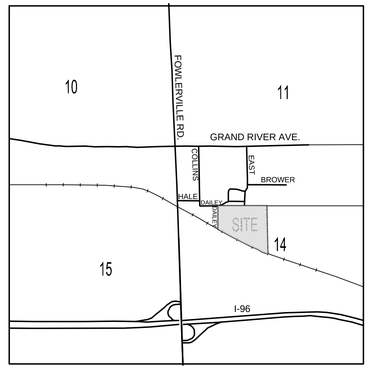
CONSTRUCTION PLAN
FOR
SOLITUDE MEADOWS–PHASE 3

PART OF THE S 1/2 OF THE NE 1/4 OF THE NW 1/4 OF SECTION 14
VILLAGE OF FOWLERVILLE, LIVINGSTON COUNTY, MICHIGAN



LOCATION MAP
NO SCALE

LEGAL DESCRIPTION:

Part of the Northwest 1/4 of Section 14, T3N–R3E, Village of Fowlerville, Livingston County, Michigan, more particularly described as follows: Commencing at the North 1/4 Corner of said Section 14; thence along the North–South 1/4 Line of said Section 14, S 00°13'16" E, 661.69 feet to the POINT OF BEGINNING of the Parcel to be described; thence continuing along said line, S 00°13'16" E, 1321.88 feet; thence along the North Line of Railroad (49.5 foot 1/2 Right of Way) the following three (3) courses:

1. N 69°10'23" W, 14.30 feet;
2. Northwesterly on an arc right, having a length of 450.44 feet, a radius of 2815.43 feet, a central angle of 09°10'00", and a long chord which bears N 64°35'23" W, 449.96 feet;
3. N 60°00'23" W, 1135.05 feet;

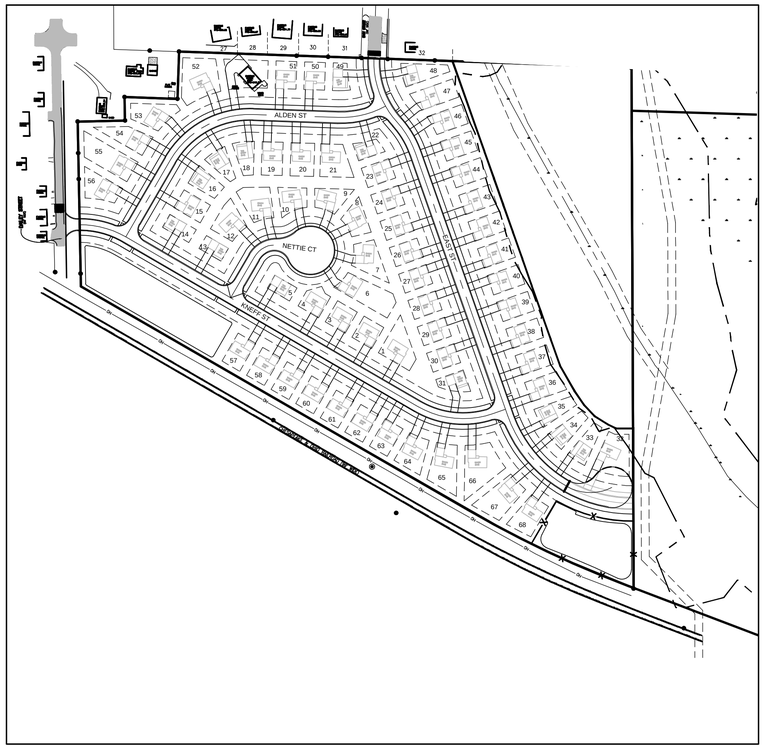
thence along the East Line of Daily Street (platted as 33 feet in "Assessor's Plat No.3" as recorded in Liber 4, Page 28 Livingston County Records, now 66 feet wide as described in Liber 689, Page 195, Livingston County Records) N 01°05'56" W, 418.69 feet; thence N 88°54'38" E, 120.00 feet; thence N 01°06'03" W, 60.00 feet; thence S 88°01'38" E, 134.28 feet; thence N 02°00'31" E, 120.00 feet; thence along the South Line of "Solitude Meadows" (Livingston County Condominium Subdivision Plan No. 217, Livingston County Records) S 88°00'37" E, 1149.23 feet, to the POINT OF BEGINNING, containing 30.71 acres, more or less, and subject to any easements or restrictions of record.

Bearings were established from "Solitude Meadows", Livingston County Condominium Subdivision Plan No. 217, Livingston County Records.

CONSTRUCTION NOTES

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING NOTES AND ANY WORK INVOLVED SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.

1. THE CONTRACTOR SHALL HOLD HARMLESS THE DESIGN PROFESSIONAL, MUNICIPALITY, COUNTY, STATE AND ALL OF ITS SUB CONSULTANTS, PUBLIC AND PRIVATE UTILITY COMPANIES, AND LANDOWNERS FOR DAMAGES TO INDIVIDUALS AND PROPERTY, REAL OR OTHERWISE, DUE TO THE OPERATIONS OF THE CONTRACTOR AND/OR THEIR SUBCONTRACTORS.
2. DO NOT SCALE THESE DRAWINGS AS IT IS A REPRODUCTION AND SUBJECT TO DISTORTION.
3. A GRADING PERMIT FOR SOIL EROSION-SEDIMENTATION CONTROL SHALL BE OBTAINED FROM THE GOVERNING AGENCY PRIOR TO THE START OF CONSTRUCTION.
4. IF DUST PROBLEM OCCURS DURING CONSTRUCTION, CONTROL WILL BE PROVIDED BY AN APPLICATION OF WATER, EITHER BY SPRINKLER OR TANK TRUCK.
5. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS AND SPECIFICATIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED VILLAGE, COUNTY, AND STATE OF MICHIGAN PERMITS.
7. PAVED SURFACES, WALKWAYS, SIGNS, LIGHTING AND OTHER STRUCTURES SHALL BE MAINTAINED IN A SAFE, ATTRACTIVE CONDITION AS ORIGINALLY DESIGNED AND CONSTRUCTED.
8. ALL BARRIER-FREE FEATURES SHALL BE CONSTRUCTED TO MEET ALL LOCAL, STATE AND A.D.A. REQUIREMENTS.
9. ANY DISCREPANCY IN THIS PLAN AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DESIGN ENGINEER PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL SETBACKS, EASEMENTS AND DIMENSIONS SHOWN HEREON BEFORE BEGINNING CONSTRUCTION.
10. THE CONTRACTOR SHALL CONTACT ALL OWNERS OF EASEMENTS, UTILITIES AND RIGHTS-OF-WAY, PUBLIC OR PRIVATE, PRIOR TO THE START OF CONSTRUCTION.
11. THE CONTRACTOR SHALL COORDINATE WITH ALL OWNERS TO DETERMINE THE LOCATION OF EXISTING LANDSCAPING, IRRIGATION LINES & PRIVATE UTILITY LINES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING LANDSCAPING, IRRIGATION LINES, AND PRIVATE UTILITY LINES.
12. THE CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE UPON COMPLETION OF THE PROJECT.
13. THE CONTRACTOR SHALL MAINTAIN THE SITE IN A MANNER SO THAT WORKMEN AND PUBLIC SHALL BE PROTECTED FROM INJURY, AND ADJOINING PROPERTY PROTECTED FROM DAMAGE.
14. THE CONTRACTOR SHALL KEEP THE AREA OUTSIDE THE "CONSTRUCTION LIMITS" BROOM CLEAN AT ALL TIMES.
15. THE CONTRACTOR SHALL CALL MISS DIG A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION.
16. ALL EXCAVATION UNDER OR WITHIN 3 FEET OF PUBLIC PAVEMENT, EXISTING OR PROPOSED SHALL BE BACKFILLED AND COMPACTED WITH SAND (MDOT CLASS II).
17. ALL PAVEMENT REPLACEMENT AND OTHER WORKS COVERED BY THESE PLANS SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWNSHIP, INCLUDING THE LATEST MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
18. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
19. NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR ANY DELAY OR INCONVENIENCE DUE TO THE MATERIAL SHORTAGES OR RESPONSIBLE DELAYS DUE TO THE OPERATIONS OF SUCH OTHER PARTIES DOING WORK INDICATED OR SHOWN ON THE PLANS OR IN THE SPECIFICATION OR FOR ANY REASONABLE DELAYS IN CONSTRUCTION DUE TO THE ENCOUNTERING OR EXISTING UTILITIES THAT MAY OR MAY NOT BE SHOWN ON THE PLANS.
20. DURING THE CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL NOT PERFORM WORK BY PRIVATE AGREEMENT WITH PROPERTY OWNERS ADJACENT TO THE PROJECT.
21. IF WORK EXTENDS BEYOND NOVEMBER 15, NO COMPENSATION WILL BE DUE TO THE CONTRACTOR FOR ANY WINTER PROTECTION MEASURES THAT MAY BE REQUIRED BY THE ENGINEER.
22. NO TREES ARE TO BE REMOVED UNTIL MARKED IN THE FIELD BY THE ENGINEER.
23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PROPERTY BEYOND THE CONSTRUCTION LIMITS INCLUDING BUT NOT LIMITED TO EXISTING FENCE, LAWN, TREES AND SHRUBBERY.
24. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE NORMAL CONSTRUCTION LIMITS OF THE PROJECT SHALL BE SODDED OR SEEDED AS SPECIFIED OR DIRECTED BY THE ENGINEER.
25. ALL ROOTS, STUMPS AND OTHER OBJECTIONABLE MATERIALS SHALL BE REMOVED AND THE HOLE BACKFILLED WITH SUITABLE MATERIAL. WHERE GRADE CORRECTION IS REQUIRED, THE SUBGRADE SHALL BE CUT TO CONFORM TO THE CROSS-SECTION AS SHOWN IN THE PLANS.
26. TRAFFIC SHALL BE MAINTAINED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL SIGNS AND TRAFFIC CONTROL DEVICES. FLAG PERSONS SHALL BE PROVIDED BY THE CONTRACTOR IF DETERMINED NECESSARY BY THE ENGINEER. ALL SIGNS SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AT NO COST TO THE TOWNSHIP. NO WORK SHALL BE DONE UNLESS THE APPROPRIATE TRAFFIC CONTROL DEVICES ARE IN PLACE.
27. ALL DEMOLISHED MATERIALS AND SOIL SPOILS SHALL BE REMOVED FROM THE SITE AT NO ADDITIONAL COST, AND DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.
28. AFTER REMOVAL OF TOPSOIL, THE SUBGRADE SHALL BE COMPACTED TO 95% OF ITS UNIT WEIGHT.
29. ALL GRADING IN THE PLANS SHALL BE DONE AS PART OF THIS CONTRACT. ALL DELETERIOUS MATERIAL SHALL BE REMOVED FROM THE SUBGRADE PRIOR TO COMPACTING.
30. NO SEEDING SHALL BE DONE AFTER OCTOBER 15 WITHOUT APPROVAL OF THE ENGINEER.
31. ANY EXISTING APPURTENANCES SUCH AS MANHOLES, GATE VALVES, ETC. SHALL BE ADJUSTED TO THE PROPOSED GRADE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
32. SOIL EROSION MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
33. ALL PERMANENT SIGNS AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST REVISION OF THE MICHIGAN MUTCD MANUAL AND SHALL BE INCIDENTAL TO THE CONTRACT.



SHEET INDEX

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3A	DETAILED LOT DIMENSION PLAN
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CONSTRUCTION PLAN
SOLITUDE MEADOWS – PHASE 3

PREPARED FOR:

ORE CREEK DEVELOPMENT
10315 EAST GRAND RIVER
BRIGHTON, MI 48116
CONTACT: MIKE KELLY
810-227-7624

PREPARED BY:

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

NO	BY	CK	REVISION	DATE
4	TE	BL	PER LCDC COMMENTS	2-27-20
3	TE	BL	PER LCDC & EGLE COMMENTS	9-03-19
2	TE	BL	PER VILLAGE & LCDC COMMENTS	5-31-19
1	TE	BL	PER VILLAGE COMMENTS	4-25-19

C1

ISSUE DATE: 10-30-18
JOB NO. 18-032

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GENERAL SURVEY NOTES:

CURRENT ZONING: R2 PER CONDITIONAL RE-ZONING (11/27/17)

1. MINIMUM SETBACK REQUIREMENTS:
   FRONT = 35 FEET
   SIDES = 10 FEET
   REAR = 15 FEET
2. BEARINGS WERE ESTABLISHED FROM "ASSESSOR'S PLAT NO. 3", AS RECORDED IN LIBER 4, PAGE 28, LIVINGSTON COUNTY RECORDS.
3. SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.
4. EASEMENTS OR RESTRICTIONS OF RECORD NOT DEPICTED ON THIS DRAWING MAY EXIST.
5. CONTOURS ARE SHOWN AT 1 FOOT INTERVALS.
6. ALL ELEVATIONS ARE SHOWN TO THE NEAREST 0.01 FOOT; HOWEVER SOFT-SURFACE ELEVATIONS CAN ONLY BE PRESUMED ACCURATE TO THE NEAREST 0.1 FOOT.
7. PLEASE SEE SUPPLEMENTAL FLOODPLAIN STUDY FOR FLOODPLAIN INFORMATION ON PROPERTY.
9. THE LOCATIONS OF STORM SEWER, SANITARY SEWER & WATERMAIN, AS SHOWN ON THIS DRAWING ARE APPROXIMATE. THE LOCATIONS ARE BASED ON PHYSICAL FIELD LOCATIONS.
10. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
11. ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.

NOTE:

1. THE VILLAGE'S INFRASTRUCTURE, INCLUDING BUT NOT LIMITED TO THE SIDEWALK, CURB, ROADWAY AND UTILITIES MUST BE PROTECTED DURING CONSTRUCTION. ANY DAMAGE TO THE VILLAGE'S EXISTING INFRASTRUCTURE SHALL BE REPAIRED BY THE PROPRIETOR AT NO COST TO THE VILLAGE OF FOWLERVILLE.

SOILS INFORMATION

BtA- BOYER-OSHTEMO LOAMY SANDS; 0%-2% SLOPES
By- BROOKSTON LOAM; 0%-2% SLOPES
Ed- EDWARDS MUCK; 0%-1% SLOPES
MoA- MIAMI LOAM; 2%-6% SLOPES
OmA- OWOSSO-MIAMI SANDY LOAMS; 0%-2% SLOPES
Tm- TAWAS MUCK;
WeA- WASEPI SANDY LOAMS; 0%-2% SLOPES

STORM STRUCTURES

EX.BEEHIVE CATCH BASIN 1
RIM=897.84
INV. E=893.44 (18")

EX.BEEHIVE CATCH BASIN 2
RIM=893.69
INV. N=884.69 (24")
INV. S=884.89 (24")

EX.BEEHIVE CATCH BASIN 3
(SUMP PUMP)
RIM=901.49

SCALE: 1 INCH = 60 FEET

SANITARY STRUCTURES

EX.SANITARY MANHOLE 1
CONC. RIM=905.59
(COULD NOT OPEN)

EX.SANITARY MANHOLE 2
RIM=904.05
INV. E & W=893.15
(12" CLAY PIPE)
894.15 TO TOP OF PIPE

EX.SANITARY MANHOLE 3
RIM=901.01
INV. N=891.89 (12")

EX.SANITARY MANHOLE 4
RIM=899.92
INV. S=891.80 (12")
INV. E=891.69 (12")
INV. N=891.72 (12")

EX.SANITARY MANHOLE 5
RIM=901.04
INV. S=890.84 (12")
INV. W=892.12 (12")
INV. N=891.01 (12")

EX.SANITARY MANHOLE 6
RIM=895.26
INV. NE=881.97 (12")
INV. NW=881.90 (12")
INV. W=882.40 (12")
INV. W=885.50 (12")
INV. E=883.52 (12")
INV. S=888.91 (8")
INV. NE=887.79 (8")

EX.SANITARY MANHOLE 7
RIM=898.76
INV. S=887.50 (8")
INV. N=887.66 (8")

EX.SANITARY MANHOLE 8
RIM=895.29
INV. S=887.01 (8")
INV. W=887.11 (8")

BENCHMARKS

BM 201
NAIL W/S LIGHT POLE.
ELEVATION=902.07

BM 205
NAIL/TAG N/S POWER POLE.
ELEVATION=897.96

BM 206
NAIL/TAG N/S 15" LOCUST.
ELEVATION=906.75

BM 210
NAIL/TAG NE/S POST.
ELEVATION=893.76

BM 211
NAIL/TAG E/S DEAD TREE.
ELEVATION=892.80

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN HEREON ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL NOTIFY ALL UTILITIES AND REQUEST FIELD VERIFICATION OF THE LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED CONNECTIONS PRIOR TO CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND OR IF ANY ADJUSTMENTS IN LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT: SOLITUDE MEADOWS - PHASE 3
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624
PREPARED FOR:

TITLE: EXISTING CONDITIONS & DEMOLITION PLAN

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C2

NOTE:

CONTRACTOR TO COORDINATE WITH VILLAGE DPW IN REGARDS TO LOCATION AND REMOVAL OF EXISTING WATER LEAD TO THE EXISTING HOUSE.

LEGEND

- EXISTING CONTOUR
- EXISTING SPOT ELEVATION
- STORM DRAINAGE FLOW
- POWER POLE
- GUY WIRE
- HYDRANT
- GATE VALVE
- WATER MANHOLE
- MANHOLE
- STORM CATCH BASIN (BEEHIVE)
- STORM CATCH BASIN (SQUARE)
- STORM INVERT
- WELL
- TRANSFORMER PAD
- TELEPHONE RISER
- U.G. TELEPHONE MARKER
- GAS METER
- GAS RISER
- U.G. GAS MARKER
- ELECTRICAL RISER
- U.G. ELECTRIC MARKER
- CABLE TV RISER
- U.G. CABLE TV MARKER
- MAILBOX
- AIR CONDITIONING UNIT
- LIGHT POLE
- ORNAMENTAL LIGHT
- SIGN
- DECIDUOUS TREE
- CONIFEROUS TREE
- SOIL BORING
- IRON SET
- IRON FOUND
- MONUMENT
- SECTION CORNER
- MARSH SYMBOL
- SANITARY SEWER
- WATER MAIN
- STORM SEWER
- GAS MAIN
- ELECTRIC
- TELEPHONE
- OVERHEAD WIRES
- FENCE
- GAS PUMP
- ANTENNA
- SATELLITE DISH
- NEWSPAPER BOX
- PARKING METER
- PHONE BOOTH
- PUMP CHAMBER
- CONC. CONCRETE
- SAN MH SANITARY MANHOLE
- ST MH STORM MANHOLE
- ℄ CENTERLINE
- L. LIBER
- P. PAGE
- L.C.R. LIVINGSTON COUNTY RECORDS
- (R&M) RECORD AND MEASURED
- P.O.B. POINT OF BEGINNING

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DETAILED LOT TABLE

LOT #	LOT SIZE (SQFT)	LOT WIDTH (FT)	HOME TYPE
1	14,066	111	RANCH
2	8,736	78	RANCH
3	8,728	78	RANCH
4	8,784	80	RANCH
5	9,568	83	TWO-STORY
6	14,565	72	RANCH
7	11,660	72	RANCH
8	9,438	72	RANCH
9	9,730	72	RANCH
10	10,016	87	RANCH
11	11,541	72	RANCH
12	10,748	72	RANCH
13	9,480	83	TWO-STORY
14	10,530	83	TWO-STORY
15	9,177	72	RANCH
16	8,838	73	TWO-STORY
17	8,731	80	TWO-STORY
18	8,852	77	TWO-STORY
19	9,824	73	RANCH
20	10,727	80	RANCH
21	11,215	72	RANCH
22	9,703	90	TWO-STORY
23	8,959	72	RANCH
24	8,840	71	RANCH
25	8,820	71	RANCH
26	8,803	71	RANCH
27	8,820	71	RANCH
28	8,814	71	RANCH
29	8,807	71	RANCH
30	8,797	71	RANCH
31	11,461	91	TWO-STORY
32	13,415	105	RANCH
33	9,417	72	TWO-STORY
34	9,405	72	TWO-STORY
35	9,350	72	TWO-STORY
36	10,138	72	RANCH
37	9,658	72	RANCH
38	9,648	72	RANCH
39	9,653	72	RANCH
40	9,646	72	RANCH
41	9,637	72	RANCH
42	9,671	72	RANCH
43	9,626	72	RANCH
44	9,605	72	RANCH
45	9,608	72	RANCH
46	9,896	72	RANCH
47	10,997	72	RANCH
48	10,738	81	RANCH
49	10,042	118	TWO-STORY
50	8,725	72	RANCH
51	8,803	71	RANCH
52	8,736	72	RANCH
53	12,624	98	RANCH
54	11,809	74	RANCH
55	15,001	77	RANCH
56	13,660	83	RANCH
57	9,496	72	RANCH
58	9,477	72	RANCH
59	9,463	72	RANCH
60	9,456	72	RANCH
61	9,447	72	RANCH
62	9,429	72	RANCH
63	9,410	73	RANCH
64	11,010	72	RANCH
65	13,690	72	RANCH
66	18,628	135	RANCH
67	13,838	74	RANCH
68	11,355	72	RANCH
S1	8,736	72	RANCH
S2	19,802	113	RANCH
S3	12,624	98	RANCH
S4	11,809	74	RANCH
S5	15,001	77	RANCH
S6	13,660	83	RANCH
S7	9,496	72	RANCH
S8	9,477	72	RANCH
S9	9,463	72	RANCH
S10	9,456	72	RANCH
S11	9,447	72	RANCH
S12	9,429	72	RANCH
S13	9,410	73	RANCH
S14	11,010	72	RANCH
S15	13,690	72	RANCH
S16	18,628	135	RANCH
S17	13,838	74	RANCH
S18	11,355	72	RANCH

MIN. LOT SIZE = 8,728 SQ FT
AVG. LOT SIZE = 10,473 SQ FT
MIN. LOT WIDTH = 71 FT
* PER CONDITIONAL RE-ZONING 71 FT LOT WIDTH IS PERMISSIBLE FOR LOTS LOCATED ON THE WEST SIDE OF EAST ST.
AVG. LOT WIDTH = 78 FT

TWO-STORY HOMES = 12
RANCH HOMES = 56
S.D= STANDARD BASEMENT
G.V = GARDEN VIEW BASEMENT

SCALE: 1 INCH = 60 FEET

COUNTY DRAIN:
HANDY NO.4 DRAIN
OHWM: 886.33

FLOODPLAIN LINE
ELEV: 893.00

OPEN SPACE ACCESSED THROUGH PHASE 2
(6.07 AC)

EASEMENT FOR TEMP. CUL-DE-SAC

TEMPORARY PAVED CUL-DE-SAC

FUTURE ROAD EXPANSION

4' CHAIN LINK FENCE

ALDEN ST
EAST ST
NETTIE CT
KNEFF ST
DAILEY STREET
OPEN SPACE (0.07 AC)
PARK (0.08 AC)
RETENTION BASIN A
DETENTION BASIN B
CHESAPEAKE & OHIO RAILROAD (99' WIDE)

BM 206
BM 211
BM 210
BM 209
BM 201

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
●	○	MANHOLE
■	□	INLET / CATCHBASIN
	(	FLARED END-SECTION
	⊗	GATE VALVE
		HYDRANT
	-o-	UTILITY POLE
x x x	x x x	FENCE
	⊥	SIGN
TBR		TO BE REMOVED
SAN #1		SANITARY SEWER LABEL
CB (1)		STORM SEWER LABEL
WM 8"		WATER MAIN LABEL
547		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

NOTES:

1. EXISTING ZONING: R-2 VILLAGE CORE RESIDENTIAL
2. PROPOSED USE: SITE CONDOMINIUM DEVELOPMENT
3. NUMBER OF UNITS PROPOSED: 68
4. SITE AREAS:
   TOTAL AREA OF SITE : 30.70 ACRES
   TOTAL AREA OF DEVELOPED : 24.47 ACRES
   TOTAL % DEVELOPED : 80%
   TOTAL AREA OF UNDEVELOPED : 6.23 ACRES
   TOTAL % UNDEVELOPED : 20%
5. HEIGHT OF EXISTING STRUCTURES WITHIN 100' OF SITE: ONE AND TWO-STORY HOMES
6. MAXIMUM HEIGHT OF PROPOSED STRUCTURES: TWO-STORY HOMES
7. NO SIGNS ARE BEING PROPOSED FOR THIS DEVELOPMENT.
8. APPROXIMATELY 25% OF THE DEVELOPED SITE SHALL BE IMPERVIOUS RESULTING IN A COMPOUND 'C' FACTOR OF APPROXIMATELY 0.35.
9. PROPOSED SEWAGE SYSTEM = PUBLIC SEWER SYSTEM
10. PROPOSED WATER SUPPLY = PUBLIC WATER SUPPLY
11. PROPOSED ELECTRICAL SUPPLY = UNDERGROUND DETROIT EDISON
12. PROPOSED GAS SERVICE = UNDERGROUND CONSUMERS ENERGY
13. PROPOSED TELEPHONE SERVICE = UNDERGROUND AMERITECH
14. OPEN SPACE PROVIDED: 6.23 ACRES
15. DENSITY PROVIDED = 68 UNITS/30.70 ACRES = 2.21 UNITS/ACRE
16. ALL PROPOSED ROADS ARE TO BE PUBLIC.
17. 35' FRONT YARD SETBACK
18. 10' SIDE YARD SETBACK
19. 15' REAR YARD SETBACK
20. MAINTENANCE OF PARKS SHALL BE OUTLINED IN THE HOMEOWNER'S ASSOCIATION COVENANTS.
21. NO DIRECT ACCESS WILL BE PERMITTED TO DAILEY STREET FOR LOTS 55 AND 56.
22. FINAL LANDSCAPING AND SIDEWALK AS PROPOSED IS TO BE INSTALLED ON EACH INDIVIDUAL LOT PRIOR TO THE FINAL INSPECTION REVIEW.
23. ALL DRIVEWAYS ARE REQUIRED TO BE PAVED PRIOR TO A ZONING COMPLIANCE APPROVAL.
24. A 12' WIDE PUBLIC UTILITY EASEMENT IS PROPOSED ON BOTH SIDES OF ALL PROPOSED ROADS.
25. PROJECT TO BE CONSTRUCTED IN 2 OR MORE PHASES. PHASED SESC PLANS TO BE SUBMITTED PRIOR TO OBTAINING PERMIT.
26. PER CONDITIONAL ZONING EACH HOME SHALL HAVE A TWO CAR GARAGE.
27. APPROXIMATELY 7.64 AC OF SITE WILL BE DEDICATED TO PUBLIC ROAD RIGHT OF WAY.
28. CRACKED, SPALLED, DAMAGED, OR OTHERWISEDEFECTIVE CONCRETE, INCLUDING DAMAGE TO THE SURFACE OF CONCRETE, IN THE VILLAGE RIGHT OF WAY WILL NOT BE ACCEPTED. UNACCEPTABLE CONCRETE SHALL BE REMOVED AND REPLACED AT NO COST TO THE VILLAGE
29. ALL CONCRETE SHALL BE A MINIMUM OF MDOT 6 SACK WITH SPECIFIED STRENGTH OF 4000 PSI AT 28 DAYS.
30. LIGHTING FOR DEVELOPMENT SHALL BE ACHIEVED THROUGH THE USE OF PHOTOCELL GARAGE MOUNTED COACH LIGHTS.

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CONNECTIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE DISCOVERED OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
OR 811
IT'S THE LAW (PUBLIC ACT 53)

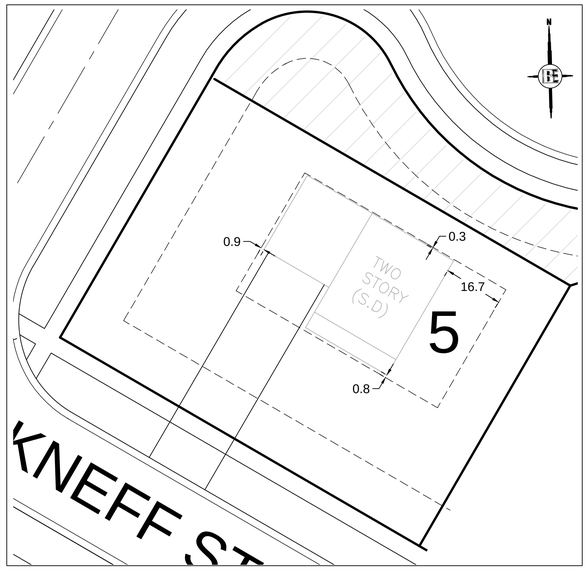
BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3
PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

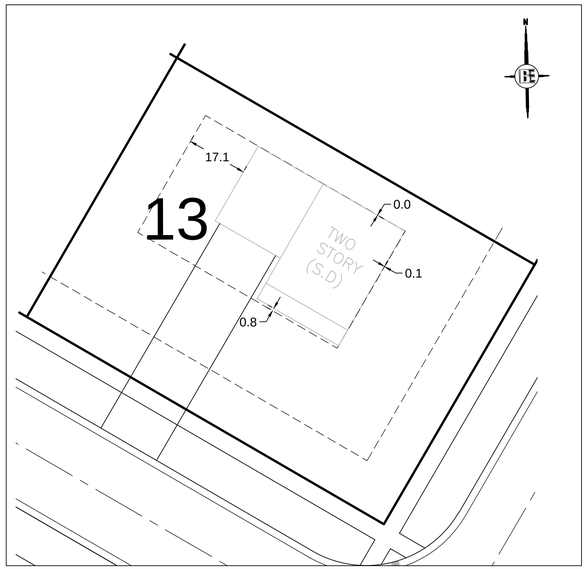
TITLE
SITE PLAN

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19

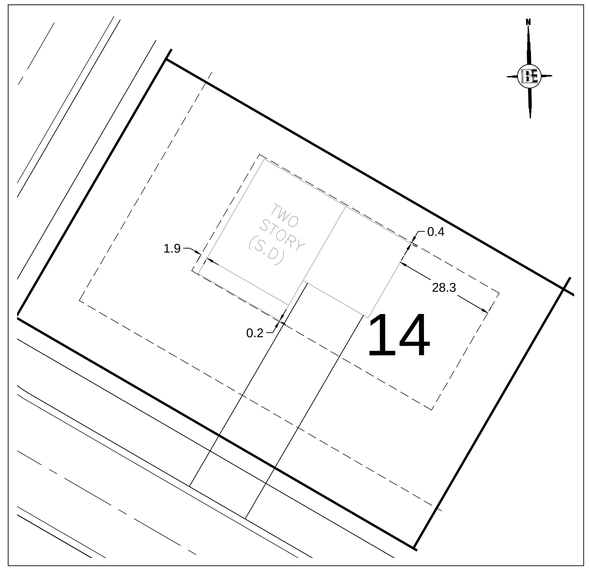
DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C3



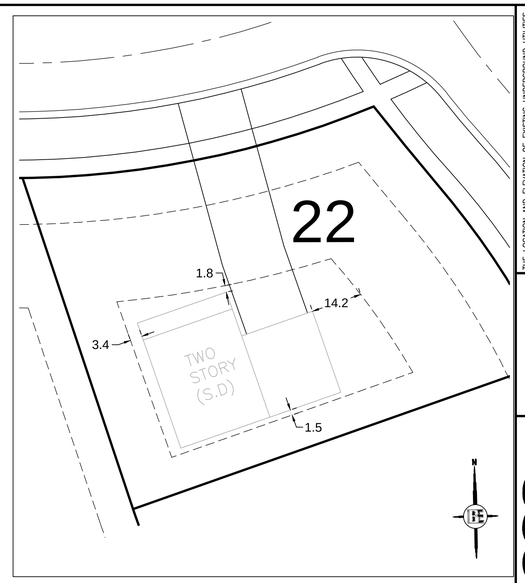
LOT #5 DIMENSION PLAN
SCALE: 1"=20'



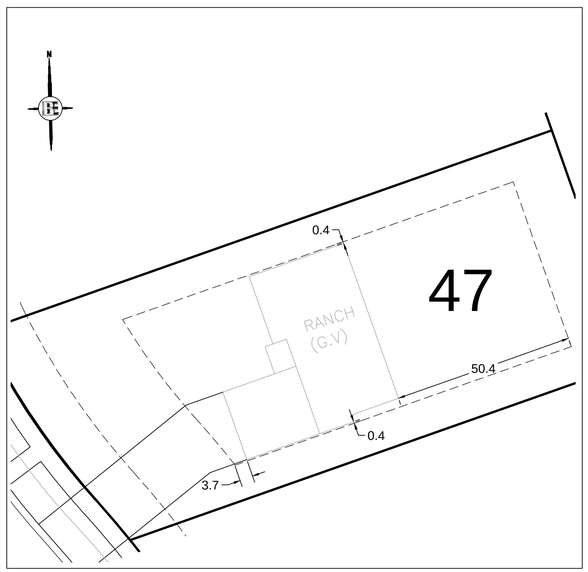
LOT #13 DIMENSION PLAN
SCALE: 1"=20'



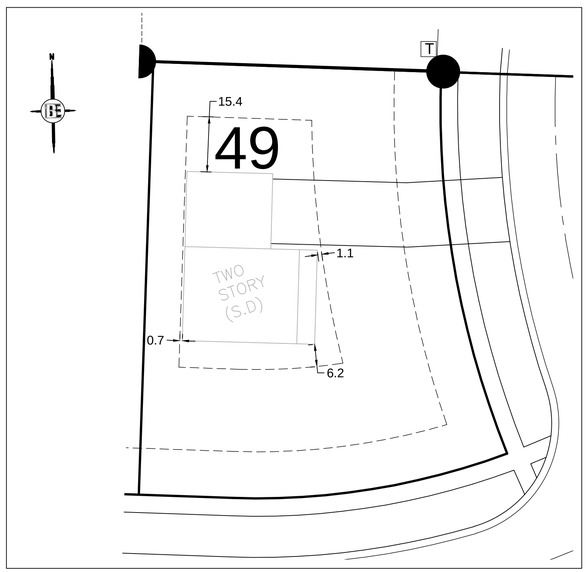
LOT #14 DIMENSION PLAN
SCALE: 1"=20'



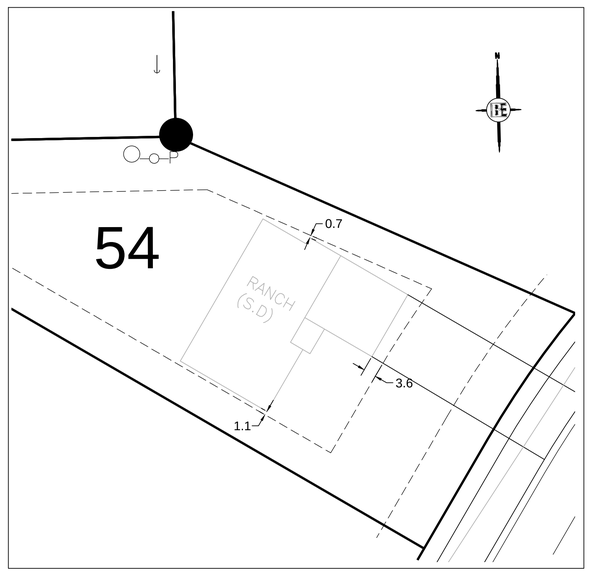
LOT #22 DIMENSION PLAN
SCALE: 1"=20'



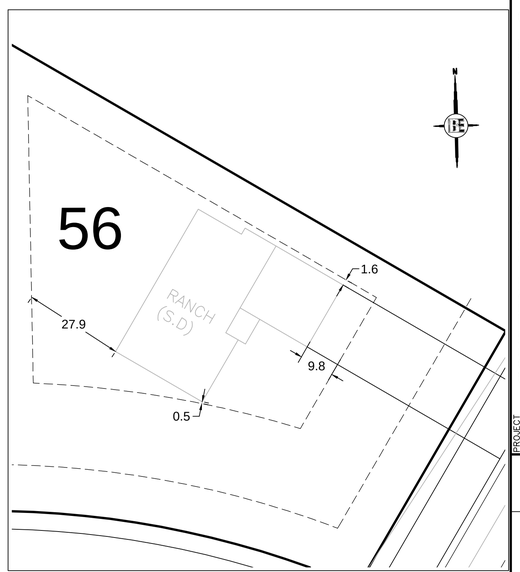
LOT #47 DIMENSION PLAN
SCALE: 1"=20'



LOT #49 DIMENSION PLAN
SCALE: 1"=20'



LOT #54 DIMENSION PLAN
SCALE: 1"=20'



LOT #56 DIMENSION PLAN
SCALE: 1"=20'

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITIES CROSSINGS AND FOR COORDINATING WITH THE UTILITIES. CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST AT THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
OR 811
IT'S THE LAW!!

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

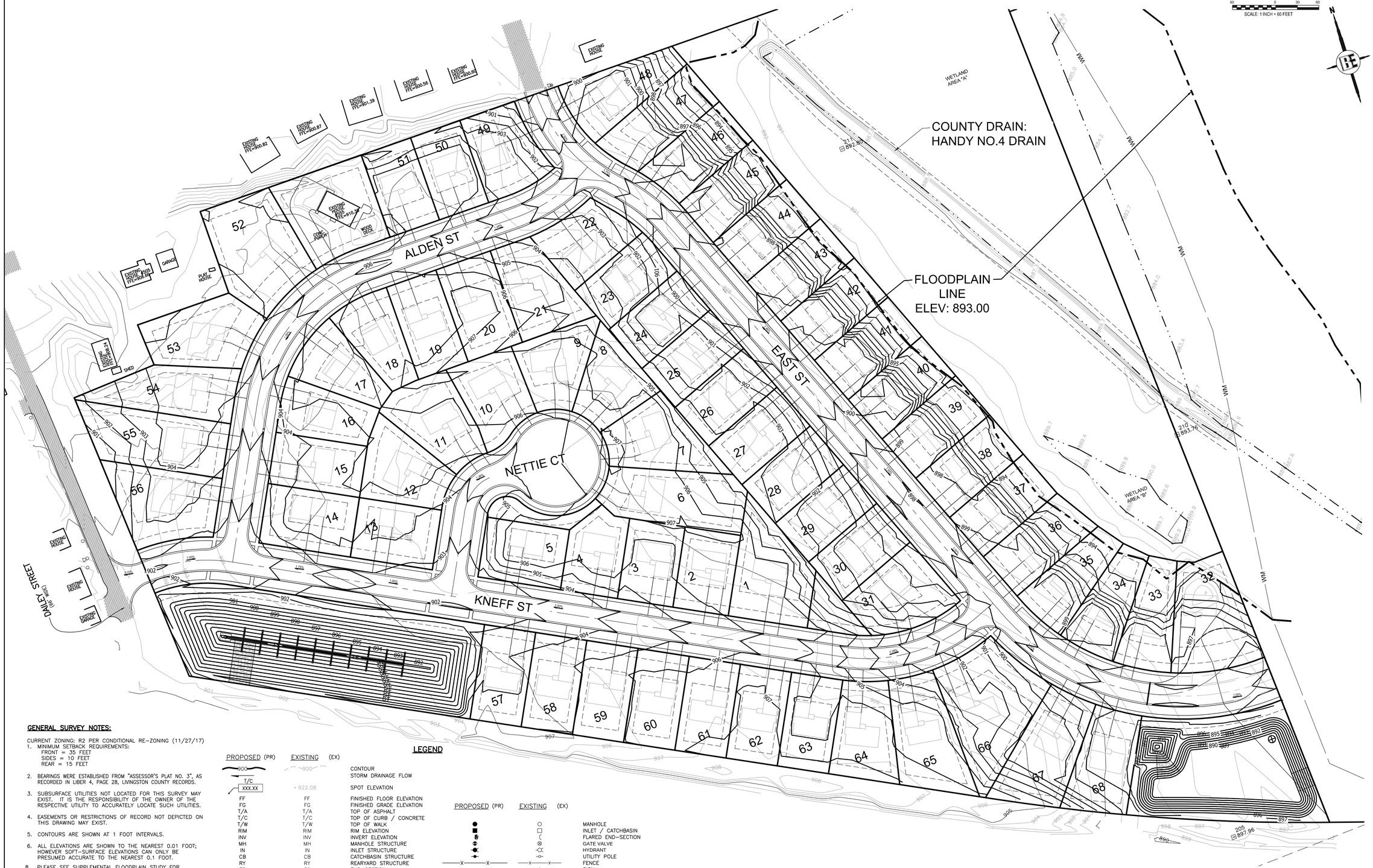
PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

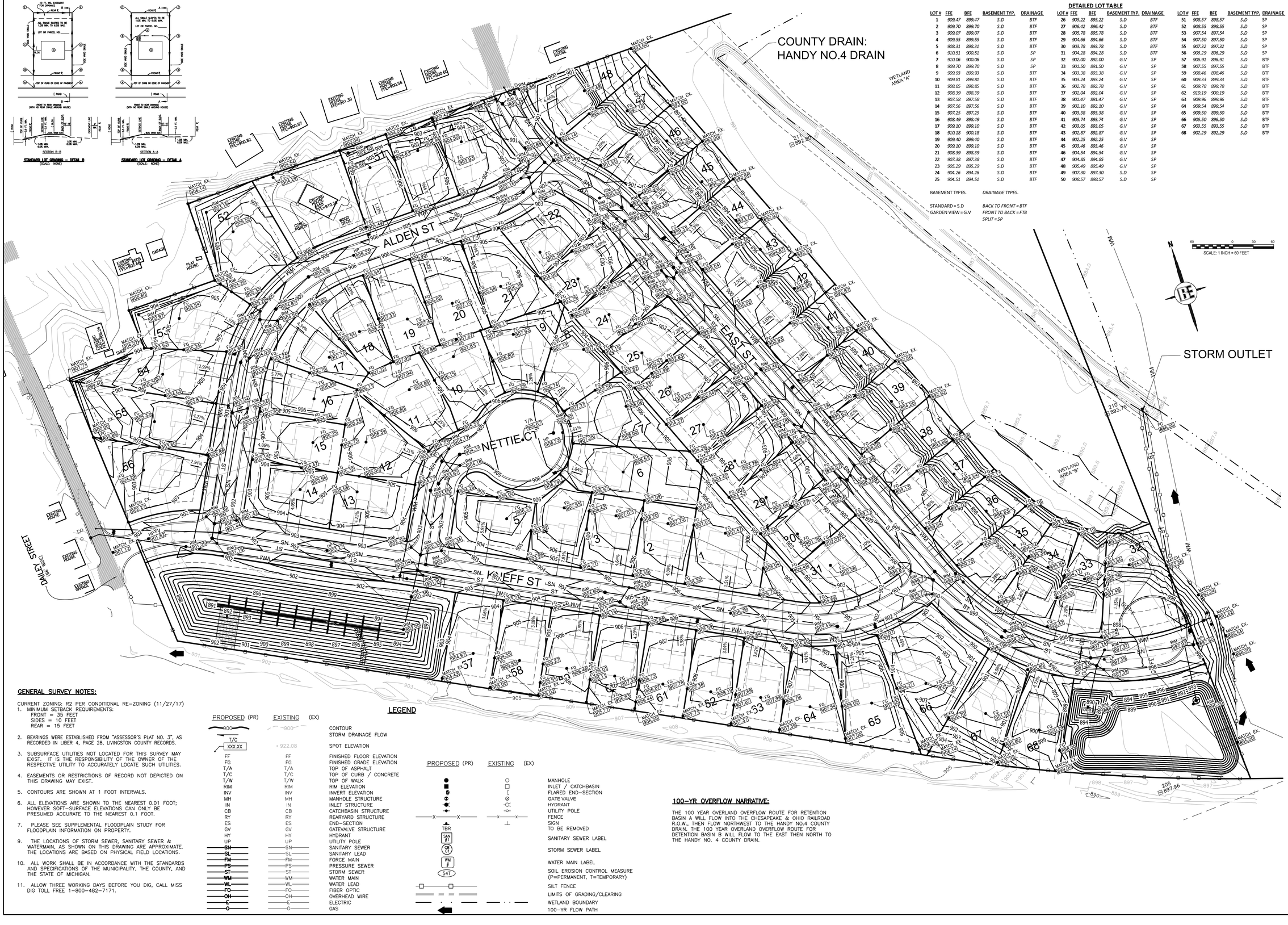
TITLE
DETAILED LOT DIMENSION PLAN

NO	BY	REVISION PER	DATE
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: CH
DRAWN BY: CH
CHECKED BY:
SCALE SEE SHEET
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C3A

G:\18-032\dwg\CP\shortcuts\18-032 BASE 9-27-18.dwg, 3/2/2020 2:26:59 PM, AutoCAD PDF (Smallest File).pc3


SCALE: 1 INCH = 60 FEET
ALDEN ST
EAST ST
NETTIE CT
KNEFF ST
DALEY ST (66' WIDE)
COUNTY DRAIN:
HANDY NO.4 DRAIN
FLOODPLAIN
LINE
ELEV: 893.00
WETLAND
AREA "A"
WETLAND
AREA "B"
EXISTING HOUSE FFE=900.82
EXISTING HOUSE FFE=900.87
EXISTING HOUSE FFE=901.39
EXISTING HOUSE FFE=900.56
EXISTING HOUSE FFE=900.64
EXISTING HOUSE FFE=910.34
EXISTING HOUSE FFE=906.09
GARAGE
SHED
COVERED PORCH
CONC. PORCH
WOOD DECK
ALLEY
EXISTING HOUSE
EXISTING GARAGE
EXISTING SHED
EXISTING HOUSE
EXISTING GARAGE
EXISTING HOUSE
EXISTING GARAGE
EXISTING HOUSE
EXISTING GARAGE



DETAILED LOT TABLE

LOT #	FFE	BFE	BASEMENT TYP.	DRAINAGE
1	909.47	899.47	S.D	BTF
2	909.70	899.70	S.D	BTF
3	909.07	899.07	S.D	BTF
4	909.55	899.55	S.D	BTF
5	908.31	898.31	S.D	BTF
6	910.51	900.51	S.D	SP
7	910.06	900.06	S.D	SP
8	909.70	899.70	S.D	SP
9	909.93	899.93	S.D	BTF
10	909.81	899.81	S.D	BTF
11	908.85	898.85	S.D	BTF
12	908.39	898.39	S.D	BTF
13	907.58	897.58	S.D	BTF
14	907.56	897.56	S.D	BTF
15	907.25	897.25	S.D	BTF
16	908.49	898.49	S.D	BTF
17	909.10	899.10	S.D	BTF
18	910.18	900.18	S.D	BTF
19	909.40	899.40	S.D	BTF
20	909.10	899.10	S.D	BTF
21	908.39	898.39	S.D	BTF
22	907.38	897.38	S.D	BTF
23	905.29	895.29	S.D	BTF
24	904.26	894.26	S.D	BTF
25	904.51	894.51	S.D	BTF
26	905.22	895.22	S.D	BTF
27	906.42	896.42	S.D	BTF
28	905.78	895.78	S.D	BTF
29	904.66	894.66	S.D	BTF
30	903.78	893.78	S.D	BTF
31	904.28	894.28	S.D	BTF
32	902.00	892.00	G.V	SP
33	901.50	891.50	G.V	SP
34	903.38	893.38	G.V	SP
35	903.24	893.24	G.V	SP
36	902.78	892.78	G.V	SP
37	902.04	892.04	G.V	SP
38	901.47	891.47	G.V	SP
39	902.10	892.10	G.V	SP
40	903.38	893.38	G.V	SP
41	903.74	893.74	G.V	SP
42	903.05	893.05	G.V	SP
43	902.87	892.87	G.V	SP
44	902.25	892.25	G.V	SP
45	903.46	893.46	G.V	SP
46	904.54	894.54	G.V	SP
47	904.85	894.85	G.V	SP
48	905.49	895.49	G.V	SP
49	907.30	897.30	S.D	SP
50	908.57	898.57	S.D	SP
51	908.57	898.57	S.D	SP
52	908.55	898.55	S.D	SP
53	907.54	897.54	S.D	SP
54	907.50	897.50	S.D	SP
55	907.32	897.32	S.D	SP
56	906.29	896.29	S.D	SP
57	906.91	896.91	S.D	BTF
58	907.55	897.55	S.D	BTF
59	908.46	898.46	S.D	BTF
60	909.33	899.33	S.D	BTF
61	909.78	899.78	S.D	BTF
62	910.19	900.19	S.D	BTF
63	909.96	899.96	S.D	BTF
64	909.54	899.54	S.D	BTF
65	909.50	899.50	S.D	BTF
66	906.50	896.50	S.D	BTF
67	909.55	899.55	S.D	BTF
68	902.29	892.29	S.D	BTF

BASEMENT TYPES.
STANDARD = S.D
GARDEN VIEW = G.V

DRAINAGE TYPES.
BACK TO FRONT = BTF
FRONT TO BACK = FTB
SPLIT = SP

GENERAL SURVEY NOTES:

CURRENT ZONING: R2 PER CONDITIONAL RE-ZONING (11/27/17)

1. MINIMUM SETBACK REQUIREMENTS:
   FRONT = 35 FEET
   SIDES = 10 FEET
   REAR = 15 FEET
2. BEARINGS WERE ESTABLISHED FROM "ASSESSOR'S PLAT NO. 3", AS RECORDED IN LIBER 4, PAGE 28, LIVINGSTON COUNTY RECORDS.
3. SUBSURFACE UTILITIES NOT LOCATED FOR THIS SURVEY MAY EXIST. IT IS THE RESPONSIBILITY OF THE OWNER OF THE RESPECTIVE UTILITY TO ACCURATELY LOCATE SUCH UTILITIES.
4. EASEMENTS OR RESTRICTIONS OF RECORD NOT DEPICTED ON THIS DRAWING MAY EXIST.
5. CONTOURS ARE SHOWN AT 1 FOOT INTERVALS.
6. ALL ELEVATIONS ARE SHOWN TO THE NEAREST 0.01 FOOT; HOWEVER SOFT-SURFACE ELEVATIONS CAN ONLY BE PRESUMED ACCURATE TO THE NEAREST 0.1 FOOT.
7. PLEASE SEE SUPPLEMENTAL FLOODPLAIN STUDY FOR FLOODPLAIN INFORMATION ON PROPERTY.
9. THE LOCATIONS OF STORM SEWER, SANITARY SEWER & WATERMAIN, AS SHOWN ON THIS DRAWING ARE APPROXIMATE. THE LOCATIONS ARE BASED ON PHYSICAL FIELD LOCATIONS.
10. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
11. ALLOW THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.

LEGEND

PROPOSED (PR)	EXISTING (EX)	
200	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
●	○	MANHOLE
■	□	INLET / CATCHBASIN
	(	FLARED END-SECTION
	⊗	GATE VALVE
		HYDRANT
		UTILITY POLE
x x x	x x x	FENCE
TBR		SIGN TO BE REMOVED
SN #1		SANITARY SEWER LABEL
CB (1)		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY
		100-YR FLOW PATH

100-YR OVERFLOW NARRATIVE:

THE 100 YEAR OVERLAND OVERFLOW ROUTE FOR RETENTION BASIN A WILL FLOW INTO THE CHESAPEAKE & OHIO RAILROAD R.O.W., THEN FLOW NORTHWEST TO THE HANDY NO.4 COUNTY DRAIN. THE 100 YEAR OVERLAND OVERFLOW ROUTE FOR DETENTION BASIN B WILL FLOW TO THE EAST THEN NORTH TO THE HANDY NO. 4 COUNTY DRAIN.

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE COMPLETENESS OR ACCURACY THEREOF. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IN THE EVENT ANY APPARENT OR IF ANY DISCREPANCY IN LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG
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1-800-482-7171
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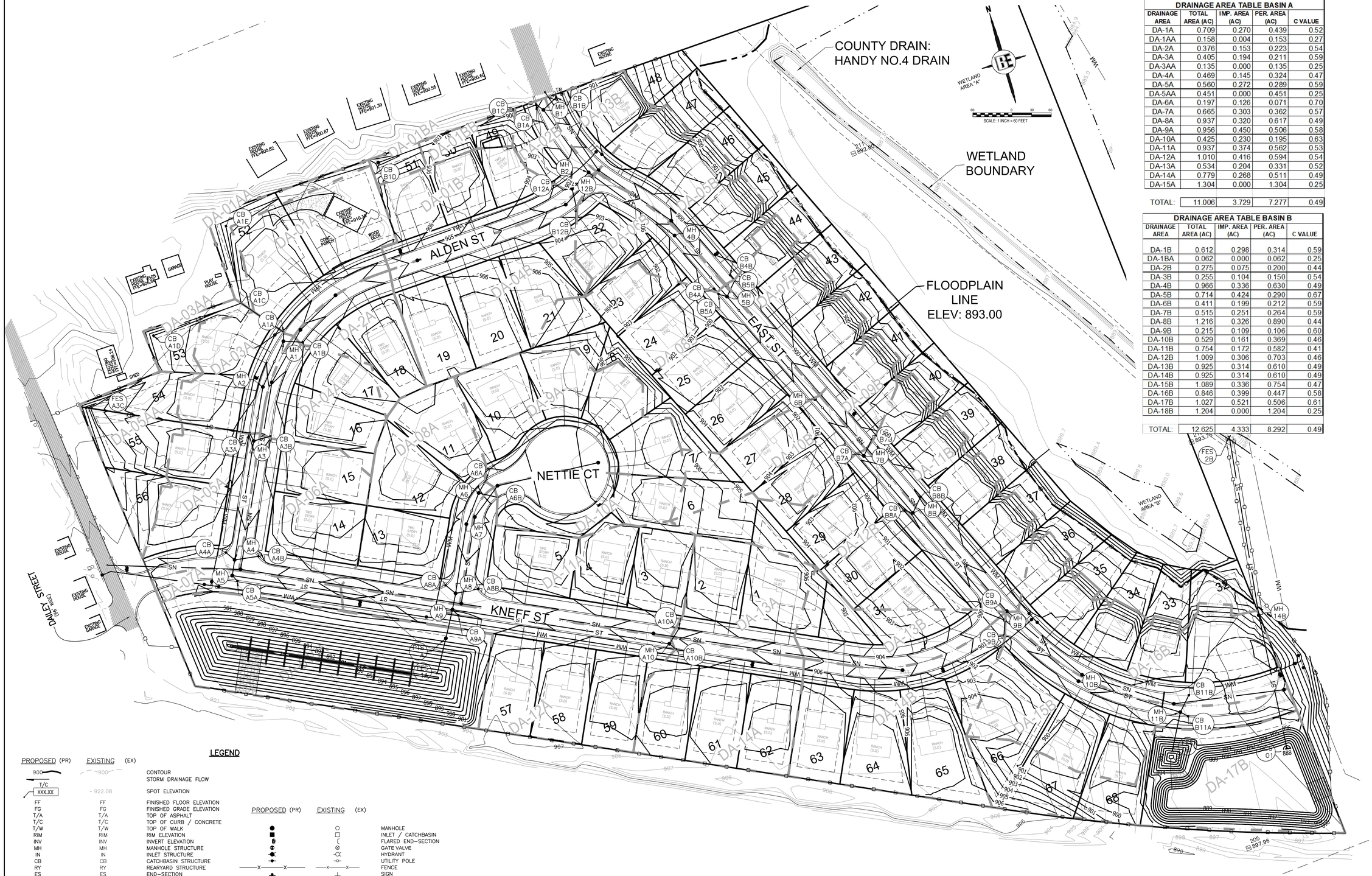
BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3
PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624
TITLE
FINAL GRADING PLAN

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: CH
DRAWN BY: CH
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C5

G:\18-032\dwg\CP\shortcuts\SURFACES\4.PROPOSED SURFACE 1-22 REVISION.dwg, 3/2/2020 2:27:35 PM, AutoCAD PDF (Smallest File).pc3



DRAINAGE AREA TABLE BASIN A

DRAINAGE AREA	TOTAL AREA (AC)	IMP. AREA (AC)	PER. AREA (AC)	C VALUE
DA-1A	0.709	0.270	0.439	0.52
DA-1AA	0.158	0.004	0.153	0.27
DA-2A	0.376	0.153	0.223	0.54
DA-3A	0.405	0.194	0.211	0.59
DA-3AA	0.135	0.000	0.135	0.25
DA-4A	0.469	0.145	0.324	0.47
DA-5A	0.560	0.272	0.289	0.59
DA-5AA	0.451	0.000	0.451	0.25
DA-6A	0.197	0.126	0.071	0.70
DA-7A	0.665	0.303	0.362	0.57
DA-8A	0.937	0.320	0.617	0.49
DA-9A	0.956	0.450	0.506	0.58
DA-10A	0.425	0.230	0.195	0.63
DA-11A	0.937	0.374	0.562	0.53
DA-12A	1.010	0.416	0.594	0.54
DA-13A	0.534	0.204	0.331	0.52
DA-14A	0.779	0.268	0.511	0.49
DA-15A	1.304	0.000	1.304	0.25
TOTAL:	11.006	3.729	7.277	0.49

DRAINAGE AREA TABLE BASIN B

DRAINAGE AREA	TOTAL AREA (AC)	IMP. AREA (AC)	PER. AREA (AC)	C VALUE
DA-1B	0.612	0.298	0.314	0.59
DA-1BA	0.062	0.000	0.062	0.25
DA-2B	0.275	0.075	0.200	0.44
DA-3B	0.255	0.104	0.150	0.54
DA-4B	0.966	0.336	0.630	0.49
DA-5B	0.714	0.424	0.290	0.67
DA-6B	0.411	0.199	0.212	0.59
DA-7B	0.515	0.251	0.264	0.59
DA-8B	1.216	0.326	0.890	0.44
DA-9B	0.215	0.109	0.106	0.60
DA-10B	0.529	0.161	0.369	0.46
DA-11B	0.754	0.172	0.582	0.41
DA-12B	1.009	0.306	0.703	0.46
DA-13B	0.925	0.314	0.610	0.49
DA-14B	0.925	0.314	0.610	0.49
DA-15B	1.089	0.336	0.754	0.47
DA-16B	0.846	0.399	0.447	0.58
DA-17B	1.027	0.521	0.506	0.61
DA-18B	1.204	0.000	1.204	0.25
TOTAL:	12.625	4.333	8.292	0.49

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
		FENCE
		SIGN
TBR		TO BE REMOVED
SAN #1		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES APPARENT OR IF ANY LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG 3 WORKING DAYS CALL MISS DIG 1-800-482-7171 It's not only the right thing to do, it's the law!

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3
ORR CREEK DEVELOPMENT
PREPARED FOR
1035 E GRAND RIVER AVE
BRIGHTON, MICHIGAN 48116
(810) 227-7624

TITLE
DRAINAGE PLAN

NO	BY	REVISION PER	DATE
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: CH
DRAWN BY: CH
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C6

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CONTROLS & MEASURES NARRATIVE

ACTIVITY	DESCRIPTION
MAINTAIN LANDSCAPING, REPLACE MULCH	COLLECT GRASS, TREE, AND SHRUB CLIPPINGS. DISPOSE IN APPROVED CONTAINER. REPLACE DEAD SOD, TREES AND SHRUBS.
CLEAN INLETS	REMOVE LITTER, SEDIMENT, AND DEBRIS. DISPOSE OF IN APPROVED LANDFILL.
COLLECT LITTER	DISPOSE OF WITH INLET DEBRIS.
SWEEP PARKING LOT	REMOVE MUD, DIRT, GREASE AND OIL WITH PERIODIC SWEEPING
DUST CONTROL	SPRINKLE WATER AS NEEDED

CONTROLS & MEASURES POST CONSTRUCTION SEQUENCE

ACTIVITY	WEEKLY	MONTHLY	AS REQUIRED
MAINTAIN LANDSCAPING, REPLACE MULCH	X	X	X
CLEAN INLETS		X	X
COLLECT LITTER	X		X
SWEEP PARKING LOT		X	X

CONSTRUCTION SEQUENCE

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT EROSION IS MINIMIZED AND THAT COMPLIANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES IS MAINTAINED THROUGHOUT EXECUTION OF THIS PROJECT.

30 DAYS	1.	INSTALL SILT FENCE AS SHOWN ON PLANS.
5 DAYS	2.	ROUGH GRADE AND INSTALL STORM DRAINAGE.
1 DAY	3.	INSTALL INLET PROTECTION ON STORM INLETS.
15 DAYS	4.	INSTALL PAVEMENT
15 DAYS	5.	FINE GRADE AROUND BUILDING, SPREAD TOPSOIL, SEED OR SOD AS APPLICABLE.
1 DAY	6.	REMOVE ALL EROSION CONTROL STRUCTURES.
1 DAY	7.	REMOVE ACCUMULATED SILT FROM ALL EXISTING DRAINAGE.

SOIL EROSION CONTROL NOTES:

1. ANY MUD OR DEBRIS TRACKED ONTO ANY STREET ADJACENT TO THE PROPOSED DEVELOPMENT SHALL BE REMOVED IMMEDIATELY. IF A VILLAGE AGENT REQUESTS IN WRITING THAT A ROAD BE CLEANED THE PROPRIETOR WILL HAVE TWELVE HOURS TO CLEAN IT. IF IT IS NOT CLEANED WITHIN TWELVE HOURS, THE VILLAGE OF FOWLERVILLE WILL HIRE IT DONE AND BILL PROPRIETOR FOR THE COSTS. ANY RELATED INVOICES MUST BE PAID BY THE PROPRIETOR BEFORE THE BOND ON THE PROJECT IS RELEASED

SCALE: 1 INCH = 60 FEET

MAINTENANCE SCHEDULE FOR SOIL EROSION CONTROLS

1. SILT FENCE SHALL BE INSPECTED WEEKLY AND AFTER EACH MAJOR STORM EVENT. MAINTENANCE SHALL INCLUDE REMOVAL OF ACCUMULATED SILT AND REPLACEMENT OF TORN SECTIONS. SILT FENCE SHALL BE REMOVED WHEN ALL CONTRIBUTING AREAS HAVE BEEN STABILIZED.
2. TRACKING PAD SHALL BE INSPECTED MONTHLY FOR ACCUMULATED DIRT. TRACKING PAD SHALL BE REPLACED WHEN THE STONES ARE CHOKED WITH DIRT. TRACKING SHALL BE REMOVED IMMEDIATELY PRIOR TO THE FIRST COURSE OF ASPHALT BEING LAID
3. DETENTION POND SHALL BE INSPECTED QUARTERLY ON A PERMANENT BASIS. MAINTENANCE SHALL INCLUDE SEDIMENT REMOVAL, EMBANKMENT STABILIZATION AND MAINTAINING THE OUTLET STRUCTURE IN GOOD CONDITION. NO TREES SHALL BE ALLOWED TO GROW ON THE EMBANKMENT.
4. CATCH BASINS SHALL BE INSPECTED ANNUALLY FOR ACCUMULATION OF SEDIMENT. ALL SEDIMENT MUST BE REMOVED AND DISPOSED OF PROPERLY WHEN THE SUMP IS FULL.
5. COMMON AREAS SHALL BE STABILIZED NO LATER THAN 15 DAYS AFTER GRADE WORK, PURSUANT TO RULE 1709 (5).

SOIL EROSION CONTROL MEASURES

6	SEEDING WITH MULCH AND/OR MATTING	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL SHOULD INCLUDE PREPARED TOPSOIL BED
14	AGGREGATE COVER	STABILIZES SOIL SURFACE, THUS MINIMIZING EROSION PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS
15	PAVING	PROTECTS AREAS WHICH CANNOT OTHERWISE BE PROTECTED, BUT INCREASES RUNOFF VELOCITY IRREGULAR SURFACE WILL HELP SLOW VELOCITY
16	CURB & GUTTER	KEEPS HIGH VELOCITY RUNOFF ON PAVED AREAS FROM LEAVING PAVED SURFACE COLLECTS AND CONDUCTS RUNOFF TO ENCLOSED DRAINAGE SYSTEM OR PREPARED DRAINAGEWAY
35	STORM SEWER	SYSTEM REMOVES COLLECTED RUNOFF FROM SITE, PARTICULARLY FROM PAVED AREAS CAN ACCEPT LARGE CONCENTRATIONS OF RUNOFF CONDUCTS RUNOFF TO MUNICIPAL SEWER SYSTEM OR STABILIZED OUTFALL LOCATION USE CATCH BASINS TO COLLECT SEDIMENT
36	CATCH BASIN, DRAIN INLET	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FILTER CLOTH OVER INLET
40	INLET SEDIMENT FILTER	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEANED AND EXPANDED AS NEEDED
54	SILT FENCE	USES GEOTEXTILE FABRIC AND POST OR POLES. EASY TO CONSTRUCT AND LOCATE AS NECESSARY. (SEE DETAIL THIS SHEET)

P= PERMANENT T=TEMPORARY

AREA OF DISTRUBANCE = 1,337,292 SF (30.7 ACRES)

FLOODPLAIN LINE ELEV: 893.00

ALDEN ST

EAST ST

NETTIE CT

KNEFF ST

OAK ST (PUBLIC, 66' WIDE)

EXISTING HOUSE FFE=900.82

EXISTING HOUSE FFE=900.87

EXISTING HOUSE FFE=900.66

EXISTING HOUSE FFE=900.56

EXISTING HOUSE FFE=910.45

EXISTING HOUSE FFE=900.54

EXISTING HOUSE

EXISTING GARAGE

CONC PORCH

WOOD DECK

GARAGE

PLAY HOUSE

SHED

SB-1 10' DEPTH BOTTOM OF BASIN

SB-2 30' DEPTH BOTTOM OF BASIN

SB-3 30' DEPTH BOTTOM OF BASIN

SB-4 10' DEPTH

SB-5 10' DEPTH

SB-6 10' DEPTH

SB-7 10' DEPTH

SB-8 10' DEPTH

SB-9 10' DEPTH

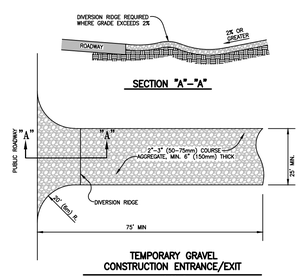
WETLAND AREA "B"

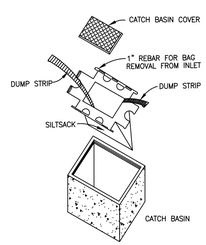
WM FOR WATERMAIN CONNECTION

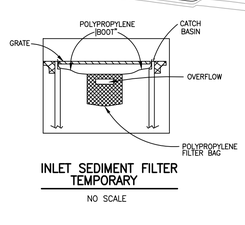
LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	~900~	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
TBR		SOIL BORING LOCATION
X X	X X	FENCE
		SIGN TO BE REMOVED
SAN #1		SANITARY SEWER LABEL
SR 01		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

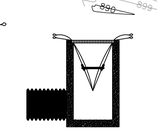






INLET SEDIMENT FILTER TEMPORARY

NO SCALE



INSTALLATION DETAIL

NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVEMENT CATCH BASINS INLET FILTER TO BE SIMILAR TO "STREAMGUARD" AS MANUFACTURED BY STORMWATER SERVICES CORPORATION (206-767-0441) OR "SILTSACK" AS MANUFACTURED BY ATLANTIC CONSTRUCTION FABRICS IN (800-448-3636). CLEAN FILTER AS NEEDED.

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THEIR COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE SAME. THE CONTRACTOR SHALL ALSO VERIFY THE LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY APPARENT OR IF ANY LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 IT'S THE LAW!!! (MICHIGAN PUBLIC ACT 53 OF 1974, AS AMENDED)

BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
1031E. GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624

TITLE
SOIL EROSION CONTROL PLAN

NO	BY	REVISION PER	DATE
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: CH
DRAWN BY: CH
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C7

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CONNECT TO EXISTING UTILITY, TAPPING SLEEVE, VALVE, AND WELL TO BE INSTALLED AT WATERMAIN CONNECTION FOR LIVE TAP (CONTRACTOR TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION)

COUNTY DRAIN:
HANDY NO.4 DRAIN

WETLAND AREA "A"

WETLAND BOUNDARY

FLOODPLAIN LINE
ELEV: 893.00

CONNECT PROPOSED LEADS TO EXISTING HOUSE AND ABANDON EXISTING LEADS. CONTRACTOR TO COORDINATE WITH HOME OWNER.

ALDEN ST

NETTIE CT

KNEFF ST

EAST ST

DALEY STREET (66' WIDE)

EXISTING 4" WATERMAIN

EXISTING 12" WATERMAIN

WETLAND AREA "B"

CONNECT TO EXISTING UTILITY. TAPPING, SLEEVE, VALVE AND WELL TO BE INSTALLED AT WATERMAIN CONNECTION FOR LIVE TAP (CONTRACTOR TO VERIFY DEPTH AND LOCATION PRIOR TO CONSTRUCTION)

MECHANICAL CDS5653-10-C PRE-TREATMENT UNIT (TYP.) (SEE DETAIL SHEET 27.)

SCALE: 1 INCH = 60 FEET

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C XXX.XX	+ 922.08	STORM DRAINAGE FLOW / SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
●	○	MANHOLE
■	□	INLET / CATCHBASIN
	(	FLARED END-SECTION
⊗	⊗	GATE VALVE
	-☼-	HYDRANT
-x-x-	-x-x-	UTILITY POLE / FENCE
	⊥	END-SECTION / SIGN
TBR		TO BE REMOVED
SAN #		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

UTILITY NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY, THE COUNTY, AND THE STATE OF MICHIGAN.
2. THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1-800-482-7171.
3. SANITARY SEWER SHALL BE 8" PVC SDR-26 PLASTIC PIPE UNLESS OTHERWISE STATED. (SEE DETAIL SHEET C26)
4. ALL SANITARY LEADS TO BE A MINIMUM OF 1.00% SLOPE
5. ALL SANITARY LEADS TO BE 6" PVC SDR 26. (SEE DETAIL SHEET C26)
6. WATERMAIN SHALL CONSIST OF DUCTILE IRON PIPE CLASS 52 UNLESS OTHERWISE STATED. (SEE DETAIL SHEET C26)
7. STORM SEWER SHALL CONSIST OF REINFORCED CONCRETE PIPE C-76 CLASS IV STORM SEWER. (SEE DETAIL SHEET C26)
8. SUMP PUMP LEADS SHALL CONSIST OF 4" SCHEDULE 40 PVC PIPE
9. TOTAL OF 68 SITES PROPOSED.
10. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION
11. A RADIAL RED WATER METER MEETING VILLAGE SPECIFICATIONS MUST BE INSTALLED IN EACH METER PIT.
12. A 12 GAUGE COPPERHEAD TRACER WIRE SHALL BE INSTALLED WITH THE PROPOSED SANITARY MAIN AND LEADS, WATER MAIN AND LEADS, AND EACH FIRE HYDRANT. A COPPERHEAD GROUNDING ANODE AND SNAKEPIT TRACER WIRE ACCESS BOX SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AT EACH HYDRANT, METER PIT AND AT ROAD RIGHT OF WAY MARKER FOR EACH SANITARY LEAD. ALL TRACER WIRE CONNECTIONS SHALL BE MADE WITH SNAKEBITE CORROSION PROOF WIRE CONNECTORS.
13. ANY WATER CONSUMED FROM A VILLAGE SOURCE FOR CONSTRUCTION PURPOSES MUST BE METERED AND PAID FOR BY THE PROPRIETOR. THE METER MUST BE ATTACHED TO BACKFLOW PREVENTER THAT HAS BEEN EITHER BORROWED FROM OR APPROVED BY THE VILLAGE.
14. CATCH BASIN CASTING ADJUSTMENTS SHALL BE DONE WITH EJ COMPOSITE ADJUSTMENT RINGS ONLY. STRUCTURE SHALL B WRAPPED FROM 2 INCHES BELOW THE TOP OF THE MANHOLE CONE TO THE MIDPOINT OF THE CASTING, INCLUDING ALL ADJUSTMENT RINGS, WITH GPT INDUSTRIES RISER WRAP OR ENGINEER APPROVED EQUIVALENT. RINGS AND WRAP SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
15. FINAL CASTING ADJUSTMENTS FOR MANHOLES IN PAVED SURFACES SHALL BE MADE AFTER THE ASPHALT TOP COURSE IS LAID. COORDINATE CONSTRUCTION EFFORTS WITH VILLAGE ENGINEER.

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO COMPLETENESS OR ACCURACY THEREOF IS GUARANTEED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANIES FOR EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES APPARENT OR IF THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

THREE WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
IT'S NOT JUST A SUGGESTION, IT'S THE LAW

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
1031 E. GRAND TRAVERSE AVE
BRIGHTON, MICHIGAN 48116
(810) 227-7624

TITLE
UTILITY PLAN

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C8

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PLANT LIST – DEVELOPMENT

KEY	QUAN.	BOTANICAL NAME	COMMON NAME	SIZE	REMARK
TREES					
BP	24	Betula papyrifera	Paperbark Birch	2 1/2" cal.	B–B
MT	8	Magnolia stellata 'Rubra'	Red Star Magnolia	6'–8' ht.	B–B
PLA	3	Platanus x acerfolia	London Plane Tree	2 1/2" cal.	B–B
PP	32	Picea pungens var. 'Glauca'	Colorado Blue Spruce	6'–8' ht.	B–B
PRS	54	Prunus sargentii	Sargent Cherry	2 1/2" cal.	B–B
SHRUBS					
EA	18	Euonymus alatus var. Compactus	Dwarf Burning Bush	24"–36" ht.	B–B
TE	10	Thuja occidentalis 'Emerald'	Emerald Arborvitae	24"–36" ht.	B–B

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END–SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE

PROPOSED (PR)	EXISTING (EX)	
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
		FLARED END–SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
		FENCE
		SIGN
	NFV	NOT FIELD VERIFIED

PROPOSED (PR)	EXISTING (EX)	
TBR		TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN 01		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
WM 1		WATER MAIN LABEL
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		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

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OR 811
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PROJECT
SOLITUDE MEADOWS – PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227–7624

TITLE
LANDSCAPE PLAN

NO	BY	DATE
3	TE	9–03–19
2	TE	5–31–19
1	CH	4–25–19

REVISION PER: PER EGLE & LCDC COMMENTS; PER VILLAGE COMMENTS

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18–032
DATE 10–30–18
SHEET NO. C9

BOSS Engineering

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LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
X X	X X	FENCE
TBR		SIGN TO BE REMOVED
SAN F1		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
WM 1		WATER MAIN LABEL
547		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

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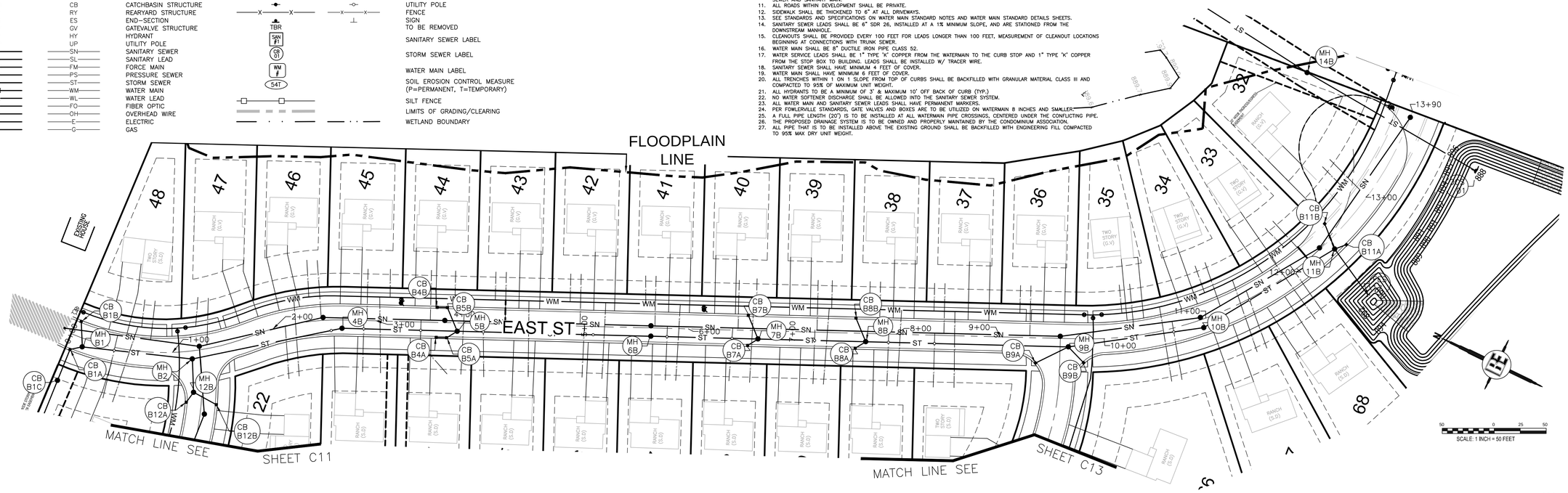

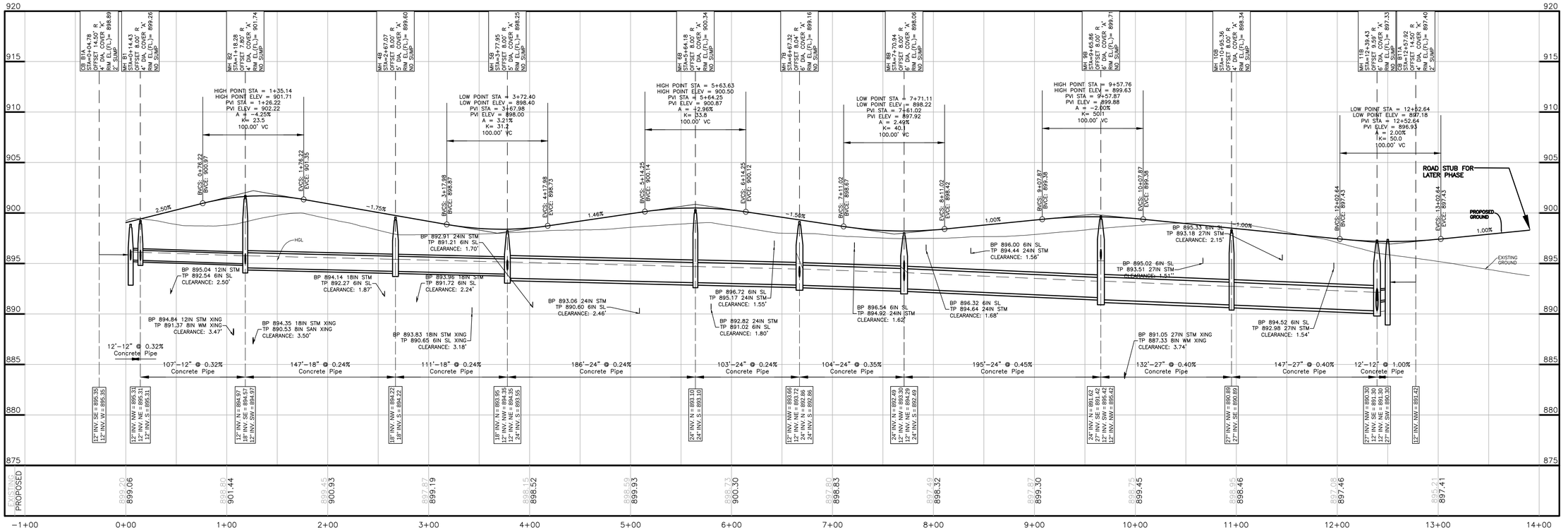

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It's not only a statewide number

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3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3
ORE CREEK DEVELOPMENT
1035 E GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624
PREPARED FOR

TITLE
EAST ST PAVING + STORM PLAN/PROFILE

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C10

BOSS Engineering

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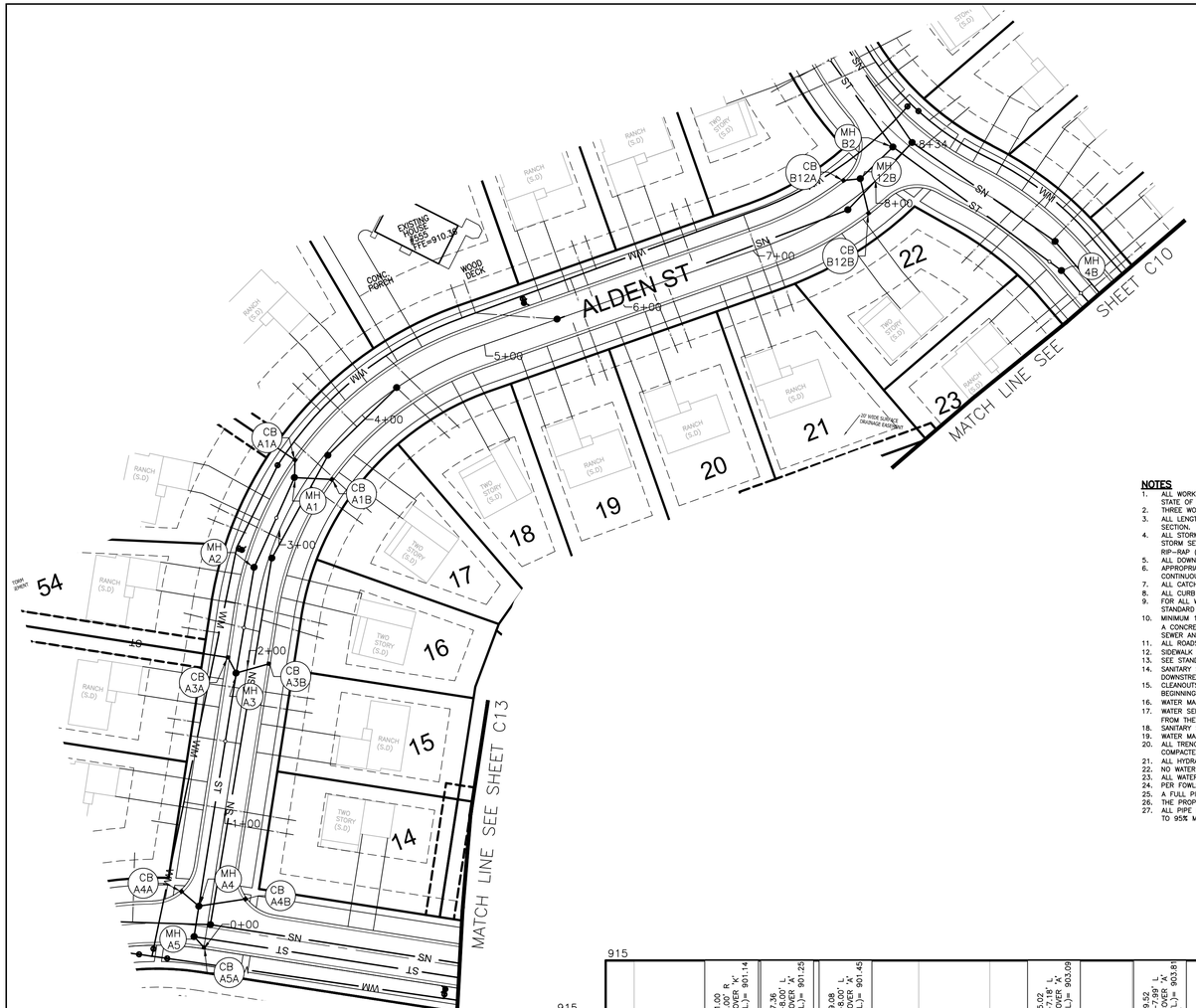

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
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G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
◖	(	FLARED END-SECTION
⊗	⊗	GATE VALVE
✱	✱	HYDRANT
⌖	⌖	UTILITY POLE
X X	X X	FENCE
⊥	⊥	SIGN
TBR	NFV	NOT FIELD VERIFIED TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN #		SANITARY SEWER LABEL
ST #		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
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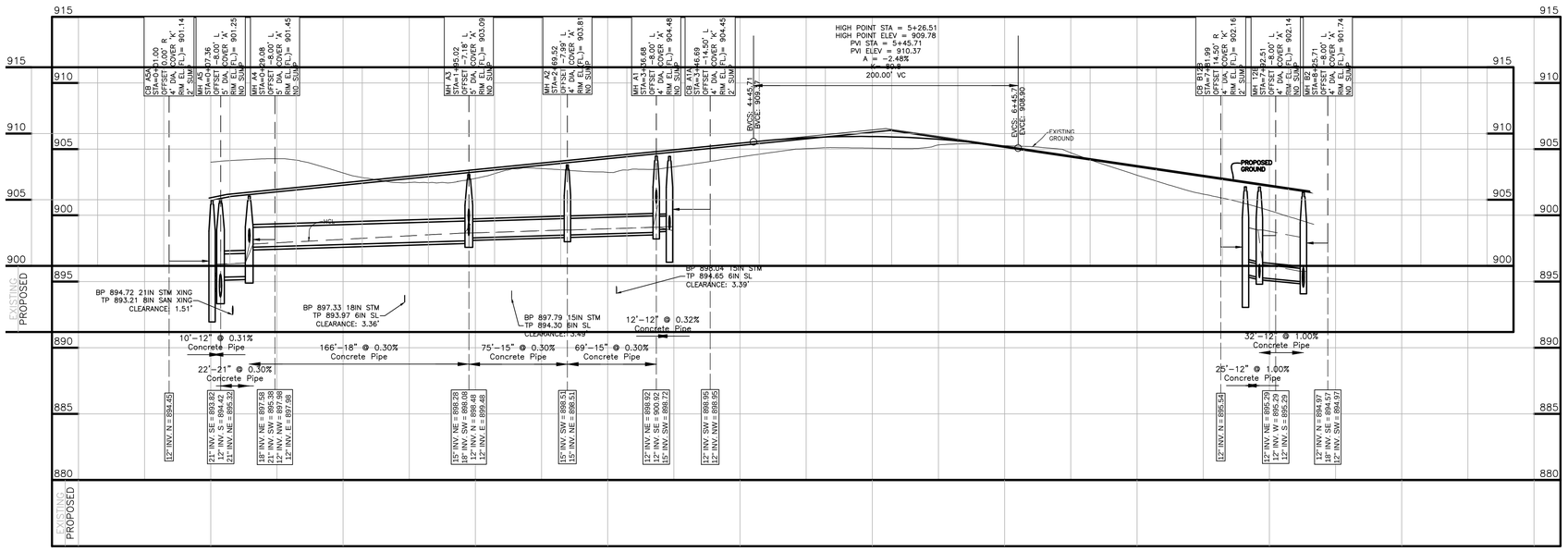

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HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

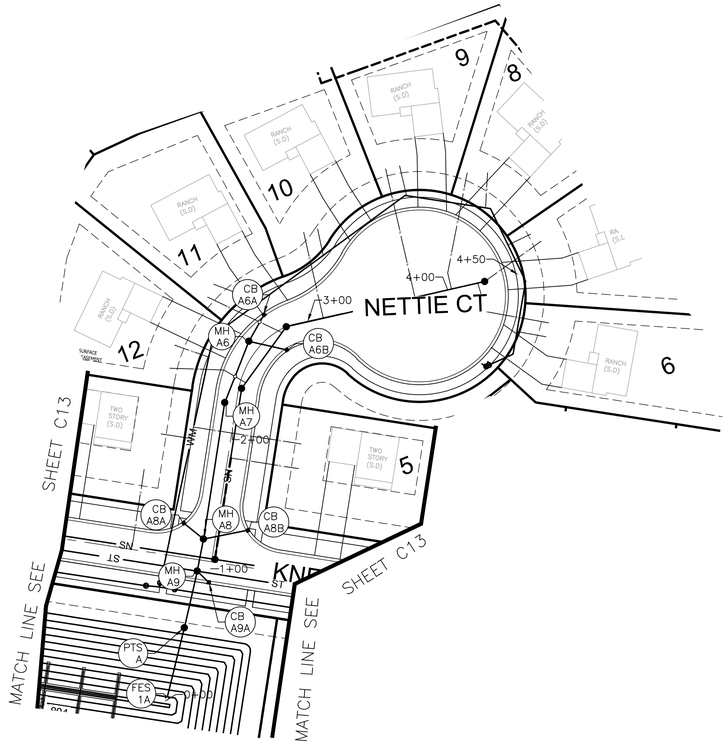
PROJECT
SOLITUDE MEADOWS - PHASE 3

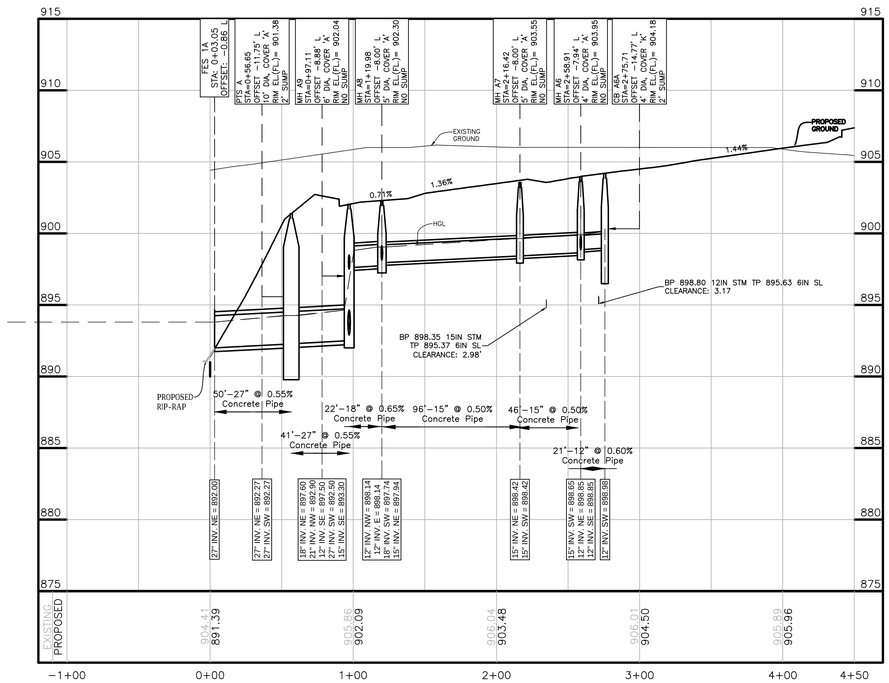
PREPARED FOR
ORE CREEK DEVELOPMENT
1035 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

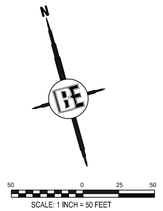
TITLE
ALDEN ST PAVING + STORM PLAN/PROFILE

NO	BY	REVISION PER	DATE
4	TE	PER LCDC COMMENTS	2-27-20
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C11







LEGEND

PROPOSED (PR)	EXISTING (EX)	
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T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
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	⊥	SIGN
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TBR		TO BE REMOVED
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TITLE
NETTIE ST PAVING + STORM PLAN/PROFILE

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
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DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C12

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900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
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T	T	TELEPHONE
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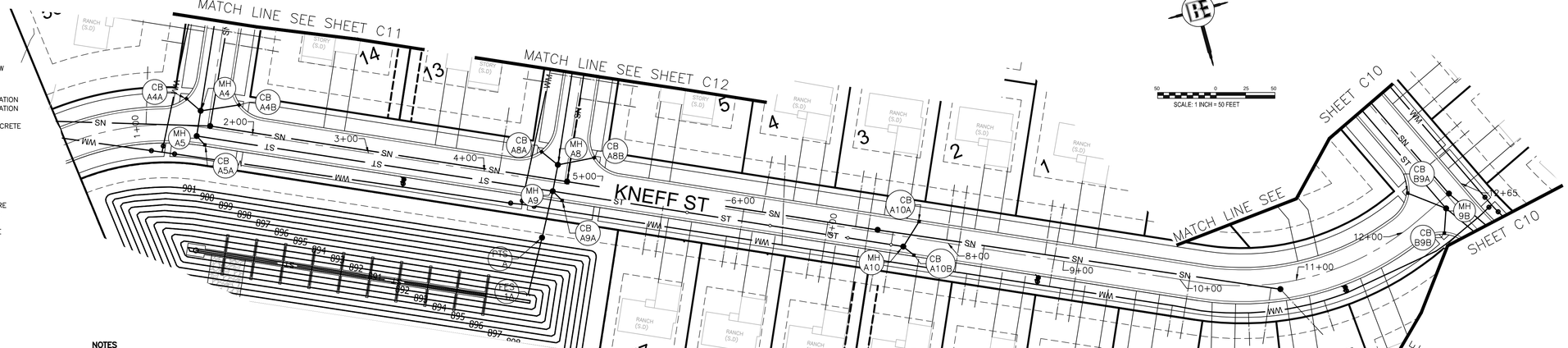
■	□	INLET / CATCHBASIN
◖	◖	FLARED END-SECTION
⊕	⊗	GATE VALVE
⊣	⊣	HYDRANT
⊣	⊣	UTILITY POLE
X X	X X	FENCE
▲	⊥	SIGN
TBR	NFV	NOT FIELD VERIFIED
CSB		TO BE REMOVED
		COMPACTED SAND BACKFILL
SAN #'		SANITARY SEWER LABEL
DR #'		STORM SEWER LABEL
WM #'		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
R		NO PARKING SIGN (TYP.)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY



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5. ALL DOWNSPOUTS SHALL BE DIRECTED TOWARD THE STORM COLLECTION SYSTEM.
6. APPROPRIATE SOIL EROSION CONTROL MEASURES SHALL BE ESTABLISHED PRIOR TO BEGINNING CONSTRUCTION AND CONTINUOUSLY MAINTAINED BY CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
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19. WATER MAIN SHALL HAVE MINIMUM 6 FEET OF COVER.
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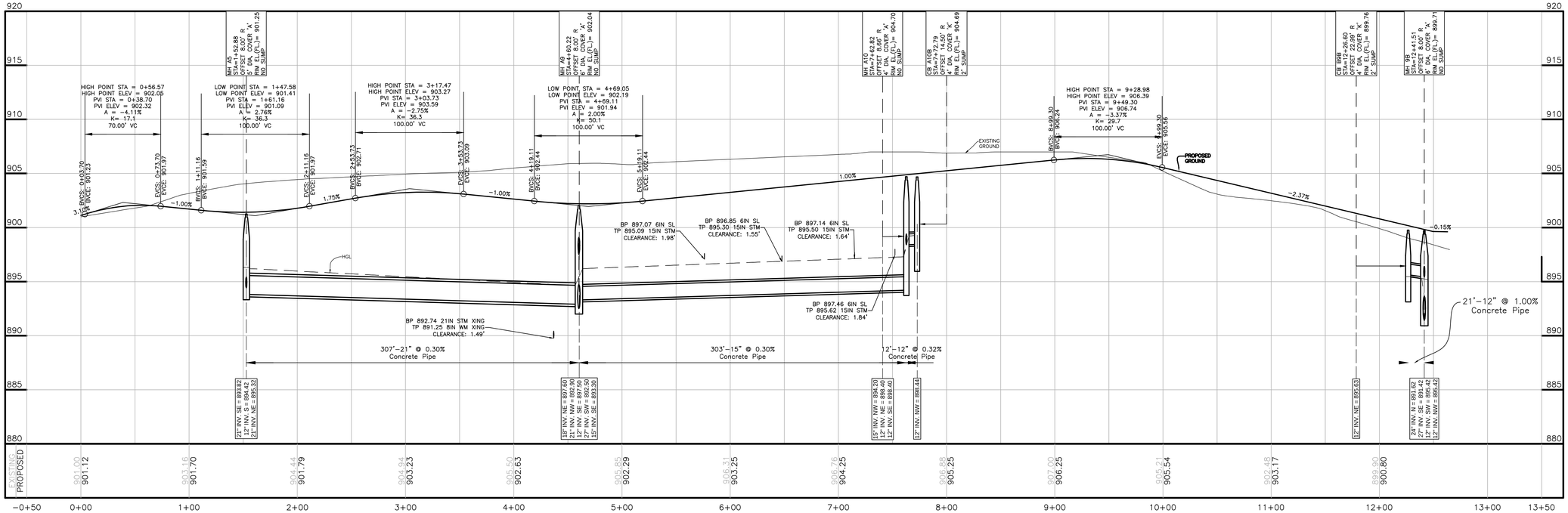

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It's the state law & common courtesy

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624

TITLE
KNEFF ST PAVING + STORM PLAN/PROFILE

NO	BY	REVISION PER	DATE
1.	CH	PER VILLAGE COMMENTS	4-25-19
2.	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	6-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C13

BOSS Engineering

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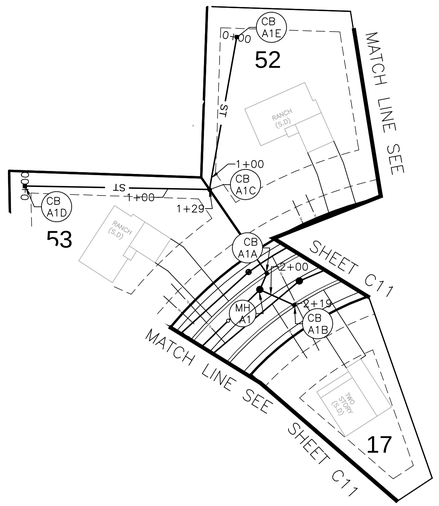

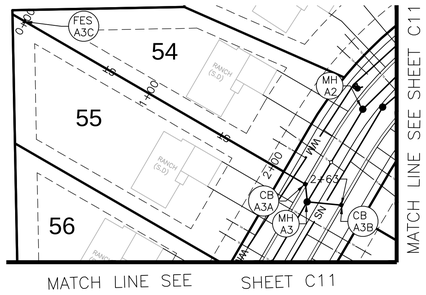

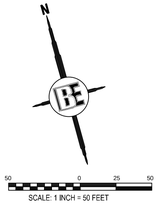

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WL	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
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⊕	⊗	GATE VALVE
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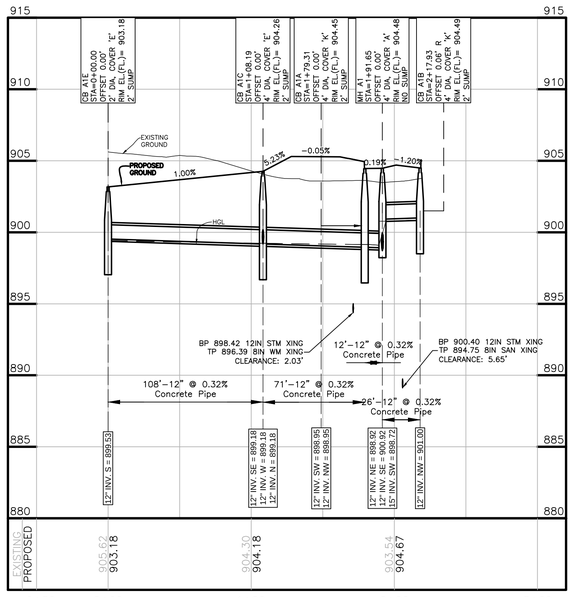

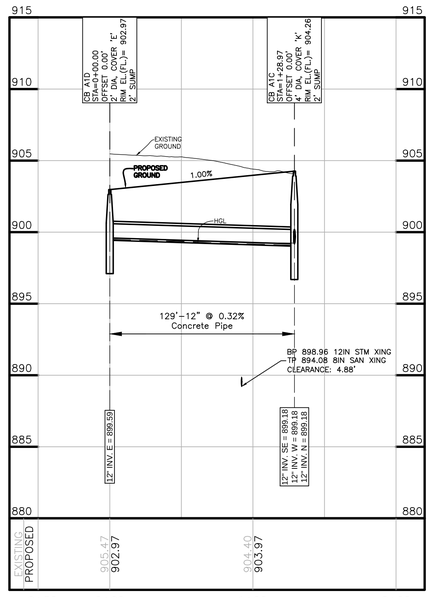

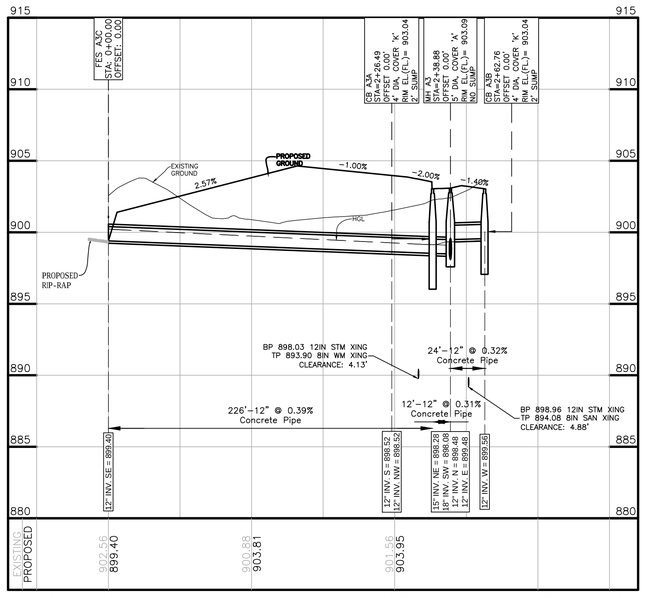

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PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

TITLE
STORM SEWER PLAN/PROFILE

NO	BY	REVISION PER	DATE
1.	CH	PR. VILLAGE COMMENTS	4-25-19
2.	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3.	TE	PER EGLE & LCDC COMMENTS	9-03-19
4.	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C14

BOSS Engineering

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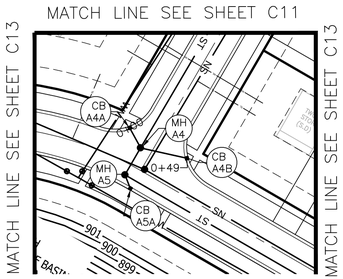

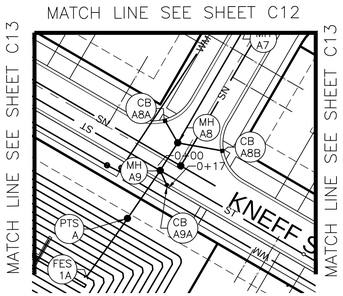

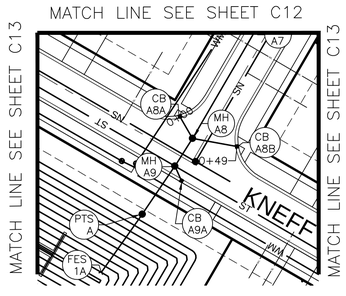

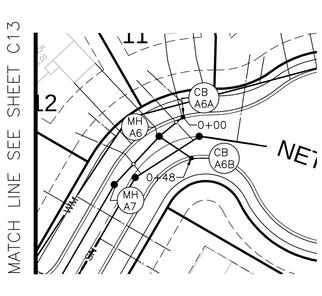

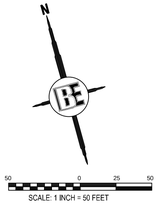

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
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⊗	⊗	GATE VALVE
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x x	x x	FENCE
⊥	⊥ NFV	SIGN
TBR		NOT FIELD VERIFIED TO BE REMOVED
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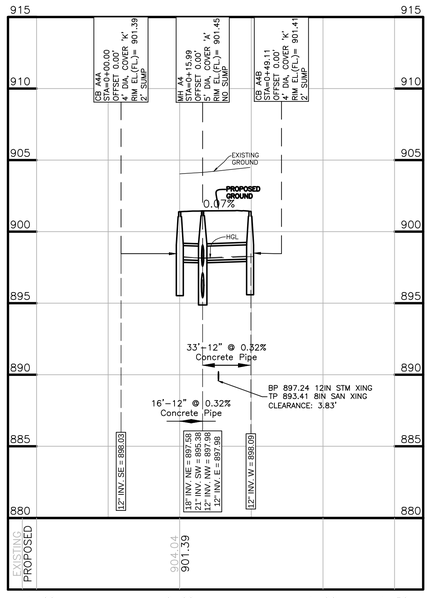

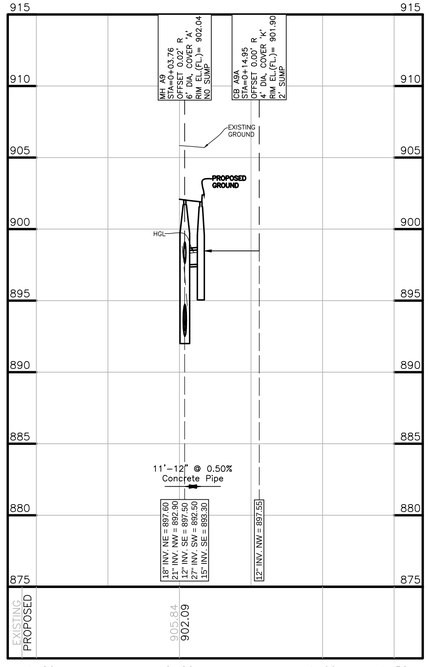

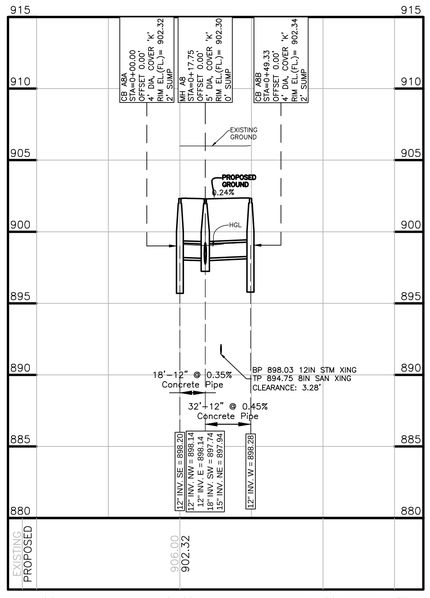

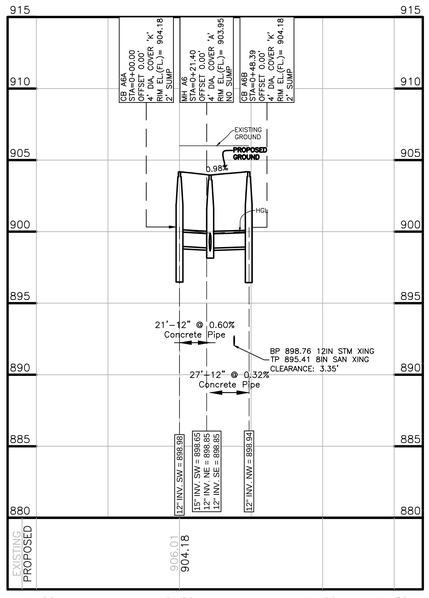

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18. SANITARY SEWER SHALL HAVE MINIMUM 4 FEET OF COVER.
19. WATER MAIN SHALL HAVE MINIMUM 6 FEET OF COVER.
20. ALL TRENCHES WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS III AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
21. ALL HYDRANTS TO BE A MINIMUM OF 3' & MAXIMUM 10' OFF BACK OF CURB (TYP.)
22. NO WATER SOFTENER DISCHARGE SHALL BE ALLOWED INTO THE SANITARY SEWER SYSTEM.
23. ALL WATER MAIN AND SANITARY SEWER LEADS SHALL HAVE PERMANENT MARKERS.
24. PER FOWLERVILLE STANDARDS, GATE VALVES AND BOXES ARE TO BE UTILIZED ON WATERMAIN 8 INCHES AND SMALLER.
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26. THE PROPOSED DRAINAGE SYSTEM IS TO BE OWNED AND PROPERLY MAINTAINED BY THE CONDOMINIUM ASSOCIATION.
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PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

TITLE
STORM SEWER PAVING PLAN/PROFILE

NO	BY	REVISION PER	DATE
1.	CH	PER VILLAGE COMMENTS	4-25-19
2.	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3.	TE	PER EGLE & LCDC COMMENTS	9-03-19
4.	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C15

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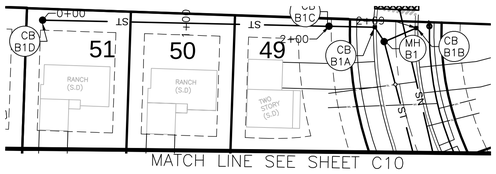

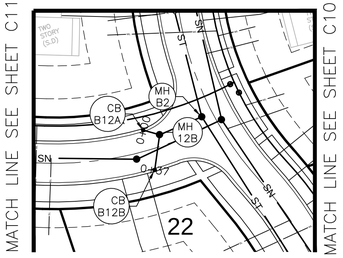

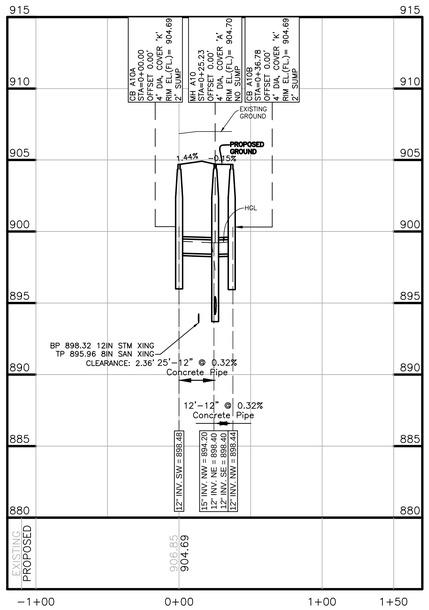

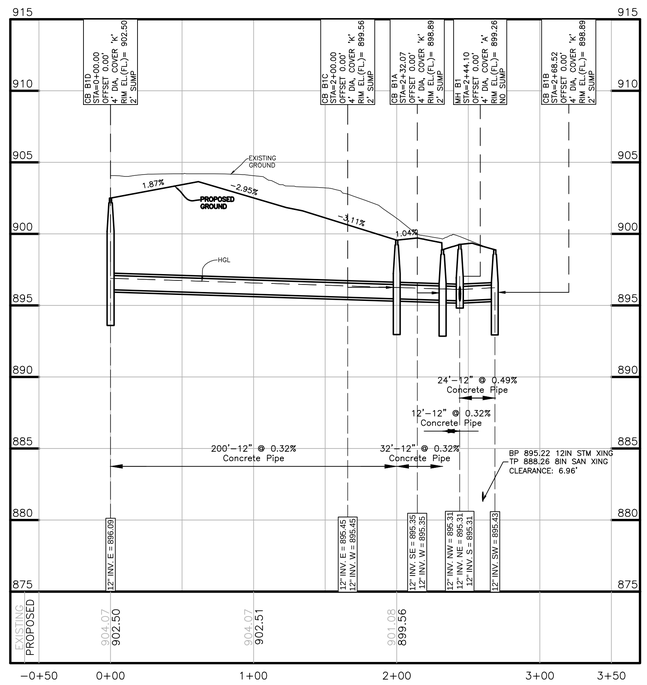

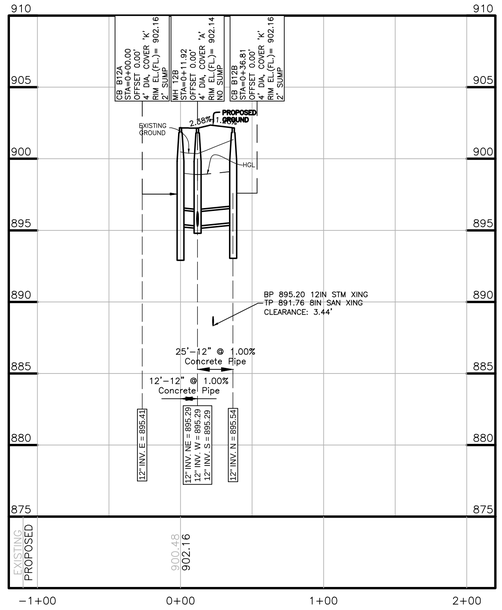

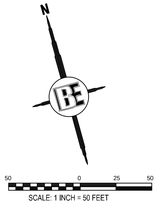

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
⊛	⊂	FLARED END-SECTION
⊕	⊗	GATE VALVE
⊕	⊙	HYDRANT
✦	○	UTILITY POLE
x x	x x	FENCE
⊥	⊥ NFV	SIGN
TBR		NOT FIELD VERIFIED TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN #1		SANITARY SEWER LABEL
CB #1		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
R		NO PARKING SIGN (TYP.)
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SOLITUDE MEADOWS - PHASE 3

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DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C16

BOSS Engineering

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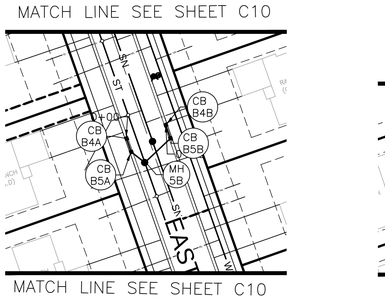

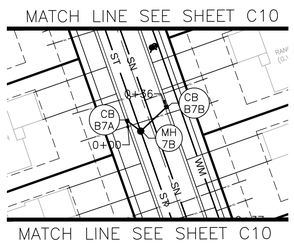

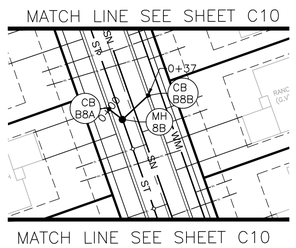

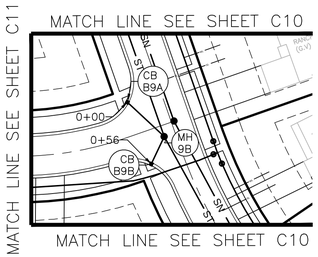

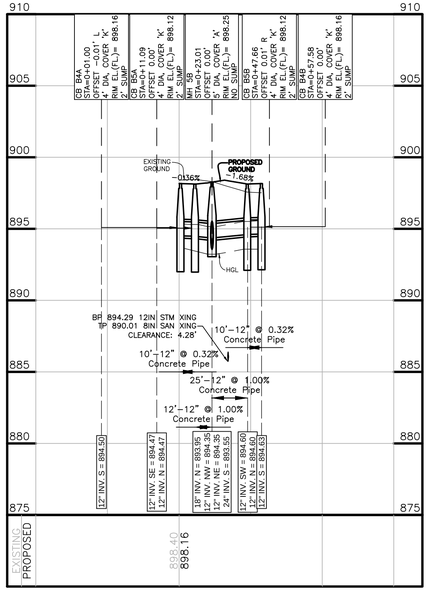

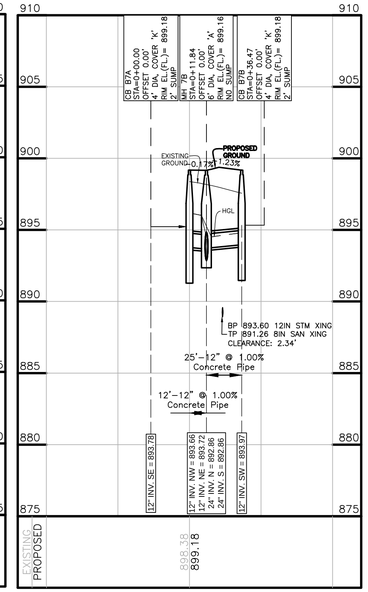

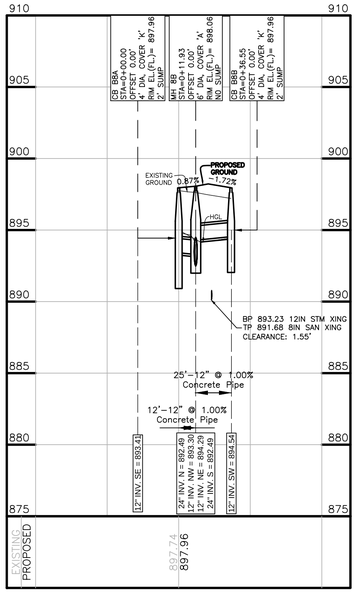

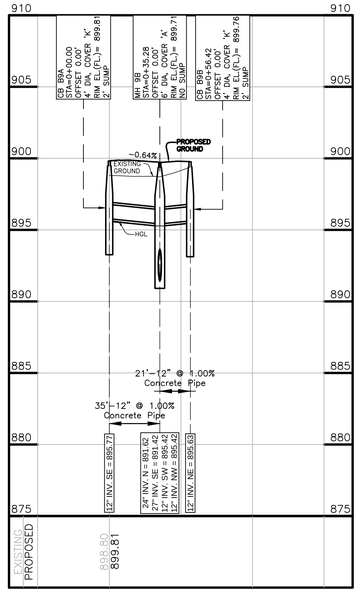

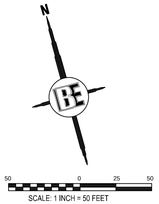

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TITLE
STORM SEWER PLAN/PROFILE

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SHEET NO. C17

BOSS Engineering

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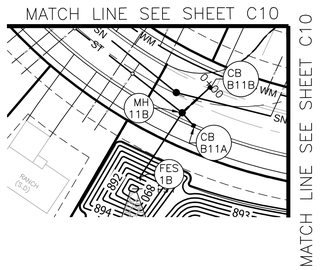
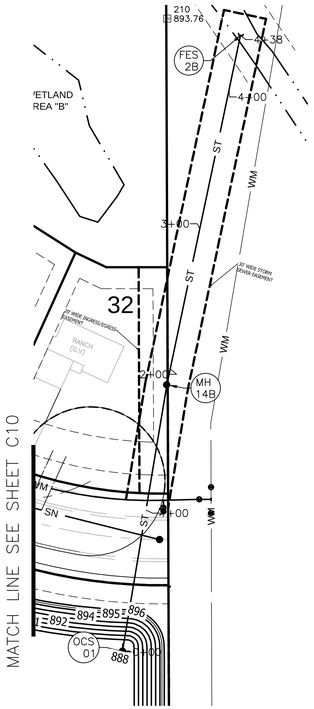
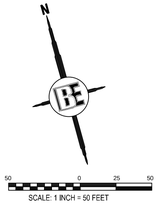
9. FOR ALL WORK WITHIN ROAD RIGHT-OF-WAY, SEE STANDARDS AND SPECIFICATIONS, LIVINGSTON COUNTY ROAD COMMISSION STANDARD DETAILS FOR RESIDENTIAL STREETS.
10. MINIMUM 10' HORIZONTAL SEPARATION AND 18" VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN UTILITIES AT ALL TIMES. A CONCRETE COLLAR SHALL BE USED WHEREVER THE MINIMUM 18" VERTICAL SEPARATION CANNOT BE MET BETWEEN STORM SEWER AND SANITARY MAIN.
11. ALL ROADS WITHIN DEVELOPMENT SHALL BE PRIVATE.
12. SIDEWALK SHALL BE THICKENED TO 6" AT ALL DRIVEWAYS.
13. SEE STANDARDS AND SPECIFICATIONS ON WATER MAIN STANDARD NOTES AND WATER MAIN STANDARD DETAILS SHEETS.
14. SANITARY SEWER LEADS SHALL BE 6" SDR 26, INSTALLED AT A 1% MINIMUM SLOPE, AND ARE STATIONED FROM THE DOWNSTREAM MANHOLE.
15. CLEANOUTS SHALL BE PROVIDED EVERY 100 FEET FOR LEADS LONGER THAN 100 FEET, MEASUREMENT OF CLEANOUT LOCATIONS BEGINNING AT CONNECTIONS WITH TRUNK SEWER.
16. WATER MAIN SHALL BE 8" DUCTILE IRON PIPE CLASS 52.
17. WATER SERVICE LEADS SHALL BE 1" TYPE 'K' COPPER FROM THE WATERMAIN TO THE CURB STOP AND 1" TYPE 'K' COPPER FROM THE STOP BOX TO BUILDING. LEADS SHALL BE INSTALLED W/ TRACER WIRE.
18. SANITARY SEWER SHALL HAVE MINIMUM 4 FEET OF COVER.
19. WATER MAIN SHALL HAVE MINIMUM 6 FEET OF COVER.
20. ALL TRENCHES WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS III AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
21. ALL HYDRANTS TO BE A MINIMUM OF 3' & MAXIMUM 10' OFF BACK OF CURB (TYP.)
22. NO WATER SOFTENER DISCHARGE SHALL BE ALLOWED INTO THE SANITARY SEWER SYSTEM.
23. ALL WATER MAIN AND SANITARY SEWER LEADS SHALL HAVE PERMANENT MARKERS.
24. PER FOWLERVILLE STANDARDS, GATE VALVES AND BOXES ARE TO BE UTILIZED ON WATERMAIN 8 INCHES AND SMALLER.
25. A FULL PIPE LENGTH (20') IS TO BE INSTALLED AT ALL WATERMAIN PIPE CROSSINGS, CENTERED UNDER THE CONFLICTING PIPE.
26. THE PROPOSED DRAINAGE SYSTEM IS TO BE OWNED AND PROPERLY MAINTAINED BY THE CONDOMINIUM ASSOCIATION.
27. ALL PIPE THAT IS TO BE INSTALLED ABOVE THE EXISTING GROUND SHALL BE BACKFILLED WITH ENGINEERING FILL COMPACTED TO 95% MAX DRY UNIT WEIGHT.

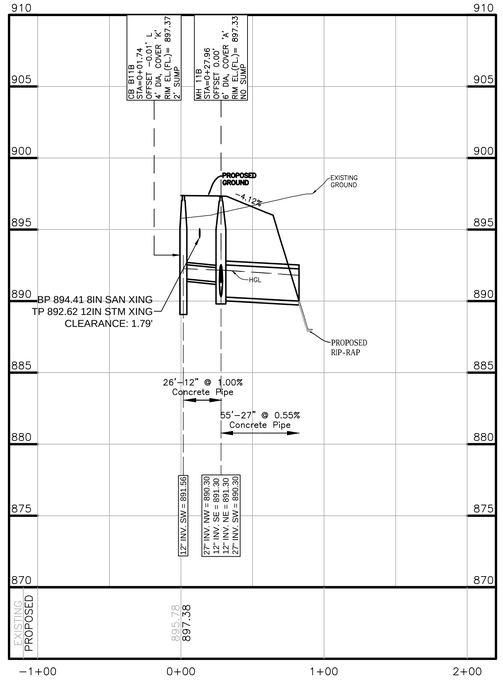


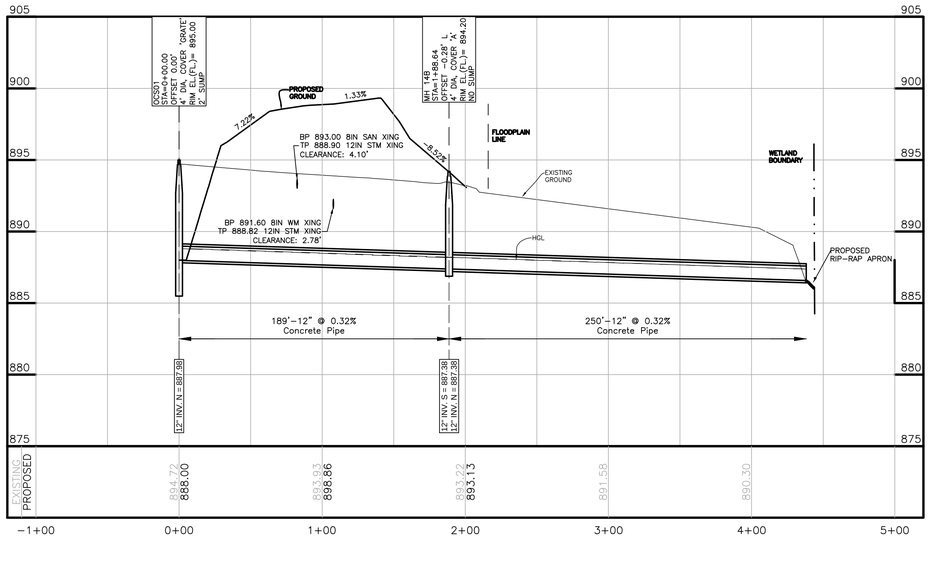




LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
❀	(	FLARED END-SECTION
●	⊗	GATE VALVE
◆	⊙	HYDRANT
✦	○	UTILITY POLE
x x	x x	FENCE
	⊥	SIGN
	NFV	NOT FIELD VERIFIED
TBR		TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN #1		SANITARY SEWER LABEL
CB 01		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		NO PARKING SIGN (TYP.)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY





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BEFORE YOU DIG
3 WORKING DAYS
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!
IT'S FREE!
IT'S A GOOD IDEA!

BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

TITLE
STORM SEWER PLAN/PROFILE

NO	BY	REVISION PER	DATE
1.	CH	PER VILLAGE COMMENTS	4-25-19
2.	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C18

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C XXX.XX	+ 922.08	STORM DRAINAGE FLOW
		SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
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CB	CB	CATCHBASIN STRUCTURE
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HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
		MANHOLE
		INLET / CATCHBASIN
		FLARED END-SECTION
		GATE VALVE
		HYDRANT
		UTILITY POLE
X X	X X	FENCE
TBR		SIGN TO BE REMOVED
SAN #1		SANITARY SEWER LABEL
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		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

NOTES

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5. ALL DOWNSPOUTS SHALL BE DIRECTED TOWARD THE STORM COLLECTION SYSTEM.
6. APPROPRIATE SOIL EROSION CONTROL MEASURES SHALL BE ESTABLISHED PRIOR TO BEGINNING CONSTRUCTION AND CONTINUOUSLY MAINTAINED BY CONTRACTOR UNTIL VEGETATION HAS BEEN RE-ESTABLISHED.
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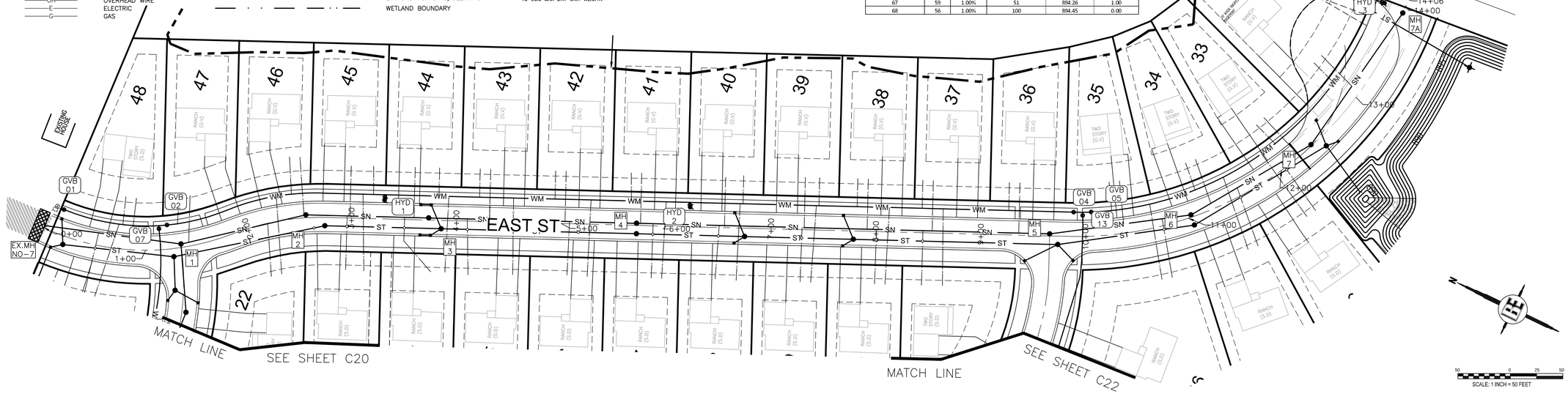
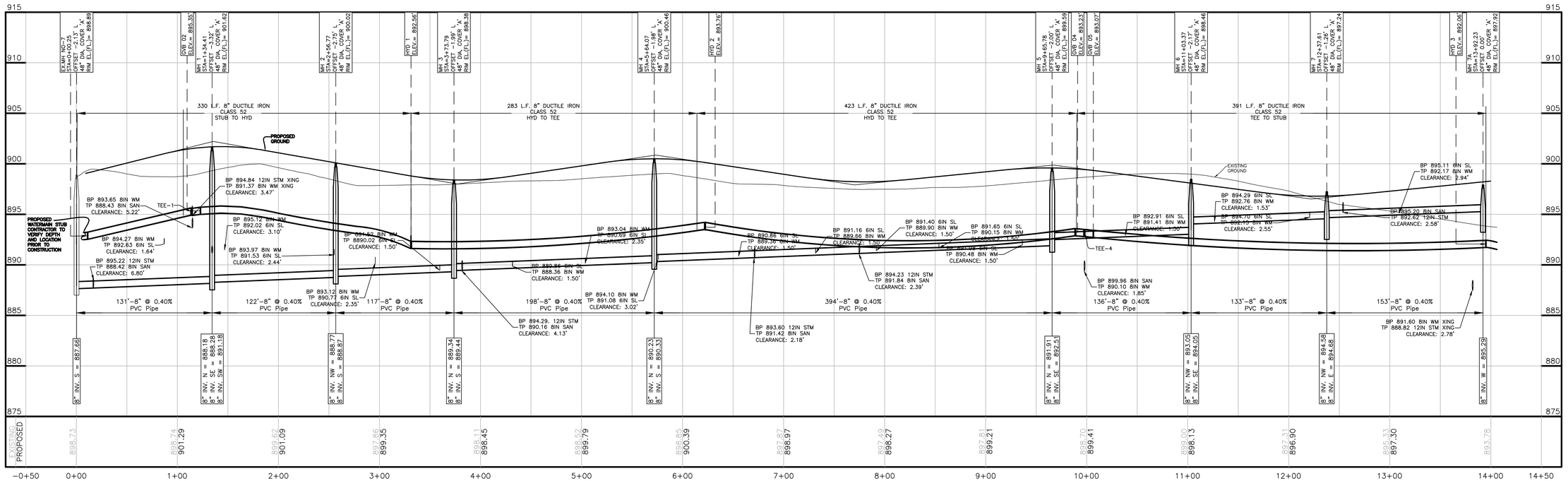
27. ALL PIPE THAT IS TO BE INSTALLED ABOVE THE EXISTING GROUND SHALL BE BACKFILLED WITH ENGINEERING FILL COMPACTED TO 95% MAX. DRY UNIT WEIGHT.

Sanitary Lead Data:

Unit #	Length	Slope	Dist. From Downstream MH	Invert at main	Riser Height
22	51	1.00%	85	888.62	3.00
23	51	1.00%	57	889.10	2.00
24	62	1.00%	39	889.03	1.00
25	53	1.00%	37	889.59	1.00
26	51	1.00%	134	889.98	0.00
27	52	1.00%	16	890.40	0.00
28	52	1.00%	79	890.65	6.00
29	52	1.00%	158	890.96	5.50
30	52	1.00%	229	891.25	5.00
31	52	1.00%	273	891.42	4.50
32	41	1.00%	68	894.95	0.00
33	46	1.00%	117	894.52	0.00
34	44	1.00%	22	894.14	0.00
35	41	1.00%	71	892.79	0.00
36	48	1.00%	364	891.79	0.00
37	48	1.00%	282	891.46	0.00
38	48	1.00%	220	891.21	0.00
39	48	1.00%	160	890.97	0.00
40	47	1.00%	84	890.67	0.00
41	48	1.00%	4	890.35	0.00
42	48	1.00%	130	889.56	0.00
43	48	1.00%	58	889.67	0.00
44	48	1.00%	103	889.28	0.00
45	48	1.00%	42	889.04	1.00
46	56	1.00%	120	888.76	2.00
47	45	1.00%	8	888.31	3.00
48	38	1.00%	83	887.99	4.00
49	62	1.00%	51	887.87	4.00
67	59	1.00%	51	894.26	1.00
68	56	1.00%	100	894.45	0.00





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BE SURE. 3 WORKING DAYS BEFORE YOU DIG, CALL MISS DIG 1-800-482-7171 It's not only the right thing to do. It's the law.

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HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
1035 E.GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624

TITLE
SANITARY SEWER/WATERMAIN PROFILE

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
10-30-18
SHEET NO. C19

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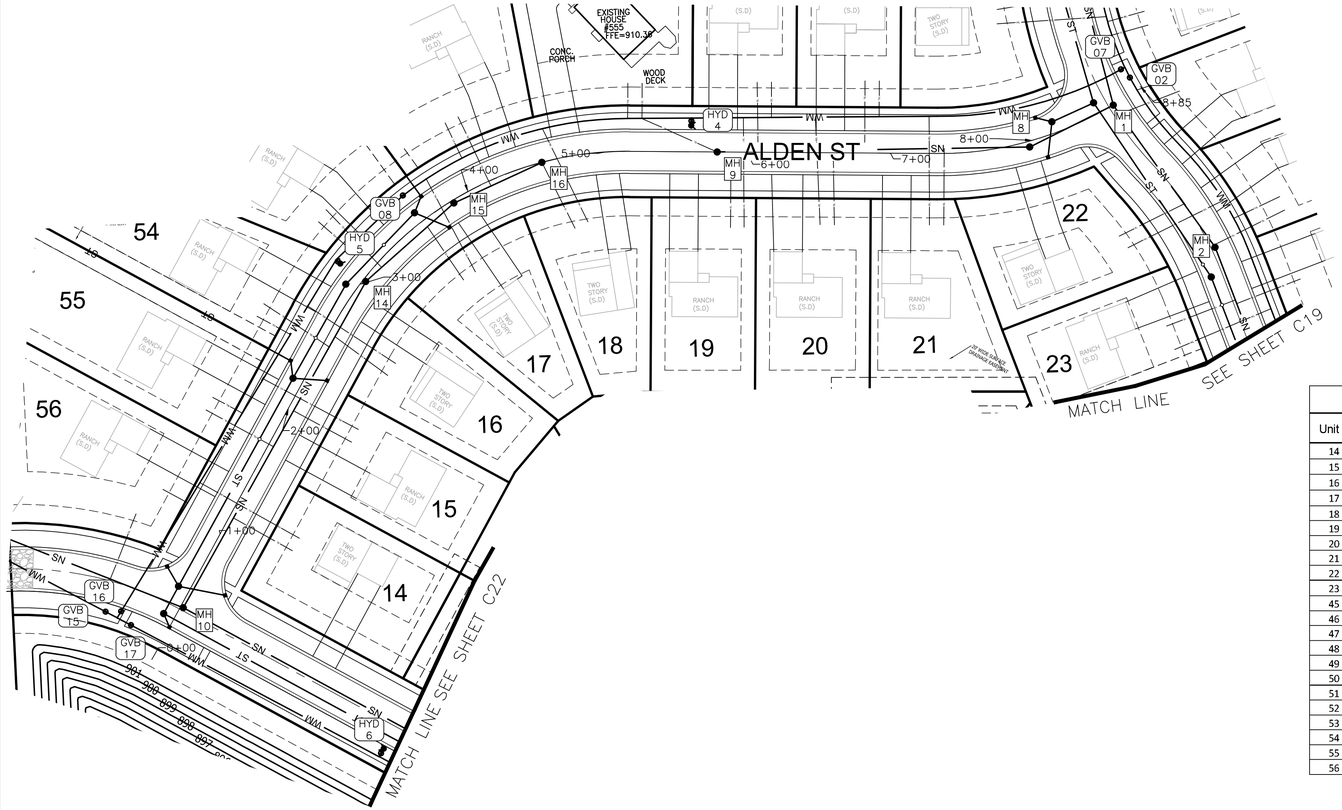

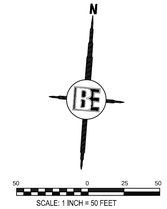

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
		STORM DRAINAGE FLOW
T/C XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
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		UTILITY POLE
X X	x x	FENCE
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SAN #		SANITARY SEWER LABEL
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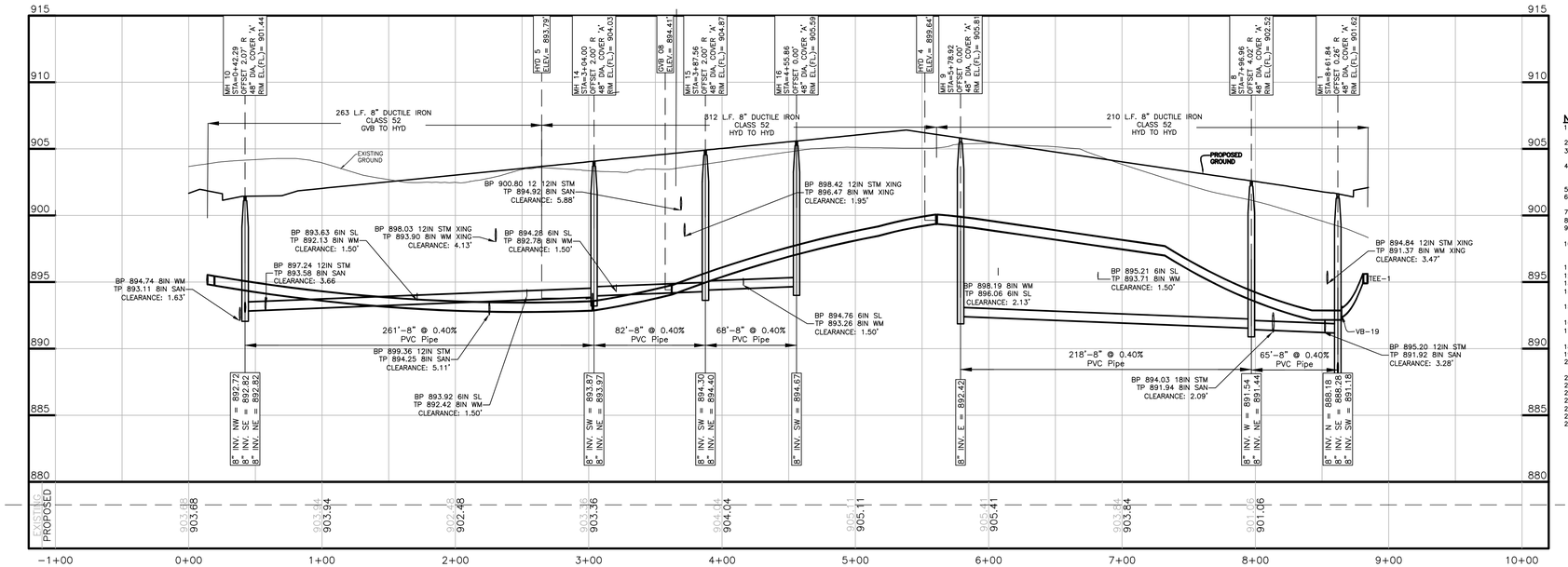
18	51	1.00%	0	894.67	2.00
19	53	1.00%	209	892.38	3.00
20	52	1.00%	137	892.09	3.00
21	54	1.00%	60	891.78	3.00
22	51	1.00%	85	888.62	3.00
23	51	1.00%	57	889.10	2.00
45	48	1.00%	42	889.04	1.00
46	56	1.00%	120	888.76	2.00
47	45	1.00%	8	888.31	3.00
48	38	1.00%	83	887.99	4.00
49	62	1.00%	51	887.87	4.00
50	48	1.00%	115	892.01	3.00
51	48	1.00%	190	892.30	3.00
52	53	1.00%	29	894.51	0.00
53	56	1.00%	15	894.03	0.00
54	55	1.00%	209	893.66	0.00
55	54	1.00%	129	893.34	0.00
56	49	1.00%	129	892.51	0.00



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19. WATER MAIN SHALL HAVE MINIMUM 6 FEET OF COVER.
20. ALL TRENCHES WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS III AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
21. ALL HYDRANTS TO BE A MINIMUM OF 3' & MAXIMUM 10' OFF BACK OF CURB (TYP.)
22. NO WATER SOFTENER DISCHARGE SHALL BE ALLOWED INTO THE SANITARY SEWER SYSTEM.
23. ALL WATER MAIN AND SANITARY SEWER LEADS SHALL HAVE PERMANENT MARKERS.
24. PER FOWLERVILLE STANDARDS, GATE VALVES AND BOXES ARE TO BE UTILIZED ON WATERMAIN 8 INCHES AND SMALLER.
25. A FULL PIPE LENGTH (20') IS TO BE INSTALLED AT ALL WATERMAIN PIPE CROSSINGS, CENTERED UNDER THE CONFLICTING PIPE.
26. THE PROPOSED DRAINAGE SYSTEM IS TO BE OWNED AND PROPERLY MAINTAINED BY THE CONDOMINIUM ASSOCIATION.
27. ALL PIPE THAT IS TO BE INSTALLED ABOVE THE EXISTING GROUND SHALL BE BACKFILLED WITH ENGINEERING FILL COMPACTED TO 95% MAX DRY UNIT WEIGHT.

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CALL MISS DIG
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Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

SOLITUDE MEADOWS - PHASE 3

PREPARED FOR

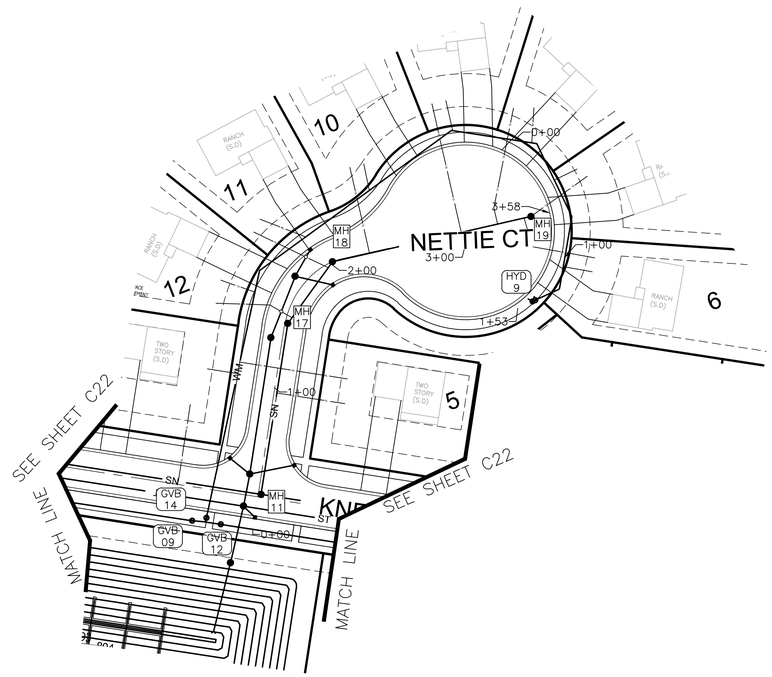
ORE CREEK DEVELOPMENT
1035 E GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

TITLE

SANITARY SEWER/WATERMAIN PROFILE

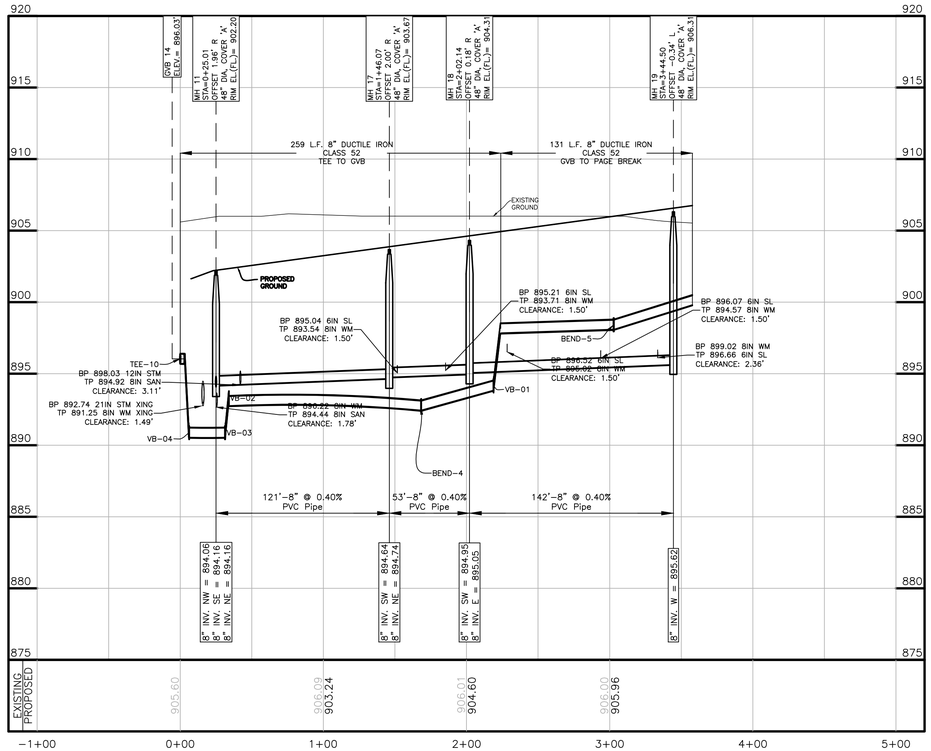
NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

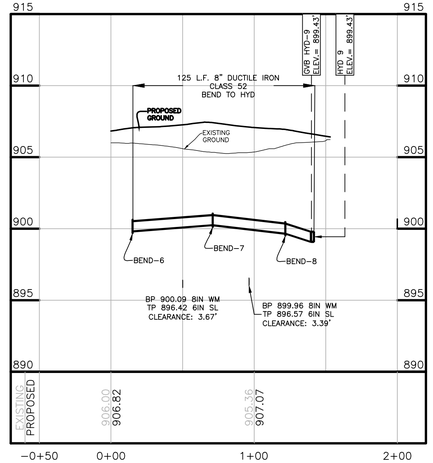
DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
10-30-18
SHEET NO. C20



Sanitary Lead Data:

Unit #	Length	Slope	Dist. From Downstream MH	Invert at main	Riser Height
5	48	1.00%	72	895.34	0.00
6	65	1.00%	137	895.60	0.00
7	48	1.00%	0	895.62	0.00
8	83	1.00%	118	895.53	0.00
9	92	1.00%	92	895.42	0.00
10	62	1.00%	27	895.16	1.00
11	58	1.00%	48	894.93	0.00
12	55	1.00%	5	894.76	0.00
13	55	1.00%	249	893.82	0.00





SCALE: 1 INCH = 50 FEET

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
		STORM DRAINAGE FLOW
T/C		
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END−SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
◗	(	FLARED END−SECTION
⊗	⊗	GATE VALVE
✱	✱	HYDRANT
✦	✦	UTILITY POLE
X X	X X	FENCE
▲	⊥	SIGN
	NFV	NOT FIELD VERIFIED
TBR		TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN #1		SANITARY SEWER LABEL
STR #1		STORM SEWER LABEL
WM #		WATER MAIN LABEL
54T		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
R		NO PARKING SIGN (TYP.)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE VILLAGE OF FOWLERVILLE AND THE STATE OF MICHIGAN.
2. THREE WORKING DAYS BEFORE YOU DIG, CALL MISS DIG TOLL FREE 1−800−482−7171.
3. ALL LENGTHS SHOWN ARE FROM ℄ TO ℄ OF STRUCTURE OR FROM ℄ OF STRUCTURE TO DISCHARGE END OF FLARED END SECTION.
4. ALL STORM SEWER UNDER THE ROADBED IS TO BE REINFORCED CONCRETE PIPE CL.IV. ALL OPEN INLET OR OUTLET END OF STORM SEWER AND CULVERTS SHALL INCLUDE PREFAB FLARED−END SECTION AND MINIMUM 15 SQ. YD. OF PLAIN COBBLESTONE RIP−RAP (6 INCH MIN. SIZE), UNLESS OTHERWISE SPECIFIED.
5. ALL DOWNSPOUTS SHALL BE DIRECTED TOWARD THE STORM COLLECTION SYSTEM.
6. APPROPRIATE SOIL EROSION CONTROL MEASURES SHALL BE ESTABLISHED PRIOR TO BEGINNING CONSTRUCTION AND CONTINUOUSLY MAINTAINED BY CONTRACTOR UNTIL VEGETATION HAS BEEN RE−ESTABLISHED.
7. ALL CATCH BASIN RIM ELEVATIONS ARE AT FLOW LINE.
8. ALL CURB SHALL BE "F" CURB UNLESS OTHERWISE NOTED.
9. FOR ALL WORK WITHIN ROAD RIGHT−OF−WAY, SEE STANDARDS AND SPECIFICATIONS, LIVINGSTON COUNTY ROAD COMMISSION STANDARD DETAILS FOR RESIDENTIAL STREETS.
10. MINIMUM 10' HORIZONTAL SEPARATION AND 18" VERTICAL SEPARATION SHALL BE MAINTAINED BETWEEN UTILITIES AT ALL TIMES. A CONCRETE COLLAR SHALL BE USED WHEREVER THE MINIMUM 18" VERTICAL SEPARATION CANNOT BE MET BETWEEN STORM SEWER AND SANITARY MAIN.
11. ALL ROADS WITHIN DEVELOPMENT SHALL BE PRIVATE.
12. SIDEWALK SHALL BE THICKENED TO 6" AT ALL DRIVEWAYS.
13. SEE STANDARDS AND SPECIFICATIONS ON WATER MAIN STANDARD NOTES AND WATER MAIN STANDARD DETAILS SHEETS.
14. SANITARY SEWER LEADS SHALL BE 6" SDR 26, INSTALLED AT A 1% MINIMUM SLOPE, AND ARE STATIONED FROM THE DOWNSTREAM MANHOLE.
15. CLEANOUTS SHALL BE PROVIDED EVERY 100 FEET FOR LEADS LONGER THAN 100 FEET, MEASUREMENT OF CLEANOUT LOCATIONS BEGINNING AT CONNECTIONS WITH TRUNK SEWER.
16. WATER MAIN SHALL BE 8" DUCTILE IRON PIPE CLASS 52.
17. WATER SERVICE LEADS SHALL BE 1" TYPE 'K' COPPER FROM THE WATERMAIN TO THE CURB STOP AND 1" TYPE 'K' COPPER FROM THE STOP BOX TO BUILDING. LEADS SHALL BE INSTALLED W/ TRACER WIRE.
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SOLITUDE MEADOWS - PHASE 3

PREPARED FOR

ORE CREEK DEVELOPMENT
1035 E.GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624

TITLE: **SANITARY SEWER/WATERMAIN PROFILE**

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
10-30-18
SHEET NO. C21

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LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C XXX.XX	+ 922.08	STORM DRAINAGE FLOW / SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
E	E	ELECTRIC
G	G	GAS

PROPOSED (PR)	EXISTING (EX)	
●	○	MANHOLE
■	□	INLET / CATCHBASIN
⟨	⟨	FLARED END-SECTION
⊗	⊗	GATE VALVE
⊕	⊕	HYDRANT
⊸	⊸	UTILITY POLE
x—x—x	x—x—x	FENCE
TBR	⊥	SIGN / TO BE REMOVED
SAN #'		SANITARY SEWER LABEL
SR #		STORM SEWER LABEL
WM #		WATER MAIN LABEL
547		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
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		LIMITS OF GRADING/CLEARING
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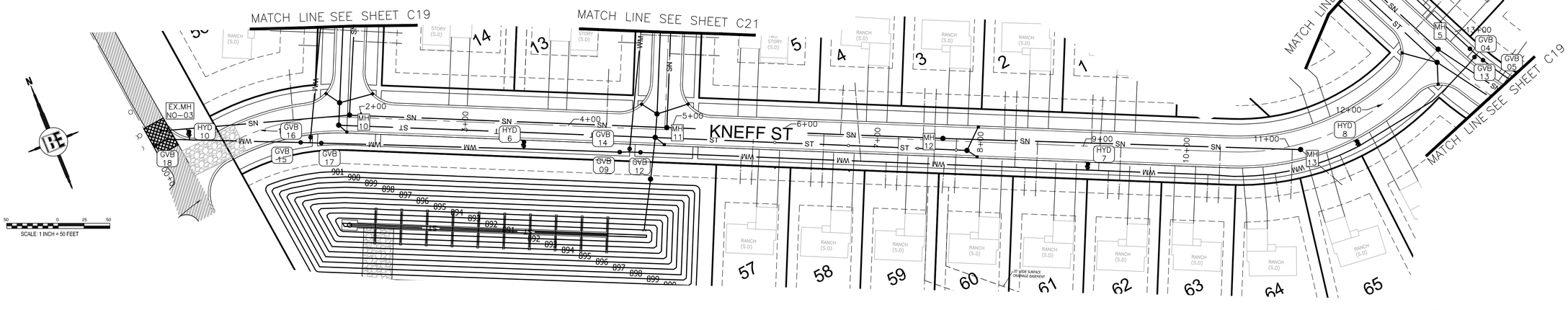
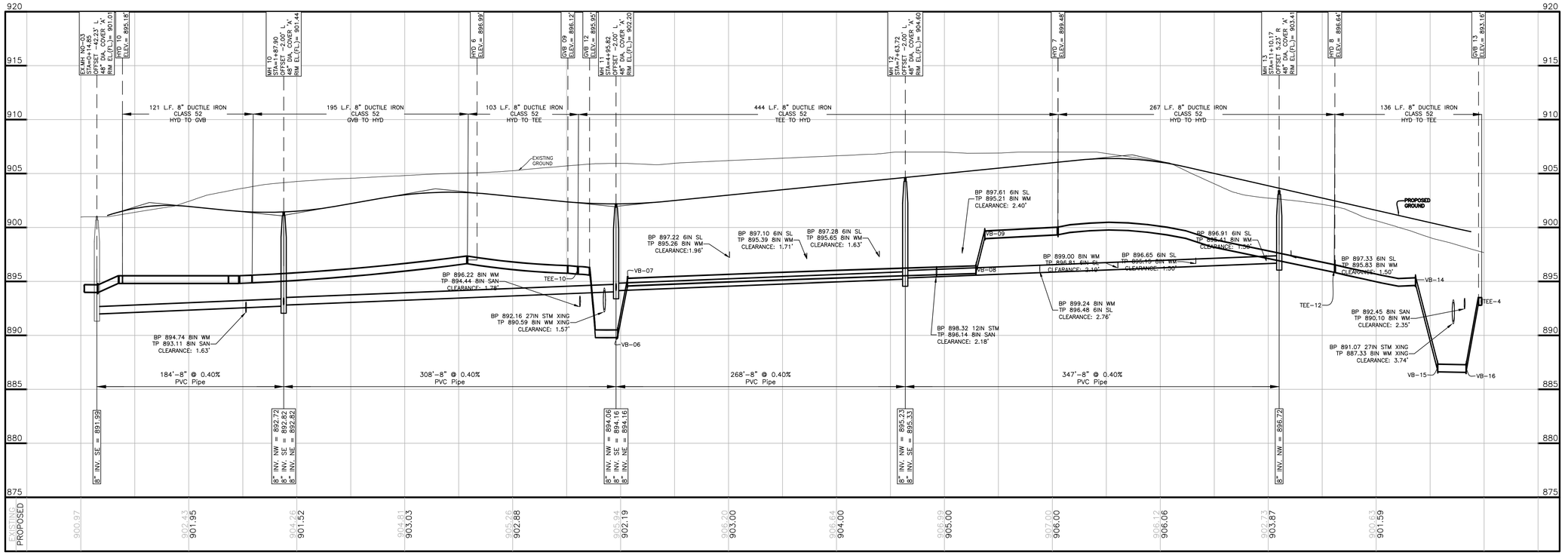
Sanitary Lead Data:

Unit #	Length	Slope	Dist. From Downstream MH	Invert at main	Riser Height
1	47	1.00%	144	895.90	0.00
2	48	1.00%	59	895.56	0.00
3	48	1.00%	249	895.15	0.00
4	48	1.00%	168	894.83	1.00
5	48	1.00%	72	895.34	0.00
13	55	1.00%	249	893.82	0.00
14	47	1.00%	72	893.11	1.00
57	52	1.00%	84	894.49	2.50
58	52	1.00%	152	894.77	2.00
59	52	1.00%	225	895.06	2.00
60	52	1.00%	13	895.38	2.00
61	53	1.00%	92	895.70	0.00
62	54	1.00%	173	896.02	0.00
63	54	1.00%	269	896.40	0.00
64	48	1.00%	339	896.68	0.00
65	53	1.00%	0	896.72	0.00





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BE SURE 3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 It's not a call to dig, it's a call to protect

SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
1031E. GRAND RIVER AVE
BRIGHTON, MI. 48116
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TITLE
SANITARY SEWER/WATERMAIN PROFILE

NO	BY	REVISION PER	DATE
4	TE	PER LCDC COMMENTS	2-27-20
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 50'
JOB NO. 18-032
10-30-18
SHEET NO. C22

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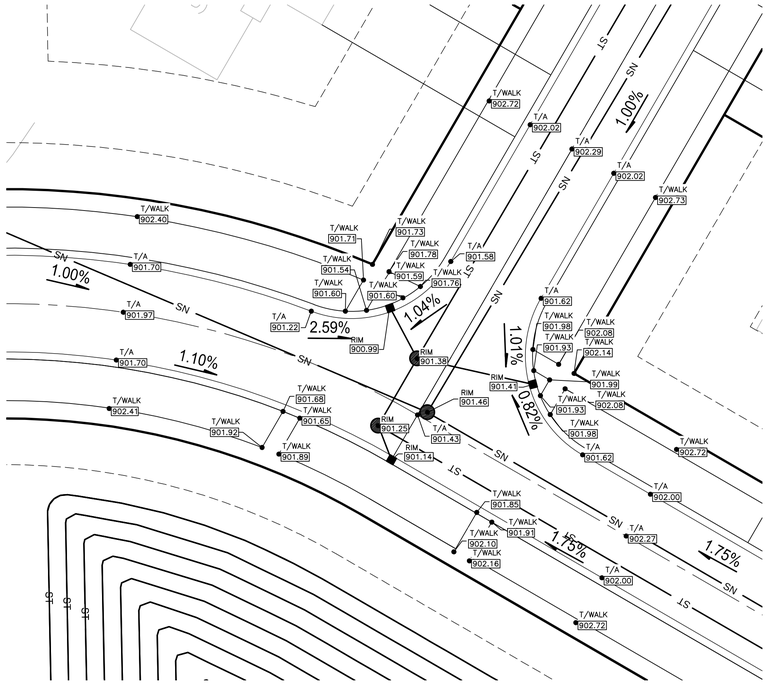
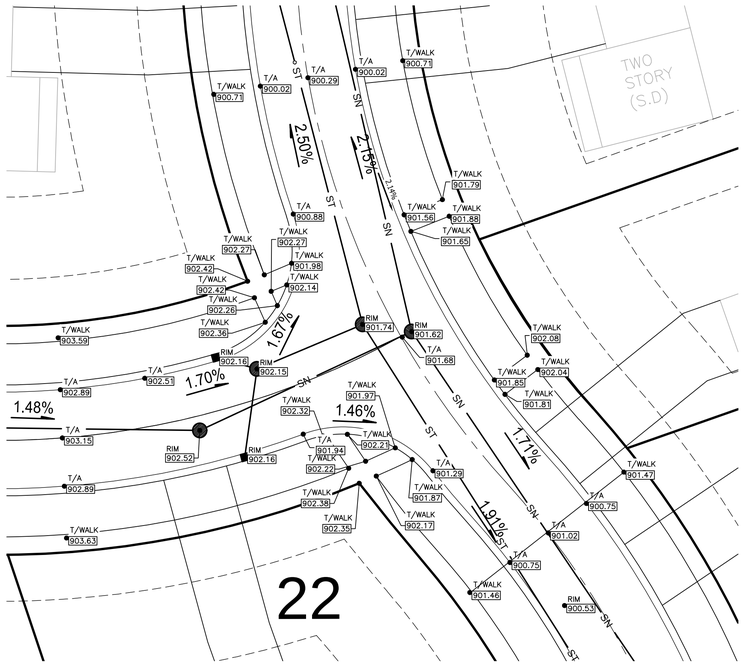
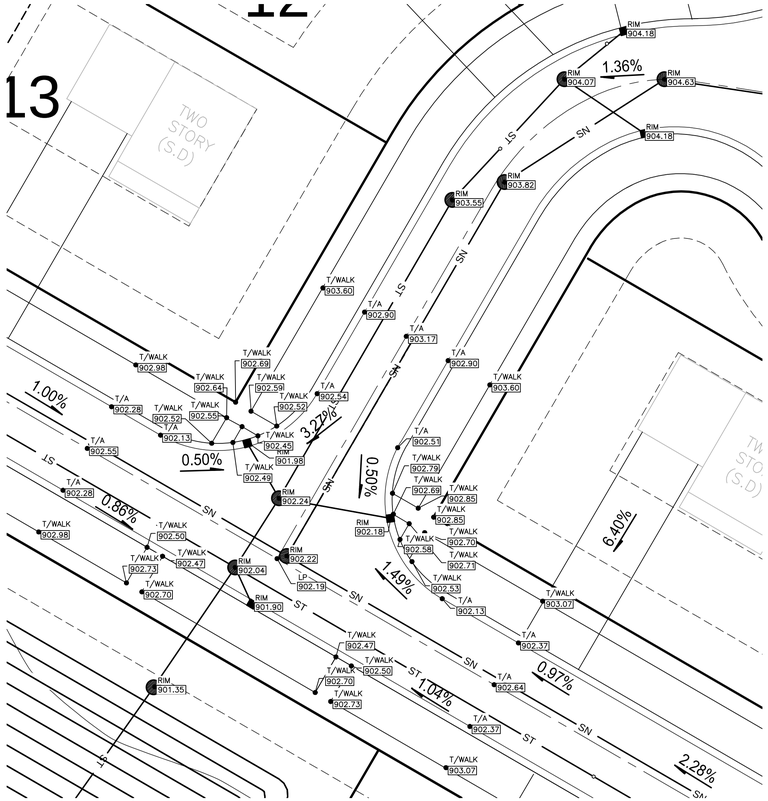
KNEFF ST AND ALDEN ST



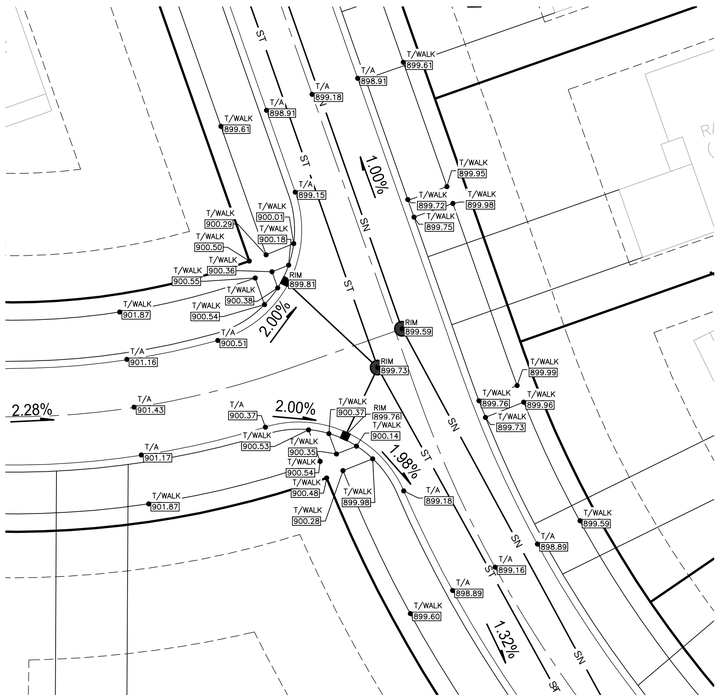
EAST ST AND ALDEN ST

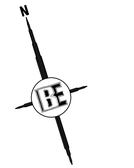


KNEFF ST AND NETTIE CT



EAST STREET AND KNEFF ST





LEGEND

PROPOSED (PR)	EXISTING (EX)	
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X X	x x	FENCE
		SIGN
TBR	NFV	NOT FIELD VERIFIED
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		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS EXPRESSED OR IMPLIED AS TO THE EXACT COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES THAT APPARENT OR IF ANY LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

BEFORE YOU DIG
3 WORKING DAYS
CALL MISS DIG
1-800-482-7171
IT'S THE LAW!!! (P.A. 53 OF 1974, as amended)

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

TITLE
INTERSECTION PLAN

NO	BY	REVISION PER	DATE
2	TE	PER EGLE & LCDC COMMENTS	9-03-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: CH
DRAWN BY: CH
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C23

RETENTION PONDS ARE TO BE SIZED FOR EITHER 2 CONSECUTIVE 100-YEAR STORMS OR 2" OF RUNOFF OVER THE ENTIRE DRAINAGE AREA

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS	
0.00	1.0	0.00	Ponds
3.73	0.9	3.36	Impervious Surfaces
7.28	0.2	1.46	Pervious Surfaces
COMPOUND C:		0.44	
TOTAL DRAINAGE AREA:		11.01	ACRES

REQUIRED RETENTION VOLUME (2 CONSECUTIVE 100-YR STORMS)

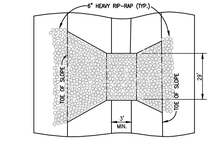
REQUIRED VOL = 2 x 16,500 x A x C = **158768 CFT**

STORAGE PROVIDED

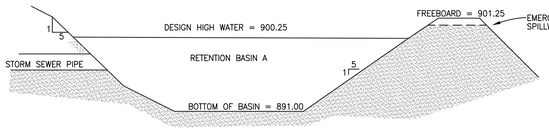
ELEV.	AREA (FT^2)	DEPTH (FT)	VOLUME (FT^3)	TOTAL VOLUME (FT^3)	
901.25	41938	1	39,475	200,562	FREEBOARD
900.25	37013	1.25	42,582	**161,086**	**DESIGN HIGHWATER ELEVATION**
899.00	31119	1	28,867	118,504	
898.00	26616	1	24,463	89,637	
897.00	22310	1	20,258	65,174	
896.00	18205	1	16,252	44,917	
895.00	14300	1	12,449	28,664	
894.00	10598	1	8,850	16,215	
893.00	7102	1	5,458	7,365	
892.00	3814	1	1,907	1,907	
891.00	738	1	369	0	

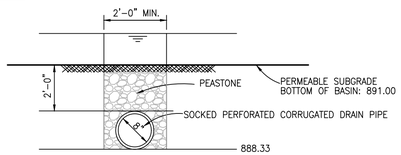
PIPE #	FROM	TO	DRAIN AREA	ACRES A	AREA IMPERV 0.9	AREA PERV 0.2	RUNOFF COEFF C	EQUIV. AREA A * C	SITY I	TIME OF CONC. Tc	ADD'L RUNOFF Q	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING FLOW CAPACITY	MANNINGS VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	INVERT UPPER END	INVERT LOWER END	DROP DISTANCE (FT)	RIM-INV	RIM-HG >1	PIPE COVER >2.667	FLOW THRU COVER
1A	CBA-1A	MH-1A	DA-1A	0.71	0.27	0.71	0.54	0.38	4.38	15.00		1.68	12	12	2.83	0.39%	0.32%	2.02	2.57	0.08	900.10	900.05	904.45	898.95	898.91		5.50	4.36	4.50	1.68
3A	MH-1A	MH-2A	-	-	-	-	-	-	4.37	15.08	1.21	2.89	69	15	2.86	0.29%	0.30%	3.55	2.89	0.40	900.05	899.85	904.48	898.71	898.51		5.76	4.43	4.51	0.00
4A	MH-2A	MH-3A	-	-	-	-	-	-	4.32	15.48		2.89	75	15	2.86	0.29%	0.30%	3.55	2.89	0.43	899.85	899.62	903.81	898.51	898.28		5.30	3.97	4.05	0.00
7A	MH-3A	MH-4A	-	-	-	-	-	-	4.28	15.91	2.49	5.38	166	18	4.24	0.51%	0.30%	5.77	3.26	0.85	899.62	898.78	903.09	898.08	897.58	2.00	5.01	3.45	3.51	0.00
10A	MH-4A	MH-5A	-	-	-	-	-	-	4.19	16.76	2.23	7.61	22	21	3.98	0.36%	0.30%	8.70	3.62	0.10	896.80	896.72	901.45	895.38	895.32	1.50	6.07	4.66	**2.37**	0.00
12A	MH-5A	MH-9A	-	-	-	-	-	-	4.18	16.86	0.67	8.28	307	21	4.70	0.51%	0.30%	8.70	3.62	1.41	896.20	894.64	904.70	893.82	892.90		10.89	8.51	7.64	0.00
14A	MH-9A	PTS-1A	-	-	-	-	-	-	4.04	18.28	13.79	22.06	41	27	7.53	0.93%	0.55%	23.03	5.79	0.12	894.64	894.26	902.04	892.50	892.27		9.54	7.40	7.29	0.00
15A	PTS-A	FES-1A	-	-	-	-	-	-	4.03	18.39		22.06	50	27	7.53	0.93%	0.55%	23.03	5.79	0.14	894.26	893.80	901.38	892.27	892.00		9.10	7.11	6.85	0.00
16A	CBA-6A	MH-6A	DA-9A	0.96	0.45	0.96	0.62	0.60	4.38	15.00		2.61	21	12	4.58	1.01%	0.60%	2.77	3.52	0.10	900.12	899.90	904.18	898.98	898.85		5.20	4.06	4.20	**2.61**
18A	MH-6A	MH-7A	-	-	-	-	-	-	4.36	15.10	1.28	3.88	46	15	4.11	0.60%	0.50%	4.58	3.73	0.21	899.90	899.62	903.95	898.65	898.42		5.30	4.05	4.05	0.00
19A	MH-7A	MH-8A	-	-	-	-	-	-	4.34	15.31		3.88	96	15	4.11	0.60%	0.50%	4.58	3.73	0.43	899.62	899.04	903.55	898.42	897.94		5.12	3.93	3.87	0.00
22A	MH-8A	MH-9A	-	-	-	-	-	-	4.30	15.74	4.37	8.26	22	18	6.25	1.10%	0.65%	8.49	4.81	0.08	899.04	898.80	902.30	897.74	897.60	4.50	4.56	3.26	3.06	0.00
25A	CBA-10B	MH-10A	DA-13A	0.53	0.20	0.53	0.54	0.29	4.38	15.00		1.27	12	12	2.38	0.27%	0.32%	2.02	2.57	0.07	899.24	899.20	904.69	898.44	898.40	4.00	6.25	5.45	5.25	1.27
23A	MH-10A	MH-9A	-	-	-	-	-	-	4.37	15.07	1.74	3.01	303	15	3.18	0.36%	0.30%	3.55	2.89	1.74	897.29	896.20	904.70	894.20	893.30		10.50	7.41	5.30	0.00
5AA	FES-A3C	CBA-3A	DA-5AA	0.45	0.00	0.45	0.20	0.09	4.38	15.00		0.39	223	12	1.89	0.17%	0.39%	2.23	2.84	1.31	900.47	900.09	899.40	898.52		0.00	-1.07	**1.00**	0.39
1AC	CBA-1D	CBA-1C	DA-3AA	0.14	0.00	0.14	0.20	0.03	4.38	15.00		0.12	129	12	1.20	0.07%	0.32%	2.02	2.57	0.84	900.39	900.18	902.97	899.59	899.18		3.37	2.57	**2.37**	0.12
1AA	CBA-1C	CBA-1A	-	-	-	-	-	-	-	15.84	0.16	0.27	71	12	1.54	0.12%	0.32%	2.02	2.57	0.46	900.18	900.10	904.26	899.18	898.95		5.08	4.08	4.08	0.00
1AB	CBA-1E	CBA-1D	DA-1AA	0.16	0.00	0.16	0.23	0.04	4.38	15.00		0.16	108	12	1.42	0.10%	0.32%	2.02	2.57	0.70	900.33	900.18	903.18	899.53	899.18		3.65	2.85	2.65	0.16
2A	CBA-1B	MH-1A	DA-2A	0.38	0.15	0.38	0.57	0.21	4.38	15.00	0.27	1.21	26	12	2.34	0.26%	0.32%	2.02	2.57	0.17	901.80	901.71	904.49	901.00	900.91	2.00	3.50	2.70	**2.50**	0.93
5A	CBA-3A	MH-3A	DA-3A	0.40	0.19	0.40	0.63	0.26	4.38	15.00	0.39	1.51	12	12	2.51	0.30%	0.32%	2.02	2.57	0.08	900.09	900.05	903.04	898.52	898.48		4.52	2.95	3.52	1.12
8A	CBA-3B	MH-3A	DA-4A	0.47	0.15	0.47	0.48	0.22	4.38	15.00		0.98	24	12	2.25	0.24%	0.32%	2.02	2.57	0.15	900.36	900.28	903.04	898.56	898.48	1.00	3.48	2.68	**2.48**	0.98
8A	CBA-4A	MH-4A	DA-5A	0.56	0.27	0.56	0.64	0.36	4.38	15.00		1.56	16	12	2.51	0.30%	0.32%	2.02	2.57	0.10	898.83	898.78	901.39	898.03	897.98	2.00	3.35	2.55	**2.35**	1.56
9A	CBA-4B	MH-4A	DA-6A	0.20	0.13	0.20	0.77	0.15	4.38	15.00		0.67	33	12	1.99	0.19%	0.32%	2.02	2.57	0.21	898.89	898.78	901.42	898.09	897.98	2.00	3.33	2.53	**2.33**	0.67
11A	CBA-5A	MH-5A	DA-6A	0.20	0.13	0.20	0.77	0.15	4.38	15.00		0.67	10	12	1.99	0.19%	0.32%	2.02	2.57	0.07	896.22	896.20	901.15	894.45	894.42		6.69	4.93	5.69	0.67
17A	CBA-6B	MH-6A	DA-10A	0.42	0.23	0.42	0.69	0.29	4.38	15.00		1.28	27	12	2.38	0.27%	0.32%	2.02	2.57	0.17	899.97	899.90	904.18	898.94	898.85		5.24	4.21	4.24	1.28
20A	CBA-8A	MH-8A	DA-8A	0.94	0.32	0.94	0.51	0.48	4.38	15.00		2.08	18	12	2.69	0.35%	0.35%	2.11	2.69	0.11	899.10	899.04	902.32	898.20	898.14		4.12	3.22	3.12	2.08
21A	CBA-8B	MH-8A	DA-11A	0.94	0.37	0.94	0.56	0.52	4.38	15.00		2.29	32	12	3.97	0.76%	0.45%	2.40	3.05	0.17	899.28	899.04	902.34	898.28	898.14		4.06	3.06	3.06	2.29
13A	CBA-9A	MH-9A	DA-12A	1.01	0.42	1.01	0.57	0.58	4.38	15.00		2.52	11	12	3.22	0.50%	0.50%	2.53	3.22	0.06	898.35	898.30	901.90	897.55	897.50	4.00	4.35	3.55	3.35	2.52
24A	CBA-10A	MH-10A	DA-14A	0.78	0.27	0.78	0.51	0.40	4.38	15.00		1.74	25	12	2.83	0.39%	0.32%	2.02	2.57	0.16	899.30	899.20	904.69	898.49	898.40	4.00	6.20	5.38	5.20	1.74

RETENTION BASIN A OVERFLOW SPILLWAY:
Q=34.67CFS (BASED ON 100 YEAR STORM)
D=DEPTH OF SPILLWAY: .5' (6")
W=WIDTH OF SPILLWAY: 29'
CAPACITY=3.33*(W-0.02*(D))*D^(3/2)
CAPACITY: 34.71 CFS

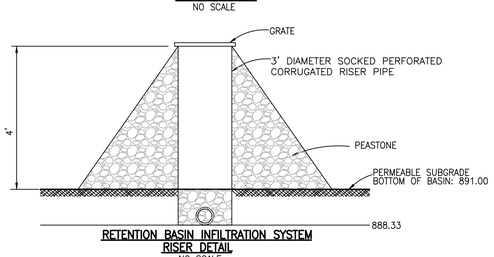


EMERGENCY SPILLWAY DETAIL
NO SCALE

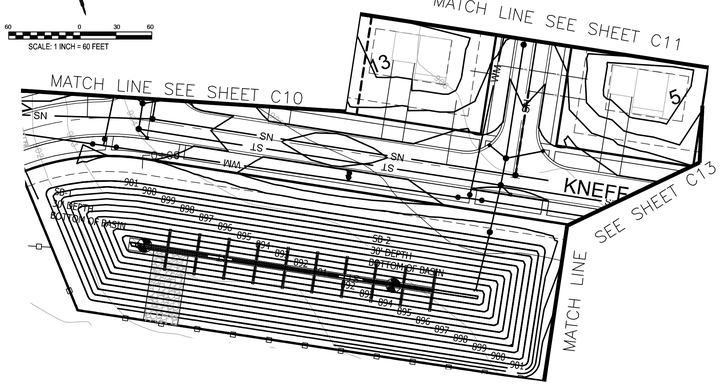




RETENTION BASIN INFILTRATION SYSTEM TRENCH DETAIL
NO SCALE



RETENTION BASIN INFILTRATION SYSTEM RISER DETAIL
NO SCALE



STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
MHA10	RIM = 904.70 SUMP = 894.20 12" INV NE = 898.40 12" INV SE = 898.40 15" INV SW = 894.20 DIA: 4' COVER: 'A'
CBA10A	RIM = 904.69 SUMP = 896.48 12" INV SW = 898.48 DIA: 4' COVER: 'K'
CBA10B	RIM = 904.69 SUMP = 896.44 12" INV NW = 898.44 DIA: 4' COVER: 'K'
CBA1B	RIM = 904.49 SUMP = 899.00 12" INV NW = 901.00 DIA: 4' COVER: 'K'
MHA1	RIM = 904.48 SUMP = 896.72 12" INV NE = 898.92 12" INV SE = 900.92 15" INV SW = 898.72 DIA: 4' COVER: 'A'
CBA1A	RIM = 904.45 SUMP = 896.95 12" INV NW = 898.95 12" INV SW = 898.95 DIA: 4' COVER: 'K'
CBA1C	RIM = 904.26 SUMP = 897.18 12" INV W = 899.18 12" INV N = 899.18 12" INV SE = 899.18 DIA: 4' COVER: 'E'
CBA6B	RIM = 904.18 SUMP = 896.94 12" INV NW = 898.94 DIA: 4' COVER: 'K'
CBA6A	RIM = 904.18 SUMP = 896.98 12" INV SW = 898.98 DIA: 4' COVER: 'K'
MHA6	RIM = 903.95 SUMP = 898.65 12" INV NE = 898.85 12" INV SE = 898.85 15" INV SW = 898.65 DIA: 4' COVER: 'A'

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
MHA2	RIM = 903.81 SUMP = 894.31 15" INV NE = 898.51 15" INV SW = 898.51 DIA: 4' COVER: 'A'
MHA7	RIM = 903.55 SUMP = 898.42 15" INV NE = 898.42 15" INV SW = 898.42 DIA: 4' COVER: 'A'
CBA1E	RIM = 903.18 SUMP = 897.53 12" INV S = 899.53 DIA: 4' COVER: 'E'
MHA3	RIM = 903.09 SUMP = 898.08 15" INV NE = 898.28 12" INV N = 898.48 12" INV E = 899.48 18" INV SW = 898.08 DIA: 5' COVER: 'A'
CBA3A	RIM = 903.04 SUMP = 896.52 12" INV NW = 898.52 12" INV S = 898.52 DIA: 4' COVER: 'K'
CBA3B	RIM = 903.04 SUMP = 897.56 12" INV W = 899.56 DIA: 4' COVER: 'K'
CBA1D	RIM = 902.97 SUMP = 897.59 12" INV E = 899.59 DIA: 4' COVER: 'E'
CBA8B	RIM = 902.34 SUMP = 896.28 12" INV W = 898.28 DIA: 4' COVER: 'K'
CBA8A	RIM = 902.32 SUMP = 896.20 12" INV SE = 898.20 DIA: 4' COVER: 'K'
MHA8	RIM = 902.30 SUMP = 897.74 12" INV NW = 898.14 12" INV E = 898.14 15" INV NE = 897.94 18" INV SW = 897.74 DIA: 5' COVER: 'A'

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
MHA9	RIM = 902.04 SUMP = 892.50 18" INV NE = 897.60 21" INV NW = 892.90 12" INV SE = 897.50 15" INV SE = 893.30 27" INV SW = 892.50 DIA: 6' COVER: 'A'
CBA9A	RIM = 901.90 SUMP = 895.55 12" INV NW = 897.55 DIA: 4' COVER: 'K'
MHA4	RIM = 901.45 SUMP = 895.38 18" INV NE = 897.58 12" INV NW = 897.98 12" INV E = 897.98 21" INV SW = 895.38 DIA: 5' COVER: 'A'
CBA4B	RIM = 901.41 SUMP = 896.09 12" INV W = 898.09 DIA: 4' COVER: 'K'
CBA4A	RIM = 901.39 SUMP = 896.03 12" INV SE = 898.03 DIA: 4' COVER: 'K'
PTSA	RIM = 901.38 SUMP = 890.27 27" INV NE = 892.27 27" INV SW = 892.27 DIA: 10' COVER: 'A'
MHA5	RIM = 901.25 SUMP = 893.82 12" INV S = 894.42 21" INV NE = 895.32 21" INV SE = 893.82 DIA: 5' COVER: 'A'
CBA5A	RIM = 901.14 SUMP = 892.45 12" INV N = 894.45 DIA: 4' COVER: 'K'
FESA3C	12" INV SE = 899.40
FES1A	27" INV NE = 892.00

LEGEND

PROPOSED (PR)	EXISTING (EX)	
900	900	CONTOUR
T/C		STORM DRAINAGE FLOW
XXX.XX	+ 922.08	SPOT ELEVATION
FF	FF	FINISHED FLOOR ELEVATION
FG	FG	FINISHED GRADE ELEVATION
T/A	T/A	TOP OF ASPHALT
T/C	T/C	TOP OF CURB / CONCRETE
T/W	T/W	TOP OF WALK
F/L	F/L	FLOW LINE
T/P	T/P	TOP OF PIPE
B/P	B/P	BOTTOM OF PIPE
RIM	RIM	RIM ELEVATION
INV	INV	INVERT ELEVATION
MH	MH	MANHOLE STRUCTURE
IN	IN	INLET STRUCTURE
CB	CB	CATCHBASIN STRUCTURE
RY	RY	REARYARD STRUCTURE
ES	ES	END-SECTION
GV	GV	GATEVALVE STRUCTURE
HY	HY	HYDRANT
UP	UP	UTILITY POLE
SN	SN	SANITARY SEWER
SL	SL	SANITARY LEAD
FM	FM	FORCE MAIN
PS	PS	PRESSURE SEWER
ST	ST	STORM SEWER
WM	WM	WATER MAIN
WL	WL	WATER LEAD
FO	FO	FIBER OPTIC
OH	OH	OVERHEAD WIRE
C	C	CABLE
E	E	ELECTRIC
G	G	GAS
T	T	TELEPHONE
●	○	MANHOLE
■	□	INLET / CATCHBASIN
⌀	(	FLARED END-SECTION
⊗	⊗	GATE VALVE
⊗	⊗	HYDRANT
⊗	⊗	UTILITY POLE
X X	X X	FENCE
●	⊥	SIGN
	NFV	NOT FIELD VERIFIED

PROPOSED (PR)	EXISTING (EX)	
TBR		TO BE REMOVED
CSB		COMPACTED SAND BACKFILL
SAN #1		SANITARY SEWER LABEL
SR #1		STORM SEWER LABEL
WM #		WATER MAIN LABEL
547		SOIL EROSION CONTROL MEASURE (P=PERMANENT, T=TEMPORARY)
		SILT FENCE
		LIMITS OF GRADING/CLEARING
		WETLAND BOUNDARY

HARTLEY GEOTECHNICAL GROUP

TEST BORING REPORT

BORING NO. SB-2 | HG JOB NO. HG.18-062
GROUND SURFACE ELEV. 902.00 | CLIENT BOSS ENGINEERING
DATUM PROVIDED BY BOSS ENGINEERING | TYLER VANCE
PROJECT SOLITUDE MEADOWS - PHASE 3 | DATE DRILLED JUNE 22, 2018
FOWLERVILLE, MI | DRILLER T. HAYES
DRILLING METHOD: 4" AUGER ON ATV

ELEV.	IN FEET	SAMPLE TYPE	SAMPLE NO.	STRATA CHANGE	SOIL CLASSIFICATION	W.L.	K = RELATIVE PERMEABILITY
		SS	1		0.5 LOOSE MOIST DARK BROWN SILTY MEDIUM SAND TOPSOIL		
		SS	2		MEDIUM COMPACT MOIST BROWN VERY CLAYEY;		
	3.1	SS	3		FINE TO MEDIUM SAND		K = 1 X 10^{-6} CM/SEC
		SS	4		FIRM MOIST BROWN SANDY CLAY WITH TRACES OF		
	4.5	SS	5		FINE GRAVEL		qu = 4300 PSF @ 4.3'
		SS	6		STIFF MOIST BROWN SANDY CLAY WITH TRACES OF		qu = 5000 PSF @ 4.8'
		SS	7		FINE GRAVEL		K = 1 X 10^{-7} CM/SEC
	9.3	SS	8				qu = 5100 PSF @ 9.0'
		SS	9		MEDIUM COMPACT MOIST BROWN MEDIUM SAND		K = 1 X 10^{-4} CM/SEC
	14.3	SS	10		COMPACT MOIST BROWN MEDIUM SAND		K = 1 X 10^{-5} CM/SEC
	18.0	SS	11		COMPACT WET BROWN MEDIUM SAND	▽	W.L. = 18.0' (886.0) ENCOUNTER AND AT COMPLETION
		SS	12				K = 1 X 10^{-3} CM/SEC
	27.0	SS	13		MEDIUM COMPACT WET GRAY MEDIUM SAND		K = 1 X 10^{-3} CM/SEC
	30.0	SS	14		END OF BORING		

SAMPLE TYPES
S.S. - 2 O.D. Split Spoon Sample
L.S. -Sectional Linear Sample
A.S. Auger Sample
C.C.P. Continuous Cone Penetration Test

NO. - Number of Blows Required To Drive Sampler into Soil in 6" Depth Increments. Using 140 lb Hammer Dropping 30". (12" Depth Increments During C.C.P. Test)

W.L. - Water Level
w - Moisture Content
qu -Unconfined Compressive Strength in P.S.F.
nd -Natural Density

SHEET 2 OF 9

HARTLEY GEOTECHNICAL GROUP

TEST BORING REPORT

BORING NO. SB-1 | HG JOB NO. HG.18-062
GROUND SURFACE ELEV. 902.00 | CLIENT BOSS ENGINEERING
DATUM PROVIDED BY BOSS ENGINEERING | TYLER VANCE
PROJECT SOLITUDE MEADOWS - PHASE 3 | DATE DRILLED JUNE 22, 2018
FOWLERVILLE, MI | DRILLER T. HAYES
DRILLING METHOD 4" AUGER ON ATV

ELEV.	IN FEET	SAMPLE TYPE	SAMPLE NO.	STRATA CHANGE	SOIL CLASSIFICATION	W.L.	K = RELATIVE PERMEABILITY
		SS	1		0.5 LOOSE MOIST DARK BROWN SILTY MEDIUM SAND TOPSOIL		
		SS	2		STIFF MOIST BROWN SANDY CLAY WITH TRACES OF		
		SS	3		FINE GRAVEL		qu = 4400 PSF @ 1.3'
		SS	4				K = 1 X 10^{-7} CM/SEC
	4.5	SS	5				qu = 6400 PSF @ 4.5'
	8.7	SS	6		HARD MOIST BROWN SILTY CLAY WITH TRACES OF		qu = >9000 PSF @ 7.0'
		SS	7		FINE GRAVEL		K = 1 X 10^{-7} CM/SEC
	10.8	SS	8				qu = >9000 PSF @ 9.5'
		SS	9		MEDIUM COMPACT MOIST LIGHT BROWN MEDIUM SAND		K = 1 X 10^{-4} CM/SEC
	14.0	SS	10		COMPACT MOIST LIGHT BROWN MEDIUM SAND		K = 1 X 10^{-5} CM/SEC
	15.5	SS	11			▽	W.L. = 15.5' (888.1)
		SS	12		COMPACT WET BROWN MEDIUM SAND		ENCOUNTER AND AT COMPLETION
		SS	13				K = 1 X 10^{-3} CM/SEC
	21.0	SS	14				
		SS	15		MEDIUM COMPACT WET GRAY MEDIUM SAND		K = 1 X 10^{-3} CM/SEC
	26.0	SS	16		COMPACT WET GRAY MEDIUM SAND		K = 1 X 10^{-3} CM/SEC
	30.0	SS	17		END OF BORING		

SAMPLE TYPES
S.S. - 2 O.D. Split Spoon Sample
L.S. -Sectional Linear Sample
A.S. Auger Sample
C.C.P. Continuous Cone Penetration Test

NO. - Number of Blows Required To Drive Sampler into Soil in 6" Depth Increments. Using 140 lb Hammer Dropping 30". (12" Depth Increments During C.C.P. Test)

W.L. - Water Level
w - Moisture Content
qu -Unconfined Compressive Strength in P.S.F.
nd -Natural Density

SHEET 1 OF 9

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THEIR COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY APPARENT OR IF ANY DISCREPANCY IN LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS SHOWN HEREON.

BEFORE YOU DIG
CALL MISS DIG
1-800-482-7171
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BE BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3
ORE CREEK DEVELOPMENT
10315 E.CRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624

PREPARED FOR

TITLE
BASIN A DETAIL

NO	BY	REVISION PER	DATE
1.	CH	PER VILLAGE COMMENTS	4-25-19
2.	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3.	TE	PER VILLAGE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. **18-032**
DATE 10-30-18
SHEET NO. **C24**

G:\18-032\dwg\CP\shortcuts\STORM 10-11-18.dwg, 3/2/2020 2:31:06 PM, AutoCAD PDF (Smallest File).pc3

LIVINGSTON COUNTY DETENTION BASIN CALCULATIONS

AREA (ACRES)	IMPERVIOUS FACTOR	ACRE IMPERVIOUS
8.29	0.9	7.46
0.00	0.7	0.00
4.33	0.2	0.87

COMPOUND C: 0.66 — 13.1055844
TOTAL DRAINAGE AREA: 12.63 ACRES

K1 = AxC (Design Constant) 8.3358
Qa = MAX ALLOW OUTFLOW (0.10 CFS / ACRE 1.263 CFS

DURATION MINUTES	DURATION SECONDS	INTENSITY (IN/HR)	INCHES	INFLOW VOLUME IN. RUNOFF x A x C	OUTFLOW DURATION x Qa	STORAGE VOLUME INFLOW - OUTFLOW
5	300	9.17	2750	22923	379	22545
10	600	7.86	4714	39297	758	38540
15	900	6.88	6188	51578	1137	50441
20	1200	6.11	7333	61129	1516	59614
30	1800	5.00	9000	75022	2273	72749
60	3600	3.24	11647	97088	4547	92541
90	5400	2.39	12913	107641	6820	100820
120	7200	1.90	13655	113827	9094	104733
180	10800	1.34	14488	120767	13640	107127

REQUIRED 100 YEAR DETENTION VOLUME = 107127 CF

FOREBAY VOLUME
VIF) = 5% OF THE 100-YEAR STORM VOLUME BASED ON THE AREA TRIBUTARY TO THE INLET

VIF)= (.05)V100)
VIF)= 5356 CF
FOREBAY STORAGE VOLUME REQUIRED: 5356 CF

FOREBAY STORAGE VOLUME PROVIDED:

ELEV	AREA	VOLUME	CUMMULATIVE VOLUME
895	2302	2081	6375
894	1861	1616	4294
893	1370	1162	2678
892	953	784	1517
891	614	481	733
890	348	252	252
889	155	0	0
888	26	0	0

BANKFULL FLOOD VOLUME
V_{BF} = 5160 x A x C= **43013 CF**

FIRST FLUSH VOLUME
V_{FF} = 1815 x A x C= **15129 CF**

BASIN STORAGE PROVIDED

ELEV.	AREA (FT²)	DEPTH (FT)	VOLUME (FT³)	TOTAL VOLUME (FT³)	
896	27501	1	25,973	144,777	FREEBOARD ELEVATION
895	24446	1	23,434	**118,804**	**DESIGN HIGHWATER ELEVATION**
894	22422	1	21,442	95,369	
893	20462	1	19,514	73,927	
892	18567	1	17,658	54,413	
891	16749	1	15,879	36,756	
890	15009	1	14,179	20,877	
889	13348	1	6,698	6,698	
888	49	1	0	0	

BOTTOM OF BASIN = 888.00
FIRST FLUSH X_{FF} = 889.59
BANKFULL X_{BF} = 891.35
100 YEAR X_{100} = 894.50

OUTLET CONTROL STRUCTURE

FIRST FLUSH OF RUNOFF
THE AVERAGE ALLOWABLE RELEASE RATE FOR RUNOFF IS 0.5" OVER AREA OF SITE IN 24 HRS.

$Q_{FF} = V_{FF} \times (1/24HRS) \times (1HR/3600SEC) =$ 0.175 CFS

PLACE OPENINGS IN STANDPIPE AT BOTTOM OF BASIN = **888.00**

HEAD = $h_{FF} = X_{FF}$ - BOTTOM BASIN ELEV = 1.59 FT

$A = Q_{FF} / (0.62 \times (2 \times 32.2 \times h_{FF})^{0.5}) =$ 0.028 FT^2

A: 1 INCH DIAMETER ORIFICE HAS AN AREA OF 0.0055 SF
A/ 0.0055 = 5.11

THEREFORE, USE THE FOLLOWING NUMBER OF 1 INCH DIAMETER HOLES
5.00 HOLES, AT ELEV. 888.00
$Q_{FF}MAX$ = 0.346 CFS

BANKFULL FLOOD
FOR THE ALLOWABLE RELEASE RATE OF 24-40 HOURS, CHECK THE DISCHARGE THROUGH THE FIRST FLUSH ORIFICE TO SEE IF ADDITIONAL HOLES ARE NECESSARY.

HEAD = h = X_{BF} - BOTTOM OF BASIN = 3.35 FT

$Q_{90.0} = 0.62x\#HOLES \times (AREA\ EACH\ HOLE_{FF}) \times (2 \times 32.2 \times h)^{0.5} =$ 0.249 CFS
$T_{90.0} = (1SEC / Q_{90.0}) \times V_{BF} \times (1HR / 3600SEC) =$ 48.08 HRS

BECAUSE THE HOLDING TIME EXCEEDS 40 HRS, ADDITIONAL ORIFICES IN THE STANDPIPE ARE REQUIRED.

VOLUME THROUGH 5 1 INCH DIAMETER HOLES IN 24 HOURS:
V= Q90.0x24HRSx3600SEC/HR = 21471 CF
REMAINING VOL. = 21542 CF
QBF = REMAINING VOLUME x (1 / 24HRS) x (1 / 3600SEC) = 0.249 CFS

PLACE OPENINGS AT FIRST FLUSH ELEVATION = 889.59
HEAD = hBF = XBF -XFF = 1.76 FT
A = QBF / (0.62 * (2*32.2*hBF)^0.5) = 0.038 SF

A: 1 INCH DIAMETER ORIFICE HAS AN AREA OF 0.0055 SF
A/ 0.0055 = 6.93
THEREFORE, USE 6 1 INCH DIAMETER HOLES AT ELEV. = 889.59
$Q_{BF}MAX$ = 0.361 CFS

100 YEAR FLOOD

Q_a = ALLOWABLE RELEASE RATE x AREA SITE IN ACRES= 1.263 CFS

Q_o IS A PEAK OR MAXIMUM FLOW. CALCULATE THE MAXIMUM FLOW PASSING THROUGH FIRST FLUSH AND BANKFULL ORIFICES, USING THE TOTAL HEAD, AND SUBTRACT FROM Q_a TO DETERMINE THE ORIFICE SIZE TO RELEASE THE 100 YEAR STORM VOLUME:

$Q_{FF}MAX + Q_{BF}MAX$ = 0.71 CFS

$Q_a - (Q_{FF}MAX + Q_{BF}MAX)$ = 0.56 CFS

$A = Q_a / (0.62 * (2 * 32.2 * (X_{100}-X_{BF}))^{0.5}) =$ 0.063 SF

A: 1.5 INCH DIAMETER ORIFICE HAS AN AREA OF 0.012 SF
A/ 0.012 = 5.14

THEREFORE, USE THE FOLLOWING NUMBER OF 1.5 INCH DIAMETER HOLES:
5 HOLES AT ELEV. = 891.35

Q_{100} = 0.542 CFS
$Q_O = Q_{100} + Q_{BF}MAX + Q_{FF}MAX$ = 1.248 CFS

SUMMARY OF REQUIRED STANDPIPE HOLES:

ELEVATION	# OF HOLES	DIAMETER OF HOLES
891.35	5	1.5 INCHES
889.59	6	1 INCHES
888.00	5	1 INCHES

PIPE #	FROM	TO	DRAIN AREA	ACRES	AREA IMPERV A	AREA PERV 0.2	RUNOFF COEFF C	EQUIV. AREA A * C	INTENSITY I	TIME OF CONC. Tc	ADD'L RUNOFF	RUNOFF (CFS) Q	PIPE LENGTH (LF)	PIPE DIA. (IN)	VELOCITY FLOWING FULL (FPS)	HYDRAULIC GRADIENT SLOPE %	ACTUAL SLOPE USED	MANNING FLOW CAPACITY	MANNING'S VELOCITY (FT/SEC)	TIME (MIN)	HG ELEV UPPER END	HG ELEV LOWER END	RIM ELEV UPPER END	INVERT UPPER END	INVERT LOWER END	DROP DISTANCE (FT)	RIM-INV	RIM-HG >1	PIPE COVER >2.667	FLOW THRU COVER
1B	CBB-1A	MH-1B	DA-2B	0.16	0.07	0.09	0.50	0.0807	4.38	15.00	0.17	0.52	12	12	1.80	0.16%	0.32%	2.02	2.57	0.08	896.15	896.11	898.89	895.35	895.31		3.54	2.74	**2.54**	0.35
3B	MH-1B	MH-2B		-	-	-	-	-	-	15.08	0.54	1.07	107	12	2.29	0.25%	0.32%	2.02	2.57	0.69	896.11	895.77	899.25	895.31	894.97		3.95	3.15	2.95	0.00
4B	MH-2B	MH-4B		-	-	-	-	-	-	15.77		1.07	147	18	1.95	0.11%	0.24%	5.16	2.92	0.84	895.77	895.42	901.74	894.57	894.22		7.17	5.97	5.67	0.00
8B	MH-4B	MH-5B		-	-	-	-	-	-	16.61		1.07	111	18	1.95	0.11%	0.24%	5.16	2.92	0.63	895.42	895.15	899.60	894.22	893.95		5.38	4.18	3.88	0.00
11B	MH-5B	MH-6B		-	-	-	-	-	-	17.24	6.17	7.24	186	24	3.27	0.21%	0.24%	11.11	3.54	0.88	895.15	894.70	898.25	893.55	893.10		4.70	3.10	2.70	0.00
12B	MH-6B	MH-7B		-	-	-	-	-	-	18.12		7.24	103	24	3.27	0.21%	0.24%	11.11	3.54	0.49	894.70	894.46	900.34	893.10	892.86		7.24	5.64	5.24	0.00
15B	MH-7B	MH-8B		-	-	-	-	-	-	18.60	1.48	8.72	104	24	3.95	0.30%	0.35%	13.42	4.27	0.40	894.46	894.09	899.16	892.86	892.49		6.31	4.71	4.31	0.00
18B	MH-8B	MH-9B		-	-	-	-	-	-	19.01	3.01	11.73	195	24	4.72	0.43%	0.45%	15.22	4.84	0.67	894.09	893.25	898.06	892.49	891.62		5.57	3.97	3.57	0.00
21B	MH-9B	MH-10B		-	-	-	-	-	-	19.68	3.75	15.48	132	27	4.89	0.39%	0.40%	19.64	4.94	0.44	893.25	892.74	899.71	891.41	890.89		8.30	6.46	6.05	0.00
22B	MH-10B	MH-11B		-	-	-	-	-	-	20.12		15.48	147	27	4.89	0.39%	0.40%	19.64	4.94	0.50	892.74	892.16	898.37	890.89	890.30		7.46	5.61	5.21	0.00
25B	MH-11B	FES-1		-	-	-	-	-	-	20.62	4.46	19.94	55	27	6.37	0.67%	0.55%	23.03	5.79	0.16	892.16	891.80	897.34	890.30	890.00		7.03	5.17	4.78	0.00
28B	CBB-12A	MH-12B	DA-1B	0.61	0.30	0.31	0.54	0.33	4.38	15.00		1.45	12	12	3.64	0.64%	1.00%	3.57	4.55	0.04	896.39	896.31	902.16	895.41	895.29		6.75	5.77	5.75	1.45
27B	MH-12B	MH-2B		-	-	-	-	-	-	15.04	1.88	3.32	32	12	5.91	1.69%	1.00%	3.57	4.55	0.12	896.31	895.77	902.14	895.29	894.97		6.85	5.83	5.85	0.00
6B	CBB-4A	CBB-5A	DA-6B	0.41	0.20	0.21	0.54	0.2216	4.38	15.00		0.97	10	12	2.25	0.24%	0.32%	2.02	2.57	0.07	895.32	895.30	898.16	894.50	894.47		3.66	2.84	2.66	0.97
9B	CBB-5A	MH-5B	DA-8B	1.22	0.33	0.89	0.39	0.4716	4.37	15.04		3.03	12	12	5.00	1.21%	1.00%	3.57	4.55	0.04	895.30	895.15	898.12	894.47	894.35		3.65	2.83	2.65	2.06
7B	CBB-4B	CBB-5B	DA-5B	0.71	0.42	0.29	0.62	0.4399	4.38	15.00		1.92	10	12	3.34	0.54%	0.32%	2.02	2.57	0.06	895.56	895.51	898.16	894.63	894.60		3.53	2.60	**2.53**	1.92
10B	CBB-5B	MH-5B	DA-7B	0.52	0.25	0.26	0.54	0.279	4.37	15.04		3.14	25	12	5.46	1.44%	1.00%	3.57	4.55	0.09	895.51	895.15	898.12	894.60	894.35		3.53	2.62	**2.53**	1.22
2B	CBB-1B	MH-1B	DA-3B	0.25	0.10	0.15	0.49	0.1241	4.38	15.00		0.54	24	12	2.15	0.22%	0.50%	2.53	3.22	0.13	896.23	896.11	898.89	895.43	895.31		3.46	2.66	**2.46**	0.54
13B	CBB-7A	MH-7B	DA-10B	0.53	0.16	0.37	0.41	0.2185	4.38	15.00		0.96	12	12	3.18	0.49%	1.00%	3.57	4.55	0.04	894.57	894.46	899.18	893.77	893.66		5.41	4.61	4.41	0.96
14B	CBB-7B	MH-7B	DA-9B	0.22	0.11	0.11	0.55	0.1193	4.38	15.00		0.52	25	12	2.73	0.36%	1.00%	3.57	4.55	0.09	894.70	894.46	899.18	893.90	893.66		5.28	4.48	4.28	0.52
16B	CBB-8A	MH-8B	DA-12B	1.01	0.31	0.70	0.41	0.4163	4.38	15.00		1.82	12	12	3.98	0.77%	1.00%	3.57	4.55	0.04	894.21	894.09	897.96	893.41	893.29		4.54	3.74	3.54	1.82
17B	CBB-8B	MH-8B	DA-11B	0.75	0.17	0.58	0.36	0.2711	4.38	15.00		1.19	25	12	3.53	0.60%	1.00%	3.57	4.55	0.09	895.34	895.09	897.96	894.54	894.29	1.00	3.42	2.62	**2.42**	1.19
19B	CBB-9A	MH-9B	DA-13B	0.92	0.31	0.61	0.44	0.4051	4.38	15.00		1.77	35	12	3.98	0.77%	1.00%	3.57	4.55	0.13	896.57	896.22	899.81	895.77	895.42	3.00	4.04	3.24	3.04	1.77
20B	CBB-9B	MH-9B	DA-14B	1.09	0.34	0.75	0.42	0.4527	4.38	15.00		1.98	21	12	4.05	0.79%	1.00%	3.57	4.55	0.08	896.43	896.22	899.76	895.63	895.42	3.00	4.13	3.33	3.13	1.98
23B	CBB-11A	MH-11B	DA-15B	0.85	0.40	0.45	0.53	0.4481	4.38	15.00		1.96	12	12	4.05	0.79%	1.00%	3.57	4.55	0.04	892.26	892.16	897.40	891.42	891.30		5.97	5.14	4.97	1.96
24B	CBB-11B	MH-11B	DA-16B	1.03	0.52	0.51	0.56	0.5702	4.38	15.00		2.49	26	12	4.32	0.90%	1.00%	3.57	4.55	0.10	892.40	892.16	897.37	891.56	891.30		5.81	4.97	4.81	2.49
29B	CBB-12B	MH-12B	DA-4B	0.97	0.34	0.63	0.44	0.4287	4.38	15.00		1.88	25	12	4.05	0.79%	1.00%	3.57	4.55	0.09	896.51	896.31	902.16	895.54	895.29		6.62	5.65	5.62	1.88
1BB	CBB-1D	CBB-1C	DA-1BB	0.11	0.01	0.11	0.24	0.027	4.38	15.00		0.12	32	12	4.05	0.10%	0.32%	2.02	2.57	0.21	896.89	896.79	902.50	896.09	895.99		6.41	5.61	5.41	0.12
1BA	CBB-1C	CBB-1A	DA-1BA	0.06	0.00	0.06	0.20	0.0124	4.35	15.21		0.17	200	12	4.05	0.10%	0.32%	2.02	2.57	1.30	896.79	896.15	899.56	895.99	895.35		3.57	2.77	**2.57**	0.05
31B	OCS-01	MH-14B		-	-	-	-	-	-	15.00		1.25	192	12	2.34	0.26%	0.32%	2.02	2.57	1.24	888.80	888.18	895.00	888.00	887.38		7.00	6.20	6.00	0.00
32B	MH-14B	FES-2		-	-	-	-	-	-	15.00		1.25	250	12	2.34	0.26%	0.32%	2.02	2.57	1.62	888.18	887.38	894.20	887.38	886.58		6.82	6.02	5.82	0.00

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
CBB1D	RIM = 902.50 SUMP = 894.09 12" INV E = 896.09 DIA: 4' COVER: 'E'
CBB12A	RIM = 902.16 SUMP = 893.41 12" INV E = 895.41 DIA: 4' COVER: 'K'
CBB12B	RIM = 902.16 SUMP = 893.54 12" INV N = 895.54 DIA: 4' COVER: 'K'
MH12B	RIM = 902.14 SUMP = 895.29 12" INV W = 895.29 12" INV S = 895.29 12" INV NE = 895.29 DIA: 4' COVER: 'A'
MHB2	RIM = 901.74 SUMP = 894.57 12" INV N = 894.97 12" INV SW = 894.97 18" INV SE = 894.57 DIA: 4' COVER: 'A'
MH6B	RIM = 900.34 SUMP = 893.10 24" INV N = 893.10 24" INV S = 893.10 DIA: 4' COVER: 'A'
CBB9A	RIM = 899.81 SUMP = 893.77 12" INV SE = 895.77 DIA: 4' COVER: 'K'
CBB9B	RIM = 899.76 SUMP = 893.63 12" INV NE = 895.63 DIA: 4' COVER: 'K'
MH9B	RIM = 899.71 SUMP = 891.42 24" INV N = 891.62 12" INV SW = 895.42 12" INV NW = 895.42 27" INV SE = 891.42 DIA: 6' COVER: 'A'
MH4B	RIM = 899.60 SUMP = 894.22 18" INV NW = 894.22 18" INV S = 894.22 DIA: 5' COVER: 'A'
CBB1C	RIM = 899.56 SUMP = 893.45 12" INV W = 895.45 12" INV E = 895.45 DIA: 4' COVER: 'E'
MHB1	RIM = 899.26 SUMP = 895.31 12" INV NW = 895.31 12" INV NE = 895.31 12" INV S = 895.31 DIA: 4' COVER: 'A'

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
CBB7B	RIM = 899.18 SUMP = 891.97 12" INV SW = 893.97 DIA: 4' COVER: 'K'
CBB7A	RIM = 899.18 SUMP = 891.78 12" INV SE = 893.78 DIA: 4' COVER: 'K'
MH7B	RIM = 899.16 SUMP = 892.86 12" INV NW = 893.66 12" INV N = 893.72 24" INV N = 892.86 24" INV S = 892.86 DIA: 6' COVER: 'A'
CBB1B	RIM = 898.89 SUMP = 893.43 12" INV SW = 895.43 DIA: 4' COVER: 'K'
CBB1A	RIM = 898.89 SUMP = 893.35 12" INV W = 895.35 12" INV SE = 895.35 DIA: 4' COVER: 'K'
MH10B	RIM = 898.34 SUMP = 890.89 27" INV NW = 890.89 27" INV SE = 890.89 DIA: 4' COVER: 'A'
MH5B	RIM = 898.25 SUMP = 893.55 18" INV N = 893.95 12" INV NW = 894.35 12" INV NE = 894.35 24" INV S = 893.55 DIA: 5' COVER: 'A'
CBB4A	RIM = 898.16 SUMP = 892.50 12" INV S = 894.50 DIA: 4' COVER: 'K'
CBB4B	RIM = 898.16 SUMP = 892.63 12" INV S = 894.63 DIA: 4' COVER: 'K'
CBB5A	RIM = 898.12 SUMP = 892.47 12" INV N = 894.47 12" INV SE = 894.47 DIA: 4' COVER: 'K'
CBB5B	RIM = 898.12 SUMP = 892.60 12" INV N = 894.60 12" INV SW = 894.60 DIA: 4' COVER: 'K'
MHBB	RIM = 898.06 SUMP = 892.49 24" INV N = 892.49 12" INV NW = 893.30 12" INV NE = 894.29 24" INV S = 892.49 DIA: 6' COVER: 'A'

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
CBB8A	RIM = 897.96 SUMP = 891.41 12" INV SE = 893.41 DIA: 4' COVER: 'K'
CBB8B	RIM = 897.96 SUMP = 892.54 12" INV SW = 894.54 DIA: 4' COVER: 'K'
CBB11A	RIM = 897.40 SUMP = 889.42 12" INV NW = 891.42 DIA: 4' COVER: 'K'
CBB11B	RIM = 897.37 SUMP = 889.56 12" INV SW = 891.56 DIA: 4' COVER: 'K'
MH11B	RIM = 897.33 SUMP = 890.30 27" INV NW = 890.30 12" INV SE = 891.30 12" INV NE = 891.30 27" INV SW = 890.30 DIA: 6' COVER: 'A'
OCS01	RIM = 895.00 SUMP = 885.98 12" INV N = 887.98 DIA: 4' COVER: 'GRATE'
MH14B	RIM = 894.20 SUMP = 887.38 12" INV S = 887.38 12" INV N = 887.38 DIA: 4' COVER: 'A'
FES1B	27" INV NE = 890.00
FES2B	12" INV S = 886.58

HARTLEY GEOTECHNICAL GROUP

TEST BORING REPORT

BORING NO. SB-3 — HG JOB NO. HG 18-062
GROUND SURFACE ELEV. 895.0 — CLIENT BOSS ENGINEERING
DATUM PROVIDED BY BOSS ENGINEERING — TYLER VANCE
PROJECT SOLITUDE MEADOWS - PHASE 3 — DATE DRILLED JUNE 25, 2018
FOWLERVILLE, MI — DRILLER T. HAYES
DRILLING METHOD 4" AUGER ON ATV

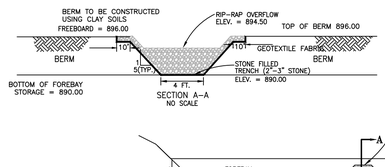
ELEV.	IN FEET	SAMPLE TYPE	SAMPLE NO.	STRATA CHANGE	SOIL CLASSIFICATION	W.L.	K = RELATIVE PERMEABILITY
		SS	1		0.9) LOOSE MOIST DARK BROWN SILTY MEDIUM SAND TOPSOIL		
		SS	2		8.7)FF MOIST BROWN SANDY CLAY WITH TRACES OF FINE GRAVEL		qu = 6000 PSF @ 1.3'
	5	SS	3		4.8) HARD MOIST MOTTLED GRAY/BROWN SILTY CLAY		K = 1 X 10⁻⁷ CM/SEC
		SS	4		5.8) MEDIUM COMPACT MOIST MOTTLED GRAY/BROWN SILT		qu = 6000 PSF @ 4.6'
		SS	5		7.2) LOOSE WET MOTTLED GRAY/BROWN SILT	▽	W.L. = 6.0' (889.0) AT COMPLETION
		SS	6		7.8)FF MOIST GRAY VERY SANDY CLAY		K = 1 X 10⁻⁷ CM/SEC
		SS	7		MEDIUM COMPACT WET GRAY SILT		K = 1 X 10⁻⁵ CM/SEC
	10	SS	8		10.5) PLASTIC MOIST GRAY VERY SANDY CLAY		K = 1 X 10⁻⁷ CM/SEC
		SS	9		11.5) LOOSE WET GRAY MEDIUM TO COARSE SAND WITH TRACES OF FINE GRAVEL		GROUNDWATER ENCOUNTERED @ 11.5'
		SS	10		18.0) MEDIUM COMPACT WET GRAY MEDIUM SAND WITH TRACES OF FINE GRAVEL		K = 1 X 10⁻⁵ CM/SEC
	15	SS	11				
		SS	12				K = 1 X 10⁻⁷ CM/SEC
		SS	13				
		SS	14		24.5) MEDIUM COMPACT WET GRAY MEDIUM SAND		
	20	SS	15				K = 1 X 10⁻⁷ CM/SEC
		SS	16		30.0) END OF BORING		

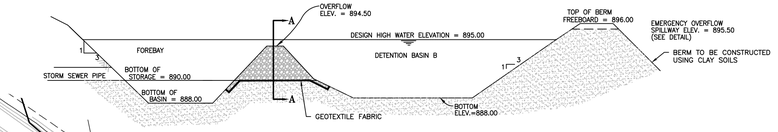
SAMPLE TYPES
S.S. - 2 O.D. Split Spoon Sample
-Sectional Linear Sample
A.S. - Auger Sample
C.C.P. - Continuous Cone Penetration Test

NO. - Number of Blows Required To Drive Sampler into Soil in 6" Depth Increments, Using 140 lb Hammer Dropping 30" (12" Depth Increments During C.C.P. Test)

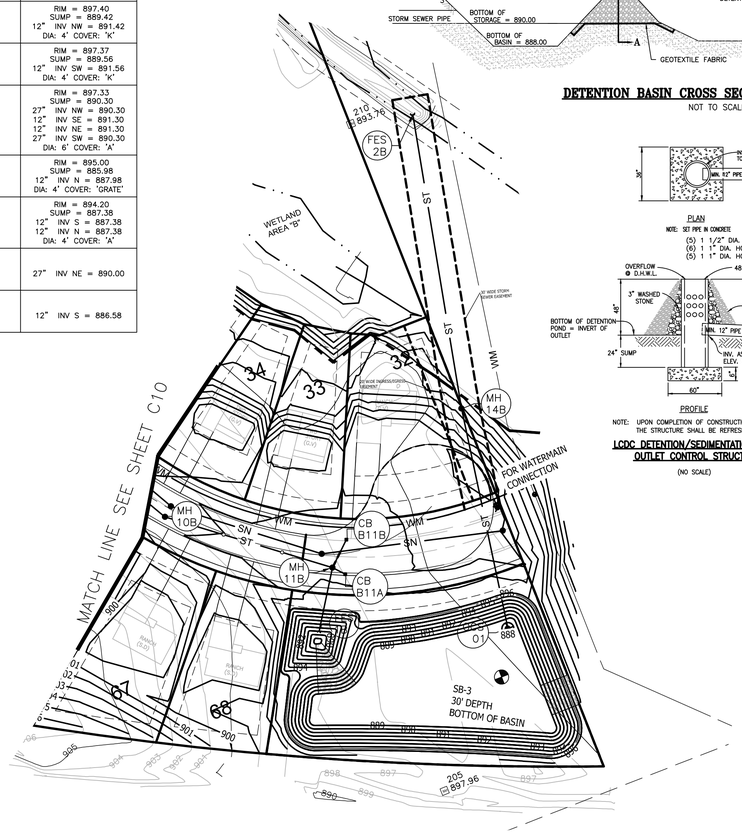
W.L. - Water Level
w - Moisture Content
qu - Unconfined Compressive Strength in P.S.F.
nd - Natural Density

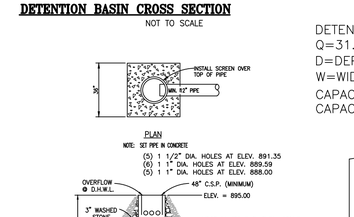
SHEET 3 OF 9





DETENTION BASIN CROSS SECTION
NOT TO SCALE

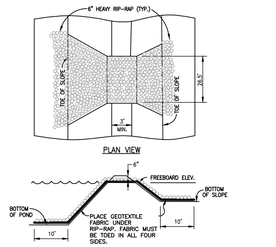




NOTE: UPON COMPLETION OF CONSTRUCTION STONE AROUND THE STRUCTURE SHALL BE REFRESHED WITH CLEAN STONE.

LCDC DETENTION/SEDIMENTATION POND OUTLET CONTROL STRUCTURE
(NO SCALE)

DETENTION BASIN B OVERFLOW SPILLWAY:
Q=31.33CFS (BASED ON 100 YEAR STORM)
D=DEPTH OF SPILLWAY: .5' (6")
W=WIDTH OF SPILLWAY: 26.5'
CAPACITY=3.33*(W-0.02*(D))*D^(3/2)
CAPACITY: 31.76 CFS



EMERGENCY SPILLWAY DETAIL
NO SCALE

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO COMPLETENESS OR ACCURACY THEREOF IS IMPLIED. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IN THE EVENT OF ANY APPARENT OR IF SPECIFIC DISCREPANCY BETWEEN THE LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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BOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT: SOLITUDE MEADOWS - PHASE 3
PREPARED FOR: ORE CREEK DEVELOPMENT
10315 E GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227-7624
TITLE: BASIN B DETAIL

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE & LCDC COMMENTS	4-25-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
3	TE	PER VILLAGE & LCDC COMMENTS	9-03-19
4	TE	PER LCDC COMMENTS	2-27-20

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE 1" = 60'
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C25

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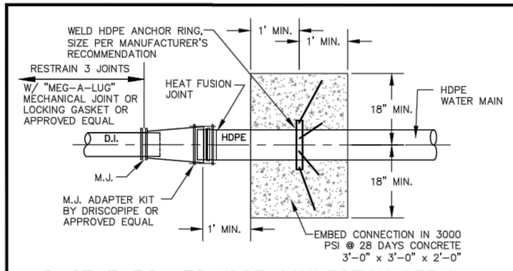
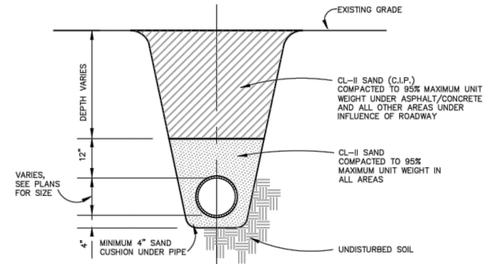


DUCTILE IRON TO HDPE CONNECTION DETAIL

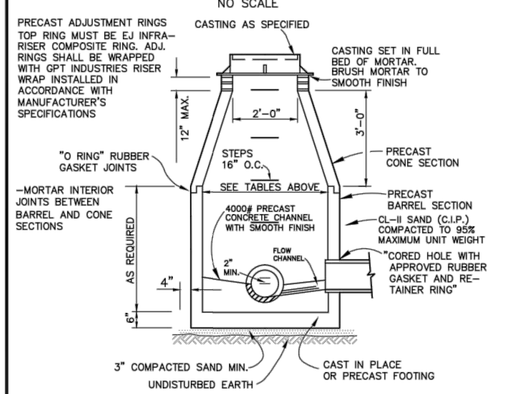
NO SCALE



TRENCH DETAIL

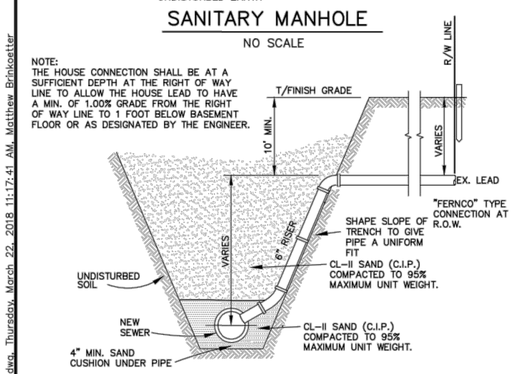
NO SCALE

DOGHOUSE STRUCTURE CHART					
A	STRUCTURE DIAMETER	4'–0"	5'–0"	6'–0"	8'–0"
B	WALL THICKNESS	0'–5"	0'–6"	0'–7"	0'–8"
C	OUTSIDE DIAMETER	4'–10"	6'–0"	7'–2"	9'–4"
D	CONE HEIGHT	1'–4"	2'–6"	3'–0"	3'–0"
E	FLAT TOP HEIGHT	0'–8"	0'–8"	0'–8"	0'–8"
F	LOOSE BASE DIAMETER	6'–0"	7'–0"	8'–0"	10'–4"
G	PIPE SIZE (CONCRETE)	8" – 24"	27" – 36"	42"	48" – 60"
H	STRUCTURE CUT OUT	18" – 36"	40" – 51"	59"	66"–73 1/2"



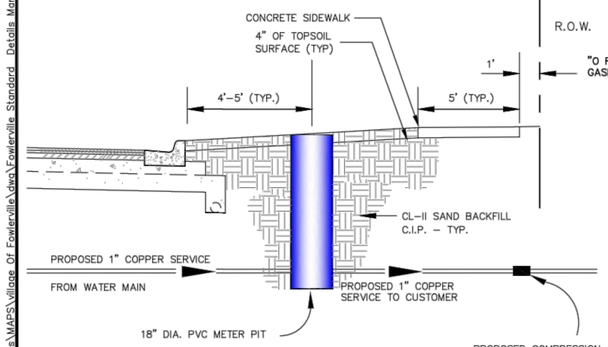
SANITARY MANHOLE

NO SCALE

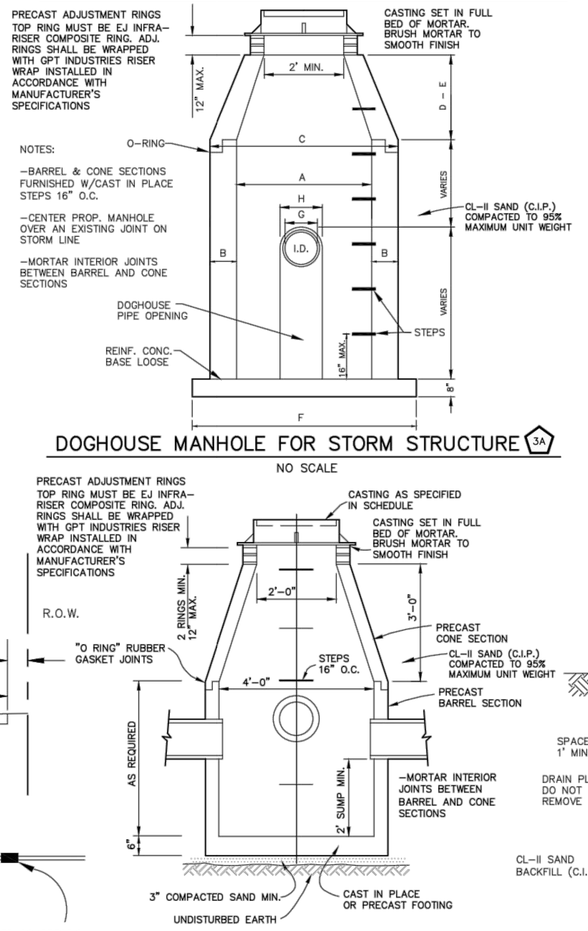


"DEEP CUT" SANITARY SEWER RISER

NO SCALE



MUELLER/McCULLOUGH THERMAL – COIL METER BOX

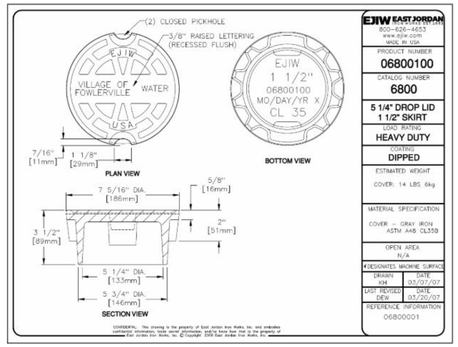


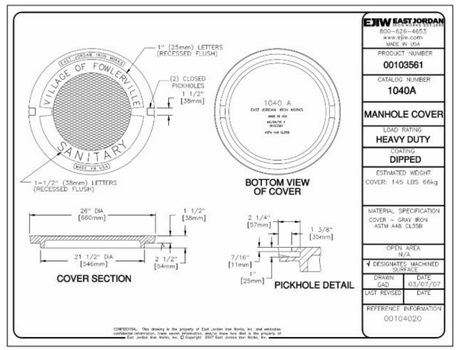
DOGHOUSE MANHOLE FOR STORM STRUCTURE 3A

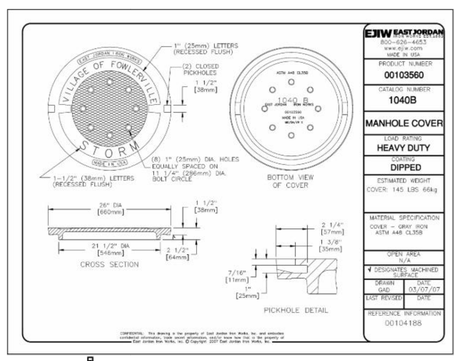
NO SCALE

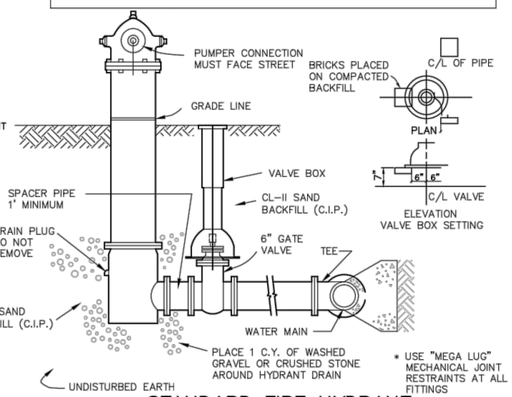
STANDARD CATCH BASIN

NO SCALE









STANDARD FIRE HYDRANT

NO SCALE

MATERIAL SPECIFICATIONS

SECTION 02100
STANDARD CASTINGS, VALVES AND HYDRANTS

PART 1 GENERAL

1.01 WORK INCLUDED:

The work covered by this section of the specifications consists of furnishing Standard Castings, Valves and Hydrants in accordance with the Village of Fowlerville Standards.

1.02 RELATED WORK:

A. REQUIREMENTS: Standard castings, valves and hydrants shall be installed in accordance with the details indicated on the plans and in these specifications.

B. RELATED SECTIONS: Including, but not limited to:

1. SECTION 02665 - WATER MAINS
2. SECTION 02715 - CONCRETE UTILITY MANHOLES AND CATCH BASINS
3. SECTION 02717 - SEWAGE FORCE MAINS
4. SECTION 02722 - STORM SEWERS
5. SECTION 02732 - SANITARY SEWER

PART 2 PRODUCTS

2.01 SANITARY/STORM SEWER SYSTEM:

A. SANITARY MANHOLE CASTINGS
1. Standard — EJIW 1040-A
2. Monitoring Manhole — EJIW 1040-A

B. STORM MANHOLE CASTINGS
1. Standard — EJIW 1040-B

C. STORM CATCH BASIN CASTINGS
1. Curb Type — EJIW 7045
2. Ditch Type — EJIW 6508
3. Gutter Type — EJIW 7066
4. Alleys — EJIW 5105
5. Parking Lots — EJIW 1690, Type M

2.02 WATER DISTRIBUTION SYSTEM

A. VALVES
1. Gute — MUELLER (A-2360-20) or EJIW (FLOWMASTER) resilient wedge valves (open left). No lead
2. Valve Box — EJIW (6860 Series - 3 piece)

B. SERVICES
1. Service Lead — Type K annealed seamless copper
2. Service Clamp — Mueller BR2B, or Ford 202 Series
3. 1" Corporation Valve — Mueller Ground Key Corporation Valve - 1"-H-15008 CC x CTS or approved equal, for residential
1" Curb Valve — Mueller Mark II Oriseal Curb Valve - 1" - H 15209 CTS x CTS or approved equal, for residential
1" Union Coupling — Mueller Straight Three Part Union - 1" - H 15403 CTS x CTS or approved equal, for residential
2" Corporation Valve — Mueller Ori-Corp Corporation Valve - 2" - H - 15013 CC x CTS or approved equal, for commercial
2" Curb Valve — Mueller Mark II Oriseal Curb Valve - 2" - H - 15209 CTS x CTS or approved equal, for commercial
2" Union Coupling — Mueller Straight Three Part Union - 2" - H - 15403 CTS x CTS or approved equal, for commercial
ALL FITTINGS MUST BE COMPRESSION TYPE
4. Curb Box — Mueller Box H-10385 Red 84154
5. Backflow Preventer — Reduced Pressure Principle Backflow Preventer
6. Meter Pits — Mueller/McCullough Thermal-coil PVC Meter Box with 4" thick insulating pads #790153, and flat lids #780069. Meters shall also include a 1" jumper connection or idler piece #700250. Final grade adjustments shall be made with 2"-6" extensions model #'s SE1802, SE1804, & SE1806. Minimum bury depth.

C. VALVE MANHOLE CASTINGS
1. All Gatewell Covers — EJIW 1040 A, Marked "Water"

D. FIRE HYDRANTS
1. Type — EJIW 5BR 250 (IBM-54913d) or Mueller Super Centurion 250
2. Hose Connection — 2-2 ½" Hose Connection, National Standard
3. Pumper Connection — 1- Pumper Connection, Storz fitting 5"
4. Nuts — National Standard, 1 ½" Pent.
5. Open — Left

B. RESTRAINTS

1. All fittings, bends and hydrants shall be mechanically restrained using EBAA Iron Inc. Series 1100, Megalug glands, or grip type gaskets, or approved equivalent. Hydrants may be rodded with ¾" threaded rods, from the tee back to the hydrant in lieu of megalug glands. Locking gaskets shall be installed within three (3) joints of bends, end of stubs and dead ends.

All underground piping (water main and water service leads) shall have Copperhead Industries #12 Solid CCS High Strength, color blue, or an engineer approved equal, tracer wire installed with and taped to the new pipe and service leads every five feet. The tracer wire shall terminate in a SnakePit Magnetized Tracer Box, Product # LD14*TP, color blue, with a cast iron cover, or engineer approved equal, at each water valve, hydrant, new service leads, curb stops and at the end of the new water main section. SnakeBite DryConn Direct Bury Lug, Product # 3WB-01 (color Blue), or engineer approved equal, shall be installed to connect tracer wire branches to the tracer wire at the water main. Water main will not be accepted until the tracer wire has been located and tested. Grounding anodes shall be installed in accordance with manufacturer's specifications.

STORM SEWER PIPE
Material for storm sewers shall be PVC SDR 26 for sewers smaller than 12" and concrete pipe C76–IV premium joint for sewers 12" and larger.

SANITARY SEWER PIPE
Polyvinyl Chloride (PVC): Shall conform to ASTM D2241, SDR 26. Minimum pipe wall thickness shall be SDR 26. All pipe shall have a "home" mark. Joints shall be of the elastomeric gasket push–on type conforming to ASTM D3212. SDR 26 PVC shall be used for six inch (6") or larger, diameter pipe. All fittings for leads shall also be SDR 26.

Concrete Sidewalk and Driveway Approaches
Non–reinforced concrete sidewalk thickness shall be 4" in green belt areas, 6" within 5' and through residential driveways, 10" within 5' and through commercial driveways and 12" within 5' and through heavy duty commercial driveways. Non–reinforced concrete driveway approach thickness shall be 6" in residential driveways, 10" in commercial driveways and 12" in heavy duty commercial driveways. Minimum subbase for commercial approaches shall be 8" of MDOT 21AA crushed aggregate. Minimum subbase for residential driveways shall be 4" MDOT Class II sand. Subbase shall be proof–rolled before aggregate placement. Rubber expansion material required. Commercial approaches shall be MDOT Type M.

WATER MAINS
Pipe for water mains shall be ductile iron class 52, cement lined in accordance with ASA 21.4. Joints shall be slip–on type conforming to ASA A21.11. Restrained joints shall have locking rubber and/or megalug mechanical joints.

ROADWAYS
Minimum subbase for asphalt roadway is 12" MDOT Class II sand under 8" MDOT 21AA crushed aggregate. 4" socked edge drain required under curb.
CONCRETE CURB AND GUTTER SHALL BE MDOT TYPE F4,(REINFORCEMENT BARS SHALL BE EPOXY COATED)
Truncated Dome Detectable Warning Devices shall be EJ Model No. 7005.

Topsoil furnished by Contractor shall be approved by Engineer prior to placement. Topsoil shall be screened, free of roots, stones and other debris and of a rich, black friable texture. All restored areas shall be covered with mulch blankets or hydro–seeded as directed by Engineer.

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REVISION	DATE	DRAWN	DESCRIPTION
1	05/25/18	JMS	1–INCH WATER SERVICE
2	03/22/18	MJB	2018 Updates

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AND STRUCTURES AS SHOWN ON THESE PLANS ARE APPROXIMATE AND NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF EXISTING UTILITIES AND PROPOSED UTILITY CROSSINGS BEFORE BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IF ANY CONFLICTS ARE FOUND TO EXIST AND SHALL DETERMINE ANY REVISION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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OR 811
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Mason, Michigan 48854
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Fax: 517.676.9360
http://www.wolverineengineers.com

BEBOSS Engineering
Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT: SOLITUDE MEADOWS – PHASE 3
PREPARED FOR: ORE CREEK DEVELOPMENT
10315 E.GRAND RIVER AVE
BRIGHTON, MI 48116
(810) 227–7624

VILLAGE OF FOWLERVILLE
LIVINGSTON COUNTY, MICHIGAN

SHEET TITLE: STANDARD DETAILS

NO	BY	REVISION PER	DATE
1	CH	PER VILLAGE COMMENTS	4–25–19
2	TE	PER EGLE & LCDC COMMENTS	9–03–19

PROJECT
APPROVED: JCW
CHECKED: JCW
DRAWN:
JOB NO.
DATE: 3/22/2018
SCALE: AS NOTED
SHEET NO.

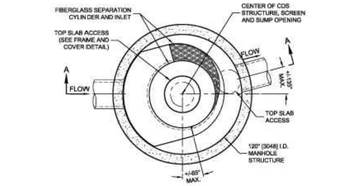
DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE N/A
JOB NO. 18–032
DATE 10–30–18
SHEET NO. C26

TITLE: FOWLERVILLE STANDARD DETAILS

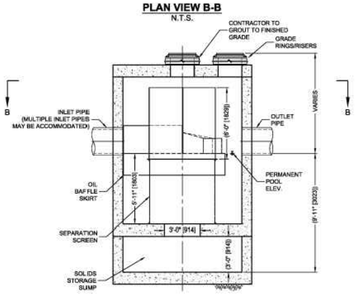
BOSS Engineering

S:\Projects\MAPS\Village Of Fowlerville\dwg\Fowlerville Standard Details March 2018.dwg, Thursday, March 22, 2018 11:17:41 AM, Matthew Brinkoetter

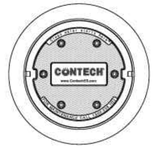
G:\18-032\dwg\CPshortcuts\18-032 BASE 9-27-18.dwg, 3/2/2020 2:31:20 PM, AutoCAD PDF (Smallest File).pc3



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS5653-10-C DESIGN NOTES

CDS5653-10-C RATED TREATMENT CAPACITY IS 14.0 CFS [396.5 Ls], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 50.0 CFS [1416 Ls]. IF THE SITE CONDITIONS EXCEED 50.0 CFS [1416 Ls], AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS5653-10-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			PTS-1A
WATER QUALITY FLOW RATE (CFS OR L/s)			10.56
PEAK FLOW RATE (CFS OR L/s)			22.06
RETURN PERIOD OF PEAK FLOW (YRS)			10 YR
SCREEN APERTURE (2400 OR 4700)			2400
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	892.27	RCP	27"
INLET PIPE 2	*	*	*
OUTLET PIPE	892.27	RCP	27"
RIM ELEVATION			901.35
ANTI-FLOTATION BALLAST	WIDTH		HEIGHT
	*		*
NOTES/SPECIAL REQUIREMENTS:			

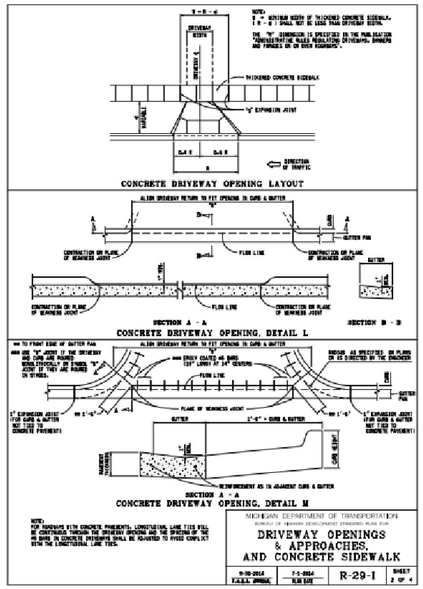
* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechESI.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET HS20 (AASHTO M 306) AND BE CAST WITH THE CONTECH LOGO.
6. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

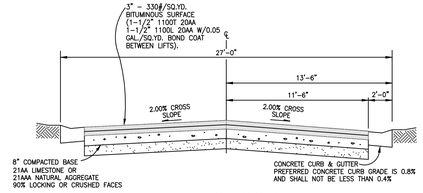
CDS5653-10-C
INLINE CDS
STANDARD DETAIL



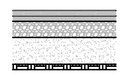
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS, DESIGN DIVISION STANDARDS ROAD WORK

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014	1-1-2014	R-29-1	SHEET 2 OF 4
F.H.W.A. APPROVAL	ELEC DATE		



TYPICAL ROAD-SECTION
(NO SCALE)



ASPHALT SECTION
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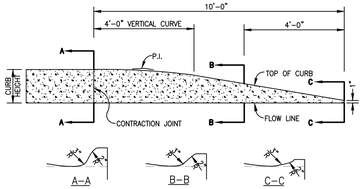
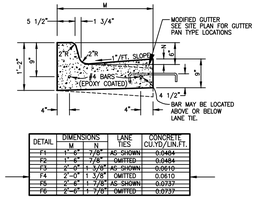
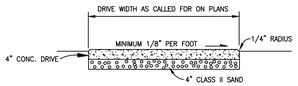


CONCRETE CURB AND GUTTER ENDINGS
(NO SCALE)



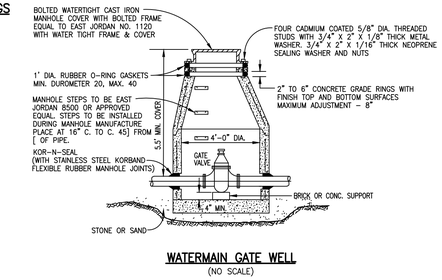
DETAIL	DIMENSIONS M	N	LANE TIES	CONCRETE CU.YD./LIN.FT.
F1	1'-6"	7/8"	AS SHOWN	0.0454
F2	1'-6"	7/8"	OMITTED	0.0484
F3	2'-0"	1 1/8"	AS SHOWN	0.0610
F4	2'-0"	1 1/8"	OMITTED	0.0610
F5	2'-6"	1 1/8"	AS SHOWN	0.0737
F6	2'-6"	1 1/8"	OMITTED	0.0737

CONCRETE CURB & GUTTER TYPE F
(NO SCALE)

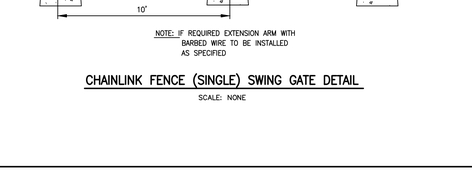


4" CONCRETE DRIVEWAY MDOT GRADE 35P CONCRETE
(NO SCALE)

4" COMPACTED BASE
CONCRETE STRENGTH FOR CURBS TO BE 3000 PSI @ 28 DAYS.
GROUND MUST BE COMPACTED TO 95% OF M.D.D.



WATERMAIN GATE WELL
(NO SCALE)



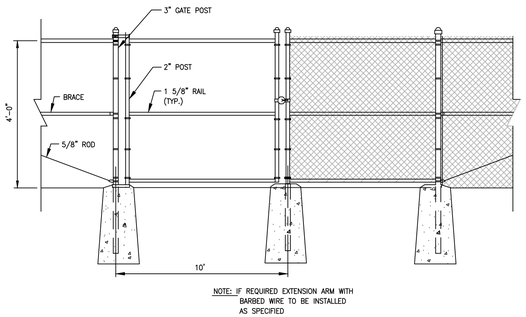
DROP MANHOLE CONNECTION
(NO SCALE)

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
NO-7	RIM = 898.89 8" INV IN = 887.66
NO-03	RIM = 901.01 8" INV IN = 891.99
1	RIM = 901.62 8" INV IN = 888.28 8" INV IN = 891.18 8" INV OUT = 888.18
2	RIM = 900.02 8" INV IN = 888.87 8" INV OUT = 888.77
3	RIM = 898.38 8" INV IN = 889.44 8" INV OUT = 889.34
4	RIM = 900.46 8" INV IN = 890.33 8" INV OUT = 890.23
5	RIM = 899.59 8" INV IN = 892.51 8" INV OUT = 891.91
6	RIM = 898.46 8" INV IN = 894.05 8" INV OUT = 893.05
7	RIM = 897.24 8" INV IN = 894.68 8" INV OUT = 894.58
7A	RIM = 897.92 8" INV OUT = 895.29
8	RIM = 902.52 8" INV IN = 891.54 8" INV OUT = 891.44

STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
9	RIM = 905.81 8" INV OUT = 892.42
10	RIM = 901.44 8" INV IN = 892.82 8" INV IN = 892.82 8" INV OUT = 892.72
11	RIM = 902.20 8" INV IN = 894.16 8" INV IN = 894.16 8" INV OUT = 894.06
12	RIM = 904.60 8" INV IN = 895.33 8" INV OUT = 895.23
13	RIM = 903.41 8" INV OUT = 896.72
14	RIM = 904.03 8" INV IN = 893.97 8" INV OUT = 893.87
15	RIM = 904.87 8" INV IN = 894.40 8" INV OUT = 894.30
16	RIM = 905.59 8" INV OUT = 894.67
17	RIM = 903.67 8" INV IN = 894.74 8" INV OUT = 894.64
18	RIM = 904.31 8" INV IN = 895.05 8" INV OUT = 894.95
19	RIM = 906.31 8" INV OUT = 895.62

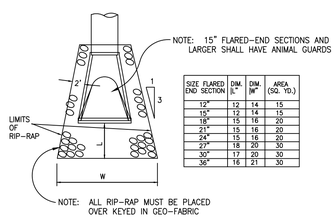
STRUCTURE FRAMES & COVERS

COVER	TYPE	USE	MANUFACTURER OR EQUAL EAST JORDAN	TYPE OF COVER OR GRATE
A	MH	ALL	1040-A 1040-B	SANITARY-SELF SEALING STORM-VENTED
C	CB & INLET	F CURB	7045	FLAT GRATE WITH VERT. 4" OPEN THROAT
E	CB & INLET	LAWN AREA OR DITCH	6508	BEEHIVE GRATE 4" HIGH



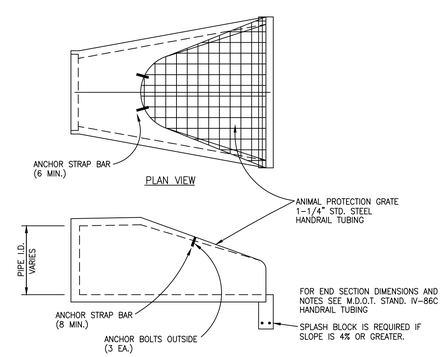
NOTE: IF REQUIRED EXTENSION ARM WITH BARBED WIRE TO BE INSTALLED AS SPECIFIED

CHAINLINK FENCE (SINGLE) SWING GATE DETAIL
SCALE: NONE



SIZE FLARED END SECTION	DIM. L'	DIM. W'	AREA (SQ. YD.)
12"	12	14	15
15"	12	14	15
18"	15	16	20
21"	15	16	20
24"	15	16	20
27"	18	20	30
30"	17	20	30
36"	16	21	30

TYPICAL RIP-RAP DETAIL
(SCALE: NONE)



PRECAST CONCRETE END SECTION FOR PIPE CULVERT W/ ANIMAL GRATE
(NO SCALE)

THE LOCATION AND ELEVATION OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE ONLY APPROXIMATE. NO GUARANTEE IS MADE AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL UTILITIES AND PROPOSED UTILITY CROSSINGS IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY APPARENT OR IF SIGNIFICANT DISCREPANCY IN LOCATION OR DEPTH DIFFERS SIGNIFICANTLY FROM THE PLANS.

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Engineers Surveyors Planners Landscape Architects
3121 E. GRAND RIVER AVE.
HOWELL, MI. 48843
800.246.6735 FAX 517.548.1670

PROJECT
SOLITUDE MEADOWS - PHASE 3

PREPARED FOR
ORE CREEK DEVELOPMENT
10315 E. GRAND RIVER AVE
BRIGHTON, MI. 48116
(810) 227-7624

TITLE
CONSTRUCTION DETAILS

NO	BY	REVISION PER	DATE
3	TE	PER EGLE & LCDC COMMENTS	9-03-19
2	TE	PER VILLAGE & LCDC COMMENTS	5-31-19
1	CH	PER VILLAGE COMMENTS	4-25-19

DESIGNED BY: TE
DRAWN BY: TE
CHECKED BY:
SCALE N/A
JOB NO. 18-032
DATE 10-30-18
SHEET NO. C27

BOSS Engineering

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