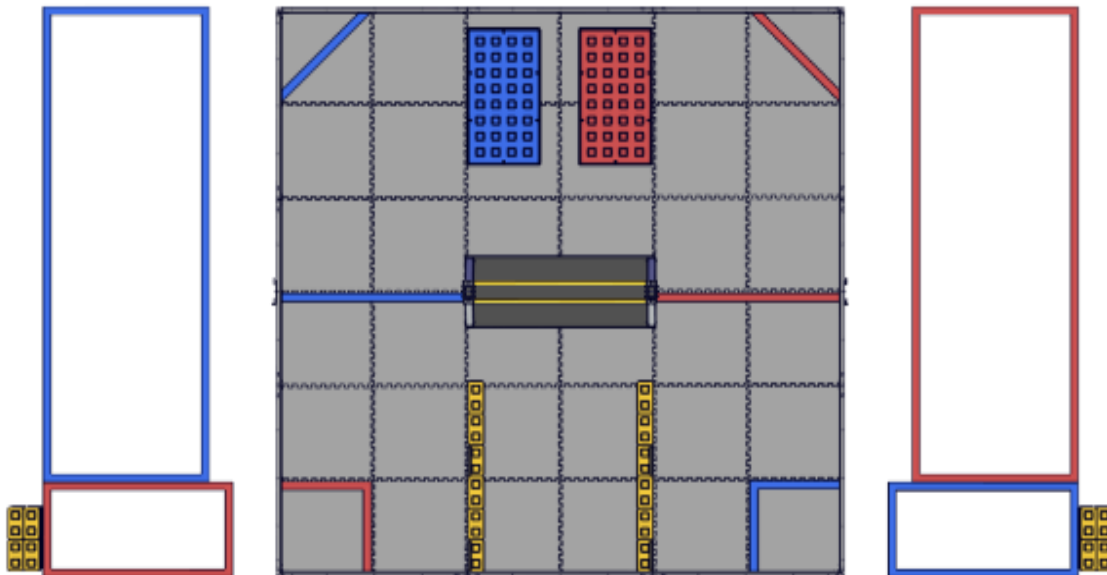




PRESENTED BY **Qualcomm**

# 2019-2020 *FIRST*® Tech Challenge Field Setup Guide





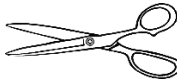

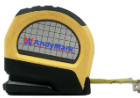

**Rev 1.2**

**This guide contains instructions for setting up the Field Elements for the  
2019-2020 *FIRST*® Tech Challenge Game**

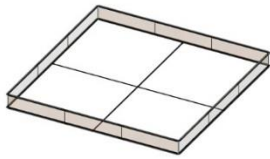

**SKYSTONE<sup>SM</sup> Presented by Qualcomm®**

***Read through all the instructions and take a parts inventory before  
you begin to assemble and setup the game elements!***



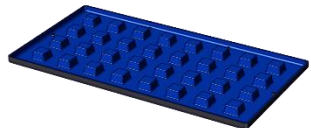

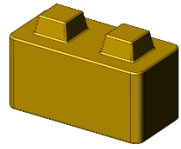

REVISION HISTORY		
Rev.	Date	Description
1.0	8/21/19	Initial Draft
1.1	9/5/19	Added details on vision target placement
1.2	10/2/19	Revision on vision target placement

TOOLS NEEDED		
Component	QTY	Part Photo
Safety Equipment	As Needed	
Safety Glasses	1	
Utility Knife	1	
File	1	
Scissors	1	
Diagonal Cutters	1	
Tape Measure	1	
Color Printer	1	

## FULL FIELD REQUIREMENTS

Component	Part #	QTY	Part Photo
FIRSTTech Challenge Field Perimeter	am-0481b or similar	1	
5/8" Gray Soft Tiles	am-2499 or similar	36	

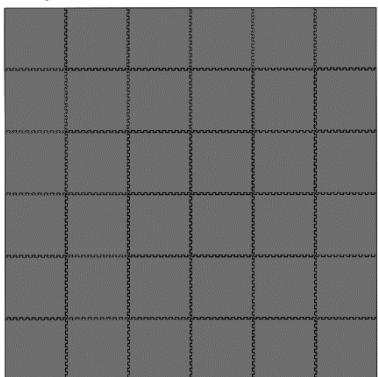
## Competition Field Components

Component	Part #	QTY	Part Photo
Skybridge	See Field Assembly Guide for assembly instructions.	1	
Red Foundation	See Field Assembly Guide for assembly instructions.	1	
Blue Foundation	See Field Assembly Guide for assembly instructions.	1	
8" Cable Ties (extras included, additional will be needed for future setups)	am-1189	10 needed each time the Skybridge is assembled	
Stones	am-4018	56	
Skystones	See Field Assembly Guide for assembly instructions.	4	

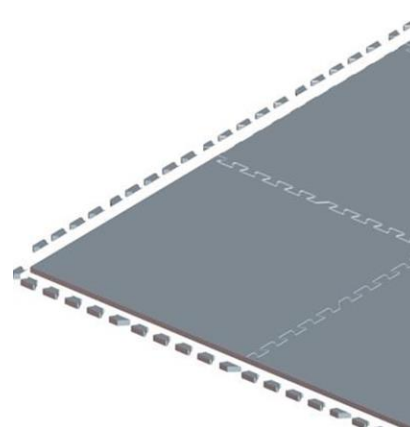
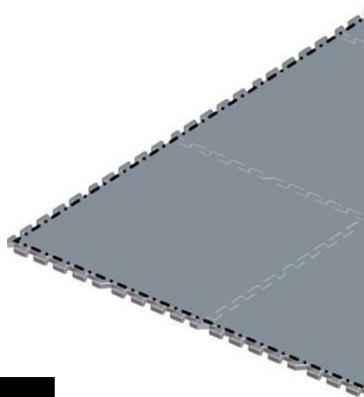
2" "Red" Gaffers Tape	am-2946	as needed	
2" "Electric Blue" Gaffers Tape	am-2947	as needed	
Cardstock for Navigation Target (Printed from <a href="#">FIRST Resource Library</a> )	White 8.5x11" or A4 (international)	16	
Velcro® Dots	Roughly ¾" diameter or larger	1 pack	
Clear Page Protection Sleeves	Similar to Staples P/N 40713	8	

# Part 1: Setting up the Floor and Field Perimeter

**Step 1-1:** Lay the tiles with the **smooth** surface facing up in a 6x6 grid pattern.



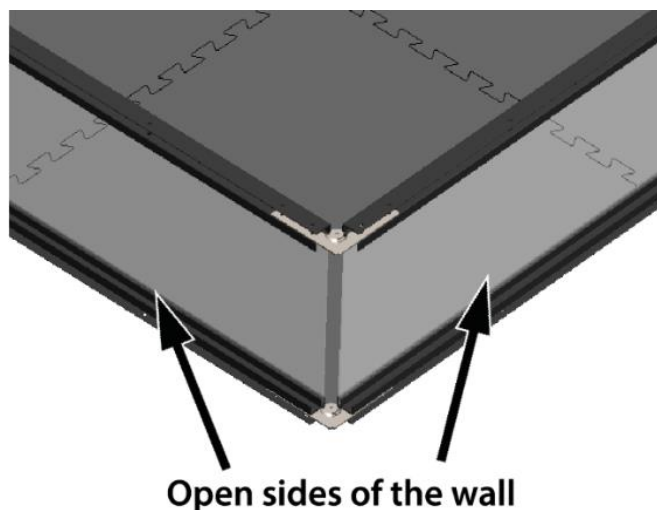
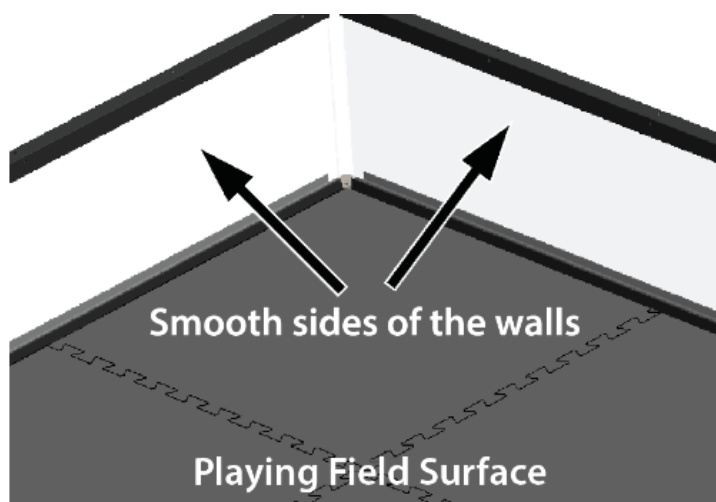
**Step 1-2: Critical Mandatory Step:** Trim all outer tabs from the 20 Soft Tiles on the outside edges of the field.



**NOTE:** Lay the tiles out and mark the outer edge to be cut. Use a sharp utility knife and a straight edge or a band saw (if available) to get a smooth clean edge.

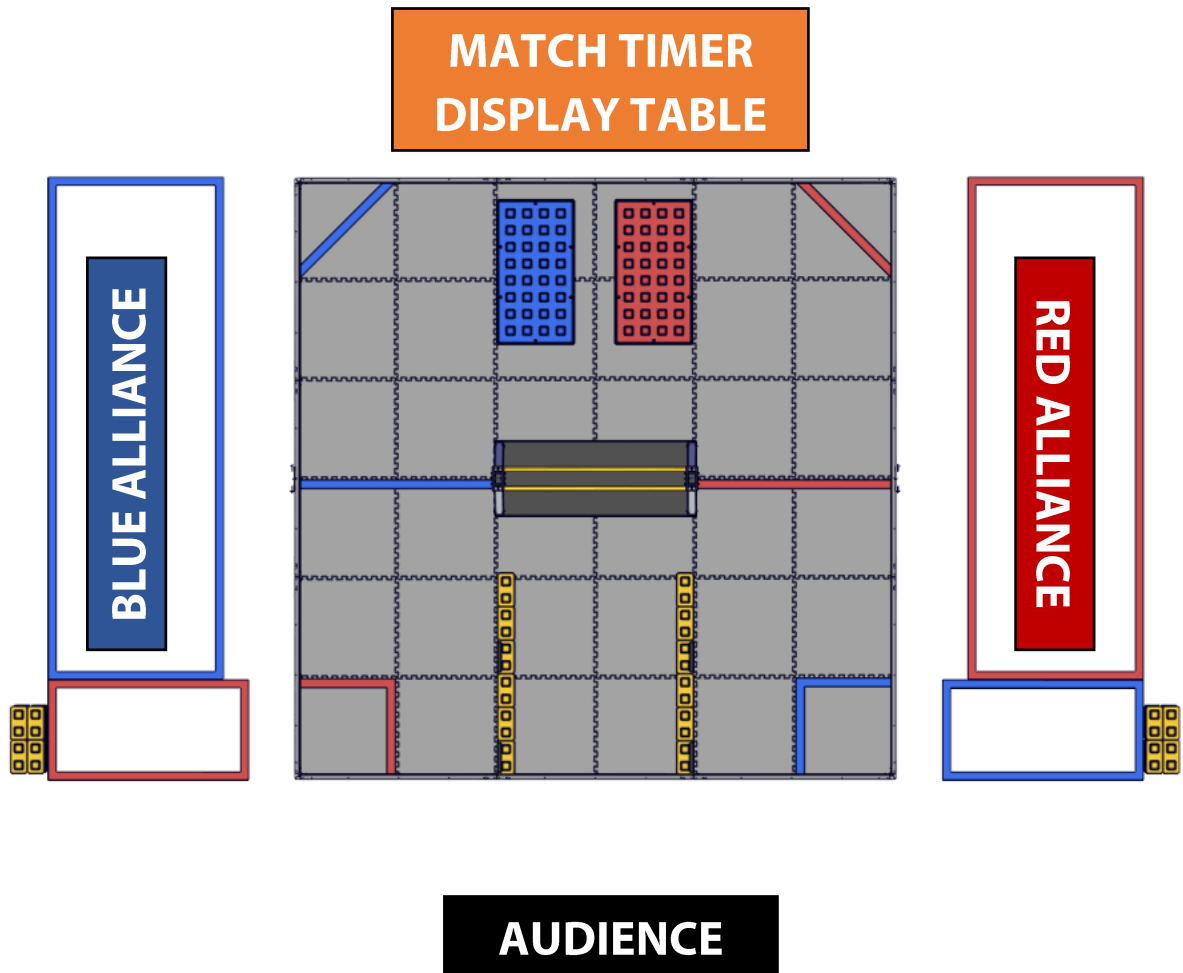
**Step 1-3:** Note that there are several **FIRST** Tech Challenge Perimeter wall designs. The wall designs fall into two categories. The smooth/non-cavity sides should face towards the inside of the Playing Field as shown in the illustration.

Perimeter	Wall Design Categories	Wall Height
AndyMark (current)	Smooth on one side and an open cavity on the other side	12.125"
IFI Perimeter	Smooth on one side and an open cavity on the other side	11.5"
Logo Loc Perimeter	Symmetrical inside and outside surfaces	12.375"



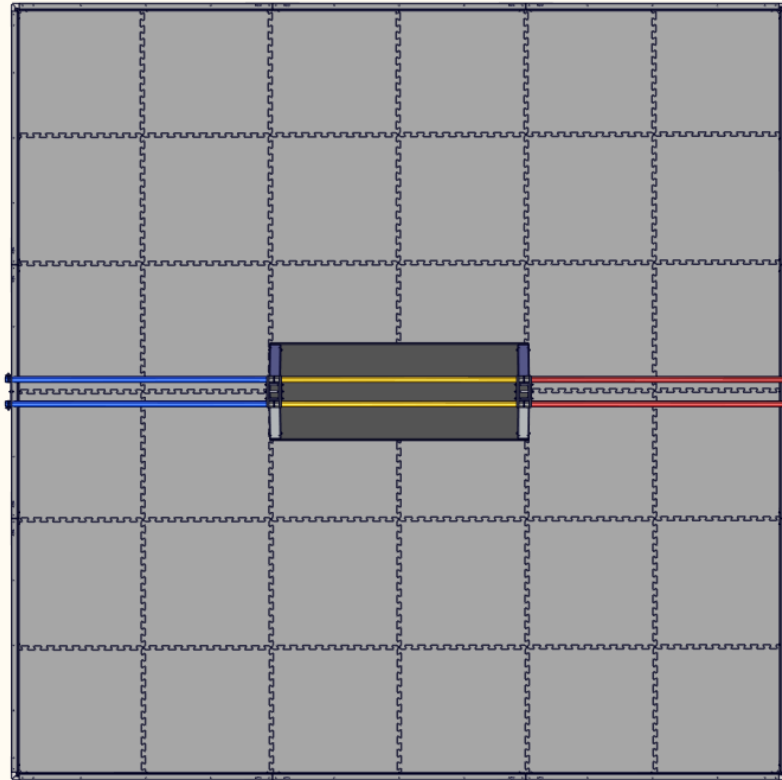
**NOTE:** If using the AndyMark Field Perimeter, ensure that straps are installed to keep walls in place during game play.

## Part 2: General Layout and Orientation



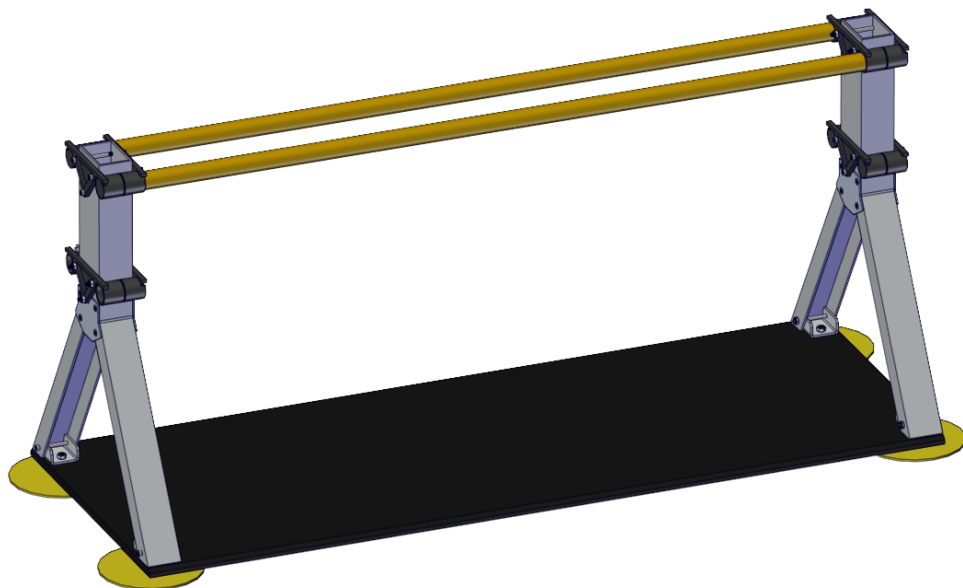
## Part 3: Skybridge Placement

On the official playing field, the Bridge Support and Skybridge spans horizontally across the center of the playing field.

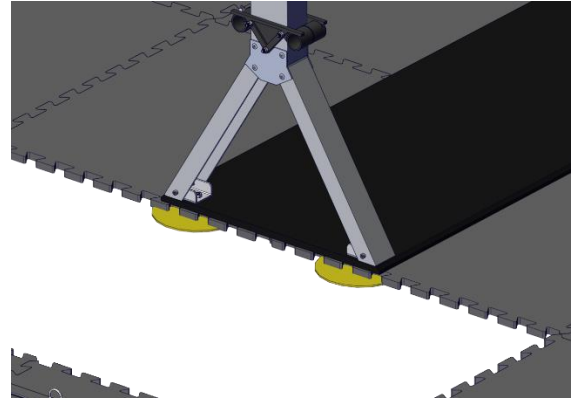
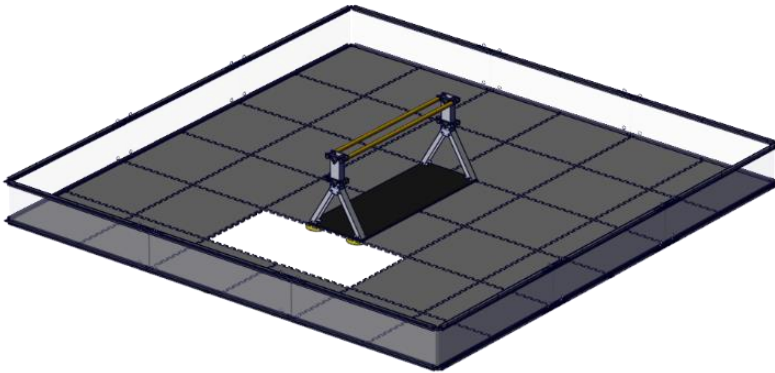


**AUDIENCE**

1. Ensure the center section of the Skybridge is assembled. Detailed assembly instructions can be found in the Field Assembly Guide.



2. The Soft Tiles sit between the bottom of the Bridge Support and the Under Tile Disk. Each elevator bolt will fit along the seam between the tiles. Make sure the tiles sit as flat as possible next to and under the Floor Plate. It may be necessary to bend the tiles to get the Under Tile Disks to sit in the right spots with the tiles so that the Skybridge sits centered on the field.

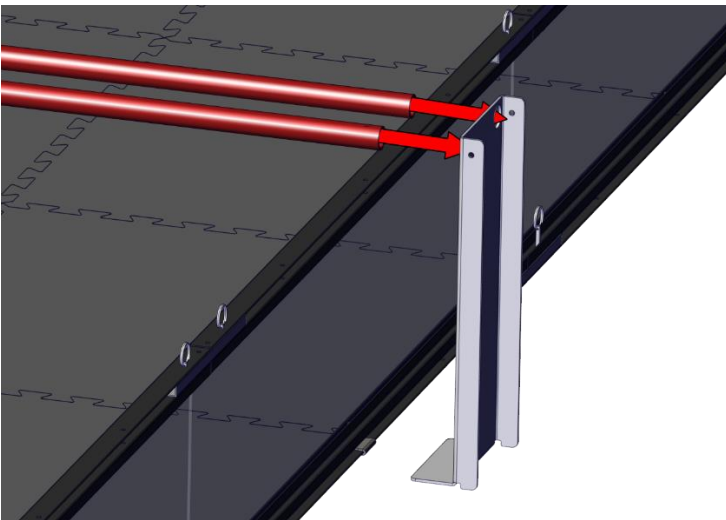


**Note:** If the target stickers are already installed, ensure they are facing the correct direction as indicated on the sticker.

3. Add the Red and Blue Pipes to the Lower End Caps. On the competition field, the red Pipes should be on the right when viewed from the audience.



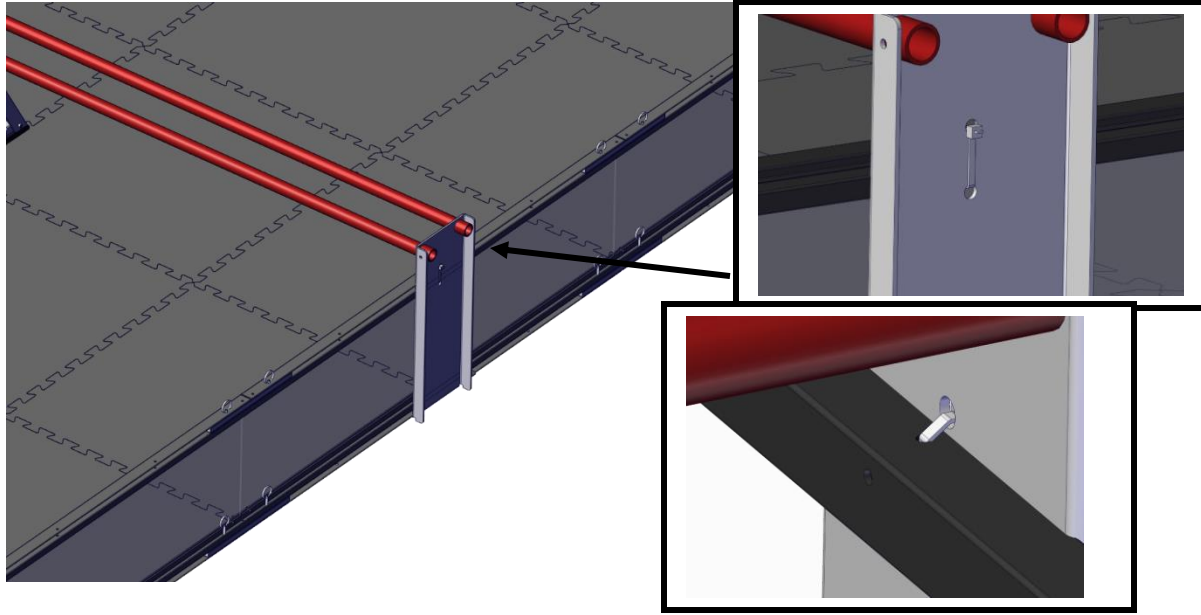
4. Slide the ends of the Pipes through the holes on the Book Ends. On the competition field, the Book End sits outside the perimeter wall. The foot should face towards the Pipe and sit underneath the perimeter wall and Soft Tile.



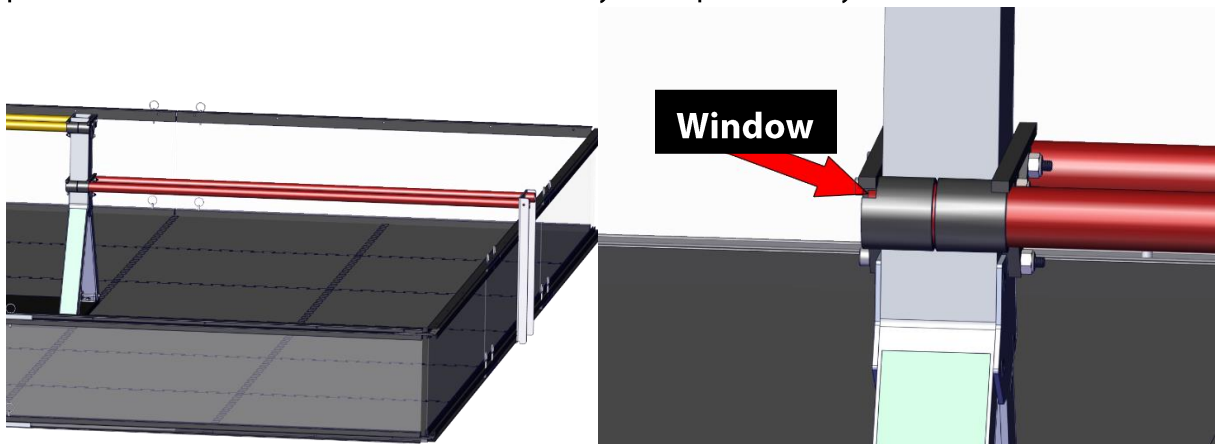
**Note:** When using a perimeter with strap, the strap may need to be moved off-center to allow the Book End to sit in the correct location.



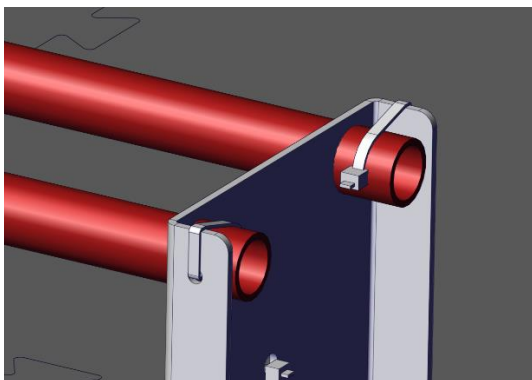
5. Attach the Book End onto the field perimeter wall using a cable tie. The tail of the cable tie should be on the outside of the field.



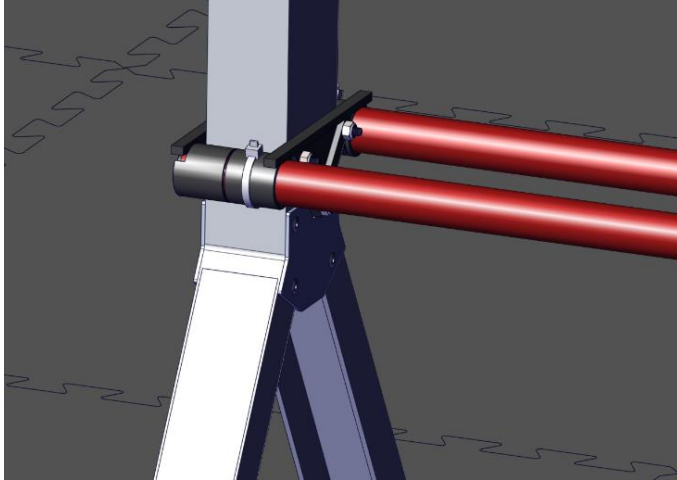
6. Ensure that the Pipes are fully inserted into the End Caps and the Book Ends are against the field perimeter. Use the window as shown to verify the Pipes are fully inserted.



7. If this is the first time the field is to be assembled, holes for cable ties will need to be drilled in the Pipes and End Caps. Details for hole placement can be found in the Field Assembly Guide.
8. Secure both Pipes to the Book End using cable ties. The cable tie should wrap around the Pipe and top of the book end as shown.



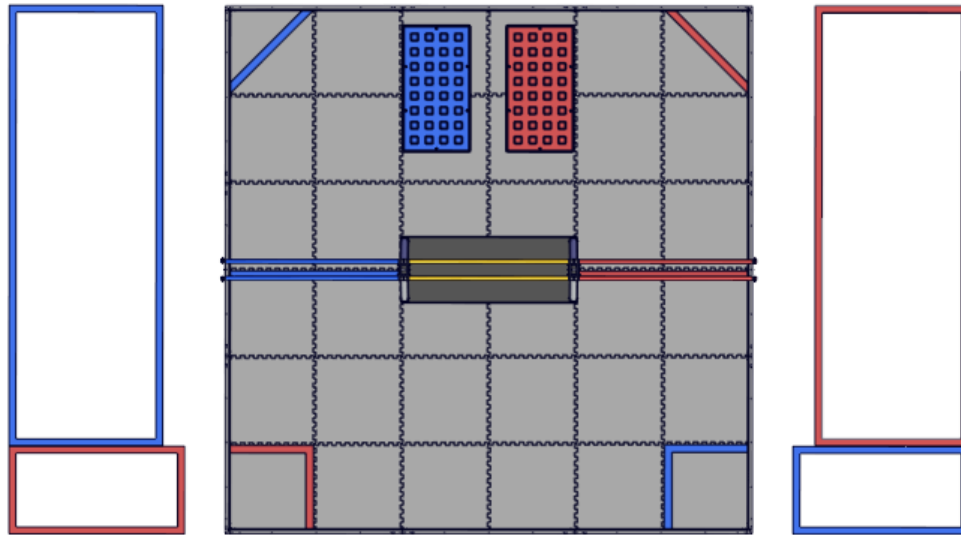
9. Secure each Pipe using a cable tie. The head of the cable tie should sit on the top of the End Cap.



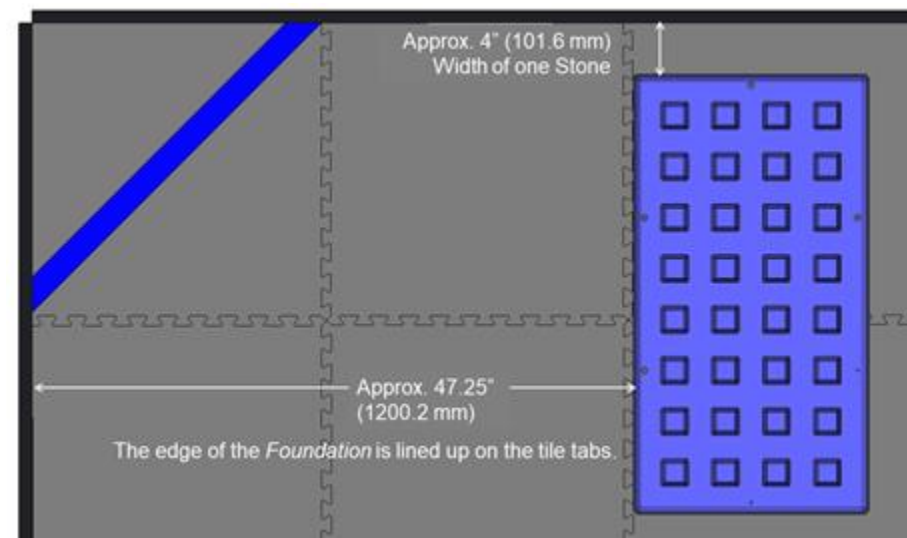
10. Repeat steps 3-8 to secure the Blue Pipes into place.

## Part 4: Foundation Placement

At the start of the match, the Foundations are placed on the field as shown. The short edge of each Foundation should be placed one Stone's width, approximately 4" away from the wall furthest from the audience. The long edge of each Foundation should be aligned with the tile tabs approximately 47.25" away from the perimeter wall. The Red Foundation is located on the right and the Blue Foundation is located on the left as viewed from the audience.



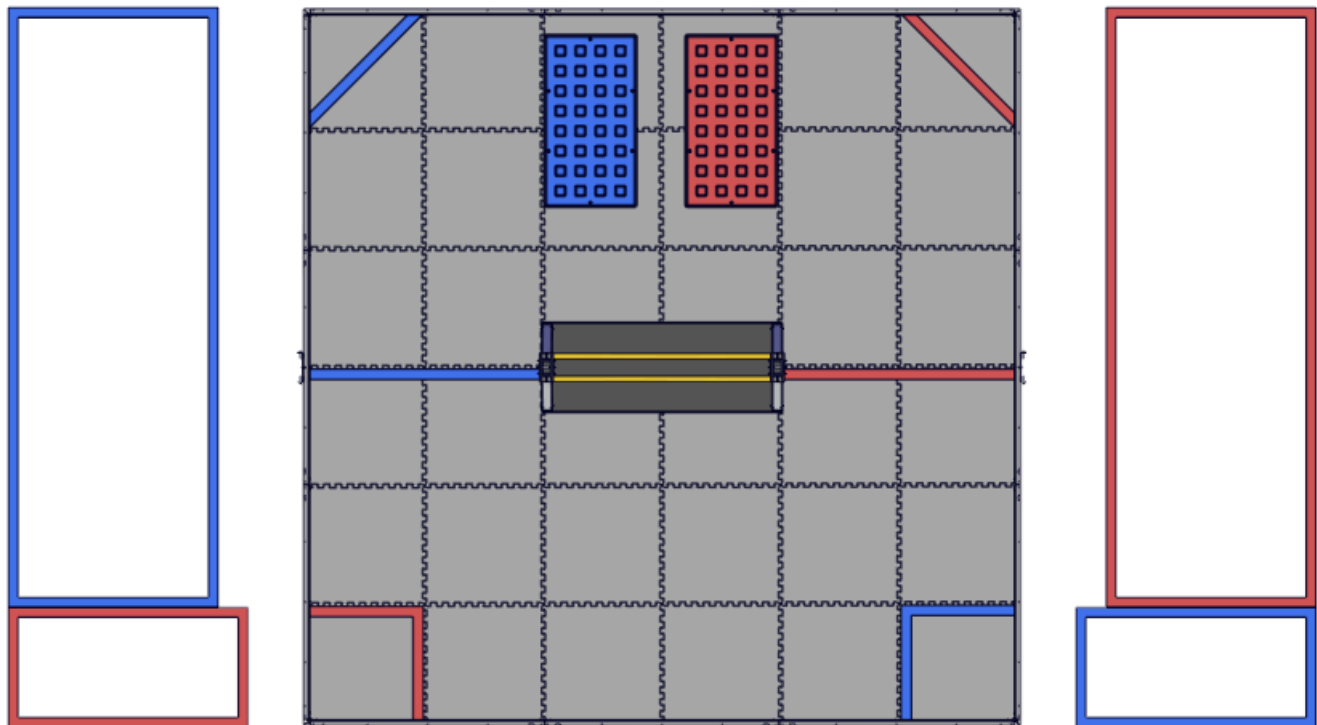
**AUDIENCE**



**AUDIENCE**

## Part 5: Tape Lines

Tape lines for the field are as shown. There are 5 sets of lines: Alliance Stations, Human Player Stations, Depots, Building Sites, and Skybridge Lines. There is also a need for a Referee Question Box close to the field area.



### AUDIENCE

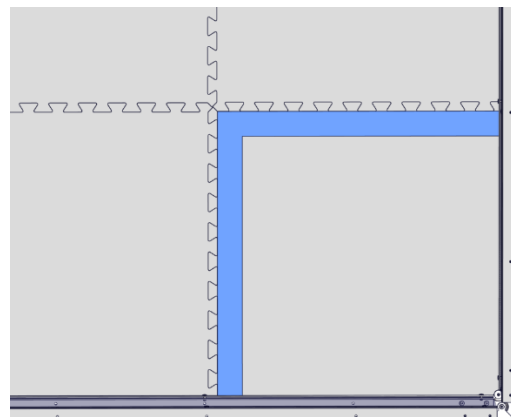
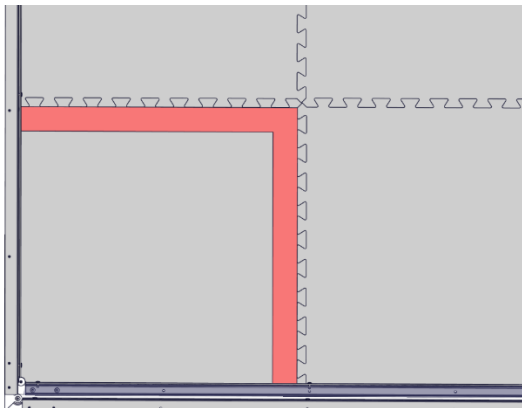
All lines on and around the field are made with 2" wide red or blue Gaffers Tape.

#### **Drivers & Human Player Stations**

Drivers Stations are 10' wide x 3.5' deep and the Human Player Stations 2' wide by 4' deep. When viewed from the audience, the Blue Driver Station and the Red Human Player Station is on the left side. The Driver Stations are located 18" away from the field perimeter and the Human Player Station sits 12" away from the field perimeter.

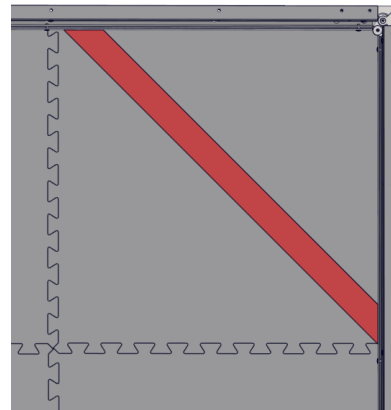
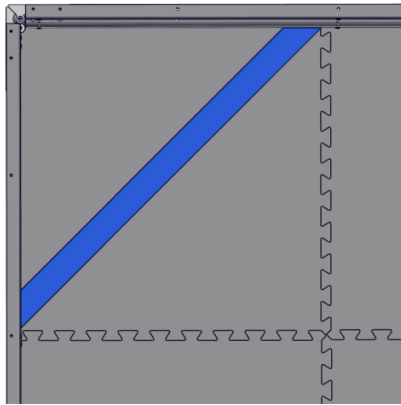
#### **Depots**

The Depots are located in the corners of the field closest to the audience. When viewed from the audience, the Red Depot is located on left side. The tape should be placed with its outside edge along the inside seam of the corner tiles.



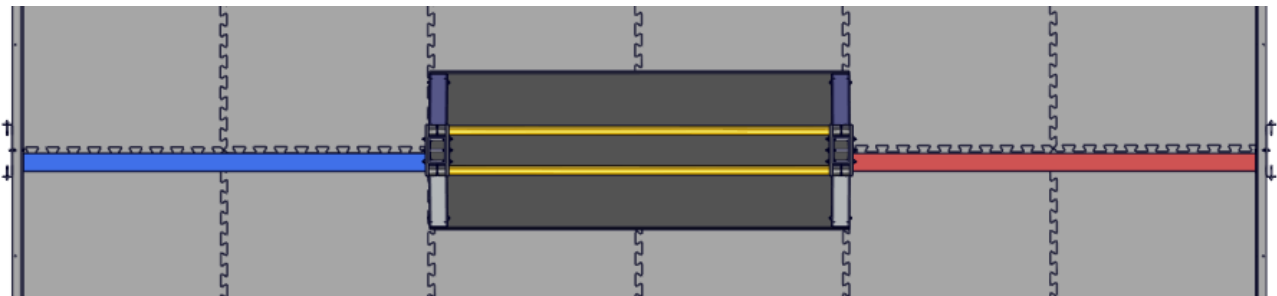
### **Building Sites**

The Building Sites are located in the corners of the field furthest away from the audience. When viewed from the audience, the Blue Building Site is located on the left side of the field. Place the tape line diagonally across the corner tile with its outside edge bisecting the center of the tile.



### **Skybridge Line**

The Skybridge Line runs across the center of the field from the Floor Plate to the Perimeter. When viewed from the audience the Blue Line should be on the left side. When viewed from the audience, the back edge of the tape should be along center line.



### **Referee Question Box**

The Referee Question Box is a place where Teams can ask questions of the Referees after a Match.

The Referee Question Box must be placed in the Competition Area in a location where it will not interfere with the current running Matches, but close enough that the Referees will be able to see a student waiting at the Question Box. The Question Box can be as simple as a 3ft Gaffers Tape square on the floor.



## Part 6: Navigation Target Placement

**Step 6-1:** Download Target Images and Backs found on the *FIRST* Tech Challenge Game and Season Info Page:  
<http://www.firstinspires.org/resource-library/ftc/game-and-season-info>



**Step 6-3:** Place the navigation targets in the plastic sleeves. The image with the logos will face outward, while the navigation target image will face inward.



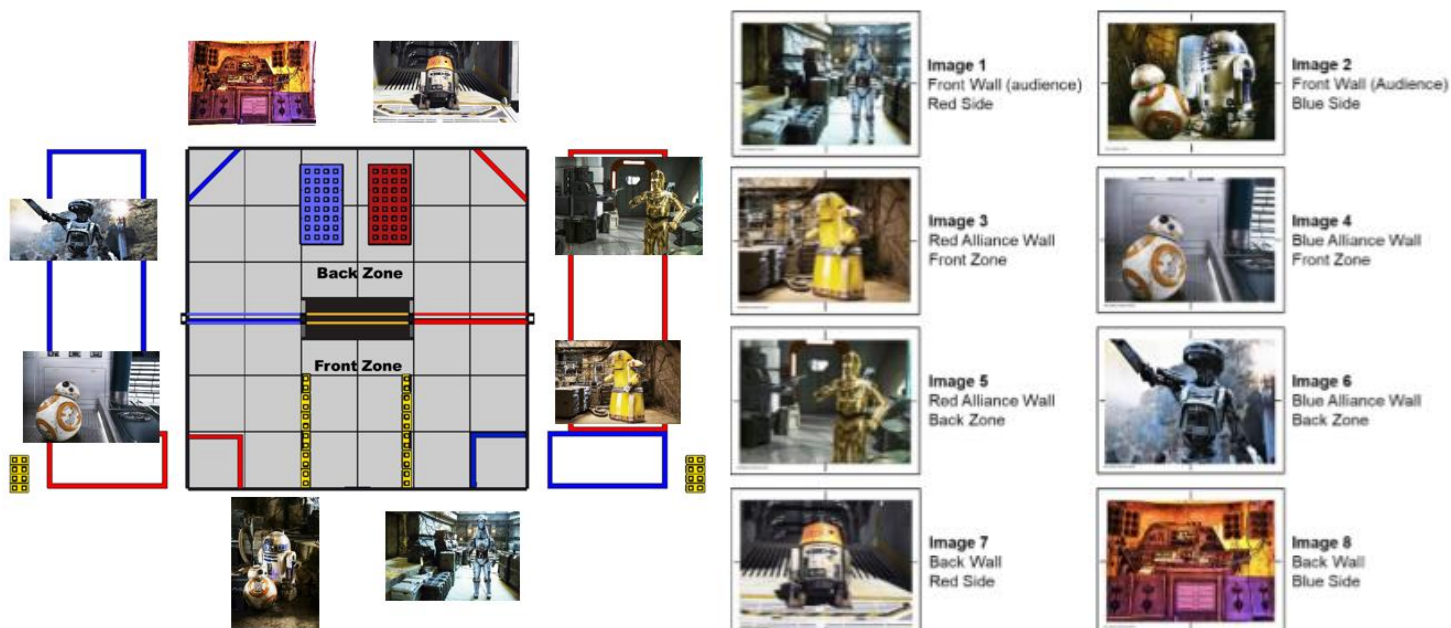
**Step 6-2:** Print the navigation targets in color, not greyscale on 8.5x11" White Cardstock. The Print resolution must be at least 300DPI.



**Step 6-4:** Use Velcro dots in the top corners of the navigation target to secure to the field perimeter.



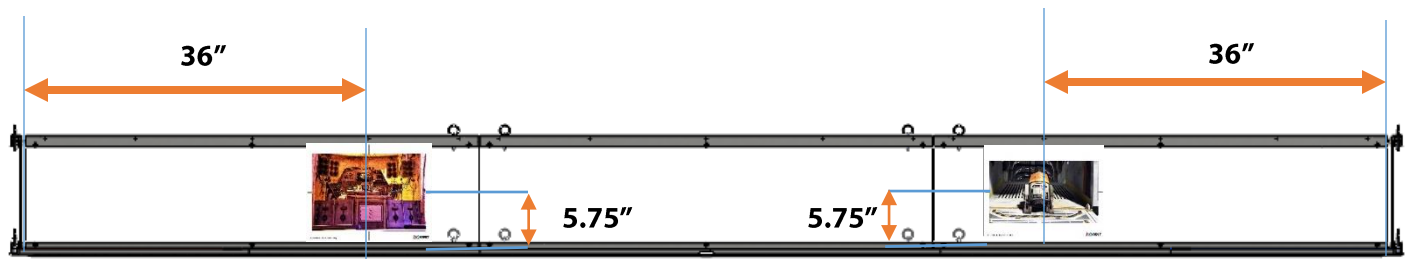
**Step 6-5:** There are 8 images are placed around the field as shown. Each target has lines around the edge indicating vertical and horizontal center.



**Step 6-6:** Navigation Targets should always be placed on the outside of the perimeter wall to avoid being damaged by robots. The placement of each Navigation Target should be as follows:

- The Navigation Target vertical center line measures **36"** to the **inside of the playing field wall**.
- The Navigation Target horizontal center line measure **5.75"** to the **tile floor**.

Repeat these measurements for each target on all four playing field walls.

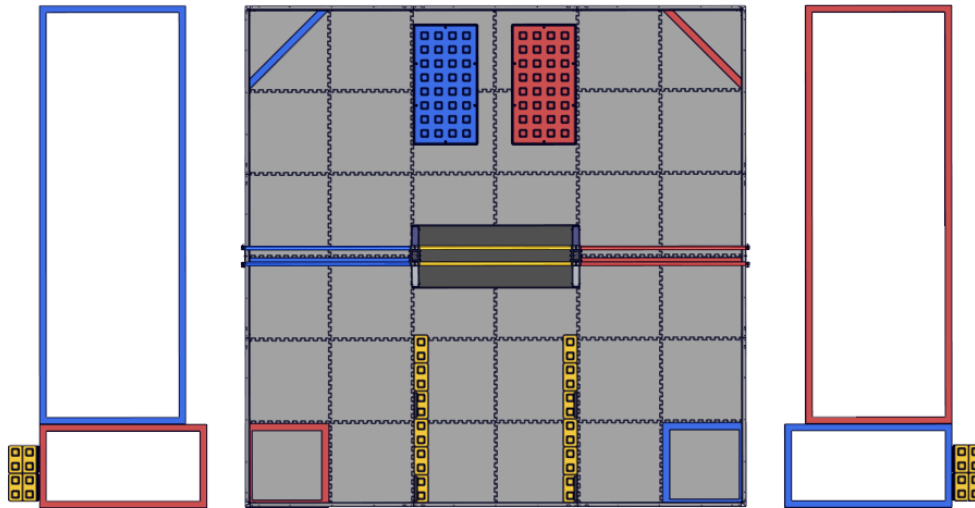


View from inside the Playing Field



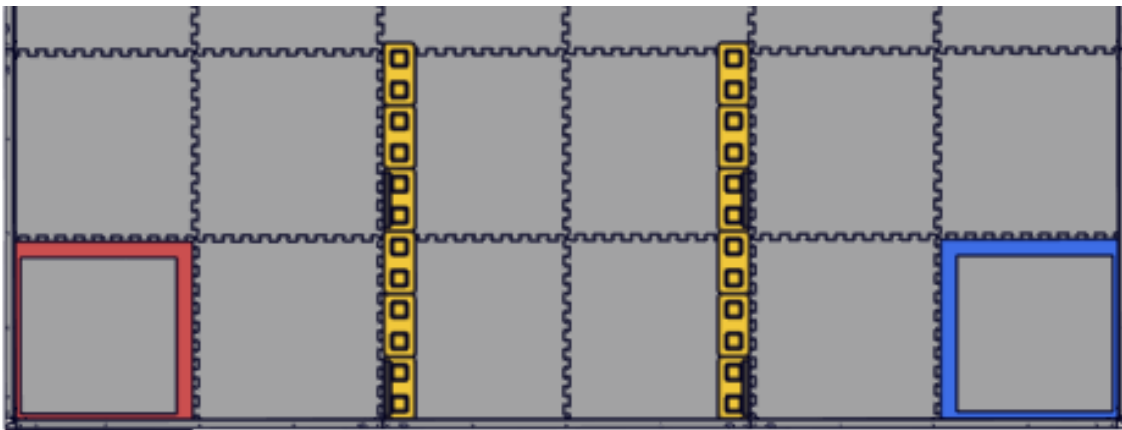
## Part 7: Game Piece Placement

Prior to the start of the match, 56 Stones and 4 Skystones are placed in two starting locations, the Quarry and the Stone Supply.



### Quarry

8 Stones and 4 Skystones with sticker targets are located in the Quarry. The Stones are to be placed along the inside of the two tile seams adjacent to the center seam as shown. The stickers on the Skystones should be facing the Depots.



### Stone Supply

4 stacks of 6 Stones are located adjacent to each Human Player Station as shown.

