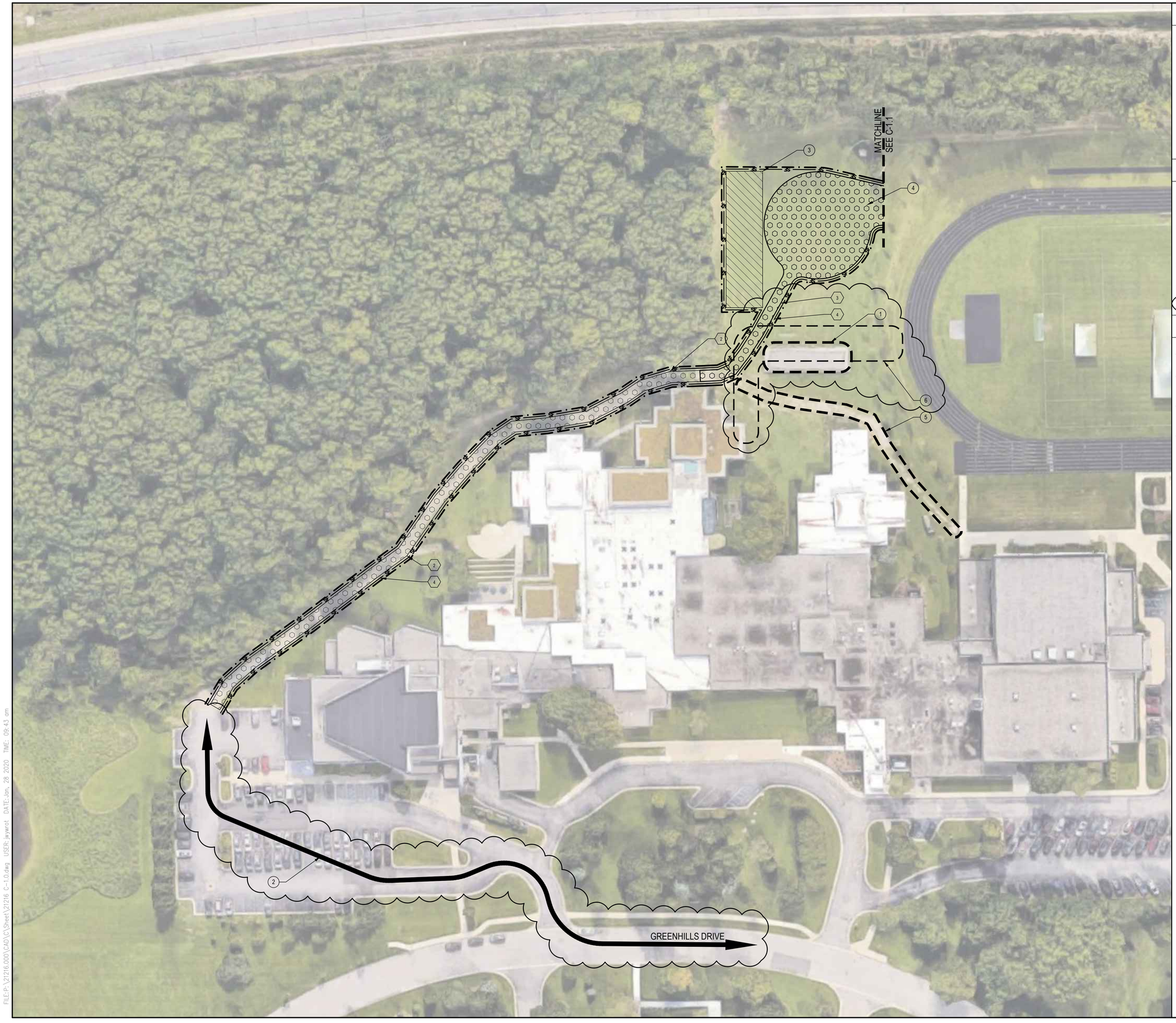


SHEET NOTES

A. AREAS OF THE SITE DISTURBED TO INSTALL THE CONSTRUCTION ACCESS ROAD OR USED AS THE CONSTRUCTION LAY DOWN AREA SHALL BE REGRADED TO EXISTING SURFACE CONDITIONS AND RESTORED WITH TOPSOIL, SEED AND MULCH.

DESCRIPTIVE KEYED NOTES

1. PROTECT EXISTING BATTING CAGE STRUCTURE TO REMAIN
2. VEHICULAR ACCESS ROUTE TO/FROM THE CONSTRUCTION SITE
3. APPROXIMATE LIMITS OF CONSTRUCTION LAY DOWN AREA; RESTORE AREA AFTER CONSTRUCTION; THE CONSTRUCTION LAY DOWN AREA SHALL NOT INTERFERE WITH FIRE/EMERGENCY SITE ACCESS
4. TURNAROUND IN CONSTRUCTION ACCESS ROAD TO BE MINIMUM 96' IN DIAMETER TO ALLOW EMERGENCY VEHICLES.
5. CONTINUATION OF FIRE ACCESS ROAD
6. APPROXIMATE LOCATION OF GEOTHERMAL WELL SYSTEM

LEGEND

1. LIMITS OF CONSTRUCTION/DISTURBANCE
2. CONSTRUCTION ACCESS ROAD ON EXISTING MAINTENANCE ROAD — 3 / C-5.0
3. CONSTRUCTION ACCESS ROAD; STRIP TOPSOIL PRIOR TO INSTALLATION; RESTORE SITE AFTER CONSTRUCTION — 3 / C-5.0
4. SF SILT FENCE

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Addendum #2		Jan 27, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

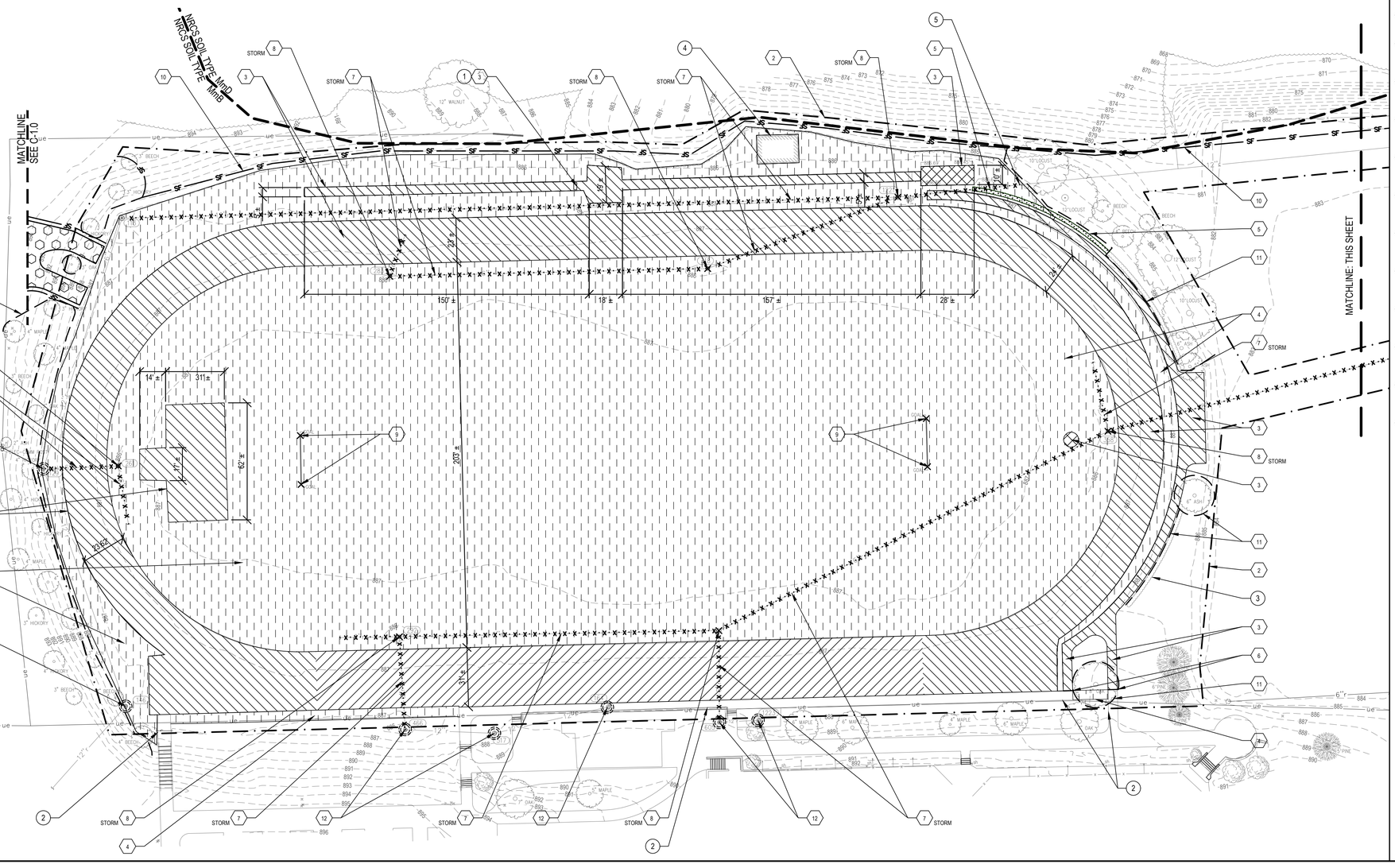
DRAWING TITLE
SITE LOGISTICS PLAN

0 20' 40' 80'
SCALE 1" = 40'

SCALE
21216.000

PROJECT NUMBER
C-1.0

DRAWING NUMBER



SHEET NOTES

A. GENERAL DIMENSIONS ARE GIVEN FOR REFERENCE ONLY; CONTRACTOR TO FIELD VERIFY QUANTITIES.
B. NRCS SOIL CLASSIFICAITON:
   - MmB - MIAMI LOAM, 2 TO 6 PERCENT SLOPES
   - MmD - MIAMI LOAM, 12 TO 18 PERCENT SLOPES
C. SEE SHEET C-5.0 - SESC AND SITE PREP DETAILS AND NOTES FOR SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE, SOIL EROSION AND SEDIMENTATION CONTROL MAINTENANCE NOTES, AND GENERAL SESC NOTES.

DESCRIPTIVE KEYED NOTES

1. REMOVE POLE VAULT BOX AND CONCRETE COLLAR
2. PROTECT EXISTING CONCRETE SIDEWALK TO REMAIN
3. PROTECT EXISTING SHRUBS TO REMAIN
4. PROTECT EXISTING STORAGE STRUCTURE TO REMAIN
5. SAWCUT EXISTING STORM SEWER PIPE TO LIMITS SHOWN

LEGEND

1. LIMITS OF CONSTRUCTION
2. FULL DEPTH PAVEMENT REMOVAL
3. REMOVE SAND PIT AND WOOD BORDER
4. TOPSOIL STRIPPING
5. CLEAR AND GRUB SHRUBS
6. SAWCUT PAVEMENT
7. UTILITY REMOVAL
8. STRUCTURE REMOVAL
9. REMOVE SOCCER GOAL POST AND FOUNDATION
10. SILT FENCE — SEE 1 / C-5.0
11. TREE PROTECTION FENCE — SEE 4 / C-5.0
12. INLET PROTECTION FILTER — SEE 2 / C-5.0

GREENHILLS SCHOOL · ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Addendum #1		Jan 20, 2017
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN · JOSEPH B. WYWROT · ENGINEER · No. 43074 · LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
DEMOLITION AND SESC PLAN

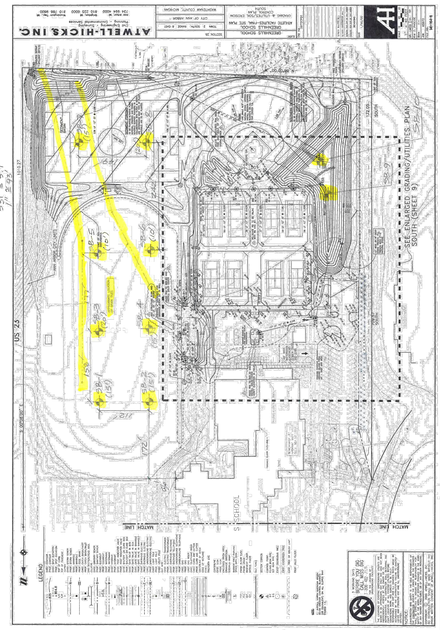
0 15' 30' 60'
SCALE 1" = 30'

SCALE 21216.000

PROJECT NUMBER C-1.1

DRAWING NUMBER

FILE:P:\21216.000\CAD\C\Sheet\21216_C-1.0.dwg USER:jwywrot DATE:Jan. 28, 2020 TIME: 09:43 am



Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 1 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: Truck
Drilling Method: Solid Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/6/2016
Completed: 7/6/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	6 10 13	.75	Moist Dark Brown Sandy TOPSOIL (9")			
2.5			3	Stiff Moist Variegated Clay With Some Silt & Trace Of Gravel-FILL			
5.0	LS	6 10 14	5.5	Stiff Moist Discolored Clay With Some Silt & Trace Of Gravel-FILL			
7.5	LS	11 16 24	8	Extremely Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
10.0	LS	7 13 19		Extremely Stiff Moist Gray CLAY With Some SIlt & Trace Of Gravel			
12.5			12.5				
15.0	LS	3 5 5	15	Firm Moist Gray CLAY With Some Silt, Trace Of Gravel & Wet Sand Seams			
17.5				Bottom of Borehole at 15'			
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 12'6"
At Completion: 11'2"
Boring No. 1

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 2 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: Truck
Drilling Method: Solid Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/6/2016
Completed: 7/6/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	2 1 3	.67	Moist Dark Brown Sandy TOPSOIL (8")			
2.5			2.5	Soft Wet Brown Clay With Some Silt & Gravel-FILL			
5.0	LS	7 11 14		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
7.5	LS	4 6 8	6	Firm Moist Gray CLAY With Some Silt & Trace Of Gravel			
10.0	LS	4 5 10					
12.5							
15.0	LS	3 3 7	15	Bottom of Borehole at 15'			
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 2

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 3 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: Truck
Drilling Method: Solid Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/6/2016
Completed: 7/6/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	6 6 6	.75	Moist Dark Brown Sandy TOPSOIL (9")			
2.5			3.5	Firm Moist Variegated CLAY With Some Silt & Trace Of Gravel			
5.0	LS	3 4 7		Firm Moist Brown CLAY With Some Silt & Trace Of Gravel			
7.5	LS	6 11 15	8	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
10.0	LS	6 10 18					
12.5							
15.0	LS	5 8 12	16	Firm Moist Gray CLAY With Some Silt & Trace Of Gravel			
17.5							
20.0	LS	2 4 5	20	Bottom of Borehole at 20'			
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 20'0"
At Completion: 12'9"
Boring No. 3

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 4 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/7/2016
Completed: 7/7/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	3 4 7	.5	Moist Dark Brown Sandy TOPSOIL (6")			
2.5			3	Firm Moist Brown CLAY With Some Silt, Trace Of Gravel & Some Organic Material			
5.0	LS	4 7 8	5.5	Firm Moist Variegated CLAY With Some Silt & Trace Of Gravel			
7.5	LS	7 11 15		Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
10.0	LS	6 9 12					
12.5			13.5				
15.0	LS	4 7 8	15	Firm Moist Gray CLAY With Some Silt, Trace Of Gravel & Wet Sand Seams			
17.5				Bottom of Borehole at 15'			
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 13'6"
At Completion: Caved To 10'9"
Boring No. 4

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 5 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: Truck
Drilling Method: Solid Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/6/2016
Completed: 7/6/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	4 4 5	.58	Moist Dark Brown Sandy TOPSOIL (7")			
2.5			3	Firm Moist Brown CLAY With Some Silt & Trace Of Gravel			
5.0	LS	2 2 2		Soft Moist Variegated CLAY With Some Silt & Trace Of Gravel			
7.5	LS	2 2 1	8.5				
10.0	LS	2 4 6	10	Firm Moist Brown Sandy CLAY With Some Silt & Trace Of Gravel			
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 5

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 6 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/7/2016
Completed: 7/7/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	4 4 4	.58	Moist Dark Brown Sandy TOPSOIL (7")			
2.5			4	Plastic Moist Variegated CLAY With Some Silt, Trace Of Gravel & Some Organic Material			
5.0	LS	3 4 5	6.5	Firm Moist Brown CLAY With Some Silt, Trace Of Gravel & Some Organic Material			
7.5	LS	6 7 9	9	Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
10.0	LS	4 6 7	10	Firm Moist Gray CLAY With Some Silt, Trace Of Gravel & Some Organic Material			
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 6

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 7 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/7/2016
Completed: 7/7/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	5 6 7	.75	Moist Brown Sandy TOPSOIL (9")			
2.5			3	Firm Moist Discolored Sandy CLAY With Some Silt & Trace Of Gravel			
5.0	LS	3 5 6		Firm Moist Variegated CLAY With Some Silt & Trace Of Gravel			
7.5	LS	5 6 7	9				
10.0	LS	4 7 11		Stiff Moist Brown CLAY With Some Silt, Trace Of Gravel & Sand Seams			
12.5							
15.0	LS	6 11 16	15	Bottom of Borehole at 15'			
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample

w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 7

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
SOIL BORING INFORMATION

0 15' 30' 60'
SCALE 1" = 30'

SCALE
21216.000
PROJECT NUMBER

C-1.2
DRAWING NUMBER

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 8 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/7/2016
Completed: 7/7/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.83	Moist Brown Sandy TOPSOIL (10")			
2.5	LS	8 8 12	3.5	Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
5.0	LS	4 8 14	6	Stiff Moist Variegated CLAY With Some Silt, Organic Material & Trace Of Gravel			
7.5	LS	7 7 7	7.5	Firm Moist Brown MARL			
10.0	LS	4 7 12	11.5	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
12.5	LS	7 10 12	18	Stiff Moist Gray CLAY With Some Silt & Trace Of Gravel			
15.0	LS	4 6 8	20	Firm Moist Gray CLAY With Some Silt & Trace Of Gravel			
17.5				Bottom of Borehole at 20'			
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 8

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 9 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/8/2016
Completed: 7/8/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	5 8 11	2	Moist Brown CLAY With Some Silt, Organic Material & Trace Of Gravel			
2.5			4.5	Stiff Moist Gray CLAY With Some Silt & Trace Of Gravel			
5.0	LS	4 8 11	6	Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
7.5	LS	19 25 26	8	Hard Moist Brown CLAY With Some Silt & Trace Of Gravel			
10.0	LS	8 11 11	10	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
12.5				Bottom of Borehole at 10'			
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 9

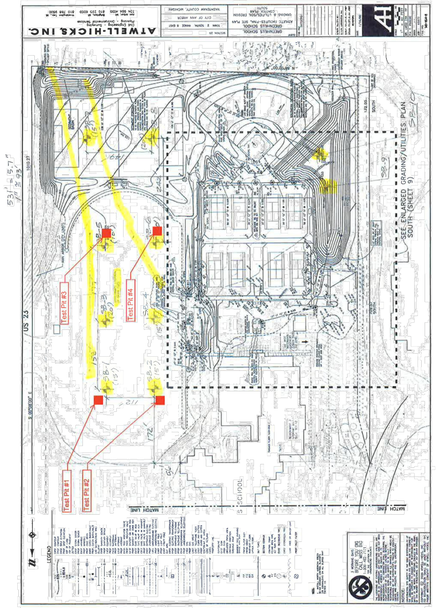
Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Boring No.: 10 **Job No.:** 57009
Client: SmithGroupJJR
Type of Rig: All-Terrain Vehicle
Drilling Method: Hollow Stem Augers
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Drilled By: R. Favor
Started: 7/8/2016
Completed: 7/8/2016

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
	LS	5 12 15	1.42	Moist Brown CLAY With Some Silt, Organic Material & Trace Of Gravel			
2.5			3.5	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
5.0	LS	8 17 24	6	Extremely Stiff Moist Variegated CLAY With Some Silt & Trace Of Gravel			
7.5	LS	13 18 8		Extremely Stiff Moist Brown CLAY With Some Silt, Trace Of Gravel & Some Cobbles			
10.0	LS	7 14 17	10	Bottom of Borehole at 10'			
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Boring No. 10



Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Test Pit No.: TP-1 **Job No.:** 57009-1
Client: SmithGroupJJR
Type of Rig: Mini Excavator
Drilling Method: Test Pit
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Logged By: G. Putt, PE
Started: 11/22/2017
Completed: 11/22/2017

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.83	Moist Black Sandy TOPSOIL (10")			
2.5			5	Moist Variegated Clay With Some Silt & Trace Of Gravel-FILL			
5.0			7.5	Moist Variegated CLAY With Some Silt, Trace Of Gravel, Cobbles & Occasional Boulders			
7.5				Bottom of Borehole at 7.5'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Test Pit No. TP-1

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Test Pit No.: TP-2 **Job No.:** 57009-1
Client: SmithGroupJJR
Type of Rig: Mini Excavator
Drilling Method: Test Pit
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Logged By: G. Putt, PE
Started: 11/22/2017
Completed: 11/22/2017

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.75	Moist Black Sandy TOPSOIL (9")			
2.5			2.5	Moist Brown Clay With Some Silt & Trace Of Gravel-FILL			
5.0			6	Moist Brown CLAY With Some Silt, Trace Of Gravel & Cobbles			
7.5				Bottom of Borehole at 6'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Test Pit No. TP-2

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Test Pit No.: TP-3 **Job No.:** 57009-1
Client: SmithGroupJJR
Type of Rig: Mini Excavator
Drilling Method: Test Pit
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Logged By: G. Putt, PE
Started: 11/22/2017
Completed: 11/22/2017

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.75	Moist Black Sandy TOPSOIL (9")			
2.5			3.5	Moist Brown CLAY With Some Silt & Trace Of Gravel			
5.0			7	Moist Variegated CLAY With Some Silt, Trace Of Gravel & Wet Sand Seam At 4'4"			
7.5				Bottom of Borehole at 7'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: 4'4"
At Completion: 4'7"
Test Pit No. TP-3

Testing Engineers & Consultants, Inc.
1343 Rochester Road - PO Box 249 - Troy, Michigan - 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

Test Pit No.: TP-4 **Job No.:** 57009-1
Client: SmithGroupJJR
Type of Rig: Mini Excavator
Drilling Method: Test Pit
Ground Surface Elevation:
Project: Proposed Storm Water Infiltration System, 850 Greenhills Drive
Location: Ann Arbor, Michigan
Logged By: G. Putt, PE
Started: 11/22/2017
Completed: 11/22/2017

Depth (ft)	Sample Type	N	Strata Change	Soil Classification	w	d	qu
			.83	Moist Black Sandy TOPSOIL (10")			
2.5			4	Moist Variegated CLAY With Some Silt & Trace Of Gravel			
5.0			6.5	Moist Brown CLAY With Some Silt & Trace Of Gravel			
7.5				Bottom of Borehole at 6.5'			
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							

"N" - Standard Penetration Resistance
SS - 2" I.D. Split Spoon Sample
LS - Sectional Liner Sample
ST - Shelby Tube Sample
AS - Auger Sample
w - H2O, % of dry weight
d - Bulk Density, pcf
qu - Unconfined Compression, psf
DP - Direct Push
RC - Rock Core

Water Encountered: None
At Completion: None
Test Pit No. TP-4

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		*Jan 28, 2020*
Site Plan Approval Resubmittal		*Dec 5, 2019*
Site Plan Approval		*Oct 24, 2019*

SEALS AND SIGNATURES

KEY PLAN

PROJECT NORTH

DRAWING TITLE
SOIL BORING AND TEST PIT INFORMATION

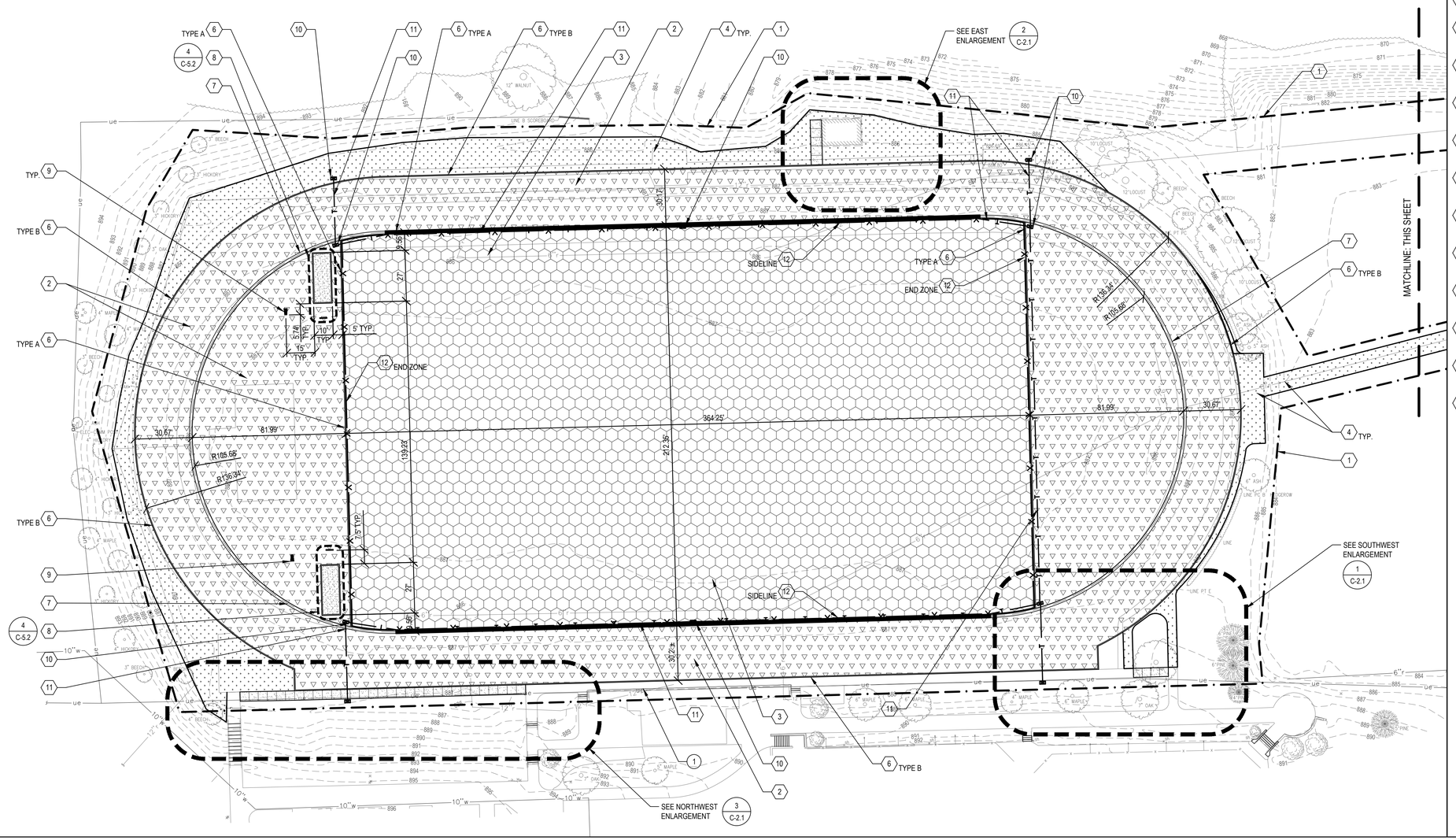
0 15' 30' 60'
SCALE 1" = 30'

SCALE
21216.000

PROJECT NUMBER
C-1.3

DRAWING NUMBER

FILE P:\21216.000\CAD\C\Sheet\21216_C-1.0.dwg USER: jwywrot DATE: Jan. 28, 2020 TIME: 10:09 am



SHEET NOTES

A. LIMITS OF TOPSOIL, SEED, AND MULCH SHOWN ARE APPROXIMATE; ALL LAWN AREAS DISTURBED DURING CONSTRUCTION ARE TO BE RESTORED
B. TRACK AND SYNTHETIC TURF MARKINGS NOT SHOWN FOR CLARITY
C. PROVIDE SPORTSFIELD SPECIALTIES (www.sportsfieldspecialties.com) HALF COMBOX 3000.5 IN TRACK AREAS AND HALF COMBOX 3551.5 IN LAWN AREAS, OR APPROVED EQUALS. TRACK SURFACE ON COVER OF HALF COMBOX IN TRACK AREA BY TRACK SURFACE CONTRACTOR AND TOPSOIL AND LAWN SURFACE ON COVER OF HALF COMBOX IN LAWN AREA BY LANDSCAPE CONTRACTOR.
D. PROVIDE DIRECT BURY CONDUIT WITH 12" COVER, END BUSHINGS, AND PULLSTRINGS FOR LOW VOLTAGE.

DESCRIPTIVE KEYED NOTES

1. PROTECT EXISTING CONCRETE SIDEWALK TO REMAIN
2. PROTECT EXISTING STORAGE SHED TO REMAIN
3. INSTALL EXPANSION JOINT WHERE NEW CONCRETE SIDEWALK MEETS EXISTING CONCRETE SIDEWALK

LEGEND

1	LIMITS OF CONSTRUCTION	
2	OUTDOOR TRACK SURFACE	1 C-5.1
3	SYNTHETIC TURF	2 C-5.1
4	TOPSOIL, SEED, AND MULCH	
5	CONCRETE SIDEWALK	3 C-5.1
6	CONCRETE CURB	4 C-5.1
7	IN-LINE TRACK DRAIN	1 C-5.3
8	LONG JUMP PIT	4 C-5.2
9	POLE VAULT BOX	1 C-5.2
10	HAND HOLE (SEE SHEET NOTE C)	
11	2 x 2" TIMING SYSTEM CONDUIT (SEE SHEET NOTE D)	
12	BALL CONTROL NETTING - ALTERNATE	5 C-5.1

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Addendum #2		Jan 24, 2017
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN — JOSEPH B. WYWROT — ENGINEER — No. 48874 — REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
LAYOUT AND MATERIALS PLAN

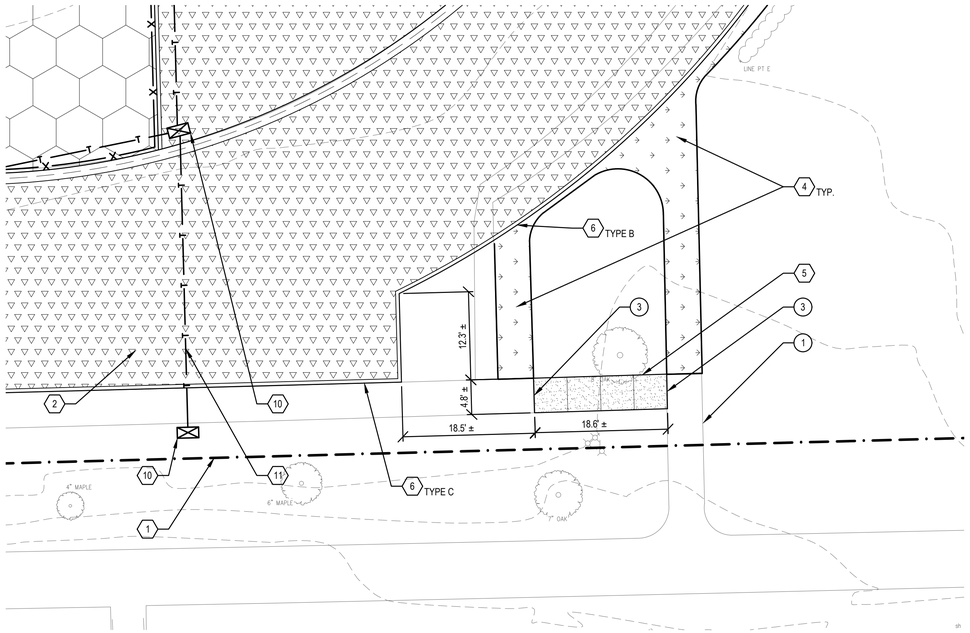
0 15' 30' 60'
SCALE 1" = 30'

SCALE 21216.000

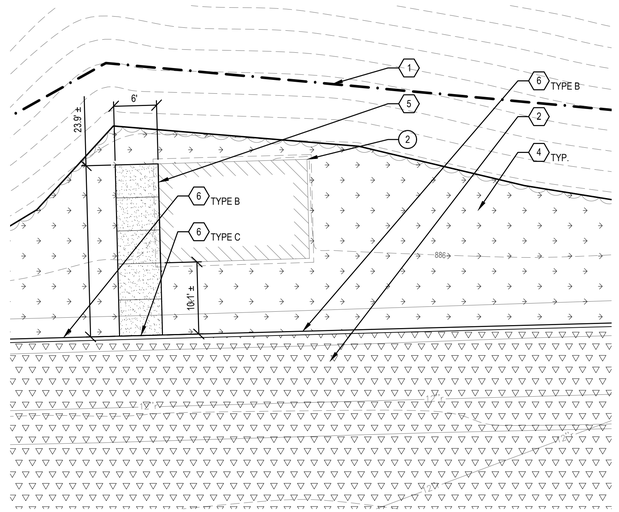
PROJECT NUMBER C-2.0

DRAWING NUMBER

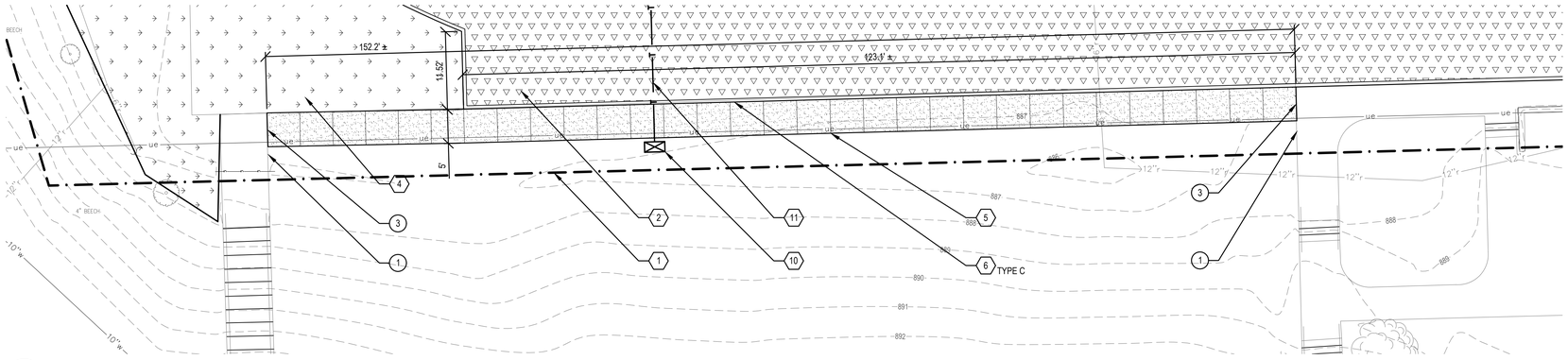
FILE: P:\21216.000\CAD\Civil\Sheet\21216_C-2.0.dwg USER: jwywrot DATE: Jan. 28, 2020 TIME: 09:43 am



1 SOUTHWEST ENLARGEMENT
PLAN
1" = 10'



2 EAST ENLARGEMENT
PLAN
1" = 10'



3 NORTHWEST ENLARGEMENT
PLAN
1" = 10'

SHEET NOTES

A. LIMITS OF TOPSOIL, SEED, AND MULCH SHOWN ARE APPROXIMATE; ALL LAWN AREAS DISTURBED DURING CONSTRUCTION ARE TO BE RESTORED
B. TRACK AND SYNTHETIC TURF MARKINGS NOT SHOWN FOR CLARITY
C. PROVIDE SPORTSFIELD SPECIALTIES (www.sportsfieldspecialties.com) HALF COMBOX 3000.5 IN TRACK AREAS AND HALF COMBOX 3551.5 IN LAWN AREAS, OR APPROVED EQUALS. TRACK SURFACE ON COVER OF HALF COMBOX IN TRACK AREA BY TRACK SURFACE CONTRACTOR AND TOPSOIL AND LAWN SURFACE ON COVER OF HALF COMBOX IN LAWN AREA BY LANDSCAPE CONTRACTOR.
D. PROVIDE DIRECT BURY CONDUIT WITH 12" COVER, END BUSHINGS, AND PULLSTRINGS FOR LOW VOLTAGE.

DESCRIPTIVE KEYED NOTES

1. PROTECT EXISTING CONCRETE SIDEWALK TO REMAIN
2. PROTECT EXISTING STORAGE SHED TO REMAIN
3. INSTALL EXPANSION JOINT WHERE NEW CONCRETE SIDEWALK MEETS EXISTING CONCRETE SIDEWALK

LEGEND

1	LIMITS OF CONSTRUCTION	
2	OUTDOOR TRACK SURFACE	1 / C-5.1
3	SYNTHETIC TURF	2 / C-5.1
4	TOPSOIL, SEED, AND MULCH	
5	CONCRETE SIDEWALK	3 / C-5.1
6	CONCRETE CURB	4 / C-5.1
7	IN-LINE TRACK DRAIN	1 / C-5.3
8	LONG JUMP PIT	4 / C-5.2
9	POLE VAULT BOX	1 / C-5.2
10	HAND HOLE (SEE SHEET NOTE C)	
11	2 x 2" TIMING SYSTEM CONDUIT (SEE SHEET NOTE D)	
12	BALL CONTROL NETTING - ALTERNATE	5 / C-5.1

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 43074
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
LAYOUT AND MATERIALS ENLARGEMENT

0 5 10 20
SCALE 1" = 10'

SCALE
21216.000

PROJECT NUMBER
C-2.1

DRAWING NUMBER

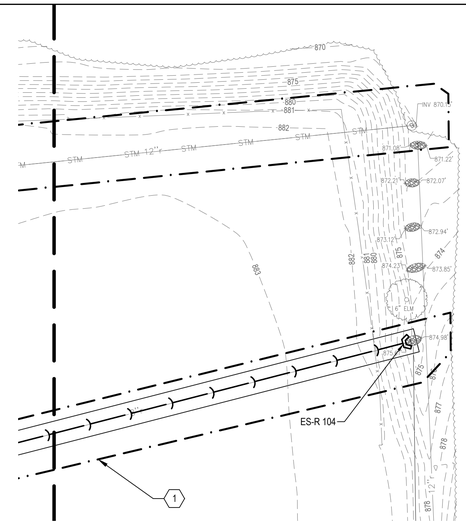
STORM SEWER BYPASS PIPING STRUCTURE TABLE		
STRUCTURE NAME:	DETAILS:	NOTES:
ES-R 104	FG/RIM: 875.78 12" INV: 875.60	END SECTION
HB-R 107	FG/RIM: 887.11 12" INV: 881.74 12" INV: 881.74	11.25° HORIZONTAL BEND
MH-R 101	FG/RIM: 886.87 12" INV: 880.34 12" INV: 878.71	STORM SEWER STRUCTURE
MH-R 102	FG/RIM: 886.82 8" INV: 883.31 12" INV: 880.49 12" INV: 880.49	STORM SEWER STRUCTURE
MH-R 103	FG/RIM: 887.22 12" INV: 882.29 12" INV: 882.29	STORM SEWER STRUCTURE
MH-R 105	FG/RIM: 883.03 12" INV: 879.69 12" INV: 879.69 12" INV: 879.59	STORM SEWER STRUCTURE
MH-R 106	FG/RIM: 887.13 12" INV: 881.53 8" INV: 883.64 12" INV: 881.43	STORM SEWER STRUCTURE
MH-R 108	FG/RIM: 887.11 12" INV: 882.19 6" INV: 882.19 12" INV: 882.19	STORM SEWER STRUCTURE
MH-R 109	FG/RIM: 887.11 6" INV: 883.02 12" INV: 883.02	STORM SEWER STRUCTURE

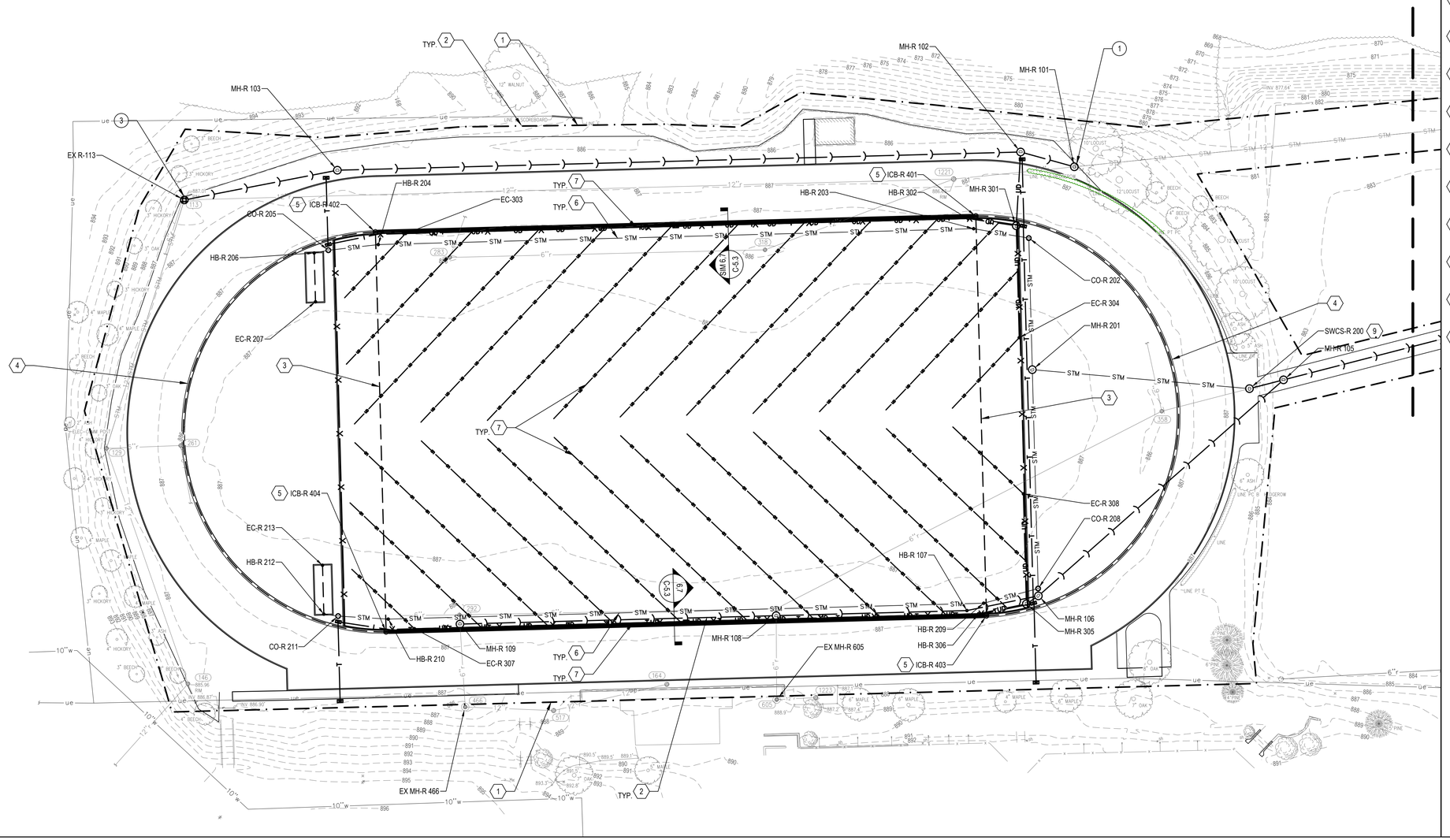
DETENTION OUTLET PIPING STRUCTURE TABLE		
STRUCTURE NAME:	DETAILS:	NOTES:
CO-R 202	FG/RIM: 887.15 8" INV: 882.31 8" INV: 882.31	STORM SEWER CLEANOUT
CO-R 205	FG/RIM: 887.13 4" INV: 883.71 8" INV: 883.55	STORM SEWER CLEANOUT
CO-R 208	FG/RIM: 887.16 8" INV: 882.47 8" INV: 882.47	STORM SEWER CLEANOUT
CO-R 211	FG/RIM: 887.13 4" INV: 883.71 8" INV: 883.55	STORM SEWER CLEANOUT
EC-R 207	FG/RIM: 887.31 4" INV: 884.14	END CAP
EC-R 213	FG/RIM: 887.31 4" INV: 884.14	END CAP
HB-R 203	FG/RIM: 887.13 8" INV: 882.79 8" INV: 882.79	11.25° HORIZONTAL BEND
HB-R 204	FG/RIM: 887.13 8" INV: 883.29 8" INV: 883.29	11.25° HORIZONTAL BEND
HB-R 206	FG/RIM: 887.12 4" INV: 883.81 4" INV: 883.81	90° HORIZONTAL BEND
HB-R 209	FG/RIM: 887.13 8" INV: 882.79 8" INV: 882.79	11.25° HORIZONTAL BEND

DETENTION OUTLET PIPING STRUCTURE TABLE (CONT.)		
STRUCTURE NAME:	DETAILS:	NOTES:
HB-R 210	FG/RIM: 887.13 8" INV: 883.29 8" INV: 883.29	11.25° HORIZONTAL BEND
HB-R 212	FG/RIM: 887.12 4" INV: 883.81 4" INV: 883.81	90° HORIZONTAL BEND
MH-R 201	FG/RIM: 887.68 8" INV: 881.21 12" INV: 881.04 8" INV: 881.21	STORM SEWER STRUCTURE
SWCS-R 200	FG/RIM: 886.63 12" INV: 879.88 12" INV: 879.88	STORM WATER CONTROL STRUCTURE

SURFACE DRAINAGE PIPING STRUCTURE TABLE		
STRUCTURE NAME:	DETAILS:	NOTES:
ICB-R 401	FG/RIM: 887.10 6" INV: 886.04	INLINE CATCH BASIN
ICB-R 402	FG/RIM: 887.10 6" INV: 886.04	INLINE CATCH BASIN
ICB-R 403	FG/RIM: 887.10 6" INV: 886.04	INLINE CATCH BASIN
ICB-R 404	FG/RIM: 887.10 6" INV: 886.04	INLINE CATCH BASIN

UNDER DRAIN PIPING STRUCTURE TABLE		
STRUCTURE NAME:	DETAILS:	NOTES:
EC-303	FG/RIM: 887.09 8" INV: 885.09	END CAP
EC-R 304	FG/RIM: 887.58 8" INV: 884.00	END CAP
EC-R 307	FG/RIM: 887.09 8" INV: 885.09	END CAP
EC-R 308	FG/RIM: 887.57 8" INV: 884.00	END CAP
HB-R 302	FG/RIM: 887.09 8" INV: 884.09 8" INV: 884.09	11.25° HORIZONTAL BEND
HB-R 306	FG/RIM: 887.09 8" INV: 884.09 8" INV: 884.09	11.25° HORIZONTAL BEND
MH-R 301	FG/RIM: 887.11 8" INV: 883.70 8" INV: 883.70 8" INV: 883.70	STORM SEWER STRUCTURE
MH-R 305	FG/RIM: 887.11 8" INV: 883.72 8" INV: 883.72 8" INV: 883.72	STORM SEWER STRUCTURE





SHEET NOTES

DESCRIPTIVE KEYED NOTES

1. CONNECT EXISTING STORM SEWER PIPING TO PROPOSED STORM SEWER MANHOLE
2. CONNECT TO EXISTING STORM SEWER MANHOLE
3. INSTALL NEW STORM SEWER STRUCTURE WITH YARD INLET FRAME AND GRATE; CONNECT EXISTING AND PROPOSED STORM SEWER PIPING AS INDICATED

LEGEND

1	LIMITS OF CONSTRUCTION	
2	STORM SEWER BYPASS PIPING	2 C-5.3
3	SURFACE DRAINAGE PIPING	
4	IN-LINE TRACK DRAIN	1 C-5.3
5	IN-LINE CATCH BASIN	
6	STM DETENTION OUTLET PIPING	
7	UD UNDER DRAIN PIPING	2 C-5.1
8	STORM SEWER STRUCTURE	5 C-5.3
9	STORM WATER CONTROL STRUCTURE (SWCS)	3 C-5.3
10	STORM SEWER CLEANOUT	4 C-5.3

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
REGISTERED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
STORM SEWER PLAN

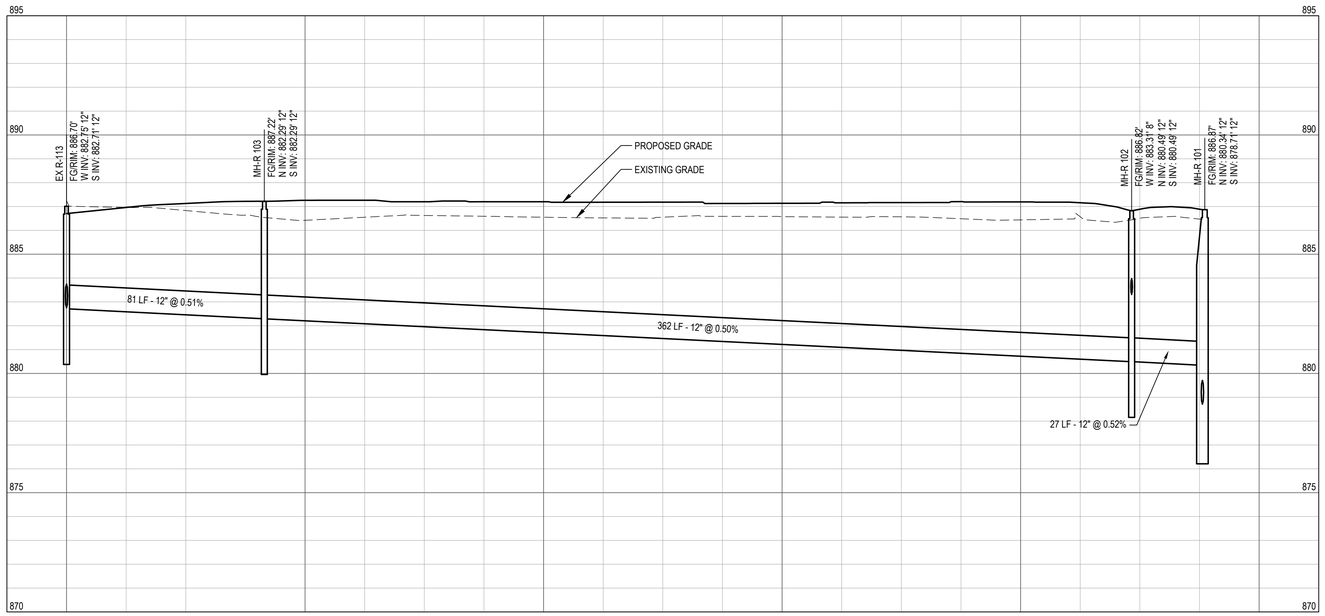
0 15' 30' 60'
SCALE 1" = 30'

SCALE 21216.000

PROJECT NUMBER

C-3.0

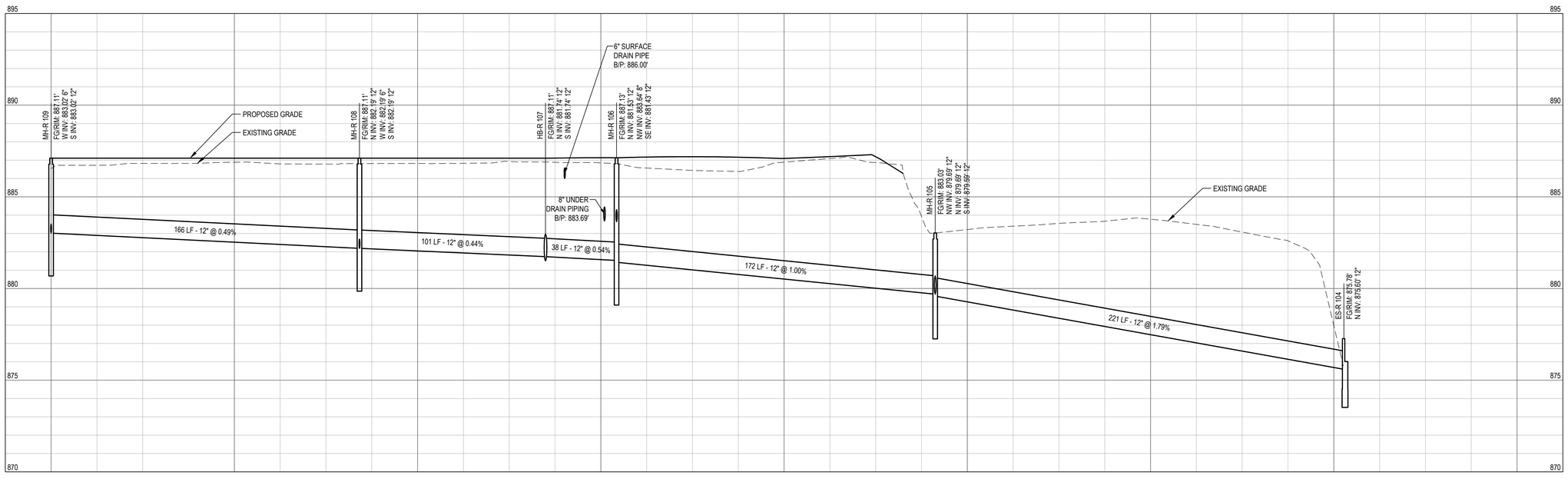
DRAWING NUMBER



1 STORM SEWER BYPASS PIPING - EX R-113 TO MH-R 101

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



2 STORM SEWER BYPASS PIPING - MH-R 109 TO ES-R 104

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL

GREENHILLS SCHOOL ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 47074
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE

STORM SEWER BYPASS PIPING PROFILES

0 15' 30' 60'

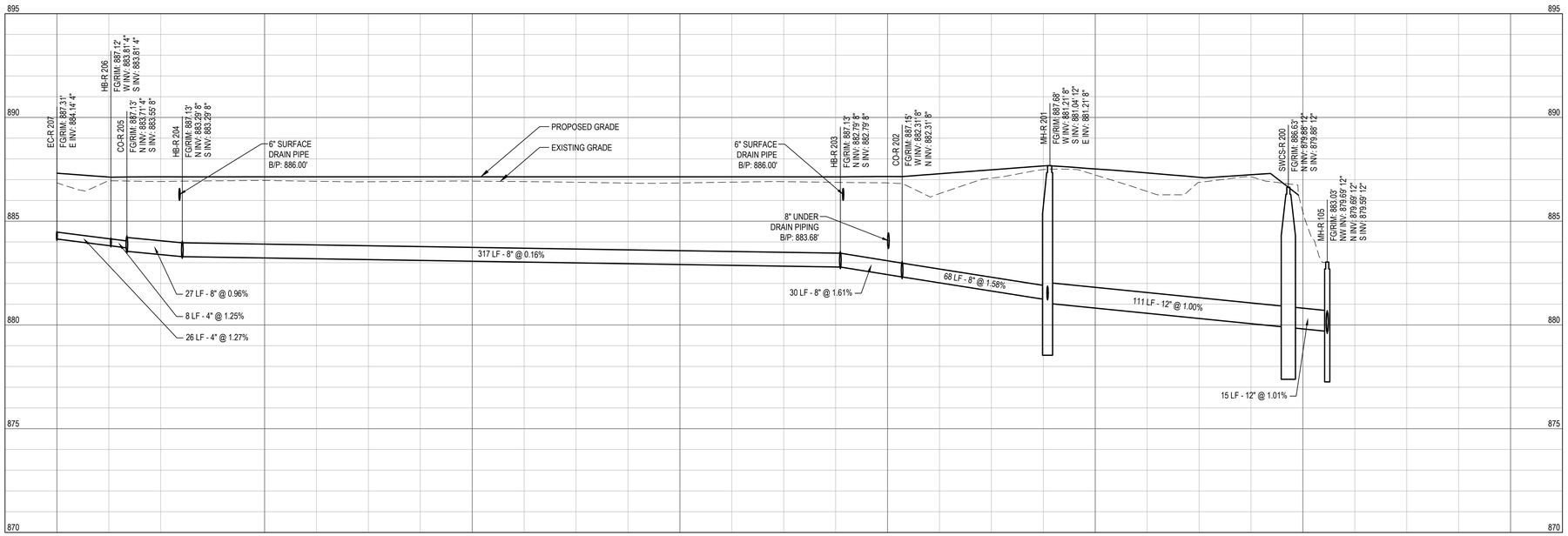
SCALE 1" = 30'

SCALE 21216.000

PROJECT NUMBER

C-3.1

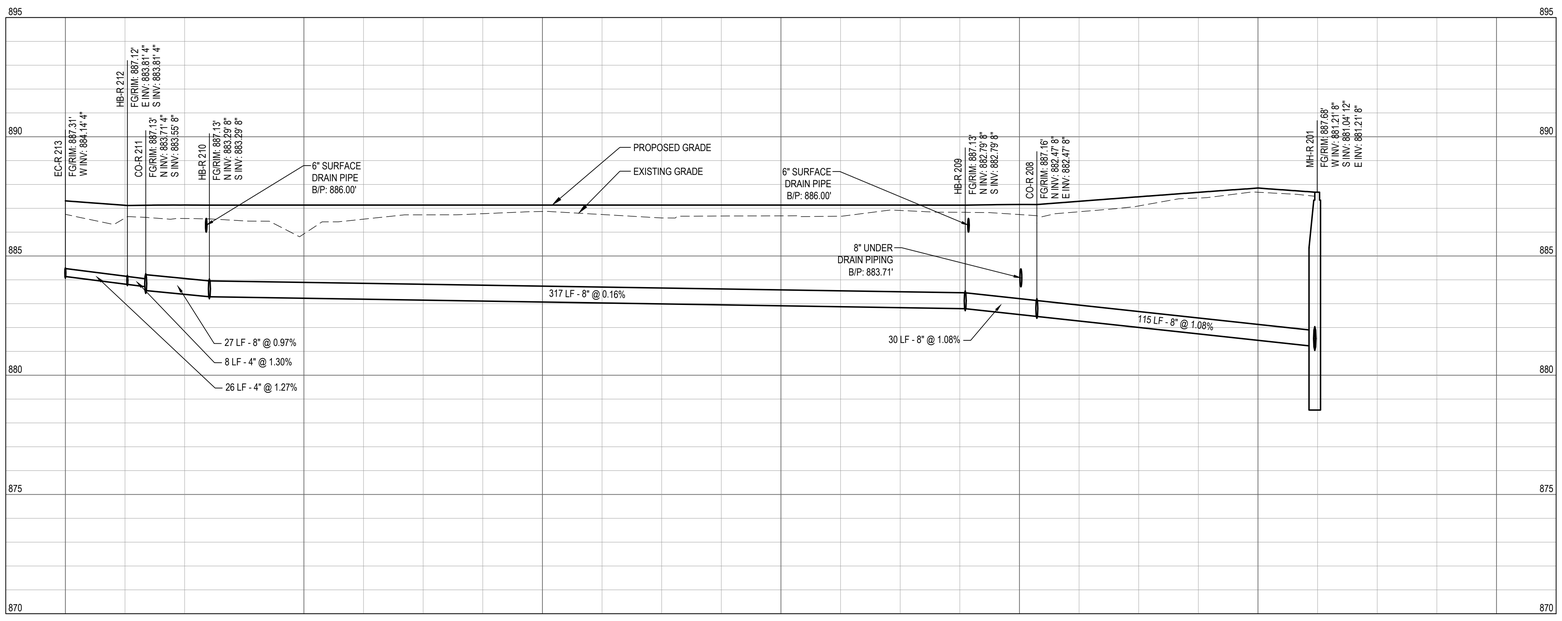
DRAWING NUMBER



1 DETENTION OUTLET PIPING - EC-R 207 TO MH-R 105

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



2 DETENTION OUTLET PIPING - EC-R 213 TO MH-R 201

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE

DETENTION OUTLET PIPING PROFILES

0 15' 30' 60'

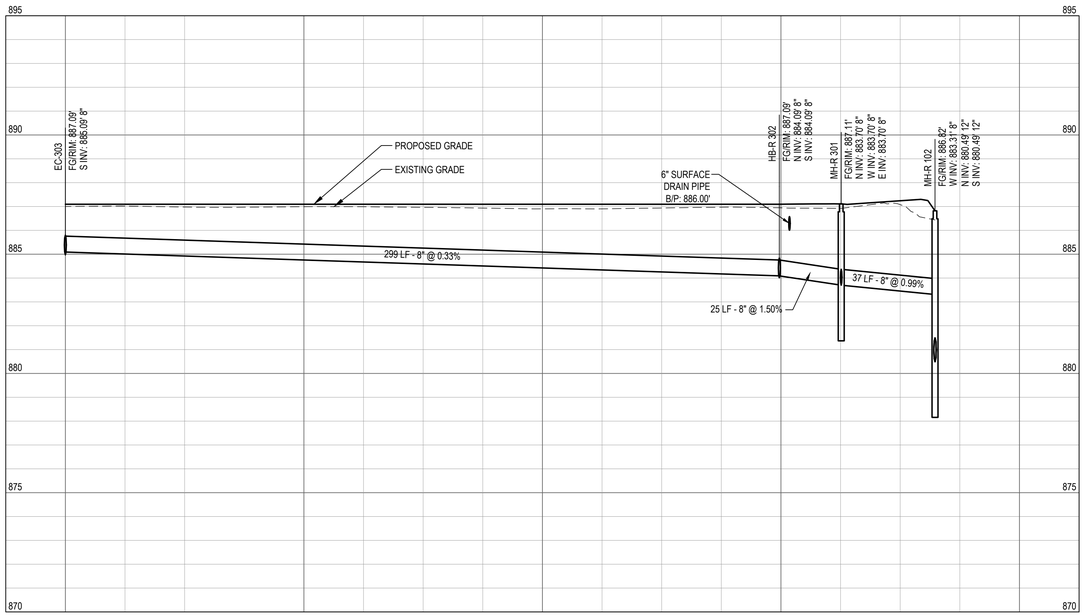
SCALE 1" = 30'

SCALE 21216.000

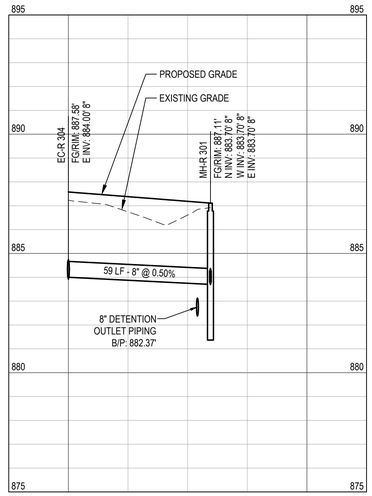
PROJECT NUMBER

C-3.2

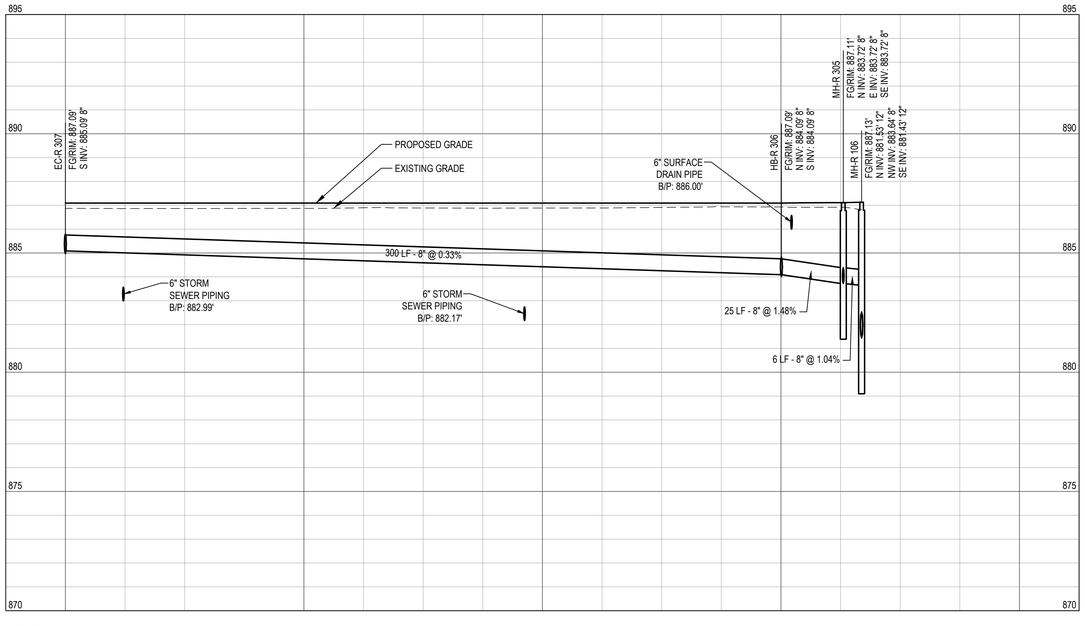
DRAWING NUMBER



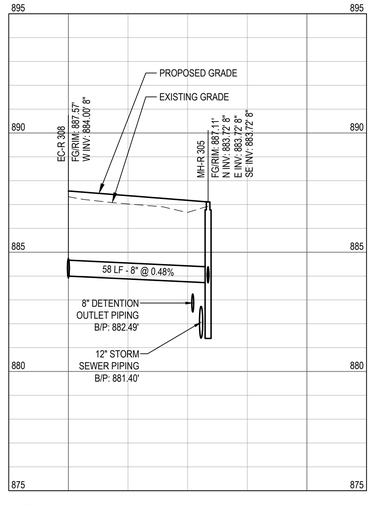
1 UNDER DRAIN PIPING - EC-R 303 TO MH-R 102
PROFILE
SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



3 UNDER DRAIN PIPING - EC-R 304 TO MH-R 301
PROFILE
SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



2 UNDER DRAIN PIPING - EC-R 307 TO MH-R 106
PROFILE
SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



4 UNDER DRAIN PIPING - EC-R 308 TO MH-R 305
PROFILE
SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48074
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE
UNDER DRAIN PIPING PROFILES

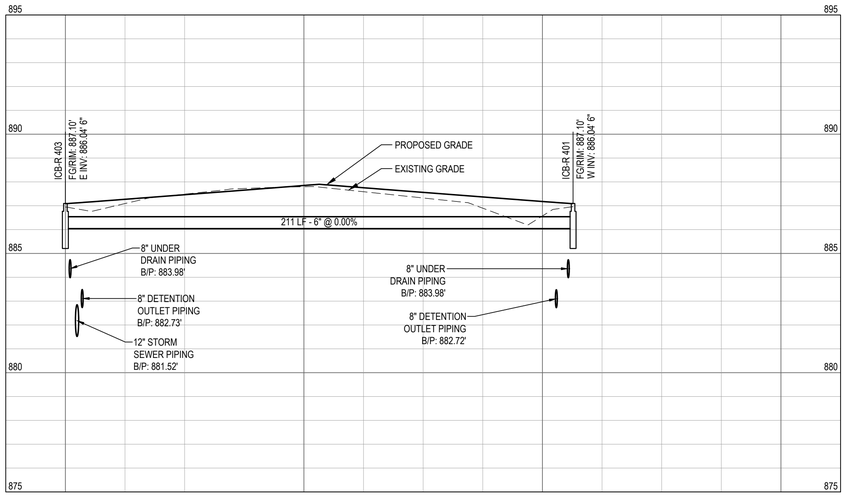
0 15' 30' 60'
SCALE 1" = 30'

SCALE
21216.000

PROJECT NUMBER

C-3.3

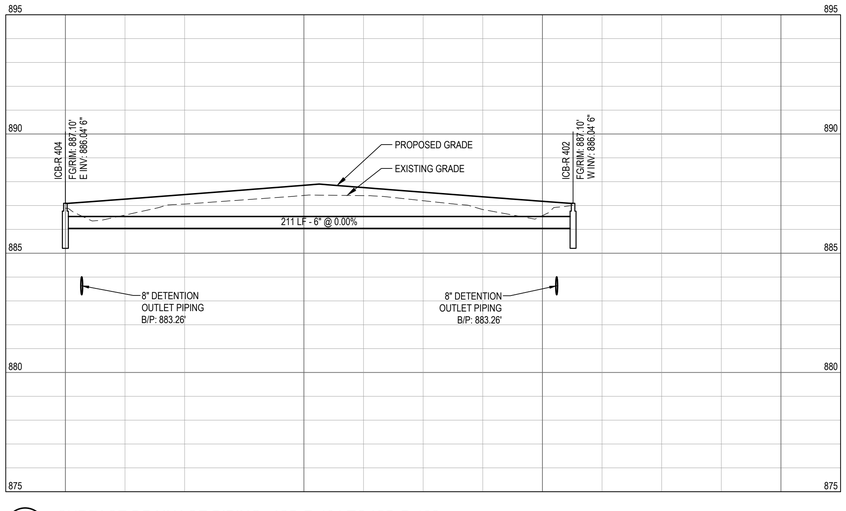
DRAWING NUMBER



1 SURFACE DRAINAGE PIPING - ICB-R 403 TO ICB-R 401

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL



2 SURFACE DRAINAGE PIPING - ICB-R 404 TO ICB-R 402

PROFILE

SCALE: 1" = 30' HORIZONTAL, 1" = 3' VERTICAL

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

KEY PLAN

PROJECT NORTH

DRAWING TITLE

SURFACE DRAINAGE PIPING PROFILES

0 15' 30' 60'

SCALE 1" = 30'

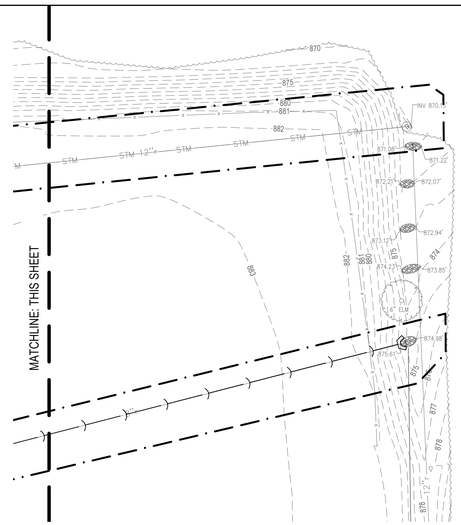
SCALE

21216.000

PROJECT NUMBER

C-3.4

DRAWING NUMBER



SHEET NOTES

DESCRIPTIVE KEYED NOTES

LEGEND

1		LIMITS OF CONSTRUCTION
2		GRADING LIMITS
3	887.30	SPOT ELEVATIONS
4	2.5%	SLOPE
5	885	EXISTING CONTOUR
6	885	PROPOSED MAJOR CONTOUR
7	887	PROPOSED MINOR CONTOUR
8	M.E.	MEET EXISTING
9	FG	FINISH GRADE ELEVATION
10	SG	BOTTOM OF SYNTHETIC TURF BASE STONE ELEVATION

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE

GRADING PLAN

0 15' 30' 60'

SCALE 1" = 30'

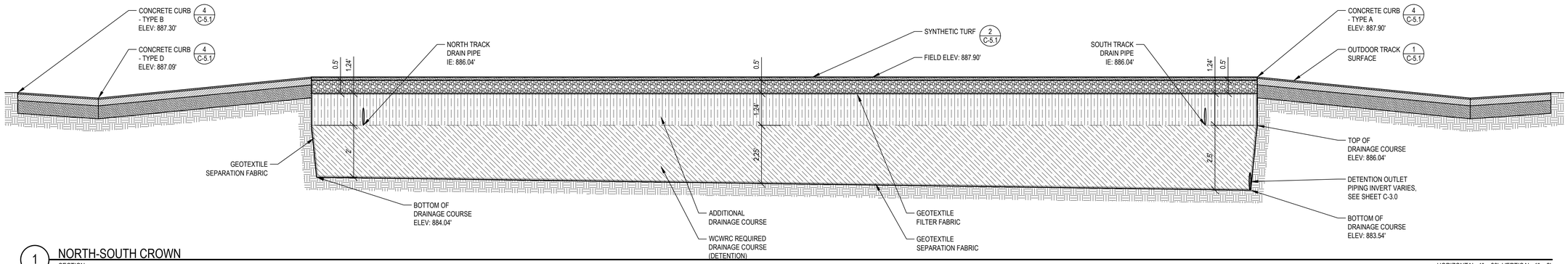
SCALE
21216.000

PROJECT NUMBER

C-4.0

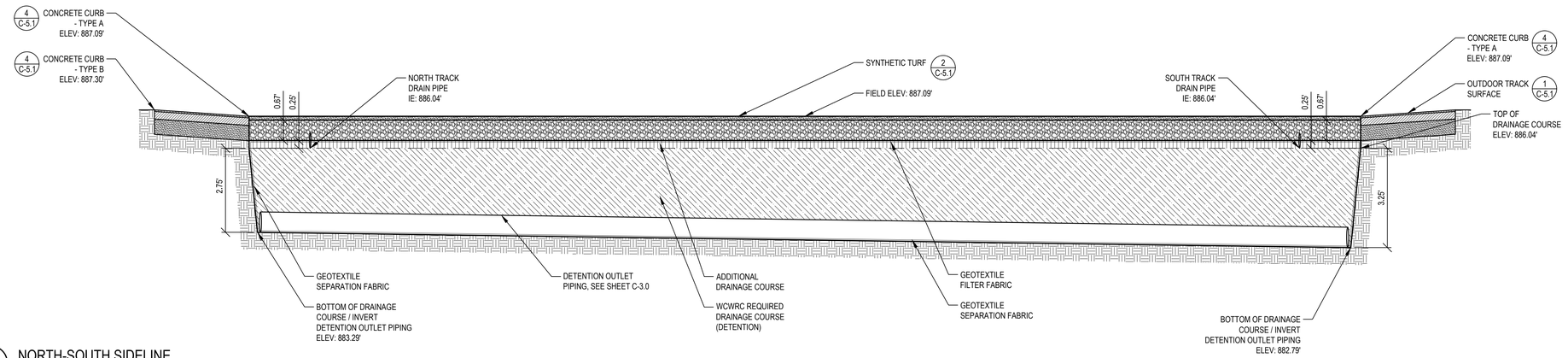
DRAWING NUMBER

FILE: P:\21216.000\CAD\C\Sheet\21216_C-4.0.dwg USER: jwywrot DATE: Jan. 28, 2020 TIME: 09:45 am



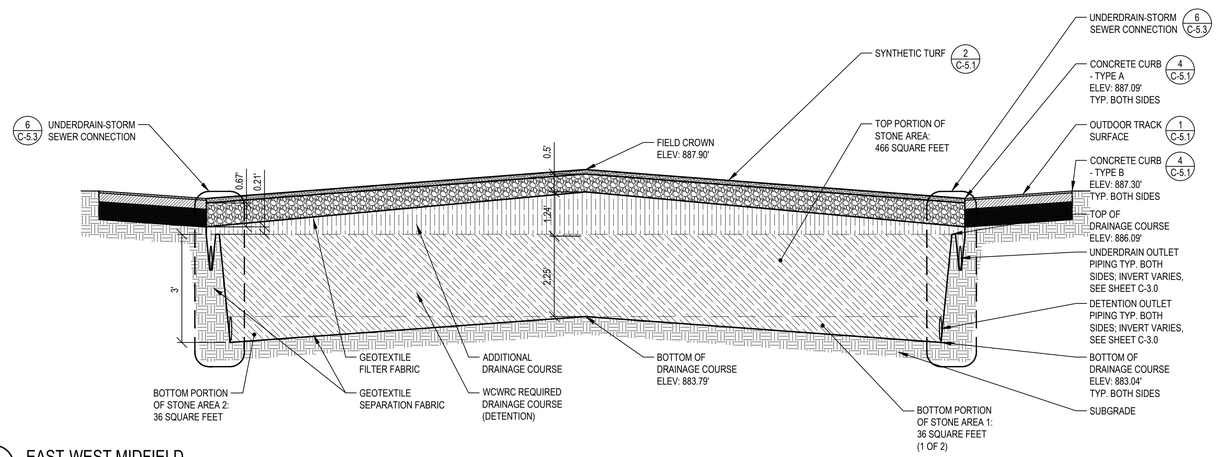
1 NORTH-SOUTH CROWN
SECTION

HORIZONTAL: 1" = 20', VERTICAL: 1" = 2'



2 NORTH-SOUTH SIDELINE
SECTION

HORIZONTAL: 1" = 20', VERTICAL: 1" = 2'



3 EAST-WEST MIDFIELD
SECTION

HORIZONTAL: 1" = 20', VERTICAL: 1" = 2'

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B WYWROT
ENGINEER
No. 46674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

PROJECT NORTH

DRAWING TITLE

SITE SECTIONS

0 15' 30' 60'

SCALE 1" = 30'

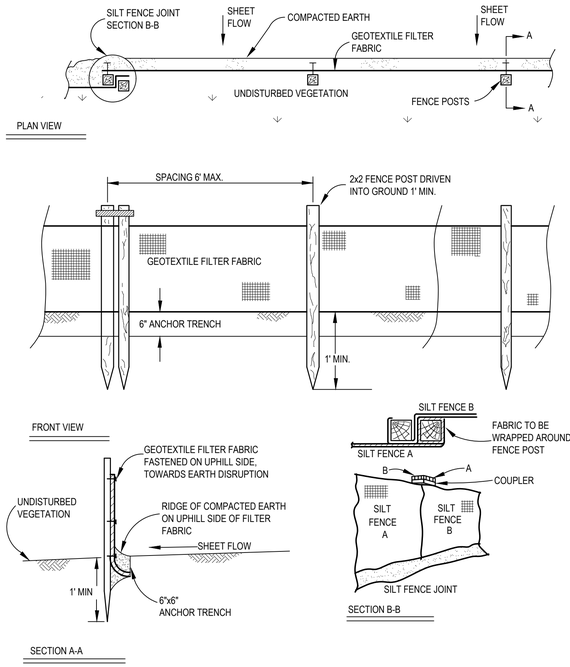
SCALE

PROJECT NUMBER

21216.000

C-4.1

DRAWING NUMBER



1 SILT FENCE

PLAN, SECTION, ELEVATION — NOT TO SCALE

SOIL EROSION AND SEDIMENTATION CONTROL SEQUENCE

IN ACCORDANCE WITH RULE 1709 PROMULGATED UNDER THE AUTHORITY OF PART 91, SOIL EROSION AND SEDIMENTATION CONTROL, OF THE NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, 1994PA 451, AS AMENDED, AND IN ADDITION TO THE INFORMATION IN THE PROJECT PLANS AND SPECIFICATIONS,THE FOLLOWING GENERAL CONDITIONS APPLY TO THE EARTH CHANGE AUTHORIZED BY THIS DOCUMENT:

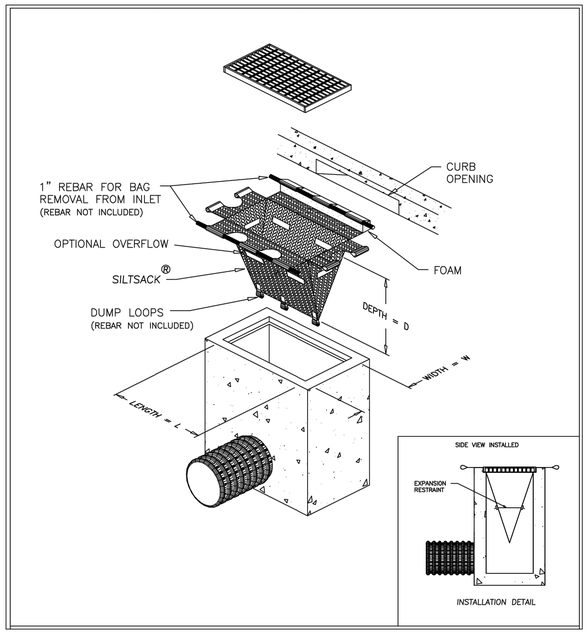
1. DESIGN, CONSTRUCT, AND COMPLETE THE EARTH CHANGE IN A MANNER THAT LIMITS THE EXPOSED AREA OF DISTURBED LAND FOR THE SHORTEST PERIOD OF TIME.
2. REMOVE SEDIMENT CAUSED BY ACCELERATED SOIL EROSION FROM RUNOFF WATER BEFORE IT LEAVES THE SITE OF THE EARTH CHANGE.
3. TEMPORARY OR PERMANENT CONTROL MEASURES SHALL BE DESIGNED AND INSTALLED TO CONVEY WATER AROUND, THROUGH OR FROM THE EARTH CHANGE AT A NON-EROSIVE VELOCITY.
4. INSTALL TEMPORARY SOIL AND SEDIMENTATION CONTROL MEASURES BEFORE OR UPON COMMENCEMENT OF THE EARTH CHANGE ACTIVITY AND MAINTAIN THE MEASURES ON A DAILY BASIS. REMOVE TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AFTER PERMANENT SOIL EROSION MEASURES ARE IN PLACE AND THE AREA IS STABILIZED. (STABILIZED MEANS THE ESTABLISHMENT OF VEGETATION OR THE PROPER PLACEMENT, GRADING OR COVERING OF SOIL TO ENSURE RESISTANCE TO SOIL EROSION, SLIDING OR OTHER EARTH MOVEMENT.)
5. COMPLETE PERMANENT SOIL EROSION CONTROL MEASURES FOR THE EARTH CHANGE WITHIN FIVE (5) CALENDAR DAYS AFTER FINAL GRADING OR UPON COMPLETION OF FINAL EARTH CHANGE. IF IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE THE EARTH CHANGE, THEN MAINTAIN TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IN PLACE AND STABILIZED.
6. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING LANDSCAPING DURING THE WARRANTY PERIOD. AFTER THE WARRANTY HAS EXPIRED, THE PERMANENT SESC MEASURES WILL BE MAINTAINED BY THE OWNER.
7. APPROXIMATE CONSTRUCTION TIME FRAME - JUNE TO OCTOBER 2017; EXACT DATES ESTABLISHED UPON AWARD OF CONTRACT
8. INSTALL SILT FENCE AND INLET FILTERS, AS INDICATED.
9. AS WORK IS COMPLETE, AND VEGETATION IS RE-ESTABLISHED, REMOVE ALL CONTROL DEVICES

ADDITIONAL SOIL EROSION AND SEDIMENTATION CONTROL INFORMATION

1. ESTIMATED TOTAL COST OF THE REQUIRED CONTROLS DURING CONSTRUCTION, INCLUDING DUST EMISSION CONTROL: $10,000
2. ESTIMATED TOTAL COST OF PROTECTING ALL EXPOSED SOIL SURFACES FROM EROSION SHOULD CONSTRUCTION DISCONTINUE: $30,000
3. ESTIMATED QUANTITY OF EXCAVATION AND FILL: 13,000 CUBIC YARDS

SOIL EROSION AND SEDIMENTATION CONTROL MAINTENANCE NOTES

1. INSTALL TEMPORARY INLET FILTERS AT ALL ADJACENT AND DOWN-GRADIENT STORM WATER INLETS, CATCH BASINS AND MANHOLES THAT MAY BE IMPACTED. CATCH BASIN INLET FILTERS SHALL BE MAINTAINED CLEAN AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD. IF A FILTER HAS HOLES OR IS INUNDATED WITH SEDIMENT, THE FILTER WILL REQUIRE REPLACEMENT.
2. INSTALL AN ANTI-TRACKING PAD AT THE SITE ENTRY AND EXIT(S), THE ANTI-TRACKING PAD SHOULD BE CONSTRUCTED OF LIMESTONE ON TOP OF A GEOTEXTILE FABRIC.
3. SILT FENCE SHALL BE MAINTAINED AT ALL TIMES THROUGHOUT THE CONSTRUCTION PERIOD. IF REPAIR OR REPLACEMENT IS NECESSARY, IT SHALL BE PERFORMED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS. MAINTENANCE INCLUDES THE REMOVING OF BUILT-UP SEDIMENT ACCUMULATES TO ½ THE HEIGHT OF THE FENCE. CONTRACTOR SHALL REMOVE, REPLACE, RETRENCH, OR RE-BACKFILL THE FENCE IF IT FAILS. ADDITIONALLY, THE CONTRACTOR SHALL REINSTALL ANY PORTION OF THE FENCING DAMAGED BY CONSTRUCTION MACHINERY.
4. PLACE STOCKPILES AND OTHER SPOIL PILES AWAY FROM THE DRAINAGE SYSTEM TO MINIMIZE SEDIMENT TRANSPORT. IF THE STOCKPILE AND/OR SPOIL PILE MUST REMAIN ON-SITE OVERNIGHT, OR IF THE WEATHER CONDITIONS INDICATE THE CHANCE FOR PRECIPITATION, A) COVER THE PILE WITH WATER REPELLENT MATERIAL TO PREVENT EROSION AND/OR B) INSTALL SILT FENCING AROUND THE BASE OF THE PILE TO PREVENT TRANSPORT OF SEDIMENT TO THE STORM WATER SYSTEM, OR APPLY OTHER CONTROL METHODS APPROPRIATE TO THE SITE. CONTROL MEASURES TO GUARD AGAINST WIND EROSION MUST ALSO BE EMPLOYED, SUCH AS WETTING OR COVERING THE STOCKPILES. KEEP AS FEW STOCKPILES AS POSSIBLE DURING THE COURSE OF THE PROJECT.
5. THROUGHOUT THE CONSTRUCTION PERIOD, ALL MUD/SILT TRACKED ONTO EXISTING ROADS FROM THE SITE DUE TO CONSTRUCTION SHALL BE IMMEDIATELY REMOVED BY THE CONTRACTOR.
6. SEEDING OR OTHER STABILIZATION SHALL BE REQUIRED IMMEDIATELY TO AREAS WHICH HAVE BEEN DAMAGED BY RUNOFF.



SILTSACK®

SPECIFICATIONS

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

HI-FLOW FLOW SILTSACK®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20%
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOIDAL TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90%
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ. FT.
PERMITTIVITY	ASTM D-4491	15 SEC-1

2 INLET PROTECTION FILTER

SECTION, ELEVATION — NOT TO SCALE

7. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL ON THE SITE THROUGHOUT THE DURATION OF THE CONSTRUCTION PROCESS.
8. WEEKLY INSPECTIONS BY A TRAINED CERTIFIED STORM WATER MANAGEMENT OPERATOR AS WELL AS PERIODIC INSPECTIONS WITHIN 24 HOURS OF ANY RAINFALL WILL BE REQUIRED. THESE INSPECTIONS MAY RESULT IN RECOMMENDATIONS FOR ROUTINE MAINTENANCE OF THE SOIL EROSION CONTROL DEVICES, AS WELL AS ADDITIONAL CONTROLS.

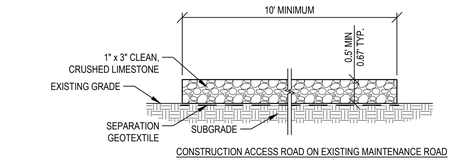
GENERAL SESC NOTES

1. DURING WORK ACTIVITIES IF SUSPECT CONTAMINATED SOIL, GROUNDWATER, OR OTHER UNKNOWN MATERIAL IS ENCOUNTERED CONTACT THE OWNER'S REPRESENTATIVE IMMEDIATELY. SUSPECT CONTAMINATED SOIL MAY EXHIBIT CHEMICAL OR UNUSUAL ODORS, STAINING, UNUSUAL COLORING, AND/OR CONTAIN MAN-MADE DEBRIS. SUSPECT CONTAMINATED GROUNDWATER MAY EXHIBIT CHEMICAL OR UNUSUAL ODORS, UNUSUAL COLORING, AND/OR SHEEN. IMMEDIATELY CEASE ALL EXCAVATION, DEWATERING, TRANSPORT, OR DISTURBANCE OF THE SUSPECT MATERIAL UNTIL GIVEN DIRECTION BY THE OWNER'S REPRESENTATIVE.
2. MANAGEMENT AND DISPOSAL OF REGULATED WASTE MATERIALS. CONTRACTOR SHALL COORDINATE WITH OWNER'S REPRESENTATIVE FOR THE REMOVAL OF ALL REGULATED WASTE MATERIALS. REGULATED WASTE MATERIALS INCLUDE, BUT ARE NOT LIMITED TO: USED CHEMICAL PRODUCTS, PAINTS, SOLVENTS, ADHESIVES, OILS, GREASES, CLEANERS, DEGREASERS, CONTAMINATED OR OILY RAGS, GLYCOLS, HEAT TRANSFER FLUIDS, AND BOILER CHEMICALS. THE OWNER'S REPRESENTATIVE SHALL SIGN ALL WASTE DISPOSAL MANIFESTS FOR REGULATED WASTES. WASTE MATERIALS SHALL BE STAGED FOR PICK UP IN AREAS THAT ARE EASILY ACCESSIBLE. WASTE CONTAINERS SHALL BE STORED ON A HARD SURFACE SUCH AS ASPHALT, CONCRETE, OR TILED FLOORING. ALL WASTE CONTAINERS SHALL BE LABELED WITH EITHER A HAZARDOUS WASTE LABEL, OR A NON RCRA REGULATED WASTE LABEL AS APPROPRIATE. LABELS SHALL REMAIN VISIBLE, AND SHALL BE COMPLETED LEGIBLY. ALL CONTAINERS SHALL BE TIGHTLY CLOSED WHEN NOT ACTIVELY BEING FILLED. CONTAINERS SHALL BE INSPECTED DAILY FOR LEAKS, CLOSURE, LABELING AND CONTAINER INTEGRITY. CONTRACTOR SHALL PROVIDE OWNER'S REPRESENTATIVE WITH MATERIALS SAFETY DATA SHEETS FOR ALL CHEMICALS USED IN THE PROJECT. CONTRACTOR SHALL CLEAN UP ALL SPILLS IMMEDIATELY.
3. CONCRETE, ASPHALT & SAWCUTTING WORK: THIS PROJECT SHALL NOT DISCHARGE TO THE SURFACE WATERS OF THE STATE ANY WASTEWATER GENERATED FROM CUTTING, GRINDING, DRILLING, OR HYDRODEMOLITION OF CONCRETE, INCLUDING ASPHALT WITHOUT AUTHORIZATION UNDER AN NPDES WASTEWATER DISCHARGE PERMIT.

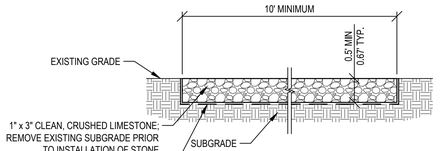
   THE FOLLOWING REQUIREMENTS APPLY:

   - DISCHARGE OF WATER, DUST, OR DEBRIS FROM CONCRETE AND ASPHALT WORK TO STORM OR SANITARY SYSTEMS IS PROHIBITED.
   - STORM DRAINS MUST BE PROTECTED FROM DUST AND DEBRIS.
   - ANY WATER USED DURING CONCRETE AND ASPHALT WORK (INCLUDING SWEEPING AND SAW-CUTTING) MUST BE CONTAINED AND COLLECTED FOR PROPER DISPOSAL. SUGGESTED CONTROLS INCLUDE WET VACUUM, OR ABSORBENTS.
   - GOOD HOUSEKEEPING PRACTICES MUST BE EMPLOYED AT THE JOBSITE. MINIMIZE DUST.
   - PROJECTS SHALL NOT DISCHARGE TO THE SURFACE WATERS OF THE STATE ANY WASTEWATER GENERATED FROM CUTTING, GRINDING, DRILLING, HYDRO-DEMOLITION OF CONCRETE WITHOUT AUTHORIZATION UNDER A NPDES WASTEWATER DISCHARGE PERMIT.
4. CONCRETE AND GROUT WASHOUT: DO NOT DISCHARGE CONCRETE/GROUT WASHOUT INTO STORM DRAINS, CATCH BASINS OR TO THE SANITARY SEWER SYSTEM. PERFORM WASHING OF CONCRETE TRUCKS IN DESIGNATED AREAS OR AN APPROVED OFFSITE LOCATION.
   - DESIGNATED AREAS SHOULD BE CLEARLY LABELED. THEY SHOULD BE IN A PIT TO PREVENT RUN-OFF OF WASTE WATER. PLACE DESIGNATED AREAS A MINIMUM OF 50 FEET FROM STORM DRAINS, BODIES OF WATER AND DITCHES. ALL DESIGNATED AREAS SHOULD BE LINED TO PREVENT SEEPAGE AND SHOULD HAVE A BARRIER.
   - ALTERNATIVE TO A DESIGNATED AREA: PROVIDE A CONCRETE BOX. IF ONLY A SMALL OF CONCRETE WASHINGS IS TO OCCUR, ONE OPTION IS TO LINE A ROLL-OFF BOX. FOR VERY SMALL PROJECTS THIS COULD BE DONE WITH A DRUM.

   ONCE CONCRETE WASHOUT HAS HARDENED, BREAK UP AND DISPOSE OF PROPERLY. DISPOSAL OF HARDENED CONCRETE/GROUT SHOULD OCCUR ON A REGULAR BASIS. WASHOUT FACILITIES MUST BE CLEANED, OR NEW FACILITIES PROVIDED ONCE THE WASHOUT AREA IS 75% FULL.
5. FERTILIZER: USE ONLY PHOSPHORUS-FREE FERTILIZERS ON TURFGRASS. PHOSPHORUS MAY BE ADDED TO TURFGRASS ONLY IF SOILS ARE TESTED (A MINIMUM OF ONCE EVERY FOUR (4) YEARS) AND A NEED FOR PHOSPHORUS IS DEMONSTRATED. PHOSPHORUS FERTILIZERS SHALL BE APPLIED TO LANDS THAT PERMITTEE OWNS OR OPERATES ONLY AS PRESCRIBED IN THE SOIL TEST RESULTS. PROVIDE OWNER'S REPRESENTATIVE WITH SOIL TESTING RESULTS IF PHOSPHORUS IS PROPOSED FOR USE ON TURFGRASS. SEEDING OR OTHER STABILIZATION SHALL BE REQUIRED IMMEDIATELY TO AREAS WHICH HAVE BEEN DAMAGED BY RUNOFF.
6. DEWATERING: UNCONTAMINATED GROUNDWATER AND SURFACE WATER WHICH IS FREE OF SEDIMENT MAY BE DISCHARGED TO A STORM DRAIN. ALL DEWATERING OPERATIONS MUST USE A FILTER (DEWATERING) BAG CONNECTED TO THE END OF THE DISCHARGE PIPE. THE FINAL DISCHARGE MUST BE CLEAR (NO TURBIDITY) AND ON A CLEAN SURFACE (NOT ON EXPOSED SOILS) TO PREVENT THE DISCHARGE FROM PICKING UP SEDIMENT. THE STORM DRAIN INLET SHALL BE PROTECTED WITH FILTER FABRIC OR FILTER BAG. THE CONTRACTOR SHALL ENSURE ROUTINE INSPECTION AND MAINTENANCE OF THE PUMP HOSES & FILTER BAGS DAILY, REPLACE EQUIPMENT WHEN SIGNS OF DETERIORATION ARE EVIDENT AND/OR IF INSTRUCTED BY THE CONSTRUCTION SITE STORM OPERATOR. IF THERE ARE INDICATIONS OF POSSIBLE CONTAMINATION, OR IF THE WATER IS TURBID, IMMEDIATELY CEASE DISCHARGE AND CONTACT THE OWNER'S REPRESENTATIVE FOR INSPECTION OF THE WATER AND DISPOSAL OPTIONS. POTENTIALLY CONTAMINATED GROUNDWATER MAY EXHIBIT CHEMICAL OR UNUSUAL ODORS, HAVE AN UNUSUAL COLOR, OR SHEEN.
7. CRUSHED CONCRETE: DUE TO THE POTENTIAL FOR LEACHATE FROM CRUSHED CONCRETE TO IMPACT SURFACE WATERS, AVOID WHERE FEASIBLE AND PRACTICAL THE USE OF CRUSHED CONCRETE ON SITE LOCATIONS WHERE THERE IS A POTENTIAL FOR RUNOFF TO ENTER STORM DRAINS AND WATERS OF THE STATE.
8. ASPHALT SEALANTS: THE USE OF COAL TAR EMULSIONS TO SEAL ASPHALT SURFACES IS PROHIBITED.
9. ACCORDING TO MICHIGAN PART 91 ADMINISTRATIVE RULE 1703, A SOIL EROSION AND SEDIMENTATION CONTROL (SESC) PLAN IS REQUIRED FOR CONSTRUCTION SITES WITH OVER ONE ACRE OF EARTH CHANGE. A FORMAL SESC PLAN IS NOT REQUIRED FOR SITES DISTURBING LESS THAN ONE ACRE WHICH ARE ALSO GREATER THAN 500 FEET FROM WATERS OF THE STATE (LAKES, STREAMS, WETLANDS, ETC.). THIS SITE IS MORE THAN 500 FEET FROM WATERS OF THE STATE; HOWEVER, THE TOTAL EARTH CHANGE WILL BE APPROXIMATELY 3.2 ACRES; CONSEQUENTLY, A FORMAL SESC PLAN IS REQUIRED
10. THE NEAREST WATERS OF THE STATE IS THE POND AT THE INTERSECTION OF EARHART ROAD AND GREENHILLS DRIVE WHICH IS APPROXIMATELY 800' FROM THE LIMITS OF WORK.
11. DURING CONSTRUCTION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO PERFORM MAINTENANCE ON THE STORM WATER SYSTEM. FOLLOWING CONSTRUCTION, IT WILL BE THE RESPONSIBILITY OF THE OWNER TO HAVE MAINTENANCE PERFORMED.



CONSTRUCTION ACCESS ROAD ON EXISTING MAINTENANCE ROAD

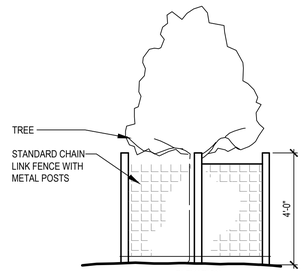


CONSTRUCTION ACCESS ROAD ON EXISTING GROUND

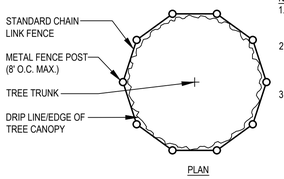
NOTES:
1. CONSTRUCTION ACCESS ROAD TO BE A MINIMUM OF 10' WIDE.
2. CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING THE CONSTRUCTION ACCESS ROAD; AGGREGATE NO LONGER CAPABLE OF PREVENTING TRACKING IS TO BE REPLACED OR REPLENISHED.
3. CONSTRUCTION ACCESS ROAD DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF SWEEPING AND CLEANING ADJACENT WALKS AND ROADS AS NECESSARY.

3 CONSTRUCTION ACCESS ROAD

SECTION — SCALE: 1/2" = 1'



ELEVATION



PLAN

NOTES:
1. TREE PROTECTION FENCE SHALL BE CONSTRUCTED OF STANDARD CHAIN LINK FENCE WITH METAL POSTS.
2. TREE PROTECTION FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE SPREAD OF THE BRANCHES (DRIP LINE) EXCEPT WHERE PROHIBITED BY EXISTING PAVEMENTS OR STRUCTURES.
3. CONTRACTOR SHALL MAINTAIN INTEGRITY OF TREE PROTECTION FENCE THROUGHOUT THE PROJECT. REPAIR DAMAGED FENCING IMMEDIATELY. TREE PROTECTION FENCE SHALL NOT BE RELOCATED, FOR ANY REASON, WITHOUT WRITTEN CONSENT BY THE OWNER'S REPRESENTATIVE.

4 TREE PROTECTION FENCE

PLAN, ELEVATION — NOT TO SCALE

GREENHILLS SCHOOL ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

KEY PLAN

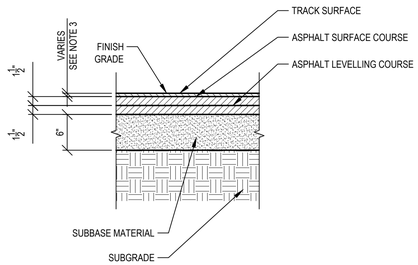
DRAWING TITLE

SESC AND SITE PREP DETAILS AND NOTES

SCALE 21216.000

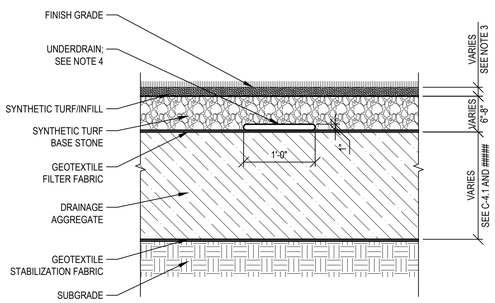
PROJECT NUMBER C-5.0

DRAWING NUMBER



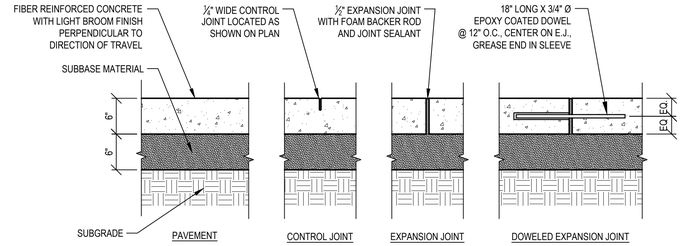
NOTES:
1. SEE SPECIFICATION SECTION 312000 "EARTH MOVING" FOR SUBBASE AND SUBGRADE REQUIREMENTS.
2. SEE SPECIFICATION SECTION 321216 "ASPHALT PAVING" FOR SURFACE AND LEVELING COURSE REQUIREMENTS.
3. TRACK SURFACE THICKNESS VARIES BETWEEN 10mm AND 14mm DEPENDING ON THE SURFACE CHOSEN. SEE SPECIFICATION SECTION 321217.26 "TRACK" FOR MORE INFORMATION

1 OUTDOOR TRACK SURFACE
SECTION 1" = 1'-0"



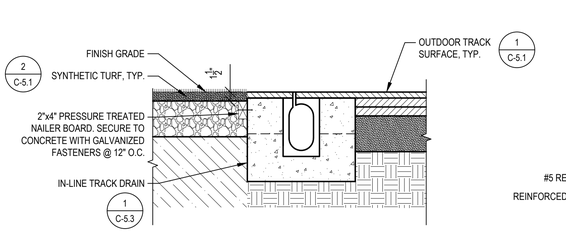
NOTES:
1. SEE SPECIFICATION SECTION 312000 "EARTH MOVING" FOR SYNTHETIC BASE STONE, DRAINAGE AGGREGATE, GEOTEXTILE FABRIC, AND SUBGRADE REQUIREMENTS.
2. SEE SECTION 321813 "SYNTHETIC TURF" FOR SYNTHETIC TURF REQUIREMENTS.
3. SYNTHETIC TURF PILE HEIGHT VARIES BETWEEN 2-INCHES AND 2-1/2 INCHES DEPENDING ON THE SURFACE CHOSEN. SEE SPECIFICATION SECTION 321813 "SYNTHETIC TURF" FOR MORE INFORMATION.
4. UNDERDRAIN PIPING TO BE ADVANEDGE AS MANUFACTURED BY ADS (www.ads-pipe.com), OR APPROVED EQUAL.

2 SYNTHETIC TURF
SECTION 1" = 1'-0"

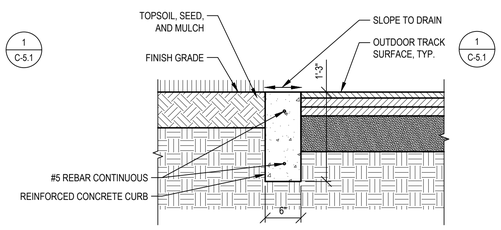


NOTES:
1. EXPANSION JOINTS SHALL BE INSTALLED SUCH THAT NO SINGLE DIMENSION EXCEEDS 40 FEET AND ALSO THE AREA BETWEEN EXPANSION JOINTS SHALL NOT EXCEED 250 SQUARE FEET. ALL EXPANSION JOINTS ARE TO BE SEALED.
2. ½" EXPANSION PAPER SHALL BE PLACED AT ALL LOCATIONS THAT NEW SIDEWALK ABUTS CONCRETE CURB, EXISTING SIDEWALK, LIGHT POLE BASES AND/OR RETAINING WALLS.
3. SNAP-CAP EXPANSION JOINT STRIPS CAN BE USED ON ALL EXPANSION JOINTS.
4. SEE SPECIFICATION SECTION 312000-EARTH MOVING FOR SUBBASE MATERIAL, SECTION 321313-CONCRETE PAVING FOR CONCRETE MATERIALS AND SECTION 321373-CONCRETE PAVING JOINT SEALANTS.

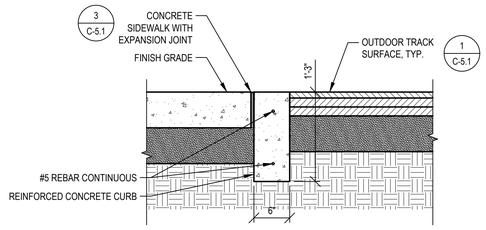
3 CONCRETE SIDEWALK
SECTION 1" = 1'-0"



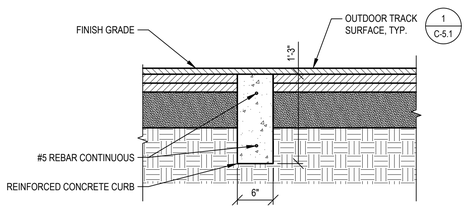
TYPE A - OUTDOOR TRACK AND SYNTHETIC TURF



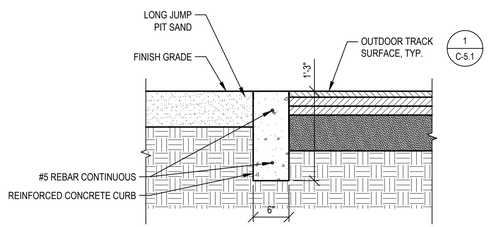
TYPE B - OUTDOOR TRACK AND LAWN



TYPE C - OUTDOOR TRACK AND CONCRETE SIDEWALK



TYPE D - OUTDOOR TRACK AND OUTDOOR TRACK

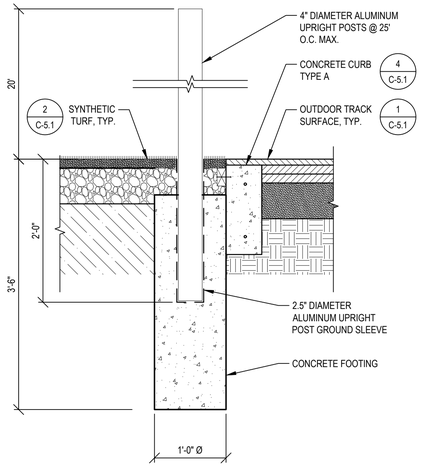


TYPE E - OUTDOOR TRACK AND LONG JUMP SAND PIT

4 CONCRETE CURB
SECTION 1" = 1'-0"

NOTES:
1. PROVIDE FULL DEPTH EXPANSION JOINTS AT 30' O.C. MAX. AND AT ALL CORNER LOCATIONS
2. ALL REBAR, CONTINUOUS BETWEEN EXPANSION JOINTS.
3. SEE SPECIFICATION SECTION 321313-CONCRETE PAVING FOR CONCRETE MATERIALS.
4. CONCRETE SURFACES TO RECEIVE TRACK SURFACE MATERIAL REQUIRE A 30-DAY CURING TIME AND SHOULD NOT BE TREATED WITH CURING COMPOUND.

NOTES:
1. BALL CONTROL NETTING TO BE "STORMGUARD BALL SAFETY NETTING SYSTEM" AS MANUFACTURED BY SPORTFIELD SPECIALTIES, OR APPROVED EQUAL (www.sportsfieldspecialties.com)
2. POSTS TO BE 4" O.D. 3-1/2" SCHEDULE 80 ALUMINUM STRAIGHT POLE
3. NETTING TO BE HEAVY DUTY, BLACK #36 NYLON, 1-3/4" SQUARE MESH NET



5 BALL CONTROL NETTING - ALTERNATE
SECTION 1" = 1'-0"

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Addendum #2		Jan 24, 2017
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 48674
LICENSED PROFESSIONAL ENGINEER

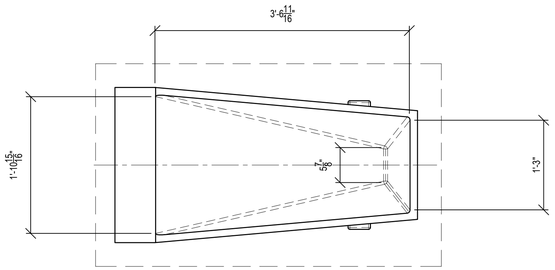
KEY PLAN

DRAWING TITLE
MATERIAL DETAILS

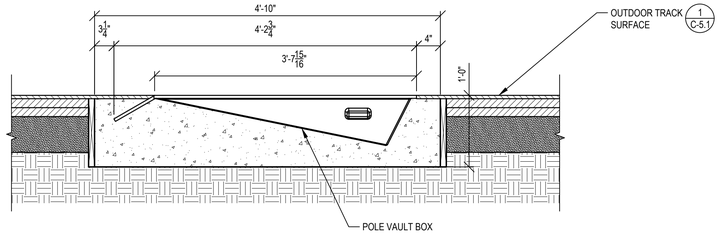
SCALE
21216.000

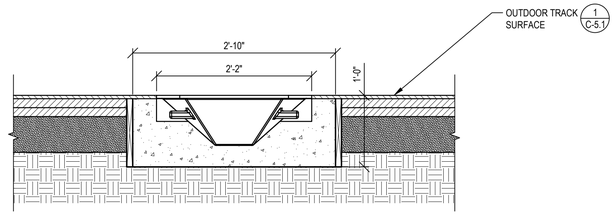
PROJECT NUMBER
C-5.1

DRAWING NUMBER

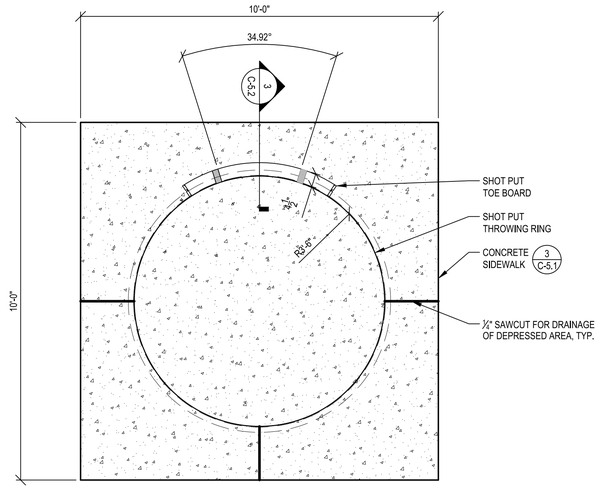


NOTES:
1. POLE VAULT BOX TO BE SPORTSFIELD SPECIALTIES (www.sportsfieldspecialties.com) TFPV00ICA - CAST ALUMINUM VAULT BOX OR APPROVED EQUAL. POLE VAULT BOX SHALL MEET OR EXCEED ALL NFHS SPECIFICATIONS.
2. PROVIDE CAST ALUMINUM VAULT BOX COVER PLUG - TFPV003ALTR-CA AS MANUFACTURED BY SPORTSFIELD SPECIALTIES, OR APPROVED EQUAL. VAULT BOX COVER PLUG TO INCLUDE A RECESSED AREA TO RECEIVE SYNTHETIC TURF MATERIAL TO MATCH THE REST OF THE PROJECT.
3. VAULT BOX, AND CONCRETE FOUNDATION, TO BE INSTALLED ACCORDING TO MANUFACTURER'S REQUIREMENTS.

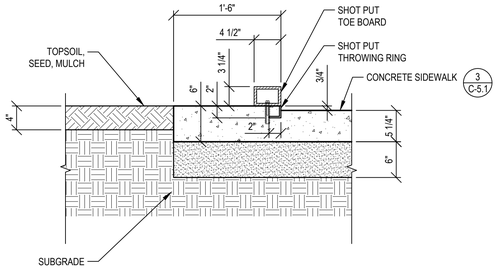




1 POLE VAULT BOX
PLAN, SECTION — 1" = 1'-0"

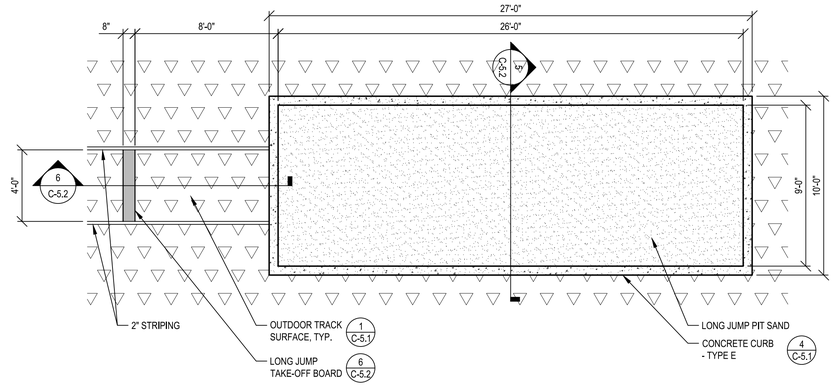


2 SHOT PUT THROWING RING
PLAN — 1/2" = 1'-0"

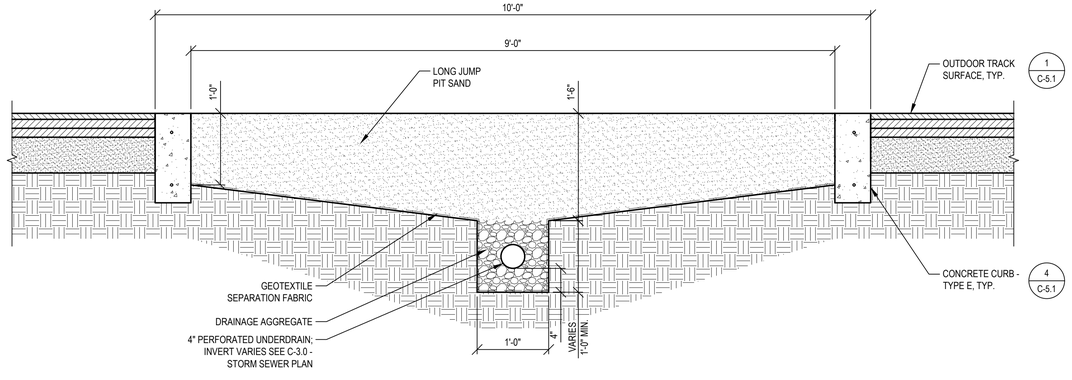


NOTES:
1. SHOT PUT RING TO BE SPORTSFIELD SPECIALTIES (www.sportsfieldspecialties.com) TFSPH084AL - SHOT PUT THROW RING (DEPRESSED PAD INSTALLATION) OR APPROVED EQUAL. SHOT PUT RING SHALL MEET OR EXCEED ALL NFHS SPECIFICATIONS.
2. SHOT PUT TOE BOARD TO BE SPORTSFIELD SPECIALTIES TFSPT00IAL - SHOT PUT TOE BOARD (DEPRESSED PAD INSTALLATION) OR APPROVED EQUAL. SHOT PUT TOE BOARD SHALL MEET OR EXCEED ALL NFHS SPECIFICAITONS.
3. SHOT PUT RING AND SHOT PUT TOE BOARD TO BE INSTALLED ACCORDING TO MANUFACTURER'S REQUIREMENTS.
4. OUTSIDE OF THE RING, CONCRETE TO BE FINISHED TO THE TOP OF THE SHOT PUT THROWING RING AND ¾" BELOW THE FINISHED LEVEL INSIDE THE RING.

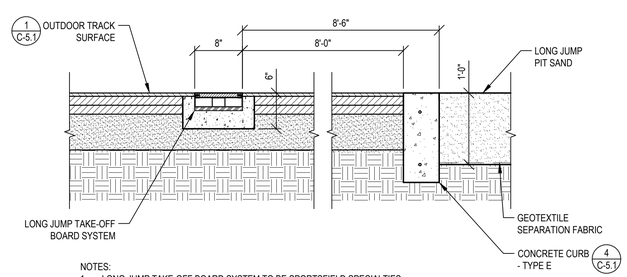
3 SHOT PUT THROWING RING
SECTION — 1" = 1'-0"



4 LONG JUMP PIT
PLAN — 1/4" = 1'-0"



5 LONG JUMP PIT
SECTION — 1" = 1'-0"



NOTES:
1. LONG JUMP TAKE-OFF BOARD SYSTEM TO BE SPORTSFIELD SPECIALTIES (www.sportsfieldspecialties.com) TFLT008SS-SYN - 8" LONG JUMP TAKE-OFF BOARD SYSTEM OR APPROVED EQUAL. LONG JUMP TAKE-OFF BOARD SYSTEM SHALL MEET OR EXCEED ALL NFHS SPECIFICATIONS.
2. TAKE-OFF BOARD SYSTEM AND CONCRETE FOUNDATION, TO BE INSTALLED ACCORDING TO MANUFACTURER'S REQUIREMENTS.

6 LONG JUMP TAKE-OFF BOARD
SECTION — 1" = 1'-0"

GREENHILLS SCHOOL ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN — JOSEPH B. WYWROT — ENGINEER — No. 48674 — REGISTERED PROFESSIONAL ENGINEER

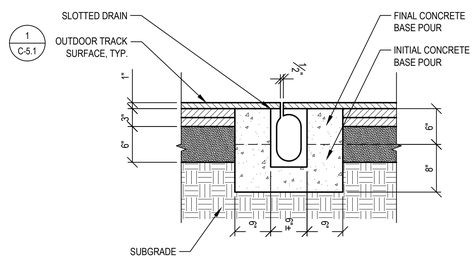
KEY PLAN

DRAWING TITLE
TRACK EQUIPMENT DETAILS

SCALE
21216.000

PROJECT NUMBER
C-5.2

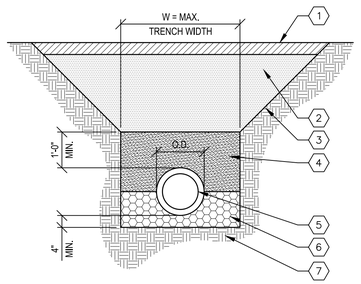
DRAWING NUMBER



INSTALLATION NOTES:
1. POUR INITIAL CONCRETE BASE TO SET SLOTTED DRAIN TO PROPER ELEVATION AND LOCATION
2. POUR FINAL CONCRETE BASE; FINAL CONCRETE BASE SHALL BE 1" BELOW THE FINISHED GRADE ELEVATION.
3. INSTALL TRACK SURFACE MATERIAL ACROSS THE CONCRETE BASE AND SLOTTED DRAIN, LEAVING OPENING AS INDICATED.
4. CONCRETE PAVEMENT TO RECEIVE TRACK SURFACING SHALL NOT BE TREATED WITH CURING COMPOUND.

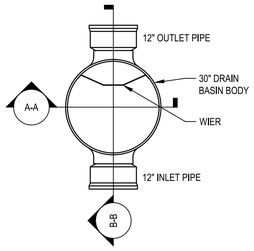
MATERIAL NOTES:
1. INLINE TRACK DRAIN TO BE ACO SPORT SYSTEM 2000 SLOTTED TRACK AND FIELD DRAINAGE SYSTEM OR APPROVED EQUAL
2. INLINE CATCH BASIN TO BE ACO SPORT SYSTEM 2000 OR APPROVED EQUAL
3. SEE SPECIFICATION SECTION 321313-CONCRETE PAVING FOR CONCRETE MATERIALS

1 IN-LINE TRACK DRAIN
SECTION — 1" = 1'-0"

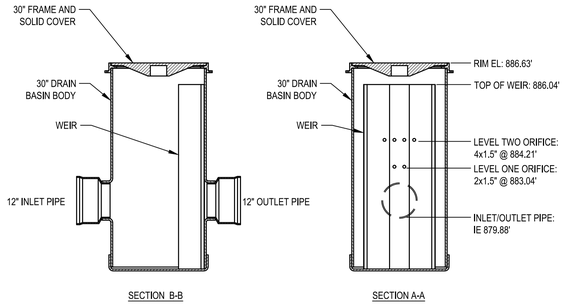


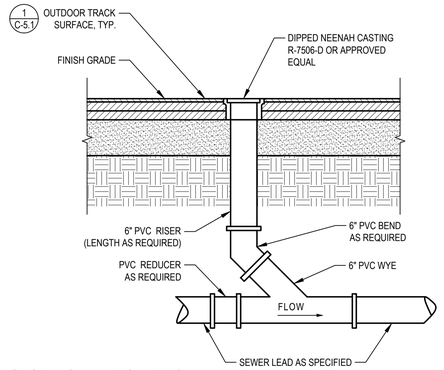
KEYED NOTES
1. FINISH GRADE PER SHEET C-4.0 - GRADING PLAN
2. FINAL BACKFILL
3. SLOPE PER OSHA SAFETY STANDARDS
4. INITIAL BACKFILL
5. PIPE MATERIAL AND SIZE PER SHEET C-3.0 - STORM SEWER PLAN
6. BEDDING COURSE
7. UNDISTURBED SUBGRADE

NOTES:
1. SEE SPECIFICATION SECTION 312000 "EARTH MOVING" FOR BACKFILL AND BEDDING COURSE REQUIREMENTS.
2. SEE SPECIFICATION SECTION 334100 "STORM DRAINAGE PIPING" FOR STORM SEWER REQUIREMENTS.
3. TRENCH WIDTH
   O.D. ≤ 12", W = 30"
   O.D. = 15" - 24", W = O.D.+18"
   O.D. = 30" - 36", W = O.D.+24"

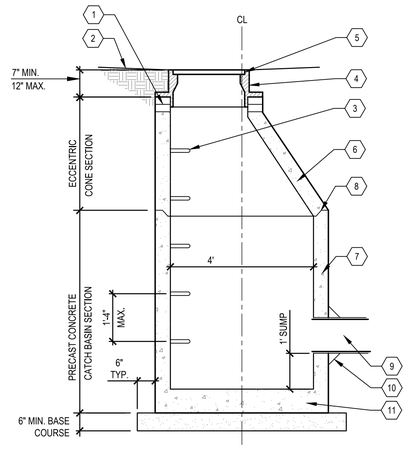


TOP VIEW W/ FRAME & COVER REMOVED





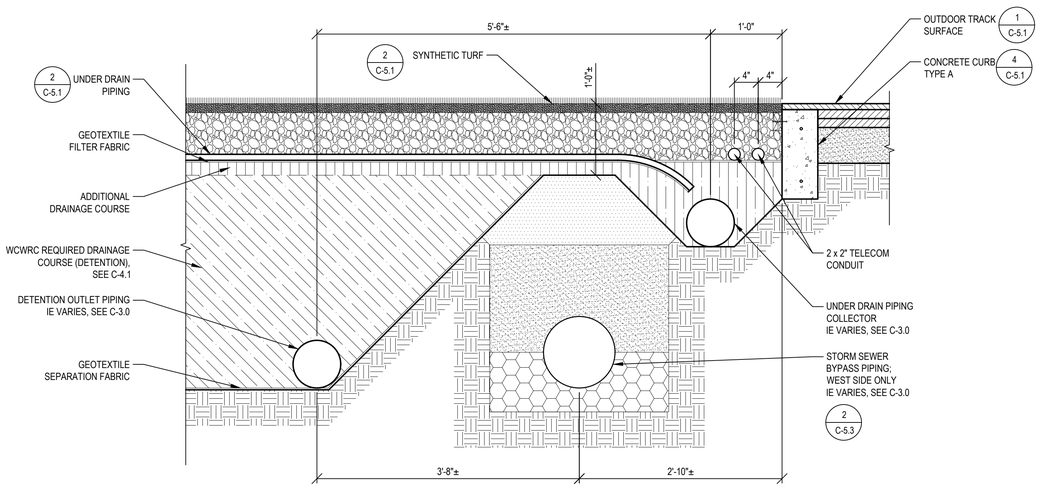
4 STORM SEWER CLEANOUT
SECTION — 1" = 1'-0"



1. ADJUST TO FINISH GRADE W/ MH BRICK OR CONCRETE GRADE RINGS
2. FINISH GRADE
3. POLYPROPYLENE COVERED REBAR STEPS PS1-PF OR EQUAL
4. FRAME AND GRATE
5. TOP OF CASTING ELEV. SEE PLAN
6. PRECAST CONCRETE ECCENTRIC REDUCING CONE
7. PRECAST CONCRETE SECTION
8. O RING JOINTS
9. OUTLET/INLET PIPE. SEE PLANS FOR SIZE AND I.E.
10. MORTAR
11. INTEGRAL PRECAST BASE

NOTES:
1. STEPS REQUIRED FOR DEPTHS OVER 4 FEET.
2. ENGINEERED FILL TO BE USED AS BACK-FILL MATERIAL AROUND ALL STORM STRUCTURES.

2 STORM SEWER TRENCH
SECTION — 1/2" = 1'-0"



3 STORM WATER CONTROL STRUCTURE (SWCS)
PLAN,SECTION — 1/2" = 1'-0"

5 STORM SEWER STRUCTURE
SECTION — 1/2" = 1'-0"

6 UNDERDRAIN-STORM SEWER CONNECTION
SECTION — 1" = 1'-0"

GREENHILLS SCHOOL ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

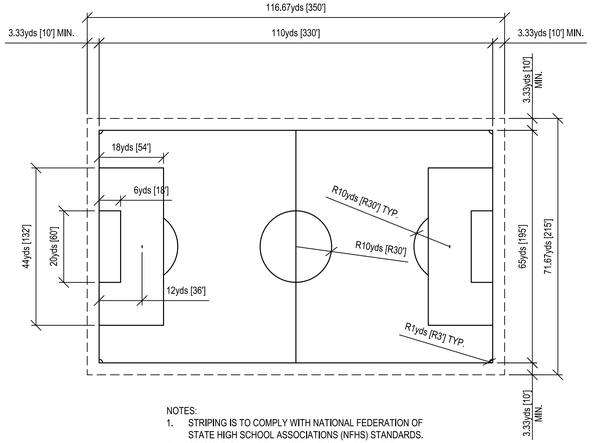
KEY PLAN

DRAWING TITLE
STORM SEWER DETAILS

SCALE
21216.000

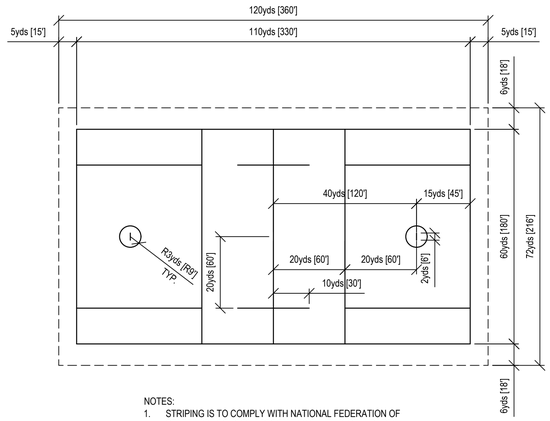
PROJECT NUMBER

DRAWING NUMBER
C-5.3



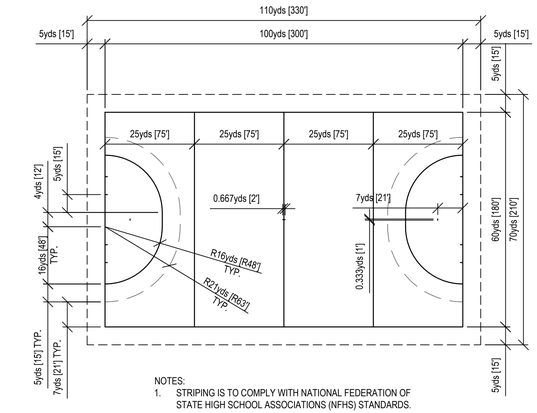
NOTES:
1. STRIPING IS TO COMPLY WITH NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NFHS) STANDARDS.
2. STRIPING SHALL BE 4" WIDE, AND SHALL BE WHITE
3. FINAL STRIPING COLOR APPROVAL WILL BE BASED ON A PHYSICAL YARN SAMPLE SUBMITTED BY THE MANUFACTURER

1 SOCCER FIELD STRIPING
PLAN 1" = 60'



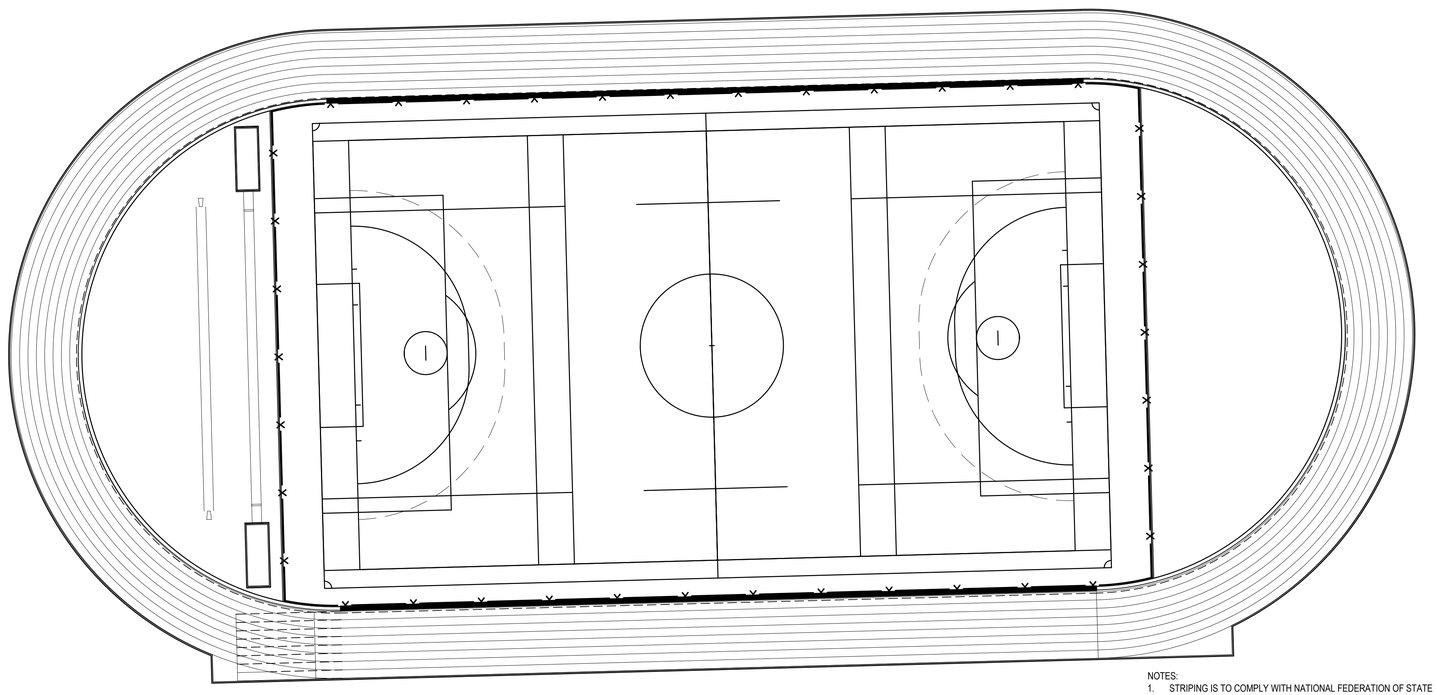
NOTES:
1. STRIPING IS TO COMPLY WITH NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NFHS) STANDARDS.
2. STRIPING SHALL BE 4" WIDE, AND SHALL BE YELLOW
3. FINAL STRIPING COLOR APPROVAL WILL BE BASED ON A PHYSICAL YARN SAMPLE SUBMITTED BY THE MANUFACTURER

2 LACROSSE FIELD STRIPING
PLAN 1" = 60'



NOTES:
1. STRIPING IS TO COMPLY WITH NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NFHS) STANDARDS.
2. STRIPING SHALL BE 4" WIDE, AND SHALL BE RED
3. FINAL STRIPING COLOR APPROVAL WILL BE BASED ON A PHYSICAL YARN SAMPLE SUBMITTED BY THE MANUFACTURER

3 FIELD HOCKEY FIELD STRIPING
PLAN 1" = 60'



NOTES:
1. STRIPING IS TO COMPLY WITH NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NFHS) STANDARDS.
2. STRIPING SHALL BE 4" WIDE, AND COLORS SHALL BE AS DETAILED
3. WHERE CONFLICTS OCCUR BETWEEN STRIPING PRECEDENCE ORDER SHALL BE AS FOLLOWS: SOCCER, LACROSSE, FIELD HOCKEY
4. FINAL STRIPING COLOR APPROVAL WILL BE BASED ON A PHYSICAL YARN SAMPLE SUBMITTED BY THE MANUFACTURER

4 MULTI-SPORT FIELD STRIPING
PLAN 1" = 30'

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Addendum #1		Jan 20, 2017
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

STATE OF MICHIGAN
JOSEPH B. WYWROT
ENGINEER
No. 45674
LICENSED PROFESSIONAL ENGINEER

KEY PLAN

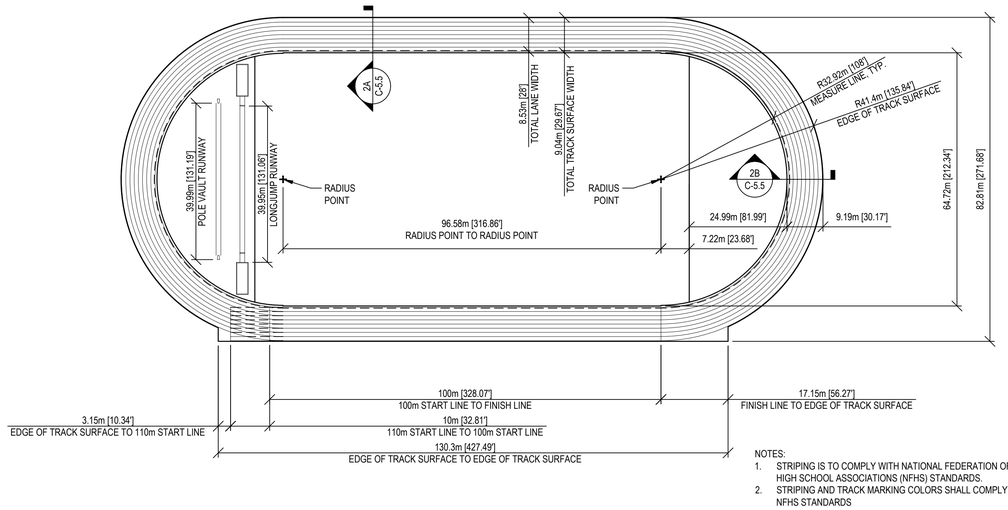
PROJECT NORTH

DRAWING TITLE
SYNTHETIC TURF STRIPING DETAILS

AS NOTED
SCALE

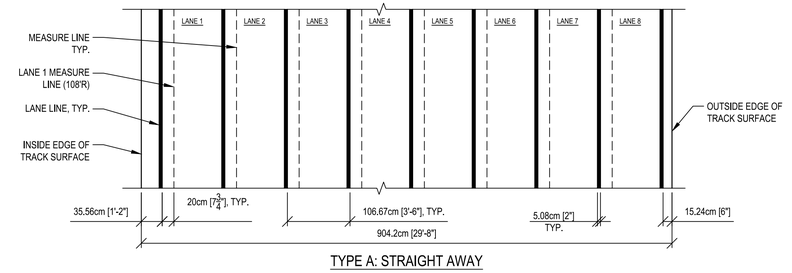
21216.000
PROJECT NUMBER

C-5.4
DRAWING NUMBER

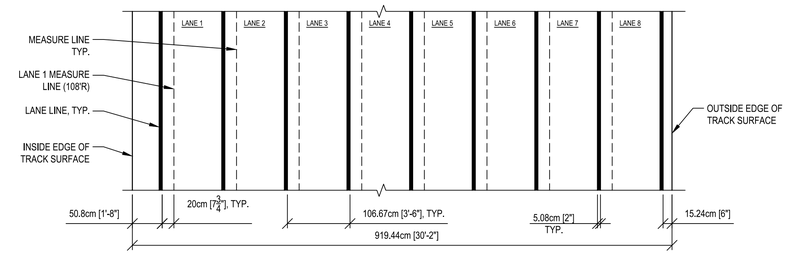


NOTES:
1. STRIPING IS TO COMPLY WITH NATIONAL FEDERATION OF STATE HIGH SCHOOL ASSOCIATIONS (NFHS) STANDARDS.
2. STRIPING AND TRACK MARKING COLORS SHALL COMPLY WITH NFHS STANDARDS

1 EQUAL-QUADRANT TRACK DIMENSIONS
PLAN
1" = 60'

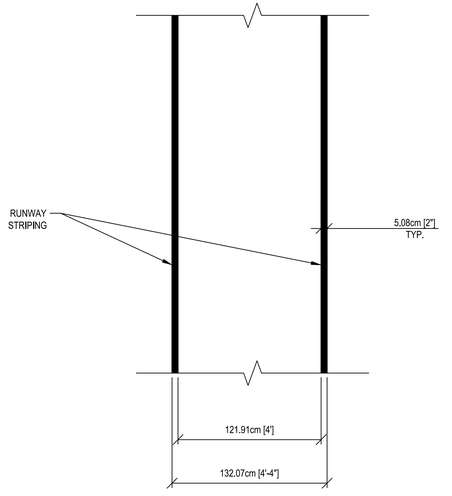


TYPE A: STRAIGHT AWAY



TYPE B: CURVES

2 LANE LINE-MEASURE LINE TRACK MEASUREMENTS
PLAN
1/4" = 1'-0"



3 RUNWAY STRIPING
PLAN
1/2" = 1'-0"

GREENHILLS SCHOOL
ANN ARBOR, MICHIGAN

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:

GREENHILLS SCHOOL

SMITHGROUP

201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
Permits		Jan 28, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019
Addendum #1		Jan 20, 2017
Bids		Jan 9, 2017
95% Construction Documents		Dec 9, 2016
100% Design Development		Sept 16, 2016
20% Design Development		July 19, 2016
Schematic Design		May 20, 2016

SEALS AND SIGNATURES

KEY PLAN

PROJECT NORTH

DRAWING TITLE
TRACK STRIPING DETAILS

AS NOTED
SCALE

21216.000
PROJECT NUMBER

C-5.5
DRAWING NUMBER

SMITHGROUP

Project Name: Greenhills School Athletic Field Improvements

Project Address: 3850 Greenhills Drive, Ann Arbor, MI 48105

Owner: Greenhills School
John Nickel - Chief Financial Officer

Engineer: SmithGroup
Joe Wywrot, PE
201 Depot Street
Ann Arbor, MI 48104
734-669-2679
joe.wywrot@smithgroup.com

Project Description:

The project consists of the removal and replacement of the running track and associated athletic field. The existing track is an asphalt surface and the athletic field is a natural grass surface. The proposed track will be an asphalt track with a synthetic track surface applied to the surface. The "D-Zones" associated with the track will have a track surface, whereas they previously were covered with grass. The athletic field would be an artificial turf surface with a sand/rubber infill and a gravel base.

Existing Storm Water Analysis

Storm water calculations were completed by Atwell-Hicks, Inc. in January 2000 when modifications were made to the adjacent athletic facilities. With this design, two detention ponds were constructed on the north and south ends of the site. These ponds collect storm water from the northern and southern paved portions of the site and were sized to have an outlet that restricted the outflow rate to greater than the required amount. This over detention allowed thee eastern portion of the site, which includes the running track, to drain without needing detention. The pertinent Atwell-Hicks information is included in Appendix A.

Proposed Storm Water Analysis

The area affected by the improvements totals 159,102 square feet, or 3.65 acres. As a result of the improvements outlined above, the runoff coefficient for the area will change from 0.45 to 0.72. The primary reason for the increase is the paving of the "D-Zones" and the use of artificial turf, which was counted as an average of gravel and lawn for the purposes of the runoff coefficient calculation, as agreed upon during the pre-application meeting. See Appendix B for Exhibit 1 (Existing Area Types) and Exhibit 2 (Proposed Area Types), which show the breakdown of the different areas that were used to determine the runoff coefficients for the different conditions.

An initial geotechnical investigation consisting of eight soil borings was conducted in July 2016. This investigation indicated that soils beneficial to infiltration are more than likely not in evidence at this site. Further investigation, in the form of test pit infiltration testing, was conducted in November 2017. This investigation found only clay soil material at the proposed detention/infiltration system invert, which

SMITHGROUP

confirmed the initial findings of the soil borings and indicates that infiltration will not be feasible at this location. Consequently, the required detention volume calculated using the WCWRC Worksheets includes a 20% penalty to compensate for the lack of infiltration. Appendix D includes the full geotechnical information for reference.

The First Flush, Bankfull, and 100-year Detention volumes calculated using the standard WCWRC Worksheets and are summarized below:

First Flush: 9,510 cubic feet
Bankfull: 16,995 cubic feet
100-year: 48,600 cubic feet

Base Bid Design
Detention (penalized): 58,320 cubic feet
This volume represents the 100-year volume with a 20% penalty required due to the lack of provided infiltration.

The detention volume for this project (58,320 cubic feet) will be stored in an additional stone storage volume beneath the artificial turf surface. The void space in this stone volume will provide the necessary volume. The area of the artificial turf surface is approximately 77,000 square feet. Assuming the stone volume will have 30% voids results in the following approximate minimum depth of stone needed to detain the required volumes:

Base Bid Design
Detention Volume (penalized)
- 58,320 cf / 77,000 sf / 30% voids = 2.52 feet = 30.3 inches

More detailed calculations of the required storage volumes and outlet structures are included with the WCWRC Worksheets.

Outlet Condition

The capacity of the swale at the southern end of the site was determined to verify its ability to receive the storm water flow from the site. The swale currently serves as the outlet; therefore, the flow for both the existing and proposed conditions were verified against the capacity. The actual area contributing flow to the swale is approximately 10 acres. The Runoff Curve Number changes from 74 in the existing condition to 79 in the proposed condition, with the increase due to the change in the track area defined above.

HydroCAD was used to determine the flow and then model it through the swale. The output from the model is included with the calculations in Appendix C. In summary, the swale has a capacity of approximately 154 cubic feet per second (cfs). The peak flow for the existing condition is 20.92 cfs and 24.95 for the proposed condition. The proposed flow was calculated without including the presence of the underground detention, so this model represents a conservative, worst-case condition; however, both flows are significantly lower than the capacity of the swale. Based on this information, there will be no negative effects from the release of storm water to the swale.

PART E
STANDARD METHOD RUNOFF VOLUME WORK SHEETS
GREENHILLS SCHOOL ATHLETIC FIELDS - PROPOSED CONSTRUCTION AREA

W1 **Determining Post - Development Cover Types, Area, Curve Numbers and Runoff Coefficients**

Total Site Area = 3.65 AC
Total Site Area Excluding "Self-Crediting" BMPs = 3.65 AC

	Cover Type	Soil Type	Area (sf)	Area (AC)	Runoff Coefficient (C)	C * Area
Rational Method Variables	Pavement	C	68,956	1.58	0.95	1.50
	Gravel/Sand	C	77,734	1.78	0.58	1.03
	Building	C	289	0.01	0.95	0.01
	Water	C	0	0.00	1.00	0.00
	Open Space	C	12,123	0.28	0.30	0.08
					Total = ∑(C) (Area) =	2.62
					Area Total = ∑ac =	3.65
					Weighted CN = ∑(CN)(Area) / ∑ac =	0.72

	Pervious Cover Type	Soil Type	Area (sf)	Area (AC)	Curve Number (CN)	CN * Area
NRCS Variables	Open Space	C	12,123	0.28	74	20.59
					Total = ∑(CN) (Area) =	20.6
					Area Total = ∑ac =	0.28
					Weighted C = ∑(C)(Area) / ∑ac =	74.0

	Impervious Cover Type	Soil Type	Area (sf)	Area (AC)	Curve Number (CN)	CN * Area
NRCS Variables	Pavement	C	68,956	1.58	98	155.14
	Turf	C	77,734	1.78	82	145.44
	Building	C	289	0.01	98	0.65
	Water	C	0	0.00	98	0.00
					Total = ∑(CN) (Area) =	301.22
					Area Total = ∑ac =	3.37
					Weighted CN = ∑(CN)(Area) / ∑ac =	89.3

W2 **Standard Method Runoff Volume Calculations**

First Flush Runoff Calculation (Vff)
A. Vff = (1") (1'/12") (43560 sf/1ac) (A)(C)
Vff = 3630 * A * C
Vff = 9,510 cf
A = Total Site Areas (ac) excluding "self-crediting" BMPs from W1
C = Weighted runoff Coefficient from W1

W3 **Standard Method Runoff Volume Calculations**

Pre-Development Bankfull runoff Calculations (Vbf-pre)

A.	2 year / 24 hour storm event	P =	2.35 in
B.	Good Cover Woods - Type C	CN =	72
C.	S = (1000 / CN) - 10	S =	3.89 in
D.	Q = (P-0.2S)^2 / (P + 0.8S)	Q =	0.453 in
E.	Total Site Area (sf)	Area =	159,102 sf
F.	Vbf-pre = Q (1/12)Area	**Vbf-pre=**	**6,001 cf**

W4 **Standard Method Runoff Volume Calculations**

Pervious Cover Post-Development Bankfull Runoff Calculations (Vbf-per-post)

A.	2 year / 24 hour storm event	P =	2.35 in
B.	Pervious Cover CN from W1	CN =	74.0
C.	S = (1000 / CN) - 10	S =	3.51 in
D.	Q = (P-0.2S)^2 / (P + 0.8S)	Q =	0.53 in
E.	Pervious Cover Area from W1	Area =	12,123 sf
F.	Vbf-per-post = Q (1/12)Area	**Vbf-per-post=**	**531 cf**

W5 **Standard Method Runoff Volume Calculations**

Impervious Cover Post-Development Bankfull Runoff Calculations (Vbf-imp-post)

A.	2 year / 24 hour storm event	P =	2.35 in
B.	Impervious Cover CN from W1	CN =	89.3
C.	S = (1000 / CN) - 10	S =	1.20 in
D.	Q = (P-0.2S)^2 / (P + 0.8S)	Q =	1.344 in
E.	Impervious Cover Area from W1	Area =	146,979 sf
F.	Vbf-imp-post = Q (1/12)Area	**Vbf-imp-post=**	**16,464 cf**

W6 **Standard Method Runoff Volume Calculations**

Pervious Cover Post-Development 100-year Storm Runoff Calculations (V100-per-post)

A.	100 year / 24 hour storm event	P =	5.11 in
B.	Pervious Cover CN from W1	CN =	74.0
C.	S = (1000 / CN) - 10	S =	3.51 in
D.	Q = (P-0.2S)^2 / (P + 0.8S)	Q =	2.45 in
E.	Pervious Cover Area from W1	Area =	12,123 sf
F.	V100-per-post = Q (1/12)Area	**V100-per-post=**	**2,477 cf**

W7 **Standard Method Runoff Volume Calculations**

Impervious Cover Post-Development 100-year Storm Runoff Calculations (V100-imp-post)

A.	100 year / 24 hour storm event	P =	5.11 in
B.	Impervious Cover CN from W1	CN =	89.3
C.	S = (1000 / CN) - 10	S =	1.20 in
D.	Q = (P-0.2S)^2 / (P + 0.8S)	Q =	3.91 in
E.	Impervious Cover Area from W1	Area =	146,979 sf
F.	V100-imp-post = Q (1/12)Area	**V100-imp-post=**	**47,841 cf**

W8 **Standard Method Runoff Volume Calculations**

Determine time of Concentration for Applicable Flow types (Tc-hrs)

Flow Type	K	Change in Elevation	Length (L)	Slope % (S)	S^0.5	V = K*S^0.5	Tc=L/(V*3600)
Sheet Flow	0.5	0.25	150.0	0.17%	0.408	0.20	0.21
Waterway	1.2	1.00	500.0	0.20%	0.447	0.54	0.26

*Sheet flow cannot exceed 300 feet. Anything beyond this is considered waterway

Total Time of Concentration (Tc-hrs) = 0.47

W9 **Standard Method Runoff Volume Calculations**

Runoff Summary & Onsite Infiltration Requirement

A. Runoff Summary from Previous Worksheets

W2: First Flush Volume (Vff)	**9,510**	cf
W3: Pre-Development bankfull Runoff Volume (Vbf-pre)	6,001	cf
W4: Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	531	cf
W5: Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	16,464	cf
Total BF Volume (Vbf-post)	**16,995**	**cf**
W6: Pervious Cover Post-Development 100-year Volume (V100-per-post)	2,477	cf
W7: Impervious Cover Post-Development 100-year Volume (V100-imp-post)	47,841	cf
Total 100-year Volume (V100)	**50,319**	**cf**

B. Determine Onsite Infiltration Requirement

Subtract the Pre-Development Bankful from the Post-Development Bankfull Volume

Total Post-Development Bankfull Volume (Vbf-post)	16,995	cf
Pre-Development Bankfull Runoff Volume (Vbf-pre)	6,001	cf
Bankfull Volume Difference	**10,994**	**cf**

Compare the Bankfull Volume Difference with the First Flush Volume
The greater of the two is the Onsite Infiltration Requirement.

Onsite Infiltration Requirement (Vinf)	**10,994**	cf

W10 **Standard Method Runoff Volume Calculations**

Detention / Retention Requirement

Detention

A.	Qp = 238.6 Tc^-0.82	Qp =	442.04 cfs/in-mi^2
B.	Total Site Area (ac) excluding "Self-Crediting" BMPs	Area =	3.65 ac
C.	Q100 = Q100-Per + Q100-imp	Q100 =	6.36 in
D.	Peak Flow(PF)=Qp(cfs/in-mi^2)*Q100 (in)*Area (ac)/640	PF =	16.04 cfs
E.	Δ = PF (cfs) - 0.15 * Area (ac)	Δ =	15.49 cfs
F.	Vdet = Δ(cfs) / PF (cfs) * V100 (cf)	**Vdet =**	**48,599.85 cf**
G.	Vforebay = Vdet*0.05	**Vforebay =**	**2,430 cf**

Retention

A.	Vret = 2 (V100)	**Vret =**	**100,637.06 cf**

W13 **Summary (Base Bid - No Infiltration)**

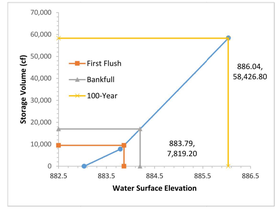
A. Stormwater Management Summary			
Minimum Onsite Infiltration Requirement	Vinf =	10,994	cf
Designed/Provided Infiltration Volume	Vinf-prov =	-	cf
% Minimum Required Infiltration Provided		0%	
Total Calculated Detention Volume	Vdet =	48,600	cf
Net Required Detention Volume (Vdet - Vinf-prov)	Vdet-net =	48,600	cf

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved

% Required Infiltration NOT provided (100% - % Minimum Required Infiltration Provided)	100%
Net % Penalty (20% x % Required Infiltration NOT provided)	20%
Total Required Detention Volume, including penalty [(100% + Net % Penalty) x Net Required Detention Volume)]	**58,320 cf**

Project: Greenhills School Athletic Field Improvements
Subject: Detention Outlet Sizing
Sheet 1/1
Job No 21216.000

Total Watershed Area, acres (see W1)	3.65
Average Runoff Coefficient, C* (see W1)	0.72
Allowable Release Rate, cfs/acre	0.15
Bottom Portion of Stone Area, sf (see C-4.1)	72
Top Portion of Stone Area, sf (see C-4.1)	466
Total Stone Area, sf (see C-4.1)	538
Length of Stone, ft	362
Porosity of Stone	0.30
Bottom Portion of Stone Storage Volume, cf	7,819
Total Stone Storage Volume, cf	58,427



	First Flush	Bankfull Orifice	100-Year Orifice	Totals
Volume, ft³	**9,510**	**16,995**	**58,320**	
Water Elevation in Stone, ft	883.87	884.20	886.04	
Elevation of Orifices	883.04	883.87	884.20	
Orifice Diameter, inches	1.5	0	1.5	
Single Orifice Area, ft²	1.23E-02	0.00E+00	1.23E-02	
Number of Orifices to Use	2	0	4	
Total Orifice Area Provided, ft²	2.45E-02	0.00E+00	4.91E-02	
Allowable Release Time, hours	24	36 - 48	--	
Allowable Release Rate, cfs	0.110	--	0.548	
First Flush Volume				
Average Head, ft	0.55	--	--	
Release Rate, cfs	9.06E-02	--	--	0.09
Volume Through Orifice, ft³	9,510	--	--	9,510
Actual Release Time, hours	29.17	--	--	**29.17**
Bankfull Volume				
Average Head, ft	0.94	0.22	--	
Release Rate, cfs	1.18E-01	0.00E+00	--	0.12
Volume Through Orifice, ft³	7,485	0	--	7,485
Actual Release Time, hours	17.60	17.60	--	
Total Volume Through Holes, ft³	16,995	0	--	16,995
Time Orifice Is In Use, hours				**46.76**
100-Year Volume				
Maximum Head, ft	3.00	2.17	1.84	
Release Rate, cfs	2.11E-01	0.00E+00	3.31E-01	**0.542**
Volume Through Orifice, ft³	16,102	0	25,223	41,325
Actual Release Time, hours	21.16	21.16	21.16	
Total Volume Through Holes, ft³	33,097	0	25,223	58,320
Time Orifice Is In Use, hours				67.93

FILE:P:\21216.000\CAD\C\Sheet\21216_C-6.0.dwg USER:jwywrot DATE:Feb. 11, 2020 TIME: 09:50 am

ATHLETIC FIELD IMPROVEMENTS

850 GREENHILLS DRIVE
ANN ARBOR, MI 48105

Owner:
GREENHILLS SCHOOL

SMITHGROUP
201 DEPOT STREET
SECOND FLOOR
ANN ARBOR, MI 48104
734.662.4457
www.smithgroupjjr.com

ISSUED FOR	REV	DATE
WCWRC Review		Feb 11, 2020
Site Plan Approval Resubmittal		Dec 5, 2019
Site Plan Approval		Oct 24, 2019
WCWRC Review		Aug 8, 2019

SEALS AND SIGNATURES

KEY PLAN

DRAWING TITLE
WCWRC STORM SEWER CALCULATIONS

SCALE
21216.000

PROJECT NUMBER
C-6.0

DRAWING NUMBER