

# Great Lakes Taco, LLC Construction Plans

6305 Highland Road, White Lake Twp., MI

## APPLICANT

DORTCH ENTERPRISES, LLC  
8467 RETREAT DR.  
GRAND BLANC, MI 48439 PHONE:  
(810)-771-4500

## ARCHITECT

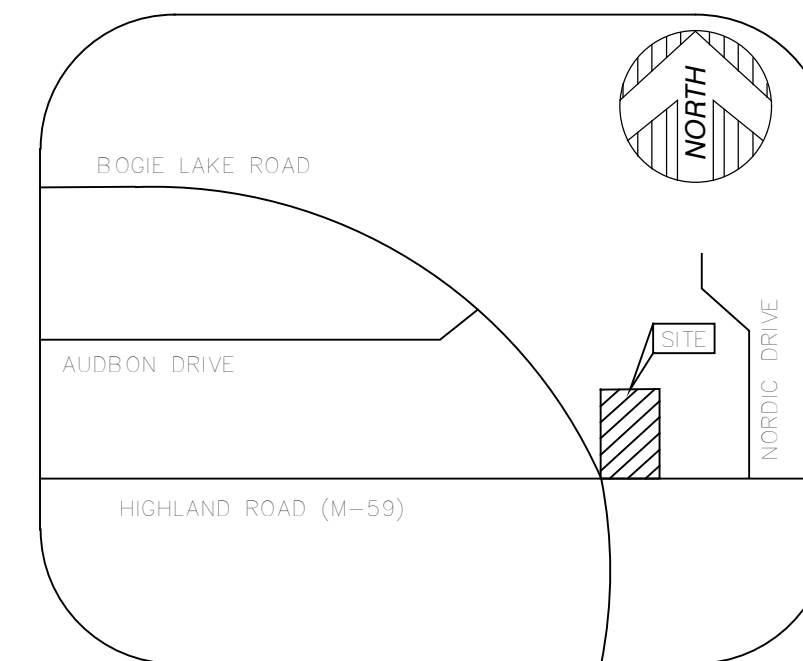
L + A ARCHITECTS INC.  
441 S. LIVERNOIS ROAD, SUITE 265  
ROCHESTER HILLS, MI 48307  
PHONE: (248)-524-4700

## CIVIL ENGINEER

KEM-TEC & ASSOCIATES  
22556 GRATIOT AVENUE  
EASTPOINTE, MI 48021  
CONTACT: GREG EZZO  
PHONE: (810)-712-8849

### LEGEND

	LIGHTPOST/LAMP POST
	SANITARY MANHOLE
	FLAGPOLE
	SET X-CUT
	FOUND MONUMENT (AS NOTED)
	GROUND ELEVATION
	ELECTRIC MANHOLE
	ELECTRIC METER
	TRANSFORMER
	UTILITY POLE
	GAS MANHOLE
	GAS METER
	GAS VALVE
	LIGHT POLE WITH STREET LAMP
	PUBLIC LIGHTING MANHOLE
	TELEPHONE MANHOLE
	TRAFFIC SIGNAL
	STORM DRAIN MANHOLE
	FIRE HYDRANT
	FIRE DEPARTMENT CONNECTION
	WATER VALVE
	SINGLE POST SIGN
	DECIDUOUS TREE (AS NOTED)
	CONIFEROUS TREE (AS NOTED)
	CLEANOUT
	SQUARE CATCH BASIN
	SANITARY LINE
	STORM LINE
	WATER LINE
	GAS LINE
	PROPOSED CATCH BASIN
	PROPOSED MANHOLE
	PROPOSED FIRE HYDRANT
	PROPOSED WATER VALVE
	PROPOSED SANITARY LINE
	PROPOSED STORM WATER LINE
	PROPOSED WATER LINE
	PROPOSED SLIT FENCE



VICINITY MAP  
(NOT TO SCALE)

### PARCEL AREA

46,241± SQUARE FEET = 1.068± ACRES

### FLOOD NOTE

SUBJECT PARCEL DOES NOT LIE WITHIN A FLOOD PLAIN

### SITE BENCHMARKS

BENCHMARK #1  
TURN ARROW ON HYDRANT, FIRST HYDRANT ALONG WEST SIDE OF BOGIE LAKE ROAD NORTH OF HIGHLAND ROAD. ELEVATION = 982.44' (NAVD 88)

BENCHMARK #2  
TURN ARROW ON HYDRANT, FIRST HYDRANT ALONG NORTH SIDE OF HIGHLAND ROAD EAST OF BOGIE LAKE ROAD. ELEVATION = 985.56' (NAVD 88)

### PROPERTY DESCRIPTION

LAND SITUATED IN THE COUNTY OF OAKLAND, TOWNSHIP OF WHITE LAKE, STATE OF MICHIGAN, IS DESCRIBED AS FOLLOWS:  
A PART OF THE NORTHEAST ¼ OF SECTION 20, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, DESCRIBED AS COMMENCING AT THE CENTER OF SECTION; THENCE NORTH 00 DEGREES 31 MINUTES 08 SECONDS EAST ALONG THE NORTH-SOUTH ¼ LINE OF SAID SECTION 20, 199.92 FEET; THENCE NORTH 89 DEGREES 58 MINUTES 09 SECONDS EAST, 519.36 FEET; THENCE SOUTH 87 DEGREES 30 MINUTES 16 SECONDS EAST, 513.36 FEET; THENCE 28.28 FEET ON A CURVE TO THE RIGHT WITH A RADIUS OF 5621.58 FEET, CHORD BEARING AND DISTANCE OF SOUTH 84 DEGREES 52 MINUTES 11 SECONDS EAST, 28.28 FEET; THENCE SOUTH 84 DEGREES 42 MINUTES 00 SECONDS EAST, 435.29 FEET; THENCE 118.86 FEET ON A CURVE TO THE LEFT WITH A RADIUS OF 5637.58 FEET, CHORD BEARING AND DISTANCE OF SOUTH 85 DEGREES 18 MINUTES 14 SECONDS EAST, 118.86 FEET TO THE POINT OF BEGINNING; THENCE NORTH 00 DEGREES 01 MINUTE 09 SECONDS WEST, 236.61 FEET; THENCE 94.99 FEET ALONG A CURVE TO THE LEFT WITH A RADIUS OF 533.50 FEET, CHORD BEARING AND DISTANCE OF NORTH 05 DEGREES 00 MINUTES 27 SECONDS WEST, 94.99 FEET; THENCE SOUTH 89 DEGREES 40 MINUTES 32 SECONDS EAST, 147.67 FEET; THENCE SOUTH 00 DEGREES 19 MINUTES 28 SECONDS WEST, 338.00 FEET; THENCE 137.67 FEET ALONG A CURVE TO THE RIGHT WITH A RADIUS OF 5637.58 FEET, CHORD BEARING AND DISTANCE OF NORTH 86 DEGREES 36 MINUTES 27 SECONDS WEST, 137.67 FEET TO THE POINT OF BEGINNING.

### DRAWING INDEX

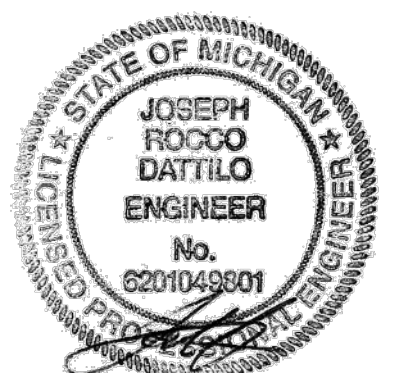
C1.0	COVER SHEET
1	TOPOGRAPHIC SURVEY
C2.0	DEMOLITION PLAN
C3.0	SITE LAYOUT & PAVING PLAN
C3.1	FIRE TRUCK ACCESS PLAN
C4.0	GRADING PLAN
C5.0	UTILITY PLAN
C6.0	PROFILE PLAN
C7.0	SOIL EROSION & SEDIMENTATION CONTROL PLAN
C8.0	SITE DETAILS

WHITE LAKE TOWNSHIP SANITARY SEWER STANDARD DETAILS  
WHITE LAKE TOWNSHIP STORM SEWER STANDARD DETAILS  
WHITE LAKE TOWNSHIP WATER MAIN STANDARD DETAILS

OAKLAND COUNTY SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

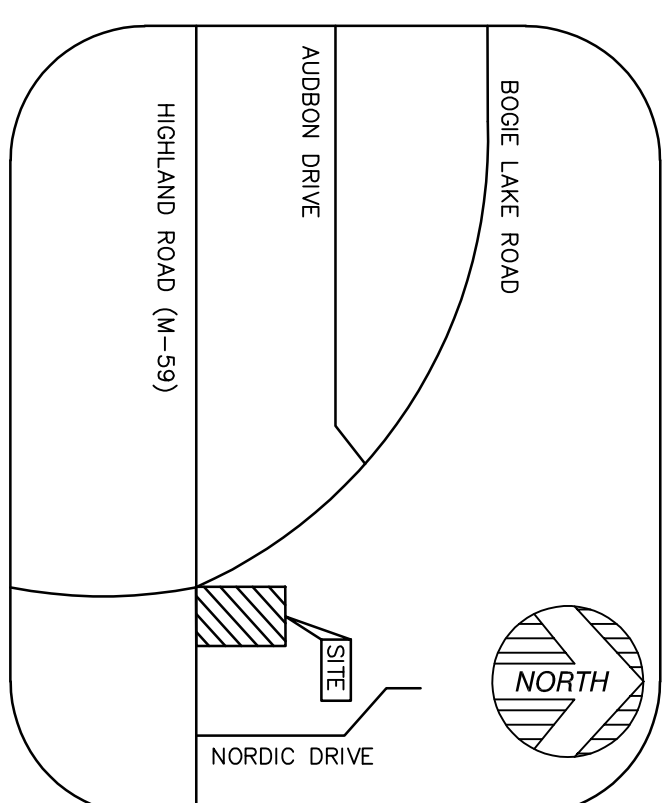
NO.	DATE	BY	REVISION	DESCRIPTION
5	02/28/2022	GAE		ENGINEERING REVIEW
4	02/01/2022	GAE		SITE PLAN APPROVAL
3	11/01/2021	GAE		SPA RESUBMISSION
2	08/02/2021	GAE		ENGINEERING SUBMISSION
1	05/19/2020	GAE		SPA SUBMISSION

DATE:	02/28/2022
DRAWN BY:	GAE
CHECKED BY:	GAE
DATE:	FEBRUARY 28, 2022
PROJECT NO.:	18-0000
SCALE:	



Know what's below.  
Call before you dig.





LEGEND

- |  |                                 |
|--|---------------------------------|
|  | FOUND SECTION CORNER (AS NOTED) |
|  | RECORD MONUMENT (AS NOTED)      |
|  | RECORD AND MEASURED DIMENSION   |
|  | MEASURED DIMENSION              |
|  | GROUND ELEVATION                |
|  | ELECTRIC METER                  |
|  | UTILITY POLE                    |
|  | GAS VALVE                       |
|  | TRAFFIC SIGNAL MANHOLE          |
|  | SANITARY MANHOLE                |
|  | ROUND CATCH BASIN               |
|  | SQUARE CATCH BASIN              |
|  | FIRE HYDRANT                    |
|  | WATER GATE MANHOLE              |
|  | GENERATOR                       |
|  | WATER VALVE                     |
|  | WELL                            |
|  | LIGHTPOST/LAMP POST             |
|  | SINGLE POST SIGN                |
|  | PARCEL BOUNDARY LINE            |
|  | PLATTED LOT LINE                |
|  | ADJOINER PARCEL LINE            |
|  | CONCRETE CURB                   |
|  | EDGE OF ASPHALT (ASPH)          |
|  | EDGE OF GRAVEL                  |
|  | OVERHEAD UTILITY LINE           |
|  | GAS LINE                        |
|  | SANITARY LINE                   |
|  | STORM LINE                      |
|  | WATER LINE                      |
|  | ELECTRIC LINE                   |
|  | MINOR CONTOUR LINE              |
|  | MAJOR CONTOUR LINE              |
|  | BUILDING AREA                   |
|  | ASPHALT                         |
|  | CONCRETE                        |

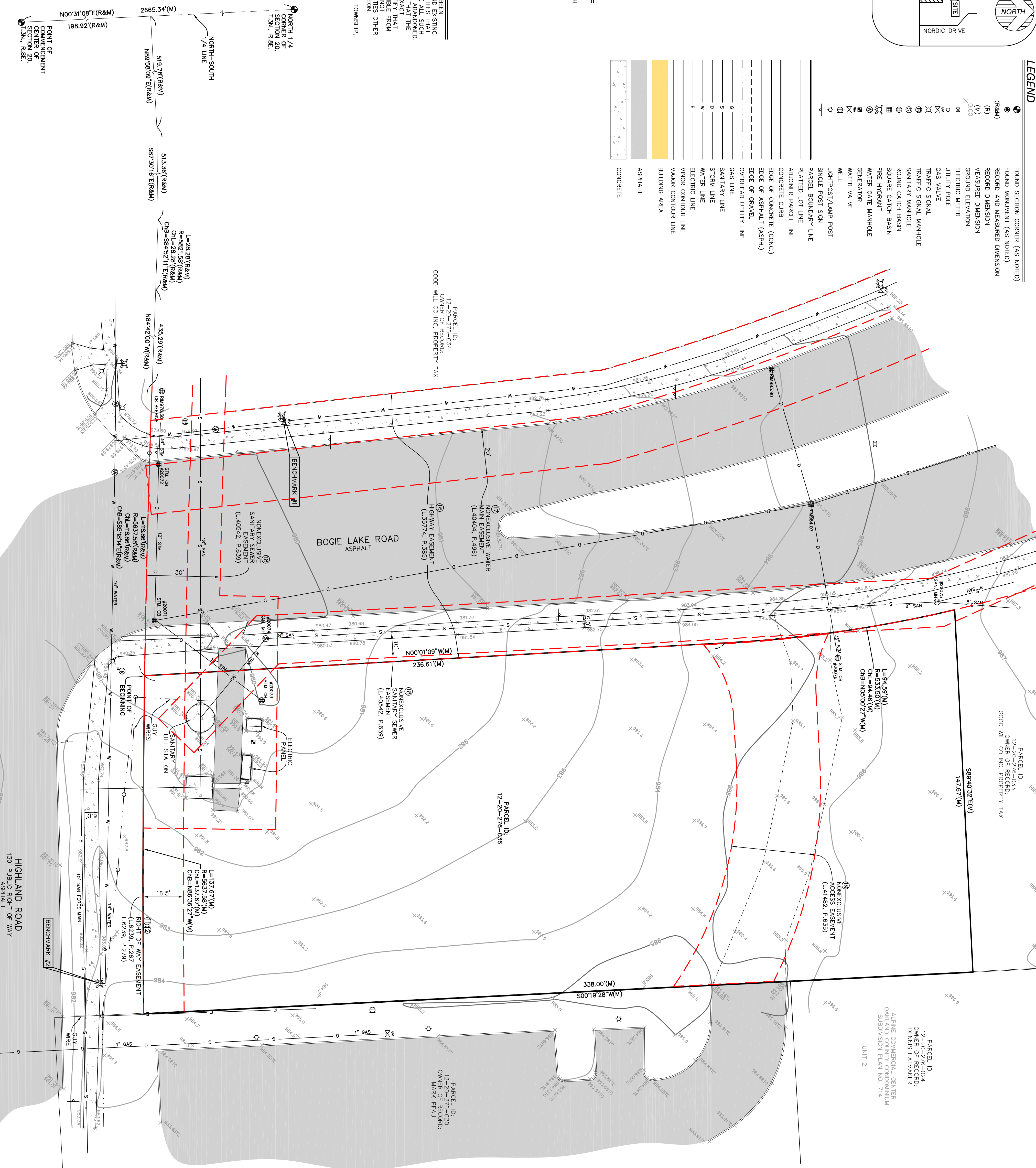
PROPOSED PARCEL AREA  
46,541± SQUARE FEET = 1.068± ACRES

BENCHMARKS

- BENCHMARK #1  
TURN ARROW ON HORPANT, FIRST HORPANT  
ALONG WEST SIDE OF BOGIE LAKE ROAD NORTH  
ELEVATION = 982.44' (NAVD 88)
- BENCHMARK #2  
TURN ARROW ON HORPANT, FIRST HORPANT  
ALONG NORTH SIDE OF HIGHLAND ROAD EAST  
ELEVATION = 989.58' (NAVD 88)

SURVEYOR'S NOTES

- THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS PROVIDED TO THE SURVEYOR. THE SURVEYOR DOES NOT GUARANTEE THE LOCATION OR DEPTH OF ANY UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UTILITIES SHOWN ARE THE ONLY UTILITIES IN THE AREA. THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM THE INFORMATION PROVIDED AND THE UNDERGROUND UTILITIES PHYSICALLY LOCATED BY THE SURVEYOR. THE SURVEYOR IS NOT RESPONSIBLE FOR DAMAGE TO ANY UTILITIES LOCATED BY OTHER THAN THE STRUCTURE INVENTORY SHOWN HEREON.
- ALL PROPERTY SLOTS REQUIRE PRIOR CITY, TOWNSHIP, COUNTY, AND/OR STATE APPROVAL.



PROPERTY DESCRIPTION

LAND SITUATED IN THE COUNTY OF OAKLAND, TOWNSHIP OF WHITE LAKE, STATE OF MICHIGAN, IS DESCRIBED AS FOLLOWS:  
A PART OF THE NORTHEAST 1/4 OF SECTION 20, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, DESCRIBED AS COMMENCING AT THE CENTER OF SECTION; THENCE NORTH 00 DEGREES 31' SECONDS 08' 198.97 FEET; THENCE NORTH 89 DEGREES 58' 09' SECONDS EAST, 515.36 FEET; THENCE SOUTH 87 DEGREES 30' MINUTES 16' SECONDS EAST, 515.36 FEET; THENCE 28.28 FEET ON A CURVE TO THE RIGHT WITH A RADIUS OF 982.138 FEET, CHORD BEARING AND DISTANCE OF 50.314 FEET; THENCE 09 DEGREES 58' 09" SECONDS EAST, 435.29 FEET; THENCE 118.86 FEET ON A CURVE TO THE LEFT WITH A RADIUS OF 583.758 FEET, CHORD BEARING AND DISTANCE OF 515.36 FEET; THENCE 94.46 FEET; THENCE NORTH 05 DEGREES 00' MINUTES 27' SECONDS WEST, 94.46 FEET; THENCE SOUTH 09 DEGREES 00' MINUTES 27' SECONDS WEST, 52.97 FEET; THENCE SOUTH 09 DEGREES 19' MINUTES 28' SECONDS WEST, 138.00 FEET; THENCE 137.67 FEET ALONG A CURVE TO THE RIGHT WITH A RADIUS OF 583.758 FEET, CHORD BEARING AND DISTANCE OF NORTH 96 DEGREES 38' MINUTES 27' SECONDS WEST, 137.67 FEET TO THE POINT OF BEGINNING.

TITLE REPORT NOTE

- RIGHT(S) OF WAY AND/OR EASEMENT(S) AND RIGHTS INCIDENTAL THEREOF ARE GRANTED IN A DOCUMENT, GRANTED TO GENERAL TELEPHONE COMPANY, AND RELIED UPON BY THIS SURVEY, AND OTHER RECORDS RESEARCH WAS PERFORMED BY THE CERTIFYING SURVEYOR.
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- RIGHT(S) OF WAY AND/OR EASEMENT(S) AND RIGHTS INCIDENTAL THEREOF, AS GRANTED IN A DOCUMENT, GRANTED TO BOARD OF COUNTY ROAD COMMISSIONERS OF THE COUNTY OF OAKLAND, A PUBLIC BODY CORPORATE AND POLITICALLY ORGANIZED, EASEMENT SHOWN PER PREVIOUS SURVEY.
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MANHOLE SCHEDULE

NUM	TYPE	RIM (FT)	SIZE (IN)	DIR	INV ELEV (FT)
20071	STORM CB	979.06	12	NE	973.64
20072	STORM CB	979.06	12	W	973.64
20073	STORM CB	979.21	12	E	974.01
20074	STORM CB	979.21	36	W	974.01
20075	STORM CB	979.94	12	SW	974.94
20076	SANITARY MH	980.25	8	N	970.51
20077	SANITARY MH	980.25	8	SE	970.51
20078	SANITARY MH	986.31	8	N	973.36
20079	SANITARY MH	986.31	8	S	973.36
20080	SANITARY MH	977.11	8	N	977.11
20081	SANITARY MH	977.11	8	S	977.11
20082	STORM CB	985.11	36	W	975.51

SURVEYOR'S CERTIFICATION

TO GREAT LAKES TACQ, LLC, WEIHER, INC., AND FIDELITY NATIONAL TITLE INSURANCE COMPANY;  
THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDED ITEMS 1, 2, 4, 5, AND 6 OF THE STANDARD. THE FIELD WORK WAS COMPLETED ON 01/21/2021.  
DATE OF PLAT OR MAP: 01/21/2021

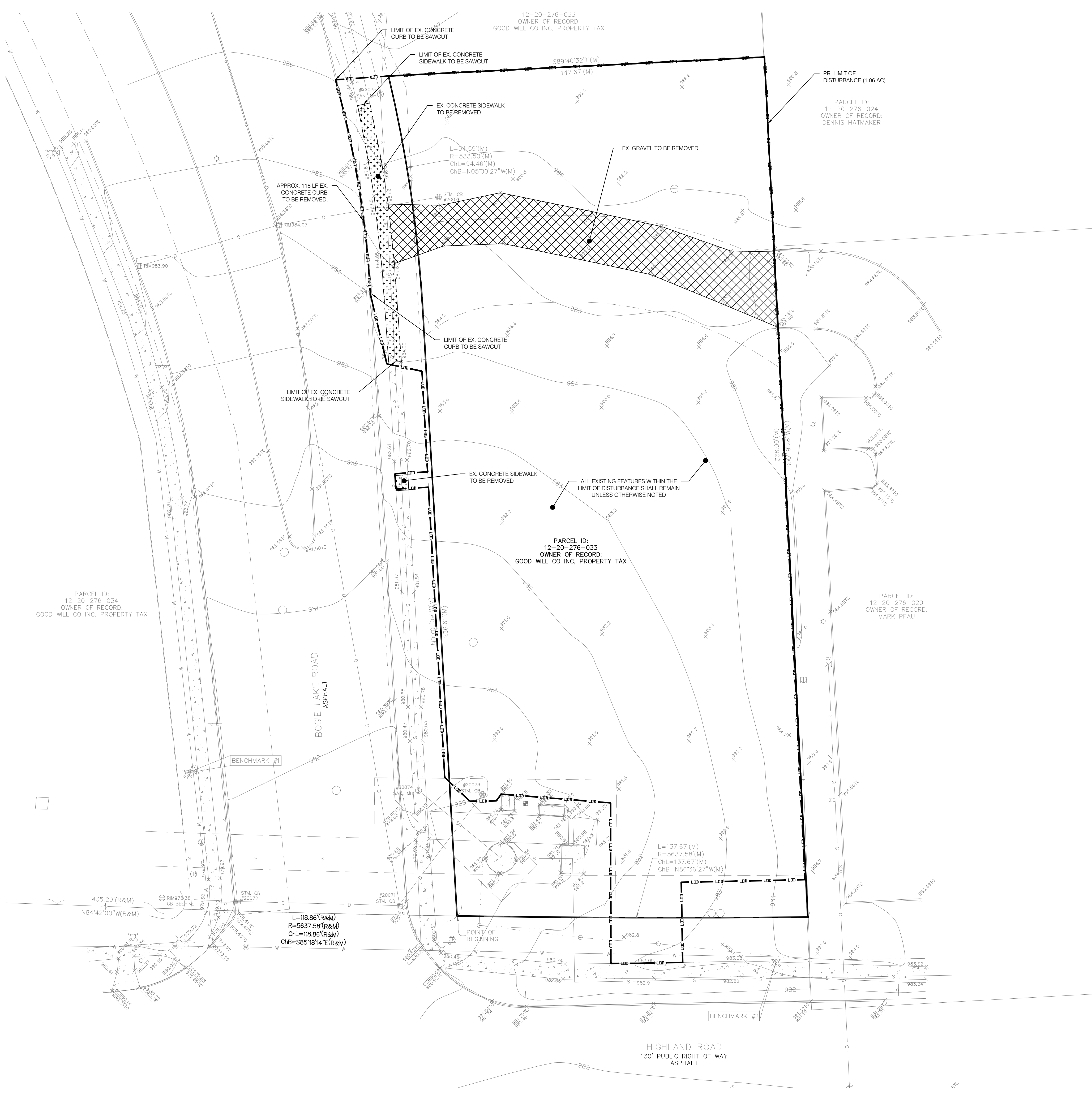
ANTHONY T. SVCKO, JR., P.S.  
PROFESSIONAL SURVEYOR  
22535 GRATIOT AVE., EASTWIND, MI 48021  
TSVCKO@antec-survey.com

**ALTA / NSPS LAND TITLE SURVEY**  
PREPARED FOR: DORTCH ENTERPRISES  
6305 HIGHLAND, WHITE LAKE, MICHIGAN,  
PART OF SECTION 20,  
TOWN 3 NORTH, RANGE 8 EAST

KEM-TEC  
A GROUP OF COMPANIES  
Professional Engineering, Surveying & Environmental Services  
Eastpointe (800) 295.7222 Detroit (313) 758.0677 Ann Arbor (734) 994.0888 Grand Blanc (888) 694.0001  
www.kemtecgroupofcompanies.com

DRAWN BY:	CMC	01/21/2021		REVISED PARCEL ID OF SUBJECT PROPERTY
CHECKED BY:	ATS	01/21/2021		PER REVIEW COMMENTS
DATE:	JANUARY 21, 2021			ADD SIDEWALK WIDTHS
PROJECT NO.:	20-03619	SCALE: 1" = 20'		REVISED PER REVIEW COMMENTS
1 OF 1 SHEETS				ADD TITLE WORK
				DESCRIPTION



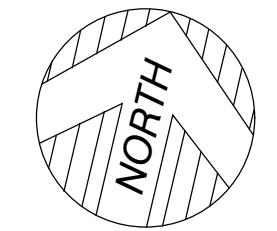
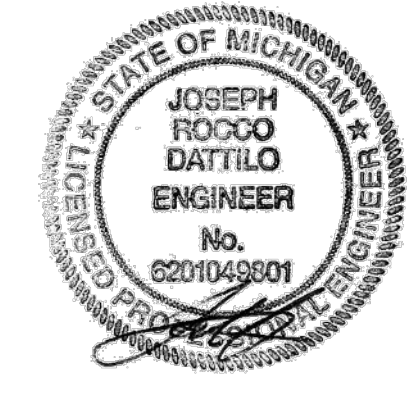


**GENERAL DEMOLITION NOTES**

- THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:
1. ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
  2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
  3. STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
  4. SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
  5. REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES CONCRETE SIDEWALKS, BRICK AND CURBED AREAS, ASPHALT, TREES, ETC.
  6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
  7. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) LATEST EDITION.
  8. THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
  9. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS AND SUPPORTS WITHIN THE WORK AREA, AS NECESSARY TO FACILITATE CONSTRUCTION. SIGNS SHALL BE PROTECTED OR STOCKPILED FOR REUSE AS SPECIFIED IN THE PLANS OR AS REQUIRED BY THE AGENCY OF JURISDICTION. THE CONTRACTOR SHALL REPLACE ANY DAMAGED SIGNS AND SUPPORTS AT NO ADDITIONAL COST TO THE OWNER.
  10. THE CONTRACTOR SHALL NOTIFY MISS DIG, THE CITY OF WARREN ENGINEER AND /OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
  11. ALL SITE FEATURES WITHIN THE LIMIT OF DISTURBANCE INDICATED ON THIS PLAN ARE TO BE REMOVED/DEMOLISHED UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL NOTIFY KEM-TEC IF SIGNIFICANT DISCREPANCIES ARE DISCERNED BETWEEN THIS PLAN & FIELD CONDITIONS.
  12. THE LOCATION OF ALL UNDERGROUND UTILITIES AS SHOWN ON THESE DRAWINGS ARE BASED ON RECORDS PROVIDED BY THE UTILITY OWNERS AND VISIBLE EVIDENCE OBTAINED IN THE FIELD. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED TO THE COMPLETENESS OR ACCURACY THEREOF.

**DEMOLITION LEGEND**

- CONCRETE PAVEMENT REMOVAL
- PROPERTY LINE
- LIMITS OF DISTURBANCE



**DEMOLITION PLAN**  
SCALE: 1" = 20'

**KEM-TEC**  
PROFESSIONAL ENGINEERING, SURVEYING & ENVIRONMENTAL SERVICES  
A GROUP OF COMPANIES  
Ann Arbor  
Detroit  
Esposito  
(800) 252-7222  
(734) 964-6888  
(888) 864-0001  
www.kemtecgroupofcompanies.com

**DEMOLITION PLAN**  
PREPARED FOR: GREAT LAKES TACO, LLC  
HIGHLAND (N-59) & BOGIE LAKE ROAD, WHITE LAKE TWP., MI, 48383

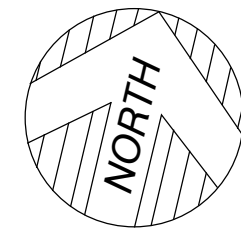
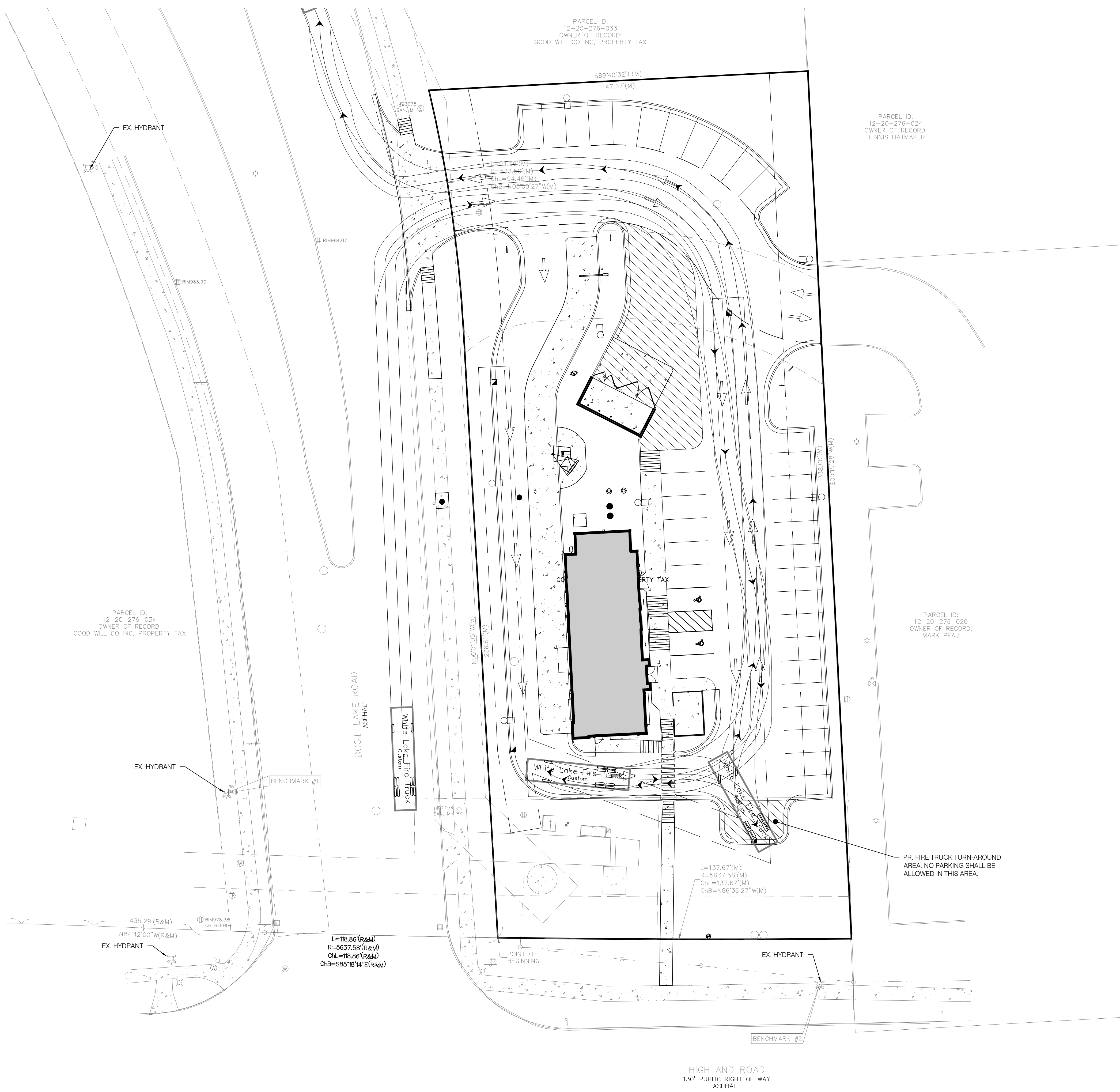
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1	2021	GAE	SPA SUBMISSION
			REVISION

SCALE: 1" = 20'  
**C2.0**





C3.1 FIRE TRUCK ACCESS PLAN



**FIRE TRUCK ACCESS PLAN**  
SCALE: 1" = 20'

**KEM-TEC**  
PROFESSIONAL ENGINEERING  
SURVEYING & ENVIRONMENTAL  
SERVICES  
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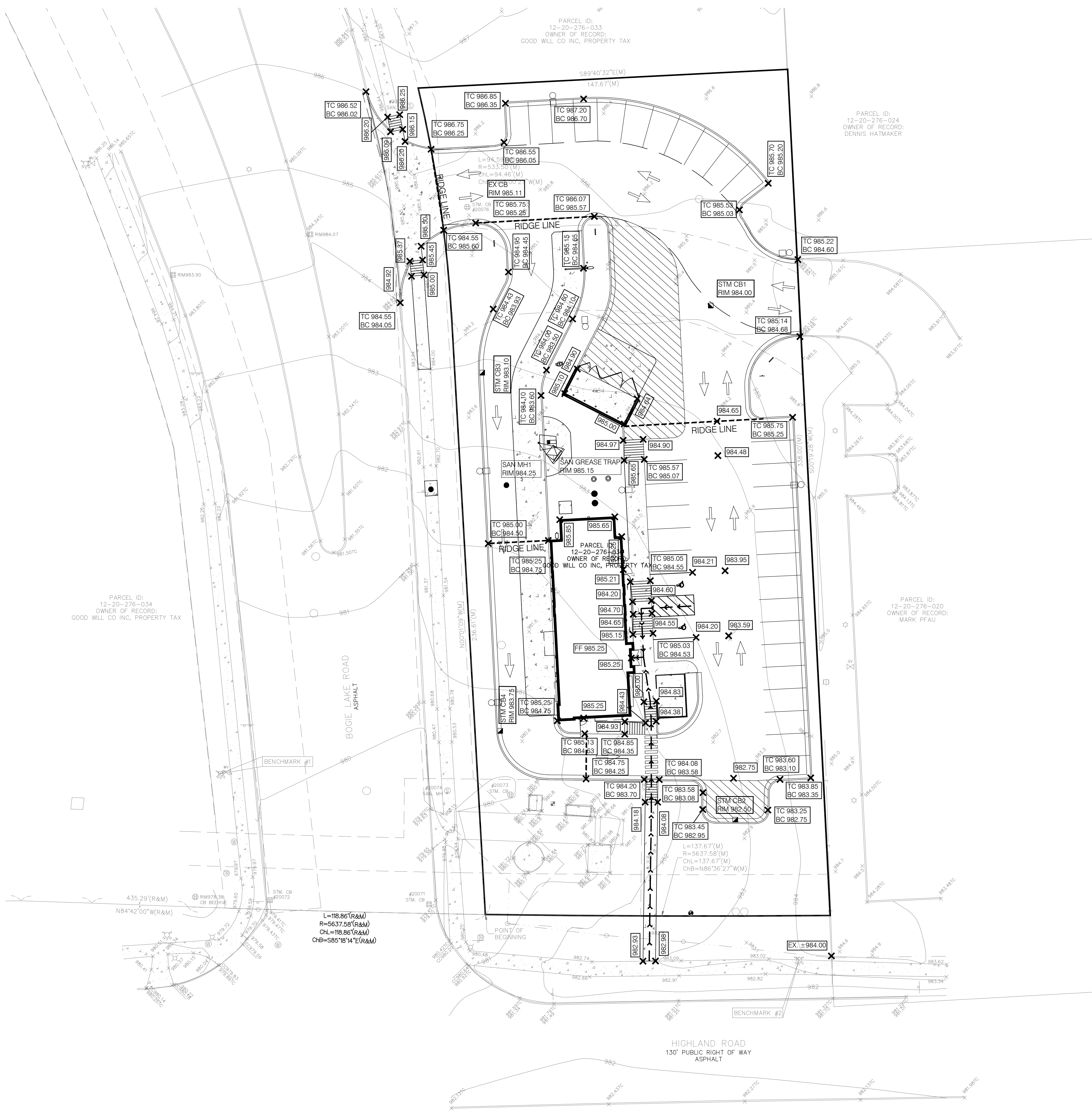
**FIRE TRUCK ACCESS PLAN**  
PREPARED FOR: GREAT LAKES TACO, LLC.  
HIGHLAND (M-59) & BOGIE LAKE ROAD, WHITE LAKE  
TWP, MI, 48383

NO.	DATE	BY	DESCRIPTION
5	02.28.2022	GAE	ENGINEERING REVIEW
4	02.01.2022	GAE	SITE PLAN APPROVAL
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1	6.14.2021	GAE	SPA SUBMISSION
			REVISION

PROJECT NO: 18-00000  
SCALE: 1" = 20'  
**C3.1**



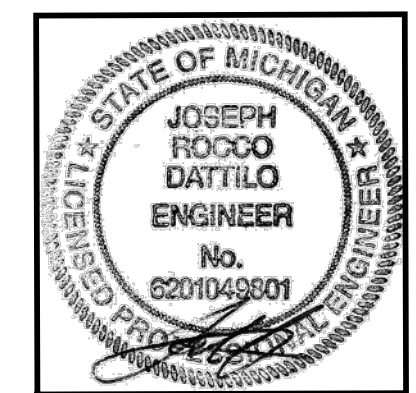
C4.0 Grading Plan



**GRADING LEGEND**

×	900.00	EXISTING GRADES
×	100.00	PROPOSED GRADES
---		PROPERTY LINE
---		PROPOSED RIDGE LINE

- GRADING NOTES**
1. ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF WHITE LAKE TOWNSHIP AND OAKLAND COUNTY.
  2. IN AREAS WHERE NEW PAVEMENTS ARE BEING CONSTRUCTED, THE TOPSOIL AND SOIL CONTAINING ORGANIC MATTER SHALL BE REMOVED PRIOR TO PAVEMENT CONSTRUCTION.
  3. ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTION REQUIREMENTS CAN BE ACHIEVED. IF ON-SITE SOIL IS USED, IT SHOULD BE CLEAN AND FREE OF FROZEN SOIL, ORGANICS, OR OTHER DELETERIOUS MATERIALS.
  4. THE FINAL SUBGRADE/EXISTING AGGREGATE BASE SHOULD BE THOROUGHLY PROOF ROLLED USING A FULLY LOADED TANDEM AXLE TRUCK OR FRONT END LOADER UNDER THE OBSERVATION OF A GEOTECHNICAL/PAVEMENT ENGINEER. LOOSE OR YIELDING AREAS THAT CANNOT BE MECHANICALLY STABILIZED SHOULD BE REINFORCED USING GEORIGIDS OR REMOVED AND REPLACED WITH ENGINEERED FILL OR AS DICTATED BY FIELD CONDITIONS.
  5. SUBGRADE UNDERCUTTING, INCLUDING BACKFILLING SHALL BE PERFORMED TO REPLACE MATERIALS SUSCEPTIBLE TO FROST HEAVING AND UNSTABLE SOIL CONDITIONS. ANY EXCAVATIONS THAT MAY BE REQUIRED BELOW THE TOPSOIL IN FILL SECTIONS OR BELOW SUBGRADE IN CUT SECTIONS, WILL BE CLASSIFIED AS SUBGRADE UNDERCUTTING.
  6. SUBGRADE UNDERCUTTING, INCLUDING BACKFILLING SHALL BE PERFORMED WHERE NECESSARY AND THE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY SUBGRADE UNDERCUTTING SHALL BE BACKFILLED WITH SAND OR OTHER SIMILAR APPROVED MATERIAL. BACKFILL SHALL BE COMPACTED TO 95% OF THE MAXIMUM UNIT WEIGHT (PER ASTM D-1557) UNLESS OTHERWISE SPECIFIED.
  7. BACKFILL UNDER PAVED AREAS SHALL BE AS SPECIFIED ON DETAILS.
  8. ANY SUB-GRADE WATERING REQUIRED TO ACHIEVE REQUIRED DENSITY SHALL BE CONSIDERED INCIDENTAL TO THE JOB.
  9. FINAL PAVEMENT ELEVATIONS SHOULD BE SO DESIGNED TO PROVIDE POSITIVE SURFACE DRAINAGE. A MINIMUM SURFACE SLOPE OF 1.0 PERCENT IS RECOMMENDED.
  10. CONSTRUCTION TRAFFIC SHOULD BE MINIMIZED ON THE NEW PAVEMENT. IF CONSTRUCTION TRAFFIC IS ANTICIPATED ON THE PAVEMENT STRUCTURE, THE INITIAL LIFT THICKNESS COULD BE INCREASED AND PLACEMENT OF THE FINAL LIFT COULD BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED. THIS ACTION WILL ALLOW REPAIR OF LOCALIZED FAILURE, IF ANY DOES OCCUR, AS WELL AS REDUCE LOAD DAMAGE ON THE PAVEMENT SYSTEM.
  11. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH WHITE LAKE TOWNSHIP AND SPECIFICATIONS.
  12. SPOT ELEVATIONS INDICATE TOP OF PAVEMENT UNLESS OTHERWISE INDICATED:  
TC = TOP OF CURB  
BC = BOTTOM OF CURB
  13. REFER TO LANDSCAPE PLAN FOR LANDSCAPE TREATMENT AND PLACEMENT.
  14. MATCH EXISTING GRADES ALONG NORTH, EAST AND WEST PROPERTY LINES.



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

**GRADING PLAN**  
SCALE: 1" = 20'

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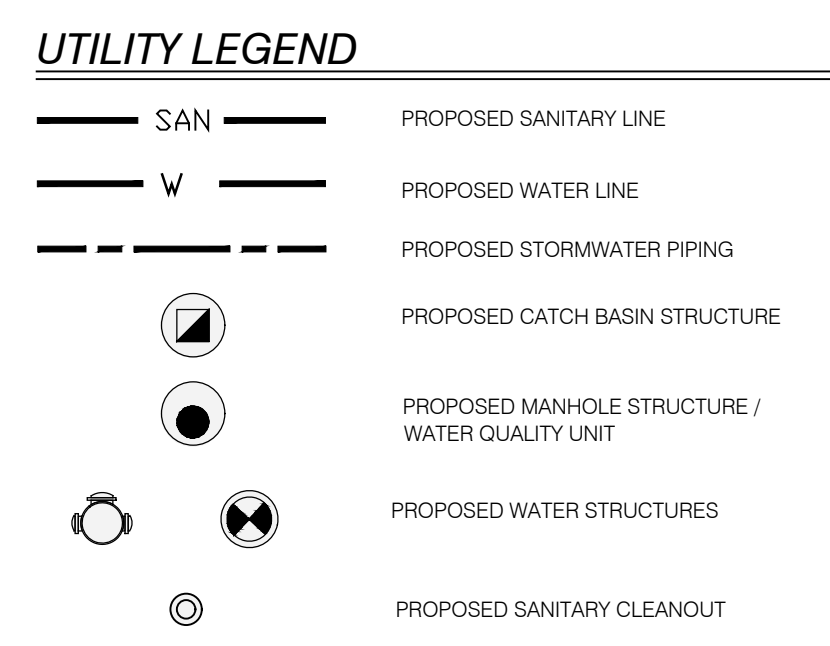
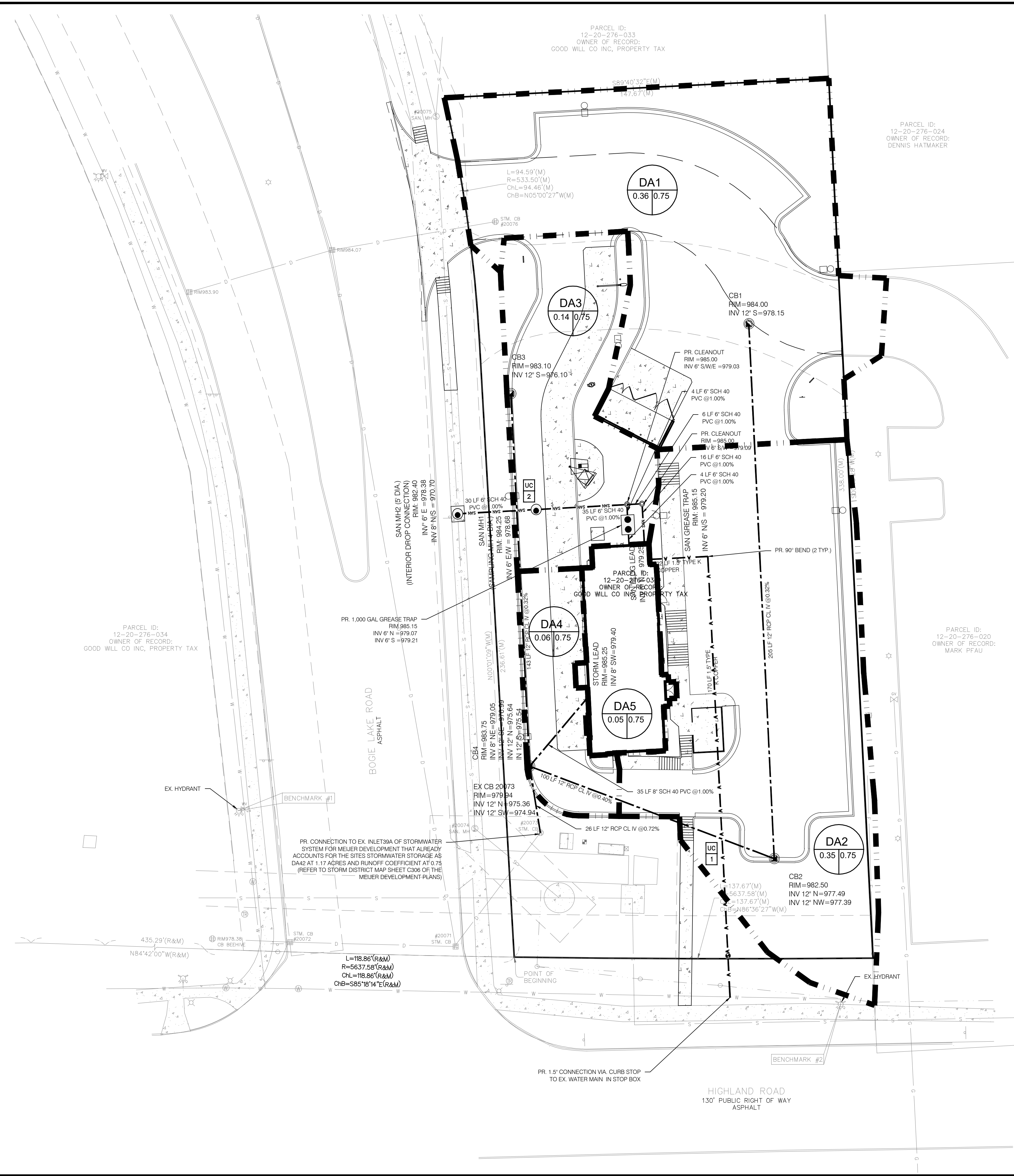
**GRADING PLAN**  
PREPARED FOR: GREAT LAKES TACO, LLC.  
HIGHLAND (M-59) & BOGIE LAKE ROAD, WHITE LAKE  
TWP., MI., 48383

NO.	DATE	BY	DESCRIPTION
5	02.28.2022	GAE	ENGINEERING REVIEW
4	02.01.2022	GAE	SITE PLAN APPROVAL
3	11.01.2021	GAE	SPA RESUBMISSION
2	08.02.2021	GAE	ENGINEERING SUBMISSION
1	6.14.2021	GAE	SPA SUBMISSION
			REVISION

SCALE: 1" = 20'  
PROJECT NO: 18-00000

**C4.0**





02.28.2022

Qp = C<sup>1.48</sup> \* A<sup>0.775</sup>  
 Cp = A x 1.488(m<sup>2</sup>/s<sup>2</sup>)<sup>0.23</sup> / (1.2)<sup>0.775</sup>  
 T = 176/(n\*25) for 10 year storm event  
 T = 16 Minutes

AREA NO.	FROM MH/CB	TO MH/CB	Area A	AVG. COEFF. C <sup>1.48</sup>	A x C	Area TOTAL	COEFF Wt C <sup>1.48</sup>	At x Cw	TIME Tc min	INT I in/hr	n	FLOW Qp cfs	PIPE DIA. in	PIPE LENGTH ft	PIPE CAP. cfs	PIPE SLOPE %	VEL. FULL 16s ft/s	TIME FLOW min	RM ELEV. HIGH	RM ELEV. LOW	HIGH END H.G.L.	LOW END H.G.L.	HIGH END INVERT	LOW END INVERT
DA1	CB1	CB2	0.36	0.75	0.27	0.28	0.75	0.27	15.00	4.38	0.0130	1.18	2.05	255	12	0.32	2.8980	1.33	984.00	982.50	978.95	979.39	978.15	977.48
DA2	CB2	CB4	0.35	0.75	0.26	0.71	0.75	0.53	16.33	4.23	0.0130	2.25	225	100	12	0.40	2.8980	0.88	982.50	983.75	978.19	977.39	976.99	976.99
DA5	BLDG	CB4	0.05	0.75	0.04	0.05	0.75	0.04	16.91	4.18	0.0130	0.16	1.22	35	8	1.00	3.4700	0.17	985.25	983.75	979.93	979.40	979.05	979.05
DA3	CB3	CB4	0.14	0.75	0.11	0.14	0.75	0.11	15.00	4.38	0.0130	0.26	2.05	143	12	0.32	2.8980	1.89	983.10	983.75	978.00	978.44	978.10	978.64
DA4	CB3	EX CB	0.06	0.75	0.05	0.06	0.75	0.72	16.91	4.18	0.0130	3.01	3.09	30	12	0.72	3.8490	0.11	983.75	979.94	976.34	976.10	975.84	975.39

### UTILITY NOTES

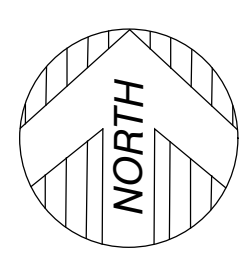
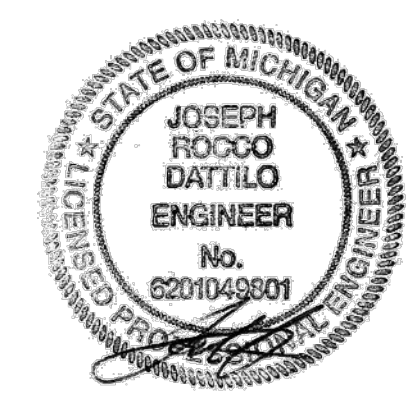
1. ALL CONSTRUCTION PROCEDURES AND MATERIALS SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF WHITE LAKE TOWNSHIP A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED BY WHITE LAKE TOWNSHIP AND HELD PRIOR TO THE START OF CONSTRUCTION.
2. CONTRACTOR MUST CONTACT MISS DIG (811) AT LEAST THREE WORKING DAYS PRIOR TO THE START OF CONSTRUCTION FOR UNDERGROUND UTILITY LOCATIONS. ALL UTILITIES SHALL BE STAKED BEFORE CONSTRUCTION BEGINS.
3. ALL WATER MAIN EASEMENTS SHALL BE PROVIDED PRIOR TO CONSTRUCTION AND ACCEPTANCE OF THE WATER DISTRIBUTION SYSTEM.
4. WATER MAINS SHALL BE CONSTRUCTED WITH A MINIMUM COVER OF 6 FEET BELOW FINISHED GRADES, INCLUDING OPEN DRAINAGE COURSES.
5. ALL TRENCHES UNDER OR WITHIN A 1:1 RATIO OF EXISTING OR PROPOSED PAVEMENT OR DRIVEWAYS, SHALL BE BACKFILLED WITH COMPACTED CLASS II SAND TO GRADE (95% MAXIMUM UNIT DENSITY).
6. WHERE TWO UTILITIES CROSS, PROVIDE CLASS II BACKFILL MATERIAL IN SIX (6) INCH COMPACTED LAYERS TO TOP HIGHEST UTILITY.
7. WHERE WATER MAINS DIP UNDER OTHER UTILITIES, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE CONSTRUCTED WITH 11-1/4" VERTICAL BENDS, 22 1/2" OR 45" BENDS MUST BE RODDED AND PROPERLY ANCHORED.
8. ALL PRECAST CONCRETE GATE WELL SECTIONS SHALL BE IN ACCORDANCE WITH A.S.T.M. C478, STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS. WALL THICKNESS SHALL BE AS SHOWN ON THESE DETAILS. ALL JOINTS FOR PRECAST CONCRETE GATE WELL SECTIONS SHALL BE "MODIFIED GROOVE TONGUE" WITH GASKET MANUFACTURED TO CONFORM WITH A.S.T.M. C443, STANDARD SPECIFICATION FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKETS.
9. CONTRACTOR SHALL INSTALL VALVES, TAPPING SLEEVES, AND GATE WELL STRUCTURES IN STRICT COMPLIANCE WITH MEASUREMENTS PROVIDED ON SHEET 1 (2'-0" BETWEEN GATE WELL WELL AND CENTERLINE OF OPERATING NUT) TO ALLOW PROPER OPERATION OF VALVE THROUGH GATE WELL OPENING.
10. ALL CROSS-CONNECTION CONTROL DEVICES SHALL BE INSTALLED AS REQUIRED BY THE PLYMOUTH TOWNSHIP PLUMBING INSPECTOR AND IN ACCORDANCE WITH THE STANDARDS OF THE OAKLAND COUNTY DRAIN COMMISSIONER OPERATION AND MAINTENANCE DIVISION AND THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF DRINKING WATER AND RADIOLOGICAL PROTECTION.
11. ALL FITTINGS AND BENDS SHOULD BE BLOCKED IN ACCORDANCE WITH THRUST BLOCK DETAILS, UNLESS ALTERNATE THRUST RESTRAINT SYSTEM, AS INDICATED PLANS AND SPECIFICATIONS, IS APPROVED BY WHITE LAKE TOWNSHIP DEPARTMENT OF PUBLIC SERVICES.

### UTILITY QUANTITIES

12" RCP CL IV STORM PIPE	474 LF
8" sch 40 PVC ROOF LEAD	35 LF
1.5" TYPE K COPPER PIPE	192 LF
6" SCH 40 PVC SAN. PIPE	95 LF
1,000 GAL GREASE TRAP	1
SANITARY MANHOLE	2
CATCH BASIN	4
CLEANOUT STRUCTURE	2
CURB STOP	1
90° BEND	1

### UTILITY CROSSING SCHEDULE

UC 1	GRADE 983.50 = TOP OF 24" STORM 678.30 12" STORM INVERT 977.30 BOTTOM OF 1.5" WATER 975.80 (WATERMAIN DIPPED WITH MIN. CLEARANCE 1.5 FT, DIPPING/DEFLECTING OF THE WATERMAIN SHALL FOLLOW APPLICABLE AGENCY STANDARDS)
UC 2	6" SAN INVERT 978.61 TOP OF 12" STORM 976.96 12" STORM INVERT 975.96 TOTAL CLEARANCE OF 1.65 FT



**UTILITY PLAN**  
SCALE: 1" = 20'

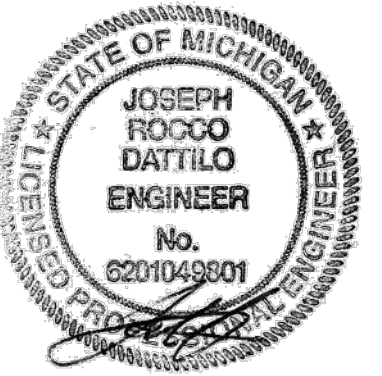
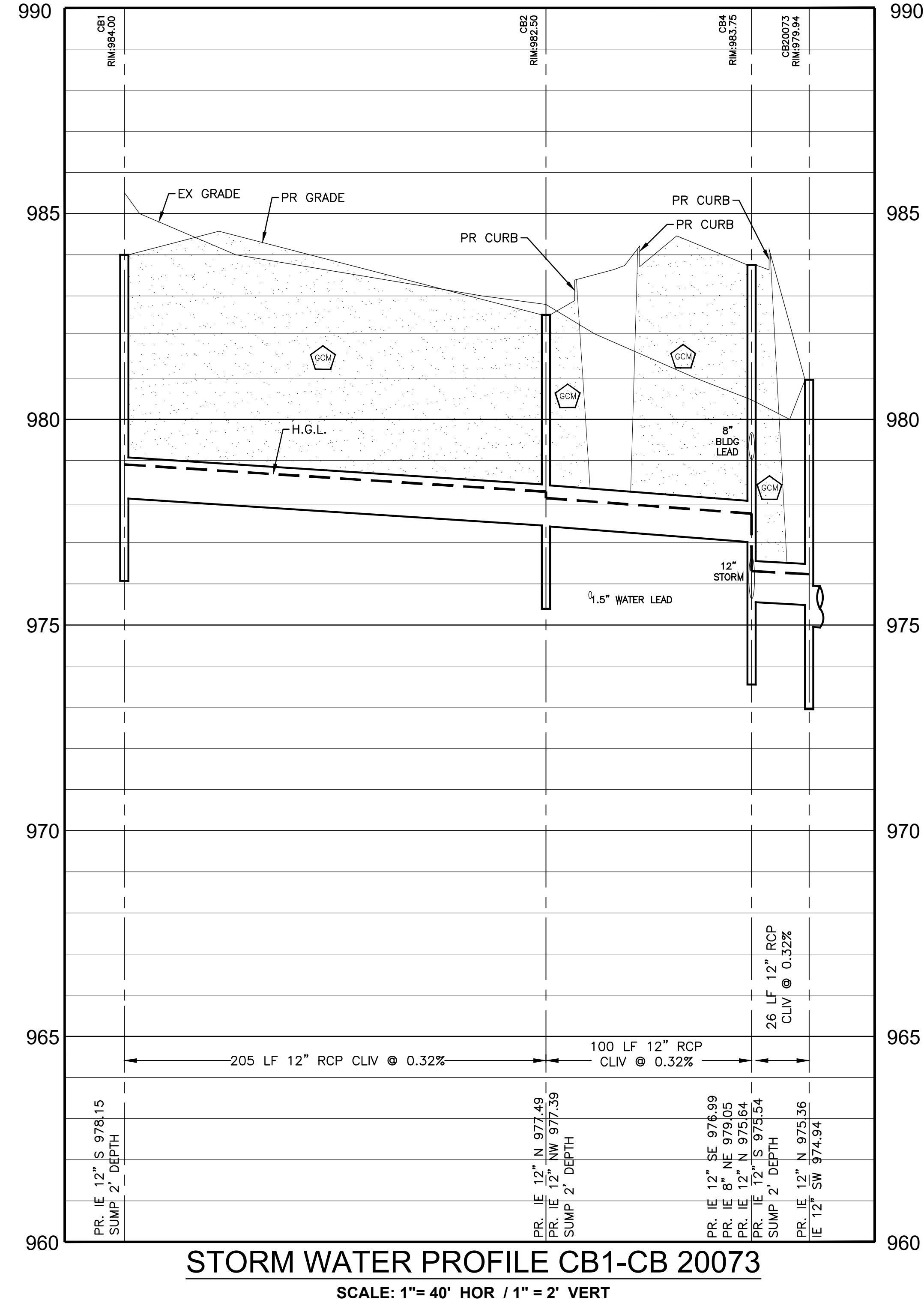
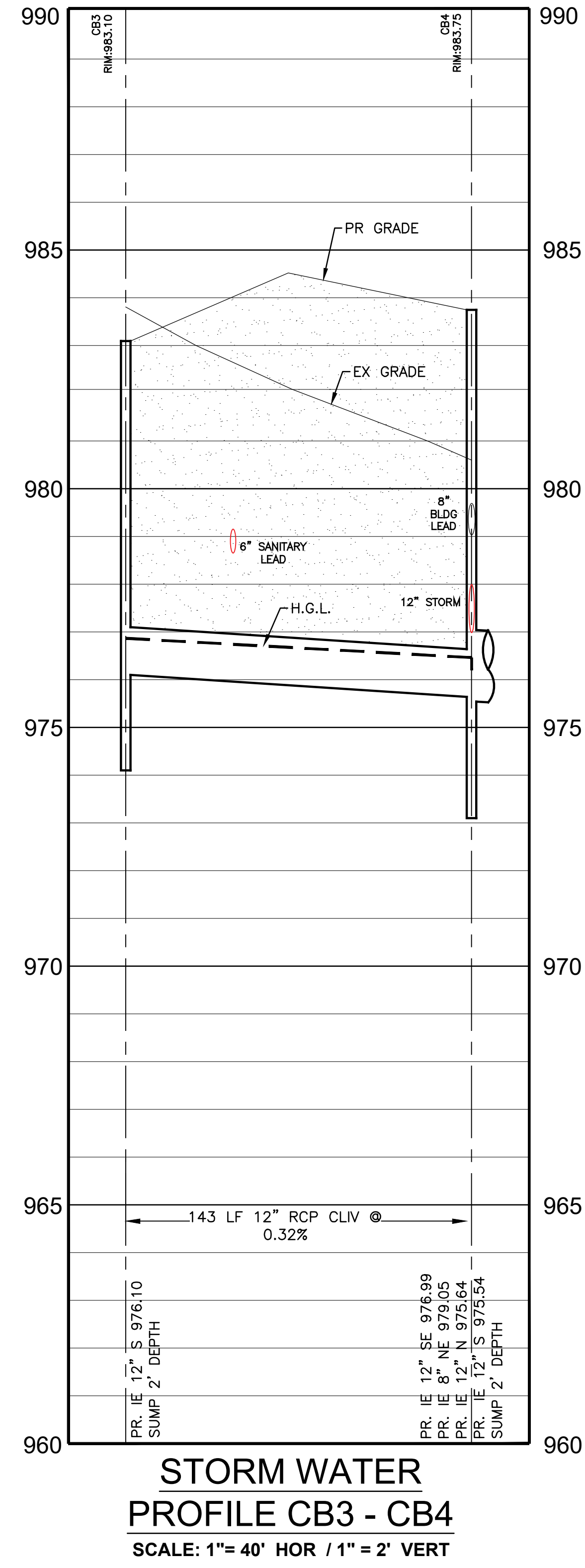
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www.kemtecgroup.com

**UTILITY PLAN**  
PREPARED FOR: GREAT LAKES TACO, LLC.  
HIGHLAND (M-59) & BOGIE LAKE ROAD, WHITE LAKE TWP., MI. 48383

NO.	DATE	BY	DESCRIPTION
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3	11.01.2021	GAE	SPA RESUBMISSION
2	08.12.2021	GAE	ENGINEERING SUBMISSION
1	6.14.2021	GAE	SPA SUBMISSION

DATE: 02/28/2022  
 CHECKED BY: GAE  
 DATE: FEBRUARY 28, 2022  
 PROJECT NO: 18-00000  
 SCALE: 1" = 20'  
**C5.0**

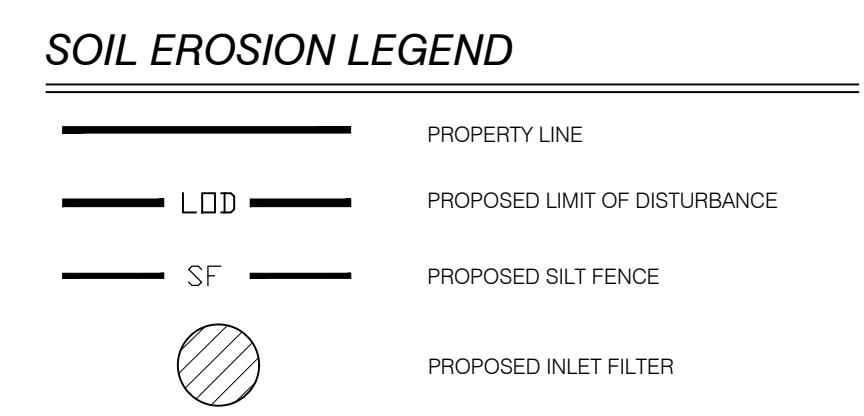




NO.	REVISION	DATE	BY	DESCRIPTION
5		02/28/2022	GAE	ENGINEERING REVIEW
4		02/01/2022	GAE	SITE PLAN APPROVAL
3		11/01/2021	GAE	SPA RESUBMISSION
2		08/02/2021	GAE	ENGINEERING SUBMISSION
1		05/25/2020	GAE	SPA SUBMISSION

PROJECT NO. 18-00000 SCALE: 1" = 20'





### SOIL EROSION & SEDIMENTATION CONTROL OPERATION TIME SCHEDULE

CONSTRUCTION SEQUENCE	NOV 2021	DEC	JAN	FEB
TEMPORARY EROSION CONTROL MEASURES	█			
STRIP & STOCKPILE TOPSOIL / ROUGH GRADE		█		
STORM SEWER		█		
FOUNDATION / BLDG. CONSTRUCTION			█	
SANITARY SEWER & WATER MAIN			█	
INSTALL ALL OTHER UTILITIES			█	
SITE CONSTRUCTION & PAVEMENT			█	
PERMANENT EROSION CONTROL MEASURES			█	
FINISH GRADING			█	
LANDSCAPING			█	

DISTURBED AREA = 1.06± ACRES

### SOIL TYPE INFORMATION

MAP UNIT SYMBOL	MAP UNIT NAME
508	UDIPSAMENTS, UNDULATING

### MAINTENANCE OF EROSION CONTROL DEVICES

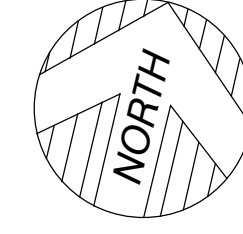
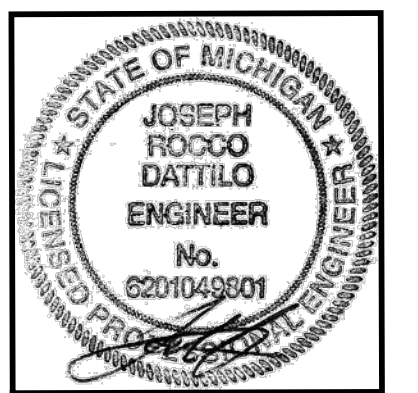
1. FILTERS MUST BE CLEANED PERIODICALLY SO THEY DONT CLOGGED.
2. FILTER FENCING WHICH SAGS, FALLS OVER OR IS NOT STAKED IN, SHOULD BE PROMPTLY REPAIRED OR REPLACED.
3. SILT FENCES SHOULD BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND SEVERAL TIMES DURING PROLONGED RAINFALLS.
4. IF THE FENCE IS SAGGING OR THE SOIL HAS REACHED ONE HALF THE HEIGHT OF THE FABRIC, THE SOIL BEHIND THE FABRIC MUST BE REMOVED.
5. MULCHED AREAS SHOULD BE CHECKED FOLLOWING EACH RAIN TO ENSURE THE MULCH IS STAYING IN PLACE. ADDITIONAL TACKING MATERIALS OR NETTING MAY NEED TO BE APPLIED TO HOLD THE MULCH IN PLACE.
6. NEWLY SEEDED AREAS NEED TO BE INSPECTED FREQUENTLY FOR THE FIRST FEW MONTHS TO ENSURE THE GRASS IS GROWING. IF THE SEEDED AREA IS DAMAGED DUE TO RUNOFF, ADDITIONAL STORMWATER MEASURES MAY BE NEEDED.

PARCEL ID:  
12-20-276-034  
OWNER OF RECORD:  
GOOD WILL CO INC, PROPERTY TAX

PARCEL ID:  
12-20-276-024  
OWNER OF RECORD:  
DENNIS HATMAKER

PARCEL ID:  
12-20-276-020  
OWNER OF RECORD:  
MARK PFAU

L=118.86'(R&M)  
R=5637.58'(R&M)  
Ch=118.86'(R&M)  
ChB=585'18"14"E(R&M)



**SOIL EROSION & SEDIMENTATION CONTROL PLAN**  
SCALE: 1"= 20'

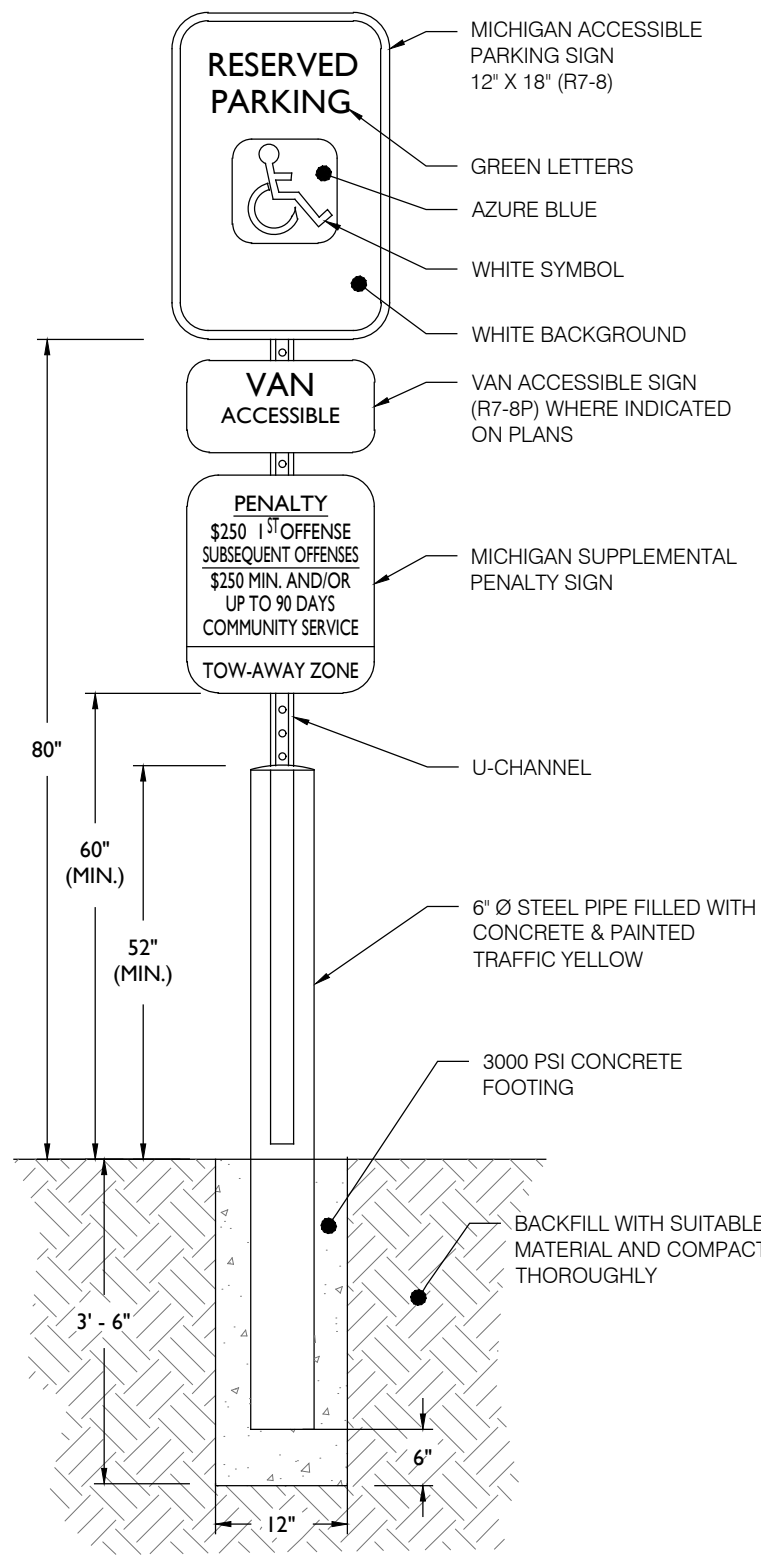
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**SOIL EROSION AND SEDIMENTATION CONTROL PLAN**  
PREPARED FOR: GREAT LAKES TACO, LLC.  
HIGHLAND (M-59) & BOGIE LAKE ROAD, WHITE LAKE TWP., MI, 48383

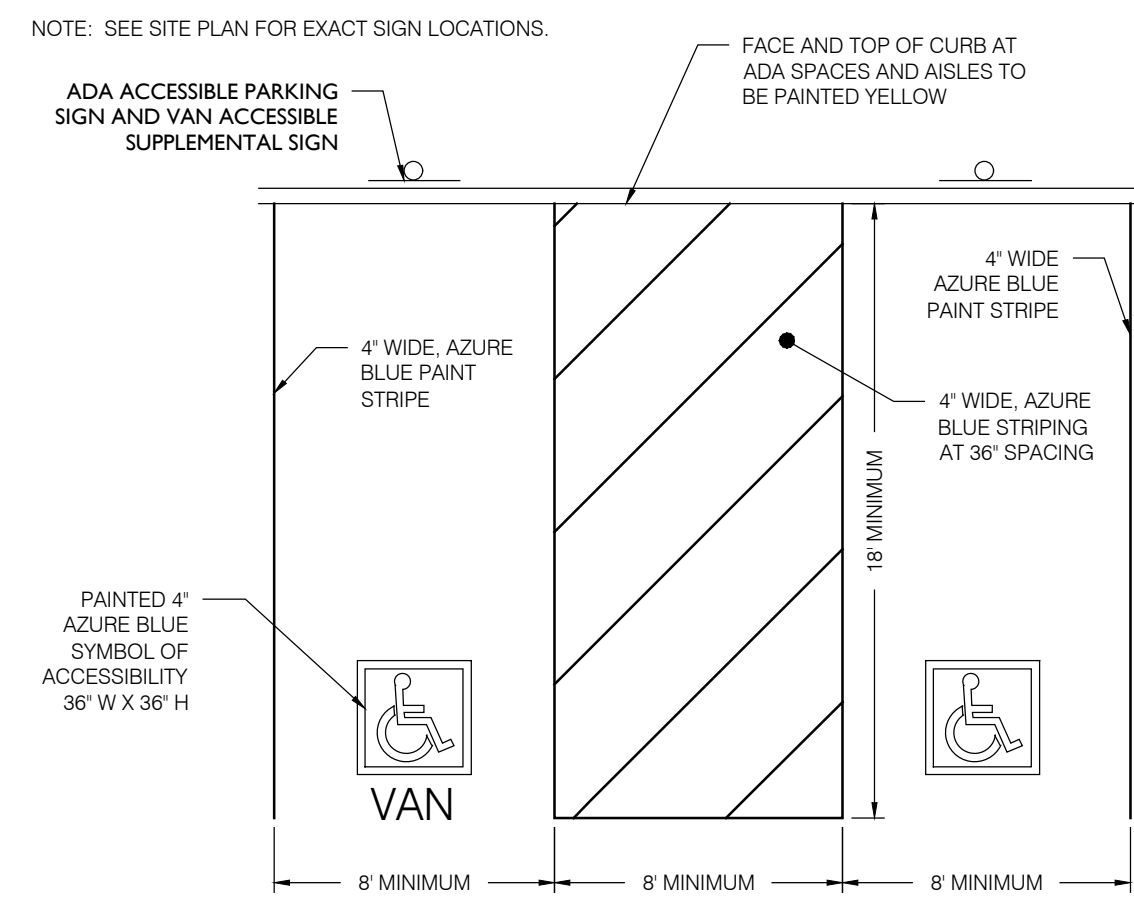
DATE	REVISION	BY
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02/01/2022	4	GAE
11/01/2021	3	GAE
08/02/2021	2	GAE
01/20/2021	1	GAE

PROJECT NO: 00-00000  
SCALE: 1" = 20'

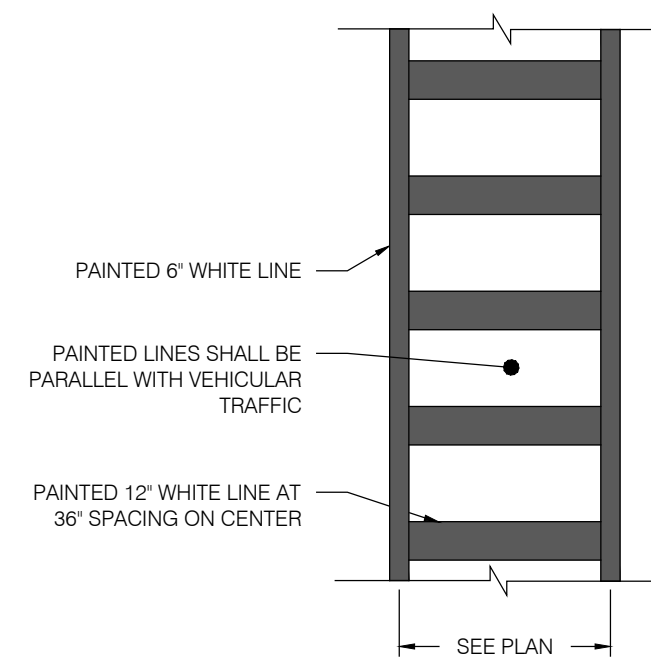
**C7.0**



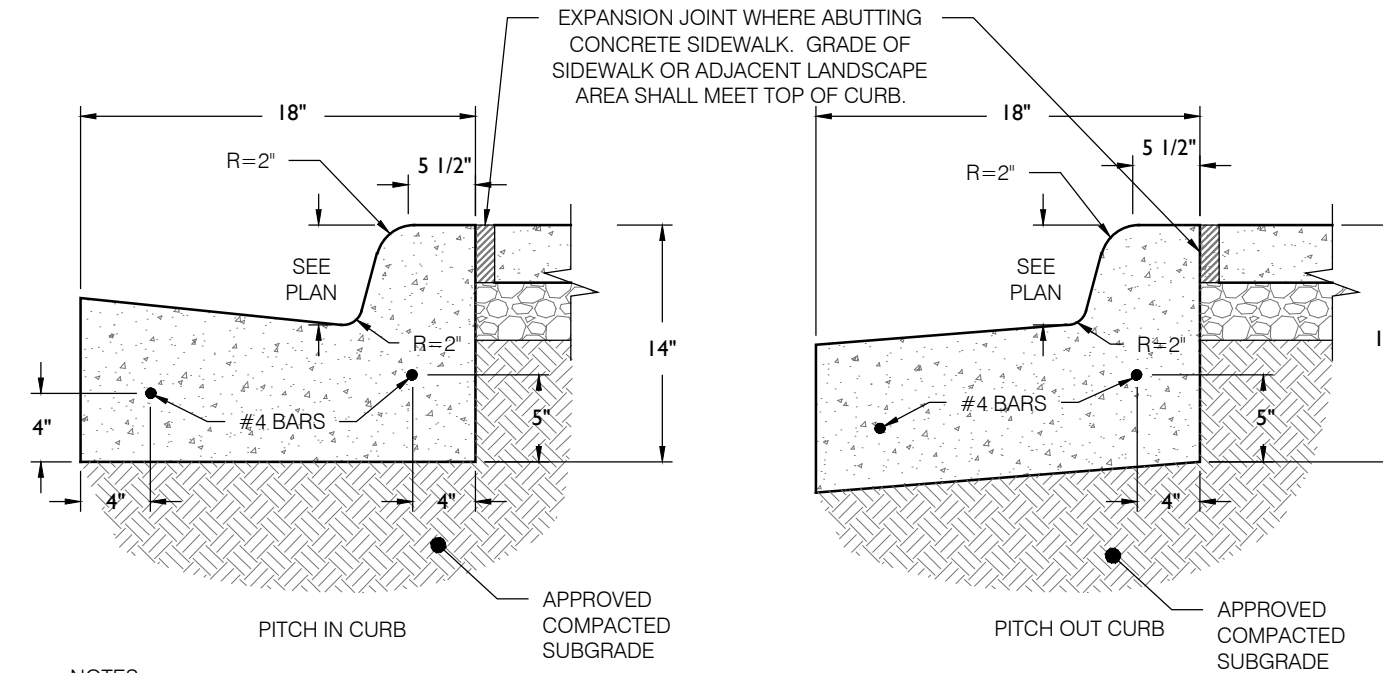
SIGN DETAILS



ACCESSIBLE PARKING STALL MARKINGS

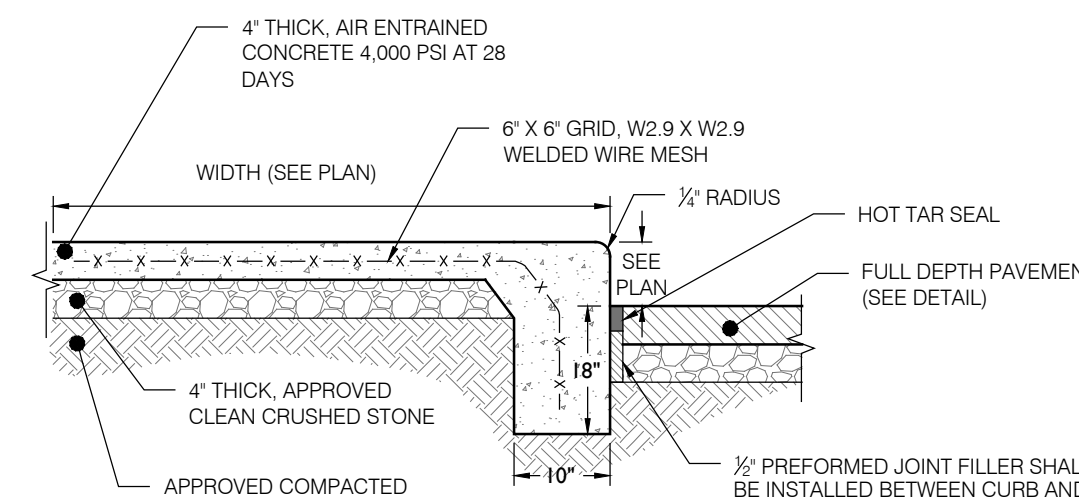


CROSSWALK DETAIL



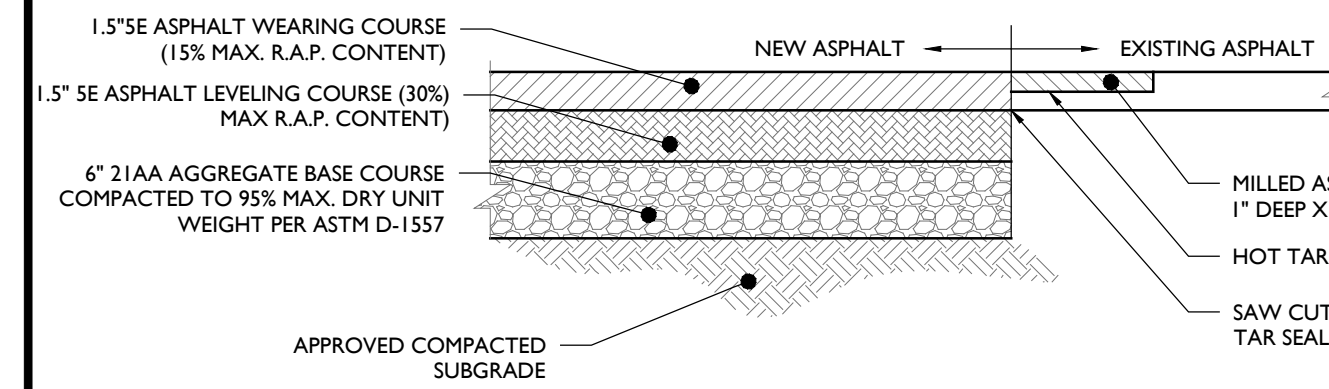
- NOTES:
1. CONCRETE SHALL BE 3500 PSI AT 28 DAYS, AIR-ENTRAINED.
  2. TRANSVERSE EXPANSION JOINTS SHALL BE PROVIDED AT 20 FOOT INTERVALS WITH PRE-MOLDED, BITUMINOUS JOINT FILLER, RECESSED 1/2\"/>

CONCRETE CURB AND GUTTER DETAIL

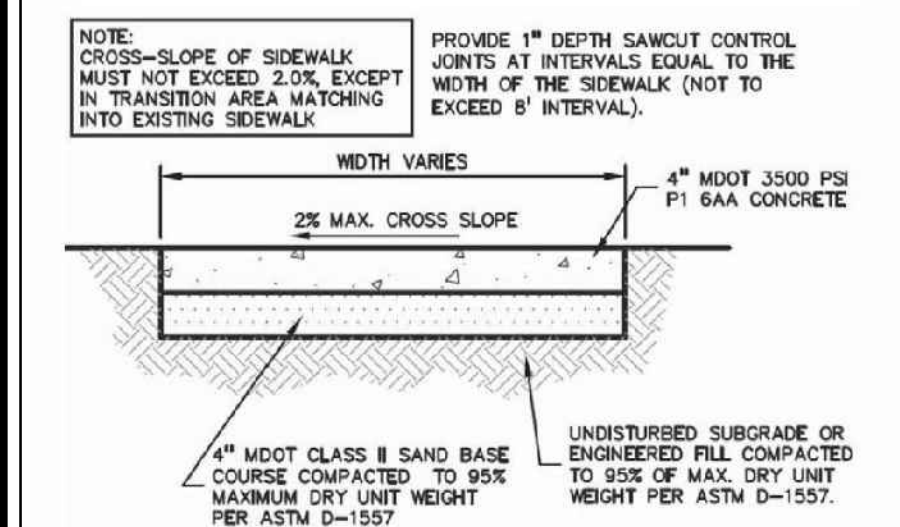


- NOTES:
1. MAXIMUM CROSS SLOPE SHALL BE 1/2\"/>

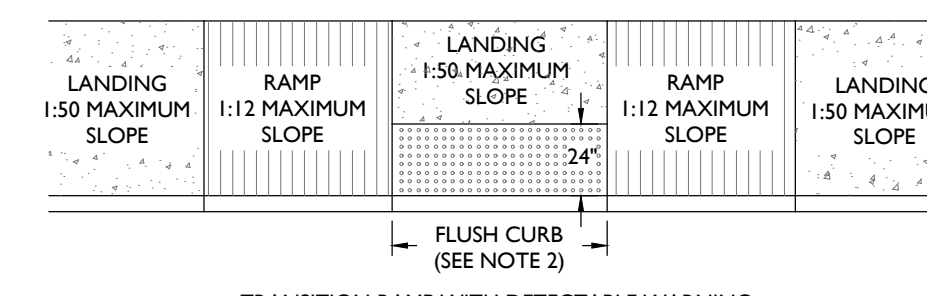
INTEGRAL CONCRETE CURB DETAIL



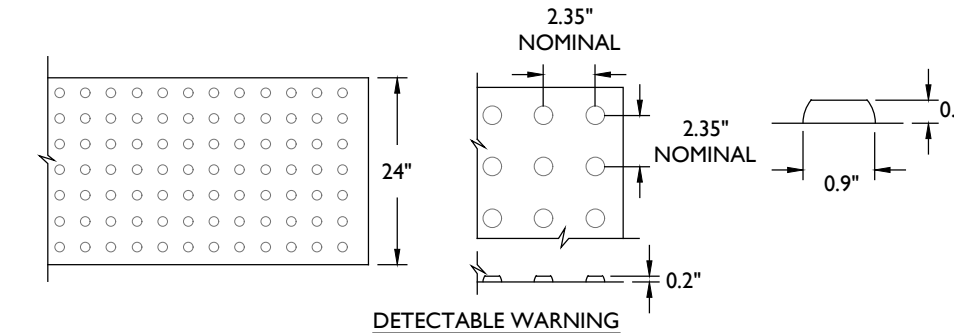
FULL DEPTH ASPHALT PAVEMENT DETAIL



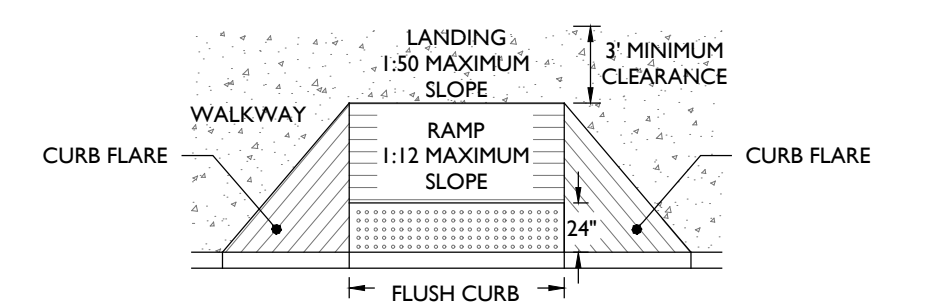
CONCRETE SIDEWALK



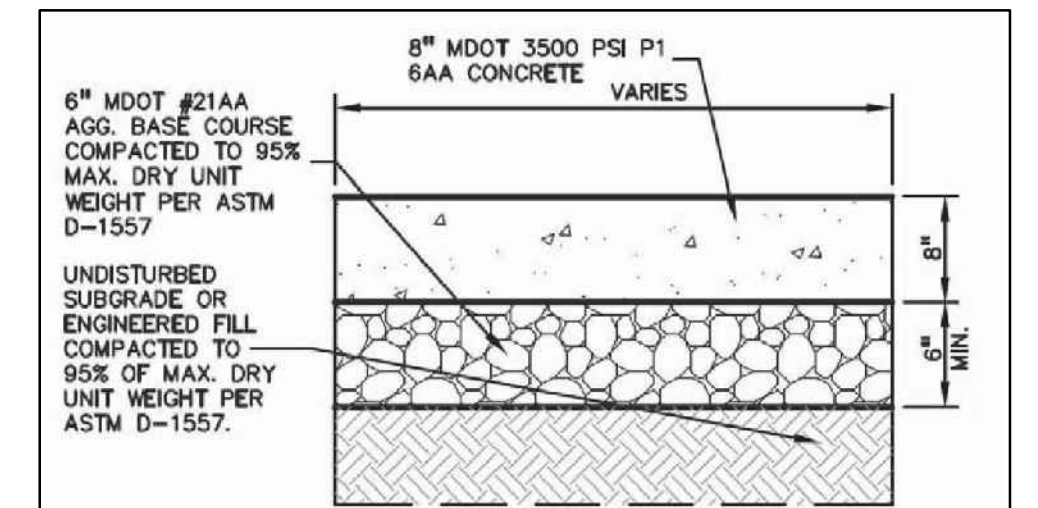
TRANSITION RAMP WITH DETECTABLE WARNING



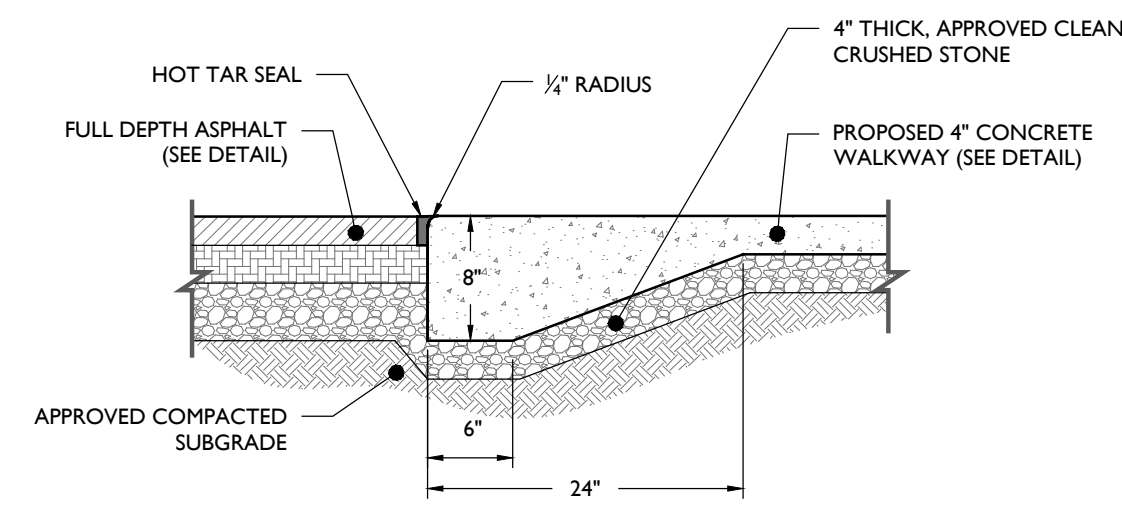
DETECTABLE WARNING



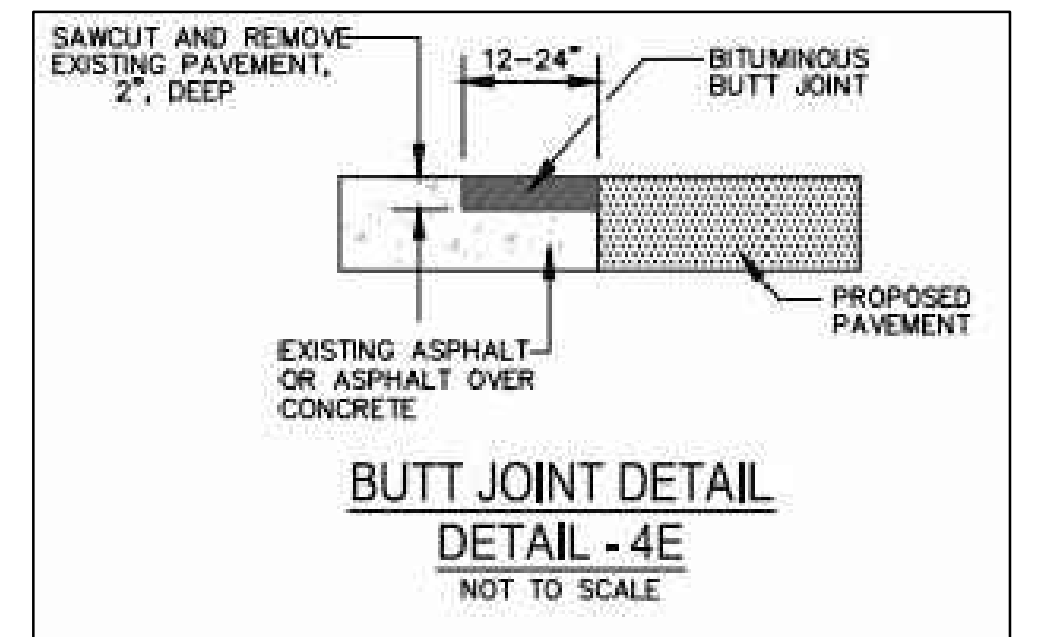
CURB RAMP DETAIL



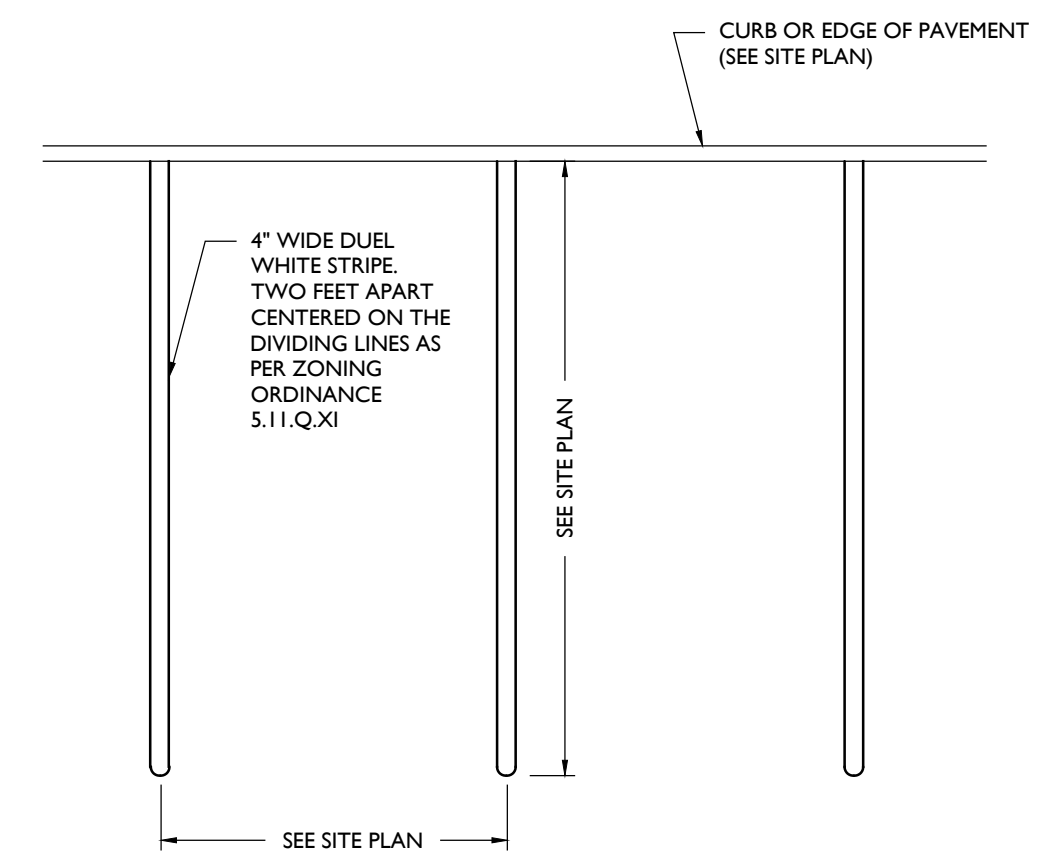
HEAVY DUTY CONCRETE DETAIL



CONCRETE PAVEMENT TO ASPHALT TRANSITION DETAIL



BUTT JOINT DETAIL - 4E



PARKING STALL MARKINGS

**WHITE LAKE TOWNSHIP NOTES**

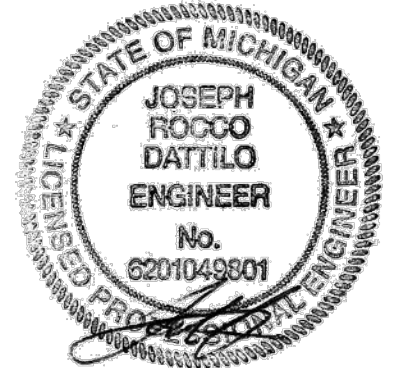
1. All construction shall be in accordance with the Township's current standards and specifications.
2. The Contractor shall notify the Township Engineer and/or the authority having jurisdiction, 48 hours prior to the beginning of construction.
3. Contractor shall contact MISS DIG at 800-482-7171, 72 hours in advance of construction, for existing underground utility locations.
4. In order to verify compliance with approved plans, full-time construction observation will generally be required during all phases of underground site construction including installation of sanitary sewer, storm sewers, drains, watermains and appurtenances as well as private street curbing and paving construction. Intermittent observations will be made for site grading, parking lot curbing and paving, retaining wall construction and other surface activity.

EXISTING DRIVE CONNECTION TO THE EAST SHALL BE BLOCKED OFF DURING CONSTRUCTION SO AS TO PREVENT VEHICLES FROM THIS SITE FROM ENTERING ONTO AND CUTTING ACROSS THE TACO BELL SITE DURING CONSTRUCTION.

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15000 E. 15th Ave., Suite 100  
Denver, CO 80232  
(303) 750-8877  
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PREPARED FOR: GREAT LAKES TACO, LLC.  
HIGHLAND (M-59) & BOGIE LAKE ROAD, WHITE LAKE  
TWP., MI. 48383

DATE	REVISION	DATE	BY	DESCRIPTION
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11/01/2021	3	GAE		SPA RESUBMISSION
08/02/2021	2	GAE		ENGINEERING SUBMISSION
00-0000	1			NOT TO SCALE



**C8.0**

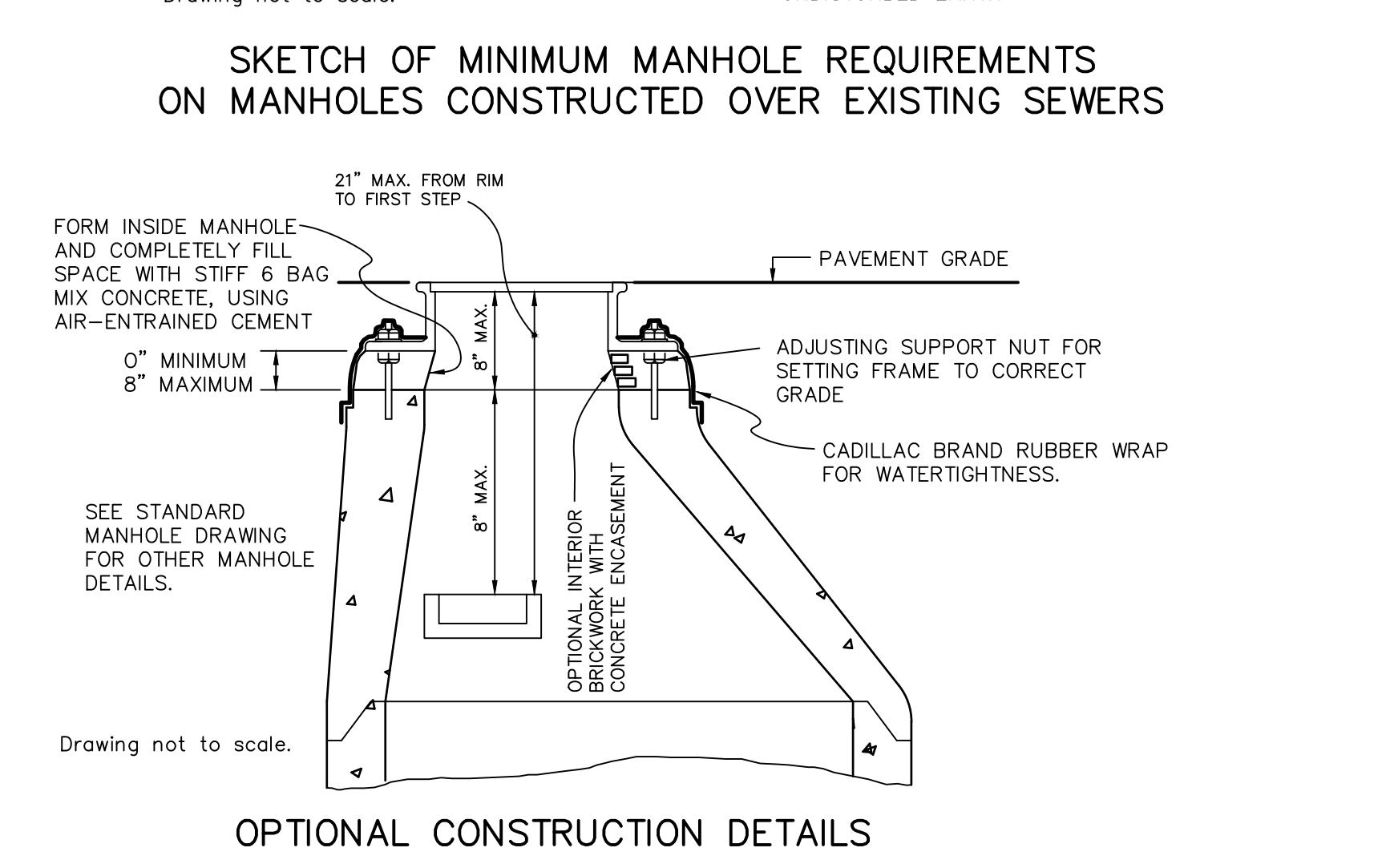
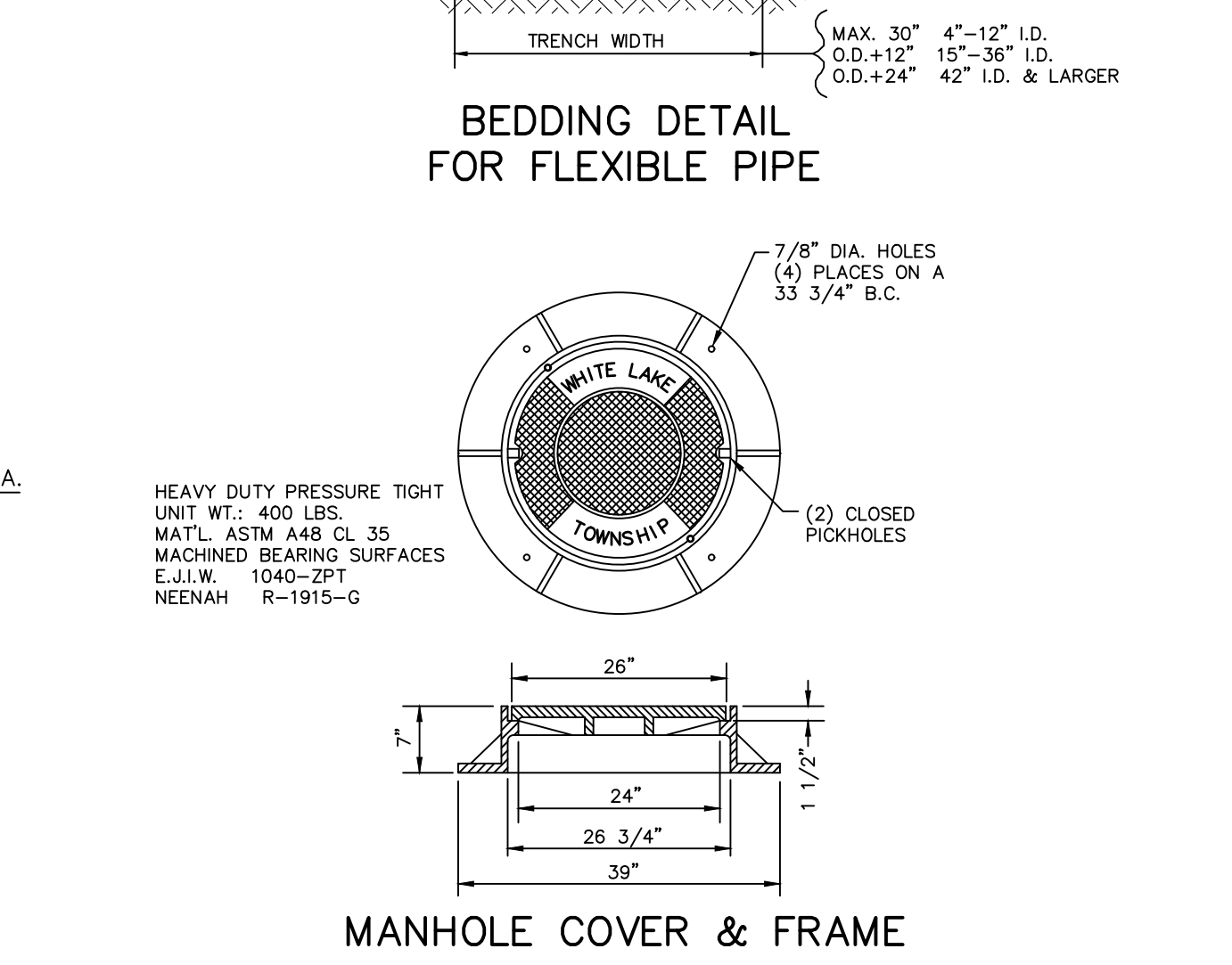
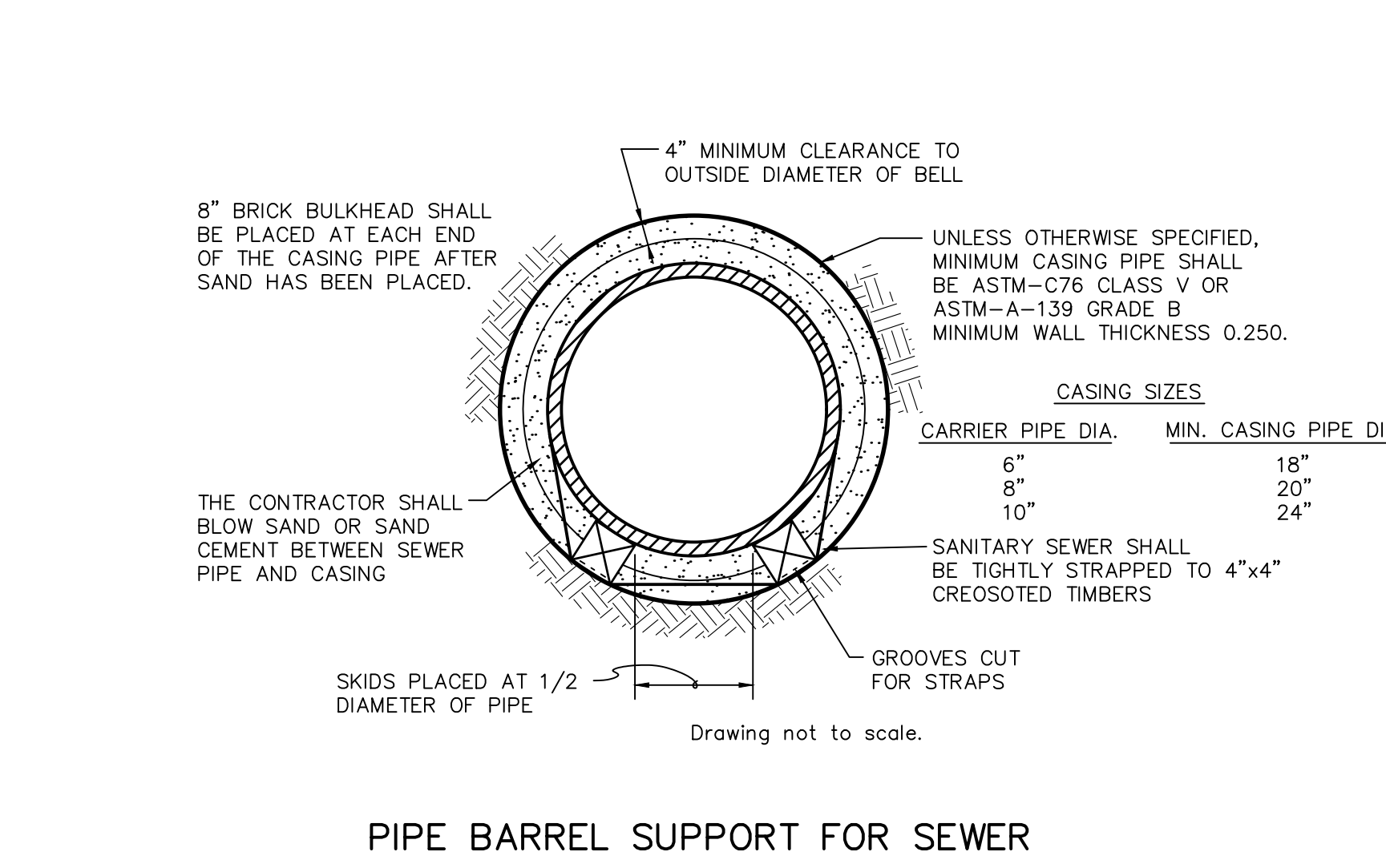
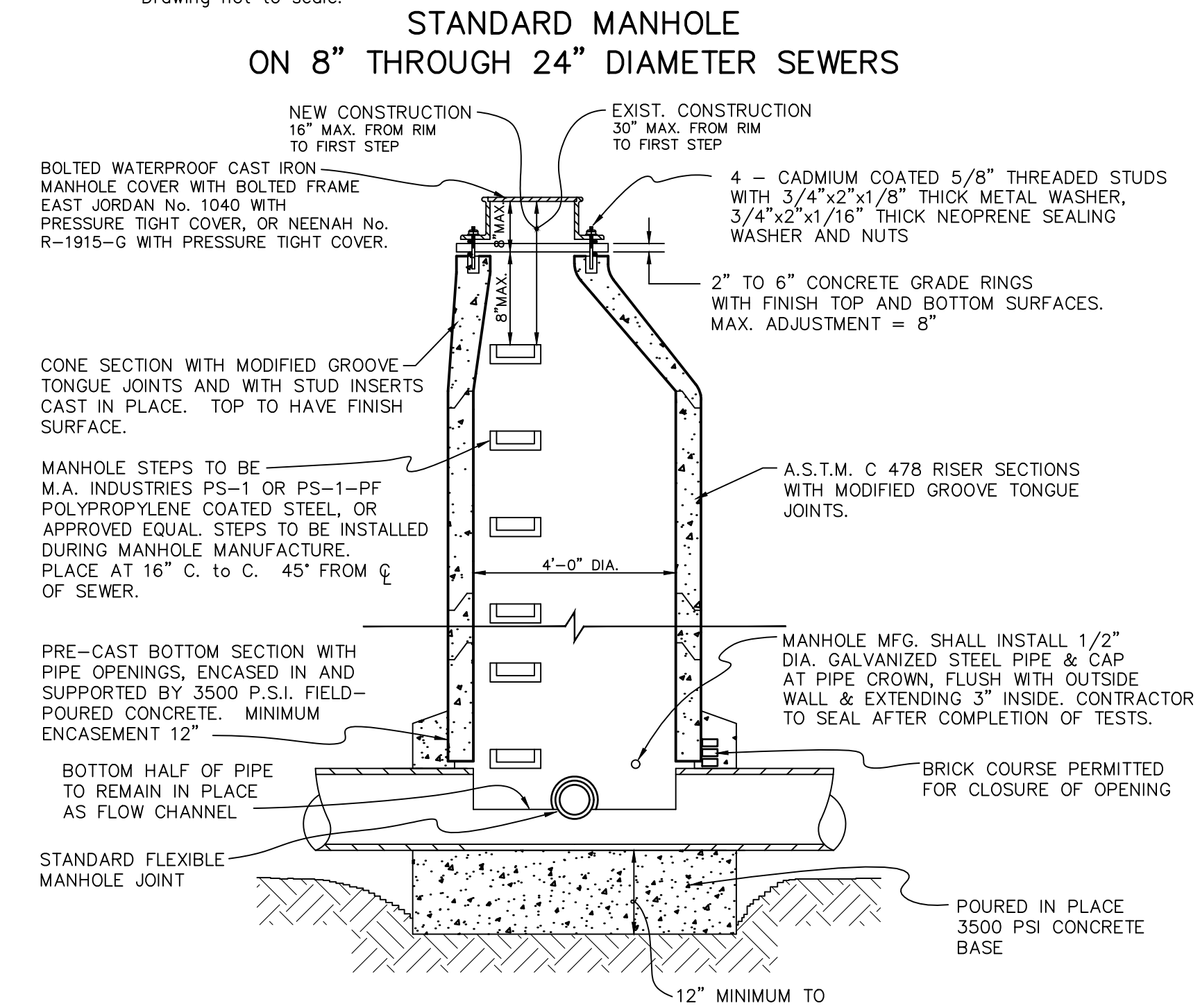
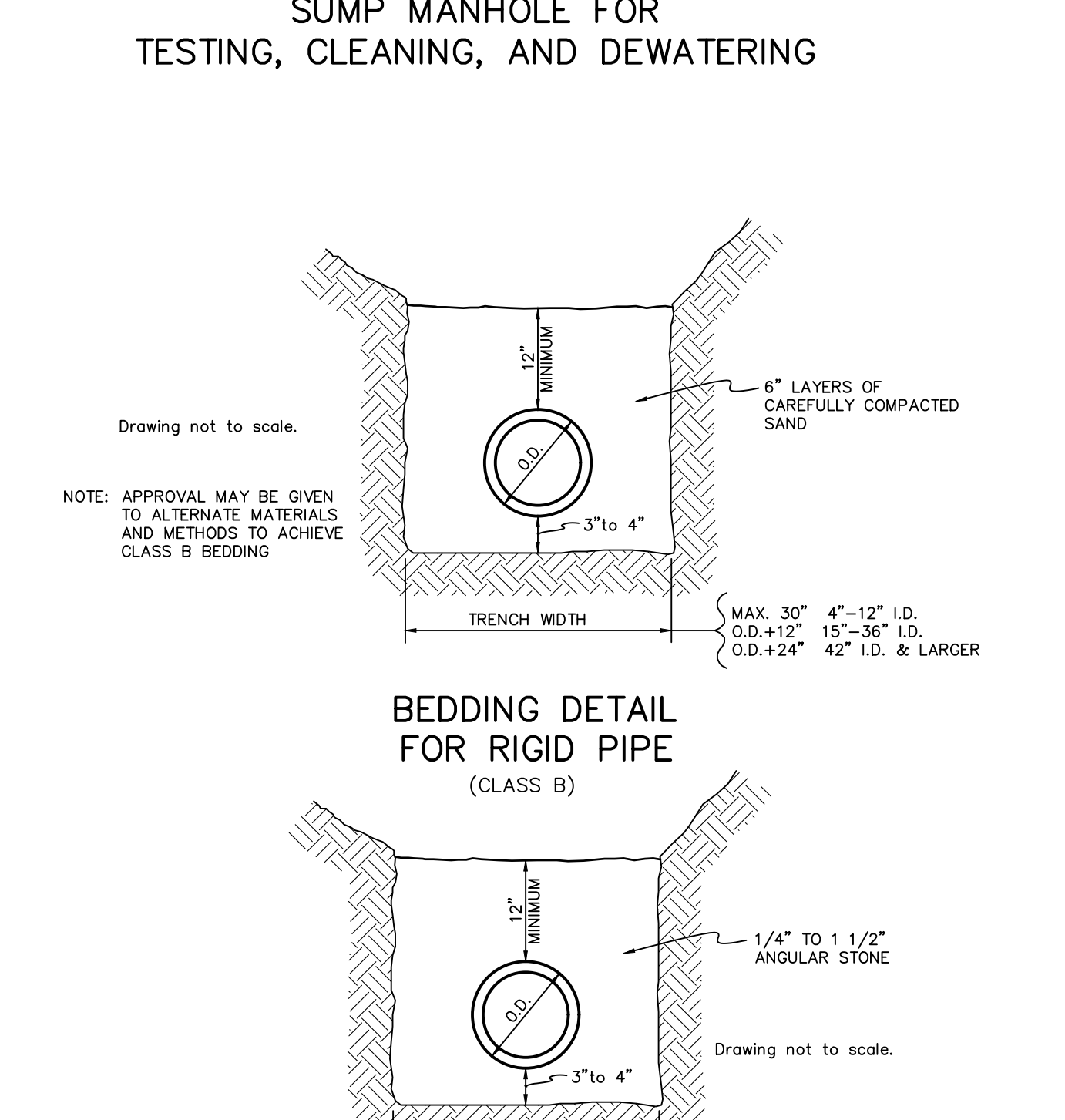
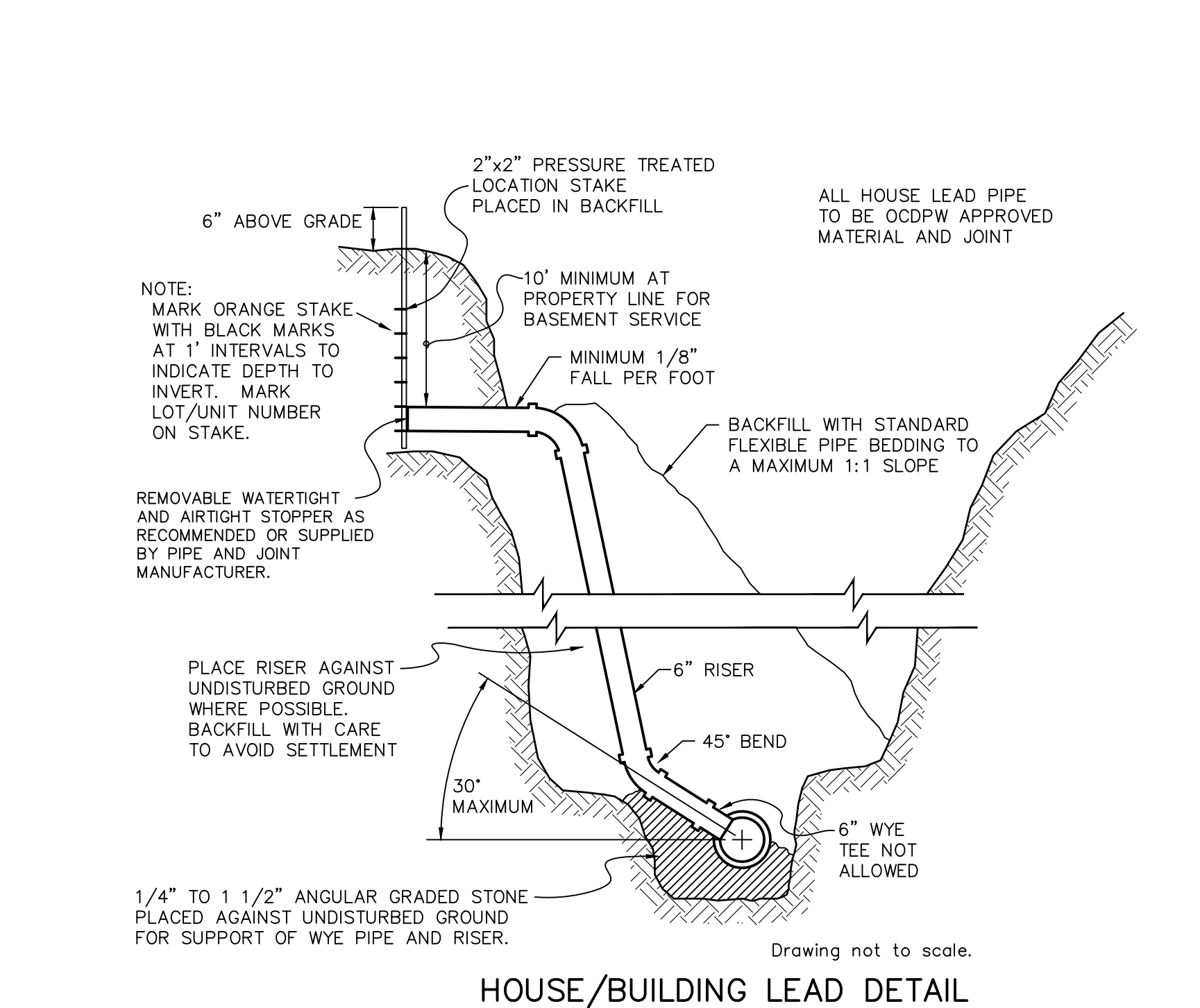
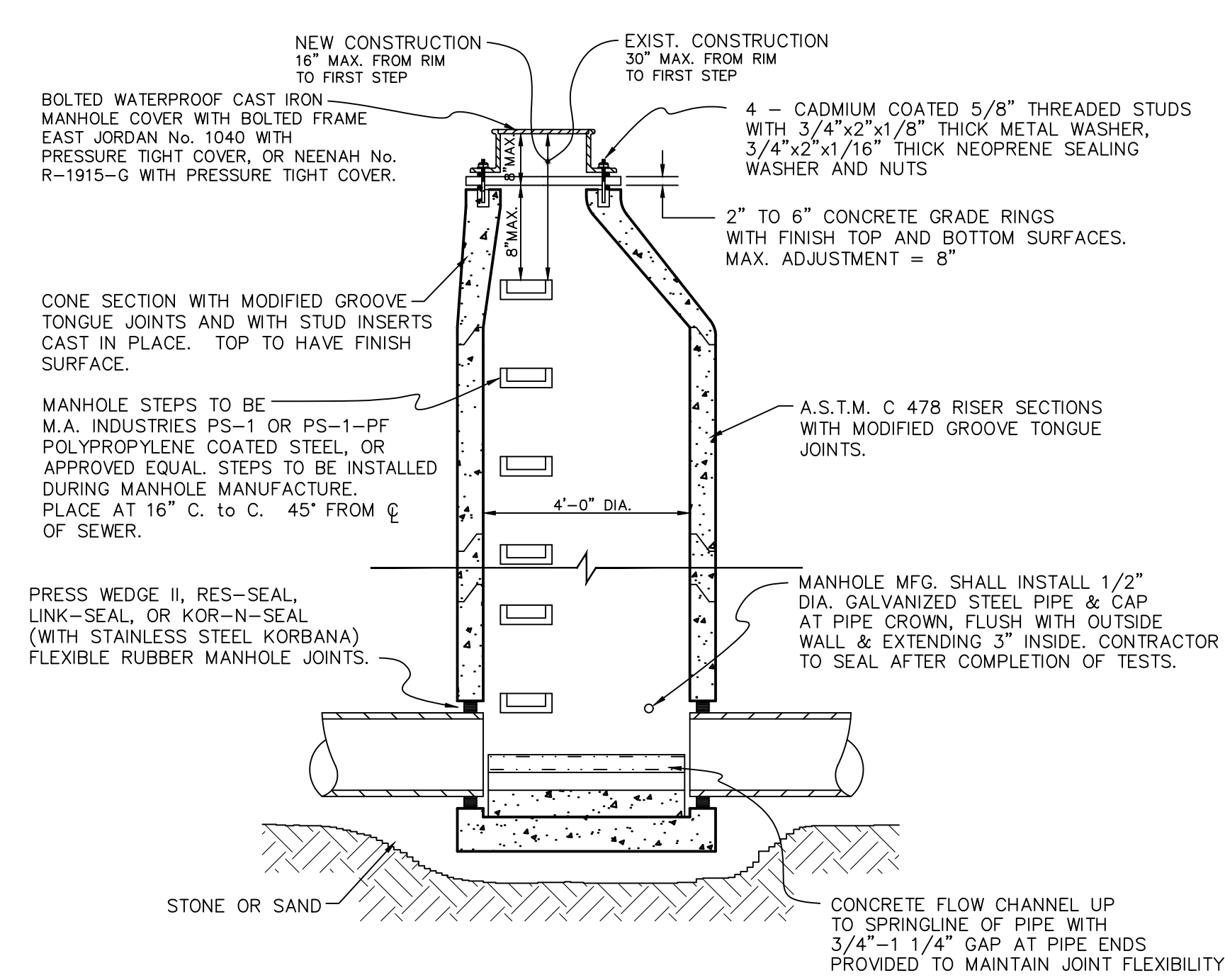
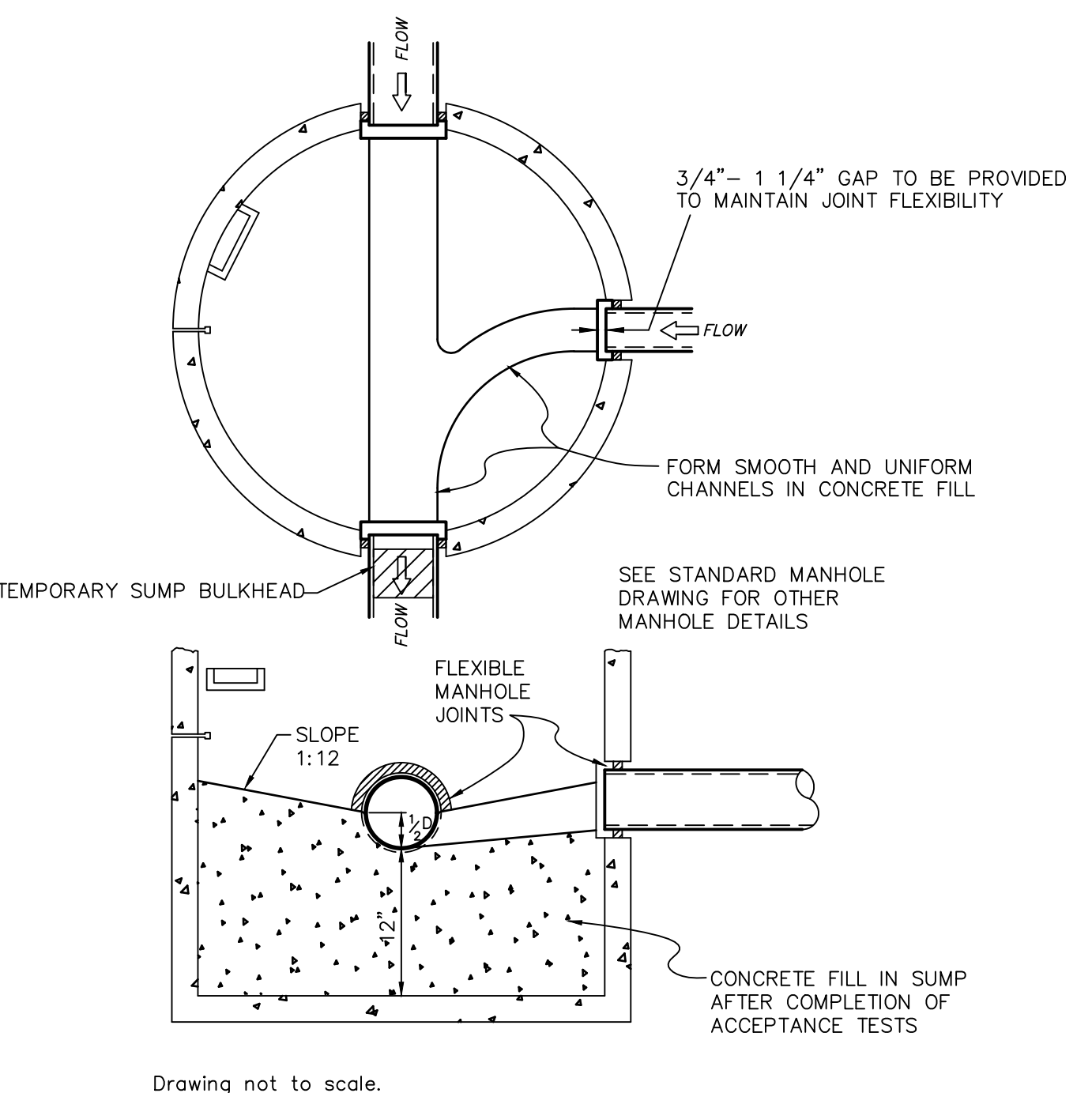
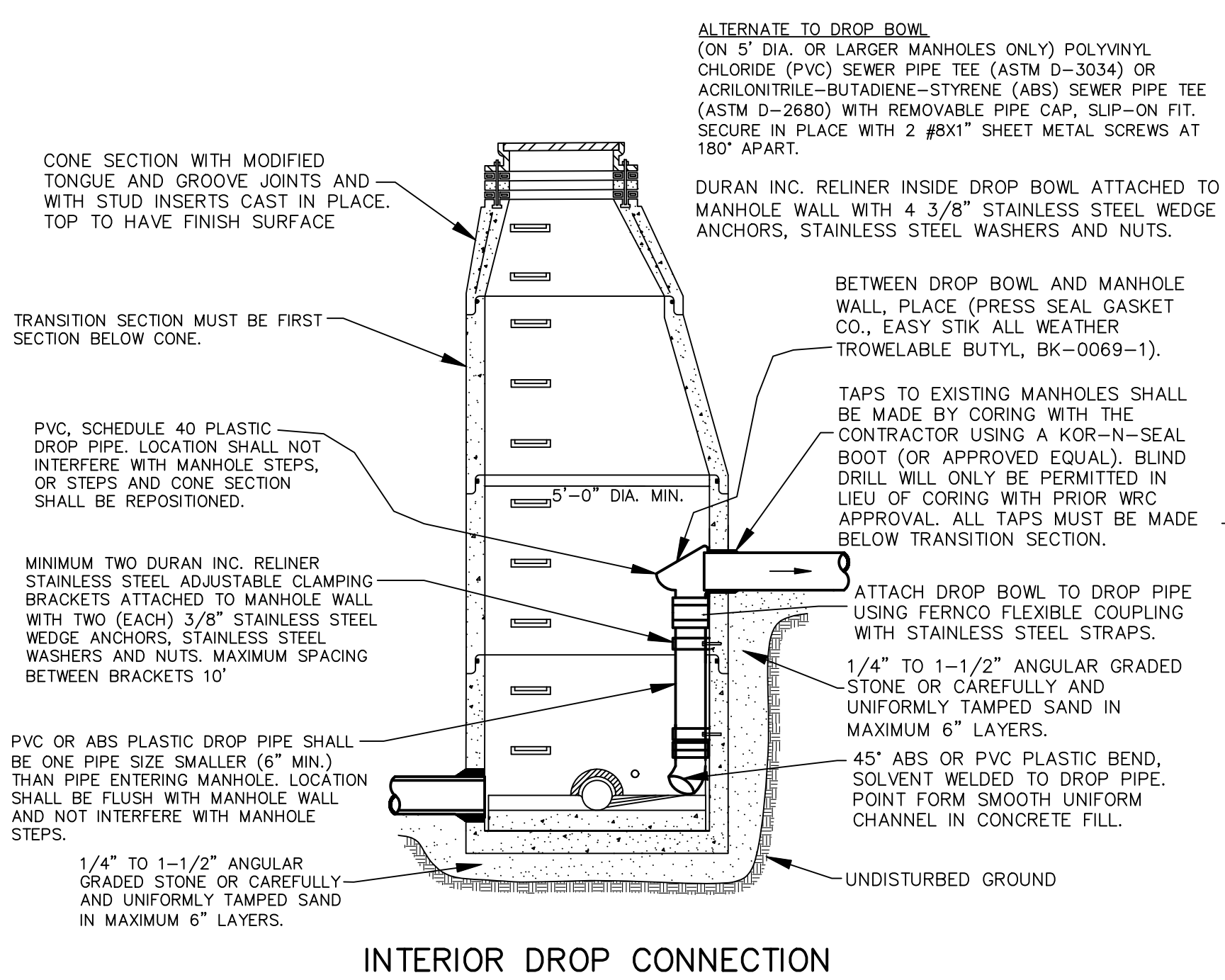
C8.0 Detail Sheet.dwg

3/1/2022

Greg Ezzo



- All construction shall conform to the current standards and specifications of the local unit of government and the Oakland County Water Resources Commissioner (OCWRC). All sanitary sewer construction shall have full time inspection supervised by a professional engineer provided by or caused to be provided by the local unit of government.
- At all connections to Oakland County Water Resources Commissioner's sewers or extensions, and before start of construction, the Contractor must obtain a Sewer Inspection Permit issued by the OCWRC. Gravity sewer permit charges are \$250.00 for each connection plus \$25.00 for each manhole constructed. Pressure sewer permit charges are \$250.00 per 2460 L.F. of force main with a minimum permit fee of \$250.00. Failure to pass any test segment will result in an additional charge to the Contractor for each retest, in accordance with the above price schedule. The Contractor shall also have posted with the OCWRC a \$5,000.00 surety bond and \$500.00 cash deposit. The Contractor shall notify the local unit of government and the OCWRC (248-858-1110) 24 hours prior to the beginning of any construction. Final acceptance tests must be witnessed by County personnel and must be scheduled by Municipality or its consultant in advance with 24 hour notice at 248-858-1110.
- No sewer installation shall have an infiltration or exfiltration exceeding 100 gallons per inch diameter per mile of pipe in a 24 hour period, and no single run of sewer between manholes shall exceed 100 gallons per inch diameter per mile. Air tests in lieu of infiltration tests shall be as specified in the OCWRC "Acceptance Tests", dated September, 1972. Only pipe and pipe joints approved by the Oakland County Water Resources Commissioner may be used for sanitary sewer construction.
- Located in the first manhole upstream from the point of all connections to an existing OCWRC sewer, or extension thereto, a temporary 12-inch deep sump shall be provided in the first manhole above the connection which will be filled in after such successful completion of any acceptance test up to the standard fill provided for the flow channel. A watertight bulkhead shall be provided on the downstream of the sump manhole.
- All building leads and risers shall be 6-inch S.D.R. 23.5 ABS OR PVC pipe with chemically fused joints, or an approved equal pipe and joint. Sewer pipe wye shall contain factory installed premium joint material of an approved type compatible with that of the building lead pipe used. Building leads to be furnished with removable air tight and water-tight stoppers.
- All rigid sewer pipe shall be installed in Class "B" bedding or better. All flexible, semi-flexible or composite sewer pipe shall be installed in conformance to the Oakland County Water Resources Commissioner specifications.
- All new manholes shall have Oakland County Water Resources Commissioner approved flexible, water-tight seals where pipes pass through walls. Manholes shall be of precast sections with modified groove tongue and rubber gasket type joints. Precast manhole cone sections shall be Oakland County Water Resources Commissioner approved modified eccentric cone type. All manholes shall be provided with bolted, water-tight covers.
- At all connections to manholes on Oakland County Water Resources Commissioner's sewers or extensions thereto drop connections will be required when the difference in invert elevations exceeds 18-inches. Outside drop connections only will be approved.
- Taps to existing manholes shall be made by coring. The Contractor shall place a KOR-N-SEAL boot (or OCWRC approved equal) after coring is completed. Blind drilling will not be permitted in lieu of coring.
- New manholes constructed directly on Oakland County Water Resources Commissioner's sewers shall be provided with covers reading "Oakland County - Sanitary" in raised letters. New manholes built over an existing sanitary sewer shall have monolithic poured bottoms.
- No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer installation.
- Prior to excavation, the Contractor shall telephone MISS DIG (647-7344) for the location of underground pipeline and cable facilities, and shall also notify representatives of other utilities located in the vicinity of the work.
- 18" minimum vertical separation and 10' minimum horizontal separation must be maintained between sanitary sewer and water main.
- Manhole frame and cover shall be as follows: East Jordan heavy manhole cover, base flange type #1040 or Neenah Foundry heavy duty #R-1642 manhole frame. Solid lid cover shall be non-rocking and marked "WHITE LAKE TOWNSHIP SEWER DEPARTMENT."



REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		FIRST ISSUE	09/11/97		OCWRC COMMENTS	11/06/15			
		UPDATED TITLE BLOCK	04/30/13						
		UPDATED NOTES	02/17/15						

**Johnson & Anderson**

4494 Elizabeth Lake Road Waterford, Michigan 48328 tel (248) 681-7800 fax (248) 681-2660

1060 W. Norton Avenue, Suite 7 Muskegon, Michigan 49441 tel (231) 780-3100 fax (231) 780-3115

2291 Water Street, Suite 6 Port Huron, Michigan 49060 tel (810) 987-7820 fax (810) 987-7895

**White Lake Township**

7525 Highland Road (M-59) White Lake, Michigan 48383 248-698-3300

**SANITARY SEWER STANDARD DETAILS**

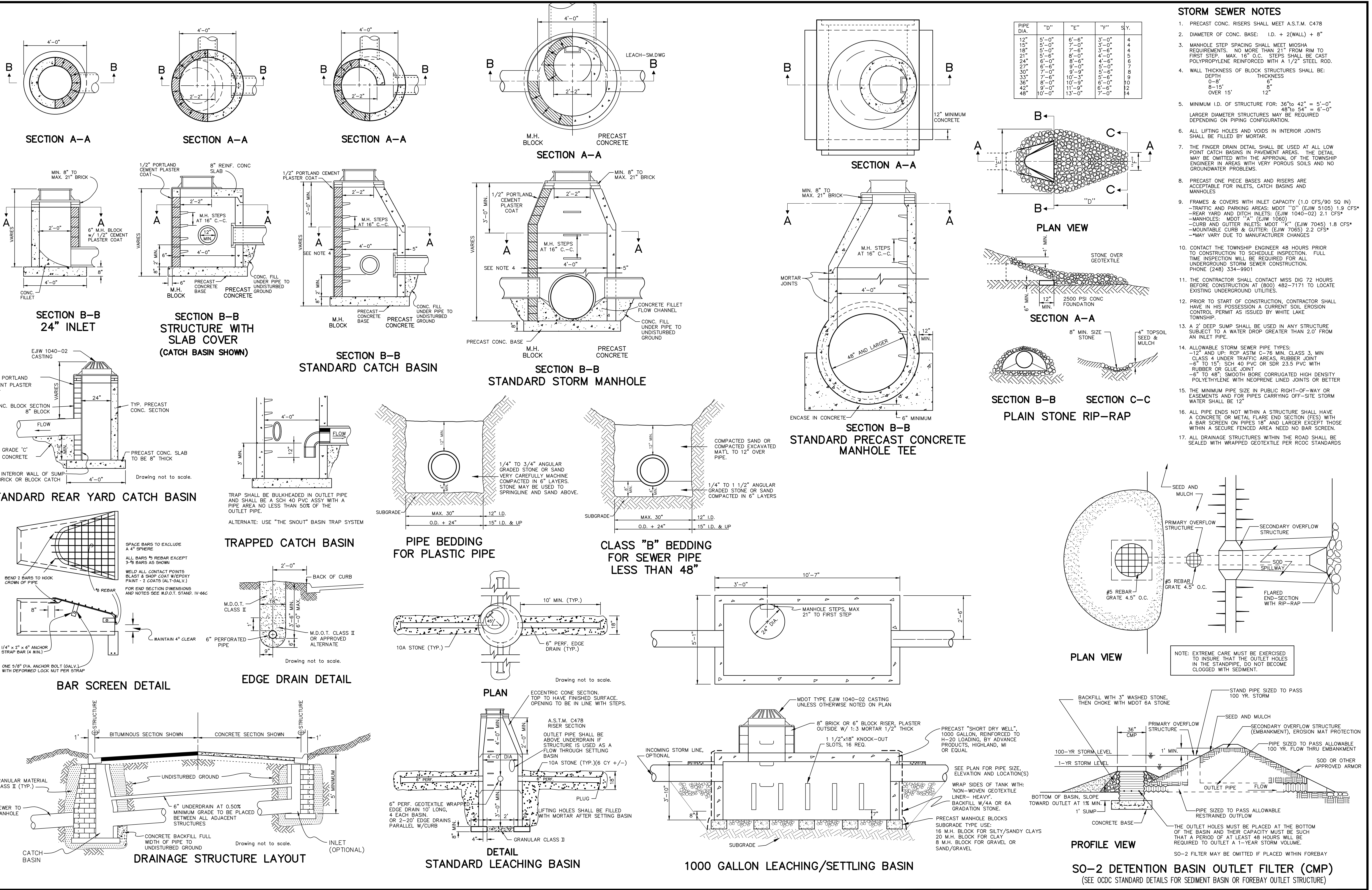
JOB NO. DATE ISSUED 09/11/97 SHEET NO.



**STORM SEWER NOTES**

1. PRECAST CONC. RISERS SHALL MEET A.S.T.M. C478
2. DIAMETER OF CONC. BASE: I.D. + 2(WALL) + 8"
3. MANHOLE STEP SPACING SHALL MEET MIOSHA REQUIREMENTS. NO MORE THAN 21" FROM RIM TO FIRST STEP. MAX. 16" O.C. STEPS SHALL BE CAST POLYPROPYLENE REINFORCED WITH A 1/2" STEEL ROD.
4. WALL THICKNESS OF BLOCK STRUCTURES SHALL BE:  
DEPTH THICKNESS  
0-8' 8"  
8-15' 8"  
OVER 15' 12"
5. MINIMUM I.D. OF STRUCTURE FOR: 36" to 42" = 5'-0"  
48" to 54" = 6'-0"  
LARGER DIAMETER STRUCTURES MAY BE REQUIRED DEPENDING ON PIPING CONFIGURATION.
6. ALL LIFTING HOLES AND VOIDS IN INTERIOR JOINTS SHALL BE FILLED BY MORTAR.
7. THE FINGER DRAIN DETAIL SHALL BE USED AT ALL LOW POINT CATCH BASINS IN PAVEMENT AREAS. THE DETAIL MAY BE OMITTED WITH THE APPROVAL OF THE TOWNSHIP ENGINEER IN AREAS WITH VERY POROUS SOILS AND NO GROUNDWATER PROBLEMS.
8. PRECAST ONE PIECE BASES AND RISERS ARE ACCEPTABLE FOR INLETS, CATCH BASINS AND MANHOLES
9. FRAMES & COVERS WITH INLET CAPACITY (1.0 CFS/90 SQ IN) -TRAFFIC AND PARKING AREAS: MDOT "D" (EJW 5105) 1.9 CFS\*  
-REAR YARD AND DITCH INLETS: (EJW 1040-02) 2.1 CFS\*  
-MANHOLES: MDOT "A" (EJW 1060)  
-CURB AND GUTTER INLETS: MDOT "K" (EJW 7045) 1.8 CFS\*  
-MOUNTABLE CURB & GUTTER: (EJW 7065) 2.2 CFS\*  
\*MAY VARY DUE TO MANUFACTURER CHANGES
10. CONTACT THE TOWNSHIP ENGINEER 48 HOURS PRIOR TO CONSTRUCTION TO SCHEDULE INSPECTION. FULL TIME INSPECTION WILL BE REQUIRED FOR ALL UNDERGROUND STORM SEWER CONSTRUCTION. PHONE: (248) 334-9901
11. THE CONTRACTOR SHALL CONTACT MISS DG 72 HOURS BEFORE CONSTRUCTION AT (800) 482-7171 TO LOCATE EXISTING UNDERGROUND UTILITIES.
12. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL HAVE IN HIS POSSESSION A CURRENT SOIL EROSION CONTROL PERMIT AS ISSUED BY WHITE LAKE TOWNSHIP.
13. A 2' DEEP SUMP SHALL BE USED IN ANY STRUCTURE SUBJECT TO A WATER DROP GREATER THAN 2.0' FROM AN INLET PIPE.
14. ALLOWABLE STORM SEWER PIPE TYPES:  
-12" AND UP: RCP ASTM C-76 MIN CLASS 3, MIN CLASS 4 UNDER TRAFFIC AREAS, RUBBER JOINT  
-6" TO 15": SCH 40 PVC OR SDR 23.5 PVC WITH RUBBER OR GLUE JOINT  
-6" TO 48": SMOOTH BORE CORRUGATED HIGH DENSITY POLYETHYLENE WITH NEOPRENE LINED JOINTS OR BETTER
15. THE MINIMUM PIPE SIZE IN PUBLIC RIGHT-OF-WAY OR EASEMENTS AND FOR PIPES CARRYING OFF-SITE STORM WATER SHALL BE 12"
16. ALL PIPE ENDS NOT WITHIN A STRUCTURE SHALL HAVE A CONCRETE OR METAL FLARE END SECTION (FES) WITH A BAR SCREEN ON PIPES 18" AND LARGER EXCEPT THOSE WITHIN A SECURE FENCED AREA NEED NO BAR SCREEN.
17. ALL DRAINAGE STRUCTURES WITHIN THE ROAD SHALL BE SEALED WITH WRAPPED GEOTEXTILE PER ROC STANDARD

PIPE DIA.	"D"	"E"	"F"	S.Y.
12"	5'-0"	6'-6"	3'-0"	4
15"	5'-0"	7'-0"	3'-6"	4
18"	5'-6"	7'-6"	3'-6"	4
21"	5'-6"	8'-0"	4'-0"	5
24"	6'-0"	8'-6"	4'-6"	6
27"	6'-6"	9'-0"	5'-0"	7
30"	7'-0"	9'-6"	5'-6"	8
33"	7'-6"	10'-3"	5'-6"	9
36"	8'-0"	10'-9"	6'-0"	10
42"	9'-0"	11'-9"	6'-6"	12
48"	10'-0"	13'-0"	7'-0"	14



DRAWN: CAD  
DESIGN: OA  
CHECKED: -

REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		FIRST ISSUE	08/16/95		REVISE	10-03-02		REVISE	06-01-07
		ADD SO-1	06-17-96		REVISE	12-17-03		UPDATED TITLE BLOCK	04/30/13
		NEW BAR GRATE	11-03-97		SEC REFERENCE	05-17-05			

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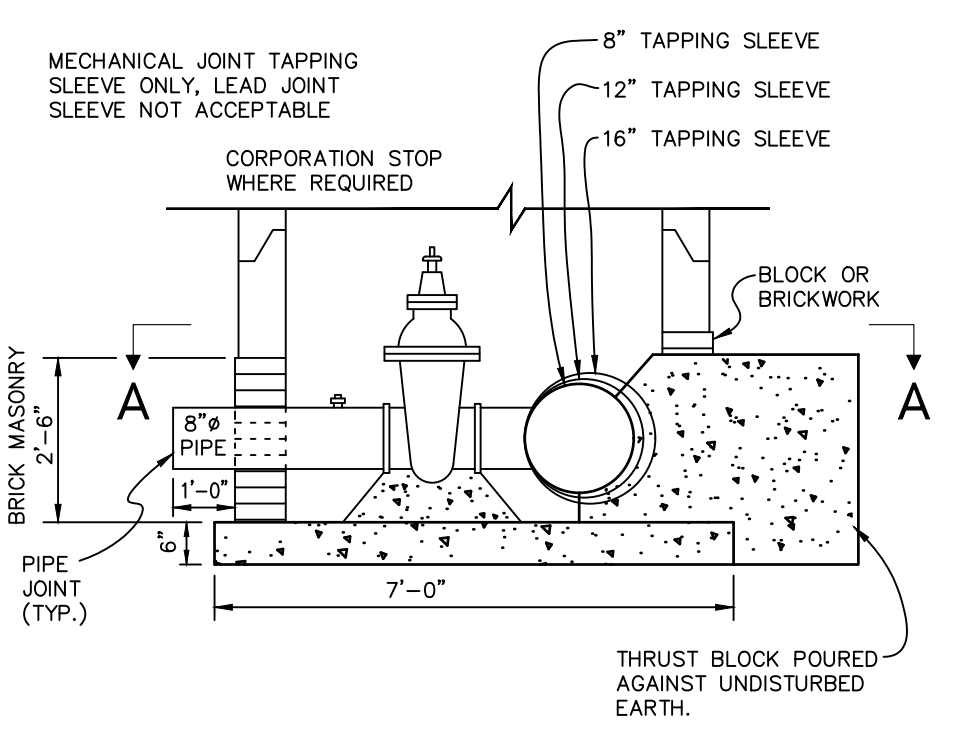
White Lake Township  
 7525 Highland Road (M-59)  
 White Lake, Michigan 48383  
 248-698-3300

**STORM SEWER STANDARD DETAILS**

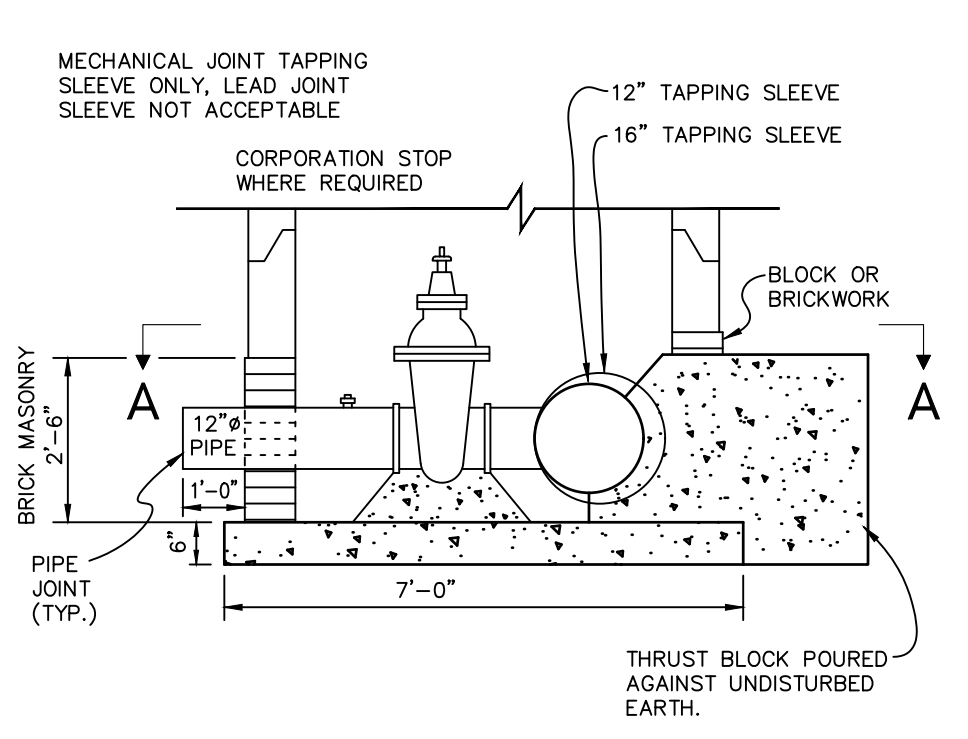
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 SHEET NO. \_\_\_\_\_

VERT. -  
SCALE: \_\_\_\_\_  
HORZ. AS NOTED

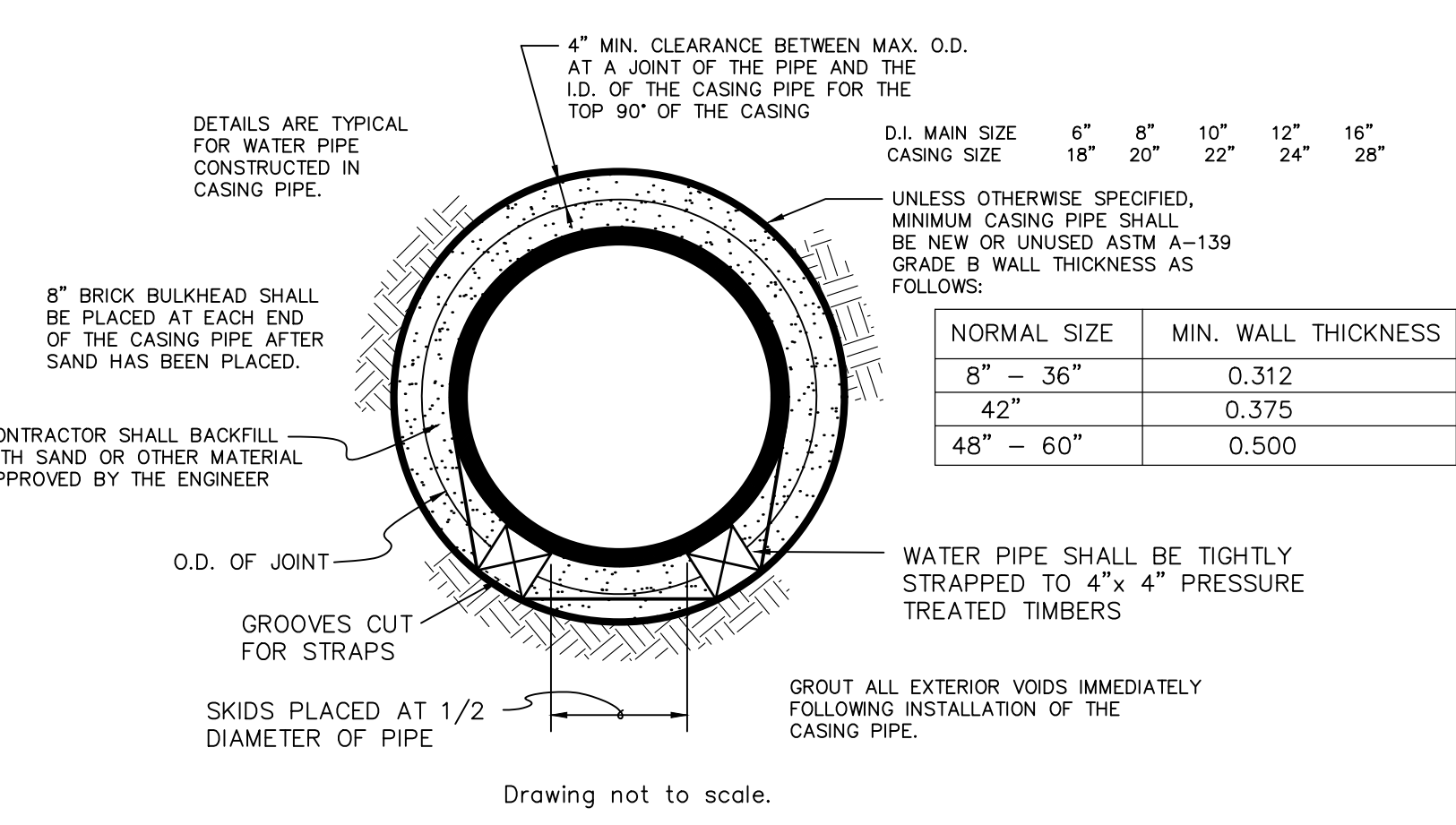




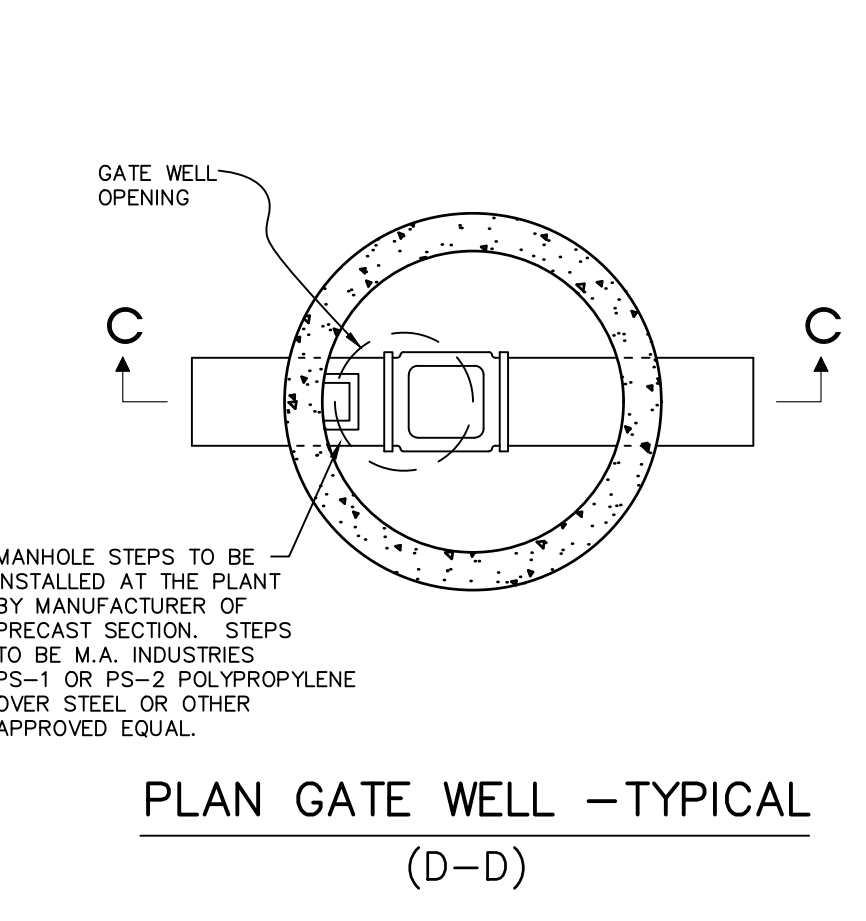
16" X 8", 12" X 8", 8" X 8" TAPPING SLEEVE, VALVE & WELL (B-B)



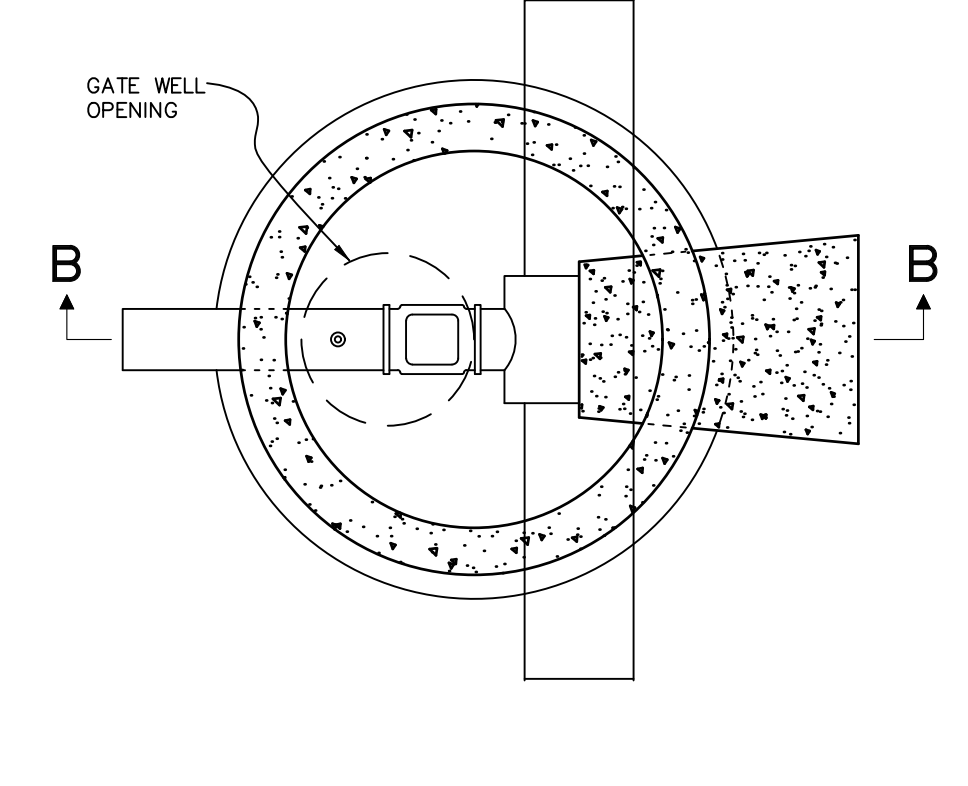
16" X 12", 12" X 12" TAPPING SLEEVE, VALVE & WELL (B-B)



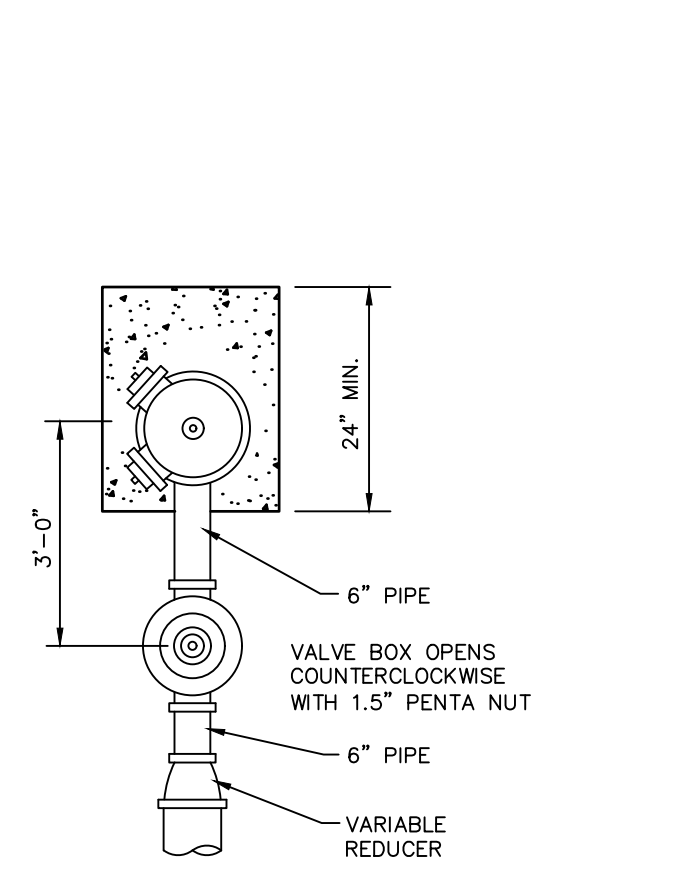
PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING



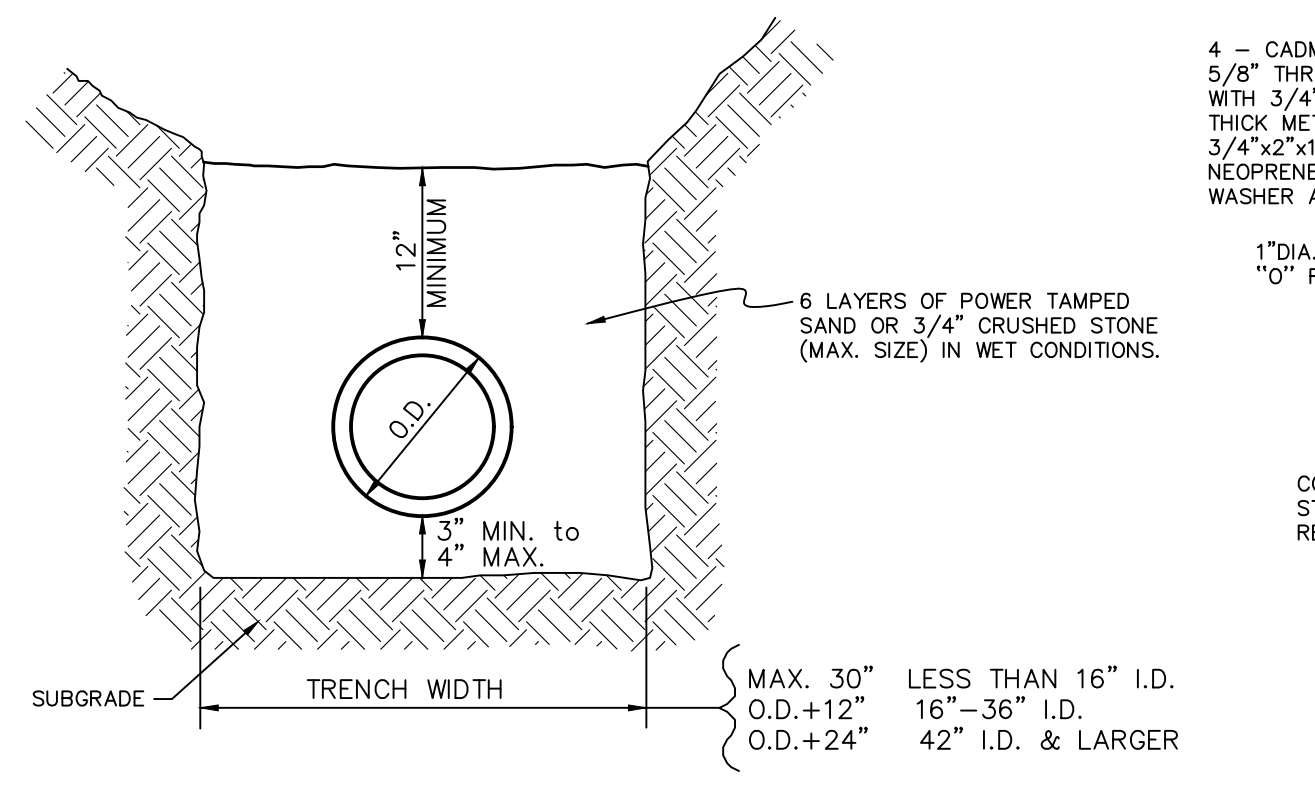
PLAN GATE WELL - TYPICAL (D-D)



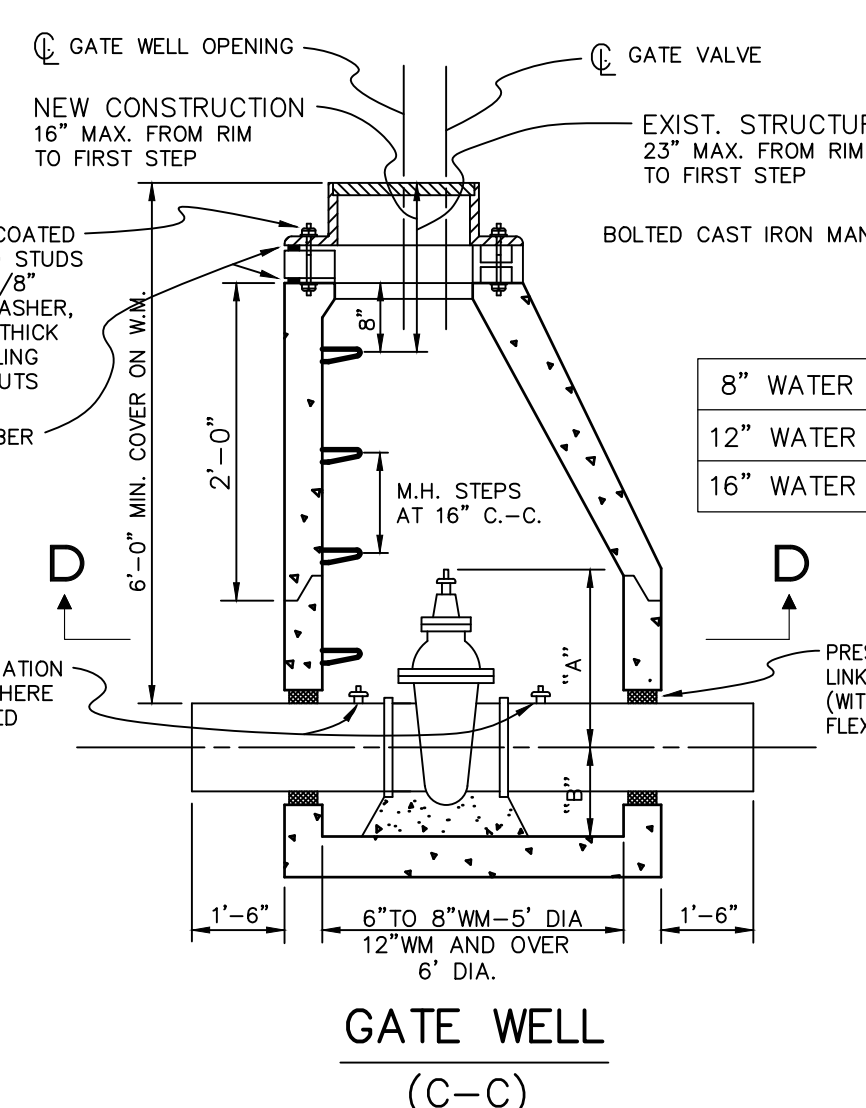
PLAN TAPPING SLEEVE, VALVE & WELL - TYPICAL (A-A)



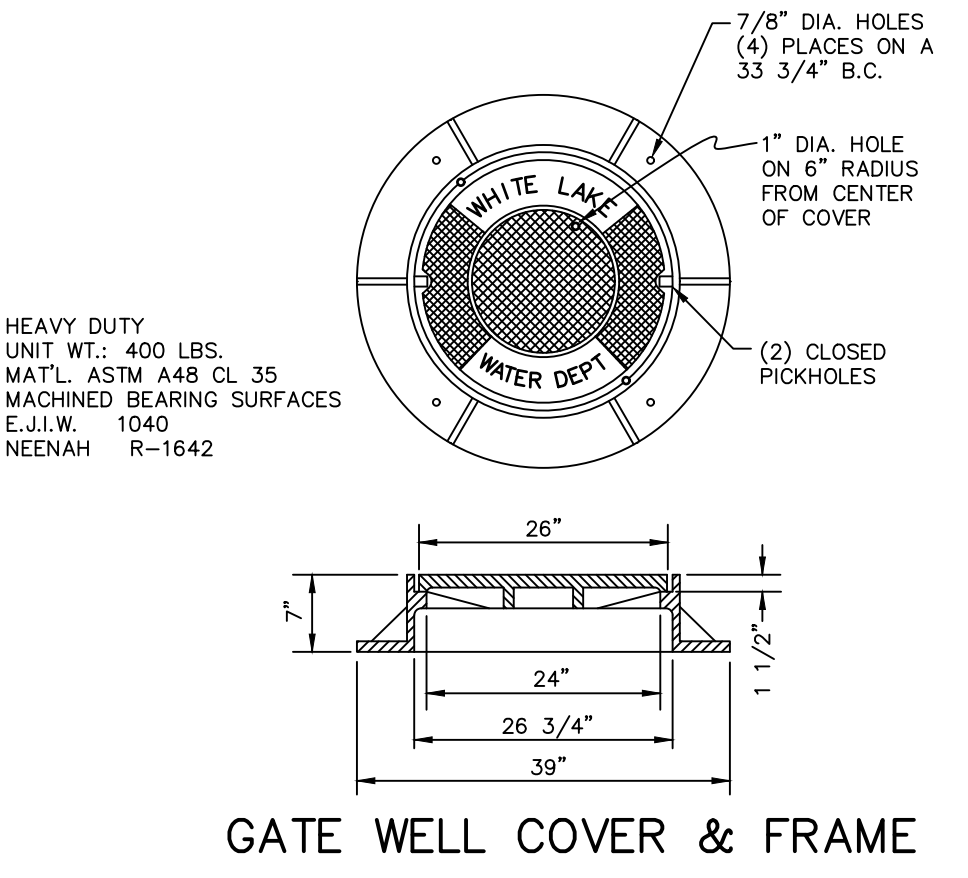
STANDARD BEDDING FOR WATER PIPE



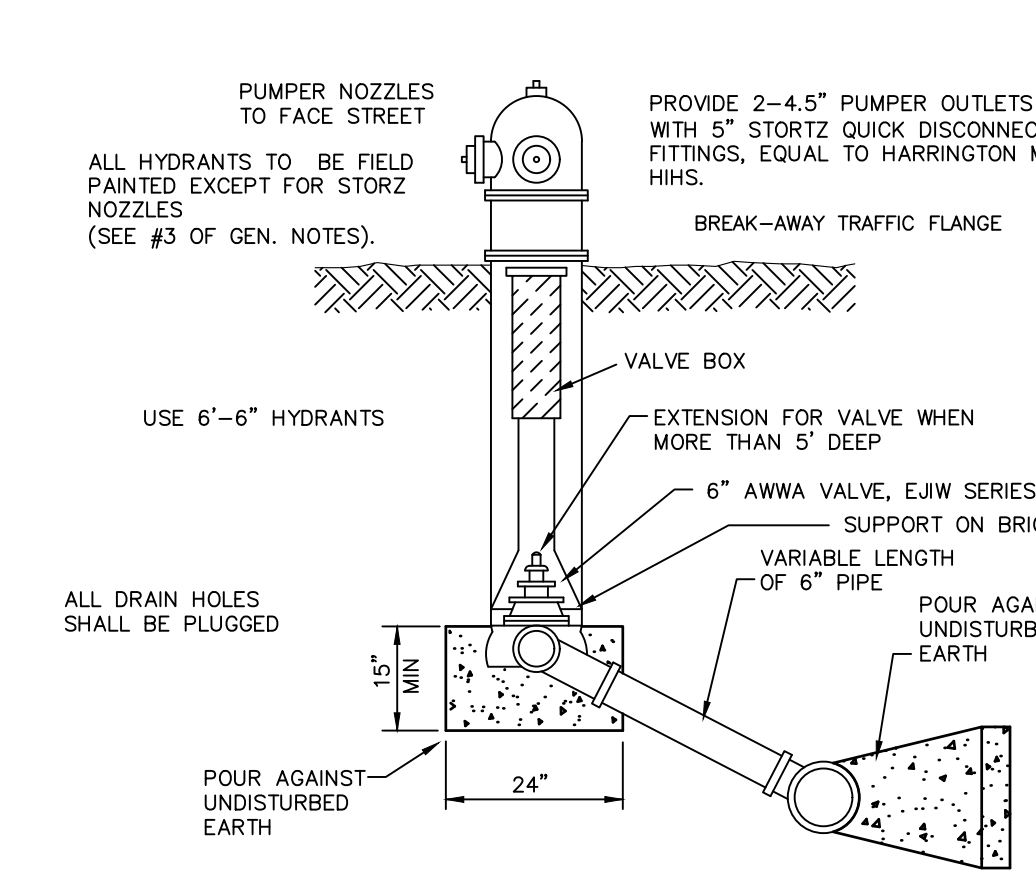
BACKFILL IN THE AREA OF STREETS, ALLEYS, SIDEWALKS, DRIVES & PARKING AREAS



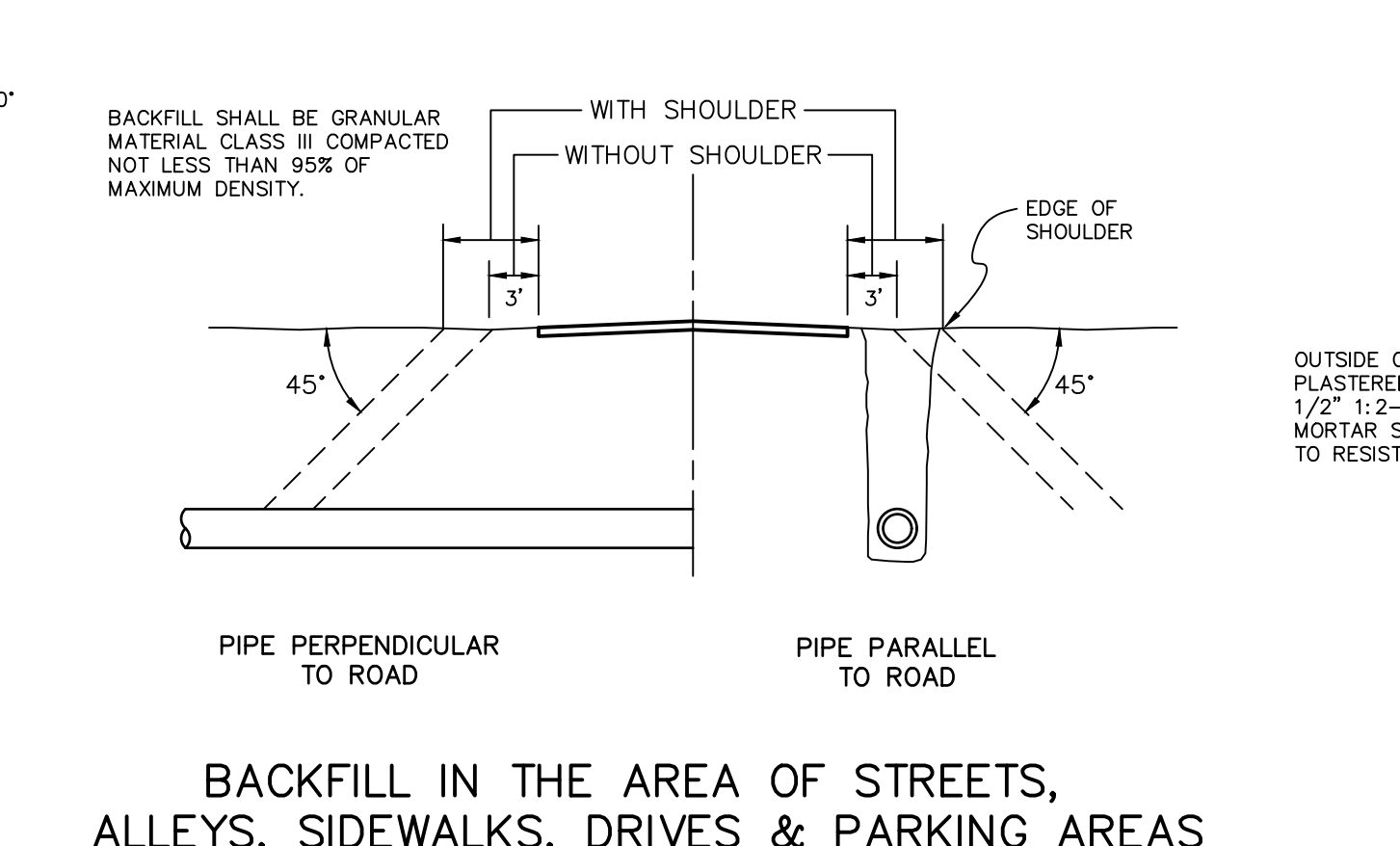
GATE WELL (C-C)



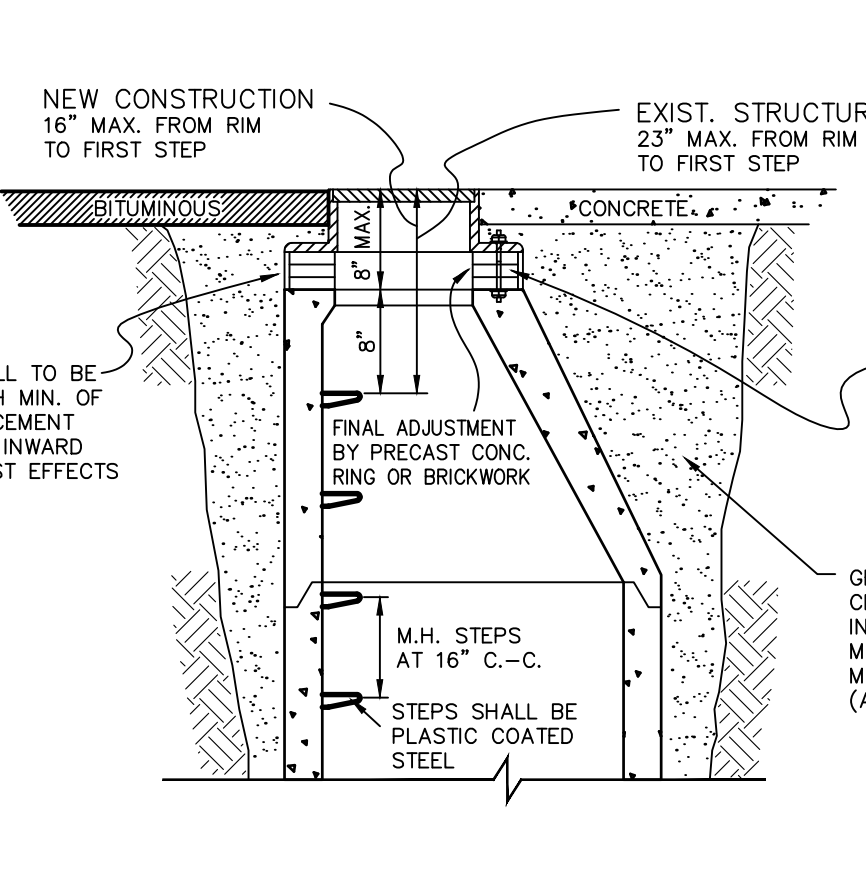
GATE WELL COVER & FRAME



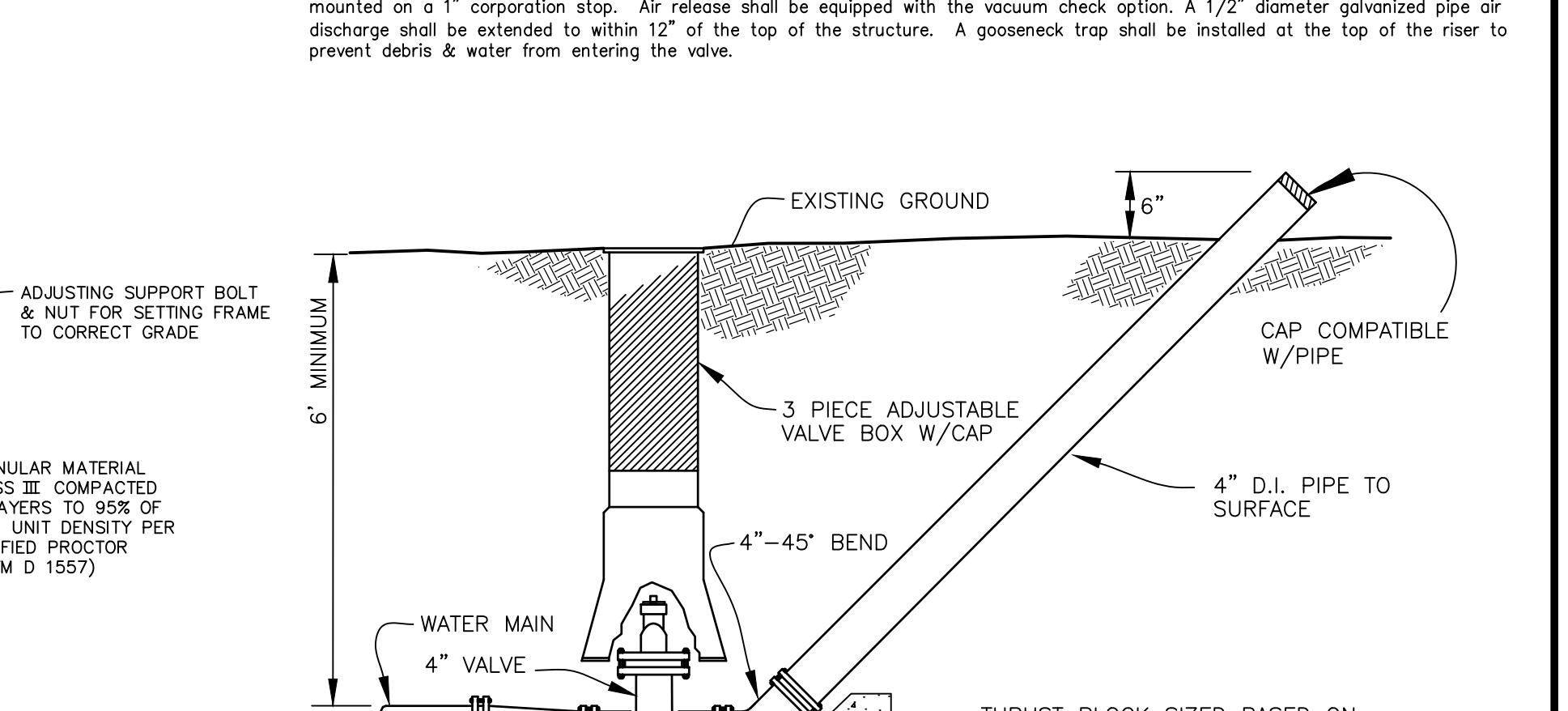
DETAIL OF HYDRANT SETTINGS



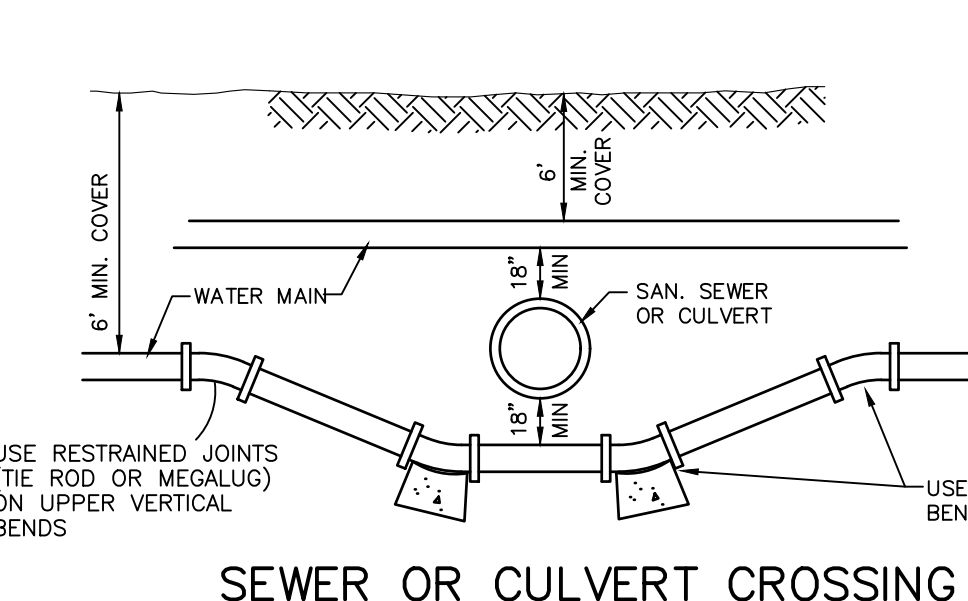
THRUST BLOCK DETAILS



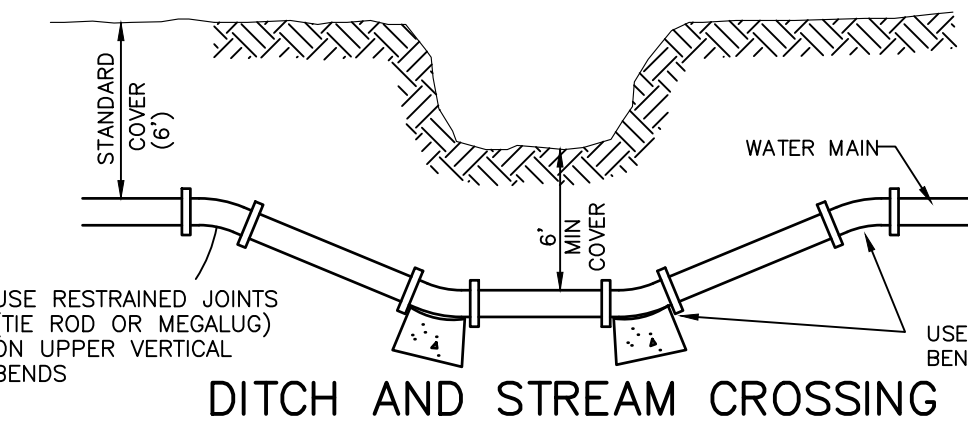
GATE WELL TOPS WITHIN PAVEMENT AREAS



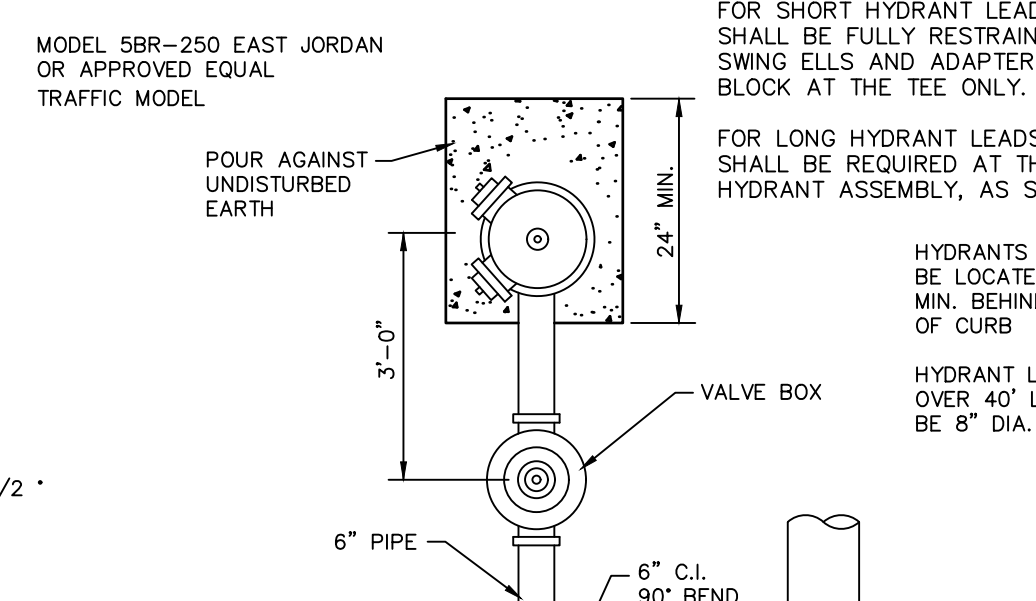
TEMPORARY BLOWOFF ASS'Y



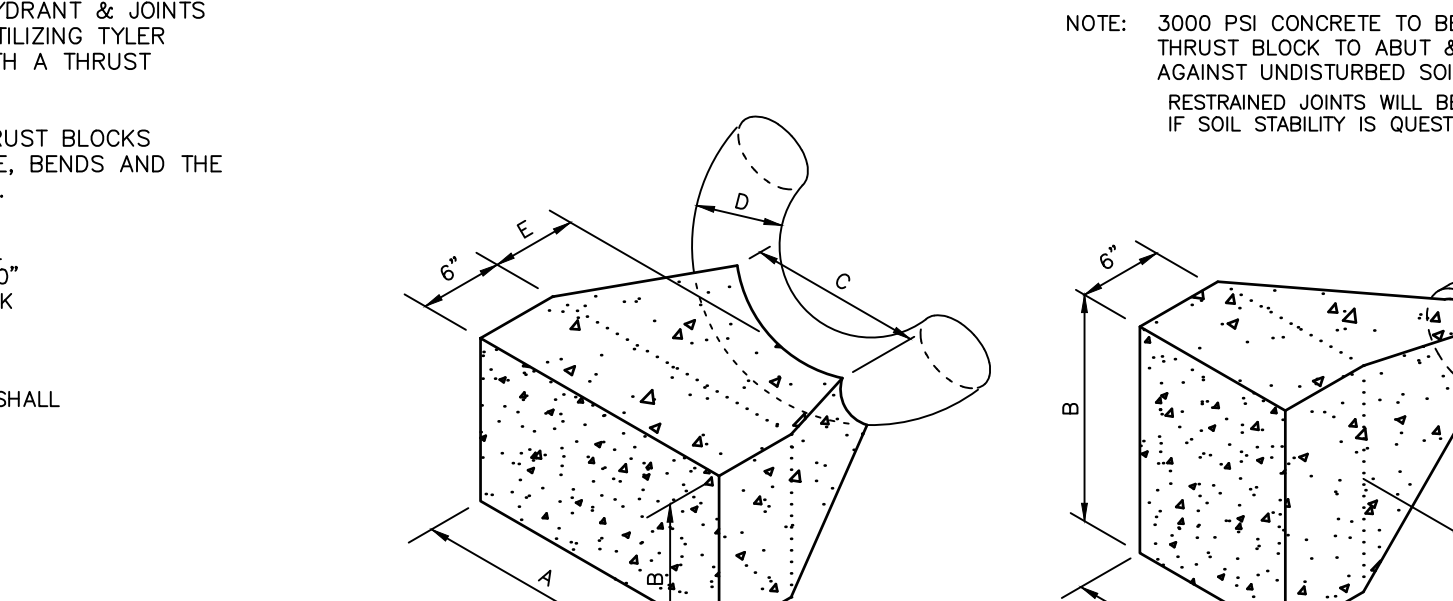
SEWER OR CULVERT CROSSING



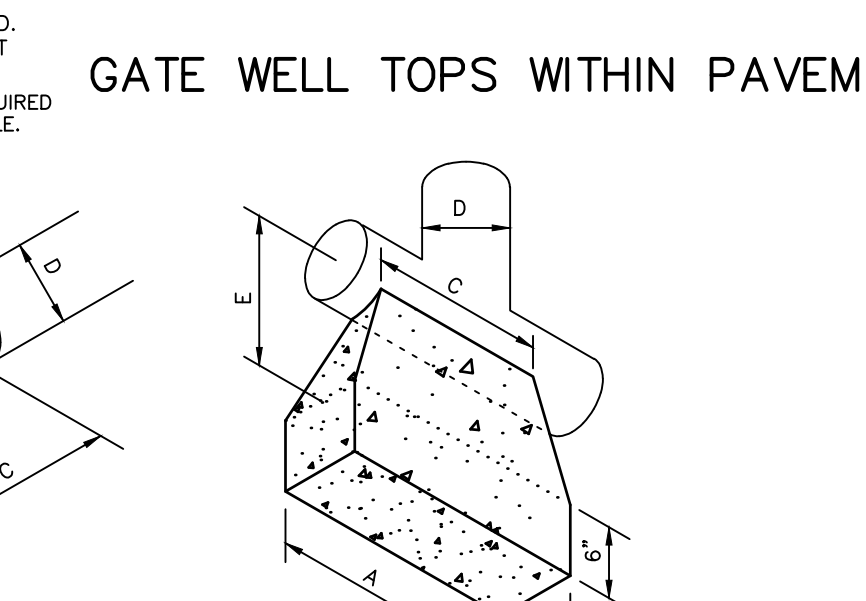
DITCH AND STREAM CROSSING



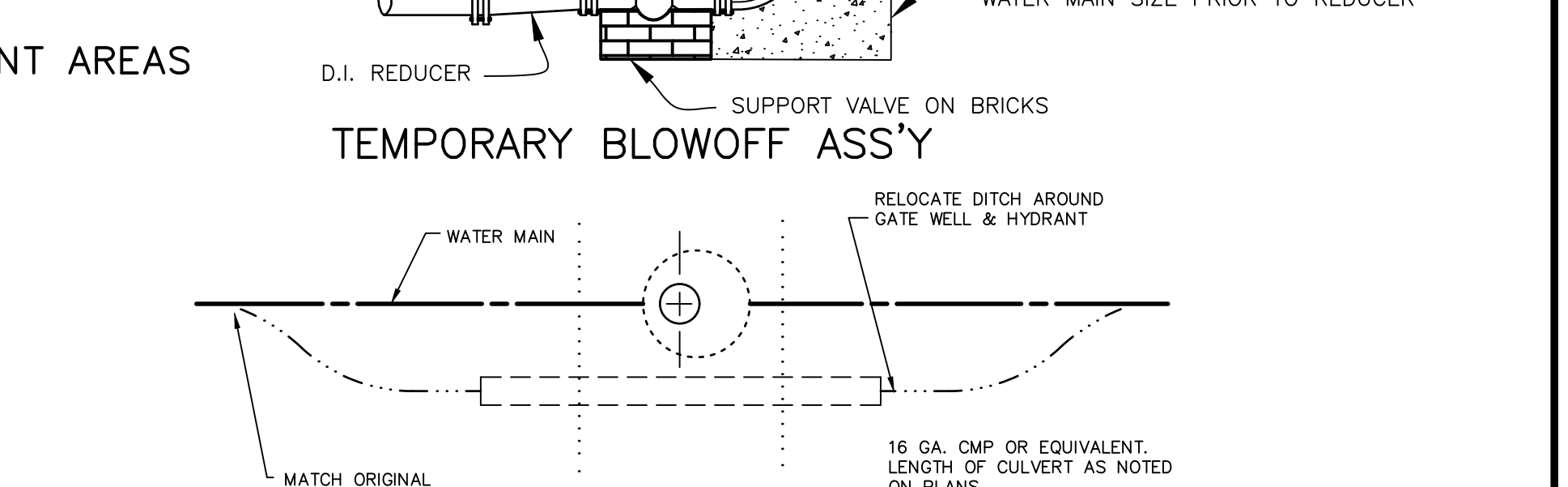
DETAIL OF HYDRANT SETTINGS



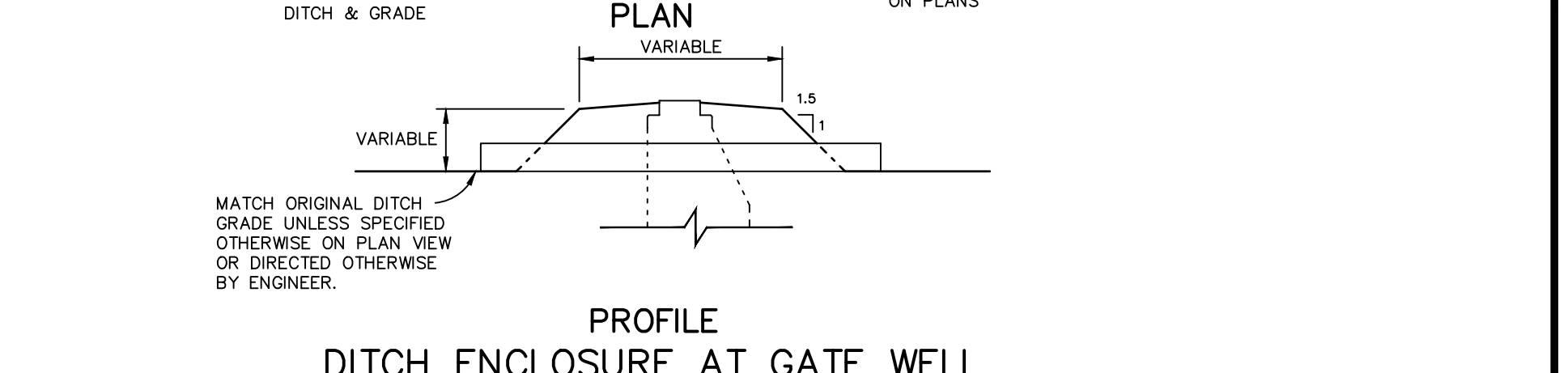
THRUST BLOCK DETAILS



GATE WELL TOPS WITHIN PAVEMENT AREAS



TEMPORARY BLOWOFF ASS'Y



DITCH ENCLOSURE AT GATE WELL

- WATER MAIN NOTES**
- All construction procedures and materials used on this project shall conform to White Lake Township current standards and specifications.
  - All hydrants shall be East Jordan Iron Works 5BR-250 traffic model. Self-draining hydrants shall not be used. Valve shall have 1-1/2" pentagon nut and shall open counter-clockwise. Provide two 4.5" Storz quick connect nozzles (Harrington Integral Hydrant Storz, Model HHS) as manufactured by Harrington, Inc. of Erie, PA.
  - All hydrants shall be field painted with a heavy coat of bright safety red polyurethane or alkyd glass enamel, except for the Storz fittings and caps, which shall be left unpainted.
  - Johnson and Anderson, Inc. field personnel will affix to the fixed collar of each Storz connection 1" wide 3M Scotch reflective tape, color coded per NFPA 291 guidelines flow capacity.
  - All water mains shall be ductile iron pipe Class 54, cement lined with push on joints. Mechanical joints allowed only for tapping sleeves, hydrants & hydrant valves. Only Cor-Blue bolts shall be used for assembling mechanical joints. All bands, tees, valves and hydrant tees shall have a poured concrete thrust block as detailed on this sheet. Joints which have thrust blocks bearing on soil of questionable stability shall be fully restrained utilizing Tyler swivel ells and adapters or a system approved by the Township Engineer. HDPE pipe for directional boring, if approved by the Township Engineer, shall meet all of the requirements of the MDEQ and shall be DR9 (200 psi), and shall have two #8 tracer wires, terminated in the nearest gate well at the highest step.
  - Tapping sleeve shall be mechanical joint or approved equal. Ductile iron or Stainless steel are allowed.
  - Specifications shall include direction of operation of all valves. All valves shall be counter clockwise open.
  - All necessary easements shall be provided in the name of White Lake Township before acceptance of the water distribution system.
  - The design engineer shall furnish White Lake Township with one reproducible set of "As-Built" water main plans or an AutoCAD file upon completion of the job.
  - All required cross-connection devices shall be installed as required by the local plumbing inspector and in accordance with the standards of the Michigan Department of Public Health.
  - Gate well frame and cover shall be as follows: East Jordan heavy manhole cover, base flange type #1040 or Neenah Foundry heavy duty #1642 Manhole frame, solid lid cover shall be non-racking and marked "White Lake Water Department"
  - Gate valves shall be AWWA approved and of a double disc or resilient wedge design with push on joints, 16" gate valves may be mechanical joint provided Cor-Blue bolts are used. All gate valves with operating nuts greater than 5" below ground surface shall be provided with an extension stem. The length of the extension shall be such that it will be within 5' of the ground surface when an extension is used it shall be held in place by an extension stem guide suitably fastened to the wall of the gate well.
  - 1" corporation stops are to be placed on the main at each side of each main line gate valve and at such other locations as may be required by the engineer.
  - All pipe and fittings shall be subjected to a hydro-static pressure test of 150 PSI for a 2 hour duration; Township Engineer must be present. Maximum segment 2000 feet except that longer segments may be tested with allowable leakage based on 2000 feet.
  - 2 consecutive safe bacteria samples shall be taken from the water system approx. 24 hours apart at points established by the Township Engineer. Samples shall be taken by the Township Engineer.
  - Filling, flushing and sampling of water main can only be performed with a "Jumper" Line, the jumper shall be equipped with an approved RPZ type of backflow preventer.
  - Adjustments on gate wells shall be limited to 23" maximum from top of rim to first step in accordance with MIOSHA Rule 341.
  - All new water service lines shall have a minimum nominal size of 1". Services from 1" to 2" may be type K copper tubing or plastic DR-9 (200 PSI rated) meeting ASTM D2237-03 (Standard Specification for Polyethylene (PE) plastic tubing). ASTM Designation and pressure rating shall be stamped on the pipe by the manufacturer. Plastic pipe shall also meet AWWA C-301 Specifications. All sizes shall relate to the copper tubing outside diameter standard size (CTS). Copper pipe joints shall be flared. Fittings shall adapt to the plastic pipe with compression to iron pipe thread adapter. Plastic pipes shall be either compression style with a steel insert or may be fusion welded in the larger sizes.
  - Plastic water service pipes shall be traced with two #10 copper tracer wires or two #12 copper coated steel or stainless steel wires insulated with a minimum of 30 mils of polyethylene insulation. The tracer wires shall be terminated to supply line so as to be locatable at the building and the curb box without digging.
  - Water services sizes 3" and greater shall be Class 54 cement lined ductile iron with push on joints or HDPE DR-9 (200 PSI rated) with fusion welded joints and fittings, DIPS (Ductile Iron Pipe Size).
  - A stop box shall be installed at the property or easement line and shall be equivalent to an A.Y. McDonald Mfg. 6100 flare regular pattern ball valve. The curb box shall have a 1" riser pipe with an Erie 2-hole pattern cover equivalent to A.Y. McDonald Mfg. 5601L. Stop box shall be protected with a 2'x4' painted blue extending 4 feet above ground.
  - Standard pipe cover shall be 6'-0".
  - Air release manholes shall consist of a standard 5' diameter gate well style structure with a ValMatic Model 25C air release valve mounted on a 1" corporation stop. Air release shall be equipped with the vacuum check option. A 1/2" diameter galvanized pipe or discharge shall be extended to within 12" of the top of the structure. A goose-neck trap shall be installed at the top of the riser to prevent debris & water from entering the valve.

DRAWN: CAD DESIGN: OA CHECKED: - VERT. - SCALE: - HORZ. AS NOTED

NO.	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
1	GENERAL	REVISION TO CAD	12/29/95	GW & NUT SIZE	07/23/98	CLARIFY HYD. SPEC	02/07/01	REV. HYD. THRUST, AIR REL.	03/29/04
2	ADD NOTE	17	11/04/97	PIPE COVER & FLANGE TAPE	05/12/99	5-BR HYD. WS STAKE	02/27/02	HDPE, HYD. VALVES	07/18/05
3	REVISE	HYD. & THRUSTING	05/18/98	ADD BLOWOFF	07/06/99	ADD NOTE 19	07/23/03	UPDATED TITLE BLOCK	04/30/13

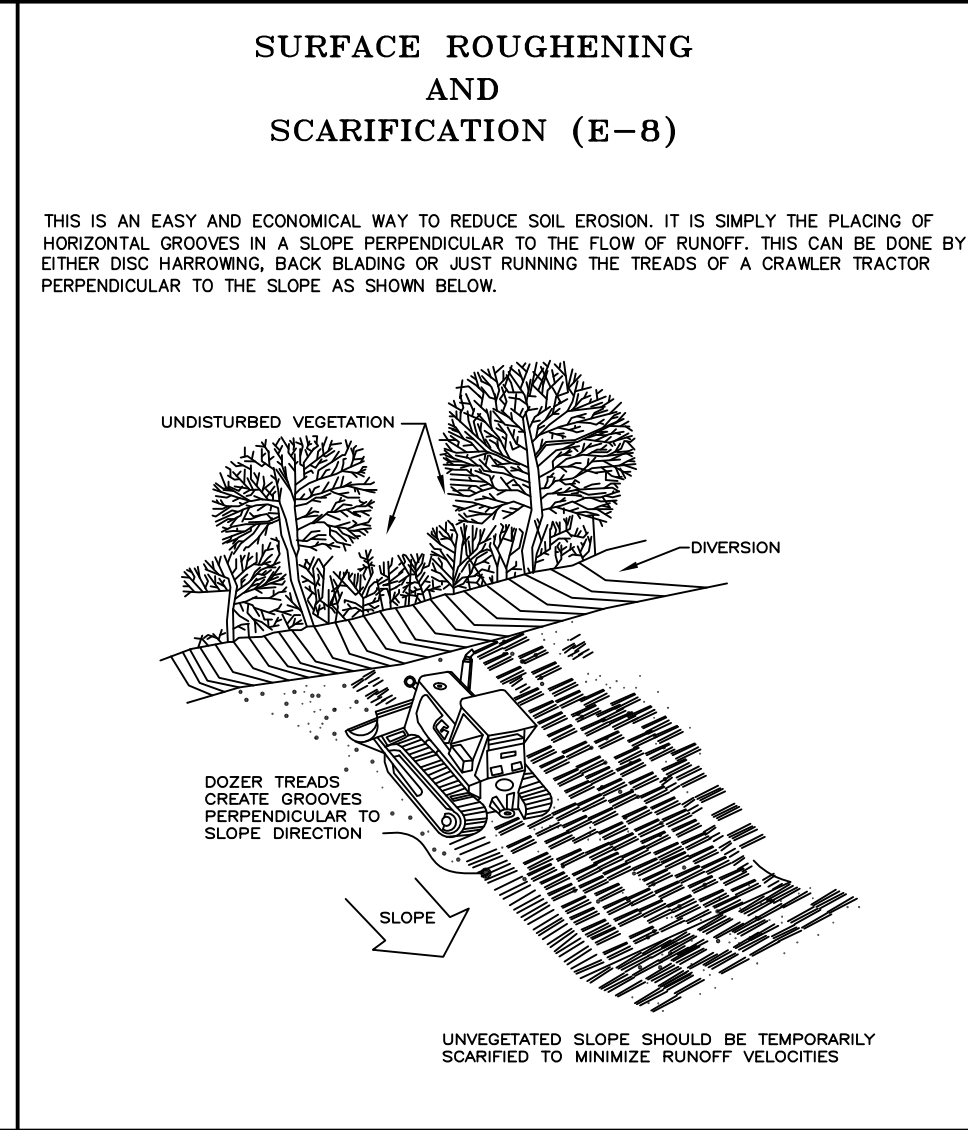
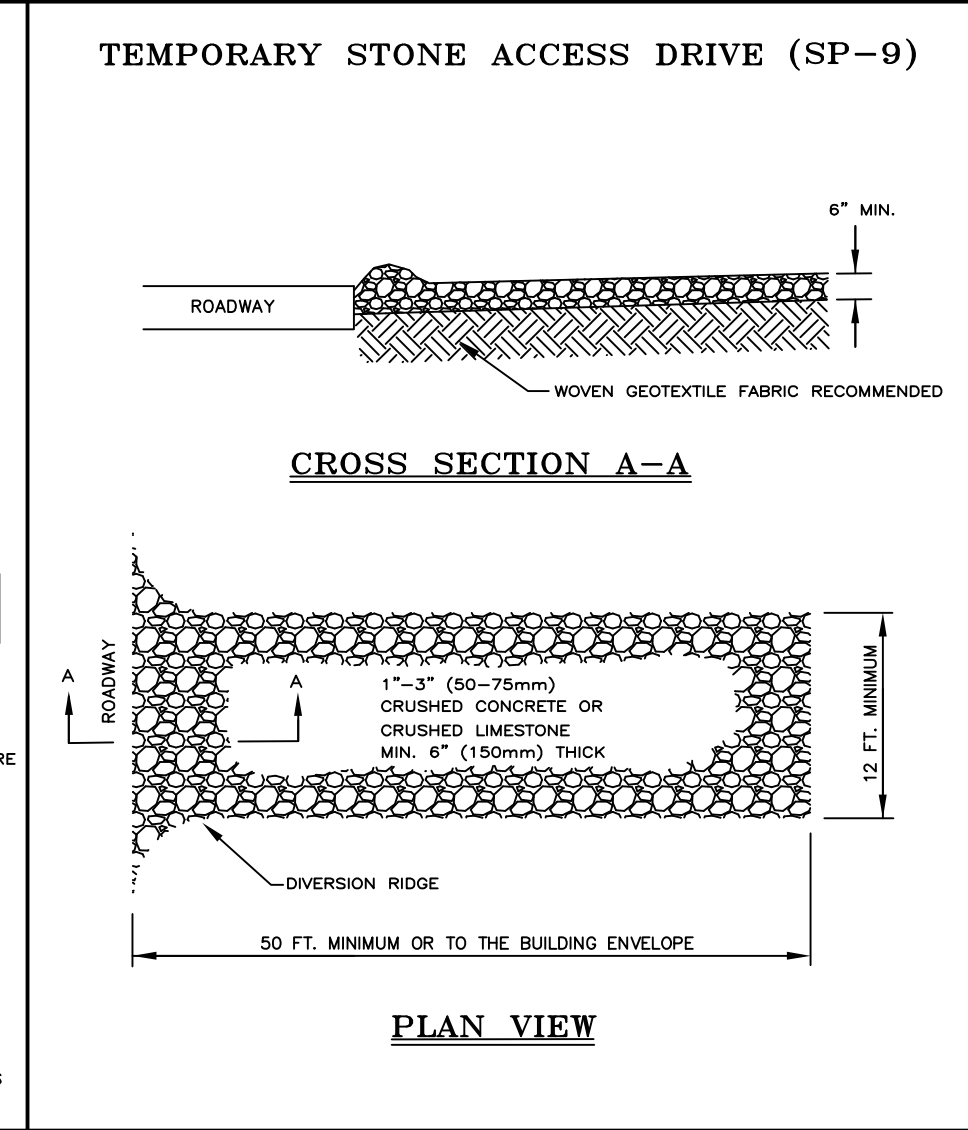
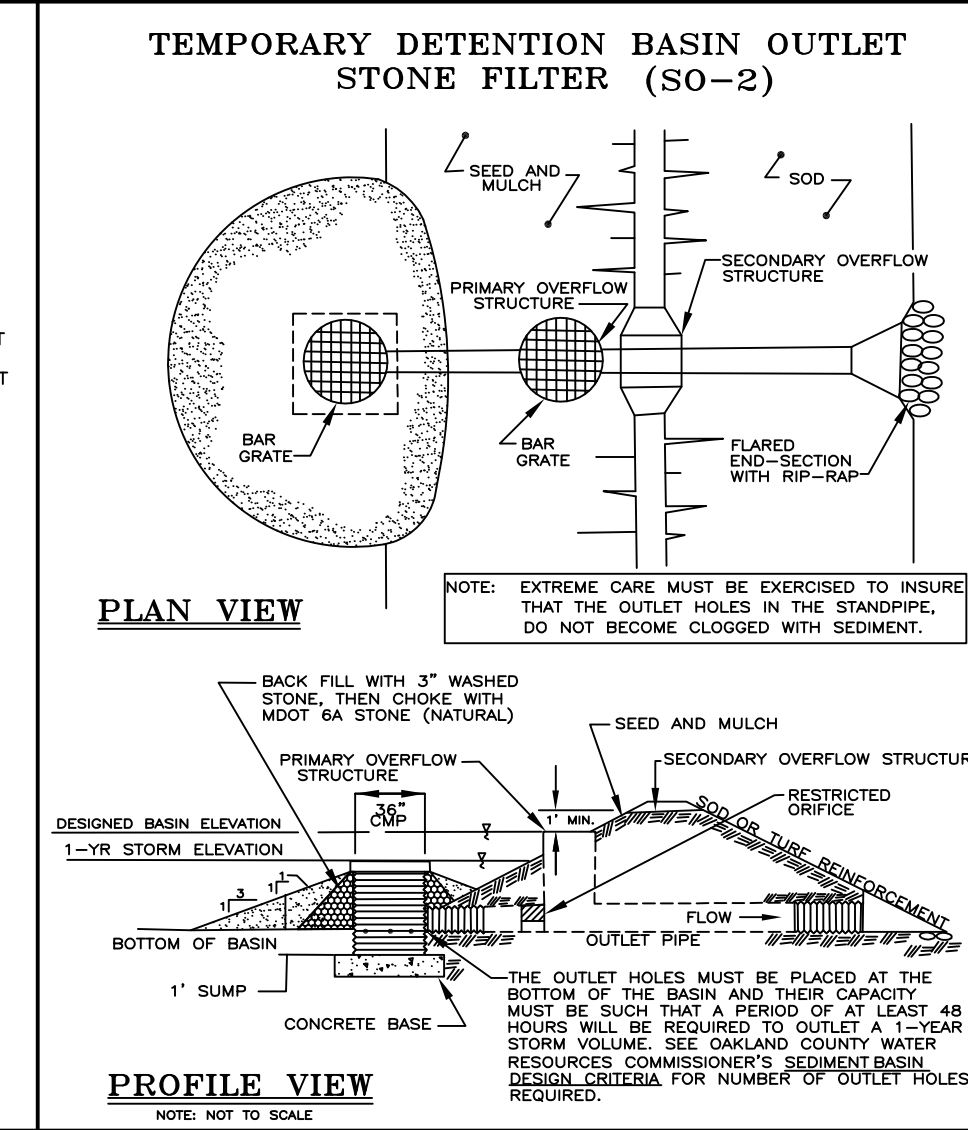
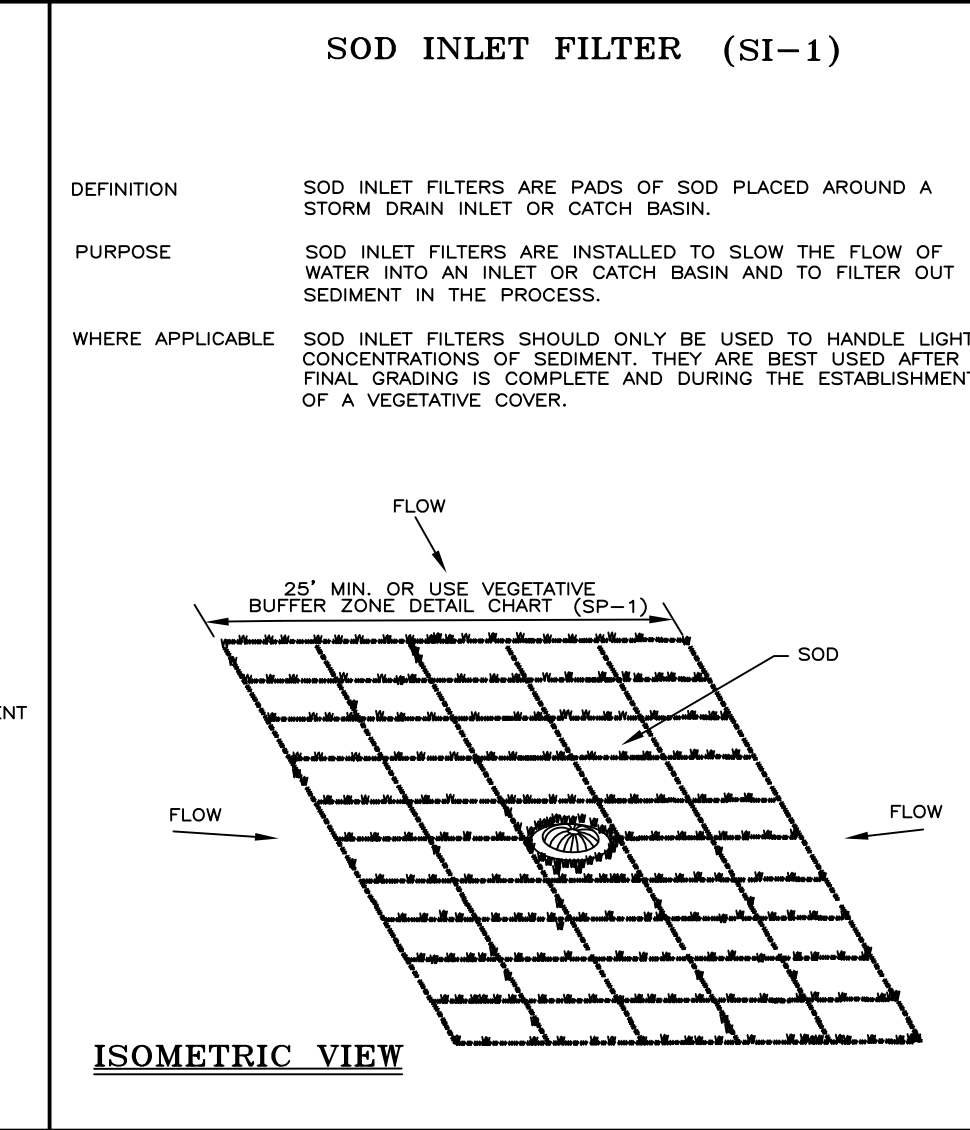
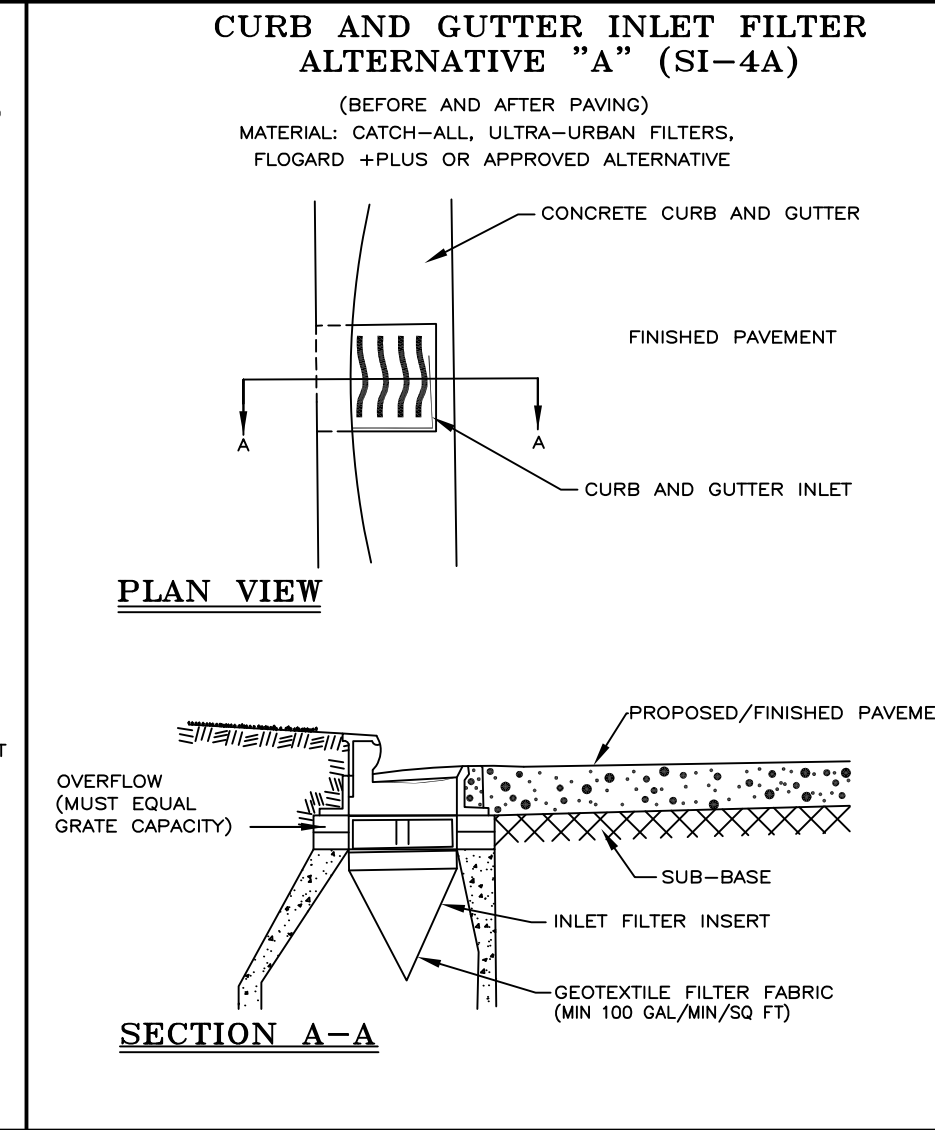
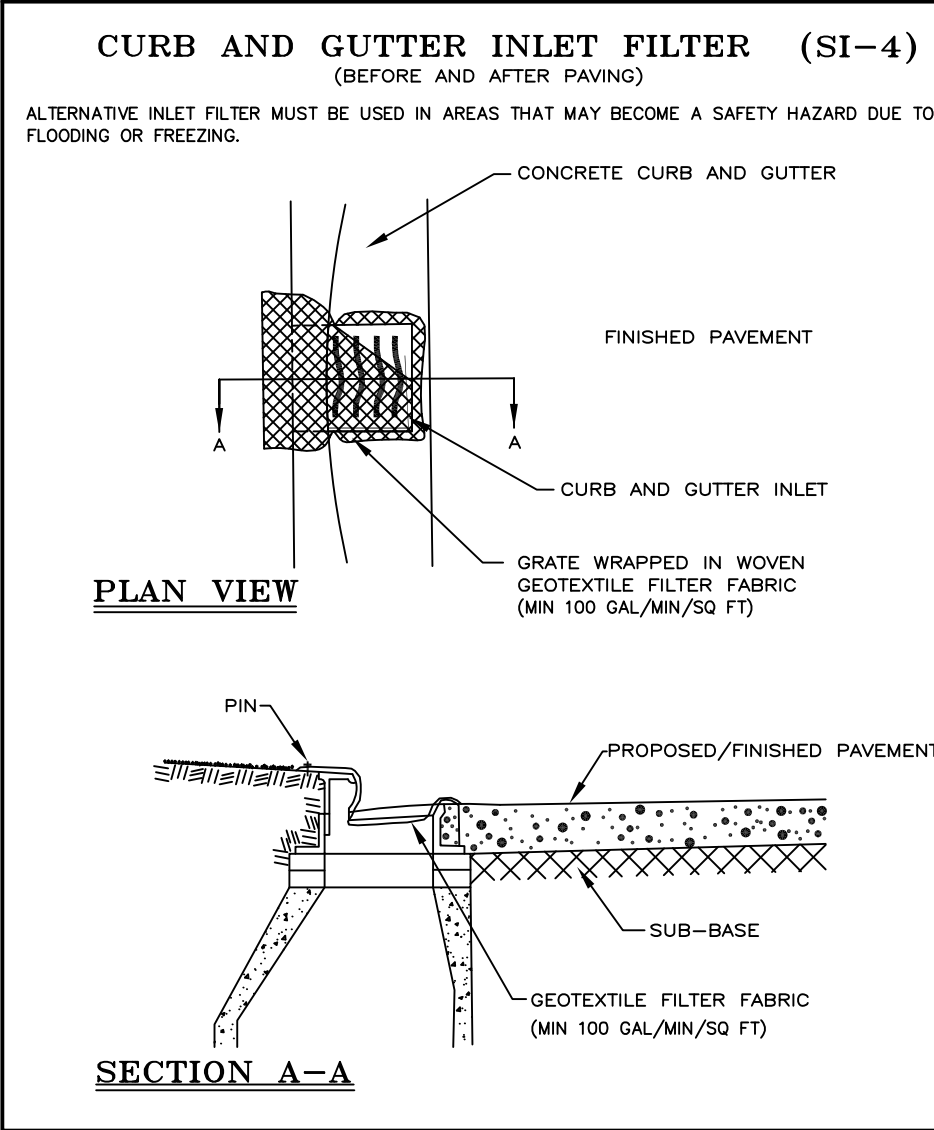
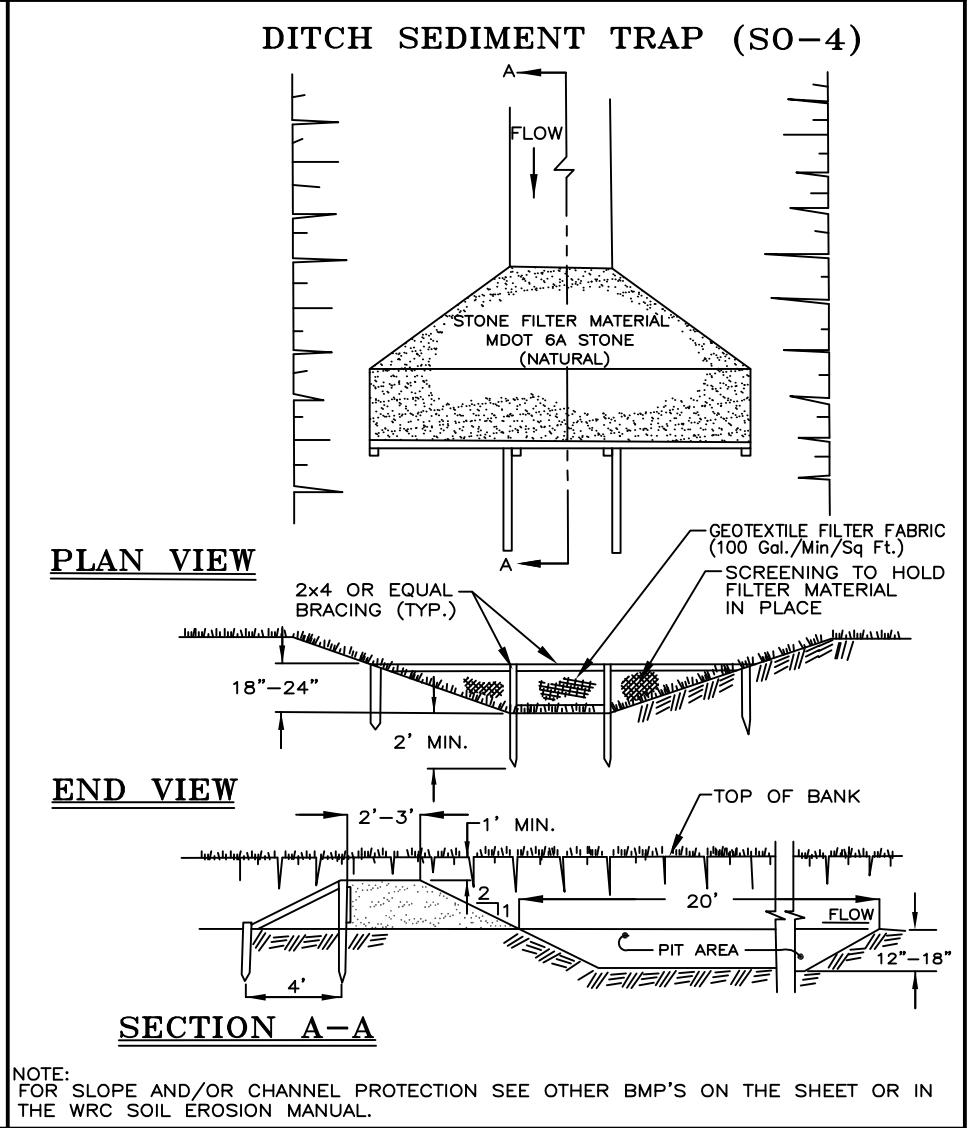
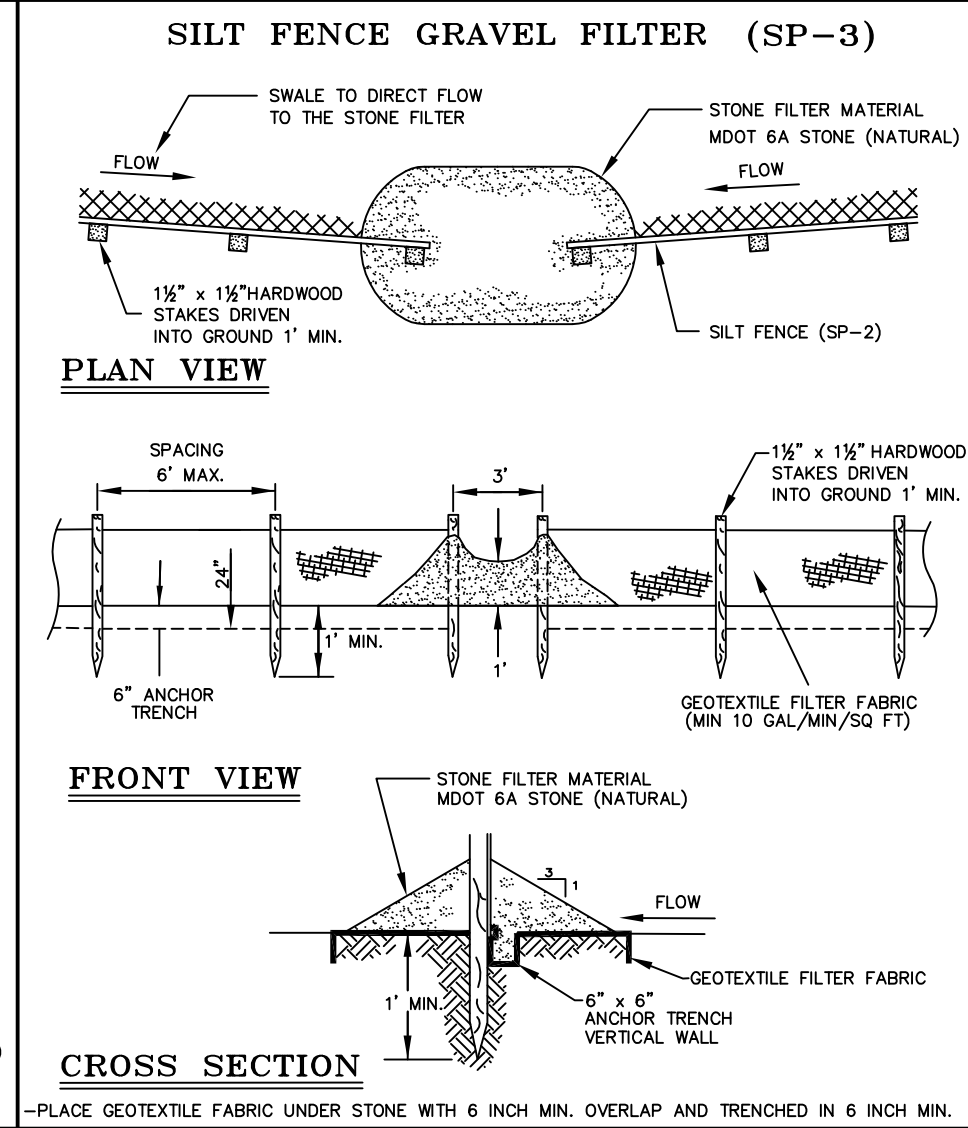
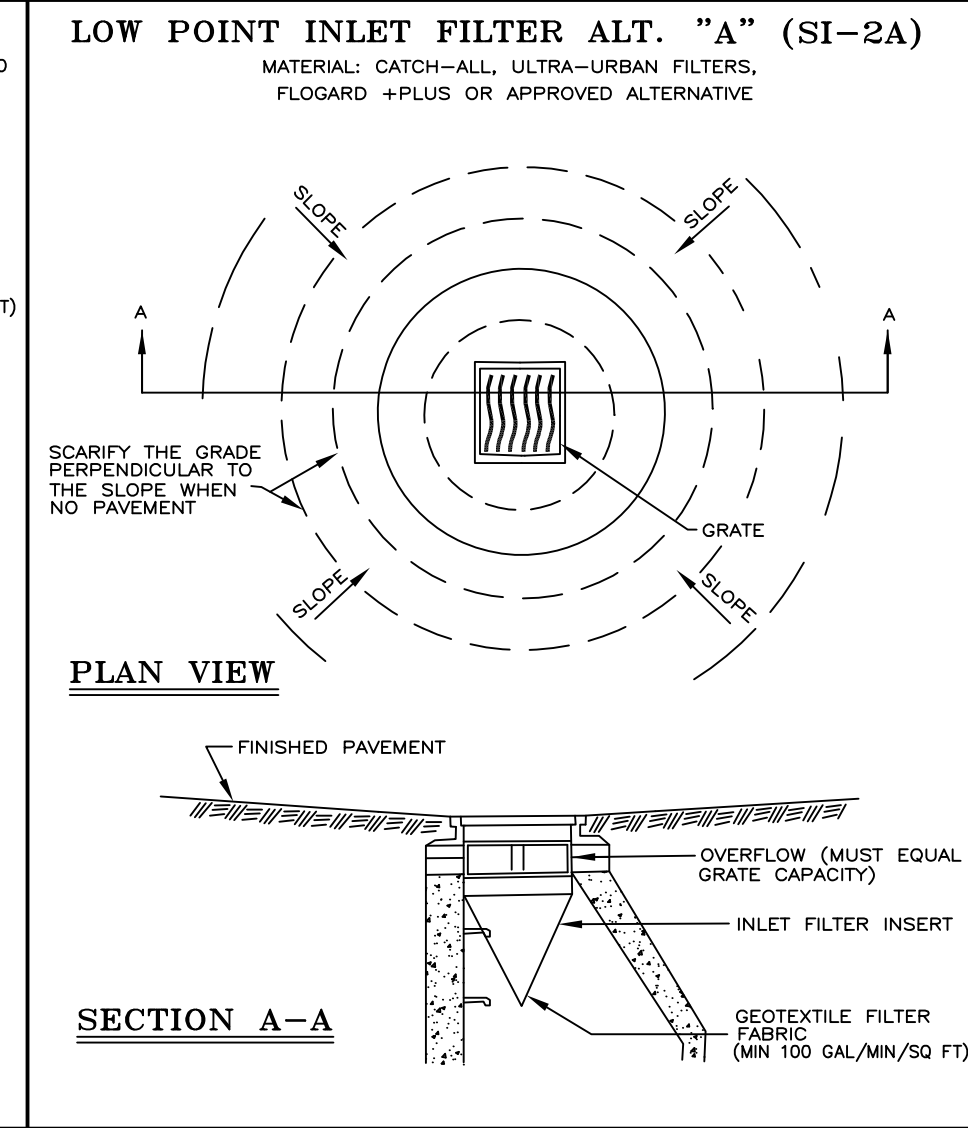
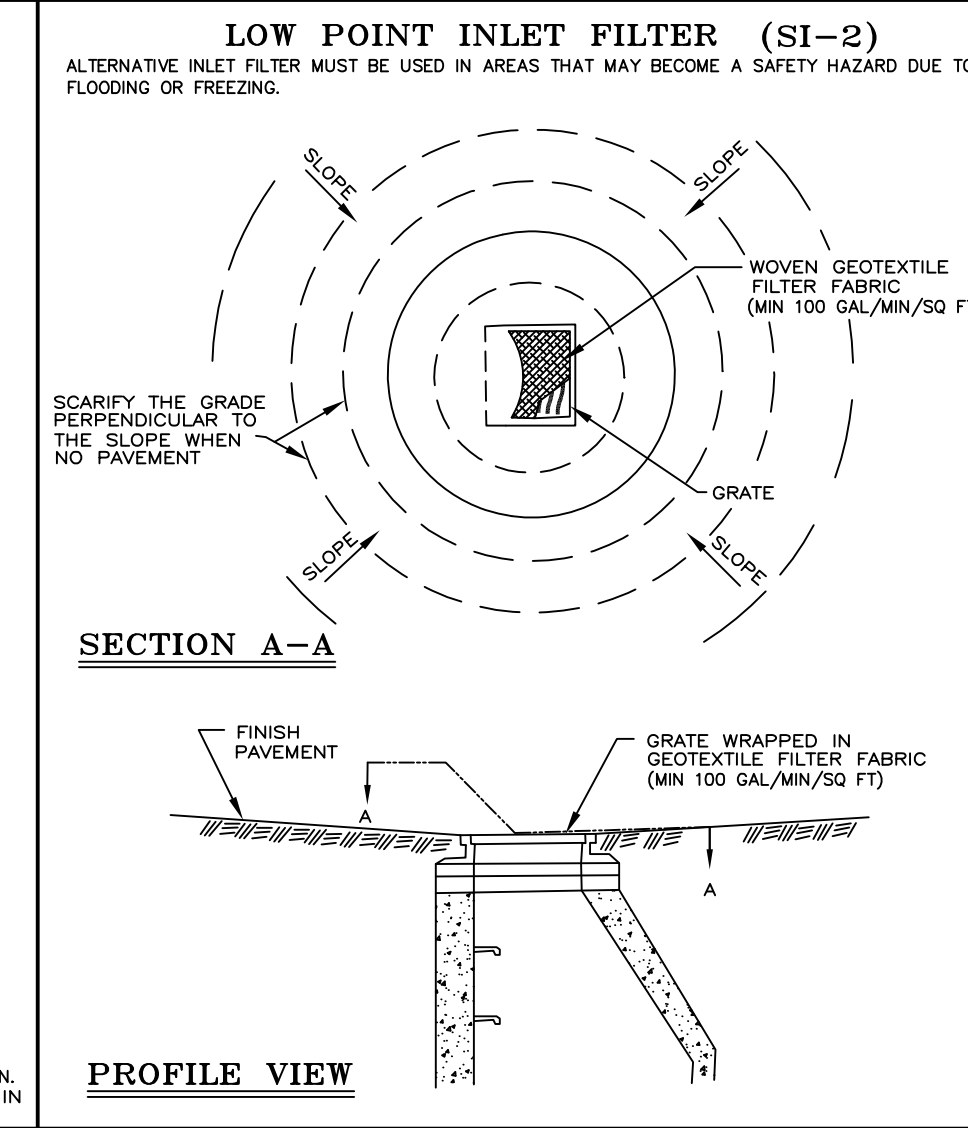
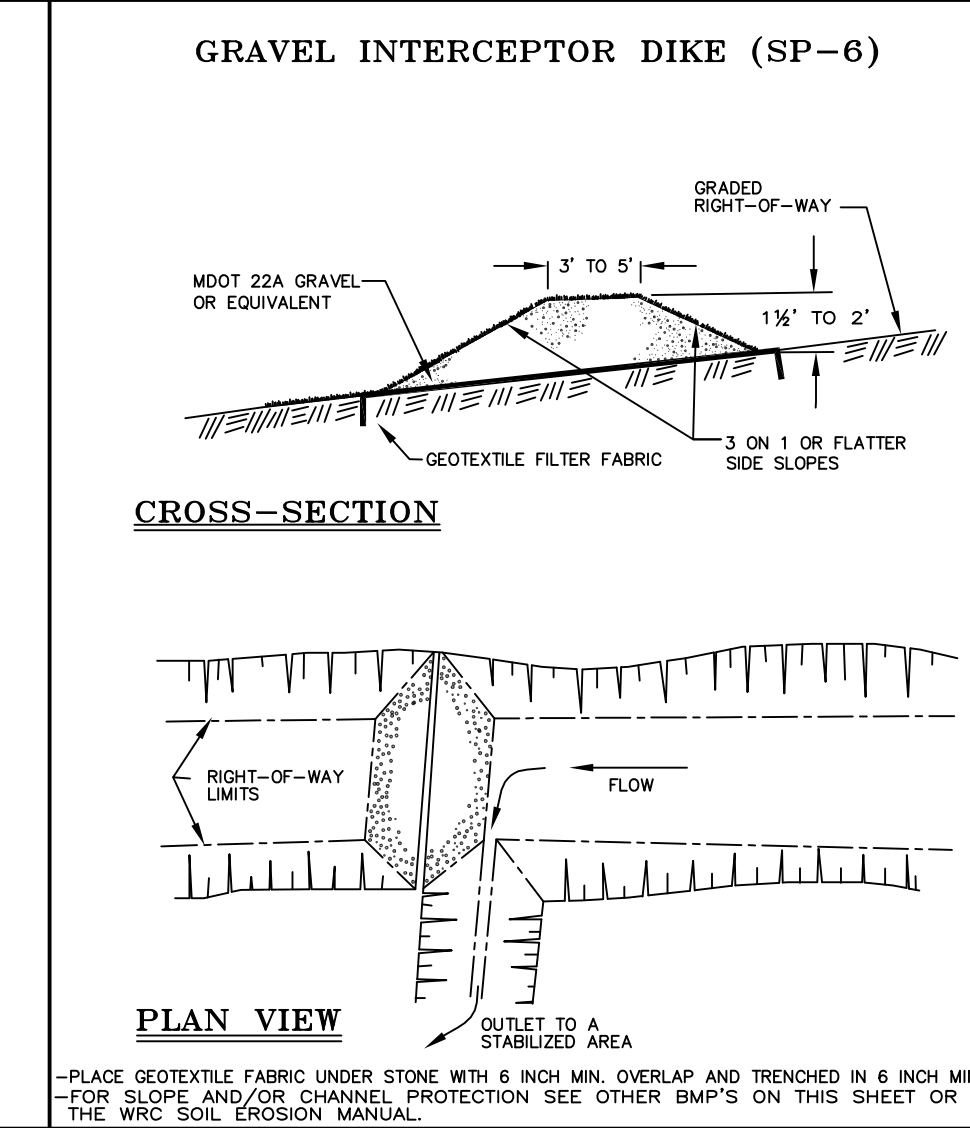
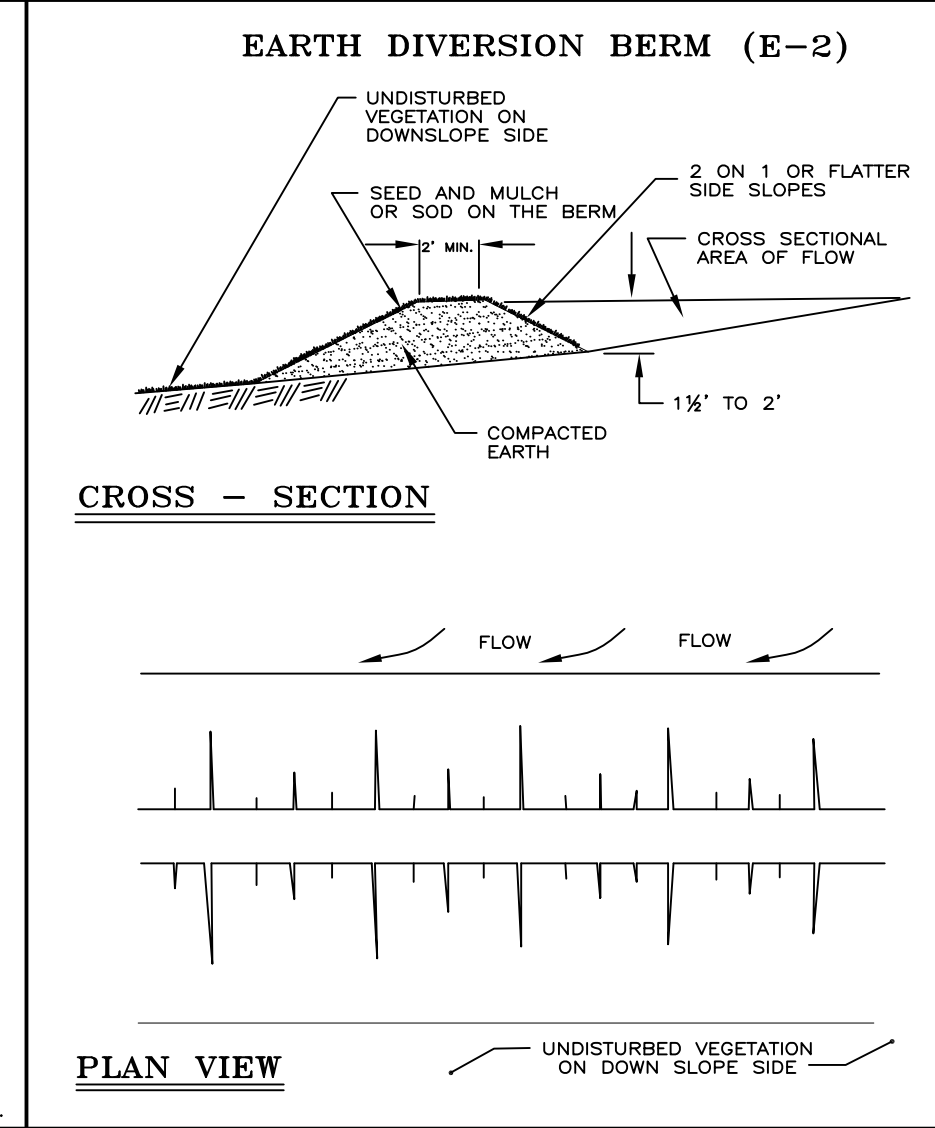
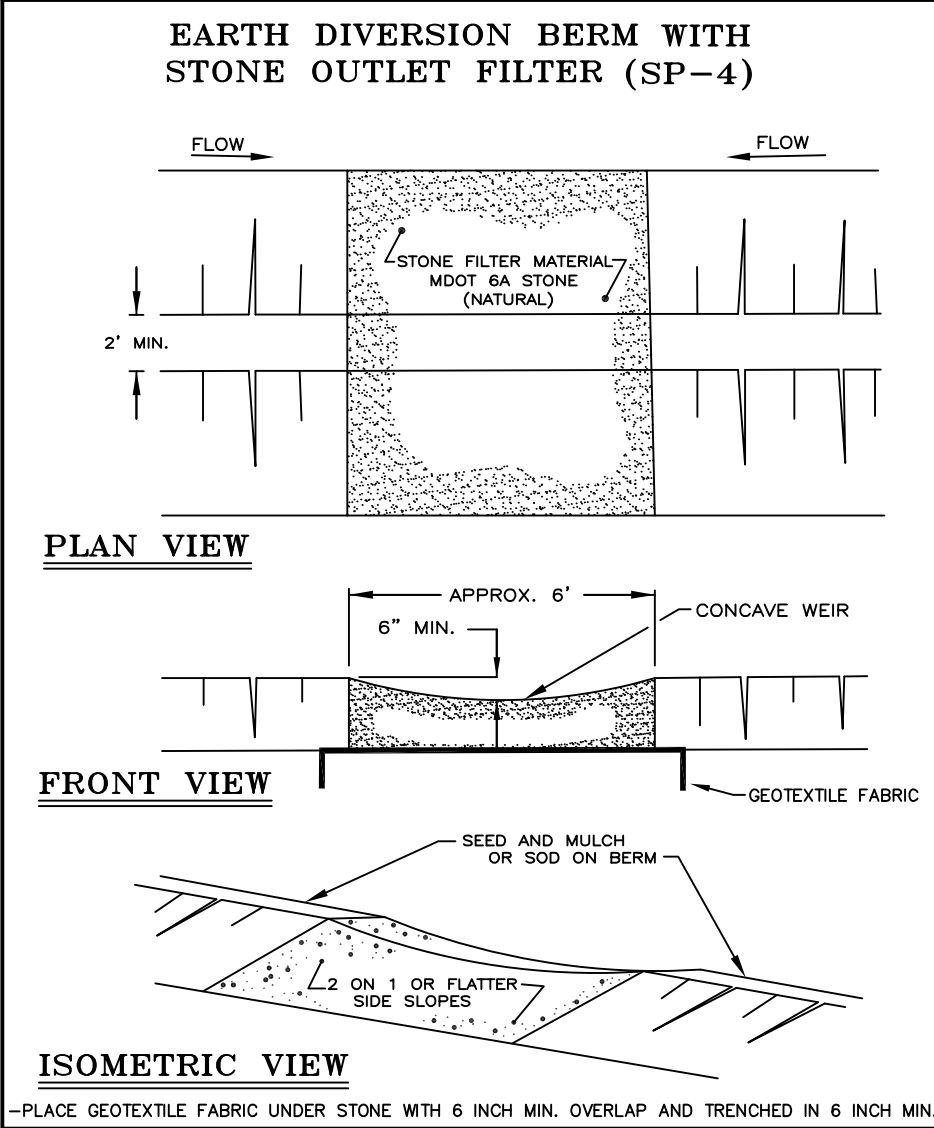
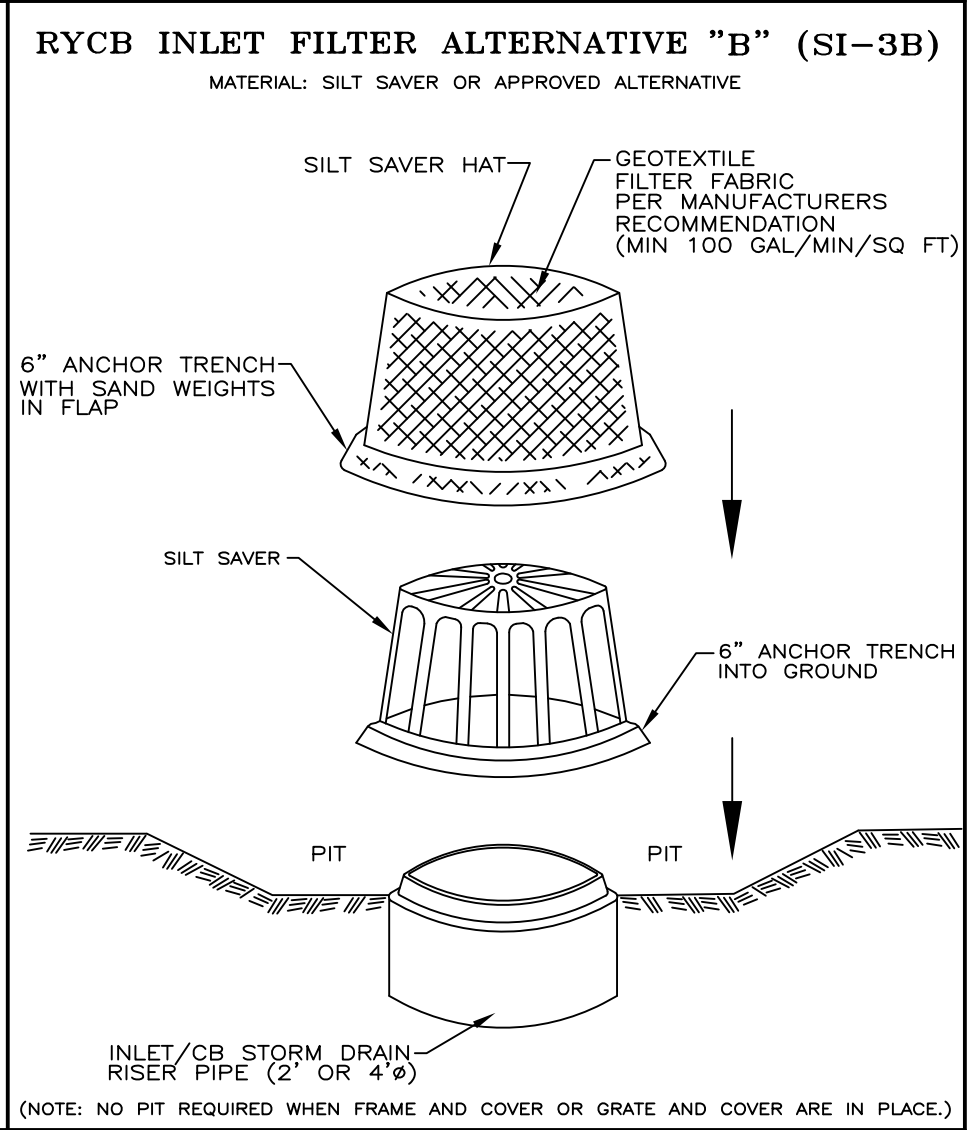
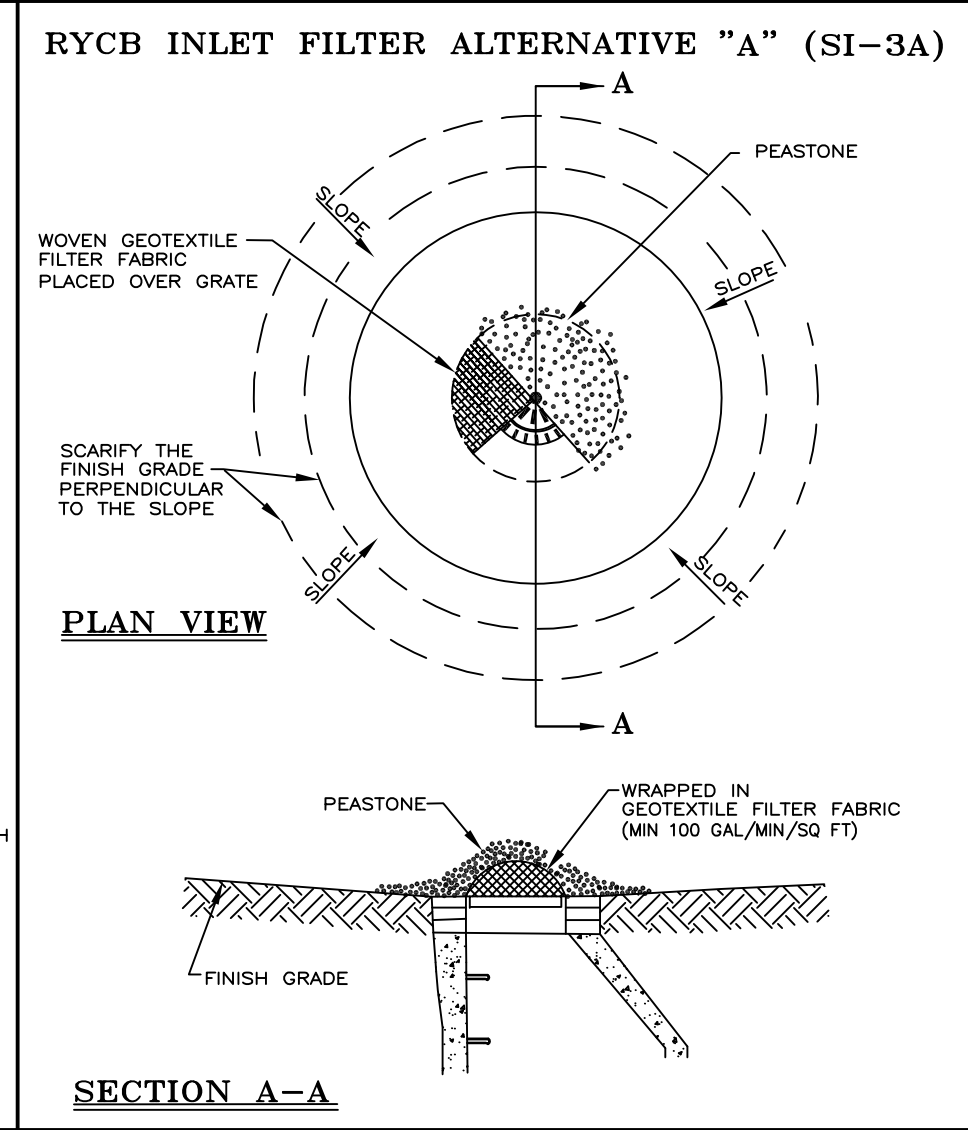
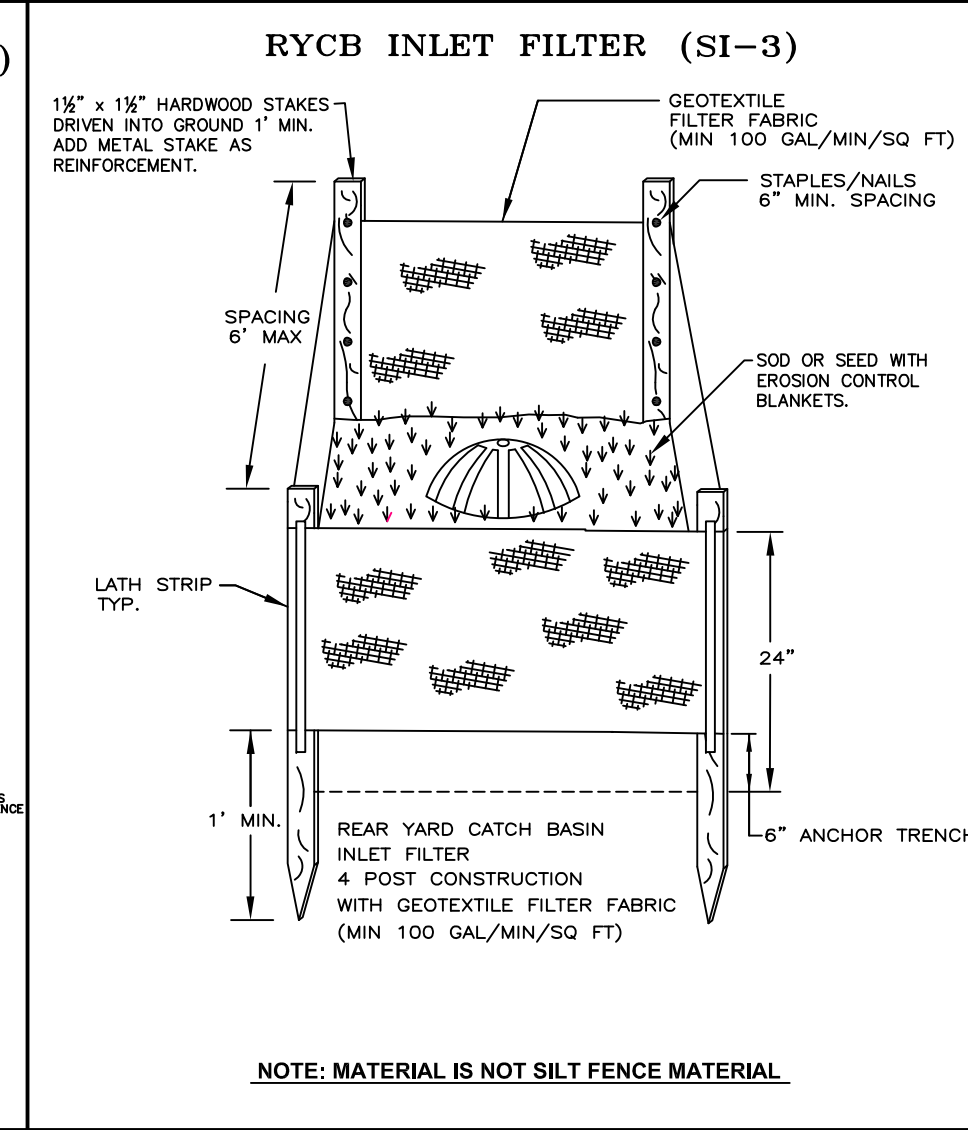
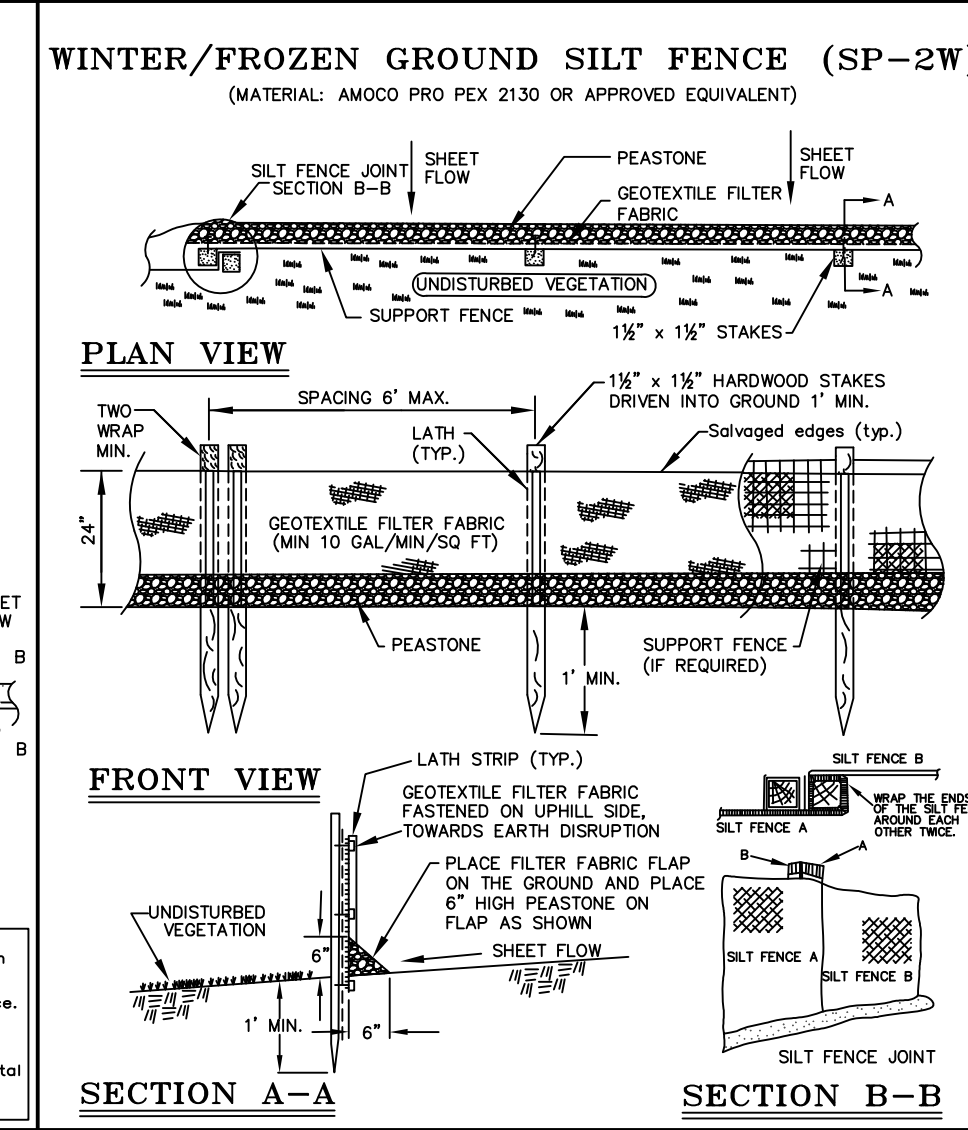
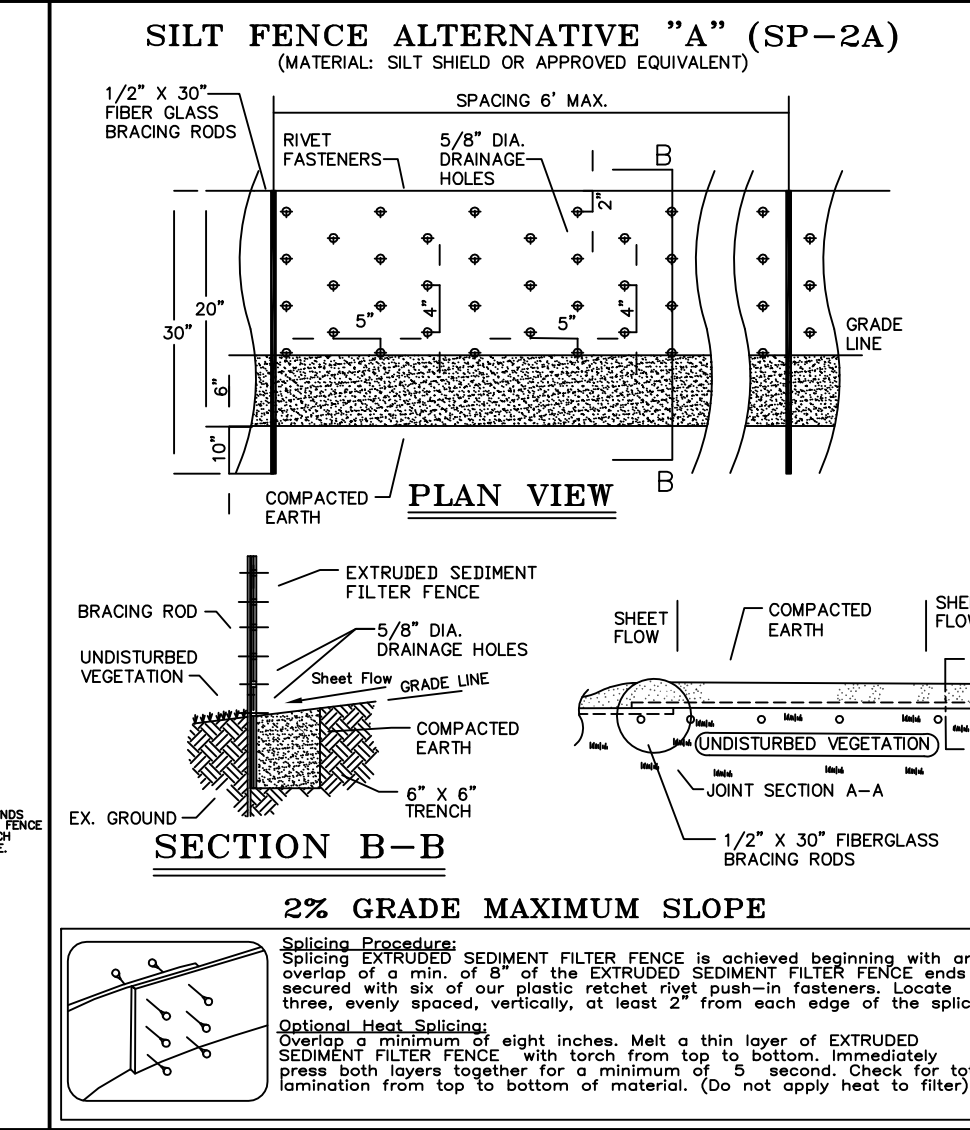
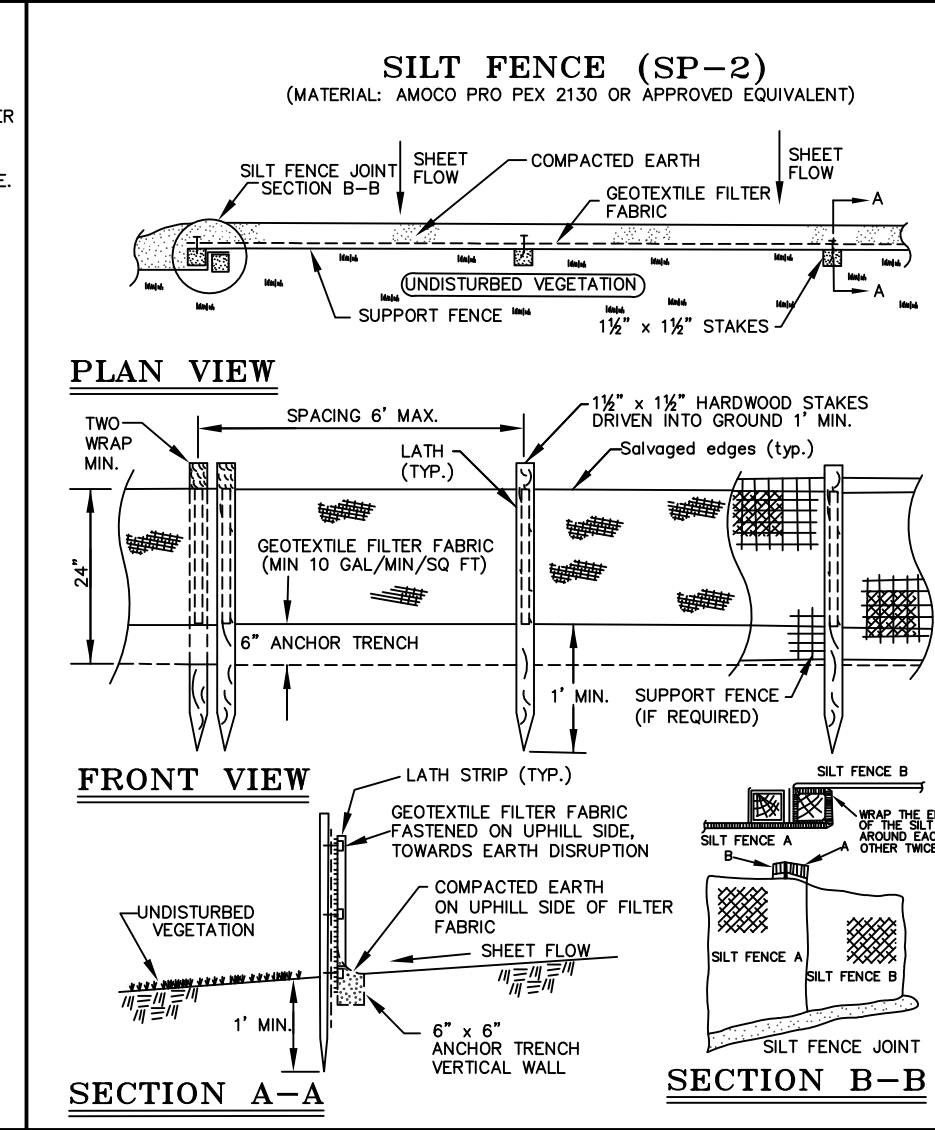
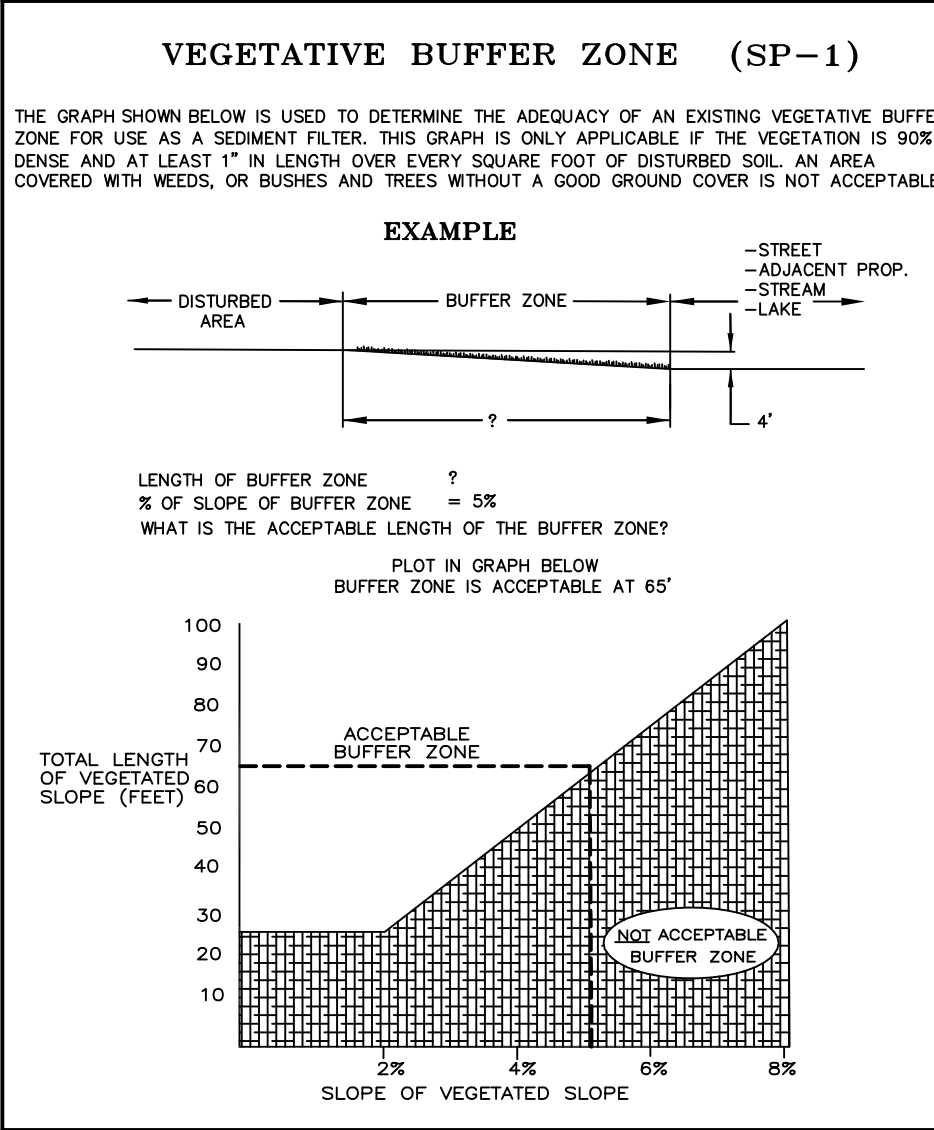
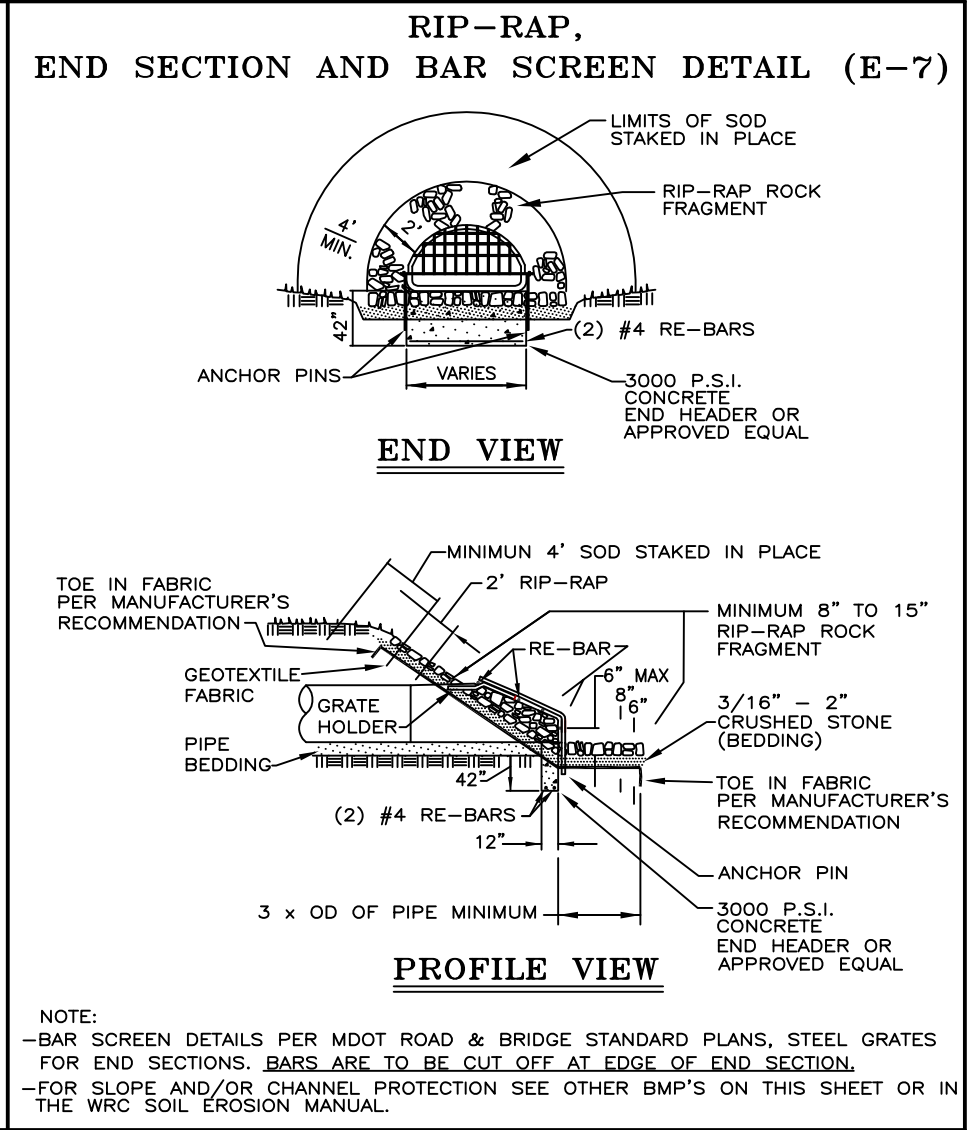
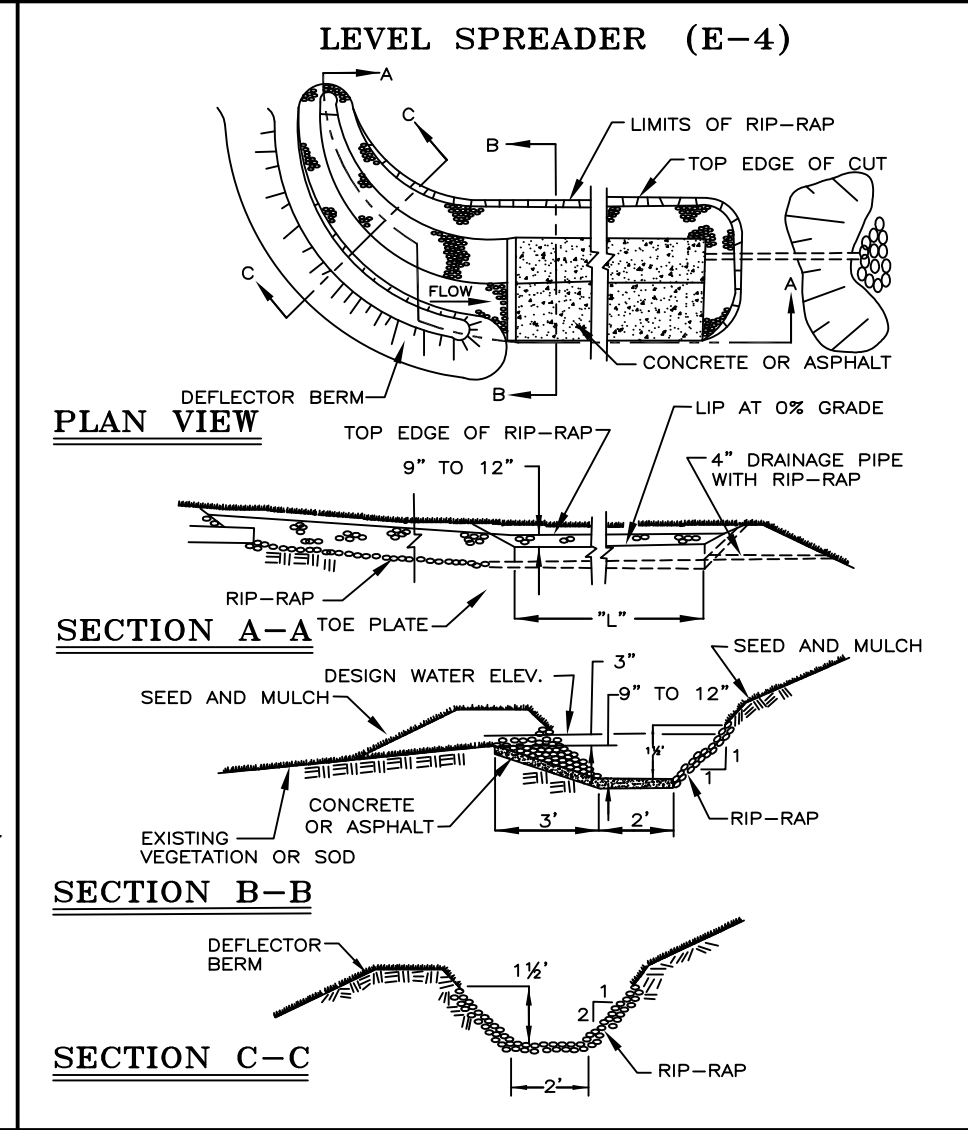
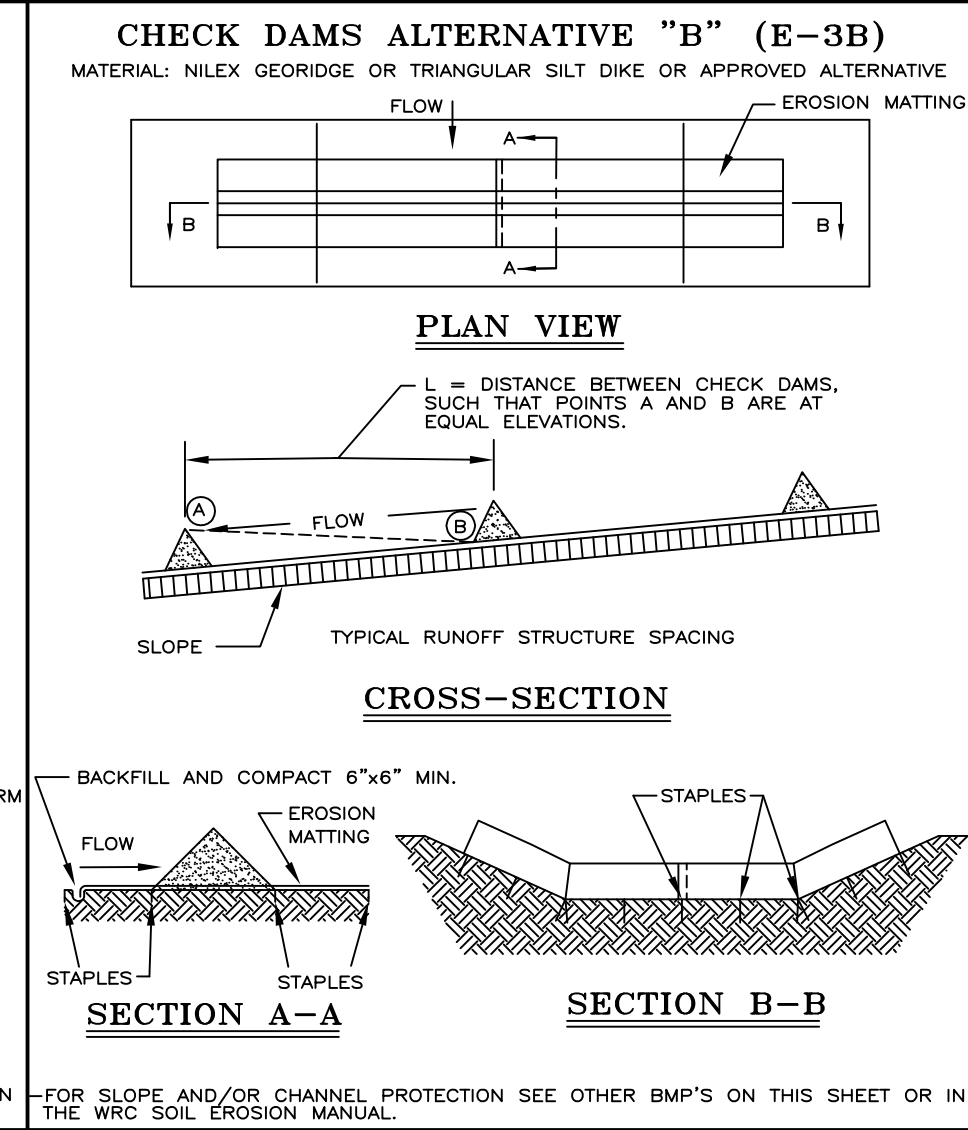
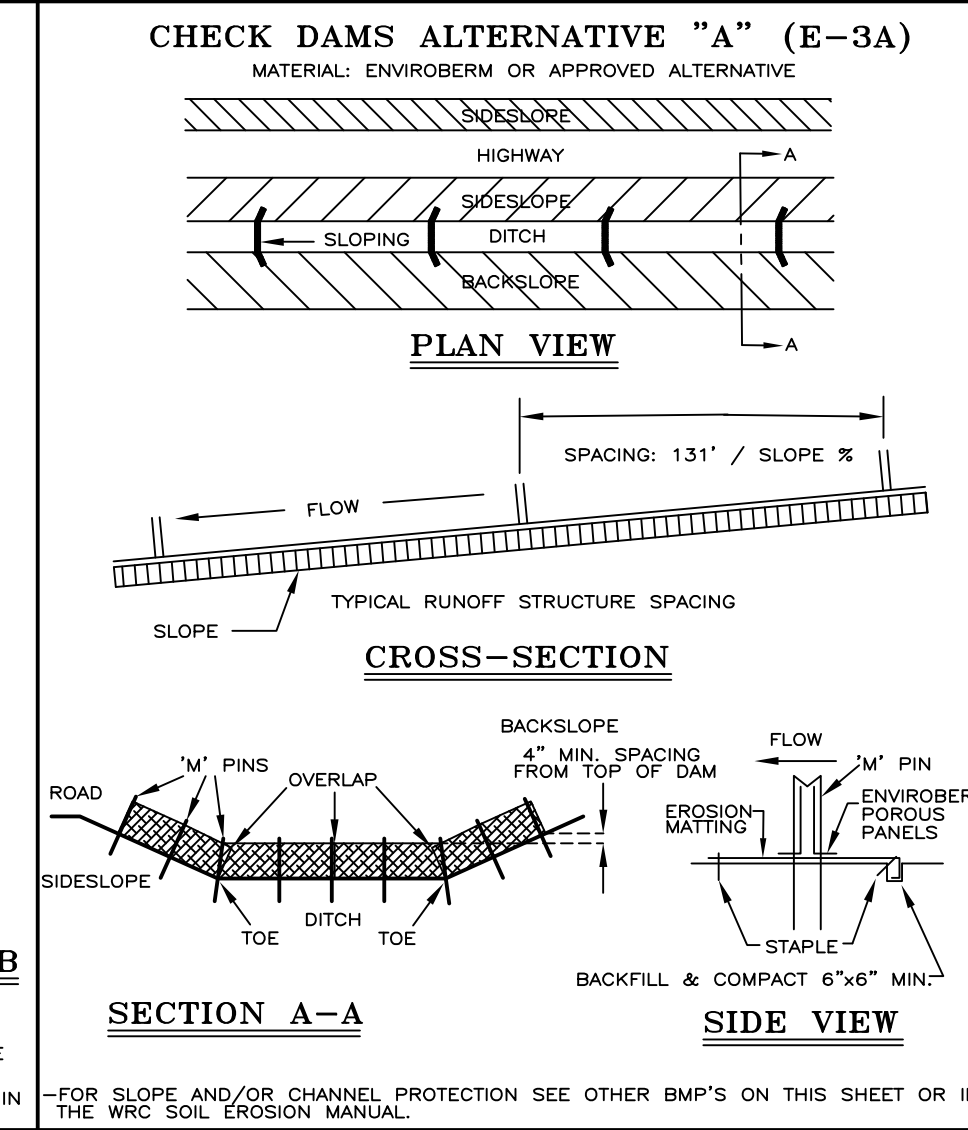
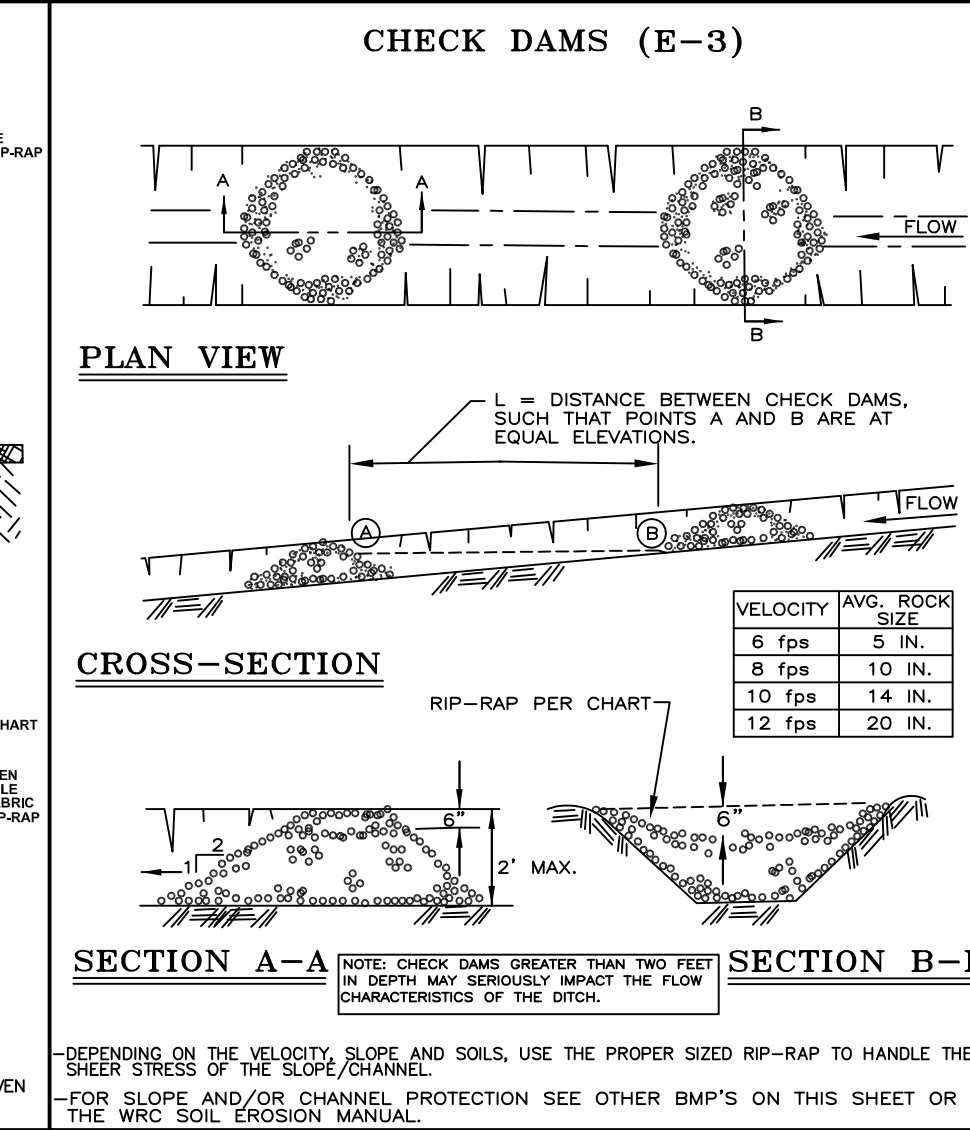
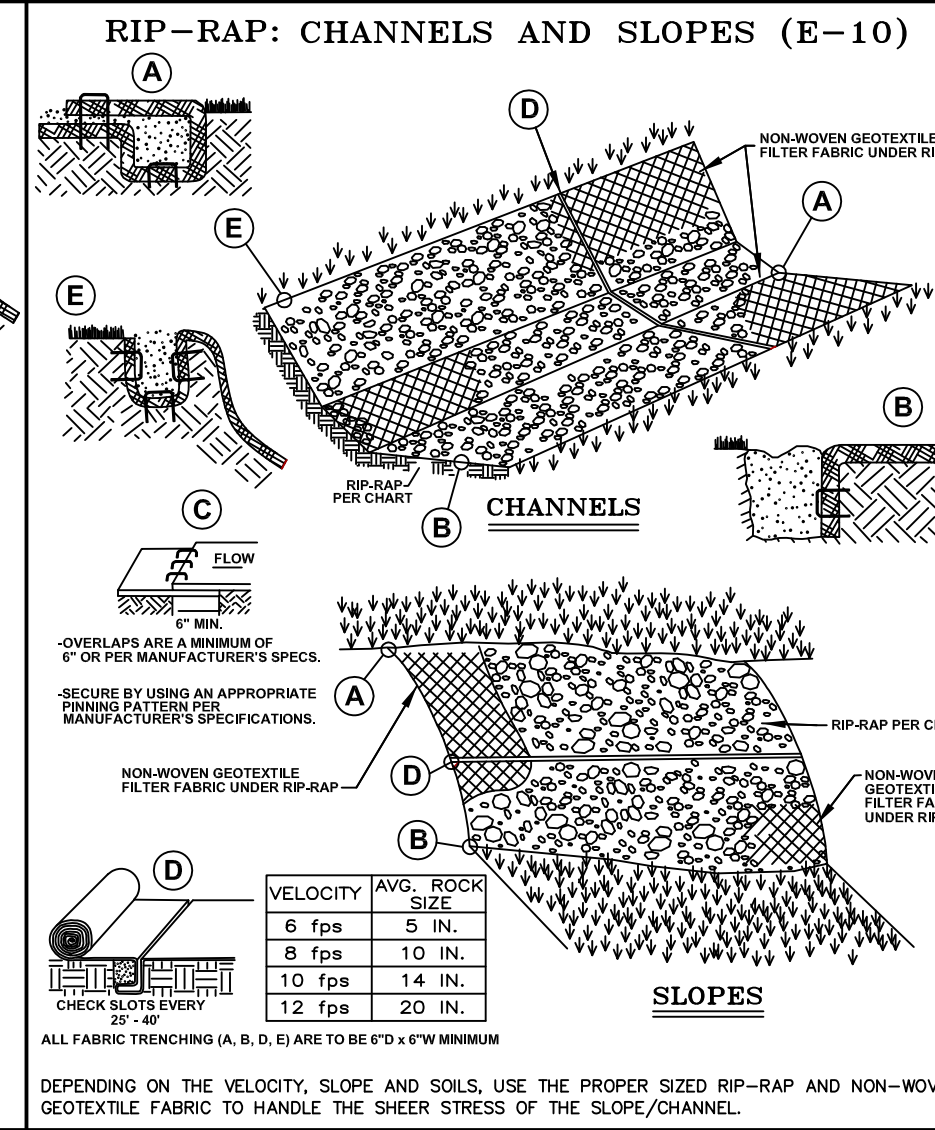
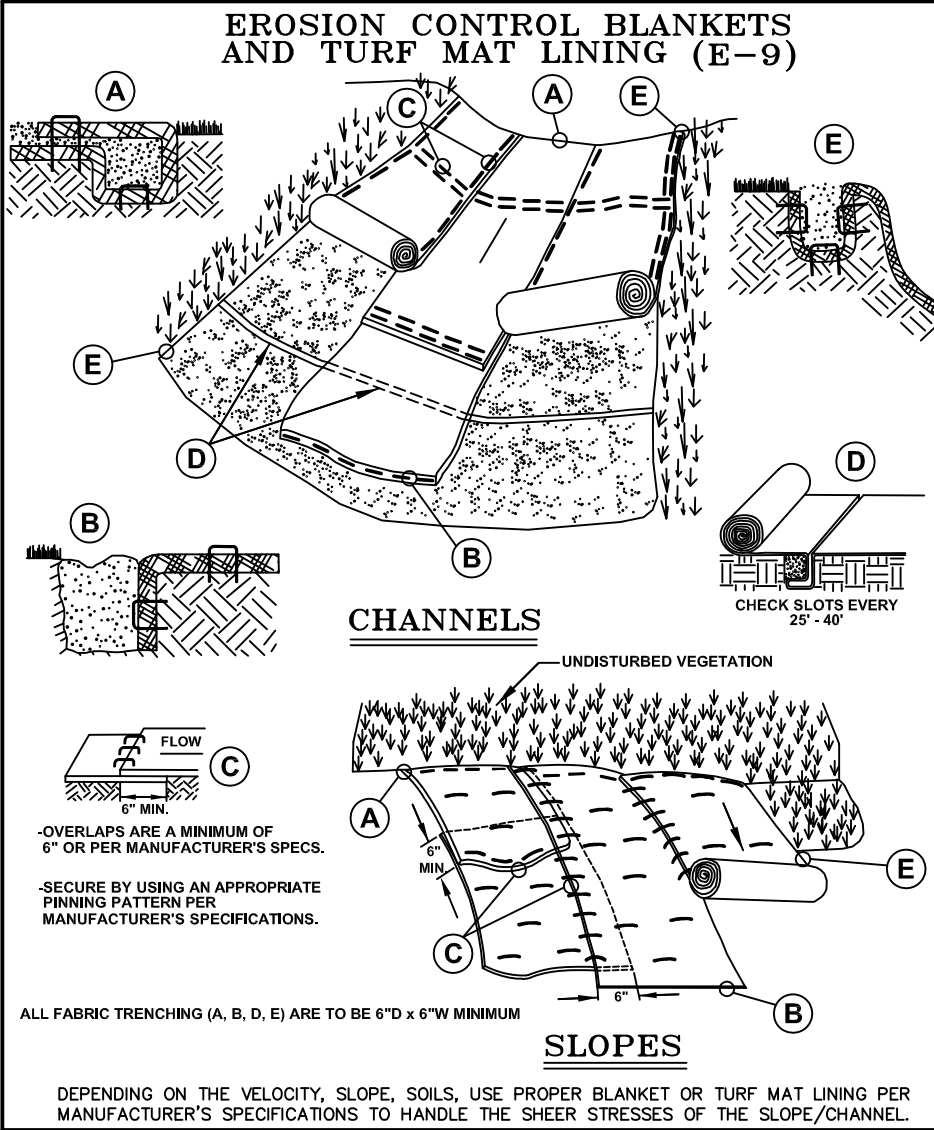
**Johnson & Anderson**  
 4494 Elizabeth Lake Road Waterford, Michigan 48328  
 1060 W. Norton Avenue, Suite 7 Muskegon, Michigan 49441  
 2291 Water Street, Suite 6 Port Huron, Michigan 48060  
 (248) 881-7800 (248) 881-2680 (231) 780-3100 (231) 780-3115 (810) 987-7820 (810) 987-7895

**White Lake Township**  
 7525 Highland Road (M-59)  
 White Lake, Michigan 48383  
 248-698-3300

**WATER MAIN STANDARD DETAILS**

JOB NO. \_\_\_\_\_  
 DATE ISSUED \_\_\_\_\_  
 SHEET NO. \_\_\_\_\_





**NOTE:**

WHILE PERFORMING WORK INVOLVING GROUNDS MAINTENANCE AND/OR THE CONSTRUCTION/MAINTENANCE OF ANY INFRASTRUCTURE, INCLUDING ROADS, WATER MAINS, SANITARY SEWERS, STORM DRAINS AND STORM WATER BEST MANAGEMENT PRACTICES (BMPs), CONTRACTORS SHALL MINIMIZE POLLUTION FROM STORM WATER RUNOFF THAT CAN AFFECT WATER QUALITY RELATED TO WORK ACTIVITIES. POLLUTANTS THAT COULD IMPAIR WATER QUALITY MAY INCLUDE FUEL, GREASE AND OIL, NUTRIENTS, BACTERIA AND PATHOGENS, LITTER AND DEBRIS, AND SOIL EROSION AND SEDIMENTATION. APPLICABLE BMP'S SHALL BE IMPLEMENTED BY THE CONTRACTOR TO THE MAXIMUM EXTENT PRACTICABLE TO PROTECT WATER QUALITY AND WILDLIFE HABITAT.

### SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

REV.	DATE	DESCRIPTION
1	01/01/01	PROPOSED DETAIL SETS
2	02/02/02	FOR CONSTRUCTION APPROVAL, NAME CHANGES
3	03/03/03	FOR CONSTRUCTION APPROVAL, NAME CHANGES
4	04/04/04	FOR CONSTRUCTION APPROVAL, NAME CHANGES

ORIG. DATE: 01/01/01

SCALE: \_\_\_\_\_

DESIGNED BY: WRC

DRAWN BY: Mapping

**WRC**  
WATER RESOURCES COMMISSIONER

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST  
WATERFORD, MICHIGAN  
48320-1907

SHEET NO.: 1 of 1