

STORM DRAINAGE CONSTRUCTION NOTES

- NOTE:
ALL MATERIALS AND INSTALLATION AND SEDIMENT AND EROSION CONTROL METHODS USED FOR LAND DEVELOPMENT CODE REQUIRED IMPROVEMENTS FOR SUBDIVISIONS AND SITE PLANS SHALL BE IN CONFORMANCE WITH THE CITY, FDOT, FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (LATEST EDITION), AND THE FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS (LATEST EDITION). THE USE OF BEST MANAGEMENT PRACTICES (BMP'S) IS REQUIRED.
- ALL STORM SEWERS AND CULVERTS LOCATED IN ROADWAY RIGHT-OF-WAYS AND ROADWAY EASEMENTS SHALL BE A MINIMUM OF CLASS III D-RING REINFORCED CONCRETE PIPE, OUTSIDE OF ROADWAY EASEMENTS AND R.O.W., PIPE MAY BE MADE OF ALTERNATE MATERIALS INCLUDING:
 - SMOOTH INNER WALL HIGH DENSITY POLYETHYLENE (HDPE) IN ACCORDANCE WITH AASHTO M-294, AASHTO M-97, ASTM D3350 AND ASTM D2412 FOR SIZES UP TO 42" IN DIAMETER OR
 - PVC IN ACCORDANCE WITH THE PROVISIONS NOTED IN THE 'SEWER DETAILS' OF THESE SPECIFICATIONS.
 - ALL STORM SEWER PIPE JOINTS LOCATED IN ROADWAY RIGHT-OF-WAYS AND ROADWAY EASEMENTS SHALL BE ENTIRELY WRAPPED WITH NON-WOVEN FILTER FABRIC WITH A MINIMUM WIDTH OF 24" AND A MINIMUM OF 24" OVERLAP. GASKETS ARE NOT PERMITTED AS AN EQUIVALENT SUBSTITUTE FOR MEETING THIS REQUIREMENT. THIS PRACTICE IS ENCOURAGED ON PRIVATE SITES. ADDITIONALLY, ALL JOINTS SHALL BE RUBBER GASKETED FOR BOTH ROUND AND ELLIPTICAL PIPE.
 - DEPTH OF COVER MEASURED TO THE TOP OF PIPE (NOT INCLUDING THE BELL JOINT) SHALL BE A MINIMUM OF 1 FOOT OVER RCP. DEVIATION FROM THIS REQUIREMENT MAY BE ALLOWED BY INCREASING THE PIPE'S STRUCTURAL STRENGTH. IF AN ALTERNATE MATERIAL IS APPROVED, DEPTH OF COVER SHALL MEET MANUFACTURER'S RECOMMENDATION.
 - ALL STORM DRAINAGE PIPES LOCATED IN ROADWAY RIGHT-OF-WAYS AND ROADWAY EASEMENTS SHALL BE A MINIMUM OF FIFTEEN INCH (15") INSIDE DIAMETER OR EQUIVALENT. STORM DRAINAGE PIPES SMALLER THAN 18" ARE PERMITTED ON PRIVATE SITES PROVIDING THAT MAINTENANCE SHALL BE PERFORMED BY THE OWNER.
 - STORM INLETS, MANHOLES, AND CATCH BASINS SHALL BE FDOT COMPLIANT. EITHER POURED IN PLACE OR PRECAST REINFORCED CONCRETE STRUCTURES SHALL BE REQUIRED AT EACH CHANGE OF PIPE SIZE OR CHANGE IN PIPE DIRECTION. ALL STRUCTURES SHALL BE IN COMPLIANCE WITH ASTM C-478 AND SHALL HAVE 6" THICK WALLS. 6" THICK WALLS MAY BE PERMITTED PROVIDING THAT THE PLANS SPECIFY INCREASED REINFORCEMENT IN ACCORDANCE WITH FDOT STANDARD INDEX NO. 201. IN ADDITION, THIS REQUIREMENT MUST BE REFLECTED ON BOTH THE SHOP DRAWING AND AS-BUILT PLANS. STRUCTURES PLACED IN HIGH TRAFFIC AREAS SHALL BE OF TRAFFIC BEARING CONSTRUCTION IN ACCORDANCE WITH FDOT STANDARDS.
 - STORM INLETS SHALL BE SPACED IN SUCH A MANNER AS TO ACCEPT ONE HUNDRED (100) PERCENT OF THE DESIGN STORM RUNOFF WITHOUT IMPEDING THE FLOW OF TRAFFIC FOR ROADWAY SECTIONS WITH DESIGN SPEEDS OF 45 MPH AND LESS AND WITHOUT FULL WIDTH SHOULDERS, SPREAD RESULTING FROM A RAINFALL INTENSITY OF FOUR INCHES (4") PER HOUR SHALL NOT EXCEED ONE-HALF OF THE TRAVEL LANE ADJACENT TO THE GUTTER. FOR SITE PLANS, INLET SPACING SHALL BE DESIGNED TO ACCEPT ONE HUNDRED (100) PERCENT OF THE RUNOFF FROM A RAINFALL INTENSITY OF FOUR INCHES (4") PER HOUR WITHOUT RESULTING IN PONDING OF WATER AROUND THE INLET.

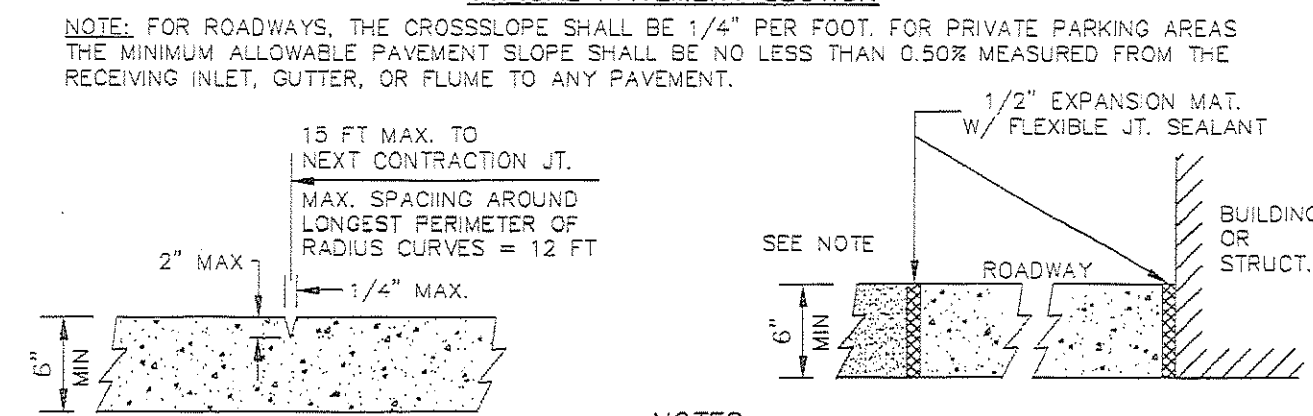
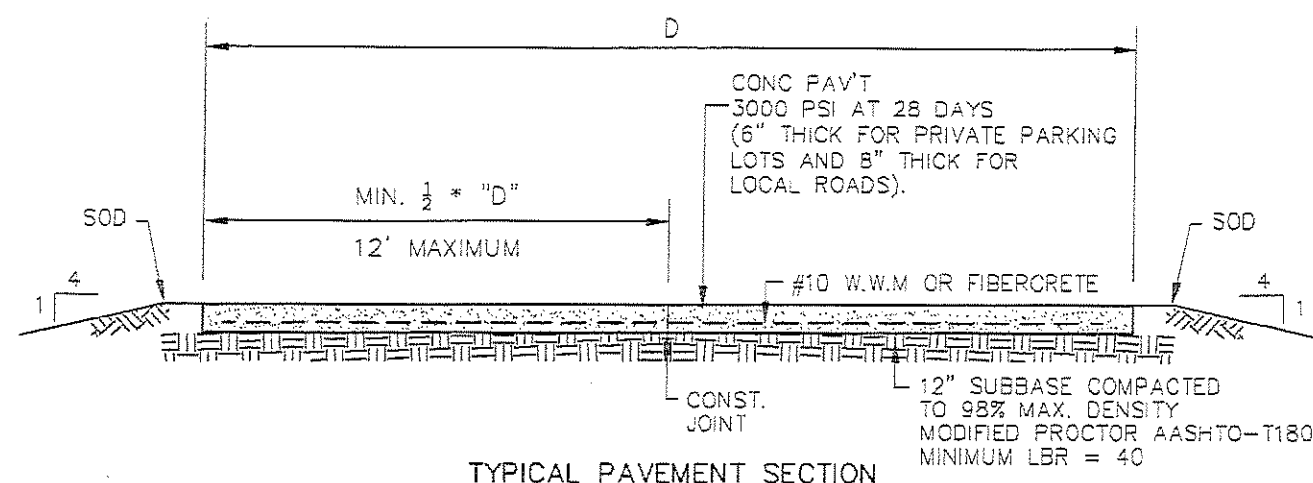
- WET POND DEPTHS SHALL BE EIGHT FEET (8') MINIMUM TO FIFTEEN FEET (15') MAXIMUM, MEASURED FROM THE TOP OF BANK.
- FOR CONNECTIONS BETWEEN INLETS WITH PIPING 15" IN DIAMETER AND LARGER, THE MAXIMUM DISTANCES BETWEEN INLETS AND / OR CLEAN-OUT JUNCTION BOXES SHALL BE 300 FEET. CULVERTS SHALL BE SLOPED TO MAINTAIN A MINIMUM SELF-CLEANING VELOCITY OF 2.5 FEET PER SECOND USING A MANNING'S 'N' OF 0.012. SPACING FOR CLEAN-OUTS AND INLETS FOR SMALLER PIPING SHALL BE REDUCED AND EVALUATED ON A CASE BY CASE BASIS.
- THE MAXIMUM PERMISSIBLE SLOPE OF ANY NEW SITE GRADING IS 1:3 (VERTICAL:HORIZONTAL). THIS LIMIT SHALL BE APPLIED TO ALL AREAS EXCEPT STORMWATER CONVEYANCE AND TREATMENT SYSTEMS WHICH HAVE A MAXIMUM SLOPE OF 1:4 (EXCEPT BELOW THE WATER TABLE WHERE STEEPER SLOPES ARE PERMISSIBLE).
- ALL SWALES AND DITCHES SHALL HAVE A MAXIMUM PERMITTED FRONT (SIDE) SLOPE NOT STEEPER THAN 1 TO 4. THE MAXIMUM PERMITTED BACK (SIDE) SLOPE, SHALL BE 1:3, PROVIDED THAT A 2' WIDE BERM IS INSTALLED. DESIGN CENTERLINE AND TOP-OF-BANK ELEVATIONS SHALL BE NOTED AT INTERVALS OF 100' AND AT SIGNIFICANT GRADE CHANGES.
- SWALES THAT ARE NORMALLY DRY AND INTENDED FOR CONVEYANCE OF STORMWATER RUNOFF AND ARE NOT INTENDED FOR RETENTION SHALL HAVE A MINIMUM DRAINAGE MAINTENANCE EASEMENT WIDTH MEASURING 15 FEET. SWALED AREAS INTENDED FOR RETENTION SHALL PROVIDE APPROPRIATE EASEMENT AREAS FOR ACCESS AND MAINTENANCE MEASURED UPWARD FROM THE TOP OF BANK. AT A MINIMUM, THE SAID EASEMENT SHALL MEASURE 10 FEET IN WIDTH FROM THE TOP OF THE SWALE.
- PIPED STORMWATER SYSTEMS SHALL HAVE A MINIMUM DRAINAGE MAINTENANCE EASEMENT WIDTH OF 20 FEET, AND MAY BE INCREASED DEPENDING UPON THE SIZE AND DEPTH OF PIPE.
- NORMAL ROADSIDE SWALES ARE PERMITTED TO BE CONSTRUCTED TO A MAXIMUM DEPTH OF 18" BELOW THE OUTSIDE EDGE OF PAVEMENT OR CONCRETE CURB.
- CONCRETE EROSION CONTROL BMP'S MUST BE PROVIDED WHERE SWALES OR CULVERTS INTERCEPT DRAINAGE DITCHES.
- WHEN A WET POND IS INCORPORATED WITHIN A SUBDIVISION AND IS ADJUTED BY LOTS, SUCH ADJUTING LOT LINES SHALL BE EXTENDED INTO THE LAKE PROPORTIONATELY ENCOMPASSING ALL OF THE LAKE AREA.
- WET POND INFLOW AND OUTLET STRUCTURES SHALL GENERALLY BE CONSTRUCTED WITH REINFORCED CONCRETE AND SHALL BE SUBJECT TO THE APPROVAL OF THE CITY. SKIMMERS FOR WET PONDS SHALL BE CONSTRUCTED SUCH THAT THE BOTTOM EXTENDS 6" BELOW THE NORMAL WATER LEVEL AND 6" ABOVE THE OVERFLOW. FOR DRY PONDS, THE SKIMMER BOTTOM SHALL BE SET 6" BELOW THE LOWEST OVERFLOW ELEVATION AND 6" ABOVE THE HIGHEST POINT OF OVERFLOW. ALL SKIMMERS SHALL BE CONSTRUCTED OF MINIMUM 1/4" THICK ALUMINUM OR FIBERGLASS ADEQUATELY SUPPORTED TO PREVENT DEFLECTION.

- SOIL EROSION AND SEDIMENT CONTROL BMP MEASURES, SATISFACTORY TO THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, FDEP AND THE CITY, SHALL BE EMPLOYED DURING CONSTRUCTION.
- THE CITY MAY REQUEST THAT THE DEVELOPER SUBMIT A REPORT BY A QUALIFIED HYDROLOGIST OR HYDROGEOLOGIST ON THE IMPACT THE WET POND WILL HAVE ON NEIGHBORING WATER TABLE ELEVATIONS BOTH DURING CONSTRUCTION AND AFTER LAKE COMPLETION. THE CITY MAY REQUIRE GROUNDWATER MONITORING DURING THE LAKE EXCAVATION.
- ADEQUATE MAINTENANCE BERMS, MINIMUM 10' IN WIDTH, SHALL BE PROVIDED AROUND THE ENTIRE PERIMETER OF ALL WET PONDS AND ASSOCIATED OUTFALLS DISCHARGING INTO AND OUT OF LAKES. APPLICABLE CROSS SECTIONS SHALL BE INCLUDED ON ALL FINAL DEVELOPMENT PLANS.
- DEVELOPMENT PLANS FOR ALL STORMWATER MANAGEMENT SYSTEMS SHALL CONTAIN PFD-OFF DATA (OVERFLOW), BOTTOM ELEVATION, NORMAL WATER LEVELS, MEAN ANNUAL SEASONAL HIGH WATER TABLE ELEVATION, TREATMENT VOLUME AND CORRESPONDING ELEVATION, 100 YEAR HIGH WATER LEVELS, AND THE DESIGN TAILWATER ELEVATION (IF APPLICABLE).
- IN GENERAL, ALL RETENTION/DETENTION SITES MUST BE CONSTRUCTED AND VEGETATED AS NECESSARY ON ALL PROJECTS PRIOR TO ANY ROAD, PARKING LOT, OR BUILDING CONSTRUCTION COMMENCING OR AS CURRENT PERMIT CONDITIONS DICTATE. SEWER AND WATER MAINS MAY BE INSTALLED PRIOR TO RETENTION/DETENTION SITE CONSTRUCTION IF DEWATERING IS NOT REQUIRED HOWEVER BMP'S FOR EROSION AND SEDIMENT CONTROL WILL BE IMPLEMENTED AS NECESSARY.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ANY AND ALL DEWATERING PERMITS THAT MAY BE REQUIRED.
- WHEN CULVERTS ARE INSTALLED TO MAINTAIN THE FLOW OF EXISTING DRAINAGE WAYS WHERE NEWLY PROPOSED ROADS WOULD OTHERWISE SEVER THE DRAINAGE RIGHT-OF-WAY, THEN CULVERTS CROSSING RIGHTS-OF-WAY SHALL EXTEND FROM RIGHT-OF-WAY LINE TO RIGHT-OF-WAY LINE UNDER THE ROADWAY. CULVERTS SHALL BE DESIGNED TO ACCOMMODATE THE FLOW FROM THE 100 YEAR - 24 HOUR STORM EVENT WITHOUT FLOODING ADJACENT PROPERTY OR SURCHARGING THE SAID ROADWAY.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW AND MAINTAIN A COPY OF THE SURVMD, NPDES, AND ALL OTHER JURISDICTIONAL PERMITS AT THE CONSTRUCTION SITE, AND ABIDE BY ALL CONDITIONS OF THOSE PERMITS.
- LANDSCAPE PLANS SHALL CLEARLY DEPICT THE DESIGN LOCATION OF TEMPORARY AND PERMANENT PLANTINGS RELATIVE TO THE LOCATION OF PUBLIC UTILITIES AND STORMWATER INFRASTRUCTURE IN ORDER TO EVALUATE POTENTIAL CONFLICTS.
- ALL STORMWATER INLETS SHALL MEET FDOT CRITERIA.
- BEST MANAGEMENT PRACTICES (BMP'S) FOR EROSION AND SEDIMENT CONTROL SHALL BE PLANNED, DESIGNED AND IMPLEMENTED THROUGHOUT THE SITE DEVELOPMENT ENGINEERING AND CONSTRUCTION PHASES.

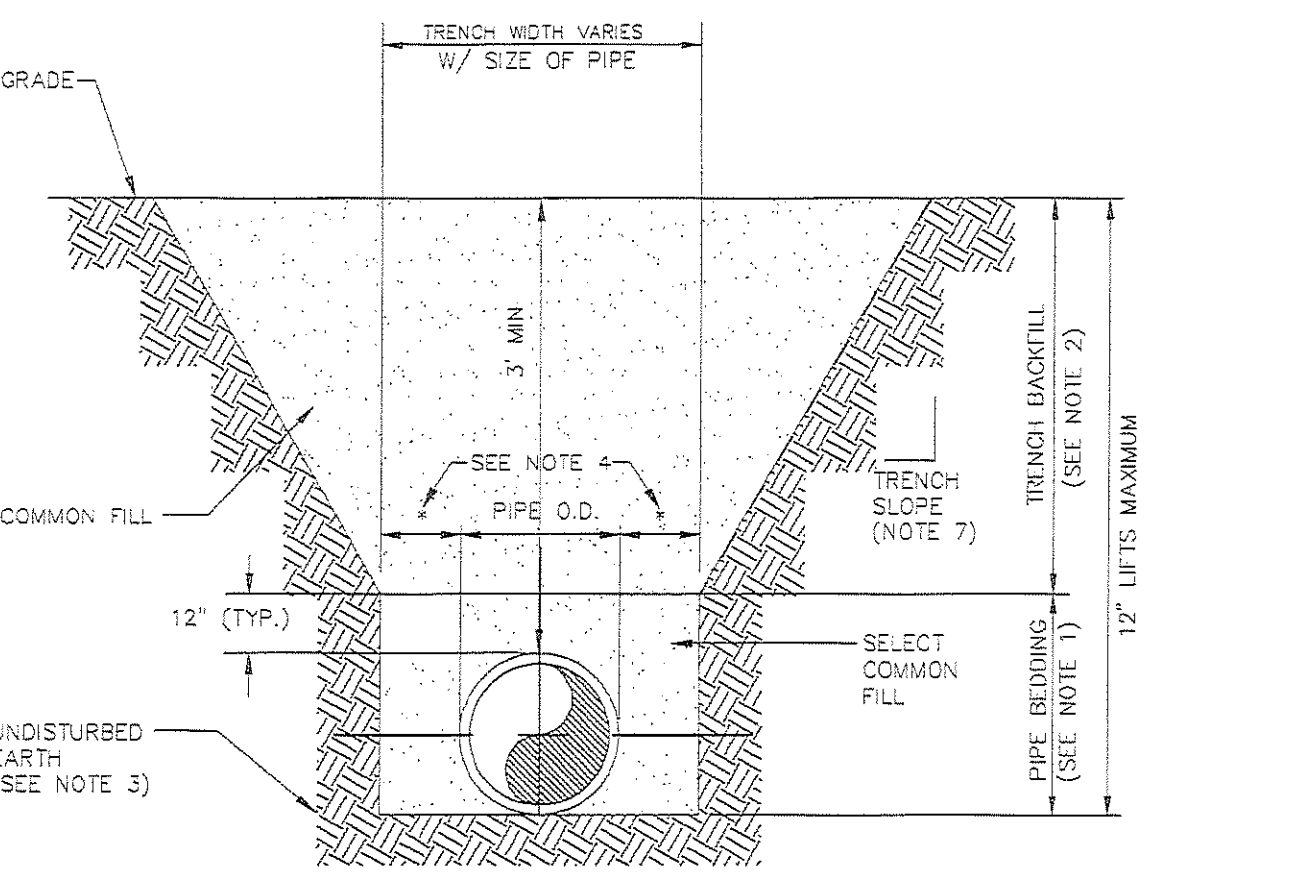
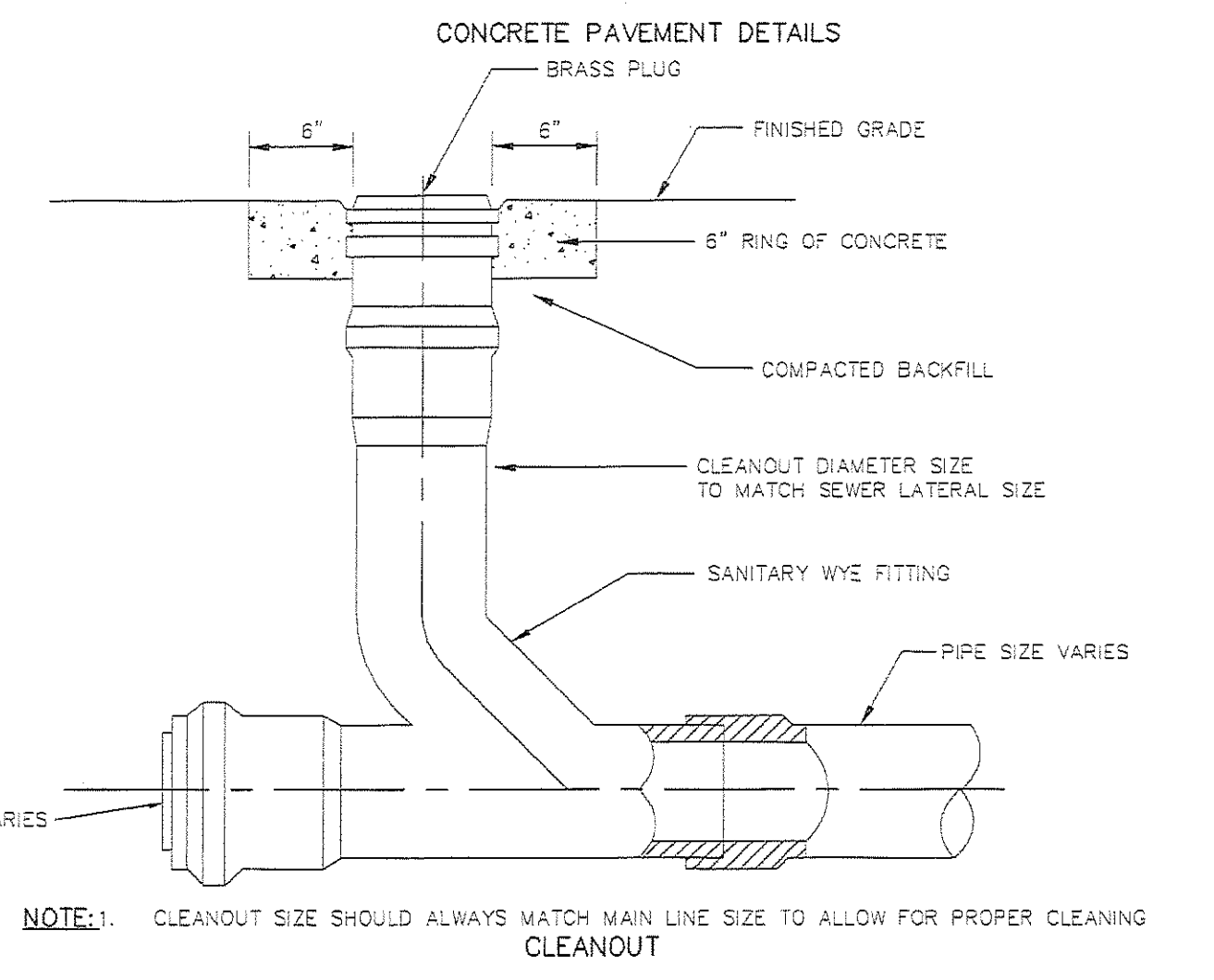
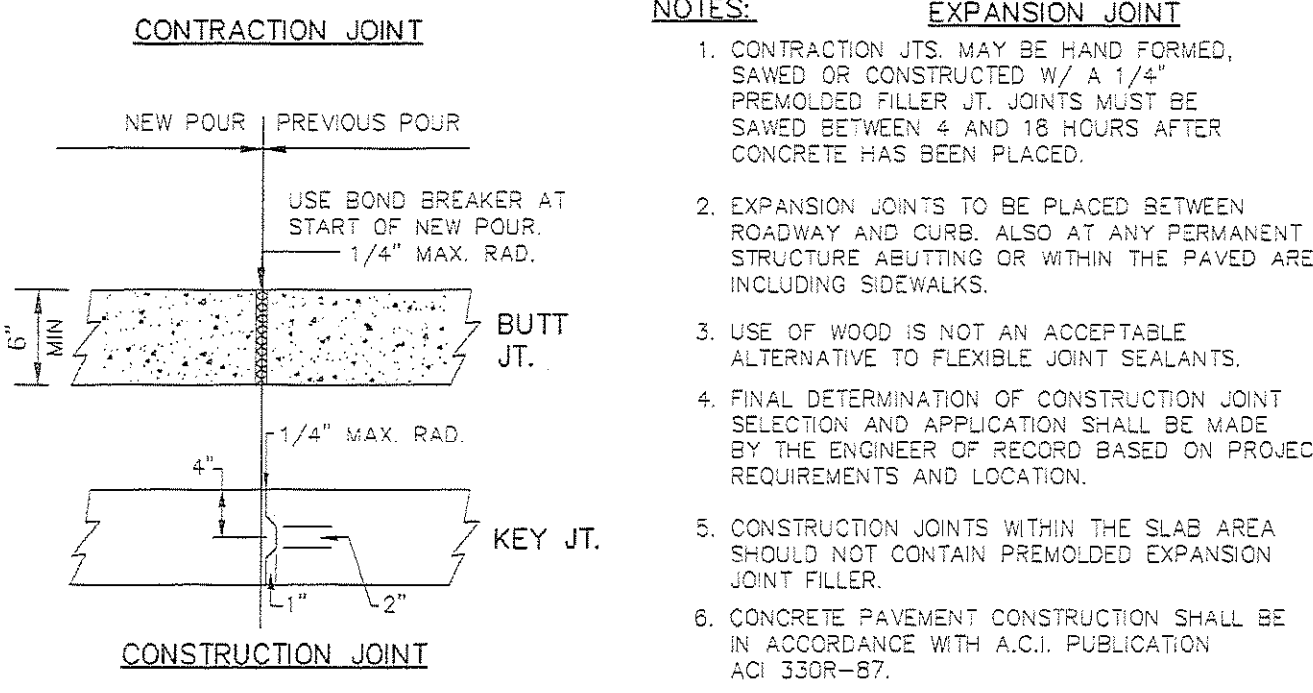
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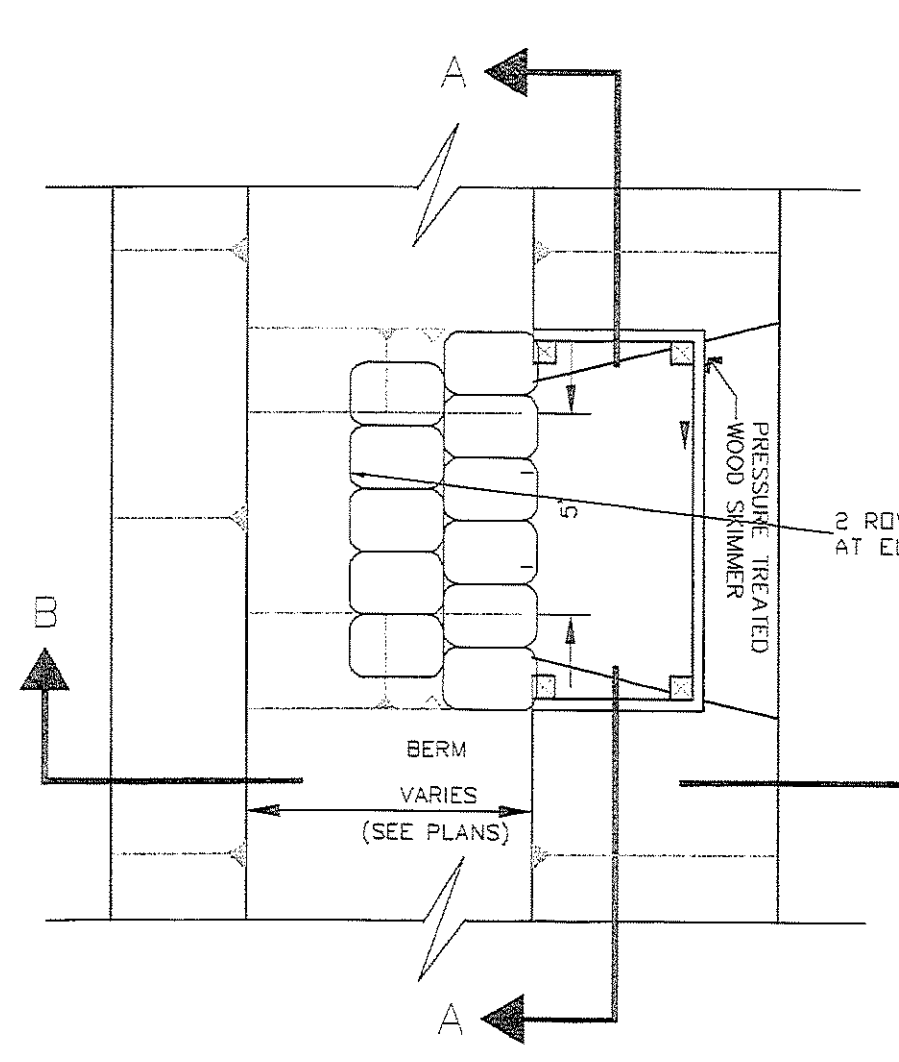
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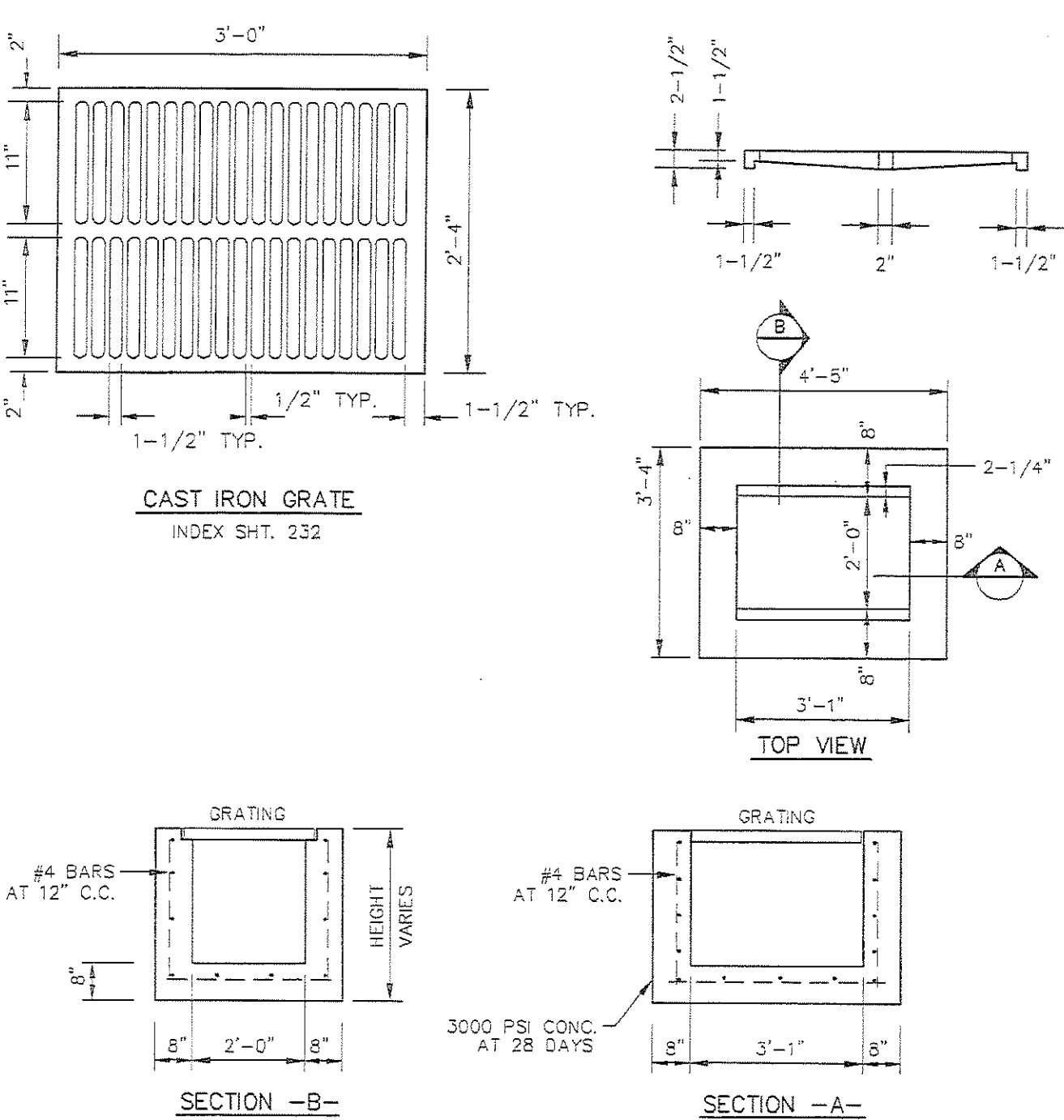
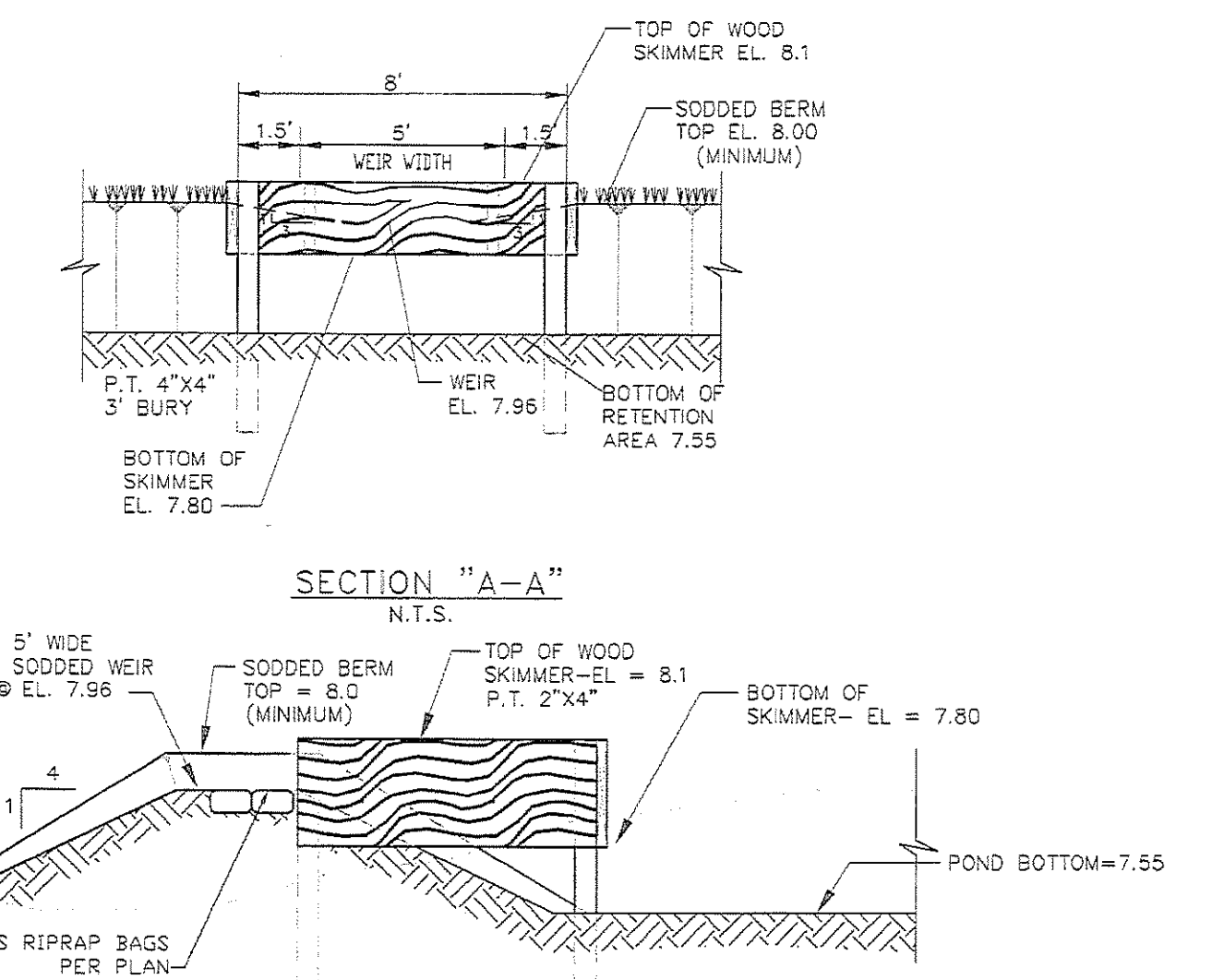
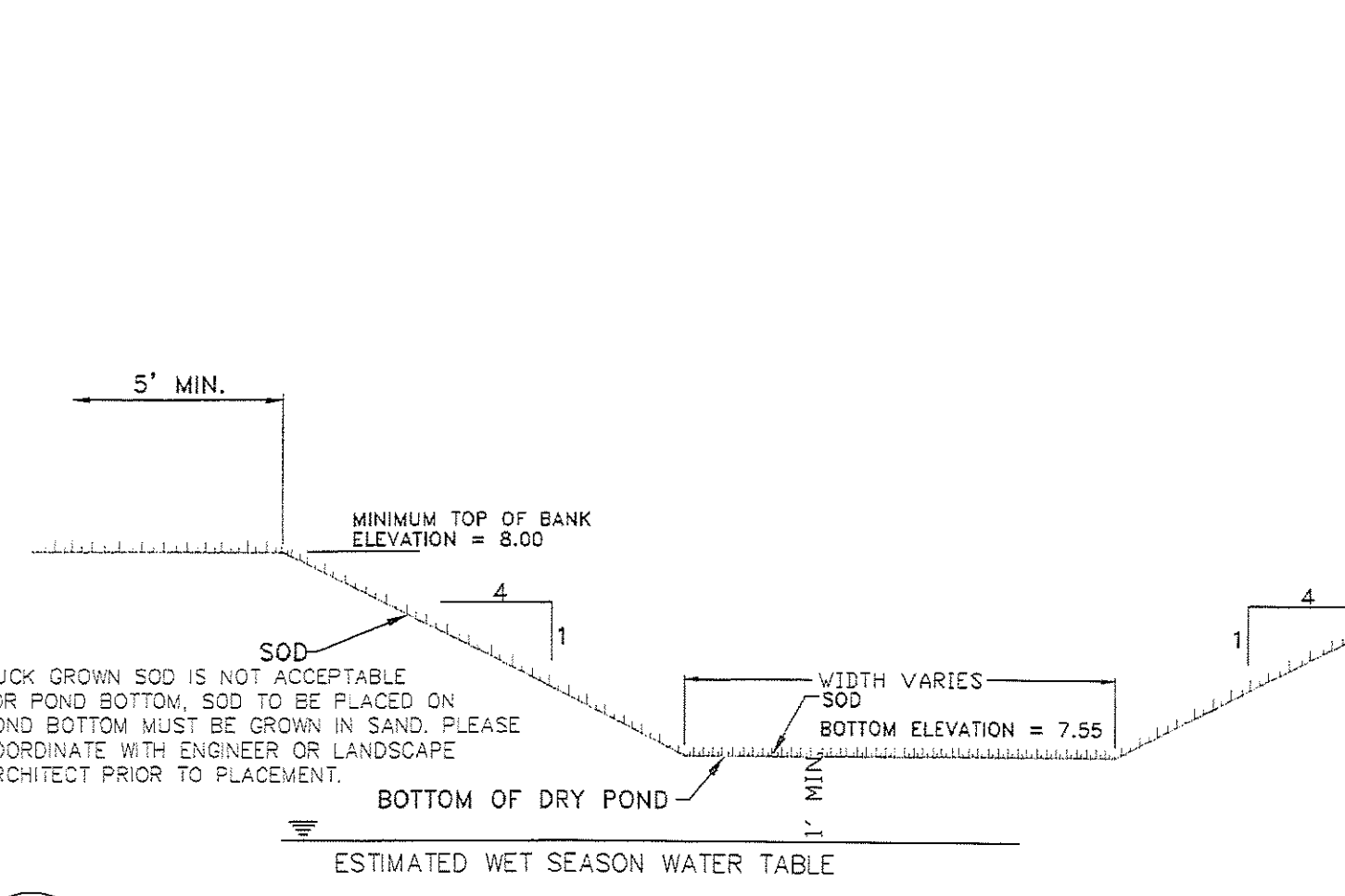
- NOTES:**
- CONTRACTION JOINTS MAY BE HAND FORMED, SAWED OR CONSTRUCTED W/ 1/4" PREMOULDED FILLER JT. JOINTS MUST BE SAWED BETWEEN 4 AND 18 HOURS AFTER CONCRETE HAS BEEN PLACED.
 - EXPANSION JOINTS TO BE PLACED BETWEEN ROADWAY AND CURB ALSO AT ANY PERMANENT STRUCTURE ABUTTING OR WITHIN THE PAVED AREA INCLUDING SIDEWALKS.
 - USE OF WOOD IS NOT AN ACCEPTABLE ALTERNATIVE TO FLEXIBLE JOINT SEALANTS.
 - FINAL DETERMINATION OF CONTRACTION JOINT SELECTION AND APPLICATION SHALL BE MADE BY THE ENGINEER OF RECORD BASED ON PROJECT REQUIREMENTS AND LOCATION.
 - CONSTRUCTION JOINTS WITHIN THE SLAB AREA SHOULD NOT CONTAIN PREMOULDED EXPANSION JOINT FILLER.
 - CONCRETE PAVEMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH A.C.I. PUBLICATION ACI 330R-87.



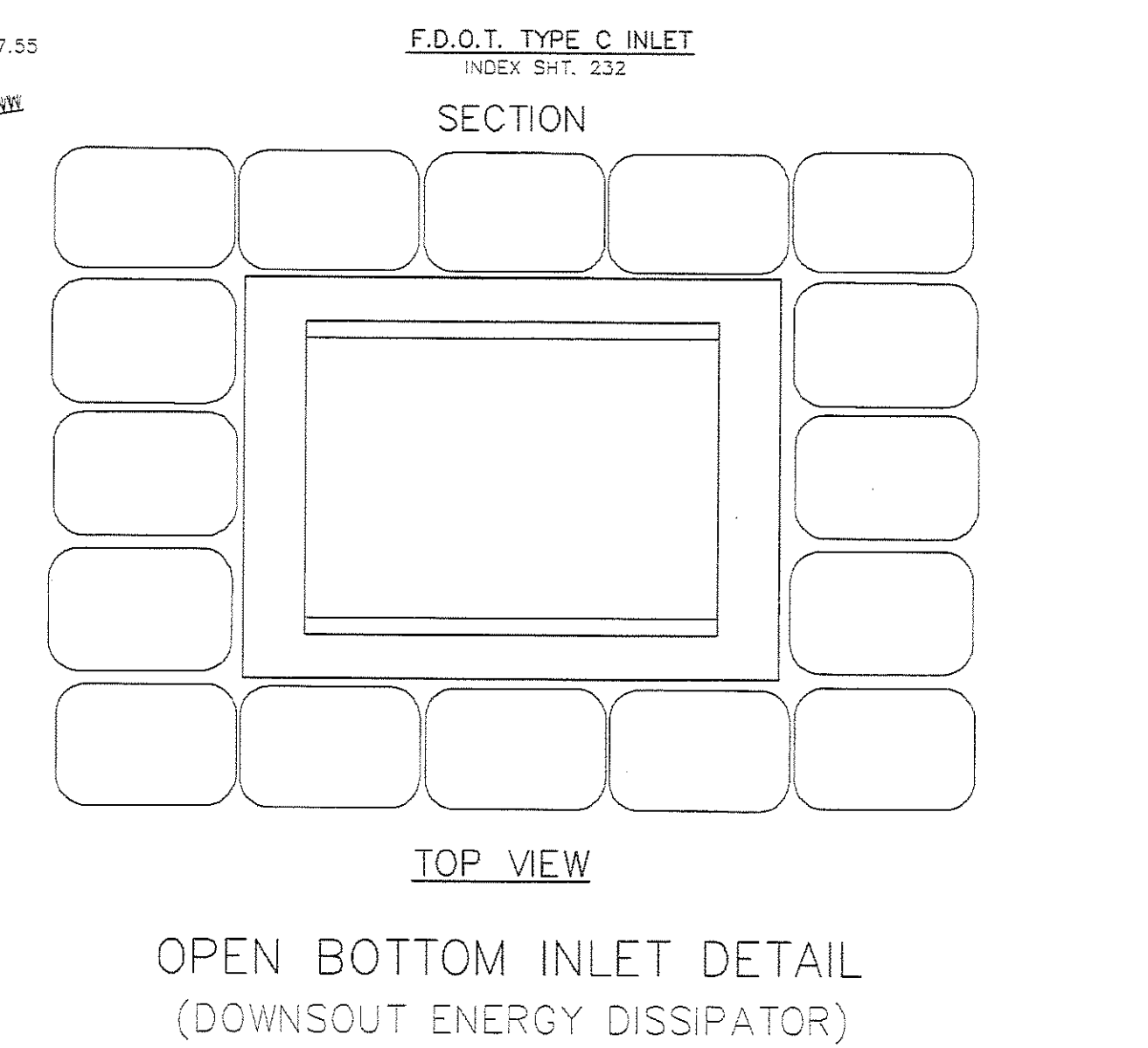
- NOTES:**
- PIPE BEDDING: SELECT COMMON FILL COMPACTED TO 95% OF THE MAXIMUM DENSITY AS PER AASHTO T-180.
 - TRENCH BACKFILL: COMMON FILL COMPACTED TO 95% OF THE MAXIMUM DENSITY AS PER AASHTO T-180, (98% DENSITY REQUIRED UNDER DRIVEWAYS, PAVEMENT AND STRUCTURES).
 - PIPE BEDDING UTILIZING SELECT COMMON FILL OR BEDDING ROCK IN ACCORDANCE WITH TYPE "A" BEDDING AND TRENCHING DETAIL MAY BE REQUIRED AS DIRECTED BY THE CITY.
 - (*) 15" MAX. FOR PIPE DIAMETER LESS THAN 24", AND 24" MAX. FOR PIPE DIAMETER 24" AND LARGER.
 - WATER SHALL NOT BE PERMITTED IN THE TRENCH DURING CONSTRUCTION.
 - ALL PIPE TO BE INSTALLED WITH BELL FACING UPSTREAM TO THE DIRECTION OF FLOW.
 - REFER TO OSHA REQUIREMENTS FOR SLOPING, SHEETING AND BRACING IN EXCAVATIONS.
 - FINAL RESTORATION IN IMPROVED AREAS SHALL BE IN COMPLIANCE WITH ALL APPLICABLE REGULATIONS OF GOVERNING AGENCIES. SURFACE RESTORATION WITHIN RIGHT-OF-WAY SHALL COMPLY WITH REQUIREMENTS OF RIGHT-OF-WAY UTILIZATION REGULATIONS AND ROAD CONSTRUCTION SPECIFICATIONS.
- TYPE "B" BEDDING AND TRENCH**
(TYPICAL FOR WATER, SEWER, FORCE MAIN, STORM DRAIN AND RECLAIMED WATER MAIN INSTALLATIONS)



- CONTRACTOR SHALL SLOPE THE TOP OF BERM DOWN TO THE CREST ELEVATION AT A SLOPE WHICH DOES NOT EXCEED 3:1 (H:V)
- CONTRACTOR SHALL STABILIZE ALL EARTHWORK & SOD ALL AREAS AROUND WEIR.
- ALL FASTENERS SHALL BE STAINLESS STEEL SCREWS OR #8 NAIL SHANKS.
- ALL PRESSURE-TREATED POSTS & BOARDS SHALL BE PREMIUM GRADE & FREE OF CRACKS & KNOTHOLES.
- ALUMINUM OR FIBERGLASS MAY BE SUBSTITUTED IN LIEU OF WOOD.
- NO SPACES SHALL BE PERMITTED BETWEEN SKIMMER BOARDS.
- CONTRACTOR MAY BE PERMITTED TO EXTEND THE LENGTH OF THE SKIMMER AS NEEDED.



- NOTE:**
- * 6" THICK WALLS MAY BE PERMITTED, PROVIDING THAT THE INCREASED REINFORCEMENT IN ACCORDANCE WITH FDOT STANDARD INDEX NO. 201 IS INSTALLED. THIS MUST BE REFLECTED ON THE DESIGN PLANS, SHOP DRAWINGS, AND AS-BUILTS.



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SHEET TITLE
STANDARD DETAILS

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