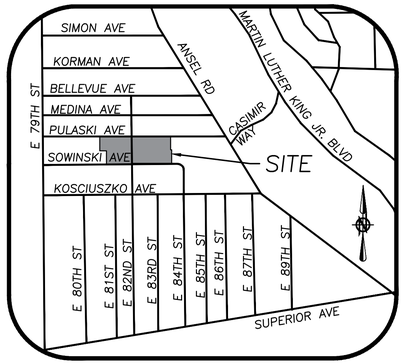
ST. CASIMIR CHURCH GREEN INFRASTRUCTURE PROJECT

CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

FUNDING BY THE NORTHEAST OHIO REGIONAL SEWER DISTRICT



LOCATION MAP

NOT TO SCALE

LEGEND

- EX. PROPERTY LINE
- EX. EDGE OF PAVEMENT
- MAGNAIL SET
- EX. MANHOLE
- EX. CATCH BASIN
- EX. DOWNSPOUT
- EX. COMBINED SEWER
- EX. ELECTRIC METER
- EX. UTILITY POLE
- EX. OVERHEAD WIRES
- EX. GAS METER
- EX. GAS VALVE
- EX. GAS LINE
- EX. WATER METER
- EX. HYDRANT
- EX. WATER VALVE
- EX. WATER LINE
- EX. BOLLARD/POST
- EX. TREE
- EX. FENCE
- EX. BUILDING
- EX. MINOR CONTOUR (631)
- EX. MAJOR CONTOUR (630)
- PROPOSED MINOR CONTOUR (631)
- PROPOSED MAJOR CONTOUR (630)
- PROPOSED STORM LINE
- PROPOSED GUTTER
- PROPOSED DOWNSPOUT LOCATION
- PROPOSED CLEANOUT LOCATION
- PROPOSED RAIN BARREL
- PROPOSED PERMEABLE PAVERS
- TEMPORARY AND PERMANENT SEEDING AREA (PS)
- SOIL TYPE (UcA)

INDEX OF SHEETS

PLANS PREPARED BY

BRAMHALL ENGINEERING AND SURVEYING COMPANY, INC.

STATE OF OHIO — MICHAEL C. BRAMHALL 61797 — REGISTERED PROFESSIONAL ENGINEER

MICHAEL C. BRAMHALL, P.E., P.S.
REGISTERED OHIO ENGINEER NO. 61797

UTILITY INFORMATION

CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL INVOLVED UTILITIES AND GOVERNMENT AGENCIES PRIOR TO CONSTRUCTION.

SANITARY AND STORM

NORTHEAST OHIO REGIONAL SEWER DISTRICT
3900 EUCLID AVE.
CLEVELAND, OH 44115
(216) 881–6600

CLEVELAND WATER POLLUTION CONTROL
12302 KIRBY AVE.
CLEVELAND, OH 44108
(216) 664–2513

GAS

DOMINION EAST OHIO
1201 E. 55TH ST.
CLEVELAND, OH 44103
(800) 362–7557

TELEPHONE

AT&T
12455 CEDAR RD.
CLEVELAND HEIGHTS, OH 44106
(800) 924–9420

ELECTRIC

THE ILLUMINATING CO.
6896 MILLER ROAD, SUITE 101
BRECKSVILLE, OH 44141
(440) 717–6845

CLEVELAND PUBLIC POWER
1300 LAKESIDE AVE. EAST
CLEVELAND, OH 44114
(216) 664–4600

CABLE

TIME WARNER CABLE
2027 W. 25TH ST.
CLEVELAND OH 44113
(800) 892–2253

WATER

CITY OF CLEVELAND DIVISION OF WATER
1201 LAKESIDE AVE.
CLEVELAND, OH 44114
(216) 664–3130

EXISTING UNDERGROUND UTILITIES NOTE:

THE SIZE & LOCATION, BOTH HORIZONTAL AND VERTICAL, OF THE UNDERGROUND UTILITIES SHOWN HEREON, HAVE BEEN OBTAINED BY A SEARCH OF AVAILABLE RECORDS. VERIFICATION BY FIELD OBSERVATION HAS BEEN CONDUCTED WHERE PRACTICAL. HOWEVER, BRAMHALL ENGINEERING AND SURVEYING COMPANY DOES NOT GUARANTEE THE COMPLETENESS NOR ACCURACY THEREOF.

OHIO UTILITIES PROTECTION SERVICE		OHIO OIL & GAS PRODUCERS UNDERGROUND PROTECTION SERVICE
BEFORE YOU DIG ANYWHERE IN OHIO! **CALL 1–800–362–2764 OR 8–1–1** (TOLL FREE) OHIO LAW REQUIRES 48 HOURS BUT NO MORE THAN 10 WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH (NON MEMBERS MUST BE CALLED DIRECTLY) WWW.OUPS.ORG TICKET NUMBERS: A613400555-00A, A613400561-00A	OHIO Utilities Protection SERVICE *Call Before You Dig*	TWO WORKING DAYS BEFORE YOU DIG CALL **1–800–925–0988** (TOLL FREE) **WWW.OGPUPS.COM**

REVISION	DATE:	BY:	DESCRIPTION:
	05/01/2017	MCB	ISSUE TO NEORSD FOR APPROVAL

DRAWN BY: RLK

CHECKED BY: CDW

BRAMHALL
ENGINEERING AND SURVEYING COMPANY
801 MOORE ROAD AVON, OHIO 44011
(440) 934 - 7878 (440) 934 - 7879 FAX

PREPARED FOR:

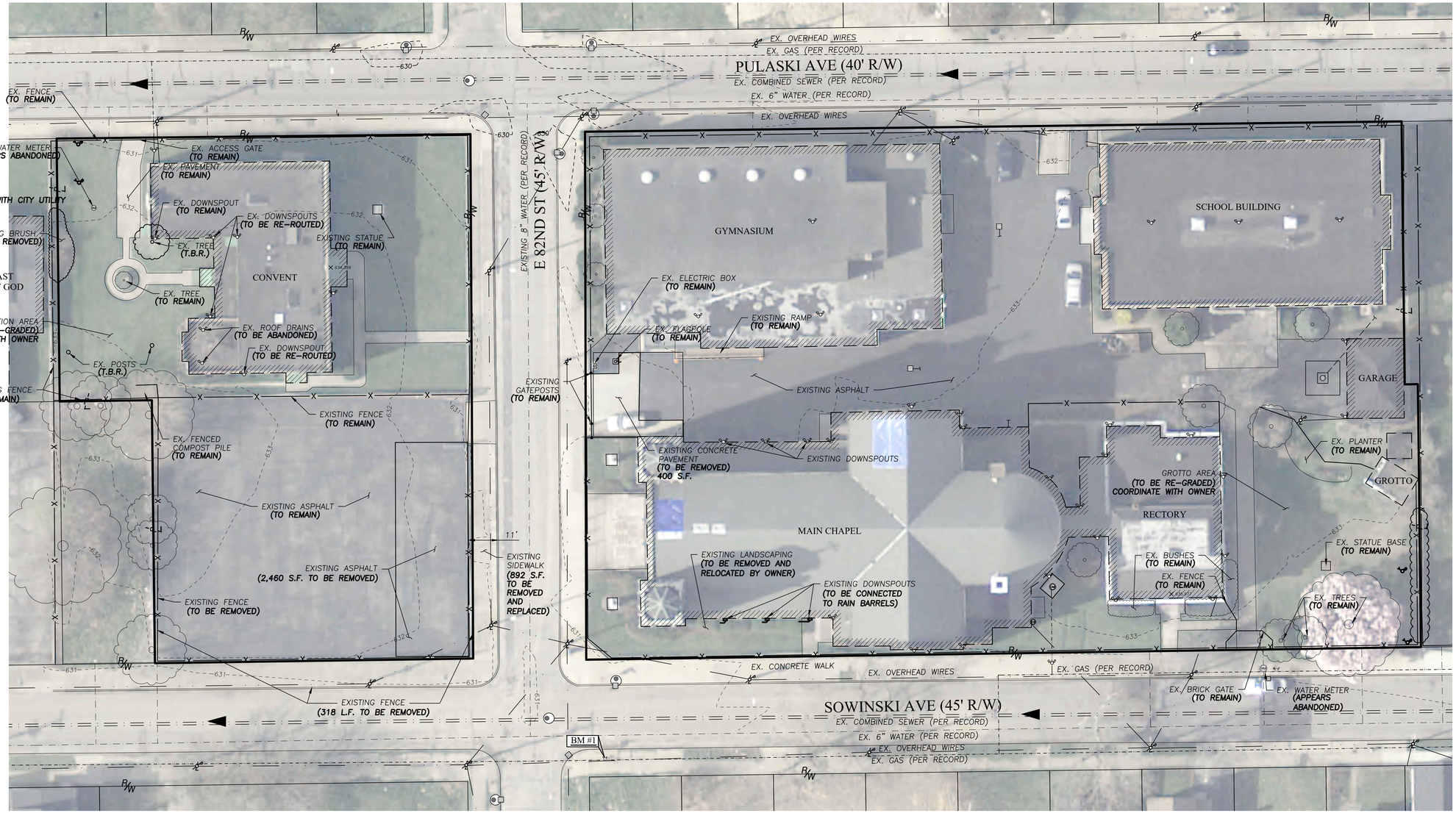
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
TITLE SHEET
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 1 OF 14

JOB NO. 15-4347

J:\15-4347 St. Casimir Church\DRAWINGS\(01) 15-4347 ST CASIMIR TITLE.dwg, Plotted: May 01, 2017 - 9:29am



LEGEND

- EX. PROPERTY LINE
- EX. EDGE OF PAVEMENT
- P.K.S. MAGNAIL SET
- EX. MANHOLE
- EX. CATCH BASIN
- EX. DOWNSPOUT
- EX. COMBINED SEWER
- EX. ELECTRIC METER
- EX. UTILITY POLE
- EX. OVERHEAD WIRES
- EX. GAS METER
- EX. GAS VALVE
- EX. GAS LINE
- EX. WATER METER
- EX. WATER VALVE
- EX. WATER LINE
- EX. BOLLARD/POST
- EX. TREE
- EX. FENCE
- EX BUILDING
- 631 EX. MINOR CONTOUR
- 630 EX. MAJOR CONTOUR
- (T.B.R.) TO BE REMOVED
- EX. ASPHALT TO BE REMOVED
- EX. GROUND TO BE EXCAVATED
- EX. CONCRETE WALK TO BE REPLACED (INCLUDING CURB AS REQUIRED)

GRAPHIC SCALE
0 20 40
10
(IN FEET)
SCALE: 1" = 20

EXISTING UNDERGROUND UTILITIES NOTE:

THE SIZE AND LOCATION, BOTH HORIZONTAL AND VERTICAL, OF THE UNDERGROUND UTILITIES SHOWN HEREON, HAVE BEEN OBTAINED BY A SEARCH OF AVAILABLE RECORDS. VERIFICATION BY FIELD OBSERVATION HAS BEEN CONDUCTED WHERE PRACTICAL. HOWEVER, BRAMHALL ENGINEERING AND SURVEYING COMPANY DOES NOT GUARANTEE THE COMPLETENESS NOR ACCURACY THEREOF.

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BENCHMARKS & CONTROL POINTS:

CONTROL POINT NO. 1
MAGNAIL SET IN WALK
N: 677871.895
E: 2206502.292
Z: 631.23

CONTROL POINT NO. 2
MAGNAIL SET IN WALK
N: 678026.146
E: 2206502.412
Z: 630.84

CONTROL POINT NO. 3
MAGNAIL SET IN WALK
N: 678151.555
E: 2206527.722
Z: 630.21

CONTROL POINT NO. 4
MAGNAIL SET IN WALK
N: 678876.714
E: 2206720.156
Z: 632.27

BENCHMARK 1
TOP TURN NUT OF HYDRANT SE CORNER OF E 82ND AND SOWINSKI AVE. ELEVATION

REVISION	DATE:	BY:	DESCRIPTION:
	05/01/2017	MCB	ISSUE TO NEORSD FOR APPROVAL

DRAWN BY: RLK
CHECKED BY: CDW

BRAMHALL
ENGINEERING AND SURVEYING COMPANY
801 MOORE ROAD AVON, OHIO 44011
(440) 934 - 7878 (440) 934 - 7879 FAX

PREPARED FOR:
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
EX. CONDITIONS/DEMOLITION PLAN
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 2 OF 14
JOB NO. 15-4347

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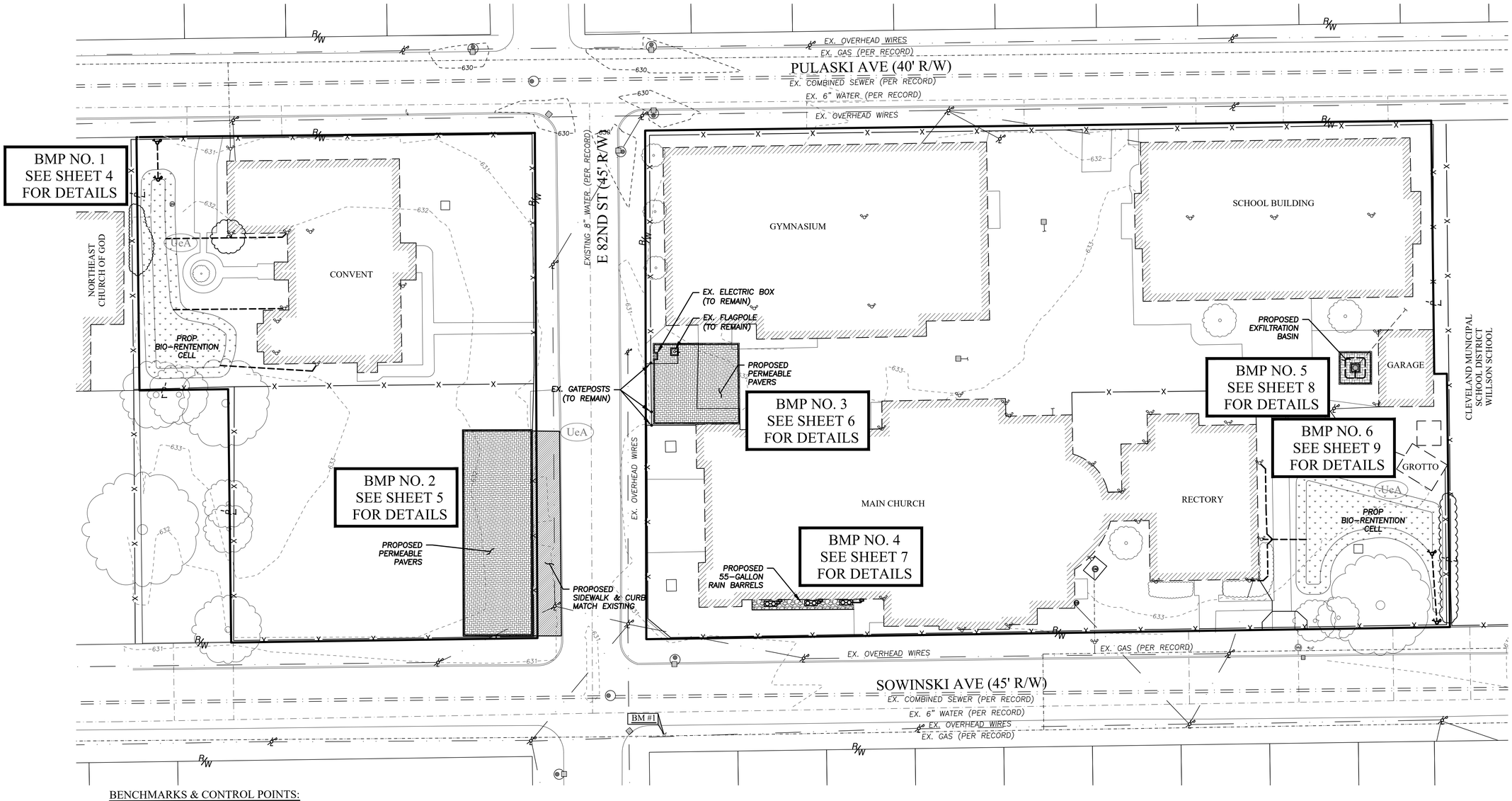

LEGEND

- EX. PROPERTY LINE
- EX. EDGE OF PAVEMENT
- P.K.S. MAGNAIL SET
- EX. MANHOLE
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- EX. DOWNSPOUT
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- EX. WATER VALVE
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- EX. BUILDING
- 631 EX. MINOR CONTOUR
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- 631 PROPOSED MINOR CONTOUR
- 630 PROPOSED MAJOR CONTOUR
- PROPOSED STORM LINE
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- PROPOSED DOWNSPOUT LOCATION
- PROPOSED CLEANOUT LOCATION
- PROPOSED RAIN BARREL
- PROPOSED PERMEABLE PAVERS
- P.S. TEMPORARY AND PERMANENT SEEDING AREA
- UeA SOIL TYPE

GRAPHIC SCALE
0 20
10 40
(IN FEET)
SCALE: 1" = 20

BENCHMARKS & CONTROL POINTS:

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E: 2206527.722
Z: 630.21

CONTROL POINT NO. 4
MAGNAIL SET IN WALK
N: 678876.714
E: 2206720.156
Z: 632.27

BENCHMARK 1
TOP TURN NUT OF HYDRANT SE CORNER OF E 82ND AND SOWINSKI AVE.
ELEVATION

SITE INFORMATION:

SITE ADDRESS
8223 SOWINSKI AVE, CLEVELAND, OHIO 44103

OWNER & SITE OPERATOR:
FATHER ERIC ORZECH
3649 WEST 65TH STREET
CLEVELAND, OHIO 44103

LIMITS OF DISTURBED AREA = 0.20 ACRES

TOTAL SITE DRAINAGE AREA = 2.07 ACRES

PRE-DEVELOPED SITE IMPERVIOUS AREA = 1.50 ACRES
POST-DEVELOPED IMPERVIOUS AREA = 1.43 ACRES

SWP3 NOTES:

1. THE FOLLOWING SOIL TYPES ARE FOUND WITHIN THE PROJECT LIMITS

   UeA – URBAN-ELNORA LAND COMPLEX, 0 TO 2 PERCENT SLOPES
   SOIL DATA REFERENCED FROM WEB SOIL SURVEY CUYAHOGA COUNTY, OHIO SOILS MAP VERSION 14, DECEMBER 2015. FIELD VERIFIED JUNE 2016.

2. OFF-SITE DISPOSAL OF EXCESS SOIL SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WHO WILL NEED TO PROVIDE THE PROPER PLANS AND BMP'S FOR ANY POTENTIAL DUMP SITE.

3. OPEN BURNING IS STRICTLY PROHIBITED ON THE PROJECT SITE.

4. NO TOXIC OR HAZARDOUS WASTES SHALL BE DISPOSED INTO STORM DRAINS, SEPTIC TANKS, OR BY BURYING, BURNING, OR MIXING THE WASTES.

CONTRACTOR NOTES:

5. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATIONS WITH ALL UTILITY COMPANIES, BOTH PUBLIC AND PRIVATE.

6. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND CROSSINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

7. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.

REVISION	DATE:	BY:	DESCRIPTION:
	05/01/2017	MCB	ISSUE TO NEORSD FOR APPROVAL

DRAWN BY: RLK
CHECKED BY: CDW

BRAMHALL
ENGINEERING AND SURVEYING COMPANY
801 MOORE ROAD AVON, OHIO 44011
(440) 934 - 7878 (440) 934 - 7879 FAX

PREPARED FOR:
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
OVERALL SITE PLAN
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 3 OF 14
JOB NO. 15-4347

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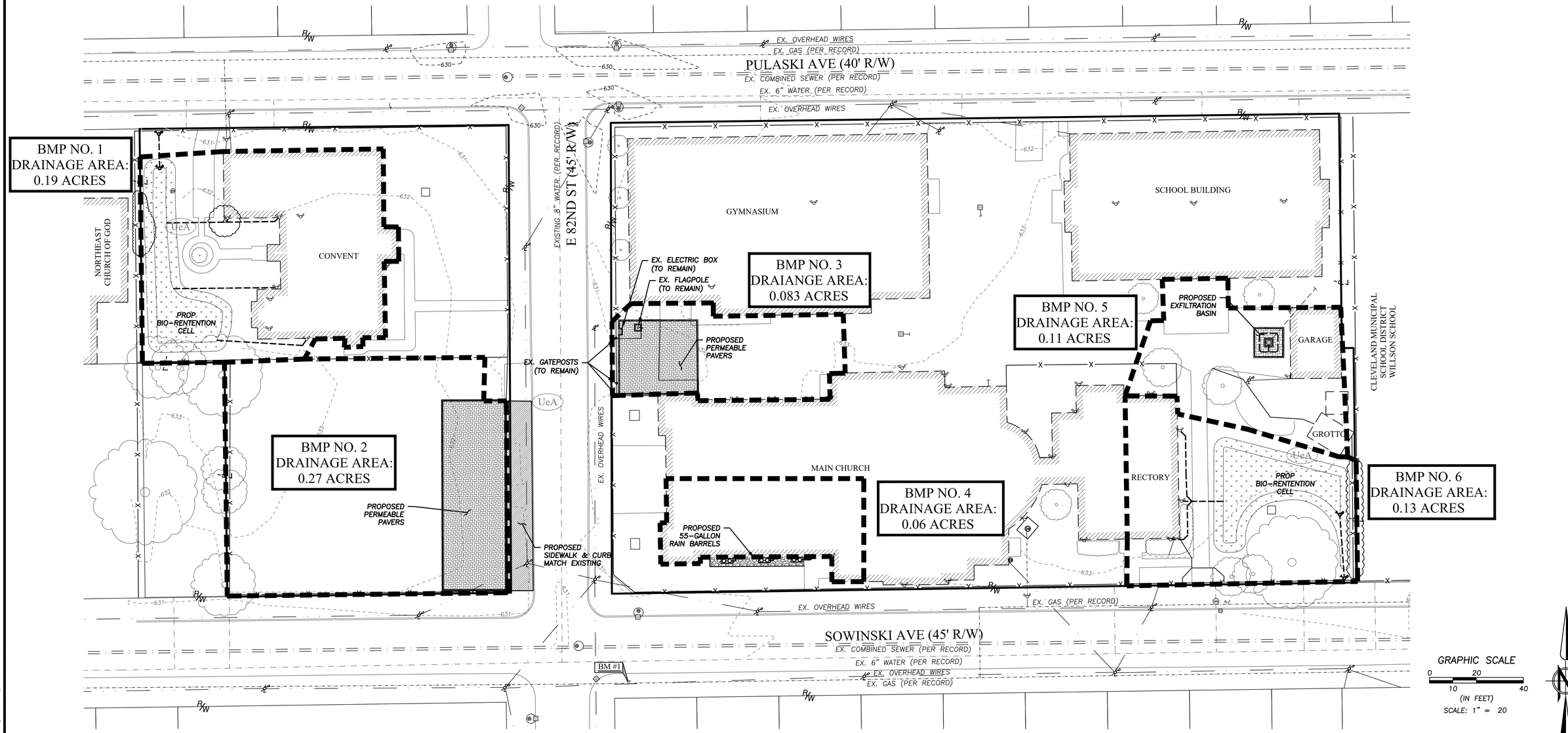

SITE INFORMATION:

SITE ADDRESS
8223 SOWINSKI AVE, CLEVELAND, OHIO 44103

OWNER & SITE OPERATOR:
FATHER ERIC ORZECH
3649 WEST 65TH STREET
CLEVELAND, OHIO 44103

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DRAWN BY: WTB
CHECKED BY: MCB

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801 MOORE ROAD AVON, OHIO 44011
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PREPARED FOR:
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
STORMWATER DRAINAGE MAP
CITY OF CLEVELAND, COUNTY OF CUYAHOGA,
STATE OF OHIO

SHEET 4 OF 14
JOB NO. 15-4347

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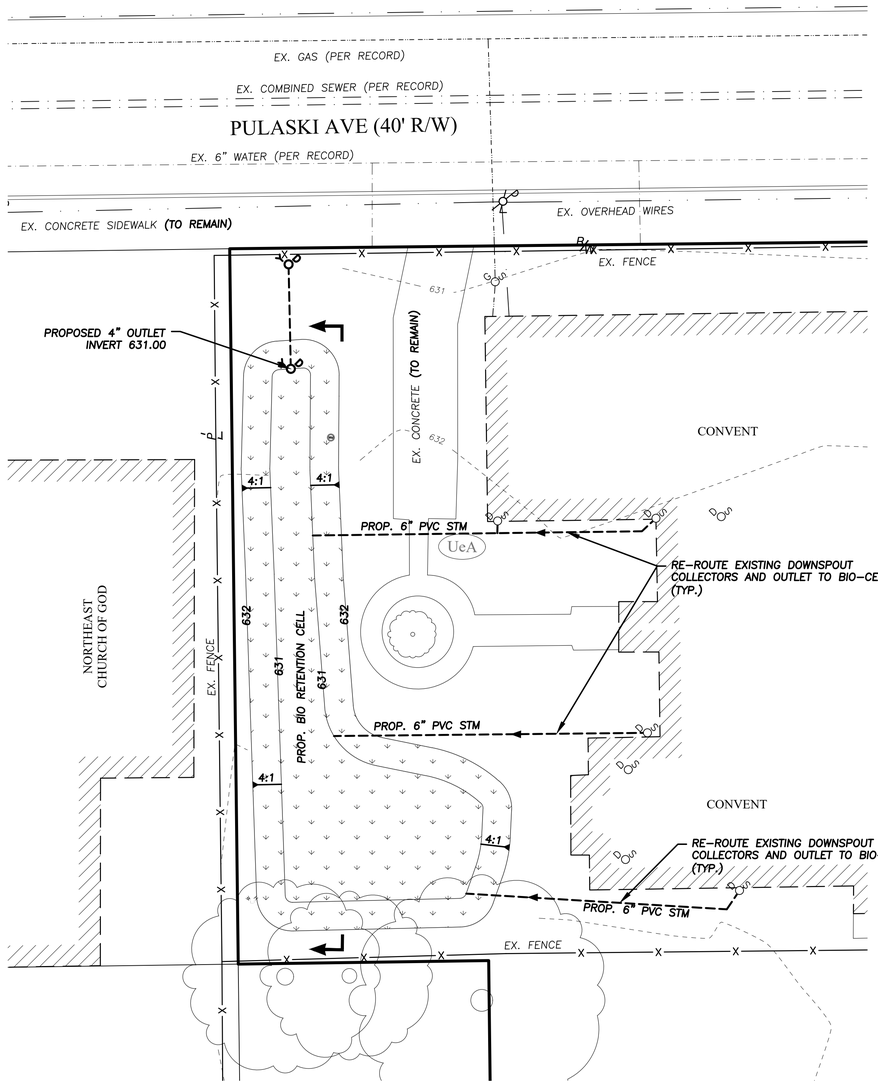
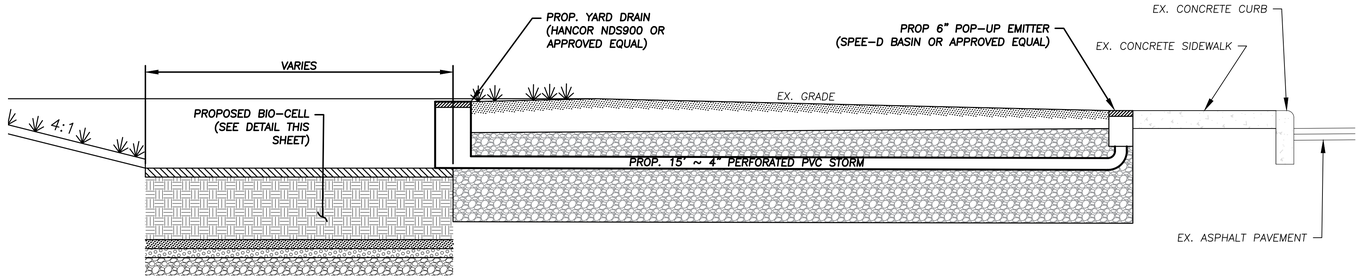


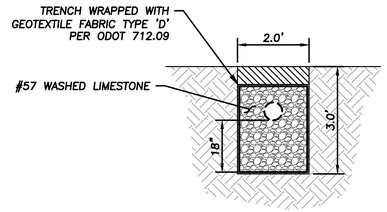
SITE PLAN

GRAPHIC SCALE
0 10
5 20
(IN FEET)
SCALE: 1" = 10'



PROFILE - BIO-RETENTION CELL OUTLET

SCALE: 1/2" = 1'-0"



TRENCH DETAIL

WATER QUALITY CALCULATIONS:

DRAINAGE AREA = 0.19 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.858i^3 - 0.78i^2 + 0.77i + 0.04 C = 0.43
i = (0.12/0.19) = 0.63
WQv = (P)(C)((A/12) = (0.75)*(0.43)*(0.19*AC-FT) = 0.0051 AC-FT = 222.4 CF

BIO-CELL DEPTH
TOTAL DEPTH > 1' 4:1 SIDESLOPES
BOTTOM AREA: 823.53
TOP AREA: 642.69
VOLUME BIO-CELL = 1,232 CF PROVIDED
WQ VOLUME @ 0.25' = 230 CF > 222.4 CF REQUIRED

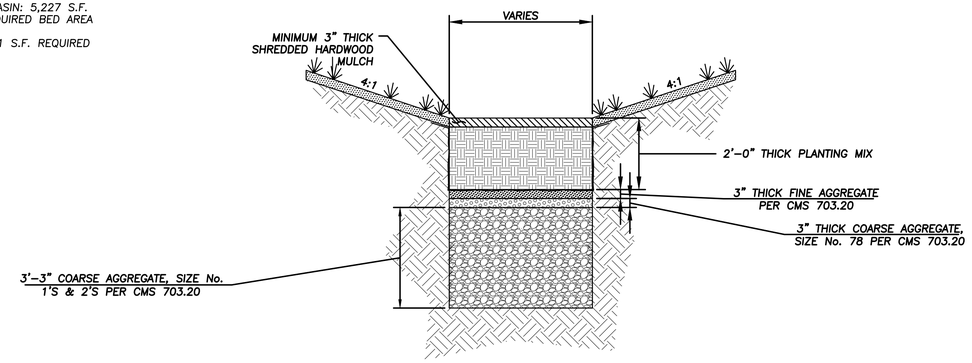
ODNR STANDARDS:

STANDARDS FOR MINIMUM FILTER BED SIZE

"FOR SITUATIONS WERE IMPERVIOUS AREAS EXCEED 25% OF THE CONTRIBUTING DRAINAGE AREA, THE FILTER BED AREA SHALL BE A MINIMUM OF 5% OF THE CONTRIBUTING IMPERVIOUS AREA."

IMPERVIOUS AREA DRAINING TO BASIN: 5,227 S.F.
5% * S.F. = 261 S.F. REQUIRED BED AREA

BASIN BED AREA: 824 S.F. > 261 S.F. REQUIRED



TYPICAL SECTION - BIO-RETENTION CELL

SCALE: 1/2" = 1'-0"

CONTRACTOR NOTES:

1. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATIONS WITH ALL UTILITY COMPANIES, BOTH PUBLIC AND PRIVATE.
2. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND CROSSINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.

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CHECKED BY: CDW

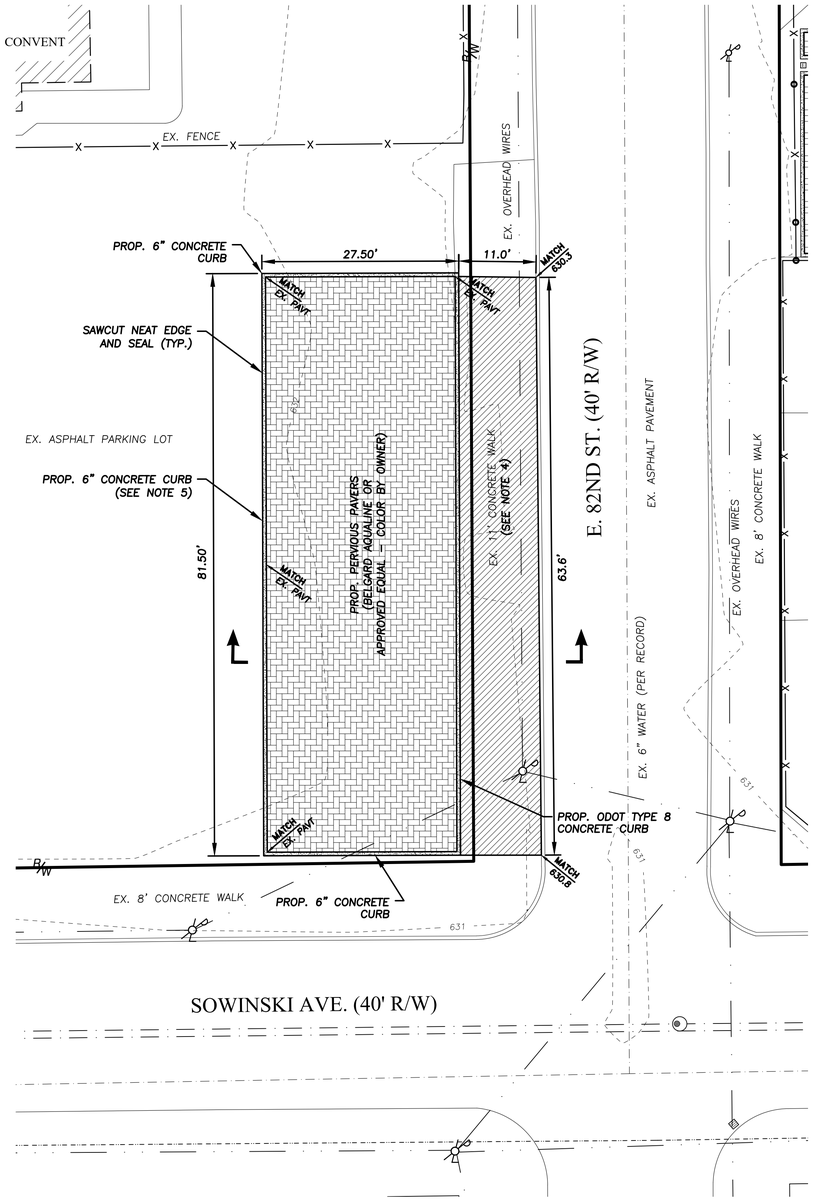
BRAMHALL
ENGINEERING AND SURVEYING COMPANY
801 MOORE ROAD AVON, OHIO 44011
(440) 934 - 7878 (440) 934 - 7879 FAX

PREPARED FOR:
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
SITE PLAN (BMP NO. 1)
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

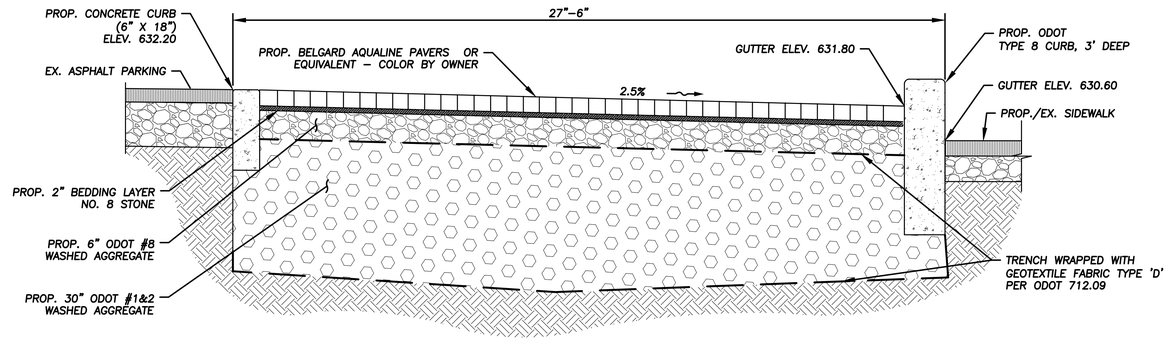
SHEET 5 OF 12
JOB NO. 15-4347

J:\15\4347 St. Casimir Church\DRAWINGS\(05) 15434 7 ST CASIMIR SITE #1.dwg, Plotted: May 01, 2017 - 9:45am



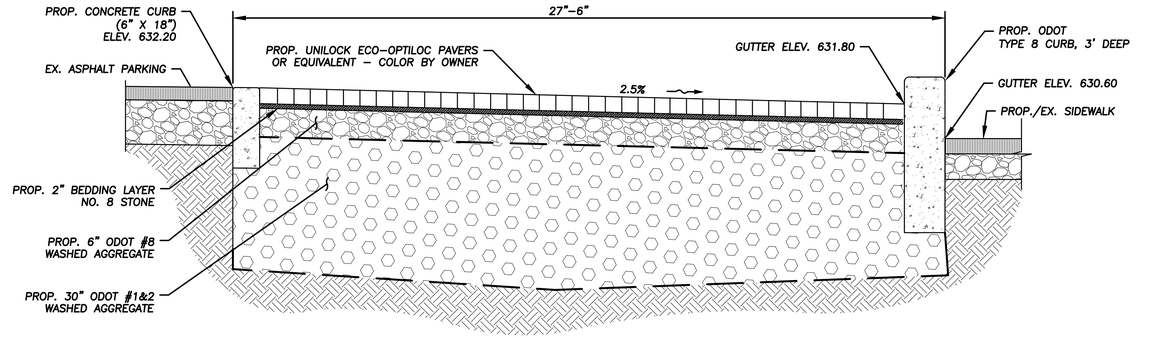
SITE PLAN

GRAPHIC SCALE
0 10
5 20
(IN FEET)
SCALE: 1" = 10'



TYPICAL SECTION - BELGARD PAVERS

SCALE: 3/4" = 1'-0"



TYPICAL SECTION - UNILOCK PAVERS (ALT. 1)

SCALE: 3/4" = 1'-0"

WATER QUALITY CALCULATIONS:

DRAINAGE AREA = 0.27 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.90
WQv = (P)(C)((A/12) = (0.75)*(0.90)*(0.27 AC/12) = 0.015 ACRE FEET = 661.5 CF

PERMEABLE PAVER AREA = 2,130 SF
DEPTH REQUIRED FOR WQv
= 661.5/(2,130)(0.30) = 1.03' = 12" TOTAL REQUIRED DEPTH < 2.5' PROVIDED

DRAW DOWN TIIME
f DESIGN = 0.5 * f MEASURED = (0.5)*(2 IN/HR) = 1 IN/HR
= (0.015 AC-FT) = 0.18 AC-IN
0.18 AC-IN/(0.048 AC* 1 IN/HR) = 3.68 HR < 48 HR

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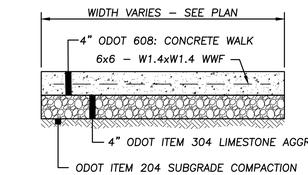
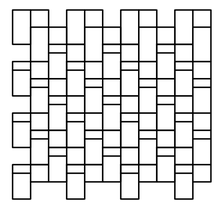
3. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.
4. SIDEWALK REPLACEMENT TO BE PERFORMED AFTER CITY REPAVES EAST 82ND STREET. TIMEFRAME TO BE DETERMINED SUMMER 2017.
5. TRANSITION FROM ASPHALT TO CURB TO PAVERS MUST BE FLUSH TO PREVENT CURB FROM DIVERTING FLOW AWAY FROM PAVERS.



NOTES:
1. SPACE CONTROL JOINTS EQUAL TO SIDEWALK WIDTH
2. PROVIDE EXPANSION JOINTS @ 30' MAX SPACING
3. PROVIDE EXPANSION JOINT MATERIAL WHEN ADJACENT TO EXISTING SIDWALK

TYPICAL SIDEWALK SECTION

– NOT TO SCALE –



UNILOCK PAVERS PATTERN

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DRAWN BY: RLK
CHECKED BY: CDW

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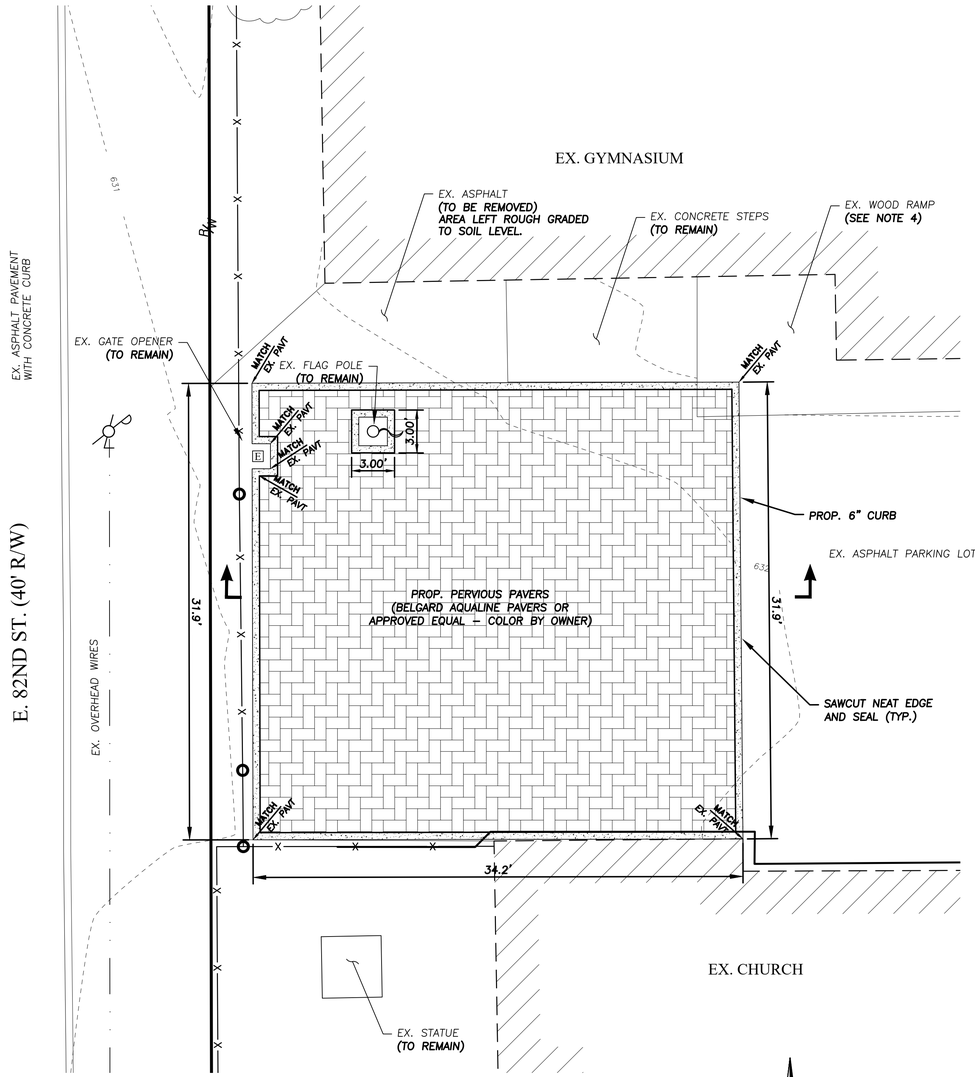
PREPARED FOR:
ST. CASIMIR CHURCH
8223 SOWINSKI AVE.
CLEVELAND, OHIO 44103

ST. CASIMIR CHURCH
SITE PLAN (BMP NO. 2)
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

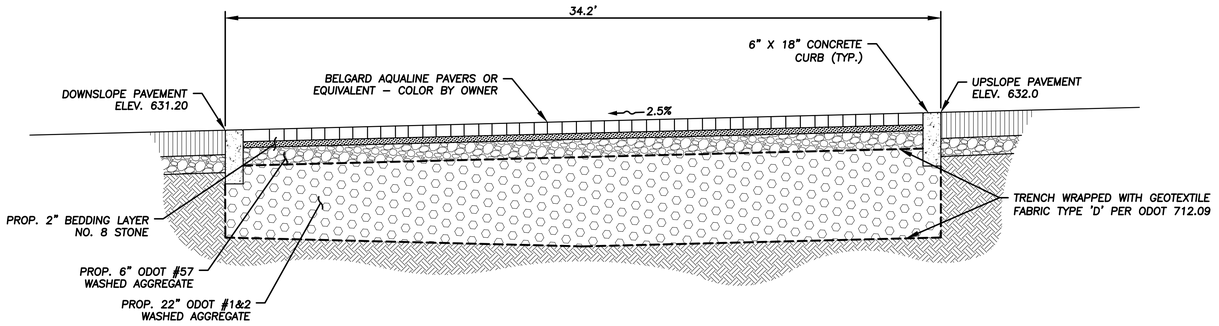
SHEET 6 OF 14
JOB NO. 15-4347

J:\15-4347 St. Casimir Church\DRAWINGS\(05) 15-4347 ST CASIMIR SITE #2.dwg, Plotted: May 01, 2017 - 9:47am



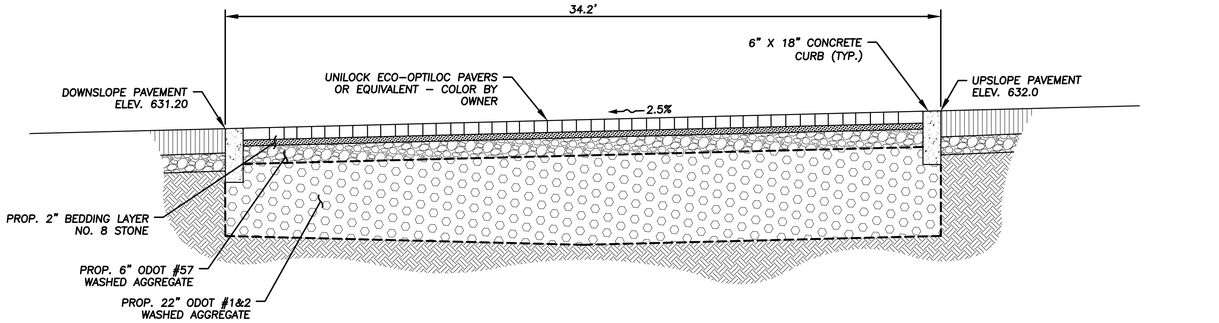
SITE PLAN

GRAPHIC SCALE
0 5
2.5 10
(IN FEET)
SCALE: 1" = 5'



TYPICAL SECTION - BELGARD PAVERS

SCALE: 3/4" = 1'-0"



TYPICAL SECTION - UNILOCK PAVERS (ALT. 1)

SCALE: 3/4" = 1'-0"

WATER QUALITY CALCULATIONS:

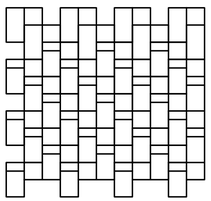
DRAINAGE AREA = 0.083 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.90
WQv = (P)(C)((A/12) = (0.75)*(0.90)*(0.083 AC/12) = 0.0046 ACRE FEET = 203 CF

PERMEABLE PAVER AREA = 1,020 SF
DEPTH REQUIRED FOR WQv
= 203/(1,020)(0.30) = 7.25" = 7.25" TOTAL REQUIRED DEPTH < 22" PROVIDED

DRAW DOWN TIME
f DESIGN = 0.5 * f MEASURED = (0.5)*(2 IN/HR) = 1 IN/HR
= (0.0046 AC–FT) = 0.06 AC–IN
0.06 AC–IN/(0.048 AC* 1 IN/HR) = 1.25 HR < 48 HR

CONTRACTOR NOTES:

1. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATIONS WITH ALL UTILITY COMPANIES, BOTH PUBLIC AND PRIVATE.
2. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND CROSSINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.
4. RAMP SHALL BE PARTIALLY MOVED BY CHURCH FOR INSTALLATION OF PAVERS FLUSH WITH EXISTING CONCRETE STEPS.



UNILOCK PAVERS PATTERN

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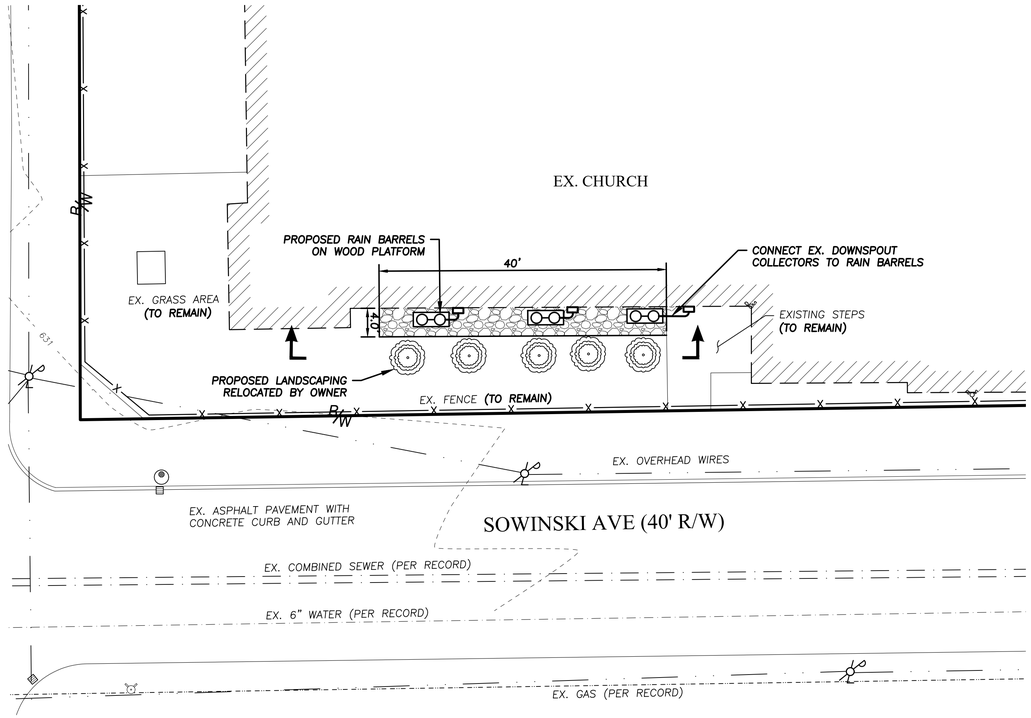
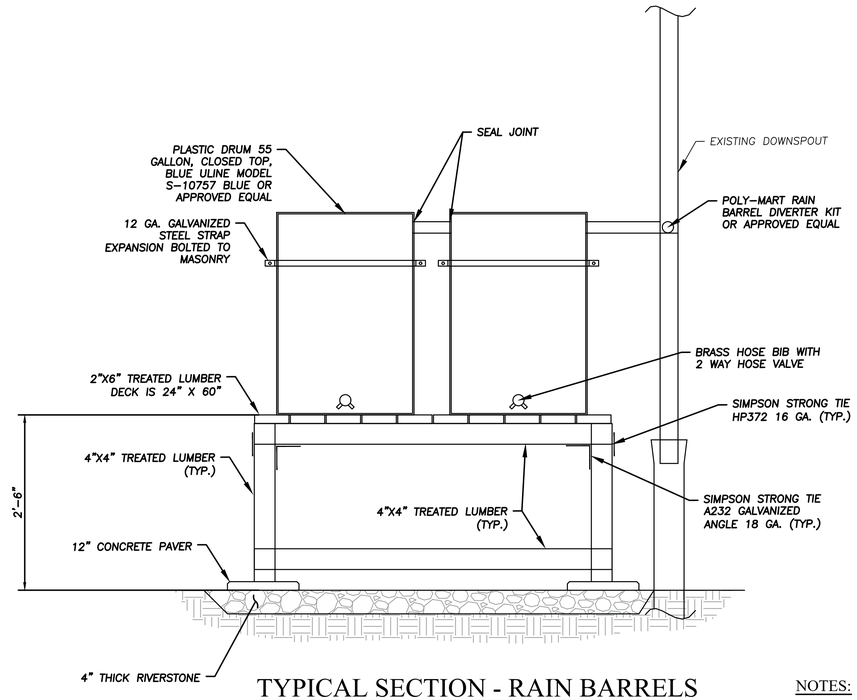
SITE PLAN (BMP NO. 3)
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 7 OF 14
JOB NO. 15-4347



SITE PLAN

GRAPHIC SCALE
0 10
5 20
(IN FEET)
SCALE: 1" = 10'



TYPICAL SECTION - RAIN BARRELS

SCALE: 1" = 1'-0"

NOTES:

1. DECK PLATFORM IS 24" X 60".

WATER QUALITY CALCULATIONS:

DRAINAGE AREA = 0.06 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.90
WQv = (P)(C)(A/12) = (0.75)*(0.90)*(0.06 AC/12) = 0.0034 ACRE FEET = 149 CF = 1115 GALLONS

RAIN BARREL VOLUME PROVIDED = 55 GALLONS/BARREL
NUMBER OF RAIN BARRELS = 6 = 330 GALLONS < 1115 GALLONS
PERCENT VOLUME TREATED = 330 GAL / 1115 GAL = 30% TREATED

CONTRACTOR NOTES:

1. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATIONS WITH ALL UTILITY COMPANIES, BOTH PUBLIC AND PRIVATE.
2. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND CROSSINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.

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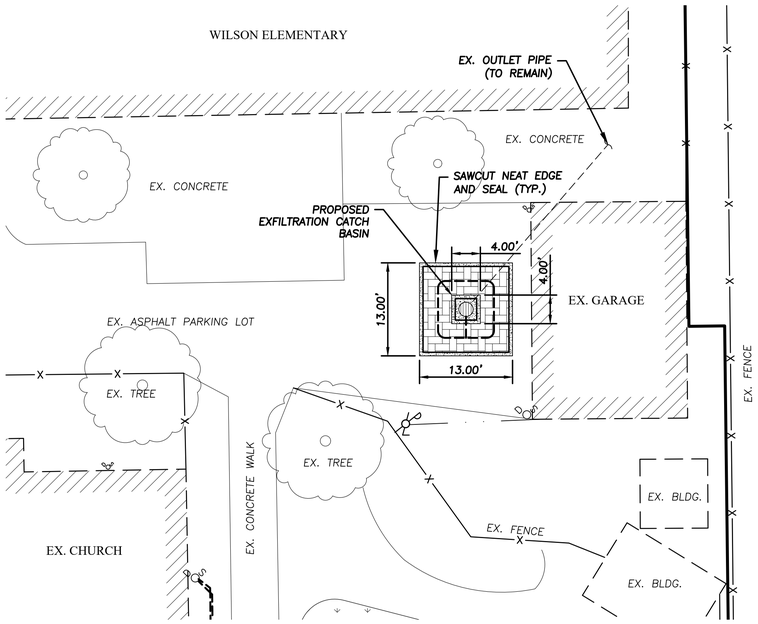
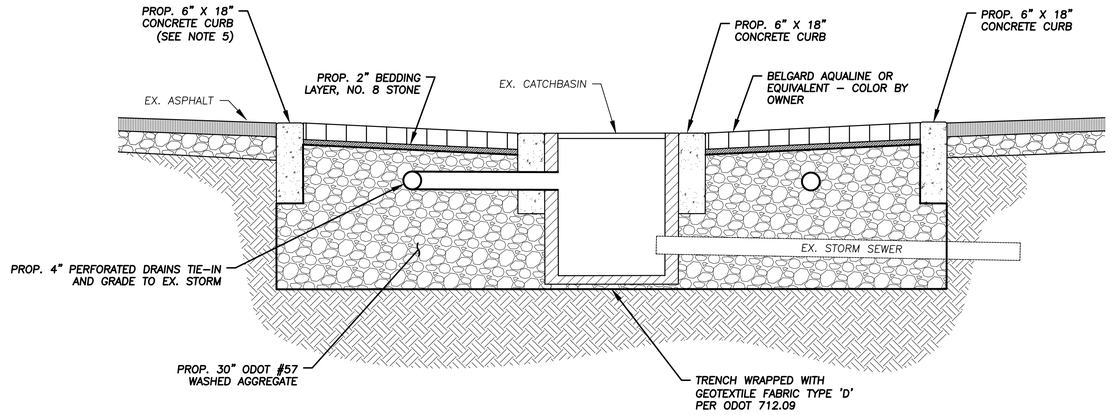
SHEET 8 OF 14
JOB NO. 15-4347

J:\15-4347 St. Casimir Church\DRAWINGS\(08) 15-4347 ST CASIMIR SITE #4.dwg, Plotted: May 01, 2017 - 9:52am



SITE PLAN

GRAPHIC SCALE
0 10
5 20
(IN FEET)
SCALE: 1" = 10'



TYPICAL SECTION - EXFILTRATION CATCH BASIN

SCALE: 3/4" = 1'–0"

WATER QUALITY CALCULATIONS:

DRAINAGE AREA = 0.11 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.858i^3 – 0.78i^2 + 0.77i + 0.04 C = 0.63
i = (0.09/0.11) = 0.83
WQv = (P)(C)((A/12) = (0.75)*(0.63)*(0.11 AC/12) = 0.004 ACRE FEET = 189 CF

PERMEABLE PAVER AREA = 128 SF
DEPTH REQUIRED FOR WQv
= 189 CF/(128)(0.30) = 4.92' = 59" TOTAL REQUIRED DEPTH > 2.5' PROVIDED

VOLUME PROVIDED
= (128 SF)(2.5')(0.30) = 96 CF =
PERCENT VOLUME TREATED = 96 CF / 189 CF = 50% TREATED

DRAW DOWN TIME FOR PROVIDED WATER QUALITY
f DESIGN = 0.5 * f MEASURED = (0.5)*(2 IN/HR) = 1 IN/HR
= (96 CF) = 0.026 AC–IN
0.026 AC–IN/(0.0029 AC* 1 IN/HR) = 8.96 HR < 48 HR

CONTRACTOR NOTES:

1. COORDINATE EXACT TRENCHING, ROUTING AND POINT OF TERMINATIONS WITH ALL UTILITY COMPANIES, BOTH PUBLIC AND PRIVATE.
2. CONTRACTOR SHALL FIELD VERIFY ALL UTILITY LOCATIONS AND CROSSINGS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. SOIL SUBGRADE SHALL NOT BE COMPACTED BY MACHINERY. IF SOIL SUBGRADE BECOMES COMPACTED, CONTRACTOR TO SCARIFY AND REPLACE SOIL TO 1' DEPTH.
4. PROVIDE WATERTIGHT CONNECTIONS WHRE UNDERDRAINS AND SEWERS TIE INTO CB.
5. TRANSITION FROM ASPHALT TO CURB/HEADER TO PAVERS MUST BE FLUSH TO PAVEMENT CURB/HEADER FROM DIVERTING FLOW AWAY FROM PAVERS.

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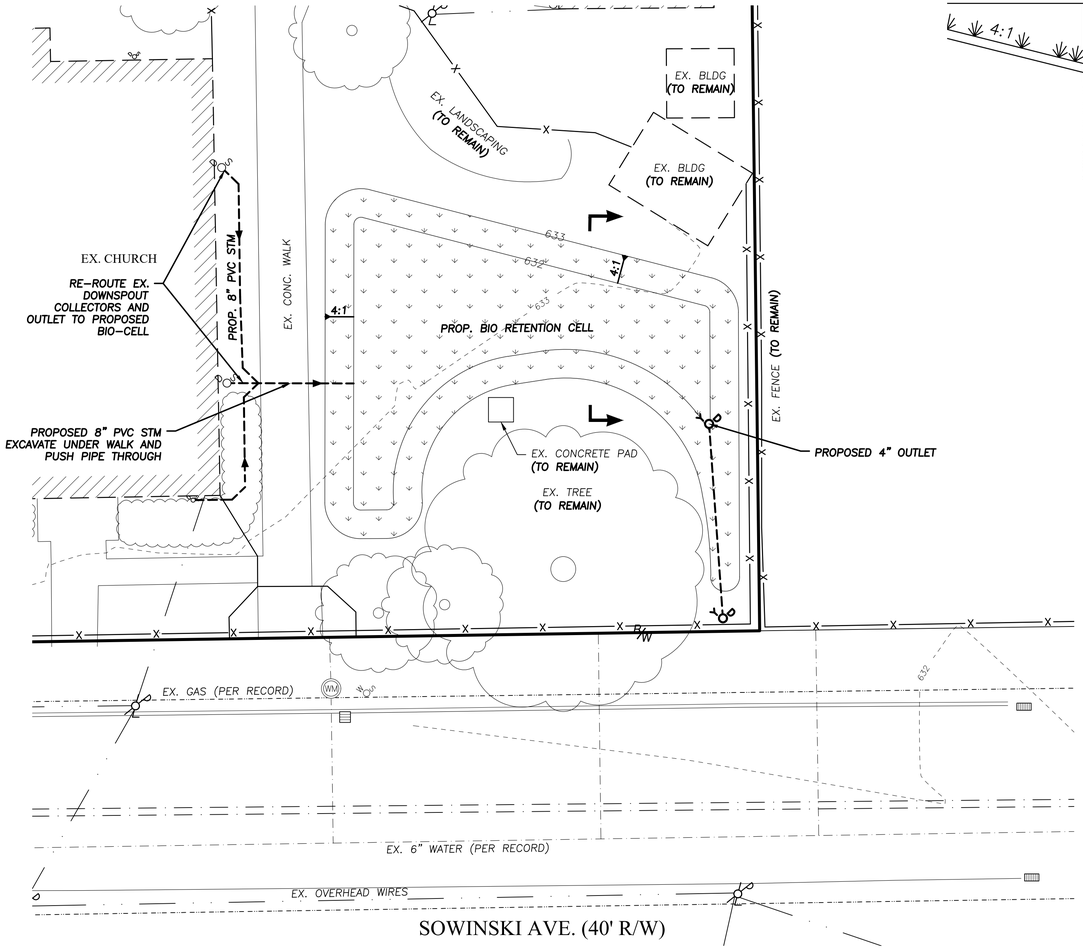
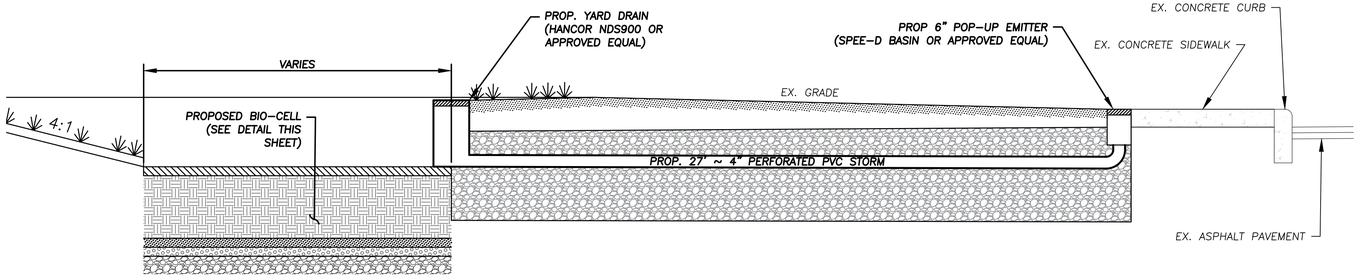
SHEET 9 OF 14
JOB NO. 15-4347

J:\15434\7.St. Casimir Church\DRAWINGS\(00) 15434 7 ST CASIMIR SITE #5.dwg, Plotted: May 01, 2017 - 9:55am



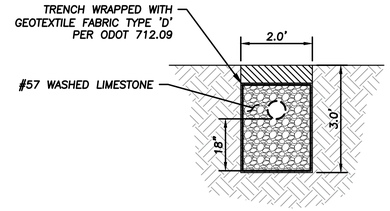
SITE PLAN

GRAPHIC SCALE
0 10
5 20
(IN FEET)
SCALE: 1" = 10'



TYPICAL SECTION - BIO-RENTENTION CELL OUTLET

SCALE: 1/2" = 1'-0"



TRENCH DETAIL

WATER QUALITY CALCULATIONS:

DRAINAGE AREA = 0.13 ACRES
PRECIPITATION DEPTH = 0.75 IN.
C = 0.858i^3 - 0.78i^2 + 0.77i + 0.002 C = 0.27
i = (0.12/0.19) = 0.38
WQv = (P)(C)((A/12) = (0.75)*(0.27)*(0.13*AC-FT) = 0.002 AC-FT = 96 CF

BIO-CELL DEPTH
TOTAL DEPTH > 1' 4:1 SIDESLOPES
BOTTOM AREA: 898.75
TOP AREA: 1741.25
VOLUME BIO-CELL = 1,320 CF PROVIDED
WQ VOLUME @ 0.25' = 248 CF < 1320 CF PROVIDED

ODNR STANDARDS:

STANDARDS FOR MINIMUM FILTER BED SIZE

"FOR SITUATIONS WERE IMPERVIOUS AREAS EXCEED 25% OF THE CONTRIBUTING DRAINAGE AREA, THE FILTER BED AREA SHALL BE A MINIMUM OF 5% OF THE CONTRIBUTING IMPERVIOUS AREA."

IMPERVIOUS AREA DRAINING TO BASIN: 2280 S.F.
5% * S.F. = 114 S.F. REQUIRED BED AREA

BASIN BED AREA: 114 S.F. < 899 S.F. PROVIDED

CONTRACTOR NOTES:

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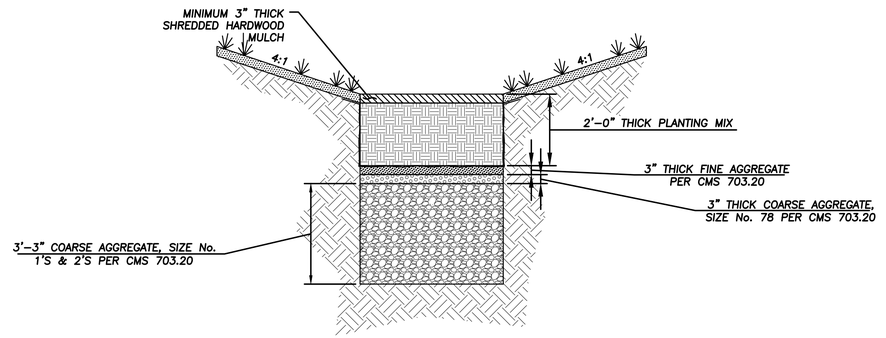

TYPICAL SECTION - BIO-RETENTION CELL

SCALE: 1/2" = 1'-0"

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CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

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JOB NO. 15-4347

J:\15-4347 St. Casimir Church\DRAWINGS\(10) 15-4347 ST CASIMIR SITE #6.dwg, Plotted: May 01, 2017 - 9:58am

SEQUENCE OF CONSTRUCTION:

1. PRE–CONSTRUCTION MEETING.
2. STAKEOUT LIMITS OF DISTURBANCE, INSTALL THE AREA WHERE THE CONSTRUCTION DUMPSTER, CONSTRUCTION STAGING, AND VEHICLE FUELING SHALL BE LOCATED.
3. INSTALL THE INLET PROTECTION AND SILT FENCE WHERE INDICATED ON THE PLANS.
4. BEGIN EARTH MOVING OPERATIONS. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE CITY OF CLEVELAND THE LOCATION OF ANY AND ALL EROSION AND SEDIMENTATION CONTROL MEASURES IMPLEMENTED AT ANY BORROW OR SPOIL SITE OF IMPORT/EXPORT MATERIAL.
5. ALL UTILITY CONSTRUCTION MAY BEGIN IMMEDIATELY FOLLOWING ESTABLISHMENT OF GRADE AND PERMISSION OF THE OWNER.
6. STABILIZE ALL UTILITY TRENCHES AT THE END OF EACH WORKDAY BY MEANS OF GRAVEL BACKFILL TO SURFACE, STEEL PLATES, REPAVING, OR MULCHING.
7. REPLACE TOPSOIL, FINE GRADE AND SEED AREAS AS REQUIRED.
8. STABILIZE ALL DISTURBED AREAS WITH PERMANENT SEED AND MULCHING OR CROWNVETCH SEEDING IMMEDIATELY UPON REACHING FINAL GRADE.
9. INSTALL PAVEMENT SUB–BASE & BEGIN PERVIOUS PAVERS.
10. COMPLETE SITE WORK, PAVEMENT MARKING, FINAL LANDSCAPING AND CLEAN UP.
11. RESEED AND REDRESS ANY AREAS THAT MAY REQUIRE ATTENTION IMMEDIATELY. NOTE THAN LAWN AREAS WILL NOT BE DEEMED STABLE UNTIL A UNIFORM SEVENTY (70%) PERCENT SHALL BE CONSIDERED TO BE IN PLACE AND FUNCTIONAL WHEN THE REQUIRED UNIFORM RATE OF COVERAGE (70%) IS OBTAINED.
12. AFTER THE UPSTREAM AREA IS AT LEAST 70% STABILIZED THE CONTRACTOR SHALL REMOVE ANY SEDIMENT DEPOSITS IN THE PROPOSED DETENTION BASIN.
13. IF FOR ANY REASON THE PROJECT IS SUSPENDED, THE CONTRACTOR SHALL INSURE THAT ALL INSTALLED EROSION MEASURES ARE FUNCTIONING AND PROPERLY MAINTAINED DURING THE PERIOD. ALL BARE SOILS ARE TO BE SEEDED AND MULCHED WITH THE TEMPORARY SEED MIXTURE.
14. CONTRIBUTING DRAINAGE AREA TO EACH STORM WATER CONTROL MEASURE MUST BE STABILIZED WITH VEGETATION PRIOR TO INSTALLATION OF BIOSOIL MIX OR PERVIOUS PAVER AGGREGATE.

STORM WATER POLLUTION PREVENTION PLAN NOTES:

1. SOIL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE IMPLEMENTED AS A FIRST STEP OF GRADING AND WITHIN SEVEN (7) DAYS FROM THE START OF CLEARING AND GRUBBING. THESE MEASURES AND PROCEDURES SHALL CONTINUE TO FUNCTION UNTIL THE ENTIRE PROJECT IS STABILIZED.
2. DISTURBED AREAS WHICH WILL REMAIN UNWORKED FOR A PERIOD OF FOURTEEN (14) DAYS OR MORE SHALL BE STABILIZED WITH TEMPORARY AND/OR PERMANENT SEEDING AND MULCHING OR OTHER APPROVED MEANS WITHIN SEVEN (7) DAYS.

   DISTURBED AREAS REMAINING DORMANT FOR OVER ONE (1) YEAR OR AT FINAL GRADE, SHALL BE STABILIZED WITH PERMANENT SEEDING AND MULCHING OR OTHER APPROVED MEANS WITHIN SEVEN (7) DAYS.
3. DITCHES WITH GRADES GREATER THAT 1.5% SHALL HAVE EROSION CONTROL BLANKETS/MATTTING INSTALLED AS PART OF STABILIZATION MEASURES.
4. REGULAR INSPECTION AND MAINTENANCE SHALL BE PROVIDED FOR ALL EROSION AND SEDIMENT CONTROL PRACTICES, AND MUST BE PERFORMED BY QUALIFIED INSPECTION PERSONNEL.
5. PERMANENT RECORDS OF MAINTENANCE AND INSPECTIONS MUST BE KEPT THROUGHOUT THE CONSTRUCTION PERIOD AND FOR 3 YEARS AFTER TERMINATION OF CONSTRUCTION ACTIVITIES.
6. INSPECTIONS MUST BE MADE A MINIMUM OF ONCE (1) EVERY SEVEN (7) DAYS AND IMMEDIATELY AFTER STORM EVENTS GREATER OF 0.5 INCHES OF RAIN IN A 24 HOUR PERIOD.
7. THE INSPECTION CHECKLIST MUST BE COMPLETED AND SIGNED BY THE QUALIFIED INSPECTOR AFTER EVERY INSPECTION.
8. ALL EROSION AND SEDIMENT CONTROLS PRACTICES MUST CONFORM TO THE LATEST EDITION OF RAINWATER AND LAND DEVELOPMENT, OHIO'S STANDARDS FOR STORM WATER MANAGEMENT, LAND DEVELOPMENT AND URBAN STREAM PROTECTION, AND THE CITY OF CLEVELAND CONSTRUCTION STANDARDS.
9. CONTRACTOR SHALL COORDINATE THE EXCAVATION AND EMBANKMENT WITH CLIENT & ENGINEER PRIOR TO CONSTRUCTION TO INSURE ADEQUATE STORM WATER POLLUTION PREVENTION MEASURES ARE INCORPORATED WITH THE CONSTRUCTION PROCESS.
10. SEDIMENT LADEN GROUND WATER ENCOUNTERED DURING TRENCHING EXCAVATIONS SHALL BE TREATED PRIOR TO DISCHARGE FROM THE SITE IN A MANNER ACCEPTABLE WITH THE LATEST EDITION OF RAINWATER AND LAND DEVELOPMENT, OHIO'S STANDARDS FOR STORM WATER MANAGEMENT, LAND DEVELOPMENT AND URBAN STREAM PROTECTION, AND THE CITY OF CLEVELAND CONSTRUCTION STANDARDS.
11. CATCH BASIN GRATES LOCATED WITHIN THE PROJECT AREA SHALL BE PROTECTED WITH A DANDY BAG, OR APPROVED EQUAL. THIS STORM WATER POLLUTION PREVENTION CONTROL SHALL REMAIN IN EFFECT UNTIL THE PERMANENT SEEDING OF THE UPLAND AREAS HAVE BEEN ESTABLISHED.

STORM WATER POLLUTION PREVENTION PLAN NOTES (CONT.):

12. EROSION AND SEDIMENT CONTROL PRACTICES NOT ALREADY SPECIFIED ON THIS PLAN MAY BE MADE NECESSARY DUE TO UNFORESEEN ENVIRONMENTAL CONDITIONS AND/OR CHANGES IN THE DRAINAGE PATTERNS CAUSED BY EARTH MOVING ACTIVITIES.
13. ANY REQUIRED MODIFICATIONS AS DETERMINED BY THE OWNER/DEVELOPER, CONTRACTOR OR OHIO EPA SHALL BE APPROVED BY THE SWP3 ENGINEER.
14. ANY APPROVED REVISIONS SHALL BE MADE IMMEDIATELY BY THE SWP3 ENGINEER AND IMPLEMENTED BY THE OWNER, DEVELOPER AND OR CONTRACTOR.
15. POSITIVE DRAINAGE MUST BE OBTAINED AT ALL TIMES.
16. THE LOCATION OF ALL STABILIZED CONSTRUCTION ENTRANCES SHALL BE COORDINATED WITH THE MAINTENANCE OF TRAFFIC SECTION OF THE PROPOSED IMPROVEMENT PLAN SET.
17. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD LOCATE THE STABILIZED CONSTRUCTION ENTRANCES, STAGING AREAS AND WASTE DISPOSAL AREAS.
18. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD LOCATE ALL CONCRETE WASHOUT PITS.
19. THE SWP3 SHALL CONTAIN SIGNATURES FROM ALL OF THE SUBCONTRACTORS ENGAGED IN ACTIVITIES THAT COULD IMPACT STORM WATER RUNOFF. INDICATING THAT THEY HAVE BEEN INFORMED AND UNDERSTAND THEIR ROLES AND RESPONSIBILITIES IN COMPLYING WITH THE SWP3. OHIO EPA RECOMMENDS THAT THE PRIMARY SITE OPERATOR REVIEW THE SWP3 WITH THE PRIMARY CONTRACTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES AND KEEP A SWP3 TRAINING LOG TO DEMONSTRATE THAT THIS REVIEW OCCUR.
20. IF AN INSPECTION REVEALS THAT A CONTROL PRACTICE IS IN NEED OF REPAIR OR MAINTENANCE IT MUST BE REPAIRED OR MAINTAINED WITHIN THREE (3) DAYS OF INSPECTION.
21. IF AN INSPECTION REVEALS THAT A CONTROL PRACTICE HAS NOT BEEN IMPLEMENTED ACCORDING TO THE SWP3, THE CONTROL PRACTICE MUST BE IMPLEMENTED WITHIN TEN (10) DAYS FROM THE DATE OF THE INSPECTION. IF THE INSPECTION REVEALS THAT THE PLANNED CONTROL PRACTICES IS NOT NEEDED, THE RECORD MUST CONTAIN A STATEMENT OF EXPLANATION AS TO WHY THE CONTROL PRACTICE IS NOT NEEDED.
22. IF AN INSPECTION REVEALS A BMP TO BE REQUIRED, THE MISSING BMP MUST BE INSTALLED WITHIN TEN (10) DAYS OF THE INSPECTION.
23. CONTRACTOR SHALL MINIMIZE THE TRACKING OF SEDIMENT AND DEBRIS ON TO EXISTING ROADWAY BY MEANS OF WASHING THE VEHICLE ON SITE. REGULAR SWEEPING MAY BE NECESSARY TO ENSURE THE ROADWAY DOES NOT BUILD UP WITH SEDIMENT AND DEBRIS.
24. THE SEDIMENT STORAGE ZONE MUST BE CLEANED OUT WHEN THE SILT OCCUPIES 40% OF THE SEDIMENT STORAGE ZONE (760 C.F. OF ACCUMULATED SILT IN SEDIMENT STORAGE ZONE).
25. CONTRACTOR SHALL NOT DISPOSE OF ANY CLEAN HARD FILL ON SITE. CONTRACTOR SHALL DISPOSE OF ANY CLEAN HARD FILL IN ACCORDANCE WITH ALL STATE AND LOCAL REGULATIONS.

SCHEDULE OF MAJOR CONSTRUCTION OPERATIONS

	A	M	J	J	A	S	O
TEMP. EROSION CONTROL	X	X	X	X	X	X	X
TEMP. EROSION CONTROL MAINTENANCE	X	X	X	X	X	X	X
CLEARING AND GRUBBING	X						
ROUGH GRADING		X	X				
UTILITIES			X				
FINE GRADING				X			
PAVING					X	X	
TOPSOIL & SEEDING						X	
LANDSCAPE							X

ACCEPTABLE EROSION CONTROL TIMETABLE

	J	F	M	A	M	J	J	A	S	O	N	D
TEMP. SEEDING				X	X	X	X	X	X	X		
PERM. SEEDING				X	X	X	X	X	X			
LANDSCAPING			X	X	X	X			X	X	X	
MULCHING	X	X	X	X	X	X	X	X	X	X	X	X
MAINTENANCE	X	X	X	X	X	X	X	X	X	X	X	X

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NOTES
CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 11 OF 14

JOB NO. 15-4347

J:\15434\7 St. Casimir Church\DRAWINGS\(11-13) 15434 ST CASIMIR Notes.dwg, Plotted: May 01, 2017 - 10:02am

Specifications
for

Temporary Seeding

Table 7.8.1 Temporary Seeding Species Selection

Seeding Dates	Species	Lb./1000 ft2	Lb/Acre
March 1 to August 15	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (4 Bushel) 40 40
	Perennial Ryegrass Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	55 142 17 17
	Oats Tall Fescue Annual Ryegrass	3 1 1	128 (3 bushel) 40 40
August 16th to November	Rye Tall Fescue Annual Ryegrass	3 1 1	112 (2 bushel) 40 40
	Wheat Tall Fescue Annual Ryegrass	3 1 1	120 (2 bushel) 40 40
	Perennial Rye Tall Fescue Annual Ryegrass	1 1 1	40 40 40
	Annual Ryegrass Perennial Ryegrass Creeping Red Fescue Kentucky Bluegrass	1.25 3.25 0.4 0.4	40 40 40
November 1 to Feb. 29	Use mulch only or dormant seeding		

Note: Other approved species may be substituted.

1. Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.
2. Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These idle areas shall be seeded within 7 days after grading.
3. The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if ideal seedbed preparation is not possible.

Mulching Temporary Seeding

1. Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seedings made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.

2. Materials:

- Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./ 1,000 sq. ft. (2-3 bales)
- Hydroseeders—If wood cellulose fiber is used, it shall be used at 2000 lbs./ ac. or 46 lb./ 1,000-sq.-ft.
- Other—Other acceptable mulches include mulch mattings applied according to manufacturer's recommendations or wood chips applied at 6 ton/ ac.

3. Straw Mulch shall be anchored immediately to minimize loss by wind or water. Anchoring methods:

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturers recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates recommended by the manufacturer
- Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

4. Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.

5. Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cultipacker seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.

Specifications
for

Dust Control

1. Vegetative Cover and/mulch – Apply temporary or permanent seeding and mulch to areas that will remain idle for over 21 days. Saving existing trees and large shrubs will also reduce soil and air movement across disturbed areas. See Temporary Seeding; Permanent Seeding; Mulching Practices; and Tree and Natural Area Protection practices.
2. Watering – Spray site with water until the surface is wet before and during grading and repeat as needed, especially on haul roads and other heavy traffic routes. Watering shall be done at a rate that prevents dust but does not cause soil erosion. Wetting agents shall be utilized according to manufacturers instructions.
3. Spray-On Adhesives – Apply adhesive according to the following table or manufacturers' instructions.

Table 7.5.1 Adhesives for Dust Control

Adhesive	Water Dilution (Adhesive: Water)	Nozzle Type	Application Rate Gal./Ac.
Latex Emulsion	12.5:1	Fine	235
Resin in Water Acrylic Emulsion (No-traffic)	4:1	Fine	300
Acrylic Emulsion (No-traffic)	7:1	Coarse	450
Acrylic Emulsion (Traffic)	3.5:1	Coarse	350

4. Stone – Graded roadways and other suitable areas will be stabilized using crushed stone or coarse gravel as soon as practicable after reaching an interim or final grade. Crushed stone or coarse gravel can be used as a permanent cover to provide control of soil emissions.
5. Barriers – Existing windbreak vegetation shall be marked and preserved. Snow fencing or other suitable barrier may be placed perpendicular to prevailing air currents at intervals of about 15 times the barrier height to control air currents and blowing soil.
6. Calcium Chloride - This chemical may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage. Application rates should be strictly in accordance with suppliers' specified rates.
7. Operation and Maintenance - When Temporary Dust Control measures are used; repetitive treatment should be applied as needed to accomplish control.

   Street Cleaning - Paved areas that have accumulated sediment from construction should be cleaned daily, or as needed, utilizing a street sweeper or bucket -type endloader or scraper.

Specifications
for

Permanent Seeding

Site Preparation

1. Subsoiler, plow, or other implement shall be used to reduce soil compaction and allow maximum infiltration. (Maximizing infiltration will help control both runoff rate and water quality.) Subsoiling should be done when the soil moisture is low enough to allow the soil to crack or fracture. Subsoiling shall not be done on slip-prone areas where soil preparation should be limited to what is necessary for establishing vegetation.
2. The site shall be graded as needed to permit the use of conventional equipment for seedbed preparation and seeding.
3. Topsoil shall be applied where needed to establish vegetation.

Seedbed Preparation

1. Lime—Agricultural ground limestone shall be applied to acid soil as recommended by a soil test. In lieu of a soil test, lime shall be applied at the rate of 100 pounds per 1,000-sq. ft. or 2 tons per acre.
2. Fertilizer—Fertilizer shall be applied as recommended by a soil test. In place of a soil test, fertilizer shall be applied at a rate of 25 pounds per 1,000-sq. ft. or 1000 pounds per acre of a 10-10-10 or 12-12-12 analyses.
3. The lime and fertilizer shall be worked into the soil with a disk harrow, spring-tooth harrow, or other suitable field implement to a depth of 3 inches. On sloping land, the soil shall be worked on the contour.

Seeding Dates and Soil Conditions

Seeding should be done March 1 to May 31 or August 1 to September 30. If seeding occurs outside of the above-specified dates, additional mulch and irrigation may be required to ensure a minimum of 80% germination. Tillage for seedbed preparation should be done when the soil is dry enough to crumble and not form ribbons when compressed by hand. For winter seeding, see the following section on dormant seeding.

Dormant Seedings

1. Seedings should not be made from October 1 through November 20. During this period, the seeds are likely to germinate but probably will not be able to survive the winter.
2. The following methods may be used for "Dormant Seeding":

3. Straw and Mulch Anchoring Methods

Straw mulch shall be anchored immediately to minimize loss by wind or water.

- Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
- Mulch Netting—Netting shall be used according to the manufacturer's recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
- Asphalt Emulsion—Asphalt shall be applied as recommended by the manufacture or at the rate of 160 gallons per acre.
- From October 1 through November 20, prepare the seedbed, add the required amounts of lime and fertilizer, then mulch and anchor. After November 20, and before March 15, broadcast the selected seed mixture. Increase the seeding rates by 50% for this type of seeding.
- From November 20 through March 15, when soil conditions permit, prepare the seedbed, lime and fertilize, apply the selected seed mixture, mulch and anchor. Increase the seeding rates by 50% for this type of seeding.
- Apply seed uniformly with a cyclone seeder, drill, cultipacker seeder, or hydro-seeder (slurry may include seed and fertilizer) on a firm, moist seedbed.
- Where feasible, except when a cultipacker type seeder is used, the seedbed should be firmed following seeding operations with a cultipacker, roller, or light drag. On sloping land, seeding operations should be on the contour where feasible.

Mulching

1. Mulch material shall be applied immediately after seeding. Dormant seeding shall be mulched. 100% of the ground surface shall be covered with an approved material.
2. Materials
- Straw—If straw is used it shall be unrotted small-grain straw applied at the rate of 2 tons per acre or 90 pounds (two to three bales) per 1,000-sq. ft. The mulch shall be spread uniformly by hand or mechanically applied so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000-sq.-ft. sections and spread two 45-lb. bales of straw in each section.
- Hydroseeders—If wood cellulose fiber is used, it shall be applied at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
- Other—Other acceptable mulches include rolled erosion control mattings or blankets applied according to manufacturer's recommendations or wood chips applied at 6 tons per acre.
- Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equivalent may be used at rates specified by the manufacturer.
- Wood Cellulose Fiber—Wood cellulose fiber shall be applied at a net dry weight of 750 pounds per acre. The wood cellulose fiber shall be mixed with water with the mixture containing a maximum of 50 pounds cellulose per 100 gallons of water.

Irrigation

Permanent seeding shall include irrigation to establish vegetation during dry weather or on adverse site conditions, which require adequate moisture for seed germination and plant growth.

Irrigation rates shall be monitored to prevent erosion and damage to seeded areas from excessive runoff.

Table 7.10.2 Permanent Seeding

Seed Mix	Seeding Rate		Notes:
	Lbs./acre	Lbs./1,000 Sq. Feet	
General Use			
Creeping Red Fescue Domestic Ryegrass Kentucky Bluegrass	20-40 10-20 20-40	1/2-1 1/4-1/2 1/2-1	For close mowing & for waterways with <2.0 ft/sec velocity
Tall Fescue	40-50	1-1 1/4	
Turf-type (dwarf) Fescue	90	2 1/4	
Steep Banks or Cut Slopes			
Tall Fescue	40-50	1-1 1/4	
Crown Vetch Tall Fescue	10-20 20-30	1/4-1/2 1/2-3/4	Do not seed later than August
Flat Pea Tall Fescue	20-25 20-30	1/2-3/4 1/2-3/4	Do not seed later than August
Road Ditches and Swales			
Tall Fescue	40-50	1-11/4	
Turf-type (Dwarf) Fescue Kentucky Bluegrass	90 5	2 1/4 0.1	
Lawns			
Kentucky Bluegrass Perennial Ryegrass	100-120	2 2	
Kentucky Bluegrass Creeping Red Fescue	100-120	2 1-1/2	For shaded areas

Note: Other approved seed species may be substituted.

Specifications
for

Concrete Washout Areas

Installation:

1. Concrete wash water shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance and washout pits shall be situated a minimum of fifty (50) feet from them.
2. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged.
3. Ensure a stable path is provided for concrete trucks to reach the washout area.
4. A highly visible sign that reads "Concrete Washout Area" shall be erected adjacent to the washout pit.
5. Surface runoff generated from upslope areas shall be diverted away from below-grade washout pits so as not to flow into them.
6. A single centralized washout area may be utilized for multiple sublots.

Maintenance:

7. The washout pit must be inspected frequently to ensure the liner is intact.
8. Once 75% of the original volume of the washout pit is filled or if the liner is torn, the material must be removed and properly disposed of once it is completely hardened. Once the hardened concrete is removed, the liner must be replaced (if torn). A new pit must be constructed if the original structure is no longer suitable.

Removal:

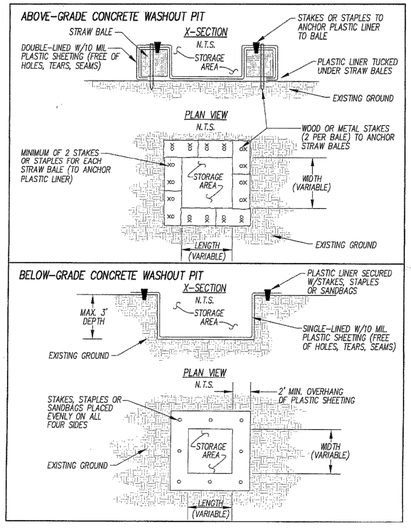
9. Once the washout pit is no longer needed, ensure all washout material has completely hardened, then remove and properly dispose of all materials. If straw bales were used, they can be spread as mulch.
10. Prefabricated containers specifically designed for concrete washout collection may be used subject to prior approval by the Community Engineer. Follow the manufacturer's suggestions for installation, maintenance and removal procedures.

Sizing of Concrete Washout Pits

Below-grade (3-ft depth)		
# of concrete trucks expected to be washed out on site*	Width (ft)	Length (ft)
2-3	3	3
4-5	4	4
6-7	5	5
8-10	6	6
11-14	7	7

Above-grade (2-ft depth)		
# of concrete trucks expected to be washed out on site*	Width (ft)	Length (ft)
2	3	3
3-4	4	4
5-6	5	5
7-8	6	6
9-11	7	7
12-15	8	8

*For small projects using a maximum of only one truckload of concrete or utilizing on-site mixing, rinsing of equipment may take place on the lot without a pit, provided it can be done a minimum of fifty (50) feet away from any water conveyances.



Specifications
for

Additional Construction Site Pollution Controls

1. Construction personnel, including subcontractors who may use or handle hazardous or toxic materials, shall be made aware of the following general guidelines regarding disposal and handling of hazardous and construction wastes:
   - Prevent spills
   - Use products up
   - Follow label directions for disposal
   - Remove lids from empty bottles and cans when disposing in trash
   - Recycle wastes whenever possible
   - Don't pour into waterways, storm drains or onto the ground
   - Don't pour down the sink, floor drain or septic tanks
   - Don't bury chemicals or containers
   - Don't burn chemicals or containers
   - Don't mix chemicals together
2. **Containers shall be provided for the proper collection of all waste material including construction debris, trash, petroleum products and any hazardous materials used on-site.** Containers shall be covered and not leaking. All waste material shall be disposed of at facilities approved for that material. Construction Demolition and Debris (CD&D) waste must be disposed of at an Ohio EPA approved CD&D landfill.
3. **No construction related waste materials are to be buried on-site.** By exception, clean fill (bricks, hardened concrete, soil) may be utilized in a way which does not encroach upon natural wetlands, streams or floodplains or result in the contamination of waters of the state.
4. **Handling Construction Chemicals.** Mixing, pumping, transferring or other handling of construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.
5. **Equipment Fueling and Maintenance,** oil changing, etc., shall be performed away from watercourses, ditches or storm drains, in an area designated for that purpose. The designated area shall be equipped for recycling oil and catching spills. Secondary containment shall be provided for all fuel oil storage tanks. These areas must be inspected every seven days and within 24 hrs. of a 0.5 inch or greater rain event to ensure there are no exposed materials which would contaminate storm water. Site operators must be aware that Spill Prevention Control and Countermeasures (SPCC) requirements may apply. An SPCC plan is required for sites with one single above ground tank of 660 gallons or more, accumulative above ground storage of 1330 gallons or more, or 42,000 gallons of underground storage. Contaminated soils must be disposed of in accordance with Item 8.

Specifications
for

Additional Construction Site Pollution Controls

6. **Concrete Wash Water** shall not be allowed to flow to streams, ditches, storm drains, or any other water conveyance. A sump or pit with no potential for discharge shall be constructed if needed to contain concrete wash water. Field tile or other subsurface drainage structures within 10 ft. of the sump shall be cut and plugged. For small projects, truck chutes may be rinsed away from any water conveyances.
7. **Spill Reporting Requirements:** Spills on pavement shall be absorbed with sawdust or kitty litter and disposed of with the trash at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. Spills shall be reported to Ohio EPA (1-800-282-9378). Spills of 25 gallons or more of petroleum products shall be reported to Ohio EPA, the local fire department, and the Local Emergency Planning Committee within 30 min. of the discovery of the release. All spills which contact waters of the state must be reported to Ohio EPA.
8. **Contaminated Soils.** If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto the soil, the soil should be dug up and disposed of at licensed sanitary landfill or other approved petroleum contaminated soil remediation facility. (not a construction/demolition debris landfill). Note that storm water run off associated with contaminated soils are not be authorized under Ohio EPA's General Storm Water Permit associated with Construction Activities.
9. **Open Burning.** No materials containing rubber, grease, asphalt, or petroleum products, such as tires, autoparts, plastics or plastic coated wire may be burned (OAC 3745-19). Open burning is not allowed in restricted areas, which are defined as: 1) within corporation limits; 2) within 1000 feet outside a municipal corporation having a population of 1000 to 10,000; and 3) a one mile zone outside of a corporation of 10, 000 or more. Outside of restricted areas, no open burning is allowed within a 1000 feet of an inhabited building on another property. Open burning is permissible in a restricted area for: heating tar, welding, smudge pots and similar occupational needs, and heating for warmth or outdoor barbeques. Outside of restricted areas, open burning is permissible for landscape or land-clearing wastes (plant material, with prior written permission from Ohio EPA), and agricultural wastes, excluding buildings.
10. **Dust Control or dust suppressants** shall be used to prevent nuisance conditions, in accordance with the manufacturer's specifications and in a manner, which prevent a discharge to waters of the state. Sufficient distance must be provided between applications and nearby bridges, catch basins, and other waterways. Application (excluding water) may not occur when rain is imminent as noted in the short term forecast. Used oil may not be applied for dust control.
11. **Other Air Permitting Requirements:** Certain activities associated with construction will require air permits including but not limited to: mobile concrete batch plants, mobile asphalt plants, concrete crushers, large generators, etc. These activities will require specific Ohio EPA Air Permits for installation and operation. Operators must seek authorization from the corresponding district of Ohio EPA. For demolition of all commercial sites, a Notification for Restoration and Demolition must be submitted to Ohio EPA to determine if asbestos corrective actions are required.
12. **Process Waste Water/Leachate Management.** Ohio EPA's Construction General Permit only allows the discharge of storm water and does not include other waste streams/discharges such as vehicle and/or equipment washing, on-site septic leachate concrete wash outs, which are considered process wastewaters. All process wastewaters must be collected and properly disposed at an approved disposal facility. In the event, leachate or septage is discharged; it must be isolated for collection and proper disposal and corrective actions taken to eliminate the source of waste water.
13. **A Permit To Install (PTI)** is required prior to the construction of all centralized sanitary systems, including sewer extensions, and sewerage systems (except those serving one, two, and three family dwellings) and potable water lines. Plans must be submitted and approved by Ohio EPA. Issuance of an Ohio EPA Construction General Storm Water Permit does not authorize the installation of any sewerage system where Ohio EPA has not approved a PTI.

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CITY OF CLEVELAND, COUNTY OF CUYAHOGA, STATE OF OHIO

SHEET 12 OF 14
JOB NO. 15-4347

SWP3 Amendment Log

Project Name:

Amendment No.	Description of the Amendment	Date of Amendment	Amendment Prepared By

SWP3 Grading and Stabilization Activities Log

Project Name:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure and Location

SWP3 Corrective Action Log

Project Name:

Inspection Date	Inspector Name	Description of Correctiove Action Needed (From Inspection Report)	Corrective Action Taken	Date Action Taken

Detention Basin Maintenance Tasks and Schedule

Tasks	Basin Side-Slopes	Basin Bottom	Basin Inlets	Basin Outlet	Catch Basin Inlets	Catch Basin Sumps	Storm Sewer System	Schedule
Inspect for sediment accumulation		O	O	O	O	O	O	Annually
Remove sediment accumulation		O	O	O	O	O	O	Every 5-10 years as needed
Inspect for debris (dead vegetation and trash)	O	O	O	O	O	O	O	Early spring, fall and after major storms
Clean debris	O	O	O	O	O	O	O	As needed
Inspect for erosion on banks and bottom	O	O	O	O				Early spring, fall and after major storms
Re-establish permanent vegetation on eroded slopes	O	O						As needed
Rake out dead vegetation			O	O				Annually – early spring
Replace stone rip-rap	O	O	O	O				Every 3-5 years as needed
Mowing	O	O						0 to 2 times per year
Inspect structural elements during rainfall event			O	O			O	Annually

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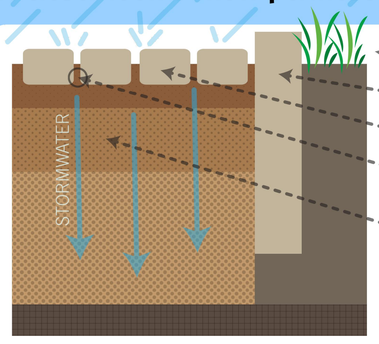
Northeast Ohio Regional Sewer District

Keeping our Great Lake great

How does permeable pavement help the environment?

Permeable pavers are more than just a creative parking-lot surface. What you are standing on is part of a stormwater management system that includes the pavers, the spaces between each block, the gravel layer underneath, and the soil all around them. Together, this system protects Lake Erie by filtering stormwater runoff into the ground rather than allowing it to flow to sewers.

A closer look at how permeable pavers work



Grass

Curb or restraint

Pavers

Gravel fills the voids.

These layers of stone vary in size and thickness. Each layer acts as a filter as water soaks through.

FASTFACTS
What about pollution?

Research shows permeable pavers help remove pollutants from surface runoff. Underlying gravel can capture excess nutrients like phosphorus and nitrogen, or heavy metals (zinc or copper) and oils. The media traps these substances, some of these pollutants are broken down by microorganisms as the water filters through.

what is bioretention?

Bioretention areas are stormwater basins that use soil, mulch, and vegetation to treat runoff and improve water quality for small drainage areas. They give runoff a place to go so it doesn't overload the storm sewer system, contribute to local flooding, or damage streams and other aquatic ecosystems.

IDEAL LOCATIONS:
Placed in traditionally landscaped areas like cul-de-sacs or parking islands, bioretention areas accept runoff from highly impervious surfaces, like roads, commercial areas, and parking lots.

What are the benefits of a bioretention area?

These features reduce stormwater runoff, naturally filter harmful bacteria and pollutants from stormwater, and support ecological integrity of the region by the use of native plants.

Why plant a bioretention area on public property?

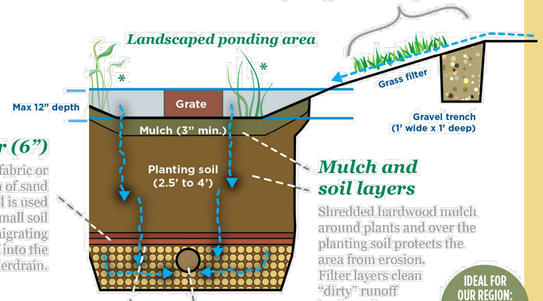
Installing a bioretention area on public property helps clean stormwater and limit flooding. Water quality is a regional concern. Our community and the **Northeast Ohio Regional Sewer District** are dedicated to educating citizens about what each of us can do to improve water quality and manage stormwater on personal and community properties.

** Plant choices*

Native plants are recommended for bioretention areas because they are uniquely suited to growing in their native area. Typically drought resistant, they adapt to soil and temperature conditions and benefit the environment, often attracting butterflies and birds.

Pretreatment area

Next to the ponding area, it slows the water flow (shown in blue) and captures excessive sediments or pollutants before runoff enters the ponding area for storage.



Filter layer (6")

A geotextile fabric or a combination of sand and pea gravel is used to prevent small soil particles from migrating down and into the underdrain.

Mulch and soil layers

Shredded hardwood mulch around plants and over the planting soil protects the area from erosion. Filter layers clean "dirty" runoff by degrading pollutants and promoting biological growth.

IDEAL FOR OUR REGION:
50% sand
25% topsoil
25% compost

Gravel layer and underdrain system

A 12"-deep gravel bed acts as water storage and provides drainage to underdrain pipes. "Clean" runoff exits through the underdrain to a nearby stream.

Project funded by a Green Infrastructure Grant from the
Northeast Ohio Regional Sewer District

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