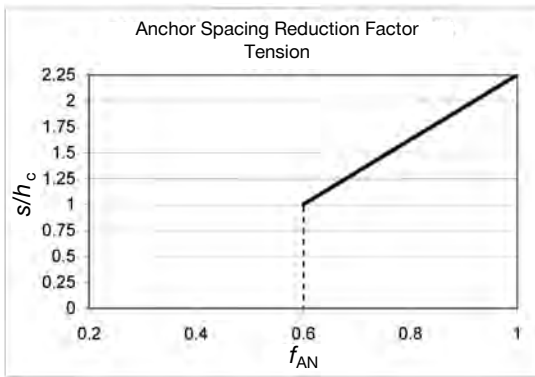


Adjustment Conditions	Critical Edge Distance	Minimum Edge Distance
Emb Ratio	$c/h_c = 1.75$	$c/h_c = 1.00$
Reduction	$f_{RN} = 1.00$	$f_{RN} = 0.80$
$h_c = h_{act}$ for $h_{min} \leq h_{act} \leq h_{nom}$ $h_c = h_{nom}$ for $h_{act} > h_{nom}$		
h_{act} = Actual Embedment c = Actual Edge Distance f_{RN} = Edge Distance Reduction Factor for Tension Loading		

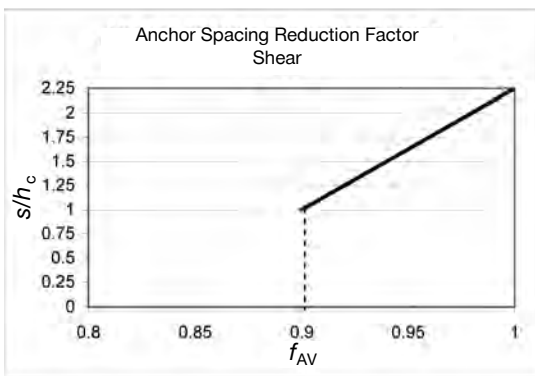


Shear Plane Correlation	Shear Conditions	f_{RV} Reduction factor at Min. Edge Distance
f_{RV1}	Shear towards edge	$f_{RV1} = 0.50$
f_{RV2}	Shear parallel edge	$f_{RV2} = 0.60$
f_{RV3}	Shear away from edge	$f_{RV3} = 0.83$
embedment to edge distance ratio at critical edge distance		$c/h_{min} = 3.00$
embedment to edge distance ratio at minimum edge distance		$c/h_{min} = 1.50$
c = Actual Edge Distance h_{min} = Min Embedment for Specific Anchor Diamete		

Anchor Spacing Adjustment Factors



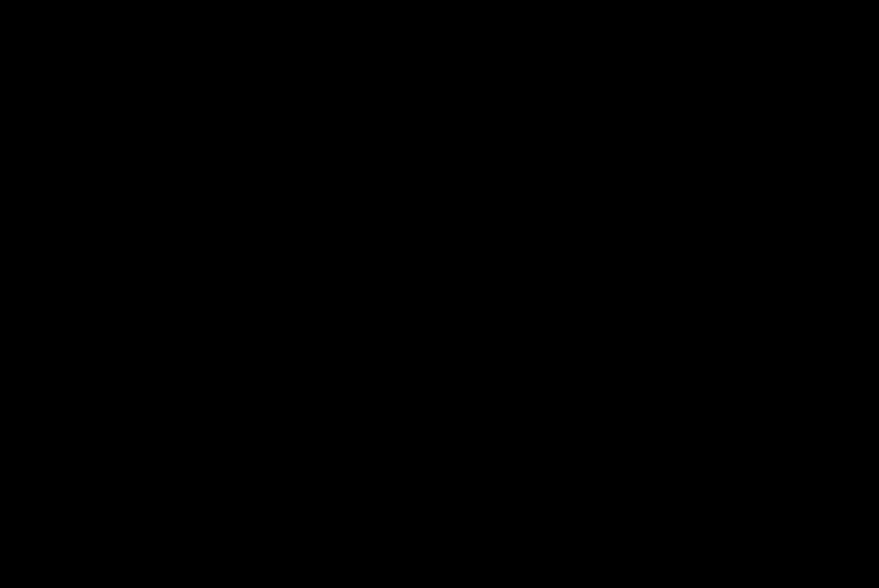
Adjustment Conditions	Critical Anchor Spacing	Minimum Anchor Spacing
Emb Ratio	$s/h_c = 2.25$	$s/h_c = 1.00$
Reduction	$f_{AN} = 1.00$	$f_{RN} = 0.60$
$h_c = h_{act}$ for $h_{min} \leq h_{act} \leq h_{nom}$ $h_c = h_{nom}$ for $h_{act} > h_{nom}$		
h_{act} = Actual Embedment c = Actual Anchor Spacing Distance f_{AN} = Anchor Spacing Reduction Factor for Tension Loading		



Adjustment Conditions	Critical Anchor Spacing	Minimum Anchor Spacing
Emb Ratio	$s/h_c = 2.25$	$s/h_c = 1.00$
Reduction	$f_{AV} = 1.00$	$f_{AV} = 0.60$
$h_c = h_{act}$ for $h_{min} \leq h_{act} \leq h_{nom}$ $h_c = h_{nom}$ for $h_{act} > h_{nom}$		
h_{act} = Actual Embedment c = Actual Anchor Spacing Distance f_{AV} = Anchor Spacing Reduction Factor for Shear Loading		

KWIK Bolt 3 Expansion Anchor 3.3.6

Influence of Edge Distance and Anchor Spacing on Anchor Performance



Standard Anchor Embedments (in.)		
1/4	h_{min}	1-1/8
	h_{nom}	2
	h_{deep}	3
3/8	h_{min}	1-5/8
	h_{nom}	2-1/2
	h_{deep}	3-1/2
1/2	h_{min}	2-1/4
	h_{nom}	3-1/2
	h_{deep}	4-3/4

Note: Tables apply for listed embedment depths. Reduction factors for other embedment depths must be calculated using equations below.

Load Adjustment Factors for 3/8" Diameter Anchors										
Adjustment Factor 3/8 in.	Spacing Tension/Shear f_{AN}		Edge Distance Tension f_{RN}		Spacing Shear f_{AV}		Edge Distance Shear			
							⊥ Toward Edge f_{RV1}	 Toward Edge f_{RV1}	⊥ Away from Edge f_{RV3}	
Embedment Depth, in.	1-5/8	≥ 2-1/2	1-5/8	≥ 2-1/2	1-5/8	≥ 2-1/2	≥ 1-5/8	≥ 1-5/8	≥ 1-5/8	
Spacing in.	1-5/8	0.60		0.80		0.90				
	2	0.67		0.86		0.92				
	2-1/4	0.72		0.90		0.93				
	2-1/2	0.77	0.60	0.94	0.80	0.94	0.90	0.51	0.61	0.83
	3	0.87	0.66	1.00	0.85	0.97	0.92	0.62	0.69	0.87
	3-1/4	0.92	0.70		0.88	0.98	0.92	0.67	0.73	0.89
	3-1/2	0.97	0.73		0.91	0.99	0.93	0.72	0.77	0.90
	3-3/4	1.00	0.76		0.93	1.00	0.94	0.77	0.82	0.92
	4		0.79		0.96		0.95	0.82	0.86	0.94
	4-1/2		0.86		1.00		0.96	0.92	0.94	0.97
	5		0.92				0.98	1.00	1.00	1.00
	5-5/8		1.00				1.00			
5-3/4										

Spacing — Tension

$$f_{AN} = \frac{s/h_{act} + 0.88}{3.13} \quad f_{AN} = \frac{s/h_{nom} + 0.88}{3.13}$$

$h_{min} \leq h_{act} \leq h_{nom} \quad h_{act} \geq h_{nom}$

Edge Distance — Tension

$$f_{RN} = \frac{c/h_{act} + 2}{3.75} \quad f_{RN} = \frac{c/h_{nom} + 2}{3.75}$$

$h_{min} \leq h_{act} \leq h_{nom} \quad h_{act} \geq h_{nom}$

Spacing — Shear

$$f_{AV} = \frac{s/h_{act} + 10.25}{12.5} \quad f_{AV} = \frac{s/h_{nom} + 10.25}{12.5}$$

$h_{min} \leq h_{act} \leq h_{nom} \quad h_{act} \geq h_{nom}$

Edge Distance — Shear

$h_{act} \geq h_{min}$

perpendicular toward edge

$$f_{RV1} = \frac{c}{3h_{min}}$$

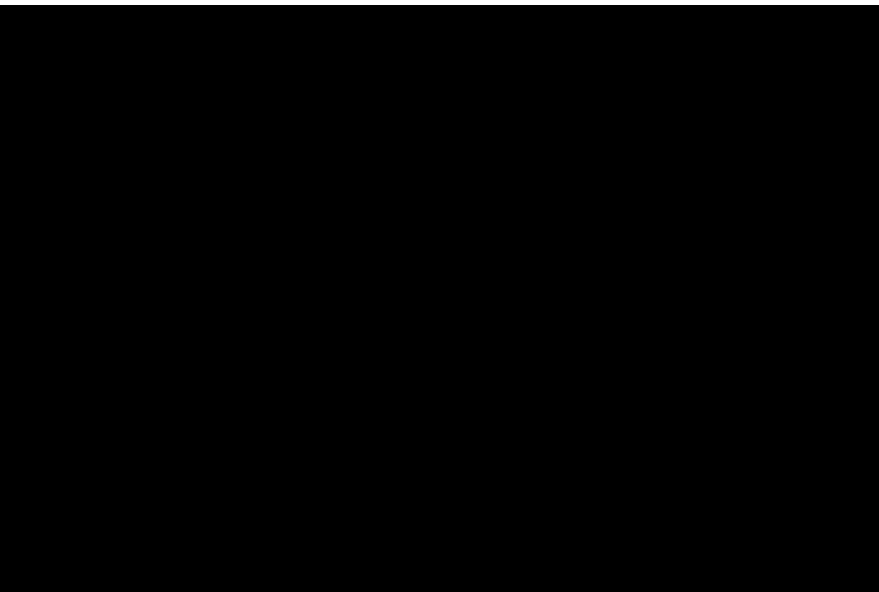
parallel to edge

$$f_{RV2} = \frac{c/h_{min} + 0.75}{3.75}$$

perpendicular away from edge

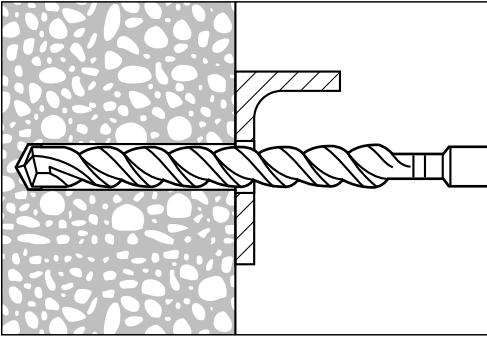
$$f_{RV3} = \frac{c/h_{min} + 5.82}{8.82}$$

Note: Edge distance and anchor spacing for all lightweight and sand-lightweight concrete are obtained by dividing the normal-weight dimensions by 0.75 and 0.85, respectively.

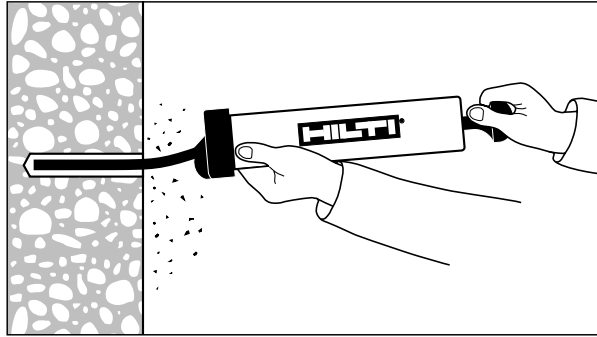


KWIK Bolt 3 Expansion Anchor 3.3.6

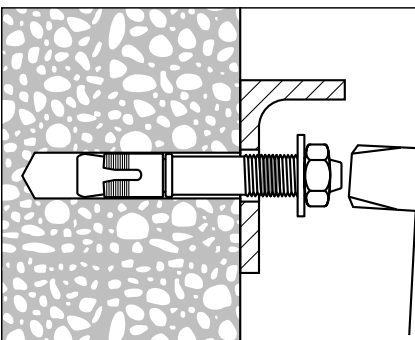
3.3.6.5 Installation Instructions



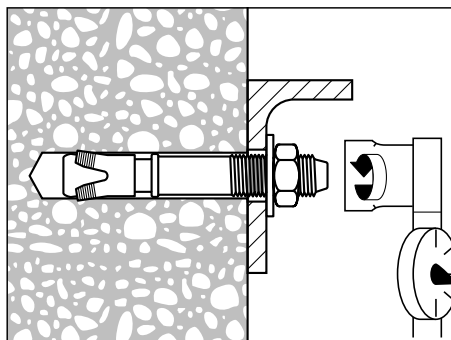
1. Hammer drill a hole to the same nominal diameter as the KWIK Bolt 3. The hole depth must exceed the anchor embedment by at least one diameter. The fixture may be used as a drilling template to ensure proper anchor location.



2. Clean hole.



3. Drive the KWIK Bolt 3 into the hole using a hammer. The anchor must be driven until at least 6 threads are below the surface of the fixture.



4. Tighten the nut to the installation torque.



Document Library
TS Data Sheet 08620
08621
08622
08625

Public

Rev:3

Effective: 09/22/2008

Status: Active

3M™ Windo-Weld™ Sealer (Bulk)

Data Sheet

3M Part No.(s)	3M Part Descriptor (s)
08622	Roll - 3/8" x 15'

3M Fax on Demand Identification Number :

Description

Tacky, black, compressible sealant supplied in rolls. Used as a secondary sealant when automotive glass is installed with a structural urethane adhesive. Compatible with urethane, polysulfide and butyl sealants.

Features, Advantages, Benefits

Features	Excellent adhesion over temperature range (20°F - 120°F) Aggressive tack provides immediate bonding Excellent water seal
Advantages	
Benefits	

Typical Physical Properties

Base	Butyl Rubber
Color	Black
Viscosity (CPS) Brookfield	N/A
Viscometer	
Solids Content (Appx.)	99% by Weight

Product Uses

Performance Properties

Test	Condition	Results
Water Resistance	1000 Hours Immersion	Excellent (no change)
Ozone Resistance	72 Hours @ 150 ppm	Excellent (no change)
Low Temperature Flexibility	-20°F	Excellent (no failures)
Heat Resistance	45 minutes @ 275°F	Very Good (no change)
Tensile Strength	Glass to Glass	15 psi minimum

Handling and Application Information

Directions for Use

3M glass products are intended for use as part of the repair process outlined in service manuals provided by automotive manufacturers. For detailed instructions by car model, refer to information available from the automobile manufacturer.

3M™ Windo-Weld™ Ribbon Sealer is designed and intended for use as a replacement to original equipment butyl installations or as a supplementary sealant when installing stationary glass with urethane adhesive.

**** 3M™ WINDO-WELD™ RIBBON SEALER IS NOT INTENDED FOR A WINDSHIELD OR BACKGLASS WHERE OEM URETHANE WAS ORIGINALLY USED. For urethane set glass, refer to and follow 3M Auto Glass Replacement Urethane directions. In some urethane set applications, use of this product may be appropriate as a supplementary sealant.**

1. Remove glass using cold knife, power tool, or piano wire.
2. **Preparation of Glass:** Thoroughly clean perimeter of glass where the butyl will bond with 3M Glass Cleaner, PN 08888. Wipe completely dry with a clean, dry, lint-free cloth.
3. **Preparation of Metal:** Use an appropriate VOC-Compliant 3M Cleaner to remove any surface contamination, such as adhesive, grease, grime, oil, etc. Scuff lightly with Scotch-Brite. If paint is scratched during removal of old butyl, prime any bar metal scratches with 3M Single Step Primer, PN 08681 or 08682.
4. **Application of 3M™ Windo-Weld™ Ribbon Sealer:** Sealer may be applied to either pinchweld or glass. Applying sealer to pinchweld is preferred. Start seal on bottom of side pillar or glass. Line up sealer even with edge of pinchweld using thumb pressure. *Butt the ends of the sealer – do not overlap* . Strip liner from sealer.
5. **Use of Settling Blocks – IMPORTANT:** Setting blocks are necessary since 3M™ Windo-Weld™ Ribbon Sealer is compressible and tacky. Replace with blocks provided if originals are damaged during glass removal.
6. **Placement of Glass:** Position glass onto pinchweld. Be certain that glass makes contact with sealant. Use hand pressure to provide good contact and seal. Paddle sealant around edge if desired.
7. **WATER TEST**
8. **Clean up:** Replace moldings as needed and clean up. Use an appropriate VOC-Compliant 3M Cleaner to remove any surface contamination, such as adhesive, grease, grime, oil, etc.

Applications

For installation of stationary glass when used as supplementary sealer/bonding material with urethane adhesive.

Storage and Handling

Store at room temperature. Rotate stock on a "first-in-first-out" basis. When stored at the recommended conditions in original, unopened containers, this product has a shelf life of 24 months.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for Health and Safety Information before using this product .

Country

US

This document is public . It may be distributed .

Warranty and Limited Remedy

This product will be free from defects in material and workmanship at the time of shipment. 3M MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's application. If this product is defective, your exclusive remedy and 3M's and seller's sole obligation shall be, at 3M's option, to replace the product or refund the purchase price.

LIMITATION OF LIABILITY : 3M and seller will not be liable for any loss or damage arising from this 3M product, whether direct , indirect , special , incidental or consequential , regardless of the legal theory asserted , including warranty , contract , negligence or strict liability .

For Additional Health and Safety Information

3M Automotive Aftermarket Division

3M Center, Building 223-6N-01

Saint Paul, MN 55144-1000

1-877-666-2277 (1-877-MMM-CARS)

Material Safety Data Sheets and Technical Data Sheets are also available by calling Fax on Demand 1-800-305-0419.

Help Line 1-800-621-5455 (US) 1-650-596-4407 (International).

3M Fax on Demand /MSDS Identification Number**Author:** Claud Cui/CN-China/3M/US**Modifiers:** Jennifer L. Kamarainen/US-Corporate/3M/US**This is the last page**



Section 5

Equipment Drawings

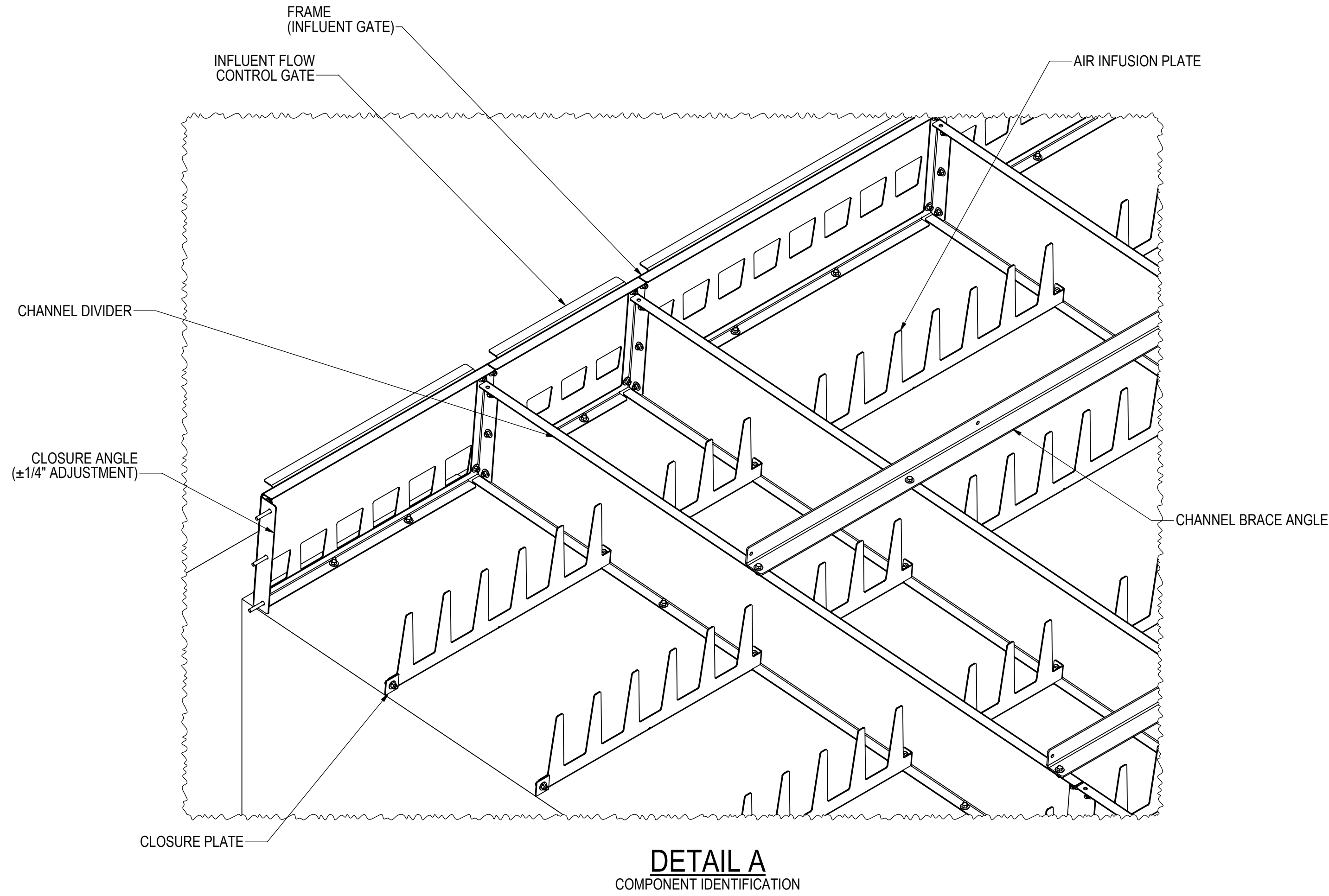
LPCA PERFORMANCE TABLE		
SYSTEM INFORMATION		UNITS
INFLUENT D.O.	2.0	mg/L
EFFLUENT D.O.	6.0	mg/L
D.O. INCREASE	4.0	mg/L
MIN. FLOW	0.30	MGD
	208.32	GPM
MIN.-AVG. FLOW	2.15	MGD
AVG. FLOW	4.00	MGD
MAX. FLOW	10.00	MGD

SPARE PARTS LIST			
QTY	PART NUMBER	DESCRIPTION	COMMENTS
3	501343	WINDO-WELD ROUND RIBBON SEALER Ø3/8", 1X ROLL IS 15FT	3M

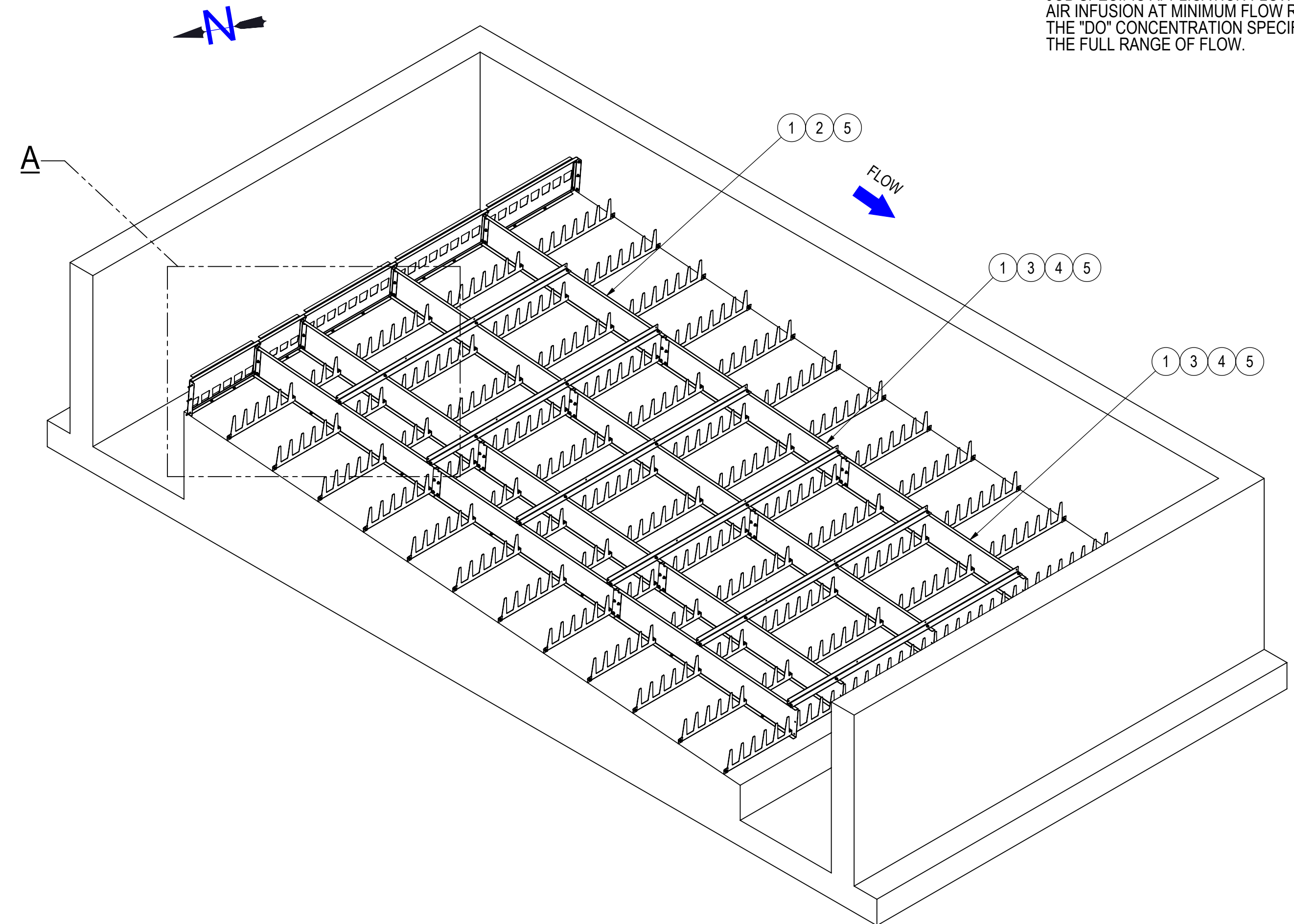
PARTS LIST					
ITEM	QTY	PART NUMBER	DESCRIPTION	WEIGHT LBS	COMMENTS
1	22	501343	WINDO-WELD ROUND RIBBON SEALER Ø3/8", 1X ROLL IS 15FT	-	3M
2	1	22031-EA-SA01	SHOP ASSEMBLY, 17' X 8' ECO-AIR LPCA INSERT, FRONT SECTION (5 CHANNEL)	603.33	JMS
3	2	22031-EA-SA02	SHOP ASSEMBLY, 17' X 8' ECO-AIR LPCA INSERT, MID & REAR SECTION (5 CHANNEL)	448.55	JMS
4	24	H00-038X100-00	3/8" X 1" HHMB W/2FW, LNUT	-	304 SS
5	148	73-014-820-00	ANCHOR MECHANICAL 3/8" - 16 UNC X 3" - 304 SS (WEDGE ANCHOR)	-	304 SS

NOTES:

- PARTS LIST INDICATES QTY. FOR ONE ASSEMBLY. TOTAL ASSEMBLIES REQ'D FOR JOB 1.
- MATERIALS OF CONSTRUCTION TO BE T-304 STAINLESS STEEL.
- CONCRETE BASIN IS BY OTHERS.
- INLETS, OUTLETS, INFLUENT, AND EFFLUENT CHAMBERS TO BE SIZED (BY OTHERS) TO NOT EXCEED INDICATED MAX WATER ELEVATION.
- INFLUENT CHAMBERS MAY NEED TO INCLUDE ENERGY DISSIPATION DEVICE TO REDUCE WATER VELOCITY IMPACT ON INFLUENT DISTRIBUTION AND TO EVENLY DISTRIBUTE FLOW TO INFLUENT FLOW CONTROL GATES.
- SLOPE OF CONCRETE FLOOR AND LEVEL OF CONCRETE FLOOR ACROSS WIDTH OF BASIN IS CRITICAL TO PROPER SYSTEM PERFORMANCE.
- CONCRETE SURFACE TO BE FLAT AND SMOOTH (1/4" IN 10' IN ALL DIRECTIONS), AND IS CRITICAL FOR PROPER SEALING.
- PLACE SEAL MATERIAL BETWEEN MATING STEEL AND CONCRETE SURFACES BEFORE ANCHORING.
- BY MFR: THE PATENT PENDING LPCA INFLUENT FLOW CONTROL GATE & AIR INFUSION PLATES WILL BE TRAPEZOIDAL SHAPED. THEY ARE DESIGNED FOR JOB SPECIFIC APPLICATION FLOW RATES TO OPTIMIZE AIR INFUSION AT MINIMUM FLOW RATES & ACHIEVE THE "DO" CONCENTRATION SPECIFIED THROUGHOUT, THE FULL RANGE OF FLOW.



DETAIL A
COMPONENT IDENTIFICATION



IN FAB DETAIL

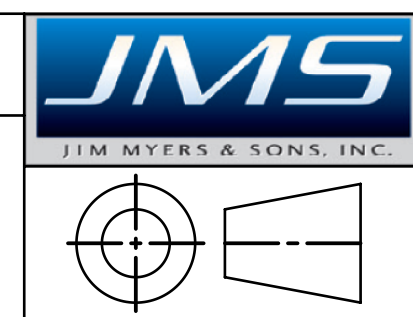
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TOLERANCES ARE AS FOLLOWS:
FIELD/SHOP ASSEMBLY ± 1/4"
WELD OR BURN ± 1/8"
SAW, SHEAR, ETC. ± 1/16"
DECIMAL .XX ± .01"
DECIMAL .XXX ± .005"
ANGLES ± .5°

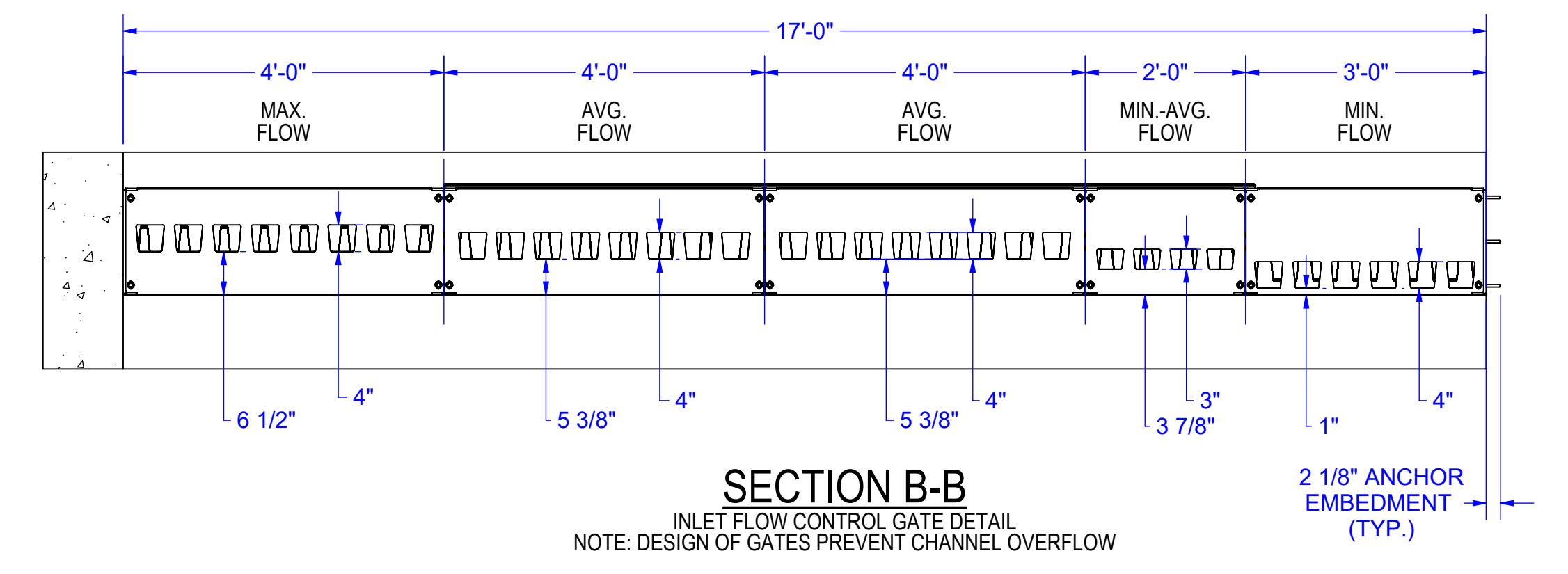
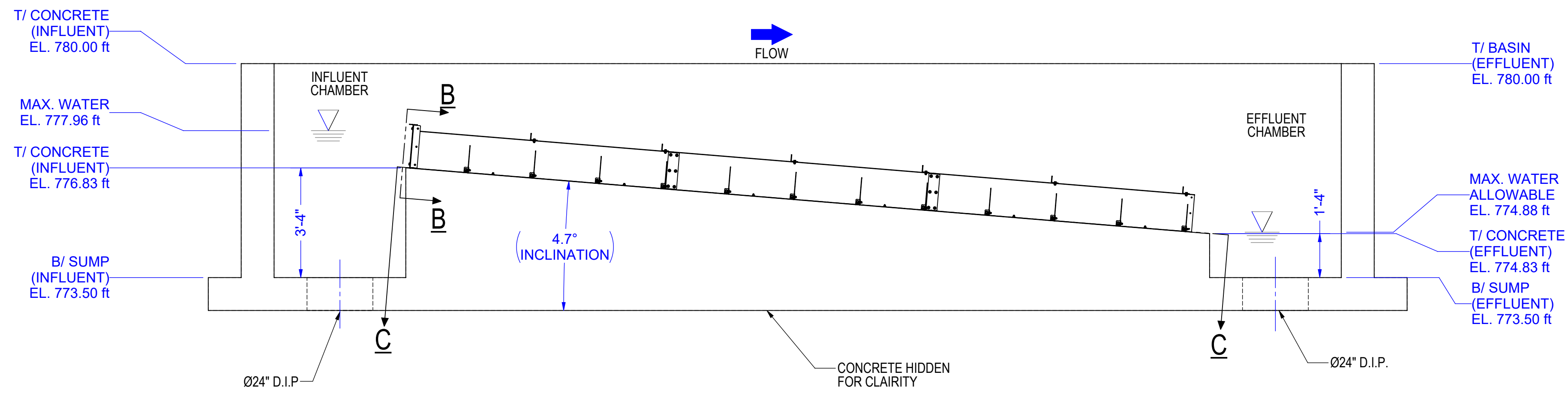
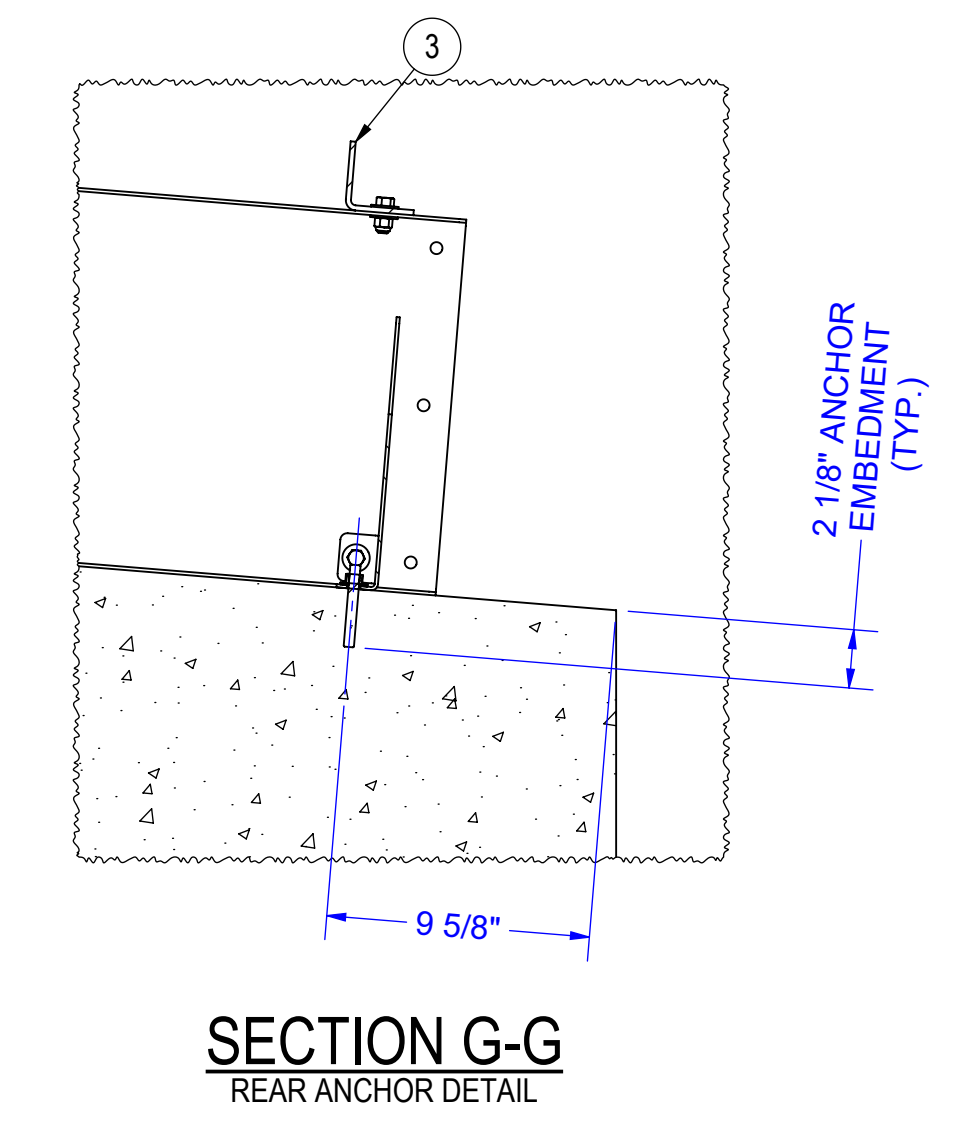
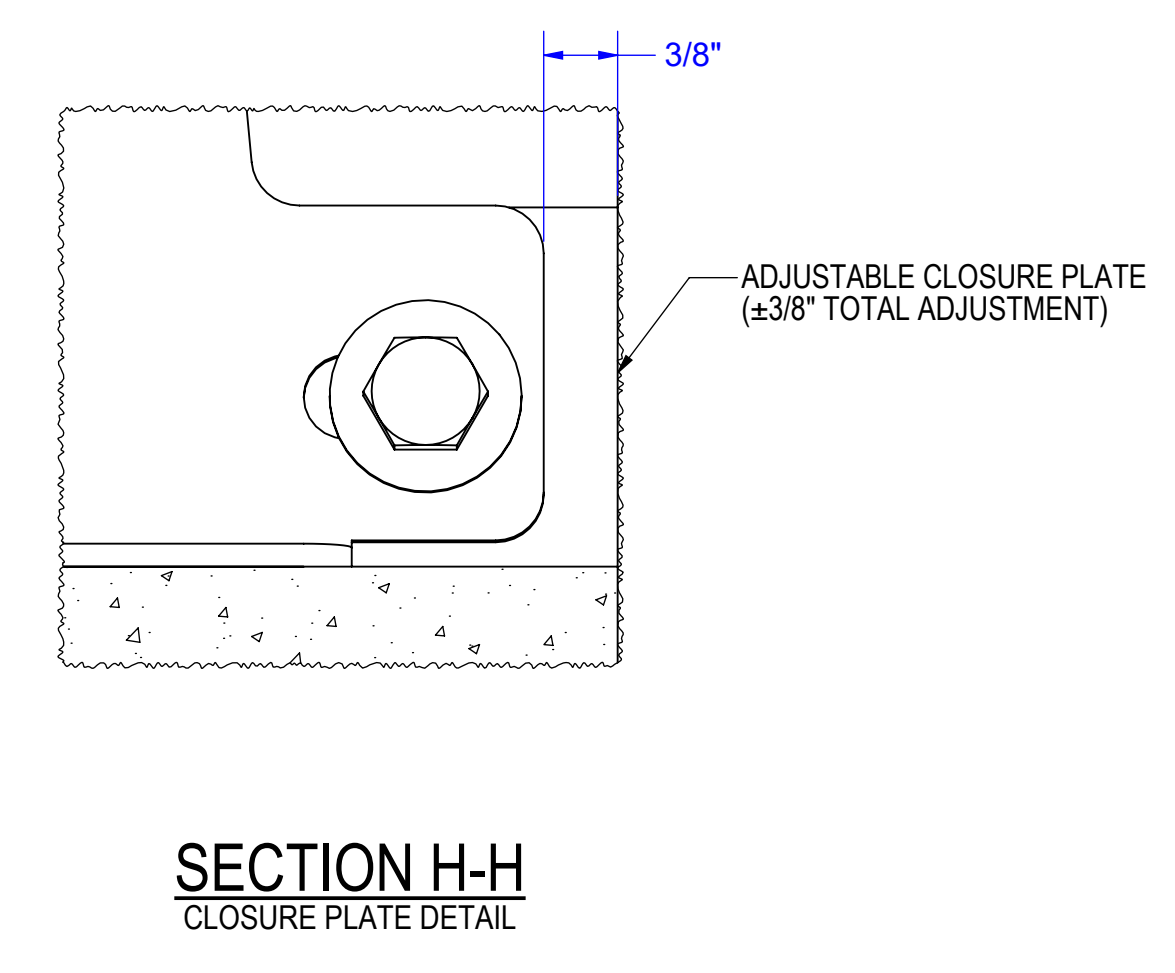
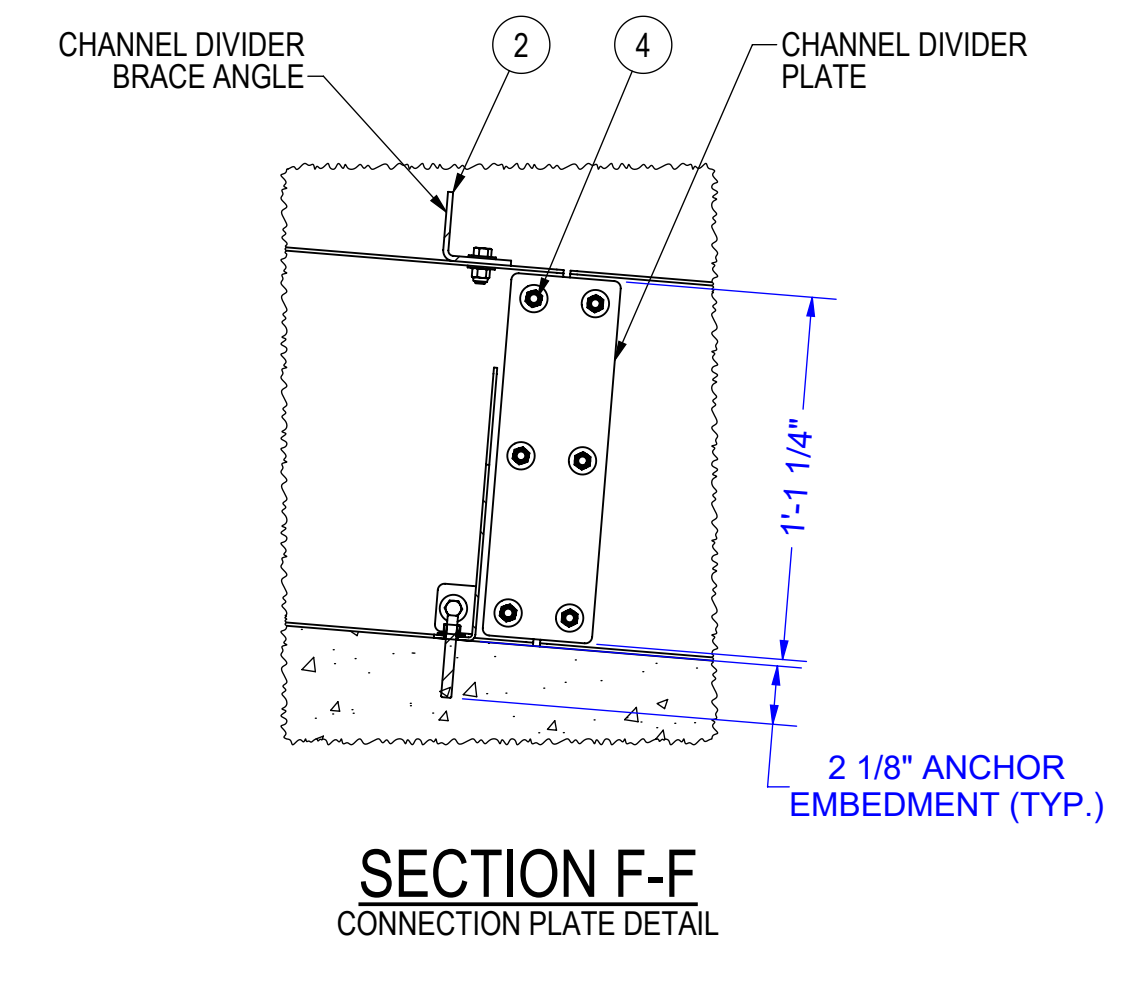
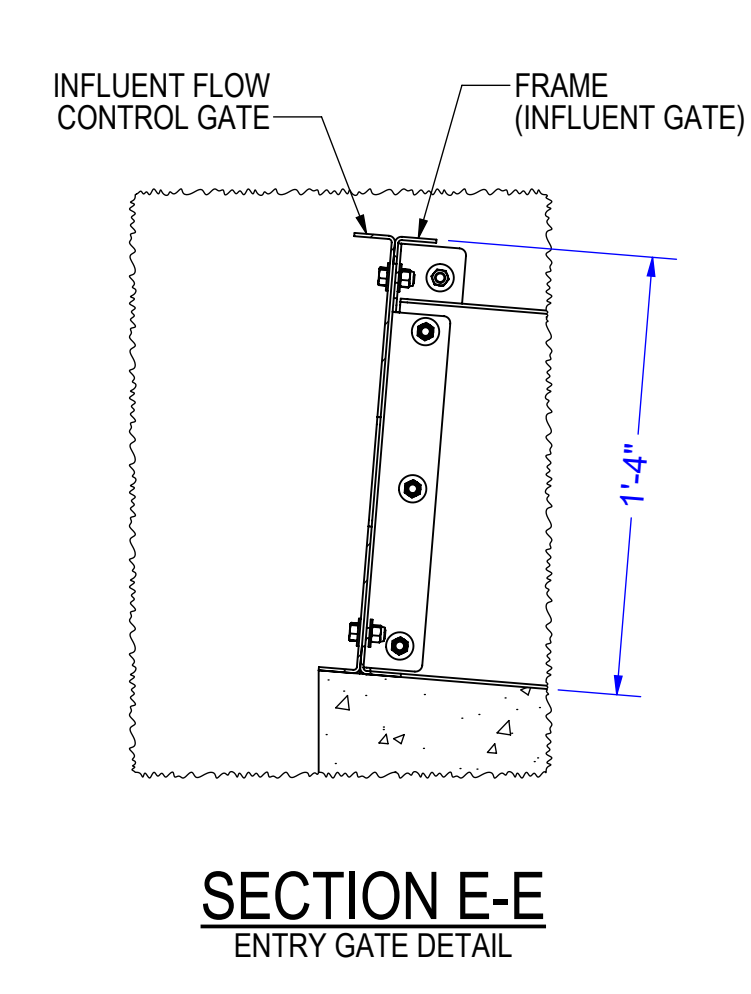
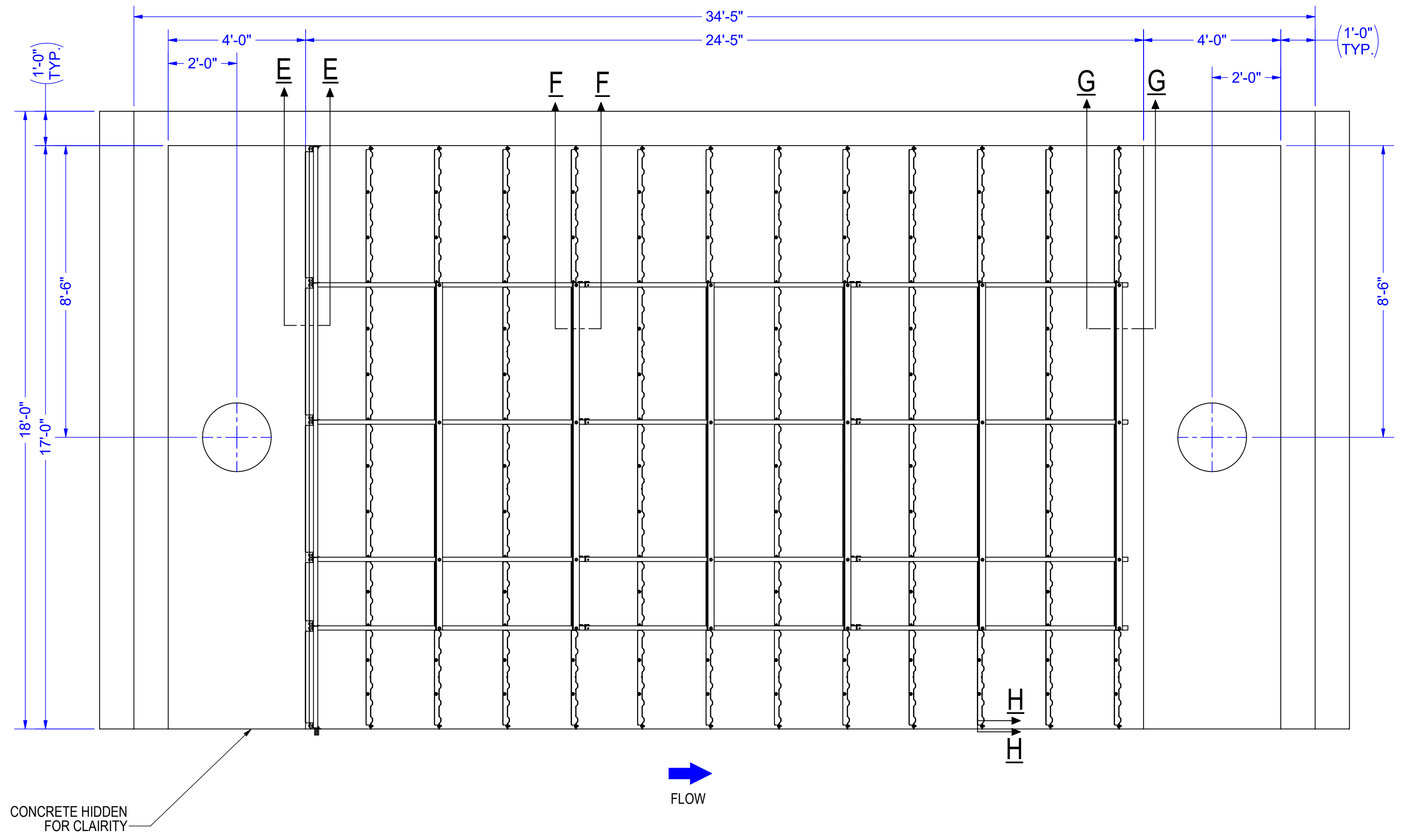
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△	06/17/22	AWM	ORIGINAL ISSUE

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DATE:	06/08/22	JOB LOC.:	JEFFERSON, GA
CKD. BY:		CUSTOMER:	CITY OF JEFFERSON
DATE:	06/17/22	ENG FIRM:	CIVIL ENGINEERING CONSULTANTS (CEC)

CONTROL NO:	22031-GA01
DRAWING OF:	GENERAL ARRANGEMENT, 17' X 24' ECO-AIR (LPCA)



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1 OF 3	A



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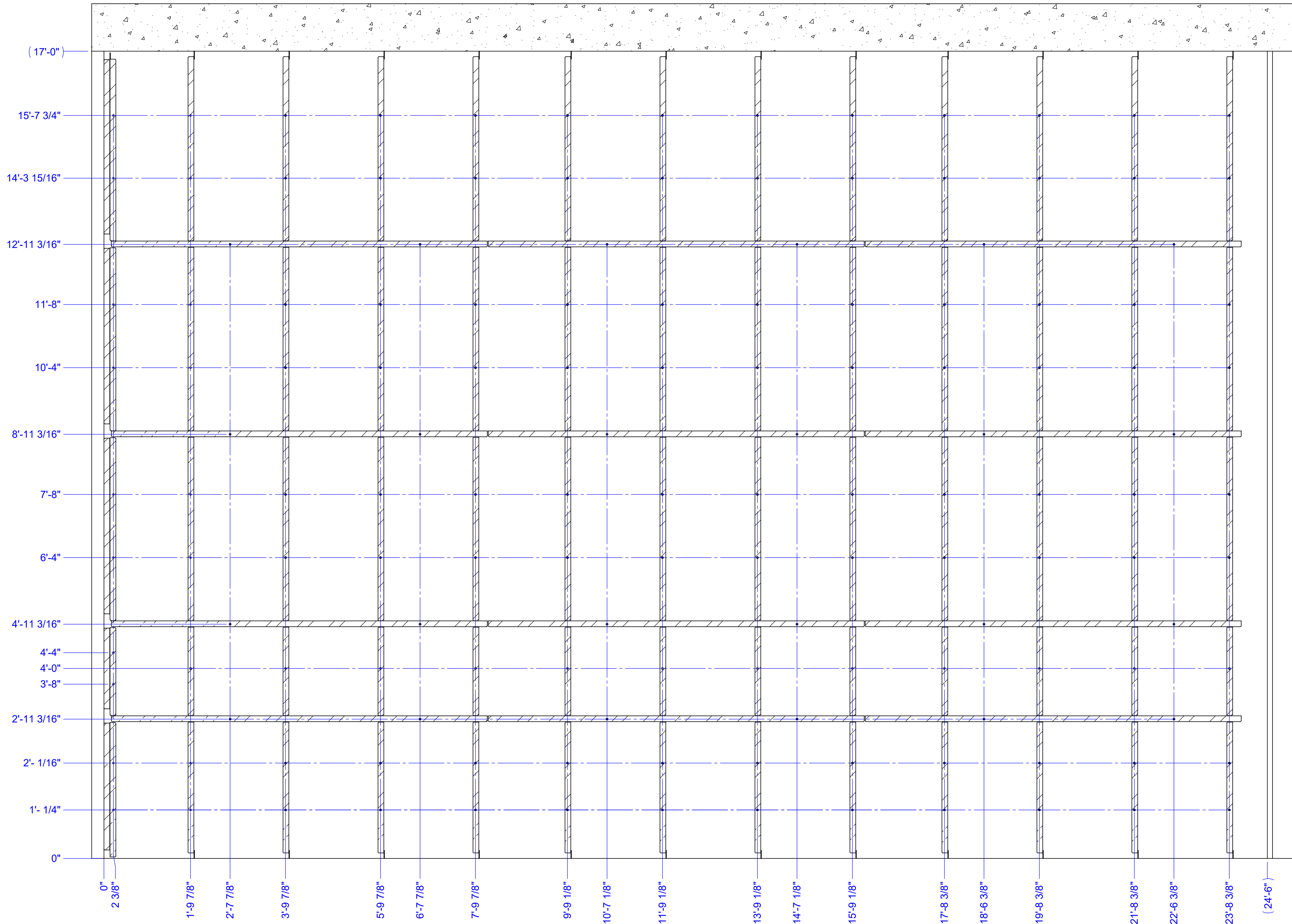
UNLESS OTHERWISE SPECIFIED:
ALL DIMENSIONS ARE IN INCHES.
TOLERANCES ARE AS FOLLOWS:
FIELD/SHOP ASSEMBLY ± 1/4"
WELD OR BURN ± 1/8"
SAW, SHEAR, ETC. ± 1/16"
DECIMAL .XX ± .01"
DECIMAL .XXX ± .005"
ANGLES ± .5°

REV	DATE	BY	REVISION DESCRIPTION
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		A



NOTE: ORDINATE DIMENSIONS SHOW ANCHOR LOCATIONS NORMAL TO THE MATING SURFACE

SECTION C-C
ANCHOR LAYOUT DETAIL

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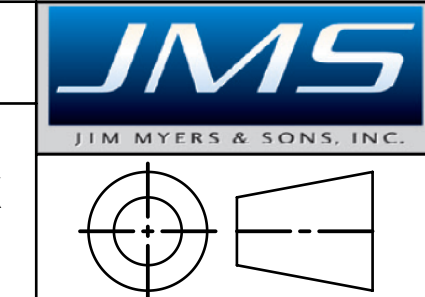
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TOLERANCES ARE AS FOLLOWS:
FIELD/SHOP ASSEMBLY ± 1/4"
WELD OR BURN ± 1/8"
SAW, SHEAR, ETC. ± 1/16"
DECIMAL .XX ± .01"
DECIMAL .XXX ± .005"
ANGLES ± 5°

REV	DATE	BY	REVISION DESCRIPTION
△	06/17/22	AWM	ORIGINAL ISSUE

DRAWN BY:	AWM	JOB NAME:	JEFFERSON I-85 WRF
DATE:	06/08/22	JOB LOC.:	JEFFERSON, GA
CKD. BY:		CUSTOMER:	CITY OF JEFFERSON
DATE:	06/17/22	ENG FIRM:	CIVIL ENGINEERING CONSULTANTS (CEC)

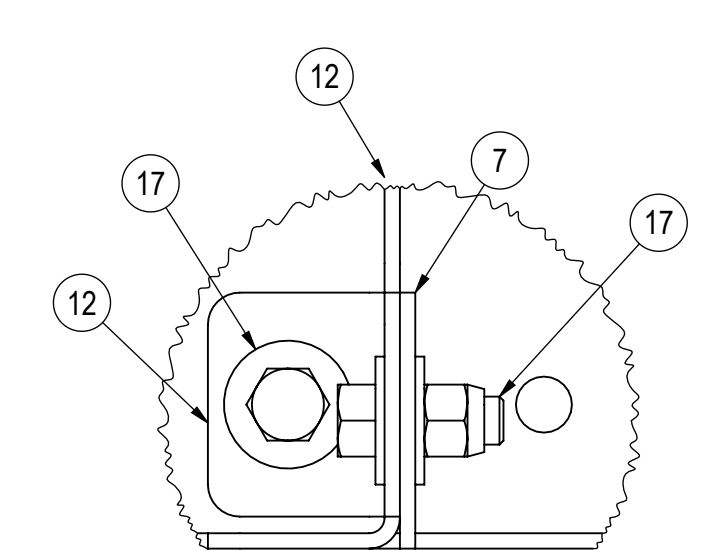
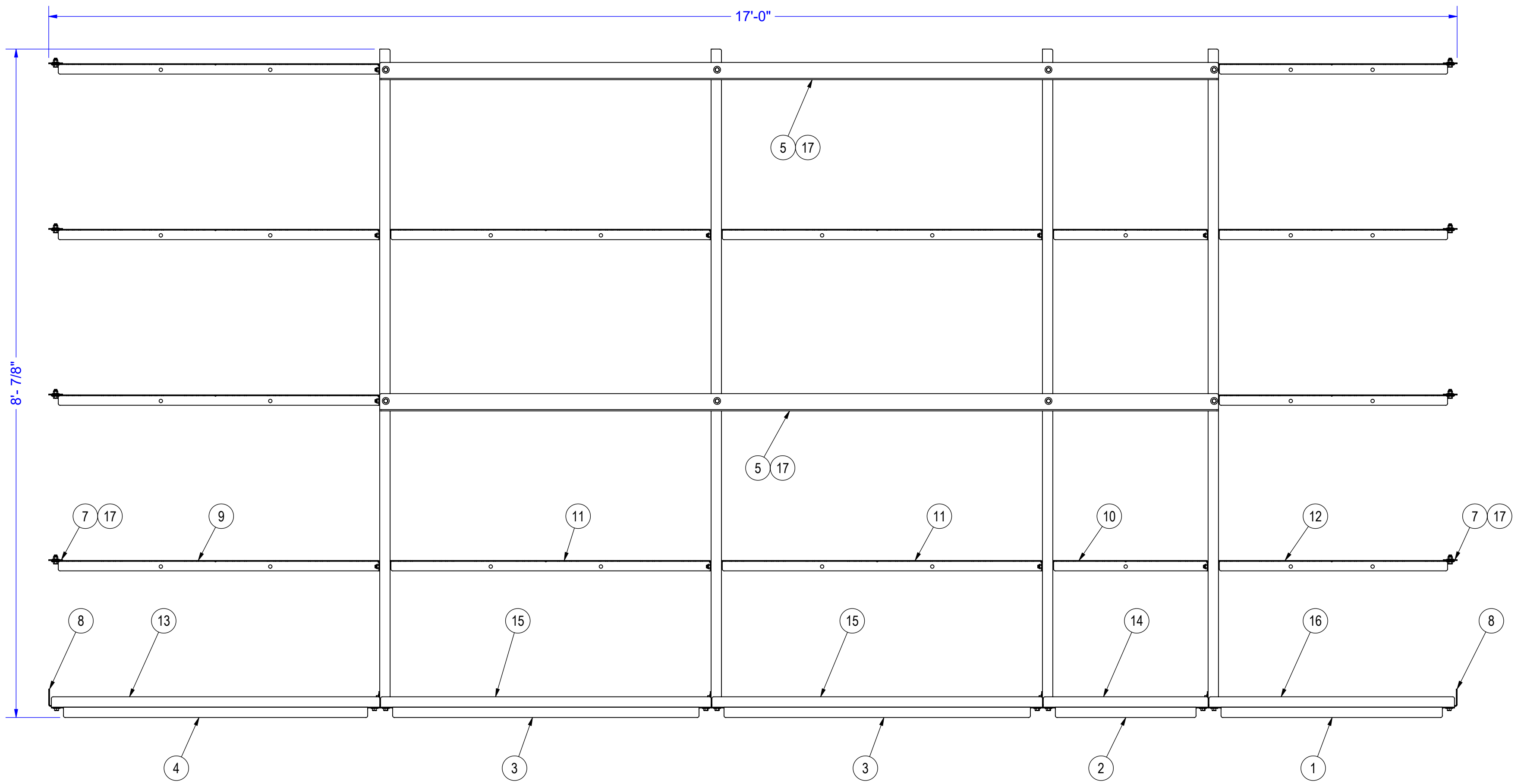
CONTROL NO:	22031-GA01
DRAWING OF:	GENERAL ARRANGEMENT, 17' X 24' ECO-AIR (LPCA)



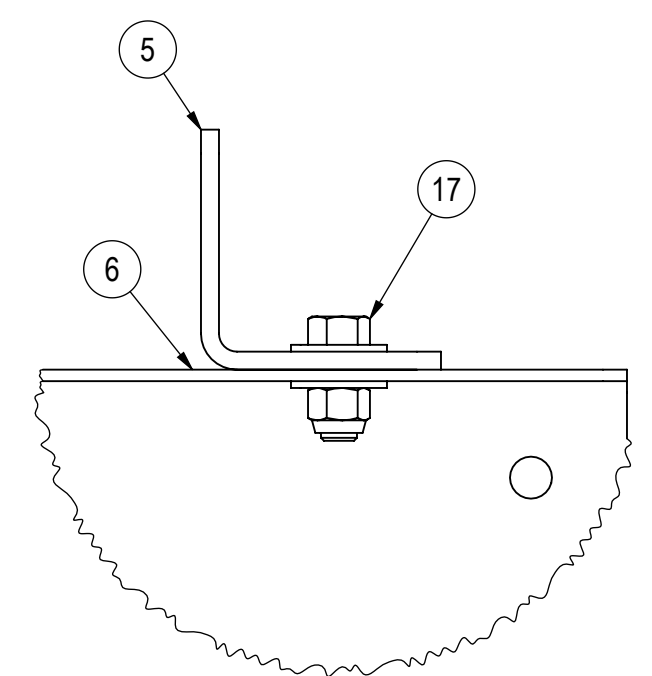
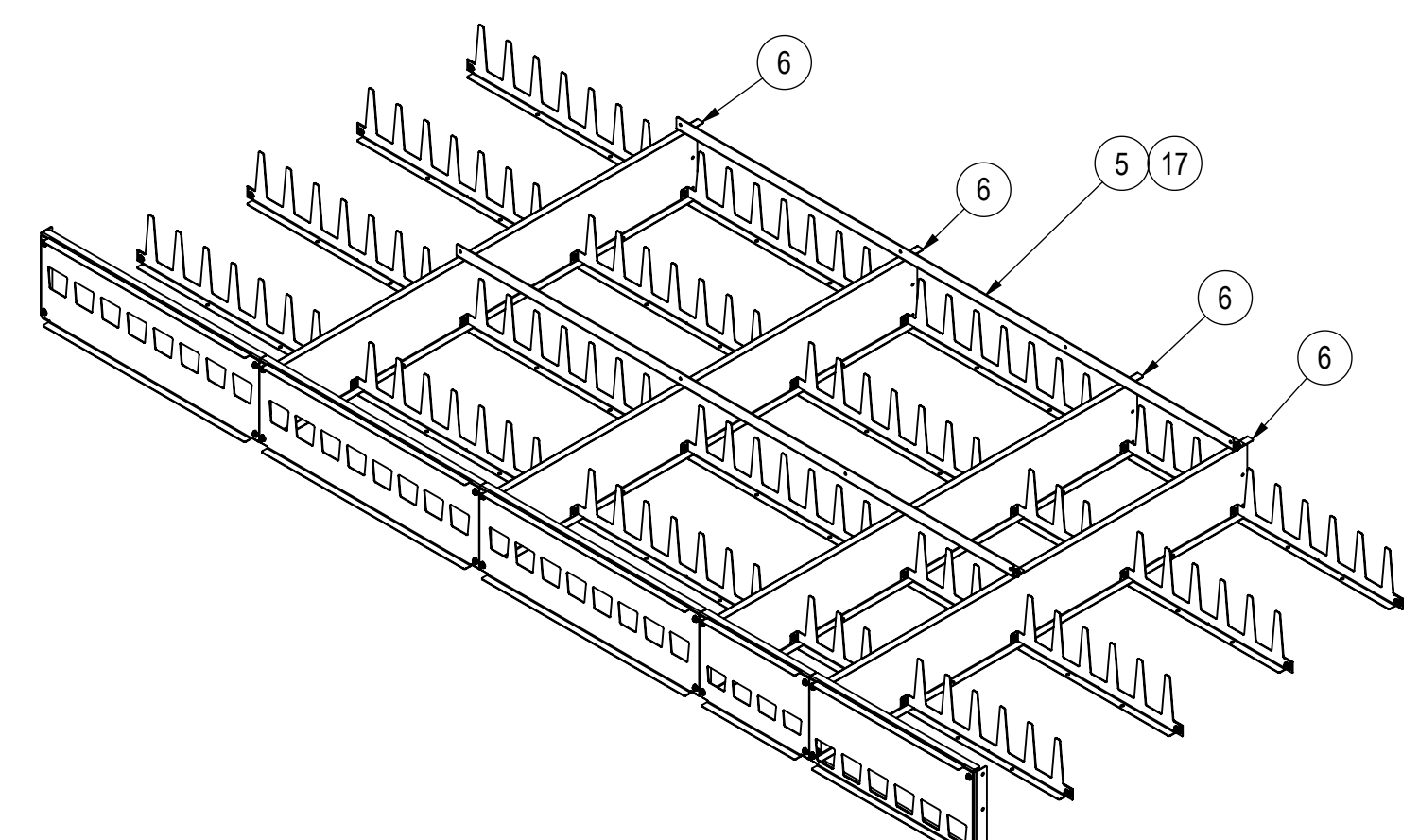
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SHEET #	REVISION
3 OF 3	A

PARTS LIST					
ITEM	QTY.	PART NUMBER	DESCRIPTION	WEIGHT LBS	COMMENTS
1	1	22031-EA-F01	INFLUENT FLOW CONTROL GATE, MIN. FLOW, PL 11GA X 10'-1 1/2" X 10'-1 1/2"	19.26	304L SS
2	1	22031-EA-F02	INFLUENT FLOW CONTROL GATE, MIN.-AVG. FLOW, PL 11GA X 3'-11 7/8" X 18 9/16"	13.36	304L SS
3	2	22031-EA-F03	INFLUENT FLOW CONTROL GATE, AVG. FLOW, PL 11GA X 3'-11 9/16" X 1'-6 9/16"	26.13	304L SS
4	1	22031-EA-F04	INFLUENT FLOW CONTROL GATE, MAX. FLOW, PL 11GA X 3'-11 9/16" X 1'-6 9/16"	25.93	304L SS
5	2	22031-EA-F05	CHANNEL BRACE ANGLE, PL 0.1875 X 1'-3 3/4" X 1'-11 7/8"	31.00	304L SS
6	4	J40F000-01	CHANNEL DIVIDER, PL 11GA X 16.29 X 95.00	53.80	304L SS
7	8	J40F001-01	AERATION CLOSURE PLATE, PL 11GA X 2" X 2"	0.13	304L SS
8	2	J40F003-01	CLOSURE ANGLE, PL 11GA X 4 1/8" X 1'-3 1/2"	2.00	304L SS
9	4	J40F011-01	AIR INFUSION PLATE, LEFT, 11GA X 11.270 X 48.832	9.32	304L SS
10	4	J40F015-01	AIR INFUSION PLATE, MIDDLE, 11GA X 11.270 X 26.415	4.73	304L SS
11	8	J40F019-01	AIR INFUSION PLATE, MIDDLE, 11GA X 11.270 X 50.415	9.42	304L SS
12	4	J40F025-01	AIR INFUSION PLATE, RIGHT, 11GA X 11.270 X 36.832	6.90	304L SS
13	1	J40F035-01	FRAME, INFLUENT GATE, LEFT, PL 11GA X 18.540 X 49.582	9.61	304L SS
14	1	J40F039-01	FRAME, INFLUENT GATE, MIDDLE, PL 11GA X 18.540 X 27.915	6.72	304L SS
15	2	J40F043-01	FRAME, INFLUENT GATE, MIDDLE, PL 11GA X 18.540 X 51.915	10.55	304L SS
16	1	J40F049-01	FRAME, INFLUENT GATE, RIGHT, PL 11GA X 18.540 X 37.582	7.68	304L SS
17	64	H00-038X100-00	3/8" X 1" HHMB W/2FW, LNUT	-	304 SS

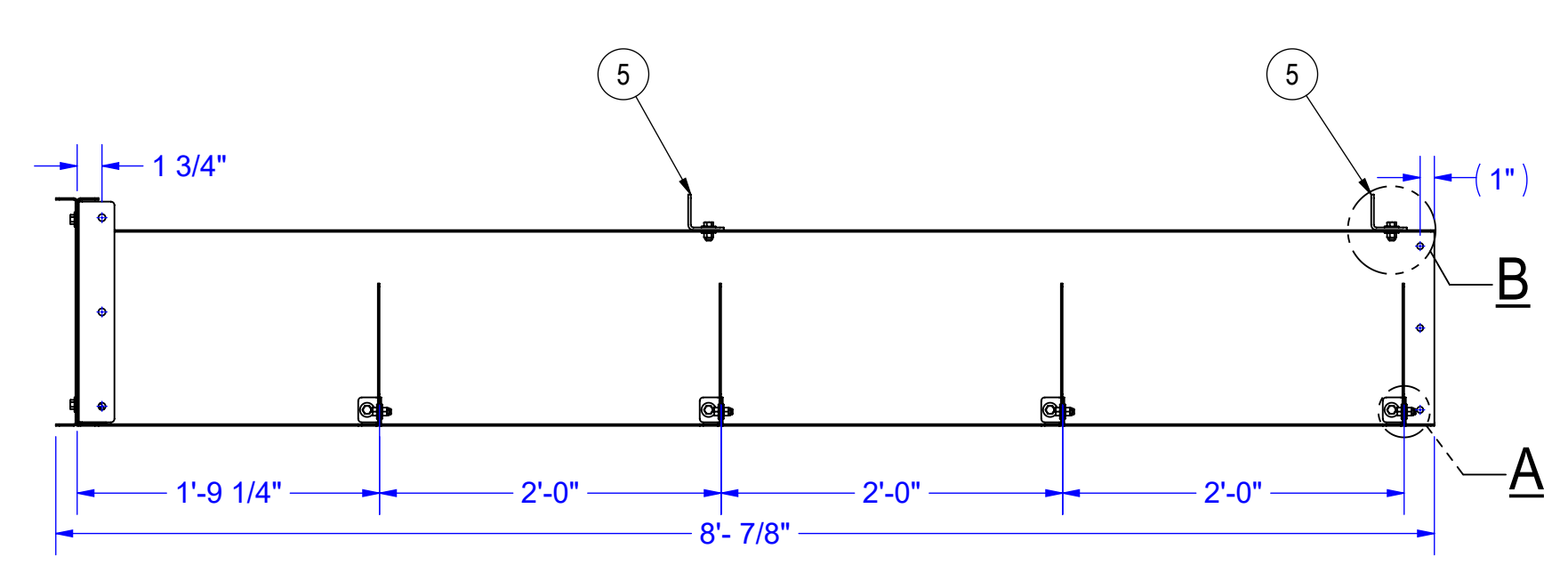
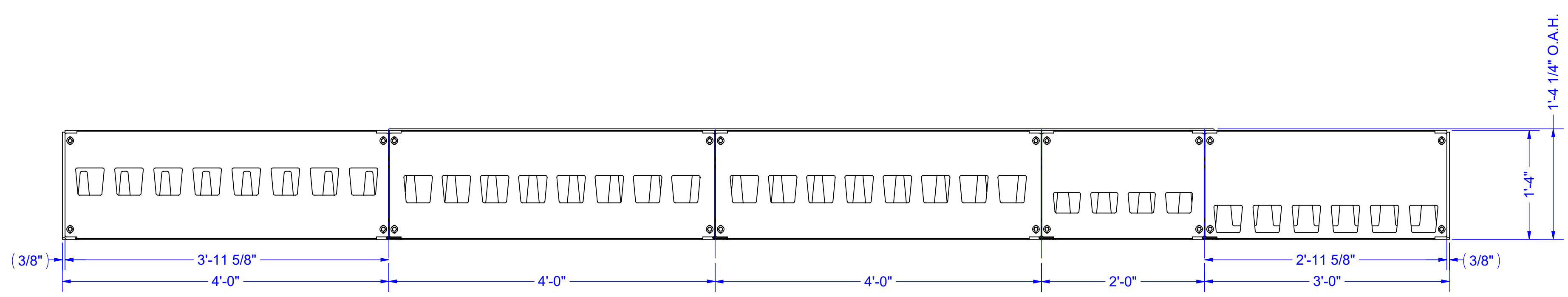
NOTES:
 1. PARTS LIST INDICATES QTY. FOR ONE ASSEMBLY. TOTAL ASSEMBLIES REQUIRED FOR JOB: 1.
 2. WEIGHT ~ 603.33 LBS.



DETAIL A
AIR INFUSION AND CLOSURE PLATE



DETAIL B
CHANNEL DIVIDER BRACE ANGLE



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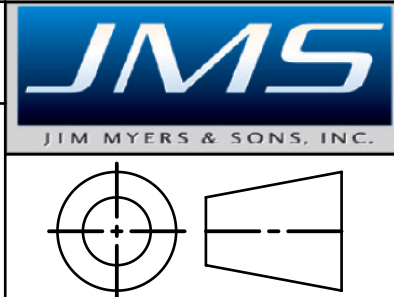
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 SAW, SHEAR, ETC. ± 1/16"
 DECIMAL .XX ± .01"
 DECIMAL .XXX ± .005"
 ANGLES ± .5°

REV	DATE	BY	REVISION DESCRIPTION
△	06/17/22	AWM	ORIGINAL ISSUE

DRAWN BY:	AWM	JOB NAME:	JEFFERSON I-85 WRF
DATE:	06/08/22	JOB LOC.:	JEFFERSON, GA
CKD. BY:		CUSTOMER:	CITY OF JEFFERSON
DATE:	06/17/22	ENG FIRM:	CIVIL ENGINEERING CONSULTANTS (CEC)

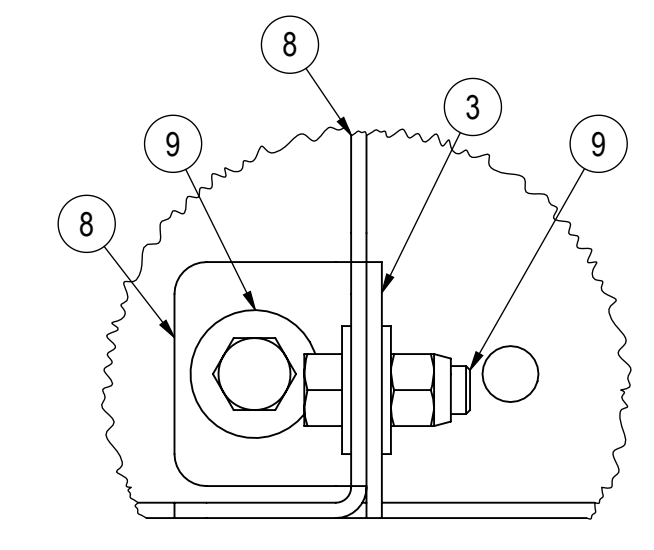
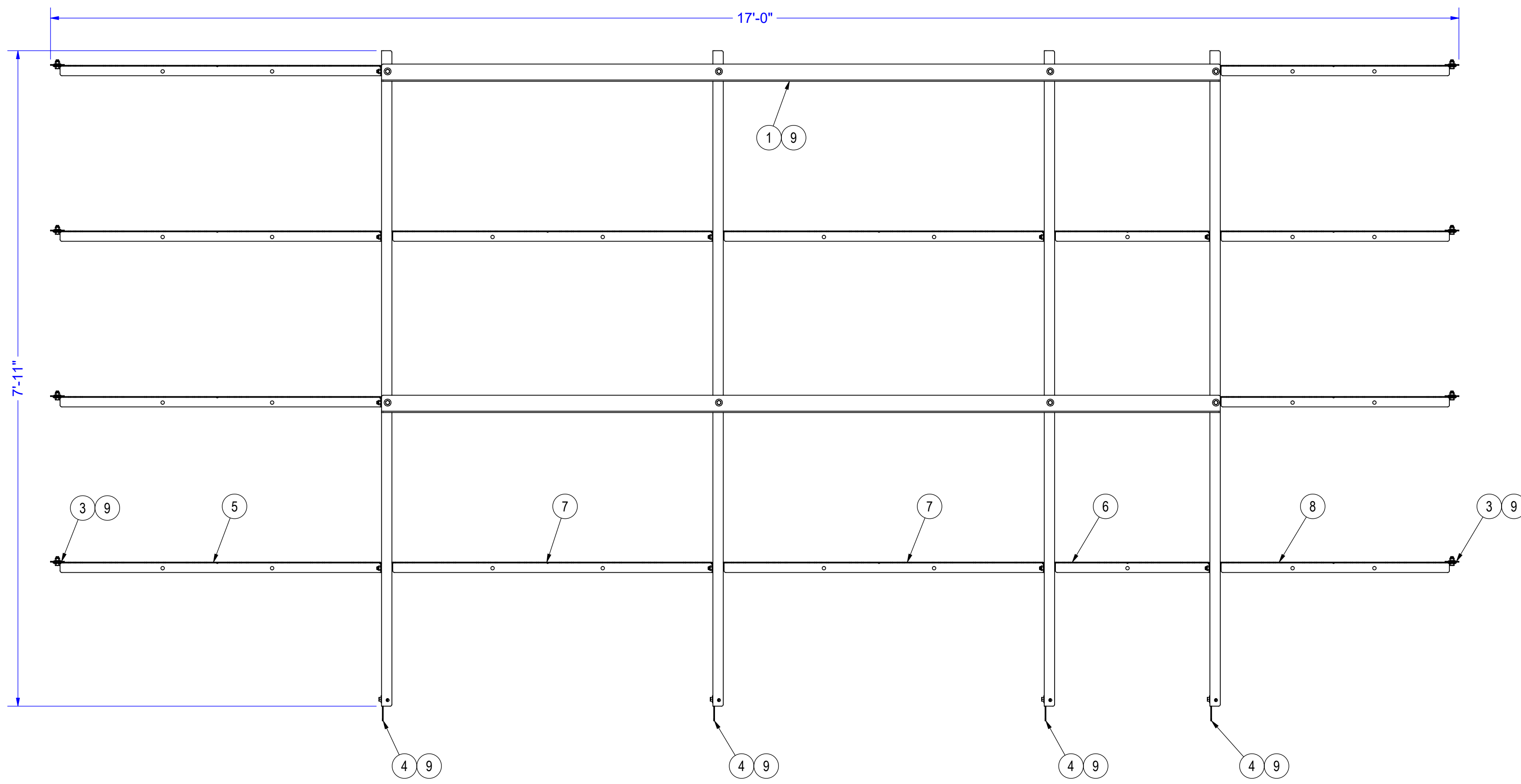
CONTROL NO:
22031-EA-SA01
 DRAWING OF:
 SHOP ASSEMBLY, 17' X 8' ECO-AIR LPCA INSERT, FRONT SECTION (5 CHANNEL)



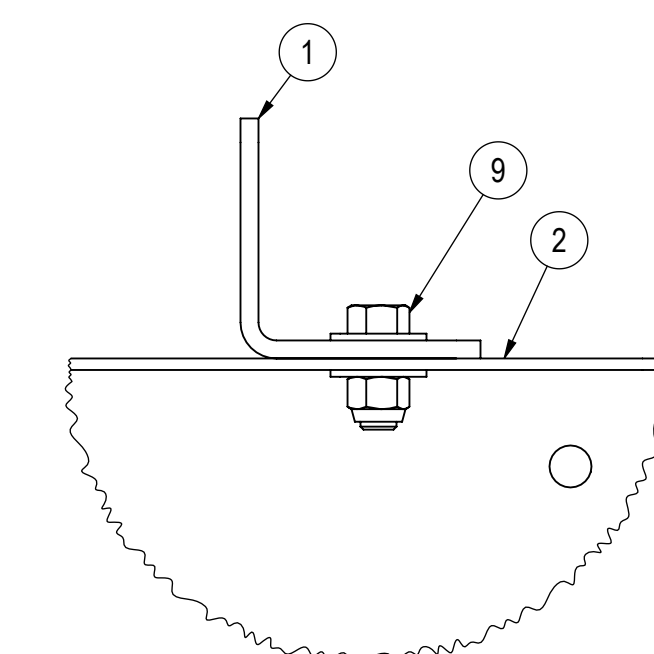
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 SHEET # **1 OF 1**
 REVISION **A**

PARTS LIST					
ITEM	QTY.	PART NUMBER	DESCRIPTION	WEIGHT LBS	COMMENTS
1	2	22031-EA-F05	CHANNEL BRACE ANGLE, PL 0.1875 X 4 5/8" X 10'-1 1/2"	31.00	304L SS
2	4	J40F000-01	CHANNEL DIVIDER, PL 11GA X 16.29 X 95.00	53.80	304L SS
3	8	J40F001-01	AERATION CLOSURE PLATE, PL 11GA X 2" X 2"	0.13	304L SS
4	4	J40F002-01	CHANNEL CONNECTOR PLATE, PL 11GA X 4" X 1'-1 1/4"	1.77	304L SS
5	4	J40F011-01	AIR INFUSION PLATE, LEFT, 11GA X 11.270 X 48.832	9.32	304L SS
6	4	J40F015-01	AIR INFUSION PLATE, MIDDLE, 11GA X 11.270 X 26.415	4.73	304L SS
7	8	J40F019-01	AIR INFUSION PLATE, MIDDLE, 11GA X 11.270 X 50.415	9.42	304L SS
8	4	J40F025-01	AIR INFUSION PLATE, RIGHT, 11GA X 11.270 X 36.832	6.90	304L SS
9	44	H00-038X100-00	3/8" X 1" HHMB W/2FW, LNUT	-	304 SS

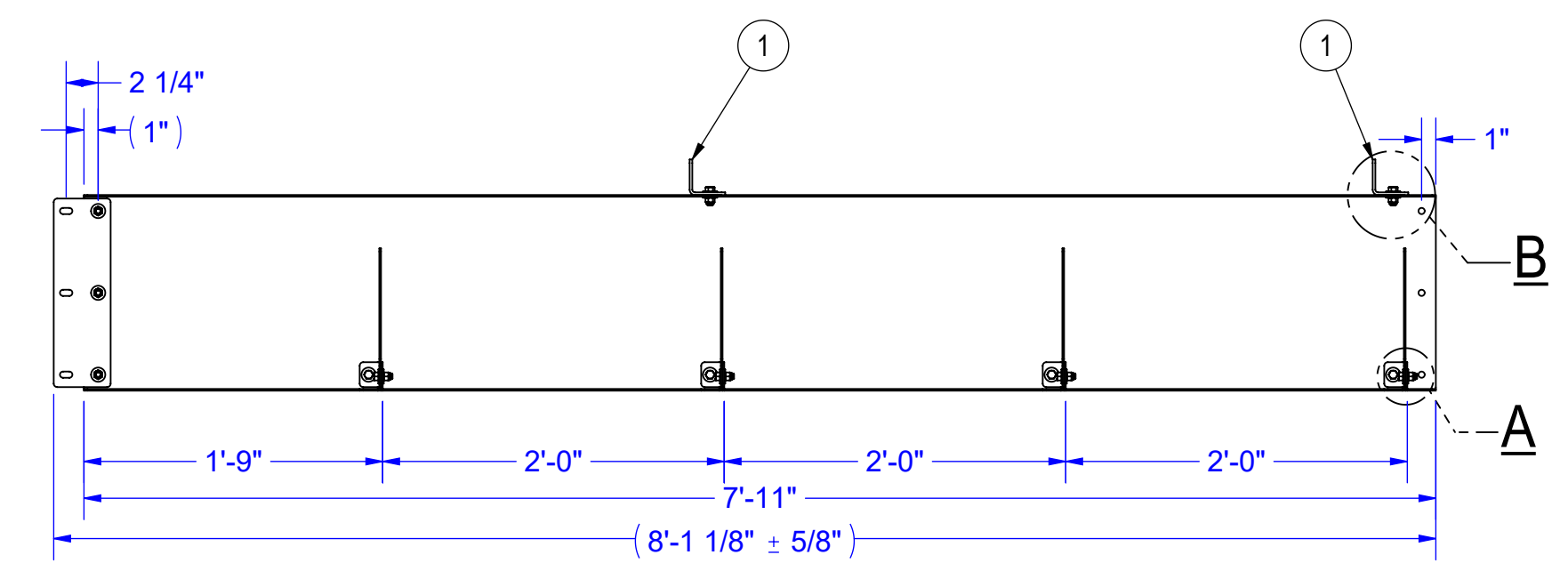
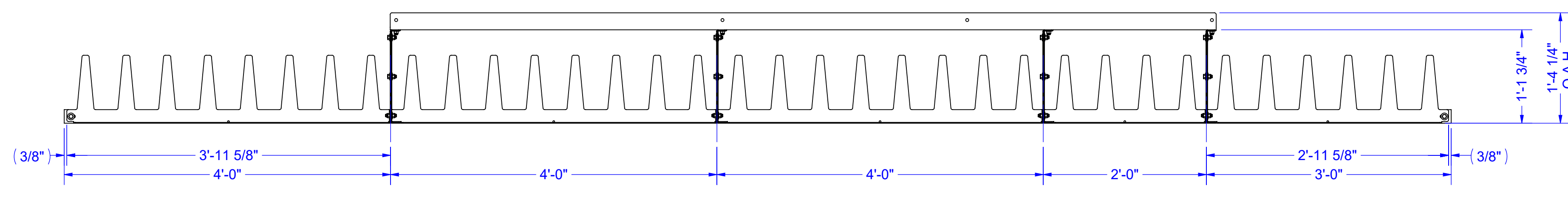
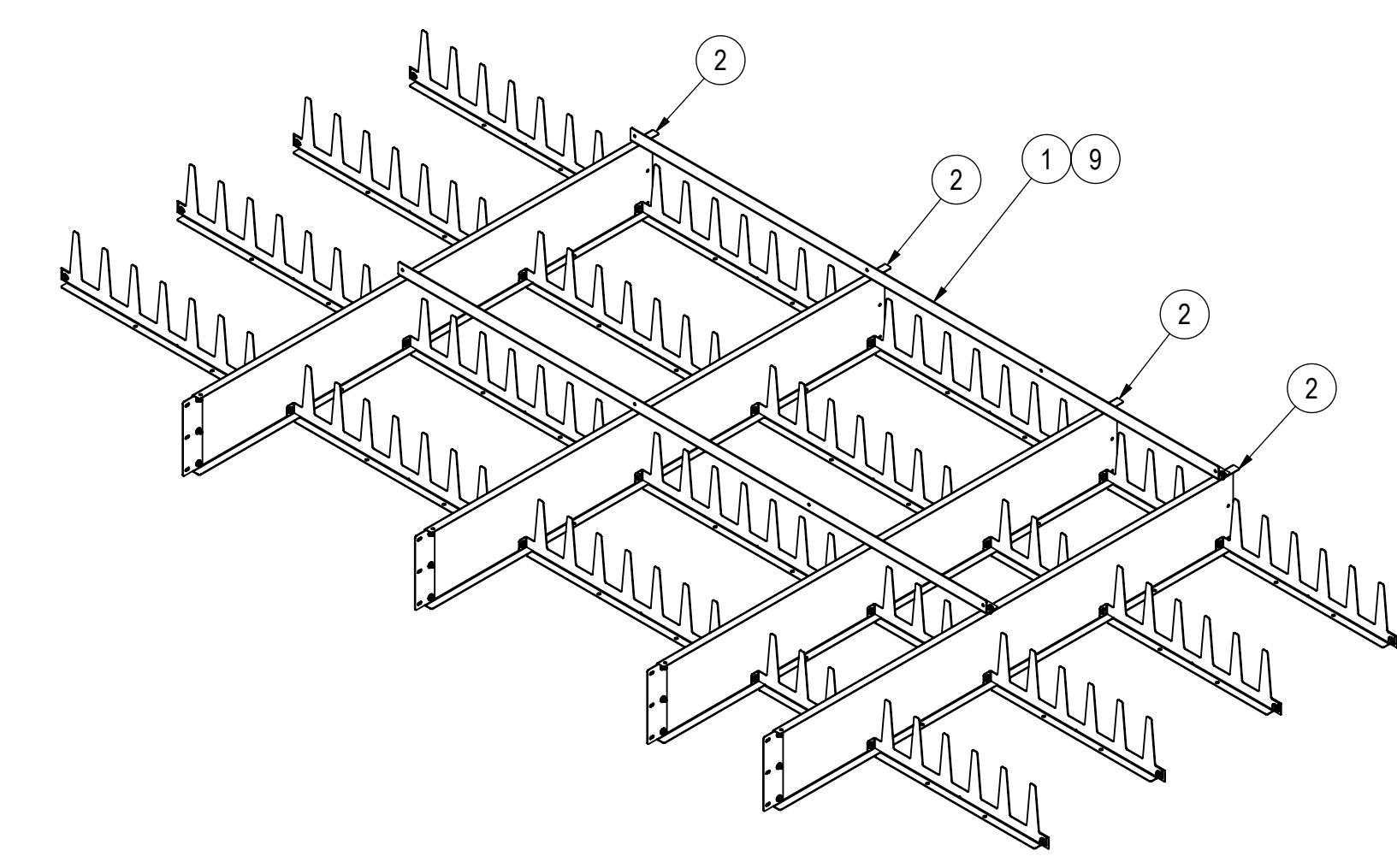
NOTES:
 1. PARTS LIST INDICATES QTY. FOR ONE ASSEMBLY. TOTAL ASSEMBLIES REQUIRED FOR JOB: 2.
 2. WEIGHT ~ 448.55 LBS.



DETAIL A
AIR INFUSION AND CLOSURE PLATE



DETAIL B
CHANNEL DIVIDER BRACE ANGLE



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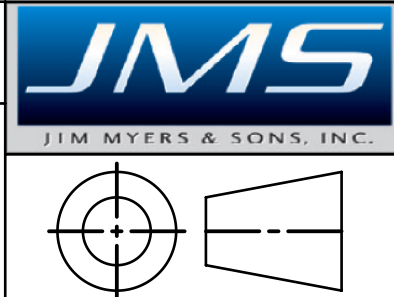
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 DECIMAL .XX ± .01"
 DECIMAL .XXX ± .005"
 ANGLES ± .5°

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DRAWN BY:	AWM	JOB NAME:	JEFFERSON I-85 WRF
DATE:	06/08/22	JOB LOC.:	JEFFERSON, GA
CKD. BY:		CUSTOMER:	CITY OF JEFFERSON
DATE:	06/17/22	ENG FIRM:	CIVIL ENGINEERING CONSULTANTS (CEC)

CONTROL NO:
22031-EA-SA02
 DRAWING OF:
 SHOP ASSEMBLY, 17' X 8' ECO-AIR LPCA INSERT, MID & REAR SECTION (5 CHANNEL)



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 SHEET # **1 OF 1**
 REVISION **A**