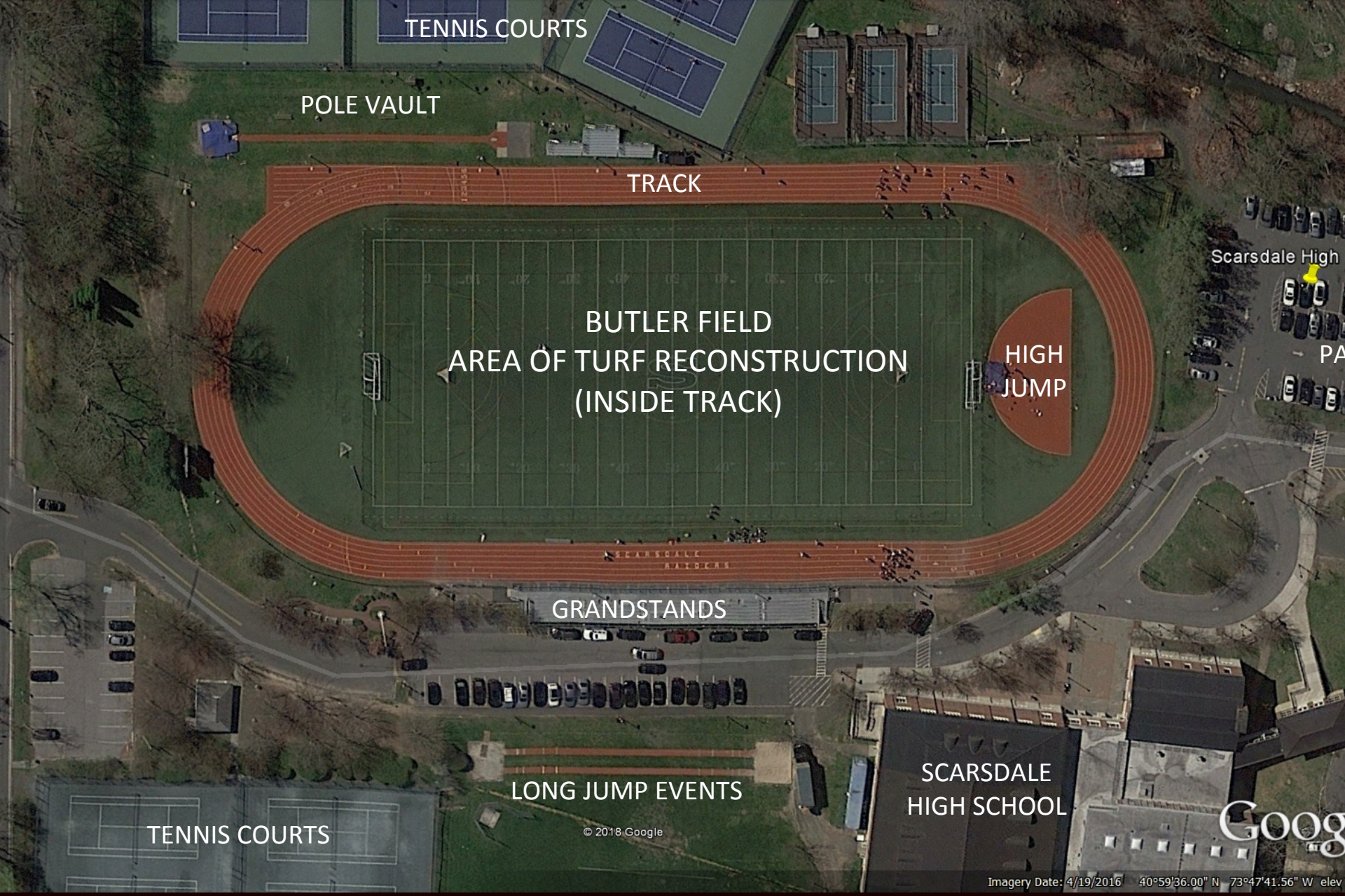
SCARSDALE
PUBLIC SCHOOLS

Scarsdale High School

BUTLER FIELD RECONSTRUCTION

Field Surfacing Options



SCARSDALE
PUBLIC SCHOOLS

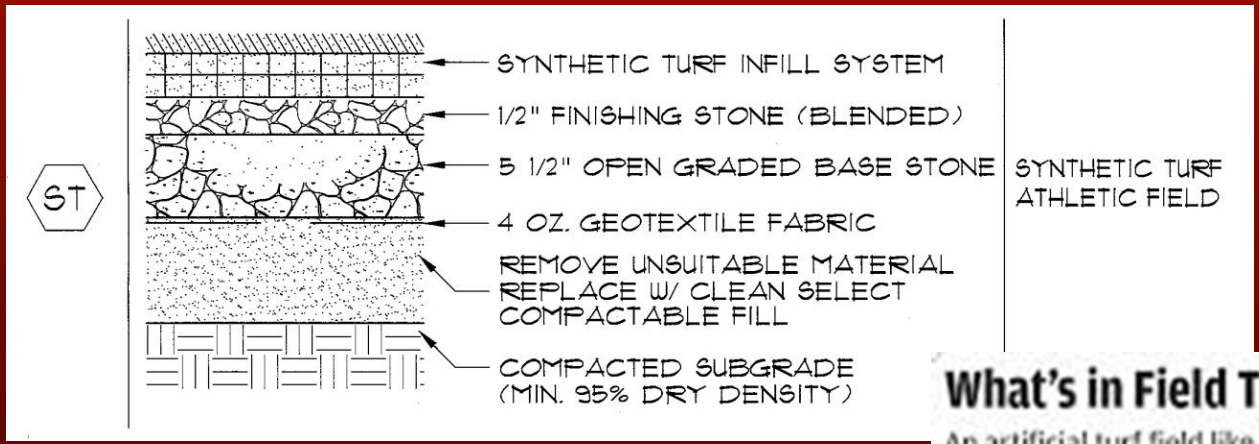
Scarsdale HS Field Reconstruction

04-10-18

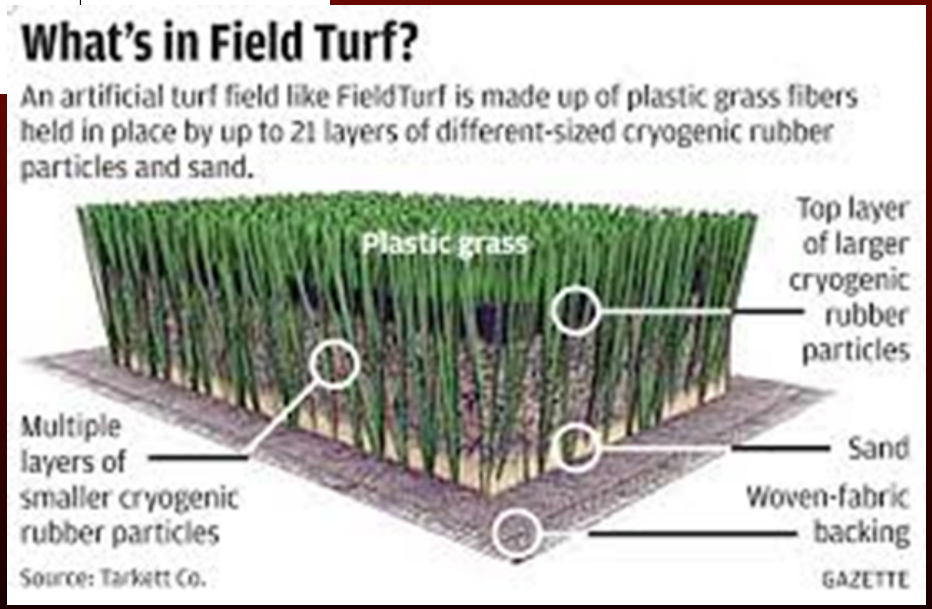
BBS

Synthetic Turf & Infill Discussion

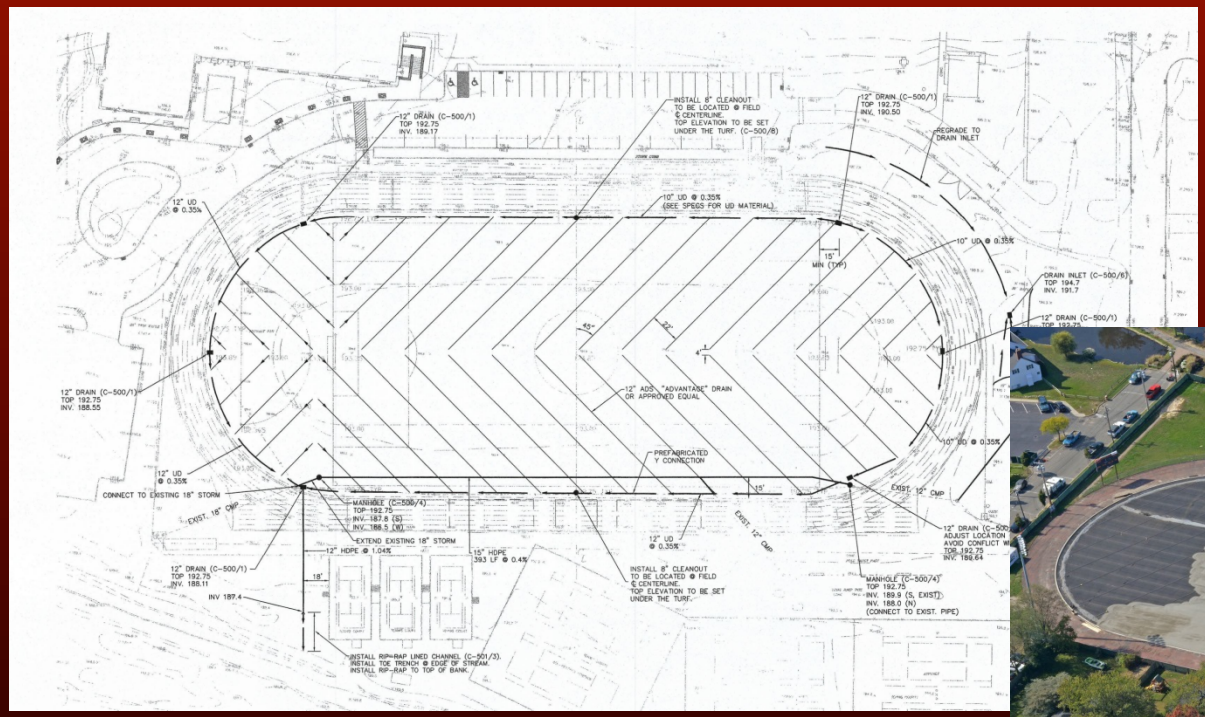
What is Synthetic Turf?



- PLASTIC GRASS FIBERS
- WOVEN FABRIC BACKING
- INFILL- RUBBER, EPDM, ETC.
- SILICA SAND (BALLAST)



How does the current field drain?



What is the Project Scope of Work?

- Remove existing synthetic turf and infill system
- Regrade finishing stone to eliminate drainage issues
- Repair & improve existing perimeter drainage system
- Replace Football/Soccer combo goals & perimeter protective netting system
- Install new turf and infill system w/ logos and lettering
- Remove existing track surfacing and repair pavement
- Install new rubber track surfacing on track and field events w/markings for all events

What infill options are there?

- Silica Sand
- SBR Crumb Rubber
- Coated SBR Crumb Rubber
- EPDM
- TPE
- Organic
- Other
- No Infill- Natural Grass

Infill- Things to Consider

- Organic vs. Inorganic
- Heat
- Performance
- Safety
- Aesthetics
- Cost

Silica Sand (Mixed with Others)

Sand (Silica) Infill

Definitions from Synthetic Turf Council (STC) Glossary

Pure silica sand is one of the original infilling materials utilized in synthetic turf. This product is a natural infill that is non-toxic, chemically stable and fracture resistant. Silica sand infills are typically tan, off-tan or white in color and - depending upon plant location – may be round or sub-round in particle shape. As a natural product there is no possibility of heavy metals, and the dust/turbidity rating is less than 100. It can be used in conjunction with many other infills on the market to provide a safe and more realistic playing surface. The round shape plays an integral part in the synthetic turf system. It is important that silica sand have a high purity (greater than 90%) to resist crushing and absorption of bacteria and other field contaminants. Silica sand can either be coated with different materials as a standalone product or can be used to firm up in combination with traditional crumb rubber infill systems.

SBR Crumb Rubber (black)

Glossary of Terms: Infill Materials

Crumb Rubber

Crumb Rubber is derived from scrap car and truck ti
Two types of crumb rubber infill exist: Ambient and
most widely used infill in the synthetic sports field ar
is substantially metal free, and, according to the ST
should not contain liberated fiber in an amount that
crumb rubber, or .6 lbs. per ton.

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of

CRM

CRUMB RUBBER MANUFACTURERS

SBR CRUMB RUBBER FOR SYNTHETIC TURF INFILL

CRM SBR SYNTHETIC TURF INFILL

CRM crumb rubber infill is produced from 100% recycled tires for the beneficial use in synthetic turf athletic fields, playgrounds, municipal parks, golf courses and landscaping. CRM infill is designed to conserve water and reduce maintenance as well as offer an environmentally friendly alternative to natural turf and provide many benefits to the communities that utilize these fields.

Benefits

- Environmentally friendly
- Produced from 100% Recycled Tires
- Eliminate Water Usage
- Longer Lasting
- Extends the fields playing ability
- Can reduce player injuries

Uses

- Athletic Fields
- Playgrounds
- Municipal Parks
- Golf Courses
- Residential Landscaping

Colors

- Standard
- All Black
- Green
- Additional Colors Are Available Upon Request

Specifications:

- SBR Crumb Rubber
- 10-20 Mesh Size
- Fiber Content: <0.1%
- Steel Content: <0.01%

CRM Corporate Headquarters
1301 Dove Street, Suite 940, Newport Beach, CA 92660 Tel 949.263.9100 Fax 949.263.9110
www.CRMRubber.com Email to: cbrooks@crmrubber.com

SBR Crumb Rubber (black)

NOTES, PROS & CONS

- Most widely used and proven infill system mixed w/ silica sand
- This is what's in the field now
- Sustainability- recycled & reusable, from domestic source
- Lowest infill upfront and lifecycle costs
- Does not float, non-abrasive, anti-microbial
- Ease of grooming/maintenance compared to natural turf or organic infill
- No shock pad or irrigation required
- Black infill hotter than other options
- Warranty 8-10 years

Turf Replacement Project Estimated Cost using Black SBR Crumb Rubber & Silica Sand infill = $818,772*

***does not include track resurfacing costs**

Coated SBR Crumb Rubber

Coate

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substa
by pro
particl

CRM
CRUMB RUBBER MANUFACTURERS

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be coated with colorants, sealers, or anti-microbial
ovides additional aesthetic appeal, reduction of dust
rocess and complete encapsulation of the rubber

Coated SBR Crumb Rubber

NOTES, PROS & CONS

- Becoming more widely used as alternative for black SBR crumb rubber
- Higher upfront cost than black SBR crumb rubber
- Proven infill system mixed w/silica sand
- Sustainability- recycled & reusable, from domestic source
- Low infill upfront and lifecycle costs
- Does not float, non-abrasive, anti-microbial
- Ease of grooming/maintenance compared to natural turf or organic infill
- No shock pad or irrigation required
- Cooler than black SBR crumb rubber
- Warranty 8-10 years

Turf Replacement Project Estimated Cost using Color Coated SBR Crumb Rubber & Silica Sand infill= $869,690*

EPDM (Ethylene Propylene Diene Monomer)

TTII TARGET TECHNOLOGIES INTERNATIONAL INC.
A WHOLLY-OWNED SUBSIDIARY OF THE QUIKRETE® COMPANIES

8535 EASTLAKE DRIVE, BURNABY, BC CANADA V5A 4T7
TEL: 604.421.3620 • 1.888.887.7373 • FAX: 604.420.3616
WEB: WWW.TTIIONLINE.COM • EMAIL: SALES@TTIIONLINE.COM

TTII PLAY-SAFE 65 EPDM Infill

SPECIFICATION SHEET

10-18 MESH GRADATION

1. Produced in North America with North American compounds
2. 100% EPDM virgin material
3. Color: black
4. Sulfur cured
5. 10-18 mesh gradation as noted below
6. Bulk density: 24.5 lbs. per cubic ft
7. 1.24 specific gravity
8. No agglomeration or stability loss at 365° F
9. 89% rebound at 175°C compression as per ASTM D395
10. Meets EN71-3 European heavy metals test method for children's toys
11. Dust free
12. Odorless
13. Not oily

Sieve Size	Min	Max
10	0	5
12	20	30
16	55	70
18	5	20
20	0	5

Available from: Target Technologies International Inc.
8535 Eastlake Drive, Burnaby, BC V5A 4T7
604.421.3620 or 1.888.887.7373

mer) is a polymer elastomer with high resistance to
s solid form under high temperatures. Typical
nas proven its durability as an infill product in all
roperties and resistance to atmospheric and
erformance infill product.

EPDM (Ethylene Propylene Diene Monomer)

NOTES, PROS & CONS

- Not sustainable- manufactured from virgin rubber
- Wide range of colors- not as hot as black crumb rubber
- Higher upfront & lifecycle costs than black or coated SBR crumb rubber
- Does not float, non-abrasive, anti-microbial
- No shock pad or irrigation required
- Ease of grooming/maintenance compared to natural turf or organic infill
- Quality control very important / source
- Warranty 8-10 years

Turf Replacement Project Estimated Cost using EPDM & Silica Sand infill w/Shock Pad= $1,124,284*

TPE (Thermo plastic elastomer)

TTII PRO-MAX 37 & 37F TPE

SPECIFICATION SHEET

Basic properties: prime, virgin elastomer base with natural fillers.

1. Polyvinyl chloride (PVC) free
2. Non SBR
3. Bisphenol A free
4. Phthalate free
5. Heavy metal free
6. Shore Hardness, 52-55 Shore A per ASTM Test D2240
7. Specific Gravity, 1.45-1.51 g/cm3 per ASTM D792
8. Abrasion Resistance 460-580 (mg loss) per ASTM D1044 per DIN53516
9. Elongation at Break -Min.350 % per ASTM D638 5. Standard
10. Standard colors: green and tan
11. Infill shape is semi-ovoid produced from underwater extrusion pelletizing process
12. Passes ASTM E648 Class 1 requirement for Critical Radiant Flux testing
13. Filler materials are inorganic in origin
14. Material is SBC (Styrenic Block Copolymer) based
15. Bulk density: 45 (+/- 3lbs) per cubic ft
16. Dust free
17. Odorless
18. LC 50 Rainbow Trout Bioassay Testing – yields 100% survival after 96 hrs
19. Thermal Stability Report – does not agglomerate at 239° F
20. Meets European Standard EN71-3 Safety of Toys
21. Meets CA Prop 65 Regulations
22. EN 14836 Standard UV Testing - no color change after 2550 hrs of exposure
23. Material is manufactured in North America and ISO Certified
24. Must have minimum 10 projects produced in North America and installed in North America in the past 5 years

Available from: Target Technologies International Inc.
8535 Eastlake Drive, Burnaby, BC Canada V5A 4T7
604.421.3620 or 1.888.887.7373

REUSABLE ▪ RECYCLABLE ▪ SUSTAINABLE

April 6, 2017

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WEB: WWW.TTIIONLINE.COM • EMAIL: SALES@TTIIONLINE.COM

) infill is non-toxic, heavy metal free, available in a variety of
ng lasting, and 100% recyclable and reusable as infill when
when utilizing virgin-based resins, will offer consistent
ax over a wide temperature range.

TPE (Thermo plastic elastomer)

NOTES, PROS & CONS

- Used in multiple NYC Parks fields- standard specification
- Dyed green or tan- not as hot as black crumb rubber
- Highest upfront costs for material
- Sustainable- can be recycled and reused for infill when replacing field
- Does not float, non-abrasive, anti-microbial
- Shock pad required
- Ease of grooming/maintenance compared to natural turf or organic infill
- Quality control very important / source
- Susceptible to heat (melting)
- Warranty 8-10 years

Turf Replacement Project Estimated Cost using TPE & Silica Sand infill w/Shock Pad= $1,171,523*

Organic (Coconut husks, cork, olive cores, etc.)

Organic (Coconut husks, cork, olive cores, etc.)

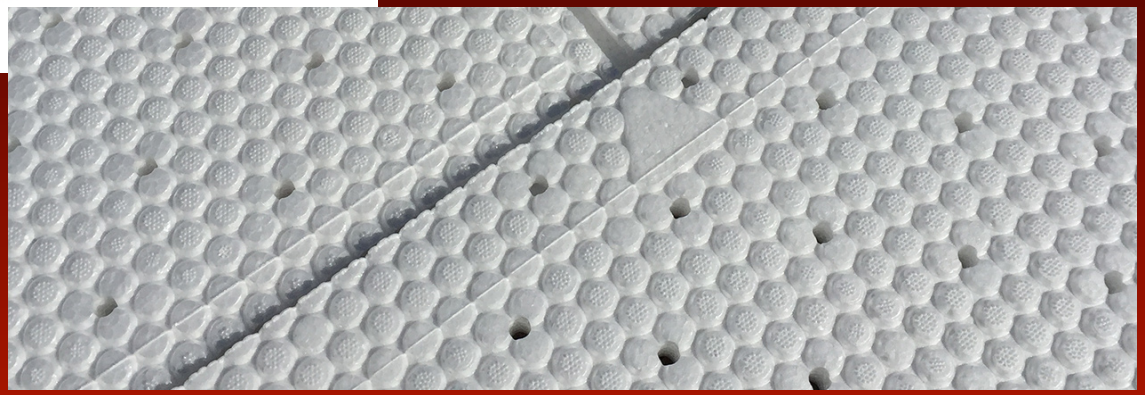
NOTES, PROS & CONS

- Recent installations at Bronxville, Irvington & Pleasantville
- Longevity of system in question- not widely used in USA until recently
- Sustainability- Compostable
- Evaporative cooling- cooler than inorganic infills
- Infill tends to migrate, float and will break down over time
- Higher upfront & lifecycle costs than black or coated SBR crumb rubber
- Shock pad and irrigation system required
- More extensive grooming/maintenance required than inorganic options
- Quality control very important / source
- Warranty 8-10 years

Turf Replacement Project Estimated Cost using Organic & Silica Sand infill w/Shock Pad & Irrigation = $1,307,591*

Shock Pad

- Required for certain infill systems (Organic, TPE) to provide shock absorption



Natural Turf (Sand Based Topsoil)

Natural Turf (Sand Based Topsoil)

NOTES, PROS & CONS

- High cost to remove existing turf base and replace with sand based topsoil
- Irrigation system required
- High maintenance required to keep field playable and healthy including mowing, fertilizing, weed control, aerating, topdressing, overseeding, etc.
- After construction field closed for one season (sod) or two seasons (seed)
- Field needs to be closed/rested during and immediately after foul weather
- Some aspects of existing turf drainage system can be reused for natural turf drainage
- Heavy use of field during spring & fall growing seasons makes it difficult for turf to recover and be maintained in optimum playing condition

Turf Replacement Project Estimated Cost using Natural Turf Sod with Irrigation = $753,868*

Summary of Project Estimated Costs

- Reconstruction of Track & Field using SBR Crumb Rubber (black) Infill
  Project Cost Estimate = $1,411,214
- Reconstruction of Track & Field using Coated SBR Crumb Rubber Infill
  Project Cost Estimate = $1,462,349
- Reconstruction of Track & Field using EPDM Infill w/Shock Pad
  Project Cost Estimate = $1,716,942
- Reconstruction of Track & Field using TPE Infill w/Shock Pad
  Project Cost Estimate = $1,764,005
- Reconstruction of Track & Field using Organic Infill w/Shock Pad & Irrig.
  Project Cost Estimate = $1,900,249
- Reconstruction of Track & Field using Natural Turf (sod)
  Project Cost Estimate = $1,346,526

(estimates include synthetic turf field and track improvements)

Maintenance

NATURAL GRASS

- Mowing
- Irrigation
- Aerating, topdressing & seeding
- Fertilization & weed control
- Geese control
- Rest field / foul weather

CRUMB RUBBER/EPDM/TPE

- Regular inspections / minor repairs
- Keep surface clean & free of debris
- Groom regularly to maintain level infill / keep fibers upright

ORGANICS

- See Crumb Rubber above
- More frequent grooming
- Infill needs replenishment more frequently
- Irrigation
- Weed control

Questions?

Thank you.

Project Cost Estimates

SCARSDALE PUBLIC SCHOOLS
Butler Field Reconstruction

April 2018

Preliminary Project Cost Estimate (Option 1 - Green Coated Crumb Rubber Infill, No Shock pad)

1	**Butler Field - Synthetic Turf and Track Surface Replacement**								
1a	Remove and Replace Synthetic Turf	110,000	sf	@	$	4.50		$	495,000
1b	Athletic Equipment (goal posts and end zone netting)	1	Allowance	@	$	55,000		$	55,000
1c	End Zone Lettering	2	ea	@	$	14,000		$	28,000
1d	Green Coated Rubber	1	Allowance	@	$	37,500		$	37,500
1e	Remove and Replace Track Surfacing (6 lanes, high jump, long jumps and pole vault)	39,500	sf	@	$	8.25		$	325,875
1f	Drainage Improvements	1	Allowance	@	$	25,000		$	25,000
1g	Asphalt Milling and Top Course Replacement	39,500	sf	@	$	2.80		$	110,600
							Subtotal	**$**	**1,076,975**
2									
2a							Contractor General Conditions 7%	$	75,388
							CONSTRUCTION COST	**$**	**1,152,363**

3			
3a	Contingencies and Soft Costs (20%)	$	230,473
3b	A/E Fees (5.75%)	$	79,513
4	**PROJECT COST TOTAL**	**$**	**1,462,349**

Project Cost Estimates

SCARSDALE PUBLIC SCHOOLS
Butler Field Reconstruction

April 2018

Preliminary Project Cost Estimate (Option 2 - EPDM Infill with Shock Pad)

1	**Butler Field - Synthetic Turf and Track Surface Replacement**							
1a	Remove and Replace Synthetic Turf	110,000	sf	@	$	4.50	$	495,000
1b	Athletic Equipment (goal posts and end zone netting)	1	Allowance	@	$	55,000	$	55,000
1c	End Zone Lettering	2	ea	@	$	14,000	$	28,000
1d	EPDM Infill	1	Allowance	@	$	125,000	$	125,000
1e	Shock Pad (Not required per manufacturer, District request)	1	Allowance	@	$	100,000	$	100,000
1f	Remove and Replace Track Surfacing (6 lanes, high jump, long jumps and pole vault)	39,500	sf	@	$	8.25	$	325,875
1g	Drainage Improvements	1	Allowance	@	$	25,000	$	25,000
1h	Asphalt Milling and Top Course Replacement	39,500	sf	@	$	2.80	$	110,600
						Subtotal	**$**	**1,264,475**
2								
2a	Contractor General Conditions 7%						$	88,513
	CONSTRUCTION COST						**$**	**1,352,988**

3			
3a	Contingencies and Soft Costs (20%)	$	270,598
3b	A/E Fees (5.75%)	$	93,356
4	**PROJECT COST TOTAL**	**$**	**1,716,942**

Project Cost Estimates

SCARSDALE PUBLIC SCHOOLS
Butler Field Reconstruction

April 2018

Preliminary Project Cost Estimate (Option 3 - Organic Infill with Shock Pad)

1	**Butler Field - Synthetic Turf and Track Surface Replacement**							
1a	Remove and Replace Synthetic Turf	110,000	sf	@	$	4.50	$	495,000
1b	Athletic Equipment (goal posts and end zone netting)	1	Allowance	@	$	55,000	$	55,000
1c	End Zone Lettering	2	ea	@	$	14,000	$	28,000
1d	Organic Infill	1	Allowance	@	$	175,000	$	175,000
1e	Shock Pad	1	Allowance	@	$	100,000	$	100,000
1f	Irrigation System	1	Allowance	@	$	85,000	$	85,000
1g	Remove and Replace Track Surfacing (6 lanes, high jump, long jumps and pole vault)	39,500	sf	@	$	8.25	$	325,875
1h	Drainage Improvements	1	Allowance	@	$	25,000	$	25,000
1i	Asphalt Milling and Top Course Replacement	39,500	sf	@	$	2.80	$	110,600
						Subtotal	**$**	**1,399,475**
2								
2a						Contractor General Conditions 7%	$	97,963
						CONSTRUCTION COST	**$**	**1,497,438**
3								
3a						Contingencies and Soft Costs (20%)	$	299,488
3b						A/E Fees (5.75%)	$	103,323
4						**PROJECT COST TOTAL**	**$**	**1,900,249**

Project Cost Estimates

SCARSDALE PUBLIC SCHOOLS
Butler Field Reconstruction

April 2018

Preliminary Project Cost Estimate (Option 4 - Remove Synthetic Turf, Reconstruct to Natural Turf)

1	**Butler Field - Synthetic Turf and Track Surface Replacement**							
1a	Remove existing synthetic turf and stone base. Regrade sub-grade material	110,000	sf	@	$	1.10		$ 121,000
1b	Import/grade 4" fill to create crown for surface drainage (exist. sub-surface drainage to remain)	1,175	cy	@	$	40.00		$ 47,000
1c	Import/grade 6" top soil	1,760	cy	@	$	45.00		$ 79,200
1d	Irrigation system	1	Allowance	@	$	85,000		$ 85,000
1e	Grass sod	110,000	sf	@	$	1.30		$ 143,000
1f	Athletic Equipment (goal posts and end zone netting)	1	Allowance	@	$	55,000		$ 55,000
1g	Remove and Replace Track Surfacing (6 lanes, high jump, long jumps and pole vault)	39,500	sf	@	$	8.25		$ 325,875
1h	Drainage Improvements	1	Allowance	@	$	25,000		$ 25,000
1i	Asphalt Milling and Top Course Replacement	39,500	sf	@	$	2.80		$ 110,600
							Subtotal	**$ 991,675**
2								
2a							Contractor General Conditions 7%	$ 69,417
							CONSTRUCTION COST	**$ 1,061,092**

3		
3a	Contingencies and Soft Costs (20%)	$ 212,218
3b	A/E Fees (5.75%)	$ 73,215
4	**PROJECT COST TOTAL**	**$ 1,346,526**