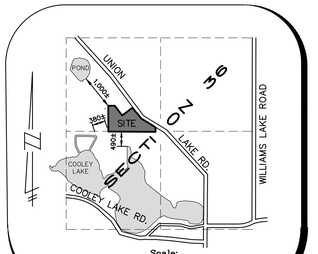
ENGINEERING CONSTRUCTION PLANS FOR

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, T 3 NORTH , R 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN

APPLICANT:
JMF WHITE LAKE, L.L.C.
1700 WEST BIG BEAVER ROAD, SUITE 120
TROY, MI 48084
PHONE: 248-602-2220



LOCATION MAP

LEGAL DESCRIPTION

THE LAND REFERRED TO IN THIS COMMITMENT IS DESCRIBED AS FOLLOWS: TOWNSHIP OF WHITE LAKE, COUNTY OF OAKLAND, STATE OF MICHIGAN:
PART OF THE SOUTHEAST 1/4 OF NORTHWEST 1/4 OF SECTION 36, TOWN 3 NORTH, RANGE 8 EAST, WHITE LAKE TOWNSHIP, OAKLAND COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE WEST 1/4 CORNER OF SAID SECTION 36; THENCE NORTH 87 DEGREES 30 MINUTES 53 SECONDS EAST 1327.83 FEET ALONG THE EAST-WEST 1/4 LINE OF SAID SECTION 36 AND THE SOUTH LINE OF "CEDAR OAKS", A SUBDIVISION AS RECORDED IN LIBER 191 OF PLATS, PAGES 21-22 TO THE POINT OF BEGINNING; THENCE ALONG THE EASTERLY LINE OF SAID "CEDAR OAKS" THE FOLLOWING THREE COURSES, 1) NORTH 02 DEGREES 36 MINUTES 44 SECONDS WEST 16.50 FEET, 2) NORTH 87 DEGREES 52 MINUTES 27 SECONDS EAST 5.68 FEET, AND 3) NORTH 02 DEGREES 43 MINUTES 01 SECONDS WEST 720.81 FEET TO THE NORTHEAST CORNER OF SAID "CEDAR OAKS"; THENCE NORTH 87 DEGREES 46 MINUTES 11 SECONDS EAST 187.78 FEET; THENCE SOUTH 40 DEGREES 09 MINUTES 00 SECONDS EAST 340.79 FEET; THENCE NORTH 49 DEGREES 58 MINUTES 01 SECONDS EAST 337.53 FEET; THENCE ALONG THE CENTERLINE OF UNION LAKE ROAD AS PREVIOUSLY SURVEYED BY DAVID P. SMITH AND ASSOCIATES, JOB NUMBER 03-050203, DATED SEPTEMBER 9, 2003 THE FOLLOWING THREE COURSES, 1) SOUTH 39 DEGREES 13 MINUTES 06 SECONDS EAST 3.56 FEET, 2) SOUTH 38 DEGREES 49 MINUTES 29 SECONDS EAST 21.54 FEET, AND 3) 307.59 FEET ALONG A NON-TANGENTIAL CURVE TO THE LEFT, SAID CURVE HAVING A RADIUS OF 1432.40 FEET, A CENTRAL ANGLE OF 12 DEGREES 18 MINUTES 13 SECONDS, AND A CHORD WHICH BEARS SOUTH 44 DEGREES 58 MINUTES 31 SECONDS EAST 307.00 FEET; THENCE SOUTH 58 DEGREES 02 MINUTES 33 SECONDS EAST 513.63 FEET ALONG THE CENTERLINE OF UNION LAKE ROAD PER "BOCOVINA HOMESITES", OAKLAND COUNTY CONDOMINIUM PLAN NO. 754 AND AS PREVIOUSLY SURVEYED BY MCGINNIS ENGINEERING COMPANY, DATED OCTOBER 12, 1973; THENCE SOUTH 02 DEGREES 52 MINUTES 24 SECONDS EAST 127.03 FEET ALONG THE NORTH-SOUTH 1/4 LINE OF SAID SECTION 36; THENCE SOUTH 00 DEGREES 40 MINUTES 48 SECONDS WEST 16.85 FEET TO THE CENTER OF SAID SECTION 36; THENCE SOUTH 87 DEGREES 53 MINUTES 19 SECONDS WEST 1312.16 FEET ALONG THE EAST-WEST 1/4 LINE OF SAID SECTION 36 AND THE NORTH LINE OF "COOLEY BEACH SUB-DIVISION" AS RECORDED IN LIBER 24 OF PLATS, PAGE 2 TO THE POINT OF BEGINNING. CONTAINING 15.14 ACRES.

TAX PARCEL No.: 12-36-176-003

GENERAL NOTES

1. THE CONTRACTOR SHALL CONTACT THE TOWNSHIP ENGINEER AT (248) 334-9901 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL KEEP THE INSPECTOR APPRAISED OF THE NEED FOR INSPECTION ON A DAY TO DAY BASIS. LACKING SPECIFIC SCHEDULING WITH THE INSPECTOR, THE CONTRACTOR SHALL GIVE 48 HOURS NOTICE TO THE TOWNSHIP ENGINEER PRIOR TO RECOMMENCING WORK REQUIRING INSPECTION. FAILURE TO INFORM THE INSPECTOR OR THE TOWNSHIP ENGINEER OF A WORK CANCELLATION MAY RESULT IN A ONE HALF DAY INSPECTION CHARGE TO THE DEVELOPER.
2. THE DEVELOPER SHALL CONTACT THE TOWNSHIP PLANNING DEPARTMENT AT (248) 698-3300 TO SCHEDULE A PRE-CONSTRUCTION MEETING. THE DEVELOPER'S PRIME SITE CONTRACTOR SHALL ATTEND. A COPY OF ALL PERMITS MUST BE SUBMITTED TO THE PLANNING DEPARTMENT PRIOR TO SCHEDULING THE MEETING.
3. ALL CONSTRUCTION MUST CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS ADOPTED BY WHITE LAKE TOWNSHIP.
4. CONTRACTOR SHALL CONTACT MISS DIG AT 1-800-482-7171, 72 HOURS IN ADVANCE OF CONSTRUCTION, FOR EXISTING UNDERGROUND UTILITY LOCATIONS.
5. ALL SOIL EROSION AND SILTATION MUST BE CONTROLLED AND CONTAINED ON-SITE.
6. ALL EXCAVATION, INCLUDING ALL UTILITIES AND LEADS, UNDER OR WITHIN 1 ON 1 INFLUENCE OF ANY PAVEMENT (INCLUDING SIDEWALKS), EXISTING OR PROPOSED, OR WHERE SAND BACKFILL IS CALLED FOR ON THE PLAN, SHALL BE BACKFILLED AND COMPACTED WITH GRANULAR MATERIAL (SAND) MDOT CLASS II TO 95 PERCENT MAXIMUM UNIT DENSITY (ALL OTHERS 90 PERCENT).
7. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES AND FACILITIES. THE CONTRACTOR SHALL EXPOSE EXISTING UTILITIES AT THE PROPOSED UTILITY CROSSINGS PRIOR TO THE START OF UNDERGROUND CONSTRUCTION. ANY CONFLICTS WITH UTILITIES SHALL BE IMMEDIATELY REPORTED TO THE PROJECT ENGINEER.
8. WHERE TWO UTILITIES CROSS, INCLUDING SANITARY SEWER LEADS, PROVIDE POROUS GRADE "B" BACKFILL MATERIAL COMPACTED TO THE UNDERSIDE OF THE HIGHER UTILITY OR AS SPECIFIED ON THE DETAIL SHEET.
9. DUST CONTROL SHALL BE MAINTAINED AT ALL TIMES.
10. ANY MUD TRACKED ONTO UNION LAKE ROAD SHALL BE REMOVED DAILY.
11. IF DEWATERING IS DETERMINED TO BE REQUIRED, IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY THE AREA TO BE DEWATERED, SUBMIT A DEWATERING PLAN TO THE WHITE LAKE TOWNSHIP ENGINEERING DIVISION FOR REVIEW, TO MONITOR AND TO DETERMINE THAT THERE WILL NOT BE ANY IMPACT TO ANY ADJOINING OR OFFSITE PROPERTIES DEWATERING PROCEDURES SHALL BE IN COMPLIANCE WITH WHITE LAKE TOWNSHIP.
12. A ROAD COMMISSION FOR OAKLAND COUNTY RIGHT-OF-WAY PERMIT IS REQUIRED FOR ANY WORK WITHIN THE UNION LAKE ROAD AND CEDAR ISLAND ROAD RIGHTS-OF-WAY (OR ANY PUBLIC ROAD RIGHT-OF-WAY) AND/OR ANY TOWNSHIP EASEMENT.
13. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS, INVERTS AND GRADES PRIOR TO THE START OF ANY WORK.
14. ALL PAVEMENT MARKINGS, TRAFFIC CONTROL SIGNS, AND PARKING SIGNS SHALL COMPLY WITH THE DESIGN AND PLACEMENT REQUIREMENTS OF THE 2011 MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
15. WHITE LAKE TOWNSHIP HAS NO RESPONSIBILITY TO IMPROVE OR MAINTAIN THE PRIVATE STREETS CONTAINED WITHIN OR PRIVATE STREETS PROVIDING ACCESS TO THE PROPERTY DESCRIBED IN THE PLAN.
16. 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, WATER MAINS 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.

SCALE
100 0 50 100 200 400
(IN FEET)
Scale: 1 inch = 100 ft.

SEE SHEET 26 FOR R.C.O.C. NOTES

SEE SHEET 29 FOR LIST OF QUANTITIES

SHEET INDEX

OCWRC DETAILS:
OCWRC STANDARD LIFT STATION DRAWINGS (ND3-ND8)
LOW PRESSER SANITARY SEWER DETAILS AND NOTES (2)

DETAILS:

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

OAKLAND COUNTY:
SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

LANDSCAPE PLANS:

LS-1 OVERALL LANDSCAPE PLANTING DETAIL
LS-2 OVERALL LANDSCAPE PLANTING DETAIL
LS-3 OVERALL LANDSCAPE PLANTING DETAIL
LS-4 PLANT MATERIAL LIST & PLANTING DETAILS
LS-5 OVERALL LANDSCAPE PLANTING DETAIL

IRRIGATION PLANS:

IRR-1 IRRIGATION PLAN
IRR-2 IRRIGATION PLAN
IRR-3 IRRIGATION PLAN
IRR-4 IRRIGATION PLAN
IRR-5 IRRIGATION PLAN
IRR-6 IRRIGATION NOTES & DETAILS

ARCHITECTURE PLANS:

A101 FIRST FLOOR PLANS
A102 TYPICAL UNIT ELEVATION
A200 BUILDING PLANS
A201 BUILDING ELEVATIONS
A203 BUILDING ELEVATIONS
AS-1 SITE PLAN

***BENCHMARKS*:**
BM#1 – CONCRETE MONUMENT AT SOUTHWEST CORNER OF PROPERTY.
ELEVATION 948.29 NAVD88

BM#2 – TELECOM MANHOLE COVER AT NORTHEAST CORNER OF CARPATHIAN DR. AND UNION LAKE RD.
ELEVATION 984.75 NAVD88

BM#3 – TELECOM MANHOLE COVER ±485' WEST OF CENTER OF SECTION 36 ALONG THE SOUTH PROPERTY LINE.
ELEVATION 962.72 NAVD88

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

ARCHITECTURAL PLANS PROVIDED BY:
ALEXANDER V. BOGAERTS AND ASSOCIATES, P.C.
2445 FRANKLIN ROAD
BLOOMFIELD HILLS, MICHIGAN 48302
PHONE: 248.334.5000

PROPERTY BOUNDARY & TOPO INFORMATION
ALPINE ENGINEERING, INC.
46892 WEST ROAD, SUITE 109
NOVI, MICHIGAN 48377
PHONE: 248.926.3765

LANDSCAPE PLANS PROVIDED BY:
FELINO PASCUAL & ASSOCIATES
LANDSCAPE ARCHITECTURE
24333 ORCHARD LAKE ROAD, SUITE G
FARMINGTON, MICHIGAN 48336
PHONE: 248.557.5588

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
2.	REV. SAN AND STORM PER OWNER	04-10-20
3.	REV SAN, ST. & PAV. PER OWNER	5-18-20
4.	REVISE PER TWP.	02-18-21
5.	REVISE PER TWP.	03-17-21
6.	REVISED WATER MAIN PER EGLE	05-11-21
7.	REV PER OWNER, RCOC AND OCWRC	11-21-22
8.	REVISED WATERMAIN FOR OWNER	04-05-23
9.	REVISED PER TOWNSHIP	04-25-23
10.	REVISE PER TWP.	7-27-23
11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVSE PER TWP	02-13-24
14.	REV. PER TWP.	06-03-24

ENGINEER'S SEAL

STATE OF MICHIGAN
JASON M. EMERINE
NO. 6201054218
LICENSED PROFESSIONAL ENGINEER

DATE: 08-23-19 | DESIGNED BY: A.A. | CHECKED BY: J.E.
JOB NUMBER: 17-031
DRAWING FILE: 17031-CV.DWG

LEGEND

- EX. CATCH BASIN
- EX. MANHOLE
- EX. END SECTION
- EX. OVERFLOW STRUCTURE
- EX. CLEANOUT
- EX. HYDRANT
- EX. WATER SHUTOFF
- EX. FIRE DEPT. CONNECTION
- EX. WATER WELL
- EX. LIGHTPOLE
- EX. UTILITY POLE
- EX. GUY ANCHOR
- EX. TRAFFIC SIGNAL
- EX. GAS SHUTOFF
- EX. GAS VENT
- EX. HANDHOLE
- EX. PEDESTAL
- EX. TRANSFORMER
- EX. GENERATOR
- EX. GAS METER
- EX. ELECTRIC METER
- EX. UTILITY MARKER
- EX. AIR CONDITIONER
- EX. RAILROAD SIGNAL
- EX. SIGN
- EX. POST/BOLLARD
- EX. FLAGPOLE
- EX. MAILBOX
- EX. PARKING METER
- EX. SATELLITE DISH
- EX. SOIL BORING
- EX. MONITOR WELL
- FOUND IRON
- SET IRON
- EX. BOULDER
- EX. TREE STUMP
- EX. TREE
- 1023 EX. TREE TAG & NUMBER
- EX. TREE LINE
- EX. FENCE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. WATER MAIN
- EX. ELECTRIC CABLE
- EX. COMMUNICATION
- EX. GAS LINE
- EX. OVERHEAD LINE

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ELEVATION 962.72 NAVD88

NGS PID DI6198
ELEVATION 966.63 NAVD88

NOTES:

–ELEVATIONS ARE BASED ON NAVD88

–THIS SURVEY MAY BE RELIED UPON BY STULBERG WHITE LAKE INVESTMENT COMPANY, L.L.C., COOLEY L.L.C., AND FAIRVIEW CONSTRUCTION INC. AND THEIR RESPECTIVE TITLE INSURANCE COMPANIES AND BANKS.

–BEARINGS ARE BASED ON STATE PLANE COORDINATES, NAD83 (2011), MICHIGAN SOUTH ZONE.

–THE CENTRAL ANGLE OF 12°58'31" IN THE TITLE DESCRIPTION SHOULD BE CORRECTED TO READ 12°18'13". IT HAS BEEN CORRECTED HEREON.

BUILDING SEPARATION

NOTICE:

CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

NOTE:

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AS DISCLOSED BY AVAILABLE UTILITY COMPANY RECORDS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE COMPANY. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.

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LEGEND

EXISTING / PROPOSED

- PAVEMENT (ASPHALT)
- SIDE WALK (CONCRETE)
- CONCRETE CURB AND GUTTER
- STORM SEWER
- SANITARY SEWER
- WATER MAIN
- MANHOLE
- CATCH BASIN
- CURB INLET W/SILT SAC
- END SECTION
- STAND PIPE
- GATE VALVE
- HYDRANT

EXISTING / PROPOSED

- FLOOD PLAIN
- 1000 — CONTOURS
- 1000.0 / 1000.00 T/C — SPOT ELEVATION
- SURFACE DRAINAGE
- OVERFLOW ROUTE
- TREE FENCE
- SILT FENCE
- PROPOSED DRIVEWAY LOCATION
- LIMIT OF DISTURBANCE
- LIGHT POLE
- TRANSFORMER

REVISIONS

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11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVSE PER TWP	02-13-24

DATE: 05-01-19 | DESIGNED BY: A.A. | CHECKED BY: J.E.

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

JOB NUMBER: 17-031

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

TOPOGRAPHIC AND DEMOLITION PLAN

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
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586.412.7050

FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

UNION LAKE ROAD SIDEWALK CROSS SECTION
(NOT TO SCALE)

BENCHMARKS:

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NOTES

1. ON-SITE SANITARY SEWERS, AND WATER MAINS SHALL BE CENTERED IN A 20-FOOT WD. EASEMENT.
2. ALL SANITARY AND WATER MAIN IMPROVEMENTS WILL BECOME PUBLIC PROPERTY.
3. CRITICAL STORM STRUCTURES WILL BE FITTED WITH TRAPS.
4. PROVISIONS PURSUANT TO OAKLAND COUNTY WATER RESOURCE COMMISSION SOIL EROSION CONTROL MANUAL WILL BE UNDERTAKEN INCLUDING, BUT NOT LIMITED TO, SILT FENCE AND INLET FILTERS.
5. "NO PARKING – FIRE LANE" SIGNAGE SHALL BE INSTALLED PROHIBITING PARKING ON ONE SIDE OF THE STREET.
6. PROPOSED GRADES WILL MATCH EXISTING ELEVATIONS AT THE PROPERTY LINE UNLESS RETAINING WALLS ARE PROVIDED OR GRADING EASEMENTS OBTAINED.
7. A PERMIT FROM THE ROAD COMMISSION FOR OAKLAND COUNTY WILL BE REQUIRED FOR ALL WORK IN THE UNION LAKE RD. & CEDAR ISLAND RD. RIGHT-OF-WAY.
8. ALL WATER MAIN SHALL BE CLASS 54 DUCTILE IRON. ALL GATE VALVES SHALL BE PLACED IN GATE WELLS.
9. ALL STRUCTURES EXCEPT FOR INLETS WHICH CONNECT TO CATCH BASINS WILL BE A MINIMUM OF 4 FEET IN DIAMETER.
10. THE DEVELOPMENT SHALL BE CONSTRUCTED AS A SINGLE PHASE.
11. THE CONSTRUCTION TYPE OF THE PROPOSED BUILDINGS IS WOOD CONSTRUCTION WITH BRICK VENEER AND SLAB ON GRADE.
12. THE FRONT PORCH LIGHTS AND THE COACH LIGHTS WILL UTILIZE 75 WATT BULBS.
13. ALL STORM SEWER PIPE SIZES ARE SHOWN ON SHEETS 17–22

SEE SHEET 14–15 FOR PUMP STATION SANITARY BASIS OF DESIGN

SEE SHEET ND2 FOR LIST OF QUANTITIES

SEE SHEET 16 FOR OVERALL SANITARY SEWER BASIS OF DESIGN

DENSITY CALCULATION:

AREA OF RESIDENTIAL SITE	=	15.14 Ac.
AREA OF 60' R.O.W.	=	1.21 Ac.
DENSITY AREA = 15.14–1.21	=	13.93 Ac.
AREA OF INTERNAL ROADS	=	1.39 Ac.
NET DENSITY AREA = 13.93–1.39	=	12.54 Ac.
	=	546,242 S.F.

RM-1 ZONING:

FOR 2 BEDROOMS AND DEN
REQUIRED 6,500 S.F./UNIT

DEDUCT 10,000 S.F. FOR FIRST UNIT

TOTAL ALLOWABLE UNITS =
546,242 – 10,000 / 6,500 = 83 UNITS

TOTAL UNITS PROVIDED = 69 UNITS
(4.95 UNITS / ACRE)

LIST OF ALL REQUIRED STATE AND FEDERAL PERMITS

TYPE	AGENCY	STATUS
1. NPDES	EGLE	NOT FILED
2. SANITARY SEWER	EGLE	FILED
3. WATER MAIN	EGLE	FILED

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
1000	1000	CONTOURS
1000.0	1000.00 T/C	SPOT ELEVATION
		LIGHT POLE
		TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

Sidewalk Requirements

1. THE MAXIMUM CROSS SLOPE FOR ALL SIDEWALK AND DRIVEWAY CROSSWALKS IS 2%
2. THE MAXIMUM RUNNING SLOPE FOR ALL SIDEWALK AND DRIVEWAY CROSSWALKS IS 5%
3. THE 5' X 5' ADA LANDING AREAS HAVE A MAXIMUM SLOPE IN ALL DIRECTIONS OF 2%
4. THE MAXIMUM SLOPE FOR A RAMP IS 8% FOR MAXIMUM DISTANCE OF 6 FEET

THE CONTRACTOR SHALL CHECK THE FORMS TO ENSURE THAT THESE SLOPE REQUIREMENTS ARE MET BEFORE ANY CONCRETE IS PLACED.

LOT COVERAGE:

GROSS AREA OF SITE	=	15.14 Ac.
BUILDING AREA	=	3.05 Ac.
MAX. LOT COVERAGE ALLOWED	=	20%
PROPOSED LOT COVERAGE	=	3.05 / 15.14
	=	20%

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

Accessible Parking Spaces

Total Surface Spaces = 165	
Accessible Spaces	
Per 2010 ADA (208.2.3 Residential Facilities)	
Total Required (Minimum 2% of the tot	4
Total Provided	
Standard Accessible Spaces	2
Van Accessible Spaces	2
	4

PARKING CALCULATIONS

2 SPACES FOR EACH UNIT, PLUS ¼ SPACE FOR EACH BDRM.
2 SPACES FOR EACH UNIT = 138 SPACES
138 BEDROOMS/4 = 35 SPACES
TOTAL SPACES REQUIRED = 173

SPACES PROVIDED:
2 SPACES PER GARAGE = 138
2 SPACES PER DRIVEWAY = 138

ADDITIONAL PARKING SPACES:
STANDARD PARKING 23
ACCESSIBLE PARKING 4
TOTAL ADDITIONAL SPACES = 27

TOTAL SPACES PROVIDED = 303

WETLANDS

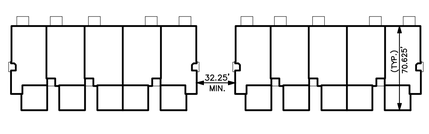
NO WETLANDS EXIST ON SITE.

FLOODPLAIN INFORMATION

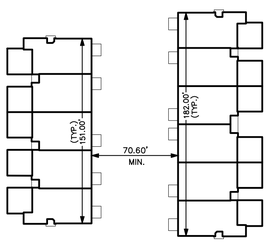
THE SUBJECT PROPERTY LIES WITHIN A ZONE "X" FLOOD HAZARD AREA – "AREAS OF MINIMAL FLOODING", PER THE NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 26125 60477 F, MAP EFFECTIVE 9-29-2006.

SIGN QUANTITIES

SYMBOL	DESCRIPTION	QUANTITY PANEL	POST
	R1-1 30"x30" (STOP) SIGN W/STREET SIGN	1	1
	R4-7 24"x30" (KEEP RIGHT) SIGN	3	3
	R1-2 36"x36"x36" (YIELD) SIGN W/STREET SIGN	2	2
	W14-2 30"x30" (NO OUTLET) SIGN	2	2
	(NO PARKING FIRE LANE) SIGN	10	5
	R7-8 12"x8" BARRIER FREE HANDICAP SIGN	3	3
	R7-8P 12"x6" (VAN ACCESSIBLE) PANEL	3	0



SIDE TO SIDE SEPARATION



REAR TO REAR SEPARATION

BUILDING SEPARATION

MIN. SEPARATION BETWEEN BUILDINGS = 20'
DEPTH OF PROPOSED BUILDINGS = 70.625'

SIDE TO SIDE SEPARATION
BETWEEN BUILDINGS REQUIRED:
70.625' – 40' (PER ORDINANCE) = 30.625'
ADD 2' FOR EVERY 10' BEYOND 40 = 6.125'
ADD SECOND BUILDING = 6.125'
MIN. SEPARATION REQUIRED = 6.125' + 6.125' + 20' = 32.25'

REAR TO REAR SEPARATION
BETWEEN BUILDINGS REQUIRED:
BUILDING LENGTH = 151.00'
151.00 – 40 = 111, 11.1 X 2 = 22.2
BUILDING LENGTH = 182.00'
182.00 – 40 = 142.00, 14.2 X 2 = 28.4
MIN. SEPARATION REQUIRED = 22.2' + 28.4' + 20' = 70.6'

THE MINIMUM FLOOR AREA PER 2-BEDROOM UNIT IS 800 S.F.

PROPOSED IMPROVEMENTS

1. MUNICIPAL SEWER TO BE PROVIDED BY CONSTRUCTING A GRAVITY SEWER FLOWING TO A PROPOSED LIFT STATION AT THE SOUTHWEST CORNER OF THE SITE, THEN DISCHARGING THRU A FORCE MAIN TO A PROPOSED MANHOLE NORTHWEST OF CARPATHIAN DRIVE AND NORTHEAST SIDE OF UNION LAKE RD.
2. WATER SUPPLY TO BE PROVIDED BY CONNECTING TO AN EXISTING 12" WATERMAIN ALONG UNION LAKE ROAD. PROPOSED WATERMAINS SHALL BE 12" AND 8" AS SHOWN ON THE PLANS.
3. ON-SITE STORM WATER DETENTION SHALL BE PROVIDED PER OAKLAND COUNTY WATER RESOURCE COMMISSIONER STANDARDS. ALL STORM DRAINAGE EASEMENTS SHALL BE A MINIMUM OF 20' WIDE IF NECESSARY.
4. ROADWAYS SHALL BE 27' WD. AND 24' WD. WITH CONC. CURB & GUTTER WITH ASPHALT PAVEMENT. ALL ROADWAYS SHALL BE PRIVATE. ALL INTERIOR SIDEWALKS SHALL BE 5' WIDE. AN 8' WIDE CONC. SIDEWALK TO BE CONSTRUCTED ALONG SOUTH R.O.W OF UNION LAKE ROAD AS SHOWN. SEE PAVEMENT CROSS SECTION AND CURB DETAILS ON SHEET 4.
5. ALL ELECTRIC, CABLE TV & TELEPHONE LINES SHALL BE LOCATED UNDERGROUND AND SHALL BE PLACED WITHIN EASEMENTS DEDICATED FOR SUCH USE.
6. TRASH DISPOSAL SHALL BE BY CURB SIDE PICKUP.
7. LIGHTING SHALL BE PROVIDED BY PHOTOCELL LIGHTS LOCATED ON THE FRONT OF EACH BUILDING.

REVISIONS

NO.	ITEM	DATE
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2.	REV. SAN AND STORM PER OWNER	04-10-20
3.	REV SAN, ST. & PAV. PER OWNER	5-18-20
4.	REVISE PER TWP.	02-18-21
5.	REVISE PER TWP.	03-17-21
6.	REVISED WATER MAIN PER EGLE	05-11-21
7.	REV PER OWNER, RCOC AND OCWRC	11-21-22
8.	REVISED WATERMAIN FOR OWNER	04-05-23
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10.	REVISE PER TWP.	7-27-23
11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVISE PER TWP.	02-13-24

DATE: 08-23-19

DESIGNED BY: G.N. JOB NUMBER: 17-031
CHECKED BY: J.E. DRAWING FILE:17031-OA.dwg

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

COMPSITE UTILITY PLAN

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7080
FARMINGTON HILLS OFFICE
30200 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 3

SEE CONTINUATION ON SHEET 6

SEE CONTINUATION ON SHEET 5

UNION LAKE ROAD

WEST VALLEY CIRCLE

WEST VALLEY DRIVE

#12-36-254-014

CENTERLINE OF UNION LAKE ROAD PER "BOCOVINA HOMESITES", O.C.C.P. # 754 AND PER SURVEY BY MCGINNIS ENGINEERING COMPANY, DATED OCTOBER 12, 1973

BM#2
MH ELEV. 984.75

BM#3
MH ELEV. 962.72

SUBJECT PARCEL
±14.64 ACRES

PROPOSED 60' RIGHT OF WAY

SEE SHEET 7 FOR PARKING AREA GRADING DETAILS, TYP.

CONSTRUCTION STONE ACCESS DRIVE (SEE DETAIL ON SHEET ND2)

FOR DRIVEWAY AND SIDEWALK GRADING- SEE DETAIL ON SHEET ND2

5' WIDE SIDEWALK, TYP.

7' WIDE SIDEWALK, TYP.

8' WIDE SIDEWALK, TYP.

SEE DETAIL ON SHEET ND2 FOR THICKENED EDGE SIDEWALK

MDOT DETAIL "M" SEE DETAIL ON SHEET ND2

12' WIDE STORM SEWER EASEMENT, TYP.

20' WIDE SANITARY SEWER EASEMENT, TYP.

20' EASEMENT FOR WATER MAIN, TYP.

MICHIGAN BELL TELEPHONE EASEMENT PER L.5157, PG. 872 AND L.5157, PG. 873

S87°52'27"W 1307.44

S87°53'19"W 1312.16

CAUTION: COMMUNICATION CABLE IN THIS AREA. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANY AND LOCATE THE CABLE PRIOR TO THE START OF CONSTRUCTION.

CAUTION: COMMUNICATION CABLE IN THIS AREA. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANY AND LOCATE THE CABLE PRIOR TO THE START OF CONSTRUCTION.

SEE SHEET ND2 FOR UNIT SIDEWALK DETAILS

SCALE

30 0 15 30 60 120

(IN FEET)

Scale: 1 inch = 30 ft.

Sidewalk Requirements

1. THE MAXIMUM CROSS SLOPE FOR ALL SIDEWALK AND DRIVEWAY CROSSWALKS IS 2%
2. THE MAXIMUM RUNNING SLOPE FOR ALL SIDEWALK AND DRIVEWAY CROSSWALKS IS 5%
3. THE 5' X 5' ADA LANDING AREAS HAVE A MAXIMUM SLOPE IN ALL DIRECTIONS OF 2%
4. THE MAXIMUM SLOPE FOR A RAMP IS 8% FOR MAXIMUM DISTANCE OF 6 FEET

THE CONTRACTOR SHALL CHECK THE FORMS TO ENSURE THAT THESE SLOPE REQUIREMENTS ARE MET BEFORE ANY CONCRETE IS PLACED.

S.E.S.C. NOTES

1. DEVELOPER SHALL MAINTAIN ALL SOIL EROSION CONTROLS WEEKLY AND AFTER EVERY STORM EVENT.
2. SEE SHEET ND1 FOR SOIL EROSION CONTROL MAINTENANCE AND SOIL EROSION CONTROL SEQUENCE OF CONSTRUCTION.

GRADING NOTES

1. PROVIDE MINIMUM 2% SLOPE IN SIDE YARD AND REAR YARD SWALES.
2. MAINTAIN A MAXIMUM 1V:3H SLOPE FROM HOUSE TO SIDE YARD SWALES.
3. AFTER INITIAL EXAMINATION & GRADING OF THE DETENTION BASIN, SILT FENCE SHALL BE PLACED AROUND THE BASINS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
1000	1000	CONTOURS
+ 1000.0	1000.00 T/C	SPOT ELEVATION
		LIGHT POLE
S		TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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14. REV PER TWP 05-03-24

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GRADING AND S.E.S.C. PLAN

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FARMINGTON HILLS OFFICE
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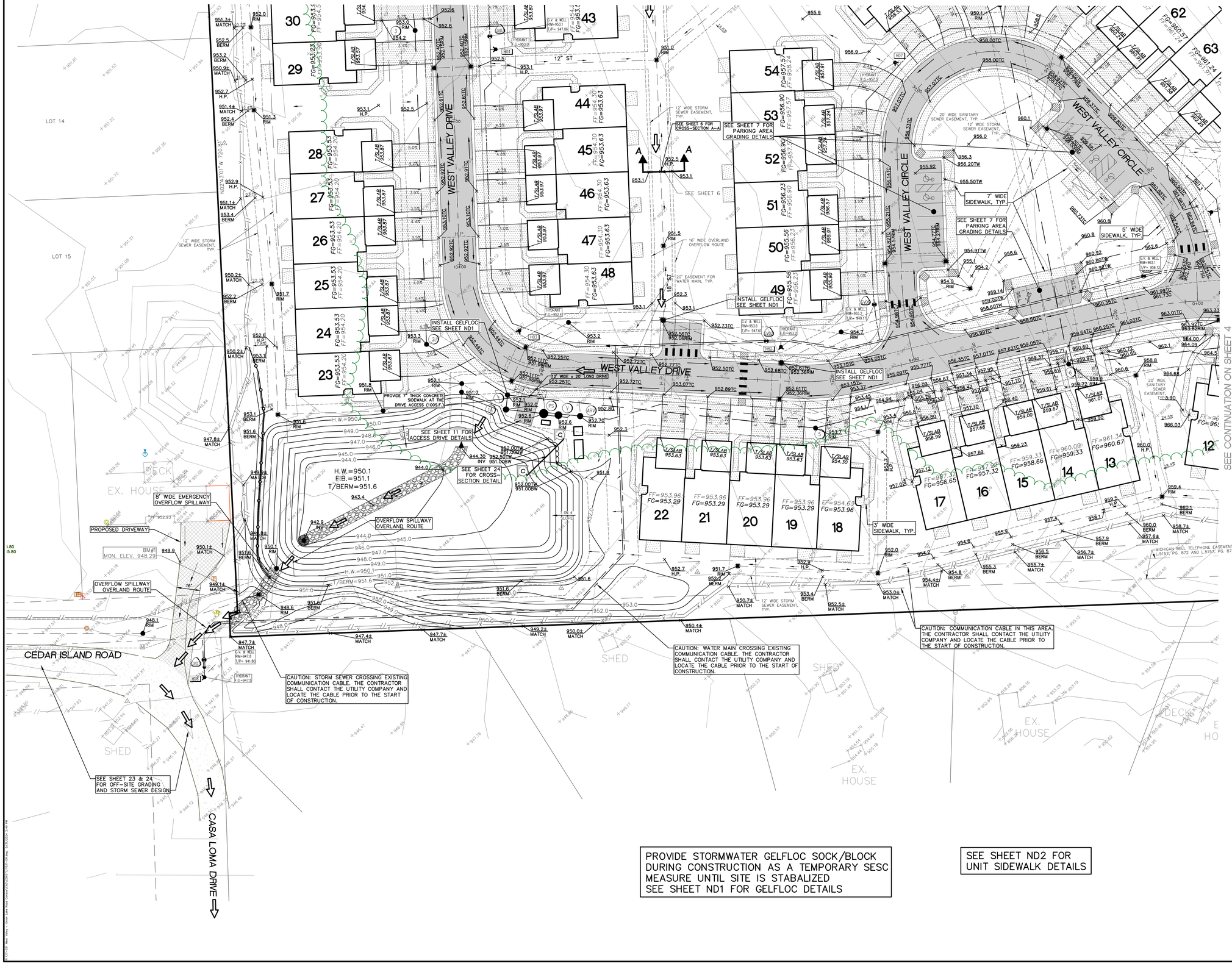
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 4

SEE CONTINUATION ON SHEET 6



PROVIDE STORMWATER GELFLOC SOCK/BLOCK DURING CONSTRUCTION AS A TEMPORARY SESC MEASURE UNTIL SITE IS STABALIZED
SEE SHEET ND1 FOR GELFLOC DETAILS

SEE SHEET ND2 FOR UNIT SIDEWALK DETAILS

SCALE

30 0 15 30 60 120

(IN FEET)
Scale: 1 inch = 30 ft.

NOTE: SEE SHEET 29 FOR S.E.S.C. SEQUENCE OF CONSTRUCTION, S.E.S.C. NOTES, GRADING NOTES AND R.C.O.C. NOTES

FOR DRIVEWAY AND SIDEWALK GRADING- SEE DETAIL ON SHEET ND2

Sidewalk Requirements

1. THE MAXIMUM CROSS SLOPE FOR ALL SIDEWALK AND DRIVEWAY CROSSWALKS IS 2%
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3. THE 5' X 5' ADA LANDING AREAS HAVE A MAXIMUM SLOPE IN ALL DIRECTIONS OF 2%
4. THE MAXIMUM SLOPE FOR A RAMP IS 8% FOR MAXIMUM DISTANCE OF 6 FEET

THE CONTRACTOR SHALL CHECK THE FORMS TO ENSURE THAT THESE SLOPE REQUIREMENTS ARE MET BEFORE ANY CONCRETE IS PLACED.

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
○	●	MANHOLE
□	▣	CATCH BASIN
	▣	CURB INLET W/SILT SAC
◁	◀	END SECTION
⊗	⊗	GATE VALVE
		HYDRANT
1000	1000	CONTOURS
+ 1000.0	1000.00 T/C	SPOT ELEVATION
☼		LIGHT POLE
	S	TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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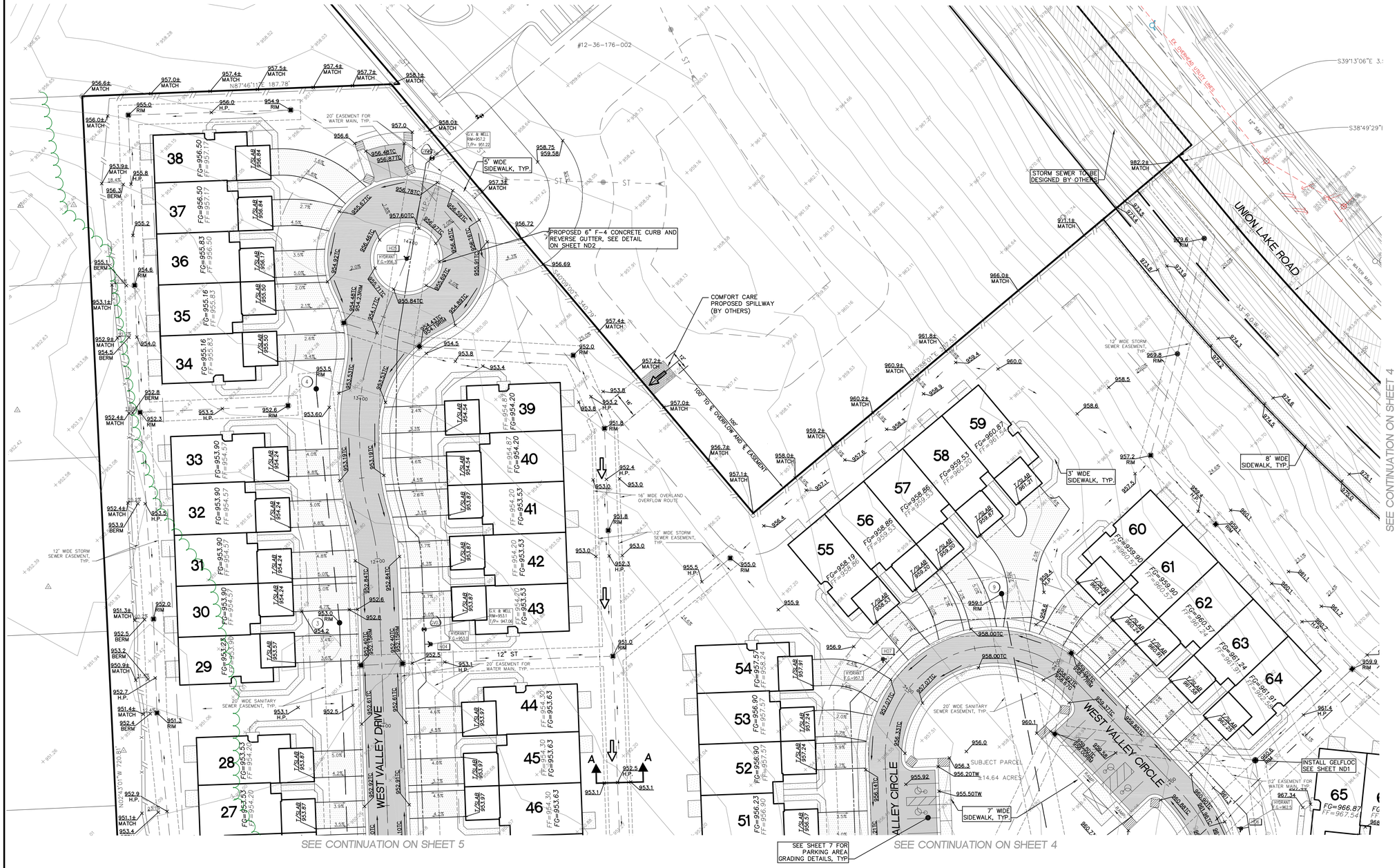
SHEET 5



Ditch Cross Section at Unit 45

IF:

Water depth =	**0.6 ft**
Slope (S) =	0.02 ft/ft
Area (A) =	4.8 s.f.
n =	0.025
wetted perimeter (P) =	16.04494 ft
hydraulic radius (R) =	0.29916 ft
Ditch width =	16 ft (with equal side slopes)

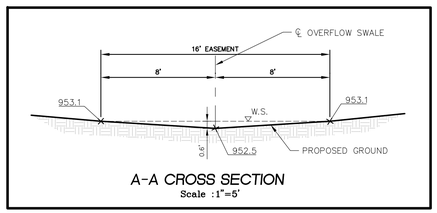
And:

$Q = (1.49/n)AR^{2/3} S^{1/2}$

Then:

Q = 18.10 cfs

10-year flow from the Comfort Care Basin = 13.95 cfs



A-A CROSS SECTION
Scale :1"=5'

PROVIDE STORMWATER GELFLOC SOCK/BLOCK DURING CONSTRUCTION AS A TEMPORARY SESC MEASURE UNTIL SITE IS STABALIZED
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SEE SHEET ND2 FOR UNIT SIDEWALK DETAILS

SCALE

30 0 15 30 60 120

(IN FEET)
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	CURB INLET W/SILT SAC
	END SECTION
	GATE VALVE
	HYDRANT
1000	1000 CONTOURS
+ 1000.0	1000.00 T/C SPOT ELEVATION
	LIGHT POLE
S	TRANSFORMER
	SURFACE DRAINAGE
	OVERFLOW ROUTE
	TREE FENCE
	SILT FENCE/LIMITS OF DISTURBANCE
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	LIMIT OF DISTURBANCE

WEST VALLEY

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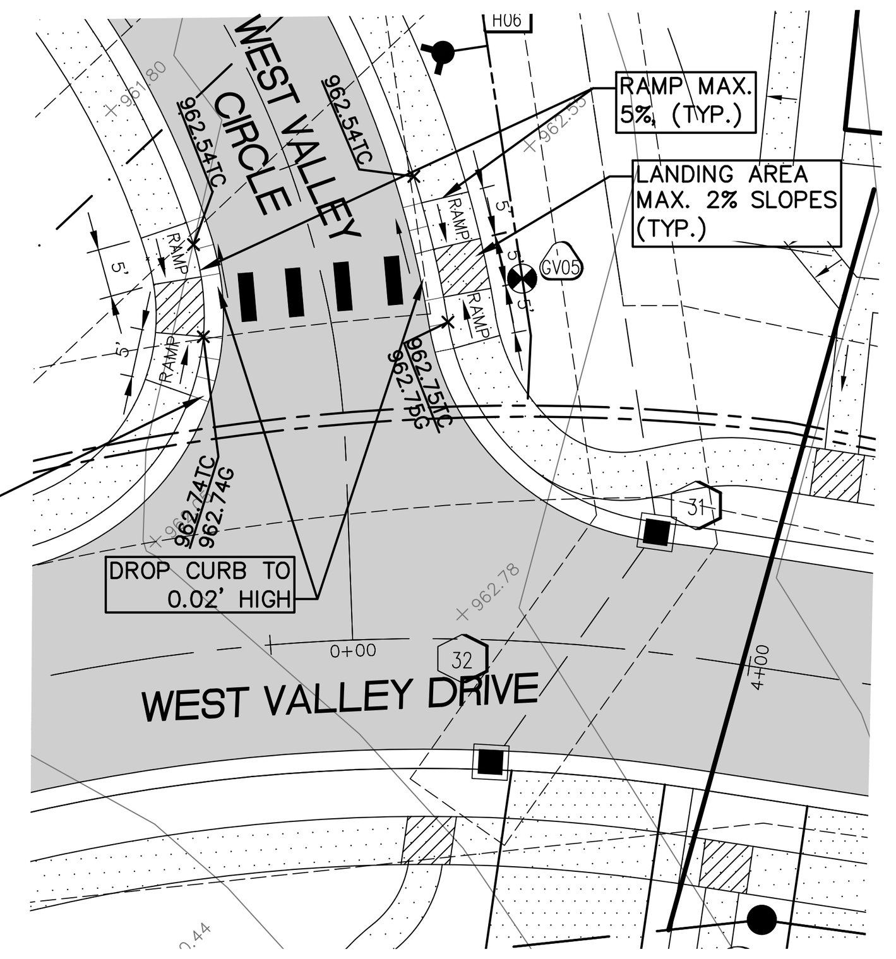
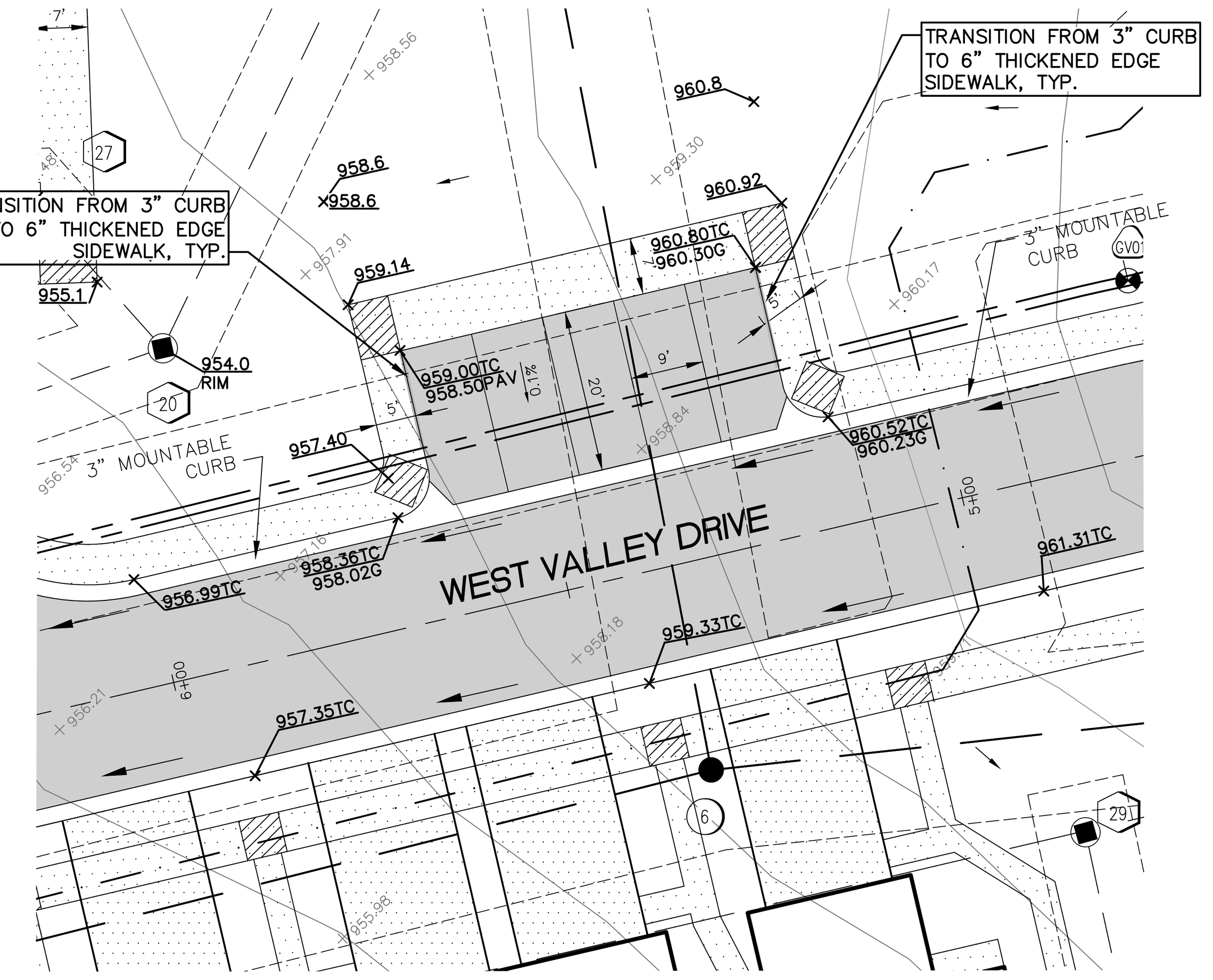
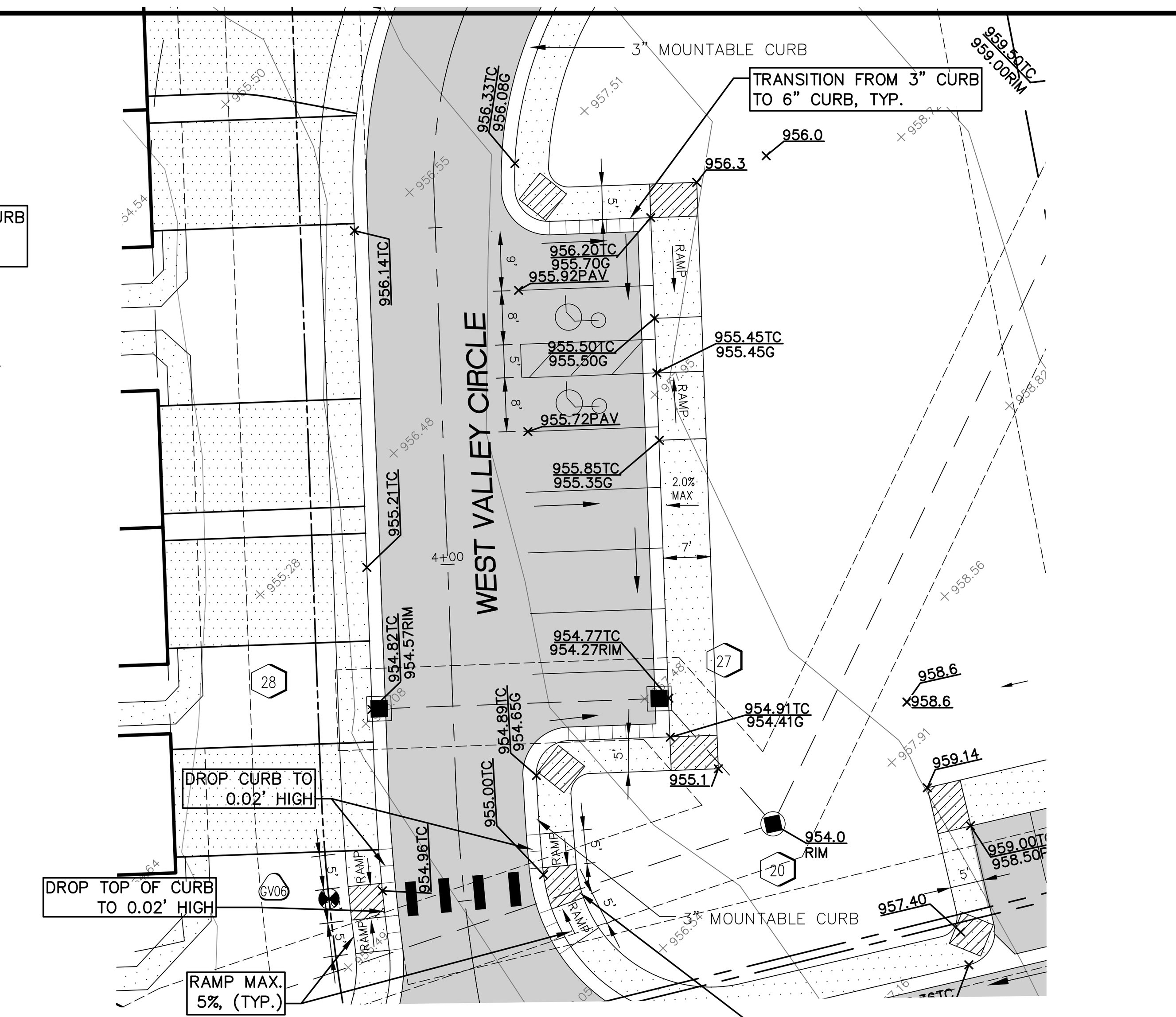
SHEET 6



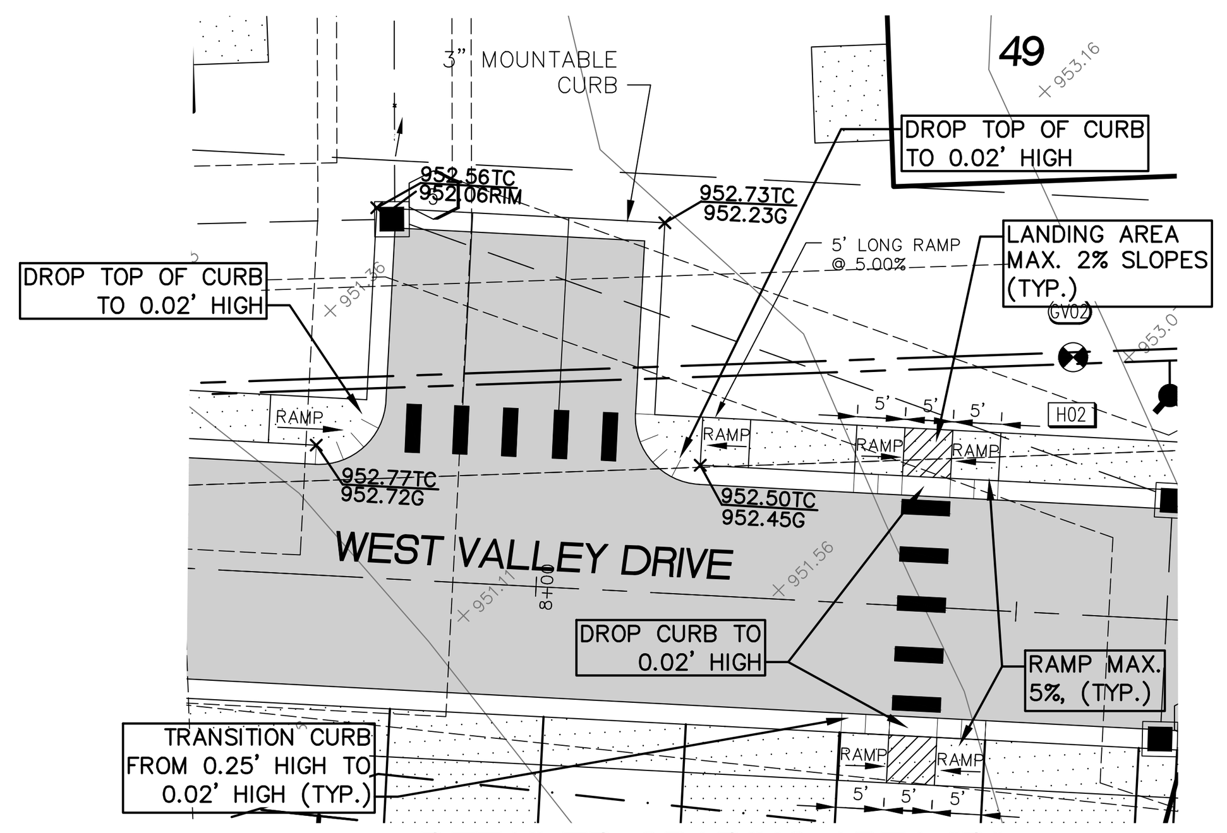
DETAILED GRADING AREA "A"



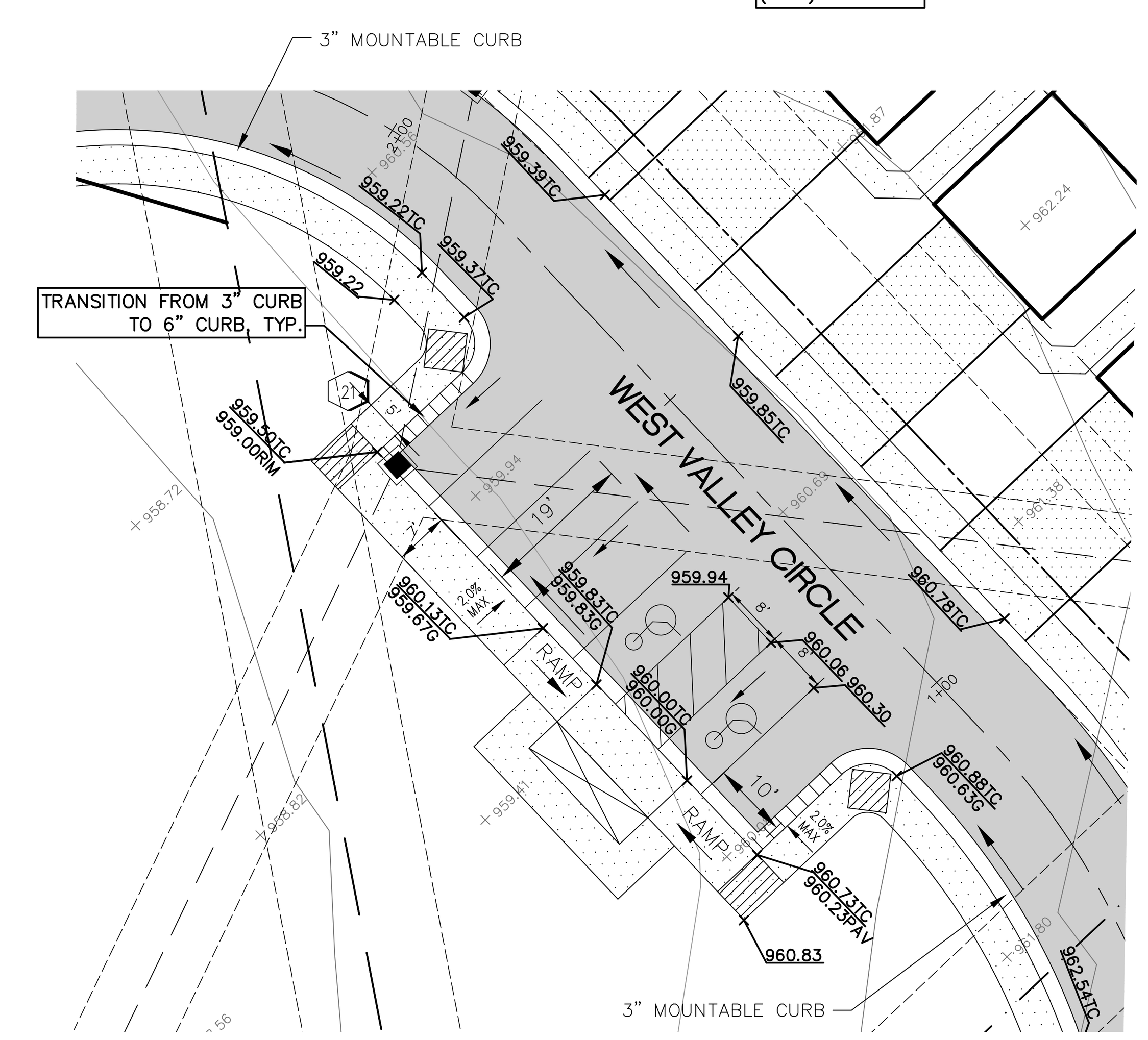
DETAILED GRADING AREA "B"



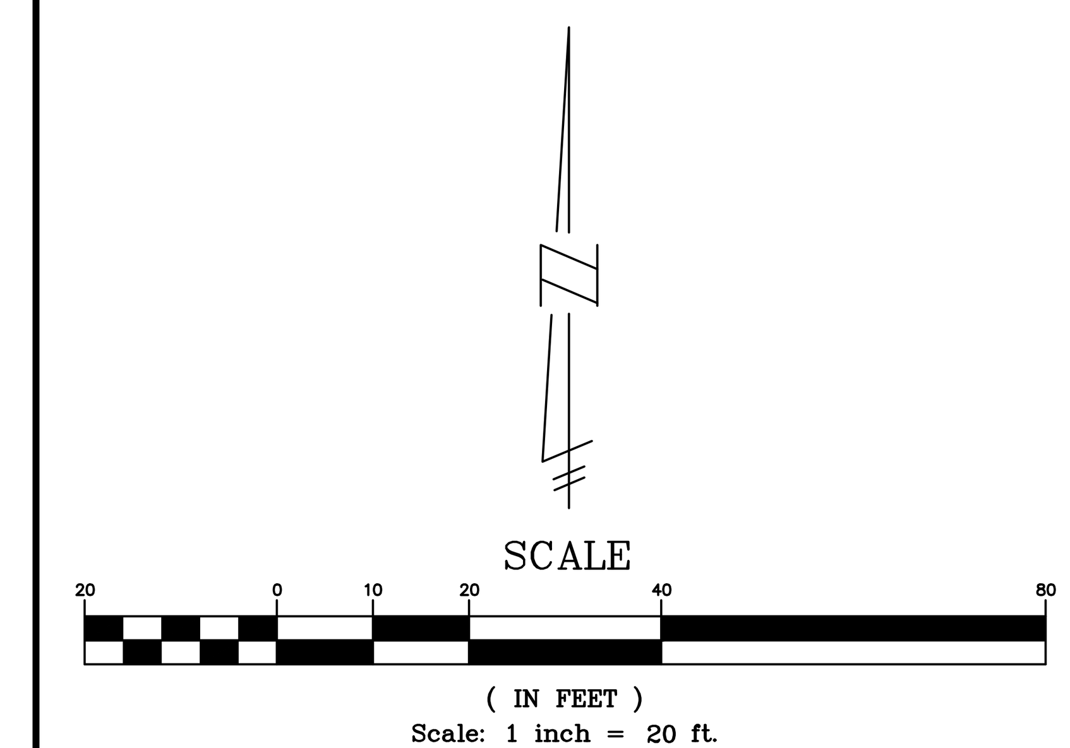
DETAILED GRADING AREA "C"

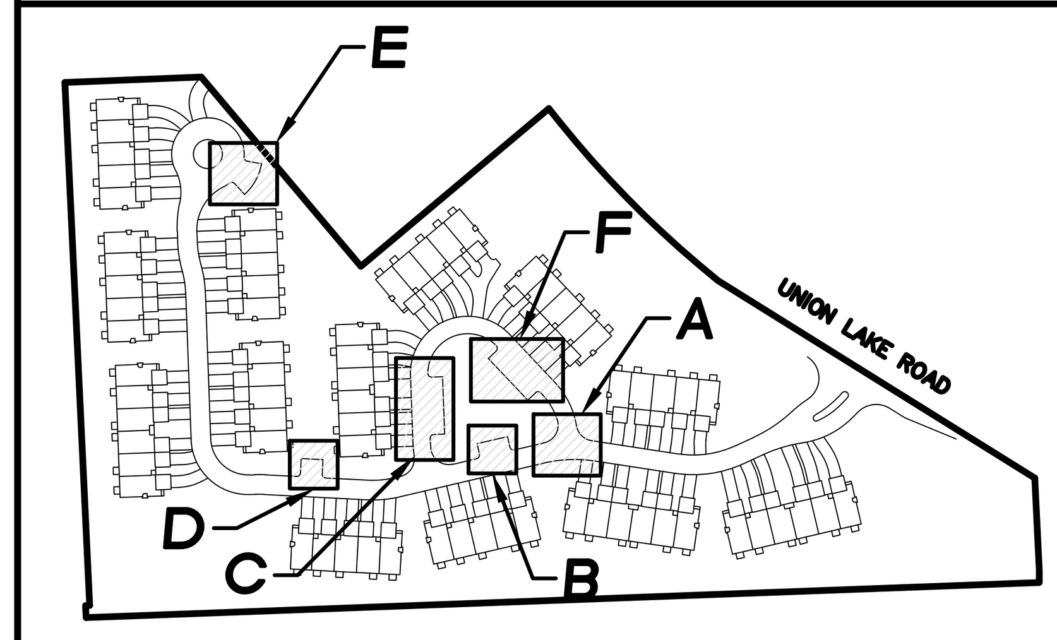


DETAILED GRADING AREA "D"



DETAILED GRADING AREA "F"





KEY MAP
(NOT TO SCALE)

Sidewalk Requirements

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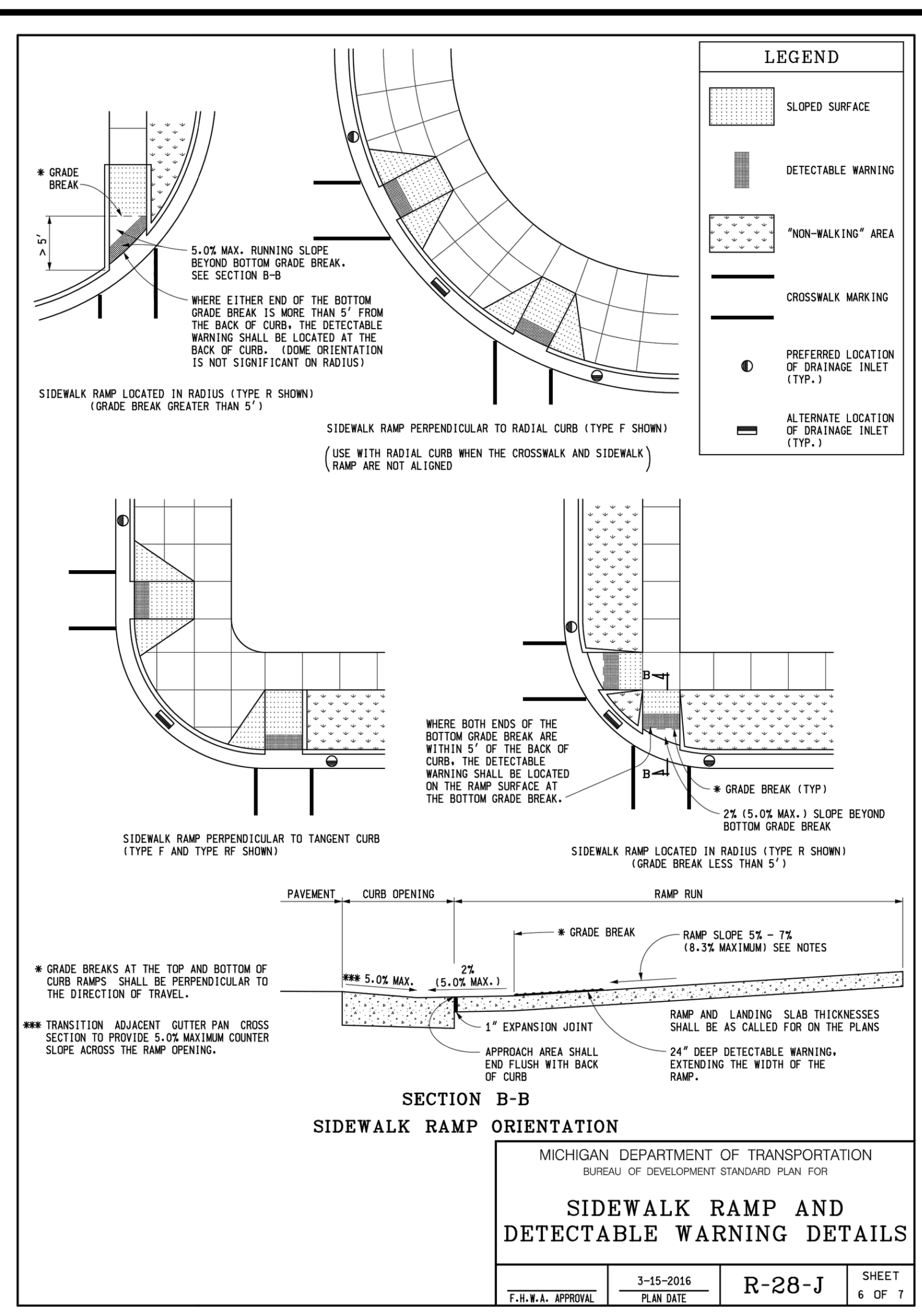
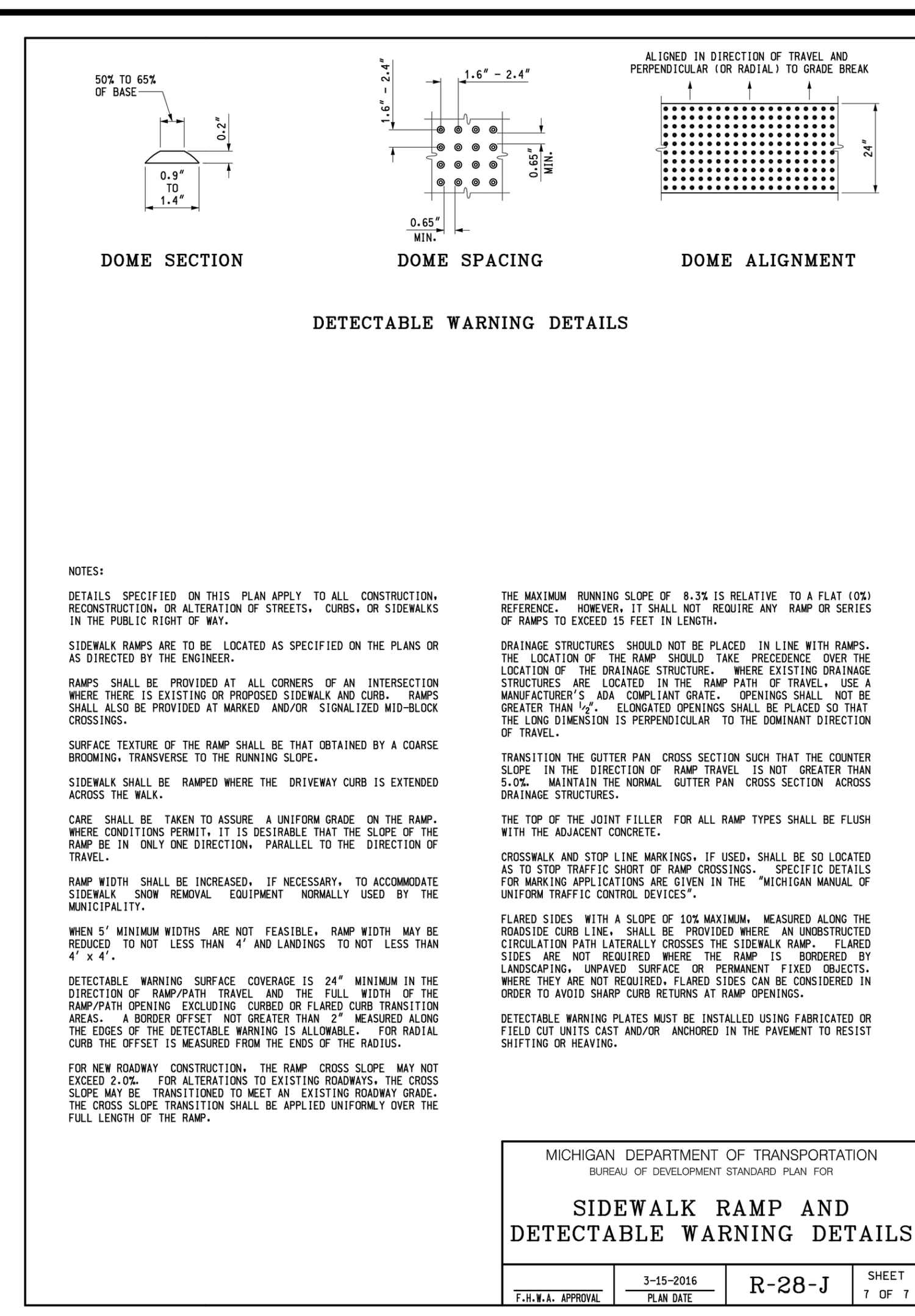
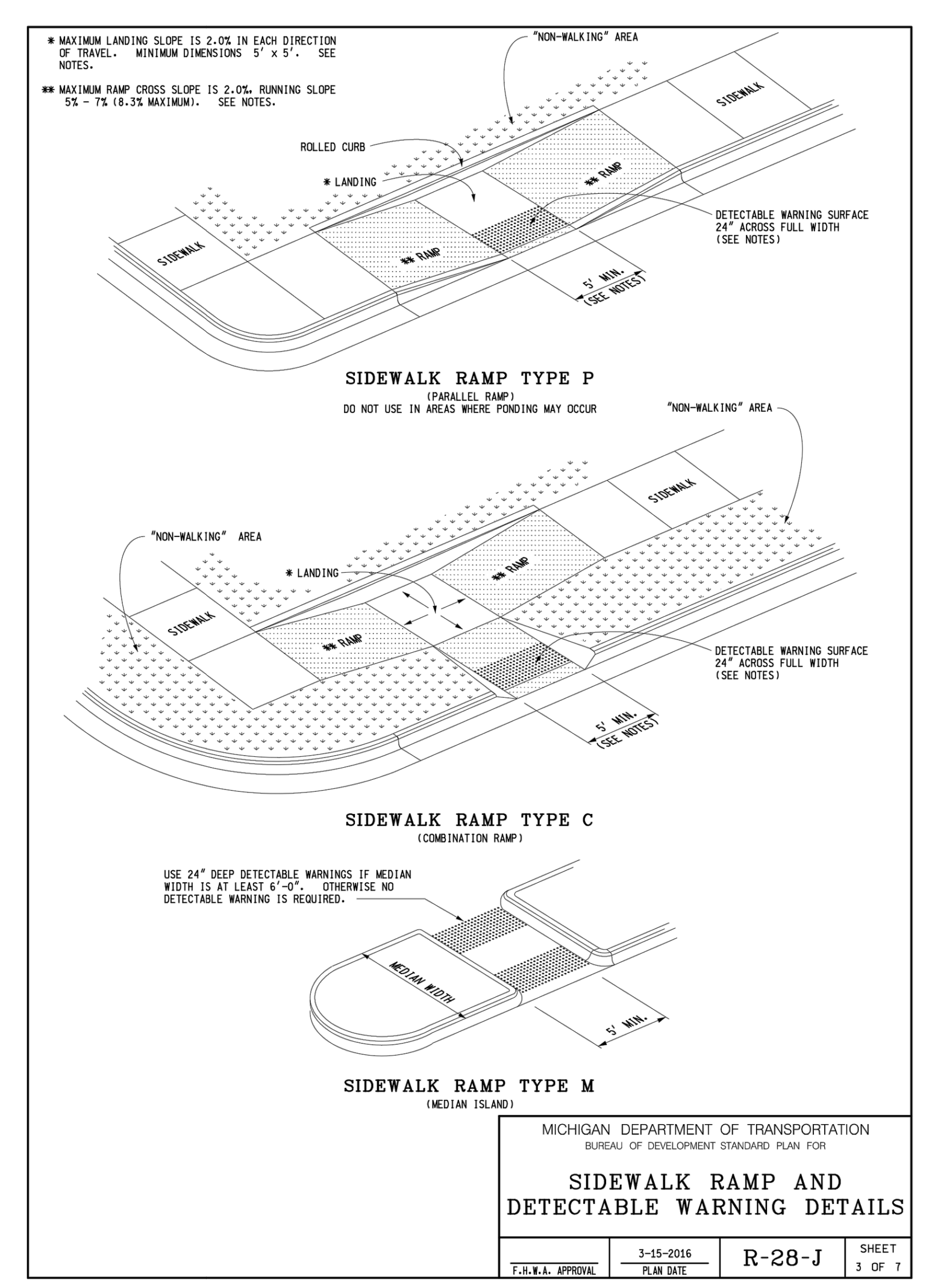
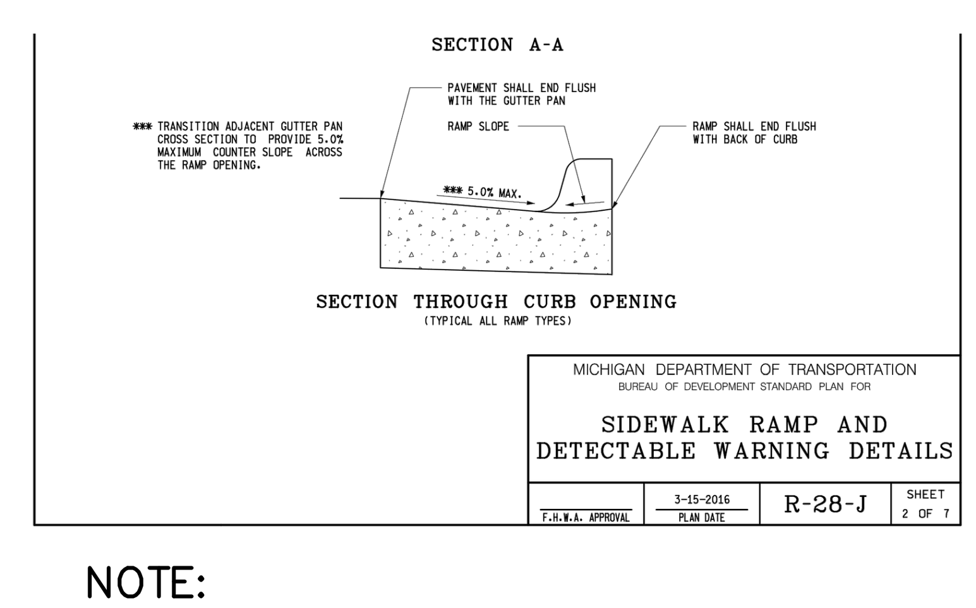
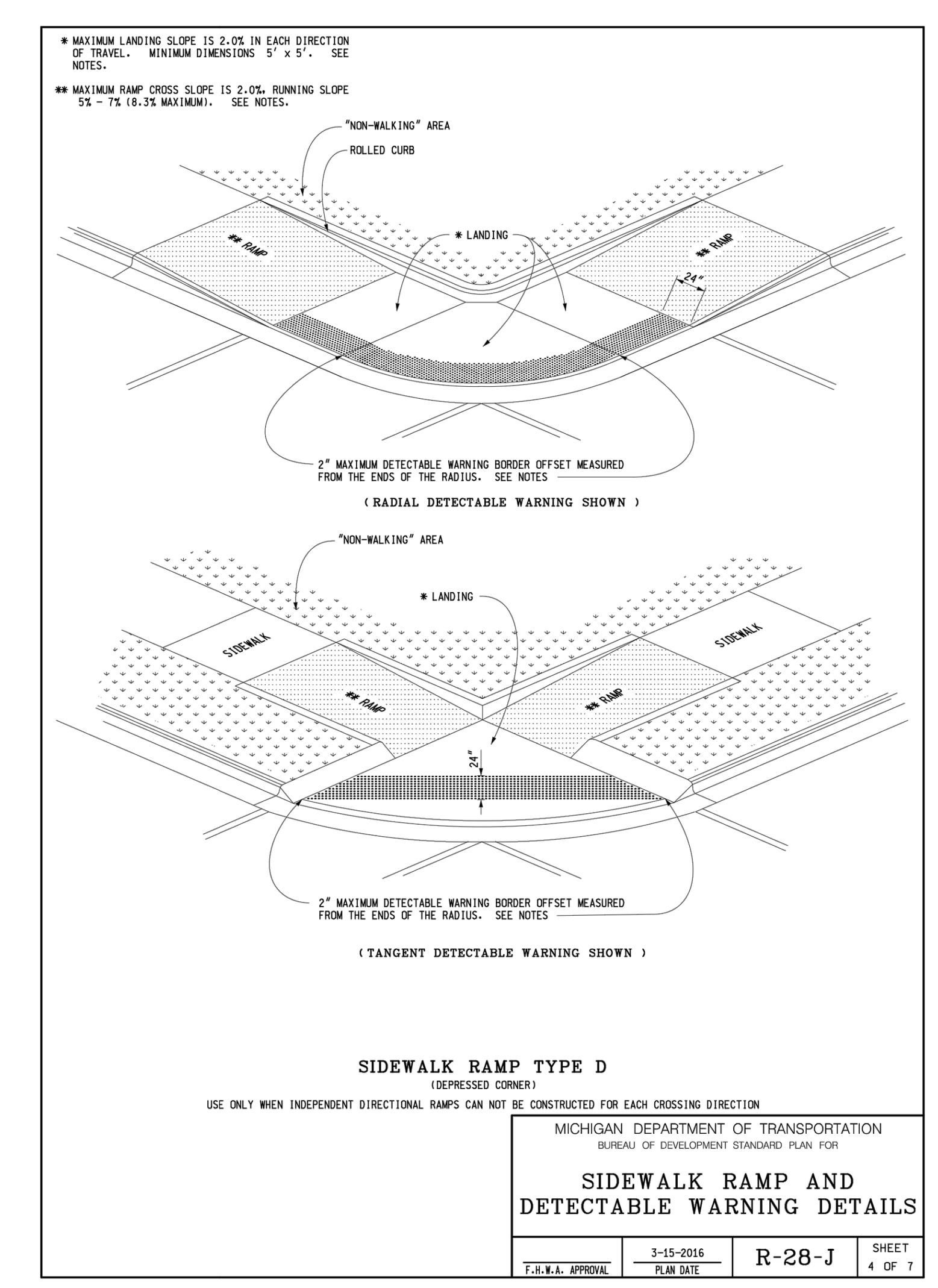








NOTE:
DETECTABLE WARNING PLATES MUST BE CONCRETE-EMBEDDED DETECTABLE WARNING PLATES. STAMPED CONCRETE WILL NOT BE ACCEPTABLE.



WEST VALLEY
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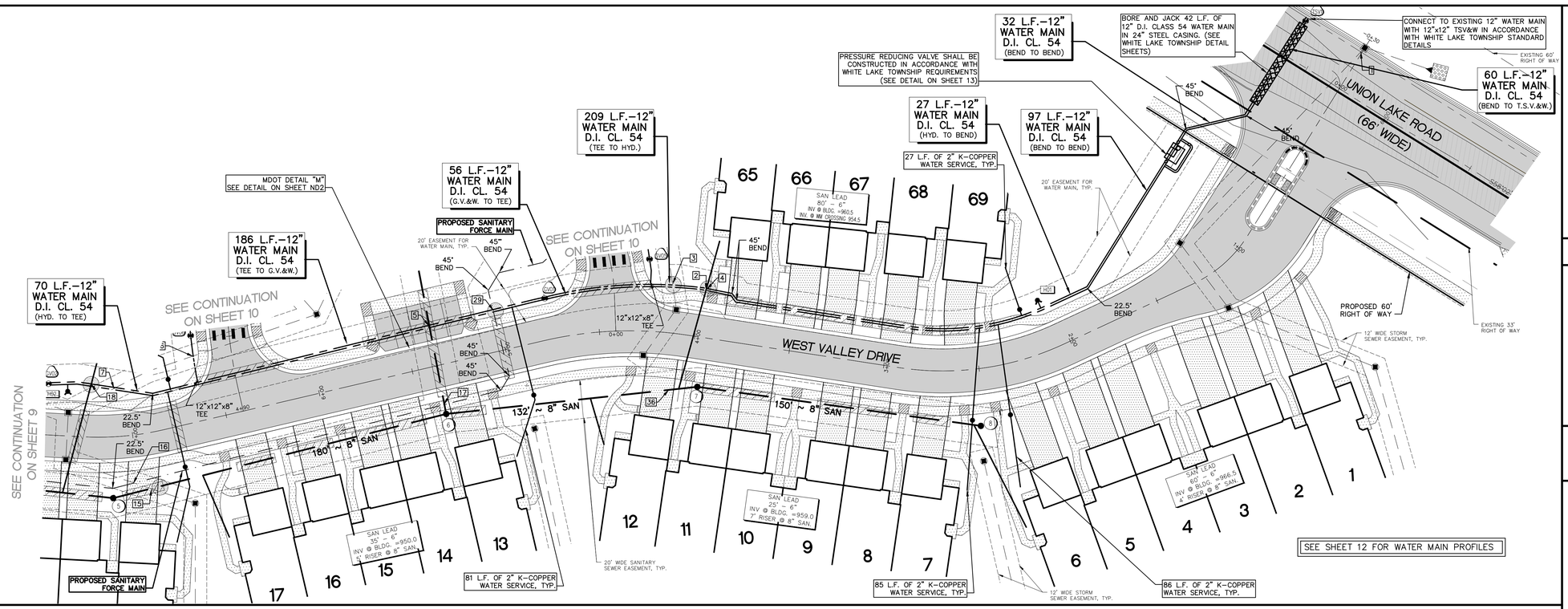

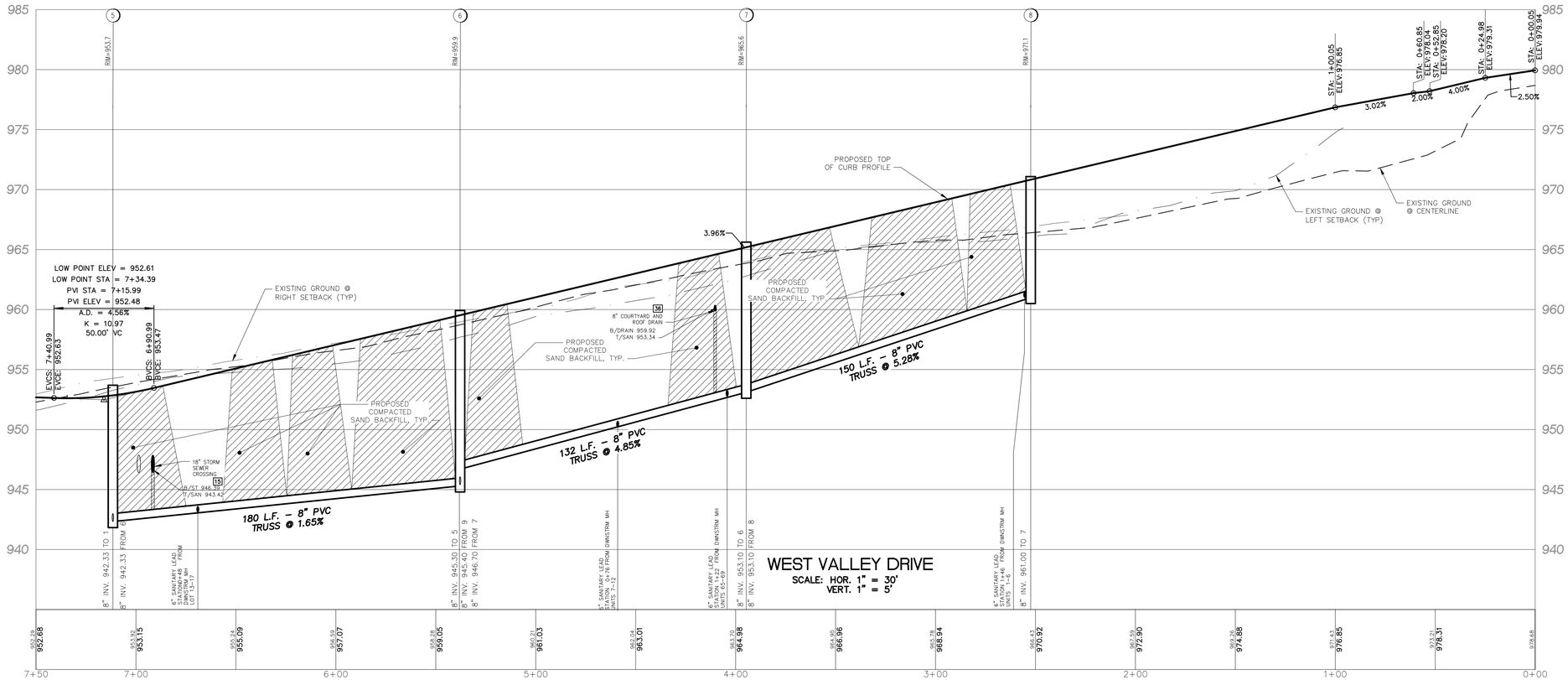

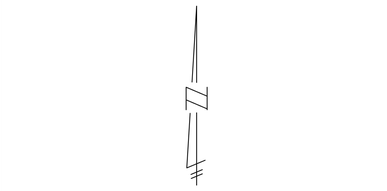

SEE SHEET 14 FOR SANITARY BASIS OF DESIGN

UTILITY CROSSING– MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

COMPACTED SAND BACKFILL UNDER THE INFLUENCE OF ROADS. MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.

NOTES

1. ALL GRAVITY SANITARY SEWER SHALL BE PVC TRUSS PIPE OR APPROVED EQUIVALENT.
2. ALL GRAVITY SANITARY SEWER LEADS SHALL BE SDR 23.5 PVC PIPE.
3. ALL TRENCHES WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS II AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
4. SANITARY LEADS SHALL BE A MINIMUM OF 1% GRADE, A MAXIMUM OF 150 LF AND A MINIMUM 6" DIAMETER.
5. SANITARY LEADS SHALL BE BURIED AT LEAST 5 FEET DEEP WHERE UNDER THE INFLUENCE OF PAVEMENT.
6. ALL SANITARY MANHOLES SHALL BE 4' DIAMETER UNLESS OTHERWISE NOTED.
7. MINIMUM DEPTH ON FORCEMAIN IS 6.0' TO TOP OF PIPE

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
1000	1000	CONTOURS
1000.0	1000.00 T/C	SPOT ELEVATION
		LIGHT POLE
		TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

WEST VALLEY

MULTI–FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST

WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
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11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVSE PER TWP	02-13-24

14. REV. PER TWP. 06-03-24

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

DATE: 08-23-19 | DESIGNED BY: G.N. JOB NUMBER: 17-031 | CHECKED BY: J.E. DRAWING FILE:17031-RD.dwg

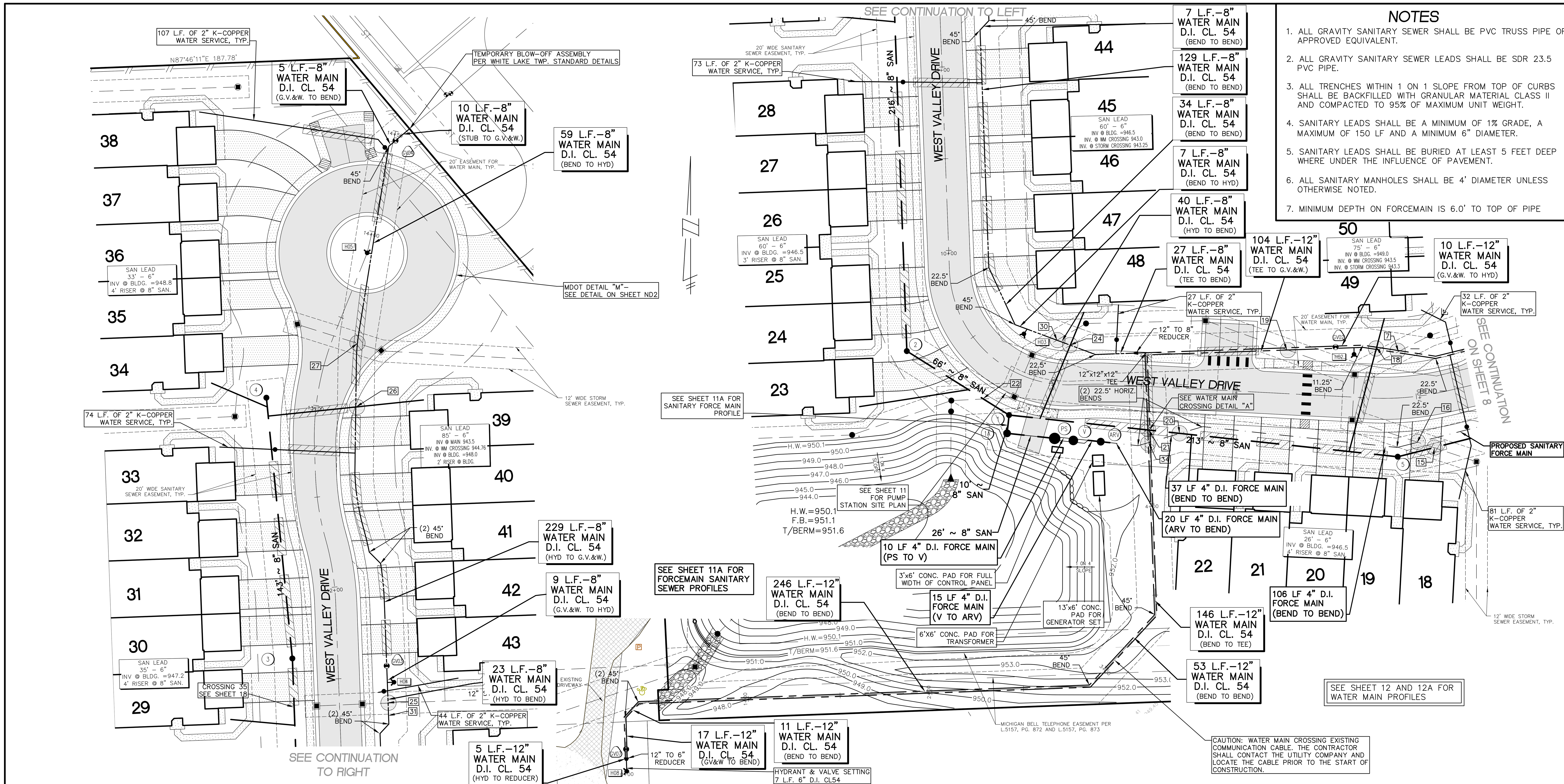
ROAD, SANITARY SEWER & WATER MAIN PLAN

SEIBER KEAST LEHNER ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7060

FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 8



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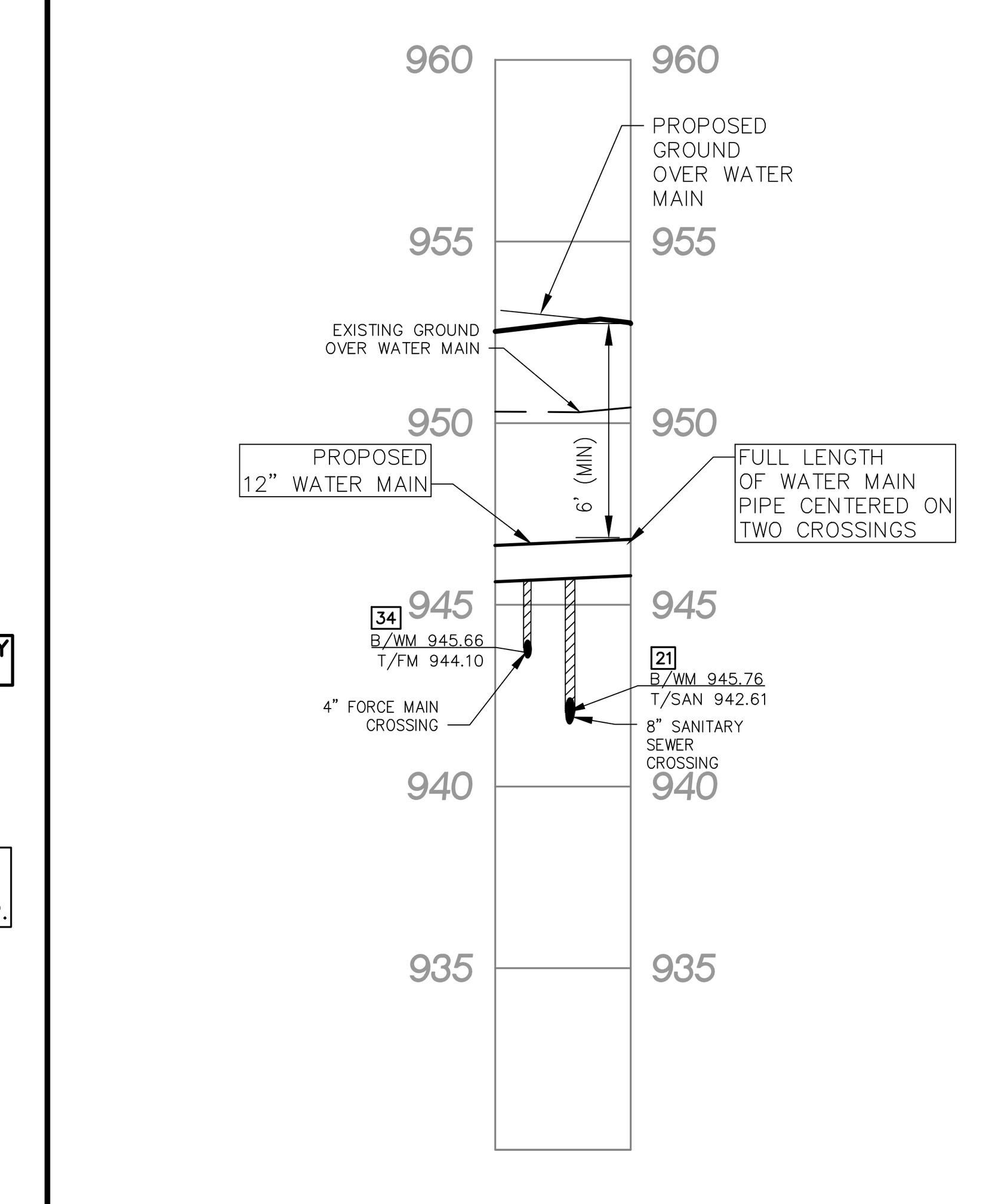
SCALE

(IN FEET)
Scale: 1 inch = 30 ft.

UTILITY CROSSING- MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

COMPACTED SAND BACKFILL UNDER THE INFLUENCE OF ROADS. MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.



WATER MAIN CROSSING DETAIL "A"

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

LEGEND

EXISTING / PROPOSED
PAVEMENT (ASPHALT)
SIDE WALK (CONCRETE)
CONCRETE CURB AND GUTTER
STORM SEWER
SANITARY SEWER
WATER MAIN
MANHOLE
CATCH BASIN
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SPOT ELEVATION
LIGHT POLE
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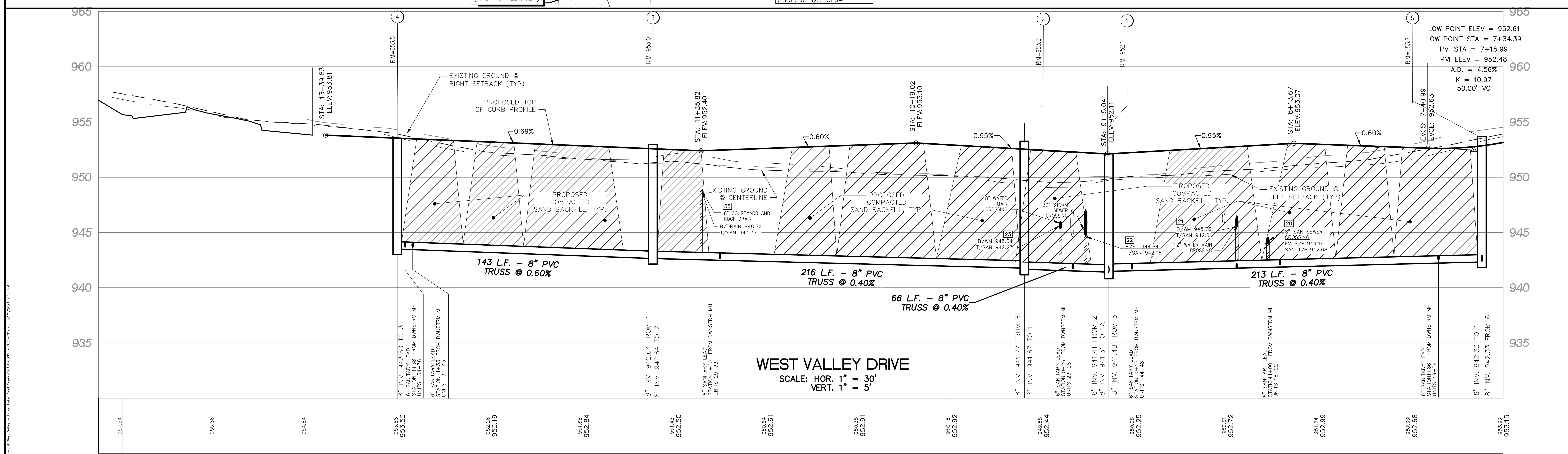
SURFACE DRAINAGE
OVERFLOW ROUTE
TREE FENCE
SILT FENCE/LIMITS OF DISTURBANCE
PROPOSED DRIVEWAY LOCATION
LIMIT OF DISTURBANCE



WEST VALLEY DRIVE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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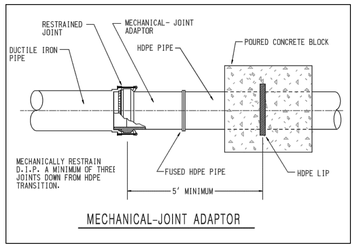
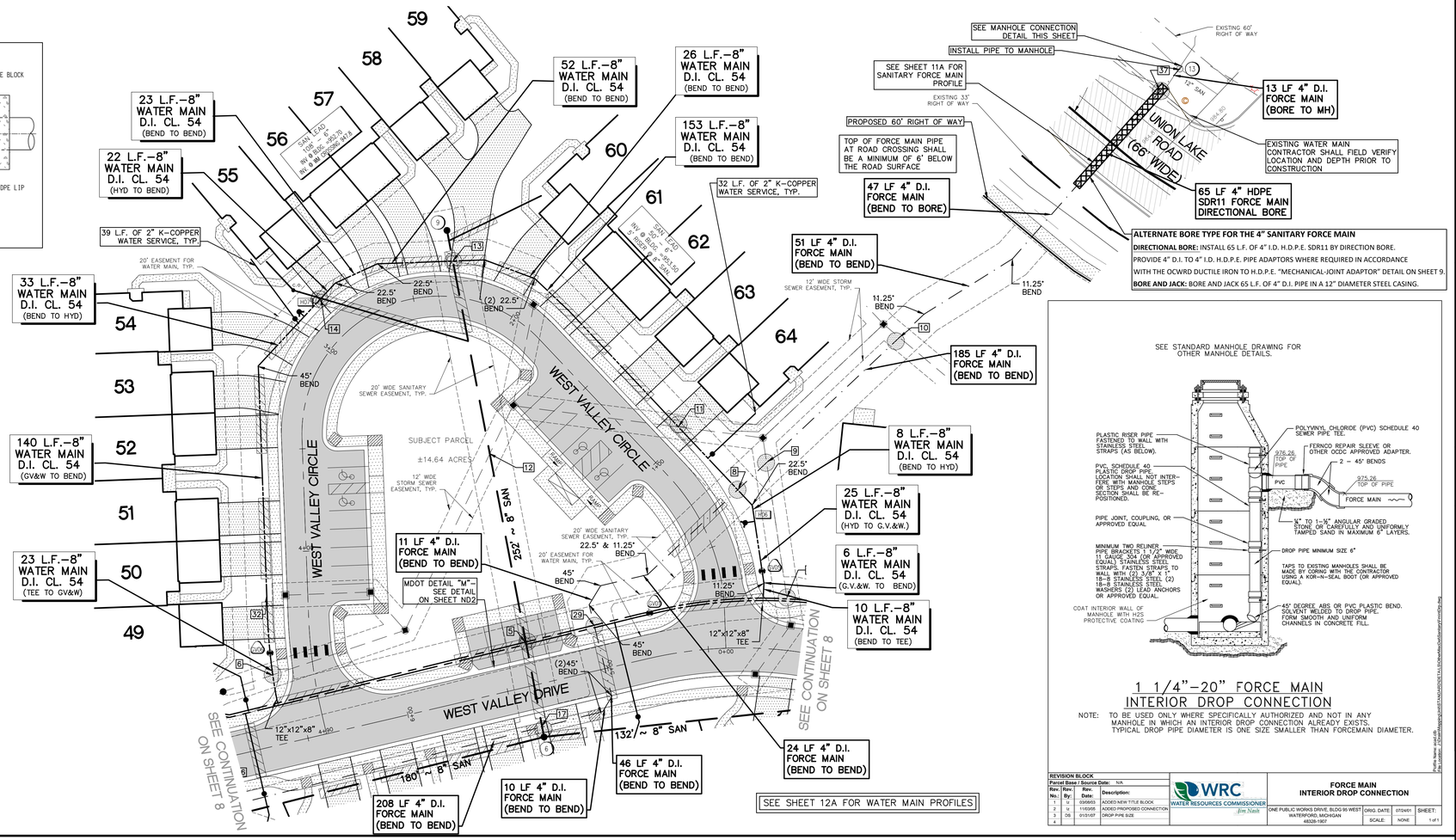
ROAD, SANITARY SEWER, FORCE MAIN & WATER MAIN PLAN

SHEET 9

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331



MECHANICAL-JOINT ADAPTOR



1 1/4"–20" FORCE MAIN
INTERIOR DROP CONNECTION

NOTE: TO BE USED ONLY WHERE SPECIFICALLY AUTHORIZED AND NOT IN ANY MANHOLE IN WHICH AN INTERIOR DROP CONNECTION ALREADY EXISTS. TYPICAL DROP PIPE DIAMETER IS ONE SIZE SMALLER THAN FORCEMAIN DIAMETER.

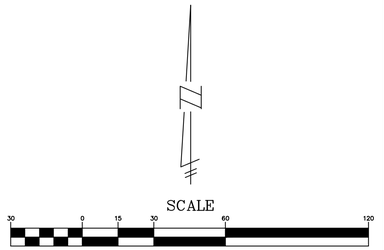
REVISION BLOCK			
Parcel Base / Source Date: N/A			
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	M	03/08/23	ADDED NEW TITLE BLOCK
2	M	11/03/23	ADDED PROPOSED CONNECTION
3	DB	01/31/24	DROP PIPE SIZE
4			

WRC WATER RESOURCES COMMISSIONER — Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST, WATERFORD, MICHIGAN 48328-1907

FORCE MAIN INTERIOR DROP CONNECTION

ORIG. DATE: 07/24/01 | SCALE: NONE | SHEET: 1 of 1



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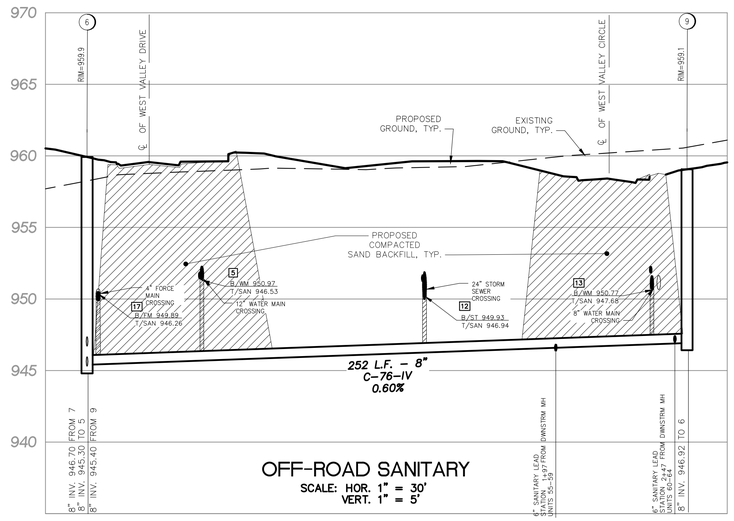
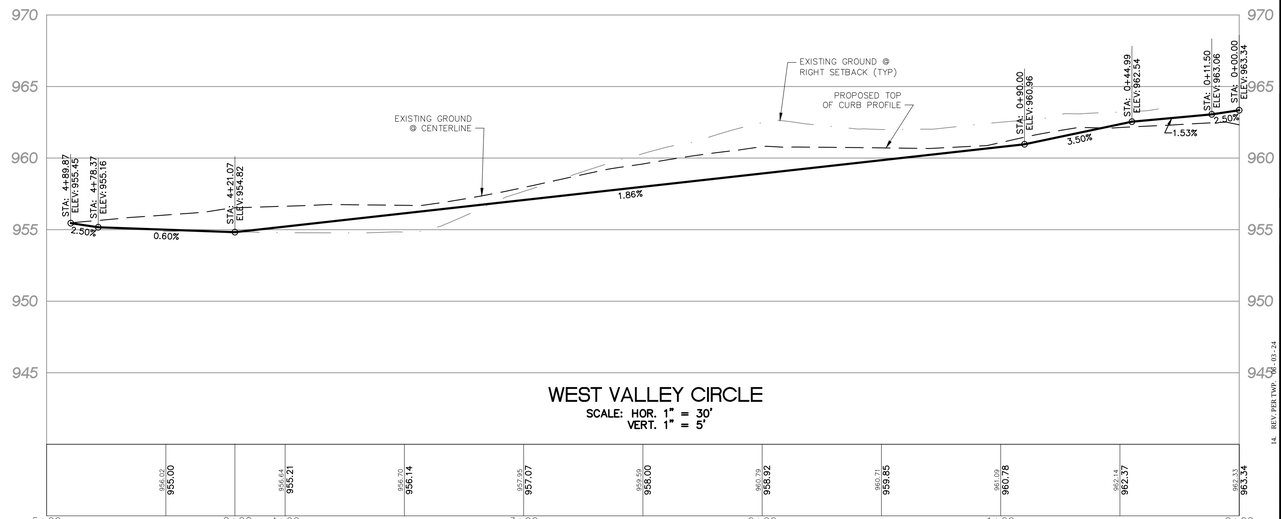
		SANITARY SEWER
		WATER MAIN
○	●	MANHOLE
□	■	CATCH BASIN
	■	CURB INLET W/SILT SAC
◁	◀	END SECTION
⊗	⧓	GATE VALVE
		HYDRANT
1000	1000	CONTOURS
+ 1000.0	1000.00 T/C	SPOT ELEVATION
☆		LIGHT POLE
N		TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
X X	X X	TREE FENCE
//	//	SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE





WEST VALLEY

MULTI–FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

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14. REV. PER TWP. 03-24

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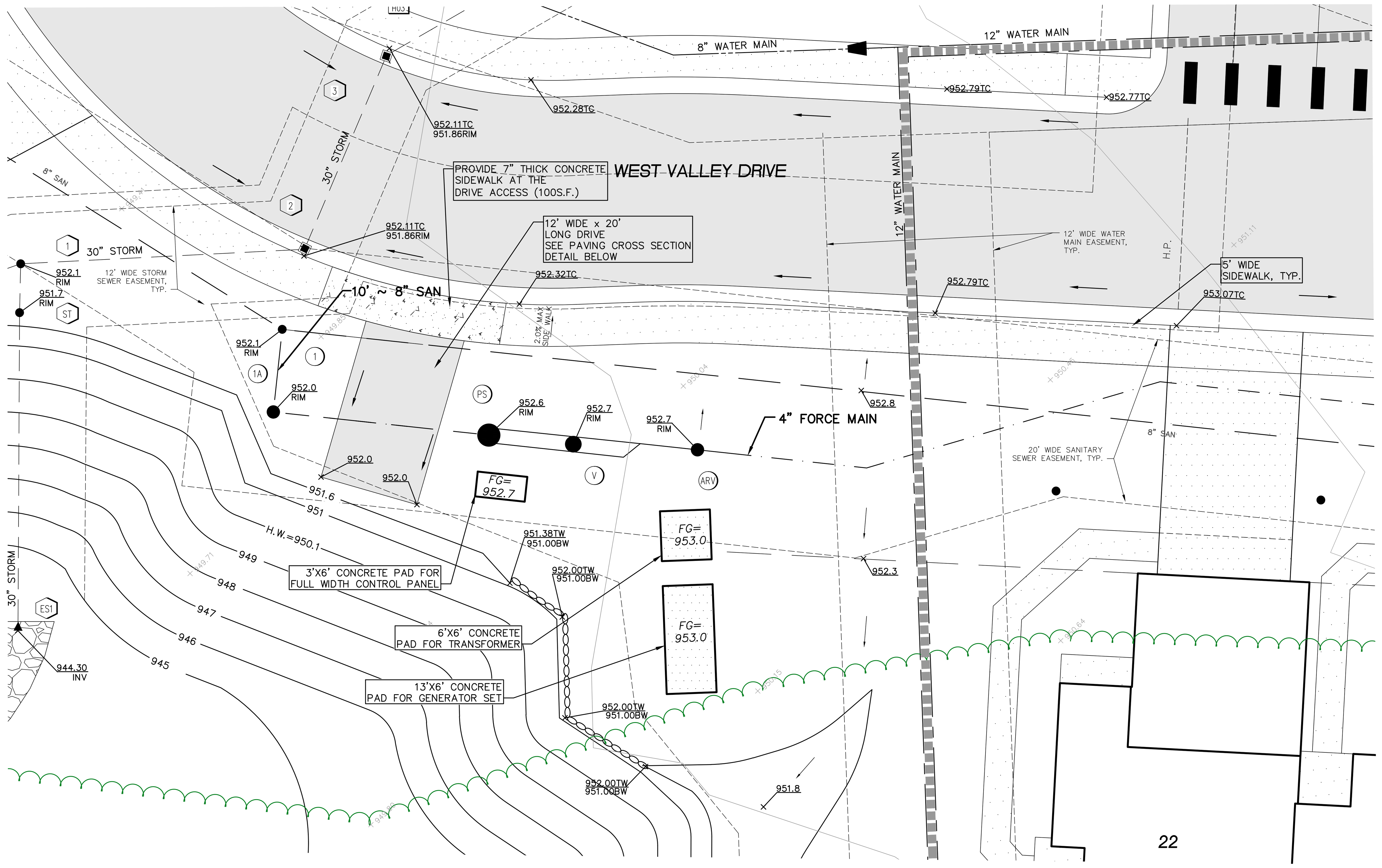
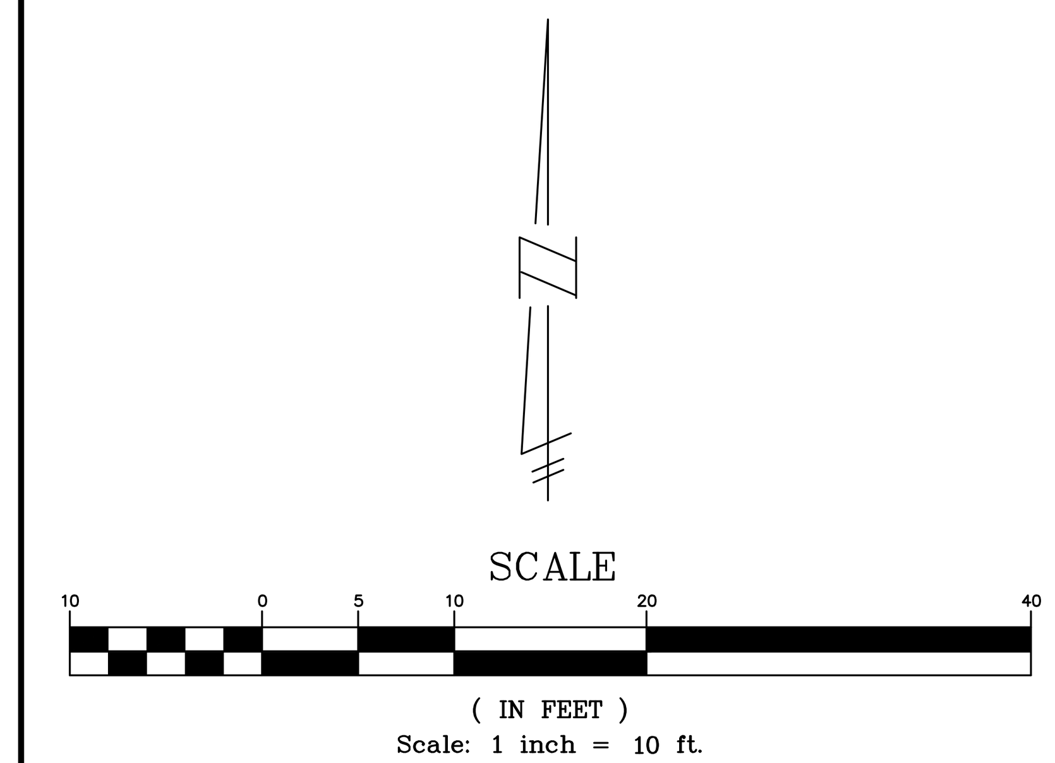
ROAD, SANITARY SEWER, FORCE MAIN & WATER MAIN PLAN

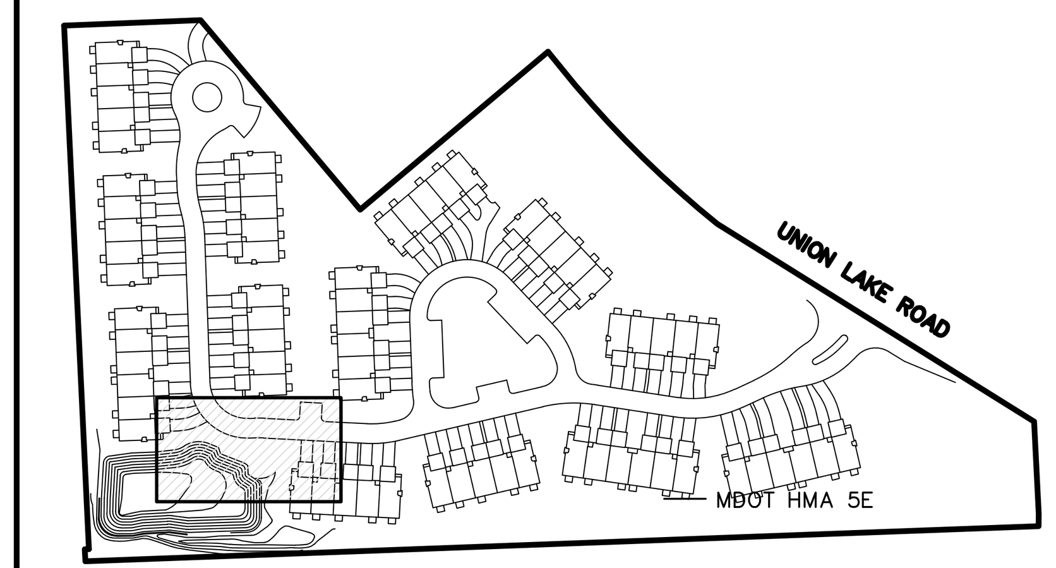
SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7080
FARMINGTON HILLS OFFICE
39206 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 10

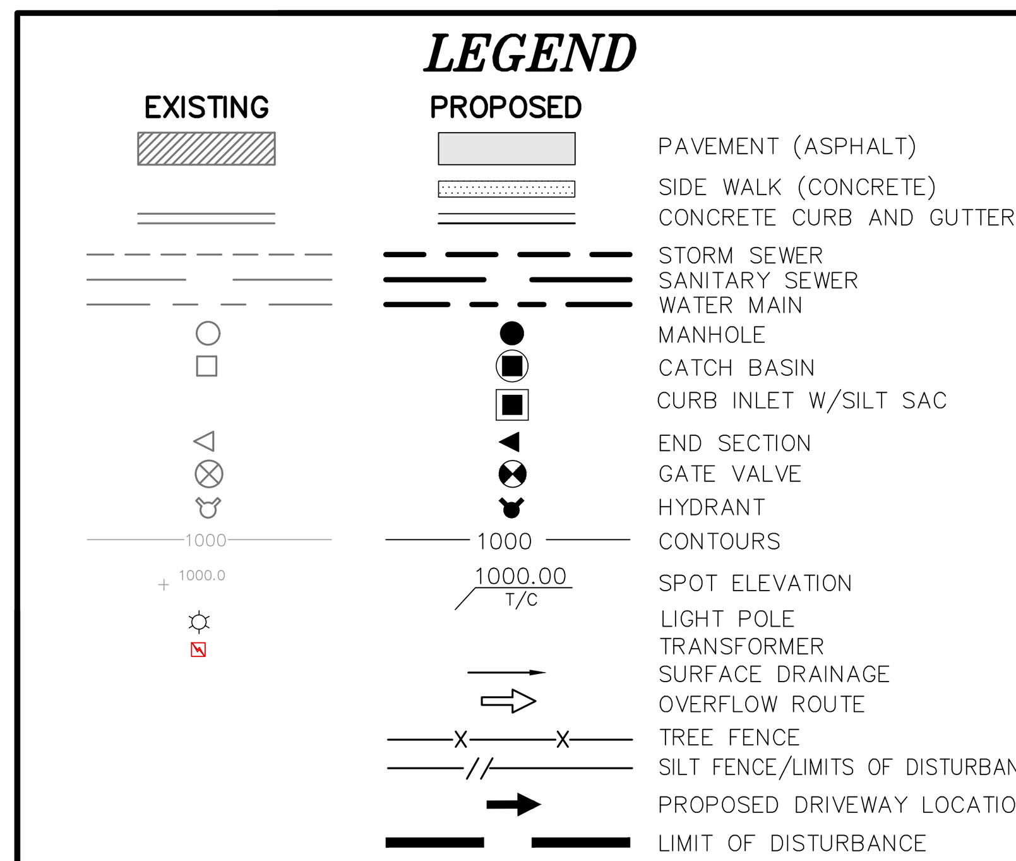


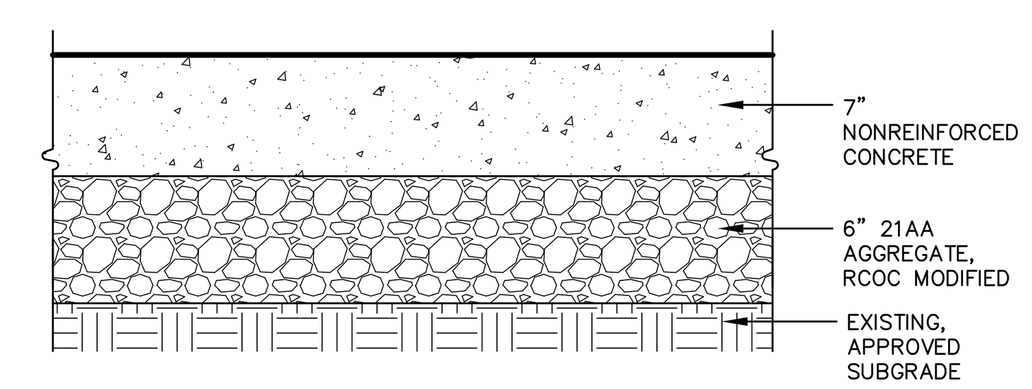
SEE SHEET 16 FOR PUMP STATION DETAILS



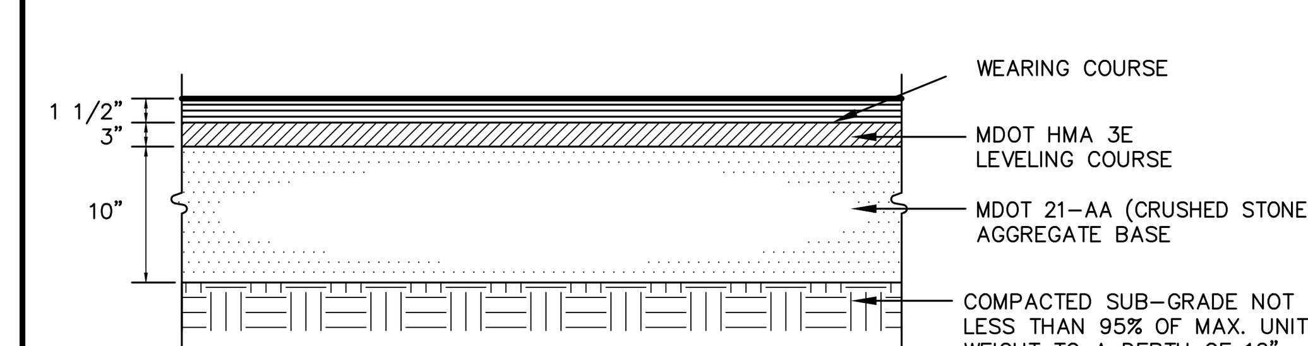


KEY MAP
(NOT TO SCALE)





CONCRETE SIDEWALK CROSS SECTION AT THE PUMP STATION ACCESS DRIVE



ASPHALT CROSS-SECTION FOR PUMP STATION ACCESS

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
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PUMP STATION SITE PLAN

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050

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39205 COUNTRY CLUB DRIVE, SUITE C8
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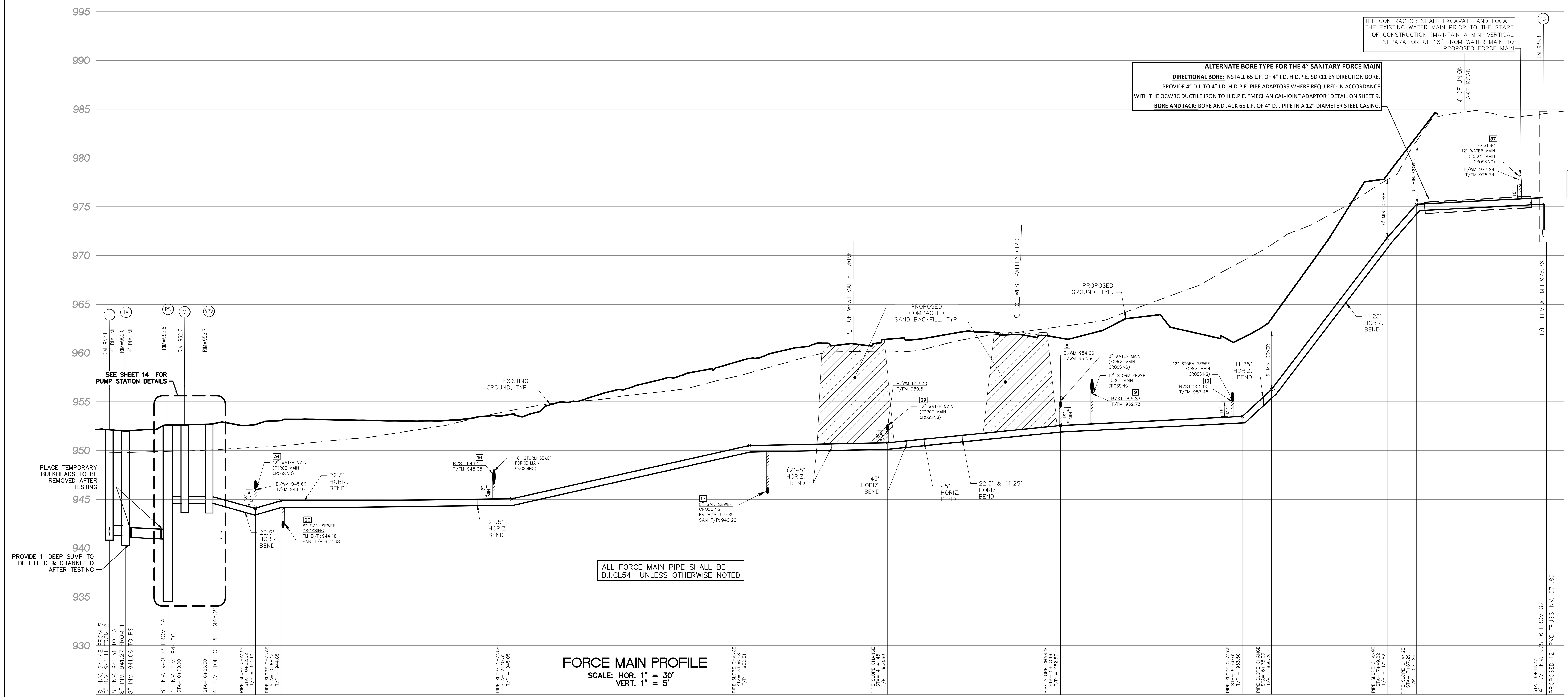

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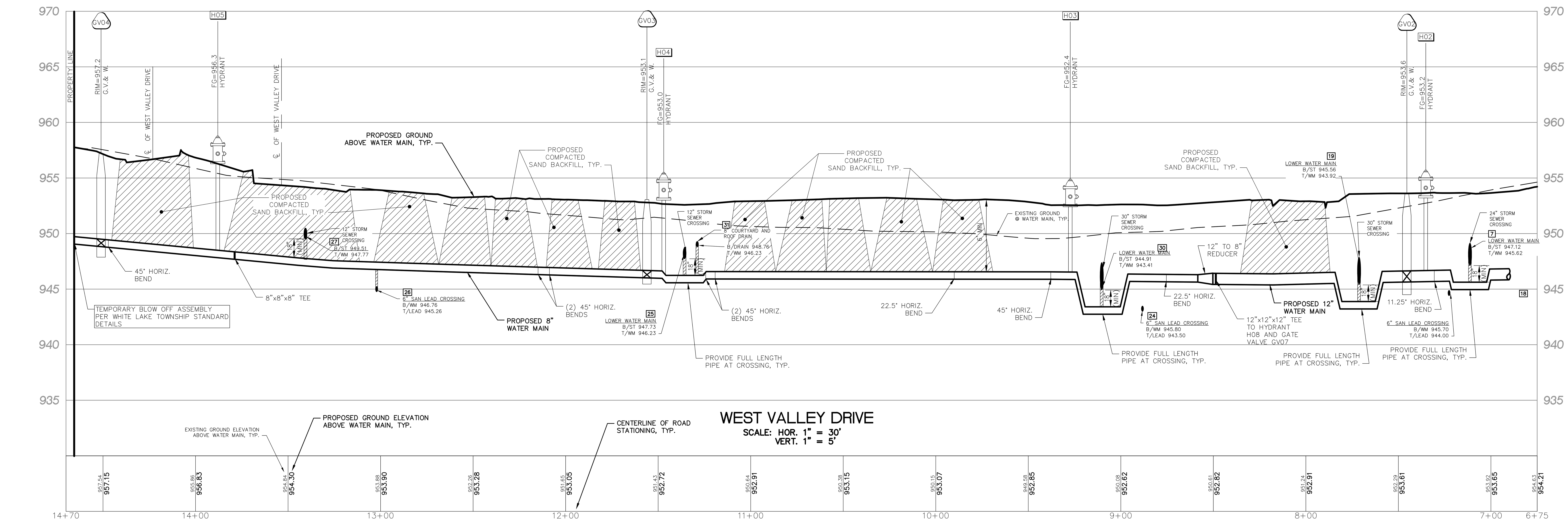
FORCE MAIN PROFILE

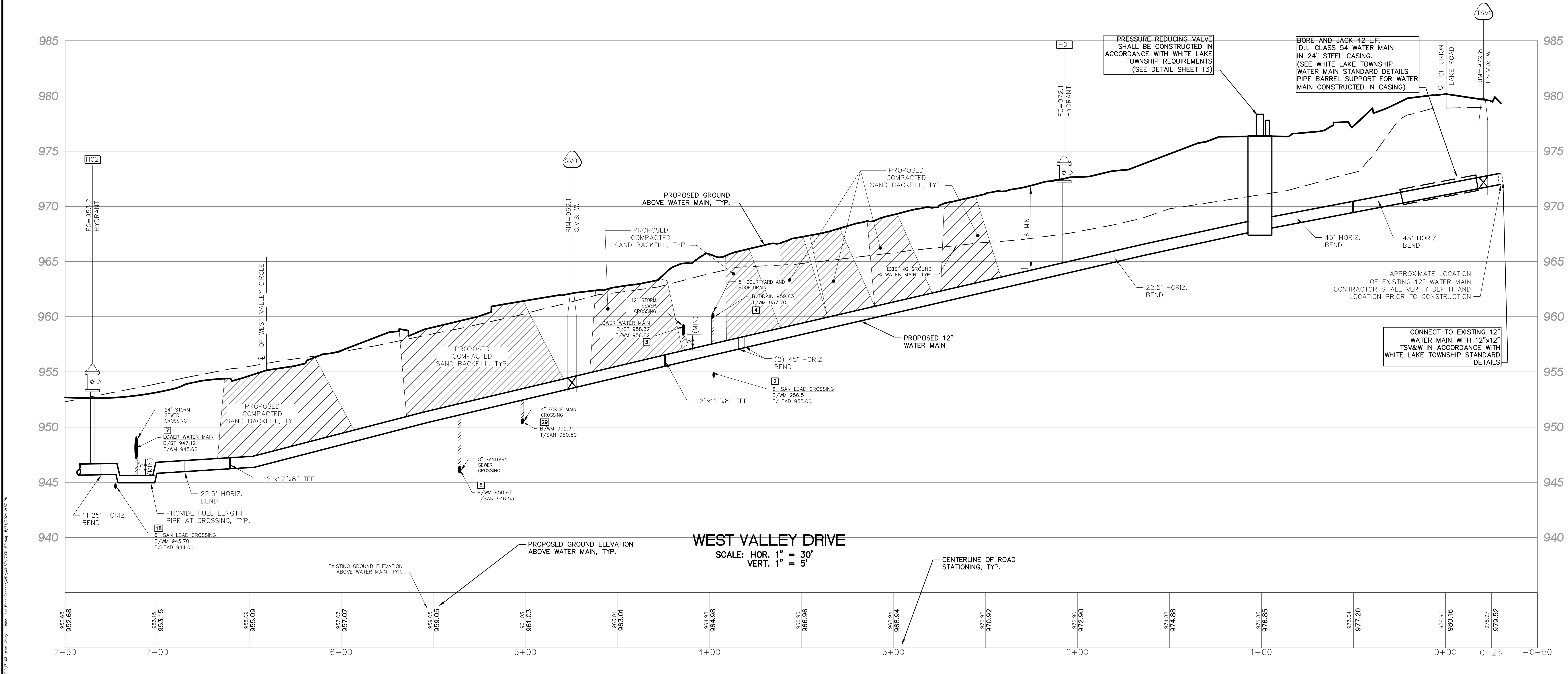
SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

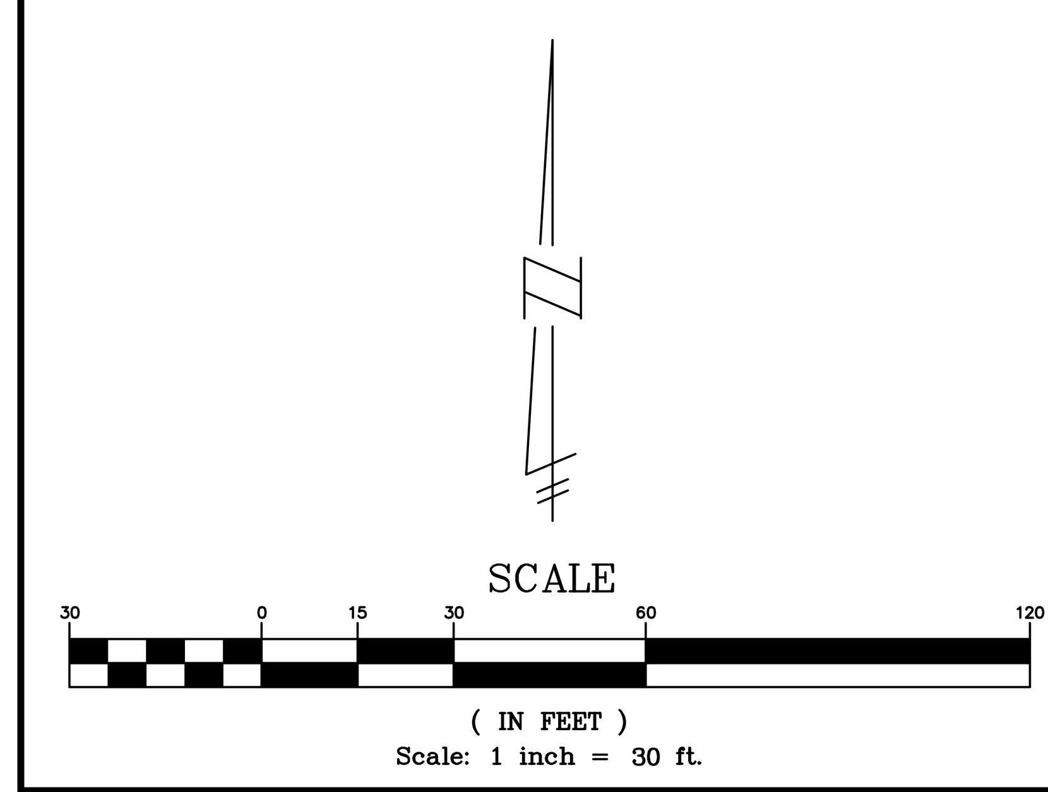
Clinton Township Office
17001 Nineteen Mile Road, Suite 3
Clinton Township, MI 48038
586.412.7050

Farmington Hills Office
39205 Country Club Drive, Suite C8
Farmington Hills, MI 48331
248.308.3331

SHEET 11A







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DATE: 08–23–19 | DESIGNED BY: G.N. JOB NUMBER: 17–031 | CHECKED BY: J.E. DRAWING FILE:17031–RD.dwg

WATER MAIN PROFILES

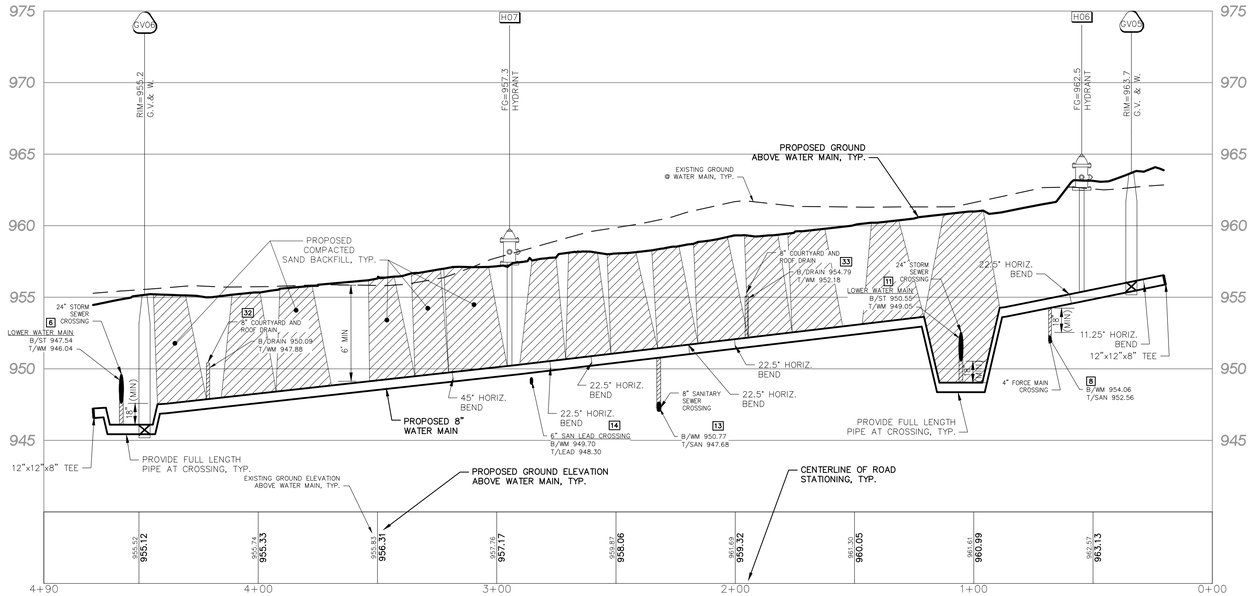
SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050

FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

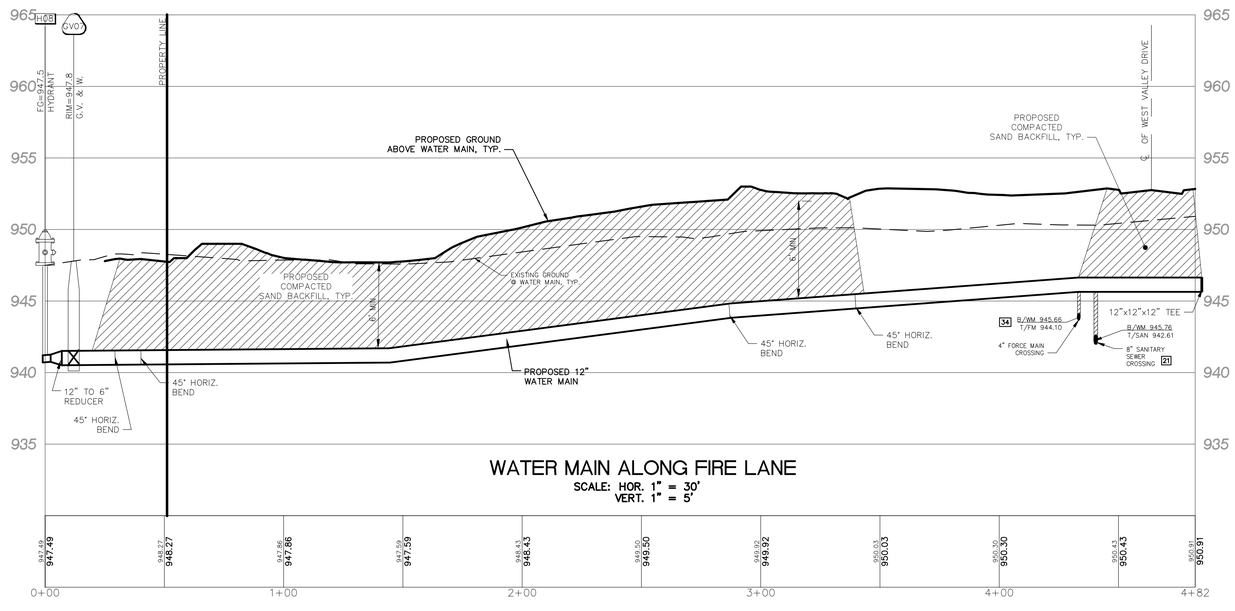
SHEET 12

CROSSING TABLE					
CROSSING #	PIPE BELOW	T/PIPE ELEV	PIPE ABOVE	B/PIPE ELEV	SEPERATION
1	12" WM	971.00	12" STORM	973.21	1.50'
2	6" SAN LEAD	955.00	12" WM	956.50	1.50'
3	12" WM	956.82	12" STORM	958.32	1.50'
4	12" WM	957.70	8' DRAIN	959.83	2.13'
5	8" SAN	946.53	12" WM	950.97	4.44'
6	8" WM	946.04	24" STORM	947.54	1.50'
7	12" WM	945.62	24" STORM	947.12	1.50'
8	4" FM	952.56	8" WM	954.06	1.50'
9	4" FM	952.73	12" STORM	955.83	3.10'
10	4" FM	953.45	12" STORM	955.00	1.55'
11	8" WM	949.05	24" STORM	950.55	1.50'
12	8" SAN	946.94	24" STORM	949.93	2.99'
13	8" SAN	947.68	8" WM	950.77	3.09'
14	6" SAN LEAD	948.30	8" WM	949.70	1.40'
15	8" SAN	943.42	18" STORM	946.39	2.97'
16	4" FM	945.05	18" STORM	946.55	1.50'
17	8" SAN	946.26	4" FM	949.89	3.63'
18	6" SAN LEAD	944.00	12" WM	945.70	1.70'
19	12" WM	943.92	30" STORM	945.56	1.64'
20	8" SAN	942.68	4" FM	944.18	1.50'
21	8" SAN	942.61	12" WM	945.76	3.15'
22	8" SAN	942.16	30" STORM	944.64	2.48
24	6" SAN LEAD	943.50	8" WM	945.80	2.30'
25	8" WM	946.23	12" STORM	947.73	1.50'
26	6" SAN LEAD	945.26	8" WM	946.76	1.50'
27	8" WM	947.77	12" STORM	949.51	1.74'
29	4" FM	950.80	12" WM	952.30	1.50'
30	8" WM	943.41	30" STORM	944.91	1.50'
31	8" WM	946.23	8" DRAIN	948.76	2.53'
32	8" WM	947.88	8" DRAIN	950.09	2.21'
33	8" WM	952.18	8" DRAIN	954.79	2.61'
34	4" FM	944.10	12" WM	945.66	1.56'
35	8" SAN	943.37	8" DRAIN	948.72	5.35'
36	8" SAN	953.34	8" DRAIN	959.92	6.58'
37	EX. 12" WM	977.24	4" FM	975.74	1.50'



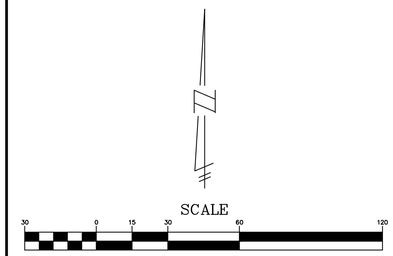
WEST VALLEY CIRCLE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



WATER MAIN ALONG FIRE LANE

SCALE: HOR. 1" = 30'
VERT. 1" = 5'



UTILITY CROSSING– MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

COMPACTED SAND BACKFILL UNDER THE INFLUENCE OF ROADS. MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER / SANITARY SEWER / WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
1000	1000	CONTOURS
+ 1000.0	1000.00 T/C	SPOT ELEVATION
		LIGHT POLE / TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
		TREE FENCE
		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE

WEST VALLEY

MULTI–FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
2.	REV. SAN AND STORM PER OWNER	04-10-20
3.	REV SAN, ST. & PAV. PER OWNER	5-18-20
4.	REVISE PER TWP.	02-18-21
5.	REVISE PER TWP.	03-17-21
6.	REVISED WATER MAIN PER EGLE	05-11-21
7.	REV PER OWNER, RCOC AND OCWRC	11-21-22
8.	REVISED WATERMAIN FOR OWNER	04-05-23
9.	REVISED PER TOWNSHIP	04-25-23
10.	REVISE PER TWP.	7-27-23
11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVISE PER TWP	02-13-24

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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

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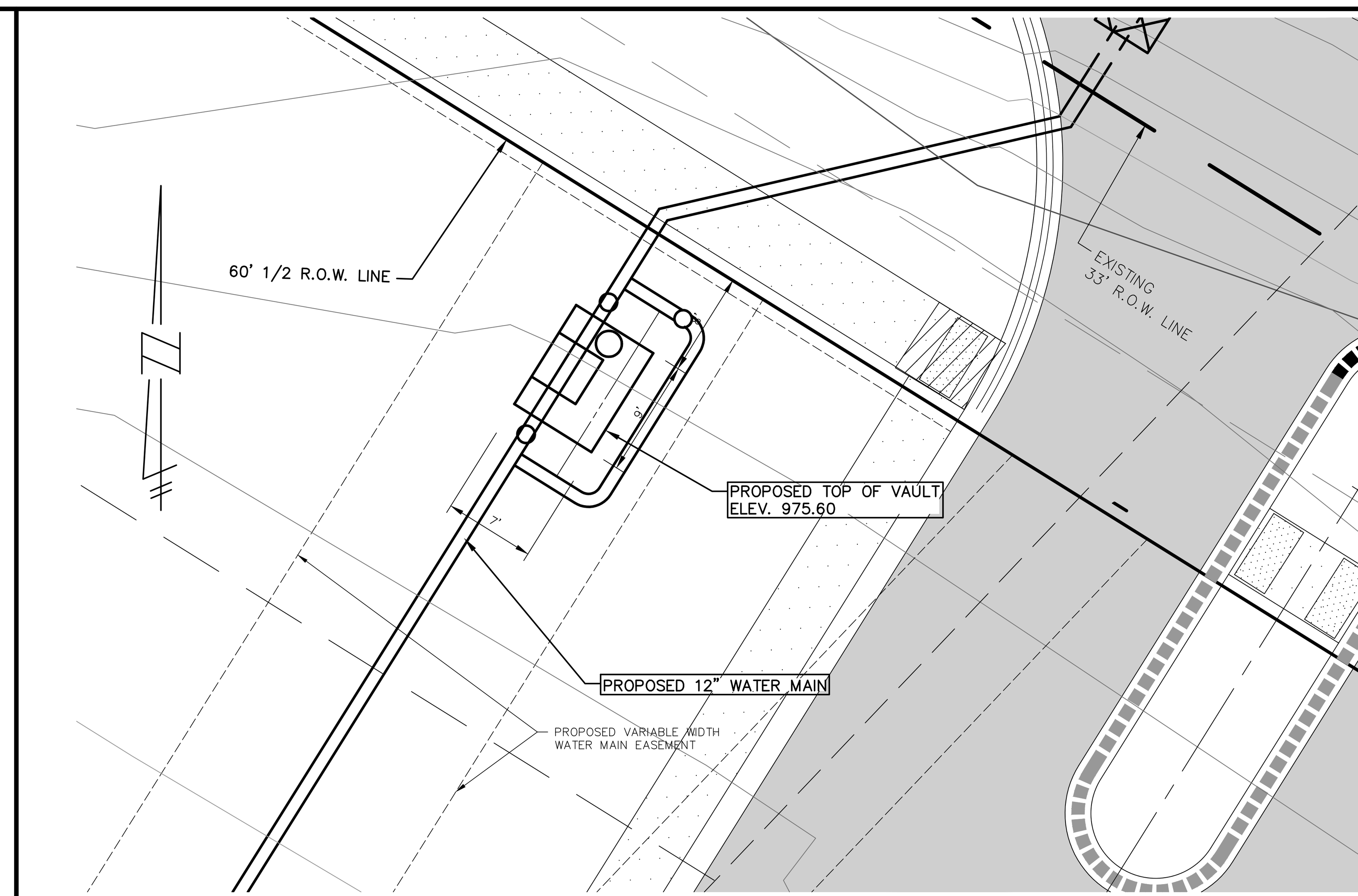
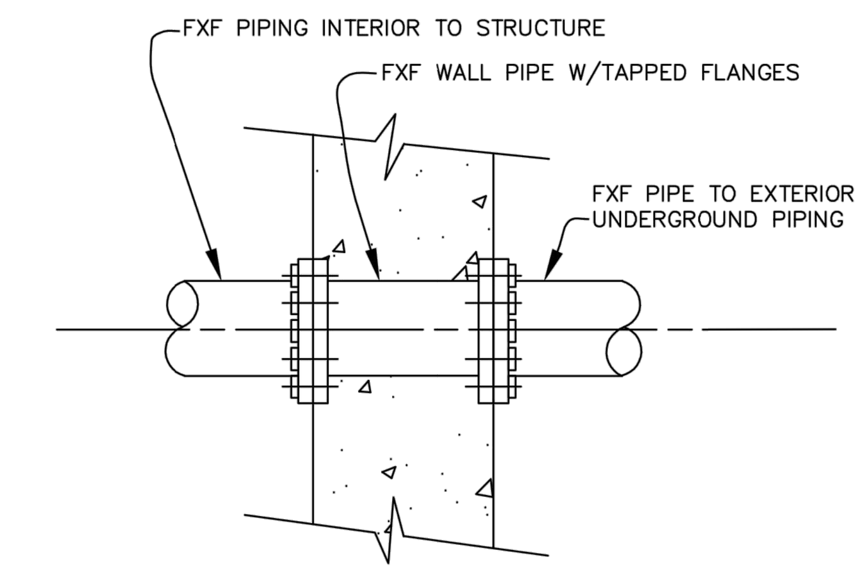
SHEET 12A

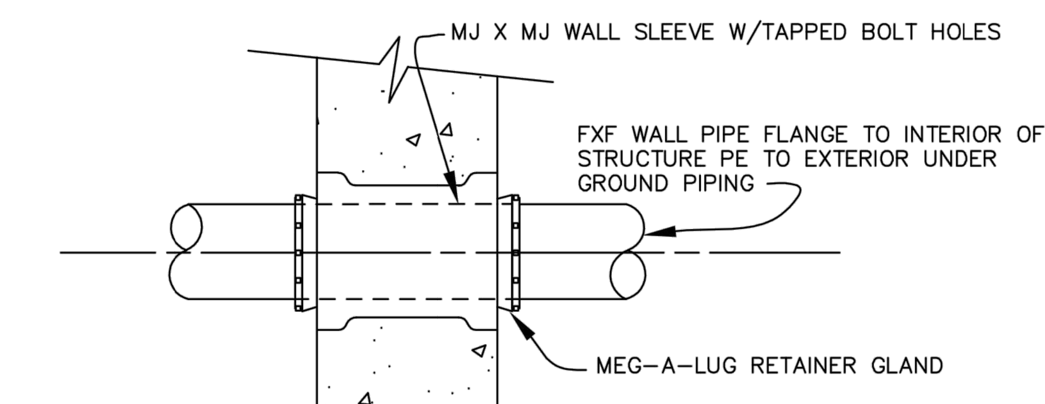


12" PRV PLAN VIEW

Scale: 1 inch = 10 ft.

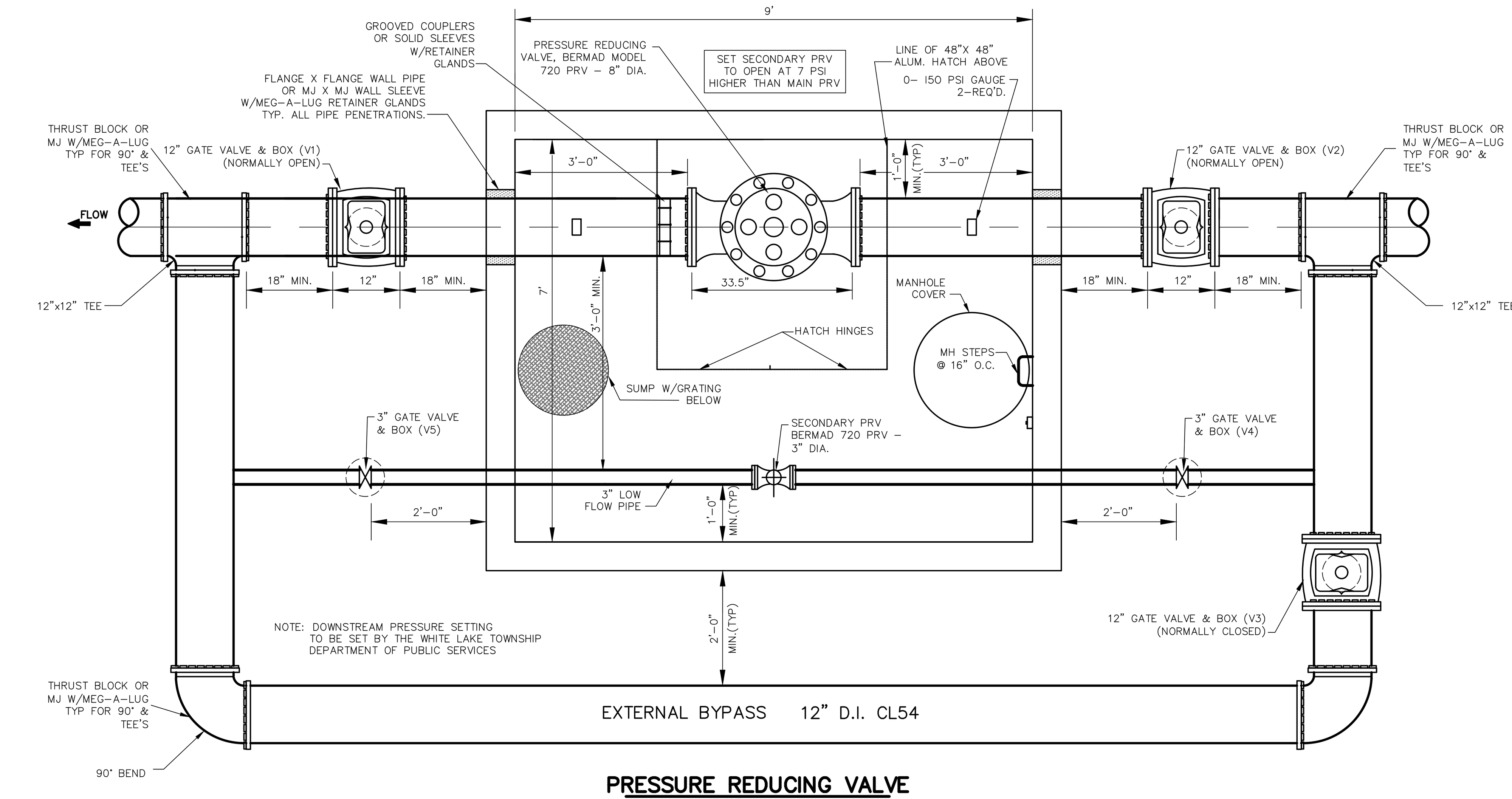


FLANGE X FLANGE WALL PIPE



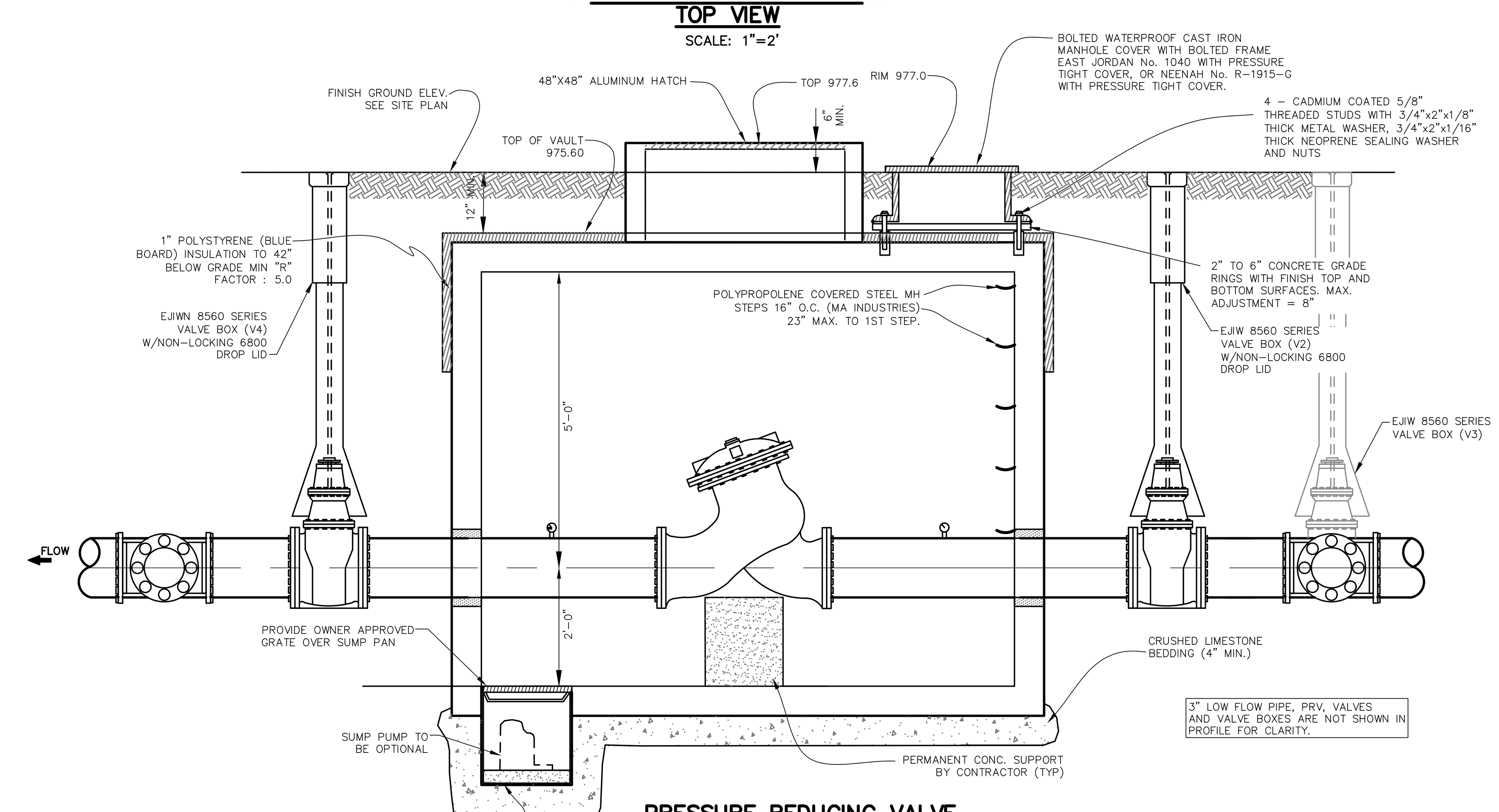
MJ X MJ WALL SLEEVE
W/MEG-A-LUG RETAINER GLAND

12" PRESSURE REDUCING VALVE DETAIL



PRESSURE REDUCING VALVE
TOP VIEW

SCALE: 1"=2'



PRESSURE REDUCING VALVE
WALL ELEVATION

SCALE: 1"=2'

SCALE

10 0 5 10 20 40

(IN FEET)

Scale: 1 inch = 10 ft.

GENERAL NOTES VAULT

1. THE CONTRACTOR SHALL NOTIFY WHITE LAKE TOWNSHIP AND CALL 811 FOR EXISTING UTILITY LOCATIONS A MINIMUM OF 72 HOURS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES.
2. ALL CONSTRUCTION MUST CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS ADOPTED BY WHITE LAKE TOWNSHIP.
3. ALL SOIL EROSION AND SILT MUST BE CONTROLLED AND CONTAINED ON SITE.
4. ALL PUBLIC WATER MAIN PIPE SHALL BE CLASS 54 DUCTILE IRON WITH DOUBLE CEMENT LINING.
5. THRUST BLOCKS ARE REQUIRED FOR ALL TEES AND BENDS OUTSIDE VAULT.
6. ALL CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4500 P.S.I., AND SHALL BE AIR-ENTRAINED.
7. EXCAVATION AREA FOR VAULT SHALL BE OVER EXCAVATED 6" AND BACK FILLED WITH 6" OF CRUSHED LIMESTONE. ALL BACK FILL SHALL BE 95% COMPACTION.
8. ALL JOINTS BETWEEN PIPES AND WALL SLEEVES SHALL HAVE A WATERPROOF SEALANT.
9. ALL JOINTS BETWEEN PRECAST SECTIONS INCLUDING TOP SHALL BE SEALED WITH BUTYL ROPE TYPE SEALANT.
10. HATCH SHALL BE 48" X 48" ALUMINUM EQUAL TO BILCO TYPE "J", 300psf LOADING, WITH LOCK HASP.
11. THE VAULT SHALL BE DESIGNED FOR AN H-20 LOADING WITH 12" OF BACKFILL.
12. ALL EXTERIOR CONCRETE SURFACES SHALL BE WATERPROOFED WITH MASTIC ASPHALT COATING (50 MIL. THICKNESS), ALL INTERIOR CONCRETE SURFACES SHALL BE SEALED WITH ONE COAT OF THOROSEAL AND TWO TOP COATS OF HIBUILD MASONRY SEALANT (50 MIL. THICKNESS).
13. SHOP DRAWINGS FOR THE VAULT, HATCH AND ALL PIPING AND APPURTANANCES SHALL BE SUBMITTED TO THE TOWNSHIP ENGINEER FOR REVIEW AND APPROVAL.
14. SOIL BORING OR TEST PIT LOG SHALL BE PROVIDED WITH OR PRIOR TO SHOP DRAWINGS. SOILS AND WATER TABLE INFORMATION TO A MINIMUM OF TEN FEET BELOW THE GROUND SURFACE SHALL BE PROVIDED.

LEGEND

EXISTING PROPOSED

PAVEMENT (ASPHALT)
SIDE WALK (CONCRETE)
CONCRETE CURB AND GUTTER
STORM SEWER
SANITARY SEWER
WATER MAIN
MANHOLE
CATCH BASIN
CURB INLET W/SILT SAC
END SECTION
GATE VALVE
HYDRANT
1000 CONTOURS
1000.00 SPOT ELEVATION
LIGHT POLE
TRANSFORMER
SURFACE DRAINAGE
OVERFLOW ROUTE
TREE FENCE
SILT FENCE/LIMITS OF DISTURBANCE
PROPOSED DRIVEWAY LOCATION
LIMIT OF DISTURBANCE

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
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11.	REVISED PER TWP.	09-21-23
12	REVISED PER EGLE	01-31-24
13	REVSE PER TWP	02-13-24
14.	REV. PER TWP.	06-03-24

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PRESSURE REDUCING VALVE DETAILS AND NOTES

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
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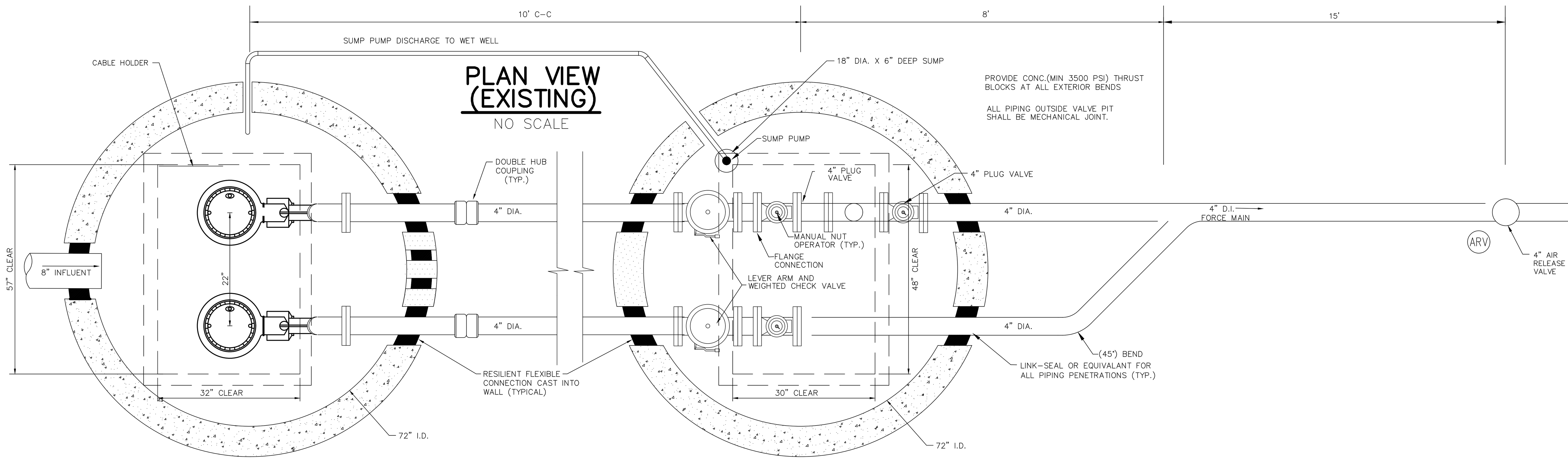
SHEET 13



NOTES

PUMPS:

1. PUMPS SHALL BE FLYGT MODEL NP 3085 SH3~ADAPTIVE 256 SUBMERSIBLE WASTEWATER PUMP WITH A 4" DISCHARGE TO DELIVER 116 GAL/MIN AGAINST AN OPERATING HEAD OF 52 FT WITH 3.44 HP – 3415 RPM MOTOR (230V, 3PH.,VFD) OR APPROVED EQUAL.
2. PUMPS SHALL BE CAPABLE OF PASSING SPHERES AT LEAST 3" IN DIAMETER.

ELECTRICAL/CONTROL PANEL:

1. CONTROL PANEL SHALL BE PROVIDED BY PUMP MANUFACTURER.
2. RELAYS FOR LEAK DETECTION DEVICES IN EACH PUMP SHALL BE PROVIDED AND DELIVERED TO OWNER.
3. CONTROL CIRCUIT TO BE CONNECTED THROUGH HEAT SENSING SWITCHES IN THE PUMP AND SHALL DISCONNECT THE CONTROL CIRCUIT IN CASE OF A HIGH TEMPERATURE CONDITION IN THE PUMP MOTOR.
4. ALL SELECTOR SWITCHES AND LIGHTS SHALL BE OIL TIGHT, INDUSTRIAL RATED WITH 10 AMP CONTACTS.
5. CONTROL OF THE PUMPS SHALL BE BY MULTITRODE DUPLEX PUMP CONTROLLER, MODEL #MSU–3MP, WITH ENERGY MONITORING & MOTOR PROTECTION, MULTITRODE LEVEL PROBE WITH INTRINSICALLY SAFE BARRIER, AND REDUNDANT INTRINSICALLY SAFE MERCURY FLOAT SWITCHES FOR HIGH AND LOW WATER LEVELS.
6. PUMPS SHALL ALTERNATE AFTER EVERY CYCLE.
7. LOW WATER ALARM SHALL BE WIRED AS A REDUNDANT PUMP OFF SWITCH.
8. HOUR METERS SHALL BE PROVIDED FOR EACH PUMP.
9. THE ELECTRICAL CONTROL PANEL SHALL CONTAIN GAS–TIGHT SEALS.
10. ELECTRIC POWER (110V) SHALL BE PROVIDED FOR MAINTENANCE AND SHALL BE GROUND FAULT PROTECTED.
11. CONTROL PANEL SHALL BE LOCATED ABOVE GROUND.
12. GAS TIGHT SEALS SHALL BE PROVIDED IN CONDUITS FROM WET WELLS AND LOCATED WITHIN 18" OF CONTROL PANEL.
13. VOLTAGE AND AMPERAGE FROM CONTROL PANEL SHALL BE COMPATIBLE WITH MOTORS AND OTHER ELECTRICAL EQUIPMENT.
14. A DISCONNECTION OF THE ELECTRIC POWER TO PUMP MUST BE PROVIDED TO ALLOW COMPLETE REMOVAL OF PUMPS WITHOUT DISTURBING THE GAS TIGHT SEAL BETWEEN THE WET WELL AND THE CONTROL PANEL.
15. UNI–STRUT RACK SHALL BE PROVIDED FOR CONTROL PANEL MOUNT, MOUNT CONTROL PANELS ON EACH SIDE TO MINIMIZE RACK FOOT PRINT.
16. SCADA EQUIPMENT TO BE PROVIDED PER WHITE LAKE TOWNSHIP SPECIFICATIONS.
17. PUMP STATION CONTROL PANEL SHALL CONFORM TO WHITE LAKE TOWNSHIP SPECIFICATIONS AND SHALL INCLUDE VARIABLE FREQUENCY DRIVES (VFD'S) FOR PHASE CONVERSION.

PUMP STATION/VALVE PIT:

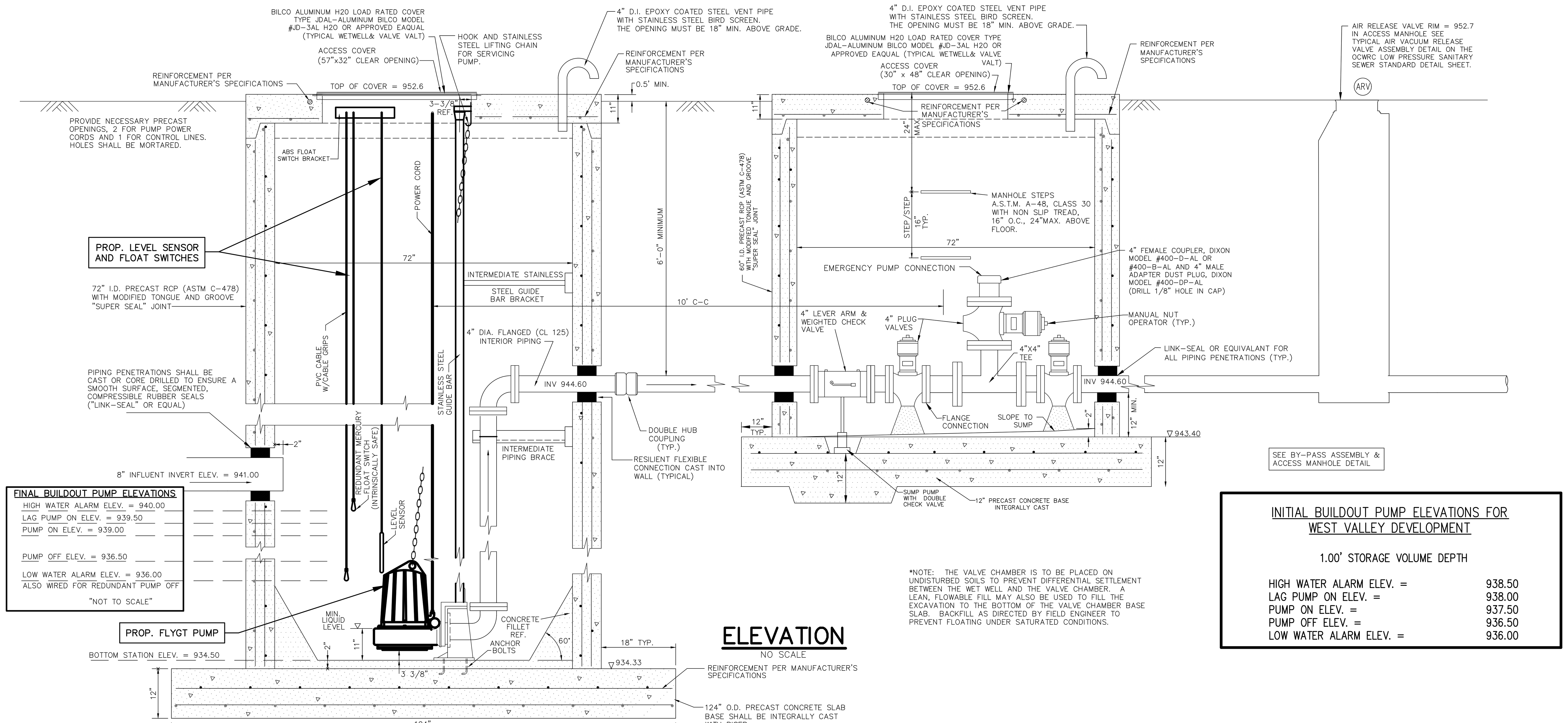
1. COVERS A. PUMP STATION – ITT FLYGHT HEAVY DUTY ANGLE FRAME COVER WITH 32"x57" CLEAR OPENING WITH A SAFE–HATCH ACCESS COVER FOR FALL PROTECTION. THE COVER SHALL BE PROVIDED WITH A PADLOCK STYLE LOCKING DEVICE TO PREVENT UNAUTHORIZED ACCESS. B. VALVE PIT – ITT FLYGHT HEAVY DUTY ANGLE FRAME COVER WITH 30"x48" CLEAR OPENING WITH A SAFE–HATCH ACCESS COVER FOR FALL PROTECTION. THE COVER SHALL BE PROVIDED WITH A PADLOCK STYLE LOCKING DEVICE TO PREVENT UNAUTHORIZED ACCESS.
2. CHECK VALVES – APCO SERIES 100 RUBBER FLAPPER SWING CHECK VALVE WITH CAST IRON BODY AND COVER. MODEL 104 (4") SUPPLIED WITH BACKFLOW DEVICE AND FLOW CONTROL DEVICE.
3. PLUG VALVES – 4" DEZURIK (OR APPROVED EQUAL) – HAND ACTIVATED.
4. ALL INTERIOR PIPING SHALL BE 4" DIA. FLANGED (CL.125). ALL SUPPORT BRACKETS, GUIDE RAILS, LIFTING CHAINS, LIFTING EYES, HOOKS, CABLE SUPPORT BRACKETS, AND MOUNTING HARDWARE WITHIN THE WET WELL SHALL BE STAINLESS STEEL.
5. ALL ELECTRICAL EQUIPMENT AND WIRING WITHIN THE WET WELL SHALL BE INSTALLED IN ACCORDANCE WITH THE N.E.C. REQUIREMENTS FOR CLASS 1, DIVISION 1, GROUP D HAZARDOUS LOCATIONS.
6. THE PUMP STATION AND APPURTENANCES ARE LOCATED TO PROVIDE 24–HOUR ACCESS.
7. CONTRACTOR AND PUMP MANUFACTURER MUST COORDINATE THE LOCATION OF FLOATS AND BUBBLER TO ENSURE THERE WILL NOT BE DISTURBANCE FROM PUMP SUCTION AND INFLUENT SEWER TURBULENCE.
8. LINK–SEAL OR EQUIVALENT FOR ALL PIPING PENETRATIONS

ALARM SYSTEM:

1. THE ALARM SYSTEM SHALL CONTAIN A POWER BACK–UP IN THE CASE OF A POWER FAILURE, AND SHALL ALERT A 24–HOUR LOCATION OF POWER FAILURE.
2. THE ALARM SYSTEM SHALL ALERT A 24–HOUR LOCATION OF SEAL FAILURE.

AUXILIARY POWER:

1. ONE 40KW CUMMINGS DIESEL GENERATOR SET MODEL C40 D6 OR APPROVED EQUAL AND A CUMMINGS AUTOMATIC TRANSFER SWITCH OTEC OPEN TRANSITION WITH A 225 AMP RATING WITHIN A NEMA 3R ENCLOSURE.

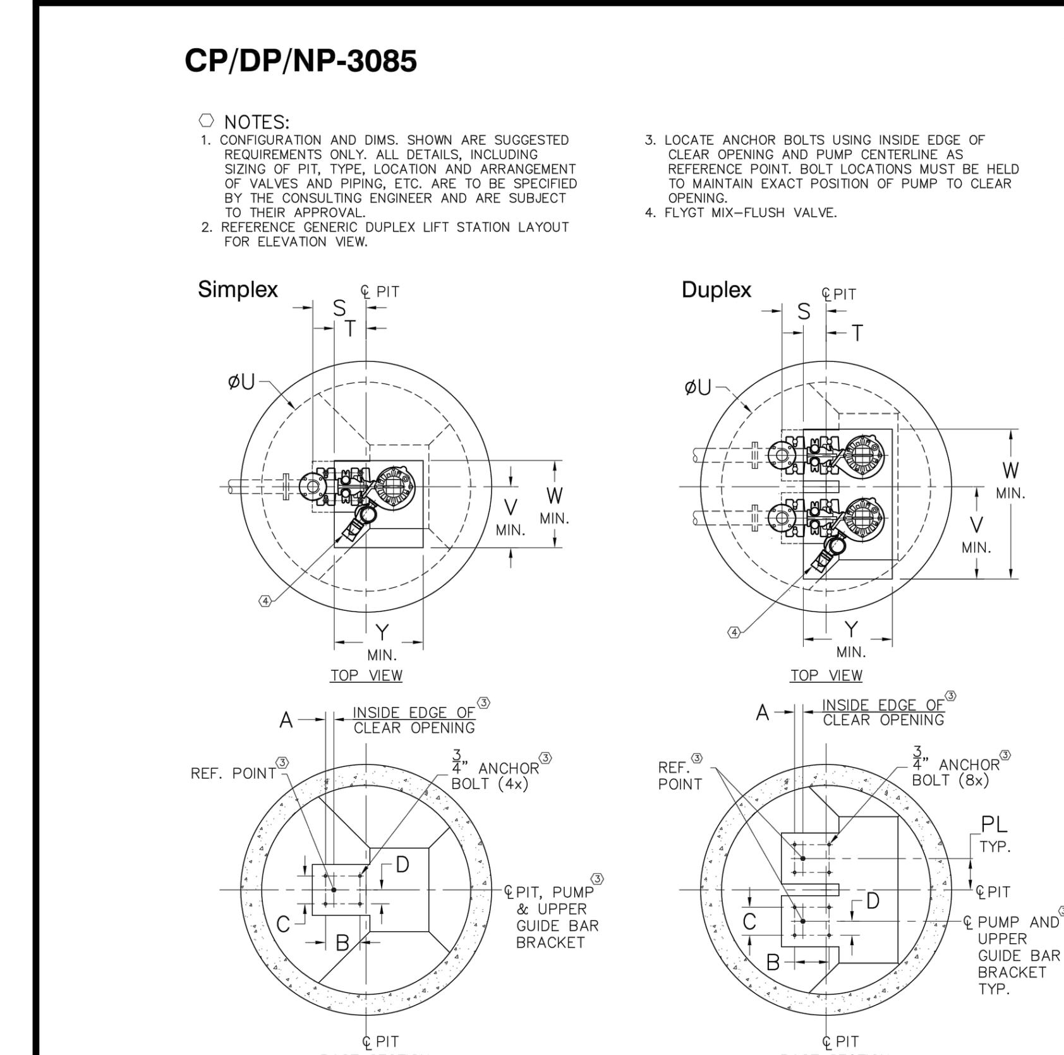


INITIAL BUILDOUT PUMP ELEVATIONS FOR WEST VALLEY DEVELOPMENT

1.00' STORAGE VOLUME DEPTH

HIGH WATER ALARM ELEV. =	938.50
LAG PUMP ON ELEV. =	938.00
PUMP ON ELEV. =	937.50
PUMP OFF ELEV. =	936.50
LOW WATER ALARM ELEV. =	936.00

THE PUMP STATION IS PUBLIC AND SHALL BE MAINTAINED IN ACCORDANCE WITH OAKLAND COUNTY WATER RESOURCE COMMISSIONER REQUIREMENTS



ALL DIMENSIONS ARE IN INCHES

MODEL	NOM. SIZE	VERSION	A	B	C	D	SIMPLEX S	T	U	V	W	Y	DUPLEX S	T	U	PL	V	W	Y
NP	3"	SH	2 3/8	9 7/8	8	4	15 1/4	9 1/8	60	17 1/2	15	24 1/2	13	6 7/8	60	8	25 1/2	31	24 1/2
CP	3"	HT	2 3/8	9 7/8	8	4	15 1/4	9 1/8	60	17 1/2	25	24 1/2	13	6 7/8	60	8	25 1/2	41	24 1/2
DP	3"	HT	2 3/8	9 7/8	8	4	15 1/4	9 1/8	60	7 1/2	15	24 1/2	13	6 7/8	60	8	15 1/2	31	24 1/2
CP/DP/NP	3"	MT	2 3/8	9 7/8	8	4	15 1/4	9 1/8	60	17 1/2	25	25 1/2	12 5/8	6 1/2	60	9	26 1/2	43	25 1/2
CP/DP/NP	4"	MT	2 1/4	9 7/8	8	4	13 3/4	7 1/4	60	17 1/2	25	25 1/2	10 7/8	4 3/8	60	9	26 1/2	43	25 1/2

Pump Station
Basis of Design

Ultimate Design for Pump Station

Population:

Parcel 12-36-176-002				
Maximum Estimated REU for future build out - Assume 50 REUs				
=	2.7	people/unit x	50	units
=			135.0	people
West Valey Development		=	69	units
* Multi Fmaily Unit Factor	0.6	=	41.4	units
	2.7	people/unit x	111.78	people
Total Ultimate Population =			**246.78**	**people**

Average Flow:

=	246.78	people x	100	gal/cap/day
=	24,678	GPD		
=	17.14	GPM		
=	0.0382	CFS		

Peak Factor:

=	(18+SQRT(P/1000))/(4+SQRT(P/1000))	
=	4.23	(28,400 > Pop > 500)
=	4	(Pop < 500 people, 10 State Standard)
use =	4	

Peak Flow:

=	98,712	GPD
=	69	GPM
=	0.1527	CFS

Mimimum Flow:

Mimimum Flow =	0.2	* Avg Flow =	4,936	GPD
			3.4	GPM
			0.0076	CFS

Initial Design for Pump Station

Population:

=	2.7	people/unit x	69	units
* Multi Fmaily Unit Factor	0.6	=	41.4	units
=	2.7	people/unit x	111.78	people

Average Flow:

=	111.78	people x	100	gal/cap/day
=	11,178	GPD		
=	7.76	GPM		
=	0.0173	CFS		

Peak Factor:

=	(18+SQRT(P/1000))/(4+SQRT(P/1000))	
=	4.23	(28,400 > Pop > 500)
=	4	(Pop < 500 people, 10 State Standard)
=	4	(Per 10 States Standards; Population < 500)

Peak Flow:

=	PEAK FACTOR XAVERAGE FLOW	
=	44,712	GPD
=	31	GPM
=	0.0692	CFS

Mimimum Flow:

Mimimum Flow =	0.2	* Avg Flow =	2,236	GPD
			1.6	GPM
			0.0035	CFS

Wet Well:

2.5' Storage Volume & 6' I.D. =	70.69	CF		
(Pump On to Pump Off)	528.77	GAL		
Peak Flow Will Be Discharged at approximately	69	GPM =	0.1527	CFS
		(Ultimate Design)		

Head Loss Calculation (4" Forcemain)

Pump Station Compnoents

No.	Item	Length	4" Equiv. Length	6" Equiv. Length
	Pump Station Compnents for Head Loss			
1	Ordinary Entrance	-	6	-
2	Long Sweep Elbow	-	7	-
3	3" x 4" Reducer	-	2	-
4	Pipe (Vertical)	-	9	-
5	Long Sweep Elbow	-	7	-
6	Pipe (Horizontal)	-	12	-
7	Swing Check Valve	-	25	-
8	Plug Valve (Gate)	-	3	-
9	Standard Tee	-	7	-
10	Pipe (Horizontal)	-	8	-
11	4" x 4" Wye	-	5	-
	4" Equv. Len. =		91	L.F.
	Forcemain Component For Headloss			
12	4" Gate Valve	-	3	-
13	4" x 4" Tee	-	7	-
14	4" Gate Valve	-	3	-
15	4" - 45 deg bend (3 ea)	-	15	-
16	4" - 22.5 degree bend (4 ea)	-	12	-
17	4" - 11.25 deg bend (2 ea)	-	4	-
18	Pipe (Horizontal)	-	830	-
	4" Equv. Len. =		874	L.F.

FM High Point =	976.5	ft
HW (Pump On) =	939.50	ft
LW (LW Alarm) =	936.50	ft

4" Forcemain System Curves:

c = 120

Q (gpm)	Q (cfs)	HL/1000' C = 120 4"	TDH HW	HL/1000' C = 120 4"	TDH LW	
0	0.00	0.00	37.00	0.00	40.00	(Static Head)
25	0.06	0.67	37.65	0.67	40.65	
50	0.11	2.43	39.35	2.43	42.35	
75	0.17	5.15	41.97	5.15	44.97	
100	0.22	8.77	45.46	8.77	48.46	
125	0.28	13.25	49.79	13.25	52.79	
150	0.33	18.56	54.91	18.56	57.91	
175	0.39	24.69	60.83	24.69	63.83	

Pump Operating Data:

NPSH allow:	34.48	ft		
NPSH actual:	17.10	ft		
Pump Flows:	116	gpm	0.26	cfs

Ultimate Design

Area of 4" Pipe:	0.0873	sf
FM Velocity:	2.96	ft/s

Cycle Times:	Inflow (gpm)	ΔQ (gpm)	Fill Time (min)	Pump Time (min)	Cyc. Time (min)	Starts/Hr
Min	3.4	112.6	154.27	4.70	158.97	0.38
Average	17.1	98.9	30.85	5.35	36.20	1.66
Peak	69	47.5	7.71	11.14	18.86	3.18
Max # Starts	58	58.0	9.12	9.12	18.23	3.29

Initial Design - Fill Time for Build out of West Valley

West Valley Number of Units =	69	Units
Multi Family Unit Assignment Factor =	0.6	
OCWRC Equivalent Units =	41.4	Units
Population Density =	2.7	People / Unit
Population =	111.78	People
Average Flow:		
111.78 People * 100 Gal/Person/Day =	11,178	GPD
	7.8	GPM
Fill Time =	68.12	min > 30 min

** Since Fill Time Exceeds 30 min, set the "Pump On" Elevation to El. 938.0 (Lag Pump El. 938.5) to accommodate flows from West Valley. **

Wet Well Fill Times for West Valley Flows:

1.0' Storage Volume & 6' I.D. =	28.27	cf
(Pump On to Pump Off)	211.51	gal
Fill Time =	27.25	min < 30 min, ok

WEST VALLEY
MULTI–FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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11	REVISED PER TWP.	09–21–23
12	REVISED PER EGLE	01–31–24
13	REVSE PER TWP	02–13–24

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DATE: 08–23–19 | DESIGNED BY: G.N. | JOB NUMBER: 17–031 | CHECKED BY: J.E. | DRAWING FILE:17031–PS.dwg

SANITARY SEWER PUMP STATION DETAILS

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Clinton Township Office
17001 Nineteen Mile Road, Suite 3
Clinton Township, MI 48038
586.412.7050
Farmington Hills Office
39205 Country Club Drive, Suite C8
Farmington Hills, MI 48331
248.308.3331

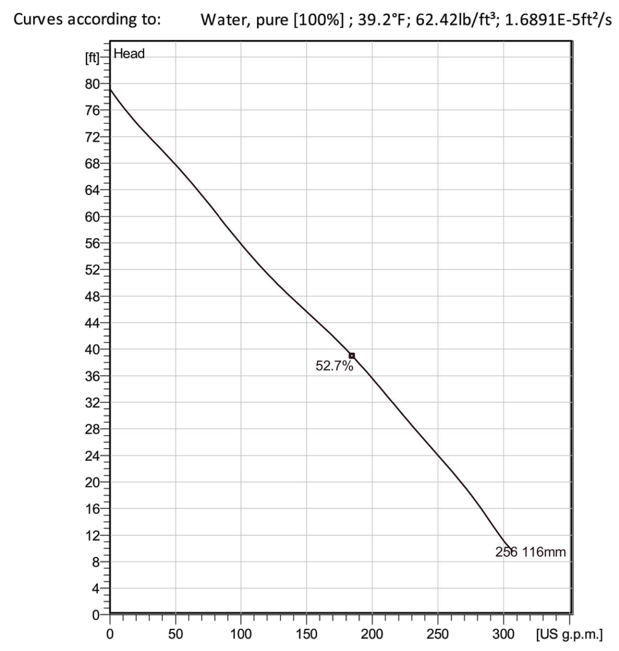
SHEET 14

NP 3085 SH 3~ Adaptive 256

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Technical specification

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Configuration

Motor number
N3085.070 15-09-2AL-W 4hp

Installation type
P - Semi permanent, Wet

Impeller diameter
116 mm

Discharge diameter
3 1/8 inch

Pump information

Impeller diameter
116 mm

Discharge diameter
3 1/8 inch

Inlet diameter
80 mm

Maximum operating speed
3415 rpm

Number of blades
2

Materials

Impeller
Hard-Iron ™

Stator housing material
Grey cast iron

Project	Created by		Last update
Block	Created on	6/5/2019	

NP 3085 SH 3~ Adaptive 256

Technical specification

Motor - General

Motor number	Phases	Rated speed	Rated power
N3085.070 15-09-2AL-W 4hp	3~	3415 rpm	4 hp
Approval	**Number of poles**	**Rated current**	**Stator variant**
FM	2	10 A	12
Frequency	**Rated voltage**	**Insulation class**	**Type of Duty**
60 Hz	230 V	H	S1

Motor - Technical

Power factor - 1/1 Load	Motor efficiency - 1/1 Load	Total moment of inertia	Starts per hour max.
0.91	80.8 %	0.152 lb ft²	30
Power factor - 3/4 Load	**Motor efficiency - 3/4 Load**	**Starting current, direct starting**	
0.88	82.7 %	60 A	
Power factor - 1/2 Load	**Motor efficiency - 1/2 Load**	**Starting current, star-delta**	
0.81	82.5 %	20 A	

Project	Created by		Last update
Block	Created on	6/5/2019	

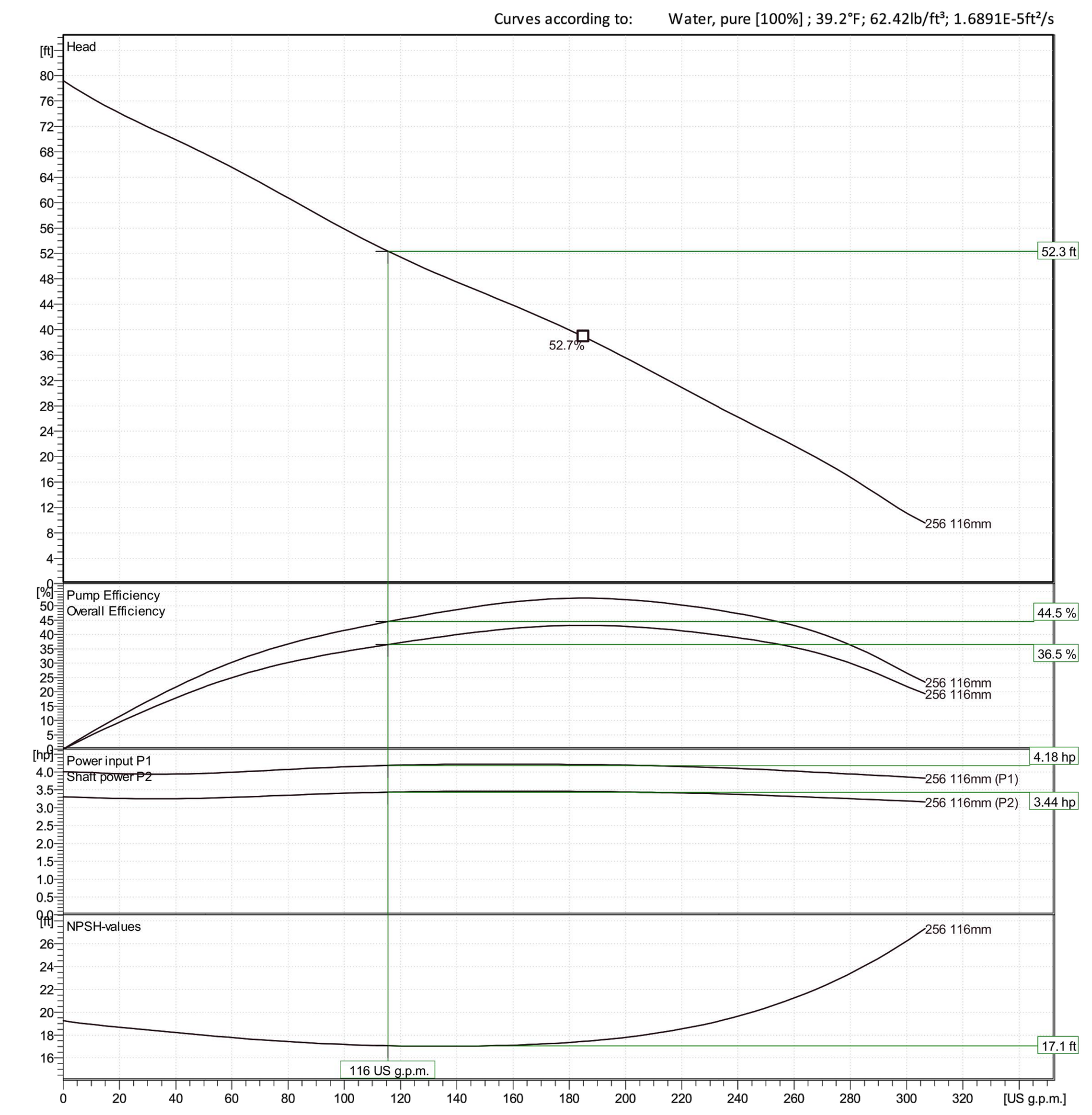
NP 3085 SH 3~ Adaptive 256

Performance curve

Duty point

Flow	Head
116 US g.p.m.	52.3 ft

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s

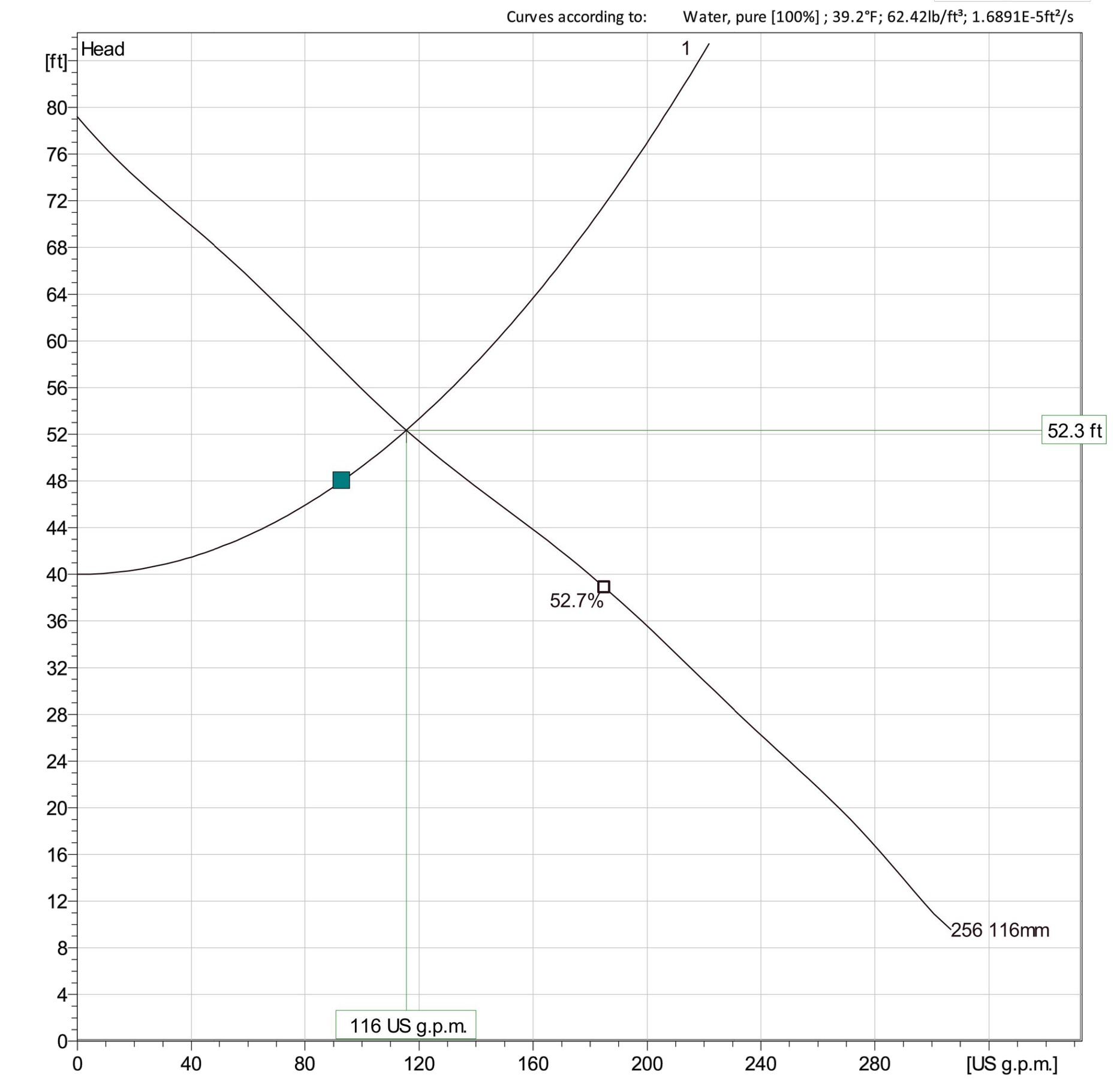


Project	Created by		Last update
Block	Created on	6/5/2019	

NP 3085 SH 3~ Adaptive 256

Duty Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Operating characteristics

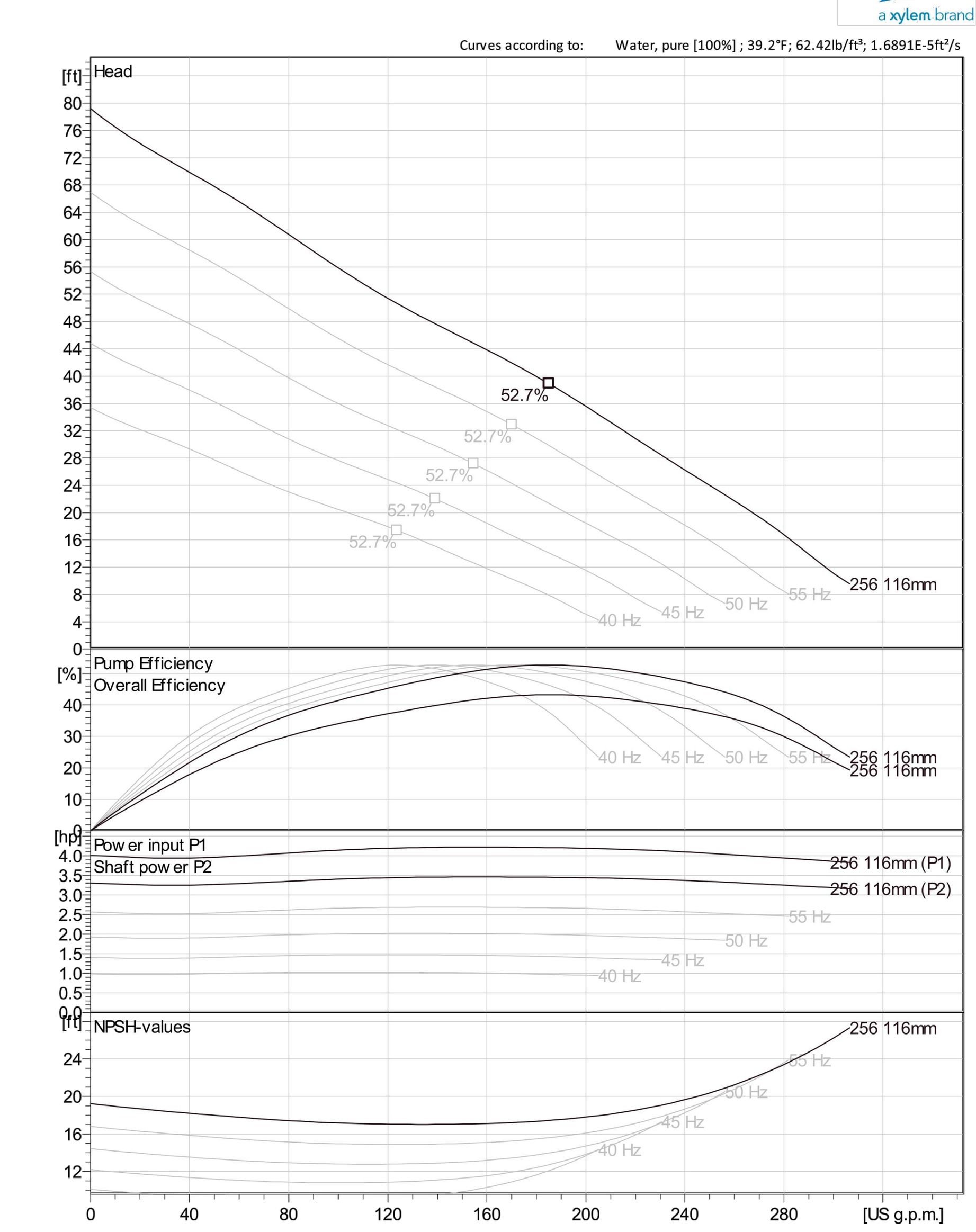
Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
1	116 US g.p.m.	52.3 ft	3.44 hp	116 US g.p.m.	52.3 ft	3.44 hp	44.5	450 kWh/US MG	17.1 ft

Project	Created by		Last update
Block	Created on	6/5/2019	

NP 3085 SH 3~ Adaptive 256

VFD Curve

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s

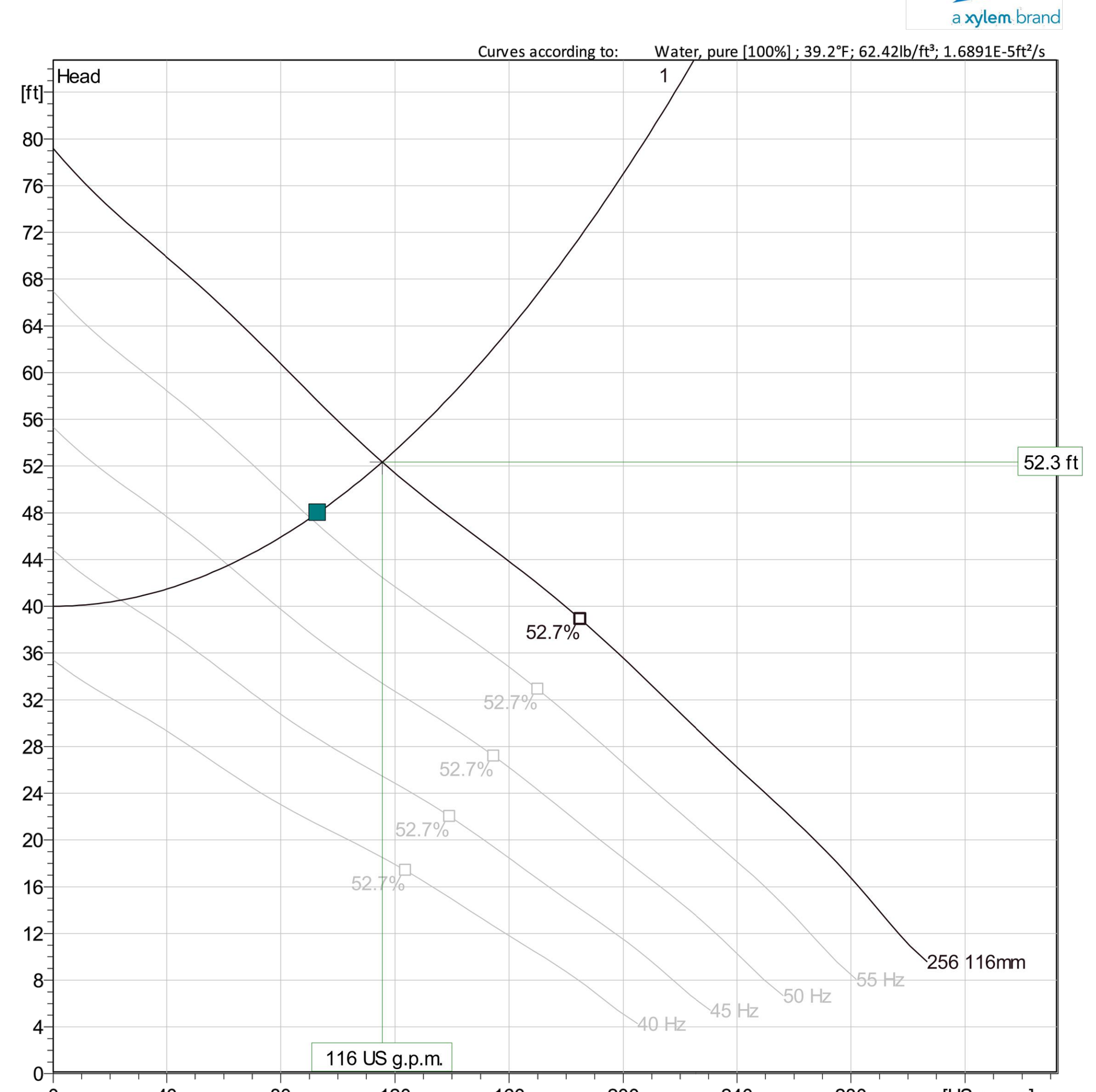


Project	Created by		Last update
Block	Created on	6/5/2019	

NP 3085 SH 3~ Adaptive 256

VFD Analysis

Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



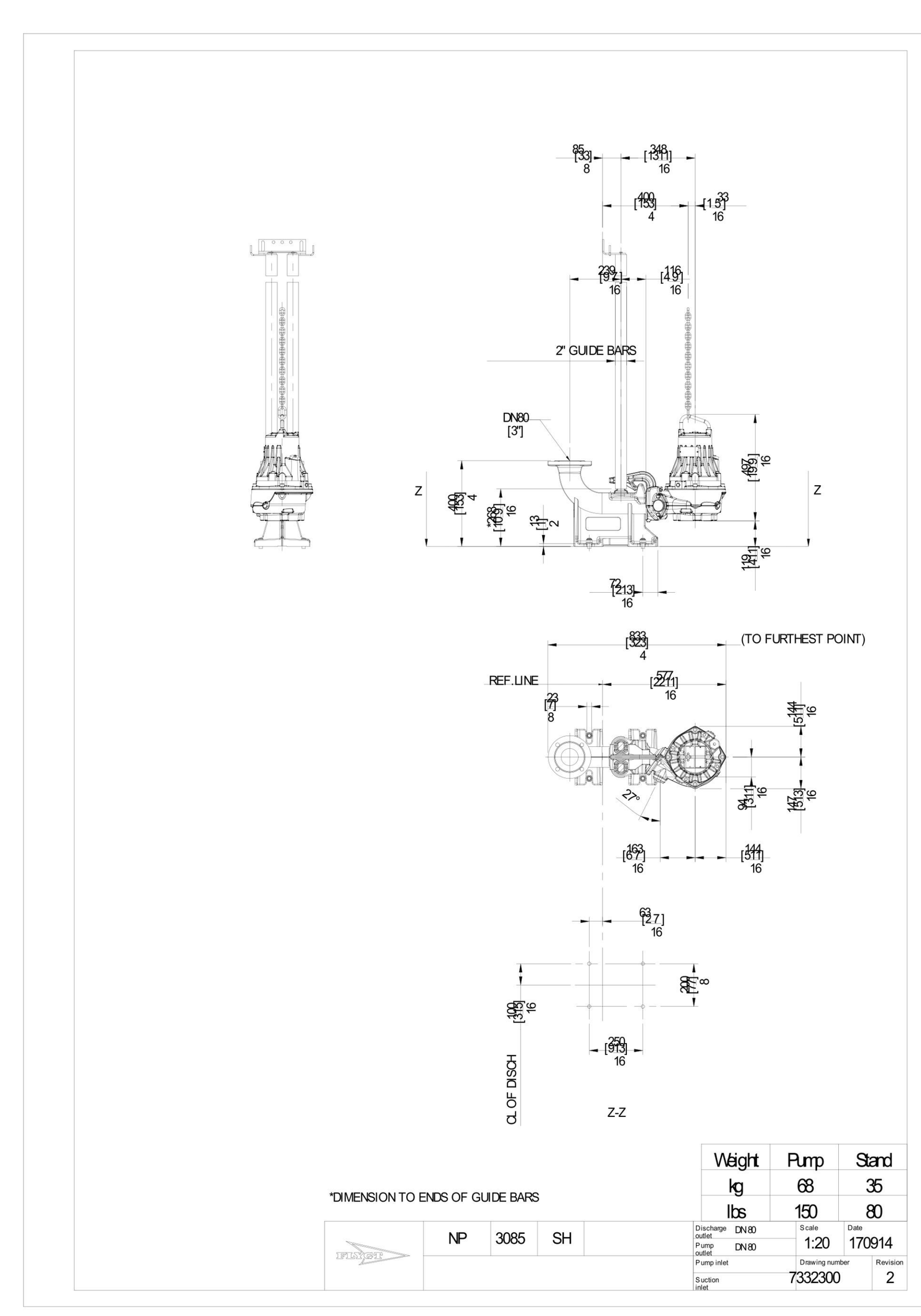
Operating Characteristics

Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
1	60 Hz	116 US g.p.m.	52.3 ft	3.44 hp	116 US g.p.m.	52.3 ft	3.44 hp	44.5 %	450 kWh/US MG	17.1 ft
1	55 Hz	90.4 US g.p.m.	47.6 ft	2.64 hp	90.4 US g.p.m.	47.6 ft	2.64 hp	41.1 %	438 kWh/US MG	15 ft
1	50 Hz	61.6 US g.p.m.	43.5 ft	1.94 hp	61.6 US g.p.m.	43.5 ft	1.94 hp	34.9 %	478 kWh/US MG	13.2 ft
1	45 Hz	23.7 US g.p.m.	40.5 ft	1.38 hp	23.7 US g.p.m.	40.5 ft	1.38 hp	17.5 %	911 kWh/US MG	11.7 ft
1	40 Hz									

Project	Created by		Last update
Block	Created on	6/5/2019	

NP 3085 SH 3~ Adaptive 256

Dimensional drawing



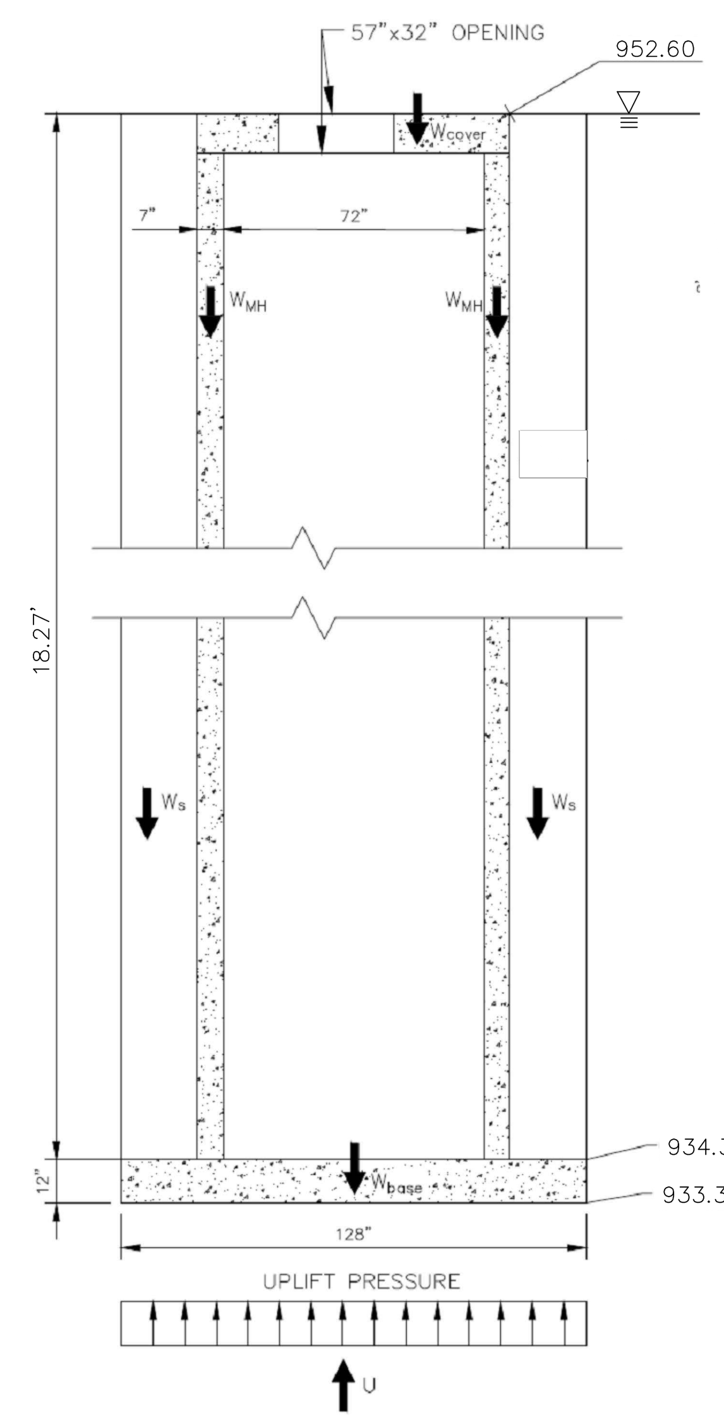
Project	Created by		Last update
Block	Created on	6/5/2019	

West Valley - Pump Station Buoyancy Calculations

RESISTING LOADS

PUMP STATION WEIGHT

	γ_C =	**150 lb/ft³**		
COVER	O.D.=	86 in.	OPENING=	1824 in²
	t=	11 in.		
	$V_{cover} = V_{top} - V_{opening}$		=	43832.85 in³
			=	25.37 ft³
		$W_{COVER} = \gamma_C * V_{cover}$ =		**3,805 lb**
MANHOLE	O.D.=	86 in.	HEIGHT=	17.35 ft
	I.D.=	72 in.		
	A_{OD}=	40.34 ft²	V_{MH} =	$(A_{OD}-A_{ID})$*HEIGHT
	A_{ID}=	28.27 ft²	V_{MH} =	209.36 ft³
		$W_{MH} = \gamma_C * V_{MH}$ =		**31,404 lb**
BASE	O.D.=	122 in.		
	t=	12 in.	A_{BASE}=	81.18 ft²
	$V_{base} = A_{BASE}$ * t		=	81.18 ft³
		$W_{BASE} = \gamma_C * V_{base}$ =		**12,177 lb**
SOIL (Above Base)				
	γ_S =	**120 lb/ft³**		
	$O.D._{BASE}$=	124 in.	$A_{OD,base}$=	83.86 ft²
	$O.D._{MH}$=	86 in.	$A_{OD,MH}$=	40.34 ft²
			DEPTH=	17.35 ft.
	$V_S = (A_{OD,base} - A_{OD,MH})$*DEPTH =			755.29 ft³
		$W_S = \gamma_S * V_s$ =		**90,635 lb**
TOTAL RESISTING LOADS				
	$W_R = W_{COVER} + W_{MH} + W_{BASE} + W_S$ =			**138,021 lb**
UPLIFT LOADS				
	γ_w =	**62.4 lb/ft³**		
	GW ELEV =	952.60	$O.D._{BASE}$=	122 in.
	BOT OF BASE ELEV =	933.33	A_{BASE}=	81.18 ft²
	DEPTH OF WATER=	19.27 ft.		
	UPLIFT PRESURE	$P_{UPLIFT} = \gamma_w$ * DEPTH =		1202.45 lb/ft²
		$U = A_{BASE} * P_{UPLIFT}$ =		**97,614 lb**
SAFETY FACTOR				
	$S.F = W_R / U$ =	138021 lb / 97614 lb	=	**1.41** ok

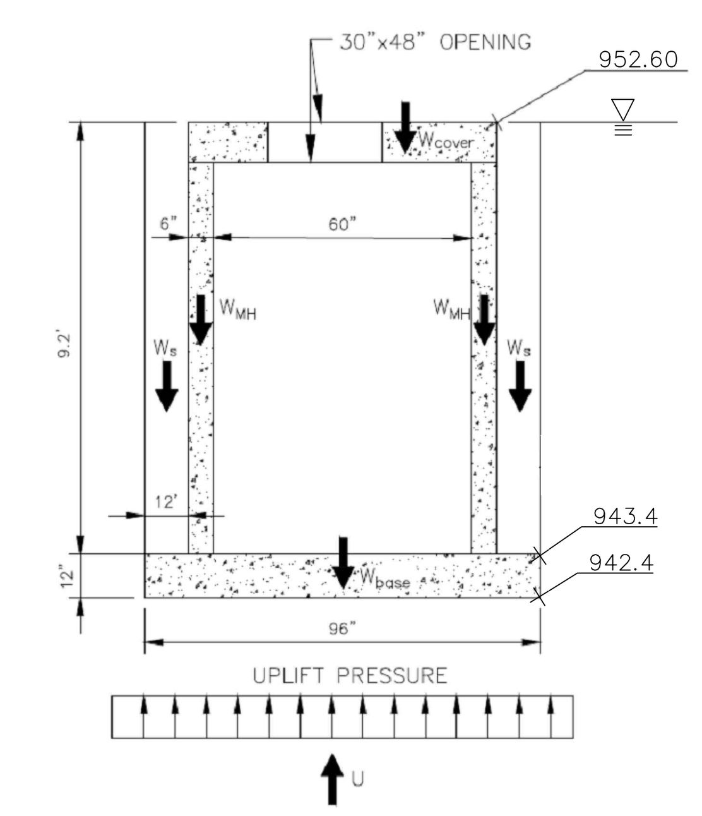


West Valley - Valve Vault Buoyancy Calculations

RESISTING LOADS

VALVE VAULT WEIGHT

	γ_C =	**150 lb/ft³**		
COVER	O.D.=	72 in.	OPENING=	1440 in²
	t=	11 in.		
	$V_{cover} = V_{top} - V_{opening}$		=	28946.54 in³
			=	16.75 ft³
		$W_{COVER} = \gamma_C * V_{cover}$ =		**2,513 lb**
MANHOLE	O.D.=	72 in.	HEIGHT =	8.28 ft.
	I.D.=	60 in.		
	A_{OD}=	28.27 ft²	V_{MH} =	$(A_{OD}-A_{ID})$*HEIGHT
	A_{ID}=	19.63 ft²	V_{MH} =	71.56 ft³
		$W_{MH} = \gamma_C * V_{MH}$ =		**10,734 lb**
BASE	O.D.=	96 in.		
	t=	12 in.	A_{BASE}=	50.27 ft²
	$V_{base} = A_{BASE}$ * t		=	50.27 ft³
		$W_{BASE} = \gamma_C * V_{base}$ =		**7,540 lb**
SOIL (Above Base)				
	γ_S =	**120 lb/ft³**		
	$O.D._{BASE}$=	96 in.	$A_{OD,base}$=	50.27 ft²
	$O.D._{MH}$=	72 in.	$A_{OD,MH}$=	28.27 ft²
			DEPTH=	9.20 ft.
	$V_S = (A_{OD,base} - A_{OD,MH})$*DEPTH =			202.32 ft³
		$W_S = \gamma_S * V_s$ =		**24,278 lb**
TOTAL RESISTING LOADS				
	$W_R = W_{COVER} + W_{MH} + W_{BASE} + W_S$ =			**45,065 lb**
UPLIFT LOADS				
	γ_w =	**62.4 lb/ft³**		
	GW ELEV =	952.60	$O.D._{BASE}$=	96 in.
	BOT OF BASE ELEV =	942.40	A_{BASE}=	50.27 ft²
	DEPTH OF WATER=	10.20 ft.		
	UPLIFT PRESURE	$P_{UPLIFT} = \gamma_w$ * DEPTH =		636.48 lb/ft²
		$U = A_{BASE} * P_{UPLIFT}$ =		**31,993 lb**
SAFETY FACTOR				
	$S.F = W_R / U$ =	45065 lb / 31993 lb	=	**1.41** ok



WEST VALLEY
MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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DATE: 08-23-19 | DESIGNED BY: G.N. | JOB NUMBER: 17-031 | CHECKED BY: J.E. | DRAWING FILE:17031-PS.dwg

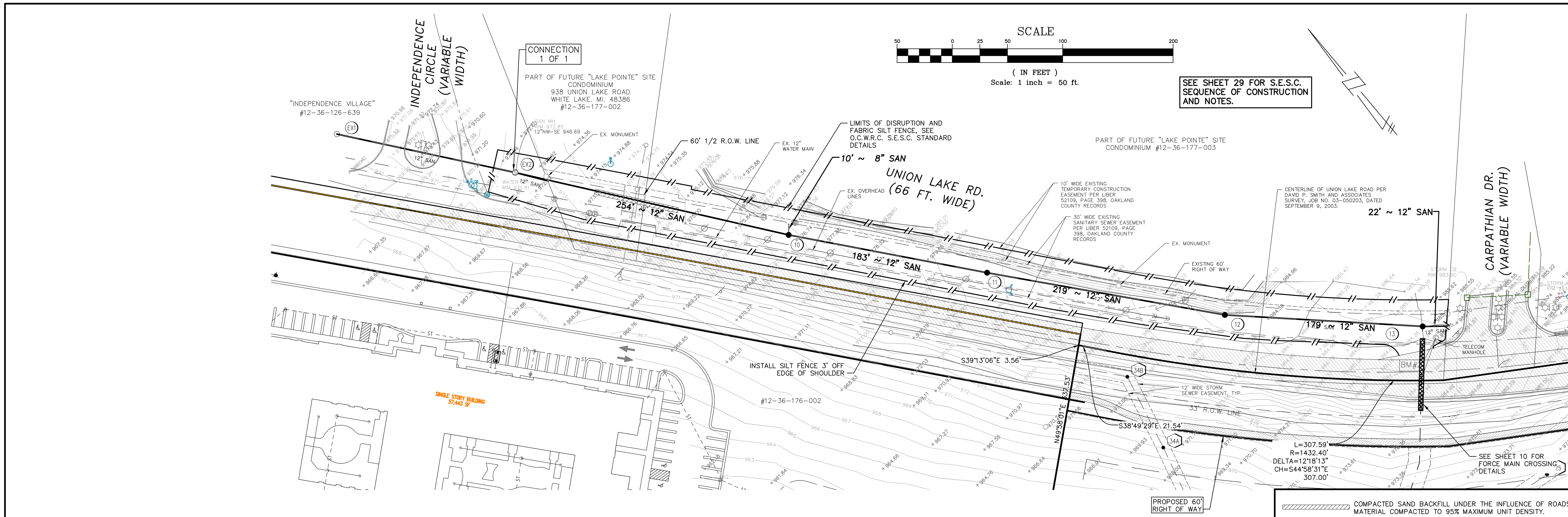
SANITARY SEWER PUMP STATION CALCULATION CHARTS

SEIBER KEAST LEHNER ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050

FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 15



SANITARY SEWER BASIS OF DESIGN

CONNECTION TO PROPOSED MANHOLE / 12-INCH PVC TRUSS
ON THE EAST SIDE OF UNION LAKE ROAD NORTH OF CARPATHIAN DRIVE

INITIAL DESIGN - UNION LAKE ROAD SANITARY SEWER

NUMBER OF UNITS

	Area (Ac)	Number of Units	Unit Factor	
West Valley	15.14	69	0.6	41.4
			TOTAL	41.4

POPULATION
= 2.7 people/unit x 41.4 units
= 111.78 people

POPULATION DENSITY
111.78 people
15.14 Acers
= 7.38 ppl / ac

AVERAGE FLOW
= 111.78 people x 100 gal/cap/day
= 11,178 gal/day
= 0.0173 cfs

PEAK FACTOR
= (18+SQRT(P/1000))/(4+SQRT(P/1000))
= 4.23

PEAK FLOW
= PEAK FACTOR X AVERAGE FLOW
= 0.0732 cfs
Population < 500 People, therefore use 10 State Standards

ULTIMATE DESIGN - 12" UNION LAKE ROAD SEWER

CALCULATE NUMBER OF UNITS

West Valley	41.4	REUs	8.69	Acres
Lake Pointe Condominiums	47.9	REUs	13.32	Acres
Bocovina Country Side Condo Homes	34	REUs	14.98	Acres
Carpathian Drive (12-36-178-002 & 12-36-178-001)	2	REUs	2.54	Acres
TOTAL NUMBER OF ULTIMATE UNITS	125.3	units	39.53	Acres

POPULATION
= 2.7 people/unit x 125.3 units
= 338.31 people

POPULATION DENSITY
338.31 people
39.530 Acres
= 8.56 ppl / ac

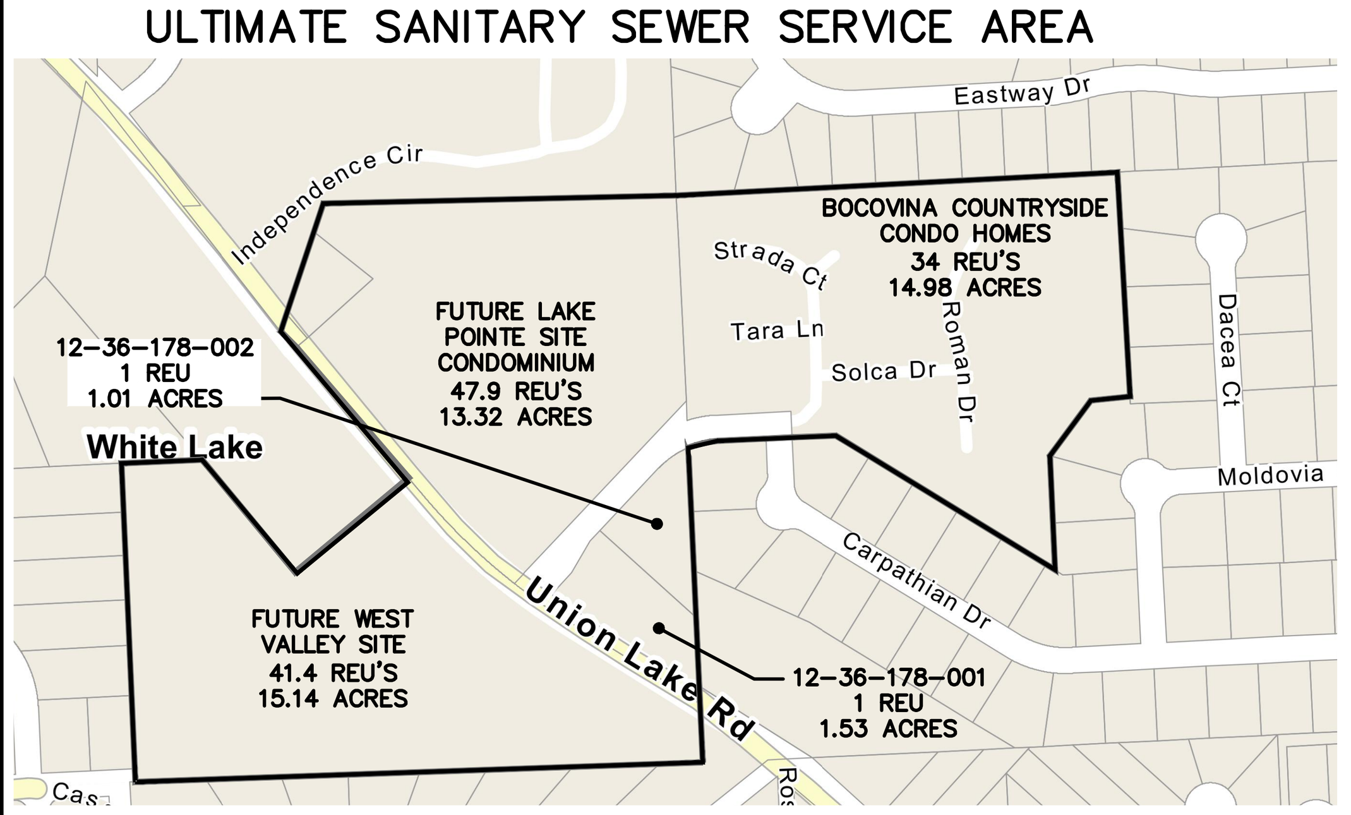
AVERAGE FLOW
= 338.31 people x 100 gal/cap/day
= 33,831 gal/day
= 0.0523 cfs

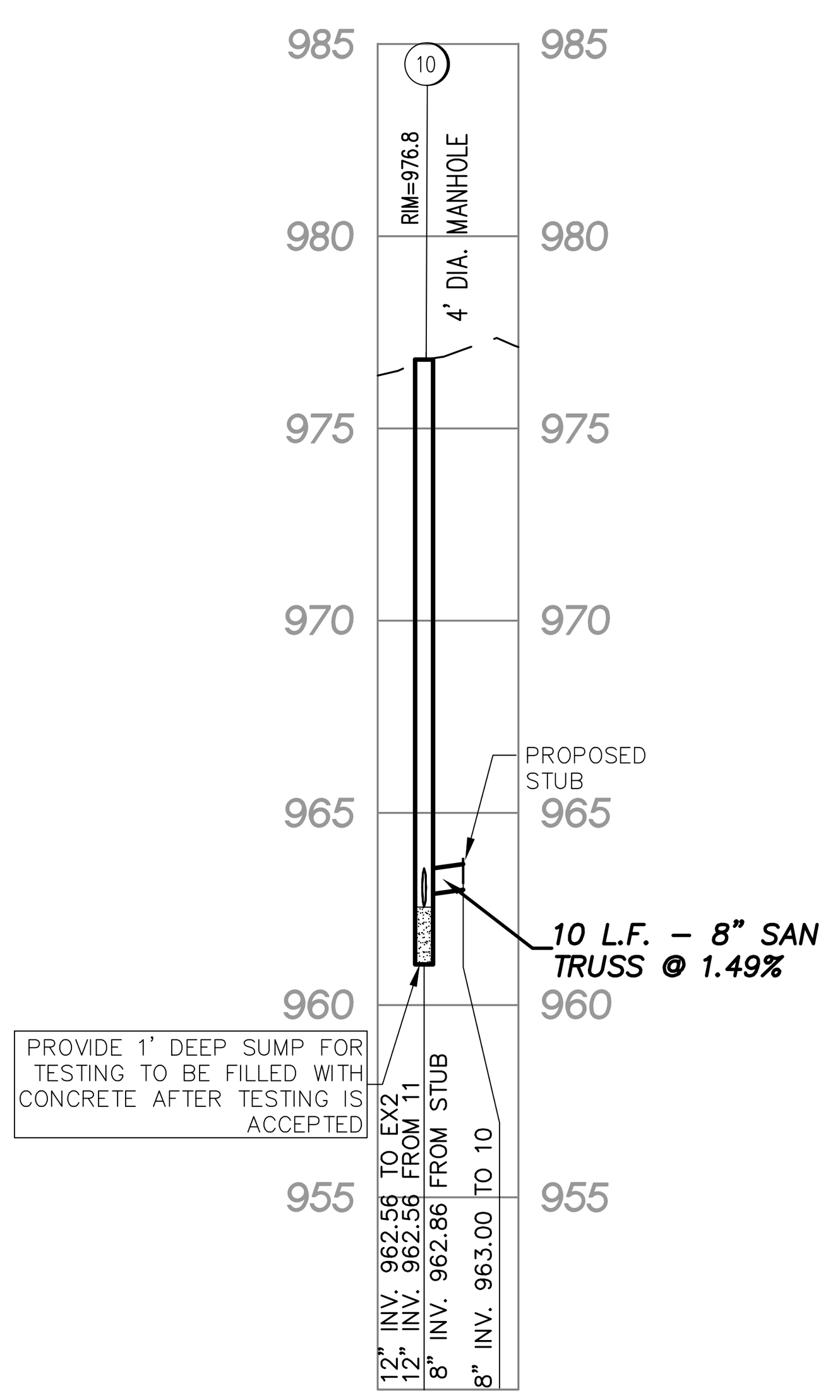
PEAK FACTOR
= (18+SQRT(P/1000))/(4+SQRT(P/1000))
= 4.1

PEAK FLOW
= PEAK FACTOR X AVERAGE FLOW
= 0.2123 cfs
Population < 500 People, therefore use 10 State Standards

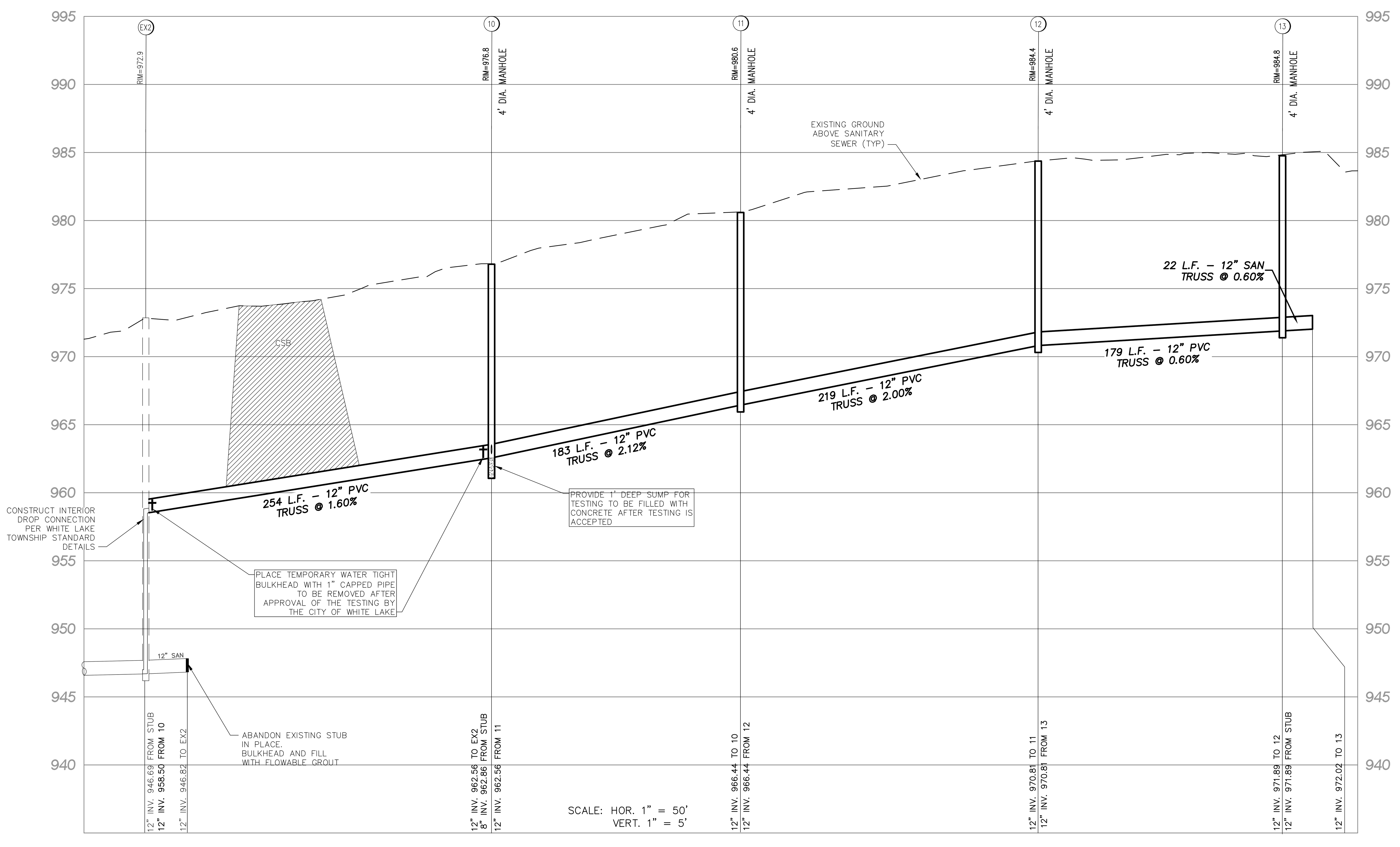
CAPACITY OF A 12" PIPE @ 0.22% IS 1.63 cfs
THEREFORE PIPE CAPACITY IS SUFFICIENT.

UNION LAKE ROAD SANITARY SEWER EXTENSION ULTIMATE SANITARY SEWER SERVICE AREA





SCALE: HOR. 1" = 50'
VERT. 1" = 5'



SCALE: HOR. 1" = 50'
VERT. 1" = 5'

NOTES:

1. SANITARY SEWER CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH WHITE LAKE TOWNSHIP SANITARY SEWER STANDARD DETAILS.
2. ALL DISTURBED AREAS SHALL BE RESTORED TO EXISTING GRADES AFTER UTILITY CONSTRUCTION AND SHALL BE STABILIZED WITH TOPSOIL, SEED AND MULCH WITHIN 5 WORKING DAYS.

LEGEND

EXISTING | PROPOSED

- PAVEMENT (ASPHALT)
- SIDE WALK (CONCRETE)
- CONCRETE CURB AND GUTTER
- STORM SEWER
- SANITARY SEWER
- WATER MAIN
- MANHOLE
- CATCH BASIN
- CURB INLET W/SILT SAC
- END SECTION
- GATE VALVE
- HYDRANT
- 1000 CONTOURS
- 1000.00 SPOT ELEVATION
- LIGHT POLE
- TRANSFORMER
- SURFACE DRAINAGE
- OVERFLOW ROUTE
- TREE FENCE
- SILT FENCE/LIMITS OF DISTURBANCE
- PROPOSED DRIVEWAY LOCATION
- LIMIT OF DISTURBANCE

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11.	REVISED PER TWP.	09–21–23
12	REVISED PER EGLE	01–31–24
13	REVSE PER TWP	02–13–24

14. REV. PER TWP. 06-03-24

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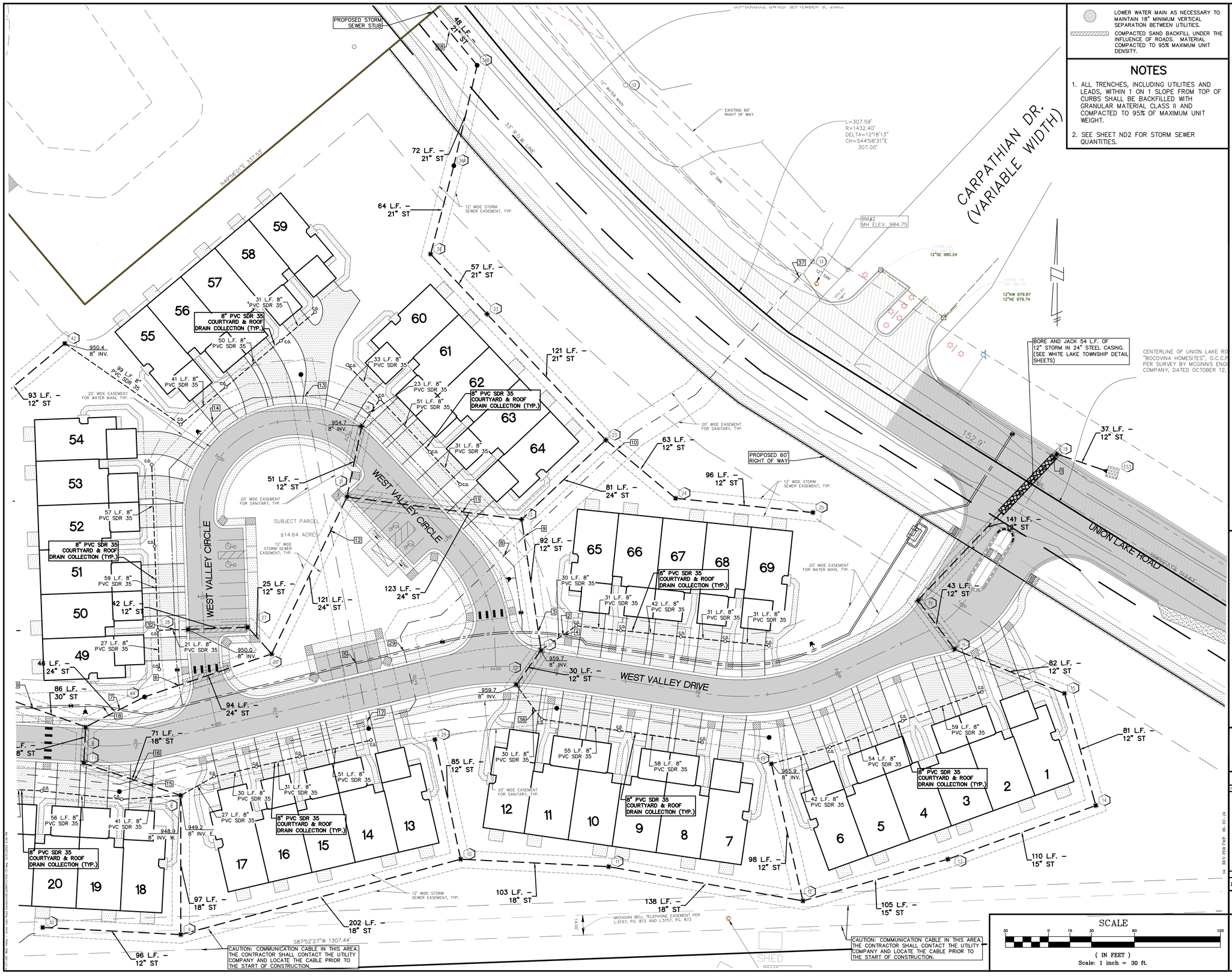
DATE: 08–23–19 | DESIGNED BY: G.N. JOB NUMBER: 17–031 | CHECKED BY: J.E. DRAWING FILE:17031UL–SAN–OFF SITE.dwg

OFF–SITE SANITARY DESIGN

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Clinton Township Office, 17001 Nineteen Mile Road, Suite 3, Clinton Township, MI 48038, 586.412.7050
Farmington Hills Office, 39205 Country Club Drive, Suite C8, Farmington Hills, MI 48331, 248.308.3331



LOWER WATER MAIN AS NECESSARY TO MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

COMPACTED SAND BACKFILL UNDER THE INFLUENCE OF ROADS. MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.

NOTES

1. ALL TRENCHES, INCLUDING UTILITIES AND LEADS, WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS II AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
2. SEE SHEET ND2 FOR STORM SEWER QUANTITIES.

STORM SEWER STRUCTURE SCHEDULE

NO.	TYPE	SIZE (DIA) (feet)	SUMP DEPTH (feet)	FRAME AND COVER
1	MANHOLE	6	0	EJW 1040 Frame Type B Cover
2	CATCH BASIN	6	2	EJW 7065 Frame Type M1 Cover
3	CATCH BASIN	5	2	EJW 7065 Frame Type M1 Cover
4	MANHOLE	5	0	EJW 1040 Frame Type B Cover
5	CATCH BASIN	5	2	EJW 7045 Frame Type M1 Cover
6	CATCH BASIN	5	2	EJW 7065 Frame Type M1 Cover
6A	MANHOLE	4	0	EJW 1040 Frame Type B Cover
7	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
8	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
9	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
10	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
11	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
12	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
13	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
14	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
15	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
16	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
17	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
18	CATCH BASIN	4	2	EJW 7045 Frame Type M1 Cover
19	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
20	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
21	CATCH BASIN	4	2	EJW 7045 Frame Type M1 Cover
22	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
23	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
24	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
25	INLET	2	0	EJW 1040 Frame Type N Cover
26	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
27	CATCH BASIN	4	2	EJW 7045 Frame Type M1 Cover
28	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
29	INLET	2	0	EJW 1040 Frame Type N Cover
30	INLET	2	0	EJW 1040 Frame Type N Cover
31	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
32	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
33	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
34	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
34A	MANHOLE	4	2	EJW 1040 Frame Type B Cover
34B	MANHOLE	4	0	EJW 1040 Frame Type B Cover
35	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
36	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
37	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
38	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
39	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
40	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
41	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
42	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
43	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
44	CATCH BASIN	4	2	EJW 7065 Frame Type M1 Cover
45	MANHOLE	4	0	EJW 1040 Frame Type B Cover
46	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
47	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
48	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
49	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
50	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
51	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
52	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
53	INLET	2	0	EJW 1040 Frame Type N Cover
54	INLET	2	0	EJW 1040 Frame Type N Cover
A	CATCH BASIN	4	2	EJW 6508 (MDOT Type E Cover)
B	CATCH BASIN	4	2	EJW 6508 (MDOT Type E Cover)
C	MANHOLE	4	0	EJW 1040 Frame Type B Cover
D	CATCH BASIN	4	2	EJW 6508 (MDOT Type E Cover)
E	MANHOLE	4	0	EJW 1040 Frame Type B Cover
F	CATCH BASIN	4	2	EJW 1040 Frame Type N Cover
SP	36" DIA. DETENTION BASIN STANDPIPE - SEE DETAIL ON SHEET 23			
ST	STORMWATER TREATMENT MANHOLE - SEE DETAIL ON SHEET 22			
OMH	5' DIAMETER OVERFLOW MAN HOLE - SEE DETAIL ON SHEET 23			

LEGEND

EXISTING	PROPOSED
	PAVEMENT (ASPHALT)
	SIDE WALK (CONCRETE)
	CONCRETE CURB AND GUTTER
	STORM SEWER
	SANITARY SEWER
	WATER MAIN
	MANHOLE
	CATCH BASIN
	CURB INLET W/SILT SAC
	END SECTION
	GATE VALVE
	HYDRANT
1000	1000 CONTOURS
1000.0	1000.00 T/C SPOT ELEVATION
	LIGHT POLE
	TRANSFORMER
	SURFACE DRAINAGE
	OVERFLOW ROUTE
	TREE FENCE
	SILT FENCE/LIMITS OF DISTURBANCE
	PROPOSED DRIVEWAY LOCATION
	LIMIT OF DISTURBANCE

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

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12.	REVISED PER EGLE	01-31-24
13.	REVISE PER TWP	02-13-24
14.	REV. PER TWP.	06-03-24

UTILITY WARNING

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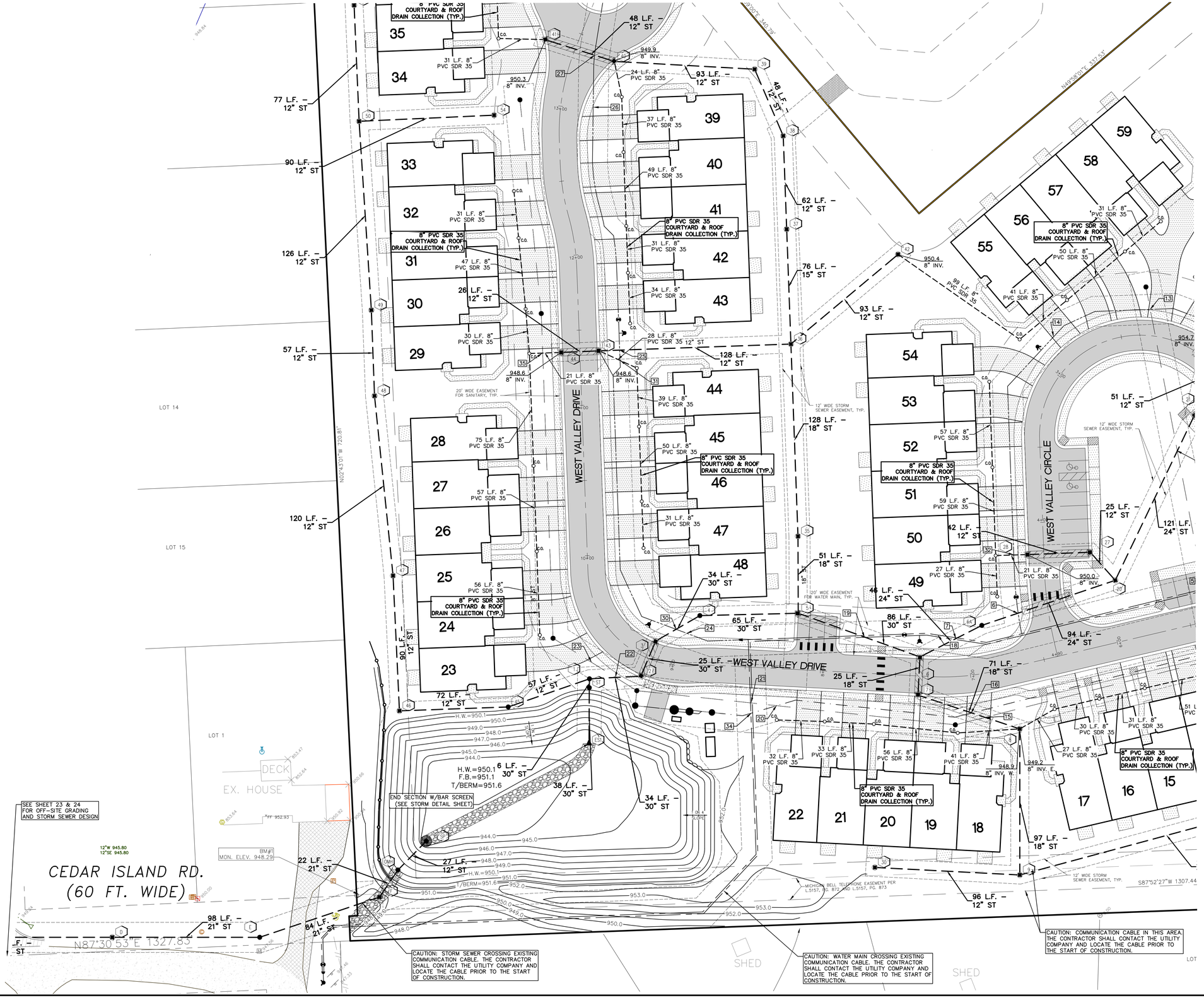
DATE: 08-23-19 | DESIGNED BY: G.N. JOB NUMBER: 17-031 | CHECKED BY: J.E. DRAWING FILE:17031-ST.dwg

STORM SEWER PLAN

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NORTHEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7080
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 17

SEE CONTINUATION ON SHEET 19



SCALE

30 0 15 30 60 120

(IN FEET)
Scale: 1 inch = 30 ft.

LOWER WATER MAIN AS NECESSARY TO MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

COMPACTED SAND BACKFILL UNDER THE INFLUENCE OF ROADS. MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.

NOTES

1. ALL TRENCHES, INCLUDING UTILITIES AND LEADS, WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS II AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
2. SEE SHEET ND1 FOR STORM SEWER QUANTITIES.

LEGEND

EXISTING	PROPOSED
	PAVEMENT (ASPHALT)
	SIDE WALK (CONCRETE)
	CONCRETE CURB AND GUTTER
	STORM SEWER
	SANITARY SEWER
	WATER MAIN
	MANHOLE
	CATCH BASIN
	CURB INLET W/SILT SAC
	END SECTION
	GATE VALVE
	HYDRANT
1000	1000 CONTOURS
1000.0	1000.00 T/C SPOT ELEVATION
	LIGHT POLE
	TRANSFORMER
	SURFACE DRAINAGE
	OVERFLOW ROUTE
	TREE FENCE
	SILT FENCE/LIMITS OF DISTURBANCE
	PROPOSED DRIVEWAY LOCATION
	LIMIT OF DISTURBANCE

WEST VALLEY
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WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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13.	REVISE PER TWP	02-13-24
14.	REV PER TWP. 06-03-24	

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STORM SEWER PLAN

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7060
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 18

SEE CONTINUATION ON SHEET 18

SCALE

30 0 15 30 60 120

(IN FEET)
Scale: 1 inch = 30 ft.

LOWER WATER MAIN AS NECESSARY TO MAINTAIN 18" MINIMUM VERTICAL SEPARATION BETWEEN UTILITIES.

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2. SEE SHEET ND1 FOR STORM SEWER QUANTITIES.

LEGEND

EXISTING | PROPOSED

- PAVEMENT (ASPHALT)
- SIDE WALK (CONCRETE)
- CONCRETE CURB AND GUTTER
- STORM SEWER
- SANITARY SEWER
- WATER MAIN
- MANHOLE
- CATCH BASIN
- CURB INLET W/SILT SAC
- END SECTION
- GATE VALVE
- HYDRANT
- 1000 CONTOURS
- 1000.00 SPOT ELEVATION
- LIGHT POLE
- TRANSFORMER
- SURFACE DRAINAGE
- OVERFLOW ROUTE
- TREE FENCE
- SILT FENCE/LIMITS OF DISTURBANCE
- PROPOSED DRIVEWAY LOCATION
- LIMIT OF DISTURBANCE

WEST VALLEY
MULTI–FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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12	REVISED PER EGLE	01–31–24
13	REVSE PER TWP	02–13–24

14. REV. PER TWP. 06-03-24

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CHECKED BY: J.E. DRAWING FILE:17031–ST.dwg

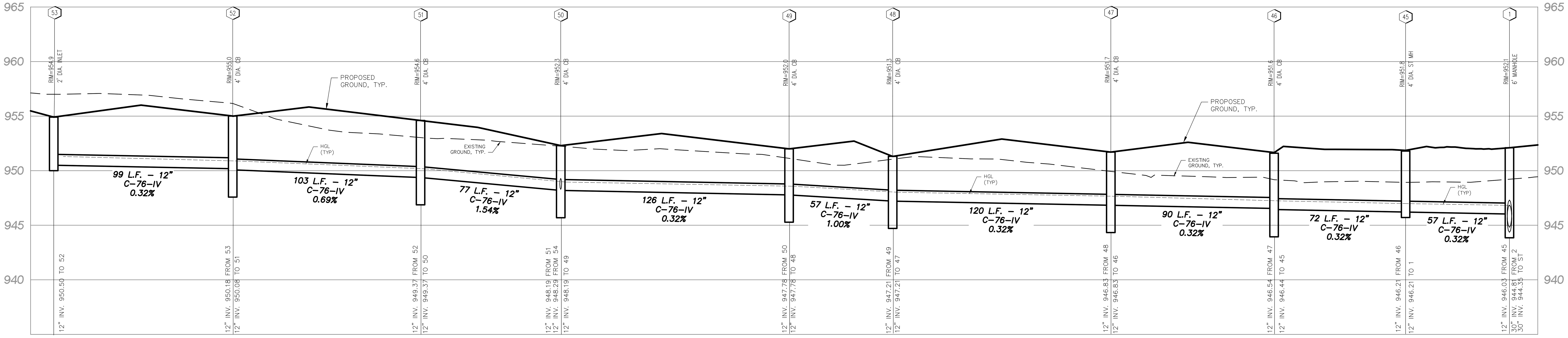
STORM SEWER PLAN

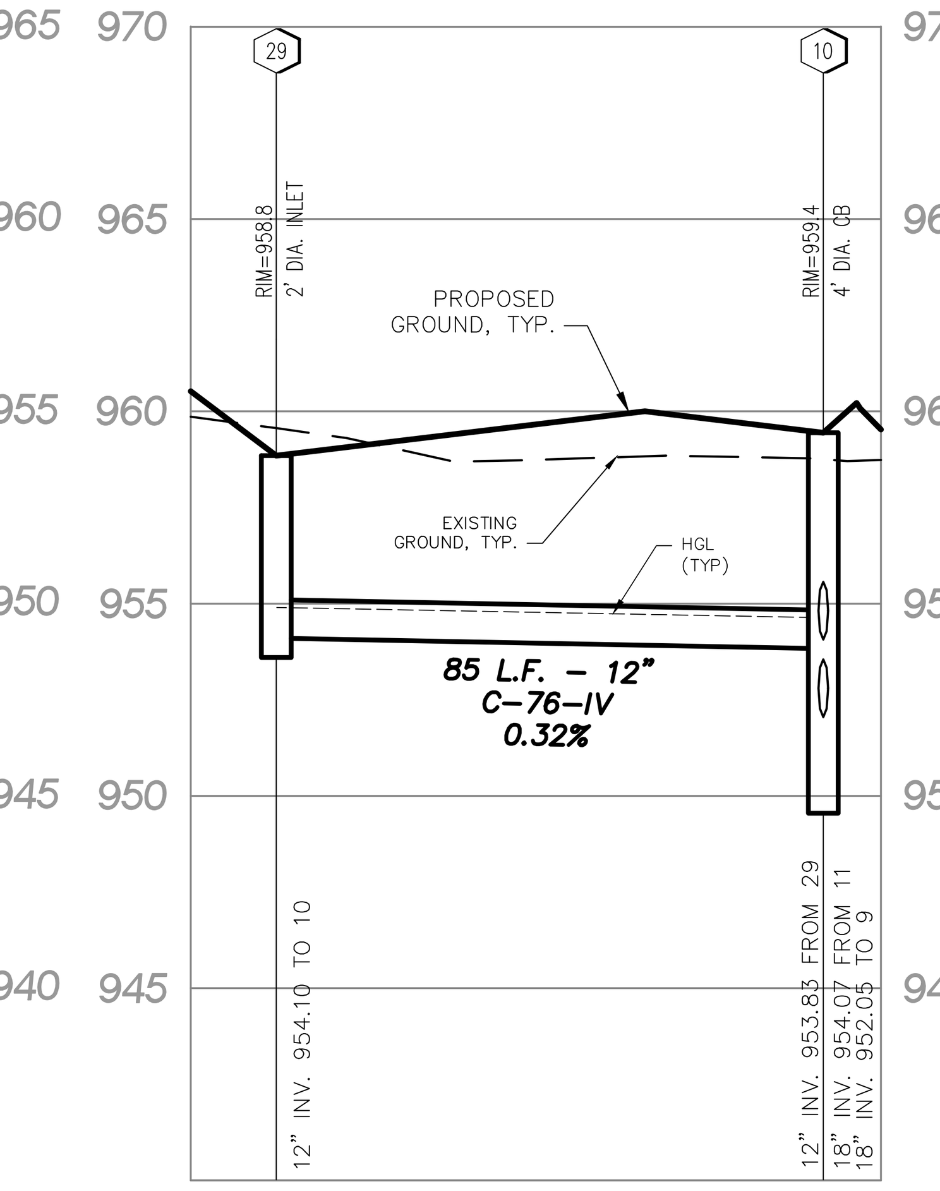
SHEET 19

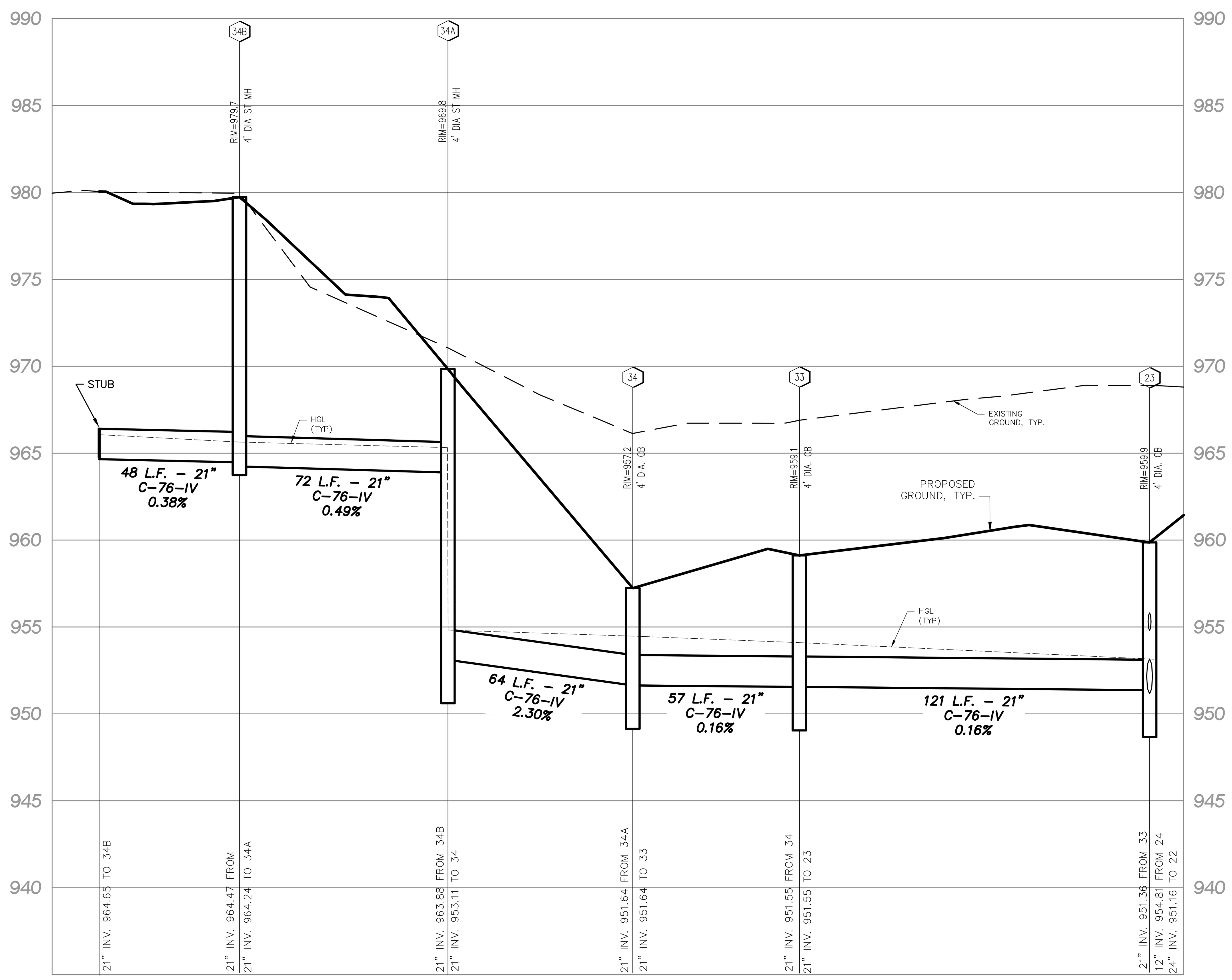
SEIBER KEAST LEHNER
ENGINEERING | SURVEYING

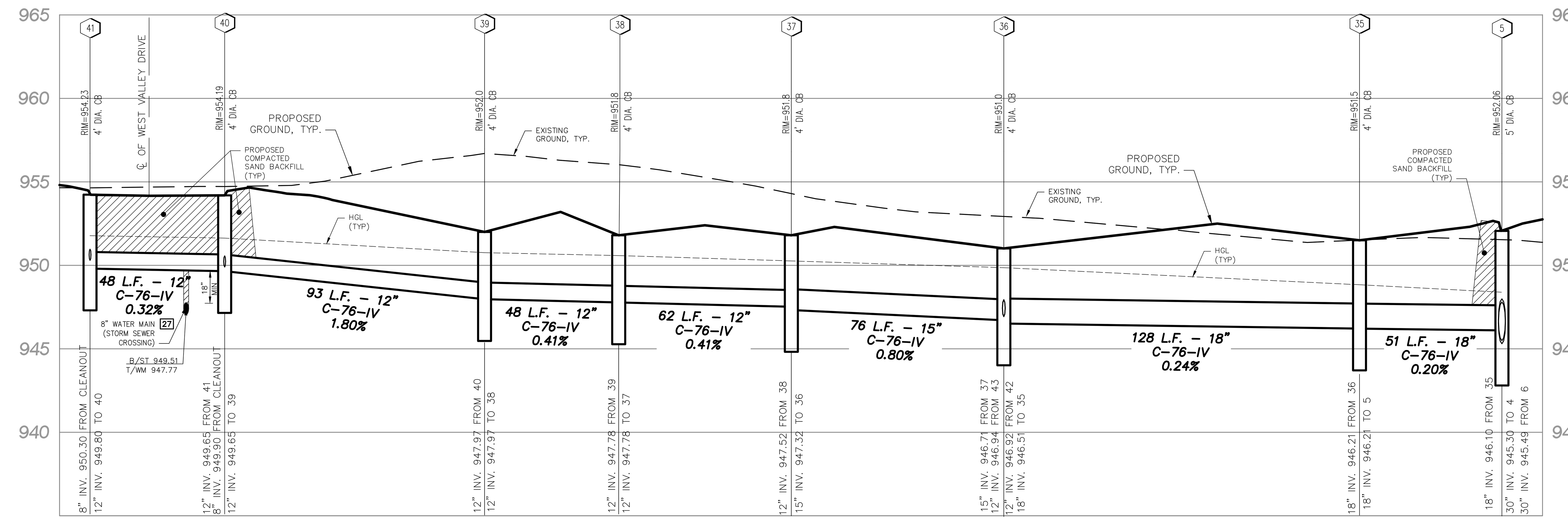
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050

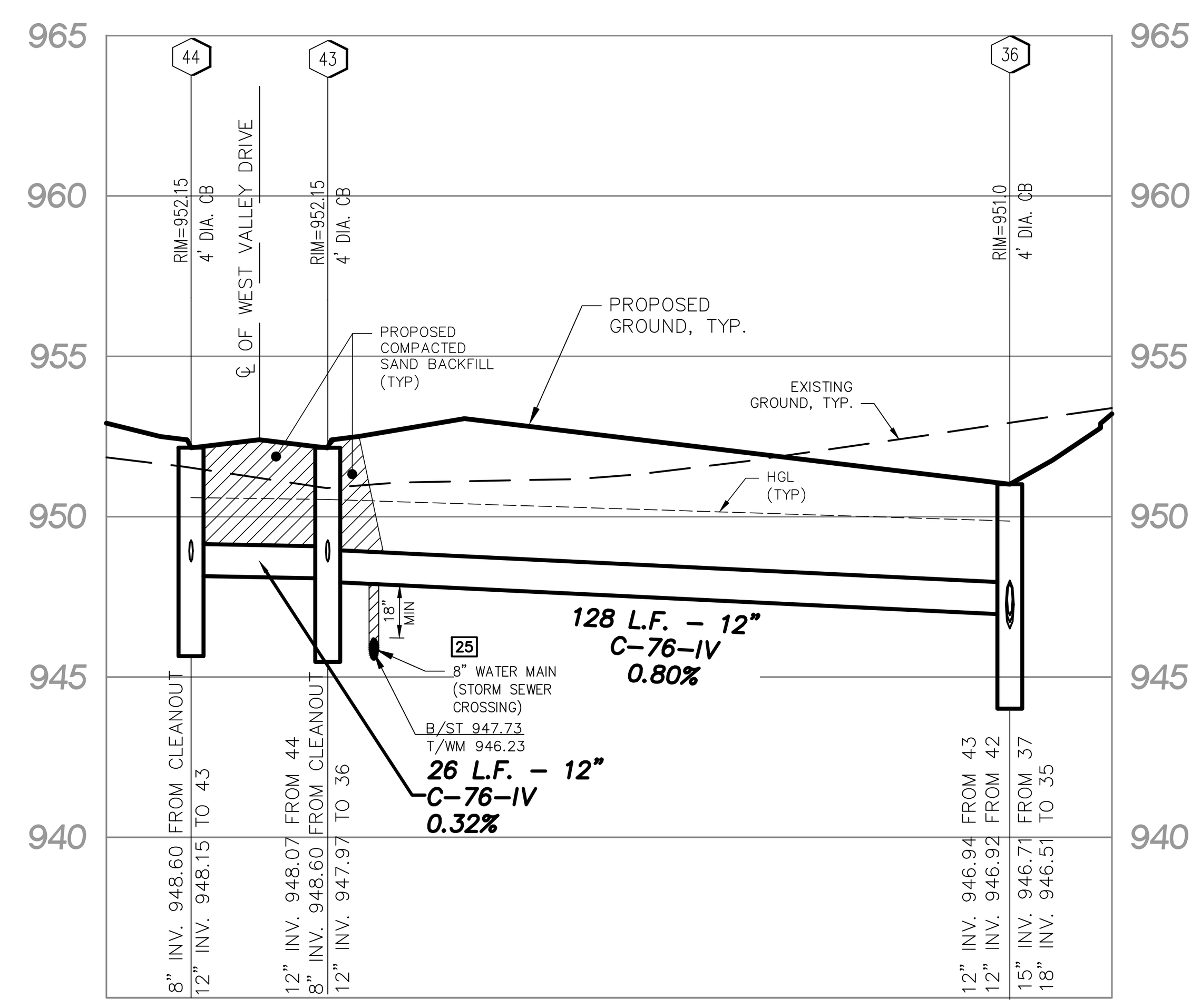
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

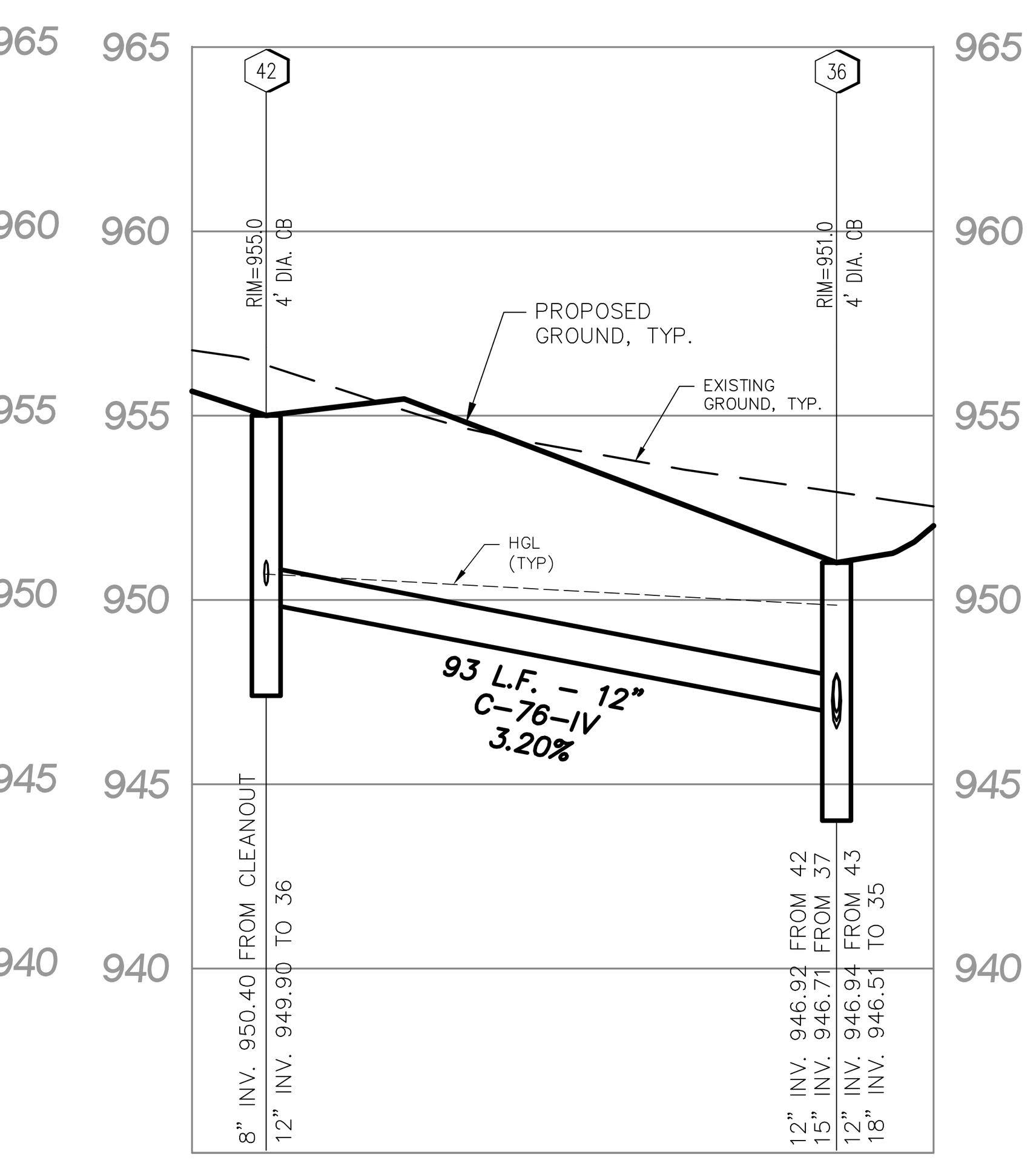












STORM SEWER PROFILES
HOR. SCALE: 1"=30'
VERT. SCALE: 1"=5'

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

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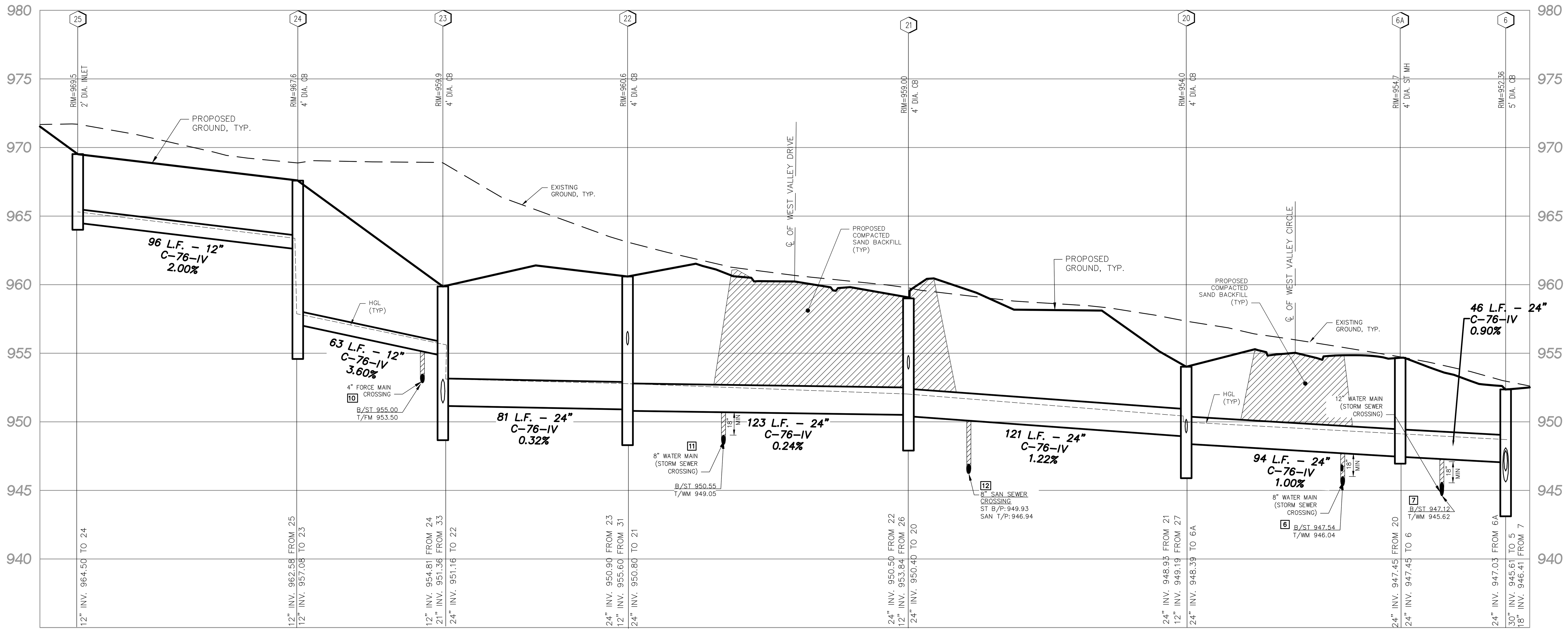
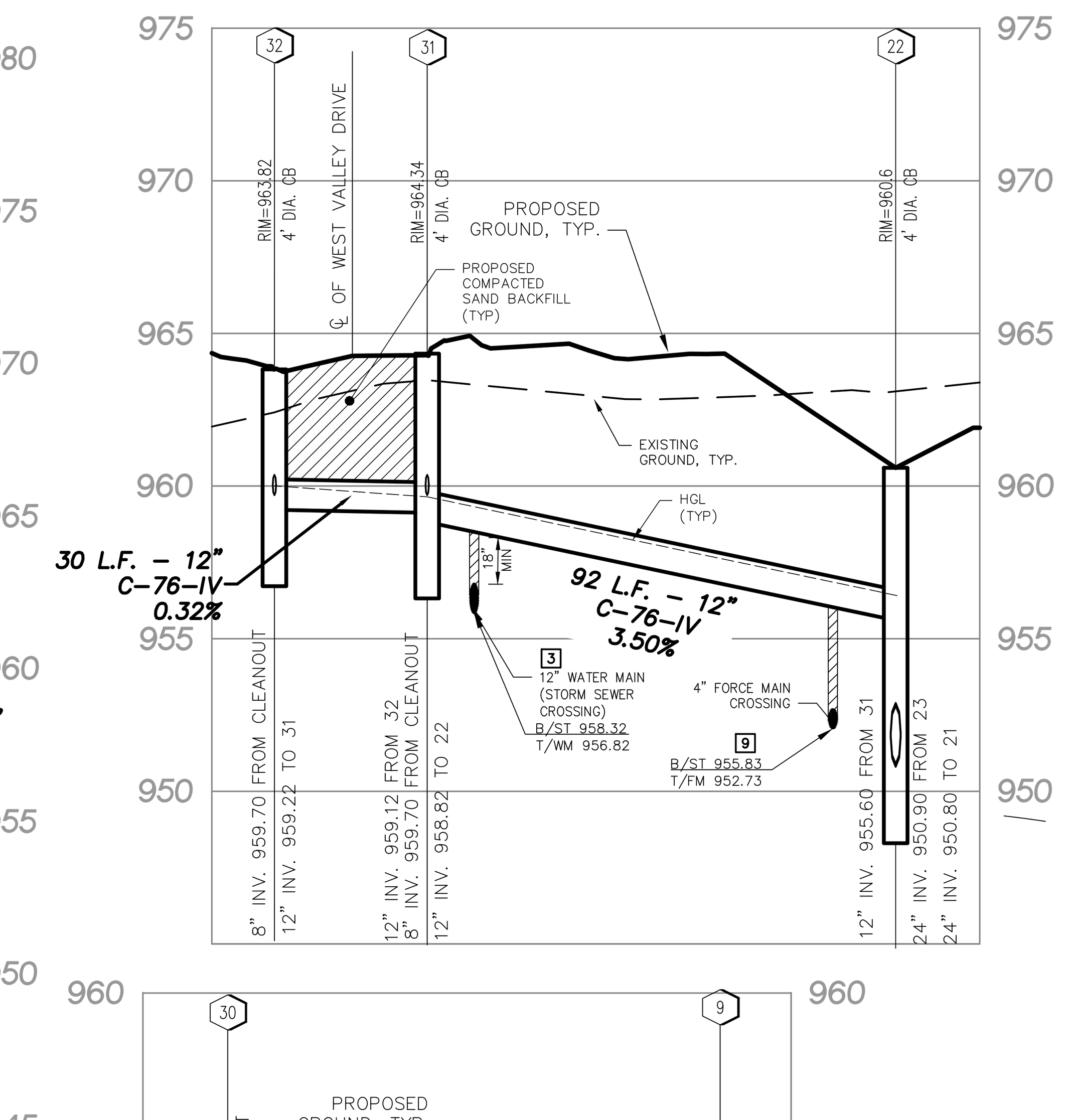
CHECKED BY: J.E. DRAWING FILE: 17031-PROF.dwg

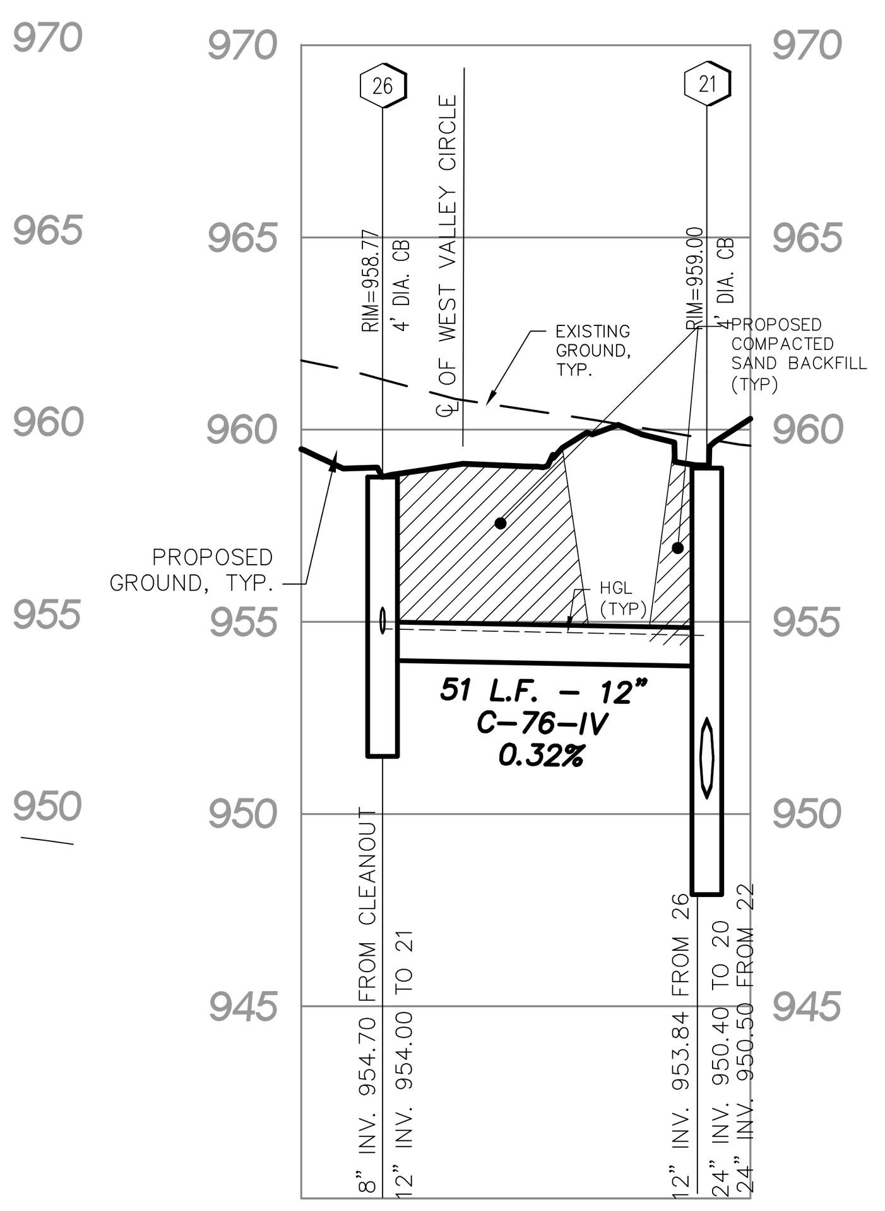
STORM SEWER PROFILES

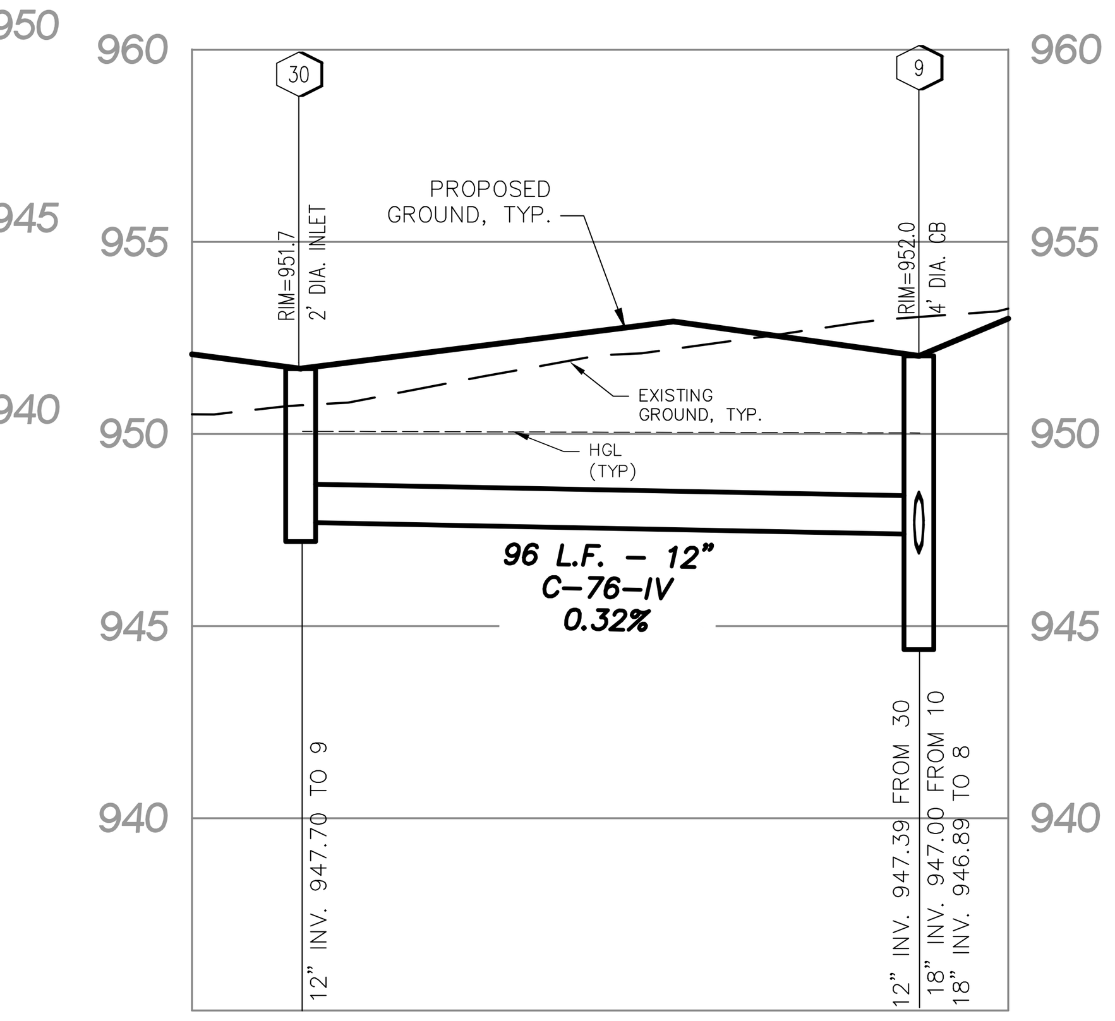
SHEET 20

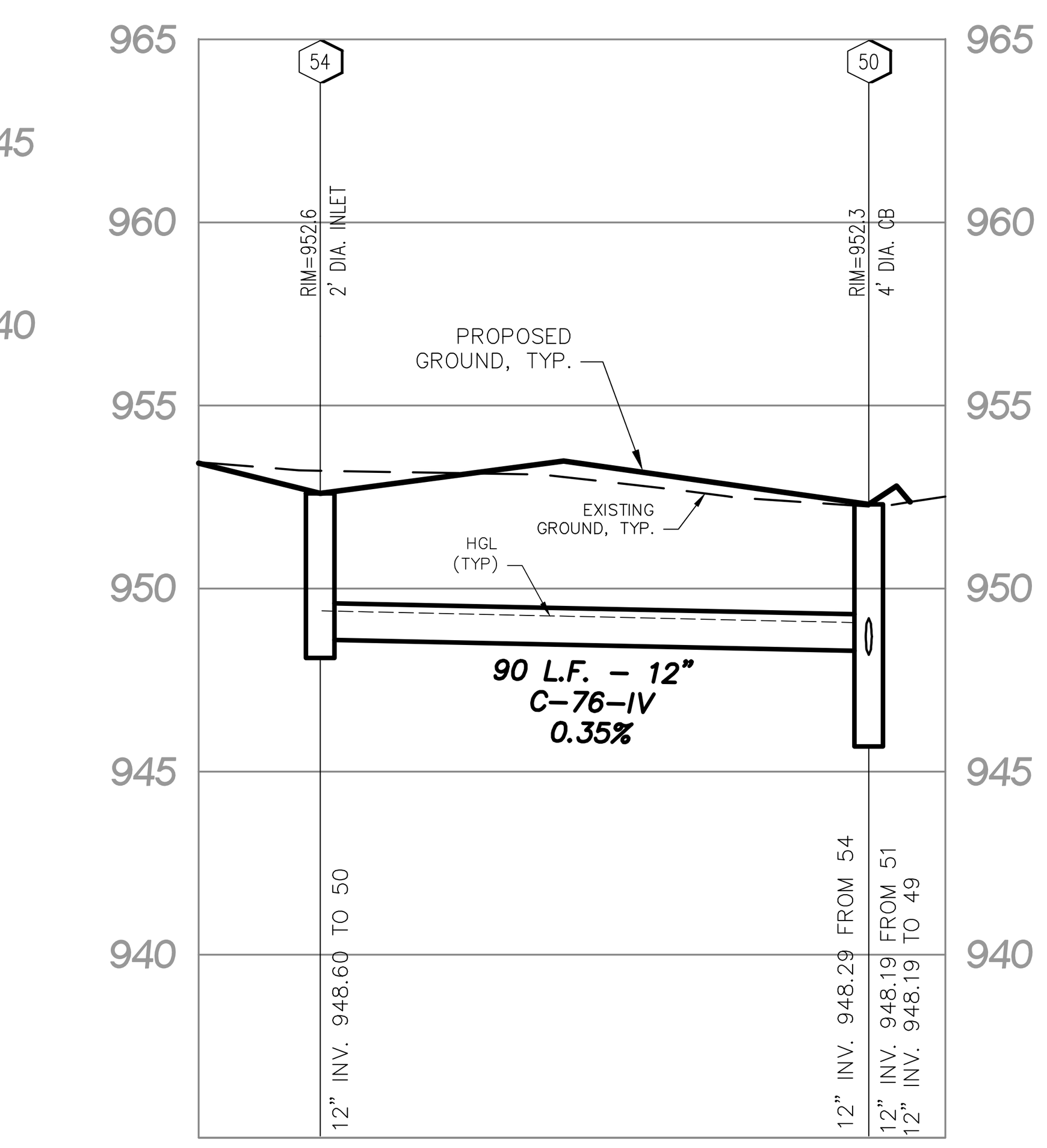
SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

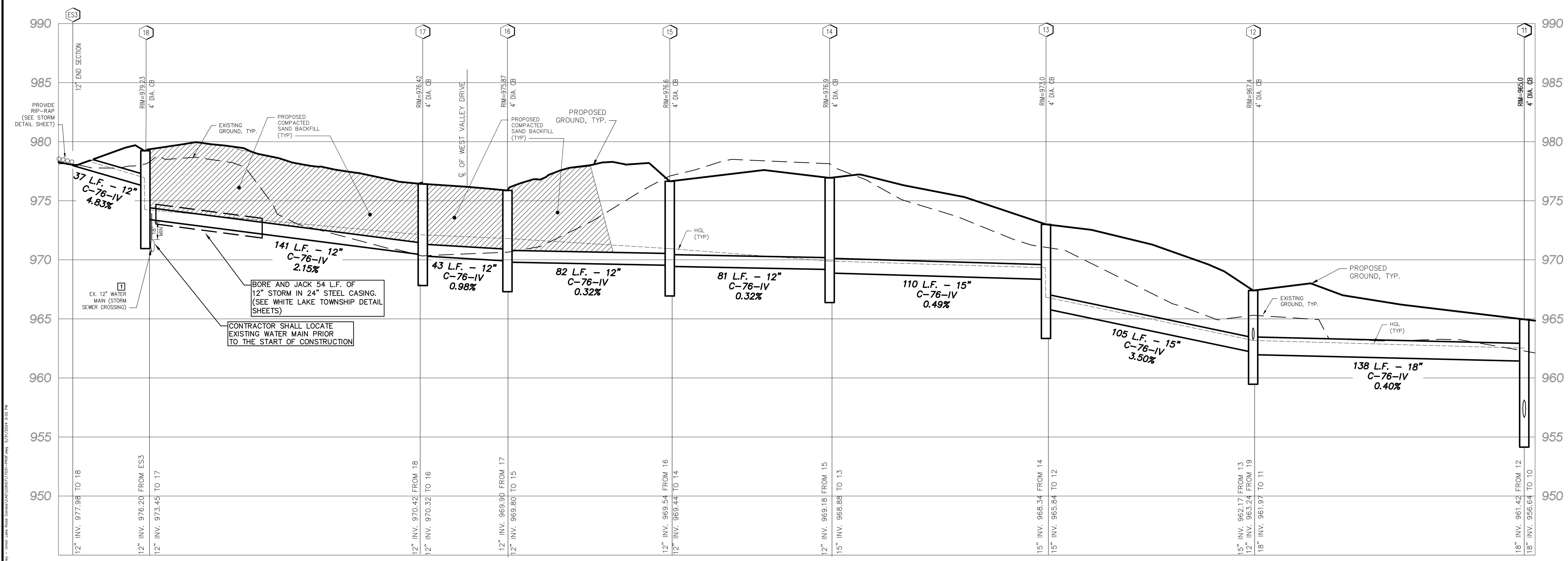












STORM SEWER PROFILES
HOR. SCALE: 1"=30'
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WEST VALLEY
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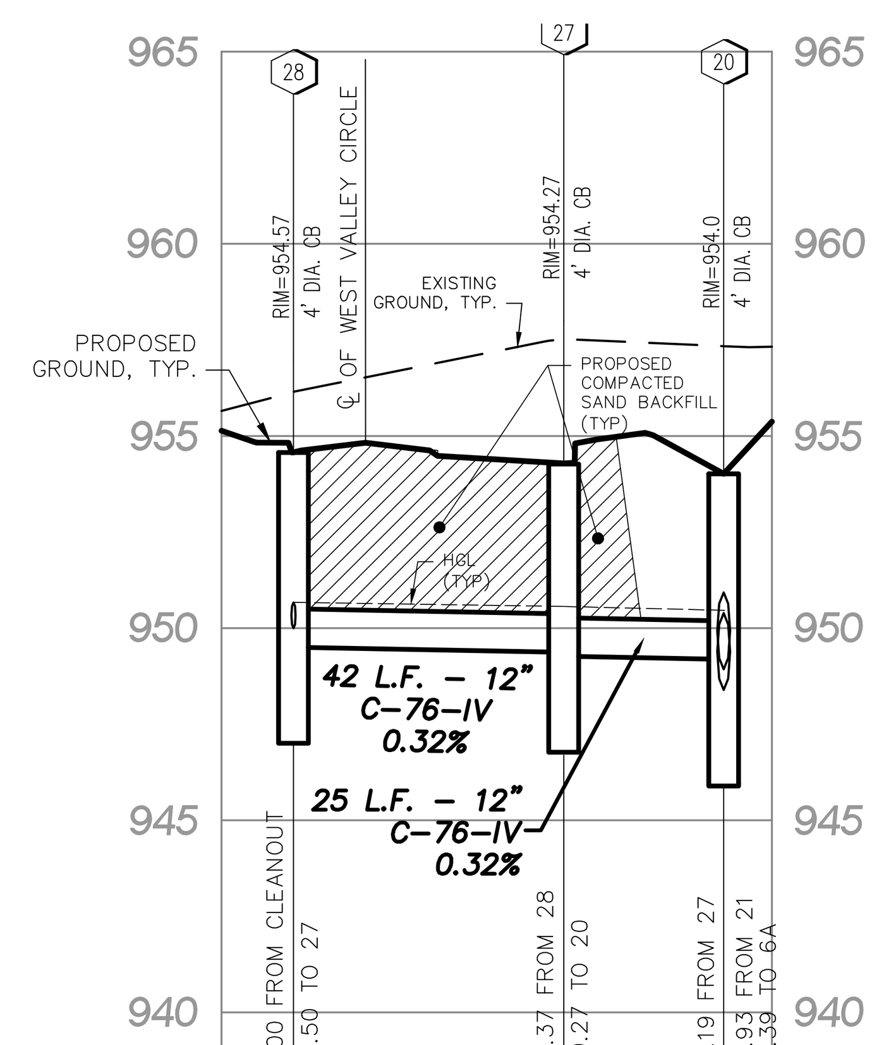
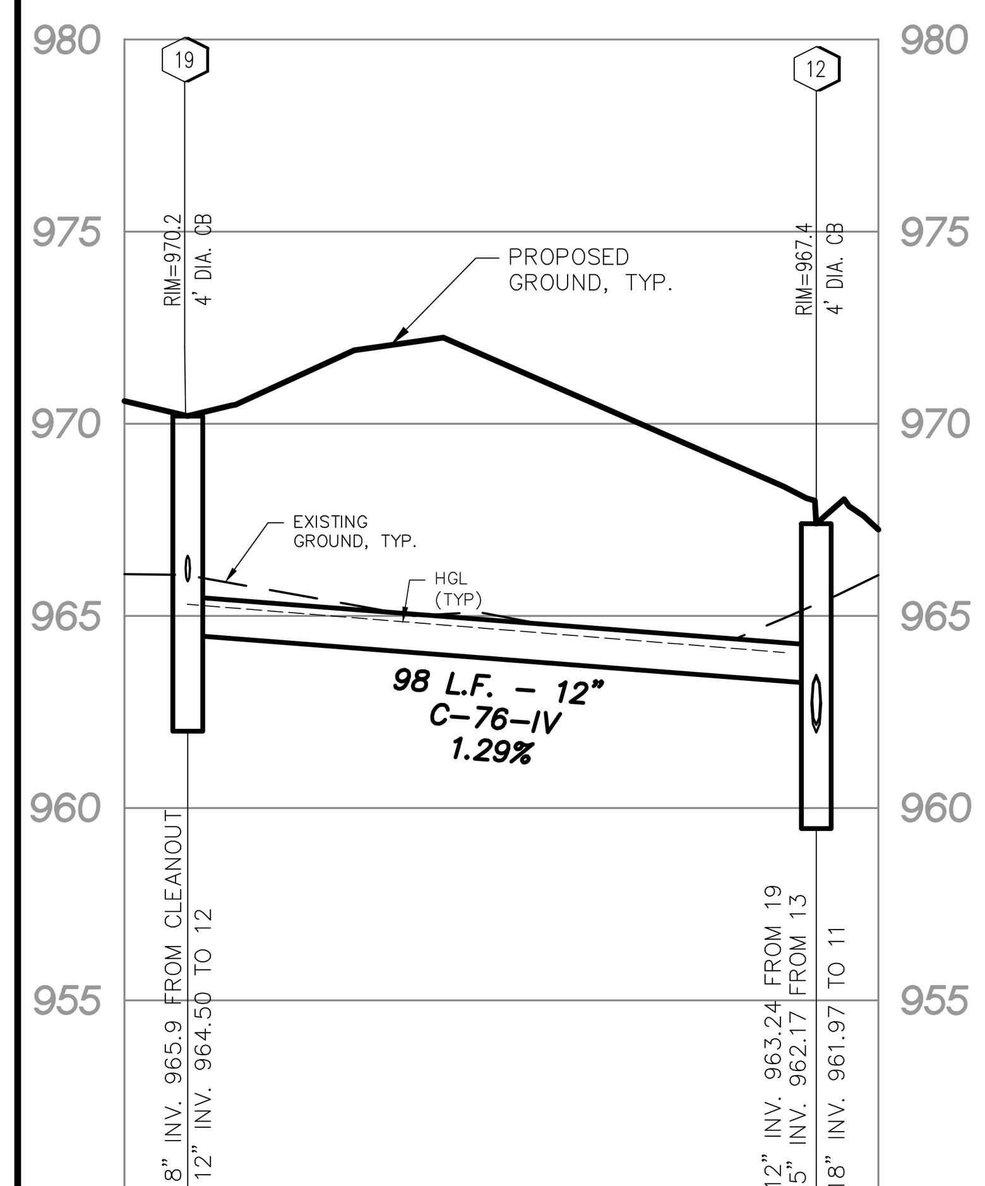
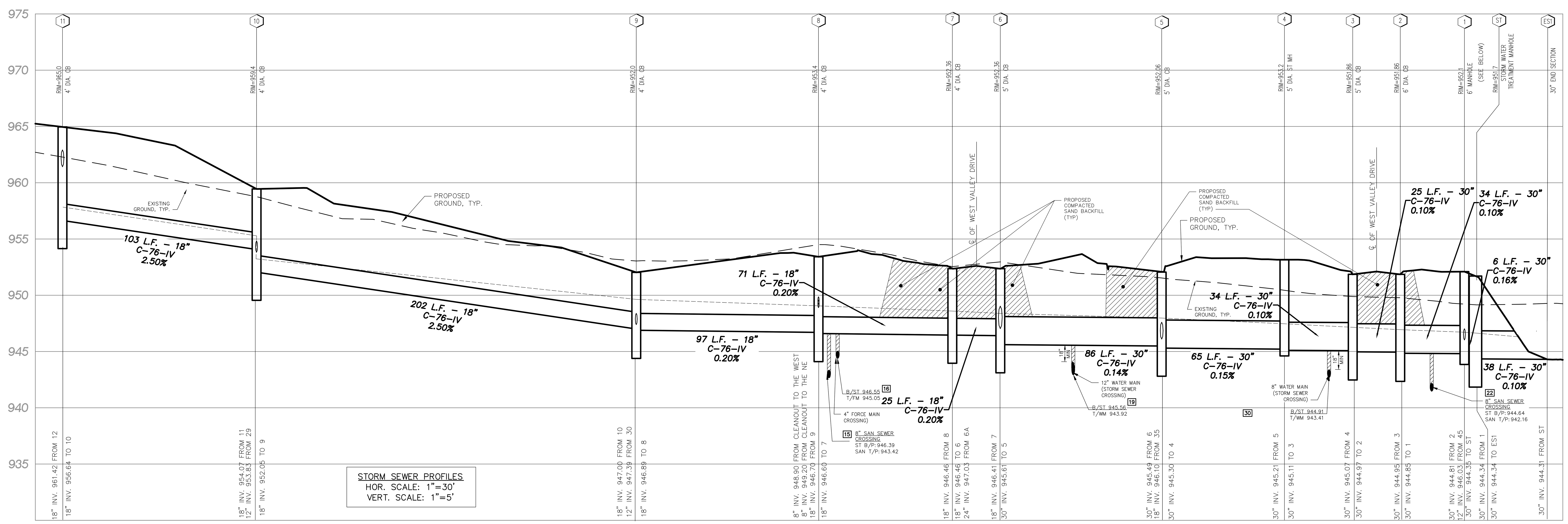
STORM SEWER PROFILES

SHEET 21

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Clinton Township Office
17001 Nineteen Mile Road, Suite 3
Clinton Township, MI 48038
586.412.7050
Farmington Hills Office
39205 Country Club Drive, Suite C8
Farmington Hills, MI 48331
248.308.3331







Project:	West Valley Multi-Family	
Location:	*White Lake, MI*	
Prepared For:	Seiber Keast Engineering	CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the first flush runoff flow rate (WQF) over a given site area. In this situation the WQV to be analyzed is the runoff produced by the first 1" of rainfall.

Reference: United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Given:

Structure Name	A (acres)	A (miles^2)	Runoff Coefficient	Percent Imp. (%)*	t_c (min)	t_c (hr)
WQU	12.07	0.01886	0.53	38.33	15.0	0.250

* Assumes runoff coefficient of 0.3 for pervious areas and 0.9 for impervious areas.

Procedure:

The Water Quality Flow (WQF) is calculated using the Water Quality Volume (WQV). This WQV, converted to watershed inches, is substituted for the runoff depth (Q) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 Gr

1. Compute WQV in watershed inches using the following equation:

$$WQV = P * R$$

where: WQV = water quality volume (watershed inches)
P = design precipitation (inches)
R = volumetric runoff coefficient = 0.05 + 0.009(I)
I = percent impervious cover

Structure Name	Percent Imp. (%)	R	P (in)	WQV (in)	WQV (CF)
WQU	38.33	0.395	1	0.395	17,306.57

2. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using Figure 2-1 from TR-55 (USDA, 1986):

$$CN = 1000 / [10+5P+10Q-10(Q^2+1.25QP)^{1/2}]$$

where: CN = Runoff Curve Number
P = design precipitation (inches)
Q = runoff depth (watershed inches)

Structure Name	Q (in)	CN
WQU	0.395	91.83

3. Using computed CN, read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55; compute I_a/P, interpolating when appropriate.

Structure Name	I_a (in)	I_a/P
WQU	0.174	0.174

4. Compute the time of concentration (t_c) in hours and the drainage area in square miles. A minimum t_c of 0.167 hours (10 minutes) should be used.

Structure Name	t_c (hr)	A (miles^2)
WQU	0.250	0.01886

5. Read the unit peak discharge (q_u) from Exhibit 4-II in Chapter 4 of TR-55 for appropriate t_c for type II rainfall distribution.

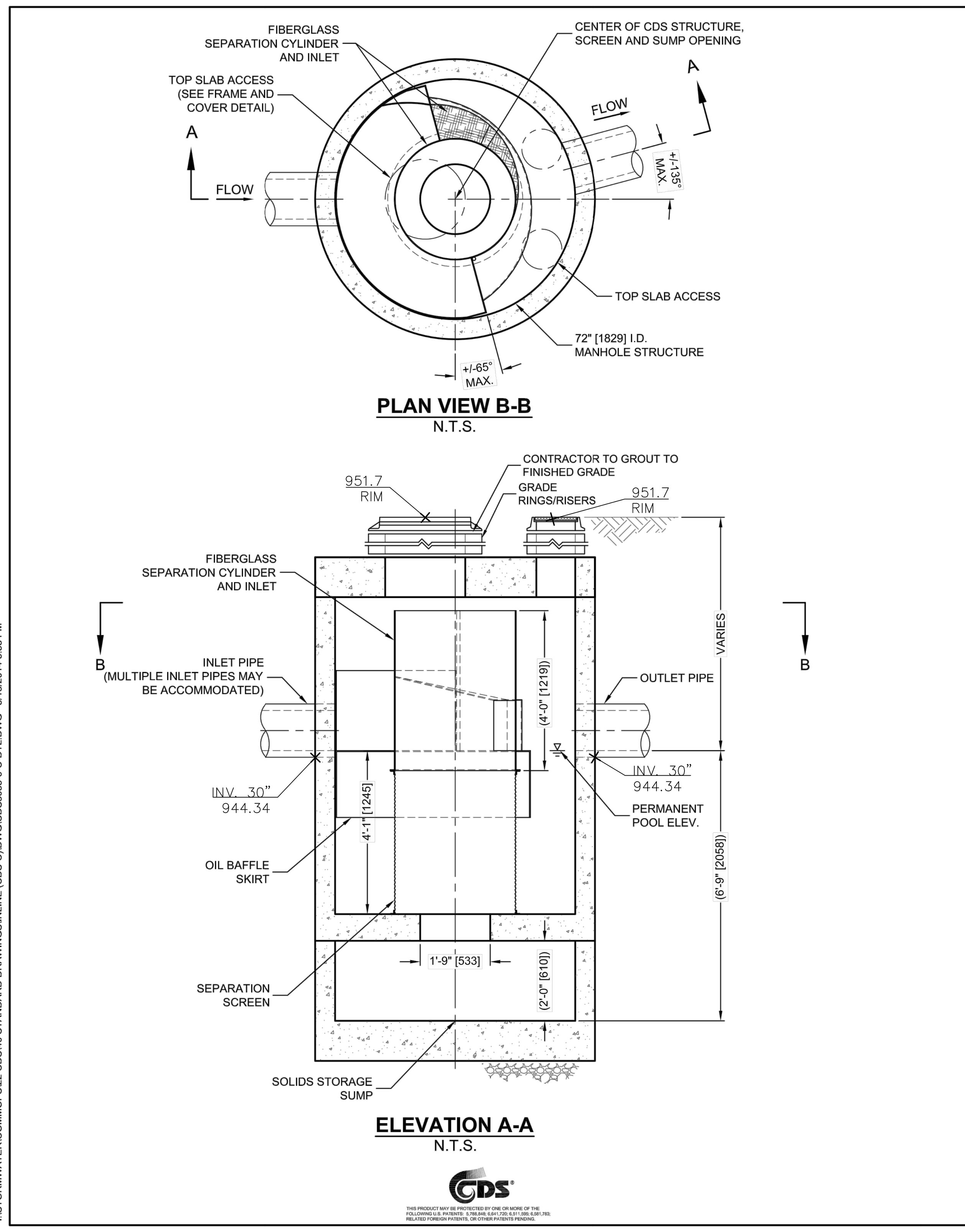
Structure Name	t_c (hr)	I_a/P	q_u (csm/in)
WQU	0.250	0.174	690

6. Substituting WQV (watershed inches) for runoff depth (Q), compute the water quality flow (WQF) from the following equation:

$$WQF = (q_u)*(A)*(Q)$$

where: WQF = water quality flow (cfs)
q_u = unit peak discharge (cfs/mi^2/inch)
A = drainage area (mi^2)
Q = runoff depth (watershed inches)

Structure Name	q_u (csm/in)	A (miles^2)	Q (in)	WQF (cfs)
WQU	690	0.01886	0.395	5.14

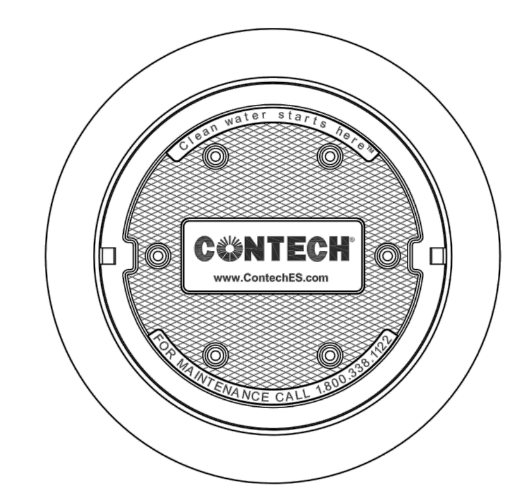


CDS3035-6-C DESIGN NOTES

CDS3035-6-C RATED TREATMENT CAPACITY IS 3.8 CFS [107.6 L/s], OR PER LOCAL REGULATIONS. MAXIMUM HYDRAULIC INTERNAL BYPASS CAPACITY IS 20.0 CFS [566 L/s]. IF THE SITE CONDITIONS EXCEED 20.0 CFS [566 L/s], AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

THE STANDARD CDS3035-6-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



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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)	*		
PEAK FLOW RATE (CFS OR L/s)	*		
RETURN PERIOD OF PEAK FLOW (YRS)	*		
SCREEN APERTURE (2400 OR 4700)	*		
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION	*		
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.ContechES.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 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. 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

CDS3035-6-C
INLINE CDS
STANDARD DETAIL

Estimated Net Annual Solids Load Reduction Based on the Rational Rainfall Method

West Valley Multi-Family Residential Community
White Lake, MI
Water Quality Unit

AREA (acres): 12.07
WEIGHTED C: 0.53
Tc (minutes): 15

CDS MODEL: 3035
PARTICLE SIZE (μm): 75

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Removal Efficiency (%)	Incremental Removal (%)
0.02	13.13%	13.1%	0.13	99.48	13.06
0.04	11.36%	24.5%	0.26	98.34	11.17
0.06	10.08%	34.6%	0.38	97.21	9.80
0.08	7.49%	42.1%	0.51	96.07	7.20
0.10	7.01%	49.1%	0.64	94.94	6.66
0.12	5.37%	54.4%	0.77	93.81	5.04
0.14	4.73%	59.2%	0.90	92.67	4.38
0.16	4.13%	63.3%	1.02	91.54	3.78
0.18	3.53%	66.8%	1.15	90.40	3.19
0.20	2.99%	69.8%	1.28	89.27	2.67
0.25	5.50%	75.3%	1.60	86.43	4.75
0.30	4.47%	79.8%	1.92	83.60	3.74
0.35	3.85%	83.6%	2.24	80.76	3.11
0.40	2.16%	85.8%	2.56	77.9	1.7
0.45	2.09%	87.9%	2.88	75.1	1.6
0.50	1.31%	89.2%	3.20	72.3	0.9
0.75	5.07%	94.3%	4.80	53.0	2.7
1.00	2.58%	96.9%	6.40	39.8	1.0
1.50	2.50%	99.4%	9.60	26.5	0.7
2.00	0.51%	99.9%	12.79	19.9	0.1
2.54	0.15%	100.0%	16.25	15.7	0.0
					87.24

Removal Efficiency Adjustment[2] = 6.5%
Predicted % Annual Rainfall Treated = 89.5%
Predicted Net Annual Load Removal Efficiency = 80.8%

1 - Based on Rainfall Data from DETROIT METRO AP Station
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

WEST VALLEY
MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
2.	REV. SAN AND STORM PER OWNER	04-10-20
3.	REV SAN, ST. & PAV. PER OWNER	5-18-20
4.	REVISE PER TWP.	02-18-21
5.	REVISE PER TWP.	03-17-21
7.	REV PER OWNER, RCOC AND OCWRC	11-21-22
8.	REVISED WATERMAIN FOR OWNER	04-05-23
9.	REVISED PER TOWNSHIP	04-25-23
10	REVISE PER TWP.	7-27-23
11	REVISED PER TWP.	09-21-23
12	REVISED PER EGLE	01-31-24
13	REVSE PER TWP	02-13-24

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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DATE: 08-23-19
DESIGNED BY: G.N. JOB NUMBER: 17-031
CHECKED BY: J.E. DRAWING FILE:17031-PROF.dwg

STORM SEWER PROFILES

SHEET 22

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Clinton Township Office
17001 Nineteen Mile Road, Suite 3
Clinton Township, MI 48038
586.412.7050
Farmington Hills Office
39205 Country Club Drive, Suite C8
Farmington Hills, MI 48331
248.308.3331

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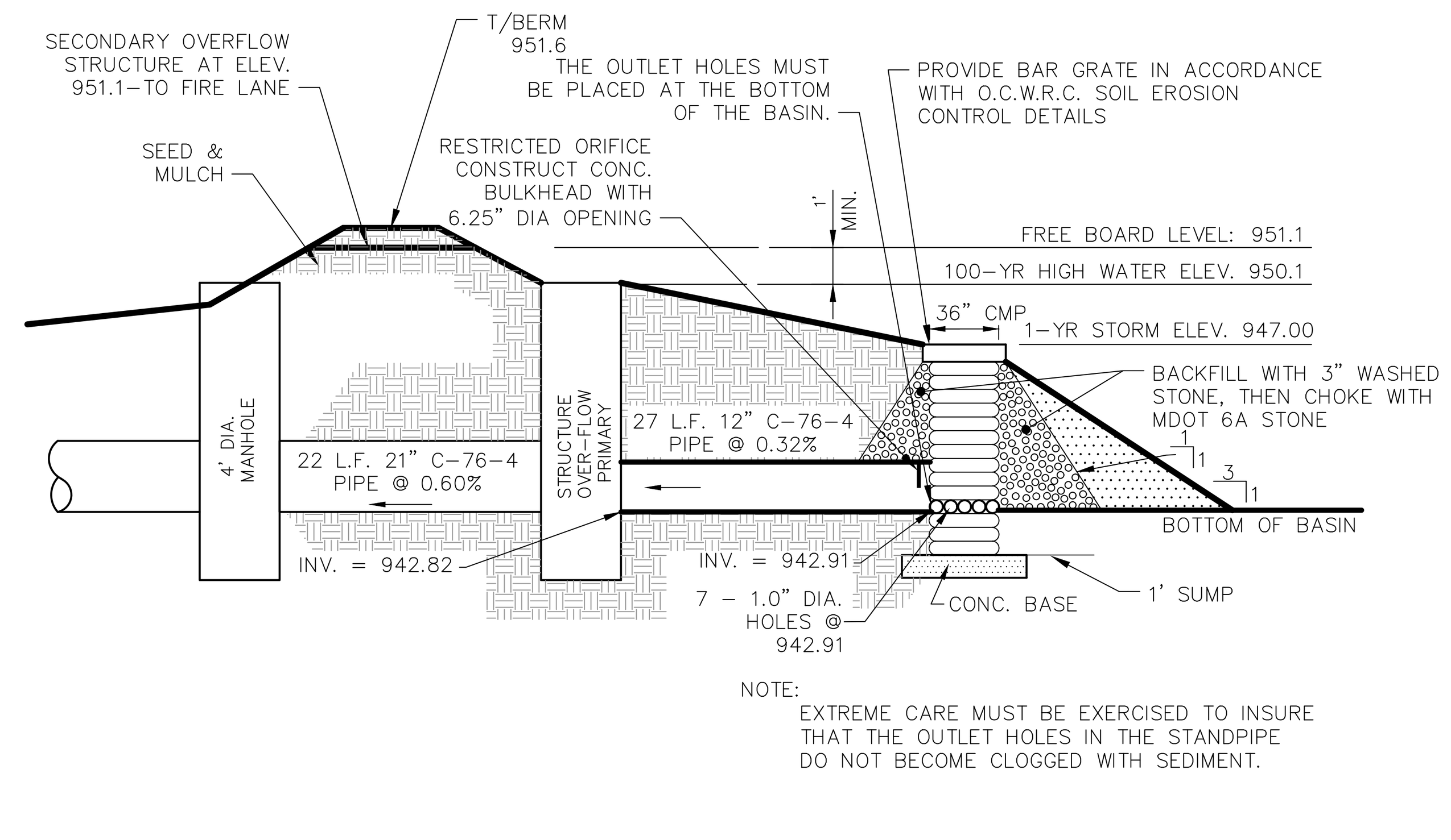
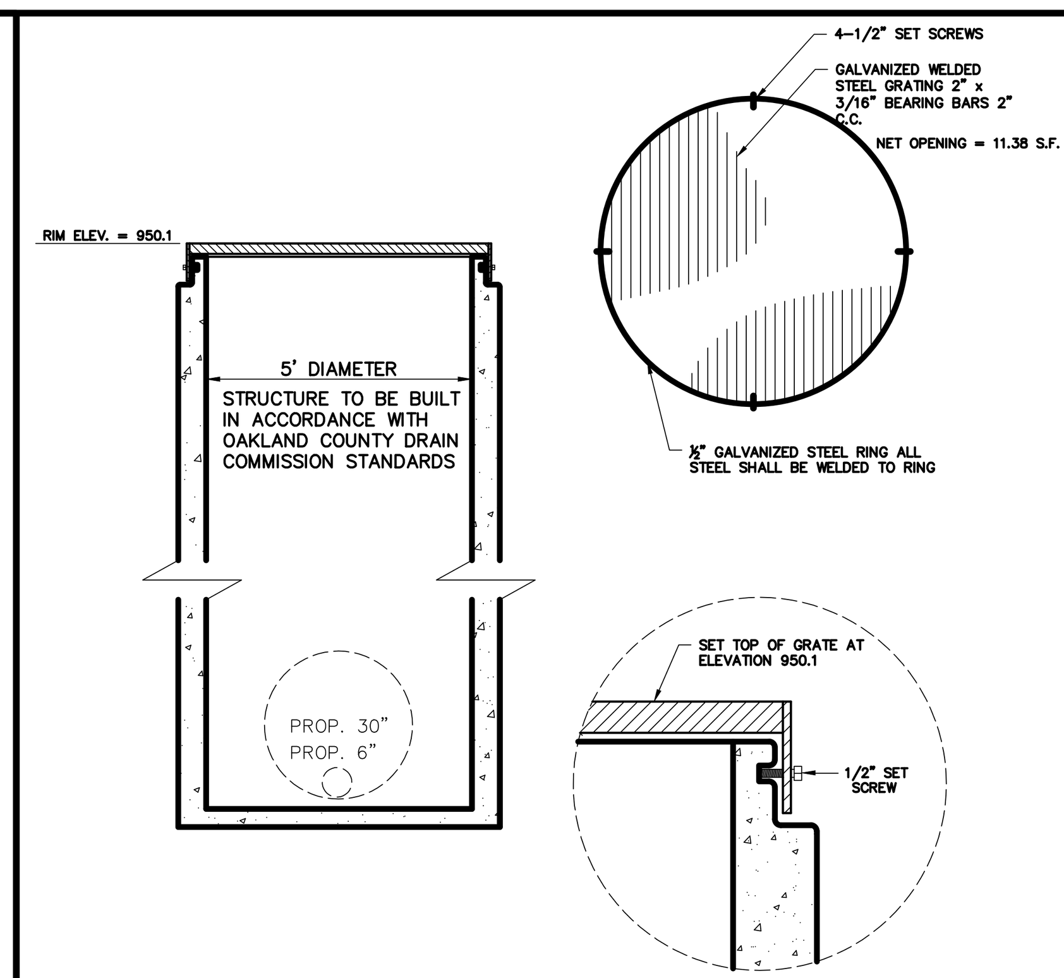
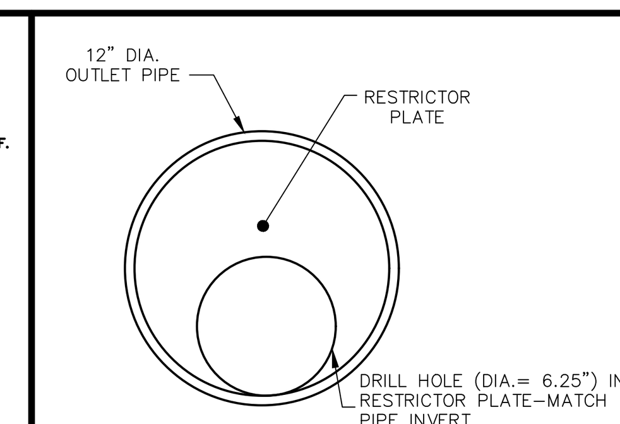


DETENTION BASIN PROFILE VIEW
NOT TO SCALE



OVERFLOW MANHOLE DETAIL

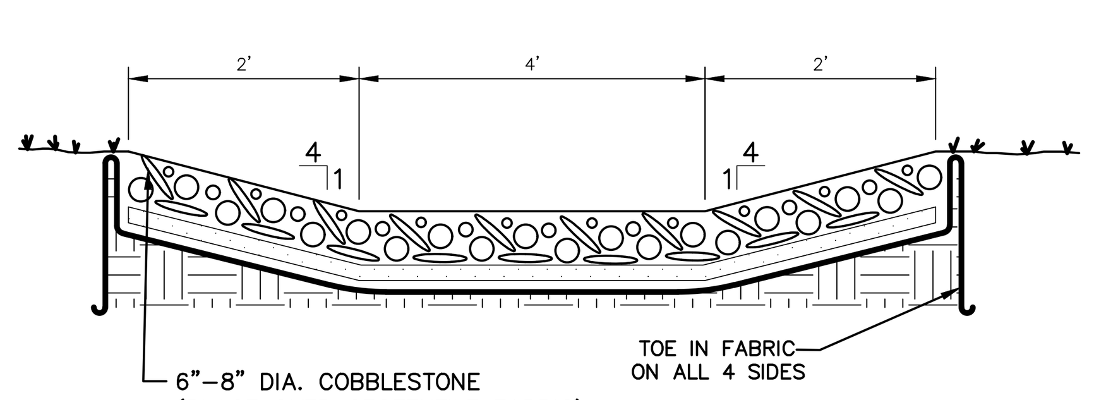


RESTRICTOR PLATE DETAIL

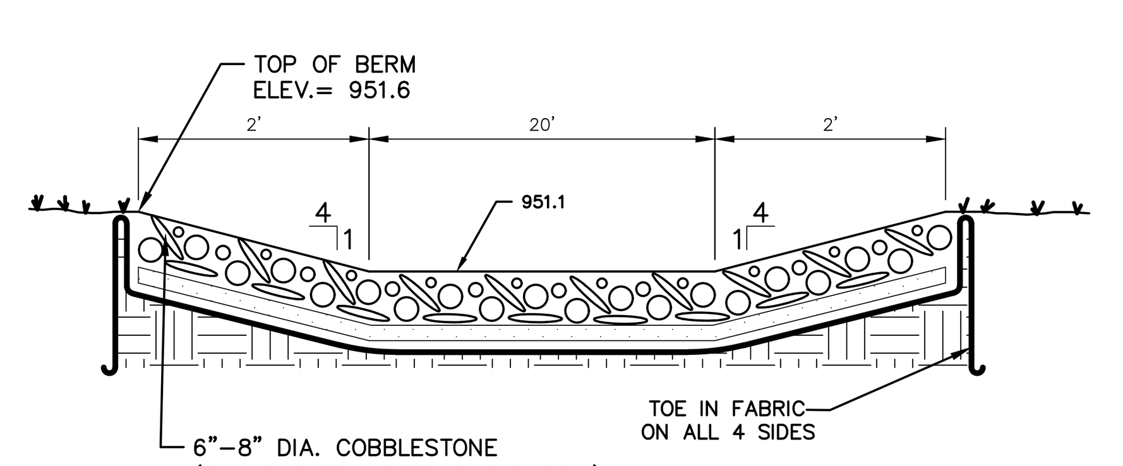
SEE SHEET 26 FOR R.C.O.C. NOTES

NOTES:

1. ALL TRENCHES WITHIN 1 ON 1 SLOPE FROM TOP OF CURBS SHALL BE BACKFILLED WITH GRANULAR MATERIAL CLASS II AND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.
2. ALL END SECTIONS SHALL BE CONSTRUCTED ACCORDING TO THE "END SECTION AND BAR SCREEN DETAIL" ON THE WHITE LAKE TOWNSHIP STORM SEWER DETAIL SHEET



DETENTION BASIN COBELSTONE SPILLWAY
(NOT TO SCALE)



DETENTION BASIN OVERFLOW SPILLWAY
(NOT TO SCALE)

LEGEND

EXISTING / PROPOSED: PAVEMENT (ASPHALT); SIDE WALK (CONCRETE); CONCRETE CURB AND GUTTER; STORM SEWER; SANITARY SEWER; WATER MAIN; MANHOLE; CATCH BASIN; CURB INLET W/SILT SAC; END SECTION; STAND PIPE; GATE VALVE; HYDRANT

EXISTING / PROPOSED: FLOOD PLAIN; CONTOURS; SPOT ELEVATION; SURFACE DRAINAGE; OVERFLOW ROUTE; TREE FENCE; SILT FENCE; PROPOSED DRIVEWAY LOCATION; LIMIT OF DISTURBANCE; LIGHT POLE; TRANSFORMER

REVISIONS

NO.	ITEM	DATE
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7.	REV PER OWNER, RCOC AND OCWRC	11–21–22
10.	REVISE PER TWP.	7–27–23
11.	REVISED PER TWP.	09–21–23
12.	REVISED PER EGLE	01–31–24
13.	REVSE PER TWP	02–13–24

DATE: 05–01–19 | DESIGNED BY: A.A. | CHECKED BY: J.E.

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JOB NUMBER: 17–031

WEST VALLEY
MULTI–FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

DETENTION BASIN PLAN

SHEET 23

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE 17001 NINETEEN MILE ROAD, SUITE 3 CLINTON TOWNSHIP, MI 48038 586.412.7050
FARMINGTON HILLS OFFICE 39205 COUNTRY CLUB DRIVE, SUITE C8 FARMINGTON HILLS, MI 48331 248.308.3331

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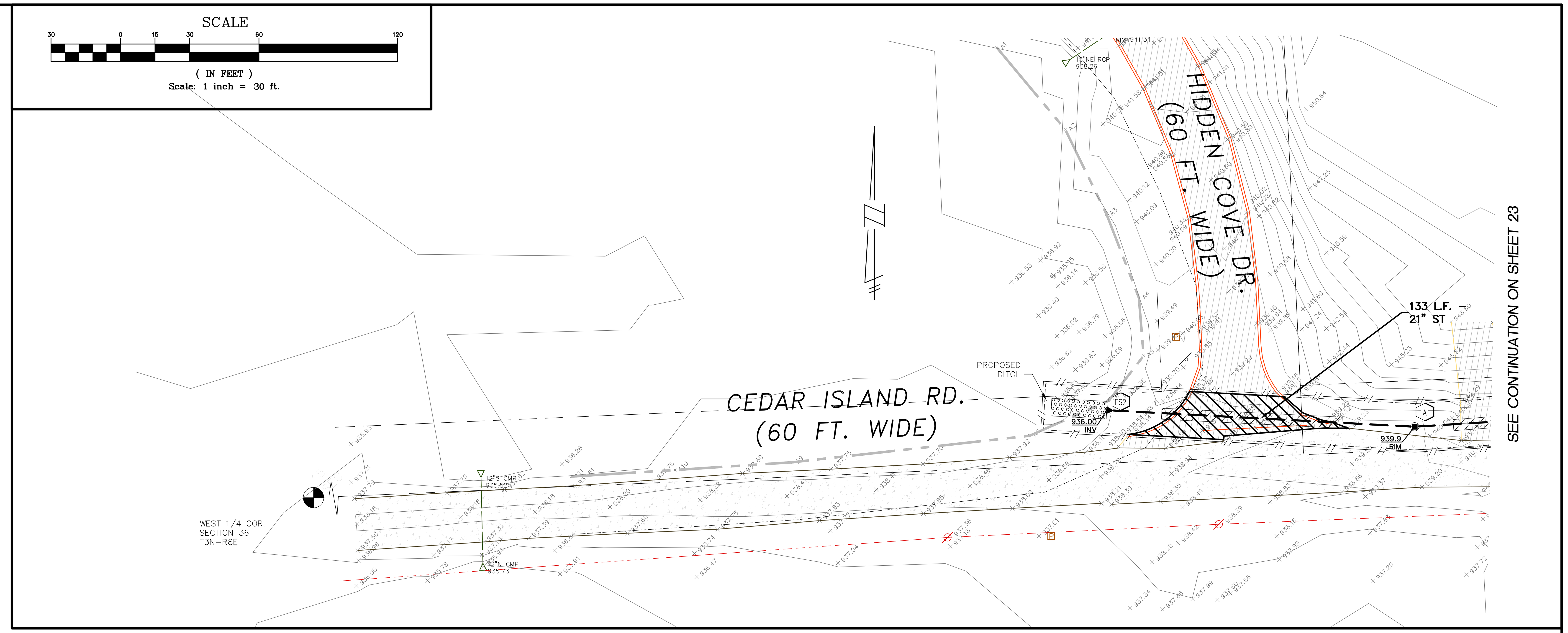
EMERGENCY OVERLAND OVERFLOW ROUTE



Detention Basin Calculations

DETERMINE DETENTION VOLUME REQUIREMENTS (100-YEAR STORM)

Ac =	12.07	Ac	Developed on site area tributary to the Detention Basin
Q_{all} =	2.41	cfs	Alowable Outflow (Total Area x 0.2 cfs/Ac.)
C =	0.551		
$Q_o = Q_{all} / (Ac * C)$ =		0.36	cfs/Ac. Imp
T = -25 + sqrt (10312.5/Q_o) =		143.54	min
Vs = (16500*T)/(T+25)-40*Q_o*T =		11968	cf/Ac. Imp
Vt = Vs * Ac. * C =		**79,578**	**ft^3 req'd**

DETERMINE DETENTION VOLUME REQUIREMENTS (1-YEAR STORM)

OCWRC Volume (1-yr Storm)

Vr = 4320 * C * A = **28,725 ft^3**

DETERMINE VOLUME PROVIDED FOR 1 YEAR AND 100-YEAR STORMS

	Elevation	Area	Vol (ft^3)
Bottom	942.91	1	
	944	4415	2407
	945	8688	8958
	946	12091	19348
	947	14053	32420
	948	16131	47512
	949	18340	64747
High Water	950.1	20820	86285

1 Year Strom EL. = 947.00 ft
Volume provided = 32,420 ft^3

100 Year Strom EL. = 950.10 ft
Volume provided = 86,285 ft^3

DETERMINE OUTLET SIZE TO DEWATER 1 YEAR STORM IN 48 HOURS

Volume of Storage =	32419.72	ft^3
Median Surface Area =	7926.58	ft^2
Orifice Area Required =	0.037	
Area of 1" diameter hole =	0.00545	
Number of holes required =	6.78	
Therefore use	**7**	**- 1" Diameter Holes**

DETERMINE 100-YEAR DETENTION BASIN OUTLET SIZE

Orifice Formula, Q = 0.625*A*sqrt(64.4*H)

Total Q_{all} =	2.41	cf
Outlet Size =	6.250	in
Invert Elevation =	942.91	ft
Springline EL. =	943.17	ft
H =	4.83	ft
Area Req'd = A =	0.2190	sf
Area of Outlet Used	0.2131	sf
Diameter Req'd =	6.250	in
USE	**6.250**	**in Dia Outlet**
Q Discharge =	2.35	cfs

DETERMINE SIZE OF DETENTION BASIN OVERFLOW STRURCTURE

Size of Overflow MH =	**5**	**ft**
% of MH that can be used as a Weir =	50	%
Calculated Length of Weir = L =	7.85	ft
Acerage Tributry to Overflow (on + off site) =	14.33	Ac
Composite run off coefficient (on and offsite):	0.521	
(From Pipe Flow Calculations)		
Longest Time of Flow to Basin =	19.27	min
Sum of all Flow into Basin	38.80	cfs
Volume of Baisn (Det Calcs) =	86285	ft^3
Storage Elevation =	950.10	ft
Freeboard Elevation =	951.10	ft
Time to Fill Basin Vprov / Flow into Basin =	37.06	min.
I = 175 / (T+25) =	2.15	In / hr
Qexp = (C*I*A) + 2.48 cfs Restricted Flow from Lake Pointe Detention	**18.54**	**cfs**
Qweir = 3.33*(L)*($h^{3/2}$)		
h =	0.79	ft
Rim Overflow MH =	950.10	ft
Elevation of Water during Overflow Conditions =	950.89	ft

Calculate how high the water will rise above the Overflow Structure to pass the expected flow.

Elevation of Water during Overflow Condition is Less than the Freeboard Elevation, Therefore the Overflow MH is Adequately Sized.

DETERMINE WIDTH OF OVERFLOW SPILLWAYS FOR DETENTION BASIN

Acreage Trib to Overflow (on + offsite):	14.33	ac
Composite run off coefficient (on and offsite):	0.52	
(From Pipe Flow Calculations)		
Longest Time of Flow to Basin =	19.27	min
Sum of all Flow into Basin (includes 2.32 cfs from Lakepoint Basin)	41.12	cfs
Volume of the Detention Basin =	86,285	cf
Time to Fill Basin Vprov / Flow into Basin =	34.97	min.
I =	2.21	In / hr
Qexp = (C*I*A) = (0.52) x (2.21)in/hr x (14.33)Ac. = 16.47cfs	**41.93**	**cfs**

+ 11.5 cfs 10-year pipe overflow from Lake Pointe Basin
+ 13.95 cfs Emergency Overflow from Comfort Care Basin

CAPACITY OF 5 FOOT DIAMETER MAN HOLE

$Q = C*L*H^{3/2}$

C =	3.33	
L =	7.85	ft
H =	0.79	ft
Qprov =	**18.54**	**cfs**

Size Spillway

CAPACITY OF 8-FOOT WIDE OVER FLOW SPILLWAY

Q = C*L*H3/2

C =	3.33	
L =	**20**	ft
H =	0.5	ft
Qprov =	**23.55**	**cfs**

TOTAL CAPACITY OF THE OVERFLOW MANHOLE AND SPILLWAY EXCEED THE MAXIMUM 100 YEAR OUTLET RATE

CAPACITY OF THE 21" DETENTION BASIN OUTLET PIPE

Orifice Formula, Q = 0.625*A*sqrt(64.4*H)

Qexp = (C*I*A) + 2.48 cfs Restricted Flow from Lake Pointe Detention

	18.54	cfs
Outlet Size =	21.00	in
Invert Elevation =	942.77	ft
Springline EL. =	943.52	ft
H =	6.58	ft
Area Req'd = A =	1.44	sf
Area of Outlet Used	2.41	sf
Diameter Req'd =	21.00	in
Use	**21.000**	**in Dia Outlet**

Use 21" Diameter Overflow Outlet Pipe @ 0.24% Slope

Determine "C" Factor for Detention Basin

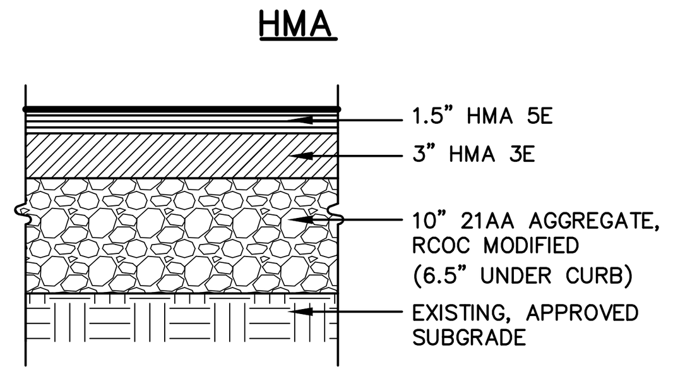
DETERMINE "C" FACTOR		Area			C		Area *C
TOTAL AREA TRIBUTARY TO DETENTION BASIN	=	12.07	Ac				
PAVING AREA (WALKS, DRIVE, ROAD)	=	3.50	Ac	@	0.80	=	2.80
BUILDING AREA	=	3.05	Ac	@	0.90	=	2.74
LAWN AREA INCLUDING DETENTION BASIN AREA	=	5.52	Ac	@	0.20	=	1.10
TOTAL AREA	=	12.07	Ac	@			6.65
Cavg = A * C / TOTAL ACRES =					0.551		

"C" Factor Calculations for Sum of all Flow into Basin

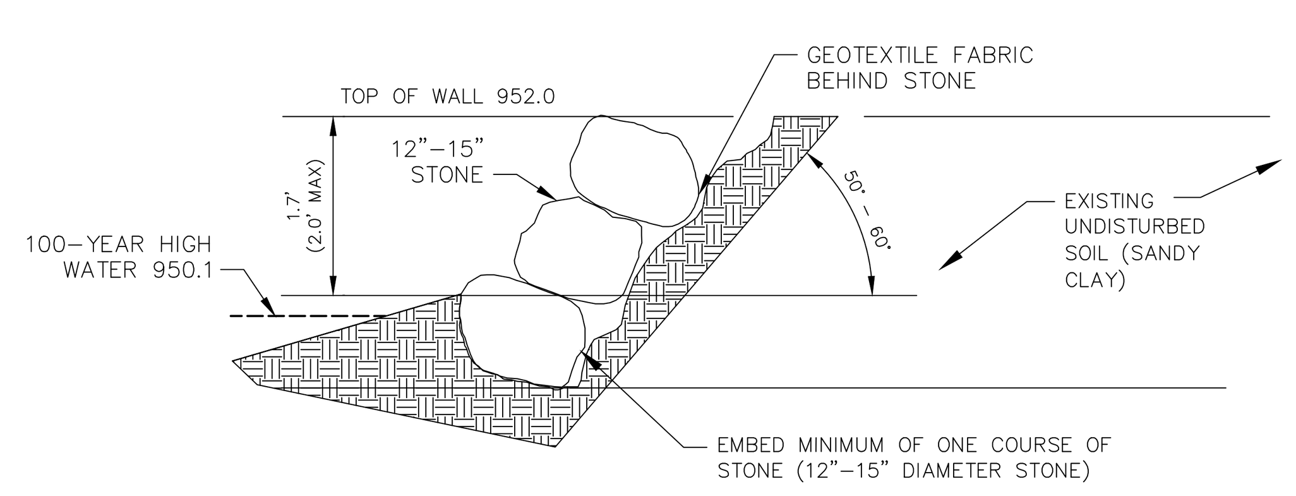
	Area	"C"	
Area North of the Site - Open	0.25	0.20	0.05
Area North of the Site - ROW	2.01	0.38	0.76
On Site	12.07	0.55	6.65
	14.33		7.46
	Average "C" =	0.521	

NOTE: STONE IS TO BE PLACED ON THE SLOPE AT THE NATURAL ANGLE OF REPOSE (ALSO KNOWN AS SLIP LINE OR FAILURE PLANE) OF THE SOIL. LATERAL FORCE DUE TO THE SOIL IS THEREFORE NON EXISTENT OR NEGLIGIBLE. BOULDERS WITH GEOTEXTILE BACKING PROVIDE FOR SOIL EROSION CONTROL

HMA



CROSS SECTION FOR CEDAR OAKS & HIDDEN COVE PAVEMENT REPLACEMENT



DETENTION BASIN BOULDER WALL CROSS SECTION
CROSS SECTION C-C
(SEE SHEET 23 FOR PLAN LOCATION)

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LEGEND

EXISTING / PROPOSED		EXISTING / PROPOSED
PAVEMENT (ASPHALT)		FLOOD PLAIN
SIDE WALK (CONCRETE)		CONTOURS (1000)
CONCRETE CURB AND GUTTER		SPOT ELEVATION (1000.0 / 1000.00 T/C)
STORM SEWER		SURFACE DRAINAGE
SANITARY SEWER		OVERFLOW ROUTE
WATER MAIN		TREE FENCE
MANHOLE		SILT FENCE
CATCH BASIN		PROPOSED DRIVEWAY LOCATION
CURB INLET W/SILT SAC		LIMIT OF DISTURBANCE
END SECTION		LIGHT POLE
STAND PIPE		TRANSFORMER
GATE VALVE		
HYDRANT		

REVISIONS

NO.	ITEM	DATE
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5.	REVISE PER TWP.	03–17–21
7.	REV PER OWNER, RCOC AND OCWRC	11–21–22
10.	REVISE PER TWP.	7–27–23
11.	REVISED PER TWP.	09–21–23
12.	REVISED PER EGLE	01–31–24
13.	REVSE PER TWP	02–13–24

DATE: 05–01–19 | DESIGNED BY: A.A. | CHECKED BY: J.E.

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JOB NUMBER: 17–031

WEST VALLEY
MULTI–FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

DETENTION BASIN PLAN

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
Clinton Township Office, 17001 Nineteen Mile Road, Suite 3, Clinton Township, MI 48038, 586.412.7050
Farmington Hills Office, 39205 Country Club Drive, Suite C8, Farmington Hills, MI 48331, 248.308.3331

STORM SEWER CALCULATIONS

WEST VALLEY
WHITE LAKE TOWNSHIP
STORM SEWER DESIGN

SEIBER, KEAST & ASSOC., INC.
1/8/2021 (revised 2/8/2021)(revised 10/7/2022),(10/31/2022),(3/28/2023)
JOB NO. 17-031

10.00 year design - I = 175 /T+25 n = 0.013 C = 0.53

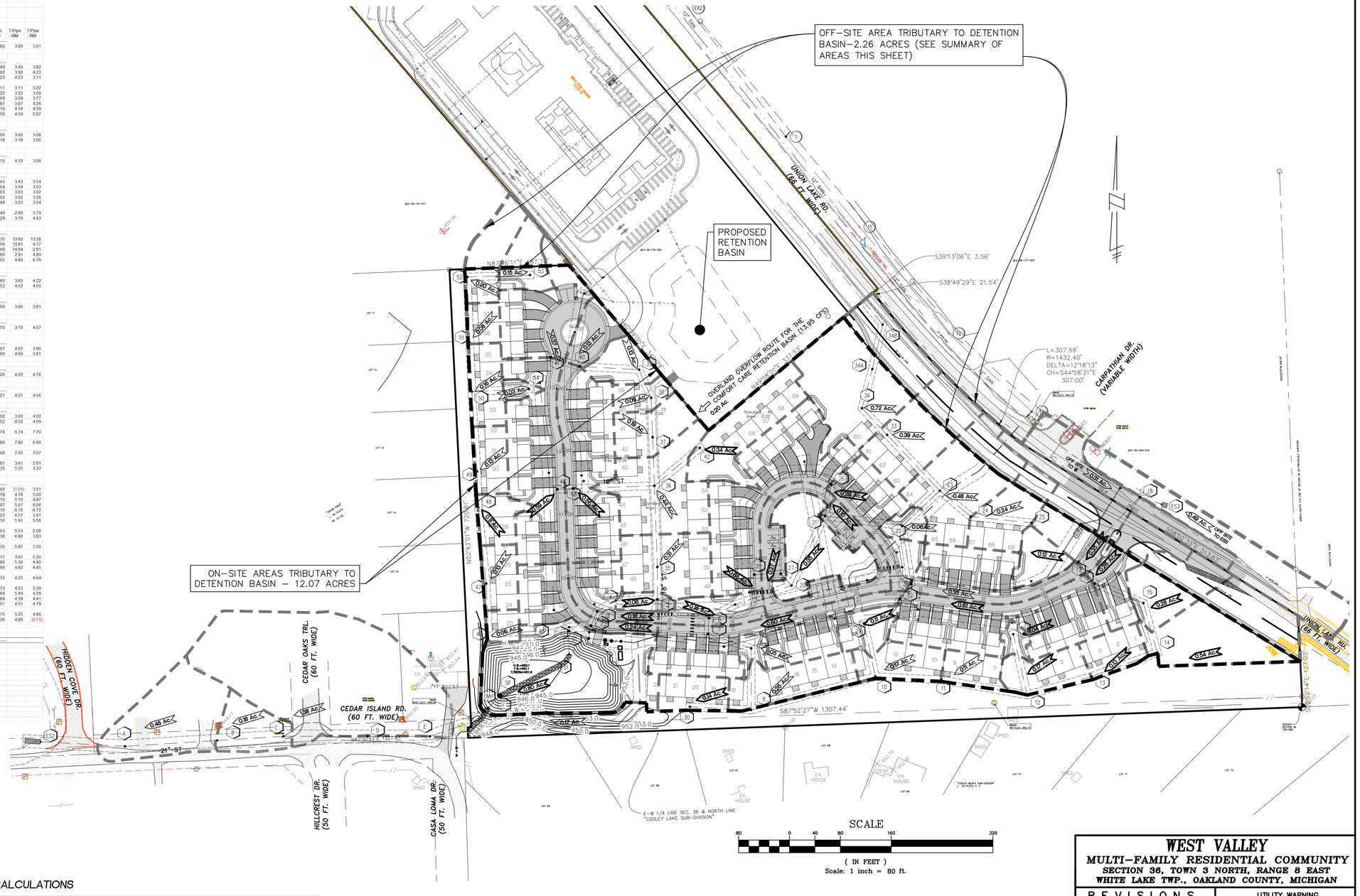
MH-MH	A(s) acres	C	A(s)xC unit	A(s)xC cumul	T min	I in/hr	Q cfs	Dia in	Hyd.Gr. %	Vel. ft/sec	Length ft	Tr Time min	Inv. upst.	Inv. dnst.	Gmd. upst.	HGL upst.	Pipe slope-%	RIM - HGL	Rim - inv	T/Pipe - RIM	T/Pipe - RIM
54-50	0.03	0.53	0.02	0.02	15.00	4.38	0.07	12	0.00	2.68	90	0.56	948.60	948.29	952.60	949.40	0.35	3.20	4.00	3.00	3.01
												Downstream Data -			952.30	949.09					
53-52	0.15	0.26	0.04	0.04	15.00	4.38	0.17	12	0.00	2.57	99	0.64	950.50	950.18	954.90	951.30	0.32	3.60	4.40	3.40	3.82
52-51	0.20	0.27	0.05	0.09	15.64	4.31	0.40	12	0.01	3.77	103	0.46	950.08	949.37	955.00	950.88	0.69	4.12	4.92	3.92	4.23
51-50	0.11	0.53	0.06	0.15	16.10	4.26	0.64	12	0.03	5.63	77	0.23	949.37	948.19	954.60	950.17	1.54	4.43	5.23	4.23	3.11
50-49	0.16	0.53	0.08	0.24																	
+ flow 54			0.02	0.25	16.33	4.23	1.07	12	0.09	2.57	126	0.82	948.19	947.78	952.30	948.99	0.32	3.31	4.11	3.11	3.22
49-48	0.13	0.53	0.07	0.32	17.14	4.15	1.33	12	0.14	4.54	57	0.21	947.78	947.21	952.00	948.58	1.00	3.42	4.22	3.22	3.09
48-47	0.12	0.53	0.06	0.38	17.35	4.13	1.59	12	0.20	2.57	120	0.78	947.21	946.83	951.30	948.01	0.32	3.29	4.09	3.09	3.77
47-46	0.13	0.53	0.07	0.45	18.13	4.06	1.84	12	0.27	2.57	90	0.58	946.83	946.54	951.70	947.63	0.32	4.07	4.87	3.87	4.26
46-45	0.06	0.53	0.03	0.48	18.72	4.00	1.94	12	0.30	2.57	72	0.47	946.44	946.21	951.00	947.24	0.32	4.36	5.16	4.16	4.59
45-1	0.00	0.00	0.00	0.48	19.19	3.96	1.92	12	0.29	2.57	57	0.37	946.21	946.03	951.80	947.01	0.32	4.79	5.59	4.59	5.07
												Downstream Data -			952.10	946.83					
44-43	0.63	0.53	0.33	0.33	15.00	4.38	1.46	12	0.17	2.57	26	0.17	948.15	948.07	952.15	950.04	0.32	2.11	4.00	3.00	3.08
43-36	0.46	0.53	0.24	0.58	15.17	4.36	2.51	12	0.50	4.06	128	0.53	947.97	946.94	952.15	949.99	0.80	2.16	4.18	3.18	3.06
												Downstream Data -			951.00	949.36					
42-36	0.63	0.53	0.33	0.33	15.00	4.38	1.46	12	0.17	8.11	93	0.19	949.90	946.92	955.00	950.70	3.20	4.30	5.10	4.10	3.08
												Downstream Data -			951.00	949.36					
41-40	0.37	0.53	0.20	0.20	15.00	4.38	0.86	12	0.06	2.57	48	0.31	949.80	949.65	954.23	950.75	0.32	3.48	4.43	3.43	3.54
40-39	0.13	0.53	0.07	0.26	15.31	4.34	1.15	12	0.10	6.09	93	0.25	949.65	947.97	954.19	950.72	1.80	3.47	4.54	3.54	3.03
39-38 +1.5 cfs	0.13	0.53	0.07	0.76	15.57	4.31	3.28	12	0.85	4.18	48	0.19	947.97	947.78	952.00	950.63	0.41	1.37	4.03	3.03	3.02
38-37	0.09	0.53	0.05	0.81	15.70	4.29	3.47	12	0.95	4.42	62	0.23	947.78	947.52	951.85	950.22	0.41	1.58	4.03	3.03	3.28
37-36	0.19	0.53	0.10	0.91	15.99	4.27	3.88	15	0.36	4.71	76	0.27	947.32	946.71	951.80	949.63	0.80	2.17	4.48	3.23	3.04
36-35	0.44	0.53	0.23	1.14																	
+ flow 42 & 43			0.91	2.05	16.26	4.24	8.70	18	0.69	4.92	128	0.43	946.51	946.21	951.00	949.36	0.24	1.64	4.49	2.99	3.79
35-5	0.31	0.53	0.16	2.21	16.69	4.20	9.30	18	0.78	5.26	51	0.16	946.21	946.10	951.50	948.48	0.20	3.02	5.29	3.79	4.43
												Downstream Data -			952.03	948.08					
stub-34B	Flow from Lake Pointe						11.50	21	0.53	4.78	48	0.17	964.65	964.47	980.00	966.05	0.38	13.95	15.35	13.60	13.58
34B-34A	0.00	0.00	0.00	2.63	15.17	4.36	11.45	21	0.52	4.76	72	0.25	964.24	963.88	979.80	965.64	0.49	14.16	15.56	13.81	4.17
34A-34	0.00	0.00	0.00	2.63	15.17	4.36	11.45	21	0.52	9.99	64	0.11	953.11	951.64	969.80	954.79	2.30	15.01	16.69	14.94	2.91
34-33	0.72	0.53	0.38	3.01	15.42	4.33	13.03	21	0.68	5.42	57	0.18	951.64	951.55	956.30	954.45	0.16	1.85	4.66	2.91	4.80
33-23	0.39	0.53	0.21	3.22	15.59	4.31	13.86	21	0.77	5.76	121	0.35	951.55	951.36	958.10	954.07	0.16	4.03	6.55	4.80	6.79
												Downstream Data -			959.90	953.14					
32-31	0.45	0.53	0.24	0.24	15.00	4.38	1.04	12	0.09	2.57	30	0.19	959.22	959.12	963.62	960.02	0.32	3.80	4.60	3.60	4.22
31-22	0.35	0.53	0.19	0.42	15.19	4.35	1.84	12	0.27	8.49	92	0.18	958.82	955.60	964.34	959.62	3.50	4.72	5.52	4.52	4.00
												Downstream Data -			960.60	956.40					
30-9	0.16	0.53	0.08	0.08	15.00	4.38	0.37	12	0.01	2.57	96	0.62	947.70	947.39	951.70	949.75	0.32	1.95	4.00	3.00	3.61
												Downstream Data -			952.00	949.74					
29-10	0.14	0.53	0.07	0.07	15.00	4.38	0.32	12	0.01	2.57	85	0.55	954.10	953.83	958.80	954.90	0.32	3.90	4.70	3.70	4.57
												Downstream Data -			959.40	954.63					
28-27	0.40	0.53	0.21	0.21	15.00	4.38	0.93	12	0.07	2.57	42	0.27	949.50	949.37	954.57	950.30	0.32	4.27	5.07	4.07	3.90
27-20	0.24	0.53	0.13	0.34	15.27	4.35	1.47	12	0.17	2.57	25	0.16	949.27	949.19	954.27	950.07	0.32	4.20	5.00	4.00	3.81
												Downstream Data -			954.00	949.99					
19-12	0.20	0.53	0.11	0.11	15.00	4.38	0.46	12	0.02	5.15	98	0.32	964.50	963.24	969.70	965.30	1.29	4.40	5.20	4.20	4.76
												Downstream Data -			969.00	964.04					
26-21	0.33	0.53	0.17	0.17	15.00	4.38	0.76	12	0.05	2.57	51	0.33	954.00	953.84	959.21	954.80	0.32	4.41	5.21	4.21	4.56
												Downstream Data -			959.40	954.64					
25-24	0.13	0.53	0.07	0.07	15.00	4.38	0.30	12	0.01	6.42	96	0.25	964.50	962.58	968.50	965.30	2.00	3.20	4.00	3.00	4.02
24-23	0.24	0.53	0.13	0.20	15.25	4.35	0.85	12	0.06	8.61	63	0.12	957.08	954.81	967.60	957.88	3.60	9.72	10.52	9.52	4.09
23-22	0.48	0.53	0.25	0.45																	
+ flow 33			3.22	3.67	15.72	4.30	15.75	24	0.48	5.01	81	0.27	951.16	950.90	959.90	953.14	0.32	6.76	8.74	6.74	7.70
22-21	0.06	0.53	0.03	0.03	3.70																
+ flow 31			0.42	4.12	15.99	4.27	17.59	24	0.60	5.60	123	0.37	950.80	950.50	960.60	952.75	0.24	7.85	9.80	7.80	6.90
21-20	0.14	0.53	0.07	0.07	4.19																
+ flow 26			0.17	4.37	16.35	4.23	18.49	24	0.67	7.95	121	0.25	950.40	948.93	959.40	952.00	1.22	7.40	9.00	7.00	3.07
20-6A	0.34	0.53	0.18	0.18	4.55																
+ flow 27			0.34	4.89	16.61	4.21	20.56	24	0.83	7.20	94	0.22	948.39	947.45	954.00	949.99	1.00	4.01	5.61	3.61	2.91
6A-6	0.00	0.53	0.00	0.89	16.82	4.18	20.45	24	0.82	6.83	46	0.11	947.45	947.03	954.80	949.42	0.90	5.38	7.35	5.35	3.33
												Downstream Data -			952.36	949.05					
ES3 - 18	0.49	0.53	0.26	0.26	15.00	4.38	1.13	12	0.10	9.94	37	0.06	976.50	974.72	976.50	977.30	4.80	(0.80)	0.00	(1.00)	3.51
18-17	0.31	0.80	0.25	0.51	15.06	4.37	2.22	12	0.39	6.65	141	0.35	973.45	970.42	979.23	974.25	2.15	4.98	5.78	4.78	5.00
17-16	0.40	0.53	0.21	0.72	15.42	4.33	3.11	12	0.76	4.49	43	0.16	970.32	969.90	976.42	972.11	0.98	4.31	6.10	5.10	4.97
16-15	0.20	0.53	0.11	0.82	15.57	4.31	3.56	12	1.00	4.53	82	0.30	969.80	969.54	975.87	971.78	0.32	4.09	6.07	5.07	6.06
15-14	0.26	0.53	0.14	0.96	15.88	4.28	4.12	12	1.34	5.24	81	0.26	969.44	969.18	975.60	970.96	0.32	5.64	7.16	6.16	6.72
14-13	0.52	0.53	0.27	1.24	16.13	4.25	5.26	15	0.66	4.29	110	0.43	968.88	968.34	976.00	969.88	0.49	7.02	8.02	6.77	3.41
13-12	0.15	0.53	0.08	1.32	16.56	4.21	5.54	15	0.74	9.85	105	0.18	965.84	962.17	973.00	966.84	3.50	6.16	7.16	5.91	5.58
+ flow 19	0.11	0.53	0.06	1.58	17.36	4.13	6.51	18	0.38	9.40	103	0.18	956.64	954.07	965.00	957.84	2.50	7.16	8.36	6.86	3.83
11-10	0.17	0.53	0.09	1.67																	
10-9			0.07	1.74	17.54	4.11	7.16	18	0.46	9.40	202	0.36	952.05	947.00	959.40	953.25	2.50	6.15	7.35	5.85	3.50
+ flow 29	0.26	0.53	0.14	1.88																	
9-8			0.48	10.17	19.26	3.95	40.20	30	0.96	8.19	4	0.01	944.35	944.34	952.10	946.73	0.16	5.37	7.75	5.25	4.86
+ flow 30	0.26	0.53	0.14	1.88																	
8-7	0.31	0.53	0.16	2.04	17.90	4.08	8.00	18	0.58	4.53	97	0.36	946.89	946.70	952.00	949.74	0.20	2.26	5.11	3.61	5.20
7-6	0.30	0.53	0.16	2.20	18.25	4.05	8.60	18	0.67	4.87	71	0.24	946.60	946.46	953.40	949.18	0.20	4.22	6.80	5.30	4.40
6-5	0.30	0.53	0.16	2.28	18.50	4.02	9.19	18	0.77	5.20	25	0.08	946.46	946.41	952.36	948.70	0.20	3.66	5.90	4.40	4.45
+ flow 6A	0.12	0.53	0.06	2.35																	
5-4	0.04	0.53	4.89	7.23	18.58	4.02	29.05	30	0.50	5.92	86	0.24	945.61	945.49	952.36	948.51	0.14	3.85	6.75	4.25	4.04
+ flow 35			0.02	7.26																	
4-3	0.00	0.00	2.21	9.47	18.82	3.99	37.82	30	0.85	7.70	65	0.14	945.30	945.21	952.03	948.08	0.15	3.95	6.73	4.23	5.39
3-2	0.15	0.53	0.00	9.47	18.96	3.98	37.70	30	0.84	7.68	34	0.07	945.11	945.07	953.10	947.53	0.10	5.57	7.99	5.49	4.29
2-1	0.25	0.53	0.08	9.55	19.03	3.97	37.95	30	0.86	7.73	25	0.05	944.97	944.95	951.86	947.24	0.10	4.62	6.89	4.39	4.41
1-ST	0.25	0.53	0.13	9.68	19.09	3.97	38.43	30	0.88	7.83	34	0.07	944.85	944.81	951.86	947.03	0.10	4.83	7.01	4.51	4.79
ST-45	0.00	0.00	0.00	9.68																	
+ flow 45	0.00	0.00	0.48	10.17	19.26	3.95	40.20	30	0.96	8.19	4	0.01	944.35	944.34	952.10	946.73	0.16	5.37	7.75	5.25	4.86
ST-ES1	0.00	0.00	0.00	10.17	19.27	3.95	40.19	30	0.96	8.19	38	0.08	944.34	944.31	951.70	946.67	0.10	5.03	7.36	4.86	(2.51)
												Downstream Data -			944.30	946.31					
															(0.04)						

SUMMARY OF AREAS

13.53	Total area through storm sewer
0.80	Plus detention basin area
14.33	Total Area Tributary to detention basin outlet
(2.26)	Minus Off Site Area
12.07	Total On Site Developed Area Tributary to Detention Basin Outlet
12.07	Total On Site Developed Area Tributary to Detention Basin Outlet
(0.80)	Minus detention basin area
11.27	Total On Site Area Tributary to the Contech Inline CDS Structure

On Site Storm Sewer "C" Factor Calculations

DETERMINE "C" FACTOR		Area			C		Area *C
TOTAL AREA TRIBUTARY TO DETENTION BASIN	=	12.88	Ac				
PAVING AREA (WALKS, DRIVE, ROAD)	=	3.50	Ac	@	0.80	=	2.80
BUILDING AREA	=	3.05	Ac	@	0.90	=	2.74
LAWN AREA	=	6.33	Ac	@	0.20	=	1.27
TOTAL AREA	=	12.88	Ac	@			6.81
Cavg = A * C / TOTAL ACRES =					**0.529**		



OFF-SITE STORM SEWER CALCULATIONS

WEST VALLEY
WHITE LAKE TOWNSHIP
Cedar Island Lake Road STORM SEWER DESIGN

SEIBER, KEAST & ASSOC., INC.
5/15/2020 (Revised 1-29-2021)(revised 10-10-2022),(3/28/2023
JOB NO. 17-031

10 year design - I = 175 /T+25 n = 0.013

MH-MH	A(s) acres	C	A(s)xC unit	A(s)xC cumul.	T min	I in/hr	Q cfs	Dia in	Hyd.Gr. %	Vel. ft/sec	Length ft	Tr Time min	Inv. upst.	Inv. dnst.	Gmd. upst.	HGL upst.	Pipe slope-%	RIM - HGL	Rim - inv	T/Pipe - RIM	T/Pipe - RIM
OMH-F					56.33	2.15	18.55	21	1.37	7.71	22	0.05	942.77	942.64	950.10	945.55	0.60	4.55	7.33	5.58	3.11
F-E	0.17	0.75	0.13	8.75	56.38	2.15	18.81	21	1.41	7.82	84	0.18	942.64	942.12	948.60	947.81	0.62	0.79	5.96	4.21	4.23
E-D					56.56	2.15	18.77	21	1.40	7.80	98	0.21	942.12	941.71	948.10	946.62	0.42	1.48	5.98	4.23	4.04
D-C					56.77	2.14	18.72	21	1.40	7.78	132	0.28	941.71	940.39	947.50	945.25	1.00	2.25	5.79	4.04	4.56
C-B	1.38	0.35	0.48	9.23	57.05	2.13	19.69	21	1.54	8.18	105	0.21	939.46	938.09	946.70	943.41	1.30	3.29	7.24	5.49	3.36
B-A	0.18	0.35	0.06	9.29	57.26	2.13	19.77	21	1.56	8.22	145	0.29	938.09	936.21	943.20	941.79	1.29	1.41	5.11	3.36	1.94
A-ES	0.46	0.35	0.16	9.45	57.56	2.12	20.04	21	1.60	8.33	133	0.27	936.21	936.00	939.90	939.53	0.16	0.37	3.69	1.94	(1.75)
												Downstream Data -			936.00	937.40					

Intial Tc = From Detention Basin Calculations = 56.33 Min.

Flow from Over Flow Manhole = 18.55 cfs
(see detention basin calculations)

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
2.	REV. SAN AND STORM PER OWNER	04-10-20
3.	REV SAN, ST. & PAV. PER OWNER	5-18-20
4.	REVISE PER TWP.	02-18-21
5.	REVISE PER TWP.	03-17-21
7.	REV PER OWNER, RCOC AND OCWRC	11-21-22
8.	REVISED WATERMAIN FOR OWNER	04-05-23
9.	REVISED PER TOWNSHIP	04-25-23
10.	REVISE PER TWP.	7-27-23
11.	REVISED PER TWP.	09-21-23
12.	REVISED PER EGLE	01-31-24
13.	REVISE PER TWP	02-13-24

14. REV. PER TWP. 06-03-24

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

DATE: 08-23-19 DESIGNED BY: G.N. JOB NUMBER: 17-031
CHECKED BY: J.E. DRAWING FILE:17031-DD.dwg

DRAINAGE DISTRIBUTION PLAN AND STORM SEWER CALCULATIONS

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7060
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 25

OVERFLOW SPILLWAY TO UNION LAKE ROAD

100–YEAR STORMWATER DETENTION BASIN

10– YEAR OVERFLOW MANHOLE. PIPED DISCHARGE OF 11.5 CFS TO THE "WEST VALLEY" STORM WATER SYSTEM

PROPOSED COMFORT CARE

PROPOSED "LAKE POINTE"

COMFORT CARE 100 YEAR STORM WATER RETENTION BASIN

PROPOSED "WEST VALLEY"

OVERFLOW SPILLWAY TO "WEST VALLEY"

OVERFLOW ROUTE FROM "COMFORT CARE"

THE SIZE OF THE " WEST VALLEY" STORM SEWER PIPES WERE INCREASED TO ACCOMMODATE THE 10– YEAR OVERFLOW FROM THE " LAKE POINTE" DETENTION BASIN

OVERFLOW MANHOLE TO PIPED OUTLET 18.55 CFS

OUTLET TO WETLAND

DETENTION BASIN OVERFLOW SPILLWAY

100–YEAR STORM WATER DETENTION BASIN

100– YEAR OVERLAND OVERFLOW"

"COOLEY BEACH SUB–DIVISION" L. 24 PLATS, P. 2

NORTH 1/4 POST SECTION 36 T.3N., R.8E. OAKLAND COUNTY, MICHIGAN

SCALE

80 0 40 80 160 320

(IN FEET)

Scale: 1 inch = 80 ft.

LEGEND

EXISTING	PROPOSED
	PAVEMENT (ASPHALT)
	SIDE WALK (CONCRETE)
	CONCRETE CURB AND GUTTER
	STORM SEWER
	SANITARY SEWER
	WATER MAIN
	MANHOLE
	CATCH BASIN
	CURB INLET W/SILT SAC
	END SECTION
	GATE VALVE
	HYDRANT
1000	1000 CONTOURS
1000.0	1000.00 T/C SPOT ELEVATION
	LIGHT POLE
	TRANSFORMER
	SURFACE DRAINAGE
	OVERFLOW ROUTE
	TREE FENCE
	SILT FENCE/LIMITS OF DISTURBANCE
	PROPOSED DRIVEWAY LOCATION
	LIMIT OF DISTURBANCE

WEST VALLEY

MULTI–FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST

WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCDC PERMITS DEPARTMENT	10–22–19
2.	REV. SAN AND STORM PER OWNER	04–10–20
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4.	REVISE PER TWP.	02–18–21
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7.	REV PER OWNER, RCDC AND OCWRC	11–21–22
8.	REVISED WATERMAIN FOR OWNER	04–05–23
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12.	REVISED PER EGLE	01–31–24
13.	REVISE PER TWP	02–13–24

14. REV. PER TWP. 06–03–24

DATE: 08–23–19

DESIGNED BY: G.N. JOB NUMBER: 17–031

CHECKED BY: J.E. DRAWING FILE:17031–WV AND LP.dwg

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

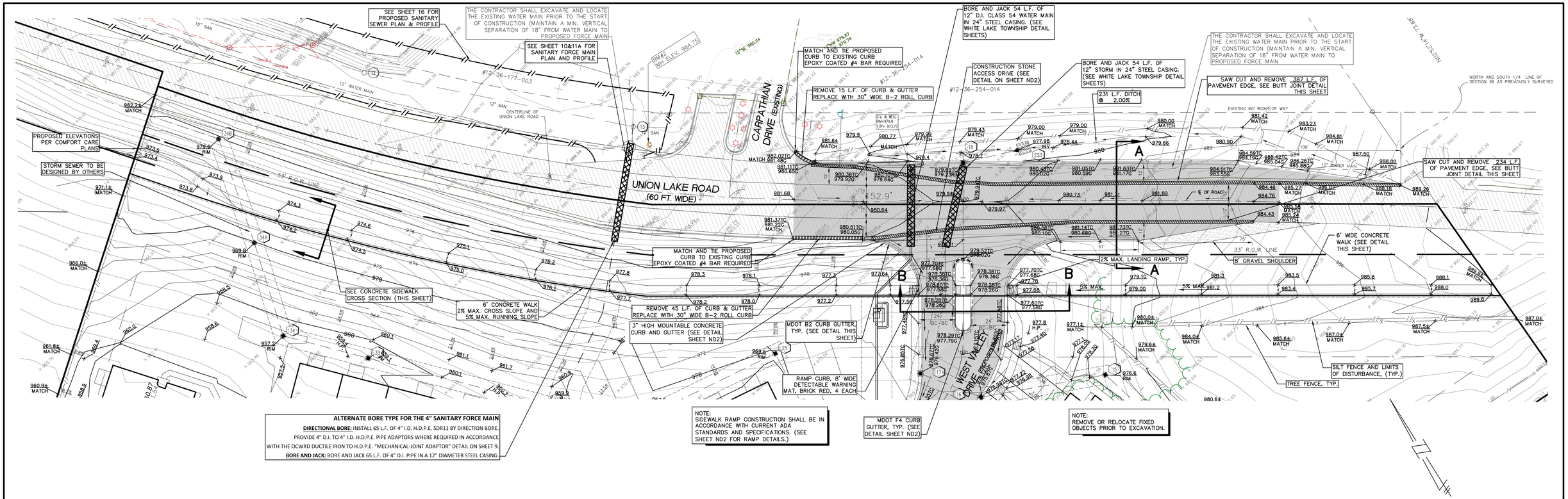
OVERALL STORM WATER MANAGEMENT SYSTEM "WEST VALLEY & LAKE POINTE"

SEIBER KEAST LEHNER ENGINEERING | SURVEYING

CLINTON TOWNSHIP OFFICE
17001 NINESTEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7060

FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 25A



SCALE

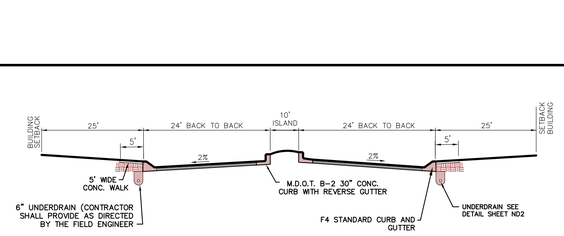
30 0 15 30 60 120

(IN FEET)

Scale: 1 inch = 30 ft.

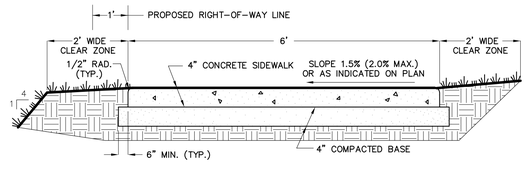
RCOC NOTES:

1. A permit must be obtained from R.C.O.C. Permits Division prior to any work within the Union Lake Road R.O.W.
2. Maintain access to existing residents at all times during construction.
3. Restore all disturbed area, drives, lawns, ect. to a condition at least equal to existing.
4. Overhead lines to be 18 feet above proposed top of pavement.
5. Contractor shall verify all existing pavement grades along Union Lake Road to ensure 2.0% slope across all widenings and shoulders.
6. All bore pit are to be situated at least 10 feet from edge of pavement.
7. Call inspector or supervisor before beginning any work in the R.O.W.
8. Maintain two-way traffic at all times.
9. "Proper Signing" is required before any work in R.O.W. is Started.
10. Lane closures restricted to 9AM to 3PM Monday through Friday.
11. Flag person is required for temporary one lane traffic.
12. Trench backfill within the influence of the roadbed shall be MDOT Class II sand compacted to 95% maximum unit density.
13. Suitable base to be determined by R.C.O.C. inspector in the field.
14. Provide full depth sawcut and/or mill a butt with location/width as directed by R.C.O.C. inspector.
15. Sidewalk ramps must meet ADA specifications.
16. Additional ditching may be necessary to obtain positive drainage as directed by the R.C.O.C. during construction.
17. Resurface all disturbed areas within Union Lake Road R.O.W. with minimum of 4" topsoil, seed and mulch.
18. All erosion control devices must be removed and vegetation must be acceptably established prior to final release of the construction deposit by R.C.O.C.
19. Maintain a minimum 3 foot flat area back of curb and a maximum 1 on 3 slope to existing
20. Gravel shoulders shall consist of 8 inches of M.D.O.T. 23A compacted aggregate
21. A separate permit is required for all underground utilities within the existing R.O.W.
22. Provide and maintain positive drainage
23. Asphalt pavement to be 7" HMA over 10" aggregate base MDOT 21-AA RCOC modified = 100% crushed bond between courses

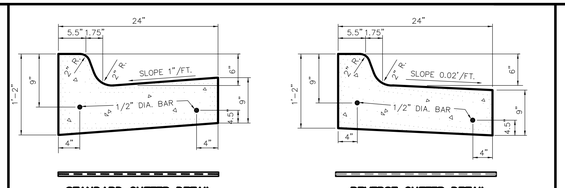


BOULEVARD CROSS SECTION FOR APPROACH
CROSS SECTION B-B AT UNION LAKE ROAD

NO SCALE

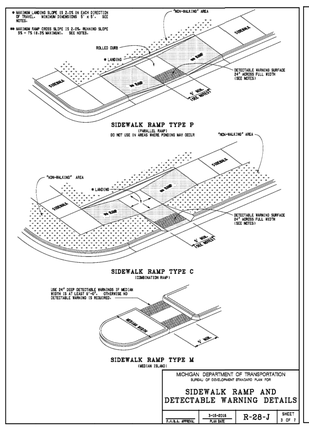


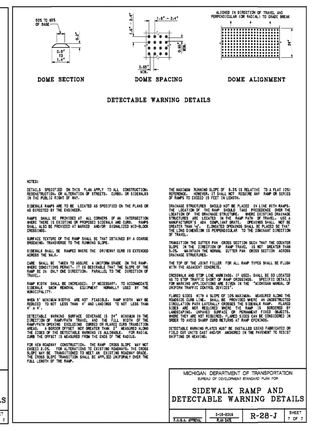
CONCRETE SIDEWALK ALONG UNION LAKE ROAD



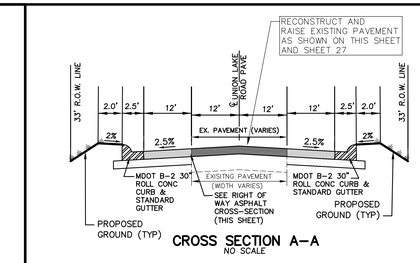
M.D.O.T. F-4 STRAIGHT FACE
CONCRETE CURB AND GUTTER

RAMP DETAILS



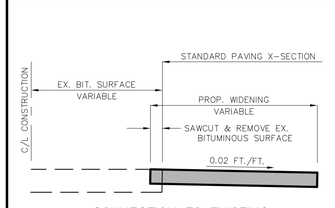


MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS
R-28-J
SHEET 1 OF 1



CROSS SECTION A-A

NO SCALE



CONNECTION TO EXISTING PAVEMENT DETAIL

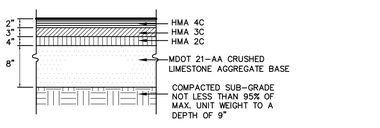
R.C.O.C. NOTES

1. SIDEWALKS AND RAMP CONSTRUCTION SHALL BE ACCORDANCE WITH ADA STANDARDS. (SEE SHEET ND1 FOR RAMP DETAILS)
2. SEE SHEET ND1 & APPROACH PLAN FOR ALL CURB DETAILS.

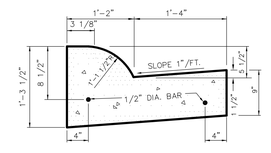
NOTE:
NO MORE THAN 1/4" VERTICAL OBSTACLE SHALL BE ALLOWED AT EACH TRANSITION BETWEEN THE PATHWAY AND THE DRIVE APPROACH

SIGN LEGEND

SYMBOL	DESCRIPTION
	R1-1 30" "STOP" SIGN W/ STREET SIGN
	R1-2 30" "YIELD" SIGN W/ STREET SIGN
	R2-1(25) "25 MPH SPEED LIMIT" SIGN
	12" D3-1 STREET NAME ATOP "STOP" SIGN
	8" D3-1 STREET NAME ATOP "YIELD" SIGN
	R4-7 "KEEP RIGHT" SIGN
	V.A. BARRIER FREE SIGN
	W11-2 CROSS WALK WARNING SIGN
	R8-3 "NO PARKING" SIGN 12"X12"



TYPICAL ASPHALT CROSS-SECTION
WITHIN UNION LAKE ROAD
(R.C.O.C.) RIGHT OF WAY



M.D.O.T. B-2 ROLL CURB WITH GUTTER

LEGEND

EXISTING	PROPOSED
	PAVEMENT (ASPHALT)
	SIDE WALK (CONCRETE)
	CONCRETE CURB AND GUTTER
	STORM SEWER
	SANITARY SEWER
	WATER MAIN
	MANHOLE
	CATCH BASIN
	CURB INLET W/SILT SAC
	END SECTION
	GATE VALVE
	HYDRANT
1000	1000 CONTOURS
1000.0	1000.00 T/C SPOT ELEVATION
S	LIGHT POLE
	TRANSFORMER
	SURFACE DRAINAGE
	OVERFLOW ROUTE
	TREE FENCE
	SILT FENCE/LIMITS OF DISTURBANCE
	PROPOSED DRIVEWAY LOCATION
	LIMIT OF DISTURBANCE

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

NO.	ITEM	DATE
1.	REV. PER RCOC PERMITS DEPARTMENT	10-22-19
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14.	REV. PER PER TWP.	06-03-24

DATE: 08-23-19 | DESIGNED BY: G.N. JOB NUMBER: 17-031 | CHECKED BY: J.E. DRAWING FILE: 17031-AP.dwg

UTILITY WARNING

UNDERGROUND UTILITY LOCATIONS AS SHOWN ON THE PLAN, WERE OBTAINED FROM UTILITY OWNER AND NOT FIELD LOCATED.

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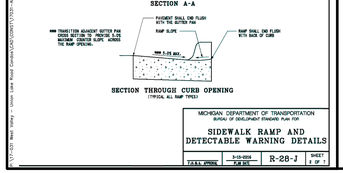
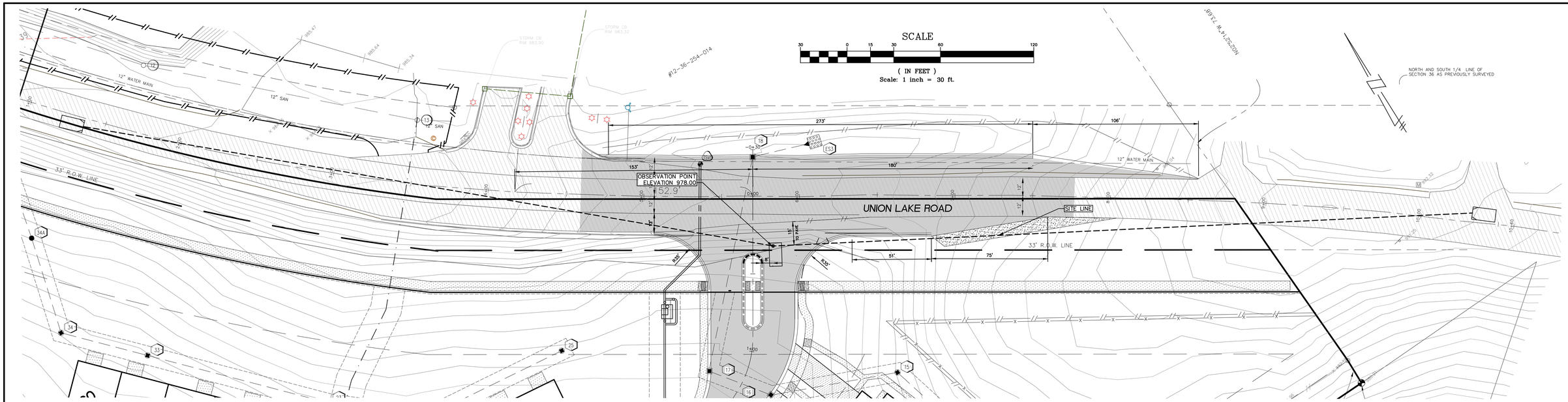
APPROACH PLAN

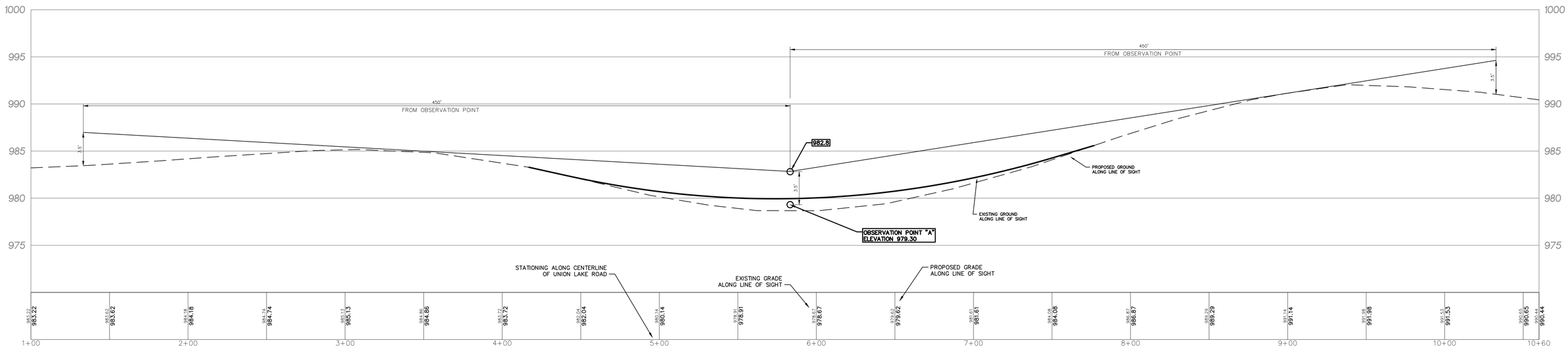
SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.493.7090
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C6
FARMINGTON HILLS, MI 48331
248.308.3331

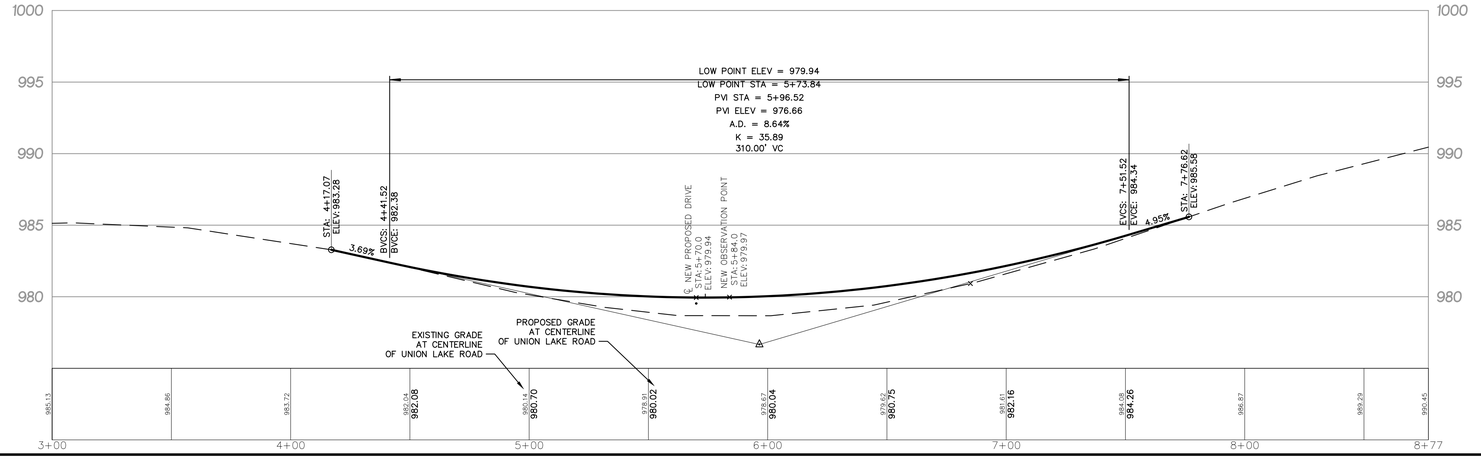
SHEET 26



MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
SIDEWALK RAMP AND DETECTABLE WARNING DETAILS
R-28-J
SHEET 1 OF 1







WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

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DESIGNED BY: G.N. JOB NUMBER: 17-031
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UTILITY WARNING

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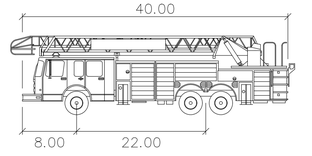
SIGHT DISTANCE PLAN AT UNION LAKE ROAD

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 27

LEGEND

EXISTING	PROPOSED	
		PAVEMENT (ASPHALT)
		SIDE WALK (CONCRETE)
		CONCRETE CURB AND GUTTER
		STORM SEWER
		SANITARY SEWER
		WATER MAIN
		MANHOLE
		CATCH BASIN
		CURB INLET W/SILT SAC
		END SECTION
		GATE VALVE
		HYDRANT
1000	1000	CONTOURS
+ 1000.0	1000.00 T/C	SPOT ELEVATION
		LIGHT POLE
		TRANSFORMER
		SURFACE DRAINAGE
		OVERFLOW ROUTE
X X		TREE FENCE
//		SILT FENCE/LIMITS OF DISTURBANCE
		PROPOSED DRIVEWAY LOCATION
		LIMIT OF DISTURBANCE



40' LONG FIRE TRUCK

	feet
Width	: 8.17
Track	: 8.50
Lock to Lock Time	: 5.0
Steering Angle	: 45.0

WEST VALLEY

MULTI-FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

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THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF AND/OR RELOCATION OF ALL UTILITIES THAT MAY INTERFERE WITH CONSTRUCTION.

DATE: 08-23-19 | DESIGNED BY: G.N. JOB NUMBER: 17-031
CHECKED BY: J.E. DRAWING FILE:17031-AT.dwg

EMERGENCY VEHICLE ROUTE

SEIBER KEAST LEHNER
ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET 28

SOIL EROSION CONTROL NOTES

1. SACK TYPE FILTERS SHALL BE INSTALLED ON ALL CATCH BASINS AND INLETS.
2. DEWATERING OF ANY KIND MUST BE FILTERED THROUGH VEGETATION, STONE OR "FILTER BAG".
3. IT IS THE DEVELOPER'S RESPONSIBILITY TO INSURE THE PROJECT STREETS AND ADJACENT ROADS ARE CLEAN & SWEPT THROUGHOUT THE ENTIRE CONSTRUCTION PERIOD.
4. IT IS THE DEVELOPER'S RESPONSIBILITY TO GRADE AND STABILIZE DISTURBANCES DUE TO INSTALLATION OF PUBLIC UTILITIES (I.E. PHONE, GAS, ELECTRIC, CABLE, ETC.)
5. THE DEVELOPER IS RESPONSIBLE FOR DUST CONTROL THROUGHOUT ALL PERIODS OF CONSTRUCTION. WATERING TANKS WILL BE AVAILABLE AT ALL TIMES TO BE USED ON ANY AREA WHERE DUST BECOMES A PROBLEM.
6. PARKING OF VEHICLES, EQUIPMENT, OR STOCKPILING OF MATERIALS IS STRICTLY PROHIBITED ALONG OR WITHIN THE UNION LAKE ROAD RIGHT OF WAY AREA.
7. ALL CULVERT END SECTIONS MUST CONTAIN GROUTED RIP-RAP IN ACCORDANCE WITH ORDINANCE SPECIFICATIONS.
8. THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY THE DEVELOPER.

S.E.S.C. SEQUENCE OF CONSTRUCTION

1. INSTALL ALL SOIL EROSION AND TREE PROTECTION FENCING AS PER APPROVED PLANS. CLEAR ONLY WHAT IS NECESSARY TO INSTALL FENCING.
2. STRIP AND STOCKPILE TOPSOIL IN A LOCATION APPROVED BY THE OWNER/ENGINEER. PLACEMENT OF ADDITIONAL CONTROL MEASURES MUST BE INSTALLED ON AND AROUND THE STOCKPILE.
3. CONSTRUCT DETENTION BASIN ALONG WITH APPLICABLE STORM SEWER (END-SECTIONS, SHORT STORM SEWER LENGTHS, STANDPIPE OUTLET FILTER). GRADE TO FINAL ELEVATIONS, DISTRIBUTE TOPSOIL, SEED AND STAKE STRAW MULCH BLANKETS ON THE SLOPES OF THE BASIN.
4. INSTALL UTILITIES (WATER MAIN, STORM SEWER, SANITARY SEWER) COMPLETE.
5. INSTALL, AS PER APPROVED PLANS, THE CATCH BASIN INLET FILTERS. INSPECT AND MAINTAIN FILTERS AS DIRECTED TO PREVENT CLOGGING AND UNNECESSARY FLOODING. INSTALL GELFLOC BLOCKS WHERE INDICATED AND MAINTAIN.
6. GRADE ROADWAY LIMITS AND INSTALL PAVEMENT COMPLETE.
7. INSTALL ALL PUBLIC UTILITIES (GAS, ELECTRIC, TELEPHONE, CABLE) COMPLETE.
8. STABILIZE TEMPORARILY OR PERMANENTLY ALL DISTURBED AREAS WITHIN FIVE (5) DAYS OF FINAL GRADE.
9. INSPECT AND MAINTAIN ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES WEEKLY AND AFTER EVERY STORM EVENT THROUGHOUT THE CONSTRUCTION OF THE PROJECT. REMOVAL OF CONTROL MEASURES MAY ONLY TAKE PLACE ONCE THE ENTIRE SITE IS FULLY STABILIZED. UPON FULL STABILIZATION IS COMPLETE, REMOVE THE STAND PIPE AND GRAVEL FILTER. THE DEVELOPER IS RESPONSIBLE FOR ALL SOIL EROSION CONTROL MEASURES.
10. VEGETATION MUST BE ACCEPTABLY ESTABLISHED PRIOR TO FINAL RELEASE OF THE CONSTRUCTION DEPOSIT BY THE ROAD COMMISSION FOR UNION LAKE ROAD.

SOIL EROSION CONTROL VIOLATIONS/CITATIONS

1. ROUTINE INSPECTIONS WILL BE PERFORMED BY THE OAKLAND COUNTY WATER RESOURCE COMMISSION (O.C.W.R.C.) OR ITS AGENT ONCE A WEEK.
2. UPON COMPLETION OF INSPECTION, IF THE SITE IS FOUND NOT TO BE IN COMPLIANCE WITH O.C.W.R.C.'S SOIL EROSION AND SEDIMENTATION CONTROL ORDINANCE, THEN THE PERMIT HOLDER/SIGNER WILL BE ISSUED, BY HAND, MAIL OR EMAIL. A "NOTICE OF EROSION CONTROL DEFICIENCY" LETTER, THAT WILL INCLUDE ALL CURRENT AND PERTINENT NON-COMPLIANCE ITEMS. THE SITE AND/OR DEVELOPMENT WILL HAVE A PRE-DETERMINED AMOUNT OF TIME, FROM THE DATE OF THE "NOTICE" TO RECTIFY THESE ITEMS.
3. IF ALL OF THE ITEMS HAVE NOT BEEN ADDRESSED AFTER THE ELAPSED TIME SPECIFIED, THE PERMIT HOLDER/SIGNER WILL RECEIVE A "NON-COMPLIANCE" LETTER, WHICH WILL INCLUDE A "NOTICE TO SHOW CAUSE".
4. UPON RECEIPT OF THE "NON-COMPLIANCE" LETTER AND THE "NOTICE TO SHOW CAUSE", THE PERMIT HOLDER/SIGNER WILL ATTEND A SHOW CAUSE HEARING AS WELL AS PAY A RE-INSPECTION FEE IN THE AMOUNT OF $250.00 TO THE O.C.W.R.C. FOR ADDITIONAL INSPECTIONS, HEARINGS AND REPORT FOLLOW UP. THE BEFORE MENTIONED ACTIVITIES MUST TAKE PLACE WITHIN 24 HOURS UPON RECEIPT OF THE LETTER. AFTER THE HEARING, THE PROJECT, DEVELOPMENT MAY BE ISSUED A "STOP WORK" ORDER.
5. IF A CITATION IS ISSUED TO THE PERMIT HOLDER/SIGNER AFTER THE SHOW CAUSE HEARING, AN ADDITIONAL $400.00 WILL BE PAID TO THEN O.C.W.R.C., FOR FOLLOW-UP INSPECTIONS, MEETINGS AND OTHER EXPENSES INCURRED.

DETENTION BASIN MAINTENANCE SCHEDULE :

THE PROPERTY OWNER IS RESPONSIBLE FOR THE MAINTENANCE OF THE SEDIMENT STRUCTURES. MAINTENANCE SHOULD BE PERFORMED FOLLOWING ANY STORM AND SHOULD INCLUDE:

1. CHECKING THE DEPTH OF SEDIMENT DEPOSIT TO ENSURE THE CAPACITY OF THE SEDIMENT STRUCTURES IS ADEQUATE FOR STORM WATER AND SEDIMENT DEPOSITION, AND FOR THE REMOVING OF SEDIMENT.
2. CHECKING THE BASIN FOR PIPING, SEEPAGE, OR OTHER MECHANICAL DAMAGE.
3. CHECKING FOR THE PRESENCE OF ANY SOIL CAKING, WHICH WOULD PREVENT PROPER DRAINAGE FROM THE BASIN.
4. ANY PROBLEM DISCOVERED DURING THE MAINTENANCE CHECKS SHOULD BE ADDRESSED IMMEDIATELY.
5. SEDIMENT REMOVED DURING CLEANING SHOULD BE PLACED AT AN UPLAND AREA AND STABILIZED SO THAT IT DOES NOT RE-ENTER THE DRAINAGE COURSE.

GROUND WATER NOTES

1. IF THE STATIC GROUNDWATER LEVEL IS HIGHER THAN THE ELEVATION AT WHICH PROPOSED CONSTRUCTION WORK WILL TAKE PLACE, WHETHER DETERMINED BY INITIAL SOIL BORINGS OR DURING CONSTRUCTION, SO THAT IT WILL BE NECESSARY TO DEWATER AN AREA TO CONTINUE CONSTRUCTION, THEN THE WHITE LAKE TOWNSHIP WILL REQUIRE A WRITTEN DEWATERING PROCEDURE PROVIDED BY THE APPLICANT'S ENGINEER, PRIOR TO COMMENCEMENT OF THE DEWATERING OPERATION.
2. IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR MUST CONTACT WHITE LAKE DPS IN WRITING SHOWING NEED TO DEWATER PRIOR TO ANY FURTHER CONSTRUCTION.
3. IF PROCEDURES ARE NOT SUBMITTED OR, ONCE APPROVED, ARE NOT ADHERED TO, THEN WHITE LAKE TOWNSHIP MAY TAKE ACTION TO SUSPEND DEWATERING ACTIVITIES AT THE PROJECT TO REQUIRE THE ADHERENCE TO PROCEDURES.

5/31/2024 3:10 PM

INSPECTION & MAINTENANCE SCHEDULE FOR SOIL EROSION CONTROL

GRADE STABILIZATION STRUCTURES SUCH AS: DROP CONTROL STRUCTURES; SIDE DRAINS (ENCLOSED); DROP INLET SPILLWAYS; DROP PIPES; STRAIGHT PIPES; TOEWALLS; DROP BOXES; CHUTES OR FLUMES (SOD, ROCK CONCRETE); EARTH EMBANKMENT STRUCTURES; DOWNDRAINS; SPILLWAYS SHALL BE MAINTAINED AS FOLLOWS:

BECAUSE GRADE STABILIZATION STRUCTURES ARE SUBJECT TO HIGH FLOW CONDITIONS, PERIODIC INSPECTIONS SHOULD BE PERFORMED TO ENSURE THAT EROSION IN NOT OCCURRING, AND THAT VEGETATION IS ADEQUATELY ESTABLISHED. THESE STRUCTURES SHOULD ALSO BE INSPECTED AFTER STORM EVENTS WHICH EXCEED THE DESIGN STORM.

THE DETENTION BASIN SHOULD BE INVESTIGATED TO ENSURE THAT THE CONCENTRATED FLOWS ARE NOT CAUSING EROSION INTO THE BOTTOM OF THE BASIN AND BLOCKING INFILTRATION. CHECK THE EMERGENCY BYPASS/OVERFLOW FOR EROSION. CHECK THE STRUCTURES ITSELF FOR CRACKED CONCRETE, UNEVEN OR EXCESSIVE SETTLING, PIPING AND PROPER DRAIN FUNCTIONING. REPAIR OR REPLACE FAILING STRUCTURES IMMEDIATELY. ADDRESS VEGETATION AND EROSION PROBLEMS AS SOON AS WEATHER PERMITS. OPEN STRUCTURES SHOULD BE SIGNED OR MARKED TO ALERT PEOPLE IN THE VICINITY ABOUT POTENTIAL DANGERS.

RIP-RAP

INSPECTIONS SHOULD BE MADE OF ALL RIP-RAPPED SITES IMMEDIATELY AFTER THE FIRST RAINFALL FOLLOWING INSTALLATION. THIS IS PARTICULARLY IMPORTANT IN AREAS WHERE RIP-RAP THAT IS DISPLACED DURING THE STORM WOULD IMPACT CULVERTS. THEREFORE, RIP-RAP SITES SHOULD BE CHECKED FOLLOWING STORMS, ESPECIALLY THOSE WHICH ARE NEAR OR EXCEED STORM FREQUENCY USED IN THE DESIGN. DISPLACED RIP-RAP SHOULD BE REMOVED FROM ITS DOWNSTREAM LOCATION AND NEW RIP-RAP PLACE ACCORDING TO THE ENGINEERED SPECIFICATIONS.

STORMWATER CONVEYANCE CHANNEL

AT MINIMUM, CHECK ALL CONSTRUCTED CHANNELS AFTER EACH STORM WHICH MEETS OR EXCEEDS THE DESIGN STORM. ON RIP-RAP LINED WATERWAYS, CHECK FOR SCOURING BELOW THE RIP-RAP LAYER, AND BE SURE THE STONES HAVE NOT BEEN DISPLACED BY THE FLOW. PARTICULAR ATTENTION SHOULD BE PAID TO THE OUTLET OF THE CHANNEL. IF EROSION IS OCCURRING, APPROPRIATE ENERGY DISSIPATION MEASURES SHOULD BE TAKEN. SEDIMENT SHOULD BE REMOVED FROM RIP-RAP LINED CHANNELS IF IT REDUCES THE CAPACITY OF THE CHANNEL.

SPOIL PILES

WHEN VEGETATION STABILIZATION IS PROMPTLY AND EFFECTIVELY APPLIED, VERY LITTLE MAINTENANCE IS REQUIRED. THE GUIDELINES BELOW SHOULD BE FOLLOWED ON ALL SITES: (1) PERIODIC INSPECTIONS SHOULD BE DONE TO ENSURE EXCESSIVE EROSION HASN'T OCCURRED. IF RUN OFF OR WIND EROSION HAS OCCURRED, REDUCE THE SIDE OF SLOPES OF THE SPOIL PILE, OR STABILIZE THE SPOIL PILE WITH PIECES OF SOD LAID PERPENDICULAR TO THE SLOPE, AND STAKED. (2) WHEN FILTER FENCING IS USED AROUND A SPOIL PILE, PERIODIC CHECKS SHOULD BE MADE TO ENSURE THAT PIPING HAS NOT OCCURRED UNDER FENCING, AND TO ENSURE THE FENCE HAS NOT COLLAPSED DUE TO SOIL SLIPPING OR ACCESS BY CONSTRUCTION EQUIPMENT. REPAIR ANY DAMAGED FENCING IMMEDIATELY. (3) BERMS AT THE BASE OF THE SPOIL PILE WHICH BECOME DAMAGED SHOULD BE REPLACED.

CATCH BASIN FILTERS

EFFECTIVE FILTERS WILL COLLECT SEDIMENT, PARTICULARLY WHEN THE SOIL IS SANDY. THESE FILTERS MUST BE CLEANED PERIODICALLY, SO THEY DON'T BECOME CLOGGED AND CAUSE FLOODING CONDITIONS, PIPING, OR OVERTOPPING OF THE CONTROL STRUCTURES. MAINTENANCE OF THESE ITEMS REQUIRES INSPECTION WEEKLY OR AFTER EACH RAIN EVENT. ALSO, THESE ITEMS ARE REUSABLE IF MAINTAINED CORRECTLY. THEY CAN BE REMOVED, EMPTIED, CLEANED AND REPLACED WITHOUT PURCHASING NEW ONES.

BUFFER/FILTER STRIPS
(25' ENVIRONMENTAL SETBACKS)

PERIODIC INSPECTIONS SHOULD BE DONE TO ENSURE THAT CONCENTRATED FLOWS HAVE NOT DEVELOPED, AND TO MAKE SURE THE VEGETATIVE COVER IS MAINTAINING ITS EFFECTIVENESS. IF THE INTEGRITY OF THE BUFFER/FILTER STRIP IS JEOPARDIZED BY UPLAND EROSION, OR IF CONCENTRATED FLOWS ARE CREATING RILLS OR GULLIES UP-SLOPE OF THE STRIP, ADDITIONAL BMP'S MAY NEED TO BE INSTALLED. IF THE BUFFER STRIP IS BEING JEOPARDIZED BY STREAM BANK EROSION, THEN THE CAUSE OF THE BANK EROSION NEEDS TO BE INVESTIGATED AND ACTIONS TAKEN TO ADDRESS THE CAUSES. DAMAGED STRIPS SHOULD BE REPAIRED AS SOON AS POSSIBLE. STRIPS DAMAGED DUE TO CONSTRUCTION UP-SLOPE OF THE BUFFER/FILTER SHOULD BE REPLANTED, AS NECESSARY, AFTER THE CAUSE OF THE DAMAGE IS ASSESSED AND ANY OTHER BMP'S ARE NEEDED ARE IMPLEMENTED.

SILT FENCE

SILT FENCES SHOULD BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND SEVERAL TIMES DURING PROLONGED RAINFALLS. 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 AND DISPOSED OF IN A STABLE UPLAND SITE. THE SOIL CAN BE ADDED TO THE SPOIL PILE. IF THE FABRIC IS BEING UNDERCUT (i.e. IF THE WATER IS SEEPING UNDER THE FENCE), THE FENCE SHOULD BE REMOVED AND REINSTALLED FOLLOWING THE GIVEN PROCEDURES. FABRIC WHICH DECOMPOSES OR OTHERWISE BECOMES INEFFECTIVE SHOULD BE REMOVED AND REPLACED WITH NEW FILTER FABRIC IMMEDIATELY. FILTER FENCES SHOULD BE REMOVED ONCE VEGETATION IS WELL ESTABLISHED AND THE UP-SLOPE AREA IS FULLY STABILIZED OR UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

SEEDING, SODDING & MULCHING

SEEDED, SODDED OR MULCHED AREAS SHOULD BE CHECKED FOLLOWING EACH RAIN TO ENSURE THE MATERIAL IS STAYING IN PLACE. ADDITIONAL TACKING MATERIALS OR NETTING MAY BE NEEDED TO BE APPLIED TO HOLD THE AFOREMENTIONED MATERIALS IN PLACE. MAINTENANCE PROCEDURES SHOULD ALSO BE FOLLOWED FOR THE BMP'S WHICH WERE IMPLEMENTED TO KEEP ERODED SOIL OR CONCENTRATED RUNOFF AWAY FROM THESE TARGET AREAS.

ACCESS ROAD (UNION LAKE ROAD)

PROPER MAINTENANCE INCLUDE ADDING ADDITIONAL LAYERS OF STONE WHEN THE ORIGINAL STONE BECOMES COVERED WITH MUD. AFTER EACH STORM EVENT, INSPECT THE ROAD FOR EROSION AND MAKE ANY NECESSARY REPAIRS. IT IS ALSO IMPORTANT TO CHECK AND MAINTAIN ANY BMP'S WHICH ARE USED IN CONJUNCTION WITH THIS BMP, ESPECIALLY THOSE FOR DRAINAGE. ALL SEDIMENT DROPPED OR ERODED ONTO PUBLIC RIGHT-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY SWEEPING.

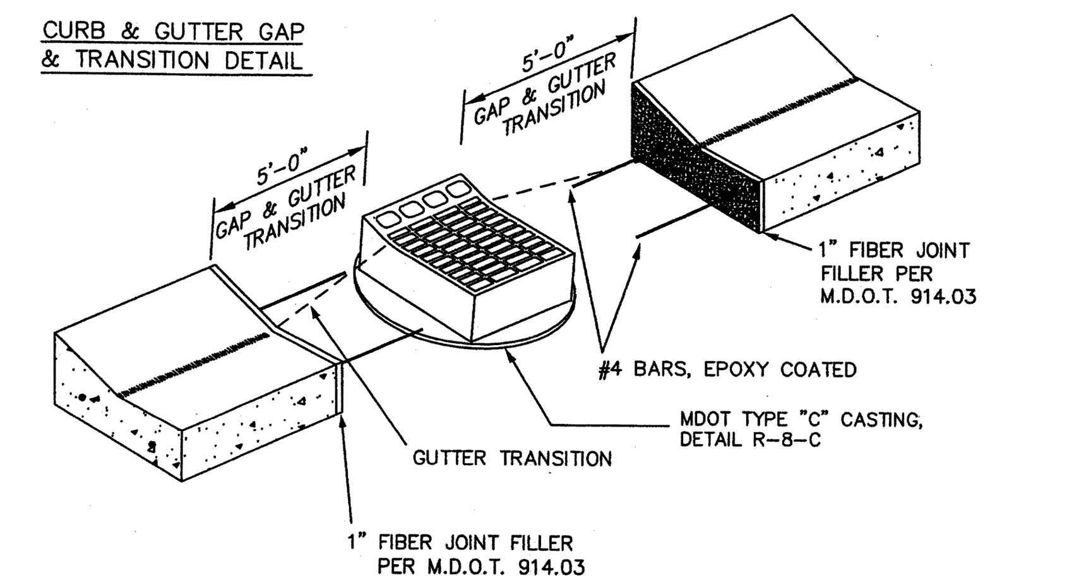
GELFLOC

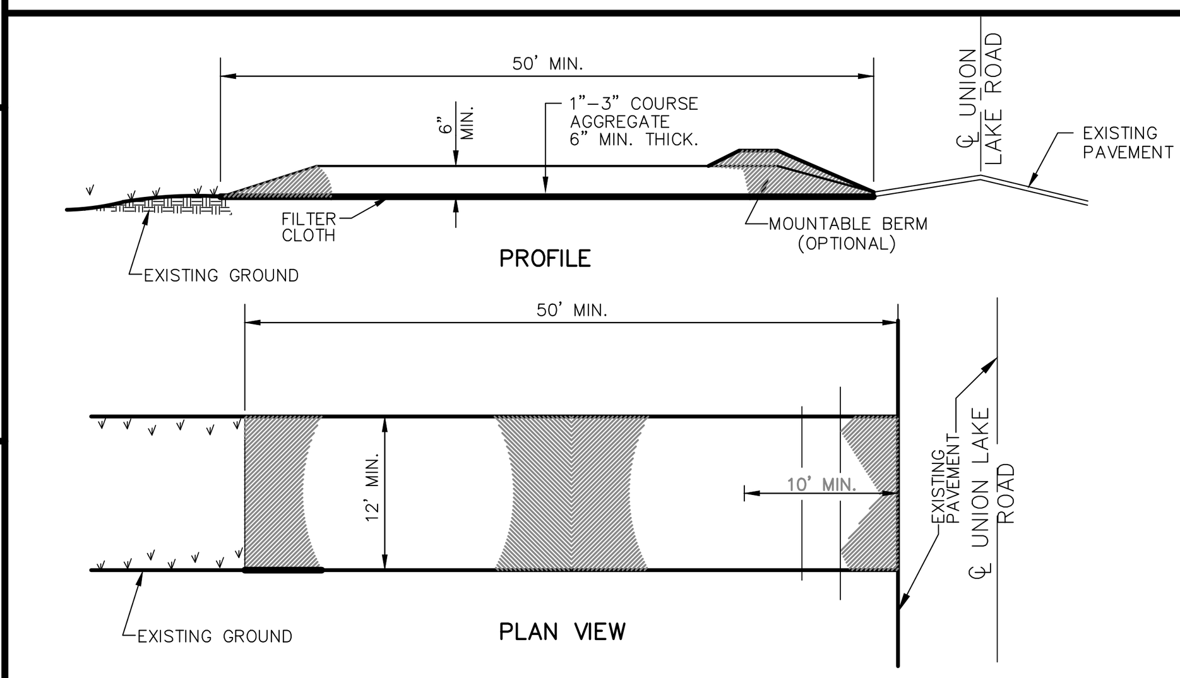
GelFloc is the dry powder version of Chitosan. GelFloc is integrated into treatment systems as a sock. The GelFloc Sock is a geotextile tube filled with GelFloc powder, designed to dose the chitosan by dissolving the powder into water as it flows over the sock.

GelFloc socks will dose approximately 100ppm at 150gpm flow. If a higher dose is required, or the system flow is higher, you can add additional socks in series. Each sock will treat approximately 100,000 gallons of water, and is highly variable based on flow rate, water temp, and turbulence of the water flowing over the sock.

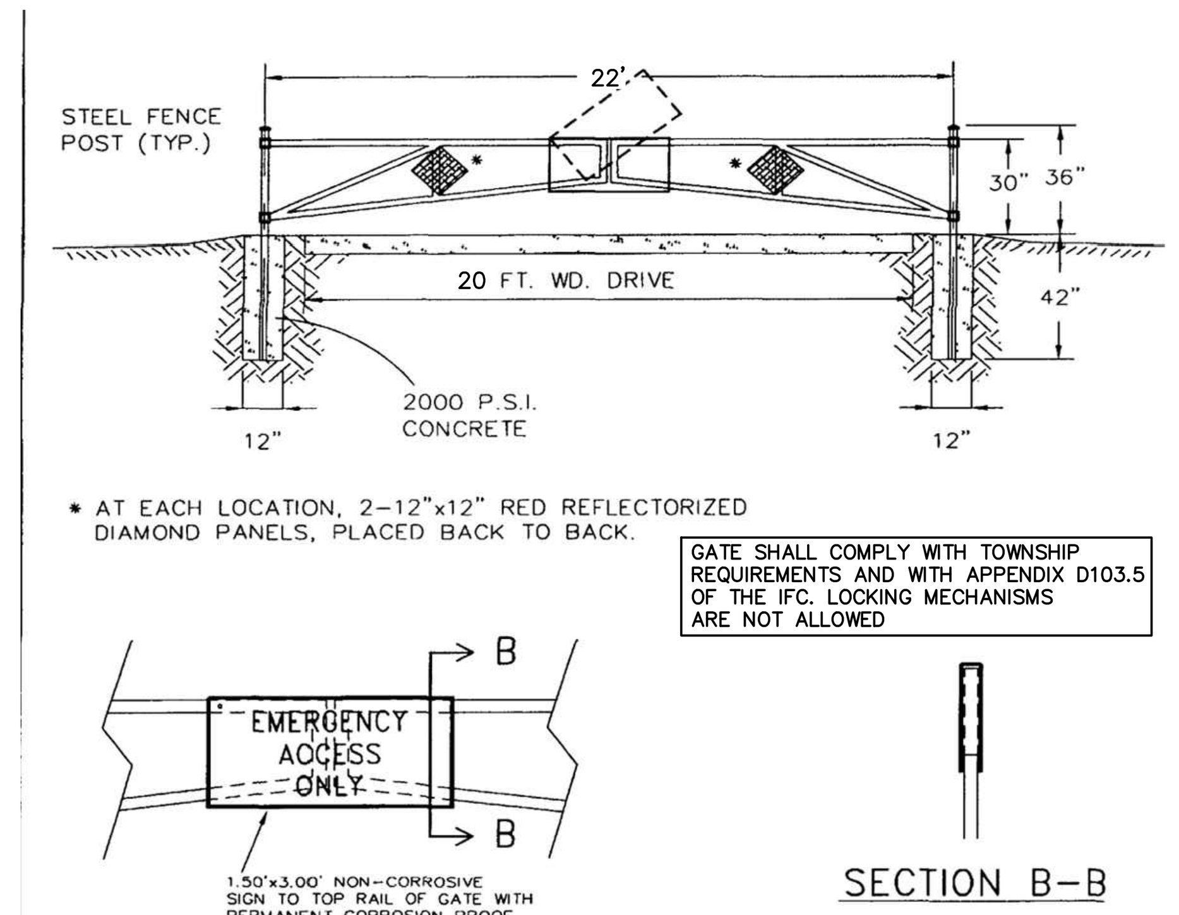
Deployment method:

- Dry sock systems
- Passive and semi-passive treatment systems

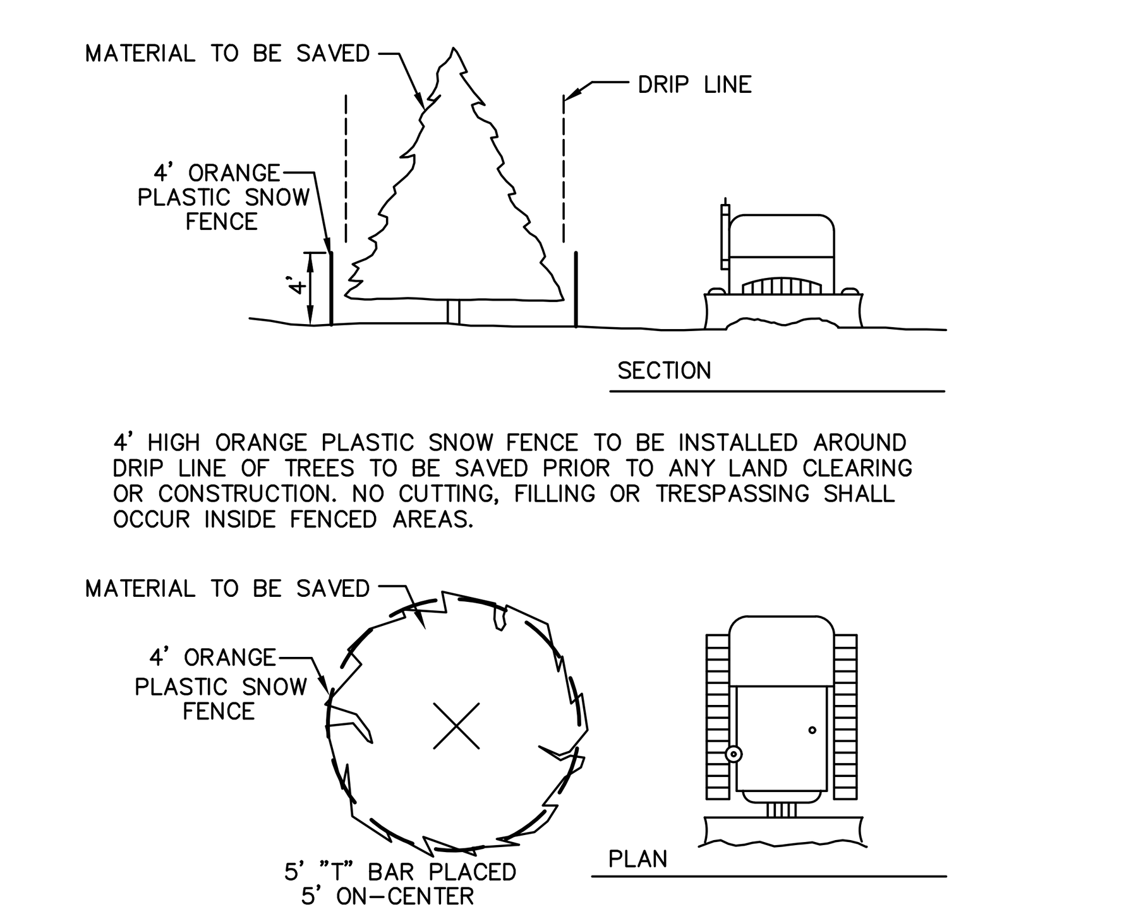




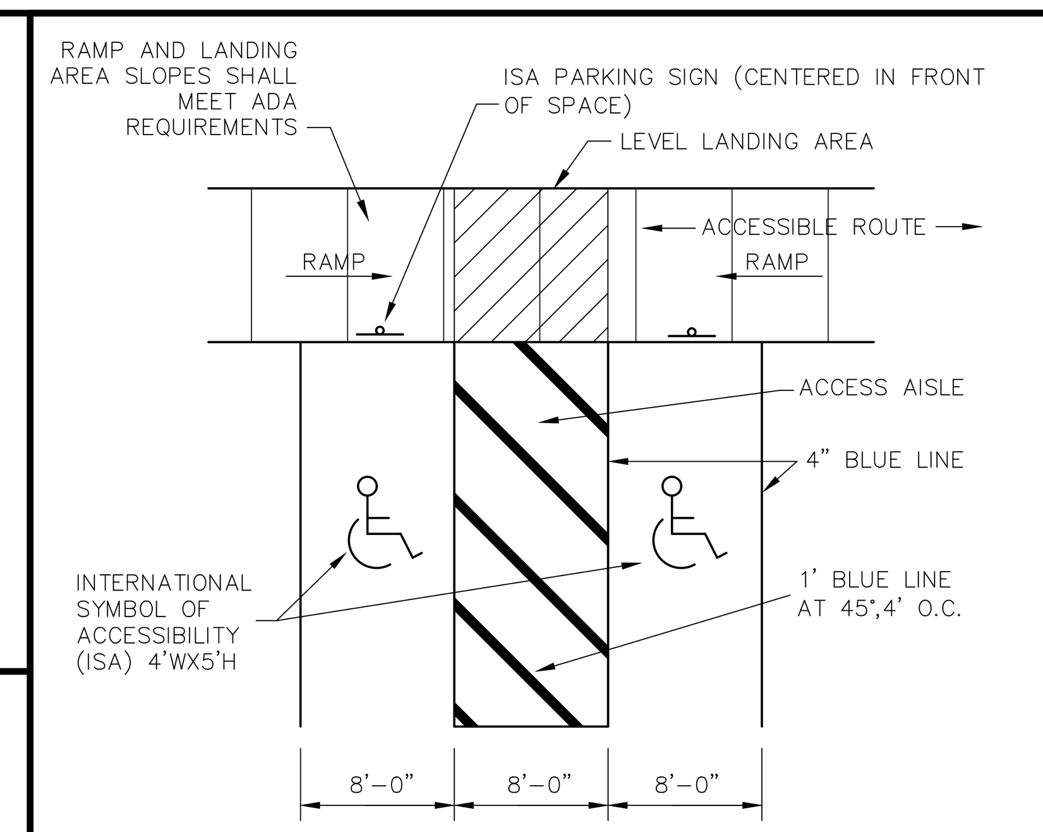
CONSTRUCTION ACCESS ROAD
(NOT TO SCALE)



EMERGENCY ACCESS GATE

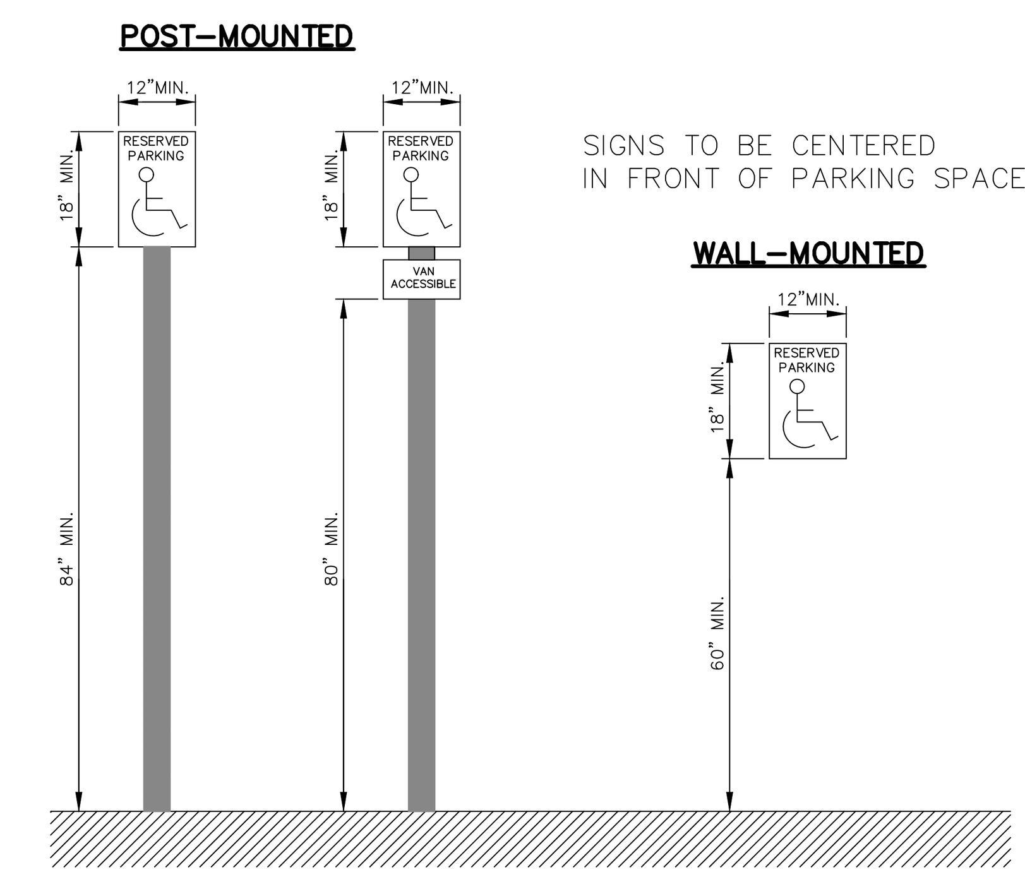


SNOW FENCE TREE PROTECTION DETAIL



BARRIER-FREE PARKING SPACE LAYOUT
VAN ACCESSIBLE

NOTE: BARRIER FREE SPACES SHALL BE LOCATED TO THE NEAREST ACCESSIBLE ENTRANCE ON AN ACCESSIBLE ROUTE. ONE (1) IN EVERY EIGHT (8) ACCESSIBLE SPACES, BUT NO LESS THAN ONE, SHALLBE SERVED BY AN ACCESS AISLE 8'-0" WIDE MINIMUM AND SHALL BE DESIGNATED "VAN ACCESSIBLE"



BARRIER-FREE RESERVED PARKING SIGNS

NOTE: ACCESSIBLE PARKING SPACE SIGNS SHALL HAVE A MINIMUM HEIGHT AND SIZE TO PERMIT THE SPACE TO BE EASILY IDENTIFIED AND ARE ELEVATED SUCH THAT THEY SHALL NOT PRESENT A HAZARD TO PERSONS WALKING NEAR THE SIGN.

HaloKlear **PRODUCT FACTS**

GELFLOC
NATURAL FLOCCULANT

Description
HaloKlear GelFloc products are formulated from natural flocculants. The patented design and concentrated formula delivers superior and consistent performance and is 100% biodegradable through enzymatic activity preventing bioaccumulation. **GelFloc** can be used as a standalone treatment or in conjunction with HaloKlear DBP-2100 as part of the Dual Product System. **GelFloc** products have a proven track record of treating billions of gallons of stormwater.

Industry Applications
- Stormwater management
- Construction
- Remediation

Deployment Method
GelFloc products can be used in several Best Management Practices (BMPs) including passive systems, semi-passive or active treatment system.

Packaging
6' segmented black material with yellow handle. 4 socks per bucket, individually bagged. Lot Number must be legible on each container. Available in 5-gallon pails.

Handling and Storage
All containers must be free of leaks, damage, and gross contamination. Product should be maintained between 40˚F and 90˚F. Keep from freezing.

Product Benefits
- **All-natural**
- **No bioaccumulation**
- **Wide pH range**
- **Not soil specific**
- **Consistent performance**
- **Wide range of applications**

Product Properties

Appearance	A fine, off-white powder
Bulk Density	(freely settled) 0.217 gm/ml
Tap Density	0.252 gm/ml
pH	3.0 – 4.5 (3.5 as measured)
LC50 fish 1	22.8 mg/l Fathead Minnow

Field Handling Recommendations
Refer to HaloKlear DPS Socks BMP Manual for Best Management Practices. For more information, contact your Dober representative.

Safety Data
Before handling this material read the corresponding Material Safety Data Sheet for safety and health data.

For additional information contact Dober at:
(800) 323-4983
info@dober.com
www.dober.com/water_treatment

DOBER

WEST VALLEY
Estimated Quantity Summary

	ITEM	QUANTITY	
	SANITARY SEWER (West Valley)		
1	6" PVC SDR 23.5 BUILDING LEAD	732	L.F.
2	8" PVC TRUSS SANITARY SEWER	1388	L.F.
3	4' DIA. MANHOLE	10	EA.
4	4" FORCE MAIN	847	L.F.
5	AIR RELEASE VALVE	1	EA.
6	5' MANHOLE VAULT	1	EA.
7	6' SAN MANHOLE PUMP STATION	1	EA.
	SANITARY SEWER (Union Lake Road)		
	ITEM	QUANTITY	
1	8" PVC TRUSS SANITARY SEWER	10	L.F.
2	12" PVC TRUSS SANITARY SEWER	857	L.F.
3	4' DIA. MANHOLE	4	EA.
	WATER MAIN		
	ITEM	QUANTITY	
1	8" WATER MAIN D.I. CL 54	1100	L.F.
2	12" WATER MAIN D.I. CL 54	1329	L.F.
3	HYDRANT, VALVE & BOX	8	EA.
4	12" TSV&W	1	EA.
5	8" GATE VALVE AND WELL	4	EA.
6	12" GATE VALVE AND WELL	3	EA.
7	12" PRESSURE REDUCING VALVE AND VAULT	1	EA.
8	2" K-Copper Water Service	788	L.F.
	STORM SEWER		
	ITEM	QUANTITY	
1	8" PVC SDR 35 PIPE	2,039	L.F.
2	12" C-76 CL. 4	2,478	L.F.
3	15" C-76 CL. 4	291	L.F.
4	18" C-76 CL. 4	815	L.F.
5	21" C-76 CL. 4	1081	L.F.
6	24" C-76 CL. 4	465	L.F.
7	30" C-76 CL. 4	288	L.F.
8	2' DIA. INLET	5	EA.
9	4' DIA. CATCH BASIN	46	EA.
10	5' DIA. CATCH BASIN	3	EA.
11	6' DIA. CATCH BASIN	1	EA.
12	4' DIA. MANHOLE	6	EA.
13	5' DIA. MANHOLE	2	EA.
14	6' DIA MANHOLE	1	EA.
15	36" CMP STANDPIPE	1	EA.
16	12" CONC. END SECTION W/ RIP RAP	1	EA.
17	24" CONC. END SECTION W/ RIP RAP	1	EA.
18	30" CONC. END SECTION W/ RIP RAP	1	EA.
19	STORM WATER TREATMENT MANHOLE	1	EA.
	PAVING		
	ITEM	QUANTITY	
1	ON SITE ROAD PAVEMENT (4" HMA ON 8" 21AA)	5,802	S.Y.
2	DRIVEWAY PAVE 8739 CEDAR ISLAND	247	S.Y.
3	3-INCH MOUNTABLE CURB	3,505	L.F.
4	ON SITE ROAD SIDEWALKS	19,788	S.F.
5	UNION LK RD ROW PAVE (9" HMA ON 8" 21AA)	1,926	S.Y.
6	MDOT TYPE B-2 CURB	405	L.F.
7	MDOT TYPE F-4 CURB	364	L.F.
8	UNION LK RD 8' WIDE PATHWAY	6781	S.F.

ESTIMATED QUANTITIES ARE FOR REFERENCE ONLY. CONTRACTOR SHALL DETERMINE THE QUANTITIES OF WORK REQUIRED TO COMPLETE THE PROJECT

UNION LAKE SANITARY SEWER EXTENSION
Quantity Summary

	ITEM	QUANTITY	
1	8" PVC TRUSS SANITARY SEWER	10	L.F.
2	12" PVC TRUSS SANITARY SEWER	857	L.F.
3	4' DIA. MANHOLE	4	EA.
4	FABRIC SILT FENCE	1,808	L.F.
5	CONSTRUCTION ROAD ACCESS	1	EA.

WEST VALLEY
MULTI-FAMILY RESIDENTIAL COMMUNITY
SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
WHITE LAKE TWP., OAKLAND COUNTY, MICHIGAN

REVISIONS

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11.	REVISED PER TWP.	09-21-23
12	REVISED PER EGLE	01-31-24
13	REVSE PER TWP	02-13-24

UTILITY WARNING

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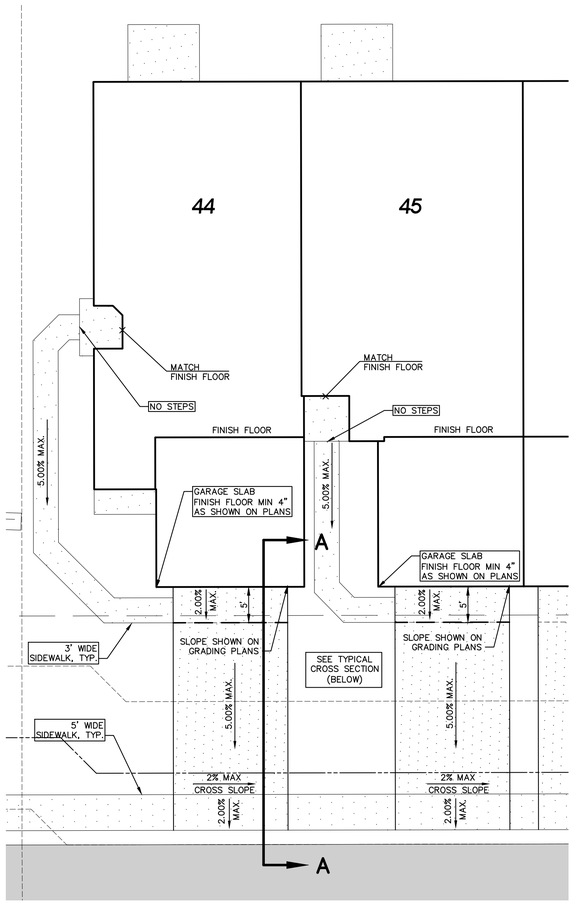
DATE: 08-23-19 | DESIGNED BY: G.N. JOB NUMBER: 17-031 | CHECKED BY: J.E. DRAWING FILE:17031-ND.dwg

NOTES AND DETAILS

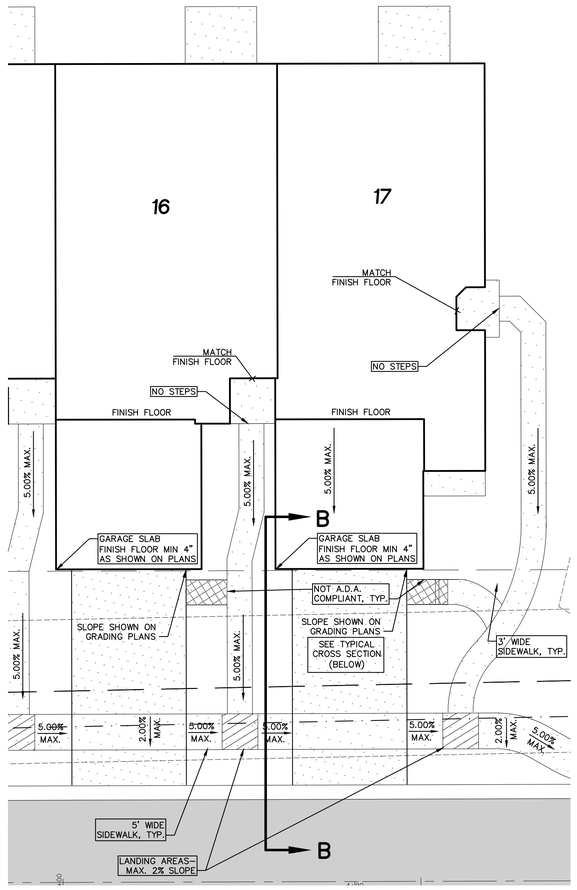
SKL SEIBER KEAST LEHNER ENGINEERING | SURVEYING
(WHITE)
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7050
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331



A.D.A. COMPLIANT SIDEWALK– MAXIMUM 2% CROSS SLOPE AND MAXIMUM 5% RUNNING SLOPE

TYPICAL DRIVE AND SIDEWALK DESIGN FOR UNITS 18–64

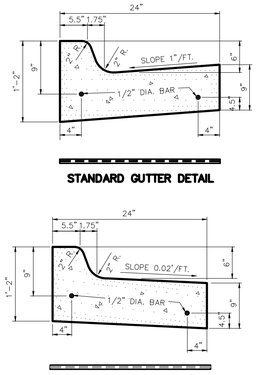
Scale: 1 inch = 10 ft.



A.D.A. COMPLIANT SIDEWALK– MAXIMUM 2% CROSS SLOPE AND MAXIMUM 5% RUNNING SLOPE

TYPICAL DRIVE AND SIDEWALK DESIGN FOR UNITS 1–17 AND 65–69

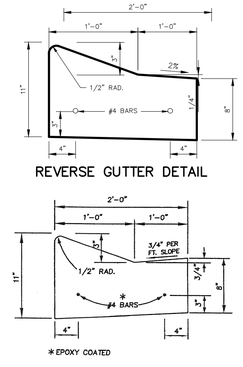
Scale: 1 inch = 10 ft.



STANDARD GUTTER DETAIL

REVERSE GUTTER DETAIL

M.D.O.T. F–4 STRAIGHT FACE CONCRETE CURB AND GUTTER

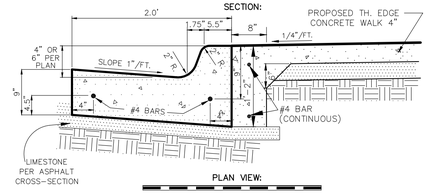


REVERSE GUTTER DETAIL

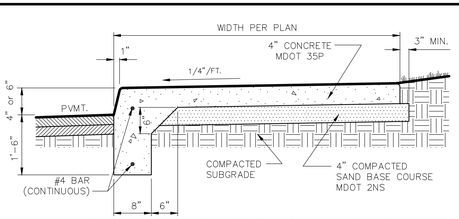
* EPOXY COATED

STANDARD GUTTER DETAIL

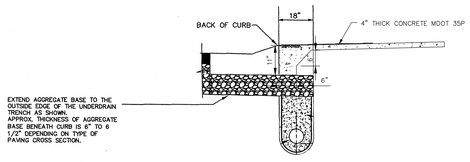
MOUNTABLE CONCRETE CURB & GUTTER DETAIL



CONCRETE CURB WITH STANDARD GUTTER ABUTTING CONCRETE SIDEWALK DETAIL

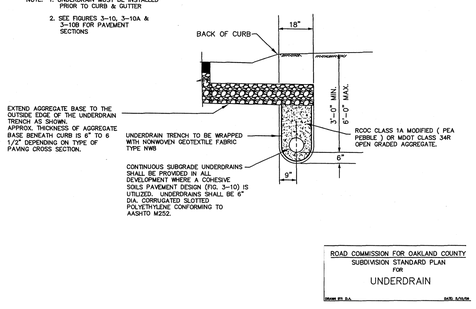


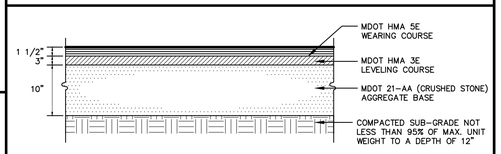
THICKENED EDGE CONCRETE SIDEWALK DETAIL



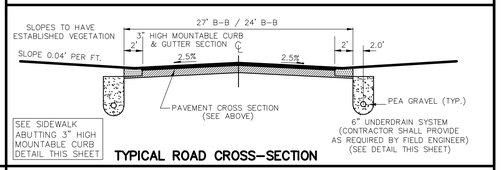
CONCRETE SIDEWALK ABUTTING 3" MOUNTABLE CURB

(SEE UNDER DRAIN DETAIL THIS SHEET)

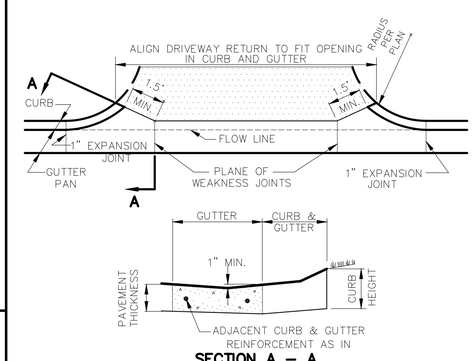




TYPICAL ASPHALT CROSS–SECTION FOR INTERIOR ROADS

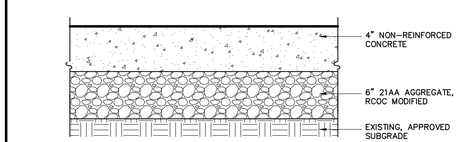


TYPICAL ROAD CROSS–SECTION

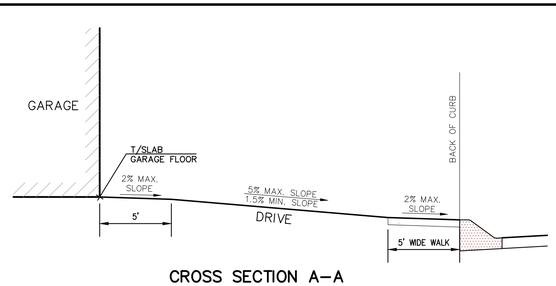


SECTION A – A

CONCRETE DROP CURB DETAIL (MDOT DETAIL "M")

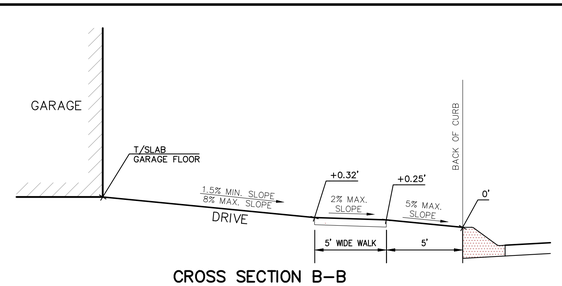


CONCRETE DRIVEWAY PAVEMENT CROSS SECTION



CROSS SECTION A–A
TYPICAL DRIVE CROSS SECTION FOR UNITS 18–64

NOT TO SCALE



CROSS SECTION B–B
TYPICAL DRIVE CROSS SECTION FOR UNITS 1–17 AND 65–69

NOT TO SCALE

WEST VALLEY

MULTI–FAMILY RESIDENTIAL COMMUNITY

SECTION 36, TOWN 3 NORTH, RANGE 8 EAST
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CHECKED BY: J.E. DRAWING FILE:17031–ND.dwg

NOTES AND DETAILS

SEIBER KEAST LEHNER ENGINEERING | SURVEYING
CLINTON TOWNSHIP OFFICE
17001 NINETEEN MILE ROAD, SUITE 3
CLINTON TOWNSHIP, MI 48038
586.412.7080
FARMINGTON HILLS OFFICE
39205 COUNTRY CLUB DRIVE, SUITE C8
FARMINGTON HILLS, MI 48331
248.308.3331

SHEET ND2

OAKLAND COUNTY
WATER RESOURCE COMMISSION

STANDARD LIFT STATION DRAWINGS

SHEET #	DESCRIPTION
	SITE LAYOUT EXAMPLE
4422-23-01	UTILITY POWER AND PUMP WIRING
4422-23-02	120VAC POWER WIRING
4422-23-03	120VAC/24VDC CONTROL WIRING
4422-23-04	24VDC CONTROL POWER
4422-23-05	24VDC CONTROL POWER
4422-23-06	PLC I/O WIRING
4422-23-07	PLC I/O WIRING
4422-23-08	PLC I/O WIRING
4422-23-09	SPARE SHEET
4422-23-10	PLC SUBPLATE LAYOUT
4422-23-11	PLC PANEL LAYOUT

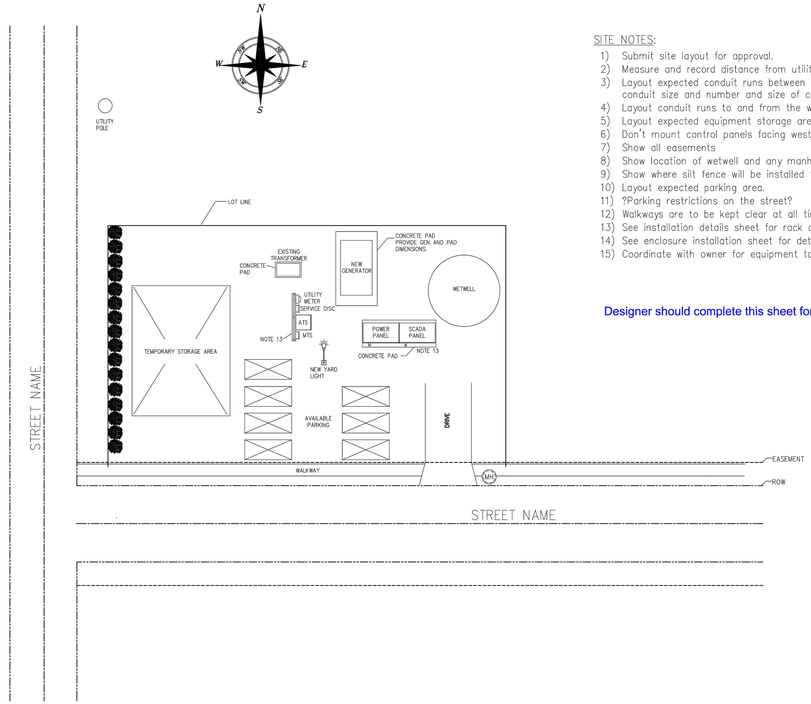
SHEET #	DESCRIPTION
4422-23-12	SCADA PANEL SUBPLATE LAYOUT
4422-23-13	SCADA PANEL ENCLOSURE LAYOUT
4422-23-14	SCADA PANEL BILL OF MATERIAL
4422-23-15	SPARE SHEET
4422-23-16	POWER/PUMP PANEL SUBPLATE LAYOUT
4422-23-17	POWER/PUMP PANEL ENCLOSURE LAYOUT
4422-23-18	POWER/PUMP PANEL BILL OF MATERIAL
4422-23-19	CONTROLS WIRING LEGEND
4422-23-20	ELECTRICAL ONE-LINE EXAMPLE
4422-23-21	EQUIPMENT INSTALLATION DETAILS
4422-23-22	WRC STANDARD DUPLEX PUMP STATION DETAILS

WATER RESOURCES COMMISSIONER

REVISIONS			BY
1/31/23	FOR REVIEW		GB
5/29/23	REVISED		GB

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
POWER/PUMP CONTROL PANEL
DRAWING TITLE:
DRAWING INDEX

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 00 OF 23



SITE NOTES:

1) Submit site layout for approval.
2) Measure and record distance from utility pole to site transformer.
3) Layout expected conduit runs between outdoor equipment. Include conduit size and number and size of conductors.
4) Layout conduit runs to and from the wetwell.
5) Layout expected equipment storage area.
6) Don't mount control panels facing west due to weather issues.
7) Show all easements
8) Show location of wetwell and any manholes.
9) Show where silt fence will be installed to meet local codes.
10) Layout expected parking area.
11) ?Parking restrictions on the street?
12) Walkways are to be kept clear at all times.
13) See installation details sheet for rack details.
14) See enclosure installation sheet for details.
15) Coordinate with owner for equipment to be salvaged and returned.

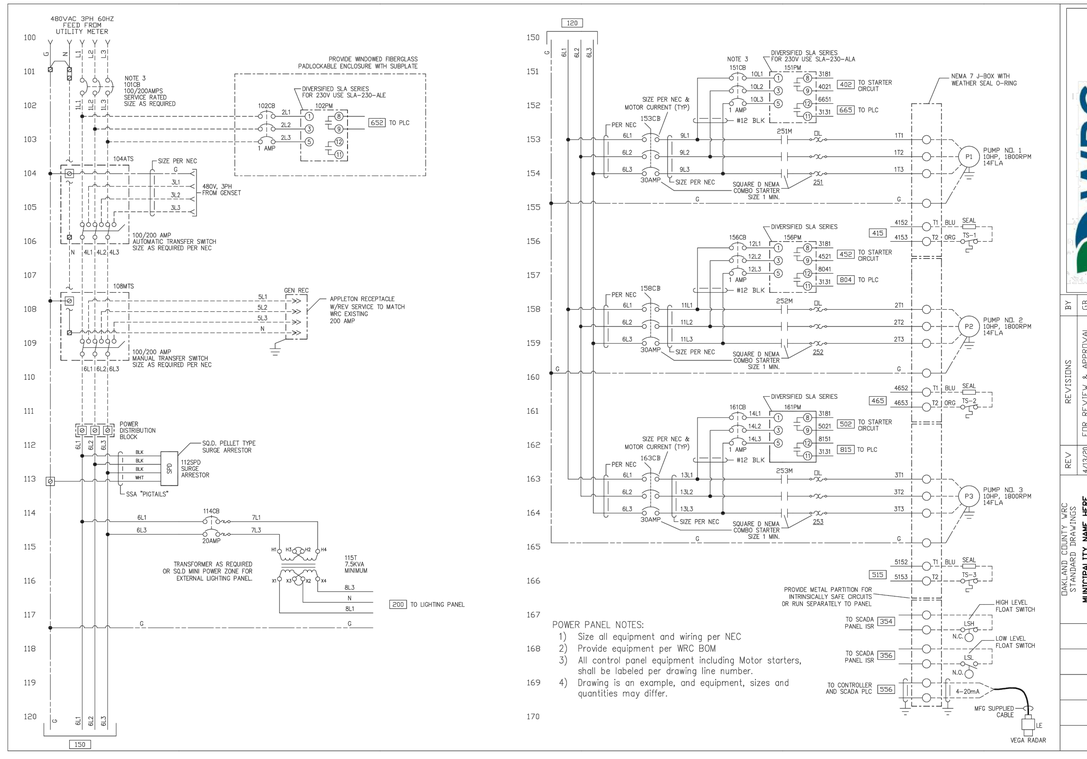
Designer should complete this sheet for a site specific layout.

WATER RESOURCES COMMISSIONER

REVISIONS			BY
4/2/20	FOR REVIEW AND APPROVAL		GB
1/23/23	REVISED		GB

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
DRAWING TITLE:
SITE LAYOUT EXAMPLE

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4419-05
SHEET: E-003



POWER PANEL NOTES:

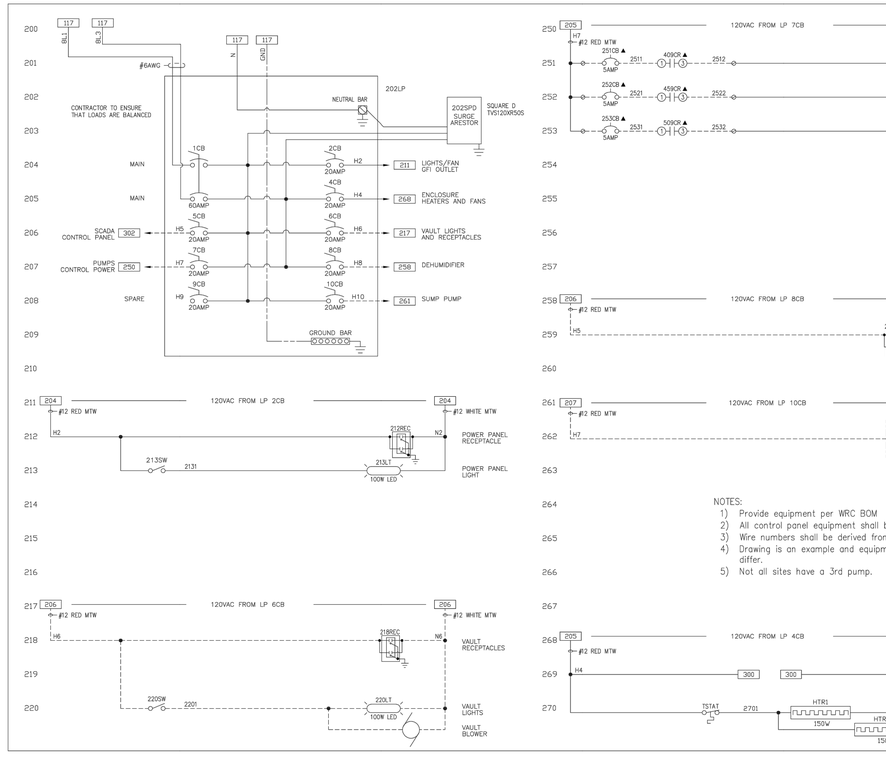
1) Size all equipment and wiring per NEC
2) Provide equipment per WRC BOM
3) All control panel equipment including Motor starters, shall be labeled per drawing line number.
4) Drawing is an example, and equipment, sizes and quantities may differ.

WATER RESOURCES COMMISSIONER

REVISIONS			BY
4/13/20	FOR REVIEW & APPROVAL		GB
2/12/21	REVISED PER COMMENTS		GB
1/30/23	REVISED PER COMMENTS		GB

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
PUMP CONTROL PANEL
DRAWING TITLE:
UTILITY POWER AND PUMP WIRING EXAMPLE

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 01 OF 21



NOTES:

1) Provide equipment per WRC BOM
2) All control panel equipment shall be labeled per drawing line number.
3) Wire numbers shall be derived from line numbers.
4) Drawing is an example and equipment, sizes and quantities may differ.
5) Not all sites have a 3rd pump.

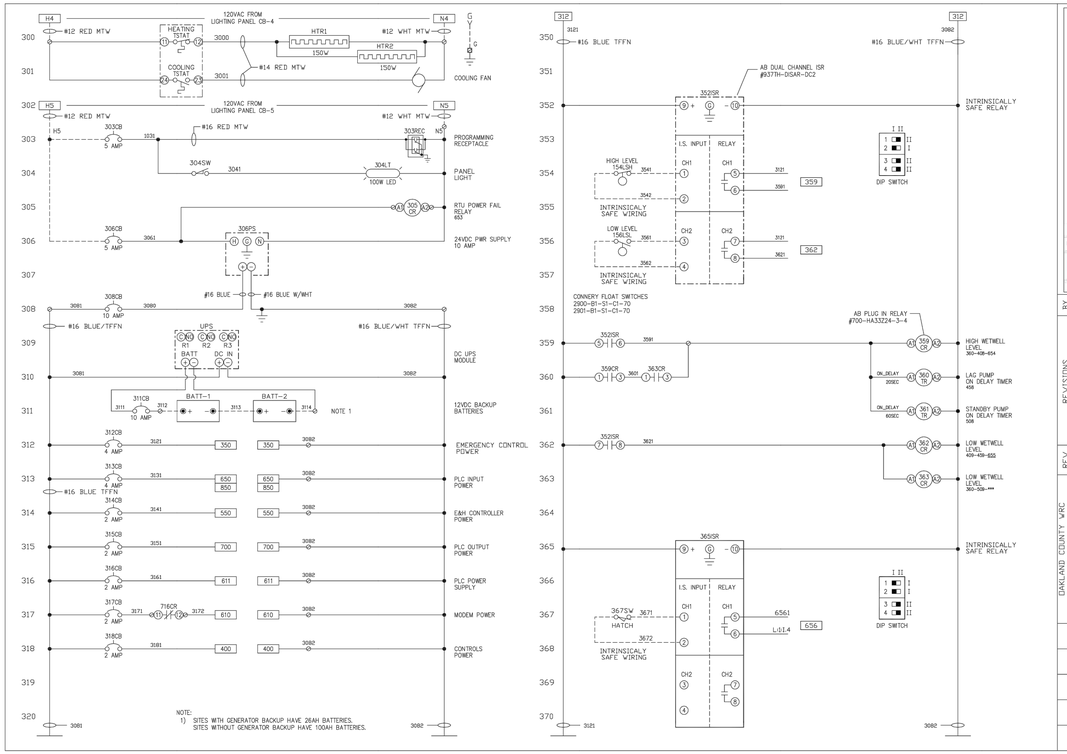
WATER RESOURCES COMMISSIONER

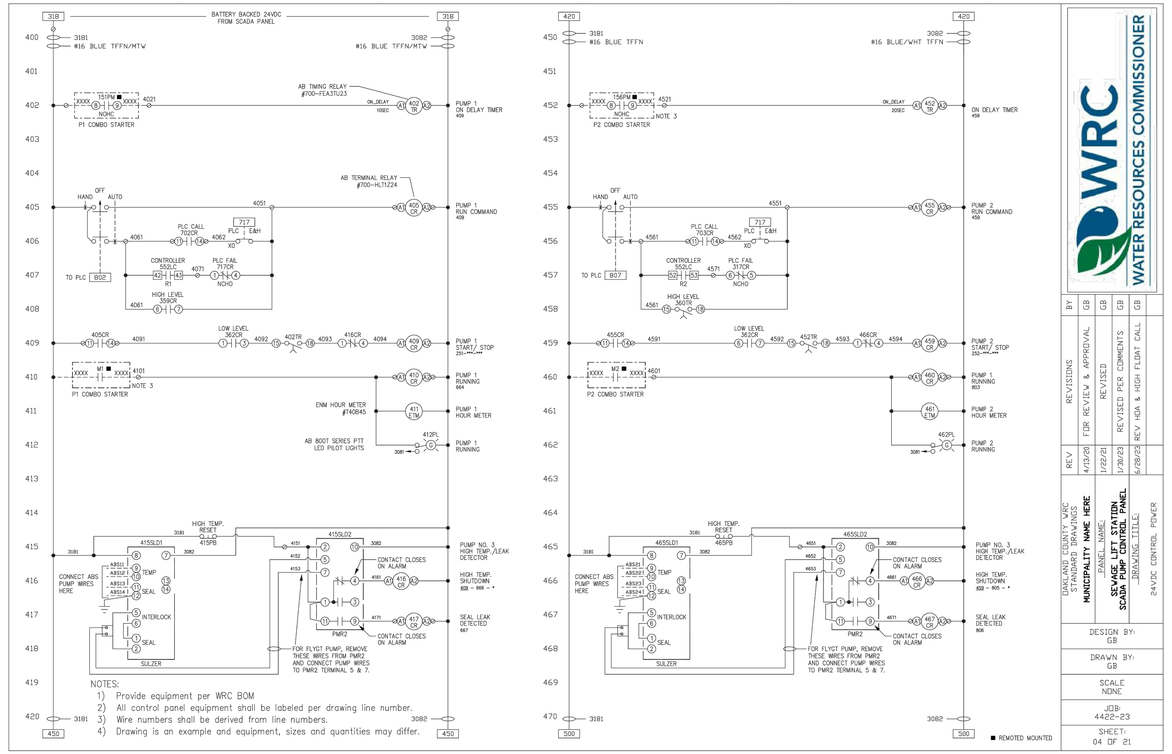
REVISIONS			BY
4/13/20	FOR REVIEW AND APPROVAL		GB
2/12/21	REVISED PER COMMENTS		GB
1/30/23	REVISED PER COMMENTS		GB

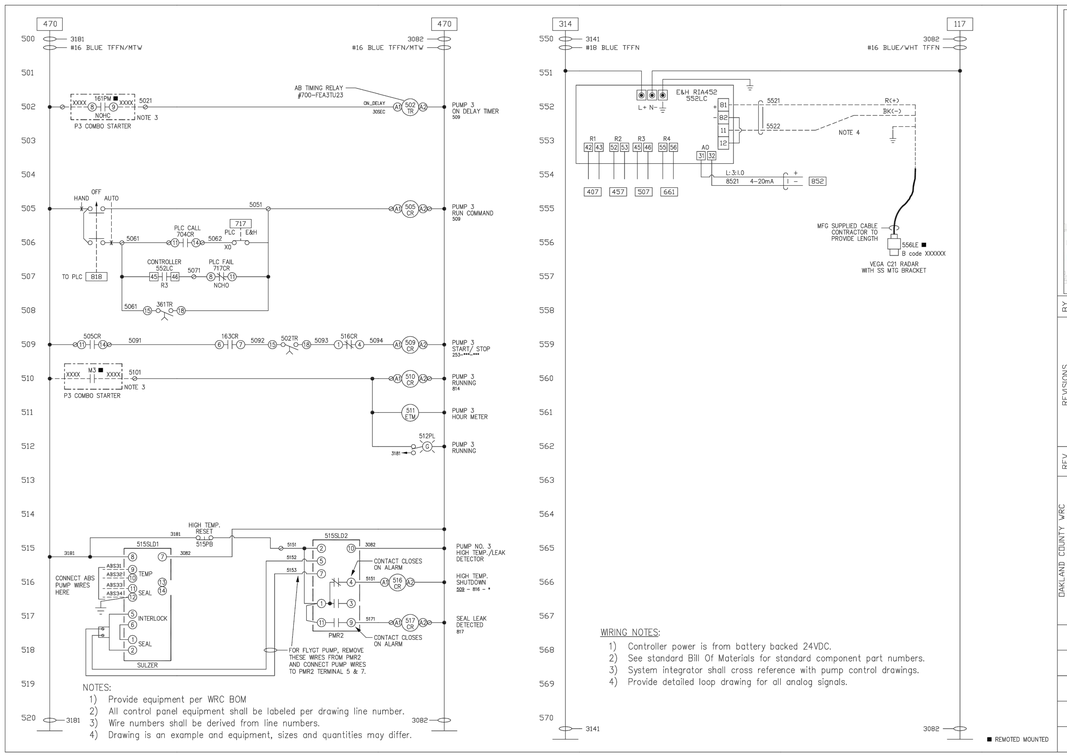
OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
PUMP CONTROL PANEL
DRAWING TITLE:
120V POWER WIRING

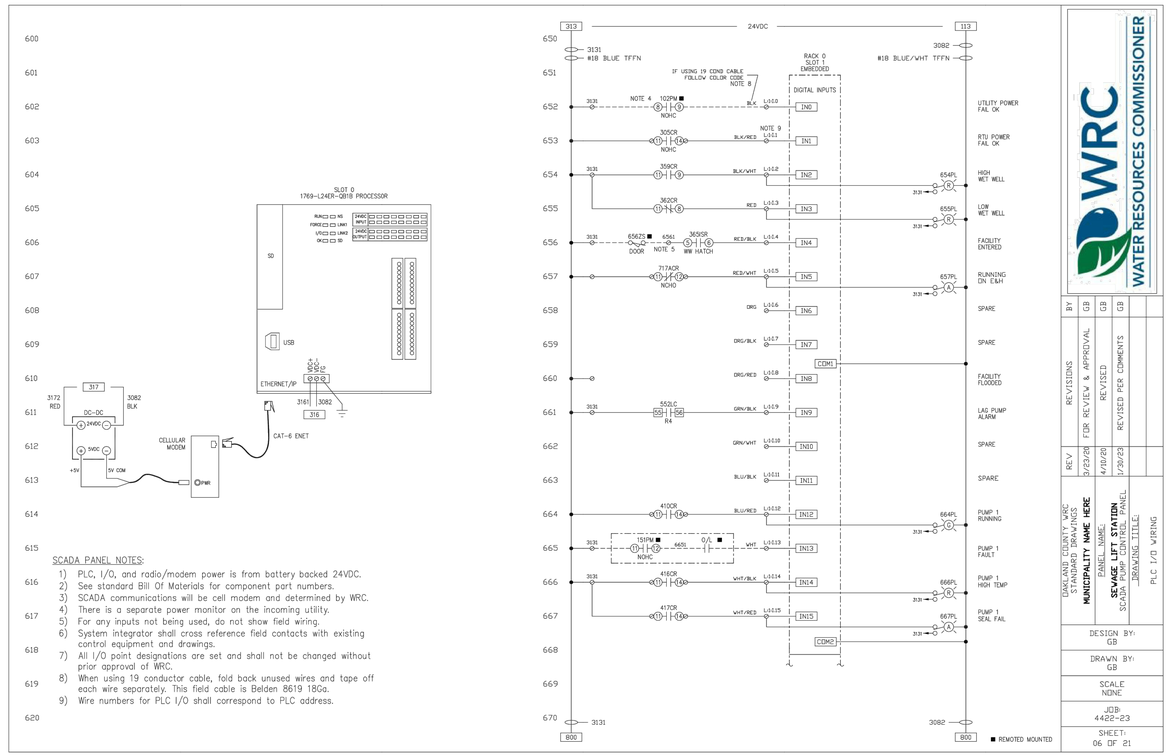
DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 02 OF 21

ND3









REV	BY	REVISIONS
4/6/05	GB	FOR REVIEW AND APPROVAL
1/10/21	GB	REVISED PER COMMENTS
1/30/23	GB	REVISED PER COMMENTS
2/7/23	GB	ADD BATTERY NOTE
4/13/01	GB	FOR REVIEW & APPROVAL
1/22/21	GB	REVISED
1/30/23	GB	REVISED PER COMMENTS
6/28/23	GB	REV HOA & HIGH FLOAT CALL
2/23/20	GB	FOR REVIEW & APPROVAL
4/10/20	GB	REVISED
1/30/23	GB	REVISED PER COMMENTS

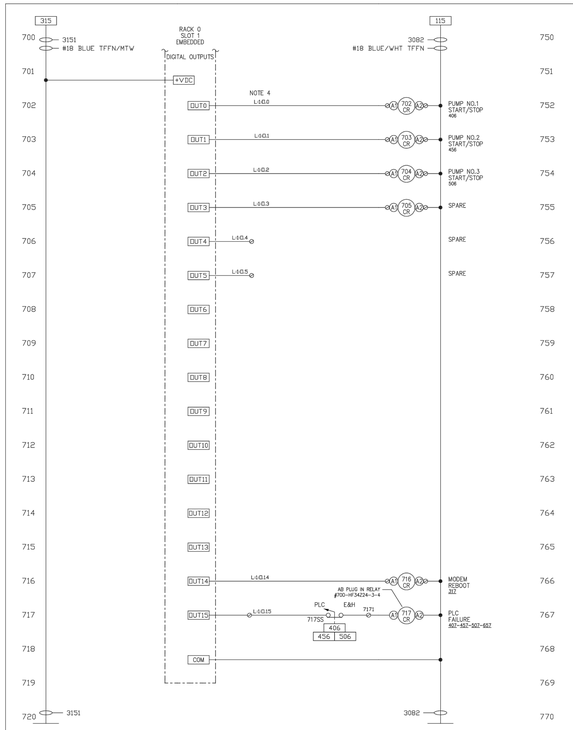
OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
SCADA PUMP CONTROL PANEL
DRAWING TITLE:
120VAC/24VDC CONTROL POWER

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
SCADA PUMP CONTROL PANEL
DRAWING TITLE:
24VDC CONTROL POWER

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
SCADA PUMP CONTROL PANEL
DRAWING TITLE:
PLC I/O WIRING

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 03 OF 21
SHEET: 04 OF 21
SHEET: 05 OF 21
SHEET: 06 OF 21

ND4



SCADA PANEL NOTES:

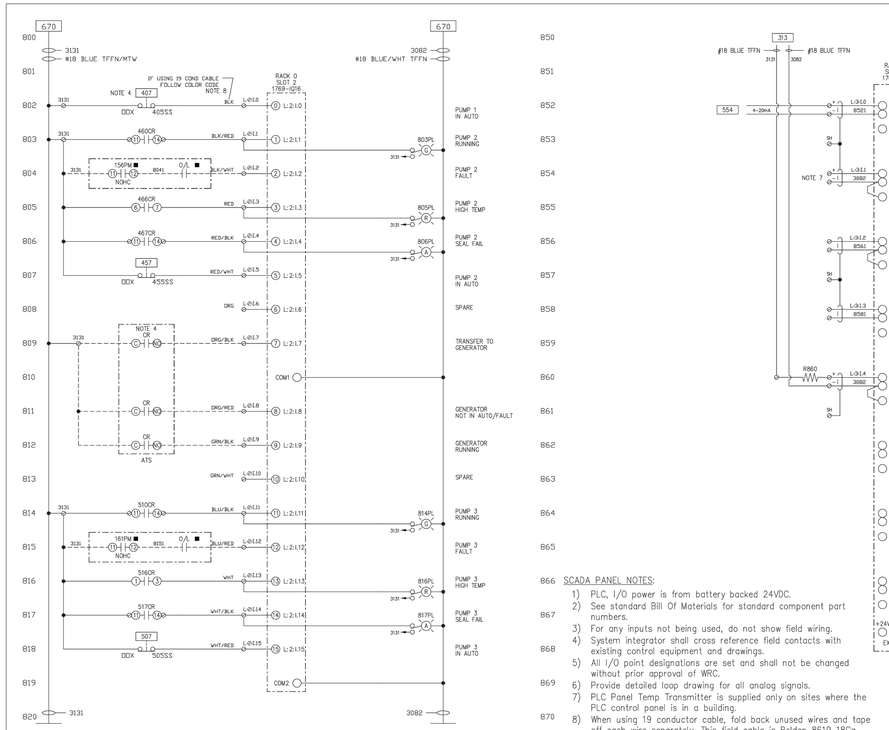
1) Pump start/stop relays that energize motor starters are standard 3 pole 10Amp rated plug in relays, with 11 pin octal base. Relays that fire other relays or for VFD's can be single pole terminal type relay.
2) The Modem Reboot relay interrupts power to the cell modem.
3) The PLC Failure relay is required on SCADA panels that also control the pumps. It will be held energized by the PLC.
4) Wire numbers for PLC I/O shall correspond to PLC address.

WATER RESOURCES COMMISSIONER

REV	REVISIONS	BY
12/22/20	FOR REVIEW & APPROVAL	GB
4/19/20	REVISED	GB
1/22/21	REVISED PER COMMENTS	GB
1/30/23	REVISED PER COMMENTS	GB

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME: SEWAGE LIFT STATION SCADA PUMP CONTROL PANEL
DRAWING TITLE: PLC I/O WIRING

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 07 OF 21



SCADA PANEL NOTES:

1) PLC, I/O power is from battery backed 24VDC.
2) See standard Bill Of Materials for standard component part numbers.
3) For any inputs not being used, do not show field wiring.
4) System integrator shall cross reference field contacts with existing control equipment and drawings.
5) All I/O point designations are set and shall not be changed without prior approval of WRC.
6) Provide detailed loop drawing for all analog signals.
7) PLC Panel Temp Transmitter is supplied only on sites where the PLC control panel is in a building.
8) When using 19 conductor cable, fold back unused wires and tape off each wire separately. This field cable is Belden 8619 18Ga.

■ REMOTED MOUNTED

WATER RESOURCES COMMISSIONER

REV	REVISIONS	BY
12/22/20	FOR REVIEW & APPROVAL	GB
4/19/20	REVISED	GB
1/22/21	REVISED PER COMMENTS	GB
1/30/23	REVISED PER COMMENTS	GB
6/28/23	REV HOA & HIGH FLOAT CALL	GB

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME: SEWAGE LIFT STATION SCADA PUMP CONTROL PANEL
DRAWING TITLE: PLC I/O WIRING

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 08 OF 21

SPARE SHEET

WATER RESOURCES COMMISSIONER

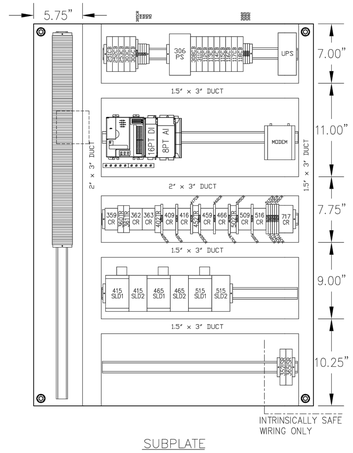
REV	REVISIONS	BY

OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME: SEWAGE LIFT STATION SCADA PUMP CONTROL PANEL
DRAWING TITLE: SPARE SHEET

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 09 OF 21

TB

2512	L:1:I.3	8561
2522	L:1:I.4	L:3:I.3
2532	L:1:I.5	8581
3081	L:1:I.6	3131
3081	L:1:I.7	L:3:I.4
3081	L:1:I.8	3082
3081	L:1:I.9	SH
3082	L:1:I.10	SH
3082	L:1:I.11	SH
3082	L:1:I.12	SPARE
3082	L:1:I.13	SPARE
3121	L:1:I.14	SPARE
3121	L:1:I.15	SPARE
3181	6561	SPARE
3181	SPARE	SPARE
3181	SPARE	SPARE
3181	L:1:0.4	
4021	L:1:0.5	
4051	L:1:O.15	
4061	7171	
4062	3131	
4071	3131	
4101	3131	
4151	3131	
4521	L:2:I.0	
4551	L:2:I.1	
4561	L:2:I.2	
4562	L:2:I.3	
4571	L:2:I.4	
4601	L:2:I.5	
4651	L:2:I.6	
5011	L:2:I.7	
5051	L:2:I.8	
5061	L:2:I.9	
5062	L:2:I.10	
5071	L:2:I.11	
5101	L:2:I.12	
5151	L:2:I.13	
5521	L:2:I.14	
5522	L:2:I.15	
GND	SPARE	
3131	SPARE	
3131	L:3:I.0	
3131	8521	
3131	L:3:I.1	
3131	3082	
3131	SH	
L:1:I.0	SH	
L:1:I.1	SH	
L:1:I.2	L:3:I.2	



SUBPLATE
45" H X 33" W
PAINT: GLOSS WHITE

NOTES:

1) Duct shall be Panduit or equal wide slotted type. Maximum duct wirefill is 50%.
2) Provide components per WRC BOM.
3) All equipment shall be properly labeled to match wiring schematics.
4) Receptacle for programming only.
5) Provide dimensions for mounting equipment and clearances.
6) Provide accurate terminal rotations.
7) Drawing is an example, and equipment, sizes and quantities may differ.

WATER RESOURCES COMMISSIONER

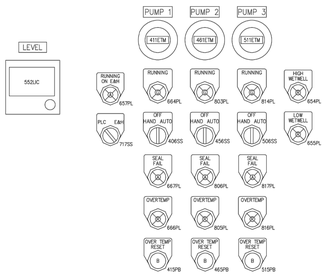
REV	REVISIONS	BY
1/30/23	REVISED	GB
6/28/23	REV HOA & HIGH FLOAT CALL	GB

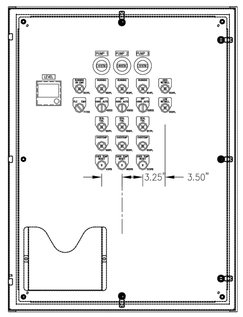
OAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME: SEWAGE LIFT STATION SCADA PUMP CONTROL PANEL
DRAWING TITLE: PLC SUBPLATE LAYOUT

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 10 OF 21

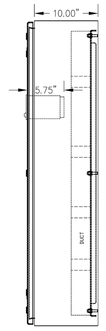
ND5

NOTES:
1) Provide components per WRC BOM.
2) Provide dimensions for mounting equipment and clearances.
3) Maintain proper clearance for 552LIC when door is closed.
4) Minimum spacing for pilot devices is 2.5 inches.
5) Drawing is an example, and equipment, sizes and quantities may differ.
9) If Combo Starters are far away from the SCADA control panel, then mount HOA's in the Combo Starters.





NEMA 12 ENCLOSURE
48"H X 36"W X 10"D
PAINT: OUT-ANSI 61
IN-GLOSS WHITE

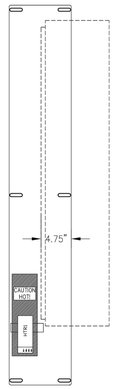


RT. SIDE

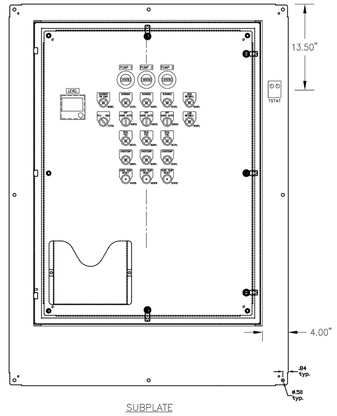
REVISIONS			BY
4/13/20	FOR REVIEW AND APPROVAL	GB	GB
1/20/21	REVISED PER COMMENTS	GB	

DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
SCADA CONTROL PANEL
DRAWING TITLE:
PANEL LAYOUT

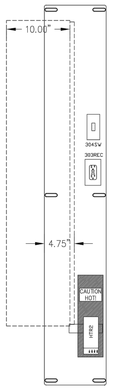
DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-13
SHEET: 11 OF 21



LFT. SUBPLATE
59.688"H X 9.75"W
PAINT: GLOSS WHITE



SUBPLATE
60" H X 44" W
PAINT: GLOSS WHITE



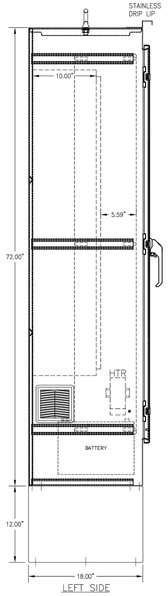
RT. SUBPLATE
59.688"H X 9.75"W
PAINT: GLOSS WHITE

NOTES:
1) Provide components per WRC BOM.
2) All equipment shall be properly labeled to match wiring schematics.
3) Receptacle shall be GFI.
4) Provide dimensions for mounting equipment and clearances.
5) Mark and dimension all unusable areas.
6) Maintain proper clearances for heaters to prevent damage due to high temps.
7) Ensure proper spacing for internal panels to allow doors to open 110Deg.
8) Drawing is an exampie, and equipment, sizes and quantities may differ.
9) If Combo Starters are far away from the SCADA control panel, then mount HOA's in the Combo Starters.

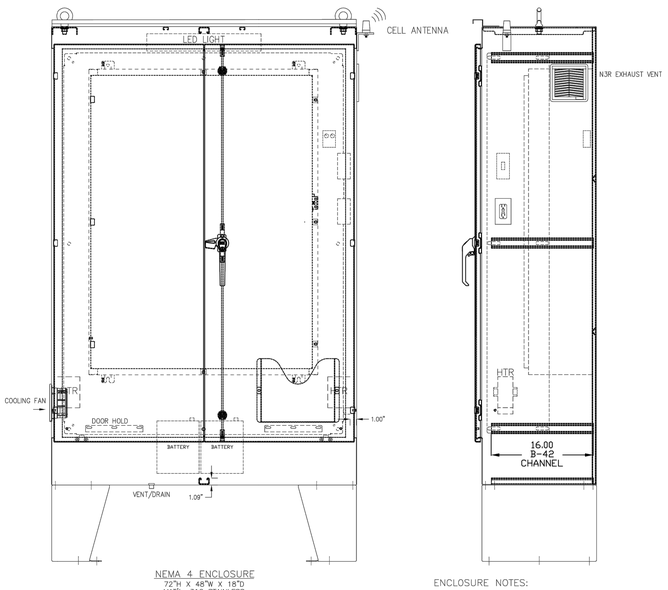
REVISIONS			BY
1/20/23	REVISED PER COMMENTS	GB	GB

DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
SCADA CONTROL PANEL
DRAWING TITLE:
SUBPLATE LAYOUT

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-13
SHEET: 12 OF 21



LEFT SIDE



NEMA 4 ENCLOSURE
72"H X 48"W X 18"D
MAT'L: 316 STAINLESS

ENCLOSURE NOTES:
Closed bottom, overlapping doors, 3pt padlockable handle
Louvered air intake N3R with filtered air exhaust.
Provide full interior insulation 1" thick.
Provide door hold mechanism for each door.

PROVIDE SUBPLATES
BACK PANEL: 60"H x 44"W w/heavy duty mounting rails.
SIDE PANELS: 59.68"H x 9.75"W

REVISIONS			BY
1/20/21	REVISED PER COMMENTS	GB	GB

DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
SCADA CONTROL PANEL
DRAWING TITLE:
ENCLOSURE LAYOUT

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 13 OF 21

BILL of MATERIAL

SYMBOL	QTY.	MANUFACTURER	PART NUMBER	DESCRIPTION
ENCL	1	SAGINAW	SCE-724818SSFSD	NEMA 3R 2 DOOR 316 STAINLESS STEEL ENCLOSURE 72"HX 48"W X 18"D
ENCL	1	SAGINAW	FX1218SS6	ENCLOSURE LEGS 12"H X 18"W 316 STAINLESS STEEL
ENCL	1	SAGINAW	SCE-72FSHDPS	HEAVY DUTY PANEL SUPPORT KIT
ENCL	1	SAGINAW	SCE-DSMRSS	48" STAINLESS STEEL DRIP LIP
DOOR STOP	2	SAGINAW	SCE-DSTOPK	DOOR STOP KIT
SUBPLATE	1	SAGINAW	SCE-72P48F1	SUBPLATE 60"H X 44"W GLOSS WHITE
SUBPLATE	2	SAGINAW	SCE-72PF	FILLER PLATE 59.688"H X 9.75"W GLOSS WHITE
CHANNEL NUT	12	ANY	CUSTOM	3/8-16 STRUT CHANNEL NUT WITH SPRING
VENT/DRAIN	1	SAGINAW	SCE-BVKO	ENCLOSURE VENT/ DRAIN
FAN	1	SAGINAW	SCE-N3RFA44	NEMA 3R FILTER FAN KIT
FILTER	1	SAGINAW	SCE-N3RFGA44	EXHAUST FILTER KIT
TSTAT	1	STEGO	011750-01	120VAC 15A DUAL HEATING/COOLING THERMOSTAT
HEATER	2	STEGO	060200-00	120VAC 150 WATT ENCLOSURE HEATER
LIGHT	1	SAGINAW	SCE-LF18NO	18" LED ENCLOSURE LIGHT
3041SW	1	RACO	5121-0	120V 10AMP WEATHER PROOF LIGHT SWITCH W/COVER
3045W	2	RACO	5320-0	2"X4" WEATHERPROOF BOX
3039EC	1	HUBBELL	GFTW5715Z	15AMP GFI RECEPTACLE
3031REC	1	LEVITON	000-80601	GFI RECEPTACLE COVER
PLC ENCL	1	SAGINAW	SCE-4821.5610P	NEMA 12 ENCLOSURE 48"H X 36"W X 10"D
PLC ENCL	1	SAGINAW	SCE-48P36	SUBPLATE 45"H X 33"W GLOSS WHITE
251,252,253, 303,306CB	5	ALLEN BRADLEY	1489-M1C050	120VAC/48VDC 1 POLE CIRCUIT BREAKER 5 AMP
308,311CB	2	ALLEN BRADLEY	1489-M1C100	120VAC/48VDC 1 POLE CIRCUIT BREAKER 10 AMP
312,313CB	2	ALLEN BRADLEY	1489-M1C040	120VAC/48VDC 1 POLE CIRCUIT BREAKER 4 AMP
315,316,317, 318CB	4	ALLEN BRADLEY	1489-M1C020	120VAC/48VDC 1 POLE CIRCUIT BREAKER 2 AMP
306PS	1	MEANWELL	NDR-240-24	120VAC/24VDC 10AMP POWER SUPPLY
UPS	1	MEANWELL	DR-UPS40	24VDC UPS MODULE
305CR	1	ALLEN BRADLEY	700-HLTU1	120VAC 1 POLE INTERPOSING CONTROL RELAY
PLC	1	ALLEN BRADLEY	1769-L24ER-QB1B	COMPACTLOGIX PLC BRICK WITH E-NET, 16DI, 16DO
PLC	1	ALLEN BRADLEY	1769-IQ16	16 PT. 24VDC DIGITAL INPUT MODULE
PLC	1	ALLEN BRADLEY	1769-IF8	8 PT. ANALOG INPUT MODULE
ENET	1	ANY	CAT-6	ETHERNET CABLE 2FT LENGTH
CELL	1	DGI TRANS PORT	WR11-M600-DE1-X8	24VDC CELLULAR MODEM
CELL	1	DGI TRANS PORT	76000976.000000	12-24VDC IN 5VDC OUT POWER ADAPTER
CR	9	ALLEN BRADLEY	700-HA33Z24-3-4	24VDC 3PDT PLUG IN RELAY WITH MAN OPERATOR AND INDICATING LIGHT
CR, SLD	12	ALLEN BRADLEY	700-HN101	11 PIN OCTAL RELAY SOCKET FINGERSAFE
360,361,402, 452,507TR	5	ALLEN BRADLEY	700-FEASTU23	UNIVERSAL VOLTAGE SPDT ON DELAY TIMING RELAY
TERM CR	14	ALLEN BRADLEY	700-HLTJZ24	24VDC 1 POLE INTERPOSING CONTROL RELAY
TERM CR	1	ALLEN BRADLEY	700-TB.ZDG	TERMINAL RELAY JUMPER STRIP 20PT
717CR	1	ALLEN BRADLEY	700-HF3AZ24-3-4	24VDC 4PDT PLUG IN RELAY WITH MAN OPERATOR AND INDICATING LIGHT
717CR	1	ALLEN BRADLEY	700-HN264	4 POLE RELAY SOCKET
415,465, 515SD2	3	MPE	PMR2	24VDC SEAL LEAK DETECTOR RELAY
415,465, 515SLD1	3	SULZER	16907007	CA462 24VDC SEAL LEAK DETECTOR RELAY
352,360SR	2	ALLEN BRADLEY	937TH-DISAR-DC2	2 CHANNEL INTRINSICALLY SAFE RELAY
411,461,511ETM	3	ENM	740B45	24VDC HOUR METER
411,461,511ETM	3	ENM	820017	GASKET FOR HOUR METER WITH MOUNTING HARDWARE
405,455,505SS	3	ALLEN BRADLEY	8007-J2A	3 POSITION SELECTOR SWITCH- 1NO & 1NC
717SS	1	ALLEN BRADLEY	8007-XA4	2 NC AUX CONTACT BLOCK
717SS	1	ALLEN BRADLEY	8007-H2A	2 POSITION SELECTOR SWITCH WITH 1N.O/N.C.
405,455,505, 717SS	4	ALLEN BRADLEY	8007-X02	1 AUX CONTACT N.C.
664,803,814PL	3	ALLEN BRADLEY	8007-Q1H2G	30MM 24VDC GREEN LED PTT PILOT LIGHT TRANSFORMER TYPE
654,655,666, 805,816PL	5	ALLEN BRADLEY	8007-Q1H2R	30MM 24VDC RED LED PTT PILOT LIGHT TRANSFORMER TYPE
657,667,806, 817PL	4	ALLEN BRADLEY	8007-Q1H2A	30MM 24VDC AMBER LED PTT PILOT LIGHT TRANSFORMER TYPE
415, 465, 515PB	3	ALLEN BRADLEY	8007-A2A	BLACK PUSH BUTTON WITH 1 N.O./N.C. CONTACT
552LIC	1	ENDRESS HAUSER	RIA452-C212A11A	24VDC 1.5, PUMP CONTROLLER WITH 4 RELAY OUTPUTS AND ALTERNATION, ANALOG OUT
TERM	124	ALLEN BRADLEY	1492-J3	600V 25AMP GREY TERMINAL
TERM	3	ALLEN BRADLEY	1492-EBJ3	END BARRIER
TERM	12	ALLEN BRADLEY	1492-EAJ35	END ANCHOR
TERM	2	ALLEN BRADLEY	1492-CJ35-2	SCREW IN CENTER JUMPER STRIP, 2 POINT
TERM	3	ALLEN BRADLEY	1492-CJ35-3	SCREW IN CENTER JUMPER STRIP, 3 POINT
TERM	4	ALLEN BRADLEY	1492-CJ35-4	SCREW IN CENTER JUMPER STRIP, 4 POINT
TERM	1	ALLEN BRADLEY	1492-CJ35-10	SCREW IN CENTER JUMPER STRIP, 10 POINT
TERM	1	ALLEN BRADLEY	199-DR1	DIN TERMINAL TRACK 3FT (CUT TO FIT)
RB6Ω	1	VISHAY DALE	RS02B1K50OFE12	1.5KΩ OHM 1% 2W PRECISION RESISTOR
GND	1	EATON	GBX10	10 SPACE GROUNDING BAR
BATTERY	2	DURACELL	SLAA12-120C/FR	12VDC 100AH BATTERY
BATTERY	2	DURACELL	DURA12-26NB	12VDC 26AH BATTERY

NOTE:
1) Sites with generator backup have 26Ah batteries. Sites without generator backup have 100Ah batteries.

NOTE 1

REVISIONS			BY
2/7/23	ADD BATTERY NOTE	GB	GB
1/31/23	REVISED PER COMMENTS	GB	
6/28/23	REV HOA & HIGH FLOAT CALL	GB	

DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
SCADA CONTROL PANEL
DRAWING TITLE:
BILL OF MATERIAL

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 14 OF 21

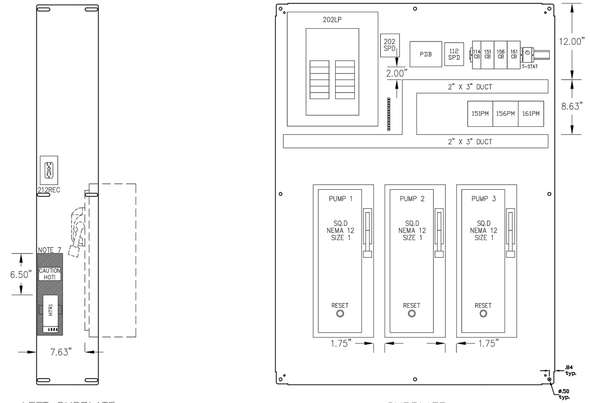
ND6

SPARE SHEET

REV	REVISIONS	BY

DAKLAND COUNTY WRC
FOR CONSTRUCTION
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
SCADA PUMP CONTROL PANEL
DRAWING TITLE:
SPARE SHEET

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 15 OF 21



LEFT SUBPLATE
59.688"H X 9.75"W
PAINT: GLOSS WHITE

SUBPLATE
60" H X 44" W
12GA STEEL
PAINT: GLOSS WHITE

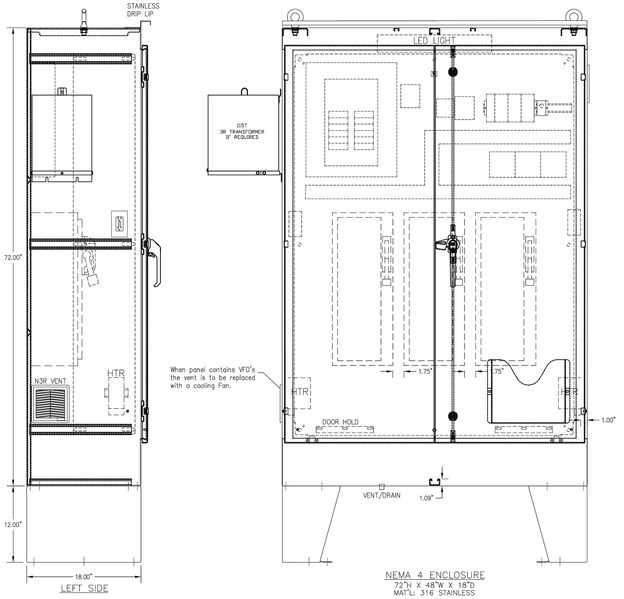
RT SUBPLATE
59.688"H X 9.75"W
PAINT: GLOSS WHITE

NOTES:
1) Duct shall be Panduit or equal wide slotted type. Maximum duct wirefill is 50%
2) Provide components per WRC BOM.
3) All equipment shall be properly labeled to match wiring schematics.
4) Receptacle shall be GFI.
5) Provide dimensions for mounting equipment and clearances.
6) Mark and dimension all unusable areas.
7) Maintain proper clearances for heaters to prevent damage due to high temps.
8) Ensure proper spacing for internal panels to allow doors to open 110Deg.
9) Drawing is an example based on 460VAC and size 1 starters. Equipment, sizes and quantities may differ.

REV	REVISIONS	BY
4/13/20	FOR REVIEW AND APPROVAL	GB
1/21/21	REVISED PER COMMENTS	GB
1/26/23	REVISED PER COMMENTS	GB

DAKLAND COUNTY WRC
FOR CONSTRUCTION
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
POWER/PUMP CONTROL PANEL
DRAWING TITLE:
SUBPLATE LAYOUT

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 16 OF 21



LEFT SIDE

NEMA 4 ENCLOSURE
72"H X 48"W X 18"D
MAT'L: 316 STAINLESS

ENCLOSURE NOTES:
Closed bottom, overlapping doors, 3pt padlockable handle
Louvered air intake N3R with filtered air exhaust.
No interior insulation required.
Provide door hold mechanism for each door.
PROVIDE SUBPLATES
BACK PANEL: 60"H x 44"W w/heavy duty mounting rails.
SIDE PANELS: 59.68"H x 9.75"W

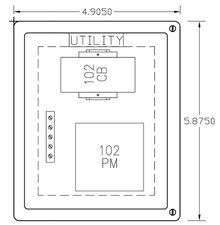
REV	REVISIONS	BY
1/31/23	REVISED PER COMMENTS	GB

DAKLAND COUNTY WRC
FOR CONSTRUCTION
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
POWER/PUMP CONTROL PANEL
DRAWING TITLE:
ENCLOSURE LAYOUT

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 17 OF 21

UTILITY PHASE MONITOR BILL of MATERIAL

SYMBOL	QTY.	MANUFACTURER	PART NUMBER	DESCRIPTION
PM ENCL	1	SAGINAW	SCE-10086PCW	NEMA 4X ENCLOSURE WITH WINDOW 11.41"H X 9.41"W X 7.39"D OR EQUAL
PM ENCL	1	SAGINAW	SCE10DPB	SUBPLATE 9"H X 7"W
102PM	1	DIVERSIFIED	SLA-440-ALE	480V 3PHASE POWER MONITOR
102CB	1	ALLEN BRADLEY	1489-M3C010	120VAC/480VDC 3 POLE CIRCUIT BREAKER 1 AMP
102DB	2	ALLEN BRADLEY	1492-EAJ35	END ANCHOR
GND	1	EATON	GBK5	5 SPACE GROUNDING BAR



UTILITY PHASE MONITOR
SEE SHEET 1 FOR WIRING

BILL of MATERIAL

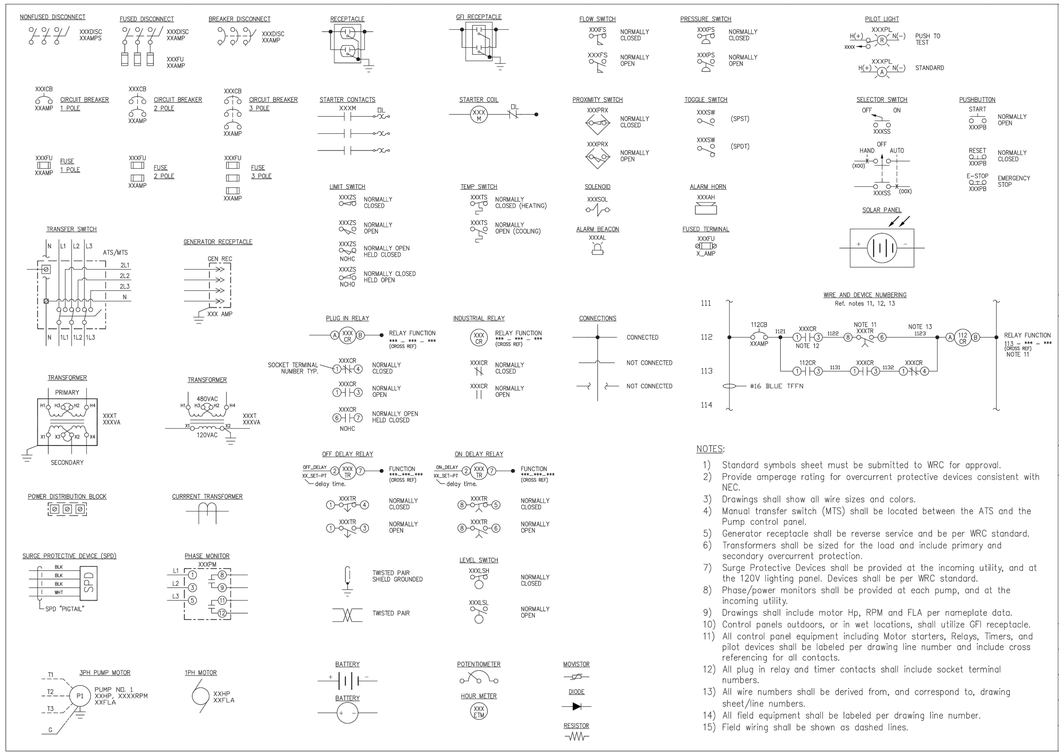
SYMBOL	QTY.	MANUFACTURER	PART NUMBER	DESCRIPTION
ENCL	1	SAGINAW	SCE-72481.85SFSD	NEMA 3R 316 STAINLESS STEEL ENCLOSURE 72"HX 48"W X 18"D.
ENCL	1	SAGINAW	FX1218SS6	ENCLOSURE LEGS 12"H X 18"W 316 STAINLESS STEEL
ENCL	1	SAGINAW	SCE-72FSHDPS	HEAVY DUTY PANEL SUPPORT KIT
ENCL	1	SAGINAW	SCE-DSABSS	48" STAINLESS STEEL DRIP LIP
DOOR STOP	2	SAGINAW	SCE-DSTOPK	DOOR STOP KIT
SUBPLATE	1	SAGINAW	SCE-72P48F1	SUBPLATE 60"H X 44"W GLOSS WHITE
SUBPLATE	2	SAGINAW	SCE-72FP	FILLER PLATE 59.688"H X 9.75"W GLOSS WHITE
CHANNEL NUT	12	ANY	CUSTOM	3/8-16 STRUT CHANNEL NUT WITH SPRING
VENT/ DRAIN	1	SAGINAW	SCE-B-VKD	ENCLOSURE VENT/ DRAIN
FILTER	2	SAGINAW	SCE-N3RFGAM4	EXHAUST FILTER KIT
TSTAT	1	STEGO	011409-00	120VAC 15 AMP DUAL HEATING THERMOSTAT
HEATER	2	STEGO	060200-00	120VAC 150 WATT ENCLOSURE HEATER
LIGHT	1	SAGINAW	SCE-LF18NO	18" LED ENCLOSURE LIGHT
304SW	1	RACO	5321-0	120V 10AMP WEATHER PROOF LIGHT SWITCH w/cover
304SW	2	RACO	5320-0	2"x4" WEATHERPROOF BOX
303REC	1	HUBBELL	GFRST15Z	15AMP GFI RECEPTACLE
303REC	1	LEVITON	000-80001	GFI RECEPTACLE COVER
115T	1	SQUARE D	7400-7540F	480-120/240 7.5KVA NEMA 3R TRANSFORMER
PDB	1	SQUARE D	9080LBA363106	335AMP 3POLE POWER DISTRIBUTION BLOCK 1 LINE, 6 LOAD CONNECTIONS
PDB	1	SQUARE D	9080LB33	3 POLE POWER DISTRIBUTION BLOCK COVER
112SPD	1	SQUARE D	SDSA-3650	600VAC 3 PHASE SURGE PROTECTIVE DEVICE
112SPD	1	SQUARE D	QOSAMK	SDAS MOUNTING BRACKET
202SPD	1	SQUARE D	TVSS120XR505	120/240V 4MRE SURGE PROTECTIVE DEVICE
202LP	1	SQUARE D	QO112L125PG	120/240V 125A 12SPACE LIGHTING PANEL WITH GROUND BAR KIT
202LP	1	SQUARE D	QOC16US	SURFACE MOUNT COVER
202LP	1	SQUARE D	QO260	2 POLE 60 AMP CIRCUIT BREAKER
202LP	8	SQUARE D	QO120	1 POLE 20 AMP CIRCUIT BREAKER
202LP	1	SQUARE D	PKAMB2LA	2 POLE CIRCUIT BREAKER RETAINING KIT
251,252,253M	3	SQUARE D	8539-SCA54V02S-H31!	460VAC NEMA 12 COMBINATION STARTER PANEL MAG GUARD FLANGE MOUNTED CB DISCONNECT, MINIMUM NEMA SIZE 1 STARTER, 120V COIL, RESET PB DOOR, 1 EXTRA NC O/L CONTACT, AUX RUNNING CONTACT
151,156,161CB	3	ALLEN BRADLEY	1489-M3C010	120VAC/480VDC 3 POLE CIRCUIT BREAKER 1 AMP
151,156,161PM	3	DIVERSIFIED	SLA-440-ALE	480V 3PHASE POWER MONITOR
114CB	1	ALLEN BRADLEY	1489-M2C200	120VAC/480VDC 2 POLE CIRCUIT BREAKER 20 AMP
TERM	29	ALLEN BRADLEY	1492-J3	600V 25AMP GREY TERMINAL
TERM	1	ALLEN BRADLEY	1492-EBJ3	END BARRIER
TERM	5	ALLEN BRADLEY	1492-EAJ35	END ANCHOR
TERM	2	ALLEN BRADLEY	1492-CJJ5-3	SCREW IN CENTER JUMPER STRIP, 3 POINT
GND	1	EATON	GBK10	10 SPACE GROUNDING BAR

REV	REVISIONS	BY
1/31/23	REVISED PER COMMENTS	GB

DAKLAND COUNTY WRC
FOR CONSTRUCTION
MUNICIPALITY NAME HERE
PANEL NAME:
SEWAGE LIFT STATION
POWER/PUMP CONTROL PANEL
DRAWING TITLE:
BILL OF MATERIAL

DESIGN BY: GB
DRAWN BY: GB
SCALE: NONE
JOB: 4422-23
SHEET: 18 OF 21

ND7



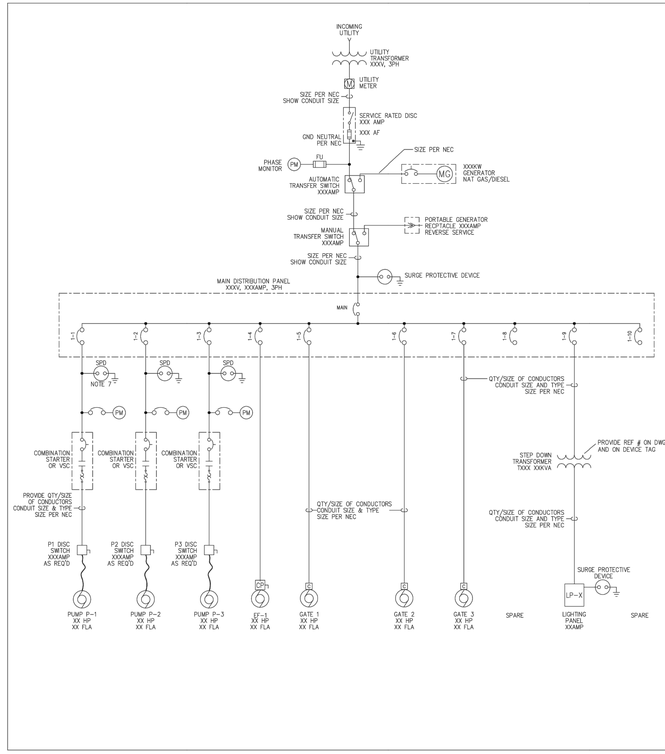
NOTES:

1) Standard symbols sheet must be submitted to WRC for approval.
2) Provide amperage rating for overcurrent protective devices consistent with NEC.
3) Drawings shall show all wire sizes and colors.
4) Manual transfer switch (MTS) shall be located between the ATS and the Pump control panel.
5) Generator receptacle shall be reverse service and be per WRC standard.
6) Transformers shall be sized for the load and include primary and secondary overcurrent protection.
7) Surge Protective Devices shall be provided at the incoming utility, and at the 120V lighting panel. Devices shall be per WRC standard.
8) Phase/power monitors shall be provided at each pump, and at the incoming utility.
9) Drawings shall include motor Hp, RPM and FLA per nameplate data.
10) Control panels outdoors, or in wet locations, shall utilize GFI receptacle.
11) All control panel equipment including Motor starters, Relays, Timers, and pilot devices shall be labeled per drawing line number and include cross referencing for all contacts.
12) All plug in relay and timer contacts shall include socket terminal numbers.
13) All wire numbers shall be derived from, and correspond to, drawing sheet/line numbers.
14) All field equipment shall be labeled per drawing line number.
15) Field wiring shall be shown as dashed lines.

REV	DATE	REVISIONS	BY
2	7/23/20	FOR REVIEW & APPROVAL	GB
1	4/22/20	REVISED PER COMMENTS	GB

DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PROJECT SITE/PANEL NAME
SEWAGE LIFT STATION
DRAWING TITLE:
CONTROLS WIRING LEGEND

DESIGN BY: GB
DRAWN BY: GB
SCALE NONE
JOB: 4422-23
SHEET: 19 OF 21



NOTE:

1) All equipment and operatus wiring shall comply with NEC and WRC standard.
2) Generator receptacle to be per WRC standard.
3) Provide quantity and size of wires for each device.
4) Provide conduit size required for each powered device.
5) All mechanical disc switches and means shall be lever operator type. No rotary mechanisms.
6) All field devices shall be identified & referenced to drawings.
7) Variable Speed Controllers shall include SPD.

MAIN 3PH DISTRIBUTION PANEL DP–X

CIRCUIT	BREAKER	CIRCUIT NAME	CIRCUIT NAME	BREAKER	CIRCUIT
1	XXXA	MAIN	PUMP 1	XXXA	2
3	XXXA	PUMP 2	EXHAUST FAN	XXXA	4
5	XXXA	GATE 1	GATE 2	XXXA	6
7	XXXA	GATE 3	SPARE	XXXA	8
9	XXXA	LP–X TRANSFORMER	SPARE	XXXA	10

1PH LIGHTING PANEL LP–X

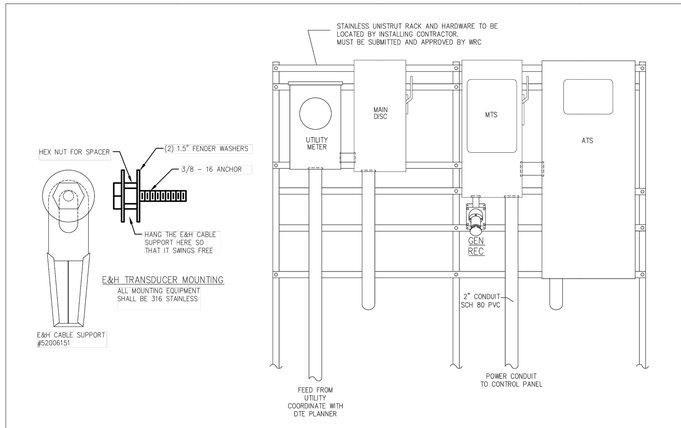
CIRCUIT	BREAKER	CIRCUIT NAME	CIRCUIT NAME	BREAKER	CIRCUIT
1	60A	MAIN	VAULT RECEPTACLES	20A	2
3		MAIN	PANEL HEATERS	20A	4
5	20A	PUMPS CONTROL PANEL	PANEL LIGHTS & RECEPTACLES	20A	6
7	20A	GEN ENGINE HEATER	DEHUMIDIFIER	20A	8
9	20A	GEN BATTERY CHARGER	SUMP PUMP	20A	10
11	20A	VAULT FAN/LIGHTS	SPARE	20A	12

CONTRACTOR RESPONSIBLE TO BALANCE LOADS

REV	DATE	REVISIONS	BY
2	7/23/20	FOR REVIEW & APPROVAL	GB
1	4/1/20	REVISED PER COMMENTS	GB
0	2/12/20	REVISED PER COMMENTS	GB

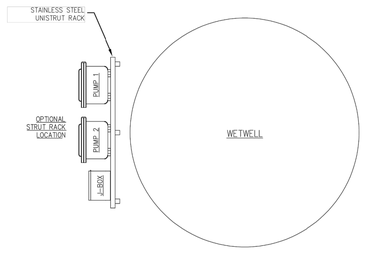
DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PROJECT SITE/PANEL NAME
SEWAGE LIFT STATION
DRAWING TITLE:
ELECTRICAL ONE-LINE EXAMPLE

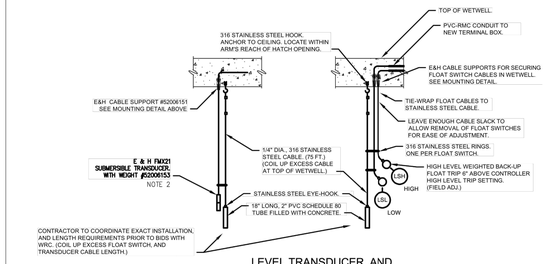
DESIGN BY: GB
DRAWN BY: GB
SCALE NONE
JOB: 4422-23
SHEET: 20 OF 21



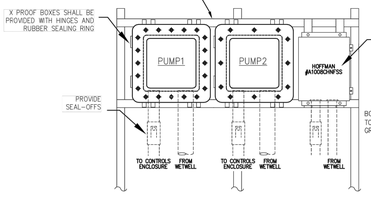
NOTE:

1) Locate the floats and level transducer in an area with low turbulance.
2) If turbulance can't be avoided, level transducer must be mounted in a stilling well.
3) Confirm low float is not affected by pump suction.
4) Level transducer to be mounted 6 inches off the bottom to reduce problems caused by sludge build up.
5) Main Disc shall be service entrance rated.





LEVEL TRANSDUCER, AND FLOAT SWITCH MOUNTING DETAIL

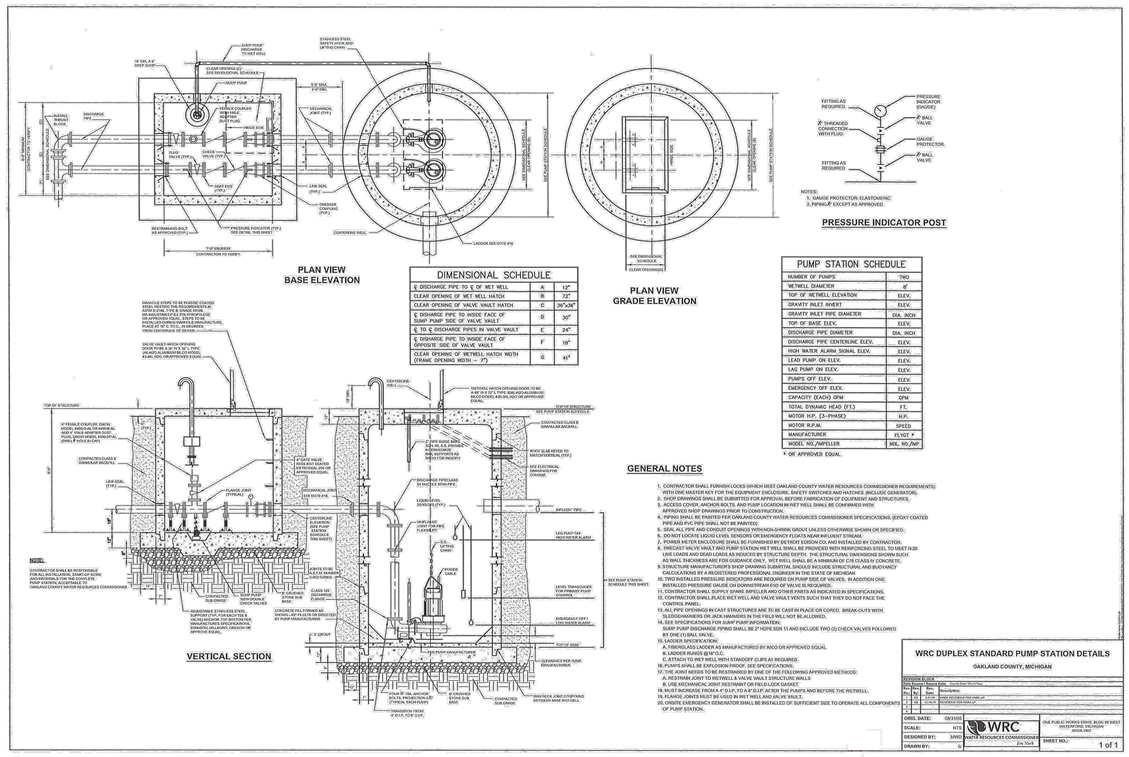


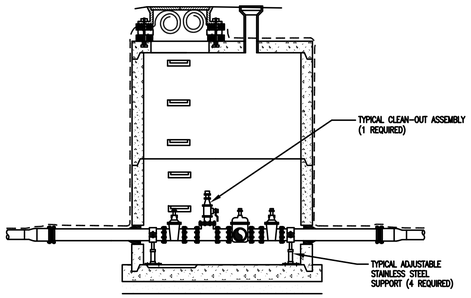
OPTIONAL STRUT RACK LAYOUT

REV	DATE	REVISIONS	BY
2	4/13/20	FOR REVIEW & APPROVAL	GB
1	1/29/21	REVISED PER COMMENTS	GB

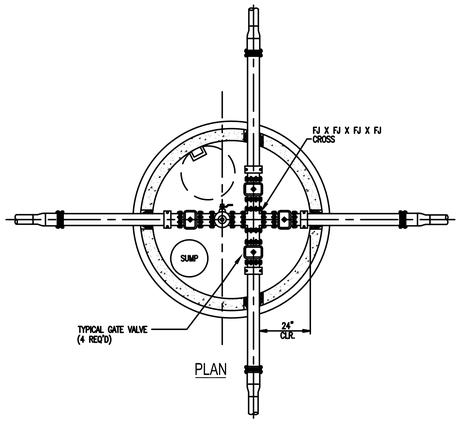
DAKLAND COUNTY WRC STANDARD DRAWINGS
MUNICIPALITY NAME HERE
PANEL NAME
SEWAGE LIFT STATION
PUMP/SCADA CONTROL PANELS
DRAWING TITLE:
EQUIPMENT INSTALLATION DETAILS

DESIGN BY: GB
DRAWN BY: GB
SCALE NONE
JOB: 4422-23
SHEET: 21 OF 21



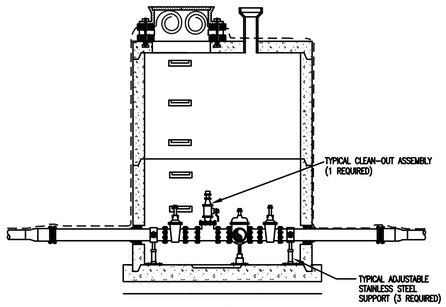


ELEVATION



PLAN

BRANCH FLUSHING CONNECTION (BFC)
4 WAY IN WELL



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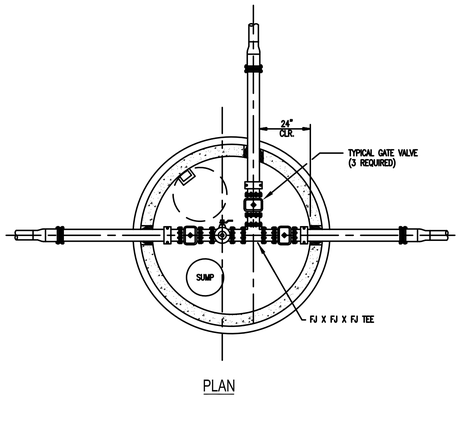
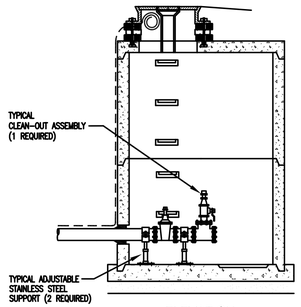


PLAN

BRANCH FLUSHING CONNECTION (BFC)
3 WAY IN WELL



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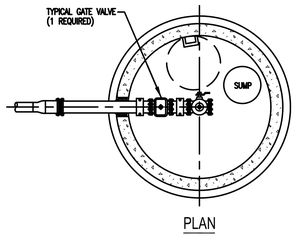
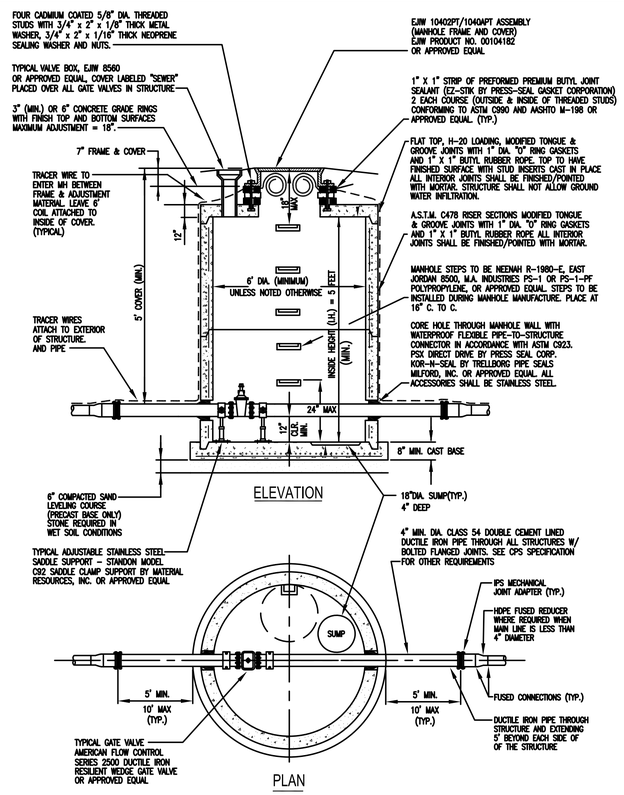


PLAN

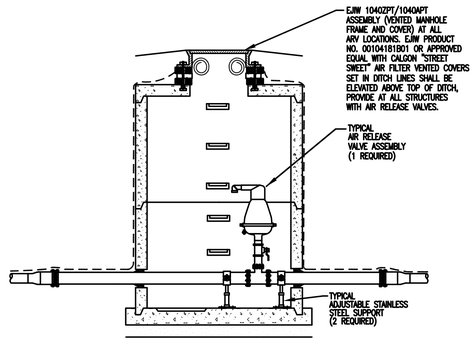
TERMINAL FLUSHING CONNECTION (TFC)
IN WELL



ELEVATION

PLAN

TYPICAL STRUCTURE DETAIL



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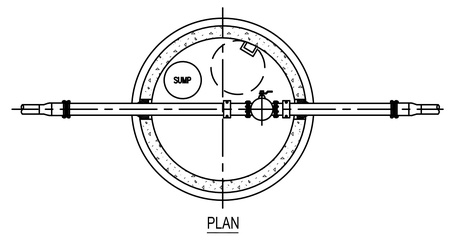
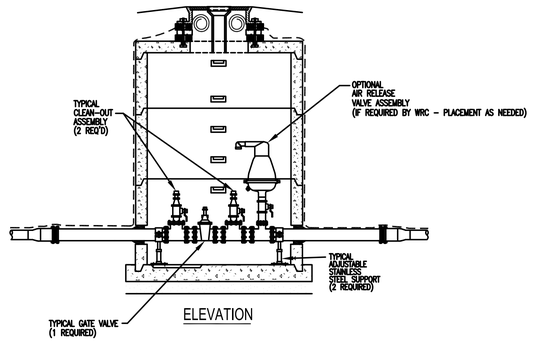
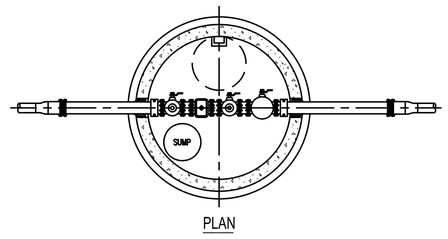


PLAN

AIR/VACUUM RELEASE VALVE (ARV)
IN WELL

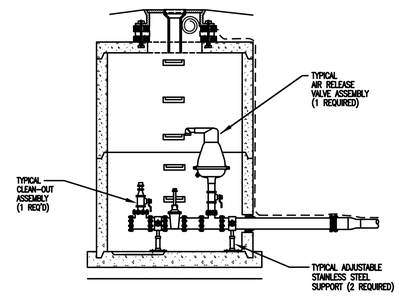


ELEVATION

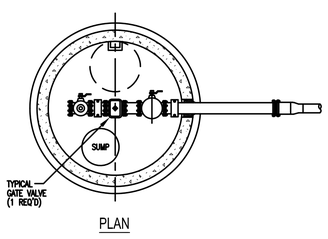


PLAN

INTERMEDIATE FLUSHING CONNECTION
(IFC/OPTIONAL ARV)
IN WELL

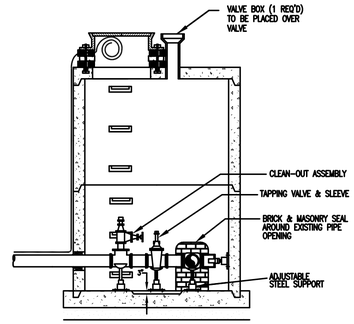


ELEVATION

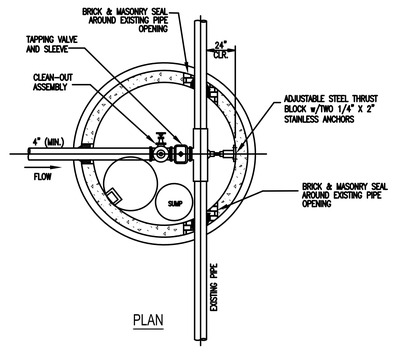


PLAN

TERMINAL FLUSHING CONNECTION WITH
AIR/VACUUM RELEASE VALVE (TFC/ARV)
IN WELL



ELEVATION



PLAN

TAPPING SLEEVE & VALVE (TSV)
IN WELL

LOW PRESSURE
SANITARY SEWER DETAILS
AND
NOTES

REVISION BLOCK
Data Source / Source Date: N/A

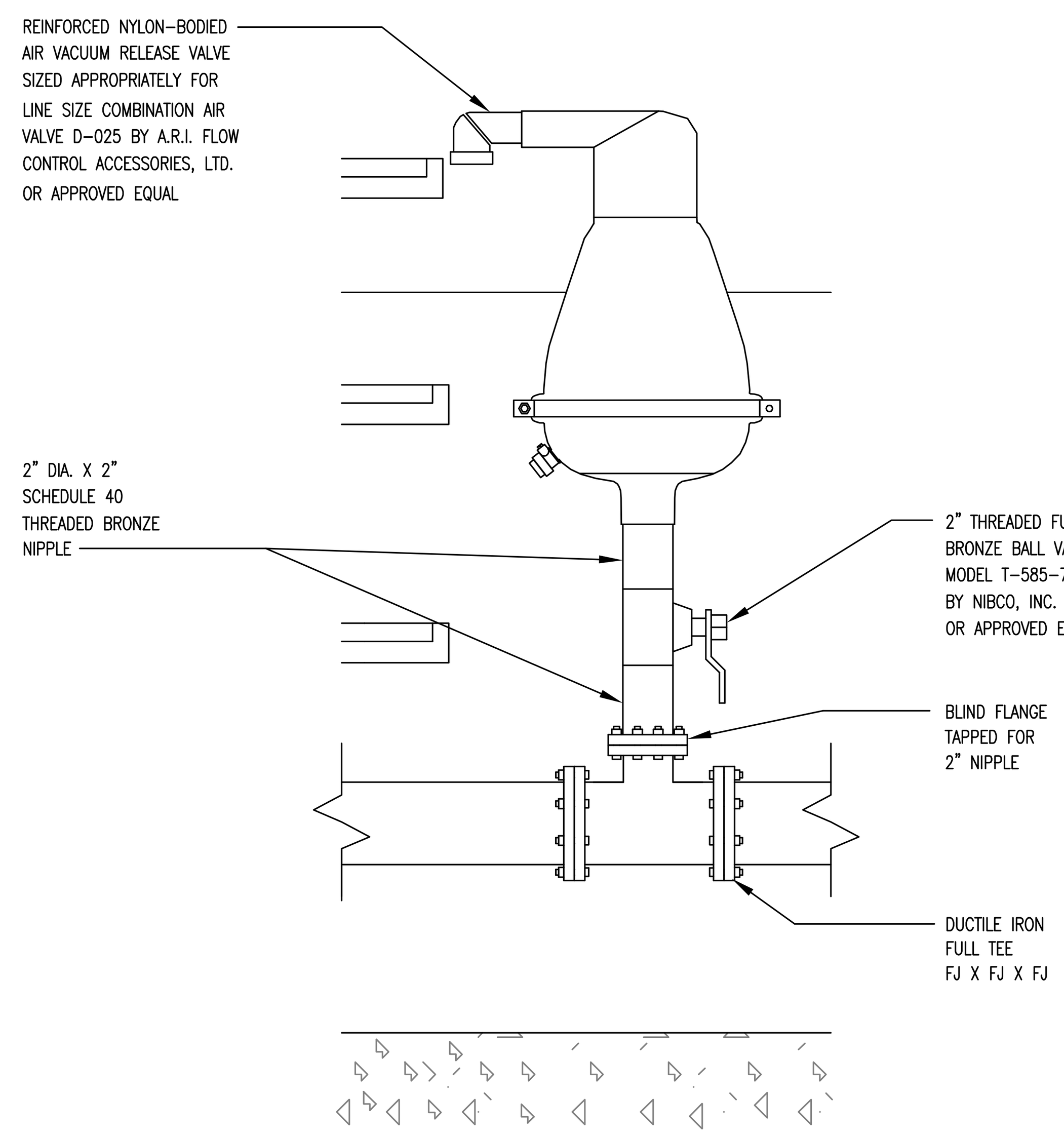
Rev. No.:	Rev. By.:	Rev. Date:	Description:
1	DS	4-15-13	APPROVED BY ENGINEERING STANDARDS COMMITTEE
2	KB	3-12-21	APPROVED BY ENGINEERING STANDARDS COMMITTEE
3	KB	5-26-22	UPDATED_TSV_DETAIL
4			

ORIG. DATE: 05/15/2013
SCALE: NONE
DESIGNED BY: WRC
DRAWN BY: WRC Mapping

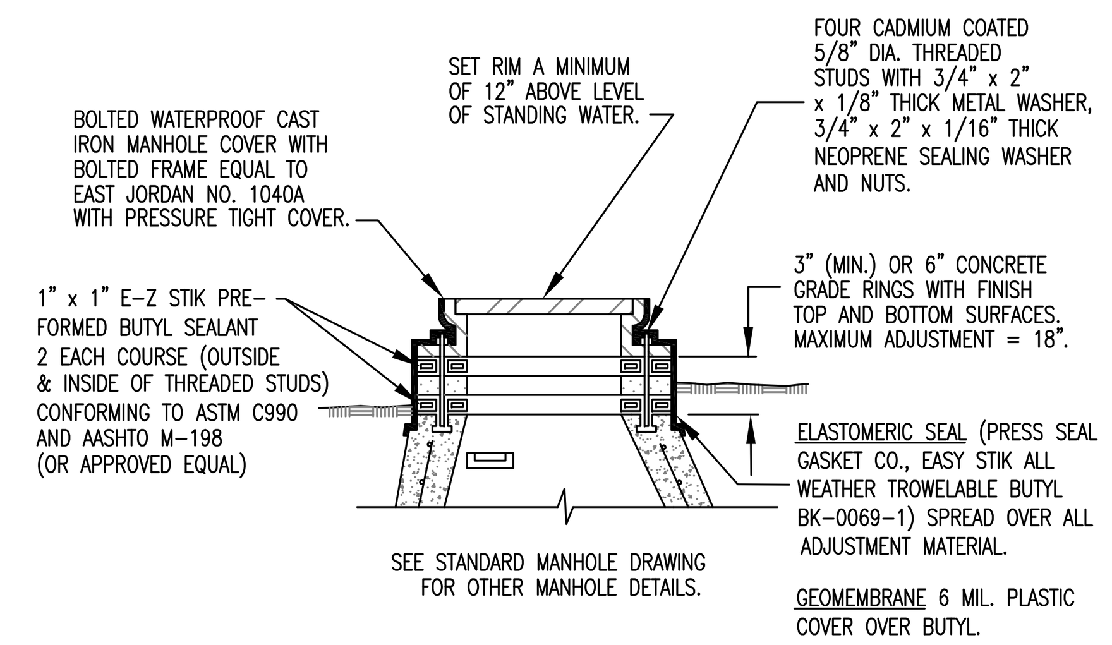
WRC WATER RESOURCES COMMISSIONER
Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
WATERFORD, MICHIGAN
48328-1907

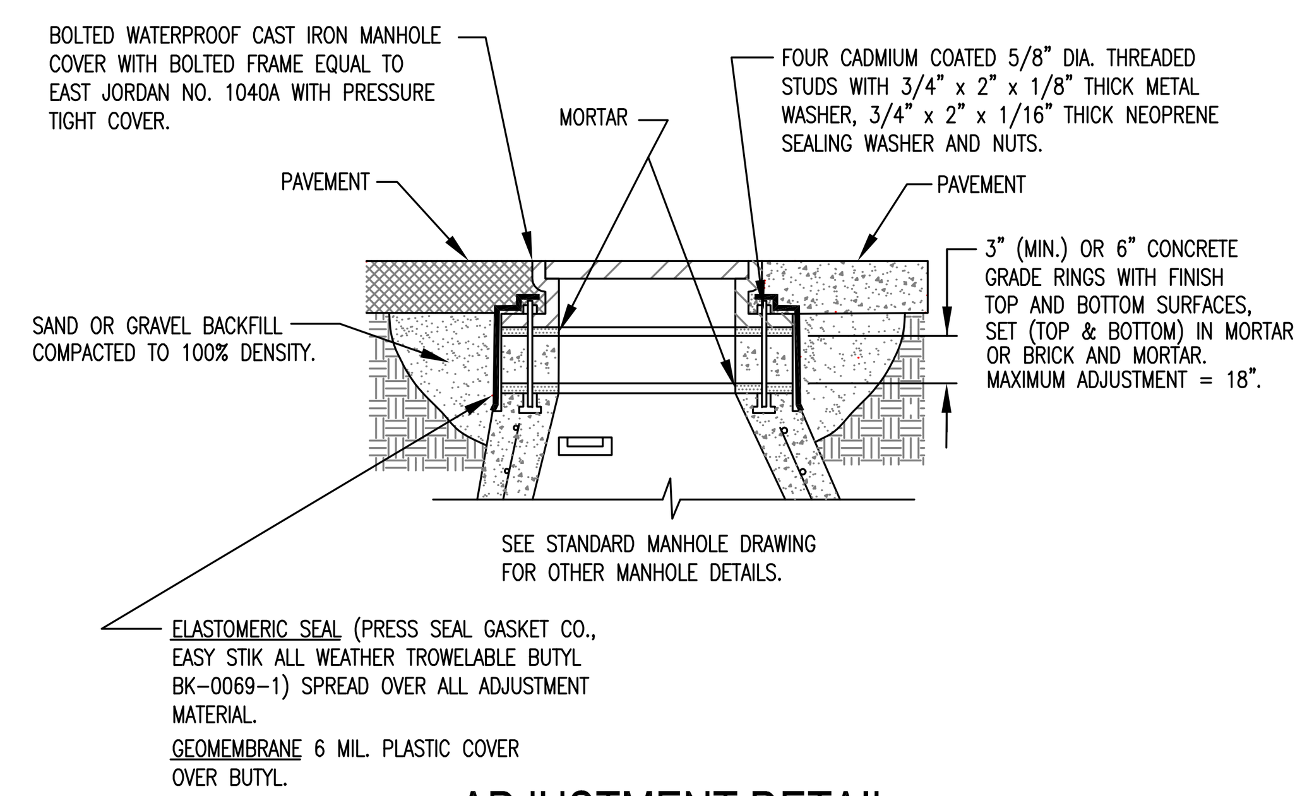
SHEET NO.: 1 of 3



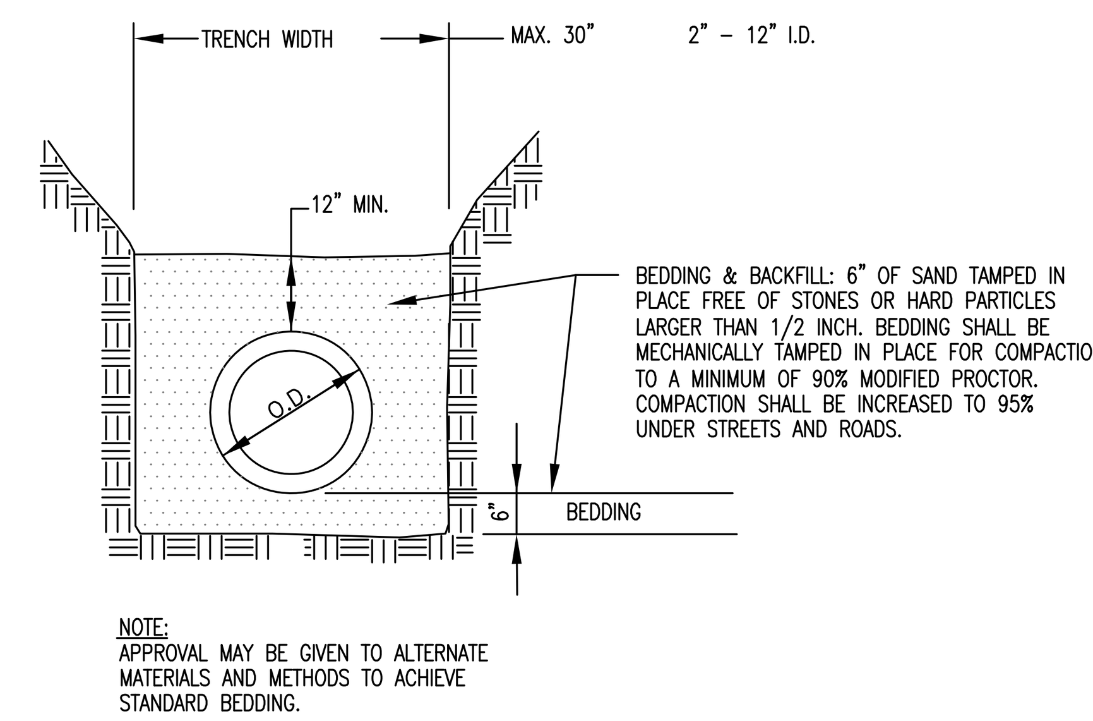
TYPICAL AIR VACUUM RELEASE VALVE ASSEMBLY



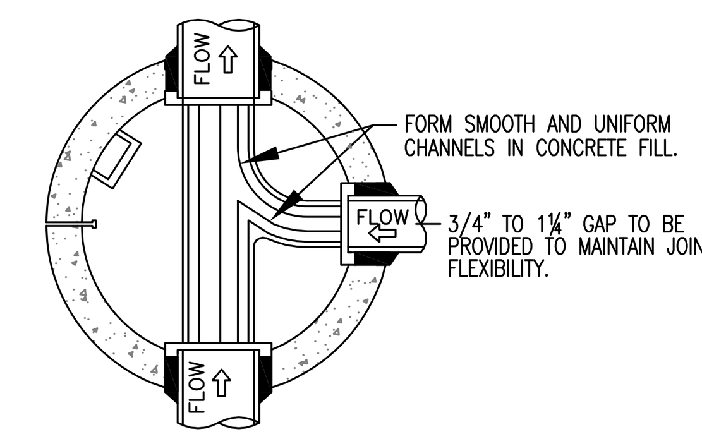
ADJUSTMENT DETAIL FOR MANHOLE TOPS WITHIN FLOOD PRONE AREAS

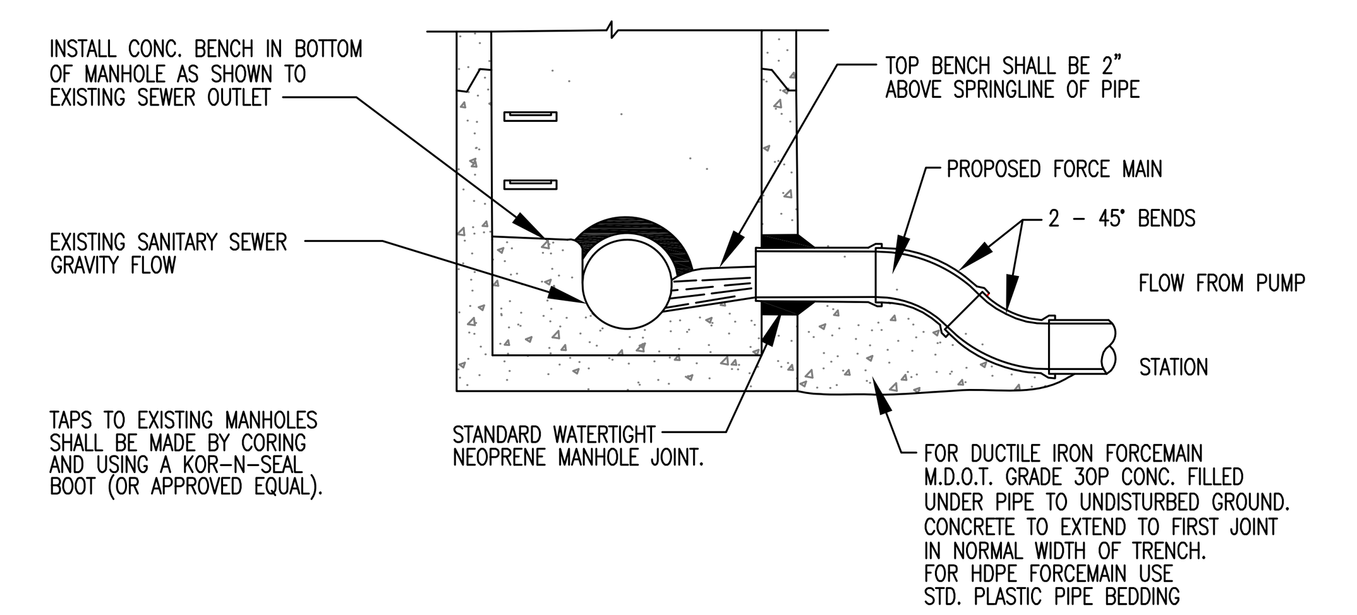


ADJUSTMENT DETAIL MANHOLE TOPS WITHIN PAVEMENT AREAS



STANDARD EMBEDMENT





FORCEMAIN DISCHARGE TO GRAVITY SEWER MANHOLE

CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE LOCAL UNIT OF GOVERNMENT AND THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER (WRC). 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.

2. AT ALL CONNECTIONS TO WRC SEWERS OR EXTENSIONS, AND BEFORE START OF CONSTRUCTION, THE CONTRACTOR MUST OBTAIN A SEWER INSPECTION PERMIT ISSUED BY WRC. SANITARY SEWER PERMIT CHARGES ARE IN ACCORDANCE WITH THE WRC CURRENT SCHEDULE OF FEES AS MODIFIED FROM TIME TO TIME. FAILURE TO PASS ANY TEST SEGMENT WILL RESULT IN AN ADDITIONAL CHARGE TO THE CONTRACTOR FOR EACH RETEST. IN ACCORDANCE WITH THE WRC CURRENT SCHEDULE OF FEES AS MODIFIED FROM TIME TO TIME. THE CONTRACTOR SHALL ALSO HAVE POSTED WITH WRC A $5,000 SURETY BOND AND $500 CASH BOND DEPOSIT. THE CONTRACTOR SHALL NOTIFY THE LOCAL UNIT OF GOVERNMENT AND THE WRC 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION. FINAL ACCEPTANCE TESTS MUST BE WITNESSED BY WRC PERSONNEL AND MUST BE SCHEDULED IN ADVANCE BY THE LOCAL UNIT OF GOVERNMENT, OR IT'S AGENT.

3. AT ALL CONNECTIONS TO MANHOLES ON WRC SEWERS, OR EXTENSIONS THERETO, DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 24 INCHES.

4. TAPS TO EXISTING MANHOLES SHALL BE MADE BY CORING. BLIND DRILLING IS ONLY PERMITTED WITH PRE-APPROVAL FROM THE WRC OFFICE.

5. IF THE STRUCTURE FALLS WITHIN THE ROADBED OF A GRAVEL ROAD OR WITHIN THE UNPAVED SHOULDER OF A PAVED ROAD, THE COVER SHALL BE SIX INCHES (6") BELOW THE FINISHED GRAVEL SURFACE. IF THE STRUCTURE CONTAINS AN ARV/AVV THEN ADDITIONAL VENTING THROUGH THE MANHOLE WALL TO GREENBELT AREA SHALL BE REQUIRED.

6. TWO 6-GAUGE SOLID OR STRANDED ANNEALED OR HARD COPPER TRACER WIRES WITH GREEN 45 MIL-THICK INSULATION (HMWPE) SHALL BE ATTACHED TO THE SEWER PIPE IN ACCORDANCE WITH CURRENT WRC SPECIFICATIONS. SPLICES SHALL BE MADE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. SPLICE SHALL THEN BE ATTACHED TO PIPE WITH TIES AND HEAT SHRINK-WRAPPED IN PLACE TO RE-ESTABLISH INSULATION ACROSS SPLICED LENGTH. ALL SPLICES SHALL REQUIRE TESTING OF THE ENTIRE LENGTH OF WIRE FOR CONTINUITY FROM STRUCTURE TO STRUCTURE. A MINIMUM LENGTH OF 6 FEET OF TRACER WIRE SHALL BE COILED AND LEFT ACCESSIBLE UNDER THE COVER OF ALL MANHOLES, SERVICE VALVE BOXES AND OTHER STRUCTURES AS DIRECTED BY THE ENGINEER. THE TRACER WIRE SHALL BE ATTACHED TO THE OUTSIDE OF THE MANHOLE DIRECTLY ABOVE THE PIPE AND SHALL ENTER THE MANHOLE BETWEEN THE MANHOLE COVER FRAME AND ADJUSTMENT MATERIAL. CONTRACTOR IS RESPONSIBLE FOR TESTING CONTINUITY OF TRACER WIRE FROM STRUCTURE TO STRUCTURE USING EQUIPMENT COMPATIBLE WITH OAKLAND COUNTY WATER RESOURCES COMMISSIONERS OFFICE OR LOCAL CITY/VILLAGE/TOWNSHIP MISS DIG LOCATING DEVICES. AT LEAST ONE OF THE TWO WIRES SHALL BE REQUIRED TO HAVE PASSED THE CONTINUITY TESTING REQUIREMENT.

7. ALL GRINDER DISCHARGE LINES SHALL BE 1.5" NOMINAL DIA. (COPPER TUBE SIZE C.T.S.) SDR 9 HDPE OR AN APPROVED EQUAL PIPE PER ASTM D2737 (STANDARD SPECIFICATION FOR POLYTHYLENE (PE) PLASTIC TUBING). MAINLINE FORCEMAINS TO BE HDPE SDR11 (IRON PIPE SIZE, I.P.S.)

8. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWN SPOUT DRAINAGE, OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.

9. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (800-482-7171) FOR THE LOCATION OF UNDERGROUND PIPELINE AND CABLE FACILITIES AND SHALL ALSO NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK.

10. AN 18 INCH MINIMUM VERTICAL SEPARATION AND 10 FOOT MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN SANITARY SEWER AND WATER MAIN IN ACCORDANCE WITH RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES. (i.e. 10 STATES STANDARDS).

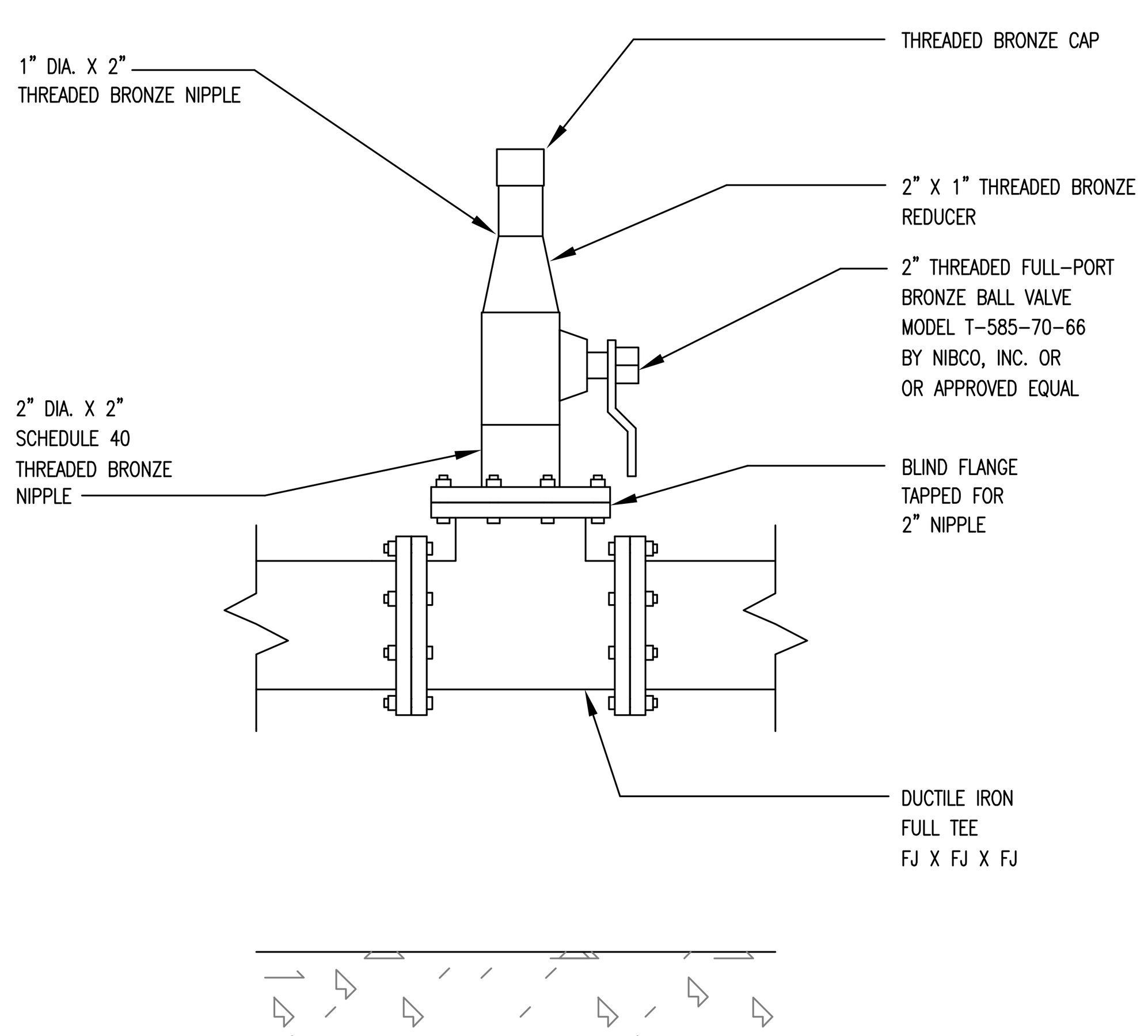
11. FOR PIPING INSTALLED USING OPEN-CUT EXCAVATION, EXCAVATION METHODS, CONTROL AND DISPOSAL OF WATER, PIPE SUPPORT, AND BEDDING AND BACKFILLING SHALL BE IN ACCORDANCE WITH THE OCWRC LOW PRESSURE SEWER SPECIFICATIONS.

12. ALL PIPE SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE OAKLAND COUNTY WATER RESOURCES COMMISSIONERS LOW PRESSURE SEWER SPECIFICATION (i.e. SECTION 33 33 00).

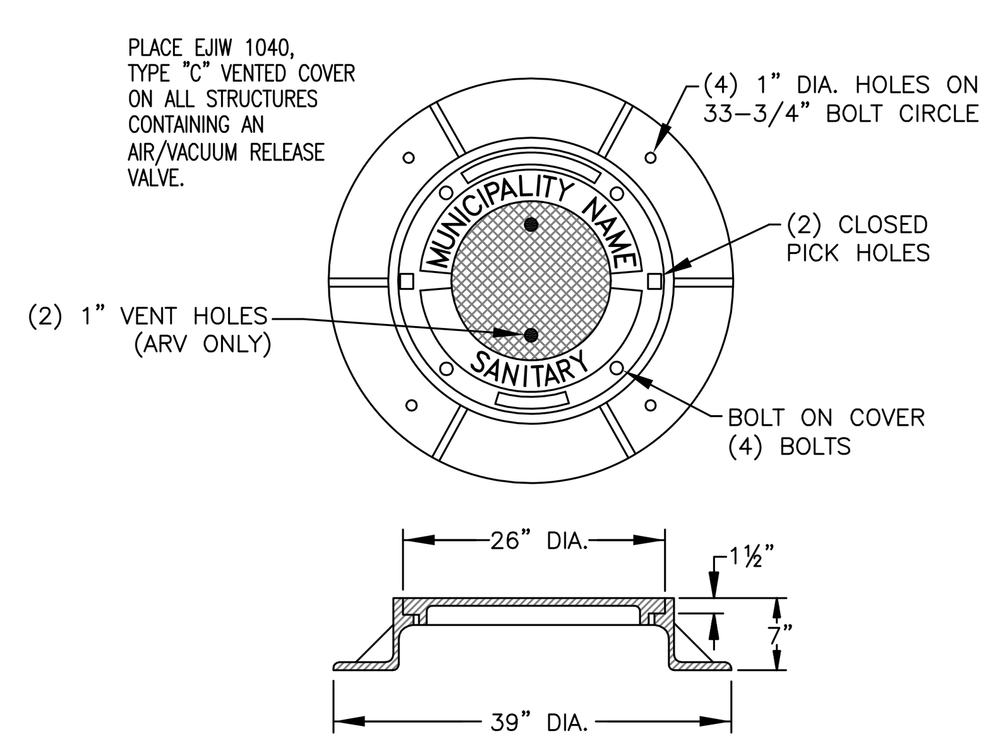
13. SEE OAKLAND COUNTY LOW PRESSURE SEWER SPECIFICATION (i.e. SECTION NO. 33 33 00) FOR ADDITIONAL REQUIREMENTS.

MANHOLE RIM ADJUSTMENT CHART

MANHOLE LOCATION	SET RIM ELEVATION
DITCH	12" ABOVE FINISH GRADE
FLOOD PLAIN	12" ABOVE STANDING WATER
GRAVEL ROAD / SHOULDER	6" BELOW FINISH GRADE
PAVEMENT / GREENBELT	FLUSH WITH FINISH GRADE



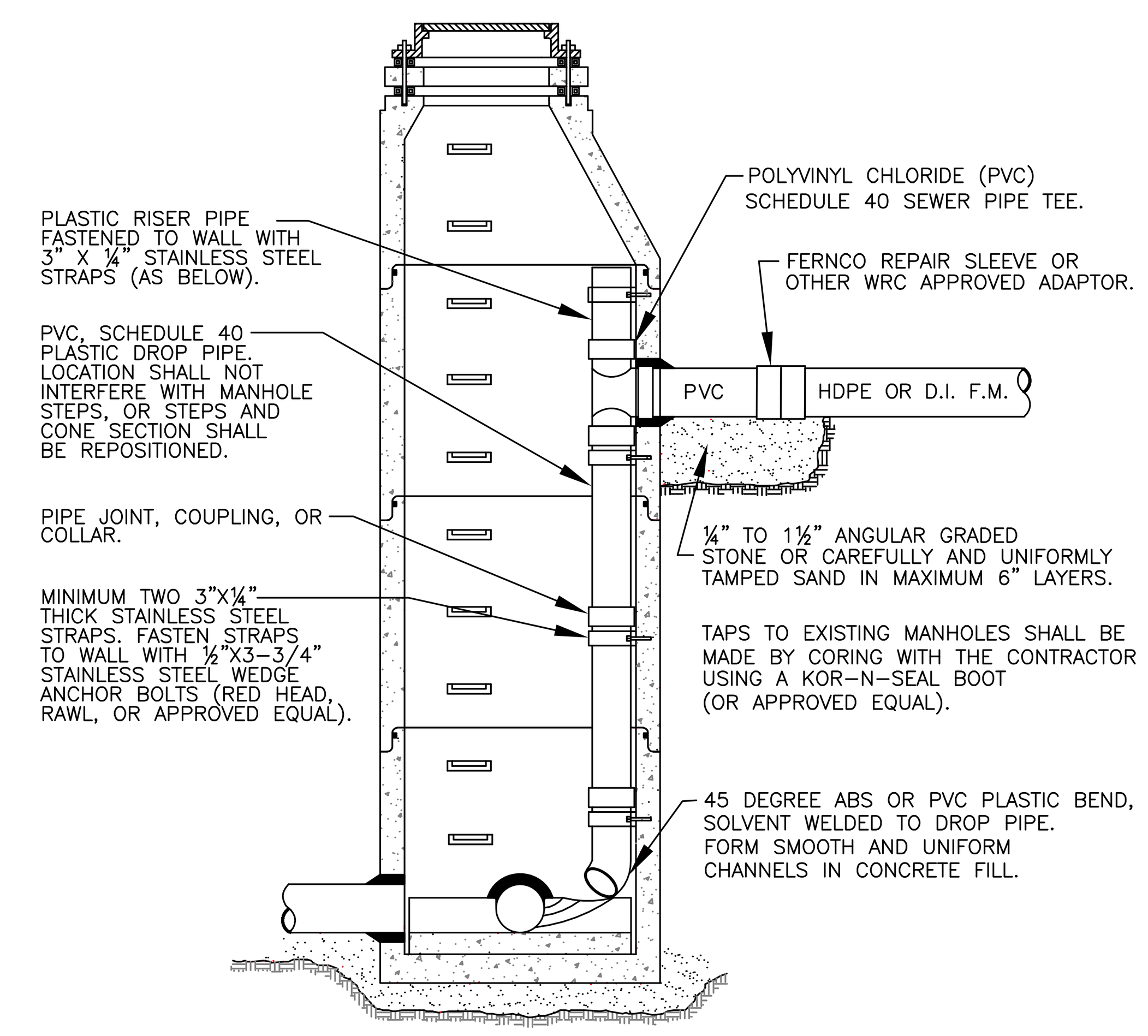
TYPICAL CLEAN OUT ASSEMBLY



EAST JORDAN IRON WORKS
HEAVY DUTY MATERIAL ASTM A48 CL.35
COVER WT., 150 LBS., CATALOG NO. 1040A
PATTERN NO. 1040A, PRODUCT NO. 1040XX OAKCOSTD.
2" RAISED LETTERS, 1" RAISED LETTERS
ALL RECESSED FLUSH.

LETTERED MANHOLE COVER FOR LOCAL MUNICIPALITIES

SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.



FORCE MAIN INTERIOR DROP CONNECTION

NOTE: TO BE USED ONLY WHERE SPECIFICALLY AUTHORIZED AND NOT IN ANY MANHOLE IN WHICH AN INTERIOR DROP CONNECTION ALREADY EXISTS.

LOW PRESSURE SANITARY SEWER DETAILS AND NOTES

REVISION BLOCK

Data Source / Source Date: N/A

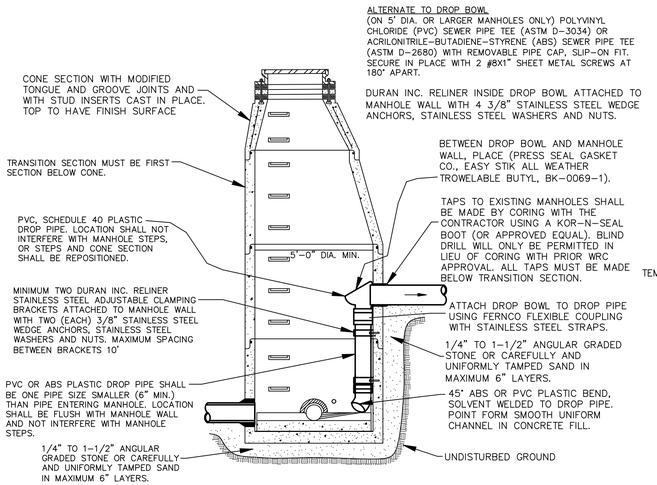
Rev. No.:	Rev. By:	Rev. Date:	Description:
1	DS	4-15-13	APPROVED BY ENGINEERING STANDARDS COMMITTEE
2			
3			
4			

ORIG. DATE:	05/15/2013
SCALE:	NONE
DESIGNED BY:	WRC
DRAWN BY:	WRC Mapping

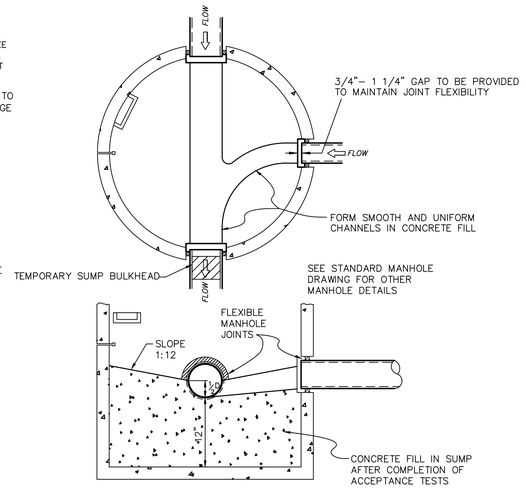
WRC WATER RESOURCES COMMISSIONER Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
WATERFORD, MICHIGAN
48328-1907

SHEET NO.: 2 of 3

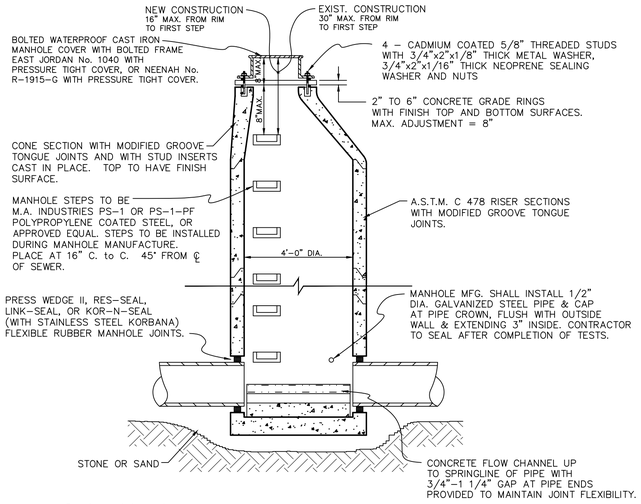


INTERIOR DROP CONNECTION



Drawing not to scale.

SUMP MANHOLE FOR
TESTING, CLEANING, AND DEWATERING



Drawing not to scale.

STANDARD MANHOLE
ON 8" THROUGH 24" DIAMETER SEWERS

SANITARY SEWER CONSTRUCTION NOTES

1. 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.

2. 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 it's consultant in advance with 24 hour notice at 248-858-1110.

3. 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.

4. 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 fillet provided for the flow channel. A watertight bulkhead shall be provided on the downstream of the sump manhole.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer installation.

12. 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.

13. 18" minimum vertical separation and 10' minimum horizontal separation must be maintained between sanitary sewer and water main.

14. 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."

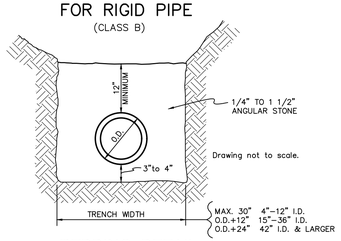
Drawing not to scale.

HOUSE/BUILDING LEAD DETAIL

Drawing not to scale.

NOTE: APPROVAL MAY BE GIVEN TO ALTERNATE MATERIALS AND METHODS TO ACHIEVE CLASS B BEDDING

BEDDING DETAIL
FOR RIGID PIPE
(CLASS B)



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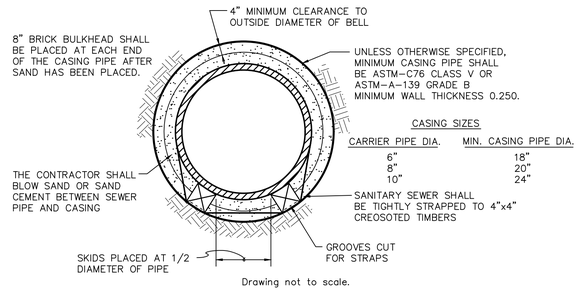
BEDDING DETAIL
FOR FLEXIBLE PIPE



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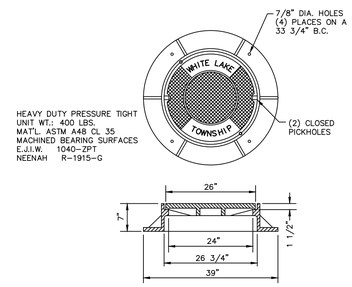
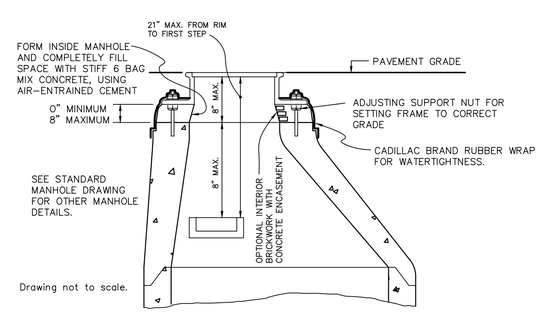
PIPE BARREL SUPPORT FOR SEWER



MANHOLE COVER & FRAME

Drawing not to scale.

SKETCH OF MINIMUM MANHOLE REQUIREMENTS
ON MANHOLES CONSTRUCTED OVER EXISTING SEWERS



Drawing not to scale.

OPTIONAL CONSTRUCTION DETAILS

DRAWN: CAD
DESIGN: OA
CHECKED: -

SCALE: VERT. -
HORZ. AS NOTED

REVISIONS

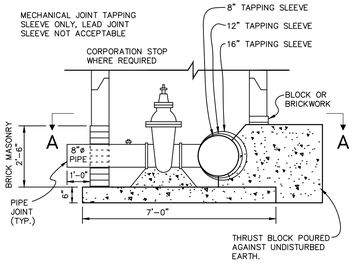
MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
	FIRST ISSUE	09/11/97		OCWRC COMMENTS	11/06/15			
	UPDATED TITLE BLOCK	04/30/13						
	UPDATED NOTES	02/17/15						

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 48060, tel (810) 987-7820 fax (810) 987-7895

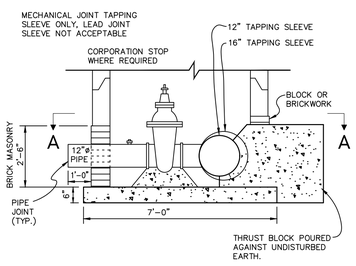
White Lake Township
7525 Highland Road (M-59)
White Lake, Michigan 48383
248-698-3300

SANITARY SEWER STANDARD DETAILS

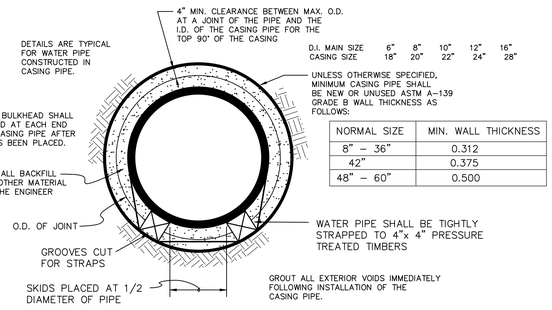
JOB NO.
DATE ISSUED 09/11/97
SHEET NO.



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



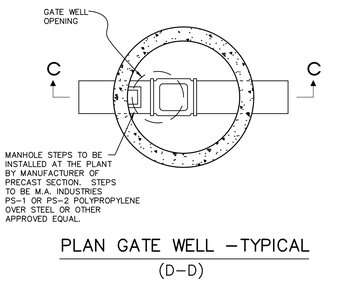
16" X 12", 12" X 12"
TAPPING SLEEVE, VALVE & WELL
(B-B)



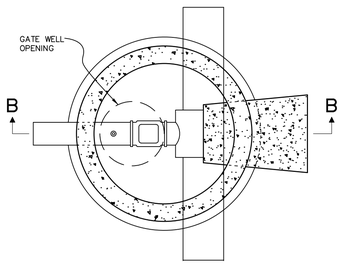
NORMAL SIZE	MIN. WALL THICKNESS
8" – 36"	0.312
42"	0.375
48" – 60"	0.500

Drawing not to scale.

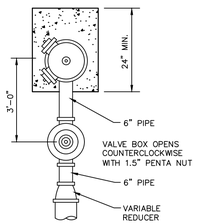
PIPE BARREL SUPPORT FOR WATER MAIN
CONSTRUCTED IN CASING

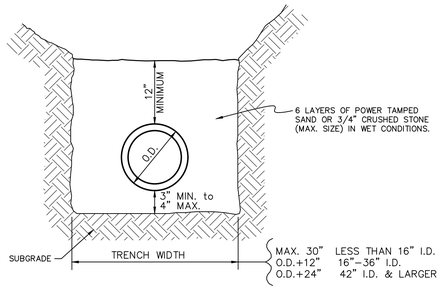


PLAN GATE WELL – TYPICAL
(D-D)

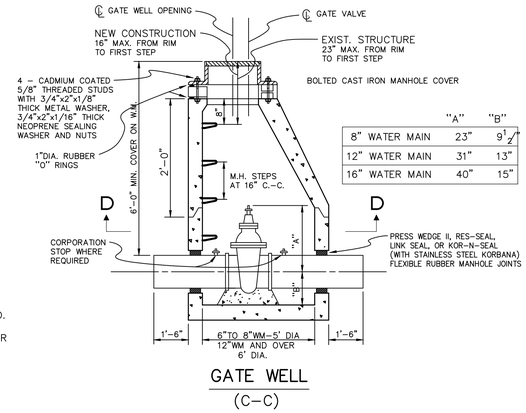


PLAN TAPPING SLEEVE, VALVE & WELL – TYPICAL
(A-A)





Drawing not to scale.
STANDARD BEDDING
FOR WATER PIPE



	"A"	"B"
8" WATER MAIN	23"	9 1/2"
12" WATER MAIN	31"	13"
16" WATER MAIN	40"	15"

GATE WELL
(C-C)

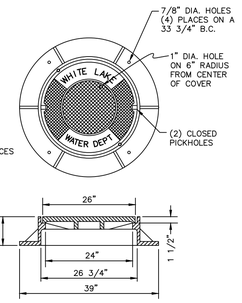
WATER MAIN NOTES

1. All construction procedures and materials used on this project shall conform to White Lake Township current standards and specifications.
2. 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" pumper outlets with 5" Storz quick connect nozzles (Harrington Integral Hydrant Storz, Model HIHS) as manufactured by Harrington, Inc. of Erie, PA.
3. All hydrants shall be field painted with a heavy coat of bright safety red polyurethane or alkyd gloss enamel, except for the Storz fittings and caps, which shall be left unpainted.
4. 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.
5. 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 bends, 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.
6. Tapping sleeve shall be mechanical joint or approved equal. Ductile Iron or Stainless steel are allowed.
7. Specifications shall include direction of operation of all valves. All valves shall be counter clockwise open.
8. All necessary easements shall be provided in the name of White Lake Township before acceptance of the water distribution system.
9. The design engineer shall furnish White Lake Township with one reproducible sets of "As–Built" water main plans or an AutoCAD file upon completion of the job.
10. 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.
11. Gate well 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 Water Department"
12. 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.
13. 1" corporation stops are to 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.
14. 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.
15. 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.
16. 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.
17. Adjustments on gate wells shall be limited to 23" maximum from top of rim to first step in accordance with MIOSHA Rule 341.
18. 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 D2737–03 (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–901 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.

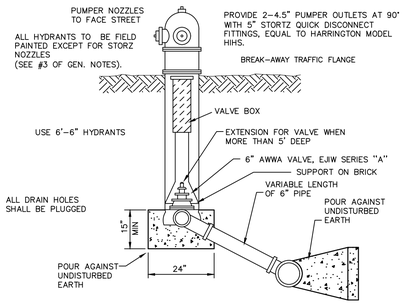
    Plastic water service pipes shall be traced with two #10 copper tracer wires or two #12 copper coated steel or stainless steel wires insulated with a minimum of 30 mils of polyethylene insulation. The tracer wires shall be terminated to supply line so as to be locatable at the building and the curb box without digging.

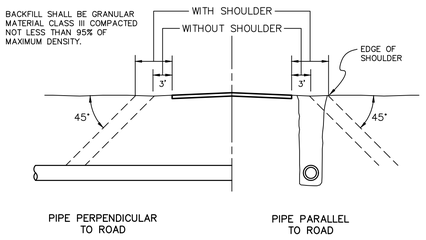
    Water services sizes 3" and greater shall be Class 54 cement lined ductile iron with push on joints or HDPE DR–9 (200 PSI rated) with fusion welded joints and fittings, DIPS (Ductile Iron Pipe Size).

    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.
19. Standard pipe cover shall be 6'–0".
20. 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 air discharge shall be extended to within 12" of the top of the structure. A gooseneck trap shall be installed at the top of the riser to prevent debris & water from entering the valve.

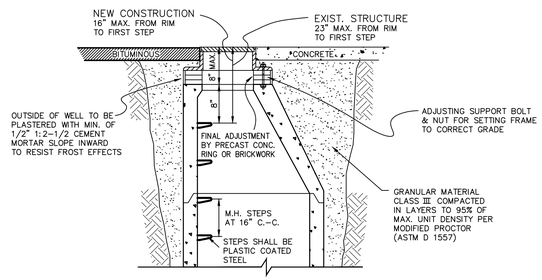


GATE WELL COVER & FRAME

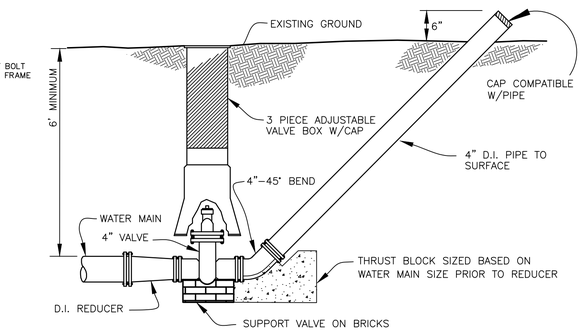




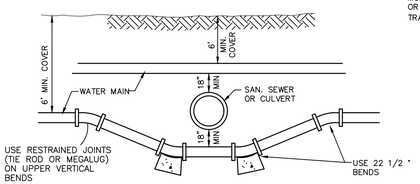
BACKFILL IN THE AREA OF STREETS,
ALLEYS, SIDEWALKS, DRIVES & PARKING AREAS



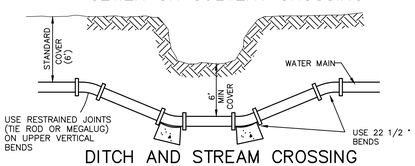
GATE WELL TOPS WITHIN PAVEMENT AREAS



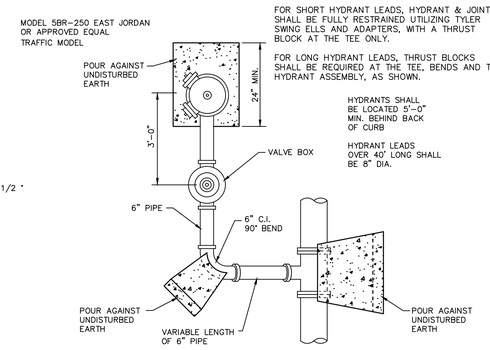
TEMPORARY BLOWOFF ASS'Y



SEWER OR CULVERT CROSSING

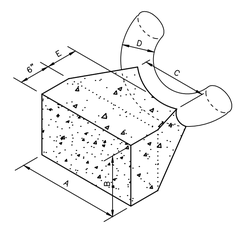


DITCH AND STREAM CROSSING



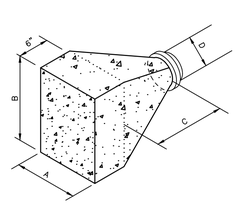
DETAIL OF HYDRANT SETTINGS

NOTE: 3000 PSI CONCRETE TO BE USED. THRUST BLOCK TO ABUT & REST AGAINST UNDISTURBED SOIL. RESTRAINED JOINTS WILL BE REQUIRED IF SOIL STABILITY IS QUESTIONABLE.



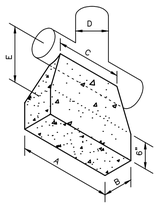
FOR 90° BENDS OR SMALLER

D	A	B	C	E MIN
20"	8"	6.5'	3.5'	2.5'
16"	6"	4'	2.5'	2'
12"	4"	3'	2'	1.75'
10"	3'	3'	2'	1.75'
8"	3'	2'	2'	1.5'
6"	2'	1.5'	2'	1.25'



FOR PLUGS

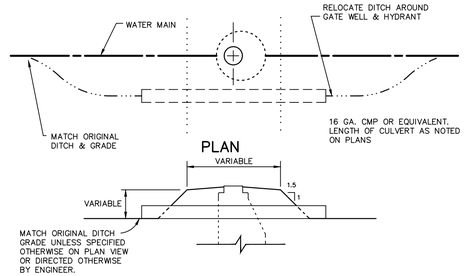
D	A	B	C MIN
20"	7'	5'	2.5'
16"	4.8'	4.8'	2'
12"	4.3'	3'	1.75'
10"	3'	2'	1.5'
8"	2.8'	2.5'	1.5'
6"	1.5'	1.5'	0.25'



FOR TEES

D	A	B	C	E MIN
20"	6.5'	4.5'	3.5'	3'
16"	4.7'	4.7'	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2.7'	2'	2'	2.25'
6"	2'	2'	2'	2.25'

THRUST BLOCK DETAILS



PROFILE
DITCH ENCLOSURE AT GATE WELL

DRAWN: CAD
DESIGN: OA
CHECKED: –

SCALE: VERT. –
HORZ. AS NOTED

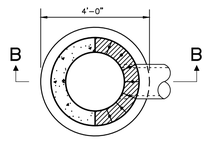
REVISIONS	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE	MARK	ADDENDUM/CHANGE ORDER	DATE
		GENERAL REVISION TO CAD	12/29/95		GW & NUT SIZE	07/23/98		CLARIFY HYD. SPEC	02/07/01		REV. HYD, THRUST, AIR REL.	03/29/04
		ADD NOTE 17	11/04/97		PIPE CIVER & FLANGE TAPE	05/12/99		5–BR HYD, WS STAKE	02/27/02		HDPE, HYD, VALVES	07/18/05
		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
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 48060
tel (810) 987-7820 fax (810) 987-7895

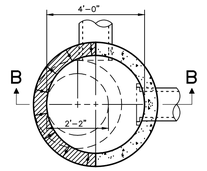
White Lake Township
7525 Highland Road (M-59)
White Lake, Michigan 48383
248-698-3300

WATER MAIN STANDARD DETAILS

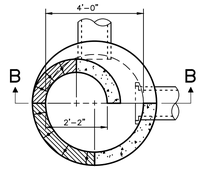
JOB NO.
DATE ISSUED
SHEET NO.



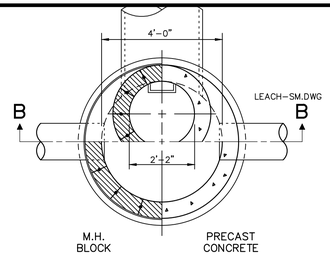
SECTION A–A



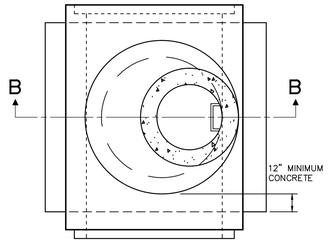
SECTION A–A



SECTION A–A

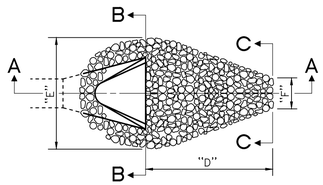


SECTION A–A



SECTION A–A

PIPE DIA.	"D"	"E"	"F"	S.Y.
12"	5'-0"	6'-6"	3'-0"	4
15"	5'-0"	7'-0"	3'-0"	4
18"	5'-0"	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'-9"	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



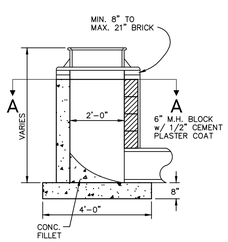
PLAN VIEW

STORM SEWER NOTES

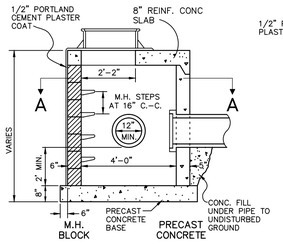
1. PRECAST CONC. RISERS SHALL MEET A.S.T.M. C478
2. DIAMETER OF CONC. BASE: I.D. + 2(WALL) + 8"
3. MANHOLE STEP SPACING SHALL MEET MIOSHA REQUIREMENTS. NO MORE THAN 21" FROM RIM TO FIRST STEP. MAX. 16" O.C. STEPS SHALL BE CAST POLYPROPYLENE REINFORCED WITH A 1/2" STEEL ROD.
4. WALL THICKNESS OF BLOCK STRUCTURES SHALL BE:

DEPTH	THICKNESS
0–8'	6"
8–15'	8"
OVER 15'	12"

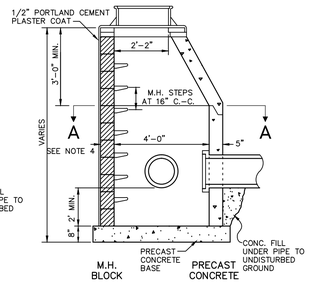
5. MINIMUM I.D. OF STRUCTURE FOR: 36"to 42" = 5'–0"
   48"to 54" = 6'–0"
   LARGER DIAMETER STRUCTURES MAY BE REQUIRED DEPENDING ON PIPING CONFIGURATION.
6. ALL LIFTING HOLES AND VOIDS IN INTERIOR JOINTS SHALL BE FILLED BY MORTAR.
7. THE FINGER DRAIN DETAIL SHALL BE USED AT ALL LOW POINT CATCH BASINS 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" (EJIW 5105) 1.9 CFS*
   –REAR YARD AND DITCH INLETS: (EJIW 1040–02) 2.1 CFS*
   –MANHOLES: MDOT "A" (EJIW 1060)
   –CURB AND GUTTER INLETS: MDOT "K" (EJIW 7045) 1.8 CFS*
   –MOUNTABLE CURB & GUTTER: (EJIW 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 DIG 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 RCOC STANDARDS



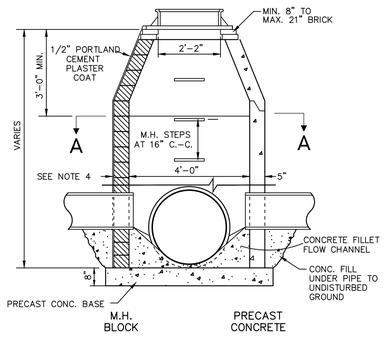
SECTION B–B
24" INLET



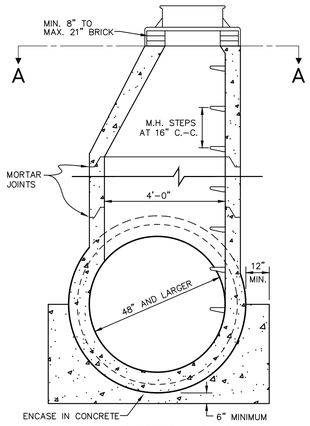
SECTION B–B
STRUCTURE WITH SLAB COVER
(CATCH BASIN SHOWN)



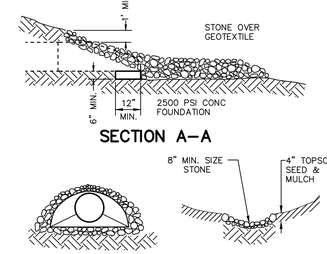
SECTION B–B
STANDARD CATCH BASIN



SECTION B–B
STANDARD STORM MANHOLE

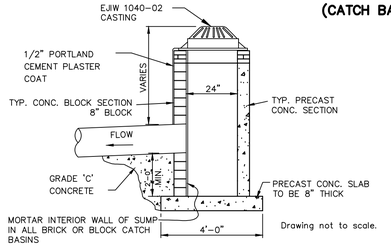


SECTION B–B
STANDARD PRECAST CONCRETE MANHOLE TEE

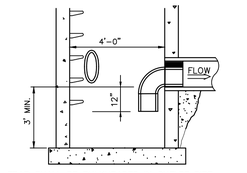


SECTION A–A

SECTION B–B SECTION C–C
PLAIN STONE RIP–RAP



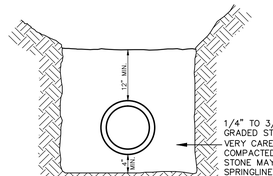
STANDARD REAR YARD CATCH BASIN



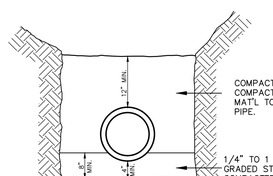
TRAP SHALL BE BULKHEADED IN OUTLET PIPE AND SHALL BE A SCH 40 PVC ASSY WITH A PIPE AREA NO LESS THAN 50% OF THE OUTLET PIPE.

ALTERNATE: USE "THE SNOUT" BASIN TRAP SYSTEM

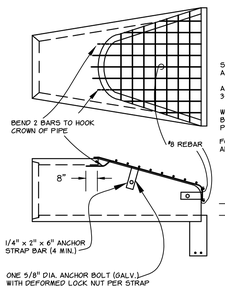
TRAPPED CATCH BASIN



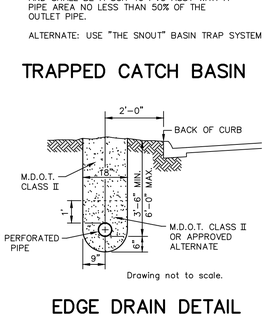
PIPE BEDDING
FOR PLASTIC PIPE



CLASS "B" BEDDING
FOR SEWER PIPE
LESS THAN 48"

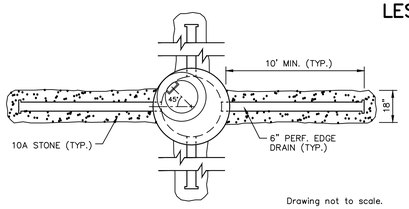


BAR SCREEN DETAIL



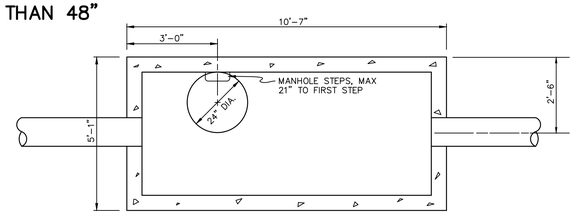
Drawing not to scale.

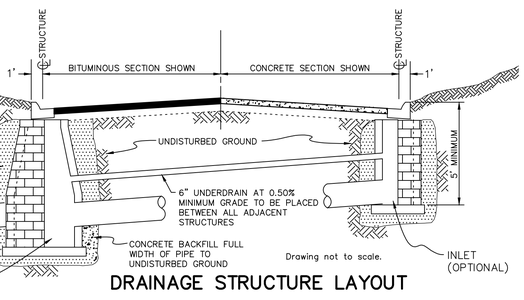
EDGE DRAIN DETAIL



Drawing not to scale.

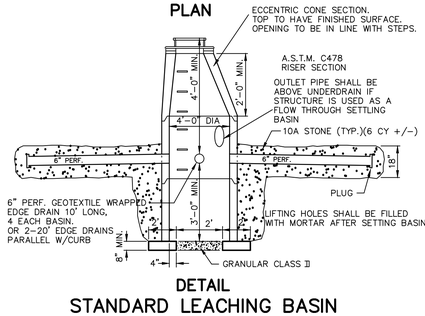
PLAN



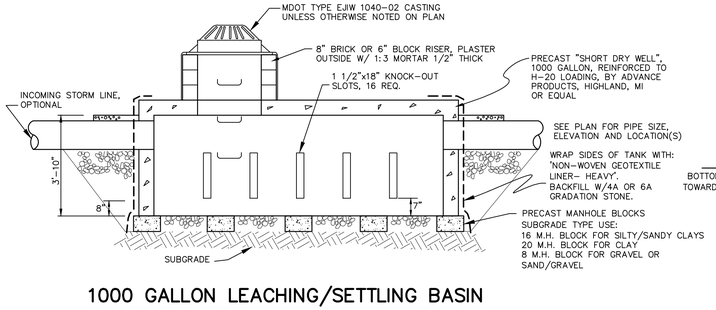


Drawing not to scale.

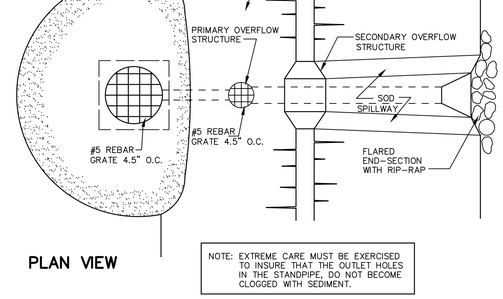
DRAINAGE STRUCTURE LAYOUT



DETAIL
STANDARD LEACHING BASIN

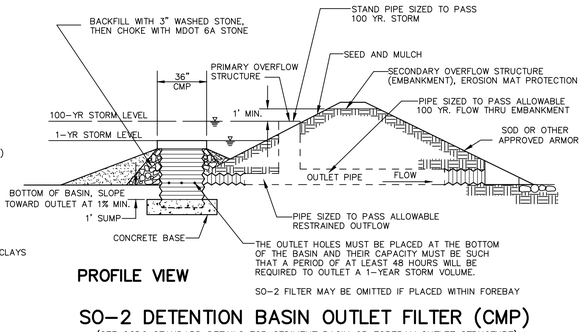


1000 GALLON LEACHING/SETTLING BASIN



PLAN VIEW

NOTE: EXTREME CARE MUST BE EXERCISED TO INSURE THAT THE OUTLET HOLES IN THE STANDPIPE, DO NOT BECOME CLOGGED WITH SEDIMENT.



PROFILE VIEW

SO–2 DETENTION BASIN OUTLET FILTER (CMP)

(SEE OCDC STANDARD DETAILS FOR SEDIMENT BASIN OR FOREBAY OUTLET STRUCTURE)

DRAWN: CAD
DESIGN: OA
CHECKED: –

SCALE: VERT. –
HORZ. AS NOTED

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			

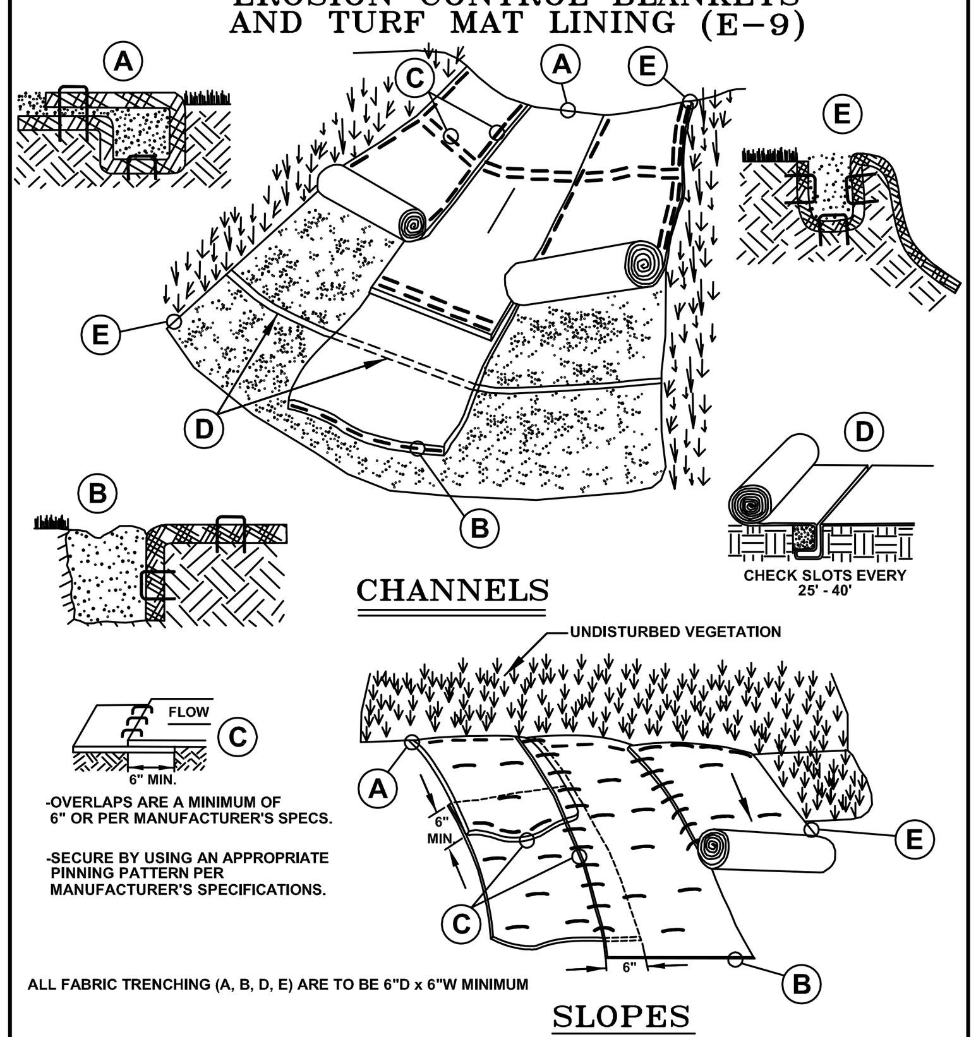
Johnson&Anderson
4494 Elizabeth Lake Road, Waterford, Michigan 48328, tel (248) 681-7800 fax (248) 681-2660
1060 W. Norton Avenue, Suite 7, Muskegon, Michigan 49441, tel (231) 780-3100 fax (231) 780-3115
3910 Lapeer Road, Port Huron, Michigan 48060, tel (810) 987-7820 fax (810) 987-7895

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

STORM SEWER STANDARD DETAILS

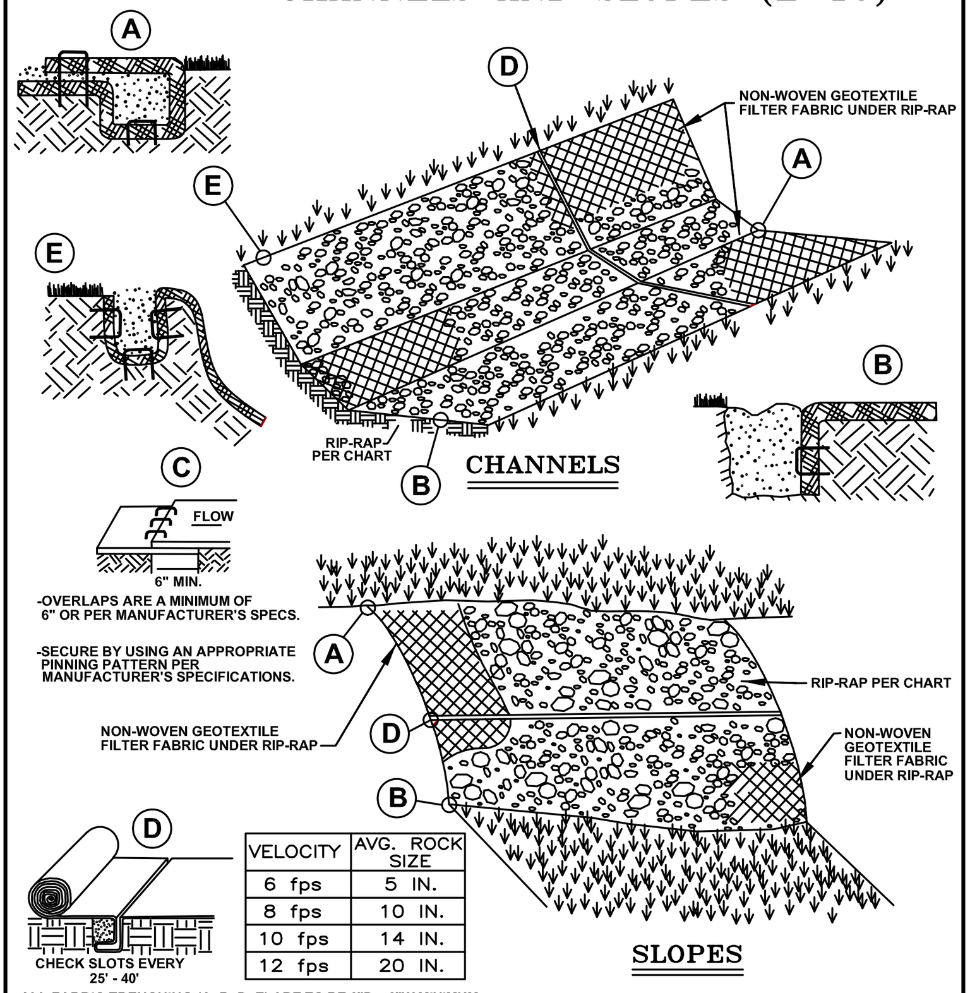
JOB NO.
DATE ISSUED 08/16/95
SHEET NO.

EROSION CONTROL BLANKETS AND TURF MAT LINING (E-9)



DEPENDING ON THE VELOCITY, SLOPE, SOILS, USE PROPER BLANKET OR TURF MAT LINING PER MANUFACTURER'S SPECIFICATIONS TO HANDLE THE SHEER STRESSES OF THE SLOPE/CHANNEL.

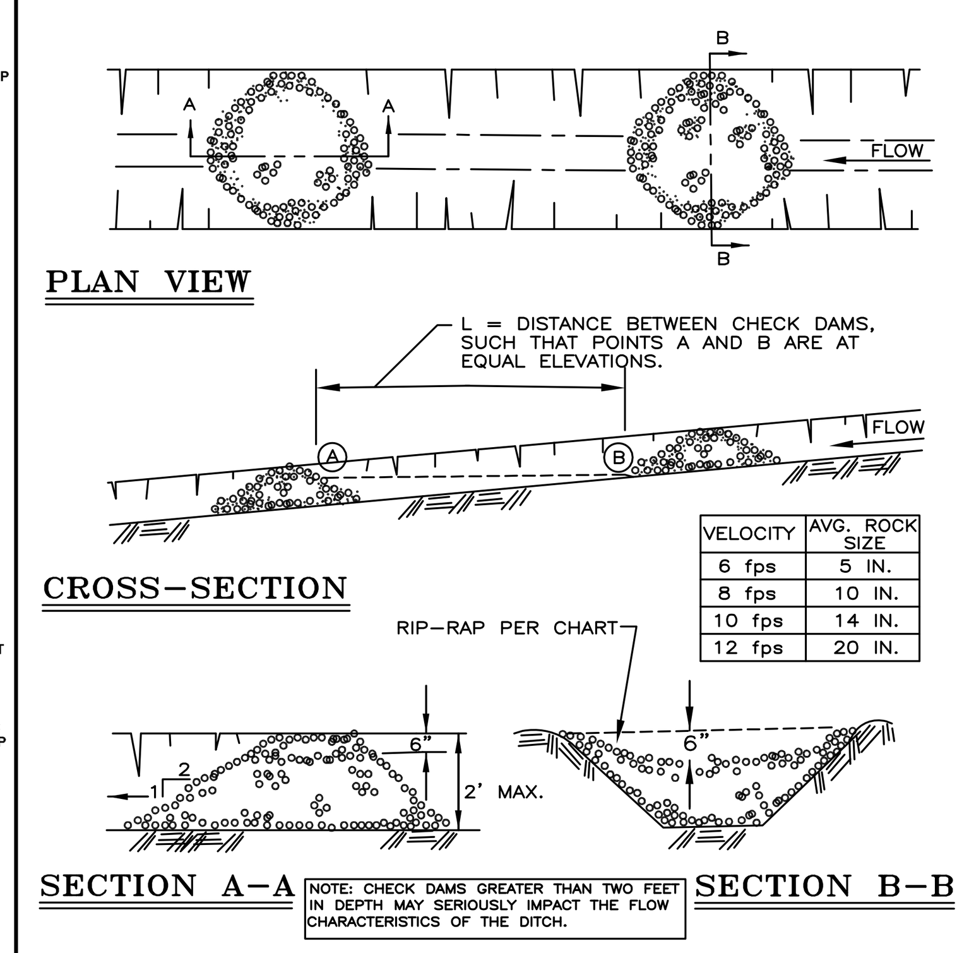
RIP-RAP: CHANNELS AND SLOPES (E-10)



VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP AND NON-WOVEN GEOTEXTILE FABRIC TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.

CHECK DAMS (E-3)

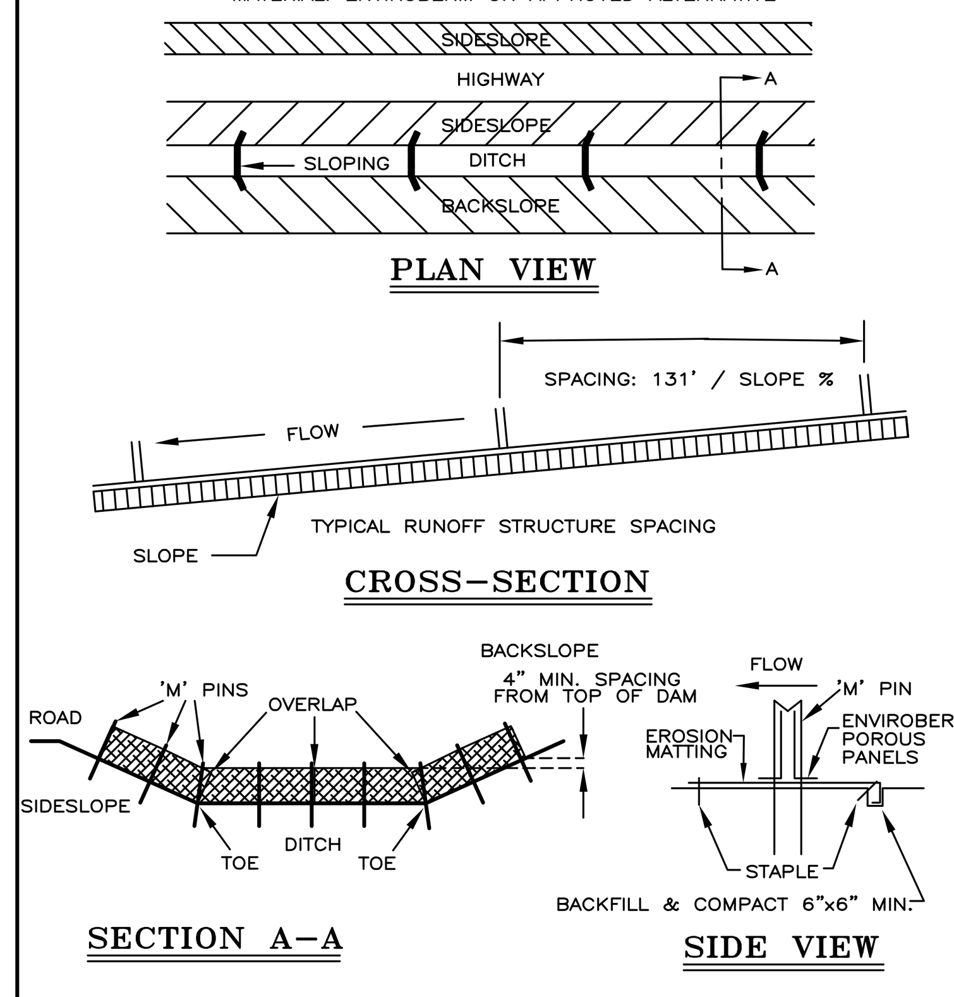


VELOCITY	AVG. ROCK SIZE
6 fps	5 IN.
8 fps	10 IN.
10 fps	14 IN.
12 fps	20 IN.

-DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZED RIP-RAP TO HANDLE THE SHEER STRESS OF THE SLOPE/CHANNEL.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

CHECK DAMS ALTERNATIVE "A" (E-3A)

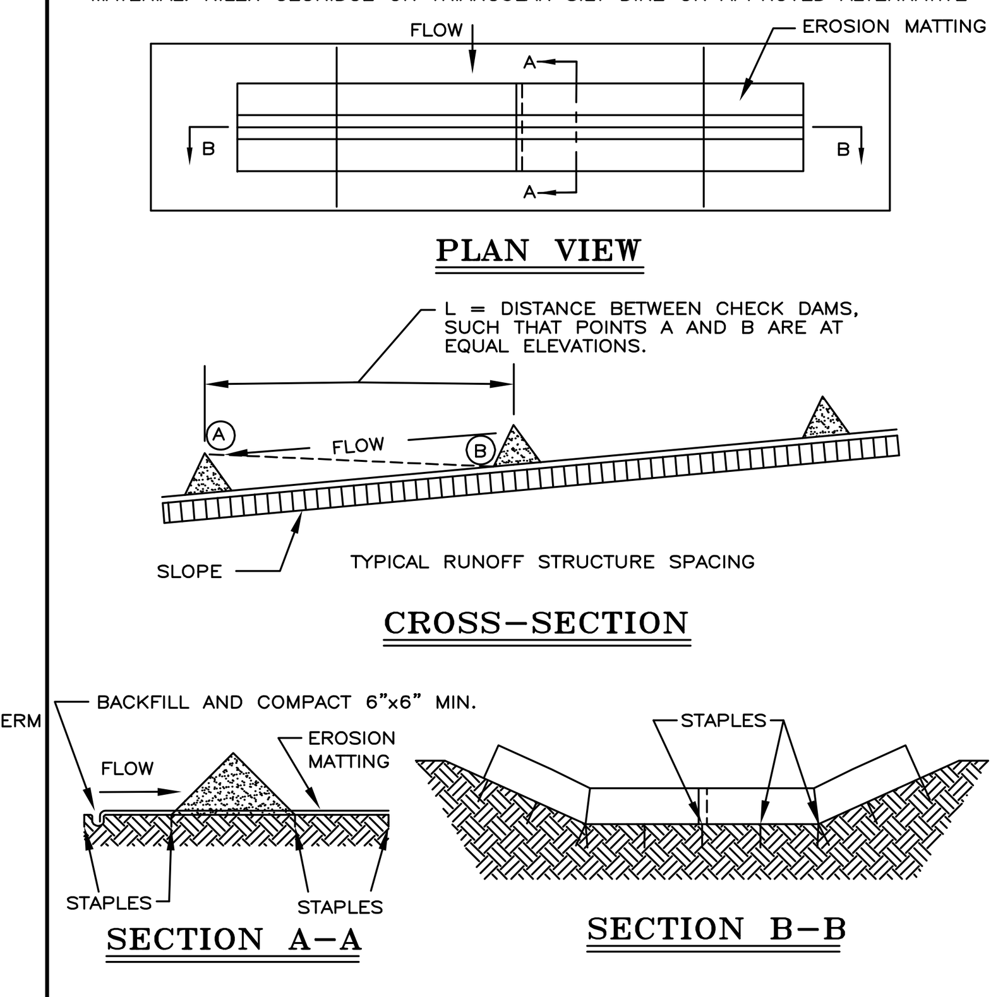
MATERIAL: ENVIROBERM OR APPROVED ALTERNATIVE



-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

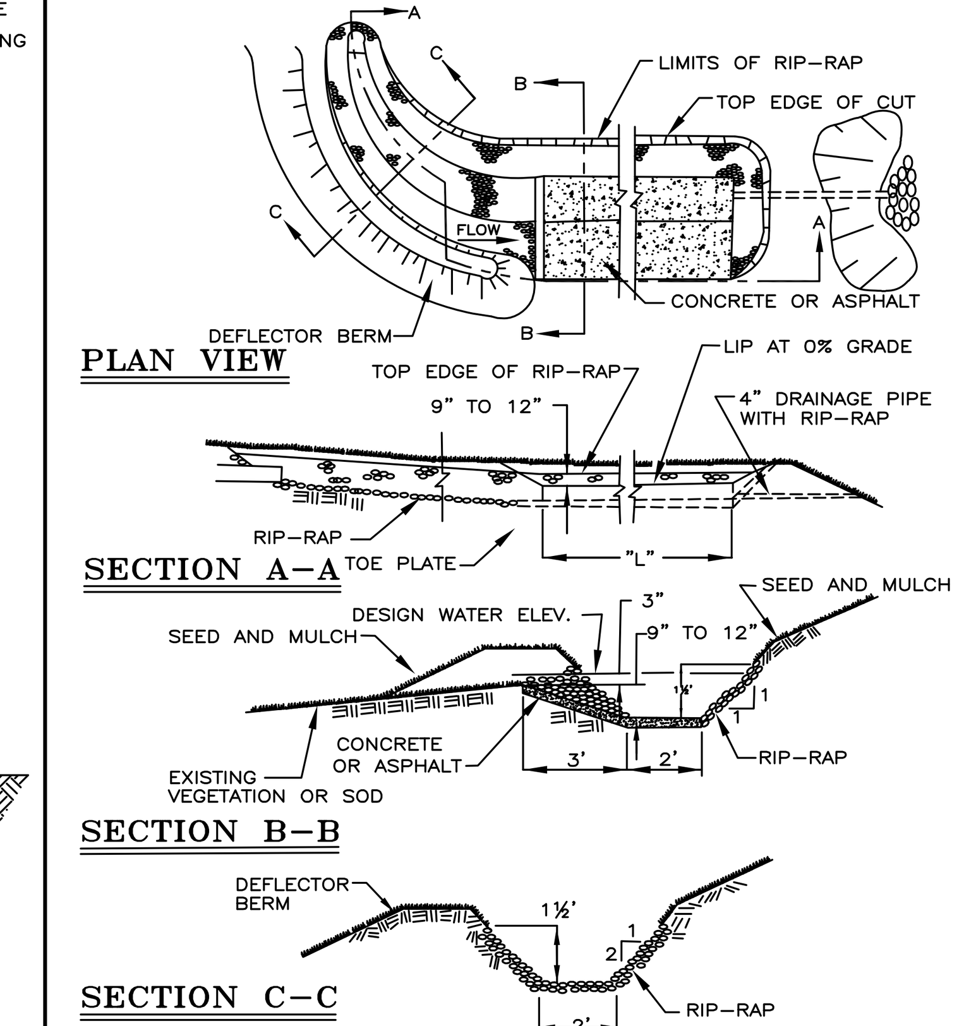
CHECK DAMS ALTERNATIVE "B" (E-3B)

MATERIAL: NILEX GEORIDGE OR TRIANGULAR SILT DIKE OR APPROVED ALTERNATIVE

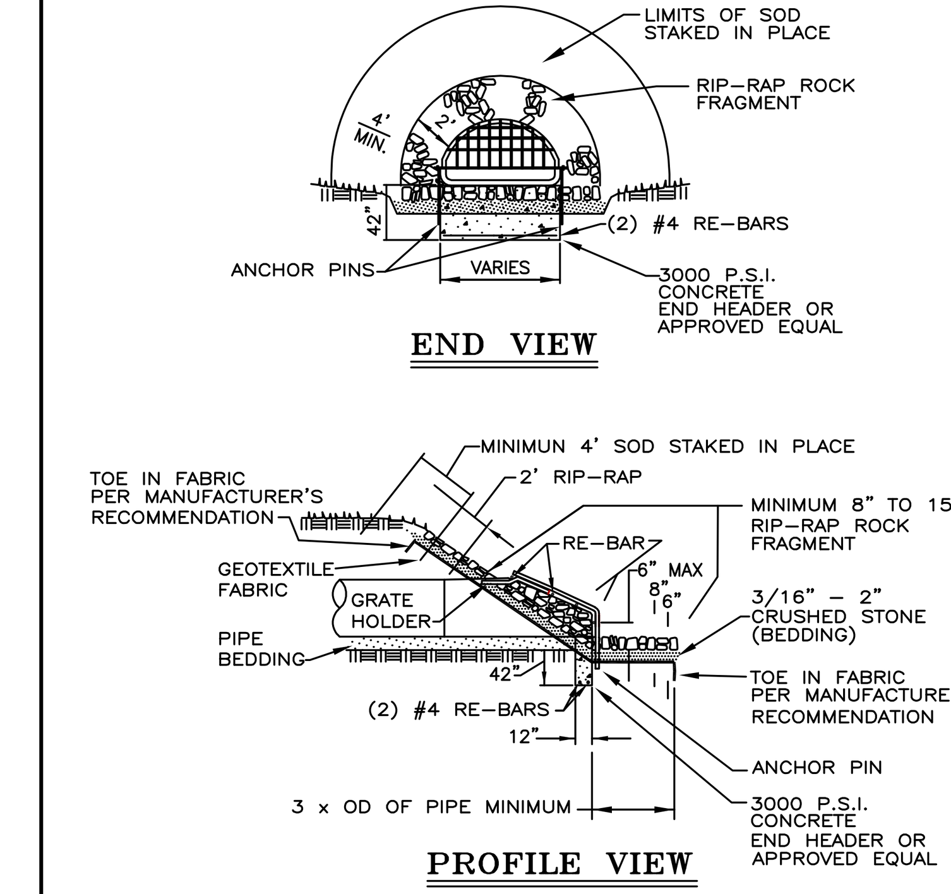


-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

LEVEL SPREADER (E-4)



RIP-RAP, END SECTION AND BAR SCREEN DETAIL (E-7)

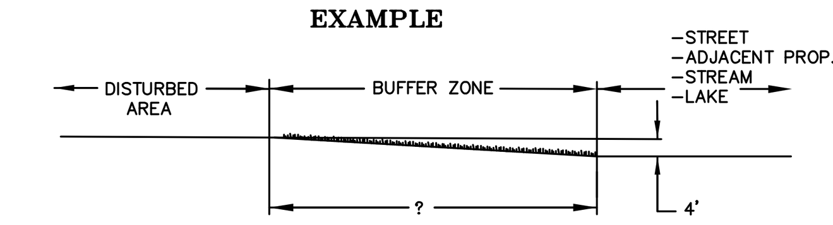


NOTE:
-BAR SCREEN DETAILS PER MDOT ROAD & BRIDGE STANDARD PLANS, STEEL GRATES FOR END SECTIONS. BARS ARE TO BE CUT OFF AT EDGE OF END SECTION.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

VEGETATIVE BUFFER ZONE (SP-1)

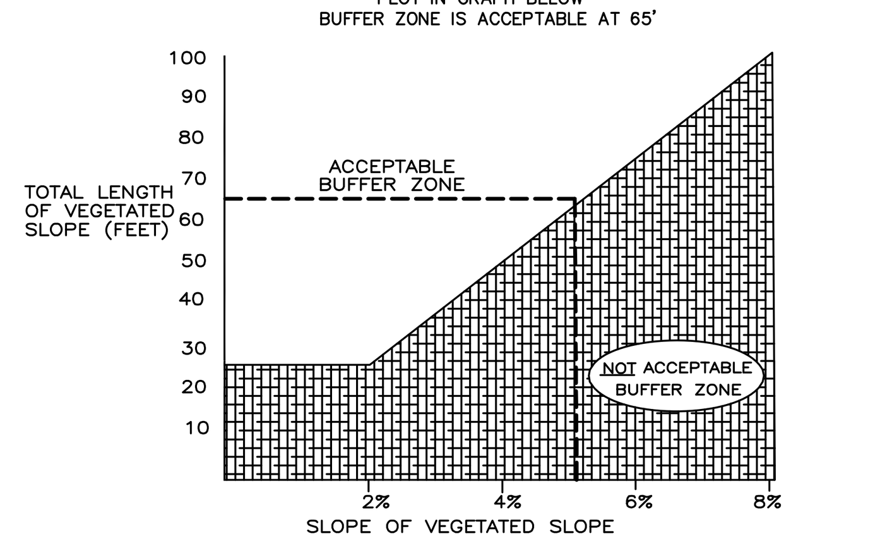
THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER ZONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90% DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS, OR BUSHES AND TREES WITHOUT A GOOD GROUND COVER IS NOT ACCEPTABLE.

EXAMPLE



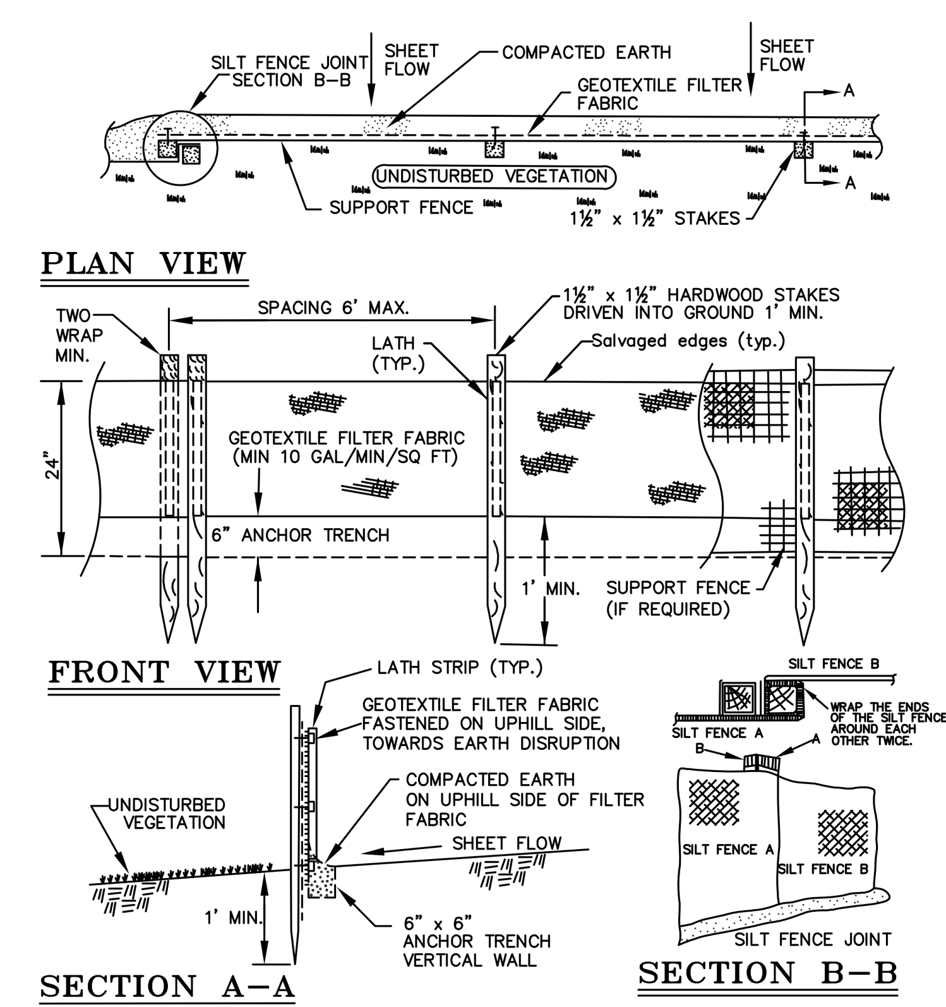
LENGTH OF BUFFER ZONE ?
% OF SLOPE OF BUFFER ZONE = 5%
WHAT IS THE ACCEPTABLE LENGTH OF THE BUFFER ZONE?

PLOT IN GRAPH BELOW
BUFFER ZONE IS ACCEPTABLE AT 65'



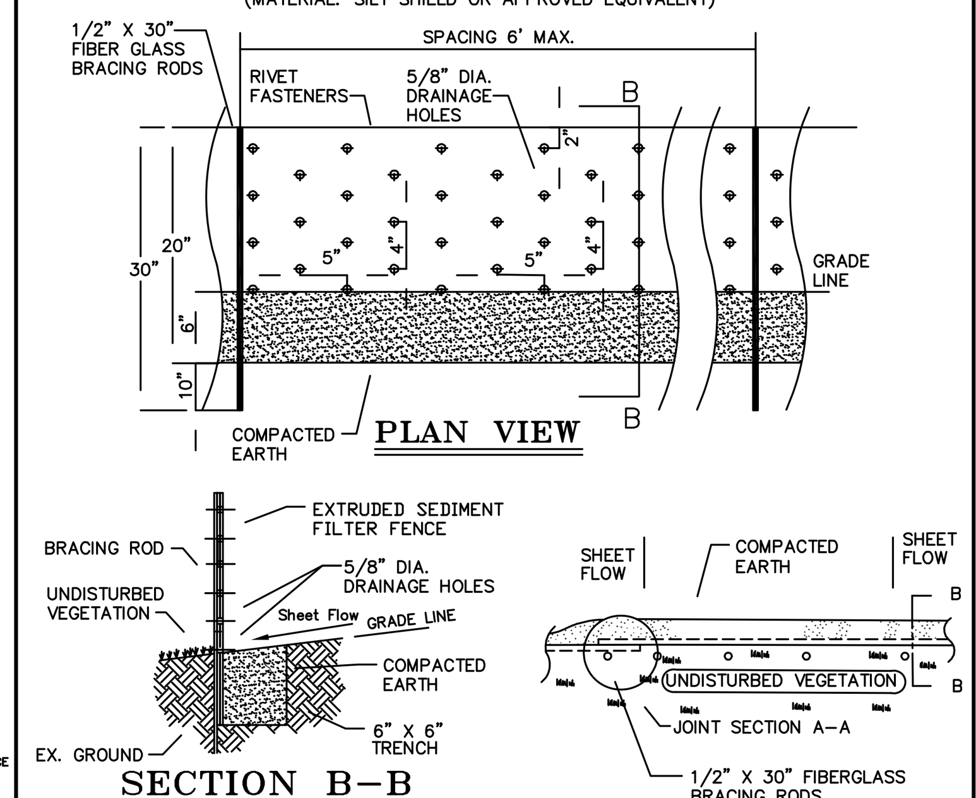
SILT FENCE (SP-2)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

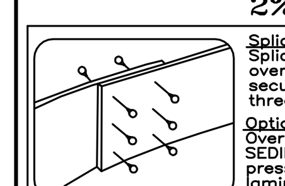


SILT FENCE ALTERNATIVE "A" (SP-2A)

(MATERIAL: SILT SHIELD OR APPROVED EQUIVALENT)



2% GRADE MAXIMUM SLOPE

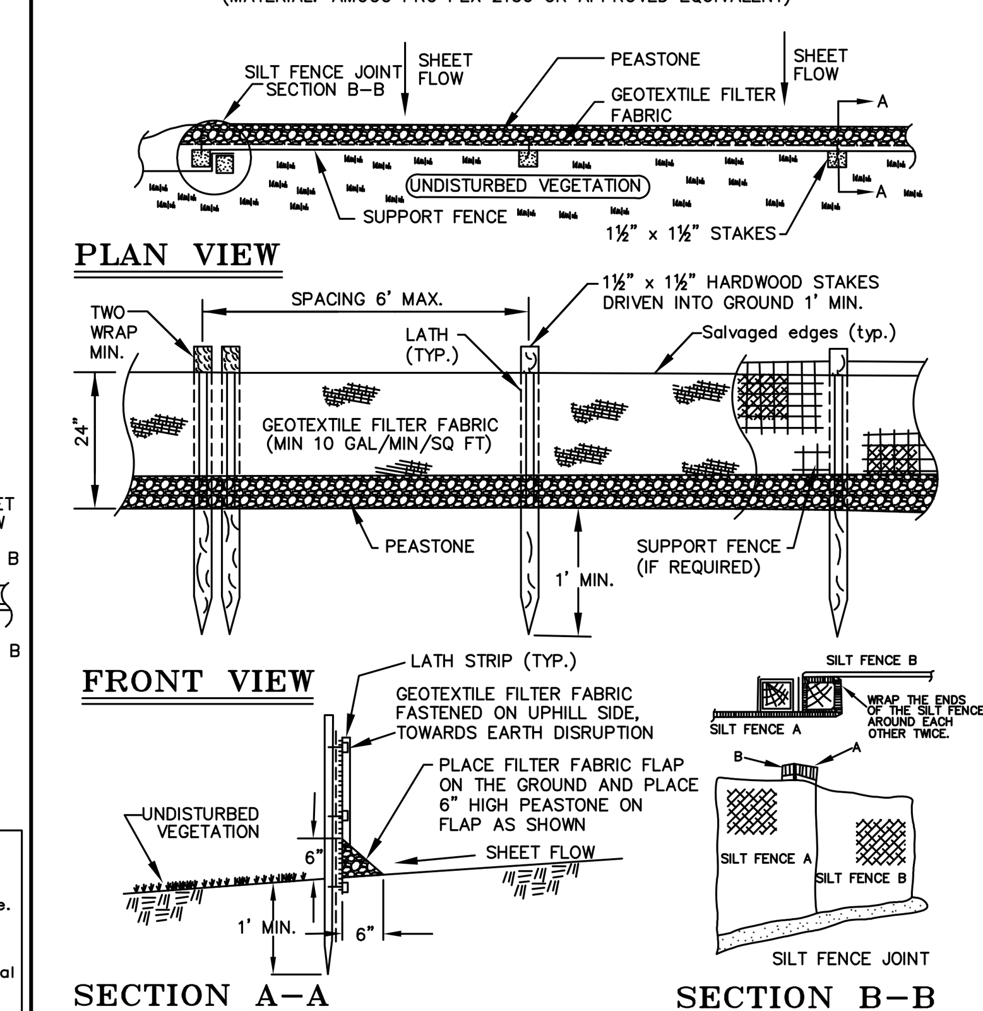


Splicing Procedure:
Splicing EXTRUDED SEDIMENT FILTER FENCE is achieved beginning with an overlap of a min. of 8" of the EXTRUDED SEDIMENT FILTER FENCE ends secured with six of our plastic retchet rivet push-in fasteners. Locate three, evenly spaced, vertically, at least 2" from each edge of the splice.

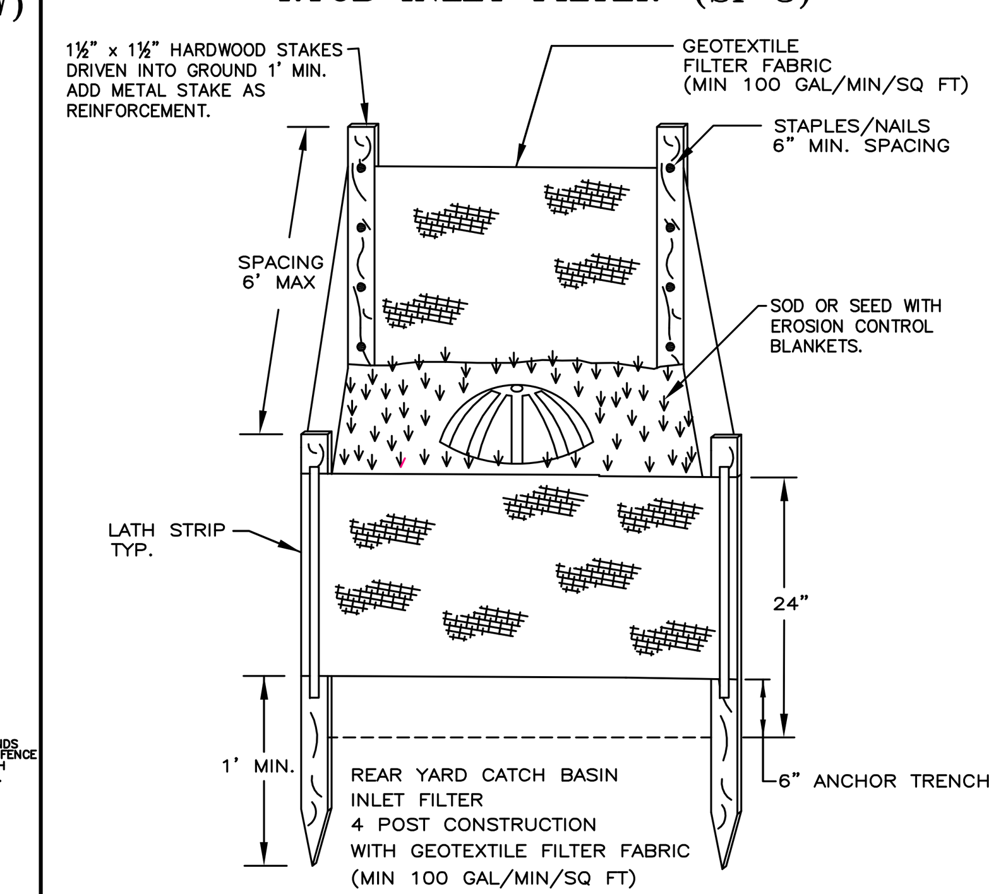
Optional Heat Splicing:
Overlap a minimum of eight inches. Melt a thin layer of EXTRUDED SEDIMENT FILTER FENCE with torch from top to bottom. Immediately press both layers together for a minimum of 5 second. Check for total lamination from top to bottom of material. (Do not apply heat to filter)

WINTER/FROZEN GROUND SILT FENCE (SP-2W)

(MATERIAL: AMOCO PRO PEX 2130 OR APPROVED EQUIVALENT)

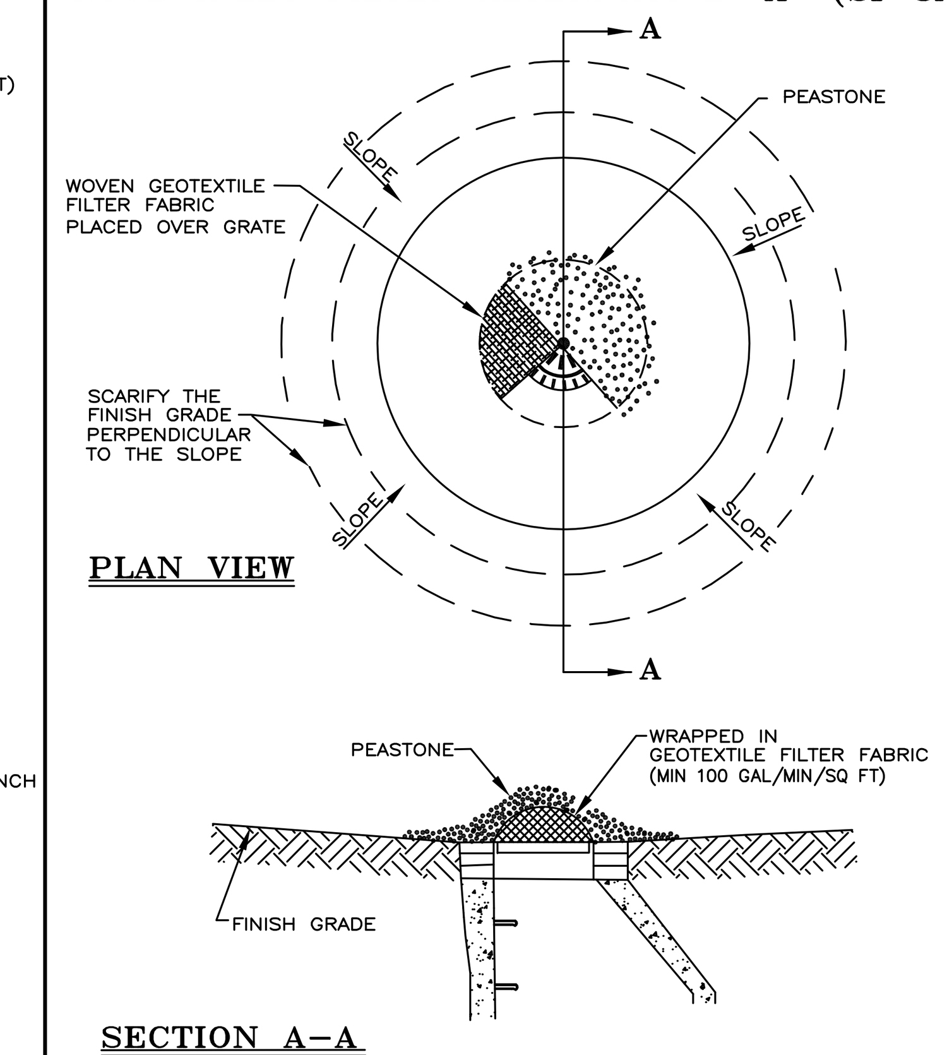


RYCB INLET FILTER (SI-3)



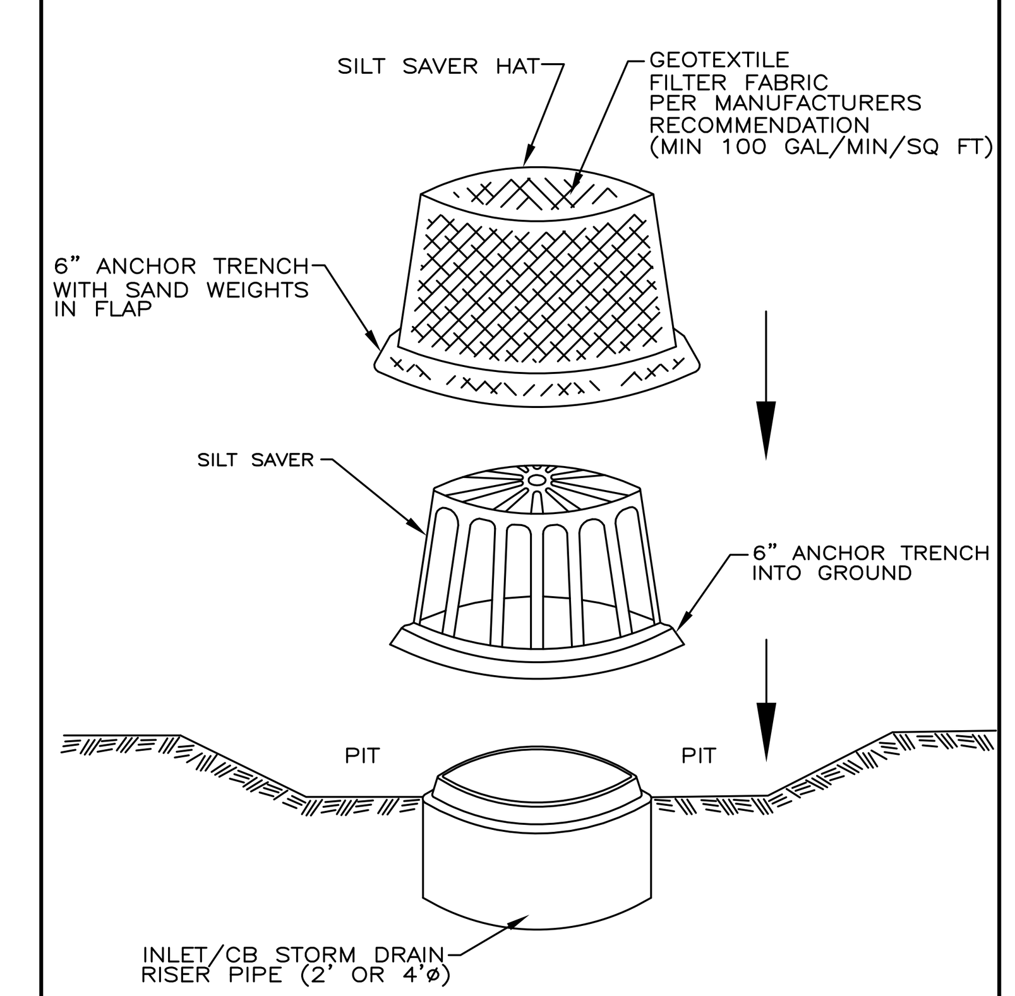
NOTE: MATERIAL IS NOT SILT FENCE MATERIAL

RYCB INLET FILTER ALTERNATIVE "A" (SI-3A)



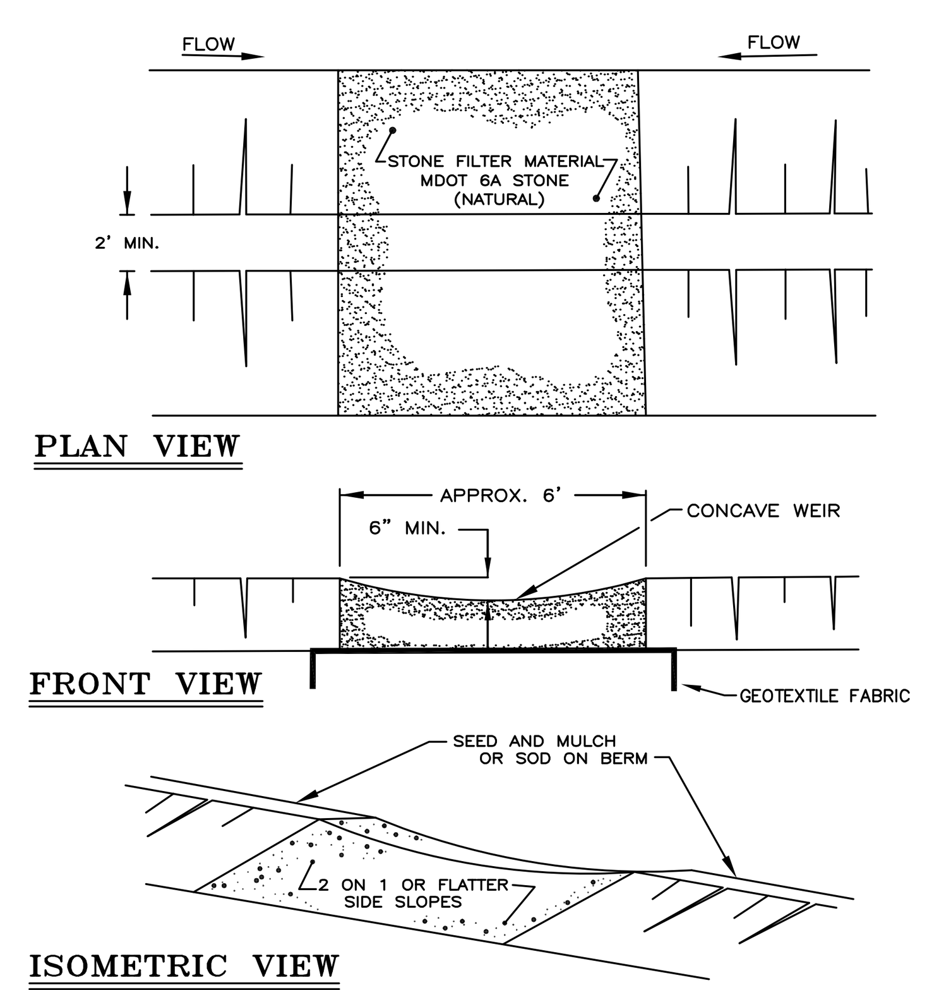
RYCB INLET FILTER ALTERNATIVE "B" (SI-3B)

MATERIAL: SILT SAVER OR APPROVED ALTERNATIVE



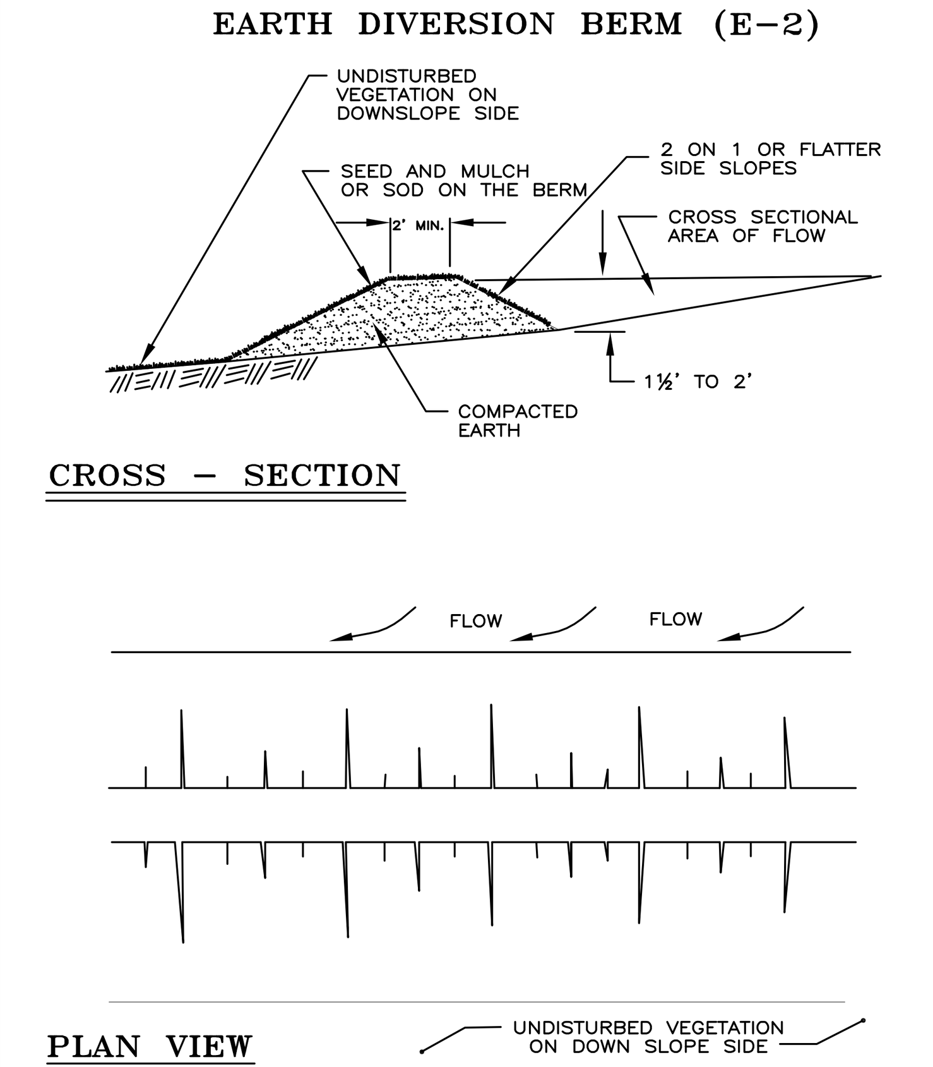
(NOTE: NO PIT REQUIRED WHEN FRAME AND COVER OR GRATE AND COVER ARE IN PLACE.)

EARTH DIVERSION BERM WITH STONE OUTLET FILTER (SP-4)

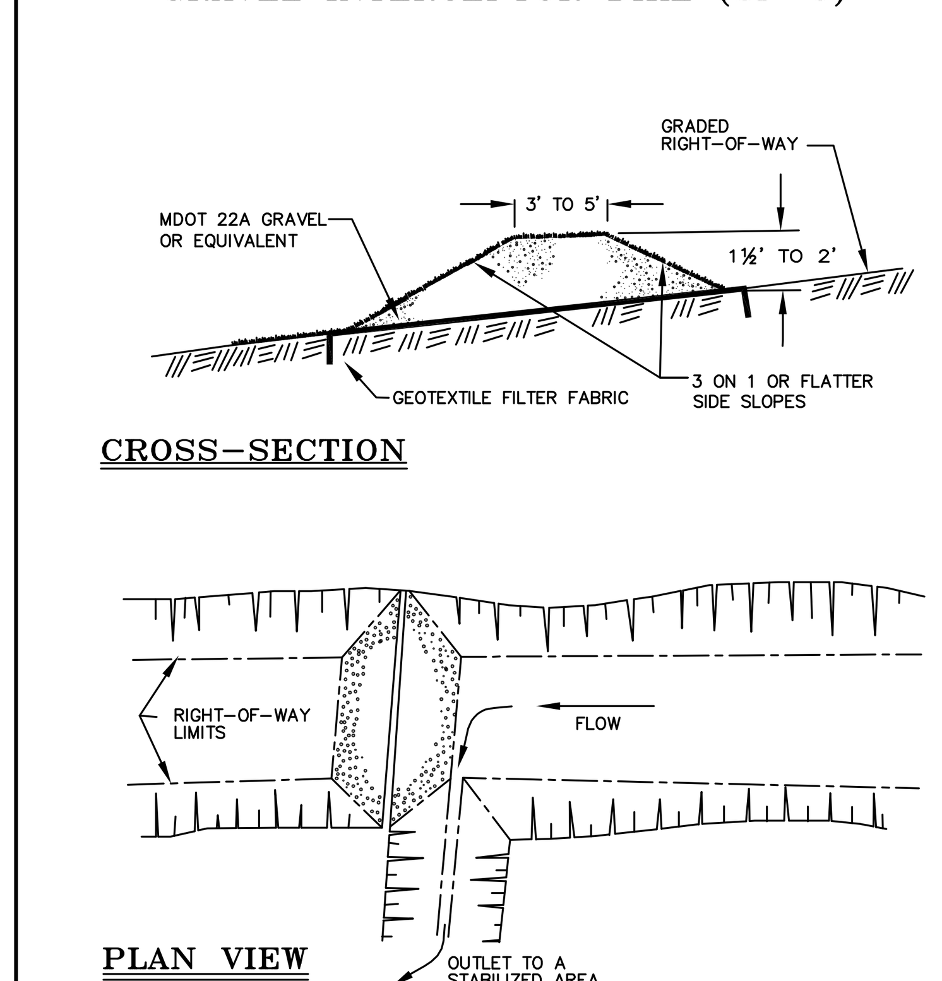


-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

EARTH DIVERSION BERM (E-2)



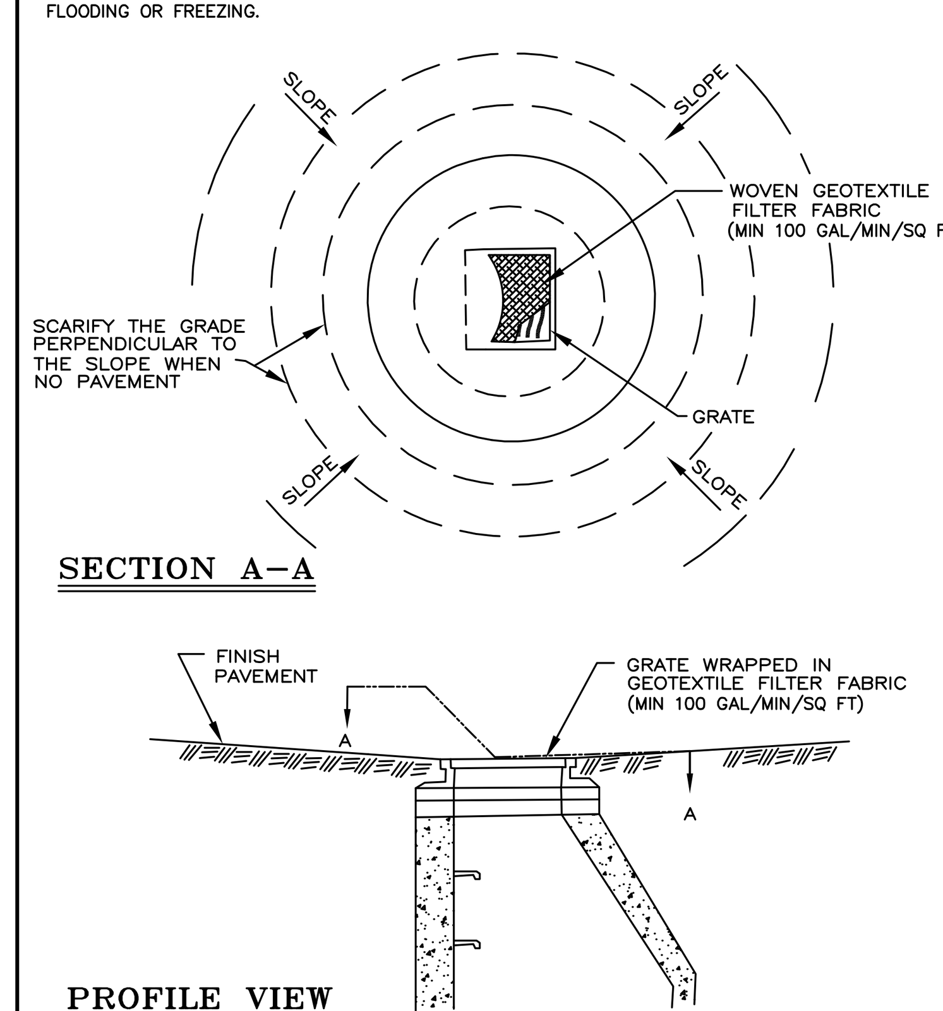
GRAVEL INTERCEPTOR DIKE (SP-6)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.
-FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THIS SHEET OR IN THE WRC SOIL EROSION MANUAL.

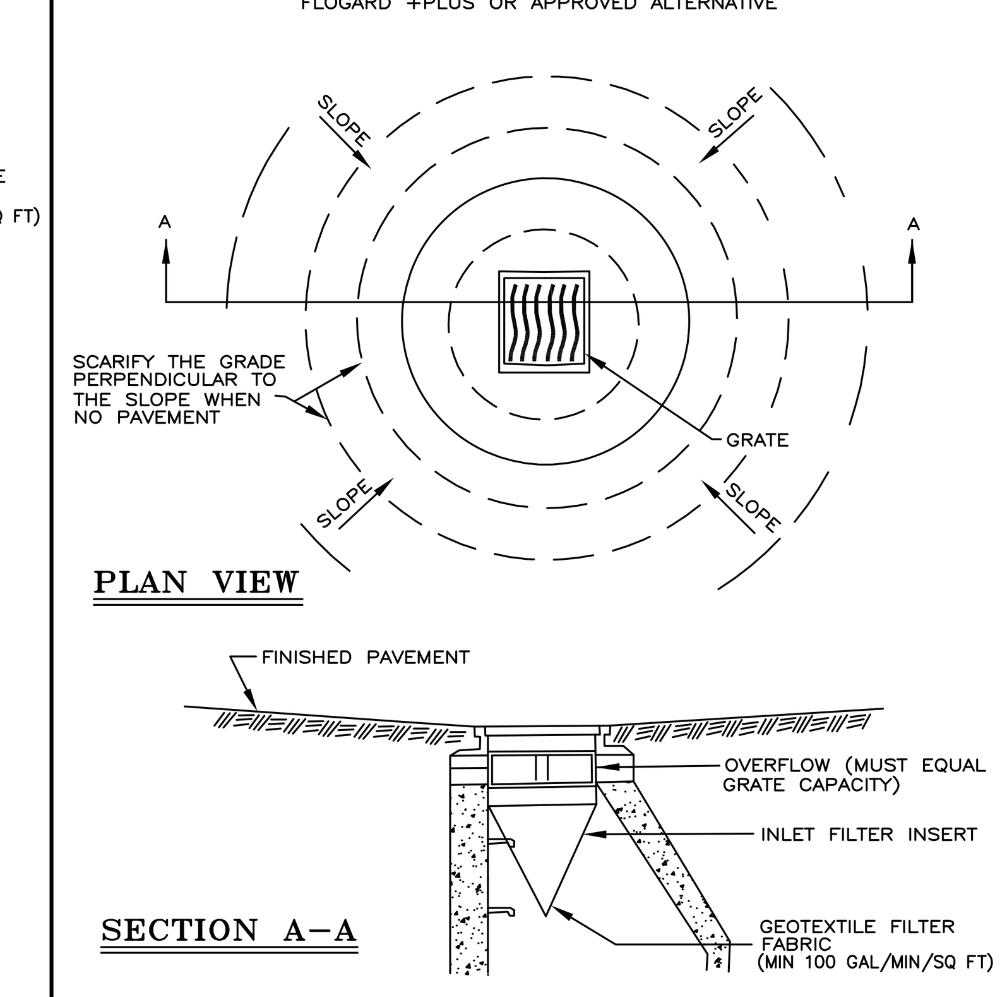
LOW POINT INLET FILTER (SI-2)

ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.

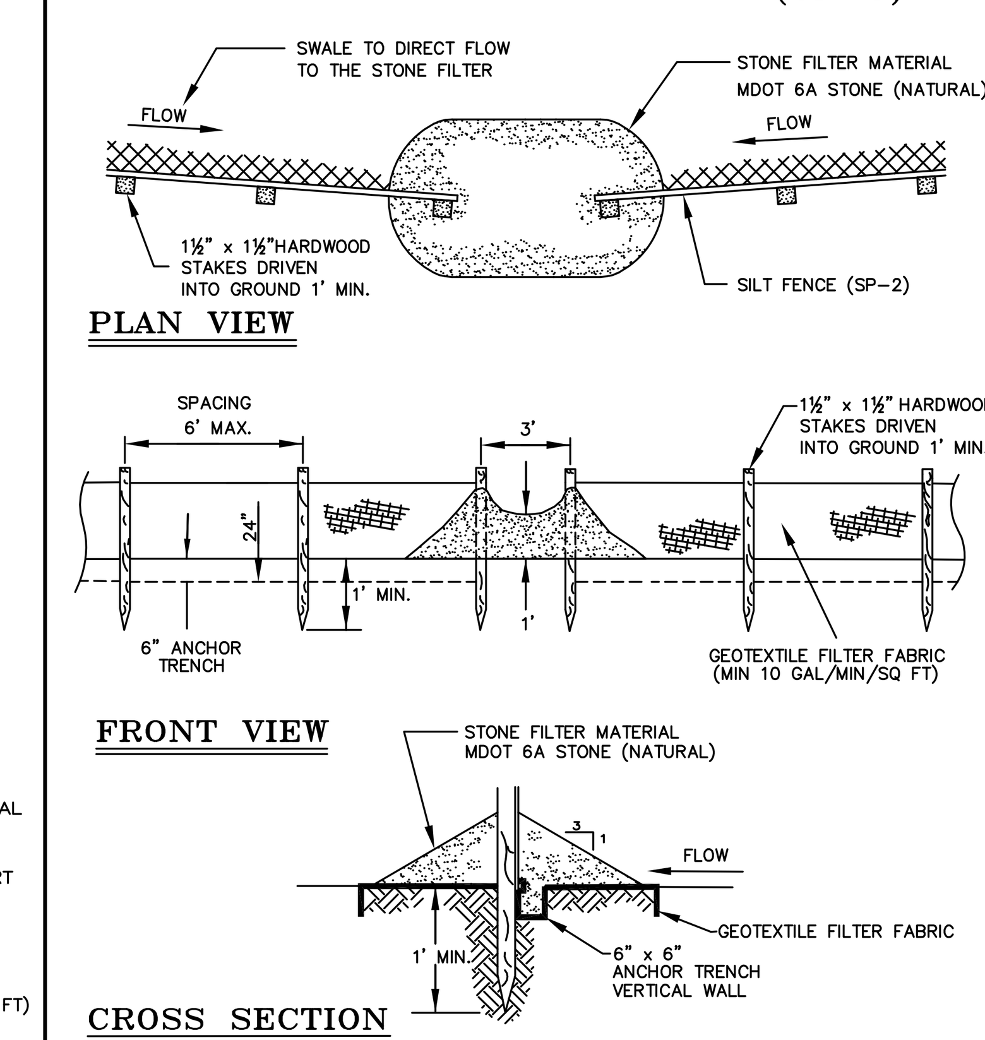


LOW POINT INLET FILTER ALT. "A" (SI-2A)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

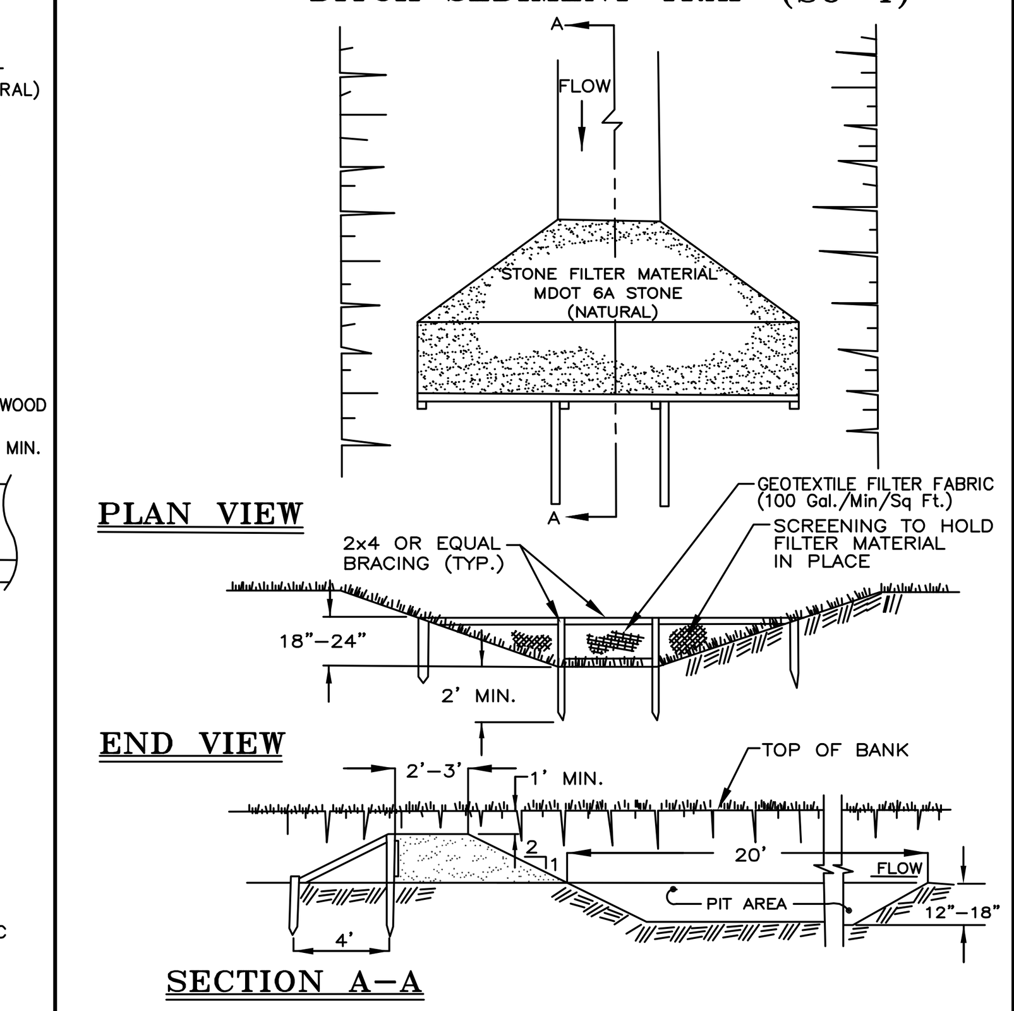


SILT FENCE GRAVEL FILTER (SP-3)



-PLACE GEOTEXTILE FABRIC UNDER STONE WITH 6 INCH MIN. OVERLAP AND TRENCHED IN 6 INCH MIN.

DITCH SEDIMENT TRAP (SO-4)

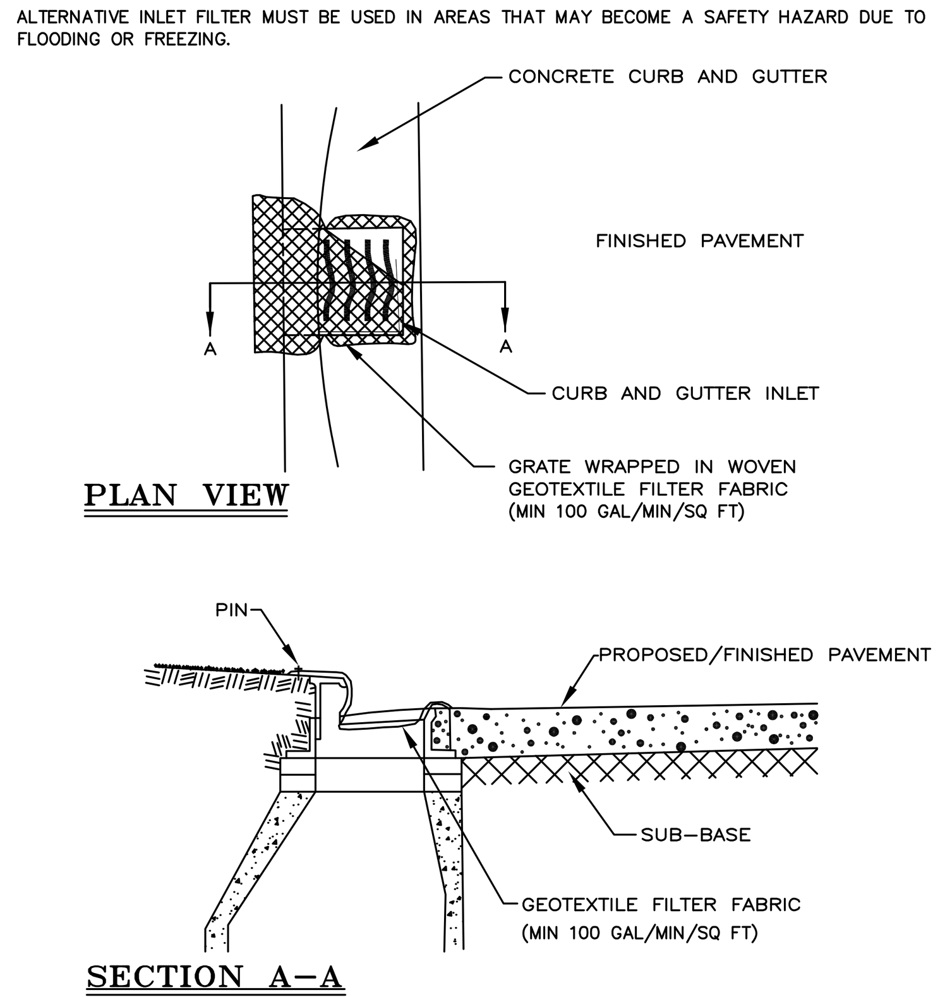


NOTE:
FOR SLOPE AND/OR CHANNEL PROTECTION SEE OTHER BMP'S ON THE SHEET OR IN THE WRC SOIL EROSION MANUAL.

CURB AND GUTTER INLET FILTER (SI-4)

(BEFORE AND AFTER PAVING)

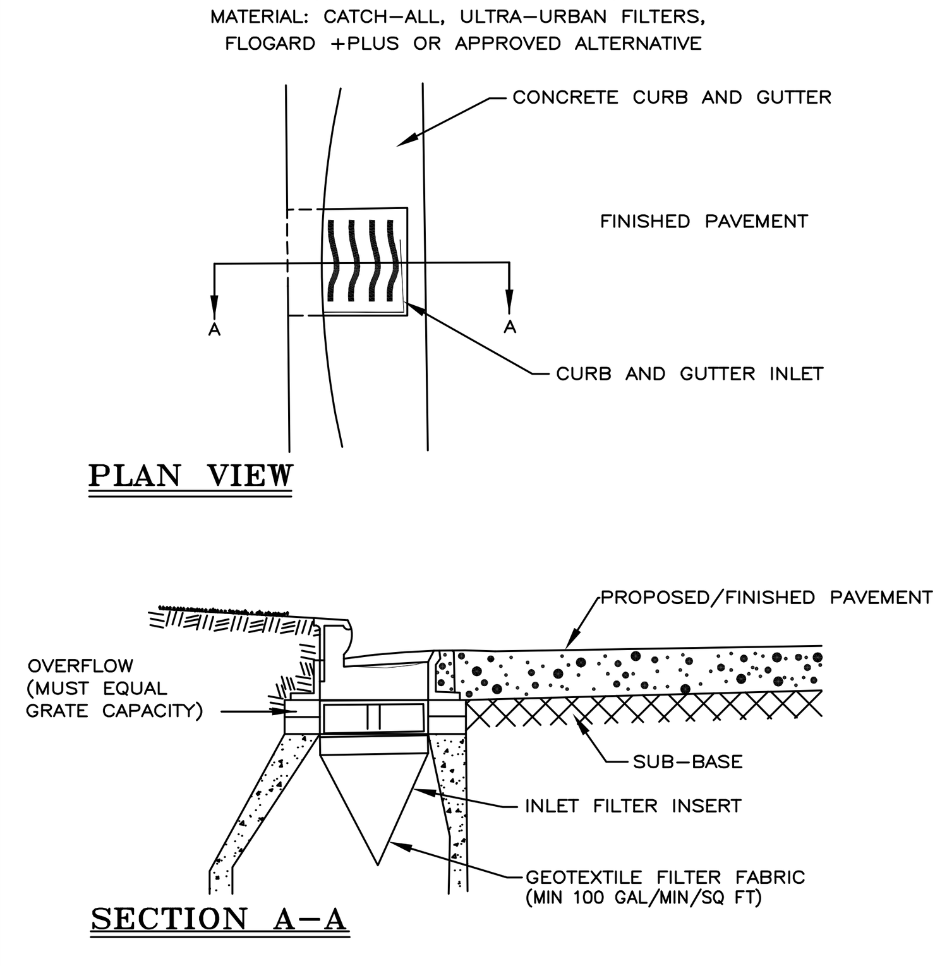
ALTERNATIVE INLET FILTER MUST BE USED IN AREAS THAT MAY BECOME A SAFETY HAZARD DUE TO FLOODING OR FREEZING.



CURB AND GUTTER INLET FILTER ALTERNATIVE "A" (SI-4A)

(BEFORE AND AFTER PAVING)

MATERIAL: CATCH-ALL, ULTRA-URBAN FILTERS, FLOGARD +PLUS OR APPROVED ALTERNATIVE

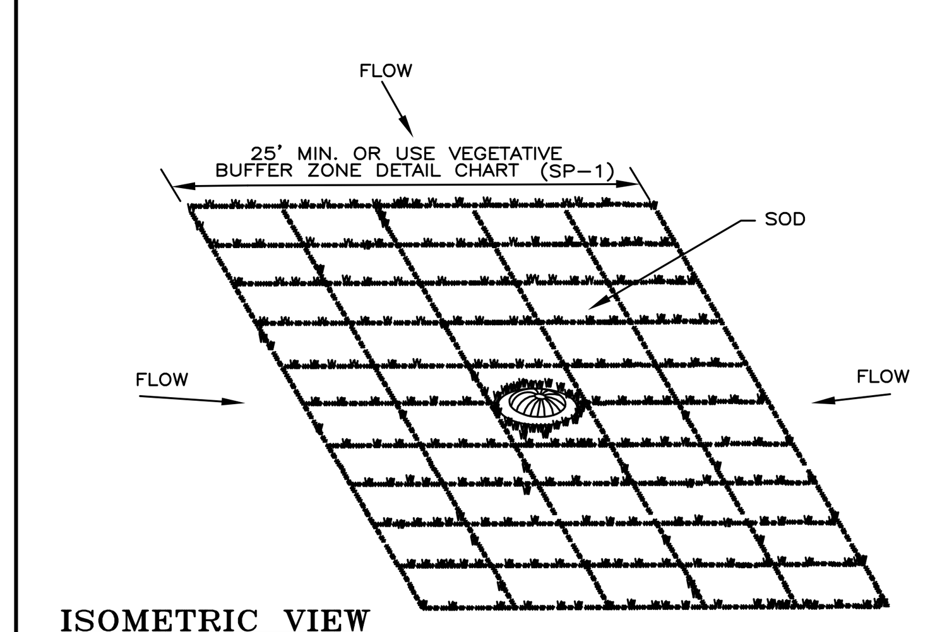


SOD INLET FILTER (SI-1)

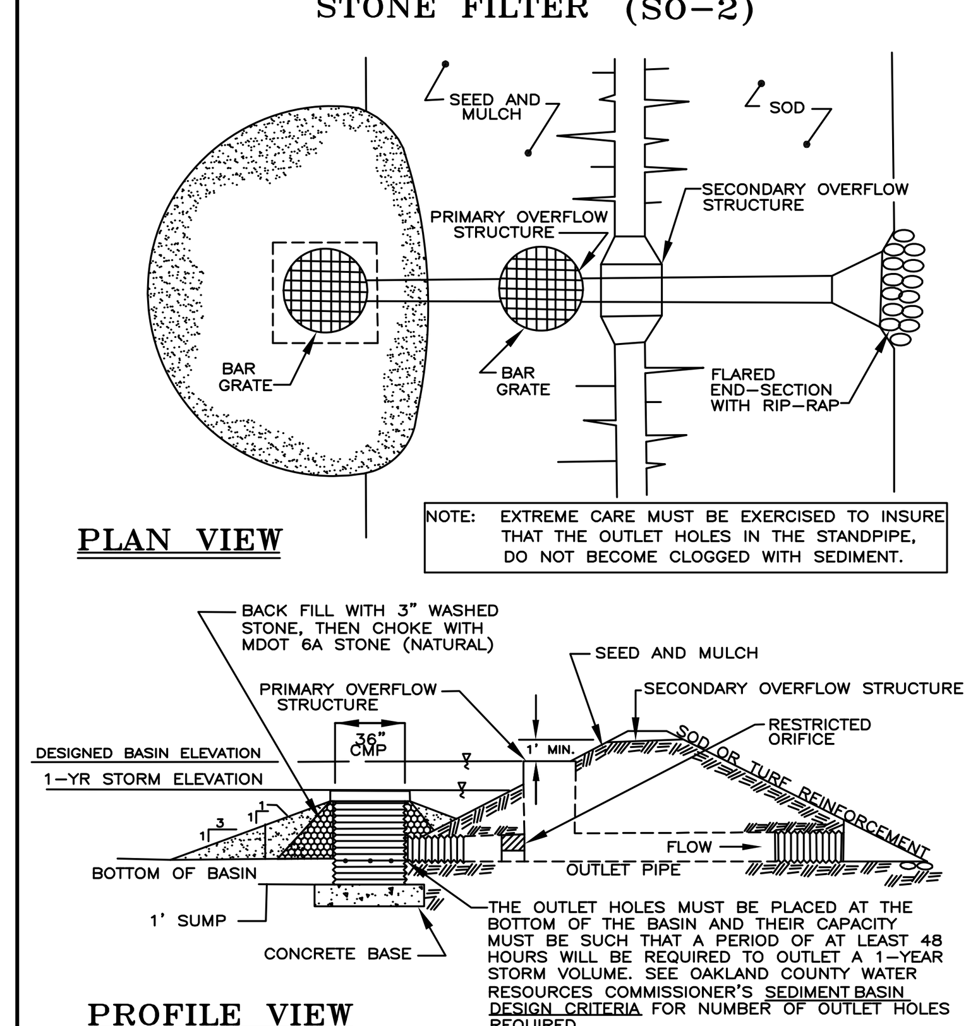
DEFINITION — SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.

PURPOSE — SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND TO FILTER OUT SEDIMENT IN THE PROCESS.

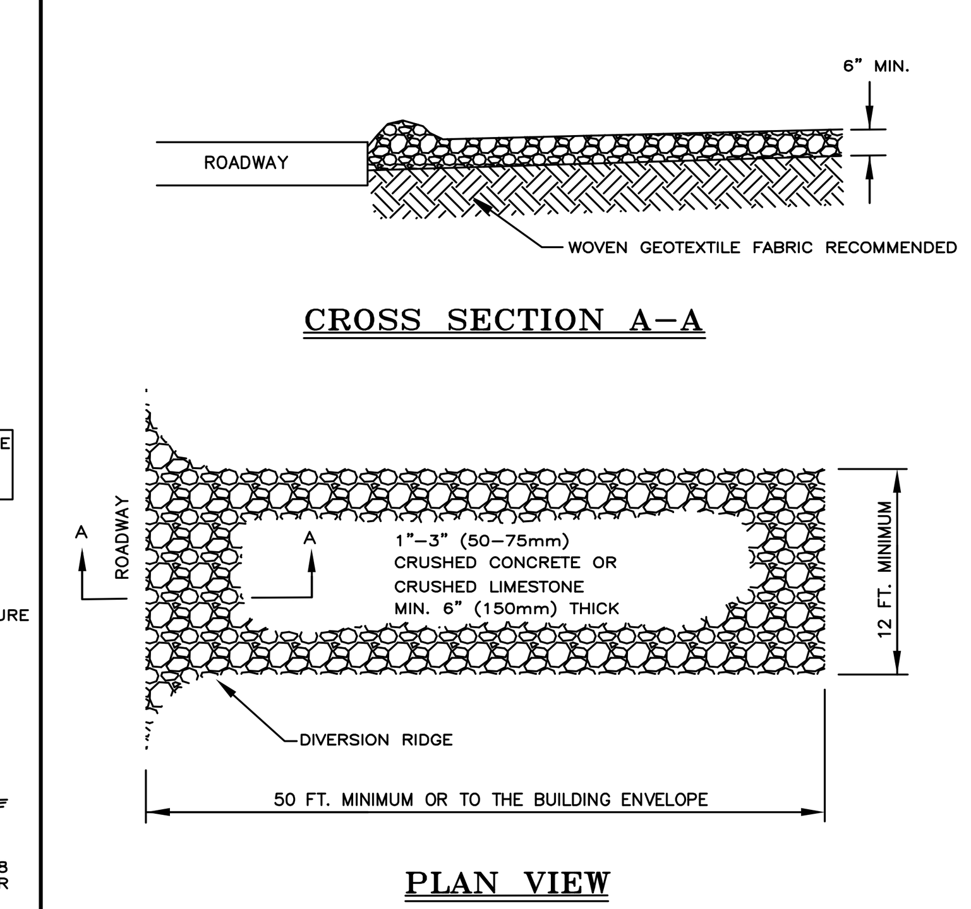
WHERE APPLICABLE — SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.



TEMPORARY DETENTION BASIN OUTLET STONE FILTER (SO-2)

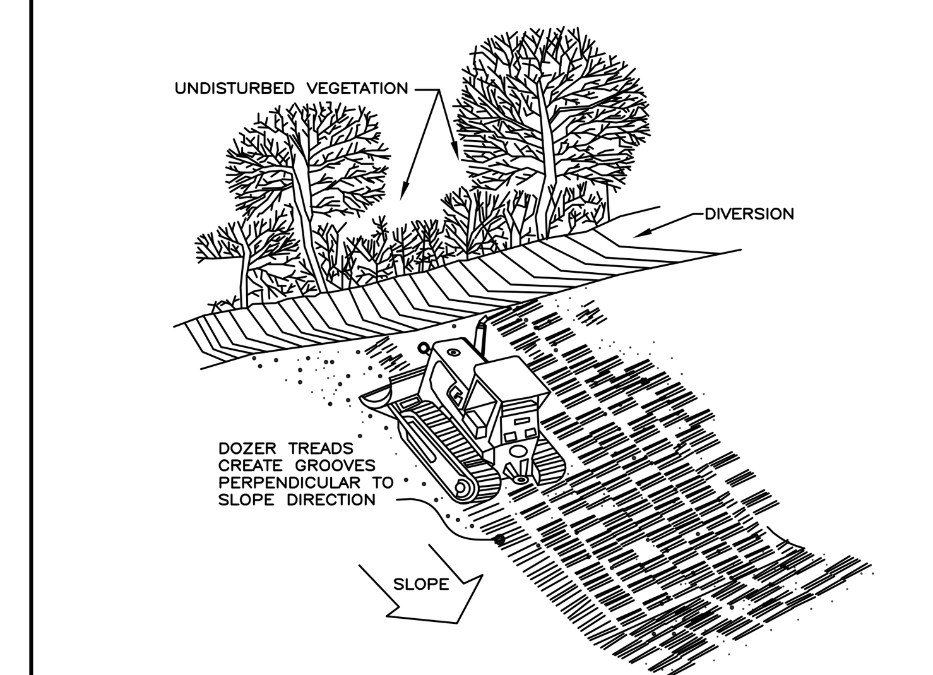


TEMPORARY STONE ACCESS DRIVE (SP-9)



SURFACE ROUGHENING AND SCARIFICATION (E-8)

THIS IS AN EASY AND ECONOMICAL WAY TO REDUCE SOIL EROSION. IT IS SIMPLY THE PLACING OF HORIZONTAL GROOVES IN A SLOPE PERPENDICULAR TO THE FLOW OF RUNOFF. THIS CAN BE DONE BY EITHER DISC HARROWING, BACK BLADING OR JUST RUNNING THE TREADS OF A CRAWLER TRACTOR PERPENDICULAR TO THE SLOPE AS SHOWN BELOW.



UNVEGETATED SLOPE SHOULD BE TEMPORARILY SCARIFIED TO MINIMIZE RUNOFF VELOCITIES

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 BMPS SHALL BE IMPLEMENTED BY THE CONTRACTOR TO THE MAXIMUM EXTENT PRACTICABLE TO PROTECT WATER QUALITY AND WILDLIFE HABITAT.

SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

REVISION BLOCK

Data Source / Source Date: N/A

Rev. No.:	Rev. By:	Rev. Date:	Description:
1	lz	3-22-07	PROPOSED DETAIL EDITS
2	lz	2-26-09	STANDARDS COMMITTEE APPROVAL / NAME CHANGES
3	DS	3-25-11	SILT FENCE ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-16-13	STANDARDS COMMITTEE APPROVAL / NOTE CHANGES

ORIG. DATE:	01/01/01
SCALE:	NONE
DESIGNED BY:	WRC
DRAWN BY:	Mapping

WRC WATER RESOURCES COMMISSIONER Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
WATERFORD, MICHIGAN
48328-1907

landscape plan for:

West Valley a multi-family rental development community

White Lake Township, Michigan

note:

unless noted otherwise, numerical value on landscape quantities specified on plan take precedence over graphic representation.

north

scale: 0' 30' 60' 120' 180'
1" = 60'- 0"

residential landscape requirements:

greenbelt		REQUIRED	PROVIDED
TOTAL LN.FT. OF GREENBELT FRONTAGE	848'±		
848'± GREENBELT FRONTAGE - 167'± EXISTING WOOD & VEGETATION FRONTAGE	681'±		
ONE (1) DECIDUOUS OR EVERGREEN TREE PER 30 LN.FT. (681' LN.FT. / 30 LN.FT. = 22.7 TREES)		23	23
EIGHT (8) SHRUB PER 30 LN.FT. (681' LN.FT. / 30 LN.FT. =22.7 x 8-SHRUBS = 181.6 SHRUBS)		182	182
GREENBELT SHRUB PLANTINGS (SHT. LS-3)	53		
ENTRY SHRUB PLANTINGS (SHT. LS-5)	129		
TOTAL PROVIDED	182		

interior landscape		REQUIRED	PROVIDED
TOTAL ACRES OF SITE	15.14 AC±		
ACRES OF 60' R.O.W. AREA	1.21 AC±		
ACRES OF INTERNAL ROAD AREA	1.39 AC±		
TOTAL ACRES OF SITE NET AREA	12.54 AC± (546,242 SQ.FT.)		
TOTAL SQ.FT. OF INTERIOR LANDSCAPING AREA	81,937 SQ.FT.		
15% OF 12.54 AC± (546,242 SQ.FT.)=81,936.36			
ONE (1) DECIDUOUS, ORNAMENTAL OR EVERGREEN TREE PER 300 SQ.FT. (81,937 SQ.FT. / 300 SQ.FT. = 273.12 TREES)		273	273
FIVE (5) SHRUB PER 300 SQ.FT. (81,937 SQ.FT. / 300 SQ.FT. = 273.12 X 5-SHRUBS =1,365.61 SHRUBS)		1366	1366
BUILDING FOUNDATION SHRUB PLANTINGS (SHT. LS-4)	1,101		
DETENTION POND SHRUB PLANTINGS (SHT. LS-4)	75		
GENERAL SHRUB PLANTINGS (SHT. LS-2)	109		
GENERAL SHRUB PLANTINGS (SHT. LS-3)	81		
TOTAL PROVIDED	1,014		

residential buffer		REQUIRED	PROVIDED
TOTAL LN.FT. OF SOUTH PROPERTY LINE	1307'±		
ONE (1) DECIDUOUS OR EVERGREEN TREE PER 15 LN.FT. (1,307 SQ.FT. / 15 LN.FT. = 87.13 TREES)		87	23-NEW + EXISTING TREES
FOUR (4) SHRUB PER 15 LN.FT. (1,307 LN.FT. / 15 LN.FT. = 87.13 X 4 = 348.53 SHRUBS)		349	EXISTING VEGETATION
TOTAL LN.FT. OF WEST PROPERTY LINE	720'±		
ONE (1) DECIDUOUS OR EVERGREEN TREE PER 15 LN.FT. (720 LN.FT. / 15 LN.FT. = 48 TREES)		48	16-NEW + EXISTING TREES
FOUR (4) SHRUB PER 15 LN.FT. (720 LN.FT. / 15 LN.FT. = 48 X 4 = 192 SHRUBS)		192	EXISTING VEGETATION

landscape maintenance notes:

LANDSCAPE MAINTENANCE PROCEDURES AND FREQUENCIES TO BE FOLLOWED SHALL BE SPECIFIED ON THE LANDSCAPE PLAN, ALONG WITH THE MANNER IN WHICH THE EFFECTIVENESS, HEALTH AND INTENDED FUNCTIONS OF THE VARIOUS LANDSCAPE AREAS ON THE SITE WILL BE ENSURED.

1. LANDSCAPING SHALL BE KEPT IN A NEAT, ORDERLY AND HEALTHY GROWING CONDITION, FREE FROM DEBRIS AND REFUSE.

2. PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.

3. ALL DEAD OR DISEASED PLANT MATERIAL SHALL BE REMOVED AND REPLACED WITHIN SIX (6) MONTHS AFTER IT DIES OR IN THE NEXT PLANTING SEASON, WHICHEVER OCCURS FIRST. THE PLANTING SEASON FOR DECIDUOUS PLANTS SHALL BE BETWEEN MARCH 15 AND NOVEMBER 15 OR UNTIL THE PREPARED SOIL BECOMES FROZEN. THE PLANTING SEASON FOR EVERGREEN PLANTS SHALL BE BETWEEN MARCH 1 AND JUNE 1. PLANT MATERIAL INSTALLED TO REPLACE DEAD OR DISEASED MATERIAL SHALL BE AS CLOSE AS PRACTICAL TO THE SIZE OF THE MATERIAL IT IS INTENDED TO REPLACE.

tree cluster/grouping planting notes:

1. typical 3 to 4 evergreen or canopy tree cluster grouping per same species
2. maximum of 8-evergreen tree cluster grouping per same species provided
3. maximum of 5-canopy tree cluster grouping per same species provided

TREES SHALL BE LOCATED A MINIMUM 6' FROM ALL WATER MAIN, SANITARY, AND STROM SEWER. NO TREES TO BE PLANTED IN DRAINAGE SWALE

FPA
FELINO A. PASCUAL and ASSOCIATES
Community Land Planner and registered Landscape Architect
24333 Orchard Lake Rd, Suite G
Farmington Hills, MI 48336
ph. (248) 557-5588
fax. (248) 557-5416

seal: STATE OF MICHIGAN FELINO A. PASCUAL LANDSCAPE ARCHITECT No. 1433 REGISTERED LANDSCAPE ARCHITECT

client:
JMF WHITE LAKE, LLC.
1700 W. BIG BEAVER ROAD SUITE 120
TROY, MI 48084

project:
WEST VALLEY

project location:
White Lake Twp. , Michigan

Union Lake Road

sheet title:
overall landscape planting detail

job no./issue/revision date:

LS19.104.08	REVIEW	9-3-2019
LS19.104.09	SPA	9-28-2019
LS21.034.21	SPA	2-18-2021
LS21.034.21	REVIEW COMMENTS	3-16-2021
LS23.083.07	UPDATES COMMENTS	7-29-2023
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LS24.032.02	UPDATES-TWP. COMMENTS	2-7-2024
LS24.032.05	UPDATES	5-29-2024

drawn by: JP, DK, PH
checked by: FP
date: 2-2-2024

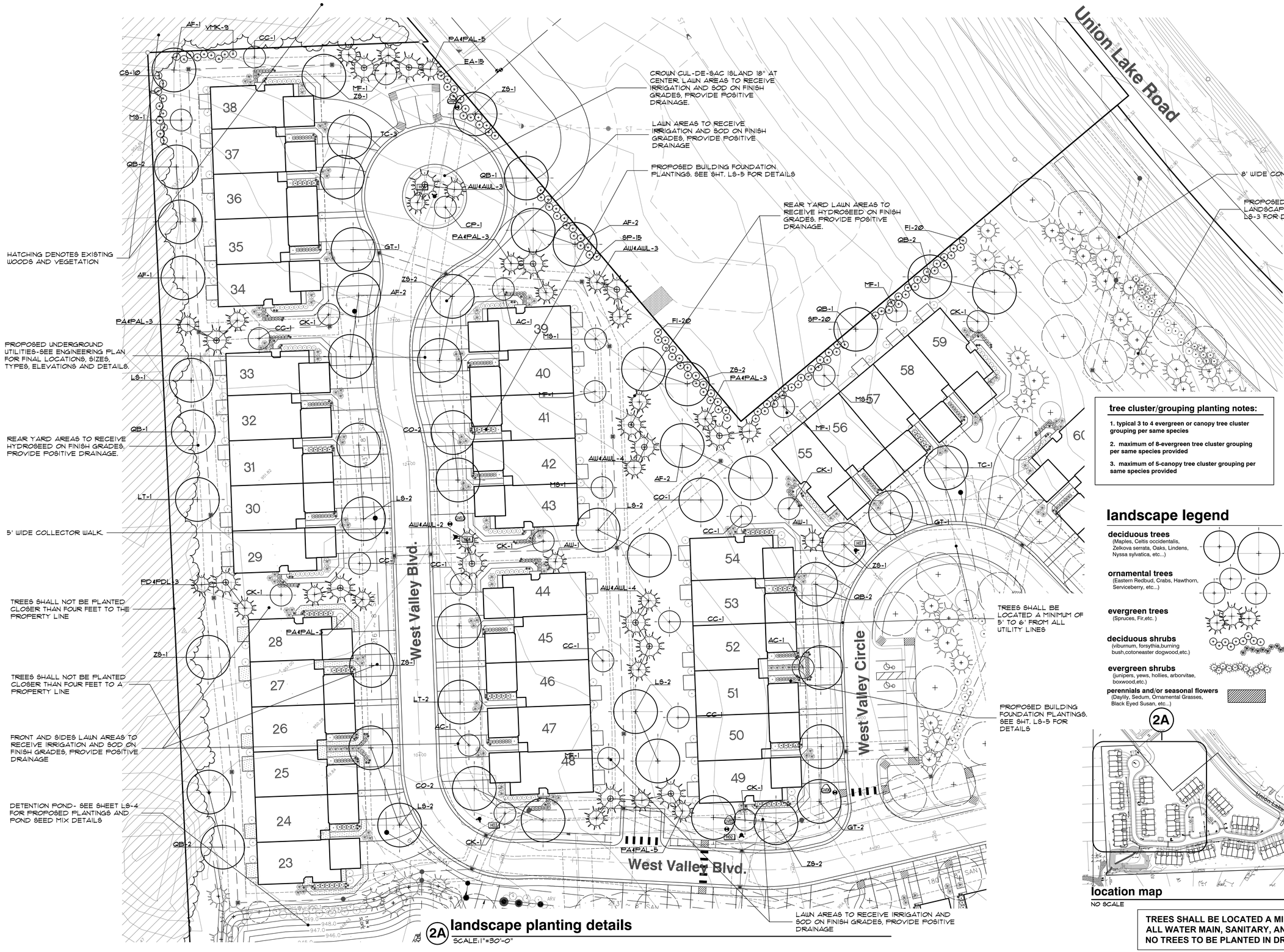
Do Not scale drawings. Use figured dimensions only

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
For free location of public utility lines

The location and elevations of existing underground utilities as shown on this drawing are only approximate. no guarantee is either expressed or implied as to the completeness of accuracy. contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of construction

project no: LS24.032.02

sheet no: LS-1 of 5



tree cluster/grouping planting notes:

1. typical 3 to 4 evergreen or canopy tree cluster grouping per same species
2. maximum of 8-evergreen tree cluster grouping per same species provided
3. maximum of 5-canopy tree cluster grouping per same species provided

landscape legend

deciduous trees
(Maples, Celtis occidentalis, Zelkova serrata, Oaks, Lindens, Nyssa sylvatica, etc...)

ornamental trees
(Eastern Redbud, Crabs, Hawthorn, Serviceberry, etc...)

evergreen trees
(Spruces, Fir,etc.)

deciduous shrubs
(viburnum, forsythia,burning bush,cotoneaster dogwood,etc.)

evergreen shrubs
(junipers, yews, hollies, arborvitae, boxwood,etc.)

perennials and/or seasonal flowers
(Daylily, Sedum, Ornamental Grasses, Black Eyed Susan, etc...)

2A

location map
NO SCALE

TREES SHALL BE LOCATED A MINIMUM 6' FROM ALL WATER MAIN, SANITARY, AND STROM SEWER. NO TREES TO BE PLANTED IN DRAINAGE SWALE

2A **landscape planting details**
SCALE: 1"=30'-0"

FELINO A. PASCUAL and ASSOCIATES
Community Land Planner and registered Landscape Architect
24333 Orchard Lake Rd, Suite G
Farmington Hills, MI 48336
ph. (248) 557-5588
fax. (248) 557-5416

seal:

STATE OF MICHIGAN — FELINO A. PASCUAL — LANDSCAPE ARCHITECT — No. 4433 — REGISTERED

client:

JMF WHITE LAKE, LLC.
1700 W. BIG BEAVER ROAD SUITE 120
TROY, MI 48084

project:

WEST VALLEY

project location:
White Lake Twp. , Michigan

Union Lake Road

sheet title:

landscape planting detail

job no./issue/revision date:

LS19.104.08	REVIEW	9-3-2019
LS19.104.09	SPA	9-28-2019
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drawn by:
JP, DK, PH

checked by:
FP

date:
2-2-2024

notice:

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project no:
LS24.032.02

sheet no:
LS-2 of 5

landscape legend

deciduous trees
(Maples, Celtis occidentalis, Zelkova serrata, Oaks, Lindens, Nyssa sylvatica, etc...)

ornamental trees
(Eastern Redbud, Crabs, Hawthorn, Serviceberry, etc...)

evergreen trees
(Spruces, Fir,etc.)

deciduous shrubs
(viburnum, forsythia,burning bush,cotoneaster dogwood,etc.)

evergreen shrubs
(junipers, yews, hollies, arborvitae, boxwood,etc.)

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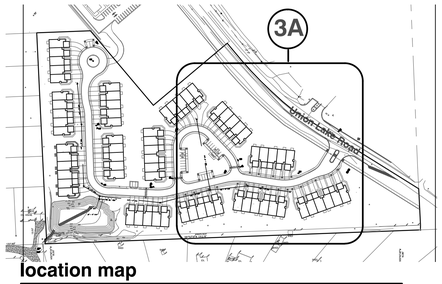

location map
NO SCALE

tree cluster/grouping planting notes:

1. typical 3 to 4 evergreen or canopy tree cluster grouping per same species
2. maximum of 8-evergreen tree cluster grouping per same species provided
3. maximum of 5-canopy tree cluster grouping per same species provided

PROPOSED BENCH SEAT LOCATION. SEE SHT. LS-4 FOR DETAILS

LAWN AREAS TO RECEIVE IRRIGATION AND SOD ON FINISH GRADES, PROVIDE POSITIVE DRAINAGE

DETENTION POND- SEE SHEET LS-4 FOR PROPOSED PLANTINGS AND POND SEED MIX DETAILS

PROPOSED BUILDING FOUNDATION PLANTINGS. SEE SHT. LS-5 FOR DETAILS

LAWN AREAS TO RECEIVE IRRIGATION AND SOD ON FINISH GRADES, PROVIDE POSITIVE DRAINAGE

PROPOSED UNDERGROUND UTILITIES-SEE ENGINEERING PLAN FOR FINAL LOCATIONS, SIZES, TYPES, ELEVATIONS AND DETAILS.

8' WIDE CONC. PUBLIC WALK, TYP.

TREES SHALL BE LOCATED A MINIMUM OF 5' TO 6' FROM ALL UTILITY LINES

LAWN AREAS TO RECEIVE IRRIGATION AND SOD ON FINISH GRADES, PROVIDE POSITIVE DRAINAGE

25' VEHICULAR CLEARVIEW LINE

SIGN MONUMENT - SEE SHT. LS-5 FOR DETAILS

PROPOSED BENCH SEAT LOCATION. SEE SHT. LS-4 FOR DETAILS

TREES SHALL NOT BE PLANTED CLOSER THAN FOUR FEET TO A PROPERTY LINE

REAR YARD AREAS TO RECEIVE HYDROSEED ON FINISH GRADES. PROVIDE POSITIVE DRAINAGE.

TREES SHALL BE LOCATED A MINIMUM 6' FROM ALL WATER MAIN, SANITARY, AND STROM SEWER. NO TREES TO BE PLANTED IN DRAINAGE SWALE

3A **landscape planting details**
SCALE:1"=30'-0"

FPA
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Community Land Planner and registered Landscape Architect
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project no: LS24.032.02

sheet no: **LS-3** of 5

plant material list

key	quant. LS-2	quant. LS-3	botanical name	common name	size	comments
			LARGE AND SMALL DECIDUOUS TREES			
GT	4	7	GLEDITSIA TRI. INERMIS 'SKYCOLE'	SKYLINE LOCUST	2 1/2" BB	
TC	3	4	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	2 1/2" BB	
LS	9	10	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	2 1/2" BB	
ZS	11	4	ZELKOVA SERRATE 'VILLAGE GREEN'	VILLAGE GREEN ZELKOVA	2 1/2" BB	
TA	-	8	TILIA AMERICANA 'REDMOND'	REDMOND LINDEN	2 1/2" BB	
AR	-	10	ACER R. 'FRANKSRED'	RED SUNSET RED MAPLE	2 1/2" BB	
CO	5	8	CELTIS OCCIDENTALIS	HACKBERRY	2 1/2" BB	
LT	3	6	LIRIODENDRON TULIPIFERA	TULIPTREE	2 1/2" BB	
QB	11	6	QUERCUS 'BICOLOR'	SWAMP WHITE OAK	2 1/2" BB	
AF	8	9	ACER X FREEMANII 'JEFFSRED'	AUTUMN BLAZE RED MAPLE	2 1/2" BB	
APC	-	7	ACER P. 'CRIMSON KING'	CRIMSON KING NORWAY MAPLE	2 1/2" BB	
CC	8	2	CERCIS CANADENSIS	EASTERN REDBUD (MULTI-STEM)	8' BB	(MULTI-STEM)
AC	3	1	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	8' BB	(MULTI-STEM)
CK	7	10	CORNUS KOUSA	KOUSA DOGWOOD	2" BB	
CP	1	5	CRATAEGUS PHAENOPYRUM	WASHINGTON HAWTHORN	2" BB	
MS	4	3	MALUS 'SNOWDRIFT'	SNOWDRIFT CRABAPPLE	2" BB	
MF	5	-	MALUS FLORIBUNDA	JAPANESE FLOWERING CRABAPPLE	2" BB	
MJ	-	4	MAGNOLIA LILIFLORA 'JANE'	JANE MAGNOLIA	10' BB	(MULTI-STEM)
SI	-	2	SYRINGA RETICULATA 'IVORY SILK'	IVORY SILK JAPANESE TREE LILAC	2" BB	
			SHRUBS			
EA	15	-	EUONYMUS ALATUS COMPACTA	DWARF WINGED BURNING BUSH	3' BB	60" SPACING O.C.
CS	10	25	CORNUS STOLONIFERA	REDTWIG DOGWOOD	3' BB	60" SPACING O.C.
VMK	9	23	VIBURNUM X.B. 'MOHAWK'	MOHAWK VIBURNUM	3' BB	60" SPACING O.C.
SK	-	26	SYRINGA PATULA 'MISS KIM'	MISS KIM DWARF LILAC	3' B.B.	48" SPACING O.C.
FI	40	10	FORSYTHIS X INTERMEDIA	BORDER FORSYTHIA	3' BB	60" SPACING O.C.
SP	35	-	SYRINGA X. 'PERSICA'	PERSIAN LILAC	3' BB	60" SPACING O.C.
JT	-	39	JUNIPERUS S. 'TAMARISAFOLIA'	TAM'S JUNIPER	24" BB	42" SPACING O.C.
			LARGE AND SMALL EVERGREENS			
AW	11	16	ABIES CONCOLOR	CONCOLOR WHITE FIR	8' BB	
AWL	7	13	ABIES CONCOLOR	CONCOLOR WHITE FIR	10' BB O	
PA	14	18	PICEA ABIES	NORWAY SPRUCE	8' BB	
PAL	8	14	PICEA ABIES	NORWAY SPRUCE	10' BB O	
PD	2	11	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	8' BB	
PDL	1	8	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	10' BB O	

general landscape notes:

1. LANDSCAPE CONTRACTOR SHALL VISIT THE SITE, INSPECT EXISTING CONDITIONS, REVIEW PROPOSED PLANTINGS AND RELATED WORK, CONTACT THE OWNER AND/OR LANDSCAPE ARCHITECT WITH ANY CONCERNS OR DISCREPANCY BETWEEN THE PLAN, PLANT MATERIAL LIST, AND/OR SITE CONDITIONS.

2. PRIOR TO BEGINNING OF CONSTRUCTION ON ANY WORK, CONTRACTORS SHALL VERIFY LOCATIONS OF ALL ON SITE UTILITIES, GAS, ELECTRIC, TELEPHONE, CABLE TO BE LOCATED BY CONTACTING MISS DIG 1-800-482-7171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE ALL RELATED WORK ACTIVITIES WITH OTHER TRADES AND REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER PRIOR TO COMMENCING

3. NUMERICAL VALUE ON THE LANDSCAPE QUANTITIES SPECIFIED ON THE PLAN TAKE PRECEDENCE OVER GRAPHIC REPRESENTATION. VERIFY ANY CONCERN-DISCREPANCY WITH LANDSCAPE ARCHITECT.

4. ALL CONSTRUCTION AND PLANT MATERIAL LOCATION TO BE ADJUSTED ON SITE IF NECESSARY

5. ALL SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED BY WHITE LAKE TOWNSHIP AND LANDSCAPE ARCHITECT

6. ALL LARGE TREES AND EVERGREENS TO BE STAKED, GUYED AND WRAPPED AS DETAILED, SHOWN ON PLAN.

7. PLANT BEDS TO BE DRESSED WITH MIN. 4" OF FINELY DOUBLE SHREDDED HARDBARK MULCH.

8. DIG SHRUB PITS 1' LARGER THAN SHRUB ROOT BALLS AND TREE PITS 2' LARGER THAN ROOT BALL. BACK FILL WITH ONE PART TOP SOIL AND ONE PART SOIL FROM EXCAVATED PLANTING HOLE.

9. NATURAL COLOR, FINELY DOUBLE SHREDDED HARDWOOD BARK MULCH REQUIRED FOR ALL PLANTINGS.

10. REMOVE ALL TWINE, WIRE AND BURLAP FROM TREE AND SHRUB EARTH BALLS, AND FROM TREE TRUNKS. 4" THICK BARK MULCH FOR TREES IN 4' DIA. CIRCLE WITH 3" PULLED AWAY FROM TRUNK . 4" THICK BARK MULCH FOR SHRUBS AND 4" THICK BARK MULCH FOR PERENNIALS.

11. PLANT MATERIAL QUALITY & INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.

12. PROVIDE PEAT SOD FOR ALL NEW AND DISTURBED LAWN AREAS UNLESS NOTED OTHERWISE.

13. ALL PLANTING AREAS TO BE PREPARED WITH APPROPRIATE SOIL MIXTURES AND FERTILIZER BEFORE PLANT INSTALLATION.

14. PLANT TREES AND SHRUBS GENERALLY NO CLOSER THAN THE FOLLOWING DISTANCES FROM SIDEWALKS, CURBS AND PARKING STALLS:
   a). SHADE TREES _____ 5 FT.
   b). ORNAMENTAL AND EVERGREEN TREES (CRAB, PINE, SPRUCE, ETC.) _____ 10 FT.
   c). SHRUBS THAT ARE LESS THAN 1 FOOT TALL AND WIDE AT MATURITY _____ 2 FT.

15. NO TREES OR EVERGREENS TO BE INSTALLED OVER AND/OR WITHIN 5' TO 6' OF ANY PROPOSED OR EXISTING UTILITY LINES AS SHOWN ON THE OVERALL LANDSCAPE PLAN. SEE ENGINEERING PLANS FOR LOCATION AND DETAILS.

16. ALL LAWN AREAS AND LANDSCAPE BEDS TO BE FULLY IRRIGATED WITH AN AUTOMATIC UNDERGROUND SYSTEM. IRRIGATION SYSTEM TO HAVE SEPARTE ZONES FOR LAWN AREAS, PARKING ISLANDS, AND SHRUB BEDS WITH DIFFERENT CONTROL MOISTURE LEVEL ADJUSTMENT PER ZONE AS REQUIRED

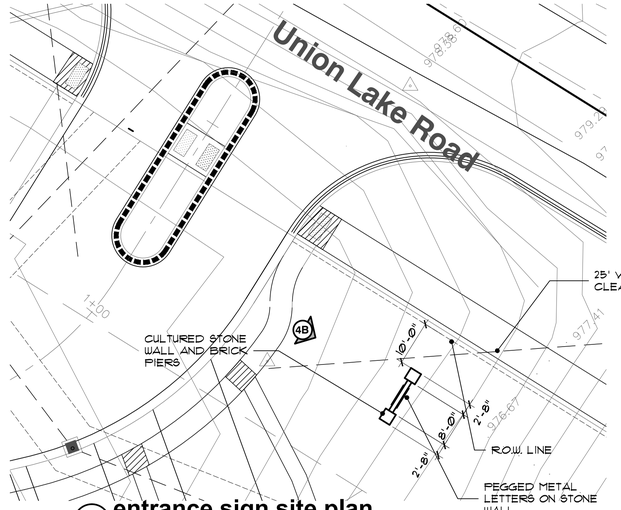
17. UNLESS NOTED OTHERWISE, LANDSCAPE BEDS ADJACENT TO LAWN TO RECIEVE EDGING. EDGING SHALL BE 4" X 1/8" METAL (FINISH BLACK OR GREEN) OR APPROVED EQUAL AND TO BE INSTALLED WITH HORIZONTAL METAL STAKES AT 32" O.C. OR PER MANUFACTERER'S SPECIFICATION.

18. LANDSCAPE BEDS ADJACENT AND NEXT TO BUILDING SHALL BE EXCAVATED OF ALL BUILDING MATERIALS AND POOR SOILS A MIN. OF 12" DEPTH. BACK FILL WITH GOOD, MEDIUM TEXTURED PLANTING SOILS. ADD A MIN. 4" OF TOPSOIL OVERFILL TO FINISH GRADE. PROVIDE POSITIVE DRAINAGE.

19. WATERING OF ALL PLANTS AND TREES TO BE PROVIDED IMMEDIATELY AND MULCHING WITHIN 24 HOURS AFTER INSTALLATION.

20. ALL TREE PITS TO BE TESTED FOR PROPER DRAINAGE PRIOR TO TREE PLANTING. PROVIDE APPROPRIATE DRAINAGE SYSTEM AS REQUIRED IF THE TREE PIT DOES NOT DRAIN SUFFICIENTLY.

21. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL LANDSCAPE PLANT MATERIALS AND IRRIGATION INSTALLATION FOR A PERIOD OF TWO YEAR BEGINNING AFTER THE COMPLETION OF LANDSCAPE INSTALLTION DATE APPROVED BY THE TWP. OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE DURING AND AT THE END OF THE GUARANTEE PERIOD, ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE TOWNSHIP OR LANDSCAPE ARCHITECT, WITHOUT COST TO THE OUNER.



4A entrance sign site plan
SCALE 1"=20'-0"

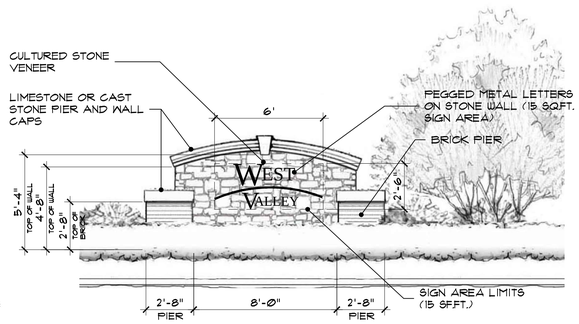
signage monument notes:

1. LOCATE AND STAKE ALL EXISTING AND PROPOSED UTILITIES PRIOR TO CONSTRUCTION. COORDINATE ANY ADJUSTMENTS WITH ARCHITECT.

2. ALL INFORMATION CONTAINED HEREIN IS SUBJECT TO APPROVAL, AND PERMITS PERMITS TO BE OBTAINED PRIOR TO CONSTRUCTION.

3. SEE LANDSCAPE PLAN FOR PROPOSED PLANTINGS ADJACENT TO PROPOSED ENTRY SIGN MONUMENTS, PIERS & FENCES.

4. VERIFY SOIL BEARING CAPACITY PRIOR TO TO ENTRY SIGN MONUMENT & PIER CONSTRUCTION. IF SOIL BEARING CAPACITY FALLS BELOW STANDARD REQUIREMENTS, CONSULT STRUCTURAL ENGINEER FOR RECOMMENDATION OF FINAL ENTRY MONUMENT & PIER FOOTING DESIGN.

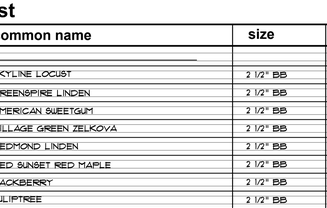


4B entrance sign elevation
SCALE 1"=20'-0"

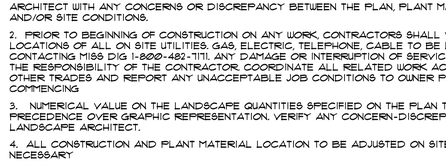
TREES IDENTIFIED FOR PROTECTION DURING CONSTRUCTION AND THE MEANS OF PROTECTION SHALL BE IDENTIFIED PRIOR TO FINAL SITE PLAN. NO CONSTRUCTION SHALL OCCUR UNTIL TREE PROTECTION HAS BEEN INSTALLED AND APPROVED BY THE COMMUNITY DEVELOPMENT DIRECTOR.

TREES SHALL BE LOCATED A MINIMUM 6' FROM ALL WATER MAIN, SANITARY, AND STROM SEWER. NO TREES TO BE PLANTED IN DRAINAGE SWALE

bench seating
(2-CONDITION)



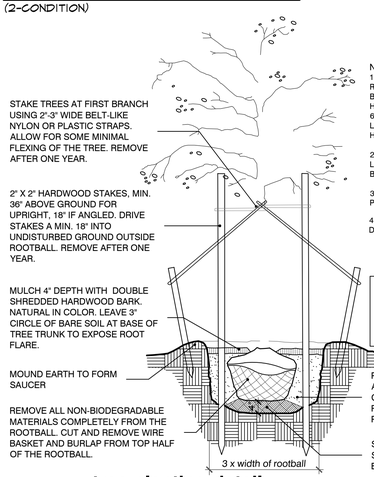
decorative wood fence
6' HIGH DECORATIVE WOOD FENCE. SEE ENGINEERING PLANS FOR FINAL LOCATION.



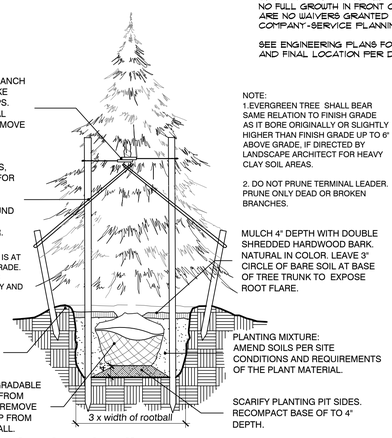
transformer pad planting detail
SCALE 1"=20'-0"

A MINIMUM OF 2' SEPARATION BETWEEN TRANSFORMER AND FULL GROUN SHRUBS AND TREES. GROUND COVERS ALLOWED UP TO TRANSFORMER PAD IF MAINTAINED BELOW 4" FULL GROWTH. IF TRANSFORMER FACES TOWARDS THE HOUSE, THEN THE SAME CONDITIONS EXIST. NO FULL GROWTH IN FRONT OF THE TRANSFORMER FOR AT LEAST A MINIMUM OF 8'. THERE ARE NO WAIVERS GRANTED TO THE ABOVE CONDITION. DETAIL PER THE DETROIT EDISON COMPANY-SERVICE PLANNING DEPARTMENT (9-11-98)

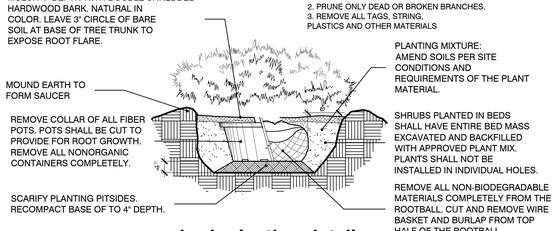
SEE ENGINEERING PLANS FOR PROPOSED LOCATIONS, TOTAL NUMBER OF TRANSFORMERS AND FINAL LOCATION PER DETROIT EDISON REQUIREMENTS.



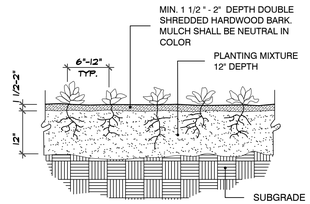
tree planting detail
no scale



evergreen planting detail
no scale



shrub planting detail
no scale



perennial planting detail
no scale

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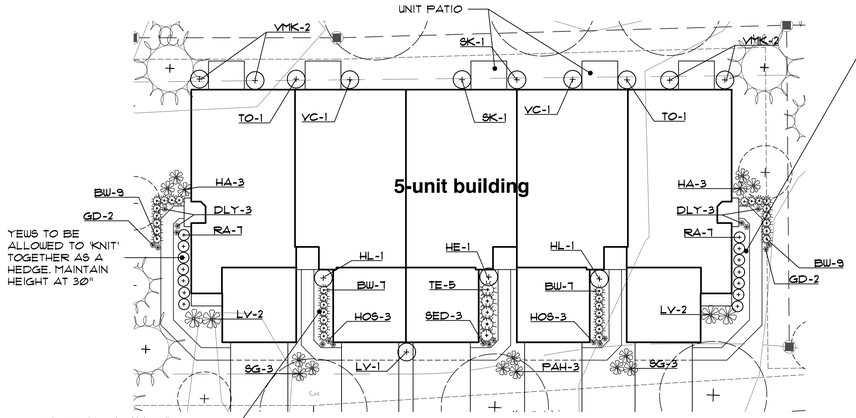
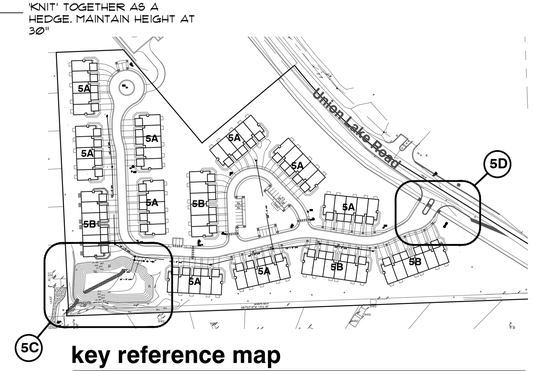


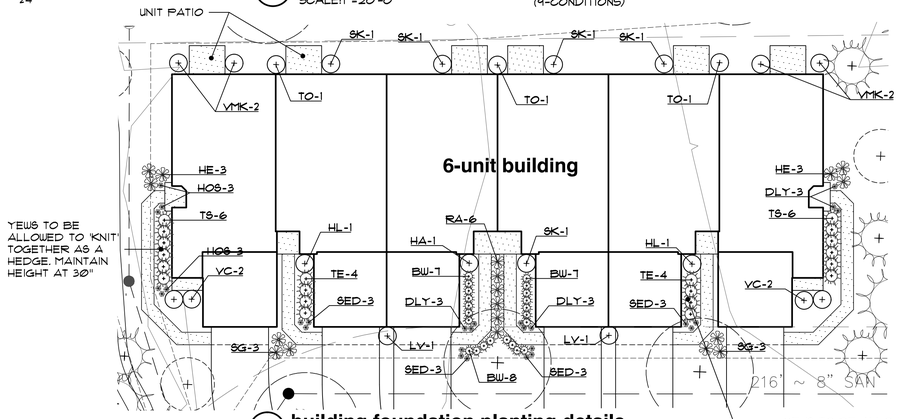
5A building foundation planting details

SCALE:1"=20'-0" (4-CONDITIONS)



key reference map

SCALE:1"=200'-0"



5B building foundation planting details

SCALE:1"=20'-0" (4-CONDITIONS)

detention basin seed mix:

Sedge Meadow Mix: *(Edge Zone)*

A mix of sedges, grasses and wildflowers recommended for soils that are saturated during most of the growing season. Use just above the normal waterline in the capillary zone in our Lake Edge Enhancement System.

Sedge Meadow Mix oz/acre

1	Carex comosa (Bristly Sedge)
1	Carex cristatella (Crested Sedge)
6	Carex frankii (Frank's Sedge)
2	Carex hystericina (Porcupine Sedge)
4	Carex lurida (Lurid Sedge)
2	Carex stipata (Awl-Fruited Sedge)
2	Carex tribuloides (Pointed Oval Sedge)
6	Carex vulpinoidea (Fox Sedge)
64	Elymus virginicus (Virginia Wild Rye)
6	Glyceria striata (Fowl Manna Grass)
8	Leersia oryzoides (Rice Cut Grass)
8	Panicum virgatum (Switchgrass)
2	Scirpus atrovirens (Dark Green Bulrush)
112	

Forbs oz/acre

	Alisma subcordatum (Water plantain)
	Angelica atropurpurea (Angelica)
	Aster novae-angliae (New England Aster)
1	Aster puniceus (Swamp Aster)
1	Aster umbellatus (Flat-topped Aster)
3	Cassia hebecarpa (Wild Senna)
2	Eupatorium maculatum (spotted Joe-Pye Weed)
2	Eupatorium perfoliatum (Boneset)
2	Helenium autumnale (Autumn Sneezeweed)
2	Liatris spicata (Dense Blazing Star)
1	Lobelia cardinalis (Cardinal Flower)
1	Lobelia siphilitica (Great Blue Lobelia)
2	Penstemon digitalis (Foxglove Beardtongue)
1	Pycnanthemum virginianum (Mountain Mint)
3	Rudbeckia fulgida speciosa (Showy Black-Eyed Susan)
4	Rudbeckia hirta (Black-Eyed Susan)
3	Rudbeckia subtomentosa (Sweet Black-Eyed Susan)
2	Silphium integrifolium (Rosinweed)
2	Silphium perfoliatum (Cupplant)
2	Silphium terebinthinaceum (Prairie Dock)
1	Solidago patula (Swamp Goldenrod)
2	Solidago riddellii (Riddell's Goldenrod)
2	Verbena hastata (Blue Vervain)
2	Vernonia fasciculata (Smooth Ironweed)
1	Veronicastrum virginicum (Culver's Root)
1	Zizia aurea (Golden Alexanders)
48	

Components per acre

Sedge Meadow	8 lbs grasses and sedges, 3 lbs forbes

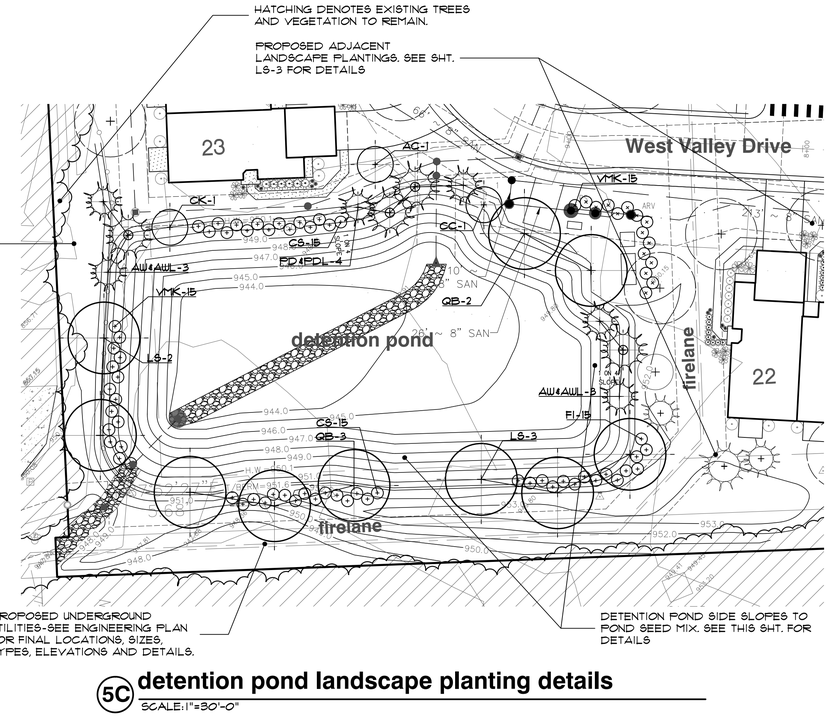
annual cover: *(Edge, Upland & Dry Upland Zones)*

50% Temporary Grasses: will contain two of the following species.

Seed Oats	*Avena sativa*
Annual Rye	*Lolium multiflorum*
Winter Wheat	*Triticum aestivum*
American Slough Grass	*Beckmannia syzgachne*

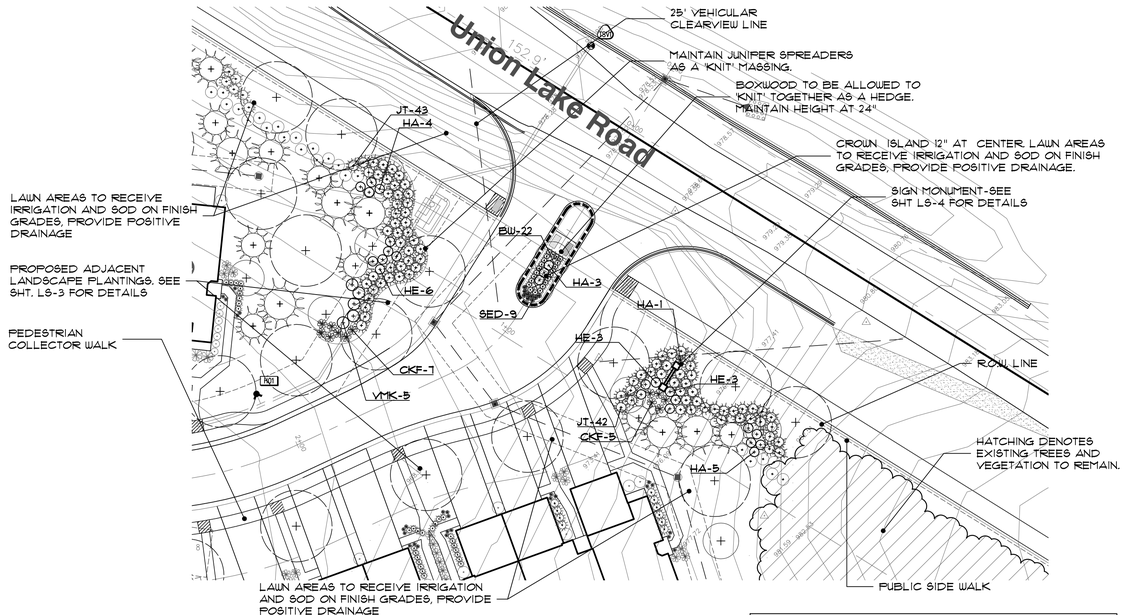
SOURCE:
NATIVESCAPE LLC
P.O. BOX 122
MANCHESTER, MICHIGAN 48158
ph: 517.456.6646
www.nativescape.net

ALL REQUIRED SITE IRRIGATION SYSTEMS SHALL INCLUDE A RAIN SENSOR OR SIMILAR MEASURE TO ENSURE IRRIGATION DOWN NOT OCCUR DURING OR SHORTLY AFTER PRECIPITATION EVENTS.



5C detention pond landscape planting details

SCALE:1"=30'-0"



5D entry landscape planting details

SCALE:1"=30'-0"

TREES SHALL BE LOCATED A MINIMUM 6' FROM ALL WATER MAIN, SANITARY, AND STROM SEWER. NO TREES TO BE PLANTED IN DRAINAGE SWALE

plant material list

key	quant. 5A	quant. 5B	quant. 5C	quant. 5D	botanical name	common name	size	comments
					LARGE AND SMALL DECIDUOUS TREES			
LS	-	-	5	-	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	2 1/2" BB	
QB	-	-	5	-	QUERCUS 'BICOLOR'	SWAMP WHITE OAK	2 1/2" BB	
CC	-	-	1	-	CERCIS CANADENSIS	EASTERN REDBUD (MULTI-STEM)	8' BB	(MULTI-STEM)
AC	-	-	1	-	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	8' BB	(MULTI-STEM)
CK	-	-	1	-	CORNUS KOUSA	KOUSA DOGWOOD	2" BB	
					SHRUBS			
SK	18	20	-	-	SYRINGA PATULA 'MISS KIM'	MISS KIM DWARF LILAC	3' B.B.	
TO	18	12	-	-	THUJA OCCIDENTALIS 'NIGRA'	AMERICA DARK GREEN ARBORVITAE	3' B.B.	
HA	54	4	-	13	HYDRANGEA ANNABELLE	ANNABELLE HYDRANGEA	#3 CONT.	
HL	18	8	-	-	HYDRANGEA 'LINDSEY ANN'	LA DREAMIN HYDRANGEA	#3 CONT.	
LV	45	8	-	-	LIGUSTRUM X. VICARY1	GOLDEN VICARY PRIVET	#3 CONT.	60" O.C. SPACING
VC	18	16	-	-	VIBURNUM CARLES11	KOREAN SPICE FRAGRANT VIBURNUM	3' B.B	60" O.C. SPACING
SG	54	24	-	-	SPIRAEA X.B. BUMALDA 'GOLDFLAME'	GOLDFLAME SPIREA	#3 CONT	
HE	9	24	-	12	HYDRANGEA M. 'GLOWING EMBERS'	GLOWING EMBERS HYDRANGEA	#3 CONT.	
FI	-	-	15	-	FORSYTHIS X INTERMEDIA	BORDER FORSYTHIA	3' BB	60" O.C. SPACING
CS	-	-	30	-	CORNUS STOLONIFERA	REDTWIG DOGWOOD	3' BB	60" O.C. SPACING
VMK	36	16	30	5	VIBURNUM X.B. 'MOHAWK'	MOHAWK VIBURNUM	3' BB	
RA	126	24	-	-	RIBES ALPINUM 'GREEN MOUND'	GREEN MOUND ALPINE CURRANT	#3 CONT	
					LARGE AND SMALL EVERGREENS			
BW	288	88	-	22	BUXUS S. 'VADAR VALLEY'	VADAR VALLEY BOXWOOD	18" BB	24" O.C. SPACING
TS	-	48	-	-	TAXUS . SEBIAN	SEBIAN YEW	24"-30" BB	32" O.C. SPACING
TE	45	32	-	-	TAXUS X.M. 'EVERLOW'	EVERLOW YEW	24"-30" BB	32" O.C. SPACING
JT	-	-	-	85	JUNIPERUS S. 'TAMARISAFOLIA'	TAMS JUNIPER	24"-30" BB	42" O.C. SPACING
AW	-	-	4	-	ABIES CONCOLOR	CONCOLOR WHITE FIR	8' BB	
AWL	-	-	2	-	ABIES CONCOLOR	CONCOLOR WHITE FIR	10' BB O	
PS	-	-	2	-	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	8' BB	
PSL	-	-	2	-	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	10' BB O	
					PERENNIALS AND GRASSES			
GD	36	-	-	-	GERANIUM X. 'ROZANNE'	ROZANNE GERANIUM	8 / FLAT	
PAH	27	-	-	-	PENNISETUM ALOPECUROIDES 'HAMELN'	DWARF FOUNTAIN GRASS	#3 CONT.	
CKF	-	-	-	12	CALAMAGROSTIS X.A. 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	#3 CONT.	
DLY	54	36	-	-	HEMEROCALLIS 'HAPPY RETURNS'	HAPPY RETURNS DAYLILY	#1 CONT.	
SED	27	48	-	9	SEDUM X. 'NEON'	NEON SEDUM	#1 CONT.	
HOS	54	24	-	-	HOSTA 'PATRIOT'	PATRIOT HOSTA	#1 CONT.	

FELINO A. PASCUAL and ASSOCIATES
Community Land Planner and registered Landscape Architect
24333 Orchard Lake Rd, Suite G
Farmington Hills, MI 48336
ph. (248) 557-5588
fax. (248) 557-5416

seal:

STATE OF MICHIGAN — FELINO A. PASCUAL — LANDSCAPE ARCHITECT — No. 1433 — REGISTERED

client:

JMF WHITE LAKE, LLC.
1700 W. BIG BEAVER ROAD SUITE 120
TROY, MI 48084

project:

WEST VALLEY

project location:

White Lake Twp. , Michigan

Union Lake Road

sheet title:

overall landscape planting detail

job no./issue/revision date:

LS19.104.08	REVIEW	9-3-2019
LS19.104.09	SPA	9-28-2019
LS21.034.21	SPA	2-18-2021
LS21.034.21	REVIEW COMMENTS	3-16-2021
LS23.083.07	UPDATES/ COMMENTS	7-29-2023
LS23.083.11	UPDATES/ COMMENTS	11-2-2023
LS24.032.02	UPDATES/TWP COMMENTS	2-7-2024
LS24.032.05	UPDATES	5-29-2024

drawn by: JP, DK, PH

checked by: FP

date: 2-2-2024

notice:

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 For free location of public utility lines

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project no: LS24.032.02

sheet no: **LS-5** of 5

irrigation plan for:

West Valley

White Lake Township, Michigan

note:

unless noted otherwise, numerical value on landscape quantities specified on plan take precedence over graphic representation.

north

scale: 0 50 100 150 feet

1" = 50'

FELINO A. PASCUAL and ASSOCIATES

Community Land Planner and registered Landscape Architect

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project:

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project location:

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Union Lake Road

sheet title:

IRRIGATION PLAN

job no./issue/revision date:

LS24.032.02	UPDATES COMMENTS	2-7-2024
LS24.032.05	UPDATES	5-29-2024

drawn by: **JP, DK, PH**

checked by: **FP**

date: **2-15-2024**

notice:

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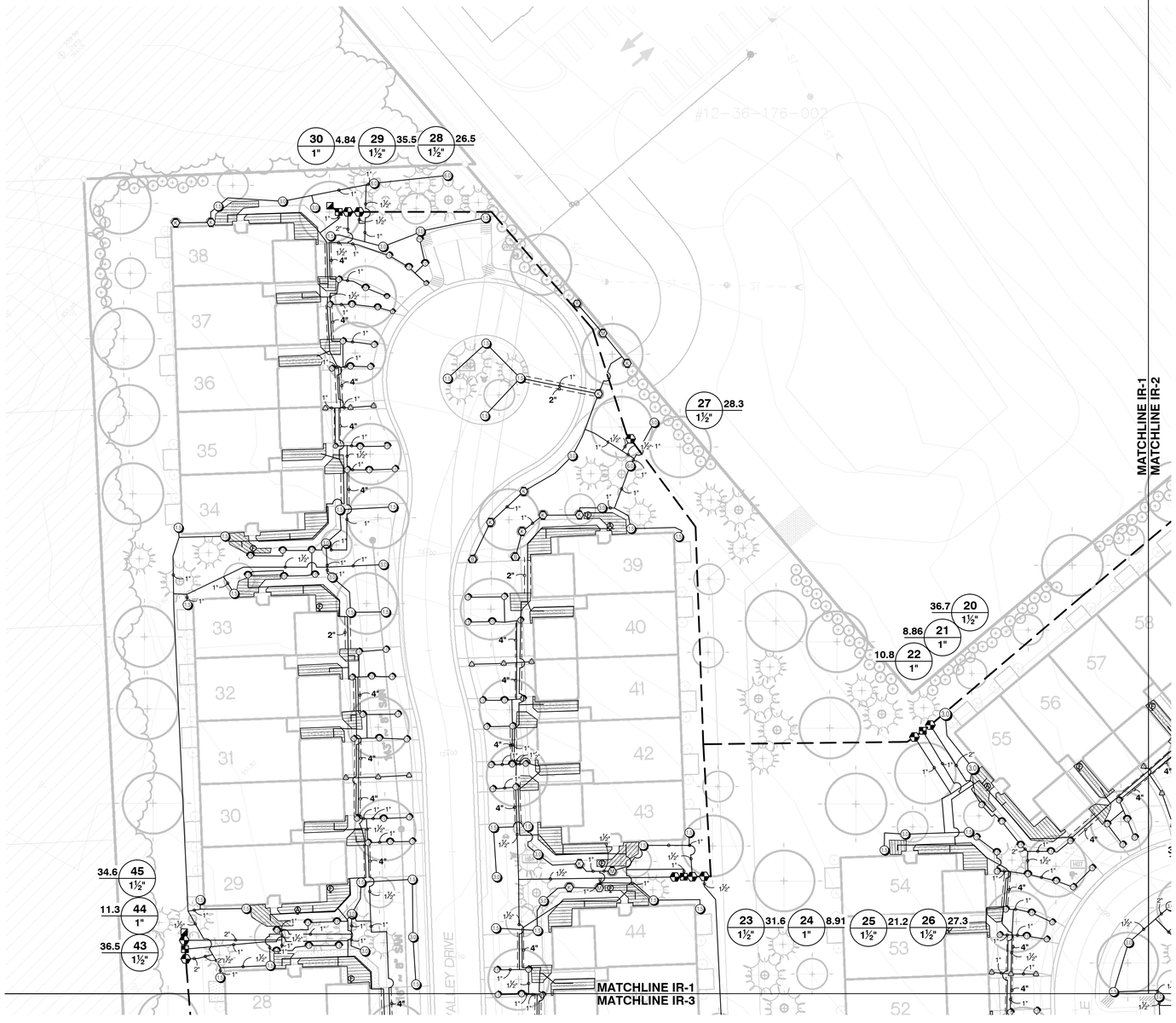
project no: **LS24.032.02**

sheet no: **IRR-1 of 6**

CENTRAL TURF & IRRIGATION SUPPLY



IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL	QTY
EST LCS RCS CST SST	Rain Bird 1804 15 Strip Series	104
8 Q, 8 T, 8 H, 8 F	Rain Bird 1804 8 Series MPR	83
10 Q, 10 T, 10 H, 10 F	Rain Bird 1804 10 Series MPR	42
12 Q, 12 T, 12 H, 12 TQ, 12 F	Rain Bird 1804 12 Series MPR	44
15 Q, 15 T, 15 H, 15 TQ, 15 F	Rain Bird 1804 15 Series MPR	163
M, L, Q	Rain Bird 1804-SAM-P45 W/MP 1000	34
K, G, R	Rain Bird 1804-SAM-P45 W/MP 2000	41
B, V, A	Rain Bird 1804-SAM-P45 W/MP 3000	24
L LST, S SST, R RST	Rain Bird 1804-SAM-P45 W/MP Strip	9

SYMBOL	MANUFACTURER/MODEL	QTY
1.5	Rain Bird 5004-PC 1.5	100
3.0	Rain Bird 5004-PC 3.0	174
6.0	Rain Bird 5004-PC 6.0	3

SYMBOL	MANUFACTURER/MODEL	QTY
	Rain Bird XCZ-100-IVMQ 1"	10
F	Rain Bird MDCFCAP	32
A	Rain Bird ARV050 1/2"	15
	Area to Receive Dripline Rain Bird XFDe-06-18	16,126 l.f.

SYMBOL	MANUFACTURER/MODEL	QTY
	Rain Bird IVM-PGA Globe 1-1/2"	33
	Rain Bird IVM-PGA Globe 1"	2
	Rain Bird 5-RC 1"	4
MV	Rain Bird IVM-PGA Globe 2"	1
BF	Febco 825Y W/ Enclosure 2"	1
C	Rain Bird ESPLXIVM Controller	1
R	Rain Bird WR2-RFC	1
FS	Rain Bird FS-150-P	1
POC	Point of Connection 2"	1
	Irrigation Lateral Line: Polyethylene Pipe100 PSI Non NSF	62.5 l.f.
	Irrigation Lateral Line: Polyethylene Pipe100 PSI Non NSF 1"	18,377 l.f.
	Irrigation Lateral Line: Polyethylene Pipe100 PSI Non NSF 1 1/2"	3,357 l.f.
	Irrigation Lateral Line: PVC Class 160 SDR 26 2"	797.5 l.f.
	Irrigation Mainline: PVC Class 160 SDR 26 2 1/2"	3,256 l.f.
	Pipe Sleeve: PVC Class 160 SDR 26 2"	140.2 l.f.
	Pipe Sleeve: PVC Class 160 SDR 26 4"	1,256 l.f.
	Pipe Sleeve: PVC Class 160 SDR 26 6"	32.9 l.f.

Valve Callout
- # — Valve Number
- # — Valve Flow
- #" — Valve Size

2A **IRRIGATION PLAN**
SCALE: 1"=30'-0"

0 30 60 90 120 feet
1" = 30'

CENTRAL TURF & IRRIGATION SUPPLY

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seal:

client:
JMF WHITE LAKE, LLC.
1700 W. BIG BEAVER ROAD SUITE 120
TROY, MI 48084

project:
WEST VALLEY

project location:
White Lake Twp. , Michigan

Union Lake Road

sheet title:
IRRIGATION PLAN

job no./issue/revision date:

LS24.032.02	UPDATES COMMENTS	2-7-2024
LS24.032.05	UPDATES	5-29-2024

drawn by: JP, DK, PH
checked by: FP
date: 2-15-2024

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project no: LS24.032.02

sheet no: **IRR-2 of 6**

IRRIGATION SCHEDULE

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Q T H F	Rain Bird 1804 8 Series MPR	83
Q T H F	Rain Bird 1804 10 Series MPR	42
Q T H TQ F	Rain Bird 1804 12 Series MPR	44
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M L O	Rain Bird 1804-SAM-P45 W/MP 1000	34
W G E	Rain Bird 1804-SAM-P45 W/MP 2000	41
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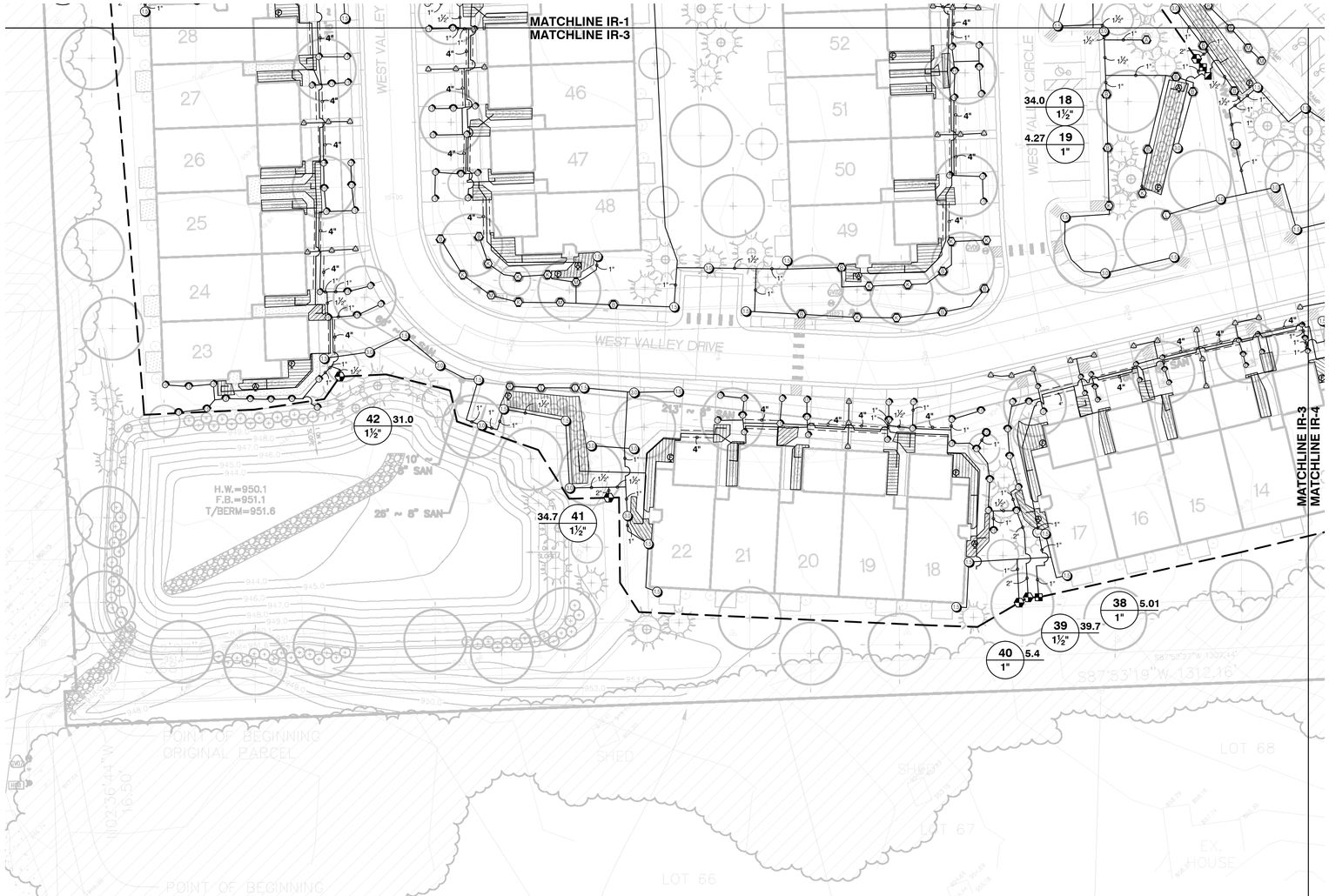

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Valve Callout
Valve Number
Valve Flow
Valve Size

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SCALE: 1"=30'-0"

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TROY, MI 48084

project:
WEST VALLEY

project location:
White Lake Twp. , Michigan

Union Lake Road

sheet title:
IRRIGATION PLAN

job no./issue/revision date:

LS24.032.02	UPDATES COMMENTS	2-7-2024
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drawn by: JP, DK, PH
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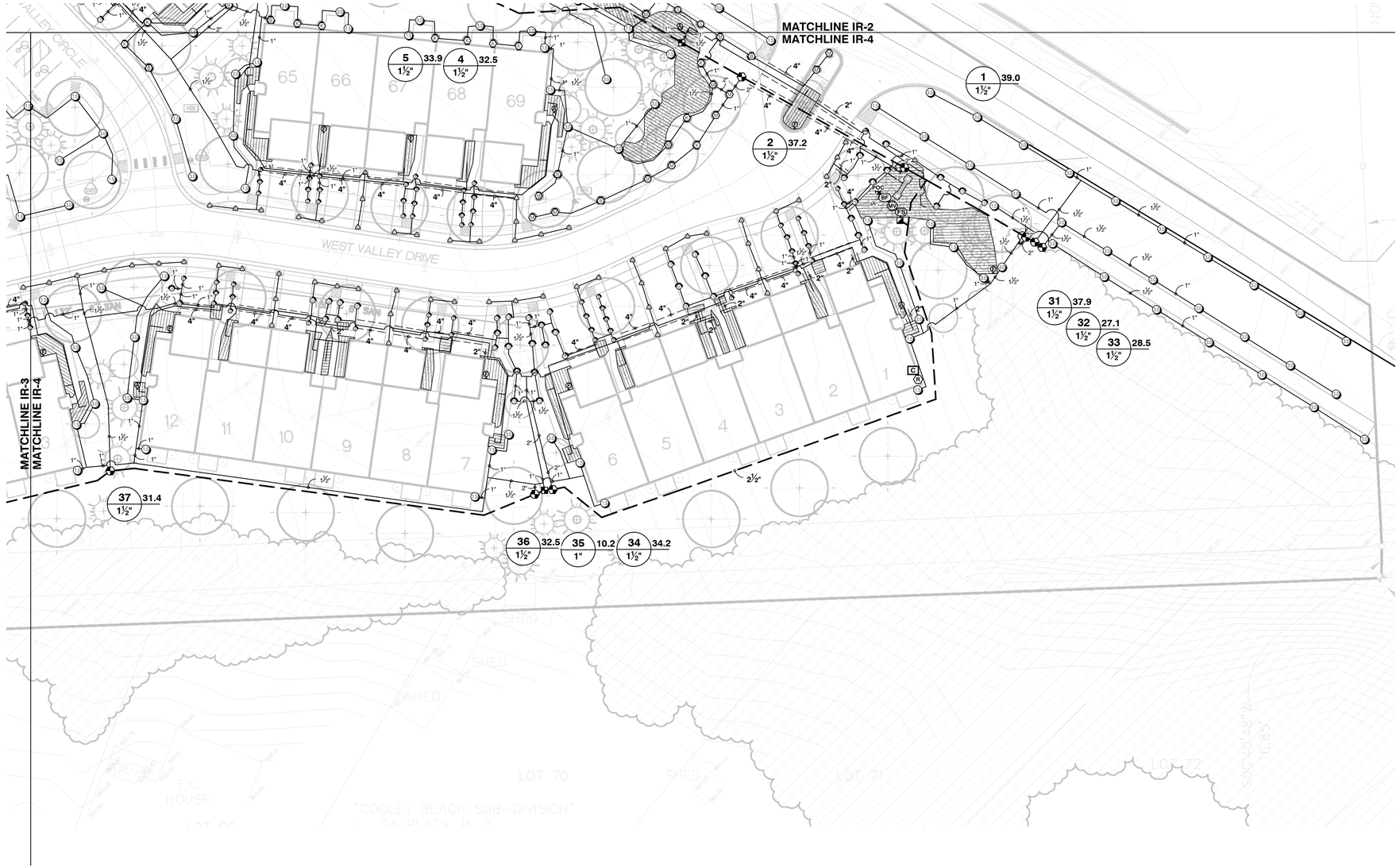
project no: LS24.032.02

sheet no: **IRR-4 of 6**



2A IRRIGATION PLAN

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0 30 60 90 120 feet

1" = 30'

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drawn by: **JP, DK, PH**

checked by: **FP**

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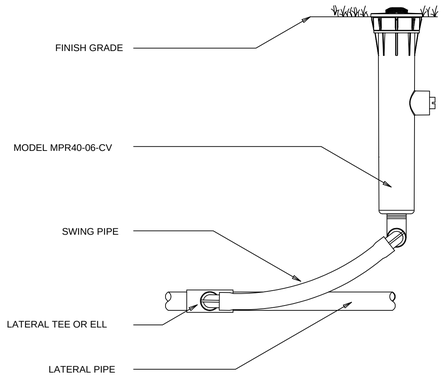
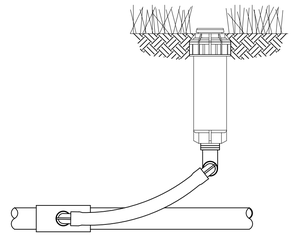
sheet no: **IRR-5 of 6**



1 1804 SPRAY W/ MP ROTATOR NOZZLE

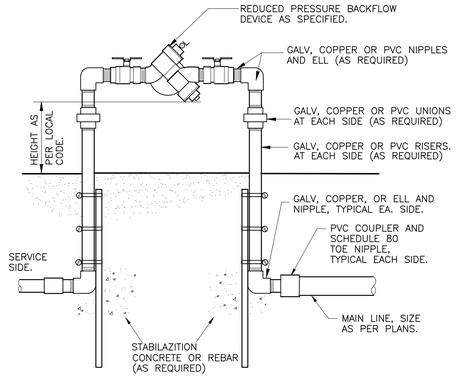
DETAIL-FILE



2 5004 ROTOR HEAD WITH SWING PIPE

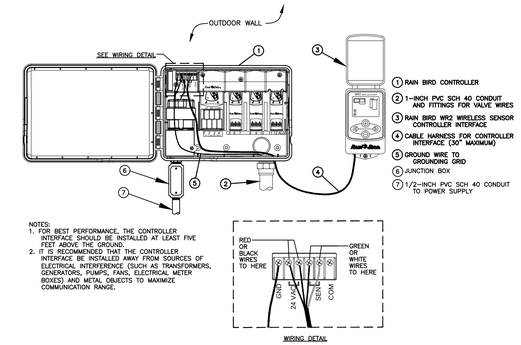
NTS S1-RO-RAI-01

INSTALLATION MAY DIFFER PER LOCAL CODE



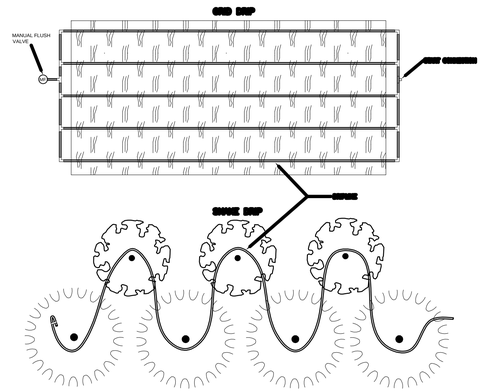
3 REDUCED PRESSURE BACKFLOW DEVICE STANDARD

S1-BA-01



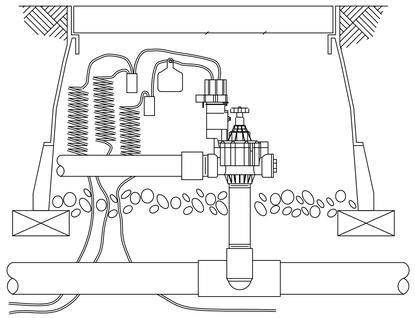
4 WR2 WIRELESS RAIN SENSOR

NTS

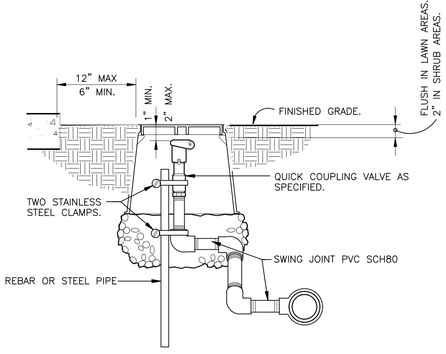


5 TYPICAL DRIP TUBING LAYOUT

NTS

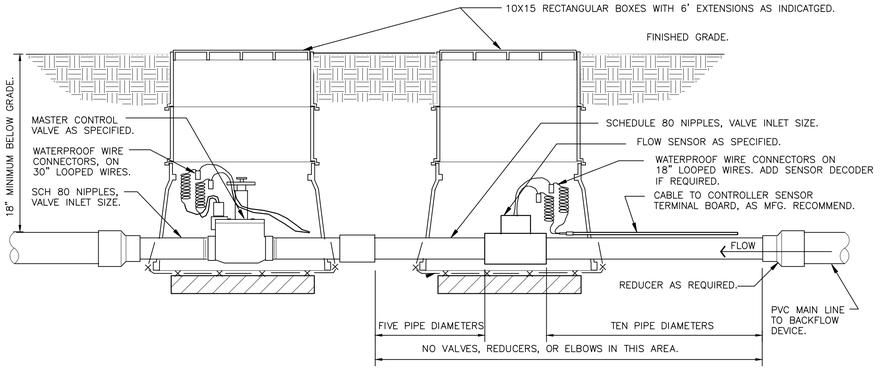


6 RAIN BIRD IVM-PGA VALVE



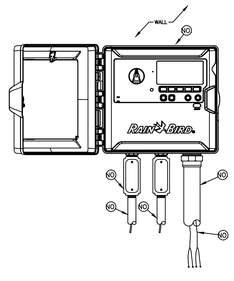
7 QUICK COUPLING VALVE IN BOX

S1-QU-01



8 MASTER VALVE/FLOW SENSOR ASSEMBLY

S1-MI-03



1. TWO-WIRE CONTROLLER: RAIN BIRD ESP-LXIVM IN PLASTIC CABINET WITH WALL MOUNT. INSTALL CONTROLLER AND CABINET ON WALL PER MANUFACTURER'S RECOMMENDATIONS.
2. JUNCTION BOX
3. 1-INCH CONDUIT AND FITTINGS FOR POWER SUPPLY WIRE
4. 2-INCH CONDUIT AND FITTINGS FOR TWO-WIRE CABLE
5. MAXICABLE TWO-WIRE PATH TO FIELD DEVICES USE A DIFFERENT CABLE JACKET COLOR FOR EACH PATH.
6. 1-INCH CONDUIT AND FITTINGS FOR GROUND WIRE. ONLY FOR OUTDOOR INSTALLATIONS.

NOTES:
1. ESP-LXIVM CONTROLLER IS AVAILABLE IN TWO MODELS. THE LXIVM WITH 60 STATIONS AND THE LMIVM-PRO WITH 240 STATIONS. REFER TO THE CHART BELOW FOR DIFFERENCES BETWEEN THE TWO MODELS.
2. USE STEEL CONDUIT FOR ABOVE GRADE AND SCH 40 PVC CONDUIT FOR BELOW GRADE CONDITIONS.
3. PROVIDE PROPER GROUNDING COMPONENTS TO ACHIEVE GROUND RESISTANCE OF 10 OHMS OR LESS. IF CONTROLLER IS MOUNTED INDOORS, USE POWER SUPPLY GROUND.

KEY SPECIFICATIONS

FEATURE / MODEL	MAX PROGRAMS	STATIONS PER SERIES	MASTER VALVES	FLOW SENSORS	WEATHER SENSORS
LX-IVM	10	8	5	5	4

9 ESP-LXIVM TWO-WIRE CONTROLLER IN PLASTIC CABINET

IRRIGATION SPECIFICATIONS

1. IRRIGATION SYSTEM DESIGN BASED ON 40 GPM AT 65 PSI.
2. IRRIGATION DESIGN IS FROM THE POINT OF CONNECTION(POC)ONLY. THE DESIGN IS BASED ON GALLONS PER MINUTE(GPM)AND POUNDS PER SQUARE INCH(PSI)FURNISHED BY OTHERS.
3. IRRIGATION CONTRACTOR IS TO VERIFY POINT OF CONNECTION IN THE FIELD. INSTALLER IS TO CONFIRM THE MINIMUM DISCHARGE REQUIREMENTS OF THE POINT OF CONNECTION AS INDICATED ON THE LEGEND PRIOR TO INSTALLATION.
4. THE PRESSURE REQUIREMENT AT THE POINT OF CONNECTION IS BASED ON NO MORE THAN 5 FEET OF ELEVATION CHANGE IN THE AREAS OF IRRIGATION.
5. ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ACCORDING TO LOCAL BUILDING, ELECTRICAL, AND PLUMBING CODES.
6. IRRIGATION CONTRACTOR WILL ARRANGE INSPECTIONS REQUIRED BY LOCAL AGENCIES AND ORDINANCES DURING THE COURSE OF CONSTRUCTION AS REQUIRED. ALL WIRING TO BE PER LOCAL CODE. BACKFLOW PREVENTION TO BE PER LOCAL CODE.
7. LOCATION OF IRRIGATION COMPONENTS SHOWN ON DRAWING IS APPROXIMATE. ACTUAL PLACEMENT MAY VARY SLIGHTLY AS REQUIRED TO ACHIEVE FULL, EVEN COVERAGE.
8. ALL SPRINKLER HEADS SHALL BE INSTALLED PERPENDICULAR TO FINISH GRADES. EXCEPT AS OTHERWISE INDICATED.
9. INSTALL IRRIGATION MAINS WITH A MINIMUM 18" OF COVER BASED ON FINISH GRADES. INSTALL IRRIGATION LATERALS WITH MINIMUM 12" OF COVER BASED ON FINISH GRADES.
10. PIPE LOCATIONS ARE DIAGRAMMATIC. VALVES AND MAINLINE SHOWN IN PAVED AREAS ARE FOR GRAPHIC CLARITY ONLY.
11. THE IRRIGATION CONTRACTOR SHALL COMPLY WITH PIPE SIZES AS INDICATED.
12. ALL WIRE SPLICES OR CONNECTIONS SHALL BE MADE WITH APPROVED WATERPROOF WIRE CONNECTIONS AND BE IN A VALVE OR SPLICE BOX.
13. ALL CONTROL WIRING DOWNSTREAM OF THE CONTROLLER IS TO BE 2 WIRE, UL APPROVED DIRECT BURY.
14. THE DESIGN IS BASED ON THE SITE INFORMATION AND/OR DRAWING SUPPLIED WITH THE DESIGN CRITERIA BEING SET(AREA TO BE IRRIGATED, EQUIPMENT MANUFACTURER AND MODEL TO BE USED, WATER SOURCE INFORMATION, ELECTRICAL POWER AVAILABILITY, ETC...). SITEONE LANDSCAPE SUPPLY BEARS NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS IN DESIGN OR INSTALLATION THAT ARISE DUE TO INACCURACIES IN THE ABOVE REFERENCED INFORMATION SUPPLIED TO SITEONE LANDSCAPE SUPPLY LANDSCAPES IN RELATION TO THIS PROJECT, UNLESS OTHERWISE NOTED.

CENTRAL TURF & IRRIGATION SUPPLY

FELINO A. PASCUAL and ASSOCIATES
Community Land Planner and registered Landscape Architect
24333 Orchard Lake Rd, Suite G
Farmington Hills, MI 48336
ph. (248) 557-5588
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seal:

client:

JMF WHITE LAKE, LLC.
1700 W. BIG BEAVER ROAD SUITE 120
TROY, MI 48084

project:

WEST VALLEY

project location:
White Lake Twp. , Michigan

Union Lake Road

sheet title:

IRRIGATION NOTES & DETAILS

job no./issue/revision date:

LS24.032.02	UPDATES COMMENTS	2-7-2024
LS24.032.05	UPDATES	5-29-2024

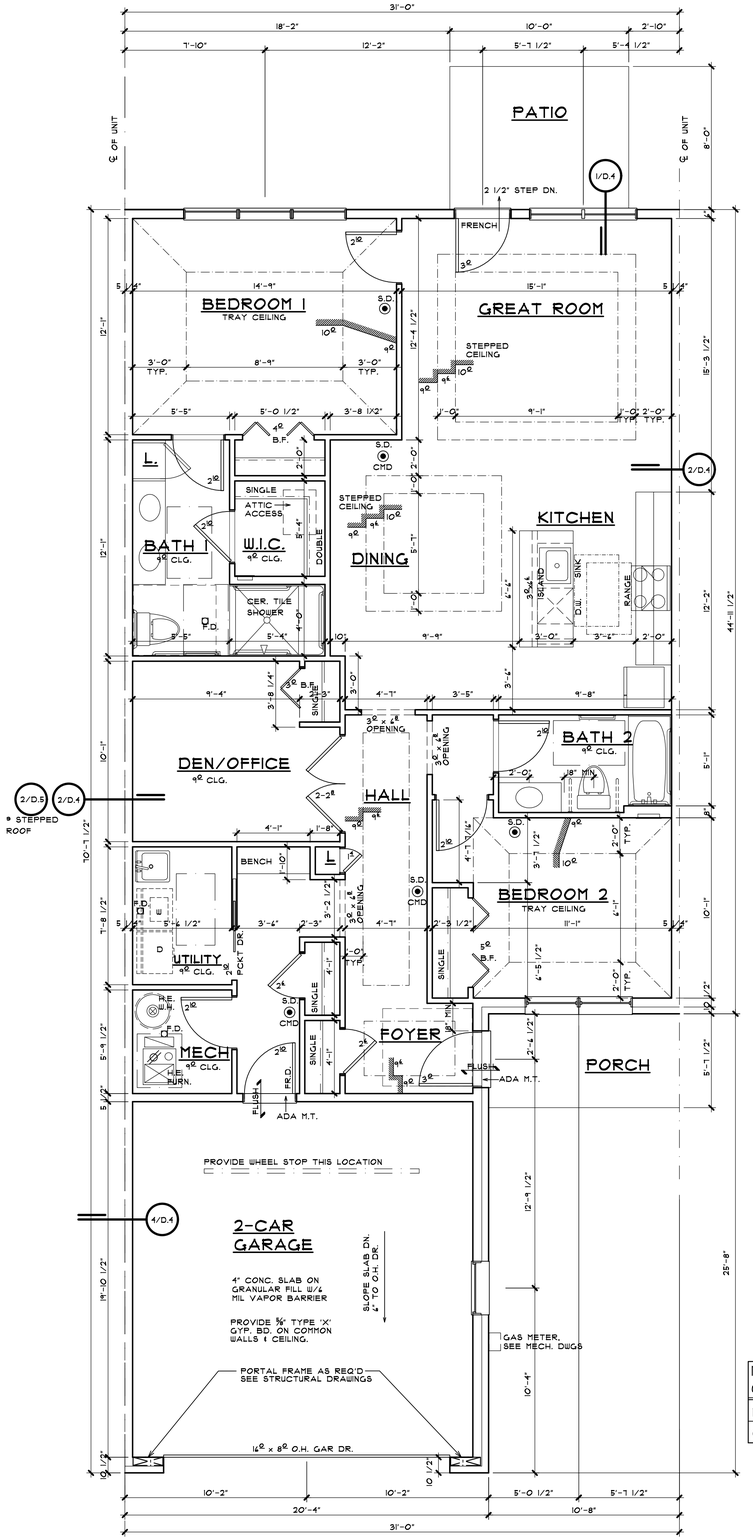
drawn by: JP, DK, PH
checked by: FP
date: 2-15-2024
notice:

3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171 For free location of public utility lines

The location and elevations of existing underground utilities as shown on this drawing are only approximate. no guarantee is either expressed or implied as to the completness of accuracy. contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of construction

project no: LS24.032.02

sheet no: **IRR-6 of 6**

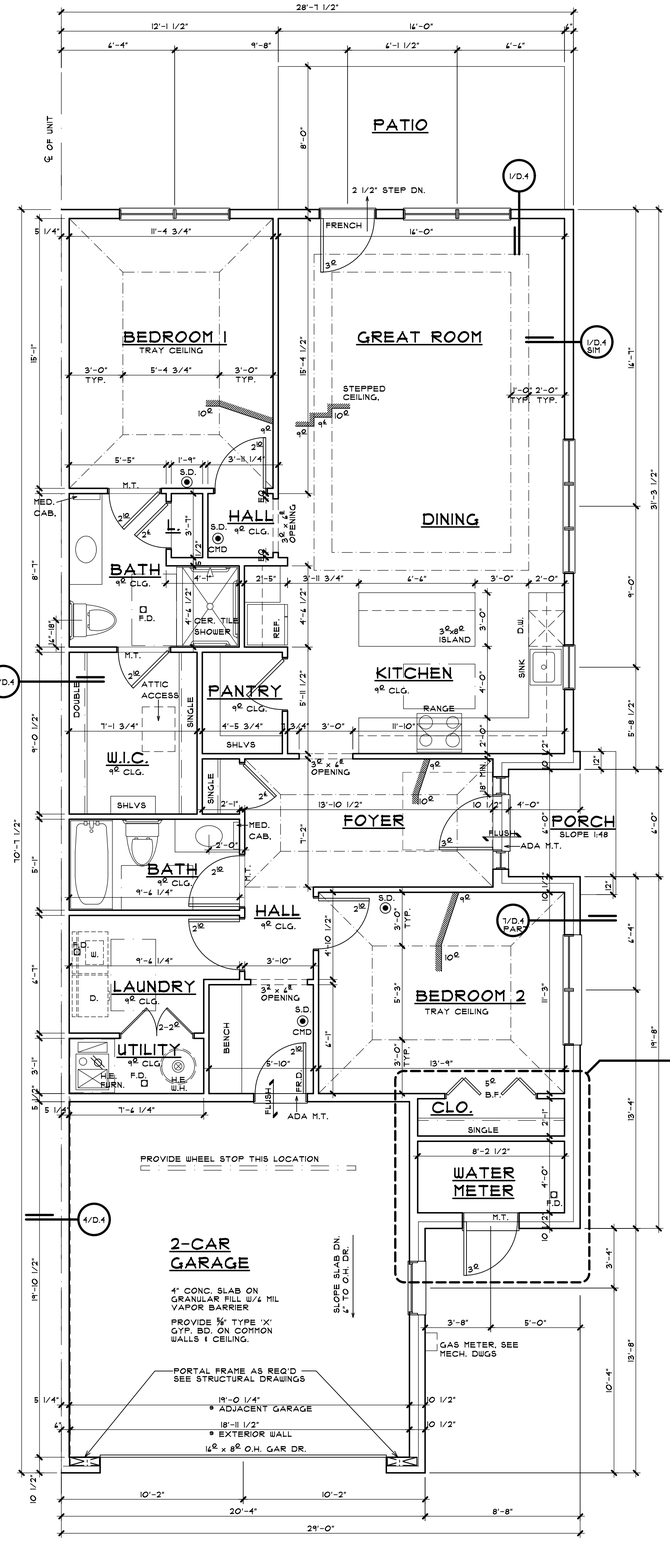


INTERIOR UNIT GROSS SQUARE FOOTAGE	
IST FLOOR (FIN.)	1,494 SQ FT
GARAGE	421 SQ FT

2 / A101 INTERIOR UNIT FIRST FLOOR PLAN - TYPE 'B'

SINGLE STORY DWELLING UNIT

SCALE: 1/4" = 1'-0"

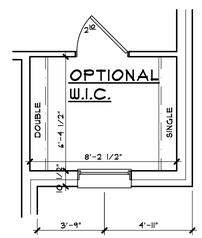


END UNIT GROSS SQUARE FOOTAGE	
IST FLOOR (FIN.)	1,478 SQ FT
GARAGE	416 SQ FT

1 / A101 END UNIT FIRST FLOOR PLAN - TYPE 'B'

SINGLE STORY DWELLING UNIT

SCALE: 1/4" = 1'-0"



1 / A101 OPT. CLOSET PLAN

PART. PLAN

SCALE: 1/4" = 1'-0"

NOTE:
SEE STRUCTURAL ENGINEERING PLANS (BY OTHERS) FOR ALL STRUCTURAL INFORMATION. ALL FOUNDATION INFORMATION REGARDING BEARING CAPACITY OF SOIL CAN VARY ON A BUILDING BY BUILDING BASIS.

NOTES

ALL EXTERIOR TRIM TO BE ALUMINUM WRAPPED OR VINYL. VERIFY EXACT LOCATIONS FOR EACH MATERIAL WITH OWNER PRIOR TO CONSTRUCTION.

PROVIDE PEEP HOLES AND DEAD BOLTS AT ALL FRONT ENTRY DOORS. SEE BUILDER FOR SPECIFICATIONS.

ALL DRYWALL TO BE PREPPED & READY TO BE PAINTED-INCLUDING THE GARAGE

BRICK ROWLOCK SILLS MAY BE REPLACED WITH PRECAST STONE OR CONCRETE. VERIFY WITH BUILDER PRIOR TO CONSTRUCTION

NOTE:
FUTURE GRAB BARS SHOWN AT WATER CLOSETS, TUBS & SHOWERS. PROVIDE BLOCKING ONLY AT TIME OF OCCUPANCY.

NOTE:
ALL GYP. BOARD INSTALLED IN ROUGH BY ROUGH CARPENTERS MUST BE MOLD/MOISTURE RESISTANT TYPE APPROVED FOR INSTALLATION DURING THE ROUGH FRAMING PROCESS.

NOTE:
ROUGH CARPENTER TO VERIFY ALL TUB AND SHOWER SIZES PRIOR TO ROUGH IN.

NOTE:
REFER TO STRUCTURAL DESIGN DRAWINGS FOR ALL STRUCTURAL INFORMATION

ALL INTERIOR PARTITION DIMENSIONS ARE 3 1/2" UNLESS NOTED OTHERWISE.

BEFORE CONSTRUCTION OBTAIN WINDOW & DOOR ROUGH OPENING SIZES FROM WINDOW/DOOR SUPPLIER.

SEE SHEETS N-1 - N-4 FOR ADDITIONAL NOTES REGARDING DRAWINGS & CONSTRUCTION

SEE SHEETS D.1-D.4 FOR ADDITIONAL DETAILS REGARDING DRAWINGS & CONSTRUCTION.

DO NOT SCALE THESE DRAWINGS. USE CALCULATED DIMENSIONS. IF VARIATIONS OCCUR CONTACT ARCHITECT FOR CLARIFICATION.

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SHEET TITLE: INTERIOR & END UNIT FIRST FLOOR PLANS

CLIENT/PROJECT: WEST VALLEY MULTIFAMILY COMMUNITY WHITE LAKE, MICHIGAN

■ PRELIMINARY 08-19-19
□ BIDS
■ PERMITS 06-15-21
□ CONSTRUCTION

REVISIONS
22-10-18 OWNER COMMENT RESPONSE
2024 02 07

DRAWN BY: MS / DA
CAD FILENAME: UNITPLANS.DWG
CHECKED BY: TM
JOB NUMBER: 8140
DATE:
SHEET NUMBER: A101

WINDOW SILLS

IN DWELLING UNITS, WHERE THE OPENING OF AN OPERABLE WINDOW IS LOCATED MORE THAN 72" ABOVE FINISHED GRADE OR SURFACE BELOW, THE LOWEST PART OF THE CLEAR OPENING OF THE WINDOW SHALL BE A MINIMUM OF 24 INCHES ABOVE THE FINISHED FLOOR OF THE ROOM IN WHICH THE WINDOW IS LOCATED. GLAZING BETWEEN THE FLOOR AND 24" SHALL BE FIXED OR HAVE OPENINGS THROUGH WHICH A 4 INCH DIAMETER SPHERE CANNOT PASS.
EXCEPTIONS:
1. WINDOWS WHOSE OPENINGS WILL NOT ALLOW A 4" DIA. SPHERE TO PASS THROUGH THE OPENING WHERE THE OPENING IS IN ITS LARGEST OPENED POSITION.
2. OPENINGS THAT ARE PROVIDED WITH WINDOW GUARDS THAT COMPLY WITH ASTM F2090.

OVERHANGS & DRAINAGE

PROVIDE GUTTERS AND DOWNSPOUTS FOR DRAINAGE OF ROOF WATER. DOWNSPOUTS ARE TO BE CONNECTED TO THE STORM WATER COLLECTION SYSTEM. SEE CIVIL ENGINEERING DRAWINGS FOR CONNECTION DETAILS/LOCATIONS.

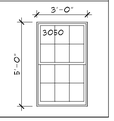
DOWNSPOUT LOCATIONS ARE T.B.D. BY BUILDER.

UNLESS NOTED OTHERWISE OVERHANG DIMENSIONS ARE 12" FROM FRAME. RAKE DIMENSIONS ARE 4" AT BRICK AND 4" AT SIDING.

TYP. WINDOW DESIGNATION

GENERAL REFERENCE FOR ROUGH OPENING SIZES ONLY.

CONSULT WITH WINDOW MANUFACTURER FOR EXACT WINDOW SIZES & REQUIREMENTS.



EGRESS WINDOW

EVERY SLEEPING ROOM SHALL HAVE AT LEAST ONE OPERABLE WINDOW OR EXTERIOR DOOR APPROVED FOR EMERGENCY EGRESS OR RESCUE. THE UNIT(S) MUST BE OPERABLE FROM THE INSIDE TO A FULL CLEAR OPENING WITHOUT THE USE OF SEPARATE TOOLS. WHERE WINDOWS ARE PROVIDED AS A MEANS OF EGRESS, OR RESCUE, THEY SHALL HAVE SILL HEIGHT OF NOT MORE THAN 44 INCHES ABOVE THE FLOOR. ALL EGRESS OR RESCUE WINDOWS FROM SLEEPING ROOMS MUST HAVE A MINIMUM NET CLEAR OPENING HEIGHT DIMENSION SHALL BE 24 INCHES AND WIDTH OF 20 INCHES.

NOTE: VERIFY TYPE OF TRIM W/ OWNER PRIOR TO CONSTRUCTION. OWNER MAY CHOOSE 2x_ TRIM WRAPPED IN ALUMINUM OR VINYL TRIM BOARDS.

NOTE: SEE AS-1 FOR INDIVIDUAL BUILDING COLOR SCHEME

NOTES

ALL EXTERIOR TRIM TO BE ALUMINUM WRAPPED OR VINYL. VERIFY EXACT LOCATIONS FOR EACH MATERIAL WITH OWNER PRIOR TO CONSTRUCTION.

PROVIDE PEEP HOLES AND DEAD BOLTS AT ALL FRONT ENTRY DOORS. SEE BUILDER FOR SPECIFICATIONS.

ALL DRYWALL TO BE READY TO BE PAINTED

BRICK ROWLOCK SILLS MAY BE REPLACED WITH PRECAST STONE OR CONCRETE. VERIFY WITH BUILDER PRIOR TO CONSTRUCTION

FIXED GLASS WINDOWS IN GABLES TO HAVE OPAQUE FINISH ON INTERIOR OF GLASS SO FRAMING OF ROOF NOT VISIBLE FROM EXTERIOR.

PROVIDE RECESS LIGHT IN SOFFIT ABOVE DOOR ENTRY - CONNECT TO PHOTO CELL

PROPOSED VENT AREA: REQUIRED PER EACH END UNIT
VENT AREA RATIO 1:150
ATTIC AREA = 1462 SQ.FT. (1/150)
VENT AREA = 9.75 SQ.FT. x 144 = 1404 SQ.IN.
50% SOFFIT AND 50% RIDGE = 702 SQ.IN. EACH

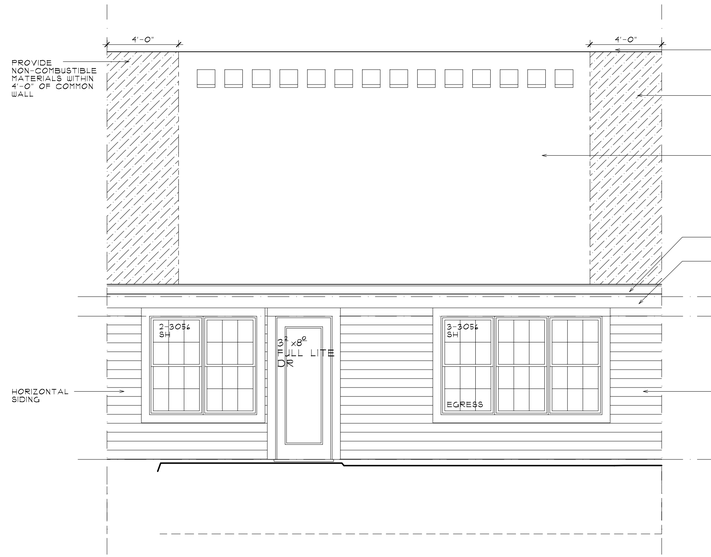
VENT AREA PROVIDED @ RIDGE
CONTINUOUS RIDGE TYPE @ 18 SQ.IN. PER FT. = X LIN.FT.
LOUVER AT RIDGE TYPE @ 54 SQ.IN. EA. = 13 UNITS
GABLE END TYPE (TOTAL) ____ SQ.IN. = ____ UNITS
TOTAL VENTING AT RIDGE = 702 SQ.IN.

VENT AREA PROVIDED @ SOFFIT
CONTINUOUS SOFFIT TYPE @ 9 SQ.IN. PER FT. = X LIN.FT.
LOUVER TYPE 8"x 16" w/o BRICK @ 54 SQ.IN. EA. = 13 UNITS
TOTAL VENTING AT SOFFIT = 702 SQ.IN.

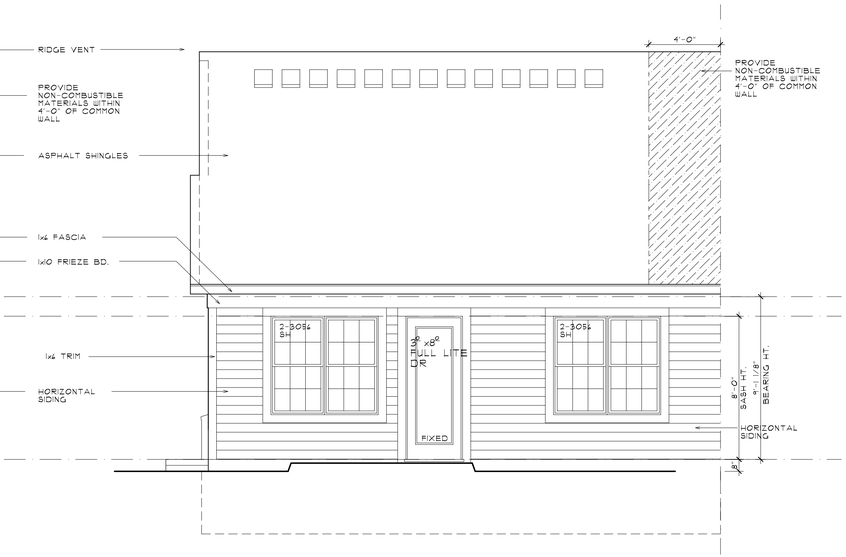
PROPOSED VENT AREA: REQUIRED PER EACH INTERIOR UNIT
VENT AREA RATIO 1:150
ATTIC AREA = 1488 SQ.FT. (1/150)
VENT AREA = 9.9 SQ.FT. x 144 = 1426 SQ.IN.
50% SOFFIT AND 50% RIDGE = 713 SQ.IN. EACH

VENT AREA PROVIDED @ RIDGE
CONTINUOUS RIDGE TYPE @ 18 SQ.IN. PER FT. = X LIN.FT.
LOUVER AT RIDGE TYPE @ 54 SQ.IN. EA. = 14 UNITS
TOTAL VENTING AT RIDGE = 756 SQ.IN.

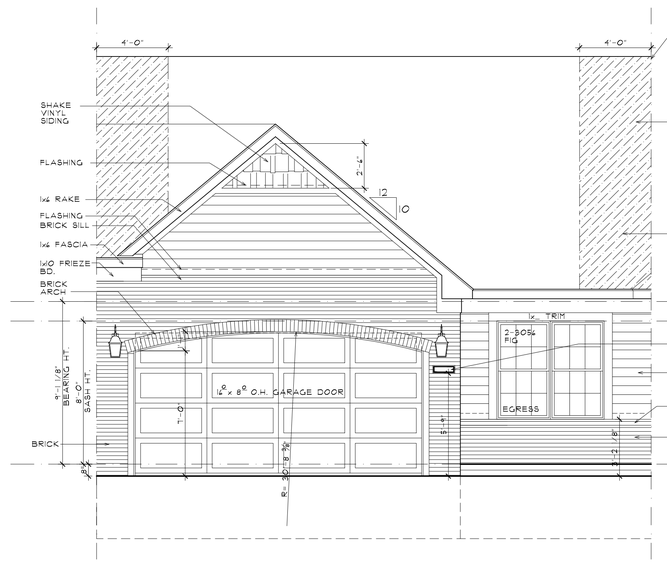
VENT AREA PROVIDED @ SOFFIT
CONTINUOUS SOFFIT TYPE @ 9 SQ.IN. PER FT. = X LIN.FT.
LOUVER TYPE 8"x 16" w/o BRICK @ 54 SQ.IN. EA. = 14 UNITS
TOTAL VENTING AT SOFFIT = 756 SQ.IN.



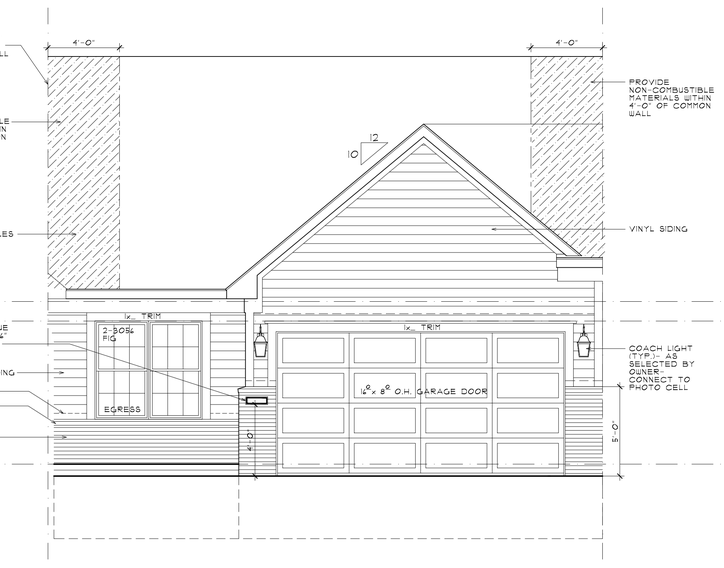
5 A102 REAR ELEVATION - TYP. INTERIOR UNIT
5 AND 6 UNIT SINGLE STORY — SCALE: 1/4" = 1'-0"



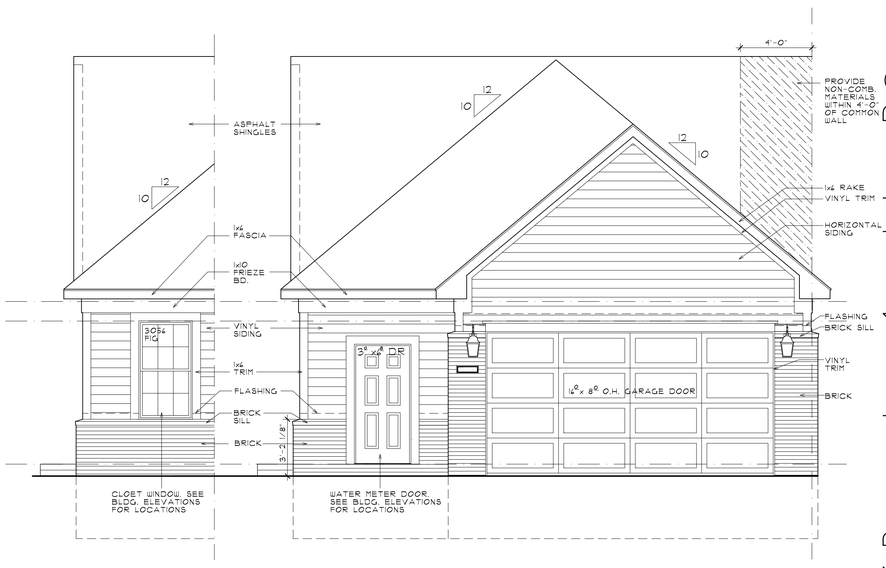
2 A102 REAR ELEVATION - TYP. END UNIT
5 AND 6 UNIT SINGLE STORY — SCALE: 1/4" = 1'-0"



4 A102 FRONT ELEVATION B - TYP. INTERIOR UNIT
5 AND 6 UNIT SINGLE STORY — SCALE: 1/4" = 1'-0"



3 A102 FRONT ELEVATION A - TYP. INTERIOR UNIT
5 AND 6 UNIT SINGLE STORY — SCALE: 1/4" = 1'-0"



1 A102 FRONT ELEVATION - TYP. END UNIT
5 AND 6 UNIT SINGLE STORY — SCALE: 1/4" = 1'-0"

ALL INTERIOR PARTITION DIMENSIONS ARE 3 1/2" UNLESS NOTED OTHERWISE.

BEFORE CONSTRUCTION OBTAIN WINDOW & DOOR ROUGH OPENING SIZES FROM WINDOW/DOOR SUPPLIER.

SEE SHEETS N-1 - N-4 FOR ADDITIONAL DETAILS REGARDING DRAWINGS & CONSTRUCTION

SEE SHEETS D.1-D.4 FOR ADDITIONAL NOTES REGARDING DRAWINGS & CONSTRUCTION.

DO NOT SCALE THESE DRAWINGS. USE CALCULATED DIMENSIONS. IF VARIATIONS OCCUR CONTACT ARCHITECT FOR CLARIFICATION.

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SHEET TITLE: TYP. UNIT ELEVATIONS (1/4" Scale)

CLIENT/PROJECT: WEST VALLEY MULTIFAMILY COMMUNITY, WHITE LAKE, MICHIGAN

- PRELIMINARY 08-19-19
- BIDS
- PERMITS 06-15-21
- CONSTRUCTION

REVISIONS
22-10-18 OWNER COMMENT RESPONSE
2024 02 07

DRAWN BY: MS / DA
CAD FILENAME: UNITPLANS.DWG
CHECKED BY: TM
JOB NUMBER: 8140
DATE:
SHEET NUMBER: A102

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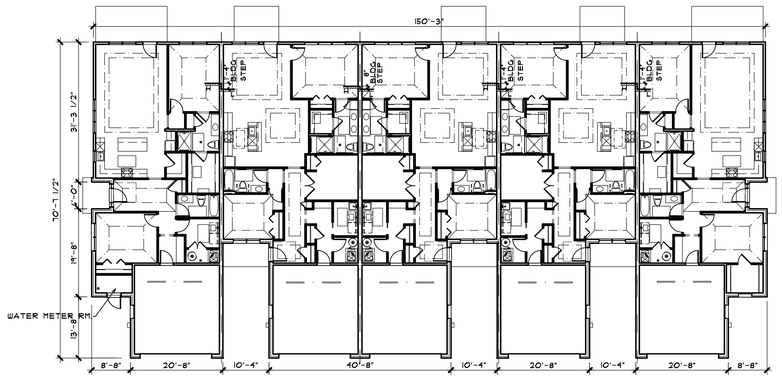
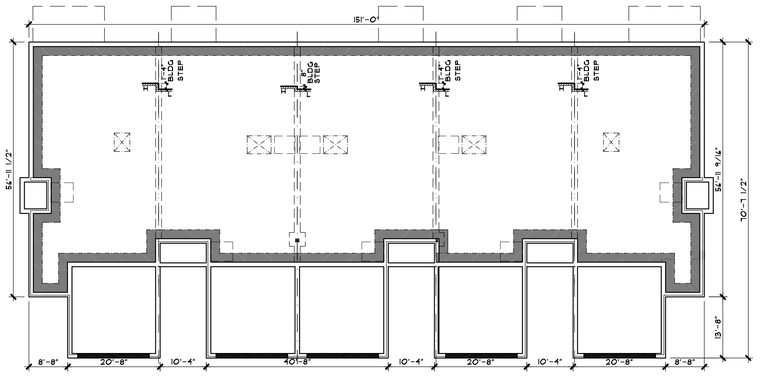


6 A200 BUILDING C (UNIT 13-17) - FIRST FLOOR PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"



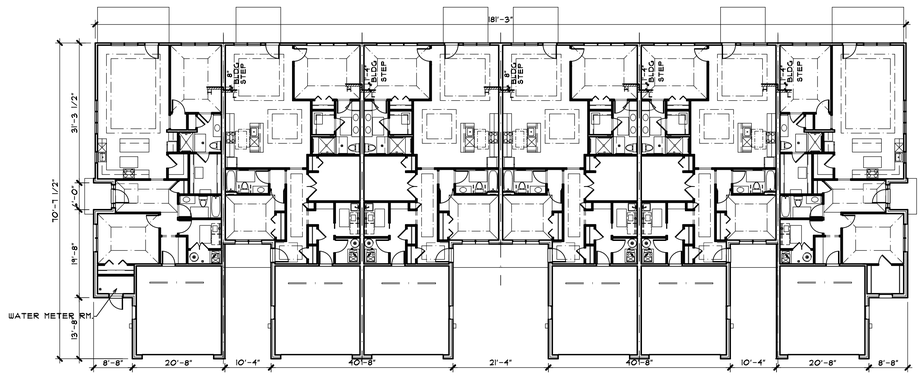
5 A200 BUILDING C (UNIT 13-17) - FOUNDATION PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"

NOTE:

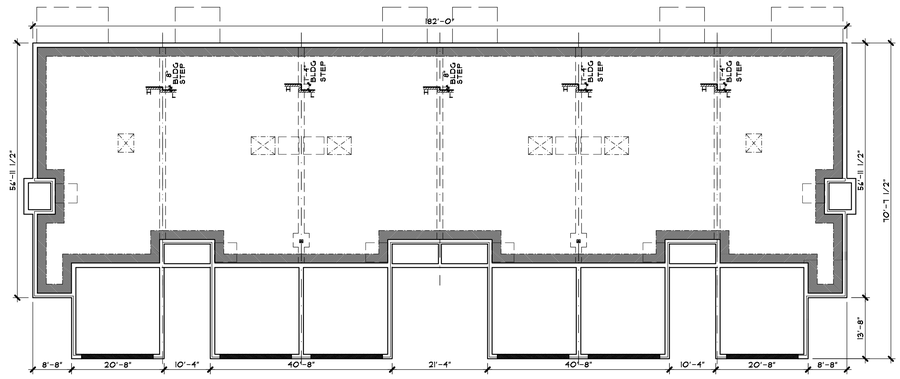
- REFER TO 1/4" SCALE UNIT PLANS FOR ALL NOTES, DIMENSIONS, DETAILS AND ALL ADDITIONAL INFORMATION NOT SHOWN.
- SEE STRUCTURAL ENGINEERING PLANS (BY OTHERS) FOR ALL STRUCTURAL INFORMATION. ALL FOUNDATION INFORMATION REGARDING BEARING CAPACITY OF SOIL CAN VARY ON A BUILDING BY BUILDING BASIS.
- REFER TO CIVIL ENGINEERING PLANS (BY OTHERS) FOR ADDITIONAL INFORMATION ON BUILDING STEPS AND GRADING.

NOTE: CONFIRM WATER METER ROOM LOCATION W/CIVIL PRIOR TO CONSTRUCTION.



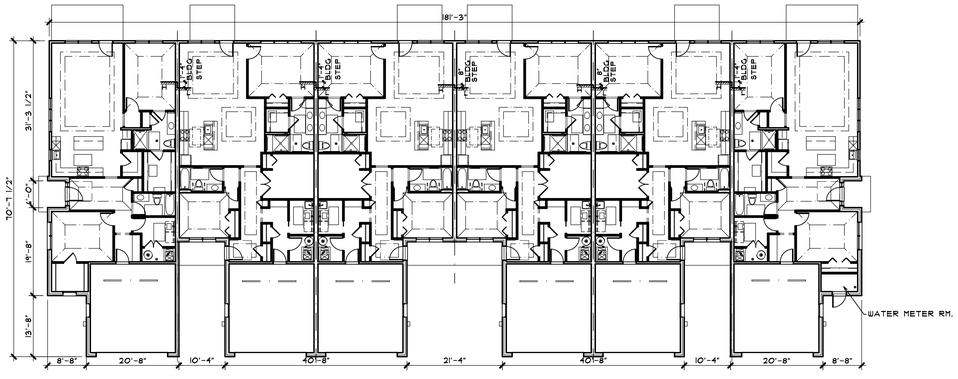
4 A200 BUILDING B (UNIT 7-12) - FIRST FLOOR PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"



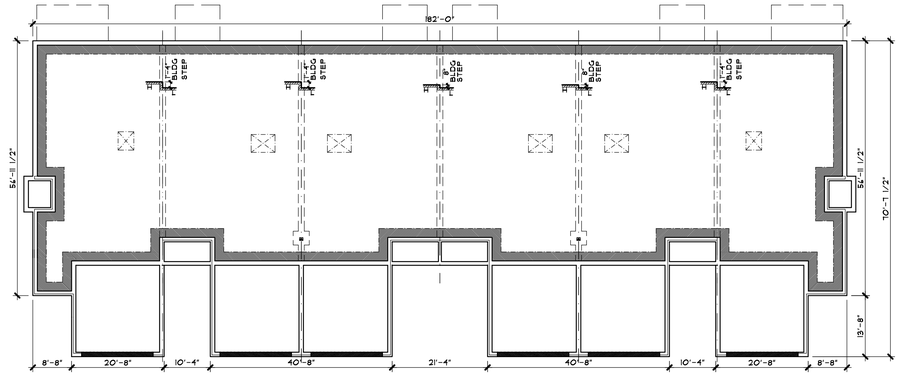
3 A200 BUILDING B (UNIT 7-12) - FOUNDATION PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"



2 A200 BUILDING A (UNIT 1-6) - FIRST FLOOR PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"



1 A200 BUILDING A (UNIT 1-6) - FOUNDATION PLAN

SINGLE STORY DWELLING UNIT — SCALE: 1/16" = 1'-0"

ALL INTERIOR PARTITION DIMENSIONS ARE 3 1/2" UNLESS NOTED OTHERWISE.

BEFORE CONSTRUCTION OBTAIN WINDOW & DOOR ROUGH OPENING SIZES FROM WINDOW/DOOR SUPPLIER.

SEE SHEETS N-1 - N-4 FOR ADDITIONAL NOTES REGARDING DRAWINGS & CONSTRUCTION

SEE SHEETS D.1-D.4 FOR ADDITIONAL DETAILS REGARDING DRAWINGS & CONSTRUCTION.

DO NOT SCALE THESE DRAWINGS. USE CALCULATED DIMENSIONS. IF VARIATIONS OCCUR CONTACT ARCHITECT FOR CLARIFICATION.

Alexander V. Boggaerts + Associates, P.C. • Architecture • Planning • Interior Design
2445 Franklin Road
Bloomfield Hills, MI 48302
248•334•5000

SHEET TITLE: BUILDING PLANS

CLIENT/PROJECT: WEST VALLEY MULTIFAMILY COMMUNITY WHITE LAKE, MICHIGAN

- ■ PRELIMINARY 08-19-19
- □ BIDS
- ■ PERMITS 06-15-21
- □ CONSTRUCTION

REVISIONS
22-10-18 OWNER COMMENT RESPONSE
2024 02 07

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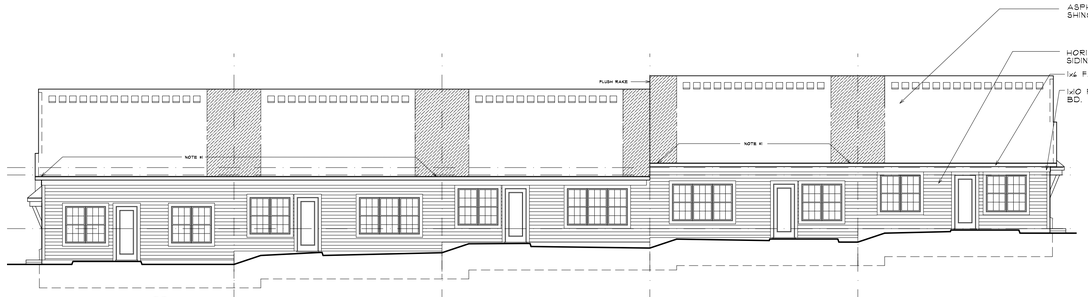
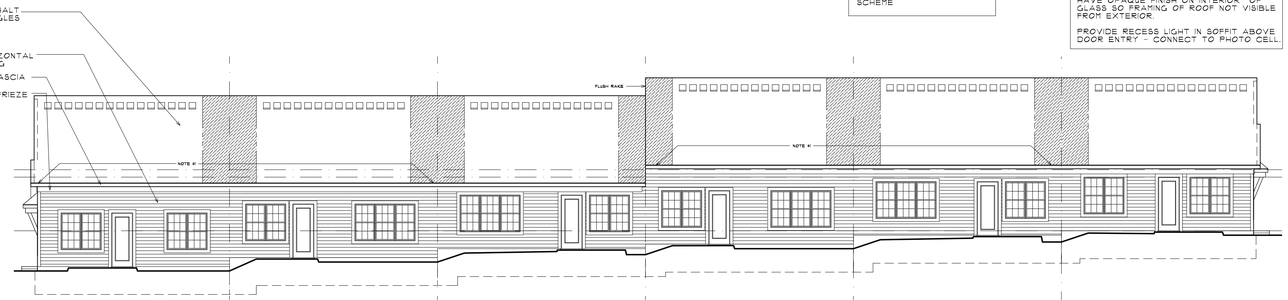
CAD FILENAME: UNITPLANS.DWG
CHECKED BY: TM
JOB NUMBER: 8140
DATE:
SHEET NUMBER: A200



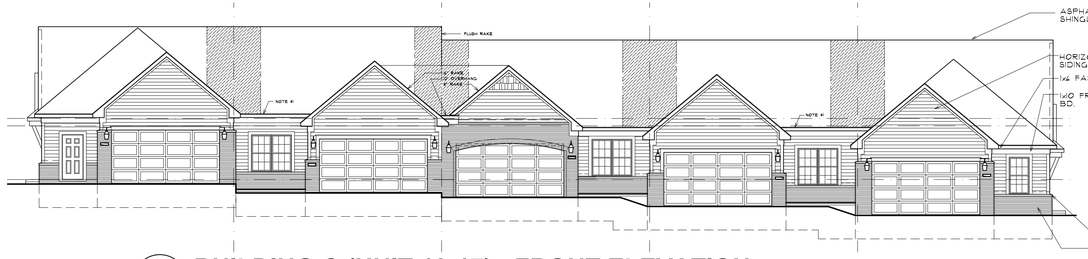
6 A201 BUILDING C (UNIT 13-17) - REAR ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



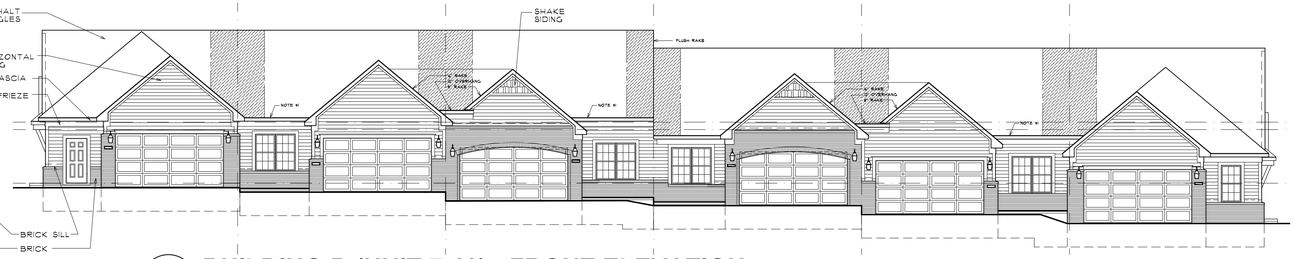
4 A201 BUILDING B (UNIT 7-12) - REAR ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



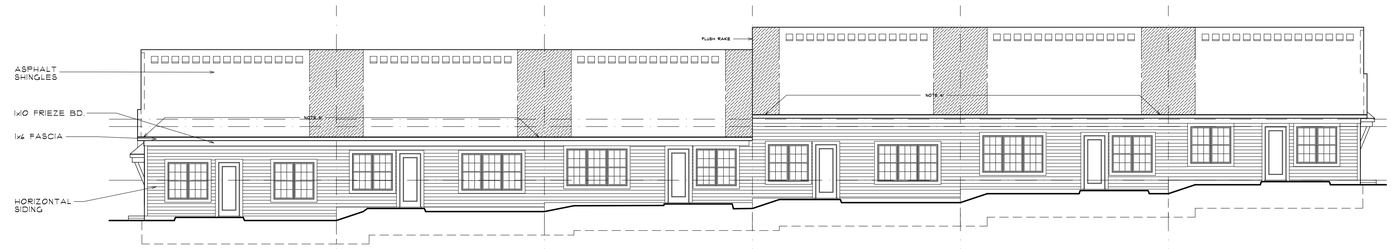
5 A201 BUILDING C (UNIT 13-17) - FRONT ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



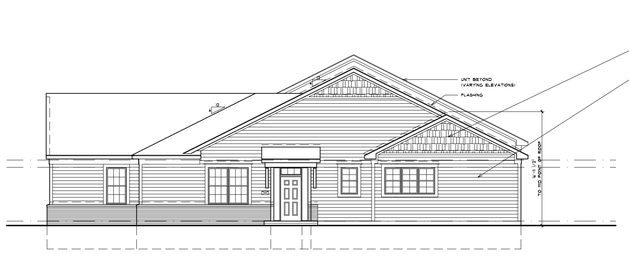
3 A201 BUILDING B (UNIT 7-12) - FRONT ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



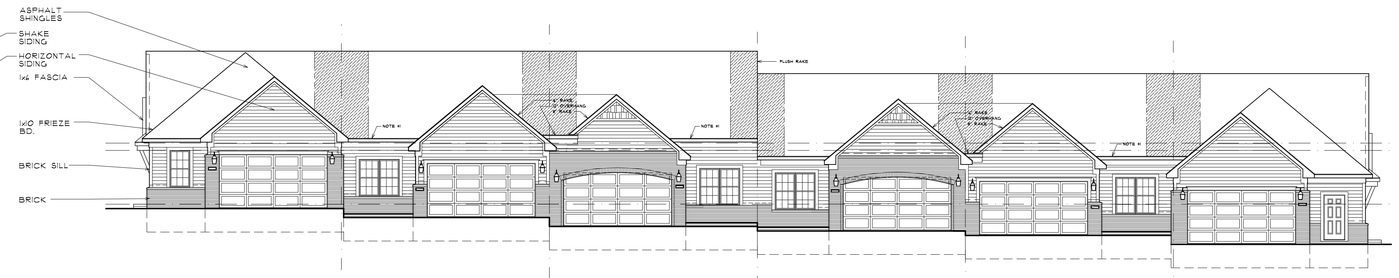
2 A201 BUILDING A (UNIT 1-6) - REAR ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



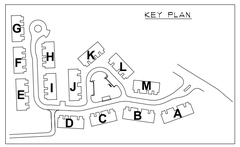
7 A201 TYPICAL RIGHT SIDE ELEVATION

TYPICAL LEFT SIDE - OPP. HAND — SCALE: 3/32" = 1'-0"



1 A201 BUILDING A (UNIT 1-6) - FRONT ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



NOTE:
REFER TO 1/4" SCALE ELEVATIONS ON SHEET A102 FOR ADDITIONAL NOTES AND DIMENSIONS. SEE SHEET S-1 FOR COLOR SCHEME OF BUILDINGS

NOTE 2:
RAISE HEELS AS NECESSARY TO ELIMINATE STEPPING IN ROOF.

NOTE: SEE AS-1 FOR INDIVIDUAL BUILDING COLOR SCHEME

NOTES

ALL EXTERIOR TRIM TO BE ALUMINUM WRAPPED OR VINYL. VERIFY EXACT LOCATIONS FOR EACH MATERIAL WITH OWNER PRIOR TO CONSTRUCTION.

PROVIDE PEEP HOLES AND DEAD BOLTS AT ALL FRONT ENTRY DOORS. SEE BUILDER FOR SPECIFICATIONS.

ALL DRYWALL TO BE READY TO BE PAINTED

BRICK ROWLOCK SILLS MAY BE REPLACED WITH PRECAST STONE OR CONCRETE. VERIFY WITH BUILDER PRIOR TO CONSTRUCTION

FIXED GLASS WINDOWS IN GABLES TO HAVE OPAQUE FINISH ON INTERIOR OF GLASS SO FRAMING OF ROOF NOT VISIBLE FROM EXTERIOR.

PROVIDE RECESS LIGHT IN SOFFIT ABOVE DOOR ENTRY - CONNECT TO PHOTO CELL.

ALL INTERIOR PARTITION DIMENSIONS ARE 3 1/2" UNLESS NOTED OTHERWISE.

BEFORE CONSTRUCTION OBTAIN WINDOW & DOOR ROUGH OPENING SIZES FROM WINDOW/DOOR SUPPLIER.

SEE SHEETS N-1 - N-4 FOR ADDITIONAL DETAILS REGARDING DRAWINGS & CONSTRUCTION

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SHEET TITLE: BUILDING ELEVATIONS

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■ PRELIMINARY 08-19-19
☐ BIDS
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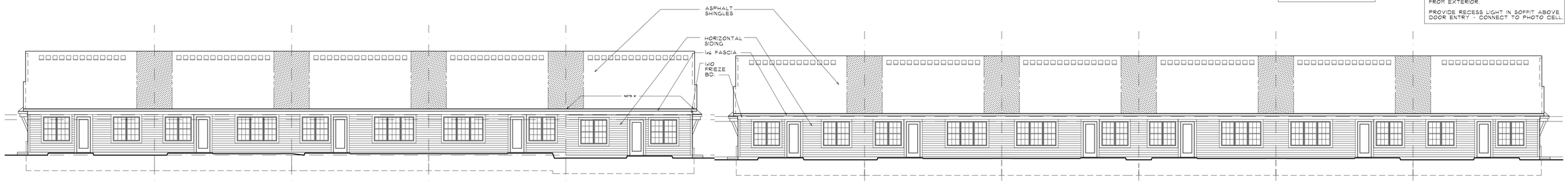
S:\CURRENT\1client\Furnari\WHITE LAKE\WEST VALLEY\04 DRAWINGS\8140 ELEV.dwg, 2/6/2024 2:39:55 PM

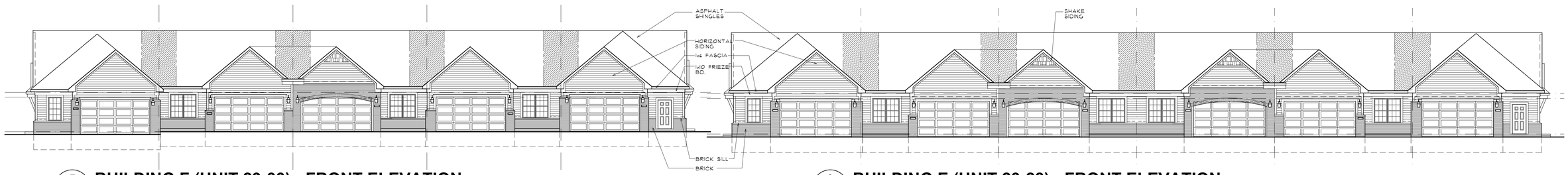


6 A203 BUILDING F (UNIT 29-33) - REAR ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"

4 A203 BUILDING E (UNIT 23-28) - REAR ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"

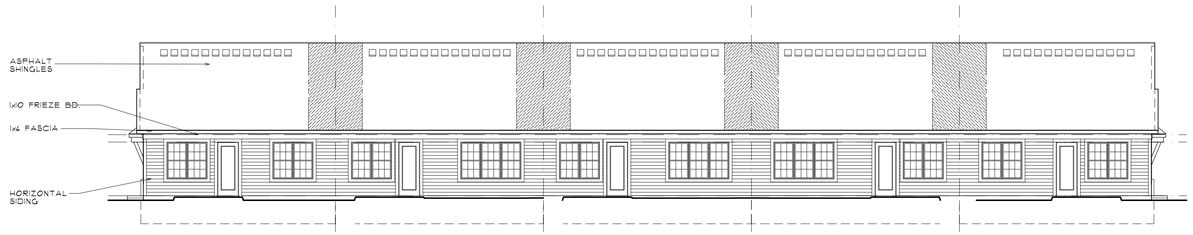


5 A203 BUILDING F (UNIT 29-33) - FRONT ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"

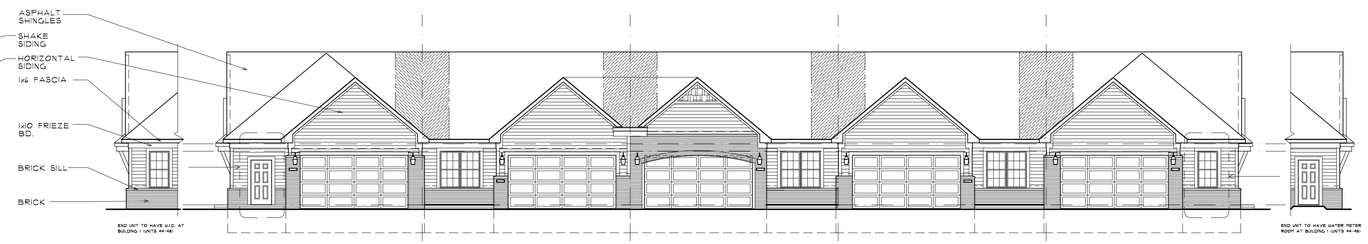
3 A203 BUILDING E (UNIT 23-28) - FRONT ELEVATION

6 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



2 A203 BUILDING D & I (UNIT 18-22 & 44-48) - REAR ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"

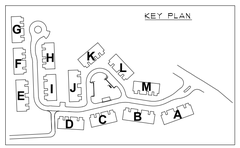


7 A203 TYPICAL RIGHT SIDE ELEVATION

TYPICAL LEFT SIDE - OPP. HAND — SCALE: 3/32" = 1'-0"

1 A203 BUILDING D & I (UNIT 18-22 & 44-48) - FRONT ELEVATION

5 UNIT SINGLE STORY — SCALE: 3/32" = 1'-0"



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NOTE 8:
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NOTE: SEE AS-1 FOR INDIVIDUAL BUILDING COLOR SCHEME

NOTES

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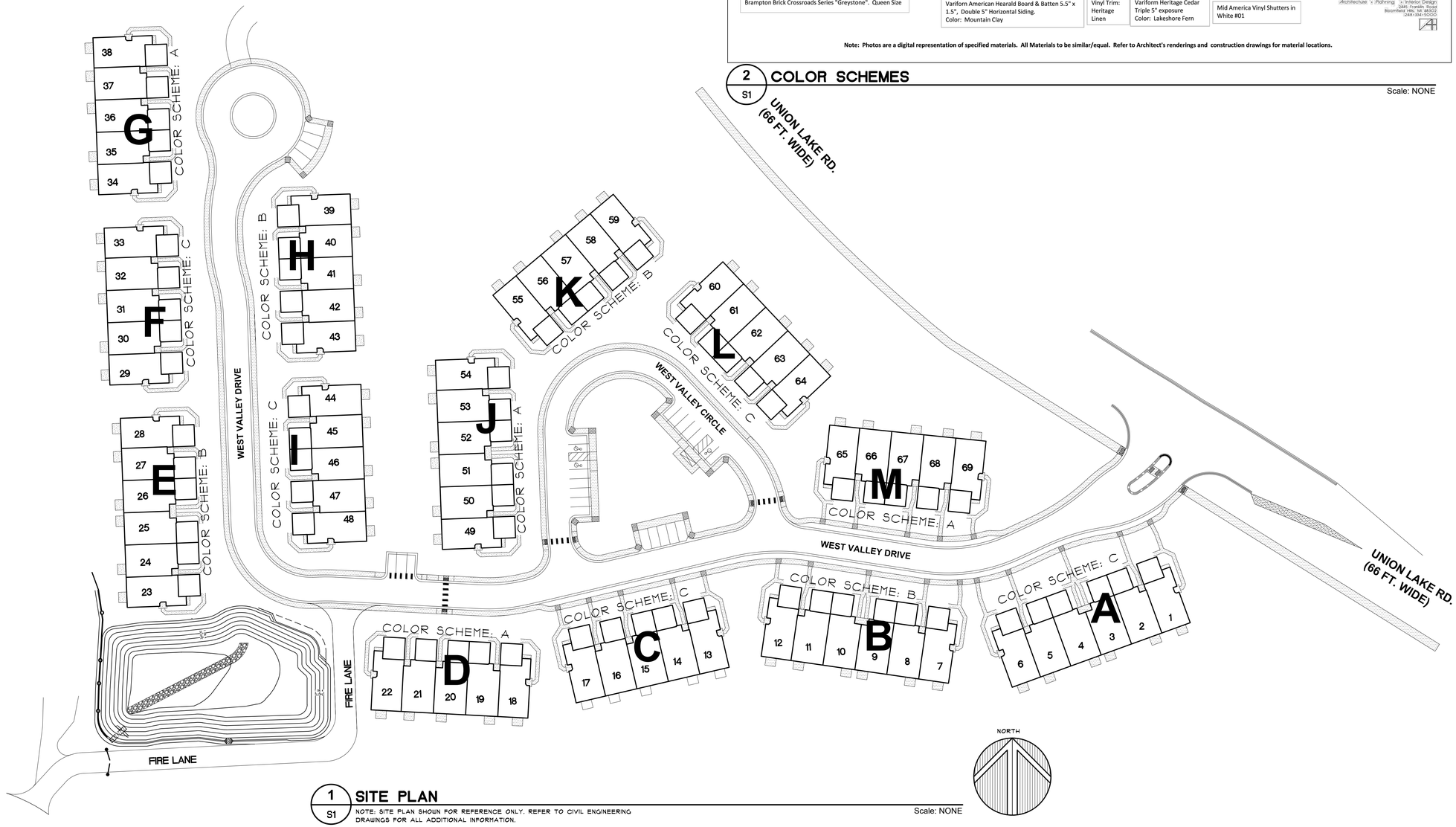


1 S1 **SITE PLAN**

NOTE: SITE PLAN SHOWN FOR REFERENCE ONLY. REFER TO CIVIL ENGINEERING DRAWINGS FOR ALL ADDITIONAL INFORMATION.

Scale: NONE

FUNARI: WEST VALLEY
EXTERIOR MATERIALS AND FINISHES

Updated: 10-18-2022

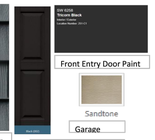
Scheme A

Brampton Brick Crossroads Series "Whitestone". Queen Size

Variform American Herald: Board & Batten 5.5" x 1.5", Double 5" Horizontal Siding. Color: Rich Mocha

Vinyl Trim: Dover White

Variform Heritage Cedar Shake Siding: Double 5" exposure. Color: Wedgewood



Mid America Vinyl Shutters in Black #02

Front Entry Door Paint

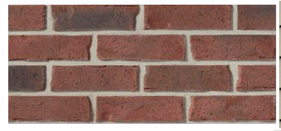
Garage

All Schemes

Roof Shingles: Certainteed "Landmark Series" Weathered Wood

Windows & Railings: Black

Scheme B



Brampton Brick Crossroads Series "Crawford". Queen Size

Variform American Herald Board & Batten 5.5" x 1.5", Double 5" Horizontal Siding. Color: Sandy Tan

Vinyl Trim: Heritage Linen

Variform Heritage Cedar Triple 5" exposure. Color: Island Pearl

Mid America Vinyl Shutters in Midnight Blue #166

Front Entry Door Paint

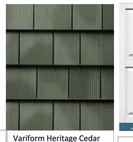
Garage Door

Scheme C

Brampton Brick Crossroads Series "Greystone". Queen Size

Variform American Hearald Board & Batten 5.5" x 1.5", Double 5" Horizontal Siding. Color: Mountain Clay

Vinyl Trim: Heritage Linen



Variform Heritage Cedar Triple 5" exposure Color: Lakeshore Fern

Mid America Vinyl Shutters in White #01

Front Entry Door Paint

Garage Door

Trex Decking in Rocky Harbor. Scheme A

Trex Decking in Coastal Bluff. Scheme B & C

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Note: Photos are a digital representation of specified materials. All Materials to be similar/equal. Refer to Architect's renderings and construction drawings for material locations.

2 S1 **COLOR SCHEMES**

Scale: NONE

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