

STUB INFORMATION							
PIECE STUB INVERT SYS' INVE							
Ø21" STUB A2 470.20 467	.00						
Ø60" STUB G1 467.00 467	.00						
Ø36" STUB J2 468.07 467	.00						
Ø21" STUB M1 472.01 467	.00						
Ø30" STUB N2 467.08 467	.00						

RISER INFORMATION							
PIECE RIM ELEV. SYSTEM INVERT							
Ø15" RISER A1	476.50	467.00					
Ø8" RISER C1	476.50	467.00					
Ø36" RISER H1	482.50	467.00					
Ø36" RISER J1	483.00	467.00					
Ø36" RISER N1	481.00	467.00					
Ø36" RISER P1	480.00	467.00					

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (13) PAGES INCLUDING THE FOLLOWING:

- **VOLUME = 76,309 CF**
- MAINLINE PIPE GAUGE = 14

CONTRACTOR TO FIELD TRIM RISER ELBOWS TO FIT

- WALL TYPE = SOLID
- **DIAMETER = 102"**
- FINISH = ALT2
- CORRUGATION = 5X1

CUSTOMER

DATE

ASSEMBLY

SCALE: 1" = 30' VOLUME: 76,309 CF LOADING: H20/H25 SYSTEM INV = 467±

AS-BUILT

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Maurie L. Boilla WINKELMANN AND ASSOCIATES, INC.

10-19-2016 DATE

NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE.
- ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE 2%" x ½" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.

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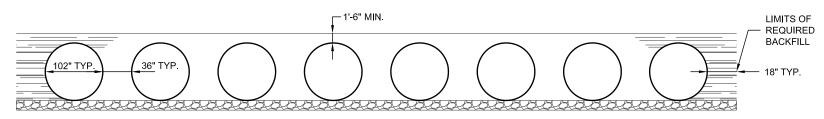


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10-19-2016 DATE



TYPICAL SECTION VIEW

SCALE: N.T.S.

	FABRICATION BoM								
FITTING	TYPE	QTY	Ø	CORRUGATION	GAUGE	FINISH	WALL TYPE	LENGTH	TOTAL
Α	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23.5	23.5
A - TEE	TEE	1	102	5X1	14	ALT2	SOLID	6.25	6.25
A1	RISER	1	15	2 2/3X1/2	16	ALT2	SOLID	5.25	5.25
A2	STUB	1	21	2 2/3X1/2	16	ALT2	SOLID	1.08	1.08
В	MANIFOLD - 0 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23	23
B - TEE	TEE	2	102	5X1	14	ALT2	SOLID	6.25	12.5
С	MANIFOLD - 0 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23	23
C - TEE	TEE	2	102	5X1	14	ALT2	SOLID	6.25	12.5
C1	RISER	1	8	1 1/2X1/4	16	ALT2	SOLID	5.25	5.25
D	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23.5	23.5
D - TEE	TEE	1	102	5X1	14	ALT2	SOLID	6.25	6.25
E	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	12	12
F	MANIFOLD - 0 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23	23
F - TEE	TEE	2	102	5X1	14	ALT2	SOLID	6.25	12.5
G	MANIFOLD - 1 ELBOW (S)	1	102	5X1	14	ALT2	SOLID	23.5	23.5
G - TEE	TEE	1	102	5X1	14	ALT2	SOLID	6.25	6.25
G1	STUB	1	60	5X1	16	ALT2	SOLID	5.25	5.25
Н	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
H1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	11.25	11.25
H1A	LADDER	1		16		GALV			
J	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
J1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	11.75	11.75
J1A	LADDER	1		16		GALV			

FABRICATION BoM									
FITTING	TYPE	QTY	Ø	CORRUGATION	GAUGE	FINISH	WALL TYPE	LENGTH	TOTAL
J2	STUB	1	36	2 2/3X1/2	16	ALT2	SOLID	2.42	2.42
K	PIPE	1	102	5X1	14	ALT2	SOLID	14	14
K1	BULKHEAD	1	102		12	ALT2	SOLID		
L	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
L1	BULKHEAD	1	102		12	ALT2	SOLID		
М	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
M1	STUB	1	21	2 2/3X1/2	16	ALT2	SOLID	1.92	1.92
M2	BULKHEAD	1	102		12	ALT2	SOLID		
N	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
N1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	9.75	9.75
N1A	LADDER	1		16		GALV			
N2	STUB	1	30	2 2/3X1/2	16	ALT2	SOLID	4.08	4.08
Р	PIPE	1	102	5X1	14	ALT2	SOLID	20	20
P1	RISER	1	36	2 2/3X1/2	16	ALT2	SOLID	8.75	8.75
P1A	LADDER	1		16		GALV			
Q	MANIFOLD - 1 ELBOW (S)	1	8	1 1/2X1/4	16	ALT2	SOLID	6	6
R	MANIFOLD - 1 ELBOW (S)	1	15	2 2/3X1/2	16	ALT2	SOLID	7.25	7.25
S	PIPE	46	102	5X1	14	ALT2	SOLID	20	920
Т	PIPE	1	102	5X1	14	ALT2	SOLID	16	16
U	PIPE	5	102	5X1	14	ALT2	SOLID	15	75
V	PIPE	1	102	5X1	14	ALT2	SOLID	14	14
W	PIPE	1	102	5X1	14	ALT2	SOLID	16	16
BAND	12 HUGGER	71	102	W/7" TECHCO WD	18	ALT2			
GASKETS	FLAT	71	102	12" WIDE					

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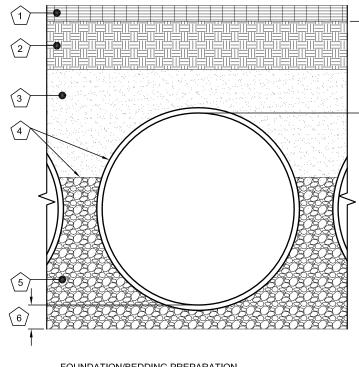
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- 1. RIGID OR FLEXIBLE PAVEMENT.
- 2. NORMAL ROADWAY EMBANKMENT FILL PLACED IN 8" LIFTS AND COMPACTED TO MIN. 90% STANDARD DENSITY PER AASHTO T-99.
- 3. SAND FILL TO 12" ABOVE PIPE.
- 4. CONTECH C40 NON-WOVEN GEOTEXTILE RECOMMENDED TO PREVENT SOIL MIGRATION.
- 5. WELL GRADED CRUSHED STONE. IN DEPTH. (#57 OR #8 OR OTHER SUITABLE GRANULAR) 2/3RDS UP
- 6. 6" WELL GRADED CRUSHED STONE BEDDING BELOW PIPE.

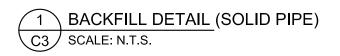
FOUNDATION/BEDDING PREPARATION

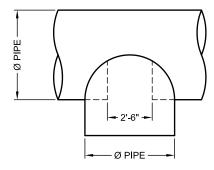
PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE 4 INCHES OF A WELL-GRADED GRANULAR MATERIAL SHALL BE PLACED AS THE

<u>BACKFILL</u>

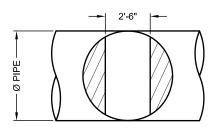
THE BACKFILL SHALL BE AN A1, A2 OR A3 GRANULAR FILL PER AASHTO M-145 OR A WELL-GRADED GRANULAR FILL AS APPROVED BY THE ENGINEER (SEE INSTALLATION GUIDELINES). THE MATERIAL SHALL BE PLACED IN 8-INCH LOOSE LIFTS AND COMPACTED TO 90% AASHTO T99 STANDARD PROCTOR DENSITY. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL FOR MATERIAL



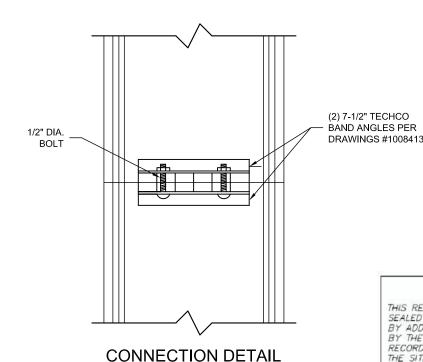


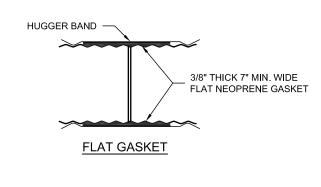
PLAN



FRONT

TYPICAL MANWAY DETAIL SCALE: N.T.S.





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10-19-2016 DATE

GENERAL NOTES

1. BANDS ARE NORMALLY FURNISHED AS FOLLOWS: 12" THRU 48" 1-PIECE 54" THRU 96" 2-PIECE 102" THRU 144" 3-PIECES

SINGLE

7-1/2" TECHCO ANGLE

- 2. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS
- 3. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2%" x 1/2". DIMENSIONS ARE SUBJECT TO MANUFACTURING



H-12 HUGGER BAND DETAIL

SCALE: N.T.S.

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FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)					
INCLIES	18-50	50-75	75-110	110-150		
	MINIMUM COVER (FT)					
12-42	2.0	2.5	3.0	3.0		
48-72	3.0	3.0	3.5	4.0		
78-120	3.0	3.5	4.0	4.0		
126-144	3.5	4.0	4.5	4.5		

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.



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Maura L. Boulla WINKELMANN AND ASSOCIATES, INC.

10-19-2016 DATE

SPECIFICATION FOR CORRUGATED STEEL PIPE-ALUMINIZED TYPE 2 STEEL

SCOPE

THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED STEEL PIPE (CSP) DETAILED IN THE PROJECT PLANS.

MATERIAL

THE ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M274 OR ASTM A929.

PIPE

THE CSP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M36 OR ASTM A760. THE PIPE SIZES, GAGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE

HANDLING AND ASSEMBLY

SHALL BE IN ACCORDANCE WITH RECOMMENDATIONS OF THE NATIONAL CORRUGATED STEEL PIPE ASSOCIATION (NCSPA)

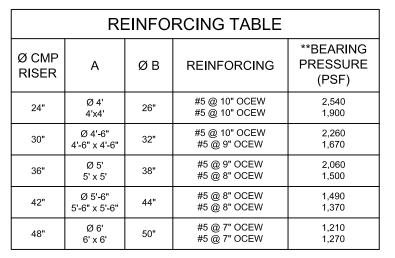
INSTALLATION

SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

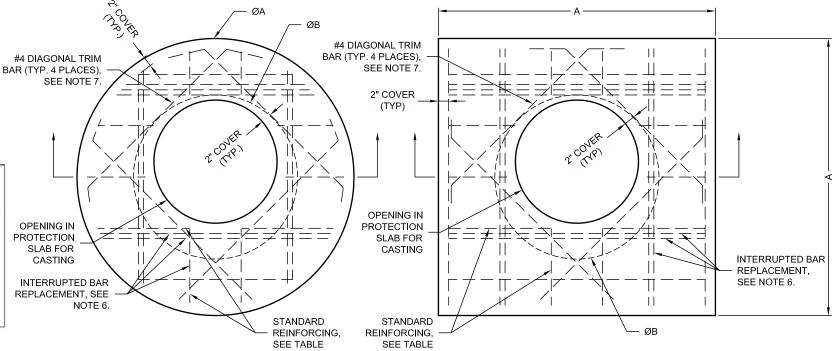
IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

GASKET MATERIAL SUFFICIENT TO PREVENT SLAB FROM BEARING ON RISER TO BE PROVIDED BY CONTRACTOR.

SECTION VIEW



** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW

NOTES:

- 1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION AND ACI 350.
- 2. DESIGN LOAD HS25.
- 3. EARTH COVER = 1' MAX.
- 4. CONCRETE STRENGTH = 4,000 psi
- 5. REINFORCING STEEL = ASTM A615, GRADE 60
- PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.

SQUARE OPTION PLAN VIEW

- 7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
- 8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- DETAIL DESIGN BY DELTA ENGINEERS, ARCHITECTS AND LAND SURVEYORS, ENDWELL, NY.



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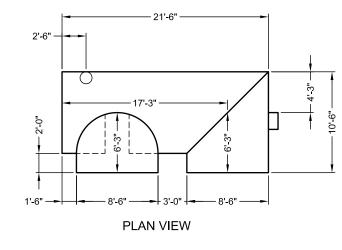
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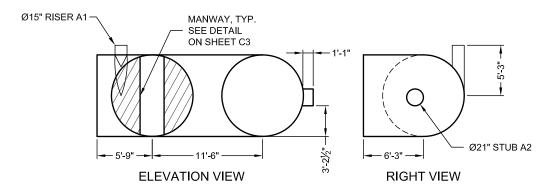
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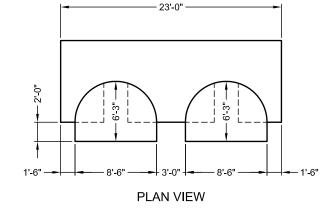


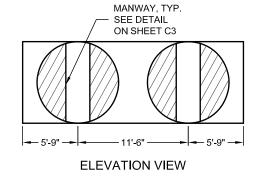
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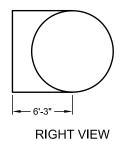
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PART B SCALE: 1"=10'

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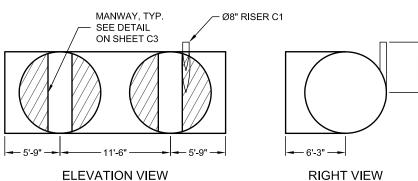
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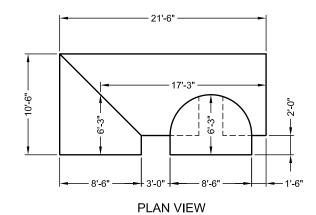
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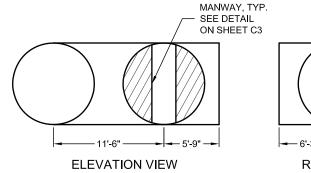
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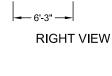
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Mauria L. Boilla WINKELMANN AND ASSOCIATES, INC.

10-19-2016







PART D SCALE: 1"=10'

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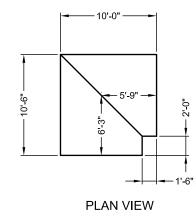
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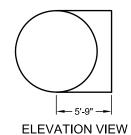
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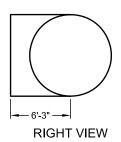
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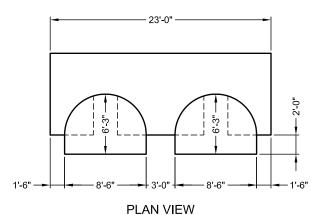


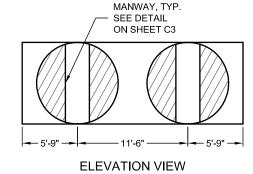
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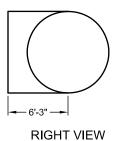
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PART F SCALE: 1"=10'

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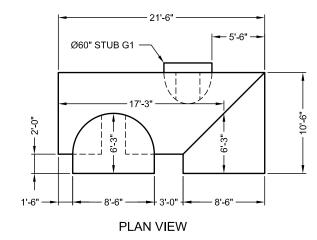
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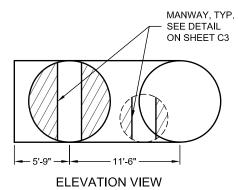
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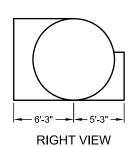
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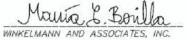






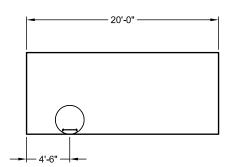
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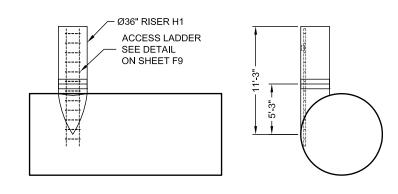


DATE

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PLAN VIEW



ELEVATION VIEW

RIGHT VIEW

PART H SCALE: 1"=10'

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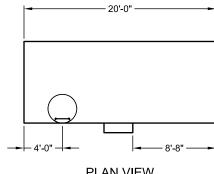
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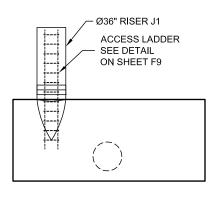
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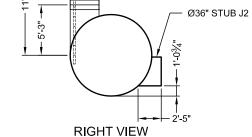
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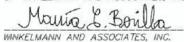
ELEVATION VIEW



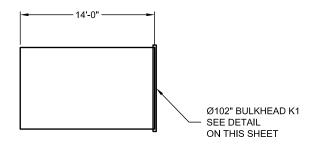
PART J SCALE: 1"=10'

AS-BUILT

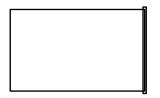
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PLAN VIEW

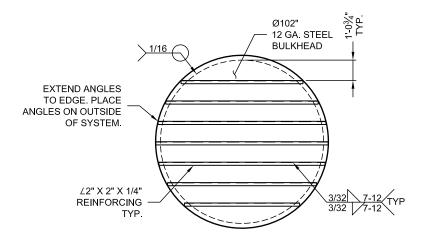




ELEVATION VIEW

RIGHT VIEW

PART K SCALE: 1"=10'



BULKHEAD DETAIL - PART K SCALE: N.T.S.

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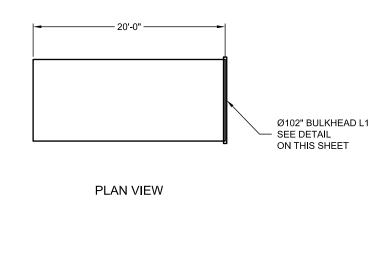
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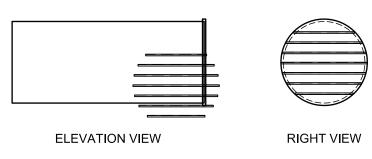
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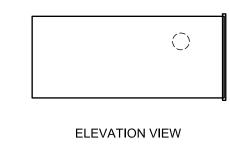


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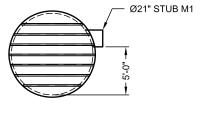


PART L SCALE: 1"=10'



20'-0" -

PLAN VIEW -- 3'-71/4"



RIGHT VIEW

Ø102" BULKHEAD M2

SEE DETAIL

ON THIS SHEET

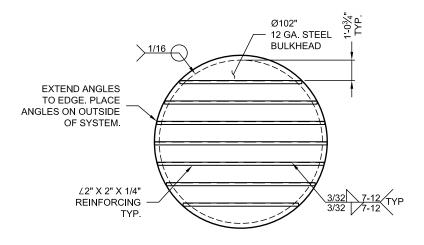
PART M SCALE: 1"=10'

AS-BUILT

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10-19-2016



BULKHEAD DETAIL - PART L AND M SCALE: N.T.S.

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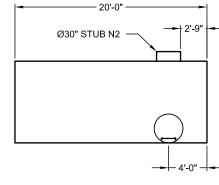
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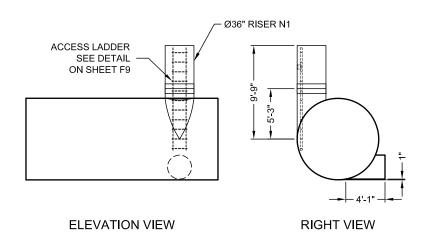
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PLAN VIEW



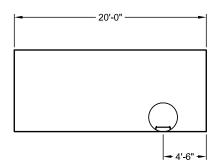
PART N SCALE: 1"=10'

AS-BUILT

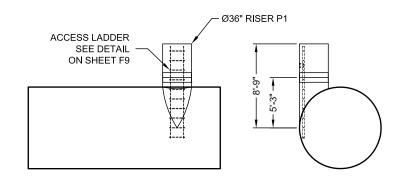
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PLAN VIEW



ELEVATION VIEW

RIGHT VIEW

PART P SCALE: 1"=10'

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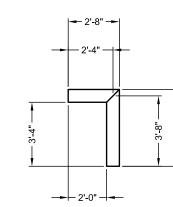
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PLAN VIEW



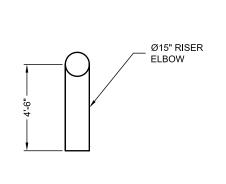
LEFT VIEW **ELEVATION VIEW**

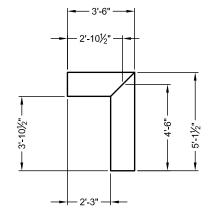
SCALE: 1"=5'

Ø8" RISER

PART Q

PLAN VIEW





LEFT VIEW

ELEVATION VIEW

PART R SCALE: 1"=5'

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ROCKWALL, IX SITE DESIGNATION: WEST

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