No.	Date	Revision
△1	4/23/18	REV. PER JEFFERSON CO. COMMENTS SHTS. 1,2,3,4,&5
△2	4/26/18	REV. PER JEFFERSON CO. COMMENTS (4/26/18) REV. PER WVDOH COMMENTS (4/26/18)
△3	5/29/18	REV. PER WVDEP COMMENTS SHTS. 1,4,5&12

COVER
CAD File No.

CJM
Drawn

KJK
Checked

KJK
Approved

AS NOTED
Scale:

FEB 2018
Date:

17-0430
Project No.

WWTP LAGOON DECOMMISSION AND SINKHOLE REMEDIATION PROJECT

BARDANE INDUSTRIAL PARK

JEFFERSON COUNTY, WEST VIRGINIA

ISSUED: 4/2/2018 REV. 5/29/2018

POTESTA & ASSOCIATES, INC.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
15 South Braddock St., Winchester, Virginia 22602
TEL: (540) 450-0180 FAX: (540) 450-0182
E-Mail Address: potesta@potesta.com

POTESTA

△ WORKING HOURS:

NORMAL WORKING HOURS SHALL BE:

MONDAY THRU FRIDAY FROM 7AM – 5PM
* EXCEPT FOR DEWATERING/PUMPING OF LAGOON SHALL RUN 24 HOURS +.

△ CONTACT INFORMATION:

CONTACT JEFFERSON COUNTY PLANNING COMMISSION OFFICE PRIOR TO INITIATING ANY EXCAVATION ON THE SITE: (304)728-3228

LOCATE ALL UNDERGROUND UTILITIES PRIOR TO INITIATING ANY EXCAVATION ON THIS SITE BY CALLING;

- MISS UTILITY (800) 245-4848
- THE JEFFERSON COUNTY PUBLIC SERVICE DISTRICT (JCPSD) (304) 725-4647
- THE JEFFERSON UTILITY INC (JUI) (304) 728-2077

SITE INFORMATION:

TAX PARCEL #:TM 2 PARCEL 1.4 CHARLES TOWN DISTRICT

LOT SIZE: 4.26 ACRES

ZONING INFORMATION:
ZONING: INDUSTRIAL / COMMERCIAL
USE: WWTP LAGOON

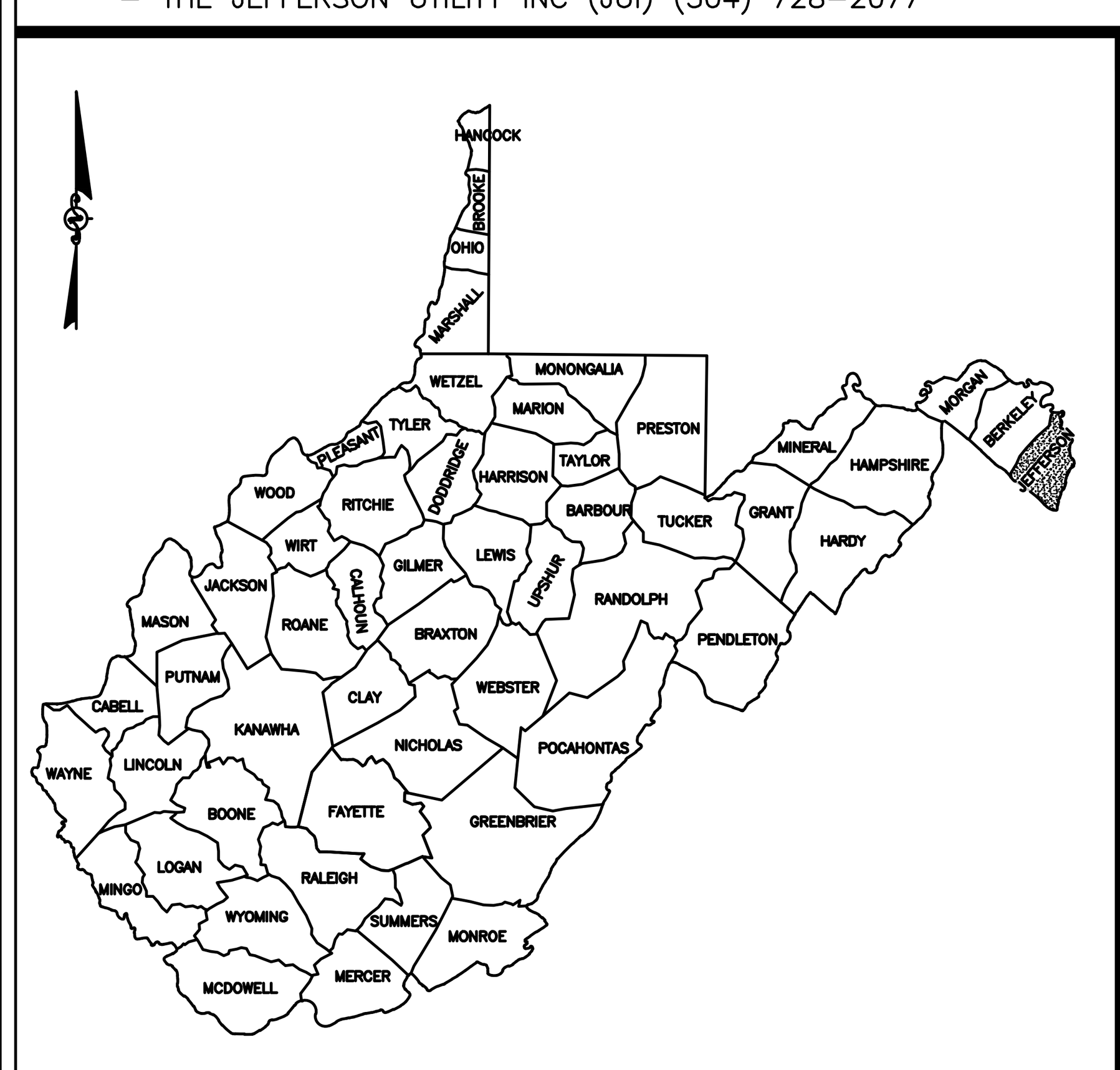
PROPOSED USE: DRAINAGE SWALE (NO STRUCTURES)

DRAWING INDEX

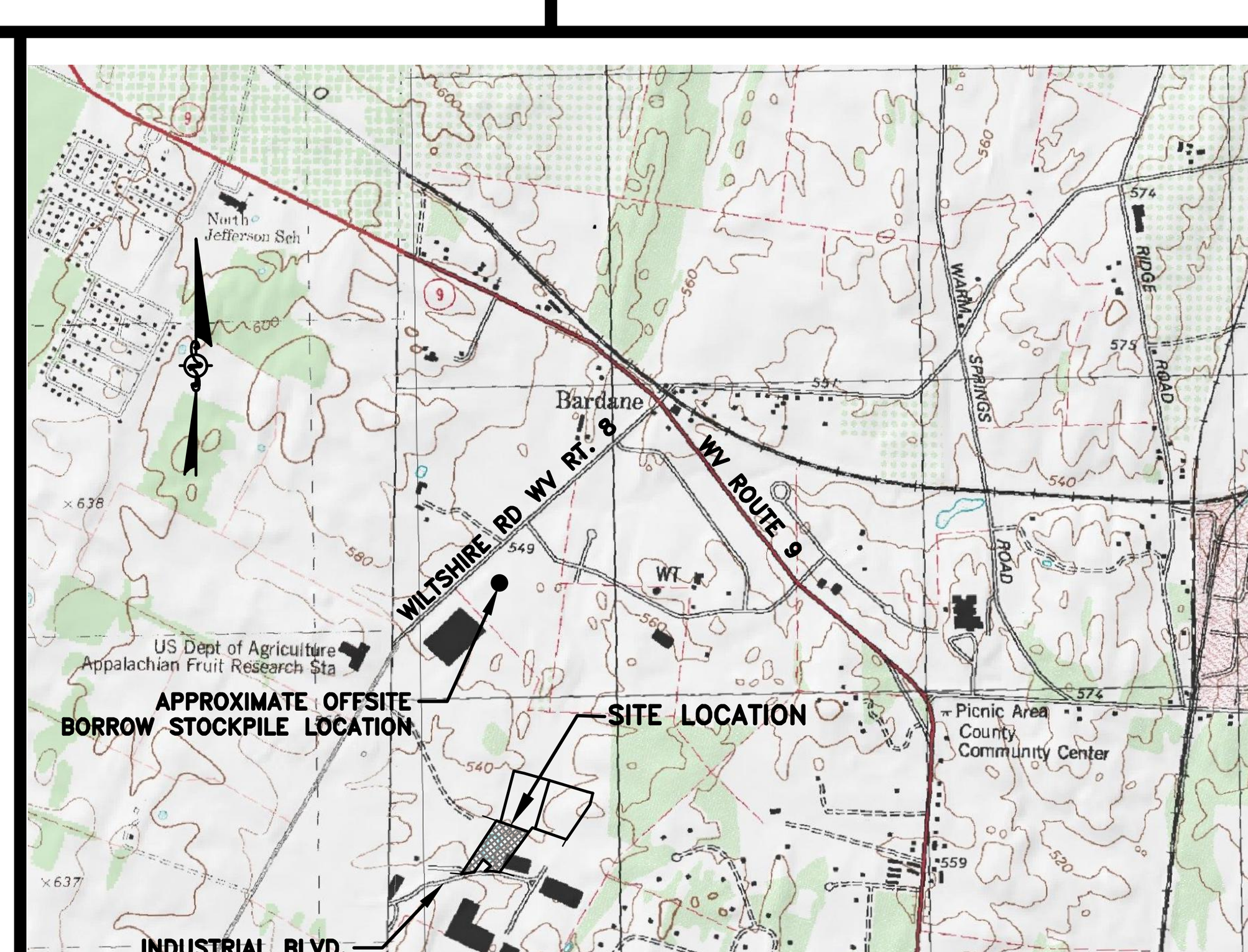
DRAWING NO.	TITLE
1	COVER SHEET
2	EXISTING CONDITIONS AND DEMOLITION PLAN
3	EXISTING CONDITIONS PLAN
4	SINKHOLE REMEDIATION AND EROSION & SEDIMENT CONTOL PLAN
5	SWALE AND EROSION & SEDIMENT CONTOL PLAN
6	SWALE CROSS SECTIONS
7	SWALE CROSS SECTIONS
8	SINKHOLE DETAILS
△9	SIGHT DISTANCE PLAN & PROFILE
D1	STORMWATER CALCULATIONS & DETAILS
D2	STORMWATER CALCULATIONS & DETAILS
△D3	EROSION & SEDIMENT CONTROL DETAILS AND MISCELLANEOUS DETAILS

△ OWNER/DEVELOPER

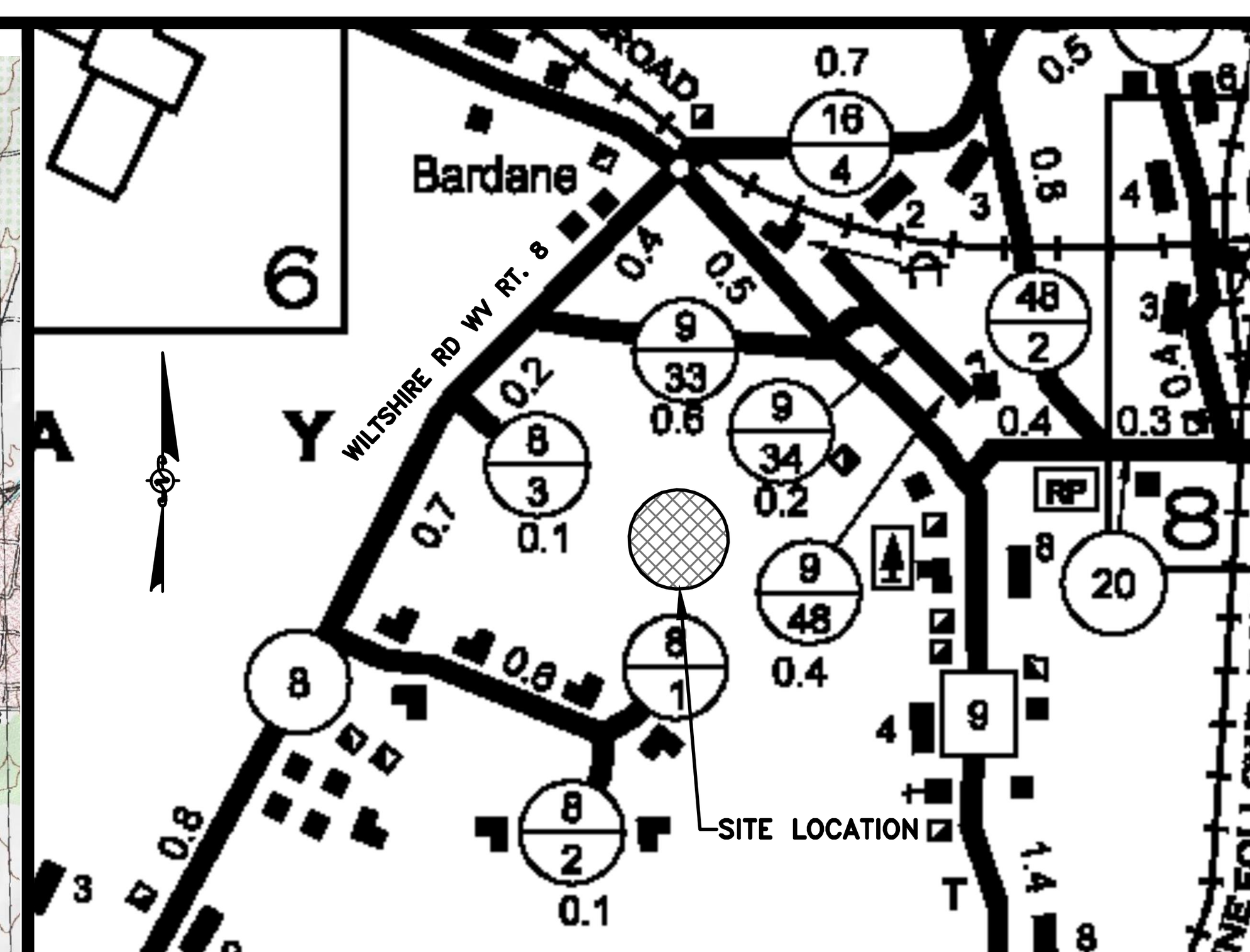
COUNTY COMMISSION OF JEFFERSON COUNTY
JEFFERSON COUNTY ENGINEERING OFFICE
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414



WEST VIRGINIA



△LOCATION MAP
U.S.G.S. 7.5' QUADRANGLE
CHARLES TOWN, WEST VIRGINIA
SCALE: 1"=2,000'



VICINITY MAP
WV DIVISION OF HIGHWAYS
JEFFERSON COUNTY HIGHWAY MAP
SCALE: 1"=2,000'

FLOOD ZONE

PROPERTY IS IN ZONE X OF THE FLOOD INSURANCE RATE MAP COMMUNITY PANEL NUMBER 54037C0130E FOR JEFFERSON COUNTY, WEST VIRGINIA AND HAVING AS EFFECTIVE DATE OF DECEMBER 18, 2009

POTESTA & ASSOCIATES, INC.
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15 S. Braddock Street, Winchester, Virginia 22601
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E-Mail Address: potesta@potesta.com

Kevin J. Knechtel, P.E.

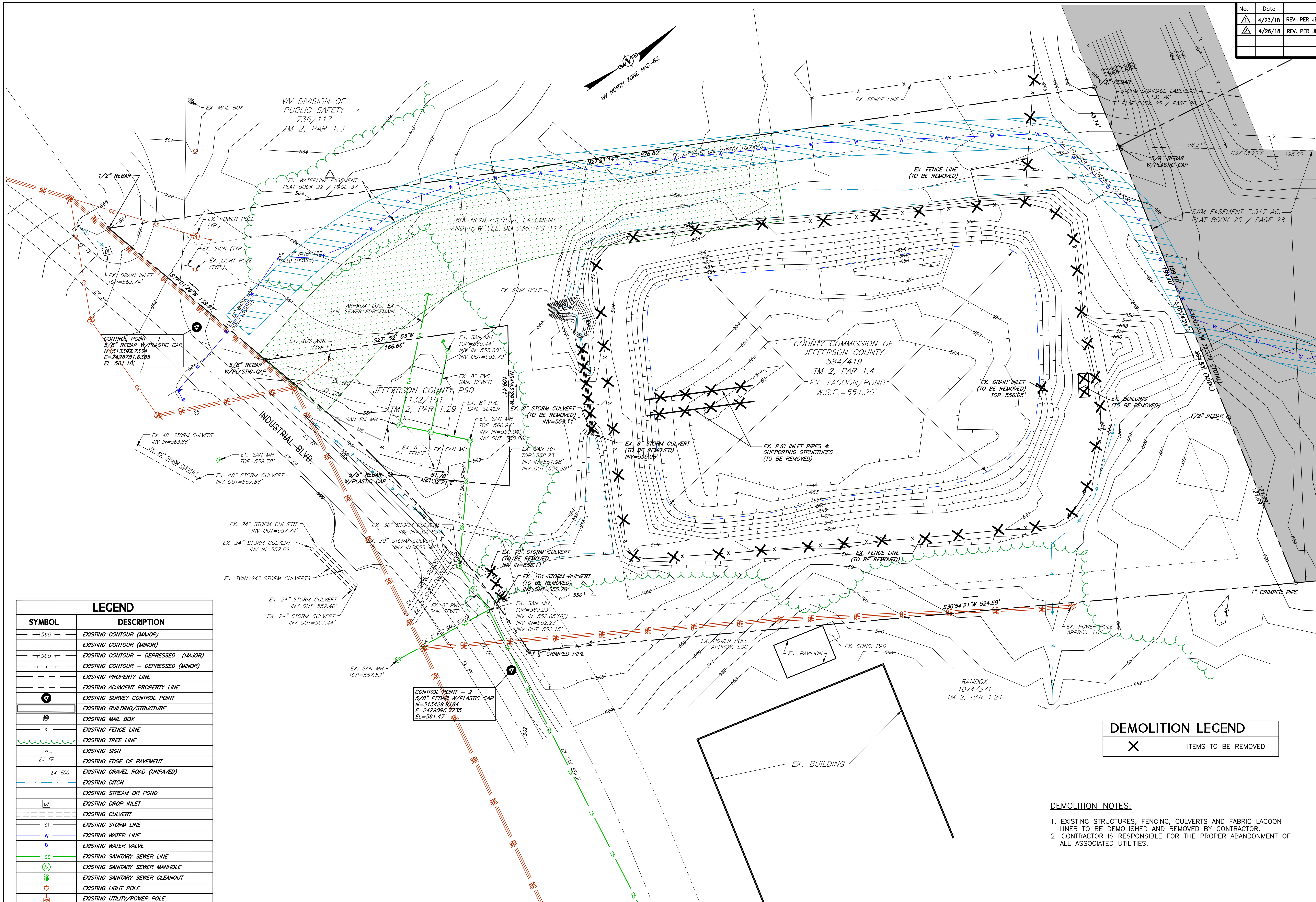
Date

Client
COUNTY COMMISSION OF JEFFERSON COUNTY
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
COVER SHEET
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

1
Drawing No.

No.	Date	Revision
1	4/23/18	REV. PER JEFFERSON CO. COMMENTS
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS



WV NORTH ZONE NAD-83
WV DIVISION OF PUBLIC SAFETY 736/117 TM 2, PAR 1.3
EX. MAIL BOX
EX. WATERLINE EASEMENT PLAT BOOK 22 / PAGE 37
60' NONEXCLUSIVE EASEMENT AND R/W SEE DB 736, PG 117
EX. 12" WATER LINE (APPROX. LOCATION)
EX. FENCE LINE
EX. FENCE LINE (TO BE REMOVED)
STORM DRAINAGE EASEMENT 1.135 AC. PLAT BOOK 25 / PAGE 28
5/8" REBAR W/PLASTIC CAP
SWM EASEMENT 5.317 AC. PLAT BOOK 25 / PAGE 28
1/2" REBAR
EX. POWER POLE (TYP.)
EX. SIGN (TYP.)
EX. LIGHT POLE (TYP.)
EX. DRAIN INLET TOP=563.74'
CONTROL POINT - 1 5/8" REBAR W/PLASTIC CAP N=313393.7334 E=2428781.6385 EL=561.18'
APPROX. LOC. EX. SAN. SEWER FORCEMAIN
EX. SINK HOLE
EX. GUY WIRE (TYP.)
JEFFERSON COUNTY PSD 1132/101 TM 2, PAR 1.29
COUNTY COMMISSION OF JEFFERSON COUNTY 584/419 TM 2, PAR 1.4 EX. LAGOON/POND W.S.E.=554.20'
EX. DRAIN INLET (TO BE REMOVED) TOP=556.05'
EX. BUILDING (TO BE REMOVED)
EX. PVC INLET PIPES & SUPPORTING STRUCTURES (TO BE REMOVED)
EX. 8" STORM CULVERT (TO BE REMOVED) INV=555.11'
EX. 8" STORM CULVERT (TO BE REMOVED) INV=555.05'
INDUSTRIAL BLVD.
EX. 48" STORM CULVERT INV IN=563.86'
EX. 48" STORM CULVERT INV OUT=557.86'
EX. SAN MH TOP=559.78'
EX. 24" STORM CULVERT INV OUT=557.74'
EX. 24" STORM CULVERT INV IN=557.69'
EX. TWIN 24" STORM CULVERTS
EX. 10" STORM CULVERT (TO BE REMOVED) INV IN=556.11'
EX. 10" STORM CULVERT (TO BE REMOVED) INV OUT=555.78'
EX. FENCE LINE (TO BE REMOVED)
1" CRIMPED PIPE
EX. POWER POLE APPROX. LOC.
EX. CONC. PAD
EX. PAVILION
RANDOX 1074/371 TM 2, PAR 1.24
EX. BUILDING
CONTROL POINT - 2 5/8" REBAR W/PLASTIC CAP N=313429.9184 E=2429096.7735 EL=561.47'
EX. SAN MH TOP=557.52'

MATCHLINE SEE SHEET 3 FOR CONTINUATION

DEMOLITION LEGEND

X	ITEMS TO BE REMOVED

LEGEND

SYMBOL	DESCRIPTION
560	EXISTING CONTOUR (MAJOR)
	EXISTING CONTOUR (MINOR)
555	EXISTING CONTOUR – DEPRESSED (MAJOR)
	EXISTING CONTOUR – DEPRESSED (MINOR)
	EXISTING PROPERTY LINE
	EXISTING ADJACENT PROPERTY LINE
	EXISTING SURVEY CONTROL POINT
	EXISTING BUILDING/STRUCTURE
MB	EXISTING MAIL BOX
X	EXISTING FENCE LINE
	EXISTING TREE LINE
	EXISTING SIGN
EX. EP	EXISTING EDGE OF PAVEMENT
EX. EOG	EXISTING GRAVEL ROAD (UNPAVED)
	EXISTING DITCH
	EXISTING STREAM OR POND
DI	EXISTING DROP INLET
	EXISTING CULVERT
ST	EXISTING STORM LINE
W	EXISTING WATER LINE
	EXISTING WATER VALVE
SS	EXISTING SANITARY SEWER LINE
S	EXISTING SANITARY SEWER MANHOLE
	EXISTING SANITARY SEWER CLEANOUT
	EXISTING LIGHT POLE
	EXISTING UTILITY/POWER POLE
	EXISTING GUY WIRE
OE	EXISTING OVERHEAD ELECTRIC LINE
UE	EXISTING UNDERGROUND ELECTRIC LINE
UT	EXISTING UNDERGROUND TELEPHONE LINE
T	EXISTING TELEPHONE PEDESTAL

DEMOLITION NOTES:

1. EXISTING STRUCTURES, FENCING, CULVERTS AND FABRIC LAGOON LINER TO BE DEMOLISHED AND REMOVED BY CONTRACTOR.
2. CONTRACTOR IS RESPONSIBLE FOR THE PROPER ABANDONMENT OF ALL ASSOCIATED UTILITIES.

GRAPHIC SCALE

30 15 0 30 60

MAPPING REFERENCE:
INFORMATION SHOWN HEREON WAS PRODUCED FROM INFORMATION COLLECTED BY POTESTA FIELD CREW DURING JANUARY 15–19, 2018. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GPS O.P.U.S. SOLUTION TAKEN ON SITE.
HORIZONTAL DATUM – WV NORTH ZONE NAD–83, VERTICAL DATUM – NAVD–88.
CONTOUR INTERVAL = 1'.

KEVIN J. KNIGHT REGISTERED 17338 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 4/26/18

ISSUED: 4/2/2018 REV: 4/26/2018

EX-COND 2	CAD File No.
CJM	Drawn
KJK	Checked
KJK	Approved
1"=30'	Scale:
MARCH 2018	Date:
17-0430	Project No.

POTESTA & ASSOCIATES, INC.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
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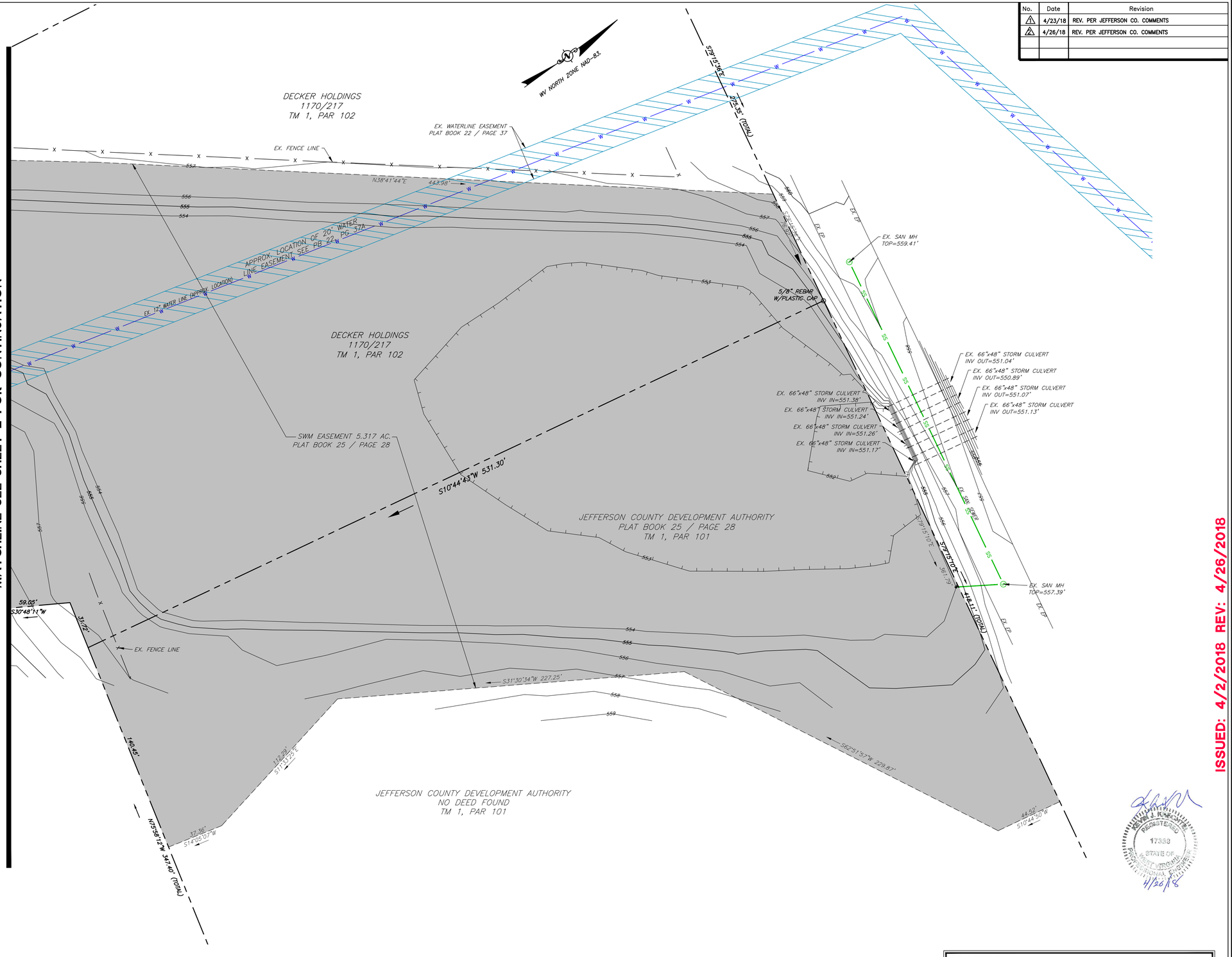
Client
COUNTY COMMISSION OF JEFFERSON COUNTY
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
EXISTING CONDITIONS AND DEMOLITION PLAN
WWTP LAGOON DECOMMISSION AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

2
Drawing No.

MATCHLINE SEE SHEET 2 FOR CONTINUATION



No.	Date	Revision
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2	4/26/18	REV. PER JEFFERSON CO. COMMENTS

LEGEND

SYMBOL	DESCRIPTION
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	EXISTING DITCH
	EXISTING STREAM OR POND
DI	EXISTING DROP INLET
	EXISTING CULVERT
ST	EXISTING STORM LINE
W	EXISTING WATER LINE
	EXISTING WATER VALVE
SS	EXISTING SANITARY SEWER LINE
S	EXISTING SANITARY SEWER MANHOLE
	EXISTING SANITARY SEWER CLEANOUT
	EXISTING LIGHT POLE
PP	EXISTING UTILITY/POWER POLE
	EXISTING GUY WIRE
OE	EXISTING OVERHEAD ELECTRIC LINE
UE	EXISTING UNDERGROUND ELECTRIC LINE
UT	EXISTING UNDERGROUND TELEPHONE LINE
T	EXISTING TELEPHONE PEDESTAL

GRAPHIC SCALE
30 15 0 30 60

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HORIZONTAL DATUM – WV NORTH ZONE NAD–83, VERTICAL DATUM – NAVD–88.
CONTOUR INTERVAL = 1'.

KEVIN J. KNOTTS
REGISTERED
17338
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
4/26/18

ISSUED: 4/2/2018 REV: 4/26/2018

EX-COND 3
CAD File No.
CJM
Drawn
KJK
Checked
KJK
Approved
1"=30'
Scale:
MARCH 2018
Date:
17-0430
Project No.

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POTESTA

Client
COUNTY COMMISSION OF
JEFFERSON COUNTY
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
EXISTING CONDITIONS PLAN
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

3
Drawing No.

File: T:\2017\17-0430 - Jefferson Co-Lagoon-Sinkhole\17-0430_EXCOND.dwg
Plot Date/Time: May 29, 2018 - 12:01pm
Plotted By: cmowery

EROSION AND SEDIMENT CONTROL PLANS

PROJECT DESCRIPTION (3)
PREPARATIONS FOR THE CONSTRUCTION OF THE PROPOSED PROJECT WILL INCLUDE THE ROUGH GRADING OF APPROXIMATELY 4.63 ACRES. CUT AND FILL AREAS ARE REQUIRED FOR THE PROPOSED LAGOON REMOVAL SINKHOLE REMEDIATION AND STORMWATER SWALE DEVELOPMENT. OFFSITE BORROW AREA WILL BE COVERED UNDER THIS LAND DISTURBANCE PERMIT, AND WILL HAVE ITS OWN EROSION & SEDIMENT CONTROL PLAN (SEE DRAWING D3).

EXISTING SITE CONDITIONS
THE EXISTING SITE CONDITIONS INCLUDE AN OPERATING JEFFERSON COUNTY PSD LIFT STATION WITH SANITARY SEWER, NON-OPERATIING WASTE WATER TREATMENT PLANT LAGOON OVERGROWN WITH VEGETATION AND WOODS, AND AN EXISTING SINKHOLE. THE LAGOON AND SINKHOLE ARE WITHIN EXISTING STORMWATER DRAINAGE FOR THE INDUSTRIAL PARK.

ADJACENT AREAS
THE SITE IS BORDERED ON THE SOUTH BY INDUSTRIAL BLVD. ON THE EAST BY A COMMERCIAL RANDOX LABORATORIES FACILITY, ON THE WEST BY WV STATE POLICE FACILITY AND TO THE NORTH BY AN EXISTING 300' WIDE STORMWATER SWALE.

SOILS
ACCORDING TO THE NRCS SOIL SURVEY WEB SITE, THE SITE DISTURBED AREA CONTAIN SOILS TYPES URBAN LAND-UDORTHENTS AND FUNKSTOWN SILT LOAM 3-8% SLOPE THESE SOILS ARE HYDROLOGIC CLASSIFICATION "C".

CRITICAL AREAS
A). CRITICAL AREA OF CONCERN IS THE EXISTING SINKHOLE ON THE SOUTHWEST CORNER OF THE LAGOON BERM. SEQUENCE TO PROTECT SINKHOLE SHALL BE TO DEWATER:
1). THE LAGOON PER POTESTA & ASSOCIATES, INC. LETTER TO WVDEP TO "REVISED REQUEST TO AMEND THE DECOMMISSION IRRIGATION LAGOON AND SINKHOLE REMEDIATION PLAN" DATED FEBRUARY 28, 2018.
2). CONSTRUCT A TEMPORARY DIVERSION DIKE THROUGH THE LAGOON AS SHOWN, OPENING THE LAGOON'S NORTHERN BERM AND THEN THE SOUTHERN BERM, ONCE THE DD (DIVERSION DIKE) IS STABILIZED, TO ALLOW STORMWATER DISCHARGE FROM THE EXISTING TWIN 30 INCH CULVERTS TO BY PASS THE SINKHOLE.
B). CRITICAL AREA SHALL BE AVOIDING SILT LADEN RUNOFF INTO EXISTING DOWNSTREAM DRAINAGE SWALE AND EASEMENT ON DECKER HOLDINGS PROPERTIES.

EROSION AND SEDIMENT CONTROL MEASURES
SILT FENCE WILL BE INSTALLED IN SELECTED LOCATION DOWNSLOPE FROM THE DISTURBED AREAS AS A FIRST MEASURE OF CONSTRUCTION. SILT FENCES SHALL BE INSPECTED AFTER EACH RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. DAMAGED, DECOMPOSED OR OTHERWISE INEFFECTIVE SILT FENCE SHALL BE REPLACED. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE IS NO LONGER NEEDED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE AND STABILIZED.

TEMPORARY DIVERSION DIKES WILL BE CONSTRUCTED TO DIRECT STORMWATER FLOW FROM THE SINKHOLE.

A CONSTRUCTION ENTRANCE WILL BE INSTALLED OFF INDUSTRIAL BLVD. AS SHOWN ON THE PLANS.

TEMPORARY SEEDING IN ACCORDANCE WITH THE WEST VIRGINIA BEST MANAGEMENT PRACTICE MANUAL (2006) SECTION 3.10 WILL BE APPLIED ALL AREAS WHICH WILL NOT BE BROUGHT TO FINAL GRADE WITHIN 30 DAYS. EMBANKMENT OR EXCAVATED SLOPES DENUDED FOR A PERIOD OF GREATER THAN 30 DAYS SHALL BE TEMPORARY SEEDED AND MULCHED. TO COINCIDE WITH THE ANTICIPATED CONSTRUCTION DATES, THE SEEDING WILL CONSIST OF 50 POUNDS PER AREA OF GERMAN MILLET. ALL TEMPORARY SEEDING AREAS WILL BE MULCHED IN ACCORDANCE WITH THE SCHEDULE INCLUDED HEREIN.

(3) EROSION CONTROL MATTING TO BE PLACED IN THE DRAINAGE SWALE AS SHOWN HEREON SHALL BE THREE ROLL WIDTHS IN WIDTH AND CENTERED ALONG THE CENTERLINE OF THE DRAINAGE SWALE. EROSION CONTROL MATTING SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS INCLUDING ANCHORING AND OVERLAPS.

ALL DISTURBED AREAS WILL BE STABILIZED BY PERMANENT SEEDING IN ACCORDANCE WITH THE SCHEDULE INCLUDED HEREIN. THE ANTICIPATED TIME FOR CONSTRUCTION IS JULY 2018 THROUGH SEPTEMBER 2018.

ALL SEEDED AREAS WILL BE MULCHED IN ACCORDANCE WITH THE SCHEDULE INCLUDED ON THE CONSTRUCTION PLANS.

PERMANENT STABILIZE
THE CONTRACTOR SHALL STABILIZE ALL DENUDED LAND WITHIN 7 DAYS AFTER THE END OF CONSTRUCTION. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE. THE CONTRACTOR SHALL ESTABLISH VEGETATION ON ALL AREAS NOT OTHERWISE STABILIZED ACCORDING THE FOLLOWING SPECIFICATIONS:

SEEDBED PREPARATION
A. SCARIFY TOP 1-INCH TO 2-INCH OF SOIL AFTER FINAL GRADES HAVE BEEN ACHIEVED.
B. ADD 3 TONS PER ACRE PULVERIZED AGRICULTURE LIMESTONE (140LB/1000SF).

SEED TYPE RATE MIN. PURITY (%) MIN. GERM.(%)
TALL FESCUE 60 LB./AC. 97 85
RED CLOVER 8 LB./AC. 95 65
LADINO CLOVER 8 LB./AC. 95 65

NURSE GRASS - (SEASON DEPENDENT)
SEPT. 1 - FEB. 15:
ANNUAL RYEGRASS 12 LB./AC. 98 85
WINTER RYE 12 LB./AC. 98 85
MAY 1 - AUG. 31
GERMAN MILLET 12 LB./AC. 98 85
OR
FEB. 16 - APR 30:
ANNUAL RYEGRASS 12 LB./AC. 98 85
MULCH 1.5 TON/AC. SMALL GRAIN STRAW
FERTILIZER 1000 LB/AC 10-10-10

TEMPORARY SEEDING
SEPT. 1 - FEB. 15:
ANNUAL RYEGRASS 50LB./AC. 98 85
WINTER RYE 50LB./AC. 98 85
MAY 1 - AUG. 31:
GERMAN MILLET: 50LB./AC. 98 85
OR
FEB. 16 - APR. 30:
ANNUAL RYEGRASS: 50LB./AC. 98 85
MULCH: 1.5 TON/AC. SMALL GRAIN STRAW
FERTILIZER: 1000 LB./AC. 10-10-10

1. EROSION CONTROL PRACTICES SHALL CONFORM TO THE REQUIREMENTS OF THE WEST VIRGINIA BEST MANAGEMENT PRACTICE MANUAL (2006).
2. ALL PERIMETER SEDIMENT CONTROL DEVICES SHALL BE ERECTED PRIOR TO ANY LAND DISTURBING ACTIVITIES AND SHALL REMAIN IN PLACE UNTIL THE SITE IS FULLY STABILIZED.
3. THE CONTRACTOR SHALL PERFORM OVERLOT GRADING TO PROVIDE POSITIVE DRAINAGE AND PRECLUDE PONDING OF WATER.
4. ALL OFF SITE GRADING AND CONSTRUCTION IS TO BE DONE WITH THE PROPERTY OWNER'S CONSENT.
5. CUT AND FILL SLOPES SHALL BE GRADED AT A MAXIMUM OF TWO HORIZONTAL TO ONE VERTICAL UNLESS OTHERWISE SPECIFIED ON THE PLANS.

No.	Date	Revision
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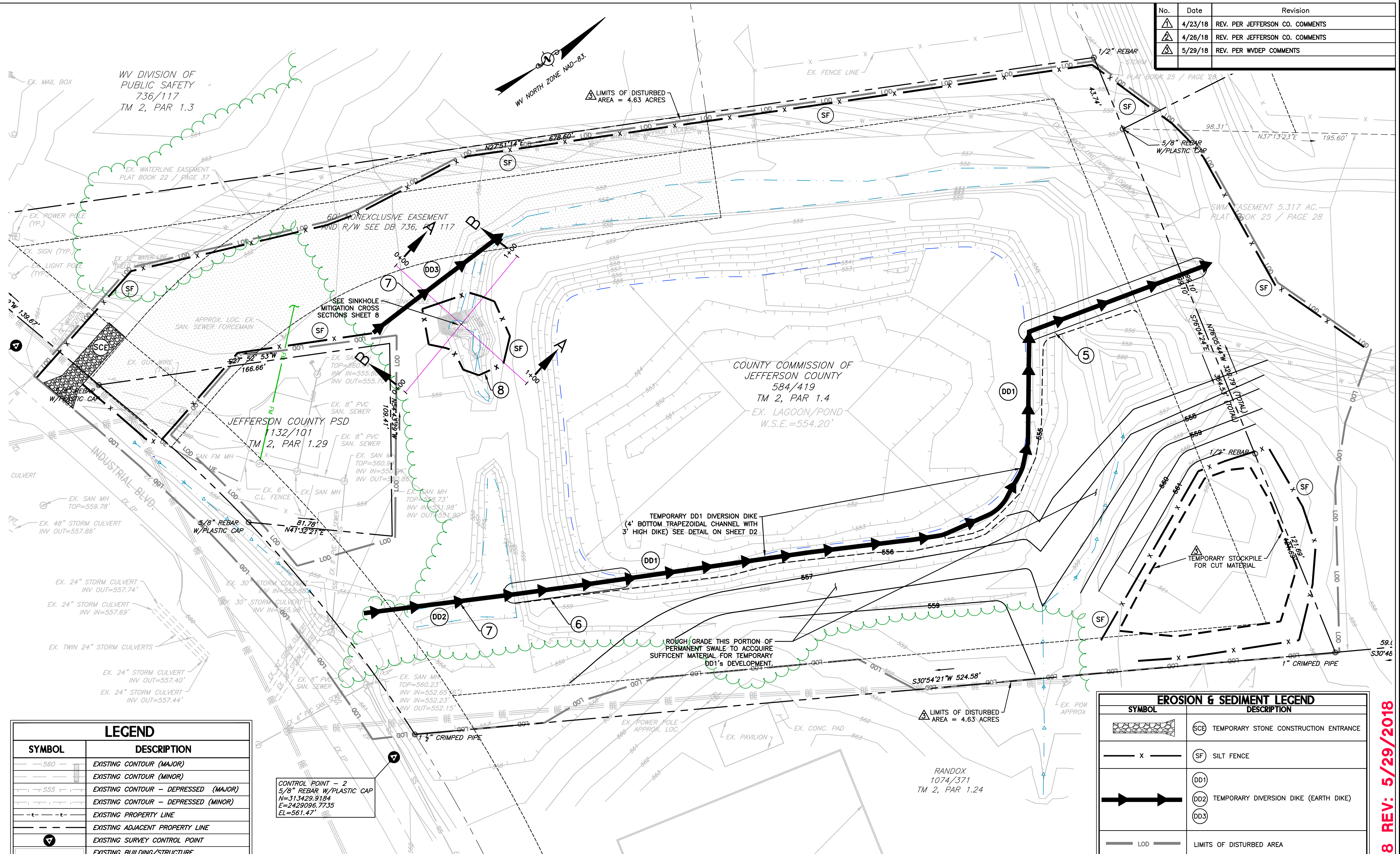

LEGEND

SYMBOL	DESCRIPTION
560	EXISTING CONTOUR (MAJOR)
	EXISTING CONTOUR (MINOR)
555	EXISTING CONTOUR - DEPRESSED (MAJOR)
	EXISTING CONTOUR - DEPRESSED (MINOR)
	EXISTING PROPERTY LINE
	EXISTING ADJACENT PROPERTY LINE
	EXISTING SURVEY CONTROL POINT
	EXISTING BUILDING/STRUCTURE
	EXISTING MAIL BOX
X	EXISTING FENCE LINE
	EXISTING TREE LINE
	EXISTING SIGN
EX. EP	EXISTING EDGE OF PAVEMENT
EX. EOG	EXISTING GRAVEL ROAD (UNPAVED)
	EXISTING DITCH
	EXISTING STREAM OR POND
DI	EXISTING DROP INLET
	EXISTING CULVERT
ST	EXISTING STORM LINE
W	EXISTING WATER LINE
	EXISTING WATER VALVE
SS	EXISTING SANITARY SEWER LINE
	EXISTING SANITARY SEWER MANHOLE
	EXISTING SANITARY SEWER CLEANOUT
	EXISTING LIGHT POLE
	EXISTING UTILITY/POWER POLE
	EXISTING GUY WIRE
OE	EXISTING OVERHEAD ELECTRIC LINE
UE	EXISTING UNDERGROUND ELECTRIC LINE
UT	EXISTING UNDERGROUND TELEPHONE LINE
	EXISTING TELEPHONE PEDESTAL
555	PROPOSED CONTOUR (MAJOR)
556	PROPOSED CONTOUR (MINOR)

CONSTRUCTION NOTES

1. THE CONTRACTOR TO ENSURE A STABILIZED CONSTRUCTION ENTRANCE IS ESTABLISHED AND MAINTAINED DURING THE LIFE OF THE CONSTRUCTION AND EARTH MOVEMENT.
2. THE CONTRACTOR WILL NEED TO FOLLOW THE EROSION & SEDIMENT CONTROL MEASURES, AS STATED ON THIS DESIGN/CONSTRUCTION DRAWING.
3. THE CONTRACTOR SHALL MAINTAIN ALL SILT FENCE, AND STORM WATER BEST MANAGEMENT PRACTICES, INCLUDING SEEDING OF EXPOSED SOILS.
4. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE. ALSO A REPRESENTATIVE OF THE DEVELOPER MUST BE AVAILABLE AT ALL TIMES.
5. THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING MUD FROM TRUCKS AND/OR OTHER EQUIPMENT PRIOR TO ENTERING PUBLIC STREETS, AND IT IS THE CONTRACTORS RESPONSIBILITY TO CLEAN STREETS, ALLAY DUST, AND TO TAKE WHATEVER MEASURES ARE NECESSARY TO INSURE THAT THE STREETS ARE MAINTAINED IN A CLEAN, MUD AND SILT FREE CONDITION AT ALL TIMES.
6. THE LOCATIONS OF EXISTING UTILITIES SHOWN IN THESE PLANS ARE TAKEN FROM EXISTING RECORDS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES AS NEEDED PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ENGINEER OF ANY CONFLICTS ARISING FROM HIS EXISTING UTILITY VERIFICATION AND THE PROPOSED CONSTRUCTION.
7. THE CONTRACTOR IS TO VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION AND NOTIFY POTESTA ENGINEERING AT (540) 450-0180 IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THE APPROVED PLAN.
8. CONTROLLED FILLS SHALL BE COMPACTED IN 8" LIFTS TO 95% OF MAXIMUM DENSITY AS DETERMINED BY METHOD "A" PER STANDARD PROTOCOL ASHTO-T99 AND ASTM-D698. EACH 8" LIFT SHALL BE TESTED TO DETERMINE THAT ADEQUATE COMPACTION HAS BEEN ACHIEVED PRIOR TO PLACEMENT OF ADDITIONAL FILL LIFTS.
9. CONTRACTORS SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATING OR BLASTING AT LEAST TWO (2) WORKING DAYS, BUT NOT MORE THAN TEN (10) WORKING DAYS, PRIOR TO COMMENCEMENT OF EXCAVATION OR DEMOLITION.
10. OWNER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL DISCHARGE IN ACCORDANCE WITH COUNTY & STATE REGULATIONS.
11. EXCAVATION OF SOIL SHALL BE AT A MAXIMUM SLOPE OF 2:1. BEDROCK MAY BE EXCAVATED AT SLOPES NOT GREATER THAN 1.5:1.

EROSION & SEDIMENT LEGEND

SYMBOL	DESCRIPTION
	(SCE) TEMPORARY STONE CONSTRUCTION ENTRANCE
—— X ——	(SF) SILT FENCE
	(DD1) (DD2) (DD3) TEMPORARY DIVERSION DIKE (EARTH DIKE)
LOD	LIMITS OF DISTURBED AREA

SEQUENCE OF CONSTRUCTION

1. INSTALL STABILIZED CONSTRUCTION ENTRANCE.
2. CLEAR & GRUB FOR E&S MEASURES ONLY AND INSTALL PERIMETER E&S MEASURES AND SILT FENCE AROUND SINKHOLE.
3. DEWATER LAGOON. DEMOLISH & REMOVE PUMP HOUSE AND FORMER IRRIGATION/LAGOON STRUCTURES. (SEE EXISTING CONDITIONS & DEMOLITION PLAN SHEET 3)
4. BUILD TEMPORARY STORMWATER RUNOFF DIVERSION CHANNEL TO REROUTE FLOW FROM SINKHOLE.
5. CONSTRUCT A TEMPORARY OPENING FOR DD1 IN THE LAGOON'S NORTHERN BERM TO 504' ELEVATION DURING DEVELOPMENT OF DD1. CUT MATERIAL TO BE USED FOR DEVELOPMENT OF TEMPORARY DD1.
6. CONSTRUCT A TEMPORARY OPENING FOR DD1 IN THE LAGOON'S SOUTHERN BERM TO 506' ELEVATION AFTER STABILIZATION OF DD1.
7. INSTALL DD2 AFTER DD1 IS STABILIZED AND THE LAGOON BERM IS OPENED. AND INSTALL DD3 DIVERSION DIKE PRIOR TO SINKHOLE MITIGATION AROUND SINKHOLE TO DIRECT RUNOFF AWAY FROM SINKHOLE.
8. REMEDIATE SINKHOLE.

FOR CONTINUATION OF SEQUENCE OF CONSTRUCTION SEE NOTES 9 THRU 12 ON SHEET 5.

MAPPING REFERENCE:
INFORMATION SHOWN HEREON WAS PRODUCED FROM INFORMATION COLLECTED BY POTESTA FIELD CREW DURING JANUARY 15-19, 2018. HORIZONTAL AND VERTICAL CONTROL WAS ESTABLISHED UTILIZING GPS O.P.U.S. SOLUTION TAKEN ON SITE. HORIZONTAL DATUM - WV NORTH ZONE NAD-83, VERTICAL DATUM - NAVD-88. CONTOUR INTERVAL = 1'.

ISSUED: 4/2/2018 REV: 5/29/2018

SH-ES — CAD File No.
CJM — Drawn
KJK — Checked
KJK — Approved
1"=30' — Scale:
MARCH 2018 — Date:
17-0430 — Project No.

POTESTA & ASSOCIATES, INC.
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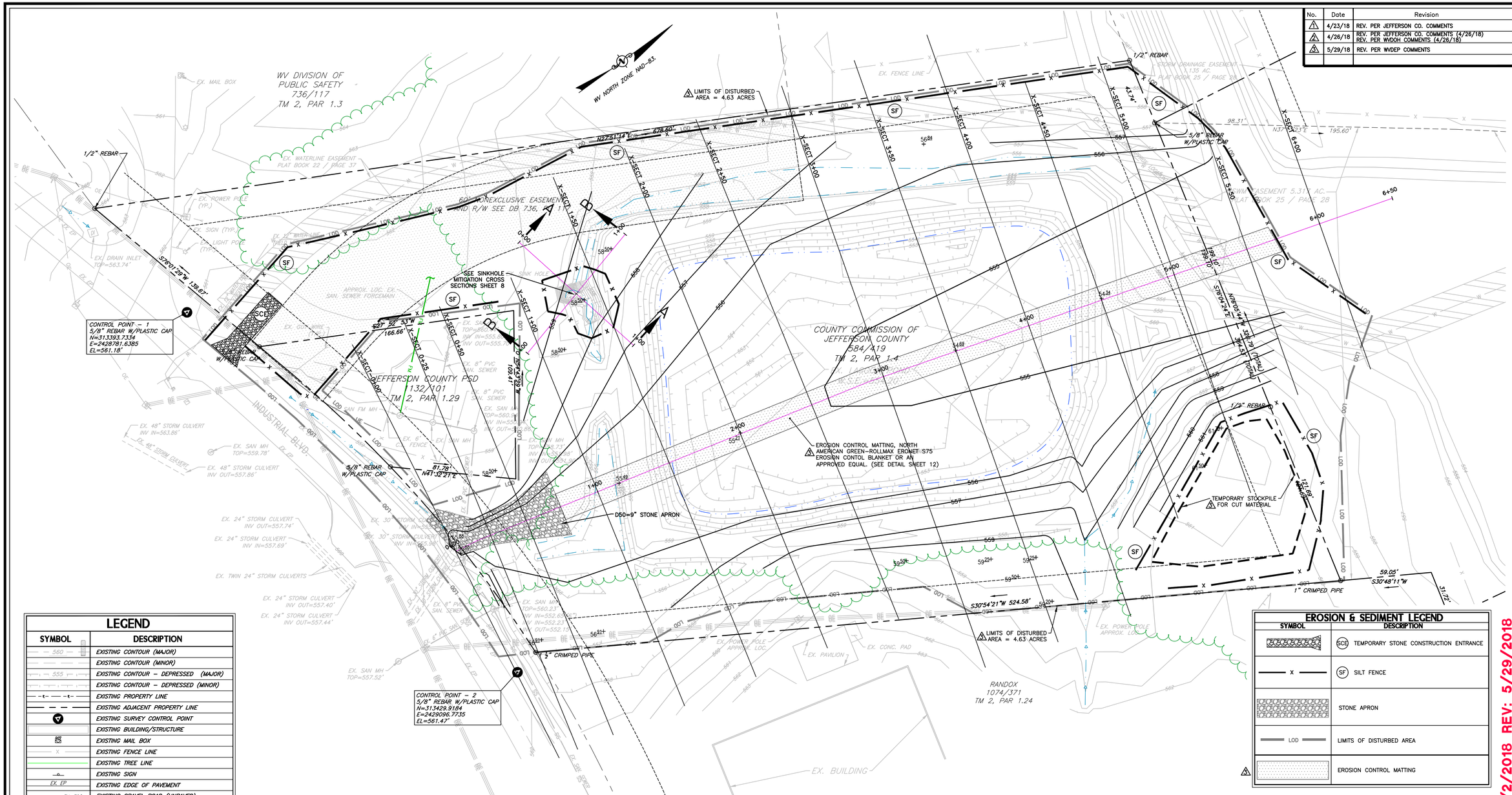
Client: COUNTY COMMISSION OF JEFFERSON COUNTY, 116 EAST WASHINGTON STREET, SUITE 100, CHARLES TOWN, WEST VIRGINIA 25414

Title: SINKHOLE REMEDIATION AND EROSION & SEDIMENT CONTROL PLAN
WWTP LAGOON DECOMMISSION AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

Drawing No. 4

No.	Date	Revision
1	4/23/18	REV. PER JEFFERSON CO. COMMENTS
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS (4/26/18) REV. PER WVDOH COMMENTS (4/26/18)
3	5/29/18	REV. PER WVDEP COMMENTS



LEGEND

SYMBOL	DESCRIPTION
560	EXISTING CONTOUR (MAJOR)
	EXISTING CONTOUR (MINOR)
555	EXISTING CONTOUR - DEPRESSED (MAJOR)
	EXISTING CONTOUR - DEPRESSED (MINOR)
-t- -t-	EXISTING PROPERTY LINE
	EXISTING ADJACENT PROPERTY LINE
	EXISTING SURVEY CONTROL POINT
	EXISTING BUILDING/STRUCTURE
MB	EXISTING MAIL BOX
X	EXISTING FENCE LINE
	EXISTING TREE LINE
-o-	EXISTING SIGN
EX. EP	EXISTING EDGE OF PAVEMENT
EX. EOG	EXISTING GRAVEL ROAD (UNPAVED)
	EXISTING DITCH
	EXISTING STREAM OR POND
DI	EXISTING DROP INLET
	EXISTING CULVERT
ST	EXISTING STORM LINE
W	EXISTING WATER LINE
	EXISTING WATER VALVE
SS	EXISTING SANITARY SEWER LINE
S	EXISTING SANITARY SEWER MANHOLE
	EXISTING SANITARY SEWER CLEANOUT
	EXISTING LIGHT POLE
PP	EXISTING UTILITY/POWER POLE
	EXISTING GUY WIRE
OE	EXISTING OVERHEAD ELECTRIC LINE
UE	EXISTING UNDERGROUND ELECTRIC LINE
UT	EXISTING UNDERGROUND TELEPHONE LINE
TP	EXISTING TELEPHONE PEDESTAL
555	PROPOSED CONTOUR (MAJOR)
556	PROPOSED CONTOUR (MINOR)

EROSION & SEDIMENT LEGEND

SYMBOL	DESCRIPTION
SCE	TEMPORARY STONE CONSTRUCTION ENTRANCE
SF	SILT FENCE
	STONE APRON
LOD	LIMITS OF DISTURBED AREA
3	EROSION CONTROL MATTING

NOTES:

3 TRAFFIC CONTROL
WORK ZONE CASE A4 TO BE USED FROM MANUAL ON TEMPORARY TRAFFIC CONTROL FOR STREETS AND HIGHWAYS. SEE DETAIL SHEET D3.

LAGOON DEWATERING
IT IS REQUIRED THAT THE LAGOON BE DEWATERED USING A SYSTEM OF PUMPS AND HOSES TO REMOVE WATER FROM THE LAGOON IN A CONTROLLED MANNER AND DIRECT WATER TO THE EXISTING DRAINAGE SWALE DOWNSTREAM OF THE LAGOON.

THE DISCHARGE SHALL BE MONITORED CONTINUOUSLY DURING DISCHARGE, AT THE DISCHARGE POINT AT THE STORM WATER DRAINAGE SWALE, AND AT POINTS DOWNSTREAM OF THE DISCHARGE, TO ENSURE NO FLOODING, EROSION, OR OTHER ISSUES OCCUR.

FOR FURTHER DETAIL, SEE SECTION 16.0, "LAGOON DEWATERING" AND APPENDIX B OF THE TECHNICAL SPECIFICATIONS,"WWTP LAGOON DECOMMISSION, SWALE DEVELOPMENT, AND SINKHOLE REMEDIATION JEFFERSON COUNTY, WEST VIRGINIA", DATED 4/23/2018.

3 OFF-SITE BORROW STOCKPILE
LOCATION AND E&S MEASURES FOR OFF-SITE BORROW STOCKPILE CAN BE FOUND ON DETAIL SHEET D3.

SEQUENCE OF CONSTRUCTION CONTINUED FROM SHEET 4

9. CLEAR & GRUB REMAINDER OF SITE.
10. GRADE SWALE, REMOVING DIVERSION DIKES.
11. STABILIZE LAND DISTURBANCE AREAS.
12. REMOVE E&S MEASURES ONCE STABILIZED.

RICHARD S. KNECHTEL REGISTERED 17338 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 5/29/18

GRAPHIC SCALE
30 15 0 30 60

MAPPING REFERENCE:
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SWALE PLAN
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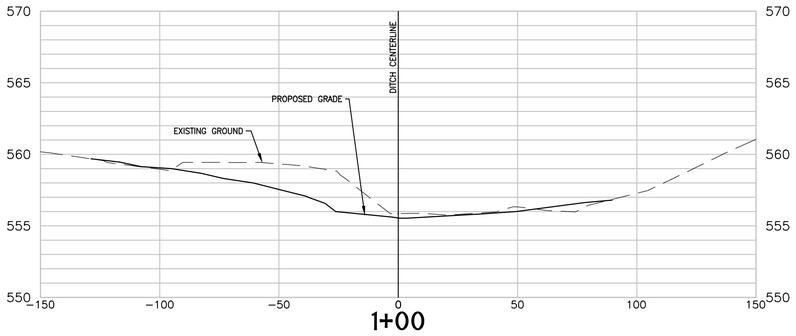
Title
SWALE AND EROSION & SEDIMENT CONTROL PLAN
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
INDUSTRIAL BLVD. AREA
JEFFERSON COUNTY, WEST VIRGINIA

5
Drawing No.

File: T:\2017\17-0430 - Jefferson Co-Lagoon-Sinkhole\17-0430_DESIGN.dwg
Plot Date/Time: May 29, 2018 - 11:58am
Plotted By: cmowbray

No.	Date	Revision
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS



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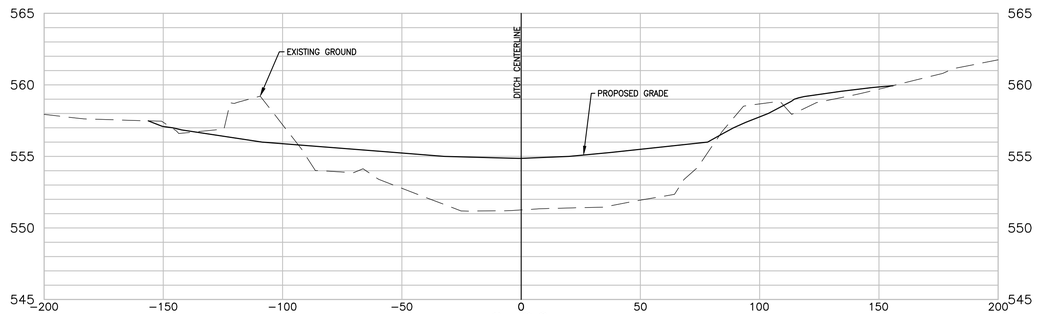

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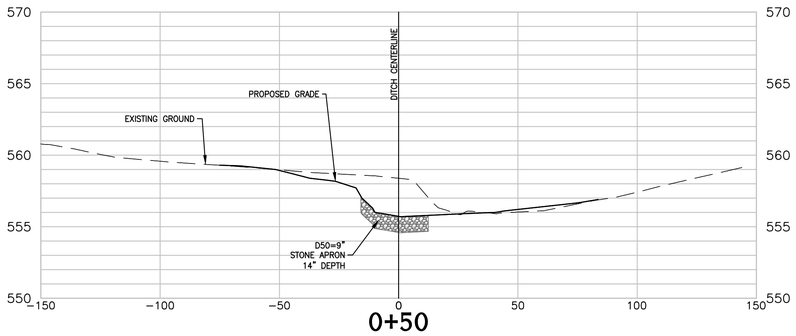

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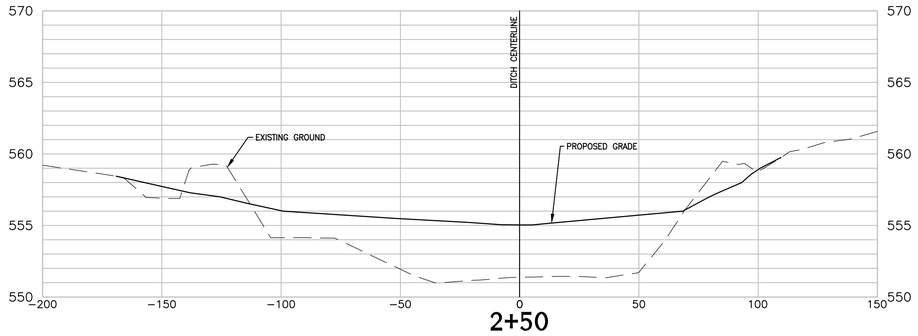

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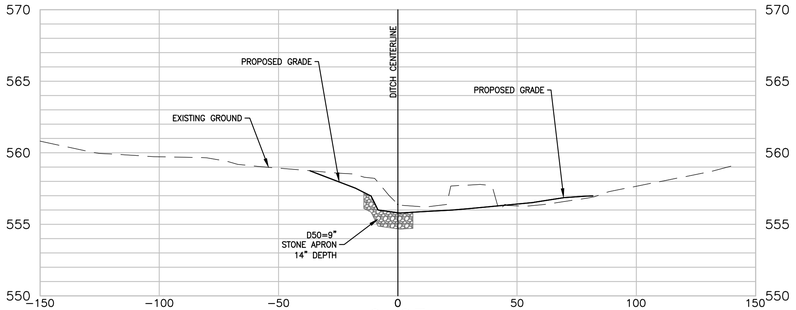

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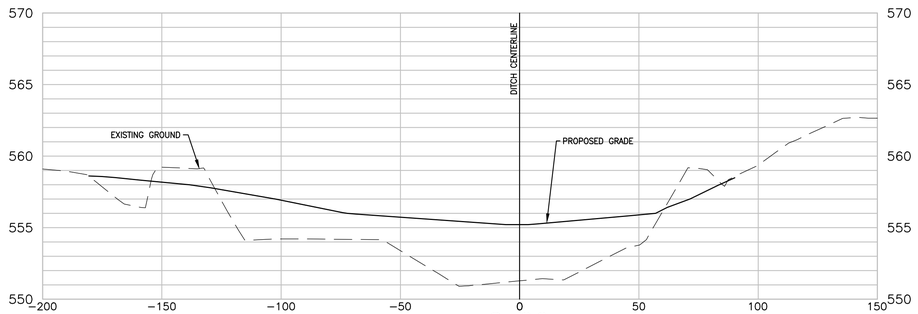

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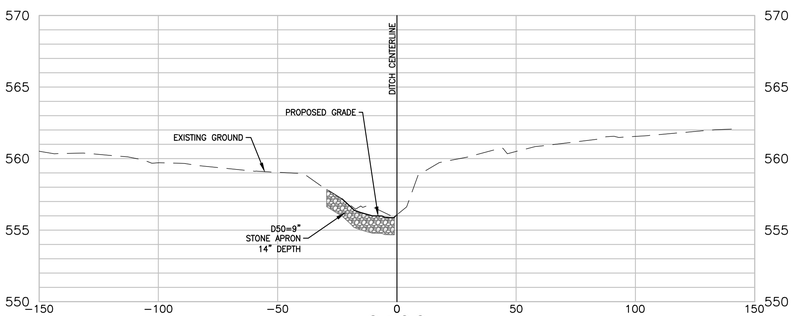

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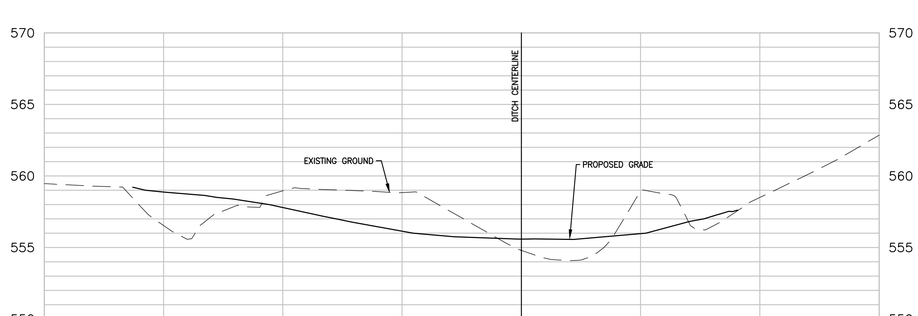

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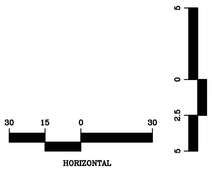

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X-SECTION
CAD File No.

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KJK
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KJK
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NOTED
Scale:

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116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
SWALE CROSS SECTIONS
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

6
Drawing No.

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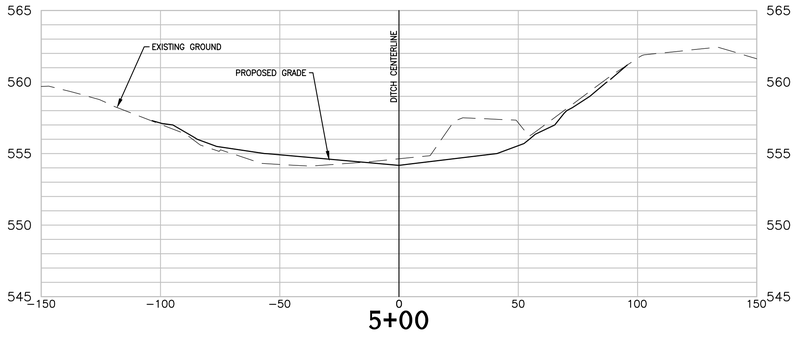
Plotted By: mmoore



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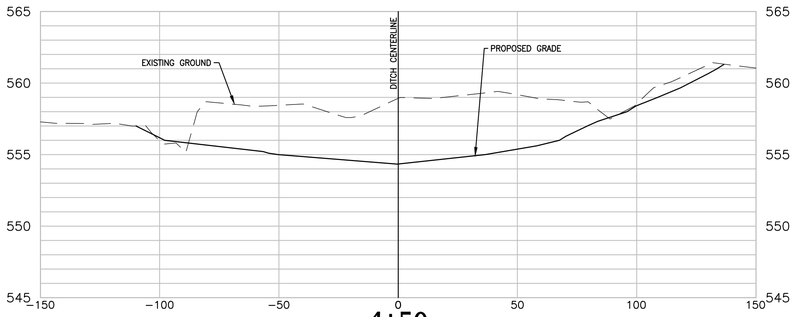

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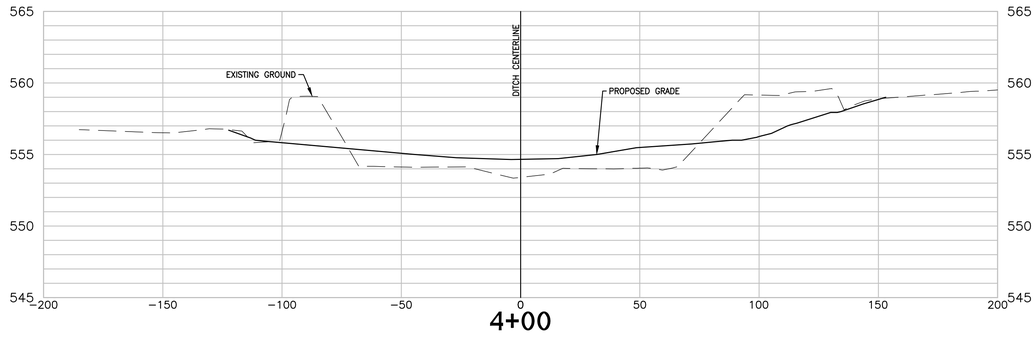

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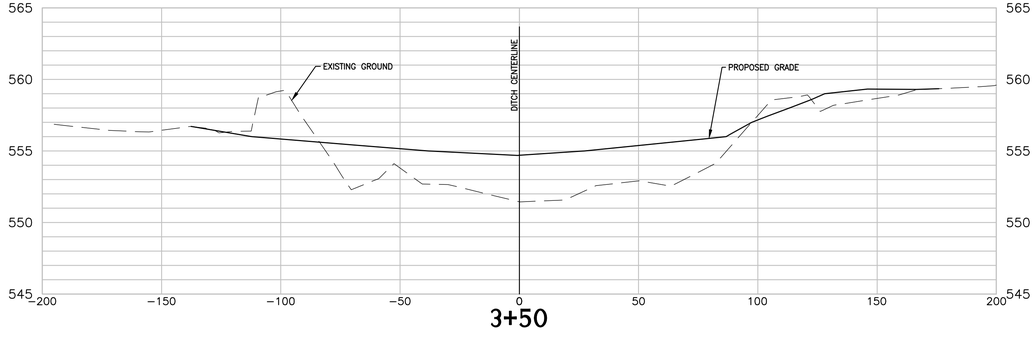

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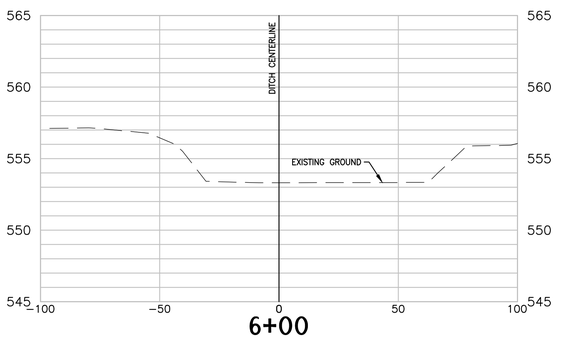

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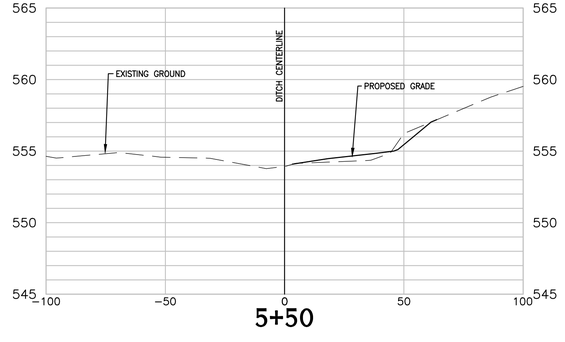

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No.	Date	Revision
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS

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ISSUED: 4/2/2018 REV. 4/26/2018

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CHARLES TOWN, WEST VIRGINIA 25414

Title
SWALE CROSS SECTIONS
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

7
Drawing No.

KEVIN J. KOBETITSCH
REGISTERED
17388
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER
4/26/18

HORIZONTAL: 30 15 0 30
VERTICAL: 5 0 2.5 5

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Plot Date/Time: May 29, 2018 - 11:52am
Plot By: cmowbray

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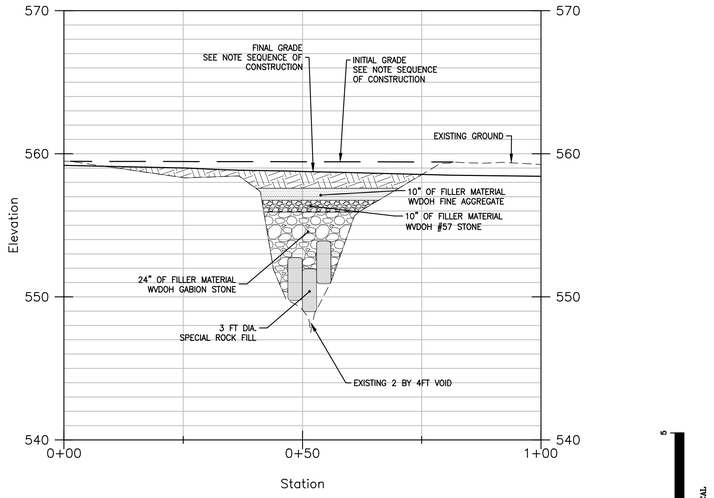
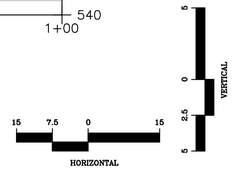
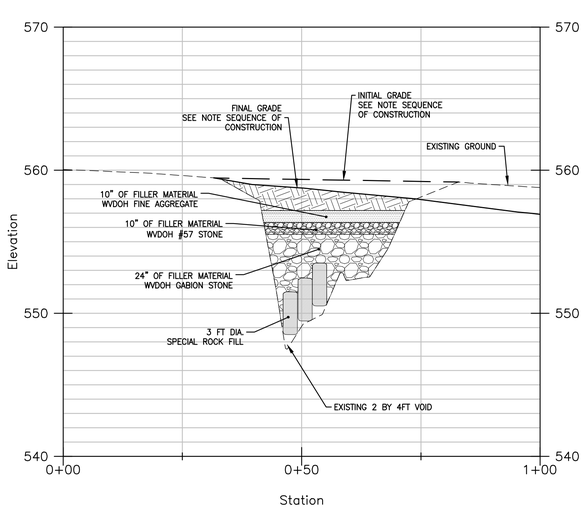
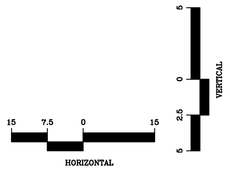


SINKHOLE SECTION B–B





SINKHOLE SECTION A–A



SINKHOLE MITIGATION SPECIFICATIONS (DRAINAGE AREAS LESS THAN 5 ACRES

1. REMOVE AND PROPERLY DISPOSE OF MATERIALS DUMPED IN AND AROUND THE SINKHOLE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS.

2. EXCAVATE LOOSE MATERIAL THE SINKHOLE AND TRY TO EXPOSE THE SOLUTION VOID(S) IN THE BOTTOM. ENLARGE THE SINKHOLE, AS NECESSARY, TO ALLOW FOR INSTALLATION OF THE FILTER MATERIAL.

3. SELECT STONE THAT IS APPROXIMATELY 1.5 TIMES LARGER THAN THE SOLUTION VOID(S). PLACE THE STONE INTO THE VOID(S) FORMING A COMPETENT BRIDGE. STONE USED FOR THE BRIDGE SHOULD HAVE ROCK STRENGTH EQUAL TO, AT EAST, MODERATELY HARD (E.G., RESISTANT TO ABRASION OR CUTTING BY A KNIFE BLADE BUT CAN BE EASILY DENTED OR BROKEN BY LIGHT BLOWS WITH A HAMMER). SHALE OR SIMILAR SOFT AND NON–DURABLE ROCK IS NOT ACCEPTABLE.

4. PLACE A LAYER OF FILTER MATERIAL OVER THE BRIDGE TO A MINIMUM THICKNESS OF 24 INCHES. APPROXIMATELY 35 PERCENT OF THE MATERIAL SHOULD BE LARGER THAN THE OPENING BETWEEN THE BRIDGE AND THE VOID(S). THERE SHOULD BE NO DISCERNABLE LARGE OPENINGS AROUND THE BRIDGE. THE MATERIAL SHOULD BE EITHER GABION STONE, STONE FOR RIP RAP, OR STONE FOR SPECIAL ROCK FILL THAT CONFORMS TO WEST VIRGINIA DEPARTMENT OF HIGHWAYS, STANDARD SPECIFICATION ROADS AND BRIDGES, SECTION 704.

5. PLACE A LAYER OF SMALLER SIZE FILTER MATERIAL OVER THE PREVIOUS LAYER TO A MINIMUM THICKNESS OF 10 INCHES. THE SIZE OF THE MATERIAL SHOULD BE ¼ TO ½ THE SIZE OF THAT USED IN THE PREVIOUS LAYER. THE MATERIAL SHOULD BE NO. 57 AGGREGATE, WHICH CONFORMS TO WEST VIRGINIA DEPARTMENT OF HIGHWAYS, STANDARD SPECIFICATIONS ROADS AND BRIDGES, SECTIONS 703.1.1, 703.1.2, 703.1.3, 704.1.4, AND 703.2.1. UNACCEPTABLE FILTER MATERIAL CONSISTS OF PEA GRAVEL OR SLAGS (STEEL, ELECTROMAGNETIC, OR POWER PLANT).

6. PLACE A LAYER OF SAND–SIZED FILTER MATERIAL OVER THE PREVIOUS LAYER AT TO A MINIMUM THICKNESS OF 10 INCHES. THE SAND MUST BE COMPATIBLE IN SIZE WITH THE PREVIOUS LAYER TO PREVENT PIPING. THE MATERIAL SHOULD BE FINE AGGREGATE THAT CONFORMS TO WEST VIRGINIA DEPARTMENT OF HIGHWAYS,STANDARD SPECIFICATION ROADS AND BRIDGES, SECTIONS 702.1.1, 702.1.2, AND 702.1.3.

7. ENGINEERING FABRIC CONFORMING TO AASHTO M 288 MAY BE SUBSTITUTED FOR THE STONE AND SAND FILTER MATERIALS DISCUSSED IN 5 AND 6.

8. BACKFILL OVER THE TOP FILTER LAYER OR ENGINEERING FABRIC WITH SOIL MATERIAL TO THE SURFACE. THIS SHOULD BE MINERAL SOIL WITH AT LEAST 12 PERCENT FINES. REUSE SOIL MATERIAL EXCAVATED FROM THE SINKHOLE AS MUCH AS POSSIBLE AND PLACE ANY AVAILABLE TOPSOIL OVER THE BACKFILL. OVERFILL BY ABOUT 5 PERCENT TO ALLOW FOR SETTLING.

9. ESTABLISH VEGETATION ON THE MITIGATED SINKHOLE AND OTHER DISTURBED AREAS OF THE SITE. THE SINKHOLE SHOULD BE INSPECTED AFTER PERIODS OF HEAVY PRECIPITATION BECAUSE SOME MATERIAL MAY RUN INTO ADJACENT SINKHOLE VOIDS CAUSING A SURFACE DEPRESSION. IN THIS CASE, MAINTENANCE WILL INCLUDE ADDING SOIL MATERIAL AT THE SURFACE. THE EXISTING LAND USE OR PRACTICE MAY CONTINUE OVER THE TREATED SINKHOLE AS LONG AS THE TREATMENT IS MAINTAINED.

ISSUED: 4/2/2018 REV. 4/26/2018

SINKHOLE-DET
CAD File No.

CJM
Drawn

KJK
Checked

KJK
Approved

NOTED
Scale:

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Title
SINKHOLE DETAILS
WWTP LAGOON DECOMMISSION
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BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

8
Drawing No.

File: T:\2017\17-0430 - Jefferson Co-Lagoon-Sinkhole\17-0430_DESIGN.dwg
Plot Date/Time: May 29, 2018 - 11:53am
Plot By: cmowbray

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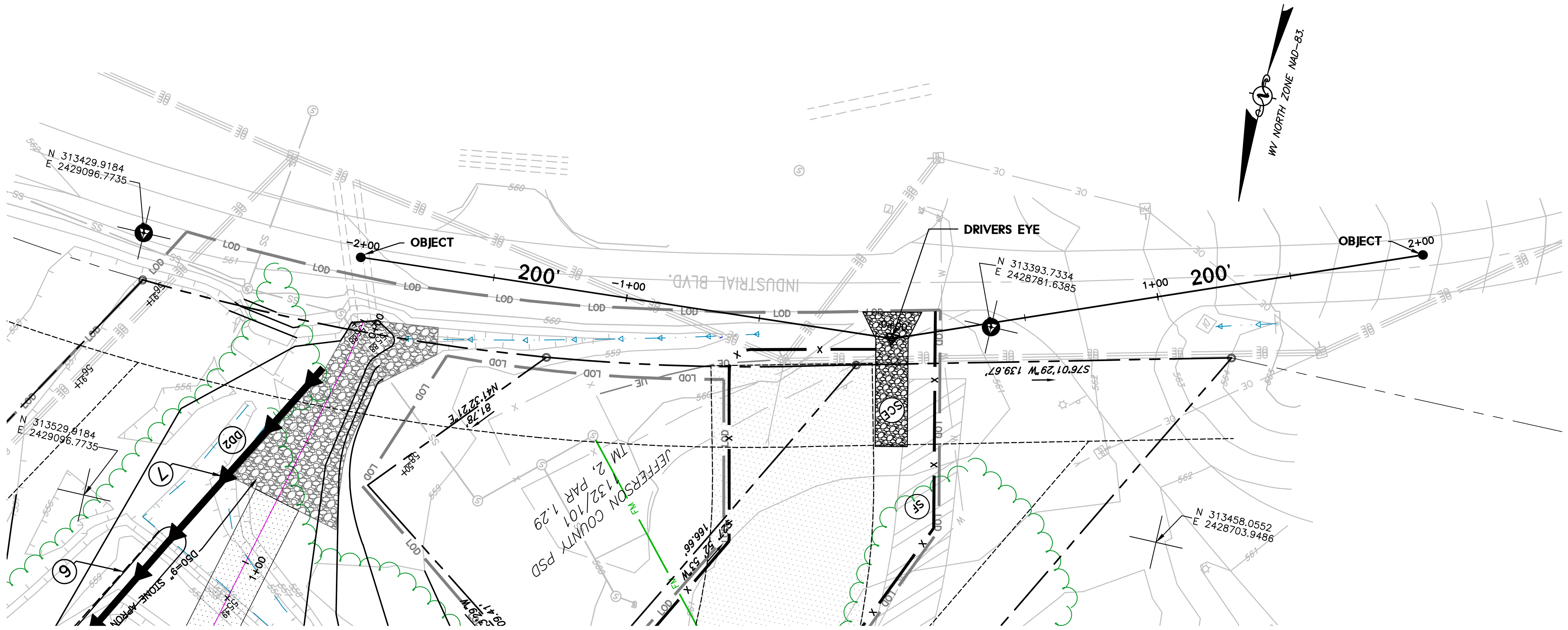
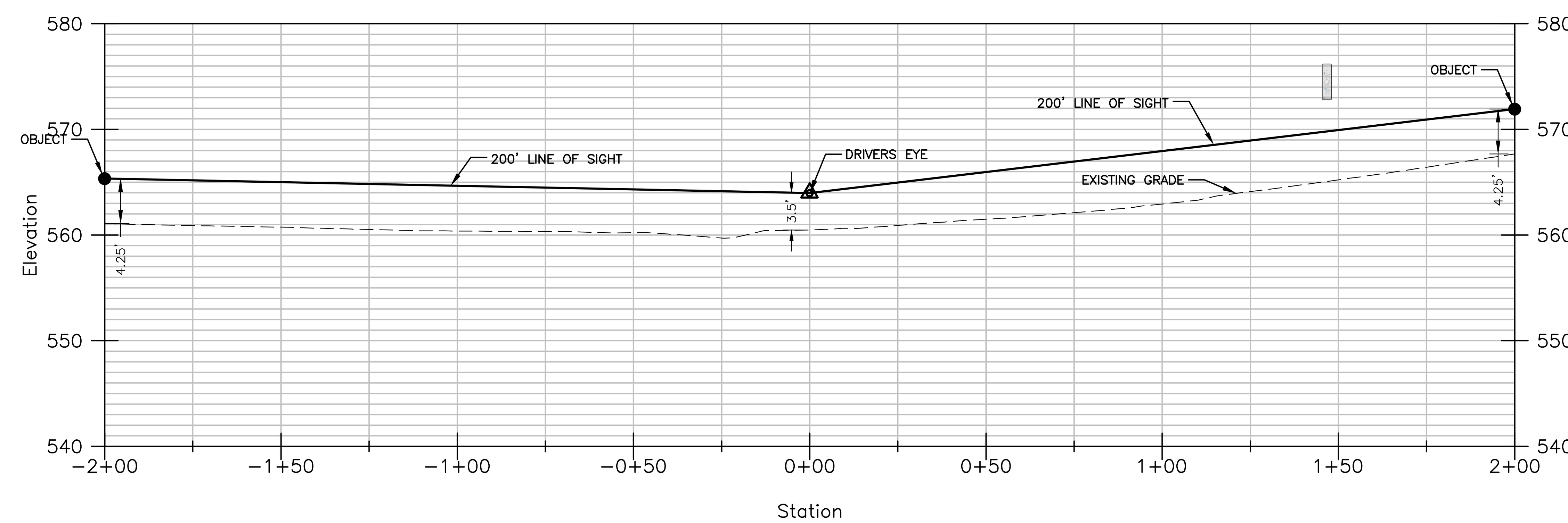


INDUSTRIAL BLVD.

POSTED SPEED 30 MPH

GRAPHIC SCALE 30 15 0 30 60



SIGHT DISTANCE - INDUSTRAIL BLVD.

VERTICAL 10 5 0 10

HORIZONTAL 30 15 0 30

X-SECTION
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ISSUED: 4/26/2018

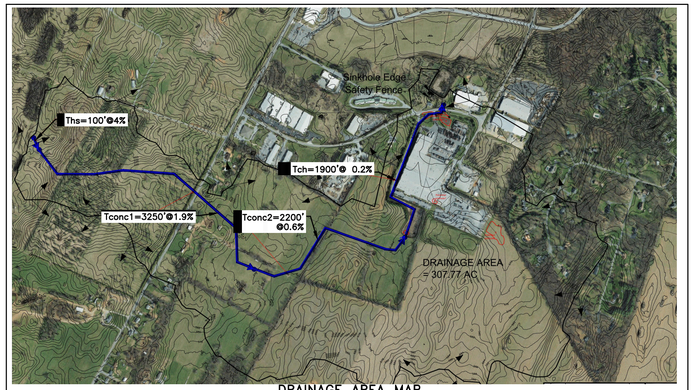
Client
COUNTY COMMISSION OF JEFFERSON COUNTY
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
SIGHT DISTANCE PLAN & PROFILE
WWTP LAGOON DECOMMISSION AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

KEVIN J. KOONTZ REGISTERED 17338 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 4/26/18

9
Drawing No.

No.	Date	Revision
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS



DRAINAGE AREA MAP
NO SCALE

WinTR-55 Current Data Description

--- Identification Data ---

User: KJK
Project: Lagoon
SubTitle:
State: West Virginia
County: Jefferson NOAA
Filename: J:\KJKnechtel\2017\17-0430 - Jefferson Co - Lagoon, Sinkhole\Lagoon.w55

Date: 3/20/2018
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
upstream	307.8	Outlet	307.77	73	1.469

Total area: 307.77 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	.1-Yr (in)
2.4	2.86	4.17	5.04	5.78	6.57	1.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

Storm Data

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	.1-Yr (in)
2.4	2.86	4.17	5.04	5.78	6.57	1.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 2-Yr (cfs)	10-Yr (cfs)	25-Yr (cfa)
SUBAREAS			
upstream	86.16	202.49	291.13
REACHES			
OUTLET	86.16	202.49	291.13

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)	10-Yr (cfs) (hr)	25-Yr (cfa) (hr)
SUBAREAS			
upstream	86.16 12.85	202.49 12.88	291.13 12.80
REACHES			
OUTLET	86.16	202.49	291.13

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
upstream	307.77	1.469	73	Outlet	307.8

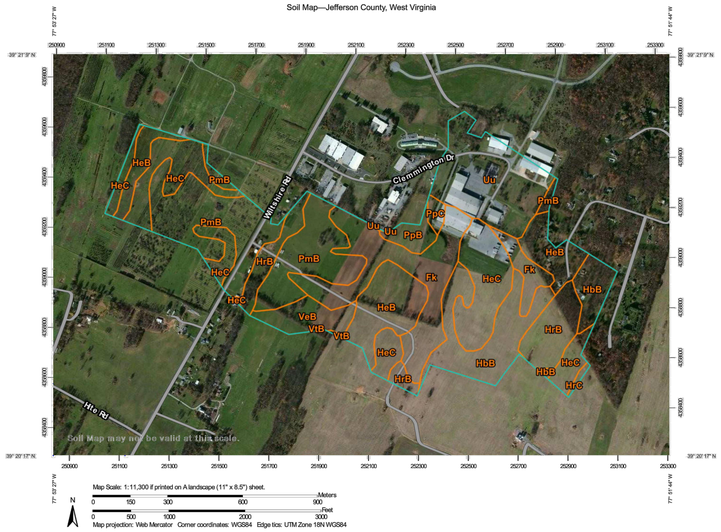
Total Area: 307.77 (ac)

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
upstream							
SHEET	100	0.0400	0.130				0.117
SHALLOW	3250	0.0190	0.050				0.406
SHALLOW	2200	0.0060	0.050				0.489
CHANNEL	1900	0.0020	0.030	1.50	4.00	1.155	0.457
					Time of Concentration		1.469

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
upstream	Industrial	D	21.77	93
	Legume/Rot. Meadow Contoured	(good) B	218.5	69
	Legume/Rot. Meadow Contoured	(good) C	67.5	78
	Total Area / Weighted Curve Number		307.77	73



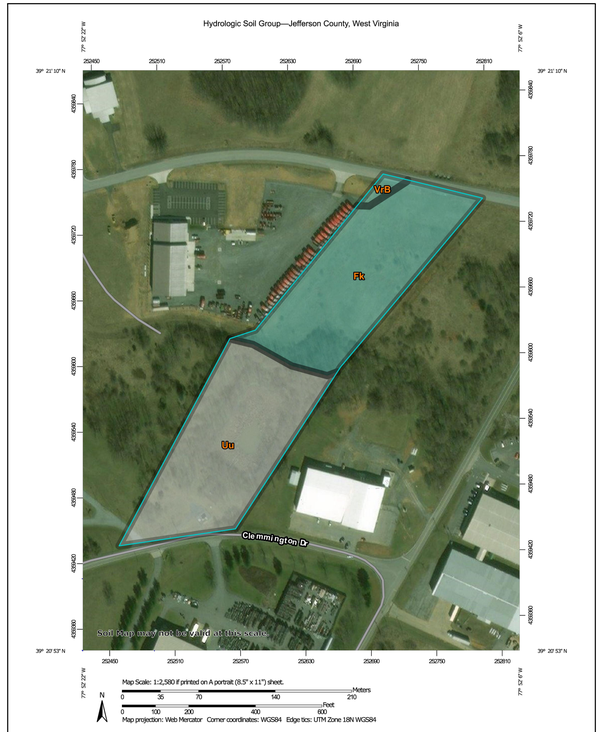
Drainage Area for Swale

This drainage area to the twin 30 inch CMP culverts and proposed drainage swale is approximately 307.8 acres. The soils (Source - United States Department of Agriculture - Soil Conservation Service, *"Natural Resources Conservation Service, Web Soil Survey 1.1, National Cooperative Soil Survey"*) are:

Map unit symbol	Map unit name	Rating	% in AOI
Fk	Funkstown silt loam, 3 to 8 percent slopes	C	12
HbB	Hagerstown silt loam, 3 to 8 percent slopes, very rocky	B	13
HeB	Hagerstown silt loam	B	12
HeC	Hagerstown silt loam	B	19
HrB	HrB Hagerstown-Rock outcrop complex, 3 to 8 percent slopes	B	6
HrC	Hagerstown -Rock outcrop complex, 8 to 15 percent slopes	B	1
PmB	Poplimento silt loam, 3 to 8 percent slopes	B	17
PpB	Poplimento silt loam, 3 to 8 percent slopes, very rocky	B	2
PpC	Poplimento silt loam, 8 to 15 percent slopes, very rocky	B	1
Uni	Urban land-Udorthents		11
VeB	Vertrees silt loam, 3 to 8 percent slopes	C	3
ViB	Vertrees-Rock outcrop complex, 3 to 8 percent slopes	C	3
		Summary	**29% C 71% B**

The conditions are as follows:

- 67.5ac Cultivated Agricultural Land-Meadow (Contoured), Soils Group C in good condition, CN of 78
- 218.5ac Cultivated Agricultural Land-Meadow (Contoured), Soils Group B in good condition, CN of 69
- 21.7 ac Industrial District, CN assumed = 93



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Fk	Funkstown silt loam	C	4.2	48.3%
Uu	Urban land-Udorthents		4.3	50.2%
VrB	Vertrees silt loam, 3 to 8 percent slopes, very rocky	C	0.1	1.6%
Totals for Area of Interest			**8.6**	**100.0%**

ISSUED: 4/2/2018 REV. 4/26/2018

SW-DET-D1
CAD File No.

CJM
Drawn

KJK
Checked

KJK
Approved

NOTED
Scale:

MARCH 2018
Date:

17-0430
Project No.

POTESTA & ASSOCIATES, INC.
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POTESTA

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Title
STORMWATER CALCULATIONS & DETAILS
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

D1
Drawing No.

File: I:\2017\17-0430 - Jefferson Co-Lagoon-Sinkhole\17-0430_SWM.dwg
Plot Date/Time: May 29, 2018 - 11:44am
Plotted By: cmowbray

X-sect 0+25 (25yr = 292cfs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00330	ft/ft
Discharge	292.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
-0+50	559.00
-0+27	558.00
-0+13	557.00
-0+08	556.00
0+00	555.79
0+24	556.00
0+76	557.00
1+10	558.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+50, 559.00)	(1+10, 558.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	1.63	ft
Elevation Range	555.79 to 559.00 ft	
Flow Area	105.19	ft²
Wetted Perimeter	109.17	ft
Hydraulic Radius	0.96	ft

X-sect 0+25 (25yr = 292cfs)

Results

Top Width	109.04	ft
Normal Depth	1.63	ft
Critical Depth	1.18	ft
Critical Slope	0.01478	ft/ft
Velocity	2.78	ft/s
Velocity Head	0.12	ft
Specific Energy	1.75	ft
Froude Number	0.50	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.63	ft
Critical Depth	1.18	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.01478	ft/ft

X-sect 0+50 (25yr = 292cfs)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00330	ft/ft
Discharge	292.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
-0+53	559.00
-0+25	558.00
-0+16	557.00
-0+10	556.00
0+00	555.73
0+36	556.00
0+89	557.00
1+15	558.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(-0+53, 559.00)	(1+15, 558.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	1.50	ft
Elevation Range	555.73 to 559.00 ft	
Flow Area	106.70	ft²
Wetted Perimeter	113.14	ft
Hydraulic Radius	0.94	ft

X-sect 0+50 (25yr = 292cfs)

Results

Top Width	113.02	ft
Normal Depth	1.50	ft
Critical Depth	1.08	ft
Critical Slope	0.01500	ft/ft
Velocity	2.74	ft/s
Velocity Head	0.12	ft
Specific Energy	1.62	ft
Froude Number	0.50	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.08	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.01500	ft/ft

DD-1 (2yr 87cfs_

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00330	ft/ft
Discharge	87.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	558.00
0+02	557.00
0+04	556.00
0+06	555.00
0+10	555.00
0+14	556.00
0+18	557.00
0+22	558.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 558.00)	(0+22, 558.00)	0.030

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	2.30	ft
Elevation Range	555.00 to 558.00 ft	
Flow Area	25.08	ft²
Wetted Perimeter	18.63	ft
Hydraulic Radius	1.35	ft

DD-1 (2yr 87cfs_

Results

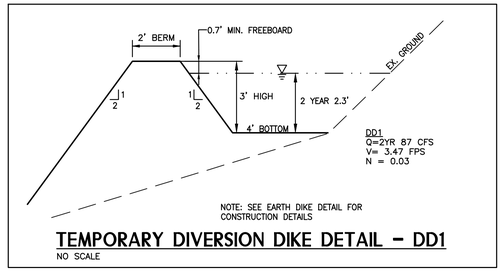
Top Width	17.80	ft
Normal Depth	2.30	ft
Critical Depth	1.66	ft
Critical Slope	0.01357	ft/ft
Velocity	3.47	ft/s
Velocity Head	0.19	ft
Specific Energy	2.49	ft
Froude Number	0.52	
Flow Type	Subcritical	

GVF Input Data

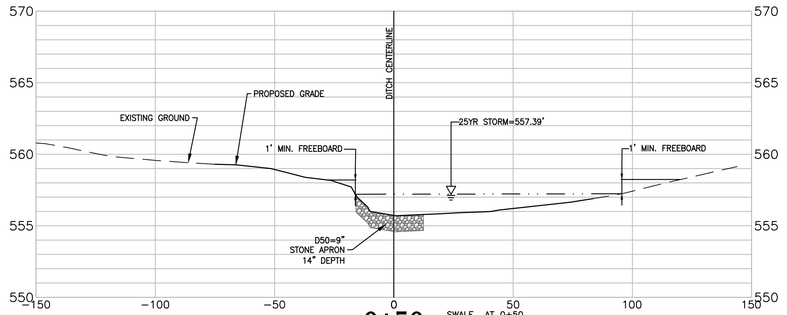
Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	2.30	ft
Critical Depth	1.66	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.01357	ft/ft

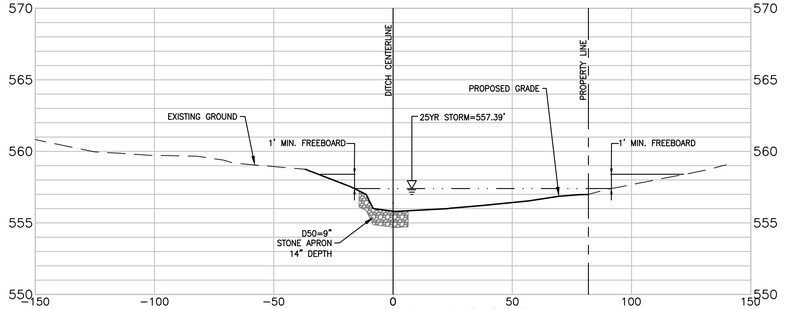


TEMPORARY DIVERSION DIKE DETAIL - DD1
NO SCALE



0+50

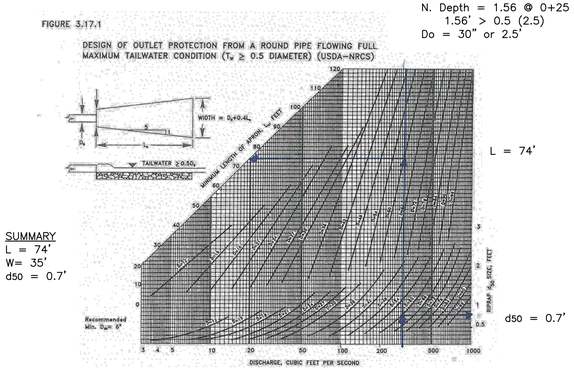
SWALE AT 0+50
SLOPE = 0.3%,
N = 0.03
SIDE SLOPES: VARIES>3:1
FLOW = 292CFS
MAXIMUM VELOCITY AT STA 0+25 = 2.74FPS < 5 FPS =>
OK FOR SOLID SOD
NORMAL DEPTH AT STA 0+25 = 1.50 FT



0+25

SWALE AT 0+25
SLOPE = 0.3%,
N = 0.03
SIDE SLOPES: VARIES>3:1
FLOW = 292CFS
MAXIMUM VELOCITY AT STA 0+25 = 2.78FPS < 5 FPS =>
OK FOR SOLID SOD
NORMAL DEPTH AT STA 0+25 = 1.63 FT

25 YR = 292 cfs
N. Depth = 1.56 @ 0+25
1.56' > 0.5 (2.5)
Do = 30" or 2.5'

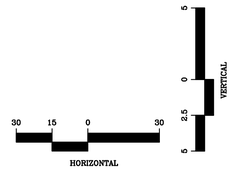


L = 74'

d50 = 0.7'

SUMMARY
L = 74'
W= 35'
d50 = 0.7'

APRON FOR TWIN 30" CULVERTS
NO SCALE



No.	Date	Revision
2	4/26/18	REV. PER JEFFERSON CO. COMMENTS

SW-DET-D2
CAD File No.

CJM
Drawn

KJK
Checked

KJK
Approved

NOTED
Scale:

MARCH 2018
Date:

17-0430
Project No.

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POTESTA

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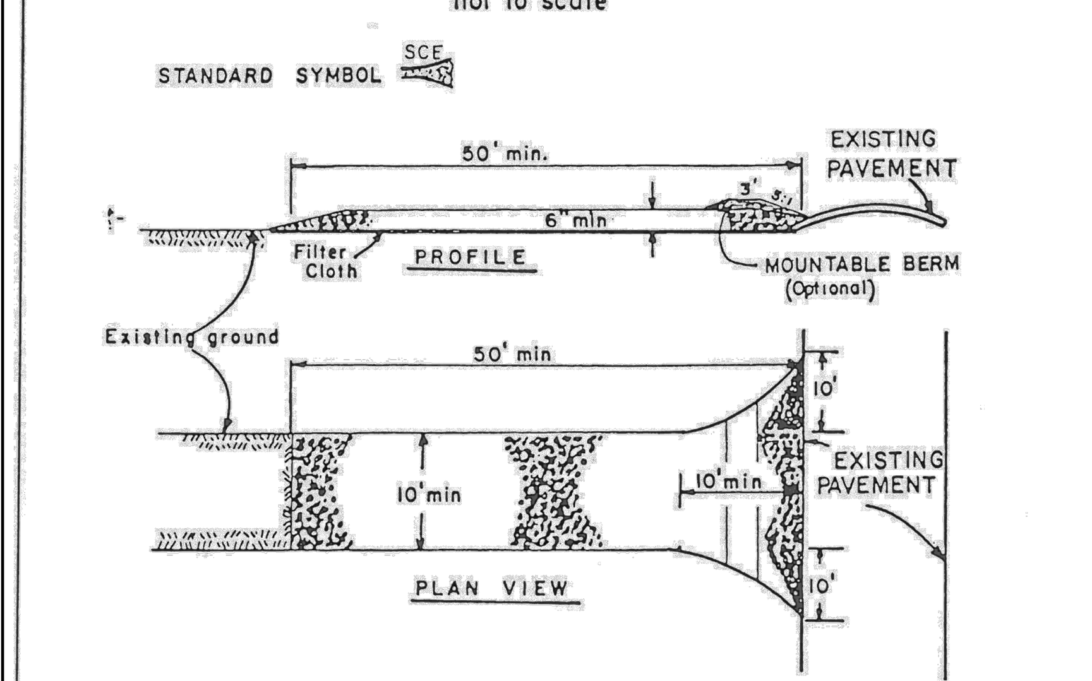
Title
STORMWATER CALCULATIONS & DETAILS
WWTP LAGOON DECOMMISSION
AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

D2
Drawing No.

ISSUED: 4/2/2018 REV. 4/26/2018

STABILIZED CONSTRUCTION ENTRANCE
not to scale



CONSTRUCTION SPECIFICATIONS

1. Stone Size - Use 2" stone, or reclaimed or recycled concrete equivalent.
2. Length - As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness - Not less than six (6) inches.
4. Width - Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Filter Cloth - Will be placed over the entire area prior to placing of stone. Filter will not be required on a single family residence lot.
6. Surface Water - All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance - The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights-of-way must be removed immediately.
8. Washing - Wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Periodic inspection and needed maintenance shall be provided after each rain.

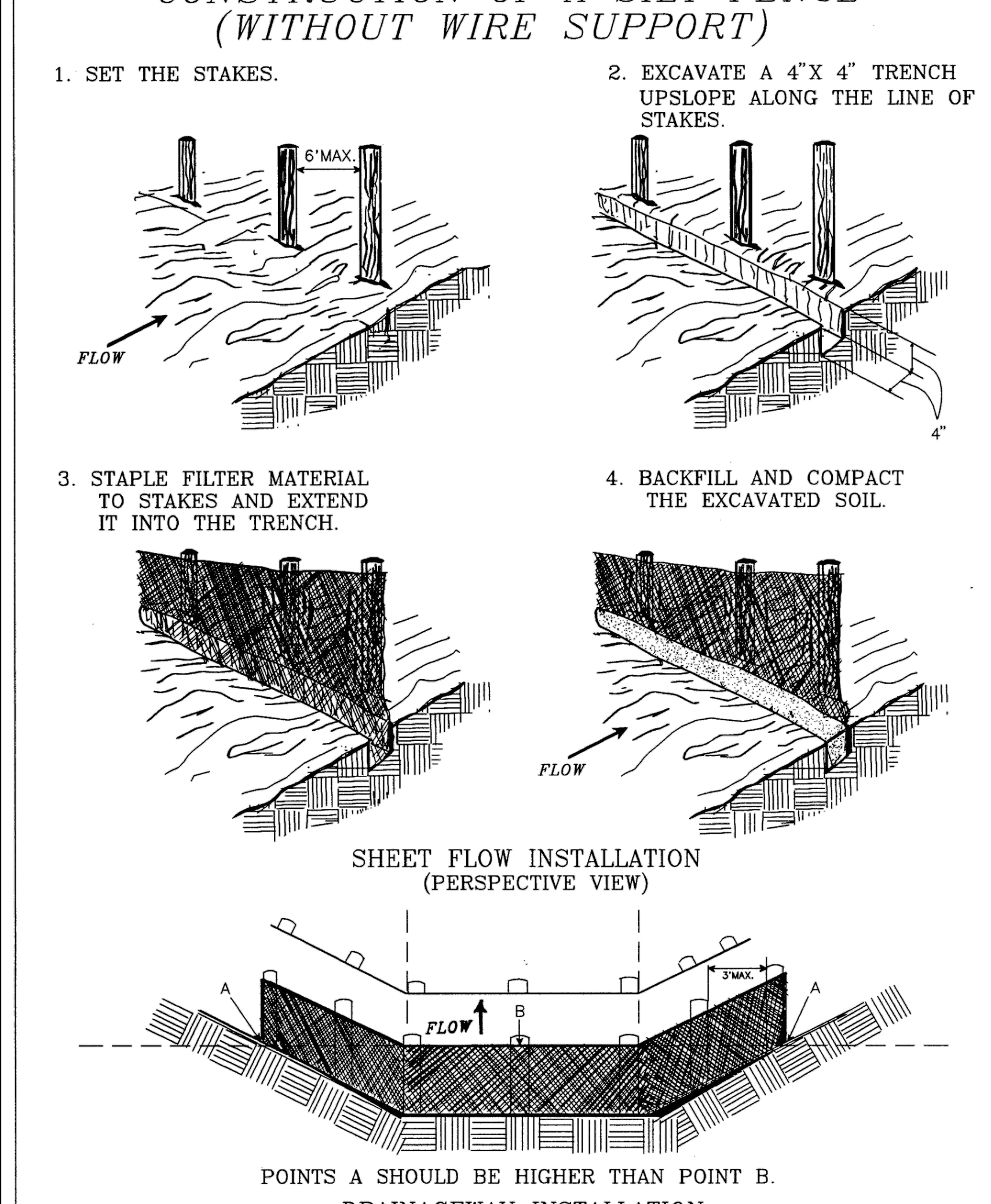
JEFFERSON COUNTY, WEST VIRGINIA	APPROVED: March 10, 1989 COUNTY ENGINEER	STABILIZED CONSTRUCTION ENTRANCE	REVISIONS:	DETAIL No. SC-10

NOTES:

- MOUNTABLE BERM MUST BE LOCATED GREATER THAN 10 FEET FROM EDGE OF PAVEMENT.
- CLASS 1 STONE TO BE USED FOR THE FIRST 10 FEET OF CONSTRUCTION ENTRANCE.

(SCE)

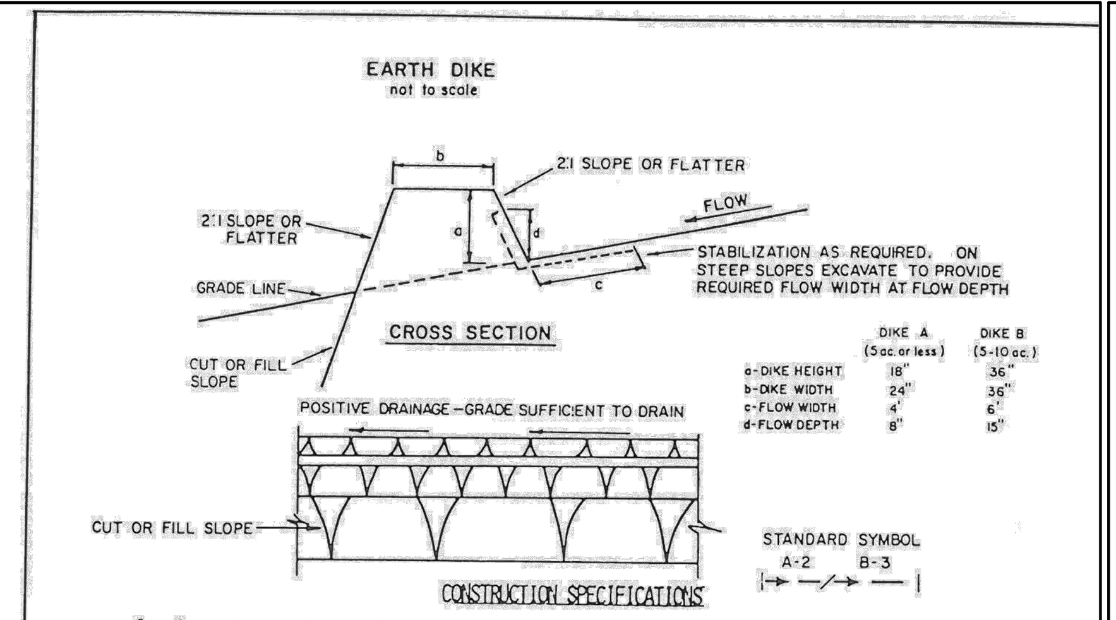
CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



1. SET THE STAKES.
2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.
6' MAX.
FLOW
4"
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.
FLOW
SHEET FLOW INSTALLATION (PERSPECTIVE VIEW)
FLOW
POINTS A SHOULD BE HIGHER THAN POINT B.
DRAINAGEWAY INSTALLATION (FRONT ELEVATION)

(SF) SILT FENCE W/O WIRE DETAIL
NO SCALE

EARTH DIKE
not to scale



2:1 SLOPE OR FLATTER
2:1 SLOPE OR FLATTER
FLOW
GRADE LINE
STABILIZATION AS REQUIRED. ON STEEP SLOPES EXCAVATE TO PROVIDE REQUIRED FLOW WIDTH AT FLOW DEPTH
CROSS SECTION
CUT OR FILL SLOPE
a-DIKE HEIGHT 18" 36"
b-DIKE WIDTH 24" 36"
c-FLOW WIDTH 4' 6'
d-FLOW DEPTH 8" 15"
POSITIVE DRAINAGE - GRADE SUFFICIENT TO DRAIN
CUT OR FILL SLOPE
STANDARD SYMBOL
A-2 B-3

CONSTRUCTION SPECIFICATIONS

1. ALL DIKES SHALL BE COMPACTED BY EARTH-MOVING EQUIPMENT.
2. ALL DIKES SHALL HAVE POSITIVE DRAINAGE TO AN OUTLET.
3. TOP WIDTH MAY BE WIDER AND SIDE SLOPES MAY BE FLATTER IF DESIRED TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
4. FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED SAFE OUTLET.
5. EARTH DIKES SHALL HAVE AN OUTLET THAT FUNCTIONS WITH A MINIMUM OF EROSION. RUNOFF SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS A SEDIMENT TRAP OR SEDIMENT BASIN WHERE EITHER THE DIKE CHANNEL OR THE DRAINAGE AREA ABOVE THE DIKE ARE NOT ADEQUATELY STABILIZED.
6. STABILIZATION SHALL BE: (A) IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR SEED AND STRAW MULCH OR STRAW MULCH IF NOT IN SEEDING SEASON, (B) FLOW CHANNEL AS PER THE CHART BELOW.

FLOW CHANNEL STABILIZATION

TYPE OF TREATMENT	CHANNEL GRADE	DIKE A	DIKE B
1	.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE, OR EXCELSIOR; SOD; 2" STONE
3	5.1-8.0%	SEED WITH JUTE, OR SOD; 2" STONE	LINED RIP-RAP 4-8"
4.	8.1-20%	LINED RIP-RAP 4-8"	ENGINEERING DESIGN

A. STONE TO BE 2 INCH STONE, OR RECYCLED CONCRETE EQUIVALENT, IN A LAYER AT LEAST 3 INCHES IN THICKNESS AND BE PRESSED INTO THE SOIL WITH CONSTRUCTION EQUIPMENT.
B. RIP-RAP TO BE 4-8 INCHES IN A LAYER AT LEAST 8 INCHES THICKNESS AND PRESSED INTO THE SOIL.
C. APPROVED EQUIVALENTS CAN BE SUBSTITUTED FOR ANY OF THE ABOVE MATERIALS.

7. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

(ED)

JEFFERSON COUNTY, WEST VIRGINIA	APPROVED: March 10, 1980 COUNTY ENGINEER	EARTH DIKE	REVISIONS:	DETAIL No. SC-21

Jefferson County, WV — **Stormwater Management Ordinance**

Figure 1- Erosion and Sediment Control Notes

1. Any area of exposed soil where no construction activity is anticipated for a period of longer than three weeks or where construction activity has stopped for three weeks shall be temporarily stabilized.
2. Following initial soil disturbance or re-disturbance, permanent stabilization shall be completed within seven calendar days after completion of all perimeter dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1); and seven calendar days after reaching final grade for all other disturbed or graded areas.

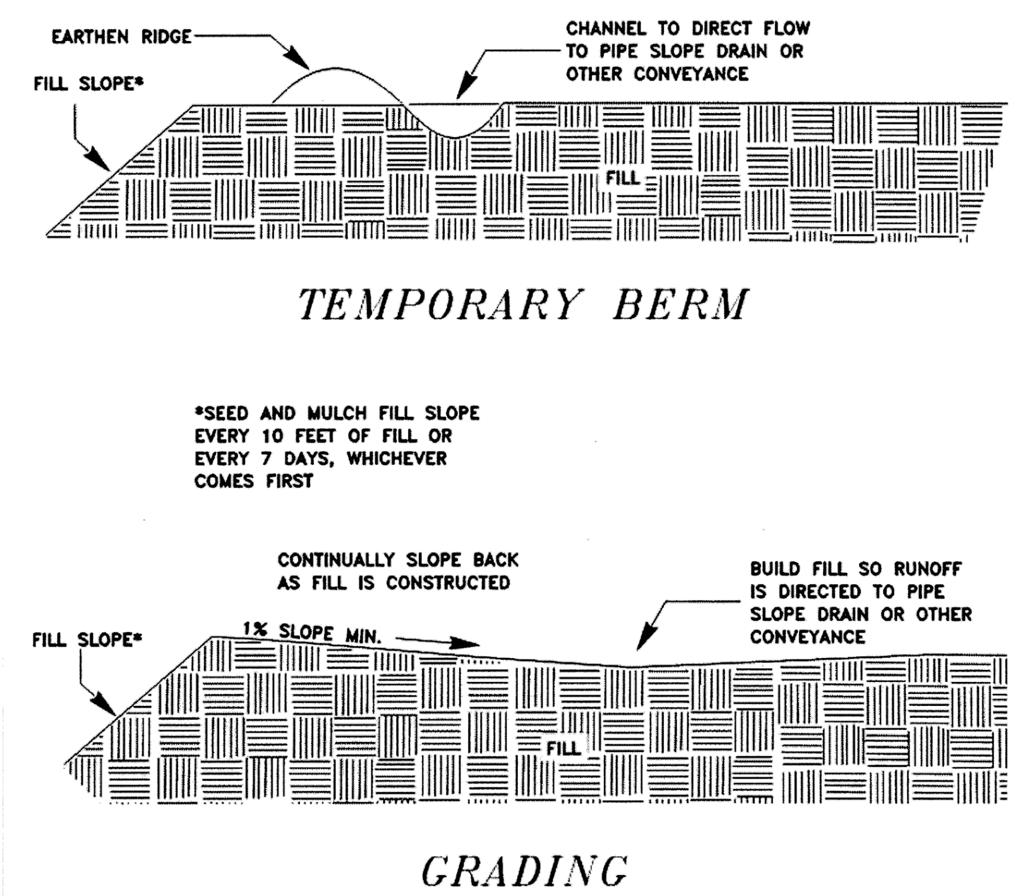
   These provisions do not apply to those areas that are shown on the plan for material storage or for those areas on which actual construction activities are currently being performed.

   These time requirements may be extended, as deemed necessary by the Jefferson County Engineer in the event that adverse conditions prevent compliance with the stated time limitations for the completion of permanent or temporary stabilization.
3. Stabilization will be considered adequate when the following conditions are met:
   a) Water courses, stream banks, and drainage easements shall be 100% stabilized and free from erosion and deposition.
   b) Slopes steeper than 10% shall have at least 98% stable ground cover, as determined by the Jefferson County Engineer.
   c) All other areas shall have at least 85% stable ground cover, as determined by the Jefferson County Engineer.
   d) Grass vegetation shall have reached a minimum of 3 inches of height or have been mowed back to a minimum of 2 inches of height.
4. For all projects adjacent to or within 500 feet of a continuously flowing stream, no grading, excavating, removal, or destruction of topsoil, trees, or other vegetative cover, or construction activity shall result in point or non-point loading of suspended matter such that turbidity standards spelled out in the Water Resources Board legislative rules are violated. Said standards state that turbidity shall not exceed 10 NTUs over background turbidity when the background is 50 NTUs or less, or have more than a 10% increase in turbidity (plus 10 NTUs minimum) when the background turbidity is more than 50 NTUs.
5. Indication whether an off-site borrow pit is (or is not) proposed for this project.
6. Maintenance shall be performed as necessary to ensure that all erosion and sediment control measures are performing as designed. The Jefferson County Engineer may require modifications to an approved plan, require additional sediment and erosion control measures, or cause new plans to be submitted as a result of field inspection revealing the approved plans do not provide adequate protection.
7. All residential and commercial/industrial building Lots shall have a stabilized construction entrance installed prior to beginning construction on the Lot.

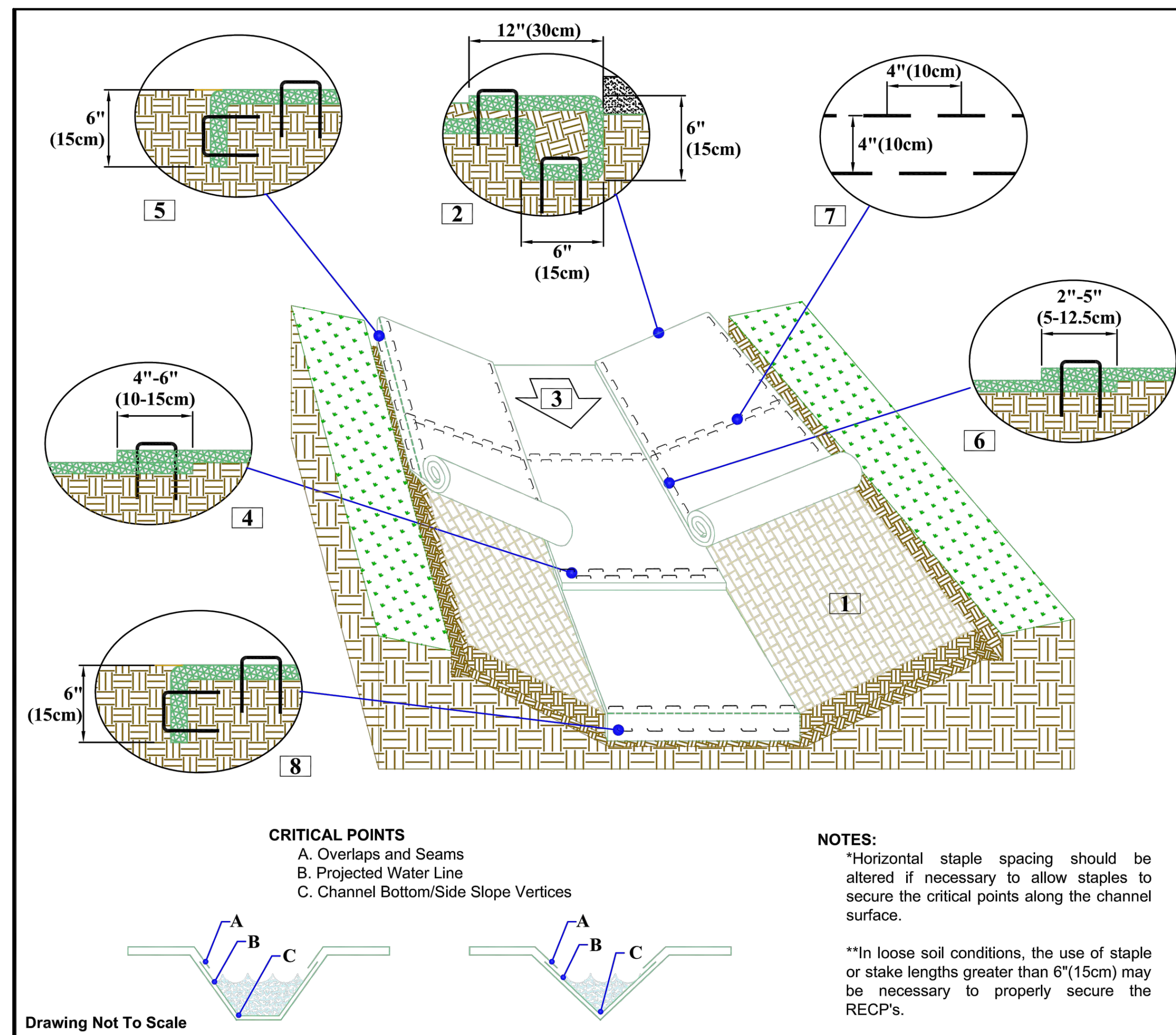
FIGURE 3.15.2

(DD) TEMPORARY FILL DIVERSIONS

NOTE: FOR DD1 & DD2 (DIVERSION DIKES)



EARTHEN RIDGE
FILL SLOPE*
CHANNEL TO DIRECT FLOW TO PIPE SLOPE DRAIN OR OTHER CONVEYANCE
FILL
TEMPORARY BERM
*SEED AND MULCH FILL SLOPE EVERY 10 FEET OF FILL OR EVERY 7 DAYS, WHICHEVER COMES FIRST
CONTINUALLY SLOPE BACK AS FILL IS CONSTRUCTED
1% SLOPE MIN.
BUILD FILL SO RUNOFF IS DIRECTED TO PIPE SLOPE DRAIN OR OTHER CONVEYANCE
FILL SLOPE*
FILL
GRADING



NOTES:
*Horizontal staple spacing should be altered if necessary to allow staples to secure the critical points along the channel surface.

**In loose soil conditions, the use of staple or stake lengths greater than 6"(15cm) may be necessary to properly secure the RECP's.

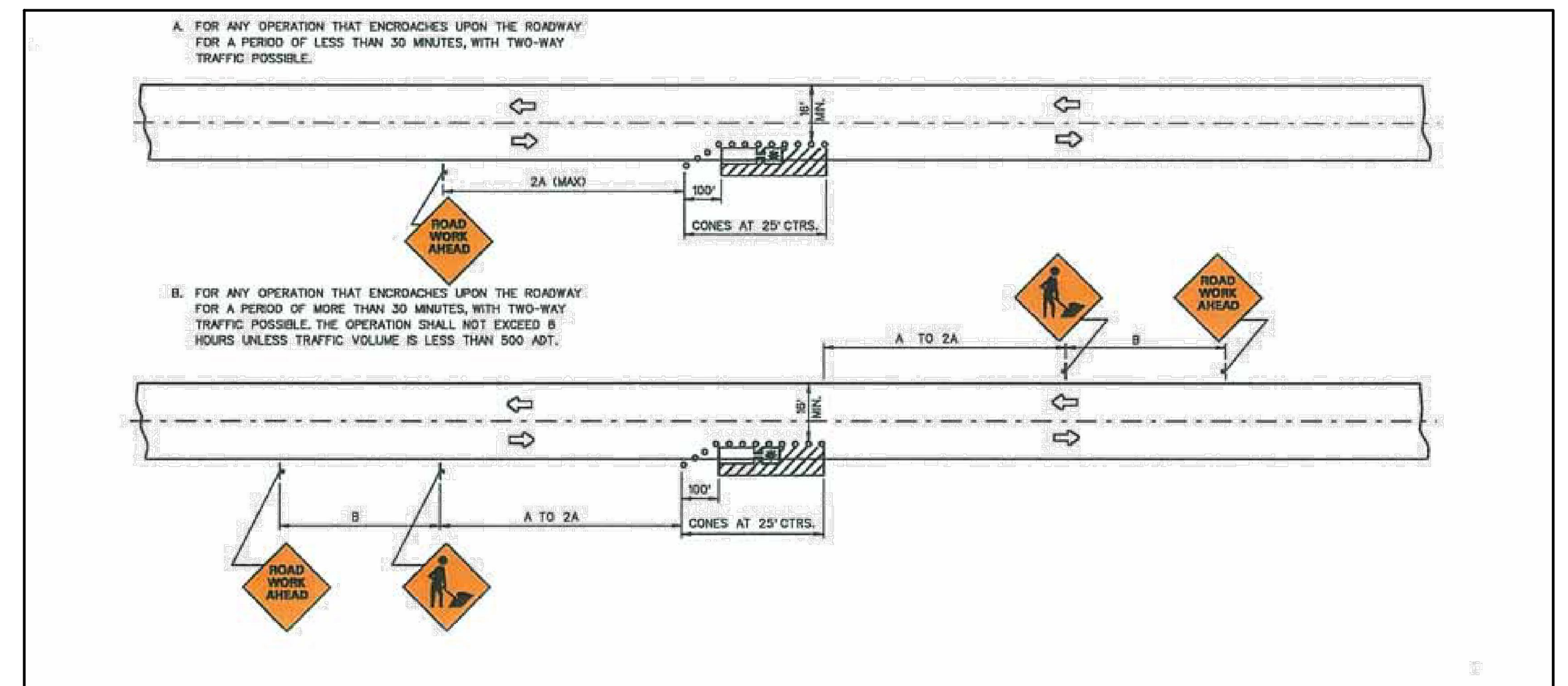
NORTH AMERICAN GREEN
5401 St. Wendel - Cynthiana Rd.
Poseyville, IN 47633
PH: 800-722-2040
www.nagreen.com

Disclaimer:
The information presented herein is general design information only. For specific applications, consult an independent professional for further design guidance.

Drawn on: 5-4-17

CHANNEL (3) INSTALLATION DETAIL

1. Prepare soil before installing rolled erosion control products (RECPs), including any necessary application of lime, fertilizer, and seed.
2. Begin at the top of the channel by anchoring the RECPs in a 6"(15cm) deep X 6"(15cm) wide trench with approximately 12"(30cm) of RECPs extended beyond the up-slope portion of the trench. Use ShoreMax mat at the channel/culvert outlet as supplemental scour protection as needed. Anchor the RECPs with a row of staples/stakes approximately 12"(30cm) apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to the compacted soil and fold the remaining 12"(30cm) portion of RECPs back over the seed and compacted soil. Secure RECPs over compacted soil with a row of staples/stakes spaced approximately 12" apart across the width of the RECPs.
3. Roll center RECPs in direction of water flow in bottom of channel. RECPs will unroll with appropriate side against the soil surface. All RECPs must be securely fastened to soil surface by placing staples/stakes in appropriate locations as shown in the staple pattern guide.
4. Place consecutive RECPs end-over-end (Shingle style) with a 4"-6" overlap. Use a double row of staples staggered 4" apart and 4" on center to secure RECPs.
5. Full length edge of RECPs at top of side slopes must be anchored with a row of staples/stakes approximately 12"(30cm) apart in a 6"(15cm) deep X 6"(15cm) wide trench. Backfill and compact the trench after stapling.
6. Adjacent RECPs must be overlapped approximately 2"-5" (5-12.5cm) (Depending on RECPs type) and stapled.
7. In high flow channel applications a staple check slot is recommended at 30 to 40 foot (9 -12m) intervals. Use a double row of staples staggered 4"(10cm) apart and 4"(10cm) on center over entire width of the channel.
8. The terminal end of the RECPs must be anchored with a row of staples/stakes approximately 12" (30cm) apart in a 6"(15cm) deep X 6"(15cm) wide trench. Backfill and compact the trench after stapling.



A. FOR ANY OPERATION THAT ENCROACHES UPON THE ROADWAY FOR A PERIOD OF LESS THAN 30 MINUTES, WITH TWO-WAY TRAFFIC POSSIBLE.
2A (MAX)
CONES AT 20' CTRS.
B. FOR ANY OPERATION THAT ENCROACHES UPON THE ROADWAY FOR A PERIOD OF MORE THAN 30 MINUTES, WITH TWO-WAY TRAFFIC POSSIBLE. THE OPERATION SHALL NOT EXCEED 8 HOURS UNLESS TRAFFIC VOLUME IS LESS THAN 500 ADT.
A TO 2A
A TO 2A
CONES AT 20' CTRS.

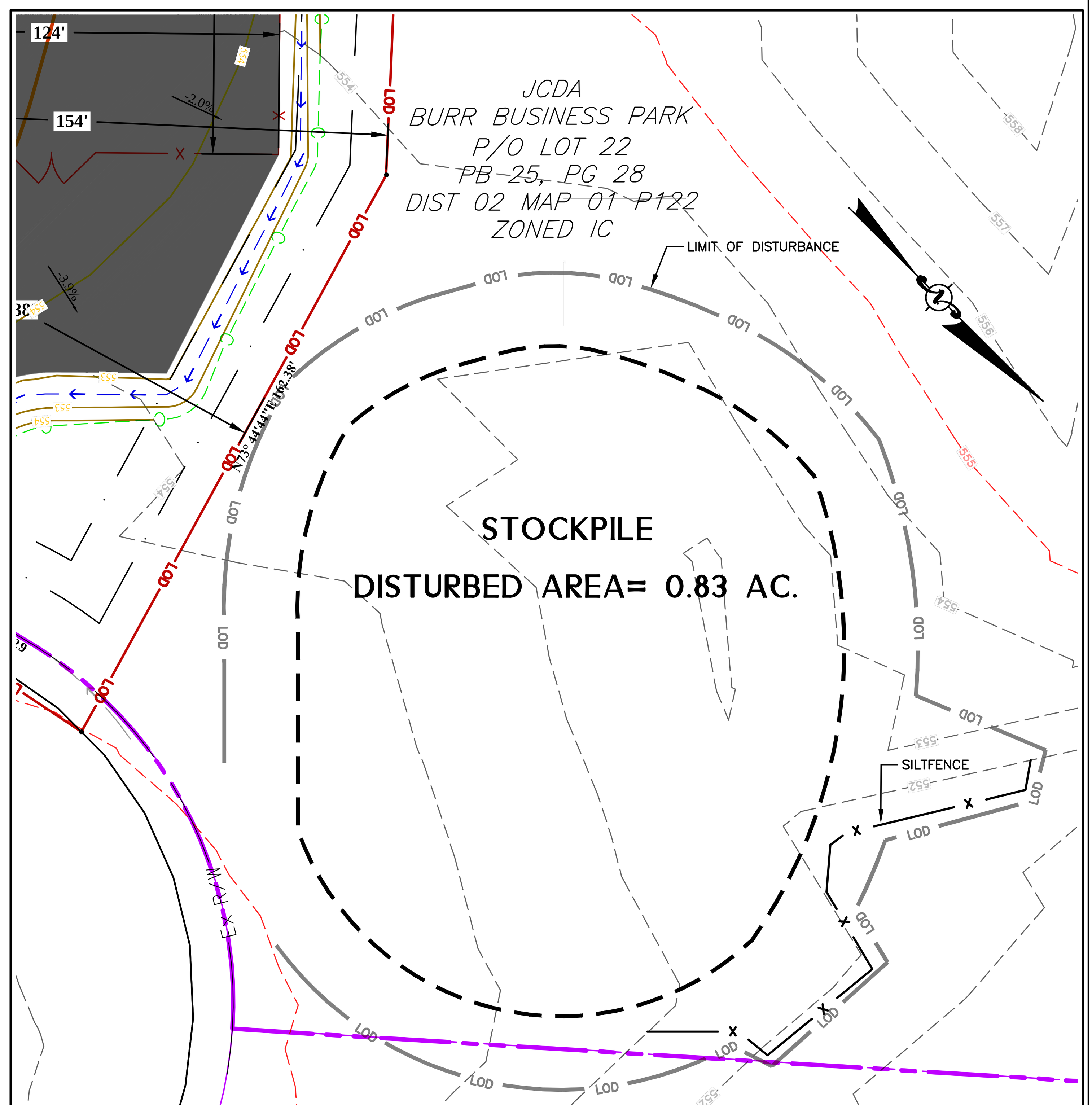
SYMBOLS
WORK AREA
SIGN
SIGN ON PORTABLE OR PERMANENT SUPPORT
CONES

TYPICAL APPLICATIONS

GENERAL NOTES

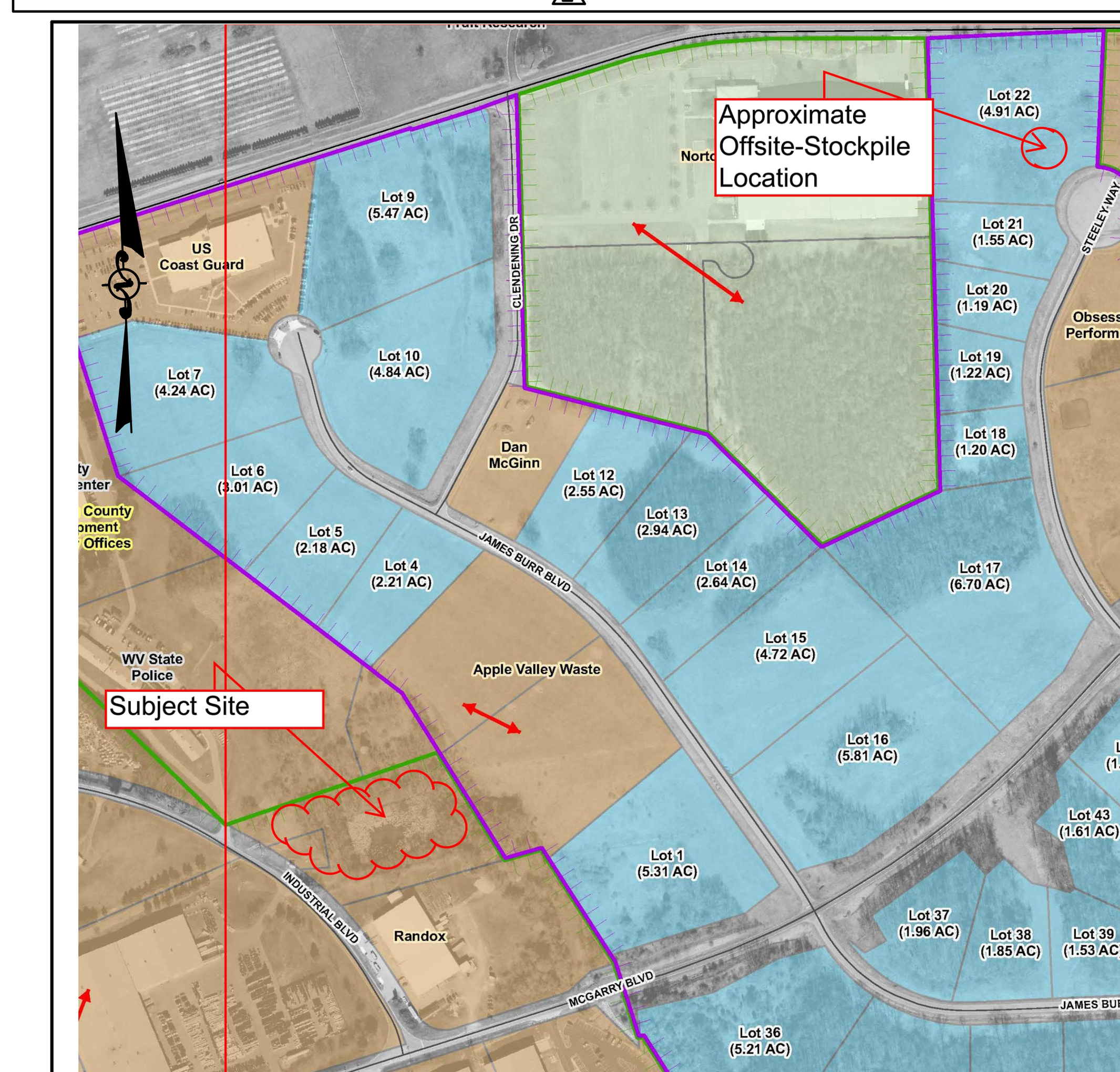
REF: WVDOH MANUAL ON TEMPORARY TRAFFIC CONTROL FOR STREETS AND HIGHWAYS

CASE A4



GRAPHIC SCALE
30 15 0 30 60

(3) OFFSITE BORROW STOCKPILE
EROSION & SEDIMENT CONTROL DETAIL
SCALE: 1"=30'



Approximate Offsite-Stockpile Location
Subject Site
US Coast Guard
Lot 22 (4.91 AC)
Lot 21 (1.55 AC)
Lot 20 (1.19 AC)
Lot 19 (1.22 AC)
Lot 18 (1.20 AC)
Lot 17 (6.70 AC)
Lot 9 (5.47 AC)
Lot 10 (4.84 AC)
Lot 7 (4.24 AC)
Lot 6 (3.01 AC)
Lot 5 (2.18 AC)
Lot 4 (2.21 AC)
Lot 12 (2.55 AC)
Lot 13 (2.94 AC)
Lot 14 (2.64 AC)
Lot 15 (4.72 AC)
Lot 16 (5.81 AC)
Lot 1 (5.31 AC)
Lot 36 (5.21 AC)
Lot 37 (1.96 AC)
Lot 38 (1.65 AC)
Lot 39 (1.53 AC)
Apple Valley Waste
Dan McGinn
Obsession Performance
WV State Police
Randox

(3) LOCATION MAP
PORTIONS OF BARDANE INDUSTRIAL & BURR BUSINESS PARKS
JEFFERSON COUNTY, WV
NO SCALE

No.	Date	Revision
(2)	4/26/18	REV. PER JEFFERSON CO. COMMENTS REV. PER WVDOH COMMENTS (4/26/18)
(3)	5/29/18	REV. PER WVDEP COMMENTS

E&S DETAILS
CAD File No.
CJM
Drawn
KJK
Checked
KJK
Approved
NOTED
Scale:
MARCH 2018
Date:
17-0430
Project No.

POTESTA & ASSOCIATES, INC.
ENGINEERS AND ENVIRONMENTAL CONSULTANTS
15 South Braddock St. Winchester, VA 22601
TEL: (540) 450-0180 FAX: (540) 450-0182
E-Mail Address: potesta@potesta.com

POTESTA

ISSUED: 4/2/2018 REV. 5/29/2018

Client
COUNTY COMMISSION OF JEFFERSON COUNTY
116 EAST WASHINGTON STREET, SUITE 100
CHARLES TOWN, WEST VIRGINIA 25414

Title
EROSION & SEDIMENT CONTROL DETAILS AND MISCELLANEOUS DETAILS
WWTP LAGOON DECOMMISSION AND SINKHOLE REMEDIATION PROJECT
BARDANE INDUSTRIAL PARK
JEFFERSON COUNTY, WEST VIRGINIA

KEVIN J. KNOTTS REGISTERED 17338 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 5/29/18

D3
Drawing No.