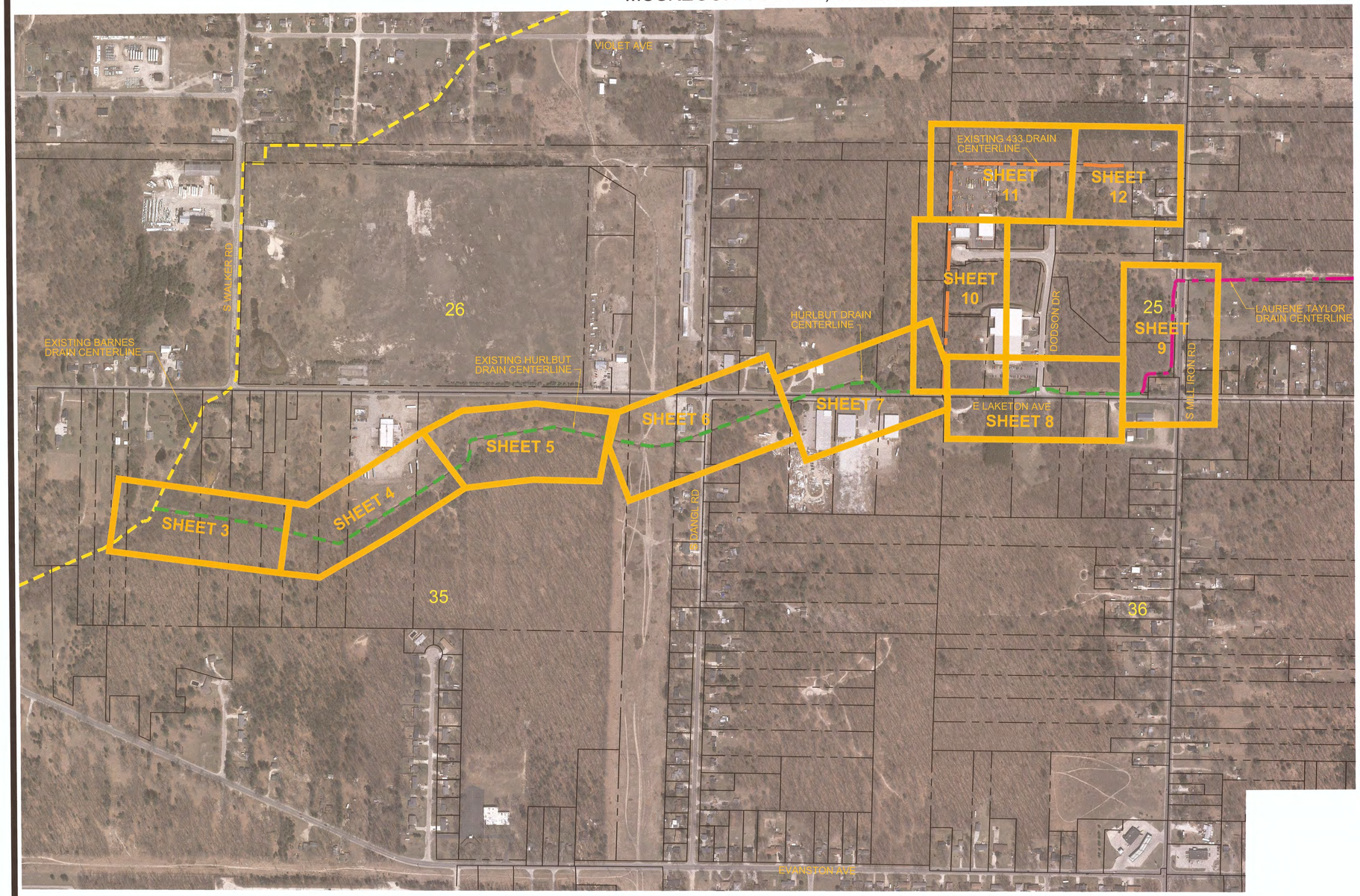
BRENDA M. MOORE

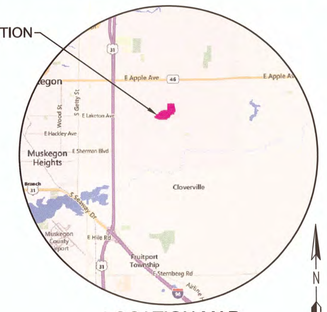
MUSKEGON COUNTY DRAIN COMMISSIONER

STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT

PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP, T10N, R16W AND
PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W
MUSKEGON COUNTY, MICHIGAN





LOCATION MAP
NO SCALE

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

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

TELEPHONE
FRONTIER COMMUNICATIONS
DAVID FLERMOEN
860 TERRACE STREET
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PHONE: 231-727-1319

ELECTRIC
CONSUMERS ENERGY
MICHELLE ANDREE
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CABLE TELEVISION
COMCAST
JON CHARLAND
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MUSKEGON, MI 49441
PHONE: 231-375-5112

WATER & SEWER
MUSKEGON TOWNSHIP
DEPARTMENT OF PUBLIC WORKS
JERRY SANDERS
1990 APPLE AVENUE
MUSKEGON, MI
PHONE: 231-773-8458

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

PETROLEUM PIPELINE
MARATHON PIPELINE, LLC
GIANNA COVELL, PE
539 SOUTH MAIN ST
FINDLAY, OH 45840
PHONE: 800-537-6644
419-672-6520
gdcovell@marathonpetroleum.com

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

SHEET INDEX

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2. DRAINAGE DISTRICT BOUNDARY AND ROUTE & COURSE EXHIBIT
3. PLAN & PROFILE STA 1+00 TO STA 10+00
4. PLAN & PROFILE STA 10+00 TO STA 20+00
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13. PROFILE THROUGH REGIONAL DETENTION BASIN
14. DETAILS & SOIL EROSION & SEDIMENTATION CONTROL MEASURES
15. DETAILS

LEGEND

- EXISTING HURLBUT DRAIN CENTERLINE
- EXISTING SECTION 433 DRAIN CENTERLINE
- EXISTING LAURENE TAYLOR DRAIN CENTERLINE
- EXISTING BARNES DRAIN CENTERLINE
- PARCEL LINE
- 25 — SECTION NUMBER
- SHEET 5 — SHEET LOCATION

N

SCALE: 1"= 300'

RYAN McENHILL, PE #56096 DATE

COVER SHEET

NO	REVISIONS	BY	DATE

Drawn By: SPM
Date: 8/1/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
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517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

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Engineering & Surveying

BRENDA M. MOORE
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W
AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W
MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

DRAWING
1 OF 15

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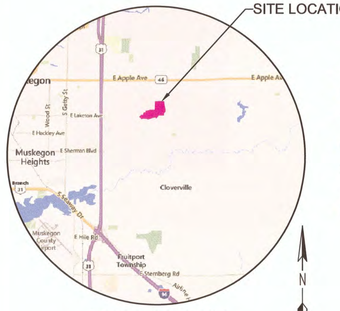
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STEPHANIE BARRETT DEPUTY DRAIN COMMISSIONER

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PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP, T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN



LOCATION MAP
NO SCALE

LEGEND

- EXISTING HURLBUT DRAIN CENTERLINE
- EXISTING SECTION 433 DRAIN CENTERLINE
- EXISTING LAURENE TAYLOR DRAIN CENTERLINE
- EXISTING BARNES DRAIN CENTERLINE
- MUNICIPAL BOUNDARY
- PARCEL LINE
- PROPOSED HURLBUT DRAIN DRAINAGE DISTRICT BOUNDARY
- 25 SECTION NUMBER

ROUTE & COURSE DESCRIPTION

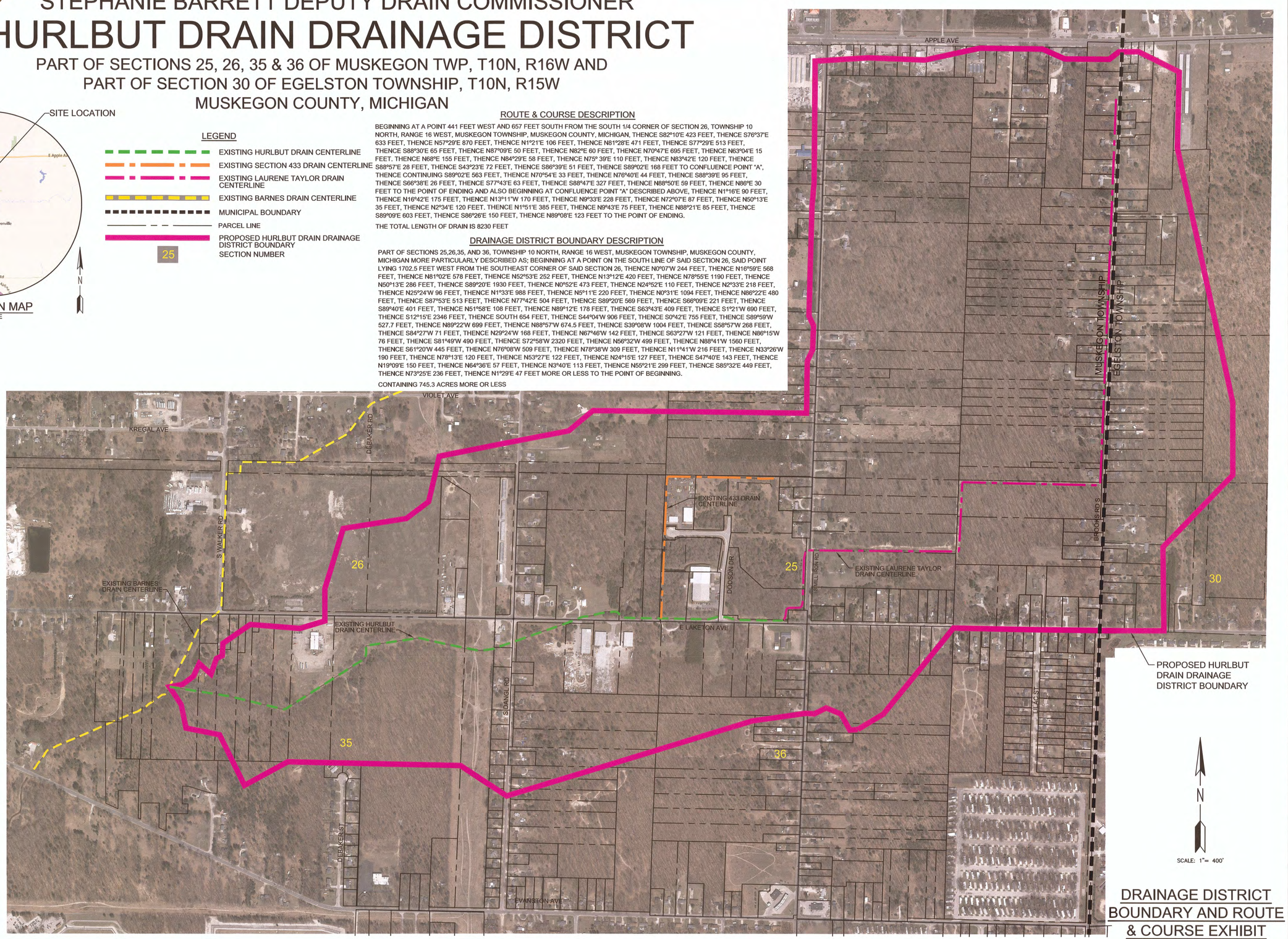
BEGINNING AT A POINT 441 FEET WEST AND 657 FEET SOUTH FROM THE SOUTH 1/4 CORNER OF SECTION 26, TOWNSHIP 10 NORTH, RANGE 16 WEST, MUSKEGON TOWNSHIP, MUSKEGON COUNTY, MICHIGAN, THENCE S82°10'E 423 FEET, THENCE S76°37'E 633 FEET, THENCE N57°29'E 870 FEET, THENCE N1°21'E 106 FEET, THENCE N81°28'E 471 FEET, THENCE S77°29'E 513 FEET, THENCE S88°30'E 65 FEET, THENCE N87°09'E 50 FEET, THENCE N82°E 60 FEET, THENCE N70°47'E 695 FEET, THENCE N63°04'E 15 FEET. THENCE N68°E 155 FEET, THENCE N84°29'E 58 FEET, THENCE N75° 39'E 110 FEET, THENCE N83°42'E 120 FEET, THENCE S88°57'E 28 FEET, THENCE S43°23'E 72 FEET, THENCE S86°39'E 51 FEET, THENCE S89°02'E 168 FEET TO CONFLUENCE POINT "A", THENCE CONTINUING S89°02'E 563 FEET, THENCE N70°54'E 33 FEET, THENCE N76°40'E 44 FEET, THENCE S88°39'E 95 FEET, THENCE S66°38'E 26 FEET, THENCE S77°43'E 63 FEET, THENCE S88°47'E 327 FEET, THENCE N88°50'E 59 FEET, THENCE N86°E 30 FEET TO THE POINT OF ENDING AND ALSO BEGINNING AT CONFLUENCE POINT "A" DESCRIBED ABOVE, THENCE N1°16'E 90 FEET, THENCE N16°42'E 175 FEET, THENCE N13°11'W 170 FEET, THENCE N9°33'E 228 FEET, THENCE N72°07'E 87 FEET, THENCE N50°13'E 35 FEET, THENCE N2°34'E 120 FEET. THENCE N1°51'E 385 FEET, THENCE N9°43'E 75 FEET, THENCE N88°21'E 85 FEET, THENCE S89°09'E 603 FEET, THENCE S86°26'E 150 FEET, THENCE N89°08'E 123 FEET TO THE POINT OF ENDING.

THE TOTAL LENGTH OF DRAIN IS 8230 FEET

DRAINAGE DISTRICT BOUNDARY DESCRIPTION

PART OF SECTIONS 25,26,35, AND 36, TOWNSHIP 10 NORTH, RANGE 16 WEST, MUSKEGON TOWNSHIP, MUSKEGON COUNTY, MICHIGAN MORE PARTICULARLY DESCRIBED AS; BEGINNING AT A POINT ON THE SOUTH LINE OF SAID SECTION 26, SAID POINT LYING 1702.5 FEET WEST FROM THE SOUTHEAST CORNER OF SAID SECTION 26, THENCE N0°07'W 244 FEET, THENCE N16°59'E 568 FEET, THENCE N81°02'E 578 FEET, THENCE N52°53'E 252 FEET, THENCE N13°12'E 420 FEET, THENCE N78°55'E 1190 FEET, THENCE N50°13'E 286 FEET, THENCE S89°20'E 1930 FEET, THENCE N0°52'E 473 FEET, THENCE N24°52'E 110 FEET, THENCE N2°33'E 218 FEET, THENCE N25°24'W 96 FEET, THENCE N1°33'E 988 FEET, THENCE N5°11'E 220 FEET, THENCE N0°31'E 1094 FEET, THENCE N86°22'E 480 FEET, THENCE S87°53'E 513 FEET, THENCE N77°42'E 504 FEET, THENCE S89°20'E 569 FEET, THENCE S66°09'E 221 FEET, THENCE S89°40'E 401 FEET, THENCE N51°58'E 108 FEET, THENCE N89°12'E 178 FEET, THENCE S63°43'E 409 FEET, THENCE S1°21'W 690 FEET, THENCE S12°15'E 2346 FEET, THENCE SOUTH 654 FEET, THENCE S44°04'W 906 FEET, THENCE S0°42'E 755 FEET, THENCE S89°59'W 527.7 FEET, THENCE N89°22'W 699 FEET, THENCE N88°57'W 674.5 FEET, THENCE S39°08'W 1004 FEET, THENCE S58°57'W 268 FEET, THENCE S84°27'W 71 FEET, THENCE N29°24'W 168 FEET, THENCE N67°46'W 142 FEET, THENCE S63°27'W 121 FEET, THENCE N86°15'W 76 FEET, THENCE S81°49'W 490 FEET, THENCE S72°58'W 2320 FEET, THENCE N56°32'W 499 FEET, THENCE N88°41'W 1560 FEET, THENCE S61°20'W 445 FEET, THENCE N76°08'W 509 FEET, THENCE N78°38'W 309 FEET, THENCE N11°41'W 216 FEET, THENCE N33°26'W 190 FEET, THENCE N78°13'E 120 FEET, THENCE N53°27'E 122 FEET, THENCE N24°15'E 127 FEET, THENCE S47°40'E 143 FEET, THENCE N19°09'E 150 FEET, THENCE N64°36'E 57 FEET, THENCE N3°40'E 113 FEET, THENCE N55°21'E 299 FEET, THENCE S85°32'E 449 FEET, THENCE N73°25'E 236 FEET, THENCE N1°29'E 47 FEET MORE OR LESS TO THE POINT OF BEGINNING.

CONTAINING 745.3 ACRES MORE OR LESS



DRAINAGE DISTRICT BOUNDARY AND ROUTE & COURSE EXHIBIT

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 10/10/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

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Eng TM
Engineering & Surveying

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STEPHANIE BARRETT DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT

PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

DRAWING
2 OF 15

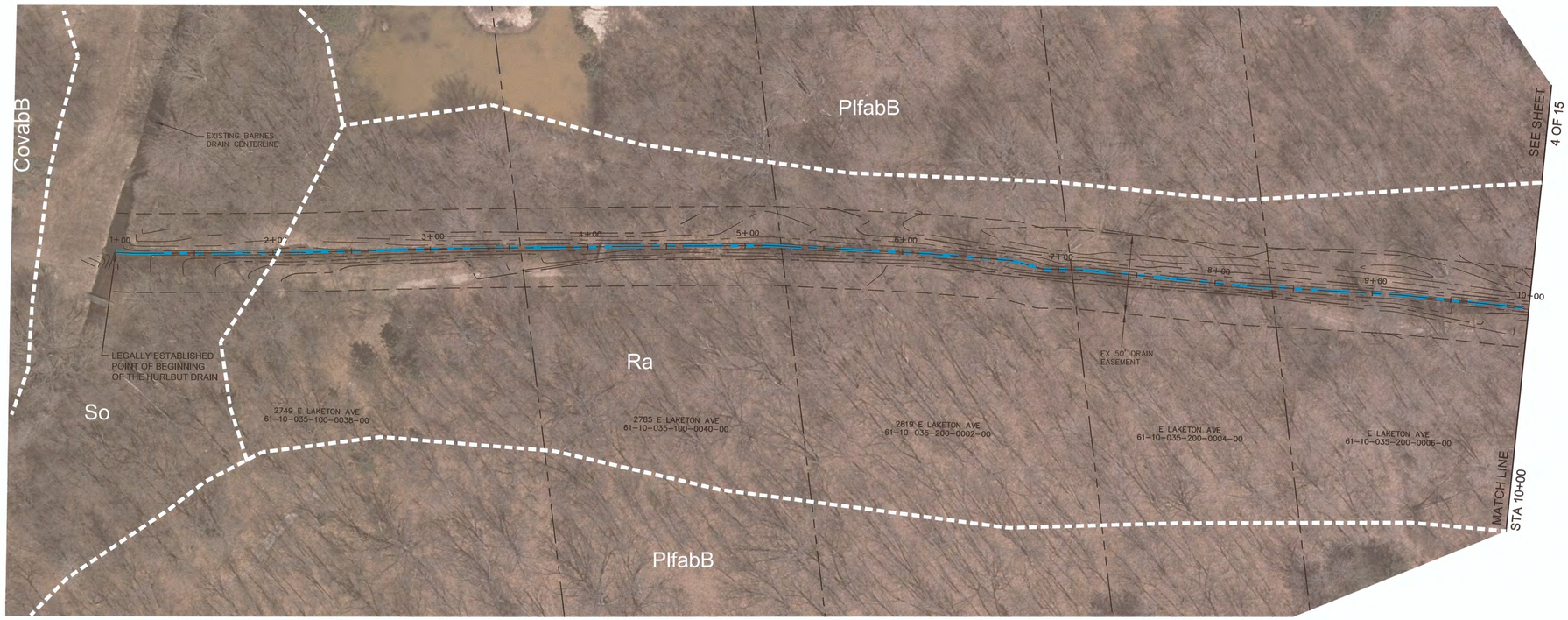
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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJIW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

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

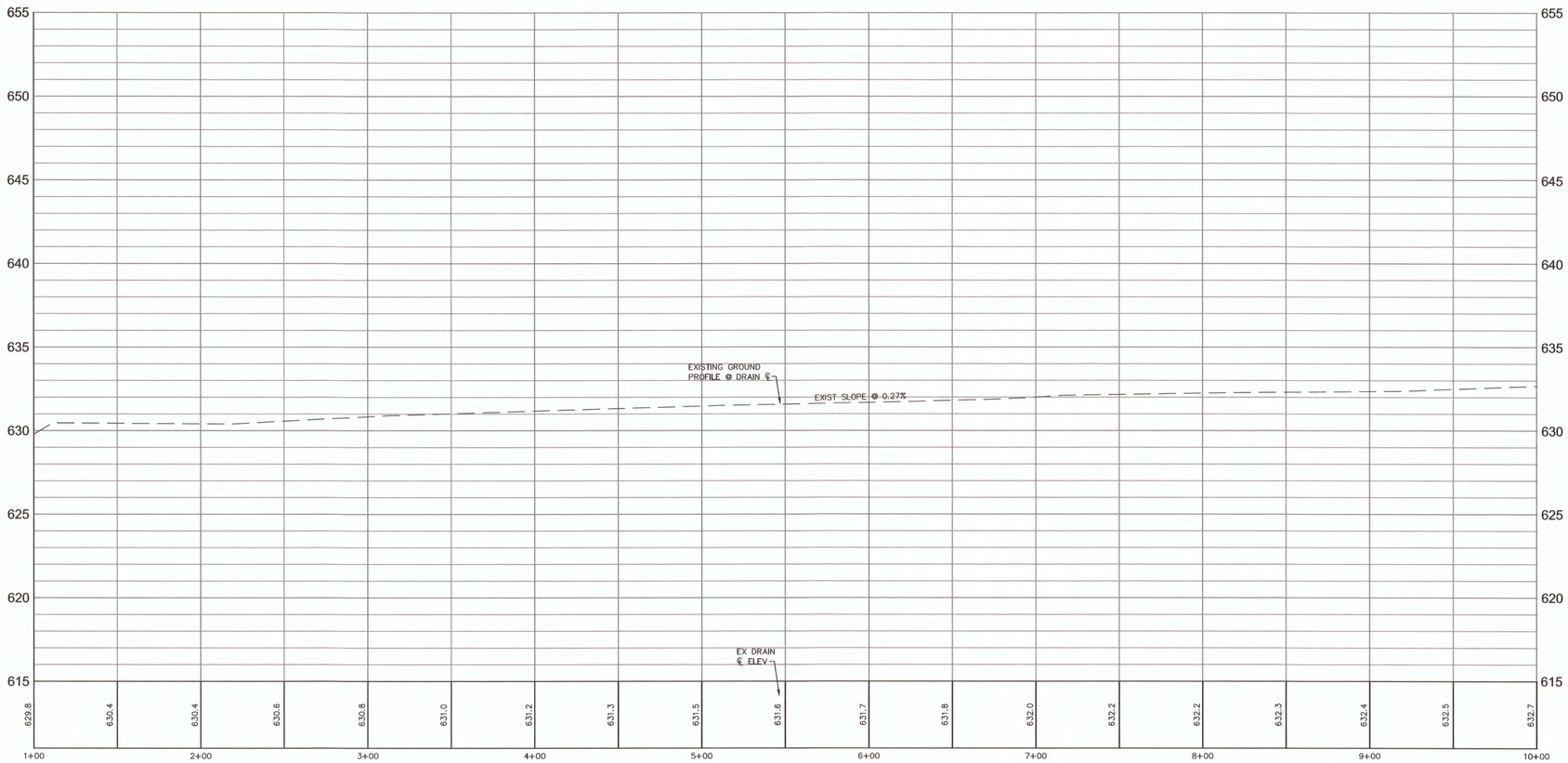
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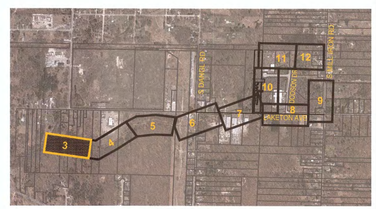
SCALE
HORIZONTAL: 1"=40'
VERTICAL: 1"=4'

NO CONTRACT WORK THIS SHEET



LEGEND

- = DECIDUOUS TREE
- = CONIFEROUS TREE
- = SHRUB
- = EXISTING LIGHT POLE
- = EXISTING UTILITY POLE
- = EXISTING ELECTRIC
- = EXISTING FIRE HYDRANT
- = EXISTING WATER VALVE/WATER MAIN
- = EXISTING SANITARY MANHOLE/SEWER
- GAS = EXISTING GAS LINE
- = EXISTING RIGHT OF WAY LINE
- = EXISTING PROPERTY LINE
- = EXISTING DRAIN EASEMENT LINE
- = EXISTING HURLBUT DRAIN ℄
- = BEEHIVE CATCH BASIN
- = CURB INLET CATCH BASIN
- = STORM MANHOLE/SEWER
- 660 = EXISTING CONTOUR
- = SIGN
- BM = BENCH MARK
- = SECTION CORNER
- = EXISTING CURB AND GUTTER
- HMA = EXISTING HMA PAVEMENT
- CONC = EXISTING CONCRETE PAVEMENT
- = EXISTING FENCE LINE
- 1744 S DANGL 61-10-025-300-0027-00 = PROPERTY ID
- = PROPOSED STORM SEWER
- PlfabB = SOIL TYPE



KEY PLAN

PLAN & PROFILE
STA 1+00 TO STA 10+00

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

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

Engineering & Surveying

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
3 OF 15

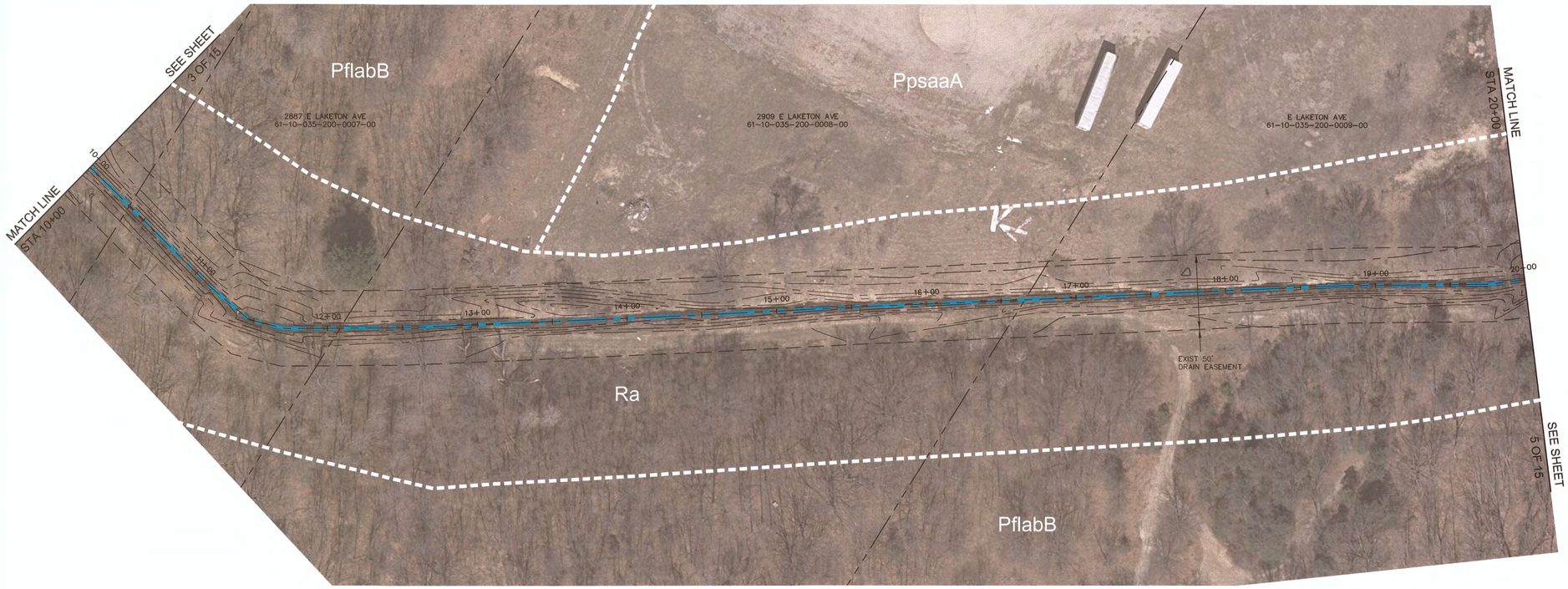
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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJW ON HYDRANT S SIDE LUND AVE AT W END

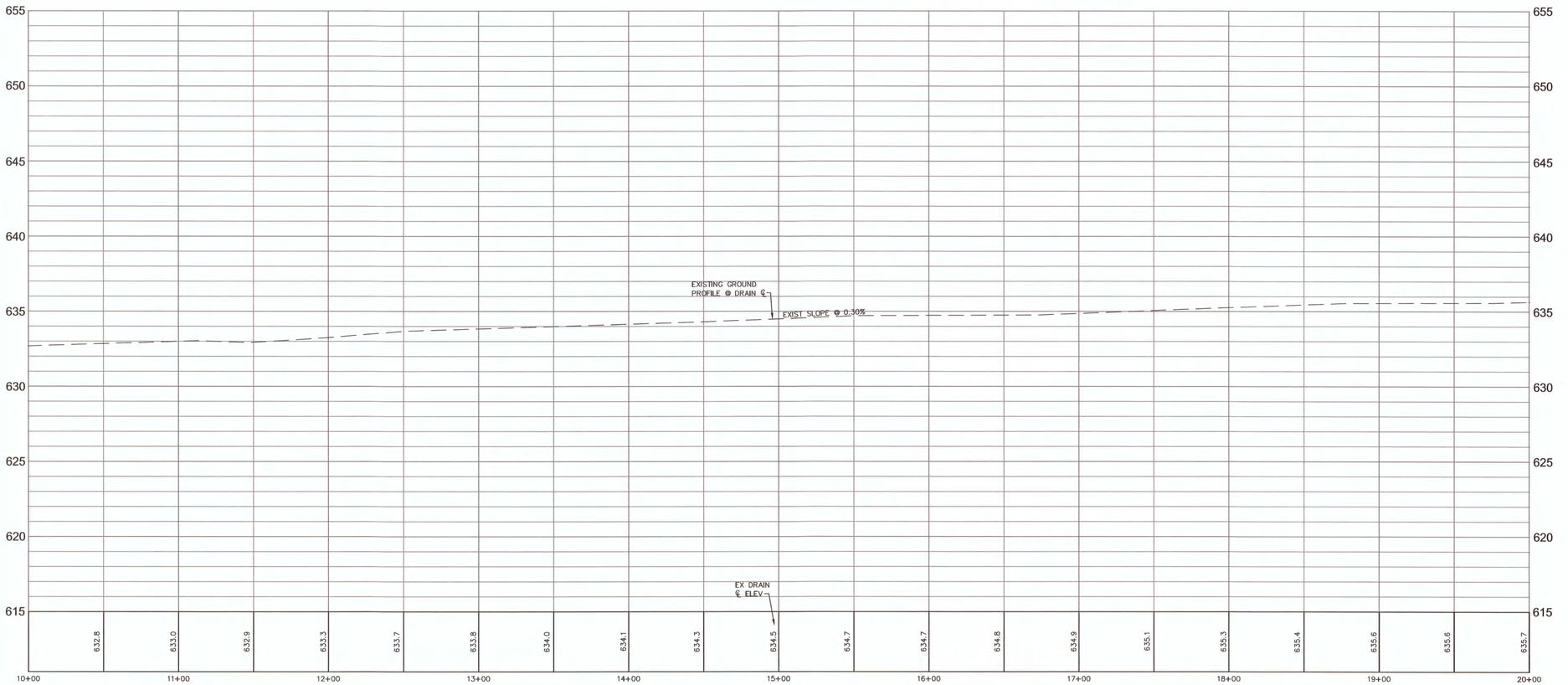
BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

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

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NO CONTRACT WORK THIS SHEET

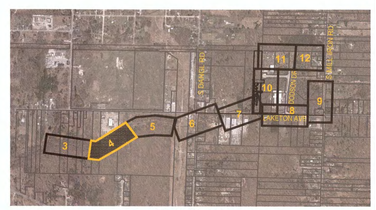


N

SCALE
HORIZONTAL: 1"=40'
VERTICAL: 1"=4'

LEGEND

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- = CONIFEROUS TREE
- = SHRUB
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- = CURB INLET CATCH BASIN
- = STORM MANHOLE/SEWER
- 860 = EXISTING CONTOUR
- = SIGN
- BM = BENCH MARK
- = SECTION CORNER
- = EXISTING CURB AND GUTTER
- HMA = EXISTING HMA PAVEMENT
- CONC = EXISTING CONCRETE PAVEMENT
- = EXISTING FENCE LINE
- 1744 S DANGL 61-10-025-300-0027-00 = PROPERTY ID
- = PROPOSED STORM SEWER
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KEY PLAN

PLAN & PROFILE
STA 10+00 TO STA 20+00

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

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Engineering & Surveying

BRENDA M. MOORE
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STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
4 OF 15

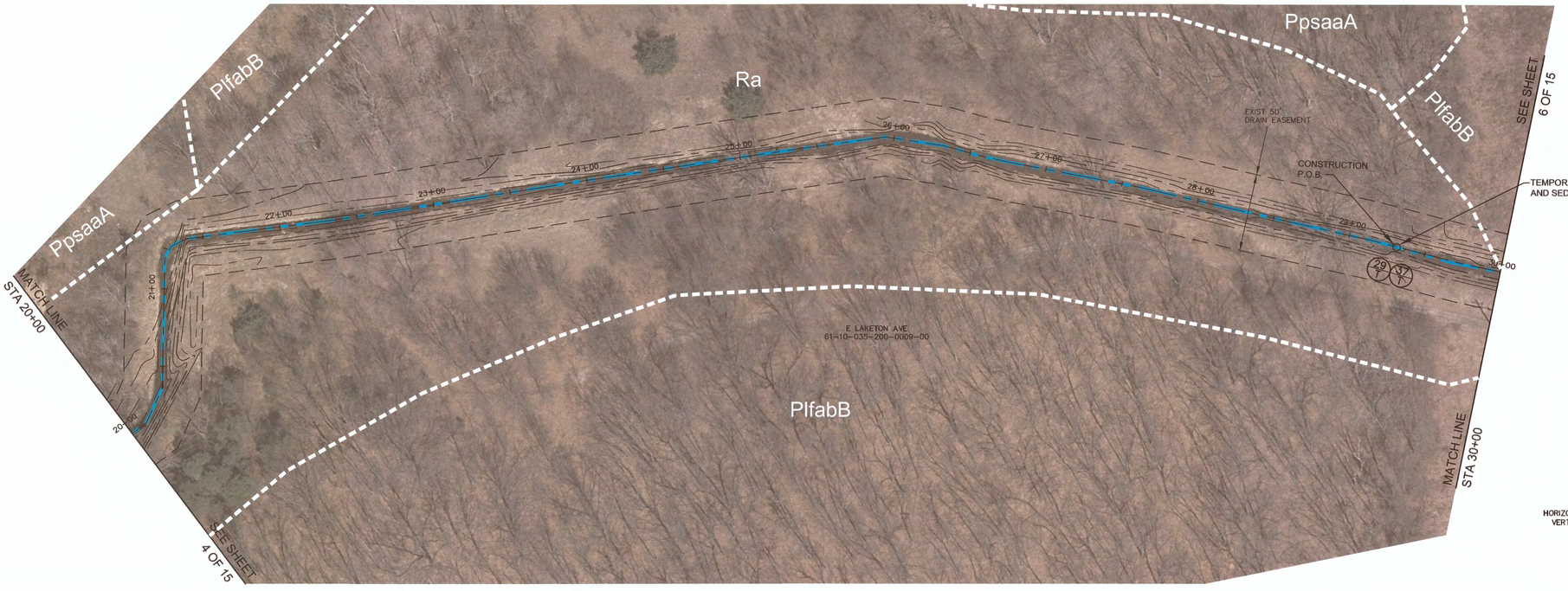
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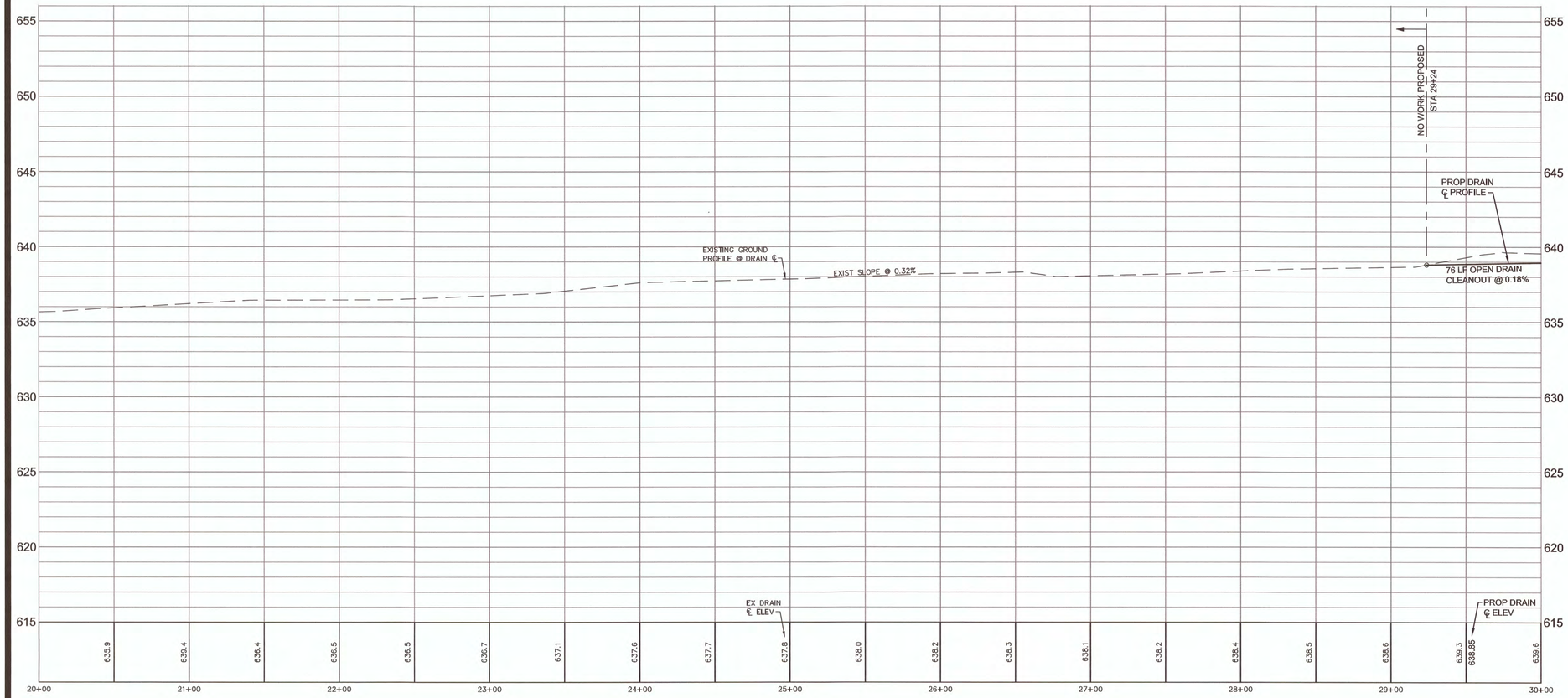
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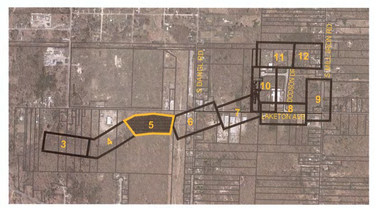
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SCALE
HORIZONTAL: 1"=40'
VERTICAL: 1"=4'



LEGEND

- = DECIDUOUS TREE
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- PlfabB = SOIL TYPE
- XX T = TEMPORARY SESC MEASURE
- XX P = PERMANENT SESC MEASURE



KEY PLAN

PLAN & PROFILE
STA 20+00 TO STA 30+00

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
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Engineering & Surveying

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HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
5 OF 15

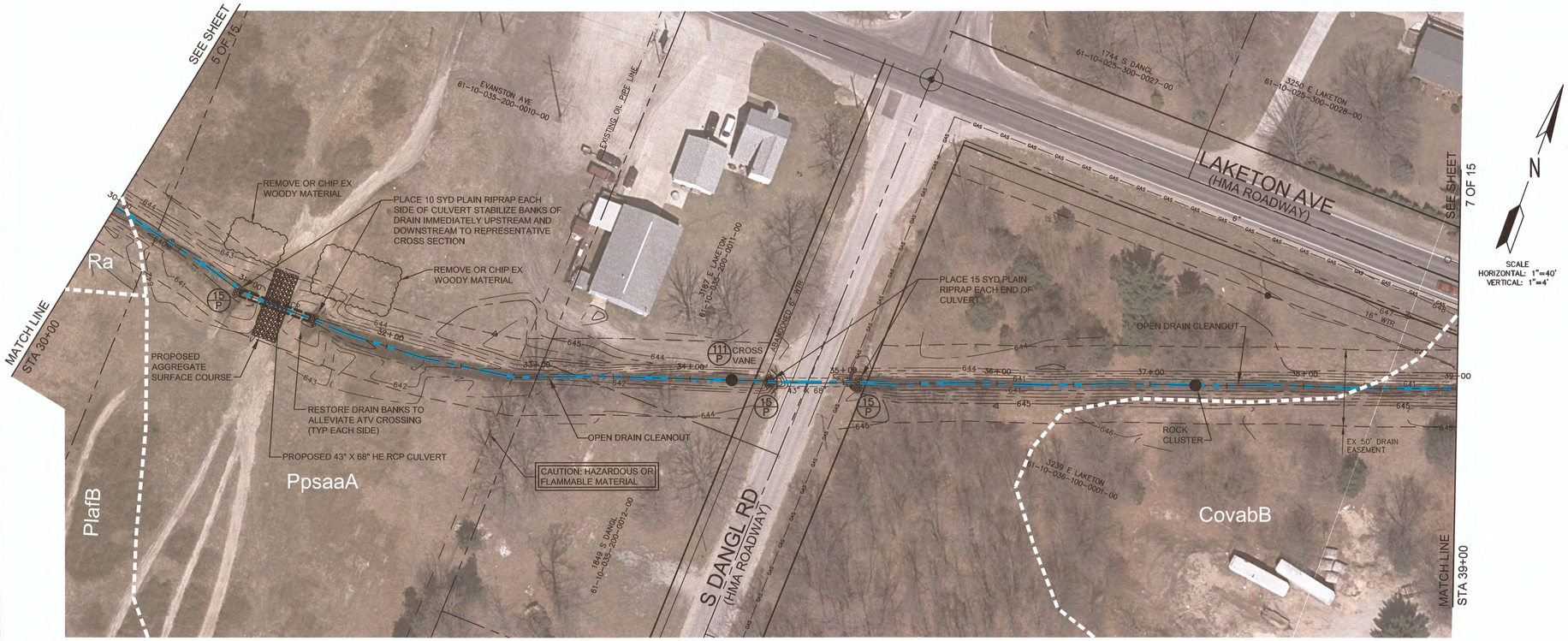
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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJIW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

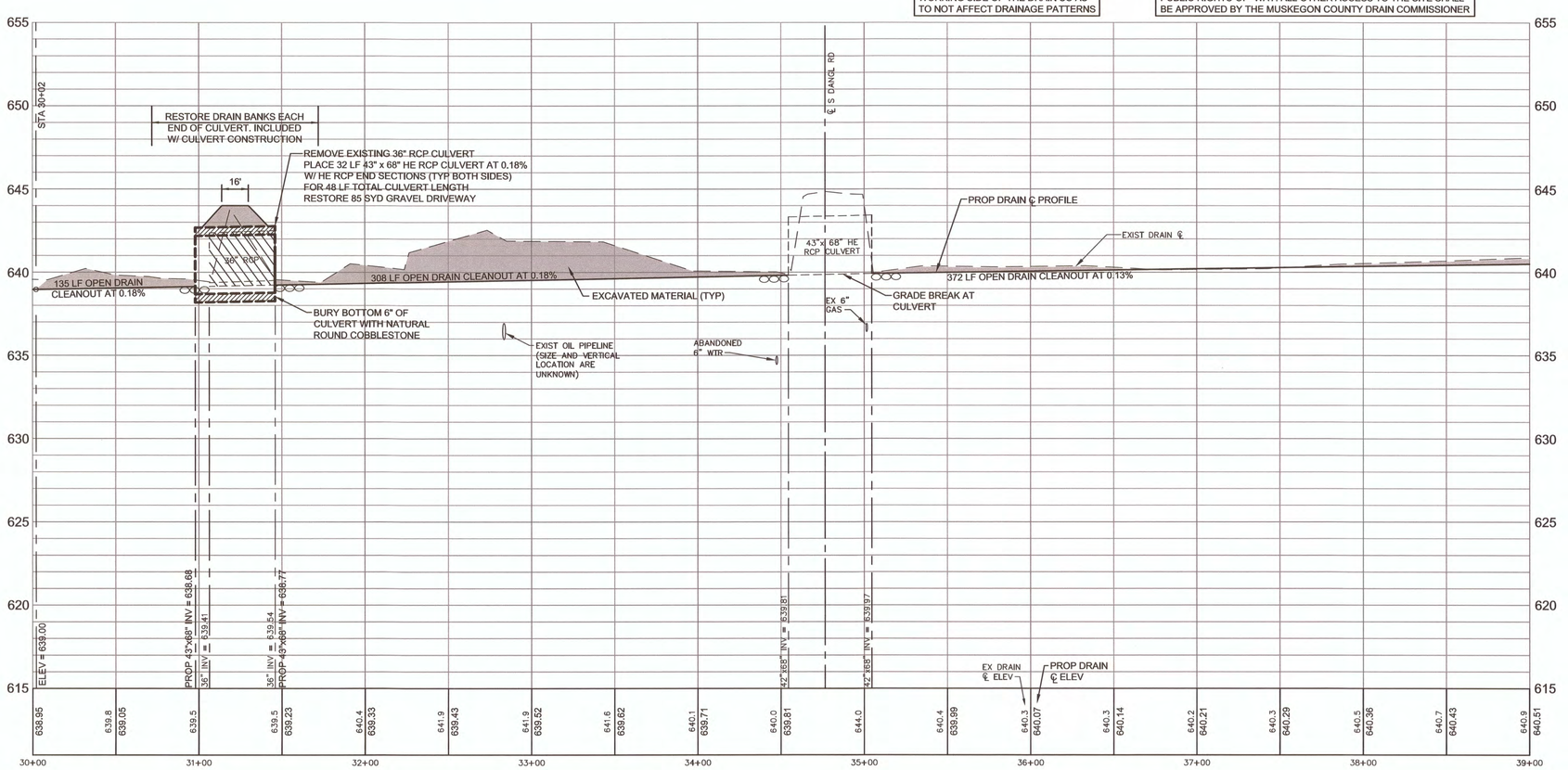
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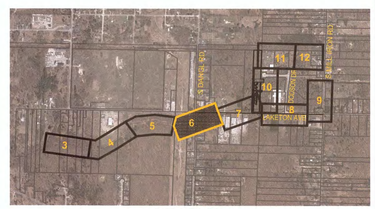
SPOILS TO BE PLACED ALONG THE WORKING SIDE OF THE DRAIN SO AS TO NOT AFFECT DRAINAGE PATTERNS

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LEGEND

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- = EXISTING DRAIN EASEMENT LINE
- = EXISTING HURLBUT DRAIN ℄
- = BEEHIVE CATCH BASIN
- = CURB INLET CATCH BASIN
- = STORM MANHOLE/SEWER
- 650 = EXISTING CONTOUR
- = SIGN
- BM = BENCH MARK
- = SECTION CORNER
- = EXISTING CURB AND GUTTER
- HMA = EXISTING HMA PAVEMENT
- CONC = EXISTING CONCRETE PAVEMENT
- = EXISTING FENCE LINE
- 1744 S DANGL 61-10-025-300-0027-00 = PROPERTY ID
- = PROPOSED STORM SEWER
- PlfabB = SOIL TYPE
- XX = TEMPORARY SESC MEASURE
- XX P = PERMANENT SESC MEASURE



KEY PLAN

PLAN & PROFILE STA 30+00 TO STA 39+00

NO.	REVISIONS	BY	DATE

Drawn By SPM Date 7/29/16 Approved By Date

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

engdct.com

Engineering & Surveying

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO. 16022

SHEET NO. 6 OF 15

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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJIW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

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SEE SHEET 6 OF 15

MATCH LINE STA 39+00

PLACE 15 SYD PLAIN RIPRAP EACH END OF CULVERT

GRAVEL DRIVEWAY RESTORATION

HMA ROADWAY RESTORATION IN ACCORDANCE WITH CROSS SECTION DETAIL ON SHEET 15 (SAW CUT REQUIRED AT EACH END)

OPEN DRAIN CLEANOUT

PLACE 10 SYD HEAVY RIPRAP EACH END OF CULVERTS

SEE SHEET 13 OF 15 FOR DETAILED GRADING OF REGIONAL DETENTION SYSTEM

CROSS VANE

RELOCATE UTILITY POLE AND GUY WIRES (BY OTHERS)

REMOVE EX 54" RCP CULVERT

REMOVE AND RE-INSTALL GUARDRAIL AS NECESSARY TO ACCOMMODATE CULVERT REPLACEMENT

20' UTILITY EASEMENT

LAKETON AVE (HMA ROADWAY)

ROCK CLUSTER

EXIST 50' DRAIN EASEMENT

REMOVE EX 42" CULVERT HMA DRIVEWAY RESTORATION

OPEN DRAIN CLEANOUT

HAZARDOUS OR FLAMMABLE MATERIAL

ARMOR BANK WITH 15 SYD HEAVY RIPRAP

TEMPORARY CHECK DAM AND SEDIMENT SUMP

REMOVE EX 42" RCP CULVERT AND RESTORE OPEN CHANNEL

SEE SHEET 8 OF 15

MATCH LINE STA 49+00

PpsaaA

CavabB

PfabB

3279 E LAKETON 61-10-036-100-0004-00

3319 E LAKETON 61-10-036-100-0005-00

3359 E LAKETON 61-10-036-100-0005-10

3270 E LAKETON 61-10-025-300-0029-00

3320 E LAKETON 61-10-025-300-0028-00

3330 E LAKETON 61-10-025-300-0031-00

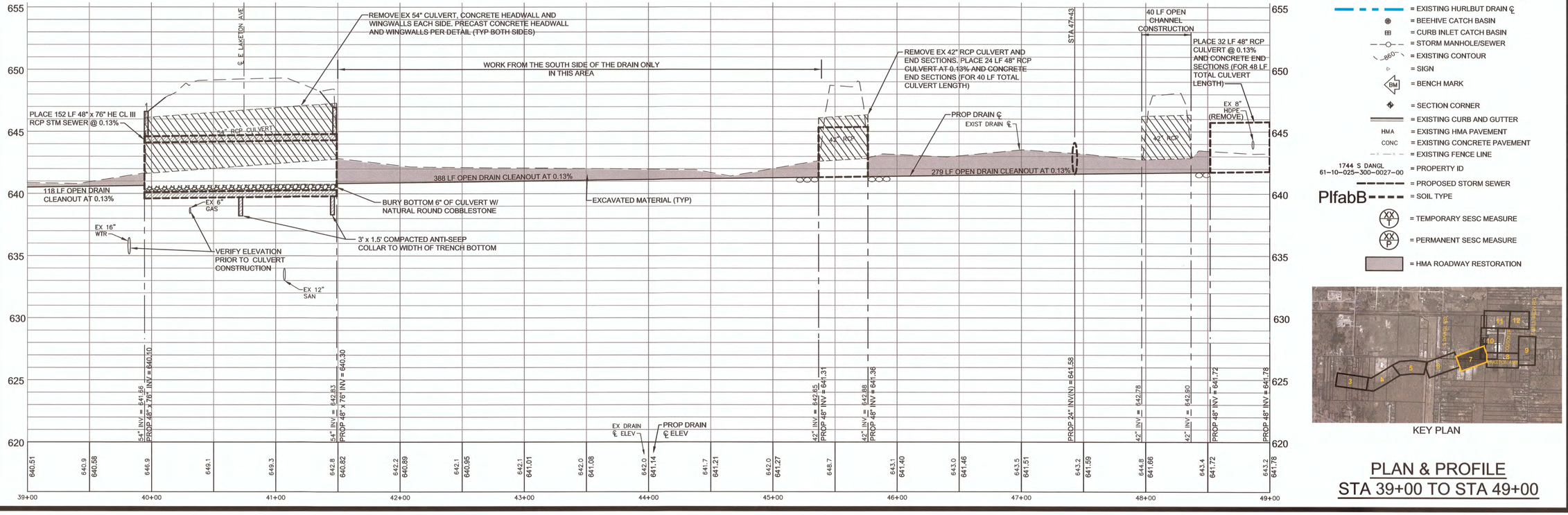
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KEY PLAN

PLAN & PROFILE STA 39+00 TO STA 49+00

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
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517.887.1100

16930 Robbins Road Suite 105
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Eng TM Engineering & Surveying

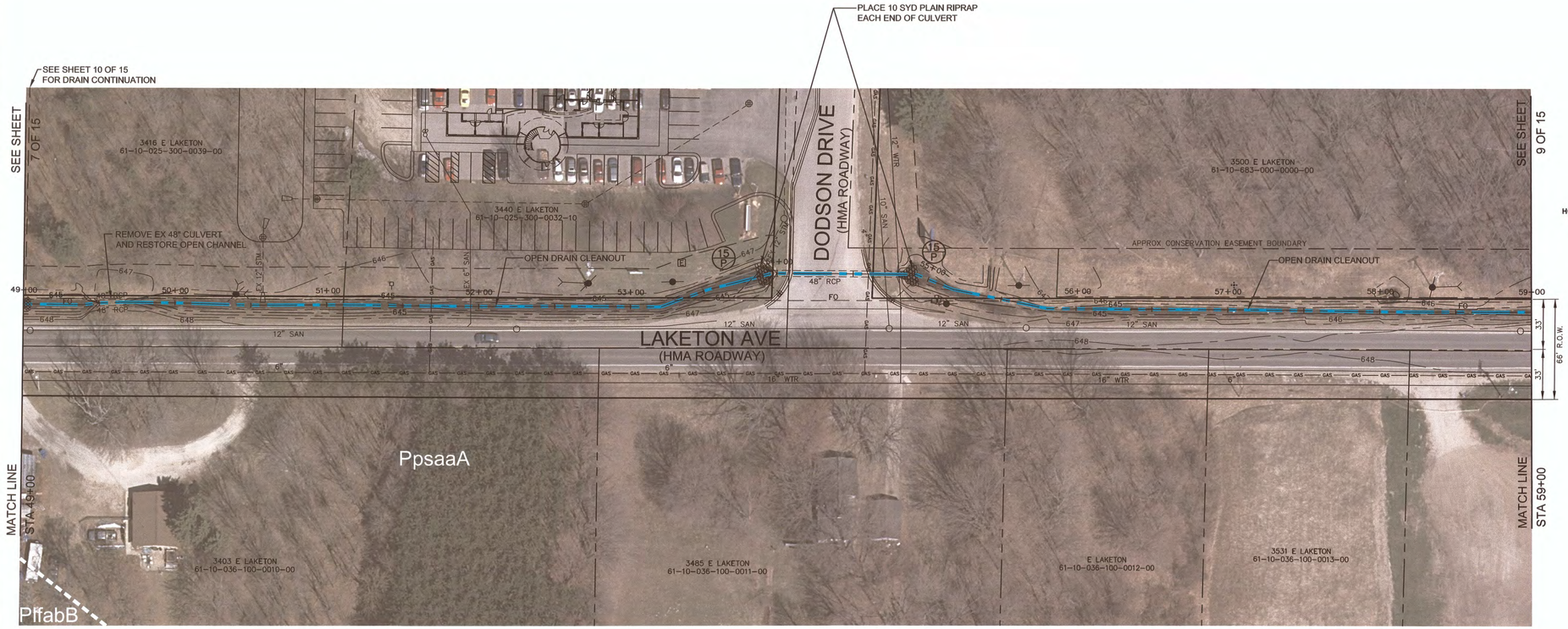
BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO. 16022

SHEET NO. 7 OF 15

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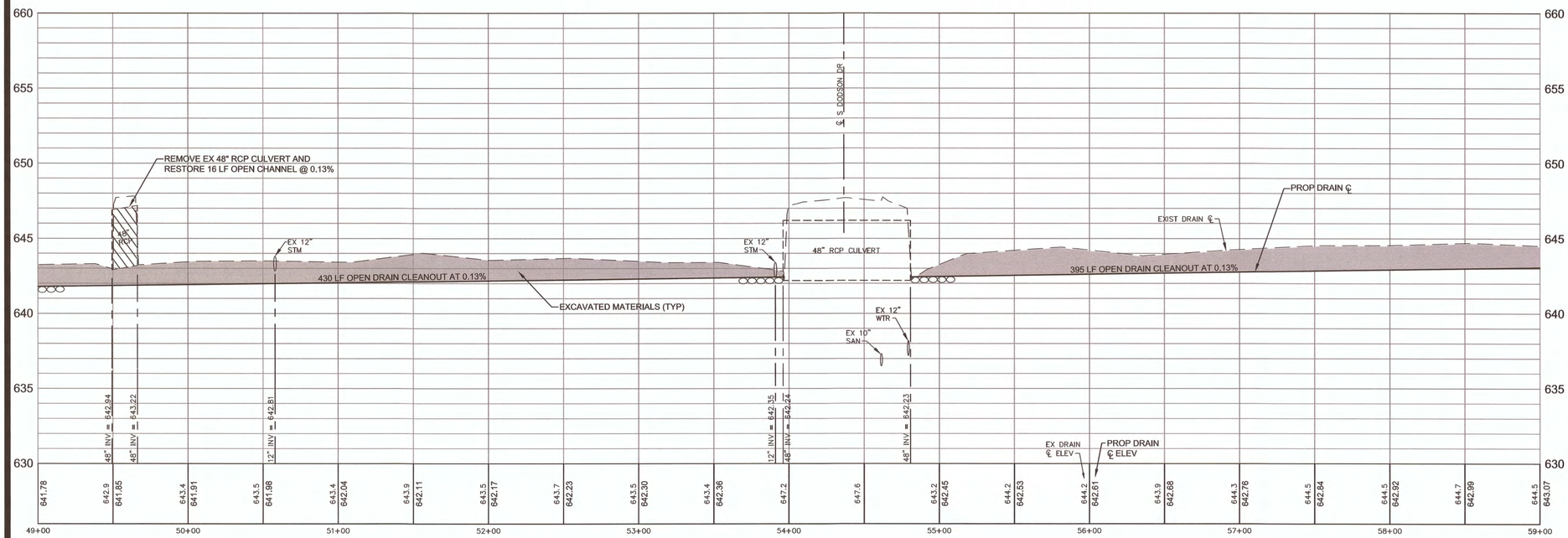
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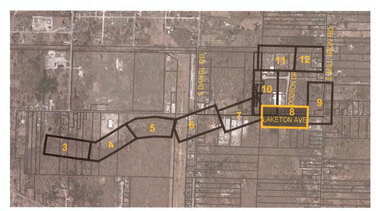
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- = PROPOSED STORM SEWER
- PlfabB = SOIL TYPE



KEY PLAN

PLAN & PROFILE STA 49+00 TO STA 59+00

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
616.743.7070

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Engineering & Surveying

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT

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PROJECT NO.
16022

SHEET NO.
8 OF 15

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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

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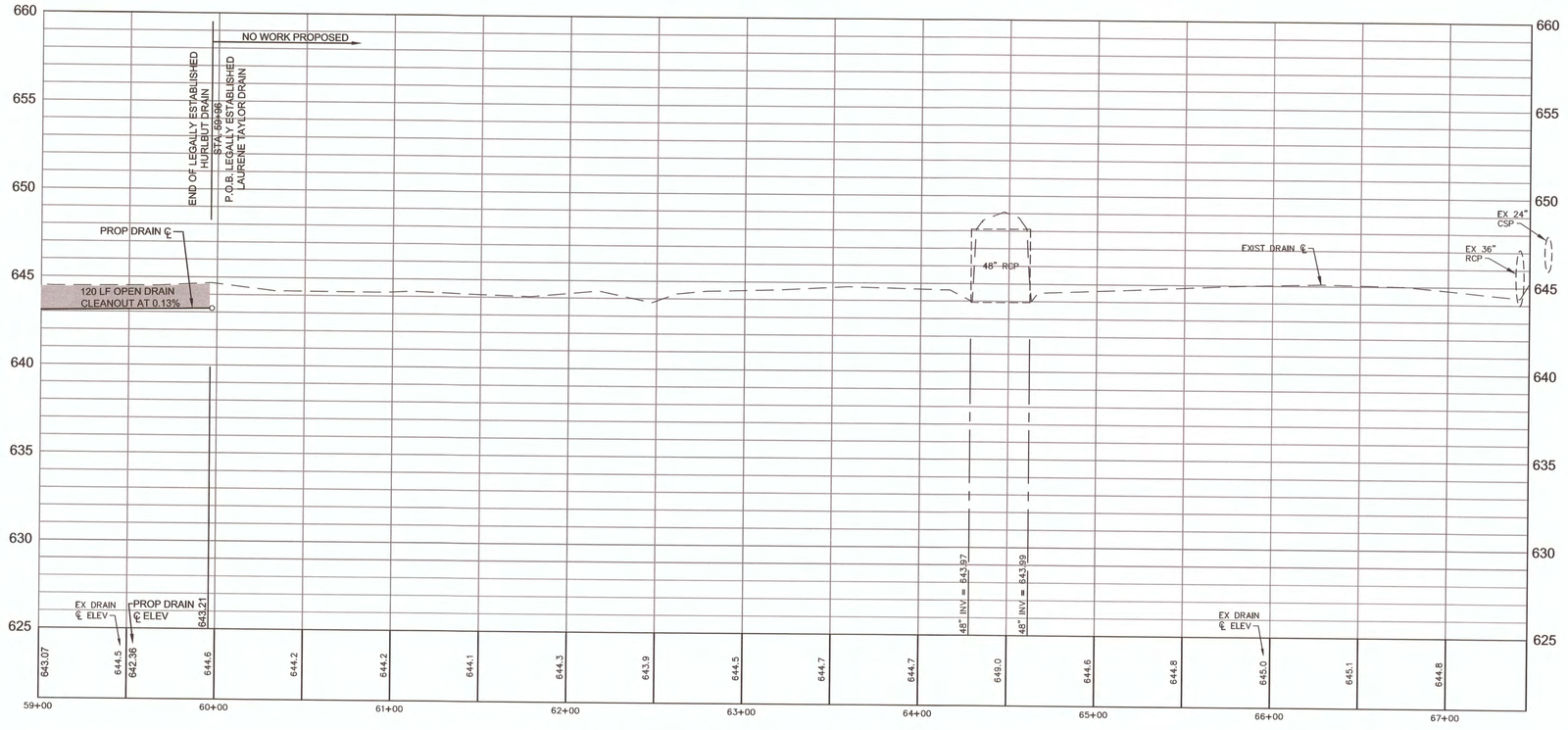
MATCH LINE
STA 59+00

SEE SHEET
8 OF 15



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N

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KEY PLAN

PLAN & PROFILE STA 59+00 TO STA 67+46

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MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
9 OF 15

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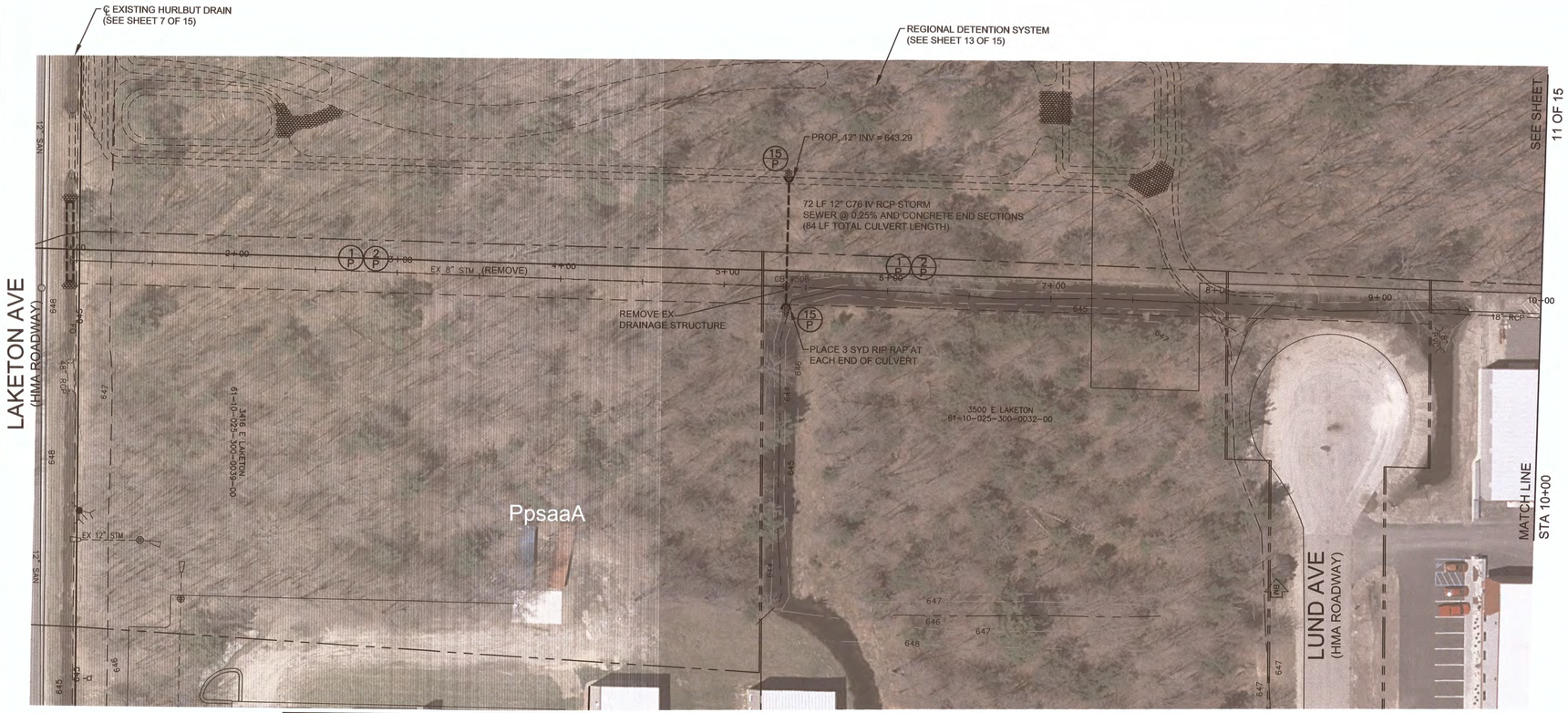
Drawn By: SPM
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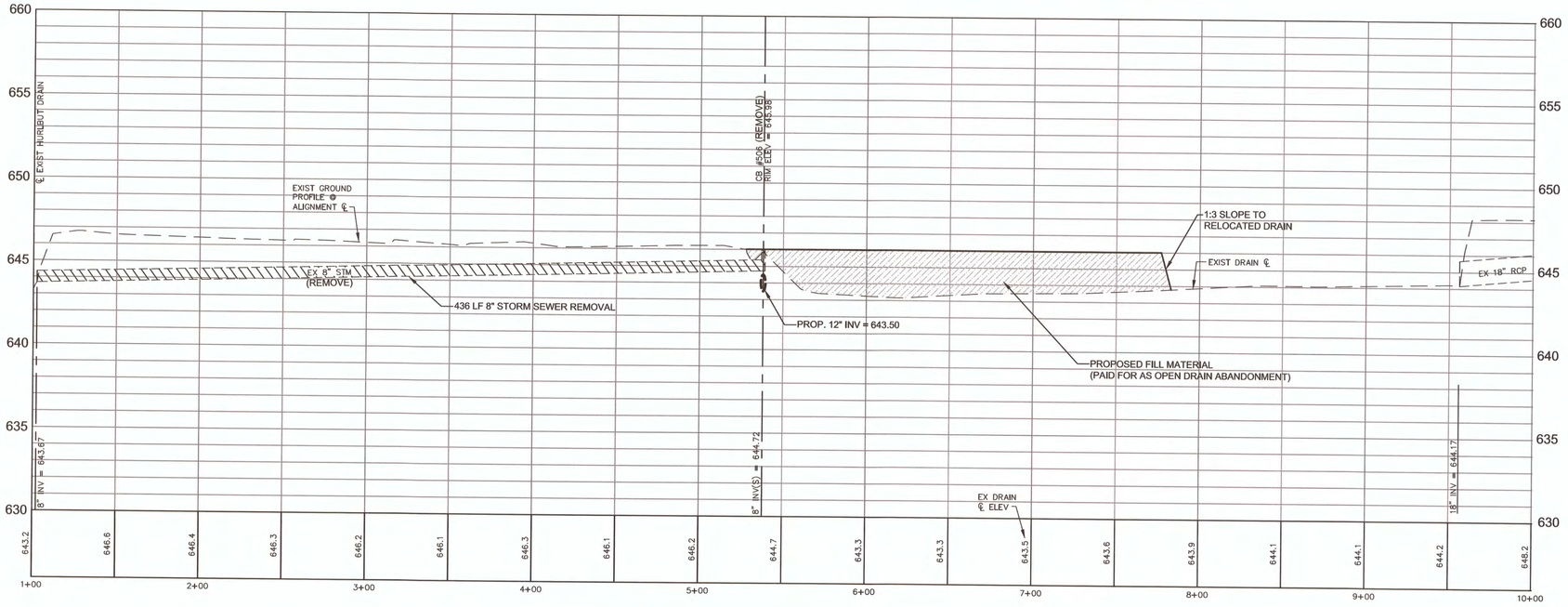
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Eng TM Engineering & Surveying



EMBANKMENT MATERIAL SHALL BE DRY, SOUND FILL MATERIAL SUBJECT TO ACCEPTANCE BY ENGINEER

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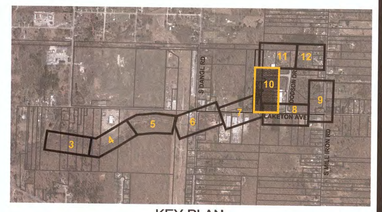


N

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KEY PLAN

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
10 OF 15

PLAN & PROFILE BRANCH DRAIN STA 1+00 TO STA 10+00

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SPM	7/29/16		

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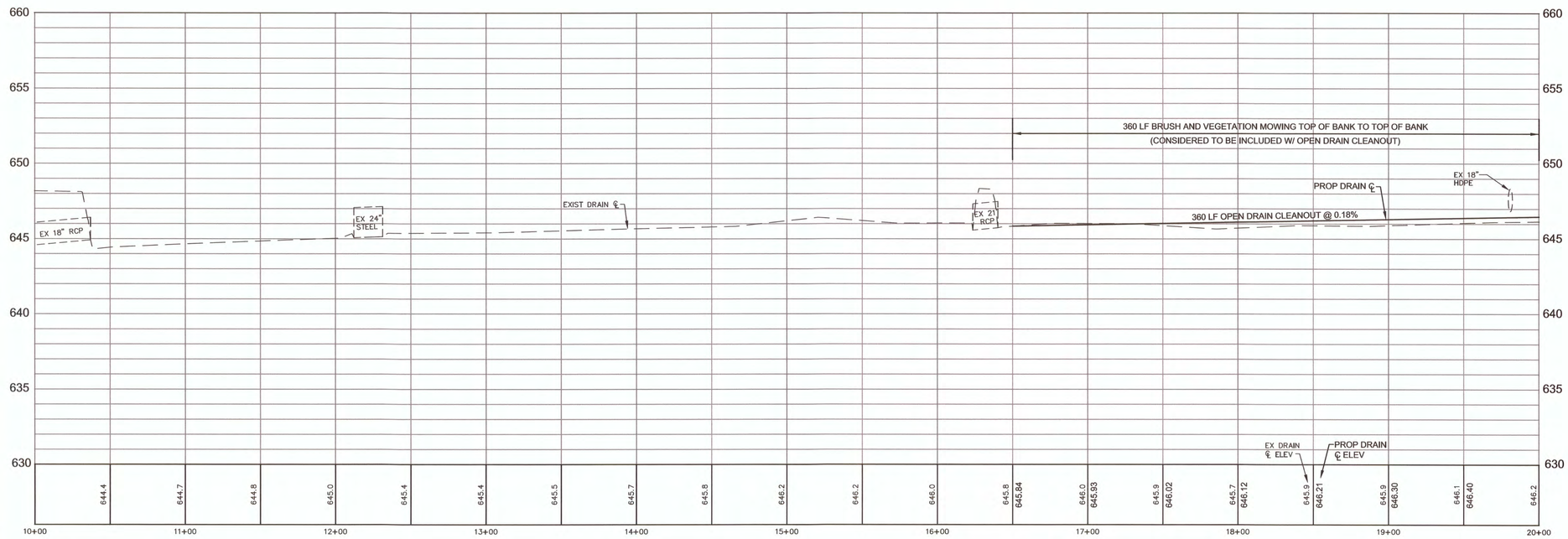
SCALE
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VERTICAL: 1"=4'

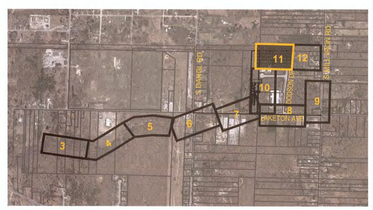
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- = EXISTING FENCE LINE
- 1744 S DANGL 61-10-025-300-0027-00 = PROPERTY ID
- = PROPOSED STORM SEWER
- PlfabB = SOIL TYPE





KEY PLAN

PLAN & PROFILE BRANCH DRAIN STA 10+00 TO STA 20+00

BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
11 OF 15

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BM #1 ELEV=648.68
SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

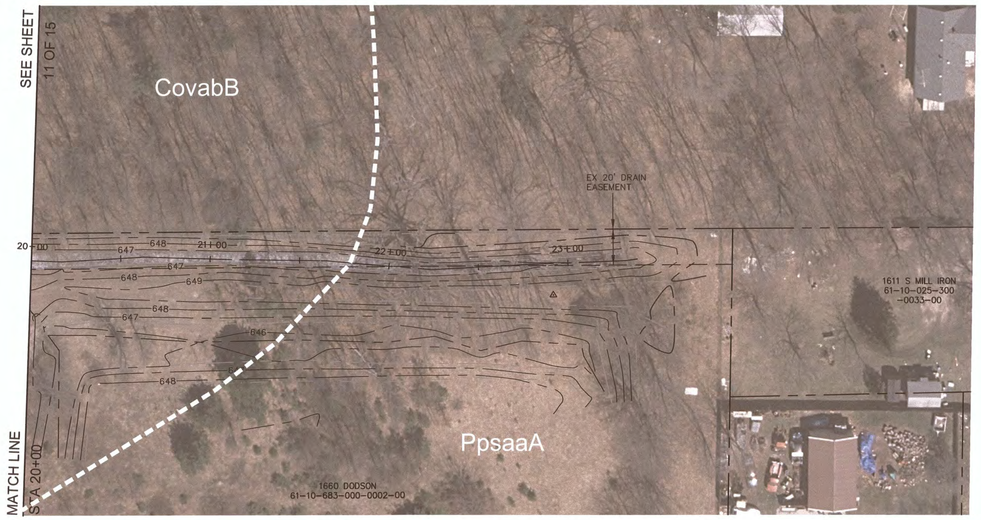
BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJIW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

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

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NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 1/13/19
Approved By:
Date:

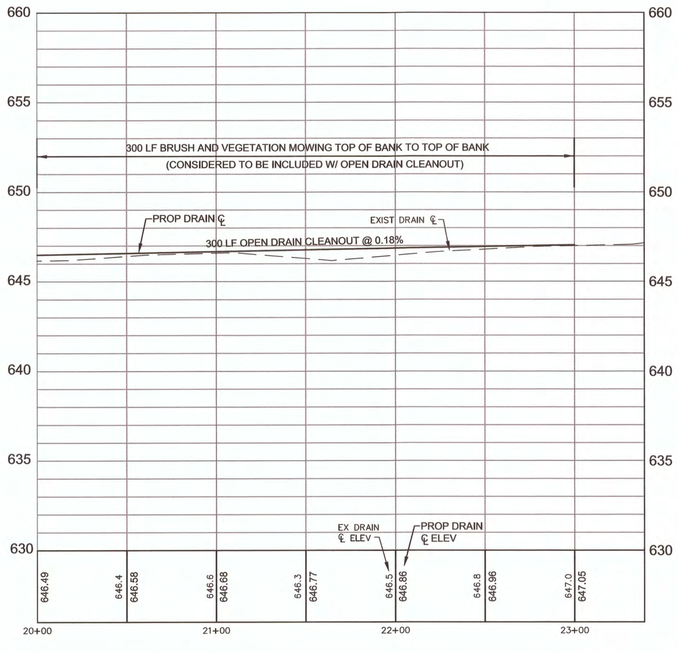


N

SCALE
HORIZONTAL: 1"=40'
VERTICAL: 1"=4'

SPOILS TO BE PLACED ALONG THE WORKING SIDE OF THE DRAIN SO AS TO NOT AFFECT DRAINAGE PATTERNS

SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS AND PUBLIC RIGHTS-OF- WAY. ALL OTHER ACCESS TO THE SITE SHALL BE APPROVED BY THE MUSKEGON COUNTY DRAIN COMMISSIONER



LEGEND

- = DECIDUOUS TREE
- = CONIFEROUS TREE
- = SHRUB
- = EXISTING LIGHT POLE
- = EXISTING UTILITY POLE
- = EXISTING ELECTRIC
- = EXISTING FIRE HYDRANT
- = EXISTING WATER VALVE/WATER MAIN
- = EXISTING SANITARY MANHOLE/SEWER
- GAS = EXISTING GAS LINE
- = EXISTING RIGHT OF WAY LINE
- = EXISTING PROPERTY LINE
- = EXISTING DRAIN EASEMENT LINE
- = EXISTING HURLBUT DRAIN ℄
- = BEEHIVE CATCH BASIN
- = CURB INLET CATCH BASIN
- = STORM MANHOLE/SEWER
- 860 = EXISTING CONTOUR
- = SIGN
- BM = BENCH MARK
- = SECTION CORNER
- = EXISTING CURB AND GUTTER
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KEY PLAN

PLAN & PROFILE BRANCH DRAIN STA 20+00 TO STA 23+45

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

Engineering & Surveying

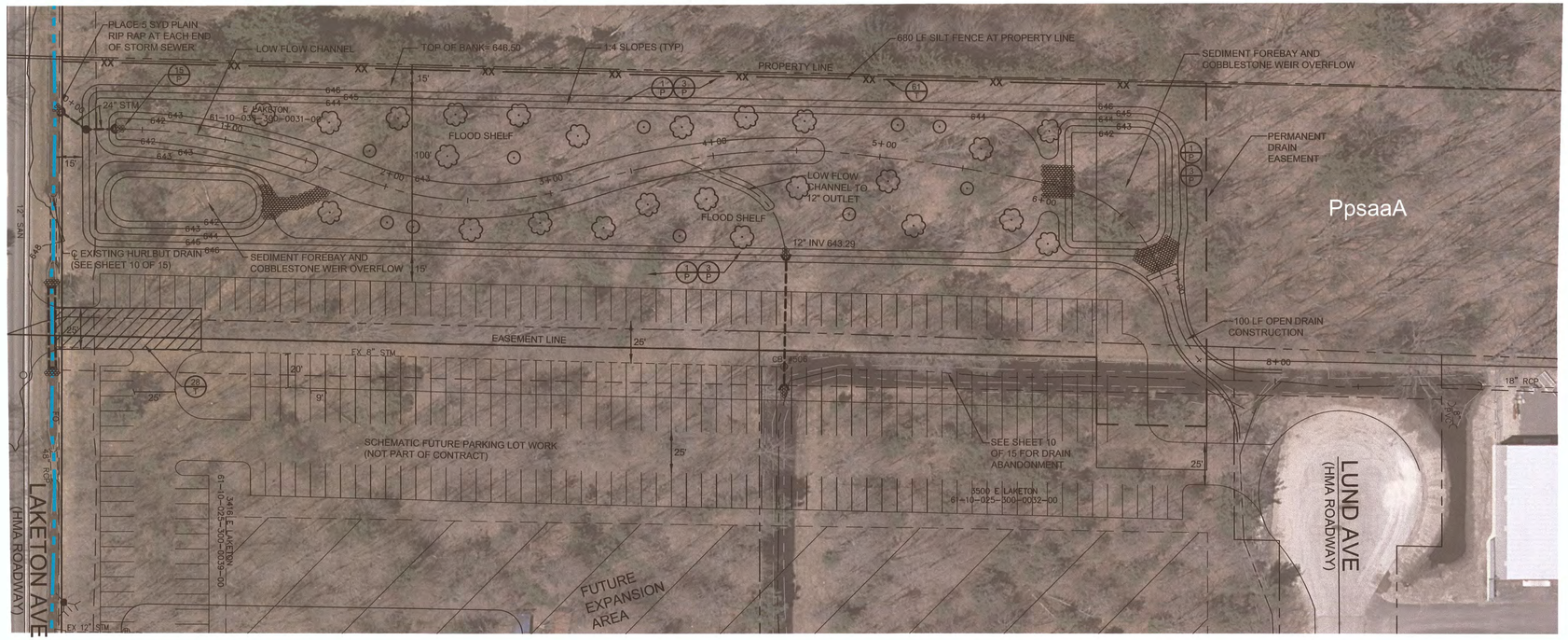
BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

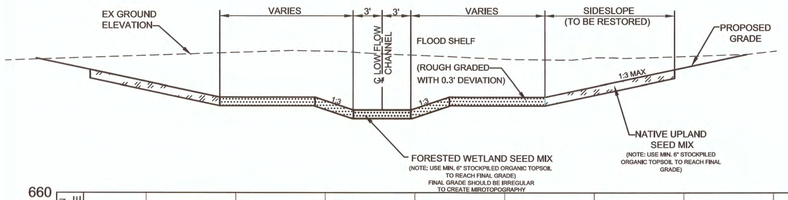
HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

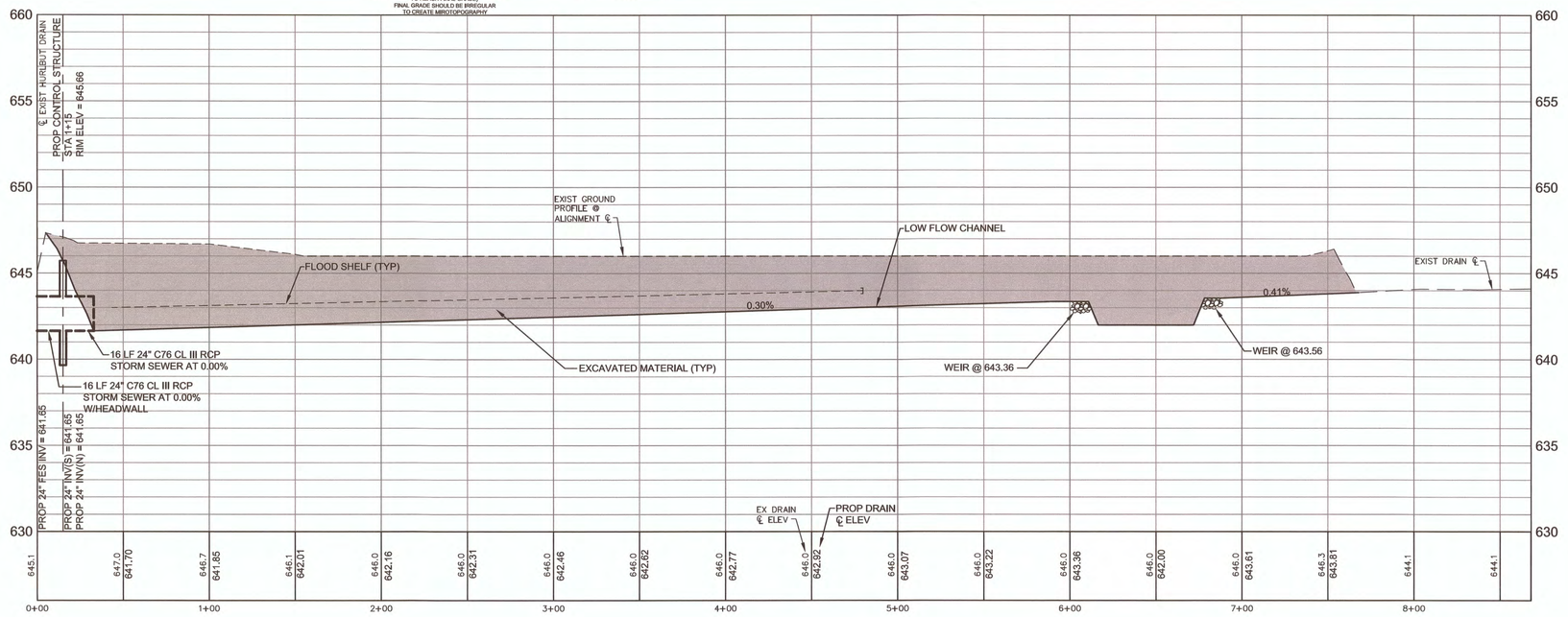
SHEET NO.
12 OF 15

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SITE ACCESS IS RESTRICTED TO EXISTING DRAIN EASEMENTS AND PUBLIC RIGHTS-OF- WAY. ALL OTHER ACCESS TO THE SITE SHALL BE APPROVED BY THE MUSKEGON COUNTY DRAIN COMMISSIONER



PROFILE THROUGH REGIONAL DETENTION BASIN

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SSE FLANGE BOLT UNDER W IN EJIW ON HYDRANT S SIDE LUND AVE AT W END

BM #2 ELEV=649.93
NE FLANGE BOLT ON W IN EJIW ON HYDRANT ON E SIDE DODSON DRIVE AT N END

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N

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- 1744 S DANGL 61-10-025-300-0027-00 = PROPERTY ID
- = PROPOSED STORM SEWER
- PlfabB = SOIL TYPE
- = FORESTED WETLAND SEED MIX
- = NATIVE UPLAND SEED MIX
- = PROPOSED BUSH (SIZE: 1 GALLON)
- = PROPOSED TREE (SIZE: 1 GALLON)

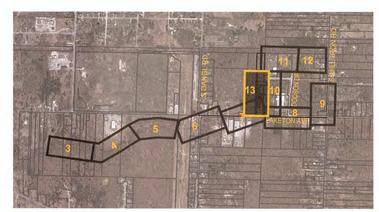
TREES

Scientific Name	Common Name	Rating	Size	Number
Acer rubrum	Red Maple	FAC	Gallon	4
Acer saccharinum	Silver Maple	FACW	Gallon	4
Quercus bicolor	Swamp White Oak	FACW	Gallon	4
Quercus palustris	Pin Oak	FACW	Gallon	4
Nyssa sylvatica	Black Gum	FACW	Gallon	4
Platanus occidentalis	Sycamore	FACW	Gallon	4
			Total =	24

SHRUBS

Scientific Name	Common Name	Rating	Size	Number
Lindera benzoin	Spice Bush	FACW	Gallon	5
Alnus incana	Speckled Alder	FACW	Gallon	5
			Total =	10

No hybrid or exotic nursery species can be used.



KEY PLAN

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 7/29/16
Approved By:
Date:

4063 Grand Oak Drive Suite A109
Lansing, MI 48911
517.887.1100

16930 Robbins Road Suite 105
Grand Haven, MI 49417
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PROJECT NO.
16022

SHEET NO.
13 OF 15

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APPROXIMATE CONSTRUCTION SCHEDULE FOR SESC MEASURES

SESC - CONSTRUCTION SEQUENCE	MAY 2019	JUNE 2019	JULY 2019	AUG 2019
INSTALL TEMPORARY SESC MEASURES:				
A. STABILIZED CONSTRUCTION ACCESSES				
B. CONSTRUCTION/TREE PROTECTION FENCE				
C. CATCH BASIN PROTECTION				
D. STORM DRAIN INLET PROTECTION				
E. SEEDING				
MAINTAIN TEMPORARY SESC MEASURES				
LAKETON AVE. CULVERT INSTALLATION AND ROADWAY REPLACEMENT CULVERT				
CULVERT INSTALLATIONS				
OPEN DRAIN CLEANOUT & BMPs				
REGIONAL DETENTION BASIN				
FINAL GRADE				
FINAL SITE STABILIZATION (TO BE COMPLETED WITHIN 24 HOURS OF FINAL GRADING OR ACTIVITY WITHIN THAT AREA)				
REMOVE TEMPORARY SESC MEASURES				
PERMANENT SESC MEASURES				

(#/P) = PERMANENT MEASURE (#/T) = TEMPORARY MEASURE

SESC Notes

General Maintenance
- Temporary SESC measures to be maintained by the contractor at all times.

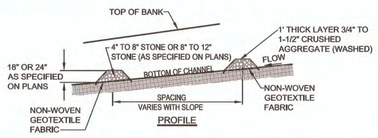
Silt fence
- Silt fence is to be trenched in no less than 6 inches below the ground surface
- Inspect silt fence immediately following each rainfall
- Repair when silt fence is sagging or has been removed/torn down
- When silt collects to half the height of the fence all silt is to be removed and fence repaired
- Remove silt fence when permanent SESC measures are in place and vegetation is established

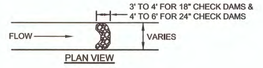
Seeding and Mulching
- Seeding practices include topsoil (as required), and mulch or mulch blanket (as directed by Engineer or required on plans).
- Where necessary, appropriate mulch blanket must be applied based on slope and growing conditions as approved by the engineer.
- All slopes and highly erosive areas will be temporarily seeded and mulched when construction activity is not taking place
- Seed and mulch is to be inspected following each rain event to determine if concentrated flows are present
- In the event that seed and mulch are removed by erosive runoff, repairs are to be made immediately.
- Site will be permanently stabilized within 5 days of final grade

Storm drain inlet protection
- Storm drain inlets to be inspected weekly and after each rain event.
- Empty sediment and keep inlet protection clean during inspection and maintenance operations.

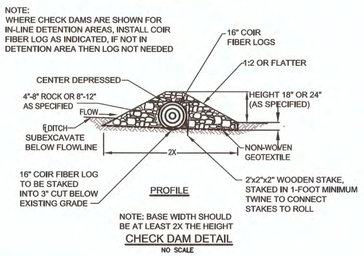
Compliance with Part 91 of PA 451
- Respond immediately to stormwater operator and/or soil erosion and sedimentation control inspector concerns. Make corrective measures as Required

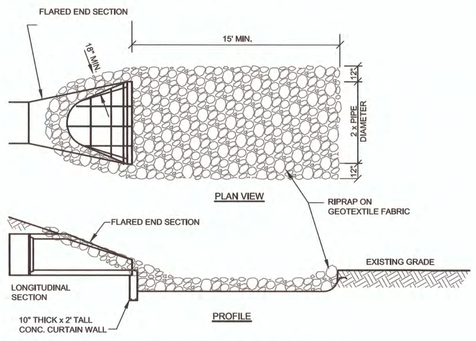
Continued Maintenance Plan
- Stormwater operator/APA owner or maintenance supervisor will inspect monthly through the first growing season. Non established vegetation will be repaired/reseeded as necessary









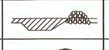


FLARED END SECTION DETAIL
NO SCALE

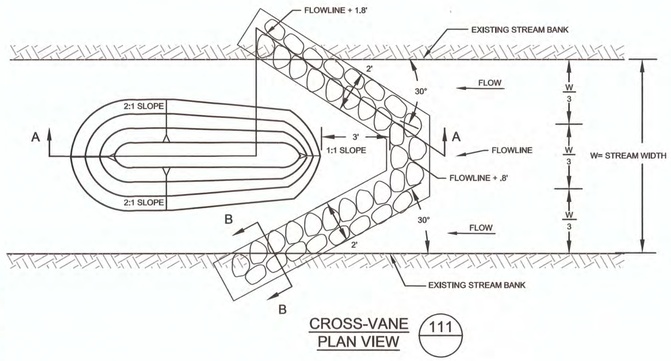
CONSTRUCTION & SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

1. ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE IN PLACE BEFORE CONSTRUCTION BEGINS. THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING ALL MEASURES AT LEAST ONCE EACH WEEK AND/OR WITHIN 24 HOURS OF A PRECIPITATION EVENT THAT RESULTS IN STORM WATER RUNOFF OR DISCHARGE.
2. SURFACE RESTORATION OF ALL SEWER TRENCHES IN LAWN AREAS SHALL BE TOP SOILED, SEEDED, AND MULCHED WITHIN 5 CALENDAR DAYS OF BACKFILLING THE TRENCH.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DUST CONTROL AND SHALL PROVIDE ALL EQUIPMENT AND MATERIAL NECESSARY TO KEEP DUST IN CHECK AT ALL TIMES. THE CONTRACTOR SHALL RESPOND IMMEDIATELY TO ANY AND ALL COMPLAINTS. STREETS, PARKING LOTS, DRIVEWAYS, PAVED ACCESS ROADS, AND ALL OTHER PAVED SURFACES SHALL BE SWEPT AT LEAST ONCE A DAY AND/OR AS NEEDED THROUGHOUT THE DAY.
4. MULCH AND/OR MULCH BLANKET SHALL BE APPLIED AND ANCHORED APPROPRIATELY ON ALL SLOPES 3:1 OR GREATER ON ALL SLOPES DEEMED NECESSARY TO PREVENT OR CORRECT EROSION PROBLEMS AND ON ALL DISTURBED AREA DUE TO CONSTRUCTION.
5. ALL TEMPORARY SOIL EROSION MEASURES SHALL BE REMOVED AFTER PERMANENT MEASURES HAVE BEEN ESTABLISHED.
6. ALL CONSTRUCTION SHALL BE CONFINED TO AREAS OF DISTURBANCE WITHIN THE ROAD RIGHT OF WAY AND/OR WITHIN STORM SEWER EASEMENTS. NO WORK, MATERIAL, OR STOCKPILES WILL BE ALLOWED OUTSIDE OF THESE LIMITS.
7. ALL TRENCHES SHALL BE BACKFILLED TO GRADE OR PROPERLY PROTECTED IN ACCORDANCE WITH PROJECT PLANS & SPECIFICATIONS AT THE END OF EVERY DAY. AT NO TIME SHALL A TRENCH BE LEFT OPEN FOR A PERIOD LONGER THAN 48 HOURS.
8. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL UTILITY TRENCHES SHALL CONFORM TO TYPICAL TRENCH DETAIL. SEE SHEET 15 OF 15.
9. PROTECT ALL TREES AND VEGETATION NOT SCHEDULED TO BE REMOVED. ENGINEER APPROVAL IS REQUIRED FOR ANY UNSCHEDULED REMOVAL OF TREES, SHRUBS OR LANDSCAPING.
10. EROSION AND SEDIMENTATION FROM WORK ON THIS PROJECT SHALL BE CONTAINED WITHIN THE WORK AREA AND NOT ALLOWED TO COLLECT ON OFF-SITE AREAS OR IN WATERWAYS - WATERWAYS INCLUDE BOTH NATURAL AND MAN-MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
11. SILT FENCE MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY BUILT-UP SEDIMENT. CONTRACTORS SHALL BE RESPONSIBLE TO REMOVE, REPLACE, RETRENCH OR REBACKFILL THE SILT FENCE SHOULD IT FAIL OR BECOME DAMAGED DURING THE CONSTRUCTION.
12. INLET FILTER MAINTENANCE SHALL INCLUDE THE REMOVAL OF ANY ACCUMULATED SILT OR OTHER DEBRIS. IF INLET FILTERS CANNOT BE CLEANED, OR ARE DAMAGED, THEN THE FILTER AND/OR STONE SHALL BE REPLACED.

MACDC - SESC MEASURES

1	SEEDING		When bare soil is exposed, temporarily or permanently, to erosive forces from wind and or water on flat areas, mild slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles.
2	MULCH BLANKET		On flat areas, mild slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles when areas are subject to raindrop impact, and erosive forces from wind or water.
15	RIPRAP		Along drain banks, shorelines, or where concentrated flows occur. Slows velocity, reduces erosion and sediment load.
26	DUST CONTROL		As a temporary measure on exposed and unstabilized areas that must be protected from wind or water erosion.
28	STABILIZED CONSTRUCTION ACCESS		At locations where construction equipment will enter and exit the drain easement and track of soil is anticipated.
29	TEMPORARY CHECK DAM		In constructed and existing flow corridors to reduce flow velocities.
37	SEDIMENT SUMP (TRAP)		For use in upland areas prior to entering a drain or within a drain in conjunction with a culvert installation or cleanout.
39	DEWATERING/BYPASS PUMPING		When construction or maintenance activities are limited by the presence of water and a dry work area is required.
61	SILT FENCE		As a temporary measure used to capture sediment from sheet flow. May also divert small volumes of sheet flow to protected outlets.

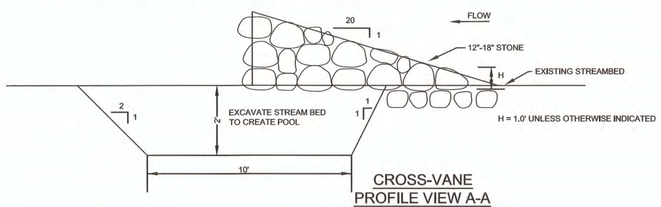
(#/P) = PERMANENT MEASURE (#/T) = TEMPORARY MEASURE



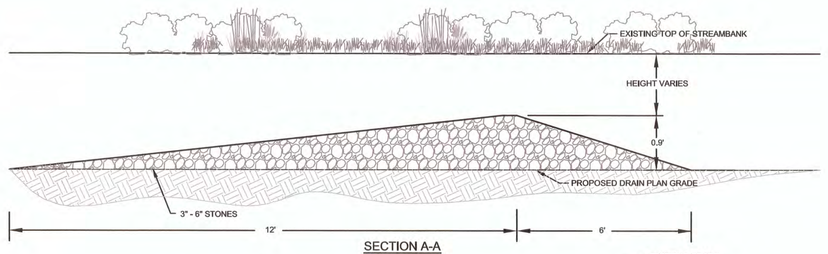
CROSS-VANE PLAN VIEW (111)

CROSS-VANE PROFILE VIEW B-B





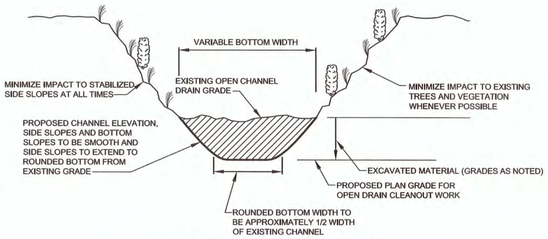
CROSS-VANE PROFILE VIEW A-A



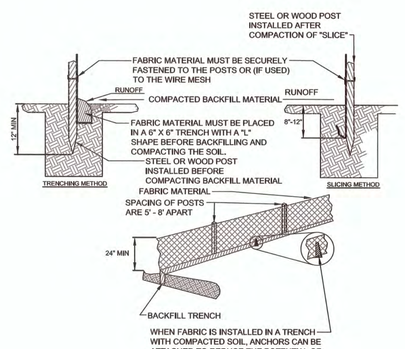
SECTION A-A



7/P STREAM RESTORATION DETAIL
ROCK CLUSTER
NO SCALE



OPEN DRAIN CLEANOUT DETAIL
NO SCALE



61/T SILT FENCE DETAIL

DETAILS & SOIL EROSION & SEDIMENTATION CONTROL MEASURES

NO.	REVISIONS	BY	DATE

Drawn By: SPM
Date: 1/14/19
Approved By:
Date:

4063 Grand Oak Drive Suite A109
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engdot.com

Eng TM Engineering & Surveying

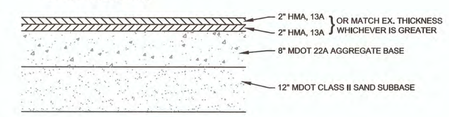
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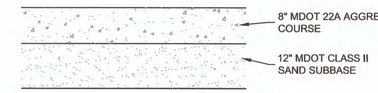
PROJECT NO.
16022

SHEET NO.
14 OF 15

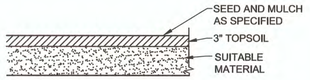
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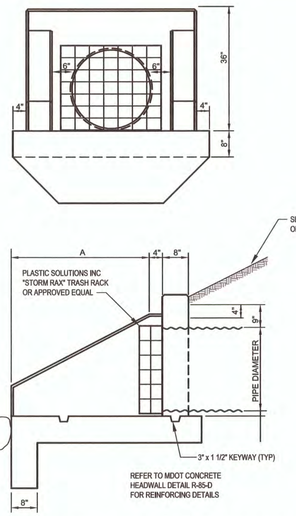
HMA ROADWAY & DRIVEWAY
RESTORATION PAVEMENT SECTION



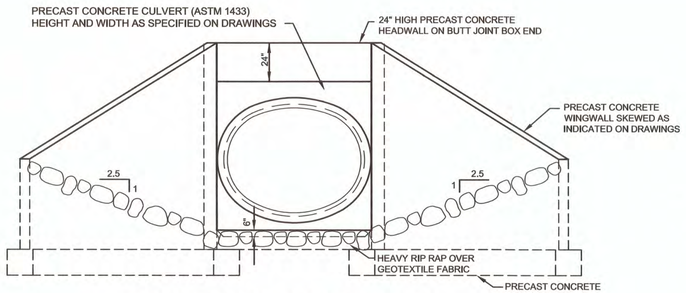
GRAVEL DRIVEWAY RESTORATION
PAVEMENT SECTION



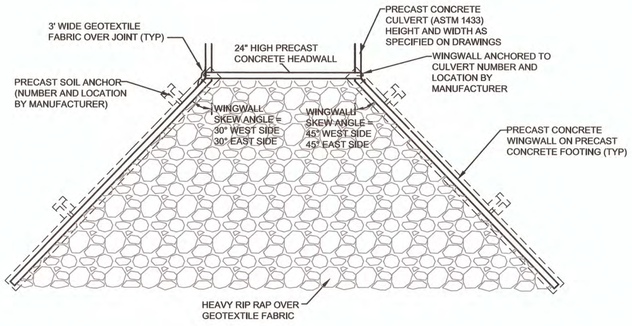
SURFACE RESTORATION
CROSS SECTION
NO SCALE



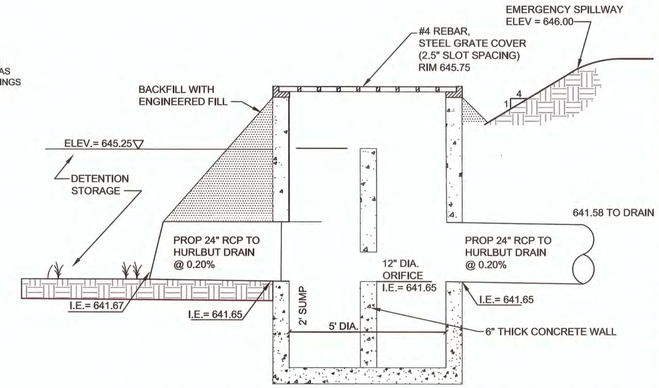
MDOT CONCRETE HEADWALL DETAIL R-85-D
FOR 24" PIPE (MODIFIED)
NO SCALE



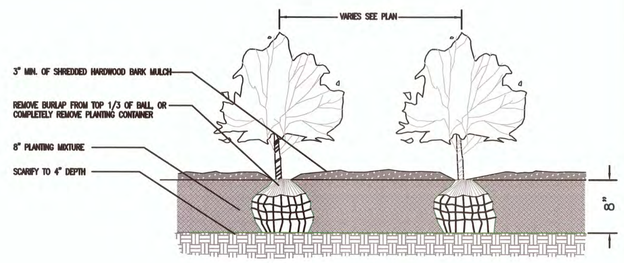
PRECAST 48"X78" HE CONCRETE ELLIPTICAL
CULVERT END ELEVATION
NO SCALE



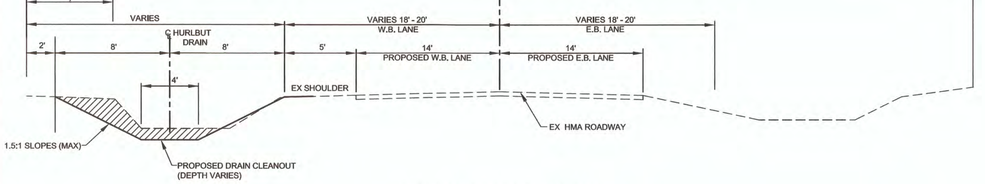
PRECAST CONCRETE BOX CULVERT END
TREATMENT - PLAN VIEW
NO SCALE



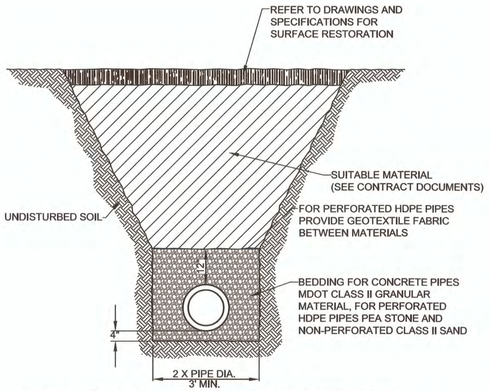
5' DIA. PRECAST OUTLET CONTROL STRUCTURE (DETENTION BASIN)
NO SCALE



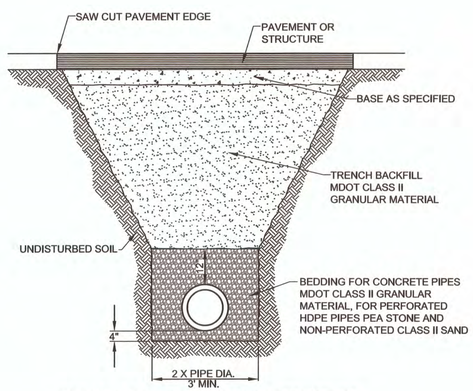
SHRUB PLANTING BED DETAIL
NOT TO SCALE



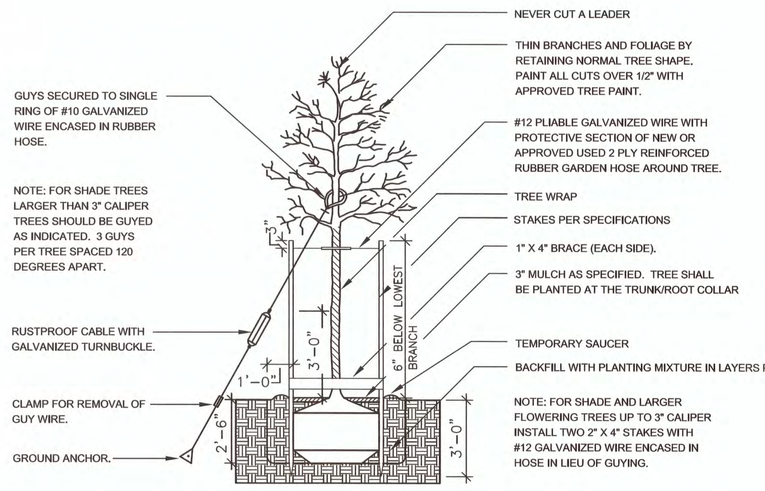
TYPICAL CROSS SECTION
LAKETON AVENUE (STA 45+50 TO STA 60+00)
SCALE 1"=5'



TRENCH NOT ADJACENT TO PAVEMENT OR STRUCTURE
SCALE: 1"=2'



TRENCH BELOW PAVEMENT OR STRUCTURE
SCALE: 1"=2'



TREE PLANTING & STAKING OR GUYING DETAIL
NOT TO SCALE

DETAILS

NO	REVISIONS	BY	DATE

Drawn By: SPM
Date: 1/14/19
Approved By:
Date:

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BRENDA M. MOORE
MUSKEGON COUNTY DRAIN COMMISSIONER
STEPHANIE BARRETT, DEPUTY DRAIN COMMISSIONER

HURLBUT DRAIN DRAINAGE DISTRICT
PART OF SECTIONS 25, 26, 35 & 36 OF MUSKEGON TWP., T10N, R16W AND PART OF SECTION 30 OF EGELSTON TOWNSHIP, T10N, R15W MUSKEGON COUNTY, MICHIGAN

PROJECT NO.
16022

SHEET NO.
15 OF 15

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