APPENDIX A

WATER DISTRIBUTION SYSTEM CONSTRUCTION STANDARDS

Section 1: General

A. These Standards supersede all previous issues, and shall be effective for all plans and specifications approved after December 1, 2002.

B. The Standards and Requirements found in this Article are for materials and construction of water mains constructed in and for the Town of St. John, Indiana. Specification references contained herein refer to the following:

1. AWWA – American Water Works Association
2. ANSI – American National Standards Institute
3. INDOT – Indiana Department of Transportation
4. IDEM – Indiana Department of Environmental Management
5. ISBH – Indiana State Board of Health
6. IDNR – Indiana Department of Natural Resources
7. LCHD – Lake County Health Department
8. LCDOT – Lake County Department of Transportation
9. LCDB – Lake County Drainage Board

C. The water system shall be located in the East or North parkway of the street/right of way, unless otherwise authorized in writing by the Director of Public Works.

D. A permit from the Office of the Director of Public Works shall be obtained for all additions and/or connections to the existing water main system of the Town of St. John. Plans and Specifications for the work, detailing the proposed additions/connections shall be presented for review, approval, and issuance of permit PRIOR to the start of construction of the proposed addition/connection. Plans shall be completed by Registered Professional Engineer or Land Surveyor, licensed in the State of Indiana.

E. Notice shall be given to the Director of Public Works not less than 48 hours in advance of the start of actual construction. The Owner/Developer shall insure that access to the work is provided at all times to Public Works personnel for the inspection of the work.

F. All additions/connections to the existing water main system of the Town of St. John, Indiana, shall be designed in accordance with these standards, and in accordance with the Town of St. John Subdivision Control Ordinance as amended from time to time.

Section 1.1 – Construction Standards:

It is the intent of these standards to define allowable types of pipe, fittings, and accessory items normally used in water distribution systems in general, and in particular those methods, procedures and items allowed in the Town of St. John.

Section 1.2 – Other Permits Required:

All other Permits/Approvals required by other regulatory agencies of the State and/or County must be separately applied for and obtained by the Owner or his/her agent. Copies of all other approvals shall be provided to the Public Works Director.

Section 1.3 – Shop Drawings:

Prior to starting construction of any project two (2) sets of Shop Drawings shall be submitted to the Public Works Department for review and approval. Shop Drawings shall be provided for any materials of any kind not specifically described herein.

Section 2: Pipe

Section 2-1 Water Main Pipe:

A. Ductile Iron Pipe (DIP):

1. Ductile Iron Pipe meeting requirements of AWWA C-151 shall be used in the in the following pipe classes:

   (a) For 12" nominal diameter and less use Pressure Class 350,

   (b) For greater than 12" nominal diameter use Pressure Class 250.

2. Unrestrained Pipe shall utilize either the "Tyton" joint or the "Fastite" joint with gasket.

3. Restrained Joint Pipe shall utilize Boltless Restraint, as manufactured by either US Pipe and Foundry Co., "TR Flex"; Clow Water Systems Co., "Super Lock"; or American Cast Iron Pipe Co., "Flex Ring". (NOTE: Restraint using either Mechanical Joint Pipe with a "Mega Lug" Restraining Gland and Type 316 Stainless Steel Bolts or "Field Lock Gaskets."

4. If Ductile Iron Pipe is proposed for use, it shall be installed with the following:

   (a) Polyethylene encasement meeting all requirements of AWWA C-105.

   (b) Serrated Silicon Bronze wedges shall be used at each joint to provide electrical continuity.

B. PolyVinyl Chloride Pipe (PVC):

1. PVC pipe for water main shall be allowed for pipe sizes equal to or less than 12" nominal diameter, and shall meet requirements of AWWA C-900, Pressure Class 150, DR 18. Joints shall be push on.

2. Restraint of PVC pipe shall be provided using Series 1500 Bell Retainers with Type 316 Stainless Steel Bolts, as manufactured by the Ebba Iron Sales Co.

3. Restraint of PVC Pipe may be accomplished using Certa-Lok Pipe.

C. High Density Polyethylene Pipe (HDPE):

1. HDPE pipe for water main shall be allowed for sizes equal to or less than 16" nominal diameter, and shall meet requirements of AWWA C-906, Ductile Iron Pipe Size outside diameter, Pressure Class 160, DR 11.

2. Long runs of HDPE pipe (longer than 40 linear feet) shall be joined by heat fusion. Such fusion shall be performed by personnel certified by the manufacturer of the fusion equipment. Fusion recommendations published by the pipe manufacturer shall be utilized. Both the personnel certification and the pipe manufacturer fusion recommendations shall be maintained at the job site at all times while the work is in progress.

3. Short runs of HDPE pipe shall be joined by heat fusion, as described above; or use of mechanical joint fittings in accordance with specification requirements stated above.

4. If HDPE pipe is used, the actual pipe size used compared to the nominal size required shall be in accordance with the following (Basis of conversion is the internal diameter of the various pipe):

Nominal Size Required (DIP or PVC)	Size Required (HDPE)
6"	8"
8"	10"
10"	12"
12"	16"
16"	20"
18"	24"
20"	24"
24"	30"

Section 2-2 Fittings:

A. Ductile Iron Pipe (DIP):

1. Fittings for use with DIP shall be Mechanical Joint Fittings meeting requirements of AWWA C-153 and C-111.

2. All nuts and bolts used in the joint shall be made of Type 316 Stainless Steel.

3. The glands shall be the Wedge Action Mega Lug gland for use on DIP as manufactured by Ebba Iron Sales Co.

4. The fitting(s) shall be encased in polyethylene encasement materials meeting the requirements of AWWA C-105, encasement to extend beyond the fitting not less than three (3') feet in all directions from the fitting(s).

B. PolyVinyl Chloride Pipe (PVC):

1. Fittings for use with PVC shall be Mechanical Joint Fittings meeting requirements of AWWA C-153 and C-111.

2. All nuts and bolts used in the joint shall be made of Type 316 Stainless Steel.

3. The glands shall be the Wedge Action Mega Lug gland for use on PVC pipe as manufactured by Ebba Iron Sales Co.

4. The fitting(s) shall be encased in polyethylene encasement materials meeting the requirements of AWWA C-105, encasement to extend beyond the fitting not less than three (3') feet in all directions from the fitting(s).

C. High Density Polyethylene Pipe (HDPE):

1. Fittings for use with HDPE shall be Mechanical Joint Fittings meeting requirements of AWWA C-153 and C-111. All fittings, valves, and specials shall be sized to fit the actual o.d. of the HDPE Pipe installed.

2. All nuts and bolts used in the joint shall be made of Type 316 Stainless Steel.

3. The glands shall be the Wedge Action Mega Lug gland for use on PVC pipe as manufactured by Ebba Iron Sales Co.

4. The fitting(s) shall be encased in polyethylene encasement materials meeting the requirements of AWWA C-105, encasement to extend beyond the fitting not less than three (3') feet in all directions from the fitting(s).

5. On HDPE pipe of twelve (12") inch or smaller diameters, a Type 316 Stainless Steel insert stiffener shall be used at every gland location.

Section 2.4 Water Main Sizing:

A. Water Main sizes shall conform to the Water Distribution System Construction Standards. A meeting shall be scheduled with the Public Works Director at the inception of the project to establish the proper sizes for the proposed water mains.

B. The minimum required size water main in the Town of St. John shall be eight (8") inch.

C. Dead End runs will not be permitted. Temporary dead ends will be acceptable, to accommodate project phasing. When permitted Temporary Dead Ends shall be provided with temporary hydrant assemblies for flushing purposes. An automatic flushing device shall be included which drains to a sanitary sewer.

D. Water mains designed for multi-family developments, commercial developments, or industrial developments shall be sized based upon analysis of expected water use and fire protection needs. The developer shall present the sizing computations and analyses to the Public Works Director for review and final sizing determination in the design phase of the project. After review of the data submitted, the sizing determination of the Public Works Director will be final in all cases.

E. Water Mains shall be sized using a "required" diameter. Actual constructed diameter is dependent upon the type of pipe used, and shall be based upon the internal diameter and flow characteristics of the various types of pipe used. The conversion between the required pipe size and nominal diameters for the differing pipe types shall be as follows:

Required Diameter	Ductile Iron Pipe	PVC, C-900, Cl 150	HDPE, DR 11, Cl 160
6"	6"	6"	8"
8"	8"	8"	10"
10"	10"	10"	12"
12"	12"	12"	16"
16"	16"	----	18"
18"	18"	----	24"
20"	20"	----	24"
24"	24"	----	30"

Section 3: Protection of Water Mains:

The following text taken from Recommended Standards for Water Works (10 States Standards) shall govern water main proximity to potential hazards. The reviewing authority for the Town and Waterworks Board shall be the Public Works Director:

Section 3.1 – Parallel Installation:

Water mains shall be laid at least 10-feet horizontally from any existing or proposed sewer/septic tank absorption field trench. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18-inches above the top of the sewer.

Section 3.2 – Crossings:

Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18-inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

Section 3.3 – Exception:

The reviewing authority must specifically approve any variance form the requirements of Sections 3.1 and 3.2 when it is impossible to obtain the specified separation distances. Where sewers are being installed and Section 3.1 and 3.2 cannot be met, the sewer materials shall be waterworks grade 150 psi (1.0 Mpa) pressure rated pipe or equivalent and shall be pressure tested to ensure water tightness.

Section 3.4 – Force Mains:

Water Mains shall be laid at least ten (10') feet horizontally from any existing or proposed Sanitary Sewer Force Mains, and not less than eighteen (18") inch vertical separation shall be provided.

Section 3.5 – Sewer Manholes:

No water pipe shall pass through or come in contact with any part of a sewer manhole. A minimum separation distance of eighteen (18") inches between the outside wall of the manhole structure and the nearest wall of the water main pipe barrel shall be maintained.

Section 3.6 – Separation of Water Mains from other Sources of Contamination:

Design engineers should exercise caution when locating water mains at or near certain sites such as sewage treatment plants or industrial complexes. On site waste disposal facility including absorption field must be located and avoided. The engineer must contact the reviewing authority to establish specific design requirements for locating water mains near any source of contamination.

Section 4: Pipeline Installation for Water Mains:

Section 4.1 – Licensed Contractor:

All Contractor's installing water main improvements in the Town of St. John, Indiana shall be registered to do such business in accordance with rules of the Town of St. John, Indiana Building Department Rules.

Section 4.2 – Open Cut Pipe Installation:

A. Ductile Iron Pipe Installation:

1. Ductile iron water main shall be installed in accordance with procedures defined in AWWA C-600.

2. Absolutely no slag materials will be permitted in contact with the ductile iron pipe.

3. An #8 Gauge insulated copper tracer wire shall be installed with both the main line piping and all service piping regardless of size and/or type of pipe used. The tracer wire shall be terminated at each hydrant assembly approximately two (2") inches above grade with three (3) wraps around the hydrant.

B. PolyVinyl Pipe Installation

1. PolyVinyl Chloride water main shall be installed in accordance with procedures defined in AWWA C-605.

2. An #8 Gauge insulated copper tracer wire shall be installed with both the main line piping and all service piping regardless of size and/or type of pipe used. The tracer wire shall be terminated at each hydrant assembly approximately two (2") inches above grade with three (3) wraps around the hydrant.

C. High Density Polyethylene Pipe Installation

1. High Density Polyethylene Pipe shall be installed in accordance with procedures defined in AWWA C-605.

2. An #8 Gauge insulated copper tracer wire shall be installed with both the main line piping and all service piping regardless of size and/or type of pipe used. The tracer wire shall be terminated at each hydrant assembly approximately two (2") inches above grade with three (3) wraps around the hydrant.

3. At each point where High Density Polyethylene Pipe transitions from/to another type of pipe a restraint shall be provided which will prevent the movement of the HDPE pipe due to thermal expansion/contraction.

D. Backfill

1. Backfill of water main trench not under or within four (4') feet of any existing or proposed pavement and above the bedding material may be suitable excavated material, compacted to 90% Standard Proctor. (See Figure No 1)

2. Backfill of water main trench crossing under any existing or proposed pavement and above the bedding material shall be INDOT Std Specification for #53 Crushed Stone Aggregate compacted to not less than 95% Standard Proctor. (See Figure No 2)

3. Backfill of water main trench laid longitudinally under or within four (4') feet of any existing or proposed pavement and above the bedding material shall be INDOT Std Specification for "B-Borrow for Structure Backfill" compacted to not less than 95% Standard Proctor. (See Figure No 3)

4. Existing or proposed pavement are defined as any roadway pavement (asphalt and/or concrete), driveway (asphalt and/or concrete), or sidewalk.

5. Compaction testing shall be the responsibility of the installer/developer. Copies of test reports shall be submitted to the Public Works Director prior to and as a condition of acceptance of the completed work. Tests shall be taken as follows:

   a. for longitudinal runs under or within four (4') feet of existing or proposed pavement, one (1) test per two (2') depth per one thousand (1000') feet of trench length, or portion thereof.

Section 4.3 – Horizontal Directional Drilling Installation:

A. General:

1. The HDD System employed to install the lines shall be remotely steerable and permit electronic monitoring of the tunnel depth and direction of the pipe. It must be accurate to ± 2". (Any software required to "read" or "print" the depth data recorded shall be provided to the Town of St. John at no cost to the Town.)

2. The spoils from the HDD process shall be recovered by a vacuum system mounted on a vehicle. Spoils will not be discharged into the existing sanitary and/or storm sewer system.

3. The equipment shall be equipped with a permanent alarm system capable of detecting an electrical current. This system shall warn the Operator with an audible alarm horn when the drill head nears an energized buried cable or conduit.

B. Construction/Installation Requirements:

1. At each point where High Density Polyethylene Pipe transitions from/to another type of pipe or at a dead end (if permitted), an HDPE anchor ring encased in concrete shall be provided which will prevent the movement of the HDPE pipe due to thermal expansion/contraction. See Figure 4 for details of one (1) acceptable style anchor system.

2. Connections to HDPE pipe shall not be made immediately after the pipe has been installed. It is required to wait a minimum of twelve (12) hours after installation to permit the pipe to approach an equilibrium temperature with the ground. (Due to the much higher coefficient of expansion of the HDPE pipe, reaching the equilibrium point in the ground will result in lower induced stress on the connections.)

3. All proposed connection and restraint details shall be included with the Plans and Specifications for the project.

4. Backfill of bore holes shall be in accordance with Section 4.2.D above.

Section 4.4 – Conventional Highway and Railroad Crossings by Jack and Bore:

A. Requirements of LC DOT, INDOT, or the particular Railroad shall be met, and a valid copy of the permit from the appropriate agency shall be provided to the Public Works Director before that portion of the work may begin. The provisions of Section 4.4.C below shall be incorporated in these crossings also.

B. Crossings of all existing Town of St. John streets shall require either casing installed by Jack and Bore methods, or pipe installation using the horizontal directional drilling method.

C. Minimum requirements for water main inside of casings are as follows:

1. The minimum casing wall thickness shall be 0.250", but shall be no less than the thickness required by the appropriate agency issuing the permit for the work.

2. The inside diameter of the casing shall be 6"-8" larger than the outside diameter of the bells of the carrier pipe.

3. Manufactured casing chocks centering the water main in the casing shall be provided. The chocks shall be fabricated using either Type 316 Stainless Steel or plastic materials. Rollers shall be incorporated to permit the pipe to be inserted with minimum effort. A minimum of three (3) chocks per individual piece of pipe shall be provided.

4. Manufactured end plugs to prevent soil and water from entering the casing shall be provided for each end of the casing.

5. See Figure 5 for pipe in casing details.

Section 4.5 – Subaqueous Crossings:

A. Waters of the State of Indiana are regulated by the IDNR, and their requirements for any subaqueous crossing shall be met. A valid copy of the permit for this crossing shall be provided to the Public Works Director before work on that segment of the project may begin.

B. Natural or Legal Drains, not under the jurisdiction of the IDNR, are regulated by the LCDB, and their requirements for this crossing shall be met. A valid copy of the permit for this crossing shall be provided to the Public Works Director before work on that segment of the project may begin.

C. Any subaqueous crossing not under the jurisdiction of either the IDNR or the LCDB shall be governed by the Town of St. John, and the requirements of the crossing shall be as directed by the Public Works Director.

Section 4.6– Depth of Cover:

Unless otherwise approved by the Public Works Director, all water mains shall be laid to a depth of not less than five (5') feet and not greater than eight (8') feet measured from existing ground surface or established final grade to the top of the barrel of the pipe.

Section 4.7– Dewatering:

When installing water mains, no matter the type of pipe used or the method of installation, a dry trench shall be maintained. No trench water shall be allowed in the new pipe at any time. Provisions shall be made to prevent the flotation of the pipeline.

Section 4.8 – Thrust Blocking and Restrained Joints:

A. Thrust Blocking is an acceptable method of preventing the movement of a water main. Thrust blocks shall be a minimum of twelve (12") inches thick and use concrete with a minimum compressive strength of three thousand pounds per square inch (3,000 psi). Each block shall be designed for the test pressure using a passive soil pressure of three thousand pounds per square foot (3,000 psf). Thrust blocks shall be placed to allow complete access to all fitting joints and bolts.

B. Joint restraint shall be devices to connect pipe segments and/or fittings for the length shown in the following table. All joint restraint systems using bolts shall use Type 316 Stainless Steel bolts. All joint restraint systems used on PVC and/or HDPE pipe shall be approved prior to use by the Public Works Director.

	RESTRAINED PIPE LENGTH (FEET)					
Nominal Pipe Size (inches)	Tee* Branch	90° Bend	45° Bend	22 ½° Bend	11 1/4° Bend	Dead End
4	0	15	6	3	2	20
6	9	22	9	4	2	28
8	18	27	11	5	3	37
10	25	33	14	7	3	44
12	33	39	16	8	4	52
16	48	50	21	10	5	68
18	56	55	23	11	5	75
20	63	61	25	12	6	82
24	77	71	29	14	7	96

* One Full Length of Pipe each side of Tee to Be Restrained Also.

NOTE:
1. Increase all lengths in the table by 75% if the pipe is DIP encased in polyethylene wrap.
2. Increase all lengths in the table by 75% if the pipe is PVC.
3. Test Pressure is based on 150 psi.
4. Length to be restrained shall extend the tabular distance on each side of the fitting.

Section 4.9 – Connections to Existing Mains:

A. Connections to existing water mains shall be accomplished without interruption of service.

B. All taps on existing mains shall be not greater than two (2) sizes less than the water main being tapped, unless otherwise approved by the Public Works Director. (i.e. Existing water main size is 12", maximum tap size is 8".)

C. Taps of greater size than permitted by Section 4.8.B above will be allowed subject to the prior approval by the Public Works Director.

Section 5: Disinfection:

A. Before being placed into service, all new mains and extensions to existing mains shall be disinfected using the "Tablet Method" in accordance with AWWA C-651, except that ONLY quick dissolving calcium hypochlorite granules with a minimum of 70% available chlorine shall be used. During construction, the calcium hypochlorite granules shall be placed at the upstream end of each run, at the upstream end of each branch, and at five hundred (500') foot intervals. The quantity of granules shall be not less than that shown in the following table:

Ounces of Calcium Hypochlorite Granules, per 500 feet of Main

Pipe Diameter, in.	Calcium Hypochlorite Granules	
	Oz.	Grams
4	1.7	57
6	3.8	113
8	6.7	200
10	10.5	300
12	15.1	430
16	20.1	570
18	22.7	640
20	25.2	710
24	30.2	860

B. When pipe installation has been completed, the mains shall be filled with water at a rate that will ensure a velocity not greater than one (1fps) foot per second. Precautions shall be taken to ensure that air pockets are eliminated. The water shall remain in the pipe for not less than twenty four (24 hrs) hours. If the water temperature is less than forty one degrees Fahrenheit (41°F), the water shall remain in the pipe for forty eight (48 hrs) hours. A detectable chlorine residual should be found at each sampling point in the main.

1. The Public Works Director shall be notified not less than forty eight (48 hrs) hours in advance of the intent to fill the pipe, to ensure that sufficient supply is available, and to prevent disruption of existing service to upstream users.
2. Filling of pipe shall only be conducted between the hours of 9:00 AM and 2:30 PM.

C. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shows a residual not in excess of that carried in the system. The Public Works Department shall be notified at least 48 hours in advance of any main flushing occurring. The following additional conditions appurtenant to the flushing shall be met:

1. Flushing shall be conducted in such a manner as to produce a velocity of three feet per second (3 fps) in the mains being flushed.
2. All taps, hoses, temporary risers, or other requisites necessary to accomplish chlorination, flushing, temporary or permanent release of air, or disinfection sampling shall be provided at no cost to the Town of St. John. All such taps, hoses temporary risers, or other requisites necessary to accomplish chlorination not otherwise needed or permanently incorporated into the final water main system shall be removed by the Contractor before acceptance of the improvements by the Town of St. John.

3. Per the current requirements of the Indiana Department of Environmental Management the disposal of heavily chlorinated water shall be reviewed prior to the actual conduct of the flushing.
   a. In ALL cases the discharge shall be dechlorinated prior to release to the environment.
   b. The discharge location shall be reviewed to ensure that erosion, or any other damage to existing facilities will not occur.

D. THE PUBLIC WORKS DEPARTMENT OF THE TOWN OF ST. JOHN SHALL DRAW THE NECESSARY SAMPLES AND COMPLETE THE LABORATORY TESTING OF ALL NEW WATER MAIN CONSTRUCTION. The developer shall pay for the cost of any such testing including retests if they are necessary. The Public Works Director shall be notified of the need to draw samples 48 hours before the samples are requested to be drawn. After flushing, water samples will be collected on two (2) successive days by the Town of St. John from the treated piping system, as directed by the Director of Public Works or Town Engineer. The Contractor shall provide any personnel and/or equipment necessary to assist the Town personnel in completing this task. The samples taken shall show satisfactory bacteriological results. Should the initial treatment result in an unsatisfactory bacterial test, the chlorination procedure shall be repeated by the Contractor until satisfactory results are obtained. In the event that rechlorination is required, the procedures and methods to be employed shall be approved by the Public Works Director prior to completing the work.

Section 6: Water Main Pressure Testing:

A. After the pipe has been installed, all newly laid pipe or any valved sections of it shall, be subjected to a hydrostatic pressure of one hundred and fifty (150) pounds per square inch in accordance with the procedures outlined in AWWA C600. Duration of each pressure test shall be for a period of not less than two (2) hours.

B. Suitable means shall be provided by the Contractor for determining the quantity of water lost to leakage under the specified test pressure. Allowable leakage shall be not greater than that computed by the following table. (Allowable leakage is shown in Gal./Hr./1000/Ft.)

Diameter of pipe, inches	Allowable Leakage,Gph
6"	0.55
8"	0.74
10"	0.92
12"	1.10
16"	1.47
18"	1.66
20"	1.84
24"	2.21

C. Each test shall be witnessed by a representative of the Public Works Department, and the contractor shall notify the Public Works Director of the date and time of the test not less than forty eight (48) hours prior to the time of the start of the test.

Section 7: Valves for Water Main:

A. The valves shall be suitable for ordinary waterworks service, intended to be installed in a normal position on buried pipe lines for water distribution systems.

B. East Jordan (Flow Master) or equal resilient wedge gate valves conforming to AWWA C515 shall be provided for all mains 16-inches in diameter and less. Valves shall open left. Valves shall be suitable for direct buried service. East Jordan three piece valve box (EJ8550 Series) made in the USA with "Water" embossed on the lid and Valve Box Stabilizer shall be provided. See details at Figure 6. Valves shall have restrained mechanical joints.

C. Butterfly valves conforming to AWWA C504 Class 150B shall be provided for mains 14-inches and greater in diameter. Wafer type valves are not acceptable. All valves shall be suitable for direct burial. Three piece valve box with "Water" embossed on the lid and Valve Box Stabilizer shall be provided. See details at Figure 6. Valves shall have restrained mechanical joints

D. Valves shall be located as follows:
   1. At intervals not exceeding eight hundred (800') feet in industrial and commercial areas.

   2. At intervals not exceeding six hundred (600') feet in all other areas.

   3. At the ends of mains which are to be extended in the future.

   4. Not in an asphalt or concrete paved area.

   5. Three (3) valves shall be provided at each tee in the main, except at hydrants and large diameter service branches.

   6. Four (4) valves shall be provided at each cross in the main.

E. All valves provided shall be of US manufacture. Acceptable manufacturers are; East Jordan Iron Works, Clow Corp., US Pipe Co., American Cast Iron Pipe Co., Mueller Corp., or approved equal.

Section 8: Fire Hydrant:

A. Fire flows for an individual installation shall be approved jointly by the Public Works Director and the Town of St. John Fire Chief.

B. Hydrants shall be traffic model designed for above ground valve replacement and shall conform to AWWA C502 with two 2 ½ inch ports and one 5 inch Storz fitting pumper nozzle with threads conforming to the St. John Fire Department Standards. The main valve opening shall be 5 ¼ inch. The main valve seat shall be constructed entirely of bronze. All hydrants shall be of U.S. manufacture and for purposes of standardization shall be EJ Model 5BR250. All hydrants shall be painted red. An auxiliary valve shall be installed such that the hydrant may be isolated from the water main without interrupting service to customers, and the lid for the auxiliary valve box shall be painted red. Hydrants shall be installed as shown at Figure 7.

C. Hydrant spacing shall be as follows:

   1. One (1) Hydrant shall be placed at or near each intersection, and

   2. At intervening points such that the distance between hydrants shall be not greater than five hundred (500') feet.

   3. All hydrants shall have a 5' standard marker attached to them, model number 22516 as shown in USABlueBook.

D. The following fire flows listed below are the minimum allowed in the Town of St. John. The building construction, on-site fire protection systems, and the hazard of contents will be used in the Town's determination of the exact flow requirement within the minimum range. The required fire flow is to be calculated at water system maximum day demand condition using a residual pressure of 20 psi.

Single family detached residential homes----------1000-1500 GPM
Town, row or cluster housing----------1500-2000 GPM
Apartment type buildings----------3000-4000 GPM
Manufacturing and storage----------3000-5000 GPM
Institutional----------3000-4000 GPM
Business and Office uses----------2500-3500 GPM
Commercial, mercantile or regional shopping center---------3000-5000 GPM

Section 9: Water Services :

A. Meter size, water main tap size, and service line size will be determined by the Public Works Director for each individual case. In cases where the Public Works Director determines that the building location on the site will result in excessive pressure loss in the service line, the director may require that service line between the buffalo box and the building be sized larger than the meter and water main tap size. Usually for structures of greater than 2000 Sq. Ft. in area an upsize will be required. In special circumstances, such as in areas of known low pressure, the Public Works Director may require the increased service line size for lesser distances from the main to the residence. Irrigation meters, if used shall be 1-inch and shall connect to the service line outside the residence.

B. Service connections equal to or less than two (2") inches in diameter shall be copper tube type "K". Fittings, Corporation Cocks, Curb Stops and Stop Boxes shall be of the following manufacture:
   1. Corporation Cocks –
      a. Ford Meter Box Co., Fig. F-1000
      b. Mueller Co., Fig. H-15008
      c. AY McDonald Co., Fig. 4701Q or comparable

   2. Curb Stops –
      a. Ford Meter Box Co., Fig. B-66
      b. Mueller Co., Fig. B-25209
      c. AY McDonald Co., Fig. 6100Q or comparable

   3. Stop Boxes –
      a. Ford Meter Box Co., Fig. EA-1-55-40-42R
      b. Mueller Co., Fig. H-10306
      c. AY McDonald Co., Fig. 5604 box with stainless steel rod

4. Fittings and/or Specials shall be of the same type of manufacture as the Corporation Cocks, and Curb Stops above

5. Unions 4758Q

C. Taps for copper services shall:
   1. Be made in the upper third of the main as close to a forty-five degree (45°) angle with the horizontal axis as is practical. (A tap in the top of the main will not be permitted.)

   2. Adjacent taps shall not be less than ten (10') feet apart.

   3. Full Circle Type 316 Stainless Steel Tapping Saddles shall be used as follows:
      a. For all taps on Ductile Iron Pipe of 10" nominal diameter and less.
      b. For all taps made on PolyVinyl Chloride Pipe of any nominal diameter.
      c. For all taps made on High Density Polyethylene Pipe of any diameter.

   4. Details of service taps less than three (3") inch diameter are shown at Figure 8.

D. Water service connections greater than two (2") inch diameter shall be constructed using one of the types of pipe defined in Section 503 above; or PVC, ASTM D-2241 Pressure Pipe, Class 160 may be used on private property. Additionally, such taps shall meet the following:
   1. If the tap is constructed at the same time that the main is constructed, the tap may be accomplished with appropriate fittings specified for the water main.

   2. If the tap is constructed on an existing main, constructed of either DIP or PVC, the tap shall be made using a Type 316 Stainless Steel tapping sleeve and valve. Such a tap shall be limited in size to two (2) sizes less than the main being tapped. (i.e. Existing main is 12" PVC, C-900 pipe. Tap size not greater than 8" maximum will be permitted.)

   3. If the tap is constructed on an existing High Density Polyethylene Pipe, a Flanged Branch Saddle shall be heat fused to the pipe to accomplish the tap. Such a tap shall be limited in size to two (2) sizes less than the main being tapped. (i.e. Existing main is 16" HDPE pipe (Required 12" diameter). Tap size not greater than 10" HDPE (required 8" diameter) maximum will be permitted.)

   4. Taps of greater size on existing water mains than permitted above require the prior approval of the Public Works Director.

   5. In all cases for taps greater than or equal to three (3") inch required diameter, an isolation valve shall be provided adjacent to the main not in a paved area.

   6. See Figure 9 for details.

E. It is possible that taps, of any size, may be required on existing water mains that are located within the paved area of an existing street or property. Should such a situation occur, the roadway cut shall be kept to the minimum dimensions possible, and repairs completed in accordance with Section 600.

F. Installation of water service tap piping shall be completed in accordance with Section 503, above, except that all pipe installation under existing paved areas shall be completed utilizing trenchless technology.

Section 10: Administration and Enforcement:

A. Inspection of Construction Activities:

1. Inspection shall be completed by the Public Works Department of the Town of St. John, Indiana. A prior notice of intent to begin work shall be provided not less than forty eight (48) hours before any work shall commence.

2. In resolution of any situations arising in the construction phase of the work the decision of the Public Works Director shall be final.

B. Maintenance on Completion:

1. Any water system improvements shall be guaranteed by the developer on their completion. The guarantee shall be in the form of a written warranty of three (3) years. The three (3) year guarantee period shall start on the date of acceptance of the improvements by the Town of St. John, Indiana.

C. As Built Drawings:

1. Water Mains:

a. As Built Drawings of the water system improvement shall be submitted to the Public Works Director.

b. Two (2) copies of As Built Drawings, and one (1) digital electronic copy of the same data in Auto CAD format of the same version possessed by the Town of St. John (or a compatible format) shall be provided. Further, the digital As Built data will be entered on the base drawing as a separate layer named "Water Main – As Built Data- 'Subdivision Name and Phase '," to facilitate its incorporation into the Town of St. John digital map base.

c. The "X","Y" and "Z" Coordinate of each tee, bend, plug, valve and hydrant shall be provided using the State Plane Coordinate System. The "Z" coordinate shall be at the approximate centerline of the new mains.

2. Services:

   a. For services less than three (3") in diameter:

      (1.)The "X", "Y", and "Z" coordinate of the tap location and the stop box location shall be provided. On the digital record all tap data shall be entered on a separate layer named "Water Main – Tap Data – 'Subdivision Name and Phase'."

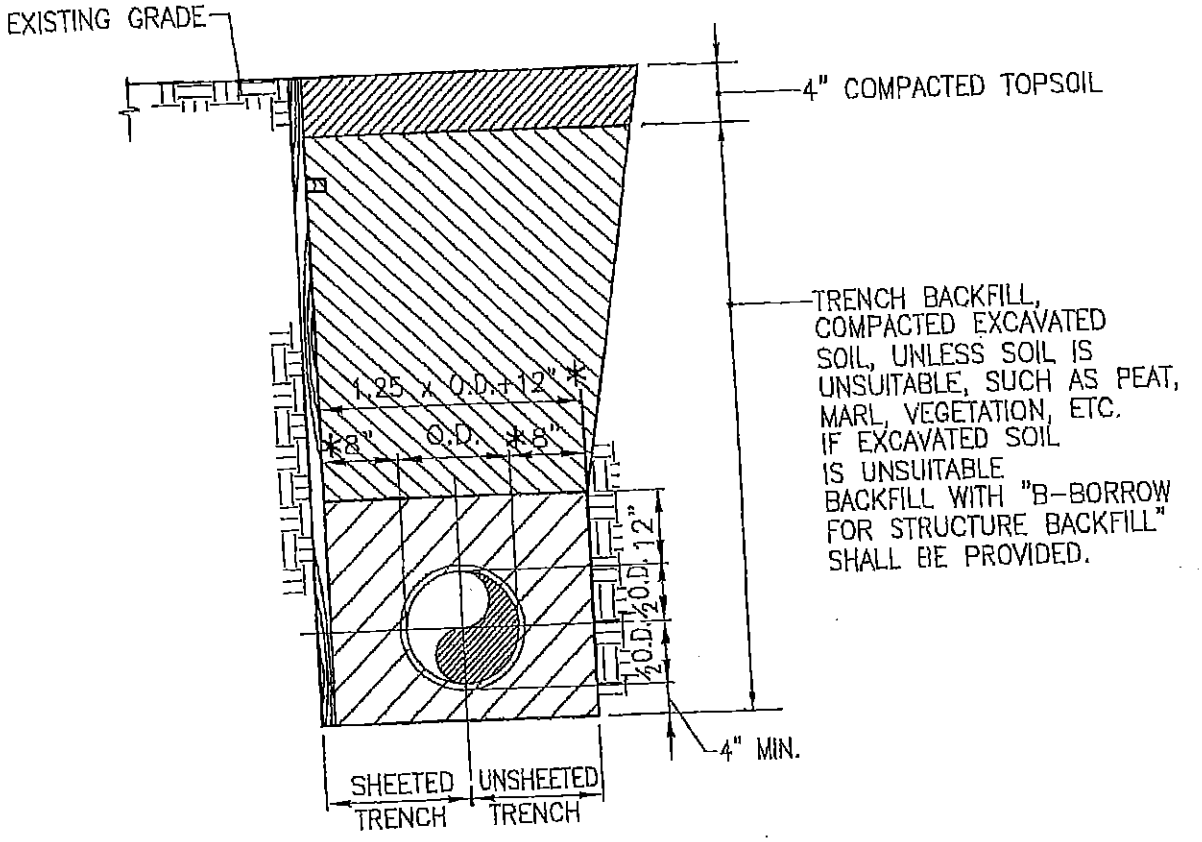
      (2.)Additionally, on the As Built Drawings (both prints and digital sets), the following measurements shall be shown:

         (a.)The lateral distance from the intersection north/east of the tap to the tap, along the centerline of the street, and

         (b.)The distance from the centerline of the street out to the stop box.

   b. Services three (3") and larger shall be shown on the Water Main – As Built in accord with requirements of Section 10.C.1 above.

Figure 1



PIPE BEDDING DETAIL

NOT TO SCALE

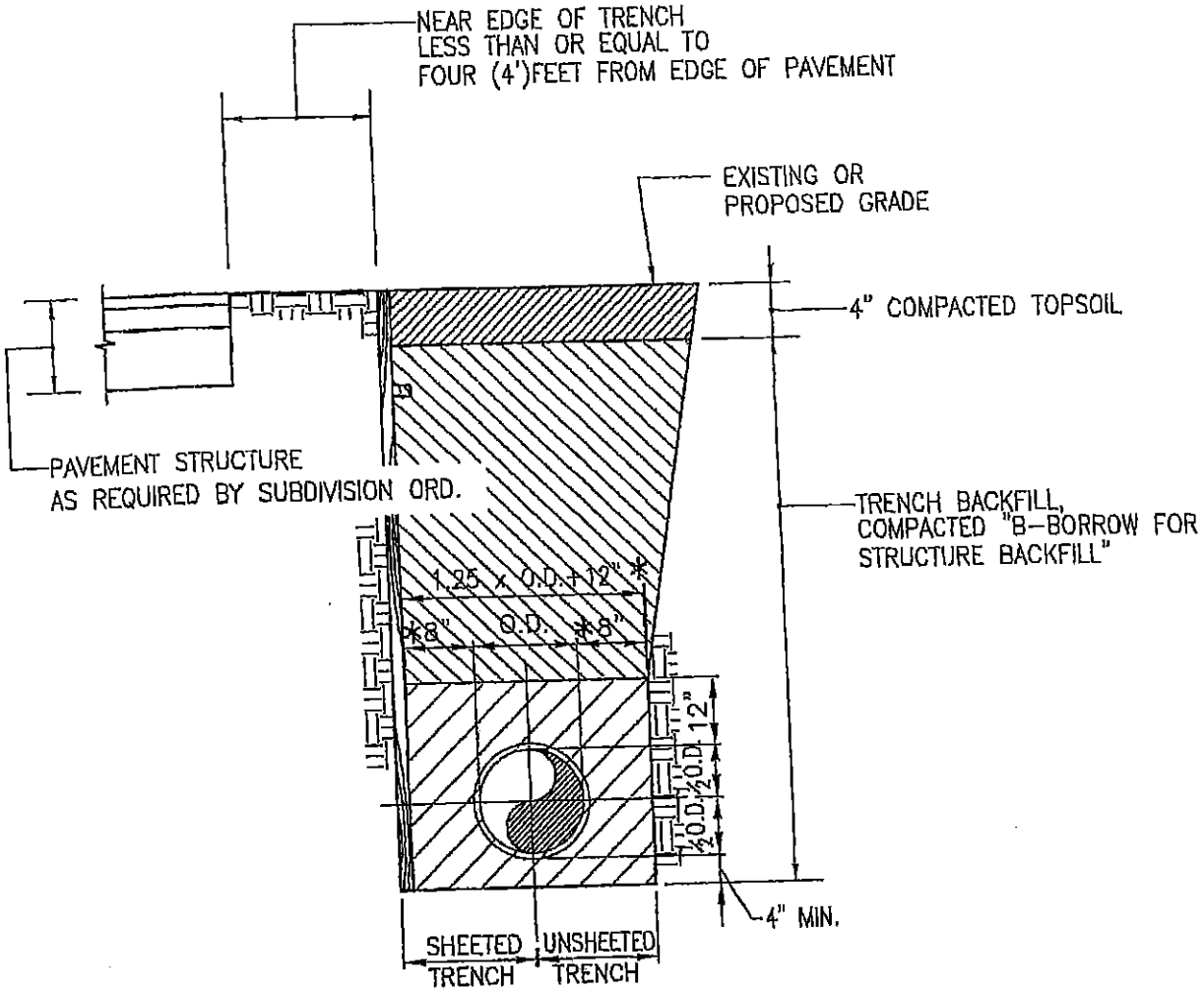
FOR TRENCH NOT IN PAVED AREAS

NOTES:

1. THE COST OF TRENCH SUPPORT SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. OPEN-CUT TRENCHES SHALL BE SHEETED AND BRACED AS REQUIRED BY OSHA (29CFR 1926/1910), AND AS NECESSARY TO PROTECT LIFE, PROPERTY, AND THE WORK.

* 3. WHICHEVER PROVIDES GREATER TRENCH WIDTH

Figure 2



PIPE BEDDING DETAIL

NOT TO SCALE

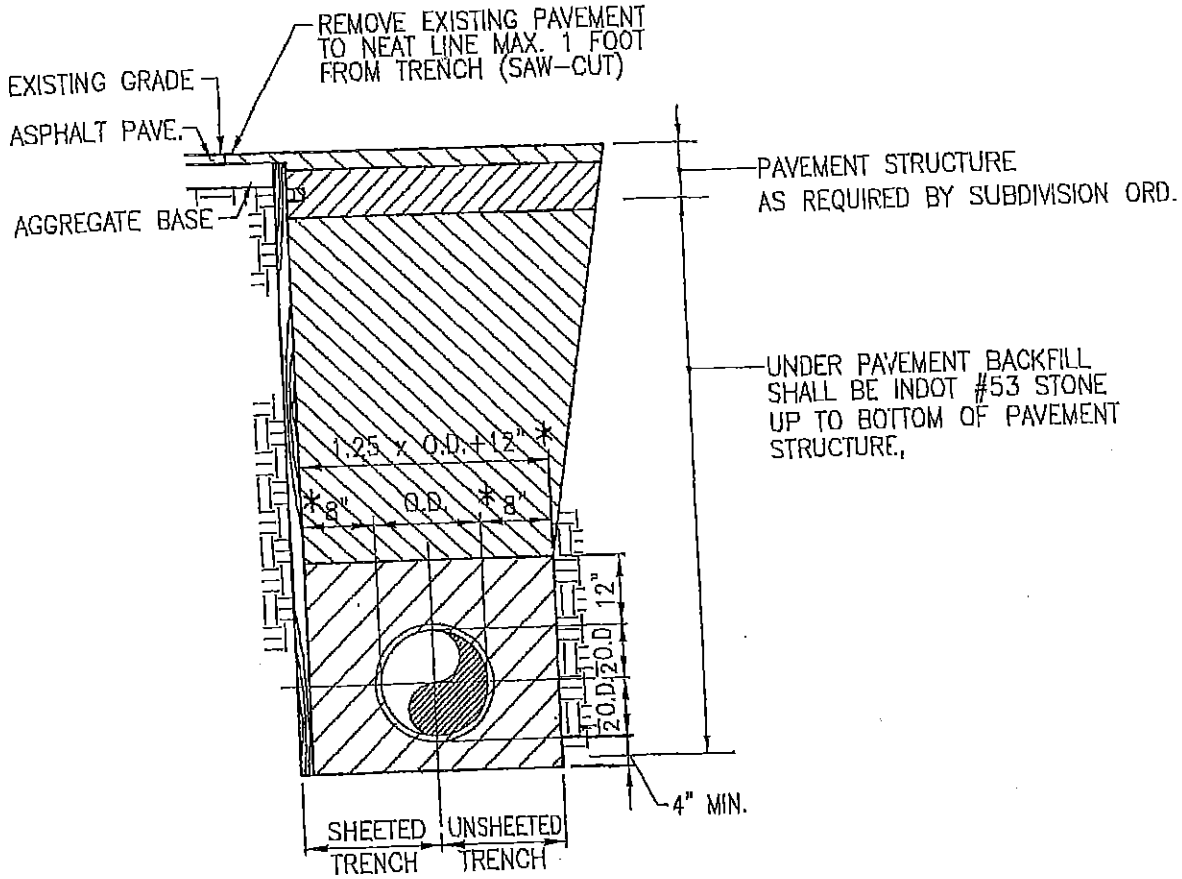
FOR TRENCH WITHIN FOUR FEET OF PAVEMENT

NOTES:

1. THE COST OF TRENCH SUPPORT SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. OPEN-CUT TRENCHES SHALL BE SHEETED AND BRACED AS REQUIRED BY OSHA (29CFR 1926/1910), AND AS NECESSARY TO PROTECT LIFE, PROPERTY, AND THE WORK.

* 3. WHICHEVER PROVIDES GREATER TRENCH WIDTH

Figure 3



PIPE BEDDING DETAIL

NOT TO SCALE

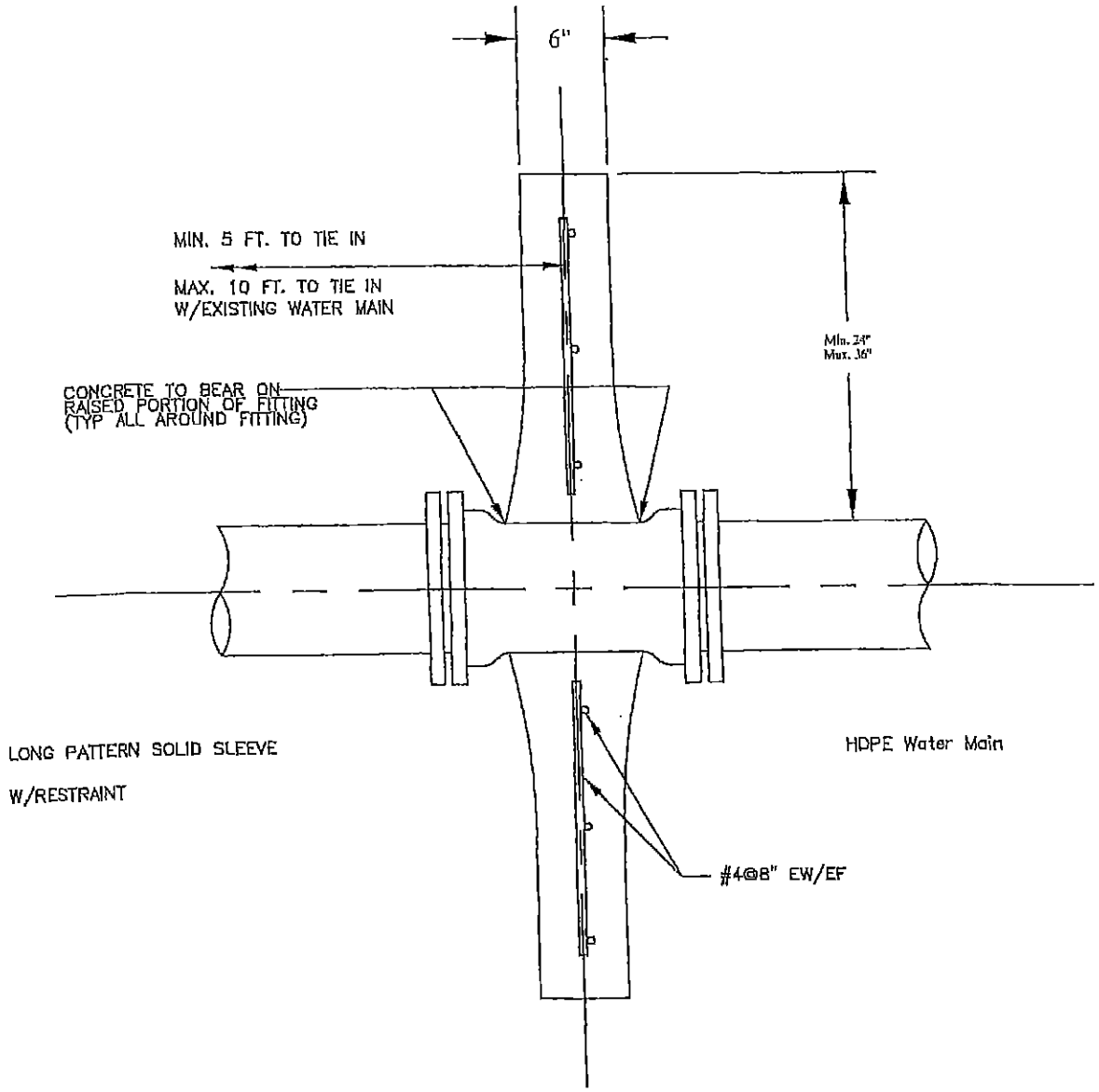
FOR TRENCH UNDER EXISTING OR PROPOSED PAVEMENT

NOTES:

1. THE COST OF TRENCH SUPPORT SHALL BE INCLUDED IN THE COST OF THE PIPE.
2. OPEN-CUT TRENCHES SHALL BE SHEETED AND BRACED AS REQUIRED BY OSHA (29CFR 1926/1910), AND AS NECESSARY TO PROTECT LIFE, PROPERTY, AND THE WORK.

* 3. WHICHEVER PROVIDES GREATER TRENCH WIDTH

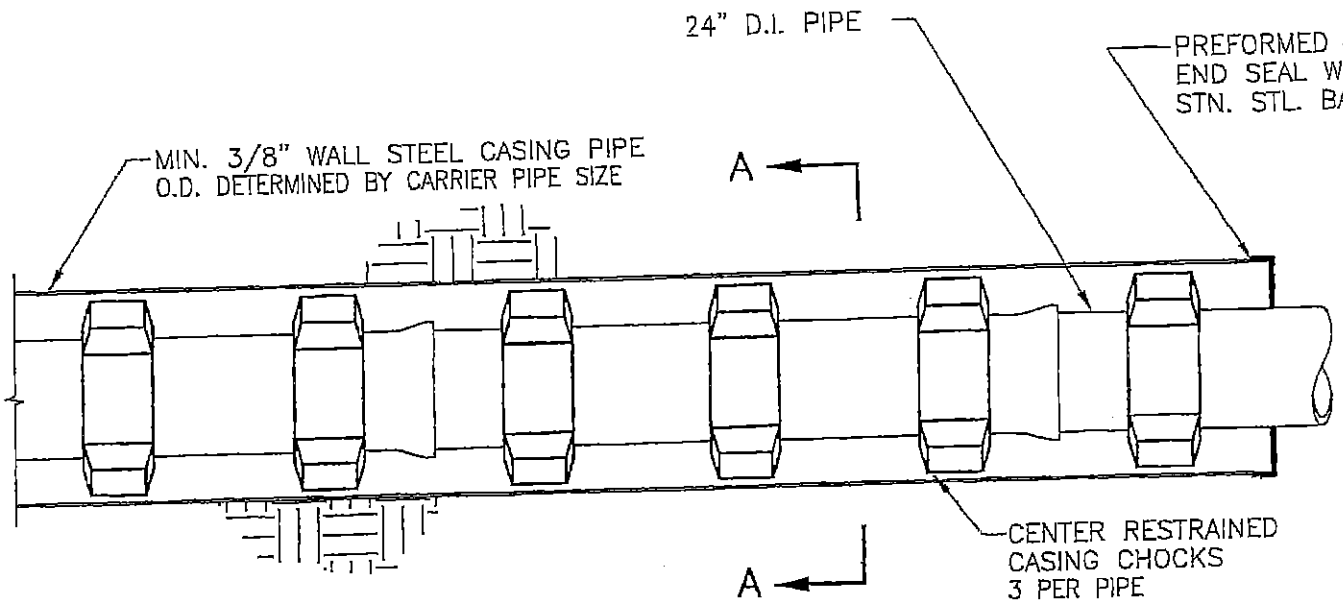
Figure 4



HDPE ANCHOR RING DETAIL

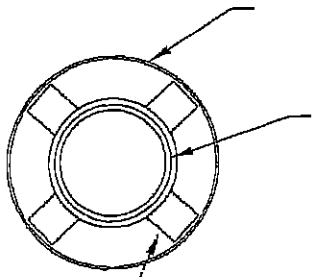
NO SCALE

Figure 5



CASING DETAIL

(LONGITUDINAL SECTION)
NOT TO SCALE

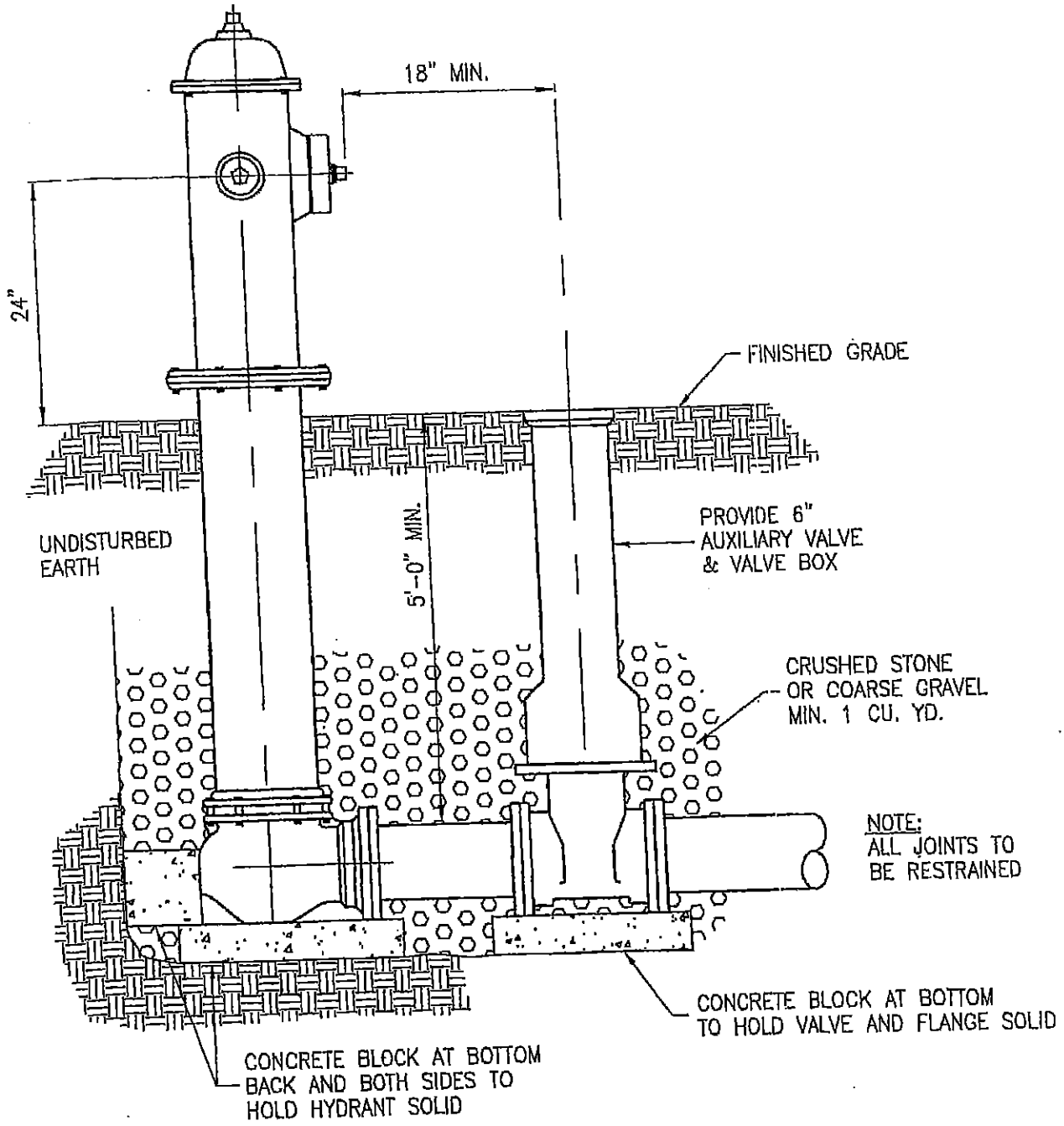


SECTION A–A

NOT TO SCALE

CENTER RESTRAINED CASING CHOCKS

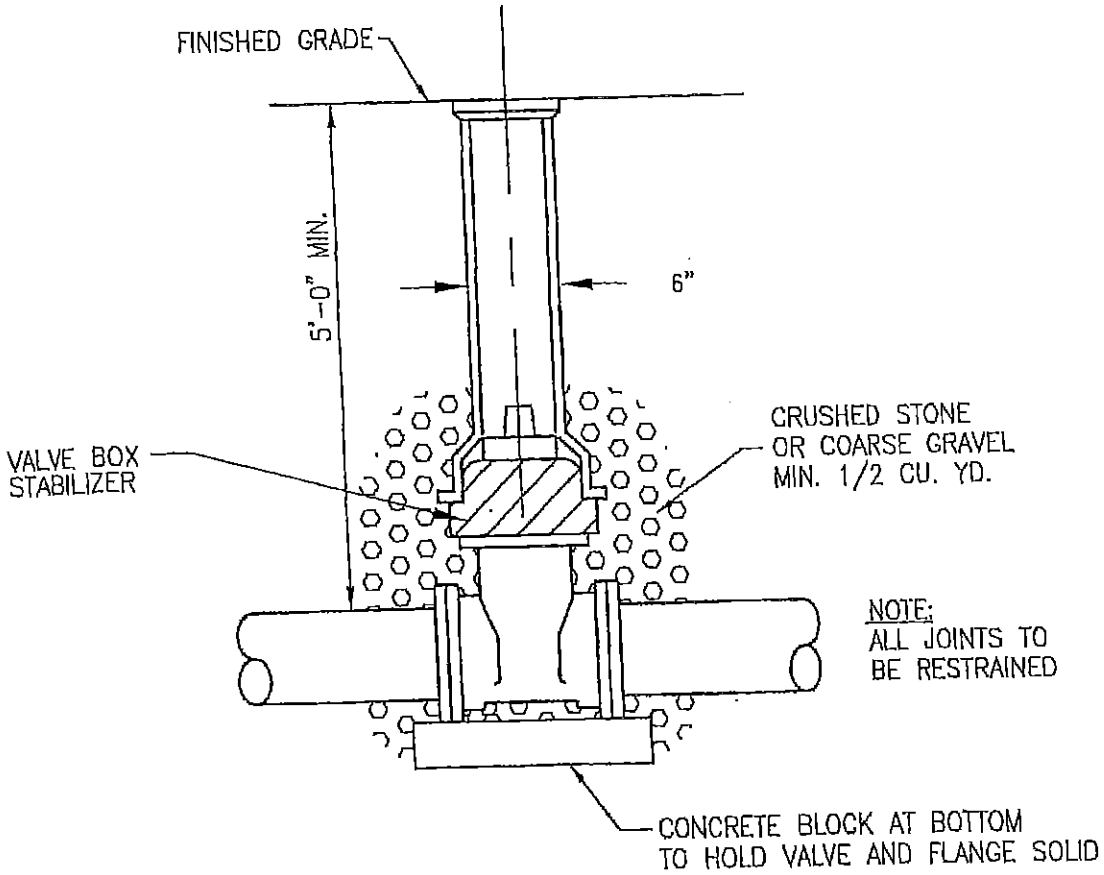
Figure 6



TYPICAL HYDRANT ASSEMBLY DETAIL

TRAFFIC MODEL – BREAKABLE FLANGE AND COUPLING
NOT TO SCALE

Figure 7



BURIED VALVE DETAIL

NO SCALE

NOTE: FOR ALL VALVES 3" – 24"
VALVES OVER 12" ARE BUTTERFLY VALVES

Figure 8

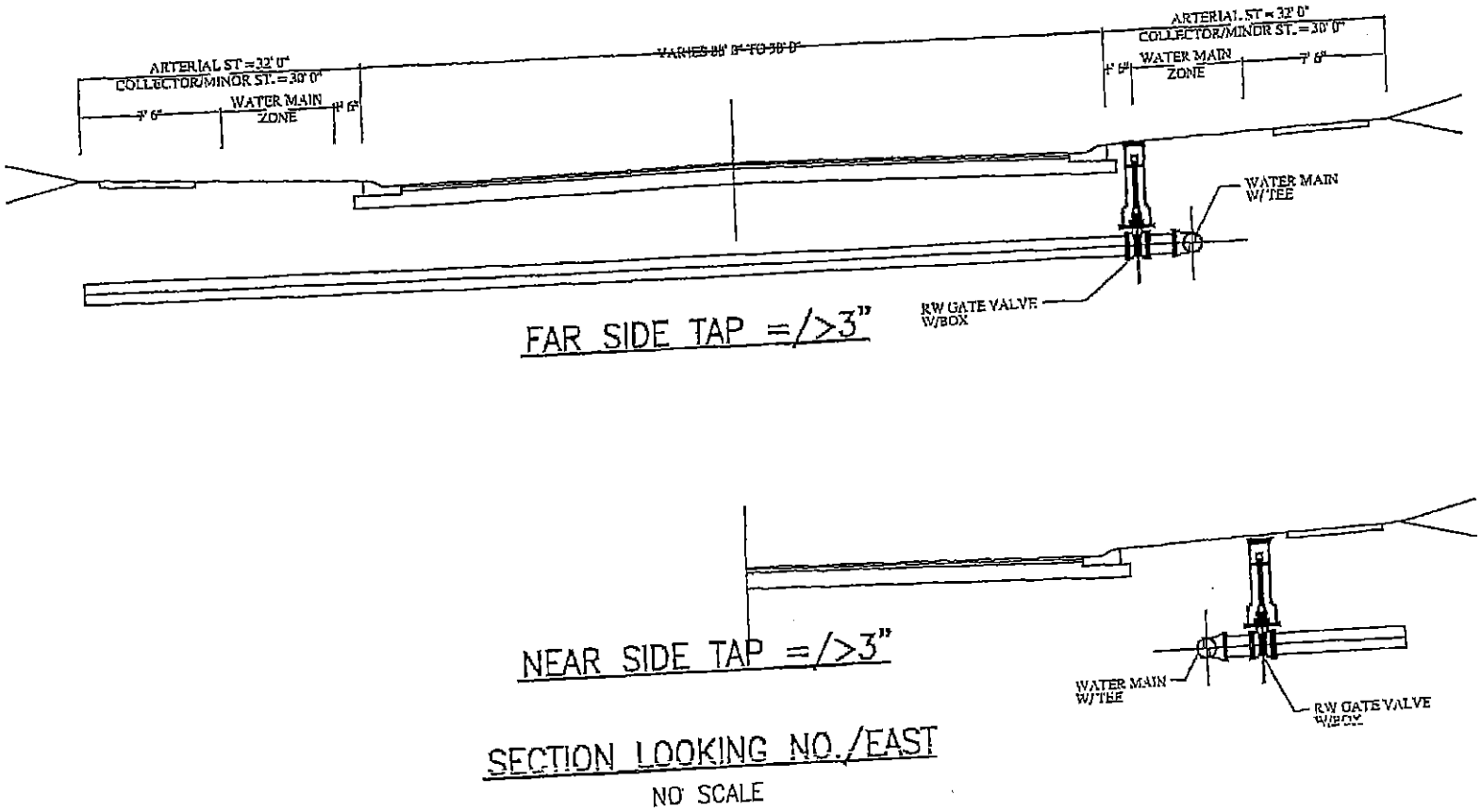
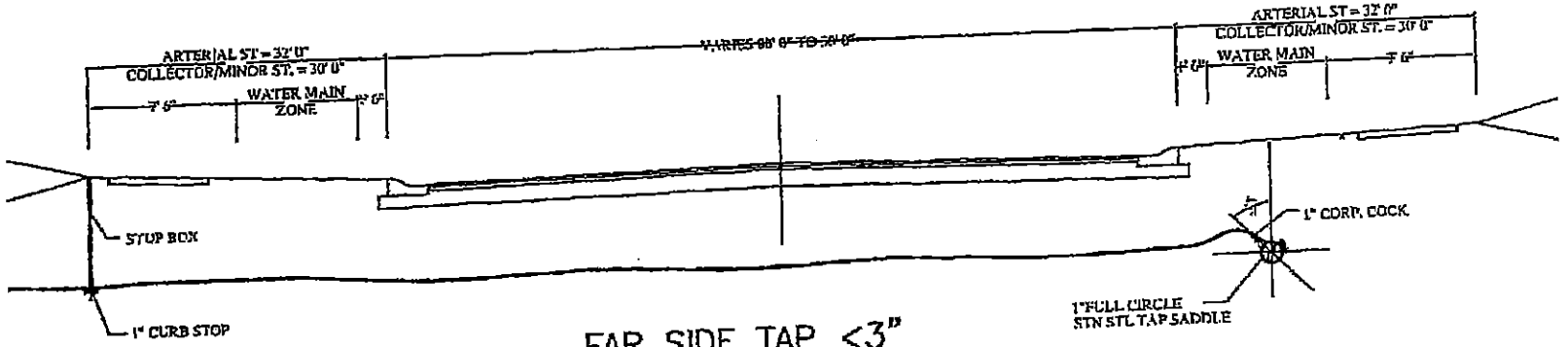
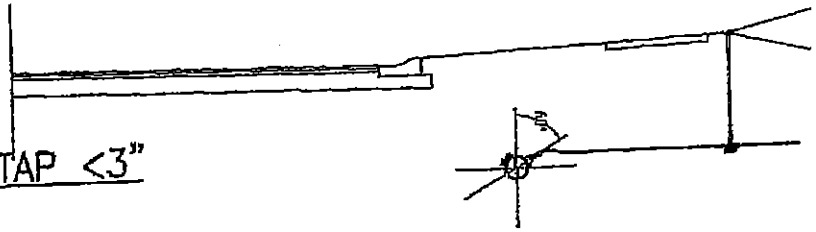

ARTERIAL ST = 32' 0"
COLLECTOR/MINOR ST. = 30' 0"
WATER MAIN ZONE
VARIES 88' 8" TO 98' 0"
ARTERIAL ST = 32' 0"
COLLECTOR/MINOR ST. = 30' 0"
WATER MAIN ZONE
WATER MAIN W/TEE
RW GATE VALVE W/BOX
FAR SIDE TAP =/>3"
NEAR SIDE TAP =/>3"
WATER MAIN W/TEE
RW GATE VALVE W/BOX
SECTION LOOKING NO./EAST
NO SCALE

Figure 9



FAR SIDE TAP <3"



NEAR SIDE TAP <3"

SECTION LOOKING NO./EAST

NO SCALE