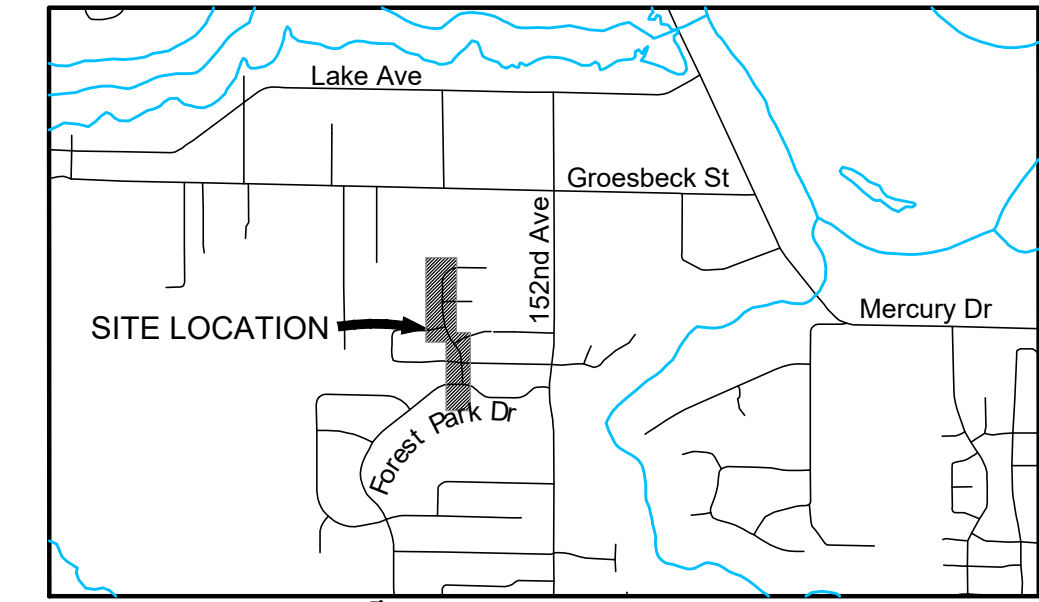




# GRAND OAK SUBDIVISION NO. 3 DRAIN

OTTAWA COUNTY WATER RESOURCES COMMISSIONER - JOE BUSH  
 SECTION 2  
 GRAND HAVEN TOWNSHIP (T07N R16W)  
 OTTAWA COUNTY, MICHIGAN



VICINITY MAP  
NOT TO SCALE

2121 3 Mile Rd. NW  
Walker, MI 49544  
Ph: 616-301-7886  
www.LREMI.com

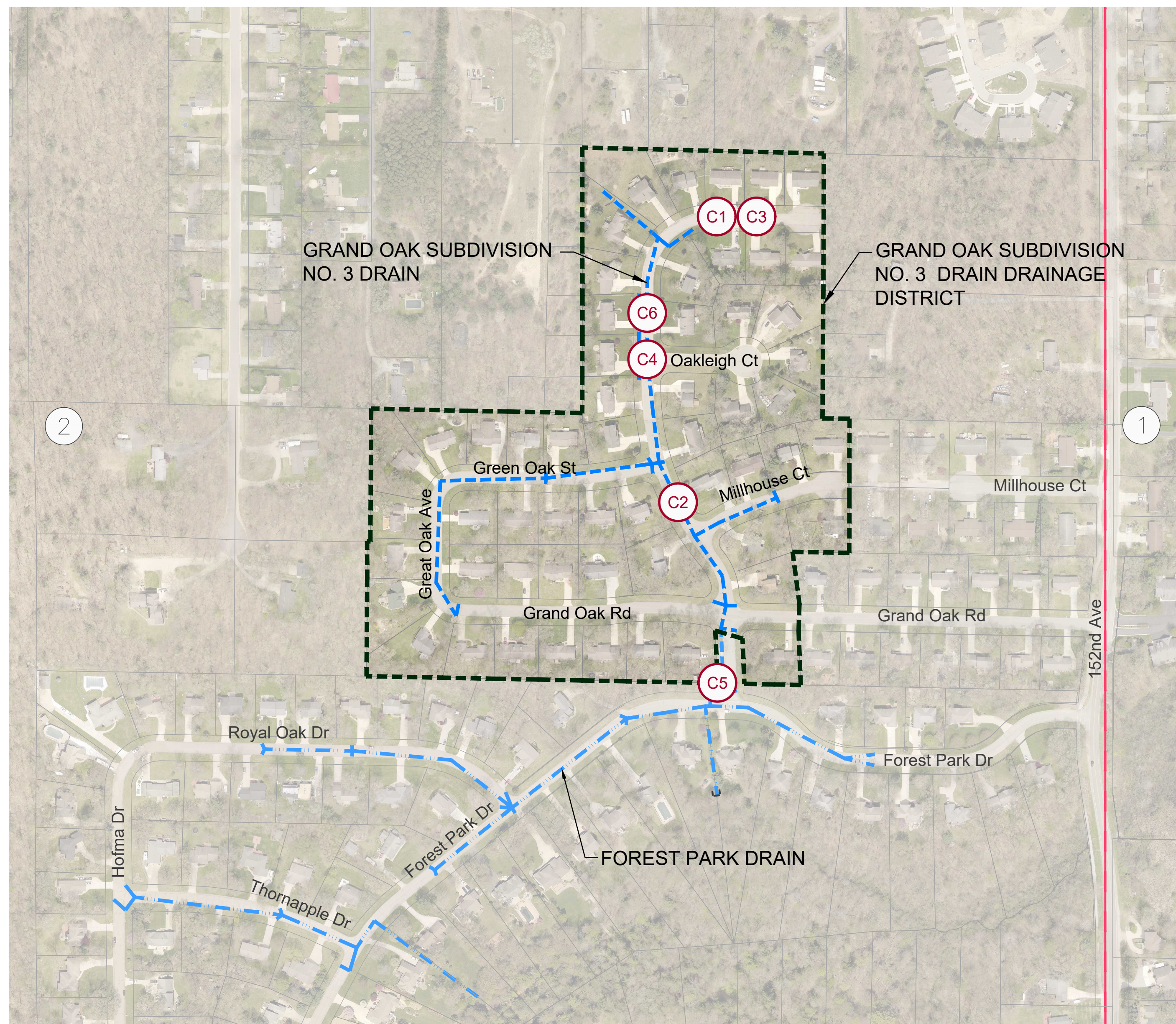


REVISIONS:	NO.	ISSUED FOR	DATE
1.	PERMITS		2/29/2024
2.	REVISED PERMIT SET		4/2/2024
3.	REVISED PERMIT SET		4/8/2024
4.	REVISED PERMIT SET		4/8/2024
5.	BIDS & CONSTRUCTION		5/6/2024

CLIENT: OTTAWA COUNTY WATER RESOURCES COMMISSIONER  
 12220 FILLMORE ST., #411, WEST OLIVE, MI 49686  
 PROJECT: GRAND OAK SUBDIVISION NO. 3 DRAIN  
 GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN

PROJECT NUMBER:	DATE
20-071	12/2020
	1/2023
	12/2020
	1/2023

SHEET NAME: COVER SHEET  
 SHEET NUMBER: CS



## INDEX OF SHEETS

- CS - COVER SHEET**
- C1 - REMOVALS & RESTORATION**  
RED OAK ST.
- C2 - REMOVALS & RESTORATION**  
OAK CHAPEL AVE. & FOREST PARK DR.
- C3 - PLAN & PROFILE**  
RED OAK ST. (STA. 0+00 - 1+40)
- C4 - PLAN & PROFILE**  
OAK CHAPEL AVE. (STA. 0+00 - 8+50)
- C5 - PLAN & PROFILE**  
OAK CHAPEL AVE. (STA. 8+50 - 17+00)
- C6 - PLAN & PROFILE**  
WEST SIDE-OAK CHAPEL AVE.  
(STA. 0+00 - 3+50)
- C7 - PLAN & PROFILE**  
WATER MAIN OFFSET (BY OTHERS)
- C8 - DETAILS**

## DRAIN INFORMATION

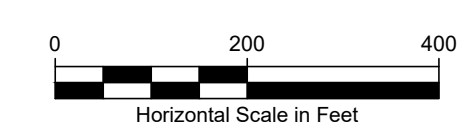
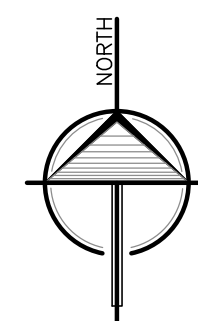
GRAND OAK SUBDIVISION NO. 3 DRAIN LENGTH 0.60 MILES  
 GRAND OAK SUBDIVISION NO. 3 DRAIN DRAINAGE DISTRICT AREA 26.25 ACRES

## LEGEND

- ENCLOSED CHANNEL DRAIN - GRAND OAK SUBDIVISION NO. 3 DRAIN
- ENCLOSED CHANNEL DRAIN - FOREST PARK DRAIN
- DRAINAGE DISTRICT BOUNDARY
- SECTION LINE
- TOWNSHIP LINE
- ROADS
- PROPERTY LINES
- SECTION NUMBERS
- SHEET NUMBERS

## MISCELLANEOUS QUANTITIES:

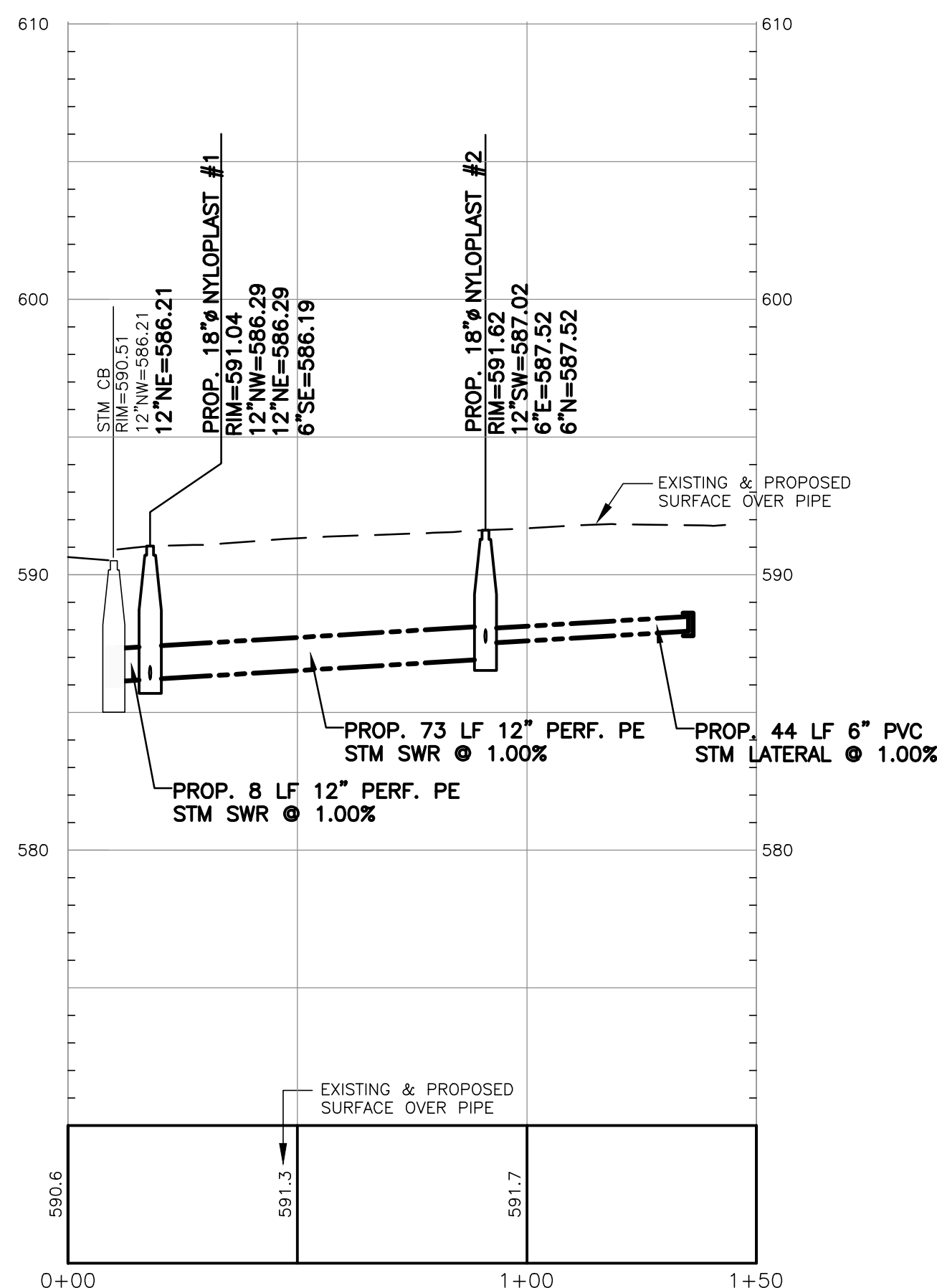
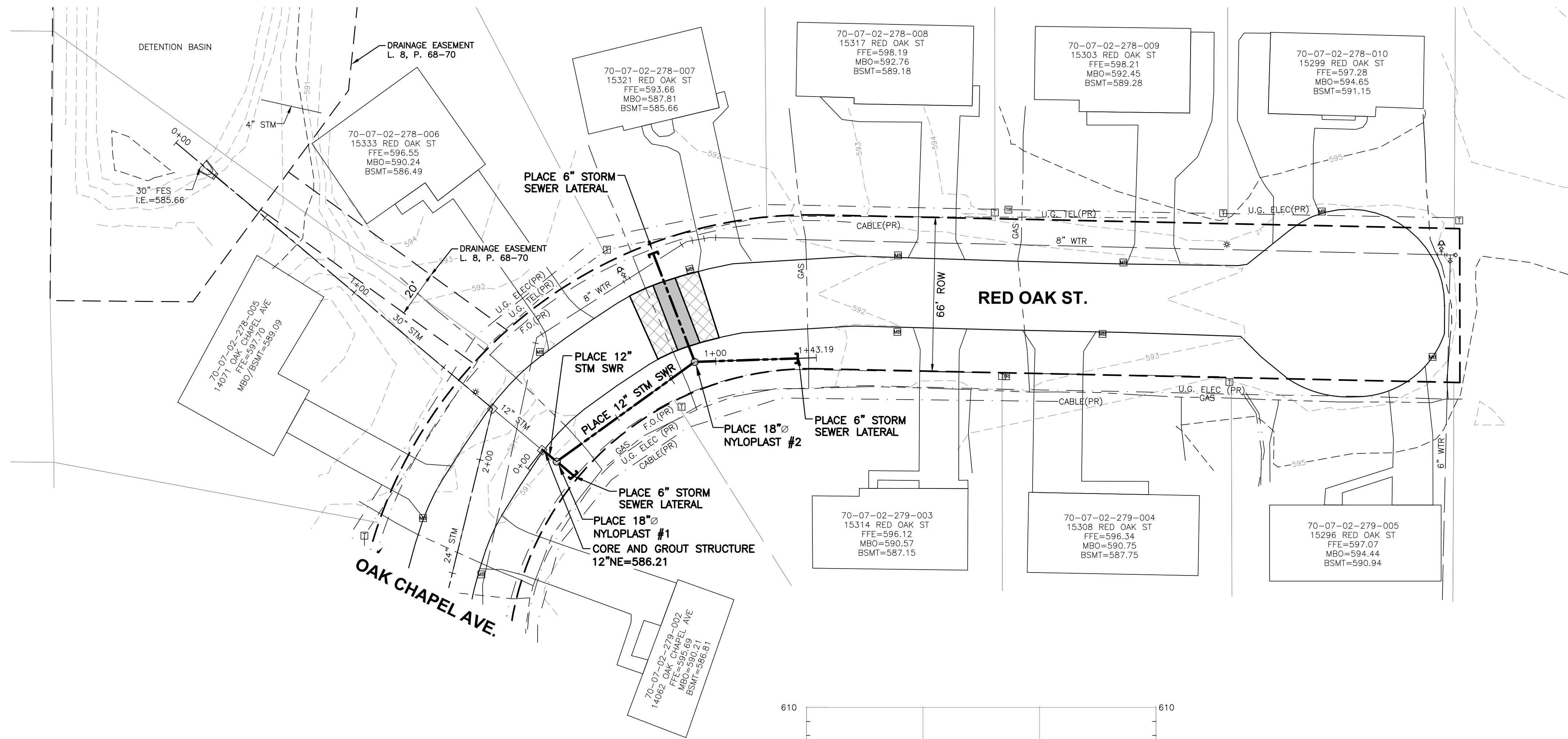
MOBILIZATION (10% MAX)	1 LS
TRAFFIC CONTROL	1 LS
UTILITY INVESTIGATION & PROTECTION	1 LS
SOIL EROSION & SEDIMENTATION CONTROL	1 LS
IRRIGATION COORDINATION AND REPLACEMENT	1 LS
TURF RESTORATION	1 LS
TREE REMOVAL AND CLEARING	1 LS
CASH ALLOWANCE - CONSTRUCTION TESTING	\$20,000



ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.





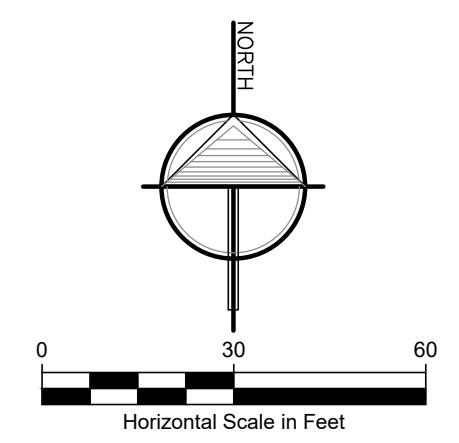


**PROFILE VIEW**

SCALE: HORIZONTAL: 1" = 30'  
 VERTICAL: 1" = 5'

**NOTES:**

1. STORM SEWER BELOW PUBLIC ROAD MUST BE REINFORCED CONCRETE PIPE.
2. ALL JOINTS ON REINFORCED CONCRETE PIPE MUST BE WRAPPED IN GEOTEXTILE FABRIC. USE GEOTEXTILE AT LEAST 36 INCHES WIDE AND CENTER IT ON THE JOINT. OVERLAP THE ENDS OF THE GEOTEXTILE BLANKET AT LEAST 12 INCHES.
3. STORM SEWER LATERALS TO BE PVC SDR-35 OR DUAL WALL HDPE (SLCPP) UNLESS CALLED OUT OTHERWISE.
4. STORM SEWER LATERALS MUST BE CONNECTED TO PIPE AND NYLOPLAST STRUCTURES PER DETAILS PROVIDED ON SHEET C8.



ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

2121 3 Mile Rd. NW  
 Walker, MI 49544  
 Ph: 616-301-7886  
 www.LREMI.com



NO.	ISSUED FOR	DATE
1.	PERMITS	2/29/2024
2.	REVISED PERMIT SET	4/2/2024
3.	REVISED PERMIT SET	4/8/2024
4.	REVISED PERMIT SET	4/8/2024
5.	BIDS & CONSTRUCTION	5/6/2024

CLIENT: OTTAWA COUNTY WATER RESOURCES COMMISSIONER  
 12220 FILLMORE ST. #41, WEST OLIVE, MI 49660  
 PROJECT: GRAND OAK SUBDIVISION NO. 3 DRAIN  
 GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN

DATE	PROJECT NUMBER
12/2020	20-071
11/2023	
12/2020	
11/2023	

SURVEYED BY: DJF  
 DESIGNED BY: DJC  
 DRAFTED BY: NDJ  
 QA/QC: DJF

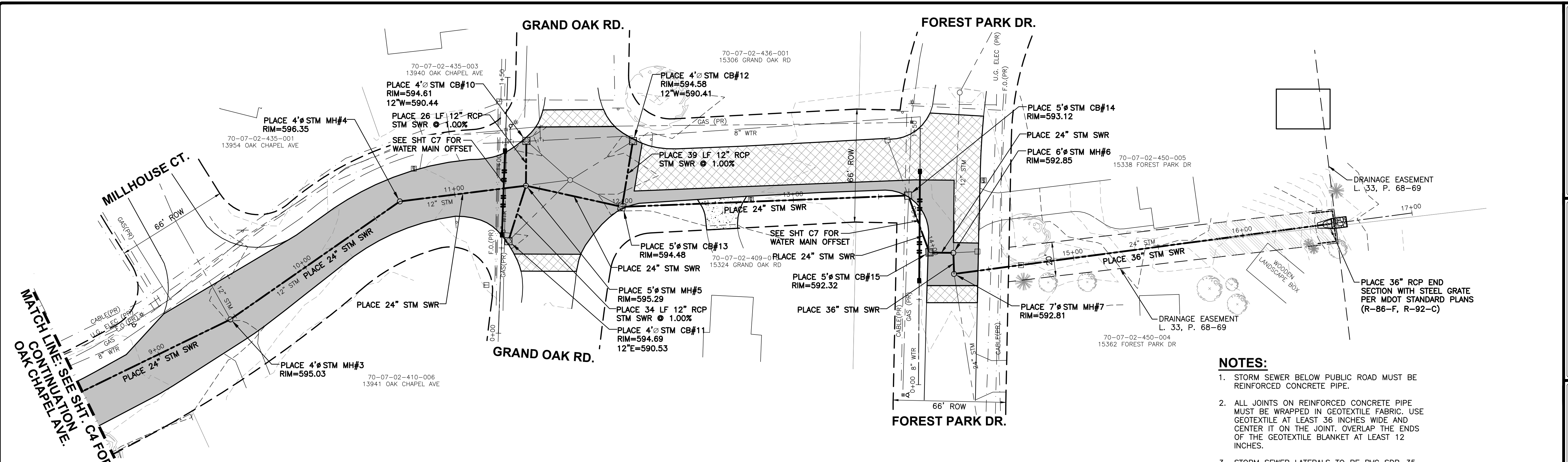
SHEET NAME: PLAN & PROFILE  
 RED OAK ST.  
 (STA. 0+00 - 1+40)

SHEET NUMBER

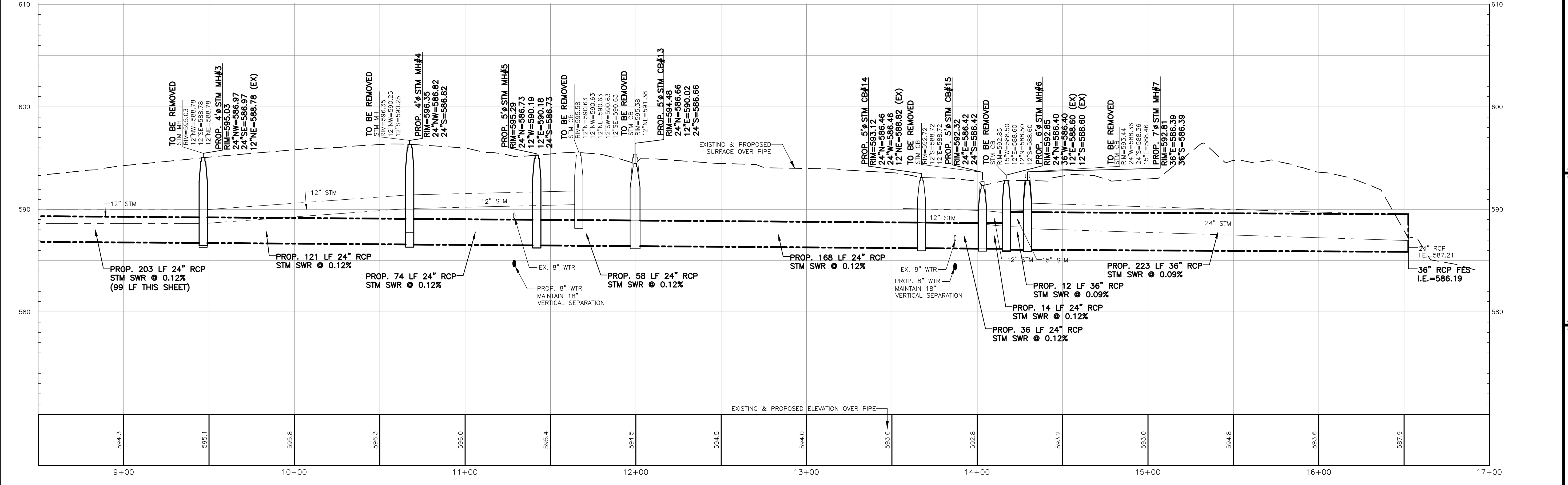
**C3**

10/15/2024 10:55:42 AM C:\Users\jdc\OneDrive\Documents\Projects\20-071\Drawings\20-071-001.dwg (1/1)





- NOTES:**
1. STORM SEWER BELOW PUBLIC ROAD MUST BE REINFORCED CONCRETE PIPE.
  2. ALL JOINTS ON REINFORCED CONCRETE PIPE MUST BE WRAPPED IN GEOTEXTILE FABRIC. USE GEOTEXTILE AT LEAST 36 INCHES WIDE AND CENTER IT ON THE JOINT. OVERLAP THE ENDS OF THE GEOTEXTILE BLANKET AT LEAST 12 INCHES.
  3. STORM SEWER LATERALS TO BE PVC SDR-35 OR DUAL WALL HDPE (SLCPP) UNLESS CALLED OUT OTHERWISE.
  4. STORM SEWER LATERALS MUST BE CONNECTED TO PIPE AND NYLOPLAST STRUCTURES PER DETAILS PROVIDED ON SHEET C8.



**PROFILE VIEW**  
SCALE: HORIZONTAL: 1" = 30'  
VERTICAL: 1" = 5'



ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

**LRE ENGINEERS & SURVEYORS**  
2121 3 Mile Rd. NW  
Walker, MI 49544  
Ph: 616-301-7886  
www.LREMI.com

REVISIONS:	NO.	ISSUED FOR	DATE
	1.	PERMITS	2/29/2024
	2.	REVISED PERMIT SET	4/2/2024
	3.	REVISED PERMIT SET	4/8/2024
	4.	BIDS & CONSTRUCTION	5/6/2024

CLIENT: OTTAWA COUNTY WATER RESOURCES COMMISSIONER  
12220 FILLMORE ST. #41, WEST OLIVE, MI 48460

PROJECT: GRAND OAK SUBDIVISION NO. 3 DRAIN  
GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN

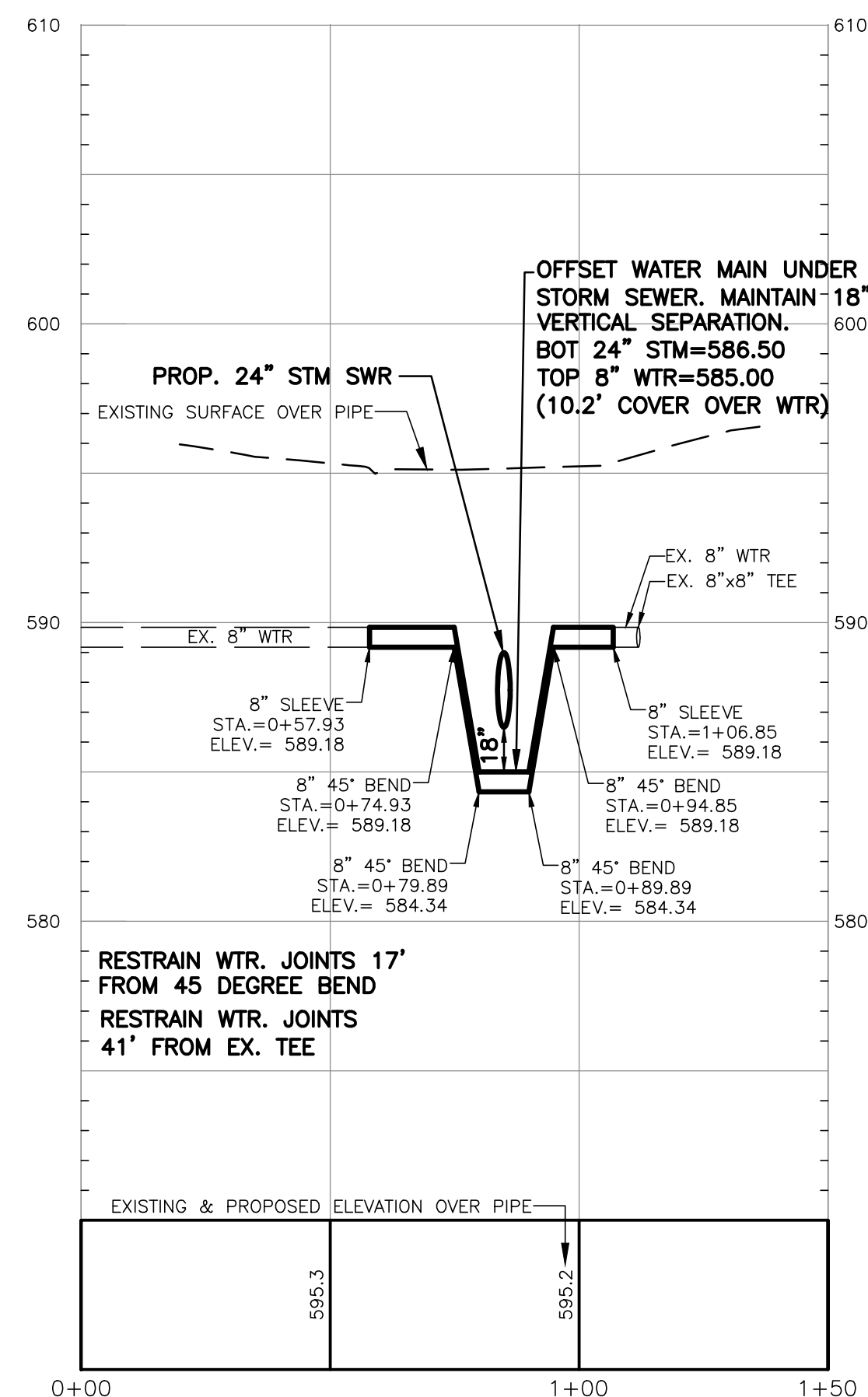
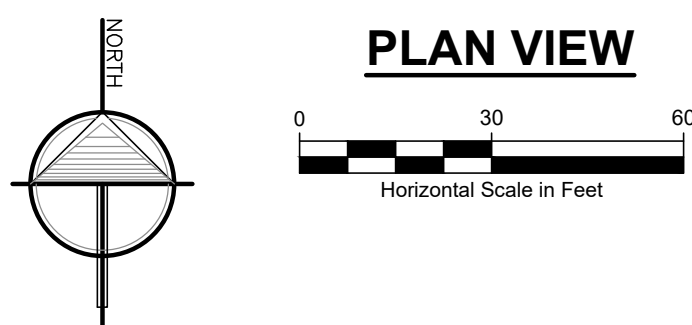
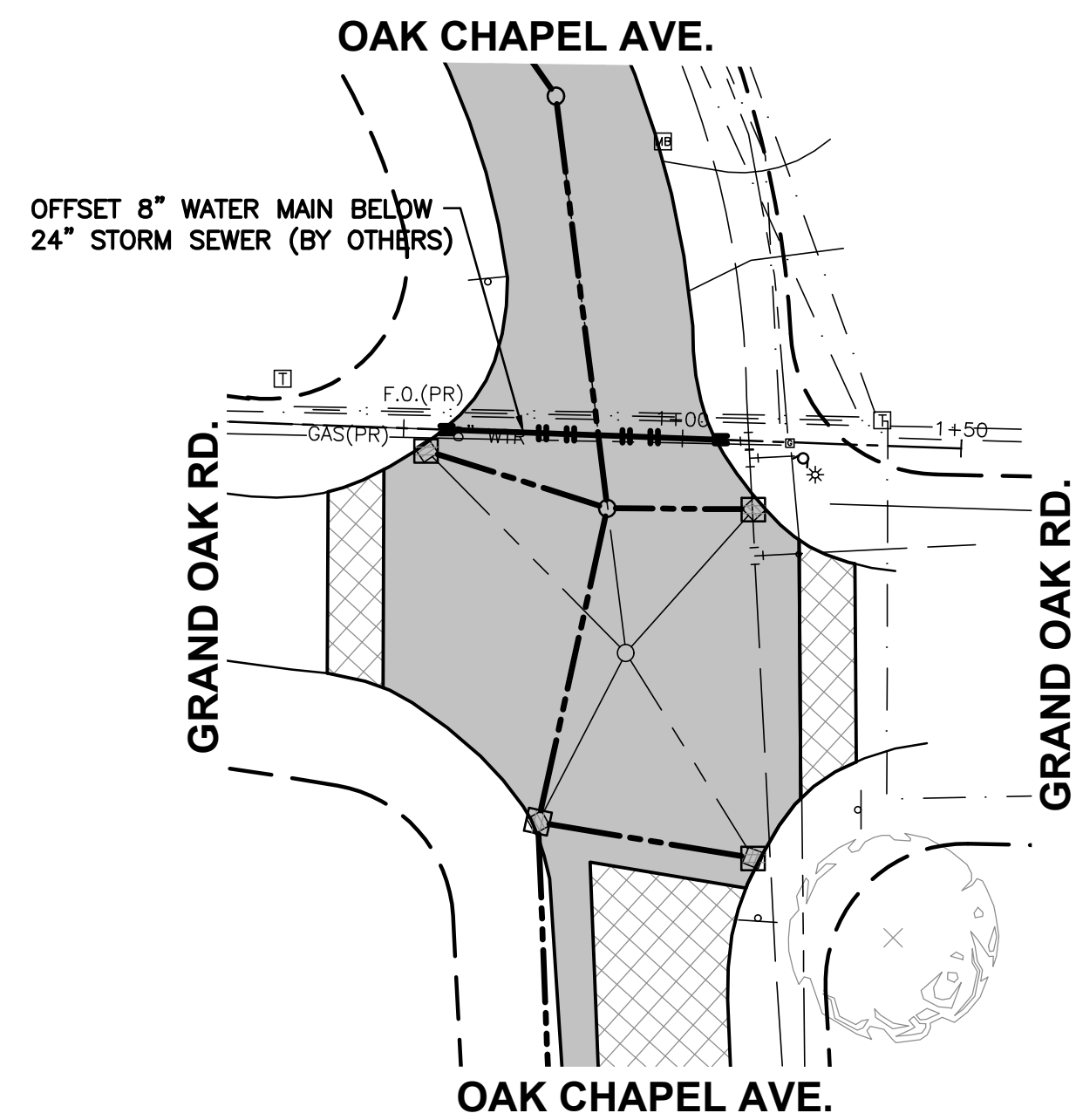
PROJECT NUMBER:	DATE
20-071	12/2020
	1/2023
	12/2020
	1/2023

SURVEYED BY: DJF  
DESIGNED BY: DJC  
DRAFTED BY: NDJ  
QA/QC: DJF

SHEET NAME: PLAN & PROFILE  
OAK CHAPEL AVE.  
(STA. 8+50 - 17+00)

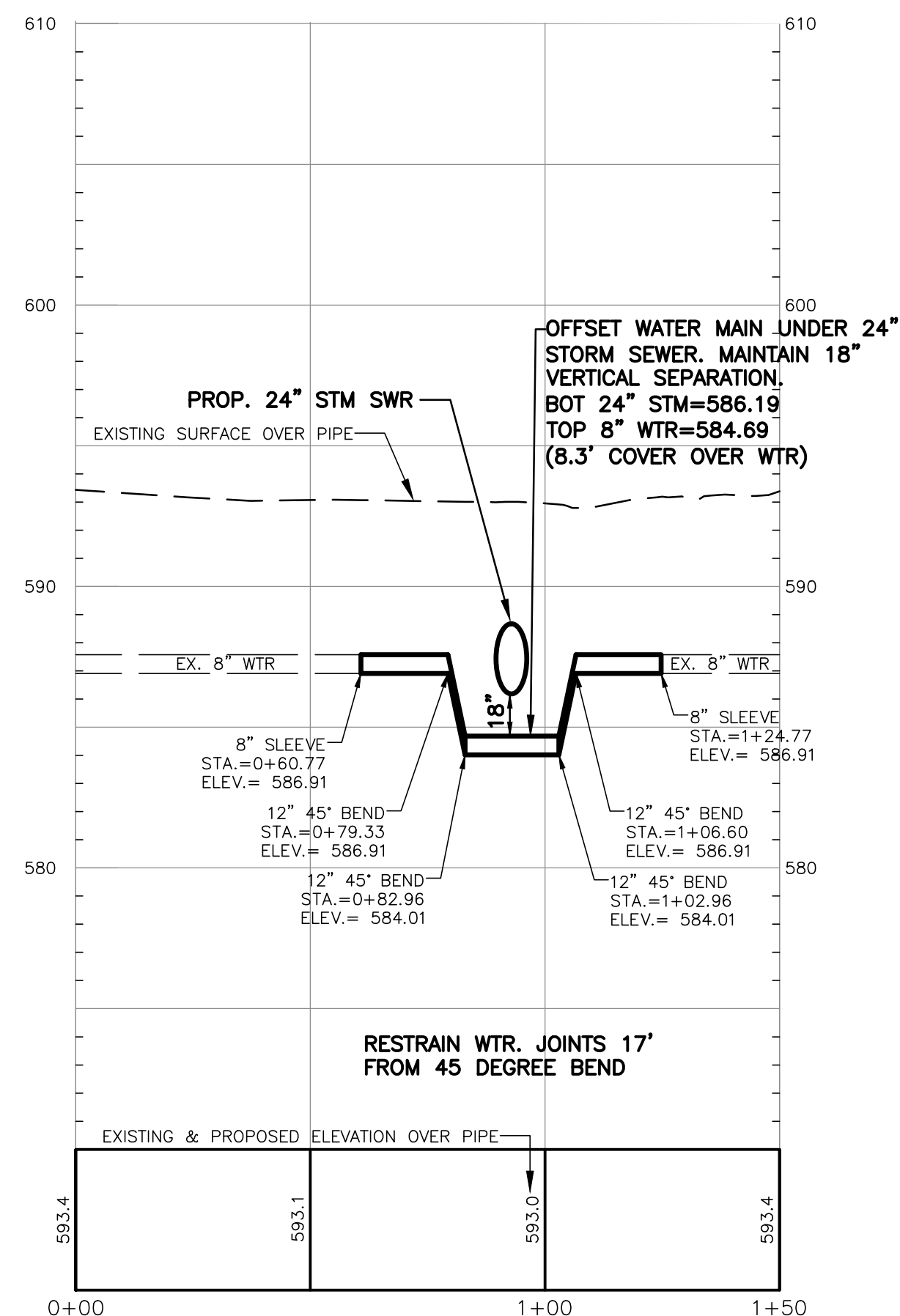
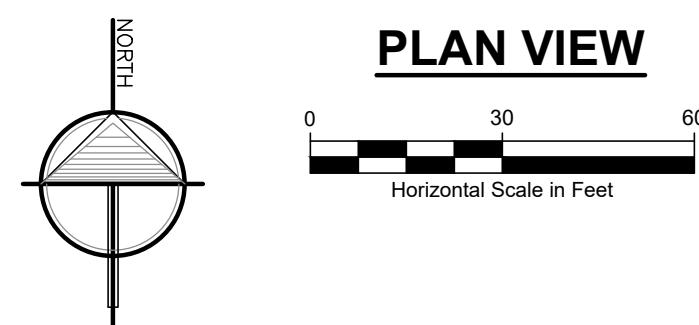
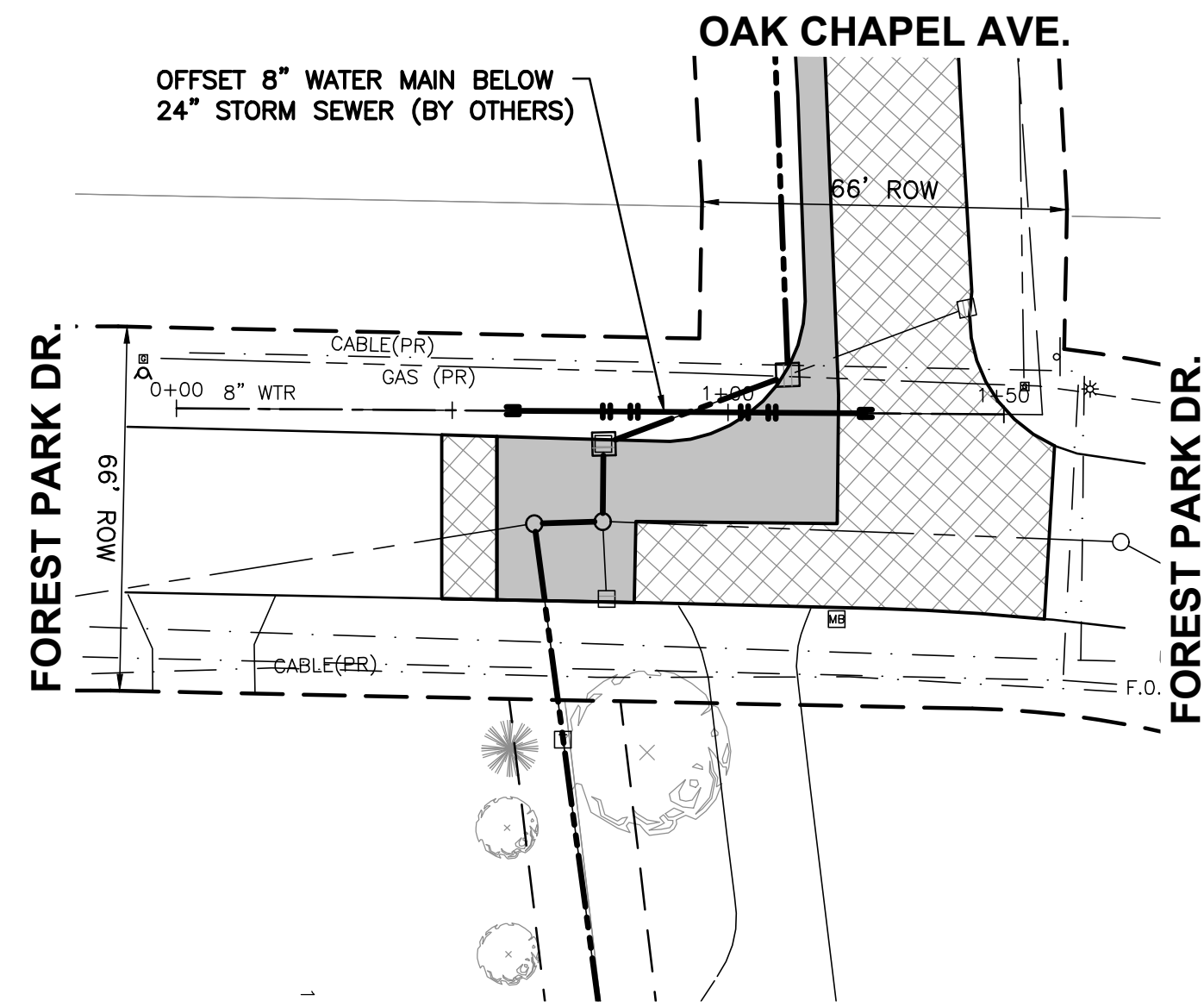
SHEET NUMBER: **C5**





**PROFILE VIEW**

SCALE: HORIZONTAL: 1" = 30'  
VERTICAL: 1" = 5'

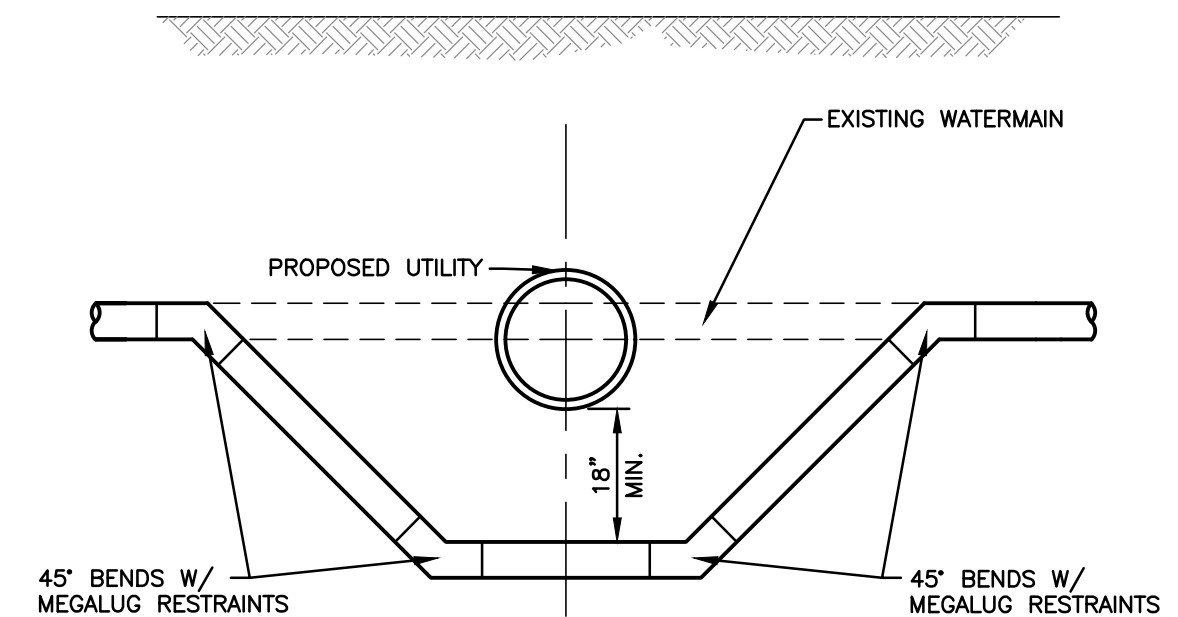


**PROFILE VIEW**

SCALE: HORIZONTAL: 1" = 30'  
VERTICAL: 1" = 5'

**WATER MAIN NOTES**

- EXISTING UTILITY LOCATIONS SHOWN ARE APPROXIMATE.
- VERIFY THE HORIZONTAL AND VERTICAL LOCATION OF EXISTING UTILITIES PRIOR TO EXCAVATION WHERE NECESSARY.
- PROTECT AND MAINTAIN SERVICE OF OTHER UTILITIES AT CROSSINGS.
- PROVIDE AND MAINTAIN INLET FILTERS AT ALL CATCH BASIN INLETS DURING CONSTRUCTION.
- ALL WATER MAIN AND WORKMANSHIP SHALL CONFORM TO THE GRAND HAVEN CHARTER TOWNSHIP PUBLIC SERVICES DEPARTMENT WATER MAIN CONSTRUCTION SPECIFICATIONS DATED MARCH 2017.
- EXISTING WATER LINES ARE TO BE PROTECTED FROM DEBRIS AND CONTAMINATION.
- EXPOSE ALL UNDERGROUND UTILITIES AT POTENTIAL POINTS OF CONFLICT BEFORE LAYING WATER MAIN TO DETERMINE WHETHER TO GO OVER OR UNDER THE EXISTING UTILITIES. THE WATER MAIN SHALL BE DEFLECTED TO GO OVER OR UNDER EXISTING UTILITIES WHEN REQUIRED BY THE ENGINEER. 45° BENDS TO ACCOMPLISH ELEVATION CHANGES OF THE WATER MAIN WILL ONLY BE USED WHEN REQUIRED OR APPROVED BY THE ENGINEER.
- WATER MAIN SHALL HAVE A MINIMUM OF 5'-6" OF COVER TO THE TOP OF THE PIPE UNLESS OTHERWISE NOTED ON DRAWINGS. ADJUSTMENT MAY BE REQUIRED TO AVOID CONFLICTS WITH EXISTING OR PROPOSED UTILITIES.
- PROVIDE A MINIMUM OF EIGHTEEN (18) INCHES OF VERTICAL SEPARATION AND TEN (10) FEET OF HORIZONTAL SEPARATION BETWEEN THE WATER MAIN AND ALL SANITARY AND STORM SEWERS.
- WATER MAIN SHALL BE DUCTILE IRON CLASS 52.
- TWO (2) BRONZE WEDGES SHALL BE INSTALLED FOR 6 INCH AND 8 INCH PIPE AT EACH PIPE JOINT.
- PIPE RESTRAINT SHALL BE ACCOMPLISHED THROUGH THE USE OF MEGA-A-LUG™ RESTRAINING GLANDS. SET SCREW GLANDS ARE NOT PERMITTED.
- SOLID SLEEVES SHALL BE LONG PATTERN TYPE. INSTALLATION SHALL INCLUDE A PROPERLY FITTED "SPOOL PIECE" TO FILL THE VOID BETWEEN THE TWO PIECES OF PIPE. THE SPOOL PIECE SHALL HAVE A TOLERANCE OF NO MORE THAN 1/8 INCH.



**WATERMAIN RELOCATION DETAIL**

NOT TO SCALE

**INFORMATION ONLY  
WATER MAIN BY OTHERS**

**RESTRAINT LENGTH TABLE**

PIPE DIAMETER (IN)	TEES, 90° BENDS	45° BENDS	22½° BENDS	11¼° BENDS	DEAD ENDS	REDUCERS (ONE SIDE)	SEE NOTE 1
4	23	9	5	2	57		
6	32	13	6	3	82	43	63
8	41	17	8	4	104	43	55
12	58	24	12	6	149	80	120
16	74	31	15	7	194	82	110
20	89	37	18	9	233	82	104
24	104	43	21	10	272	82	99

NOTE 1. IF THE PIPE ON THE SMALL SIDE OF A REDUCER EXCEEDS THE VALUE IN THIS COLUMN, THEN NO RESTRAINT IS NEEDED.  
NOTE 2. ALL JOINTS LYING WITHIN THE ABOVE MINIMUM DISTANCES FROM THE FITTING MUST ALSO BE RESTRAINED AS SHOWN BY THE ABOVE CHART.  
NOTE 3. THE LENGTH OF RESTRAINED PIPE REQUIRED AS SHOWN IS BASED ON TRENCH BACKFILL BEING COMPACTED TO 95% OF THE MAXIMUM WEIGHT AS MEASURED BY THE MODIFIED PROCTOR, AASHTO T-180. IF THE PIPE IS TO BE WRAPPED IN POLYETHYLENE, THE LENGTH OF RESTRAINED PIPE REQUIRED WILL BE AS SHOWN ON THE DRAWINGS OR IN THE SPECIAL SPECIFICATIONS. THE ABOVE TABLE DOES NOT CONSIDER POLYETHYLENE WRAPPED PIPE.



ALL UTILITIES AS SHOWN ARE APPROXIMATE LOCATIONS DERIVED FROM ACTUAL MEASUREMENTS AND AVAILABLE RECORDS. THEY SHOULD NOT BE INTERPRETED TO BE EXACT LOCATION NOR SHOULD IT BE ASSUMED THAT THEY ARE THE ONLY UTILITIES IN THE AREA.

2121 3 Mile Rd. NW  
Walker, MI 49544  
Ph: 616-301-7886  
www.LREMI.com



REVISIONS:	NO.	ISSUED FOR	DATE
	1.	PERMITS	2/29/2024
	2.	REVISED PERMIT SET	4/2/2024
	3.	REVISED PERMIT SET	4/8/2024
	4.	BIDS & CONSTRUCTION	5/6/2024

CLIENT: OTTAWA COUNTY WATER RESOURCES COMMISSIONER  
12220 FILLMORE ST. #411, WEST OLIVE, MI 49660  
PROJECT: GRAND OAK SUBDIVISION NO. 3 DRAIN  
GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN

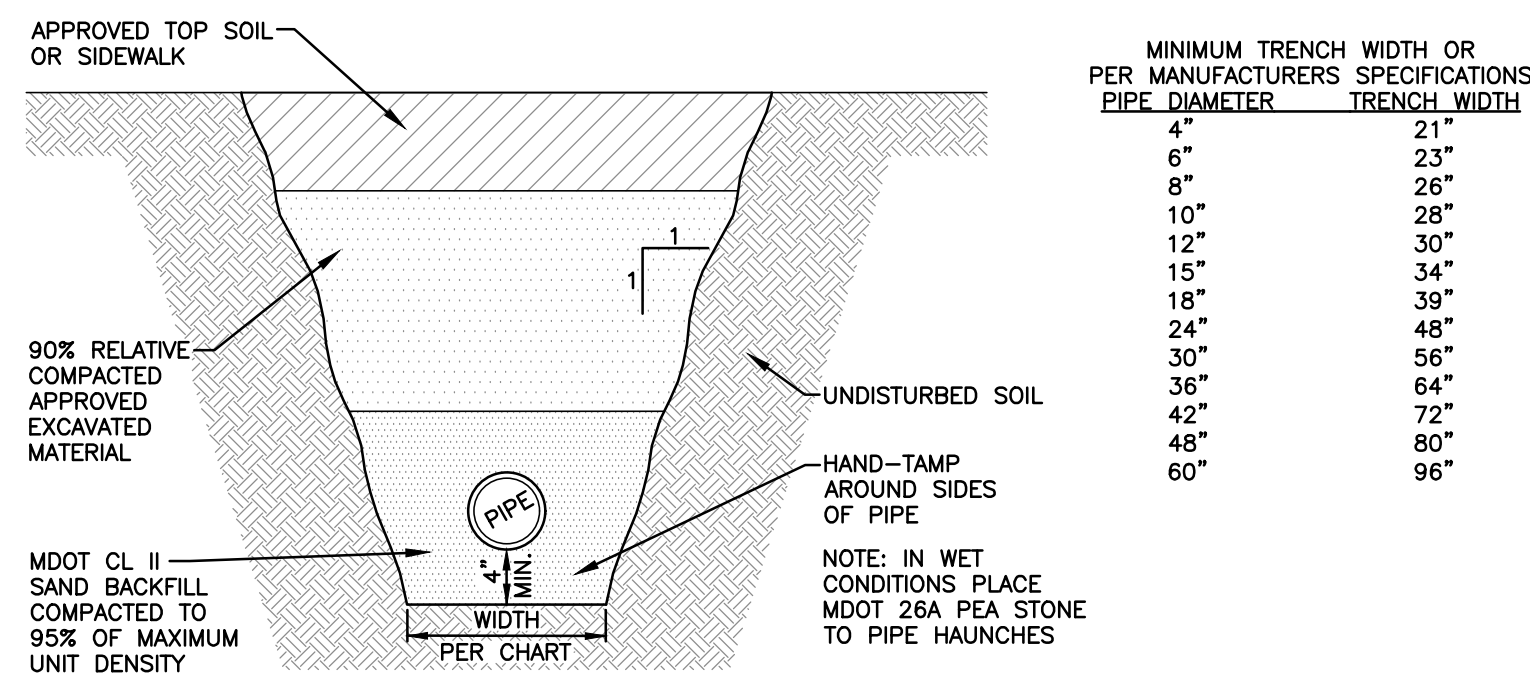
PROJECT NUMBER:	DATE
20-071	12/2020
	11/2023
	12/2020
	11/2023

SHEET NAME: PLAN & PROFILE WATER MAIN OFFSETS (BY OTHERS)

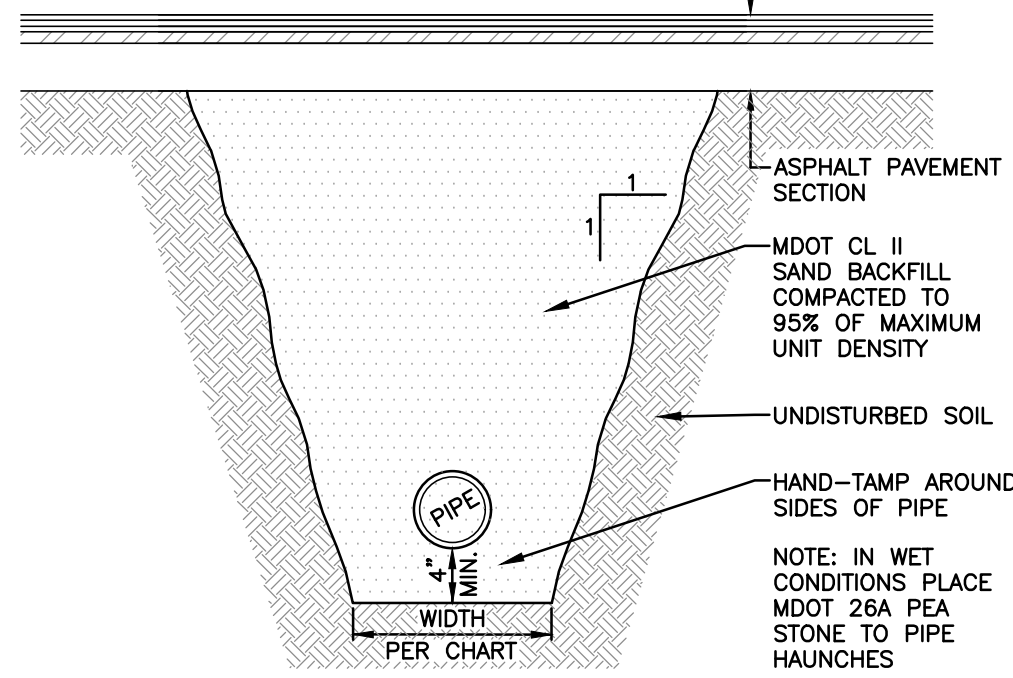
SHEET NUMBER

**C7**

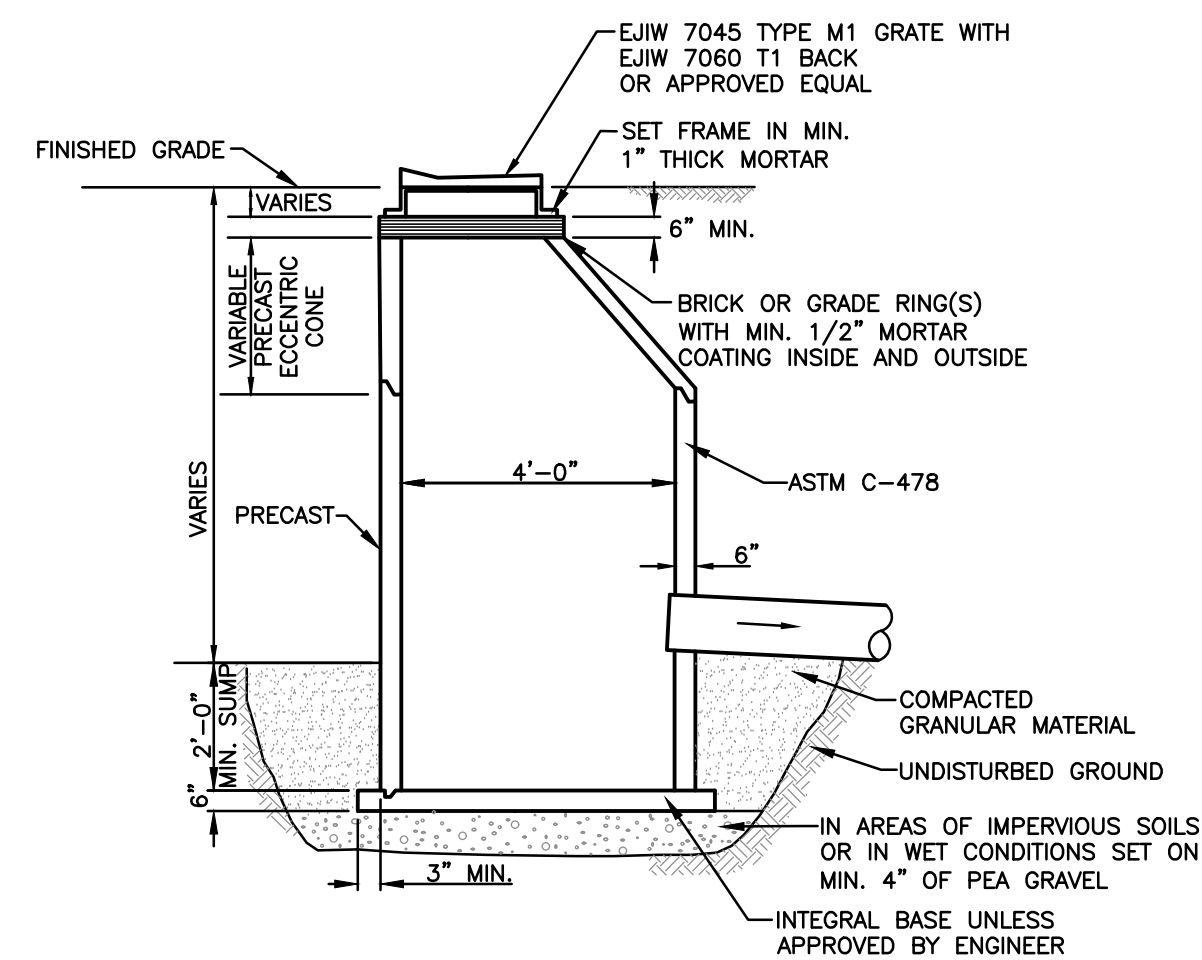




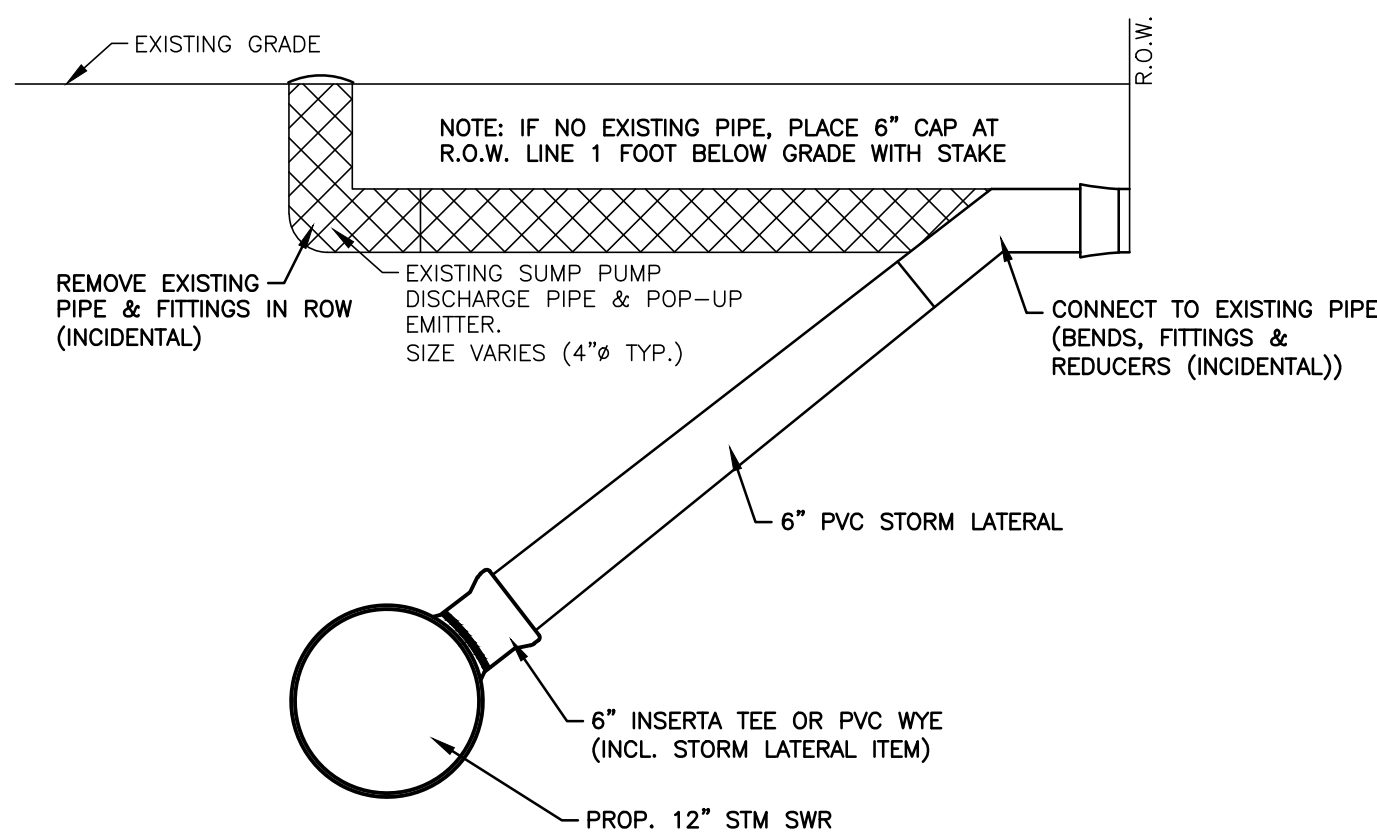
**TYPICAL TRENCH DETAIL**  
NOT TO SCALE



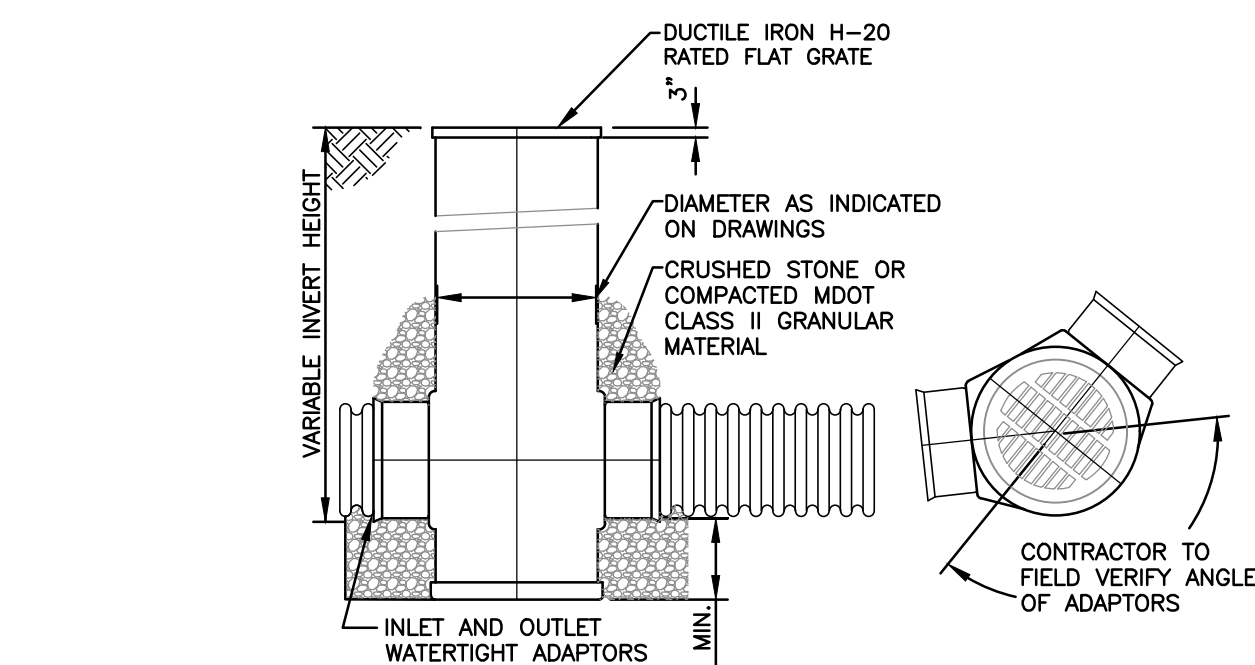
**TYPICAL TRENCH DETAIL UNDER ASPHALT SURFACES ONLY**  
NOT TO SCALE



**STANDARD CATCH BASIN**  
NO SCALE



**STORM SEWER LATERAL PIPE CONNECTION**  
NOT TO SCALE

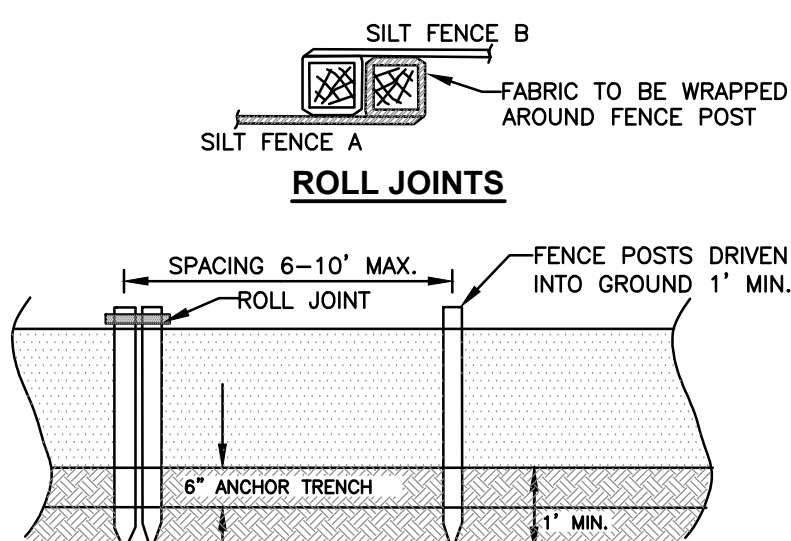


**NYLOPLAST DRAIN BASIN DETAIL**  
NOT TO SCALE

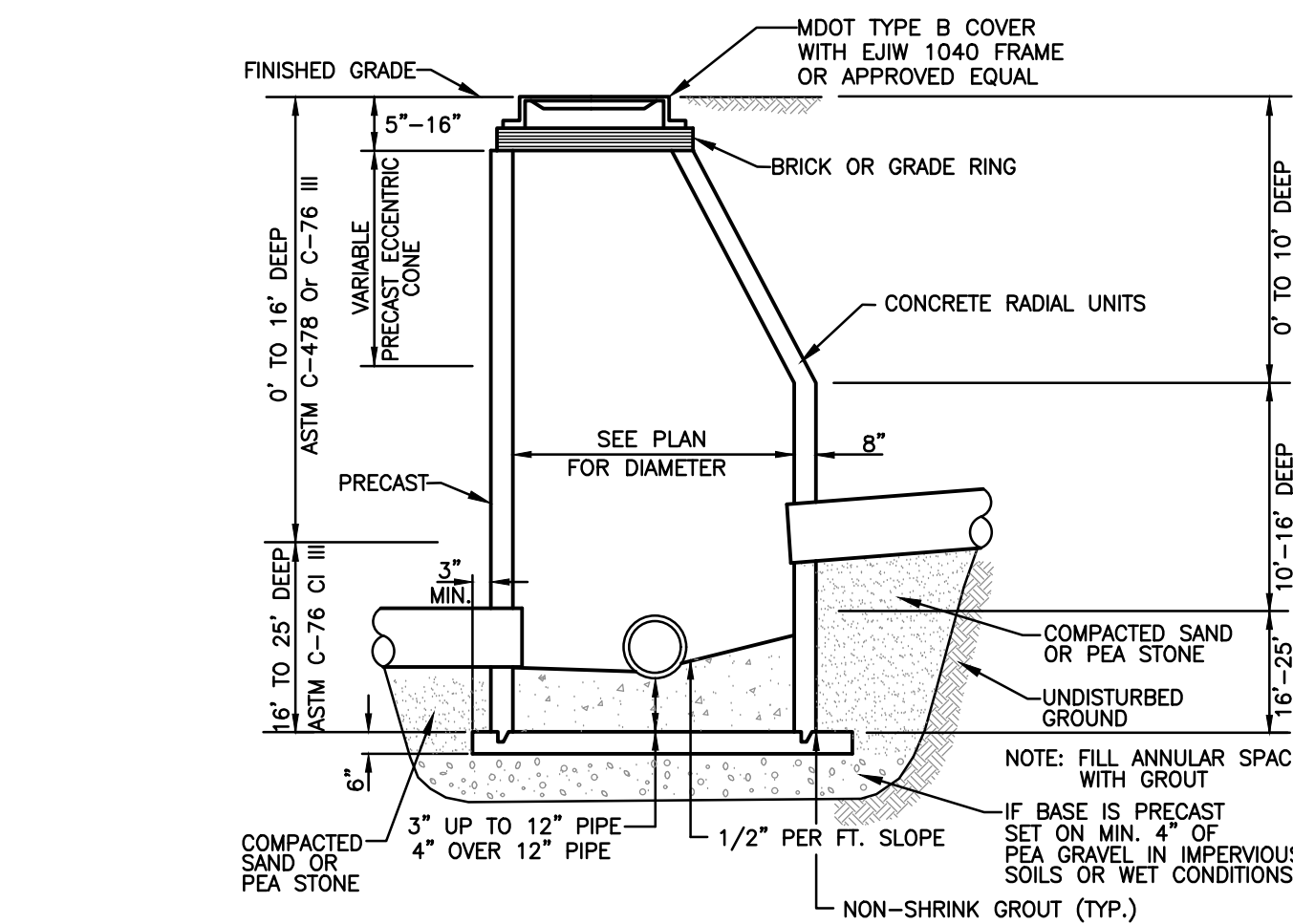
**E8 PERMANENT SEEDING NOTE:**  
ALL PROPOSED LAWN AREAS AND ALL AREAS DISTURBED BY CONSTRUCTION SHALL RECEIVE A MINIMUM OF 4" OF TOPSOIL AND LAWN SEED MIX AS INDICATED ON PLANS AND AS FOLLOWS:

PROPORTION	CLASS "A" SEED TYPE
10%	CANNON KENTUCKY BLUEGRASS
10%	GOLDRUSH KENTUCKY BLUEGRASS
20%	RONDE KENTUCKY BLUEGRASS
20%	SR5100 CHEWINGS FESCUE
20%	SR5200 CREEPING RED FESCUE
10%	SR4400 PERENNIAL RYEGRASS
10%	SR4500 PERENNIAL RYEGRASS

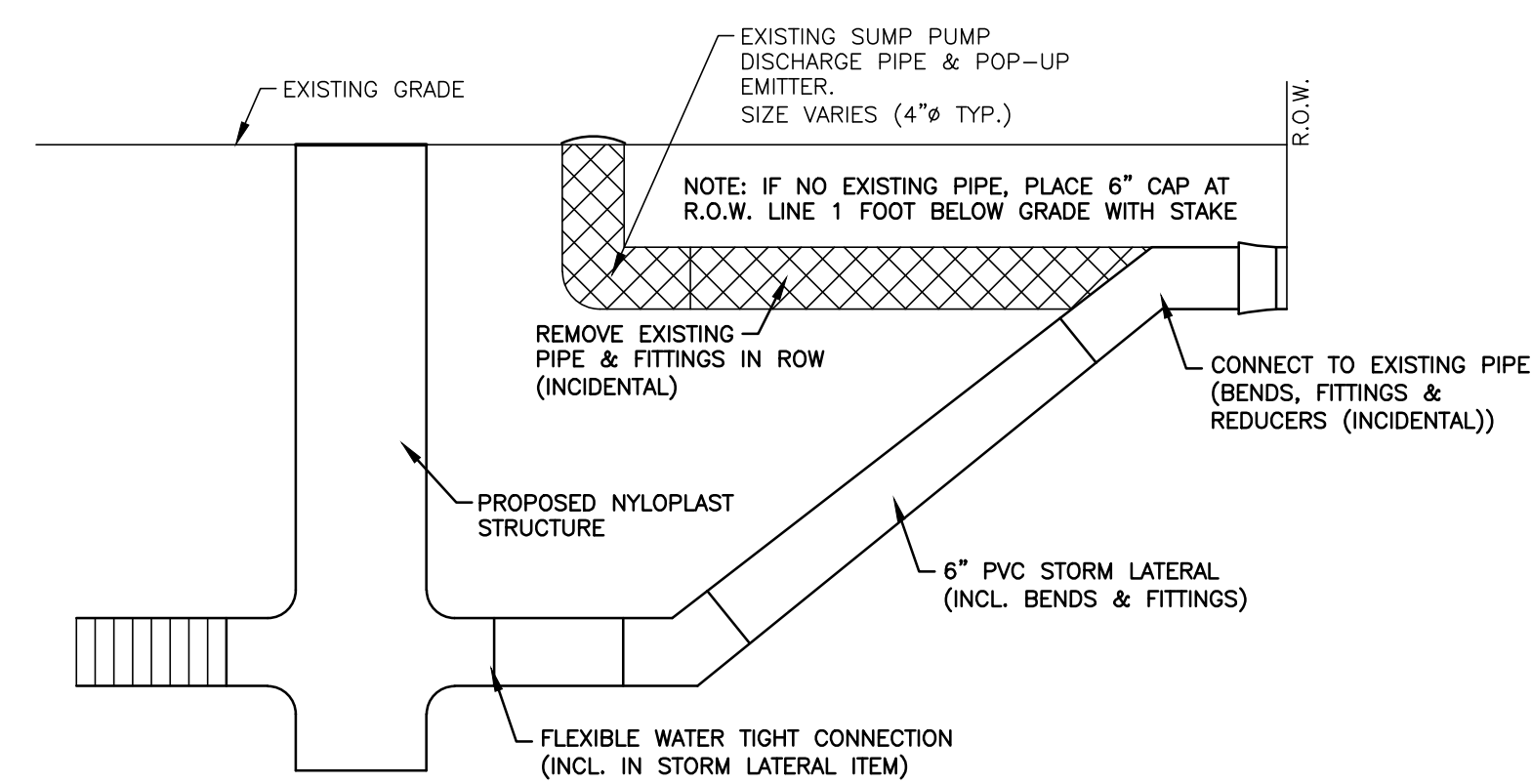
SEEDING RATE SHALL BE 4 TO 6 lbs. PER 1000 SQ. FEET.



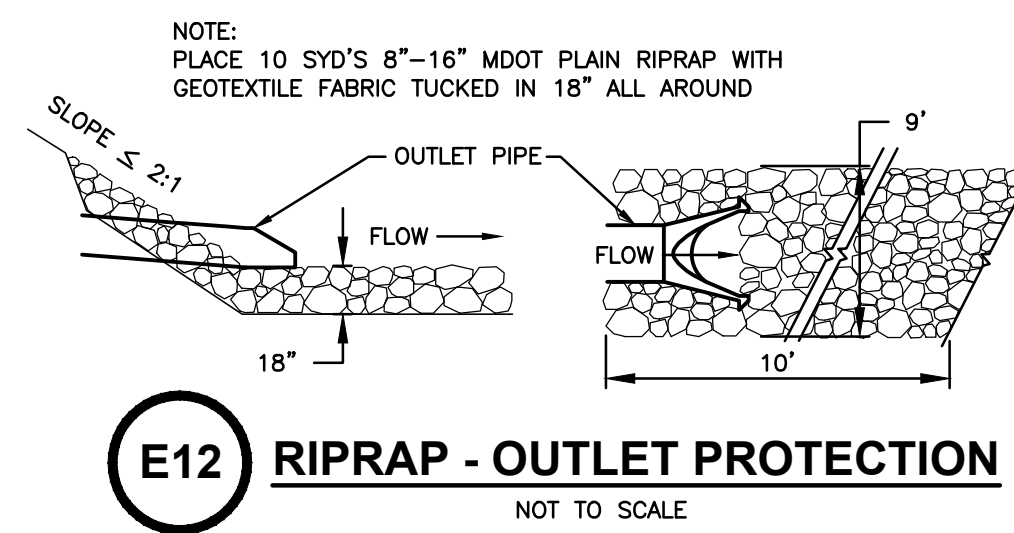
**S51 SILT FENCE DETAIL**  
NOT TO SCALE



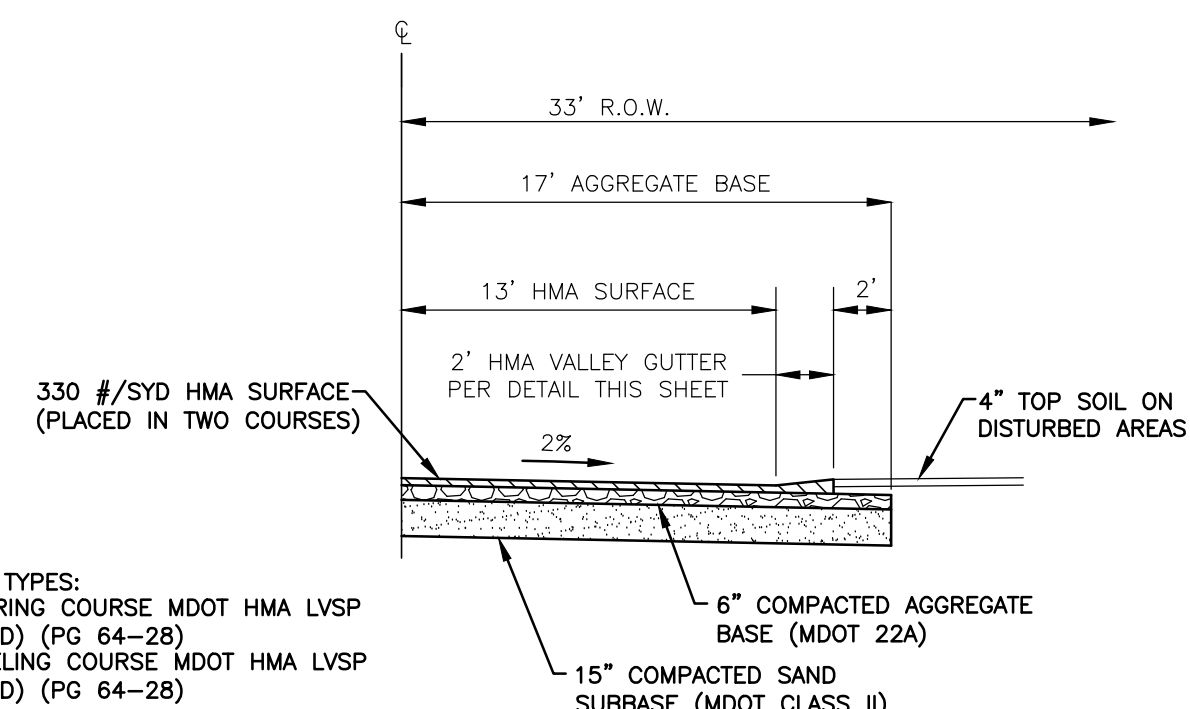
**STANDARD STORM MANHOLE**  
NOT TO SCALE



**STORM SEWER LATERAL NYLOPLAST STRUCTURE CONNECTION**  
NOT TO SCALE

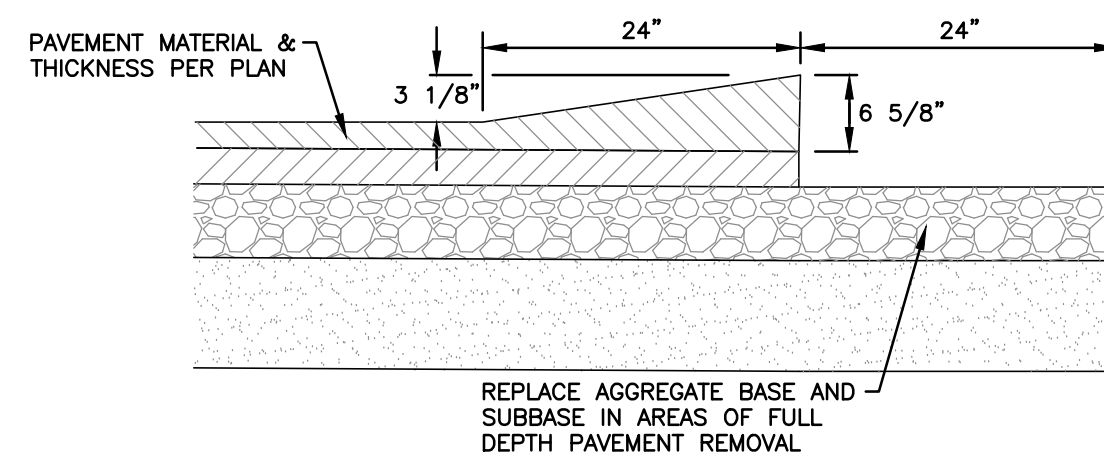


**E12 RIPRAP - OUTLET PROTECTION**  
NOT TO SCALE

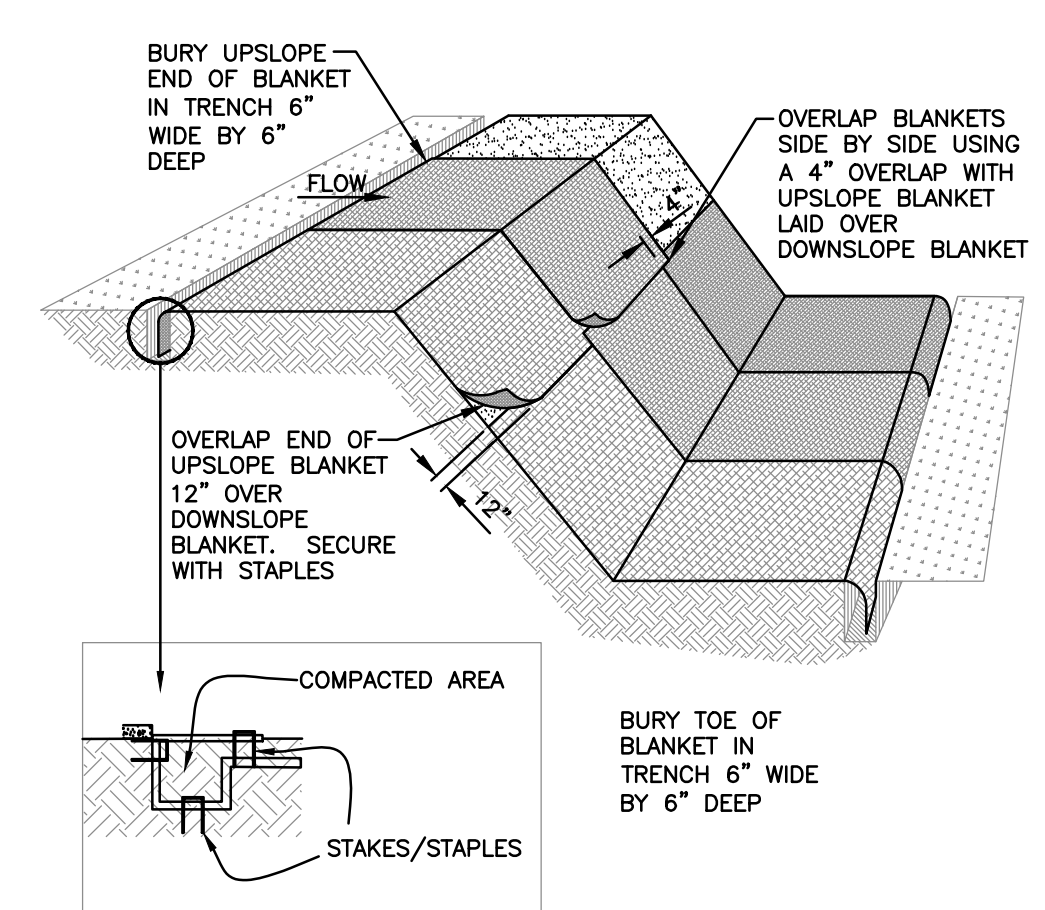


**RESIDENTIAL ROAD TYPICAL SECTION**  
OCRC DETAIL RD-13

**NOTES:**  
1. MINIMUM CENTERLINE GRADE SHALL BE 0.8% USING HMA VALLEY CURB.  
2. WHEN USING HMA VALLEY CURB, BACK OF CATCH BASIN CASTING SHALL BE AT 14.5" FROM CENTERLINE.  
3. TOP OF CATCH BASIN CASTING ALONG HMA VALLEY CURB SHALL BE SET FLUSH WITH HMA LEVELING COURSE. AGGREGATE BASE SHALL BE GRADED 10" FROM CASTING EACH DIRECTION (PARALLEL TO CENTERLINE, TO ALLOW FOR THICKNESS OF HMA TOP COURSE).  
4. ALL MATERIAL DESIGNATIONS REFER TO M.D.O.T. STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2020 EDITION AND SUPPLEMENTAL SPECIFICATIONS.

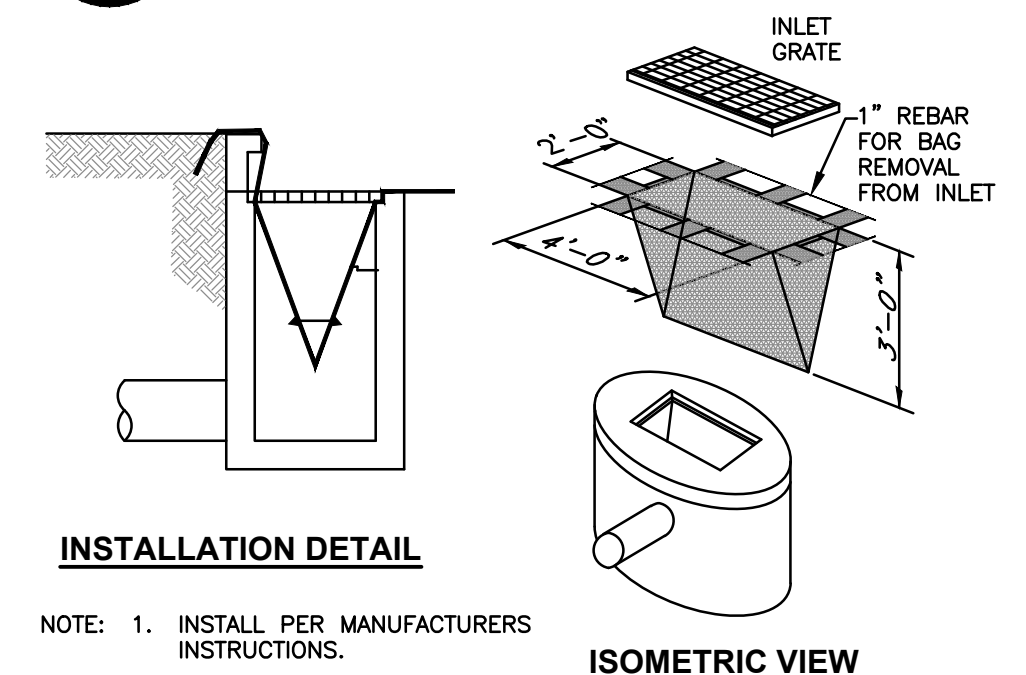


**BITUMINOUS VALLEY GUTTER DETAIL**  
NOT TO SCALE



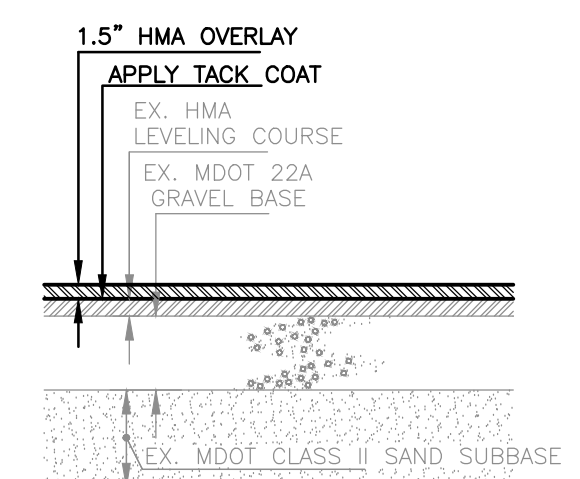
**NOTES:**  
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.  
2. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

**E9 MULCH BLANKETS**  
NOT TO SCALE

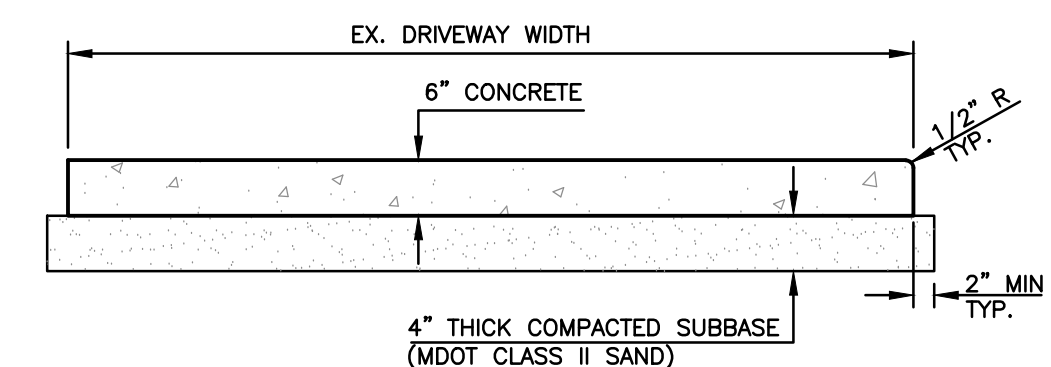


**S58 INLET PROTECTION - FABRIC DROP**  
NOT TO SCALE

**MATERIAL TYPES:**  
HMA WEARING COURSE OVERLAY MDOT HMA LVSP (165#/SYD) (PG 64-28)  
ALL MATERIAL DESIGNATIONS REFER TO M.D.O.T. STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2020 EDITION AND SUPPLEMENTAL SPECIFICATIONS



**COLD MILL & PAVEMENT OVERLAY SECTION**  
NOT TO SCALE



**CONCRETE DRIVEWAY DETAIL**  
NOT TO SCALE

REVISIONS:	NO.	ISSUED FOR	DATE
	1.	PERMITS	2/29/2024
	2.	REVISED PERMIT SET	4/2/2024
	3.	REVISED PERMIT SET	4/8/2024
	4.	BIDS & CONSTRUCTION	5/6/2024

CLIENT: OTTAWA COUNTY WATER RESOURCES COMMISSIONER  
12220 FILLMORE ST., #411, WEST OLIVE, MI 49460  
PROJECT: GRAND OAK SUBDIVISION NO. 3 DRAIN  
GRAND HAVEN TOWNSHIP, OTTAWA COUNTY, MICHIGAN

PROJECT NUMBER:	DATE
20-071	12/2020
	11/2023
	12/2020
	11/2023

SHEET NUMBER: C8