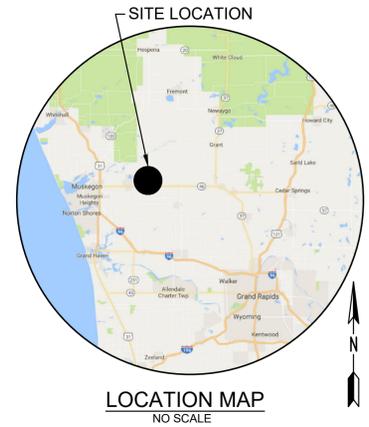




BRENDA M. MOORE
 MUSKEGON COUNTY DRAIN COMMISSIONER
 STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK DRAIN DRAINAGE DISTRICT

DIVISION 10

SMITH & MULDER DRAIN AND HH&G DRAIN
 PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
 MUSKEGON COUNTY, MICHIGAN



LIST OF DRAWINGS

- 1 COVER SHEET
- 2 PLAN & PROFILE SMITH & MULDER DRAIN STA 1+00 TO STA 22+00
- 3 PLAN & PROFILE SMITH & MULDER DRAIN STA 22+00 TO STA 46+00
- 4 PLAN & PROFILE SMITH & MULDER DRAIN STA 46+00 TO STA 69+00
- 5 PLAN & PROFILE SMITH & MULDER DRAIN STA 69+00 TO STA 91+00
- 6 PLAN & PROFILE SMITH & MULDER DRAIN STA 91+00 TO STA 114+00
- 7 PLAN & PROFILE SMITH & MULDER DRAIN STA 114+00 TO STA 120+00
- 8 PLAN VIEW HH&G DRAIN STA 1+00 TO STA 45+00
- 9 PLAN & PROFILE HH&G DRAIN STA 45+00 TO STA 68+00
- 10 PLAN & PROFILE HH&G DRAIN STA 68+00 TO STA 90+71
- 11 DETAILS
- 12 DETAILS



LIST OF CONTACTS

OWNER
 MUSKEGON COUNTY DRAIN COMMISSIONER
 BRENDA M MOORE
 PHONE: 231-724-6219
 STEPHANIE BARRETT
 PHONE: 231-724-6319
 CENTRAL SERVICES BUILDING
 141 E APPLE AVENUE
 MUSKEGON, MI 49442

ELECTRIC
 CONSUMERS ENERGY
 JOEL BROWN
 700 E STERNBERG RD
 NORTON SHORES, MI 49441
 PHONE: 231-332-2621

GAS DISTRIBUTION
 DTE ENERGY GAS
 VINCE DUCA
 2359 OLTHOFF DRIVE
 MUSKEGON, MI 49444
 PHONE: 231-777-4034

CABLE TELEVISION
 COMCAST
 JON CHARLAND
 700 W BROADWAY AVE
 MUSKEGON, MI 49441
 PHONE: 231-375-5112

GAS TRANSMISSION
 DTE ENERGY GAS
 TYLER GAGE, PE
 444 WEALTHY STREET
 GRAND RAPIDS, MI 49503
 PHONE: 989-330-3231
 tyler.gage@dteenergy.com

ROADS
 MUSKEGON COUNTY ROAD COMMISSION
 PAUL R BOUMAN, PE
 7700 E APPLE AVENUE
 MUSKEGON, MI 49442
 PHONE: 231-788-2381

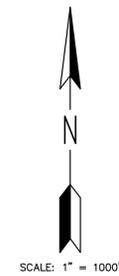
TELEPHONE
 FRONTIER COMMUNICATIONS
 DAVID FLERMOEN
 860 TERRACE STREET
 MUSKEGON, MI 49444
 PHONE: 231-727-1319

ENGINEER
 Eng., Inc.
 RYAN C McENHILL, PE
 16930 ROBBINS ROAD
 SUITE 105
 GRAND HAVEN, MI 49417
 PHONE: 616-743-7070
 mcenhillr@engdot.com

ROADS
 MICHIGAN DEPARTMENT OF TRANSPORTATION
 JAMES DAVIS, PE
 VAN WAGONER BUILDING
 425 W OTTAWA
 P.O. BOX 30050
 LANSING, MI 48909
 PHONE: 517-335-6781

LEGEND

- BLACK CREEK CONSOLIDATED DRAIN CENTERLINE
- BRANCH DRAIN CENTERLINE
- MUNICIPAL BOUNDARY
- PARCEL LINE
- ROAD
- SECTION LINE
- SECTION NUMBER
- SECTION CORNER
- SHEET LOCATION



Ryan C. McEnhill
 RYAN C MCENHILL, P.E. #56096
 DATE 6-25-20

COVER SHEET

NO	REVISIONS	BY	DATE	Drawn	SPM	Use	Approved	Date

4063 Grand Oak Drive Suite A109
 Lansing, MI 48911
 517.687.1100
 16930 Robbins Road Suite 105
 Grand Haven, MI 49417
 616.743.7070
 engdot.com



BRENDA M. MOORE
 MUSKEGON COUNTY DRAIN COMMISSIONER
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 BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
 PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
 MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
 DIVISION 10
1 OF 12

T:\Autocad Drawings\16041 - Black Creek\DIVISION 10 COVER.dwg, 6/25/2020, 4:02:08 PM, DWG, To PDF.pc3



811 Know what's below.
Call before you dig.

BM #1 ELEV = 674.00
SET SPIKE W SIDE UTILITY POLE N
OF EVANSTON AVE, 75' OF MAPLE
ISLAND RD.

BM #2 ELEV = 672.91
SET SPIKE E SIDE UTILITY POLE N
OF EVANSTON AVE, E OF DRIVE
WAY 7360

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

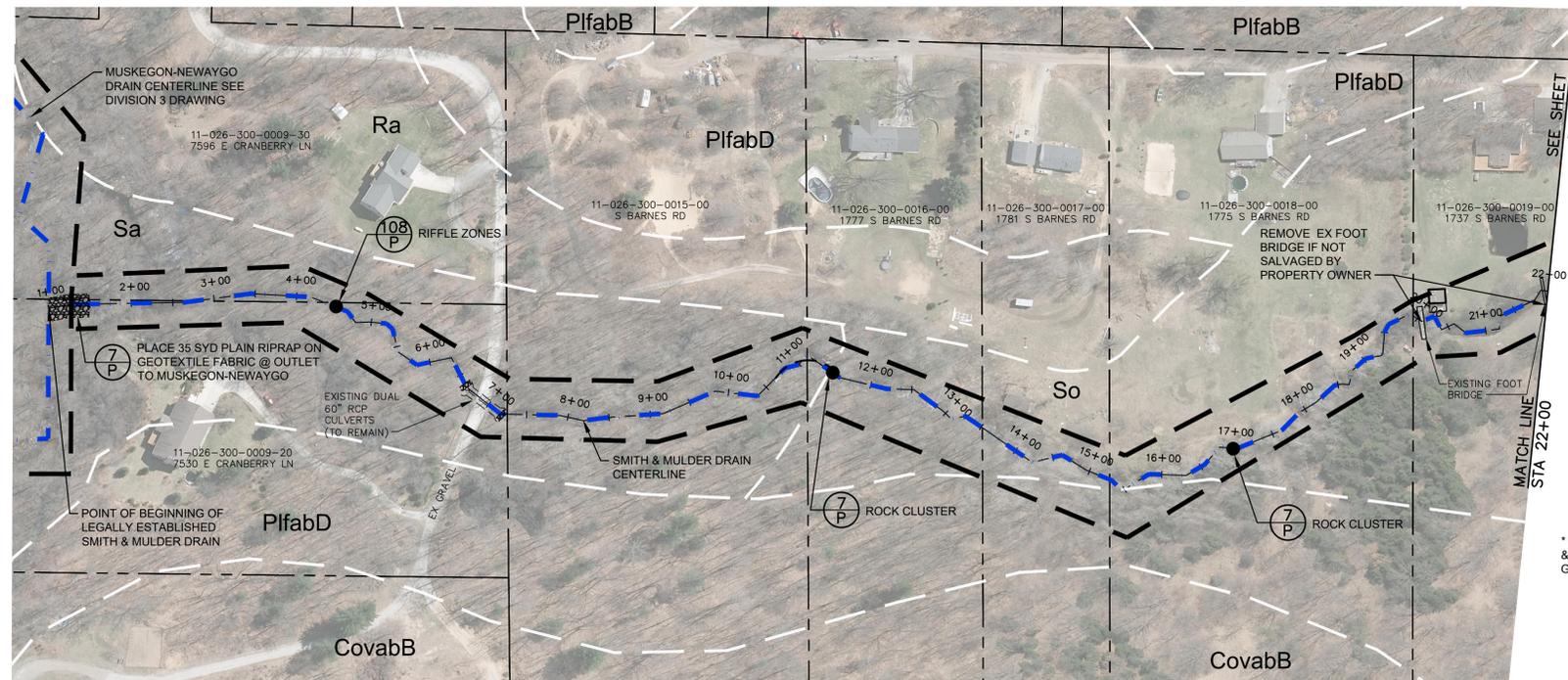
GENERAL NOTES:

1. ALL TREES MUST BE MARKED BY ENGINEER PRIOR TO REMOVAL.
2. FOR ACCESS CLEARING, ALL TREES REMOVED MUST BE CHIPPED OR HAVE LOGS STACKED WITHIN THE EASEMENT LIMITS. ALL OTHER WOODY MATERIAL MUST BE CHIPPED, BURIED-ON-SITE OR REMOVED FROM SITE. ALL TREES REMOVED FROM DITCH BOTTOM OR SIDES MUST BE CUT FLUSH.
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7. TEMPORARY SESC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PlfabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PlfabD	Plainfield sand, lake plain, 6 to 18 percent slopes
PpsaaA	Pipestone-Covert-Saugatuck sands, 0 to 3 percent slopes
Ra	Roscommon and Au Gres Sands
Sa	Saranac loam
So	Sloan soils

LEGEND

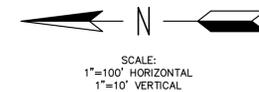
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- = CONIFEROUS TREE
- = BUSH
- = STUMP
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* EASEMENT WIDTH FOR THE SMITH & MULDER DRAIN IS SUFFICIENT GROUND ON EITHER SIDE OF DRAIN.

SHEET SPECIFIC NOTES:

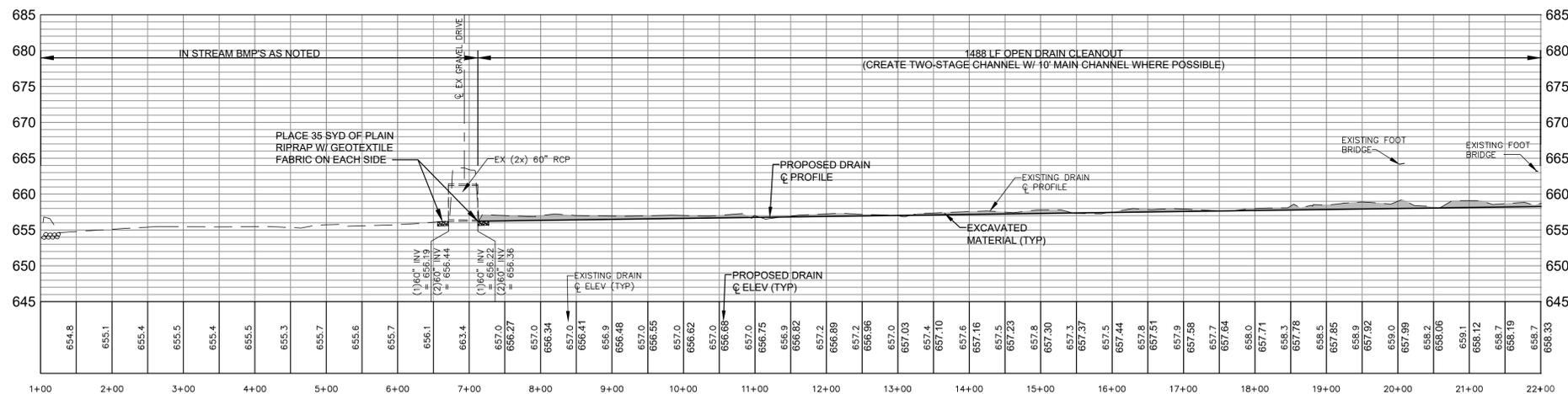
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* DENOTES MISCELLANEOUS ITEM & QUANTITY

WORK ITEM	LOCATION	QUANTITY
FOOT BRIDGE REMOVAL	STA 20+05 STA 21+93	2 EA
OPEN DRAIN CLEANOUT	STA 7+12 TO 22+00	1488 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 1+00 STA 6+72 STA 7+12	105 SYD
ROCK CLUSTER	STA 11+50 STA 17+00	2 EA
RIFFLE ZONE	STA 4+50	1 EA
* BANK STABILIZATION	VARIABLES	100 FT
* COIR LOGS	VARIABLES	200 FT

SMITH & MULDER DRAIN



**PLAN AND PROFILE
SMITH & MULDER DRAIN
STA 1+00 TO STA 22+00**

NO.	REVISIONS	DATE	BY

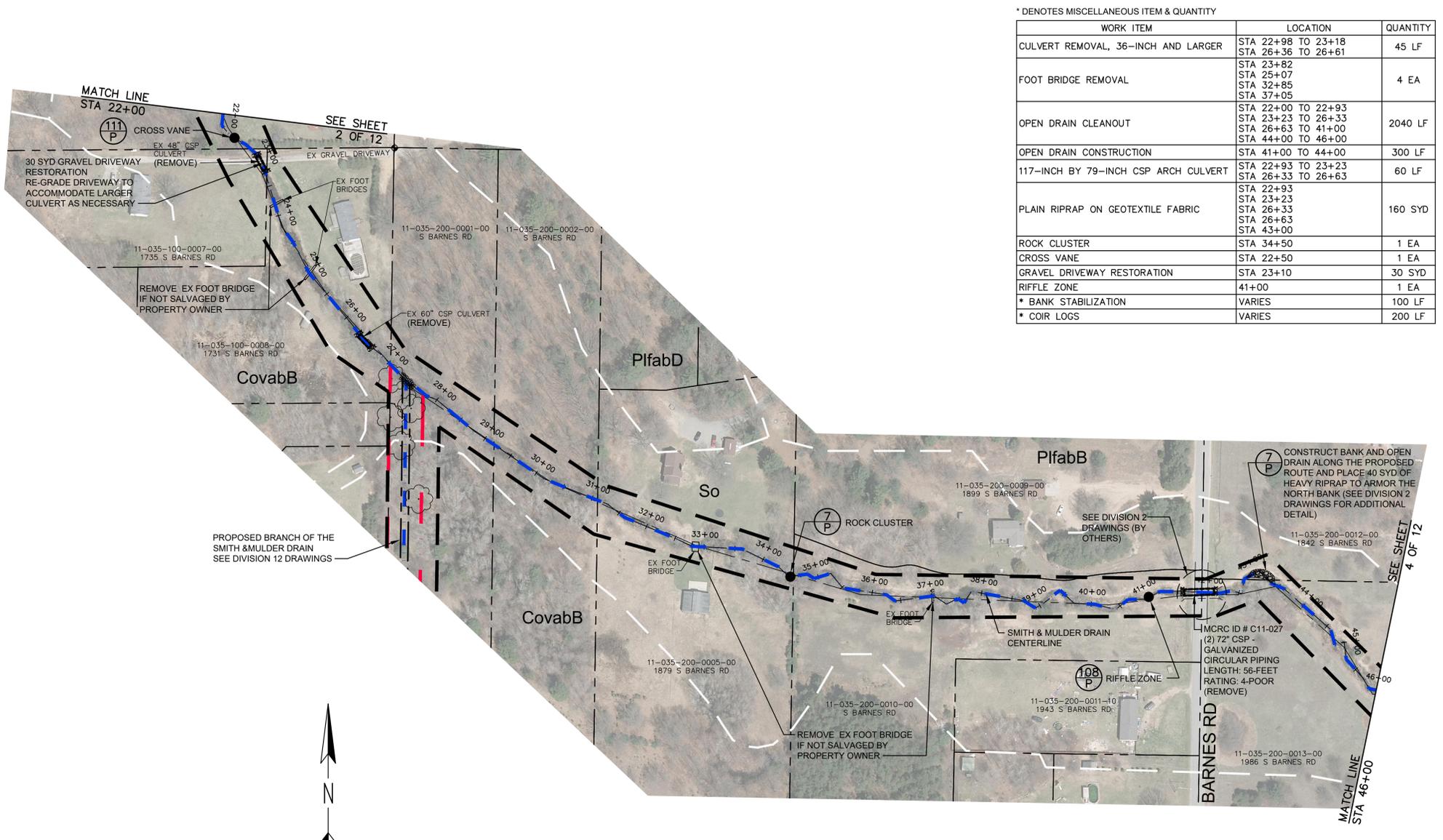
4063 Grand Oak Drive Suite A109
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MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 10
2 OF 12



* DENOTES MISCELLANEOUS ITEM & QUANTITY

WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, 36-INCH AND LARGER	STA 22+98 TO 23+18 STA 26+36 TO 26+61	45 LF
FOOT BRIDGE REMOVAL	STA 23+82 STA 25+07 STA 32+85 STA 37+05	4 EA
OPEN DRAIN CLEANOUT	STA 22+00 TO 22+93 STA 23+23 TO 26+33 STA 26+63 TO 41+00 STA 44+00 TO 46+00	2040 LF
OPEN DRAIN CONSTRUCTION	STA 41+00 TO 44+00	300 LF
117-INCH BY 79-INCH CSP ARCH CULVERT	STA 22+93 TO 23+23 STA 26+33 TO 26+63	60 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 22+93 STA 23+23 STA 26+33 STA 26+63 STA 43+00	160 SYD
ROCK CLUSTER	STA 34+50	1 EA
CROSS VANE	STA 22+50	1 EA
GRAVEL DRIVEWAY RESTORATION	STA 23+10	30 SYD
RIFFLE ZONE	41+00	1 EA
* BANK STABILIZATION	VARIES	100 LF
* COIR LOGS	VARIES	200 LF

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BM #1 ELEV = 674.00
SET SPIKE W SIDE UTILITY POLE N OF EVANSTON AVE, 75' OF MAPLE ISLAND RD.

BM #2 ELEV = 672.91
SET SPIKE E SIDE UTILITY POLE N OF EVANSTON AVE, E OF DRIVEWAY 7360

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SOIL TYPES AND ABBREVIATIONS

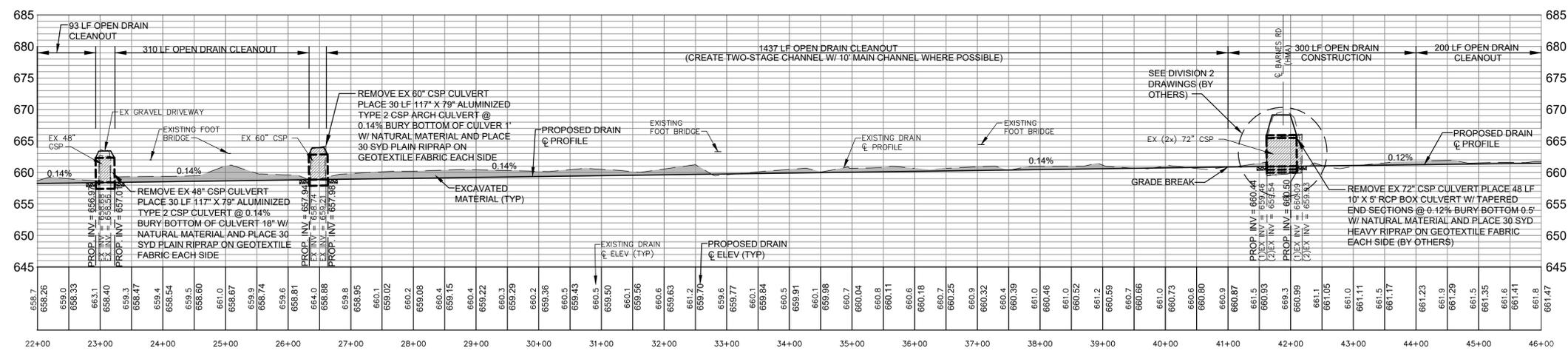
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Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
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Ra	Roscommon and Au Gres Sands
Sa	Saranac loam

LEGEND

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PLAN AND PROFILE
 SMITH & MULDER DRAIN
 STA 22+00 TO STA 46+00

Drawn By: GTO
 Date: 02/21/17
 Approved By: [Signature]
 Date: [Blank]

REVISIONS

NO	DATE	DESCRIPTION

4063 Grand Oak Drive Suite A109
 Lansing, MI 48911
 517.887.1100

16930 Robbins Road Suite 105
 Grand Haven, MI 49417
 616.743.7070
 engdco.com

Eng
 Engineering & Surveying

BRENDA M. MOORE
 MUSKEGON COUNTY DRAIN COMMISSIONER
 STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
 BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
 PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
 MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
 DIVISION 10
3 OF 12



811 Know what's below.
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SET SPIKE W SIDE UTILITY POLE N
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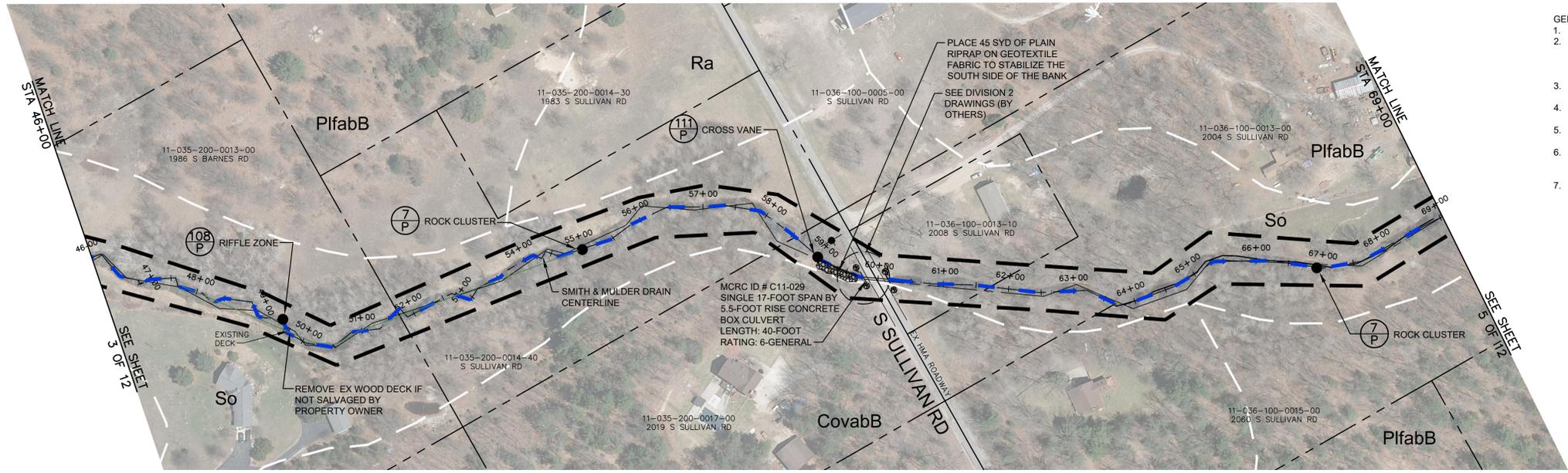
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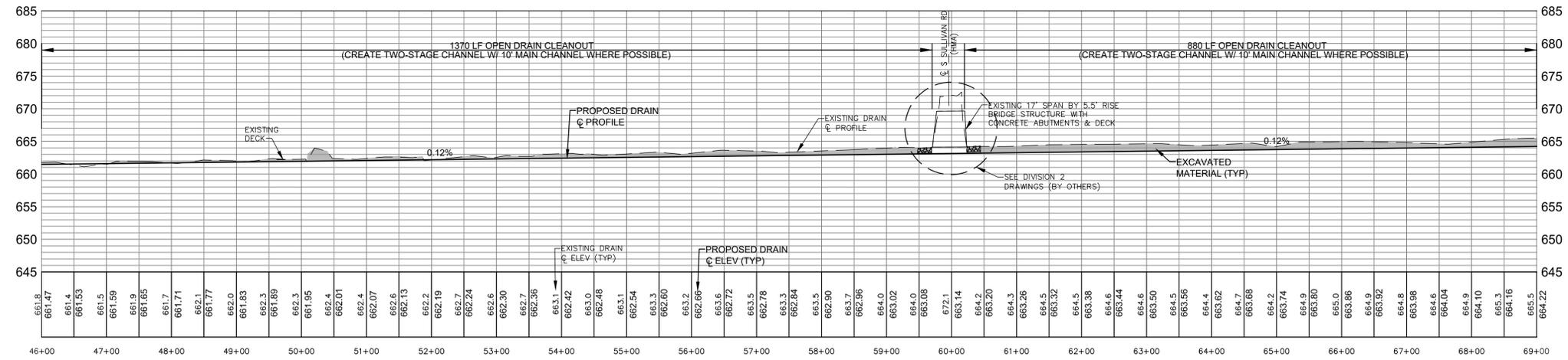
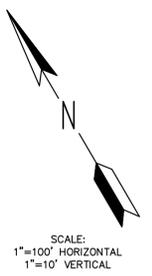


* DENOTES MISCELLANEOUS ITEM & QUANTITY

WORK ITEM	LOCATION	QUANTITY
WOOD DECK REMOVAL	STA 49+68	1 EA
OPEN DRAIN CLEANOUT	STA 46+00 TO 59+70 STA 60+20 TO 69+00	2250 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	59+50	45 SYD
ROCK CLUSTER	STA 55+00 STA 67+00	2 EA
CROSS VANE	STA 59+00	1 EA
RIFFLE ZONE	49+50	1 EA
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* COIR LOG	VARIABLES	200 LF

SMITH & MULDER DRAIN

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**PLAN AND PROFILE
SMITH & MULDER DRAIN
STA 46+00 TO STA 69+00**

BY DATE Drawn By GTO
Date 6/23/17
Approved By
Date

REVISIONS

NO	DATE	DESCRIPTION

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070
engdot.com

Eng
Engineering & Surveying

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MUSKEGON COUNTY, MICHIGAN

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SHEET NO.
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4 OF 12



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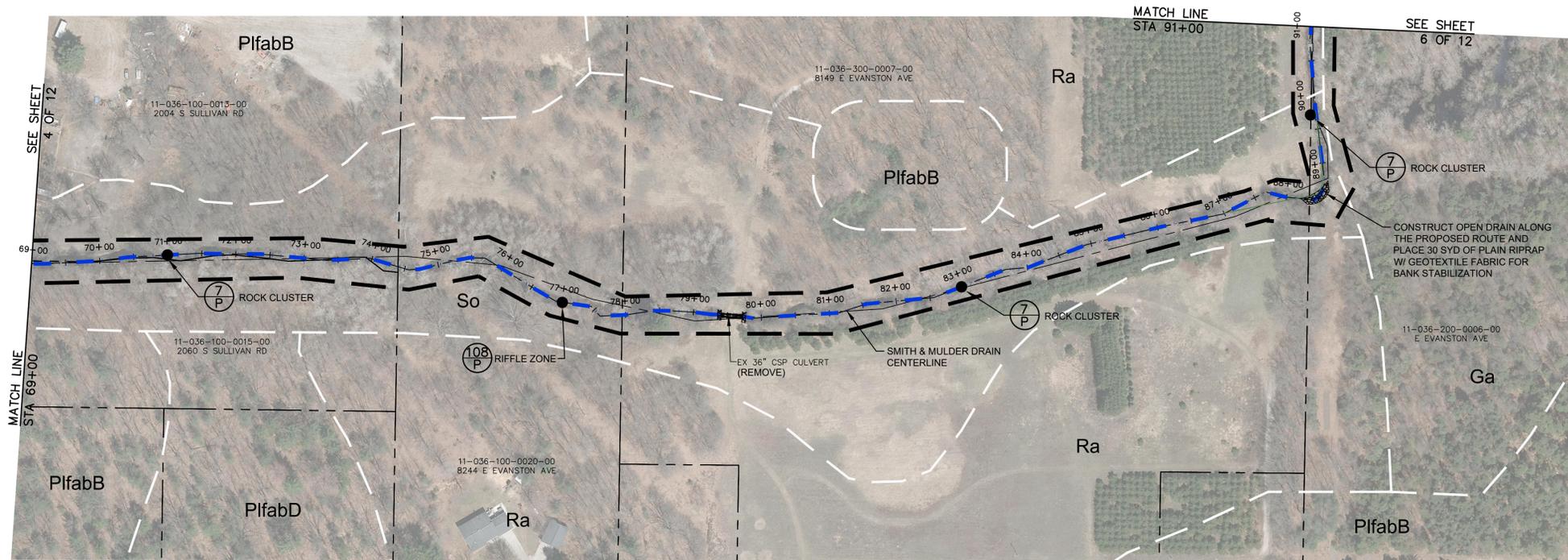
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 - PROPERTY OWNERS MUST BE NOTIFIED 7 DAYS PRIOR TO ANY ACCESS AND TREE REMOVALS ON THEIR PROPERTY.
 - SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS. TEMPORARY ACCESS EASEMENTS, AND PUBLIC RIGHTS OF WAY SHOWN ON DRAWINGS. ALL OTHER ACCESS TO SITE SHALL BE APPROVED BY THE OWNER.
 - TEMPORARY SESC MEASURES MUST BE IN PLACE AT 500 FOOT INCREMENTS TO CONTROL SEDIMENT TRANSPORT.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PlfabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PlfabD	Plainfield sand, lake plain, 6 to 18 percent slopes
PpsaaA	Pipestone-Covert-Saugatuck sands, 0 to 3 percent slopes
Ra	Roscommon and Au Gres Sands
Sa	Saranac loam
So	Sloan soils

LEGEND

- = PROPERTY LINE OR R.O.W. LINE
- = EDGE OF PAVEMENT
- X - X - X - = FENCE
- = EXISTING GUARDRAIL
- = WETLANDS (AS MARKED BY OTHERS)
- = EXISTING SPOT ELEVATION
- = EXISTING CONTOUR ELEVATION
- = EDGE OF WOODS
- = DECIDUOUS TREE
- = CONIFEROUS TREE
- = BUSH
- = STUMP
- = EXISTING GAS LINE
- = EXISTING STORM SEWER
- = EXISTING SANITARY SEWER
- = EXISTING MANHOLE
- ⊕ = EXISTING STORM CATCH BASIN
- ⊙ = EXISTING WELL LOCATION
- ⊗ = EXISTING WATER VALVE
- = EXISTING CURB STOP / METER
- ⊞ = EXISTING CATCH BASIN
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- △ = EXISTING SIGN
- ⊞ = EXISTING MAILBOX
- ⊞ = EXISTING LIGHT POLE
- ⊞ = EXISTING GUY ANCHOR
- = EXISTING UTILITY POLE
- ⊞ = EXISTING TELEPHONE PEDESTAL
- = EXISTING DRAIN EASEMENT
- = EXISTING DRAIN C
- = PROPOSED TOP OF BANK
- = PROPOSED TOE OF BANK
- = SOIL TYPE
- XX P = PERMANENT SOIL EROSION CONTROL MEASURE OR RESTORATION DETAIL
- XX T = TEMPORARY SOIL EROSION CONTROL MEASURE



* DENOTES MISCELLANEOUS ITEM & QUANTITY

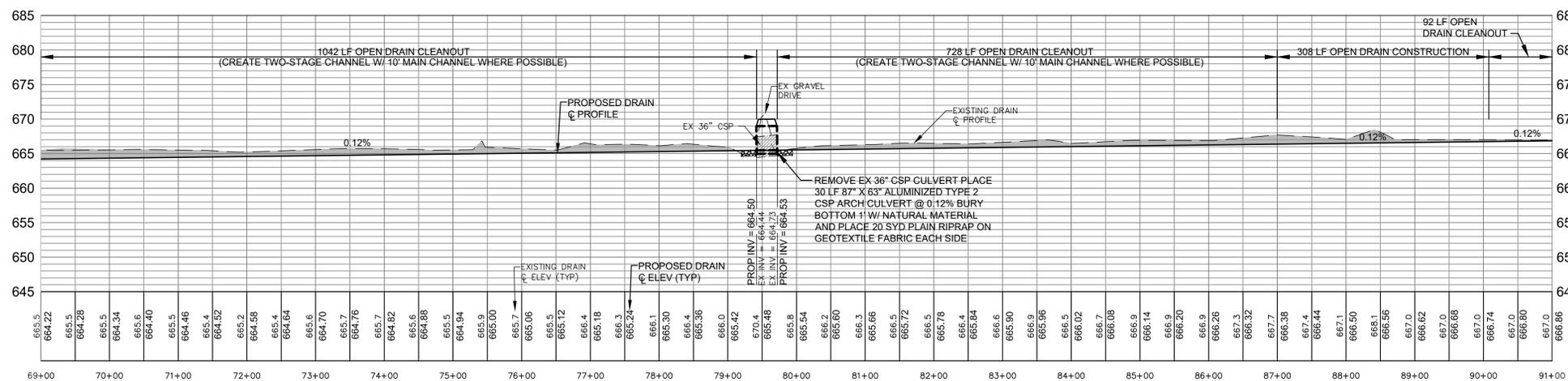
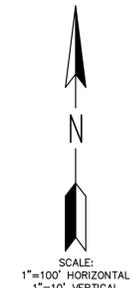
WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, 36-INCH DIAMETER AND LARGER	STA 79+38 TO 79+68	30 LF
OPEN DRAIN CLEANOUT	STA 69+00 TO 79+38 STA 79+68 TO 87+00 STA 90+08 TO 91+00	1862 LF
OPEN DRAIN CONSTRUCTION	STA 87+00 TO 90+08	308 LF
48-INCH DIA CSP CULVERT	STA 79+38 TO 79+68	30 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 79+38 STA 79+68 STA 88+25	70 SYD
ROCK CLUSTER	STA 71+00 STA 83+00 STA 89+50	3 EA
RIFFLE ZONE	STA 77+00	1 EA
* BANK STABILIZATION	VARIABLES	100 LF
* COIR LOGS	VARIABLES	200 LF

SMITH & MULDER DRAIN

SHEET SPECIFIC NOTES:

- WORK FROM EITHER SIDE OF THE DRAIN THIS SHEET AND WHICH PRESENTS THE LEAST ENVIRONMENTAL IMPACT.
- ACCESS CLEARING WILL BE REQUIRED THIS SHEET IN THE FORM OF MINOR BRUSH AND WOODY VEGETATION REMOVAL. NOTIFY ENGINEER OR INSPECTOR PRIOR TO ANY CLEARING.

* EASEMENT WIDTH FOR THE SMITH & MULDER DRAIN IS SUFFICIENT GROUND ON EITHER SIDE OF DRAIN.



**PLAN AND PROFILE
SMITH & MULDER DRAIN
STA 69+00 TO STA 91+00**

NO	DATE	BY	REVISIONS

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070
engdot.com



BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER
BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 10

5 OF 12

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BM #1 ELEV = 674.00
SET SPIKE W SIDE UTILITY POLE N
OF EVANSTON AVE, 75' OF MAPLE
ISLAND RD.

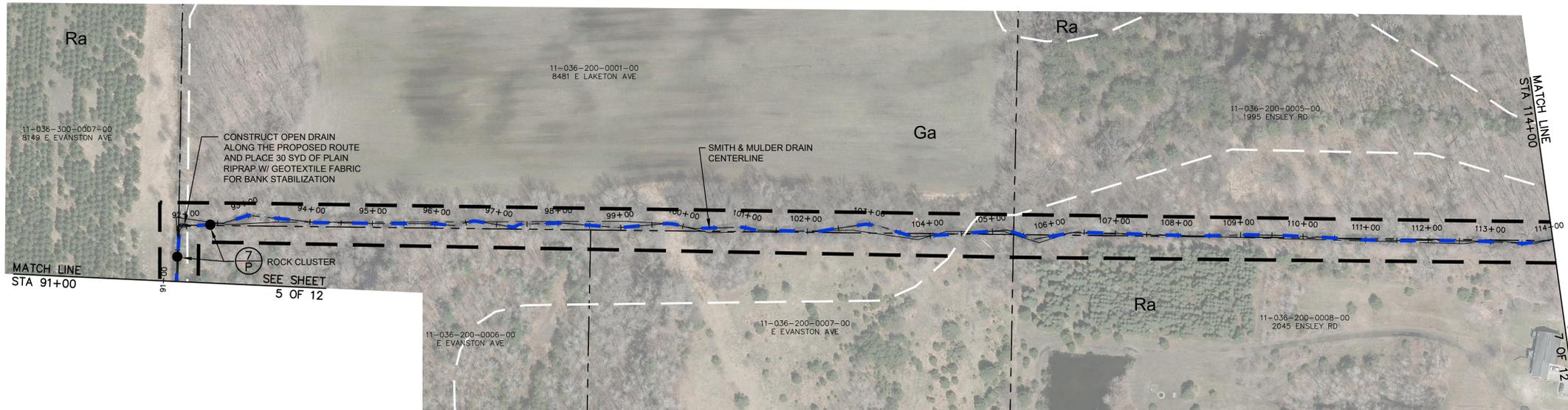
BM #2 ELEV = 672.91
SET SPIKE E SIDE UTILITY POLE N
OF EVANSTON AVE, E. OF DRIVE
WAY 7360



Know what's below.
Call before you dig.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

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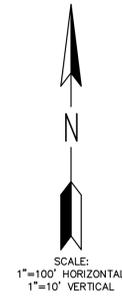
- GENERAL NOTES:
- ACCESS CLEARING AND THE USE OF HEAVY EQUIPMENT IS NOT ALLOWED FOR THIS WORK ITEM. ALL WORK IS TO BE COMPLETED BY HAND AND THROUGH THE USE OF PORTABLE EQUIPMENT.
 - WORK ITEM INCLUDES THE REMOVAL OF ALL FALLEN TREES, VEGETATION, AND DEBRIS WITHIN THE DRAIN CHANNEL THAT IMPEDES THE FLOW OF WATER.
 - REMOVED TREES, VEGETATION, AND DEBRIS IS TO BE PLACED WITHIN EASEMENT LIMITS.

SOIL TYPES AND ABBREVIATIONS	
CovabB	Covert-Pipestone sands, 0 to 6 percent slopes
Ga	Granby loamy sand
PifabB	Plainfield sand, lake plain, 0 to 6 percent slopes
PifabD	Plainfield sand, lake plain, 6 to 18 percent slopes
PpsaaA	Pipestone-Covert-Saugatuck sands, 0 to 3 percent slopes
Ra	Roscommon and Au Gres Sands
Sa	Saranac loam

* EASEMENT WIDTH FOR THE SMITH & MULDER DRAIN IS SUFFICIENT GROUND ON EITHER SIDE OF DRAIN.

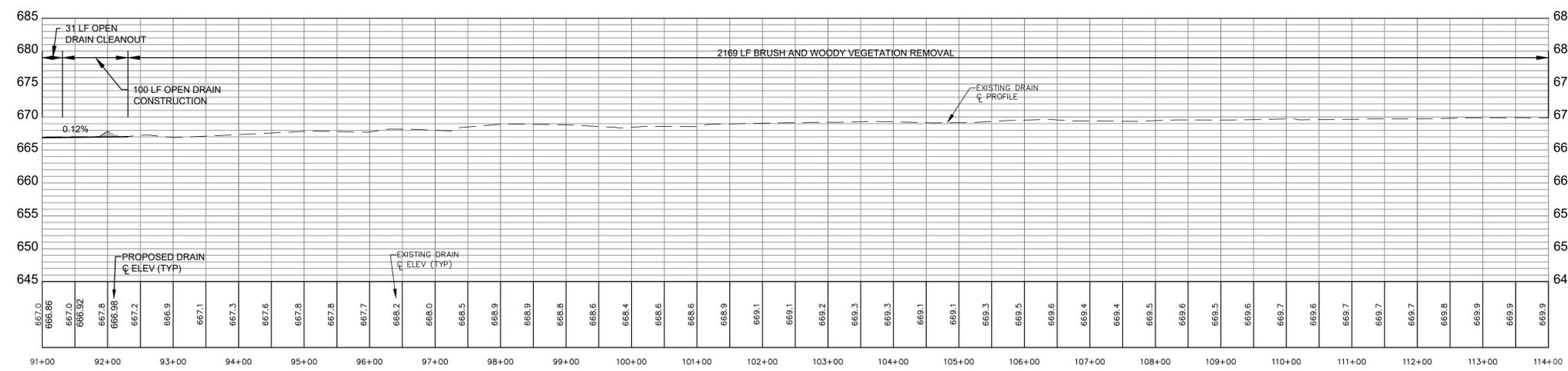
WORK ITEM	LOCATION	QUANTITY
OPEN DRAIN CLEANOUT	STA 91+00 TO 91+31	31 LF
OPEN DRAIN CONSTRUCTION	STA 91+31 TO 92+31	100 LF
BRUSH AND WOODY VEGETATION REMOVAL	STA 92+31 TO 114+00	2169 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 91+90	30 SYD
ROCK CLUSTER	STA 91+31 STA 92+31	2 EA

SMITH & MULDER DRAIN



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MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 10
6 OF 12

**PLAN AND PROFILE
SMITH & MULDER DRAIN
STA 91+00 TO STA 114+00**

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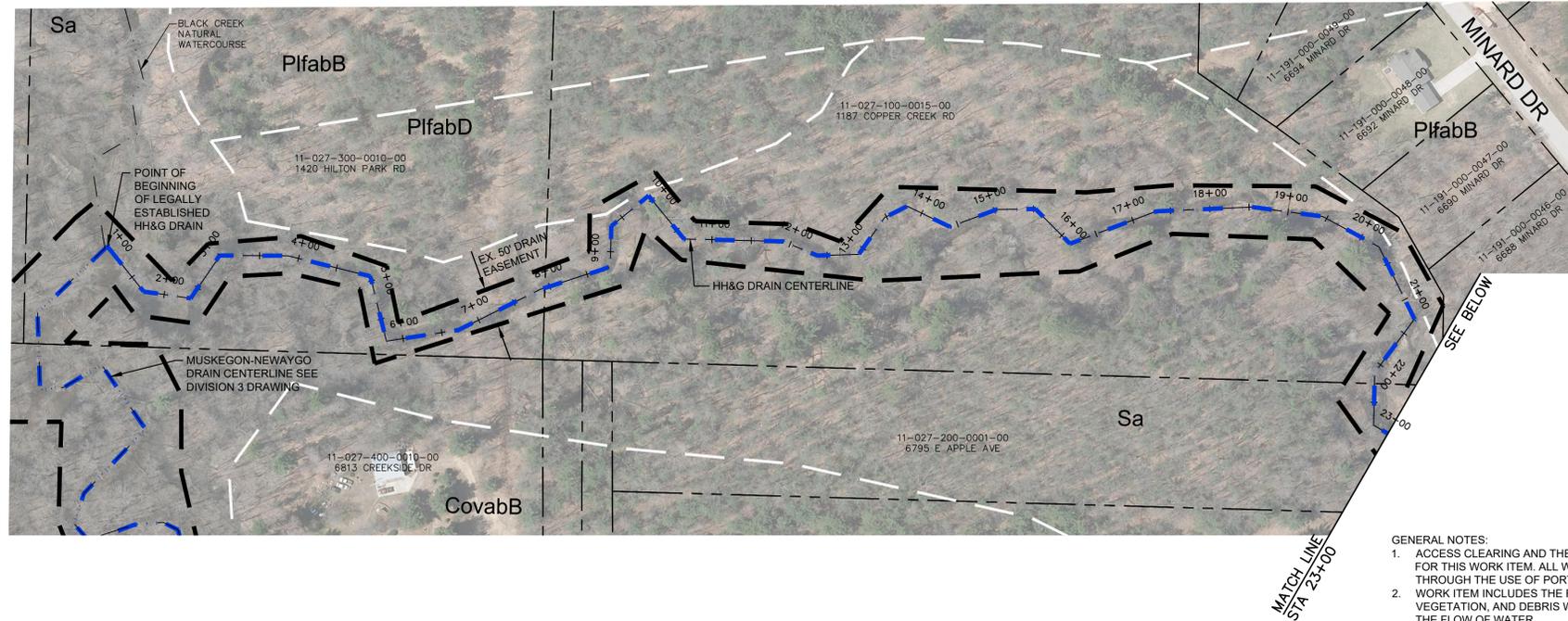


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BM #1 ELEV = 674.00
SET SPIKE W SIDE UTILITY POLE N OF EVANSTON AVE, 75' OF MAPLE ISLAND RD.

BM #2 ELEV = 672.91
SET SPIKE E SIDE UTILITY POLE N OF EVANSTON AVE, E OF DRIVE WAY 7360



- GENERAL NOTES:**
- ACCESS CLEARING AND THE USE OF HEAVY EQUIPMENT IS NOT ALLOWED FOR THIS WORK ITEM. ALL WORK IS TO BE COMPLETED BY HAND AND THROUGH THE USE OF PORTABLE EQUIPMENT.
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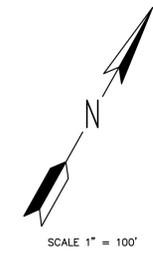
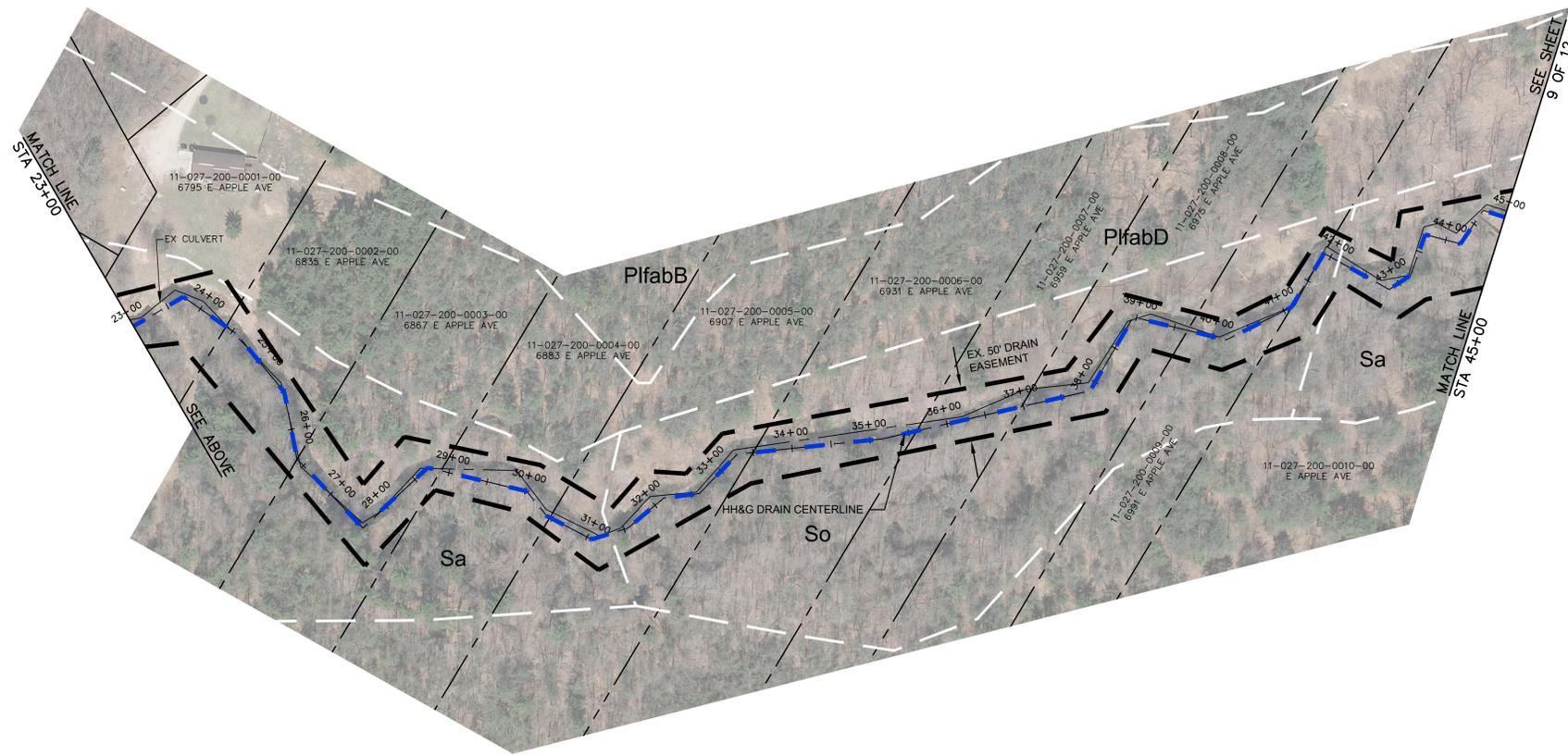
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WORK ITEM	LOCATION	QUANTITY
CHANNEL VEGETATION AND DEADFALL REMOVAL, W/O GRUBBING	STA 1+00 TO 45+00	4400 LF

HH&G DRAIN



**PLAN VIEW
HH&G DRAIN
STA 1+00 TO STA 45+00**

NO.	REVISIONS	DATE	BY

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517.887.1100

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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

BLACK CREEK CONSOLIDATED DRAIN DRAINAGE DISTRICT
PART OF EGELSTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 10
8 OF 12

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BM #2 ELEV = 672.91
SET SPIKE E SIDE UTILITY POLE N
OF EVANSTON AVE, E OF DRIVE
WAY 7360

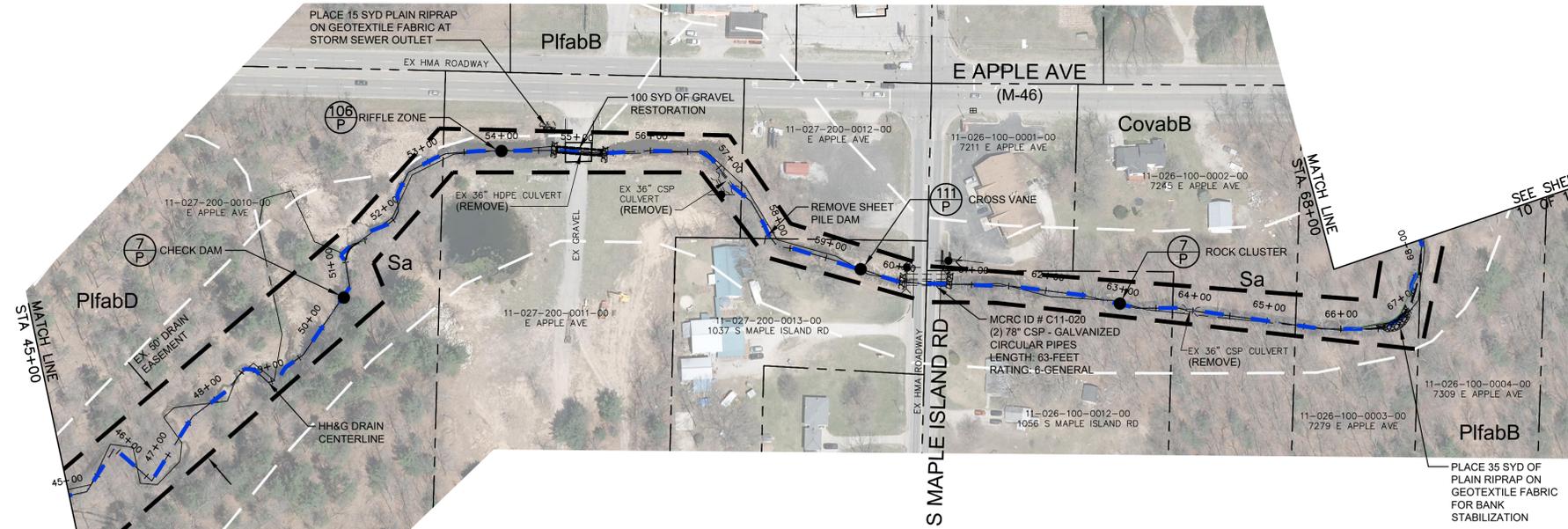
GENERAL NOTES:

- ALL TREES MUST BE MARKED BY ENGINEER PRIOR TO REMOVAL. FOR ACCESS CLEARING, ALL TREES REMOVED MUST BE CHIPPED OR HAVE LOGS STACKED WITHIN THE EASEMENT LIMITS. ALL OTHER WOODY MATERIAL MUST BE CHIPPED, BURIED-ON-SITE OR REMOVED FROM SITE. ALL TREES REMOVED FROM DITCH BOTTOM OR SIDES MUST BE CUT FLUSH.
- SPOILS TO BE PLACED AND LEVELED ALONG THE WORKING SIDE OF THE DRAIN, SO AS NOT TO AFFECT THE EXISTING DRAINAGE PATTERNS.
- LEVEL MULCH AND SEED SPOILS WITH OPEN CHANNEL SEED MIX. SPOILS SHALL NOT BE GREATER THAN 8-INCHES IN HEIGHT IN ANY GIVEN AREA.
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LEGEND

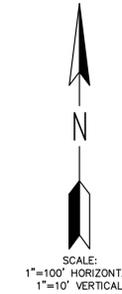
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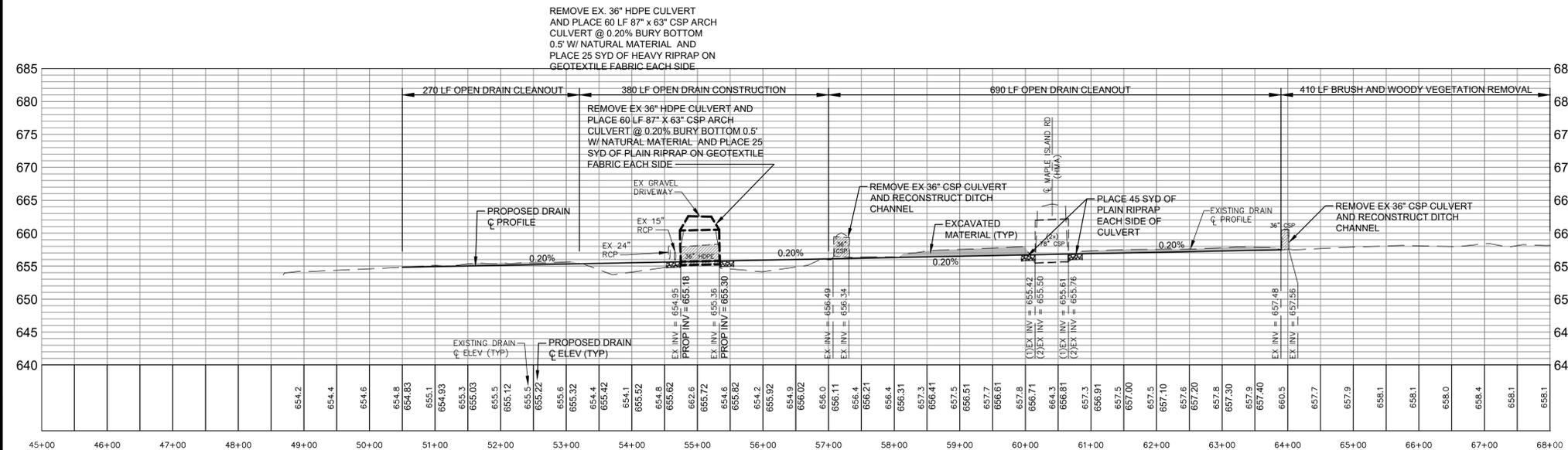
WORK ITEM	LOCATION	QUANTITY
CULVERT REMOVAL, 36-INCH DIAMETER AND LARGER	STA 54+75 TO 55+35 STA 57+08 TO 57+33 STA 63+90 TO 64+02	97 LF
SHEET PILE REMOVAL	STA 58+10	1 EA
OPEN DRAIN CLEANOUT	STA 50+50 TO 53+20 STA 57+00 TO 63+90	960 LF
OPEN DRAIN CONSTRUCTION	STA 53+20 TO 57+00	380 LF
CHANNEL VEGETATION AND DEADFALL REMOVAL, W/O GRUBBING	STA 63+90 TO 68+00	410 LF
87-INCH BY 63-INCH CSP ARCH CULVERT	STA 54+75 TO 55+35	60 LF
PLAIN RIPRAP ON GEOTEXTILE FABRIC	STA 54+73 STA 54+75 STA 55+35 STA 60+15 STA 60+65 STA 66+75	190 SYD
CROSS VANE	STA 59+50	1 EA
CHECK DAM	STA 50+50	1 EA
GRAVEL DRIVEWAY RESTORATION	STA 55+00	100 SYD
RIFFLE ZONE	STA 54+00	1 EA
ROCK CLUSTER	STA 63+00	1 EA
* BANK STABILIZATION	VARIABLES	100 LF
* COIR LOGS	VARIABLES	200 LF

HH&G DRAIN



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**PLAN AND PROFILE
HH&G DRAIN
STA 45+00 TO STA 68+00**

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Eng
Engineering & Surveying

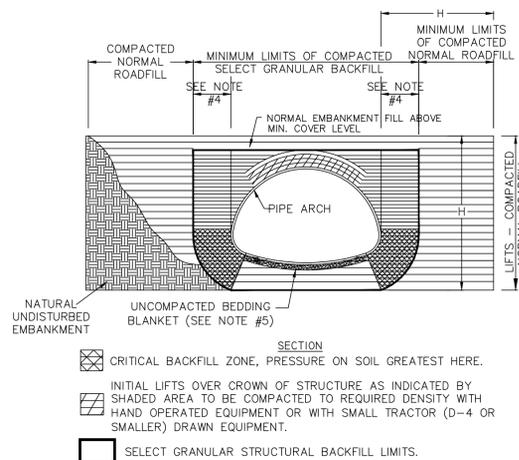
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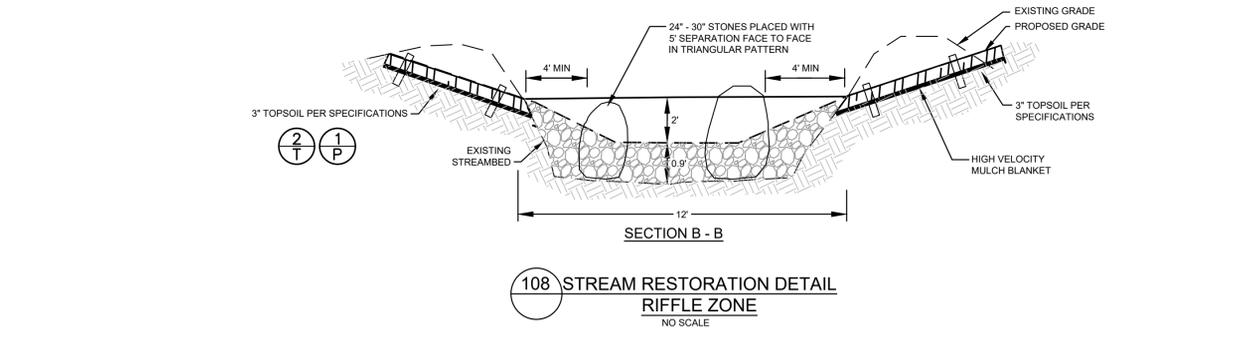
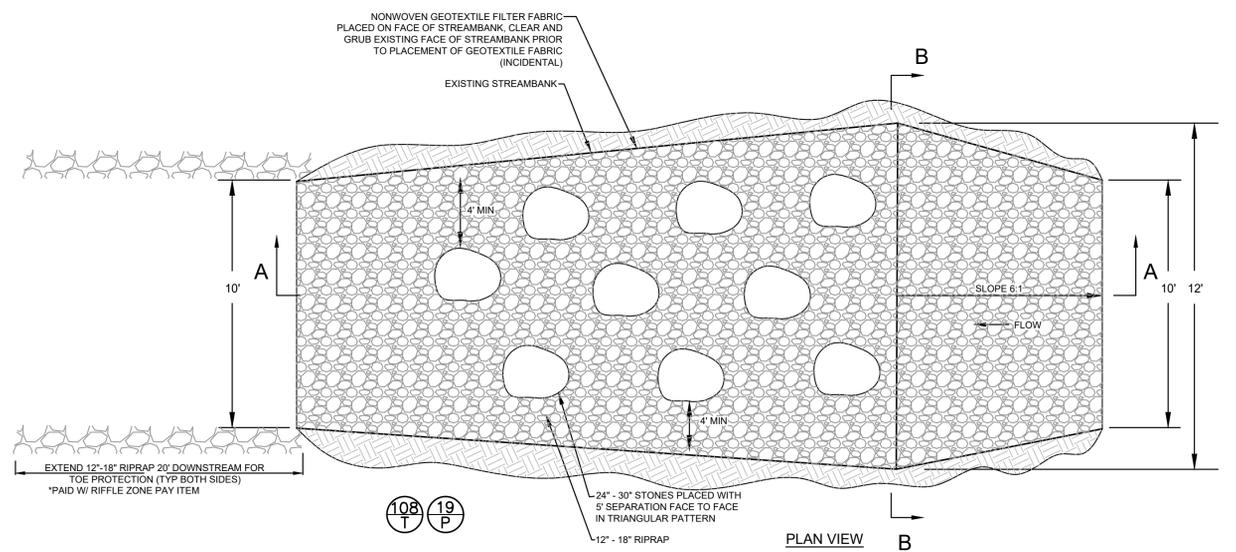
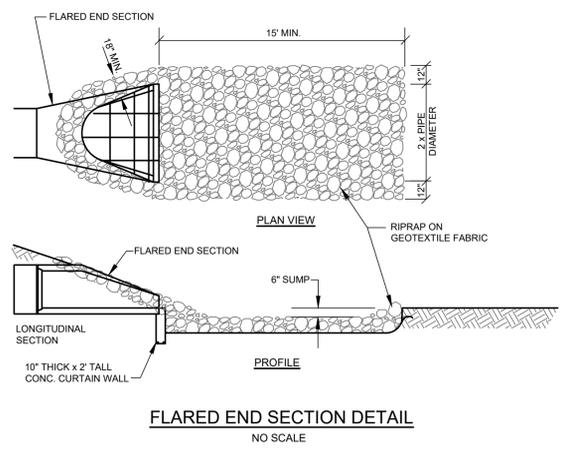
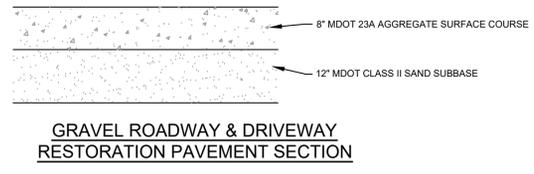
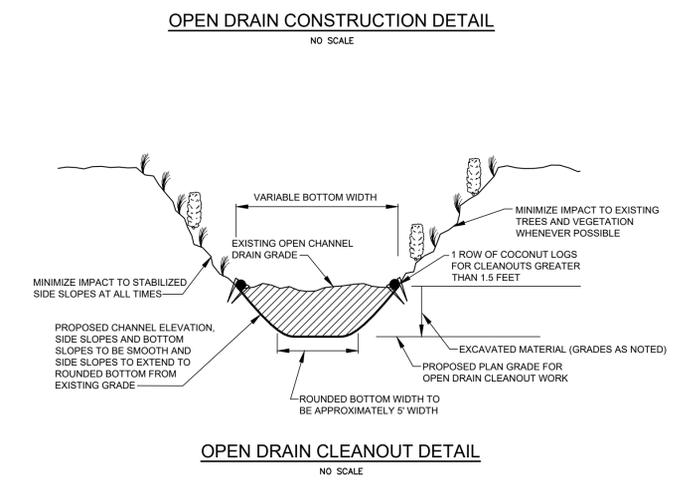
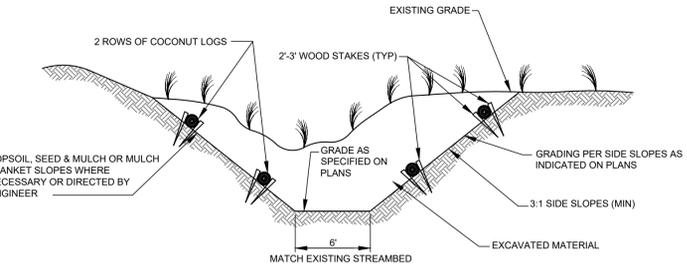
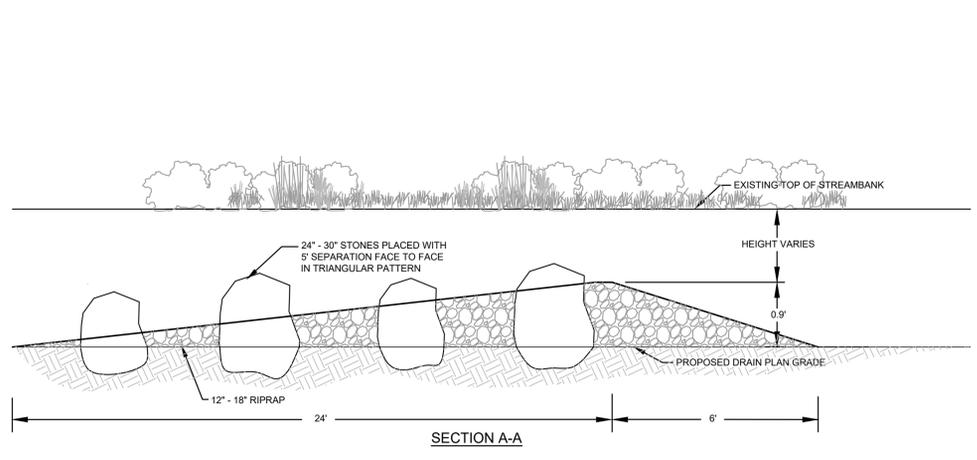
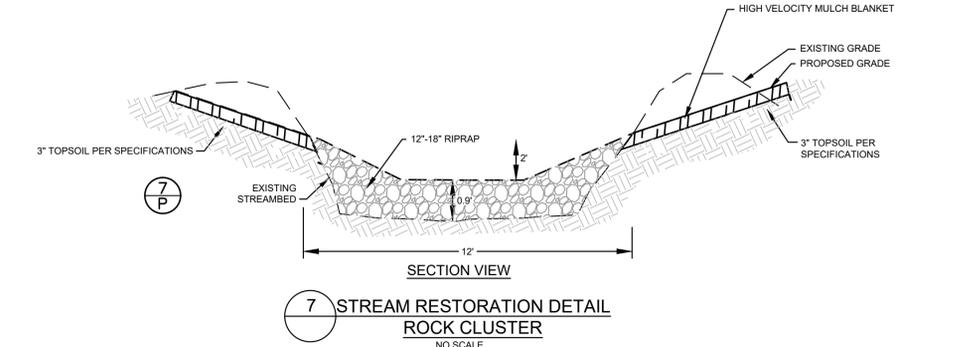
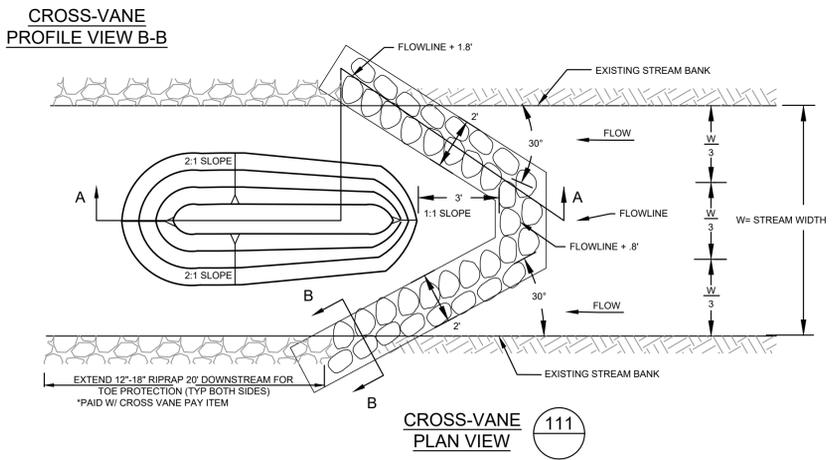
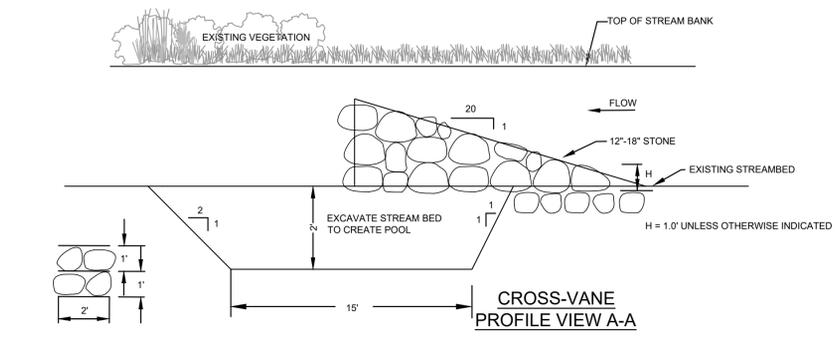


- NOTES:**
1. ALL SELECT GRANULAR BACKFILL TO BE PLACED IN A BALANCED FASHION IN THIN LIFTS (6"-8" TYPICALLY) AND COMPACTED TO 90 PERCENT DENSITY PER AASHTO T-180.
 2. COMPLETE AND REGULAR MONITORING OF THE CSP ARCH SHAPE IS NECESSARY DURING ALL BACKFILLING OF THE STRUCTURE.
 3. PREVENT EXCESSIVE DISTORTION OF SHAPE AS NECESSARY BY VARYING COMPACTION METHODS AND EQUIPMENT.
 4. THIS WIDTH SHOULD BE EQUAL TO 1/2 SPAN TO ONE SPAN WIDTH TYPICALLY. GREATER OR LESSER DISTANCE MAY BE REQUIRED. DISTANCE DEPENDS ON BEARING LOAD FOR ANY GIVEN LOADING, STRUCTURE SHAPE AND BACKFILL MATERIAL. THIS MUST BE EVALUATED BY THE PROJECT ENGINEER FOR EACH SPECIFIC SITUATION.
 5. SHAPED BED FOR A MINIMUM WIDTH OF SPAN/2. MINIMUM BEDDING THICKNESS IS TWICE THE CORRUGATION DEPTH.
 6. EMBANKMENT WIDTH H TO BE SUCH THAT A STABLE EMBANKMENT CAPABLE OF RESISTING SIDE PRESSURES FROM CSP PIPE-ARCH SHAPE WILL BE MAINTAINED THROUGHOUT THE LIFE OF INSTALLATION. THIS WIDTH TO BE DETERMINED BY THE PROJECT ENGINEER.

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CORRUGATED METAL PIPE-ARCH TYPICAL BACKFILL SECTION

DRAWN BY: CMD	REV. BY: XX	SCALE: N/A
DATE: 4/20/04	DATE: XX	1



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PART OF EGGLESTON, MOORLAND, RAVENNA & CASNOVIA TOWNSHIPS
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16041

SHEET NO.
DIVISION 10
11 OF 12

DETAILS

