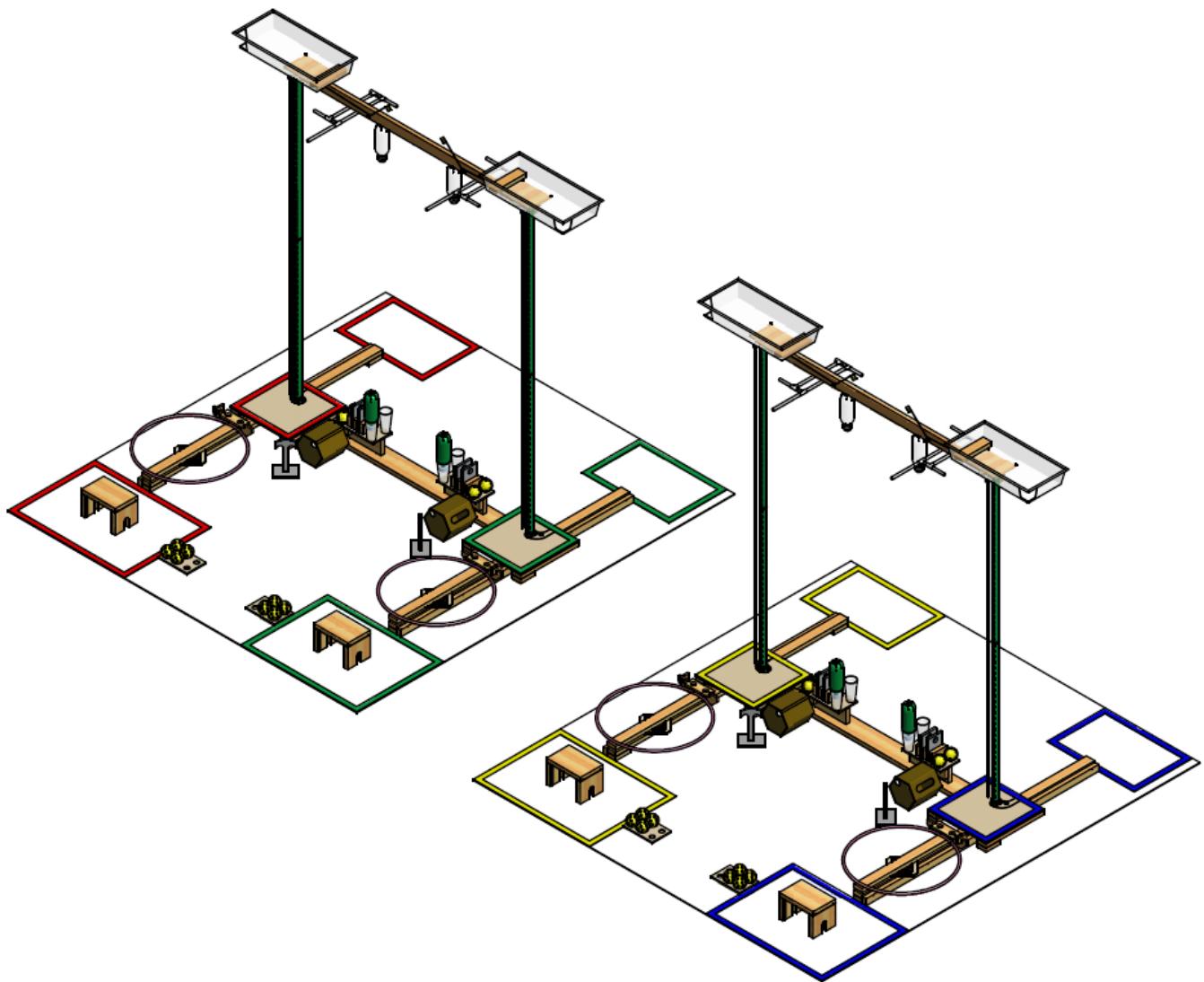


**BEST 2012 Design Contest
FIELD CONSTRUCTION DRAWINGS
Version 1.1
21 August 2012**

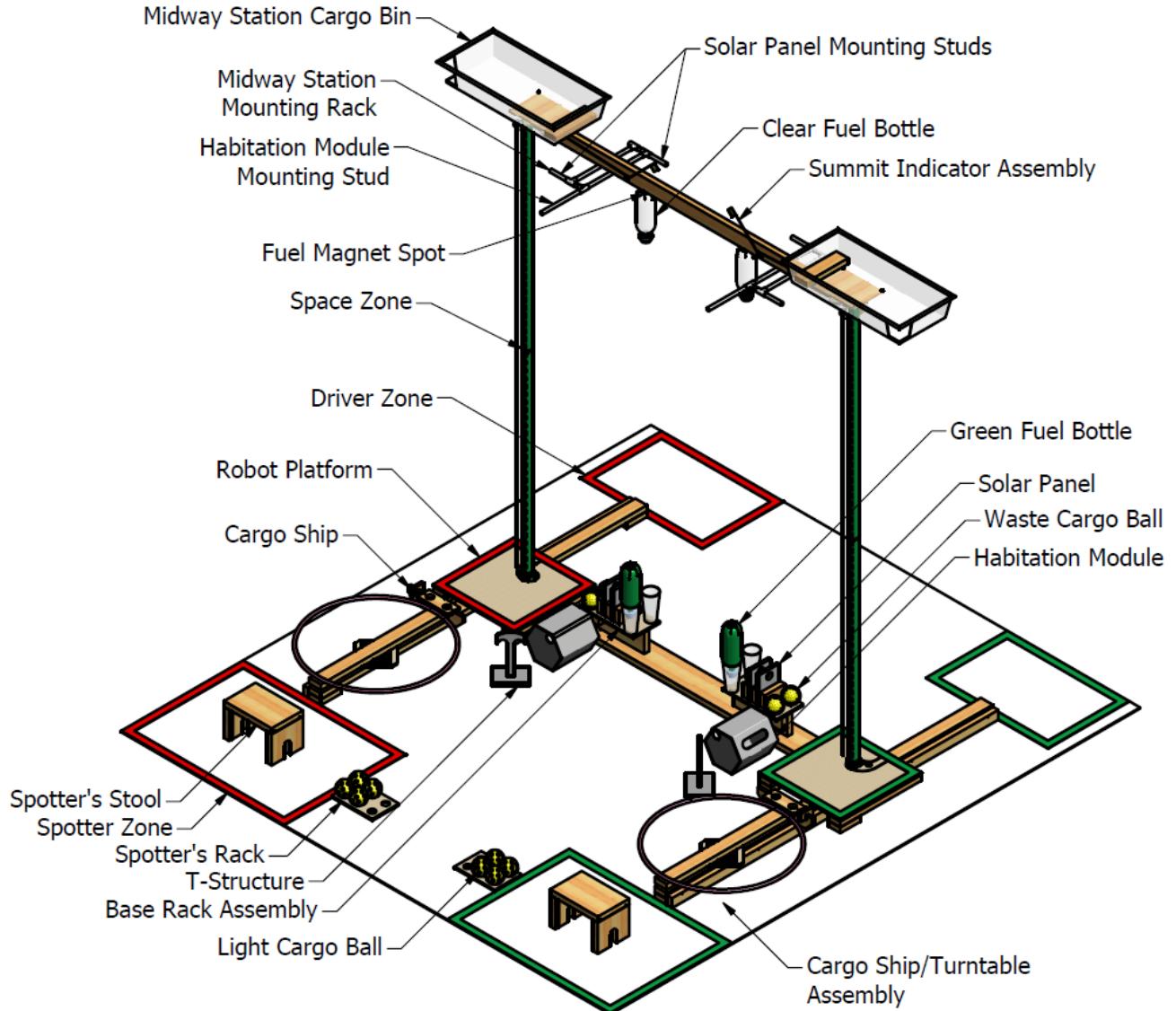
Revision Control Sheet

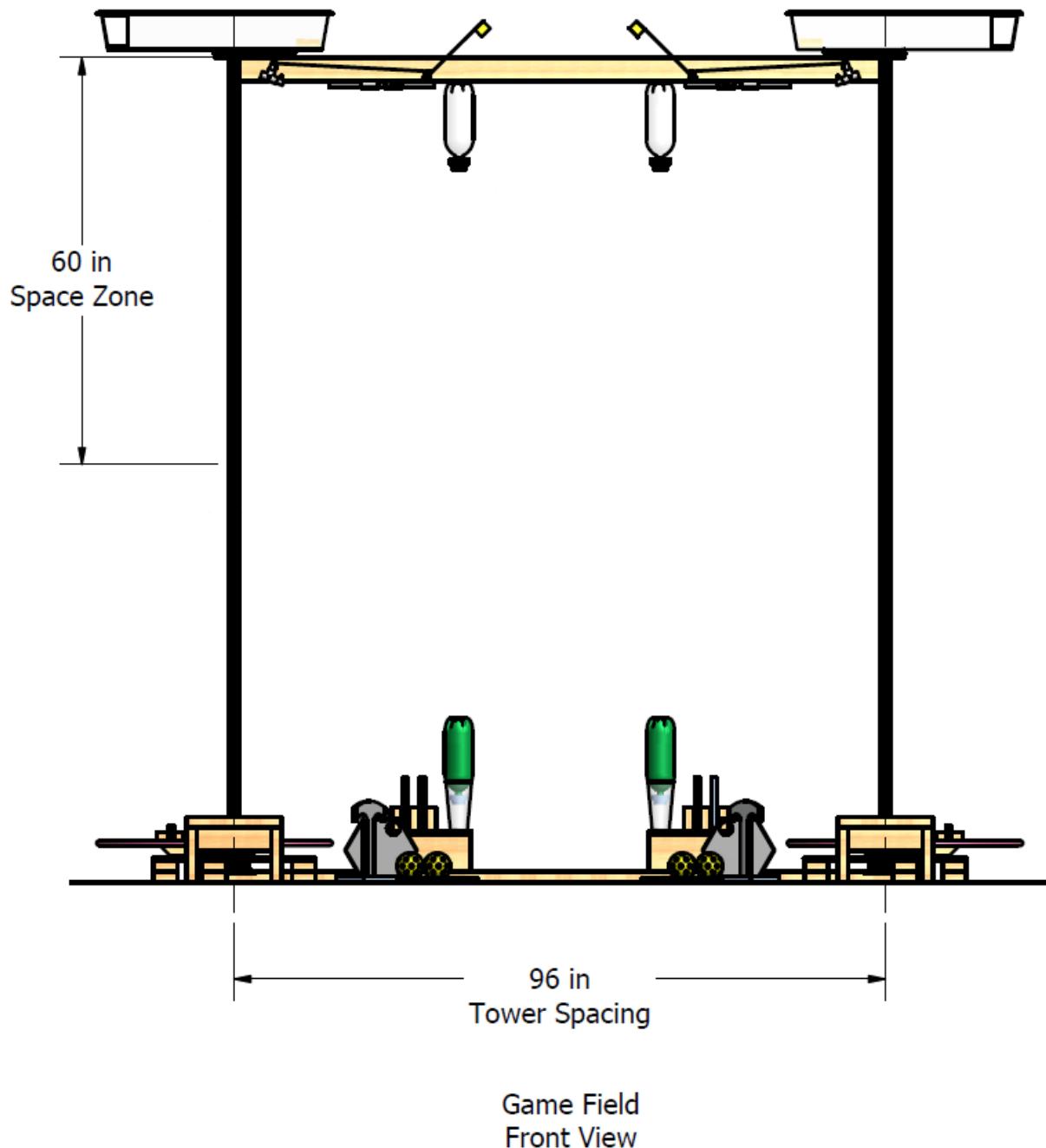
Revision	Description	Release Date
1.0	Initial Release	July 6, 2012
1.1	<ul style="list-style-type: none"> - Updated drawing list on Sheet 7 - Field View – Updated size of Spotter's Box - BEST2012-100-2 (Cargo Bin Assembly) – Updated corner cutout dimension on Sheet 3; Updated instructions on Sheet 5 - BEST2012-130 (Base Rack Assembly) – Updated assembly views of Item 5 (Fuel Bottle Holder); Updated Item 3 cut dimensions on Sheet 5 -BEST2012-160 (T-Structure) – Updated cut dimensions of Items 1 & 2 on Sheets 3 & 4 - BEST2012-170 (Habitation Module) – Updated dimension of Item 4 on Sheet 6 	August 21, 2012

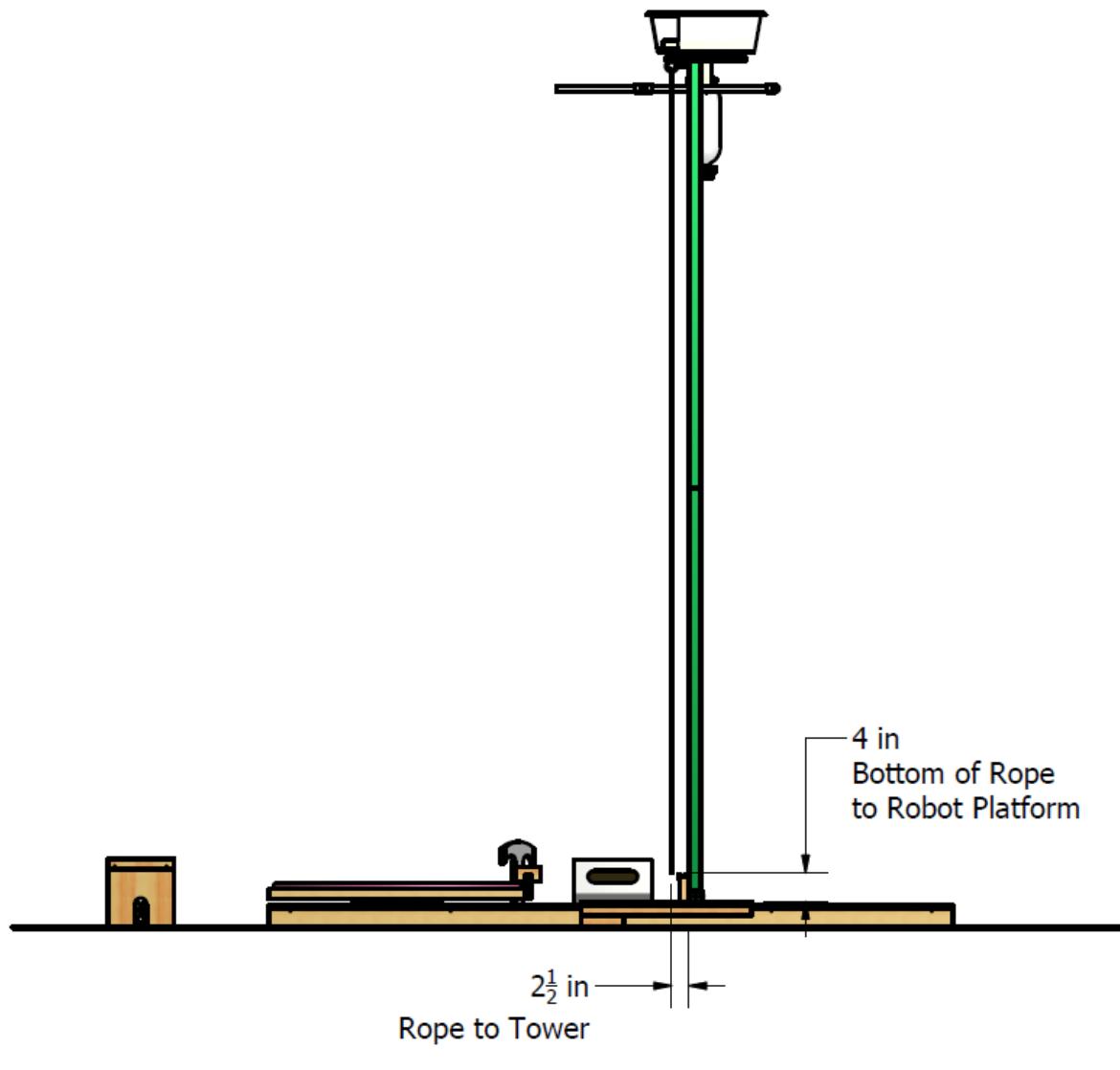
Warp XX Game Field



Half Game Field



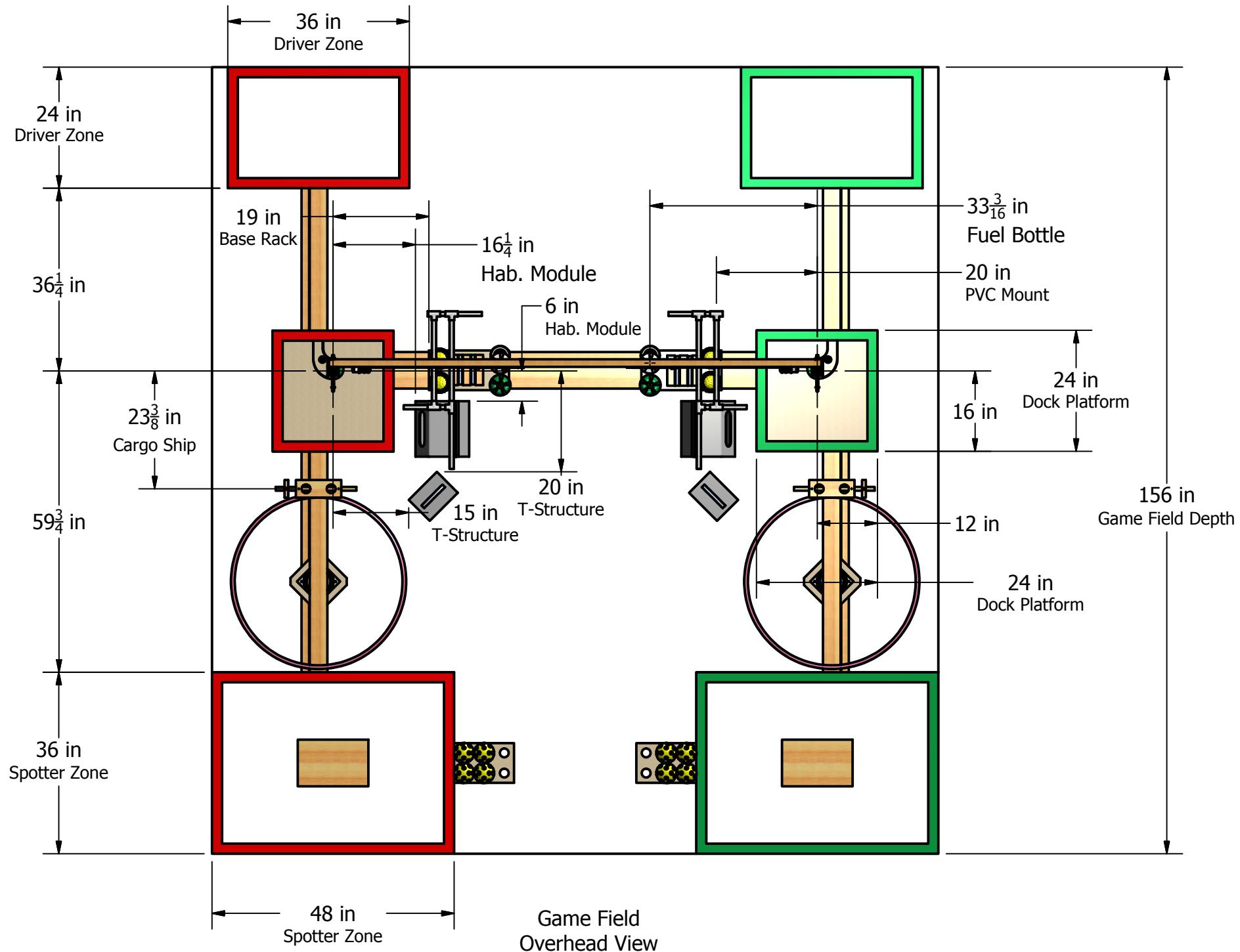


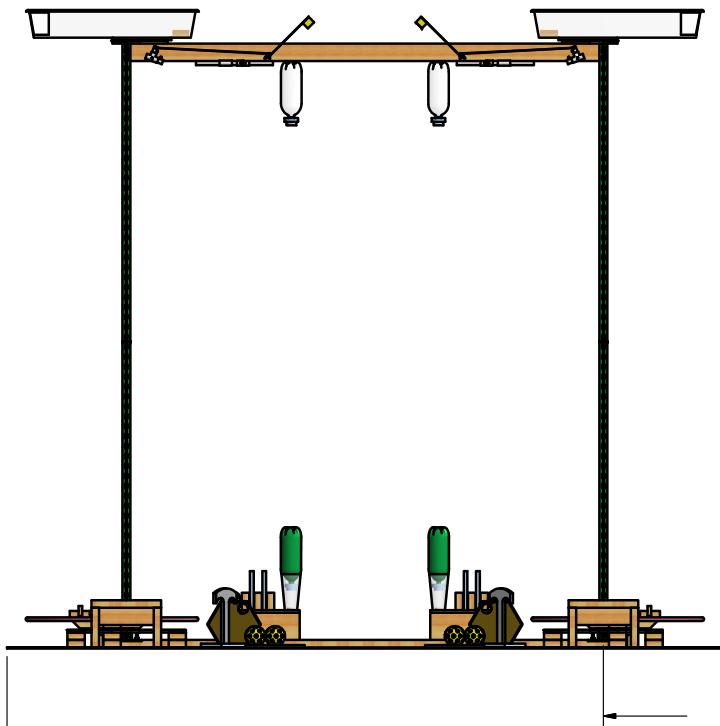


Game Field
Side View

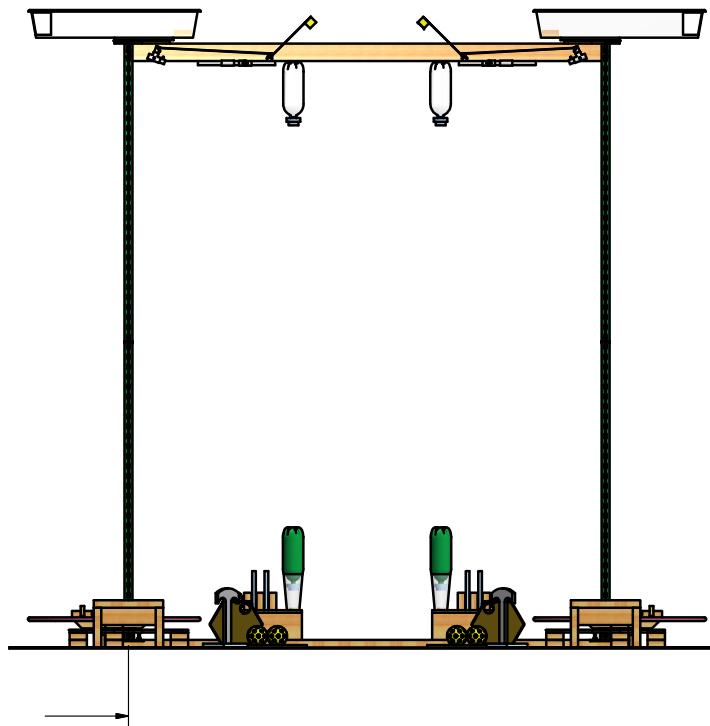
Drawing List

Warp XX			
BEST 2012 Drawing List			
Group	Drawings/Sheets	Details	Drawing Number
Tower Assembly		Complete Assembly	BEST2012-100
	Midway Station Beam Assembly	Sub Assembly	BEST2012-100-1
	Midway Station Cargo Bin Assembly	Sub Assembly	BEST2012-100-2
	Midway Station Mounting Rack Assembly	Sub Assembly	BEST2012-100-3
	Summit Indicator Assembly	Sub Assembly	BEST2012-100-4
Robot Dock Assembly		Complete Assembly	BEST2012-110
Cargo Ship/Turntable Assembly		Complete Assembly	BEST2012-120
	Cargo Ship Assembly	Sub Assembly	BEST2012-120-1
Base Rack Assembly		Complete Assembly	BEST2012-130
	Fuel Bottle Assembly	Sub Assembly	BEST2012-130-1
Spotter's Stool Assembly		Complete Assembly	BEST2012-140
Spotter's Rack		Complete Assembly	BEST2012-150
T-Structure Assembly		Complete Assembly	BEST2012-160
Habitation Module Assembly		Complete Assembly	BEST2012-170
Field Reset Bucket Assembly		Complete Assembly	BEST2012-180
Compliance Caliper Assembly		Complete Assembly	BEST2012-190





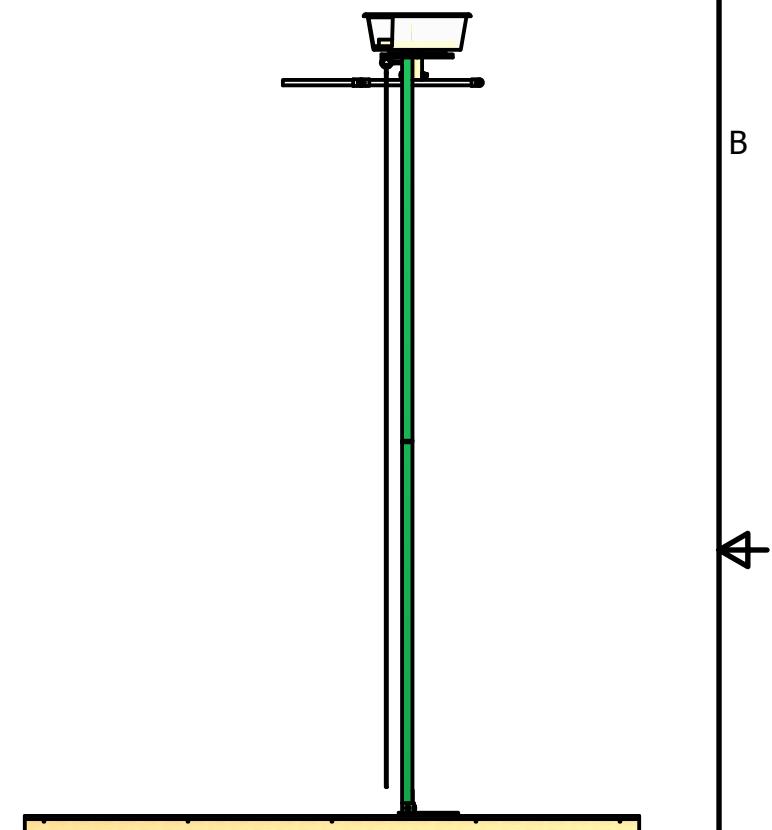
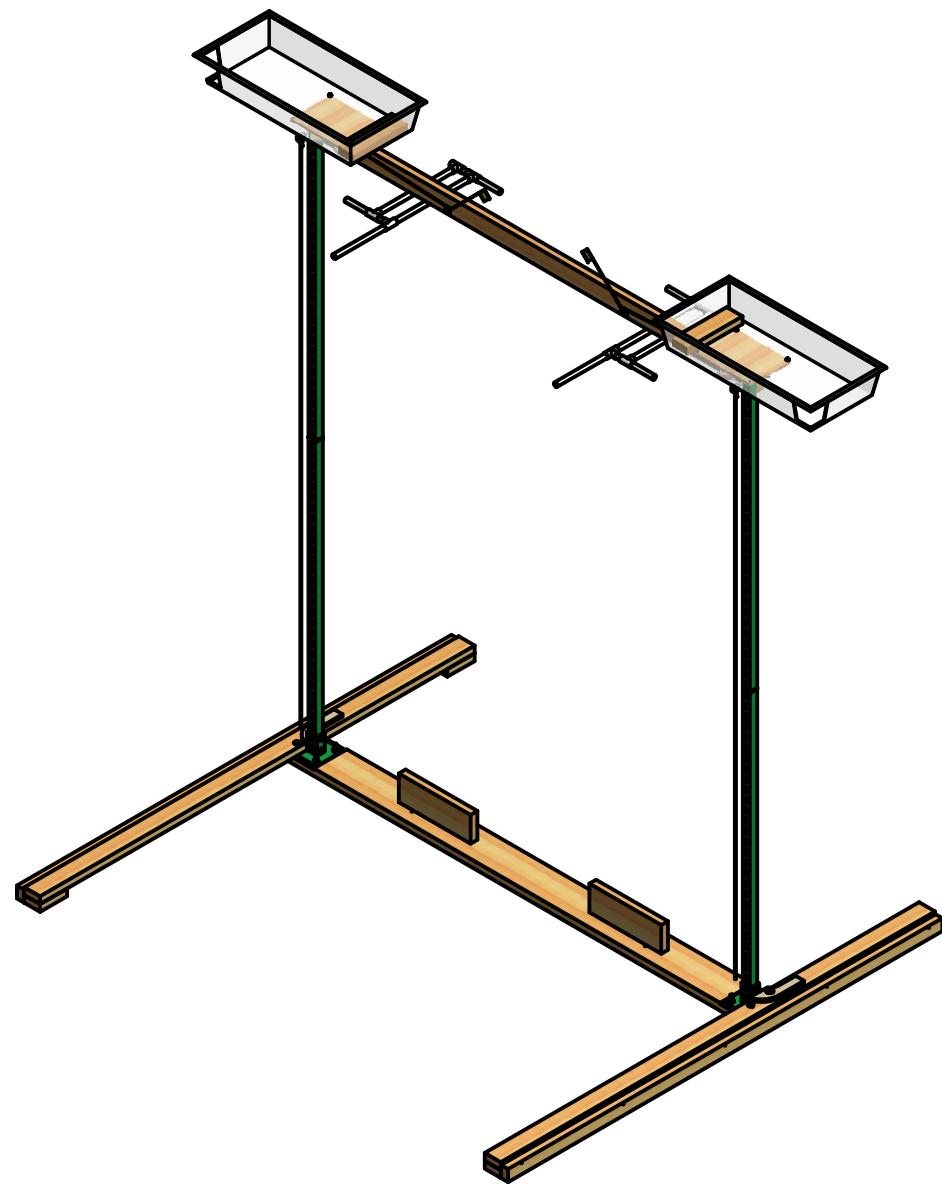
8 ft Minimum
Center Between Fields



Approx. 27 ft
Game Field Width

4 1 3 2 1

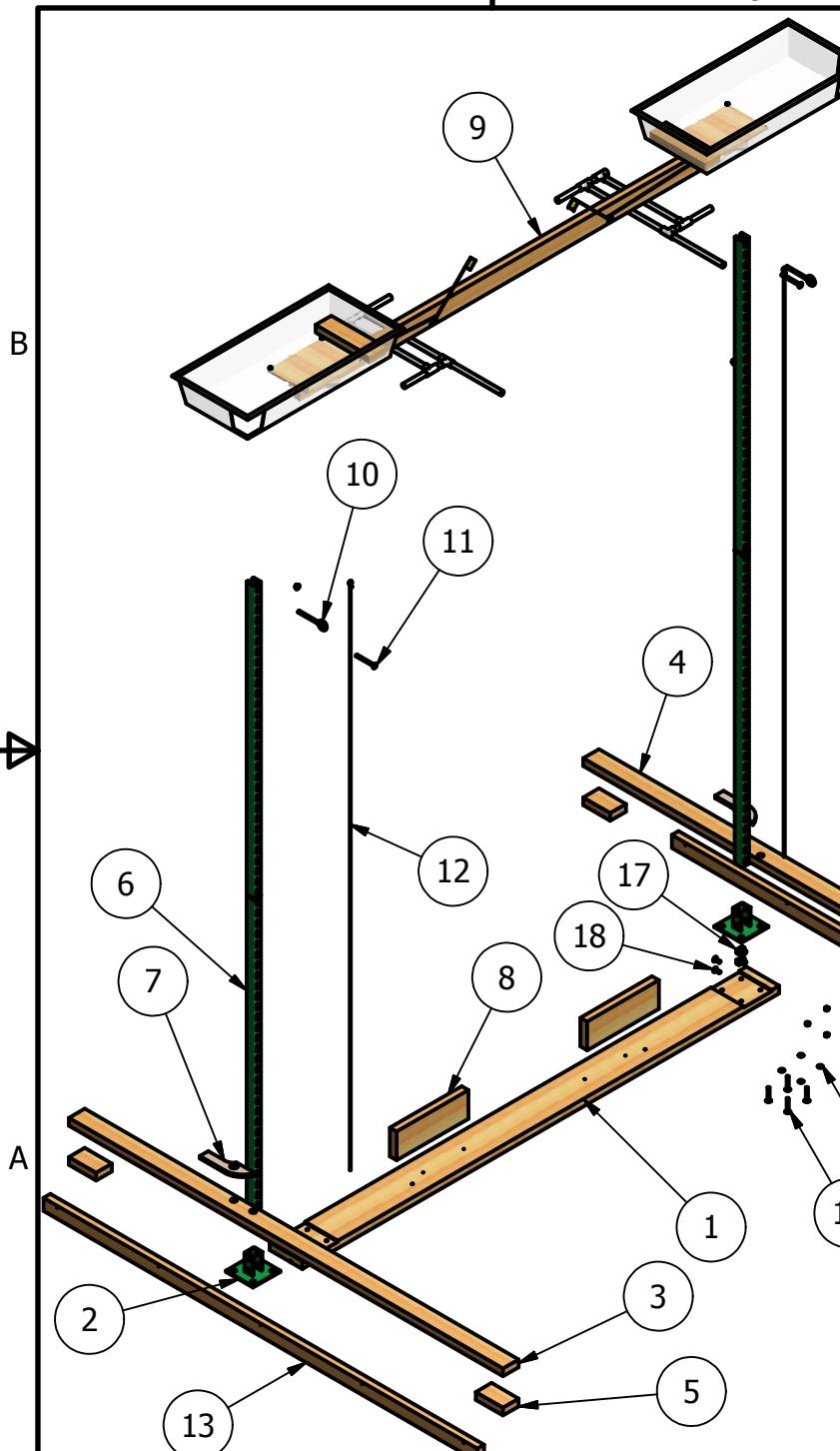
Tower Assembly



WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE A	DWG NO BEST-2012-100	REV 1.1
SCALE DRAWN DALLAS BEST		SHEET 1 OF 18

4 1 3 2 1

4 1 3 2 1



PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Base Beam	2" x 8" x 10' Lumber	2
2	Tower Base	Unistrut Base	4
3	Crossbeam Left	2" x 4" Lumber	2
4	Crossbeam Right	2" x 4" Lumber	2
5	Crossbeam Foot	2" x 4" Lumber	8
6	Tower	10' unistrut, slotted hole	4
7	Dock Station Insert	1/2" Plywood	4
8	Base Rack Mount	2" x 6" Lumber	4
9	Midway Station Beam Assembly	Sub-assembly	4
10	3/8" x 6" Eyebolt	Eyebolt	4
11	3/8" x 4" Carriage Bolt	Carriage Bolt	4
12	Rope - 10'	5/32" dia Nylon Rope	4
13	Crossbeam Support	2" x 3" Lumber	4
14	3/8" x 2-1/2" Carriage Bolt	Carriage Bolt	16
15	3/8" Flat Washer	Washer	16
16	3/8" Nut	Hex Nut	24
17	1/2" Spring Nut	Spring Nut for Unistrut	8
18	1/2" x 1" Bolts	Bolts for Unistrut	8

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

DWG NO
BEST-2012-100

REV

1.1

SCALE

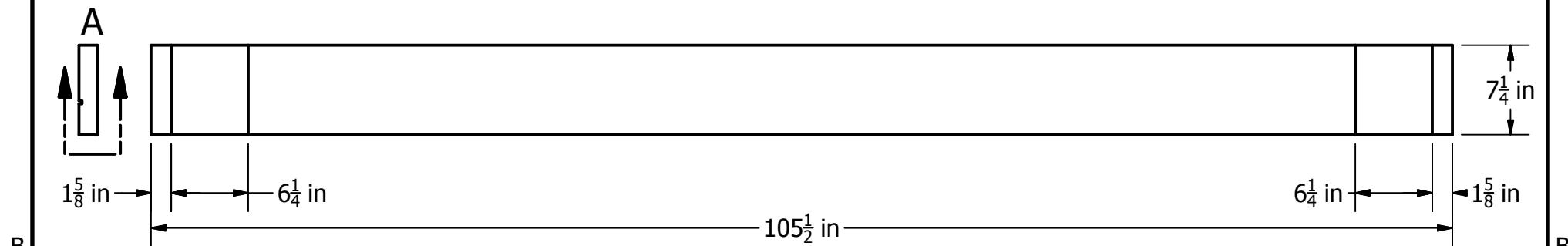
DRAWN

DALLAS BEST

SHEET 2 OF 18

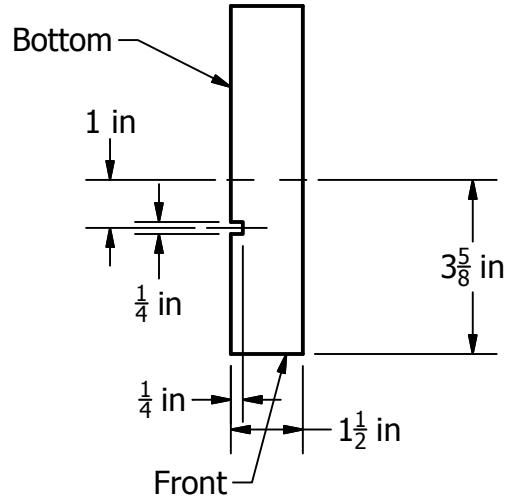
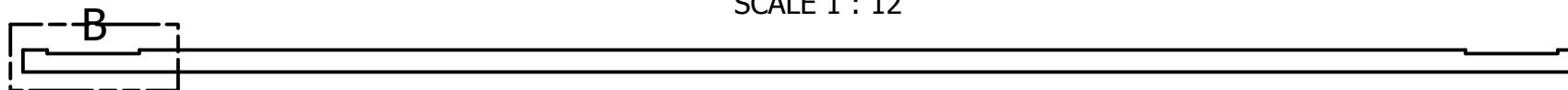
4 1 3 2 1

4 3 2 1



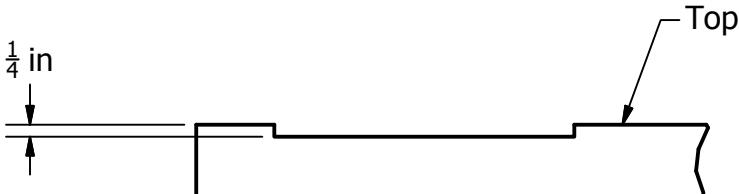
Item 1

SCALE 1 : 12



DETAIL A

SCALE 1 : 4



DETAIL B

SCALE 1 : 4

Instructions:

1. Cut a notch $\frac{1}{4}$ " wide by $\frac{1}{4}$ " deep in the bottom of the beam (Detail A), running the entire length of the beam as shown (notch may be made wider or deeper depending on the size of the wire used for the tiebreaker).
2. Cut notches for base plates $\frac{1}{4}$ " deep by $6\frac{1}{4}$ " wide on the top of the beam (Detail B).

WARP XX FIELD DRAWINGS

TITLE

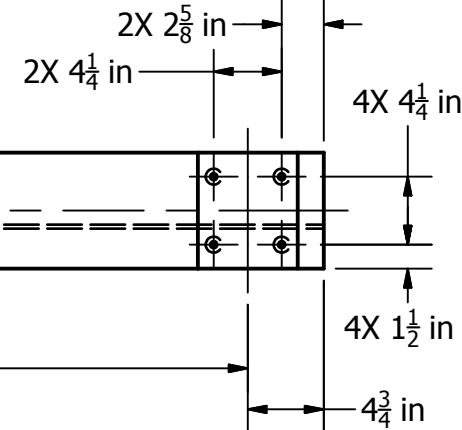
TOWER ASSEMBLY

SIZE	DWG NO	REV
A	BEST-2012-100	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 3 OF 18

4 3 2 1

4 3 2 1

8X $\phi\frac{3}{8}$ in THRU
└ $\phi 1$ in $\nabla \frac{1}{4}$ in
FROM BOTTOM



B

4 $\frac{3}{4}$ in

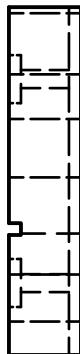
96 in
Tower Center-to-Center

105 $\frac{1}{2}$ in

B

ITEM 1
SCALE 1 : 12

1 $\frac{5}{8}$ in 6 $\frac{1}{4}$ in
 4 $\frac{3}{4}$ in



→

←

A

- Instructions:
1. Mark center of holes for base plates.
 2. Countersink base plate holes from bottom.
 3. Drill through with 3/8" bit.

DETAIL C
SCALE 1 : 4

8X $\phi\frac{3}{8}$ in THRU
└ $\phi 1$ in $\nabla \frac{1}{4}$ in
FROM BOTTOM

WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE	DWG NO	REV
A	BEST-2012-100	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 18

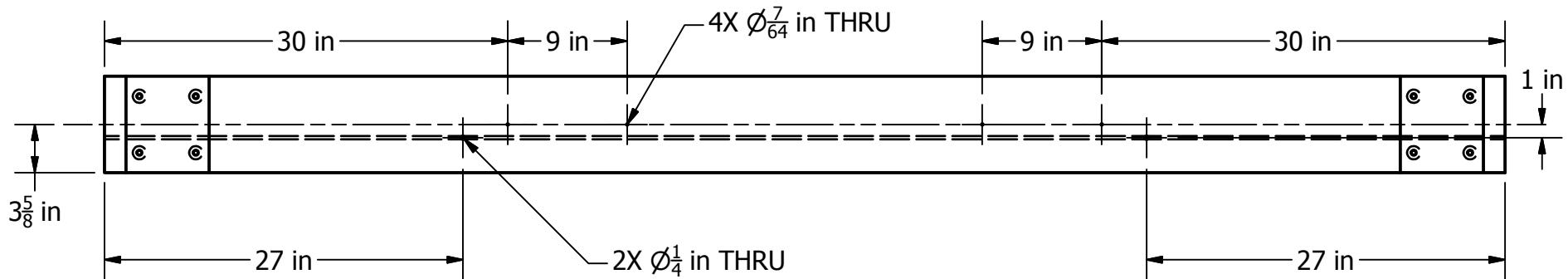
4 3 2 1

↑

2

1

4 | 3 | 2 | 1



Item 1
SCALE 1 : 12

A
Instructions:

1. Drill two 1/4" diameter through holes 27" from each end of beam, 1" from center of beam.
2. Drill four pilot holes for attaching Base Rack Mount along center of beam.

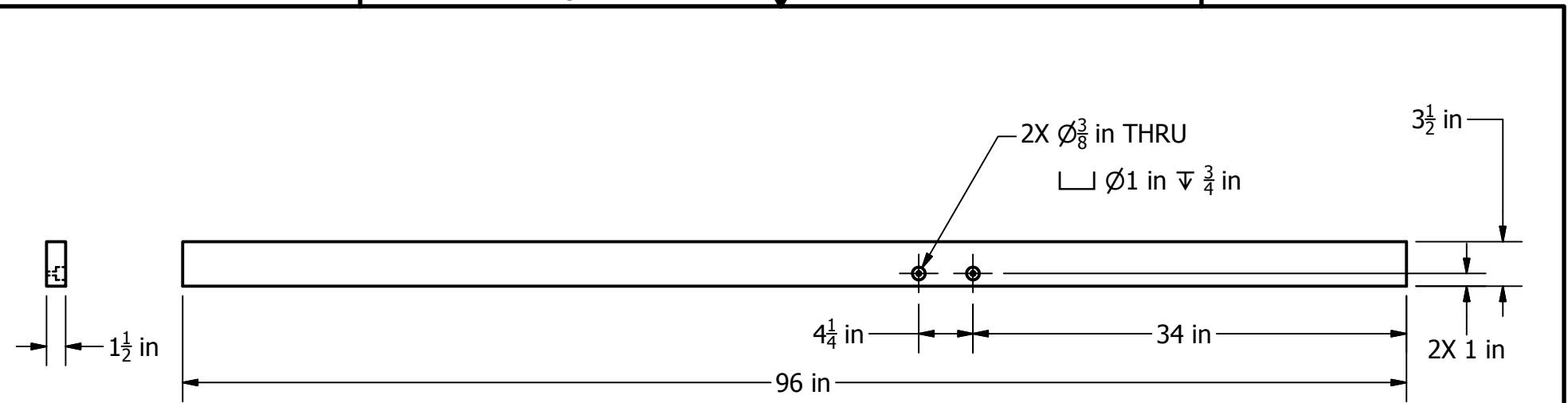
WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE A	DWG NO BEST-2012-100	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 5 OF 18

4 | 3 | 2 | 1



ITEM 3

SCALE 1 : 12

Instructions:

1. Mark center of holes.
2. Drill holes with pilot bit.
3. Countersink holes.

WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE	DWG NO	REV
A	BEST-2012-100	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 6 OF 18

4

I

3

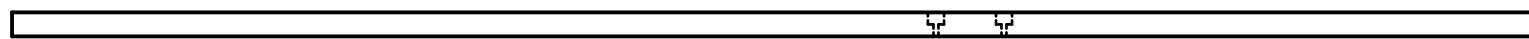
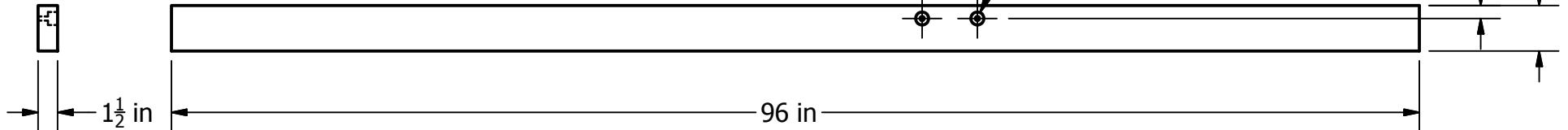
↓

2

1

B

B



ITEM 4

SCALE 1 : 12

A

A

Instructions:

1. Mark center of holes.
2. Drill holes with pilot bit.
3. Countersink holes.
4. Drill through with 3/8" bit.

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 7 OF 18

4

I

3

↑

2

1

4 | 3 | 2 | 1



$1\frac{1}{2}$ in



6 in

$3\frac{1}{2}$ in

ITEM 5
SCALE 1 : 2

A

Instructions:

1. Cut from 2x4" lumber.
2. Attach two pieces each to Items 3 and 4 using 2-1/2" drywall screws flush with ends of Items 3 and 4 as shown in drawing 2012-100 Sheet 13.

4 | 3 | 2 | 1

WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE A	DWG NO BEST-2012-100	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 8 OF 18

4 | 3 | 2 | 1

B

B

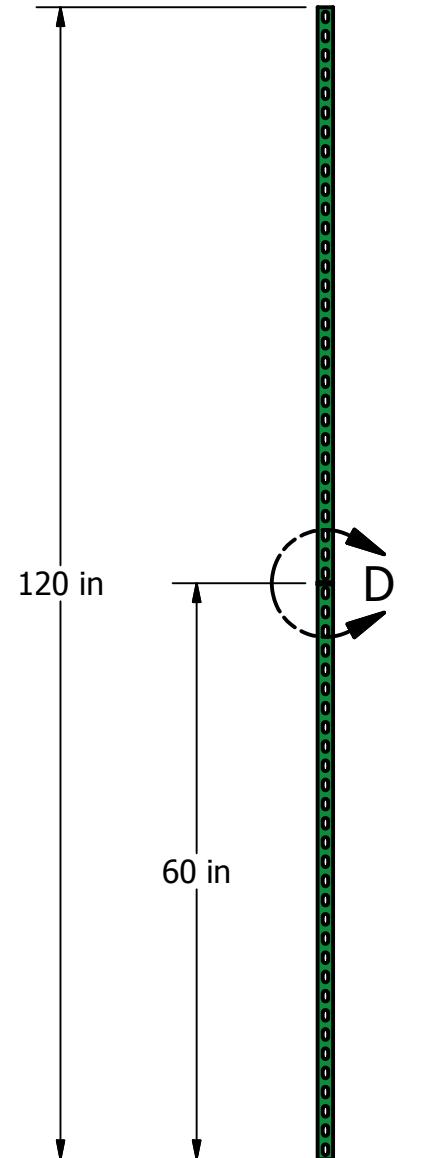
A

A

Instructions:

1. Paint a $\frac{1}{4}$ " wide stripe on each piece of Item 6 to indicate the "Space Zone", which is the upper 5 ft of the tower.

ITEM 6
SCALE 1 : 20



DETAIL D
SCALE 1 : 4

WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE A	DWG NO BEST-2012-100	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 9 OF 18

4 | 3 | 2 | 1

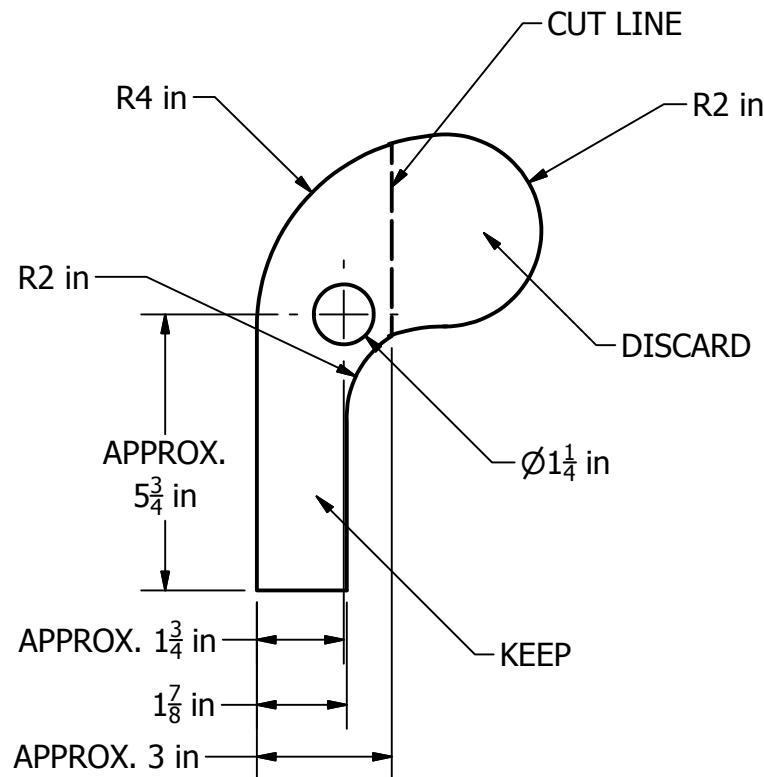
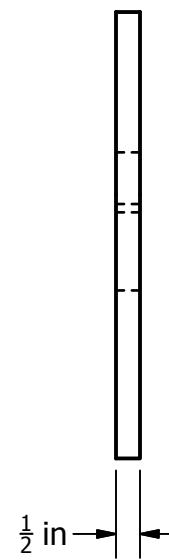
4 3 2 1

B

B

A

A



ITEM 7
SCALE 1 : 4

Instructions:

1. Save plywood insert from dock platform cutout (drawing BEST2012-110) to attach to each Crossbeam.
2. Cut round edge off so insert aligns flush with Crossbeam.
3. Drill hole in insert to align with bolt for base plate (aligns with driver side countersunk hole in crossbeam).

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

SCALE

DWG NO
BEST-2012-100

REV

1.1

DRAWN

DALLAS BEST

SHEET 10 OF 18

4 3 2 1

A

2

1

4

1

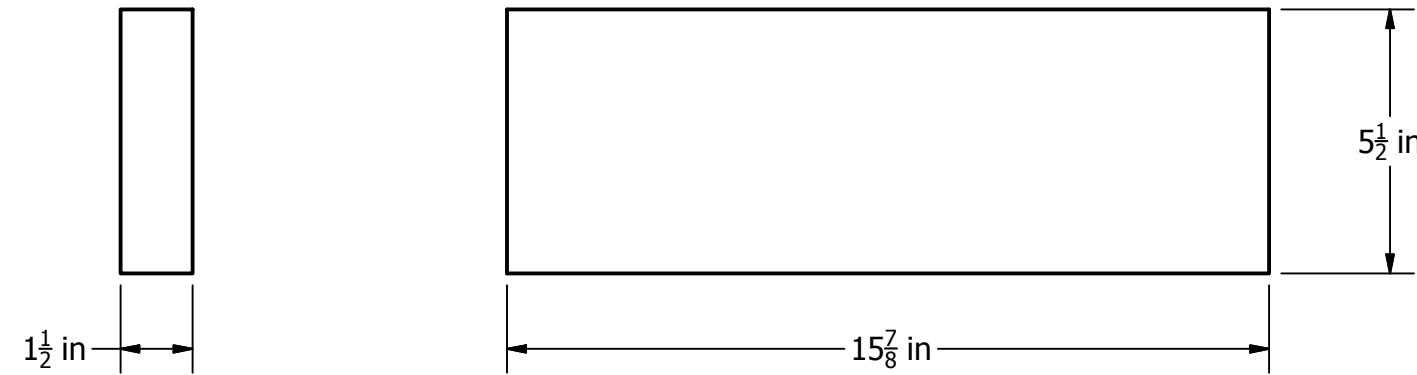
3

↓

2

1

B



ITEM 8
SCALE 1 : 4

→

B

A

Instructions:

1. Cut from 2x6" lumber.
2. Attach two pieces to Item 1 as shown in sheet 14.

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 11 OF 18

4

1

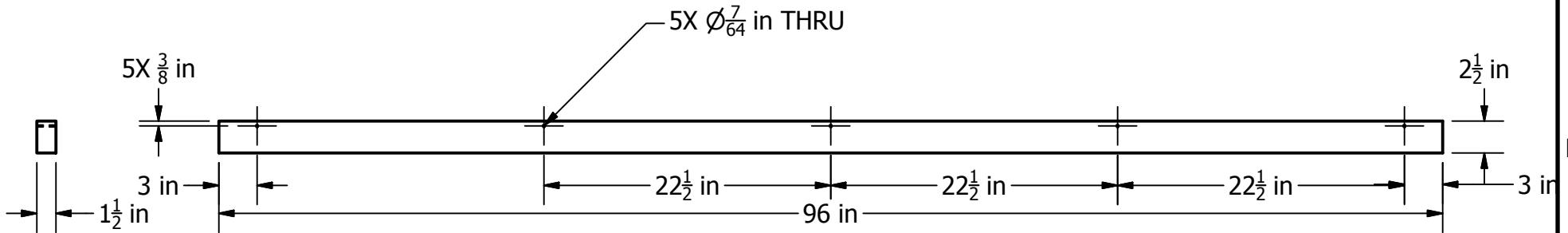
3

↓

2

1

4 | 3 | 2 | 1



Item 13

SCALE 1 : 12

→

B

←

A

A

Instructions:

1. Drill 5 pilot holes in Item 13 about 3/8" from the top edge of the 2x3" board, two holes about 3" from each end, and the other 3 spaced along the 2x3.
2. Attach to each crossbeam with 2-1/2" drywall screws as shown in drawing 2012-100 Sheet 15.

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 12 OF 18

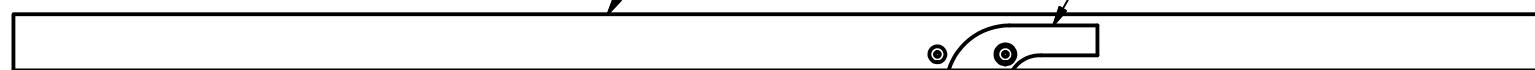
4 | 3 | 2 | 1

↑

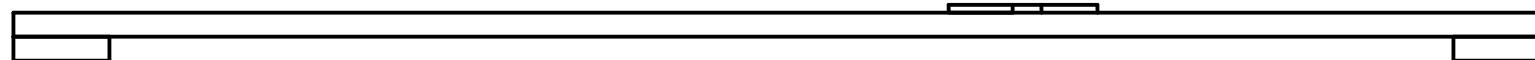
2

1

4 | 3 | 2 | 1



Item 3
Top View
SCALE 1 : 12



Side View

B

B

A

A

Instructions:

1. Attach 2 pieces of Item 5 to bottoms of both Items 3 and 4, flush with end of board.
2. Item 7 can be added to Items 3 and 4 after Item 3 assembled to Tower and Robot Platforms are placed. Align to fill gap in cutout in dock platform.

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

1.1

SCALE

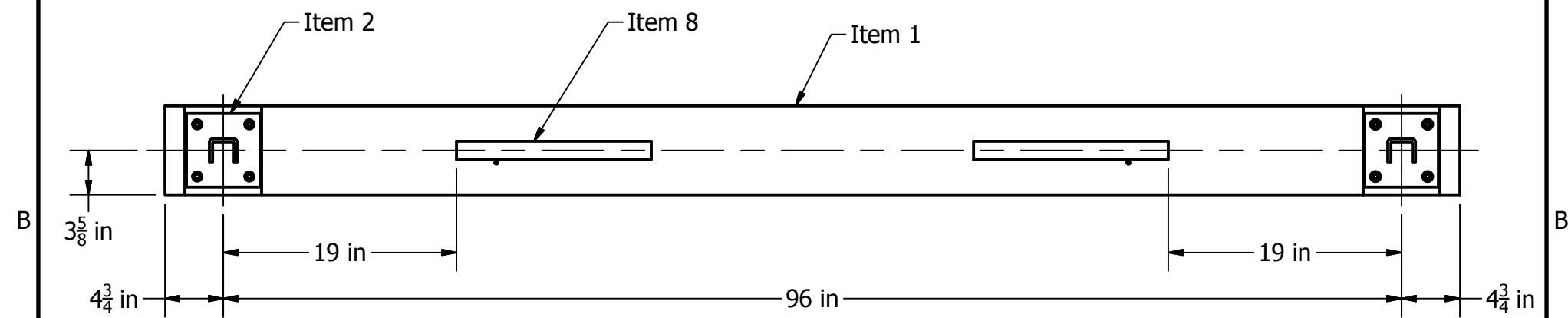
DRAWN

DALLAS BEST

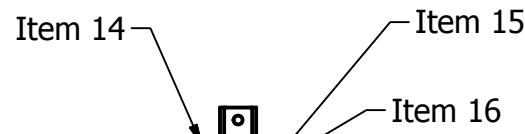
SHEET 13 OF 18

4 | 3 | 2 | 1

4 | 3 | 2 | 1



B | B



Instructions:

1. Attach Item 2 to Item 1 with 2-1/2" carriage bolts. Fasten with 3/8" washer and nut on carriage bolts towards center of beam. Items 3 and 4 will be attached to Item 1 using two outer carriage bolts on each end of beam.
2. Attach Item 8 to Item 1 using #8 x 2-1/2" bugle head wood screws. Distance is measured to center of Item 2.

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

1.1

SCALE

DRAWN

DALLAS BEST

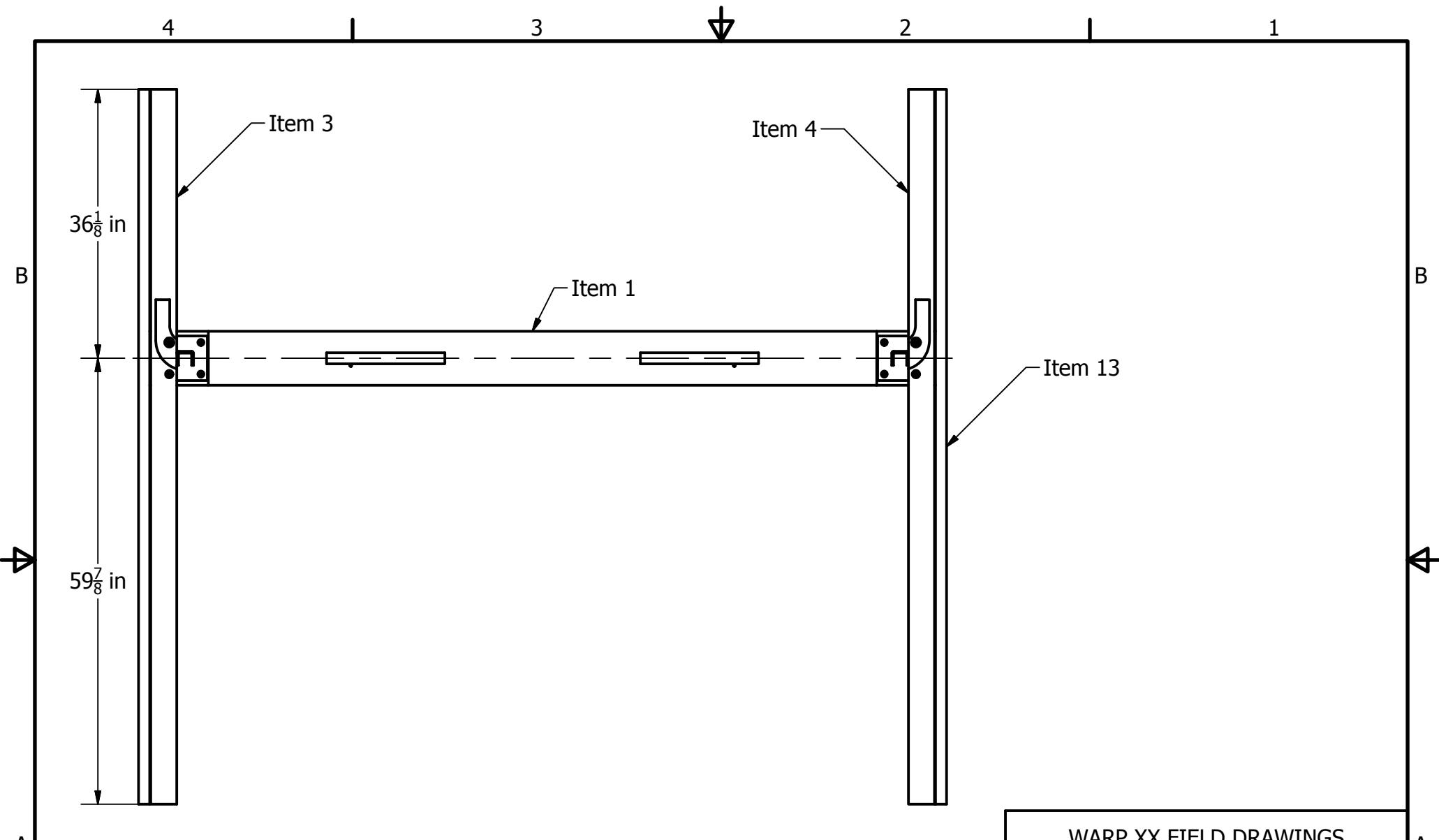
SHEET 14 OF 18

4 | 3 | 2 | 1

4

2

1



Instructions:

1. Attach Items 3 and 4 to Item 1 using carriage bolts on outer sides of Item 2, fasten each bolt with 3/8" washer and nut.
2. Attach Item 13 to outer faces of Items 3 and 4 with #8 x 2-1/2" wood screws (5 places each).

WARP XX FIELD DRAWINGS

TITLE

TOWER ASSEMBLY

SIZE

A

DWG NO

BEST-2012-100

REV

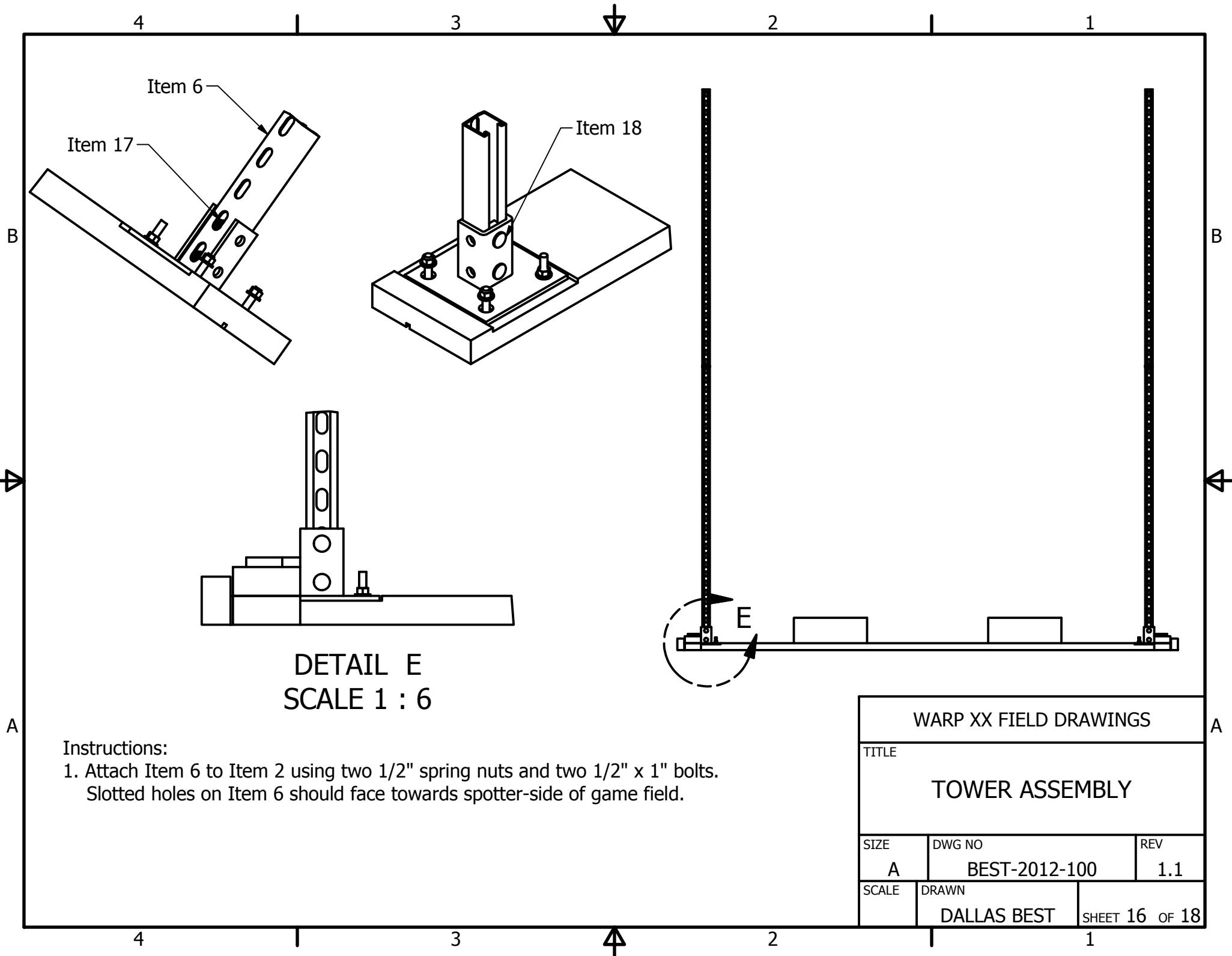
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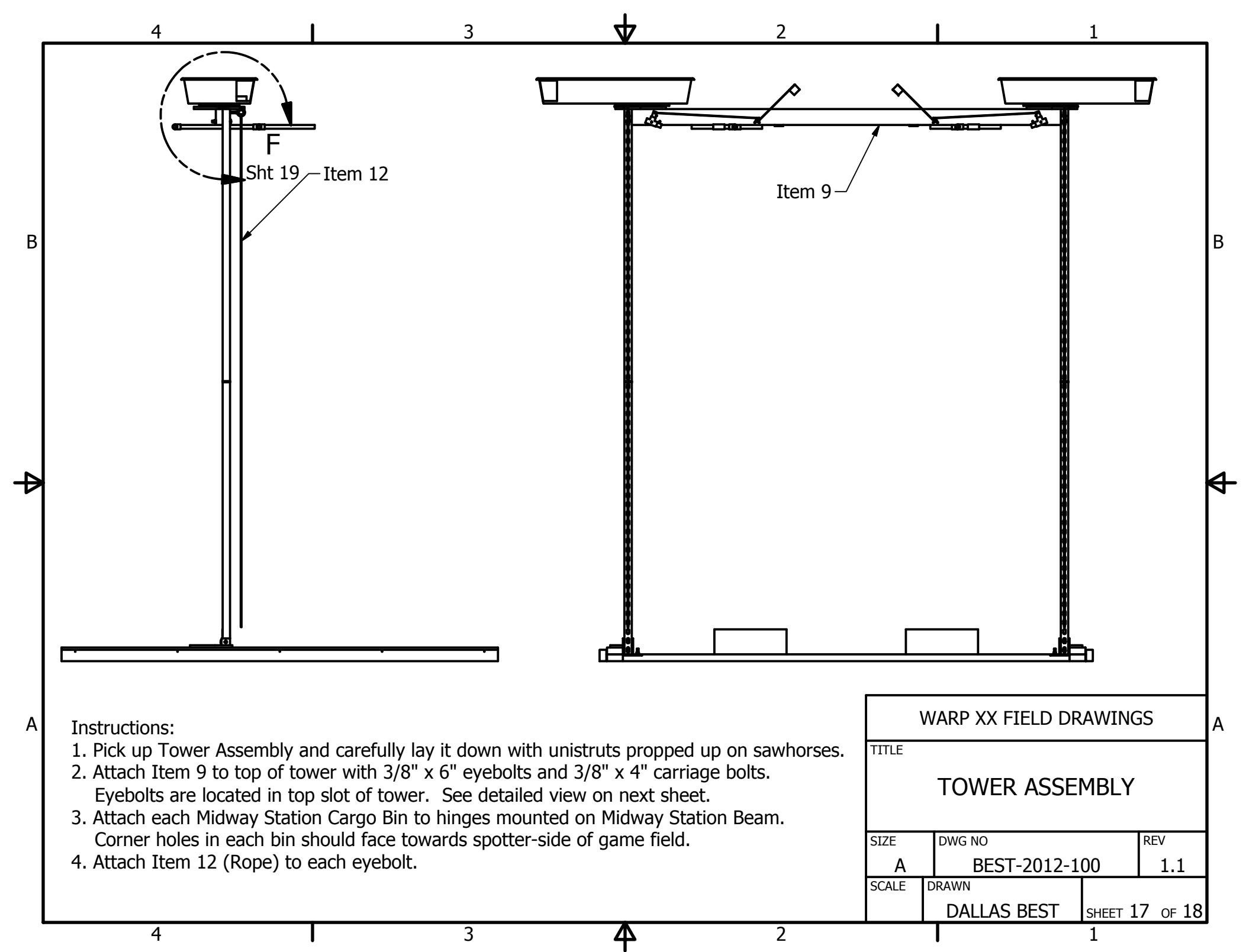
SCALE

DRAWN

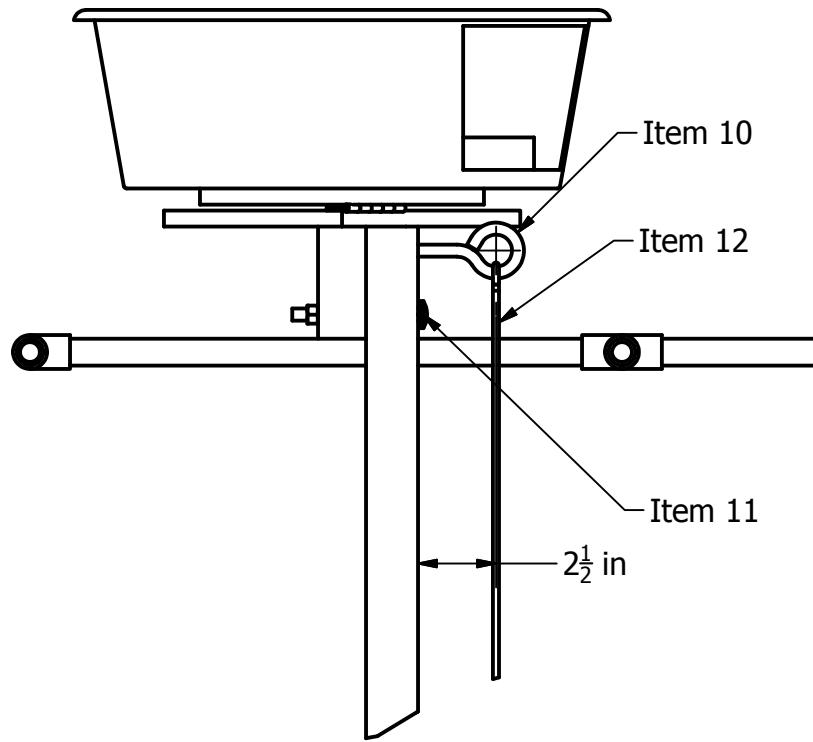
DALLAS BEST

SHEET 15 OF 18





4 | 3 | 2 | 1



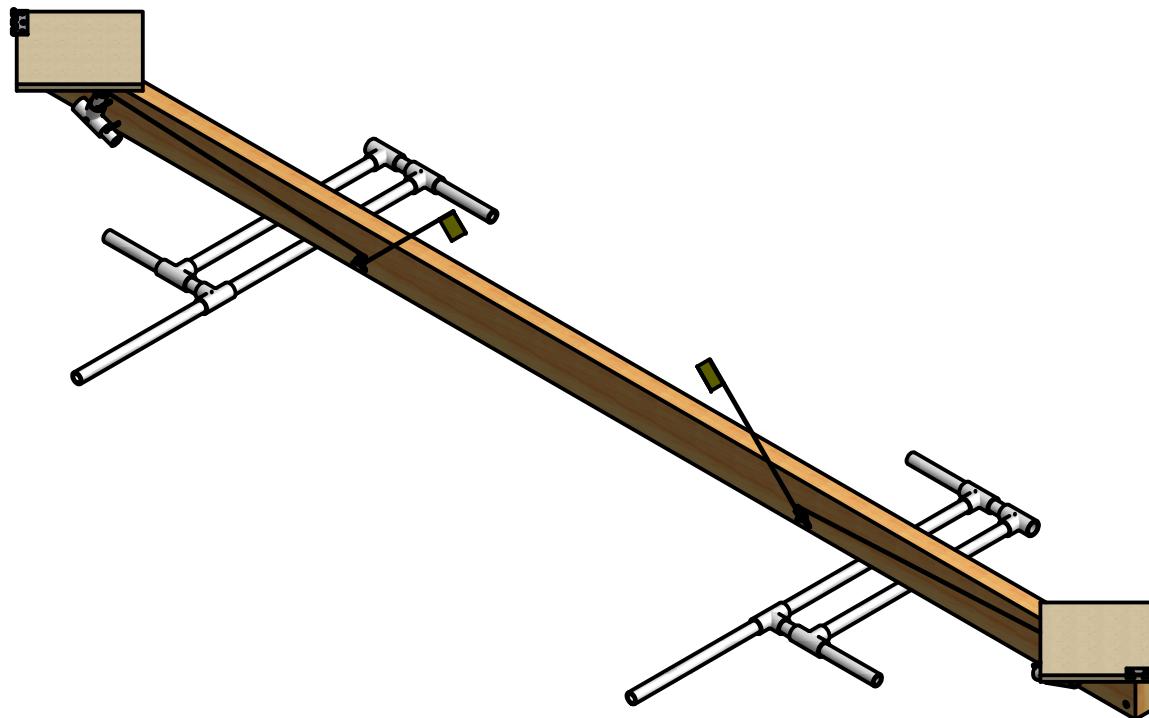
DETAIL F
SCALE 1 : 6

WARP XX FIELD DRAWINGS		
TITLE		
TOWER ASSEMBLY		
SIZE	DWG NO	REV
A	BEST-2012-100	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 18 OF 18

4 | 3 | 2 | 1

4 1 3 2 1

Midway Station Beam Assembly



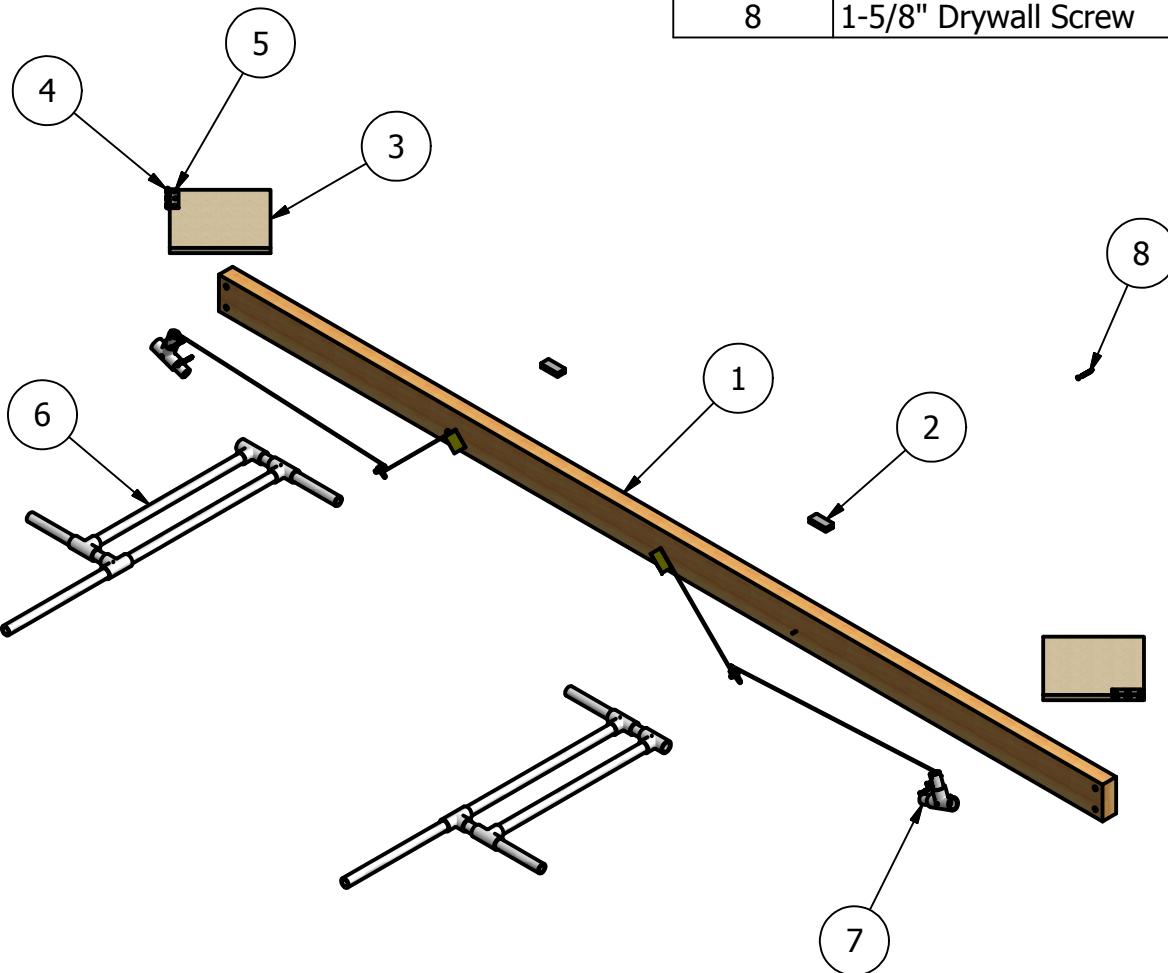
WARP XX FIELD DRAWINGS		
TITLE		
MIDWAY STATION BEAM ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-100-1	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 1 OF 6

4 1 3 2 1

4 | 3 | 2 | 1

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Midway Station Beam	2" x 4" Lumber	2
2	Magnet	Magnet	4
3	Hinge Mount	1/2" Plywood	4
4	1/2 Hinge	Hinge, Removable Pin	4
5	Wood Screw	Provided with Hinge	12
6	Mounting Rack Assembly	Sub Assembly	4
7	Summit Indicator Assembly	Sub Assembly	4
8	1-5/8" Drywall Screw	Drywall Screw	AR



WARP XX FIELD DRAWINGS

TITLE

MIDWAY STATION BEAM
ASSEMBLY

SIZE

A

DWG NO
BEST2012-100-1

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 6

4 | 3 | 2 | 1

4

2

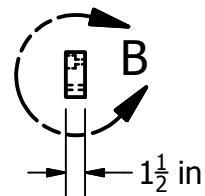
1

4

3

2

1



$2X \frac{3}{8}$ in THRU

$\frac{3}{8}$ in THRU

$\frac{1}{8}$ in $\nabla \frac{3}{4}$ in

$3\frac{1}{2}$ in

2 in

$2X \frac{7}{8}$ in

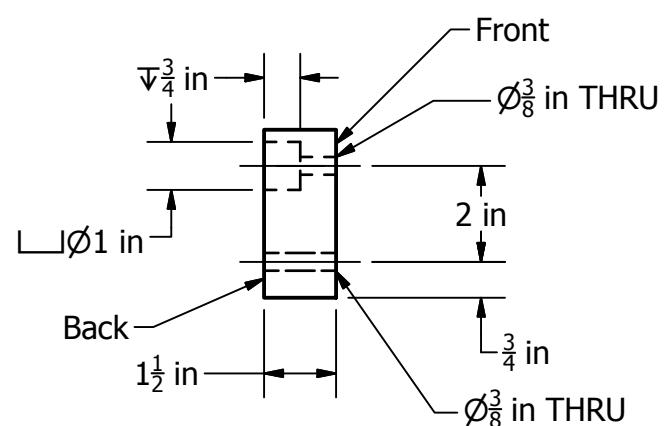
$2X \frac{3}{4}$ in

2X 96 in

$97\frac{5}{8}$ in

ITEM 1

SCALE 1:15



DETAIL B

SCALE 1:4

Instructions:

1. Cut Item 1 from 10' 2x4" lumber.
2. Drill $3/8"$ through holes $3/4"$ from bottom edge for mounting beam to towers.
3. Countersink top holes from back side of board with 1" counterbore $3/4"$ deep.
4. Drill $3/8"$ thru hole to front of board.

WARP XX FIELD DRAWINGS

TITLE

MIDWAY STATION BEAM
ASSEMBLY

SIZE

A

DWG NO

BEST2012-100-1

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 6

4

3

2

1

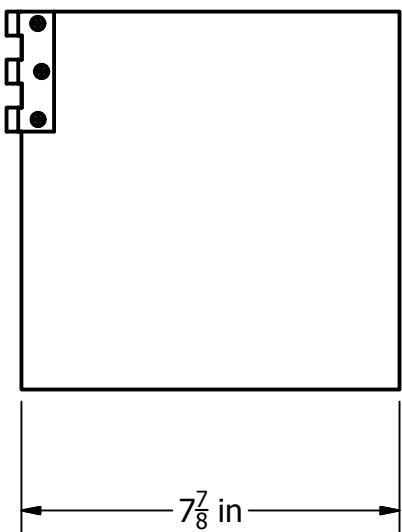
4

3

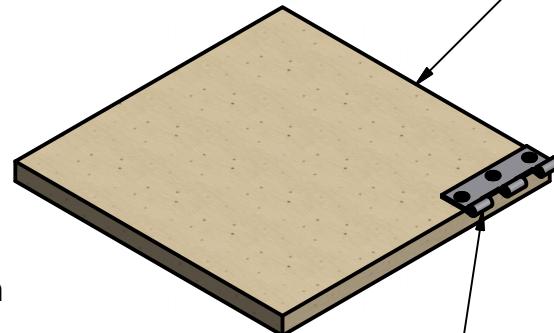
2

1

Left Side



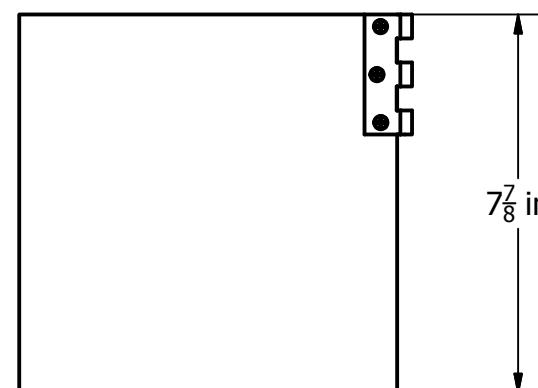
$7\frac{7}{8}$ in



Item 3

Item 4

Right Side



$7\frac{7}{8}$ in

$\frac{1}{2}$ in

$7\frac{7}{8}$ in

C
Sheet 5

C
Sheet 5

Instructions:

1. Cut Item 3 from 1/2" plywood.
2. Attach Item 4 to Item 3 with wood screws provided with hinge. Hinge should be mounted flush with corner of board.

See Sheet 5 for assembly to Midway Station Beam

Item 3

SCALE 1 : 4

WARP XX FIELD DRAWINGS

TITLE

MIDWAY STATION BEAM
ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-1

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 6

4

3

2

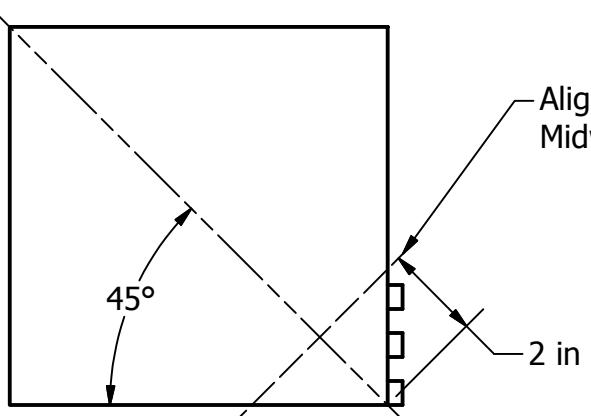
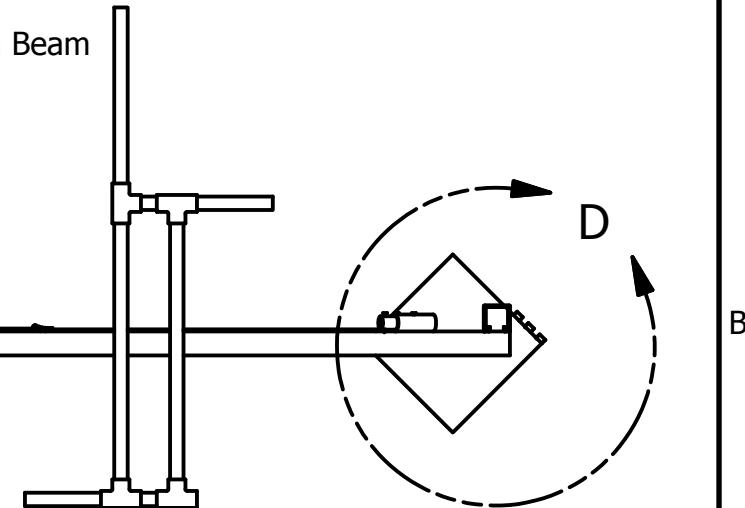
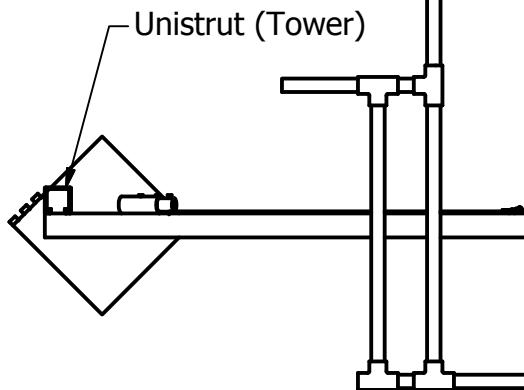
1

A

B

4 1 3 2 1

Bottom View - Looking up at Midway Station Beam



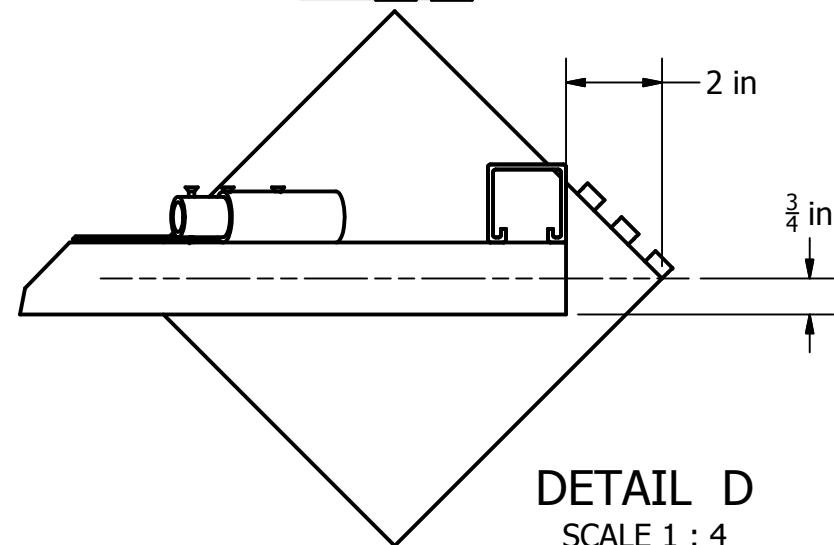
VIEW C-C

Bottom View
SCALE 1 : 4

Align with end of
Midway Station Beam

2 in

Align with center line of
Midway Station Beam



DETAIL D

SCALE 1 : 4

A Instructions:

1. Turn board over and draw a line at 45 degrees from the corner the hinge is attached to across to opposite corner. See View C-C.
2. Make a mark 2" from corner of board where hinge is mounted. The line is aligned with the center line of the midway beam, and the 2" mark is aligned with the end of the beam.
3. Secure with 2 drywall screws from the top of the square board into the midway beam, taking care not to screw through the bolt hole.

WARP XX FIELD DRAWINGS

TITLE

**MIDWAY STATION BEAM
ASSEMBLY**

SIZE

A

DWG NO

BEST2012-100-1

REV

1.1

SCALE

DRAWN

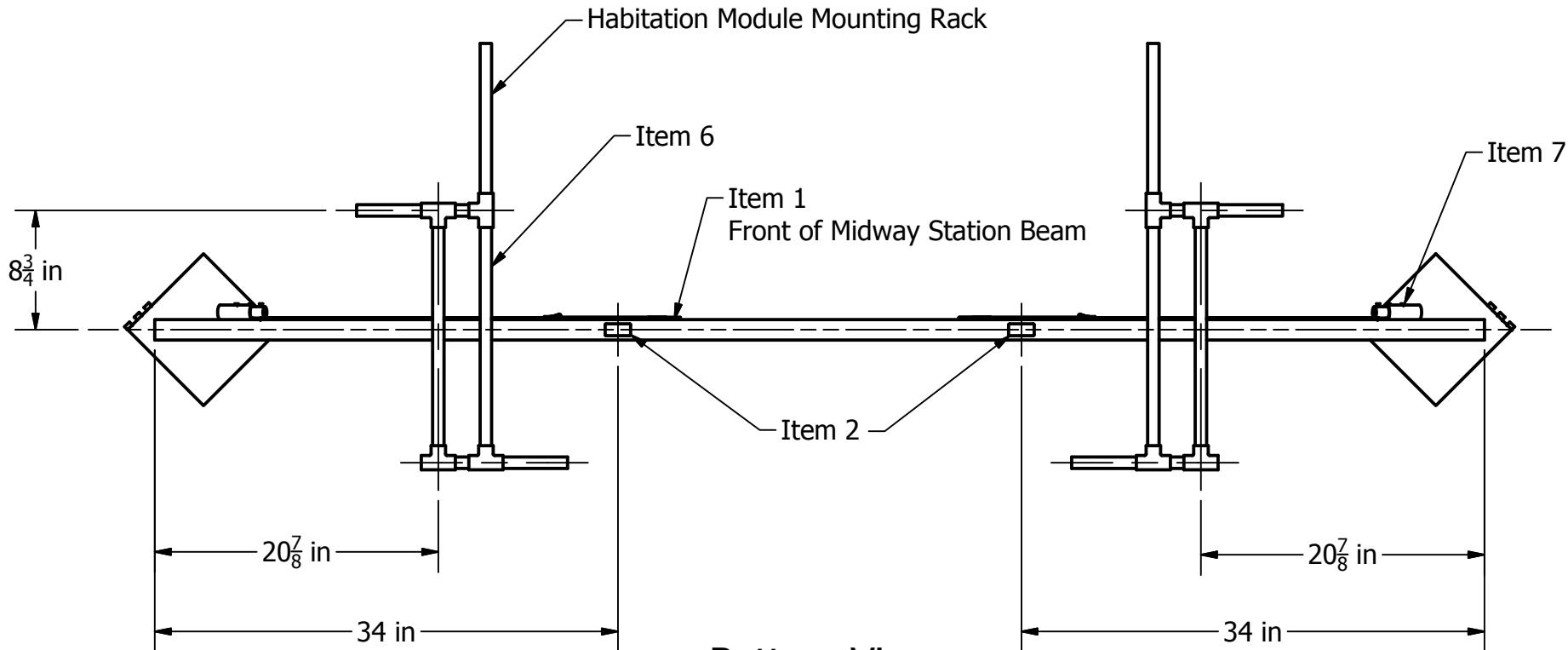
DALLAS BEST

SHEET 5 OF 6

4 1 3 2 1

4 1 3 2 1

B B



Bottom View

SCALE 1 : 12

Instructions:

1. Glue two each of Item 2 (Magnet) to Item 1 with contact cement, located as shown above.
2. Attach two each of Item 6 (Mounting Rack Assembly) with 1-5/8" drywall screws. Assembly should be mirrored for left and right sides of field. Habitation Module mount should point towards front of field (towards spotter). See drawing BEST2012-100-3 for sub-assembly.
3. Refer to drawing BEST2012-100-4 for Item 7 assembly instructions.

WARP XX FIELD DRAWINGS

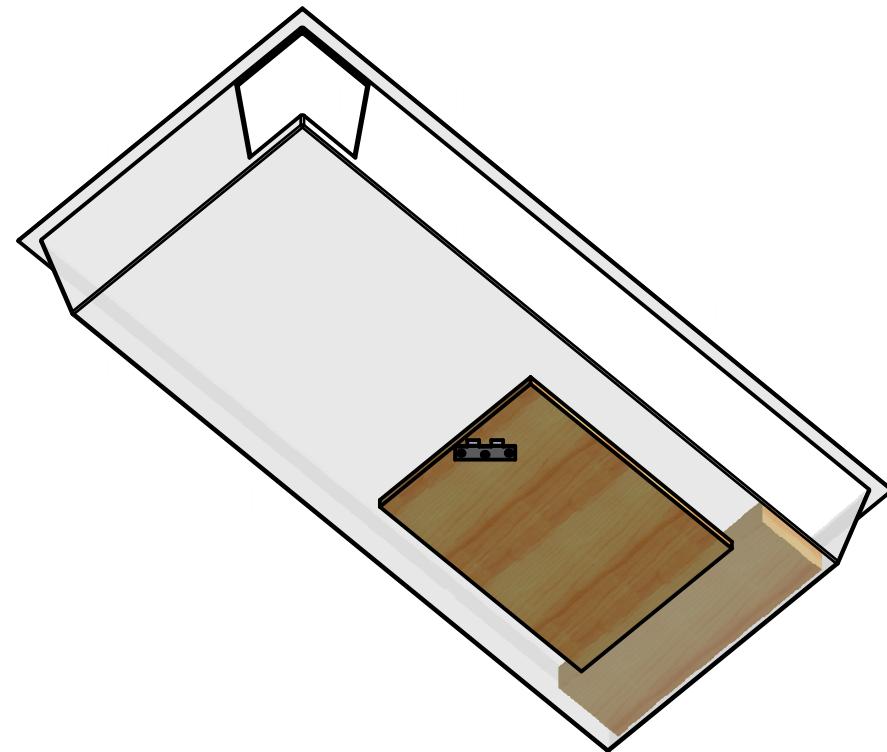
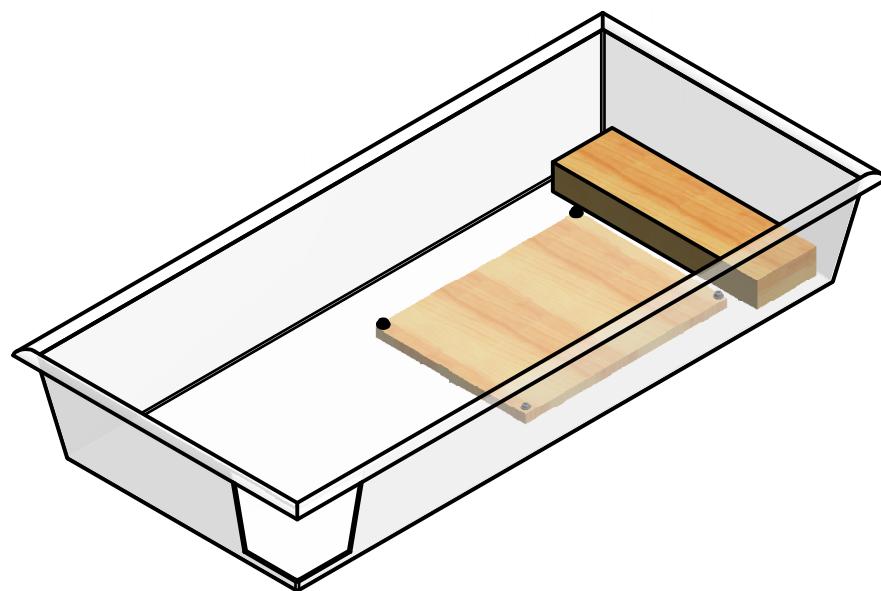
TITLE
MIDWAY STATION BEAM
ASSEMBLY

SIZE	DWG NO	REV
A	BEST2012-100-1	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 6 OF 6

4 1 3 2 1

A A

Midway Station Cargo Bin Assembly



A → A ←

4

1

3

4

2

1

B

B

WARP XX FIELD DRAWINGS		
TITLE		
MIDWAY STATION CARGO BIN		
ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-100-2	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 1 OF 5

4

3

2

1

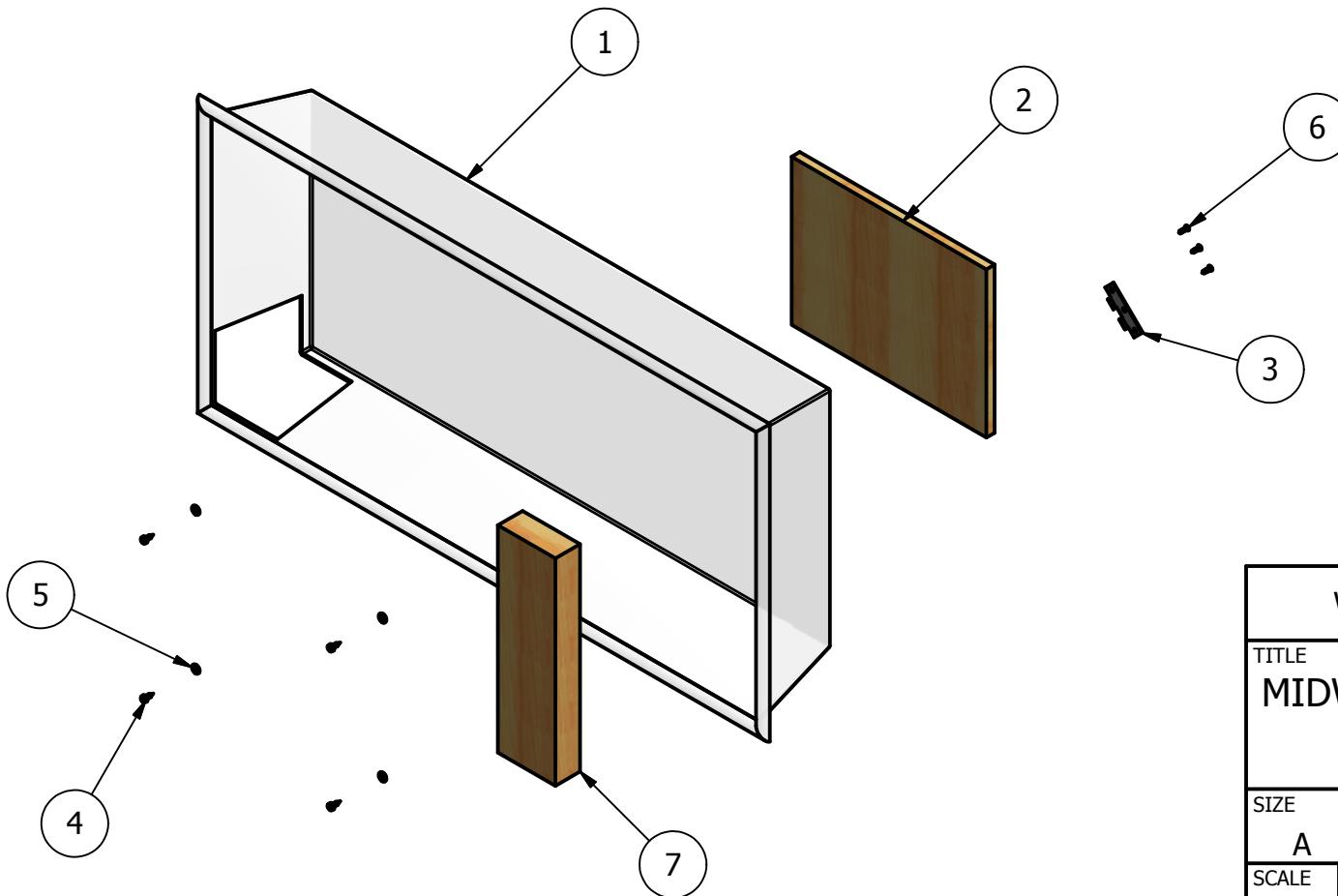
↓

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Plastic Bin	Sterilite 41qt bin	4
2	Bin Mount	1/2" Plywood	4
3	1/2 Hinge	Hinge, Removable Pin	4
4	# 8 - 1/2" Pan Head Screw	Pan Head Sheet Metal Screw	16
5	#8 Flat Washer	Flat Washer	16
6	Wood Screw	Provided with Hinge	12
7	Bin Counterweight	2x4" Lumber	4

B

B



→

←

A

A

WARP XX FIELD DRAWINGS

TITLE
MIDWAY STATION CARGO BIN
ASSEMBLY

SIZE A	DWG NO BEST2012-100-2	REV 1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 2 OF 5

4

3

2

1

↑

4

I

3

↓

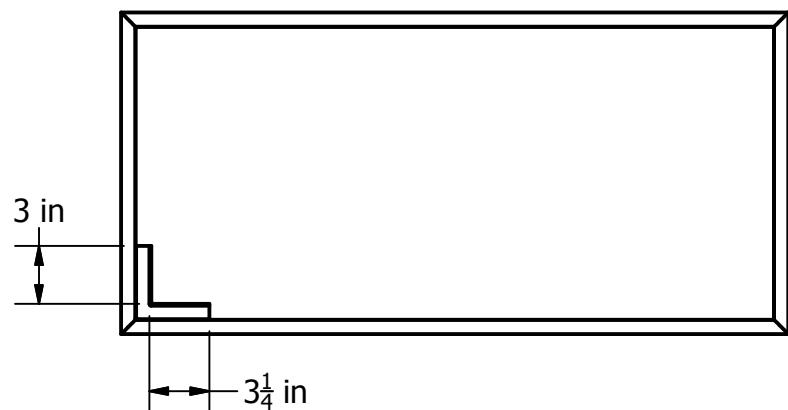
2

1

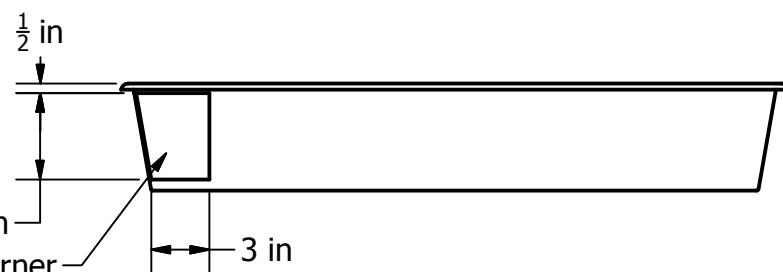
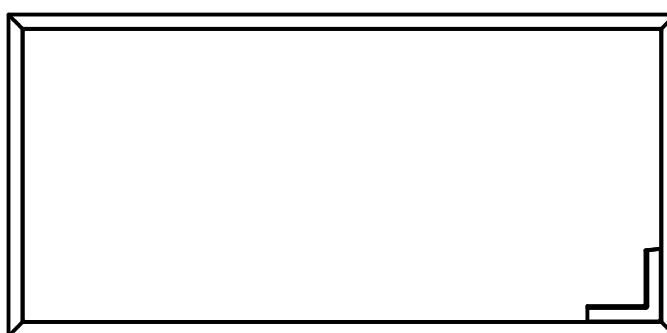
B

B

Item 1 - Left Side



Item 1 - Right Side



A

A

Instructions:

1. Cut hole in corner of plastic bin large enough for 4" ball to fit through, leaving at least 1/2" of bottom rim intact. Extend cut ~3" in width on each side of corner.
2. Cut opposite corner for Left Side/Right Side field positions.

Note:

If using jigsaw, cut top line from inside of bin.

WARP XX FIELD DRAWINGS

TITLE
MIDWAY STATION CARGO BIN
ASSEMBLY

SIZE	DWG NO	REV
A	BEST2012-100-2	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 3 OF 5

4

I

3

↑

2

1

4

Left Side

3



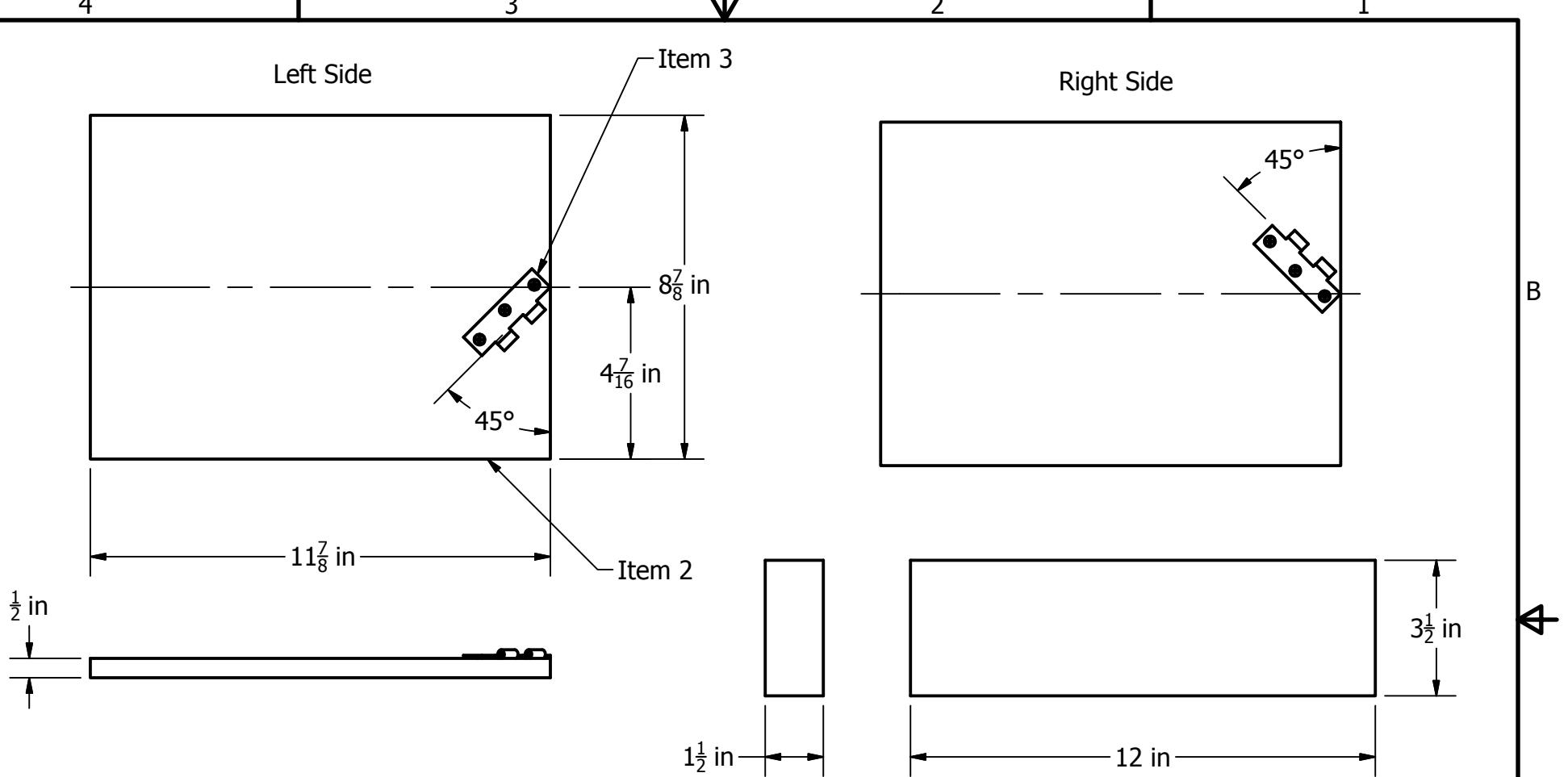
2

1

Right Side

B

B



A

A

Instructions:

1. Cut Item 2 from 1/2" plywood.
2. Attach Item 3 to Item 2 with screws provided with hinges (Item 6).
Align hinge to board at 45 degree angle with corner flush with end of board and aligned along center line of board.
3. Mirror hinge angle for Left/Right field position.
4. Cut Item 7 from 2x4" Lumber.

Item 7

SCALE 1 : 4

WARP XX FIELD DRAWINGS		
TITLE		
MIDWAY STATION CARGO BIN		
ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-100-2	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 5

4

3

2

1



4

3

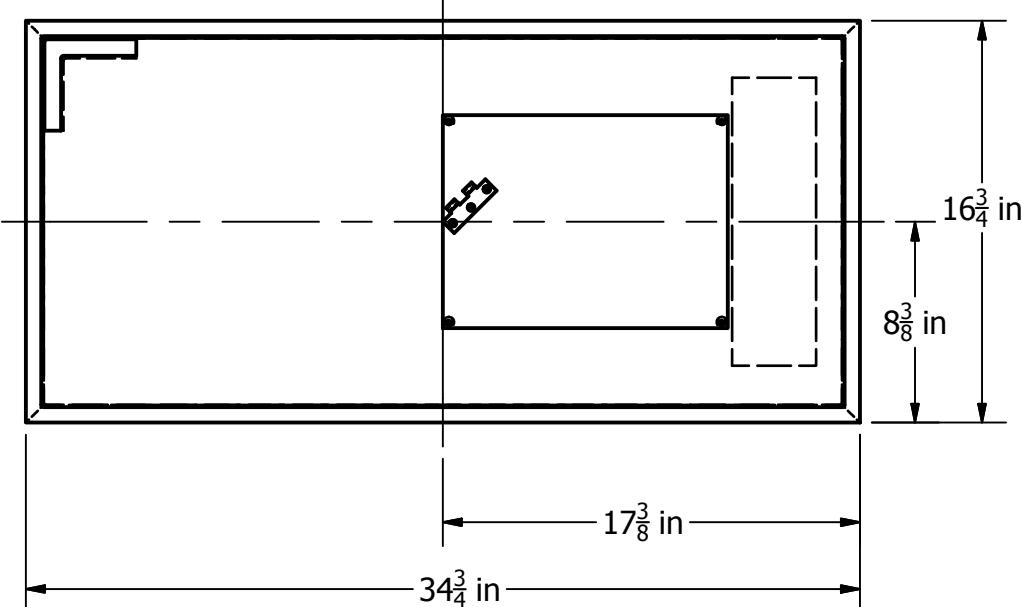
2

1

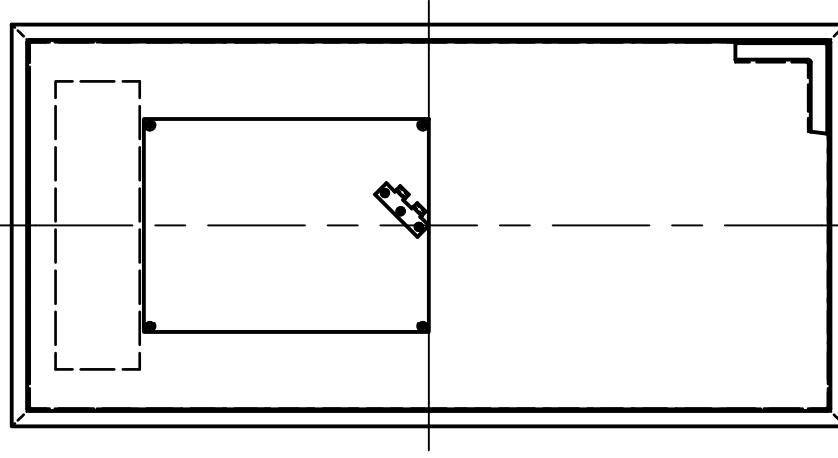


Item 7

B



Left



Right

A

Instructions:

1. Attach Item 2 to bottom of Item 1 with 4 each #8 x 1/2" pan head screws and #8 flat washers. Align hinge along center line of Item 1.
2. Attach Item 7 flat (wide side down) to the inside bottom of Item 1 with 2ea 1-5/8" drywall screws, against short side of bin opposite the hole in the bin.

4

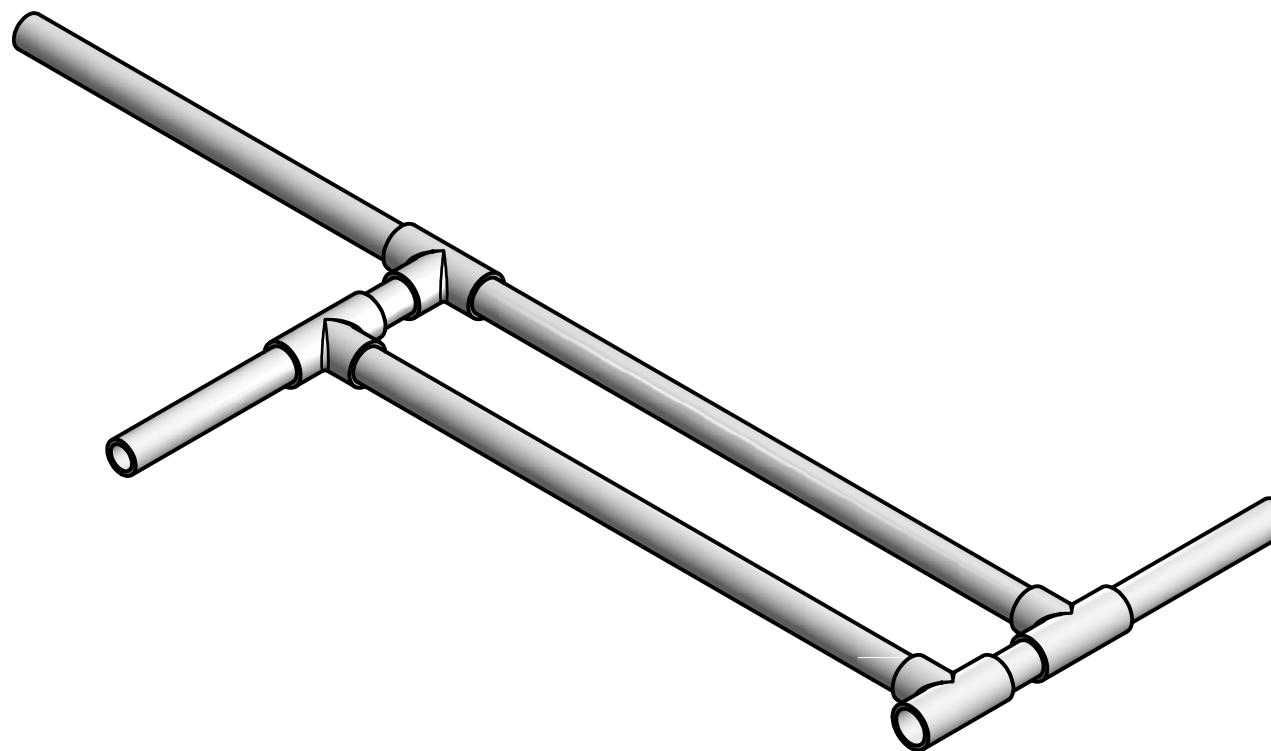
3

2

1

WARP XX FIELD DRAWINGS		
TITLE		
MIDWAY STATION CARGO BIN		
ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-100-2	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 5 OF 5

Midway Station Mounting Rack Assembly



WARP XX FIELD DRAWINGS

TITLE
**MIDWAY STATION MOUNTING
RACK ASSEMBLY**

SIZE A	DWG NO BEST2012-100-3	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 1 OF 4

4 1 3 2 1

4 1 3 2 1

B

B

→

←

A

A

↑

↑

↑

4

I

3



2

I

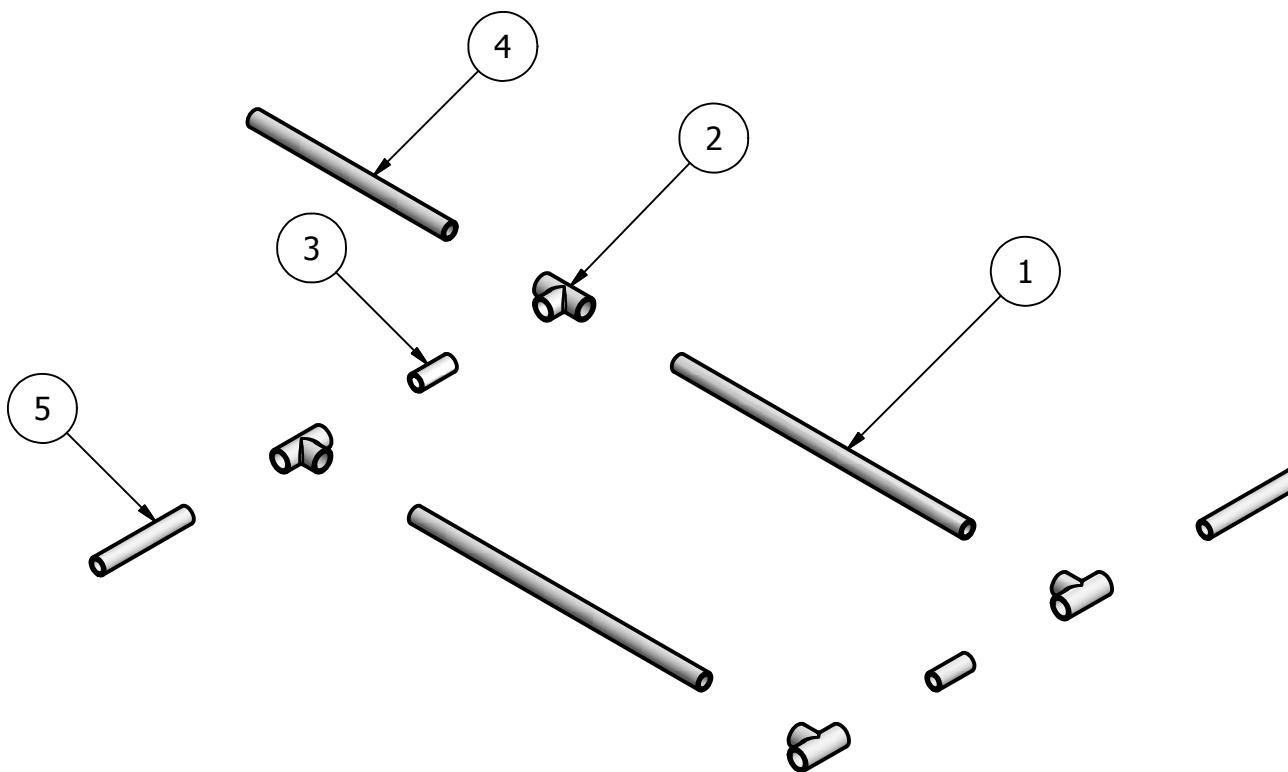
1

B

B

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	PVC Pipe - 17"	1/2" PVC Pipe	8
3	PVC Pipe - 2"	1/2" PVC Pipe	8
4	PVC Pipe - 11-1/2"	1/2" PVC Pipe	4
5	PVC Pipe - 5-1/4"	1/2" PVC Pipe	8
2	PVC Tee	1/2" PVC Pipe	16



4

I

3



2

I

1

A

A

WARP XX FIELD DRAWINGS

TITLE

MIDWAY STATION MOUNTING
RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-100-3

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 4

4

3

2

1

B

B

Item 1
2 pieces per assembly

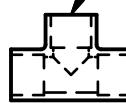


17 in

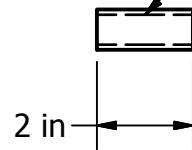
Item 4
1 piece per assembly

 $11\frac{1}{2}$ in

Item 2
4 pieces per assembly

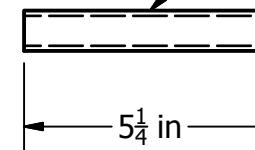


Item 3
2 pieces per assembly



2 in

Item 5
2 pieces per assembly

 $5\frac{1}{4}$ in

Instructions:

- Cut pieces from 1/2" PVC pipe.

WARP XX FIELD DRAWINGS

TITLE

MIDWAY STATION MOUNTING
RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-100-3

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 4

4

3

2

1

A

B

4

I

3

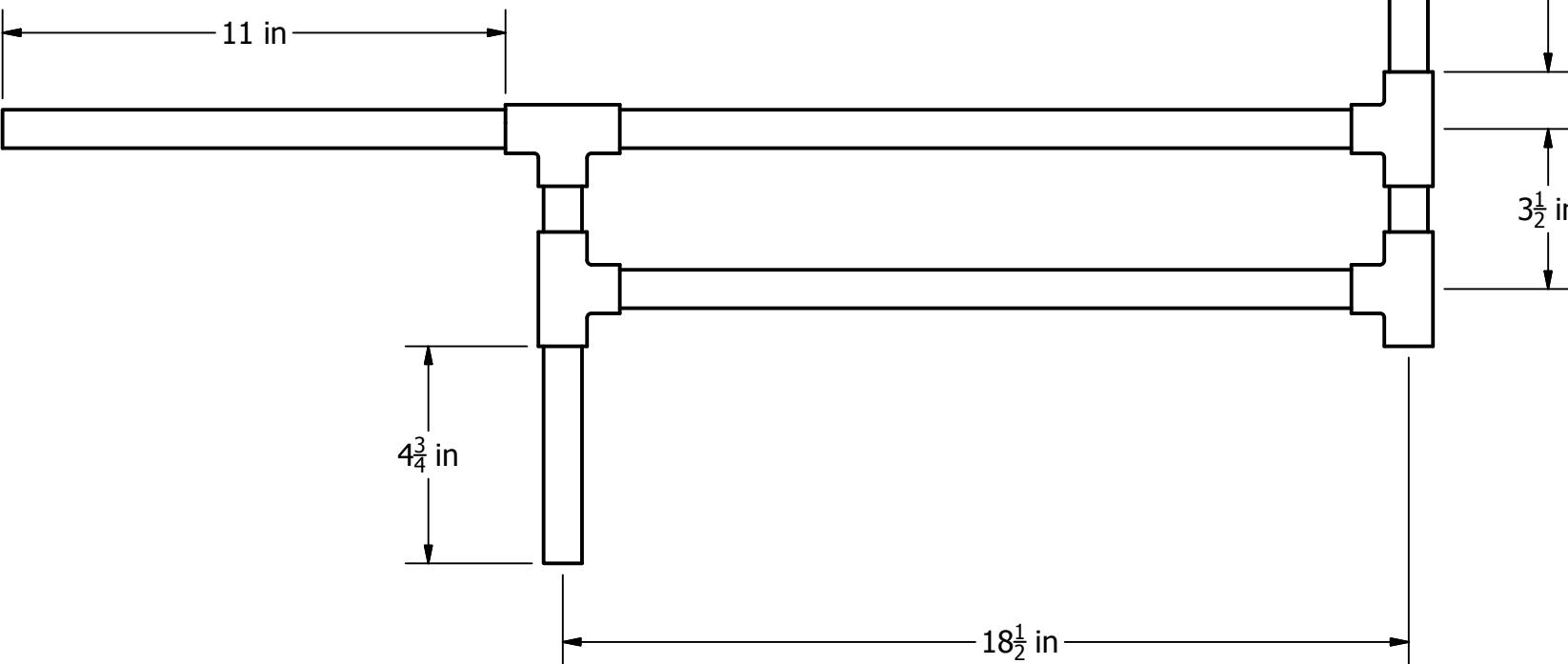
↓

2

1

Note: Assembled dimensions are approximate.

B



11 in

4 $\frac{3}{4}$ in

18 $\frac{1}{2}$ in

4 $\frac{3}{4}$ in

3 $\frac{1}{2}$ in

→

B

A

Instructions:

1. Connect fittings to pipe with PVC cement.
2. Bottom out pipe in fittings for assembly.
3. Attach to Midway Station Mounting Beam as shown in drawing BEST2012-100-1, sheet 6.

WARP XX FIELD DRAWINGS

TITLE
MIDWAY STATION MOUNTING
RACK ASSEMBLY

SIZE	DWG NO	REV
A	BEST2012-100-3	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 4

4

I

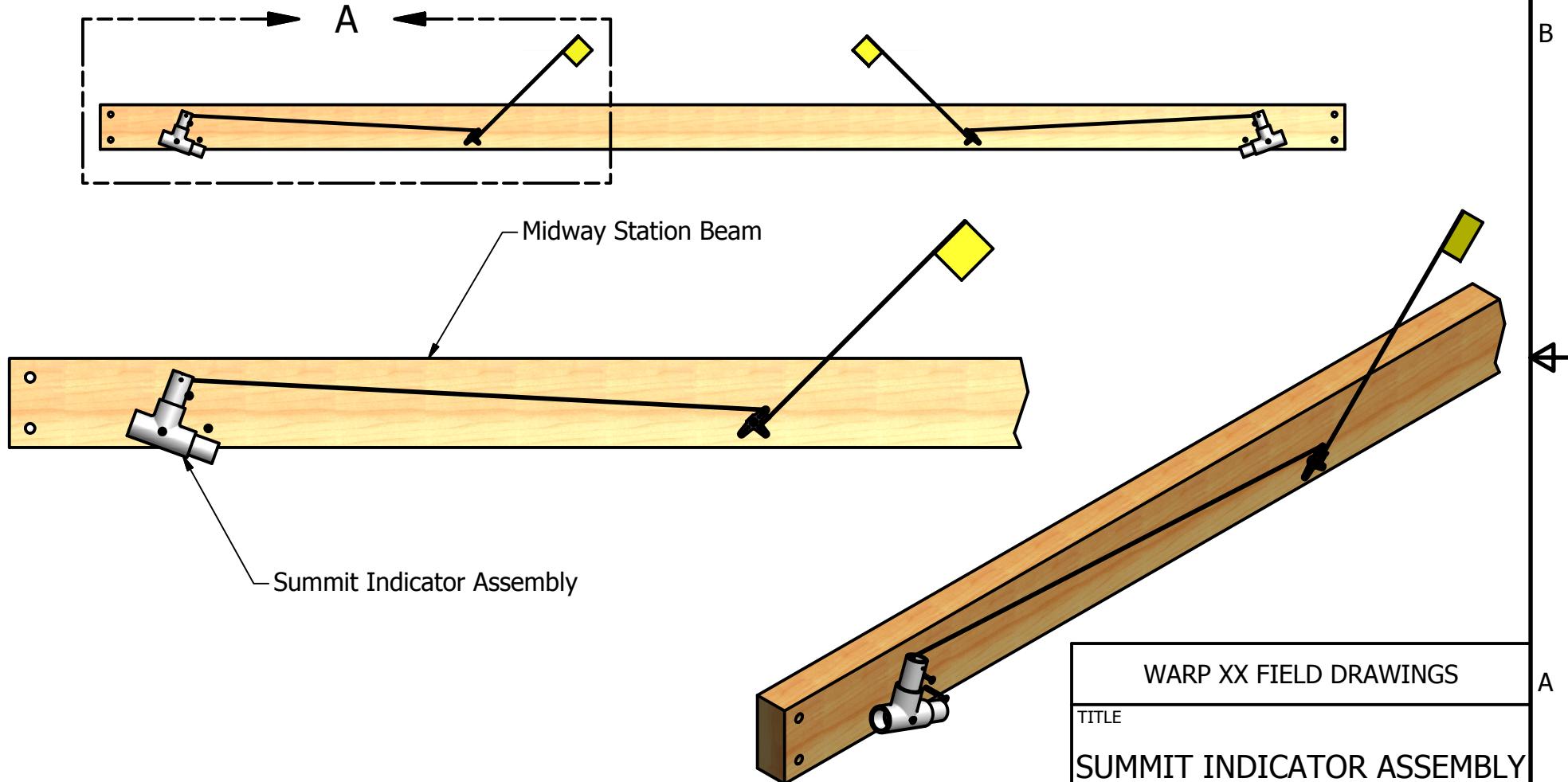
3

↑

2

1

Summit Indicator Assembly



WARP XX FIELD DRAWINGS		
TITLE		
SUMMIT INDICATOR ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-100-4	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 1 OF 10

4

I

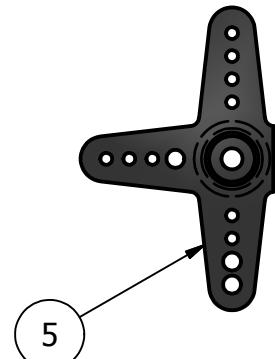
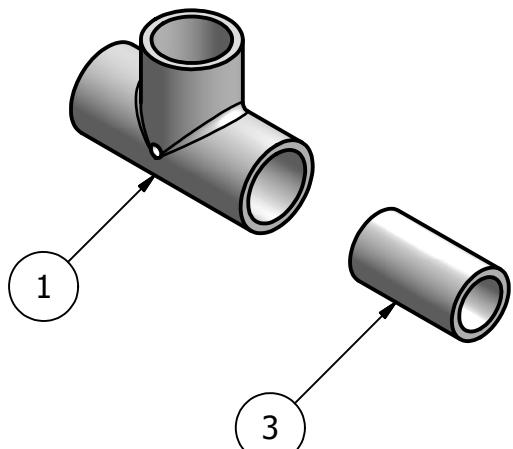
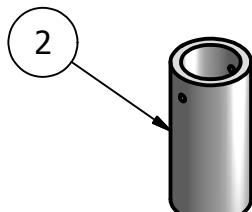
3

↓

2

I

B



3

↑

2

I

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	PVC Tee	1/2" PVC Tee	4
2	PVC Pipe - 1 3/4"	1/2" PVC Pipe	4
3	PVC Pipe - 1 1/2"	1/2" PVC Pipe	4
4	Wire - 24"	Piano Wire, .063" diameter	4
5	Servo Horn	4-arm Servo Horn	4
6	Summit Flag - 12" Wire	Piano Wire, .063" diameter, Floor Tape	4
7	1-5/8" Drywall Screws	Drywall Screws	12
8	Servo Mounting Screw	#4 x 1/2" wood screw	4
9	Cable Tie	Cable tie to secure flag	4

↓

↑

4

7

6

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-4

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 10

4

1

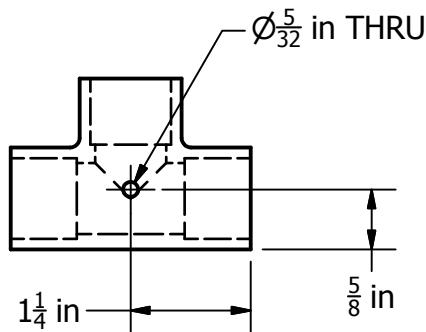
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2

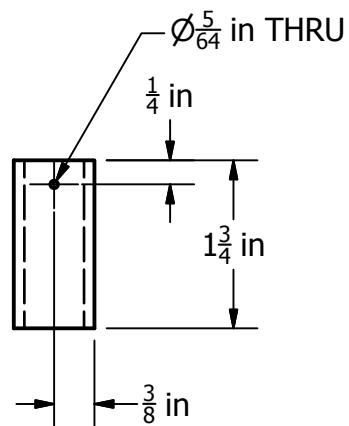
1

B

B



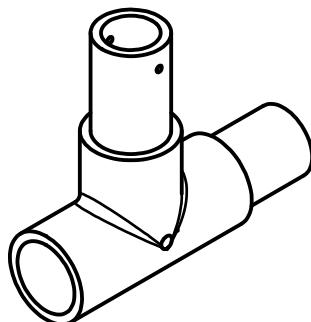
Item 1
SCALE 1 : 2



Item 2
SCALE 1 : 2



Item 3
SCALE 1 : 2



Instructions:

1. Drill through hole in Item 1.
2. Cut Items 2 and 3 from 1/2" PVC pipe.
3. Drill through hole in Item 2.
4. Attach Item 2 to top of Item 1 with through hole facing same direction as through hole in Item 1.
5. Attach Item 3 to one side of Item 1.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-4

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 10

4

3

2

1

4

B

4

I

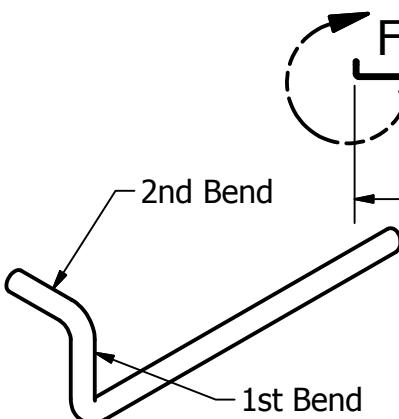
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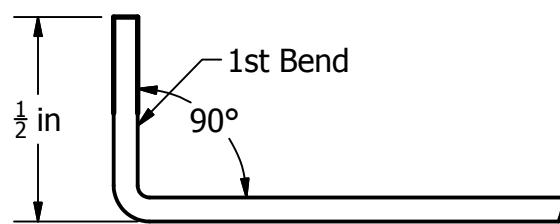
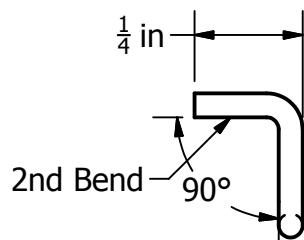
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I

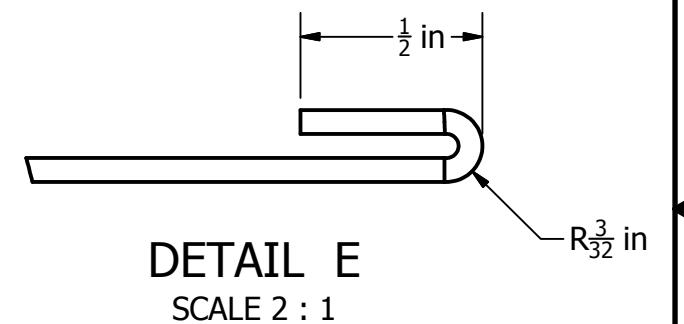
1



Item 4
Left Side
SCALE 1:4



DETAIL F
SCALE 2 : 1



B

B

→

←

A

A

Instructions:

1. Bend $1/2$ " of wire end with radius of $3/32$ " as shown in Detail E.
2. Bend $1/2$ " of other end of wire 90 degrees, bend $1/4$ " end of wire 90 degrees as shown going into the sheet in Detail F.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-4

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 10

4

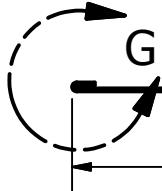
3

2

1

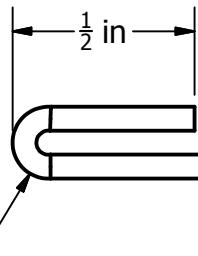
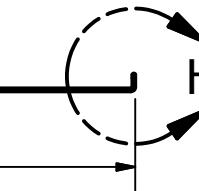
↑

4 3 2 1



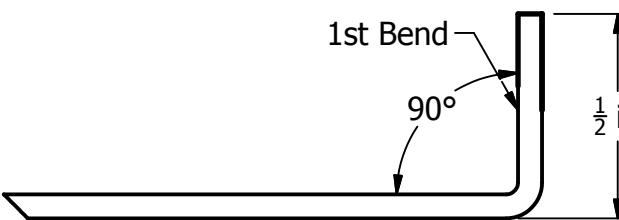
23 in

Item 4
Right Side
SCALE 1 : 4

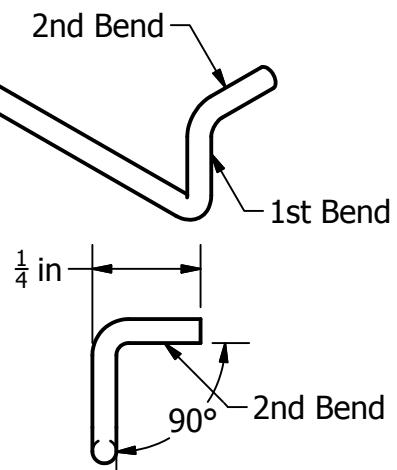


$R \frac{3}{32}$ in

DETAIL G
SCALE 2 : 1



DETAIL H
SCALE 2 : 1



B

B

→

←

A

A

Instructions:

1. Bend $1/2$ " of wire end with radius of $3/32$ " as shown in Detail G.
2. Bend $1/2$ " of other end of wire 90 degrees, bend $1/4$ " end of wire 90 degrees as shown going into the sheet in Detail H.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

A

DWG NO

BEST2012-100-4

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 5 OF 10

4 3 2 1

↑

2

1

4

I

3

↓

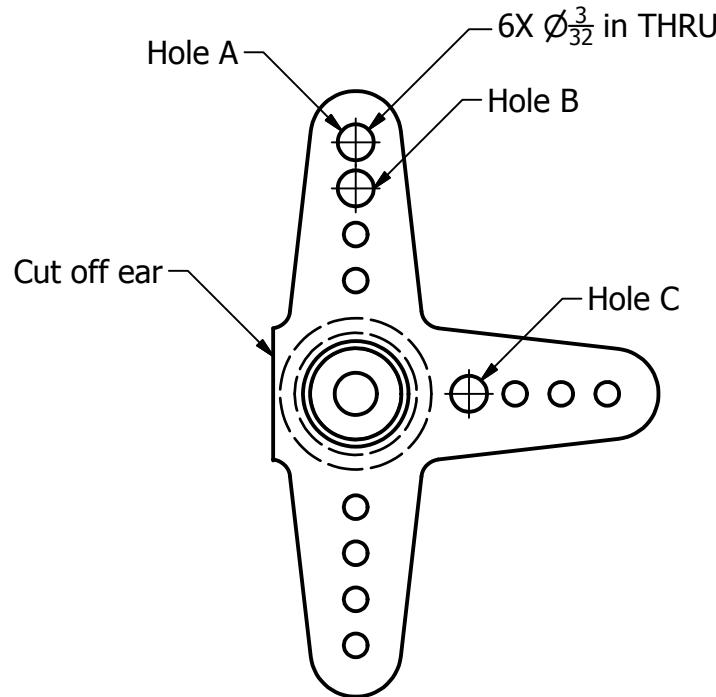
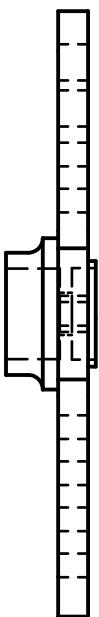
2

I

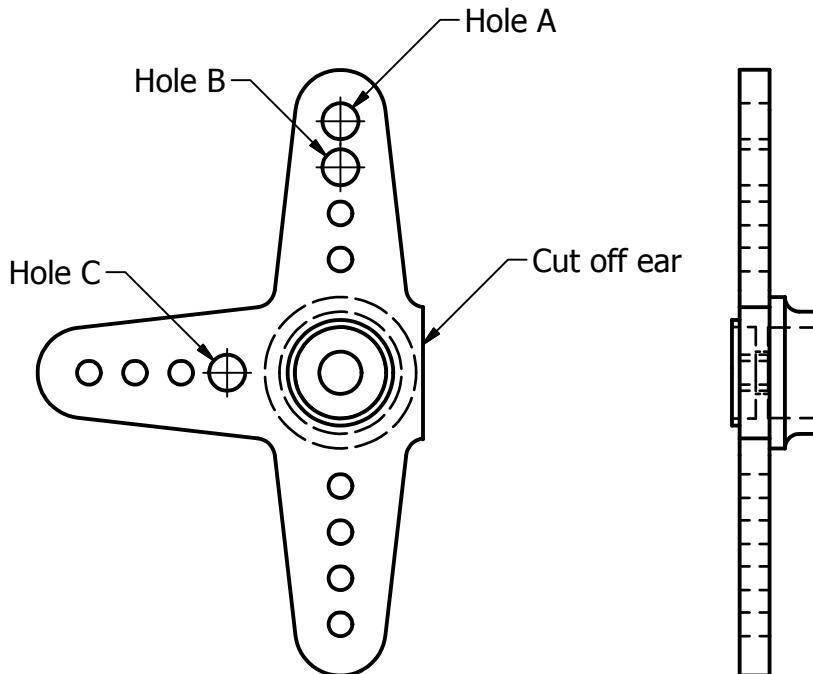
1

B

B



**Item 5
Left Side**
SCALE 2 : 1



**Item 5
Right Side**
SCALE 2 : 1

A
Instructions:

1. Cut one ear off Item 5.
2. Enlarge existing through holes marked A, B and C in top and side ears of Item 5 as shown.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-4

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 6 OF 10

4

I

3

↑

2

I

1

4

I

3

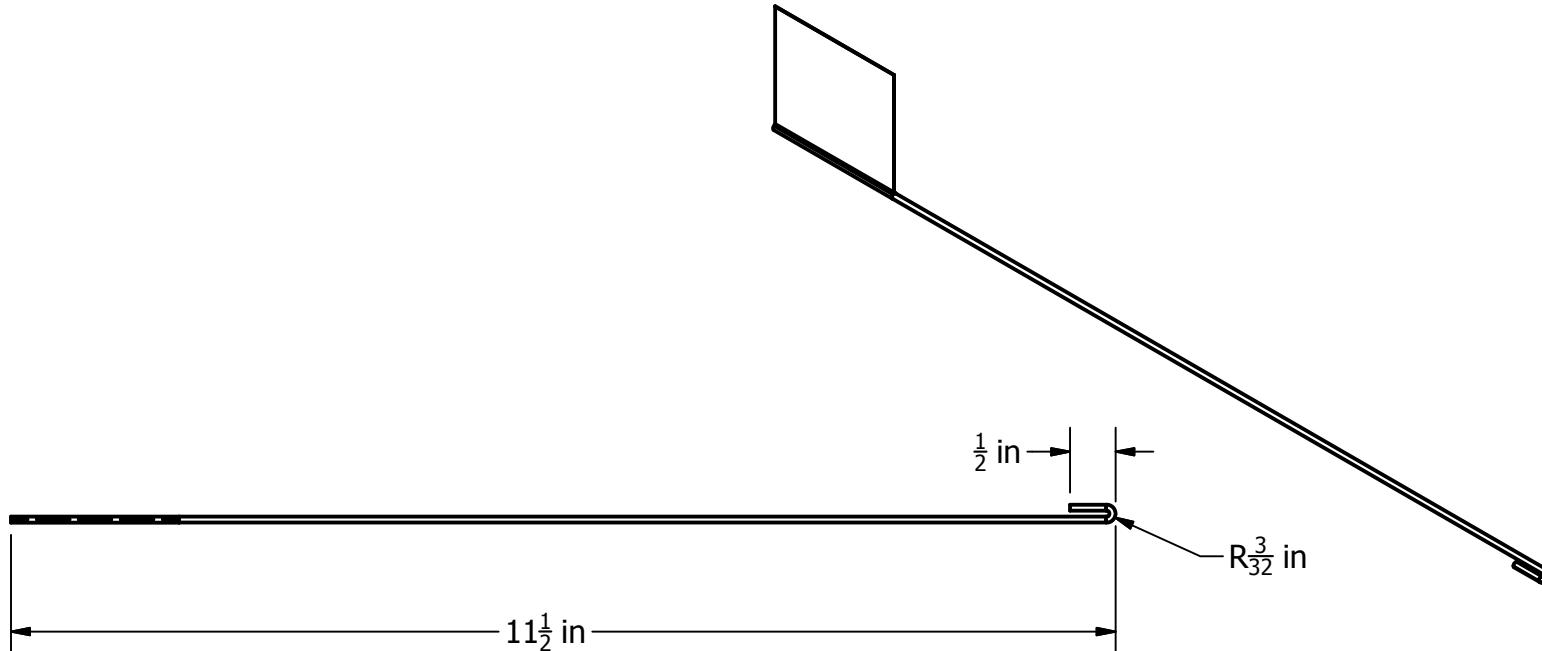
↓

2

1

B

B



Instructions:

1. Cut 12" piece of piano wire.
2. Bend 1/2" of end of wire and loop through Hole C in servo horn.
3. Secure wire to servo horn Hole B with cable tie.
4. Create flag with floor tape.

May also use marking flag cut to 12".

See assembled view on Sheet 10.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

A

DWG NO

BEST2012-100-4

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 7 OF 10

4

I

3

↓

2

1

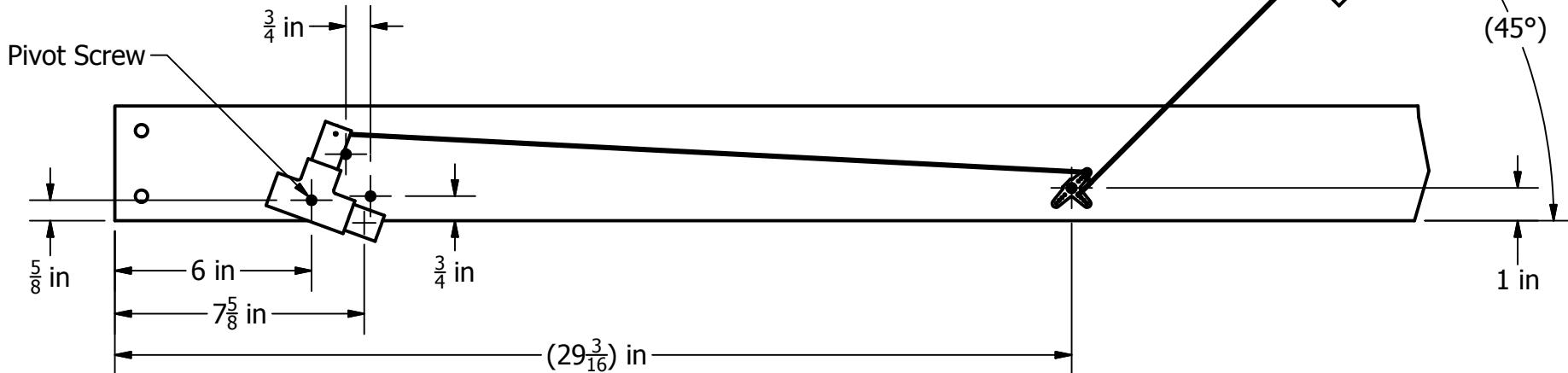
4 | 3 | 2 | 1

C

D
Sheet 9

Left Side

Right Side



DETAIL C

Left Side
SCALE 1 : 5

See instructions on Sheet 9.

WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-100-4

1.1

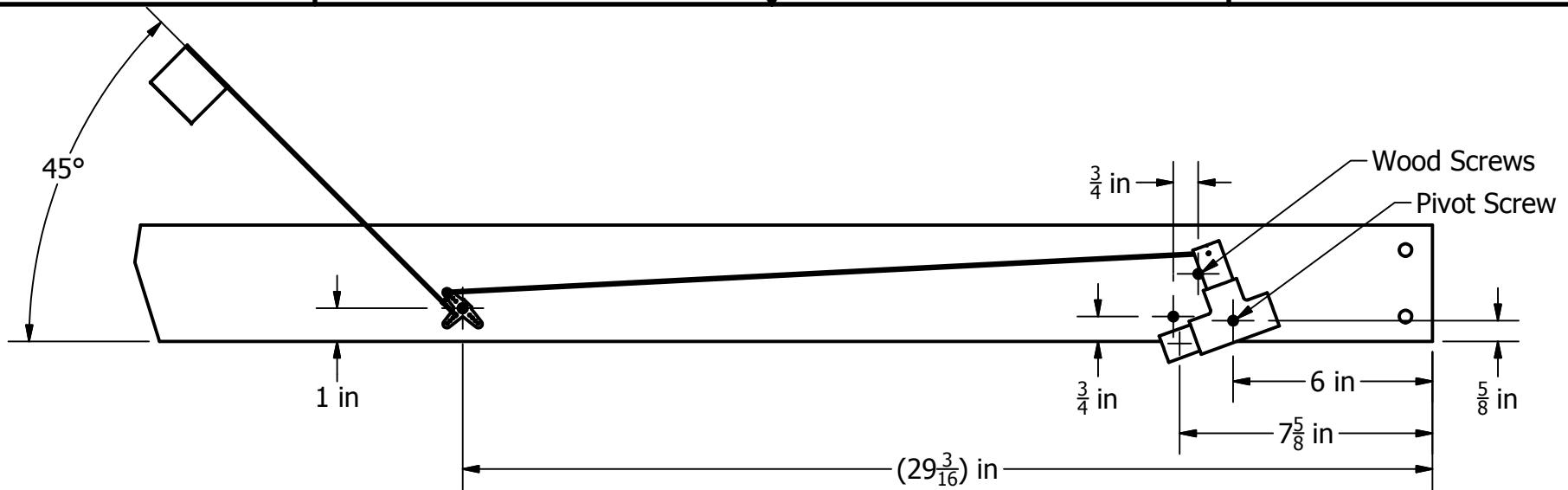
SCALE

DRAWN

DALLAS BEST

SHEET 8 OF 10

4 | 3 | 2 | 1



DETAIL D

Right Side
SCALE 1 / 5

Instructions:

1. Attach Item 4 to Item 2 with wire end with 90 degree bends inserted into Item 2 hole near beam.
2. Attach assembled PVC Tee to the Midway Station Beam 6" from end of 2x4 with drywall screw, measured to screw location on Item 1. Adjust the screw so that the tee requires 8-12oz of force to rotate on the screw.
3. Attach Item 4 to Item 5 (Servo Horn) Hole A.
4. Attach Item 6 (Summit Flag) to Item 5 by looping wire end into Hole C of Item 5. Secure flag wire to Servo Horn with cable tie (or twist tie, safety wire, etc) through hole B.
5. Set the PVC Tee subassembly such that the top of the exposed end of item 3 is level with the bottom of the midway beam. This is the match starting position for the indicator.
6. Attach Item 5 to Midway station Beam with servo mounting screw from the servo horn kit, or a #4 x 1/2" wood screw in a location such that the servo horn pivot is in a "not-triggered" (starting) position as distance from end of beam. Flag is shown in "not triggered" position in Detail D, which is 45 degrees +0/-10 degrees. Approximate distance shown for reference only. Install a drywall screw adjacent to item 2 towards the inside of the Midway Station Beam to act as a stop.
7. Set Summit Indicator in "triggered" position (bottom visible end of item 3 one quarter inch below bottom of Midway Station Beam) and install a drywall screw to Midway Station Beam adjacent to and above Item 3 to act as a stop.

See Sheet 10 for additional views of assembly.

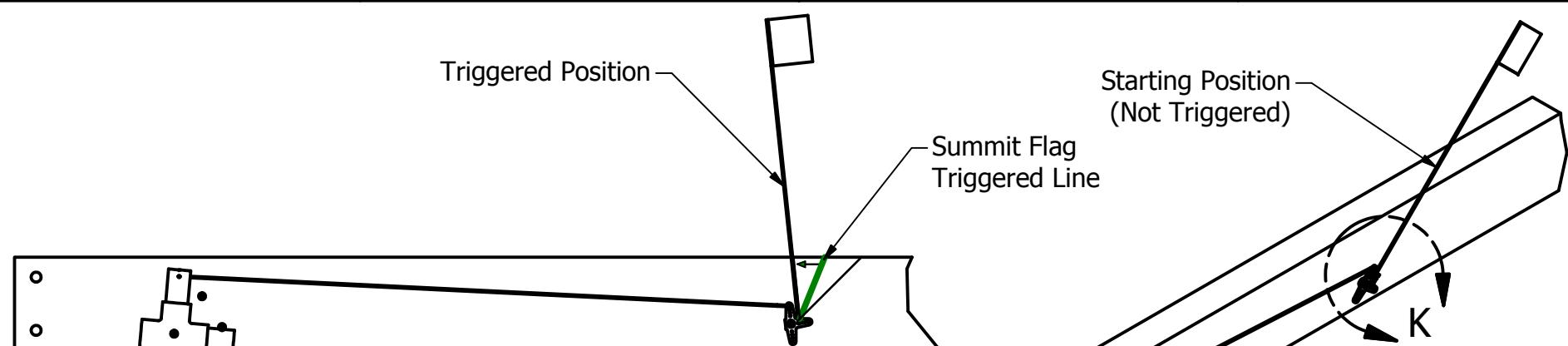
WARP XX FIELD DRAWINGS

TITLE

SUMMIT INDICATOR ASSEMBLY

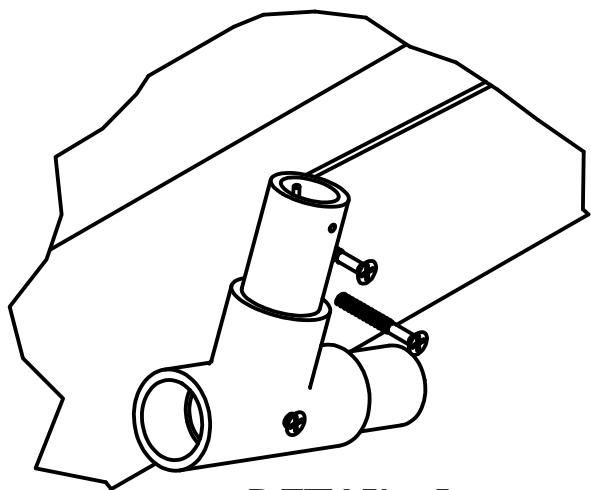
SIZE	DWG NO	REV
A	BEST2012-100-4	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 9 OF 10

4 3 2 1



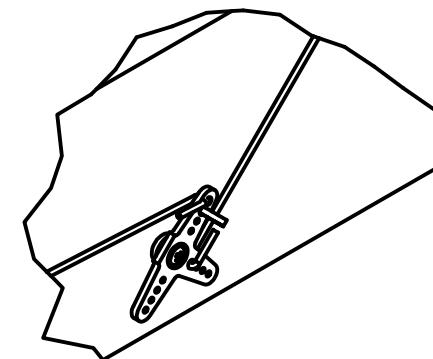
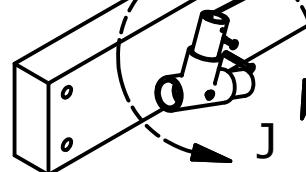
Triggered Position

SCALE 1 : 6



DETAIL J

SCALE 1 : 2



DETAIL K

SCALE 1 : 2

Summit Flag Triggered Line:

Instructions:

1. Set PVC T against the screw stop in untriggered position, and draw a pencil line along the flag wire.
2. Set PVC T against the screw stop in triggered position, and draw a pencil line along the flag wire.
3. Draw an ink line representing the half-triggered position, with an arrow pointing toward the more triggered line. Scored position is anywhere past this midpoint line.

4 3 2 1

4 3 2 1

WARP XX FIELD DRAWINGS		
TITLE		
SUMMIT INDICATOR ASSEMBLY		
SIZE A	DWG NO BEST2012-100-4	REV 1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 10 OF 10

4 1 3 2 1

Robot Platform Assembly

B

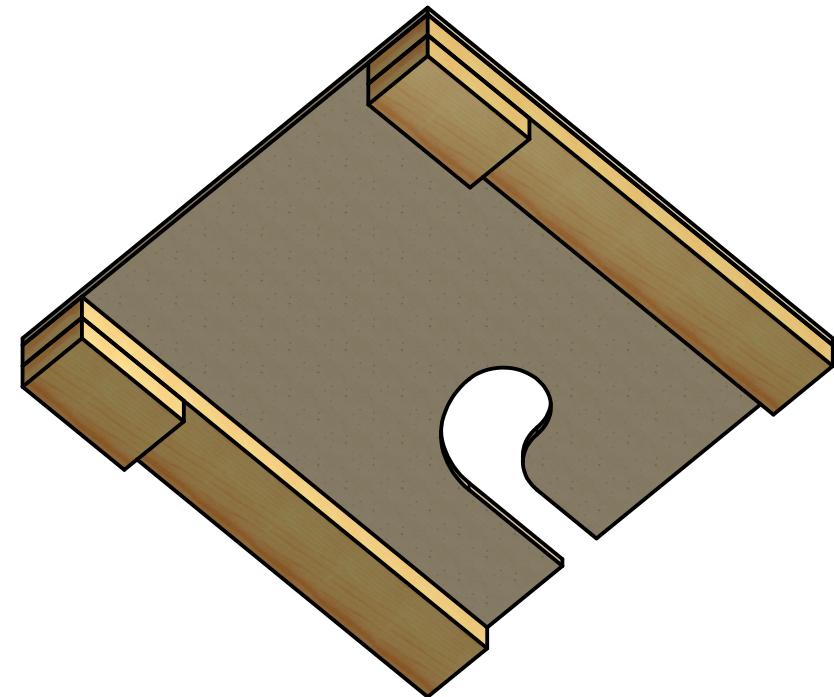
B

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A

A



WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE

A

DWG NO

BEST-2012-110

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 6

4 1 3 2 1

4

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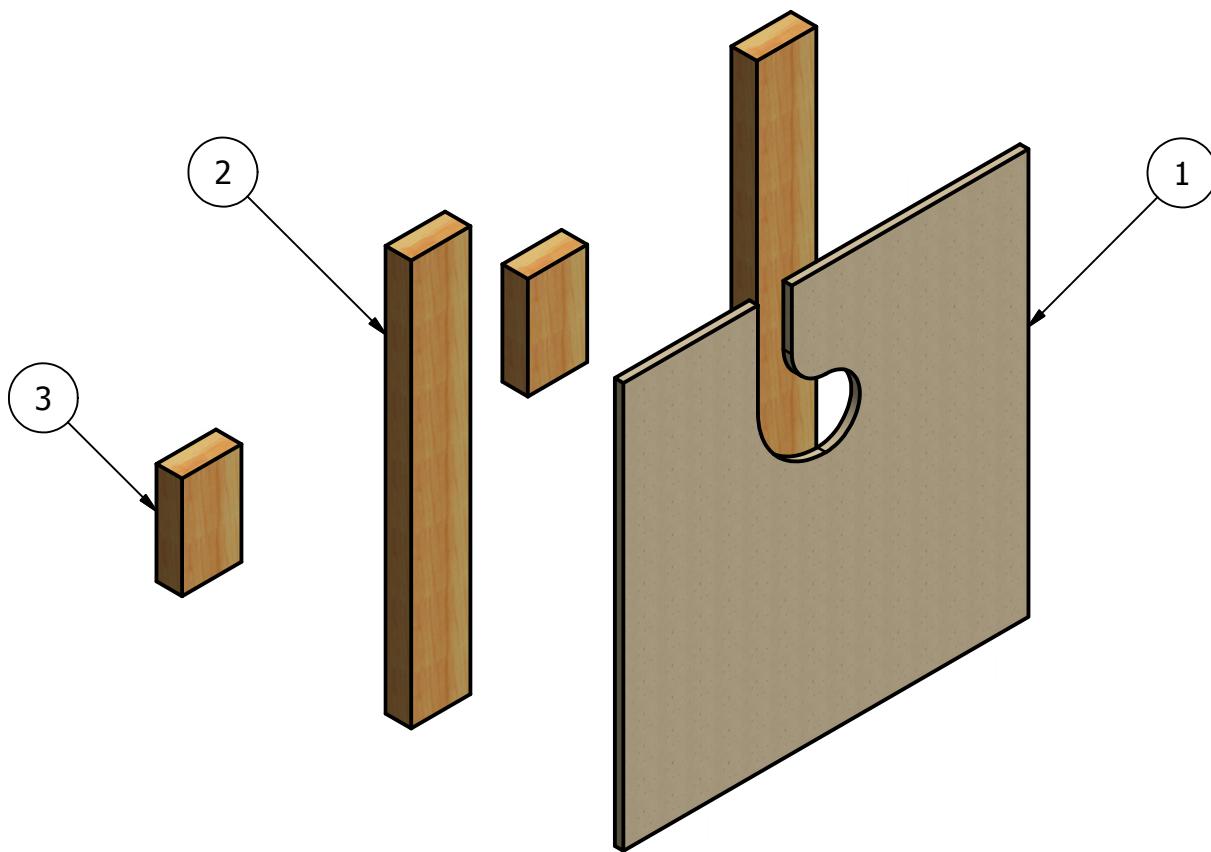
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2

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B

B



PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Platform	1/2" Plywood	4
2	Platform Foot	2" x 4" Lumber	8
3	Platform Standoff	2" x 4" Lumber	8
4	#6 x 1-5/8" Drywall Screws	Drywall Screws	AR
5	#8 x 2-1/2" Drywall Screws	Drywall Screws	AR

4

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3

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2

I

B

B

WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE

A

DWG NO

BEST-2012-110

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 6

4 3 2 1

B B

$\frac{1}{2}$ in

Radii center points
along center line

R4 in

2 in

$23\frac{7}{8}$ in

$11\frac{15}{16}$ in $13\frac{15}{16}$ in

R2 in

$3\frac{1}{2}$ in

$5\frac{1}{2}$ in

$7\frac{1}{2}$ in

$23\frac{7}{8}$ in

ITEM 1

SCALE 1 : 8

Instructions:

1. Cut Item 1 from 1/2" plywood.
2. Mark and cut two pieces with the smooth side of the plywood up and two pieces with the rough side of the plywood up.
3. Save cutout pieces for drawing BEST2012-100 Sheet 10.

WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE

DWG NO

REV

A

BEST-2012-110

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 6

4 3 2 1

4

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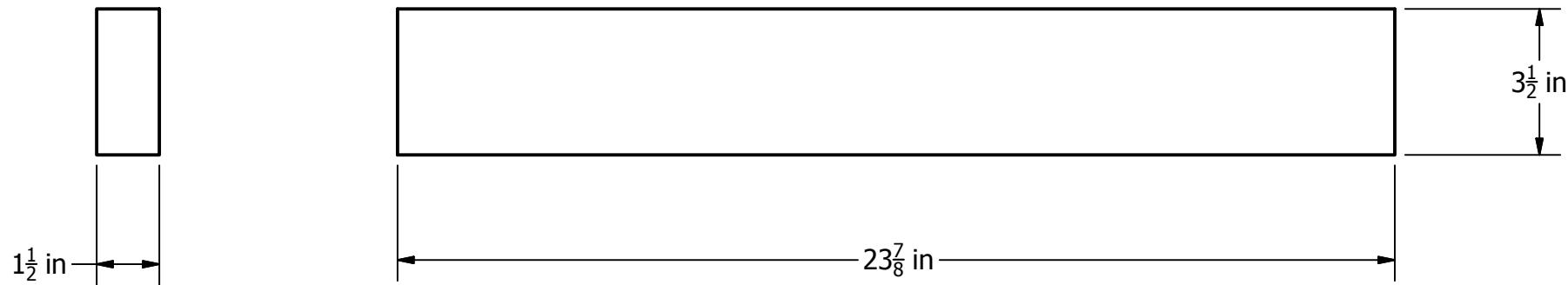
2

I

1

B

B



ITEM 2
SCALE 1 : 4

A

Instructions:

1. Cut board from 2x4" lumber.
2. Attach 2 pieces of Item 2 to bottom of Item 1 with drywall screws.

WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE A	DWG NO BEST-2012-110	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 4 OF 6

4

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3



2

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3



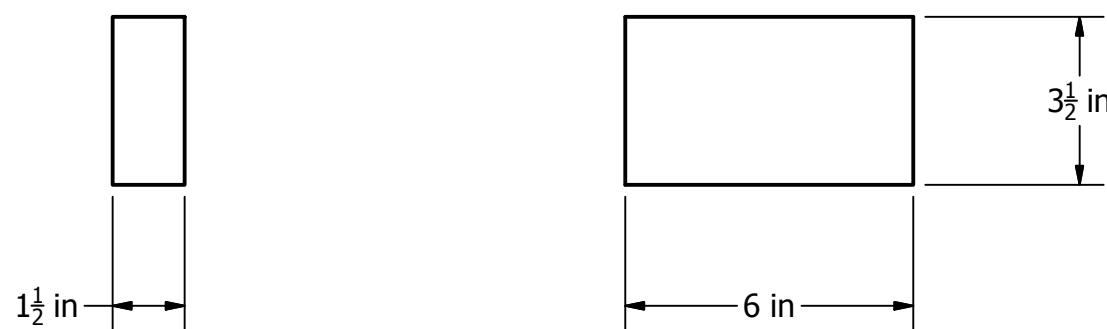
2

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B



ITEM 3
SCALE 1 : 4

Instructions:

1. Cut board from 2x4" lumber.
2. Attach Item 3 to bottom of Item 2 with 2-1/2" drywall screws.

WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE

A

DWG NO

BEST-2012-110

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 5 OF 6

4

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3



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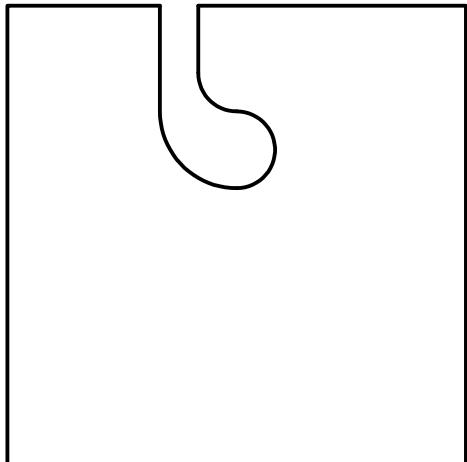
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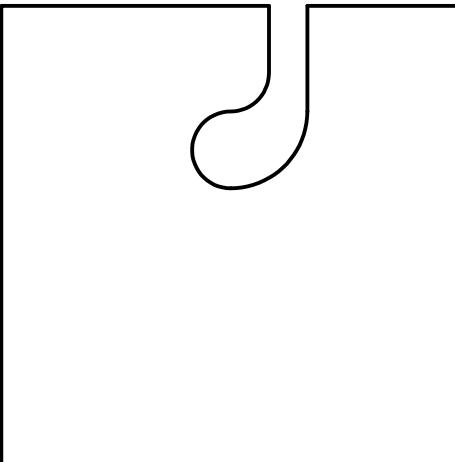
2

1

Robot Platform Assembly Left



Robot Platform Assembly Right

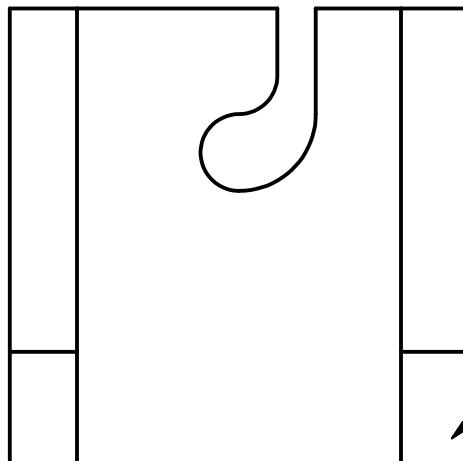


B

B

B

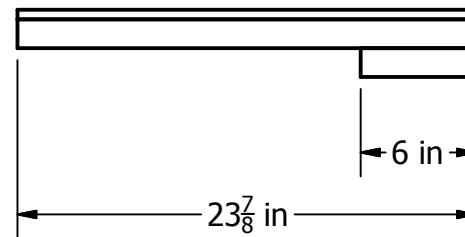
A



Bottom of Dock Assembly Left

Instructions:

1. Attach two pieces of Item 2 to bottom (rough side) of Item 1.
Attaching Item 2 to rough side of Item 1 yields two left and two right side platforms.
2. Attach two pieces of Item 3 to bottom of each Item 2 board flush with front of dock assembly.

VIEW B-B
SCALE 1 : 10VIEW C-C
SCALE 1 : 10

WARP XX FIELD DRAWINGS

TITLE

ROBOT PLATFORM ASSEMBLY

SIZE

DWG NO

REV

A

BEST-2012-110

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 6 OF 6

4

3

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A

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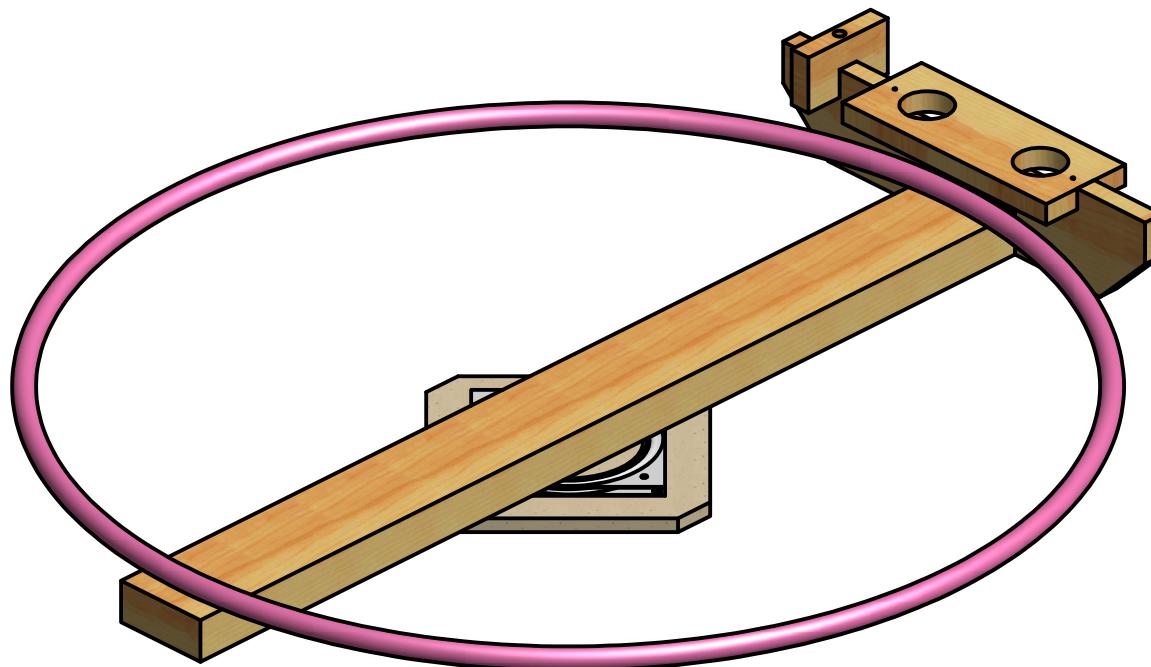
4

2

1

1

Cargo Ship / Turntable Assembly



B

B

→

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A

A

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP / TURNTABLE
ASSEMBLY

SIZE

A

DWG NO

BEST2012-120

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 9

4

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4

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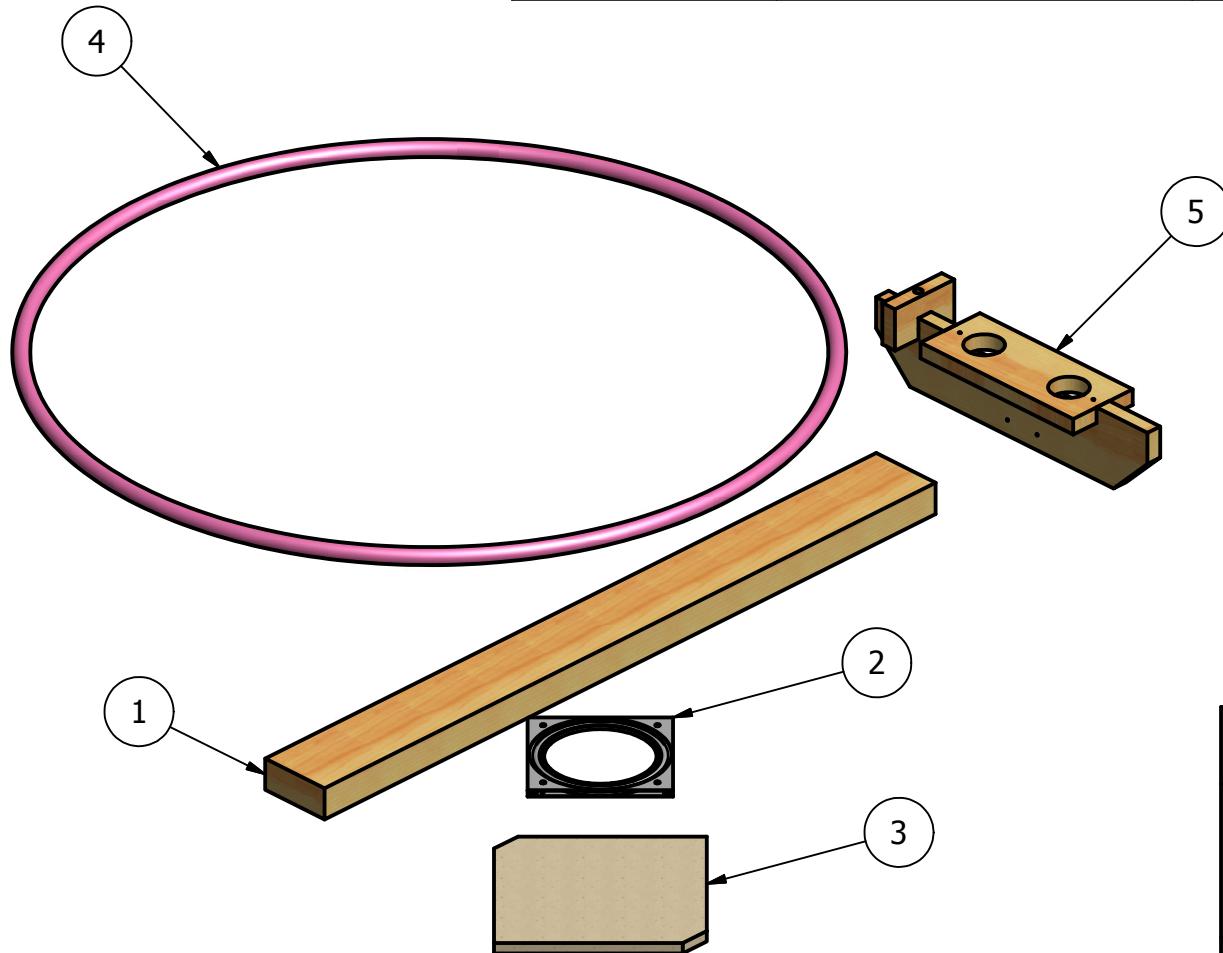
1

B

B

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Beam	2x4" Lumber	4
2	Turntable	6" Lazy Susan	4
3	Turntable Base	1/2" Plywood	4
4	Hula Hoop	34" Hula Hoop	4
5	Cargo Ship Assembly	Sub Assembly	4
6	1/2" Wood Screws	Wood Screws	AR
7	#6 x 1-5/8" Drywall Screws	Drywall Screws	AR



WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP / TURNTABLE
ASSEMBLY

SIZE

A

DWG NO

BEST2012-120

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 9

4

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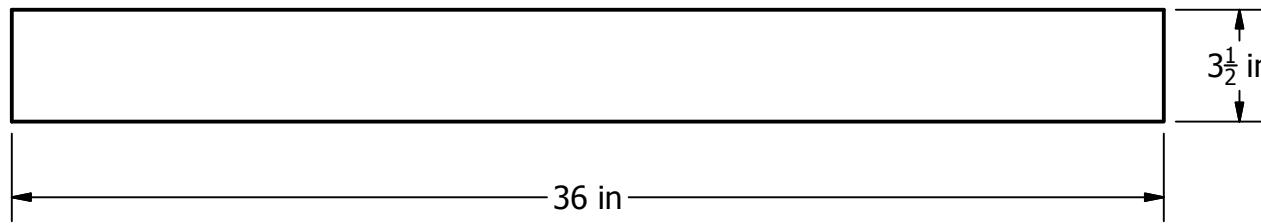
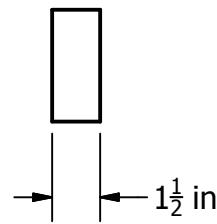
2

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4 | 3 | 2 | 1

B

B



ITEM 1
SCALE 1 : 6

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A

Instructions:

1. Cut board from 2x4" lumber.

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP / TURNTABLE
ASSEMBLY

SIZE

A

DWG NO

BEST2012-120

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 9

4 | 3 | 2 | 1

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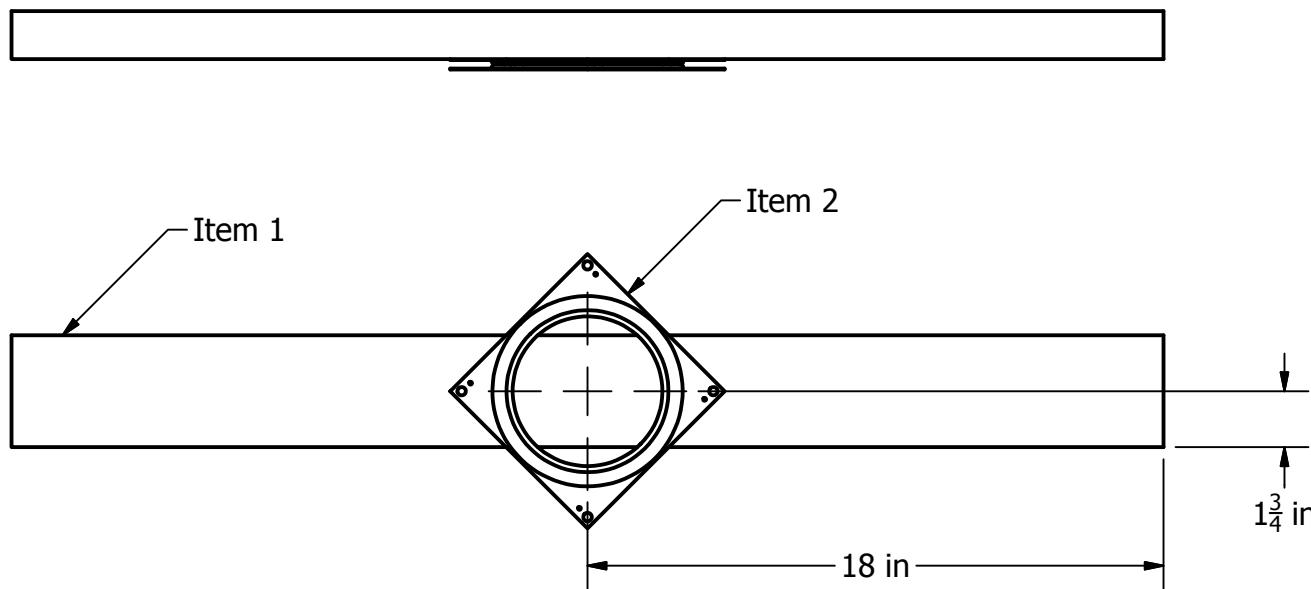
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2

1

B

B



Bottom View

SCALE 1 : 6

A

A

Instructions:

1. Attach Item 2 to bottom of Item 1 with 1/2" wood screws.

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP / TURNTABLE
ASSEMBLY

SIZE

A

DWG NO

BEST2012-120

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 9

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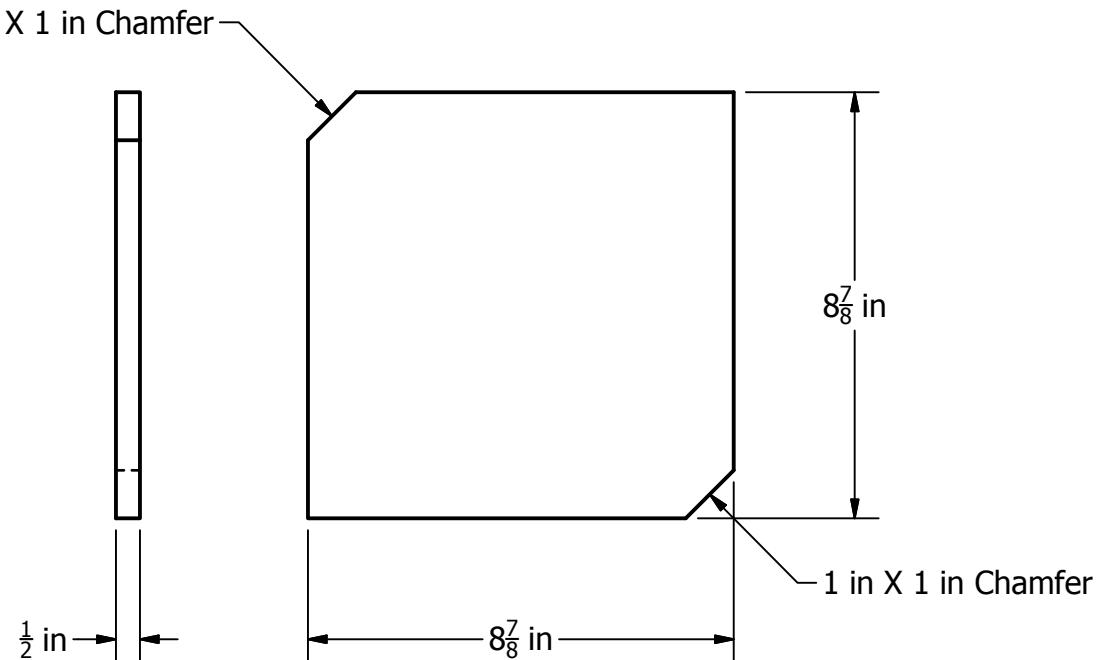
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ITEM 3
SCALE 1 : 4

A

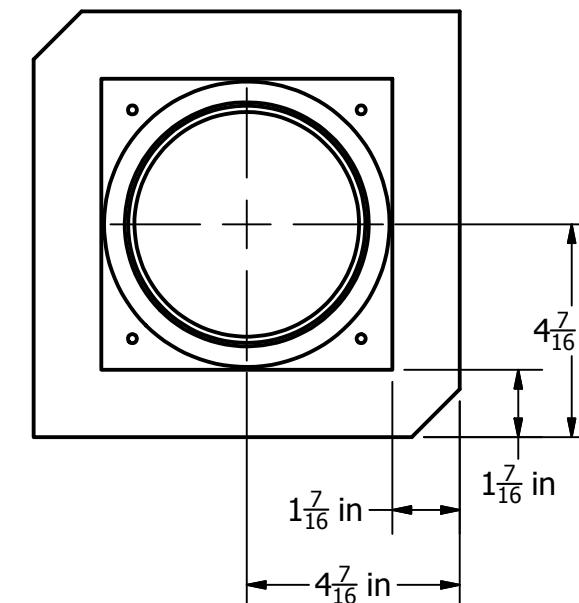
Instructions:

1. Cut Item 3 from $1/2"$ plywood.
2. Cut chamfer on 2 opposite corners.
3. Attach Item 3 centered on bottom of Item 2 with $1/2"$ wood screws.

4

2

1



WARP XX FIELD DRAWINGS		
TITLE		
CARGO SHIP / TURNTABLE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-120	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 5 OF 9

4 | 3 | 2 | 1

B

B

→

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A

A

Item 4

18 in

Instructions:

1. Attach Item 4 to top of item 1 with drywall screws, orienting the splice of the hoop on the 2x4 and placing a screw on both sides of the splice.

$\phi 3\frac{3}{4}$ in

$1\frac{3}{4}$ in

$\frac{3}{4}$ in

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP / TURNTABLE
ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-120

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 6 OF 9

4 | 3 | 2 | 1

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4

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3



2

I

B

B



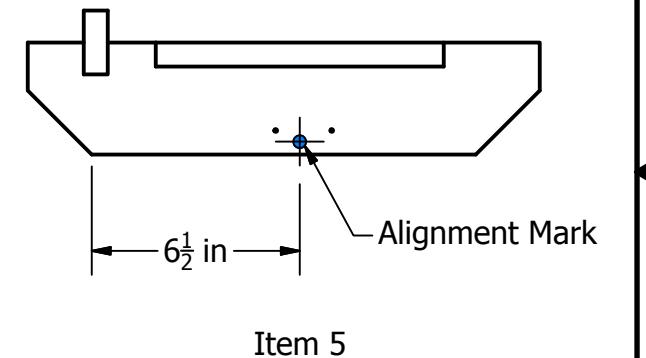
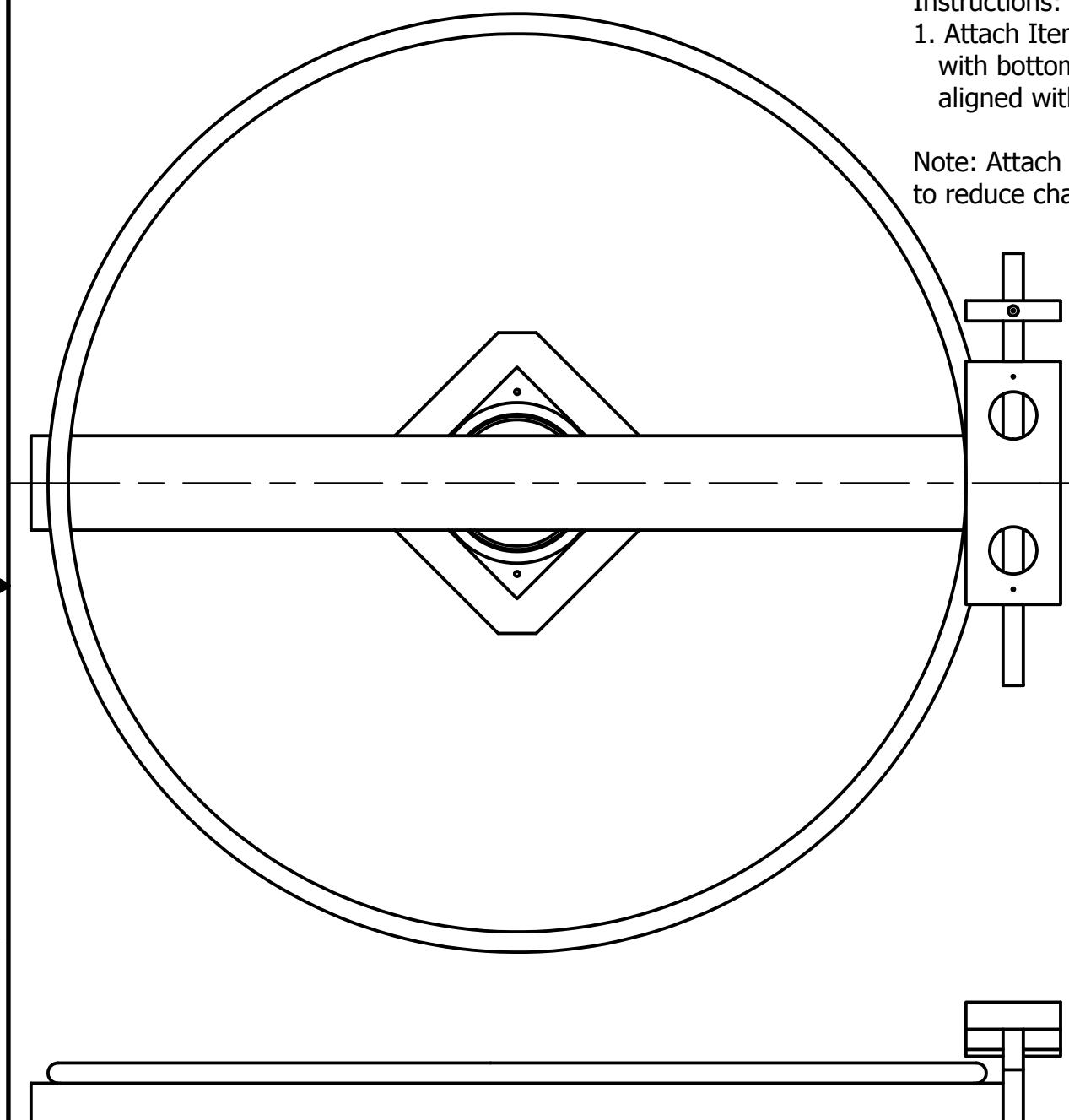
A

A

Instructions:

1. Attach Item 5 to Item 1 with bottom of Item 5 flush with bottom of Item 1, alignment mark of Item 5 aligned with center of Item 1 as shown using drywall screws.

Note: Attach boat to end of beam that has hula-hoop splice to reduce chances for wear and tear.



Item 5

WARP XX FIELD DRAWINGS		
TITLE		
CARGO SHIP / TURNTABLE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-120	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 7 OF 9

4

I

3



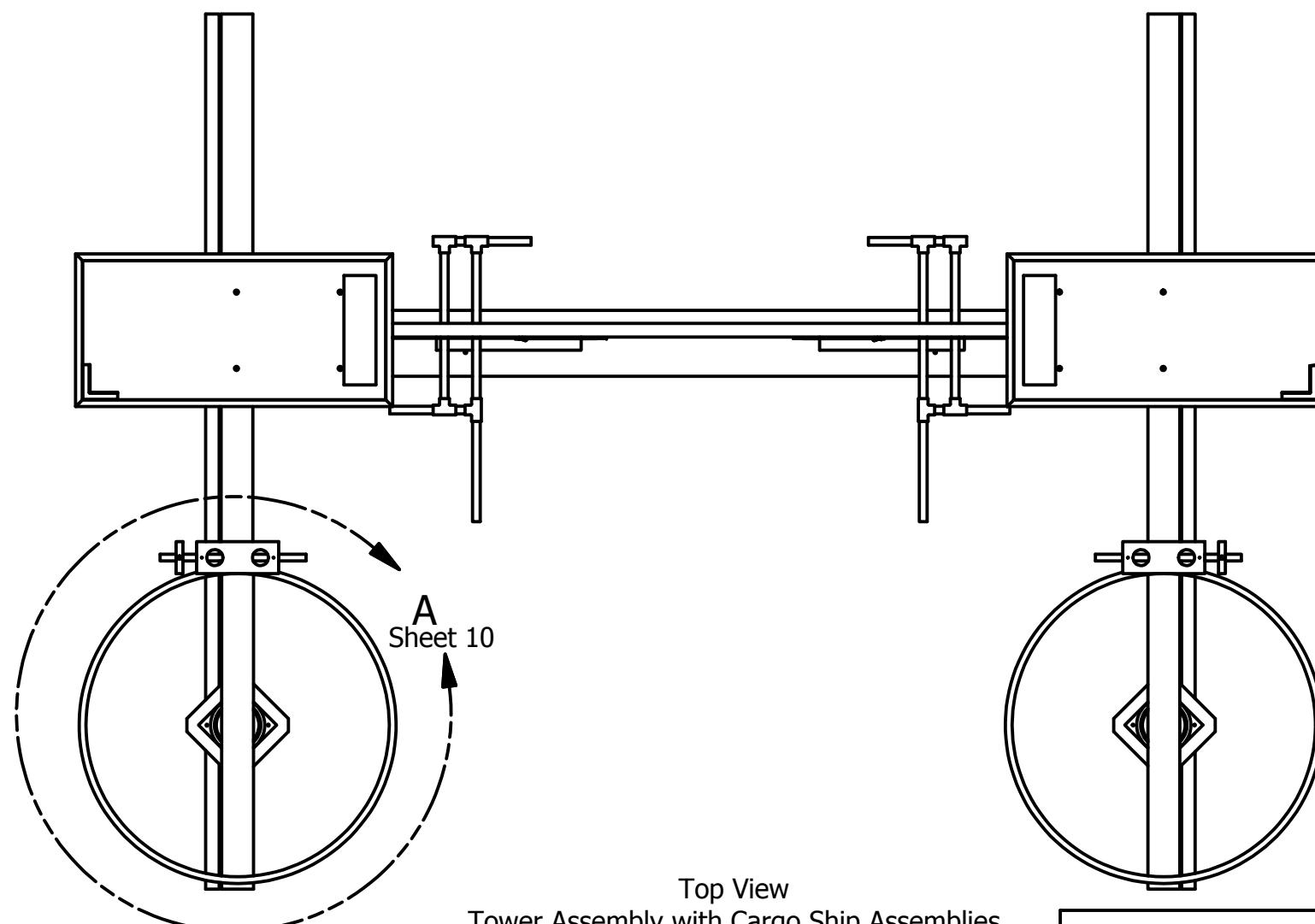
2

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B

4 1 3 2 1

B B



Top View
Tower Assembly with Cargo Ship Assemblies

See Detail A on Sheet 10

4

2

1

WARP XX FIELD DRAWINGS
TITLE
**CARGO SHIP / TURNTABLE
ASSEMBLY**

SIZE A	DWG NO BEST2012-120	REV 1.1
SCALE	DRAWN DALLAS BEST	SHEET 8 OF 9

4

I

3

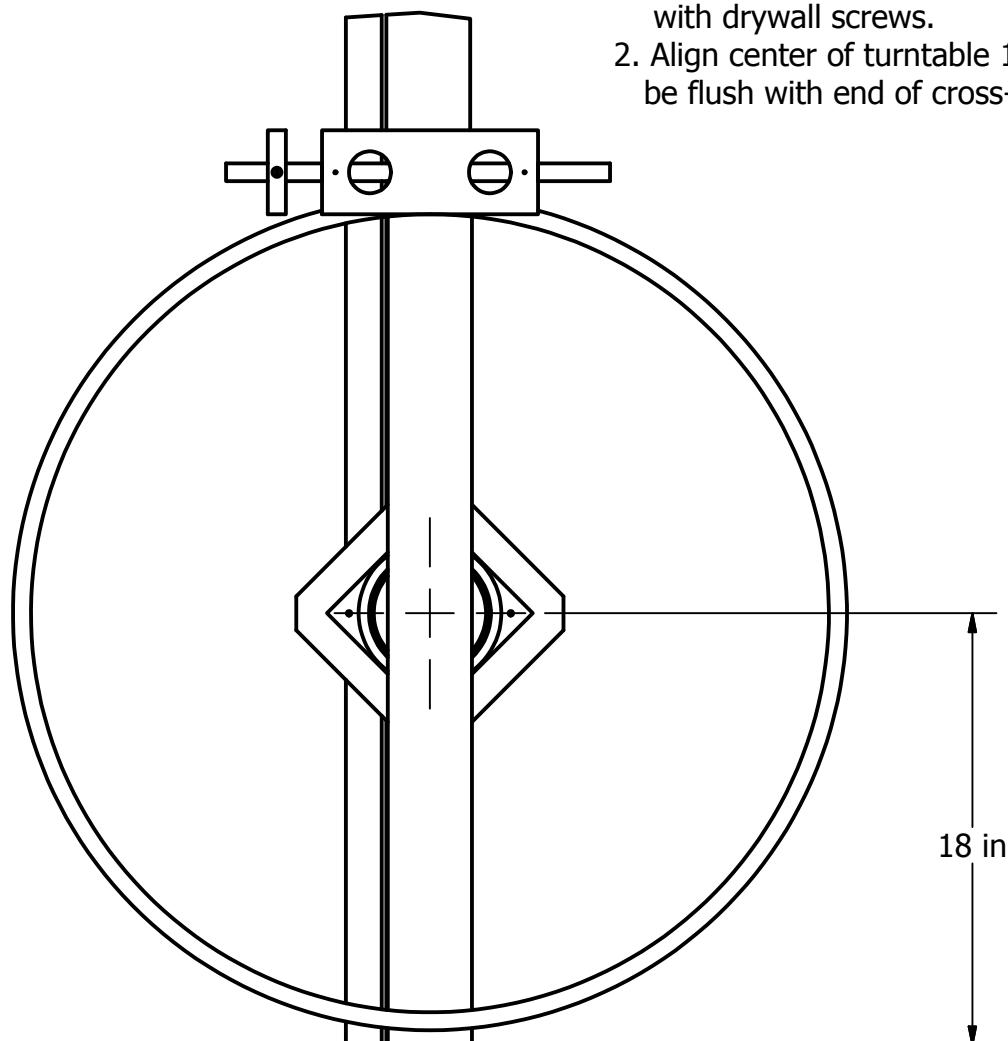
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2

1

B

B



DETAIL A

SCALE 1 : 8

Instructions:

1. Attach each Cargo Ship/Turntable Assembly to Tower Assembly Cross-beams with drywall screws.
2. Align center of turntable 18" from end of cross-beam, end of Item 1 (2x4) should be flush with end of cross-beam.

4

I

3

↑

2

1

B

WARP XX FIELD DRAWINGS		
TITLE		
CARGO SHIP / TURNTABLE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-120	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 9 OF 9

4

1

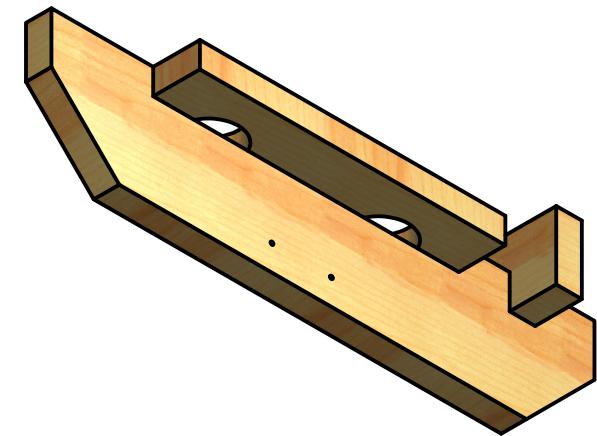
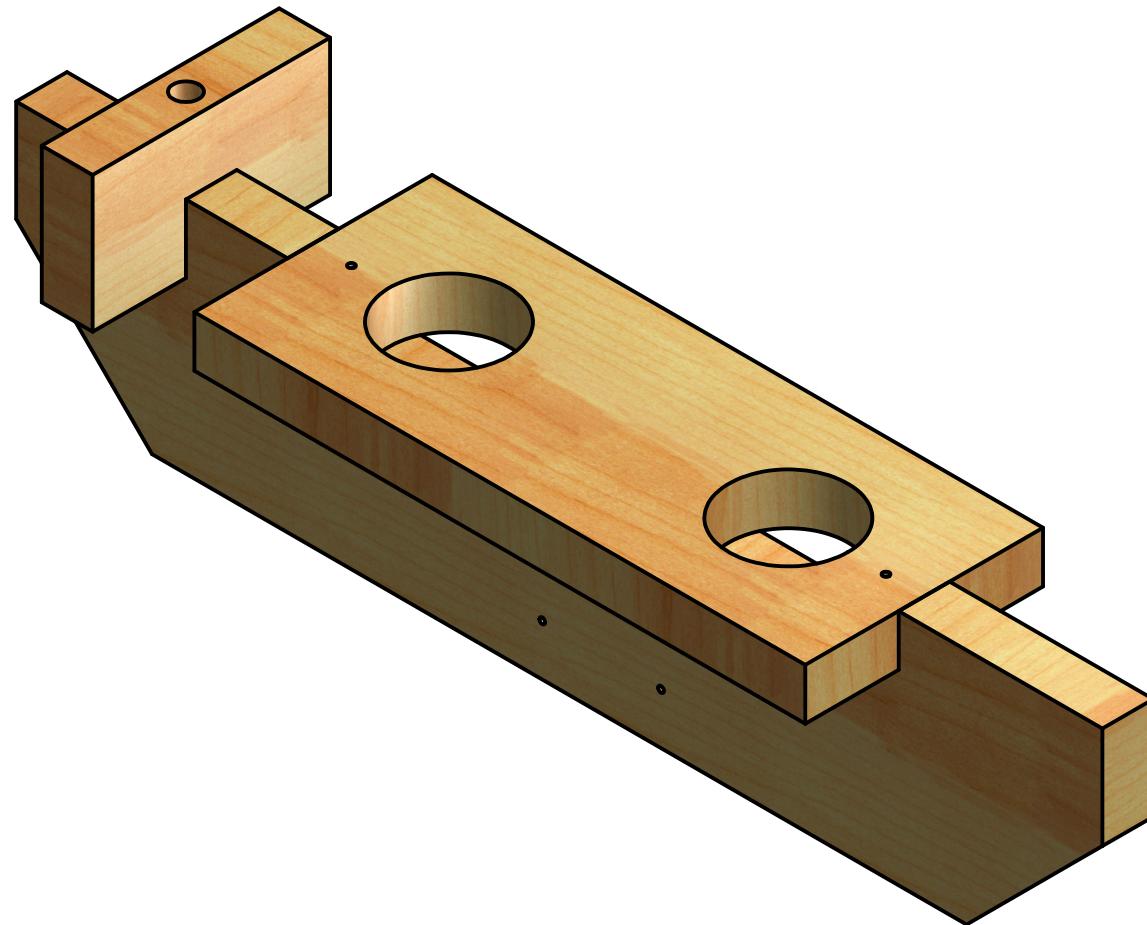
3

4

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B



4

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4

2

1

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP ASSEMBLY

SIZE

A

DWG NO

BEST2012-120-1

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 5

4 | 3 | 2 | 1

PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Cargo Ship Hull	1" x 4" Lumber	4
2	Cargo Ship Deck	1" x 4" Lumber	4
3	Cargo Ship Bridge	1" x 4" Lumber	4

B

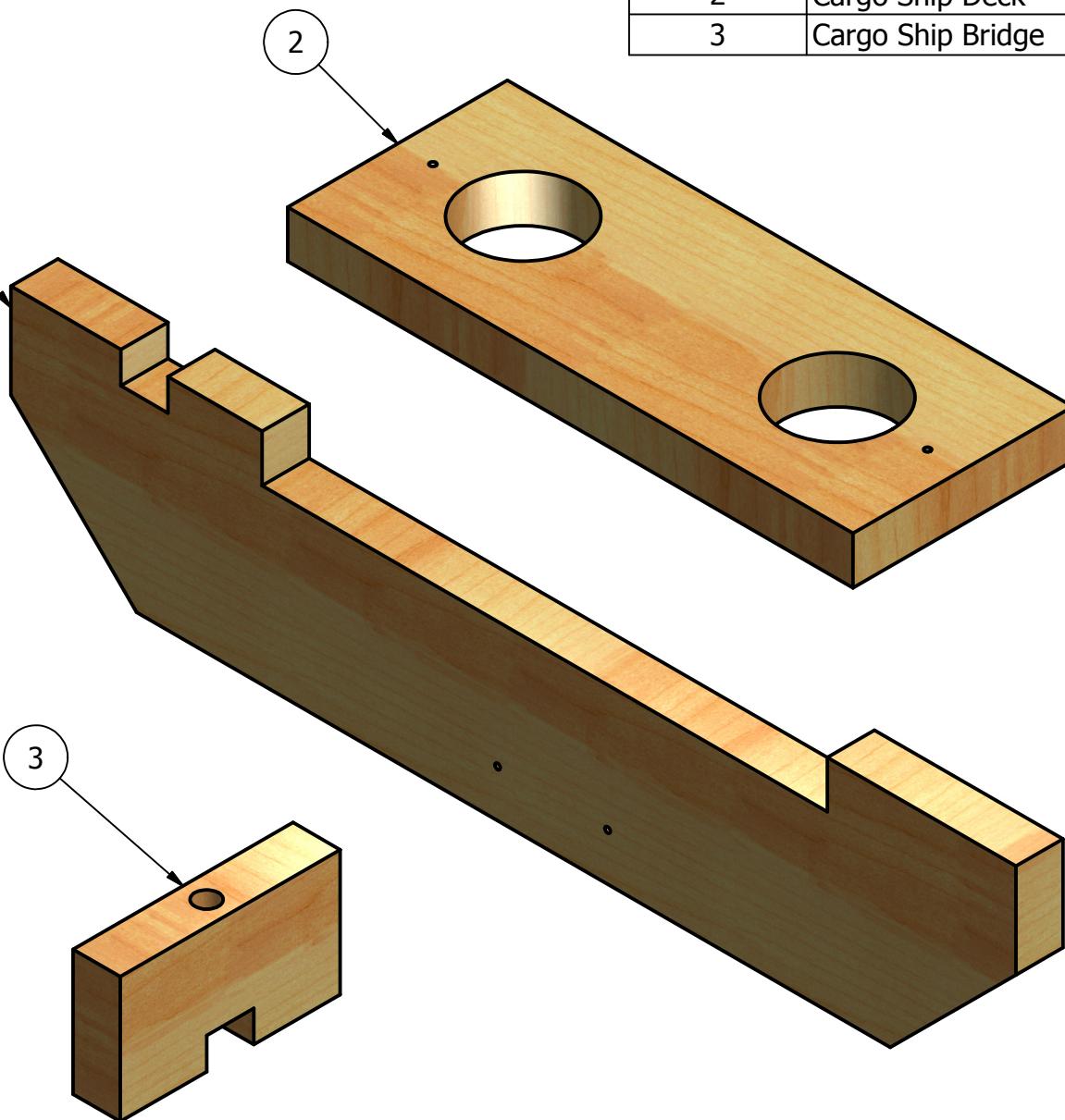
B

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A

A



Assemble with 3 drywall screws in pilot holes.

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP ASSEMBLY

SIZE

DWG NO

REV

A BEST2012-120-1 1.1

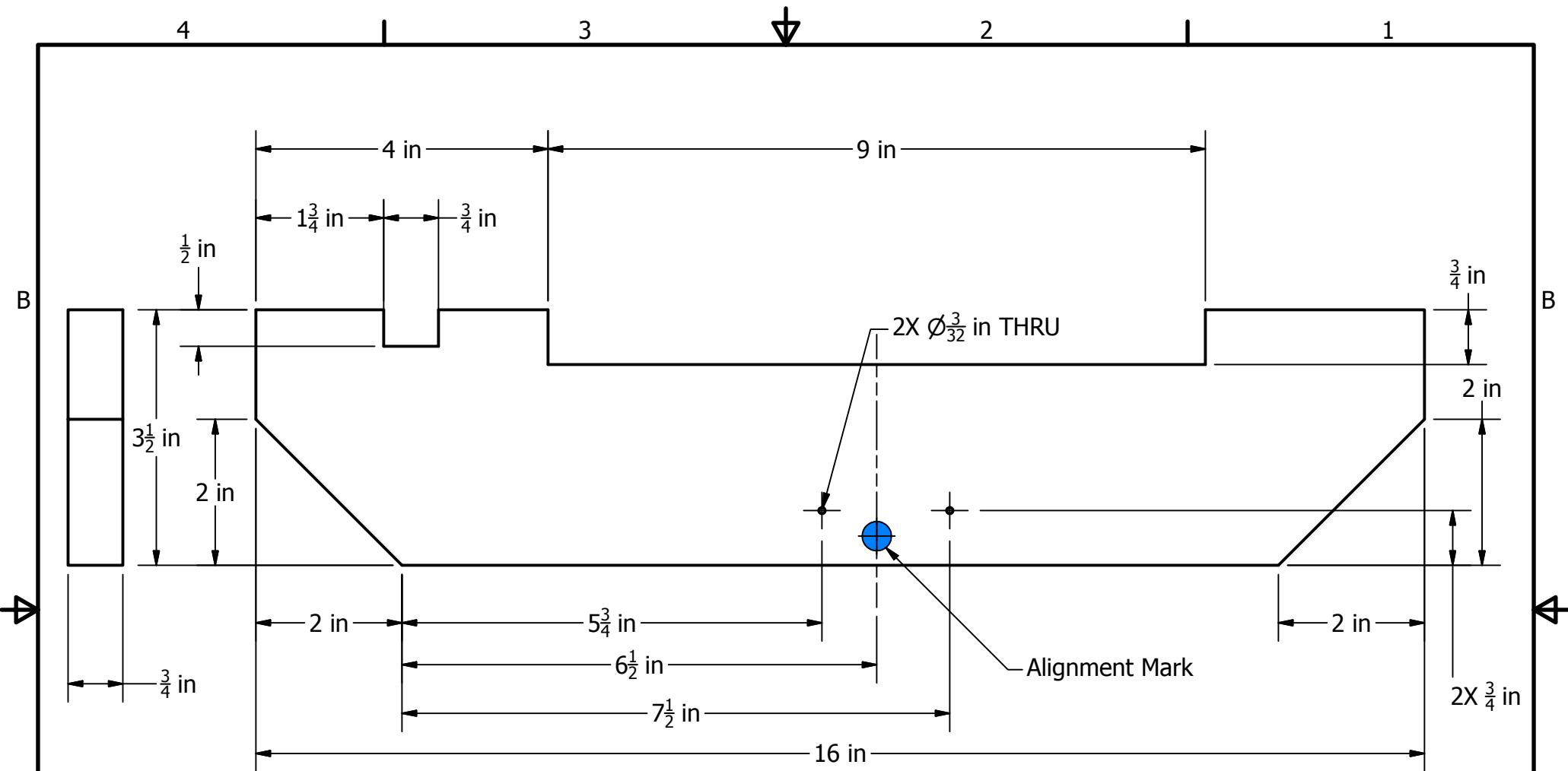
SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 5

4 | 3 | 2 | 1



ITEM 1

SCALE 1 : 2

Instructions:

1. Cut Item 1 from 1x4" lumber.
2. Chamfer bottom corners.
3. Cut slots for Items 2 and 3.
4. Drill 2 3/32" pilot holes as shown.
5. Make alignment mark at the bottom of Item 1 at 6-1/2" from front bottom corner.

WARP XX FIELD DRAWINGS		
TITLE		
CARGO SHIP ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-120-1	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 3 OF 5

4 1 3 2 1

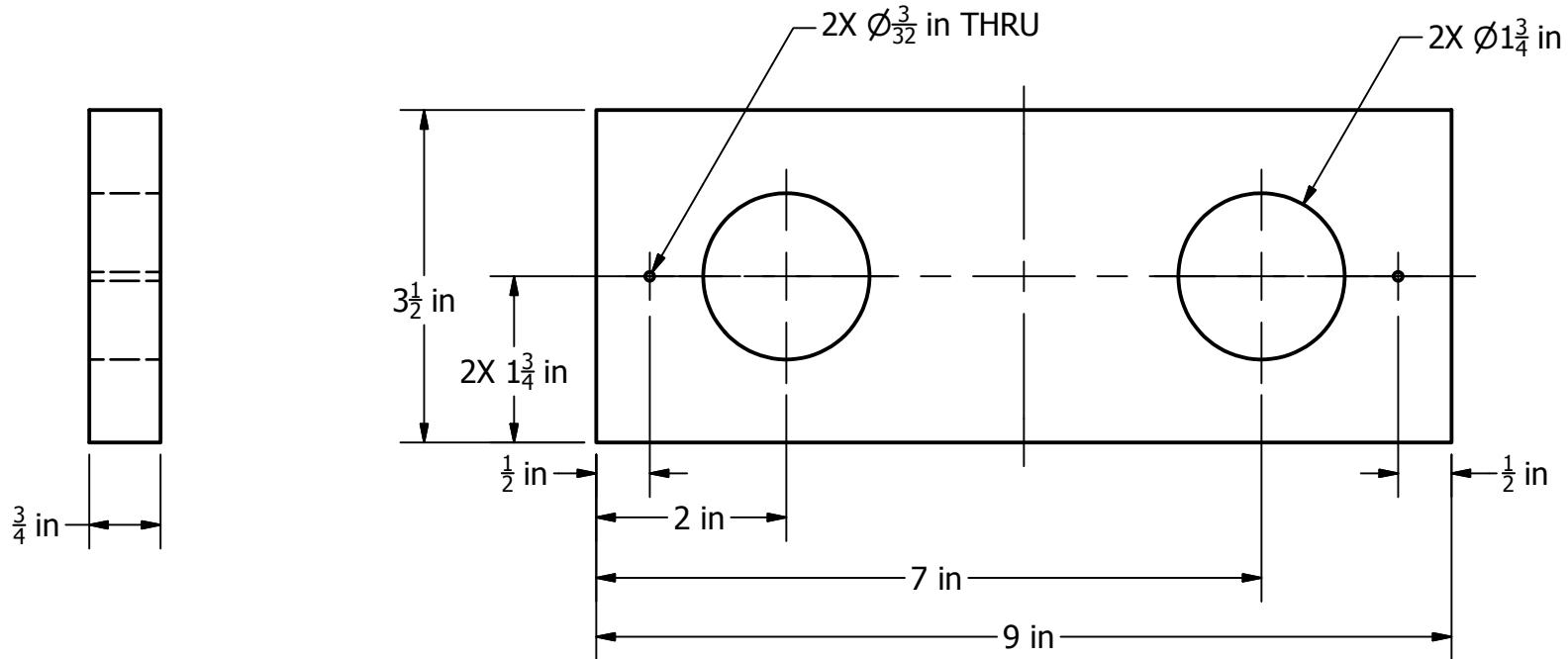
B

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A

B

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ITEM 2

SCALE 1 : 2

Instructions:

1. Cut Item 2 from 1x4" lumber.
2. Cut two 1 3/4" holes in board.
3. Drill two 3/32" pilot holes.
4. Attach to Item 1 with drywall screws in pilot holes.

WARP XX FIELD DRAWINGS

TITLE

CARGO SHIP ASSEMBLY

SIZE

A

DWG NO

BEST2012-120-1

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 5

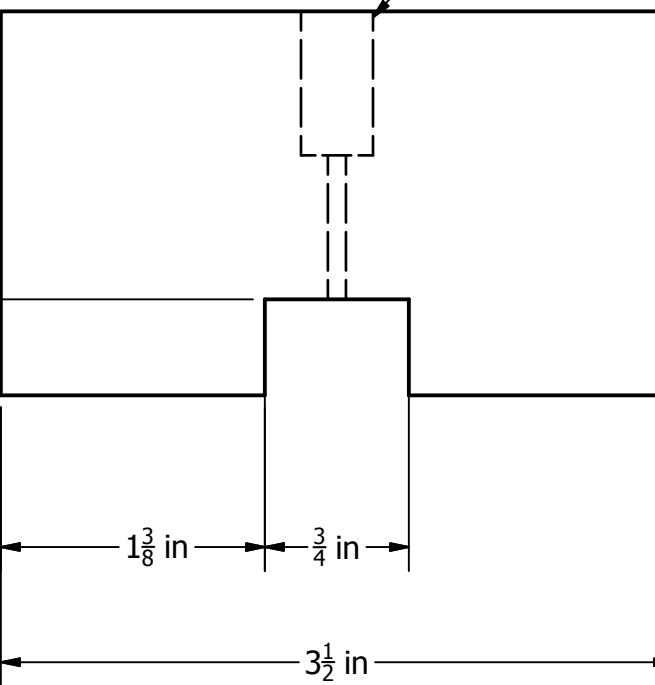
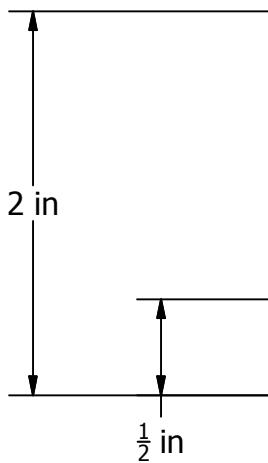
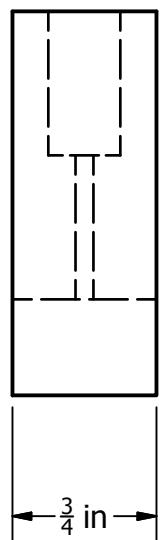
4 1 3 2 1

↑

2

1

4 | 3 | 2 | 1



$\odot \frac{3}{32}$ in THRU
 $\square \odot \frac{3}{8}$ in $\nabla \frac{3}{4}$ in

ITEM 3
SCALE 1 : 1

A

Instructions:

1. Cut Item 3 from 1x4" lumber.
2. Drill through hole from center of top 3/32" pilot hole. Counterbore 3/8" diameter, 3/4" deep.
3. Attach to Item 1 with drywall screw in pilot hole.

4 | 3 | 2 | 1

WARP XX FIELD DRAWINGS		
TITLE		
CARGO SHIP ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-120-1	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 5 OF 5

4

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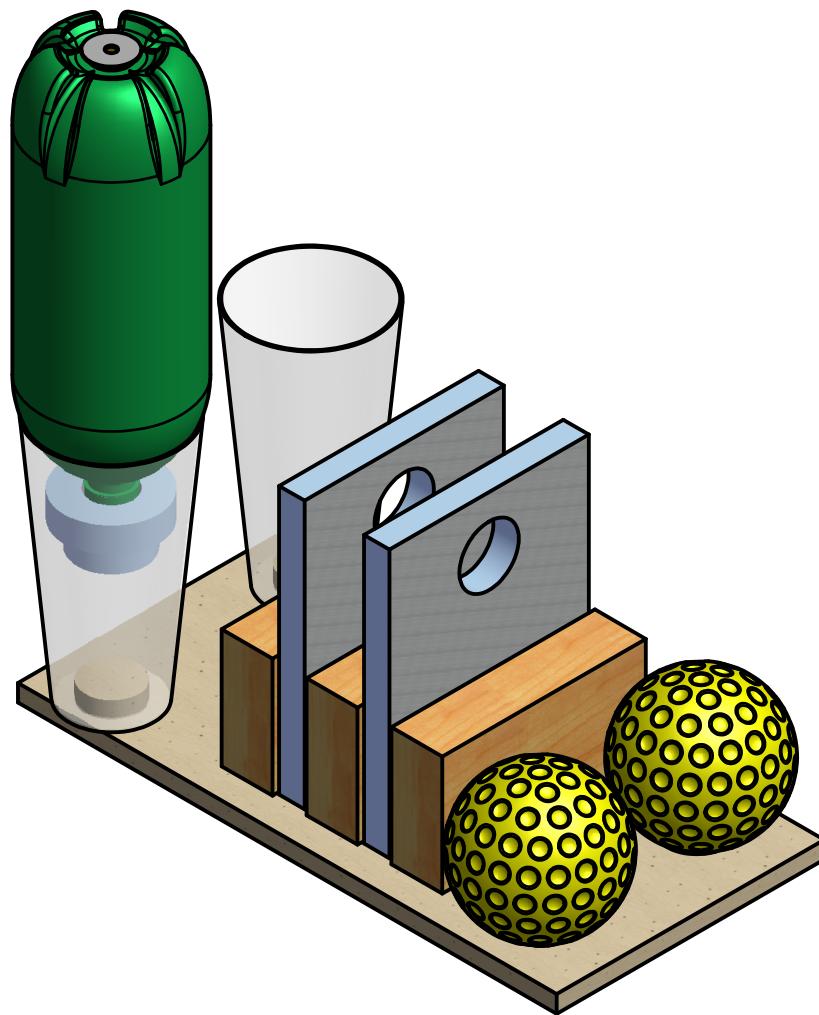
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A

A



WARP XX FIELD DRAWINGS

TITLE

BASE RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-130

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 8

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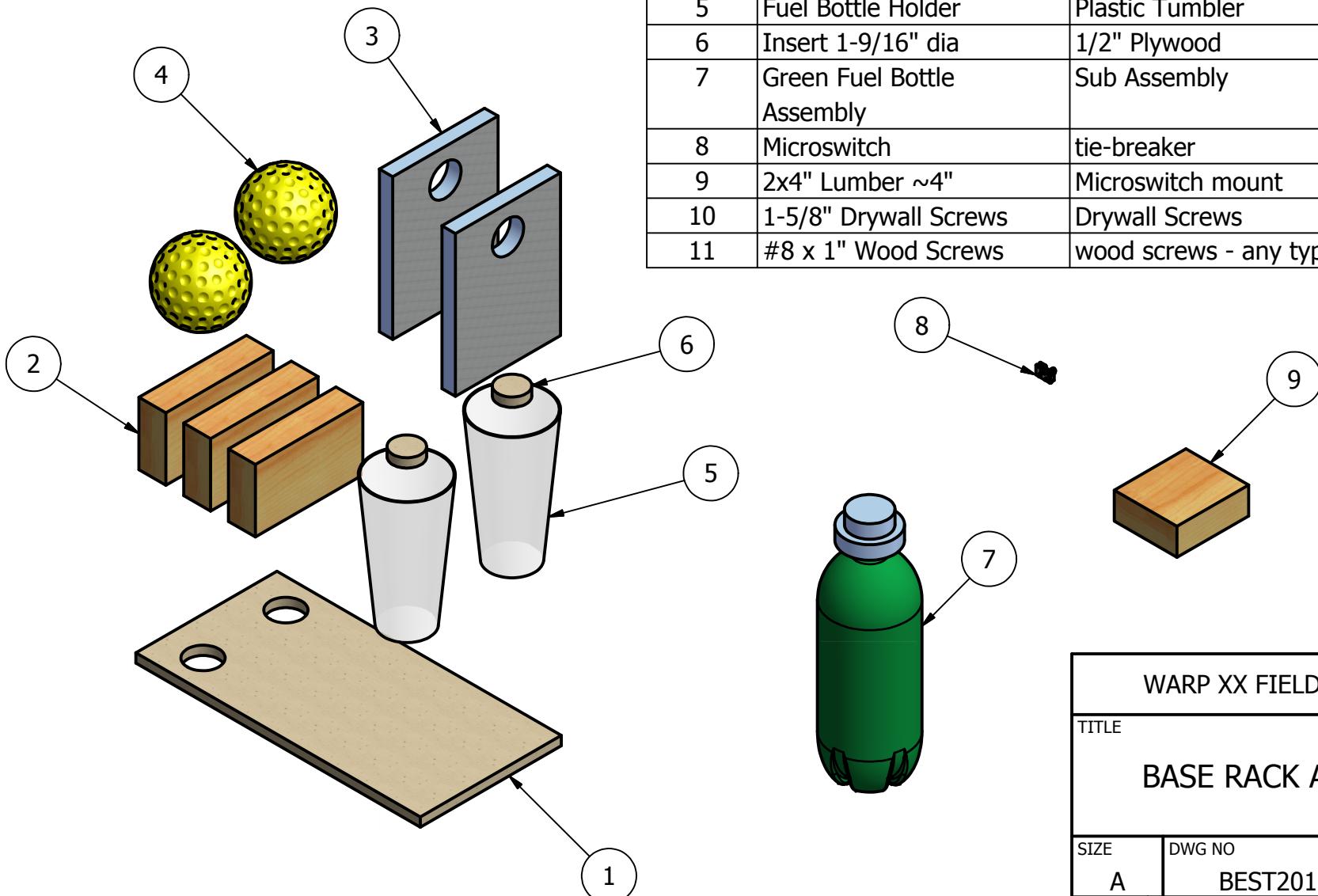
2

1

4 1 3 2 1

B

B



PARTS LIST			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	Base Rack	1/2" Plywood	4
2	Solar Panel Holder	2" x 4" Wood	12
3	Solar Panel	3/4" Foamboard	8
4	Waste Cargo Ball	4" Practice Softball	8
5	Fuel Bottle Holder	Plastic Tumbler	8
6	Insert 1-9/16" dia	1/2" Plywood	8
7	Green Fuel Bottle Assembly	Sub Assembly	4
8	Microswitch	tie-breaker	4
9	2x4" Lumber ~4"	Microswitch mount	4
10	1-5/8" Drywall Screws	Drywall Screws	~32
11	#8 x 1" Wood Screws	wood screws - any type	8

WARP XX FIELD DRAWINGS

TITLE

BASE RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-130

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 8

4 1 3 2 1

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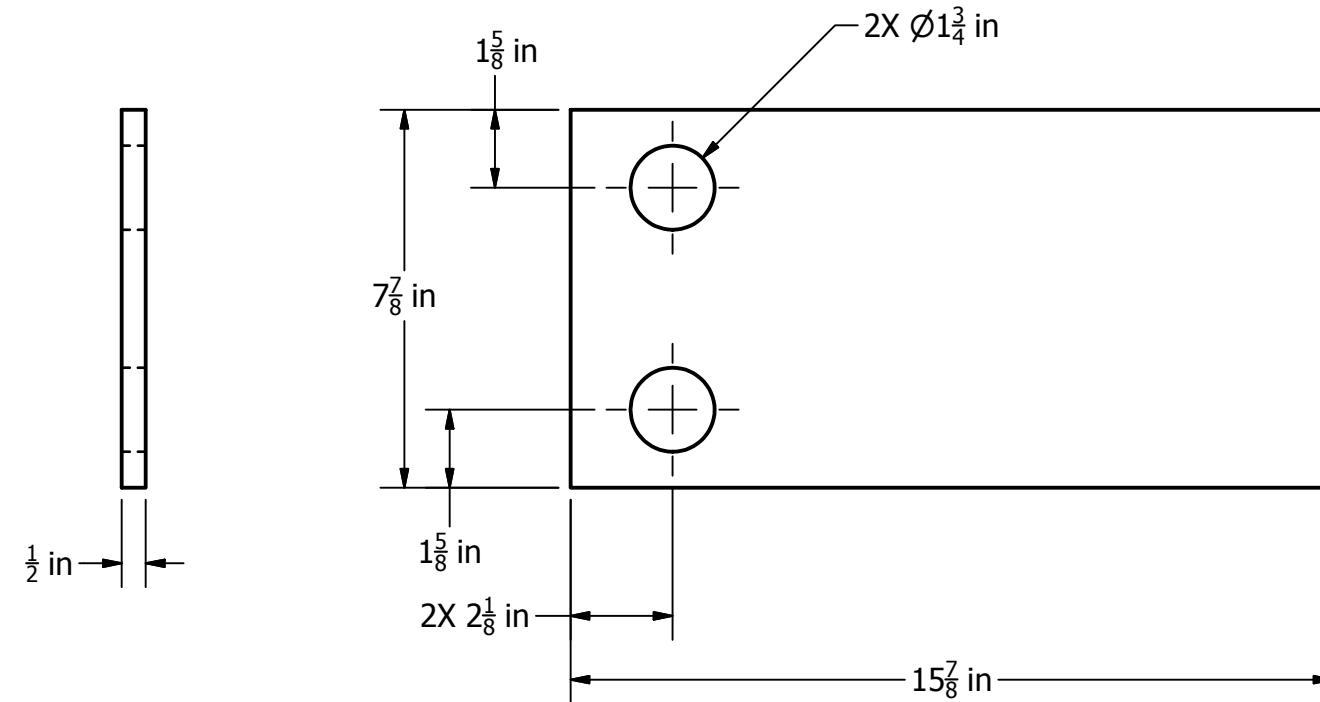
3

↓

2

1

B

**ITEM 1**

SCALE 1 : 4

Instructions:

1. Cut Item from $1/2"$ plywood sheet.
2. Cut two $1\frac{3}{4}"$ diameter holes in Item 1.
3. Save plywood cutouts for Item 6 to assemble fuel bottle holders.

WARP XX FIELD DRAWINGS		
TITLE		
BASE RACK ASSEMBLY		
SIZE A	DWG NO BEST2012-130	REV 1.1
SCALE DALLAS BEST	DRAWN DALLAS BEST	SHEET 3 OF 8

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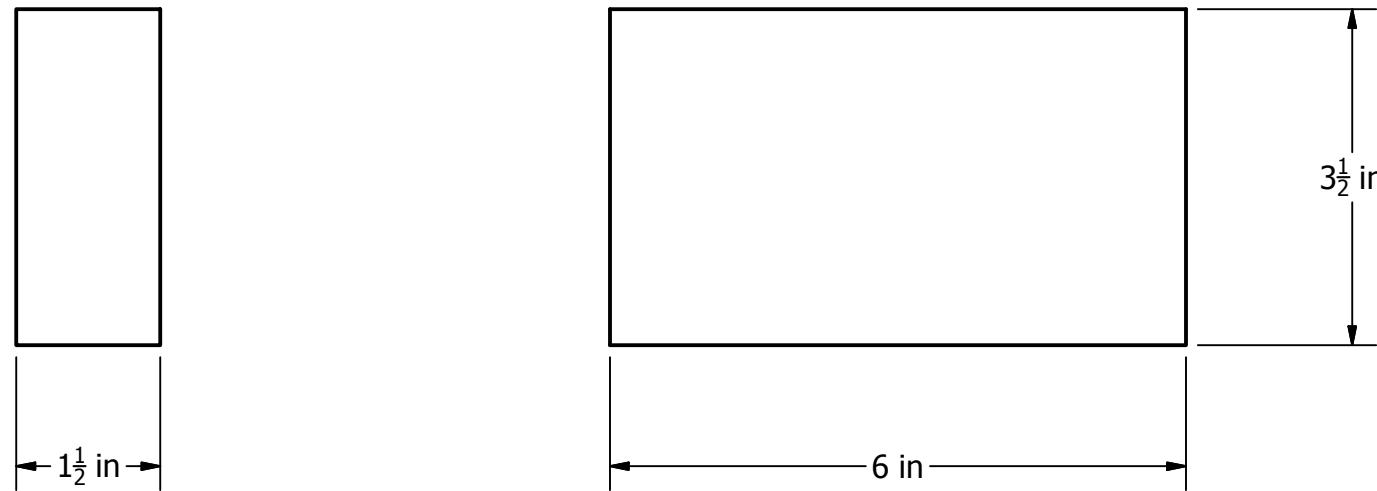
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B

B

**ITEM 2**

SCALE 1 : 2

Instructions:

1. Cut three 6" length boards from 2x4" lumber.
2. Attach to Item 1 with #6 x 1-5/8" wood screws per dimensions shown on Sheet 7.

WARP XX FIELD DRAWINGS

TITLE

BASE RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-130

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 8

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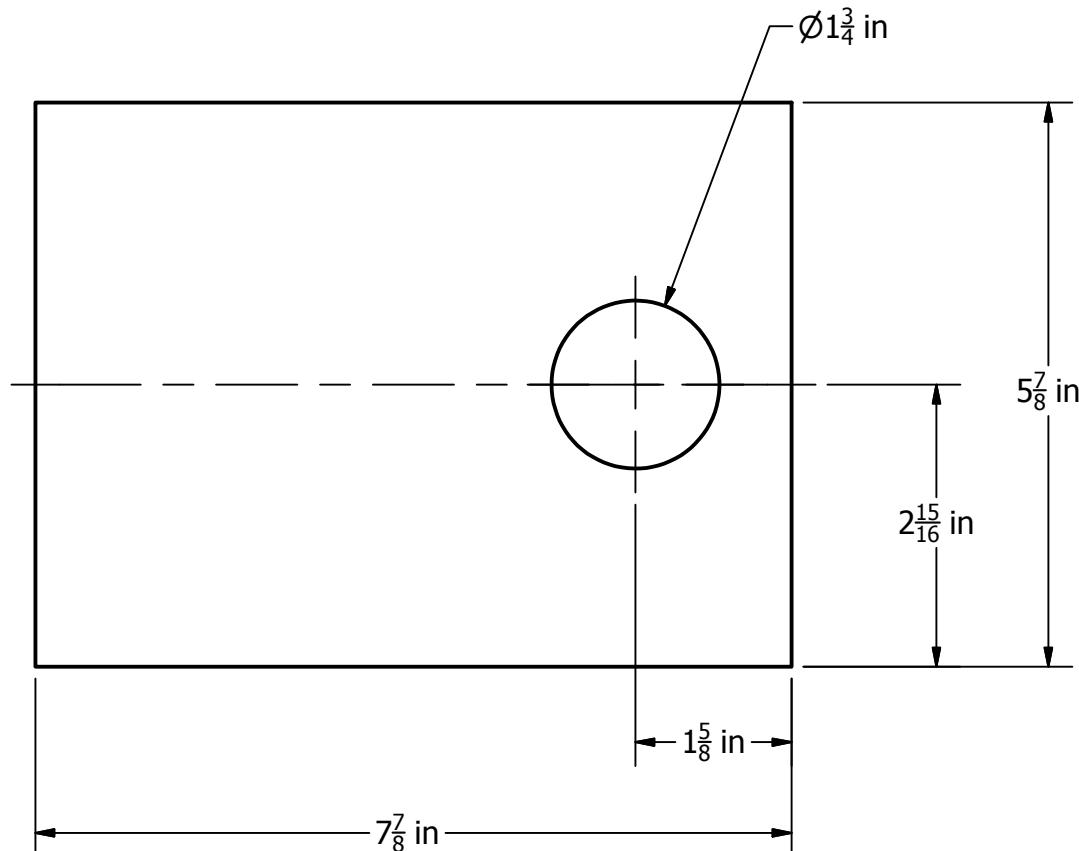
3



2

1

B

 $\frac{3}{4}$ in

ITEM 3
SCALE 1 : 2

Instructions:

1. Cut Solar Panel from 3/4" foamboard.
2. Cut hole in Solar Panel using 1-3/4" hole saw in portable drill. For best hole quality, set drill for reverse (unscrews) direction and drill only ~half-way through, then finish from the other side.
3. Cover cut edges with 2" clear packaging tape.

4

1

3

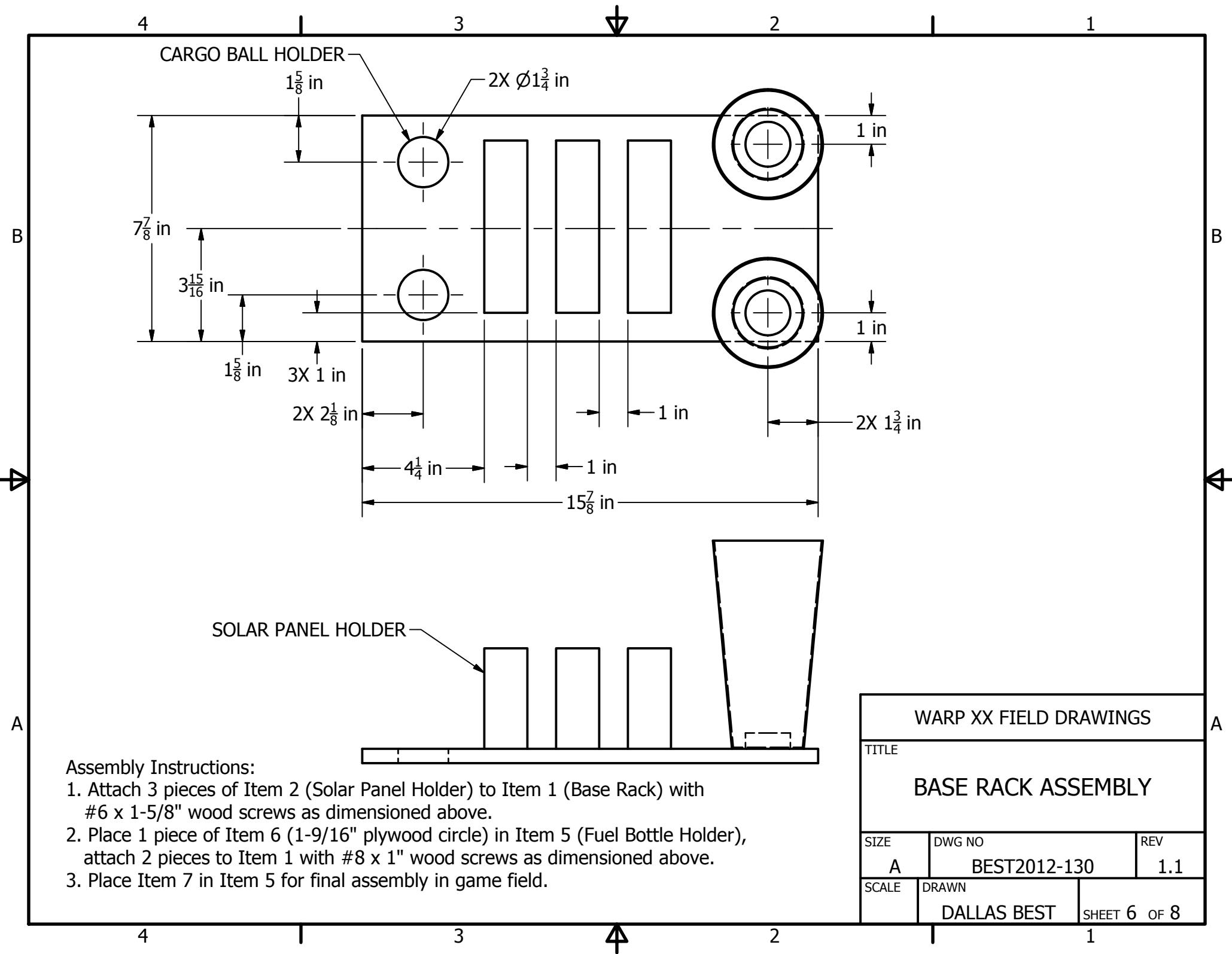


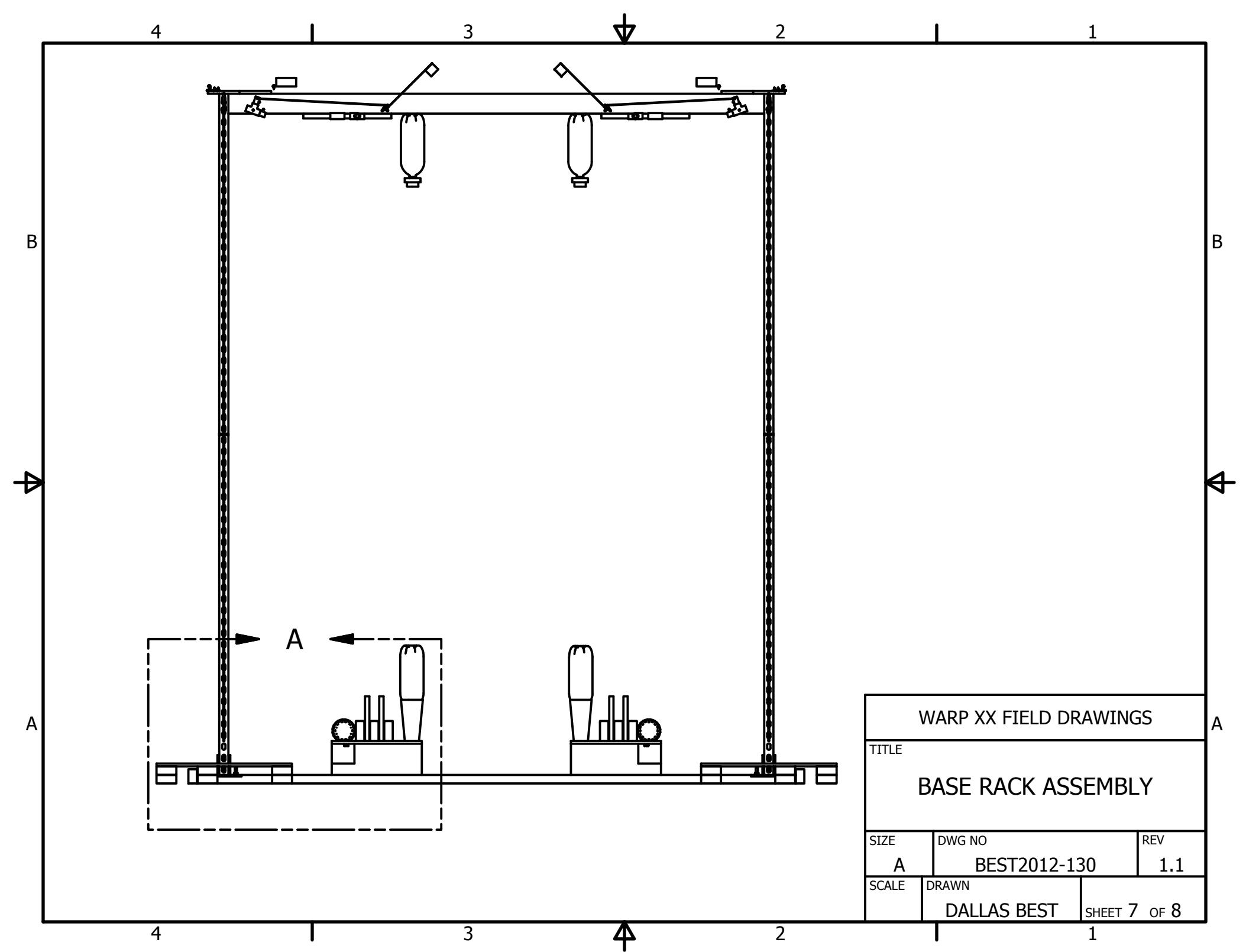
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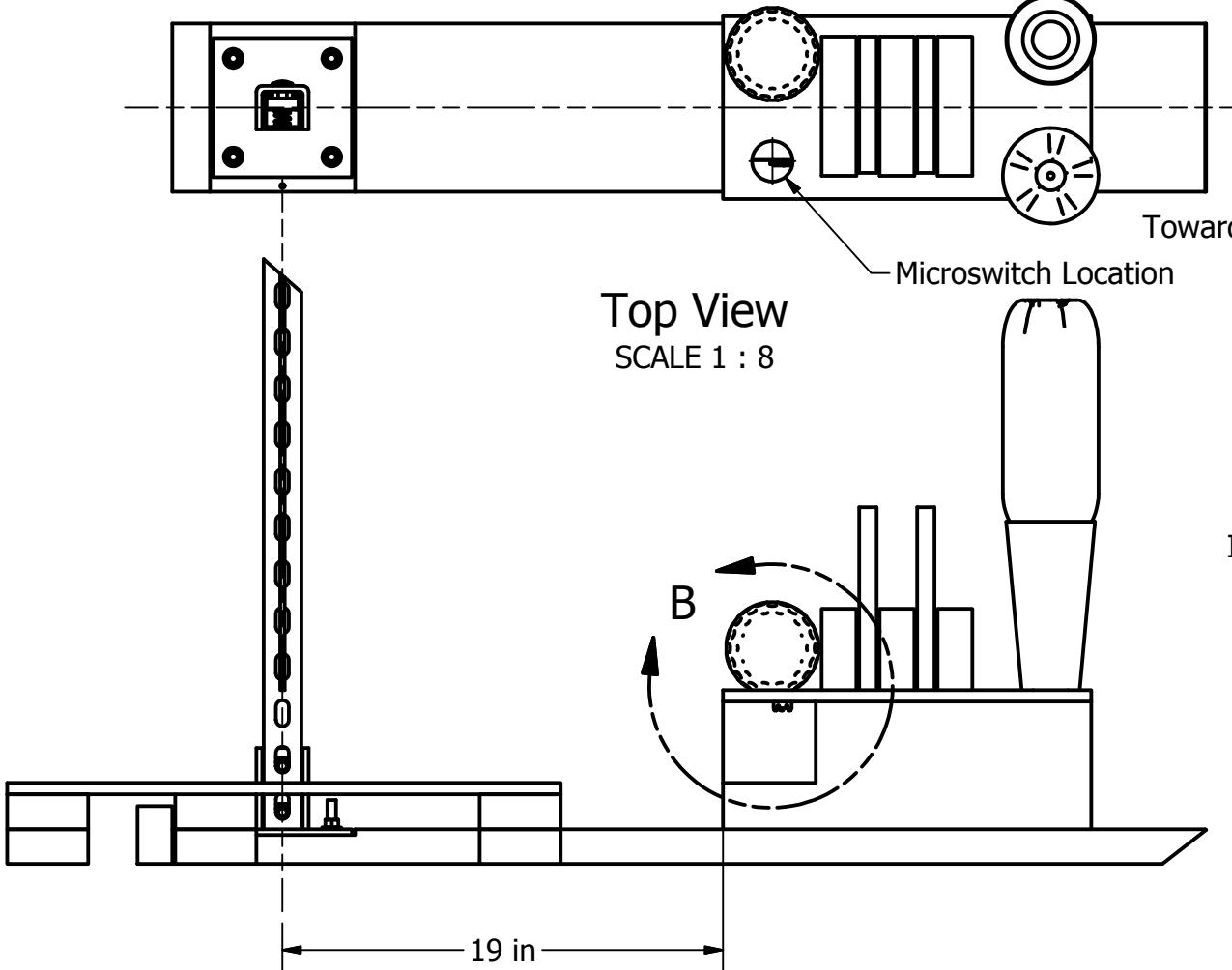
A

WARP XX FIELD DRAWINGS		
TITLE		
BASE RACK ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-130	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 5 OF 8



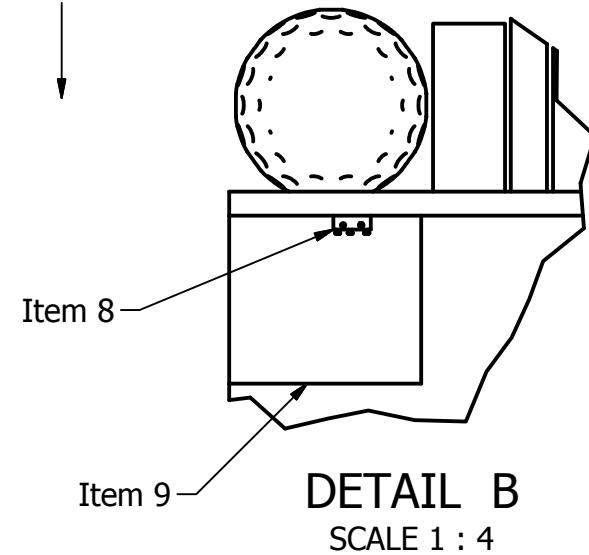


4 1 3 ↓ 2 1



Top View
SCALE 1 : 8

Towards Spotter



DETAIL B
SCALE 1 : 4

B

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A

DETAIL A
SCALE 1 : 8

Instructions:

1. Attach Base Rack Assembly to Base Rack Mount on Tower Assembly (see drawing BEST2012-100) with 1-5/8" drywall screws. Base Rack should be placed flush with mount lengthwise and centered across width. Base rack should be oriented such that waste cargo balls are closest to the robot platform.
2. Attach ~4" 2x4 wood piece (Item 9) with Microswitch (Item 8) attached so the microswitch aligns with hole in base rack closest to the spotter and the switch is tripped when a heavy cargo ball is on the rack.

WARP XX FIELD DRAWINGS

TITLE

BASE RACK ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-130

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 8 OF 8

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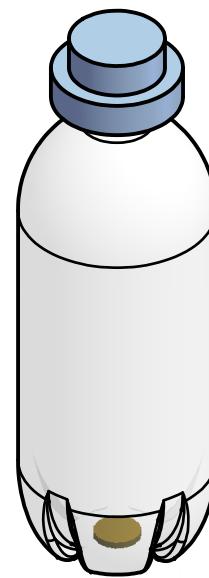
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WARP XX FIELD DRAWINGS

TITLE

FUEL BOTTLE ASSEMBLY

SIZE

A

DWG NO

BEST2012-130-1

REV

1.1

SCALE

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DALLAS BEST

SHEET 1 OF 4

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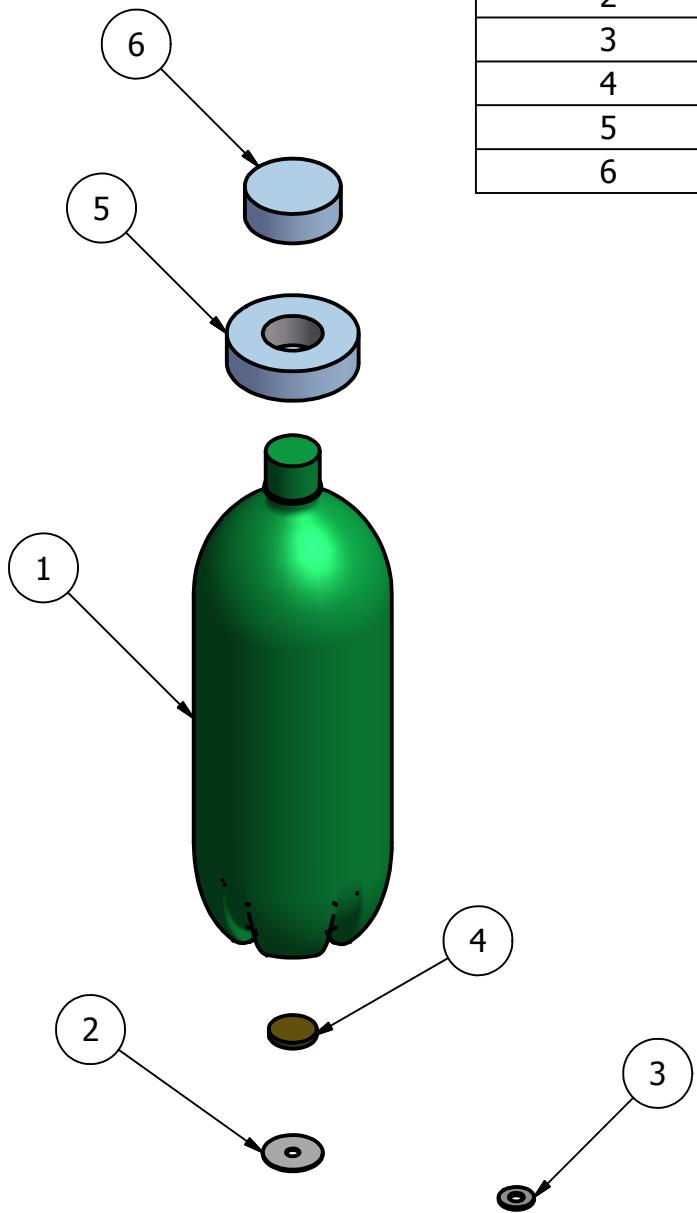
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PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	2-Liter Bottle	4 green & 4 clear bottles	8
2	1/4" Fender Washer	Washer for green bottles	4
3	1/4" Flat Washer	Washer for clear bottle	4
4	Cardboard Circle - 1" dia	Cardboard	8
5	Soft Hat Ring	3/4" Foamboard	8
6	Soft Hat Circle	3/4" Foamboard	8

A

A

WARP XX FIELD DRAWINGS

TITLE

FUEL BOTTLE ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-130-1

1.1

SCALE

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DALLAS BEST

SHEET 2 OF 4

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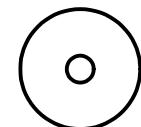
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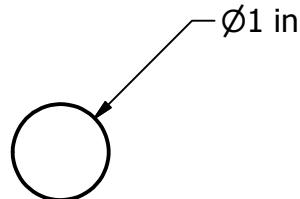
4 1 3 2 1



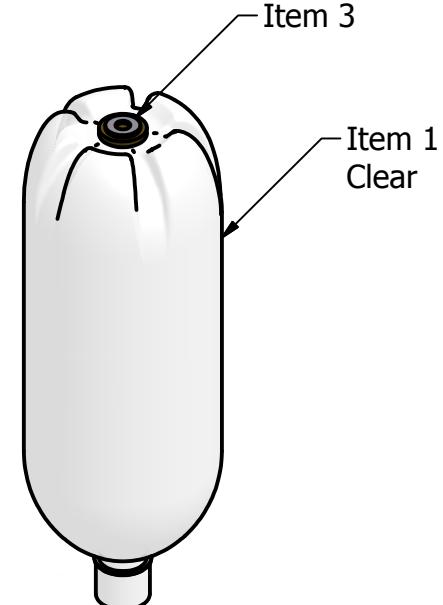
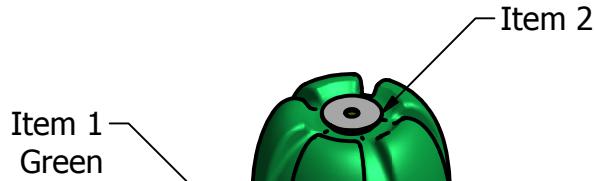
Item 2
SCALE 1 : 2



Item 3
SCALE 1 : 2



Item 4
SCALE 1 : 2



B

B

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A

A

Instructions:

1. Cut Item 4 from cardboard.
2. Glue Item 4 to bottom of Item 1 with contact cement.
3. Attach Item 2 (fender washer) to Item 1 (Green Bottles) by gluing to Item 3 with contact cement.
4. Attach Item 3 (flat washer) to Item 1 (Clear Bottles) by gluing to Item 3 with contact cement.

WARP XX FIELD DRAWINGS

TITLE

FUEL BOTTLE ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-130-1

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 4

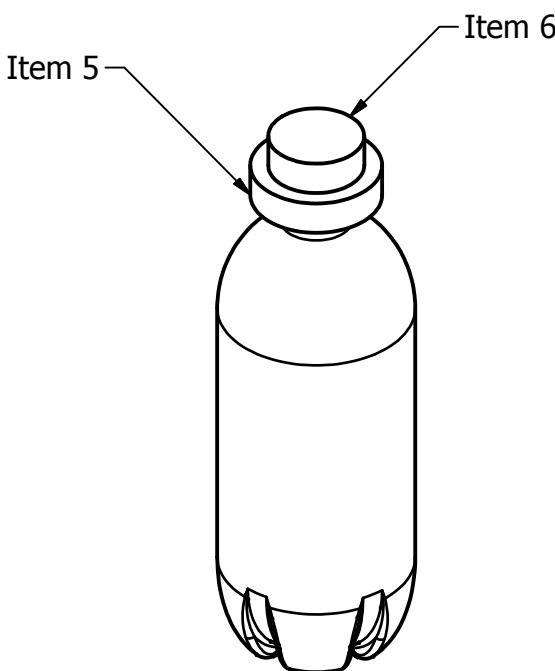
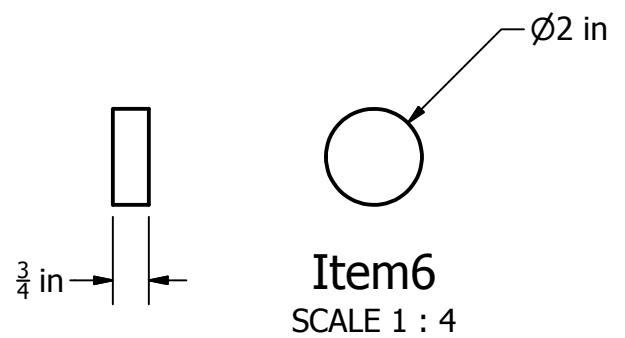
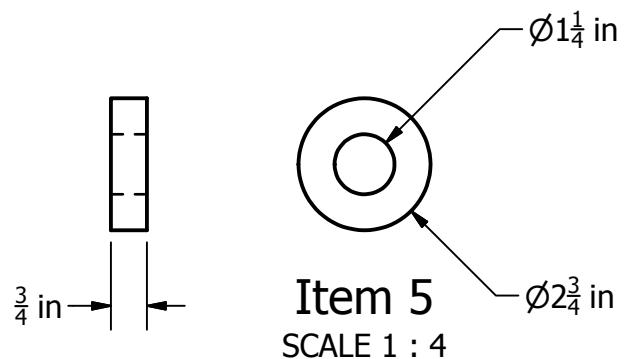
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4 | 3 | 2 | 1



Instructions:

1. Cut a 2-3/4" diameter circle from the foamboard.
2. Cut a 1-1/4" diameter hole in the center of this circle, making a doughnut (Item 5).
3. Cut a second circle 2" in diameter from the foamboard (Item 6).
4. Apply contact cement to the inside of the hole in the doughnut and push onto the pressurized bottle until it is flush with the top of the bottle cap.
5. When this is dry, use contact cement to attach the second circle to the center of the bottle/doughnut assembly.
6. Secure stack by covering with a 12" piece of clear packaging tape.

Note:

- Green fuel bottles insert into Base Rack Assembly (see drawing BEST2012-130).
- Clear fuel bottle attach to magnets on Midway Station Mounting Rack (see drawing BEST2012-100-1).

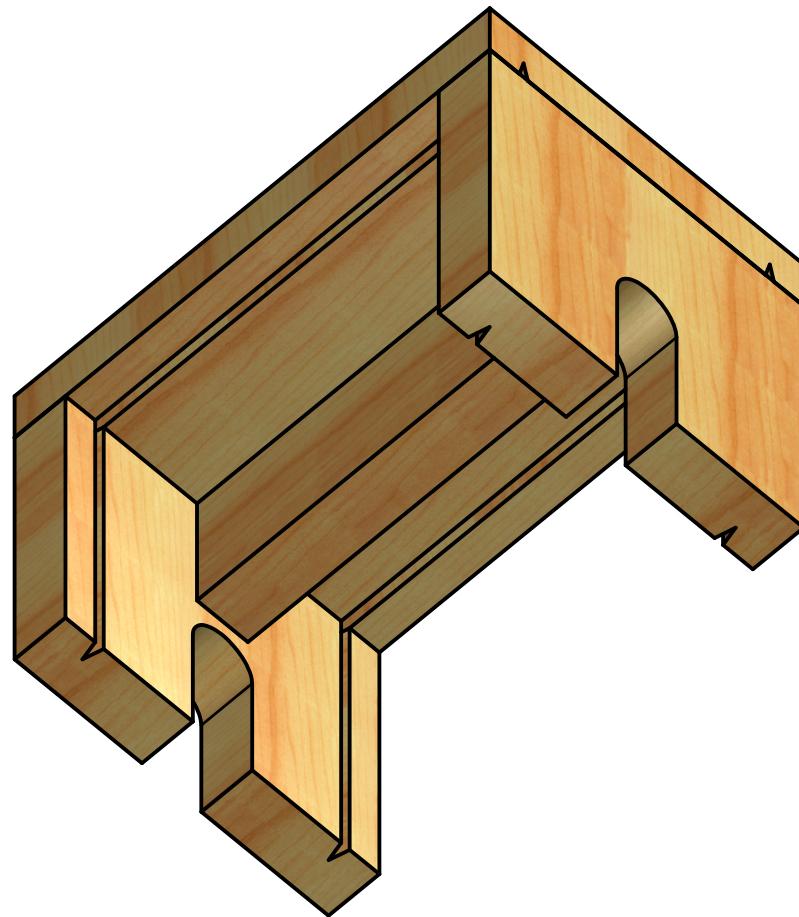
WARP XX FIELD DRAWINGS		
TITLE		
FUEL BOTTLE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-130-1	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 4

4 | 3 | 2 | 1

4 1 3 2 1

Spotter's Stool Assembly

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4 1 3 2 1

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S STOOL ASSEMBLY

SIZE

A

DWG NO

BEST2012-140

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 6

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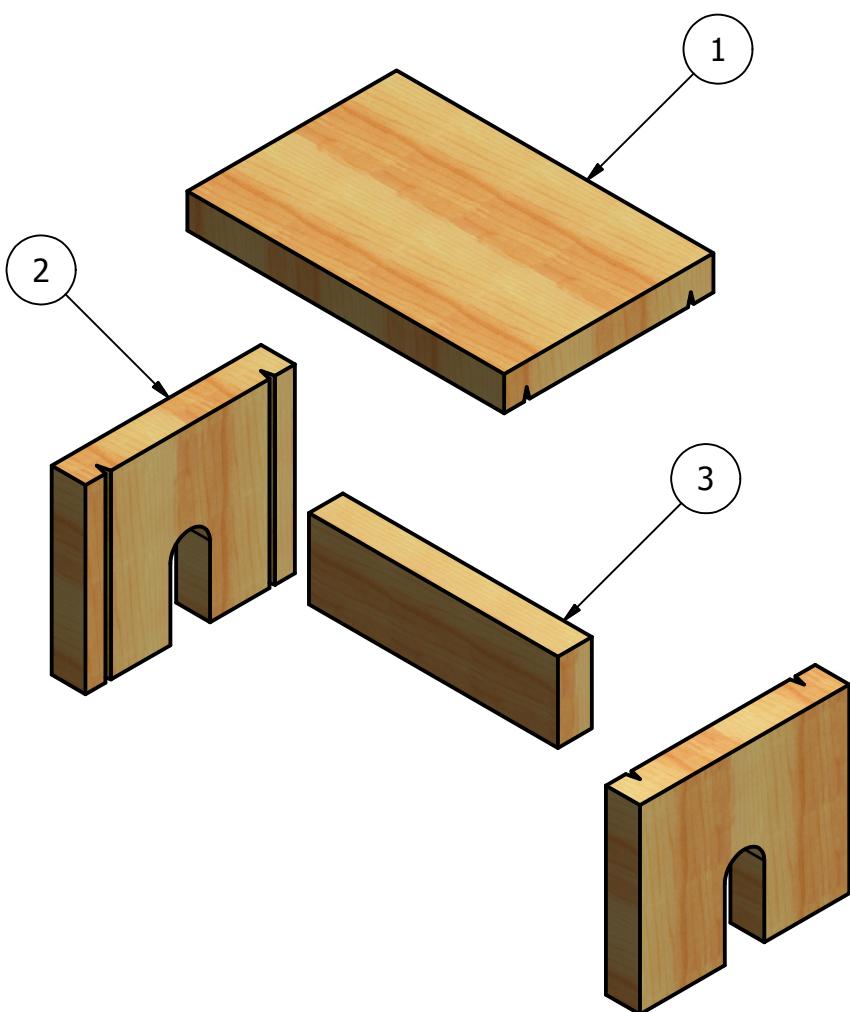
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PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Spotter Stool Seat	2" x 10" Lumber	4
2	Spotter Stool Leg	2" x 10" Lumber	8
3	Spotter Stool Support	2" x 4" Lumber	4



Note: All four stools can be cut from one 10' length of 2x10" lumber.

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S STOOL ASSEMBLY

SIZE

DWG NO
BEST2012-140

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 6

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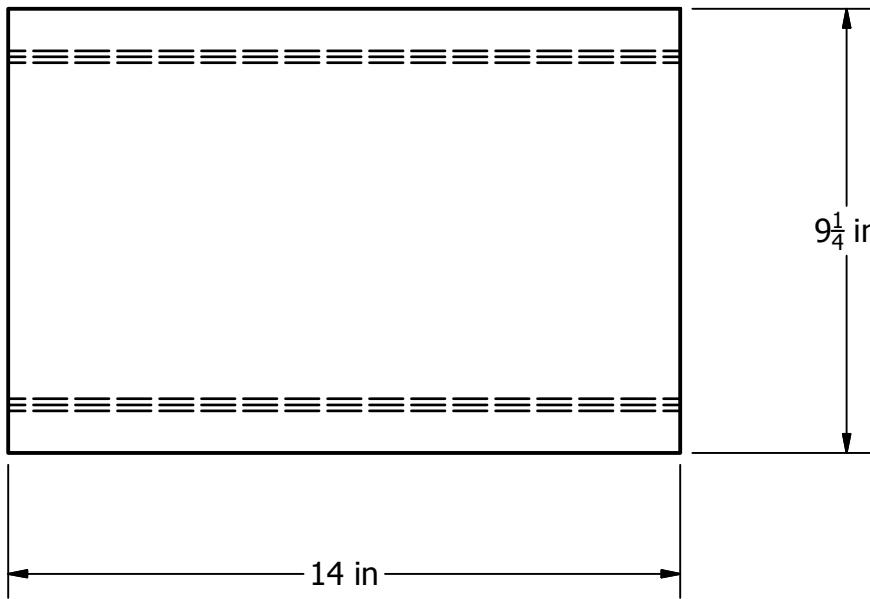
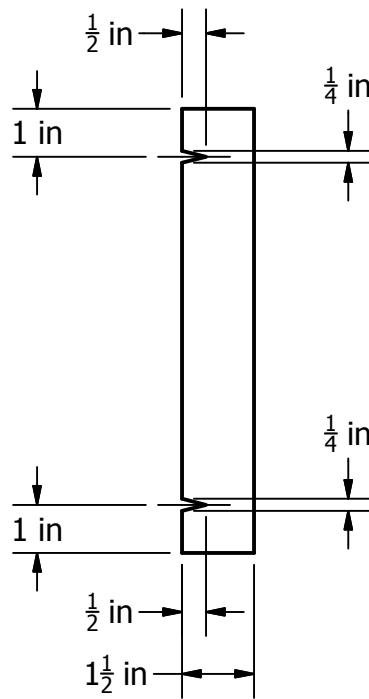
3

2

1

B

B



ITEM 1

SCALE 1 : 4

Instructions:

- Cut board from 2x10" lumber.

Optional: Finger groove entire board 1" from edge prior to cutting.

Instructions:

- Cut a V groove down the length of the board 1/2" deep by wide 1/2" deep at a distance of 1" away from both edges of the 10' 2x10", before making the other cuts. These will be on the underside of the stool and make it easier to carry securely.

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S STOOL ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-140

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 6

4

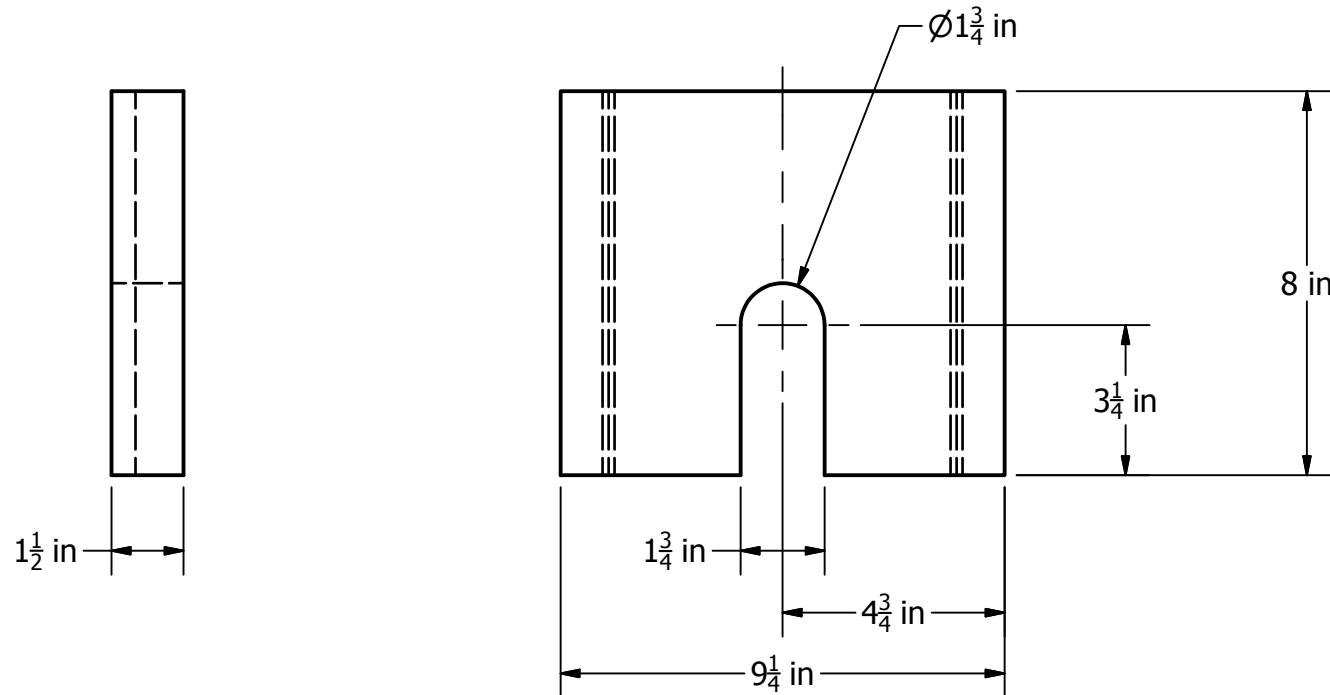
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4 | 3 | 2 | 1



ITEM 2

SCALE 1 : 4

A

Instructions:

1. Cut board from 2x10" lumber.
2. Cut 1-3/4" diameter hole cutout.

The U shape cutout in the feet allow the stools to stack leg to leg in half the space.

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S STOOL ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-140

1.1

SCALE

DRAWN

DALLAS BEST

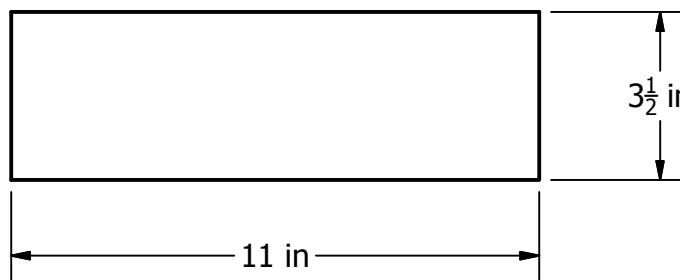
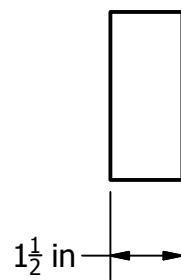
SHEET 4 OF 6

4 | 3 | 2 | 1

4 | 3 | 2 | 1

B

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ITEM 3
SCALE 1 : 4

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Instructions:

1. Cut board from 2x4" lumber.

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S STOOL ASSEMBLY

SIZE

A

DWG NO

BEST2012-140

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 5 OF 6

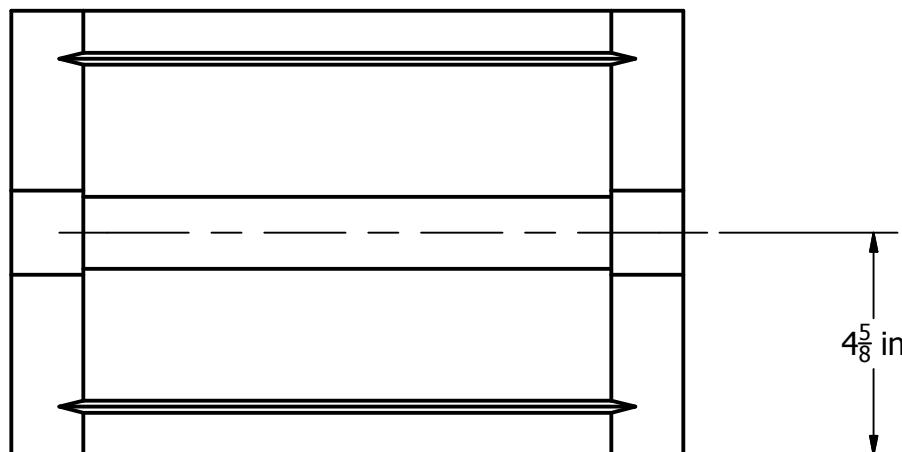
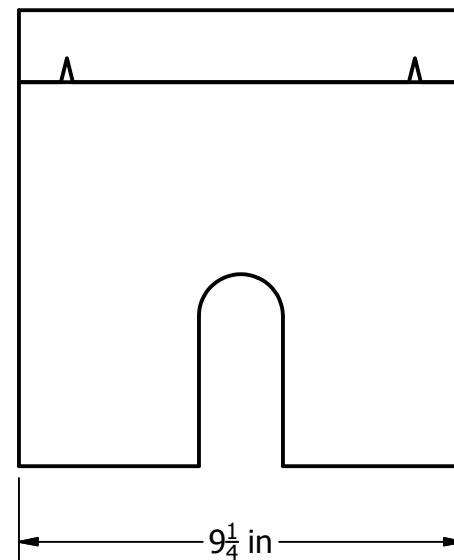
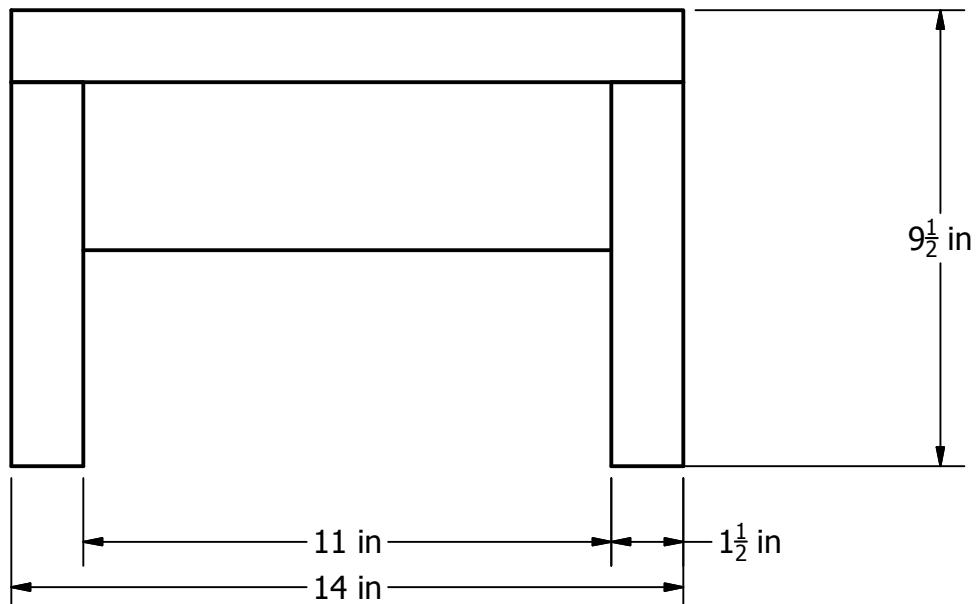
4 | 3 | 2 | 1

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4 | 3 | 2 | 1



Instructions:

1. Attach Item 2 to bottom of Item 1 at each end with 2-1/2" drywall screws.
2. Attach Item 3 to bottom of Item 1 along center line with 2-1/2" drywall screws.

WARP XX FIELD DRAWINGS		
TITLE		
SIZE A	DWG NO BEST2012-140	REV 1.1
SCALE DRAWN DALLAS BEST	SHEET 6 OF 6	1

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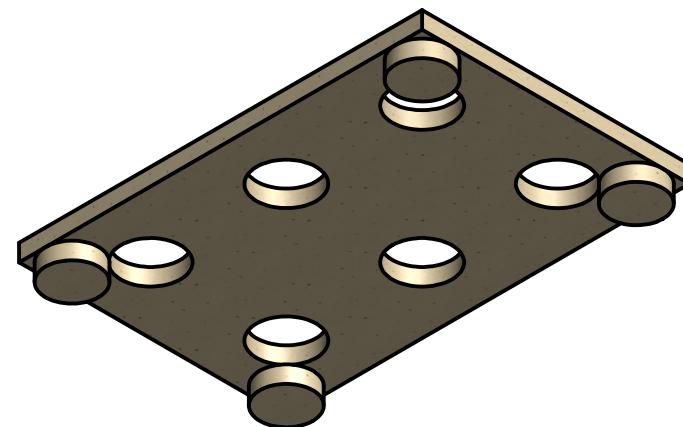
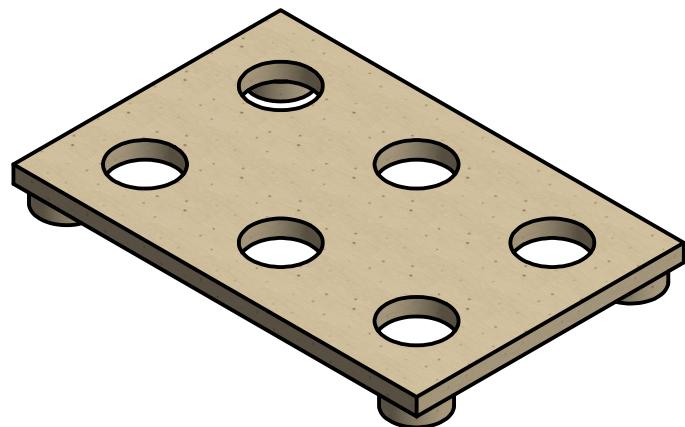
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Spotter's Rack Assembly



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WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-150

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 3

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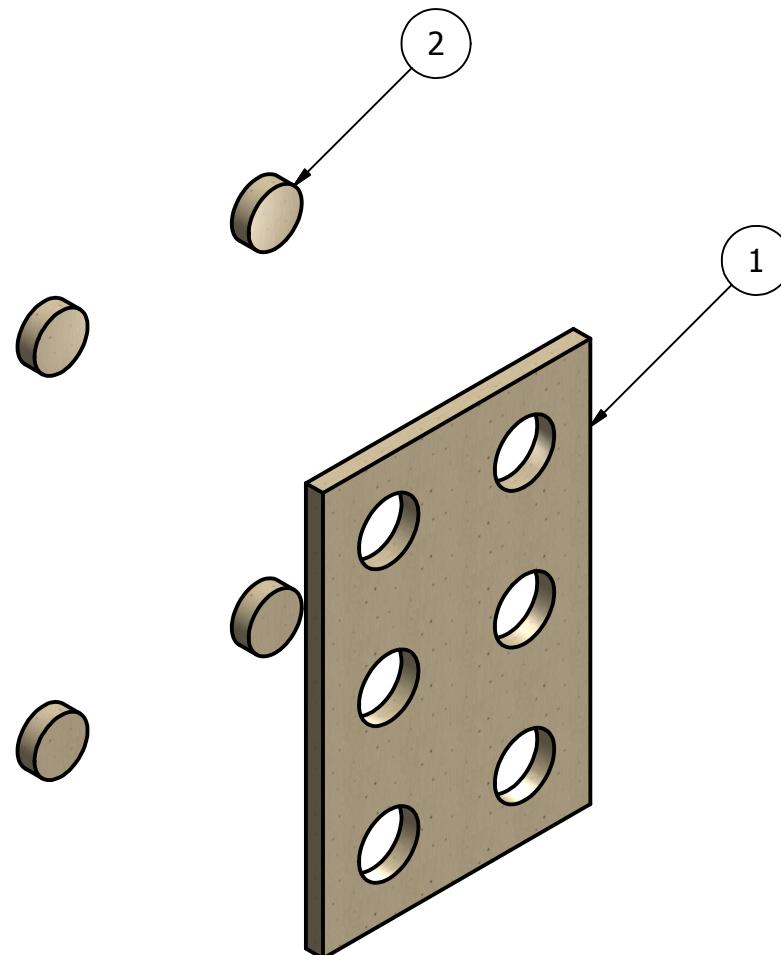
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**PARTS LIST**

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Spotter's Rack	1/2" Plywood	4
2	Spotter's Rack Foot	1/2" Plywood	16

WARP XX FIELD DRAWINGS

TITLE

SPOTTER'S RACK ASSEMBLY

SIZE

A

DWG NO

BEST2012-150

REV

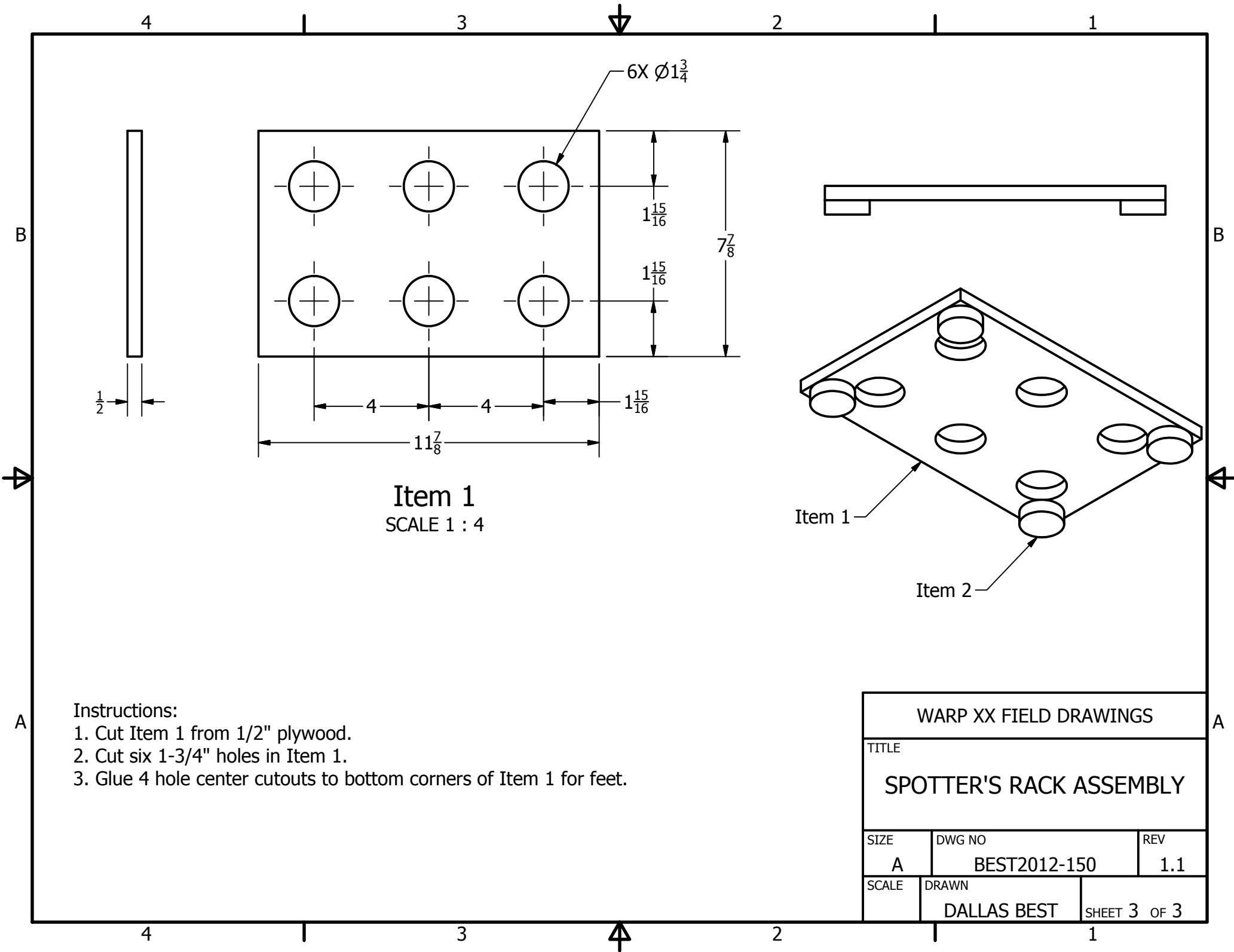
1.1

SCALE

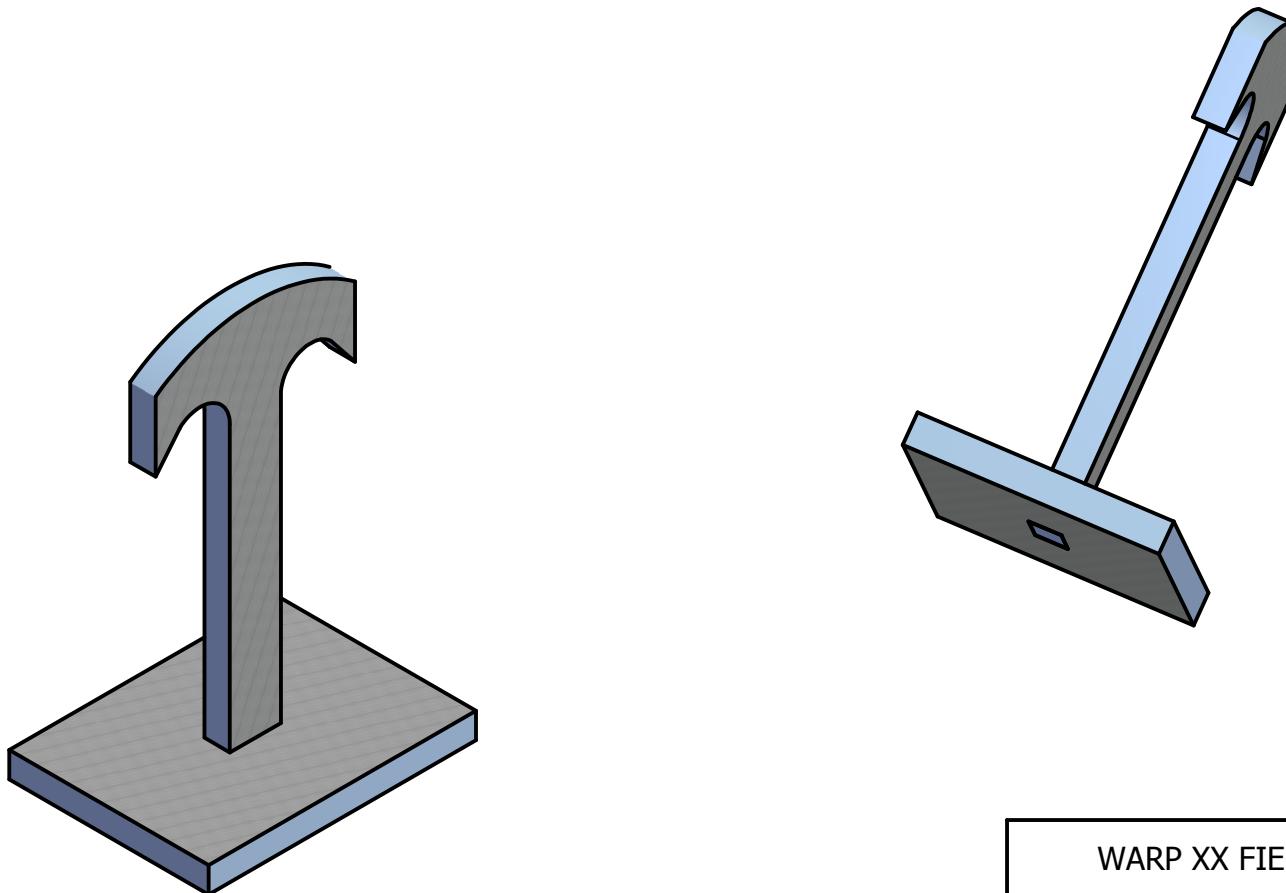
DRAWN

DALLAS BEST

SHEET 2 OF 3



T-Structure Assembly



WARP XX FIELD DRAWINGS		
TITLE		
T-STRUCTURE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-160	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 1 OF 4

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PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	T-Structure Base	3/4" Foamboard	4
2	T-Structure	3/4" Foamboard	4

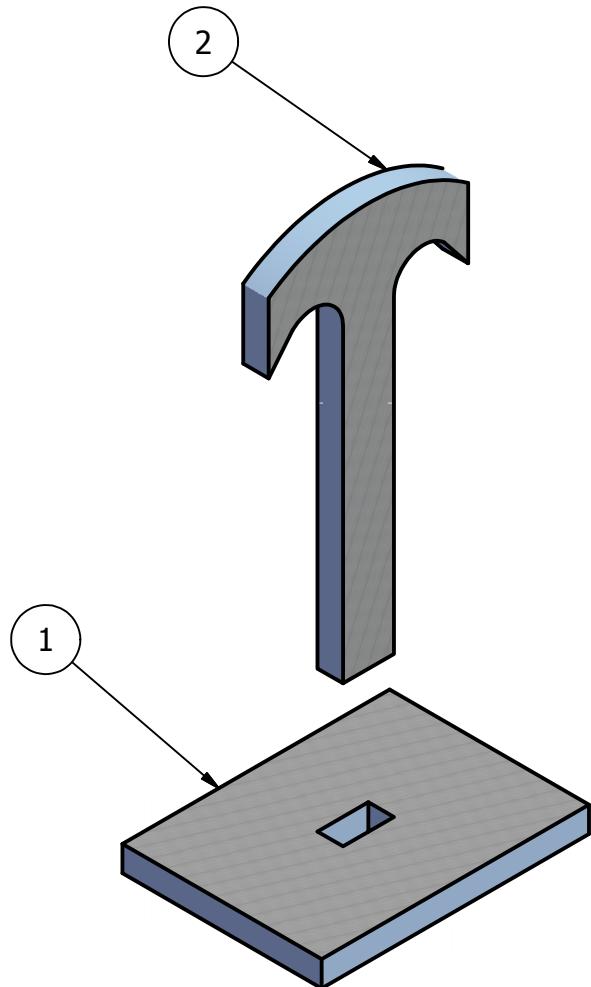
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WARP XX FIELD DRAWINGS

TITLE

T-STRUCTURE ASSEMBLY

SIZE

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DWG NO
BEST2012-160

REV

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SCALE

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DALLAS BEST

SHEET 2 OF 4

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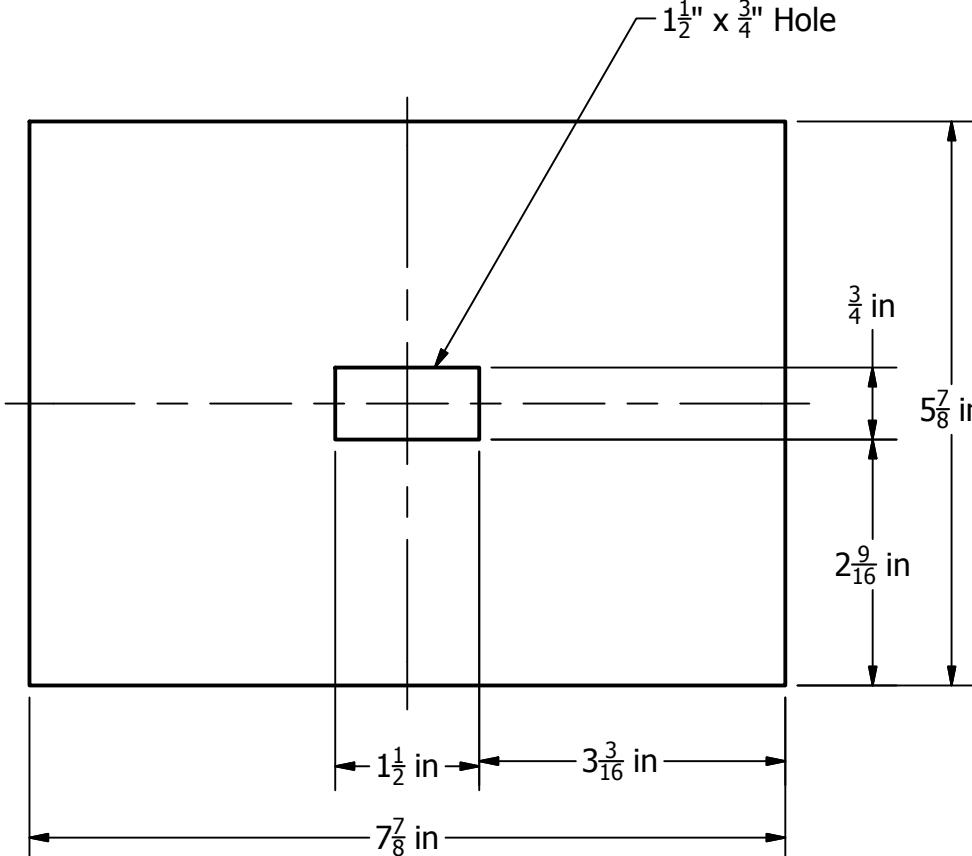
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$\frac{3}{4}$ in



ITEM 1

SCALE 1 : 2

A

Instructions:

1. Cut base from $\frac{3}{4}$ " foamboard.
2. Cut hole in center of foamboard base along the 8" length.
3. Cover cut edges with 2" clear packaging tape.

WARP XX FIELD DRAWINGS

TITLE

T-STRUCTURE ASSEMBLY

SIZE

A

DWG NO

BEST2012-160

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 4

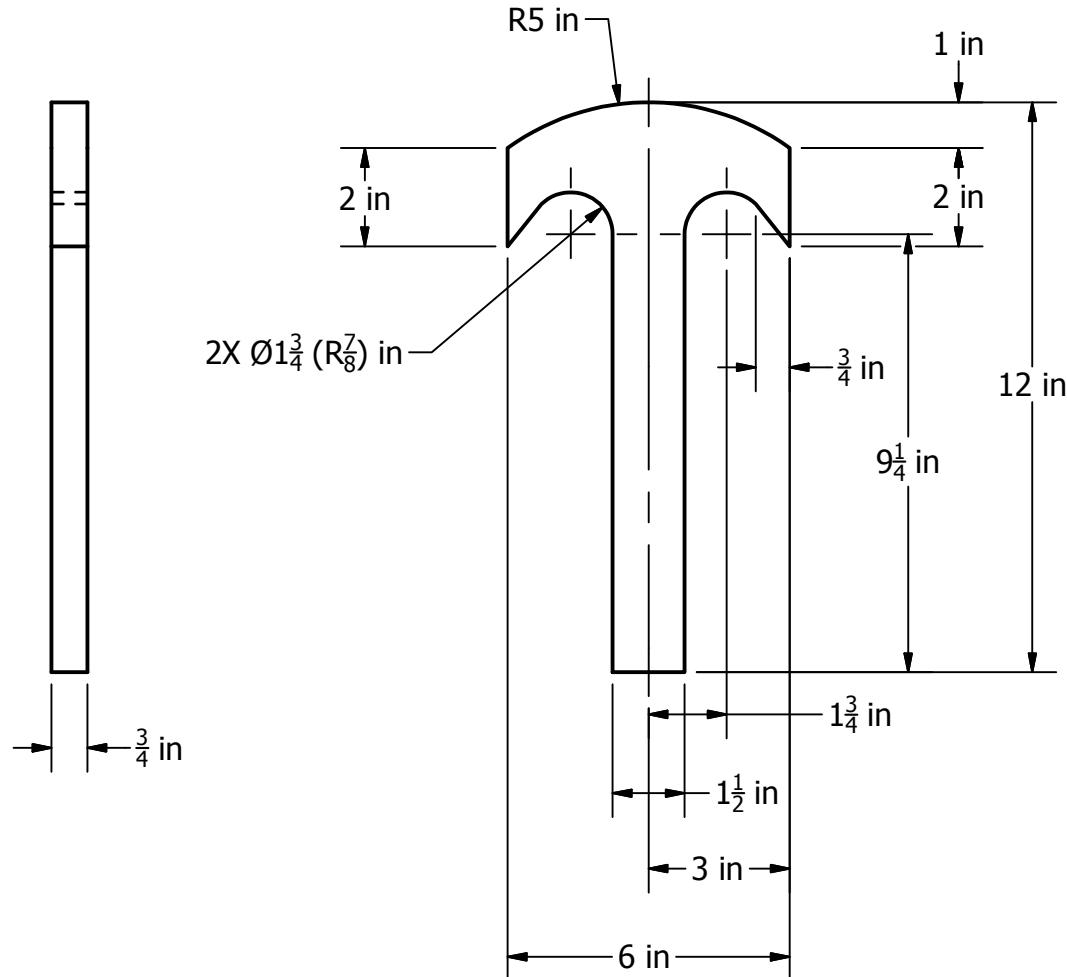
4 | 3 | 2 | 1

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4 3 2 1



ITEM 2

SCALE 1 : 4

Instructions:

1. Cut "T" shape out of 3/4" foamboard.
2. Glue Item 2 in hole of Item 1 with contact cement.
3. Cover cut edges with 2" clear packaging tape.

WARP XX FIELD DRAWINGS

TITLE

T-STRUCTURE ASSEMBLY

SIZE

A

DWG NO

BEST2012-160

REV

1.1

SCALE

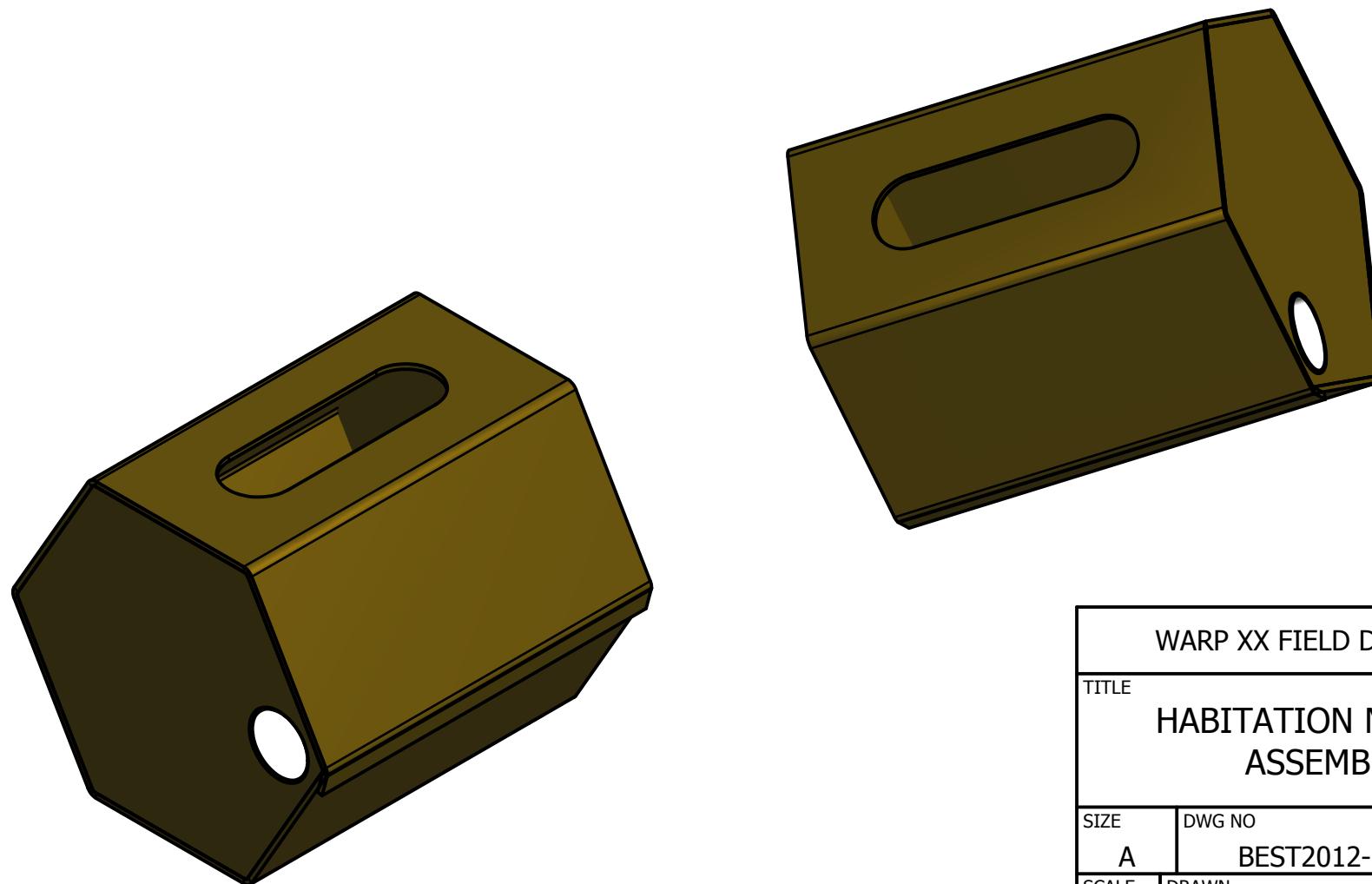
DRAWN

DALLAS BEST

SHEET 4 OF 4

4 3 2 1

Habitation Module Assembly



WARP XX FIELD DRAWINGS		
TITLE		
HABITATION MODULE ASSEMBLY		
SIZE A	DWG NO BEST2012-170	REV 1.1
SCALE DALLAS BEST	DRAWN DALLAS BEST	SHEET 1 OF 7

4

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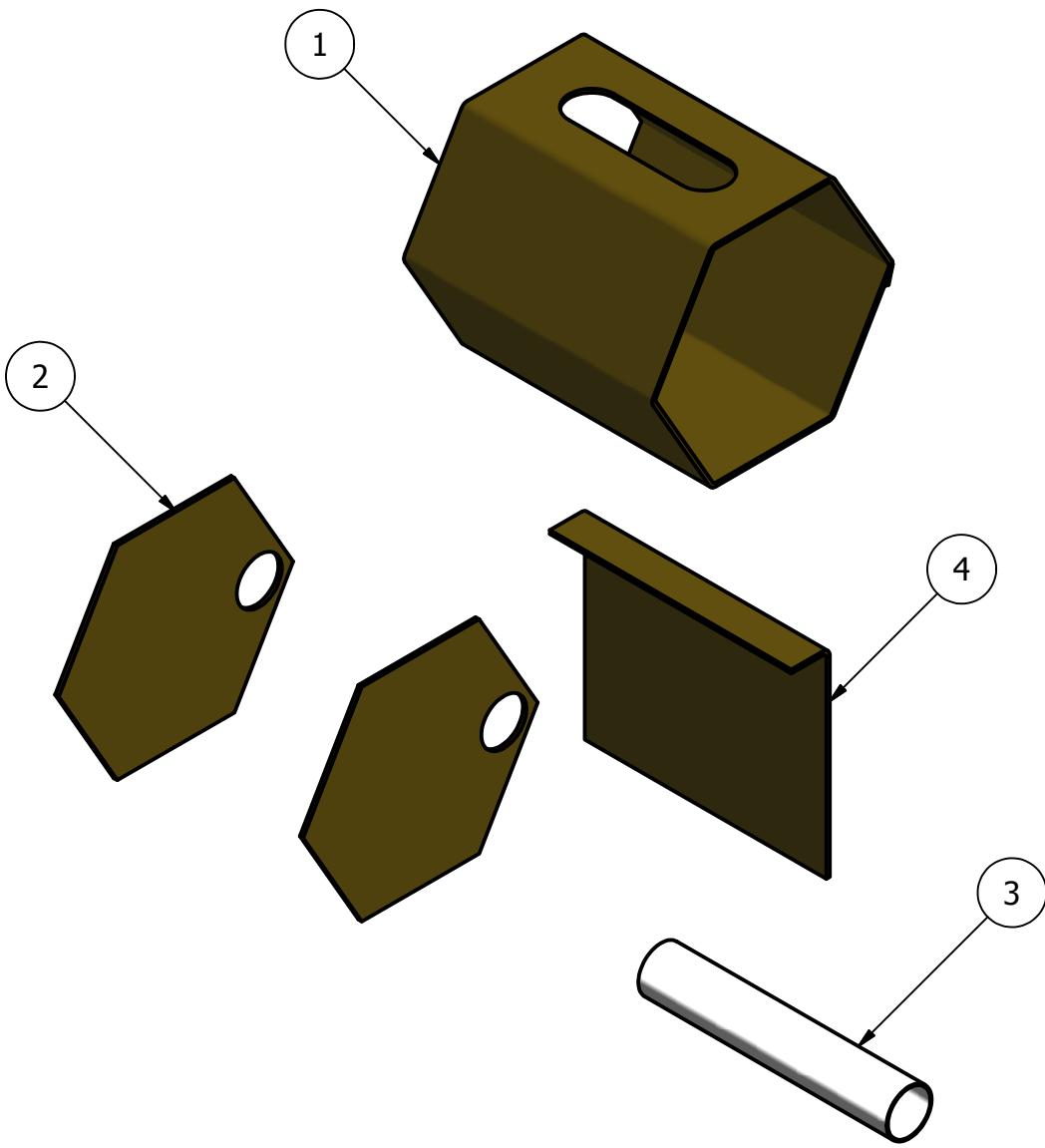
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PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	Habitation Module Shell	Cardboard	4
2	Habitation Module Endcap	Cardboard	8
3	2" Paper Tube	11x14" Paper, rolled & glued	4
4	Tube Protection Flap	Cardboard	4

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WARP XX FIELD DRAWINGS

TITLE

HABITATION MODULE
ASSEMBLY

SIZE

DWG NO

REV

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BEST2012-170

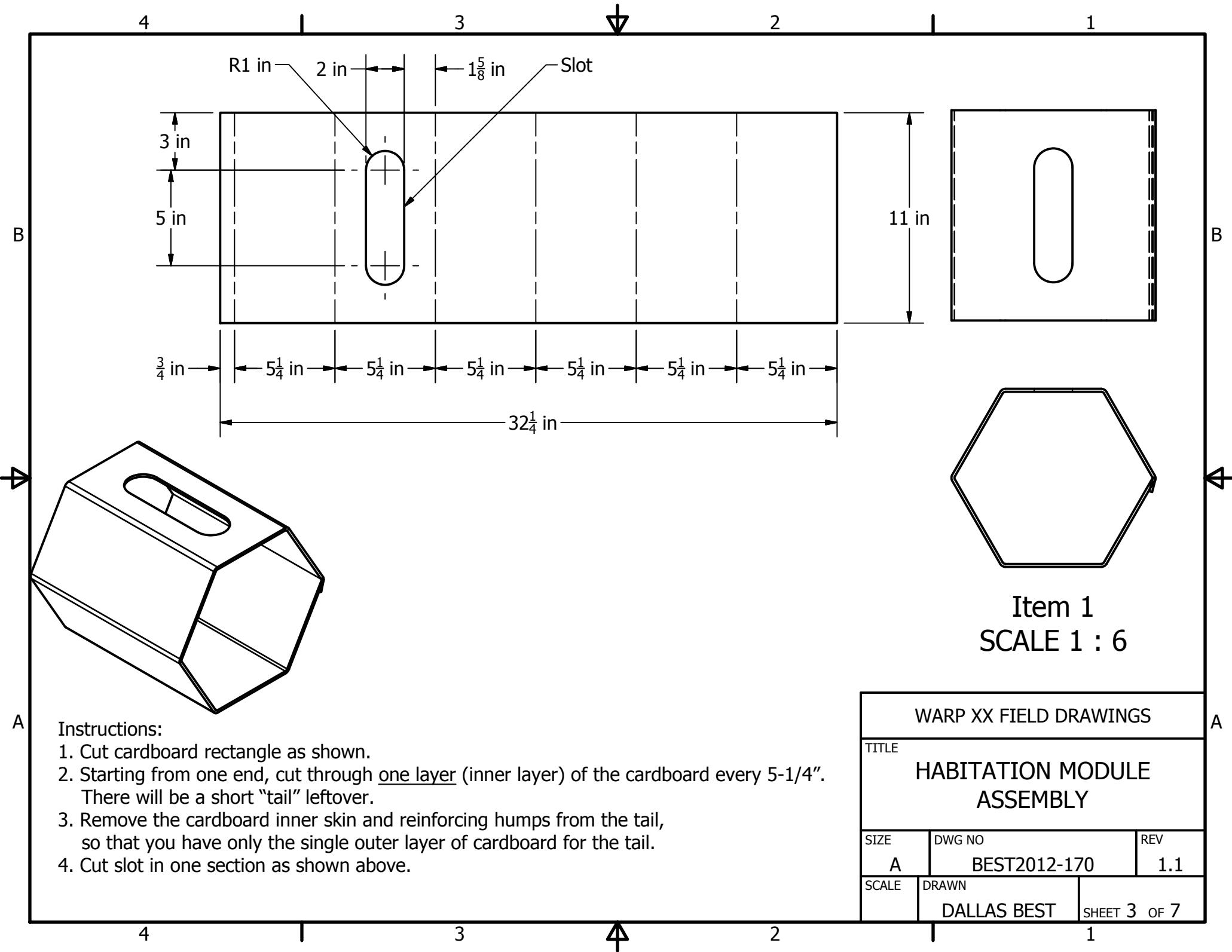
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SCALE

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DALLAS BEST

SHEET 2 OF 7



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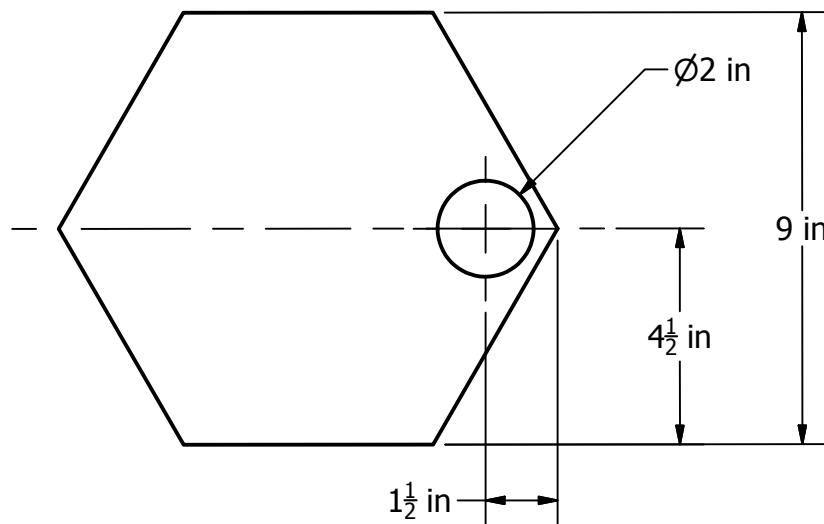


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**ITEM 2**

SCALE 1 : 4

Instructions:

1. Cut 2 hexagons from cardboard, cutting 1 hole in each.

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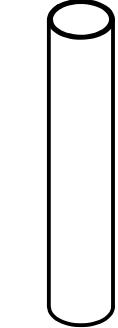
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WARP XX FIELD DRAWINGS		
TITLE		
HABITATION MODULE ASSEMBLY		
SIZE	DWG NO	REV
A	BEST2012-170	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 7



Item 3

SCALE 1 : 6

11x14" Paper

11 in

1 in
overlap

14 in



1-1/2" PVC Pipe

0 in



Roll Paper

A Paper Tube hand-rolling instructions:

1. To form one HM tube, glue two sheets of 11x14" paper together with 1" overlap along the 11" edge to make one sheet 11x27".
2. Use the 2' piece of 1-1/2" PVC pipe as a rolling form; it is 1.91" in diameter. Roll the 11x27" paper along the 11" edge, while gluing the overlap, to make a ~6 layer 11" long tube.

WARP XX FIELD DRAWINGS

TITLE

**HABITATION MODULE
ASSEMBLY**

SIZE

A

DWG NO

BEST2012-170

REV

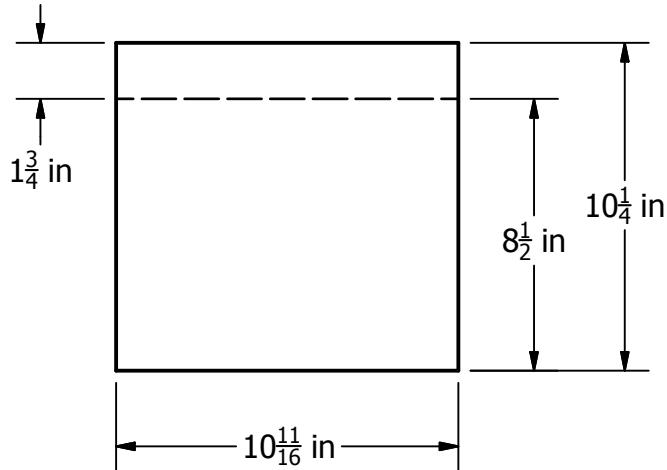
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SCALE

DRAWN

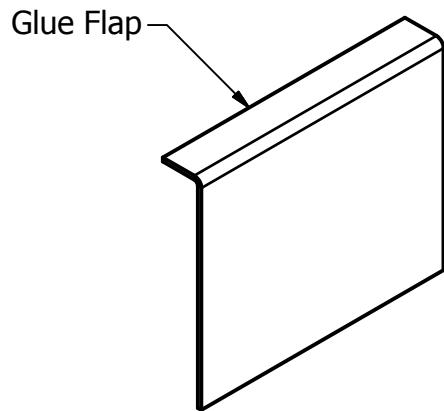
DALLAS BEST

SHEET 5 OF 7



Item 4

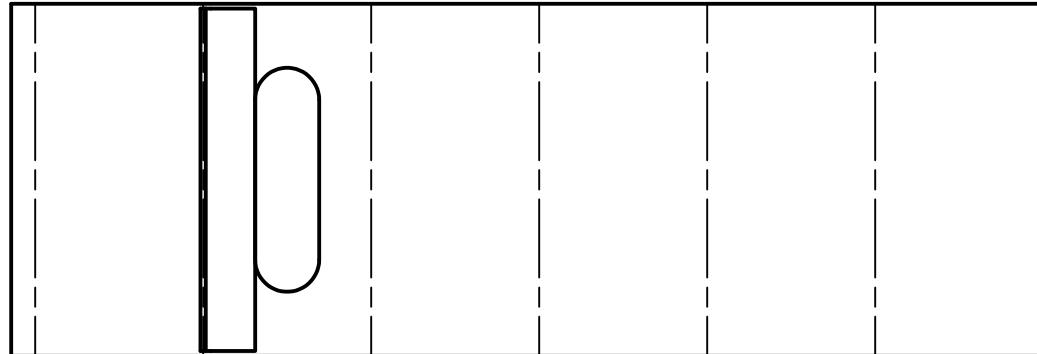
SCALE 1 : 6



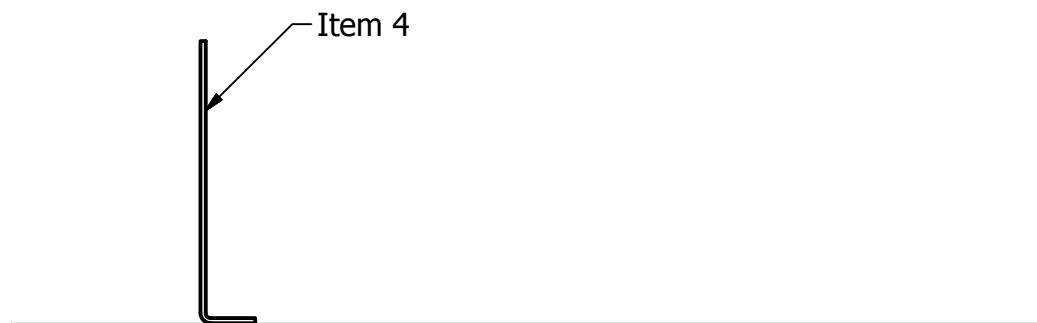
Instructions:

1. Cut Item 4 from cardboard.
2. Fold 1-3/4" edge to serve as a gluing flap.
3. Glue flap to top of slot in Item 1 to double the thickness of the top of the slot.

The rectangle provides a roof for the slot and protects the tube.



Item 1



WARP XX FIELD DRAWINGS

TITLE

HABITATION MODULE
ASSEMBLY

SIZE

A

DWG NO

BEST2012-170

REV

1.1

SCALE

DRAWN

DRAWN

DALLAS BEST

SHEET 6 OF 7

4

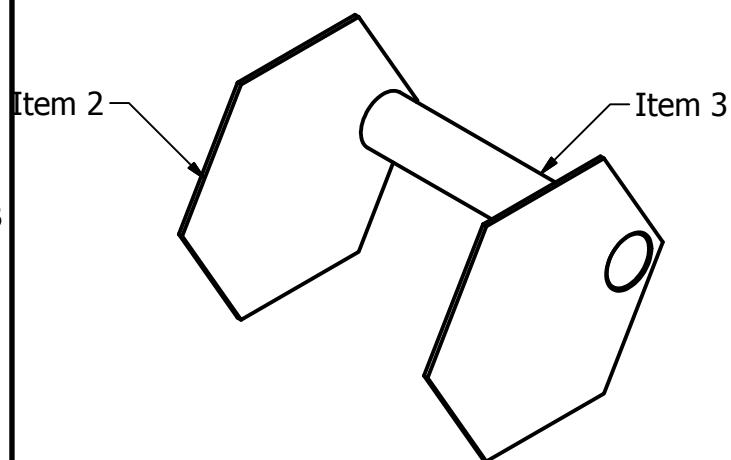
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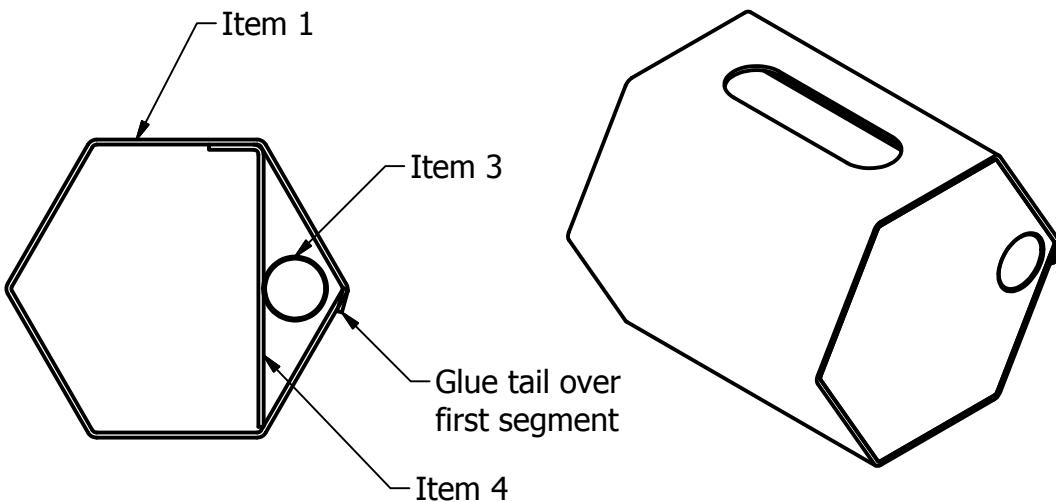
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View 1

SCALE 1 : 6



VIEW 2

SCALE 1 : 6

Item 2 omitted for clarity

Assembly Instructions

1. Fit Item 3 to hole in one piece of Item 2.
2. Use hot glue to hold in place, with a fillet on the inner part of the joint.
3. Begin from the point nearest the tube, and attach Item 1 (rectangle) to the Item 2 (hexagon) sides with hot melt glue (if you use other glue, wait for glue to set between attaching each face).
4. At the end of the last side, lay the tail over the first segment and glue in place.

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WARP XX FIELD DRAWINGS		
TITLE		
HABITATION MODULE		
	ASSEMBLY	
SIZE	DWG NO	REV
A	BEST2012-170	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 7 OF 7

4

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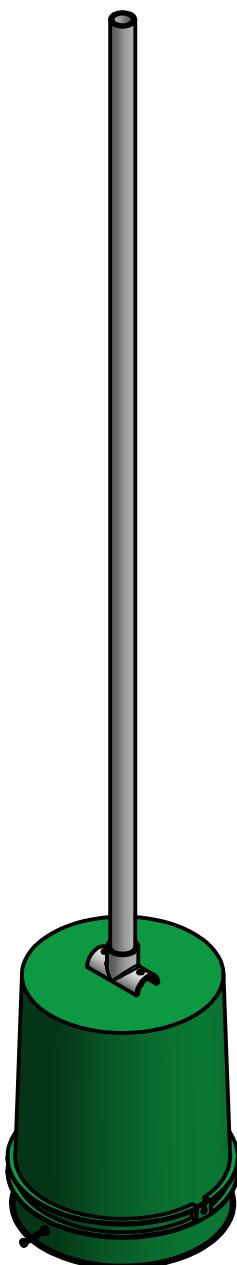
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Field Reset Bucket Assembly

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WARP XX FIELD DRAWINGS

TITLE

FIELD RESET BUCKET
ASSEMBLY

SIZE

A

DWG NO

BEST2012-180

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 4

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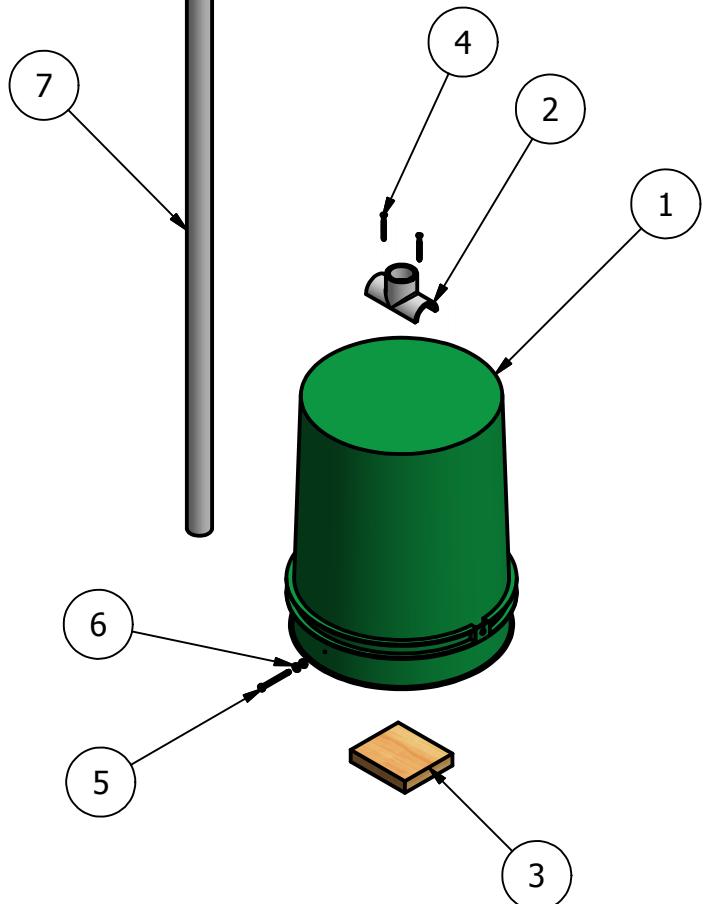
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2

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PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	5 Gallon Bucket	Bucket	2
2	1" PVC Tee	1" PVC	2
3	1x4" Lumber ~4"	Wood for screw attach	4
4	1-5/8" Drywall Screws	Drywall Screw	4
5	8-32 x2" Round Head Machine Screw	Machine Screw	2
6	8-32 Hex Nut	Hex Nut	4
7	1" PVC Pipe - 60"	1" PVC Pipe	2

4

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WARP XX FIELD DRAWINGS		
TITLE		
FIELD RESET BUCKET ASSEMBLY		
SIZE A	DWG NO BEST2012-180	REV 1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 2 OF 4

4

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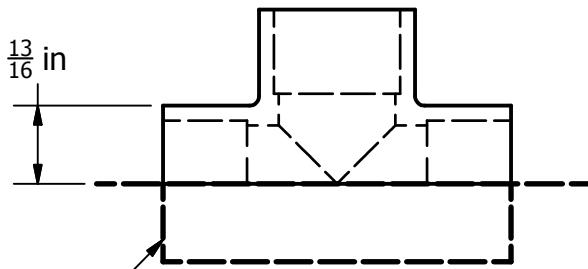
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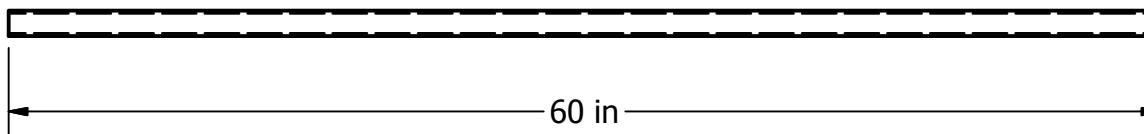
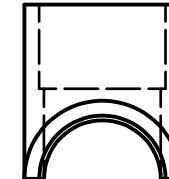
B

B



Cut off bottom half of PVC pipe

Item 2
SCALE 1 : 2



Item 3
SCALE 1 : 10

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A

A

Instructions:

1. Cut off bottom half of PVC Tee for Item 2 as shown above.
2. Cut Item 2 from 1" PVC Pipe.

WARP XX FIELD DRAWINGS

TITLE

**FIELD RESET BUCKET
ASSEMBLY**

SIZE

A

DWG NO

BEST2012-180

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 4

4

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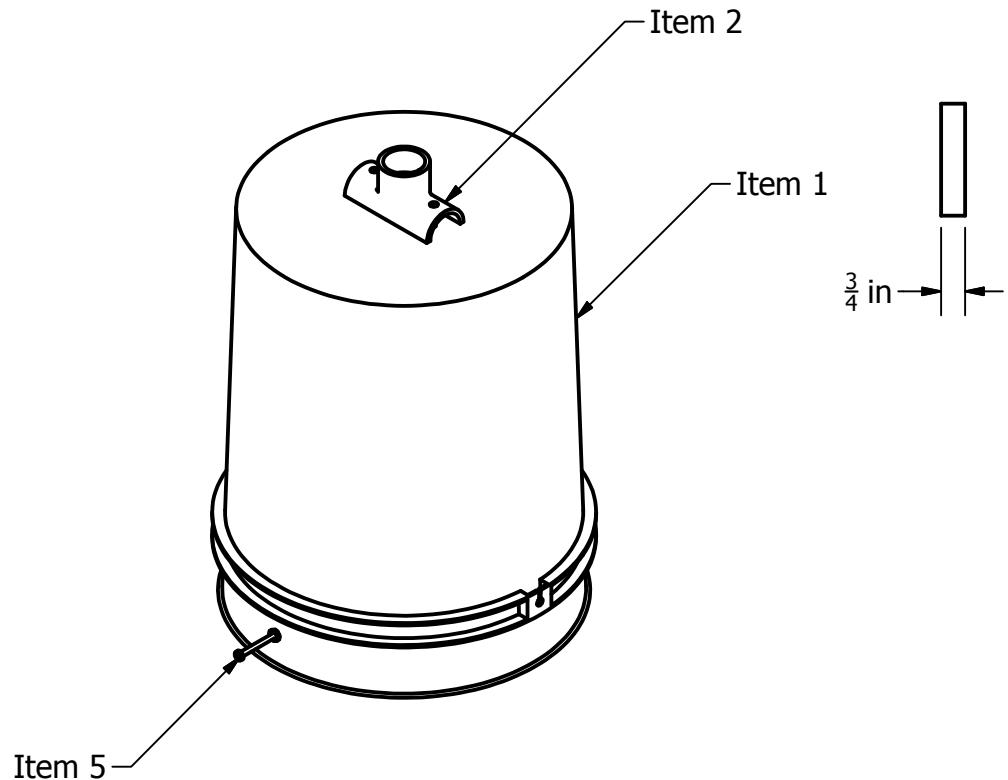
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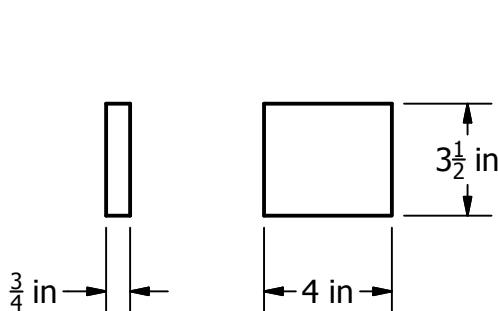
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4 1 3 2 1



View 1
SCALE 1 : 6



Item 3
SCALE 1 : 6



Item 7
SCALE 1 : 12

A Instructions:

1. Attach Item 2 centered on the bottom of Item 1 using drywall screws. Use a small piece of 1x4" lumber inside bucket to attach Item 2 to Item 1.
2. Attach Item 5 to outside of Item 1 with two nuts (Item 6) near rim of bucket for latching onto Midway Station Cargo Bin for field reset between rounds. Use one nut inside the bucket and one nut outside the bucket.
3. Insert Item 7 into Item 2 fitting.

WARP XX FIELD DRAWINGS

TITLE

**FIELD RESET BUCKET
ASSEMBLY**

SIZE	DWG NO	REV
A	BEST2012-180	1.1
SCALE	DRAWN	
	DALLAS BEST	SHEET 4 OF 4

4 1 3 2 1

4

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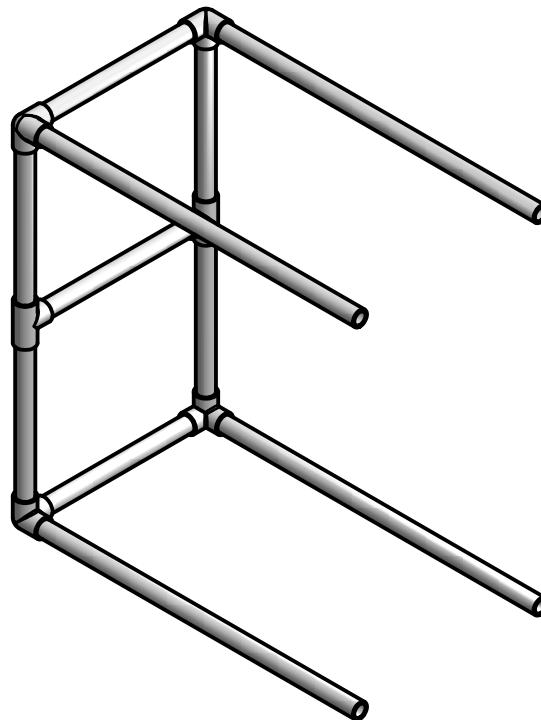
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WARP XX FIELD DRAWINGS

TITLE

COMPLIANCE CALIPER
ASSEMBLY

SIZE

A

DWG NO

BEST2012-190

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 1 OF 4

4

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2

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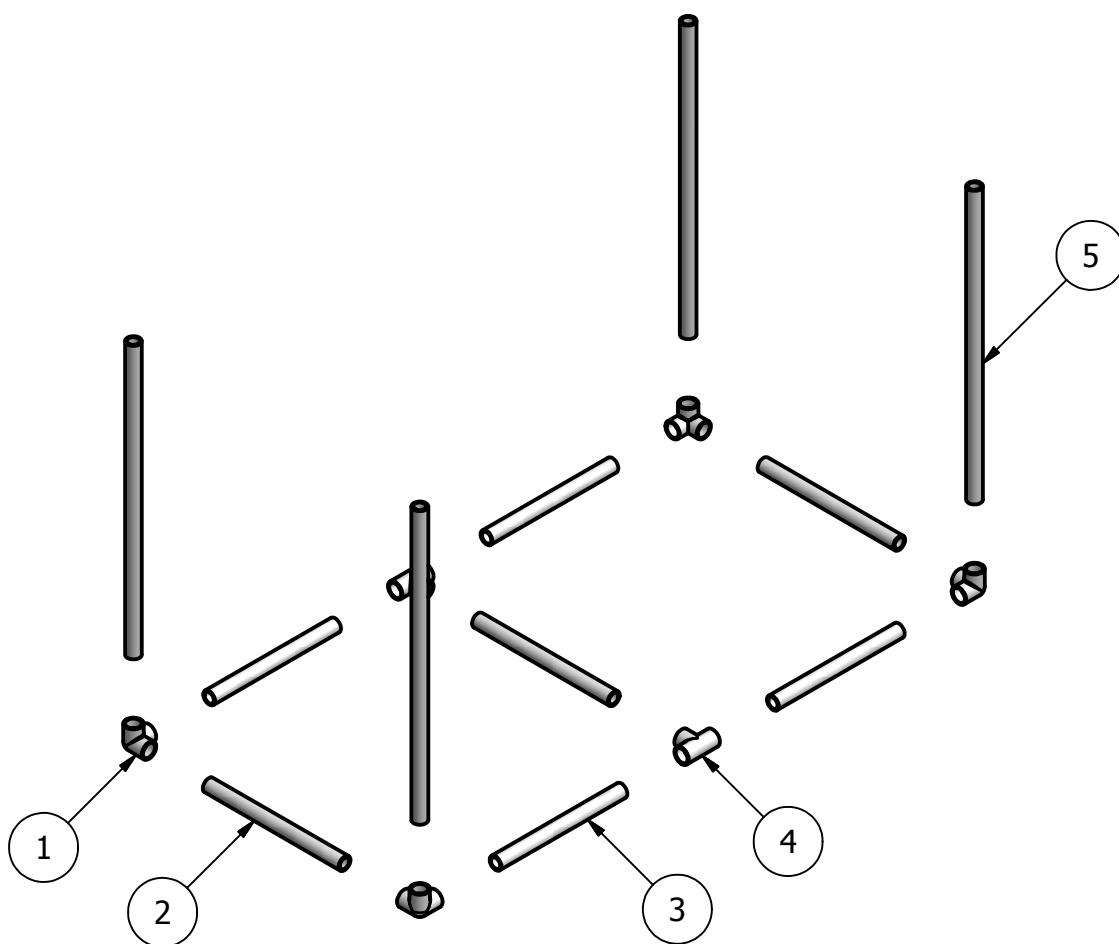
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B



PARTS LIST

ITEM	PART NUMBER	DESCRIPTION	QTY
1	PVC Side Outlet Tee	3/4" PVC	4
2	PVC Pipe - 12"	3/4" PVC Pipe	3
3	PVC Pipe - 11-1/8"	3/4" PVC Pipe	4
4	PVC Tee	3/4" PVC Tee	2
5	PVC Pipe - 24"	3/4" PVC Pipe	4

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WARP XX FIELD DRAWINGS

TITLE

COMPLIANCE CALIPER
ASSEMBLY

SIZE

DWG NO
BEST2012-190

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 2 OF 4

4

1

3

2

1

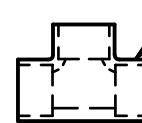
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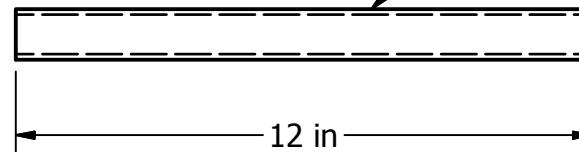
Item 1
4 Pieces

SCALE: 1 : 4



Item 4
2 Pieces

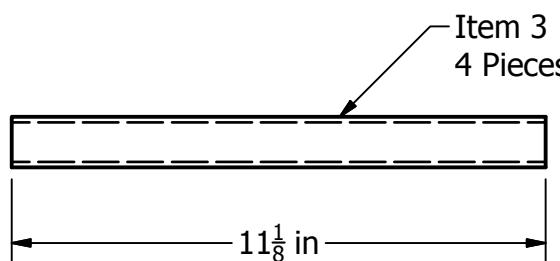
SCALE: 1 : 4



Item 2
3 Pieces

12 in

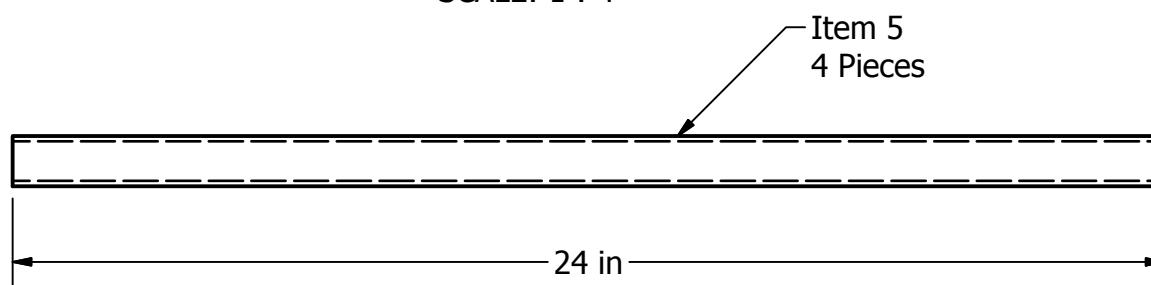
SCALE: 1 : 4



Item 3
4 Pieces

$11\frac{1}{8}$ in

SCALE: 1 : 4



Item 5
4 Pieces

24 in

SCALE 1 : 4

A

A

Instructions:

- Cut Items 2, 3, and 4 from 3/4" PVC pipe.

WARP XX FIELD DRAWINGS

TITLE

COMPLIANCE CALIPER
ASSEMBLY

SIZE

A

DWG NO

BEST2012-190

REV

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 3 OF 4

4

3

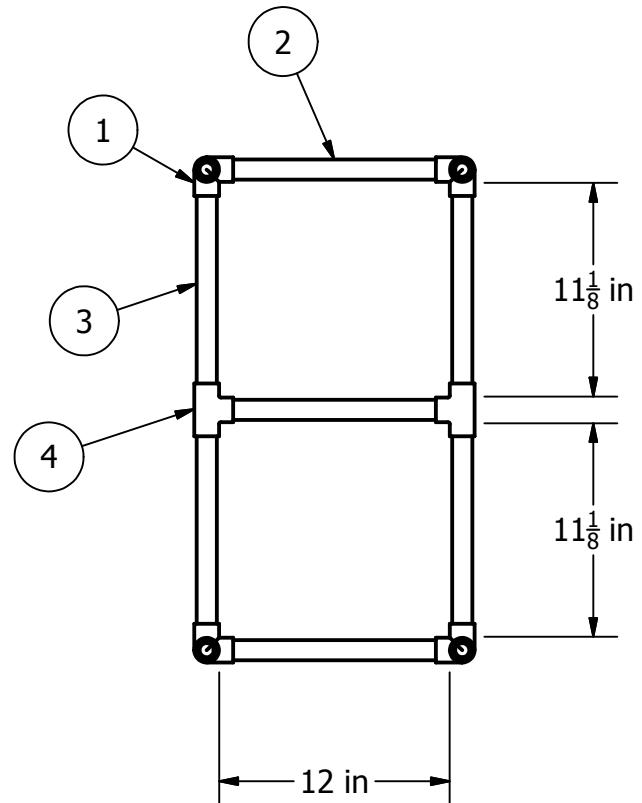
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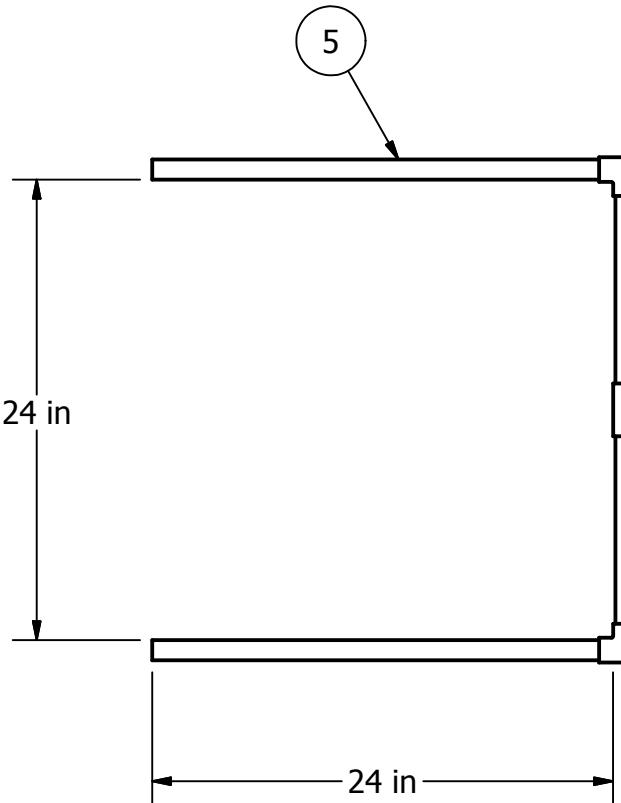
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4 | 1 | 3 | 2 | 1



Base View
SCALE 1 : 10



Side View
SCALE 1 : 10

A Instructions:

1. Connect Items 2 and 3 (PVC Pipe) to Items 1 and 4 (PVC Fittings) using PVC Cement as shown in Base View above. Insert pipes into fitting far enough to get desired dimension. A 24" length of 2x4 can be used as a spacer for attaching PVC pipes to fittings. Attach Item 5 to Item 1 before gluing Items 1, 3 and 4 together and use the spacer on Item 5 at the end of Item 1.
2. Item 5 connects to Item 1 as shown in view on right side. Do not glue Item 5 pieces with PVC cement to allow easier transport and storage.

WARP XX FIELD DRAWINGS

TITLE

COMPLIANCE CALIPER
ASSEMBLY

SIZE

DWG NO

REV

A

BEST2012-190

1.1

SCALE

DRAWN

DALLAS BEST

SHEET 4 OF 4

4 | 1 | 3 | 2 | 1