City of
Everman, Texas

Design Manual

THE CITY OF EVERMAN

EXHIBIT A

Adopted: March 11, 2003

City of Everman, Texas

SECTION I
GENERAL

Section I - General

A. General

1. The following Design Manual is primarily intended for use by the Developer's Engineer. There may be special circumstances which would dictate requirements in excess of those outlined; however, in most cases, these exceptions will be apparent to the Developer's Engineer while preparing the Construction Plans and Specifications for the subdivision.

2. The latest version of "Standard Specifications for Public Works Construction, North Central Texas" of the North Central Texas Council of Governments, with all amendments thereto, shall govern and shall constitute the technical specifications for all improvements to be dedicated to the City of Everman except as amended by the Everman Design Manual and is made a part thereof, but is not physically bound within this document.

3. All subdivisions, development and new construction shall comply with all related City Ordinances, including, but not limited to, the Subdivision and Development Ordinance, Zoning Ordinance and Design Manual.

4. No final plat shall be approved by the City Council, and no completed improvements shall be accepted by the City or its representatives, unless and until such improvements conform to the Everman Design Manual and all other applicable standards as prescribed by the City of Everman. All improvements, including, but not limited to streets, sidewalks, parking lots, drainage ways, water and sewer lines and improvements shall be designed, placed and constructed in accordance with the Design Manual.

5. Where specific topographic or other conditions make variance from these standards necessary in order to achieve the best overall design, these standards may be modified by the City Manager, upon recommendation from the Director of Public Works and/or City Engineer.

6. Where the appropriate use of the neighboring property will not be substantially injured, the City Manager, after consultation with the City Engineer, may in specific cases, and subject to appropriate conditions and safeguards, authorize special exceptions to the Design Manual items in order to permit reasonable development and improvement of property where literal enforcement of these values would result in an unnecessary hardship.

7. Any land which, in its natural state, is subject to a 100-year flood or which cannot be properly drained shall not be subdivided, re-subdivided or developed until receipt of evidence that the construction of specific improvements proposed by the Developer can be expected to yield a usable building site. Thereafter the Planning and Zoning Commission may recommend approval of the plat; however, construction upon such land shall be prohibited until the specific improvements have been planned and construction completed.

8. An erosion control plan or Storm Water Pollution Prevention Plan (SWPPP) shall be provided with each construction plan submitted for review by the City Engineer. Each erosion control plan shall clearly identify all erosion and sediment control measures to be installed and maintained throughout the duration of the project. The erosion control plan or SWPPP shall meet the requirements outlined in the most recent version of NCTCOG's *Storm Water Quality Best Management Practices for Construction Activities* as well as the EPA's *Storm Water Phase II Rule.*

SECTION II
CONSTRUCTION PLANS

Section II – Construction Plans

A. Plan Order

A civil construction plan submittal shall meet the following general sheet requirements and order.

1. Cover Sheet with Vicinity Map
2. Final Plat
3. Site Layout
4. Dimensional Control Plan
5. Paving Plan and Profile
6. Grading Plan
7. Drainage Area Map
8. Storm Sewer Layout
9. Storm Sewer Plan and Profile
10. Water Layout
11. Water Plan and Profile
12. Sanitary Sewer Layout
13. Sanitary Sewer Plan and Profile
14. Storm Water Pollution Prevention Plan (Erosion Control Plan)
15. Traffic Control Plan
16. Standard Construction Details

Construction plans must be 100% complete at the time of submittal. Any incomplete sets of construction plans shall be returned unreviewed.

B. Plan Layout

1. The Construction Plans shall be submitted on standard 24" x 36" sheets. Additional half-size plans may be required for inspection.

2. Each sheet of the Construction Plans shall include north arrow, scale, date, and benchmark description to sea level datum. Scales shall be 1 inch equal 20, 40 or 50 feet horizontally and 1 inch equal 2, 4, or 5, feet vertically.

3. Each sheet shall bear the seal and signature of the Licensed Professional Engineer in the State of Texas who prepared the plans.

4. Each sheet of the Construction Plans shall contain a title block, including space for the notation of revisions. This space is to be completed with each revision to the plan sheet and shall clearly note the nature of the revision and the date that the revision was made.

5. Plan and Profile sheets for roads, sewers, storm drains, flumes, water lines twelve inch (12") diameter and larger, and channels. Stationing shall be generally left to right and with stationing beginning at the downstream end for all sewers, storm drains, and channels.

6. Construction plans will be reviewed by the City Engineer after all comments have been resolved. Construction must start within three (3) years of the date of City Engineer approval.

SECTION III
BLOCKS

Section III - Blocks

A. General

A tract of land bounded by streets, or by a combination of streets, public parks, cemeteries, railroad rights-of-way, shorelines of water ways, or boundary lines of municipalities and containing one or more building sites.

1. The length of a block shall be considered to be the distance from property corner to property corner measured along the property line of the block face:

   a. of greatest dimension, or

   b. on which the greatest number of lots face.

2. The width of a block shall be considered to be the distance from property corner to property corner measured along the property line of the block face:

   a. of least dimension, or

   b. on which the fewest number of lots face.

3. The length, width and shapes of blocks shall be determined with due regard to:

   a. provision of adequate building sites suitable to the special needs of the type of use contemplated;

   b. zoning requirements as to lot sizes and dimensions;

   c. needs for convenient access, circulation, control and safety of street traffic;

   d. limitations and opportunities of topography.

4. In general, intersecting streets should be provided at such intervals as to serve traffic adequately and to meet existing streets. Where no existing subdivision controls, the block length should not exceed one thousand (1,000) feet. Where no existing subdivision controls, the blocks should not be less than five hundred (500) feet in length. However, in cases where physical barriers, property ownership, or individual usage creates conditions where it is appropriate that these standards be varied, the length may be increased or decreased to meet existing conditions, having due regard for connecting streets, circulation of traffic and public safety.

5. Where long blocks in the vicinity of a school, park or shopping center are platted, the City Council may require a public walkway near the middle of long blocks or opposite a street that terminates between the streets at the ends of the block. If required, the concrete walkway shall not be less than five (5) feet nor more than eight (8) feet in width, through the block from sidewalk to sidewalk, or curb to curb, or if no street, to the property line adjacent to school, park, or shopping center and shall meet barrier free requirements in accordance with ADA and Texas Accessibility Standards.

SECTION IV
LOTS

Section IV - Lots

A. General

A platted parcel of land having frontage on a public street or approved public access easement and intended to be used as a building site or for purposes of building development and which is designated as a distinct and separate parcel identified by a lot number or symbol in a duly approved subdivision. A lot is not a parcel of unplatted property with an acreage status.

1. Lot design shall provide adequate width, depth, and shape to provide open area, to eliminate overcrowding, and to be appropriate for the location of the subdivision for the type of development and use contemplated, and in accordance with the Zoning Ordinance of the City of Everman.

2. Every lot shall have frontage on, and access to, a public street.

3. Lot markers shall be iron pins not less than one half inch (1/2") in diameter and no less than eighteen inches (18") long and shall be set flush with the ground at each lot corner.

4. All lot corners shall be set prior to the acceptance of the public improvements and shall be marked in a way that is traceable to the responsible registrant or associated employer.

5. Depth and width of properties reserved or laid out for commercial and industrial purposes shall be adequate to provide for the off-street service and parking facilities required by the type of use and development contemplated.

6. All side lines of lots shall be at approximately right angles to straight street lines and radial to curved street lines except where a variation to this rule will provide a better street and lot layout. Reference Section V(A.)(3.) Public Open Space Easement.

7. No lot shall have less width at the building line than is required by the Zoning Ordinance.

8. Direct access from residential lots shall be permitted on collector streets only where design conditions do not permit any other possibility.

9. Where the area is divided into larger lots than for normal urban building sites, and, in the opinion of the City, any or all of the tracts are susceptible of being re-subdivided, the original subdivision shall be such that the alignment of future street dedications may conform to the general street layout in the surrounding area, and so that the larger tracts may be later subdivided in conformance with the requirements of this ordinance and the minimum standards specified by the Zoning Ordinance.

10. Double frontage and reverse frontage lots should be avoided except where essential to provide separation of residential development from traffic arteries or to overcome specific disadvantages of topography and orientation.

11. Building lines shall be shown on all lots in the subdivision but shall not be less restrictive than the Zoning Ordinance.

SECTION V
EASEMENTS

Section V - Easements

A. General

Easements shall be provided on subdivision plats when the following criteria indicate that an easement is required.

1. Utility Easements

   a. Where not adjacent to a public right-of-way, easements at least fifteen (15) feet wide for utility construction, service, and maintenance shall be provided where necessary in locations approved by the City Council.

   b. Easements at least fifteen (15) feet wide for utility construction, service, and maintenance shall be provided for lots, which have frontage along state highways.

   c. Easements of at least ten (10) feet in width shall be provided on each side of all rear lot lines and along side lot lines, where necessary, for utilities such as electric, telephone, and gas.

   d. Easements having greater width dimensions may also be required along or across lots where engineering design or special conditions make it necessary for the installation of utilities outside public right-of-ways.

   e. The following statement of restrictions shall be placed in the dedication instrument:

      Utility Easement Restriction:

      Any public utility, including the City of Everman, shall have the right to move and keep moved all or part of any building, fences, trees, shrubs, other growths or improvements which in any way endanger or interfere with the construction, maintenance, or efficiency of its respective systems on any of the easements shown on the plat; and any public utility, including the City of Everman, shall have the right at all times of ingress and egress to and from and upon said easements for the purpose of construction, reconstruction, inspection, patrolling, maintaining and adding to or removing all or part of its respective systems without the necessity at any time of procuring the permission of anyone.

2. Fire Lane Easement

   Emergency access and fire lane easements shall be provided in locations required by the Chief of the Everman Fire Department. These easements shall have a minimum width of twenty (20) feet and a minimum height clearance of fourteen (14) feet. Any emergency access and fire lane easement more than one hundred (100) feet in length shall either connect at each end to a dedicated public street or be provided with a cul-de-sac having a minimum diameter of eighty (80) feet with an additional distance of ten (10) feet on all sides clear of permanent structures. These easements shall be paved in accordance with Everman Design Manual and shall be maintained by means of a Home Owner's Association, the property owner granting the easement or other means as approved by the City.

c. Storm drainage easements shall be provided for emergency overflow drainageways of sufficient width to contain within the easement storm water resulting from a 100-year frequency storm less the amount of storm water carried in an enclosed system of a capacity required by the City of Everman.

d. No construction or filling without the written approval of the City of Everman shall be allowed within a drainage easement, and then only after detailed engineering plans and studies show that no flooding will result, that no obstruction to the natural flow of water will result; and subject to all owners of the property affected by such construction becoming a party to the request. Where construction is permitted, all finished floor elevations shall be a minimum of one (1) foot above the 100-year flood elevation and must be in accordance with FEMA and EPA requirements.

e. These easements shall be paved in accordance with Everman Design Manual and shall be maintained by means of a Home Owner's Association, the property owner granting the easement or other means as approved by the City.

f. The following statement of restriction shall be placed in the dedication instrument of the subdivision plat:

Drainage Easement Restriction

No construction or filling, without the written approval of the City of Everman shall be allowed within a drainage easement, and then only after detailed engineering plans and studies show that no flooding will result, that no obstruction to the natural flow of water will result; and subject to all owners of the property affected by such construction becoming a party to the request. Where construction is permitted, all finished floor elevations shall be a minimum of one (1) foot above the ultimate 100-year flood elevation based on land use.

5. Floodway Easements

a. Floodway easements shall be provided along natural drainageways and lakes or reservoirs. Floodway easements shall encompass all areas beneath the water surface elevation of the base flood, plus such additional width as may be required to provide ingress and egress to allow maintenance of the banks and for the protection of adjacent property, as determined and required by the City Engineer.

b. The following statement of restrictions shall be placed in the dedication instrument of the subdivision plat:

Floodway Easement Restriction

No construction, without the written approval of the City of Everman shall be allowed within a floodway easement, and then only after detailed engineering plans and studies show that no flooding will result, that no obstruction to the natural flow of water will result; and subject to all owners of the property affected by such construction becoming a party to the request. Where construction is permitted, all finished floor elevations shall be a minimum of one (1) foot above the ultimate 100-year flood elevation based on land use.

c. Existing creeks, lakes, reservoirs, or drainage channels traversing along or across portions of this addition, will remain as an open channel at all times and will be maintained by the

SECTION VI
SIDEWALKS

Section VI - Sidewalks

A. General Requirements

1. Sidewalks shall be constructed of Class "A" concrete and shall have a width of 5 feet and a minimum thickness of 4 inches. Sidewalks shall be constructed for all lots adjoining dedicated streets and across power line easements and in other areas where pedestrian walkways are necessary. Sidewalk construction may be delayed until development of lots, but in locations not adjacent to lots and across bridges and culverts, the sidewalk shall be constructed with the other improvements to the subdivision. Sidewalks adjacent to screening walls or fences shall be 5 feet in width and shall abut the wall or fence.

2. Routing to clear poles, trees or other obstacles shall be subject to approval by the Director of Public Works. The plat or construction plans shall show the location of all proposed sidewalks and shall state at what stage of the project they will be constructed.

3. All sidewalks shall conform to the latest ADA and Texas Accessibility Standards (TAS) requirements.

4. Every new subdivision, or re-subdivision hereafter approved, shall be required to install sidewalks, with appropriate curb ramps, adjacent to all public streets rights-of-way. Sidewalk placements shall conform to the following:

   a. All corner lots shall have sidewalks placed on the two frontages or sides adjacent to the streets.

   b. Any triple frontage lots shall have sidewalks placed on the three frontages or sides adjacent to the streets.

   c. Any double frontage lots shall have sidewalks placed on the two frontages adjacent to the streets.

   d. Construction of all side yard sidewalks and rear yard sidewalks adjacent to perimeter streets shall be the Developer's responsibility to construct after plat approval. Front yard sidewalks shall be constructed for each lot prior to completion of any primary structure.

SECTION VII
MISCELLANEOUS

Section VII - Miscellaneous

A. General

1. Planned Development

   a. All proposed planned developments shall comply with the provisions relating thereto and contained within the Zoning Ordinance. All streets not dedicated to the public shall be constructed in accordance with the Everman Design Manual and shall be maintained by means of a Home Owner's Association, the property owner or other means as approved by the Commission.

   b. Any request to dedicate a private street as a public street shall be approved only if arrangements are made to bring the street into conformity with all City standards and regulations in effect at the time of dedication at the cost of affected property owners.

   c. All private streets that intersect with public streets shall be constructed with standard drive approaches. In such cases where an unusual condition exists, the City Engineer may approve standard intersection approaches if the approval is requested prior to the preparation of the plans. Private streets will be named and shown on the plat. Street signs for said private streets shall be erected and maintained by the Home Owner's Association or property owner.

2. Trench Safety

   In conformance with House Bills 662 and 665 as passed by the Seventieth Legislative Regular Session of the State of Texas, all construction projects within the City of Everman or its extraterritorial jurisdiction is provided by the Municipal Annexation Act (Article 9700, Vernon's Texas Civil Statutes) shall contain provisions for trench safety.

   On construction projects in which trench excavation will exceed a depth of five (5) feet, the uniform set of general conditions must require that the bid documents and the contract include detailed plans and specifications for adequate safety systems that meet Occupational Safety and Health Administration standards and that these plans and specifications include a pay item for these same safety systems.

3. Underground Utilities

   All distribution lines, cables, etc. for utilities other than those listed above shall be installed below ground within the subdivision. Transmission lines or major cables to provide utilities such as electric, telephone, and cable television to the area as a whole may be located above ground on the perimeter of the subdivision being served. The installation of these utilities shall conform to commonly accepted construction standards and be subject to review by the City Engineer. The location of proposed utilities shall be verified with the City of Everman.

SECTION VIII
PARKING

Section VIII - Parking

A. General

1. All parking shall be off-street, meaning that all vehicle maneuvering is done on the subject parcel and not on the street right-of-way.

2. Minimum construction standards for off-street parking shall include:

   a. 3,600 psi reinforced concrete with a minimum thickness of 6 inches or 4 inches of Type "B" and 2 inches of type "D" HMAC.

   b. Subgrade thickness and content shall be determined from a geotechnical report sealed by a Licensed Professional Engineer in the State of Texas provided by the Developer.

   c. Standard curb and gutter as shown on Detail P-8 of the Construction Standards shall be placed around all landscaping areas and the external boundary of the parking lot.

   d. All off-street parking areas shall be stripped in accordance with the latest version of the *Manual of Uniform Traffic Control Devices* (MUTCD) published by the Texas Department of Transportation.

   e. The following minimum dimensions apply for off-street parking:

Parking Angle	Stall Width	Stall Length	Maneuvering Space
90 degrees	9 feet	18 feet	24 feet
60 degrees	9 feet	18 feet	20 feet
45 degrees	9 feet	18 feet	18 feet

SECTION IX
MASONRY/CONCRETE SCREENING WALLS

Section IX – Masonry/Concrete Screening Walls

A. Construction

Masonry or concrete screening walls shall be constructed according to the following specifications.

1. Concrete foundations shall have a minimum compressive strength of 3000 psi at 28 days. Compressive strength tests conducted by an independent testing laboratory shall be submitted to the City staff for confirmation. All testing costs shall be paid by the Developer or his Contractor.

2. Reinforcing steel shall be billet steel conforming to the requirements of ASTM A615-GR.60.

3. Concrete piers shall be placed within 8 hours of drilling pier holes.

4. Brick masonry shall be as approved by the City.

5. Mortar shall be Type "S".

6. Construction shall be in accordance with the requirements of the "Recommended Practice for Engineered Brick Masonry" Brick Institute of America.

7. Use #9 Gaugc 1-3/4" wide galvanized ladder wire to extend horizontal in wall panel on every course.

8. The wall shall be a minimum of six feet (6') in height as measured from the nearest/adjacent sidewalk grade. No masonry or concrete screening wall or column shall exceed eight feet (8') in height unless the wall is functioning as a retaining wall and is designed as such.

9. Unless it has been determined by the City Engineer that no drainage problems are anticipated, an opening designed to allow for storm water drainage shall be provided. The opening shall be a uniform two inches (2") high the full length between columns.

10. Prefabricated screening fences such as "brickcrete" or "woodcrete" may be substituted for on-site masonry construction, provided that the finish resembles typical masonry constructed fences. No ordinary concrete finishes or traditional concrete block as a finish shall be allowed along collector or arterial streets. However, a concrete finish consisting of exposed aggregate shall be allowed.

11. All masonry or concrete screening walls shall be designed by a Professional Structural or Civil Engineer registered in the State of Texas. Sealed plans shall be submitted to the City for review.

B. Location

1. No masonry or concrete screening wall shall be located on public right-of-way.

SECTION X
STREET IMPROVEMENTS

Section X - Street Improvements

A. Street Classification Definitions

1. Streets shall be classified according to the following:

a. Street Classification	Functions - Uses
Local	Carries traffic from residential and commercial areas to collector streets and interconnects individual sites. Local streets carry light traffic volumes and trips are of a short duration. A road intended to provide right-of-way for sewer, water, storm drainage systems, and electric, telephone, gas, and cable TV utilities.
Collector	Carries traffic from local streets to arterials. Also may serve local facilities such as schools and churches. Uses served would include medium and high density residential, limited commercial facilities, elementary schools, some small offices and as direct access within industrial parks. Collector streets also carry heavy traffic to major commercial and industrial facilities from arterial. Uses would include office parks, industrial parks, and community level commercial facilities.
Minor Arterial	Minor Arterial system should connect and expand the Major Arterial system to accommodate trips of moderate length with somewhat lower level of travel mobility and a higher level of land access than a Major arterial system.
Major Arterial	The Main function of the major arterial is to carry traffic from one urban area to another. The Major Arterial system serves the major activity centers of urbanized areas. The Major Arterial is used for longer urban trips and carries a high portion of the total traffic with a minimum of mileage.

B. General Requirements

1. Any roadway design criteria not addressed in these documents shall conform with the latest edition of AASHTO's *Geometric Design of Highways and Streets* and the *Manual of Uniform Traffic Control Devices* (MUTCD) published by the Texas Department of Transportation. The following general requirements apply to street improvements:

   a. Adequate streets shall be provided by the subdivider. The arrangement, character, extent, pavement width, right-of-way width, grade and location of each street shall conform to the Master Thoroughfare Plan. Each street shall be considered in its relation to existing and planned streets, topographical conditions, significant natural features such as mature trees or water courses, public safety and convenience, and its relationship to the proposed uses of land to be served by such street.

   b. Whenever a tract to be subdivided abuts any part of any street so designated on the Master Thoroughfare Plan, or where a street designated on the Master Thoroughfare Plan crosses

k. A median opening with an offset of less than 125 feet from the centerline of an intersecting street or alley shall be prohibited.

2. Eyebrows or partial cul-de-sacs are not permitted on major arterial or collector streets.

C. Cul-de-sacs

1. Streets designated to be dead-ended permanently shall be platted and constructed with a paved cul-de-sac. Any dead-end street of a temporary nature, if longer than two hundred (200) feet, shall have a surfaced turning area eighty (80) feet in diameter for a cul-de-sac. Temporary dead-end streets shall have provisions for future extension of the street and utilities and, if the temporary cul-de-sac is utilized, a reversionary right to the land abutting the turnaround for excess right-of-way shall be provided.

2. A street ending permanently in a cul-de-sac shall not be longer than six hundred (600) feet measured from the center of the cul-de-sac to the curbline of the intersecting street. Also, the closed end shall be provided with a turnaround having an outside roadway diameter of at least eight (80) feet measured from face of curb to face of curb, and a street property line diameter of at least one hundred (100) feet.

D. Street Class Requirements

1. Street layout shall provide for continuation of collector streets in areas between major arterials.

2. Those local streets designated by the Planning and Zoning Commission shall be extended through the tract to the tract boundary to provide future connection with adjoining unplatted lands. In general, these extensions should be at such intervals as necessary to facilitate internal vehicular circulation with adjoining unplatted lands.

3. Where single family or duplex uses abut an existing or proposed arterial or collector street, the plat or dedication instrument will provide:

   a. Lots to side onto the arterial with a non-access restriction on the collector side, or

   b. Reverse frontage with screening and containing a non-access restriction along the rear property line, or

   c. Lots with screened rear alleys, or

   d. Other treatment as may be necessary or required for adequate protection of adjoining properties, and as approved by the City Council after taking into consideration the proposed method of off-street parking and maneuvering which will prevent the necessity of backing into the arterial or collector street.

be spaced at least seventy-five (75) feet apart on major arterial streets and fifty (50) feet apart on collector streets

6. The normal driveway grade within the street right-of-way is set at one-quarter inch per foot rise above the top of curb at the property line. The minimum elevation of a driveway at the right-of-way is two inches (2-1/4") above the top of curb. Barrier free sidewalk construction requires a maximum driveway grade as measured from the gutter of eight percent (8%).

   Where driveway construction or reconstruction must occur of the street right-of-way, the usual maximum grade is fourteen percent (14%). The maximum change in grade without vertical curve is twelve percent (12%) for any ten feet (10') in distance. Driveways should be profiled for a distance of at least twenty-five feet (25') outside the right-of-way to ensure adequate replacement design.

   Due to state laws requiring barrier free construction of sidewalks, steps or other abrupt changes in sidewalk grades are prohibited at driveways.

F. Driveway Requirements

1. Residential Driveway Approaches

   a. Residential driveway approaches shall be constructed of five inch (5") thick three thousand (3,000) psi compressive strength concrete reinforced with #3 steel bars on eighteen in (18") centers each way. The driveway shall begin at the street curb and extend to the right-of-way line or to a point ten feet (10') from the face of the curb, whichever is greater. The drive approach at the right-of-way line, with a normal ten foot (10') parkway, shall be two and one-quarter inches (2-1/4") higher than the top of curb.

   b. Width of Driveway Approaches: Residential driveway approaches shall not be less than twelve feet (12') in width nor more than twenty feet (20') wide measured at the property line. Specific variance to this criteria may be requested by the property owner. Any variance granted based on a specific design submittal must have the approval of the City Engineer.

   c. Radius: Residential driveways shall be constructed with return curbs having a rolled face disappearing at the sidewalk and joining the street curb with a minimum five foot (5') radius and a maximum ten foot (10') radius.

   d. Provision for Joint Approaches: Drive approaches shall be located entirely within the frontage of the premises they serve except for joint-use, or cooperative, driveways which may be permitted for use by adjoining property holders. When the joint drive approach is proposed, the request must be made by, and agreed to, by all the interested parties and all property owners involved. The design of the joint driveway facilities must be submitted with the request to be approved by the City Engineer.

   e. Residential Driveway Approaches at Street Intersections: The drive approach on corner lots must be located to approximately line up with the side of the house or garage that is farthest from the intersection. The drive approach edge farthest from the street intersection must be within three feet (3') of the far side of the house or garage.

f. Approaches on Properties other than Residential: The driveway for the corner lot, if allowed, must be located a minimum of fifty feet (50') from the point of intersection of the curb lines of both streets.

g. Angle of Driveway Approach: The angle of the driveway approach with the curb line shall be ninety degrees (90°).

h. Sidewalk to be Removed: Where a driveway approach is to be built, the sidewalk shall be removed and the entire area replaced as a driveway. The driveway approach shall extend to the property line.

3. Driveway Crossing Bar Ditches

a. The minimum culvert pipe size shall be eighteen inch (18") diameter for reinforced concrete pipe (RCP). Corrugated galvanized metal pipe may be used as an alternative, however, the diameter of the pipe may need to be larger because of additional head losses. The ends of all culvert pipe shall be cut at a 6:1 slope.

b. Radius: Driveways shall be constructed with the return curbs joining the edge of pavement at the street with a minimum five foot (5') radius for residential and ten foot (10') for commercial and industrial.

c. The maximum slope from the edge of driveway to the top of the culvert pipe shall be 6:1. The sloped area around the end of the culvert pipe shall be sodded or hydromulched to resist erosion.

d. The minimum cross slope on the drive shall be one-eighth inch (1/8") per foot. The minimum longitudinal slope between the edge of pavement at the street and the valley over the culvert pipe shall be one-quarter inch (1/4") per foot.

e. All driveways over bar ditches shall be constructed with a valley at least four inches (4") lower than the edge of road pavement to allow excess storm water to exit from the drive before entering the roadway.

f. Future maintenance of the drive approach and culvert pipe is the responsibility of the property owner.

g. During the drive approach installation, all finish grading upstream and downstream of the proposed driveway culvert is the responsibility of the property owner.

4. General

a. Driveway Approaches at Pedestrian Crossings: Driveway approaches shall not be located in street intersections or at established pedestrian crossings.

b. Driveway Approaches at Obstructions: Driveways shall be kept at a minimum of five feet (5') away from obstructions such as street light posts, fire hydrants, traffic signals, etc.

b. For Collector Streets, the Developer shall construct 7 inches of reinforced concrete on 8 inches of stabilized subgrade.

c. For Major and Minor Arterial Streets, the Developer shall construct 8 inches of reinforced concrete on 10 inches of stabilized subgrade.

H. Street Signs

1. Street signs shall be furnished and installed by the Subdivider for all intersections within or abutting the subdivision.

2. Street signs shall be 6 inches extruded, have white lettering on a green background, be engineer grade reflectorized, and include the block numbers along with the street name.

3. Stop signs shall be 24 inch by 24 inch in size and shall conform to the standards as set forth in the Texas Manual on Uniform Traffic Control Devices.

4. All signs shall be of engineer grade reflective material and be located in accordance with the Texas Manual on Uniform Traffic Control Devices.

5. The sign pole shall be buried to a minimum depth of 2 feet and placed in 12 inches diameter concrete filled posthole. The pole shall be tall enough to accommodate all applicable signs. The bottom of the stop sign shall be located 7 feet above the finished grade of the surrounding ground.

6. The Developer shall submit a list of signs to be placed and a graphical representation of the signs for review by City Staff prior to installation.

I. Street Lighting

1. Street lights in all subdivisions shall be installed on approved metal poles.

   a. Poles must be approved by a public electric utility holding a City franchise and the City Engineer.

   b. Poles shall be contracted and paid for by the Developer during the construction phase of a subdivision and before building permits are issued.

   c. Poles not purchased through a public electric utility company holding a City franchise, shall be certified by an engineer as meeting the specifications as required by a public electric utility company holding a City franchise.

2. The location of street lights shall be as follows:

   a. At all intersections.

   b. Where a new street intersects an existing street.

SECTION XI
WATER SYSTEM IMPROVEMENTS

Section XI - Water System Improvements

A. General

1. This section pertains to general design requirements for water distribution system construction in the City of Everman. All water lines shall be sized and designed in accordance with the City of Everman Water Distribution System Master Plan or as determined by the City Engineer. In the absence of specific standards, all water supply, distribution, pumping, and storage improvements shall be designed in accordance with the most current standards of the American Water Works Association, the Standard Specifications for Public Works Construction of the North Central Texas Council of Governments, and criteria adopted by the Texas Administrative Code, Chapter 290, "Water Hygiene".

2. Water lines for multi-family, commercial and industrial fire protection lines shall be private and isolated from the public system by a double detector check placed at the property line. All water lines shall be 6 inches minimum diameter and looped when possible. Dead end lines shall not exceed 50 feet and end with a fire hydrant on multi-family, commercial, or industrial sites. All public water lines located on private property shall be centered in a 15 foot minimum easement. Larger easements may be required by the City Engineer to provide adequate space for maintenance. Water lines shall not be located under paved surfaces where possible.

   Multi-family developments may be supplied fire protection and domestic service by the same water line provided that a fire-rated master meter is used along with a double detector check at the looped end of the water line.

   If residential developments require fire suppression systems, the Developer is responsible for the design and specification of said fire suppression system.

3. The Developer shall furnish, install, construct, or extend, at his own expense, water distribution facilities necessary for the proper development of the subdivision. The water system shall provide individual service to every lot in the subdivision. All water mains constructed within a proposed subdivision shall be extended to the perimeter of the proposed subdivision to allow for future extension of the water system into adjacent properties. The water system shall be designed and constructed in accordance with the specifications contained in these Standards. Where considered necessary by City Staff, the facilities shall be sized in excess of that dictated by these Standards to provide for the future growth and expansion of the City's water distribution system.

4. All components of the water system must comply with ANSI/NSF Standard 61.

B. Water Line Sizing

1. Standard water line sizes are 6 inch, 8 inch, 12 inch, and 16 inch diameter. Other sizes must be approved by the City Engineer.

b. Fittings: ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber and factory installed. Natural rubber will not be acceptable.

c. All buried metal shall be wrapped in polyethylene Tube Wrap: ANSI/AWWA C105/A21.5

E. Installation

1. General

a. All installations shall conform to the latest NCTCOG Specifications, as amended by these standards.

b. Separations – Water line installations shall conform with the separation criteria outlined in the Texas Administrative Code, Chapter 290.44, "Water Distribution."

c. All 6 inch and 8 inch water pipe shall be installed with a minimum of 42 inches of cover over top of pipe, 12 inch water pipe shall be installed with a minimum of 48 inches cover, and pipe 16 inches and larger water pipe shall be installed with a minimum of 60 inches of cover over top of pipe.

d. The amount of trench excavation shall not exceed 200 (two hundred) feet from the end of the pipe laying operations, and no more than 300 (three hundred) feet of total open trench will be allowed. At the end of each work day, all trench excavation shall be backfilled to the end of the pipe laying operation. Barricades and lights will be required around any open trench left overnight.

e. All connections to existing water mains shall be made under pressure unless dry connections will not cause any loss of service. Under special conditions connections that cause an interruption of service may be performed with approval of the City Engineer.

f. Coated tracer wire (min. 10-Gauge) shall be installed in the embedment material above the PVC pipe with the tracer wire terminating in in-line gate valve boxes accessible by City Staff. Blue underground water line tape of a minimum 4-inch width shall be installed above the embedment material.

g. Density tests shall be taken every 200 feet. The density reports shall be submitted daily to the City's inspector.

h. All density reports shall be completed and delivered to the City's inspector before paving is allowed to begin.

2. PVC Water Pipe

PVC water pipe and appurtenances shall be installed as specified in AWWA Manual M-23 and in accordance with the pipe manufacturer's recommendations.

3. Fittings

a. Fittings shall be installed in accordance with AWWA C-600.

from turning or backing out. Connecting the nozzle to hydrant by leading is not acceptable.

f. Nozzle cap harnessing and gaskets shall be furnished.

g. Shut off:

i) The hydrants shall be of the compression type, with the main valve opening against the pressure and closing with the pressure.

ii) The valve action shall provide positive shut-off at minimum closing torque.

iii) Wedge action closing gates shall not be used.

iv) All hydrants shall open by turning the operating-stem nut to the RIGHT (CLOCKWISE). A clearly visible CURVED ARROW and the word "OPEN" shall be cast in relief on the top of the hydrant to indicate the direction of opening.

v) The fire hydrant operating nut shall be square in shape. The square nut shall measure 1 inch at the base, and 7/8 inch at the top with all faces tapered uniformly. The nut shall be so designed as to protect the working mechanism from the moisture and dirt.

h. Bury Length: The standard fire hydrant bury length from ground to bottom of the connecting pipe shall be 3 feet 6 inches. The hydrant shall be of a design that will permit extensions without disturbing the bottom section of the hydrant.

i. Hub Type: Inlet connection shall be mechanical joint unless otherwise specified, and shall be for 6 inch ductile iron pipe. The nominal diameter of the fire hydrant main valve opening is to be 5¼ inches.

j. Hydrant Body: The body of the hydrant between the elbow and the top cap must be made in two parts connected by a swivel flange, or breakable flange which will permit facing of the nozzles in any desired direction in increments of 45 degrees or less. The complete hydrant shall be of such design that when the hydrant barrel is broken through traffic collision or otherwise, it may be replaced without disturbing the bottom section of the hydrant. Extension sections, where required, shall include barrel extension section, extension rod with connectors provided for lengthening the complete unit. These units shall be available in increments of six (6) inches in length.

k. The fire hydrant body shall be painted a high gloss alkyd fire hydrant red.

l. Ballards shall be placed around fire hydrants in high traffic areas. The ballards shall be placed at 45 degree angles to the fire hydrant with a minimum spacing of 30 inches.

3. Installation

a. Location Markers

A location marker shall be placed in the center of the roadway opposite the fire hydrant. If the fire hydrant is located near the intersection of at least two streets a marker shall be placed on all streets. The installation of this reflector shall be in accordance with the

b. Adjustable valve boxes shall be furnished and set on each valve in accordance with these standards. Valves that are deeper than 48 inches, AWWA C900 PVC pipe shall be used for stacks, as long as the adjustable valve box is used at the top.

c. After the final clean-up and alignment has been complete, the Contractor shall cast in place a concrete block, 24 inches by 24 inches around all valve box tops at the finish grade. See Detail W-3.

d. Valves located within a right-of-way shall be indicated on the face of the curb, or where curbs do not exist, on a conspicuous location adjacent to the valve location. Markings are to be the stamping of a four (4) inch high letter "V" with the point of the "V" pointing towards the valve location.

e. Valve markers shall be provided in rural areas.

5. Manufacturers

a. Approved manufacturers of 3 inch through 12 inch resilient seated gate valves are as follows:

i) Mueller
ii) M & H
iii) U.S. Pipe
iv) CLOW
v) American Flow Control

b. Approved manufacturers of 16 inches resilient seated gate valves are as follows:

i) Mueller
ii) M & H
iii) American Flow Control

c. Approved manufacturers of 16" and larger butterfly valves are as follows:

i) Dezurik
ii) Clow
iii) Keystone

H. Air Release and Flushing Valves

1. Adequate air relief, and flushing valves shall be provided for flushing, disinfection, daily operation requirements, and repairs when required by the City Engineer. Air release valves shall be required on 12 inches and larger water lines. Water lines shall be designed so that each section of the water line can be flushed at its lowest and highest points.

2. All dead end lines shall have a fire hydrant installed for flushing purposes and a sampling station. Sampling station shall be an Eclipse No. 88 or approved equal.

6. Installation

   a. General

      i) All water service shall be installed in accordance with these standards.

      ii) Each individual service location shall be saw cut into the face of the curb with a four (4) inch high blue "W" painted by the Contractor. If no curb exist a similar mark should be placed in the pavement near the edge of the roadway.

   b. Residential Meters - All residential meters shall be manufactured by either Hendy, Badger, or approved equal.

   c. Commercial Meters (3 inches and larger) - The Developer shall purchase from the manufacturer either Hendy, Badger, or approved equal compound meter. The meter shall be installed by a utility Contractor or plumber. All meters in this size class are required to have a strainer prior to the meter.

7. Acceptable Manufacturers for Corporation Stops, Curb Stops, and Service Saddles:

   a. Ford
   b. Mueller
   c. Smith-Blair

K. Flushing Valves

1. Materials

   a. Corporation stop shall be 2 inch ball type with compression outlet fitting, designed for a minimum working pressure of 200 psi.

   b. 2 inch curb stop shall be ball type with compression inlet fitting with tee head shut off.

   c. Pipe shall be 2 inches diameter, Type K copper as specified in ASTM B88.

L. Water Line Bore

1. Minimum casing thickness shall be 1/4 inch. Casings shall be required under collectors and major arterials, highway crossings, and railroad crossings. Casings may also be required were deemed necessary by the City Engineer. The construction bore pit shall be located at a minimum distance of 4 feet behind the back of curb or edge of pavement where no curb is present.

2. The design engineer shall design the water line pipe casing for the following loading conditions and applicable combinations thereof:

   a. Cooper's E-80 Railway loading or AASHTO HS20 loading as applicable
   b. Earth loading with the height of fill above the casing as shown on the plans
   c. Loads applied during jacking, including axial load from jacking

SECTION XII
WASTEWATER SYSTEM IMPROVEMENTS

Section XII - Wastewater System Improvements

A. General

1. This section pertains to general design requirements for waste water collection system construction in the City of Everman. All sewer lines shall be sized and designed in accordance with the City of Everman Wastewater System Master Plan or as determined by the City Engineer. In the absence of specific standards, all collection, treatment, and disposal systems shall be designed in accordance with the most current criteria adopted by the Texas Administrative Code, Chapter 317, "Design Criteria for Sewerage Systems".

2. All sewers shall be designed with consideration for serving the full drainage area subject to collection by the sewer in question; the drainage area may be modified with the concurrence of the City Engineer because of the projected rate of development or the financial feasibility of the proposed extension.

3. Sewers should be designed with straight alignment whenever possible. When horizontal curvatures must be used, the maximum joint deflection should be in accordance with the pipe manufacturer's recommendations.

4. The Developer shall furnish, install, construct, or extend, at his own expense, wastewater collection facilities necessary for the proper development of the subdivision. The wastewater collection system shall provide individual service to every lot in the subdivision. All sewer mains constructed within a proposed subdivision shall be extended to the perimeter of the proposed subdivision to allow for future extension of the wastewater collection system into adjacent properties. The wastewater collection system shall be designed and constructed in accordance with the specifications contained in these Standards. Where considered necessary by City Staff, the facilities shall be sized in excess of that dictated by these Standards to provide for the future growth and expansion of the City's wastewater collection system.

5. All sewers shall be designed with hydraulic slopes sufficient to give mean velocities, when flowing full or half full, of no less than two (2) feet per second on Kutter's or Manning's formulas using an "n" value of 0.013. Slopes shall also conform to TAC Chapter 317, Sewage Collection System.

6. When a 150 psi rated sewer line is required due to its proximity to a water line, the 150 psi rated pipe shall terminate at a manhole on each end. The pipe shall be extended to the interior wall of the manhole. No external boot connection will be allowed.

7. Sampling wells are required for all industrial buildings, Laundromats, dry cleaners, automotive repair facilities, and food handling facilities.

B. Sanitary Sewer Line Sizing

1. Standard sewer line sizes are 6 inches, 8 inches, 12 inches, 15 inches, and 18 inches in diameter; other sizes must be approved by the City Engineer.

2. Excavation and Backfill

   a. When PVC pipe is used, green marker tape with the wording "Buried Sanitary Sewer" shall be installed in the backfill material no more than twelve (12) inches above the top of the pipe.

   b. The amount of trench excavation shall not exceed 200 (two hundred) feet from the end of the pipe laying operations, and no more than 300 (three hundred) feet of total open trench will be allowed. At the end of each workday, all trench excavation shall be backfilled to the end of the pipe laying operation. Barricades and lights will be required around any open trench left overnight.

   c. Density tests shall be taken every 200 feet. The density reports shall be submitted daily to the City's inspector.

   d. All density reports shall be completed and delivered to the City's inspector before paving is allowed to begin.

F. Inspection

1. All sanitary sewer lines shall be inspected using television inspection methods prior to acceptance by the City.

   a. The Contractor is responsible for cleaning the sewer pipe. If the inspection shows debris or evidence that the line has not been properly cleaned, the review will cease and the tape will be returned to the Contractor.

   b. A City representative shall be present during the television inspection, unless otherwise authorized in writing.

   c. The televised inspection shall commence only after the line has passed both air and mandrel test.

2. Televised Inspection Criteria

   a. All sanitary sewer mains must be flushed with water just prior to televised inspection. Water is to be provided at the Contractor's expense. A City representative shall be present during the flushing of the main.

   b. All television equipment used shall have a minimum of 220 lines of horizontal resolution. The picture shall be in color.

   c. All video information on tape must have good picture quality.

   d. As a title heading on the tape and during the televising, the operator must:

      i. Note the project name and Contractor name.

      ii. Note the name of the company and the operator performing the video inspection.

g. Tapes must be VHS format, 1" wide T-120, high quality tape. Tapes are to be recorded on SP (2 hours) play.

h. All tapes and run sheets shall be submitted to the City. All tapes and log sheets shall become the property of the City.

3. Criteria for Repair

a. The Contractor shall make repairs if the inspection reveals any deficiency in the sewer line. If repairs are required, another television inspection shall be made after the repairs are complete on a new tape from manhole to manhole at the Contractor's expense.

b. Repairs shall be made to the satisfaction of the City Engineer and Public Works Director.

G. Manholes

1. Manholes shall be located at all intersections of sewer lines and at intermediate spacing along the line. Generally the maximum spacing should not exceed 500 feet. Manholes should be located at all changes in grade and at the ends of all sewer lines that will be extended.

2. A manhole is required at the junction of sewer lines with different inside pipe diameters.

3. A drop of at least 0.1 feet is required through the manhole when a change in flow direction occurs.

4. The flow line into a manhole should not be greater than 6 inches above the flow line out of the manhole. Where the flow line in is greater than two (2) feet above the flow line out, a drop manhole is required.

5. Minimum manhole inside diameter is four (4) feet.

6. Drop-connection manholes shall have a minimum inside diameter of five (5) feet, with an interior drop connection if line size is greater than 8 inches.

7. Minimum cast in place manhole wall thickness is eight (8) inches. For depth's greater than 12 feet add an extra 4 inches of thickness for each additional 6 feet of depth.

8. Minimum pre-cast wall thickness is 5 inches.

9. A Manhole is required where a sanitary sewer line enters and exits private property.

10. All manholes shall be constructed of concrete.

11. Installation

a. Use the following table to determine sanitary sewer manhole sizes:

ii) Manhole base shall have a spread footing and be placed on a minimum of twelve (12) inches of crushed rock.

12. Manufacturers

Approved precast manhole manufacturers are as follows:

a. Hydro-conduit

b. Hanson

H. Manhole Frame and Cover

1. Cover

a. Materials

All manhole covers shall conform to the Standard Specifications for Grey Iron Castings, ASTM A-48, Class 30 B.

b. Installation

i) All manhole covers shall be 24 inches in diameter.

ii) All manhole covers shall have two integrally cast pick bars.

c. Manufacturers

i) Bass and Hays

ii) Vulcan

2. Frames

a. Materials

All manhole frames shall conform to the Standard Specifications for Grey Iron Castings, ASTM A-48, Class 30 B.

b. Installation

All manhole frames shall provide a 24 by ¼ inch opening to assure proper fit of the manhole cover.

c. Manufacturers

i) Bass and Hays

ii) Vulcan

3. PVC sewer pipe and fittings shall conform to the current ASTM Designation D 3034 for 4 inches through 15 inches and ASTM Designation F 679 for greater than 15 inches.

K. Aerial Sewer

1. The piers for the aerial crossing shall be designed in accordance with the guide lines of the Ductile Iron Pipe Research Association.

2. Aerial sewer crossing shall be located in areas where the sewer line cannot be constructed with the appropriate minimum cover. The design engineer shall design the aerial crossing in accordance with these standards and as approved by the City Engineer.

3. Pier placement and spacing shall be determined according to soils analysis performed by a geotechnical engineer. Piers shall be placed at a maximum span distance as indicated by the design engineer's calculations.

4. Pier placement and spacing along with a soils report shall be submitted to the City Engineer.

5. All above ground sewer installations shall be ductile iron, minimum Class 150, utilizing restrained joints and shall have a wall thickness required for the size and span as designed. The pipe shall have an internal polyurethane coating.

6. The aerial pipe shall be connected to the sanitary sewer pipe by means of a manhole on each side of the aerial crossing.

7. Piers to be constructed with a minimum of Class A 3,500 psi reinforced concrete.

8. The design engineer shall submit a pipe design for approval by the City Engineer.

9. The design engineer shall submit a pier design for approval by the City Engineer.

L. Sewer Line Boring

1. The design engineer shall design the sewer line pipe casing for the following loading conditions and applicable combinations thereof:

   a. Cooper's E-80 Railway loading or AASHTO HS20 loading as applicable.

   b. Earth loading with the height of fill above the casing as shown on the plans.

   c. Loads applied during jacking, including axial load from jacking.

   d. All other applicable loading conditions, including loads applied during transportation and handling.

2. Materials

   a. Steel Casing Pipe - Steel casing pipe shall be new (or used if approved by the City Engineer) and suitable for the purpose intended and shall have a minimum yield strength

M. Lift Stations

1. Minimum requirements, plans and specs submitted for approval by City Engineer. Lift Stations must be designed in accordance with 30 TAC, 317.3.

2. Instrumentation and Control

   a. The voltage supplied for pump operation shall be 3 phase, 480 volts. Converting single phase power to three phase power using additional mechanical equipment shall not be allowed.

   b. Wet-well level control shall be achieved through the use of an ultrasonic level indicating transmitter.

   c. A main disconnect shall be installed on power supply between the meter and control panel.

   d. All lift stations dedicated to the City of Everman shall have SCADA telemetry equipment installed, at the expense of the Developer, that interfaces with the City's SCADA system and meets the City's protocol and specifications.

   e. Submersible pumps shall be provided with moisture and motor over-temperature sensors.

3. Site Requirements

   a. A concrete pad will be required at the front of the control cabinet. The pad shall provide a 3 foot working area away from the face of the cabinet and extend the width of the enclosure mounting structure. Pad depth shall be a typical 4 inches.

   b. A 1 inch minimum potable water service is required. The water service may be set in a standard 18 inch galvanized water meter box with a 1 inch brass angle stop.

   c. The site shall be graded to drain away from the station to prevent stormwater inflow or infiltration into the wet-well.

   d. The site shall be located outside of the 100-year flood plain.

   e. The site shall not be located within 100 feet of an existing or proposed residence, if possible

   f. If applicable the lift station site driveway shall include driveway area for maintenance vehicles to park off public roadway while performing maintenance. The minimum driveway length shall be 15 feet.

   g. A concrete driveway turning area is required where access drives extend more than 20 feet from main roads. The driveway area shall be "T" shaped with the applicable turning radius. The minimum driveway width shall be 15 feet.

SECTION XIII
DRAINAGE AND STORM SEWER

Section XIII - Drainage and Storm Sewer

A. General

1. Drainage facilities shall be provided and constructed by the Developer in accordance with all current City Standards and the following basic requirements:

   a. The Developer or Owner is required to meet all FEMA regulations. When submittal to FEMA is required, the submittal must be submitted to and approved by the City Engineer or Director of Public Works prior to submitting to FEMA. Conditional Letter of Map Revisions (CLOMRs) and Letter of Map Revisions (LOMRs) are required for any modifications to a floodplain or floodway.

   b. A Certificate of Occupancy will not be issued by the City until a copy of the FEMA approval letter for the LOMR is sent to the City (if required for the site). In the typical development of a site, a CLOMR precedes site development, and a LOMR follows site development and is based on as-built conditions.

B. Runoff Calculations

1. The selection of which method to use for calculating runoff depends upon the size of the contributing drainage area at the most downstream point of the project. The "Rational Method" is acceptable for designing projects in which the drainage area is less than 100 acres. A unit hydrograph method is required for projects with larger drainage areas.

2. No matter which method is used to calculate runoff, a Developer or Builder of property greater than one acre in size, or any property that was platted as a part of an overall tract which was greater than one acre in size (including churches and schools), shall develop the property so that the rate of runoff created by the development as it leaves the property does not exceed the rate of runoff that would have been created if the property had developed as a single-family residential property.

3. Runoff computations shall be based upon fully developed watershed conditions in accordance with the land use projections in the latest comprehensive land use plan for the City of Everman. The design engineer shall size drainage facilities by disregarding the detention effects of upstream property and calculating the runoff as if the off-site property was developed without any detention. If a City approved regional detention facility is in operation, the design engineer may size downstream drainage facilities based on consideration of the detention effects of the regional facility. The term "___-year" storm in this section refers to the fully developed storm unless otherwise specified.

4. Procedure for drainage area less than 100 acres.

   a. Computation of Storm water Runoff for drainage areas less than 100 acres shall be by the "Rational Method," which is based on the principle that the maximum rate of runoff from a given drainage area for an assumed rainfall intensity occurs when all parts of the area are contributing to the flow at the point of discharge. The formula for calculation of runoff by the "Rational Method" is:

b. The unit hydrograph method shall be based upon fully developed watershed conditions assuming no effects from the small on-site detention facilities. The detention effects of large regional detention facilities can be taken into account in unit hydrograph methods.

c. Circumstances that may require the use of a unit hydrograph method include sizing open channels, reclaiming floodplains, creating lakes, or building other types of drainage-related facilities on major drainage courses. Design engineers of these types of facilities should be aware that the requirement of designing for fully developed watershed conditions will mean that they will have to calculate these fully developed flows in addition to using the flows calculated in the Federal Emergency Management Agency's (FEMA) flood insurance studies for Everman.

C. Design Storm Frequencies

The approved drainage system shall provide for positive overflow at all low points. The term "positive overflow" means that when the inlets do not function properly or when the design capacity of the conduit is exceeded, the excess flow can be conveyed overland along a grassed or paved course. Normally, this would mean along a street or alley, or shall require the dedication of special drainage easements on private property.

DRAINAGE FACILITY	DESIGN RECURRENCE INTERVAL
Closed Storm Sewer Systems	10-year with 100-year positive overflow in streets such that the depth of flow in the street does not exceed the top of curb.
Closed Storm Sewer Systems and Inlets at Street Low Point or Sag	100-year with positive overflow
Culverts and Bridges	100-year
Concrete-lined Channels	100-year
Earthen Channels	100-year

D. Street Capacity

1. The depth of flow in the streets shall not exceed the top of curb for the 100-year storm.

E. Inlet Placement and Capacity

1. Storm sewer inlets shall be built along paved streets at such intervals that the depth of flow, based upon the 100-year storm, does not exceed the top of curb. Inlets shall be located as necessary to remove the flow based on a 10-year storm. If in the opinion of the City Engineer the flow in the gutters would be excessive using the above design criteria, the storm sewers or inlet locations could be altered to relieve adverse conditions.

2. Culverts must be designed using standard methods and engineering judgement. Culverts shall be designed in accordance with the latest edition of the Texas Department of Transportation (TxDOT) Hydraulic Design Manual. Standards of City of Everman will take precedence over TxDOT Manual in cases of conflict.

3. Culvert hydraulic grade line calculations shall consider both inlet and outlet control.

4. Culverts shall be skewed such that impacts due to the flood and normal flow angles of attack on the structure are minimized.

5. The maximum velocity through a culvert shall be 15 feet per second. Maximum discharge velocities for culverts shall be in accordance with Section XIII (F.)(2.)(c.).

6. Stream stability shall be assessed when determining the number of barrels, height and width and culvert skew. Potential for scour shall be accounted for in the design.

H. Bridges

1. Two (2) feet of freeboard is required between the 100-year water surface elevation and the low chord of the bridge. Exceptions to this requirement must be approved by the City Engineer in writing.

2. The skew of the bridge piers and abutments shall be oriented as close to the normal or flood direction of flow resulting in an angle of attack as close to 0 degrees as possible.

3. Bridges shall be designed using standard hydraulic and structural methods. These methods should be approved by the City Engineer prior to commencing design.

4. Stream stability shall be assessed when designing the abutments and interior bents of the bridge. Scour shall be accounted for in the design.

I. Channels

1. Open channels are discouraged in urban areas. Open channels may be used instead of enclosed systems when the pipe size, necessary to carry the design storm event, exceeds the capacity of 2-60 inch RCP. Open channels shall not be permitted when 2-60 inch RCP pipes will carry the design flow, unless approved by the City Engineer.

2. Open channel design criteria:

   a. Channels may be left in their natural state provided that the channel velocities are 6.0 feet per second or less and that (1) one foot of freeboard is available from the water surface to adjacent finished floors during the design storm event.

   b. If the natural channel is to be replaced by an improved channel, the flow from the 100-year design flood must be contained within the improved channel while allowing for one (1) foot of freeboard to the top of bank.

watershed conditions in accordance with the land use projections in the latest comprehensive land use plan for the City of Everman. The design engineer shall size drainage facilities by disregarding the detention effects of upstream property and calculating the runoff as if the off-site property was developed without any detention. If a City approved regional detention facility is in operation, the design engineer may size downstream drainage facilities based on consideration of the detention effects of the regional facility. Detention facilities shall be designed for the 100-year design flood according to the following criteria:

1. The minimum amount of storage volume of the detention basin shall be that volume required to reduce runoff rate to a single-family rate. Dedicated detention/retention basins shall also include an additional one foot of freeboard and two feet of sediment storage. The volume of runoff storage for drainage areas greater than 100 acres shall be computed using unit hydrograph procedures. Acceptable unit hydrograph procedures are provided in section XIII.B.5 of this document.

   For drainage areas less than 100 acres, the above methods are recommended; however, an approximate routing method based on the rational formula is allowable.

2. All detention facilities designed shall consider the timing of the flood peak in the main channel into which the detention facility drains. Delaying the peak from a site in lower portions of a watershed may result in a higher peak on the main channel.

3. A detention facility shall have enough gradient to ensure positive drainage to the outlet structures so as to avoid nuisance conditions such as standing water, odors, insects, and weeds. A minimum slope of 0.40% towards the outlet structure is required for all detention facilities.

4. Detention areas in parking lots shall not be:

   a. In required parking spaces but in extra spaces.

   b. Behind speed bumps unless the speed bumps are made with reinforced concrete.

   c. Deeper than six inches unless otherwise approved by the City Engineer and warning signs are posted.

5. Drainage easements shall be provided for all regional detention facilities and for other detention facilities where two or more owners are involved.

6. Detention facilities shall be designed to empty in less than 24 hours, unless it is also serving as an erosion control facility.

7. Detention facilities used as a sediment control device shall meet the following requirements;

   a. The sediment control facility shall be designed with minimal velocities such that sediment is dropped and not picked up by flows at any time during the storm event.

   b. The basin shall be designed with adequate sediment storage area so that sediment removal is not required more than twice a year. Expected removal periods greater than

M. Earthwork

This section shall apply to all subdivisions which are proposed for development; are existing and require additional grading; or are single-lot subdivisions (platted or unplatted) which are proposing excavation or fill.

1. Definitions.

   a. Conceptual Grading Plan – A topographical map of the subdivision with sufficient perimeter area to provide a clear definition of the initial elevations, watercourses, ground configuration, and drainage patterns. In addition, the plan shall include proposed flow arrows, cross-sections and spot elevations sufficient to control the magnitude of excavation and fill. The plan must be sealed and signed by a Registered Professional Engineer licensed by the Sate of Texas.

   b. Excavation – The removal of turf, soil, rock or weeds such that the surface is six inches (6") lower than the initial elevation.

   c. Final Grading Plan – The final grading plan shall include a topographical map of the subdivision with sufficient perimeter area to provide a clear definition of the initial elevations, watercourses and drainage patterns. In addition, the plan shall include one foot (1') contours, spot elevations, and flow arrows. The plan must be in sufficient detail and scale to determine limits and depths of excavation or fill. The plan must be signed and sealed by a Registered Professional Engineer licensed by the State of Texas.

   d. Grading – The movement of dirt, top soil, grass, native material, brush, trees, landscaping or other forms of surface material which will result in a long term difference of six inches (6") or greater from the initial elevation.

   e. Initial Elevation – Shall be understood as the mean sea level elevation as it existed prior to modification.

   f. Multi-Lot Subdivision – A division of any tract of land into two or more parcels.

2. Unplatted Multi-Lot Subdivision

   When a multi-lot subdivsion has been proposed for platting, but has not yet been approved by the City Council, the following provisions shall govern the excavation and fill process.

   a. A conceptual grading plan shall be submitted to the City Engineer. The plan will be reviewed for consistency with City ordinances and policies. If the concept is approved, a 30-day permit will be issued to allow grading to begin.

   b. The process must be inspected by a City representative and all fill shall be tested for proper compaction. All test costs are the responsibility of the Developer.

   c. Areas which fail the compaction tests shall be excavated, the material replaced (or new material imported, depending on moisture content) recompacted and retested.

   d. Areas which have been filled without adequate compaction tests or without inspection by a City representative shall be considered as areas which have failed the compaction tests.

DRAINAGE AND STORMWATER

FIGURES

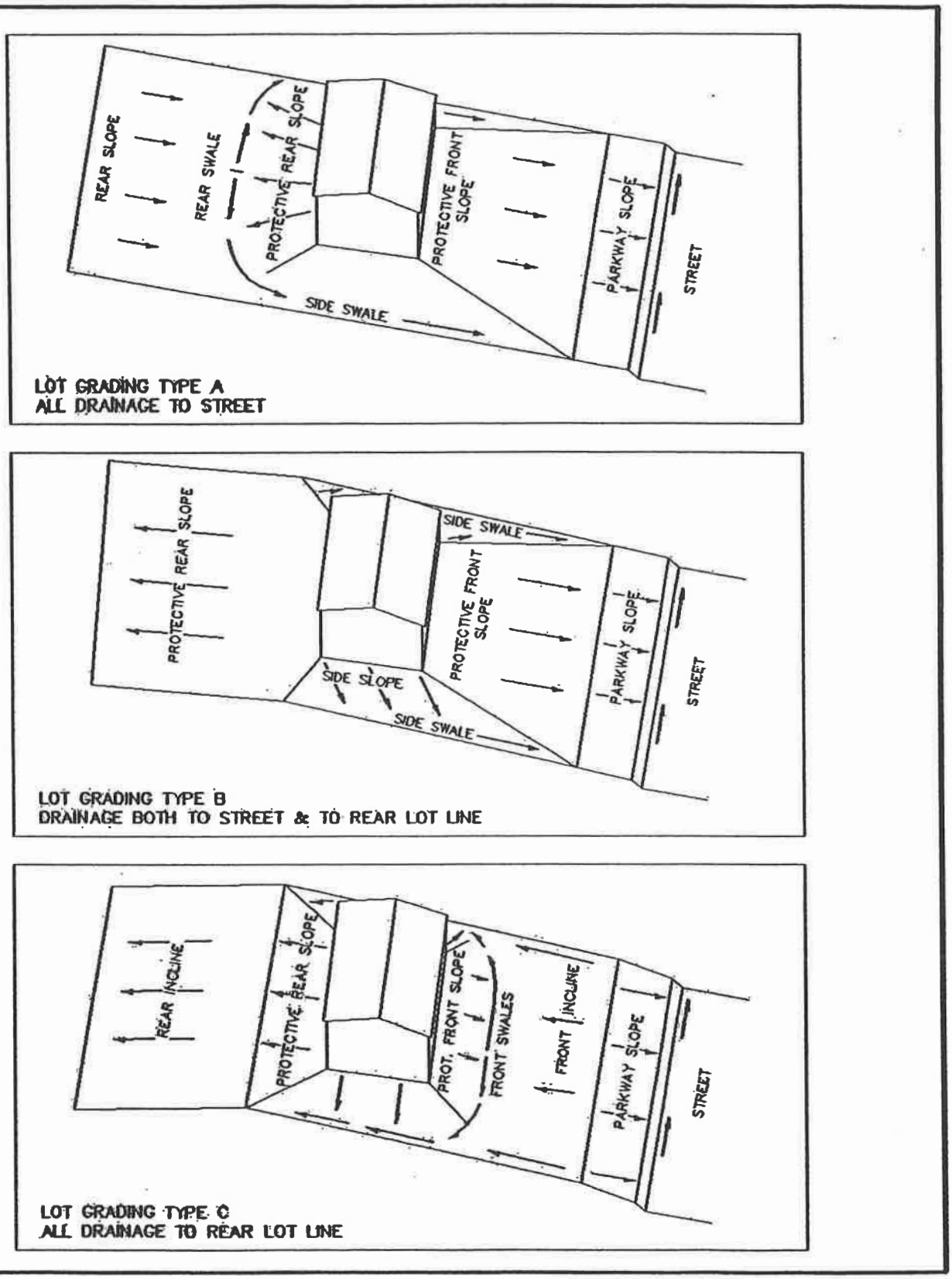
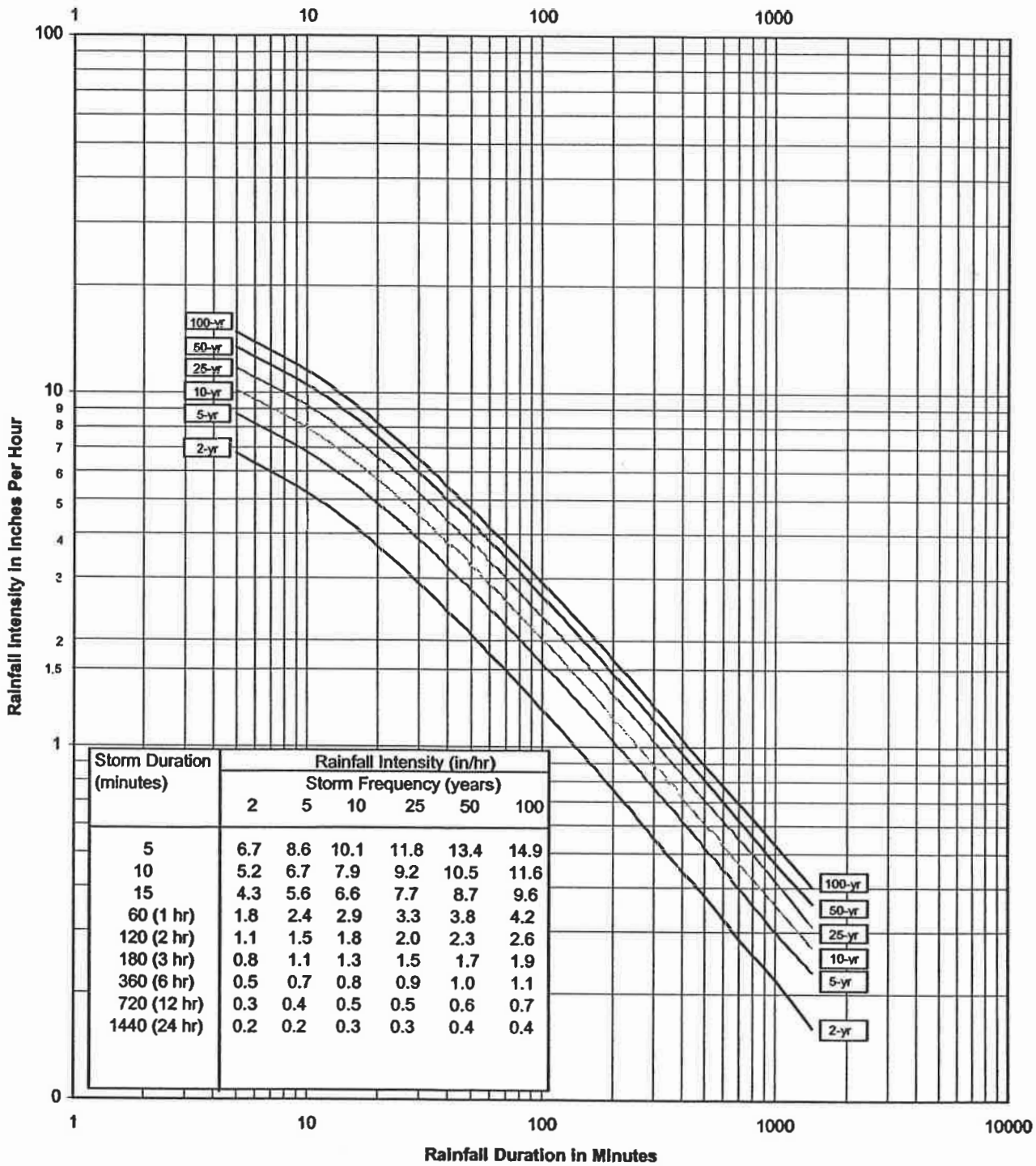


FIGURE 1 - Allowable Lot Grading Designs

Intensity Duration - Frequency (IDF) Curve
City of Everman



Storm Duration (minutes)	Rainfall Intensity (in/hr) Storm Frequency (years)					
	2	5	10	25	50	100
5	6.7	8.6	10.1	11.8	13.4	14.9
10	5.2	6.7	7.9	9.2	10.5	11.6
15	4.3	5.6	6.6	7.7	8.7	9.6
60 (1 hr)	1.8	2.4	2.9	3.3	3.8	4.2
120 (2 hr)	1.1	1.5	1.8	2.0	2.3	2.6
180 (3 hr)	0.8	1.1	1.3	1.5	1.7	1.9
360 (6 hr)	0.5	0.7	0.8	0.9	1.0	1.1
720 (12 hr)	0.3	0.4	0.5	0.5	0.6	0.7
1440 (24 hr)	0.2	0.2	0.3	0.3	0.4	0.4

Source: TP40

FIGURE 2 - IDF CURVE

APPENDIX A

Appendix A

MINOR HEAD LOSSES

A. Entrance Losses

1. Equation

$$HL = Ke \frac{(V_2)^2}{2g}$$

Where

HL = head loss (feet)

V_2 = velocity in downstream pipe (ft/s)

Ke = head loss coefficient

g = gravity constant (32.2 ft/s^2)

2. Entrance Loss Coefficients (Ke)

Type of Structure and Design of Entrance	Ke
Concrete Pipe	
Projecting from fill, socket end (groove-end)	0.2
Projecting from fill, square cut end	0.5
Headwall or headwall and wingwalls	
Socket end of pipe (groove-end)	0.2
Square-edge	0.5
Rounded (radius = 1/12D)	0.2
Mitered to conform to fill slope	0.7
End-section conforming to fill slope	0.5
Beveled edges, 33° to 45° bevels	0.2
Side- or slope-tapered inlet	0.2
Pipe or Pipe-Arch Corrugated Metal	
Projecting from fill (no headwall)	0.9
Headwall or headwall and wingwalls square-edged	0.5
Mitered to conform to fill slope, paved or unpaved slope	0.7
End-section conforming to fill slope	0.5
Beveled edges, 33° to 45° bevels	0.2
Side- or slope-tapered inlet	0.2

Box, Reinforced Concrete	
Headwall parallel to embankment (no wingwalls)	
Square-edged on 3 edges	0.5
Rounded on 3 edges to radius of 1/12 barrell dimension or Beveled on 3 sides	0.2
Wingwalls at 30° to 75° to barrel	
Square-edge rounded to radius of 1/12 barrell dimension dimension, or beveled top edge	0.2
Wingwall at 10° to 25° to barrel	
Square-edged at crown	0.5
Wingwall parallel (extension of sides)	
Square-edged at crown	0.7
Side-or slope-tapered inlet	0.2

B. Bend Losses

1. Equation

$$HL = Kb \frac{(V_2)^2}{2g}$$

Where

HL = Head loss (ft)
V_2 = Velocity in downstream pipe (ft/s)
Kb = Head loss coefficient
g = Gravity constant (32.2 ft/s^2)

2. Bend Loss Coefficient (Kb)

The following head loss coefficients for bends in storms are for pipes with diameters of 48 inches or less. For storm sewers with diameters greater than 48 inches the momentum equation should be used to determine headloss.

Conduit on Curves	**K_b Radius of Pipe Bend**			
	90°	**60°**	**45°**	**22.5°**
Pipe radius = diameter	0.50	0.43	0.35	0.20
Pipe radius = 2 to 8 diameter	0.25	0.21	0.18	0.10
Pipe radius = 8 to 20 diameter	0.40	0.34	0.28	0.16

C. Junction Losses

1. Equation

$$HL = \frac{(V_2)^2}{2g} - Kj\,\frac{(V_1)^2}{2g}$$

Where

HL = Head loss (ft)
V_1 = Velocity in the upstream pipe (ft/s)
V_2 = velocity in the downstream pipe (ft/s)
Kj = Head loss coefficient
g = Gravity constant (3.2 ft/s^2)

2. Junction Loss Coefficient (Kj)

Description of Condition	**Kj**
Inlet on Main Line	0.50
Inlet on Main Line with Lateral	0.25
Manhole on Main Line with 22-1/2° Lateral	0.75
Manhole on Main Line with 45° Lateral	0.50
Manhole on Main Line with 60° Lateral	0.35
Manhole on Main Line with 90° Lateral	0.25
45° Wye Connection or Cut-in	0.75
60° Wye Connection or Cut-in	0.70
Inlet or Manhole at Beginning of Line	1.25

SECTION XIV
CONSTRUCTION STANDARDS

Section XIV - Construction Standards

Paving Detail	Detail No.	Revision Date
R.C.P. Four Lane Divided Major Arterial	P-1	March 2003
R.C.P. Four Lane Divided Minor Arterial	P-2	March 2003
R.C.P. Four Lane Undivided Minor Arterial	P-3	March 2003
R.C.P. Collector	P-4	March 2003
R.C.P. Local	P-5	March 2003
Concrete Pavement Joints	P-6	March 2003
Intersection Joint Spacing	P-7	March 2003
Standard Curb and Gutter	P-8	March 2003
Residential Driveway Approach	P-9	March 2003
Commercial Driveway Approach	P-10	March 2003
Curb and Gutter, Sidewalk and Driveway	P-11	March 2003
Barrier Free Ramp	P-12	March 2003
Concrete Sidewalk	P-13	March 2003
Concrete Valley	P-14	March 2003

Water Detail	Detail No.	Revision Date
Standard Water Line Embedment and Backfill	W-1A	March 2003
Standard Water Line Embedment and Backfill	W-1B	March 2003
Fire Hydrant Installation	W-2	March 2003
Gate Valve Installation	W-3	March 2003
Air Release Valve Assembly (Type 1)	W-4A	March 2003
Air Release Valve Assembly (Type 2)	W-4B	March 2003
1 Inch Through 2 Inch Water Service Assembly	W-5	March 2003
Flushing Valve Installation	W-6	March 2003
Horizontal and Vertical (Downward) Thrust Blocking	W-7	March 2003
Vertical Thrust Block	W-8	March 2003
Typical Ring Connection	W-9	March 2003
Water Line Bore and Casing Detail	W-10	March 2003
3 Inch and Larger Meter Vault	W-11	March 2003
Blow-Off Sump Manhole Installation	W-12	March 2003
Service Line Encasement	W-13	March 2003
Concrete Encasement	W-14	March 2003

Sanitary Sewer Detail	Detail No.	Revision Date
Standard Sanitary Sewer Embedment and Backfill	S-1A	March 2003
Standard Sanitary Sewer Embedment and Backfill	S-1B	March 2003
Precast Sanitary Sewer Manhole	S-2	March 2003
Cast-in-Place Sanitary Sewer Manhole	S-3	March 2003
Drop Sanitary Sewer Manhole	S-4	March 2003
Manhole Frame and Cover	S-5	March 2003
Extension Ring Installation	S-6	March 2003
4 Inch Sanitary Sewer Service	S-7	March 2003
Abandonment of Existing Manhole	S-8	March 2003
Concrete Encasement	S-9	March 2003
Sanitary Sewer Line Bore and Casing	S-10	March 2003

Drainage Detail	Detail No.	Revision Date
Storm Sewer Embedment and Backfill	D-1	March 2003
Storm Sewer Embedment and Backfill	D-2	March 2003
Storm Sewer Embedment and Backfill	D-3	March 2003
Storm Sewer Subsurface Drain	D-4	March 2003
Storm Sewer Inlet General Notes	D-5	March 2003
Storm Sewer Curb Inlet	D-6	March 2003
Storm Sewer Recessed Curb Inlet	D-7	March 2003
Storm Sewer Curb Inlet	D-8	March 2003
Storm Sewer Drop Inlet	D-9	March 2003
Storm Sewer Storm Drain Manhole	D-10	March 2003
Storm Sewer Reinforced Concrete Collar	D-11	March 2003
Storm Sewer Curbed Flume and Pilot Channels	D-12	March 2003
Storm Sewer Concrete Riprap	D-13	March 2003
Storm Sewer Sloping Headwall	D-14	March 2003
Storm Sewer Vertical Headwall	D-15	March 2003
Storm Sewer Culvert Safety End Treatments	D-16A	March 2003
Storm Sewer Safety End Treatment Runners	D-16B	March 2003

THE CITY OF EVERMAN

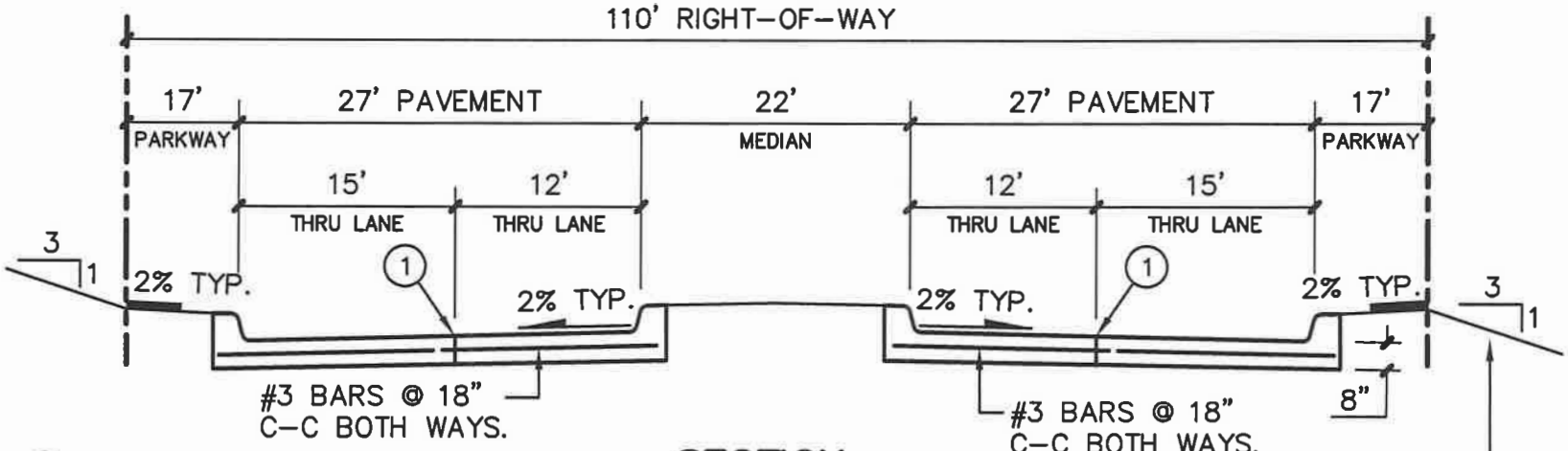
PAVING CONSTRUCTION DETAILS

REINFORCED CONCRETE PAVEMENT
FOUR LANE DIVIDED MAJOR ARTERIAL

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-1

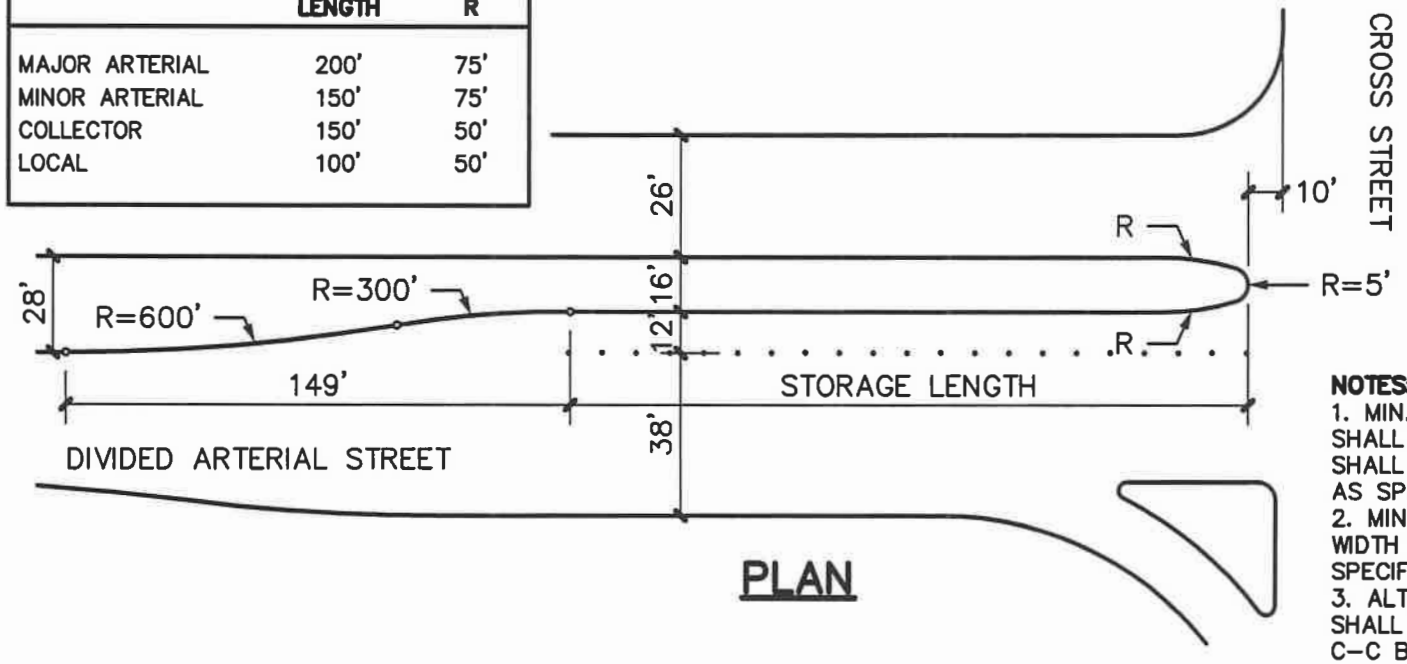


① LONGITUDINAL CONSTRUCTION JOINT

SECTION

FILL SECTION ONLY. ALTERNATE REVERSE SLOPE ACCEPTABLE NOT TO EXCEED 3:1

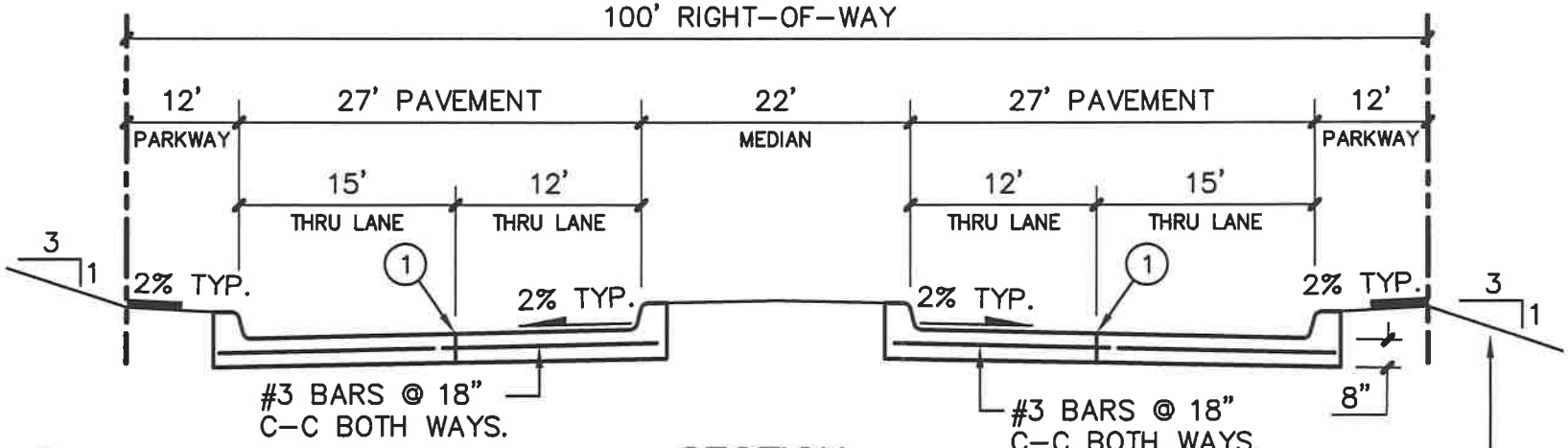
CROSS STREET	MINIMUM STORAGE LENGTH	CONTROL RADIUS R
MAJOR ARTERIAL	200'	75'
MINOR ARTERIAL	150'	75'
COLLECTOR	150'	50'
LOCAL	100'	50'



PLAN

NOTES:
1. MIN. PAVEMENT THICKNESS SHALL BE 8". CONCRETE SHALL BE CLASS "A" OR AS SPECIFIED BY CITY.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6" OR AS SPECIFIED BY CITY.
3. ALTERNATE REINFORCMENT SHALL BE #4 BARS @ 24" C-C BOTH WAYS.

03/11/03 P-1

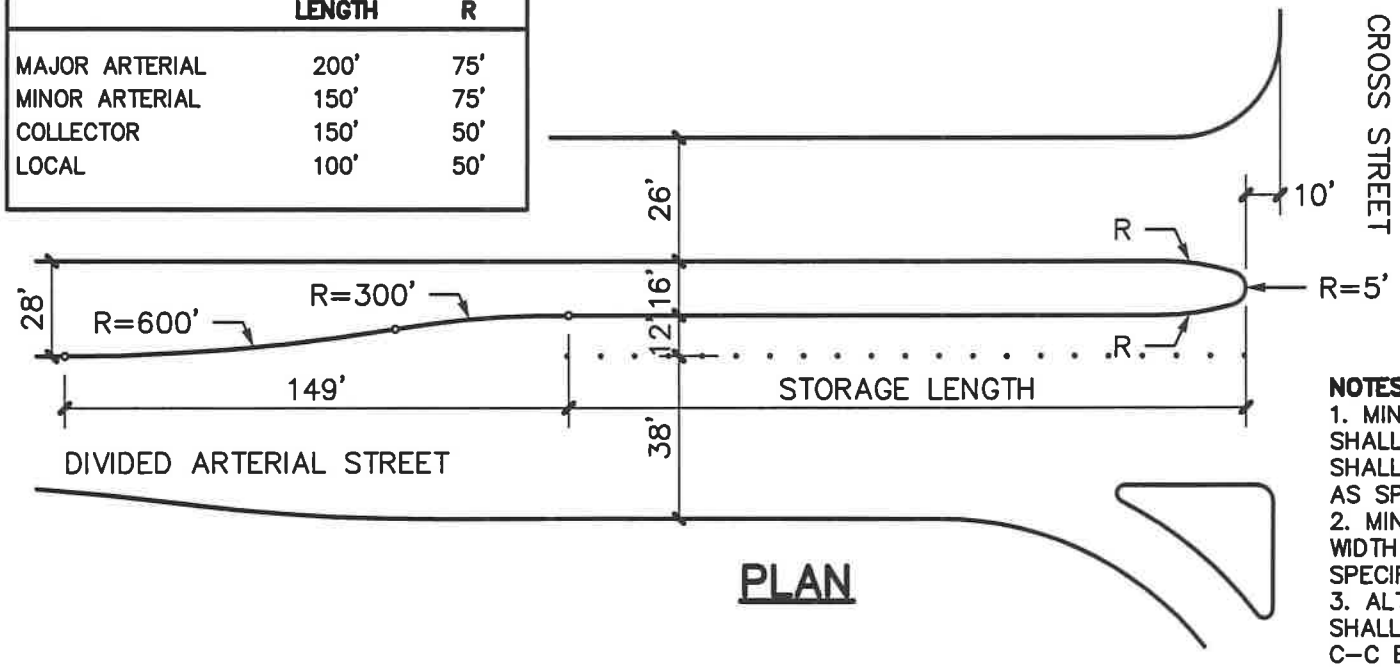


SECTION

① LONGITUDINAL CONSTRUCTION JOINT

FILL SECTION ONLY. ALTERNATE REVERSE SLOPE ACCEPTABLE NOT TO EXCEED 3:1

CROSS STREET	MINIMUM STORAGE LENGTH	CONTROL RADIUS R
MAJOR ARTERIAL	200'	75'
MINOR ARTERIAL	150'	75'
COLLECTOR	150'	50'
LOCAL	100'	50'



PLAN

NOTES:
1. MIN. PAVEMENT THICKNESS SHALL BE 8". CONCRETE SHALL BE CLASS "A" OR AS SPECIFIED BY CITY.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6" OR AS SPECIFIED BY CITY.
3. ALTERNATE REINFORCMENT SHALL BE #4 BARS @ 24" C-C BOTH WAYS.

"EVERMAN" THE CITY OF

PAVING CONSTRUCTION DETAILS

REINFORCED CONCRETE PAVEMENT
FOUR LANE DIVIDED MINOR ARTERIAL

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-2

THE CITY OF EVERMAN

PAVING CONSTRUCTION DETAILS

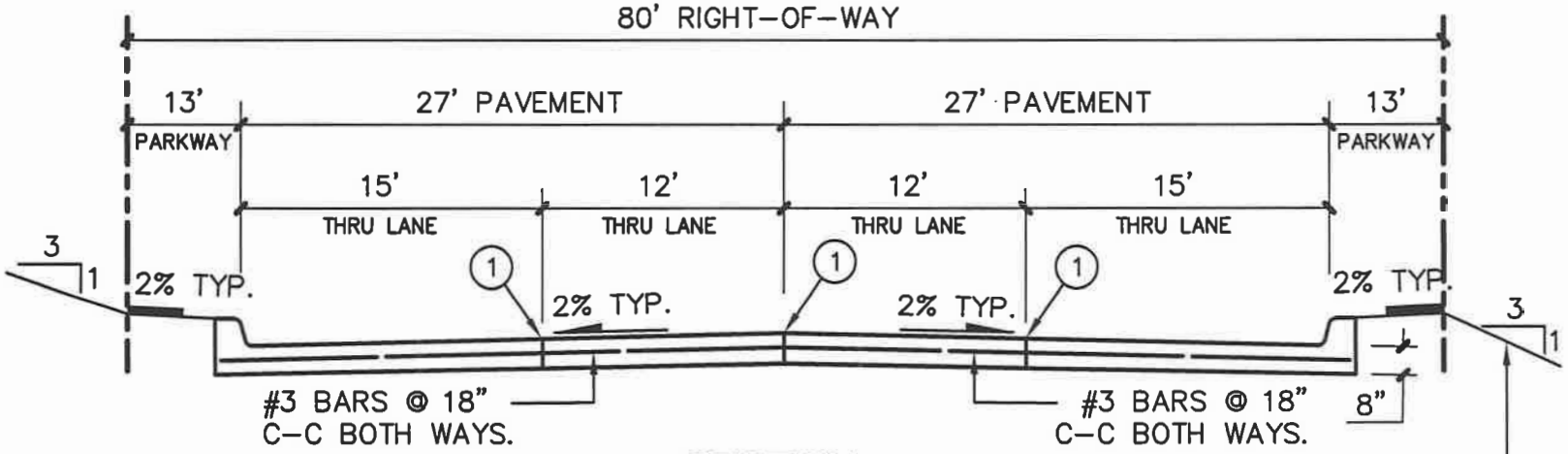
REINFORCED CONCRETE PAVEMENT

FOUR LANE UNDIVIDED MINOR ARTERIAL

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-3



① LONGITUDINAL CONSTRUCTION JOINT

SECTION

FILL SECTION ONLY. ALTERNATE REVERSE SLOPE ACCEPTABLE NOT TO EXCEED 3:1

NOTES:

1. MIN. PAVEMENT THICKNESS SHALL BE 8". CONCRETE SHALL BE CLASS "A" OR AS SPECIFIED BY CITY.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6" OR AS SPECIFIED BY CITY.
3. ALTERNATE REINFORCMENT SHALL BE #4 BARS @ 24" C-C BOTH WAYS.

THE CITY OF EVERMAN

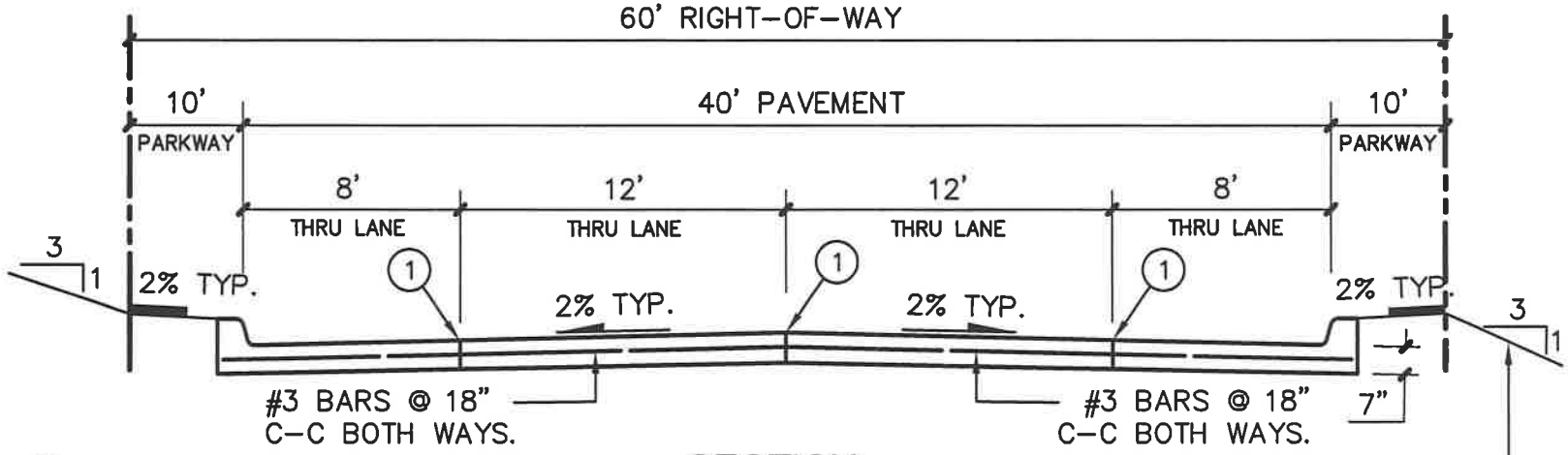
PAVING CONSTRUCTION DETAILS

REINFORCED CONCRETE PAVEMENT COLLECTOR

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-4



SECTION

(1) LONGITUDINAL CONSTRUCTION JOINT

FILL SECTION ONLY. ALTERNATE REVERSE SLOPE ACCEPTABLE NOT TO EXCEED 3:1

NOTES:

1. MIN. PAVEMENT THICKNESS SHALL BE 7". CONCRETE SHALL BE CLASS "A" OR AS SPECIFIED BY CITY.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6" OR AS SPECIFIED BY CITY.
3. ALTERNATE REINFORCMENT SHALL BE #4 BARS @ 24" C-C BOTH WAYS.

THE CITY OF EVERMAN

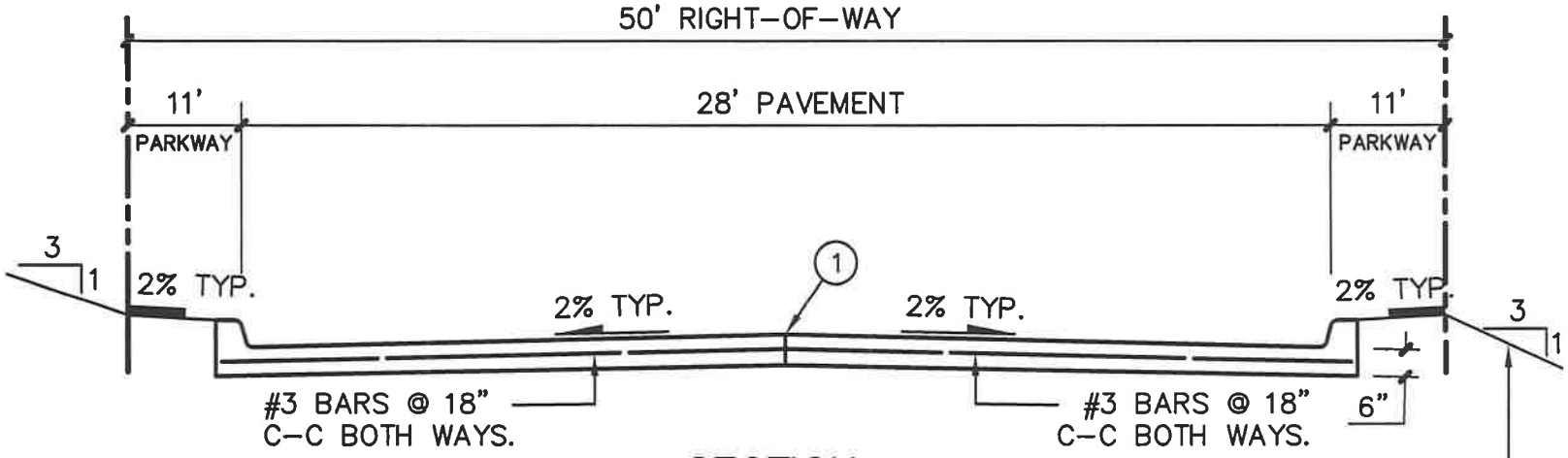
PAVING CONSTRUCTION DETAILS

REINFORCED CONCRETE PAVEMENT LOCAL

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-5



SECTION

① LONGITUDINAL CONSTRUCTION JOINT

FILL SECTION ONLY. ALTERNATE REVERSE SLOPE ACCEPTABLE NOT TO EXCEED 3:1

NOTES:

1. MIN. PAVEMENT THICKNESS SHALL BE 6". CONCRETE SHALL BE CLASS "A" OR AS SPECIFIED BY CITY.
2. MIN. CURB HEIGHT AND WIDTH SHALL BE 6" OR AS SPECIFIED BY CITY.
3. ALTERNATE REINFORCMENT SHALL BE #4 BARS @ 24" C-C BOTH WAYS.

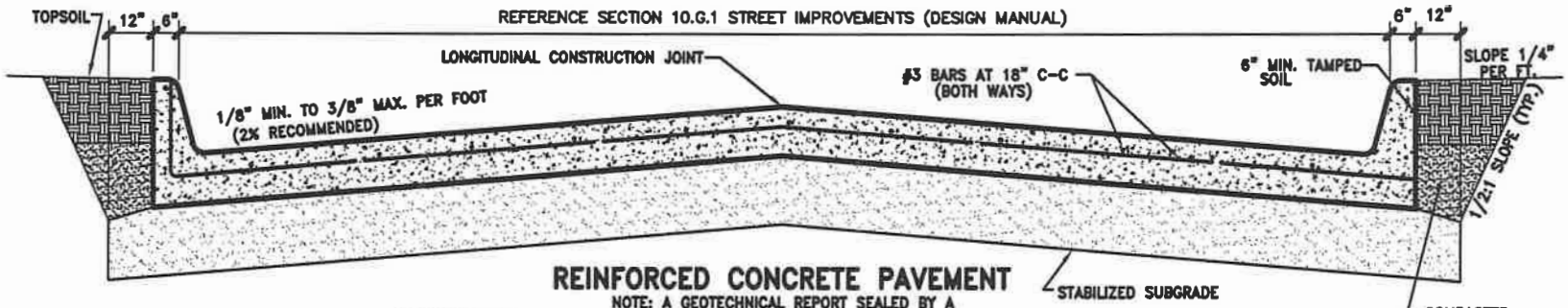
PAVING CONSTRUCTION DETAILS

CONCRETE PAVEMENT JOINTS

REVISED MAR 2003

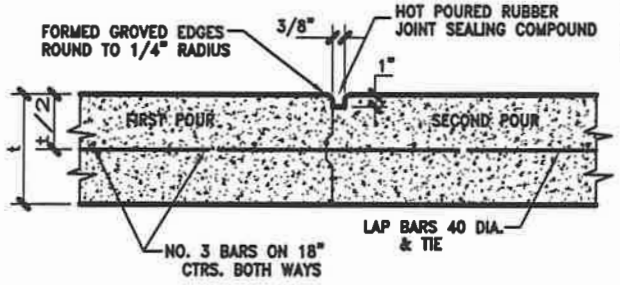
SCALE: N.T.S.

SHEET: P-6

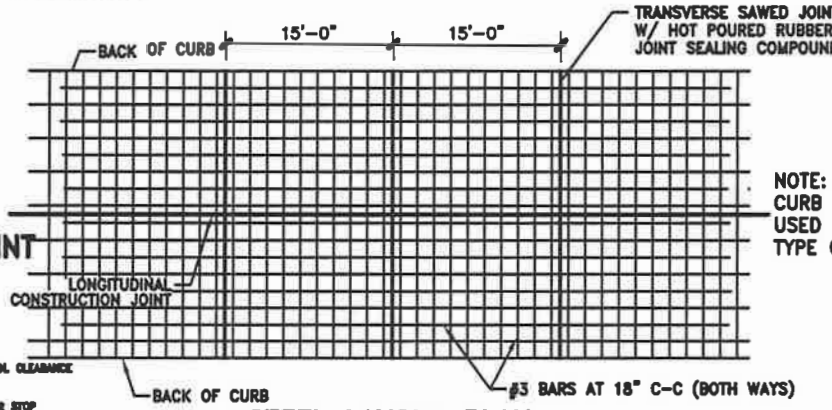


REINFORCED CONCRETE PAVEMENT

NOTE: A GEOTECHNICAL REPORT SEALED BY A LICENSED PROFESSIONAL ENGINEER IS REQUIRED TO PROVIDE RECOMENDATIONS FOR LIME OR CEMENT CONTENT AND SUBGRADE THICKNESS.

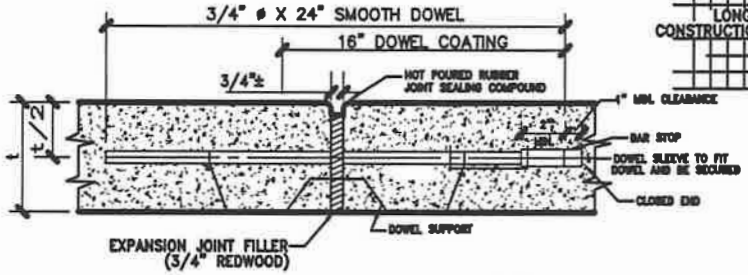


TRANSVERSE OR LONGITUDINAL CONSTRUCTION JOINT



NOTE: MONOLITHIC CURB SHALL BE USED WITH THIS TYPE OF PAVING.

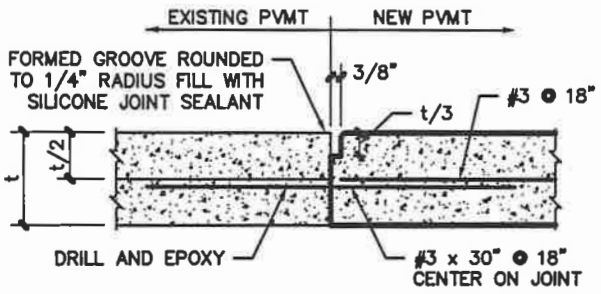
STEEL LAYOUT PLAN



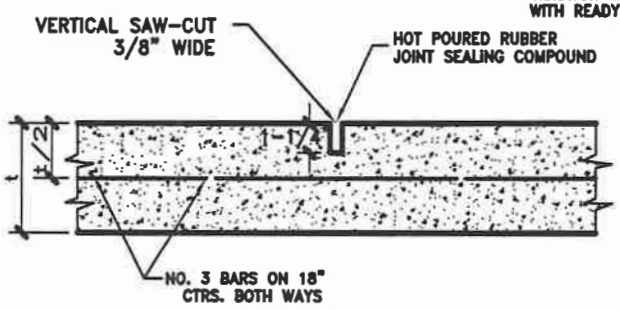
TRANSVERSE EXPANSION JOINT (ISOLATION JOINT)

NOTE: ALL CONCRETE PAVEMENT SHALL BE CLASS "A"

CONSTRUCT TRANSVERSE SAWED JOINTS AT 15' CENTERS. TRANSVERSE EXPANSION JOINTS TO BE AT INTERSECTIONS, BRIDGES AND OTHER STRUCTURES AND AT SPACING NOT TO EXCEED 240'. ALL JOINTS TO BE PROPERLY SEALED. A MANUALLY OPERATED SCREED EQUIPPED WITH A POWER VIBRATOR MAY BE USED IN COMBINATION WITH READY-MIXED CONCRETE.

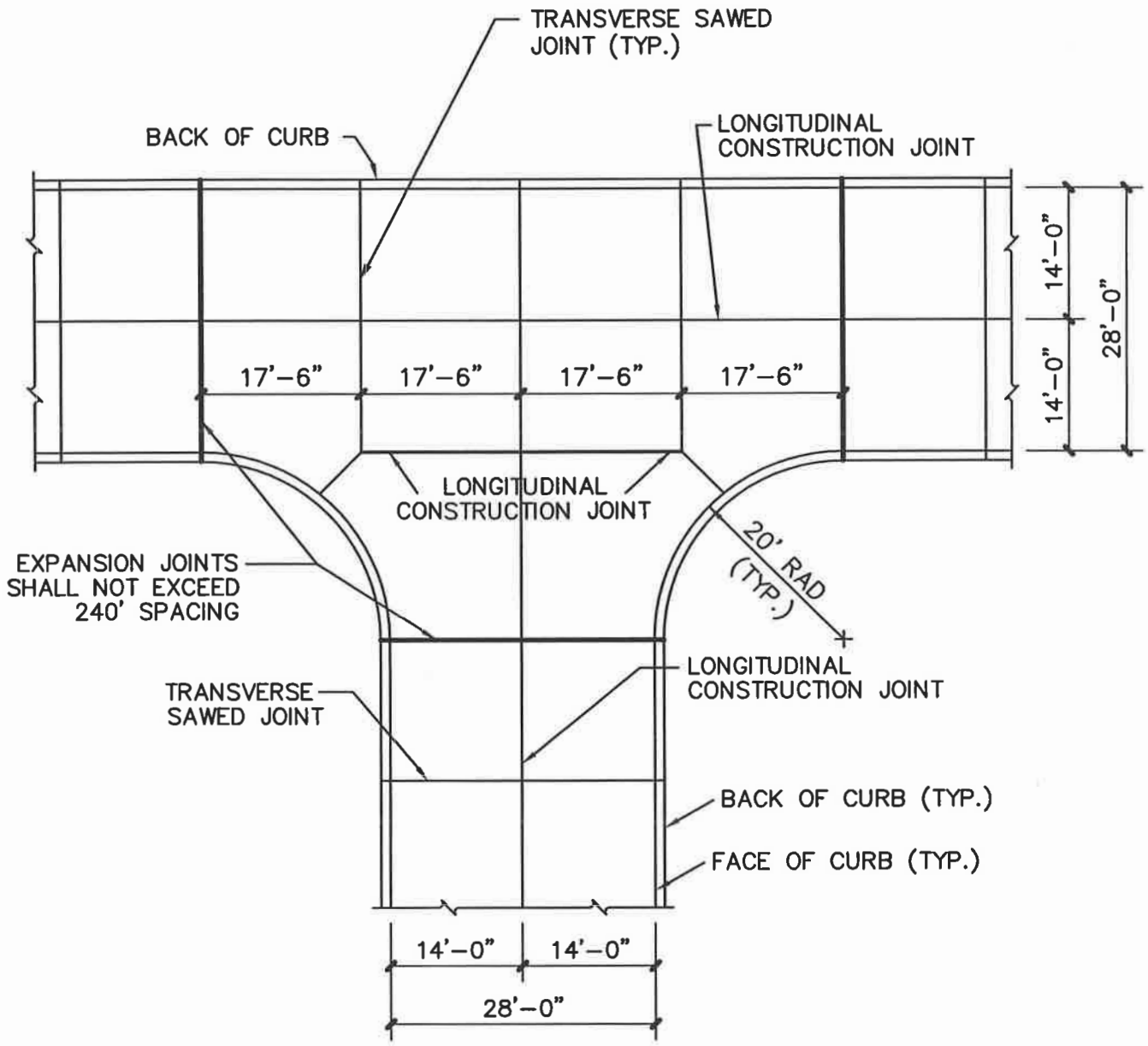


SAWED CONSTRUCTION JOINT



TRANSVERSE OR LONGITUDINAL SAWED JOINT

PAVING FULL WIDTH SECTION SHALL BE PERMISSIBLE WHEN USING READY-MIX CONCRETE. HAND FINISH IS PERMISSIBLE WHEN THE PAVING QUANTITIES ARE SMALL (APPROXIMATELY ONE BLOCK OR LESS)

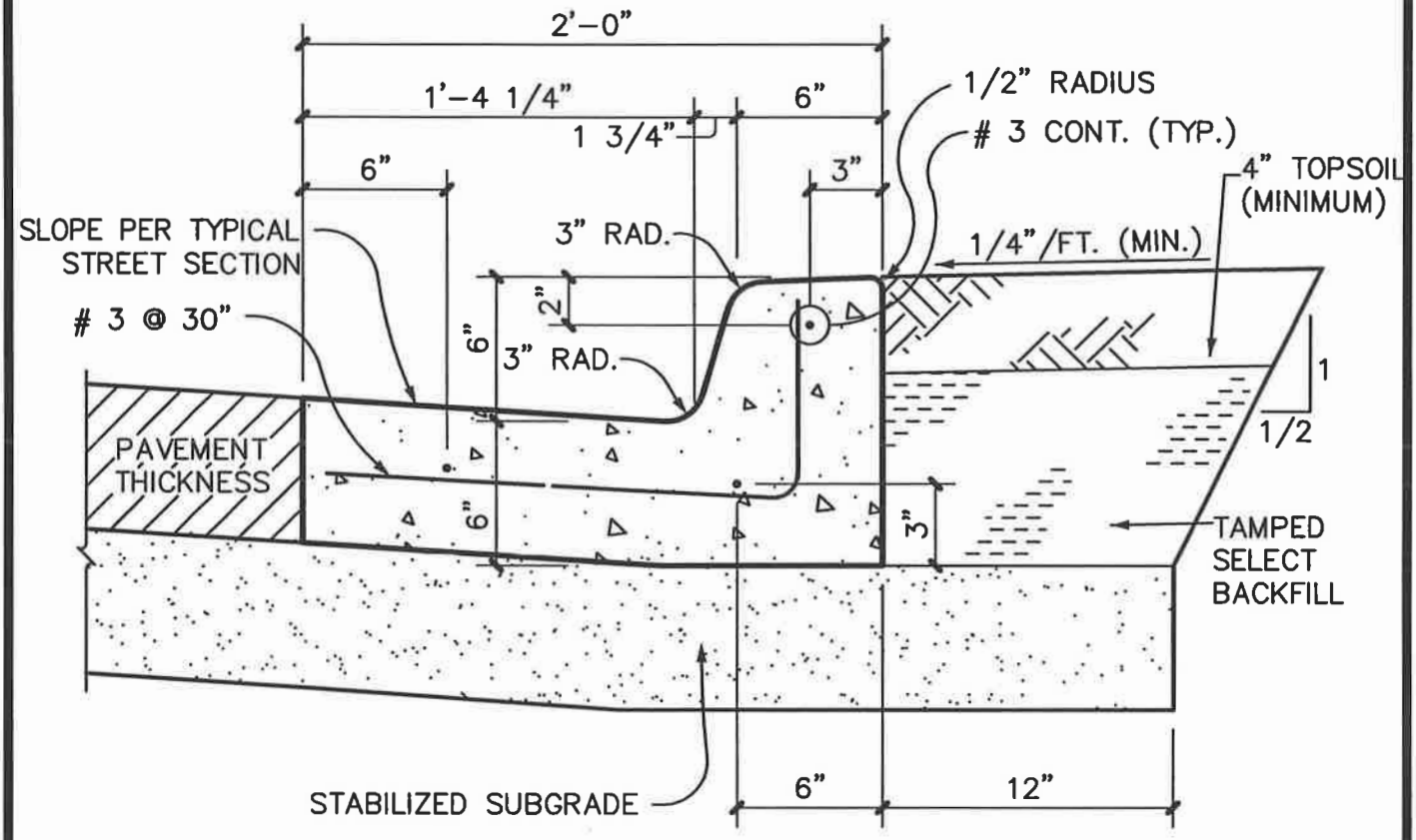


THE CITY OF *EVERMAN

PAVING CONSTRUCTION DETAILS

INTERSECTION JOINT SPACING

REVISED MAR 2003
SCALE: N.T.S.
SHEET: P-7

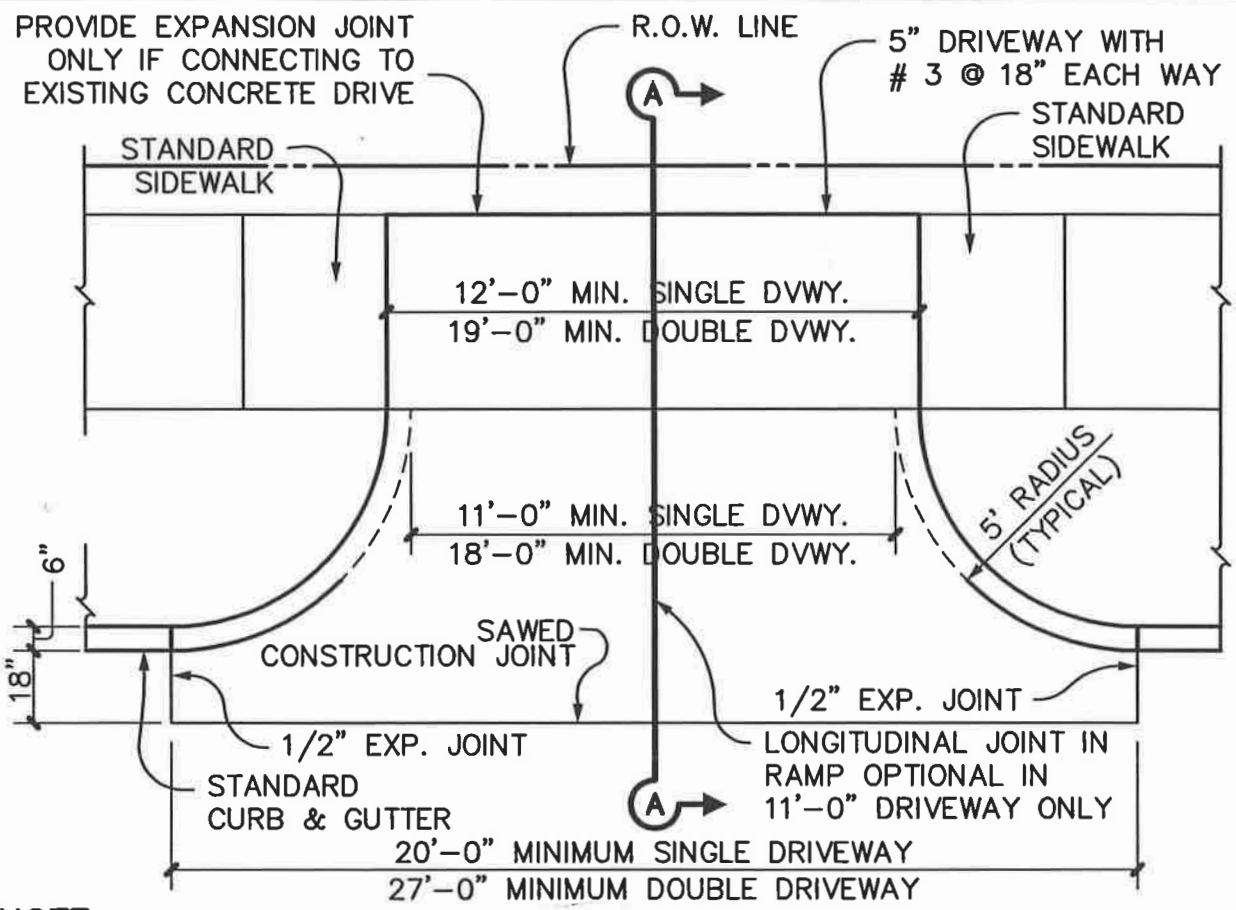


THE CITY OF EVERMAN

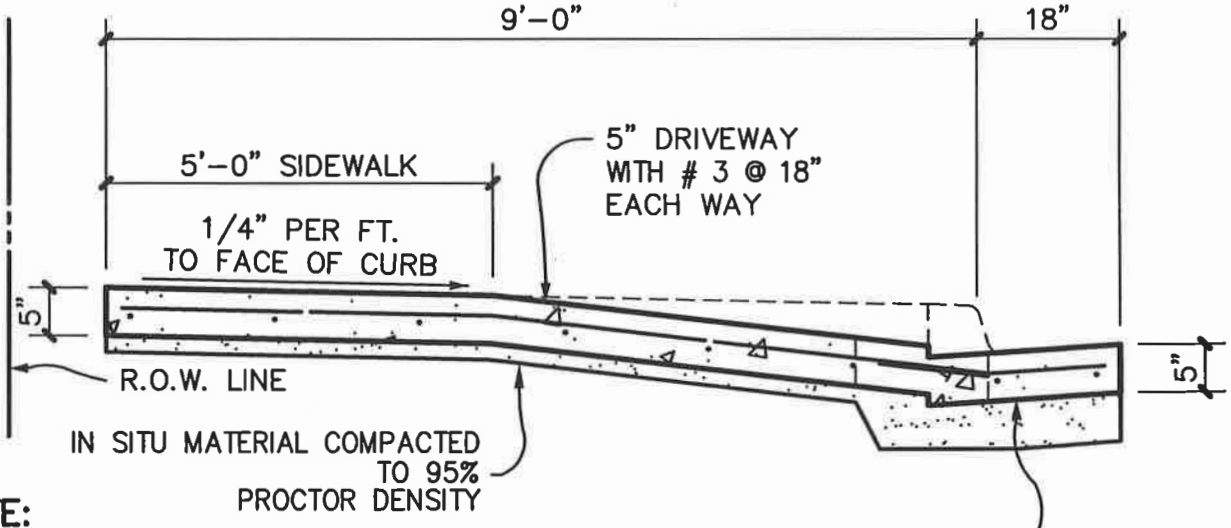
PAVING CONSTRUCTION DETAILS

STANDARD CURB AND GUTTER

REVISED MAR 2003
SCALE: N.T.S.
SHEET: P-8



NOTE: REMOVE EXISTING CURB ONLY, VIA HORIZONTAL AND VERTICAL SAW CUTTING. DO NOT OVER-CUT SAW JOINTS.



NOTE:
SIDEWALK SECTION THRU DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH AND PAID FOR AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED)

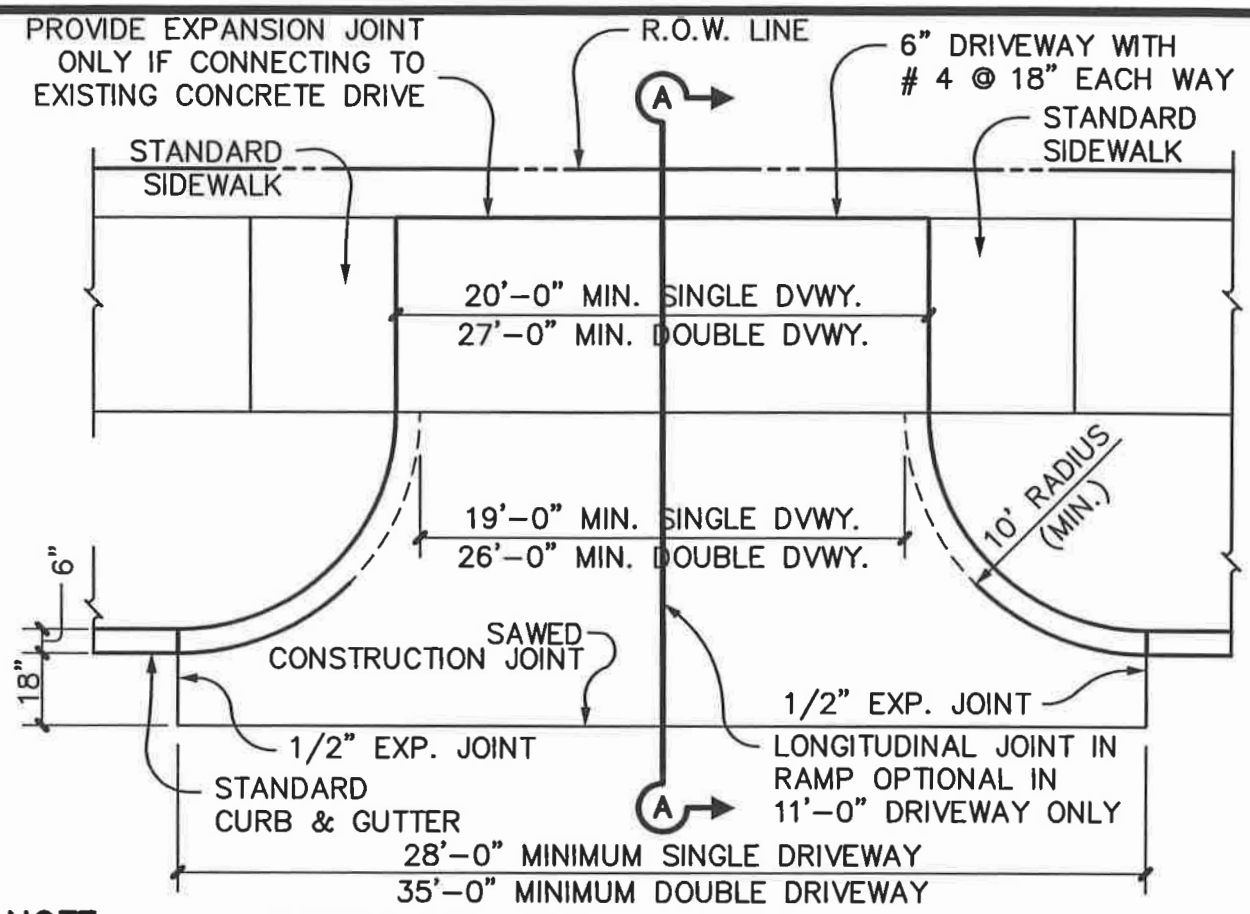
SECTION A-A

THE CITY OF EVERMAN

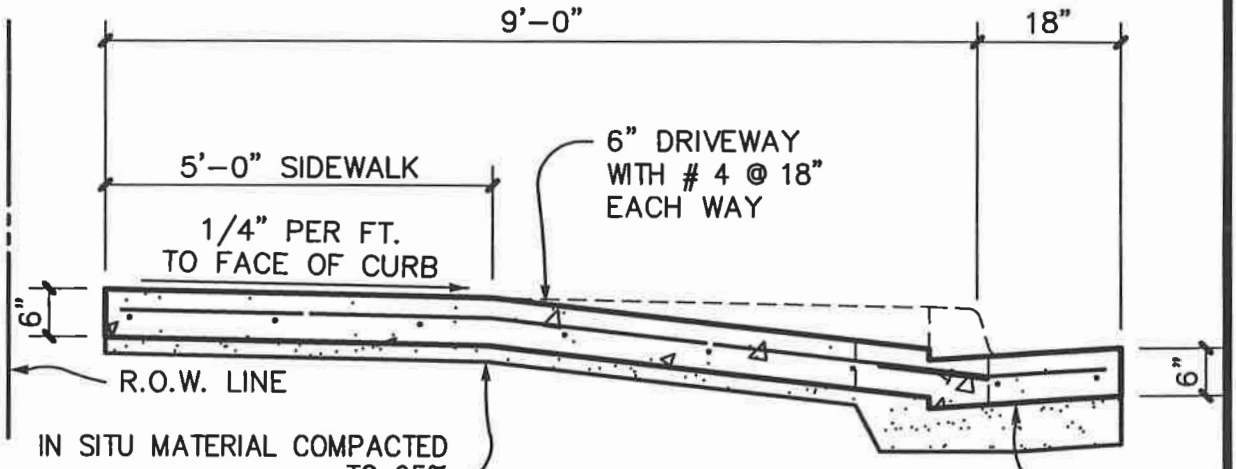
PAVING CONSTRUCTION DETAILS

RESIDENTIAL DRIVEWAY APPROACH

REVISED MAR 03
SCALE: N.T.S.
SHEET: P-9



NOTE: REMOVE EXISTING CURB ONLY, VIA HORIZONTAL AND VERTICAL SAW CUTTING. DO NOT OVER-CUT SAW JOINTS.



NOTE:
SIDEWALK SECTION THRU DRIVEWAY SHALL BE POURED SAME THICKNESS AS DRIVEWAY APPROACH AND PAID FOR AS DRIVEWAY APPROACH (EXISTING SIDEWALK, IF ANY, SHALL BE REMOVED AND REPLACED)

SECTION A-A

THE CITY OF *EVERMAN

PAVING CONSTRUCTION DETAILS

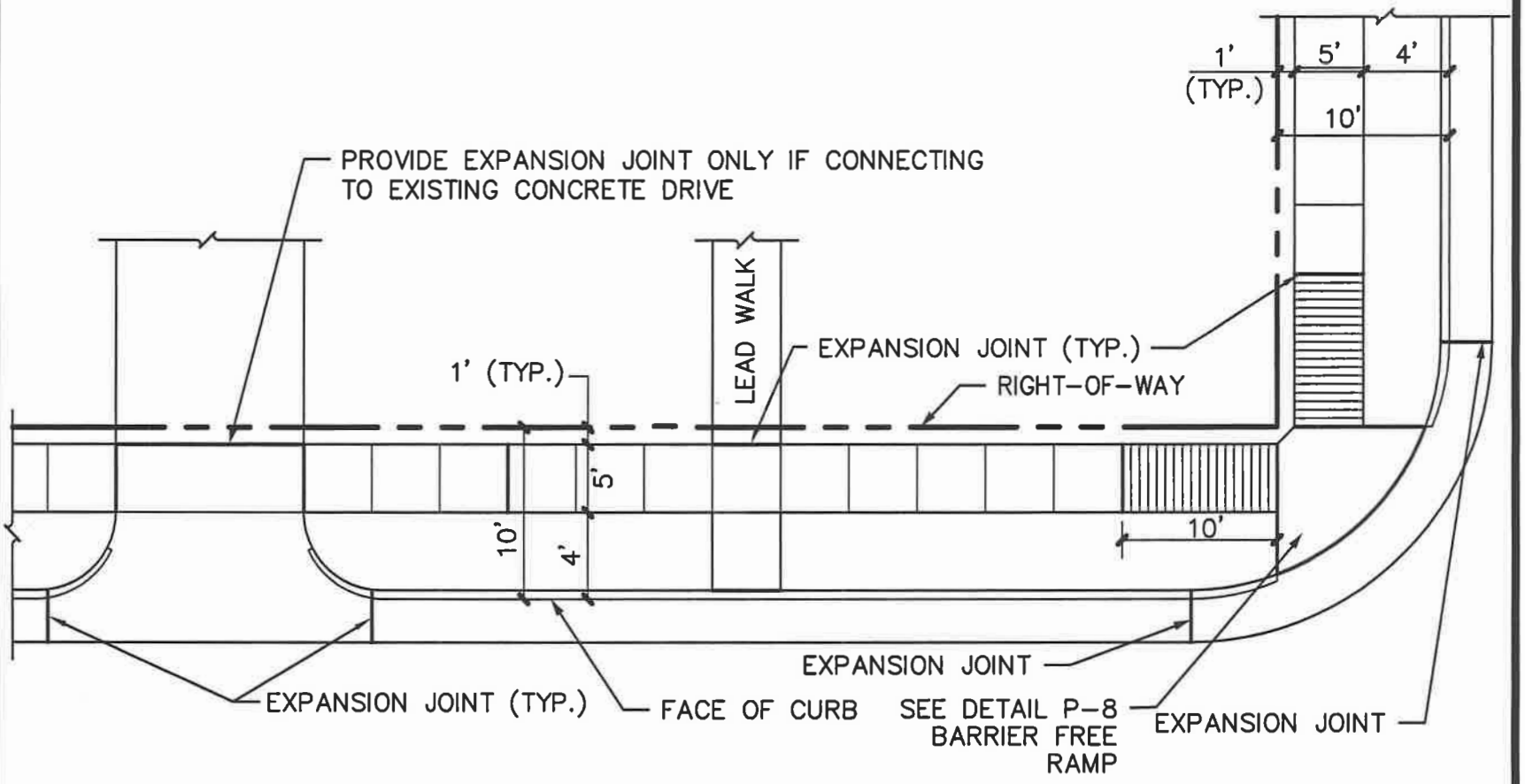
COMMERCIAL DRIVEWAY APPROACH

REVISED MAR 03
SCALE: N.T.S.
SHEET: P-10

THE CITY OF EVERMAN

PAVING CONSTRUCTION DETAILS

CURB AND GUTTER SIDEWALK AND DRIVEWAY



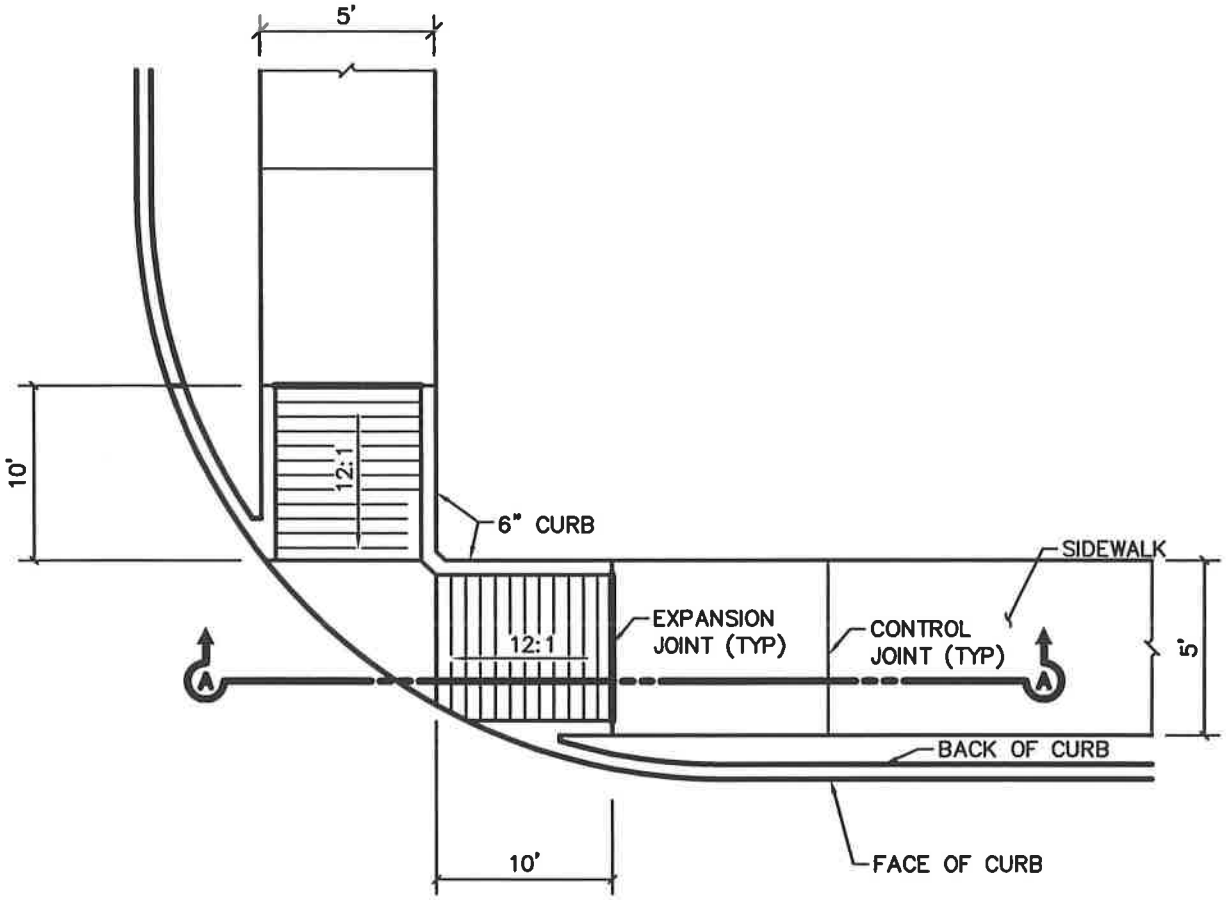
NOTE:

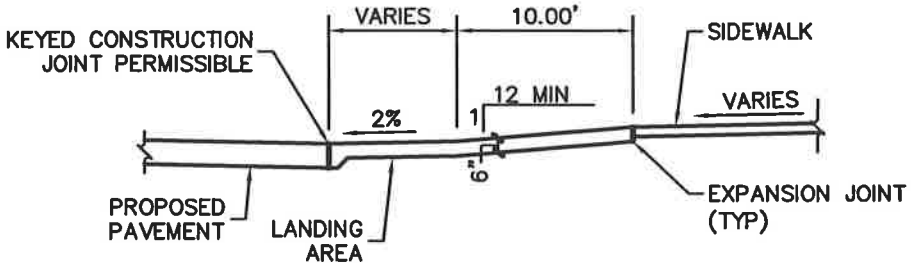
1. CURB AND GUTTER PLACED MONOLITHICALLY WITH PAVEMENT SHALL BE REINFORCED AND JOINTED IN ACCORDANCE WITH PAVEMENT DETAILS.

REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-11





SECTION A–A

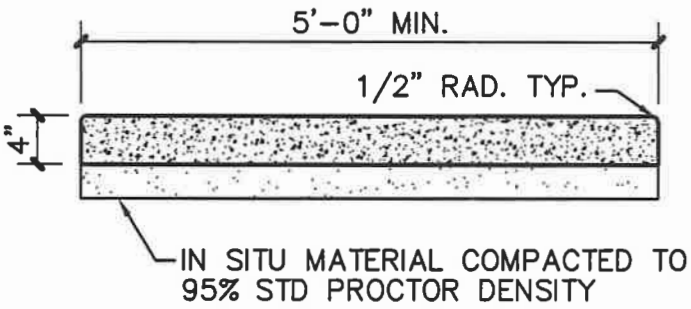
NOTE:
INSTALL 1/2" ø X 18" SMOOTH DOWELS @ 18" (GREASE ON ONE SIDE) THROUGH EXPANSION JOINTS.

THE CITY OF *EVERMAN	PAVING CONSTRUCTION DETAILS **BARRIER FREE RAMP**	REVISED MAR 2003 SCALE: N.T.S. SHEET: P–12

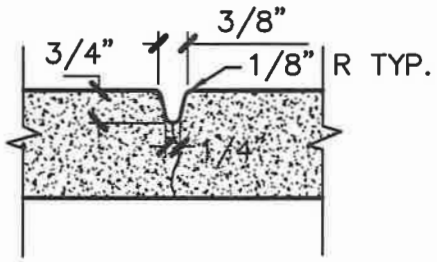
THE CITY OF EVERMAN

PAVING CONSTRUCTION DETAILS

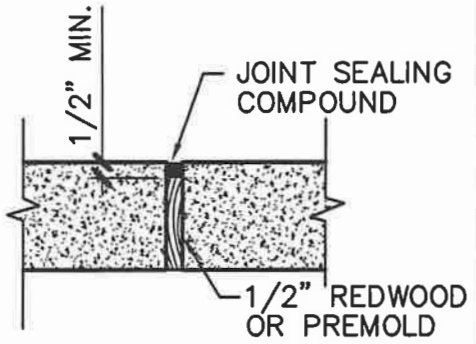
CONCRETE SIDEWALK



SECTION A-A
N.T.S

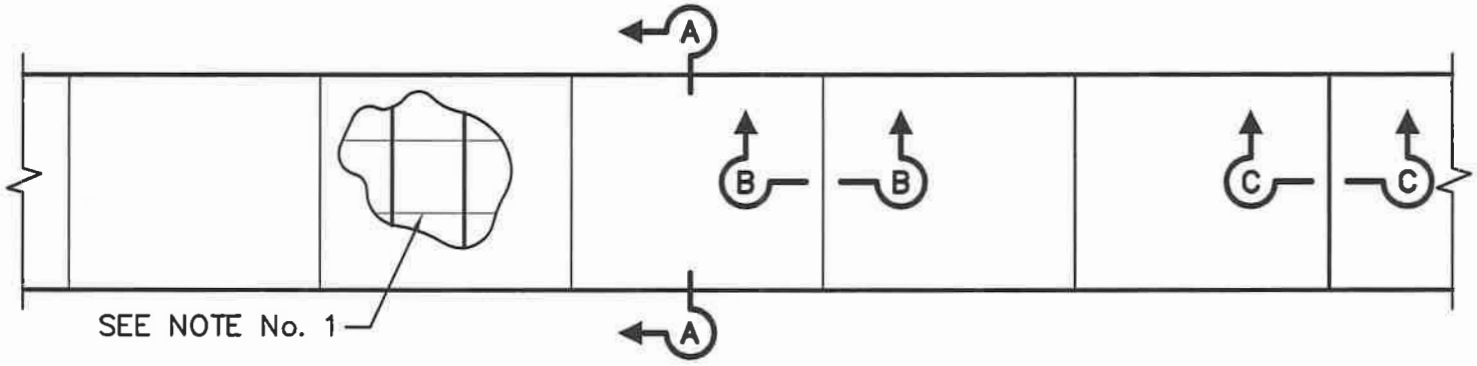


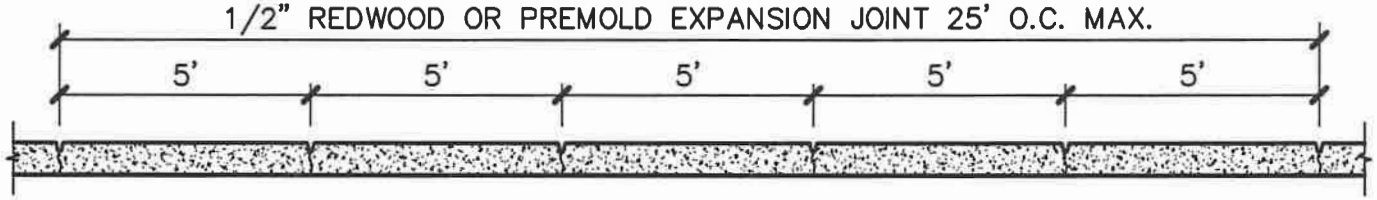
SECTION B-B
N.T.S



REQUIRED WHEN ABUTTING CURB
AND EXISTING WALK

SECTION C-C
N.T.S





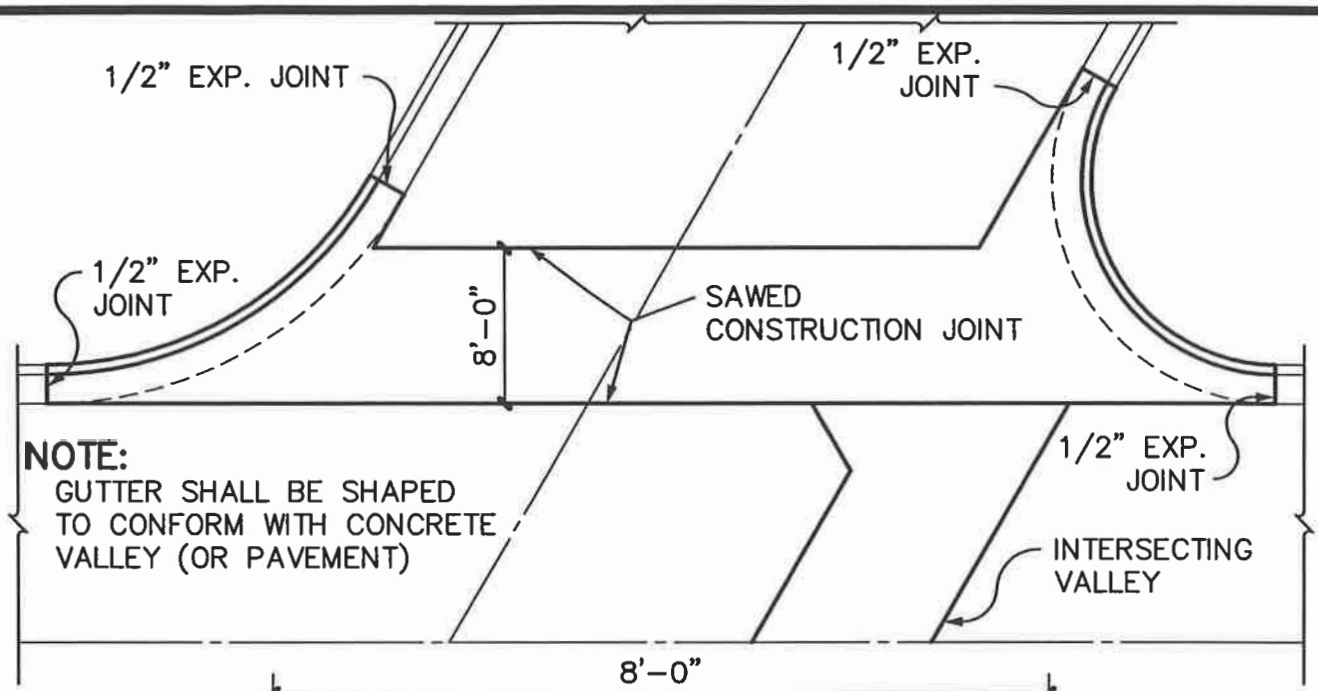
NOTE:

1. REINFORCEMENT TO BE #3 BARS AT 18" C-C
2. DOWEL WITH #4 BARS AT 18" C-C WHEN CONNECTING TO EXISTING SIDEWALKS, DRIVEWAYS, CURBS AND GUTTER.
2. INSTALL 1/2"ø X 18" SMOOTH DOWELS @ 18" (GREASE ONE END) THROUGH EXPANSION JOINTS.

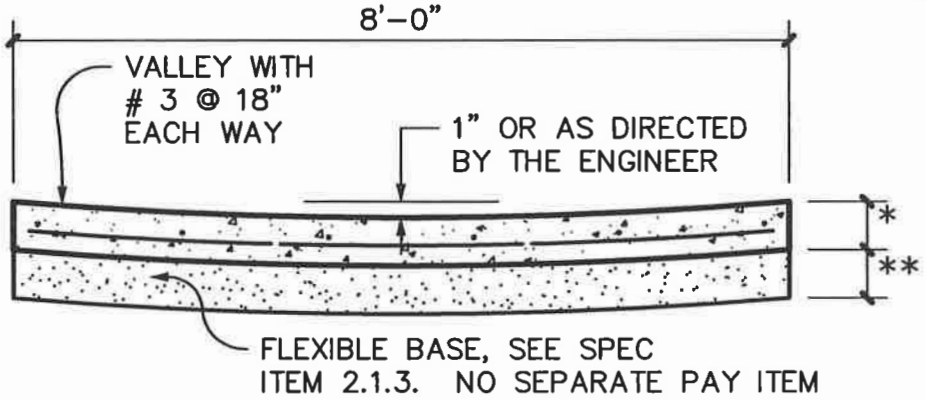
REVISED MAR 2003

SCALE: N.T.S.

SHEET: P-13



NOTE:
GUTTER SHALL BE SHAPED TO CONFORM WITH CONCRETE VALLEY (OR PAVEMENT)



THE REINFORCED CONCRETE VALLEY SHALL REPLACE THE TOP OF THE PAVEMENT WITH THE REMAINING PORTION OF THE PAVEMENT TO BE CONSTRUCTED INCLUDING SUBGRADE TREATMENT, IN ACCORDANCE WITH THE TYPICAL PAVING SECTION. THE CONCRETE VALLEY WILL BE GOVERNED ACCORDING TO CITY STANDARDS FOR CONCRETE CURB AND GUTTER.

TRANSITION SECTION
FOR VALLEYS CROSSING MAJOR STREETS

DIST. FROM ℄ OF DIP	CROWN
0 FT	0.000 FT
5 FT	0.041 FT
10 FT	0.083 FT
20 FT	0.208 FT
30 FT	0.333 FT
40 FT	0.458 FT
50 FT	0.500 FT

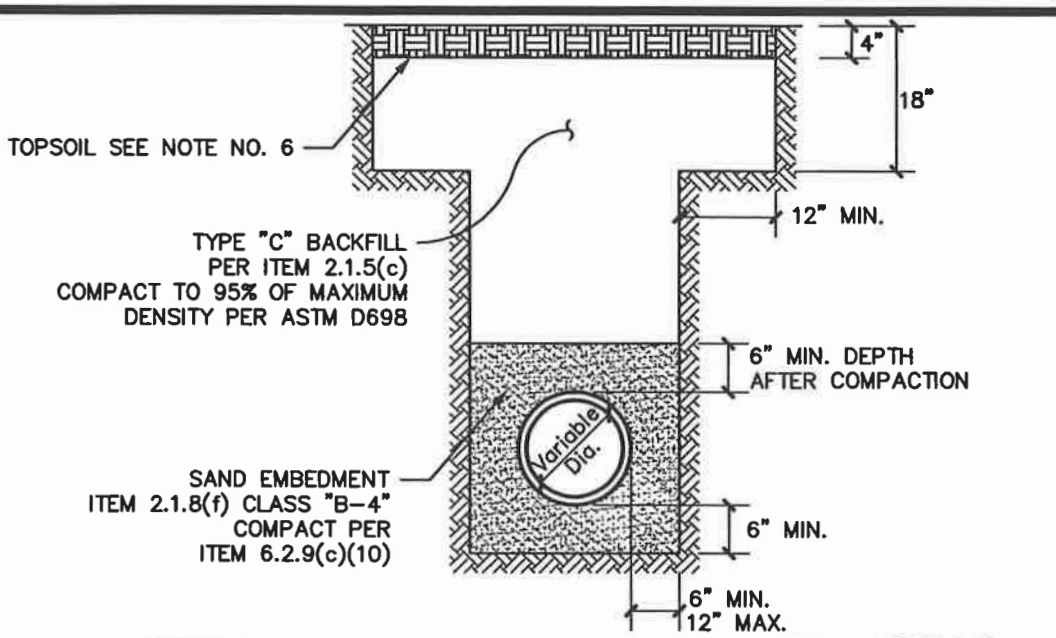
* 5" FOR LOCAL STREETS
7" FOR COLLECTOR STREETS
8" FOR ARTERIAL STREETS

** 8" FOR LOCAL STREETS
10" FOR COLLECTOR STREETS
10" FOR ARTERIAL STREETS

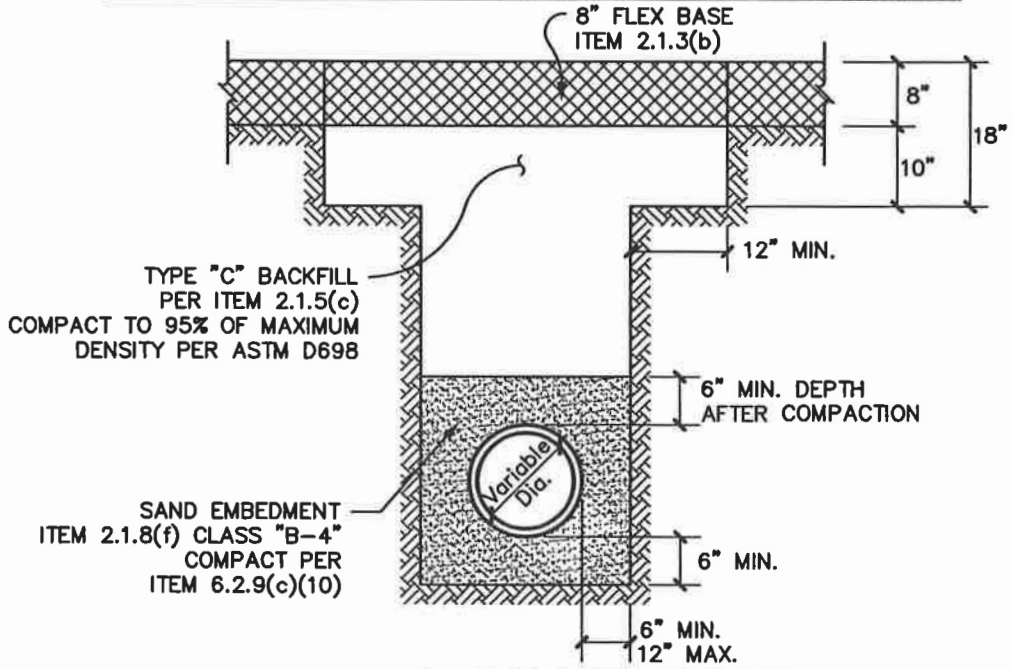
THE CITY OF EVERMAN

PAVING CONSTRUCTION DETAILS
CONCRETE VALLEY

REVISED MAR 2003
SCALE: N.T.S.
SHEET: P-14



UNPAVED AND FUTURE PAVED AREAS

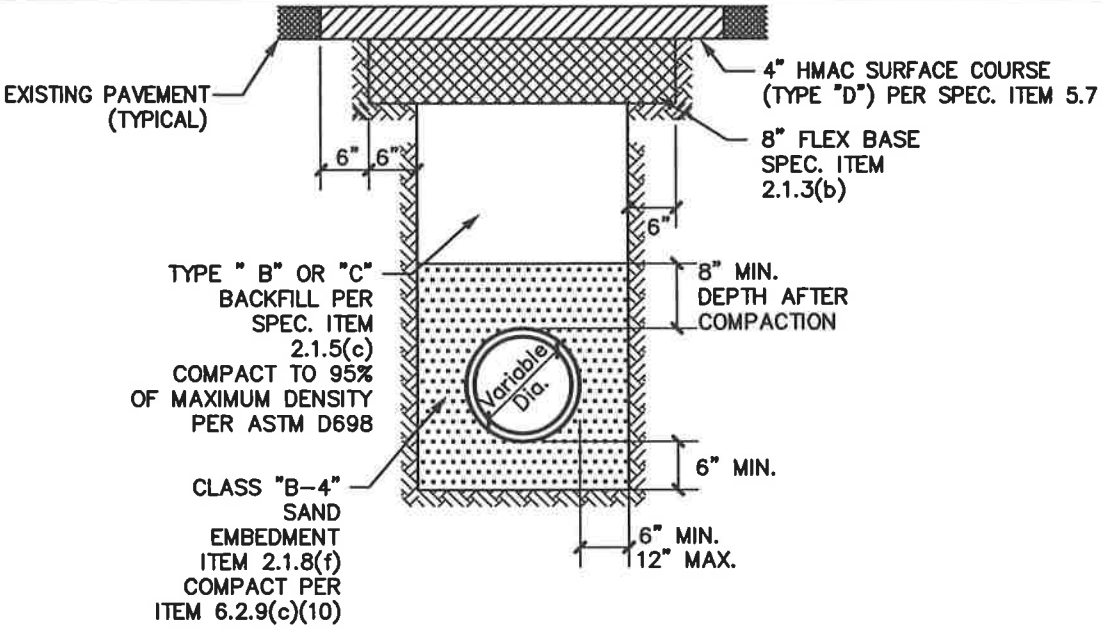


EXISTING FLEXBASE SURFACE

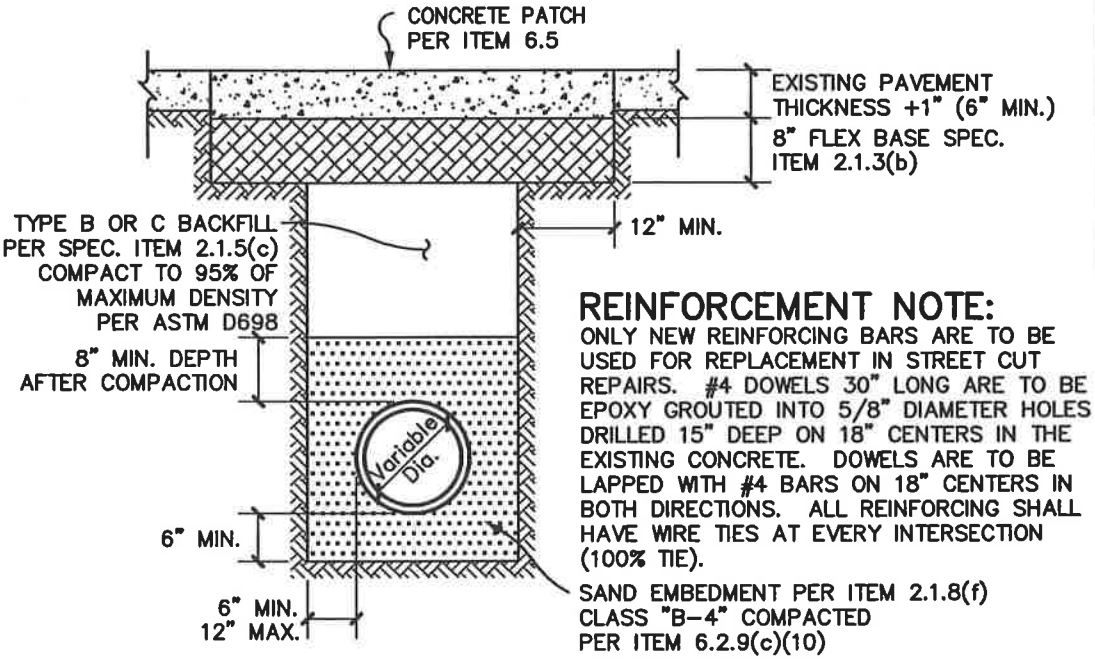
NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TXDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC ITEM 8.8.
4. COATED TRACER WIRE (MIN. 10-GAUGE) SHALL BE INSTALLED IN THE EMBEDMENT MATERIAL ABOVE THE PVC PIPE WITH THE TRACER WIRE TERMINATING IN IN-LINE GATE VALVE BOXES ACCESSIBLE BY CITY STAFF. BLUE UNDER-GROUND WATER LINE WARNING TAPE OF MIN. 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
5. A MAXIMUM OF 200-FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
6. TOPSOIL SHALL BE 4 INCHES IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.

THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS **STANDARD WATER LINE EMBEDMENT AND BACKFILL**	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: **W-1A**



EXISTING ASPHALT PAVEMENT



REINFORCEMENT NOTE:

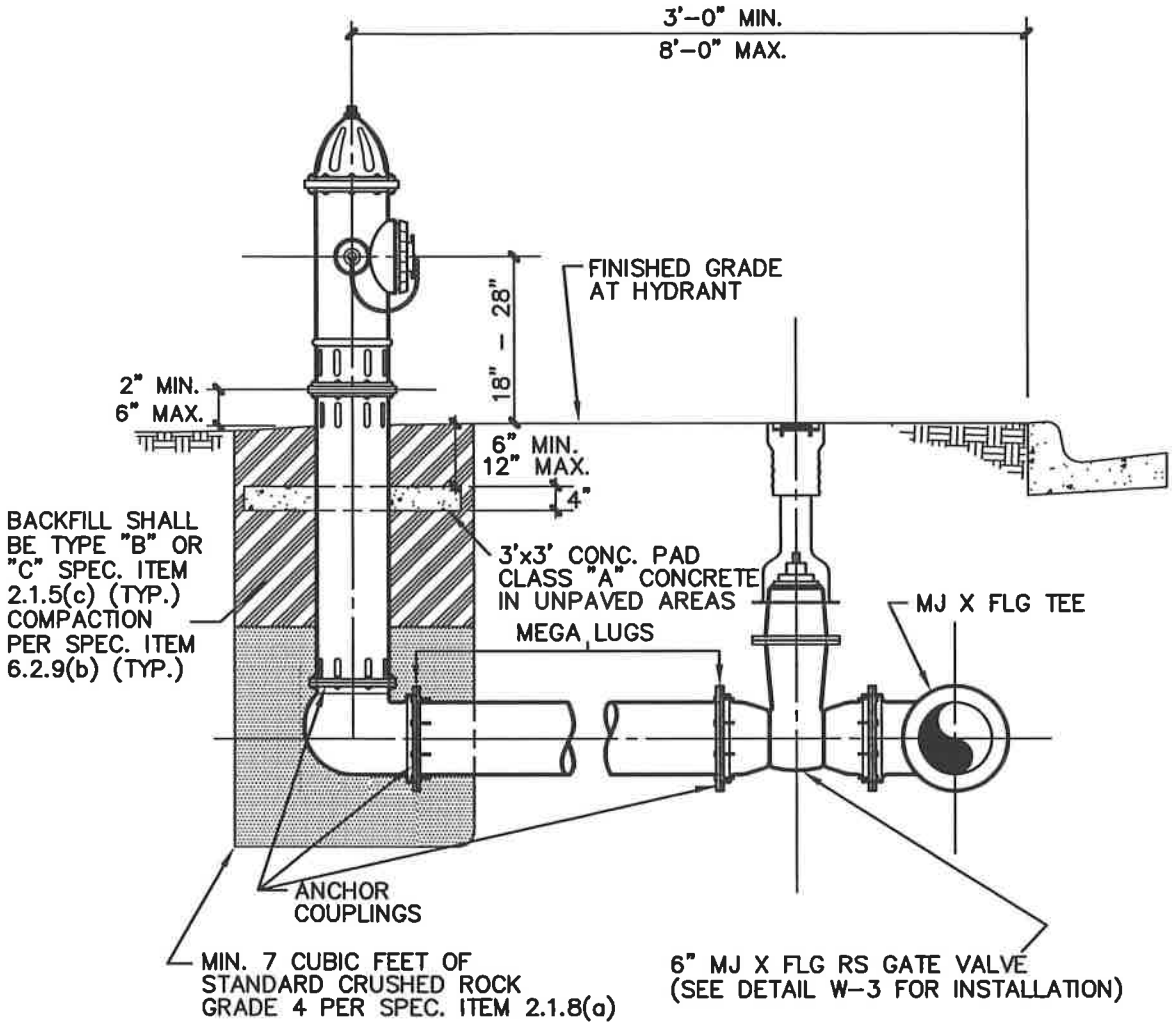
ONLY NEW REINFORCING BARS ARE TO BE USED FOR REPLACEMENT IN STREET CUT REPAIRS. #4 DOWELS 30" LONG ARE TO BE EPOXY GROUTED INTO 5/8" DIAMETER HOLES DRILLED 15" DEEP ON 18" CENTERS IN THE EXISTING CONCRETE. DOWELS ARE TO BE LAPPED WITH #4 BARS ON 18" CENTERS IN BOTH DIRECTIONS. ALL REINFORCING SHALL HAVE WIRE TIES AT EVERY INTERSECTION (100% TIE).

EXISTING CONCRETE PAVEMENT

NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TXDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC ITEM 8.8.
4. COATED TRACER WIRE (MIN. 10-GAUGE) SHALL BE INSTALLED IN THE EMBEDMENT MATERIAL ABOVE THE PVC PIPE WITH THE TRACER WIRE TERMINATING IN IN-LINE GATE VALVE BOXES ACCESSIBLE BY CITY STAFF. BLUE UNDER-GROUND WATER LINE WARNING TAPE OF MIN. 4" WIDTH SHALL BE INSTALLED ABOVE THE EMBEDMENT MATERIAL.
5. A MAXIMUM OF 200-FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.

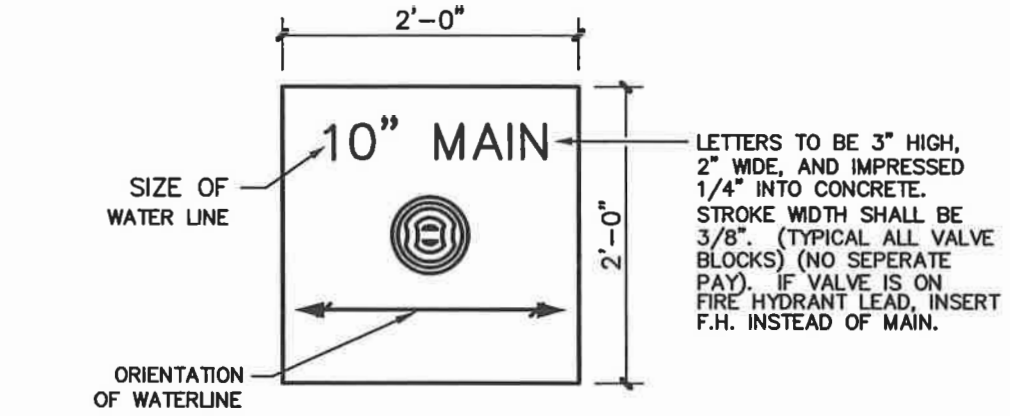
THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS STANDARD WATER LINE EMBEDMENT AND BACKFILL	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: W-1B

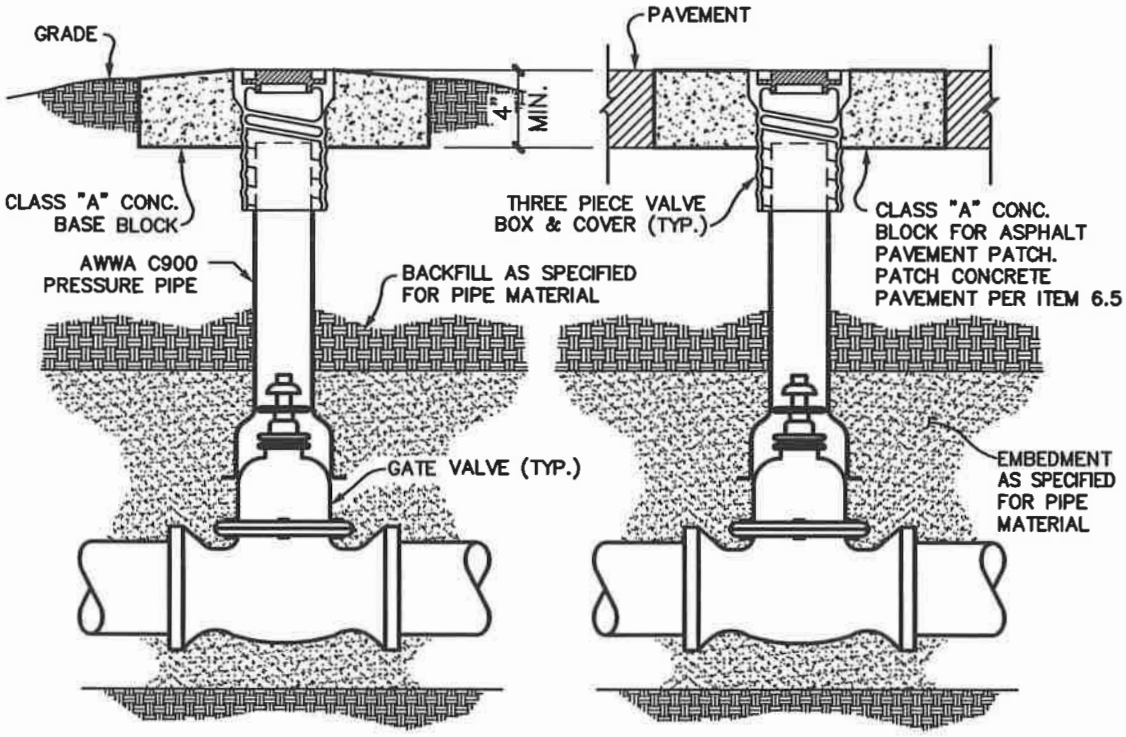


NOTES:

1. ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN VALVE OPENING AND AN INSIDE BARREL DIAMETER OF APPROXIMATELY 7". ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
3. FIRE HYDRANT NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (TYPICAL)
4. BURY DEPTH SHALL NOT EXCEED 7-FEET.
5. FIRE HYDRANT SHALL BE PLACED ON THE EXTENDED LOT LINE WHEN POSSIBLE.
6. ALL BELOW GROUND IRON ASSEMBLES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
7. FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF 1 FOOT OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADIUS AT THE INTERSECTIONS.
8. FIRE HYDRANT SHALL BE AT LEAST 42-INCHES FROM ANY ABOVE GROUND OBSTRUCTIONS, SUCH AS GUARDRAILS, RETAINING WALLS, BOLLARDS, ETC.
9. ALL FIRE HYDRANTS SHALL BE MANUFACTURED BY M&H OR MULLER (M&H MODEL 129, OR MULLER SUPER CENTERION 200).
10. ALL HYDRANTS SHALL OPEN BY TURNING THE OPERATING-STEM NUT TO THE RIGHT (CLOCKWISE). A CLEARLY VISIBLE CURVED ARROW AND THE WORD "OPEN" SHALL BE CAST IN RELIEF ON TOP OF THE HYDRANT TO INDICATE THE DIRECTION OF OPENING.

THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS FIRE HYDRANT INSTALLATION	REVISED MAR 2003 SCALE: 3/8" = 1' SHEET: W-2

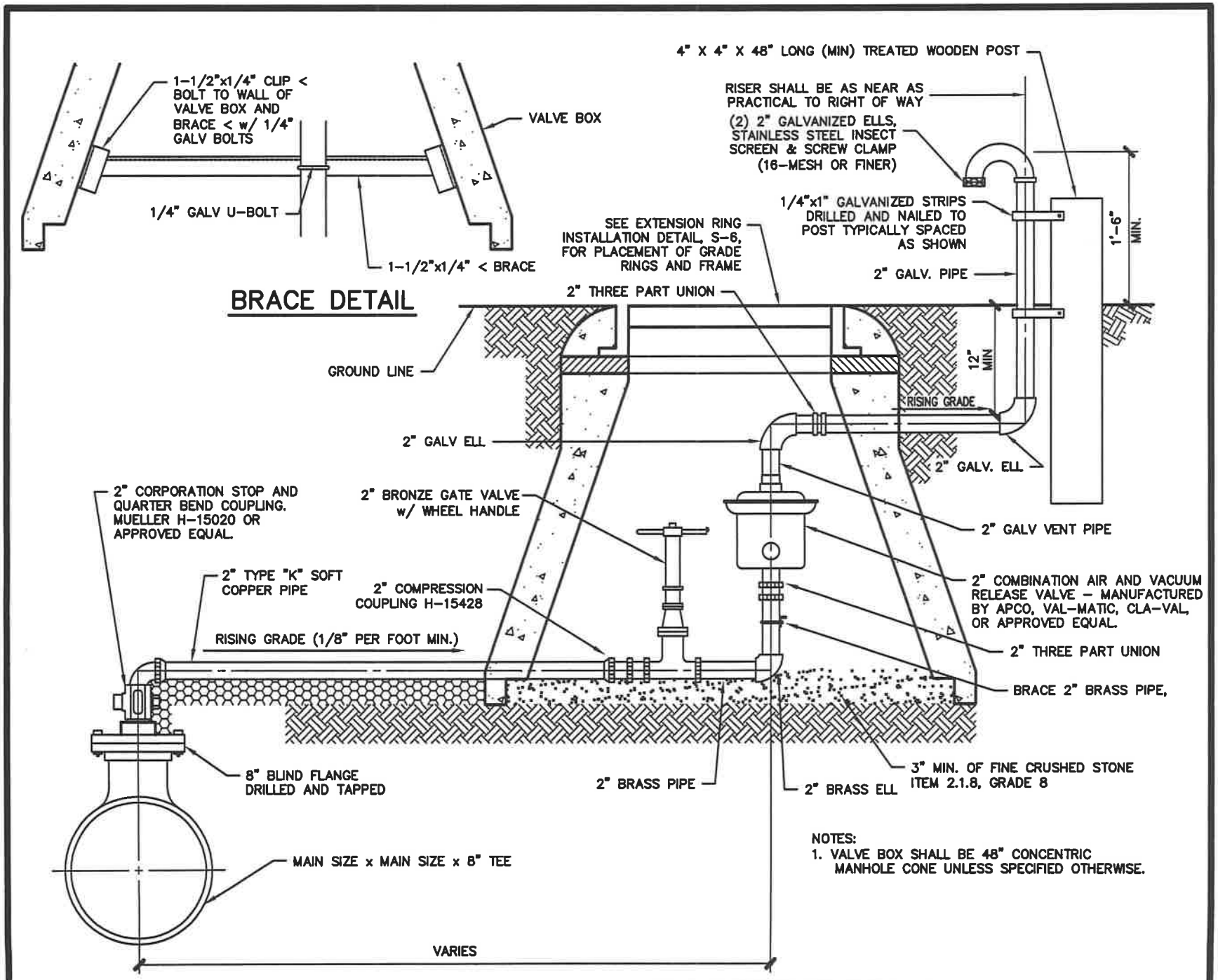




NOTES:

1. THE VALVE AND JOINT ASSEMBLIES SHALL BE WRAPPED IN POLYETHYLENE ACCORDING TO AWWA C105.
2. THE JOINT TYPE SHALL BE MECHANICAL JOINT UNLESS OTHERWISE SPECIFIED IN THE PLANS.
3. VALVE BOX SHALL BE TYLER PIPE 6850 SERIES OR APPROVED EQUAL.
4. GATE VALVE SHALL BE RESILIENT SEAT TYPE WITH A NON RISING STEM AND A 2-INCH SQUARE OPERATOR. RESILIENT SEAT GATE VALVE SHALL CONFORM TO AWWA C509.
5. A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE WITH AN OPERATING NUT LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE SUFFICIENT LENGTH TO ENSURE THAT ITS TOP IS WITHIN 4 FEET OF VALVE BOX LID.
6. 16" AND LARGER GATE VALVES REQUIRE CONCRETE BLOCK UNDER THE VALVE BODY.
7. ALL VALVE COVERS SHALL BE PAINTED BLUE.
8. A "V" SHALL BE SAW CUT IN THE CURB AT ALL VALVE LOCATIONS.
9. REFERENCE DESIGN CRITERIA FOR ALLOWABLE GATE VALVE MANUFACTURERS.

THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS GATE VALVE INSTALLATION	REVISED MAR 2003 SCALE: 3/4" = 1' SHEET: W-3



THE CITY OF EVERMAN

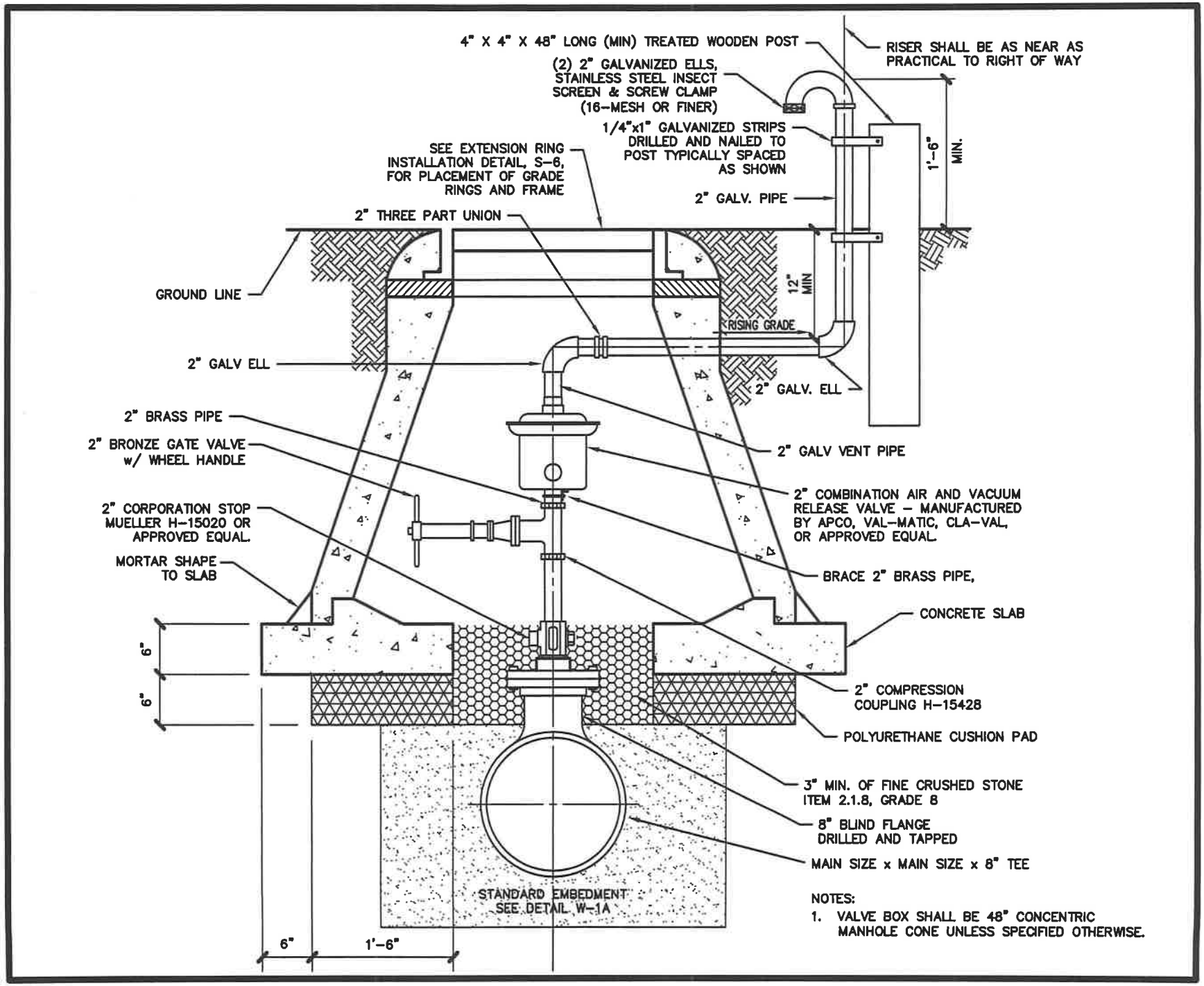
WATER SYSTEM CONSTRUCTION DETAILS

AIR RELEASE VALVE ASSEMBLY TYPE 1

REVISED MAR 2003

SCALE: 3/4" = 1'

SHEET: W-4A



THE CITY OF EVERMAN

WATER SYSTEM CONSTRUCTION DETAILS

AIR RELEASE VALVE ASSEMBLY TYPE 2

REVISED MAR 2003

SCALE: 3/4" = 1'

SHEET: W-4B

THE CITY OF EVERMAN

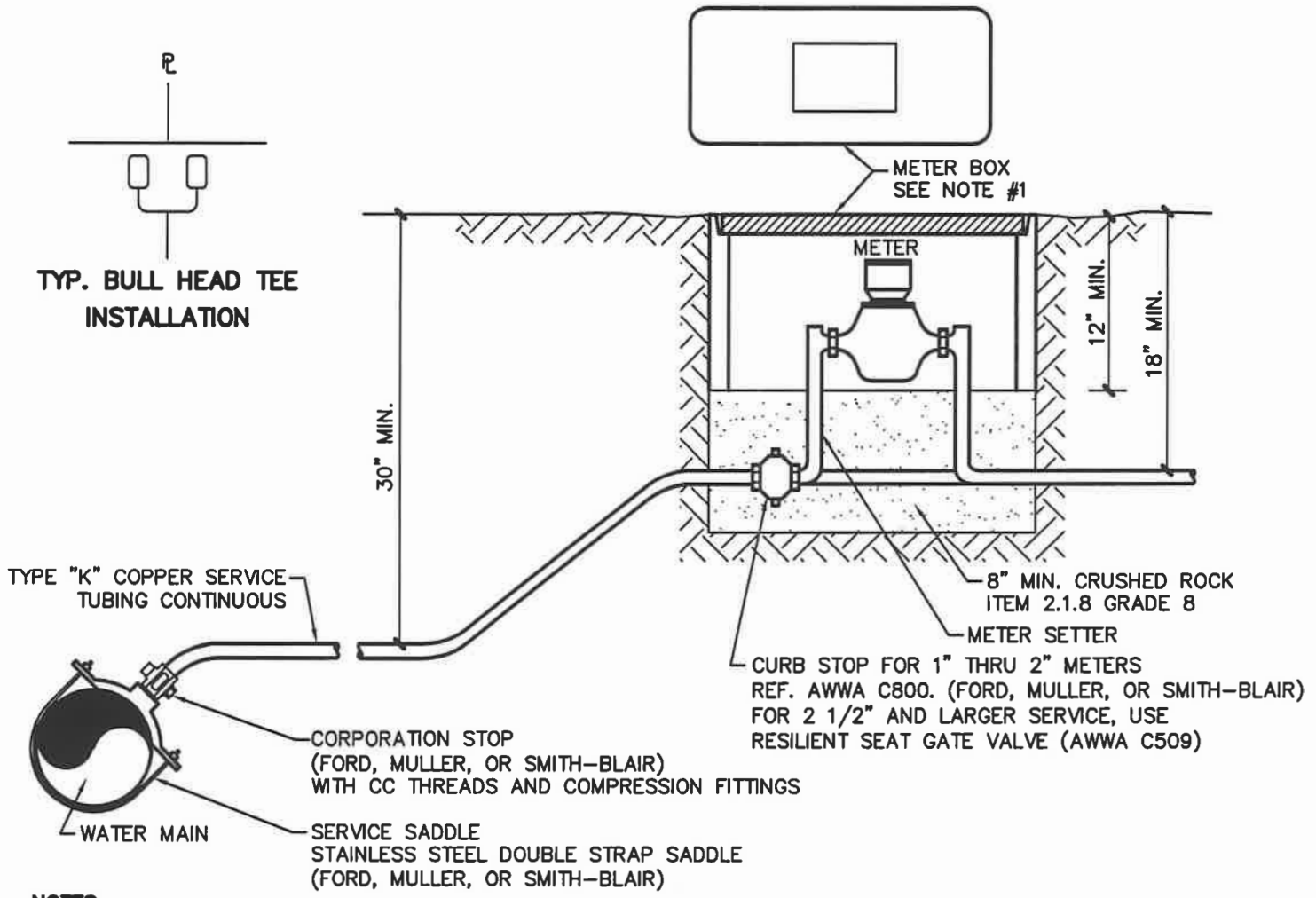
WATER SYSTEM CONSTRUCTION DETAILS

1"-2" WATER SERVICE ASSEMBLY

REVISED MAR 2003

SCALE: 1" = 1'

SHEET: W-5



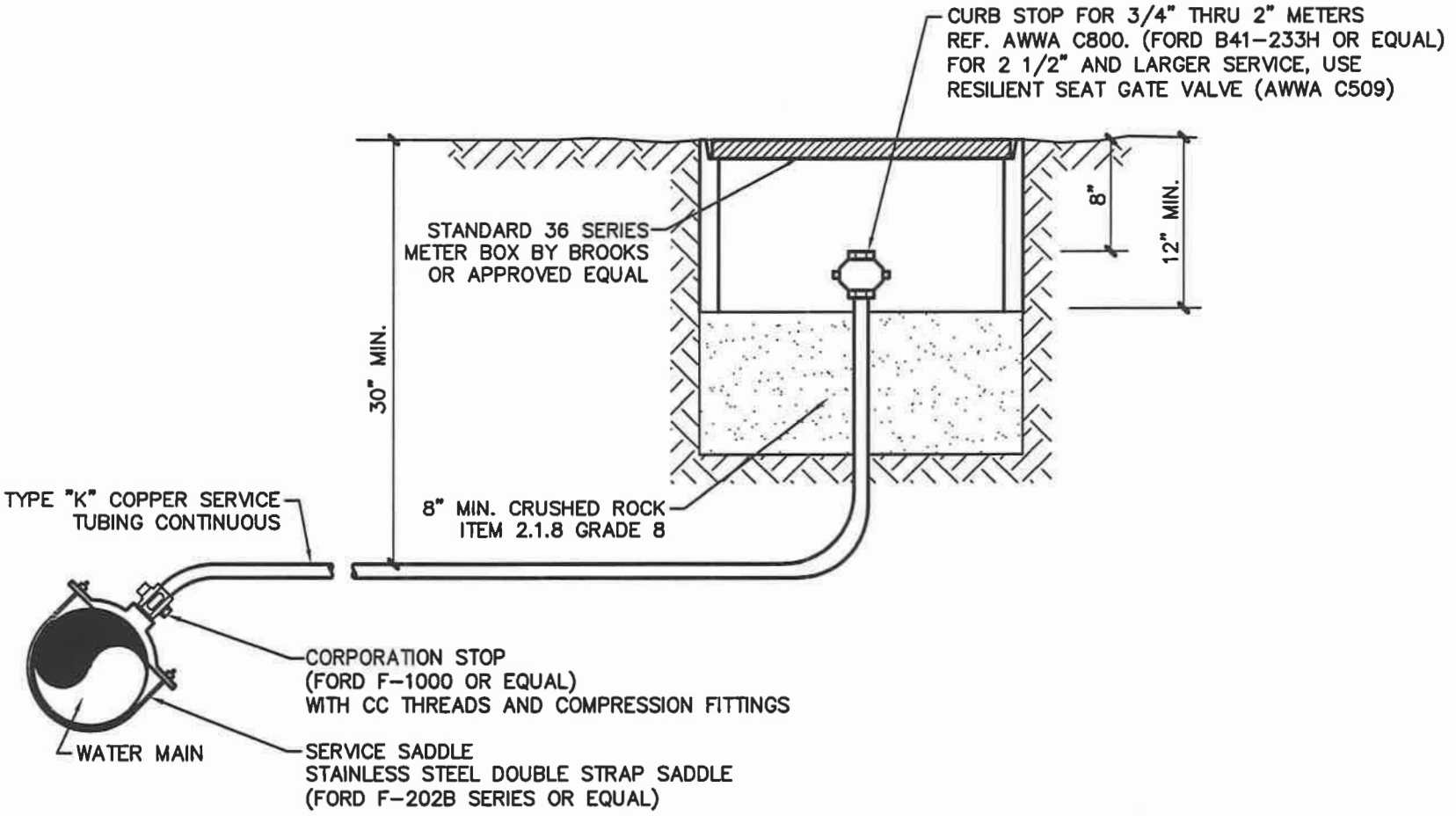
NOTES:

1. METER BOX SHALL BE BROOKS 36 CONCRETE PULLBOX OR APPROVED EQUAL WITH A 36-T CAST IRON COVER. METER BOX SHALL BE BROOKS 38 CONCRETE PULLBOX OR APPROVED EQUAL WITH A 38-T CAST IRON COVER FOR 2" METERS.
2. INSTALL CURB STOP FOR 1" THRU 2" METERS (AWWA C800) WITH LOCKING MECHANISM AND COMPRESSION FITTINGS. FOR LARGER THAN 2" SERVICE, INSTALL RESILIENT SEAT GATE VALVE (AWWA C509).
3. METER BOX SHALL BE A MINIMUM OF 12" BEHIND THE BACK OF CURB WITH THE WATER SERVICE NOT LESS THAN 18" BELOW GRADE.
4. SERVICES ALONG ROADWAYS WITHOUT CURB AND GUTTER SHALL BE LOCATED A MINIMUM OF 18" BELOW THE DITCH FLOWLINE.
5. SERVICE LINES CROSSING UNDER THE ROADWAY SHALL BE LOCATED A MINIMUM OF 30" BELOW GRADE AND BE ENCASED (SEE DETAIL W-13).
6. ALL WATER METERS SHALL BE EITHER HENDY OR BADGER METERS OR APPROVED EQUAL.

THE CITY OF EVERMAN

WATER SYSTEM CONSTRUCTION DETAILS

FLUSHING VALVE INSTALLATION



NOTES:

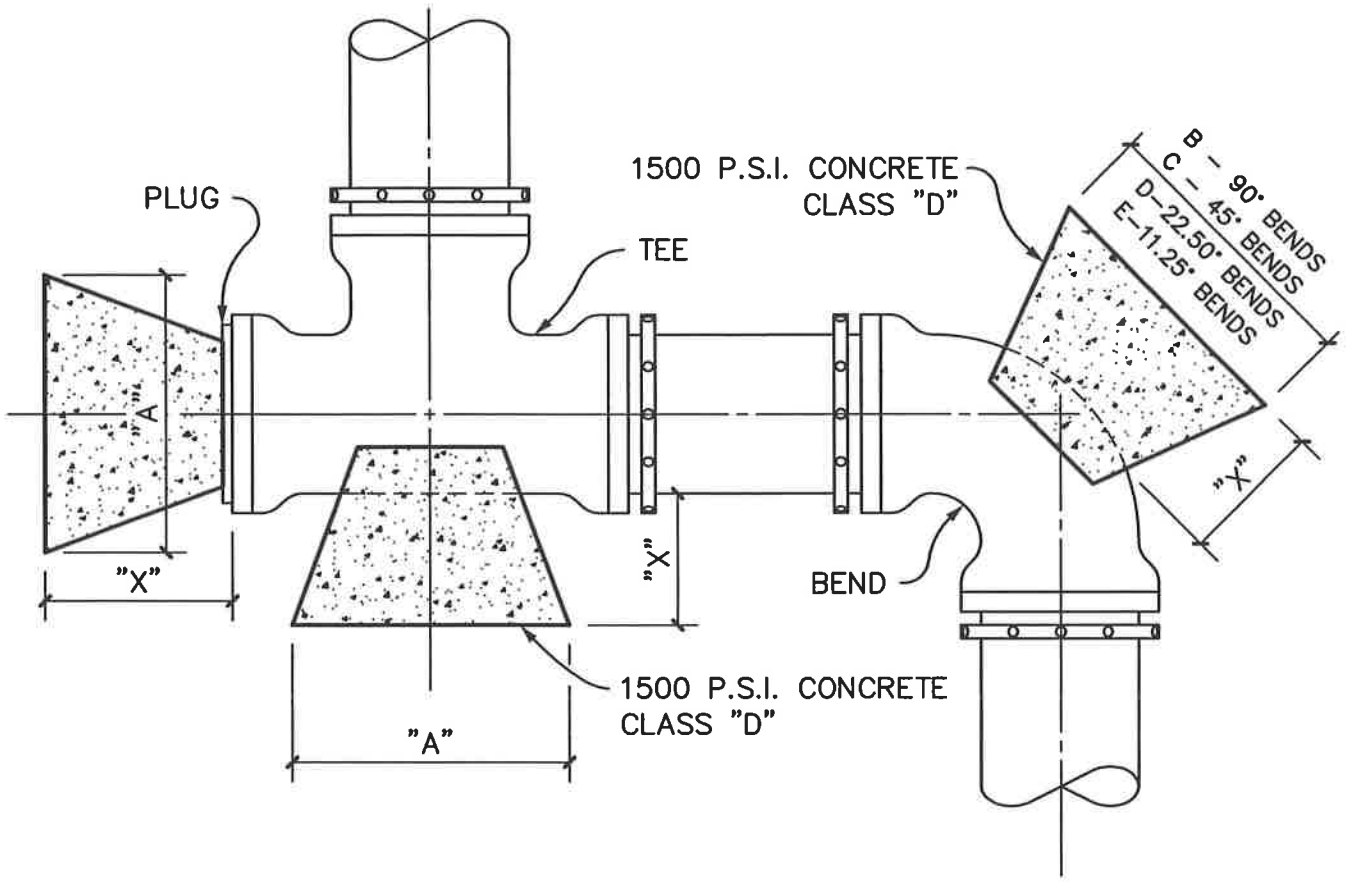
1. SERVICE SADDLE AND CORPORATION STOP SHALL BE PER WATER SERVICE ASSEMBLY.

REVISED MAR 2003

SCALE: 1" = 1'

SHEET: W-6

03/11/03 W-6



HORIZONTAL BLOCKING TABLE

DIMENSION "X" TO BE A MINIMUM OF (1) FOOT, BUT IS TO BE INCREASED WHERE NECESSARY TO PROVIDE BEARING AGAINST UNDISTURBED TRENCH WALL.

PIPE SIZE	"X" DIM.	PLUGS & TEES		90° BENDS		45° BENDS		22.50° BENDS		11.25° BENDS	
		"A"	MIN. AREA sf	"B"	MIN. AREA sf	"C"	MIN. AREA sf	"D"	MIN. AREA sf	"E"	MIN. AREA sf
6"	1'-6"	1'-0"	1.06	1'-2"	1.50	1'-0"	.83	1'-0"	.83	1'-0"	.83
8"	1'-6"	1'-3"	1.89	1'-6"	2.66	1'-3"	1.44	1'-0"	.83	1'-0"	.83
10"	1'-6"	1'-9"	2.95	2'-0"	4.17	1'-6"	2.26	1'-3"	1.15	1'-0"	.83
12"	1'-6"	2'-0"	4.25	2'-3"	6.00	1'-9"	3.25	1'-3"	1.65	1'-0"	.83
16"	2'-0"	2'-7"	7.54	3'-0"	10.65	2'-3"	5.76	1'-8"	2.94	1'-2"	1.48

NOTES:

1. BEARING AREAS SHOWN ARE BASED ON 150 PSI TEST PRESSURE AND 3000 PSF ALLOWABLE SOIL BEARING PRESSURE.
2. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
3. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED BY MEGALUG OR APPROVED EQUAL.

THE CITY OF EVERMAN

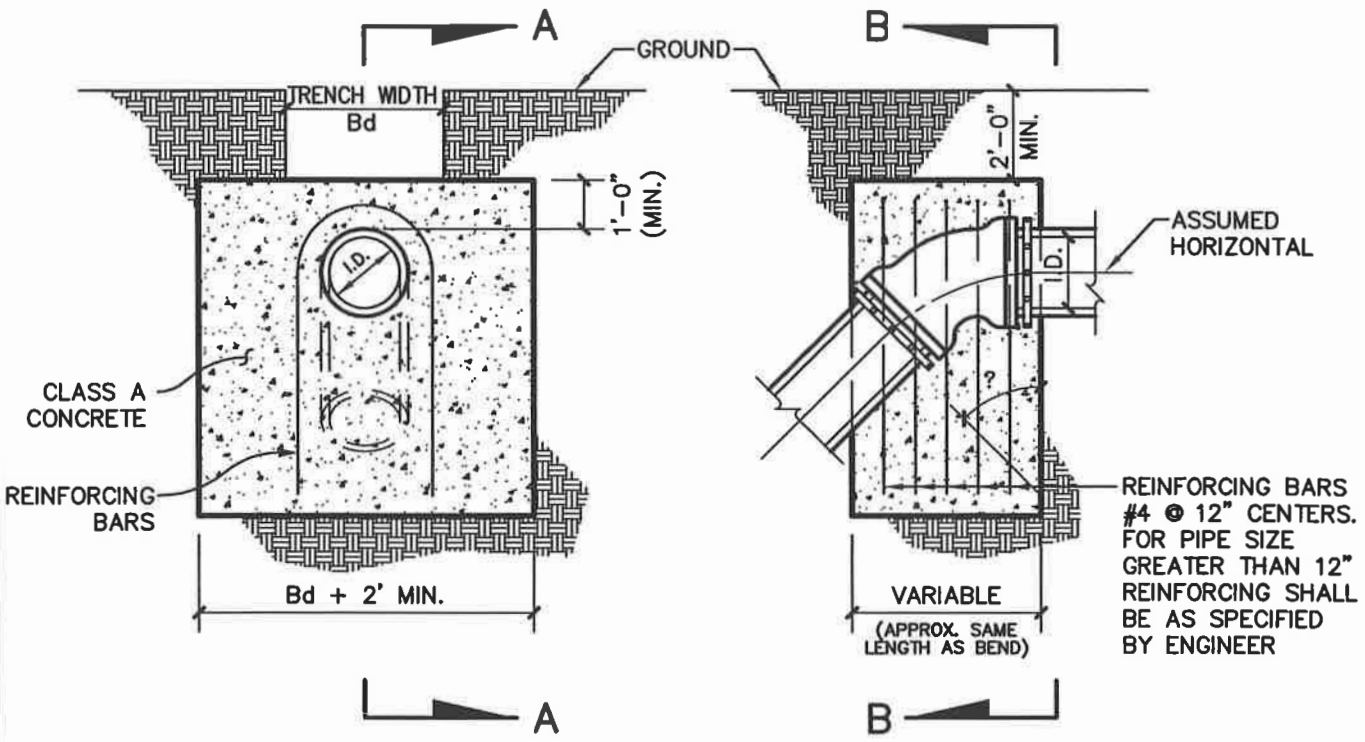
WATER SYSTEM CONSTRUCTION DETAILS

HORIZONTAL AND VERTICAL (DOWNWARD) THRUST BLOCKING

REVISED MAR 2003

SCALE: N.T.S.

SHEET: W-7



ELEVATION "B–B"

SECTION "A–A"

VERTICAL THRUST BLOCK TABLE

Δ→	11.25'		22.50'		30.00'		45.00'		67.50'		90.00'		←Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12

NOTES:

1. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
2. ALL TEES, BENDS, PLUGS, ETC. SHALL BE MECHANICALLY RESTRAINED BY MEGALUG OR APPROVED EQUAL.

THE CITY OF *EVERMAN

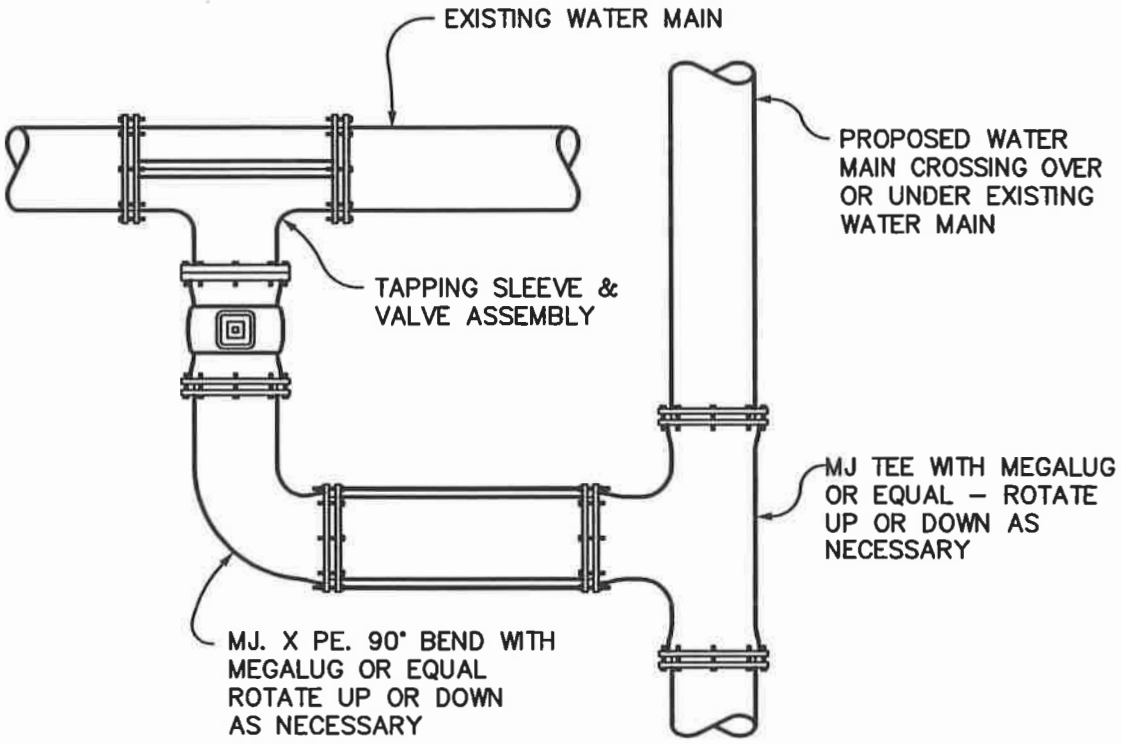
WATER SYSTEM CONSTRUCTION DETAILS

VERTICAL THRUST BLOCK

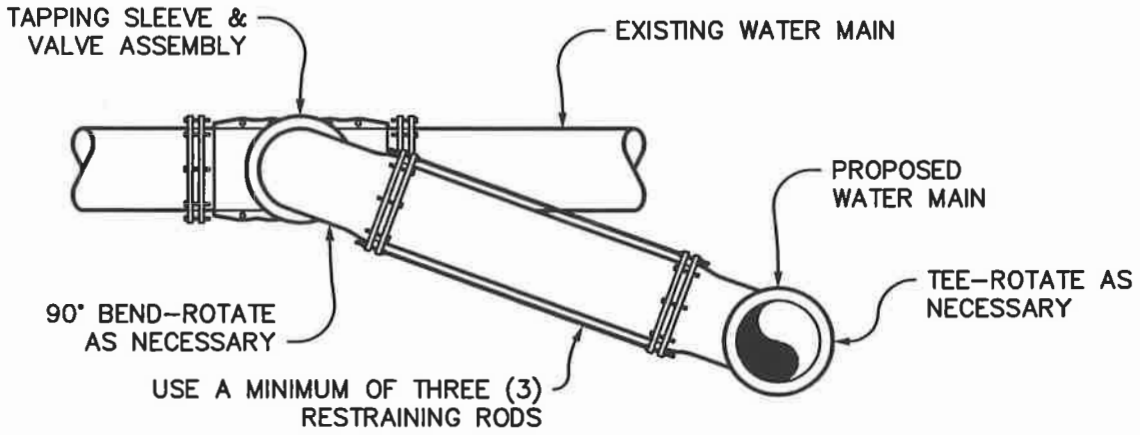
REVISED MAR 2003

SCALE: N.T.S.

SHEET: W–8



PLAN

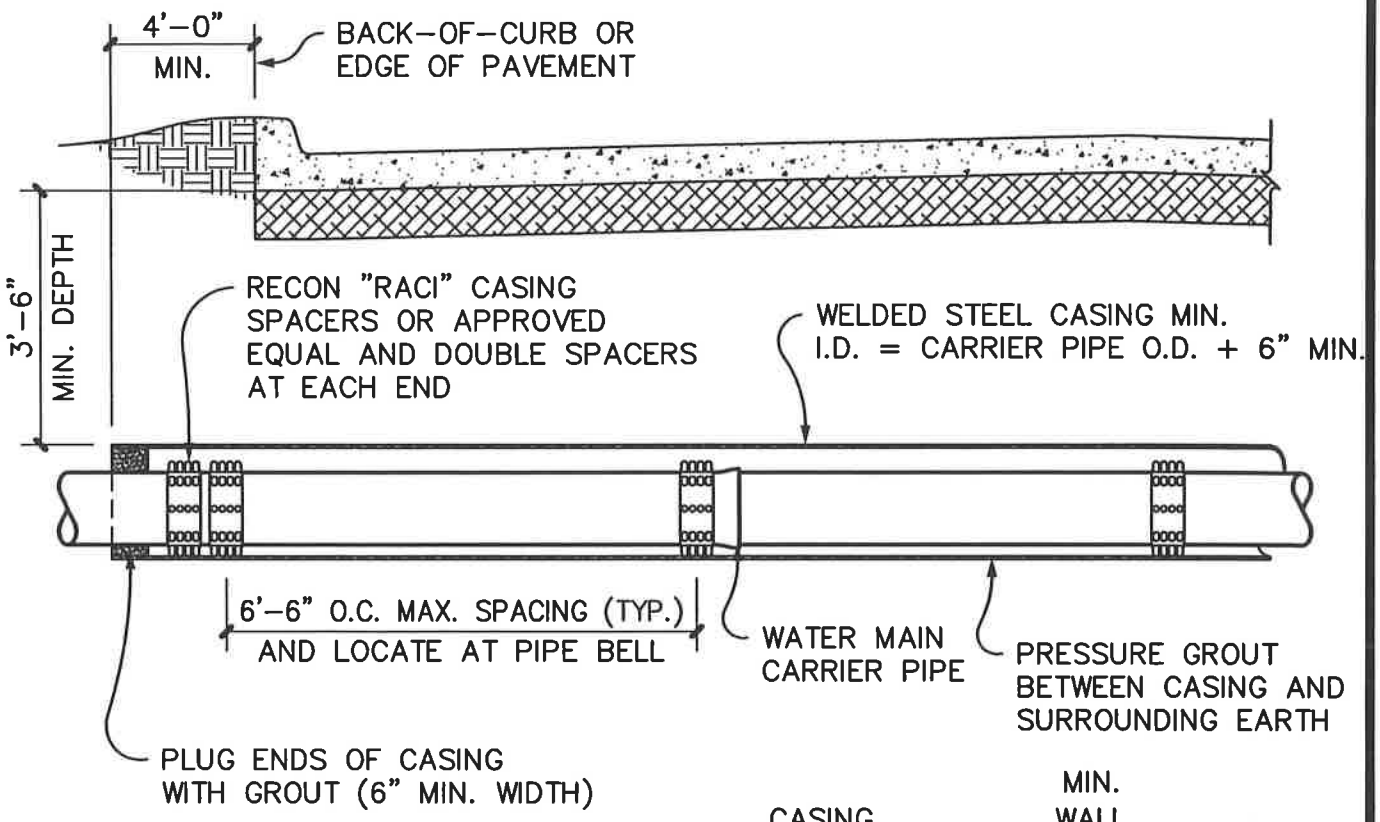


SECTION

NOTES:

1. WRAP ALL BELOW GROUND ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.
2. THE DIAMETER OF THE CONNECTING PIPE BETWEEN THE PROPOSED AND EXISTING WATER MAINS SHALL HAVE A DIAMETER EQUAL TO THE SMALLER OF THE TWO MAINS TO BE CONNECTED THROUGH THE PROPOSED RING CONNECTION.

THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS TYPICAL RING CONNECTION	REVISED MAR 2003 SCALE: N.T.S. SHEET: W–9



CASING DIAMETER	MIN. WALL THICKNESS
12" OR LESS	0.25"
OVER 12" – 18"	0.3125"
OVER 18" – 22"	0.375"
OVER 22" – 28"	0.4375"
OVER 28" – 34"	0.5"
OVER 34" – 42"	0.5625"
OVER 42" – 48"	0.625"
OVER 48" – 60"	0.6875"

NOTES:

1. WHERE A BORE PIT EXCEEDS 5 FEET IN DEPTH THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY OSHA.
2. WHERE A BORE IS TO BE PARTIALLY OR COMPLETELY ABANDONED, SAID BORE SHALL BE COMPLETELY FILLED WITH HYDRAULICALLY PLACED CEMENT GROUT.
3. CASING SHALL BE EXTENDED TO THE RIGHT–OF–WAY LINE FOR STATE HIGHWAY AND RAILROAD CROSSINGS.
4. THE EDGE OF BORE PIT SHALL BE A MINIMUM OF 4' BEHIND THE BACK OF CURB OR EDGE OF PAVEMENT.
5. STEEL CASING PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35 KSI.

THE CITY OF *EVERMAN

WATER SYSTEM CONSTRUCTION DETAILS

WATER LINE BORE AND CASING

REVISED MAR 2003

SCALE: 3/8" = 1'

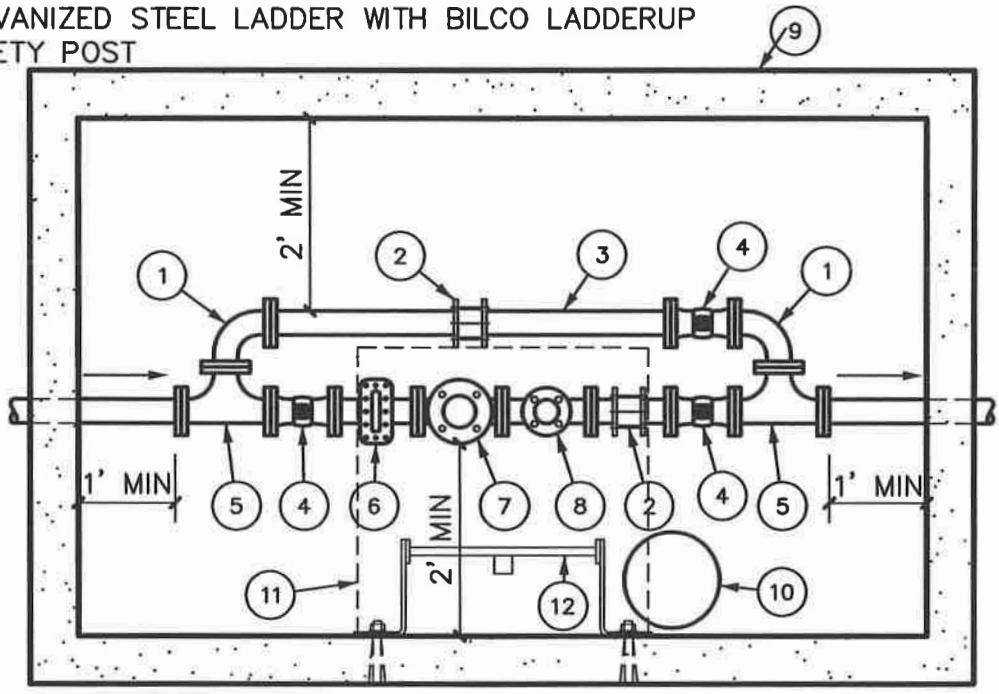
SHEET: W–10

MATERIALS LIST:

1 – D.I. 90° BEND FLG. x FLG.
2 – RESTRAINED COUPLING OR EXPANSION JOINT
3 – BYPASS LINE
4 – GATE VALVE OS&Y W/ CHAIN & LOCK FLG. X FLG.
5 – D.I. TEE FLG. X FLG.
6 – STRAINER
7 – COMPOUND OR TURBINE METER
8 – TESTING TEE FLG. X FLG. WITH 2" GATE VALVE AND FLG. X THREADED END DISCHARGE PIPE
9 – PRECAST METER VAULT
10 – 12" SUMP x 24" DEEP (12" R.C.P. OR EQUAL)
11 – ACCESS DOOR
12 – GALVANIZED STEEL LADDER WITH BILCO LADDERUP SAFETY POST

MINIMUM VAULT SIZE

METER	VAULT
3 INCH	6'X8'
4 INCH	6'X8'
6 INCH	8'X10'



NOTES:

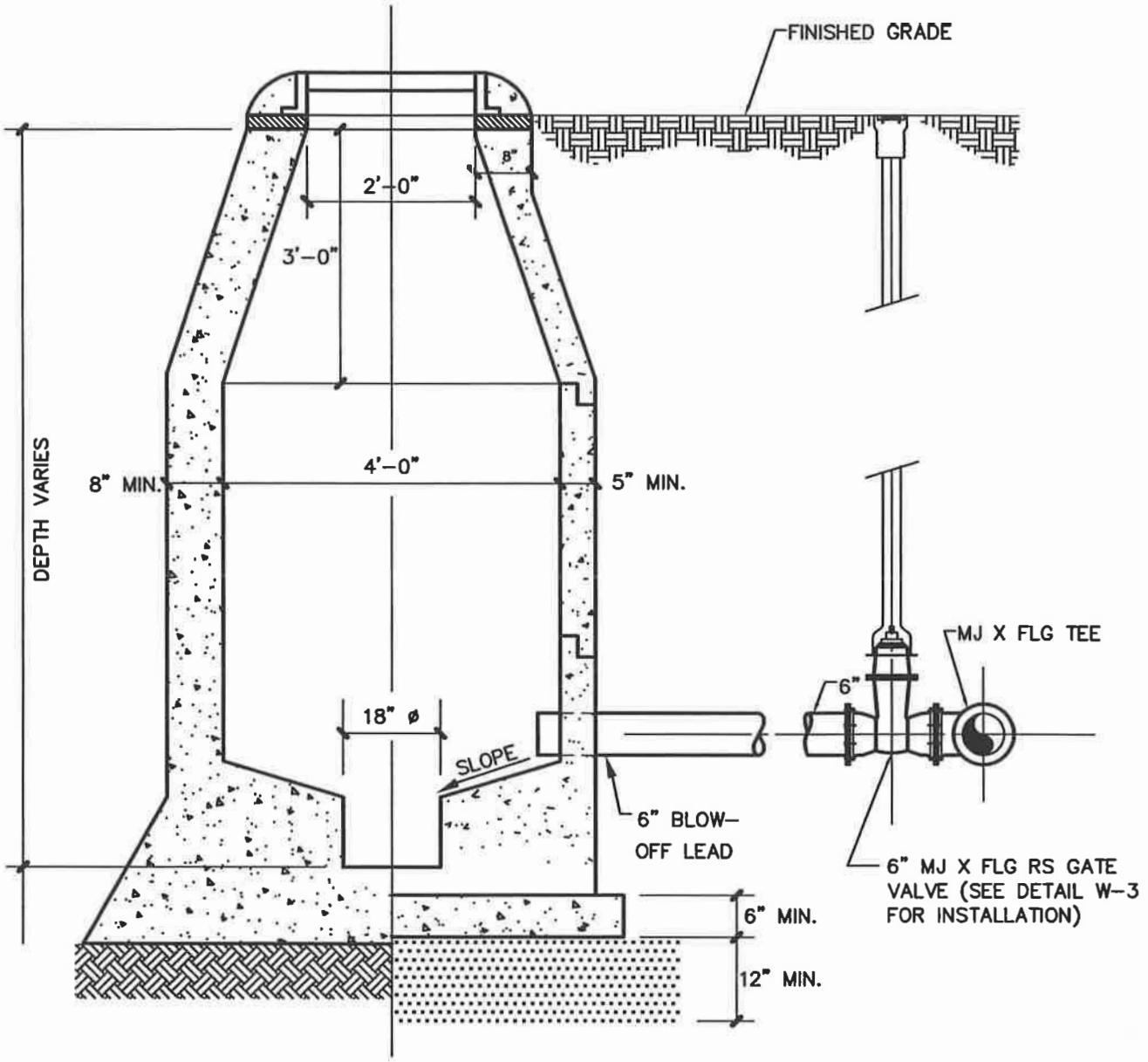
1. A J–4AL BILCO DOOR (3'x3') SHALL BE SPECIFIED FOR 3" AND AND 4" METER VAULTS. A JD–2AL BILCO DOOR (4'x4') SHALL BE SPECIFIED FOR 6" AND 8" METER VAULTS OR APPROVED EQUAL. DOOR SHALL BE DESIGNED FOR AASHTO H–20 WHERE APPLICABLE.
2. ALL VAULTS SHALL BE BROOKS, AMERICAN OR APPROVED EQUAL AND DESIGNED FOR AASHTO H–20 OR H–20–44 LIVE LOADS.
3. DOOR DRAIN SHALL BE PLUMBED TO OUTSIDE OF VAULT.
4. ALL WALL PENETRATIONS SHALL BE SEALED WITH LINK SEAL OR APPROVED EQUAL.
5. PIPE AND FITTINGS SHALL BE CONSTRUCTED A MIN. OF 1' ABOVE THE VAULT FLOOR. A CONCRETE PEDESTAL SHALL BE INSTALLED AT THE MID POINT OF THE PIPING ASSEMBLY FOR HORIZONTAL SUPPORT.
6. BYPASS LINE SHALL BE SAME SIZE AS MAIN LINE.
7. METERS SHALL BE HENDY, BADGER OR APPROVED EQUAL COMPOUND METERS.

THE CITY OF *EVERMAN

WATER SYSTEM CONSTRUCTION DETAILS

3" AND LARGER METER VAULT

REVISED MAR 2003
SCALE: 1/2" = 1'
SHEET: W–11



CAST-IN-PLACE 1/2 SECTION

SEE DETAIL S-3, CAST-IN-PLACE SANITARY SEWER MANHOLE

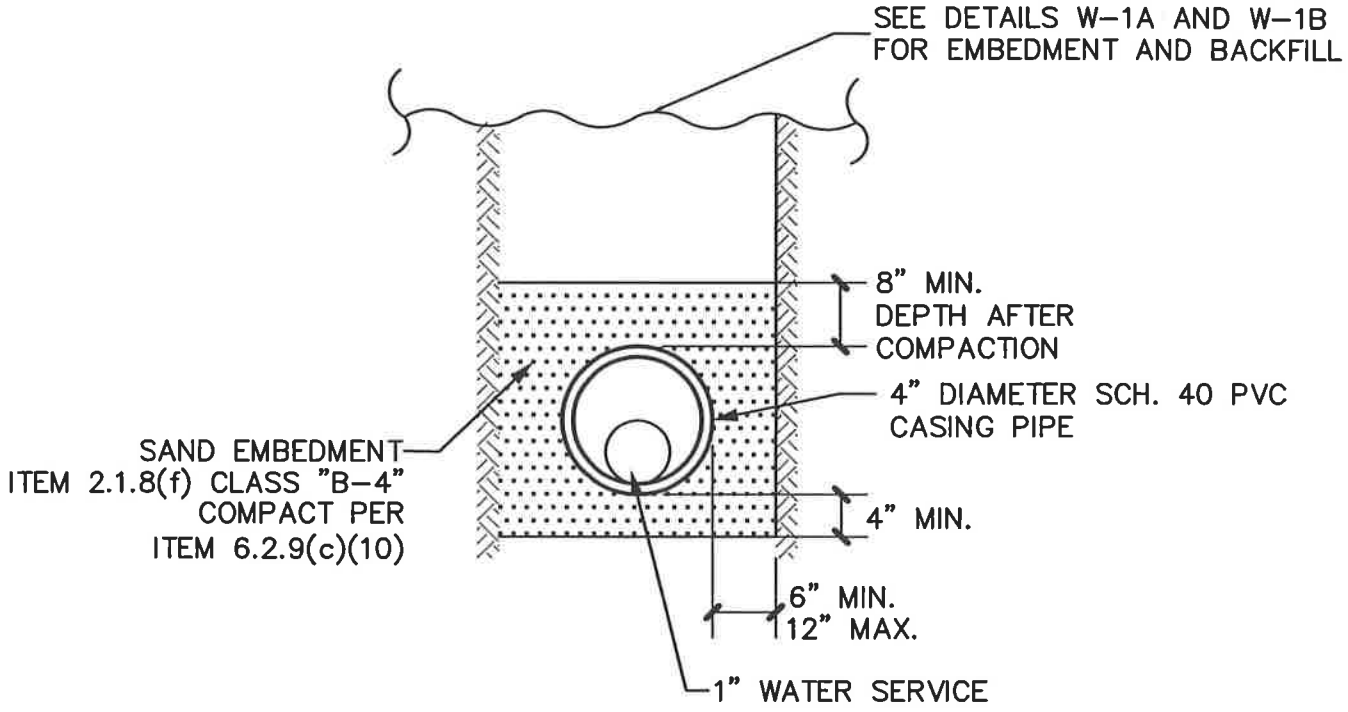
PRECAST 1/2 SECTION

SEE DETAIL S-2, PRECAST SANITARY SEWER MANHOLE

NOTES:

1. LOCATE THE BLOW-OFF SUMP MANHOLE NEAR PROPERTY LINE WITHOUT DISRUPTION TO SERVICE LINES.
2. ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF THE WATER MAIN.

THE CITY OF *EVERMAN	WATER SYSTEM CONSTRUCTION DETAILS **BLOW-OFF SUMP MANHOLE INSTALLATION**	REVISED MAR 2003 SCALE: 3/4" = 1' SHEET: **W-12**



THE CITY OF *EVERMAN

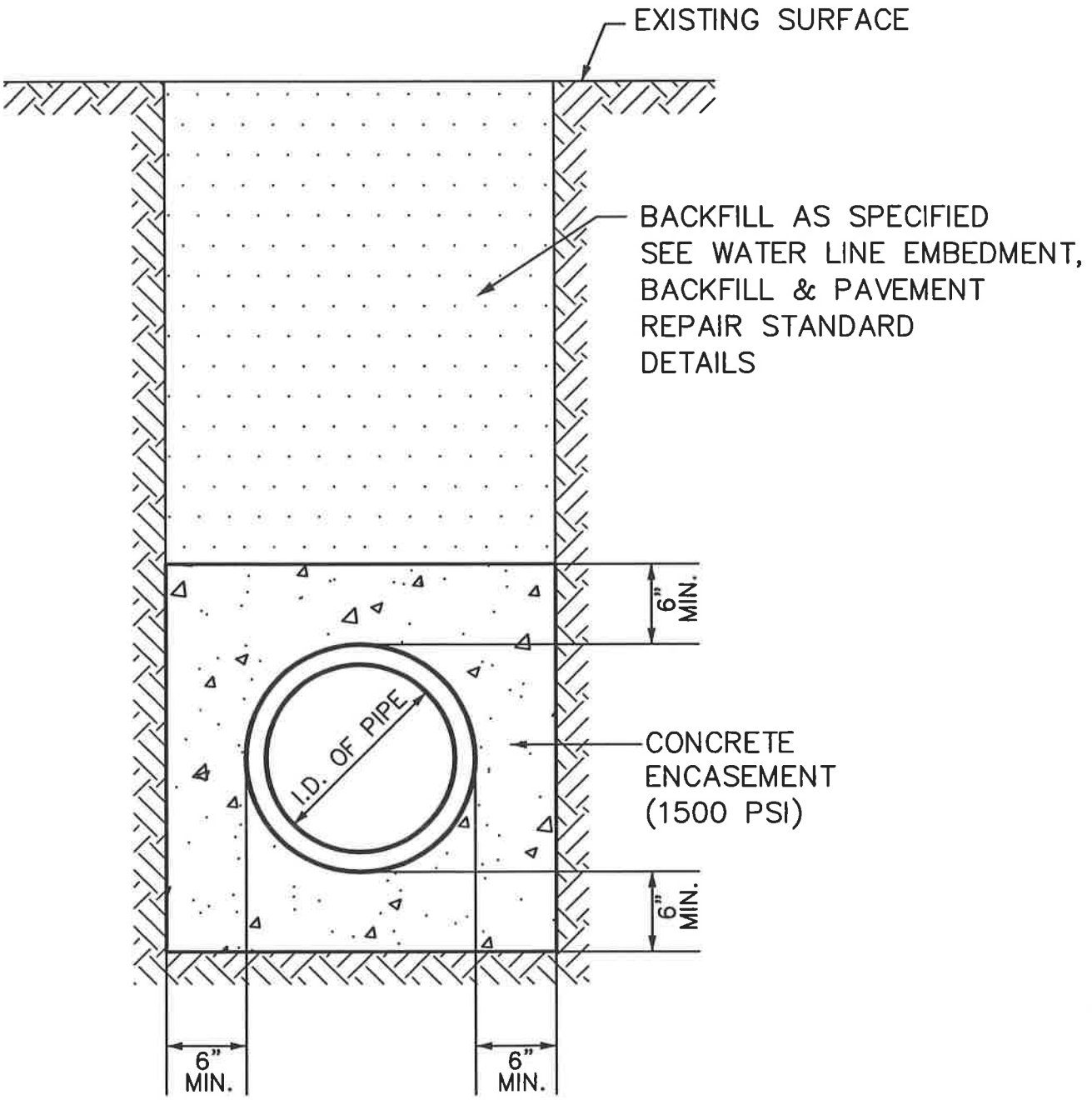
WATER SYSTEM CONSTRUCTION DETAILS

SERVICE LINE ENCASEMENT

REVISED MAR 2003

N.T.S.

SHEET: W-13



THE CITY OF EVERMAN

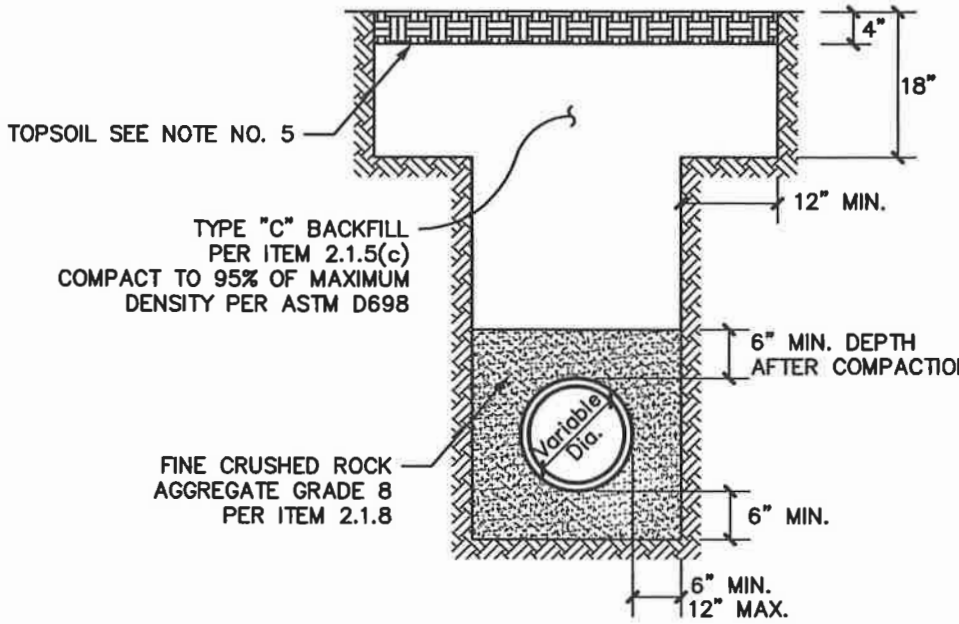
WATER SYSTEM CONSTRUCTION DETAILS

CONCRETE ENCASEMENT

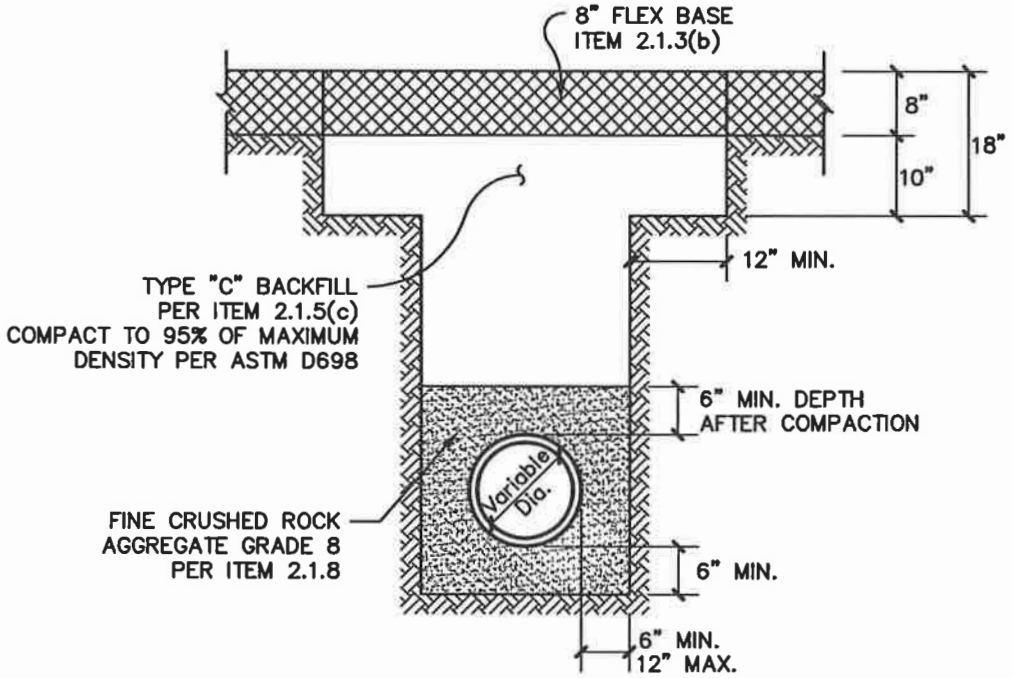
REVISED MAR 2003

SCALE: N.T.S.

SHEET: W-14



UNPAVED AND FUTURE PAVED AREAS

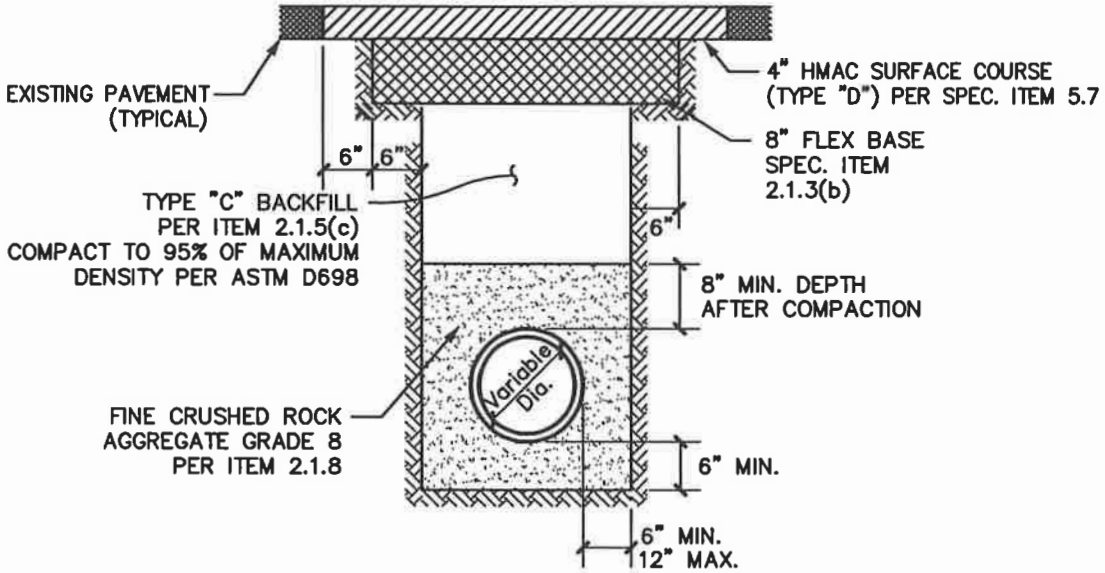


EXISTING FLEXBASE SURFACE

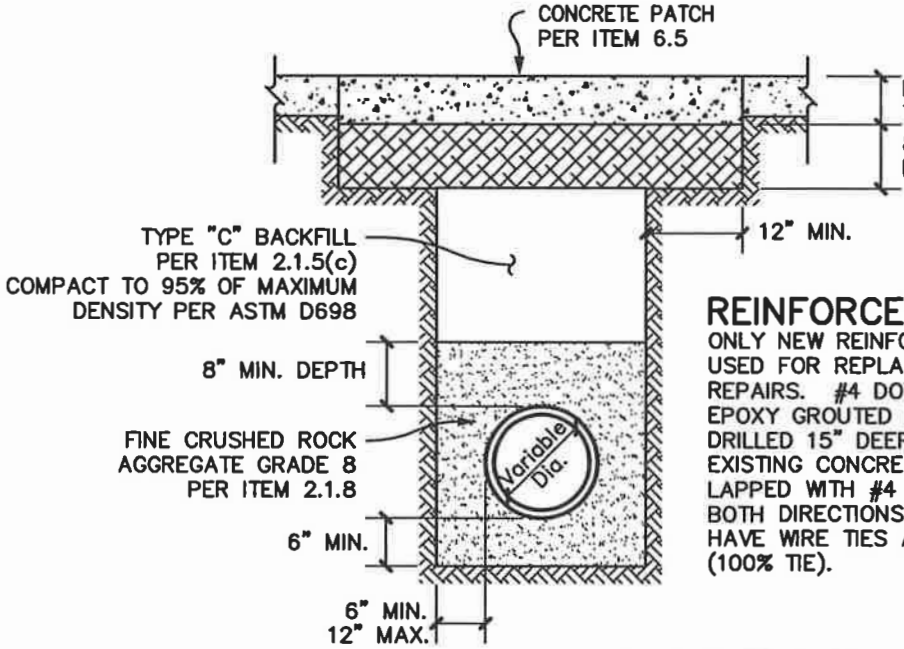
NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TXDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC ITEM 8.8.
4. A MAXIMUM OF 200-FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
5. TOPSOIL SHALL BE 4 INCHES IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.

THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS STANDARD SANITARY SEWER EMBEDMENT AND BACKFILL	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: S-1A



EXISTING ASPHALT PAVEMENT



REINFORCEMENT NOTE:

ONLY NEW REINFORCING BARS ARE TO BE USED FOR REPLACEMENT IN STREET CUT REPAIRS. #4 DOWELS 30" LONG ARE TO BE EPOXY GROUTED INTO 5/8" DIAMETER HOLES DRILLED 15" DEEP ON 18" CENTERS IN THE EXISTING CONCRETE. DOWELS ARE TO BE LAPPED WITH #4 BARS ON 18" CENTERS IN BOTH DIRECTIONS. ALL REINFORCING SHALL HAVE WIRE TIES AT EVERY INTERSECTION (100% TIE).

EXISTING CONCRETE PAVEMENT

NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TXDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIAMETER SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES PER SPEC ITEM 8.8.
4. A MAXIMUM OF 200-FT OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.

THE CITY OF EVERMAN

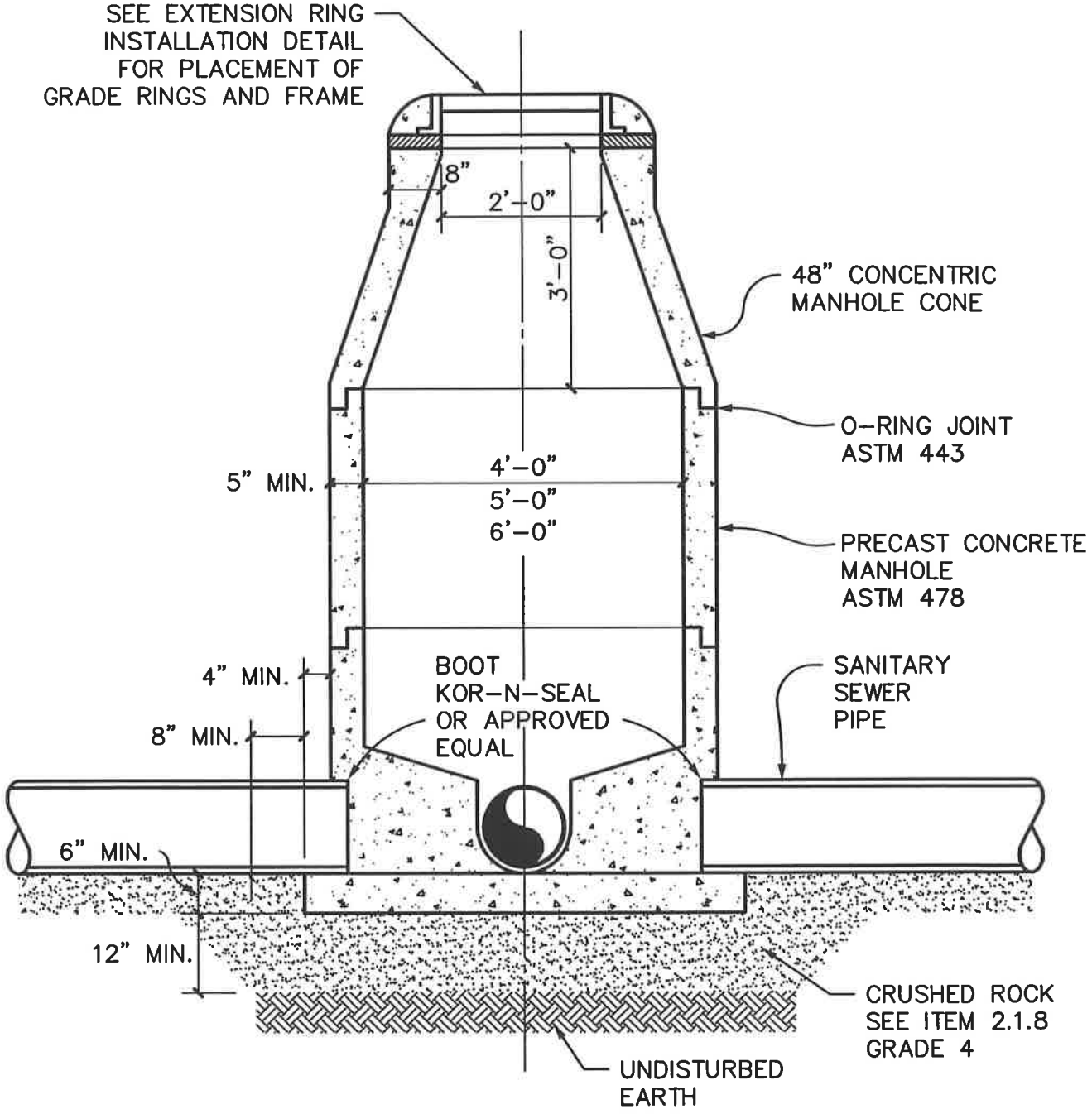
SEWER SYSTEM CONSTRUCTION DETAILS

STANDARD SANITARY SEWER EMBEDMENT AND BACKFILL

REVISED MAR 2003

SCALE: 1/2" = 1'

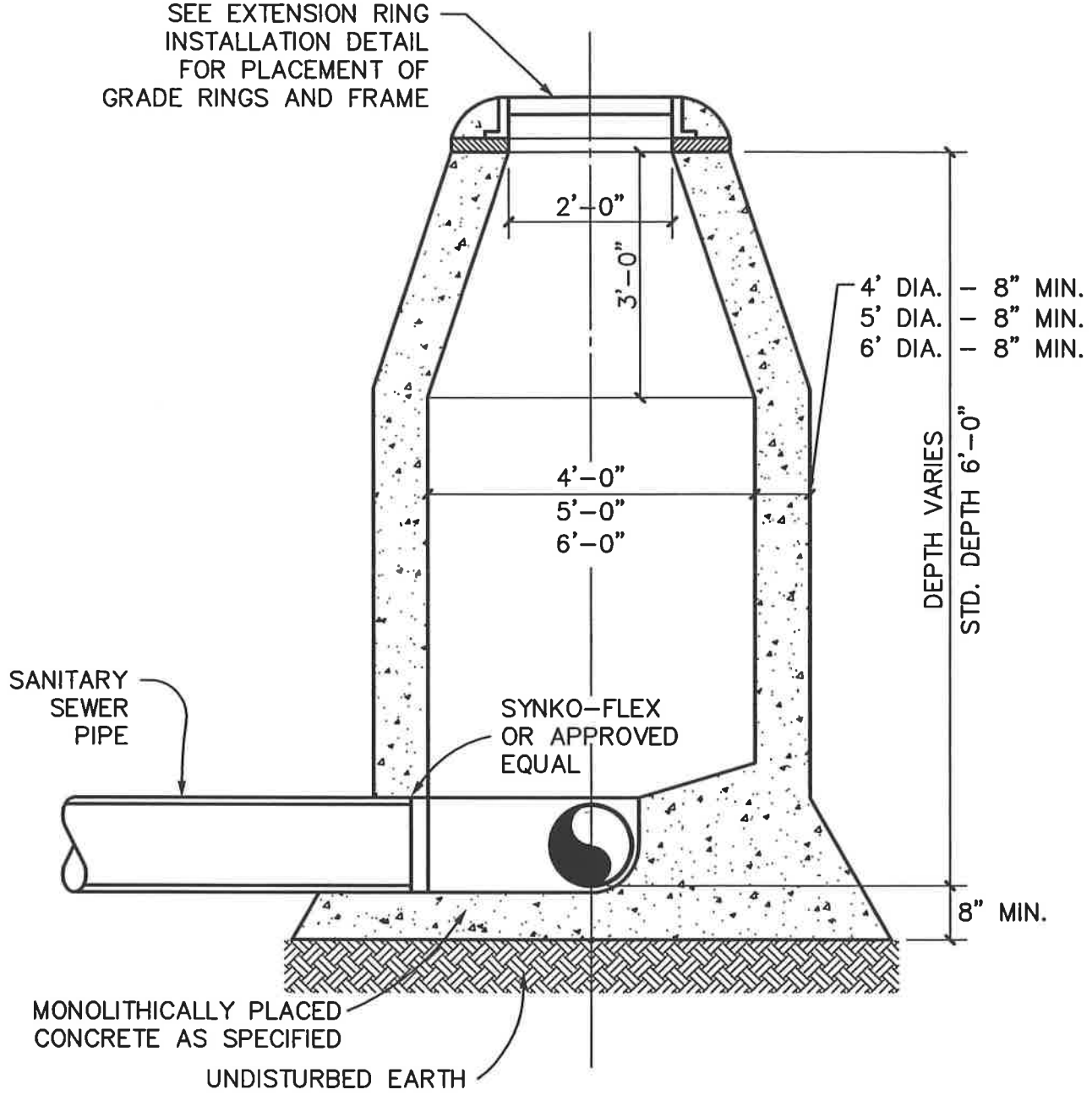
SHEET: S-1B



NOTES:

1. MAXIMUM CHIMNEY HEIGHT SHALL BE 12".
2. MANHOLES SHALL BE CONCENTRIC UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. TRANSITIONS TO 5' AND 6' BARREL DIAMETERS SHALL OCCUR JUST BELOW THE CONE SECTION.
4. INVERTS SHALL BE EQUAL TO OR GREATER THAN THE PIPE DIAMETER.

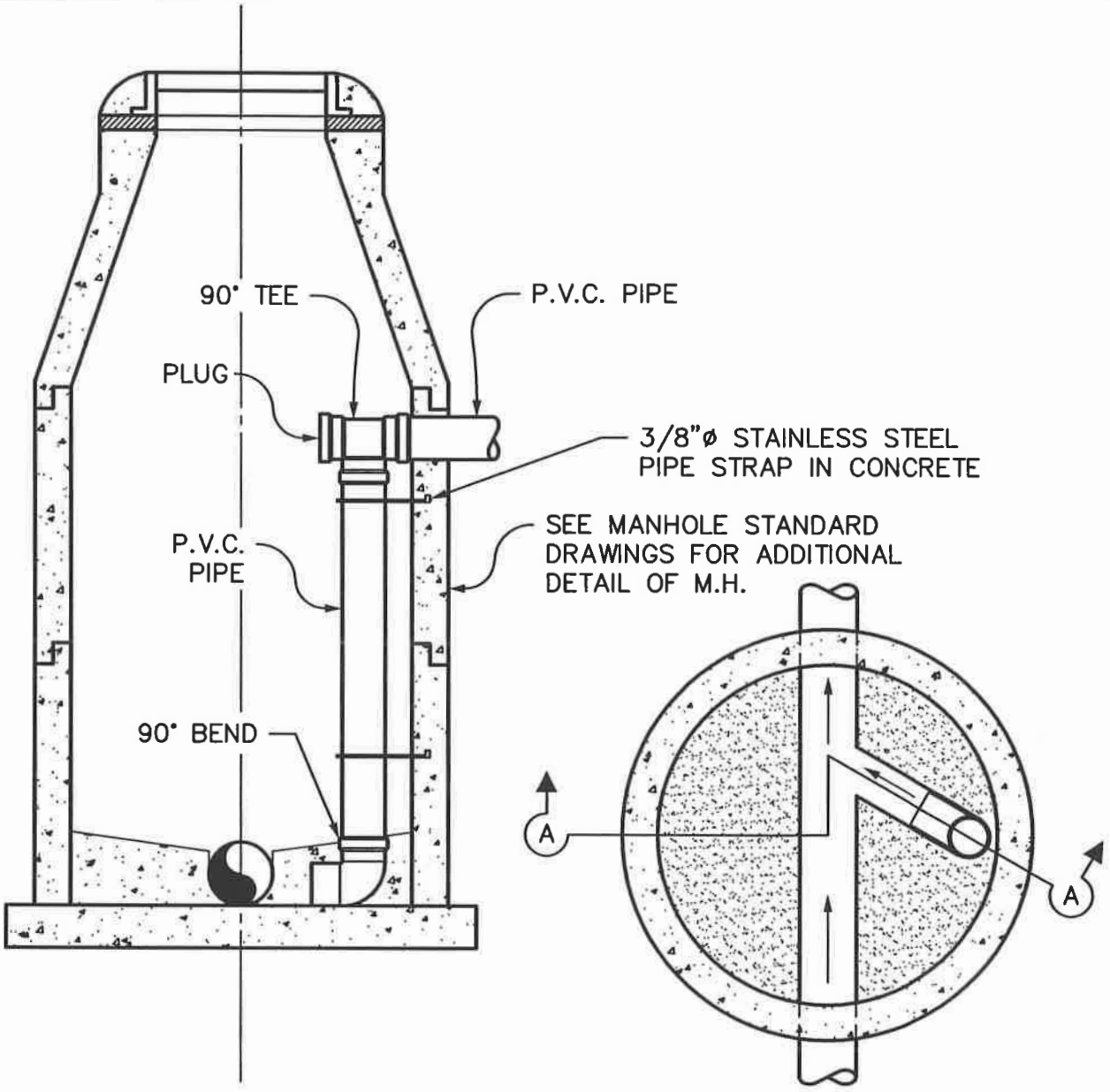
THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS **PRECAST SANITARY SEWER MANHOLE**	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: S-2



NOTES:

1. MAXIMUM CHIMNEY HEIGHT SHALL BE 12".
2. MANHOLES SHALL BE CONCENTRIC UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. INVERTS SHALL BE EQUAL TO OR GREATER THAN THE PIPE DIAMETER.
4. FOR MANHOLE DEPTHS GREATER THAN 12 FEET ADD AN ADDITIONAL 4" INCHES OF CONCRETE TO THE WALL THICKNESS FOR EACH ADDITIONAL 6 FEET OF DEPTH.

THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS CAST-IN-PLACE SANITARY SEWER MANHOLE	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: S-3



ELEVATION A

PLAN

NOTES:

1. P.V.C. PIPE WITHIN MANHOLE SHALL BE SDR–35.
2. MANHOLE MAY BE EITHER PRECAST OR MONOLITHIC TYPE.
3. ℄ OF SURCHARGE LINE NORMALLY PLACED AT TOP OF EXISTING WASTEWATER LINE UNLESS NOTED OTHERWISE ON PLANS.

THE CITY OF *EVERMAN

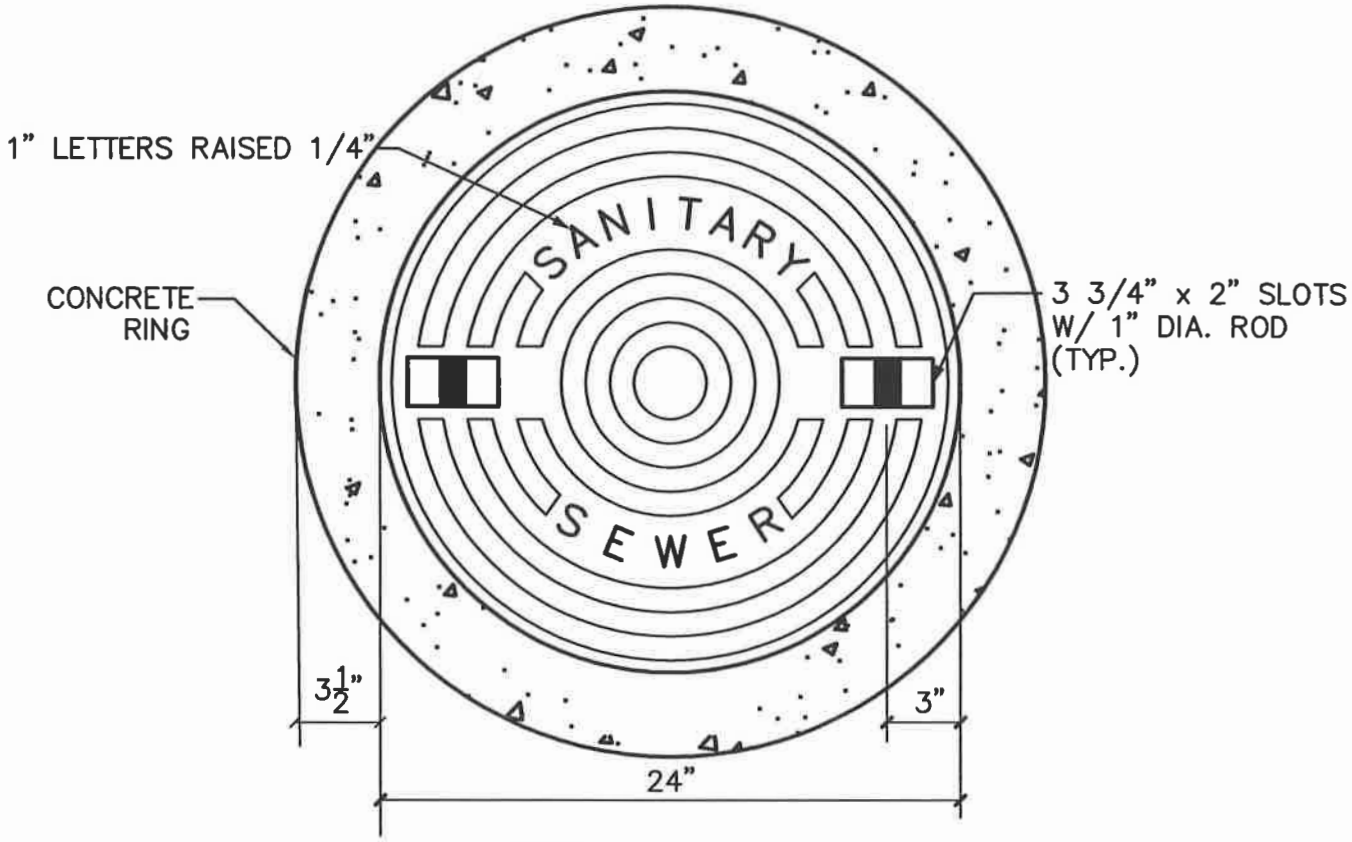
SEWER SYSTEM CONSTRUCTION DETAILS

DROP SANITARY SEWER MANHOLE

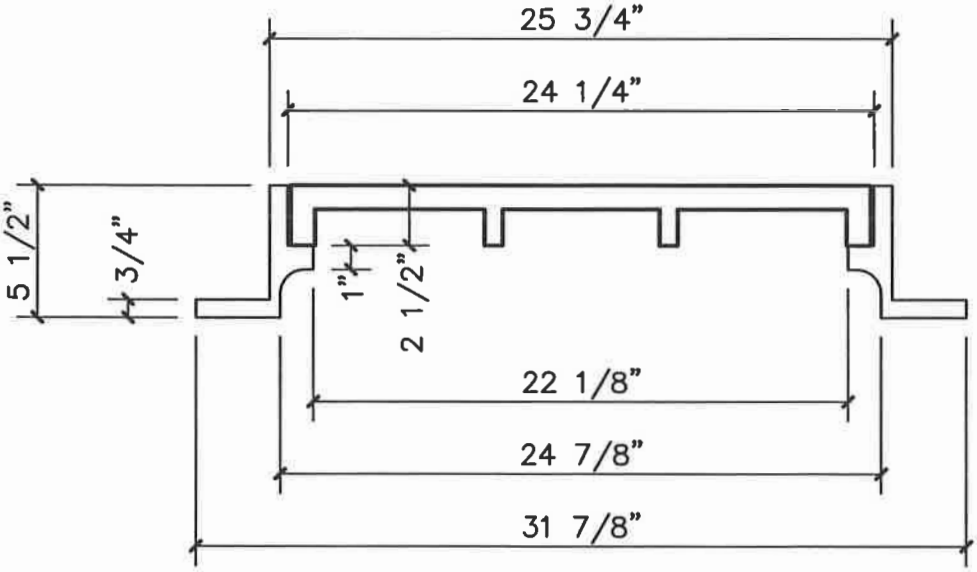
REVISED MAR 2003

SCALE: 1/2" = 1'

SHEET: S–4

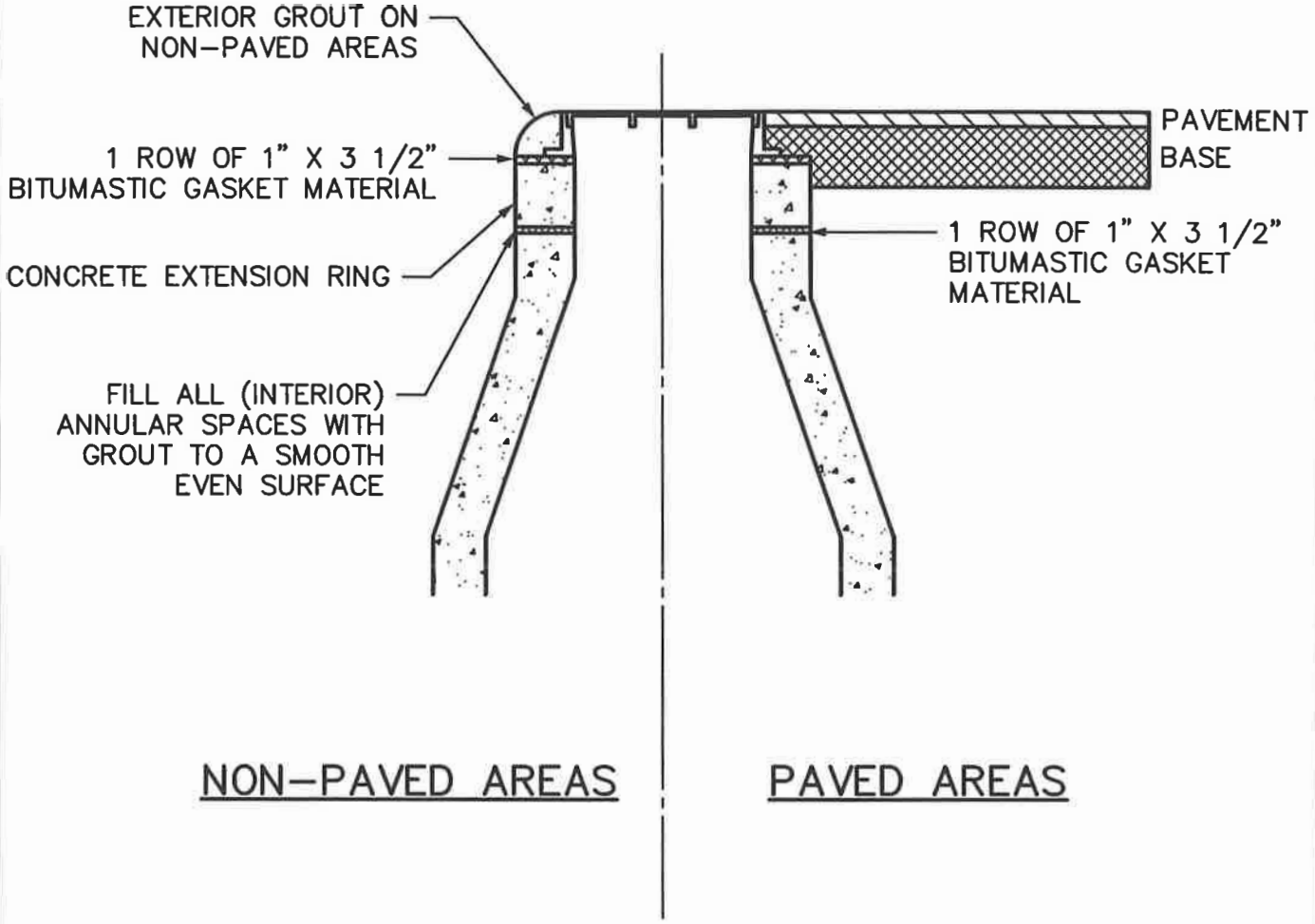


COVER FACE



300 LB. X 24" FRAME AND COVER

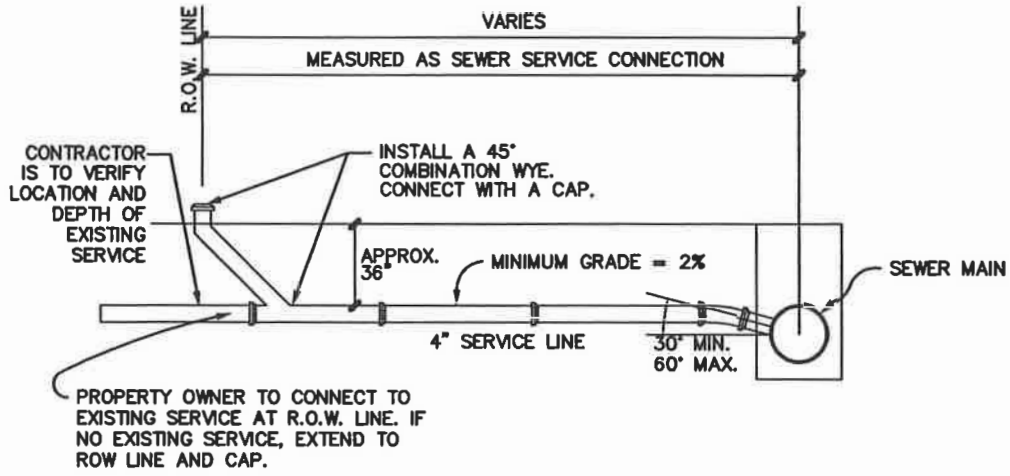
THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS MANHOLE FRAME AND COVER	REVISED MAR 2003 SCALE: 1 1/2" = 1' SHEET: S-5



NOTES:

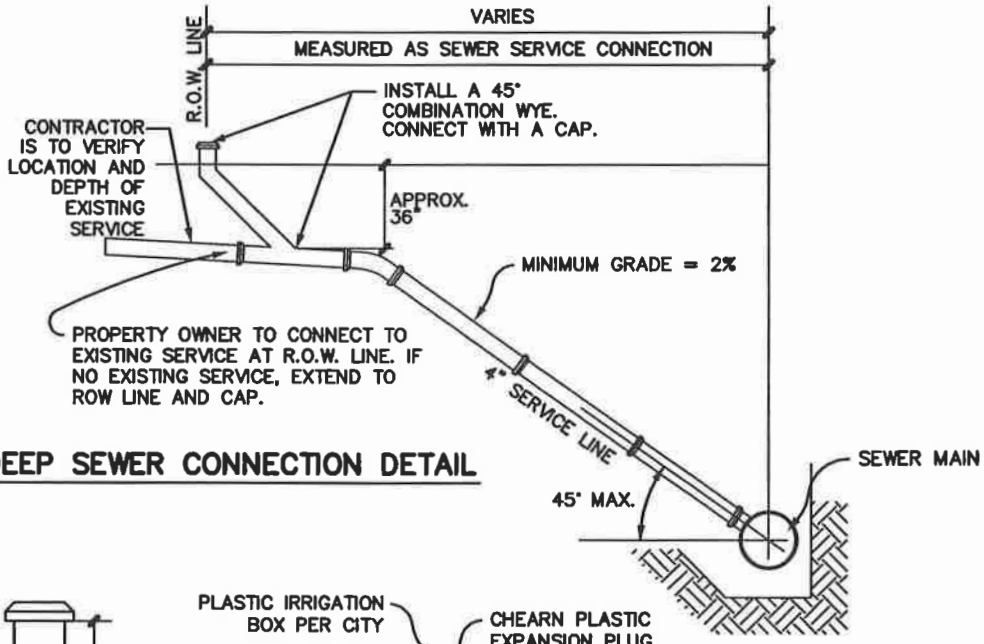
1. NO GAPS WILL BE ALLOWED IN BITUMASTIC GASKET.
2. THERE SHALL BE SMOOTH TRANSITION BETWEEN THE FRAME AND CONE OR GRADE RING, OR THE GRADE RING AND THE CONE.
3. CONCRETE EXTENSION RINGS MAY BE PRECAST OR CAST-IN-PLACE. BRICK EXTENSION RINGS WILL NOT BE ALLOWED.
4. STANDARD EXTENSIONS SHALL BE 2", 3", 4", 6", AND 12". EXTENSIONS SHALL BE SIZED TO MINIMIZE THE NUMBER REQUIRED TO RAISE THE MANHOLE. NO MORE THAN 1-2" EXTENSION WILL BE ALLOWED ON ANY MANHOLE.

THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS **EXTENSION RING INSTALLATION**	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: S-6

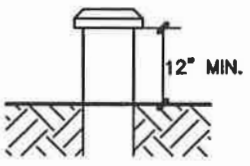


STANDARD SEWER CONNECTION DETAIL

NOTE: EITHER WYE FITTING OR WYE SADDLE MAY BE USED FOR CONNECTION. NO TEES WILL BE ALLOWED. ALL PIPE AND FITTINGS REQUIRED SHALL BE CONSIDERED SUBSIDIARY TO THE ITEM "SEWER SERVICE CONNECTIONS". NO DEDUCTION FROM THE LENGTH OF SEWER MAIN WILL BE MADE FOR THE LENGTH OF WYE, IF INSTALLED. CONNECTIONS TO SEWER MAINS FROM 0' TO 7' DEEP SHALL CONFORM TO THE STANDARD SEWER CONNECTION DETAIL. CONNECTIONS TO SEWER MAINS DEEPER THAN 7' SHALL CONFORM TO THE DEEP SEWER CONNECTION DETAIL. ALL CONNECTIONS SHALL BE COUNTED AS "SEWER SERVICE CONNECTIONS" REGARDLESS OF DEPTH.



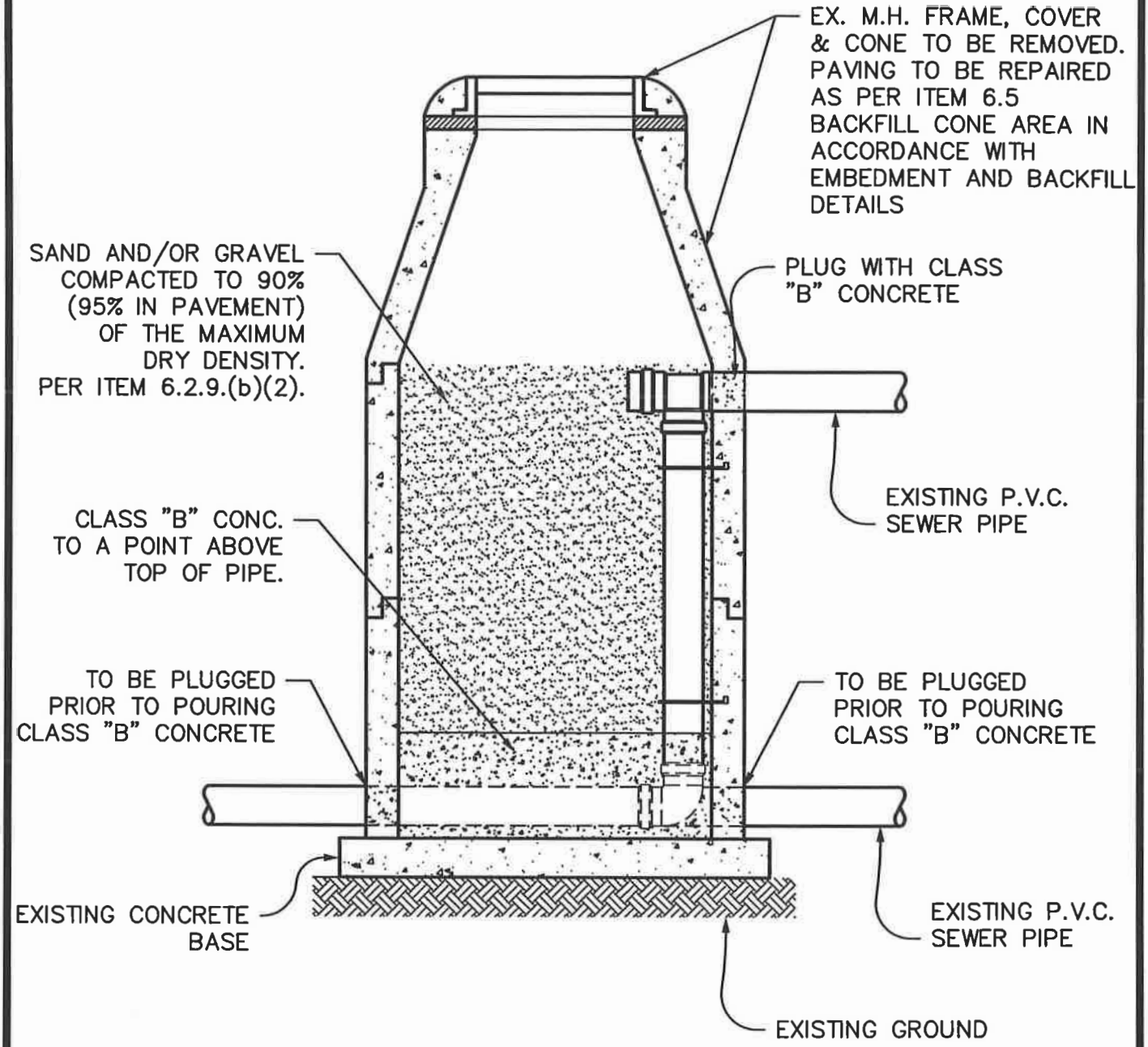
DEEP SEWER CONNECTION DETAIL



SANITARY SEWER SERVICE SECTION VIEW (UNDEVELOPED LOTS)

SANITARY SEWER SERVICE SECTION VIEW (DEVELOPED LOTS)

THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS 4" SANITARY SEWER SERVICE	REVISED MAR 2003 SCALE: N.T.S. SHEET: S-7



THE CITY OF *EVERMAN

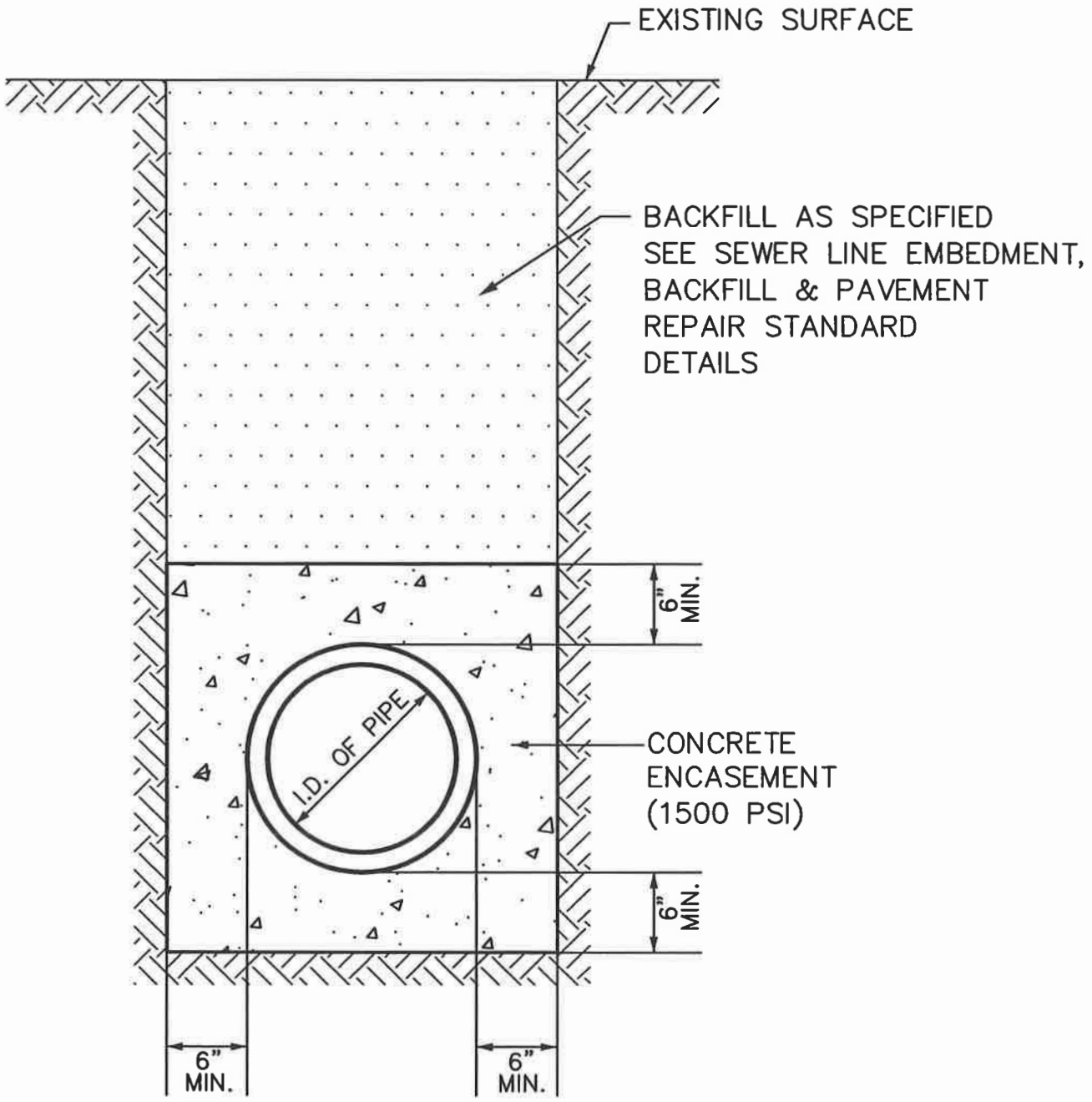
SEWER SYSTEM CONSTRUCTION DETAILS

ABANDON OF EXISTING MANHOLE

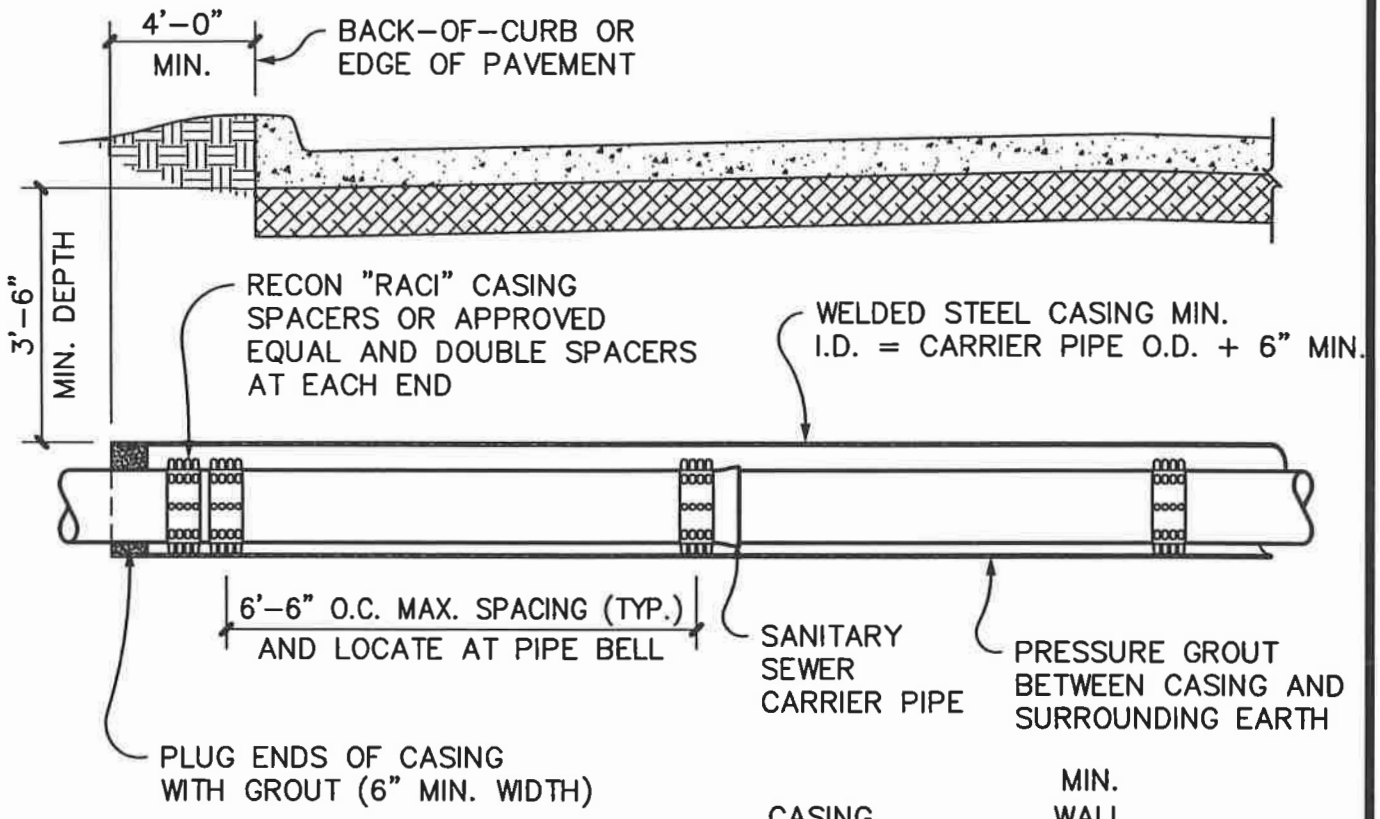
REVISED MAR 2003

SCALE: 1/2" = 1'

SHEET: S-8



THE CITY OF *EVERMAN	SEWER SYSTEM CONSTRUCTION DETAILS	REVISED MAR 2003
		SCALE: N.T.S.
	CONCRETE ENCASEMENT	SHEET: S–9



CASING DIAMETER	MIN. WALL THICKNESS
12" OR LESS	0.25"
OVER 12" – 18"	0.3125"
OVER 18" – 22"	0.375"
OVER 22" – 28"	0.4375"
OVER 28" – 34"	0.5"
OVER 34" – 42"	0.5625"
OVER 42" – 48"	0.625"
OVER 48" – 60"	0.6875"

NOTES:

1. WHERE A BORE PIT EXCEEDS 5 FEET IN DEPTH THE CONTRACTOR SHALL INSTALL SHORING OF THE PIT WALLS AS REQUIRED BY OSHA.
2. WHERE A BORE IS TO BE PARTIALLY OR COMPLETELY ABANDONED, SAID BORE SHALL BE COMPLETELY FILLED WITH HYDRAULICALLY PLACED CEMENT GROUT.
3. CASING SHALL BE EXTENDED TO THE RIGHT-OF-WAY LINE FOR STATE HIGHWAY AND RAILROAD CROSSINGS.
4. THE EDGE OF BORE PIT SHALL BE A MINIMUM OF 4' BEHIND THE BACK OF CURB OR EDGE OF PAVEMENT.
5. STEEL CASING PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35 KSI. OR EDGE OF PAVEMENT.

THE CITY OF *EVERMAN

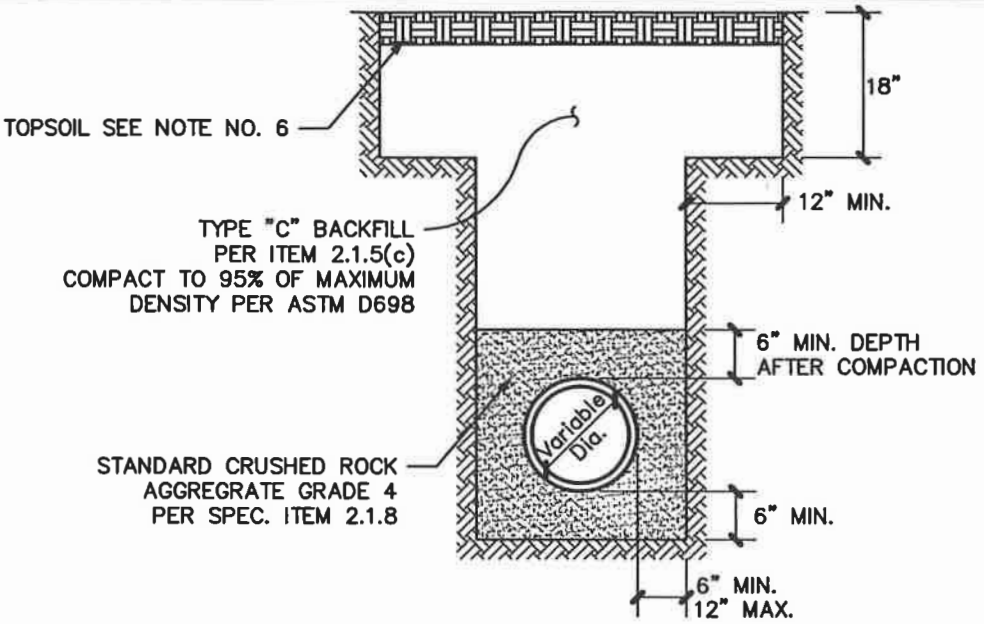
SEWER SYSTEM CONSTRUCTION DETAILS

SANITARY SEWER LINE BORE AND CASING

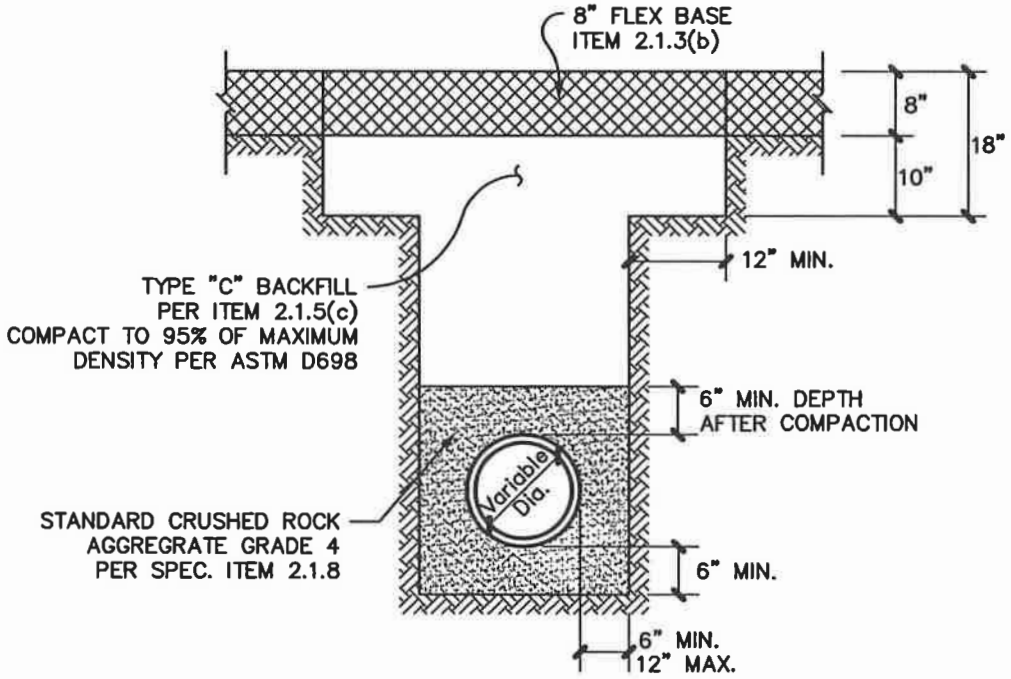
REVISED MAR 2003

SCALE: 3/8" = 1'

SHEET: S-10



UNPAVED AND FUTURE PAVED AREAS

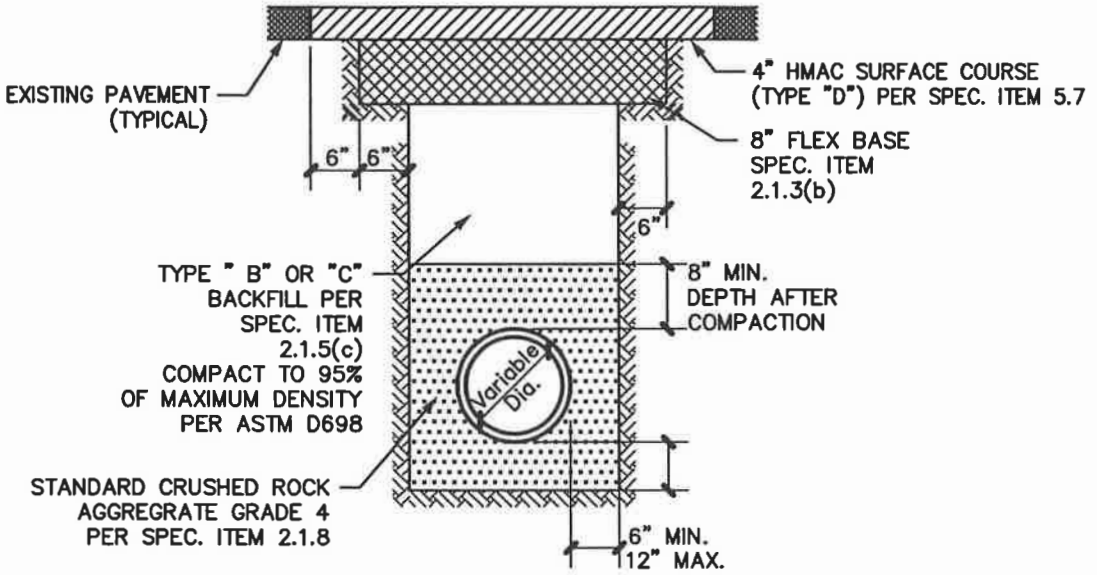


EXISTING FLEXBASE SURFACE

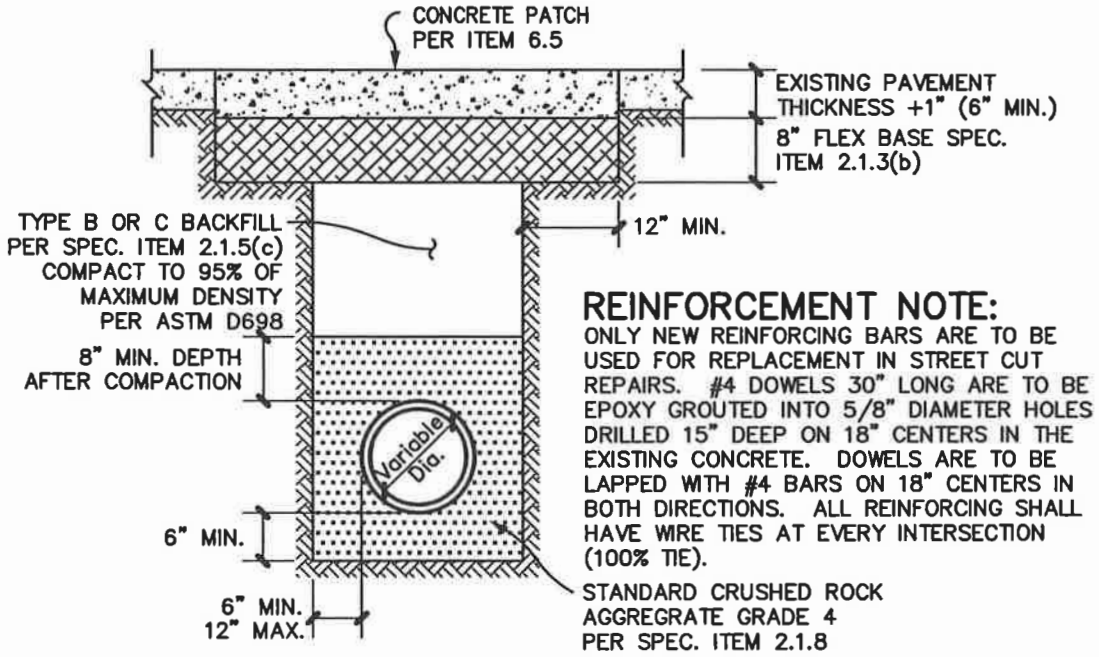
NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TxDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
2. ALL BACKFILL SHALL BE PER SPEC. ITEM 6.2 AND SHALL BE COMPACTED PER SPEC. ITEM 6.2.9 (b). ROCKS GREATER THAN 4" IN DIA. SHALL BE REMOVED FROM ANY NATIVE MATERIAL USED AS BACKFILL.
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC. ITEM 8.8.
4. A MAXIMUM OF 200 FT. OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
5. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.
6. TOPSOIL SHALL BE 4 INCHES IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL	REVISED MAR 2003 SCALE: 1" = 2' SHEET: D-1



EXISTING ASPHALT PAVEMENT



REINFORCEMENT NOTE:

ONLY NEW REINFORCING BARS ARE TO BE USED FOR REPLACEMENT IN STREET CUT REPAIRS. #4 DOWELS 30" LONG ARE TO BE EPOXY GROUTED INTO 5/8" DIAMETER HOLES DRILLED 15" DEEP ON 18" CENTERS IN THE EXISTING CONCRETE. DOWELS ARE TO BE LAPPED WITH #4 BARS ON 18" CENTERS IN BOTH DIRECTIONS. ALL REINFORCING SHALL HAVE WIRE TIES AT EVERY INTERSECTION (100% TIE).

EXISTING CONCRETE PAVEMENT

NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TxDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
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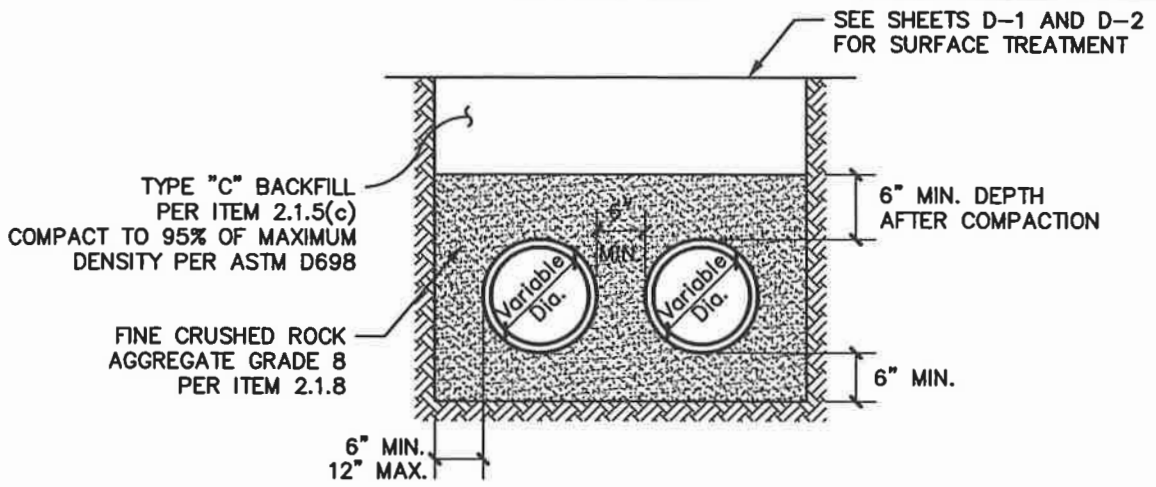
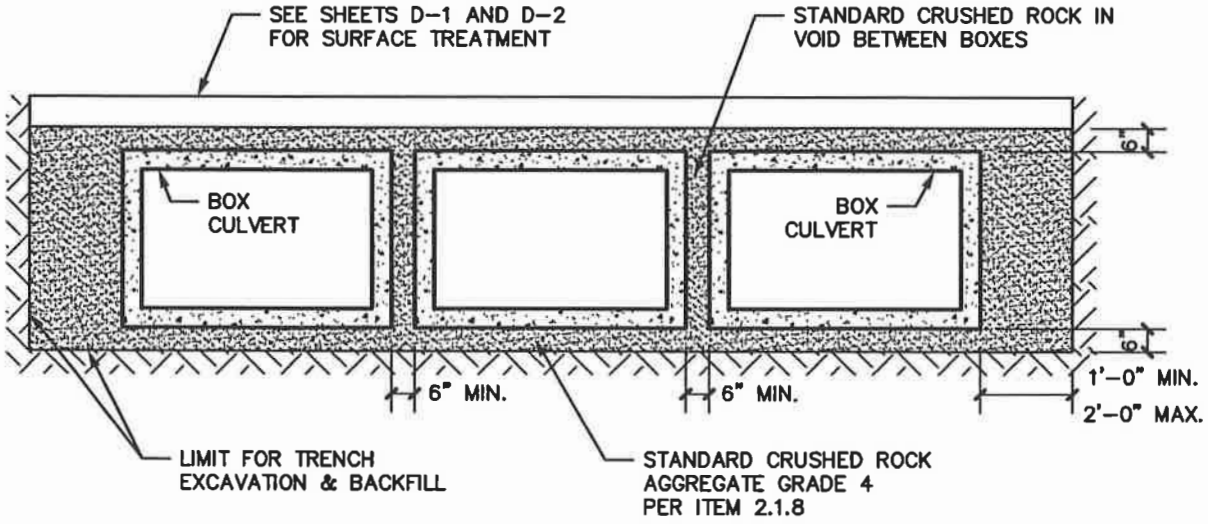
3. ALL PAVEMENT SHALL BE REMOVED ALONG NEAT SAW-CUT LINES PER SPEC. ITEM 8.8.
4. A MAXIMUM OF 200 FT. OF OPEN TRENCH WILL BE ALLOWED AT ANY TIME, UNLESS APPROVED BY THE CITY ENGINEER.
5. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL	REVISED MAR 2003 SCALE: 1" = 2' SHEET: D-2



MULTIPLE PIPE EMBEDMENT



MULTIPLE BOX EMBEDMENT

NOTES:

1. AT THE END OF EACH WORK DAY ALL SPOILS SHALL BE REMOVED FROM THE CITY & TxDOT R.O.W. UNLESS PRIOR WRITTEN PERMISSION IS OBTAINED FROM THE OWNER TO STORE SPOILS IN DESIGNATED SPOIL STORAGE AREAS THAT DO NOT OBSTRUCT AUTOMOBILE OR PEDESTRIAN TRAFFIC.
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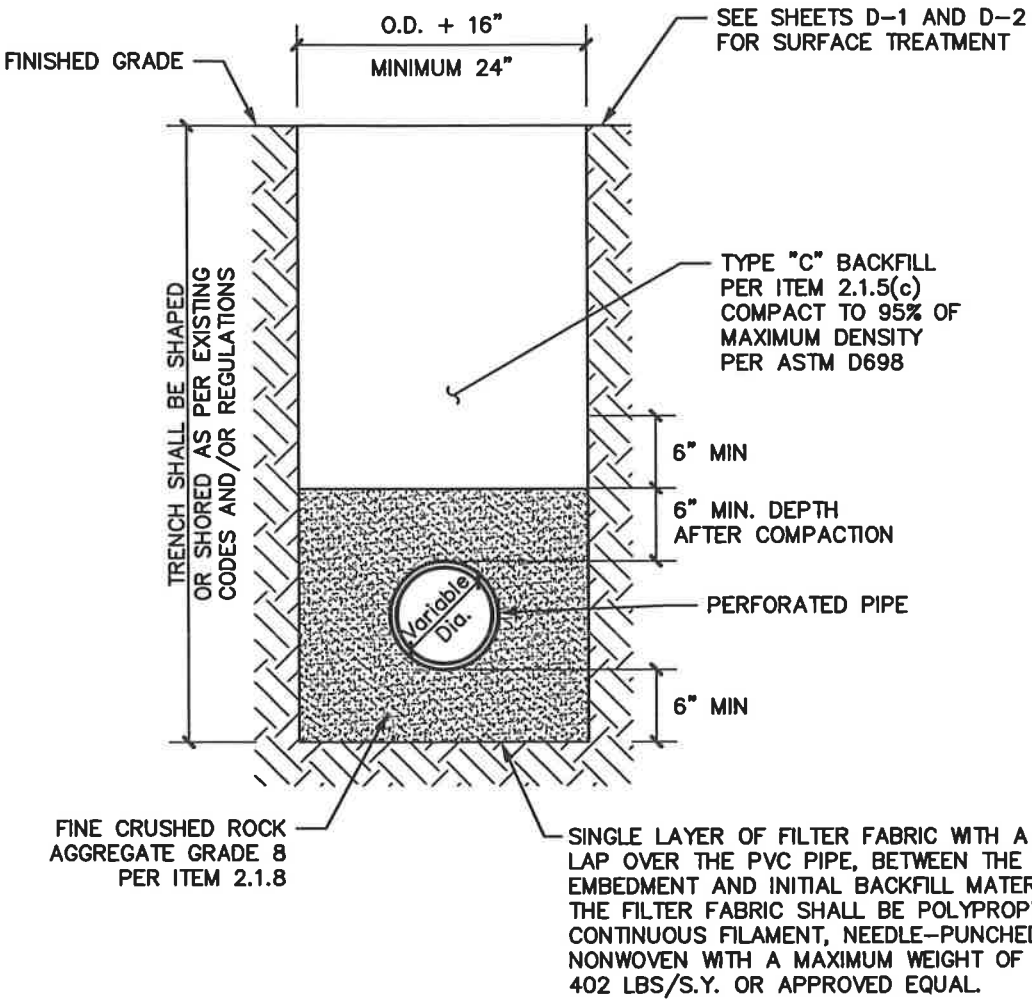
5. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.
6. TOPSOIL SHALL BE 4 INCHES IN DEPTH AND SHALL BE LOOSE AND FREE OF ROCKS OR CLODS GREATER THAN 1/4" IN DIAMETER. ALL TOPSOIL SHALL BE APPROVED BY THE OWNER PRIOR TO INSTALLATION.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER EMBEDMENT & BACKFILL	REVISED MAR 2003 SCALE: 1" = 2' SHEET: D-3



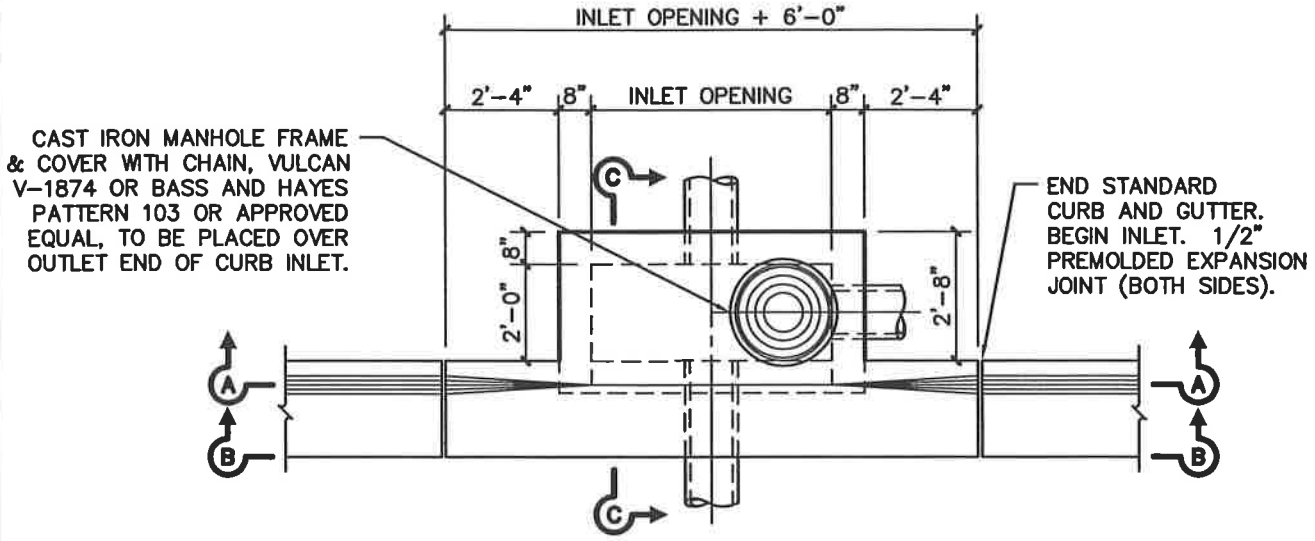
NOTES:

1. WHERE THE CONTRACTOR ENCOUNTERS UNDERGROUND WATER, A SUBSURFACE DRAINAGE SYSTEM SHALL BE INSTALLED, WITH THE DISCHARGE OF SAID SYSTEM BEING CARRIED TO THE NEAREST STORM DRAIN SYSTEM OR NATURAL WATER SHED SYSTEM.
2. THE SUBSURFACE DRAINAGE SYSTEM SHALL BE CONSTRUCTED WITH A MINIMUM SIZE OF SIX (6) INCH DIAMETER TYPE PS-46 PVC PIPE, OR APPROVED EQUAL. THE PIPE SHALL MEET ALL CURRENT ASTM F758 REQUIREMENTS, AND SHALL HAVE GASKET TYPE JOINTS. THE PERFORATED AND CONDUCTING PIPES SHALL BE WHITE IN COLOR.
3. IN SANDY SOILS THE CRUSHED ROCK EMBEDMENT SHALL BE WRAPPED IN A FILTER FABRIC.
4. CLEANOUTS SHALL BE INSTALLED AT THE END OF EACH PIPING SYSTEM.
5. FRENCH DRAINS SHALL BE SHOWN ON ALL RECORD DRAWINGS.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER SUBSURFACE DRAIN	REVISED MAR 2003 SCALE: 3/4" = 1' SHEET: D-4

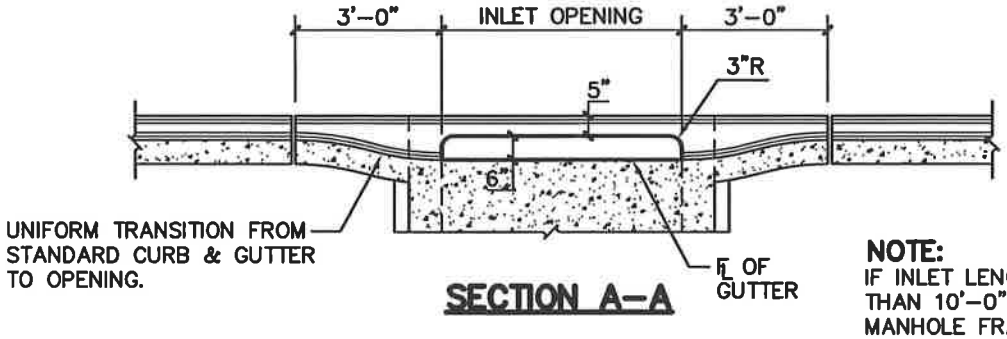
GENERAL NOTES:

1. IN GENERAL, INLET REINFORCING STEEL SHALL BE #4 BARS ON 12" CENTERS BOTH WAYS FOR GUTTER, BOTTOM SLAB ENDS, FRONT AND BACK WALLS, AND #4 BARS ON 6" CENTERS BOTH WAYS FOR TOP SLAB. AN ADDITIONAL #6 BAR SHALL BE PLACED IN THE FRONT EDGE OF THE TOP SLAB IN THE INLETS AND ADDITIONAL REINFORCING STEEL SHALL BE PLACED AROUND MANHOLES AS SHOWN.
2. ALL REINFORCING STEEL SHALL BE GRADE 60.
3. ALL CONCRETE SHALL BE CLASS "A". ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
4. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 2" TO THE CENTERS OF THE BARS.
5. 10'–0" OF EXISTING CURB AND GUTTER UPSTREAM AND 10'–0" OF EXISTING CURB AND GUTTER DOWNSTREAM SHALL BE REMOVED AND REPOURED INTEGRALLY WITH EACH INLET.
6. ALL BACK FILLING SHALL BE IN ACCORDANCE WITH ITEM 6.2.9 TO 95% STANDARD PROCTOR DENSITY.
7. CENTER BEAM IS REQUIRED FOR ALL INLET OPENINGS GREATER THAN 10'–0".
8. TWO MANHOLE FRAMES AND COVERS ARE REQUIRED WHEN INLET OPENING IS GREATER THAN 10'–0".
9. ALL INLET FLOORS ARE TO HAVE A 2% SLOPE TOWARDS THE OUTLET PIPE.
10. MINIMUM INLET OPENING SIZE IS 5'–0".
11. MAXIMUM INLET OPENING SIZE IS 20'–0".
12. OUTLET PIPE TO BE PLACED AT LOWEST END OF FLOOR INLET. MANHOLE COVER TO BE PLACED ABOVE OUTLET END OF INLET.
13. MANHOLE FRAME AND COVER SHALL BE CAST IRON, VULCAN V–1874 OR BASS AND HAYES PATTERN 103 OR APPROVED EQUAL.
14. MANHOLE COVERS SHALL HAVE CHAINS ATTACHED TO PREVENT COVERS FROM BEING WASHED AWAY DURING FLOOD CONDITIONS.



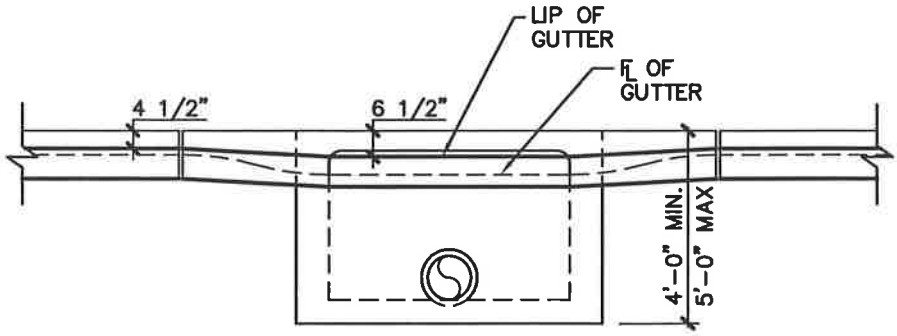
SEE SHEET D-8 FOR SECTION C-C

PLAN VIEW



SECTION A-A

NOTE:
IF INLET LENGTH IS GREATER THAN 10'-0", PLACE TWO (2) MANHOLE FRAMES AND COVERS ON TOP OF INLET BOX.



SECTION B-B

THE CITY OF EVERMAN

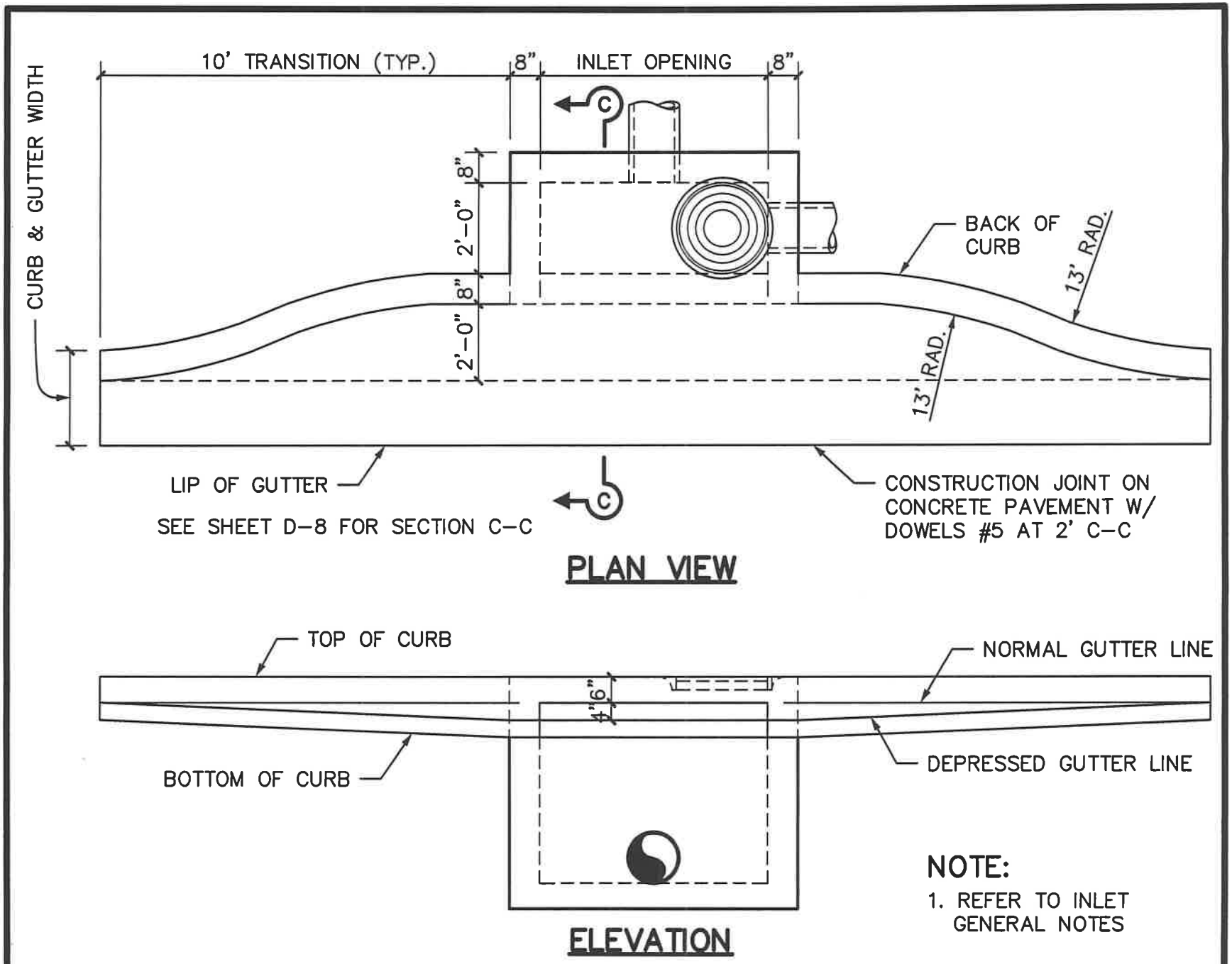
DRAINAGE SYSTEM CONSTRUCTION DETAILS

STORM SEWER CURB INLET

REVISED MAR 2003

SCALE: 1/4" = 1'

SHEET: D-6



"EVERMAN" THE CITY OF

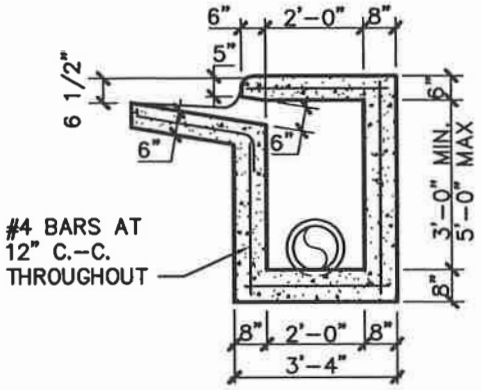
DRAINAGE SYSTEM CONSTRUCTION DETAILS

STORM SEWER RECESSED CURB INLET

REVISED MAR 2003

SCALE: N.T.S.

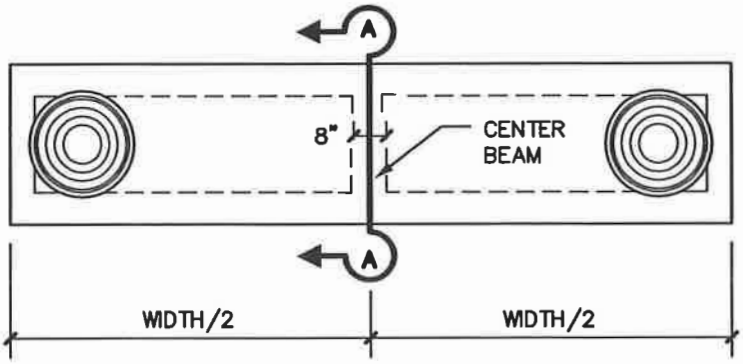
SHEET: D-7



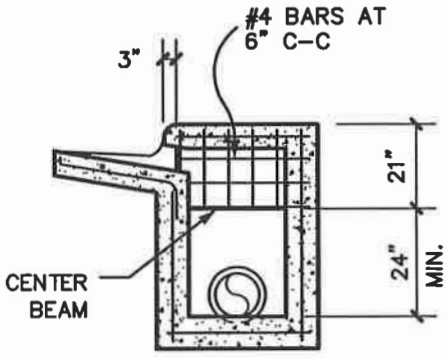
SECTION C-C

NOTE

SEE SHEET D-5 FOR GENERAL INLET INFORMATION



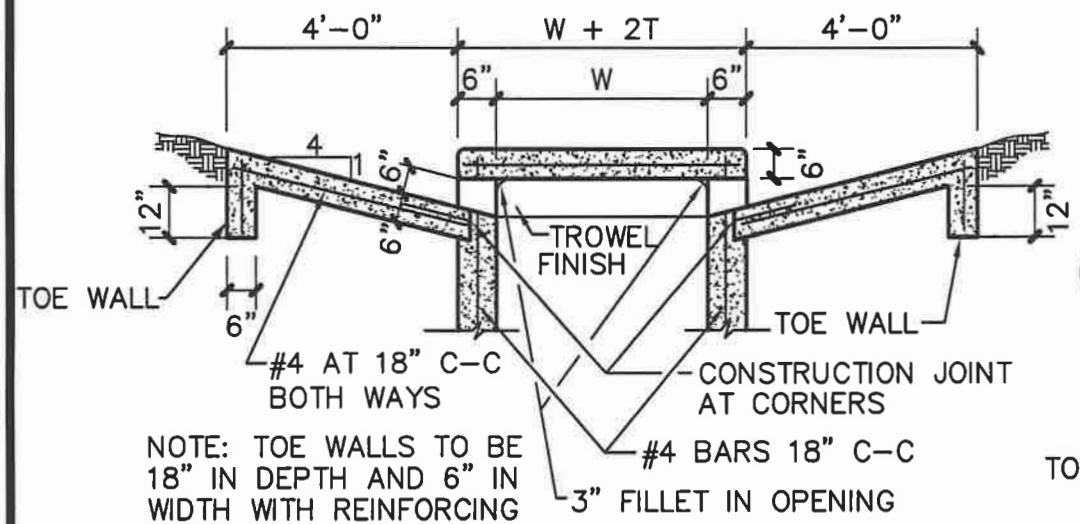
PLAN VIEW



SECTION A-A

CENTER BEAM DETAIL

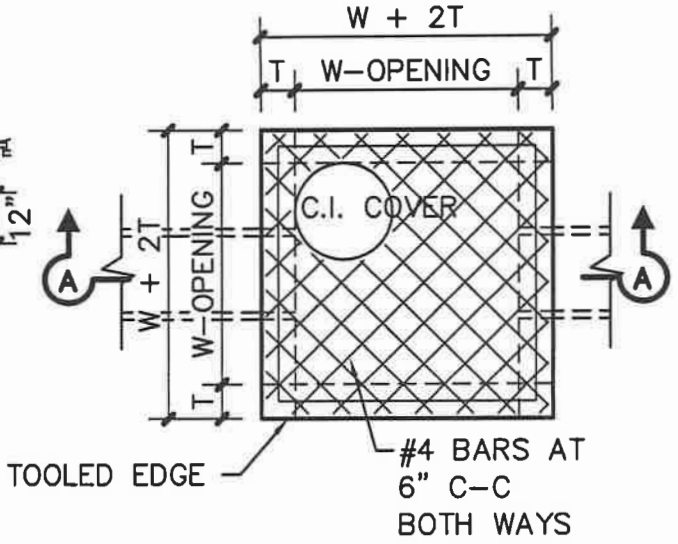
THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS STORM SEWER CURB INLET	REVISED MAR 2003 SCALE: 1/4" = 1' SHEET: D-8



NOTE: TOE WALLS TO BE 18" IN DEPTH AND 6" IN WIDTH WITH REINFORCING BARS.

SECTION A-A

N.T.S.



PLAN VIEW

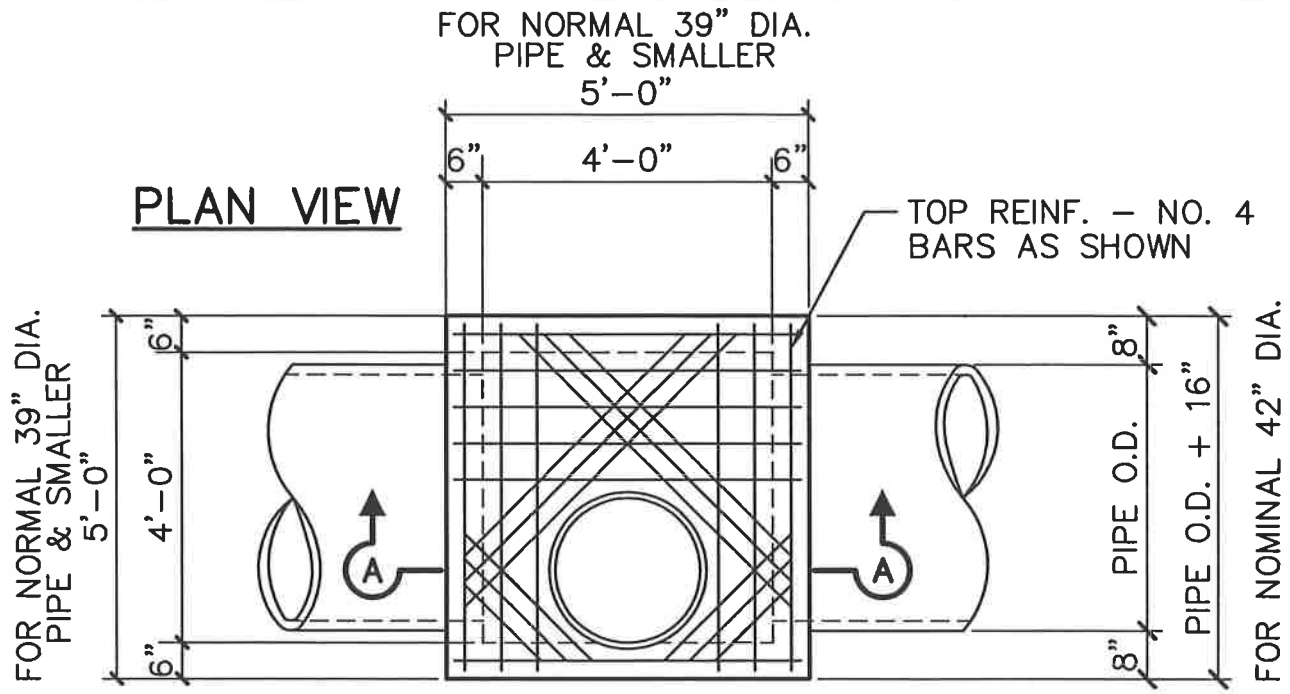
N.T.S.

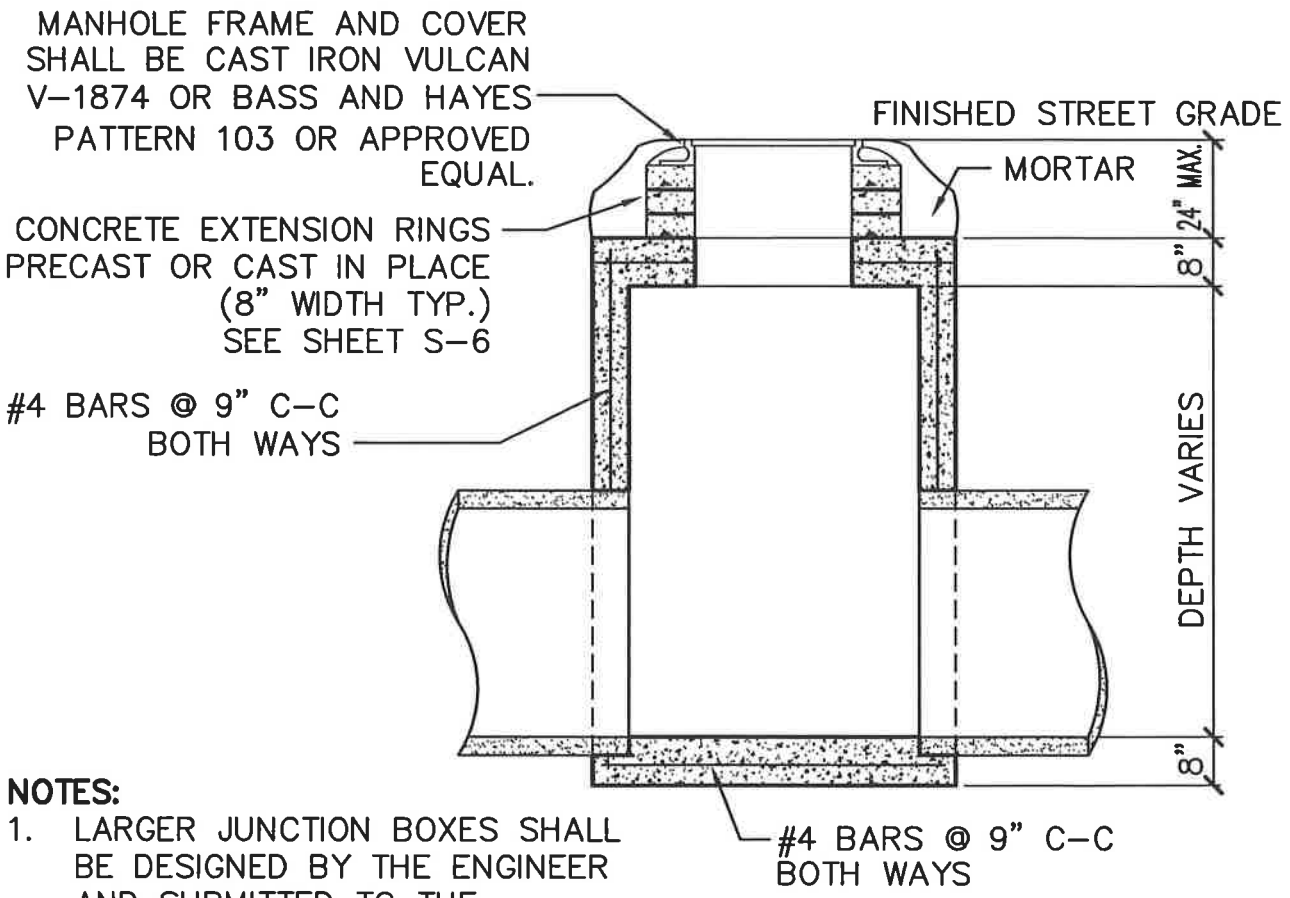
NOTES:

1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES.
2. LAYERS OF REINFORCED STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. EXCAVATION FOR DROP INLET TO BE INCLUDED IN THE PRICE BID FOR DROP INLET.
4. FOR DETAILS OF REINFORCING TO LOWER PORTIONS OF INLET SEE APPROPRIATE SQUARE STORM DRAIN MANHOLE DETAILS.
5. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
6. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS SHOWN ON PLANS.
7. DECK MAY BE REINFORCED SAME AS STANDARD SQUARE STORM DRAIN MANHOLE.
8. CAST IRON FRAME AND COVER WITH CHAIN. VULCAN V-1874 OR BASS AND HAYES PATTERN NO. 103, OR APPROVED EQUAL.

INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"
7' SQUARE	9"	7'-0"
8' SQUARE	9"	8'-0"

FOR LOWER PORTION OF 2' SQUARE DROP INLET USE REINF. STEEL DETAILS OF 4' SQUARE MANHOLE AND ELIMINATE INLET RING AND COVER.



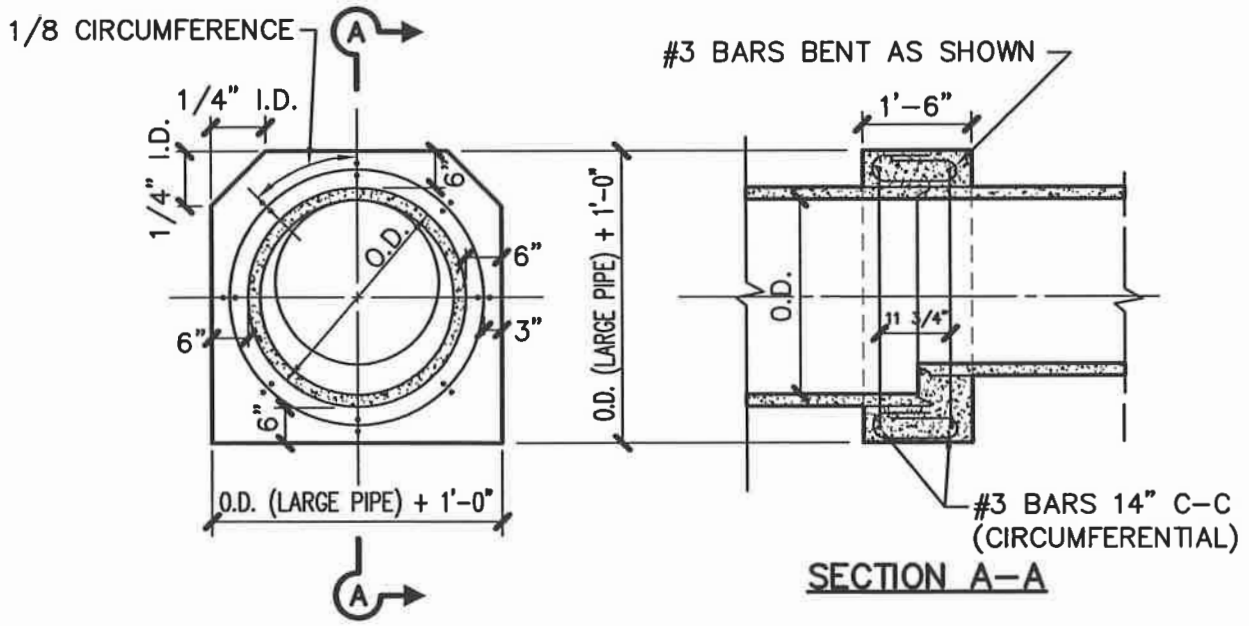


NOTES:

1. LARGER JUNCTION BOXES SHALL BE DESIGNED BY THE ENGINEER AND SUBMITTED TO THE CITY ENGINEER FOR REVIEW.

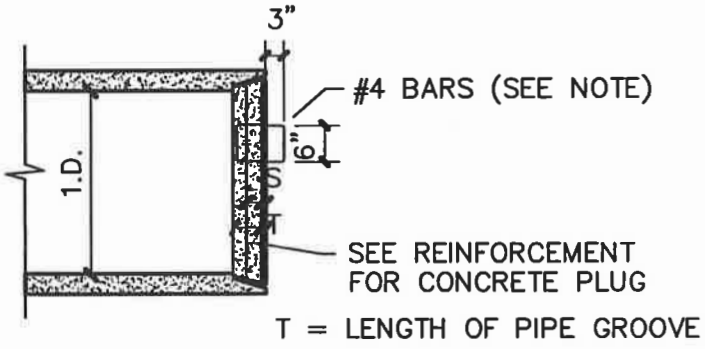
SECTION A-A

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS **STORM SEWER MANHOLE**	REVISED MAR 2003 SCALE: 3/8" = 1' SHEET: **D-10**



REINFORCED CONCRETE COLLAR

NOTE:
COLLARS MAY ONLY BE USED TO REDUCE THE DIAMETER ONE PIPE SIZE.
A JUNCTION BOX IS REQUIRED FOR REDUCING MORE THAN ONE PIPE SIZE.



REINFORCED CONCRETE PIPE PLUG

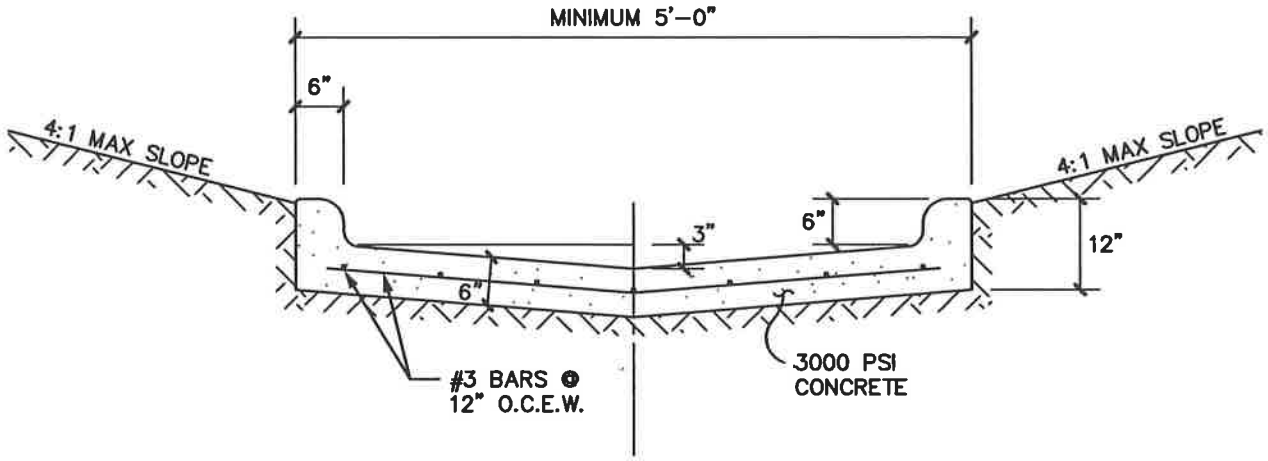
PIPE SIZE	REINF. BAR	DISTANCE C-C BOTH WAYS	S
18"-33"	# 2	12"	1/2 T
36"-54"	# 3	12"	1/3 T
60"	# 4	12"	1/4 T

NOTE:
STEEL HANDLE FOR REINFORCED CONCRETE PIPE PLUG SHALL BE LOCATED 1/4 I.D. ABOVE CENTER POINT OF PLUG. TWO (2) STEEL HANDLES WILL BE REQUIRED ON PLUGS OF 36" DIA. PIPES OR LARGER AND SHALL BE PLACED 1/4 I.D. APART AND 1/4 I.D ABOVE CENTER OF PLUG.

THE CITY OF *EVERMAN

DRAINAGE SYSTEM CONSTRUCTION DETAILS
STORM SEWER REINFORCED CONCRETE COLLAR

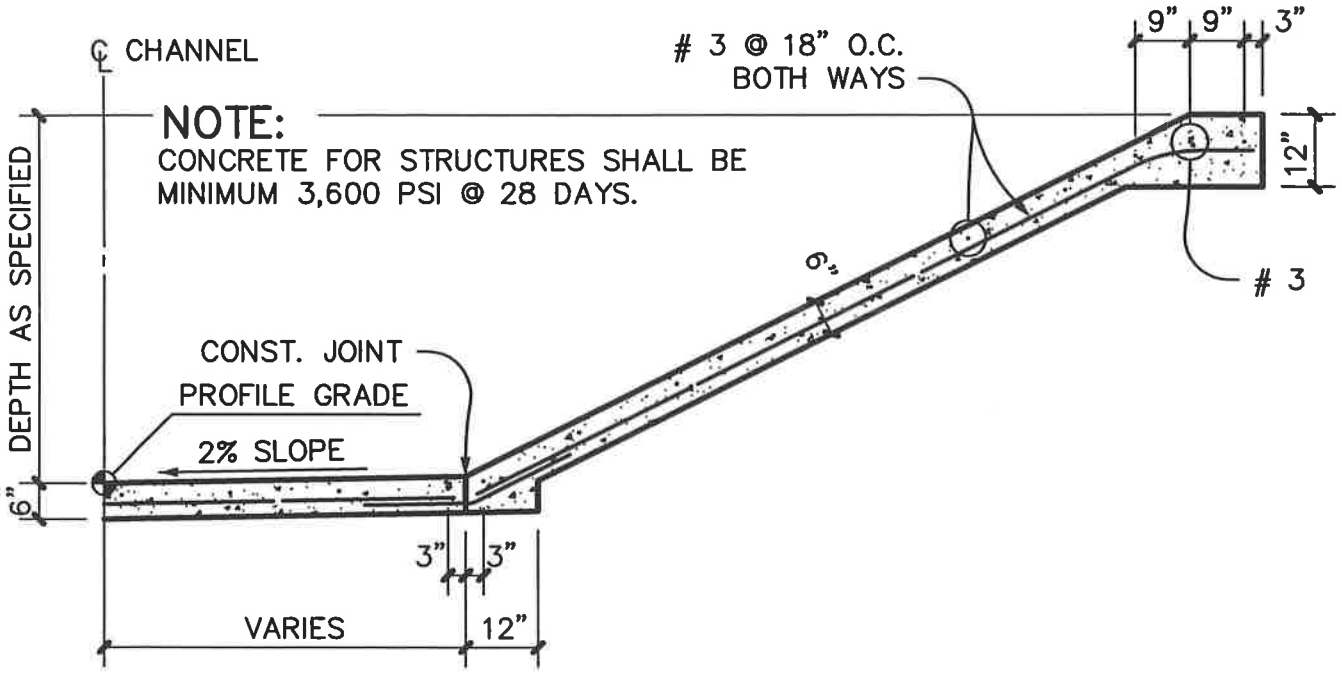
REVISED MAR 2003
SCALE: 3/8" = 1'
SHEET: D-11



NOTES:

1. IF FLUME IS 7' OR WIDER, USE PIPE BOLLARDS
   7' x 6" DIA., AND FILL WITH CONCRETE
   PLACE AT BOTH START AND END OF FLUME
   BURY TO 4' DEPTH
2. SIDE SLOPES TO BE HYDROMULCHED.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS **STORM SEWER CURBED FLUME AND PILOT CHANNELS**	REVISED MAR 2003 SCALE: 1/2" = 1' SHEET: D-12



NOTE:

RIPRAP TO BE FORMED ON UNDISTURBED SOIL CUT TO GRADE. IF TO BE PLACED ON FILL, ALL FILL SHALL BE PLACED ON BENCHES CUT IN UNDISTURBED SOIL AND FILLED IN 8" LOOSE LIFTS, EACH COMPACTED TO 95% STANDARD PROCTOR DENSITY. THE FILL SO COMPACTED SHALL THEN BE CUT TO GRADE.

THE CITY OF *EVERMAN

DRAINAGE SYSTEM CONSTRUCTION DETAILS

STORM SEWER CONCRETE RIPRAP

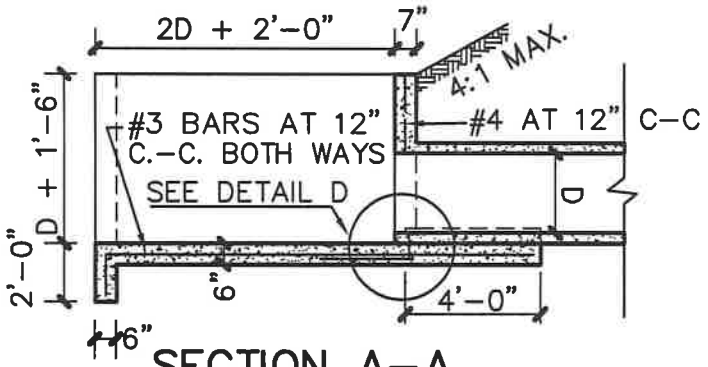
REVISED MAR 2003
SCALE: 3/8" = 1'
SHEET: D–13

EVERMAN
THE CITY OF

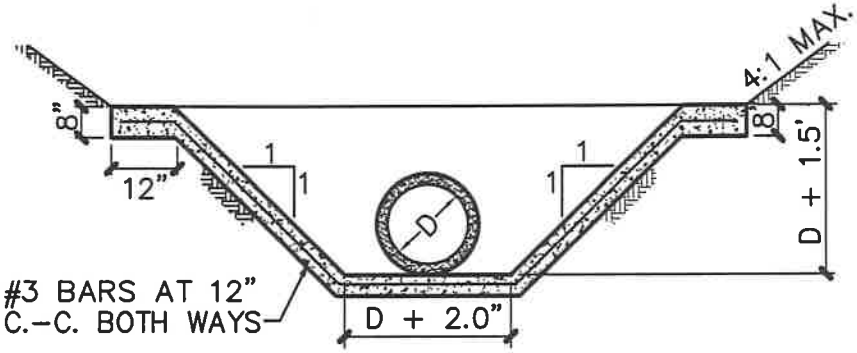
DRAINAGE SYSTEM CONSTRUCTION DETAILS

STORM SEWER SLOPING HEADWALL

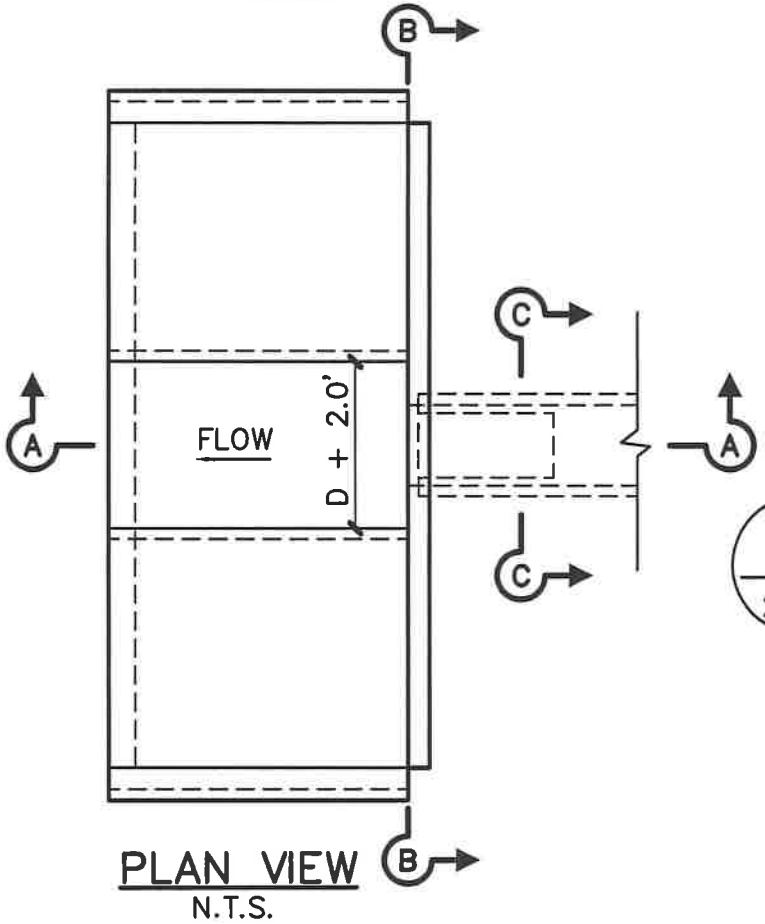
REVISED MAR 2003
SCALE: N.T.S.
SHEET: D-14



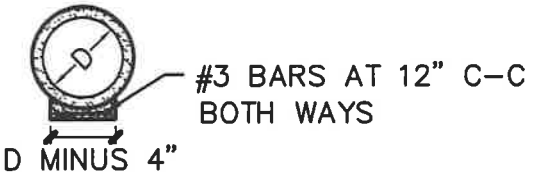
SECTION A–A
N.T.S.



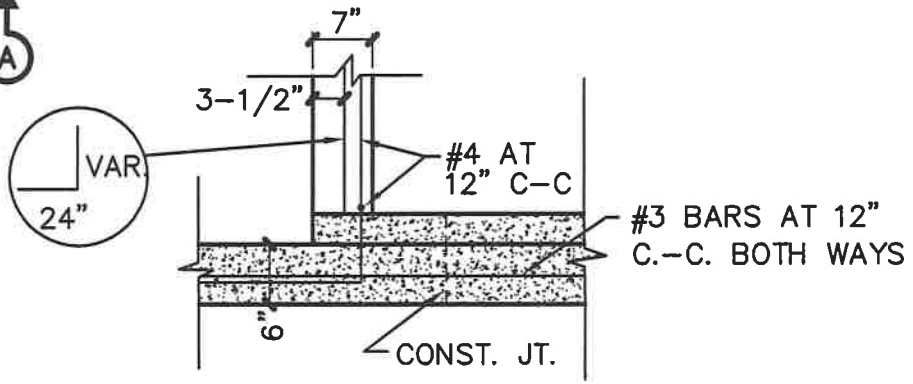
SECTION B–B
N.T.S.



PLAN VIEW
N.T.S.



SECTION C–C
N.T.S.



DETAIL D
N.T.S.

EVERMAN

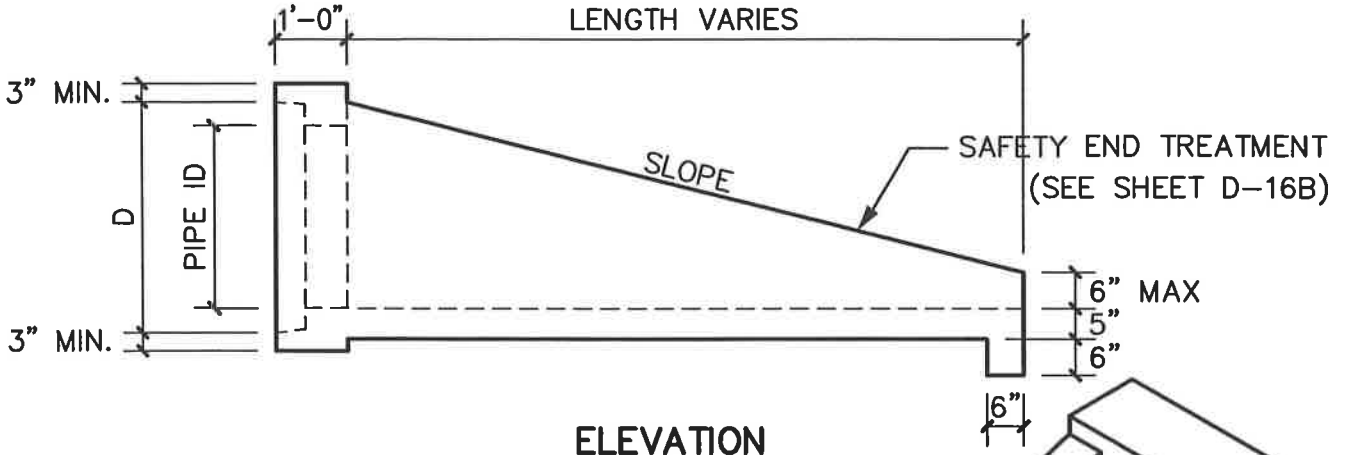
DRAINAGE SYSTEM CONSTRUCTION DETAILS

STORM SEWER VERTICAL HEADWALL

REVISED MAR 2003

SCALE: N.T.S.

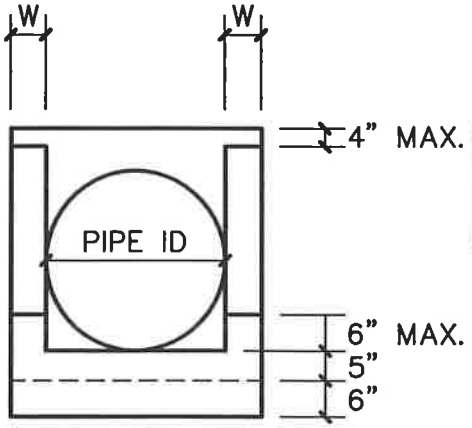
SHEET: **D–15**



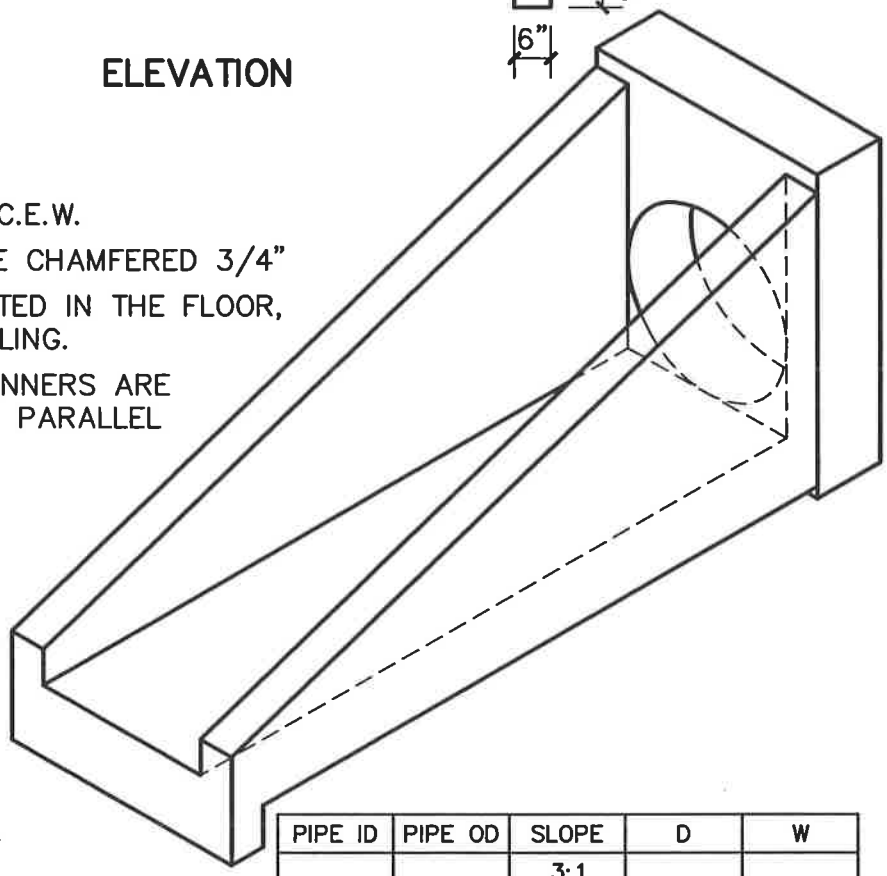
ELEVATION

NOTES:

1. 4500 PSI CONCRETE
2. #4 GRADE 60 REBAR 9" O.C.E.W.
3. ALL EXPOSED CORNERS ARE CHAMFERED 3/4"
4. SWIFT LIFT ANCHORS, LOCATED IN THE FLOOR, SHALL BE USED FOR HANDLING.
5. GALVANIZED STEEL PIPE RUNNERS ARE AVAILABLE FOR CROSS AND PARALLEL DRAINAGE APPLICATIONS.



FRONT ELEVATION



PIPE ID	PIPE OD	SLOPE	D	W
18"	23"	3:1	24"	5"
		4:1		
		6:1		
24"	30"	3:1	31"	5"
		4:1		
		6:1		

PIPE ID	PIPE OD	SLOPE	D	W
30"	37"	3:1	38"	6"
		4:1		
		6:1		
36"	44"	3:1	45-1/2"	6"
		4:1		
		6:1		
42"	51"	3:1	52-3/4"	8"
		4:1		
		6:1		
48"	58"	3:1	60"	8"
		4:1		
54"	65"	3:1	67"	8"

THE CITY OF EVERMAN

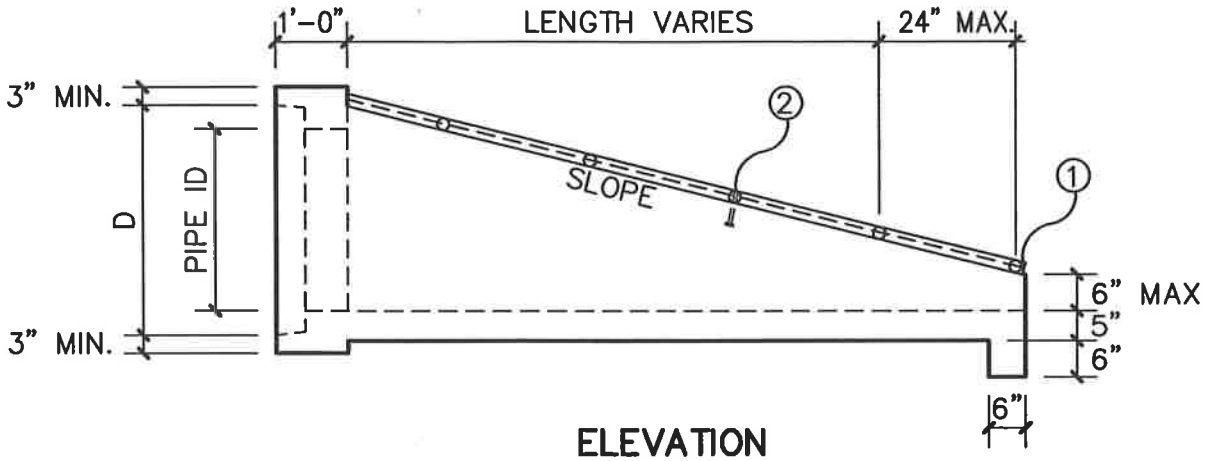
DRAINAGE SYSTEM CONSTRUCTION DETAILS

CULVERT SAFETY END TREATMENTS

REVISED MAR 2003

SCALE: 3/8" = 1'

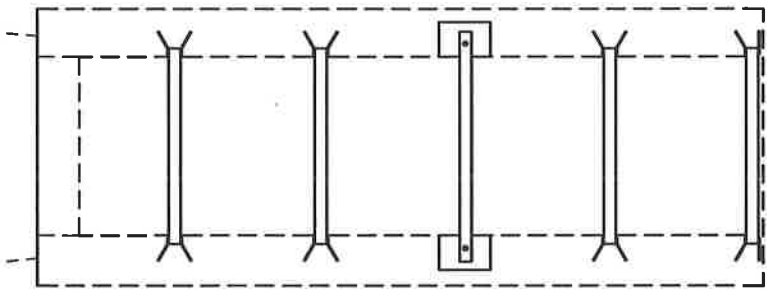
SHEET: D-16A



ELEVATION

① TOP OF SAFETY PIPE RUNNER (TYP)

② THIRD PIPE RUNNER SHALL ALWAYS HAVE BOLTED CONNECTION FOR CLEAN OUT ACCESS



PLAN

NOTES:

1. SAFETY END PIPE SHALL BE 2" DIAMETER.
2. PIPE AND BOLTS SHALL BE GALVANIZED STEEL.

THE CITY OF *EVERMAN	DRAINAGE SYSTEM CONSTRUCTION DETAILS SAFETY END TREATMENT RUNNERS	REVISED MAR 2003 SCALE: 3/8" = 1' SHEET: D-16B