

CITY OF NOVI 45175 WEST 10 MILE ROAD | NOVI, MI 48275 | P (248) 347-3456 | WWW.CITYOFNOVI.ORG

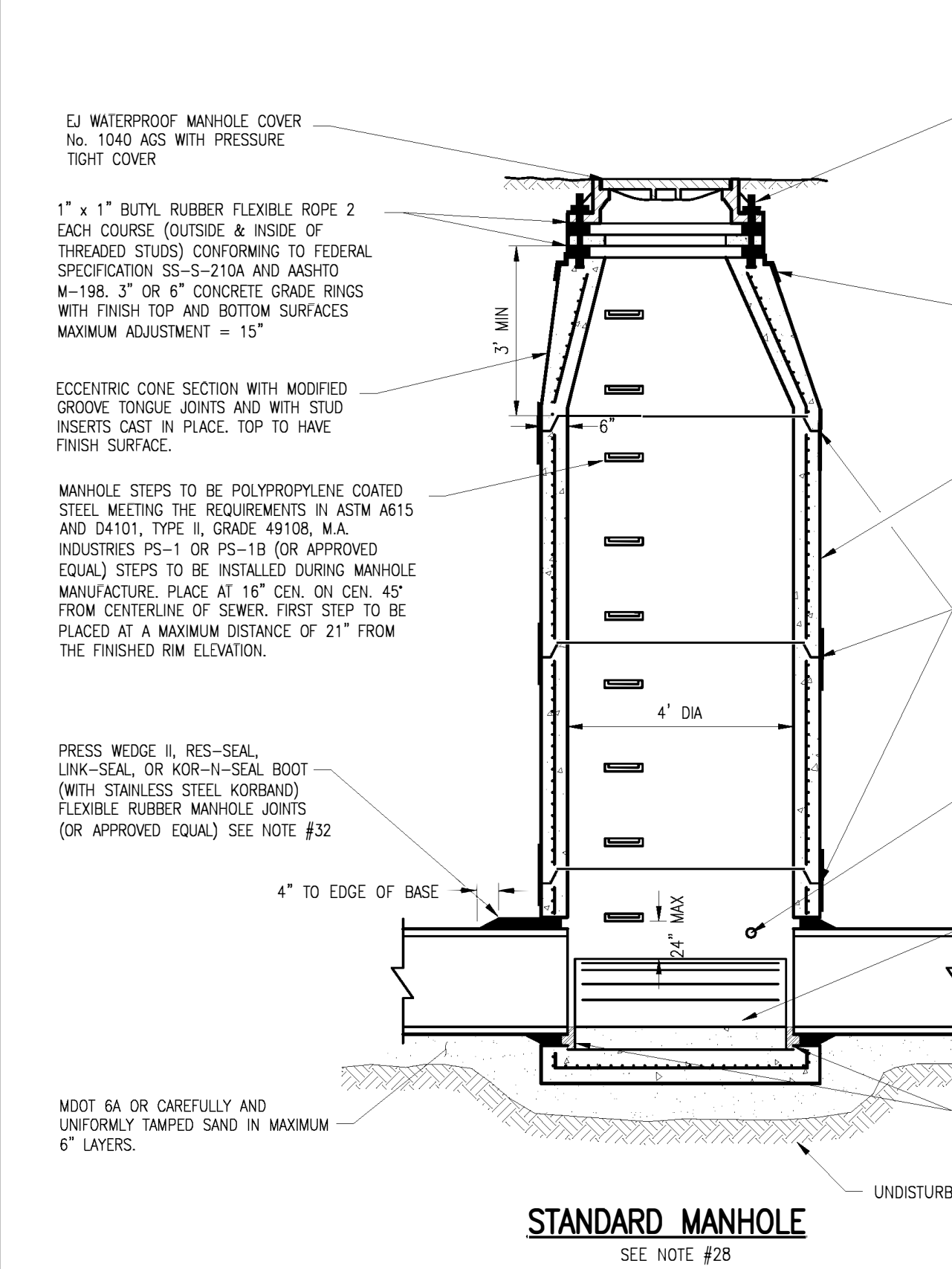
SCALE: V: N.T.S.

COUNTY: OAKLAND COUNTY

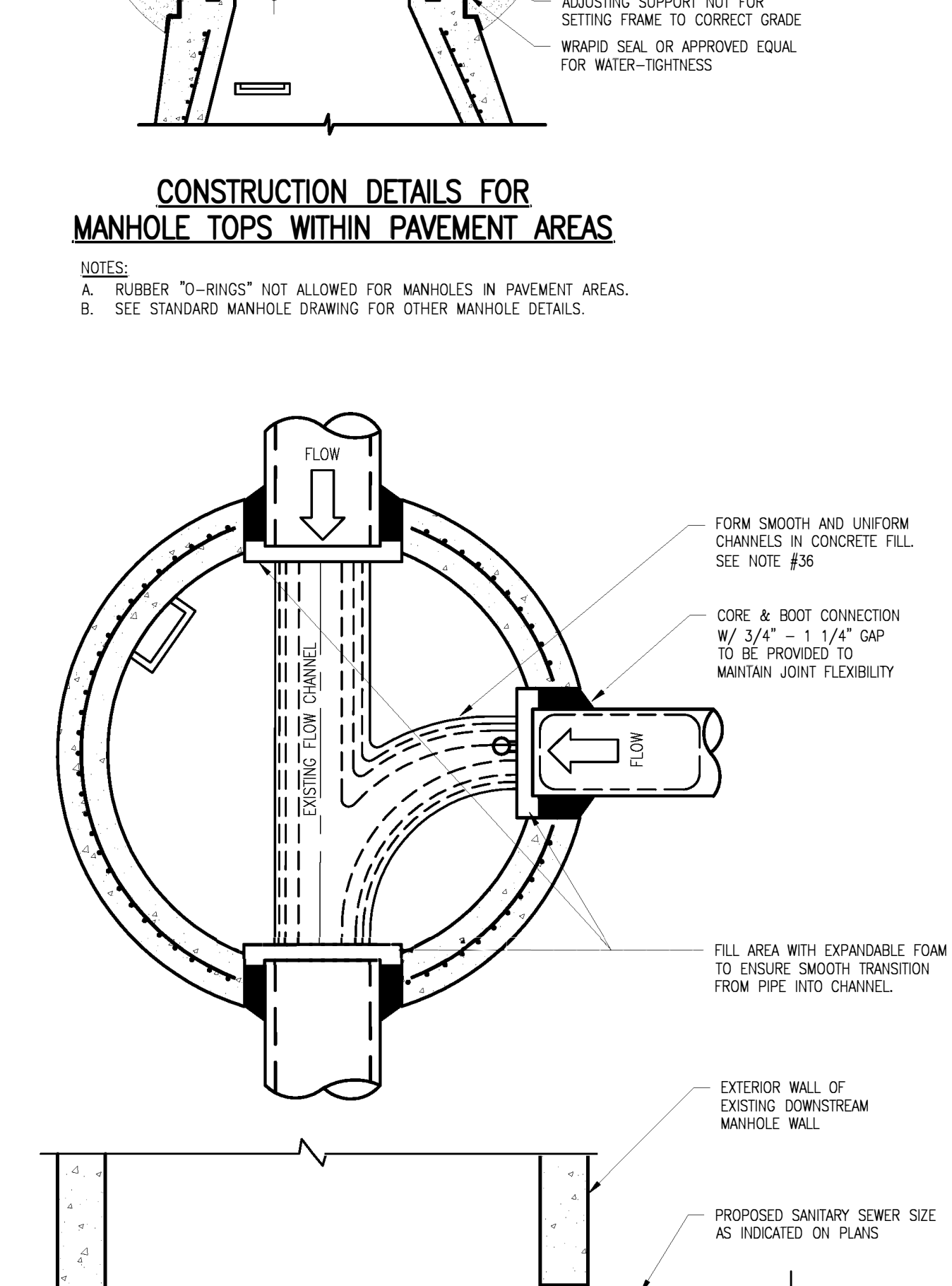
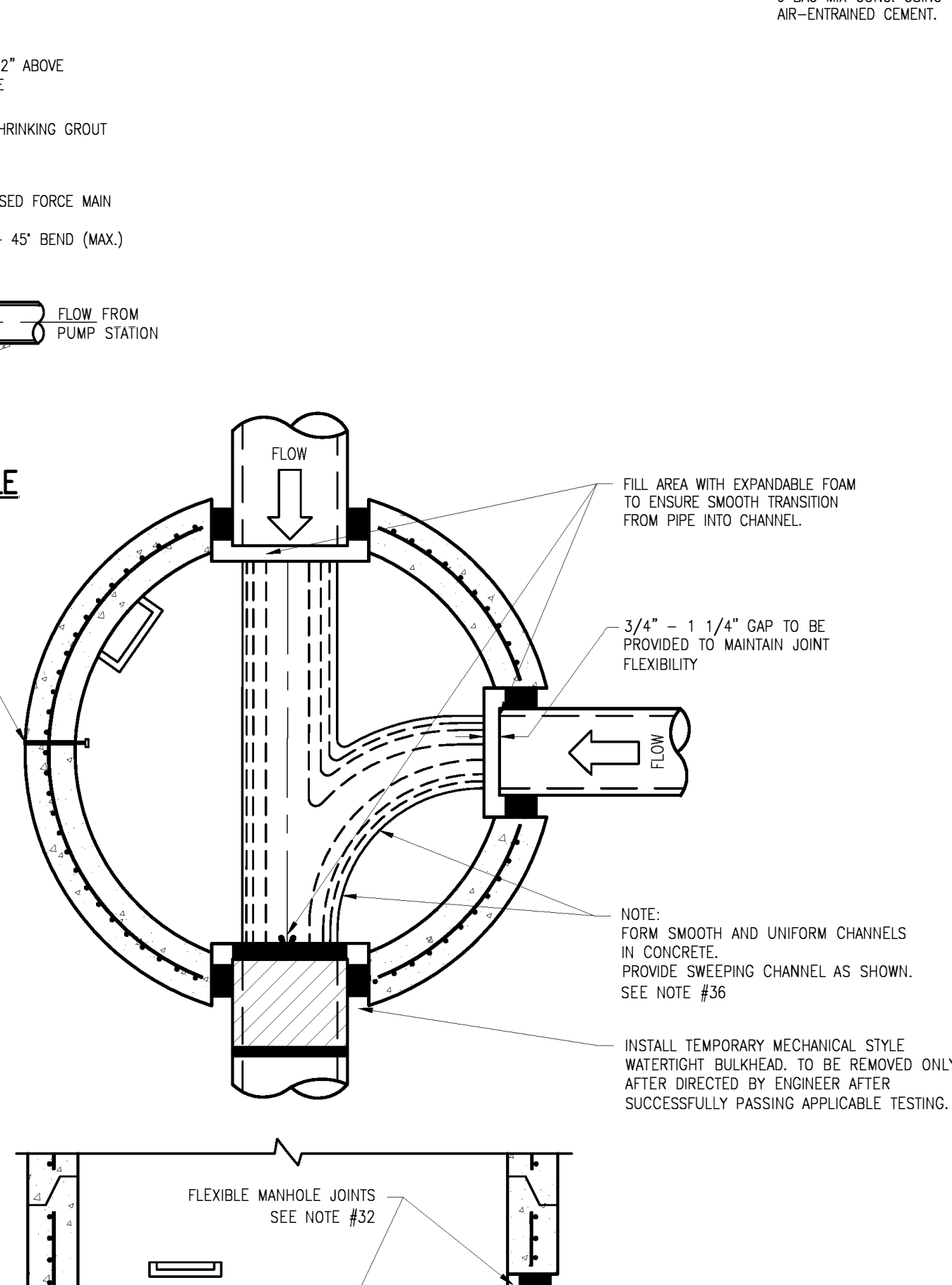
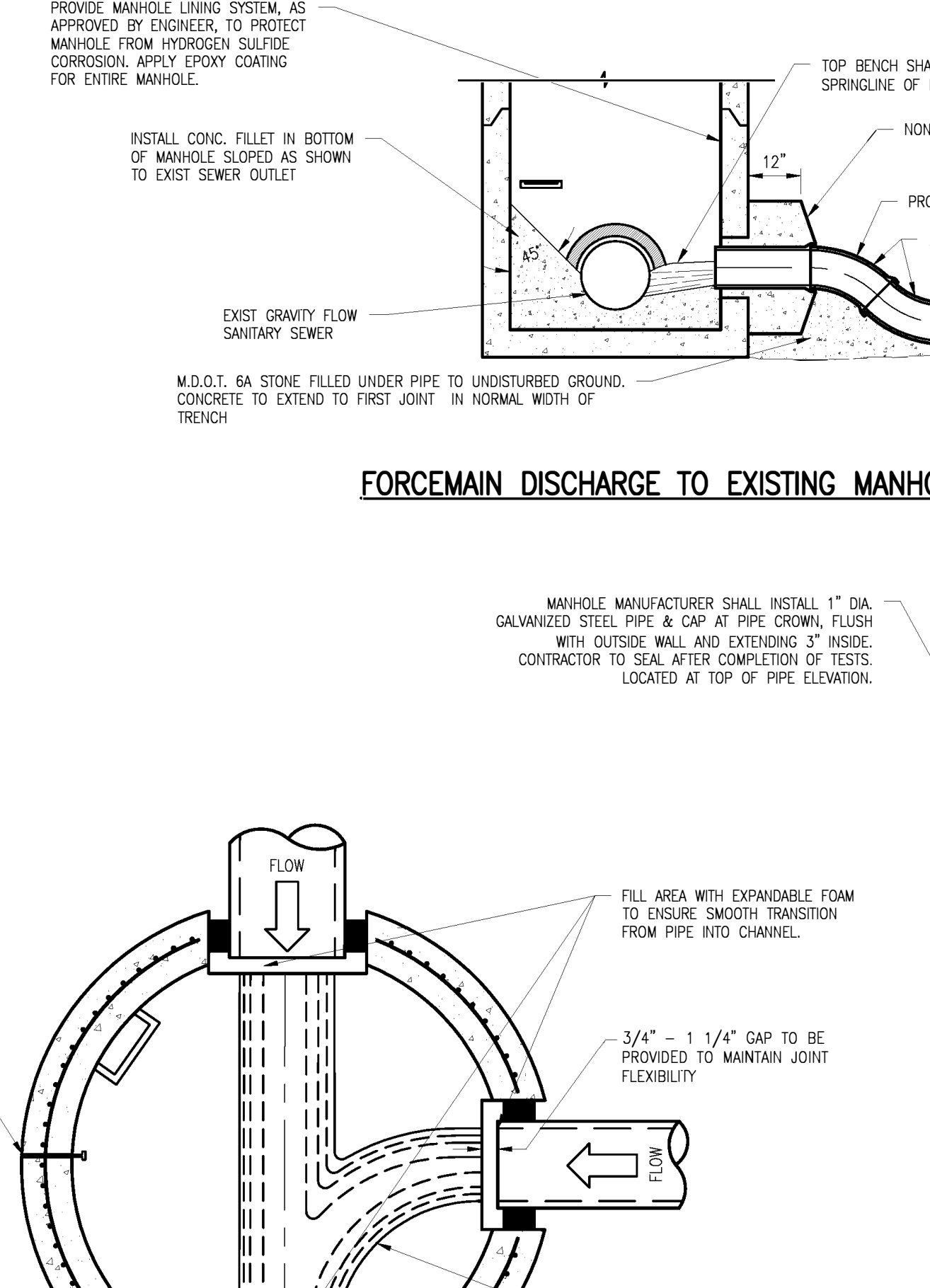
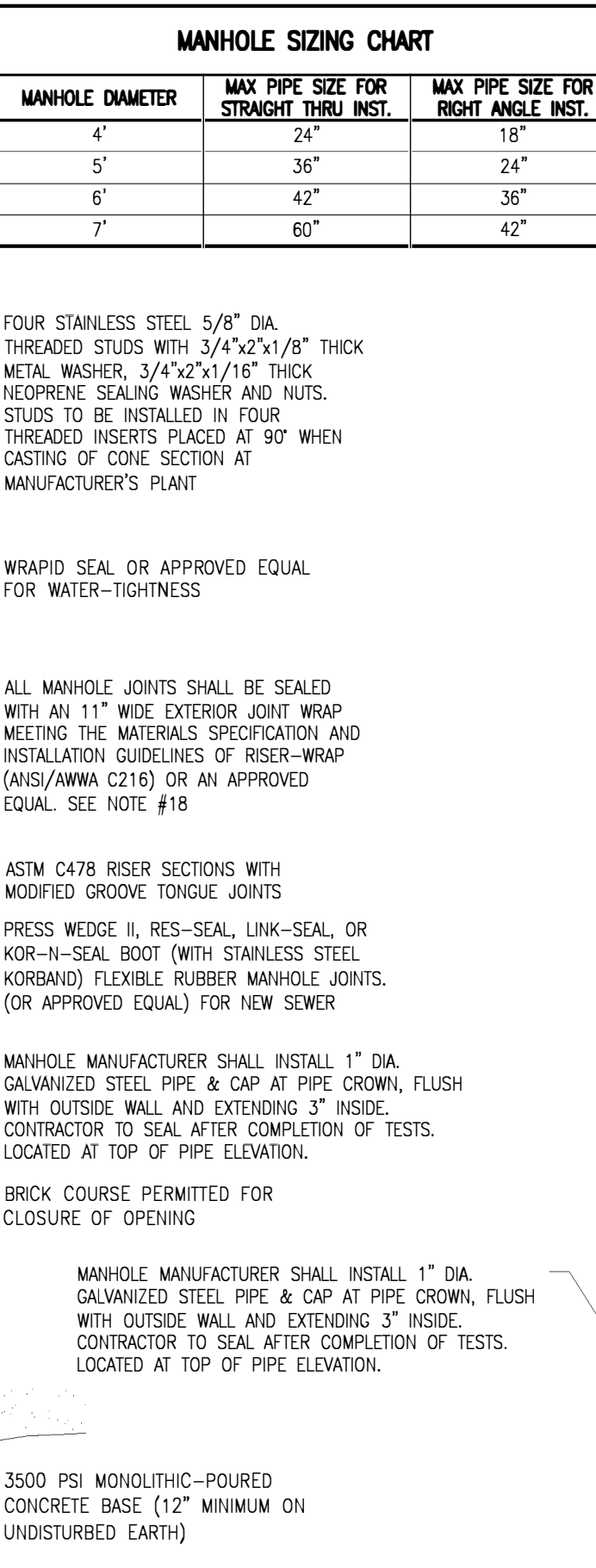
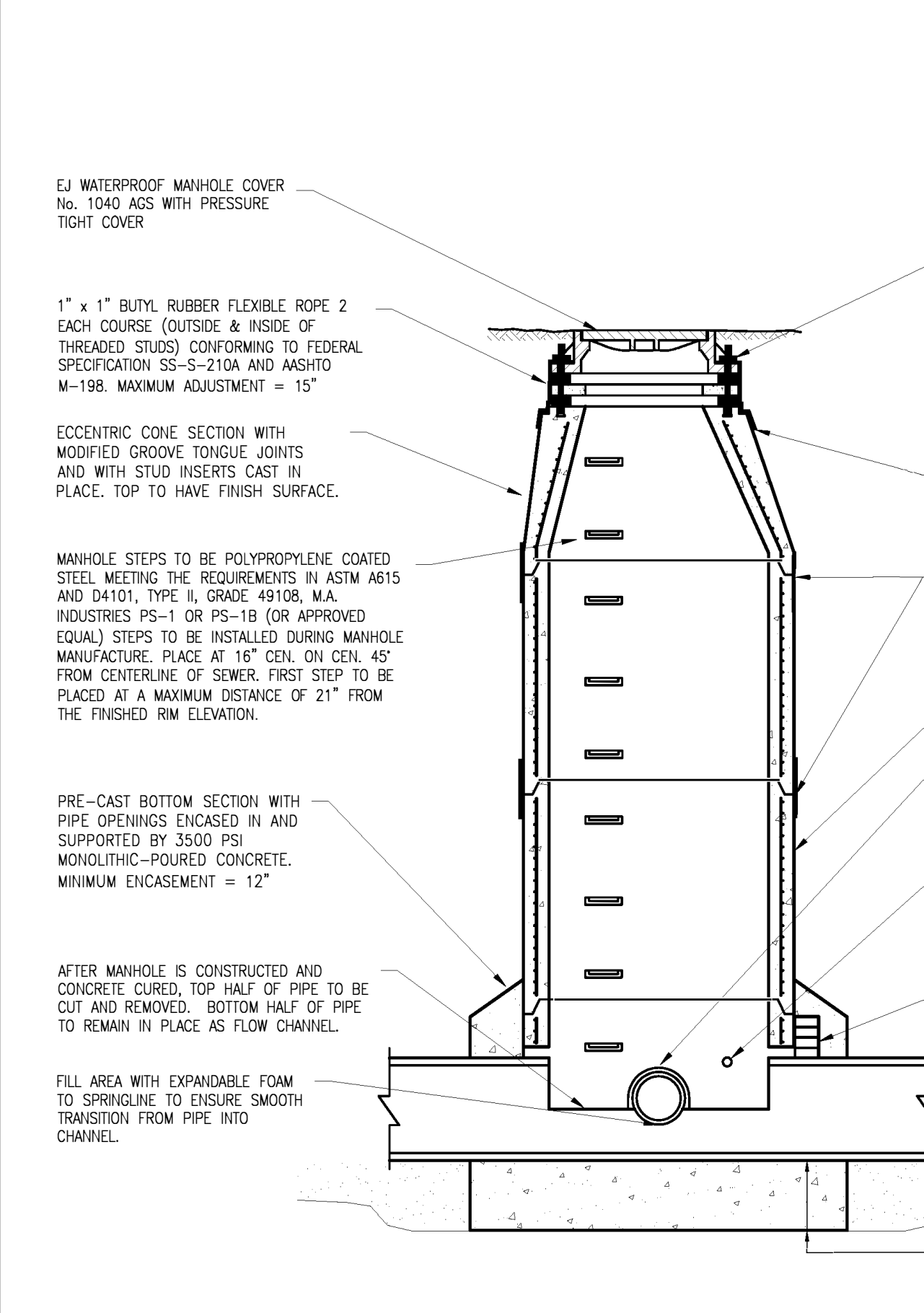
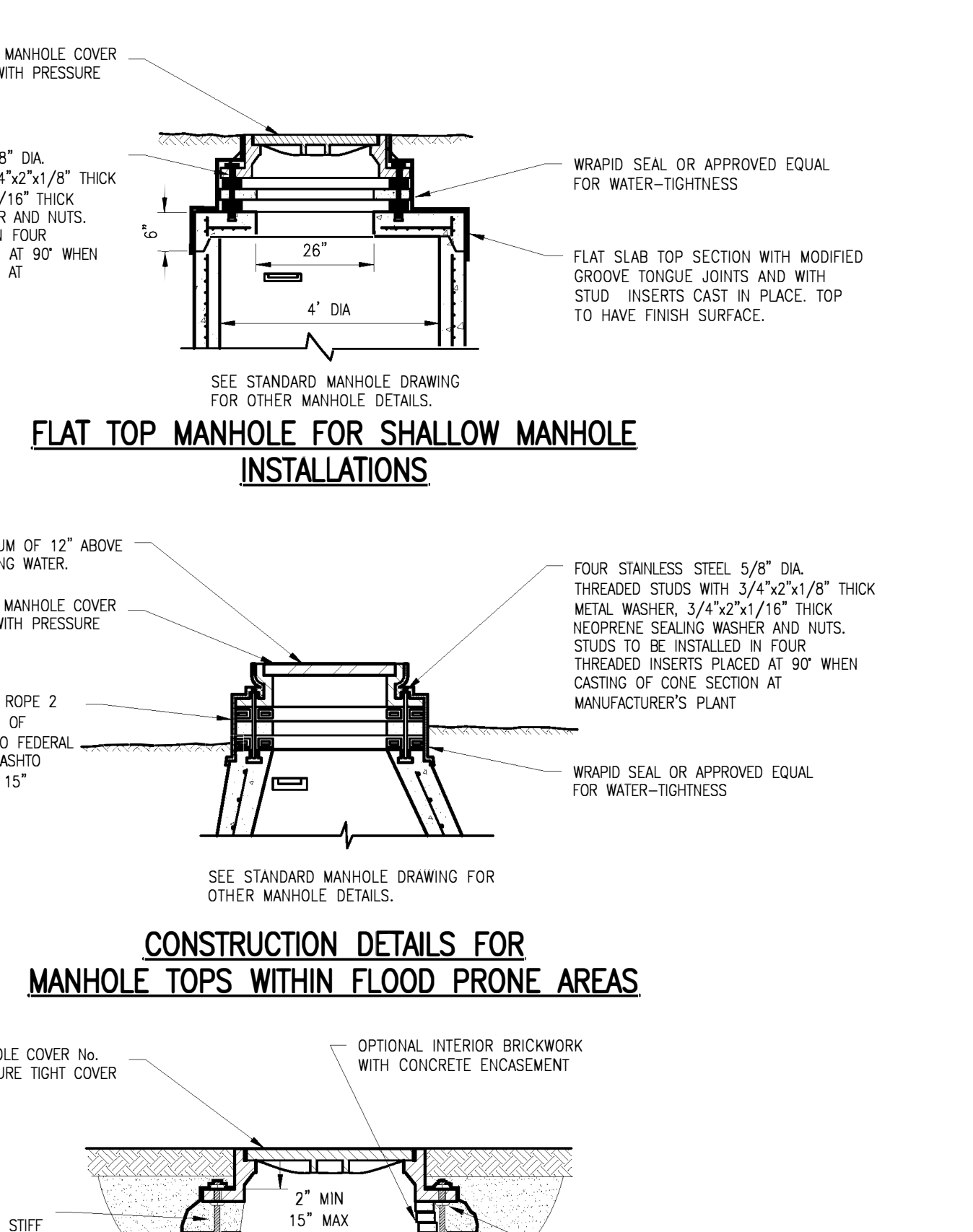
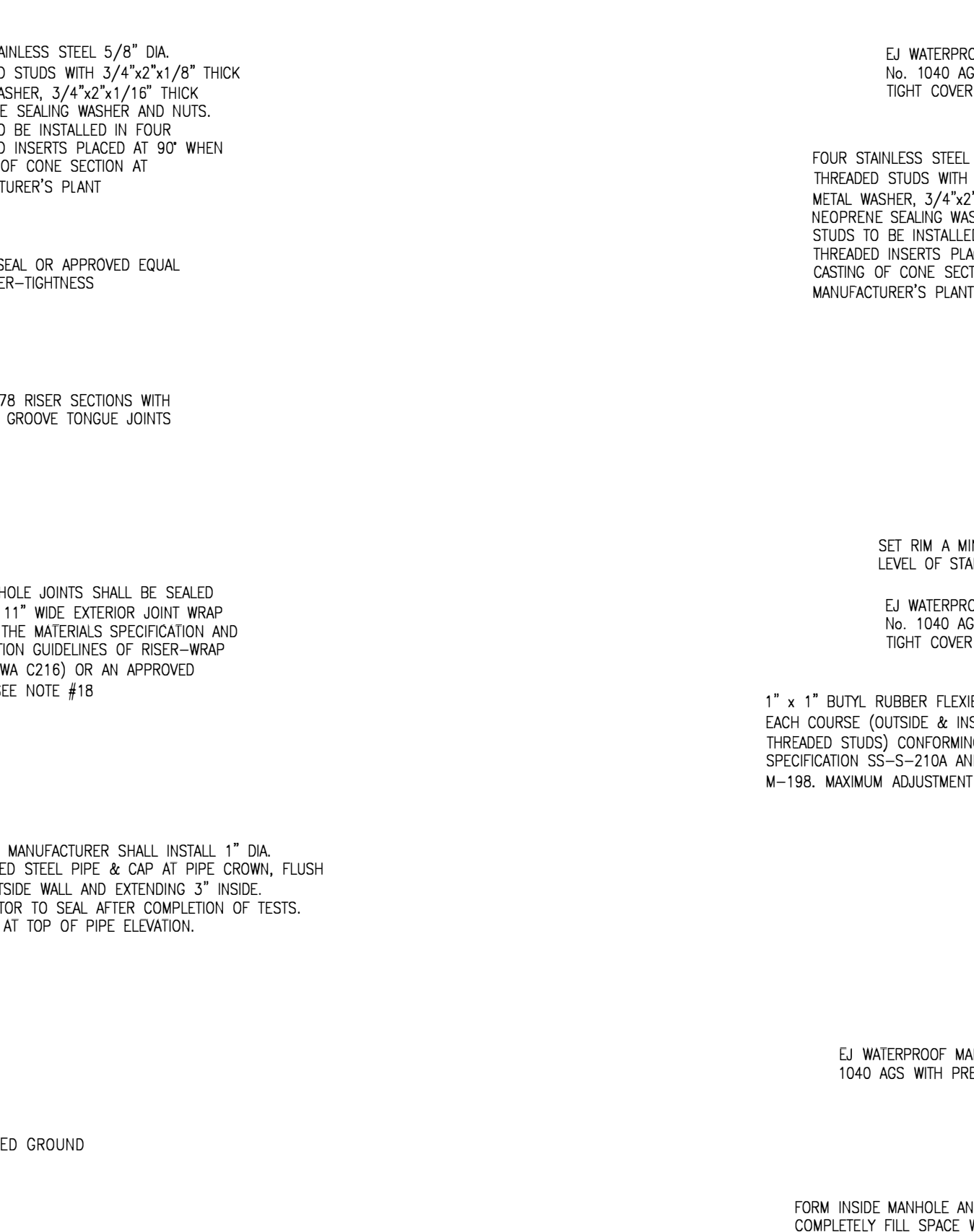
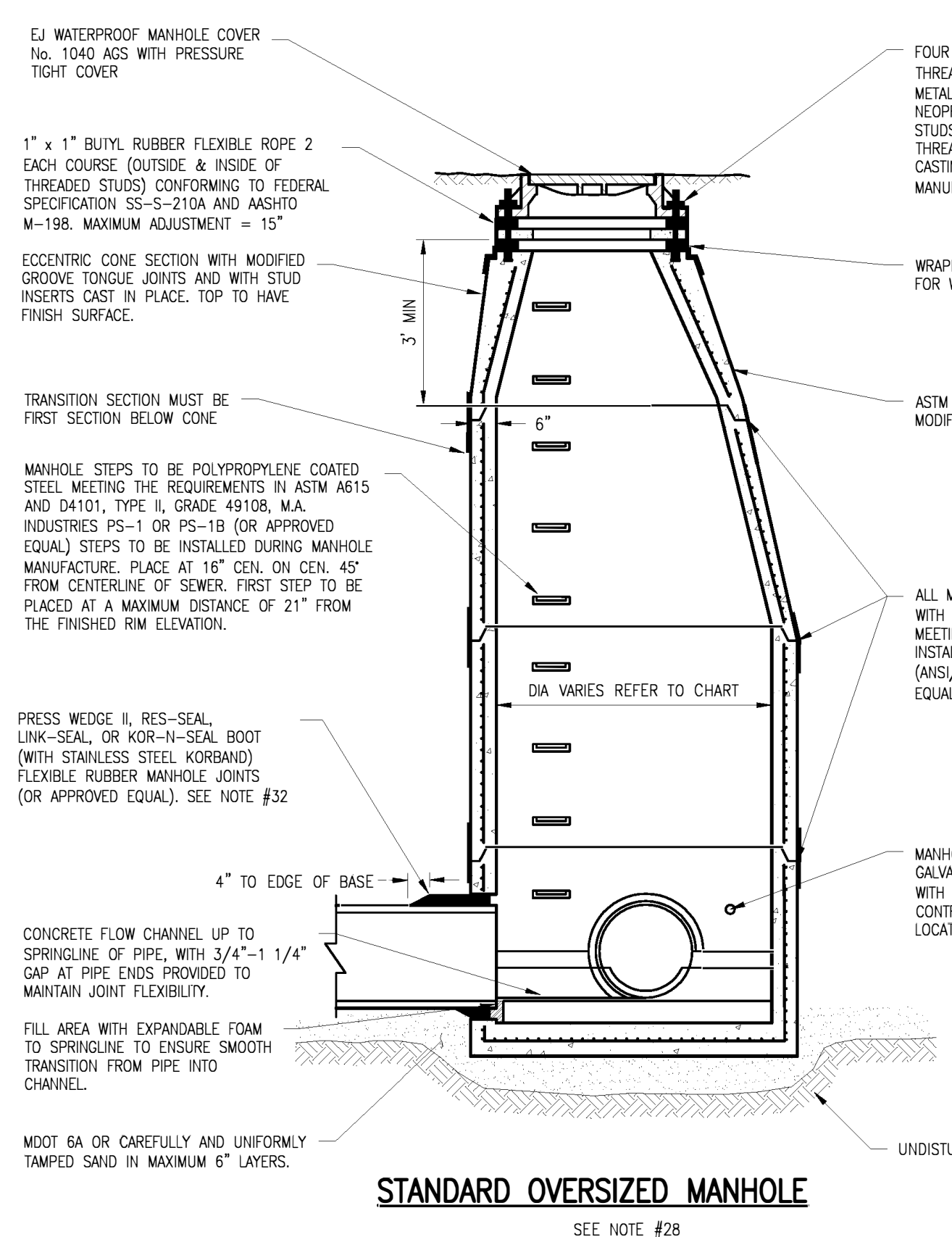
TOWN: BE

CITY OF NOVI
SANITARY SEWER
STANDARD DETAILS

SHEET
1
OF 3

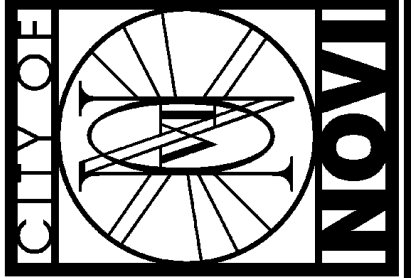


MANHOLE SIZING CHART		
MANHOLE DIAMETER	MAX PIPE SIZE FOR STRAIGHT THRU INST.	MAX PIPE SIZE FOR RIGHT ANGLE INST.
4'	24"	18"
5'	36"	24"
6'	42"	36"
7'	60"	42"



NOTE:
REMOVAL AND/OR REPLACEMENT OF ANY INSTALLATION WHICH DOES NOT MEET THE CITY OF NOVI DESIGN MANUAL OR THESE STANDARD DETAILS MAY BE REQUIRED AT THE PROPERTY OWNER'S EXPENSE.

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CITY OF NOVI | 4575 WEST 10 MILE ROAD | NOVI, MI 48275 | P. (248) 347-4468 | WWW.CITYOFNOVI.ORG

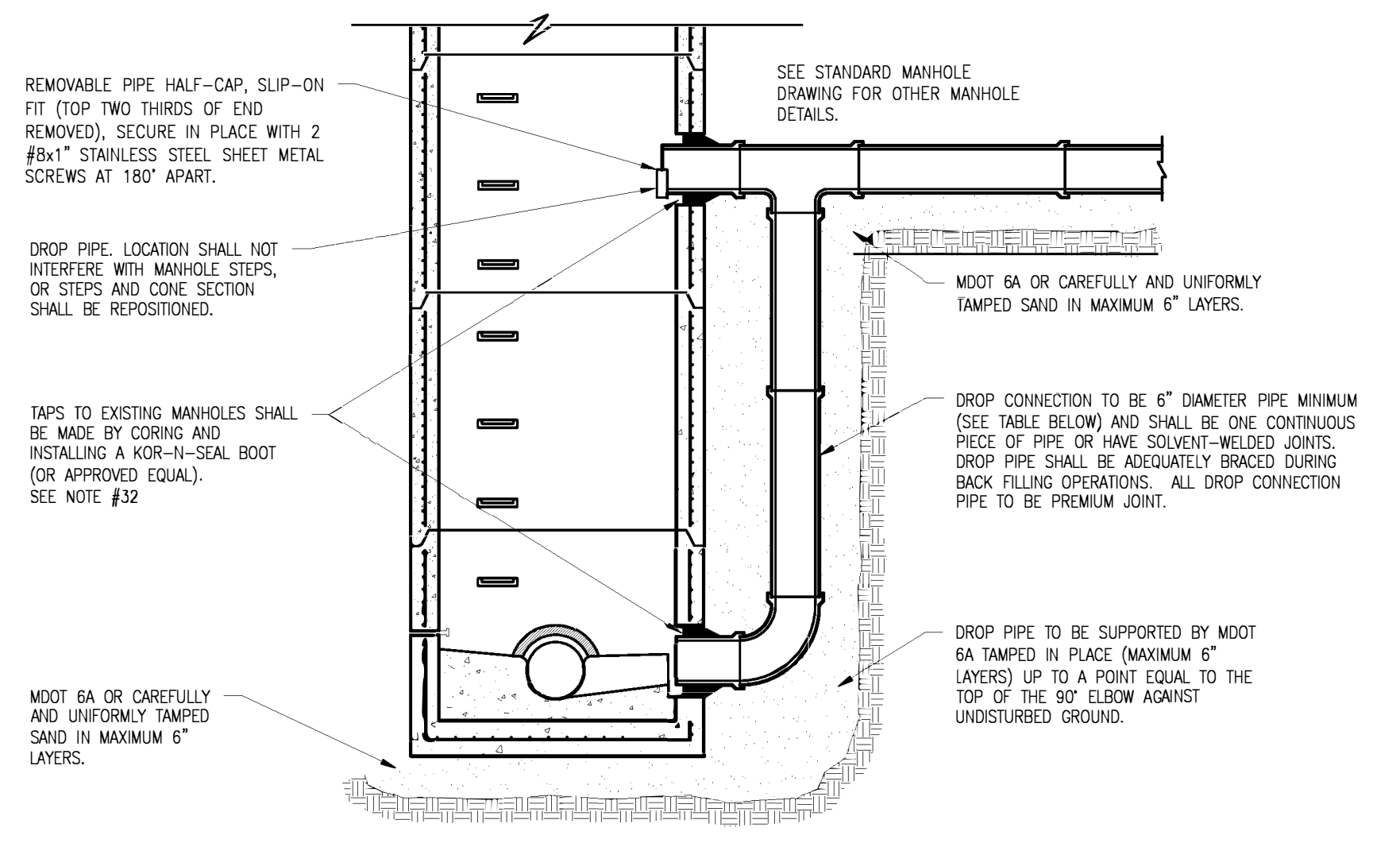
SCALE: V. N.T.S. H. N.T.S.

COUNTY: OAKLAND COUNTY

TOWN: NOVI

CITY OF NOVI
SANITARY SEWER
STANDARD DETAILS

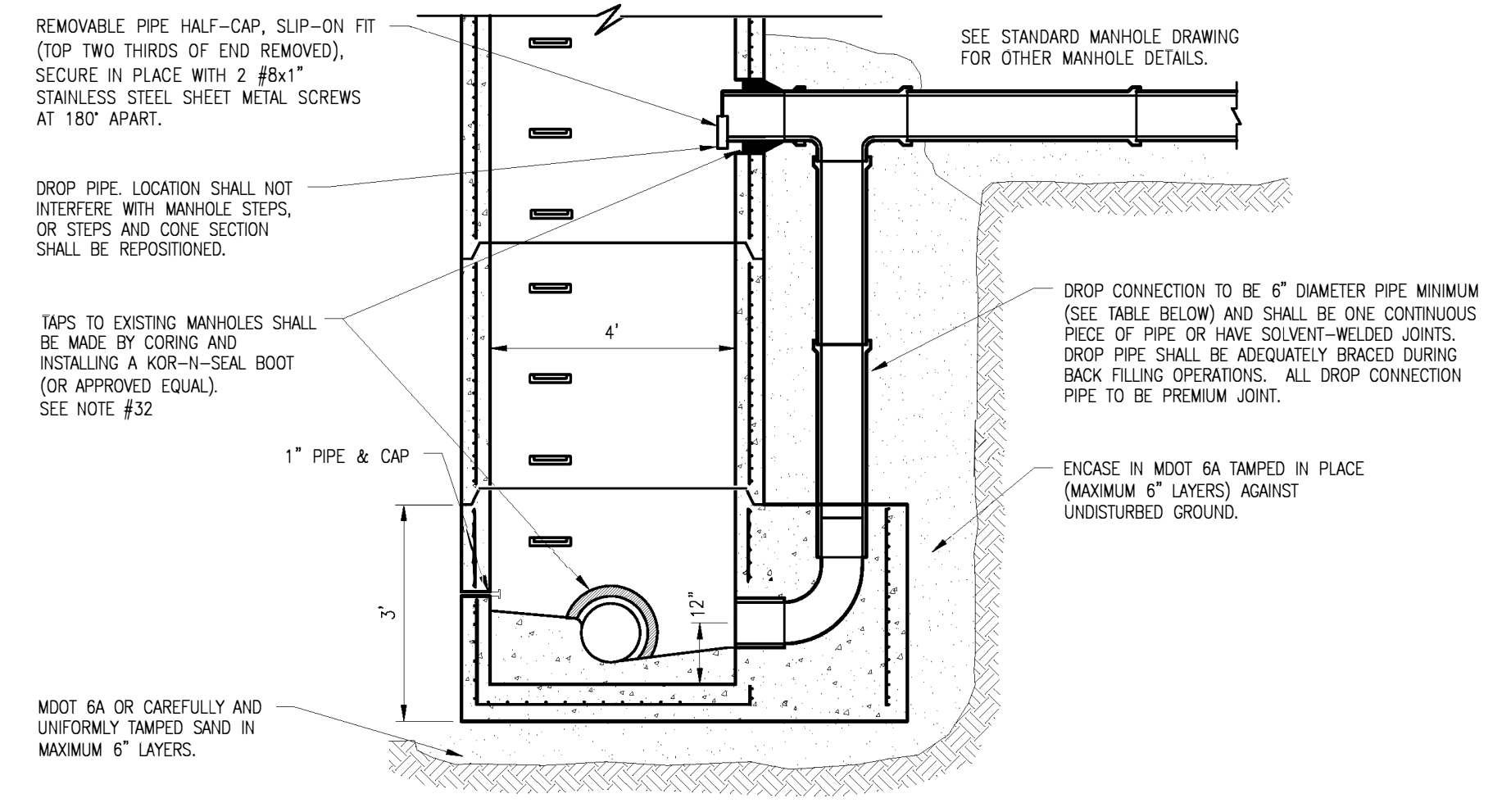
SHEET
2
OF 3



EXISTING MANHOLE EXTERNAL DROP CONNECTION

SEE NOTES #29, #30 AND #32

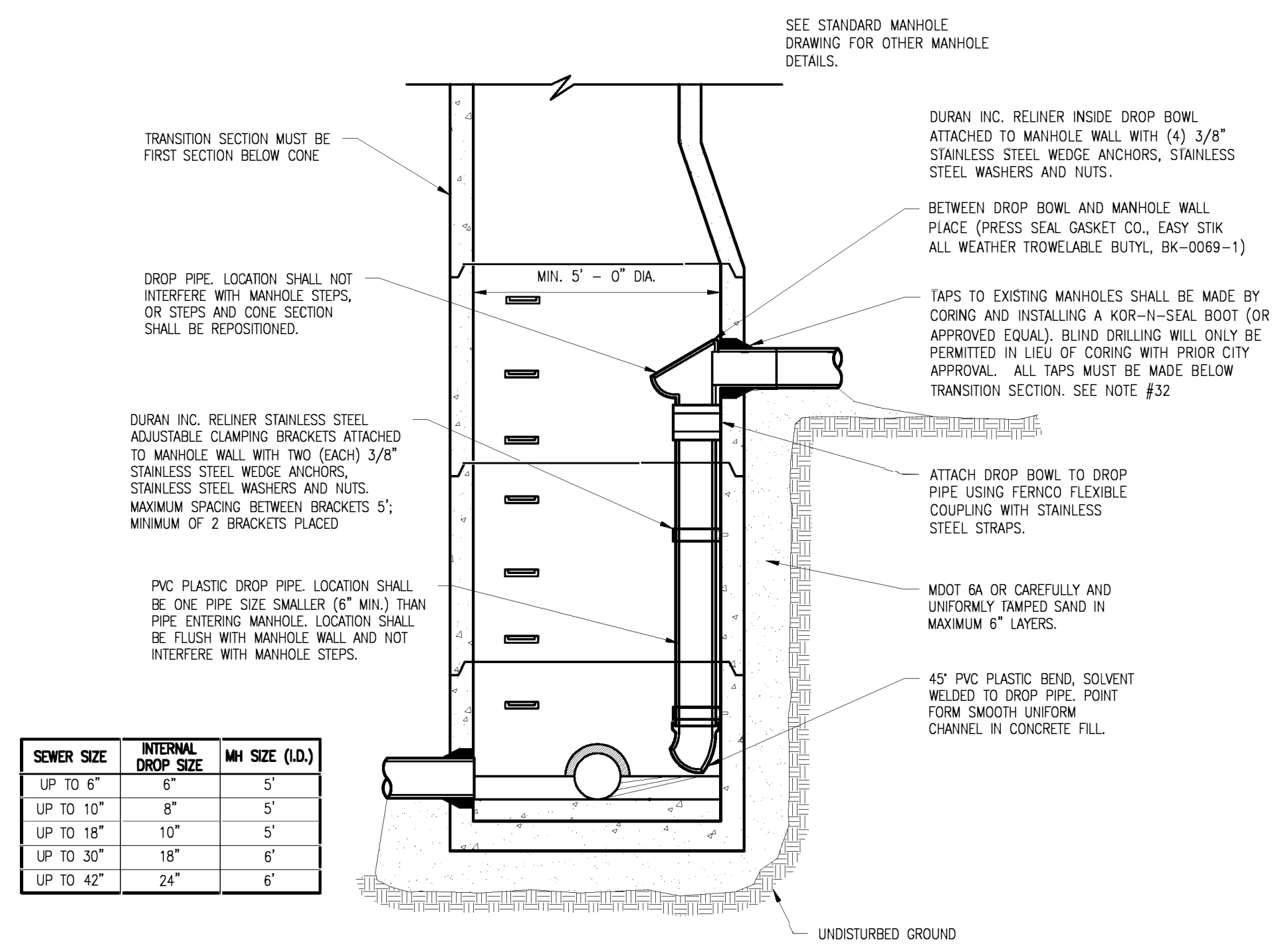
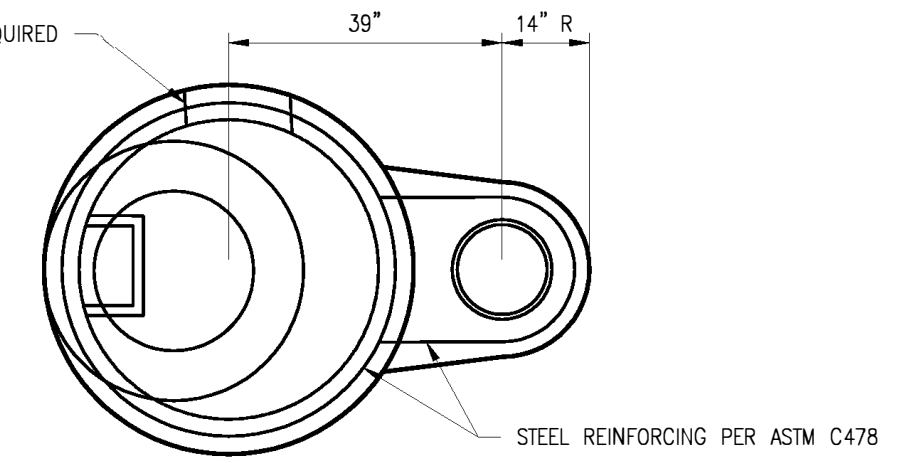
SEWER SIZE	EXTERNAL DROP SIZE	MH SIZE (L.D.)
UP TO 6"	6"	4'
UP TO 10"	8"	4'
UP TO 18"	10"	4'
UP TO 30"	18"	5'



EXTERNAL DROP MANHOLE CONNECTION WITH PRECAST BASE FOR NEW SEWER SYSTEM CONSTRUCTION

SEE NOTES #29, #30 AND #31

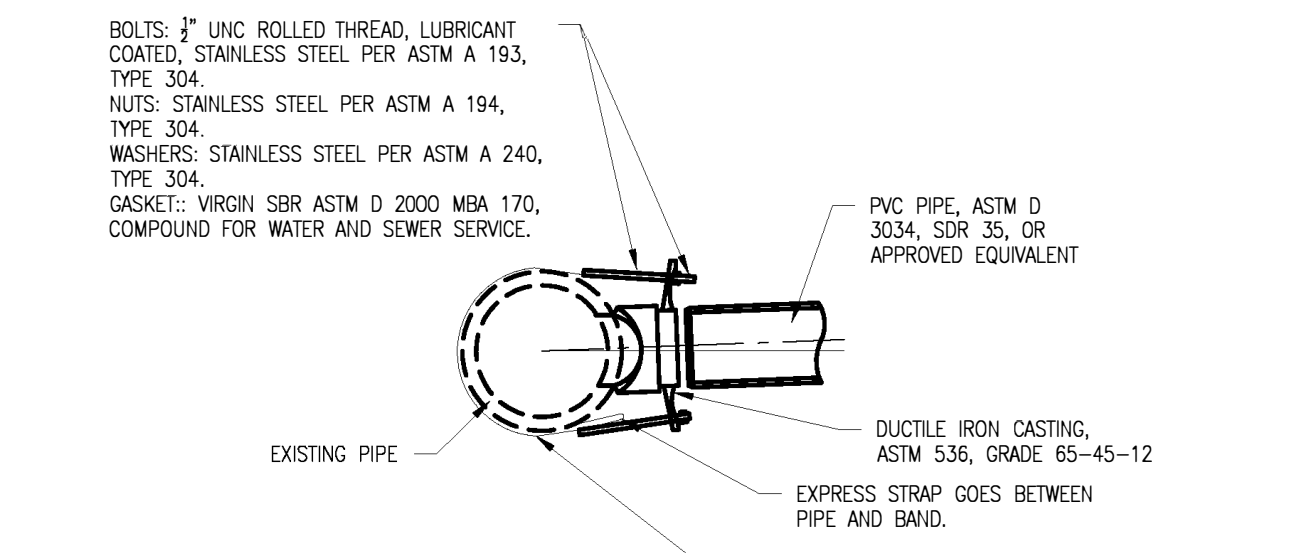
SEWER SIZE	EXTERNAL DROP SIZE	MH SIZE (L.D.)
UP TO 6"	6"	4'
UP TO 10"	8"	4'
UP TO 18"	10"	4'
UP TO 30"	18"	5'



INTERNAL DROP MANHOLE CONNECTION

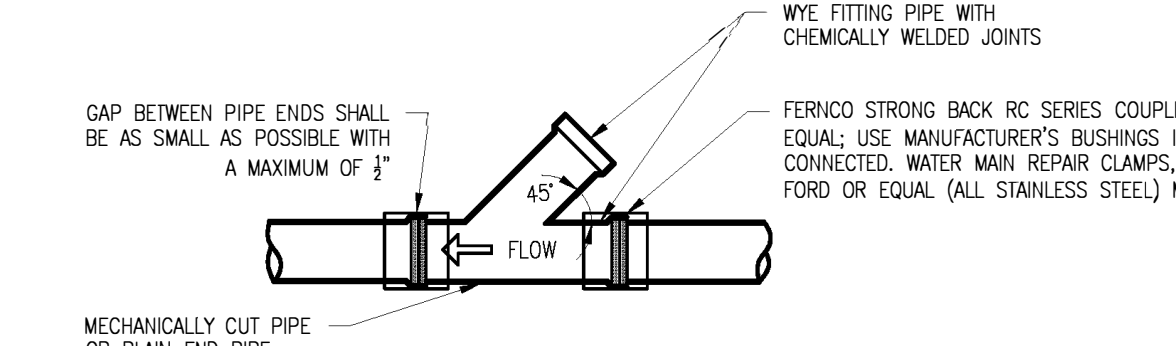
SEE NOTE #29

SEWER SIZE	INTERNAL DROP SIZE	MH SIZE (L.D.)
UP TO 6"	6"	5'
UP TO 10"	8"	5'
UP TO 18"	10"	5'
UP TO 30"	18"	6'
UP TO 42"	24"	6'



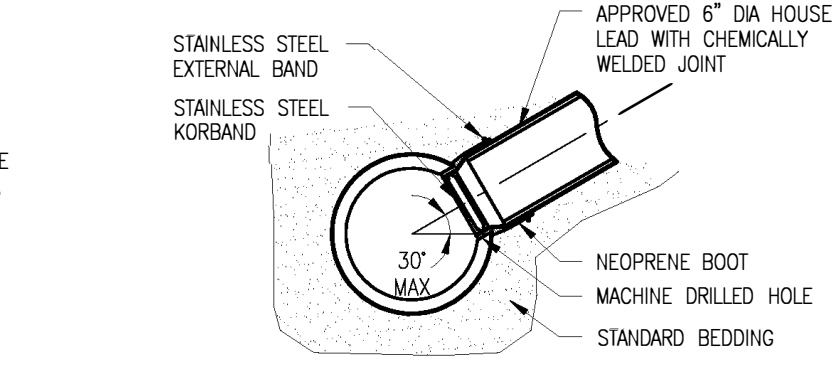
ROMA TAP FOR PVC PIPE

NOTES:
1) USE ROMAC INDUSTRIES, INC. STYLE "CS" SEWER SADDLE, OR APPROVED EQUIVALENT. 2) CORE DRILL AN APPROPRIATELY SIZED HOLE IN EXISTING PIPE TO ACCOMPLISH THE TAP.

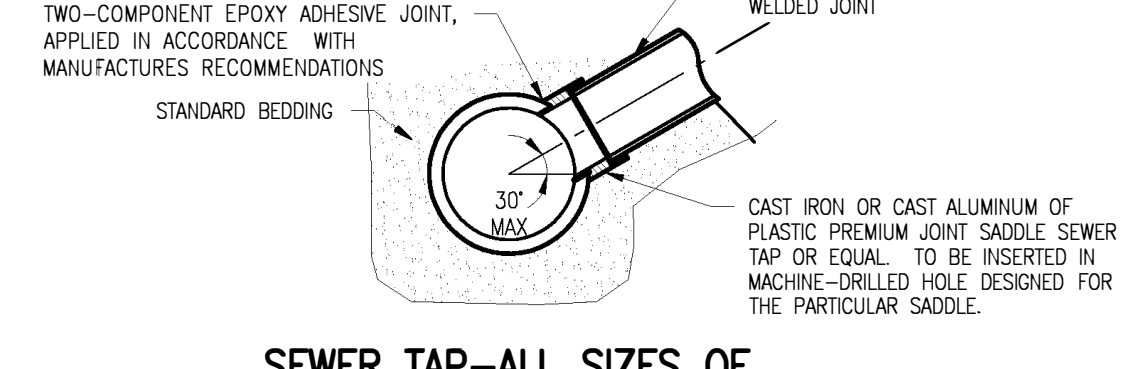


WYE PIPE INSERTION WITH FLEXIBLE COUPLINGS (RIDGID PIPE)

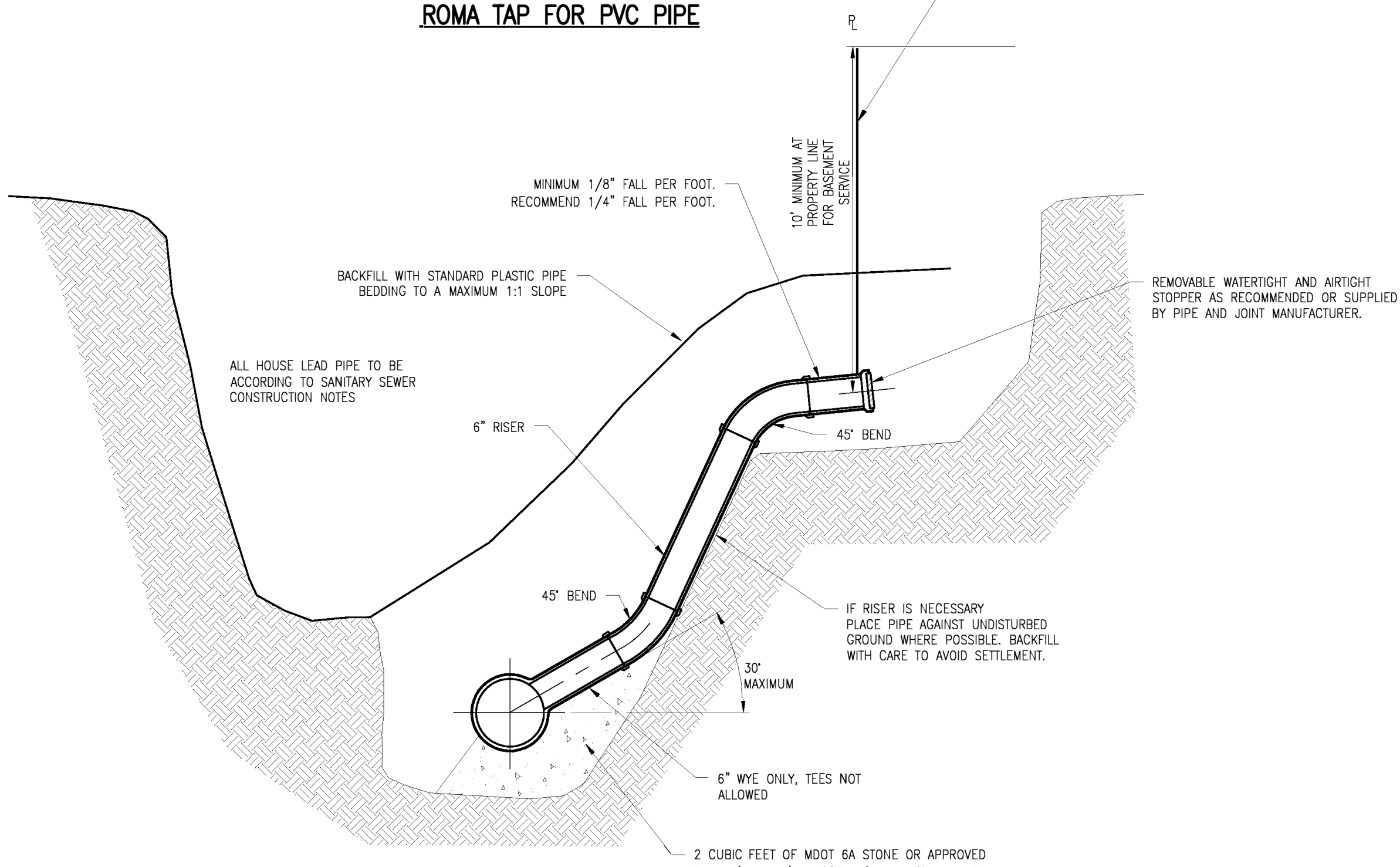
SEE NOTE #41



KOR-N-TEE TAP FOR CONCRETE PIPE

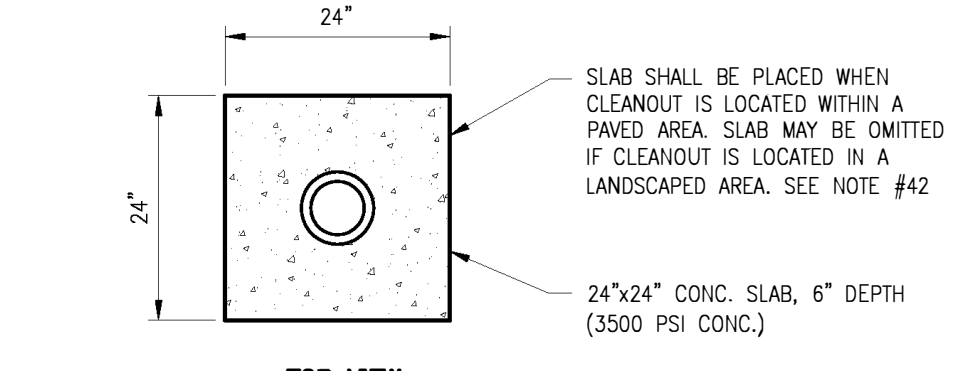


SEWER TAP-ALL SIZES OF MAIN SEWER, VITRIFIED CLAY PIPE

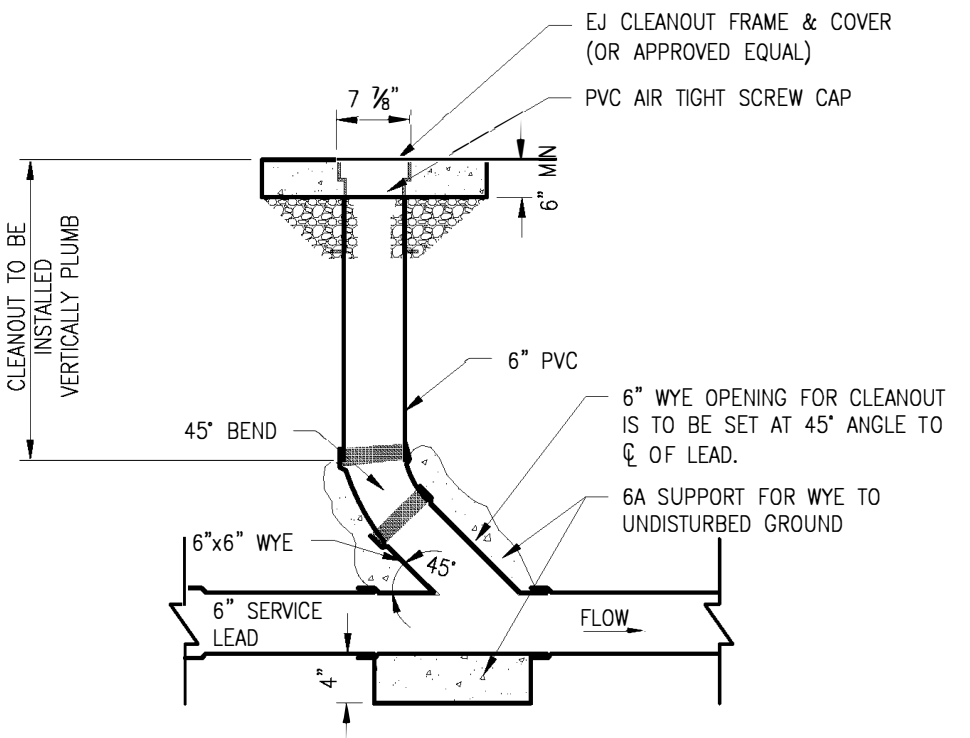


HOUSE LEAD DETAIL

SEE NOTES #14 & #39



TOP VIEW

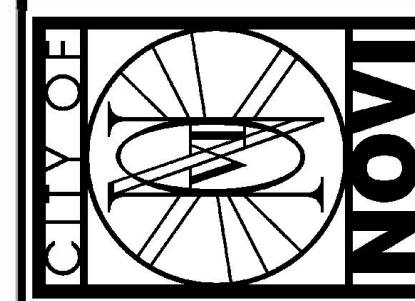


ELEVATION

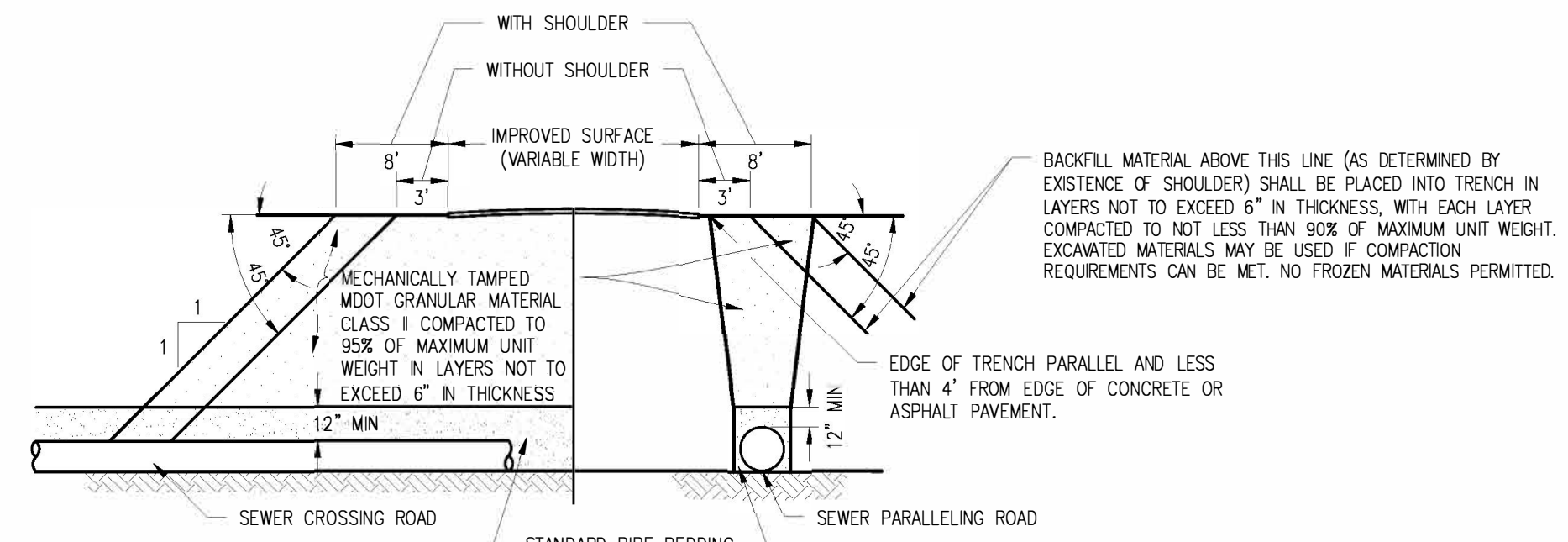
DETAIL OF SANITARY SEWER CLEANOUT

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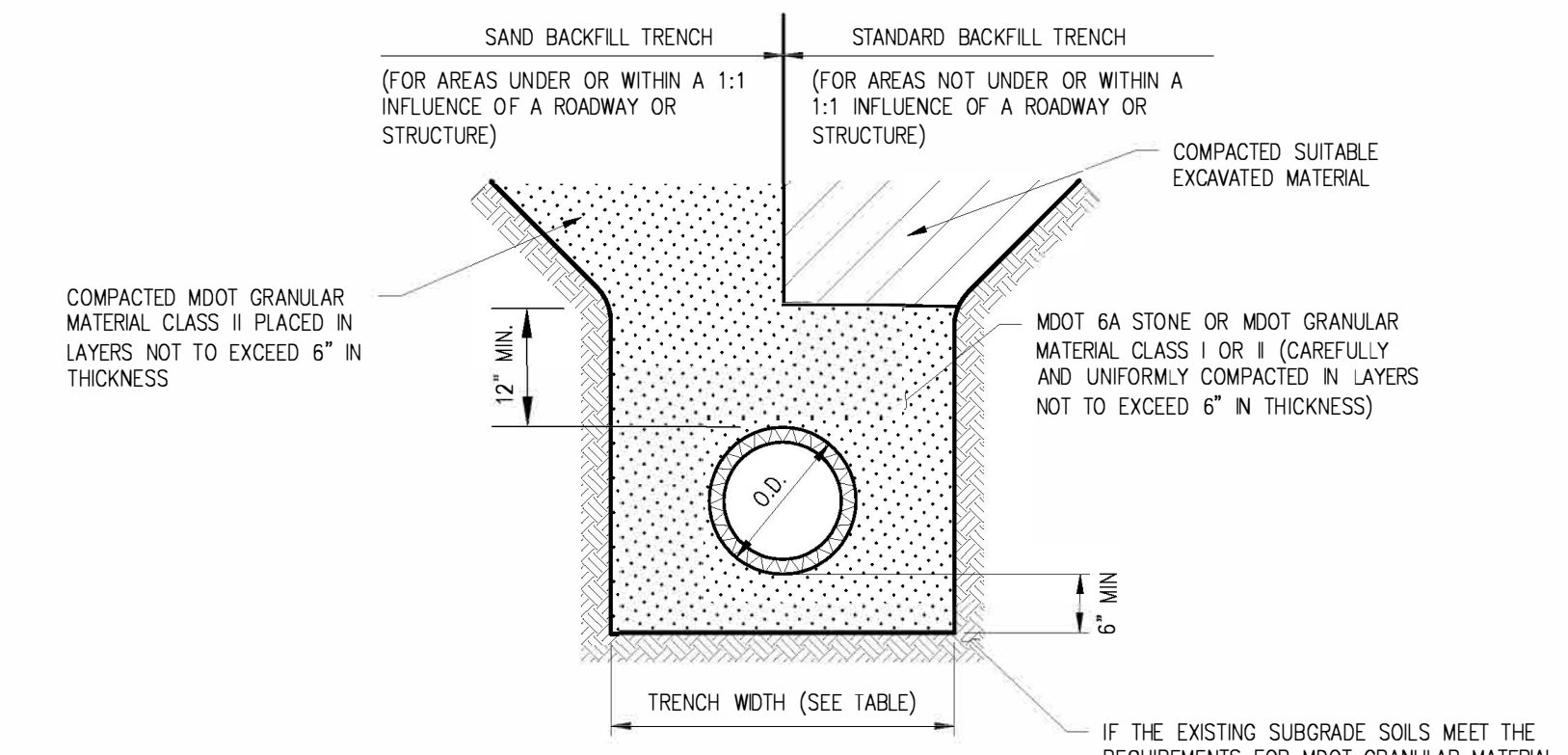
SANITARY SEWER CONSTRUCTION NOTES



CITY OF NOVI
 COUNTY: OAKLAND COUNTY
 TOWN: BEAUMONT
 RANGE: 1N 1E
 DATE: 3/20/14
 REVISIONS: SPALING REVISOR: 2/9/2018
 SCALE: V. N.T.S.
 CITY OF NOVI 4515 WEST 10 MILE ROAD | NOVI, MI 48275 | P. (248) 947-0456 | WWW.CITYOFNOVI.ORG



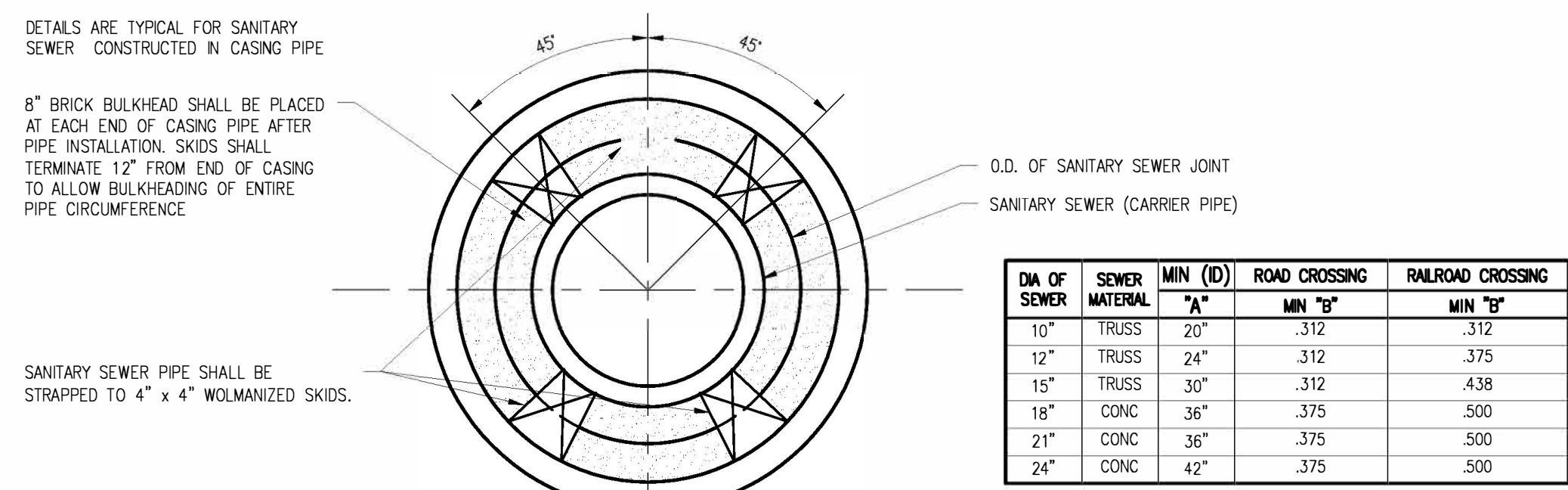
SAND OR GRAVEL BACKFILL DETAILS FOR SEWERS UNDER GRAVEL, CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS
 SEE NOTES #25



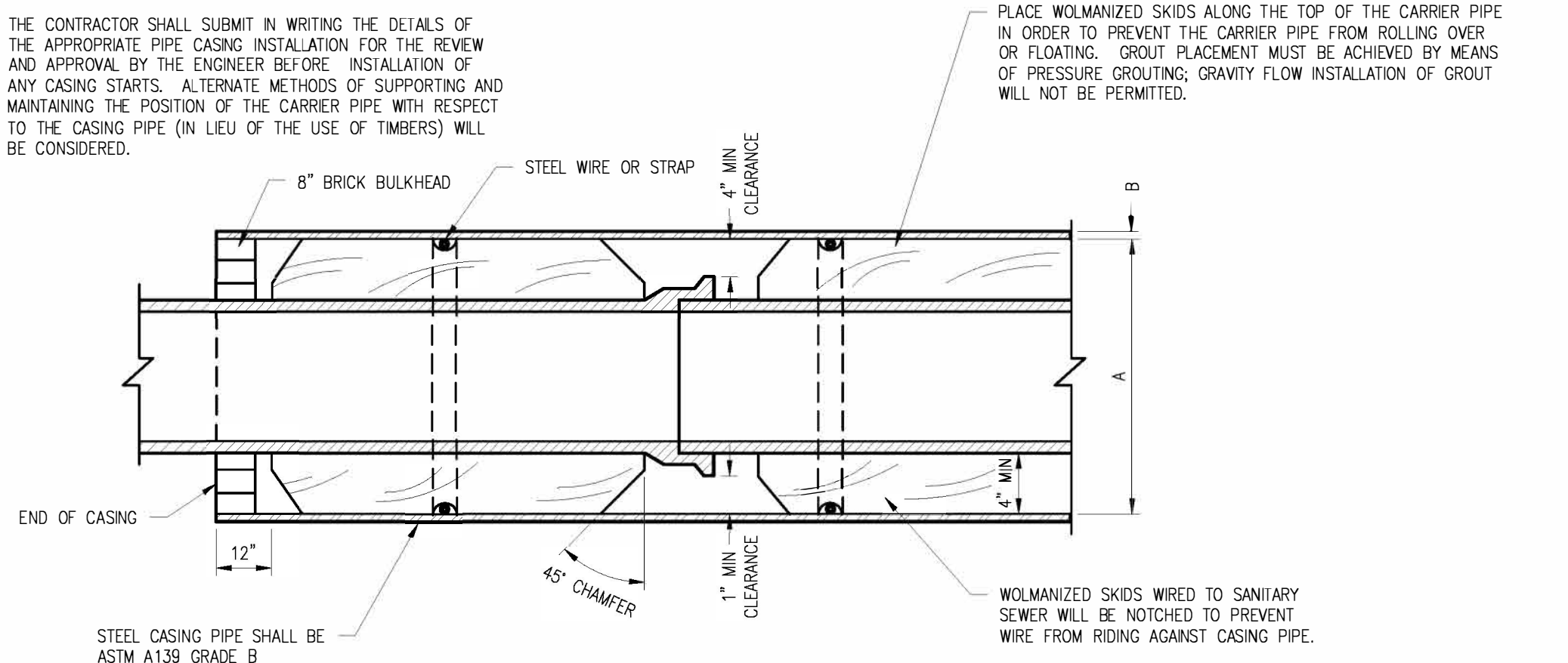
MAXIMUM TRENCH WIDTHS

I.D. PIPE SIZE	TRENCH WIDTH
UP TO 15"	30"
18" TO 36"	O.D. + 16"
42" OR LARGER	O.D. + 24"

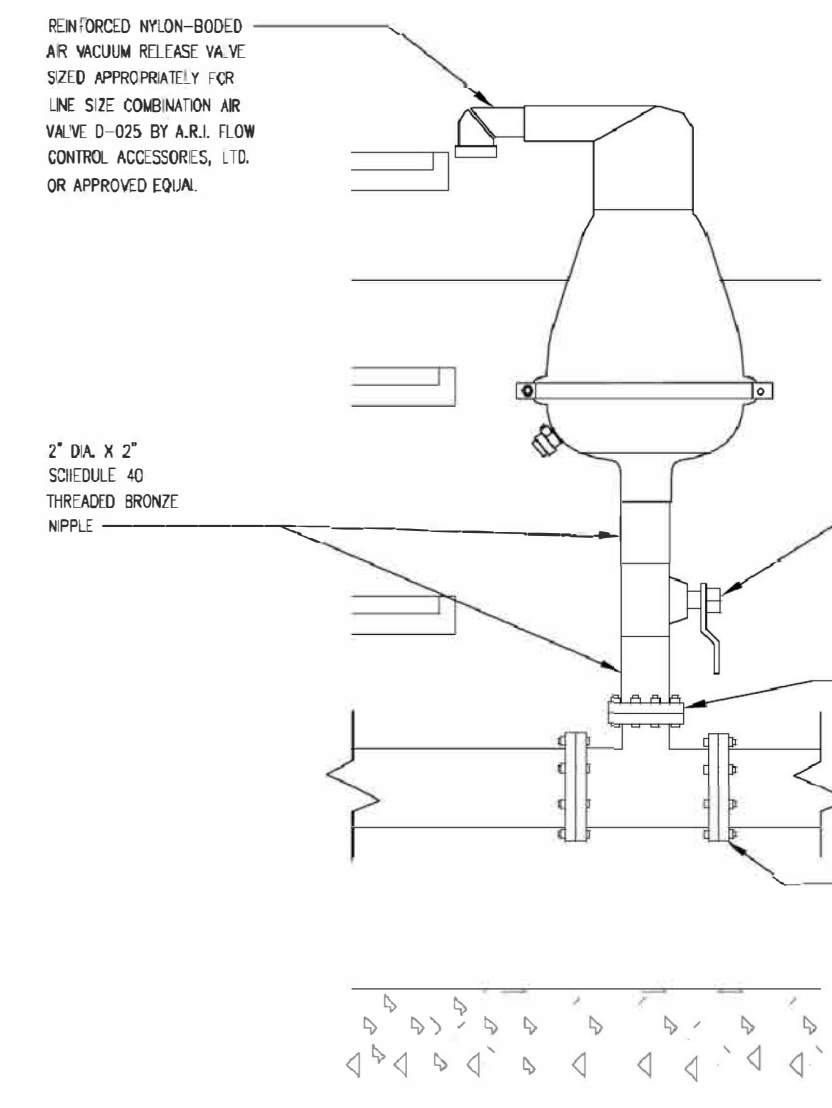
BEDDING AND TRENCH BACKFILL DETAIL
 SEE NOTES #20 THRU #25



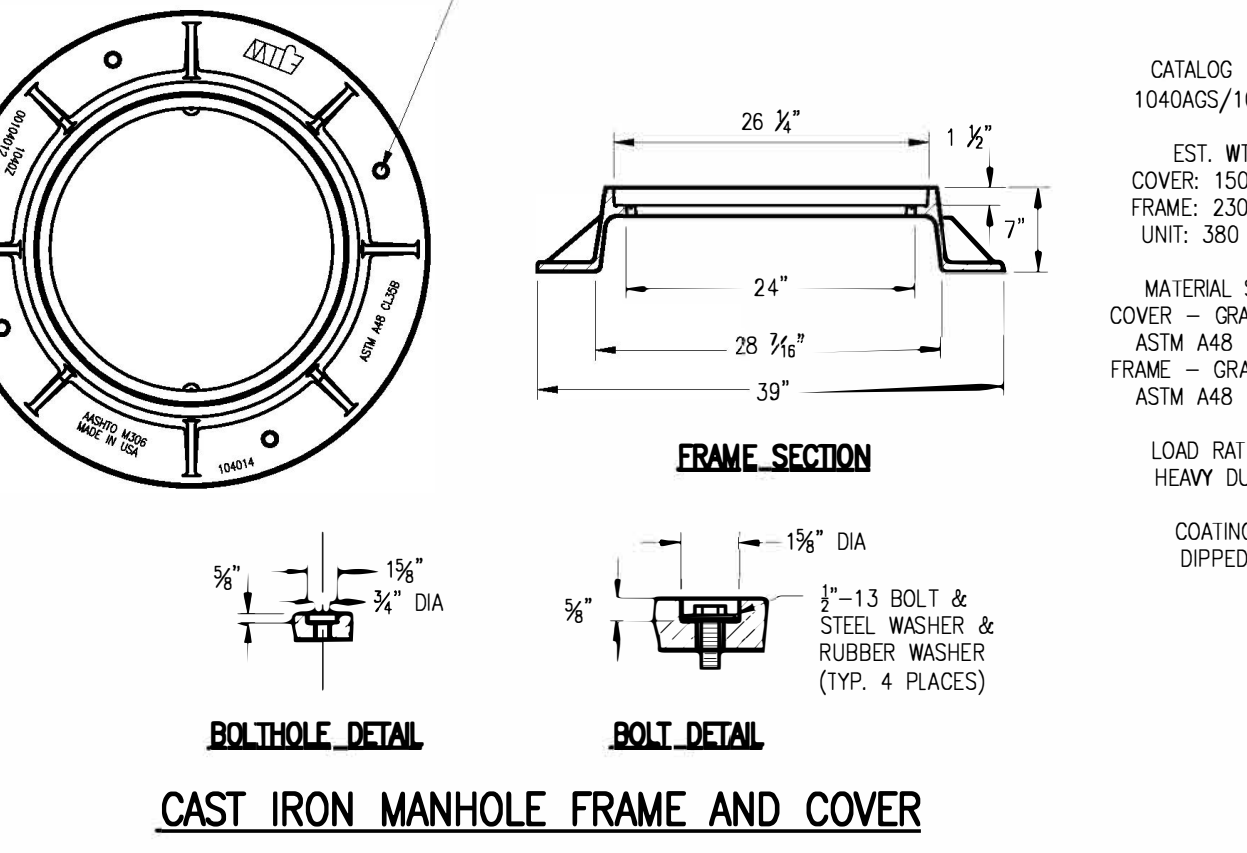
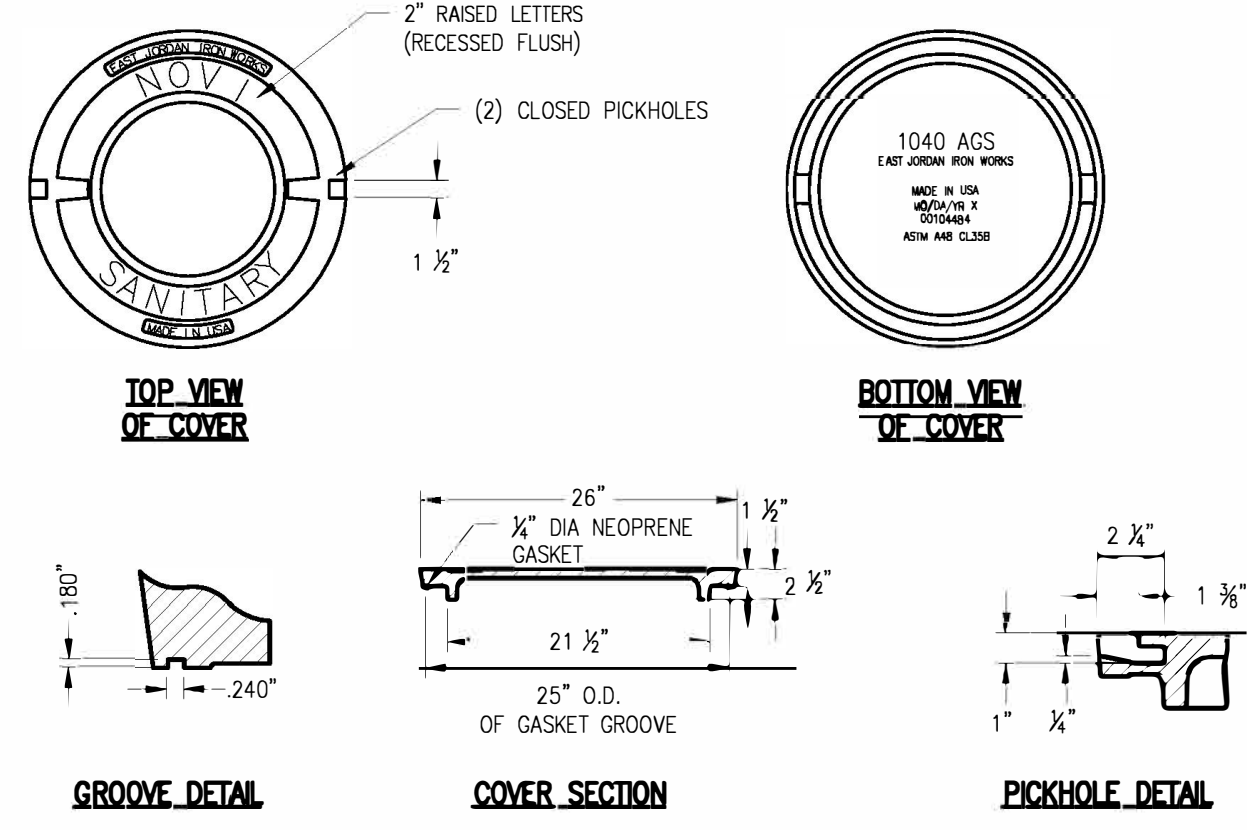
PIPE BARREL SUPPORT FOR SANITARY SEWER CONSTRUCTED IN CASING PIPE



STANDARD CASING SECTION



TYPICAL AIR VACUUM RELEASE VALVE ASSEMBLY



CAST IRON MANHOLE FRAME AND COVER

- GENERAL NOTES:**
- All construction shall conform to the current standards and specifications of the City of Novi and the Oakland County Water Resource Commissioner (O.C.W.R.C.). All sanitary sewer construction shall have full-time inspection supervised by a State of Michigan professional engineer provided by, or caused to be provided by, the City of Novi. The Contractor shall contact the City Consultant to schedule inspection two (2) full working days prior to the start of construction.
 - At all connections to O.C.W.R.C. sewers or to extensions thereto, and before the start of construction, the Contractor must request and have in his possession an approved Sewer Inspection Permit issued by the O.C.W.R.C. The Contractor shall be responsible for all O.C.W.R.C. charges and shall contact O.C.W.R.C. for their fees, bonds and deposit requirements. The Contractor shall notify the City's Consultant and the O.C.W.R.C. (248) 858-1110 three (3) full working days prior to the beginning of any construction. Final test must be witnessed by the O.C.W.R.C. personnel and must be scheduled in advance.
 - Three (3) working days prior to construction, the Contractor shall telephone MISS DIG (811 or 1-800-482-7171) for underground facilities locations and shall also notify representatives of other utilities located in the vicinity of the work.
 - No ground water, storm water, construction water, downspout drainage or weep tile drainage shall be allowed to enter any sanitary sewer.
 - 18 inch minimum vertical separation and 10 foot minimum horizontal separation must be maintained between sanitary sewer and water main.
 - No sewer installation shall have an infiltration exceeding 100 gallons per inch diameter per mile per 24 hour period and no single run of sewer between manholes shall exceed 100 gallons per inch diameter per mile. Air tests in lieu of infiltration tests shall be as specified in O.C.W.R.C. Standards. All testing gauges shall be calibrated every six (6) months, with the last certification date provided to O.C.W.R.C. prior to testing. Only Qualified Groove Tongue, O-Ring, Uniloc, Arvill, Nobel, Ring-Tite, Fluid-Tite or equal, as approved by O.C.W.R.C./City of Novi may be used for sewer joints. All joints shall meet requirements of ASTM C425 or C443.
 - At all connections to an existing sewer or to extensions thereto, a temporary watertight bulkhead with a threaded, capped or valved 1 inch diameter pipe to permit measuring infiltration shall be provided to be removed only after directed by the engineer. A 12 inch temporary sump and a watertight mechanical bulkhead shall be installed on the first manhole upstream of the proposed connection. The temporary sump shall be filled in after successful completion of any infiltration test up to the standard fill provided for the flow channel, and the bulkhead shall be removed after directed by engineer. Infiltration testing is required for all sewers twenty-four (24) inch diameter and greater, or for all sewer pipe diameters where the ground water level is seven (7) feet above the top of the sewer pipe.
 - When connections are made to sewers carrying fluids, special care must be taken that no part of the work is built under water. A flame or dam must be installed and pumping maintained, if necessary, and the new work kept dry until completed and any concrete or mortar has set up.
 - A NASSCO PACP formatted video of the interior of sanitary sewer 8" or greater in diameter (with top and lead location) shall be submitted to and approved by the City's Consultant prior to final acceptance. Said video shall be obtained a minimum of 30 days after construction is completed and by a NASSCO PACP Certified CCTV Contractor. Typical items to be reviewed on the videotape will include pipe deflections, pipe settlements, lead connections, joints and pipe cleanliness. If the video review reveals unsatisfactory conditions, the Contractor shall correct the condition at his own cost and shall then re-video the affected pipe for review by the City's Consultant.
 - The completed installation shall at no point have out-of-round pipe deflections greater than 5%. Deflectometer or go/no-go gauging tests will be required prior to sewer acceptance.
 - 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.

- SANITARY SEWER NOTES:**
- MATERIALS AND CERTIFICATIONS**
- Truss Pipe and Fittings shall be as described under the current ASTM D2880. Appendix XI of said specification shall be as modified by the bedding requirements outlined below.
 - Solid wall pipe for 6" house connection sewers shall be PVC SDR 23.5 conforming to ASTM D3034 or ASTM D2665. Solid wall pipe shall be installed in accordance with bedding requirements outlined below.
 - Pipe material utilized for force main shall be submitted to and approved by the City prior to installation.
 - All pipe shall be certified by the manufacturer to meet the applicable ASTM specification requirements. Certification forms, together with a report of the test results, shall be provided to the inspector with pipe deliveries and copies shall be forwarded to the Engineer or the Owner. Certification forms shall include project name, location, Contractor, and test lot number. Lot sizes shall be acceptable to the Engineer.
 - All pipe and fittings shall be suitably marked to provide manufacturer's name, extrusion code (including date and location of manufacture), ASTM designation, type of plastic, nominal diameter, and SDR number, where applicable. Fittings however, need not contain the extrusion code. Pipe shall have a "home" mark. Truss Pipe with an absence of filler material at the ends greater than 1/4" deep shall be subject to rejection or acceptable repair.
 - O.C.W.R.C./City of Novi approved flexible manhole joints shall be used. Where adapters to other materials are required, only approved adapters and joints may be used. Where the connections are made to existing manholes, a rubber waterstop shall be used around the pipe.
 - No day pipe will be allowed for main line sanitary sewer or for sanitary sewer leads.

- BEDDING**
- Bedding for Truss Pipe and solid wall pipe shall be in accordance with the current ASTM D2321, except, (1) only MDOT Class I and Class II granular materials or MDOT 6A stone may be used, (2) embedment shall extend to minimum 12" above top of pipe, and (3) flooding or puddling shall not be used. The use of flexible and semi-flexible pipe requires that the bedding provide unyielding side support and complete bedding contact under pipe haunches. Bedding material must be properly placed and compacted to provide lateral restraint against deflection in the pipe diameter. Pipe must be bedded to the true line and grade throughout its length. Bell holes shall be provided where required.
- Where unstable bottoms are encountered, the Contractor shall undercut to stable ground and construct a foundation consisting of MDOT 6A stone to act as an impervious mat to prevent migration or vertical movement of unstable soils or bedding materials. Where trench sheeting, plates, or a trench box are used due to severe ground conditions, all voids to the side and below the top of the pipe caused by the sheeting, plates, or box withdrawal shall be completely filled or the supports left in place below the top of the pipe.
 - Due to potential damage to exterior walls of Truss Pipe or solid wall pipe, particularly under cold weather conditions, if rocks, frozen material, or large objects strike the pipe, the Contractor shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until 12" cover is placed on it, particularly under cold weather conditions. Pipe walls and ends shall also be protected from abrasion and damage during handling, and shall be fully inspected just prior to placing in the trench.

- Care shall be taken during bedding compaction to avoid distorting the shape of the pipe or damaging its exterior wall. Mobile equipment shall not be used over the pipe trench until 48" of cover has been placed.
- BACKFILL**
- Backfill shall be compacted above pipe or 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 MDOT granular material Class II compacted in layers not to exceed 6" in thickness to a density of 95% as determined by MSHTD 1799. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 6" layers and compacted. Trenches which are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the city.
- JOINTS**
- Joints for PVC Truss Pipe, PVC solid wall pipe and fittings shall be of the elastomeric gasket push-on type. Such joints shall conform to the current ASTM D3212 and the pipe manufacturer shall file with the O.C.W.R.C. a copy of certified test results of its jointing system prior to use. Gasket joints shall be installed in accordance with procedures specified by the pipe manufacturer, such that the gasket will be compressed (not displaced) in the joint to form a positive seal. Care shall be taken to insure all joints be pushed to the full "home" position and held together in the "home" position during any grade or line adjustments.
- CUTTING AND HANDLING**
- Cutting of pipe lengths, where required, shall be performed with tools or equipment that will provide a neat, perpendicular cut without damage to the plastic or the filler material. All burrs shall be removed by the use of a file, knife, or abrasive paper. Spigot ends on cut pipe shall be beveled similar to factory beveling to prevent gasket damage.
 - Bowing or warping of Truss Pipe or solid wall pipe can occur with temperature fluctuations. The Contractor shall store and protect the pipe to minimize bowing. Nominal 1/2" or longer pipe lengths having deviations from straight greater than 1", as measured along a straight line, shall not be used.
- STRUCTURE NOTES:**
- All new manholes shall have O.C.W.R.C./City of Novi approved flexible, watertight seals where pipes pass through walls. Manholes shall be precast sections with modified tongue and groove joints with rubber gaskets and shall conform to ASTM C478. Precast manhole sections shall be O.C.W.R.C./City of Novi approved modified eccentric cone type. All manholes shall be provided with watertight covers.
 - At all connections to manholes on O.C.W.R.C. sewers or extensions thereto, interior drop connections will be required when there is a difference in invert elevations.
 - The difference in the invert elevations at a drop connection must be a minimum of 18". If an 18" minimum cannot be obtained, the sewer must be made steeper in order to achieve matching invert elevations for all incoming and outgoing sewers.
 - All new manholes requiring an exterior drop connection shall be constructed using a manhole base with a precast drop as shown on sheet 2 of these details.
 - Wherever existing manholes are to be topped, the top shall be made by coring. The contractor shall place a NOR-SEAL boot (or approved equal) after coring is completed. Blind drilling will only be permitted in lieu of coring with prior approval from both O.C.W.R.C. and City of Novi.
 - All manholes constructed or adjusted as part of the system maintained by the City of Novi shall be provided with watertight covers as depicted on this detail sheet.
 - New manholes constructed directly on O.C.W.R.C. sewers shall be provided with covers reading "Oakland County Water Resources Commissioner - Sanitary" in raised letters per detail in the O.C.W.R.C. specifications.
 - New manholes built over any existing sanitary sewers shall have monolithic poured bottoms.
 - A proper channel shall be constructed within the existing structure at the connection point to the existing system. Channel shall be constructed to create the least amount of turbulence. Any portion of the existing structure which would interfere with such construction shall be removed. When forming a concrete channel in a precast structure that utilizes a flexible joint pipe connector, the channel shall be placed so as not to interfere in any way with the flexibility of the joint. The channel shall be constructed the same size as the inside diameter of the existing pipe.
- SANITARY SEWER LEAD NOTES:**
- All building lead work must be performed under City of Novi inspection. The Department of Public Service conducts inspection of lead from ROW line to building connection.
 - No sanitary sewer may be used as a dewatering outlet.
 - All building leads and risers shall be 6" SDR 23.5 PVC with rubber gasket joint (ASTM D2665), or a City of Novi approved equal pipe and joint. Sewer pipe openings shall contain factory installed premium joint material of the type identical to that of the building lead pipe used. Building leads to be furnished with removable airtight and watertight stoppers. Taps to existing PVC or Truss Pipe shall be made with wye saddle taps.
 - Where an existing building lead is being extended, dissimilar types and sizes of pipe shall be joined using an O.C.W.R.C./City of Novi approved adapter. Allowable types of sewer pipe adapters are the Femco Adapter or the Femco Flexible Coupling.
 - Field taps of existing sanitary sewers shall be made by installing a wye fitting for house connections. Femco fittings with stainless steel bands shall be used to secure the wye fitting to the sanitary sewer pipe. Bedding for house connection sewers shall be equal to that of the main sewer bedding. Risers in deep and unstable trenches should be bedded in MDOT 6A stone, or an approved equal, to avoid settlement. Concrete shall not be used for bedding. End caps or plugs shall be braced or anchored to withstand air test pressures. Caps or plugs shall not be chemically welded in place.
 - Where sanitary sewer cleanouts fall within a paved area (parking lot, service drive area, etc.), the cleanout shall have a cast iron cover that is centered in a 2'x2' (min.) concrete slab having a compressive strength of 3000 psi at 28-day cure time.