

ASBA  2024

ASBA TECHNICAL MEETING & TRADE SHOW  
DECEMBER 3-6, 2024 | ORLANDO, FLORIDA

# Developing the playing surface for the FIFA® World Cup 2026

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*Michigan State University*

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Research Leader 4



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Research Leader 1



THE UNIVERSITY OF  
**TENNESSEE**  
KNOXVILLE



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researcher



**Bella Brasher**

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researcher



**Jack Judge**

Undergrad  
researcher



MICHIGAN STATE  
UNIVERSITY



**3** HOST COUNTRIES



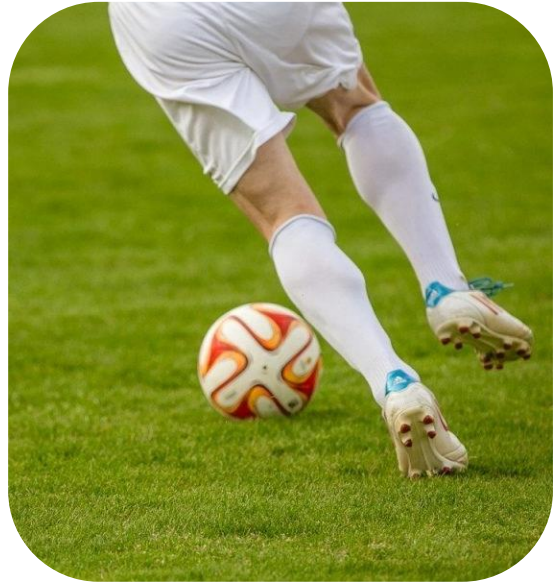
**16** HOST CITIES

**48** PARTICIPATING TEAMS

**104** MATCHES

**Largest** WORLD CUP FOOTPRINT

# Must achieve consistency and uniformity between pitches!



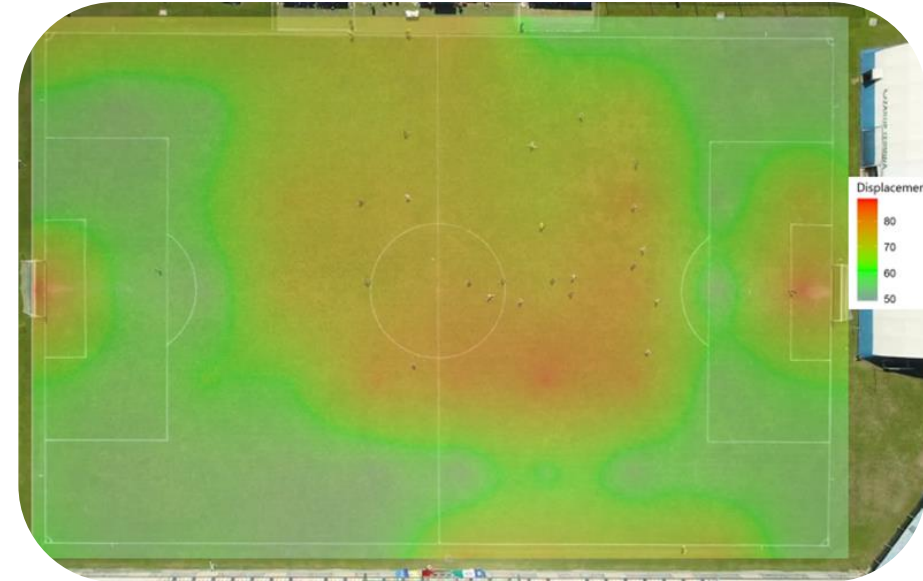
## Player to surface interaction

Players can make the movements for optimal performance, consistently across the pitch



## Ball to surface interaction

The ball is consistent in roll, angled rebound, and bounce across the pitch



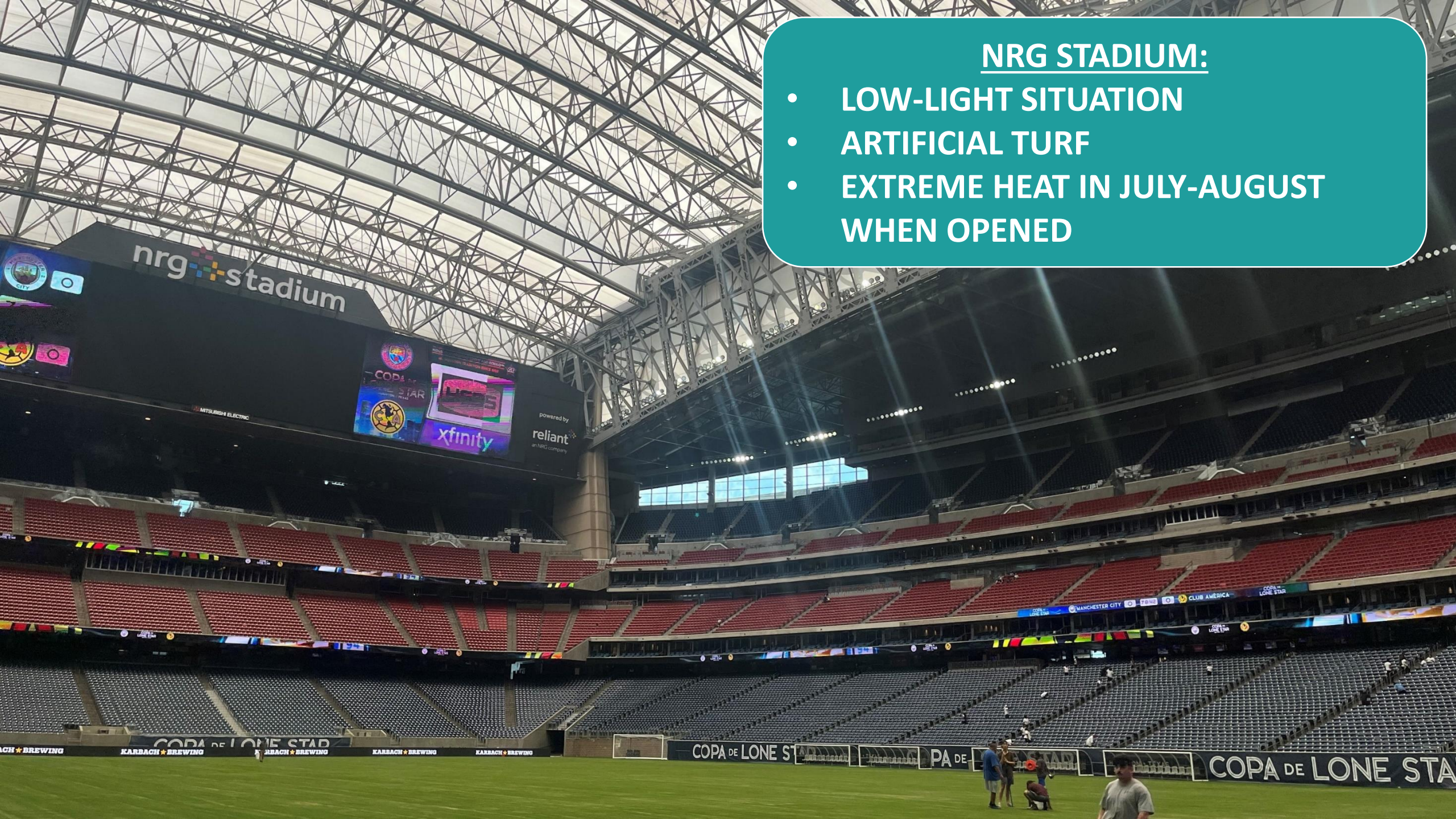
## Uniform pitch appearance

The pitch is optimal and uniform in appearance

Host Venue	Natural or Synthetic	Open or Closed	Drainage	Hybrid?	Vacuum Ventilation	Supplementary lighting	Irrigation	Current surface
<b>Toronto</b> BMO Field	Natural	Open	Yes	SISGRASS	Yes	Yes	Yes	Kentucky bluegrass
<b>Vancouver</b> BC Place	Synthetic	Both	No	No	No	No	No	Synthetic
<b>Guadalajara</b> Estadio Akron	Natural	Open	Yes	No	No	No	Yes	Bermudagrass
<b>Monterrey</b> Estadio BBVA	Natural	Open	Yes	No	No	No	Yes	Bermudagrass
<b>Mexico City</b> Estadio Aztec	Natural	Open	Yes	No	No	No	Yes	Kikuyugrass
<b>Atlanta</b> Mercedes-Benz Stadium	Synthetic	Both	No	No	No	No	No	Synthetic
<b>Boston</b> Gillette Stadium	Synthetic	Open	Yes	No	Yes	No	No	Synthetic
<b>Dallas</b> AT &T Stadium	Synthetic	Both	Yes	No	No	No	No	Synthetic
<b>Houston</b> NRG Stadium	Synthetic	Both	No	No	No	No	No	Synthetic
<b>Kansas</b> Arrowhead Stadium	Natural	Open	Yes	No	No	Yes	Yes	Bermudagrass
<b>Los Angeles</b> SoFi Stadium	Synthetic	Both	No	No	No	No	No	Synthetic
<b>Miami</b> Hard Rock Stadium	Natural	Open	Yes	No	Yes	Yes	Yes	Bermudagrass
<b>New Jersey/ New York</b> Met Life Stadium	Synthetic	Open	Yes	No	No	No	Yes	Synthetic
<b>Philadelphia</b> Lincoln Financial Field	Natural	Open	Yes	No	Yes	No	Yes	Bermudagrass
<b>San Francisco</b> Levi's Stadium	Natural	Open	Yes	No	No	No	Yes	Kentucky bluegrass
<b>Seattle</b> Lumen Field	Synthetic	Open	Yes	No	No	No	No	Synthetic

## NRG STADIUM:

- LOW-LIGHT SITUATION
- ARTIFICIAL TURF
- EXTREME HEAT IN JULY-AUGUST WHEN OPENED

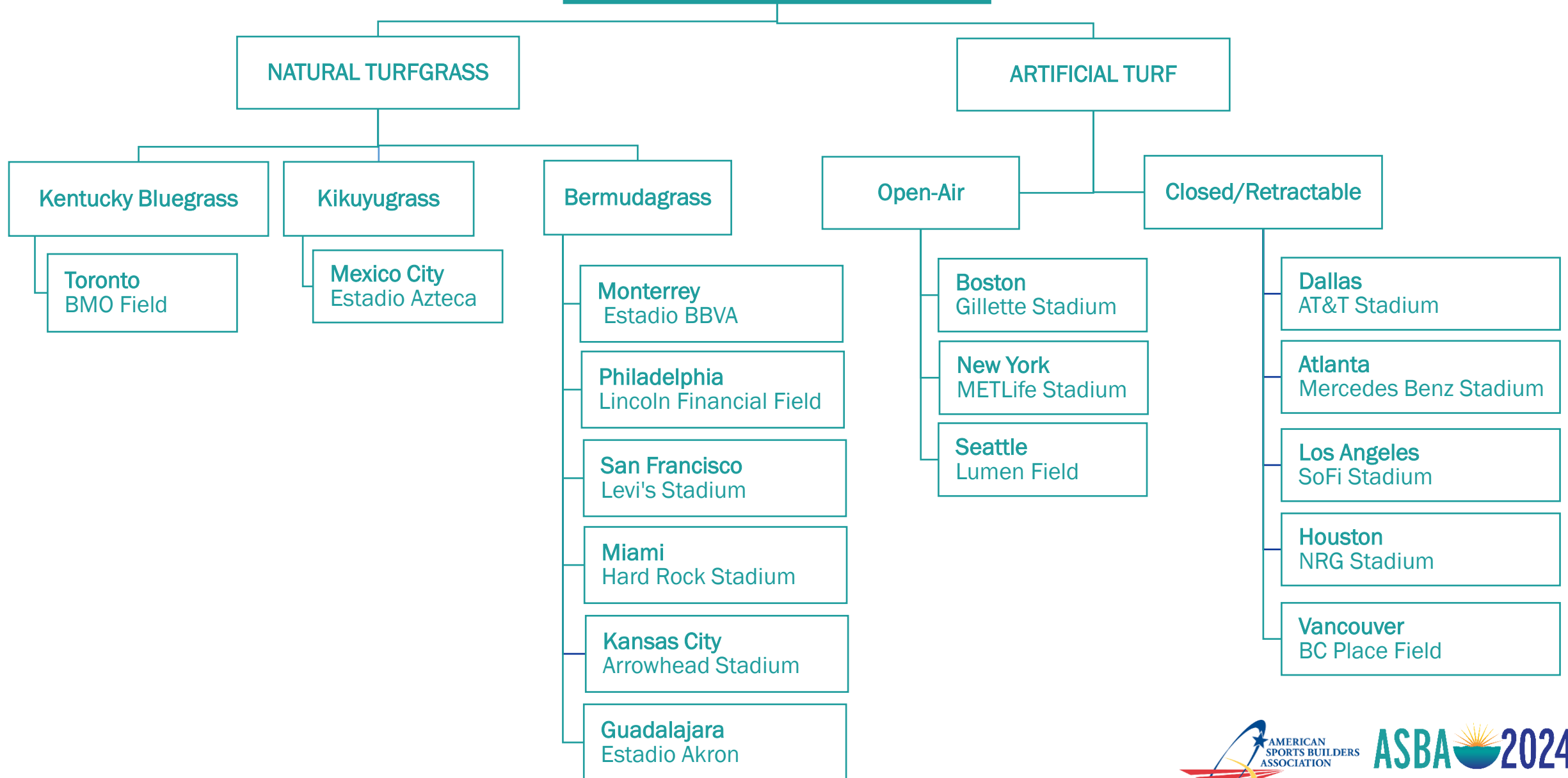


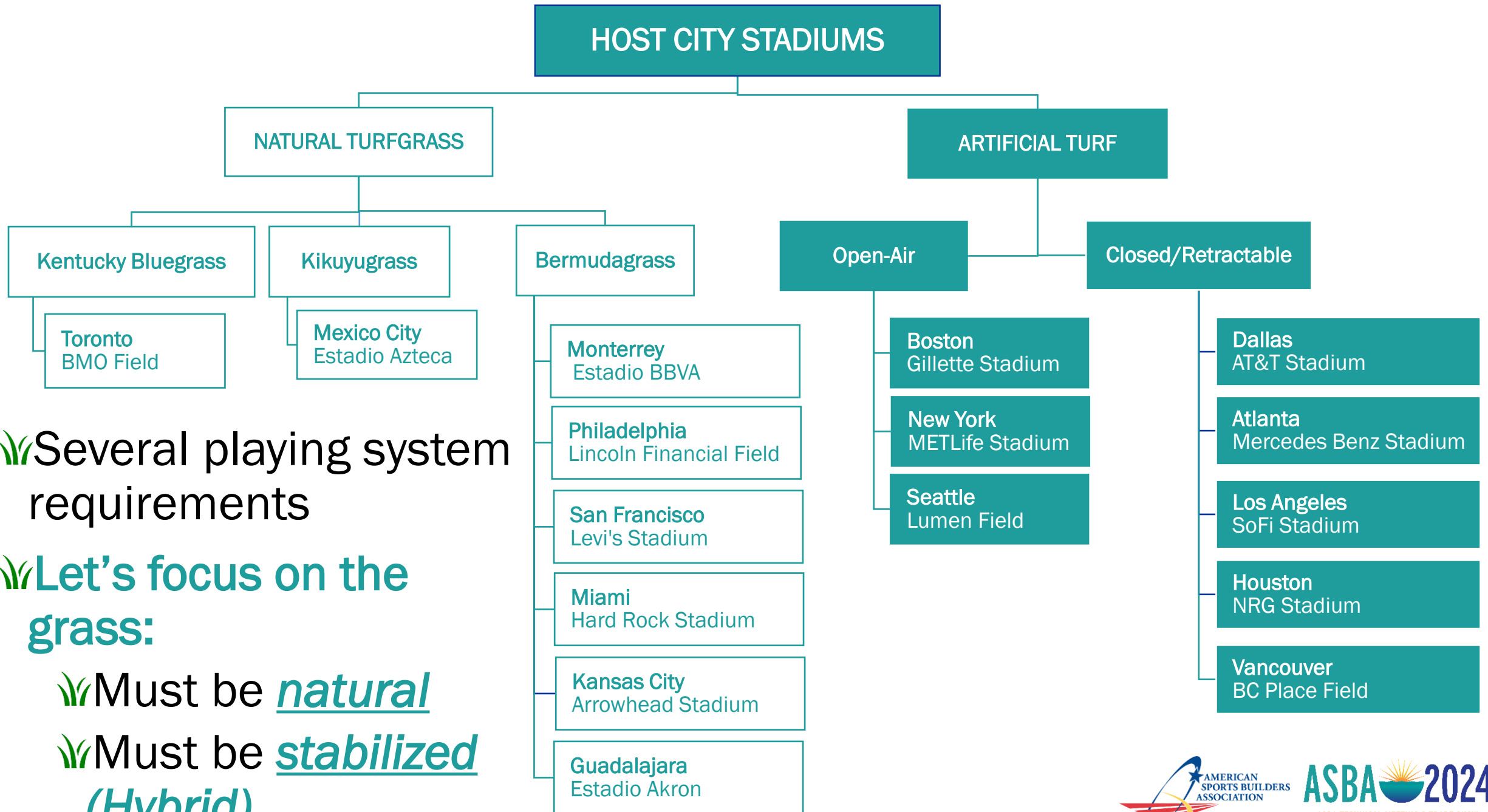


## BMO FIELD:

- OPEN-AIR
- NATURAL GRASS
- LOADED STADIUM
- LEAST OF OUR CONCERNS
- LIGHTING???

# HOST CITY STADIUMS



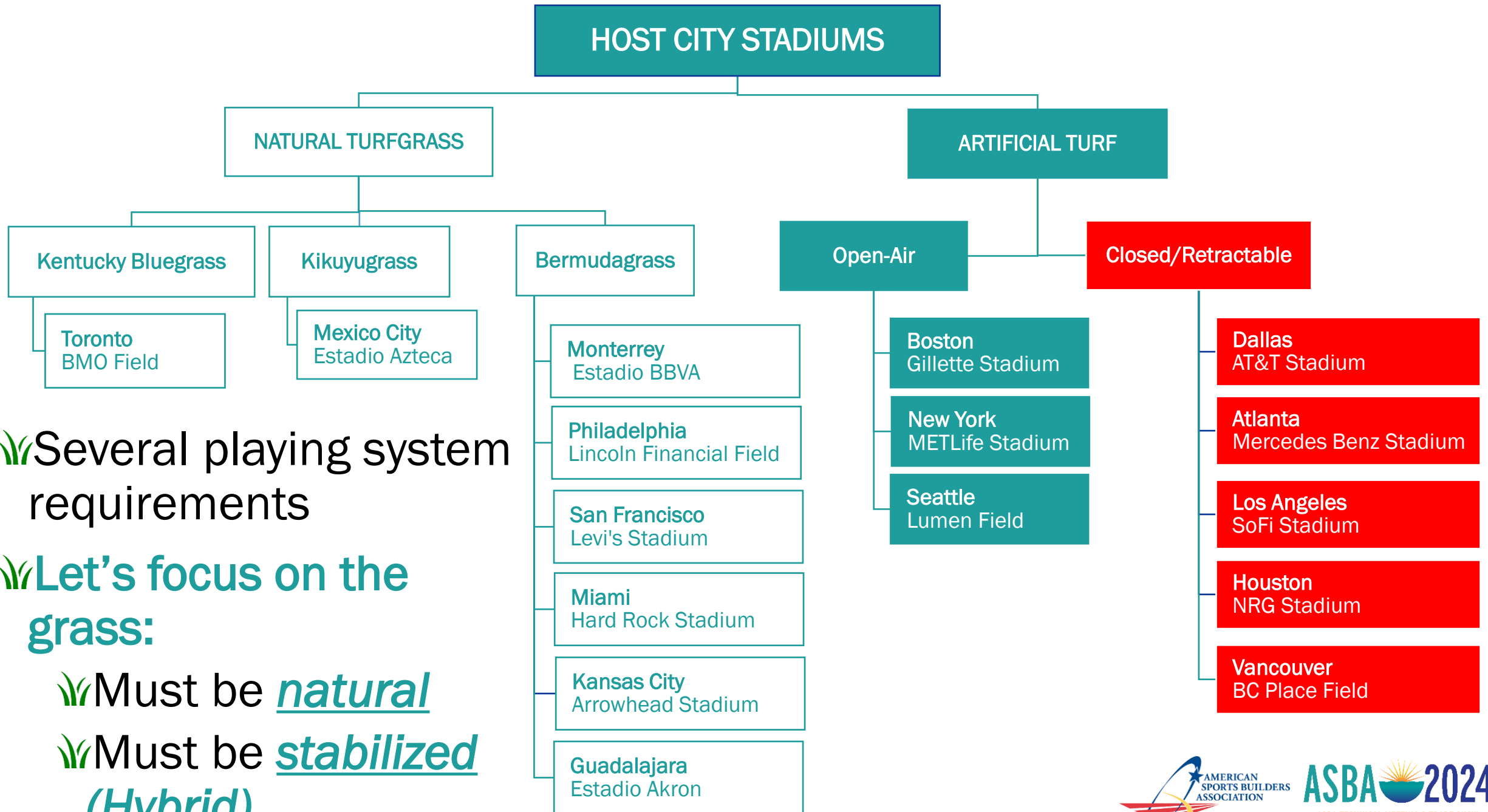


Several playing system requirements

Let's focus on the grass:

Must be natural

Must be stabilized (Hybrid)



Several playing system requirements

Let's focus on the grass:

Must be natural

Must be stabilized (Hybrid)





# RESEARCH FOCI

Sod Establishment/Sod system

Stadium Floor Construction/Renovation

Pitch Installation

Turfgrass Management



# RESEARCH FOCI



Sod Establishment/Sod system

**Sod options**

Hybrid system options

Stadium Floor Construction/Renovation

Pitch Installation

Turfgrass Management



## Sod on plastic, by the numbers:

- Farm-to-field ready
- 0-transplant shock
- $\geq 40\%$  faster rooting
- Non-species discriminate
- Harvest-ready in 4-6 months
- $\geq 50\%$  stronger



# EVALUATION OF SEED MIXES

2

Kentucky bluegrass and perennial ryegrass **seeding ratios** trials

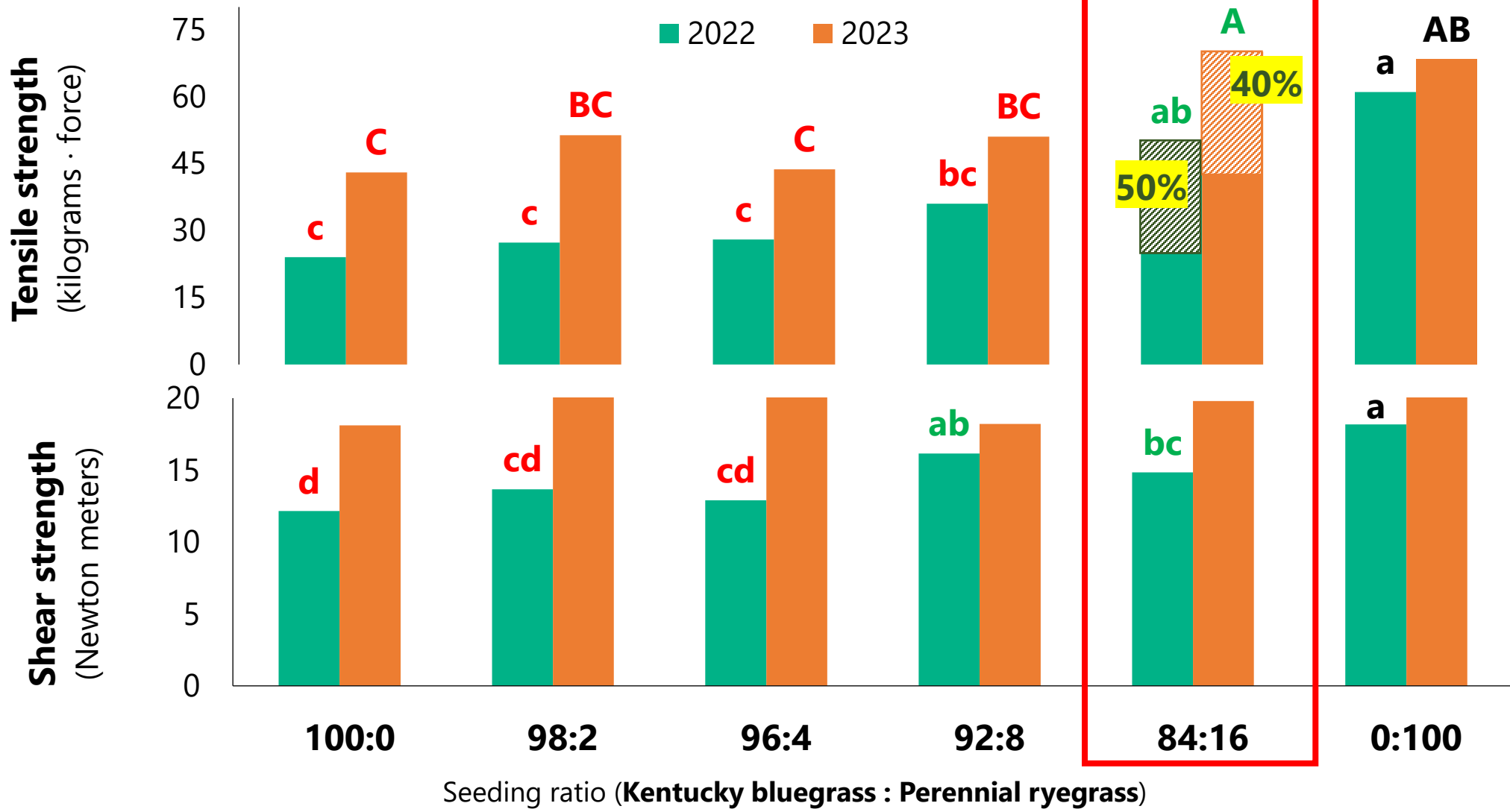
Kentucky bluegrass	Perennial ryegrass
Seeding ratio (by count)	
100	0
98	2
96	4
92	8
84	16
0	100

June (Seeding)



July (1 month)





Sod **shear and tensile strength** of sod grown on plastic with varying Kentucky bluegrass and perennial ryegrass seeding ratios, **evaluated 4 months after seeding** at East Lansing, MI – 2022 and 2023. Significant differences within each year were indicated with different letters (Fisher's protected LSD,  $\alpha=0.05$ )

# RESEARCH FOCI

## Sod Establishment/Sod system

Sod options

**Hybrid system options**

## Pitch Installation

## Stadium Floor Construction/Renovation

## Turfgrass Management

# WHAT IS A HYBRID?



**Stitched**

Vertically-oriented systems



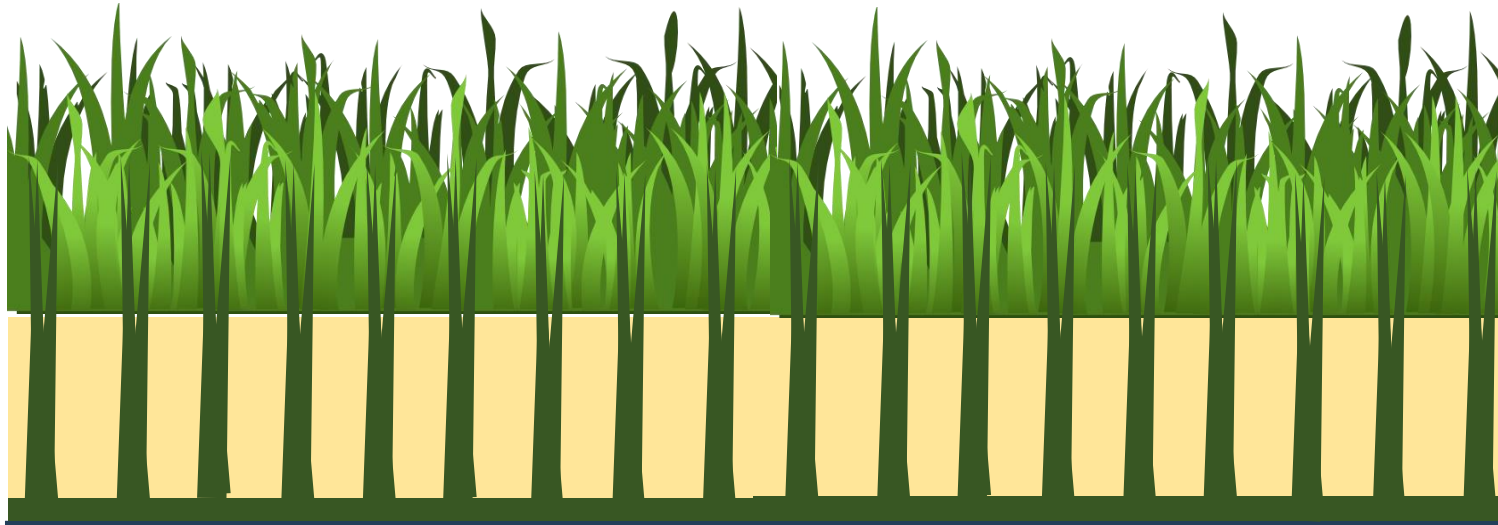
**Carpet-mat**



**Netted**

Horizontally-oriented systems

# HYBRID SOD ON PLASTIC ESTABLISHMENT 2021



**Infill**

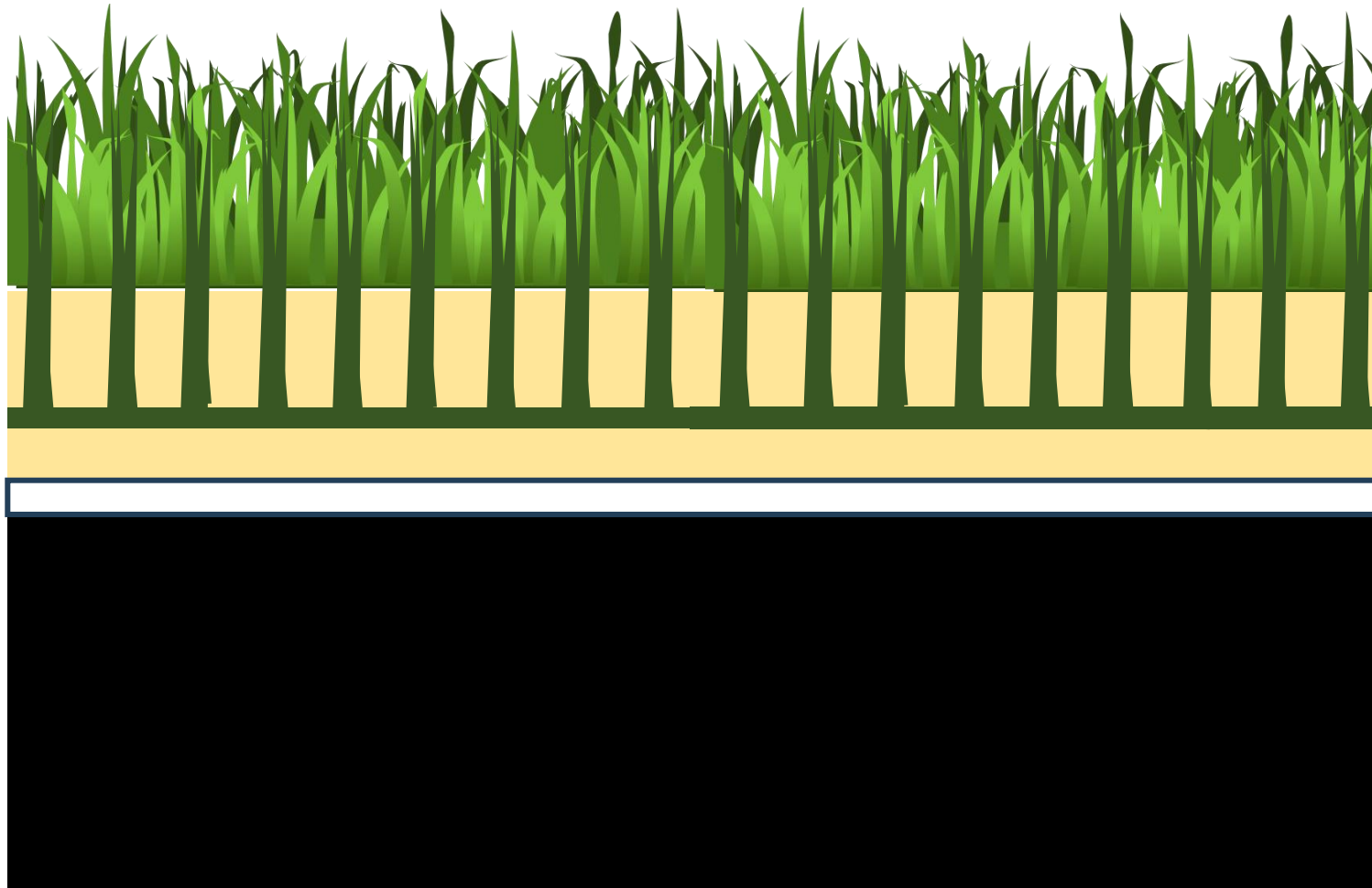
**Carpet mat system**

**Plastic sheet**

**Asphalt**



# HYBRID SOD ON PLASTIC ESTABLISHMENT 2022'--



**Infill**

**Carpet mat system**

**Blinding layer**

**Plastic sheet**

**Asphalt**



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Buried fibers

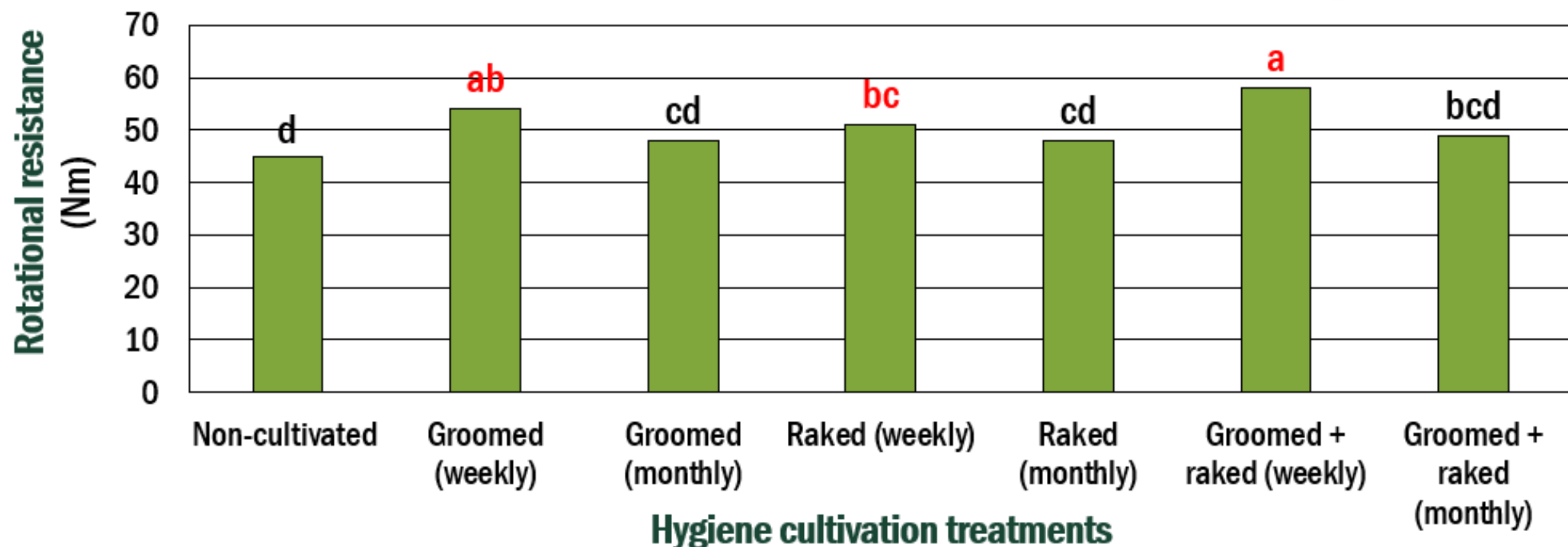
+ Traffic and wear





**HYGIENE:** Organic matter management strategies used to prolong the function and use of a hybrid system—Stand the fibers and prevents surface litter

## RESULTS—Rotational resistance/Shear strength



**Figure 3.** The effects of seven hygiene cultivation treatments on rotational resistance of 84:16 Kentucky bluegrass (*Poa pratensis* L.):Perennial ryegrass (*Lolium perenne* L.) hybrid-stabilized sod, 6-months after establishment, evaluated at the Hancock Turfgrass Research Center, East Lansing, MI—Fall 2024

# RESEARCH FOCI



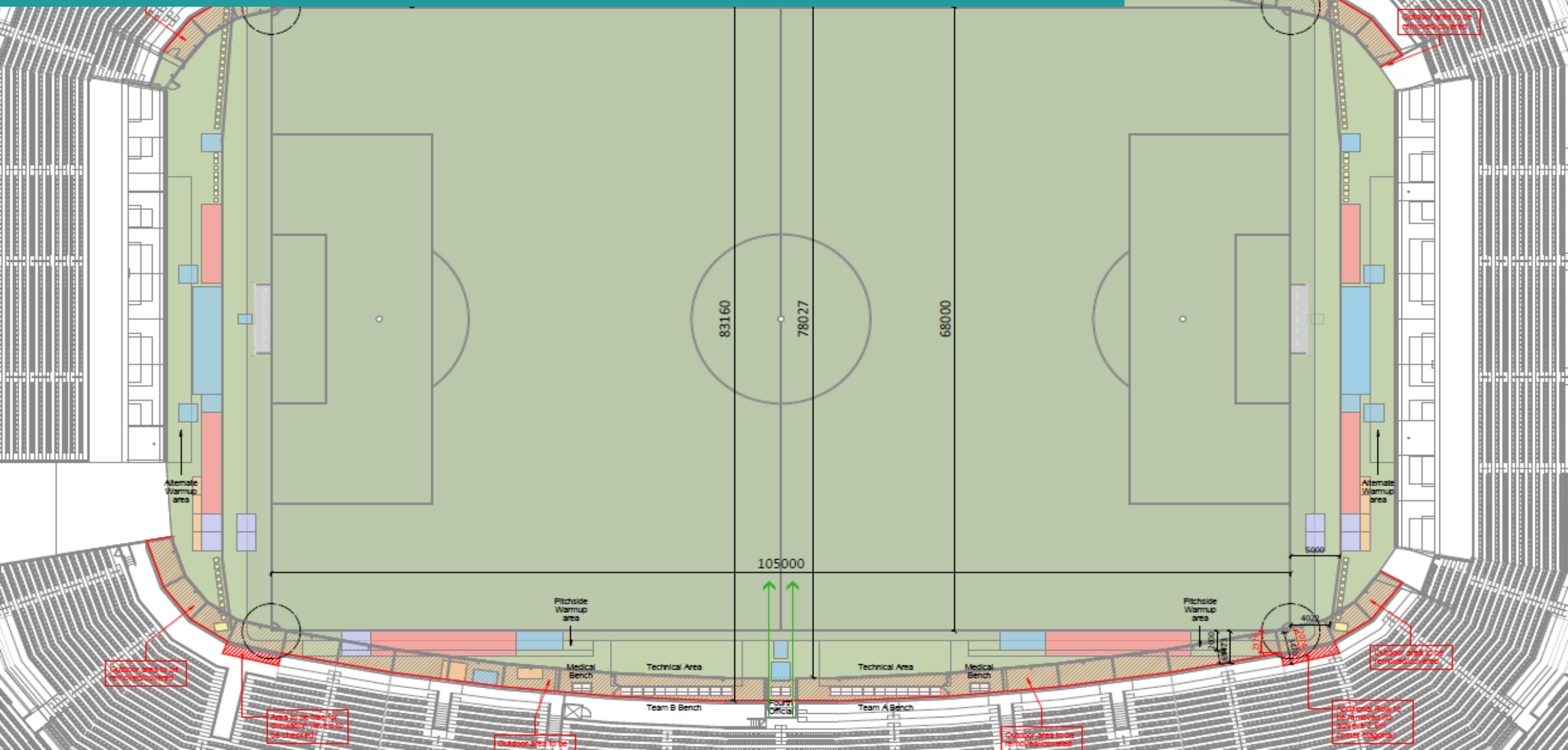
Sod Establishment/Sod system

Stadium Floor Construction/Renovation

Pitch Installation

Turfgrass Management

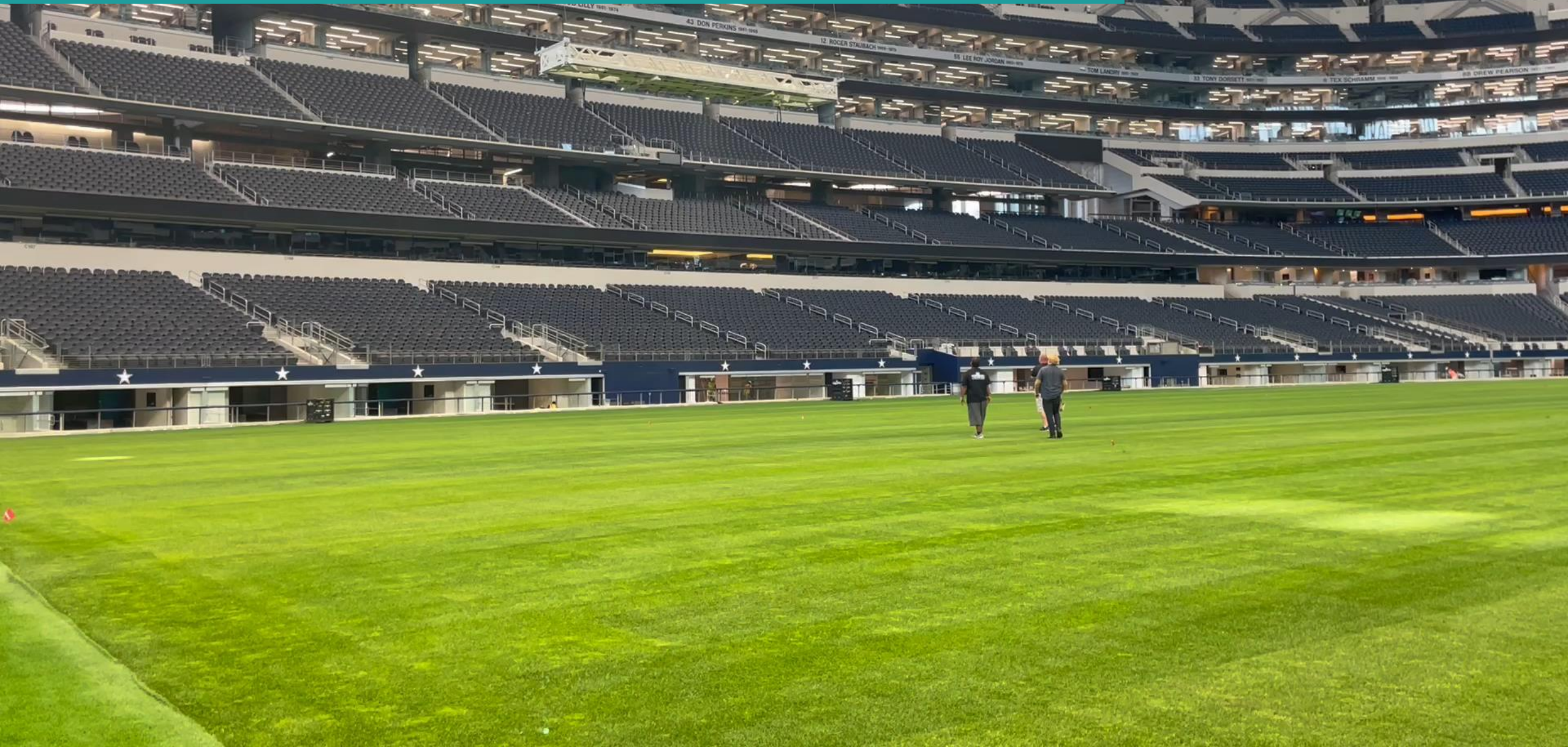
# ATT STADIUM MODIFICATIONS



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# RESEARCH FOCI



Sod Establishment/Sod system

Stadium Floor Construction/Renovation

**Pitch Installation**

**Shallow profile construction?**

**PROVE IT!**

Turfgrass Management

# OPTIONS FOR MULTI-USE STADIUMS

1 MODULAR



2 CONVENTIONAL FIELD



3 SHALLOW TURFGRASS PROFILE?





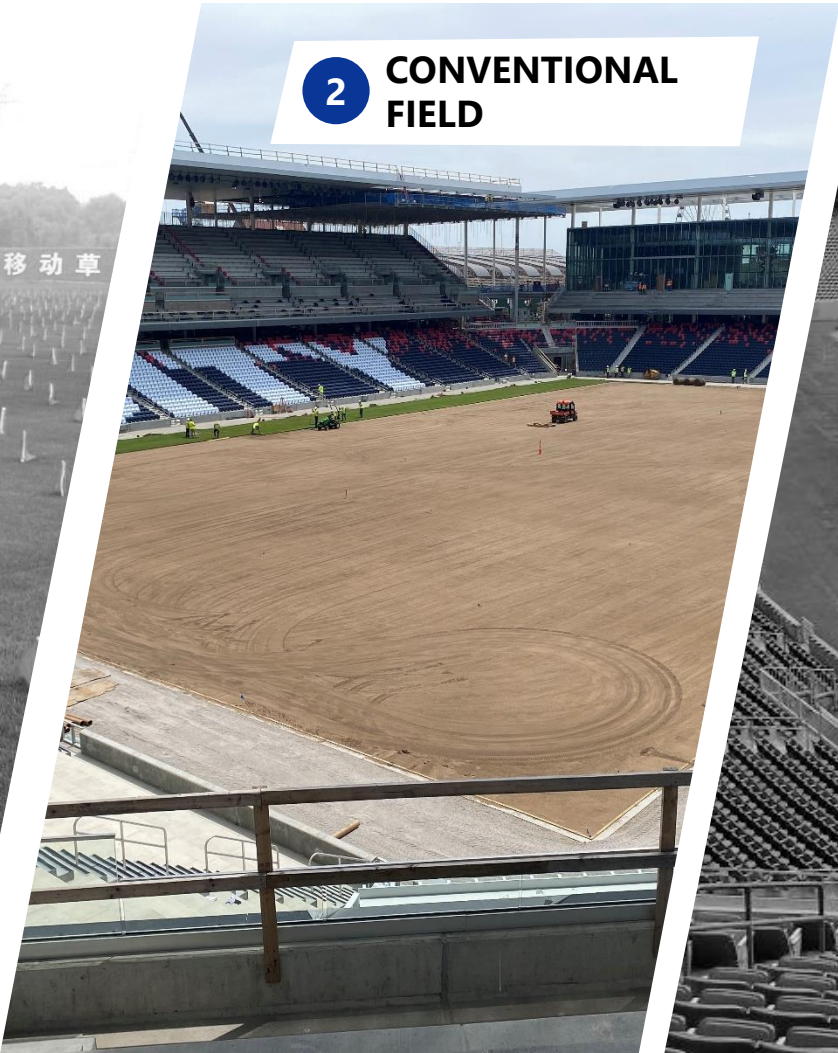


# OPTIONS FOR TEMPORARY FIELD CONVERSION

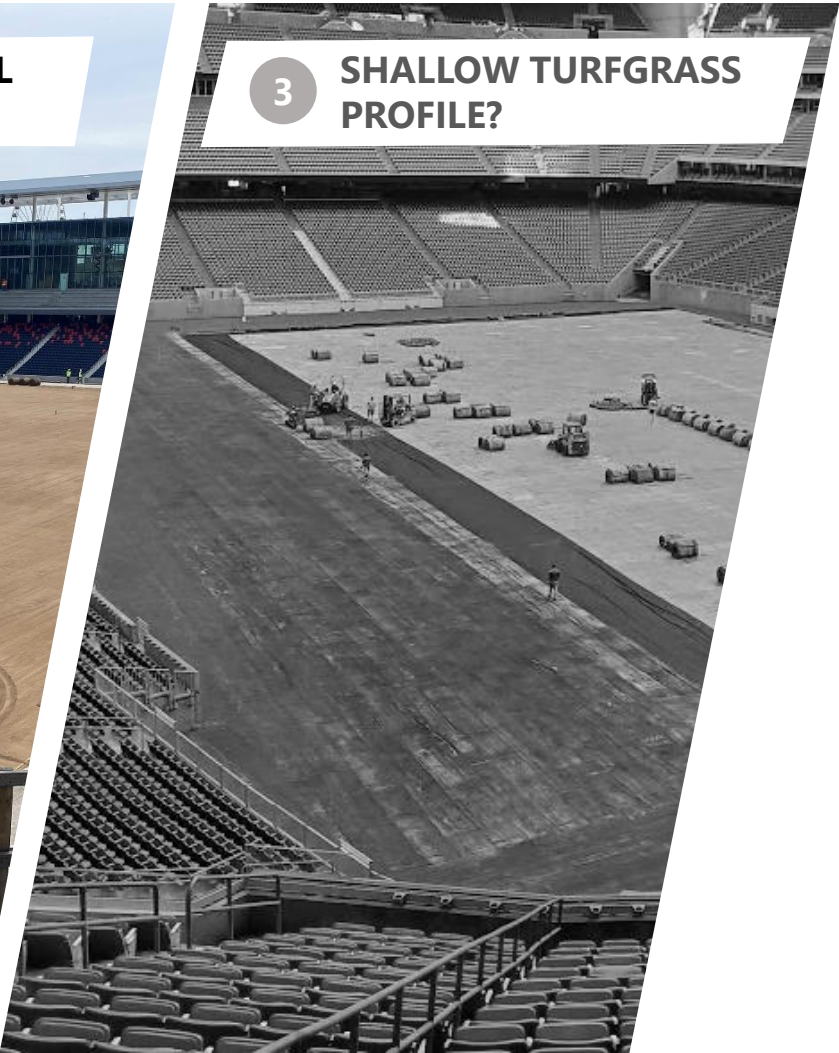
1 MODULAR



2 CONVENTIONAL FIELD



3 SHALLOW TURFGRASS PROFILE?





# OPTIONS FOR TEMPORARY FIELD CONVERSION

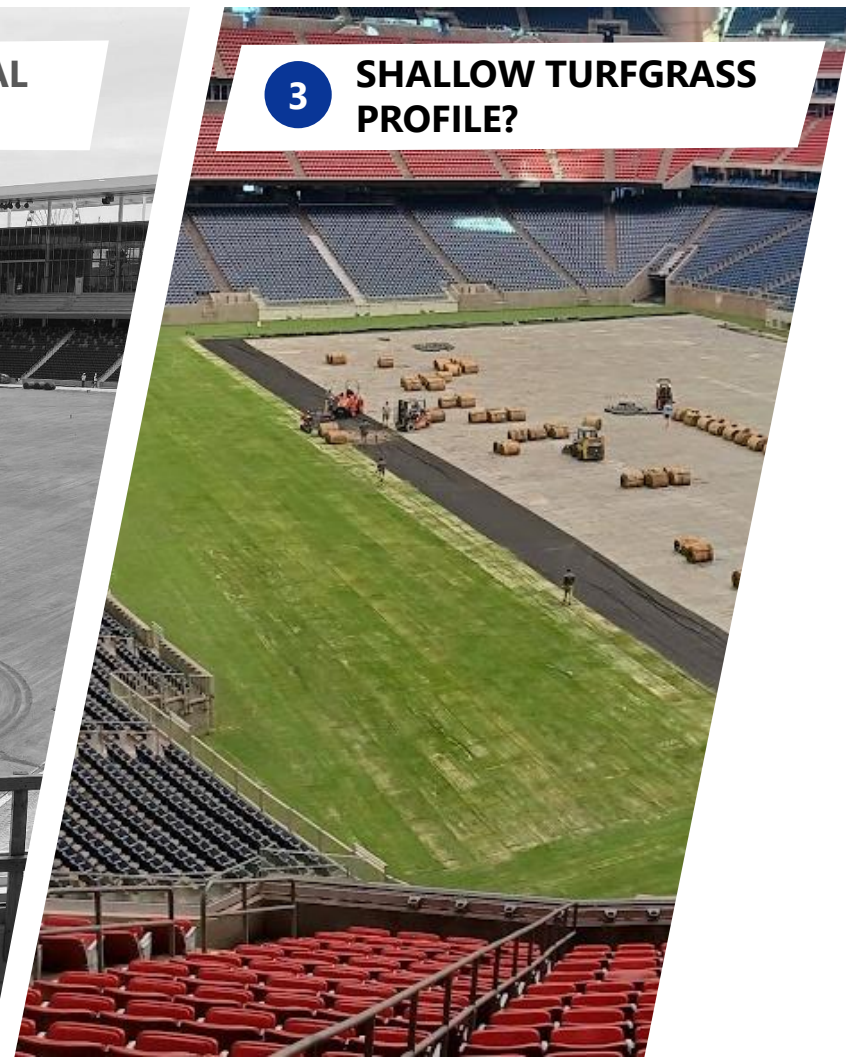
## 1 MODULAR



## 2 CONVENTIONAL FIELD

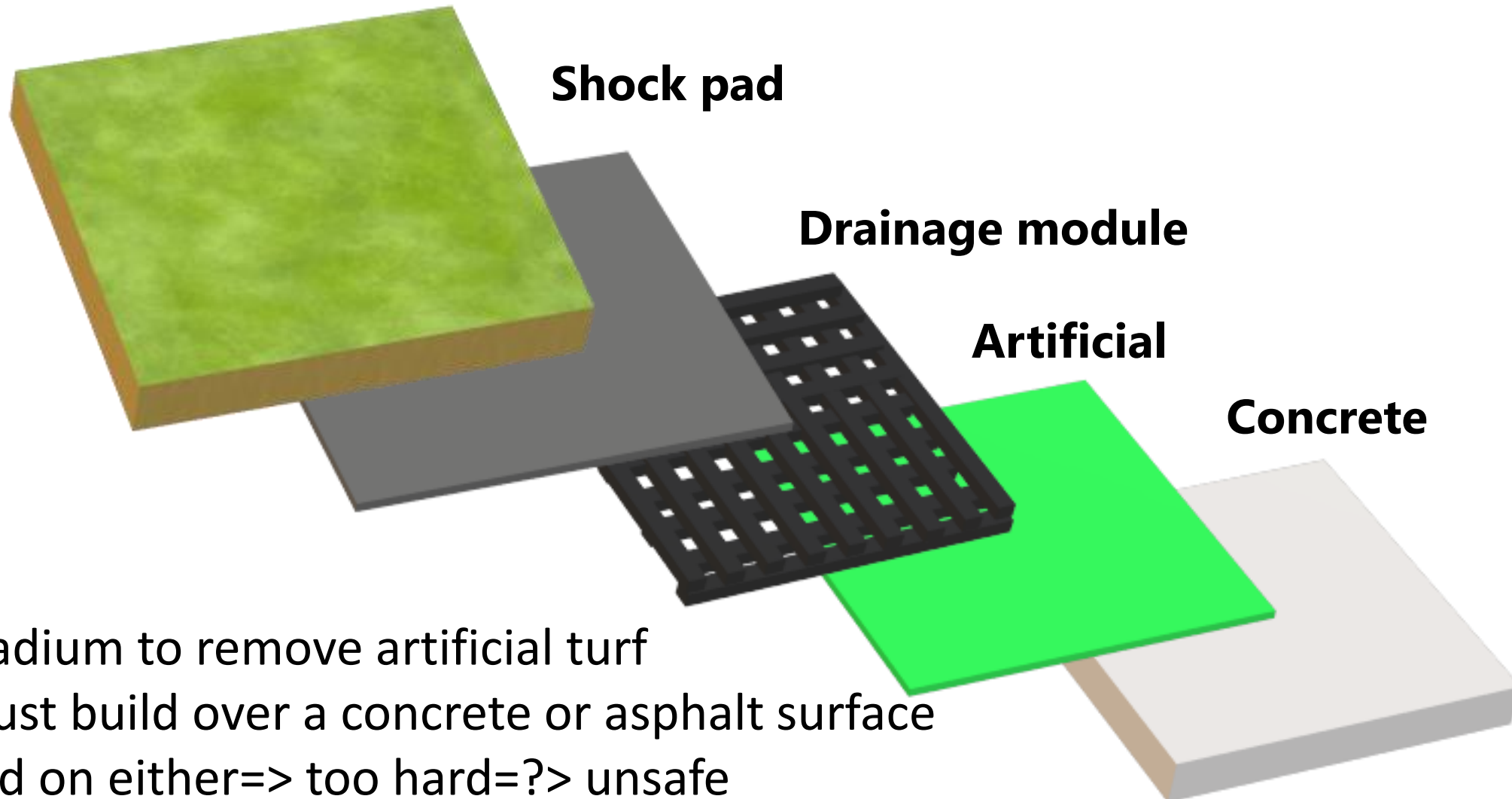


## 3 SHALLOW TURFGRASS PROFILE?



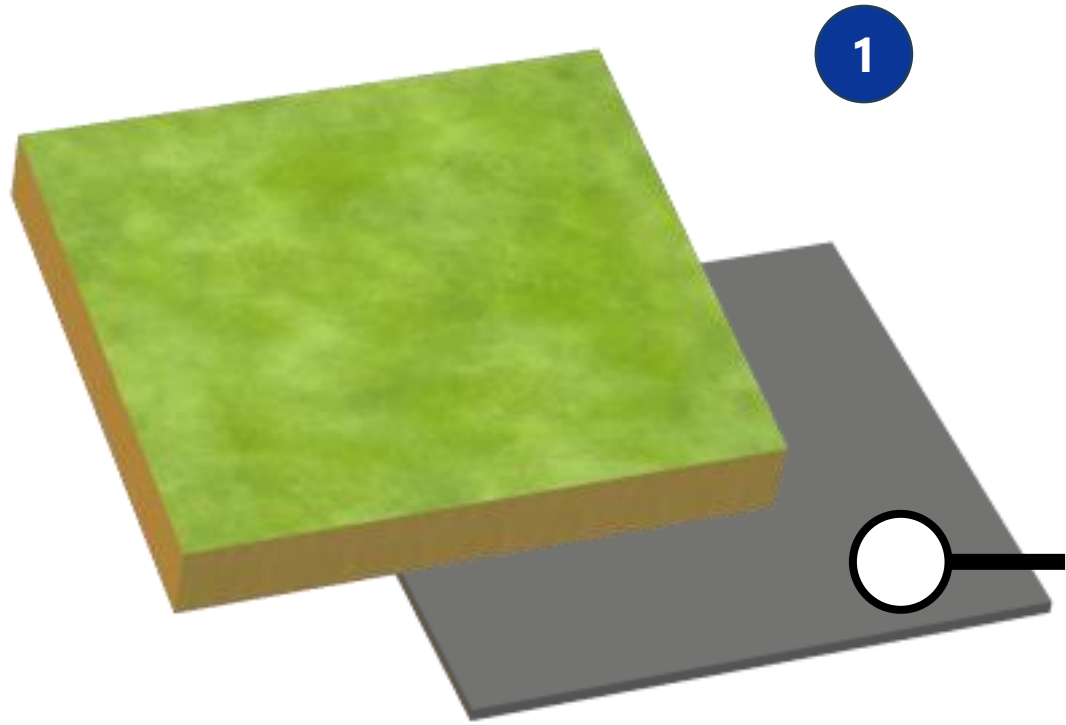
# SHALLOW-PROFILE SYSTEM FOR THE FIFA WORLD CUP 2026?

**Sod grown on plastic with reinforcement**

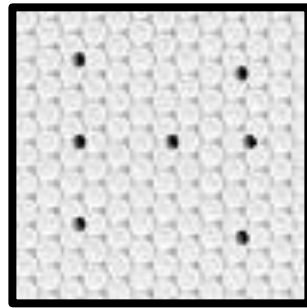


- Stadium to remove artificial turf
- Must build over a concrete or asphalt surface
- Sod on either=> too hard=?> unsafe

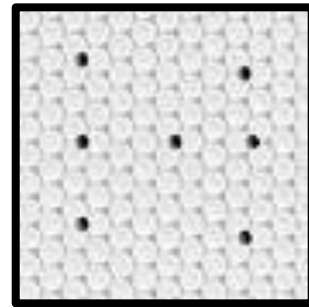
# SHALLOW-PROFILE SYSTEM FOR THE FIFA WORLD CUP 2026?



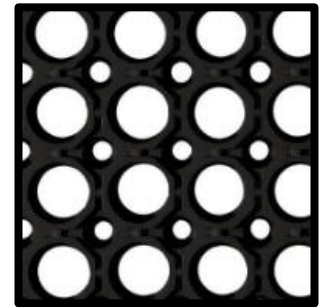
1



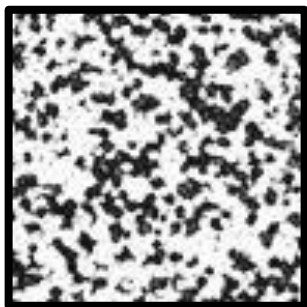
**Brock® Pro**



**Brock® YSR**



**Drain Mat**



**Brock® SP**  
14, 17 and 20  
mm



**Armacell®**  
8, 16 mm  
5013, 5091  
and IUO 3/4



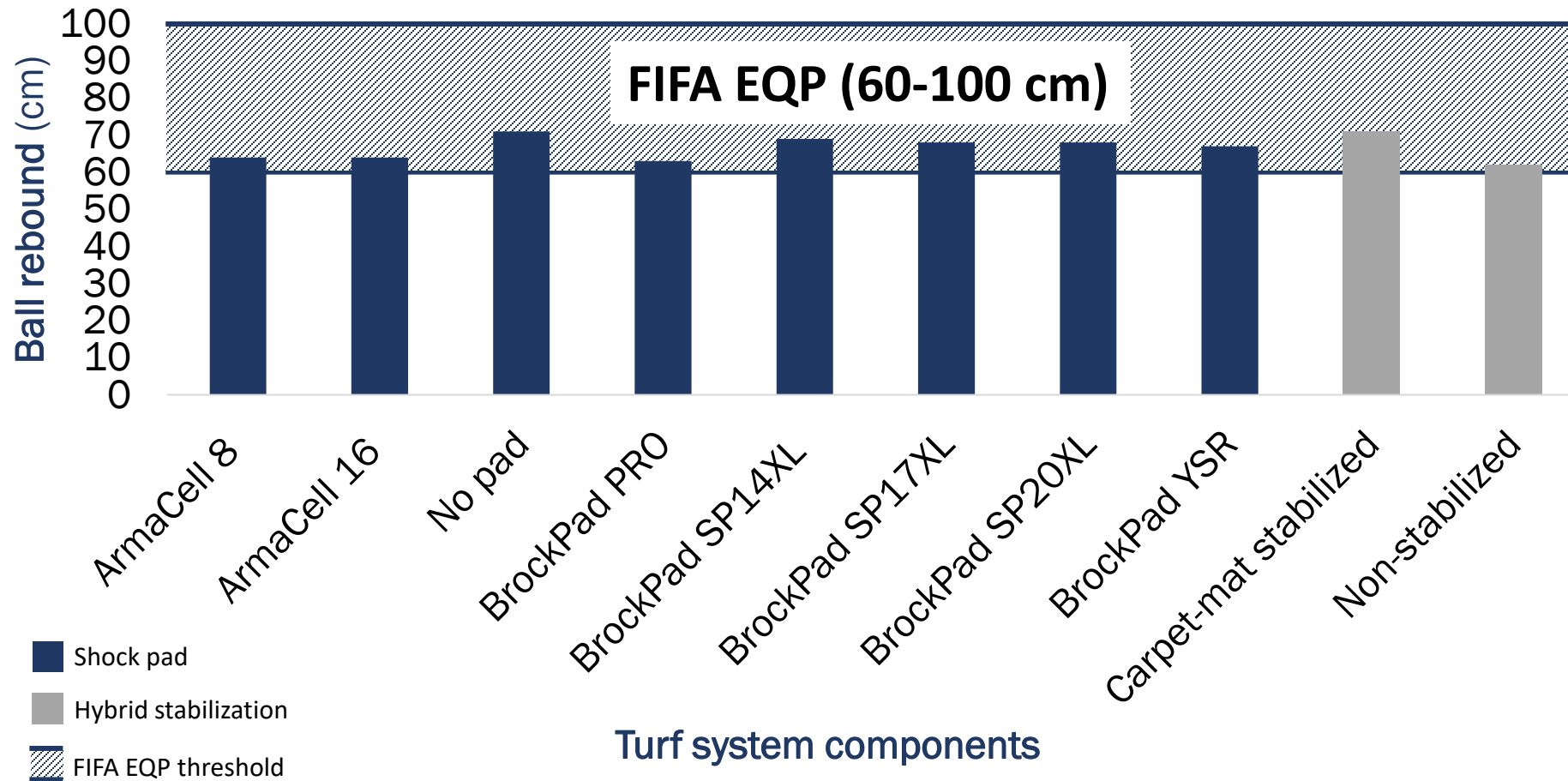
**Porous Pave®**  
XLB\*, XLR

# Initial testing of shock pad and drainage modules

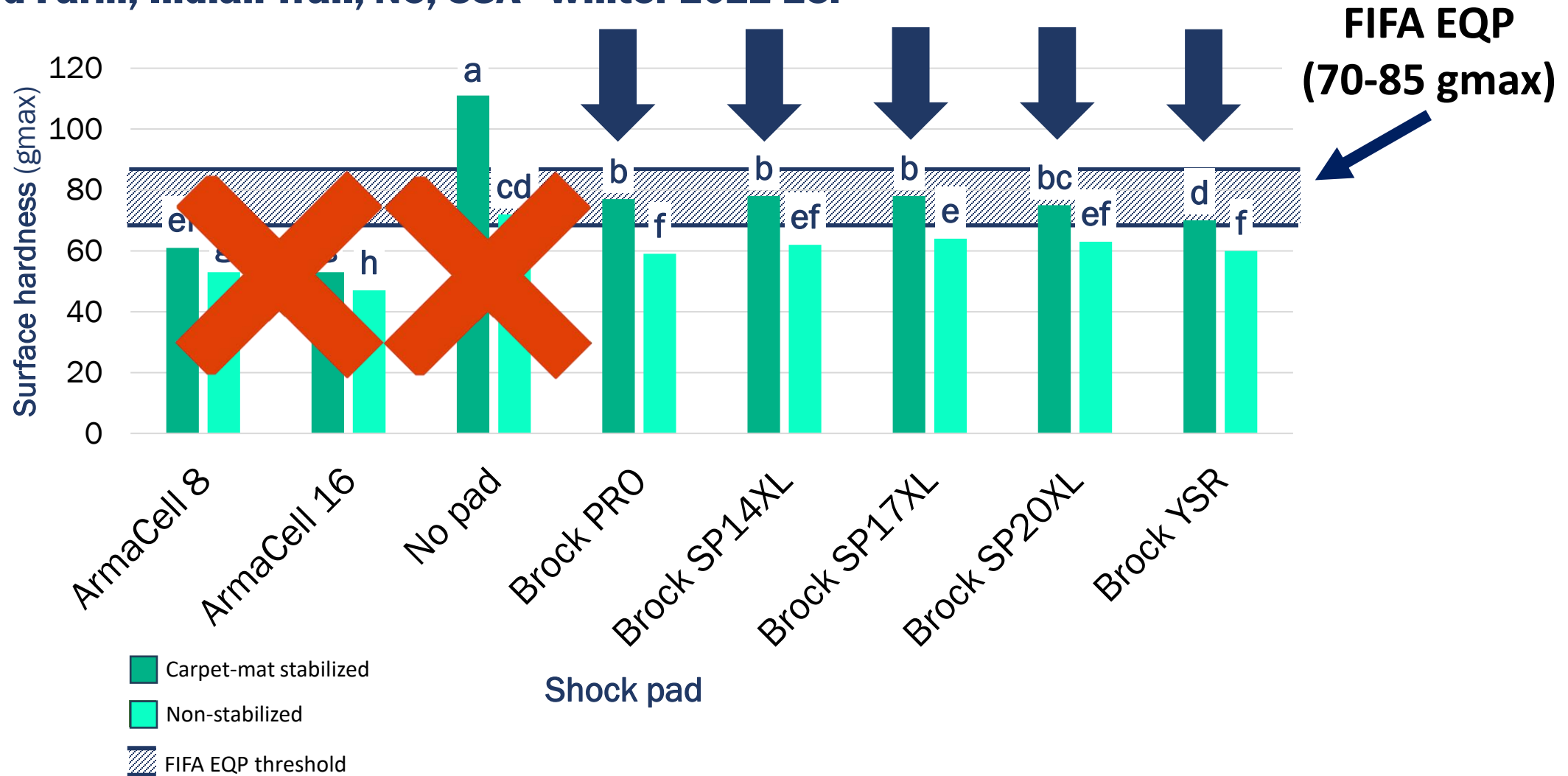
February 2022 – Carolina Green Sod Farm, North Carolina



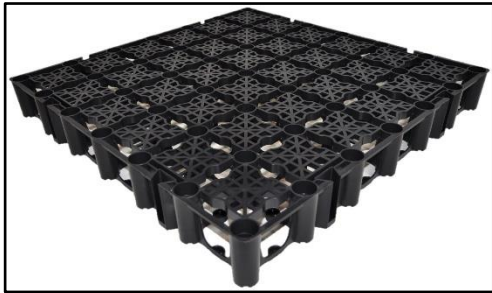
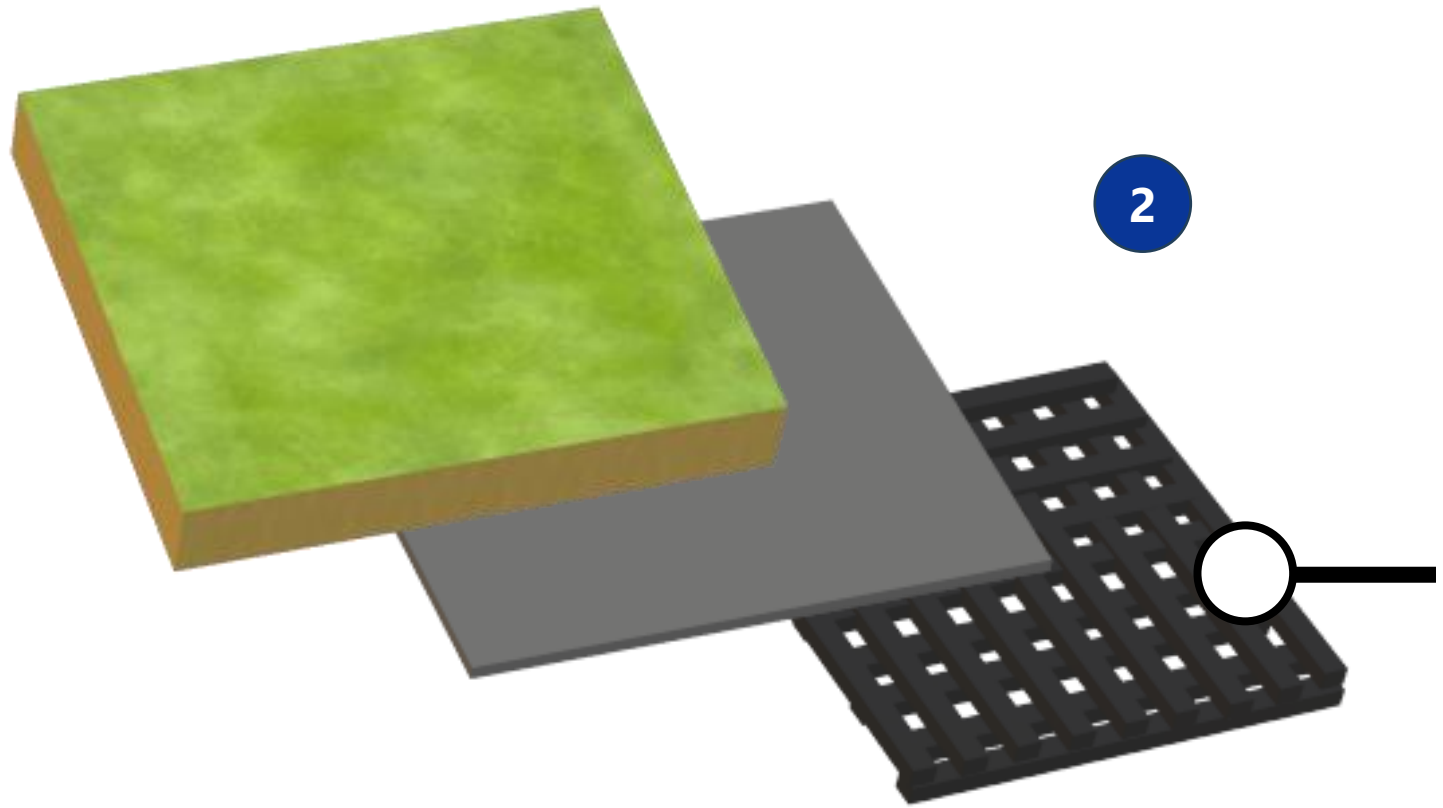
The effects of shock pad and HERO carpet-mat stabilization on ball rebound (cm) of Kentucky bluegrass (*Poa pratensis* L.) sod grown on plastic relative to FIFA excellent quality pitch (EQP) thresholds, evaluated over concrete, six-months after establishment at the Carolina Green Sod Farm, Indian Trail, North Carolina, USA— Winter 2022-23.



**The effects of HERO carpet-mat stabilization and shock pad on surface hardness ( $g_{max}$ ) of *Lolium perenne* L. sod grown on plastic, tested on concrete and evaluated six months after establishment at Carolina Green Sod Farm, Indian Trail, NC, USA—Winter 2022-23.**



# SHALLOW-PROFILE SYSTEM FOR THE FIFA WORLD CUP 2026?



**Permavoid® 85s**



**Drain Mat**

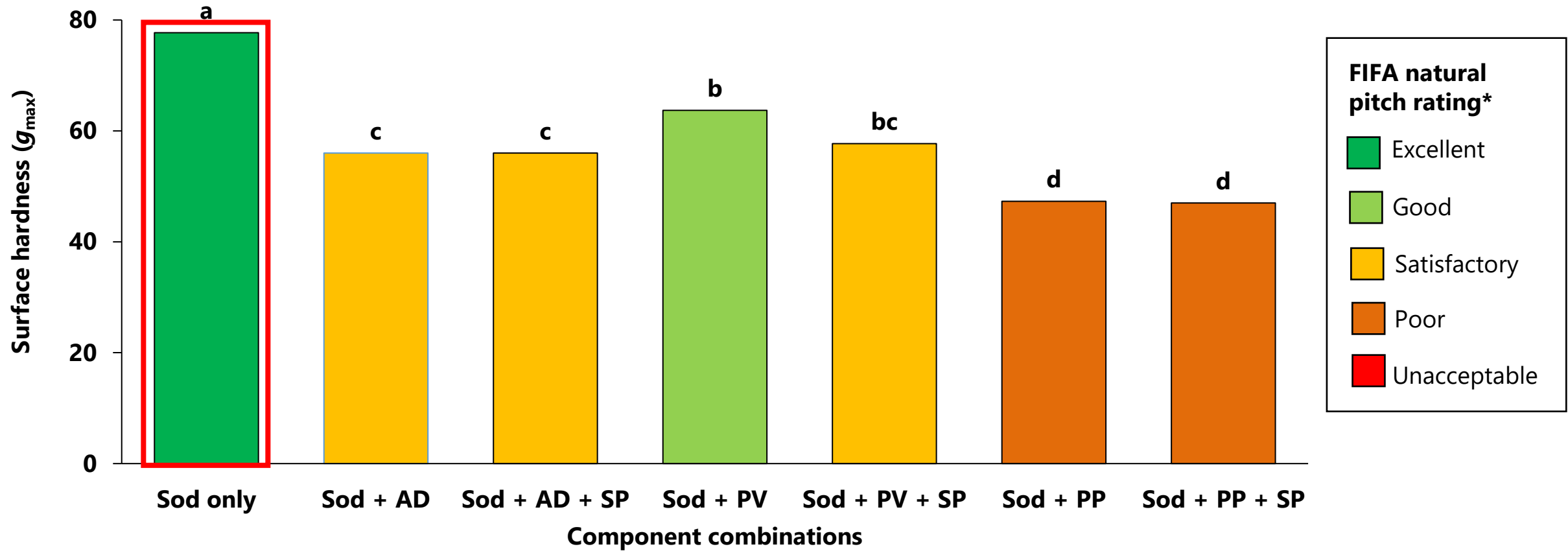


**Porous Pave® XLB**

# Testing shockpad and drainage modules

July 2023 – Michigan State University

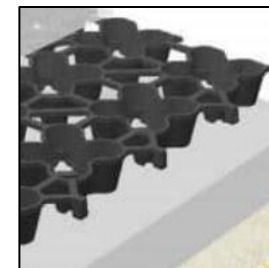
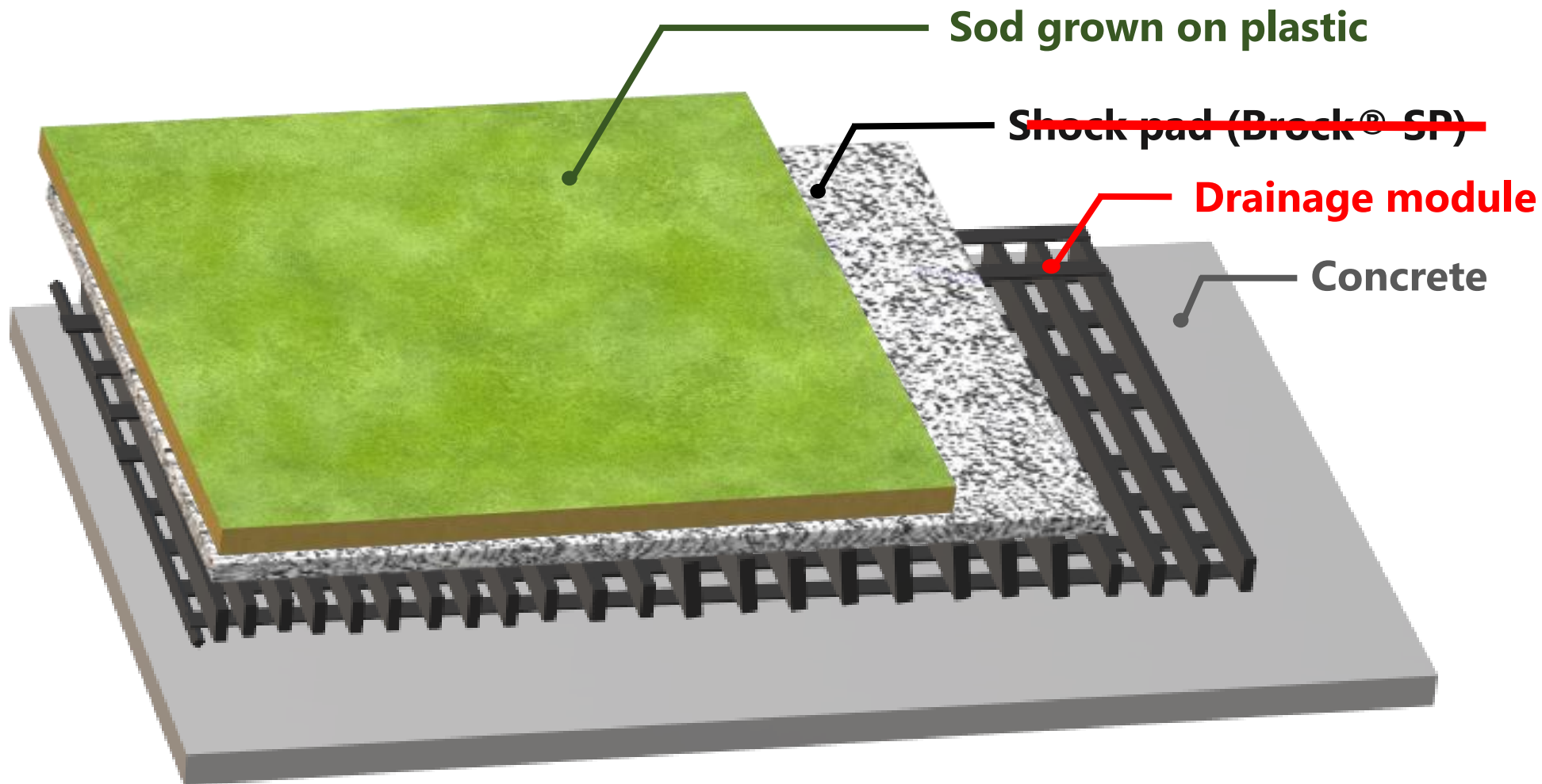




**Effect of various combinations of drainage and shock pads on mean surface hardness** of a temporary shallow-profile system with a perennial ryegrass (*Lolium perenne* L.) sod grown on plastic, evaluated at Michigan State University and University of Tennessee, USA – 2023. Means followed by the same letter are not significantly different according to Tukey’s Honest Significance Difference ( $\alpha = 0.05$ ).

**AD = AirDrain; PV = Permavoid; PP = Porous Pave; SP = Shock pad.**

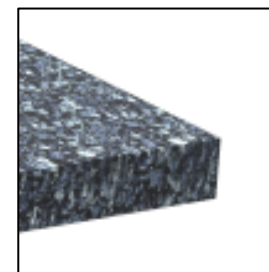
# SHALLOW-PROFILE SYSTEM FOR THE FIFA WORLD CUP 2026?



AirDrain



Permavoid 85s



Porous Pave XL

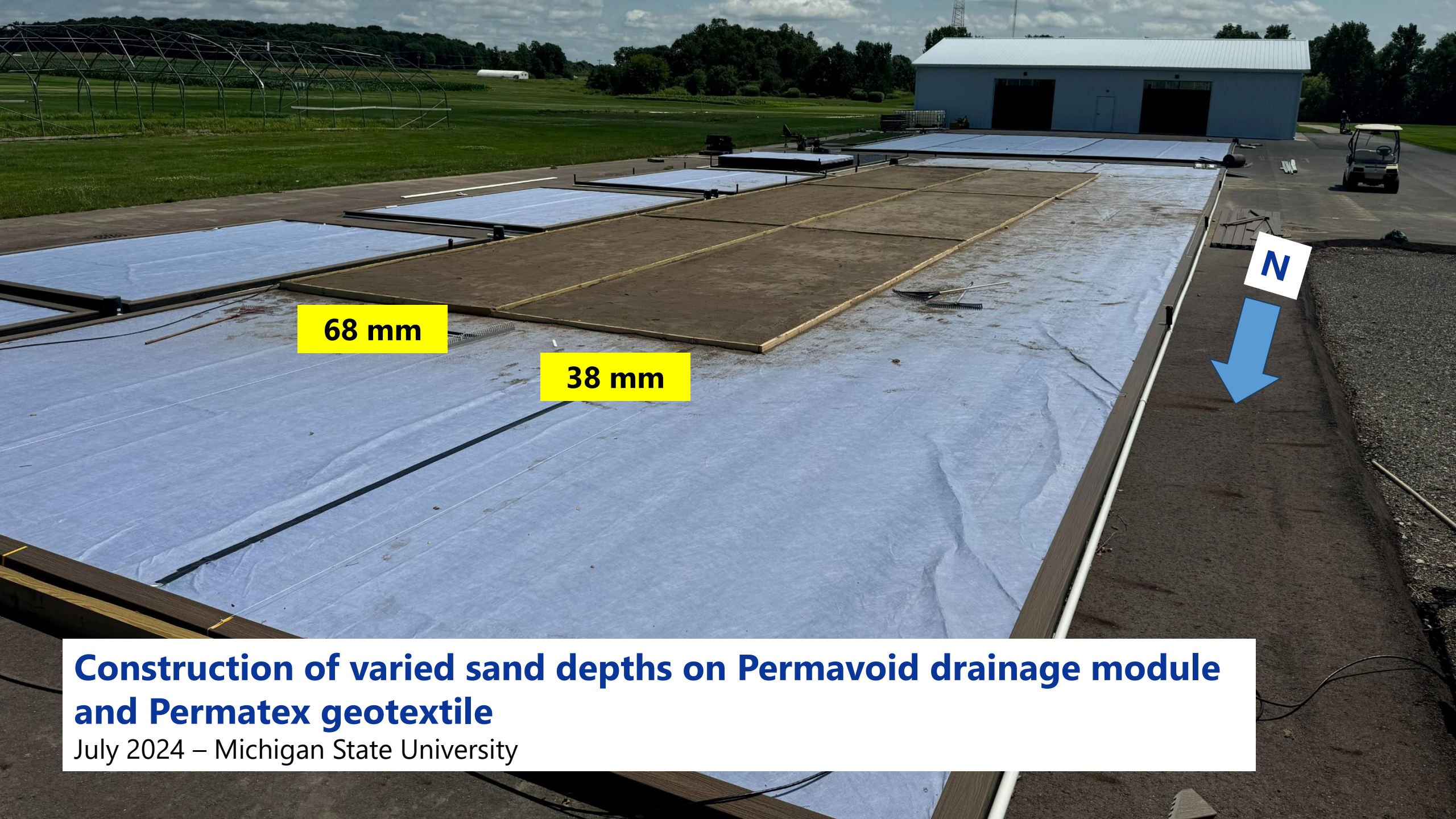


nrg stadium

sponsored by  
reliant  
an aetna company

sponsored by  
reliant  
an aetna company





68 mm

38 mm

N

## Construction of varied sand depths on Permavoid drainage module and Permatex geotextile

July 2024 – Michigan State University





# Shallow-stitch assessments



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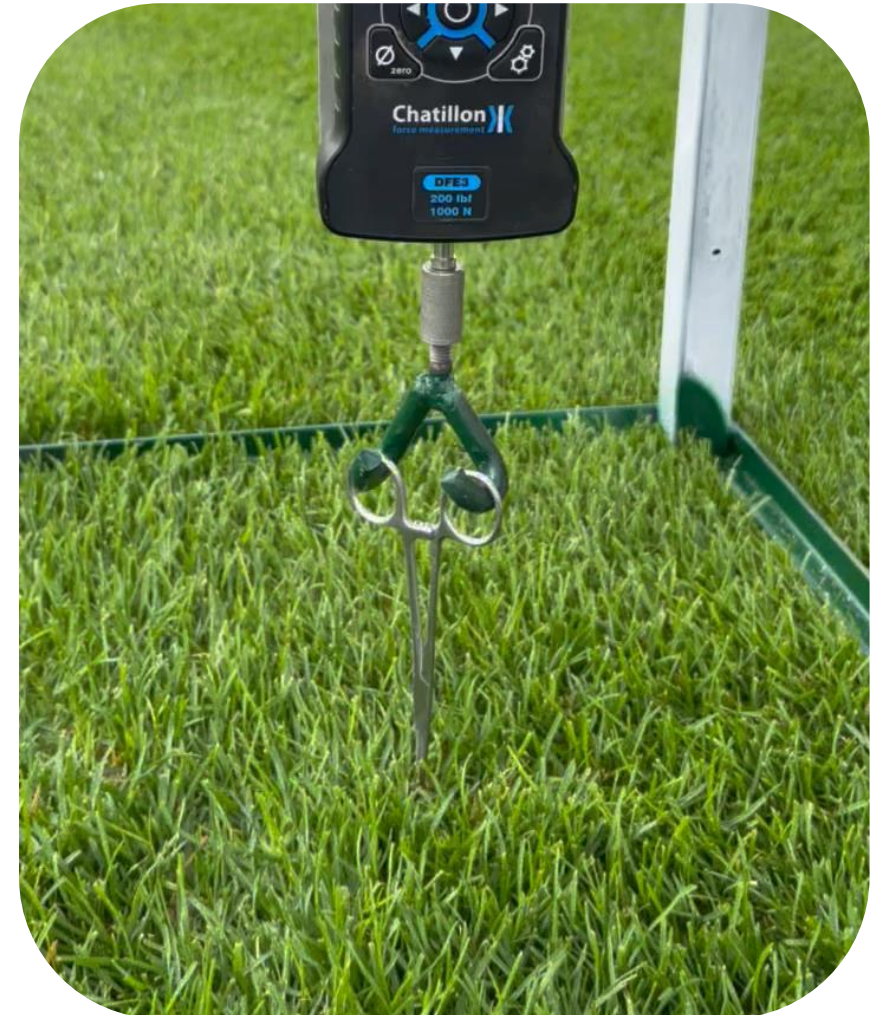


# Shallow-stitch assessments— Fiber force tester



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- Measures tuft withdrawal force of stitched fibers
- Length of time for fiber anchoring
- Effects of sand and stitching depth



# RESEARCH FOCI



Sod Establishment/Sod system

Stadium Floor Construction/Renovation

Pitch Installation

Shallow profile construction?

**PROVE IT!**

Turfgrass Management

# COPA AMERICA 2024 KEY DATES

**May 20, 2025**

*PBR World Finals Exit*

**May 21, 2025**

*Construction of Pitch Begins*

**June 10-11, 2025**

*MATCH 1*

**June 21, 2025**

*MATCH 2*

**June 23, 2025**

*MATCH 3*

**July 5, 2025**

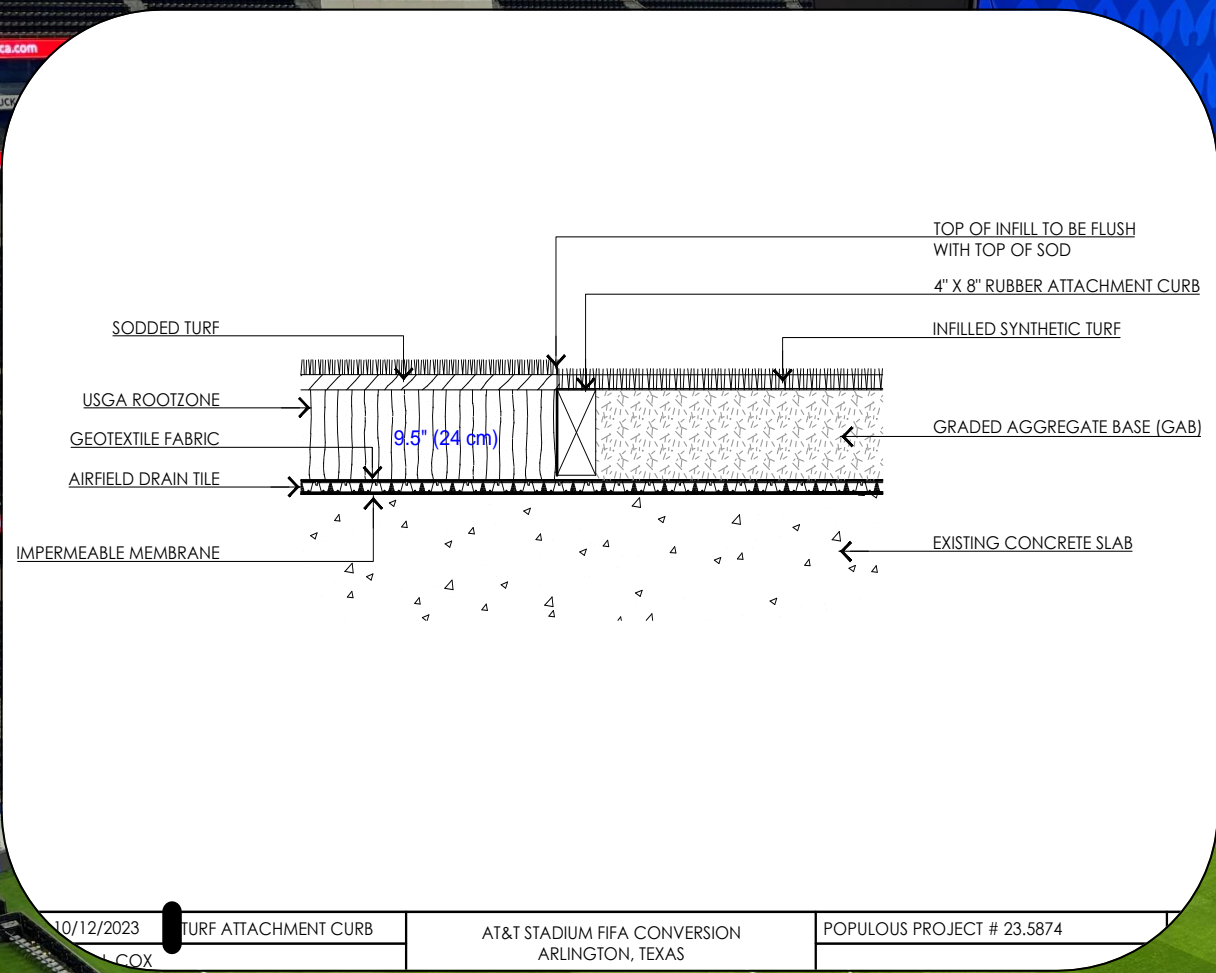
*Community Events*

**July 9-10, 2025**

*Pitch Demo*

**EOB July 12, 2025**

*Completion*



## OBJECTIVE:

Convert ATT stadium to a 9.5" sand-based root zone, natural turf playing surface

# ATT NATURAL CONVERSION PROCESS



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**AirField drain cells  
installed**



**GeoTextile laid, irrigation  
lines installed**



# ATT NATURAL CONVERSION PROCESS



**ASBA 2024**  
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DECEMBER 3-6, 2024 | ORLANDO, FLORIDA



**Graded aggregate based  
installed**



**Synthetic turf surrounds  
installed**





Miller  
Lite

AT&T STADIUM

34 CHARLES HALEY 1966-1999  
33 DARRIN WOODSON 1966-2000

SCL

ROCKING  
THE COURTNEY



# THE FINAL PRODUCT

A wide-angle photograph of a large stadium, likely for soccer, taken from an elevated position in the stands. The stadium is mostly empty, with rows of dark blue or black seats visible. A large, bright pink temporary structure covers the central field and extends into the seating areas. The structure consists of a grid of beams and panels, creating a series of rectangular sections. In the background, the stadium's architecture and some lights are visible under a clear sky.

- 10-days to install
- Maintained for 30-days
- Removed in 4-days

MEXTOUR  
SOMOS LOCALES

# MÉXICO VS CANADA

PRESENTED BY: AT&T

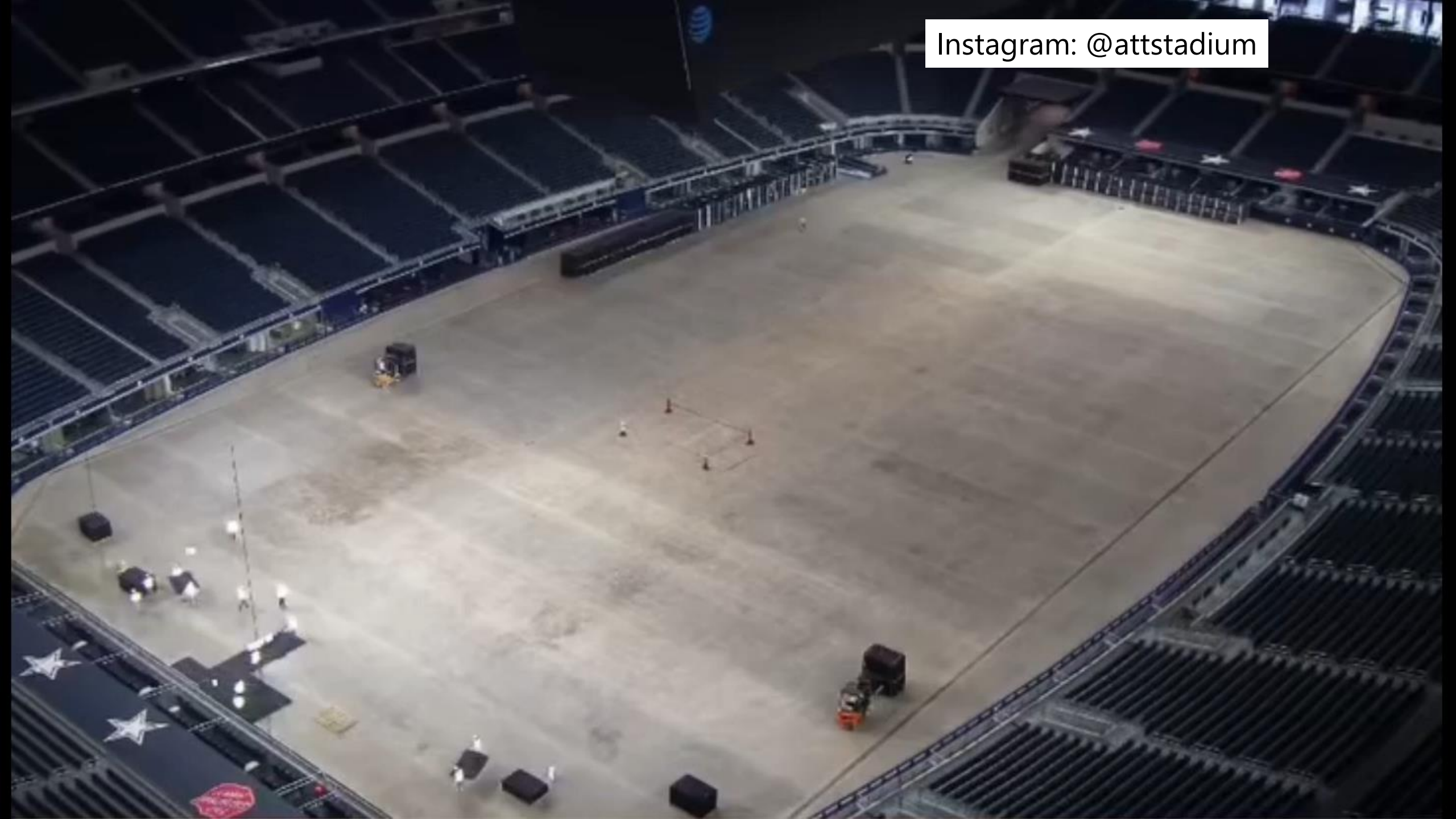
SEPTEMBER 10 | AT&T STADIUM  
ARLINGTON, TX

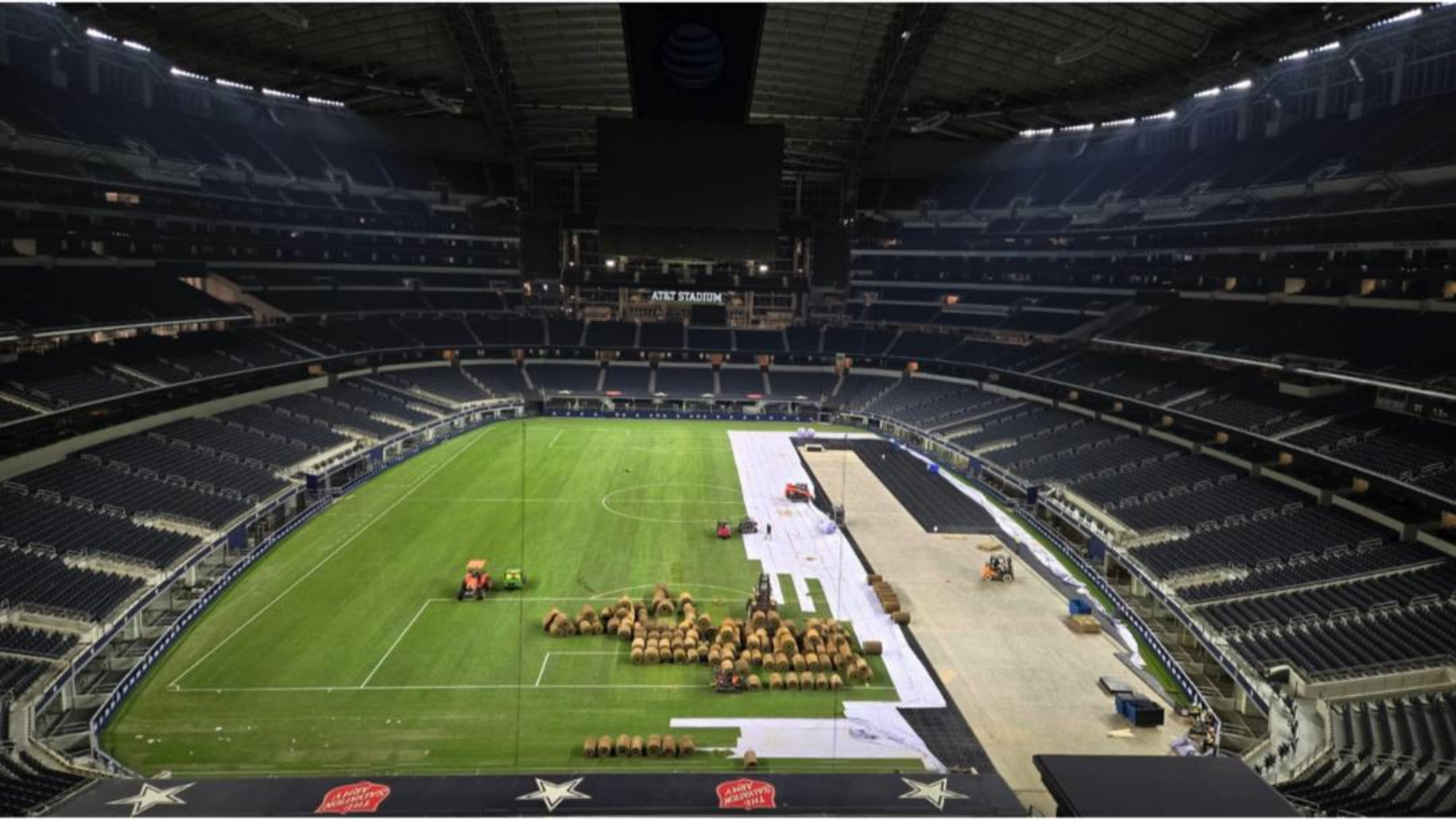


**THE STP LITMUS TEST: MEXICO vs. CANADA**



Instagram: @attstadium





AT&T STADIUM





**41 mm  
(1.6")**

**32 mm  
(1.3")**

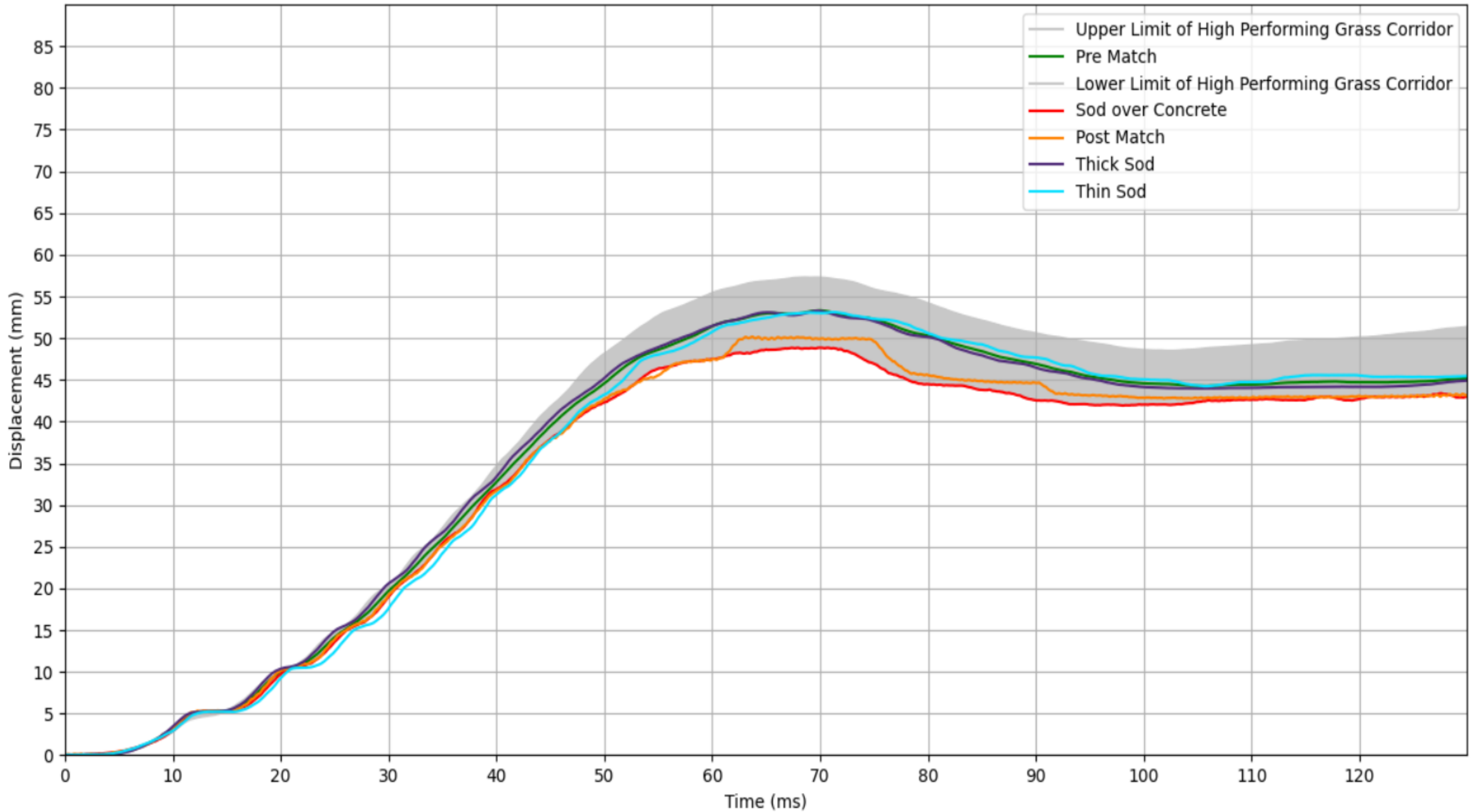


FLEX

8

adidas

Dallas Match Cleat Movement



# RESEARCH FOCI



Sod Establishment/Sod system

Stadium Floor Construction/Renovation

Pitch Installation

**Turfgrass Management**

Shallow pitch management

Lighthouse Research

- Light requirements
- Plant growth regulators (PGRs)
- Disease, Irrigation, Fertilization Management



**HOW ARE WE GOING TO  
MANAGE NATURAL TURFGRASS INSIDE OF  
A DOMED STADIUM?**

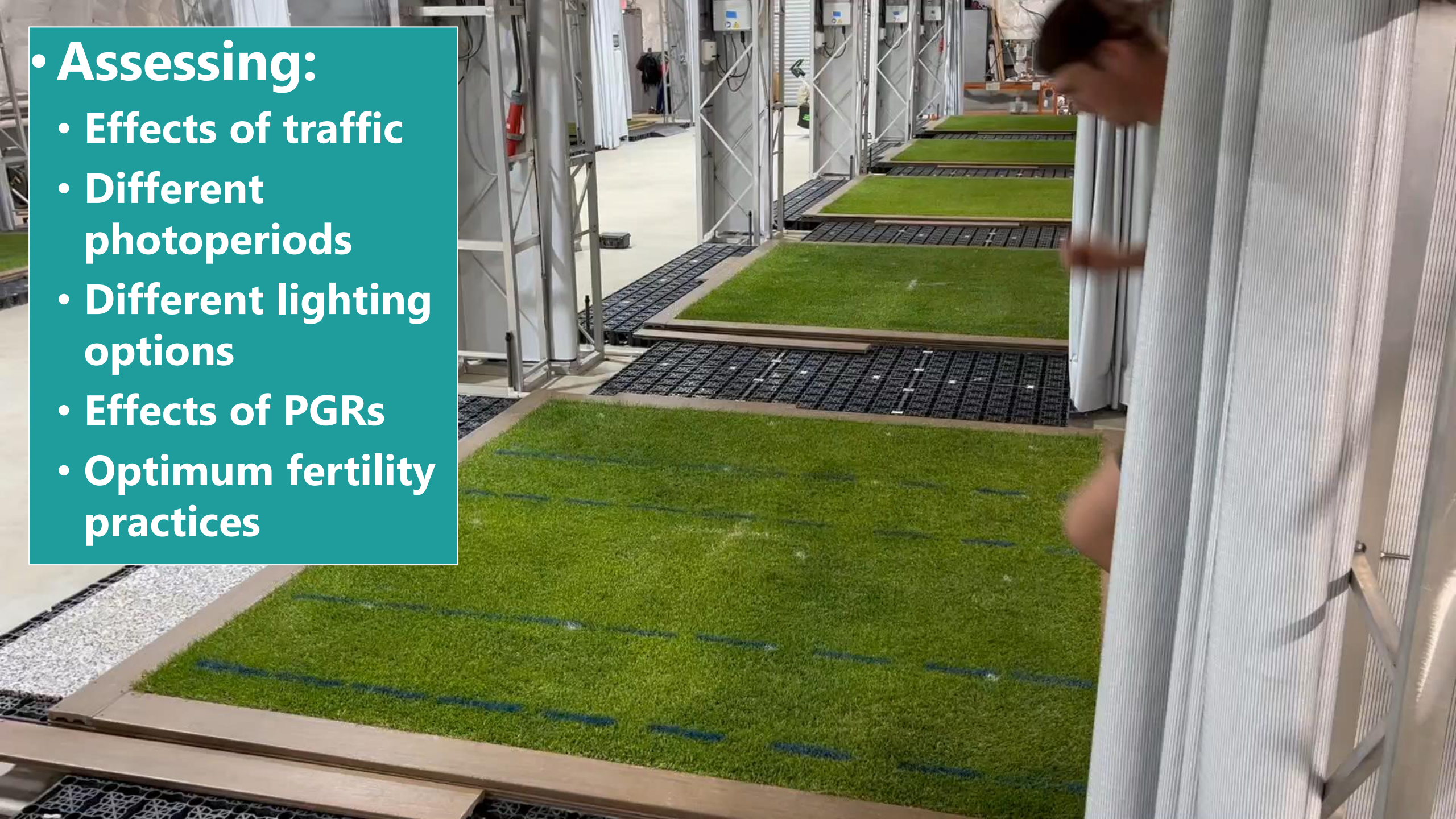




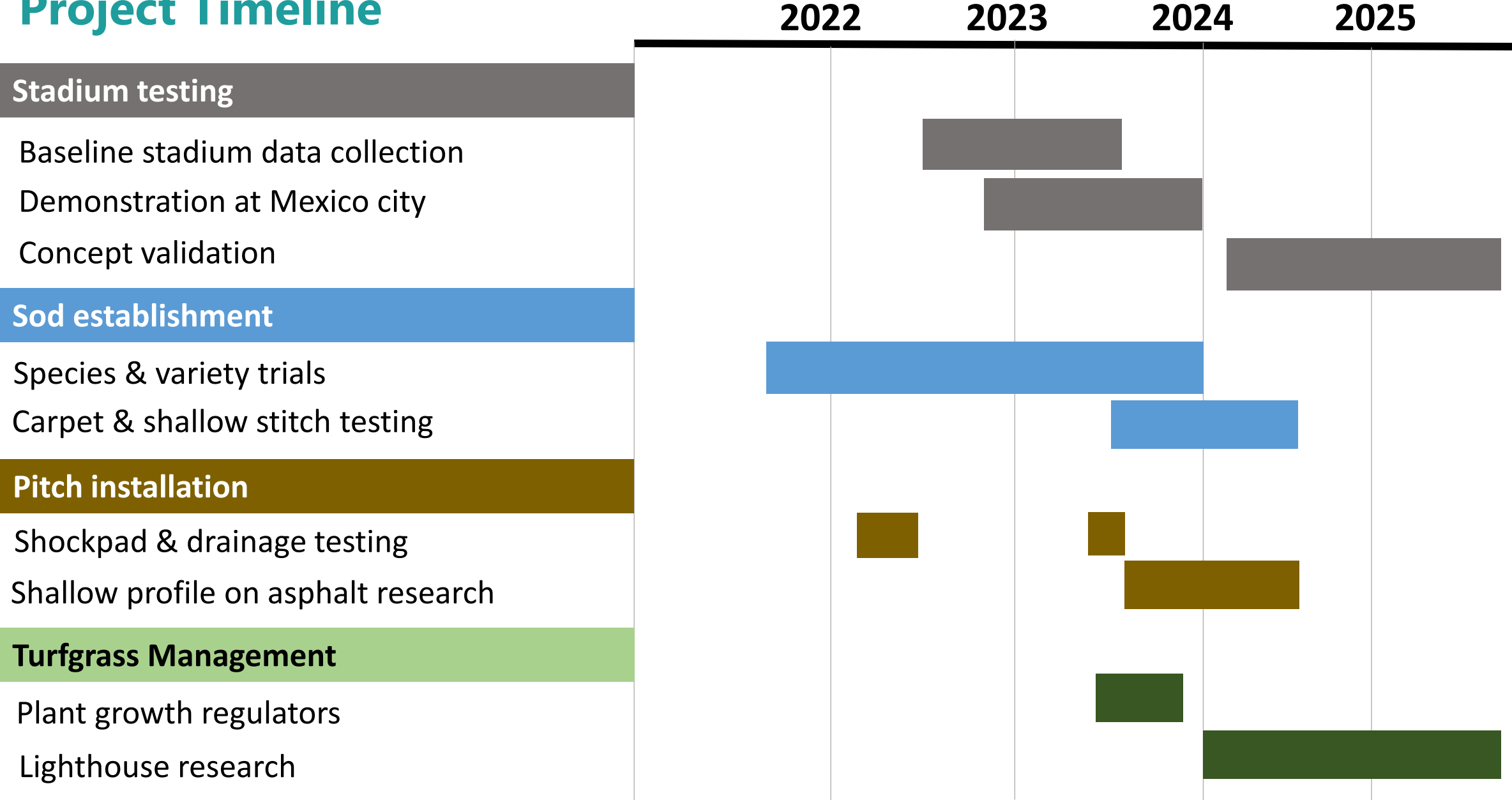
- **12 bays fitted with LED grow lights (three with LED and HPS)**
- **Temperature maintained at ~70°F (21° C)**
- **Concrete floor with a 1% slope from the middle to allow for drainage**

## • **Assessing:**

- **Effects of traffic**
- **Different photoperiods**
- **Different lighting options**
- **Effects of PGRs**
- **Optimum fertility practices**



# FIFA World Cup 2026 Research Project Timeline



# QUESTIONS?

**LET'S TALK TURF!**  
**Ryan Bearss**  
**bearssry@msu.edu**  
**X @rbearssturf**  
**248.912.2768**



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