

Application to: US Coast Guard & American Bureau of Shipping

Submitted to US EPA by: Lake Michigan Carferry Service

Dated: February 25, 2014

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**ALL CONFIDENTIAL BUSINESS INFORMATION**  
**REDACTED BY LAKE MICHIGAN CARFERRY SERVICE**

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CONTAINS CONFIDENTIAL BUSINESS INFORMATION

**From:** Marine Shop [engineering@ssbadger.com]  
**Sent:** Thursday, February 20, 2014 9:14 AM  
**To:** Bklages@eagle.org  
**Cc:** cleonard@pmship.com  
**Subject:** Badger  
**Attachments:** 2013-12-20\_Stoker\_Front\_PDF.zip; Stee, boiler fronts.tif; DSCo\_Feeder\_Mounting.pdf; Over\_Fire\_Air\_PDF.zip

Good morning Brian,

We are now positioned for replacement of the boiler fronts and feeders aboard *Badger*, one part of the combustion control renewal program as agreed to in the consent decree between Lake Michigan Carferry and the DOJ.

I have attached PDF files of the drawings for the new boiler fronts, also attached is a file with mill certificates for the 0.750" ABS Grade A/A-36 steel plate we will use to fabricate the new fronts. We will fabricate the four new boiler fronts in our shop here in Ludington and are currently laying them out in preparation for drilling and cutting.

While we have the old boiler fronts removed we are taking the opportunity to repair any wasted material we may find in the grate support structure.

We have the final drawings of the new feeders, which have been manufactured by [REDACTED] ny. We chose [REDACTED] because Hoffman Combustion Engineering, the original stoker manufacturer, is out of business and the Detroit feeders are an improved design of our original feeders. I have attached information regarding them as well.

The new [REDACTED] feeders will be controlled via Variable Frequency Drive units by the combustion control automation being designed for us by G.R. Bowler company. The automation portion of the package will be submitted by them under a separate cover. You may recognize [REDACTED] the company that designed the propulsion controls for the S.S. Cason J. Calloway and other improvements for her fleet mates.

While we have the boiler fronts off we have also removed the refractory brick from the 'knee wall' between the lower drum and the furnace and intend to replace the existing wasted over-fire air manifold and nozzles. We have changed the spacing of the nozzles along this header to improve the delivery of combustion air above the fuel bed. In this pursuit we have also designed a second manifold to be installed in the 'filler wall' that was added along the back of the furnace in the early 1960's. These new and additional over-fire air nozzles will be positioned to introduce oxygen and turbulence above the fuel bed to enhance combustion. The existing over-fire air fan will be replaced with a new fan of larger capacity manufactured by the [REDACTED]. The output of these fans will also be monitored and controlled by the combustion control automation, an improvement over the former system that ran at a fixed volume.

The combustion control system will require more ships service air volume than we can currently supply with our existing air compressor so we propose to upgrade to a larger machine and relocate it. We have contacted [REDACTED] in Sturgeon Bay to provide drawings for this sub-system and will include them in the scope of our work as soon as we have them.

As none of these are a significant change from original equipment we would like to consider them as a replacement in kind, I have requested thru our USCG Inspector, Richard Baker, to have American Bureau of Shipping review everything as allowed in in NVIC 10-82.

If I can answer any questions or provide further information, please do contact me at any time.

Best regards,

Chuck



CONTAINS CONFIDENTIAL BUSINESS INFORMATION

Chuck Leonard

**From:** Marine Shop [engineering@ssbadger.com]  
**Sent:** Wednesday, February 19, 2014 6:54 PM  
**To:** Baker, Richard (Richard.A.Baker@uscg.mil)  
**Cc:** cleonard@pmship.com  
**Subject:** Badger  
**Attachments:** 2013-12-20\_Stoker\_Front\_PDF.zip; AB-2793-D1-1L\_REV\_0\_(FUEL SUPPLY EQUIPMENT ARR AUXILIARY VIEWS).pdf; Over\_Fire\_Air\_PDF.zip; Stee, boiler fronts.tif; Charles Cart.vcf

Good afternoon Rich,

We are now positioned for replacement of the boiler fronts and feeders aboard *Badger*, one part of the combustion control renewal program as agreed to in the consent decree between Lake Michigan Carferry and the DOJ.

I have attached PDF files of the drawings for the new boiler fronts, also attached is a file with mill certificates for the 0.750" ABS Grade A/A-36 steel plate we will use to fabricate the new fronts. We will fabricate the four new boiler fronts in our shop here in Ludington and are currently laying them out in preparation for drilling and cutting.

While we have the old boiler fronts removed we are taking the opportunity to repair any wasted material we may find in the grate support structure.

We have the final drawings of the new feeders, which have been manufactured by [REDACTED]. We chose [REDACTED] because Hoffman Combustion Engineering, the original stoker manufacturer, is out of business and the [REDACTED] feeders are an improved design of our original feeders. I have attached information regarding them as well.

The new [REDACTED] feeders will be controlled via Variable Frequency Drive units by the combustion control automation being designed for us by [REDACTED] company. The automation portion of the package will be submitted by them under a separate cover. You may recognize [REDACTED] as the company that designed the propulsion controls for the S.S. Cason J. Calloway and other improvements for her fleet mates.

While we have the boiler fronts off we have also removed the refractory brick from the 'knee wall' between the lower drum and the furnace and intend to replace the existing wasted over-fire air manifold and nozzles. We have changed the spacing of the nozzles along this header to improve the delivery of combustion air above the fuel bed. In this pursuit we have also designed a second manifold to be installed in the 'filler wall' that was added along the back of the furnace in the early 1960's. These new and additional over-fire air nozzles will be positioned to introduce oxygen and turbulence above the fuel bed to enhance combustion. The existing over-fire air fan will be replaced with a new fan of larger capacity manufactured by the [REDACTED]. The output of these fans will also be monitored and controlled by the combustion control automation, an improvement over the former system that ran at a fixed volume.

The combustion control system will require more ships service air volume than we can currently supply with our existing air compressor so we propose to upgrade to a larger machine and relocate it. We have contacted [REDACTED] in Sturgeon to provide drawings for this sub-system and will include them in the scope of our work as soon as we have them.

As none of these are a significant change from our existing equipment we would like to consider them as a replacement in kind, and while we would be happy to have MSC review our drawings I do feel it would be expeditious to have American Bureau of Shipping review everything as allowed in in NVIC 10-82, and I would like to formally request that here if I may.

If I can answer any questions or provide further information, please do contact me at any time.

Best regards,

Chuck



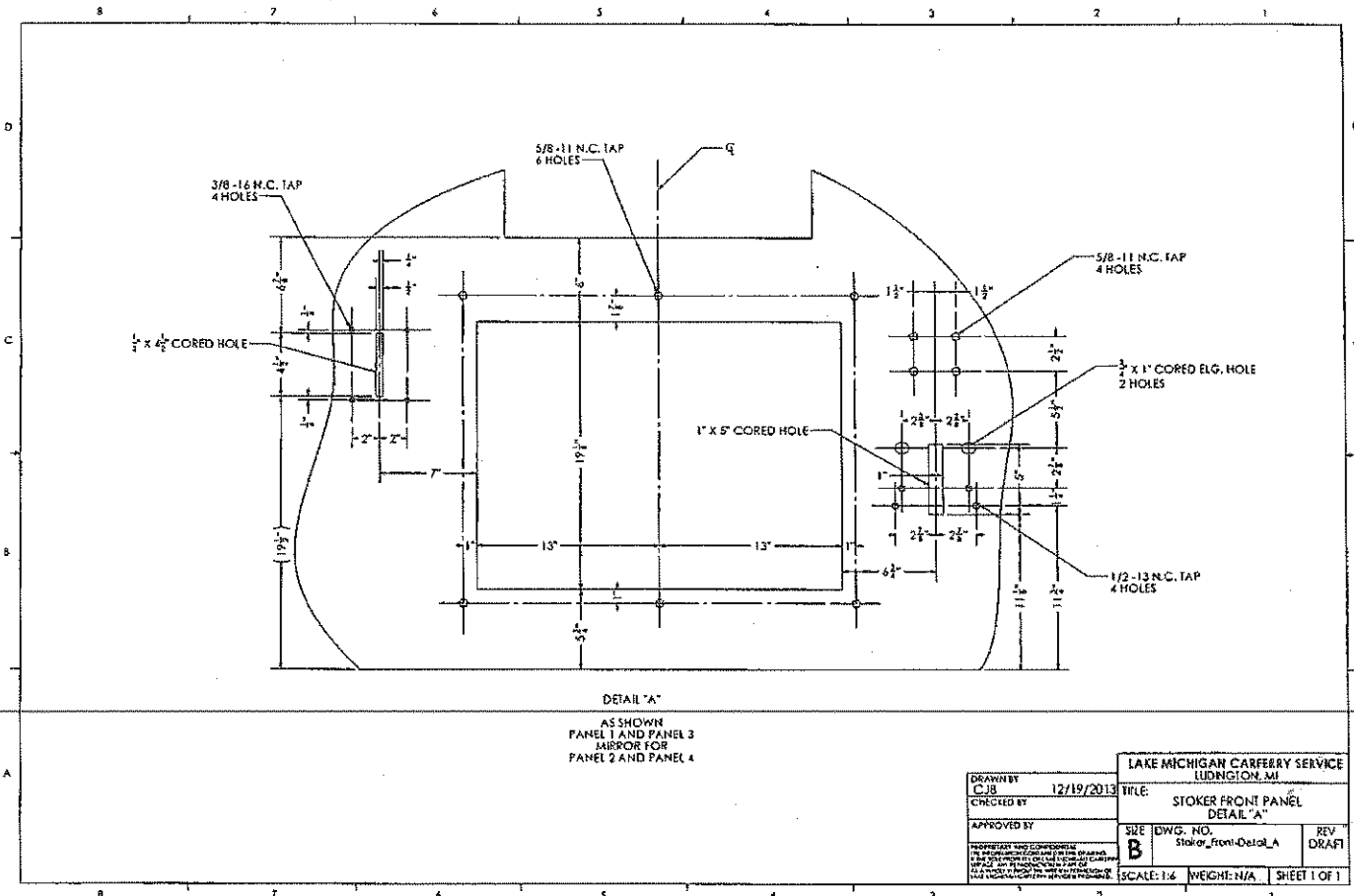
**Charles Cart**  
Senior Chief Engineer

701 Maritime Drive  
Ludington, MI 49431

[Redacted]

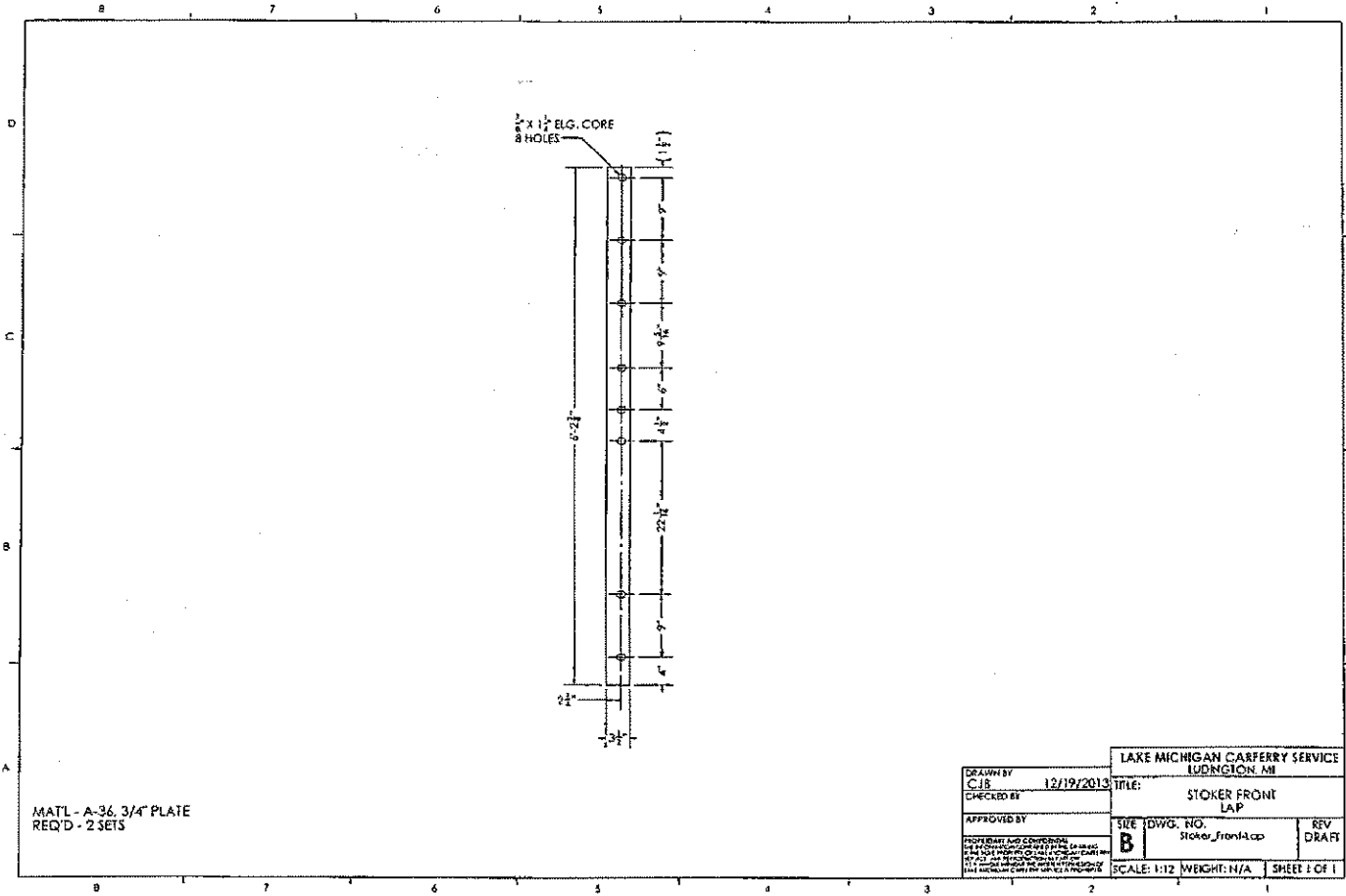
[Redacted]

[Redacted]



DETAIL "A"  
 AS SHOWN  
 PANEL 1 AND PANEL 3  
 AIRBOR FOR  
 PANEL 2 AND PANEL 4

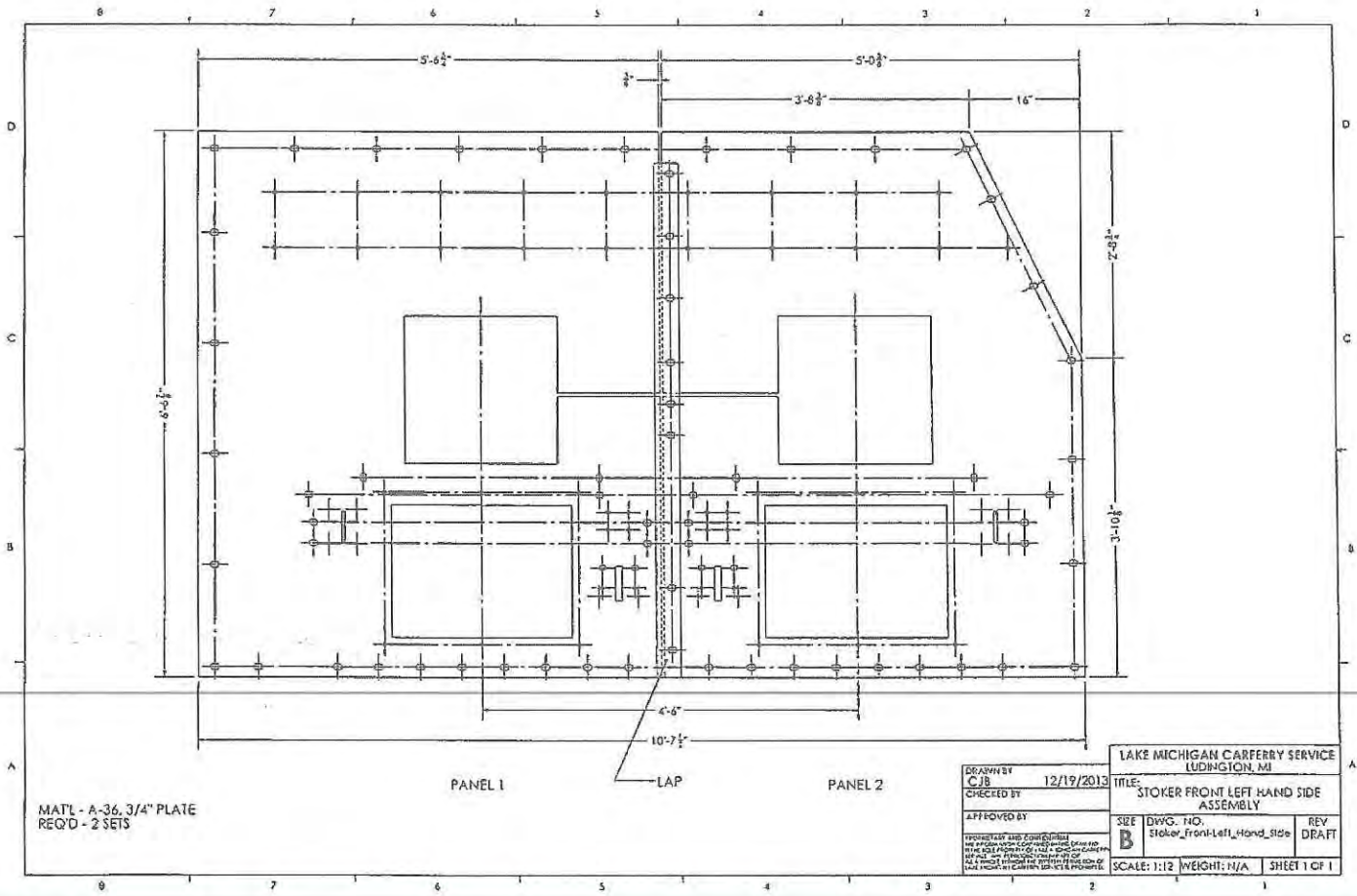
LAKE MICHIGAN CARRIERY SERVICE (LUDINGTON, MI)	
DRAWN BY CJB	12/19/2013
CHECKED BY	
APPROVED BY	
TITLE STOKER FRONT PANEL DETAIL "A"	
SRE DWG. NO. B	Stoker_Front-Detail_A
REV DRAFT	
SCALE: 1:6	WEIGHT: N/A
SHEET 1 OF 1	



MATL - A-36, 3/4" PLATE  
REQ'D - 2 SETS

DRAWN BY C 18		12/19/2013		LAKE MICHIGAN CARRIAGE SERVICE LUDINGTON, MI	
CHECKED BY				TITLE: STOKER FRONT LAP	
APPROVED BY		SITE B		DWG. NO. Stoker_front-lap	
<small>         PROPERTY AND COPYRIGHT          OF THE ENGINEERING CENTER OF THE UNIVERSITY OF MICHIGAN          1500 TAPSCOTT DRIVE, ANN ARBOR, MI 48106-1324          TEL: 734-763-2700 FAX: 734-763-2700          WWW.UMICH.EDU       </small>		SCALE: 1:12		WEIGHT: N/A	
				REV DRAFT	
				SHEET 1 OF 1	





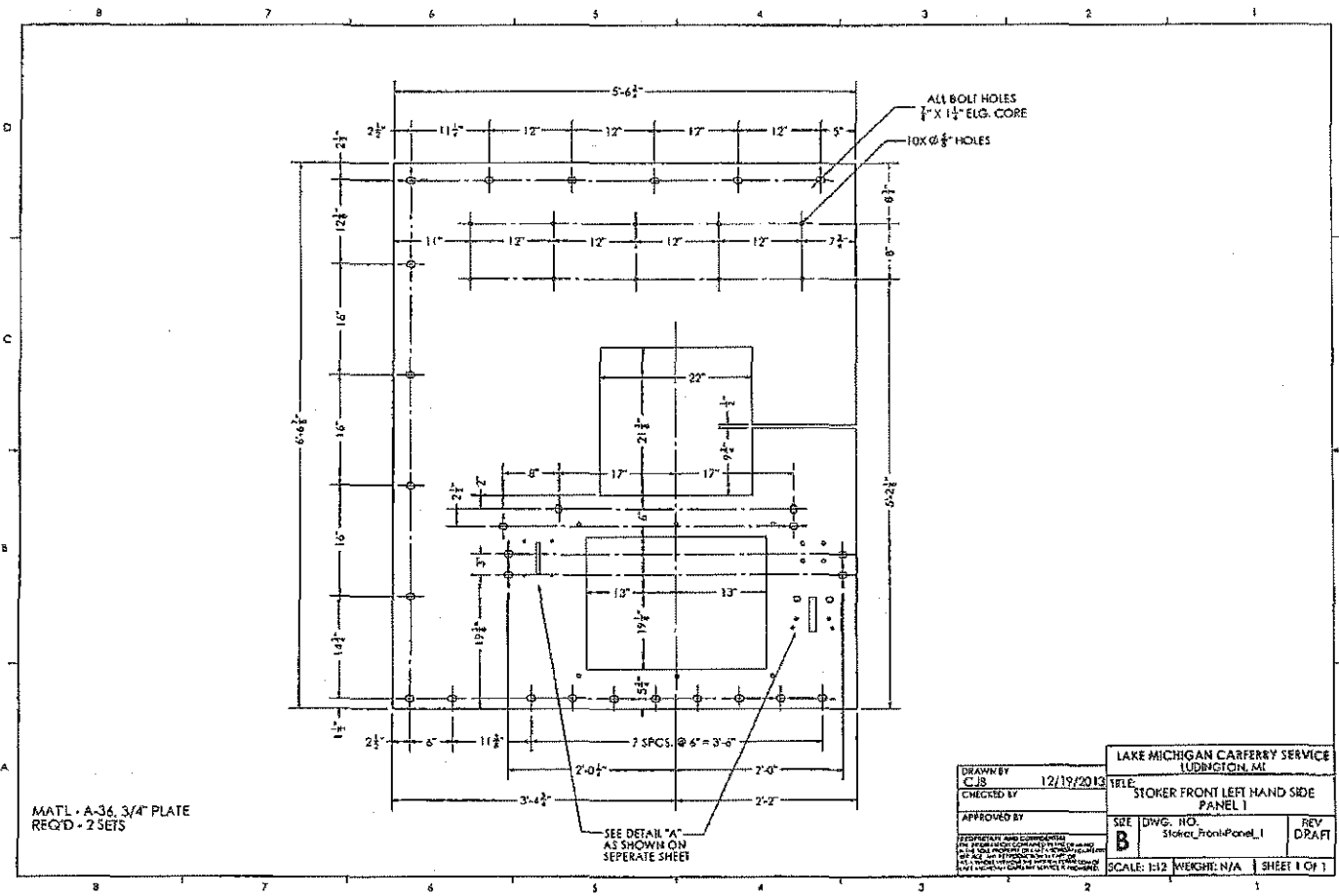
MAT'L - A-36, 3/4" PLATE  
REQ'D - 2 SETS

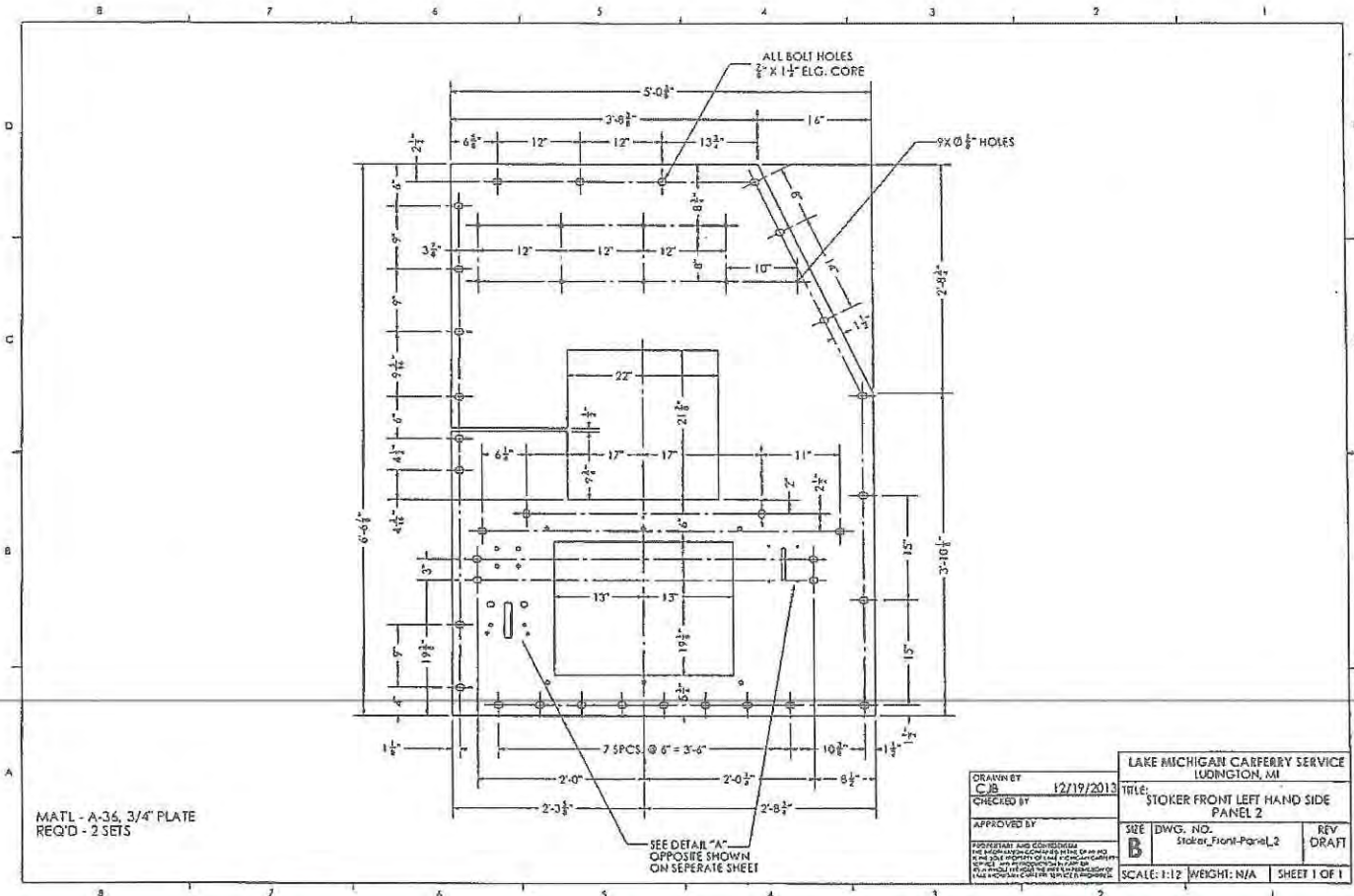
PANEL 1

LAP

PANEL 2

DRAWN BY CJB		12/19/2013		LAKE MICHIGAN CARRIAGE SERVICE (LUDINGTON, MI)	
CHECKED BY				TITLE: STOKER FRONT LEFT HAND SIDE ASSEMBLY	
APPROVED BY		B		DWG. NO. Stoker_front-Left_Hand_Side	REV DRAFT
<small>PROTECT AND CONFIDENTIAL THIS DRAWING IS THE PROPERTY OF LAKE MICHIGAN CARRIAGE SERVICE IT IS TO BE USED ONLY FOR THE PROJECT AND NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF LAKE MICHIGAN CARRIAGE SERVICE &amp; PROJECT.</small>		SCALE: 1:12		WEIGHT: N/A	SHEET 1 OF 1

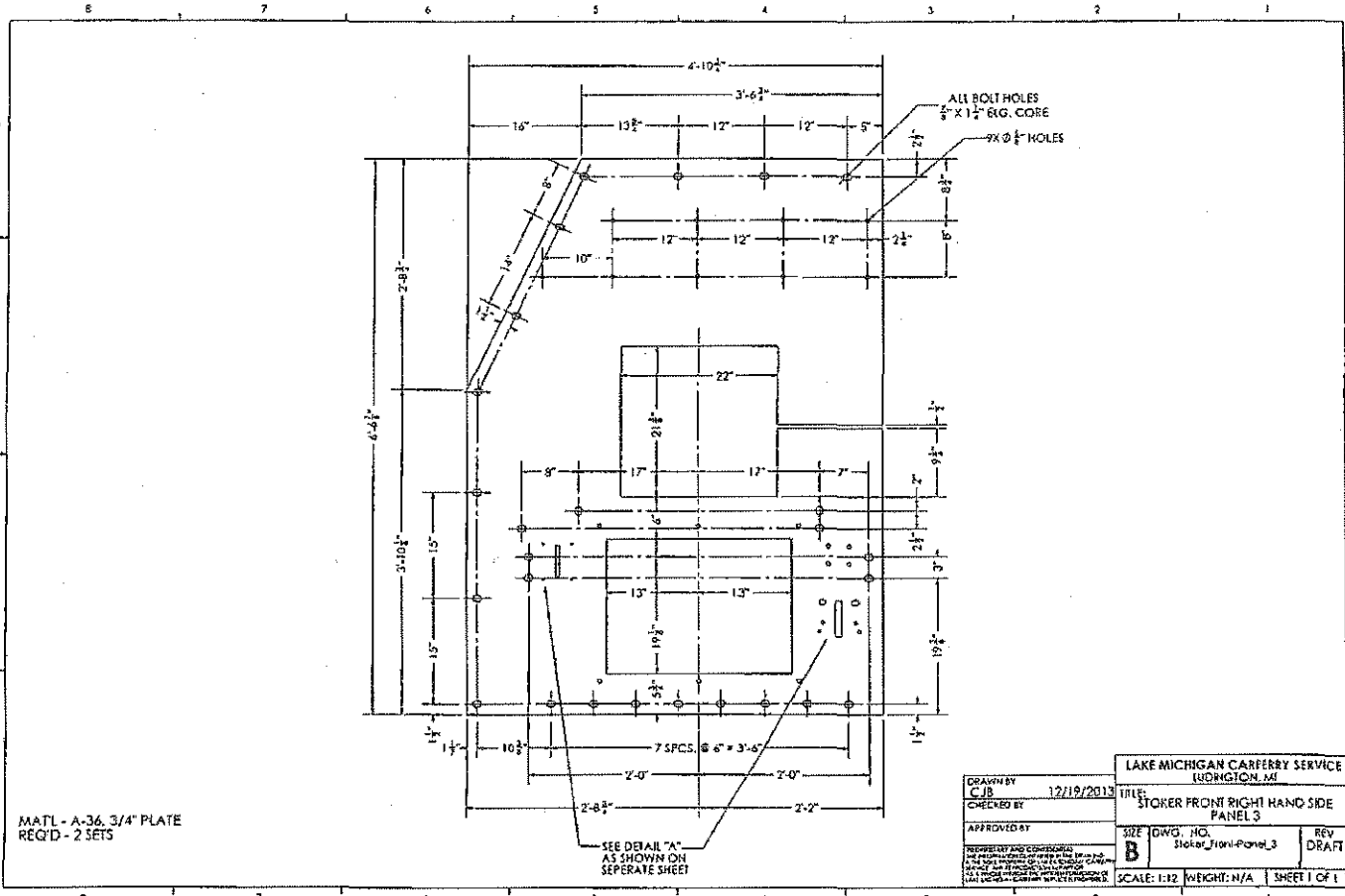




MATL - A-36, 3/4" PLATE  
REQ'D - 2 SETS

SEE DETAIL "A"  
OPPOSITE SHOWN  
ON SEPARATE SHEET

DRAWN BY C.B.		DATE 12/19/2013		LAKE MICHIGAN CARRIAGE SERVICE LUDINGTON, MI	
CHECKED BY		TITLE STOKER FRONT LEFT HAND SIDE PANEL 2		REV	
APPROVED BY		SIZE B	DWG. NO. Stoker_Front-Panel_2	REV DRAFT	
<small>FORNITORY AND CONSULTING INC. ENGINEERING CONSULTING ARCHITECTURE AND INTERIOR DESIGN. 10000 W. GRAND AVENUE ANN ARBOR, MI 48106-1500 TEL: 734/769-0000 FAX: 734/769-0001 WWW.FORNITORY.COM</small>		SCALE: 1:12	WEIGHT: N/A	SHEET 1 OF 1	

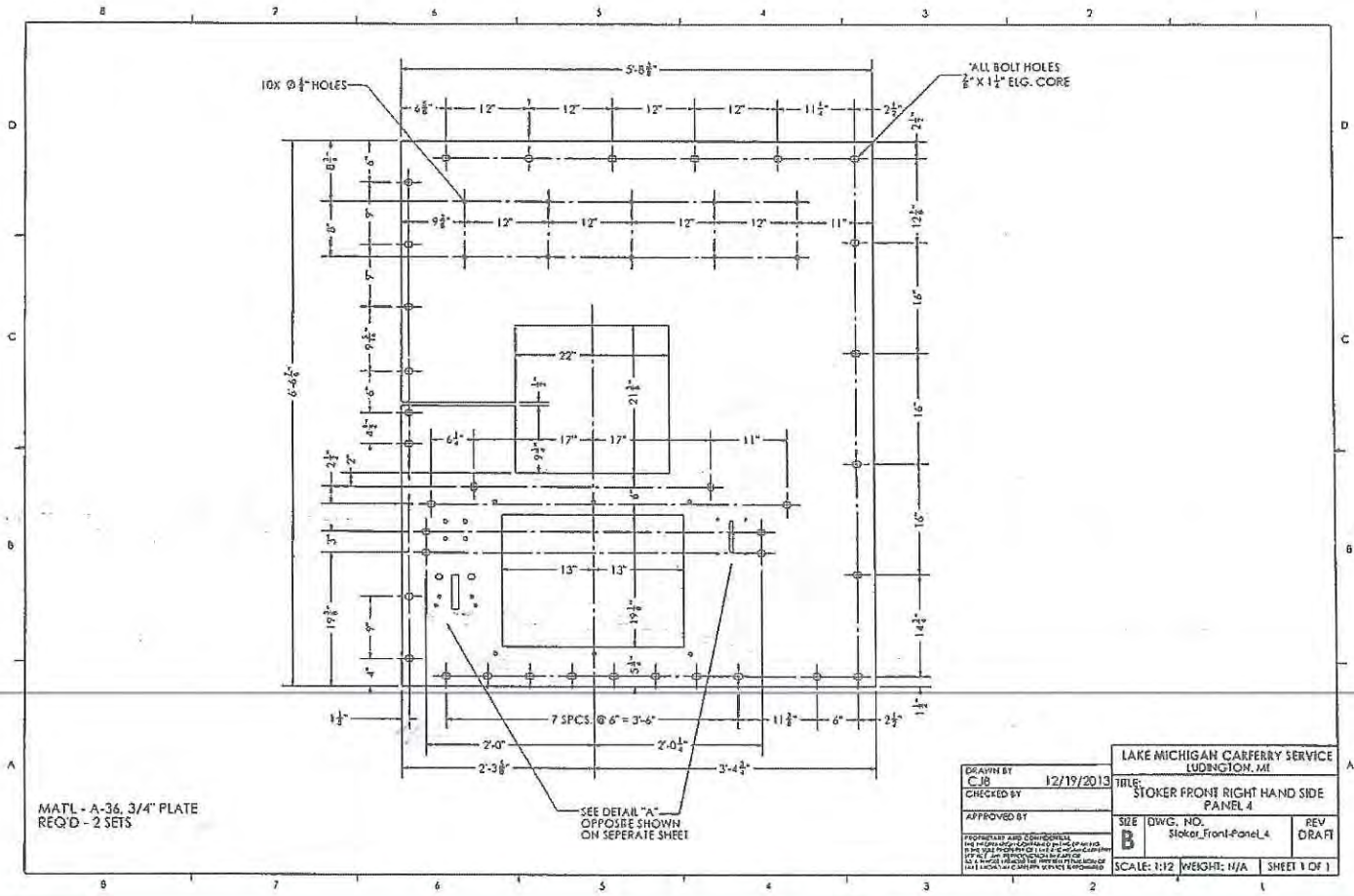


MATL - A-36, 3/4\"/>

SEE DETAIL "A"  
AS SHOWN ON  
SEPERATE SHEET

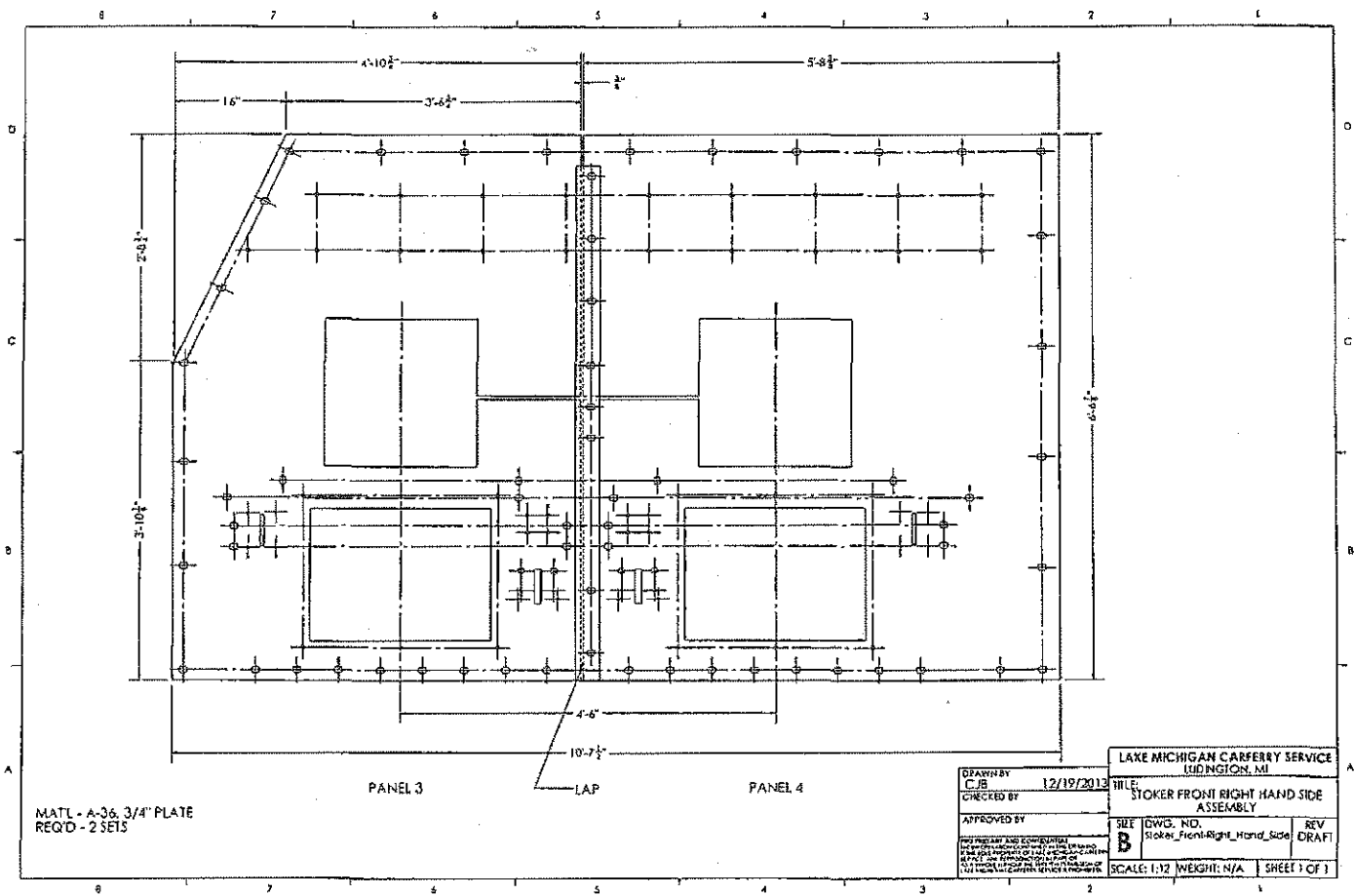
DRAWN BY  
CJB  
12/19/2013  
CHECKED BY  
APPROVED BY  
PROPERTY AND CONFIDENTIALITY NOTICE: THIS DRAWING IS THE PROPERTY OF THE U.S. ARMY CORPUS OF ENGINEERS AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM WITHOUT PERMISSION.

LAKE MICHIGAN CARRIERY SERVICE LUDRIGION, MI		
TITLE: STOKER FRONT RIGHT HAND SIDE PANEL 3		
SIZE B	DWG. NO. Stoker_Front-Panel_3	REV DRAFT
SCALE: 1:12 WEIGHT: N/A SHEET 1 OF 1		



MATL - A-36, 3/4" PLATE  
REQ'D - 2 SETS

DRAWN BY CJB		12/19/2013		LAKE MICHIGAN CARRIERY SERVICE LUDINGTON, MI	
CHECKED BY				TITLE STOKER FRONT RIGHT HAND SIDE PANEL 4	
APPROVED BY				SIZE B	REV DRAFT
<small>PROPRIETARY AND CONFIDENTIAL THIS DRAWING IS THE PROPERTY OF THE DRAWING ENGINEER AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION SYSTEMS WITHOUT THE WRITTEN PERMISSION OF THE DRAWING ENGINEER.</small>		SCALE: 1:12		WEIGHT: N/A	SHEET 1 OF 1



MATL - A-36, 3/4" PLATE  
REQ'D - 2 SETS

DRAWN BY C.J.B.		12/19/2013		LAKE MICHIGAN CARRIAGE SERVICE LUDINGTON, MI	
CHECKED BY				TITLE STOKER FRONT RIGHT HAND SIDE ASSEMBLY	
APPROVED BY				REV B	REV DRAFT
<small>THESE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE COMPANY AND ARE NOT TO BE REPRODUCED OR USED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE COMPANY. ANY REPRODUCTION OR USE WITHOUT PERMISSION IS STRICTLY PROHIBITED AND WILL BE PROSECUTED TO THE FULL EXTENT OF THE LAW.</small>		SCALE: 1:12		WEIGHT: N/A	SHEET 1 OF 1



# MILL TEST CERTIFICATE

1700 HOLT RD N.E.  
Tuscaloosa, AL 35404-1000  
800-827-8872

Load Number	Tally	Mill Order Number	PO NO   Line NO	Part Number	Certificate Number	Prepared														
R045384	0000000525341	N-125271-001	CHI-8591 1		S198466-2	11/15/2013 12:19														
Grade				Customer:																
Order Description: A36, 0.7500 IN x 96.000 IN x 240.000 IN Quality Plan Description: ABS A / A36: ASTM A36-08/ABS GR A 13/A709-36-11/ASME SA36-03				Sold TO: CHAPEL STEEL Bourbonnais IL Ship TO: CHAPEL STEEL CO. INDIAN OAKS IL																
Shipped Item	Heat/Slab Number	Certified By	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Cb	V	Al	Ti	N2	B	Ca	Sn	CEV
3J0992F	B3W8586-02 ***	B3W8586	0.18	0.84	0.007	0.009	0.04	0.16	0.05	0.05	0.018	0.000	0.001	0.032	0.001	0.009	0.0000	0.0034	0.006	0.34
3J0993D	B3W8586-03 ***	B3W8586	0.18	0.84	0.007	0.009	0.04	0.16	0.05	0.05	0.018	0.000	0.001	0.032	0.001	0.009	0.0000	0.0034	0.006	0.34
Shipped Item	Certified By	Heat Number	Yield ksi	Tensile ksi	Y/T %	ELONGATION %		Bend OK?	Hard HB	Charpy Impacts (ft-lbs)				Shear %			Test Temp			
						2"	8"			Size mm	1	2	3	Avg	1	2	3	Avg		
3J0992F	S3J0992FTT	B3W8586 ***	51.5	69.0	74.6	36.7														
3J0992F	S3J0992MTT	B3W8586 ***	48.5	64.5	75.2	33.3														
3J0993D	S3J0993FTT	B3W8586 ***	47.8	68.8	69.5	37.0														
3J0993D	S3J0993MTT	B3W8586 ***	49.9	65.3	76.4	34.6														

Items: 2 PCS: 8 Weight: 39205 LBS

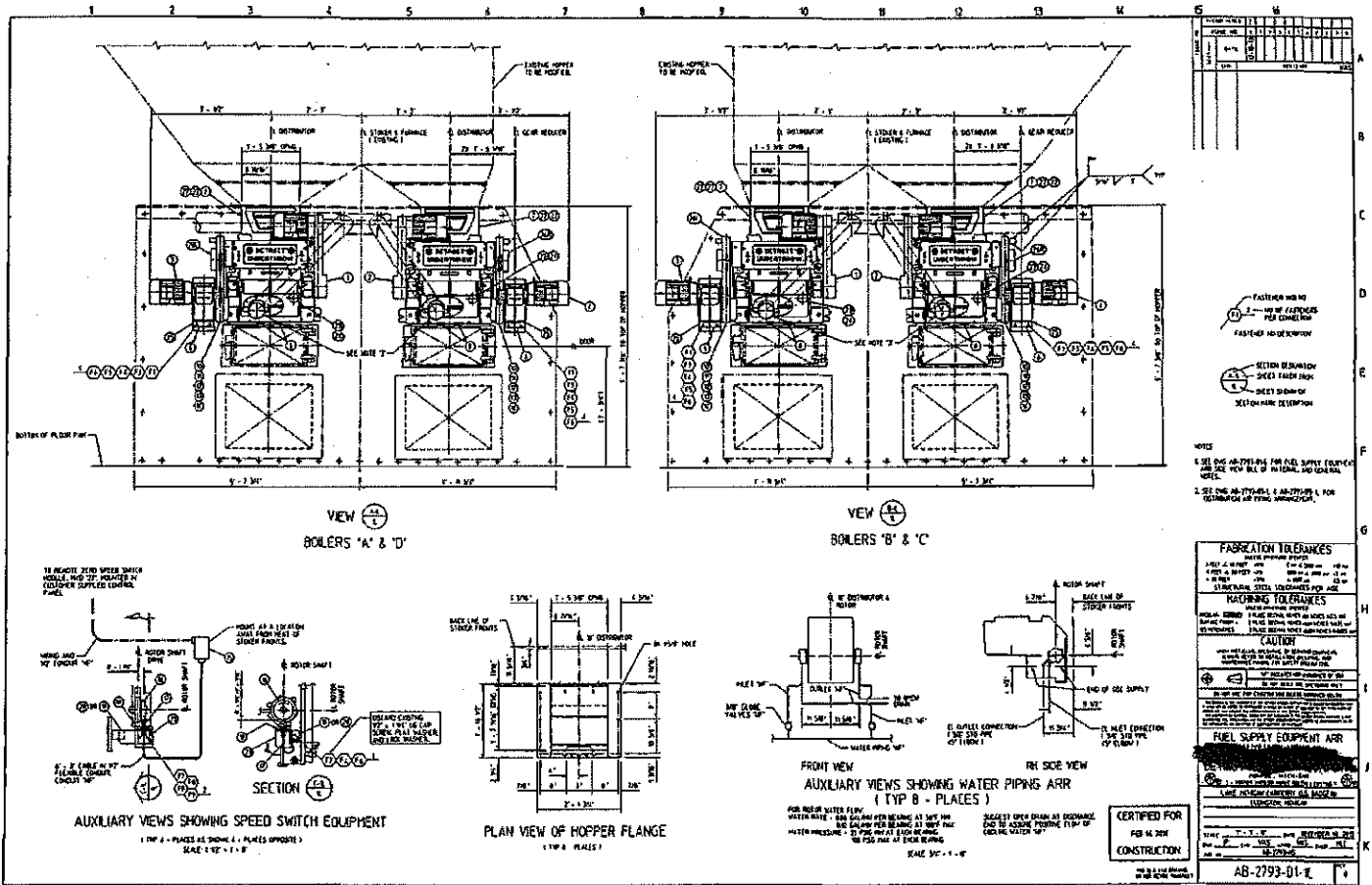
Mercury has not come in contact with this product during the manufacturing process nor has any mercury been used by the manufacturing process. Certified in accordance with EN 10204 3.1. No weld repair has been performed on this material. Manufactured under the ABS Quality Assurance Program, Certificate number 10-MMPQA-634 We hereby certify that the information herein has been made to the applicable specifications by the EAF process and tested in accordance with the requirements of the ABS rules with satisfactory results. Manufactured to a fully killed fine grain practice. NUTEMPER TEMPER PASSED plate from coil  
ISO 9001:2008 Registered, PED Certified

We hereby certify that the product described above passed all of the tests required by the specifications.

Dr. Quilin Yu - Metallurgist

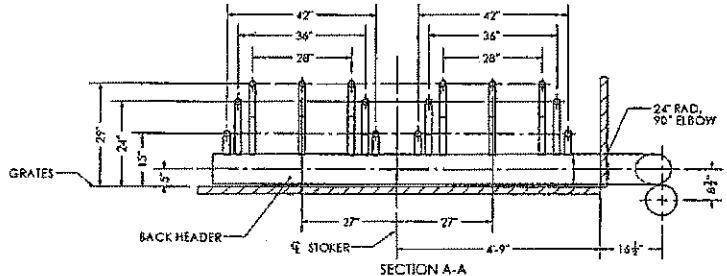
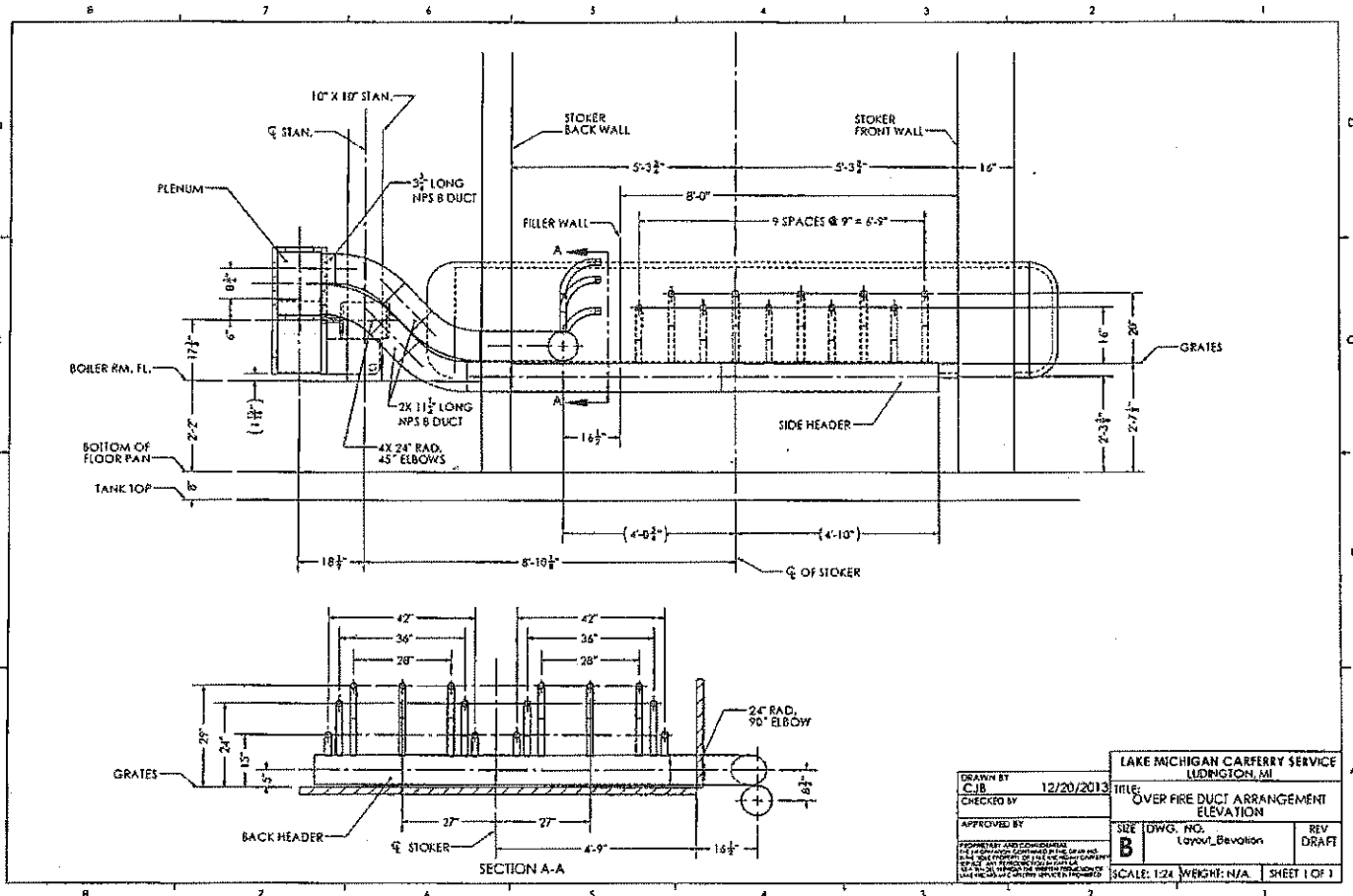
\*\*\* indicates Heats melted and Manufactured in the U.S.A.

CONTAINS CONFIDENTIAL BUSINESS INFORMATION

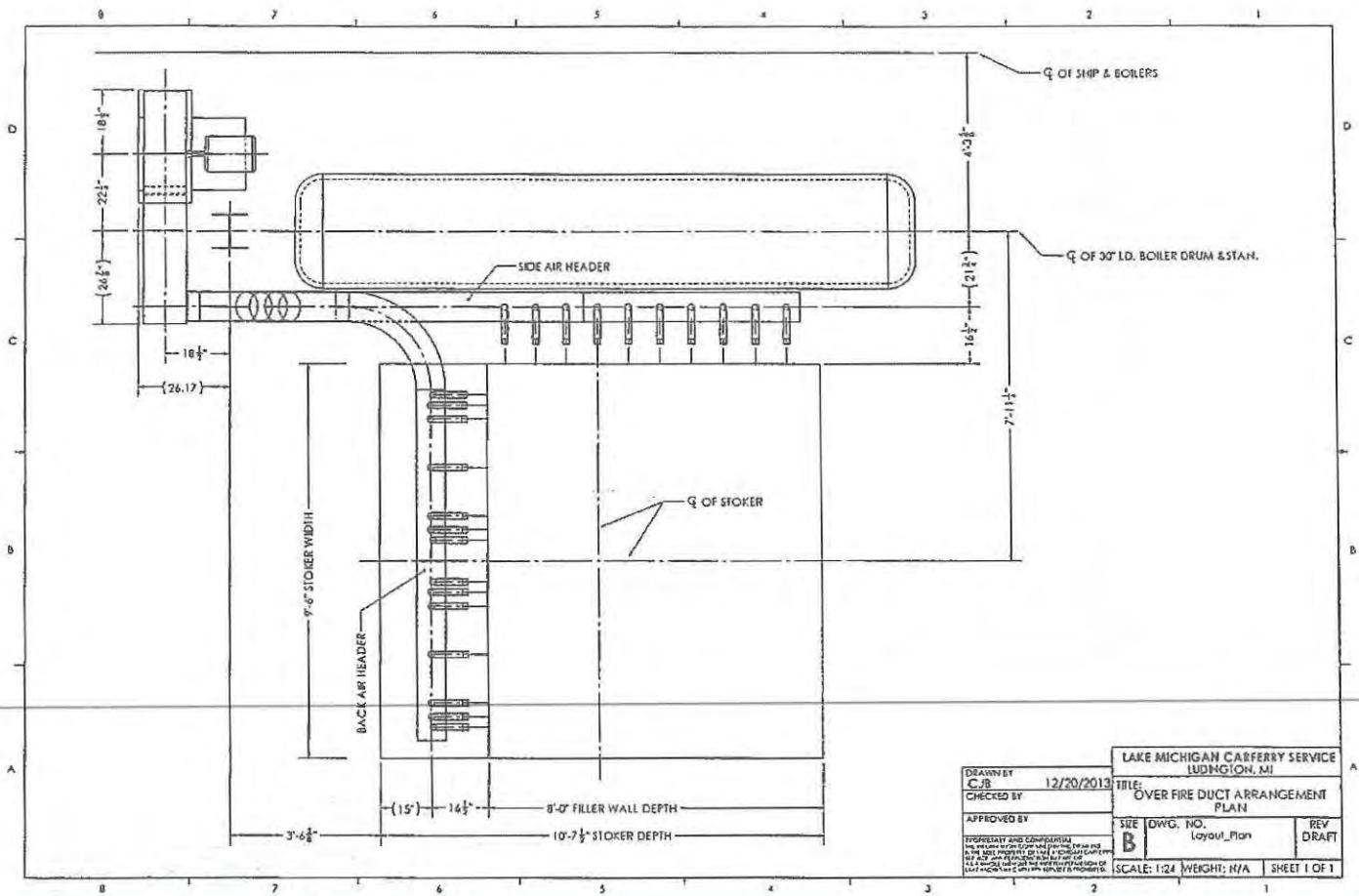






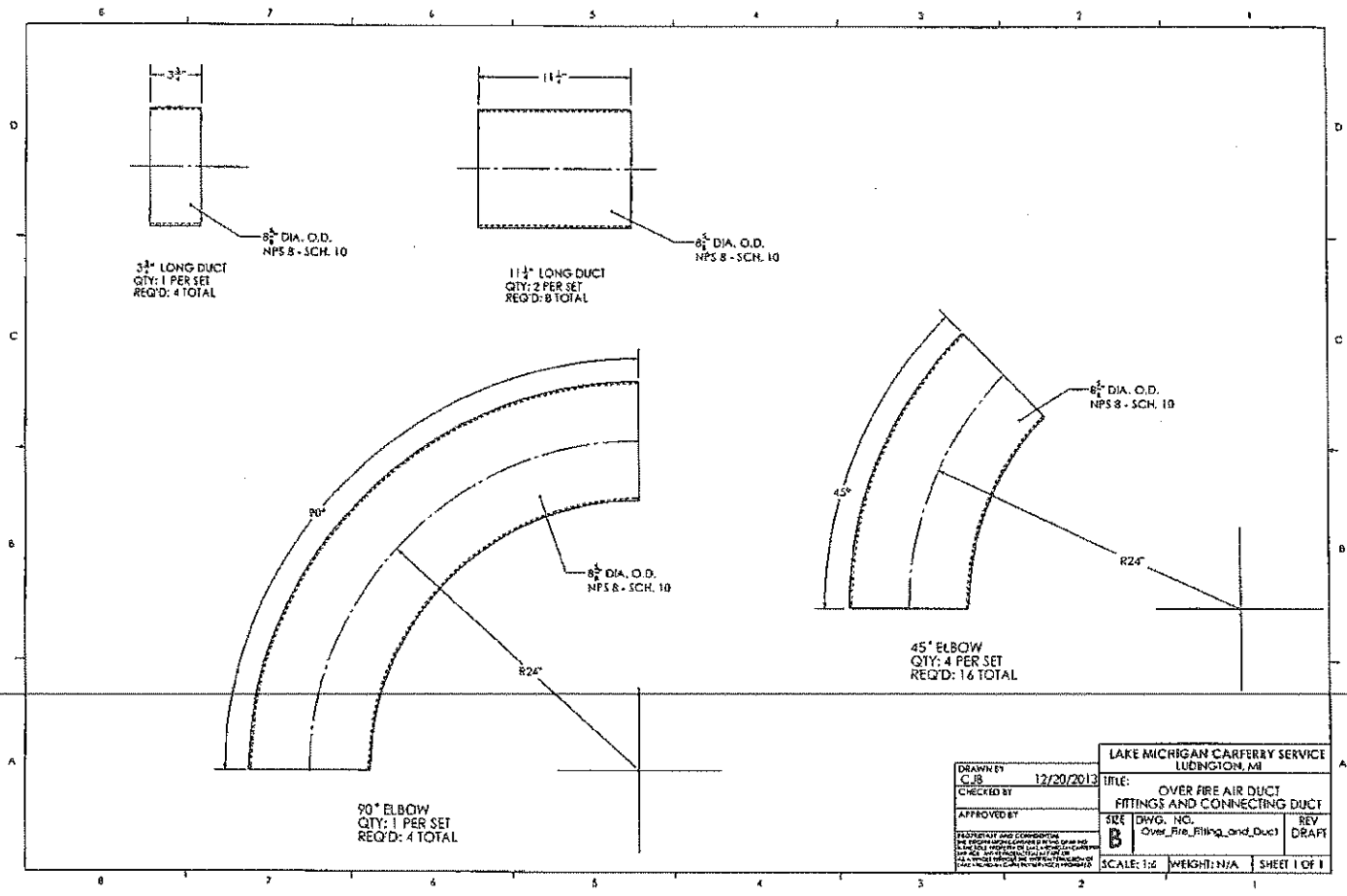


DRAWN BY CJB		12/20/2013		LAKE MICHIGAN CARRIERY SERVICE LUDIONION, MI	
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APPROVED BY				DWG. NO. Layout_Bevolton	
<small>PROPRIETARY AND CONFIDENTIAL THIS DRAWING IS THE PROPERTY OF THE COMPANY IT IS TO BE USED ONLY FOR THE PROJECT AND NOT BE LOANED, REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE COMPANY OR THE PROJECT MANAGER.</small>		<b>B</b>		REV DRAFT	
		SCALE: 1/2\"/>			



LAKE MICHIGAN CARRIERY SERVICE LUDINGWON, MI			
DRAWN BY C. JB		12/20/2013	
CHECKED BY		TITLE OVER FIRE DUCT ARRANGEMENT PLAN	
APPROVED BY		SIZE B	REV DRAFT
<small>         REPRESENT AND CONFIRM THAT THE INFORMATION ON THIS DRAWING IS TRUE AND CORRECT AND THAT THE DRAWING IS THE PROPERTY OF THE COMPANY AND IS NOT TO BE REPRODUCED OR USED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE COMPANY.       </small>		SCALE: 1:24	WEIGHT: N/A
		SHEET 1 OF 1	





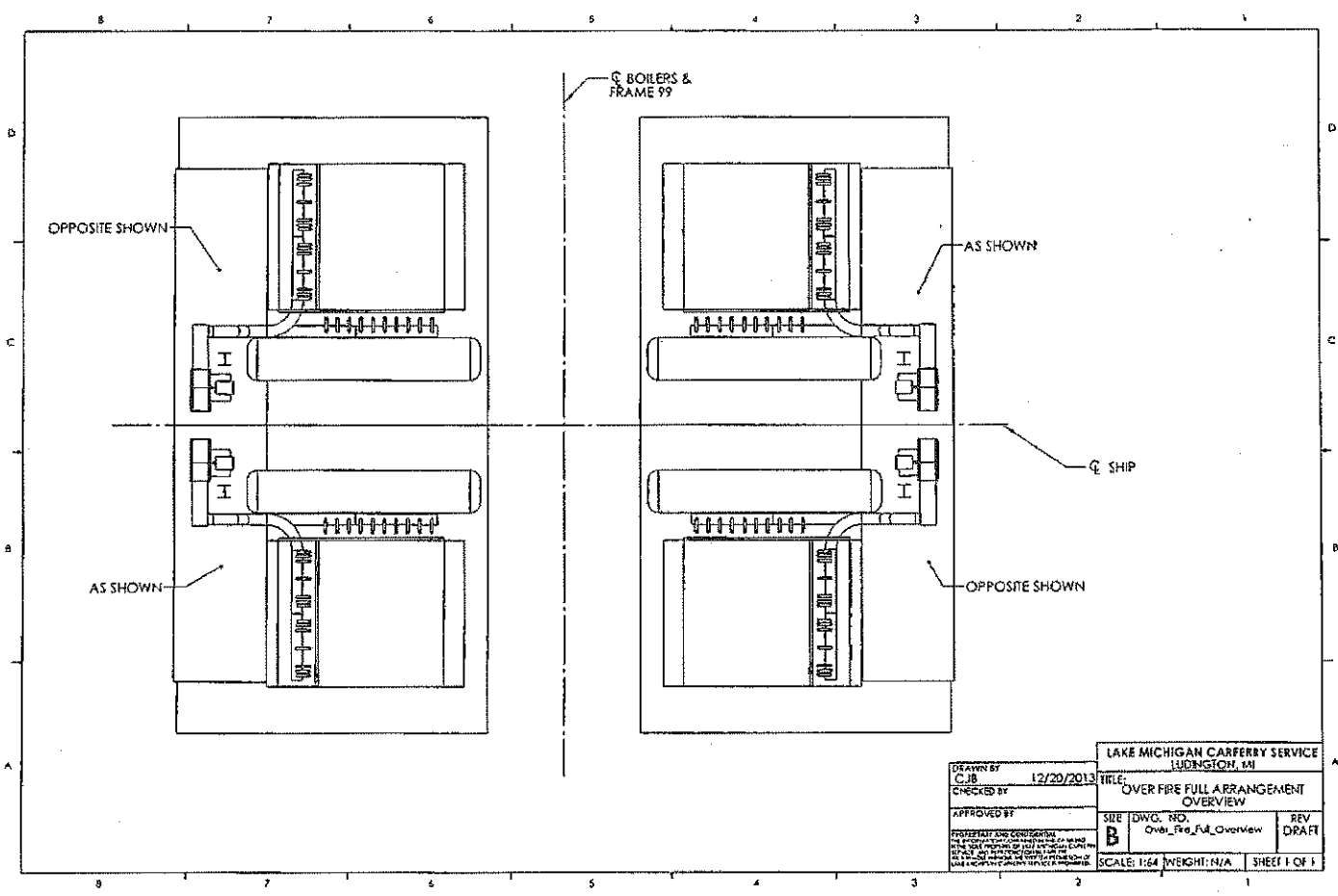
3 1/2" LONG DUCT  
 QTY: 1 PER SET  
 REQ'D: 4 TOTAL  
 6 1/2" DIA. O.D.  
 NPS 8 - SCH. 10

11 1/2" LONG DUCT  
 QTY: 2 PER SET  
 REQ'D: 8 TOTAL  
 6 1/2" DIA. O.D.  
 NPS 8 - SCH. 10

90° ELBOW  
 QTY: 1 PER SET  
 REQ'D: 4 TOTAL  
 6 1/2" DIA. O.D.  
 NPS 8 - SCH. 10  
 R24"

45° ELBOW  
 QTY: 4 PER SET  
 REQ'D: 16 TOTAL  
 6 1/2" DIA. O.D.  
 NPS 8 - SCH. 10  
 R24"

DRAWN BY C.B.		12/20/2013		LAKE MICHIGAN CARRIERY SERVICE LUDINGTON, MI	
CHECKED BY				TITLE: OVER FIRE AIR DUCT FITTINGS AND CONNECTING DUCT	
APPROVED BY				SIZE DWG. NC. Over_Fire_Fitng_and_Duct	
REVISIONS AND COMMENTS		REV B		REV DRAFT	
SCALE: 1:6		WEIGHT: N/A		SHEET 1 OF 1	



C BOILERS &  
FRAME 99

OPPOSITE SHOWN

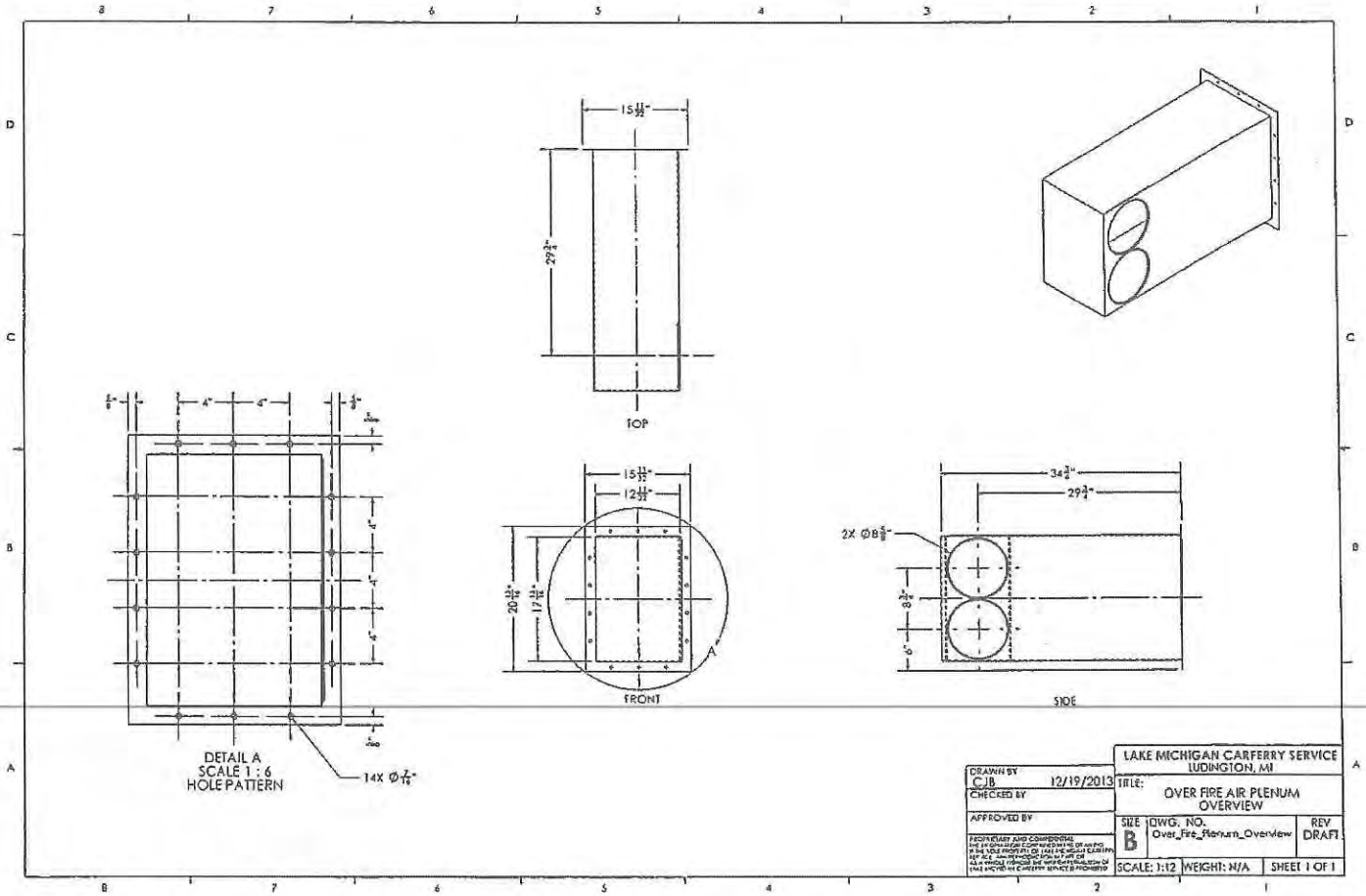
AS SHOWN

AS SHOWN

OPPOSITE SHOWN

Q SHIP

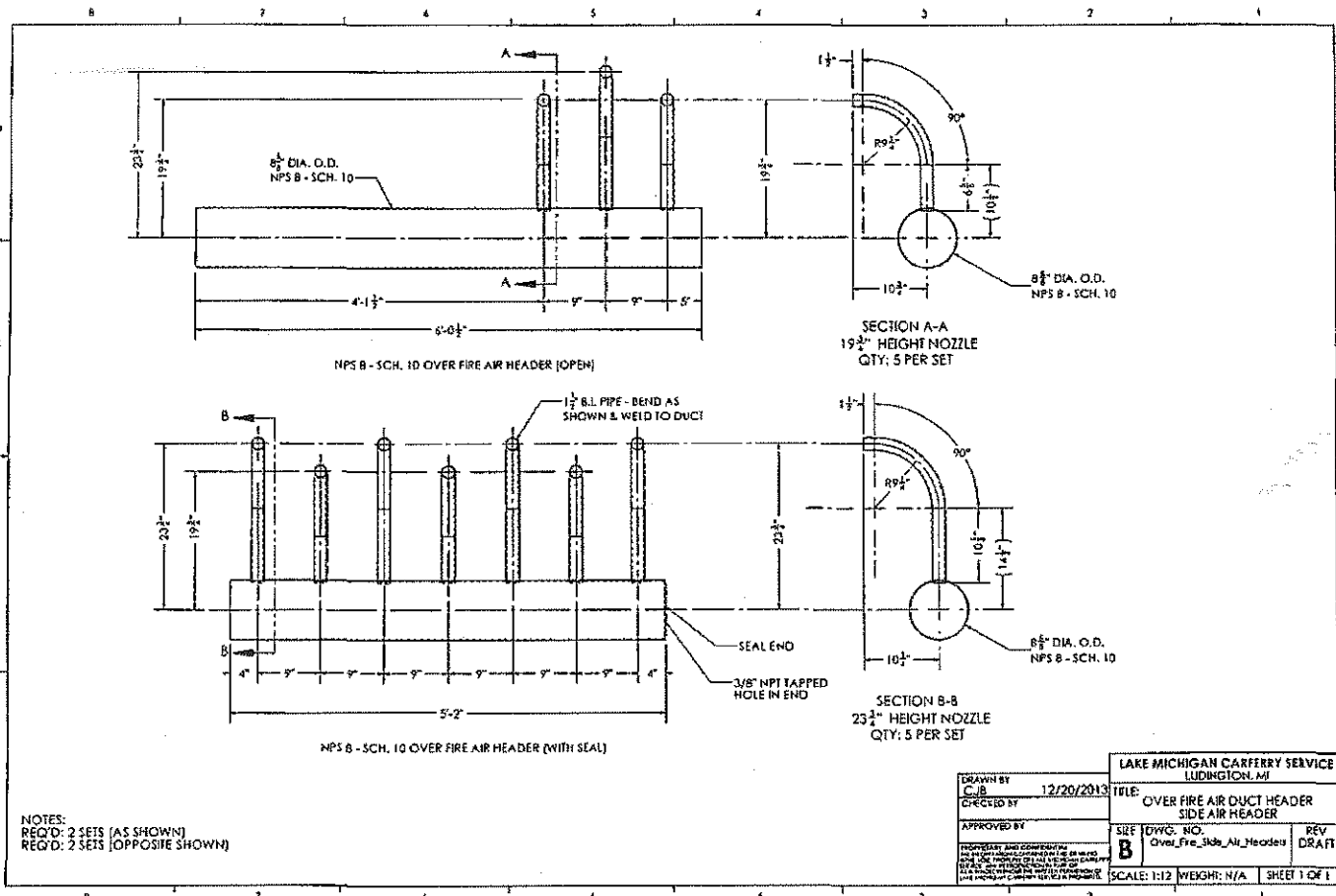
DRAWN BY CJB		DATE 12/20/2013		LAKE MICHIGAN CARRIERY SERVICE LUDINGTON, MI	
CHECKED BY		APPROVED BY		TITLE OVER FIRE FULL ARRANGEMENT OVERVIEW	
PROTECT THIS DOCUMENT IT IS UNLAWFUL TO REPRODUCE OR TO DISTRIBUTE IT WITHOUT THE WRITTEN CONSENT OF THE DRAWING ENGINEER OR THE COMPANY.		SHEET B	DWG. NO. Over_Fire_Full_Overview	REV DRAFT	SCALE: 1/64 WEIGHT: N/A SHEET 1 OF 1



DETAIL A  
SCALE 1 : 6  
HOLE PATTERN

14x  $\phi \frac{1}{4}$ "

DRAWN BY CJB		12/19/2013		LAKE MICHIGAN CARFERRY SERVICE LUDINGTON, MI	
CHECKED BY				TITLE: OVER FIRE AIR PLENUM OVERVIEW	
APPROVED BY				REV B	
<small>FOR EVERY PART COMPONENT: THE DRAWING OR COMPONENT IS AN ORIGINAL IN THE HAND OF THE DESIGNER OR HIS AUTHORIZED AGENT AND NOT TO BE REPRODUCED OR USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN CONSENT OF THE DESIGNER OR HIS AUTHORIZED AGENT.</small>		SCALE: 1:12		WEIGHT: N/A	
				SHEET 1 OF 1	



NOTES:  
 REQ'D: 2 SETS (AS SHOWN)  
 REQ'D: 2 SETS (OPPOSITE SHOWN)

LAKE MICHIGAN CARRIERY SERVICE LUDINGTON, MI	
DRAWN BY CJB	12/20/2013
CHECKED BY	
APPROVED BY	
<small>PROFESSIONAL ENGINEER AND ARCHITECT ACTING AS SUCH        I AM NOT PROVIDING ANY SERVICES OR GUARANTY OF RESULTS UNLESS I AM REGISTERED AS AN ENGINEER OR ARCHITECT IN THE STATE OF MICHIGAN        I AM NOT PROVIDING ANY SERVICES OR GUARANTY OF RESULTS UNLESS I AM REGISTERED AS AN ENGINEER OR ARCHITECT IN THE STATE OF MICHIGAN</small>	
TITLE OVER FIRE AIR DUCT HEADER SIDE AIR HEADER	REV DRAFT
SIRF DWG. NO. Over_Fire_Side_Air_Headerv	
SCALE: 1:12	WEIGHT: N/A
SHEET 1 OF 1	