

CONSTRUCTION PLANS

CHURCH OF GOD IN CHRIST

3500 BALDWIN ROAD

CITY OF AUBURN HILLS, OAKLAND COUNTY, MICHIGIAN

PERMIT / APPROVAL SUMMARY		
DATE SUBMITTED	DATE APPROVED	PERMIT / APPROVAL
		CITY OF AUBURN HILLS ENGINEERING PERMIT
		OAKLAND COUNTY SESC PERMIT
		RCOC APPROACH IN PERMIT

LEGAL DESCRIPTION - PROPOSED PARCEL:
(AS RECORDED IN L47854, P.344)

Lands in part of the East 1/2 of the Southwest 1/4 of Section 5, Town 3 North, Range 10 East, City of Auburn Hills, Oakland County, Michigan, more particularly described as:
Commencing at the South 1/4 Corner of said Section 5; thence along the South line of said Section 5, N86°55'05"W, 344.18 feet to the POINT OF BEGINNING;
thence continuing along said South line N86°55'05"W, 385.55 feet to the North line of Collier Road (66 feet wide); thence along said North line the following two (2) courses:
(1) 254.91 feet along the arc of a non-tangent curve to the left, having a radius of 988.00 feet, and a chord bearing N79°33'01"W, 254.20 feet and;
(2) N86°56'30"W, 206.86 feet to the East line of Baldwin Road (variable width);
thence along said East line, N07°11'12"W, 372.44 feet;
thence S87°52'58"E, 100.82 feet; thence N89°44'25"E, 20.02 feet; thence S87°52'58"E, 103.31 feet; thence S87°53'08"E, 79.82 feet; thence N90°00'00"E, 169.06 feet; thence S50°48'11"E, 532.79 feet;
thence S86°55'05"E, 8.72 feet; thence S03°36'55"W, 100.00 feet to the aforementioned South line of Section 5 and the POINT OF BEGINNING.

Subject to any and all easements and right of ways of record or otherwise.
Containing 6.340 acres of land, more or less.

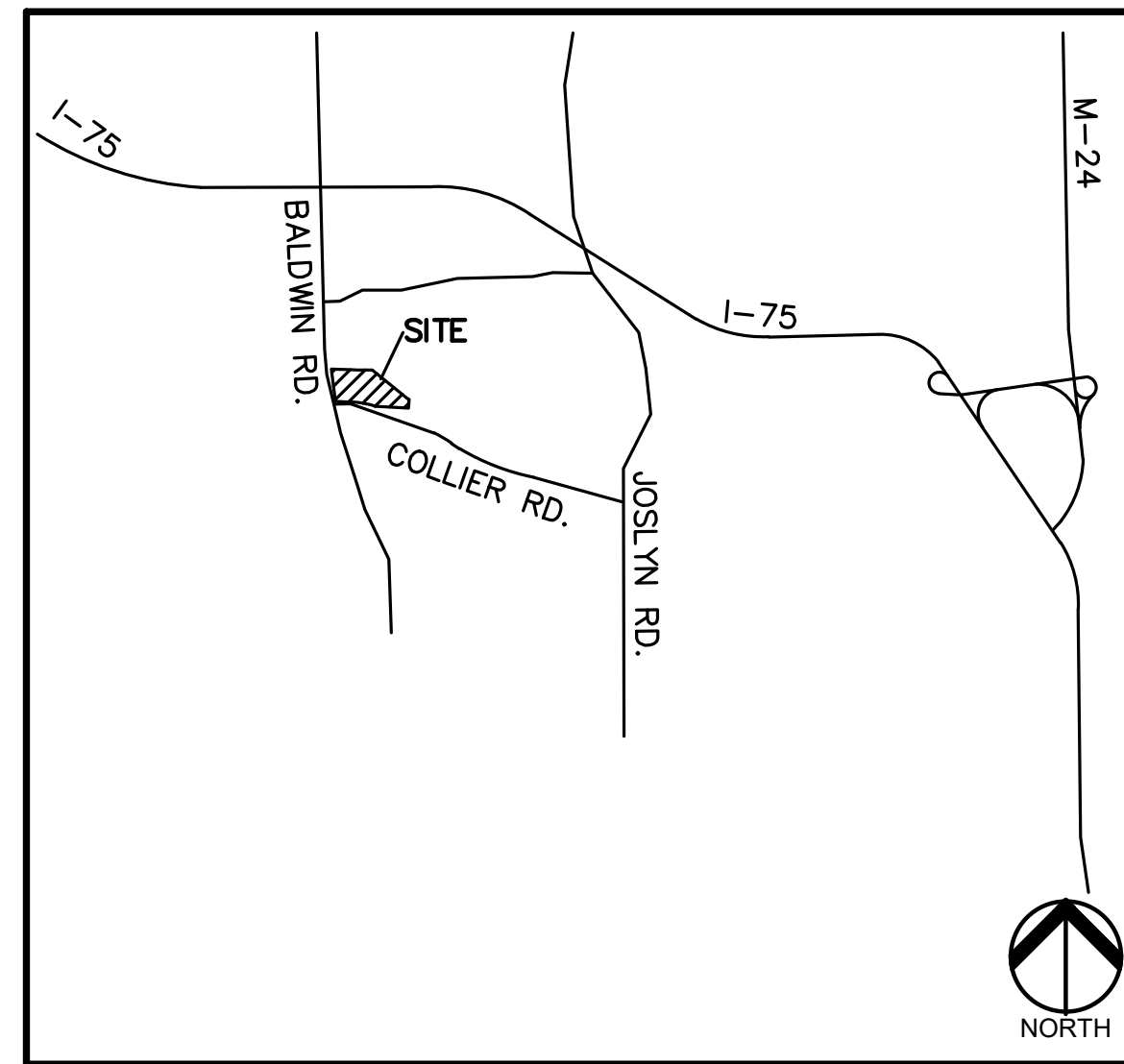
Church of God In Christ (C.O.G.I.C) announce plans to build a new worship center in Auburn Hills, MI. The new edifice will comfortably seat 400-people, and the style of architecture will allow the church to make a very powerful and positive statement of faith on the corner of Baldwin and Collier. The church will continue to fulfill its three-fold purpose: 1) to seek and save the lost, (Matthew 28:19-20); 2) to nurture the believer; 3) to equip the believer in discovering their place in ministry; and to ultimately continue the great commission in the Tri-County area and throughout the world. We will also serve the needs of the surrounding communities while proclaiming the 'Good News' for all.

The Not-for-Profit entity of the church, 'Set The Captured Free', will serve not only our congregants but the communities by offering the following:

- Day Care Program - providing a safe, home-away -from-home environment for ages 2-5, during the week. The children will learn age appropriate basic skills in preparation for grade school.
- Latch Key Program - providing a safe environment designed to support parents and children in a before and after school child care program. This program will provide support with homework and tutoring.
- Kids/Teen College - Week-end program targeting ages 4-17, which will bring FREE academic enrichment, extracurricular and creative arts classes to young people throughout the community.
- Community Resource Center - upcoming collaborative relationships with local schools and colleges offering support services, (i.e., ESL, Tutoring, Computer Skills, Soft Skills, and other resources that promote self-sufficiency).

CITY OF AUBURN HILLS STANDARD NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CURRENT CITY OF AUBURN HILLS STANDARDS.
2. NO WORK SHALL BE PERFORMED WITHOUT INSPECTION.
3. A PERMIT FROM THE DPW IS REQUIRED FOR ALL CONSTRUCTION WITHIN CITY R.O.W. NO EQUIPMENT OR MATERIAL STORAGE WILL BE PERMITTED IN THE R.O.W.
4. ALL CITY STREETS MUST BE MAINTAINED DURING CONSTRUCTION. STREETS SHALL BE KEPT FREE OF MUD, DIRT, CONSTRUCTION DEBRIS, DUST AND THE LIKE. IF CLEAN-UP IS NOT PERFORMED WITHIN 24 HOURS OF NOTIFICATION, THE CITY RESERVES THE RIGHT TO PERFORM THE WORK AND CHARGE THE DEVELOPER ACCORDINGLY.
5. WORKING HOURS (INCLUDING RUNNING OF ANY MACHINERY) SHALL BE RESTRICTED TO MONDAY THROUGH SATURDAY, 7:00 AM TO 7:00 PM; SUNUP TO SUNDOWN; WHICHEVER IS LESS. CONSTRUCTION OPERATIONS BEYOND THE PERIODS MENTIONED ABOVE SHALL BE PERMITTED ONLY AFTER WRITTEN APPROVAL OF THE CITY MANAGER OR HIS DESIGNEE.
6. ALL MATERIALS AND MANUFACTURERS SHALL CONFORM TO THE STANDARD DETAILS.
7. UTILITY STRUCTURES SHALL NOT BE LOCATED IN DRIVEWAYS, AND WHERE POSSIBLE, SHALL NOT BE LOCATED IN PAVED AREAS.
8. THE CONTRACTOR SHALL NOTIFY UTILITY COMPANIES IN ACCORDANCE WITH ACT 53 OF P.A. OF 1974 AND ALSO CONTACT OAKLAND COUNTY UTILITY AND PROTECTION SERVICE (MISS DIG 1-800-482-7111) THREE (3) WORKING DAYS BEFORE THE START OF ANY CONSTRUCTION.
9. THE CONTRACTOR SHALL PROVIDE NECESSARY SIGNS, BARRICADES AND LIGHTS TO PROTECT TRAFFIC AND THE WORK AS DIRECTED BY THE ENGINEER. SUCH DEVICES SHALL BE PLACED PRIOR TO STARTING WORK IN AFFECTED AREAS.
10. ALL SOIL EROSION AND SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE OAKLAND COUNTY STANDARDS AND DETAILS. THE CONTRACTOR SHALL FOLLOW LOCAL RULES AND REGULATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR ALL MATERIALS THAT ARE DISPOSED OF OFF OF THE PROJECT SITE.
11. ALL SOIL EROSION MEASURES MUST BE PROPERLY PLACED PRIOR TO GRADING OR OTHER CONSTRUCTION ACTIVITIES.
12. FIELD CHANGES TO THE APPROVED PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE INSPECTOR ON SITE, WHO WILL DETERMINE WHETHER THE CHANGE IS CONSIDERED "SIGNIFICANT". "SIGNIFICANT" FIELD CHANGES SHALL BE SUBMITTED TO THE CITY BY THE DESIGN ENGINEER. THE CITY SHALL NOT BE HELD RESPONSIBLE FOR DELAYS IN APPROVAL OF CHANGES TO THE APPROVED SITE IMPROVEMENT (ENGINEERING) PLAN.
13. WHERE POSSIBLE, PUBLIC UTILITIES SHALL NOT BE PLACED UNDER PAVEMENT. THE CITY OF AUBURN HILLS SHALL NOT BE RESPONSIBLE FOR PAVEMENT, CURB, OR OTHER RESTORATION OF PERMANENT FACILITIES LOCATED WITHIN THE MUNICIPAL EASEMENT.
14. THREE (3) WORKING DAYS PRIOR TO STARTING CONSTRUCTION, CONTACT THE CONSTRUCTION DEPARTMENT OF ORCHARD, HILTZ, & McCLIMENT AT (734) 466-4539 TO SCHEDULE INSPECTION. OHM SHALL INSPECT ALL SITE IMPROVEMENTS INCLUDING UNDERGROUND UTILITY INSTALLATION, RETAINING WALLS, PAVEMENT IN CITY R.O.W., ALL SIDEWALKS OR SAFETY PATHS IN ANY PUBLIC R.O.W., AND ANY ADDITIONAL ITEMS NOTED DURING REVIEW OR AT THE PRE-CONSTRUCTION MEETING. FINAL OCCUPANCY MAY BE AFFECTED IF PROCEDURES ARE NOT FOLLOWED FOR PROPER INSPECTION.
15. PERMANENT STRUCTURES OF ANY TYPE, INCLUDING BUT NOT LIMITED TO TREES, LIGHT POLES, DRAINAGE STRUCTURES, SANITARY STRUCTURES, BENCHES, TRASH RECEPTACLES, ETC., WILL BE NOT ALLOWED WITHIN THE INFLUENCE OF THE PUBLIC WATER MAIN OR SANITARY SEWER EASEMENTS.



LOCATION MAP
NO SCALE

INDEX OF DRAWINGS

NUMBER	TITLE
-	COVER SHEET
C-1.0	TOPOGRAPHIC SURVEY
C-2.0	DEMOLITON PLAN
C-3.0	DIMENSION AND PAVING PLAN
C-4.0	GRADING PLAN
C-5.0	SOIL EROSION CONTROL PLAN
C-6.1	UTILITY PLAN
C-6.2	UNDERGROUND DETENTION CALCULATIONS
C-7.0	UTILITY PROFILES
C-8.0	DRAINAGE MAP
C-9.1	NOTES & DETIALS
C-9.2	NOTES AND DETAIL SHEET
L-1.0	LANDSCAPE PLAN
L-1.1	LANDSCAPE DETAILS
T-1.0	TREE PRESERVATION PLAN
T-1.1	TREE PRESERVATION LIST

- AUBURN HILLS STANDARD STORM SEWER DETAILS (1 OF 2)
- AUBURN HILLS STANDARD STORM SEWER DETAILS (2 OF 2)
- AUBURN HILLS STANDARD WATER MAIN DETAILS (1 OF 3)
- AUBURN HILLS STANDARD WATER MAIN DETAILS (2 OF 3)
- AUBURN HILLS STANDARD WATER MAIN DETAILS (3 OF 3)

O.C.W.R.C. SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

DESIGN TEAM

OWNER/APPLICANT/DEVELOPER	CIVIL ENGINEER
TRINITY REAL ESTATE INVESTMENTS 26677 WEST TWELVE MILE RD. SOUTHFIELD, MI 48304 CONTACT: COURTNEY A. DREW PHONE: 248.358.8354 EMAIL: CDREW53@AOL.COM	PEA GROUP 2430 ROCHESTER COURT, STE. 100 TROY, MI 48063-1872 CONTACT: JOHN B. THOMPSON, PE PHONE: 844.813.2949 EMAIL: JTHOMPSON@PEAGROUP.COM
ARCHITECT	LANDSCAPE ARCHITECT
GAV & ASSOCIATES, INC. 24001 ORCHARD LAKE RD, SUITE 180A FARMINGTON, MI 48336 CONTACT: GHASSAN ABDELNOUR PHONE: 248.895.9101 EXT. 1002 EMAIL: GHASSAN@GAVASSOCIATES.COM	PEA GROUP 45 W. GRAND RIVER AVE., STE. 501 DETROIT, MI 48226 CONTACT: KIMBERLY DIETZEL, RLA PHONE: 844.813.2949 EMAIL: KDIEZEL@PEAGROUP.COM



REVISIONS	
DESCRIPTION	DATE
ORIGINAL ISSUE DATE	8/22/2020

FLOODPLAIN:
(Per Flood Insurance Rate Map Number 26125C0358F, dated September 29, 2006)

BY GRAPHICAL PLOTTING, THE SITE LIES WITHIN:

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE AE - Base Flood Elevations determined.

OTHER FLOOD AREAS
ZONE X - Area of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS
ZONE X - Areas determined to be outside of the 0.2% annual chance floodplain.

BENCHMARKS
(USGS DATUM)

BM #300
ARROW ON HYDRANT. HYDRANT LOCATED ±22' EAST OF EAST CURB LINE OF BALDWIN ROAD AND ±33' NORTH OF NORTH CURB LINE OF COLLIER ROAD.
ELEV. - 969.48'

BM #301
BENCH MARK ON NORTH SIDE OF POWER POLE. POWER POLE LOCATED EAST ±353' OF INTERSECTION OF BALDWIN AND COLLIER ROAD AND ±21' SOUTH OF SOUTH CURB LINE OF COLLIER ROAD.
ELEV. - 968.16'

LEGEND

- | | | |
|-----------------|------------------|---------------------|
| ● IRON FOUND | ⊗ BRASS PLUG SET | ⊙ SEC. CORNER FOUND |
| ⊙ IRON SET | ⊙ MONUMENT FOUND | ⊙ R. RECORDED |
| ⊙ NAL FOUND | ⊙ MONUMENT SET | ⊙ M. MEASURED |
| ⊙ NAL & CAP SET | | ⊙ C. CALCULATED |
-
- | | |
|--|---|
| —ELEC— | ELEC. PHONE OR CABLE TV O/L LINE, POLE & GUY WIRE |
| —UG-CATV— | UNDERGROUND CABLE TV, CATV PEDESTAL |
| —UG-PHONE— | TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE |
| —ELEC-UG— | ELECTRIC U.G. CABLE, MANHOLE, METER & MANHOLE |
| —GAS VALVE & GAS LINE MARKER | GAS VALVE & GAS LINE MARKER |
| —WATERMAN, HYD. GATE VALVE, TAPPING SLEEVE & VALVE | WATERMAN, HYD. GATE VALVE, TAPPING SLEEVE & VALVE |
| —SANITARY SEWER, CLEANOUT & MANHOLE | SANITARY SEWER, CLEANOUT & MANHOLE |
| —STORM SEWER, CLEANOUT & MANHOLE | STORM SEWER, CLEANOUT & MANHOLE |
| —COMBINED SEWER & MANHOLE | COMBINED SEWER & MANHOLE |
| —SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN | SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN |
| —POST INDICATOR VALVE | POST INDICATOR VALVE |
| —WATER VALVE BODY/HYDRANT VALVE BOX, SERVICE SHUTOFF | WATER VALVE BODY/HYDRANT VALVE BOX, SERVICE SHUTOFF |
| —MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE | MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE |
| —UNIDENTIFIED STRUCTURE | UNIDENTIFIED STRUCTURE |
| —SPOT ELEVATION | SPOT ELEVATION |
| —CONTOUR LINE | CONTOUR LINE |
| —FENCE | FENCE |
| —GUARDRAIL | GUARDRAIL |
| —STREET LIGHT | STREET LIGHT |
| —SIGN | SIGN |
| —CONC. | CONCRETE |
| —ASPH. | ASPHALT |
| —GRAVEL | GRAVEL SHOULDER |
| —WETLAND | WETLAND |

REFERENCE DRAWINGS

- | | |
|----------------|--|
| WATER MAIN | CHM GIS MAPPING, DATED 7-19-18 |
| SANITARY SEWER | CHM GIS MAPPING, DATED 7-19-18 |
| STORM SEWER | CHM GIS MAPPING, DATED 7-19-18 |
| TELEPHONE | AT&T NETWORK, DATED 7-12-18 |
| GAS | CONSUMERS ENERGY MAP# 03-60-50-3, DATED 01-31-18 |
| OTHER | WINDSTREAM DRAWING DATED 7-25-18 |

PEA GROUP
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www.peagroup.com

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

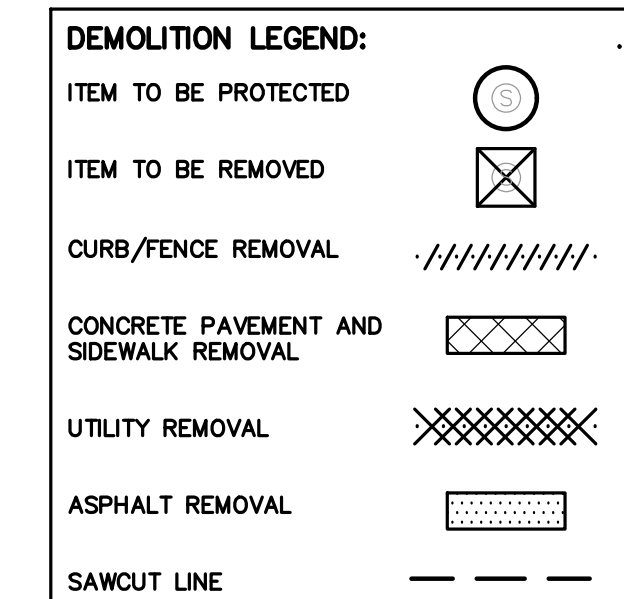
CAUTION!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



LEGAL DESCRIPTION - PROPOSED PARCEL:
(AS RECORDED IN L.47854, P.344)

Lands in part of the East 1/2 of the Southwest 1/4 of Section 5, Town 3 North, Range 10 East, City of Auburn Hills, Oakland County, Michigan, more particularly described as:
Commencing at the South 1/4 Corner of said Section 5; thence along the South line of said Section 5, N86°55'05"W, 344.18 feet to the POINT OF BEGINNING;
thence continuing along said South line N86°55'05"W, 385.55 feet to the North line of Collier Road (66 feet wide); thence along said North line the following two (2) courses:
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Subject to any and all easements and right of ways of record or otherwise.
Containing 6.340 acres of land, more or less.



GENERAL DEMOLITION NOTES:

- THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT:
- ALL MATERIAL TO BE REMOVED, WHETHER SPECIFICALLY NOTED IN THE PLANS OR NOT, SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND DISPOSED OF OFF-SITE IN A LEGAL MANNER. NO ON-SITE BURY OR BURN PITS SHALL BE ALLOWED.
 - ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES.
 - STAGING/PHASING OF DEMOLITION AND CONSTRUCTION IS TO BE COORDINATED WITH THE OWNER AND THE CONTRACTOR PRIOR TO CONSTRUCTION.
 - SPECIFIC DEMOLITION ITEMS HAVE BEEN INDICATED ON THE PLANS AS A GUIDE TO THE GENERAL SCOPE OF THE WORK. IT IS THE INTENT THAT THESE ITEMS SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR ABOVE AND BELOW GROUND, UNLESS SPECIFICALLY NOTED OTHERWISE, AND THAT DEMOLITION WILL INCLUDE BUT WILL NOT NECESSARILY BE LIMITED TO THESE ITEMS. CONTRACTOR SHALL VISIT SITE TO VERIFY EXISTING CONDITIONS AND EXTENTS OF THE DEMOLITION THAT WILL BE REQUIRED PRIOR TO SUBMITTING A BID.
 - REMOVE ALL STRUCTURES DESIGNATED FOR REMOVAL ACCORDING TO THE DEMOLITION PLAN. THIS INCLUDES FOUNDATIONS, FOOTINGS, FOUNDATION WALLS, FLOOR SLABS, UNDERGROUND UTILITIES, CONCRETE, ASPHALT, TREES, ETC.
 - REFER TO SHEET L-1.1 FOR TREE PROTECTION DETAILS.
 - THE CONTRACTOR SHALL, AS A MINIMUM, PROVIDE TREE PROTECTION FENCING AROUND EXISTING TREES TO BE SAVED THAT ARE WITHIN 15 FEET OF CONSTRUCTION ACTIVITIES AND AS INDICATED IN THE PLANS OR PER LOCAL AGENCY REQUIREMENTS.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN UP, NOISE, DUST CONTROL, STREET SWEEPING AND HOURS OF OPERATION IN ACCORDANCE WITH THE LOCAL CODES.
 - THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADES, SIGNAGE, MARKINGS, LIGHTS AND OTHER TRAFFIC CONTROL DEVICES TO PROTECT THE WORK ZONE AND SAFELY MAINTAIN TRAFFIC PER AGENCY REQUIREMENTS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
 - THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES TO CONFIRM THAT UTILITY LEADS HAVE BEEN TAKEN OUT OF SERVICE PRIOR TO DEMOLITION.
 - ALL BUILDING GAS LEADS, METERS AND ASSOCIATED EQUIPMENT SHALL BE REMOVED AS SHOWN ON THE PLANS. COORDINATE ALL ASSOCIATED WORK WITH THE APPROPRIATE UTILITY COMPANY.
 - REMOVE ALL OVERHEAD AND UNDERGROUND ELECTRICAL LINES WITHIN THE AREA OF CONSTRUCTION AS SHOWN ON THE PLANS. COORDINATE SHUTDOWNS AND REMOVALS WITH ELECTRICAL SERVICE PROVIDER OR THE APPROPRIATE UTILITY COMPANY. (NOTE: PHONE AND CABLE T.V. SERVICES MAY ALSO BE LOCATED ON OVERHEAD LINES.)
 - THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REPLACEMENT OF SIGNS AND SUPPORTS WITHIN THE WORK AREA, AS NECESSARY TO FACILITATE CONSTRUCTION. SIGNS SHALL BE PROTECTED OR STOCKPILED FOR REUSE AS SPECIFIED IN THE PLANS OR AS REQUIRED BY THE AGENCY OF JURISDICTION. THE CONTRACTOR SHALL REPLACE ANY DAMAGED SIGNS AND SUPPORTS AT NO ADDITIONAL COST TO THE OWNER.
 - THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
2877 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3590 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
DEMOLITION PLAN

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK
DRAWING NUMBER:	C-2.0

S:\PROJECTS\2016\2016-304 COLLIER ROAD - 811 Data\Construction\C-2 DEMO-1604.dwg

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(AS RECORDED IN L.47854, P.344)

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Subject to any and all easements and right of ways of record or otherwise. Containing 6.340 acres of land, more or less.

SITE DATA TABLE:

SITE AREA: 6.34 ACRES (276,169 SQ.FT.) NET AND GROSS
ZONING: R-1, ONE FAMILY RESIDENTIAL
PROPOSED USE: CHURCH (17,464 SQ.FT.)

BUILDING INFORMATION:
MAXIMUM ALLOWABLE BUILDING HEIGHT = 25 FEET (2 STORIES)
BUILDING FOOTPRINT AREA = 17,464 SQ.FT.
TOTAL BUILDING FLOOR AREA = 34,928 SQ.FT.

BUILDING LOT COVERAGE = 6.3%

TOTAL IMPERVIOUS AREA = 74,923 SQ.FT.

SETBACK REQUIREMENTS:

R-1 ZONING DISTRICT:
FRONT SETBACK (SOUTH): 25 FEET REQUIRED 57.23' PROVIDED
REAR SETBACK (EAST): 35 FEET REQUIRED 512.35' PROVIDED
FRONT SETBACK (WEST): 25 FEET REQUIRED 86.95' PROVIDED
REAR SETBACK (NORTH): 35 FEET REQUIRED 131.00' PROVIDED
LANDSCAPE BUFFER: 15 FEET REQUIRED 8.00' PROVIDED AT COLLIER 10.00' PROVIDED AT BALDWIN

PARKING CALCULATIONS:
CHURCH = 1 SPACE PER 3 SEATS
TOTAL PARKING REQUIRED = 400/3 = 134 SPACES
TOTAL PROPOSED PARKING SPACES = 134 SPACES

OPEN SPACE:
MINIMUM OPEN SPACE REQUIRED = 15%
PROVIDED OPEN SPACE = 15%

- GENERAL NOTES:**
- ALL LIGHTING SHALL BE SHIELDED AND DIRECTED DOWNWARDS AND AWAY FROM ADJACENT PROPERTIES. LIGHTING SHALL MEET THE REQUIREMENTS OF ZONING ORDINANCE NO. 372.
 - SIGNS SHALL MEET THE REQUIREMENTS OF ZONING ORDINANCE NO. 372.
 - NO OUTSIDE STORAGE WILL BE ALLOWED, WHICH INCLUDES PALLET STORAGE, OVERNIGHT VEHICLES, OR TRAILER STORAGE.
 - GROUND MOUNTED TRANSFORMERS AND ROOF MOUNTED MECHANICAL EQUIPMENT SHALL BE SCREENED PER ZONING ORDINANCE NO. 372.
 - PARKING SPACES SHALL BE DOUBLE STRIPPED PER ZONING ORDINANCE NO. 372.
 - AN ENVIRONMENTAL IMPACT STATEMENT IS NOT REQUIRED.
 - A LAND DIVISION OR COMBINATION IS REQUIRED.
 - SPECIAL LAND USE PERMIT IS REQUIRED PER SECTION 401.2, CHURCHES ARE PERMITTED WHEN INGRESS TO AND EGRESS FROM THE SITE IS DIRECTLY ONTO A MAJOR OR SECONDARY THOROUGHFARE WITH AN 86 FOOT R.O.W.
 - THE DEVELOPER HAS AGREED TO PREP THE PARKING LOT WITH THE INSTALLATION OF ELECTRIC STUBS FOR FUTURE ELECTRIC VEHICLE CHARGING STATION LOCATIONS AND RUN CONDUIT FROM THE POWER SOURCE TO THE STUBS TO SUPPORT FUTURE INSTALLATION. THE SPACES ARE DESIGNATED WITH EV ON THE PLAN AND WILL BE POSTED IF AND WHEN CHARGING STATIONS ARE INSTALLED.
 - A VARIANCE FOR A 10' LANDSCAPE BUFFER ALONG BALDWIN ROAD AND AN 8' LANDSCAPE BUFFER ALONG COLLIER ROAD WAS GRANTED AT THE SEPTEMBER 12, 2019 ZBA MEETING.

- SIDEWALK RAMP LEGEND:**
- SIDEWALK RAMP 'TYPE R'
- SIDEWALK RAMP 'TYPE P'
- REFER TO LATEST M.D.O.T. R-28 STANDARD RAMP AND DETECTABLE WARNING DETAILS
- SIGN LEGEND:**
- 'NO PARKING FIRE LANE' SIGN
- 'STOP' SIGN
- 'BARRIER FREE PARKING' SIGN
- 'VAN ACCESSIBLE' SIGN
- REFER TO SHEET C-9.1 FOR SIGN DETAILS

- FIRE DEPARTMENT NOTES:**
- THE FOUR (4) INCH STEAMER CAPS ON ALL HYDRANTS WILL BE PAINTED ACCORDING TO THE FOLLOWING:
WHITE ON 4" MAINS
RED ON 6" MAINS
ORANGE ON 8" MAINS
GREEN ON 12" MAINS
BLUE ON 16" MAINS OR LARGER
 - NO PARKING SHALL BE PERMITTED AND/OR NO OBSTRUCTIONS SHALL BE PLACED OR CONSTRUCTED WITHIN FIFTEEN (15) FEET OF ANY HYDRANT OR FIRE DEPARTMENT CONNECTION, PUBLIC OR PRIVATE.
 - THE FIRE DEPARTMENT CONNECTION MUST BE LOCATED WITHIN ONE HUNDRED (100) FEET OF A FIRE HYDRANT AND WITHIN FIFTY (50) FEET OF A MINIMUM TWENTY (20) FOOT WIDE PAVED DRIVEWAY OR STREET.
 - GAS METERS, PROPANE TANKS, OVERHEAD ELECTRICAL SERVICES, AND TRANSFORMERS MUST NOT BE LOCATED ON THE SAME SIDE OF THE BUILDING OR STRUCTURE AS THE FIRE DEPARTMENT CONNECTION UNLESS A CLEAR DISTANCE OF ONE HUNDRED FIFTY (150) FEET CAN BE MAINTAINED BETWEEN UTILITIES AND THE FIRE DEPARTMENT CONNECTION.
 - ALL DRIVE AREAS MUST BE POSTED AS FIRE LANES WITH UNIFORM SIGNS IN KEEPING WITH THE STANDARD ESTABLISHED IN THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. SIGNS MUST BE ERRECTED ON BOTH SIDES OF THE FIRE LANES WITH SPACING BETWEEN SIGNS NOT EXCEEDING ONE HUNDRED (100) FEET.
 - DESIGNATED EXIT DOORS ONTO DRIVES OR PARKING AREAS MUST BE PROTECTED WITH GUARD POSTS OR PARKING BLOCKS.
 - A WHITE HIGH VISIBILITY STRIPE SHALL BE PAINTED ON THE UPPER FLANGE OF ALL FIRE HYDRANTS.

LEGEND

EXISTING
IRON FOUND
NAIL FOUND
NAIL & CAP SET

PROPOSED
ELEC. PHONE OR CABLE TV O.H. LINE, POLE & GUY WIRE
UNDERGROUND CABLE TV, CATV PEDESTAL
TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
ELECTRIC U.G. CABLE, MANHOLE, METER & MANHOLE
WATERMAIN, HYD. GATE VALVE, TAPPING SLEEVE & VALVE
SANITARY SEWER, CLEANOUT & MANHOLE
COMBINED SEWER & MANHOLE
SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
POST REGULATOR VALVE
WATER VALVE BOOBYHANT VALVE BOX, SERVICE SHUTOFF
MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
UNIDENTIFIED STRUCTURE
SPOT ELEVATION
CONTOUR LINE
FENCE
GUARDRAIL
STREET LIGHT
SIGN
CONC. CONCRETE
ASPH. ASPHALT
GRAVEL GRAVEL SHOULDER
WETLAND

SEC. CORNER FOUND
R RECORDED
M MEASURED
C CALCULATED

BRASS PLUG SET
MONUMENT FOUND
MONUMENT SET

HEAVY FLOW DUTY ONLY
HEAVY BEEP DUTY STRENGTH

REFERENCE DRAWINGS

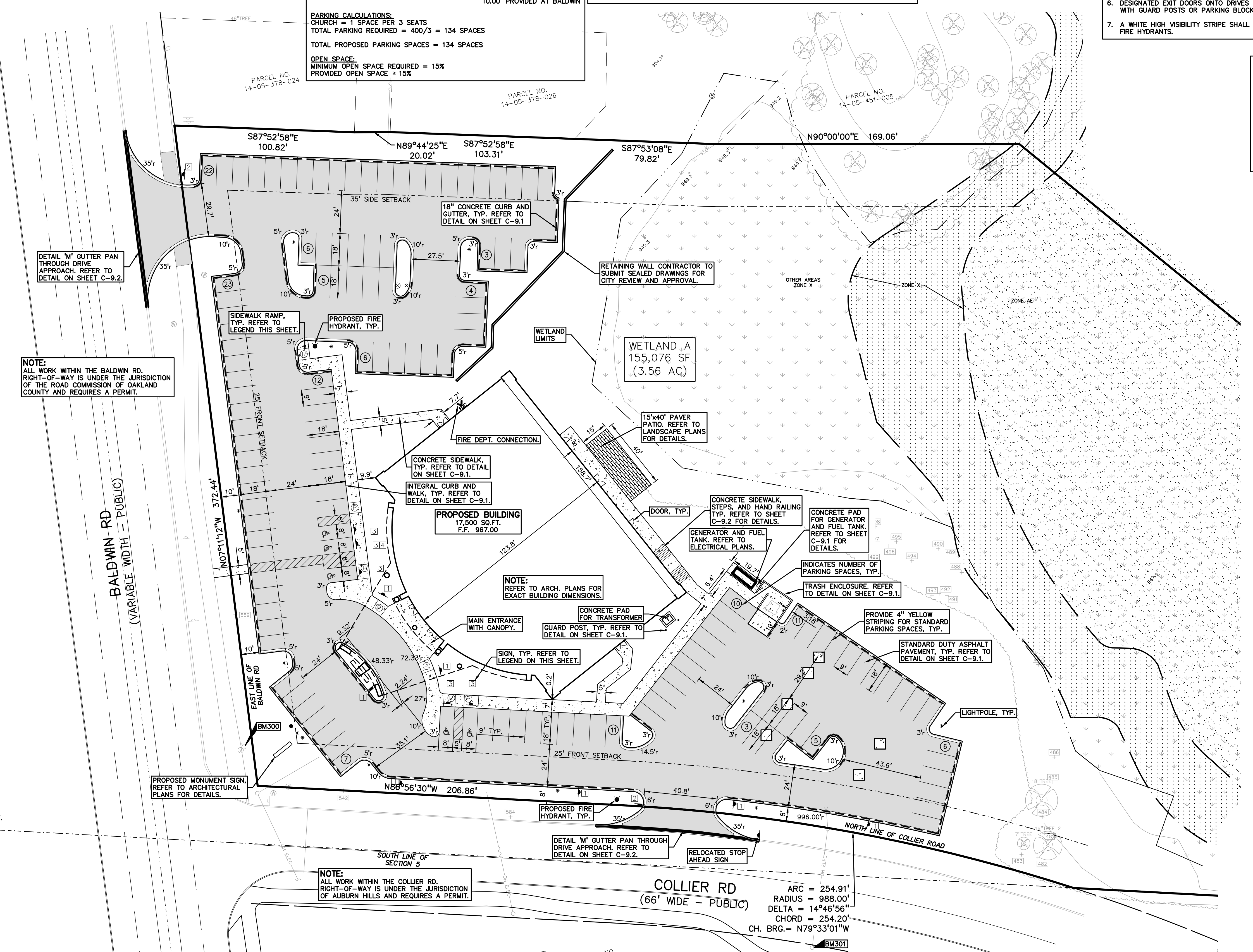
WATER MAIN O.H.M.S. MAPPING, DATED 7-19-18
SANITARY SEWER O.H.M.S. MAPPING, DATED 7-19-18
GAS O.H.M.S. MAPPING, DATED 7-19-18
TELEPHONE O.H.M.S. MAPPING, DATED 7-19-18
OTHER CONSUMERS ENERGY MAP# 03-60-60-3, DATED 01-31-18
WINDSTREAM DRAWING DATED 7-23-18

SIGN:

BALDWIN ROAD 372'
COLLIER ROAD 461'
TOTAL ROAD FRONTAGE = 833'
(833'/10)x2 = 166.6 SF (USE 164-SF MAX)
NON-DWELLING USES IN RESIDENTIAL DISTRICTS = 164 SF MAX SIGN SIZE (64 SF FREESTANDING SIGN, 100 SF WALL SIGN)

- CITY OF AUBURN HILLS STANDARD NOTES:**
- ALL CONSTRUCTION SHALL CONFORM TO CURRENT CITY OF AUBURN HILLS STANDARDS.
 - NO WORK SHALL BE PERFORMED WITHOUT INSPECTION.
 - A PERMIT FROM THE DPW IS REQUIRED FOR ALL CONSTRUCTION WITHIN CITY R.O.W. NO EQUIPMENT OR MATERIAL STORAGE WILL BE PERMITTED IN THE R.O.W.
 - ALL CITY STREETS MUST BE MAINTAINED DURING CONSTRUCTION. STREETS SHALL BE KEPT FREE OF MUD, DIRT, CONSTRUCTION DEBRIS, DUST AND THE LIKE. IF CLEAN-UP IS NOT PERFORMED WITHIN 24 HOURS OF NOTIFICATION, THE CITY RESERVES THE RIGHT TO PERFORM THE WORK AND CHARGE THE DEVELOPER ACCORDINGLY.
 - WORKING HOURS (INCLUDING RUNNING OF ANY MACHINERY) SHALL BE RESTRICTED TO MONDAY THROUGH SATURDAY, 7:00 AM TO 7:00 PM. SUNUP TO SUNDOWN; WHICHEVER IS LESS. CONSTRUCTION OPERATIONS BEYOND THE PERIODS MENTIONED ABOVE SHALL BE PERMITTED ONLY AFTER WRITTEN APPROVAL OF THE CITY MANAGER OR HIS DESIGNEE.
 - ALL MATERIALS AND MANUFACTURERS SHALL CONFORM TO THE STANDARD DETAILS.
 - UTILITY STRUCTURES SHALL NOT BE LOCATED IN DRIVEWAYS, AND WHERE POSSIBLE, SHALL NOT BE LOCATED IN PAVED AREAS.
 - THE CONTRACTOR SHALL NOTIFY UTILITY COMPANIES IN ACCORDANCE WITH ACT 53 OF P.A. OF 1974 AND ALSO CONTACT OAKLAND COUNTY UTILITY AND PROTECTION SERVICE (MISD DIG 1-800-482-7171) THREE (3) WORKING DAYS BEFORE THE START OF ANY CONSTRUCTION.
 - THE CONTRACTOR SHALL PROVIDE NECESSARY SIGNS, BARRICADES AND LIGHTS TO PROTECT TRAFFIC AND THE WORK AS DIRECTED BY THE ENGINEER. SUCH DEVICES SHALL BE PLACED PRIOR TO STARTING WORK IN AFFECTED AREAS.
 - ALL SOIL EROSION AND SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE OAKLAND COUNTY STANDARDS AND DETAILS. THE CONTRACTOR SHALL FOLLOW LOCAL RULES AND REGULATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR ALL MATERIALS THAT ARE DISPOSED OF OFF OF THE PROJECT SITE.
 - ALL SOIL EROSION MEASURES MUST BE PROPERLY PLACED PRIOR TO GRADING OR OTHER CONSTRUCTION ACTIVITIES.
 - FIELD CHANGES TO THE APPROVED PLAN SHALL BE BROUGHT TO THE ATTENTION OF THE INSPECTOR ON SITE, WHO WILL DETERMINE WHETHER THE CHANGE IS CONSIDERED "SIGNIFICANT". "SIGNIFICANT" FIELD CHANGES SHALL BE SUBMITTED TO THE CITY BY THE DESIGN ENGINEER. THE CITY SHALL NOT BE HELD RESPONSIBLE FOR DELAYS IN APPROVAL OF CHANGES TO THE APPROVED SITE IMPROVEMENT (ENGINEERING) PLAN.
 - WHERE POSSIBLE, PUBLIC UTILITIES SHALL NOT BE PLACED PRIOR TO GRADING OR OTHER CONSTRUCTION. CURB, OR OTHER RESTORATION OF PERMANENT FACILITIES LOCATED WITHIN THE MUNICIPAL EASEMENT.
 - THREE (3) WORKING DAYS PRIOR TO STARTING CONSTRUCTION, CONTACT THE CONSTRUCTION DEPARTMENT OF ORCHARD, HILTZ, & MCGILLMONT AT (734) 466-4539 TO SCHEDULE INSPECTION. OHM SHALL INSPECT ALL SITE IMPROVEMENTS INCLUDING UNDERGROUND UTILITY INSTALLATION, RETAINING WALLS, PAVEMENT IN CITY R.O.W., ALL SIDEWALKS OR SAFETY PATHS IN ANY PUBLIC R.O.W., AND ANY ADDITIONAL ITEMS NOTED DURING REVIEW OR AT THE PRE-CONSTRUCTION MEETING. FINAL OCCUPANCY MAY BE AFFECTED IF PROCEDURES ARE NOT FOLLOWED FOR PROPER INSPECTION.
 - PERMANENT STRUCTURES OF ANY TYPE, INCLUDING BUT NOT LIMITED TO TREES, LIGHT POLES, DRAINAGE STRUCTURES, SANITARY STRUCTURES, BENCHES, TRASH RECEPTACLES, ETC., WILL BE NOT ALLOWED WITHIN THE INFLUENCE OF THE PUBLIC WATER MAIN OR SANITARY SEWER EASEMENTS.

- GENERAL NOTES:**
- THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT.
- ALL CONSTRUCTION, WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT OSHA, MDOT AND MUNICIPALITY STANDARDS AND REGULATIONS.
 - THE CONTRACTOR SHALL NOTIFY THE CITY OF AUBURN HILLS ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
 - THE CONTRACTOR MUST CONTACT THE ENGINEER SHOULD THEY ENCOUNTER ANY DESIGN ISSUES DURING CONSTRUCTION. IF THE CONTRACTOR MAKES DESIGN MODIFICATIONS WITHOUT THE WRITTEN DIRECTION OF THE DESIGN ENGINEER, THE CONTRACTOR DOES SO AT HIS OWN RISK.
 - ALL NECESSARY PERMITS, TESTING, BONDS AND INSURANCES ETC., SHALL BE PAID FOR BY THE CONTRACTOR. THE OWNER SHALL PAY FOR ALL CITY INSPECTION FEES.
 - THE CONTRACTOR SHALL NOTIFY THE APPROPRIATE 811/ONE CALL UTILITY LOCATING CENTER, THE CITY ENGINEER AND/OR THE AUTHORITY HAVING JURISDICTION 3 BUSINESS DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION. IF NO NOTIFICATION IS GIVEN AND DAMAGE RESULTS, SAID DAMAGE WILL BE REPAIRED AT SOLE EXPENSE OF THE CONTRACTOR. IF EXISTING UTILITY LINES ARE ENCOUNTERED THAT CONFLICT IN LOCATION WITH NEW CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER SO THAT THE CONFLICT MAY BE RESOLVED.
 - CONTRACTOR TO VERIFY THAT THE PLANS AND SPECIFICATIONS ARE THE VERY LATEST PLANS AND SPECIFICATIONS AND FURTHERMORE, VERIFY THAT THESE PLANS AND SPECIFICATIONS HAVE BEEN APPROVED. ALL ITEMS CONSTRUCTED BY THE CONTRACTOR PRIOR TO RECEIVING FINAL APPROVAL, HAVING TO BE ADJUSTED OR RE-DONE, SHALL BE AT THE CONTRACTORS EXPENSE. SHOULD THE CONTRACTOR ENCOUNTER A CONFLICT BETWEEN THESE PLANS AND/OR SPECIFICATIONS, THEY SHALL SEEK CLARIFICATION IN WRITING FROM THE ENGINEER BEFORE COMMENCEMENT OF CONSTRUCTION. FAILURE TO DO SO SHALL BE AT SOLE EXPENSE TO THE CONTRACTOR.
 - ANY WORK WITHIN THE STREET OR HIGHWAY RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AGENCIES HAVING JURISDICTION AND SHALL NOT BEGIN UNTIL ALL NECESSARY PERMITS HAVE BEEN ISSUED FOR THE WORK.
 - ALL PROPERTIES OR FACILITIES IN THE SURROUNDING AREAS, PUBLIC OR PRIVATE, DESTROYED OR OTHERWISE DISTURBED DUE TO CONSTRUCTION, SHALL BE REPLACED AND/OR RESTORED TO THE ORIGINAL CONDITION BY THE CONTRACTOR.
 - THE CONTRACTOR SHALL PROVIDE ALL NECESSARY BARRICADEING, SIGNAGE, LIGHTS AND TRAFFIC CONTROL DEVICES TO PROTECT THE WORK AND SAFELY MAINTAIN TRAFFIC IN ACCORDANCE WITH LOCAL REQUIREMENTS AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION). THE DESIGN ENGINEER, OWNER, CITY, COUNTY, AND STATE SHALL NOT BE HELD LIABLE FOR ANY CLAIMS RESULTING FROM ACCIDENTS OR DAMAGES CAUSED BY THE CONTRACTOR'S FAILURE TO COMPLY WITH TRAFFIC AND PUBLIC SAFETY REGULATIONS DURING THE CONSTRUCTION PERIOD.
 - IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ADJUST THE TOP OF ALL EXISTING AND PROPOSED STRUCTURES (MANHOLES, CATCH BASINS, INLETS, GATE WELLS ETC.) WITHIN GRADED AND /OR PAVED AREAS TO FINAL GRADE SHOWN ON THE PLANS. ALL SUCH ADJUSTMENTS SHALL BE INCIDENTAL TO THE JOB AND WILL NOT BE PAID FOR SEPARATELY.



PEA GROUP

TROY • WASHINGTON TWP
BRIGHTON • DETROIT
T: 844.813.2949

www.peagroup.com

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

CAUTION!
THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
28977 WEST TWELVE MILE RD.
SOUTHFIELD, MI

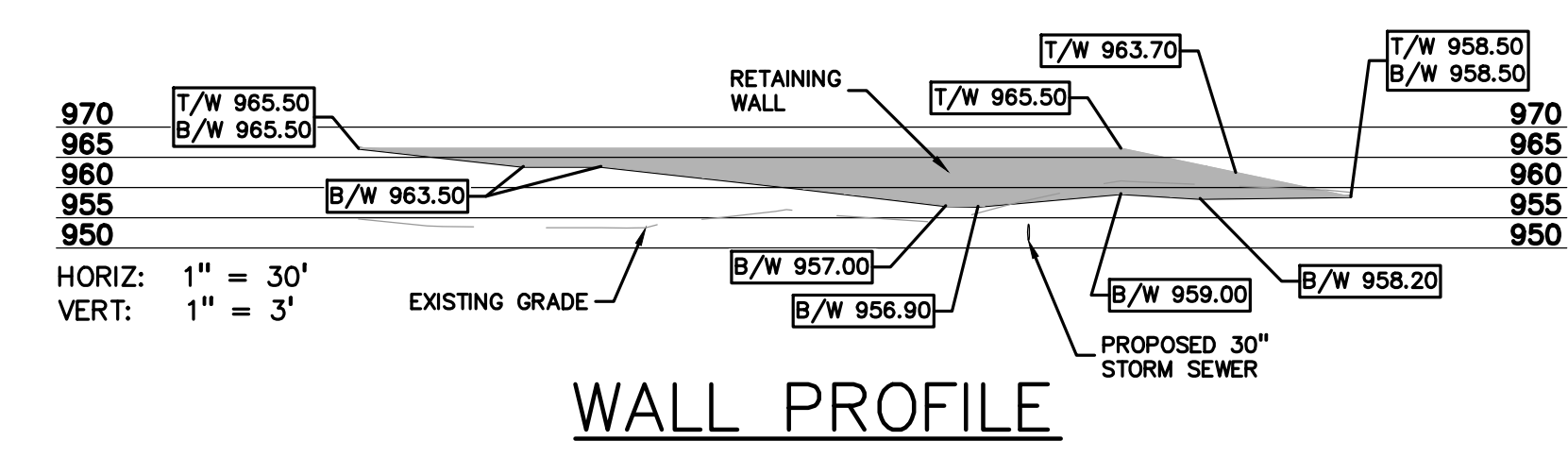
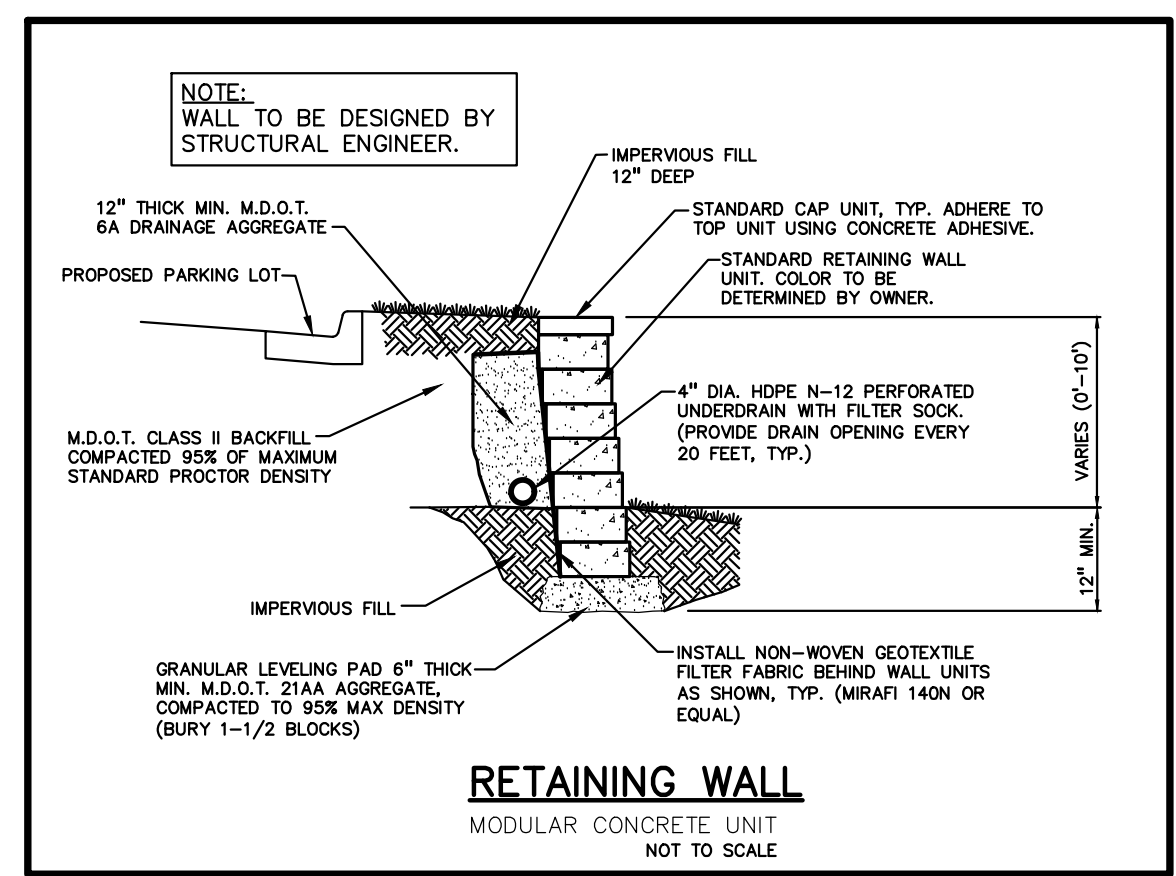
PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
DIMENSION AND PAVING PLAN

PEA JOB NO. 2016-304
P.M. JBT
DN. TMK
DES. TMK
DRAWING NUMBER:
C-3.0



LEGEND

EXISTING

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- R. RECORDED
- M. MEASURED
- C. CALCULATED

PROPOSED

- ELEC. PHONE OR CABLE TV O.U. LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD. GATE VALVE, TAPPING BLEEVE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BODY/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MALBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARDRAIL
- STREET LIGHT
- SIEN
- CONC. CONCRETE
- ASPH. ASPHALT
- GRAVEL SHOULDER
- WETLAND
- STD. HEAVY DUTY DUTY ONLY
- STD. HEAVY DEEP DUTY DUTY STRENGTH

REFERENCE DRAWINGS

- WATER MAIN O.H.M. GIS MAPPING, DATED 7-18-18
- SANITARY SEWER O.H.M. GIS MAPPING, DATED 7-18-18
- STORM SEWER O.H.M. GIS MAPPING, DATED 7-18-18
- TELEPHONE AT&T SKETCHES, DATED 7-12-18
- GAS CONSUMERS ENERGY MAP# 03-60-503, DATED 01-31-18
- OTHER WINDSTREAM DRAWING DATED 7-25-18

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

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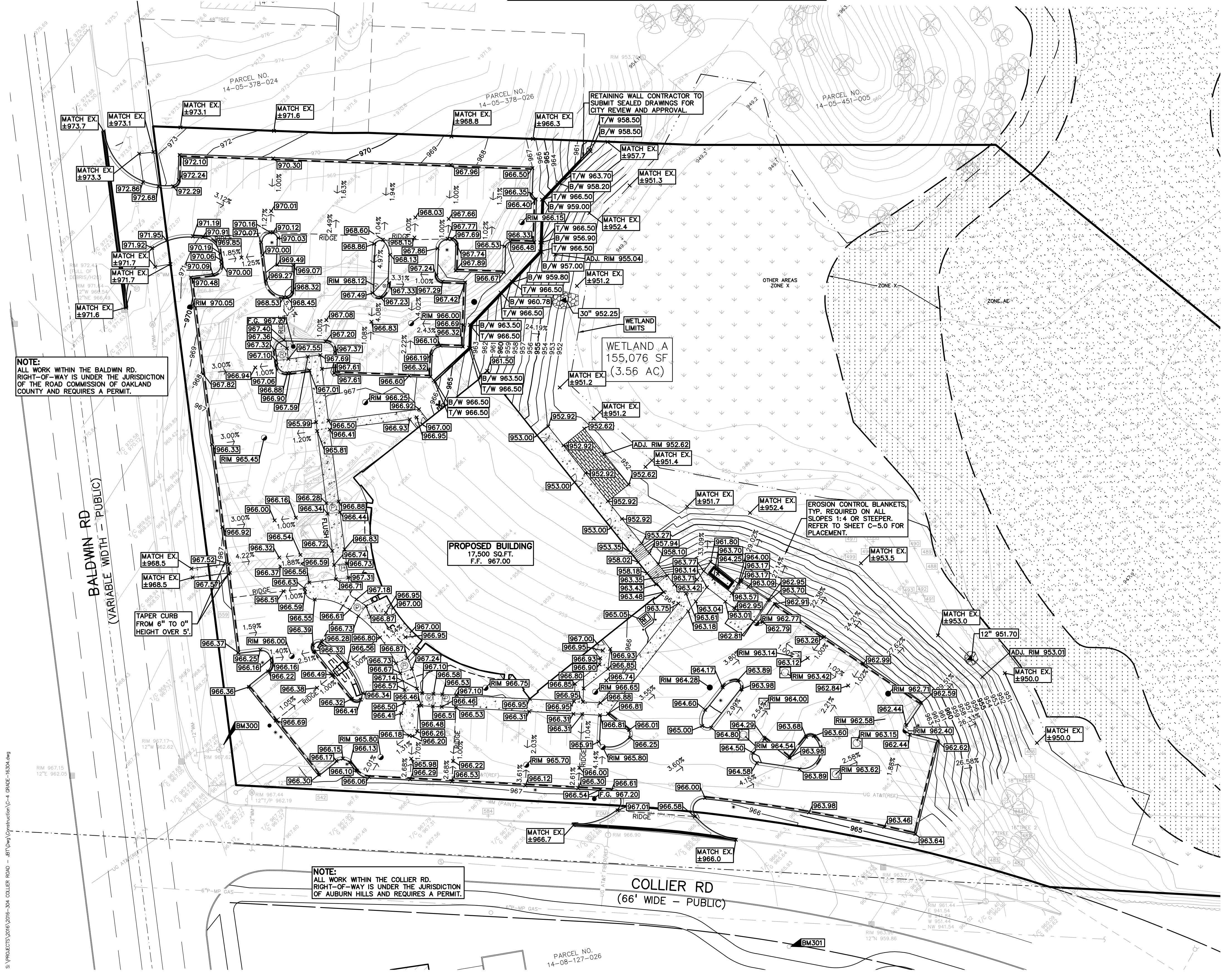
PROJECT TITLE
CHURCH OF GOD IN CHRIST
 3500 BALDWIN ROAD
 AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE:
 SEPTEMBER 22, 2020

DRAWING TITLE
GRADING PLAN

PEA JOB NO. 2016-304
 P.M. JBT
 DN. TMK
 DES. TMK
 DRAWING NUMBER:
C-4.0



SYMBOLS: GRADING

PROPOSED SPOT ELEVATION: TYPICALLY TOP OF PAVEMENT IN PAVED AREAS, GUTTER GRADE IN CURB LINES.

PROPOSED CONTOUR LINE

ABBREVIATIONS:
 T/C = TOP OF CURB
 G = GUTTER GRADE
 T/P = TOP OF PAVEMENT
 T/S = TOP OF SIDEWALK
 T/W = TOP OF WALL
 B/W = BOTTOM OF WALL
 F.G. = FINISH GRADE
 RIM = RIM ELEVATION

RETAINING WALL NOTE:
 TOP OF WALL (T/W) AND BOTTOM OF WALL (B/W) GRADES ARE THE FINISH GRADE AT THE TOP AND BOTTOM OF THE RETAINING WALL, NOT THE ACTUAL TOP AND BOTTOM OF THE WALL STRUCTURE.

EARTHWORK BALANCING NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPORTING OR EXPORTING ALL MATERIALS AS REQUIRED TO PROPERLY GRADE THIS PROJECT TO THE FINISHED ELEVATIONS SHOWN ON THE APPROVED PLANS. THE CONTRACTOR SHALL MAKE THEIR OWN DETERMINATION OF CUT AND FILL QUANTITIES AND ALLOW FOR REMOVAL OF EXCESS OR IMPORTATION OF ADDITIONAL MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

- GENERAL GRADING AND EARTHWORK NOTES:**
- THESE NOTES APPLY TO ALL CONSTRUCTION ACTIVITIES ON THIS PROJECT
- CONTRACTOR TO FIELD VERIFY ALL EXISTING TREES AND BRUSH AND REMOVE ALL THAT ARE NECESSARY TO GRADE SITE.
 - ALL GRADES ARE TO TOP OF PAVEMENT UNLESS OTHERWISE NOTED.
 - THE STAGING OF CONSTRUCTION ACTIVITIES SHALL OCCUR ONLY WITHIN THE SITE BOUNDARIES. ANY CONSTRUCTION ACTIVITIES OUTSIDE OF THE SITE BOUNDARIES SHALL BE AT THE SOLE RESPONSIBILITY AND RISK OF THE CONTRACTOR.
 - ALL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL MEET THE REQUIREMENTS OF THE AUTHORIZED PUBLIC AGENCY OF JURISDICTION. AN EROSION CONTROL PERMIT MUST BE SECURED FROM THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER PRIOR TO CONSTRUCTION.
 - ALL EARTHWORK AND GRADING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE SOILS INVESTIGATION AND REPORT.
 - REFER TO SOIL EROSION CONTROL PLAN FOR ADDITIONAL SOIL EROSION AND SEDIMENTATION CONTROL MEASURES AND NOTES.
 - ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED OR SOODED IN ACCORDANCE WITH THE LANDSCAPE PLANS. PROVIDE A MINIMUM OF 3" OF TOPSOIL IN THESE AREAS UNLESS OTHERWISE NOTED.
 - THE CONTRACTOR SHALL NOTE EXISTING UNDERGROUND UTILITIES WITHIN AND ADJACENT TO THE SITE. BACKFILL FOR EXISTING UTILITY TRENCHES SHALL BE EXAMINED CRITICALLY. ANY TRENCHES FOUND TO HAVE SOFT, UNSTABLE OR UNSUITABLE BACKFILL MATERIAL, IN THE OPINION OF THE THIRD PARTY TESTING COMPANY, THAT ARE TO BE WITHIN THE ZONE OF INFLUENCE OF PROPOSED BUILDINGS OR PAVEMENT SHALL BE COMPLETELY EXCAVATED AND BACKFILLED WITH SUITABLE MATERIAL.
 - ON-SITE FILL CAN BE USED IF THE SPECIFIED COMPACTION REQUIREMENTS CAN BE ACHIEVED. IF ON-SITE SOIL IS USED, IT SHOULD BE CLEAN AND FREE OF FROZEN SOIL, ORGANICS, OR OTHER DELETERIOUS MATERIALS.
 - THE FINAL SUBGRADE/EXISTING AGGREGATE BASE SHOULD BE THOROUGHLY PROOFOFFED USING A FULLY LOADED TANDEM AXLE TRUCK OR FRONT END LOADER UNDER THE OBSERVATION OF A GEOTECHNICAL/PAVEMENT ENGINEER. LOOSE OR YIELDING AREAS THAT CANNOT BE MECHANICALLY STABILIZED SHOULD BE REINFORCED USING GEOGRIDS OR REMOVED AND REPLACED WITH ENGINEERED FILL OR AS DICTATED BY FIELD CONDITIONS.
 - SUBGRADE UNDERCUTTING, INCLUDING BACKFILLING SHALL BE PERFORMED TO REPLACE MATERIALS SUSCEPTIBLE TO FROST HEAVING AND UNSTABLE SOIL CONDITIONS. ANY EXCAVATIONS THAT MAY BE REQUIRED BELOW THE TOPSOIL IN FILL AREAS OR BELOW SUBGRADE IN CUT AREAS WILL BE CLASSIFIED AS SUBGRADE UNDERCUTTING.
 - SUBGRADE UNDERCUTTING SHALL BE PERFORMED WHERE NECESSARY AND THE EXCAVATED MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ANY SUBGRADE UNDERCUTTING SHALL BE BACKFILLED AS RECOMMENDED IN THE GEOTECHNICAL ENGINEERING REPORT FOR THE PROJECT.
 - ANY SUB-GRADE WATERING REQUIRED TO ACHIEVE REQUIRED DENSITY SHALL BE CONSIDERED INCIDENTAL TO THE JOB.

STORM STRUCTURES	STORM STRUCTURES	STORM STRUCTURES
OC 2 (4' DIA./0' SUMP) RIM = 962.71 12" SW 951.88 12" NE 951.88	CB 8 (4' DIA./2' SUMP) RIM = 965.45 12" NE 960.28 12" S 960.18	CB 20 (4' DIA./2' SUMP) RIM = 966.65 6" NW 961.67 12" S 961.27
PT 3 (4' DIA./0' SUMP) RIM = 964.28 15" SW 958.27 12" NE 958.37 15" SE 958.17	CB 9 (4' DIA./2' SUMP) RIM = 966.00 12" NE 960.67 12" SW 960.67	CB 21 (4' DIA./2' SUMP) RIM = 966.75 12" SE 961.40
CB 4 (4' DIA./2' SUMP) RIM = 965.80 15" W 958.55 12" N 960.65 15" NE 958.55	CB 10 (4' DIA./2' SUMP)* RIM = 966.15 12" SW 962.51	CB 22 (4' DIA./2' SUMP) RIM = 966.25 12" NE 960.49 6" SE 960.89 12" W 960.49
CB 5 (4' DIA./2' SUMP) RIM = 965.70 15" W 958.72 12" NW 960.42 15" E 958.72	CB 11 (4' DIA./2' SUMP) RIM = 962.77 12" SW 958.53	MH 24 (5' DIA./2' SUMP) RIM = 967.21 30" W 956.15 30" E 952.35
CB 6 (4' DIA./2' SUMP) RIM = 965.80 15" NW 959.01 15" E 959.01	CB 12 (4' DIA./2' SUMP) RIM = 962.40 12" NW 957.04	END SECTIONS
CB 7 (4' DIA./2' SUMP) RIM = 966.00 12" N 959.43 15" SE 959.23	MH 15 (5' DIA./2' SUMP) RIM = 970.05 30" E 958.39	1 END SECTION 12" 951.70
	*LOW HEAD STRUCTURE	14 END SECTION 30" 952.25

HYDRANTS	
a	HYDRANT F.G. = 967.20
b	HYDRANT F.G. = 967.77
WATER MAIN STRUCTURES	
c	GV IN WELL RIM = 968.12
d	GV IN BOX RIM = 967.86

STORM SEWER QUANTITIES:	
12" RCP CL-IV PIPE	503 LF
15" RCP CL-IV PIPE	271 LF
30" RCP CL-IV PIPE	210 LF
12" HDPE PIPE	8 LF
15" HDPE PIPE	20 LF
12" CONC. END SECTION	1 EA.
30" CONC. END SECTION	1 EA.
4' DIA. CATCH BASIN	12 EA.
5' DIA. MANHOLE	2 EA.
6' DIA. OUTLET CONTROL STRUCTURE	1 EA.
CONSTRUCT MH OVER EXISTING LINE	1 EA.
90" UNDERGROUND DETENTION	450 LF

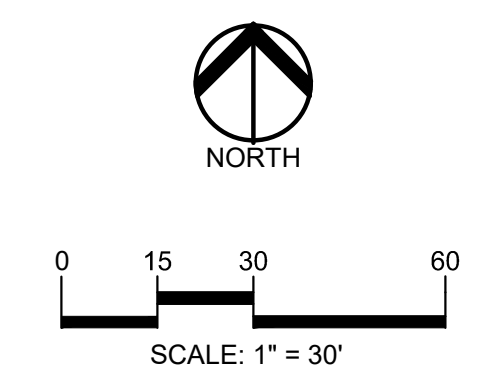
SANITARY SEWER QUANTITIES:	
6" PVC SDR 23.5 PIPE	27 LF

WATER MAIN QUANTITIES:	
2" COPPER 'K' WATER LEAD	85 LF
6" D.I.W.M. CLASS 54	111 LF
2" VALVE AND BOX	1 EA.
6" GATE VALVE AND WELL	1 EA.
HYDRANT ASSEMBLY	2 EA.

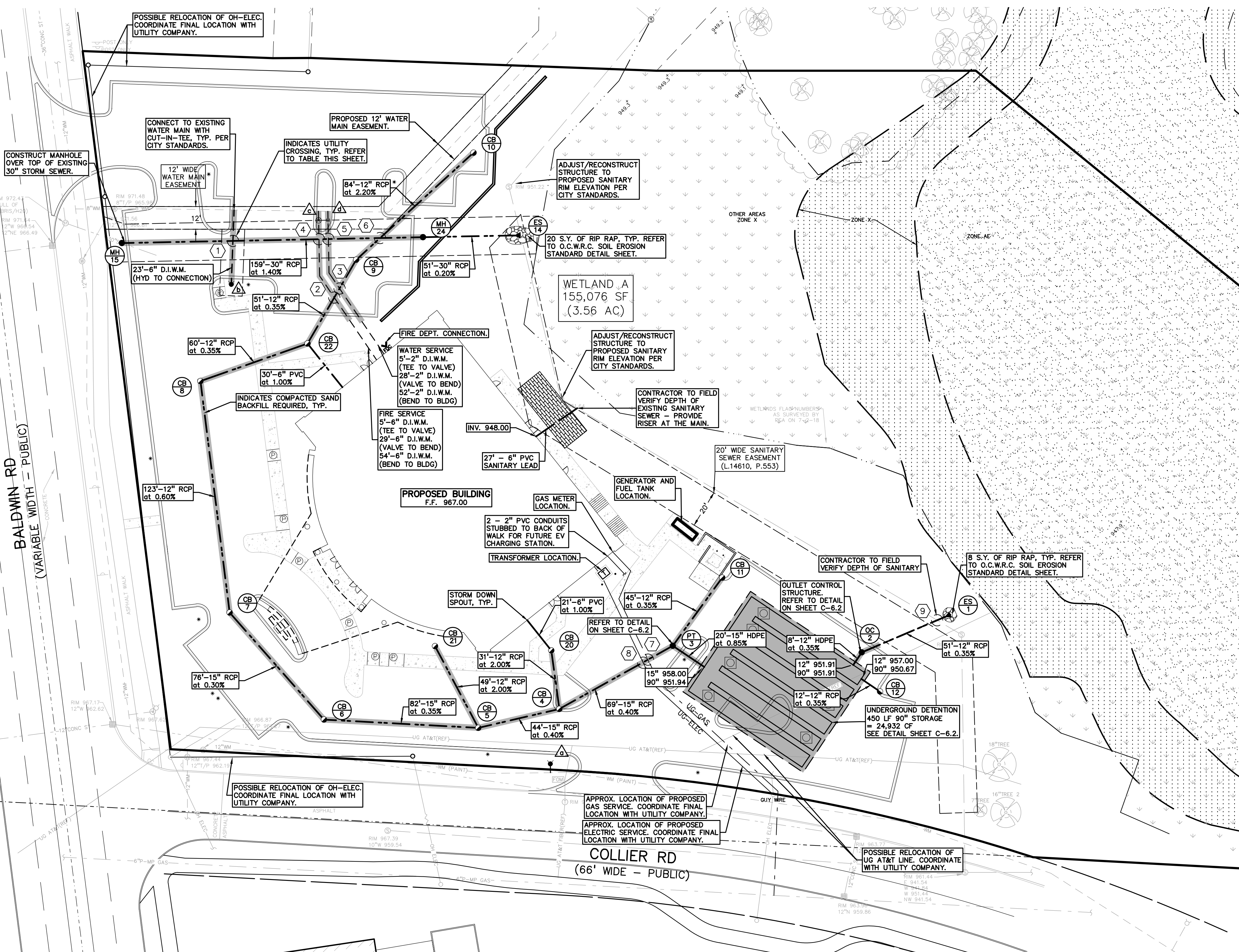
NOTE:
 CONTRACTOR TO VERIFY ALL QUANTITIES. ANY DEVIATIONS TO THE PLAN QUANTITIES SHALL BE BROUGHT TO THE ATTENTION OF PEA, INC. FOR VERIFICATION, PRIOR TO BIDDING.

- FIRE DEPARTMENT NOTES:**
- THE FOUR (4) INCH STEAMER CAPS ON ALL HYDRANTS SHALL BE PAINTED ACCORDING TO THE FOLLOWING:
 WHITE ON 4" MAINS
 RED ON 6" MAINS
 ORANGE ON 8" MAINS
 GREEN ON 12" MAINS
 BLUE ON 16" MAINS OR LARGER
 - NO PARKING SHALL BE PERMITTED AND/OR NO OBSTRUCTIONS SHALL BE PLACED OR CONSTRUCTED WITHIN FIFTEEN (15) FEET OF ANY HYDRANT OR FIRE DEPARTMENT CONNECTION PUBLIC OR PRIVATE.
 - THE FIRE DEPARTMENT CONNECTION MUST BE LOCATED WITHIN ONE HUNDRED (100) FEET OF A FIRE HYDRANT AND WITHIN FIFTY (50) FEET OF A MINIMUM TWENTY (20) FOOT WIDE PAVED DRIVEWAY OR STREET.
 - GAS METERS, PROPANE TANKS, OVERHEAD ELECTRICAL SERVICES, AND TRANSFORMERS MUST NOT BE LOCATED ON THE SAME SIDE OF THE BUILDING OR STRUCTURE AS THE FIRE DEPARTMENT CONNECTION UNLESS A CLEAR DISTANCE OF ONE HUNDRED FIFTY (150) FEET CAN BE MAINTAINED BETWEEN UTILITIES AND THE FIRE DEPARTMENT CONNECTION.
 - ALL DRIVE AREAS MUST BE POSTED AS FIRE LANES WITH UNIFORM SIGNS IN KEEPING WITH THE STANDARD ESTABLISHED IN THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. SIGNS MUST BE ERECTED ON BOTH SIDES OF THE FIRE LANES WITH SPACING BETWEEN SIGNS NOT EXCEEDING ONE HUNDRED (100) FEET.
 - DESIGNATED EXIT DOORS ONTO DRIVES OR PARKING AREAS MUST BE PROTECTED WITH GUARD POSTS OR PARKING BLOCKS.
 - A WHITE HIGH VISIBILITY STRIPE SHALL BE PAINTED ON THE UPPER FLANGE OF ALL FIRE HYDRANTS.

CROSSING	CROSSING PIPE 1	CROSSING PIPE 2	Clearance	NOTES
1	30" ST T/P= 960.35	6" WM B/P= 962.07	1.72	
2	12" ST B/P= 960.42	6" WM T/P= 958.92	1.50	DIP WATER MAIN
3	12" ST B/P= 960.44	2" WM T/P= 958.94	1.50	DIP WATER MAIN
4	30" ST B/P= 956.63	6" WM T/P= 955.13	1.50	DIP WATER MAIN
5	30" ST T/P= 959.65	2" WM B/P= 961.33	1.69	
6	30" ST T/P= 959.26	12" ST B/P= 960.87	1.61	
7	15" ST T/P= 959.77	6" GAS B/P= 962.47	2.70	
8	15" ST T/P= 959.78	2" ELEC B/P= 962.70	2.92	
9	12" ST B/P= 961.56	21" SAN T/P= 944.17	7.39	



CAUTION!
 THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY AS SHOWN AND ARE NOT TO BE CONSIDERED AS A GUARANTEE OF ACCURACY. THE CONTRACTOR SHALL BE EXCLUSIVELY RESPONSIBLE FOR DETERMINING THE EXACT UTILITY LOCATIONS AND ELEVATIONS PRIOR TO THE START OF CONSTRUCTION.



PREMIUM TRENCH BACKFILL NOTE:
 ALL UTILITIES UNDER PAVEMENT OR WITHIN 3' OF THE EDGE OF PAVEMENT (OR WITHIN THE 45° LINE OF INFLUENCE OF PAVEMENT) SHALL HAVE M.D.O.T. CLASS II GRANULAR BACKFILL COMPACTED TO 95% MAX. DRY DENSITY (ASTM D-1557).

PUBLIC UTILITY EASEMENTS:
 ALL SANITARY SEWERS 8" AND LARGER IN DIAMETER ARE TO BE PUBLIC AND SHALL BE LOCATED IN A 20' WIDE EASEMENT. ALL WATER MAIN SHALL BE LOCATED IN A 12' WIDE EASEMENT.

- GENERAL UTILITY NOTES:**
- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF AUBURN HILLS.
 - ALL TRENCHES UNDER OR WITHIN THREE (3) FEET OR THE FORTY-FIVE (45) DEGREE ZONE OF INFLUENCE LINE OF EXISTING AND/OR PROPOSED PAVEMENT, BUILDING PAD OR DRIVE APPROACH SHALL BE BACKFILLED WITH SAND COMPACTED TO AT LEAST NINETY-FIVE (95) PERCENT OF MAXIMUM UNIT WEIGHT (ASTM D-1557). ALL OTHER TRENCHES TO BE COMPACTED TO 90% OR BETTER.
 - WHENEVER EXISTING MANHOLES OR SEWER PIPE ARE TO BE TAPPED, DRILL HOLES 4" CENTER TO CENTER, AROUND PERIPHERY OF OPENING TO CREATE A PLANE OF WEAKNESS JOINT BEFORE BREAKING SECTION OUT.
 - THE LOCATIONS AND DIMENSIONS SHOWN ON THE PLANS FOR EXISTING UTILITIES ARE IN ACCORDANCE WITH AVAILABLE INFORMATION WITHOUT UNCOVERING AND MEASURING. THE DESIGN ENGINEER DOES NOT GUARANTEE THE ACCURACY OF THIS INFORMATION OR THAT ALL EXISTING UNDERGROUND FACILITIES ARE SHOWN. CONTRACTOR TO FIELD VERIFY UTILITIES.
 - THE CONTRACTOR MUST COORDINATE TO ENSURE ALL REQUIRED PIPES, CONDUITS, CABLES AND SLEEVES ARE PROPERLY PLACED FOR THE INSTALLATION OF GAS, ELECTRIC, PHONE, CABLE, IRRIGATION, ETC. IN SUCH A MANNER THAT WILL FACILITATE THEIR PROPER INSTALLATION PRIOR TO THE PLACEMENT OF THE PROPOSED PAVEMENT AND LANDSCAPING.
 - PIPE LENGTHS INDICATED ARE FROM CENTER OF STRUCTURE AND TO END OF FLARED END SECTION UNLESS NOTED OTHERWISE.

- STORM SEWER NOTES:**
- ALL STORM SEWER 12" DIAMETER OR LARGER SHALL BE REINFORCED CONCRETE PIPE (RCP C-76) CLASS IV WITH MODIFIED TONGUE AND GROOVE JOINT WITH RUBBER GASKETS UNLESS SPECIFIED OTHERWISE (ASTM C-443).
 - ALL STORM SEWER LEADS SHALL BE CONSTRUCTED AT 1.00% MINIMUM SLOPE.
 - ALL STORM SEWER 10" OR LESS AND/OR LEADS SHALL BE SDR 26.
 - JOINTS FOR P.V.C. PIPE SHALL BE ELASTOMERIC (RUBBER GASKET) AS SPECIFIED IN A.S.T.M. DESIGNATION D-3212.

- WATER MAIN NOTES:**
- ALL WATER MAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF 5.5' BELOW FINISH GRADE. WHEN WATER MAINS MUST DIP TO PASS UNDER A STORM SEWER OR SANITARY SEWER, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE KEPT TO A MINIMUM LENGTH BY THE USE OF VERTICAL TWENTY TWO AND A HALF (22.5) DEGREE BENDS, PROPERLY ANCHORED.
 - ALL TEES, BENDS, CONNECTIONS, ETC. ARE CONSIDERED INCIDENTAL TO THE JOB.
 - PHYSICAL CONNECTIONS SHALL NOT BE MADE BETWEEN EXISTING AND NEW WATER MAINS UNTIL REQUIRED TESTING IS SATISFACTORILY COMPLETED.
 - MAINTAIN 10' HORIZONTAL CLEARANCE BETWEEN OUTER EDGE OF WATER MAIN AND ANY SANITARY/STORM SEWER OR STRUCTURE.
 - NO PHYSICAL CONNECTION TO THE EXISTING WATER MAIN CAN BE MADE UNTIL ALL NEW WATER MAIN PASSES PRESSURE AND BACTERIOLOGICAL TESTS TO THE SATISFACTION OF THE CITY OF AUBURN HILLS.
 - ALL WATER MAIN AND FITTINGS (3" DIAMETER AND LARGER) SHALL BE DUCTILE IRON, CLASS 54.
 - WATER MAIN SERVICE LEADS SHALL BE TYPE 'K' ANNEALED SEAMLESS COPPER WITH FLARED FITTINGS, UNLESS OTHERWISE NOTED.
 - ALL FIRE HYDRANTS SHALL BE E.I.W. #5BR MODEL #250 PER CITY OF AUBURN HILLS STANDARDS.
 - ALL HYDRANTS TO BE A MINIMUM OF 3' FROM BACK OF CURB, TYP.
 - ALL NECESSARY FITTINGS, THRUST BLOCKS, RESTRAINING GLANDS, BLOW OFFS, ETC. FOR WATER MAIN ARE CONSIDERED INCIDENTAL TO THIS PROJECT. THE CONTRACTOR SHALL INSTALL THESE ITEMS AS NECESSARY AND AS REQUIRED BY THE CITY OF AUBURN HILLS.
 - THE WATER MAIN CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AT THE CITY OF AUBURN HILLS AT 248-370-9400 AT LEAST THREE WORKING DAYS IN ADVANCE OF STARTING CONSTRUCTION.

- SANITARY SEWER NOTES:**
- DOWNSPOUTS, WEEP TILE, FOOTING DRAINS OR ANY CONDUIT THAT CARRIES STORM OR GROUND WATER SHALL NOT BE ALLOWED TO DISCHARGE INTO A SANITARY SEWER.
 - ALL SANITARY LEADS SHALL BE CONSTRUCTED AT 1.00% MINIMUM SLOPE.
 - ALL SANITARY SEWER 8" OR LARGER SHALL BE P.V.C. TRUSS PIPE (ASTM D2680) AND FITTINGS, WITH ELASTOMERIC GASKET JOINTS PER ASTM D3212 UNLESS OTHERWISE NOTED.
 - ALL SANITARY SEWER LEADS SHALL BE POLYVINYL CHLORIDE (PVC) SDR 23.5 PIPE AND FITTINGS. ALL JOINTS TO BE ELASTOMERIC GASKET JOINTS PER ASTM D3212 UNLESS OTHERWISE NOTED.
 - SANITARY LEADS SHALL BE PROVIDED WITH CLEANOUTS EVERY 100 FEET AND AT EVERY BEND AS SHOWN. ALL CLEANOUTS TO BE PROVIDED WITH E.I.W. #156S BOX OR EQUAL.

CLIENT
TRINITY REAL ESTATE INVESTMENTS
 26877 WEST TWELVE MILE RD.
 SOUTHFIELD, MI

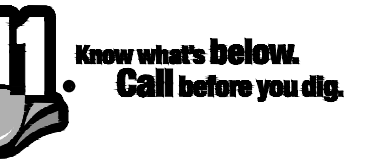
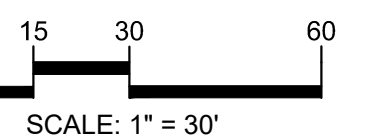
PROJECT TITLE
CHURCH OF GOD IN CHRIST
 3500 BALDWIN ROAD
 AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE:
 SEPTEMBER 22, 2020

DRAWING TITLE
UTILITY PLAN

PEA JOB NO. 2016-304
 P.M. JBT
 DN. TMK
 DES. TMK
 DRAWING NUMBER:



CAUTION!! THE LOCATIONS AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THIS DRAWING ARE ONLY APPROXIMATE...

CLIENT TRINITY REAL ESTATE INVESTMENTS 26877 WEST TWELVE MILE ROAD, SOUTHFIELD, MI

PROJECT TITLE CHURCH OF GOD IN CHRIST 3500 BALDWIN ROAD AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE: SEPTEMBER 22, 2020

DRAWING TITLE UNDERGROUND DETENTION CALCULATIONS

PEA JOB NO. 2016-304

P.M. JBT

D.N. TMK

DES. TMK

DRAWING NUMBER: C-6.2

Oakland County 1-Year

Project: Church of God in Christ Location: Auburn Hills, MI

Area (acres): 2.75 C Factor: 0.78 Tc (min): 23

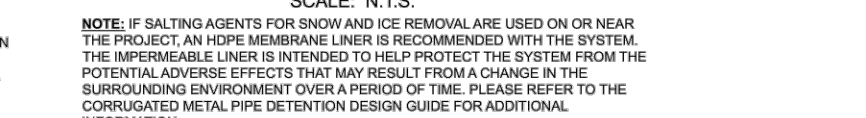
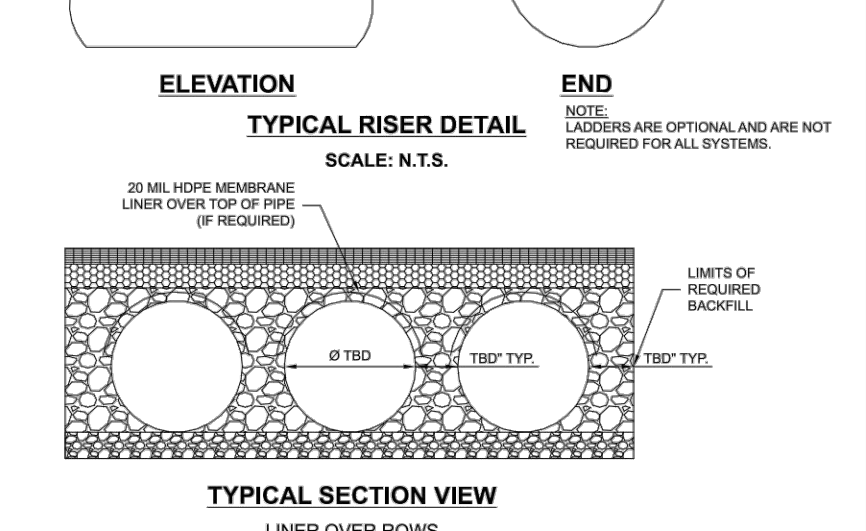
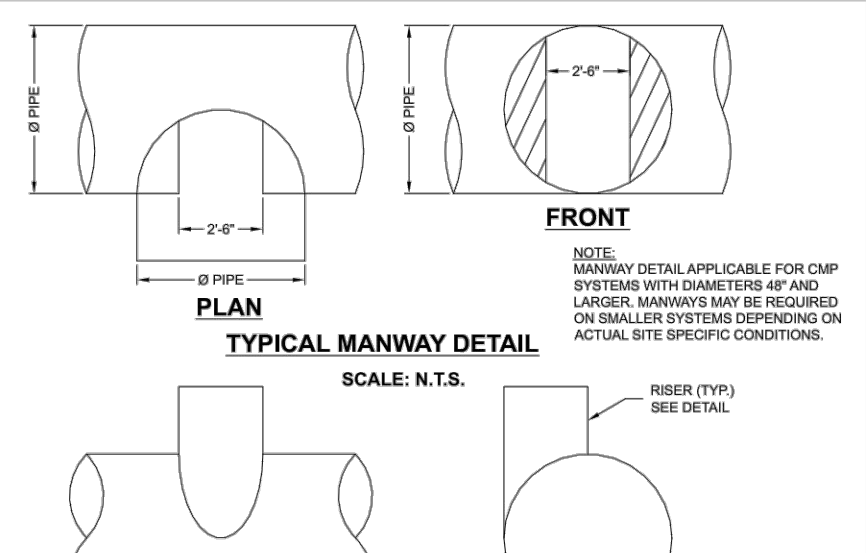
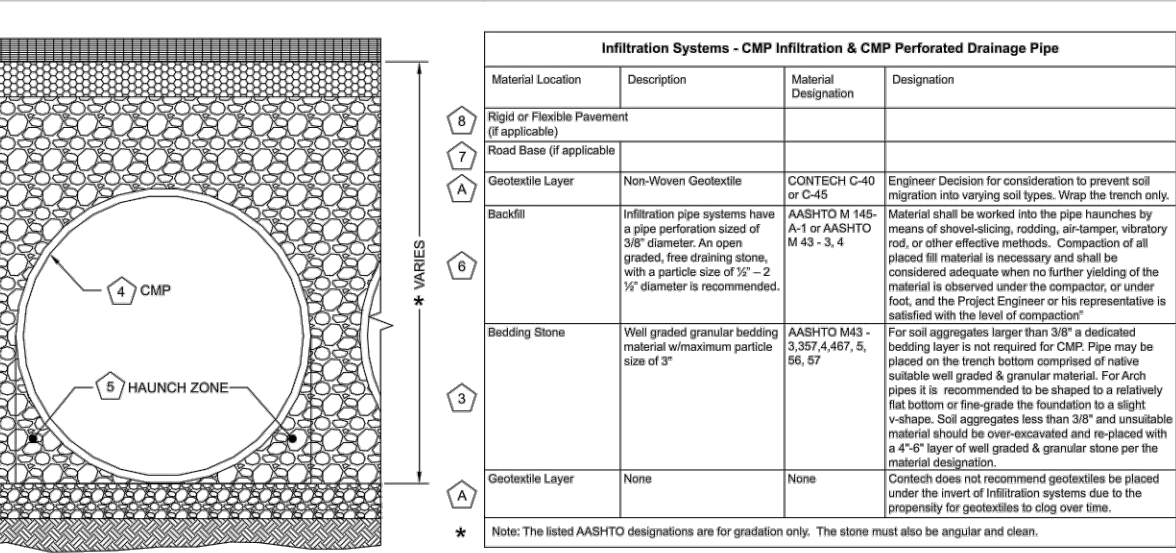
1 year I = 97(Tc+30) = 1.84 in/hr 1 year Flow = CIA = 3.94 cfs

Recommended CS Model: CS-6

CASCADE SEPARATOR™ MODEL SPECIFICATIONS PER NJDEP CERTIFICATION LETTER

Table with 4 columns: Model, Manhole Diameter (ft), MIFR (cfs), 50% Maximum Sediment Storage Area Volume (ft³). Rows include CS-4, CS-5, CS-6, CS-8, CS-10, CS-12.

The NJDEP certifies the use of the Cascade Separator™ Stormwater Treatment Device by Contech Engineered Solutions, LLC at a TSS removal rate of 50% when designed, operated, and maintained in accordance with the information provided in the certification report dated October 1, 2019.



Notes regarding installation, bedding, and manhole details. Includes instructions for minimum width, foundation preparation, and bedding materials.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D1 and D2.

CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION.

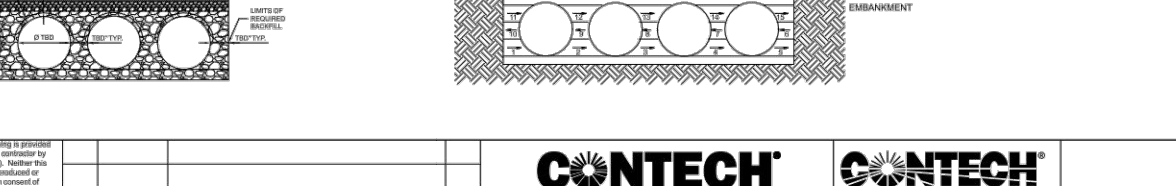
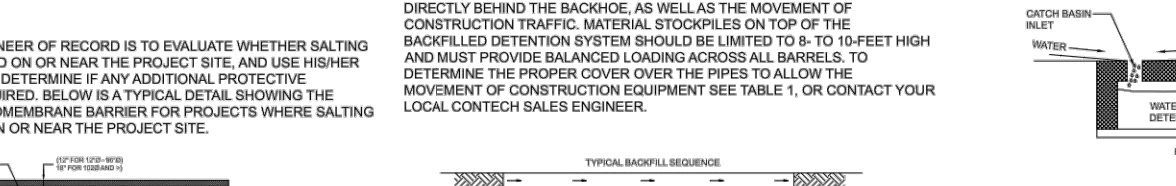
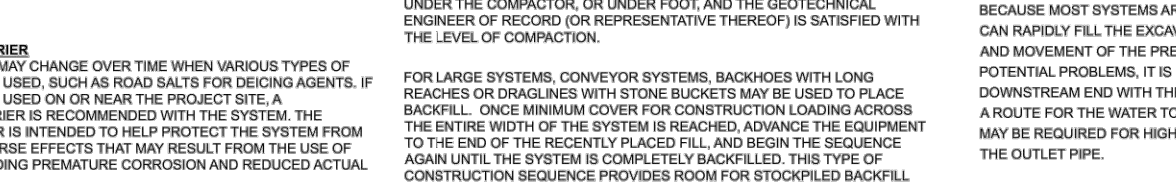
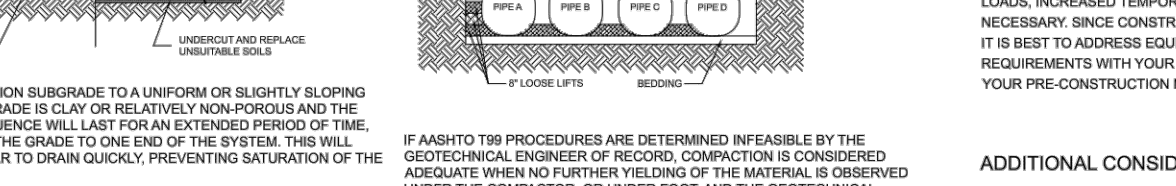
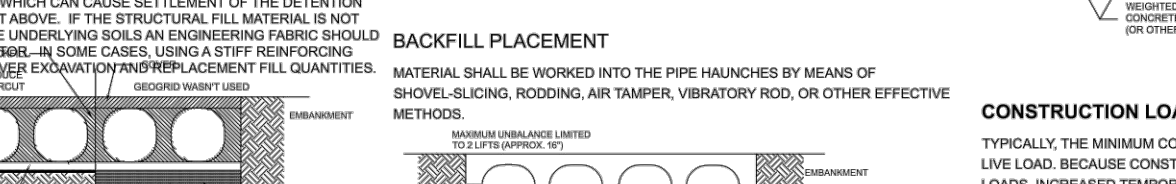
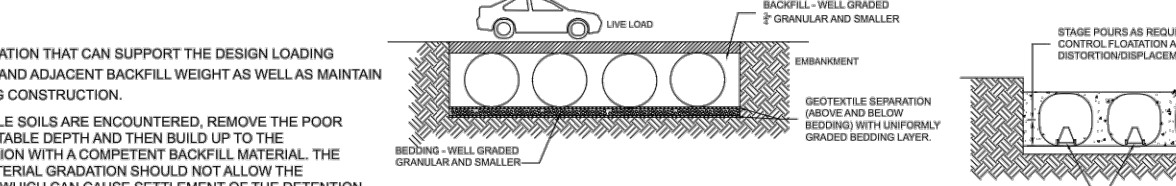


Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D1 and D2.

CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND SHOULD BE PERFORMED QUARTERLY OR MORE FREQUENTLY.

MAINTENANCE CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE LIFT TABLE.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. INSPECTIONS ARE MOST EFFECTIVE WHEN PERFORMED IN THE WARMER MONTHS OF THE YEAR.

CONSTRUCTION LOADING TYPICALLY THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES 12 IN. LIVE LOAD.

ADDITIONAL CONSIDERATIONS BECAUSE MOST SYSTEMS ARE CONTRACTED BELOW-GRADE, MANHOLE CAN MANIPULATE THE CONSTRUCTION, POTENTIALLY CAUSING FLOODING AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES.

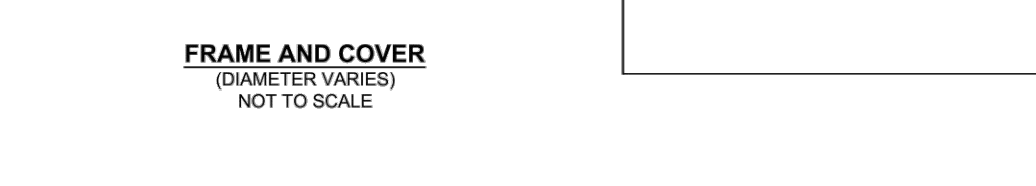
Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO MEET 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

Table with columns: STRUCTURE ID, WATER QUALITY FLOW RATE (GAL./MIN), PEAK FLOW RATE (GAL./MIN), RETURN PERIOD OF PEAK FLOW (YRS), INLET ELEVATION. Includes project information for P13.



GENERAL NOTES 1. CONTRACTOR TO PROVIDE ALL MATERIAL UNLESS NOTED OTHERWISE. 2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEER.

INSTALLATION NOTES A. ANY SUBSIDIARY RISES, DEPTHS, AND/OR ANTI-FLOUTATION PROVISIONS ARE SITE SPECIFIC AND SHOULD BE SPECIFIED BY ENGINEER OF RECORD. B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR.

CONTECH ENGINEERED SOLUTIONS LLC CS-6 CASCADE SEPARATOR STANDARD DETAIL

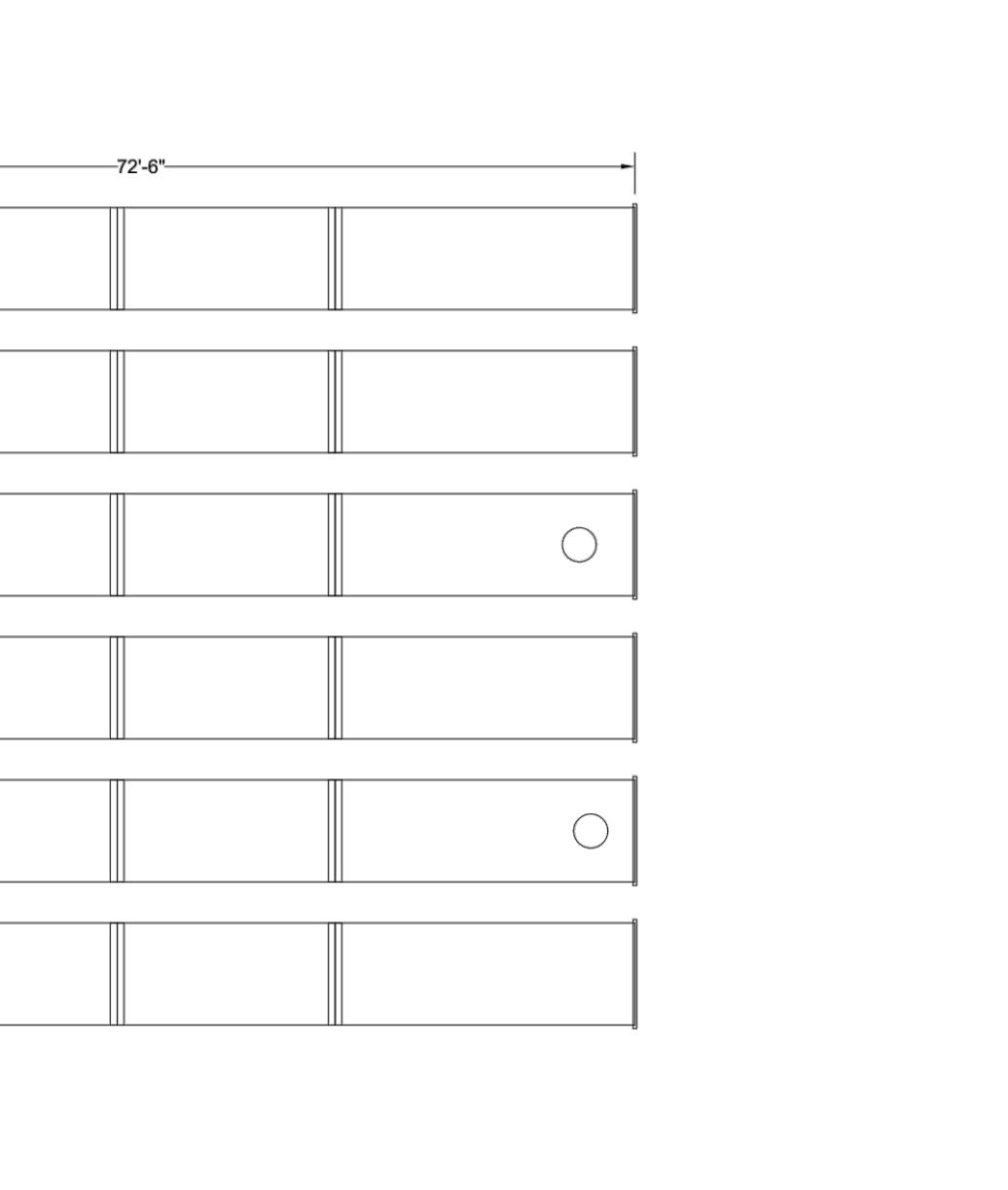
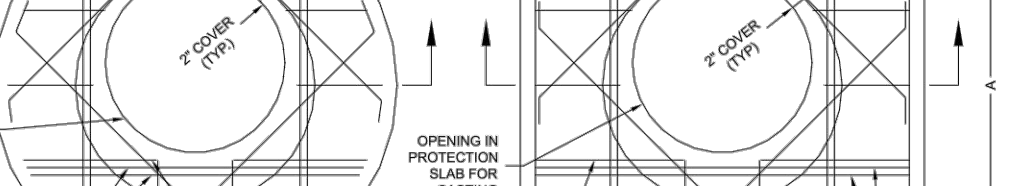
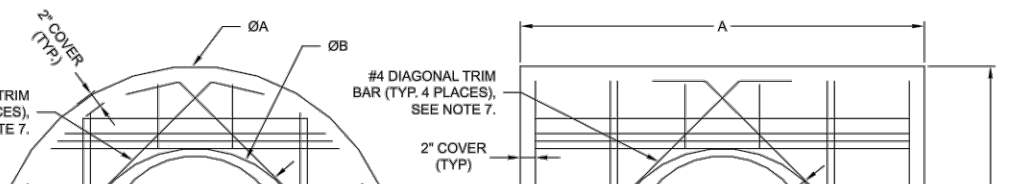
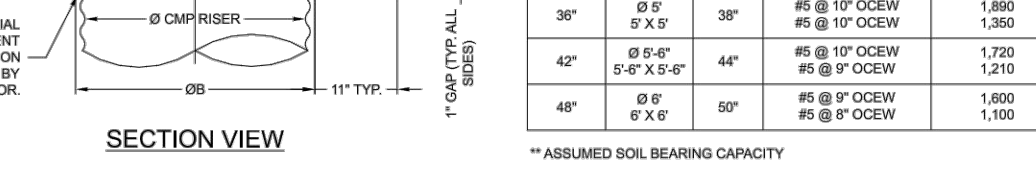


Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D1 and D2.

REINFORCING TABLE

Table with columns: CMP RISER, A, Ø B, REINFORCING, BEARING PRESSURE (PSF). Lists reinforcement details for different riser sizes.

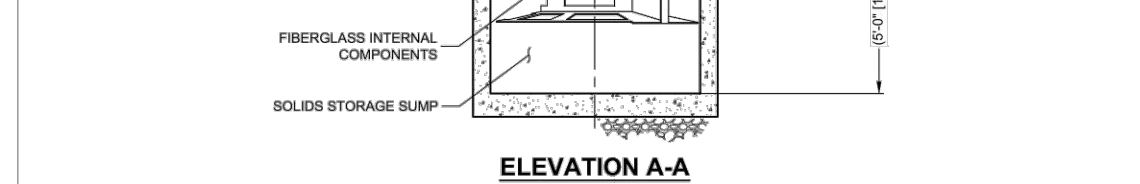
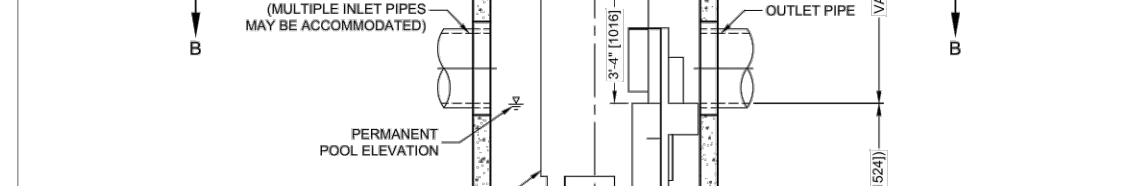
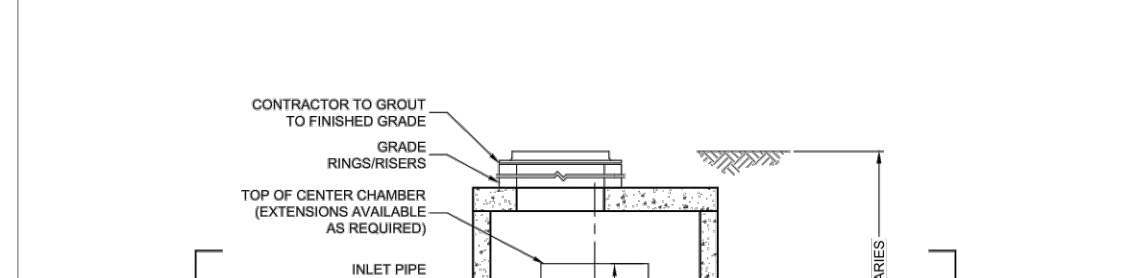
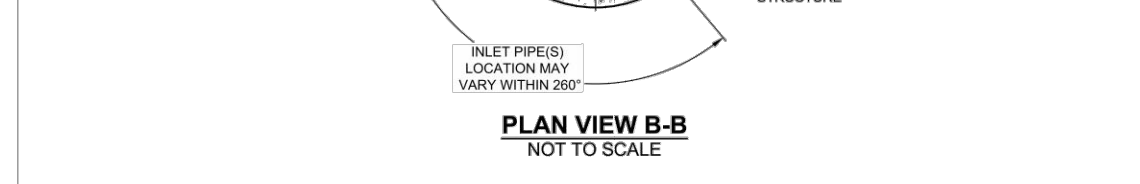
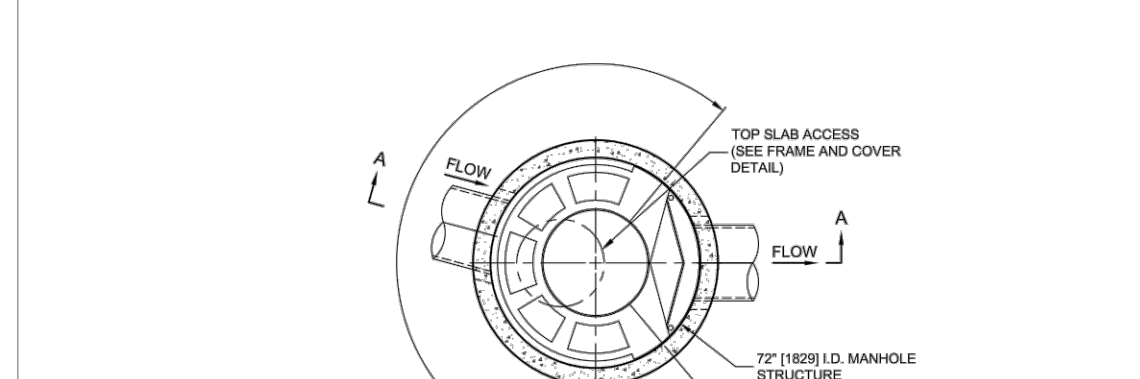


NOTES 1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION. 2. DESIGN LOADS: 2.5 KIP/FT². 3. EARTH COVER: 1'-0" MAX. 4. CONCRETE STRENGTH: 3,000 PSI. 5. REINFORCING STEEL: ASTM A615, GRADE 60.

MANHOLE CAP DETAIL SCALE: N.T.S. Shows detail of manhole cap and frame with reinforcement.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.



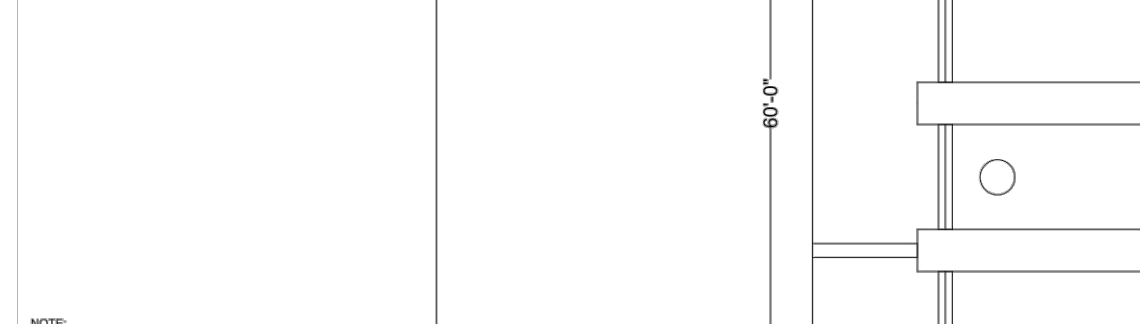
CASCADE separator™

PROJECT SUMMARY CALCULATION DETAILS • LOADS: HSD3 & HSD2 • APPROX. LINEAR FOOTAGE = 450 FT

STORAGE SUMMARY • STORAGE VOLUME REQUIRED = NA • PIPE STORAGE VOLUME = 19,880 GF • BACKFILL STORAGE VOLUME = 5,826 GF • TOTAL STORAGE PROVIDED = 24,826 GF

PIPE DETAILS • DIAMETER = 90 IN. • CORROSION = #4 • GAUGE = 16 • COATING = ALZ • WALL TYPE = Perforated • BARRELL SPACING = 36 IN.

BACKFILL DETAILS • WIDTH AT SIDES = 24 IN. • ABOVE PIPE = 0 IN. • WIDTH AT SIDES = 24 IN. • BELOW PIPE = 0 IN.



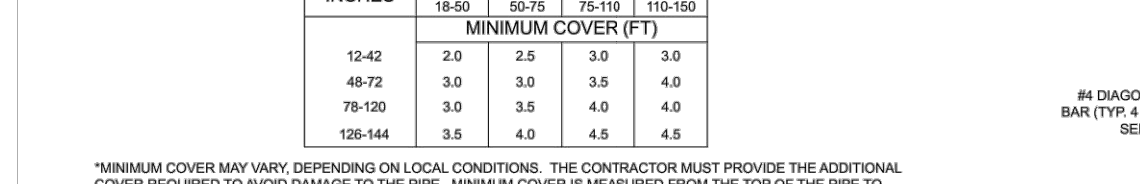
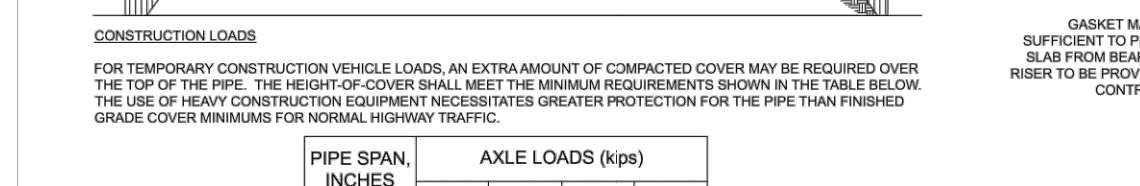
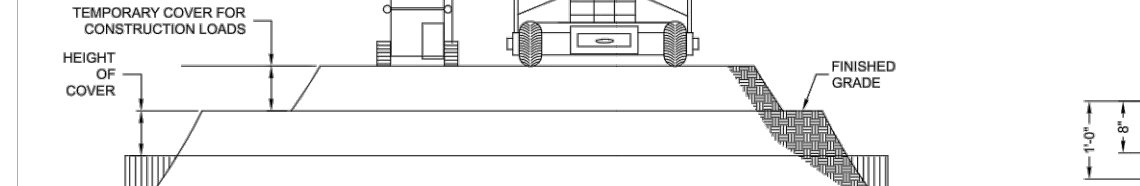
NOTES 1. THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PERMITS OR REGULATIONS. 2. CONTRACTOR TO VERIFY ALL LOCAL PERMITS AND REGULATIONS.

CONSTRUCTION LOADING DIAGRAM SCALE: N.T.S. Shows loading diagram for the separator during construction.

CONSTRUCTION LOADING DIAGRAM SCALE: N.T.S. Shows loading diagram for the separator during construction.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D1 and D2.

CONTECH ENGINEERED SOLUTIONS LLC DYO1253 Collier 90" CMP DETENTION SYSTEM



NOTES 1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION. 2. DESIGN LOADS: 2.5 KIP/FT². 3. EARTH COVER: 1'-0" MAX. 4. CONCRETE STRENGTH: 3,000 PSI. 5. REINFORCING STEEL: ASTM A615, GRADE 60.

MANHOLE CAP DETAIL SCALE: N.T.S. Shows detail of manhole cap and frame with reinforcement.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

Table with columns: Model, Manhole Diameter, MIFR, Storage Volume. Includes project information for D3 and D4.

STORM SEWER SYSTEM DESIGN

$I = \frac{B}{(T+D)} \wedge E$
 $C = \text{varies}$
 $T = 20$ (min.) Pipe "n" Value = 0.013

FROM STR	TO STR	AREA (A) (Acres)	COEF. C	A x C	TOTAL AREA (Acres)	TOTAL AREA (Acres)	TIME t (min.)	INT. I (in/hr)	FLOW Q (cfs)	PIPE CAP. (cfs)	PIPE DIA. (in.)	PIPE LENGTH (ft.)	PIPE SLOPE (%)	MIN HG PER "Q"	VEL. FULL (ft./sec)	TIME FLOW (min.)	H.G.L. ELEV.		RIM ELEV.		INVERT ELEV.		PIPE COVER		HGL COVER	
																	UP STREAM	DOWN STREAM	UP STREAM	DOWN STREAM	UP STREAM	DOWN STREAM	UP STREAM	DOWN STREAM	UP STREAM	DOWN STREAM
10	9	0.32	0.76	0.24	0.24	0.32	20.00	3.89	0.93	5.28	12	84	2.20	0.07%	6.7	0.2	963.31	961.94	966.15	966.00	962.51	960.67	2.47	4.17	2.84	4.06
9	22	0.17	0.83	0.14	0.38	0.49	20.20	3.87	1.48	2.11	12	51	0.35	0.17%	2.7	0.3	961.94	961.85	966.00	966.25	960.67	960.49	4.17	4.60	4.06	4.40
22	8	0.23	0.82	0.19	0.58	0.72	20.50	3.85	2.21	2.11	12	60	0.35	0.39%	2.7	0.4	961.85	961.62	966.25	965.45	960.49	960.28	4.60	4.01	4.40	3.83
8	7	0.45	0.64	0.29	0.87	1.18	20.90	3.81	3.31	2.76	12	123	0.60	0.86%	3.5	0.6	961.62	960.55	965.45	960.18	960.18	959.43	4.11	5.40	3.83	5.45
7	6	0.20	0.71	0.14	1.01	1.37	21.50	3.76	3.80	3.54	15	76	0.30	0.35%	2.9	0.4	960.55	960.29	966.00	965.80	959.23	959.01	5.33	5.35	5.45	5.51
6	5	0.19	0.70	0.13	1.14	1.56	21.90	3.73	4.25	3.82	15	82	0.35	0.43%	3.1	0.4	960.29	959.94	965.80	965.70	959.01	958.72	5.35	5.54	5.51	5.76
5	4	0.08	0.77	0.06	1.21	1.66	22.30	3.70	4.48	4.09	15	44	0.40	0.48%	3.3	0.2	959.94	959.73	965.70	965.80	958.72	958.55	5.54	5.82	5.76	6.07
4	3	0.04	0.72	0.03	1.43	1.92	22.50	3.68	5.25	4.09	15	69	0.40	0.66%	3.3	0.3	959.73	959.27	965.80	964.28	958.55	958.27	5.82	4.58	6.07	5.01
3	101	0.40	0.90	0.36	1.98	2.55	22.80	3.66	7.26	5.96	15	20	0.85	1.26%	4.9	0.1	959.25	959.00	964.28	964.25	958.17	958.00	4.68	4.81	5.03	5.25
100	2	0.00	0.00	0.00	0.00	0.00	20.00	3.89	0.00	2.11	12	8	0.35	0.00%	2.7	0.1	952.71	952.68	962.63	962.71	951.91	951.88	9.56	9.67	9.92	10.03
2	1	0.00	0.00	0.00	0.00	0.00	20.10	3.88	0.00	2.11	12	51	0.35	0.00%	2.7	0.3	952.68	952.50	962.71	963.07	951.88	951.70	9.67	0.20	10.03	0.57
15	24	0.00	0.00	0.00	0.00	0.00	20.00	3.89	0.00	48.53	30	159	1.40	0.00%	9.9	0.3	960.39	958.15	970.05	967.21	958.39	956.15	8.87	8.27	9.66	9.06
24	14	0.00	0.00	0.00	0.00	0.00	20.30	3.86	0.00	18.34	30	51	1.20	0.00%	3.7	0.2	954.35	954.25	967.21	965.13	952.35	952.25	12.07	0.08	12.86	0.88
21	5	0.01	0.41	0.01	0.01	0.01	20.00	3.89	0.02	5.04	12	49	2.00	0.00%	6.4	0.1	962.20	961.22	966.75	965.70	961.40	960.42	4.18	4.11	4.55	4.48
20	4	0.22	0.87	0.19	0.19	0.22	20.00	3.89	0.73	5.04	12	31	2.00	0.04%	6.4	0.1	962.07	961.45	966.65	965.80	961.27	960.85	4.21	3.99	4.58	4.35
12	13	0.10	0.84	0.08	0.08	0.10	20.00	3.89	0.32	2.11	12	12	0.35	0.01%	2.7	0.1	957.84	957.80	962.40	962.58	957.04	957.00	4.20	4.41	4.56	4.78

LEGEND

EXISTING

- IRON FOUND
- IRON SET
- NAIL FOUND
- NAIL & CAP SET
- BRASS PLUG SET
- MONUMENT FOUND
- MONUMENT SET
- SEC. CORNER FOUND
- RECORDED
- MEASURED
- CALCULATED

PROPOSED

- ELEC. PHONE OR CABLE TV O/L LINE, POLE & GUY WIRE
- UNDERGROUND CABLE TV, CATV PEDESTAL
- TELEPHONE U.G. CABLE, PEDESTAL & MANHOLE
- ELECTRIC U.G. CABLE, MANHOLE, METER & HANDHOLE
- GAS MAIN, VALVE & GAS LINE MARKER
- WATERMAIN, HYD. GATE VALVE, TAPPING BLEEDIE & VALVE
- SANITARY SEWER, CLEANOUT & MANHOLE
- STORM SEWER, CLEANOUT & MANHOLE
- COMBINED SEWER & MANHOLE
- SQUARE, ROUND & BEEHIVE CATCH BASIN, YARD DRAIN
- POST INDICATOR VALVE
- WATER VALVE BODY/HYDRANT VALVE BOX, SERVICE SHUTOFF
- MAILBOX, TRANSFORMER, IRRIGATION CONTROL VALVE
- UNIDENTIFIED STRUCTURE
- SPOT ELEVATION
- CONTOUR LINE
- FENCE
- GUARDRAIL
- STREET LIGHT
- SIGN
- CONC.
- ASPH.
- GRAVEL SHOULDER
- WETLAND
- 310 HEAVY FLOW DUTY ONLY
- 310 HEAVY DEEP DUTY STRENGTH

REFERENCE DRAWINGS

- WATER MAIN CHM GIS MAPPING, DATED 7-19-18
- SANITARY SEWER CHM GIS MAPPING, DATED 7-19-18
- STORM SEWER CHM GIS MAPPING, DATED 7-19-18
- TELEPHONE AT&T SKETCHES, DATED 7-12-19
- CONSUMERS ENERGY MAP# 03-60-60-3, DATED 01-31-18
- OTHER WINDSTREAM DRAWING DATED 7-25-18

PEA GROUP

TROY • WASHINGTON TWP
 BRIGHTON • DETROIT
 T: 844.813.2949

www.peagroup.com

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

CAUTION!
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CLIENT
TRINITY REAL ESTATE INVESTMENTS
 28877 WEST TWELVE MILE ROAD
 SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
 3500 BALDWIN ROAD
 AUBURN HILLS, MI

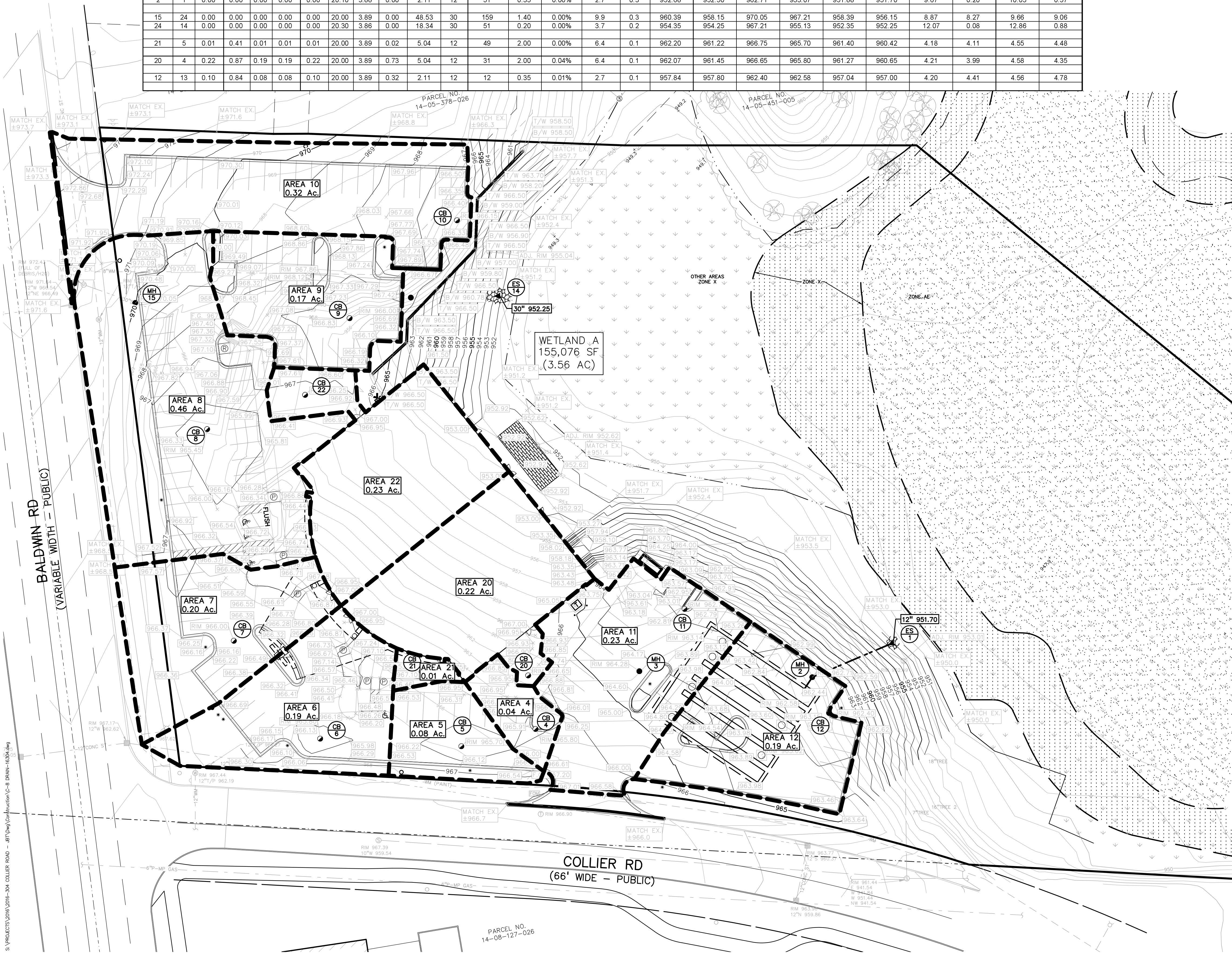
REVISIONS

ORIGINAL ISSUE DATE:
 SEPTEMBER 22, 2020

DRAWING TITLE
DRAINAGE MAP

PEA JOB NO. 2016-304
 P.M. JBT
 DN. TMK
 DES. TMK

DRAWING NUMBER:
C-8.0

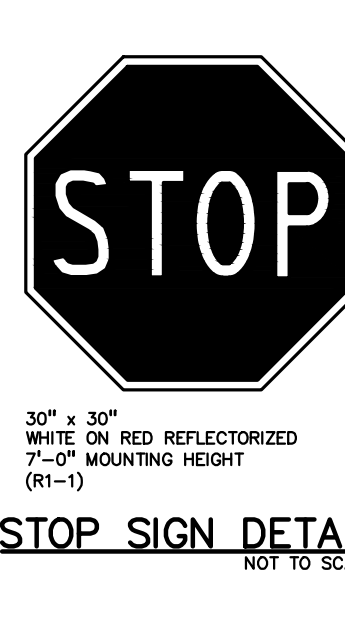


S:\PROJECTS\2016\2016-304 COLLETT ROAD - 811\Draw\Construction\C-8 BRAIN-1600.dwg

- PAVING NOTES:**
- IN AREAS WHERE NEW PAVEMENTS ARE BEING CONSTRUCTED, THE TOPSOIL AND SOIL CONTAINING ORGANIC MATTER SHALL BE REMOVED PRIOR TO PAVEMENT CONSTRUCTION.
 - PROVIDE EXPANSION JOINTS AND JOINT SEALANT AT TWO "END-OF-RADIUS" LOCATIONS (OPPOSITE SIDES AT EACH LONG END) OF CONCRETE CURB ISLANDS.
 - REFER TO ARCHITECTURAL PLANS FOR DETAILS OF FROST SLAB AT EXTERIOR BUILDING DOORS.
 - CONSTRUCTION TRAFFIC SHOULD BE MINIMIZED ON THE NEW PAVEMENT. IF CONSTRUCTION TRAFFIC IS ANTICIPATED ON THE PAVEMENT STRUCTURE, THE INITIAL LIFT THICKNESS COULD BE INCREASED AND PLACEMENT OF THE FINAL LIFT COULD BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED. THIS ACTION WILL ALLOW REPAIR OF LOCALIZED FAILURE, IF ANY DOES OCCUR, AS WELL AS REDUCE LOAD DAMAGE ON THE PAVEMENT SYSTEM.
 - PAVEMENT MIX DESIGNS SUBMITTED FOR REVIEW BY THE ENGINEER MUST FOLLOW THE CURRENT MDOT REVIEW CHECKLISTS AS SUMMARIZED BELOW:
 - CONCRETE MIX DESIGN REVIEW CHECKLIST (FORM 2000)
 - SUPERPAVE MIX DESIGN CHECKLIST (FORM 1862)
 - MARSHALL MIX DESIGN CHECKLIST (FORM 1849)
 - CONCRETE PAVEMENT JOINTING - UNLESS SHOWN OTHERWISE IN THE PLANS OR REQUIRED BY THE AUTHORITY HAVING JURISDICTION:
 - WHERE PROPOSED CONCRETE ABUTS A STRUCTURE PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT, THE JOINT FILLER BOARD MUST BE AT LEAST THE FULL DEPTH OF THE CONCRETE AND HELD DOWN A 1/4" TO ALLOW FOR SEALING.
 - WHERE PROPOSED CONCRETE ABUTS EXISTING CONCRETE OR IN BETWEEN POURS OF PROPOSED CONCRETE (CONSTRUCTION JOINT) PROVIDE 5/8" DOWELS EVERY 30" CENTER TO CENTER HALF WAY ALONG THE THICKNESS OF THE PROPOSED PAVEMENT. ALTERNATE DOWEL SIZES AND SPACINGS MUST BE APPROVED BY THE ENGINEER PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
 - WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED SIDEWALK PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT.
 - WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED CURBING PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT.
 - CONTROL, LONGITUDINAL AND/OR TRANSVERSE JOINTS SHALL BE PLACED TO PROVIDE PARAMETERS WITHIN THE PAVEMENT AS SQUARE AS POSSIBLE WITH THE FOLLOWING MAXIMUM SPACING PARAMETERS:
 - 6-8" THICK CONCRETE PAVEMENT: 12' X 12'
 - 8-12" THICK CONCRETE PAVEMENT: 15' X 15'
 - IRREGULAR-SHAPED PANELS MAY REQUIRE THE USE OF REINFORCING MESH OR FIBER MESH AS DETERMINED BY THE ENGINEER. THE USE OF MESH MUST BE APPROVED BY THE ENGINEER PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
 - IF A JOINT PLAN IS NOT PROVIDED IN THE PLANS, THE CONTRACTOR SHALL SUBMIT ONE TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCING WORK AND VIA THE SUBMITTAL PROCESS.
 - CONCRETE CURBING JOINTING - UNLESS SHOWN OTHERWISE IN THE PLANS OR REQUIRED BY THE AUTHORITY HAVING JURISDICTION:
 - WHERE PROPOSED CONCRETE CURBING ABUTS A STRUCTURE PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT.
 - WHERE PROPOSED CONCRETE ABUTS EXISTING OR PROPOSED SIDEWALK PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT.
 - WHERE PROPOSED CONCRETE ABUTS EXISTING CURBING PROVIDE A MINIMUM 1/2" EXPANSION JOINT WITH SEALANT.
 - IN BETWEEN POURS OF PROPOSED CONCRETE CURBING (CONSTRUCTION JOINT)
 - CARRY THE REBAR CONTINUOUSLY BETWEEN POURS.
 - IF THE REBAR IS NOT LONG ENOUGH TO CARRY CONTINUOUSLY THEN TIE THE TWO PIECES OF REBAR PER THE LATEST MDOT SPECIFICATIONS.
 - CONTROL JOINTS SHALL BE PLACED A MAXIMUM 10' CENTER TO CENTER AND AT ALL RADIUS RETURNS.

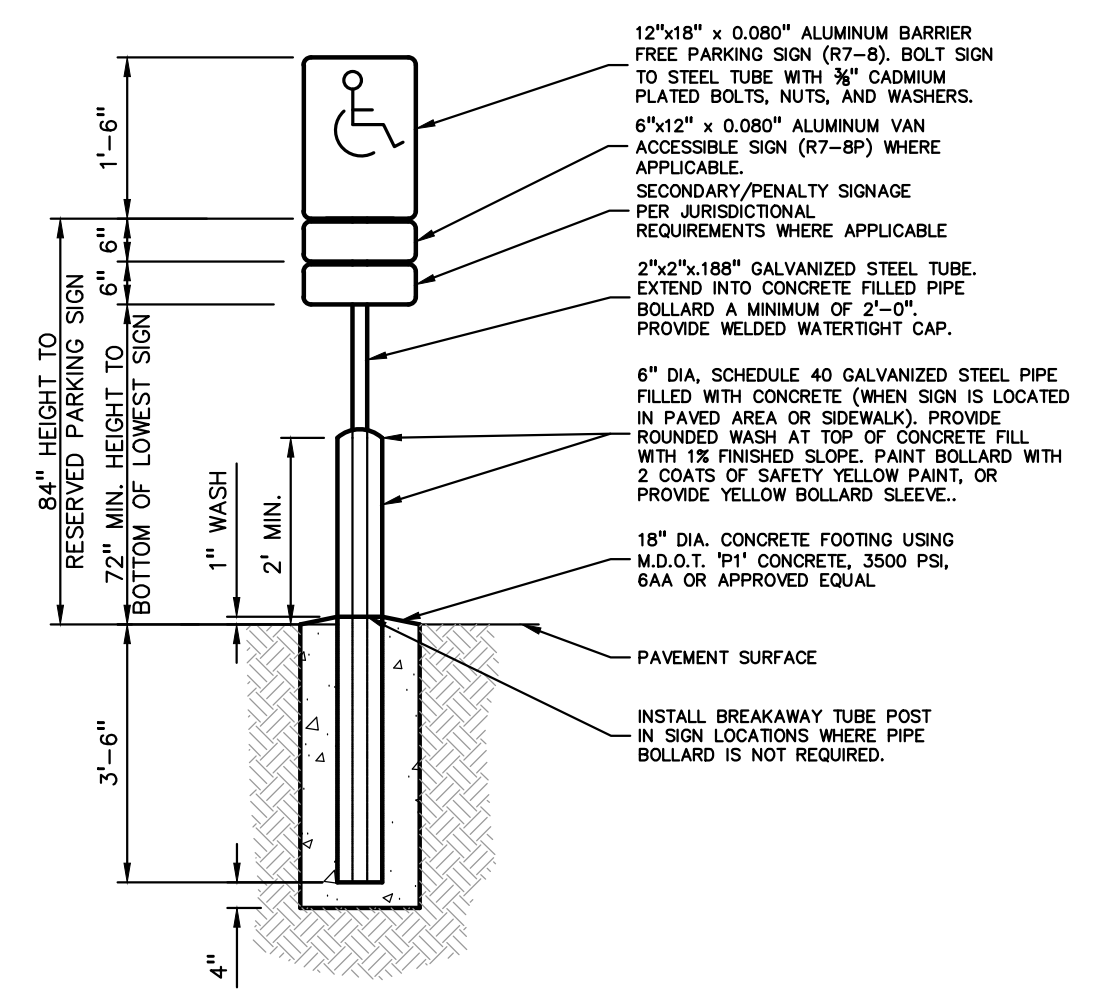


NO PARKING SIGN DETAIL
NOT TO SCALE



STOP SIGN DETAIL
NOT TO SCALE

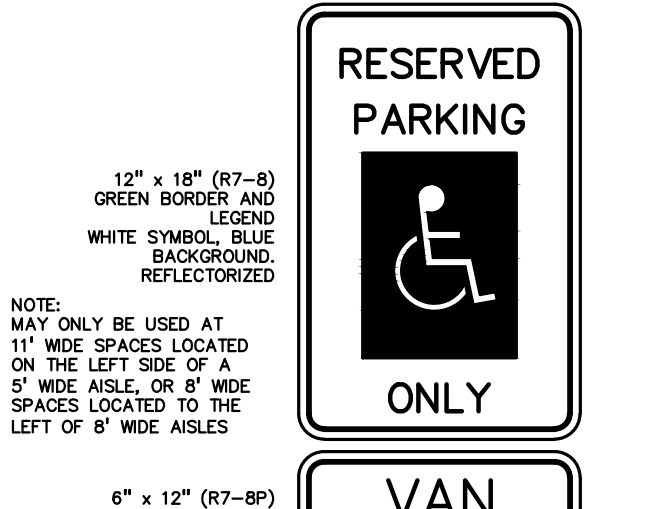
- BARRIER FREE SIGN NOTES:**
- ONE SIGN IS REQUIRED AT EACH BARRIER FREE PARKING SPACE.
 - ALL SIGNS SHALL COMPLY WITH THE LATEST STANDARDS OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD).
 - WHEN TWO BARRIER FREE PARKING SPACES ARE ADJACENT AND FACING EACH OTHER, TWO SIGNS ARE REQUIRED, BUT CAN BE MOUNTED ON THE SAME POST.
 - SIGN POSTS SHALL BE 2" NOM. SQUARE 14-GAUGE GALVANIZED STEEL TUBE WITH 7/16" HOLES AT 1" CENTERS. POSTS SHALL TELESCOPE INSIDE ANCHOR POSTS A MINIMUM OF 12".
 - ANCHOR POSTS SHALL BE 2.25" NOM. SQUARE 12-GAUGE GALVANIZED STEEL POST, A MINIMUM OF 3 FEET LONG.
 - IF THESE NOTES AND DETAILS CONFLICT WITH LOCAL CODES AND ORDINANCES, THE STRICTER REQUIREMENT SHOULD BE USED.
 - ALTERNATE METHODS MAY BE USED IF IN COMPLIANCE WITH A.D.A. GUIDELINES AND LOCAL REQUIREMENTS.



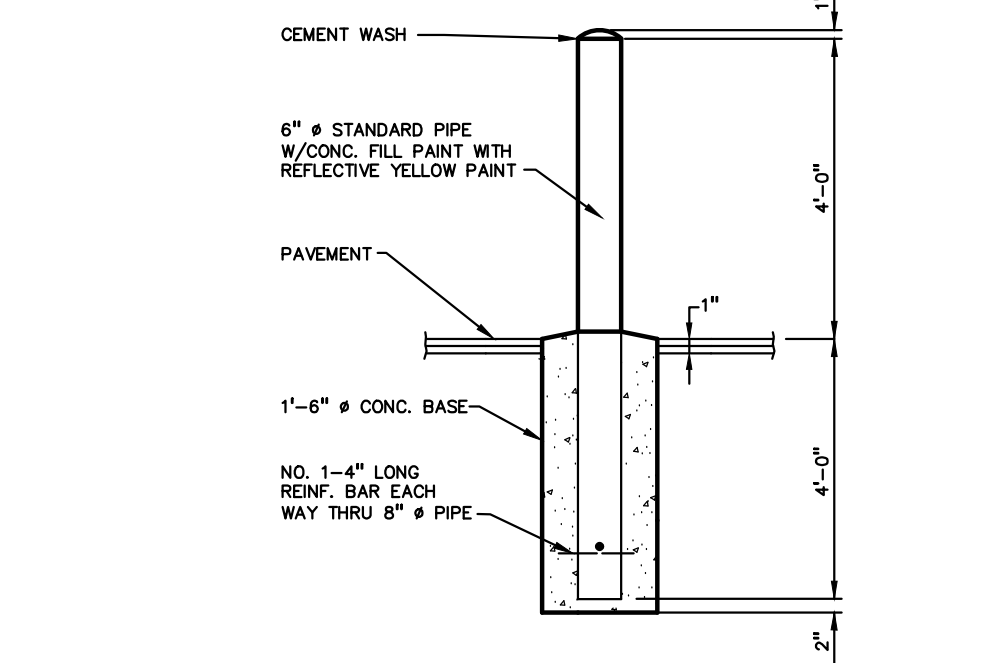
BARRIER FREE SIGN AND POST DETAIL
NOT TO SCALE



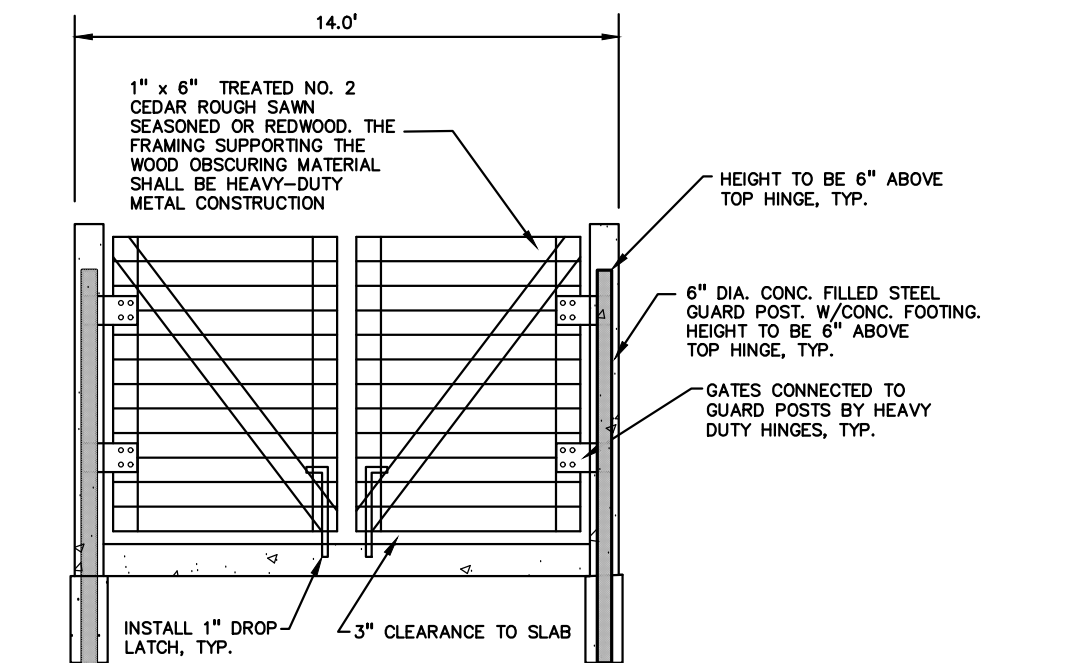
RESERVED PARKING SIGN DETAIL
NOT TO SCALE



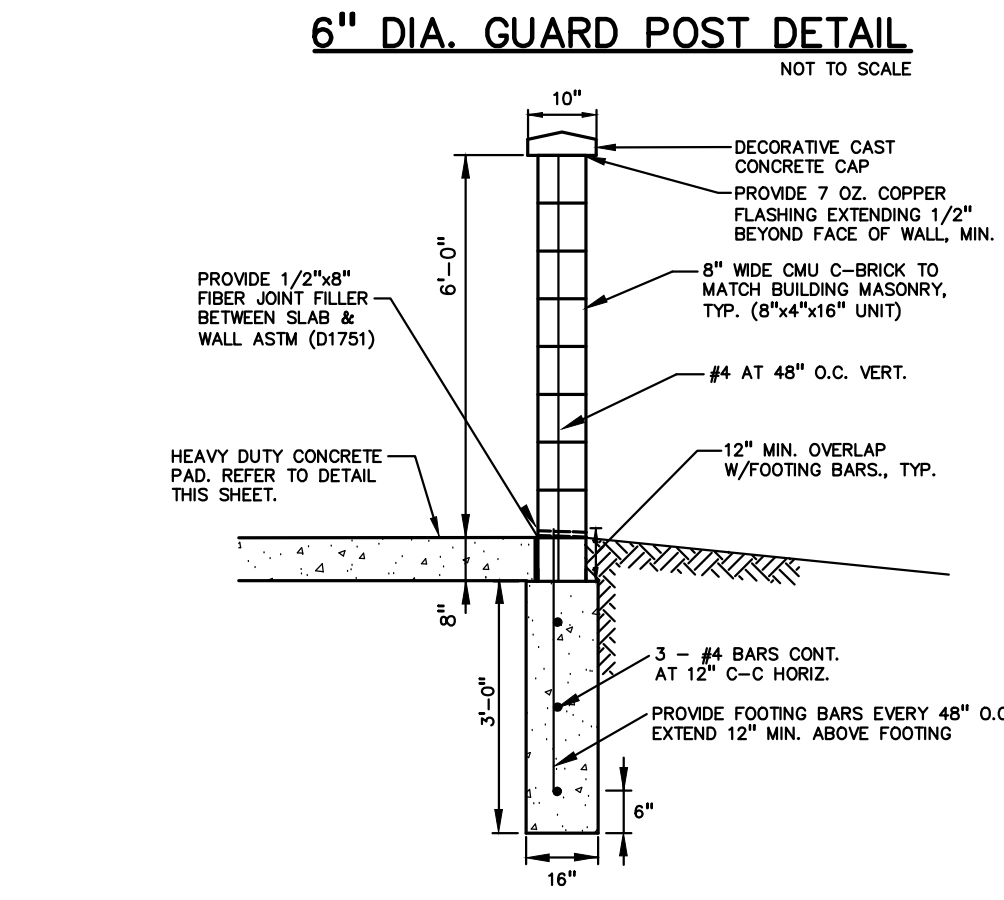
VAN ACCESSIBLE PARKING SIGN DETAIL
NOT TO SCALE



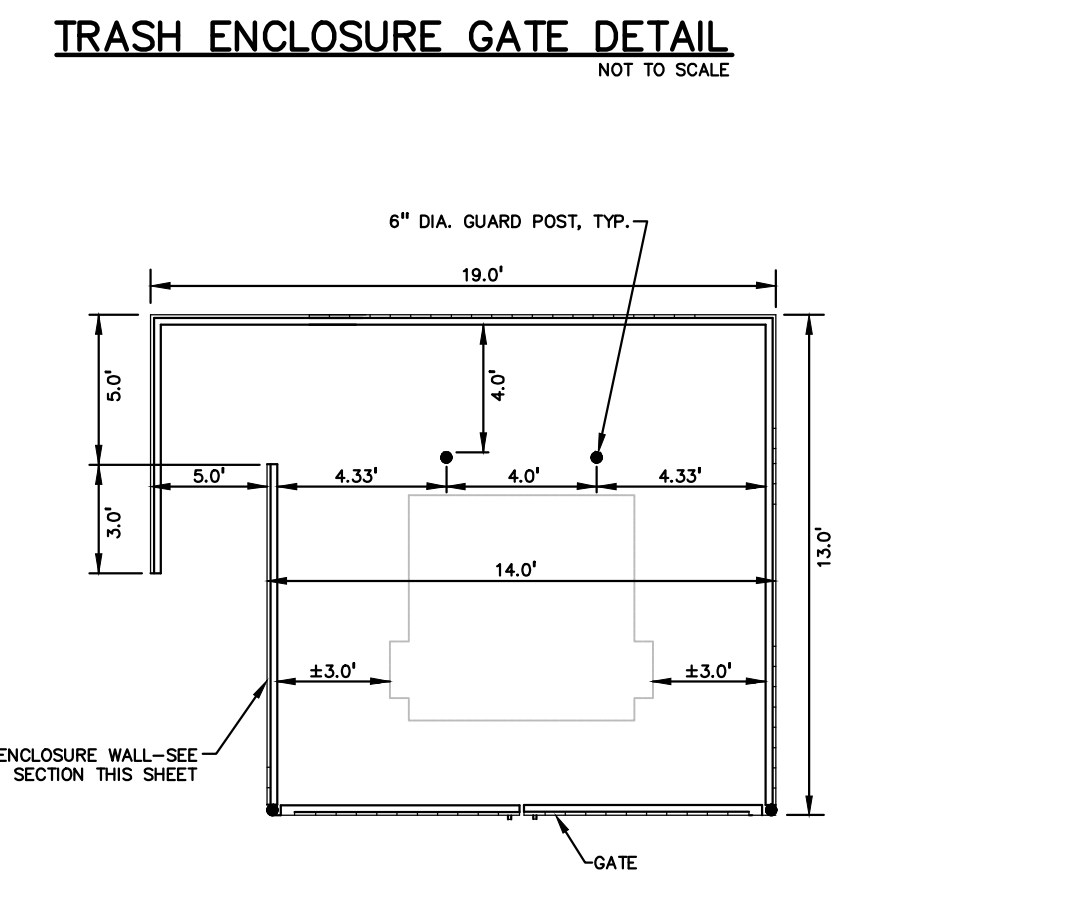
6\"/>



TRASH ENCLOSURE GATE DETAIL
NOT TO SCALE

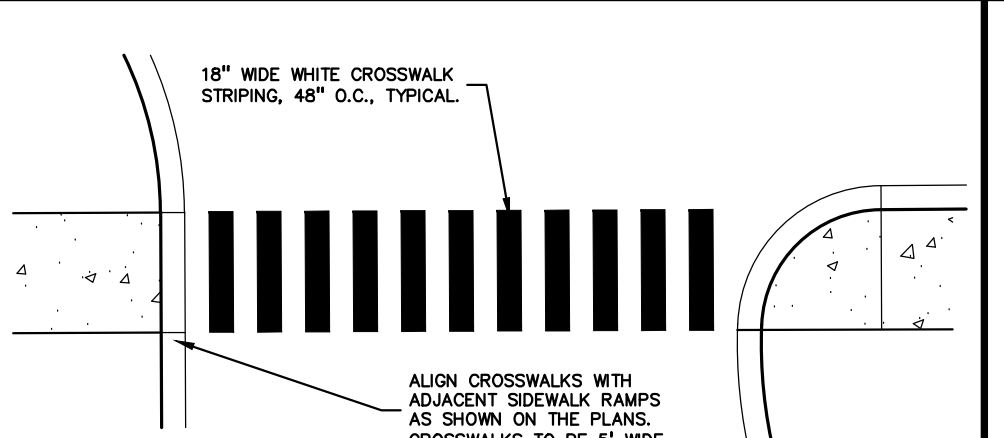


DUMPSTER ENCLOSURE WALL CROSS SECTION
NOT TO SCALE

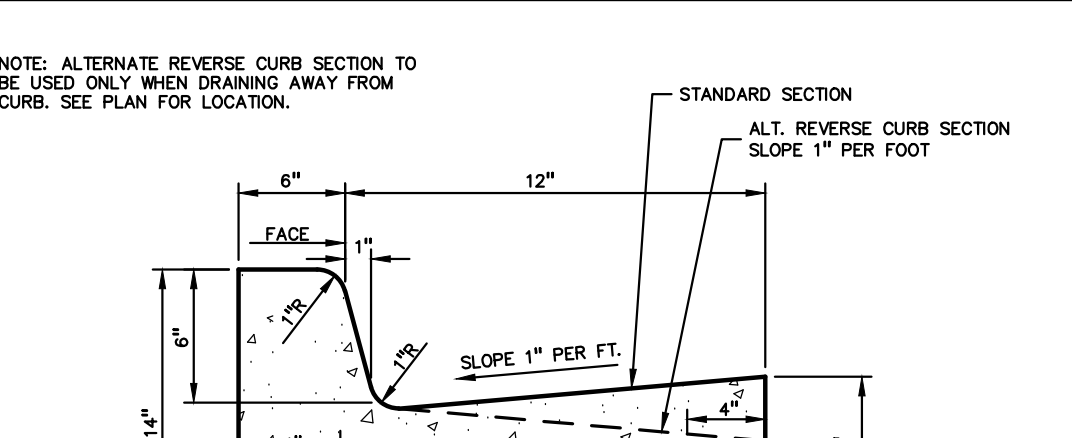


PLAN VIEW
NOT TO SCALE

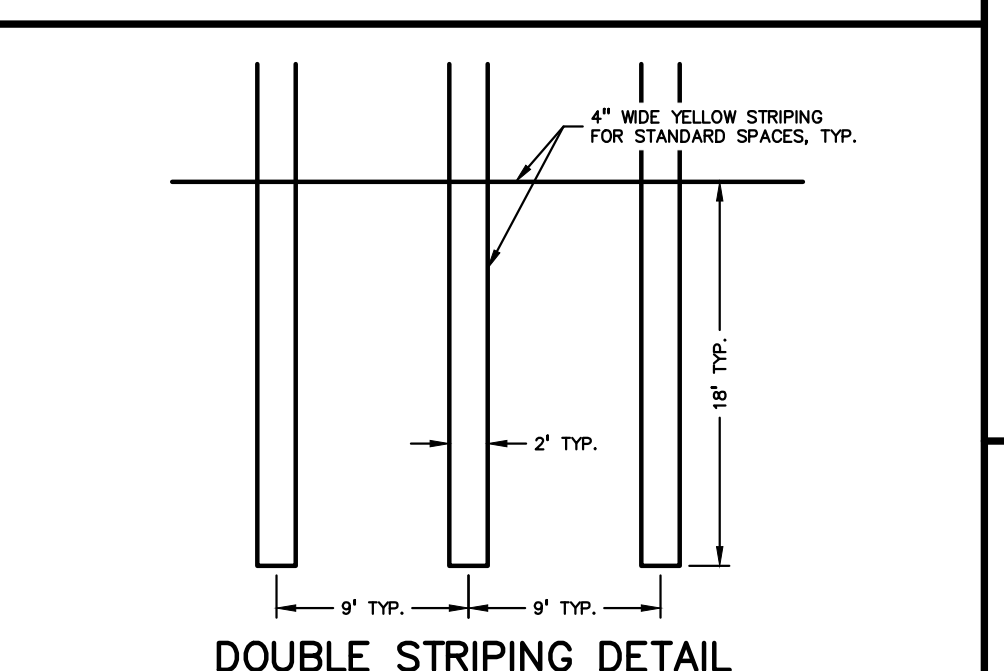
TRASH ENCLOSURE DETAILS
NOT TO SCALE



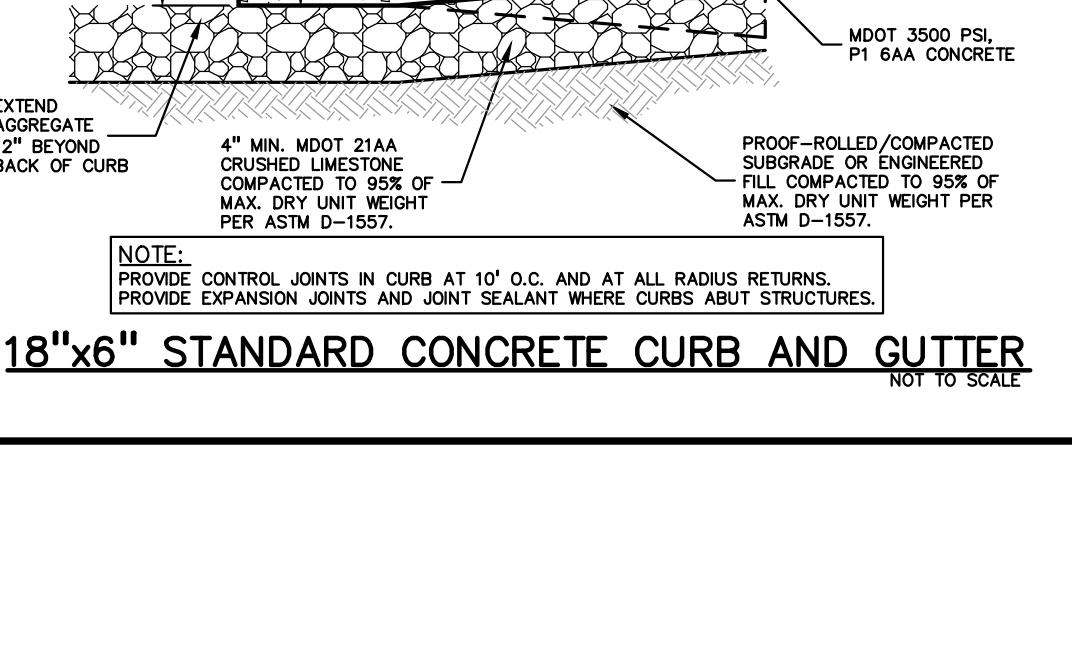
STRIPED CROSSWALK DETAIL
NOT TO SCALE



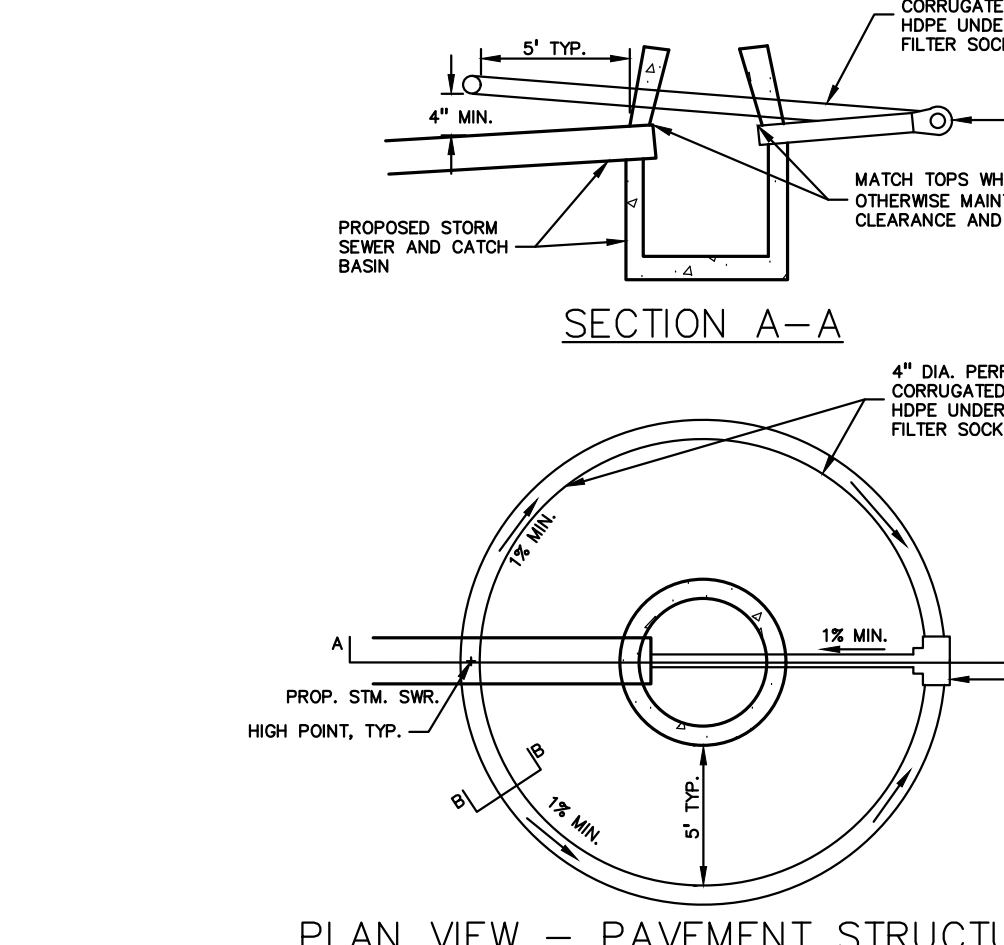
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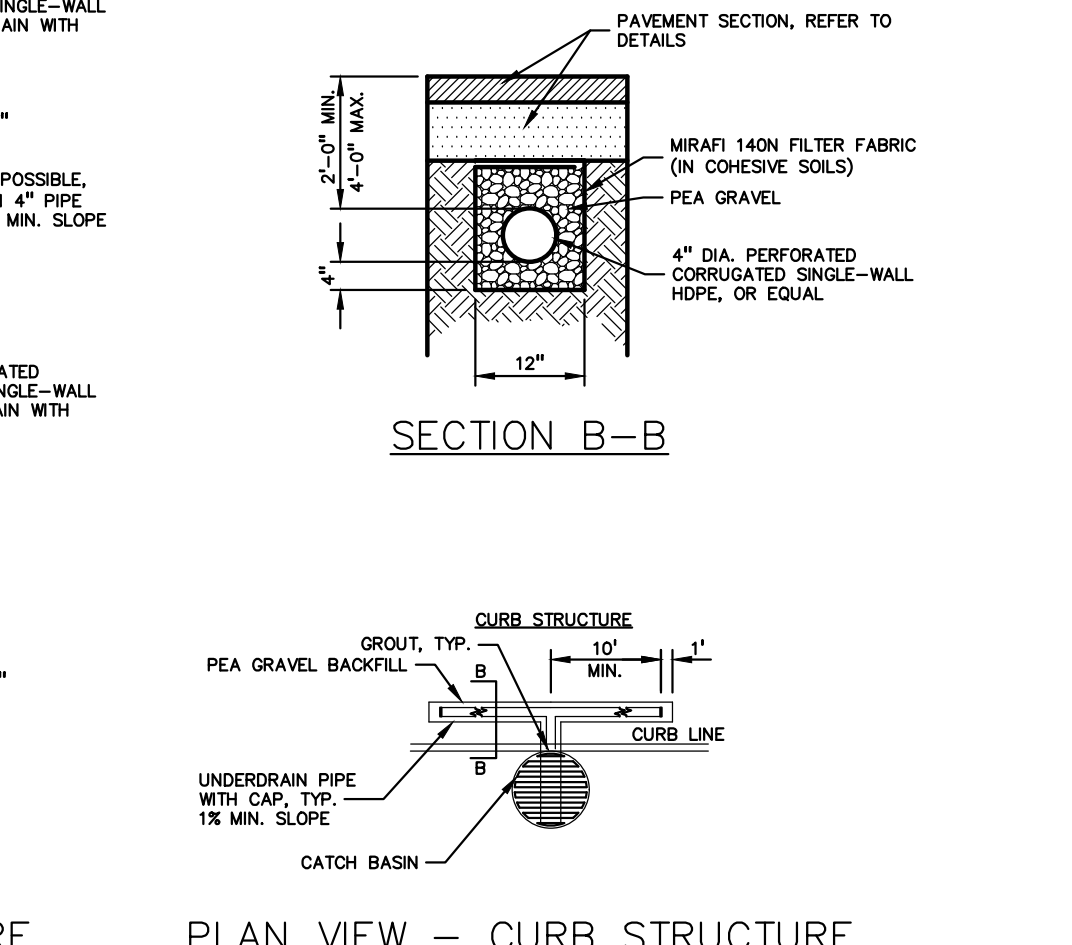
DOUBLE STRIPING DETAIL
NOT TO SCALE



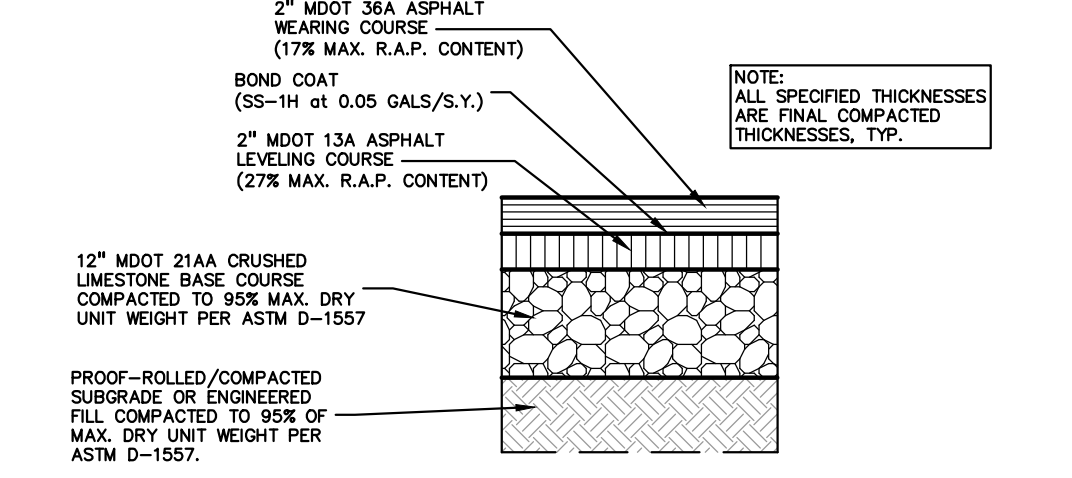
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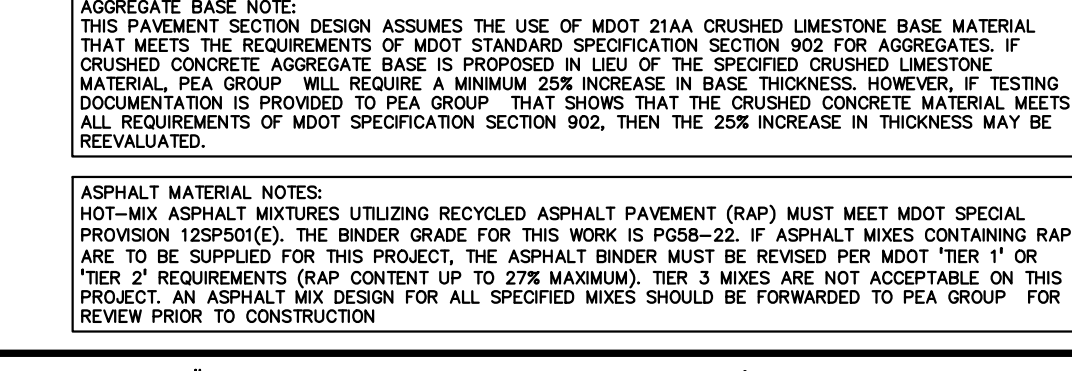
PAVEMENT INLET/CATCH BASIN UNDERDRAIN DETAIL
NOT TO SCALE



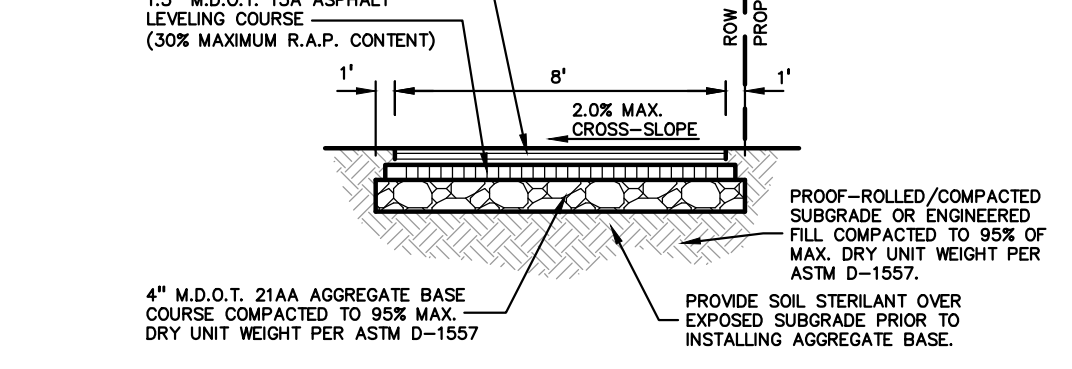
INTEGRAL CURB AND SIDEWALK
NOT TO SCALE



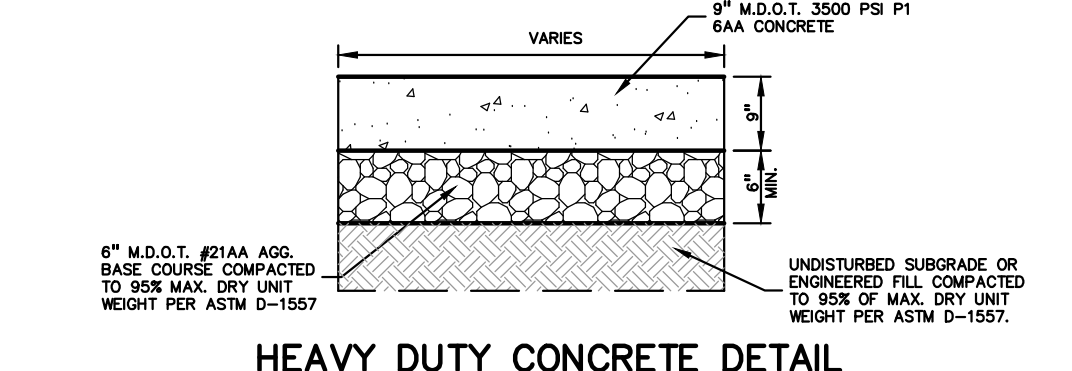
STANDARD DUTY ASPHALT DETAIL
(NOT FOR USE IN THE RIGHT-OF-WAY)
NOT TO SCALE



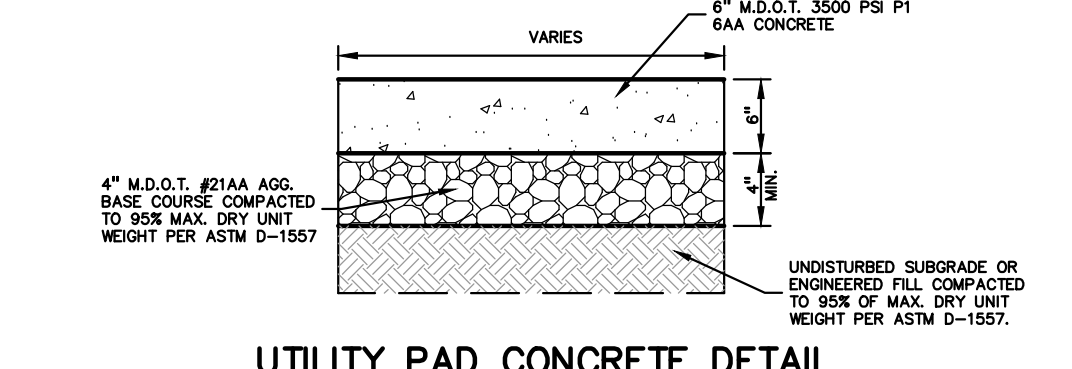
ASPHALT BIKE PATH DETAIL
NOT TO SCALE



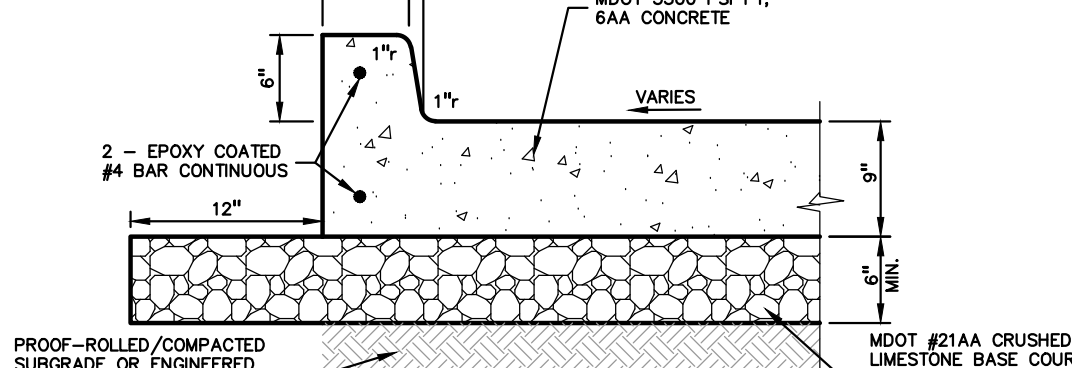
HEAVY DUTY CONCRETE DETAIL
NOT TO SCALE



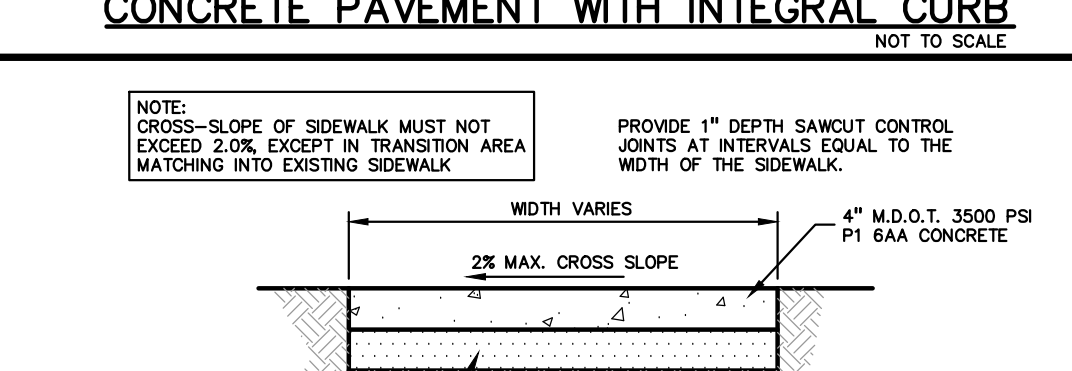
UTILITY PAD CONCRETE DETAIL
NOT TO SCALE



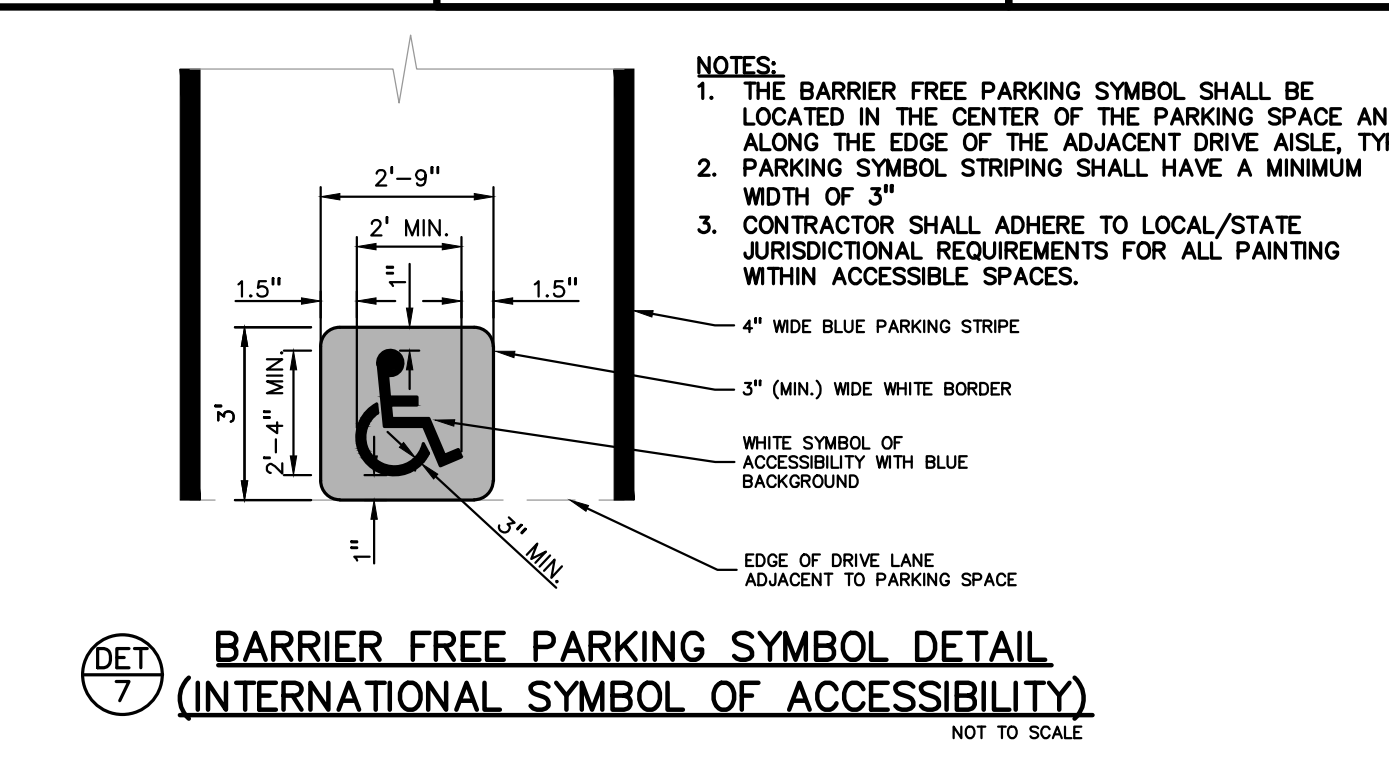
CONCRETE PAVEMENT WITH INTEGRAL CURB
NOT TO SCALE



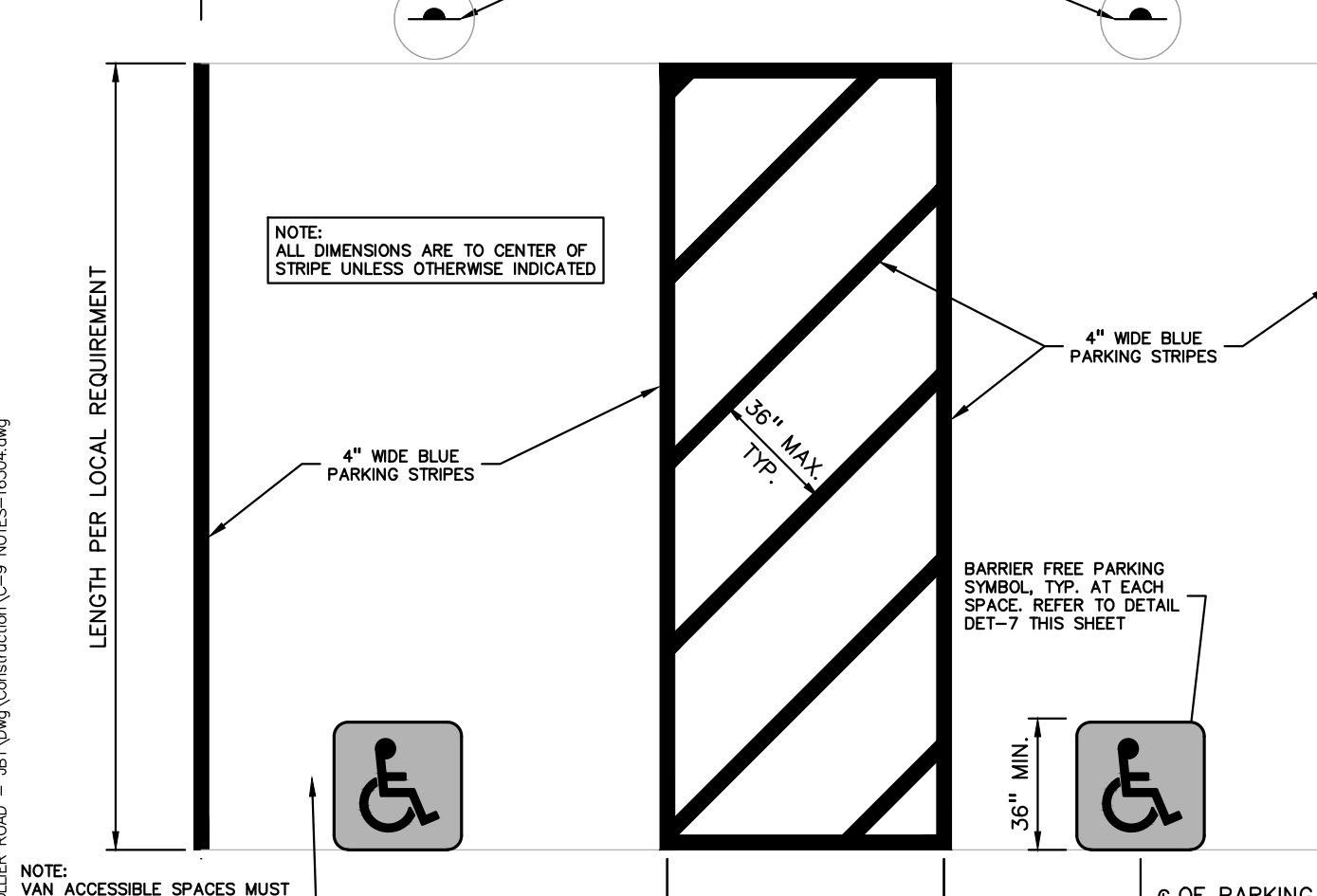
CONCRETE SIDEWALK
NOT TO SCALE



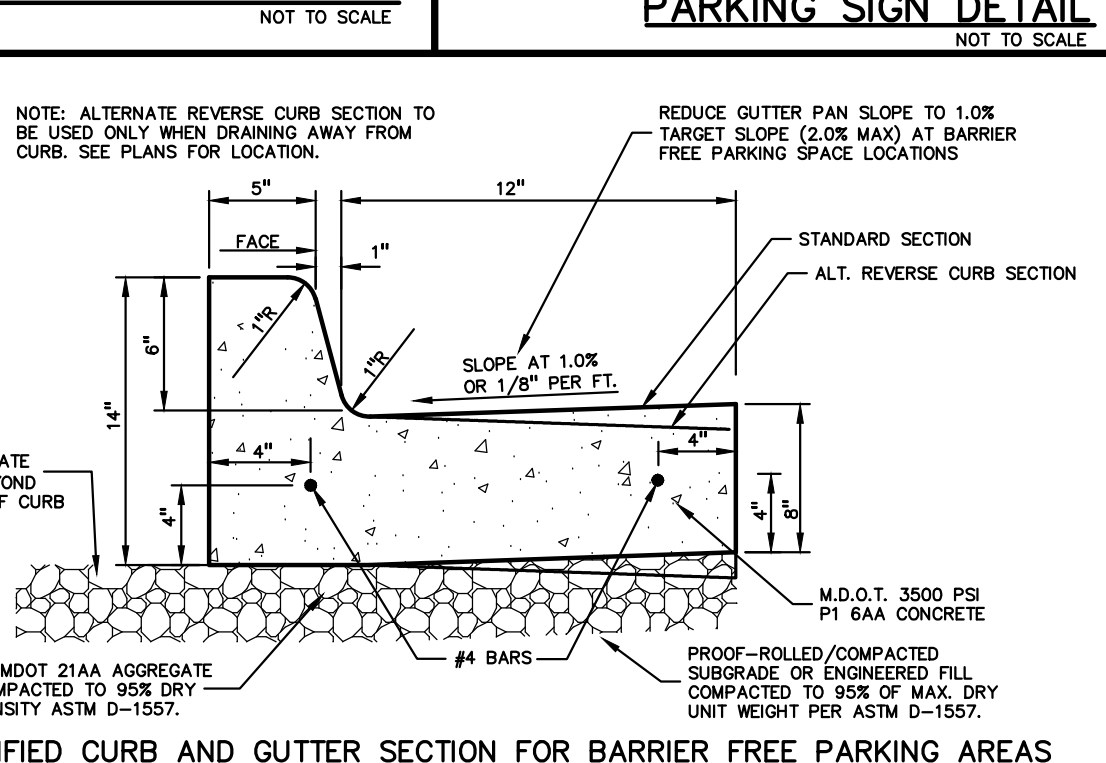
INTEGRAL CURB AND SIDEWALK
NOT TO SCALE



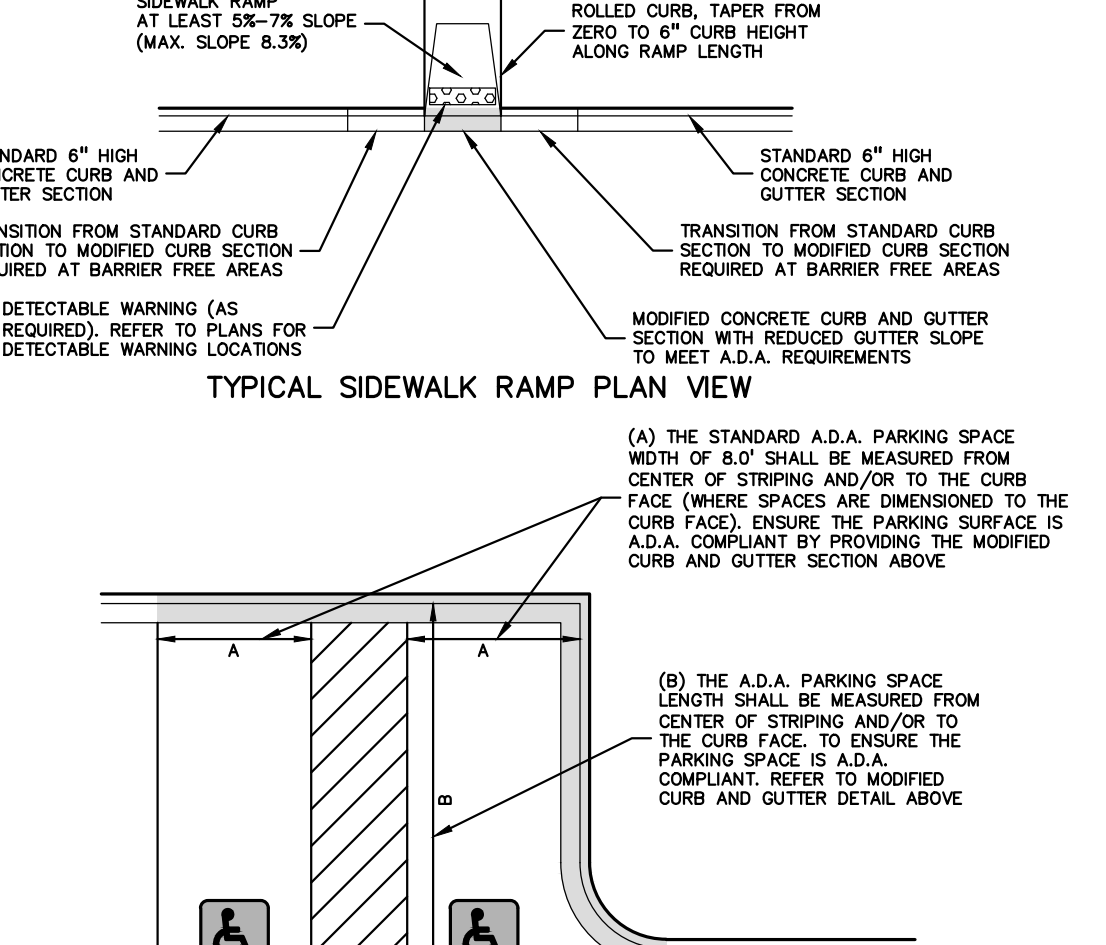
BARRIER FREE PARKING SYMBOL DETAIL
(INTERNATIONAL SYMBOL OF ACCESSIBILITY)
NOT TO SCALE



UNIVERSAL BARRIER FREE PARKING STALL DETAIL
NOT TO SCALE



MODIFIED CURB AND GUTTER SECTION FOR BARRIER FREE PARKING AREAS



TYPICAL BARRIER FREE PARKING SPACES



MODIFIED 18\"/>



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CLIENT
TRINITY REAL ESTATE INVESTMENTS
26877 WEST TWELVE MILE RD.
SOUTHFIELD, MI

PROJECT TITLE
CHURCH OF GOD IN CHRIST
3500 BALDWIN ROAD
AUBURN HILLS, MI

REVISIONS

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

DRAWING TITLE
NOTES & DETAILS

PEA JOB NO. 2016-304
P.M. JBT
DN. TMK
DES. TMK

DRAWING NUMBER:

C-9.1



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AUBURN HILLS, MI

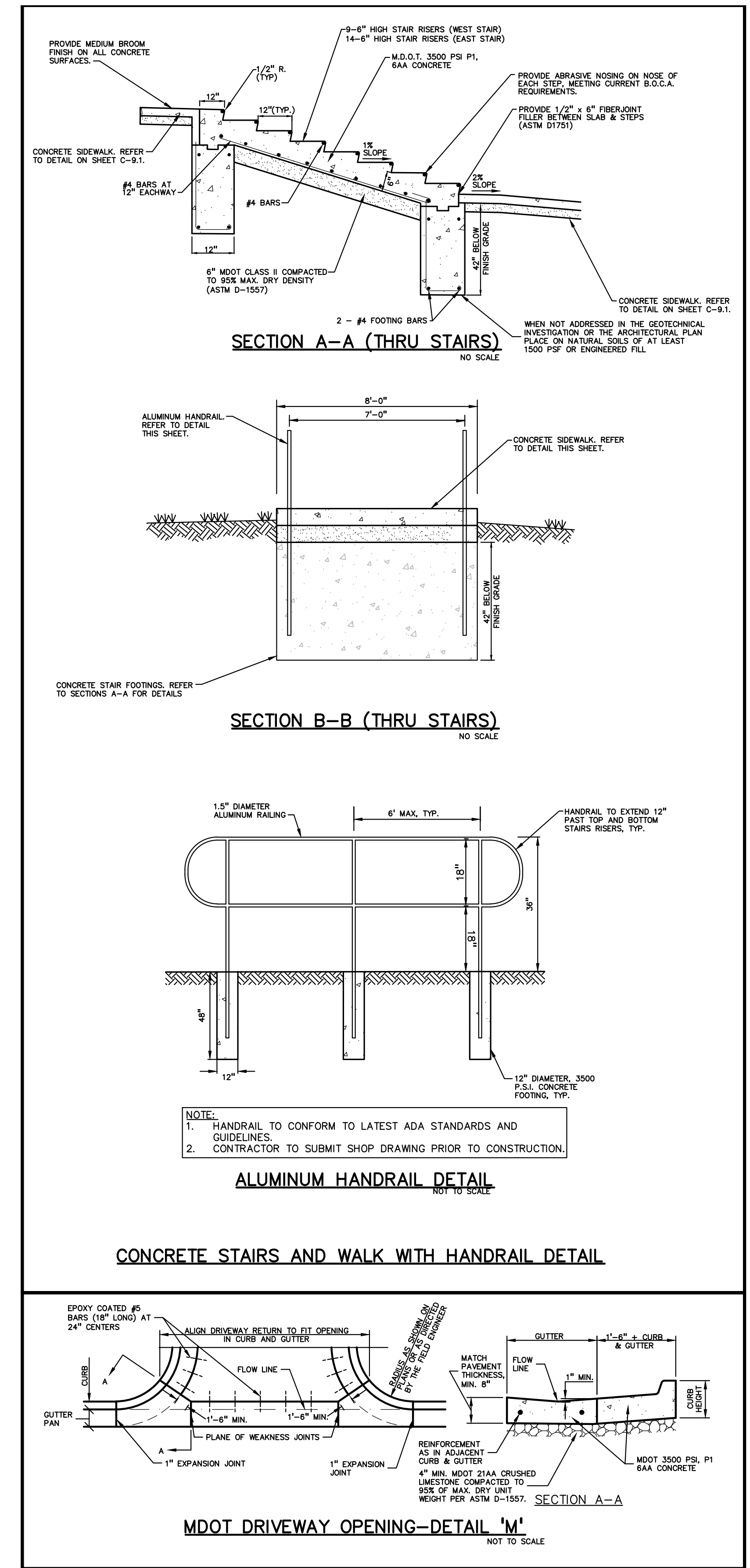
REVISIONS	

ORIGINAL ISSUE DATE:
SEPTEMBER 22, 2020

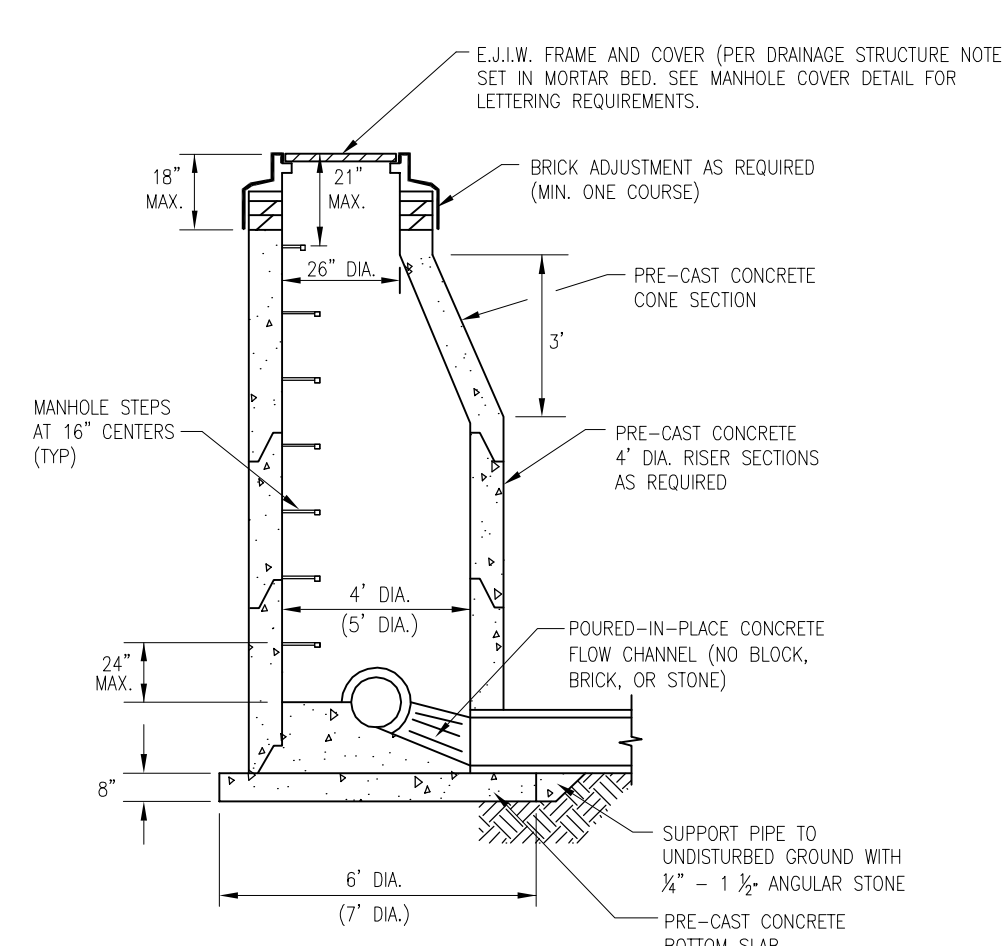
DRAWING TITLE
NOTES AND DETAIL SHEET

PEA JOB NO.	2016-304
P.M.	JBT
DN.	TMK
DES.	TMK
DRAWING NUMBER:	

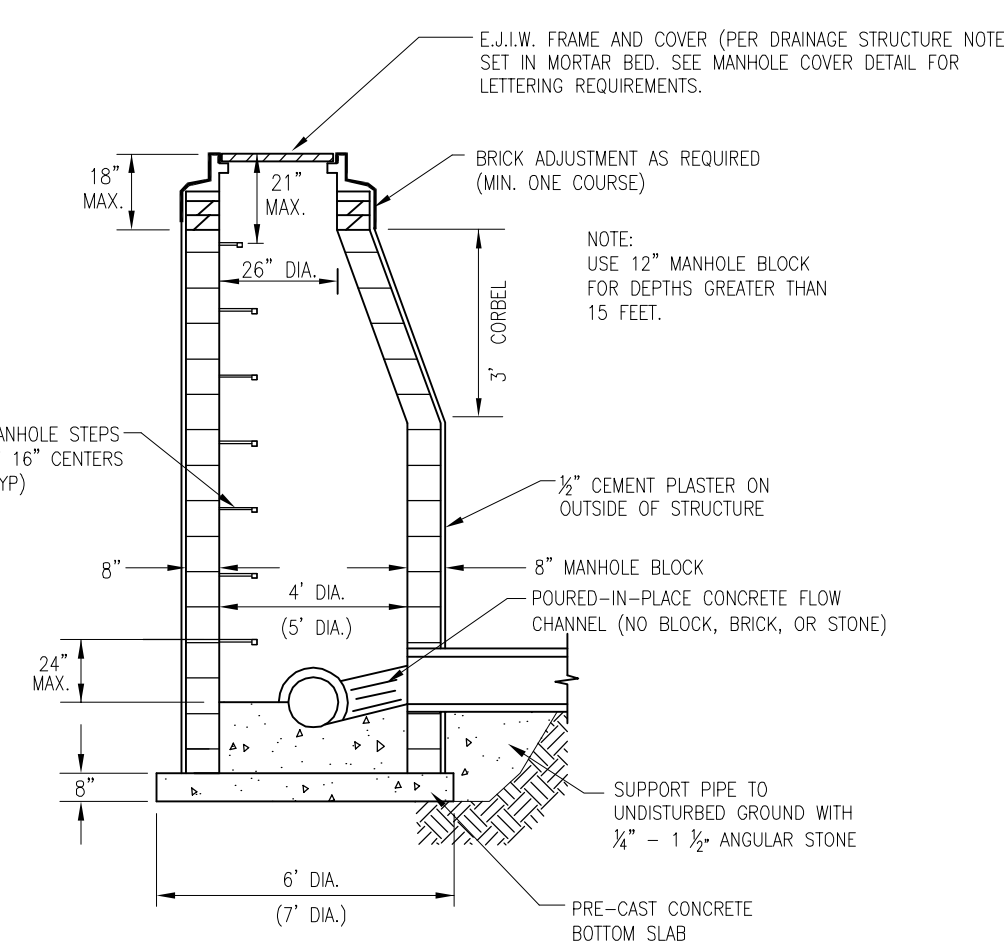
C-9.2



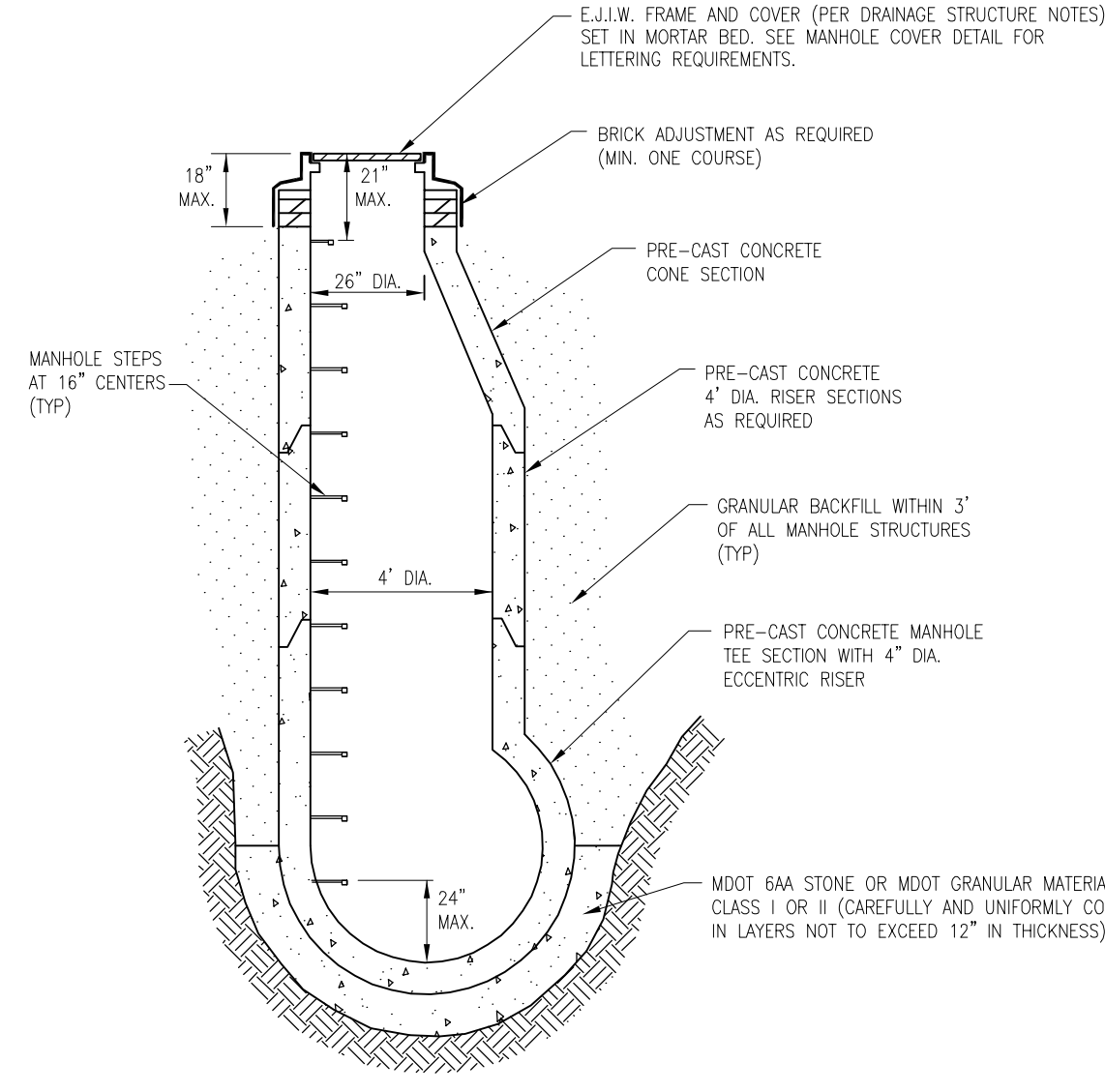
DATE	DEC 2007	BID DATE	DEC 2007	ENGINEER	JLK	PROJ. MGR.	JLK	SECTION	TOWN	RANGE	3E	COUNTY	OAKLAND COUNTY	CITY/TOWNSHIP	CITY OF AUBURN HILLS	SCALE	V. N.T.S.	H. N.T.S.	VERT. DATUM	
REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:



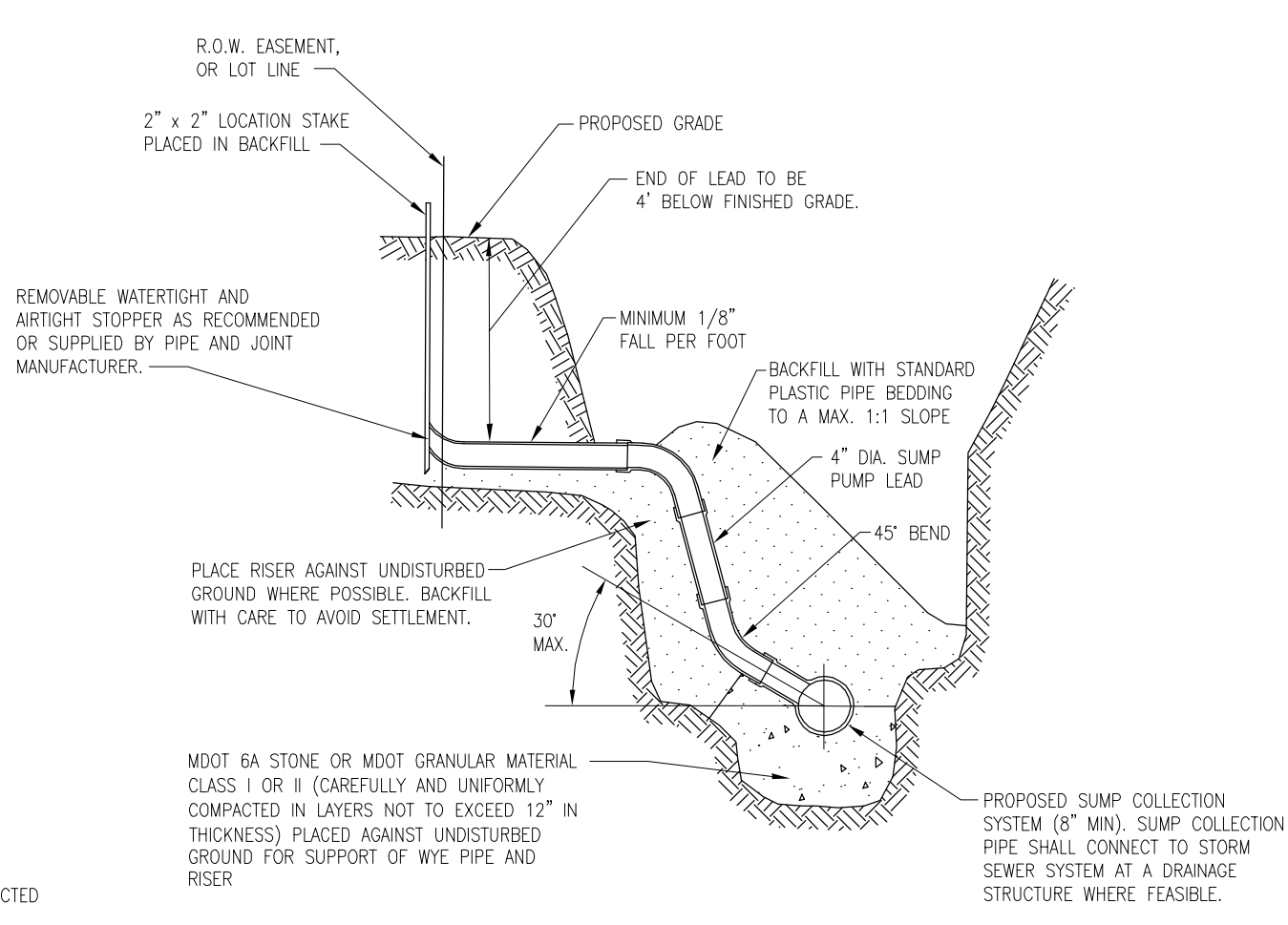
PRE-CAST MANHOLE



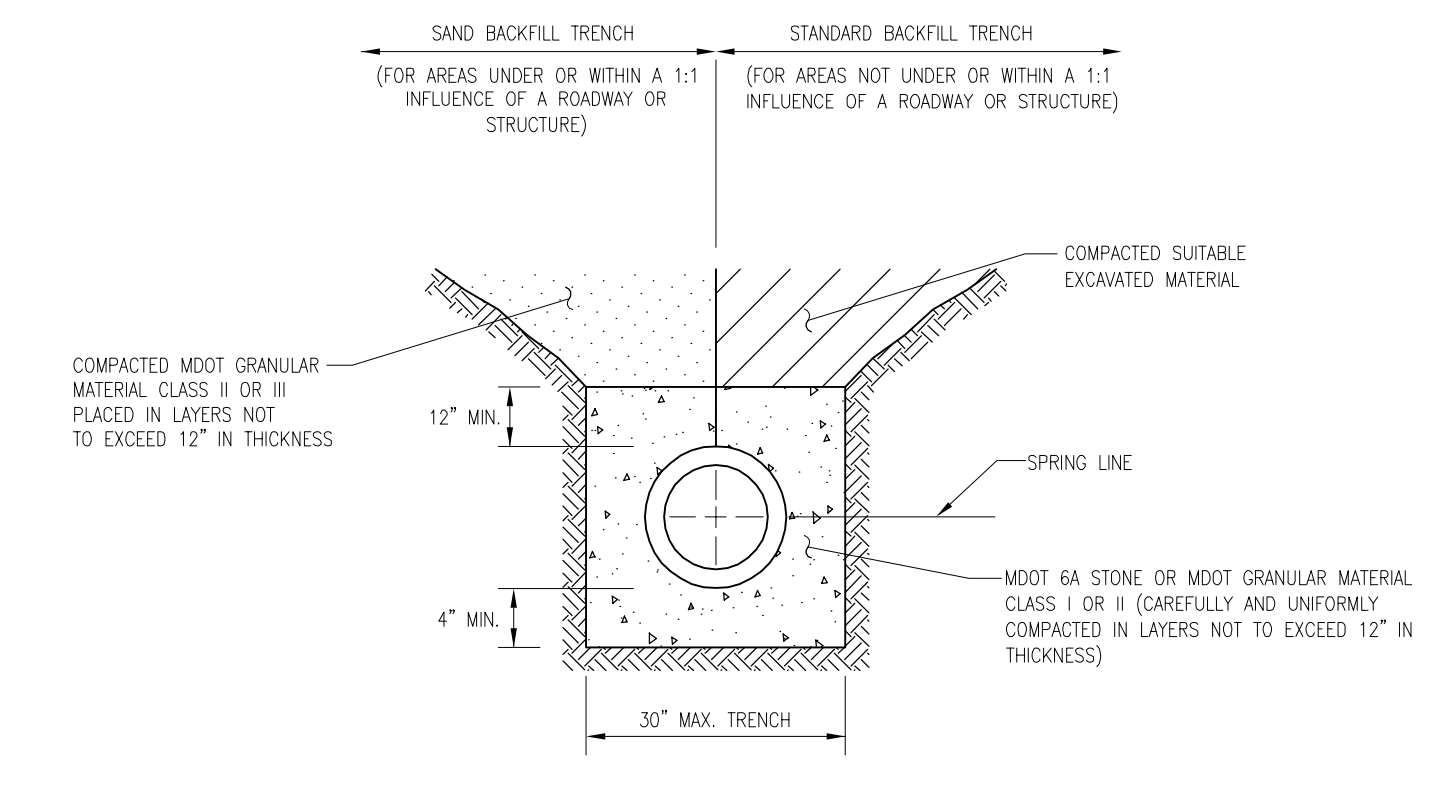
BLOCK MANHOLE



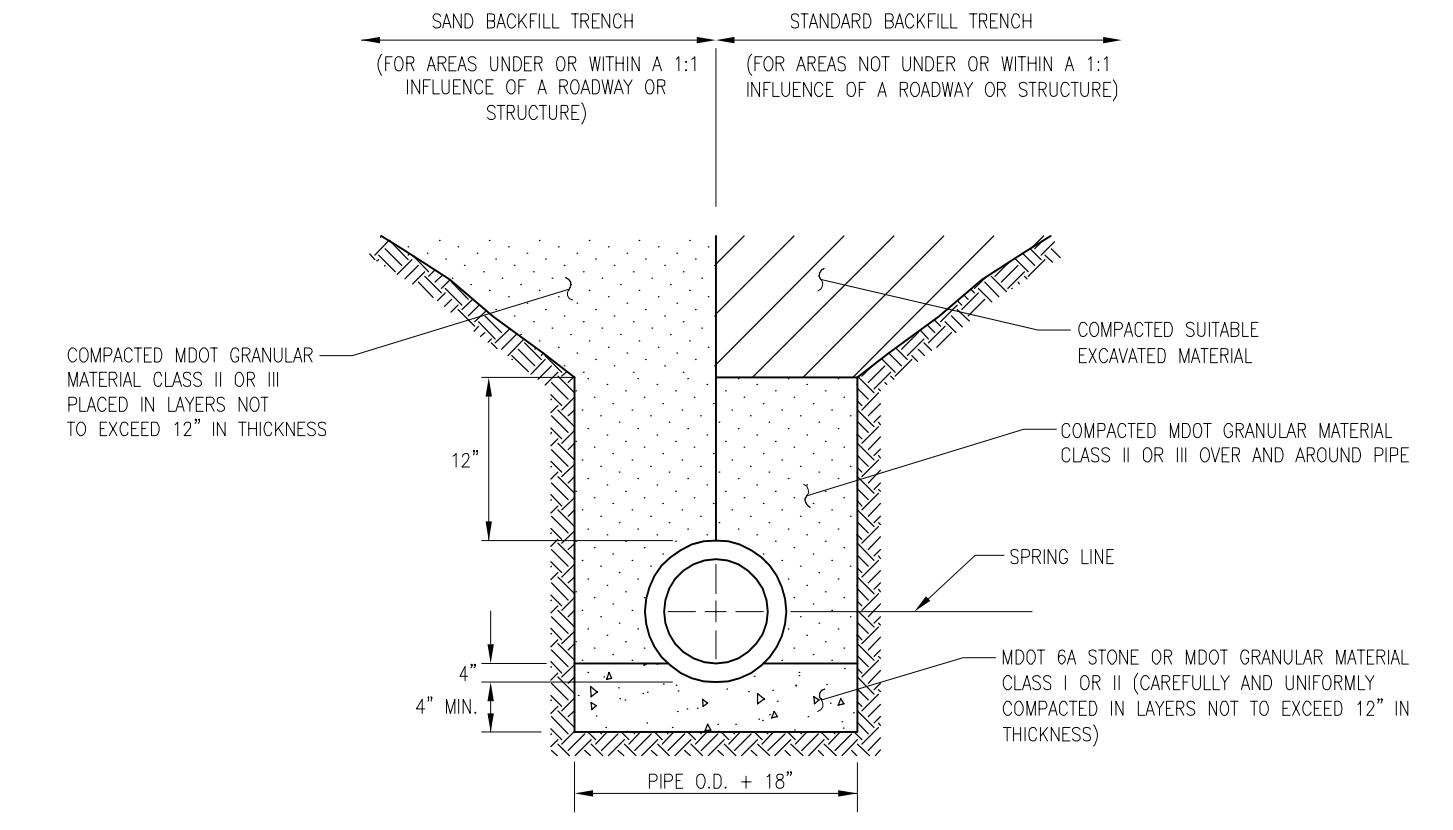
PRE-CAST TEE MANHOLE DETAIL



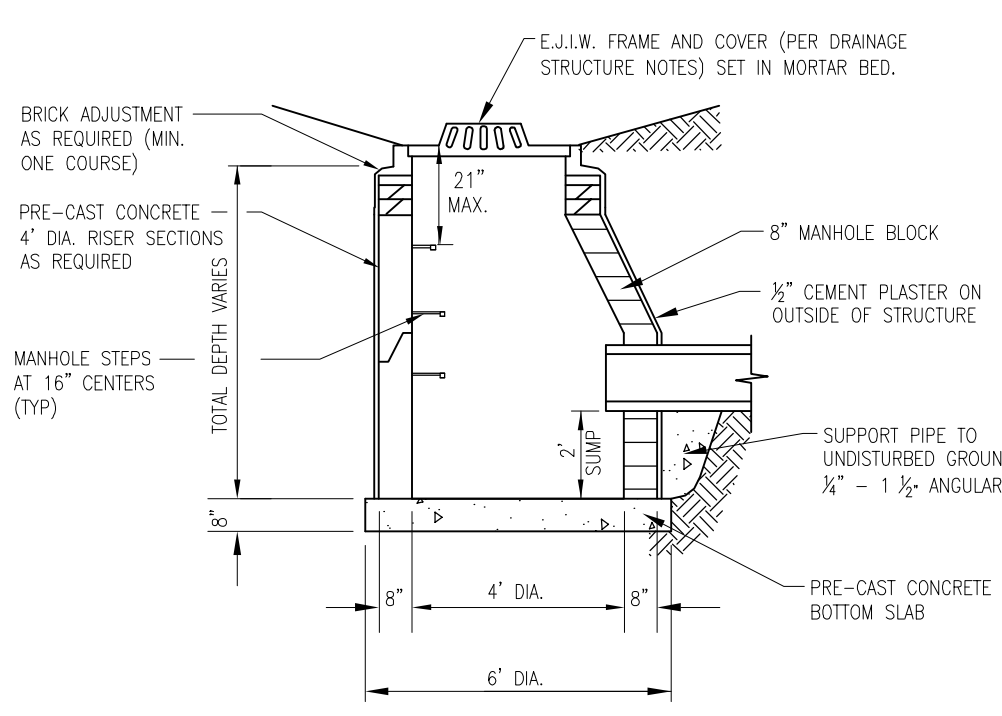
HOUSE LEAD DETAIL FOR 4" DIA. PLASTIC SUMP PUMP LEADS



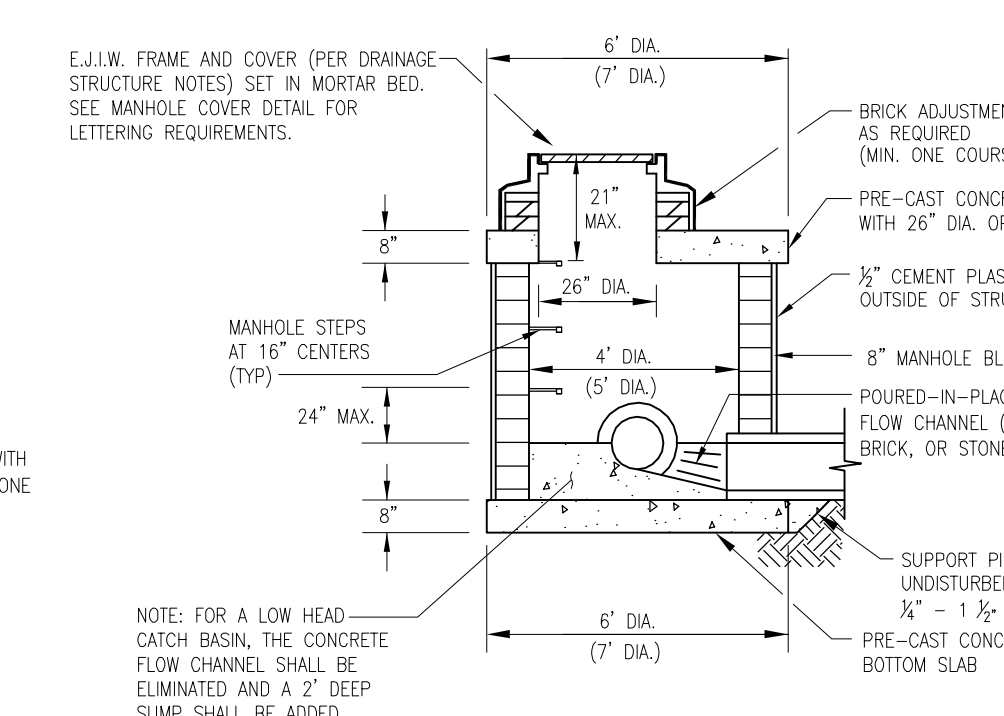
BEDDING AND TRENCH BACKFILL DETAIL FOR 18" DIAMETER AND SMALLER PIPE (PVC AND HDPE PIPE)



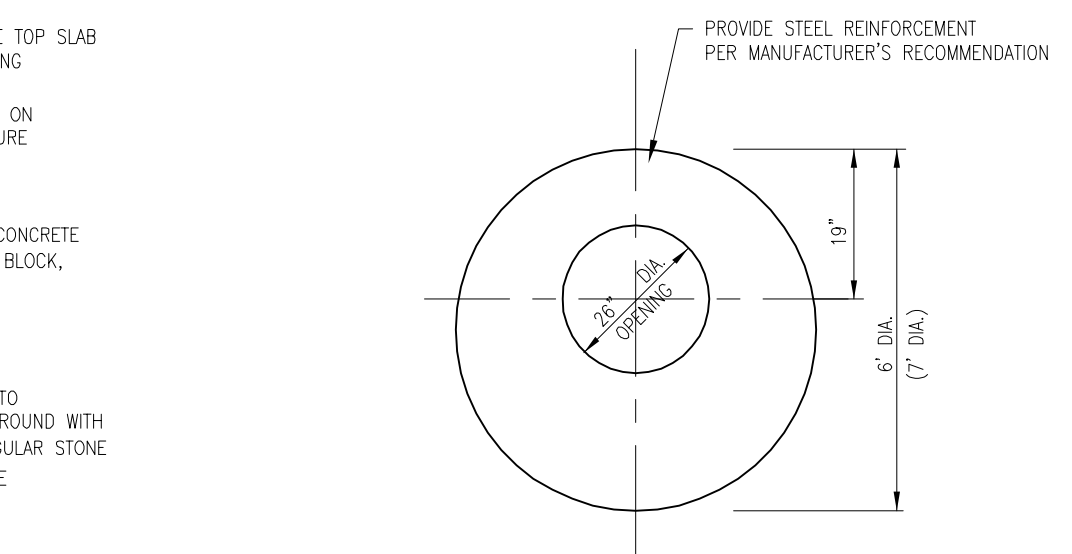
BEDDING AND TRENCH BACKFILL DETAIL FOR 24" DIAMETER AND SMALLER PIPE (CONCRETE AND METAL PIPE)



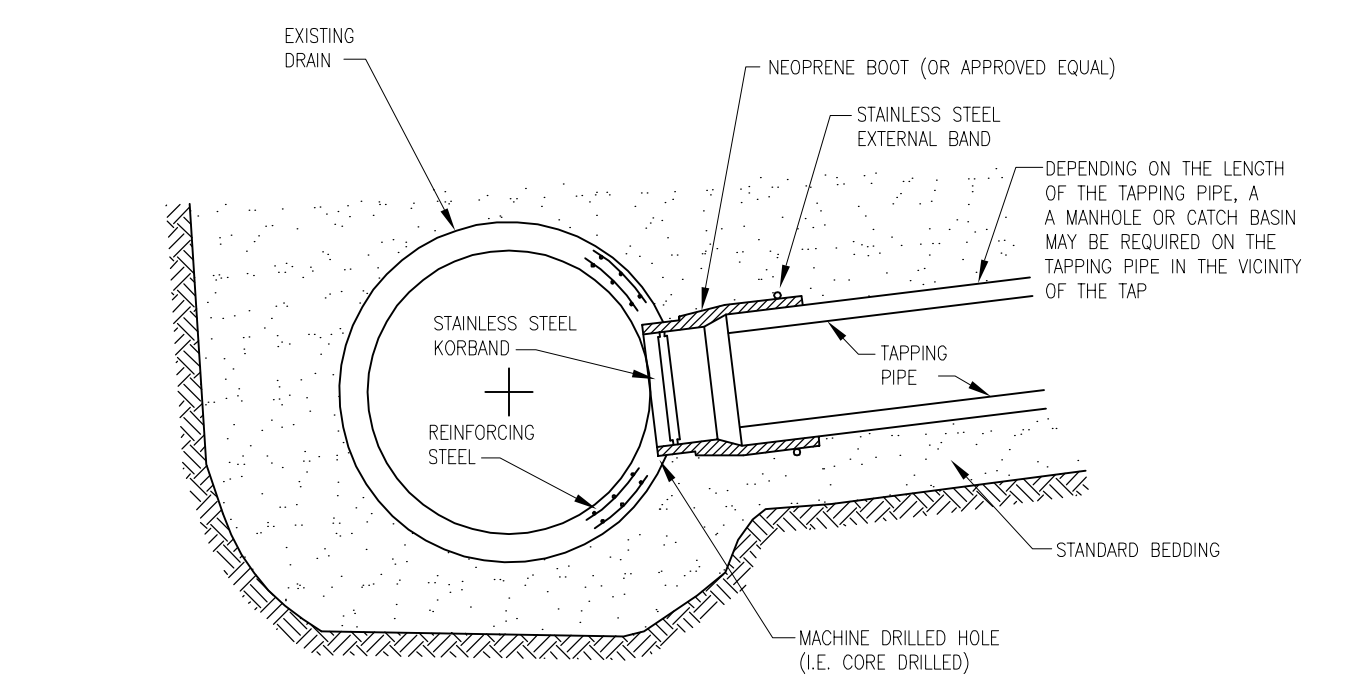
CATCH BASIN DETAIL



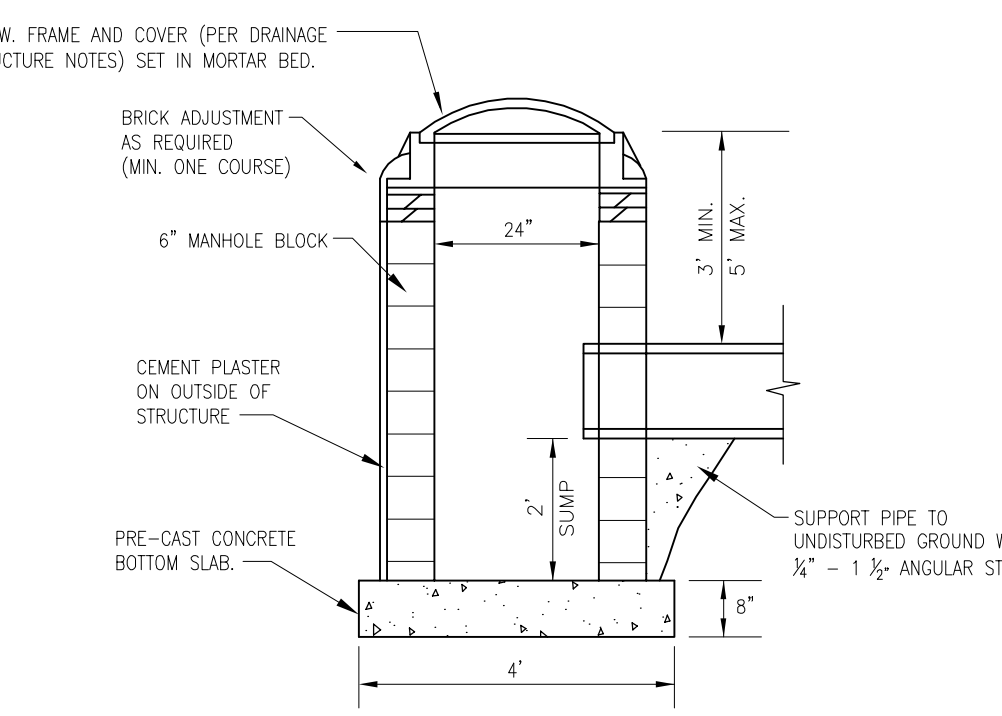
LOW HEAD MANHOLE AND CATCH BASIN DETAIL



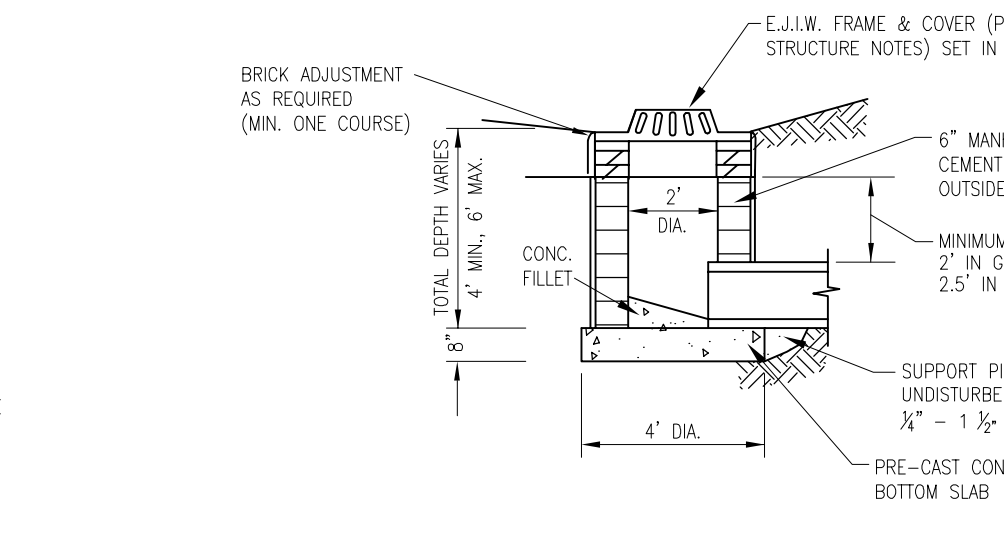
PRE-CAST CONCRETE TOP SLAB DETAIL, 8" THICK



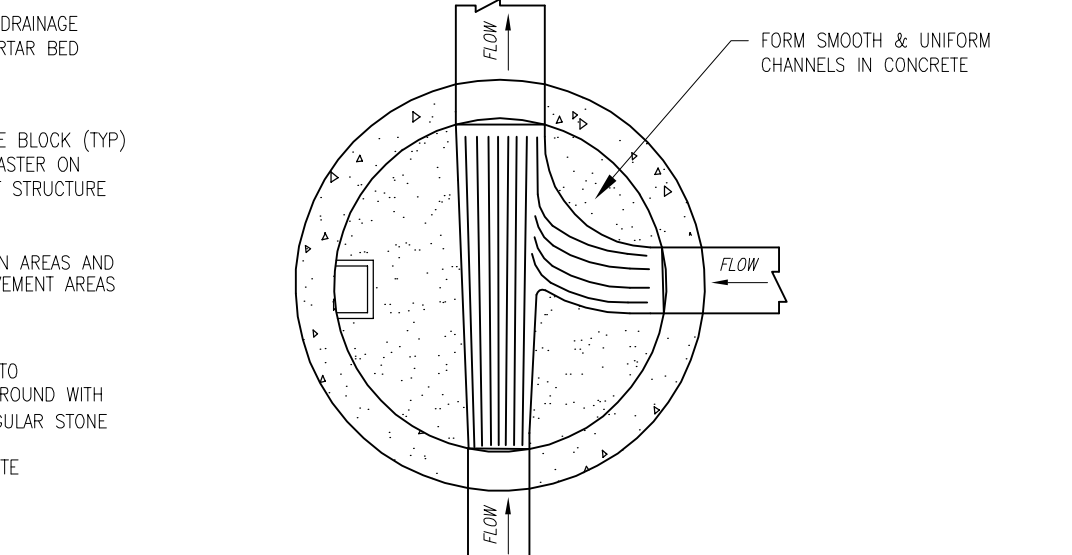
KOR-N-TEE TAP FOR CONCRETE PIPE



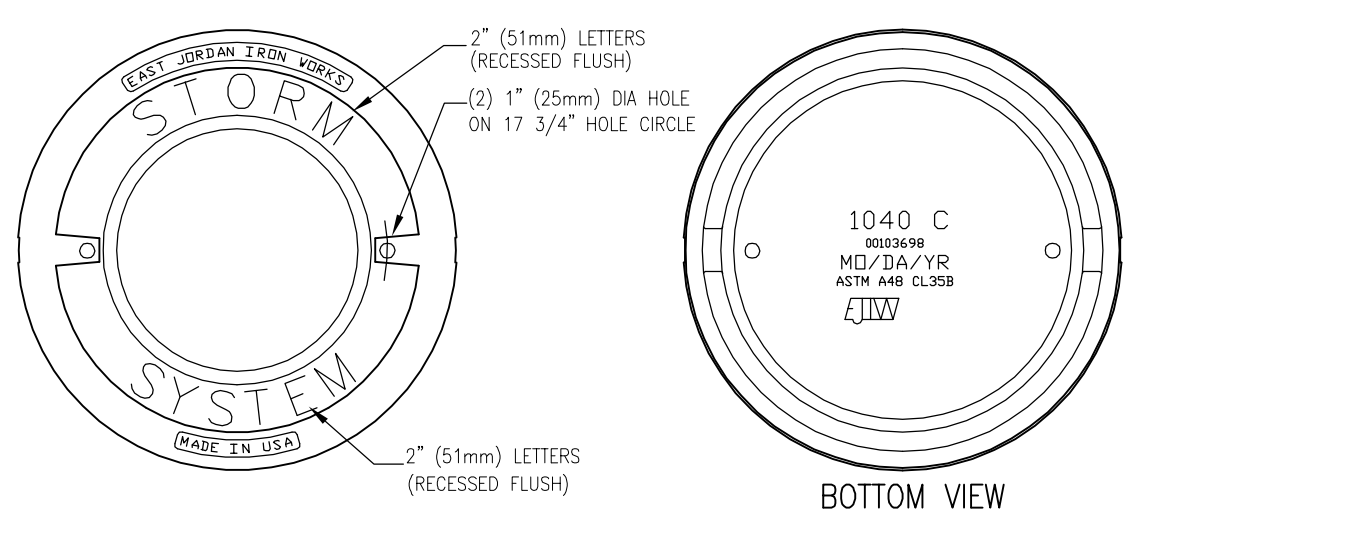
2' DIA. CATCH BASIN DETAIL
 NOT TO SCALE



2' DIA. INLET DETAIL

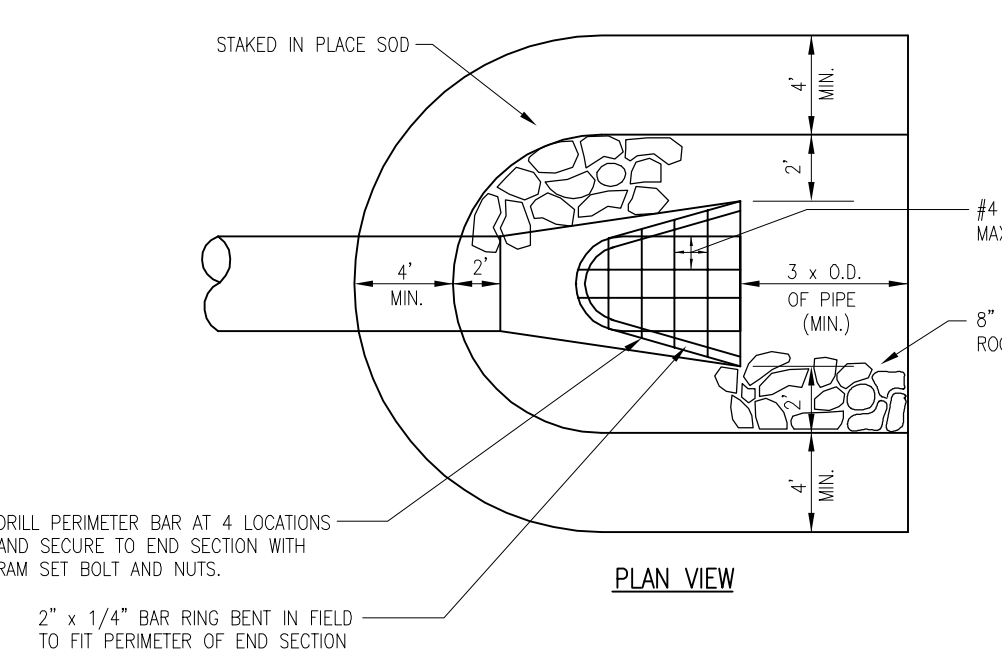


CHANNEL DETAIL

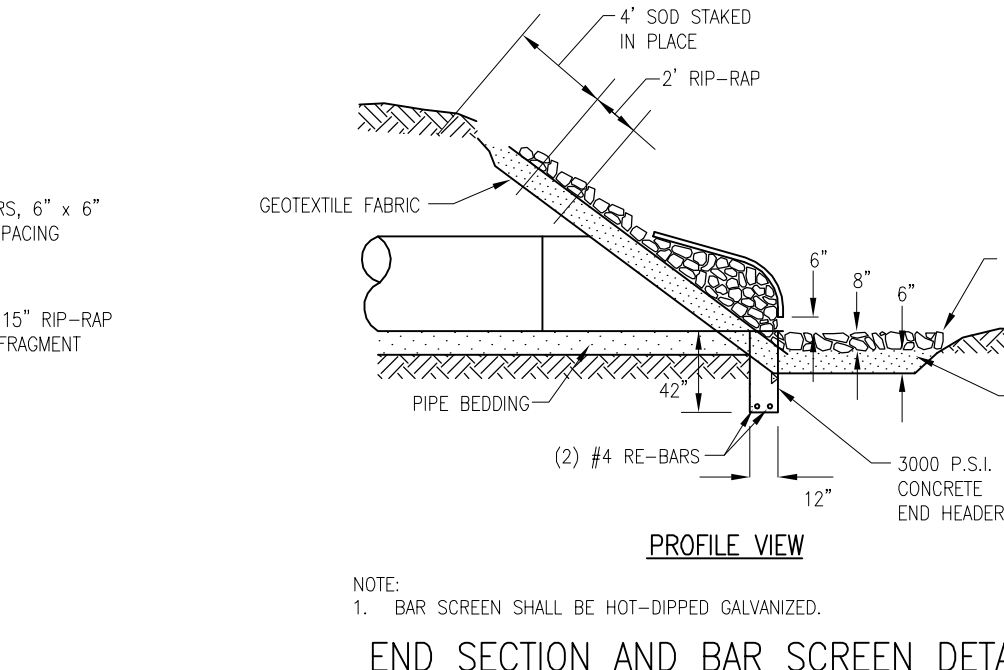


CAST IRON MANHOLE COVER E.J.I.W. 1040

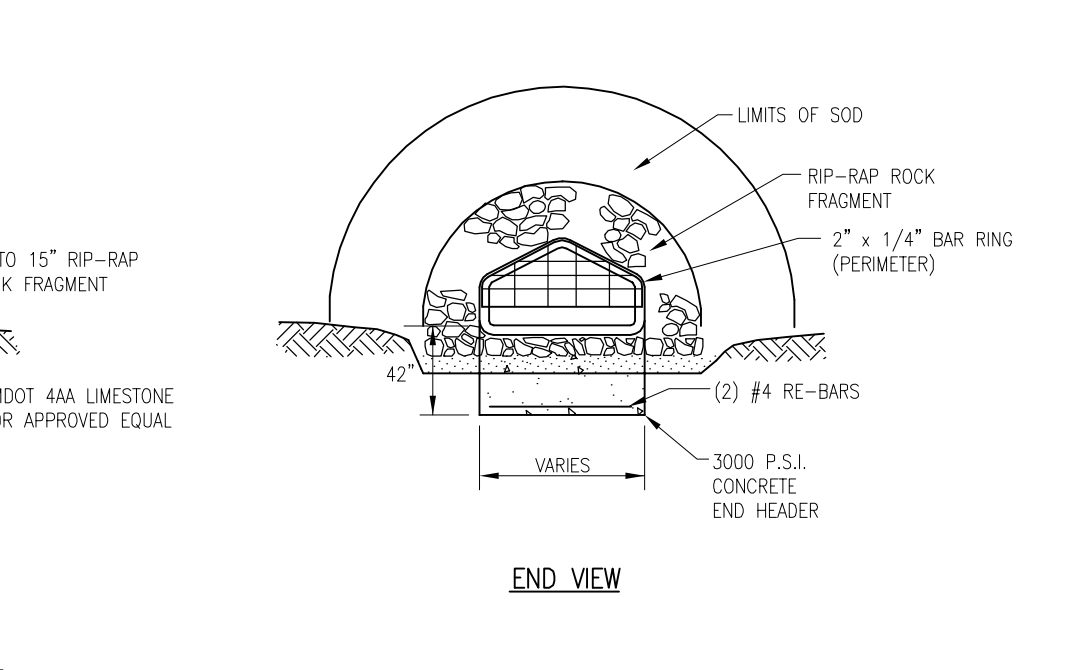
NOTE:
 1. LETTERING SHALL BE USED ONLY FOR PUBLIC STORM SYSTEM. ALL OTHERS SHALL HAVE NO LETTERING.



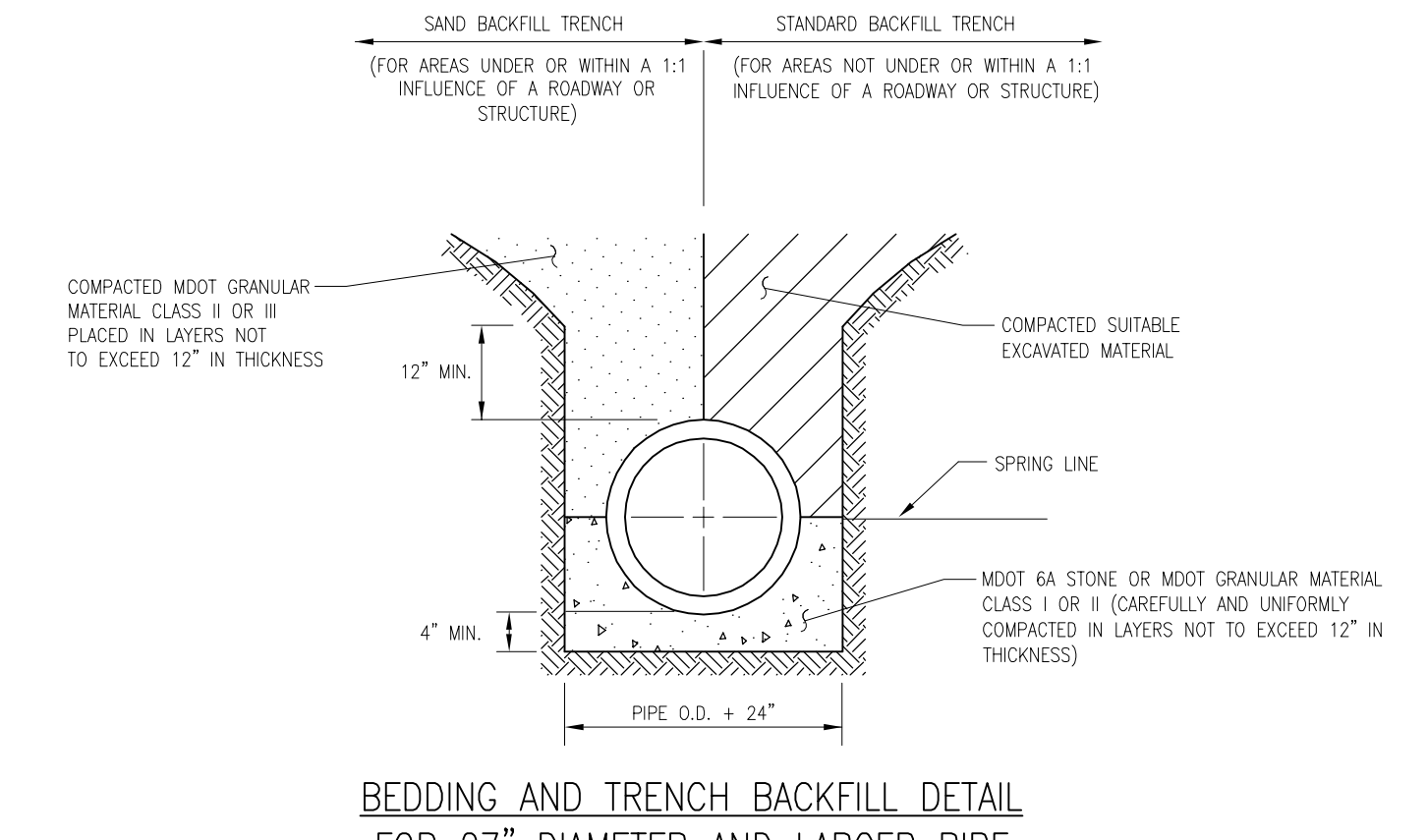
PLAN VIEW



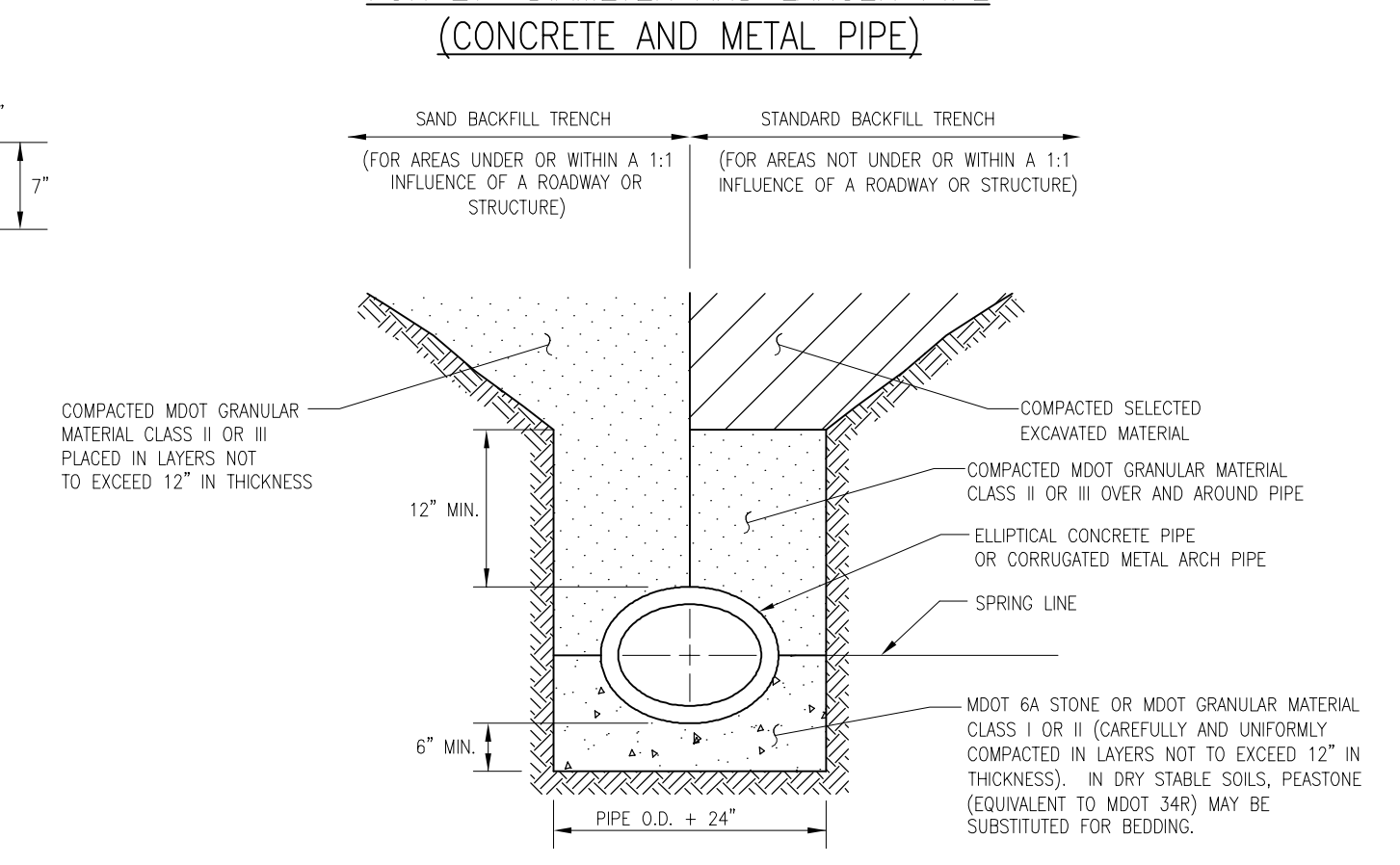
PROFILE VIEW



END VIEW



BEDDING AND TRENCH BACKFILL DETAIL FOR 27" DIAMETER AND LARGER PIPE (CONCRETE AND METAL PIPE)



BEDDING AND TRENCH BACKFILL DETAIL FOR ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL ARCH PIPE

DRAWING PATH: S:\CityStandards\Cadd\Storm Sewer Details\AH-STM DET.dwg Oct 26, 2009 - 10:48am

STORM SEWER CONSTRUCTION NOTES

GENERAL NOTES:

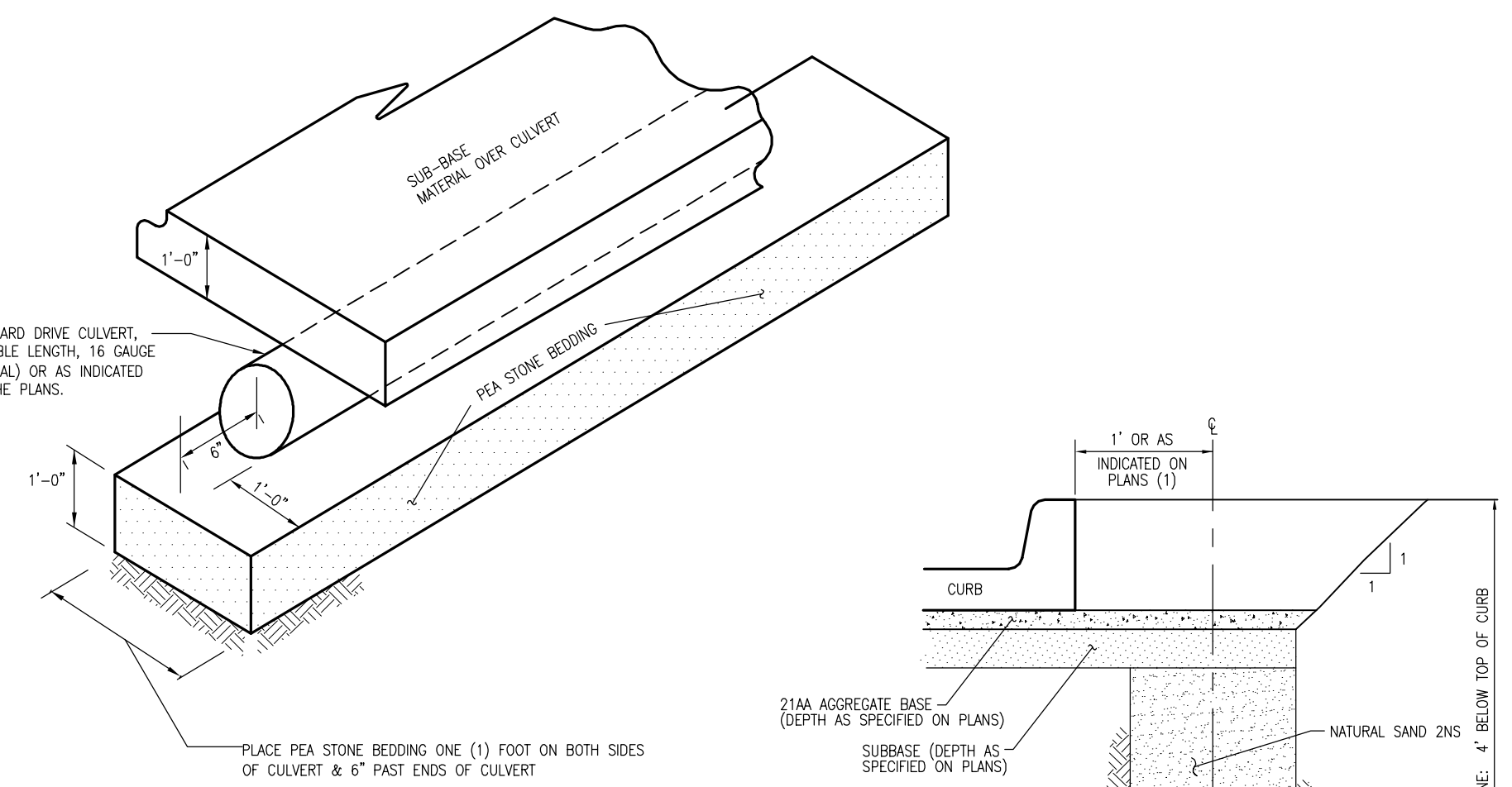
- All materials and workmanship shall be in accordance with the standards and specifications of the City of Auburn Hills.
- No storm sewer is to be installed without the City's inspector present.
- Notify MISS DIG (1-800-482-7171) at least three working days prior to the start of construction.
- Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the city.
- All end sections 18" and larger shall be provided with a galvanized bar screen.
- Hinged bar grates will be required for headwalls per ODCD or MDOT standards, whichever is stricter.
- All vertical and horizontal bars shall be tack-welded to the angle frame.
- The bar grate screen shall be hot-dipped galvanized after fabrication is complete.
- The design engineer shall furnish The City of Auburn Hills with mylar "Record Drawings" of the water main plans as well as an electronic copy of the plans on a computer disk using the most recent release of AutoCAD, upon job completion. Plans shall locate all storm sewer and structures.

STORM SEWER NOTES:

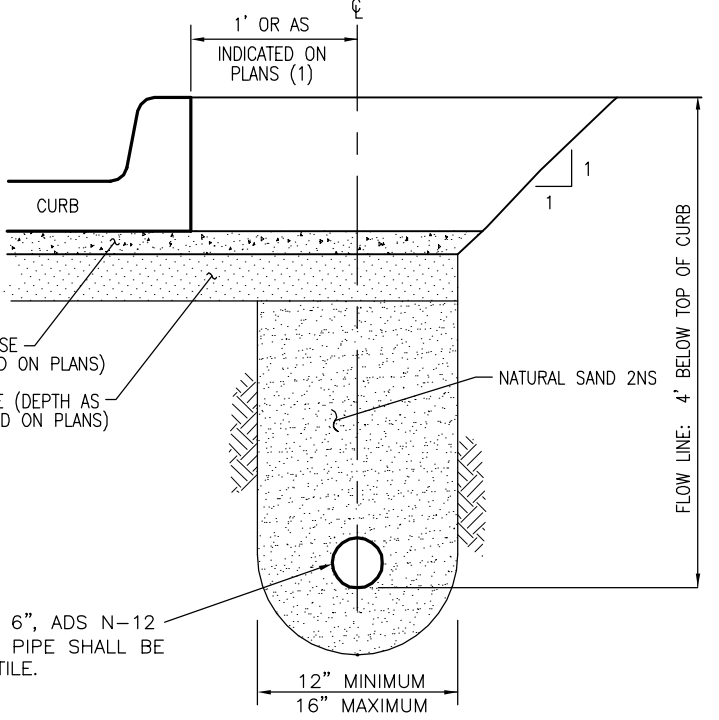
- Type and class of pipe shall be as specified on plans.
 - Concrete Pipe Requirements:
 - The contractor shall provide reinforced concrete pipe as specified on the plans.
 - All round reinforced concrete pipe shall meet the requirements of ASTM C76, Standard Specifications for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe, with modified grooved tongue and rubber gasket meeting the requirements of ASTM C443, Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
 - All elliptical reinforced concrete pipe shall meet the requirements of ASTM C507, Standard Specifications for Reinforced Concrete Elliptical Culvert Storm Drain and Sewer Pipe, with tongue and grooved joints with bituminous (DeWitt #10) joint material meeting the requirements of C443. Elliptical concrete pipe joints shall also be wrapped per ASTM C877, Standard Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections. In addition, elliptical concrete pipe of 42" equivalent size and larger shall require inside concrete pointing.
 - The inside joint of pipe over 27" diameter shall be pointed with mortar upon completion of backfilling operations.
 - Plastic Pipe Requirements:
 - Per City standards, the maximum allowable pipe size for plastic storm sewer is 12" diameter. Larger diameter plastic storm sewer may be approved by the City, depending on site conditions.
 - All plastic storm sewer pipe shall have a smooth interior.
 - PVC pipe shall meet the requirements of ASTM F949, Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings, with push-on type joints meeting the requirements of ASTM D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals, and F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - HDPE pipe shall meet the requirements of AASHTO M294 and ASTM D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials, with push-on type joints meeting the requirements of ASTM D3212 and F477.
- Bedding Requirements:
 - Bedding shall be used as called for on the details.
 - Where unstable ground conditions are encountered, stone bedding shall be used as directed by the Engineer in order to provide a stable foundation for pipe and manholes.
 - All pipes entering or leaving a manhole shall be adequately supported with 1/4"-1 1/2" angular stone fill from undisturbed earth to springline.
 - Bedding shall extend a minimum of 4" below pipe, unless otherwise noted on construction plans. Bedding shall be uniform in grade. However, if the existing native soils meet the requirements for MDT granular material class II (minimum 4" thick), then the storm sewer may be laid directly on the compacted native subgrade soils.
- Backfill Requirements:
 - Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be of a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Backfill shall be ramped into trench and compacted with a small dozer or other approved methods.
 - Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways and parking areas, sand backfill shall be used which shall consist of MDT granular material Class II or II compacted in layers not to exceed 12" in thickness to a density of 95% as determined by AASHTO T99.
 - All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 12" layers and compacted.
 - No frozen material shall be buried more than 4' below the final elevation of the ground.

- DRAINAGE STRUCTURE REQUIREMENTS:**
Contractor shall construct manholes with precast reinforced concrete in lieu of concrete, brick and block manholes in accordance with the following conditions:
- Precast reinforced concrete section with modified groove tongue joint shall conform to ASTM C-478, Standard Specification for Precast Reinforced Concrete Manhole Sections, with rubber gasket.
 - No openings shall be made in precast units which would leave less than 12" of undisturbed precast structure wall between pipes (as measured between outside pipe walls) or would remove more than 40% of the circumference along any horizontal plane.
 - Precast riser placed on the concrete base shall be set in a full bed of mortar. All joints & liftholes shall be pointed up with mortar on the outside and inside.
 - Structures for sewers larger than 18", or those not meeting the opening requirements, may be built of block or brick up to a minimum of 8" above the top of sewer, with precast units being used above this point. Where precast units rest on the block or brick, the groove in the precast unit shall be filled with mortar.
 - Block used for standard catch basins and manholes shall be 8" (for 0'-15' deep) and 12" (for 15'-25' deep). Block used for 2' diameter inlets and catch basins shall be 6".
 - All vertical openings in concrete block structure walls shall be completely filled with mortar. All vertical wall joints shall be cement pointed.
 - Plaster all outside masonry surfaces with 1:2 1/2 masonry cement (type II) 1/2" thick.
 - All manholes and catch basins shall be 4' or 5' in diameter unless otherwise indicated on construction drawings. Larger diameter drainage structures (6", 7", 8", 10", 12" diameter) may be needed for large storm sewer pipe or for situations where the angles between entering pipes require a larger diameter structure in order to maintain at least 1" of structure wall between the pipes. 2' diameter catch basins and inlets may be used where approved by the City Engineer.
 - Manhole steps shall be steel, encased with polypropylene plastic or approved equivalent to M.A. Industries, Inc., PS-1 for brick, or PS-1B for block, East Jordan Iron Works 8503 (or approved equal). Manhole steps shall be placed at 16" centers.
 - Catch basin steps shall be East Jordan Iron Works 8503 plastic coated (or approved equal).
 - Manhole frame and cover shall be East Jordan Iron Works 1040, type "C" solid cover or as per construction drawings.
 - Catch Basin and inlet frame and cover shall be:
 - East Jordan Iron Works 5105, type "M1" cover (with trout logo) with straight face curb and gutter (or approved equal).
 - East Jordan Iron Works 5105, type "M1" cover (with trout logo) with mountable curb and gutter and integral curb and gutter (or approved equal).
 - East Jordan Iron Works 1040, type "O2" cover (beehive) to be used on open ditches and swales, rear yard catch basin (or approved equal). If within 8' of road, type "N" cover (low beehive) shall be used. East Jordan Iron Works 1040, type "A" cover to be used on all 2' cleanouts and structures not located at storm water collection points (or approved equal).
 - Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
 - A minimum of one course of brick must be used and a maximum of 5 courses of brick can be used to adjust a structure. All bricks and blocks used for adjustment shall be concrete.
 - A proper channel shall be constructed within the existing manhole or other structure at which the connection is to be made to direct the flow to the existing outlet in a manner that will tend to create the least amount of turbulence. The channel shall be constructed to the same size as the inside diameter of the existing pipes, and shall be built to height of 1/3 the existing pipe diameter with a minimum of 2% slope on the benches.
 - Concrete base for manhole, catch basin, and inlet shall be MDT grade 30P (Min.), 8" thick, 3000 psi.
 - When tapping into an existing structure a brick collar shall be placed 12" thick around the pipe and extended 12" beyond the opening. If pre-cast section is tapped, bend mesh and use as reinforcement with brick collar.

- SUMP PUMP LEAD REQUIREMENTS:**
- All sump pump leads connected to a drain shall be pre-manufactured.
 - Sump pump leads shall be (1) SDR 35, non-perforated, solid wall PVC, (2) ARMO Truss Pipe, or (3) approved equal, with premium joints.
 - Sump collection system pipes shall be connected at drainage structures. However, if approved by the engineer, taps to 12" storm sewer may be made with a Fernco EZ Tap or approved equal. Taps to other size storm sewer may be made with a Romac saddle, KOR-N-TEE lateral connector for concrete pipe, or approved equal.
 - Ends of all 4" sump pump leads shall be temporarily capped and their location staked, witnessed and recorded.
 - All sump pump leads are to be taken to the property line, easement line or as indicated on the plan.
 - Sump pump cleanouts shall be a minimum inside diameter of 24" and be constructed at changes of alignment ends of sump pump mains or as indicated on the plan.

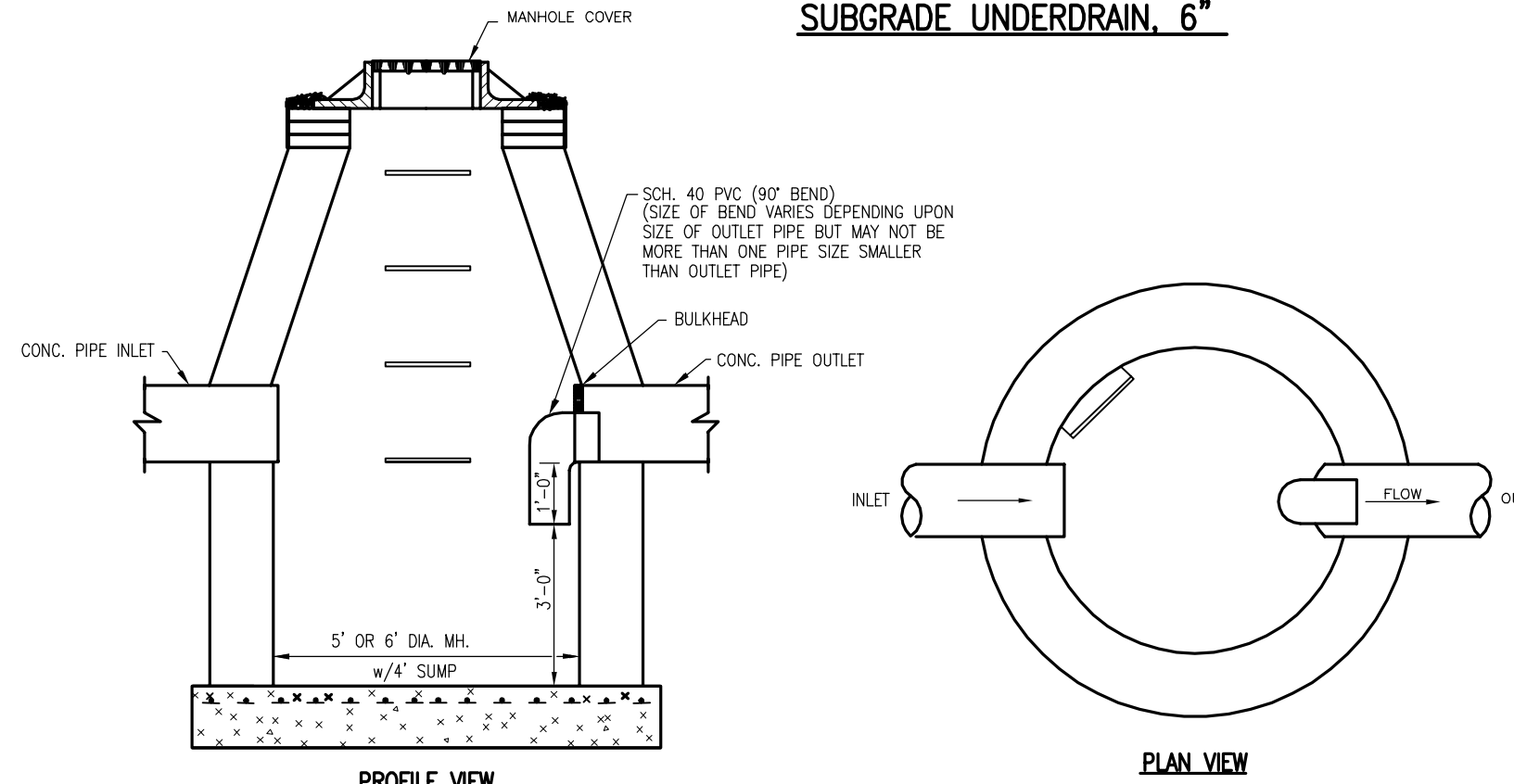


DRIVE CULVERT BEDDING DETAIL



SUBGRADE UNDERDRAIN, 6"

- NOTES:**
- LOCATION MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
 - ALL UNDERDRAIN SHALL BE APPROVED PLASTIC PIPE PER MDT SECTION 909.07. METAL PIPE SHALL NOT BE USED.
 - ALL UNDERDRAIN SHALL OUTLET TO DRAINAGE STRUCTURE.
 - UNDERDRAIN CONNECTIONS (AT LOW POINTS) SHALL BE MADE AS CLOSE TO THE STRUCTURE INVERT AS PRACTICAL WITH A SPIRAL WRAP OF THE REQUIRED FLOW LINE DEPTH TO STRUCTURE INVERT.



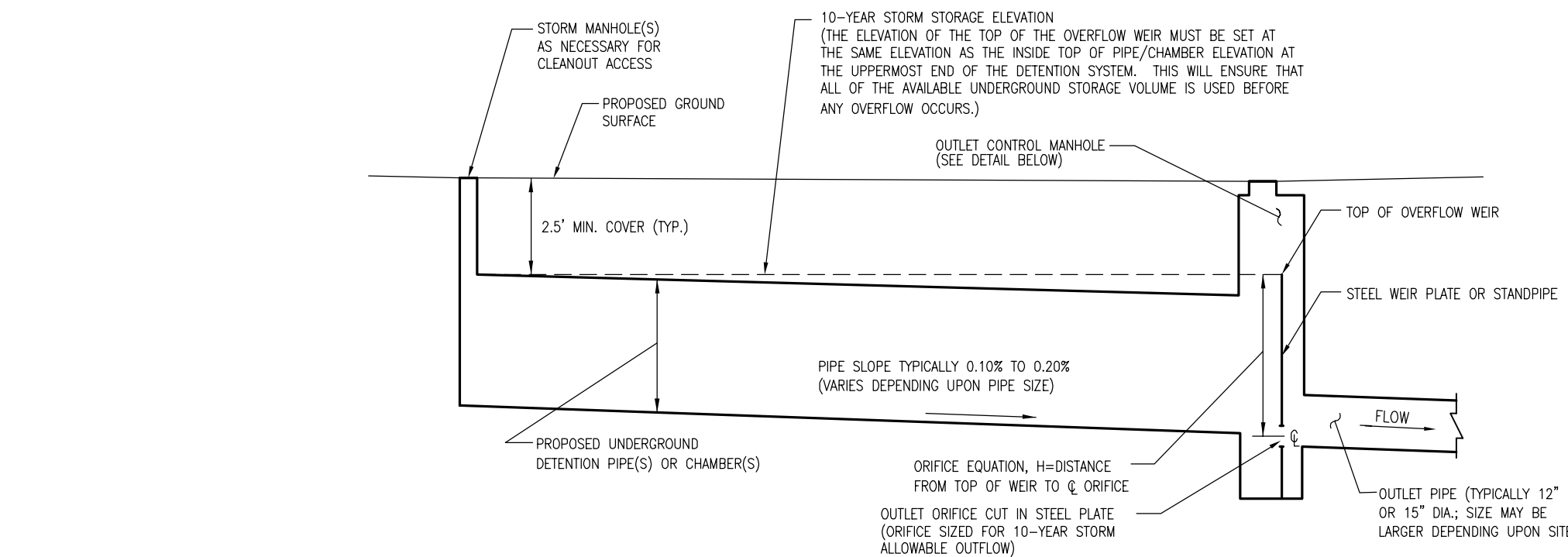
OIL/GAS SEPARATOR PLACEMENT DETAIL FOR 18" DIAMETER AND SMALLER OUTLET PIPE

(FOR OUTLET PIPES LARGER THAN 18" IN DIAMETER AN ALTERNATE DESIGN MUST BE APPROVED BY THE CITY ENGINEER)

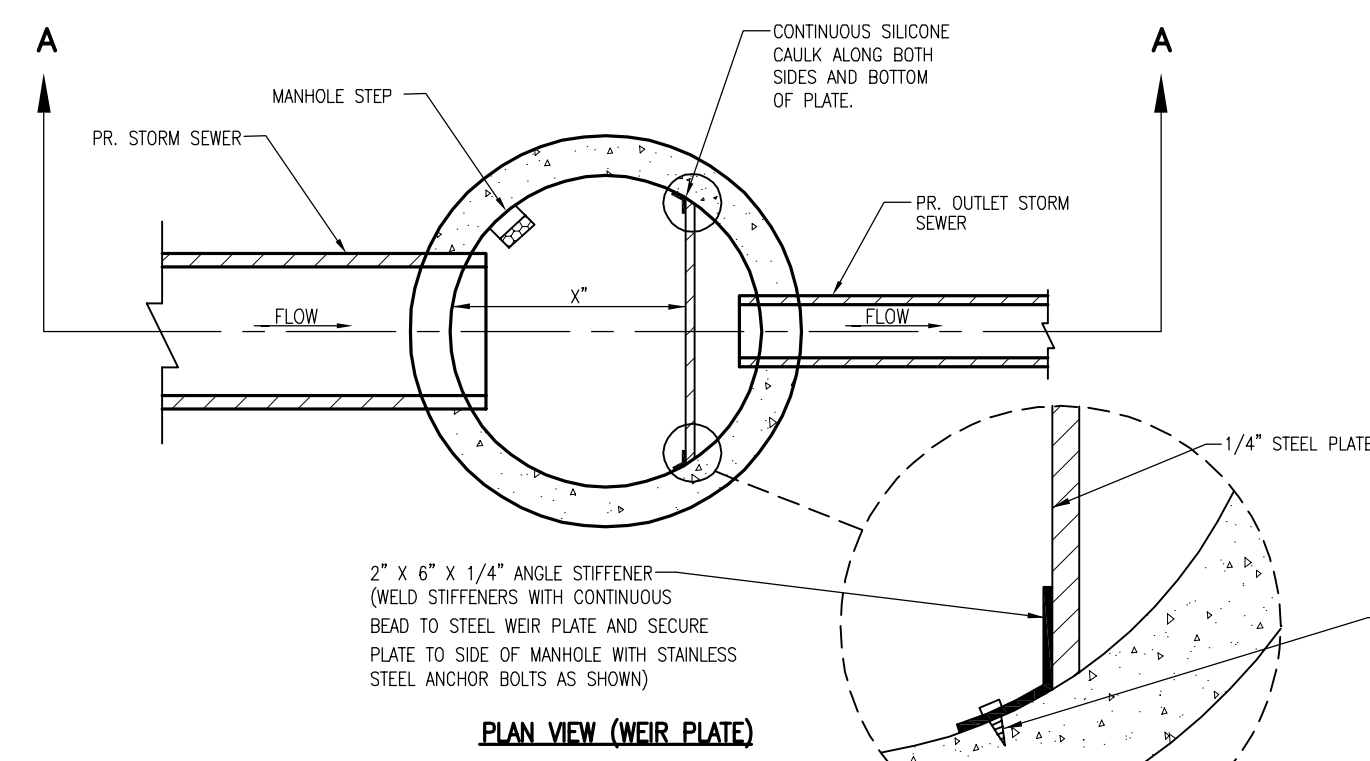
RESTORATION REQUIREMENTS:

- All disturbed areas within the right-of-way shall be restored as follows, unless otherwise noted on construction drawings: Finish Grade. Place 3" thickness of "quality" topsoil acceptable to the engineer. Apply sod or seed and fertilizer as follows.

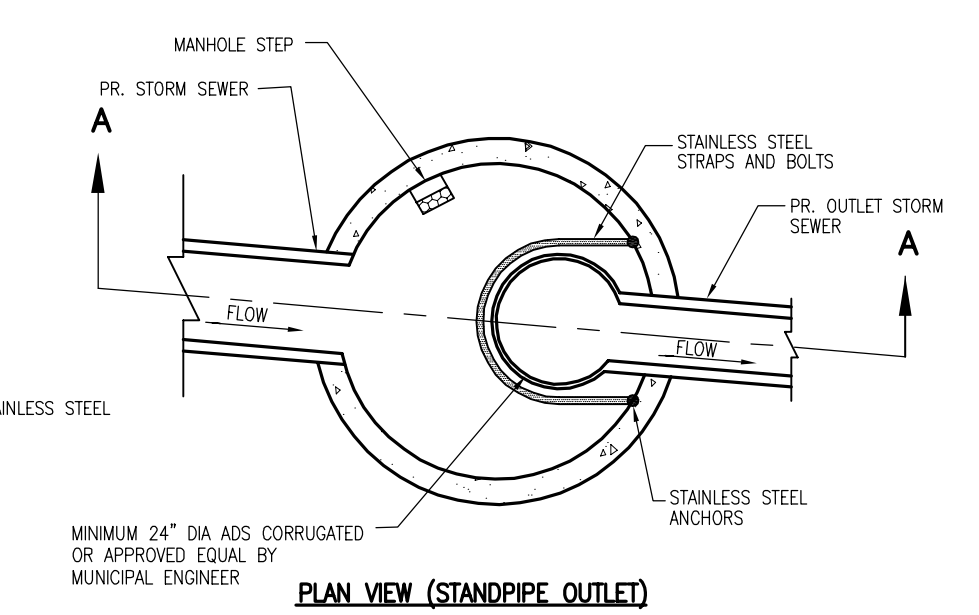
LOCATION	SODDING/ SEEDING REQUIREMENTS	FERTILIZER REQUIREMENT
Slopes & ditch banks, etc.	MDOT "Roadside" mix (20% Perennial Rye, 10% Kentucky Blue, 40% Red Fescue, 30% Hard Fescue) applied at 220 lbs/acre	240 lbs/acre of chemical fertilizer nutrients in equal proportions of Nitrogen, Phosphoric Acid and Potash. (Must be a slow-release fertilizer)
Other areas	MDOT "Class A" mix (20% Perennial Rye, 30% Kentucky Blue, 50% Red Fescue) applied at 220 lbs/acre	240 lbs/acre of chemical fertilizer nutrients in equal proportions of Nitrogen, Phosphoric Acid and Potash. (Must be a slow-release fertilizer)
Ditch bottoms, slopes exceeding 3:1, and at structures	3" Topsoil with Class A Sod	



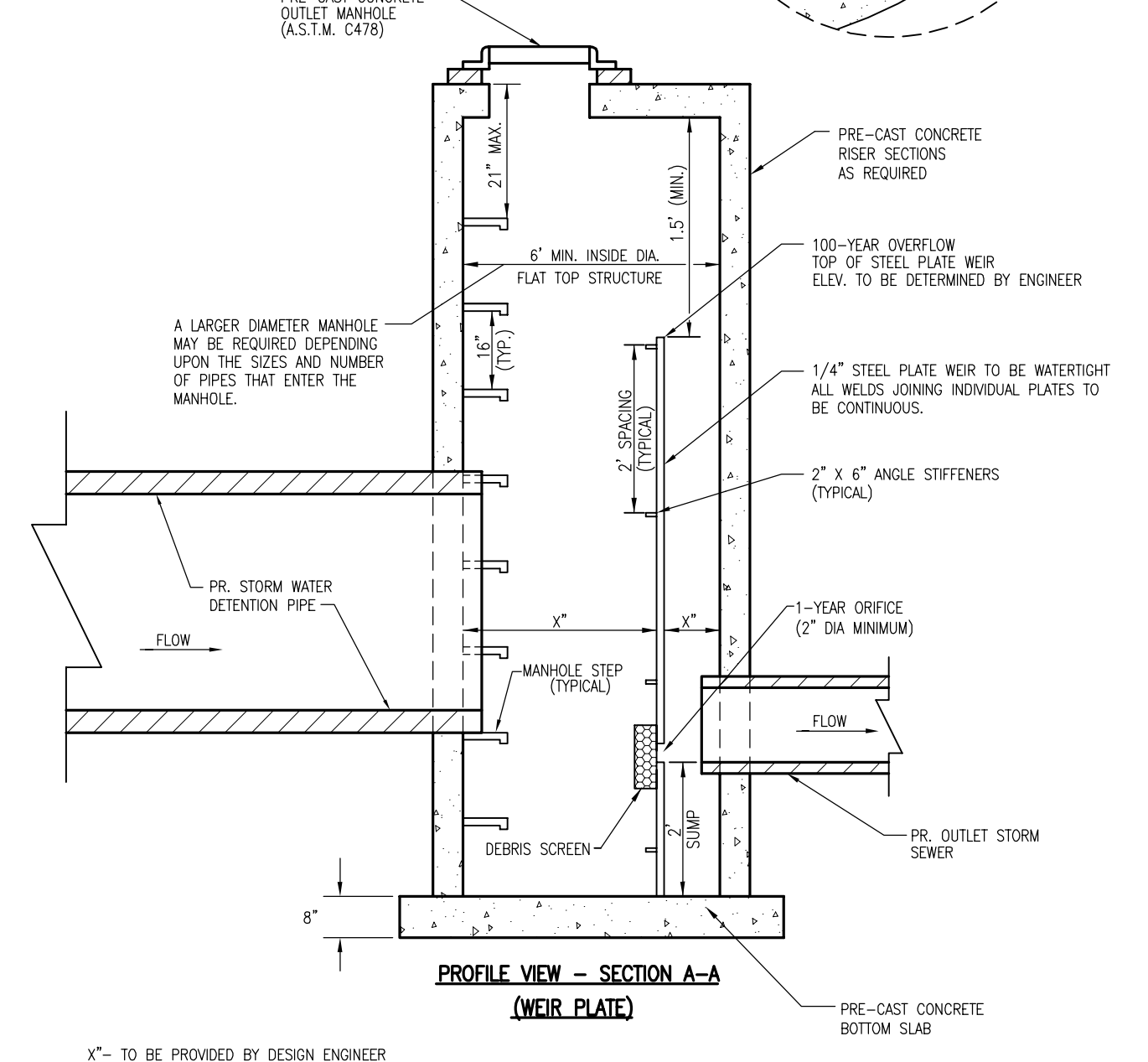
DETENTION SYSTEM PROFILE



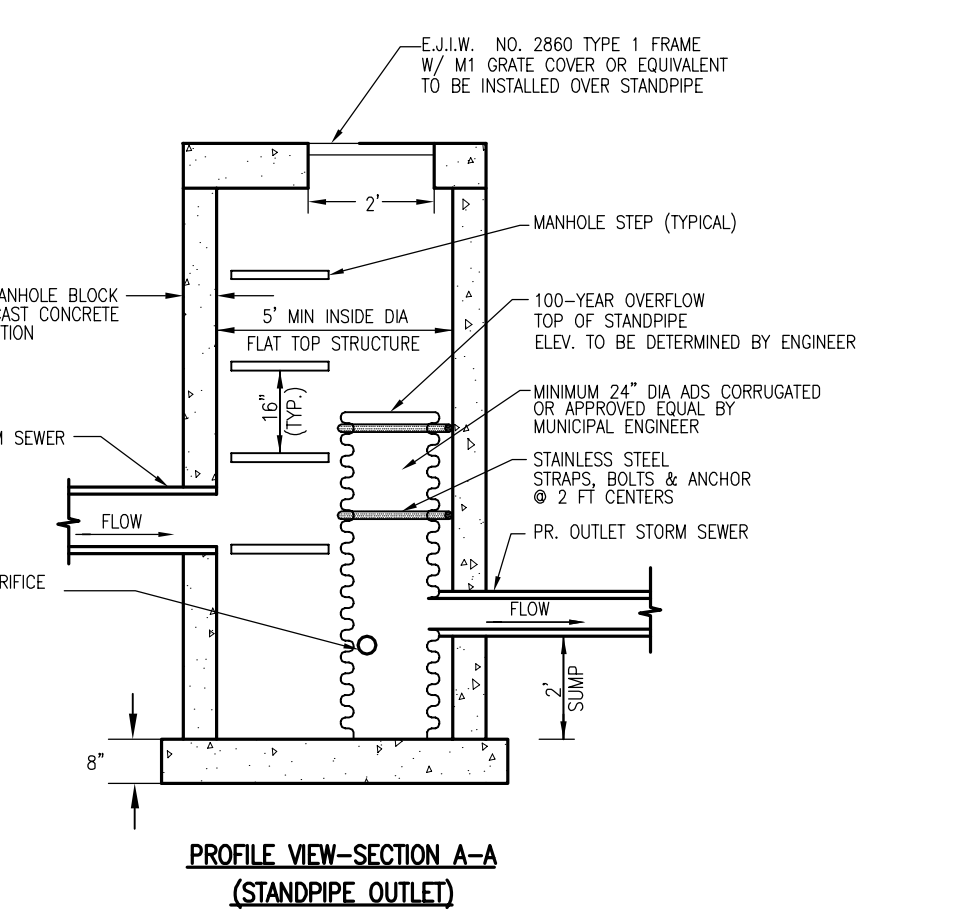
PLAN VIEW (WEIR PLATE)



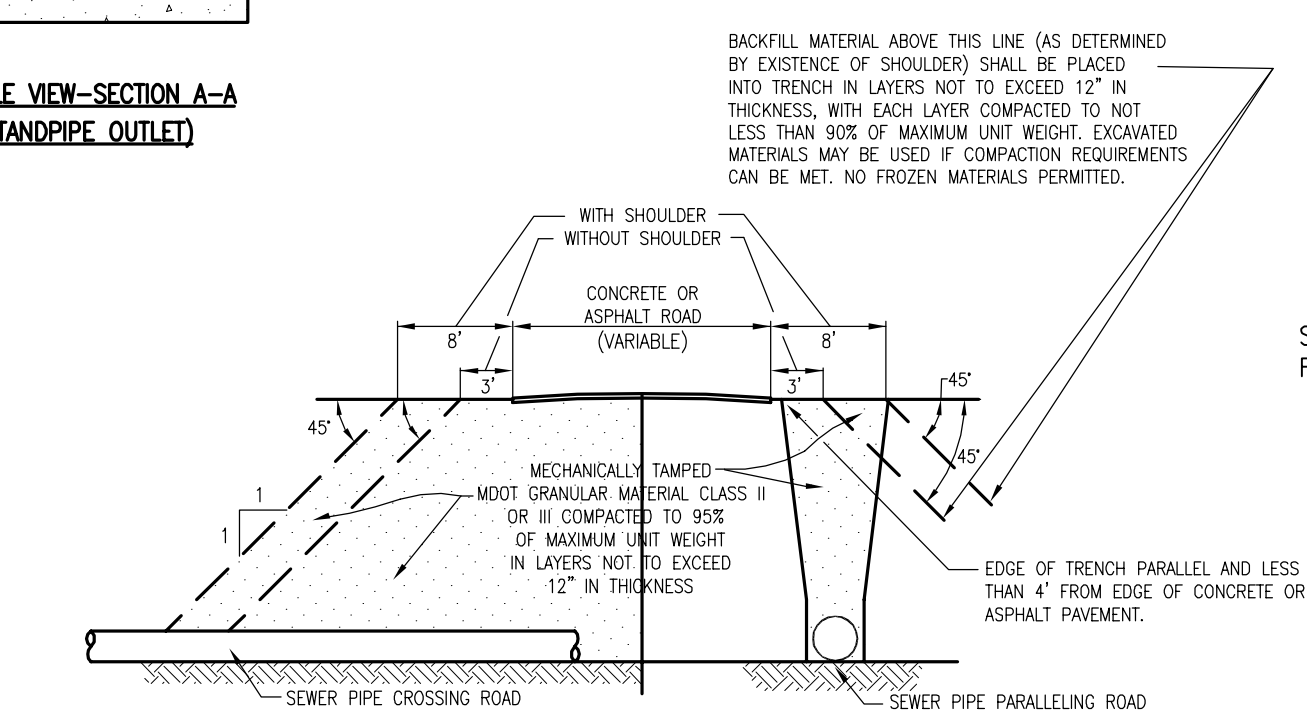
PLAN VIEW (STANDPIPE OUTLET)



TYPICAL UNDERGROUND DETENTION AND OUTLET MANHOLE DETAILS



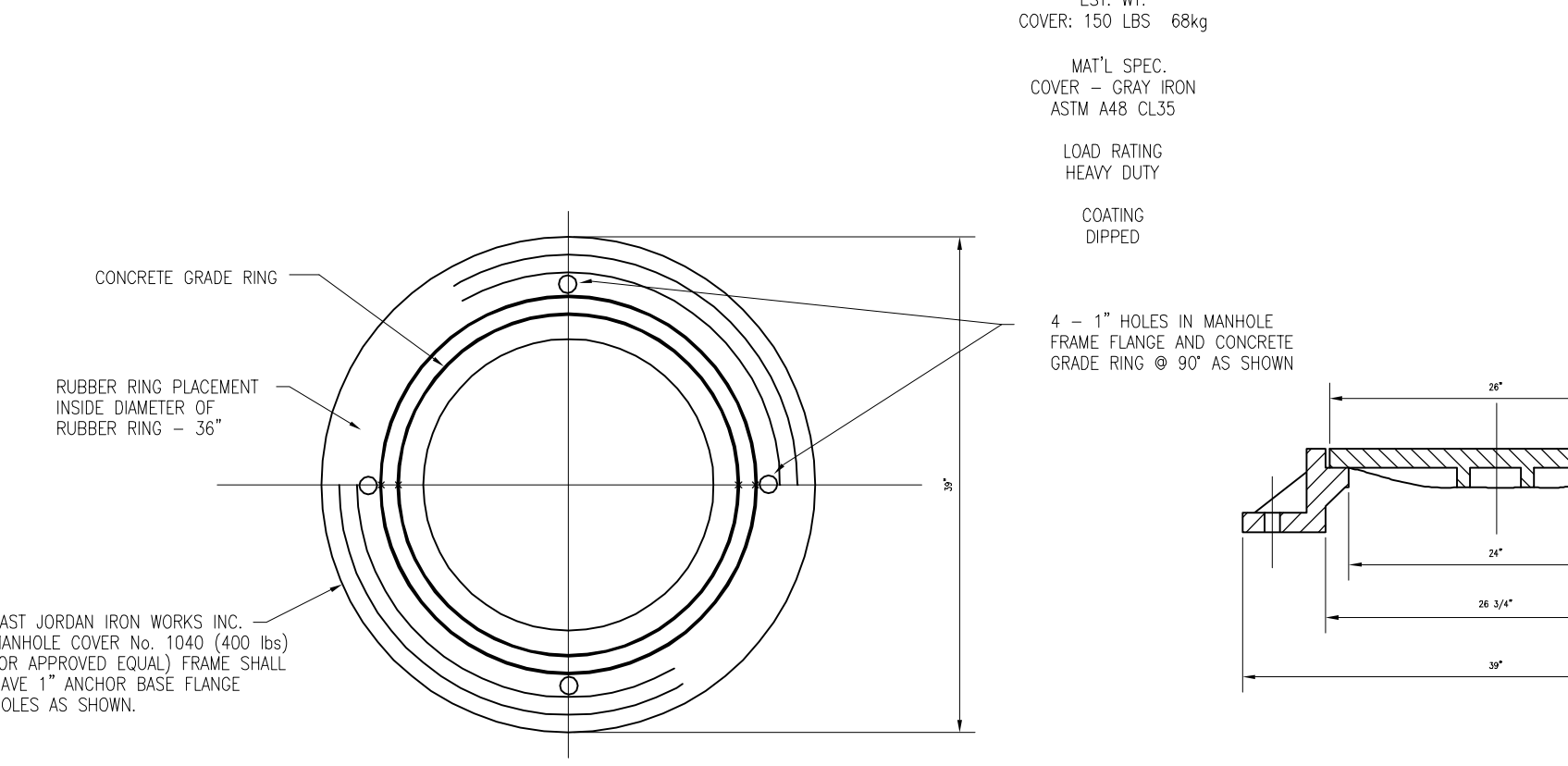
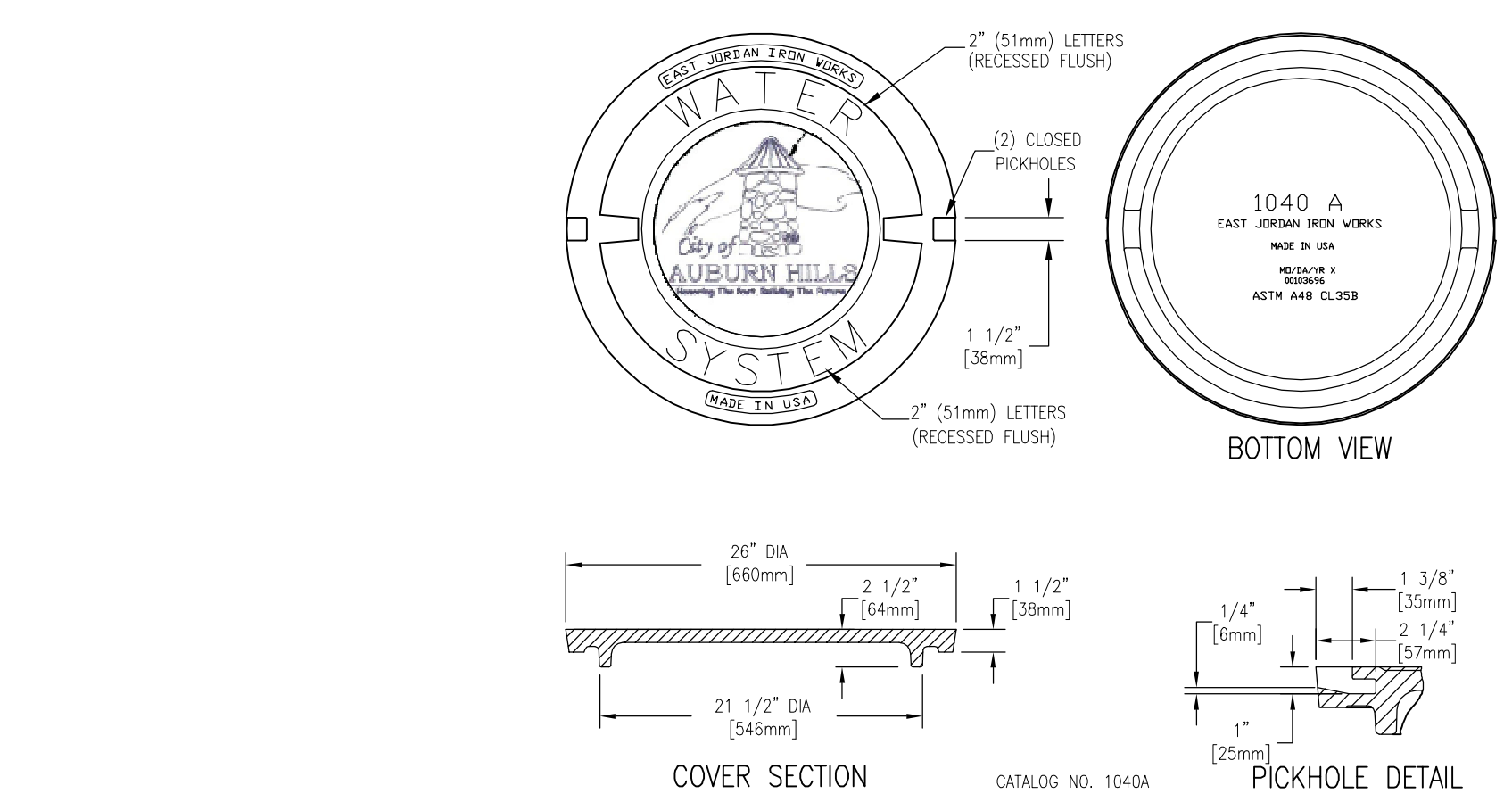
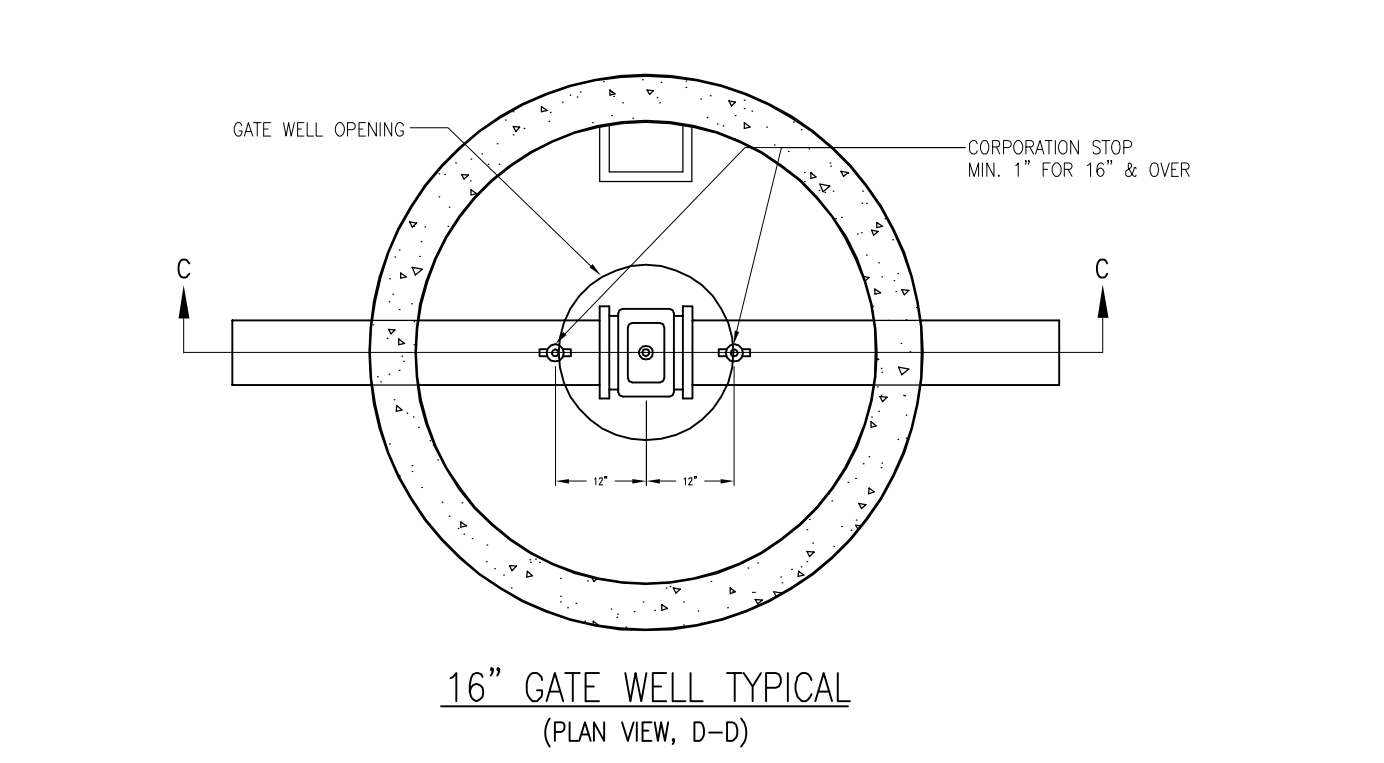
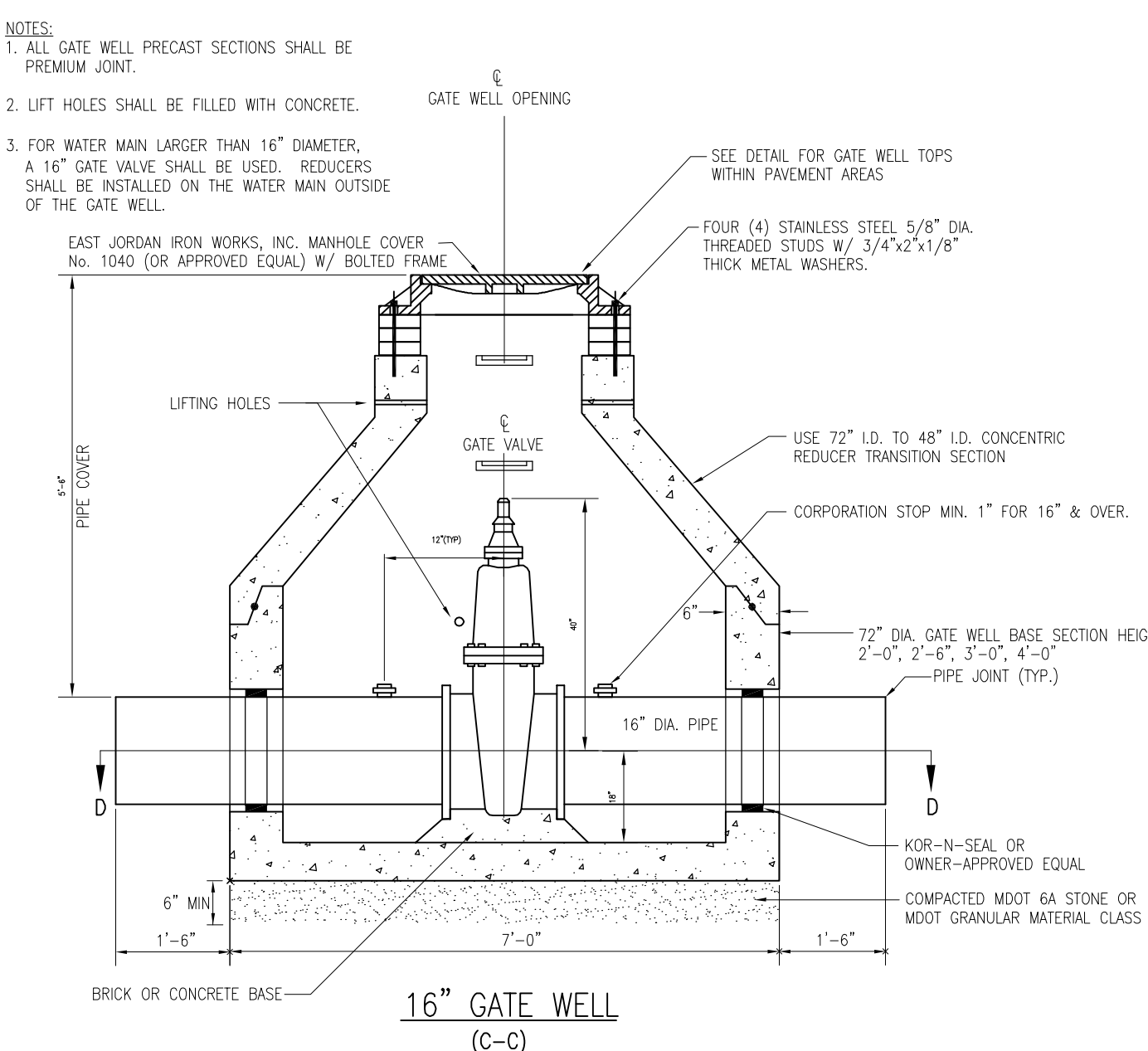
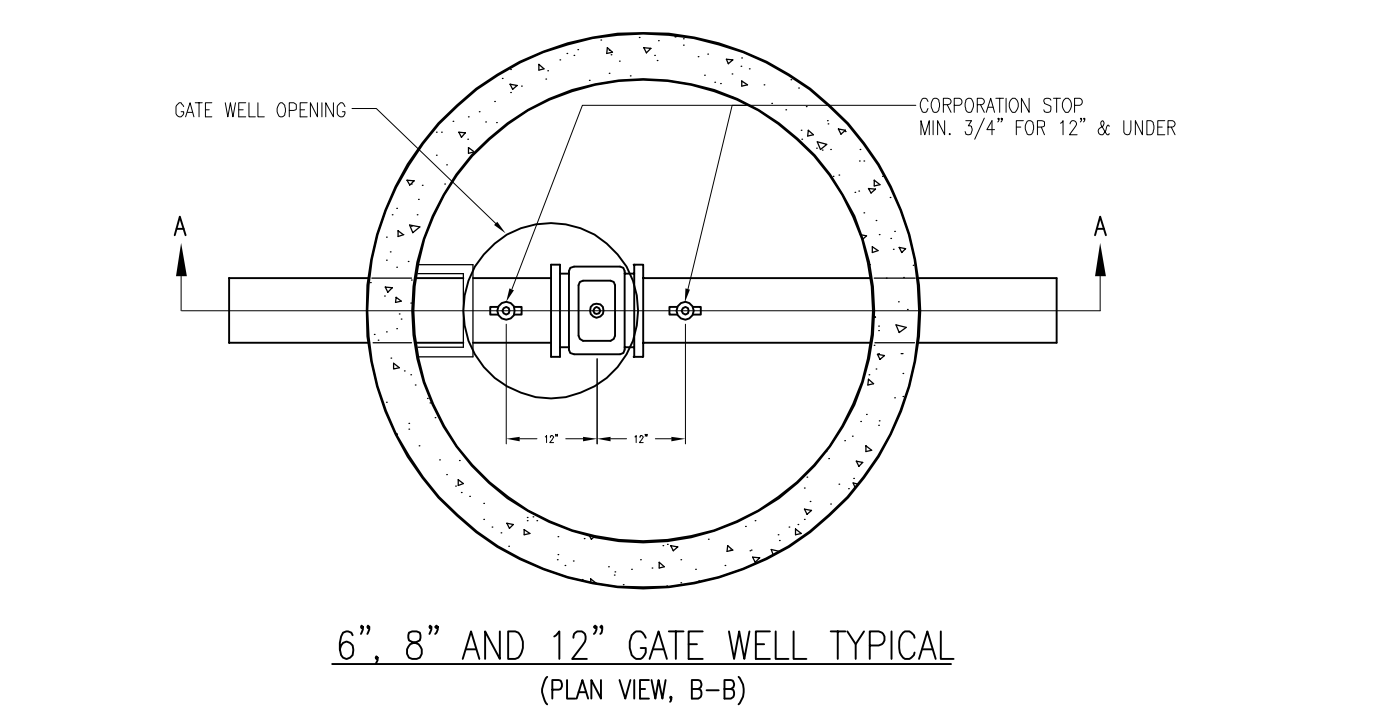
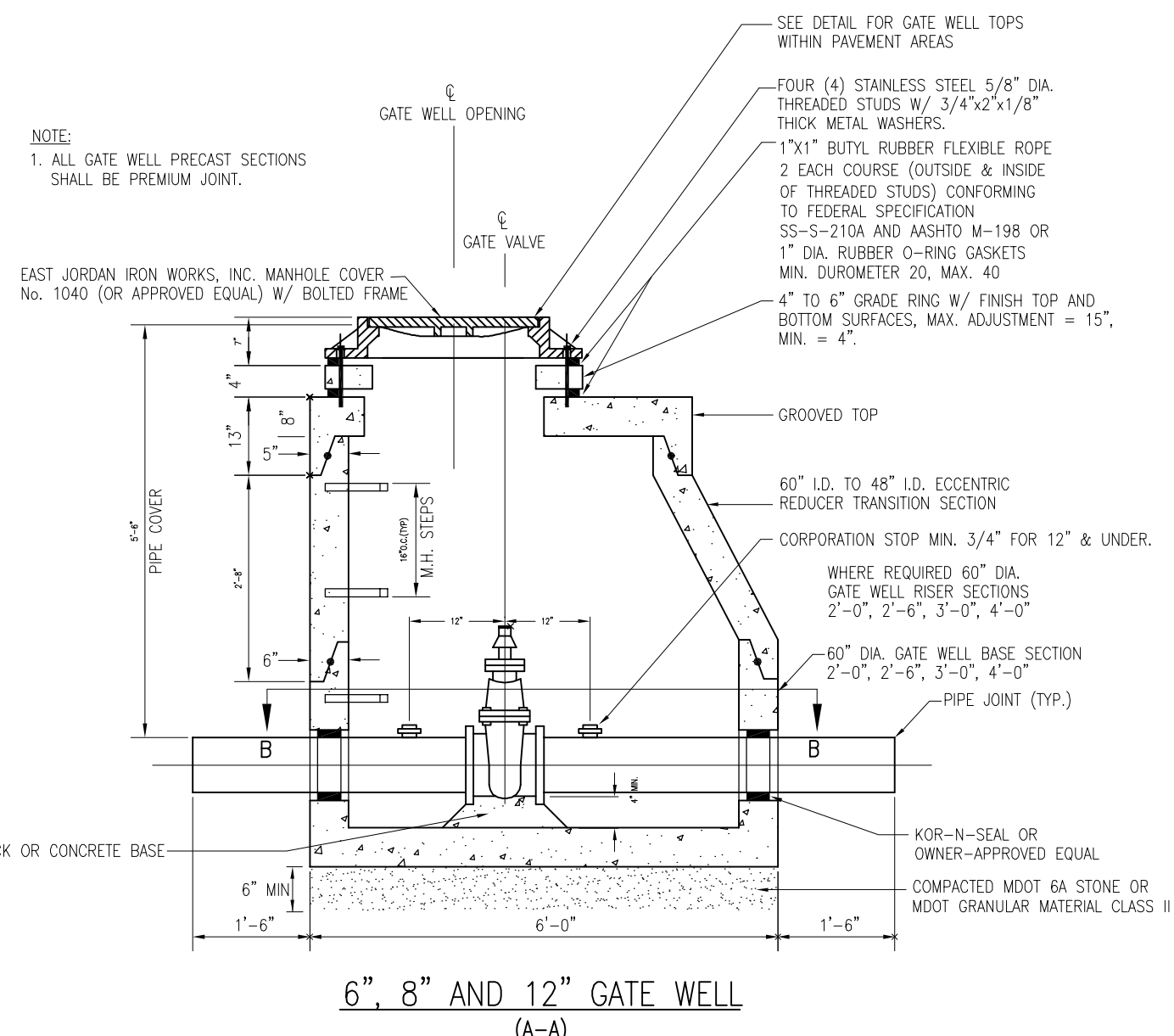
PROFILE VIEW - SECTION A-A (STANDPIPE OUTLET)



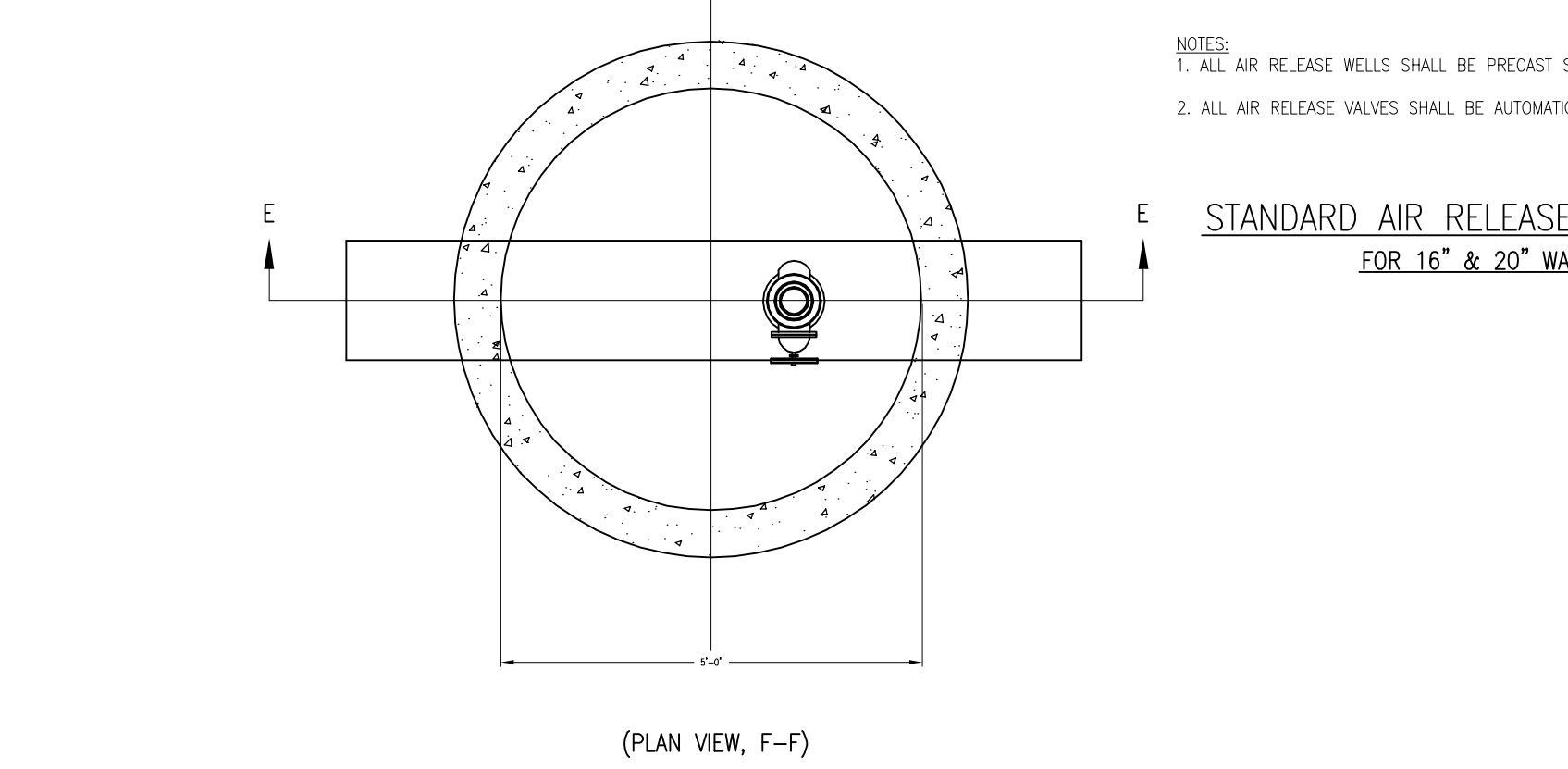
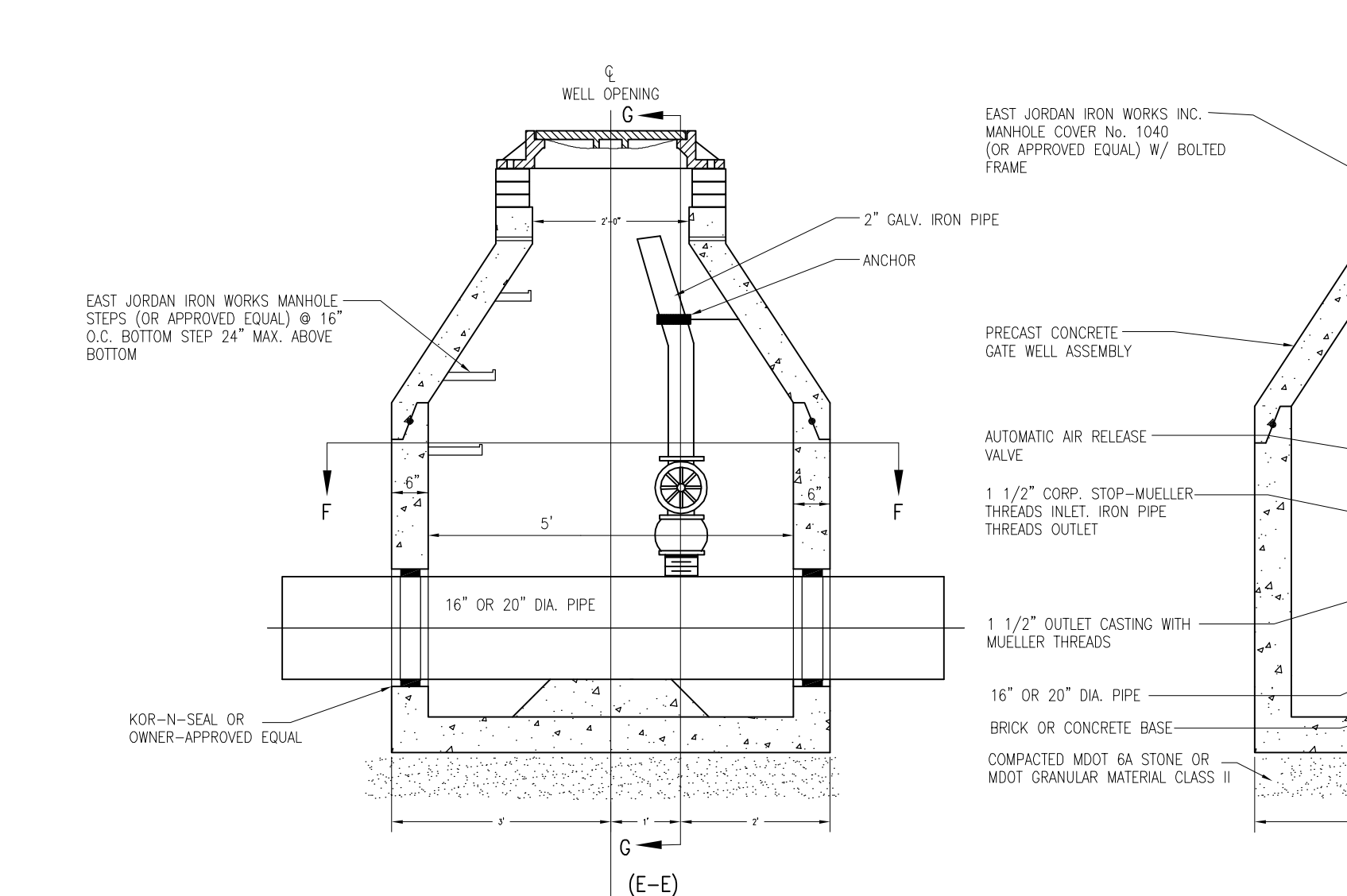
SAND OR GRAVEL BACKFILL DETAILS FOR SEWERS UNDER CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS

DATE	NOV 2007	ENGINEER	JLK	PROJ/MGR	JLK	SECTION	10N	RANGE	3E	COUNTY	OAKLAND COUNTY	CITY/TOWNSHIP	CITY OF AUBURN HILLS	SCALE	V: N.T.S.	H: N.T.S.	VERT. DATUM		
REVISIONS:		DATE:		REVISIONS:		DATE:		REVISIONS:		DATE:		REVISIONS:		DATE:		REVISIONS:		DATE:	

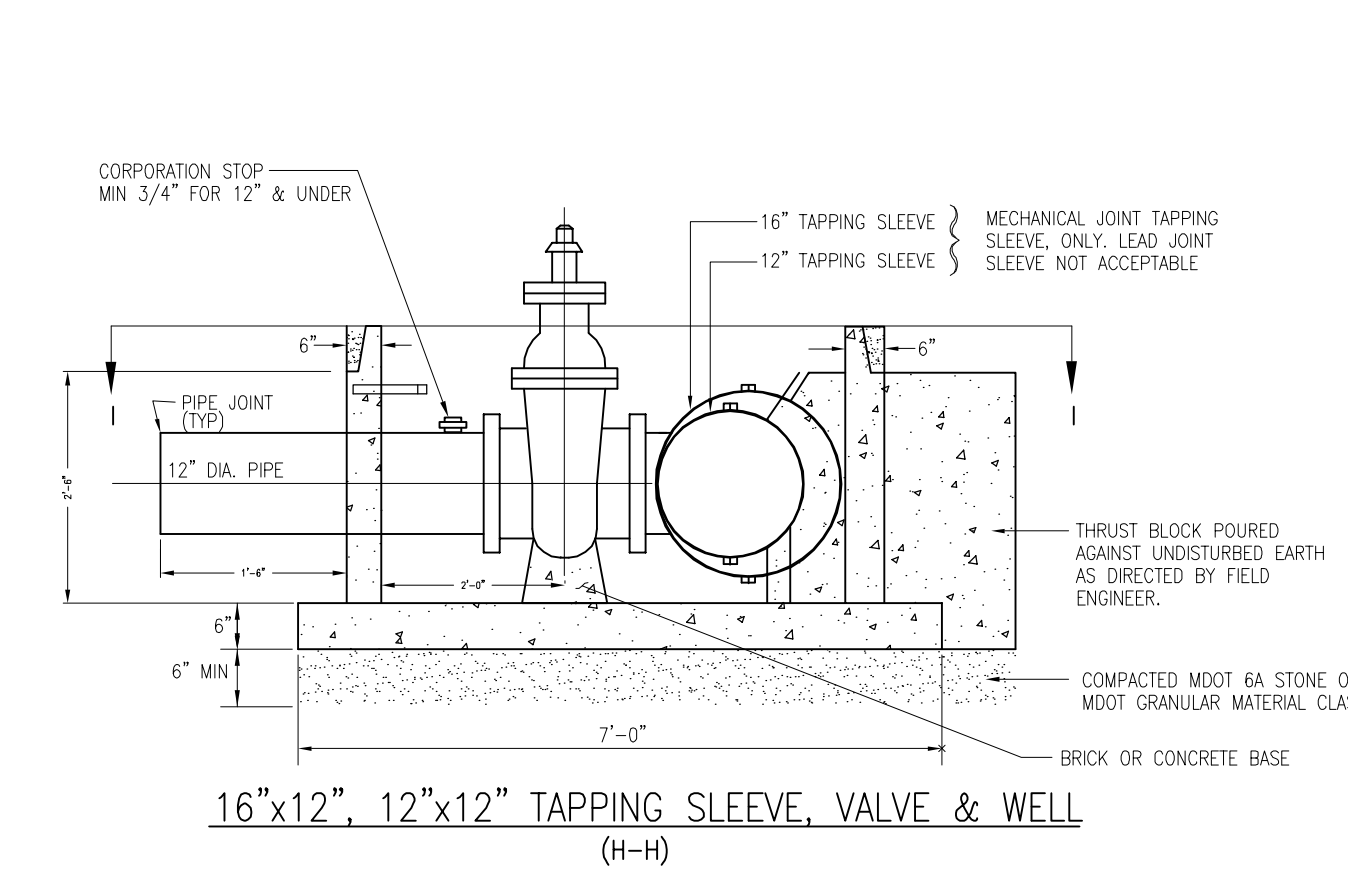
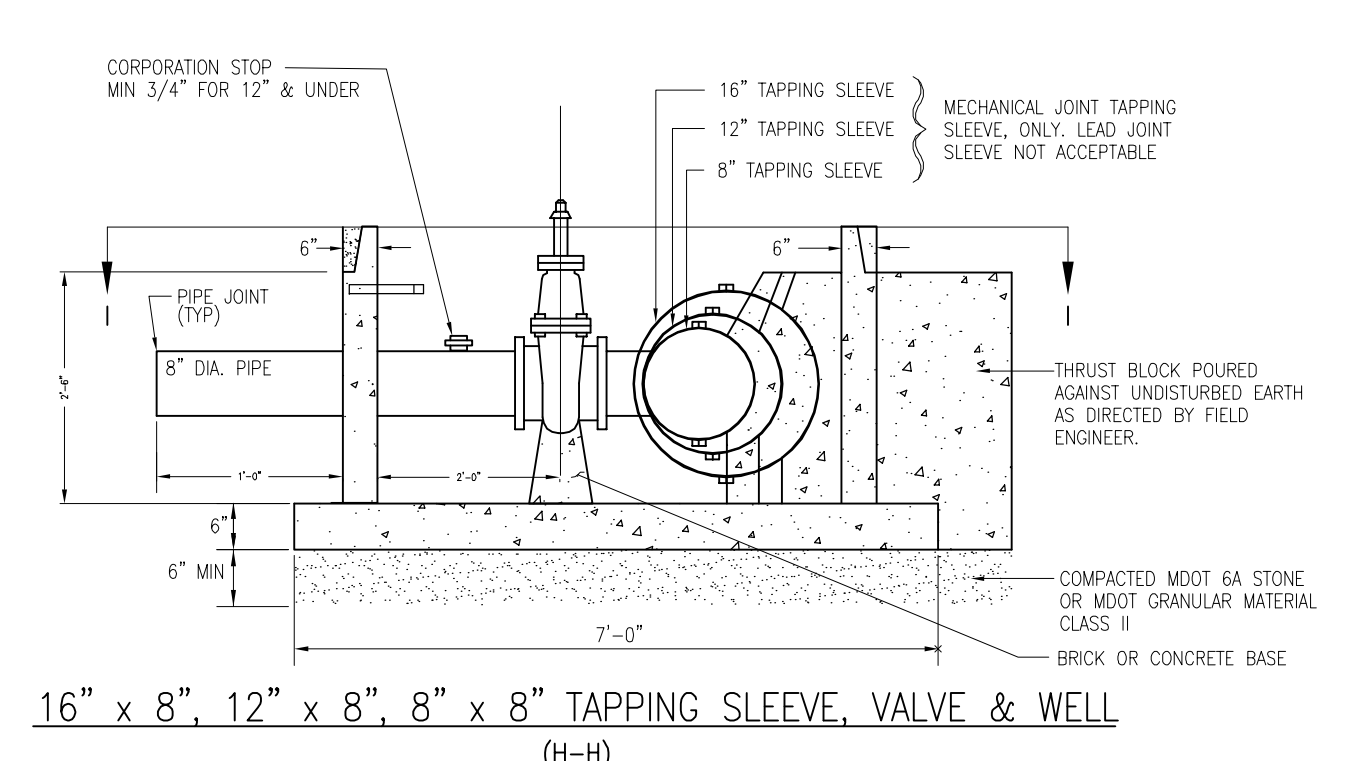
CITY OF AUBURN HILLS
STANDARD STORM SEWER DETAILS



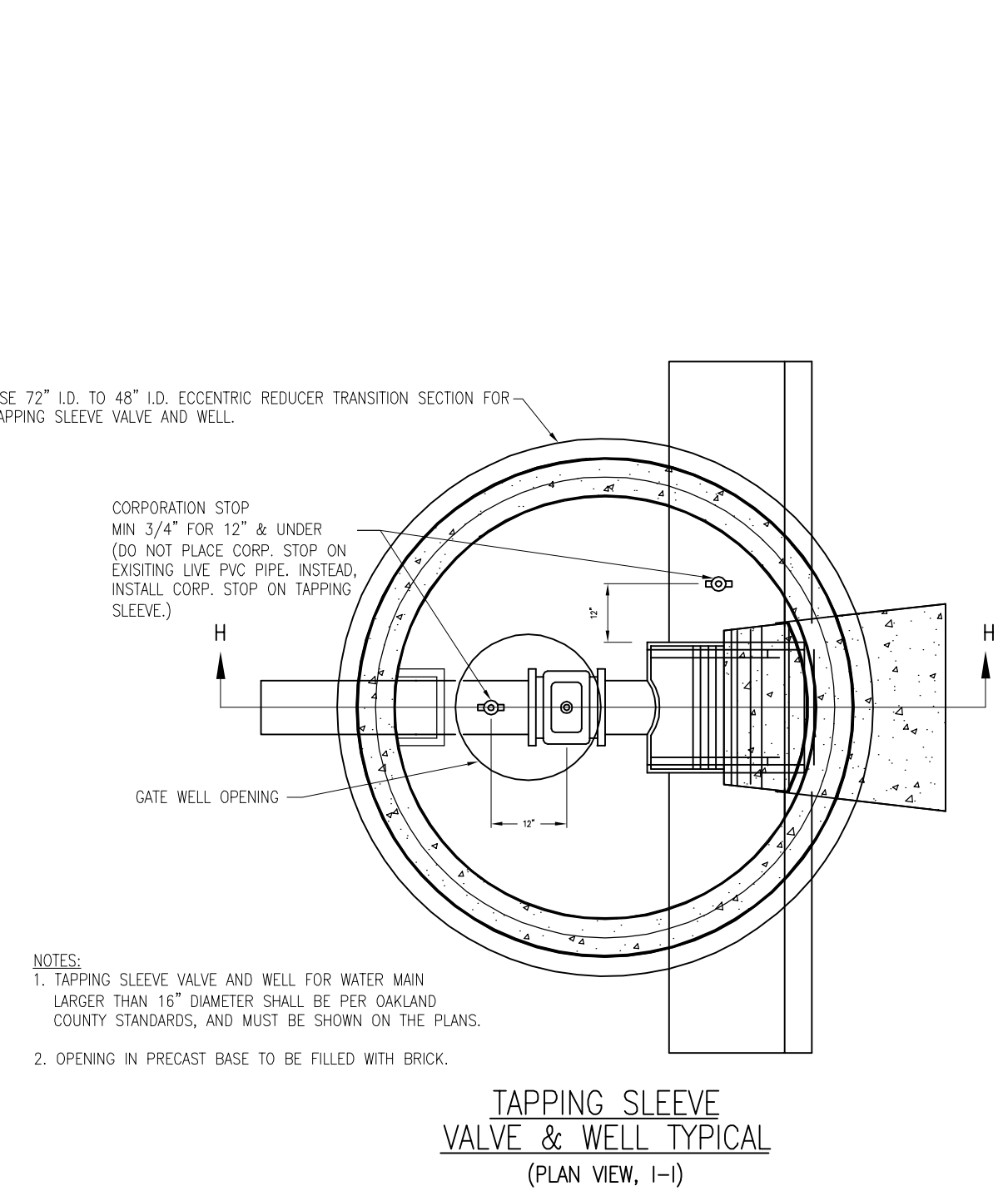
CAST IRON GATE WELL COVER AND GRADE RING



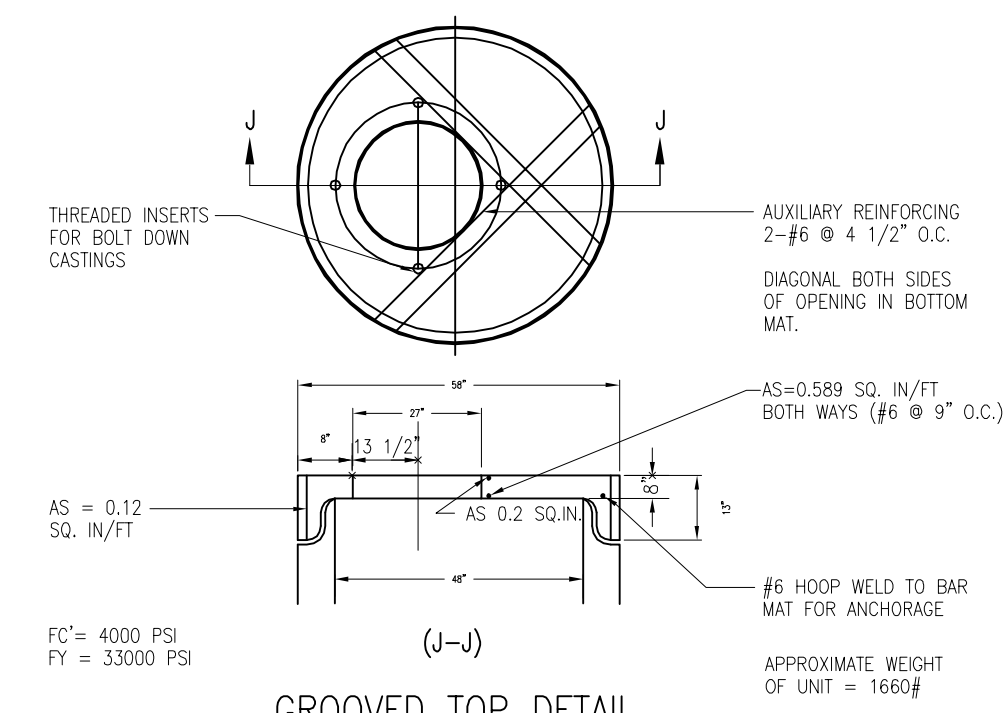
STANDARD AIR RELEASE VALVE & WELL FOR 16" & 20" WATER MAIN



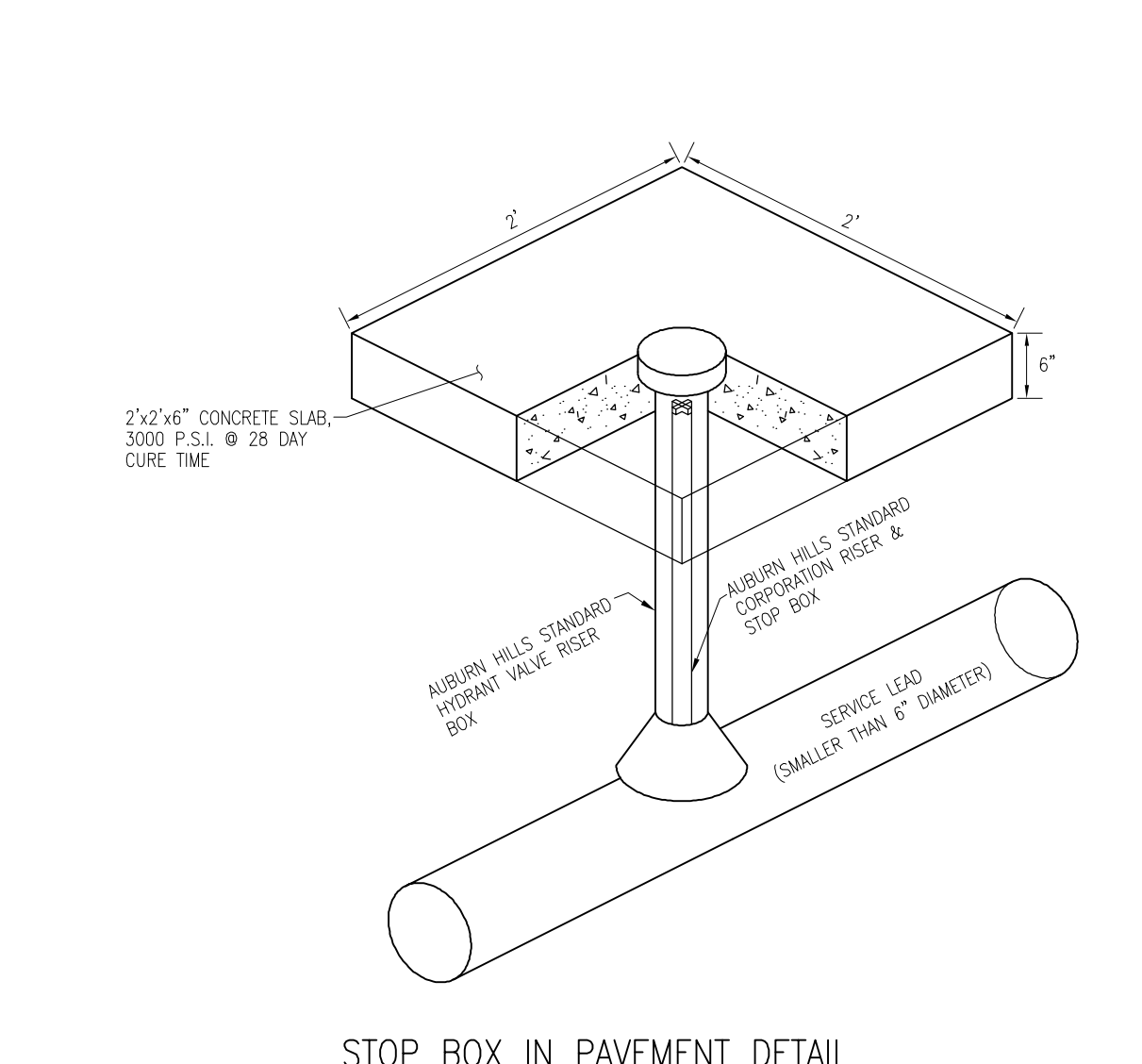
16"x12", 12"x12" TAPPING SLEEVE, VALVE & WELL



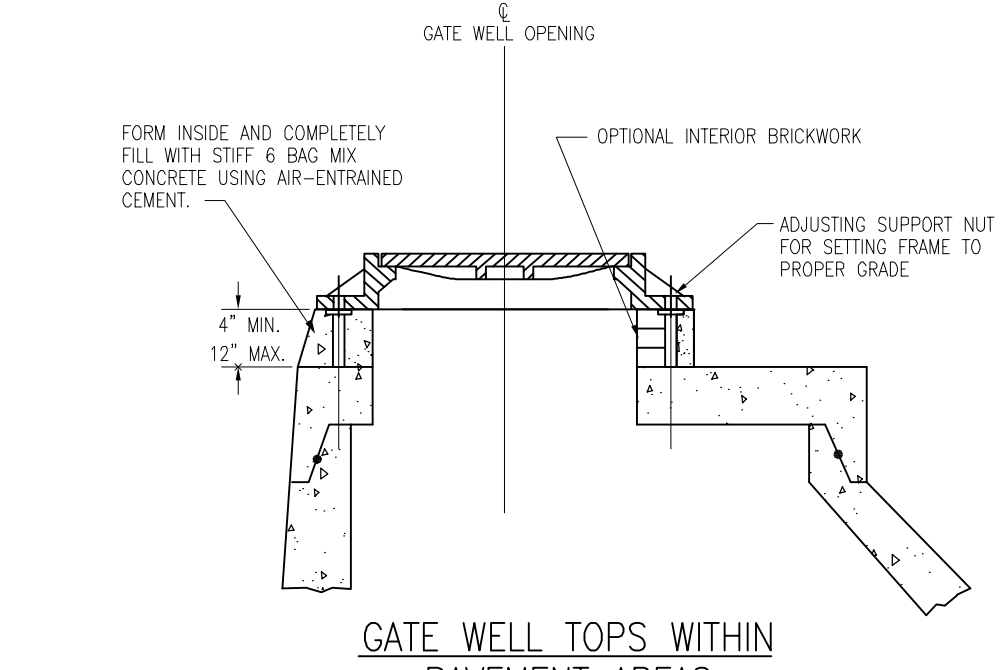
TAPPING SLEEVE VALVE & WELL TYPICAL (PLAN VIEW, I-I)



GROOVED TOP DETAIL



STOP BOX IN PAVEMENT DETAIL



GATE WELL TOPS WITHIN PAVEMENT AREAS

DATE	BID DATE	CADD	ENGINEER	PROJ. LEAD	SECTION	TOWN	RANGE	COUNTY	CITY/TOWNSHIP	SCALE	HORIZ. DATUM	VERT. DATUM
DEC 2007			JLK	JLK		3E		OAKLAND COUNTY	CITY OF AUBURN HILLS	V. N.T.S.		

REVISIONS:	DATE	DESCRIPTION
REVISED (CASTING LOGO UPDATED)	5/1/09	

CLIENT:	CITY OF AUBURN HILLS
JOB #:	AH-WM DET

REVISIONS:	DATE	DESCRIPTION

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REVISIONS:	DATE	DESCRIPTION

REVISIONS:	DATE	DESCRIPTION

REVISIONS:	DATE	DESCRIPTION

DRAWING PATH: S:\CityStandards\CADD\WATER MAIN DETAILS\AH-WM DET.dwg Oct 28, 2009 - 10:48am



DATE	DEC 2007	ENGINEER	J.L.K.	PROGRMGR	J.L.K.	CITY OF AUBURN HILLS	CLERK	J.L.K.	TOWN	10N	RANGE	3E	COUNTY	OAKLAND COUNTY	CITY/TOWNSHIP	CITY OF AUBURN HILLS	JOB #	AH-WM DET	SCALE	V. N.T.S.	VERT DATUM		
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CITY OF AUBURN HILLS
STANDARD WATER MAIN DETAILS

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427

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WATER MAIN NOTES

- GENERAL NOTES:**
- All construction procedures and materials used on all water main projects shall conform to AWWA, Detroit Water and Sewerage Department and The City of Auburn Hills current Standards and Specifications.
 - No water main is to be installed without the City inspection.
 - Notify MISS DIG (1-800-482-7171) at least three (3) working days prior to start of construction.
 - Where work is to be performed in the vicinity of a City of Detroit water main, contractor shall notify the Detroit Metropolitan Water Services Inspection Department at (313) 833-4682, 3 working days prior to start of construction and request an inspection of the job.
 - All pipe and all pipe fittings shall be made in the U.S.A.
 - Unless otherwise specified on plans, top of all water mains shall be 5.5 ft. below existing or proposed road centerline, or 5.5 ft below existing or proposed ground, whichever results in lower elevation.
 - An 18" minimum vertical clearance between storm or sanitary shall be maintained.
 - 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.
 - Tracing wire shall be provided for all water main, regardless of pipe material. When PVC is installed for a service line, tracing wire shall be run from the meter stop to the curb box. Wire shall be copper, 12-gauge stranded, blue insulated per City requirements. Connection is required at all service leads, hydrants, and gate wells. Wire shall be brought through each gate well and connected to the top stem. All wire exposed above ground surface shall be enclosed in 1/2" metal conduit. The conduit should extend 6" below the ground surface. Conductivity shall be tested by the City prior to acceptance of the main. All splices shall be made using a gel-cap product which provides a water proof seal, such as 3M's Direct Bury Splice kit #P054007/09964 or approved equal. In addition, underground marking tape shall be placed 1' above the top of PVC or HDPE water main. Underground marking tape shall be Magnatech 3" wide, foil-backed tape, #31-022 by Empire Level Manufacturing Corp., or approved equal.
 - Connection to an existing water main shall be made only after pressure and bacteriological test have been successfully completed. The city engineer must be present for the test and review the results. Testing and disinfection procedures shall meet the requirements of AWWA-C600/C651.
 - When temporary water main jumpers are used during water main construction, a dual check valve backflow preventer (A.S.S.E. Std. #1024) shall be placed on the jumper hose that is connected to the new water main. Contact Gary Bendes at the City of Auburn Hills (248-391-3777) before the water main jumper is installed for inspection.
 - Where water main is located under pavement, the City shall not be responsible for repairing pavement within the easement in the event that maintenance or repairs to the water main become necessary.
 - The design engineer shall furnish the City of Auburn Hills with mylar "Record Drawings" of the water main plans as well as an electronic copy of the plans on a computer disk using the most recent release of AutoCAD upon job completion. Plans shall locate all water mains, hydrants, and gate valves and wells.
 - The materials specified below may be substituted with an approved equal as determined by the City. It is at the sole discretion of the City to determine if a material is acceptable and can be utilized. Written authorization must be obtained prior to ordering or installing the approved equal.

WATER MAIN NOTES:

- All water main shall be ductile iron or concrete. HDPE or PVC water main may be permitted upon city approval. Water main shall be per the following specification.
 - Ductile iron pipe shall be ANSI 1-A21.51 (AWWA-C151) std. wall thickness, cement lined with bituminous seal coat Class 54 for sizes 3" through 16" and Class 55 for 20" through 24" pipe. All 6" pipe MUST be ductile iron.
 - Pre-stressed Concrete Cylinder pipe (P.C.C.P.) shall be AWWA C-301 specification for sizes larger than 24".
 - Polyvinyl Chloride (PVC) pipe shall meet the requirements of ANSI/AWWA C909-98 (including any appendices) as amended for the pressure class of 200 psi (SDR 14). PVC may only be used for 8" or 12" mains or 2" water services. All fittings for PVC shall be ductile iron, as specified in ANSI 1-A21.10 (AWWA-C110) as amended.
- High Density Polyethylene (HDPE) pipe shall meet the requirements of AWWA C906 (SDR 11) with blue steel or blue stripe.
- Water services up to 2" shall be either Type K soft copper or PVC with tracing wire meeting the requirements of AWWA for a pressure class of 200 psi. If PVC is used, a tracing wire shall be run from the meter stop to the curb box (See General Notes, Item #9 for tracing wire requirements). All water services greater than 2" shall follow the standards listed in Water Main Note #1.
- The maximum allowable deflection at joints for ductile iron water main shall be per manufacturers standards (i.e. 4" - 36" water main - 5" per 20').
- Polywrap may be required by the city and shall be placed around the water main.
- Mega lugs shall be placed at all valves, bends, tees, plungers, hydrants and mechanical fittings. Surrounding joints shall be restrained using field lok gaskets or approved equal and shall be per the manufacturer's joint restraining schedule.
- All bolts on all flanged and mechanical joint fittings shall be domestic origin high strength, low alloy COR-BLUE steel bolts or approved equal. These bolts shall meet the current provisions of American National Standard ANSI/AWWA C111/A21.11-90 for rubber gasket joints for ductile iron pressure pipes and fittings. Bolt manufacturer's certificate of compliance must accompany each shipment.
- Backfill shall be compacted above pipe as indicated on construction drawings. Trench backfill shall be a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Under road surfaces, pavement, sidewalks, curbs, driveways and areas where trench is within a 1:1 influence of the pavement, sand backfill shall be used which shall consist of MDT granular material Class II or III and shall be compacted in layers not to exceed 12" in thickness to a density of 95% as determined by AASHTO T99. Where water main is to be placed on fill material, all fill material below the pipe must also be compacted to 95% maximum unit density. All backfill placed with a 1:1 influence of structures shall be approved sand, placed in 1" layers and compacted. Trenches that are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the City.
- PVC Installation Specifications:
 - Where pipe must be cut, machine beveling shall be provided as specified by the manufacturer, unless the cut end will be butted against a fitting with an approved bolt-type joint. The factory beveled end of the spigot must be removed when the spigot will be butted against a fitting.
 - All PVC pipe deflections shall be made using mechanical fittings. PVC pipe shall not be placed or connected by "breaking" or "opening" joints (0' deflection). Physically bending the pipe is not allowed either. Each individual length of PVC pipe shall be placed in a straight line.
 - PVC water main shall not be exposed to sunlight for more than one (1) week. The contractor shall provide an opaque covering to shield all parts of pipe. Such pipe that is not adequately protected will be rejected.
 - PVC water main shall not be installed when temperatures are below zero (0) degrees Fahrenheit.
 - Pipe shall be joined per the manufacturer's recommendation. Push-on type joints shall not be installed past the "home" mark on the pipe, or otherwise disrupt the required elastomeric gasket.
 - PVC water main shall not be used in areas where any petroleum products are found or suspected to exist in the soils or surrounding area.
 - Extreme care must be used when attaching fittings. Mechanical joints to PVC pipe must distribute the loading evenly to avoid damage and potential breaks or weak points in the pipe.
 - Extreme care must be used when bringing PVC pipe into and out of structures. A uniform annular space must be created to eliminate any potential point loading on the pipe. Point loading and pipe movement at the structure joint can cause the pipe to split.
 - Rubber "boots" or "sleeves" are required for pipes entering structures (similar to sanitary sewer "boots").
 - Taps shall not be made on PVC water main that is bent, or otherwise in tension.
 - A Ford or McDonald double-banded brass tapping saddle shall be provided for all taps to PVC water main.
 - All taps shall be made with a sharp bit and high speed tap, as recommended by the manufacturer.

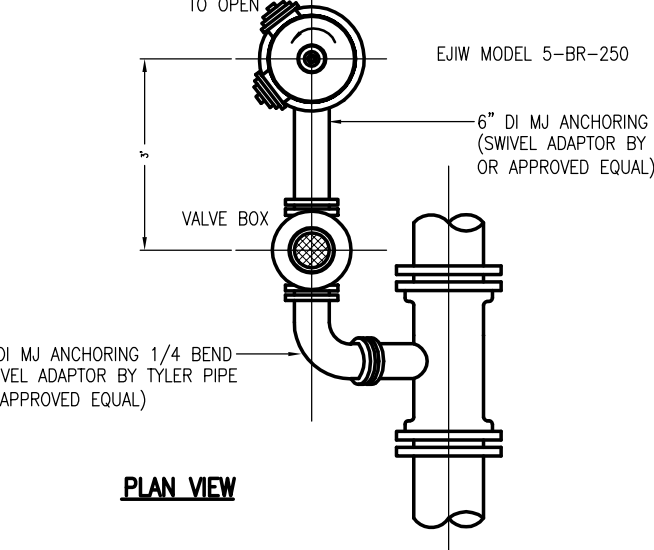
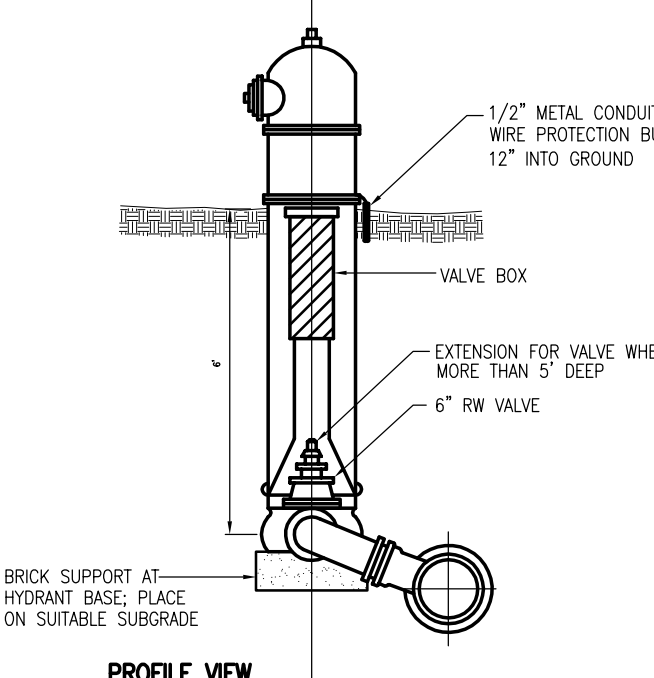
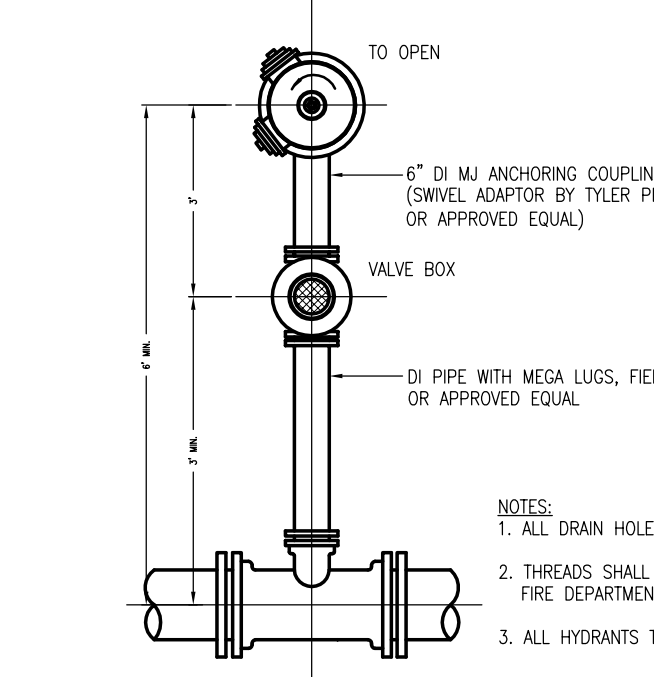
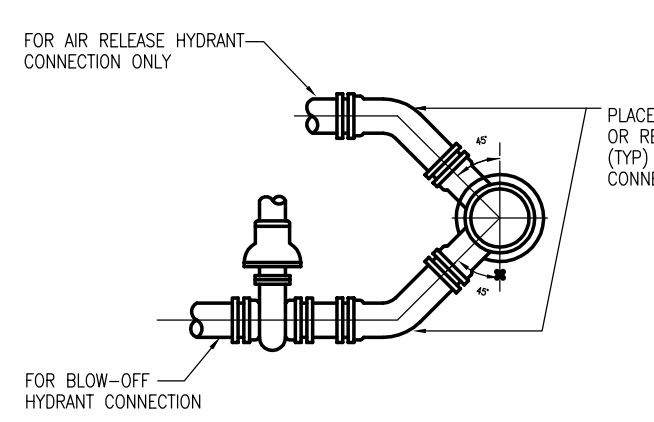
VALVE & SLEEVE NOTES:

- Gate Valves shall be ductile iron body, fully bronze mounted, E.J.I.W. resilient wedge, non-rising stem, opening counterclockwise conforming to City of Detroit Water Department specifications and to AWWA C509 or C515.
- All gate valves 6" or larger shall be placed in a well; curb stops and boxes are required for water main 2" or smaller. A valve shall be placed in a well for all water main larger than 2" and smaller than 6" when a tapping sleeve will be utilized; otherwise, a valve may be placed in a box for water main larger than 2" and smaller than 6".
- All gate valves with operating nuts at a distance 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 ground surface when an extension stem is used. It shall be held in place by two extension stem guide assemblies. Each assembly shall be comprised of a "J" bracket and "L" bracket supplied by E.J.I.W. The stem guides shall be located opposite from each other, and shall be suitably fastened to the wall of the gate well. In addition, a "stop" shall be welded to the extension stem in a location that will prevent the extension stem from slipping off the operating nut. Details of extension stem and method of installation shall be approved by the engineer prior to installation.
- All pre cast concrete gate well sections shall be manufactured to conform with ASTM C478, standard specifications for precast reinforced concrete manhole sections, except wall thickness shall be as shown on these details. All joints for precast concrete gate well sections shall be "modified grooved tongue" with gasket manufactured to conform with ASTM C443, standard specification for joints for circular concrete sewer and culvert pipe using rubber gaskets.
- All gate well covers shall be E.J.I.W. #1040A with bolted frame and have the Auburn Hills Logo imprinted on it (see detail on sheet 1), or approved equal. All cover bolts shall be stainless steel.
- Tapping sleeves shall be mechanical joint with DWS Mechanical Joint Tapping Gate Valve. Lead joint sleeves shall not be used. Like size tapping sleeves can only be used when the existing main is ductile iron and must be a mechanical tapping sleeve.

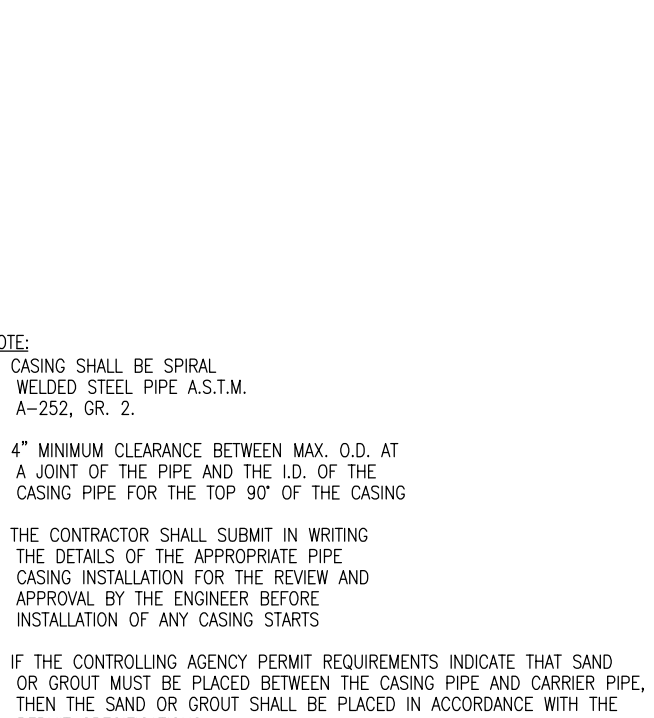
HYDRANT NOTES:

- All hydrants shall be E.J.I.W. #5BR-250-Traffic Model and shall conform to AWWA Spec. C-502 as amended, and shall have a minimum 5 1/4" valve opening that closes with the water pressure. Hydrants shall be traffic style with breakable flange and coupling.
- Hydrants shall have a swivel flange to allow bonnet to be turned 360 degrees without removing the bonnet, and barrel flanges shall be integrally cast with the barrel. Inlet shoe shall have a bronze valve seat, which can be removed without digging.
- Inlet connection shall be 6" mechanical joint, ASA-A21-11. Stem threads shall be sealed with double "O" rings and shall be permanently lubricated with all weather grease.
- Hose connections: Two (2) 4 1/2" pumper nozzles, one (1) with Harrington Integral Hydrant Storz nozzle (part# 946081/EJW# 540360) and one (1) with City of Detroit Fire Department (DFD) threads. The Storz nozzle shall have a brass metal face seal and hard anodized aluminum Storz ramps and lugs. The aluminum's finish shall be hardcoat anodized to MIL-A-8625F, Type 3 dark gray. The adapter shall be made of forged or extruded 6061-T6 aluminum. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum. The center cap shall be equipped with a suction seal. The cap shall be connected to the adapter or the hydrant with a 0.125" vinyl coated aircraft cable.
- Connecting Nut: (1) 1 1/2" P-pentagon, open left. A suitable nozzle lock shall be in place to prevent inadvertent nozzle removal. Wedge locks and/or ductile iron retainer rings to secure nozzles shall not be allowed.
- Hydrants shall be painted red above the ground and black below, with a finish coat of Glamortex 501 enamel, color 314 vermilion, or approved equal. Top flange shall be painted with JDL Industries (305) 599-2022, Bright White Reflective paint, color No.1460 or taped with 3M Scotchlite High Intensity Reflective Tape #3870. Nozzle cap shall be painted per Auburn Hills Fire Dept. requirements: White - 4" mains, Red - 6" mains (Paint #4431-01), Orange - 8" mains (Paint #4431-24), Green - 12" mains (Paint #4431-10), Blue - 16" or larger mains (Paint #4431-12). Paint can be obtain at Tractor Supply Company using the associated Paint Numbers. DO NOT paint Storz nozzle.

HYDRANT AIR RELEASE AND BLOW-OFF CONNECTION



DETAIL OF HYDRANT SETTINGS



NOTE:

- CASING SHALL BE SPIRAL WELDED STEEL PIPE A.S.T.M. A-252, GR. 2.
- 4" MINIMUM CLEARANCE BETWEEN MAX. O.D. AT A JOINT OF THE PIPE AND THE I.D. OF THE CASING PIPE FOR THE TOP 90° OF THE CASING.
- THE CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR THE REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS.
- IF THE CONTROLLING AGENCY PERMIT REQUIREMENTS INDICATE THAT SAND OR GROUT MUST BE PLACED BETWEEN THE CASING PIPE AND CARRIER PIPE, THEN THE SAND OR GROUT SHALL BE PLACED IN ACCORDANCE WITH THE PERMIT SPECIFICATIONS.

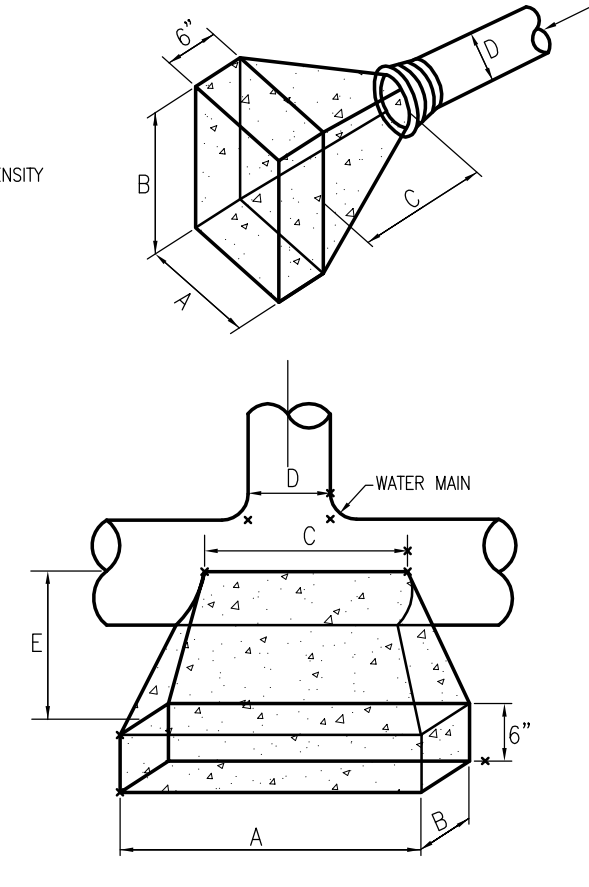
FOR FLUGS

D	A	B	C	MIN.
20"	7"	5"	2.5"	
16"	4"-10"	4"-10"	2"	
12"	4"-4"	3"	1'-9"	
10"	3"	2"	1'-6"	
8"	2"-10"	2'-6"	1'-6"	
6"	1'-6"	1'-6"	3"	

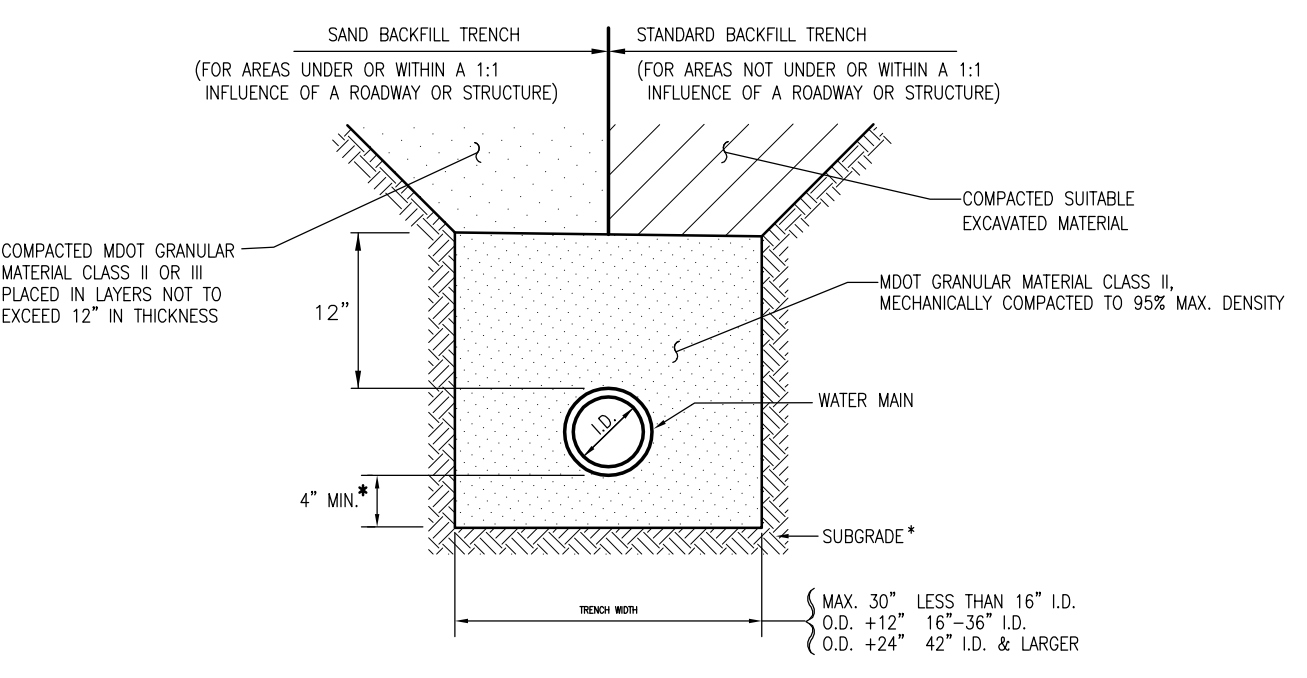
FOR TEES AND TAPPING SLEEVES

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

THRUST BLOCK DETAILS

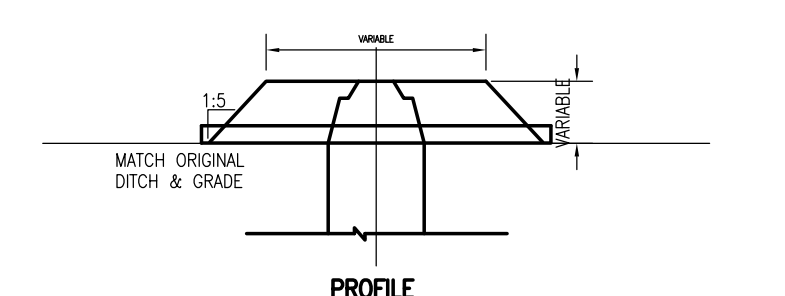
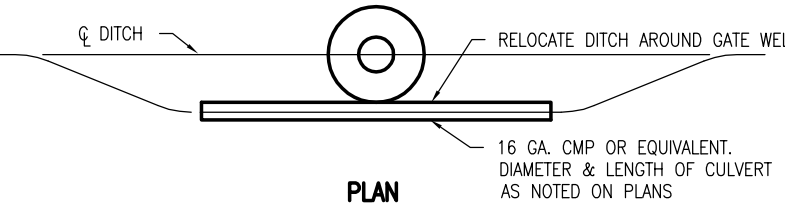
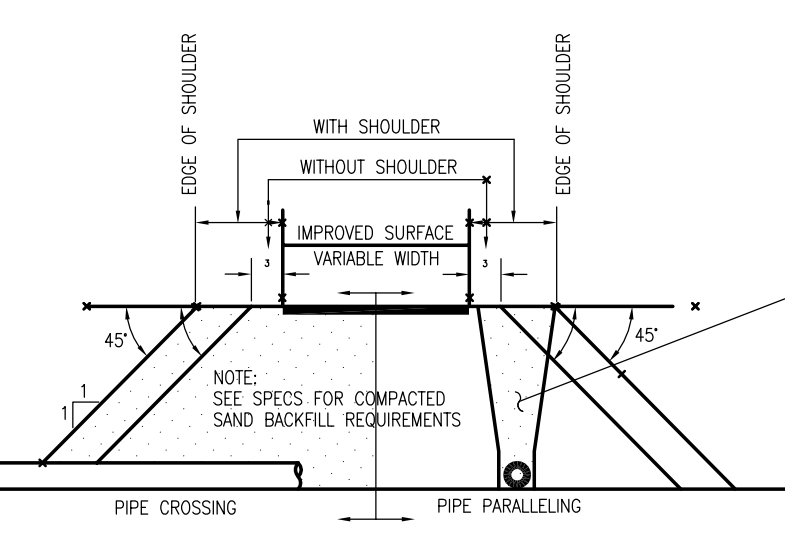


STANDARD BEDDING AND TRENCH BACKFILL DETAIL FOR WATER MAIN



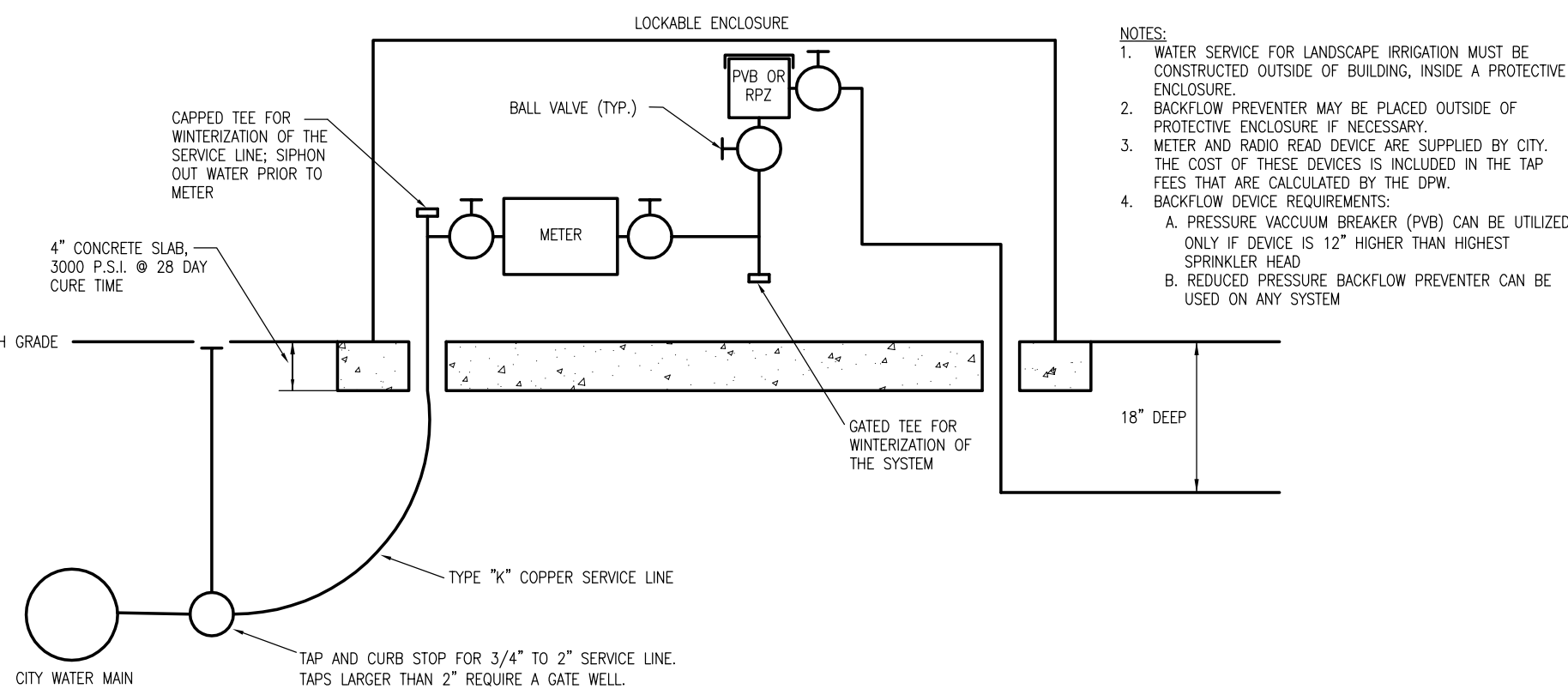
NOTE: IF THE EXISTING SUBGRADE SOILS MEET THE REQUIREMENTS FOR MDT GRANULAR MATERIAL CLASS II (MINIMUM 4" THICK), THEN THE WATER MAIN MAY BE LAD DIRECTLY ON THE COMPACTED NATIVE SUBGRADE SOILS.

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



DITCH ENCLOSURE AT GATE WELL OR HYDRANT

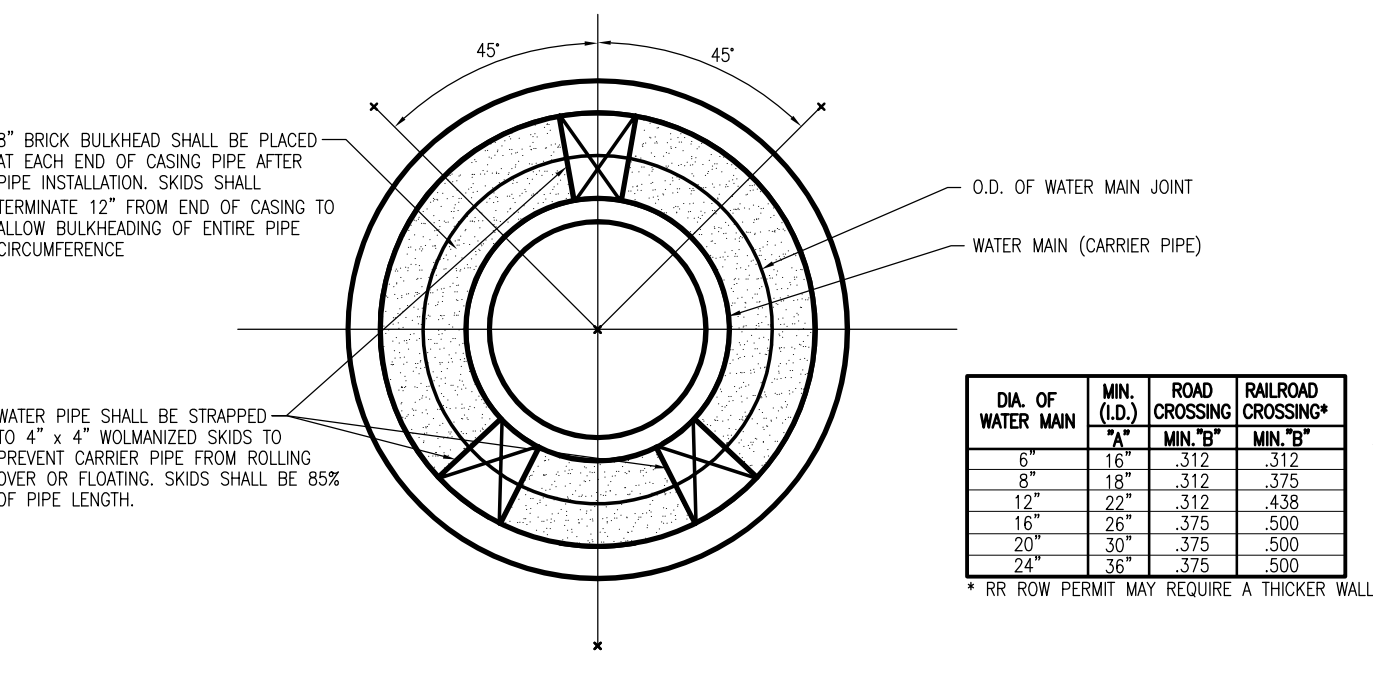
SEPARATE OUTDOOR IRRIGATION METER FOR COMMERCIAL BUILDING



NOTES:

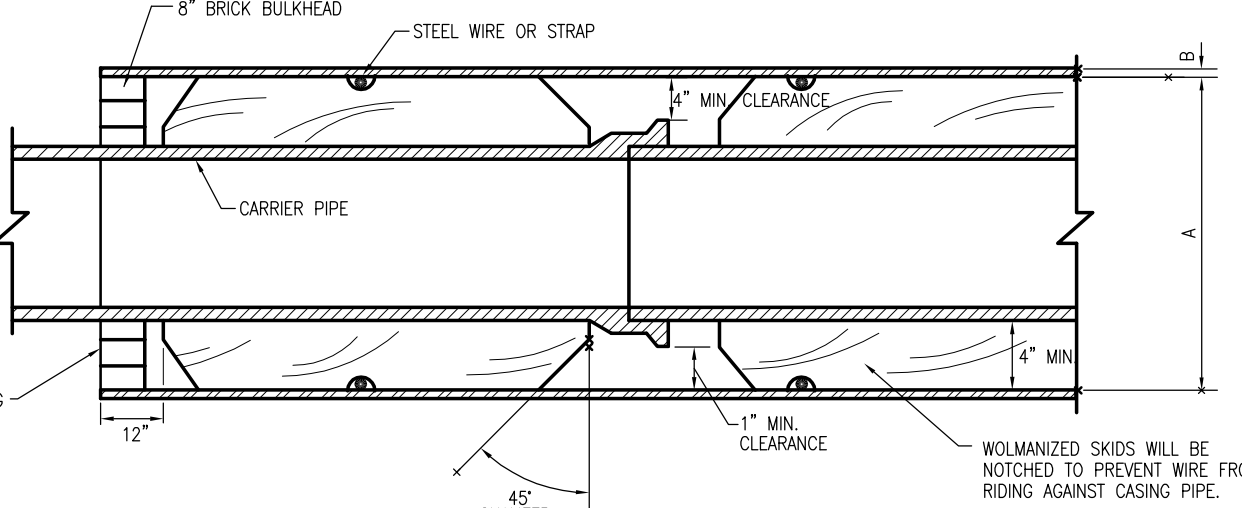
- WATER SERVICE FOR LANDSCAPE IRRIGATION MUST BE CONSTRUCTED OUTSIDE OF BUILDING, INSIDE A PROTECTIVE ENCLOSURE.
- BACKFLOW PREVENTER MAY BE PLACED OUTSIDE OF PROTECTIVE ENCLOSURE IF NECESSARY.
- METER AND GROUND HEAD DEVICE ARE SUPPLIED BY CITY. THE COST OF THESE DEVICES IS INCLUDED IN THE TAP FEES THAT ARE CALCULATED BY THE DFW.
- BACKFLOW DEVICE REQUIREMENTS:
 - PRESSURE VACUUM BREAKER (PVB) CAN BE UTILIZED ONLY IF DEVICE IS 12" HIGHER THAN HIGHEST SPRINKLER HEAD.
 - REDUCED PRESSURE BACKFLOW PREVENTER CAN BE USED ON ANY SYSTEM.

PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE



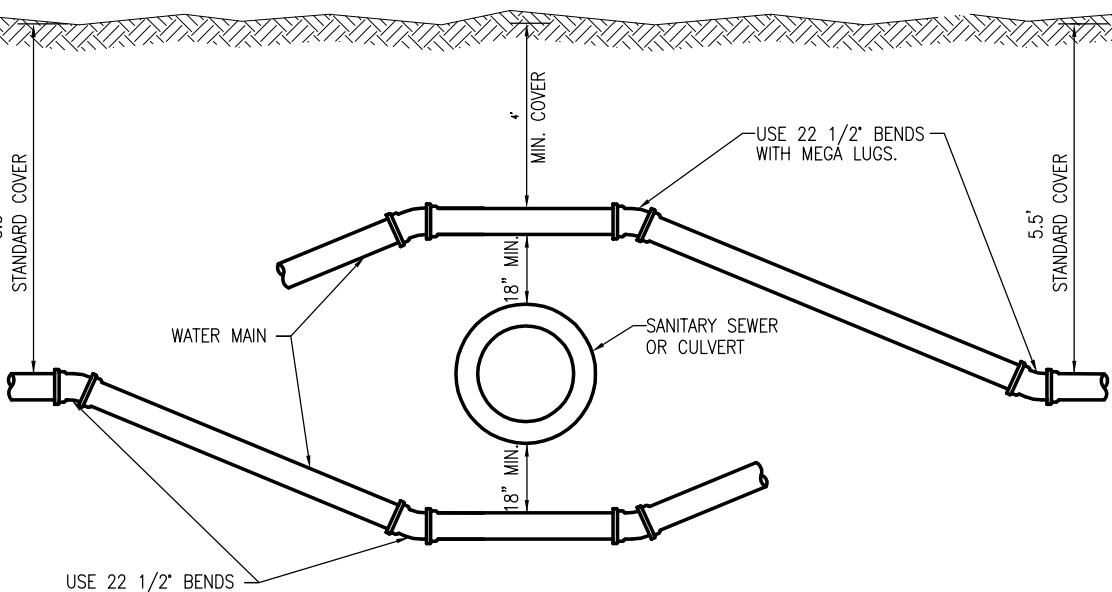
DIA. OF WATER MAIN	MIN. (I.D.)	MIN. (O.D.)	ROAD CROSSING MIN. 15'	RAILROAD CROSSING MIN. 25'
6"	16"	312"	312"	
8"	18"	312"	375"	
10"	22"	312"	438"	
16"	26"	375"	500"	
20"	30"	375"	500"	
24"	36"	375"	500"	

A=INSIDE DIAMETER
B=WALL THICKNESS
* RR ROW PERMIT MAY REQUIRE A THICKER WALL SECTION.

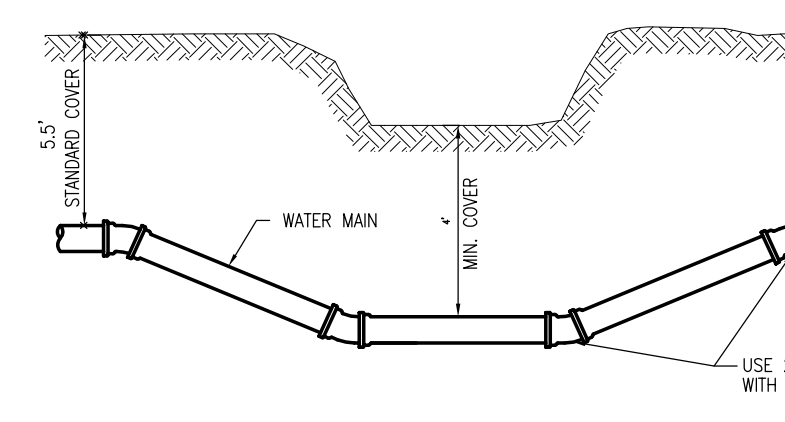


STANDARD CASING SECTION

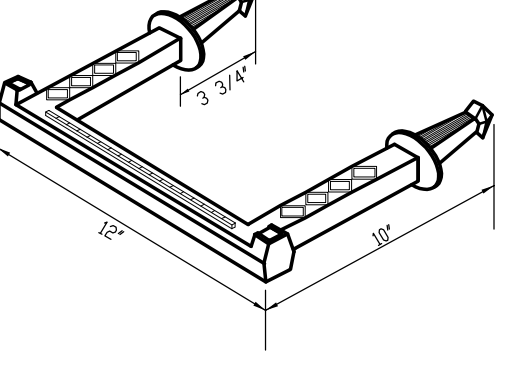
SEWER OR CULVERT CROSSING



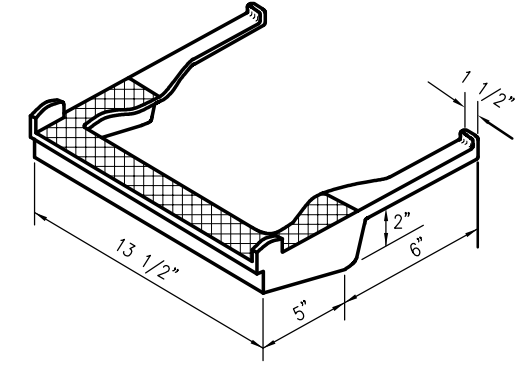
DITCH OR STREAM CROSSING

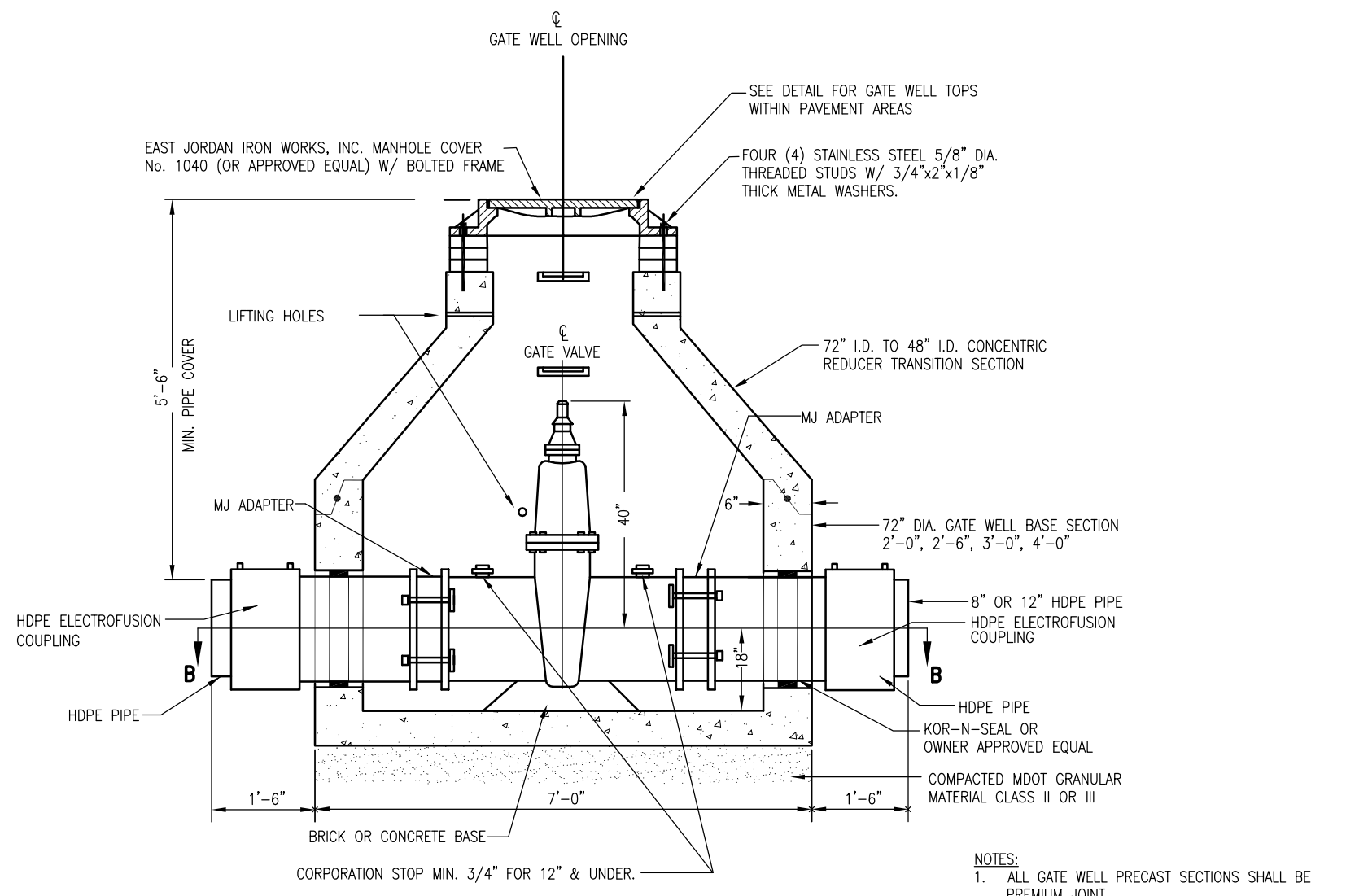


MANHOLE STEP
M.A. PSI-375

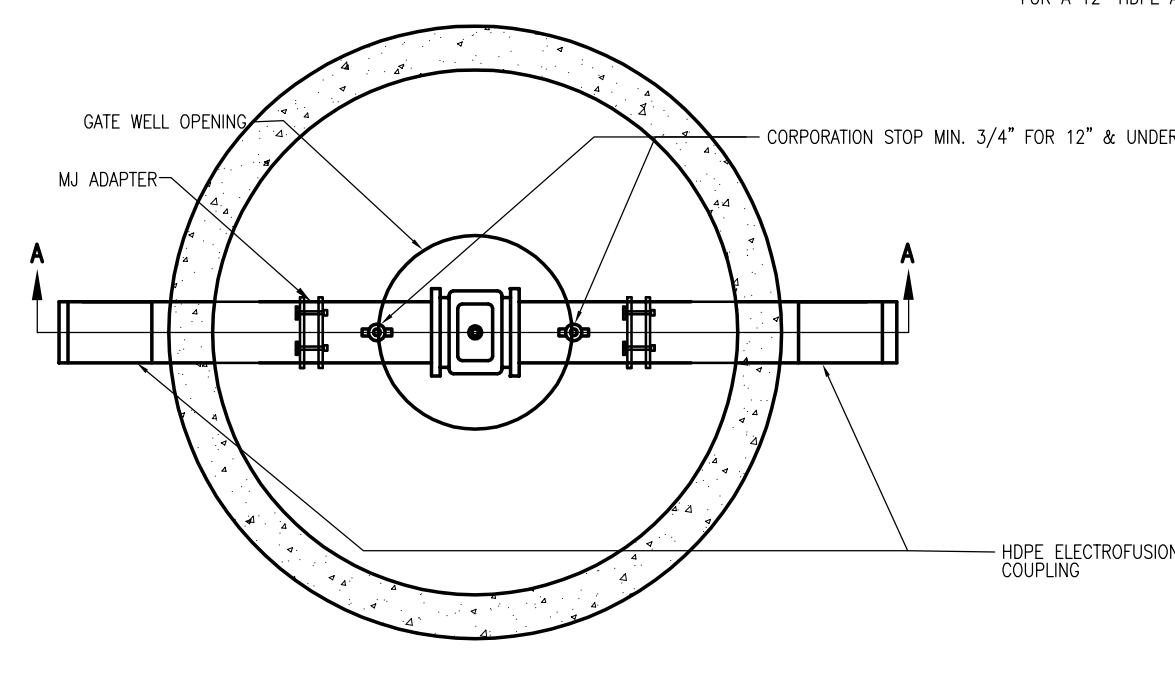


STANDARD MANHOLE STEP
E.J.I.W. 8502

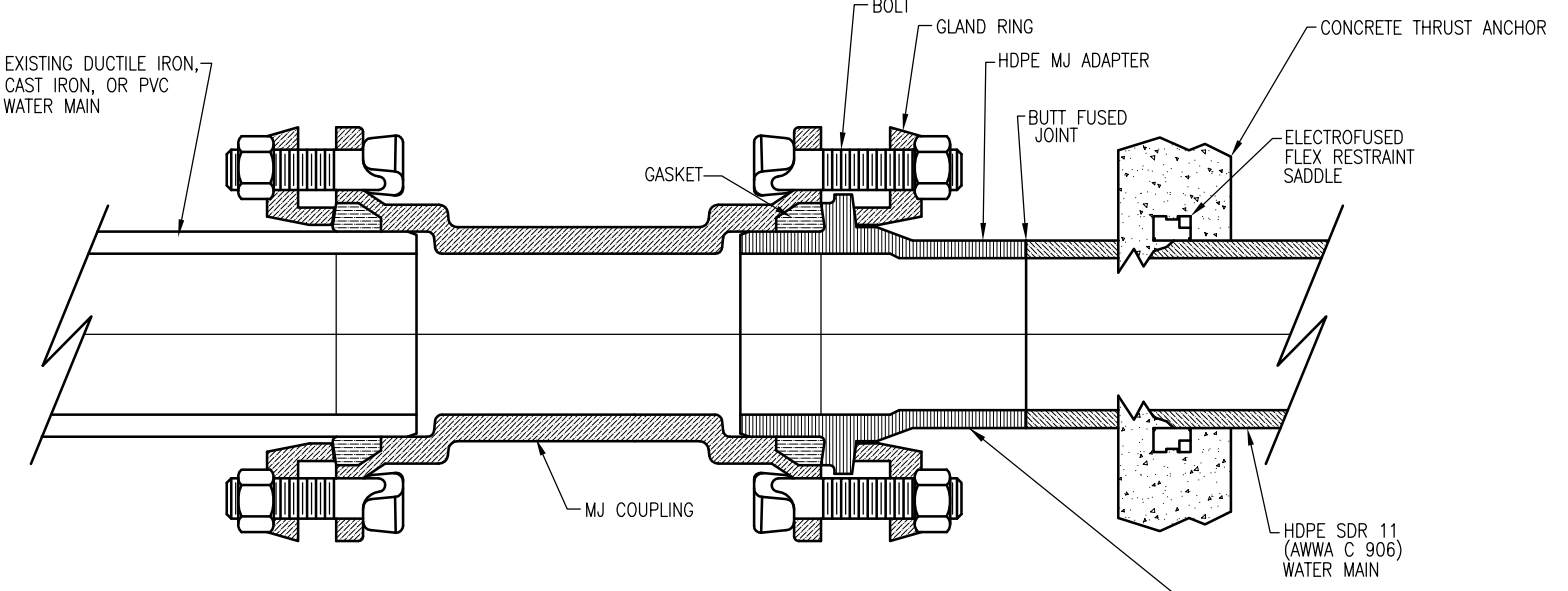




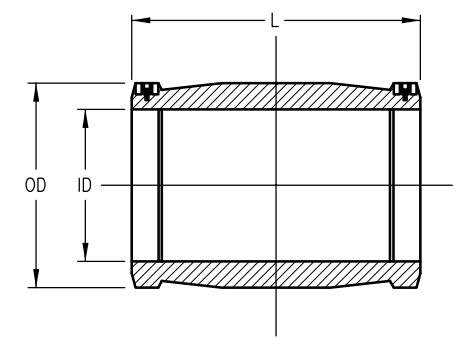
8" AND 12" GATE WELL FOR HDPE WATER MAIN (A-A)



8" AND 12" GATE WELL TYPICAL FOR HDPE WATER MAIN (PLAN VIEW, B-B)

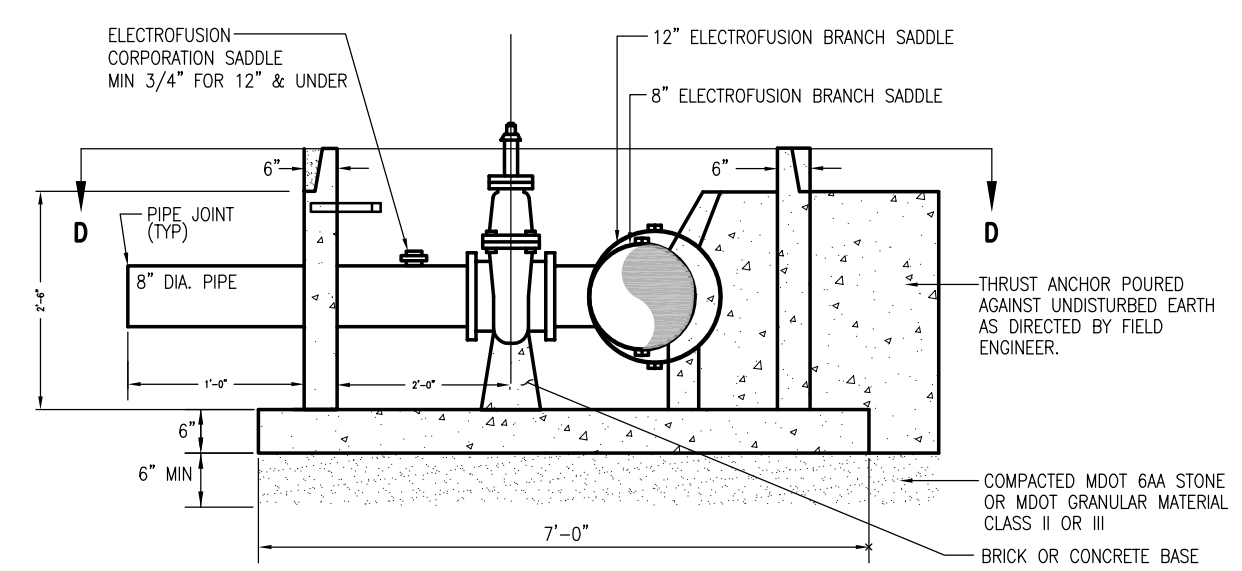


HDPE WATER MAIN JOINT RESTRAINT (FOR CONNECTING HDPE PIPE TO DUCTILE IRON PIPE)

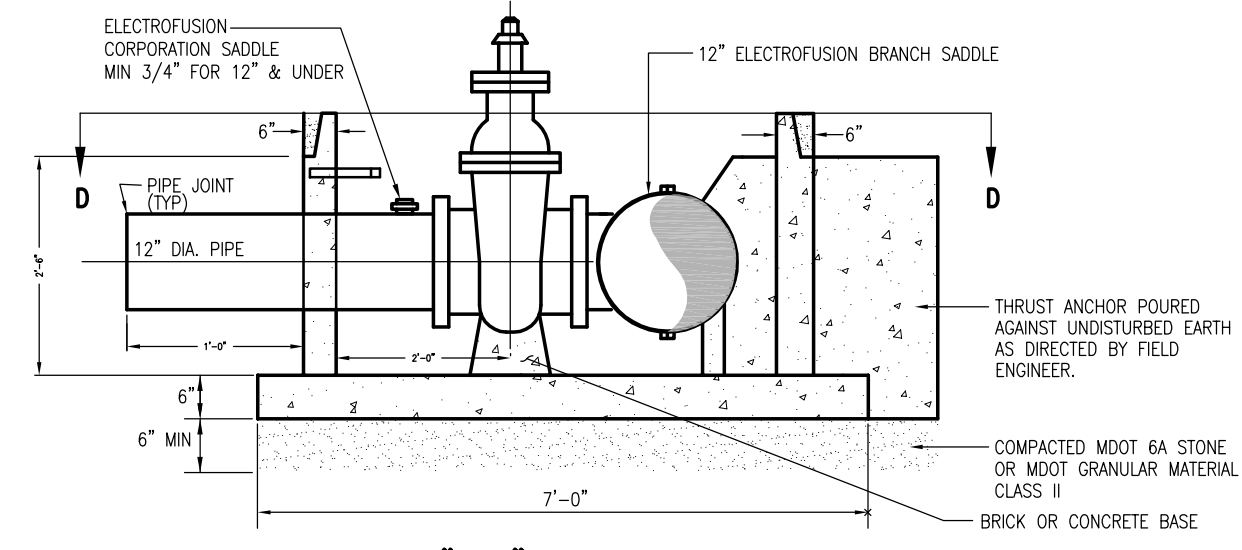


ELECTROFUSION DIPS COUPLINGS

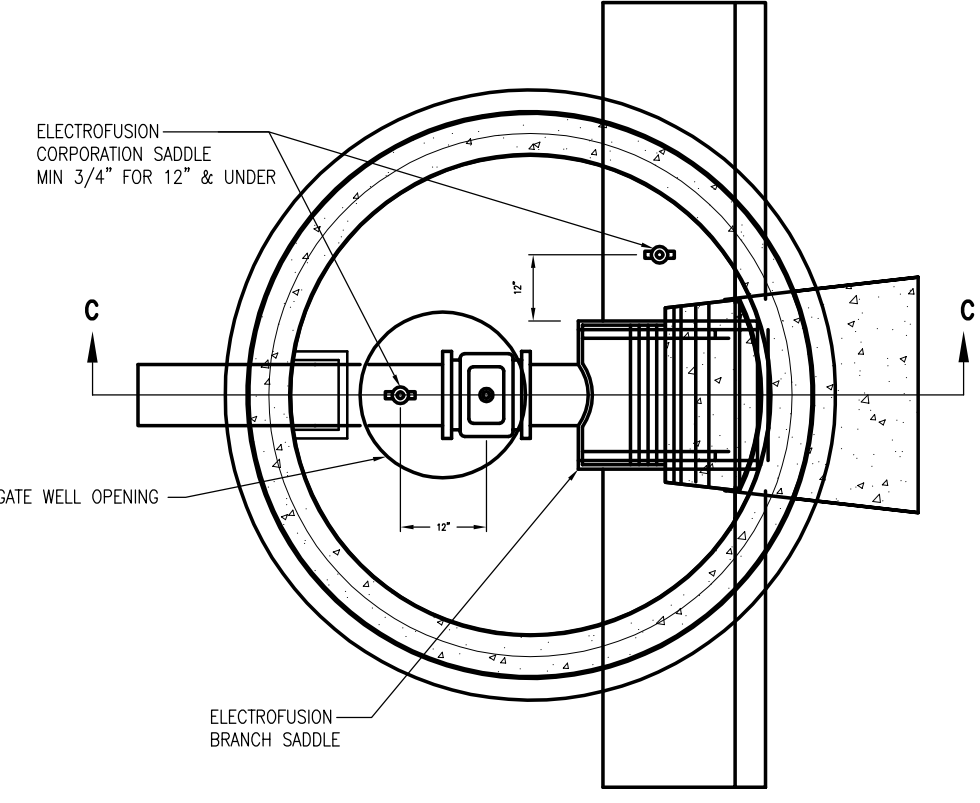
NOMINAL SIZE	INSIDE DIA (MAX) ID	INSIDE DIA (MIN) ID	OUTSIDE DIA (NOMINAL) OD	OVERALL LENGTH (NOMINAL) L
4"	4.84	4.810	6.06	6.93
6"	6.96	6.910	8.74	8.19
8"	9.13	9.060	11.14	9.53
10"	11.15	11.14	13.66	11.02
12"	13.29	13.25	16.22	13.07



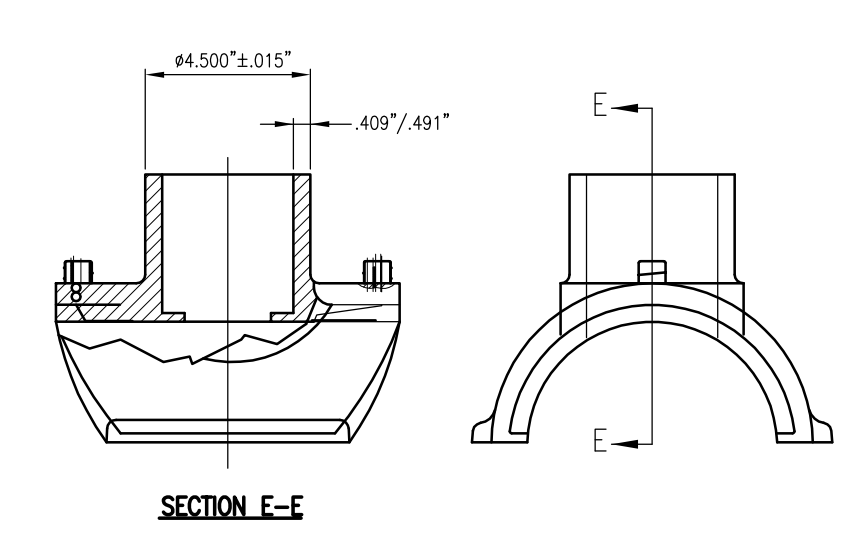
12"x8", 8"x8" VALVE & WELL (C-C)



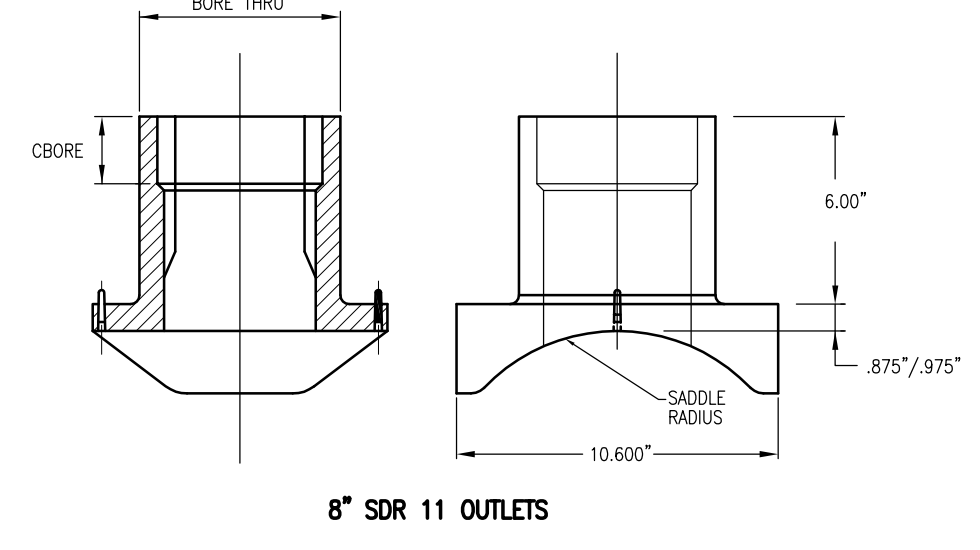
12"x12" VALVE & WELL (C-C)



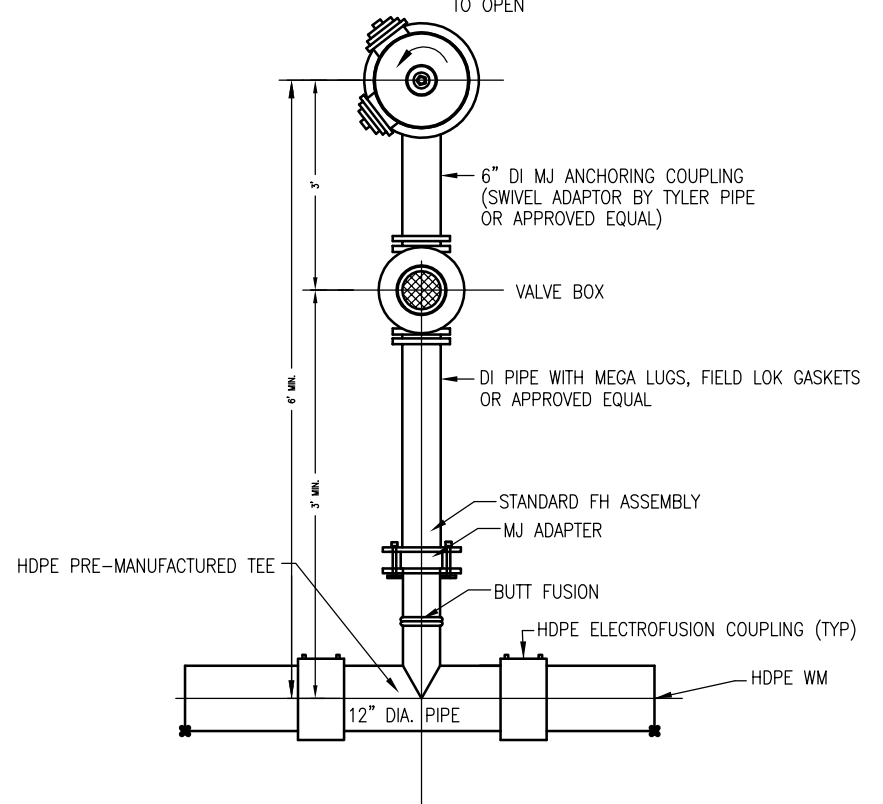
VALVE & WELL TYPICAL (PLAN VIEW, D-D)



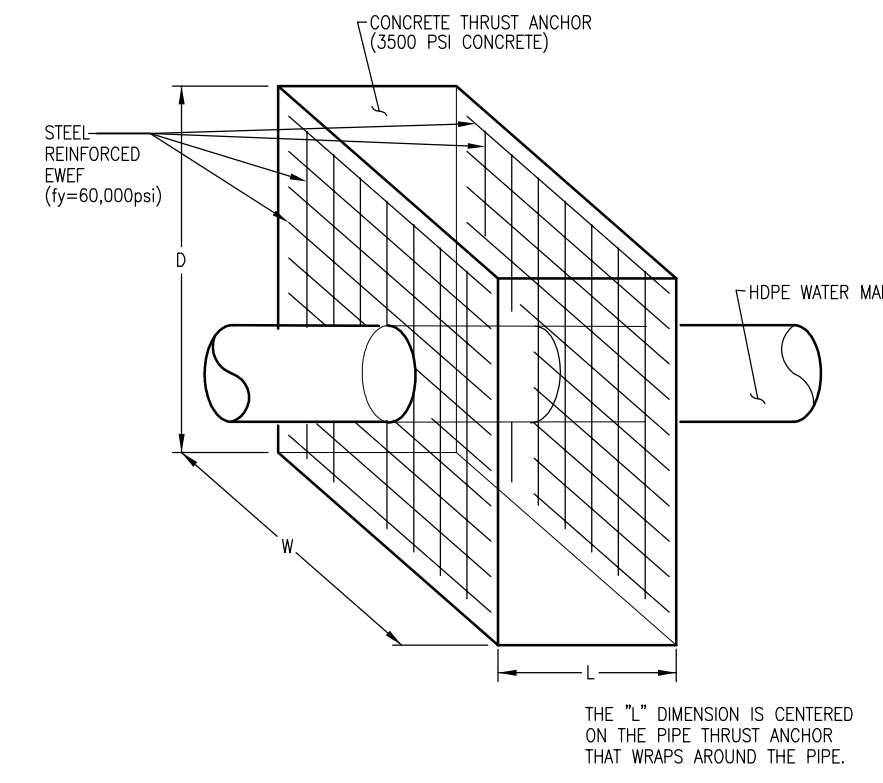
ELECTROFUSION BRANCH SADDLE DETAILS



8" SDR 11 OUTLETS



FIRE HYDRANT ASSEMBLY WITH HDPE PRE-MANUFACTURED TEE



CONCRETE THRUST ANCHOR FOR HDPE PIPE

EQUIVALENT DUCTILE IRON PIPE SIZES (DIPS)

NOMINAL PIPE SIZE (DIPS)	O.D. SIZE (INCHES)	CLASS 150 SDR 11	
		MIN WALL THICKNESS (INCHES)	MIN WALL THICKNESS (INCHES)
6"	6.90	0.627	0.823
8"	9.05	0.823	1.009
10"	11.10	1.009	1.200
12"	13.20	1.200	1.582
16"	17.40	1.582	1.964
20"	21.60	1.964	2.345
24"	25.60	2.345	

PIPE SIZE	THRUST BLOCK SIZE (W x D x L)	REINFORCEMENT
6"	2' x 2' x 12"	#5 @ 12" EWEF *
8"	2.5' x 2.5' x 12"	#5 @ 12" EWEF
12"	4' x 4' x 20"	#6 @ 12" EWEF
16"	5' x 5' x 26"	#6 @ 9" EWEF
20"	6.5' x 6.5' x 32"	#7 @ 12" EWEF
24"	8' x 8' x 36"	#8 @ 12" EWEF

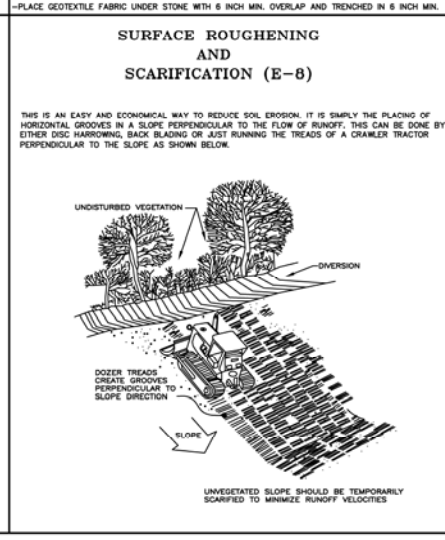
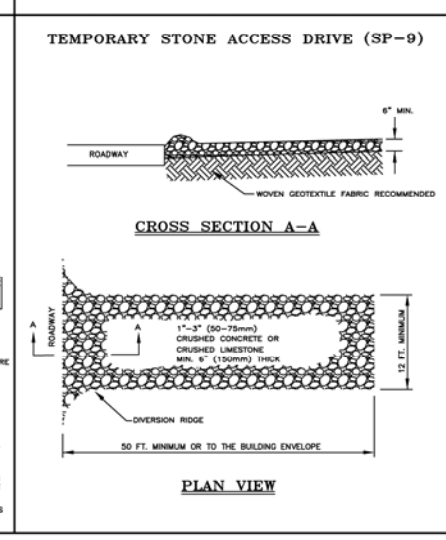
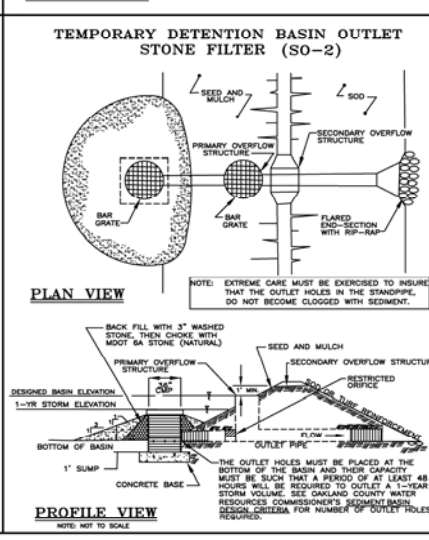
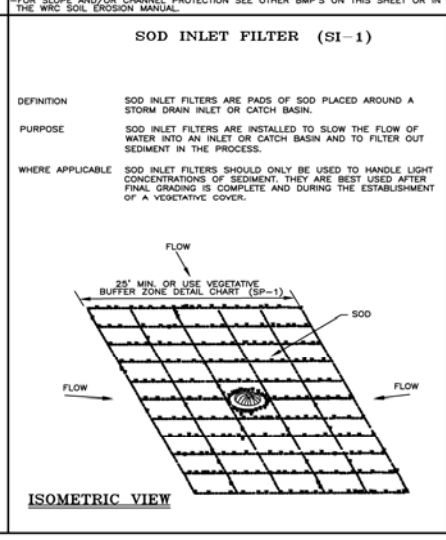
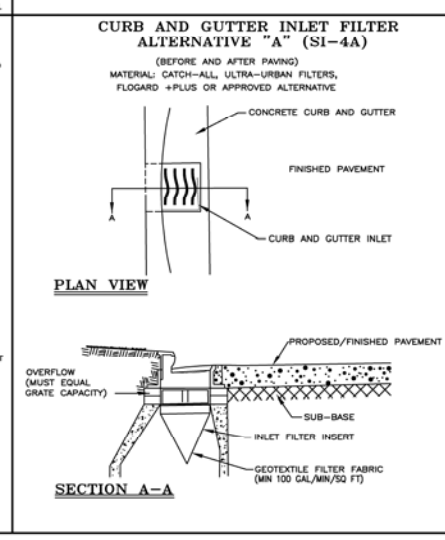
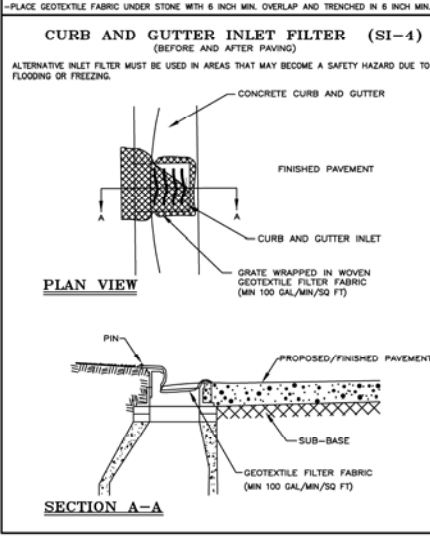
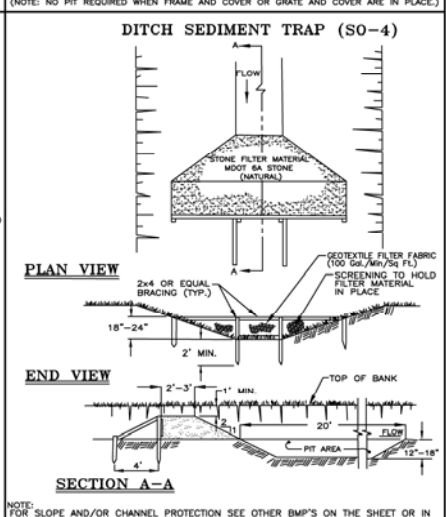
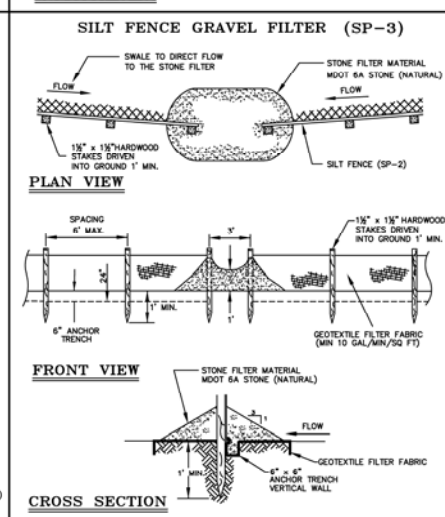
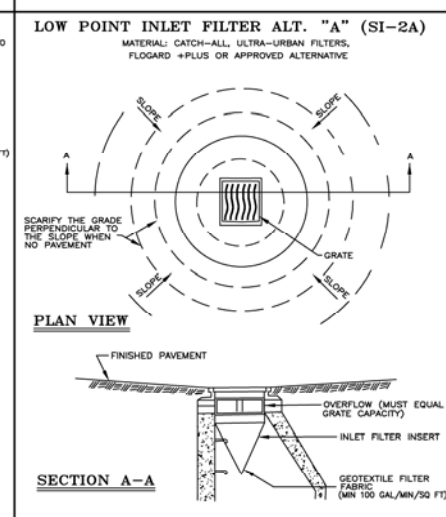
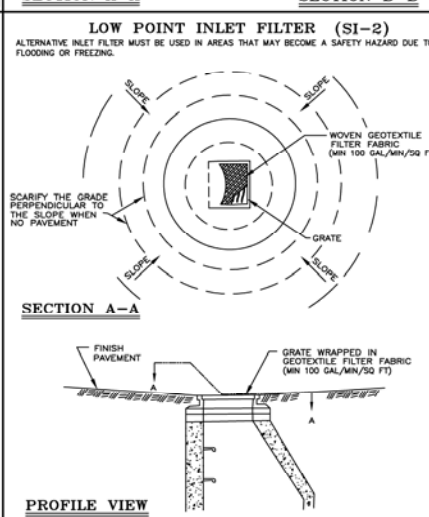
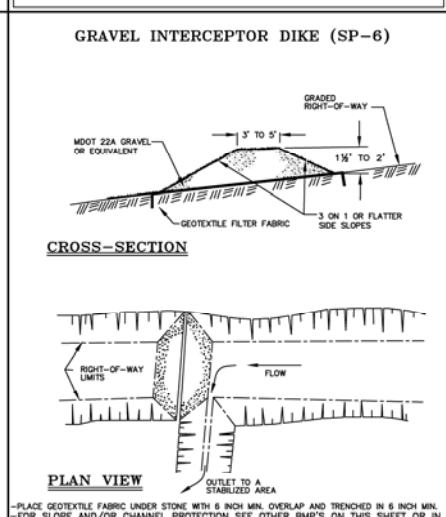
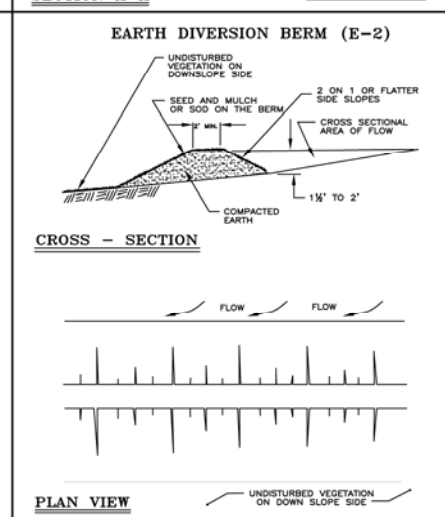
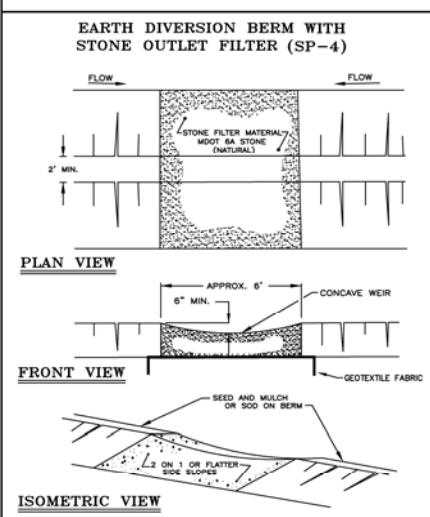
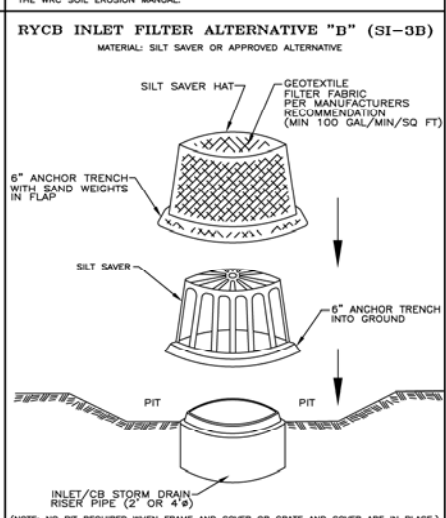
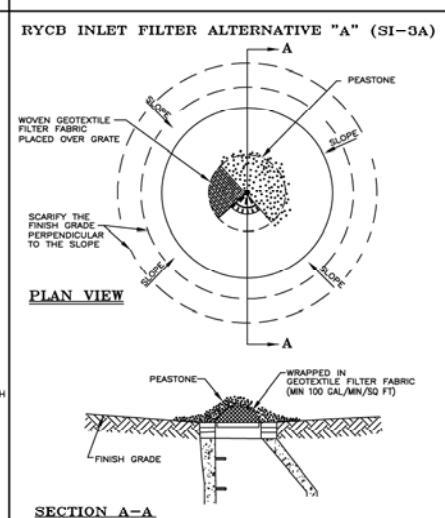
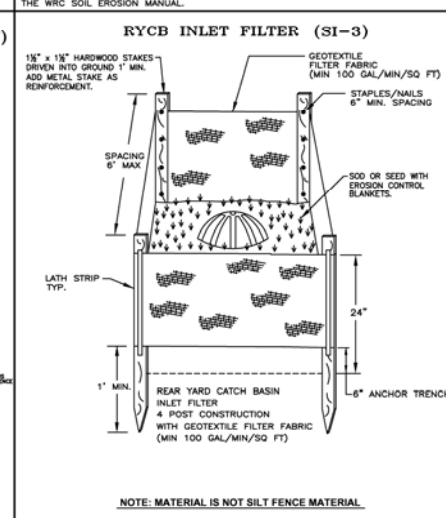
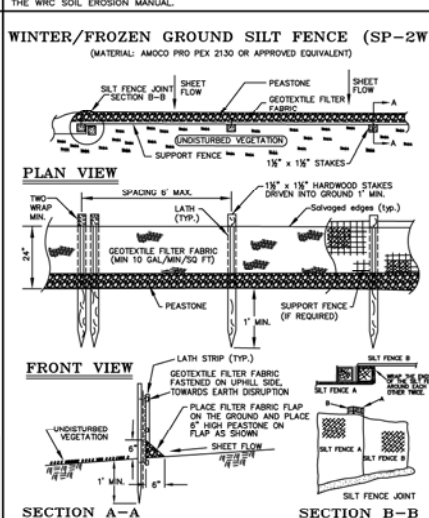
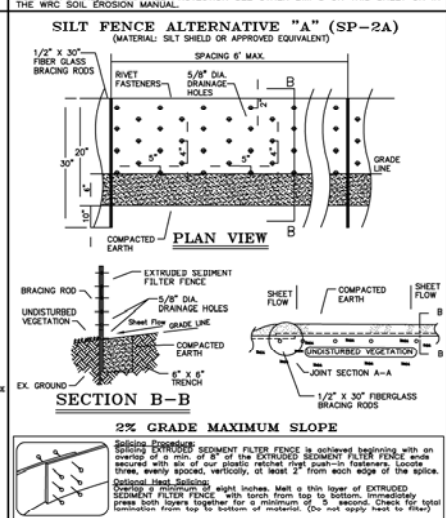
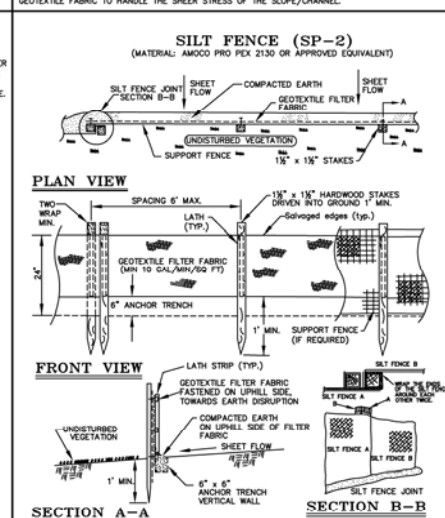
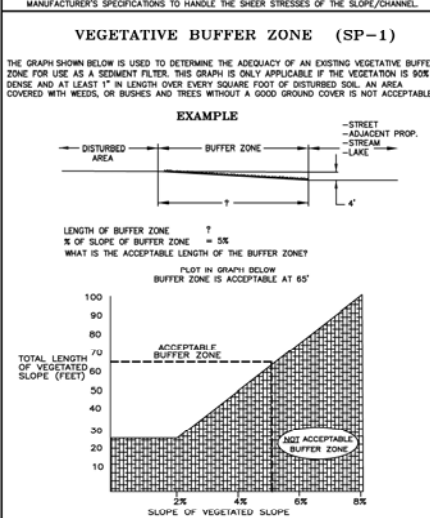
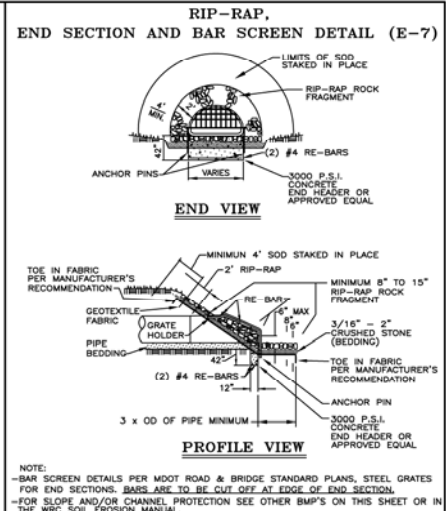
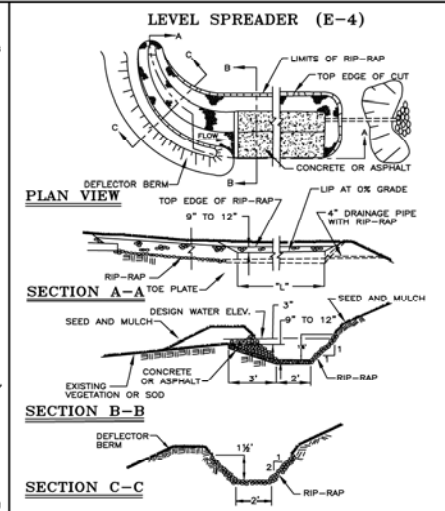
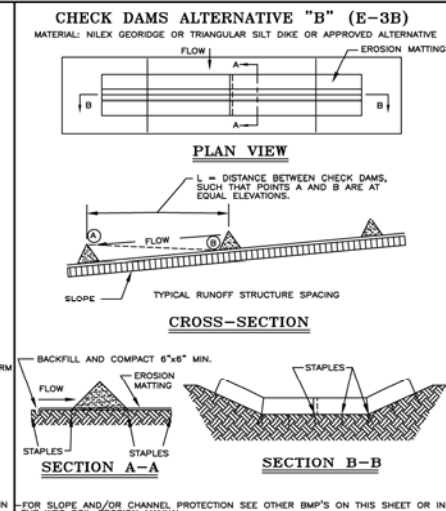
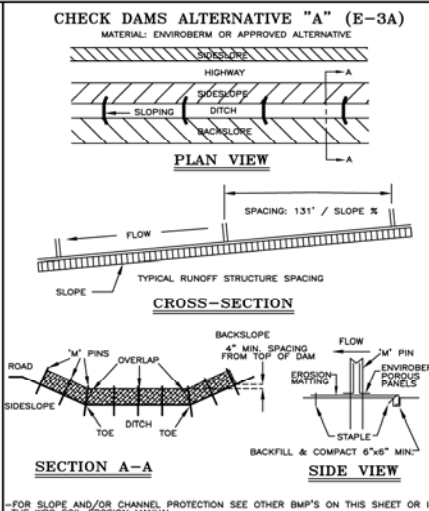
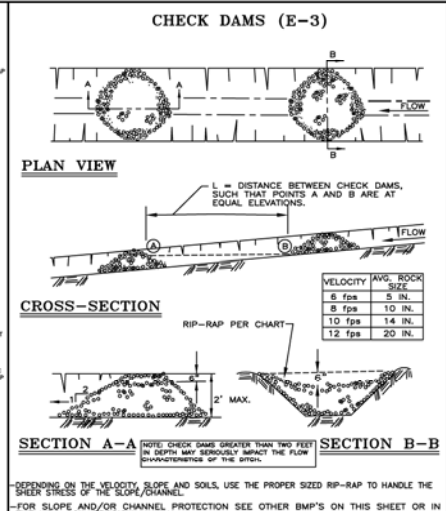
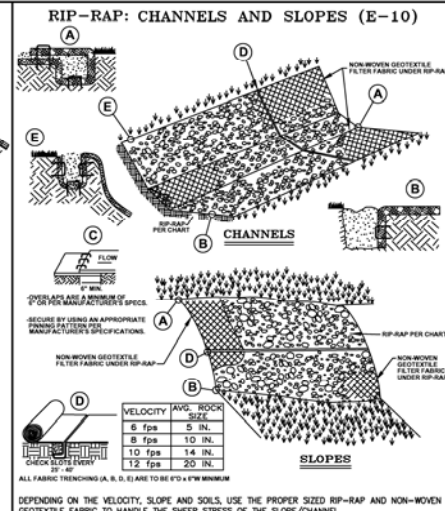
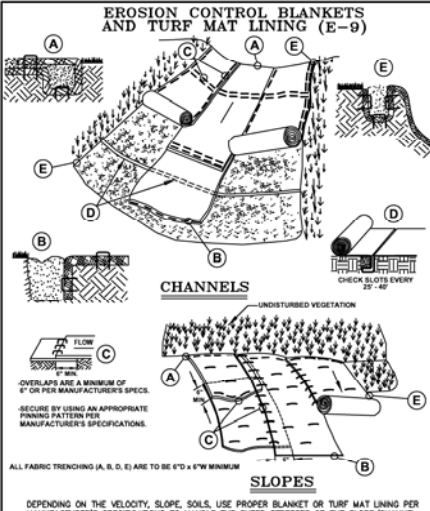
* EWEF = EACH WAY, EACH FACE

NOTE: VARIATIONS TO THE W AND D DIMENSIONS CAN BE MADE ON A CASE BY CASE BASIS DEPENDING ON THE DEPTH REQUIREMENTS FOR WATER MAIN FOR THAT PARTICULAR PROJECT. IF CHANGES ARE MADE TO THE SIZE, THE DESIGN ENGINEER WILL BE REQUIRED TO SUBMIT CALCULATIONS SUPPORTING THE REVISED SIZE, INCLUDING ANY CHANGES TO THE REINFORCING STEEL.

- NOTES:**
1. ALL GATE WELL PRECAST SECTIONS SHALL BE PREMIUM JOINT.
 2. LIFT HOLES SHALL BE FILLED WITH CONCRETE.
 3. FOR WATER MAIN LARGER THAN 16" DIAMETER, A 16" GATE VALVE SHALL BE USED. REDUCERS SHALL BE INSTALLED ON THE WATER MAIN OUTSIDE OF THE GATE WELL.
 4. USE A 5" DIAMETER GATE WELL FOR 8" HDPE ASSEMBLY AND USE A 6" DIAMETER GATE WELL FOR A 12" HDPE ASSEMBLY.

HIGH-DENSITY POLYETHYLENE (HDPE) WATER MAIN NOTES

1. HDPE pipe shall be manufactured from high density PE 3408 polyethylene resin and shall have a standard dimension ratio (SDR) of 11 or less and a minimum working pressure rating pipe of 160 psi. The SDR is the outside diameter of the pipe divided by the minimum wall thickness.
 2. HDPE pipe, appurtenances, and installation methods shall conform to the most current edition of AWWA standard C906.
 3. All HDPE materials must be listed and approved for use under ANSI/NSF Standard 14.
 4. All pipes shall be made of virgin material as defined in ASTM D3350 with an established hydrostatic design basis of 160 psi. for water at 73.4°F. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogeneous throughout and shall be free of visible cracks, holes, foreign materials, blisters, or other deleterious faults.
 5. A certificate of "Compliance with Specification" shall be furnished for all materials supplied.
 6. The physical appearance of the pipe having deformities such as concentrated ridges, discoloration, excessive spot roughness, pitting, varying wall thickness, etc., shall constitute sufficient basis for rejection. Pipe with gashes, nicks, abrasions or any physical damage that occurred during storage and/or handling which are wider or deeper than 10% of the wall thickness, shall not be used and must be removed from the construction site. Any pipe that has been damaged or does not meet the City's approval shall be replaced at the Contractor's expense.
 7. Mechanical fittings used with HDPE pipe shall be specifically designed for, or tested and found to be acceptable for use with HDPE by the fitting manufacturer. Mechanical fittings designed for other materials shall not be used.
 8. Tracing wire shall be provided per the City's specifications and details for all water mains. Wire shall be copper, 12 gage stranded, blue insulated per City's requirements and shall be brought through each gate well and connected to the top step. In addition, an approved continuous tracing tape shall be placed one foot above the HDPE pipe. Underground marking tape shall be Magntech, 3" wide, foil-backed tape, #31-022 by Empire Level Manufacturing Corp., or approved equal.
 9. Pipe and fittings must be marked as prescribed by AWWA C906 and NSF. Pipe markings will include nominal size, OD base, dimension ratio, pressure class, working pressure rating, AWWA C906, manufacturer's name, manufacturer's production code including day, month, year extruded, and manufacturer's plant and extrusion line; and optional NSF logo. Permanent identification of piping service shall be provided by co-extruding longitudinal blue stripes into the outside of the pipe (stripes printed on the outside surface of the pipe shall not be acceptable) or the pipe material shall be black with a blue shell.
 10. Personnel trained in the use of butt-fusion equipment shall perform the joining of polyethylene pipe by methods recommended for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the HDPE pipe by a qualified representative.
 11. The mechanical joint end must meet outside diameter requirements for connection to ANSI/AWWA C111/A21 and ANSI/AWWA C153/A21.53 mechanical joints. The adapter through-bore inside diameter is equal to SDR11 DIPS HDPE pipe. Butt-fusion ends must meet AWWA C906 DIPS requirements for butt fusion to SDR11.
 12. Bolts, nuts, gaskets, and glands meeting ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 are recommended. Install mechanical joint components in accordance with manufacturer's recommendations.
 13. Connections to HDPE pipe shall not be made immediately after the pipe has been installed. The fused pipe should be laid in the trench and be allowed to reach an equilibrium temperature overnight (24-hour period) in its surrounding environment.
 14. The HDPE pipe must be properly aligned at all transitions to conventional or HDPE water main and appurtenances.
 15. Under no circumstances shall HDPE pipe be pressure tested when the temperature of the pipe is above 80°F.
 16. The polyethylene pipe shall be pressure tested after the line and all fittings and valves have been installed. Connections may be left exposed for visual leak inspection.
 17. The newly installed polyethylene water main will be disinfected and samples checked for complete disinfection by the City of Auburn Hills DPW. The number of samples and sampling points will be determined by the city.
 18. Water service saddles on HDPE water main shall be "VA" Electrofusion Service Saddles by Friatec, Inc. or approved equal.
- ADDITIONAL NOTES FOR WATER MAIN PIPE BURSTING PROJECTS**
19. The method approved for rehabilitation of existing water mains by pipe bursting and installation of new HDPE pipe is T.I. Technologies GRUNDOCRACK SYSTEMS, 800-533-2078) or approved equal. All contractors must be licensed to use the particular technology proposed for this work.
 20. The pipe-bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall be pneumatic and shall generate enough force to burst and compact the existing pipeline.
 21. The Manufacturer's specifications shall dictate what size tool should be used in what diameter pipe, as well as parameters of what size tool for percentage of upsizes allowed.
 22. Prior to construction, the Contractor shall develop a temporary water system to supply water services to area residents and businesses during pipe bursting operations. It is anticipated that the temporary system will be fed from existing fire hydrants. The temporary system and hydrants shall have passed bacteriological testing by the City of Auburn Hills DPW.
 23. All service connections on the existing water main that is to be burst or will be taken out of service, shall be connected to the temporary water system prior to mainline bursting, disinfection, testing and service reconnection operations. Temporary service connections shall be made at the water service stop box by disconnecting the existing water service and connecting the temporary water line to the stop box.



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

Rev.	Date	Description
1	01/10/01	ISSUED FOR BIDDING
2	02/01/01	REVISED DETAIL
3	03/01/01	REVISED DETAIL
4	04/01/01	REVISED DETAIL
5	05/01/01	REVISED DETAIL
6	06/01/01	REVISED DETAIL
7	07/01/01	REVISED DETAIL
8	08/01/01	REVISED DETAIL
9	09/01/01	REVISED DETAIL
10	10/01/01	REVISED DETAIL
11	11/01/01	REVISED DETAIL
12	12/01/01	REVISED DETAIL

ORIG. DATE: 01/10/01

SCALE: NONE

DESIGNED BY: WRC

DRAWN BY: Mapro

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST WATERGARD MICHIGAN 48318-1907

WRC WATER RESOURCES COMMISSIONERS

SHEET NO. 1 of 1