



PROJECT COMPLETION PACKAGE



**Clarifier Retrofit
Supply and Installation of Tube Settlers and Support Beams**

**Town of Norman Wells Water Treatment Plant
Northwest Territories**

CONTACT INFORMATION

CONTACT INFORMATION	
SUBMISSION DATE:	October 26, 2022
SUBMITTED TO:	Hugo Pabke Utilities Manager Town of Norman Wells PO Box 5, Mackenzie Drive, Norman Wells, Northwest Territories Phone: 867.587.3700 (ext. 1015) utilitiesmanager@normanwells.com
DOCUMENT TYPE:	AWI Project Completion Package
PROJECT:	Clarifier Retrofit Supply and Installation of Tube Settlers and Support Beams Town of Norman Wells WTP, Northwest Territories AWI-724
SUBMITTED BY:	Anthratech Western Inc. (AWI) #432, 2880 – 45 Avenue S.E. Calgary, Alberta T2B 3M1 Phone: 403.255.7377 Fax: 403.255.3129
AWI CONTACTS:	Francis Lee, PMP Project Manager Cell: 250.837.7831 francisl@awifilter.com
	Philip Hambley Vice President and Director of Product Development Phone: 403.204.5230 Cell: 403.620.0572 philiph@awifilter.com

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1 WARRANTIES

1.1 AWI LIMITED WARRANTY

AWI LIMITED EQUIPMENT WARRANTY

BETWEEN: **TOWN OF NORMAN WELLS** (“the Owner”), a Municipality organized and existing under the laws of the Northwest Territories, with its head office located in the Town of Norman Wells, Northwest Territories, Canada.

AND: **ANTHRATECH WESTERN INCORPORATED** (“AWI”), a corporation organized and existing under the laws of Alberta, with its head office located in the City of Calgary, Alberta, Canada.

This warranty is made and effective this 14th day of October, 2022 for one clarifier at the Town of Norman Wells Water Treatment Plant.

LIMITED WARRANTY

Equipment designed, manufactured and sold by Anthrtech Western Inc. (hereinafter referred to as AWI) is designed for many years of trouble-free service.

For benefit of the Owner, AWI warrants all Aluminum Components and Tube Settlers supplied by AWI for this facility to be free from defects in workmanship and materials. The term of the AWI Limited Equipment Warranty is 12 months following commissioning of the installed equipment or 18 months after delivery of equipment to site, whichever comes first.

AWI Limited Equipment Warranty coverage includes:

- a) identification of the cause of the warranty claim; and
- b) no charge repair or replacement of equipment (including delivery costs to site) deemed by AWI to be defective as a result of workmanship or materials. Repair or replacement shall not be construed to include labour for removal or reinstallation of the equipment deemed defective.

WARRANTY CONDITIONS

Obligation by AWI under this limited equipment warranty is conditional upon adherence to the following conditions. Failure to follow recommendations may void the limited equipment warranty.

1. An AWI Installation Specialist and labour crew shall complete installation of the AWI supplied components.
2. This limited warranty does not apply to equipment or parts that have been altered, repaired or installed in a manner other than that stipulated by AWI, nor those subjected to misuse, abuse, neglect, accident, scaling or plugging.
3. Exclusions to this warranty include such consumables as materials normally replaced, adjusted or added during maintenance events.

4. Correction of minor misfits by the moderate use of hand and power tools, as well as a moderate amount of other minor adjustments and alterations, are considered a normal part of installation and/or erection. Such activity will not be accepted as reason for a warranty claim. Corrections or adjustments considered to be substantial by the Owner shall be reported immediately to AWI within 10 business days. Evaluation and investigation will be promptly undertaken by AWI and appropriate remedies will be recommended or applied in a timely manner.
5. The Owner shall have a site-specific Standard Operating Procedure (SOP) for returning a clarifier to service following a short or extended period of being offline and shall follow the SOP as required during commissioning.
6. The Owner shall notify AWI within 10 business days upon discovery of defects or first known instance of an issue. Following notification, AWI will attend site to investigate and evaluate the cause of the warranty claim. If it is concluded the reported warranty claim is not related to AWI supplied equipment, the Owner shall compensate AWI for all expenses incurred addressing the apparent claim, including daily rate and expenses for AWI site services.
7. In the event of a valid claim, the Owner shall be responsible to provide all required labour, material handling, safety requirements and utilities necessary to complete the warranty work. A suitable work and laydown area close to the clarifier will be required, including space for storage of materials that are removed during warranty related activities.
8. AWI will not approve or accept returns or back charges for labour, materials or other costs incurred by the Owner or others, in modification, adjustment, service or repair of equipment furnished by AWI, except when an authorized AWI Representative has approved all returns and/or back charges in writing prior to submittal.
9. This warranty is expressly made by AWI and accepted by the Owner in lieu of all other warranties, including warranties of merchantability and fitness for a particular purpose, whether written, verbal, expressed, implied or statutory.
10. AWI neither assumes nor authorizes any other person to assume any other liabilities with respect to AWI supplied materials. AWI shall not be liable for normal wear and tear, nor for any incidental, contingent, consequential or liquidated damage or expense due to partial or complete inoperability of supplied materials for any reason whatsoever, nor any claim that the supplied materials were negligently designed or manufactured.

CONTACT INFORMATION

AWI Warranty Services and Technical Support

Anthratech Western Inc. (AWI)

Monday to Friday 8:00 a.m. – 4:30 p.m. MST

#432, 2880 – 45 Avenue S.E.

Calgary, Alberta CANADA T2B 3M1

Phone: 403.255.7377

info@awifilter.com

AWI representatives are available for emergency, after-hours service. Contact information will be provided upon request.

1.2 BRENTWOOD WARRANTY



Clarification and Biological Treatment Parts and Components Limited Express Warranty

WARRANTY ("Warranty"): Unless agreed otherwise, in writing, between Brentwood Industries, Inc. ("Brentwood") and Purchaser (or other third party beneficiary named by Brentwood), Brentwood warrants its Clarification and Biological Treatment parts or components of Brentwood tube settlers, scum removers, SedVac™, AccuFAS® submerged fixed film, trickling filters, and Polychem® sludge collectors (collectively referred to hereinafter as "Parts and Components") against defects in materials and workmanship that affect the performance for which the Parts and Components were intended. Warranty coverage is contingent and shall remain in effect only upon proper storage, installation, use, operation, maintenance, and shutdown procedures, all occurring under ordinary conditions and in compliance with good industry standards, the approved design criteria, Brentwood's approved Submittal and Operation and Maintenance Manual, and Brentwood's Warranty claim procedure. The Warranty period shall be limited to twelve (12) months from substantial completion or eighteen (18) months from Parts and Components shipment date, whichever occurs first; however, the Warranty for aftermarket/OEM orders shall be limited to twelve (12) months from date of Parts and Components shipment. This Warranty is limited to the Purchaser of the Parts and Components or third party beneficiary named by Brentwood by written agreement. The terms of this Warranty shall be modified only through written agreement by an authorized Brentwood employee.

REMEDY AND EXCLUSIONS: The remedy for a covered defect during the Warranty period shall be limited, at Brentwood's option and control, to repair or replacement of defective Parts and Components, including shipping costs. The remedy excludes costs of labor, removal of non-conforming Parts and Components, and expenses related to installation of the replacement Parts and Components. In no event will Brentwood be obligated to pay costs, damages or other amounts, in total, exceeding the original price paid to Brentwood for the Parts and Components by the Purchaser. Brentwood shall not warrant Parts and Components, nor be liable to the Purchaser or any third party for any damage caused by non-compliance with any of the foregoing conditions or, without limitation, any of the following:

- i) abuse or neglect;
- ii) acts of god;
- iii) abnormal contaminants detrimental to the Parts and Components or any other material of construction as submitted or damages due to pollutants, solvents, or other hazardous substances;
- iv) improper operation, maintenance, storage, or improper/unplanned shut down procedures;
- v) improper handling during installation, improper installation or improper or unintended use;
- vi) damage caused by excessive hydraulic flows or other surface damage caused by abusive foot traffic;
- vii) exceeding maximum media structural loads or temperatures;
- viii) media blocks assembled in the field or elsewhere by contractor or others; and
- ix) additional exceptions provided for by Brentwood and agreed upon in Brentwood's proposal/quotation to Purchaser or executed contract between Brentwood and Purchaser.

THE TERMS OF THIS WARRANTY ARE THE SOLE AND EXCLUSIVE OBLIGATION OF BRENTWOOD TO PURCHASER OR THIRD PARTY. UNDER NO CIRCUMSTANCE SHALL BRENTWOOD BE LIABLE TO ANY PERSON OR ENTITY FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR INDIRECT DAMAGES OR ANY OTHER LOSS, COST, OR EXPENSE OTHER THAN SPECIFICALLY STATED IN THIS WARRANTY. OTHER THAN THE EXPRESS LIMITED WARRANTIES MADE HEREIN, BRENTWOOD EXPRESSLY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED BY LAW, WITH RESPECT TO ANY SERVICE OR DELIVERABLE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AS WELL AS ANY WARRANTIES WHICH MAY ARISE FROM PRIOR COURSE OF DEALING, CUSTOM, TRADE USAGE, PROVISION OF SAMPLES, PRODUCT LITERATURE OR WEBSITE CONTENT.

CLAIM PROCEDURE:

- 1) Notification: Warranty claims must be submitted to Brentwood within fifteen (15) days of discovering facts upon which such claim is based. Claims must be accompanied by an original Warranty certification or proof of purchase, detailed explanation of claim and damages, any relevant work logs/repair orders, and pictorial documentation of the claimed defect. Claims made after installation shall be accompanied by a signed certification (and, as applicable, signed punch list) by an authorized Brentwood employee, verifying Brentwood's certification of the Parts and Components' installation. Failure to provide evidence of Brentwood's certification may void this Warranty; however, provision of such certification is merely support indicating proper installation and is not conclusive evidence of the existence of an alleged defect. At all times, Brentwood reserves the right to investigate all claims and request additional information. Claims shall be emailed to water@brentwoodindustries.com or mailed to: Brentwood Industries, Inc., Attn: Warranty Claims-Clarification and/or Biological Treatment, 610 Morgantown Road, Reading, PA 19611. Claims shall be waived if they are not received in writing nor within the aforementioned Warranty period.
- 2) Dispute Resolution: Brentwood shall, in its sole opinion, have the authority to judge the existence and extent of any alleged defect. In the event Brentwood denies a Warranty claim, the Purchaser (or third party beneficiary named by Brentwood) has ten (10) days to supply additional data in support of its claim. If a second denial is made by Brentwood, or a resolution cannot otherwise be reached amongst the parties, both Brentwood and Purchaser (or third party beneficiary named by Brentwood) agree upon and preserve the right to pursue impartial mediation/arbitration under the Pennsylvania Uniform Arbitration Act, Pa. Stat. §7301-7320, subchapter A, as the means of dispute resolution. Mediation/arbitration shall take place in Reading, Berks County, in the Commonwealth of Pennsylvania. Costs of mediation/arbitration (excluding attorneys' fees and travel/individual related expenses which shall be borne by the party incurring the costs/expenses) shall be divided equally between Brentwood and Purchaser (or third party beneficiary named by Brentwood).

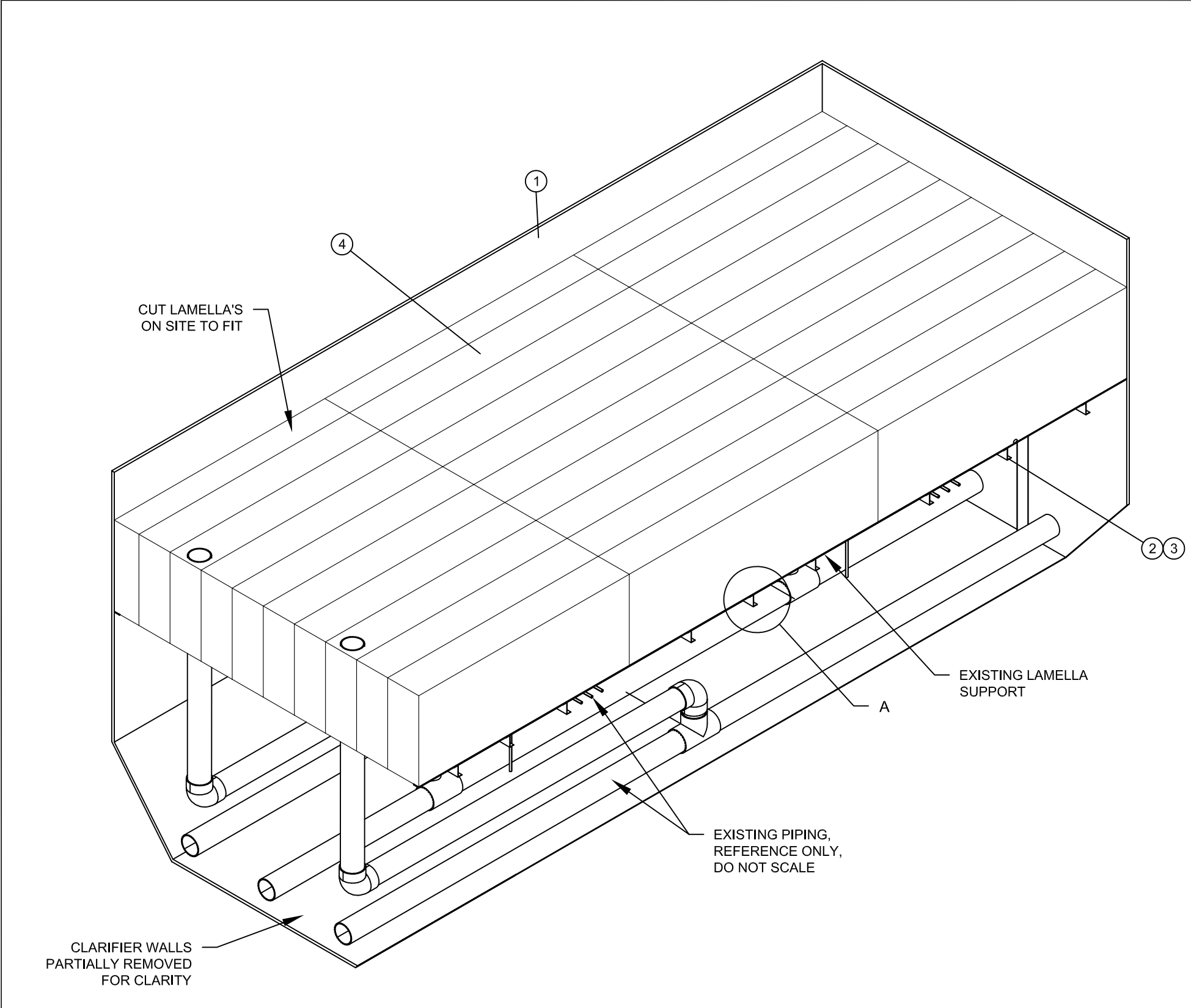
COMPLETE AGREEMENT: This Warranty incorporates and shall be interpreted along with Brentwood's Standard Terms and Conditions, in their entirety; however, in the event of conflict between the two, the terms of this Warranty shall supersede the Standard Terms and Conditions. Brentwood reserves the right to modify or discontinue offering this Warranty at any time.

SIGNED WARRANTIES: A signed copy of this Warranty with Purchaser named and order-specific details shall become available upon request subsequent to Parts and Components certification by an authorized Brentwood employee. Limited to aftermarket/OEM orders, signed warranties shall become available upon request upon Parts and Components shipment date. This Warranty will not be honored when past due invoice amounts related to the project or order for the Parts and Components exist at the time a Warranty claim is made.

2 AS-BUILT DRAWINGS

ITEM NO.	DESCRIPTION	MATERIAL	MATL.	QTY
1	EXISTING CLARIFIER TANK, 6941mm x 2985mm (273.25" x 117.50")	ALUMINUM	-	1
2	LAMELLA SUPPORT BEAM (Z-BEAM)	304 S.S.	-	9
3	SHIM	HDPE	-	9
4	TUBE SETTLER/LAMELLA (96x12x30.5)	PVC	-	30

- NOTES:
- ALL DIMENSIONS AND CONDITIONS SHOWN TO BE VERIFIED BEFORE FABRICATION AND CONSTRUCTION OF COMPONENTS CAN BEGIN. IN CASE OF DISCREPANCY MISSING DIMENSIONS AND/OR REQUIRED DETAILS, AWI MUST BE NOTIFIED IMMEDIATELY. DO NOT SCALE THE DRAWINGS.
 - STANDARD AWI QUALITY CONTROL INSPECTION IS COMPLETED ON ALL COMPONENTS PRIOR TO SHIPMENT.
 - AWI TO SUPPLY TUBE SETTLER/LAMELLA SYSTEM AND SUPPORTS AS SHOWN ON THIS DWG. SUPPLY FOR 1 (ONE) CLARIFIER TANK, WITHIN THE SCOPE OF THIS PROJECT. QUANTITY ON BILL OF MATERIAL REFLECTS ONE CLARIFIER ONLY.
 - ALL ON-SITE WELDING IS BY OTHERS.
 - MINOR FIELD ADJUSTMENTS DURING INSTALLATION INCLUDING TRIMMING OF PARTS MAY BE REQUIRED AND WILL BE THE RESPONSIBILITY OF AWI.



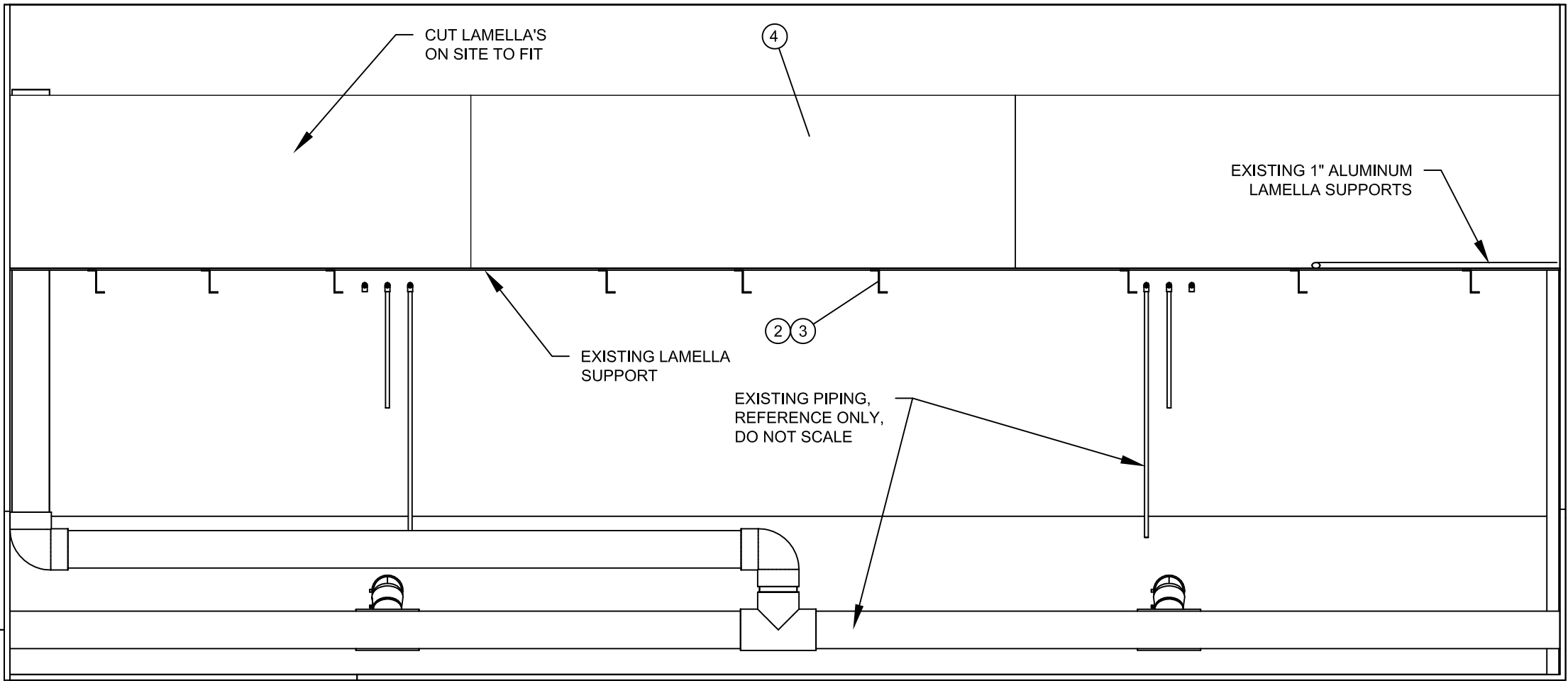
NOTES:

1. ALL PRINTS, COPIES AND ELECTRONIC FILES SHALL BE RETURNED UPON JOB COMPLETION UNLESS OTHERWISE SPECIFIED IN WRITING BY AWI.

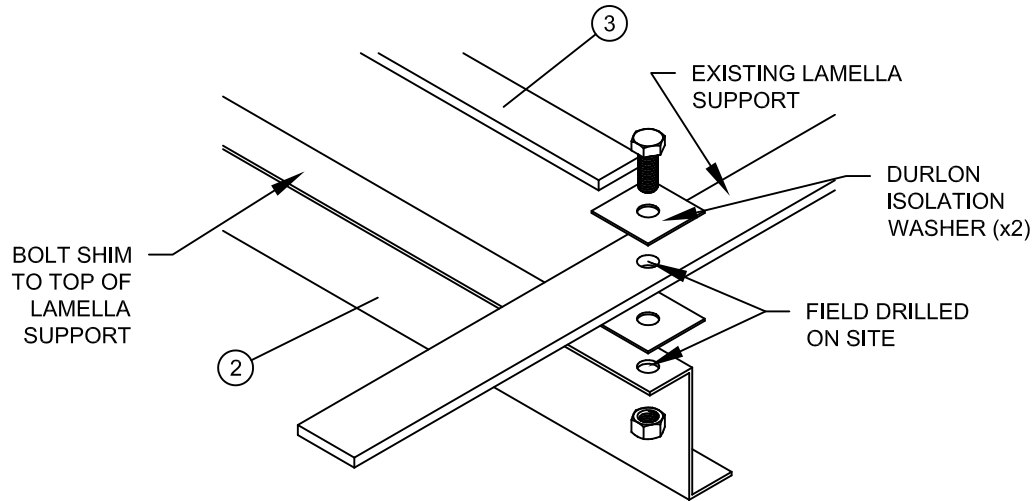
2. MTR'S REQUIRED AT TIME OF SHIPMENT.

3. REFER TO AWI FINAL INSPECTION REFERENCE SHEET AND QC LIST FOR QUALITY CONTROL AND FINAL INSPECTION.

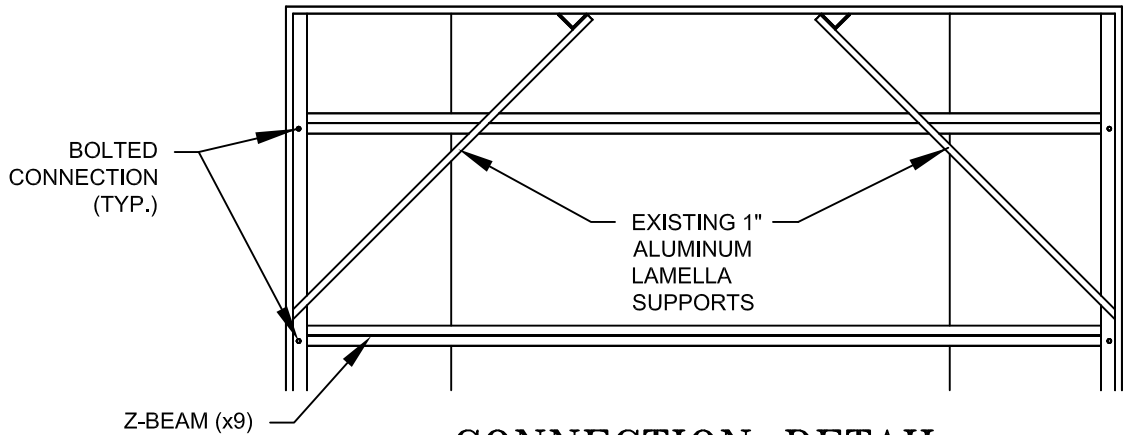
4. REFER TO AWI STANDARD WELDMENT AND FABRICATION DRAWINGS FOR SPECIFIC TOLERANCES AND WELD REQUIREMENTS.



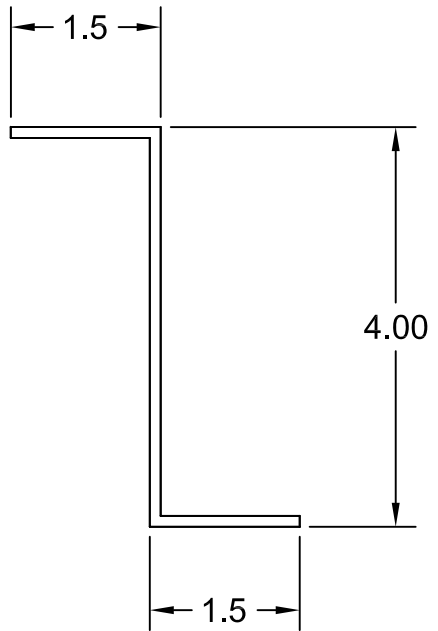
SECTION A-A



DETAIL A



CONNECTION DETAIL



SUPPORT Z-BEAM DETAIL

NOTES:

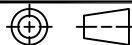
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3. REFER TO AWI FINAL INSPECTION REFERENCE SHEET AND QC LIST FOR QUALITY CONTROL AND FINAL INSPECTION.
4. REFER TO AWI STANDARD WELDMENT AND FABRICATION DRAWINGS FOR SPECIFIC TOLERANCES AND WELD REQUIREMENTS.

C	MP	AS-BUILT	10/24/2022
B	MP	RE-ISSUED FOR APPROVAL	09/27/2022
A	MP	ISSUED FOR APPROVAL	12/16/2021
REV.	REV BY	DESCRIPTION	DATE



4450-46TH AVENUE S.E. CALGARY ALBERTA, T2B 3N7
MAIN: 403-255-7377, FAX: 403-255-3129

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THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING

ANTHRATECH
WESTERN INC

MATERIAL SPECIFICATIONS:

ALUMINUM

FINISH/TREATMENT:

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED

TOLERANCES UNLESS OTHERWISE NOTED:

MACHINING:
.X = ±.030
.XX = ±.010
.XXX = ±.005

ANGULAR DIMENSIONS ±1/2°
CONCENTRICITY .005 T.I.R.
SURFACE FINISH 0.30-0.50 Ra (MAX)

FABRICATION:
0" TO 24" : ±1/16
> 24" : ±1/8

BREAK EDGES 45° x .015 MINIMUM RADIUS R.010

DEFAULT
TOLERANCE
IS CLASS A.

TOLERANCES:	CLASS A	CLASS B
FORMED	.02 .015 .5° .06 .030 1.0°	.02 .005
PUNCHED	.01 .005	.02 .005

TITLE:

TUBE SETTLER/LAMMELA SYSTEM
GENERAL ARRANGEMENT

PROJECT:

NORMAN WELLS, N.T.

DESIGNED/DRAFTED:

M.POTTIE

DATE:

12/13/2021

SCALE:

NTS

PM CHECK:

F.LEE

DATE:

12/13/2021

SHEET SIZE:
(DWG)

B

FINAL APPROVAL:

F.LEE

DATE:

12/16/2021

WEIGHT:

lbs

PART/DWG No.:

724-GA001

REV.:

C

PAGE:

3 OF 3

3 TUBE SETTLERS

3.1 DATA SHEET



BRENTWOOD TUBE SETTLERS



Enhanced Sedimentation

Tube Settlers improve plant efficiency and quality for water clarification in potable water and wastewater applications.

Features

- Certified to NSF/ANSI Standard 61 for drinking water applications.
- Available in black for tertiary clarification in wastewater applications.
- Patented wave sheet ensures accurate assembly.
- Nesting modules eliminate flow bypass for maximum sediment removal.
- Integrated structural ribs provide added strength and support.
- Available with AccuGrid® Protective Surface Grating.



Complete Tube Settler Systems

Brentwood provides complete tube settler systems, including tube settlers, supports, baffles, troughs & weirs, and protective surface grating.

SINGLE-SOURCE RESPONSIBILITY

Avoid problems with coordination of engineering, installation, and pricing of different components and save money by purchasing an economical, packaged system.

EXCLUSIVE PRODUCTS & FEATURES

Products like AccuGrid® Protective Surface Grating and features such as integrated structural ribs provide unique benefits to the tube settler system.

EXTENSIVE ENGINEERING EXPERIENCE

Brentwood's experience in both plastics design and water treatment technologies are utilized in every system we design.

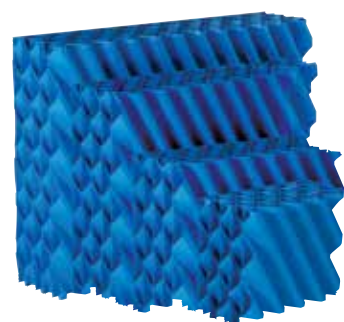


Advantages

- Cut coagulant dosages by up to half while minimizing influent turbidity to filters.
- Save on operating costs with less filter backwashing.
- Increase solids removal rate and expand settling capacity in existing basins.
- Reduce new installation footprints by adding tube settlers for greater flow capacity.

6000-SERIES TUBE SETTLER DIMENSIONS AND APPLICATION RATES

Model	Vertical Height	Tube Length	Design Application Rate
IFR-6041	41 in (104 cm)	47 in (199 cm)	3.5 GPM/ft ² (8.5 m/hr)
IFR-6036	36 in (91 cm)	42 in (107 cm)	3.0 GPM/ft ² (7.3 m/hr)
IFR-6030	30 in (76 cm)	35 in (89 cm)	2.5 GPM/ft ² (6.1 m/hr)
IFR-6024	24 in (61 cm)	28 in (71 cm)	2.0 GPM/ft ² (4.9 m/hr)



Why Tube Settlers?

Brentwood tube settler systems are an inexpensive solution for drinking water and wastewater plants to increase treatment capacity, reduce new installation footprints, improve effluent water quality, and decrease operating costs. Smaller, typically unsettleable floc particles must only fall a short vertical distance to encounter the tube surface where they accumulate and coalesce, forming larger, denser particles capable of settling to the basin floor. Constructed of lightweight PVC, tube settler modules can be easily supported with minimal structures that often incorporate effluent troughs and baffles.

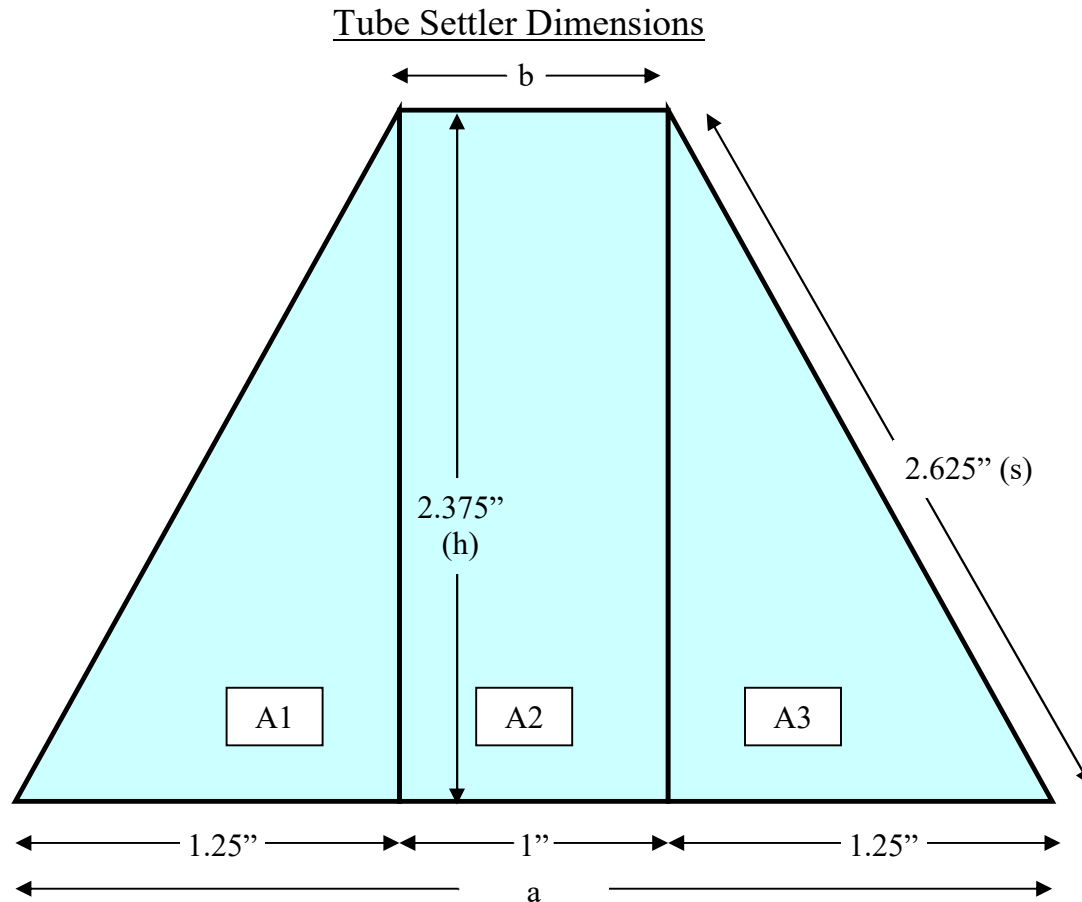


BRENTWOOD INDUSTRIES, INC.

brentwoodindustries.com
tubesettler@brentw.com
+1.610.374.5109



3.2 DIMENSIONS



AREA

$$\begin{aligned}
 &= A1 + A2 + A3 \\
 &= 1/2 * (1.25'') * (2.375'') + (2.375'') * (1'') + 1/2 * (1.25'') * (2.375'') \\
 &= 1.484375 \text{ in}^2 + 2.375 \text{ in}^2 + 1.484375 \text{ in}^2 = 5.34375 \text{ in}^2
 \end{aligned}$$

PERIMETER

$$\begin{aligned}
 &= a + s + b + s \\
 &= (1.25'' + 1'' + 1.25'') + 2.625'' + 1'' + 2.625'' = 9.75 \text{ in}
 \end{aligned}$$

EQUIVALENT DIAMETER

$$\begin{aligned}
 &= (4 * \text{Area}) / \text{Perimeter} \\
 &= (4 * 5.34375 \text{ in}^2) / 9.75'' = 2.192 \text{ in}
 \end{aligned}$$

HYDRAULIC DIAMETER

$$\begin{aligned}
 &= [2h(a+b)] / [b+2s] \\
 &= [2 * 2.375''(3.5''+1'')] / [1''+(2*2.625'')] = 3.42 \text{ in}
 \end{aligned}$$

SETTLING AREA

$$\begin{aligned}
 &= 2' \text{ H} \times 1' \text{ W} \times 10' \text{ L module has 250 settling surfaces} \\
 &= \text{Each settling surface is } 2.625'' \text{ wide} \times 28.5'' \text{ long} \\
 &= 74.81 \text{ in}^2 \text{ per settling surface} * 250 \text{ settling surfaces} \\
 &= 18,703 \text{ in}^2 / 10 \text{ ft} = 1,870.3 \text{ in}^2/\text{ft} = 12.99 \text{ ft}^2/\text{ft}
 \end{aligned}$$

PROJECTED AREA

$$\begin{aligned}
 &= 1' \text{ width has } (5) \text{ } 2.625'' \text{ settling surfaces \& length of } 15.36'' \\
 &= 15.36'' * (5 * 2.625'') = 201.6 \text{ in}^2 = 1.4 \text{ ft}^2 \text{ per surface width} \\
 &= 70 \text{ ft}^2 \text{ projected surface area for } 10' \text{ module (50 surfaces)} \\
 &= 7 \text{ ft}^2/\text{ft}
 \end{aligned}$$

3.3 NSF 61 CERTIFICATION

NSF International

RECOGNIZES

BRENTWOOD INDUSTRIES

Plant At: MARTINSBURG, WV

AS COMPLYING WITH ANSI/NSF 61.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.



Certification Program
Accredited by the
American National
Standards Institute



Certification Program
Accredited by RvA,
the Dutch Council
for Accreditation

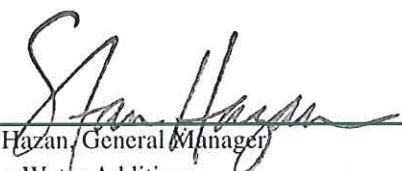


Certification Program
Accredited by the
Standards Council
of Canada

This certificate is the property of NSF International and must be returned upon request. To verify certification, call 800 NSF-MARK or (1) 734 769-8010.

July 14, 1999

Certificate #73580/73581B


Stan S. Hazan, General Manager
Drinking Water Additives

NSF International

RECOGNIZES

BRENTWOOD INDUSTRIES

Plant at: HOPE, AR

AS COMPLYING WITH ANSI/NSF 61.

PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.



Certification Program
Accredited by the
American National
Standards Institute



Certification Program
Accredited by the
Standards Council
of Canada

This certificate is the property of NSF International and must be returned upon request. To verify certification, call 800 NSF-MARK or (1) 734 769-8010.

February 20, 2002
Certificate# 73582 - 02

James R. Paschal, General Manager
Water Distribution Systems

4 PHOTO RECORD

PROJECT PHOTO RECORD



Existing Support Beam Removal



New Support Beam Installation



New Support Beam Installation



Support Beam Installation Completed



Front Side Lamella Module Installation



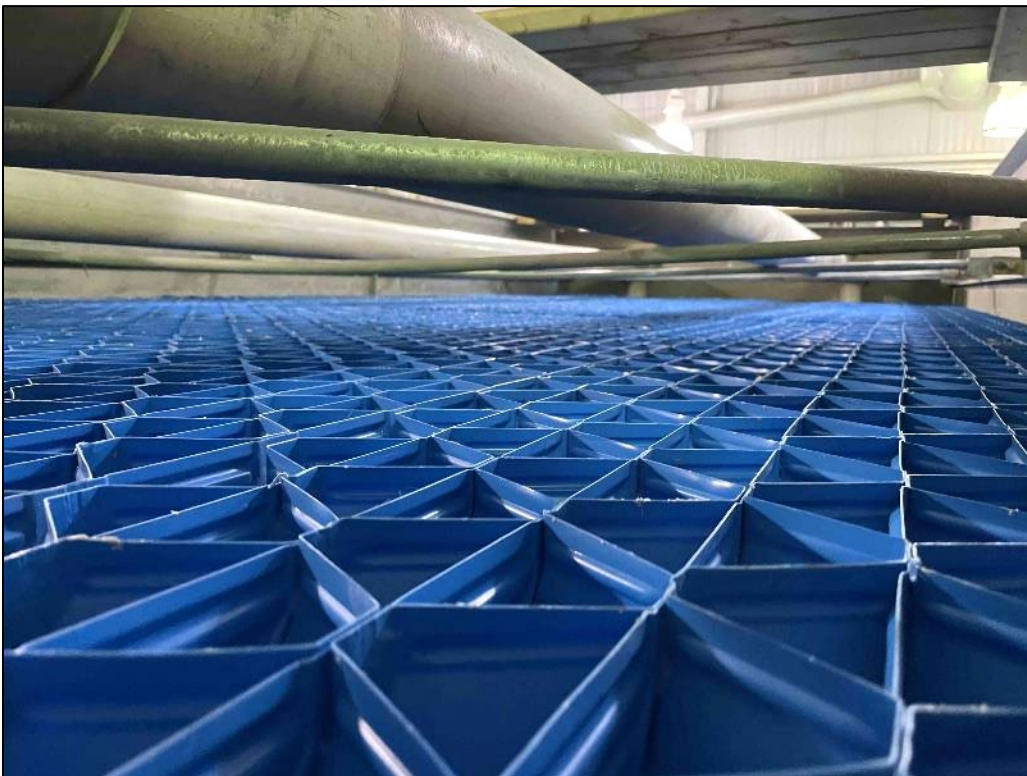
Lamella Module Installation



Front Angled Lamella Module Section Installed



Back End of Lamella Modules Installed



Lamella Module Installation Completed



Curvature Down Length of Clarifier