

TOWN OF LA CONNER

INFRASTRUCTURE IMPROVEMENTS PROJECT MANUAL



Manual Fee: \$50.00

Revised: August 2018 / R.2

INFORMATION SHEET

TOWN OF LA CONNER Skagit County, Washington

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Infrastructure Improvements Project Manual Fee: \$50.00

Town of La Conner

Infrastructure Improvements Project Manual

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SECTION A: INFRASTRUCTURE IMPROVEMENT PROCESS

INTRODUCTION

This manual provides guidance for the installation, repair, replacement, or extension of streets and certain utilities furnished by the Town of La Conner. Within this manual, the process is described, checklists and forms are included, and design standards are provided for streets, water, sewer, and storm drainage improvements.

The process includes submitting an application, signing an agreement for service, preparing and reviewing plans, submittals to agencies, construction and inspection, revising plans to construction record, recording of easements, executing a bill of sale, conveyance of facilities, warranty fulfillment, and final acceptance. A checklist is included at the end of this section.

Utilities provided by other purveyors include:

- Electricity: Puget Sound Energy.....(888) 225-5773
- Gas: Cascade Natural Gas(800) 848-3406
- Telephone: Verizon.....(800) 937-8997
- Cable: Comcast.....(877) 824-2288
Wave Broadband.....(866) 928-3123
- Solid Waste: Waste Management Services(360) 757-4068

PRE-DESIGN or FEASIBILITY REVIEW

The Town encourages potential developers to prepare a simple schematic plan of the intended construction, prior to contacting the Town for assistance or direction. The plan should show location and scope of improvements. The plan will assist the Town in providing more detailed information on development requirements, existing utility locations, available alternatives, likely permitting, land use or zoning issues and potential fees. Once the plan is prepared, contact the Planning Director to schedule a project discussion.

APPLICABILITY FOR LONG SUBDIVISIONS AND SHORT SUBDIVISIONS

Infrastructure Improvements can either be required as a part of a single lot development, change of use, or in conjunction with a long or short plat. This manual does not address the Land Use (Zoning) or Platting aspects of a proposed project, or the on-site building construction approval process. This manual sets forth the design criteria, standard details and standard specifications that apply to any infrastructure improvement constructed within the Town or the Town's Utility Service Area. This manual also describes the process required to apply for and receive a permit for construction of an Infrastructure Improvement. Additional requirements with regard to submittals, fees and hearing processes apply for Subdivisions and building construction.

Applicants are referred to the Town Planner and Chapters 12 and 15 of the La Conner Municipal Code (LCMC) for information regarding all development activities.

OUTLINE OF INFRASTRUCTURE IMPROVEMENTS PROCESS

1. Application & Agreement

To initiate the process, the Developer shall fill in the application form contained herein and submit it to the Town along with the Infrastructure Improvement Application Fee and required attachments. After the application has been submitted, the Town will review the information for serviceability, calculate the estimated connection charges and other applicable fees, and prepare a formal agreement for the proposed infrastructure improvements.

An Infrastructure Improvements Agreement (IIA) shall be signed by the Developer and the Town. The agreement must be signed and appropriate fees paid prior to the review of plans.

2. Design & Permitting

The Developer may utilize their own engineer, or request a quote from the Town, to prepare engineered construction plans and/or related reports for submittal to the Town. The plans are then reviewed and must be revised per written comments received. The plan review will identify all applicable permits and final permit fees.

After the Town approves the construction plans, receives necessary approvals from all applicable agencies, and receives all applicable permit fees, the Developer may start the construction process.

3. Construction

A preconstruction conference must be held and all appropriate permits, insurance, and bonds must be obtained prior to construction. During construction, the Town will have an inspector present to ensure that the system is installed to Town standards. As construction on underground utilities progresses to a point that all pipe is in place, easements covering those portions of the system outside the public right-of-way and plans revised to as-built construction records should be prepared to submit to the Town.

When easements, revised plans, and construction of the system are approved, a bill of sale form shall be prepared and executed by the Developer whereby the completed system shall be conveyed to the Town. The Developer shall provide a maintenance bond on the system warranting the work for one year from the date of acceptance of the system and its conveyance. Prior to the end of the one-year period, the project shall be inspected and any items needing repair shall be rectified by the Developer before the bond is released.

Construction Engineering and Inspection – All construction engineering and inspection will be performed by the Town's Engineer on a time-and-expense basis and shall be paid by the Developer.

Please note the infrastructure improvements checklist herein for determining the order of Town requirements.

FEES

The Developer shall pay an assessment to the Town of La Conner, if required, and receive monthly billing for work done by the Town and its consultants with regard to the project. Fees to be paid to the Town include:

1. **Infrastructure Improvement Application Fee** – The Developer shall pay \$1,500.00 to the Town when submitting an application as an initial payment for the costs to the Town for engineering, legal, financial, inspection, or other services performed by or for the Town to review the application, investigate the scope and impact of the proposed project, and prepare an IIA.
2. **Reimbursable Expenses** – Per the terms of the IIA, the Developer will be sent a monthly invoice for reimbursable expenses. The invoice includes costs for meetings related to project, design review or design, review of legal descriptions, inspection, preparation of documents, reporting and keeping records of the project, review and completion of as-builts, and other project-associated costs to the Town. Costs vary greatly depending on the Developer’s administrator, engineer, contractor, size and complexity of the project, and length of time for project completion.
3. **Sewer System Isolation Deposit, if applicable** – Prior to commencement of construction, a \$1,000 system isolation deposit shall be paid to the Town. The isolation device shall be in place and inspected by the Town prior to the start of construction, it shall remain in place and be functional during construction, and shall not be removed without the authorization of the Town. If the above stipulations are not adhered to, the \$1,000 deposit shall be forfeited, otherwise the deposit shall be credited to the Developer’s project account, any excess balance shall be refunded to the Developer..
4. **Connection Charge, if applicable** – The Developer’s contribution to the existing infrastructure facilities. This can include amounts for each Residential Customer Equivalent (RCE) and/or a footage charge.

Table A1 provides a summary of typical development fees and utility monthly service charges. Consult the Town code for the most current amounts.

Developers requiring special provisions in their contract or their facilities can expect total charges billed by the Town and its consultants to be increased beyond that of a similar development without the special provisions. Additional charges will be incurred when additional research, documentation, or review is required.

Examples of special provisions that cause additional charges to be incurred are listed below:

1. Latecomer agreements.
2. Use of pumping systems.

3. Designs that require modification to the Town's standard design practice.
4. Alternate assessment practice.
5. Design or construction changes.
6. Installations not in accordance with approved plans that require additional inspections or rework.

Insert Table A-1

INFORMATION FOR ENGINEER AND CONTRACTOR

The Developer is responsible to inform its consultants, its contractor, and all subcontractors of the Town's requirements. We recommend that the Developer provide his engineer/architect and contractor with the "Infrastructure Improvements Project Manual."

SELECTION OF ENGINEER

The Developer may have his own engineers prepare the construction plans and specifications and have them reviewed by the Town's Engineer, or he may request of the Town to have their Engineer prepare the construction documents.

1. If Prepared by Town Engineer
The Town's Engineer will prepare construction plans and specifications on a time-and- material basis at the request of the Developer.
2. If Prepared by Developer's Engineer
Plans prepared by the Developer's engineer shall be reviewed by the Town's Engineer to ensure that they conform to the standards of the Town. The cost to have the Town's Engineer review the plans shall be paid by the Developer. Standards for plan preparation are included in this Infrastructure Improvements Project Manual.

Pump Stations: The Town requires that pump system plans and specifications be prepared by the Town's Engineer.

OWNER'S RESPONSIBILITY FOR CONSTRUCTION MANAGEMENT

The construction management for infrastructure improvement projects undertaken by a developer is the responsibility of the Developer and/or the contractor. The Town's role in such projects is limited to review throughout the process and inspection during construction.

TABLE A-1: FEE SUMMARY

Type	*Amount	Due	Note
Infrastructure Improvements Application Fee	\$ 1,500.00	w/ application	Required before application will be reviewed.
Project Deposit	** TBD **	w/ signed Agreement	Required before agreement will be signed by Town.
Performance Bond	** TBD **	prior to Construction Authorization	Bond amount = 110% of approved construction estimate.
Sewer Connection Charge	\$ 2,432.00 per ERU (est.)	prior to Project Acceptance	Current amount applies, ERU estimate calculation and applicability determination will be performed by Town prior to Agreement.
Sewer Isolation Deposit	\$ 1,000.00	prior to Construction Authorization	only applicable to Sewer Mainline construction, returned to Developer upon successful completion.
Sewer Monthly Billing	\$ 11.00 per ERU, 3 per CCF	Beginning on approved side sewer connection	Current Monthly Rate applies.
Water Connection Charge	\$ 1,010.00 per RCE (est.)	prior to Project Acceptance	Current amount applies, RCE estimate calculation and applicability determination will be performed by Town prior to Agreement.
Water Meter & Installation	\$ 550.00 - 3/4"	prior to Construction Authorization	Consult Town for pricing on 1" and larger meters.
Water Monthly Billing	\$ 11.20 base charge, plus \$ 1.60 each CCF	Beginning on water meter activation	Current Monthly Rate applies.
Stormwater System Development Fee	\$ 0.25 per impervious surface square foot added	prior to Project Acceptance	
Stormwater Monthly Billing	\$ 10.00 per ERU	Beginning on water meter activation	

*Amount: Charges and Rates shown were current as of 8/1/2006. The fees and rates shown are periodically revised by the Town. The reader must refer to the applicable section of the Town's current code for the actual amounts that will apply.

Town of La Conner

INFRASTRUCTURE IMPROVEMENTS PROJECT CHECKLIST

For : Roads / Sidewalks Sewer Stormwater Water

Engr. Ref. # _____

Project Name: _____
 Related Project: _____
 Location: _____
 Developer: _____ Phone: _____
 Engineer: _____ Phone: _____
 Contractor: _____ Phone: _____

	DATE	FEE	BY
A. Pre-Application Meeting			
B. Infrastructure Improvements Application			
1 Preliminary Plans / Sketch attached			
2 Fee Paid Check No. <input style="width: 50px;" type="text"/>		\$ 1,500.00	
3 II Project Manual provided to Developer			
4 Application Review Complete			
5 Developer Packet returned to Applicant			
Infrastructure Improvement Agreement			
Project Deposit Fee			
Preliminary Permit Requirements			
Preliminary Fee Estimate			
Project Scoping			
C. IIA and Plan Review			
1 IIA signed by Developer and returned to Town			
2 Project Deposit - 1st half Check No. <input style="width: 50px;" type="text"/>			
3 IIA signed by Town			
4 SEPA submittal (if applicable)			
Determination Type <input style="width: 50px;" type="text"/>			
5 Construction Plans submitted to Town (3 sets)			
Plans routed to Public Works			
Plans routed to Engineer			
6 1st Review complete and comments returned to Developer			
7 Developer submits revised plans			
8 Infrastructure plans approved by Town			
Approval Letter with Permit Requirements sent to Developer			

Project: _____		DATE	FEE	BY
D. Permits				
1 Right-of -way	Req			
2 Street Excavation	Req			
3 Shoreline Substantial Development	Req			
4 Archeological Review	Req			
5 JARPA	Req			
6 Other	Req			
7 Other	Req			
E. Requirements Before Construction				
1 Contractor's references submitted to Town				
2 References checked and Contractor Approved				
3 Insurance Certificate submitted to Town				
4 Performance Bond submitted to Town				
5 Third Party Easements secured	Req			
6 Developer to submit Construction Plans for Town signature				
7 Project Deposit - 2nd Half	Check No.			
8 Sewer System Isolation Deposit	Req		\$ 1,000.00	
9 Pre-Construction Conference held				
10 Construction Stakes / Property Boundary Stakes in place				
F. Construction				
1 Town approves construction start				
2 Town begins Inspection Services				
Monthly Invoicing established				
3 Testing				
Roads - Grade and Compaction passed				
Sewer - Lamp and Pressure passed				
Storm - Lamp passed				
Water - Pressure and Purity passed				
4 Contractor schedules physical connections				
5 Final Inspection and Punchlist				
presented to Contractor				
mailed to Developer				
6 Punchlist Inspection and Approval				
7 Off-site Easement Restoration Release				
8 Town Determination that project is Construction Complete				
9 Construction Performance Bond is Released				

SECTION B: INFRASTRUCTURE IMPROVEMENTS APPLICATION

This section includes an application to initiate the process of constructing infrastructure improvements. The form that the Town will use to review the application has been included for information only. Upon review completion and approval of the application the Town of La Conner will prepare an Infrastructure Improvement Agreement (IIA) for signature by the Developer. A sample copy of the IIA is included in this section

To initiate the process the Developer must;

- Complete the II Application form
- Attach 3 copies of a schematic plan illustrating the proposed development, location, and scope of infrastructure improvements
- Attach 3 copies of a marked up Assessors Map or other exhibit that shows lot lines and parcel numbers
- Attach payment of the Application Fee

Contents:

II Application form

II Application Review form (sample)

II Agreement (sample)

Town of La Conner

APPLICATION FOR INFRASTRUCTURE IMPROVEMENTS

Check all that apply: Roads / Sidewalk Sewer Stormwater Water

1. The undersigned hereby makes application to the Town of La Conner, Skagit County, Washington, for permission to construct and install an improvement and/or extension of the Town's infrastructure in public rights-of-way under the Town's franchise and/or on easements over private property to connect to the Town's existing infrastructure, all of which are subject to the approval of the Town.
2. A check for \$1,500 for application fee is attached. The \$1,500 fee shall be used by the Town to cover all preliminary engineering, legal and administrative costs incurred by the Town in reviewing this application and preparing an Infrastructure Improvement Agreement (IIA).
3. Describe briefly the proposed scope and extent of your project (attach maps/sketches or additional sheets as necessary)

4. The proposed infrastructure improvements will be installed in roads and/or easements and/or on other approved public rights-of-way and shall be for the use and benefit of the property legally described as follows:

Common street address and legal description of the beneficial property (ies) which Developers warrant they are the legal owners of:

5. (a) Describe the type of improvements planned for the above-described property, i.e., single family residences, other individual residential units, or commercial usage, and the proposed number of units.

(b) Attach to the application three copies of each of the following:

- A preliminary plan setting forth the proposed development or infrastructure improvement: The plan shall include property boundary lines; an indication of type of development, if any; the location of roads, buildings, existing utilities, and/or other important features; type of building construction; and the number of units.
- A final or preliminary plat map or property map of the property to be developed.
- A contour map of the area with a five-foot or less contour interval: the datum shall conform to that described in Section C of this manual and the location of benchmarks shall be shown.
- Existing and proposed roadway profiles.

6. Set forth the proposed date for construction of the project and the anticipated completion date for the project:

Start of construction: _____
Completion of construction: _____

7. Has the Fire Marshall determined the required Fire or Sprinkler flow rate required?
Yes _____ Flow Required _____ GPM

8. Set forth common street address and telephone number of Developer:

9. Do you wish to be present at the meeting of the Town Council at which time your application will be reviewed?

Yes _____ No _____

10. (a) Have you made an application to Skagit County, Town of La Conner, or any other municipality having jurisdiction of the project for a building permit or for approval of a plat, a short plat, a rezone, or a planned unit development? If yes, list the name of the agency or agencies and type of action requested.

Name of Agencies

Dates Applied

(b) Have you prepared an environmental checklist, negative declaration, or EIS?

Yes _____ No _____

If yes, list name of lead agency:

Date of application: _____

If an EIS, negative declaration, or checklist has been completed, attach a copy.

11. Do you want the Town's Engineers to provide an estimate to prepare the infrastructure plan for the proposed project?

Yes _____ No _____

12. **Disclaimer:** In submitting this application and payment of fee, the applicant understands and agrees that the Town of La Conner does not imply or guarantee that the proposed project is feasible, permitable or that the Town of La Conner has sufficient capacity in any of the impacted utilities to allow additional connection. The Town can not anticipate the full extent of the proposed project implications and mitigating costs. Should the applicant elect to stop the project application review and or revise the proposed project the Town shall not refund any fees for which the Town has incurred costs.

13. Signatures and Contact Information

Signed by: _____

(Print Name)

Date: _____

Developer: _____

Address: _____

Telephone/Fax _____

Email: _____

Engineer: _____

Address: _____

Telephone/Fax _____

Email: _____

Architect: _____

Address: _____

Telephone/Fax _____

Email: _____

Town of La Conner

REVIEW OF THE APPLICATION FOR INFRASTRUCTURE IMPROVEMENTS RELATED TO DEVELOPMENT

Check all that apply: Sewer Water Stormwater Roads

1. Have all the questions in the application been adequately addressed?

Yes _____ No _____

Comments: _____

2. Upon submission of the preliminary plan to the Town, the Town's Engineer will set forth the capacity necessary for the contemplated improvement(s). Does the anticipated demand exceed the capacity of the proposed improvement(s) and/or system(s)?

Sewer: Yes _____ No _____

Water: Yes _____ No _____

Stormwater: Yes _____ No _____

Roads: Yes _____ No _____

Comments: _____

3. Can the development be served by gravity sewer?

Yes _____ No _____

4. Is a latecomer's charge, connection charge, or other charges against the real property subject of the developer extension?

Yes _____ No _____

5. Is the project within the Town limits

Yes _____ No _____

6. Does this project require an amendment to the Town's comprehensive plan?

Yes _____ No _____

7. The Town has reviewed the application.

Comments: _____

Prepared by: _____

Accepted by: _____

Rejected by: _____

SAMPLE

2. DESCRIPTION OF INFRASTRUCTURE IMPROVEMENTS AND OWNERSHIP

The proposed improvements will consist of approximately;

- _____ lineal feet of sewer pipe,
- _____ lineal feet of storm pipe,
- _____ lineal feet of water pipe,
- _____ lineal feet of roadway improvements,

and appurtenances and shall be installed in accordance with plans and specifications approved by the Town, and in accordance with the standards and conditions for constructing extensions to the Town’s utility and street system, the terms and conditions of which are attached hereto and made a part hereof.

Developer represents, guarantees, and warrants that it is the owner of said project as above described in Section No. 1.

3. FEES AND CHARGES

A. Project Deposit: All costs incurred by the Town on this project shall be borne by the Developer. The Developer shall deposit funds in an amount that shall be determined by the Town after review of the application. The funds shall be in payment for the costs to be incurred by the Town including, but not limited to, inspection, engineering, legal, financial, or other services performed by or for the Town relating to this project. The Developer shall be responsible for the payment of all actual costs incurred by the Town before the project is accepted by the Town. The funds shall be paid to the Town in compensation for the following work:

1. Preparation or review of utility and road system plans and specifications.
2. Construction inspection.
3. Communications regarding the Town requirements.
4. Review of as-built drawings.

B. Administrative Fee: In addition to the costs described in Section 3.A., a fee of 15 percent* of all costs described under Section 3 will be charged to cover the Town’s administrative costs, including recording fees, and shall be paid to the Town prior to acceptance.

*The 15 percent fee does not apply to design costs in the case where the Town’s Engineer performs the design work.

C. The remaining project deposit may be retained for one year after final acceptance, at which time all the unexpended fees will be returned to the Developer. This deposit will be used for warranty inspection and final acceptance procedures.

- D. Sewer System Isolation Deposit: Prior to starting sewer construction, a \$1,000 system isolation deposit shall be paid to the Town. The isolation device shall be in place and inspected by the Town prior to the start of construction. It shall remain in place and be functional during construction and shall not be removed without the authorization of the Town. If the above stipulations are not adhered to, the \$1,000 deposit shall be forfeited.

4. PAYMENT - SECURITY OF FEES

The Project Deposit described in Item 3 above shall be paid by the Developer to the Town as follows:

- A. One-half (1/2) of the fee at the time the Agreement is made.
- B. The remaining one-half (1/2) of the fee will be paid before construction begins.
- C. Final costs not covered by the original fee shall be paid before the infrastructure improvements are accepted by the Town.
- D. Any unpaid charges detailed herein shall be and become a lien on the property described in Paragraph 1 hereof.

5. ENGINEERING SUBMITTALS

The submittals shall be made in accordance with the Infrastructure Improvements Project Manual.

6. DESIGN AND CONSTRUCTION

The design and construction of the utilities and roads shall be subject to standards of design and construction set forth in the Town's *Infrastructure Improvements Project Manual*, the Town's "Uniform Development Code," the referenced standards in those documents, and as interpreted by the Town's Engineer.

7. EVIDENCE OF INSURANCE

(a) Developer and Developer's contractor shall assume responsibility for securing and maintaining, during the life of this Contract, public liability insurance for bodily injury and property damage liability including, without limitation, coverage for explosion, blasting, collapse and destruction of underground utilities (X.C.U.), and contingent liability, including product and contemplated operations and blanket contractual liability, which insurance shall protect Developer, the Town of La Conner and the Town of La Conner's engineers in the amounts specified in Sections (b)(1) and (b)(2) below and as specified in Section 00700-15 of the Developer Project Manual. Coverage shall also be obtained for environmental damage during the construction and the guarantee period, unless the Town of La Conner waives this coverage on account of Developer's inability to purchase same. Developer or contractor shall have the Town of La Conner and Town of La Conner engineers specifically added as additional named insureds in said policies, all at no cost to the Town of La Conner or Town of La Conner engineers. The above

insurance shall cover the Town of La Conner, Town of La Conner engineers, Developer and subcontractors for claims or damages of any nature whatever, including, but not limited to, bodily injury, including wrongful death, as well as other claims for property damage which may arise from operations under this Contract, whether such operations be performed by themselves or by any subcontractor or anyone directly or indirectly employed by either of them, and Developer agrees, in addition, to indemnify and save harmless the Town of La Conner and Town of La Conner engineers, or both, from all suits, claims, demands, judgments and attorney's fees, expenses or losses occasioned by the performance of this Contract by Developer, any subcontractor or persons working directly or indirectly for Developer, or on account of or in consequence of any neglect by any of said parties in safeguarding the work or failure to conform with the safety standards for construction work adopted by the Safety Division of the Department of Labor and Industries of the State of Washington.

(b) The minimum amount of such insurance shall be as follows:

(1) Bodily injury liability insurance in an amount not less than \$1,000,000.00 (One Million Dollars) for injuries, including accidental wrongful death, to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000.00 (One Million Dollars) on account of any one occurrence;

(2) Property damage liability insurance in an amount not less than \$1,000,000.00 (One Million Dollars) for each occurrence.

(c) Developer or contractor shall not cause any policy to be canceled or permitted to lapse, and all policies shall include a clause to the effect that the policy or certificate shall not be subject to cancellation, or to a reduction in the required limits of liability or amounts of insurance, or any other material change, until notice has been mailed to the Town of La Conner by certified mail, return receipt requested, stating when, not less than thirty (30) days thereafter, such cancellation or reduction or change shall be effective.

(d) All certificates of insurance, authenticated by the proper officers of the insurer, shall state in particular the names of those insured, the extent of the insurance, and the location, character or extent of the work to be performed by such contractor or subcontractor. Any determination of acceptance of lesser coverage shall rest solely with the Town of La Conner.

(e) Copies of all certificates of insurance shall be kept on file at the Town of La Conner office.

8. INDEMNIFICATION

A. Developer will indemnify and save the Town of La Conner and/or the Town of La Conner's agents harmless from all claims and costs of defense thereof, including (by illustration but not limitation) attorneys' fees, expert witness fees and the cost of the services of engineering and other personnel whose time is reasonably devoted to the preparation and attendance at depositions, hearings, arbitration proceedings, settlement conference and trials, growing out of the demands of the contractor, other property owners or subcontractors, laborers, workmen, mechanics, material men or suppliers, incurred in the performance and work necessary to complete the Developer Extension. Developer shall, at the Town of La Conner's request, furnish satisfactory evidence that all obligations of any nature described in this Contract have been satisfied, discharged, paid and/or waived.

B. In the event the Town of La Conner has waived the requirement for insurance coverage for environmental damage during construction and during the guarantee period, Owner's indemnification agreement, as set forth above, shall extend to any and all claims, including claims, citations, fines, penalties or other enforcement actions by governmental agencies, arising from harm or damage to the environment during construction of Developer's project or during the guarantee period.

9. PERFORMANCE BOND

The Developer and/or Developer's Contractor shall provide a performance bond as described below. The Town may accept a refundable cash deposit, amount to be determined by the Town, in lieu of the performance bond.

The Developer shall, prior to beginning construction, furnish the Town with a performance bond in penal sum equal to the amount of the construction cost, as determined by the Town, conditioned upon the performance by the Developer's Contractor of all undertakings, covenants, terms, conditions, and agreements with the Town, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work. Such bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in Washington State and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570.

The expense of these bonds shall be borne by the Developer. If at any time a surety on any such bond is declared a bankrupt or loses its right to do business in Washington State or is removed from the list, "Surety Companies Acceptable on Federal Bonds," the Developer shall substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Town.

10. MAINTENANCE BOND

In addition to the cash deposit or performance bond required by Item 9 hereof, the Developer shall provide a maintenance bond in the amount of fifteen percent (15%) of the construction costs attributable to any infrastructure improvement. Said bond shall guarantee maintenance for one (1) year after acceptance of the improvements by the Town and shall be in a form acceptable to the Town.

11. EASEMENTS

All required easements shall be obtained by the Developer at his or her sole cost and expense. The easement legal description shall be prepared by a licensed professional surveyor and shall bear his or her seal. The Town Engineer will place the easement on the proper form and it will be returned to the Developer for signature. Where applicable, the Developer shall provide an easement compatible with the Town's Comprehensive Plan(s) to ensure continuation of the utility line or right-of-way. At the completion of construction and prior to Town acceptance of the improvements, the Developer shall deliver all final signed easements to the Town.

The Developer shall obtain all easements required for intervening properties prior to commencement of construction.

12. PERMITS

All the necessary permits shall be obtained by the Developer. The Town shall be provided with a copy of all such permits before construction begins.

13. ELEVATION AND ALIGNMENT CONTROL

The Developer is solely responsible for establishing and maintaining horizontal and vertical control. Town construction approval or inspection does not warranty or imply the accuracy of the Developer's Contractor. The Developer shall advise the Town in writing of any changes which may be contemplated during construction.

14. CONNECTION TO THE TOWN'S SYSTEMS

Not less than 48 hours prior to the time that the Developer desires connection to the Town's systems, written application for permission to make the actual connection at a specified time shall be made by the Developer. All new connections to the existing systems and all testing of the new line shall require authorization of the Town and shall be conducted in the presence of the Town's representative(s).

15. FINAL ACCEPTANCE

The Town agrees to accept title to the improvements after all work is complete and after the Town makes a final inspection to determine that each system is completed in accordance with the plans and specifications. Acceptance of said improvements shall be by resolution of the Town Council upon receipt of a completed, executed conveyance of utility facilities and payment in full of all fees and charges.

16. CONVEYANCE OF CONSTRUCTED FACILITY

The Developer agrees to execute a conveyance of facility (bill of sale) approved by the Attorney for the Town within sixty (60) days of the approved and completed infrastructure improvements. Said conveyance will provide for transfer of title of the constructed infrastructure from the Developer to the Town and will further include the following items and statements:

- A. Cost, including administration, legal and engineering fees, as applicable, for each respective utility component.
- B. A statement indicating that the Developer is the lawful owner of said property and it is free from all encumbrances.
- C. A statement indicating that all bills for labor and material have been paid.
- D. A statement indicating that the Developer has the right to transfer said title and will warrant and defend the same against lawful claims and demands of all persons for one (1) year from the date of the conveyance of facility.
- E. Consideration shall be recited that the Developer grants the infrastructure to the Town for the consideration of incorporating the system(s) in the overall utility system of the Town.
- F. A statement indicating that the Developer further warrants that the constructed system will remain in working order and condition for a period of one (1) year from the date of the conveyance of the facility(ies) except where abused or neglected by the Town, and that the Developer will repair or replace at his own expense any work or material that may prove to be defective during said one (1) year period of warranty.
- G. In the event that the Town resorts to legal counsel to enforce the warranty, the Town shall receive its attorney's fees.

17. PAYBACK AGREEMENT EXECUTION AND RECORDING

Following receipt of the conveyance of facility as heretofore described, the Town agrees to execute and record a payback agreement. Said payback agreement will provide as follows:

- A. For water and sewer facilities, the parties agree to be bound pursuant to the terms of the “Municipal Water and Sewer Facilities Act,” Chapter 35.91 RCW.
- B. The Developer has constructed and installed the facilities in the general vicinity (describe the vicinity) as portrayed by a map attached and made a part of the payback agreement.
- C. That said conveyance of the facilities has been attached to the payback agreement.
- D. That the facilities have been accepted by the Town and that the Developer will be supplied with water and sewer service at the rate established by the Town for their class of service.
- E. That the payback agreement will continue for a period of ten (10) years from the date of the agreement wherein the Town will agree to reimburse the Developer and his assigns in accordance with the agreement the pro-rata share of the construction of said facilities.
- F. The owner of real estate who subsequently taps into, uses, or connects to the constructed facilities pursuant to this agreement will be charged a fair pro-rata share of the costs of the construction of these facilities.
- G. No person, firm or corporation shall use the facilities or extensions thereof during the period of time prescribed in such contract without first paying to the Town the full amount required by the provisions of the contract. All amounts so received by the Town shall be paid out by it under the terms of that contract within sixty (60) days after the receipt thereof.

18. RESPONSIBILITY FOR PROJECT MANAGEMENT

The Developer shall be responsible for project management and coordination. Project management includes, but is not limited to, overall project coordination, which encompasses utility and road locations and elevations.

19. AGREEMENT OF RESTRICTION

This Agreement is intended to be an Agreement of Restriction encumbering the said development as legally described in paragraph 1 above until such performance by the Developer of all of the terms and conditions contained herein, including any and all

payments required to be made to Town for connection charges and any other obligations from Developer to the Town.

20. OTHER AGREEMENTS

The Developer shall, under no circumstances, make and/or enter into any agreements or contracts with other property owners, whether within or without the confines of the Town of La Conner, concerning utility services to their properties without the prior written consent of the Town.

21. CONVEYANCE OF TITLE

In the event the Developer conveys title to the subject tract prior to connection of any lot or lots, it shall then be the full responsibility of the Developer to locate the existing utility stub for any subsequent owners or developers.

22. BINDING

This Agreement is binding on the heirs, successors, and assigns of each of the parties hereto.

23. AGREEMENT

I, _____, the owner of the herein described property have read and accept the terms and conditions set forth in this Agreement.

TOWN OF La CONNER

Upon compliance with the terms and conditions of this Agreement by the above-named Developer, the Town of La Conner will accept said infrastructure improvements.

By: _____
Mayor
Town of La Conner

SECTION C: ENGINEERING AND CONSTRUCTION

DESIGN CRITERIA - GENERAL

Improvements shall be made in accordance with this manual. Where special conditions exist, certain requirements may be modified at the Town's discretion. Included in this section are sample plans showing typical infrastructure designs. Drafting of plans for the Town shall conform to these examples.

1. Available Information

The Town and its consultants do not ensure the correctness of the information supplied to the Developer from the Town's records. The Developer shall verify by survey any information provided by the Town prior to using the information in design or construction.

2. Build-Thru

All improvements must conform to the standards of the Town and the requirements of the county and state, when appropriate and as noted elsewhere in this manual. In conjunction with prudent comprehensive planning and to ensure the availability of infrastructure connections to adjacent parcels, it is the Town's policy to have the Developer extend the system to points on a project site that will facilitate future extension of the system. This will, in most cases, cause the system to be extended to the opposite side(s) of the project site from the point of available service.

3. Electrical / Mechanical Design

If the infrastructure improvement necessitates the installation of a pump station or any other infrastructure system that requires electricity for operation, the Town will design such systems. The Developer will bear the costs for the design, and install the system(s).

4. Oversizing

Certain improvements may serve future build-out either within or beyond the boundaries of the proposed infrastructure improvements service area. In some cases, infrastructure oversizing may be required to accommodate demanding conditions such as fighting fires or managing severe storms. The Town will evaluate and establish sizing requirements. The Town may participate in the cost of oversizing buried infrastructure; typically by providing materials.

5. Latecomers Agreement

In locations where infrastructure construction will serve future development not included in the proposed project, the Developer may apply for the establishment of an assessment reimbursement area as described in LCMC 15.85.040 et seq. The reimbursement application form, or latecomers agreement application, is included in Section D.

6. Datum

The design of all facilities shall be based on the North American Vertical Datum of 1988 (NAVD88). Prior to 2008, most of the Town’s record drawings referenced the vertical datum to the National Geodetic Vertical Datum (NGVD)–1929. Because design calculations and connections are based on system slopes and elevations, it is important that plan submittals investigate and properly show the correct existing and proposed elevation information.

Attached is a map, **Datum Points and Locations** that show several existing reference marks (benchmarks) located through out the Town and their elevations in both NAVD88 and NGVD datums. Following the map is a detailed description of each monument.

The correlation between NAVD88, NGVD and TIDAL datums, for the La Conner area is listed below. Local surveyors may be able to supply additional references that would be acceptable, provided that they can prove consistency with the cited benchmarks. Should any discrepancy arise, the RM2 benchmark shall be the controlling reference point.

The Datum and local benchmark shall be shown on all construction plans.

TABLE C-1: ELEVATION REFERENCE MARKS			
To Convert	NAVD 10.00	NGVD 6.21 (NAVD-3.79)	TIDAL 11.51 (NAVD+1.51)
Reference Mark	NAVD88 (elev. Ft.)	NGVD (elev. Ft.)	Description of Location
RM2 (Town Control Point)	8.98	5.19	Standard disk, stamped “TIDAL 4 REST 1967”, set in southeast corner of concrete foundation about 200 feet northeast of centerline of intersection of Third and Morris Streets, 90 feet south of centerline of Centre Street. Back of 315 Morris Street

Note: A Land Surveyor licensed in the State of Washington will typically be required to provide all control elevations, base surveys and datum conversions for use with infrastructure improvements.

7. Engineering Reports and Design Calculations

Infrastructure designs shall be based on the standards referenced in this manual. Calculations and reports to support the designs shall be submitted along with the construction plan(s). Details to support the requirements of the Town's Uniform Development Code should be shown on the drawings or provided in reports, particularly if the proposed design differs from the design standards. Reports may include, but not be limited to, the following subjects:

- Hydraulic analysis.
- Soils/steep slopes/geotechnical.
- Wetlands.
- Drainage.
- Biological survey/shoreline studies/significant tree survey.
- Traffic impacts.
- Pavement thickness.
- Structural, foundation, and stability calculations for retaining walls, bridges, embankments, etc.

8. Construction Plan Sets

- 8.1. Initial plan sets, submitted for review, may be on plain paper (bond).
- 8.2. Plans shall be on plan-profile 22- x 34-inch sheets (plan and profile on same sheet). Profile grid shall have 10 horizontal lines per inch and 1 vertical line per inch equally spaced.
- 8.3. Scales: horizontal shall be 1 inch equals 50 feet; vertical shall be 1 inch equals 5 feet.
- 8.4. The minimum text height shall be 0.12 inches.
- 8.5. The plans shall be stamped by a Professional Engineer licensed in Washington.
- 8.6. Plans shall have a north arrow, datum, and legend.
- 8.7. The cover sheet shall include the following:
 - A. A vicinity map showing the project's location relative to the nearest intersection.
 - B. An overall drawing of the proposed construction area including street names and lot numbers, and an outline of the project.
 - C. A legal description of the site.
 - D. The name of the Developer and Engineer.
- 8.8. If the improvements are part of a phased development, a plan of the entire development shall be included, with the current phase clearly indicated as well as a schedule for implementation of the subsequent phases.

- 8.9. A detail sheet shall show all design details and specifications for construction not addressed in or varying from the Towns Standards.
- 8.10. Each utility or road improvement will typically be required be shown on its own separate sheet. At the Town Engineer's discretion, small or very simple plans may be exempt from this requirement.
- 8.11. Drafting shall conform with the Sample Plan, included in this manual. Improvements to be constructed shall be shown with solid lines; existing improvements shall be shown with dashed lines or screened back; future improvements shall be shown with dotted lines.
- 8.12. Include on the drawings the text contained in the General Notes section.
- 8.13. The designer may reference the Town's Standard Details, which do not need to be reproduced as part of the plan set.

9. Submittals

The Developer shall submit three (3) sets of plans to the Town for review. Once the plans have been determined to meet the Town standards, a final set of reproducible plans shall be submitted to the Town. These reproducible plans shall receive the Town's "Plan Review" approval stamp. The Town shall submit the plans to the regulatory agencies for approval, as applicable. After approvals have been received, a set of plans stamped "Issued for Construction" shall be made available to the Developer.

INFRASTRUCTURE-SPECIFIC CRITERIA:

Infrastructure that conforms to the Town's land use code must be provided to support proposed development. Criteria specific to each system are listed below.

A. Sewers

1. General:
 - a. Unless otherwise specified by the Town, the design shall meet or exceed the requirements of the most recent edition of Washington State Department of Ecology's (DOE's) *Criteria for Sewage Works Design*.
 - b. Under no condition shall stormwater or site drainage be connected to the sewer system.

2. Ownership:
 - a. All sewer lines and appurtenances, when accepted, shall become and remain the exclusive property of the Town.
 - b. Town ownership and responsibility shall end at the property or easement line, unless otherwise stated in the Town's letter of final acceptance.

3. Mainline:
 - a. Flow Development:
 - i. Residential - 85 gallons per capita per day plus Inflow and Infiltration (I/I).
 - ii. Commercial – Developed from proposed use or existing water consumption records plus I/I.
 - iii. I/I – 600 gallons per acre day for new systems, 1100 gallons per acre day for aged systems.
 - b. The sewer system improvements shall be sized and routed to meet the following criteria:
 - i. The sewer main diameter shall be a minimum of 8 inches, and may need to be larger as required for future service.
 - ii. See Table C-2 for minimum allowable pipe slopes.
 - iii. Slopes shall be expressed to two decimal places if shown as a percentage or to four decimal places if expressed as a ratio (i.e., feet of rise per feet of run).
 - iv. Where feasible, sewer mains shall be routed along the right-of-way centerline.
 - v. Extend the sewer main to serve all lots or structures in the proposed development so as to limit the length of side sewers to a maximum of 150 feet.
 - vi. Where the new system is to be connected to the existing system, there shall be the following notation on the plans: "Contractor to verify invert prior to construction."
 - vii. Extend the sewer main through the property for potential future connection.

TABLE C-2: MINIMUM SLOPES FOR SEWER PIPE	
Pipe Size (inches)	Slope (feet/foot)
8 *cr	0.0050
8 *de	0.0075
10	0.0040
12	0.0003
15	0.0025
18	0.0020
* cr = continuous or extendible run de = dead end or terminating run	

- c. Ductile iron pipe and pipe anchors shall be specified for all slopes 20 percent and greater.
 - d. Bedding material shall have characteristics that allow it to be readily compacted. Pea gravel is not allowed.
 - e. Pipes shall have a 4-foot minimum cover.
 - f. All pipes 8 inches and larger shall terminate at a manhole.
 - g. Where smaller diameter upstream pipe meets a larger diameter downstream pipe, the inverts at the manhole shall be determined by matching pipe crowns.
 - h. Design system so that each building's first (lowest) floor elevation is at least one foot higher than rim of first manhole upstream from point of side sewer connection.
4. Manholes:
- a. Manhole numbers are obtained from the Town's Engineer.
 - b. Manholes shall be 48" precast concrete structures conforming to the Town's Standard Detail.
 - c. Manholes shall have a minimum depth of 7 feet.
 - d. Terminal manholes where future connection/extension may occur shall not be channeled. A grouted bottom sloping to the outlet shall be constructed.
 - e. Joints between precast manhole sections shall be gasketed and grouted inside and outside.
 - f. Safety steps shall be used.
 - g. Manhole covers shall be locking type conforming to the Town's Standard Detail.
 - h. All-weather vehicular access suitable for the Town's maintenance vehicles shall be provided to all manholes and/or cleanouts unless waived by the Town.
 - i. A concrete or asphalt ring, extending 12" beyond the cover frame, shall be used on all manholes that are set outside of paved roadways.

5. Side sewers:
 - a. Approximate stub locations shall be shown on the plans.
 - b. Where feasible, one side sewer stub may serve two adjacent lots, per the Standard Detail. Otherwise, each building or lot to be served shall have its own side sewer extending from the sewer main. Each lot's property corners shall be staked.
 - c. Joint-Use side sewers of three (3) or more residential units may be connected to a single 6" side sewer stub where specifically approved by the Town Engineer and designed in compliance with the WA Dept. of Ecology – Criteria for Sewage Works Design (latest edition).
 - d. Joint-Use side sewers shall have a 6" cleanout at the property/right-of way line and at each upstream wye. All 6" cleanouts shall extend to grade and be set in either concrete or asphalt aprons at least 24" in diameter.
 - e. Joint-Use Maintenance Agreements are required when a property owner requires sewer service through another property, or when two or more sewer services are provided thru a common, privately owned, sewer connection.
 - f. Where commercial or multiple dwellings are to be constructed, stubs should be taken from the manhole. The number of units in each multiple dwelling complex shall be indicated. The anticipated peak flows for commercial and industrial complexes shall be noted.
 - g. The pipe diameter shall be 6 inches and extend a minimum of 5 feet inside the property line.
 - h. Cleanouts shall be used; 6 x 6 inch tees or wyes shall be installed at the end of each side sewer.
 - i. The maximum slope is 2 feet vertical to 1 foot horizontal and the minimum slope is 2 percent.
 - j. Side sewer termination locations shall be marked with 2 x 4s.
 - k. No side sewer shall be covered without first being inspected.
6. Pump stations: Developments that may require a pump station to provide sewer service shall be submitted to the Town for approval prior to plans being prepared. The Town will review the proposal and consider any alternatives prior to making a decision as to whether the pump station will be allowed. Electrical/Mechanical design will be provided by the Town and paid for by the Developer.
7. Materials and Construction: Refer to the Town's Standard Specifications and Standard Details contained in this manual.

B. Water

1. Design standards: The basis for the Town's standards and specifications are based on meeting or exceeding the following standards (latest editions), which are hereby incorporated by reference:
 - a. *Standard Specifications for Road, Bridge and Municipal Construction*, Washington State Department of Transportation (WSDOT), www.wsdot.wa.gov/fasc/EngineeringPublications
 - b. Standards of the American Water Works Association
 - c. *Uniform Plumbing Code* and installation standards, International Association of Plumbing and Mechanical Codes
 - d. *International Building Code*, International Code Council
 - e. *Water System Design Manual*, Washington State Department of Health, www.doh.wa.gov/ehp/dw/publications/design.htm
2. Flows and Pipe Sizing:
 - a. Minimum acceptable pipe size is 4".
 - b. Pipe design hydraulic basis:
 - i. Residential = 100 gallons per capita per day.
 - ii. Commercial / Industrial = calculated per zoning and proposed use.
 - c. Fire and Sprinkler – Per Town and/or County Fire Marshall requirements.
 - i. Residential fire hydrants minimum = 1000 gpm
3. Ownership:
 - a. All water lines and appurtenances, when accepted, shall become and remain the exclusive property of the Town.
 - b. Town ownership and responsibility shall end at the meter or detector check valve, unless otherwise stated in the Town's letter of final acceptance.
 - c. Town ownership and responsibility for double check detector backflow assemblies shall end at the gate valve in the water main at the point the fire service line is connected on easements on private property or at the property line on public rights-of-way.
4. Pressure:
 - a. A minimum of 40 psi will be provided at customer meters during normal conditions not including a fire or emergency.
 - i. During peak hour conditions, the system will provide a minimum pressure of 30 psi at any customer meter.
 - ii. Systems will be designed to minimize pressure fluctuations between normal and peak hourly design conditions.
 - b. All new service connections where normal pressure exceeds 80 psi will include the installation of a pressure-reducing valve (PRV) at the meter. The PRV will be owned and maintained by the Town.
 - c. During fire flow conditions, the pressure at any major risk location and in the remainder of the system will be no less than 20 psi.

5. Velocities:
 - a. Under normal demand conditions, the velocity of water in a transmission main should be less than four feet per second (fps).
 - b. Under emergency conditions such as fire, the velocity of water in a transmission main should be less than eight fps.

6. Pipe layout:
 - a. All water pipe shall be designed to lie in public road right-of-way or, if not available, on a dedicated, recorded utility easement. Preferably under the north or west roadway shoulder.
 - b. Pipe shall be designed for a maximum trench depth of 48 inches and a minimum depth to top of pipe of 36 inches.
 - c. All pipe shall maintain a positive or negative slope between respective high and low points in the water line. High points shall be fitted with air-vacuum release assemblies and low points shall be fitted with flushing assemblies, as deemed necessary by the Town.
 - d. Looping of the system is to be maximized.

7. Domestic water services:
 - a. Platted areas: Water mains shall include the installation of water service line to common or individual lot corners.
 - b. Non-platted areas: New services may be located by the customer.
 - c. Materials: Water service installation shall include all materials indicated on the appropriate standard detail.
 - d. Service lines that are part of water main improvements shall be installed concurrent with the water main installation. Services shall be connected to the water mains and extended to the customer's lot line, with a tailpiece extended above the ground, prior to pressure and bacteriological testing of the water main, if applicable. The cost of service lines installed as part of water main improvements shall be borne by the customer.

8. Fire hydrants:
 - a. Place hydrants so that any portion of a structure is within 400 accessible feet and as directed by Town.
 - b. Place a double-sided blue reflector in the center of the adjacent pavement perpendicular to the fire hydrant location.

9. Materials and Construction: Refer to the Town's Standard Specifications and Standard Details contained in this manual.

C. Stormwater

1. Design standards: The Town's standards and specifications are based on meeting or exceeding the *Stormwater Management Manual for Western Washington*, DOE, (www.ecy.wa.gov/programs/wq/stormwater/manual.html) and WSDOT's *Hydraulic Manual*, (www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/HydraulicsManual.pdf) the latest editions of which are hereby incorporated by reference.
2. Flows and Pipe Sizing:
 - a. Flows and calculations shall be based on the Western Washington Hydraulic Model (DOE).
 - b. Pipe Size:
 - i. Conveyance = minimum 12".
 - ii. Collector = minimum 8".
3. Ownership:
 - a. All stormwater pipes and appurtenances, when accepted, shall become and remain the exclusive property of the Town.
 - b. Town ownership and responsibility shall end at the terminating structure , unless otherwise stated in the Town's letter of final acceptance.
4. Materials and Construction: Refer to the Town's Standard Specifications and Standard Details contained in this manual.

D. Roads

1. Design standards: The Town's public street and sidewalk design standards are based on meeting or exceeding those provided herein or as referenced. Where standards are not specifically provided, WSDOT standards shall apply and include the latest editions of *Standard Specifications for Road, Bridge, and Municipal Construction and the Standard Plans, M 41-10*, found at www.wsdot.wa.gov/eesc/design/designstandards/HTM/TOC.htm and WSDOT's *Design Manual, M 22-01*, found at www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/DesignManual.pdf.
2. Trenching & Patching:
 - a. Existing roads resurfaced within the past five (5) years – Resurface the roadway, either half or full width depending upon the location and extent of the asphalt cut and extending at least twenty (20) lf either side.
 - b. Existing roads – Trench patch per Standard Detail.
 - c. Concrete Roads – Replace full concrete panel that is impacted.

3. The extent of street improvements associated with development shall be for the full distance of the property being developed. The width of the improvements shall be according to Table C-3 and the Town’s Standard Roadway Sections.

TABLE C-3: PUBLIC STREET IMPROVEMENT REQUIREMENTS		
Project Size	Pavement Width¹	Sidewalks and Street Lighting
2 – 4 units, residential 0 – 5,000 square feet (SF) commercial 0 – 10,000 SF industrial	Provide half of pavement width plus 10 feet; curb required on project side	Provide sidewalk on project side. No street lighting required.
5 – 20 residential lots 5,000 – 10,000 SF commercial 10,000 – 20,000 SF industrial	Provide full pavement width; curb required on project side	Provide sidewalk on project side. Street lighting required on project side.
More than: 20 units, residential 10,000 SF commercial 20,000 SF industrial	Provide full pavement width; curb required on project side	Provide sidewalk on project side. Street lighting required on project side.

¹ Refer to Section E for design illustrations

4. Curves:
 - a. Horizontal curves: Where a deflection angle of more than 10 degrees in a street alignment occurs, a curve of reasonably long radius shall be introduced, subject to review and approval by the Town’s Engineer.
 - b. Vertical curves: All changes in grade shall be connected by vertical curves of a minimum length of 200 feet unless specified otherwise by the Town’s Engineer.
 - c. Tangents for reverse curves: A tangent of at least 200 feet in length shall be provided between reverse curves for arterials, 150 feet for collectors, and 100 feet for residential access streets.
5. Arterial streets:
 - a. Rights-of-way shall be 60 feet to 150 feet in width as determined by the Town. The design standards will be established on a case-by-case basis in accordance with the existing layout and the Town’s comprehensive plan.
 - b. Grades shall not exceed 10 percent.
 - c. Pavement thickness design for new or widened arterials shall be based on standard engineering procedures. A minimum of 4” is required.
6. Cul-de-sacs shall have a minimum paved radius of 45 feet with a right-of-way radius of 55 feet.
7. Alleys may be used for vehicular access to adjacent lots but are not to be considered as primary access for emergency vehicles. The alley right-of-way shall be 20 feet.

8. Private streets, when allowed:
 - a. The easement shall be a minimum of 26 feet and the pavement shall be at least 20 feet wide.
 - b. The turn-around must be as approved by the Town's Engineer and Fire Chief.
 - c. Drainage improvements to meet the standards described herein must be provided.
 - d. The street section shall equal the section as shown in this manual's standard details.
 - e. The grade shall not exceed 15 percent except as approved by the Town's Engineer.

CONSTRUCTION INFORMATION

1. An approved copy of construction plans must be on site whenever construction is in progress.
2. It shall be the sole responsibility of the contractor to obtain street use and any other related permits prior to any construction activity in the Town right-of-way.
3. Prior to any construction activity, the Town must be contacted for a preconstruction meeting.
4. All locations of existing utilities supplied by the Town have been obtained from available records and should therefore be considered approximate only and not necessarily complete. It is the sole responsibility of the contractor to independently verify the accuracy of all utility locations, and to further discover and avoid any other utilities that may be affected by his work by calling the utilities underground location service at 1-800-424-5555 prior to construction. The contractor shall immediately contact the owner if a conflict exists.
5. All material shall be new and undamaged, of an approved brand, and with replacement and repair parts, if applicable, readily available in the general Bellingham/Everett/Seattle area.
6. All materials shall be approved by the Town prior to installation.
7. The inspector shall be notified 2 working days in advance of construction. Where work is to be done on the weekend, the inspector shall be notified one week in advance of such work.
8. For sewer and storm drains, if applicable, cut sheets shall be given to the inspector two working days in advance of construction for the purpose of checking. All cut sheets used on the job site shall be issued through the Town's inspector. Line and grade shall be checked at each hub. Cut sheets shall show cuts at the first 25- and 50-foot stations out of each downstream manhole, then every 50 feet thereafter and at all manholes.
9. At the Public Works Director's discretion, prior to commencing any construction, the Developer shall provide photographs depicting pre-existing roadway conditions. Photographs, when required, shall be taken every 50 feet in paved areas or at any other location as specified by the Public Works Director. The photos shall be provided electronically on a CD with an accompanying electronic document describing each photo.
10. Signing, flagging, and traffic control shall be in accordance with this manual and the most recent editions of the WSDOT Traffic Manual and the Manual of Uniform Traffic Control Devices.

11. Existing drainage ditches, culverts, etc., shall be kept clean at all times. Temporary diversion of any drainage system will not be permitted without the consent of the Public Works Director. Any drainage culvert, catch basin, manhole, or other drainage structure disturbed by excavation shall be replaced with new material or repaired to the satisfaction of the Public Works Director. Temporary erosion/sediment control measures shall be employed to protect adjacent property and storm drain facilities.
12. Gravel shoulders disturbed by excavation shall be shaped to Town standards and provided with a minimum of 2 inches compacted crushed surfacing top course gravel.
13. If, in the opinion of the Public Works Director, weather conditions deteriorate to the point where the traveled roadways are unsafe for the public or detrimental to the restoration of the roadway, excavation shall cease immediately and cleanup shall be promptly accomplished.
14. All pipe or other material stored along Town right-of-way must be placed at a safe distance from the traveled roadway in such a manner as to avoid falling onto the roadway.
15. No excess or unsuitable material shall be wasted on Town right-of-way. Any such material dumped on private property may require a grading permit. Verify with the Town's Planning Department.
16. Street surfaces shall be cleaned at the end of each day's operation with a power broom or other approved means.
17. No open cut crossing of Town roads or streets shall be made without the prior approval of the Public Works Director.
18. The Maximum amount of open trench on streets shall be 500 feet. At the end of each day, all ditches must be Backfilled or covered with steel plates.
19. Final cleanup—including complete restoration of shoulders; cleaning of ditches, culverts, and catch basins; and removal of loose material from back slopes of ditches—shall not be more than 1,500 lineal feet behind excavation operations or as required by the Public Works Director.
20. The permittee will be responsible to coordinate with Washington State Department of Natural Resources for any conflict between permit work and existing monumentation.
21. To remove existing asbestos cement pipe from trenches, a fee and permit is required from the Northwest Clean Air Agency (www.nwcleanair.org). In addition, Washington State Department of Labor and Industries requires that operators removing asbestos cement pipe be certified.
22. The contractor's Certificate of Insurance and Performance Bond shall be provided to the Town prior to the start of construction.

23. Construction certification and follow-up procedures:
 - b. All infrastructure system construction activity must be coordinated through the Town.
 - c. The Town will inspect the construction and will observe testing prior to authorizing connection to an existing system. All inspection and testing costs are to be paid by the Developer.
 - d. Testing may include soils paving compaction, pressure, and purity, as applicable.
 - e. Backflow prevention devices must be initially tested and certified prior to being placed into service.

EASEMENTS

Legal descriptions for easements for all portions of the utilities that lie outside of public street right-of-ways shall be signed and stamped by a professional surveyor and transmitted to the Town. The easements shall extend 5 feet beyond the utilities' centerlines and the utilities shall be centered in the easement with the appropriate separation. There shall be a separate easement provided for each lot that a utility crosses. These easements are required by the Town regardless of easements recorded with property deeds or plats.

Easements must be approved by the Town before any connections are made.

MODIFICATION OF PLANS FOR THE CONSTRUCTION RECORD—"AS-BUILTS"

When the Contractor completes the work within the rights-of-ways and easements and the surface features—if applicable—have been adjusted to the finish grade, the plans shall be revised to conform to the construction record. The location of the underground features, including manhole inverts and horizontal alignment, shall be verified by a professional land surveyor. The drawings shall include the current date and final plat information including right-of-ways and easements. The as-built drawings shall certify that the facility has been constructed as shown on the as-built plans and meets the approved plans and specifications.

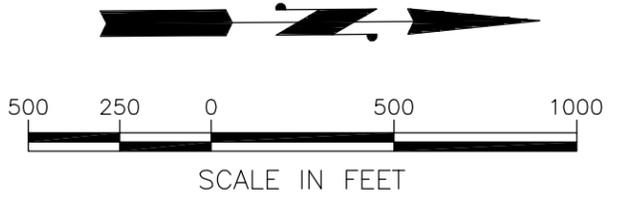
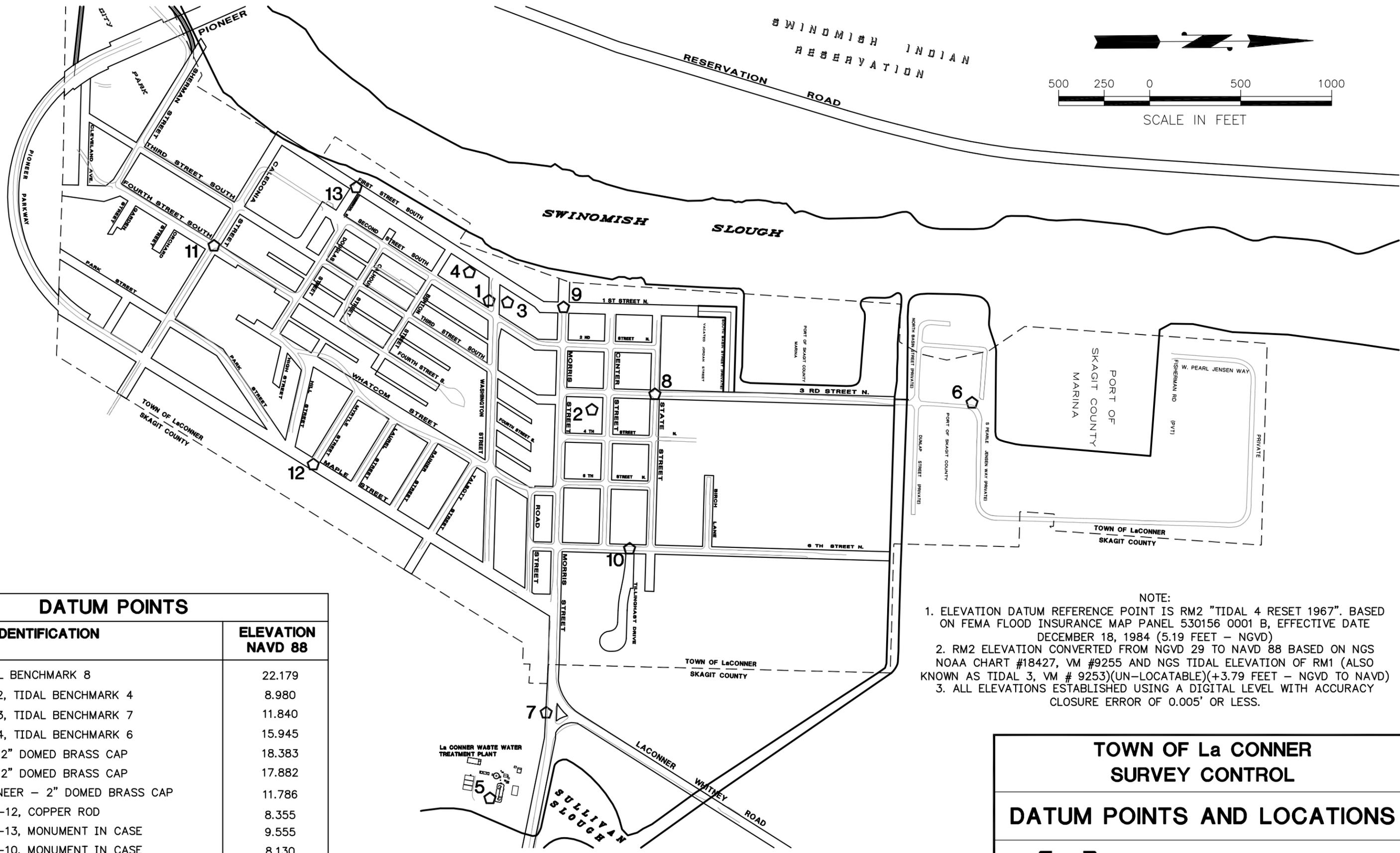
An as-built mylar and two sets of prints, stamped by an engineer licensed in the State of Washington, shall be submitted to the Town within 30 days of final inspection. In addition, an electronic file of all final as-built drawings using AutoCAD 2000 or later shall be submitted to the Town on a CD or DVD.

GENERAL NOTES

The text below is to be included on the construction drawings.

1. All construction shall conform to the requirements of the Town of La Conner that are contained in a bound volume entitled "Infrastructure Improvements Project Manual."
2. The location of the existing utilities shown on the drawing is approximate. Location and protection of underground utilities shall be in accordance with Chapter 19.122 RCW. Call 800-424-5555 at least two business days before any excavation.
3. Replace any damaged or destroyed monuments.
4. This plan and profile information has been furnished by the developer or his engineer.
5. Minimum separation between sanitary sewers and potable water lines shall be 10 feet horizontally (measured side to side) and 18 inches vertically from bottom of water line to crown of sewer. Minimum vertical separation for perpendicular or oblique crossings shall be 3 feet from outside edges. Situations that require less than minimum separation shall be constructed in accordance with DOE's "Criteria for Sewage Works Design", latest edition.
6. The Developer shall be responsible for acquiring all necessary easements and agreements prior to construction.
7. A plug shall be placed in the outlet pipe of the existing manhole to which new pipe is to be connected or in the outlet of the first new manhole. This plug shall remain in place and may not be removed without the permission of the Town of La Conner. Removal will result in forfeiture of the system isolation deposit.

CAUTION - EXTREME HAZARD - Overhead electrical service lines are generally not shown on the drawings. Electrical lines shown on the drawings are located by point-to-point, power-pole-to-power-pole connection. The contractor is responsible for determining the extent of any hazard created by overhead electrical power in all areas and shall follow procedures during construction as required by law and regulation. Prior to construction, the contractor shall meet with utility owners and determine the extent of hazard and remedial measures, and shall take whatever precautions may be required.



DATUM POINTS		
REF NO.	IDENTIFICATION	ELEVATION NAVD 88
1	TIDAL BENCHMARK 8	22.179
2	RM 2, TIDAL BENCHMARK 4	8.980
3	RM 3, TIDAL BENCHMARK 7	11.840
4	RM 4, TIDAL BENCHMARK 6	15.945
5	SET 2" DOMED BRASS CAP	18.383
6	SET 2" DOMED BRASS CAP	17.882
7	PIONEER - 2" DOMED BRASS CAP	11.786
8	CHS-12, COPPER ROD	8.355
9	CHS-13, MONUMENT IN CASE	9.555
10	CHS-10, MONUMENT IN CASE	8.130
11	CHS-7, MONUMENT IN CASE	8.074
12	CHS-9, MONUMENT IN CASE	8.629
13	CHS-8, MONUMENT IN CASE	13.560

NOTE:
 1. ELEVATION DATUM REFERENCE POINT IS RM2 "TIDAL 4 RESET 1967". BASED ON FEMA FLOOD INSURANCE MAP PANEL 530156 0001 B, EFFECTIVE DATE DECEMBER 18, 1984 (5.19 FEET - NGVD)
 2. RM2 ELEVATION CONVERTED FROM NGVD 29 TO NAVD 88 BASED ON NGS NOAA CHART #18427, VM #9255 AND NGS TIDAL ELEVATION OF RM1 (ALSO KNOWN AS TIDAL 3, VM # 9253)(UN-LOCATABLE)(+3.79 FEET - NGVD TO NAVD)
 3. ALL ELEVATIONS ESTABLISHED USING A DIGITAL LEVEL WITH ACCURACY CLOSURE ERROR OF 0.005' OR LESS.

**TOWN OF La CONNER
SURVEY CONTROL**

DATUM POINTS AND LOCATIONS



**CHS
ENGINEERS**

12507 BEL-RED RD. STE. 101 BELLEVUE, WA 98005-2500
 www.chsengineers.com TEL 425-637-3693

REF NO. 1

Town of La Conner DATUM Points

IDENTIFICATION:

RM 1, Tidal Benchmark 8: Southwest corner of intersection of Washington and Second Streets at top of slope and southwest of 3" tree. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 511796.34
Easting: 1236473.77

NAVD88 Elevation: 22.179

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

3" brass disk set in concrete. Stamped: "TIDAL 8 1972" "US COAST & GEODETIC SURVEY BENCH MARK"

Town of La Conner DATUM Points

IDENTIFICATION:

RM 2, Tidal Benchmark 4: Behind Station House 315 Morris set in concrete pad at South face of building. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 512361.73

Easting: 1237072.22

NAVD88 Elevation: 8.980

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

3" brass disk set in concrete. Stamped: "TIDAL 4 RESET 1967" "US COAST & GEODETIC SURVEY BENCH MARK"

Town of La Conner DATUM Points

IDENTIFICATION:

RM 3, Tidal Benchmark 7: Set at South East corner of Post Office loading dock, 125 South First St. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 511898.44

Easting: 1236483.09

NAVD88 Elevation: 11.840

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT:

Project # 201400 - Control

MONUMENT DESCRIPTION:

3" brass disk set in loading dock. Stamped: "TIDAL 7 1972" "US COAST & GEODETIC SURVEY BENCH MARK"

REF NO. 4

Town of La Conner DATUM Points

IDENTIFICATION:

RM 4, Tidal Benchmark 6: Set in rock behind the Northeast corner of retail store at 509 First St. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 511688.37

Easting: 1236317.38

NAVD88 Elevation: 15.945

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

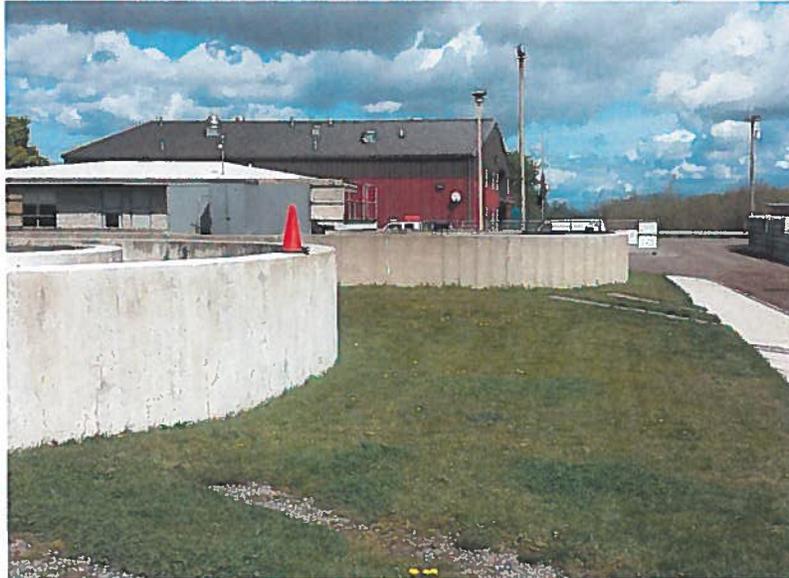
MONUMENT DESCRIPTION:

3" brass disk set in rock. Stamped: "TIDAL 6 1972" "US COAST & GEODETIC SURVEY BENCH MARK"

Town of La Conner DATUM Points

IDENTIFICATION:

Set 2" domed brass cap with punch on the top of East wall of Oxidation Ditch #2 at Waste Water Treatment Plant, La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 511801.68

Easting: 1239200.91

NAVD88 Elevation: 18.383

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

Set 2" domed brass cap with punch on the top of East wall of sewage treatment tank at sewage treatment site, Stamped:

Town of La Conner DATUM Points

IDENTIFICATION:

Set 2" domed brass cap with punch on the East edge of a 7.2' diameter round concrete pad on the West side of Third St. near the La Conner Marina, La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 514449.68
Easting: 1237032.70

NAVD88 Elevation: 17.882

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

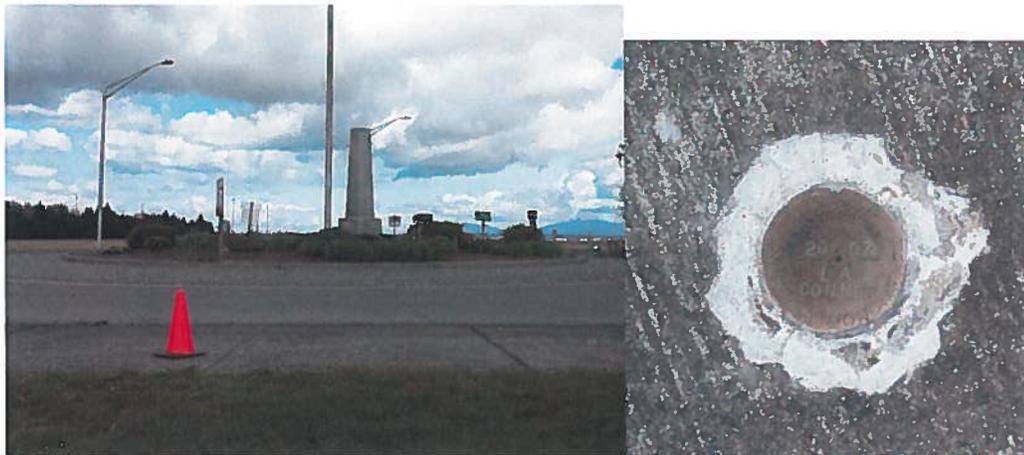
Set 2" domed brass cap with punch on the East edge of a 7.2' diameter round concrete pad on the West side of Third St. near the La Conner Marina. Stamped:

REF NO. 7

Town of La Conner DATUM Points

IDENTIFICATION:

La Conner Pioneers Monument - 2" domed brass cap with punch on the Southern quadrant of the traffic circle of Morris St. & La Conner Whitney Road, La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 512136.16

Easting: 1238766.39

NAVD88 Elevation: 11.786

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

2" domed brass cap with punch on the Southern quadrant of the traffic circle of Morris St. & La Conner Whitney Road, in the middle of the sidewalk. Stamped: "WSDOT 2007 LA CONNER"

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-12, Copper Rod: found 1/8" copper rod in concrete base in pot hole (no case) 0.3 deep at intersection of 3 rd St. and State St. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 512707.55
Easting: 1236987.26

NAVD88 Elevation: 8.355

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

Found 1/8" copper rod in pot hole in concrete base (no case) 0.3 deep at intersection of 3 rd St. and State St. La Conner, Skagit Co. Wa.

REF NO. 9

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-13, Monument in case: Found 2 ½” brass disk with punch, 0.6 ft. deep at intersection of First St. and Morris St. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 512205.81
Easting: 1236510.94

NAVD88 Elevation: 9.555

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

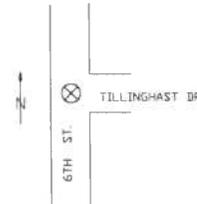
MONUMENT DESCRIPTION:

Found 2 ½” brass disk with punch, 0.6 ft. deep at intersection of First St. and Morris St.
La Conner, Skagit Co. Wa.

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-10, Monument in case: found 1/2" rebar with yellow plastic cap-- LS #22960 in 4" x 4" concrete base 0.4 ft. deep at intersection of N 6th St. and Tillinghast Dr. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 512568.69
Easting: 1237833.78

NAVD88 Elevation: 8.130

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

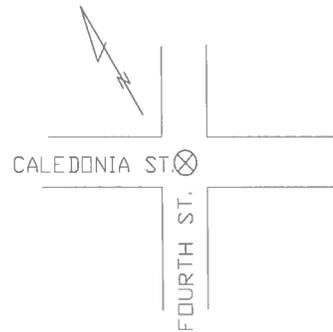
MONUMENT DESCRIPTION:

Found 1/2" rebar with yellow plastic cap-- LS #22960 in 4"x4" concrete base 0.4 ft. deep at intersection of N 6th St. and Tillinghast Dr. La Conner, Skagit Co. Wa.

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-7, Monument in case: found 1" iron pipe with lead and tack in case at intersection of 4th St. and Caledonia St. Depth 0.3ft. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 510285.33
Easting: 1236171.60

NAVD88 Elevation: 8.074

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

1" iron pipe with lead and tack in case at intersection of 4th St. and Caledonia St. Depth 0.3ft. La Conner, Skagit Co. Wa.

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-9, Monument in case: found 2 1/2" brass disk with punch in case 0.6 ft. deep at intersection of Myrtle St. and Maple Ave. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 510830.77
Easting: 1237369.89

NAVD88 Elevation: 8.629

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

2 1/2" brass disk with punch in case 0.6 ft. deep at intersection of Myrtle St. and Maple Ave. La Conner, Skagit Co.

Town of La Conner DATUM Points

IDENTIFICATION:

CHS-8, Monument in case: found 3" domed brass disk with punch in case 0.4 ft. deep at intersection of 1st St. and Commercial St. La Conner, Skagit Co. Wa.



COORDINATES: US STATE PLANE GPS WA N-4601 NAD83

Northing: 511066.68
Easting: 1235851.78

NAVD88 Elevation: 13.560

NGVD 29 = NAVD 88 - 3.79 FEET

REFERENCE DOCUMENT: Project # 201400 - Control

MONUMENT DESCRIPTION:

3" domed brass disk with punch in case 0.4 ft. deep at intersection of 1st St. and Commercial St. La Conner, Skagit Co. Wa.

SECTION D: STANDARD FORMS

This section includes examples of the forms that are typically needed over the course of a project that involves infrastructure improvements. The following forms are included herein:

- Performance and Payment Bond
- Easement Agreement
- Easement figure example
- Easement Release
- Conveyance of Facility
- Certification of Costs of Construction
- Release of Encumbrance
- Sample Insurance Form
- 11-Month Inspection Form
- Maintenance Bond Form
- Reimbursement (Latecomers) Form

Town of La Conner

PERFORMANCE AND PAYMENT BOND FOR INFRASTRUCTURE IMPROVEMENTS RELATED TO DEVELOPMENT

Project: _____

Project No.: _____ Bond No.: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, the Contractor named in the Agreement to perform infrastructure improvements, hereinafter referred to as PRINCIPAL, and _____ as SURETY, are held and firmly bound unto the State of Washington, and unto the Town of La Conner, hereinafter called the Owner named in said Agreement, in the penal sum of _____ DOLLARS (\$ _____), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, assigns, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has been permitted by the Owner via a written Agreement, dated _____, 20____, to provide such Work in connection with the _____ Project in La Conner, County of Skagit, State of Washington;

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform all of the provisions and fulfill all of the undertakings, covenants, terms, conditions and agreements of said Agreement during the period of the original Agreement and any extensions thereof that may be granted by the Owner, with or without notices to the Surety; and during the life of any guarantee required under the Agreement; and shall also well and truly perform and fulfill all of the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Agreement that may hereafter be made, notice of which modifications to the Surety being hereby waived; and furthermore shall pay all laborers, mechanics, and subcontractors and material men, and all persons who shall supply such person or persons and such principal or subcontractors with provisions and supplies for the carrying on of such work; and shall indemnify and save harmless the Owner from all costs and damage by reason of the Principal's default of or failure to do so; and shall pay the State of Washington sales and use taxes and amounts due said State pursuant to Titles 50 and 51 of the Revised Code of Washington, then this obligation shall be void, otherwise it shall remain in full force and effect.

IN WITNESS WHEREOF, the above bonded parties have executed this instrument under their separate seals this _____ day of _____, 20____, the name and corporate seal of each corporate party hereto affixed, and these presents duly signed by its undersigned representatives pursuant to authority of its governing body.

PRINCIPAL

TWO WITNESSES:

:

ATTEST (if Corporation):

By: _____

Title: _____

Corporate Seal:

SURETY

By: _____

Title: _____

CERTIFICATES AS TO CORPORATE SEAL

I hereby certify that I am the (Assistant) Secretary of the Corporation named as Principal in the within Bond, that _____ who signed the said Bond on behalf of the Principal was _____ of said Corporation, that I know his signature thereto is genuine, and that said Bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

Secretary or Assistant Secretary

After Recording Please Return To:

Attn:
Town of La Conner
Post Office Box 400, 2nd and Douglas
La Conner, Washington 98257
(360) 466-3125

Document Title(s): _____ Easement
Reference Number(s) of Documents Assigned or Released: _____
Grantor(s): (Print Last name, First name, and Initials) _____
1. _____
Grantee(s): Town of La Conner
Legal Description (abbreviated): _____
[] Additional legal description is on page one of document or attached.
Assessor's Property Tax Parcel / Account Number: _____

EASEMENT AGREEMENT

THIS AGREEMENT is made this ____ day of _____, 20____, by and between the TOWN OF LA CONNER, a municipal corporation of Skagit County, Washington, hereinafter termed "Grantee" and _____, hereinafter termed "Grantor".

WITNESSETH:

That the said Grantor, for valuable consideration, does by these presents grant unto the Grantee a perpetual right-of-way or easement for a utility corridor with the necessary appurtenances through, over, and across the following described property situated in Skagit County, Washington, more particularly described as follows:

<<Insert or attach stamped and signed legal description>>

a permanent easement over, across, along, in, upon and under the following described portion of the above-described property:

<<Insert or attach legal description of the easement>>

A sketch showing this easement and its location accompanies this description and by reference thereto is made a part hereof.

See attached Exhibit A

That said Grantee shall have the right without prior institution of any suit or proceeding at law, at such times as may be necessary, to enter upon said property for the purpose of constructing, repairing, altering, or reconstructing said utilities, or making any connections therewith, without incurring any legal obligation or liability therefor; provided that such

constructing, repairing, altering, or reconstructing of said utilities shall be accomplished in such a manner that the private improvements existing in this right-of-way shall not be disturbed or destroyed, or, in the event they are disturbed or destroyed, they will be replaced in as good a condition as they were immediately before the property was entered upon by the Grantee.

The Grantor shall retain the right to use the surface of said easement, so long as said use does not interfere with the installation and maintenance of the utility main and so long as no permanent buildings or structures are erected on said easement.

This easement shall be a covenant running with the land and shall be binding on the successors, heirs, and assigns.

GRANTOR:

CORPORATE SEAL:

By: _____

By: _____

By: _____

ATTEST: _____

By: _____

Title: _____

STATE OF WASHINGTON)
)SS
COUNTY OF SKAGIT)

I, the undersigned, a notary public in and for the State of Washington, hereby certify that on this _____ day of _____, 20____, personally appeared before me _____ to me known to be the _____ of the _____, [change entire paragraph to match Conveyance? Or clarify what these two blanks are for and take out the "oath" part?] who executed the foregoing instrument, and acknowledge that s/he signed and sealed the same as his/her free and voluntary act and deed, for the uses and purposes therein mentioned, and on oath stated that s/he is authorized to execute the said instrument and that the seal affixed is the Corporate Seal of said Corporation.

Notary Public in and for the State of
Washington, residing at _____
Appointment expires _____

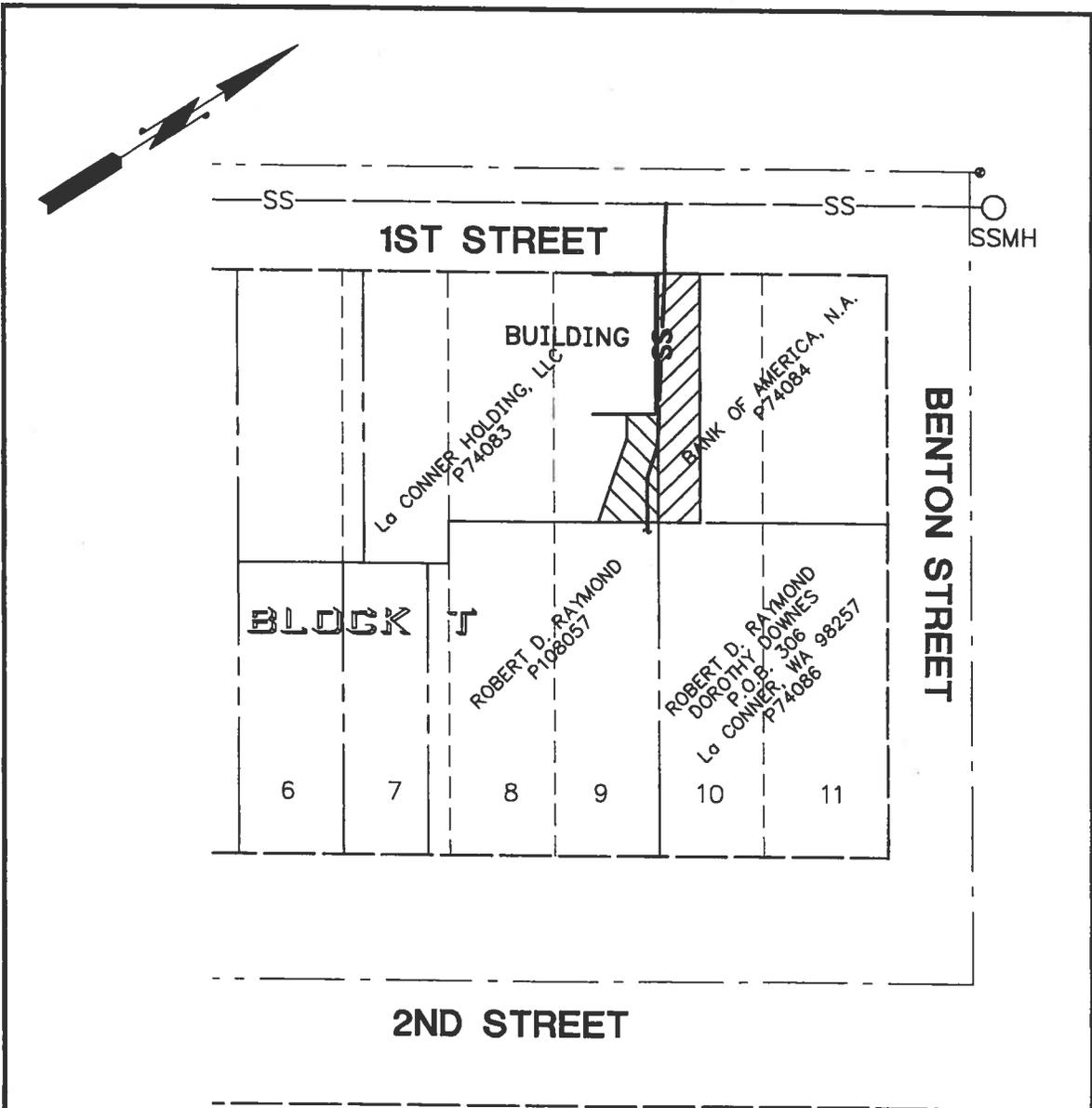


EXHIBIT A



SCALE IN FEET

P74084 Tax Lot Number

 Permanent Easement

**TOWN OF LaCONNER
SANITARY SEWER
EASEMENTS IN SE 1/4 36-34-02**

CHS

12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500

CHS ENGINEERS, LLC

TEL (425) 637-3693 FAX (425) 637-3694

Drawn by VLG
Checked by HB

Approved by EH
Date 12-04

Scale

1" = 40'

Sheet

1/1

Town of La Conner

EASEMENT RELEASE FORM

EASEMENT NO. _____

PROPERTY OWNER'S APPROVAL OF EASEMENT RESTORATION

I(We), the undersigned owner(s) of property identified as

(address or property description)

do hereby approve and accept the restoration work done by

_____,
the Contractor that performed the construction, operation, and/or maintenance activities
upon the utility(ies) on easements over and across my (our) property.

SIGNED _____

DATE _____

Town of La Conner

CONVEYANCE OF UTILITY FACILITIES

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, _____ hereby grants, bargains, sells and conveys to the TOWN OF LA CONNER, a municipal corporation, the following described property located in Skagit County, Washington:

ALL of the Water Facility, Sewer Facility, Stormwater Facility, and Streets heretofore constructed as part of the Infrastructure Improvement Project known as _____.

The **Water Facility** is more specifically described as follows:

<u>Pipe Size/Type</u>	<u>Approx. Length</u>	<u>On</u>	<u>From</u>	<u>To</u>
_____.	_____ LF			
_____.	_____ LF			
_____.	_____ LF			

Including valves, fire hydrants, specialty valves, services and other appurtenances, all within public right-of-way and/or easements.

The **Sewer Facility** is more specifically described as follows:

<u>Pipe Size</u>	<u>Approx. Length</u>	<u>On</u>	<u>From</u>	<u>To</u>
_____.	_____ LF			
_____.	_____ LF			
_____.	_____ LF			

Including manholes, side sewers, tees, wyes, and other appurtenances, all within public right-of-way and/or easements.

The **Stormwater Facility** is more specifically described as follows:

<u>Pipe Size</u>	<u>Approx. Length</u>	<u>On</u>	<u>From</u>	<u>To</u>
_____.	_____ LF			

_____. _____ LF
_____. _____ LF

Including catch basins, oil/water separators, and other appurtenances, all within public right-of-way and/or easements.

The **Street Facility** is more specifically described as follows:

<u>Pavement</u> <u>Width</u>	<u>Approx.</u> <u>Length</u>	<u>On</u>	<u>From</u>	<u>To</u>
_____ LF	_____ LF			
_____ LF	_____ LF			
_____ LF	_____ LF			

Including sidewalks, curbs, and other improvements, all within public right-of-way.

In making the conveyance, the undersigned warrants to the Town that all claims for labor, material, and/or taxes and other indebtedness that might be a lien against said Facility(ies) have been paid and further guarantees to the Town for the period of one year from the date of this instrument, that said Facility(ies) be free of defects in labor and material.

The undersigned further warrants to the Town that s/he owns said Facility(ies) free and clear of all encumbrances and has full right, title, and right to dispose of same.

The execution of this conveyance hereby ratifies the Infrastructure Improvements Agreement.

DATED this _____ day of _____, 20_____.

**CERTIFICATION OF COSTS OF CONSTRUCTION
OF INFRASTRUCTURE IMPROVEMENTS CONVEYED TO
THE TOWN OF LA CONNER**

The undersigned is the Developer of the Infrastructure Improvement Project known as _____ and has, pursuant to an agreement with the Town of La Conner dated the _____ day of _____, 20____, constructed certain utility and/or street facilities that, after connection to the existing system(s) of the Town of La Conner, are to be conveyed to the Town by the Developer.

In accordance with the terms of the said Infrastructure Improvements Agreement between the undersigned and the Town of La Conner, the undersigned hereby certifies that the costs of construction of the facility(ies) being conveyed to the Town pursuant to said Infrastructure Improvements Agreement are as follows:

Water Facility:

- | | | |
|----|----------------|----------|
| A. | Materials | \$ _____ |
| B. | Labor | \$ _____ |
| C. | Engineering | \$ _____ |
| D. | Permits & Fees | \$ _____ |
| E. | Other Costs | \$ _____ |
| | _____ | \$ _____ |
| | _____ | \$ _____ |
| | _____ | \$ _____ |

Total costs of construction of facility: \$ _____

Sewer Facility:

- | | | |
|----|----------------|----------|
| A. | Materials | \$ _____ |
| B. | Labor | \$ _____ |
| C. | Engineering | \$ _____ |
| D. | Permits & Fees | \$ _____ |
| E. | Other Costs | \$ _____ |
| | _____ | \$ _____ |
| | _____ | \$ _____ |
| | _____ | \$ _____ |

Total costs of construction of facility: \$ _____

Stormwater Facility:

- A. Materials \$ _____
 - B. Labor \$ _____
 - C. Engineering \$ _____
 - D. Permits & Fees \$ _____
 - E. Other Costs _____
- _____ \$ _____
- _____ \$ _____
- _____ \$ _____

Total costs of construction of facility: \$ _____

Street Facility:

- A. Materials \$ _____
 - B. Labor \$ _____
 - C. Engineering \$ _____
 - D. Permits & Fees \$ _____
 - E. Other Costs _____
- _____ \$ _____
- _____ \$ _____
- _____ \$ _____

Total costs of construction of facility: \$ _____

CERTIFIED TO THE TOWN OF LA CONNER

By _____
(insert name of developer if an individual or corporation if a corporate developer)

By _____, President

Corporate Seal

By _____, Secretary

INDIVIDUAL ACKNOWLEDGEMENT: _____

STATE OF WASHINGTON)
)SS
COUNTY OF SKAGIT)

On this _____ day of _____, 20____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ to me known to be the individual(s) described in and who executed the foregoing instrument, and acknowledged to me

that s/he(they) signed and sealed the said instrument as a free and voluntary act and deed for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year in this certificate above written.

Notary Public in and for the State of Washington,
residing at _____
Appointment expires _____

Town of La Conner

RELEASE OF ENCUMBRANCE

WITNESSETH:

That the Town of La Conner, a municipal corporation of Skagit County, Washington, (“the Town”) and _____ (“the Developer”) entered into an Agreement on the ____ day of _____, 20____, for construction of infrastructure improvements in association with the project known as _____:

and,

The Agreement was an Agreement of Restriction encumbering the Developer, and

The Developer has now satisfactorily performed all of the terms and conditions of the Agreement,

NOW, THEREFORE, the Town quit claims and releases unto the Developer any encumbrance held by the Town against the Developer.

TOWN OF LA CONNER
Skagit County, Washington



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
MM/DD/YYYY

PRODUCER NAME AND ADDRESS OF AGENT	THIS CERTIFICATION IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
	INSURERS AFFORDING COVERAGE	NAIC #
INSURED NAME AND ADDRESS OF AGENT	INSURER A: INSURANCE CARRIER #1	
	INSURER B: INSURANCE CARRIER #2	
	INSURER C:	
	INSURER D:	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR/ADD'L LTR/INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC	XXXXXXXX	MM/DD/YY	MM/DD/YY	EACH OCCURRENCE \$ 1,000,000.00 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 1,000,000.00 MED EXP (Any one person) \$ 1,000,000.00 PERSONAL & ADV INJURY \$ 1,000,000.00 GENERAL AGGREGATE \$ 50,000.00 PRODUCTS - COMP/OP AGG \$ 5,000.00
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS				COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN EA ACC \$ AUTO ONLY: AGG \$
	EXCESS/UMBRELLA LIABILITY <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE <input type="checkbox"/> RETENTION \$				EACH OCCURRENCE \$ 2,000,000.00 AGGREGATE \$ 2,000,000.00
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	XXXXX (OR LABOR AND INDUSTRIES ACCOUNT #)	MM/DD/YY	MM/DD/YY	<input checked="" type="checkbox"/> WC STATU-TORY LIMITS <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
	OTHER ASBESTOS	XXXXXXXX	MM/DD/YY	MM/DD/YY	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

OWNER AND CONSULTING ENGINEER ARE NAMED AS "INSUREDS AS RESPECTS WORK DONE ON THEIR BEHALF BY THE NAMED INSURED, PER ATTACHED ENDORSEMENT.

CERTIFICATE HOLDER

TOWN OF LA CONNER
 PO BOX 400
 204 DOUGLAS
 LA CONNER, WA 98257

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 45 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

Town of La Conner

11 - MONTH INSPECTION

Check all that apply: Sewer Water Stormwater Roads _____

Final inspection report for:

1. Name of development: _____
2. Contractor: _____
3. Developer: _____
4. Date of inspection: _____
5. Inspector: _____

INSPECTION CHECKLIST:

- a. Condition of roadway and associated improvements: _____

- b. Condition of sewer facilities, including main and manholes: _____

- c. Condition of water facilities, including hydrants and valves: _____

d. Condition of stormwater facilities, including drains and detention facilities:

e. Other observations: _____

f. What conditions need to be corrected in order to approve project. Use additional page(s), if necessary:

Town of La Conner

MAINTENANCE BOND

Project: _____

Project No.: _____ Bond No.: _____

Check all that apply: Sewer Water Stormwater Roads

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, the Contractor named in the Agreement to perform infrastructure improvements, hereinafter referred to as PRINCIPAL, and _____, a corporation organized and doing business under and by virtue of the laws of the State of Washington, and duly licensed to conduct a general surety business in the State of Washington as SURETY, are held and firmly bound unto the State of Washington, and unto the Town of La Conner, hereinafter called the Owner named in said Agreement, in the penal sum of _____ DOLLARS (\$_____), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, assigns, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THE OBLIGATION is that the above named Principal has caused to be constructed certain infrastructure improvements within the corporate or utility service area of the Town of La Conner.

THE FURTHER CONDITION is that the undersigned warrants the performance and guarantees the workmanship and materials used in the construction of the utility facility(ies) and will make repairs, correct deficiencies, and perform other than routine maintenance for a period of one year from the acceptance by the Town of said facility(ies) as constructed to Town standards.

IN ADDITION, if the facility(ies) requires repairs or maintenance within the one-year period, the parties agree to reimbursement as follows:

1. The Town shall perform all emergency repairs. If damage was caused because of faulty workmanship, materials, or design, then the Town shall be reimbursed for its efforts. If the emergency did not relate to the workmanship, materials, or design, then the Town shall bear the costs of repair.
2. If the repair or maintenance is not of an emergency nature but still is the result of faulty workmanship, materials, or design, then the Town shall give the undersigned a seven- (7) day written notice to repair the damage, which will be repaired by the undersigned at their expense. If, after seven (7) days, the repairs are not done or efforts to rectify the situation are not agreed to, the Town shall then do the work at the expense of the undersigned.

3. If it is routine maintenance or repair not related to the workmanship, materials, or design of the facility(ies), then the Town shall perform the work at its own expense.

At the end of 11 months, the undersigned shall request the Town to cause an inspection of the utility facility(ies) and, if found to be in condition satisfactory to the Town, then this obligation shall become null and void, and any remaining funds shall be returned to the undersigned; otherwise this bond shall remain in full force and effect until the facilities are placed in satisfactory condition.

IN WITNESS WHEREOF, the above bonded parties have executed this instrument under their separate seals this ____ day of _____, 20____, the name and corporate seal of each corporate party hereto affixed, and these presents duly signed by its undersigned representatives pursuant to authority of its governing body.

PRINCIPAL

TWO WITNESSES:
:

ATTEST (if Corporation):

By:_____

Title:_____

Corporate Seal:

SURETY

By:_____

Title:_____

CERTIFICATES AS TO CORPORATE SEAL

I hereby certify that I am the (Assistant) Secretary of the Corporation named as Principal in the within Bond, that _____ who signed the said Bond on behalf of the Principal was _____ of said Corporation, that I know his signature thereto is genuine, and that said Bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

Secretary or Assistant Secretary

Town of La Conner
REIMBURSEMENT AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 20__, between TOWN OF LA CONNER, a municipal corporation ("Town") and _____ ("Owner").

RECITALS:

A. The Town is a duly organized water, sewer and stormwater utility provider under the laws of the State of Washington, and is empowered to furnish utility service, among other things, to property owners within and without the Town in the manner provided by law; and

B. Owner heretofore entered into a Developer Extension Agreement ("Agreement") with Town for the construction and installation of water and/or sewer and/or stormwater system extension to provide service to the property (Developed Area) described in the Agreement; and Owner completed installation of the system extension in accordance with the terms of the Agreement, portions

of which are a benefit to real property within (and without) the Town other than the Developed Area, which consists of water and/or sewer and/or stormwater lines of a size and location described on Exhibit "B" attached hereto and designated "Extension Facilities"; and Owner is entitled to reimbursement from developers and real property owners seeking connection to such facilities for the cost of such facilities in excess of Owner's fair pro rata share therefor, which costs have been determined as set forth below; and

C. The Town will collect charges from the owners of property within the Town, benefiting from the installation of the aforesaid Extension Facilities; and such charges are the sole source of funds for the Town from which reimbursement to the owner can and will be made, as and when the same are collected; and

D. The Town is permitted to enter into a Reimbursement Agreement with Owner under the provisions of RCW 35.91 *et seq.*; and the parties desire to enter into a written agreement with reference to the foregoing matter; Now, Therefore,

IN CONSIDERATION OF THE FOLLOWING terms and conditions, the Town and the Owner agree as follows:

1. **Completion of Facilities**. The installation of the Extension Facilities described on Exhibit "B" in the developed area have been completed by Owner under an extension agreement with the Town; and title thereto will be transferred to the Town, and such Facilities will be a part of the Town water and/or sewer and/or stormwater system.

2. **Records/Costs.** Owner has obtained and submitted to the Town accurate records which have been provided to the Town of the actual cost of installing such facilities in accordance with the Agreement; and the Town Engineer has reviewed and approved the costs of such Facilities as reasonable costs and Town accepts such costs as costs which are subject to reimbursement; and Town agrees to reimburse Owner in the manner and on the terms and conditions set forth in this agreement, in an amount not to exceed_____, less administrative costs incurred by the Town in collecting reimbursement charges. Owner agrees to reimburse the Town for all administrative costs incurred by the Town in collecting reimbursement charges. This reimbursement of collection related administrative costs and charges due from Developer to the Town shall be deducted from the amount reimbursed to the Owner as provided in Paragraph 3.B.2. herein.

3. **Method of Reimbursement.**

A. **Benefited Properties.** The properties benefiting from the installation of the Extension Facilities as determined in the sole discretion of the Town, and which did not contribute to the original cost thereof are as described on Exhibit "C" attached hereto.

B. **Charges.**

1. **Amount.** Prior to allowing a benefited property to connect to the Extension Facilities or any lateral or branch connected thereto, the Town shall collect the fair pro rata share of the cost of installing such facilities as a

charge from the owners of benefited properties. The benefited properties to which this provision shall apply are set forth on Exhibit "C". The amount of such reimbursement charges to be collected prior to each connection is also set forth on Exhibit "C". Such charges may include, but are not limited to, pro rata share of Town legal, engineering, administrative, set-up, handling and actual costs of the facility. Such reimbursement charges shall be in addition to all other Town charges in effect at the time of seeking connection to such extension facilities, including without limitation, general facilities fees. Upon application by affected property owners, the Town may further segregate reimbursement charges attributed to property benefited by the Extension Facilities. All costs of such segregation shall be borne by the party requesting such segregation.

2. **Payment.** Town shall deduct from all reimbursement charges it collects an amount equal to ten percent (10%) of each collected amount to cover its administrative collection costs, and the remaining balance shall be paid over to Owner within sixty (60) days after receipt thereof.

C. **Payment Procedure.** The Town shall forward reimbursement funds referenced herein to Owner at Owner's address provided herein or to Owner's agent as authorized by Owner to the Town in writing. As a condition of receiving such reimbursement funds, Owner or Owner's agent shall execute a receipt to the Town for such reimbursement amounts so paid upon a receipt form provided by the Town. Such form shall include the legal description and name of the owner of the connecting property making payment of such amount to the Town.

In the event of dispute as to the rightful party to receive such funds, Town may pay the same to the Owner referenced herein or interplead such funds to the court; in either event, Town shall thereupon be relieved of any further obligation or of any liability hereunder as to such reimbursement funds so paid. The Owner shall indemnify the Town for any costs, including attorney fees, incurred by the Town in such interpleader action.

4. **Town Authority; Effective Date; and Contract Duration**. The Town is authorized to enter into this agreement by virtue of the provisions of RCW 35.91 et seq.; and this Agreement shall remain in full force and effect for a period of ten (10) years, beginning from the date of final acceptance of title to the extension facilities by the Town's Council. All of Owner's rights to reimbursement shall terminate upon expiration of said ten (10) year term, regardless of the status of reimbursement at that time.

5. **Recording**. This contract shall be recorded in the office of the Skagit County Auditor, Skagit County, Washington, immediately upon execution by the Town and the Owner.

6. **Agreement Implementation**. The Town will use its best efforts to collect and distribute the funds pursuant to the process set forth in this Agreement. However, the Town, its officials, employees or agents shall not be held liable or responsible for failure to implement any of the provisions of this Agreement unless such failure was willful or intentional.

7. **General**. This Agreement constitutes the entire agreement between the parties. All exhibits referred to herein are by this reference made a part of this

Agreement as though set forth in full. This Agreement is binding upon the heirs, executors, administrators, successors and assigns, of each of the parties hereto.

8. **Assignment.** The Owner shall not assign the whole or any part of this Agreement without the prior written consent of the Town, and in the event of such assignment shall notify the Town of the Name and address of the assignee.

TOWN OF LA CONNER

By: _____

Its: _____

OWNER:

By: _____

Its _____

Address _____

Telephone: _____

Town of La Conner
EXHIBIT B
to
Reimbursement Agreement
Facility Description and Cost

Description:

Applicable Cost:

Unit Cost

Town of La Conner
EXHIBIT C
to
Reimbursement Agreement
Benefited Property and Charges

Property 1

Legal Description:

Front Footage:

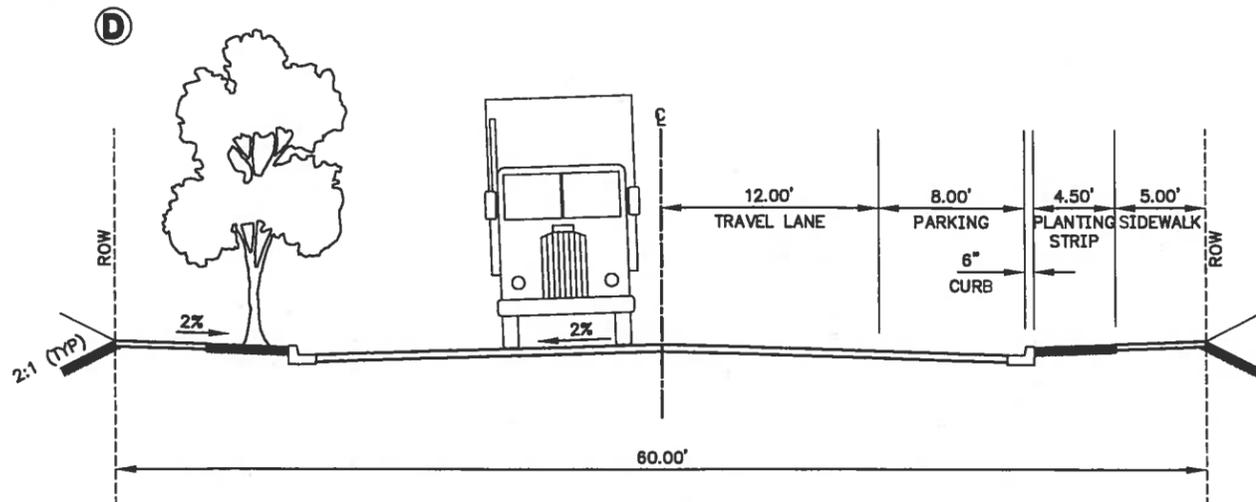
Assessed Charge

Property 2

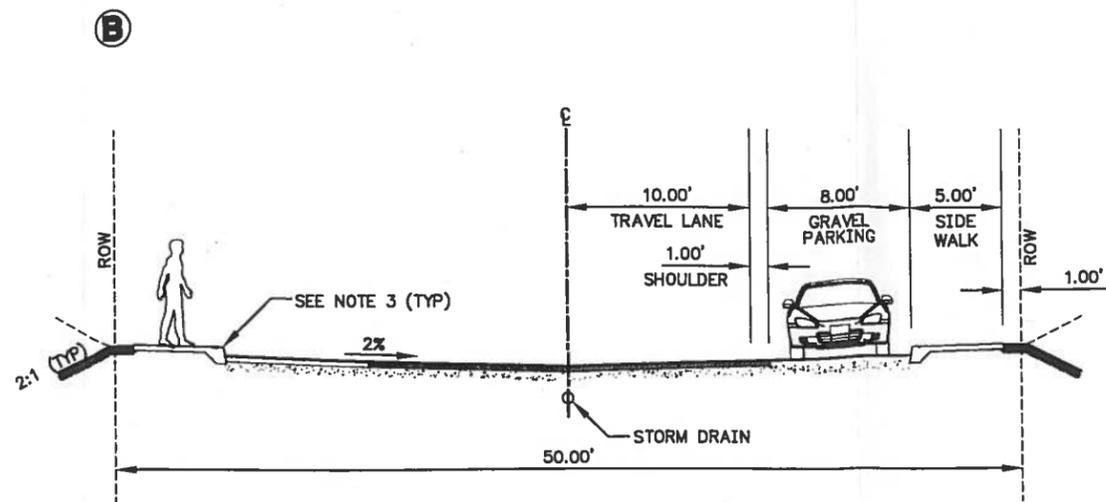
Legal Description:

Front Footage:

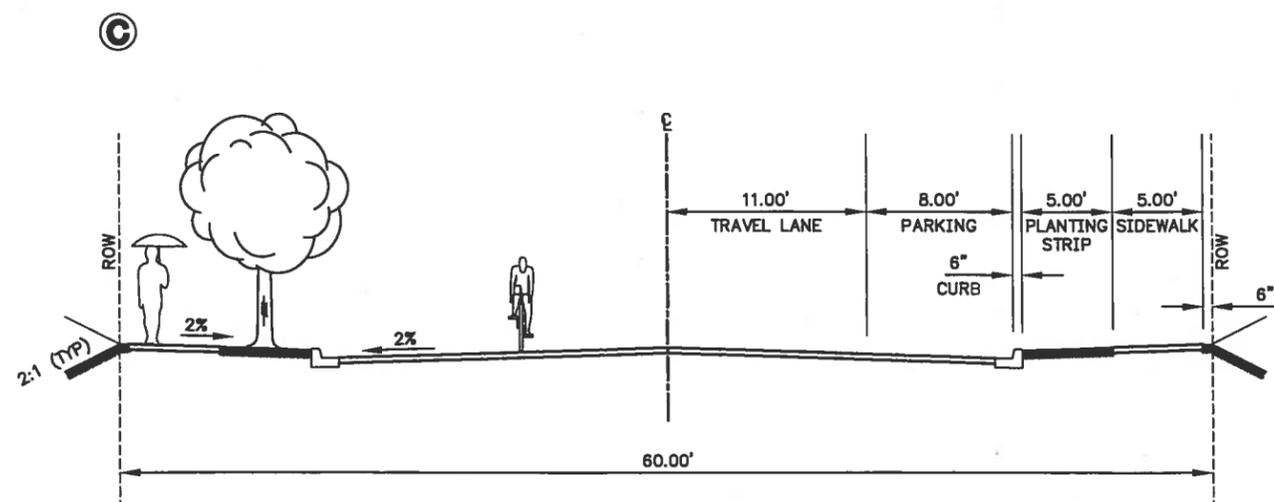
Assessed Charge



COMMERCIAL AND INDUSTRIAL ACCESS STREETS

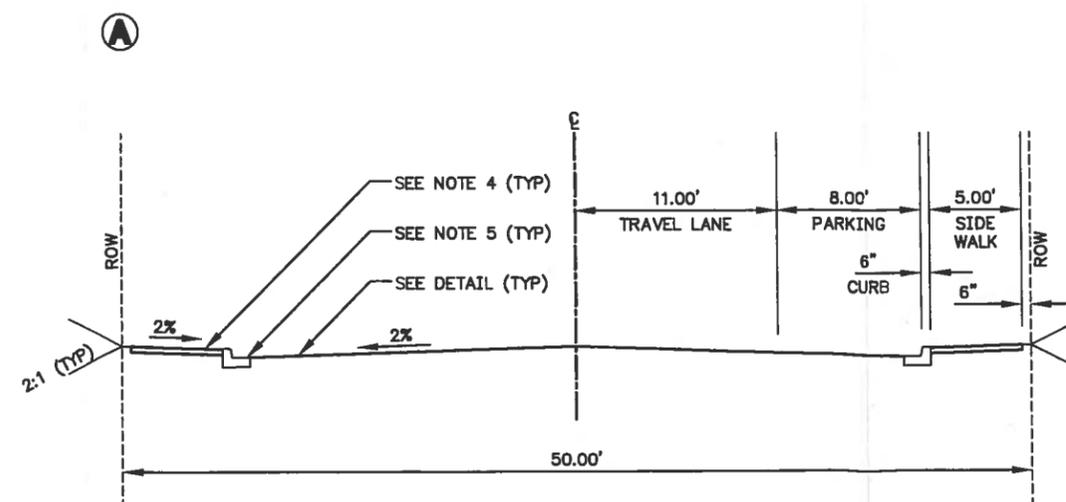


RESIDENTIAL ACCESS STREETS



COLLECTOR STREETS

Current code for



MINIMUM DESIGN STANDARDS FOR RESIDENTIAL ACCESS STREET FOR FULL PLAT

NOTES:

1. USE WSDOT STANDARD PLANS FOR GEOMETRY AND DIMENSIONS, EXCEPT AS MODIFIED HEREIN.
2. GRADES SHALL NOT EXCEED 15 PERCENT EXCEPT WITHIN APPROVED HILLSIDE SUBDIVISIONS.
3. WSDOT STANDARD PLAN F-3, MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK.
4. WSDOT STANDARD PLAN F-3, CEMENT CONCRETE SIDEWALK.
5. WSDOT STANDARD PLAN F-1, CEMENT CONCRETE TRAFFIC CURB AND GUTTER.
6. AT RESIDENTIAL STREET INTERSECTIONS, INSTALL SIDEWALK BULBS USING A 20-FOOT RADIUS. SEE WSDOT SIDEWALK DETAILS: A GUIDE FOR WASHINGTON LOCAL AGENCIES AND TRIBES, MAY 2000, FIGURE 2-8C, AND ADAPT IT TO THESE STREET STANDARDS. SEE NOTE 8 FOR RAMPS.
7. AT ALL OTHER INTERSECTIONS, PROVIDE A 20-FOOT CURB RETURN RADIUS AND RESTRICT PARKING NEAR THE INTERSECTION IN ORDER TO PROVIDE AN APPROPRIATE LINE OF SIGHT TO SIDEWALK USERS WHO ARE NEARING THE CROSSWALK.
8. INSTALL SIDEWALK RAMPS AT ALL INTERSECTIONS. USE WSDOT STANDARD PLAN F-3B, MODIFIED TO FIT EACH INTERSECTION CONDITION. FOR INSTANCE, AT AN ARTERIAL INTERSECTION, THE RAMP GEOMETRICS WILL ENCROUGH UPON THE PLANTING STRIP IN ORDER TO MAINTAIN A 60-FOOT RIGHT-OF-WAY (ROW).
9. INSTALL DRIVEWAYS ACCORDING TO WSDOT STANDARD PLAN F-4, TYPE 4; MODIFY TO INTEGRATE WITH THESE STREET STANDARDS.

300408-DE Manual Update 2006 Manual VRoadProfile.dwg 1:1 2/25/04 05-19-06

No.	Date	By	Clk.	Appr.	Revision

CHS 12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500

CHS ENGINEERS, LLC TEL (425) 637-3693 FAX (425) 637-3694

Drawn By N.H.	Date 05-06	Checked By SG	Date 05-06
Designed By DJ	Date 05-06	Approved By SG	Date 05-06

Scale:
Horiz. 1"=5'
Vert. N/A
Job No.
200408

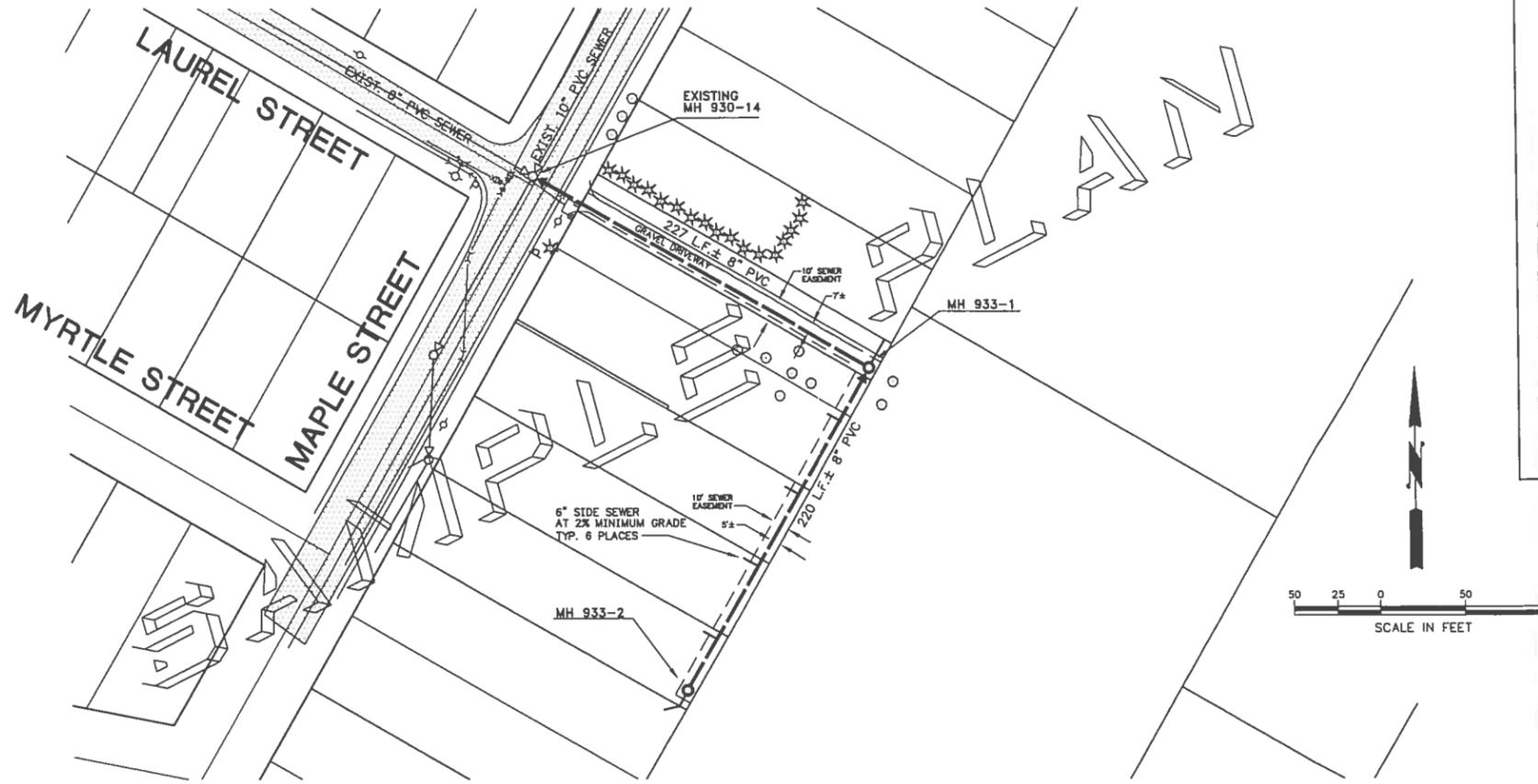
TOWN OF LA CONNER
ROADWAY SECTIONS

Sheet **NO.**
Of **NO.**
NO.

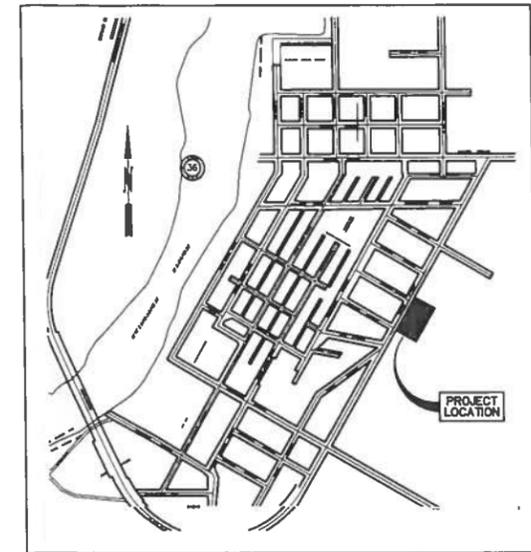
GENERAL NOTES

USE THE NOTES PROVIDED IN THE PROJECT MANUAL.

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON



SEWER PLAN
SCALE 1" = 50'

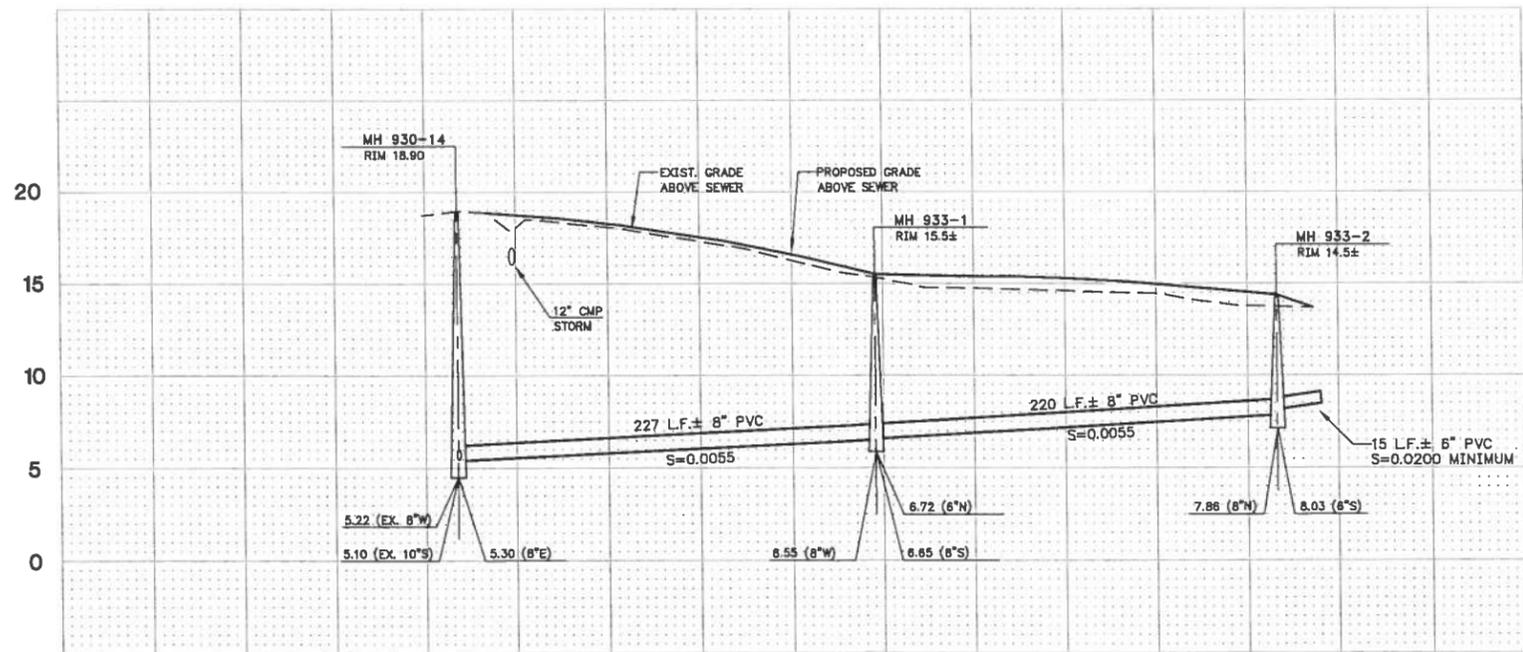


VICINITY MAP

NOT TO SCALE

LEGEND

- GRAVEL EXIST. DRIVEWAY / ACCESS
- EXIST. ASPHALT PAVEMENT
- EXIST. DITCH LINE
- EXIST. FENCE LINE
- EXIST. SEWER LINE
- EXIST. WATER LINE
- PROPOSED SEWER LINE
- EXIST. CULVERT
- FIRE HYDRANT (FH)
- WATER VALVE (WV)
- BLOW-OFF ASSEMBLY
- PROPOSED WATER SERVICE
- EXISTING WATER SERVICE
- EXIST. UTILITY POLE
- EXIST. ROAD SIGN
- EXIST. TREES
- EXIST. UTILITY BOX



SEWER PROFILE
SCALE HORIZ 1" = 50'
VERT 1" = 5'

DRAFTING NOTES

1. STANDARD SHEET SIZE 22"x34"
2. MANHOLE NUMBERS ASSIGNED BY TOWN
3. SCALES HORIZONTAL 1"=50 TO 1"=20'
VERTICAL 1"=5 OR 1"=10'

TOWN OF LA CONNER



CHS ENGINEERS, LLC
12807 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chsengineers.com

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

PROJECT NAME
SANITARY SEWER
PLAN AND PROFILE



NAVD 88
LIST BENCHMARK LOCATION
AND ELEVATION

CALL 2 BUSINESS
DAYS BEFORE
YOU DIG
1-800-424-5555

APPROVED BY TOWN PUBLIC WORKS DEPT.

BY _____ DATE _____

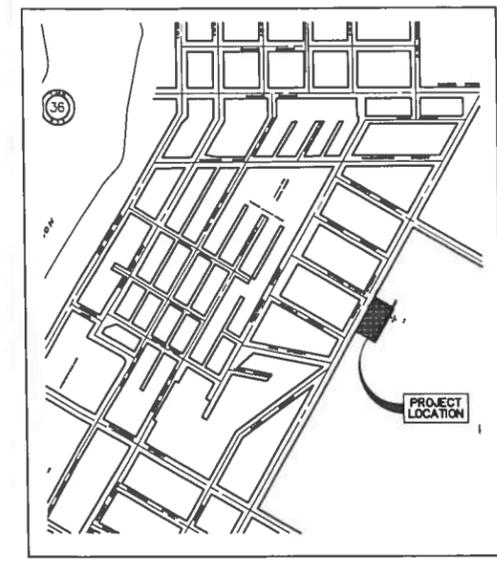
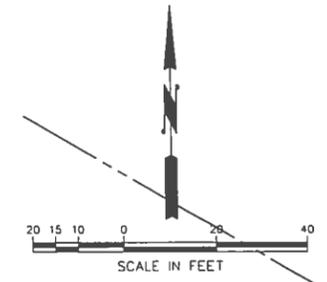
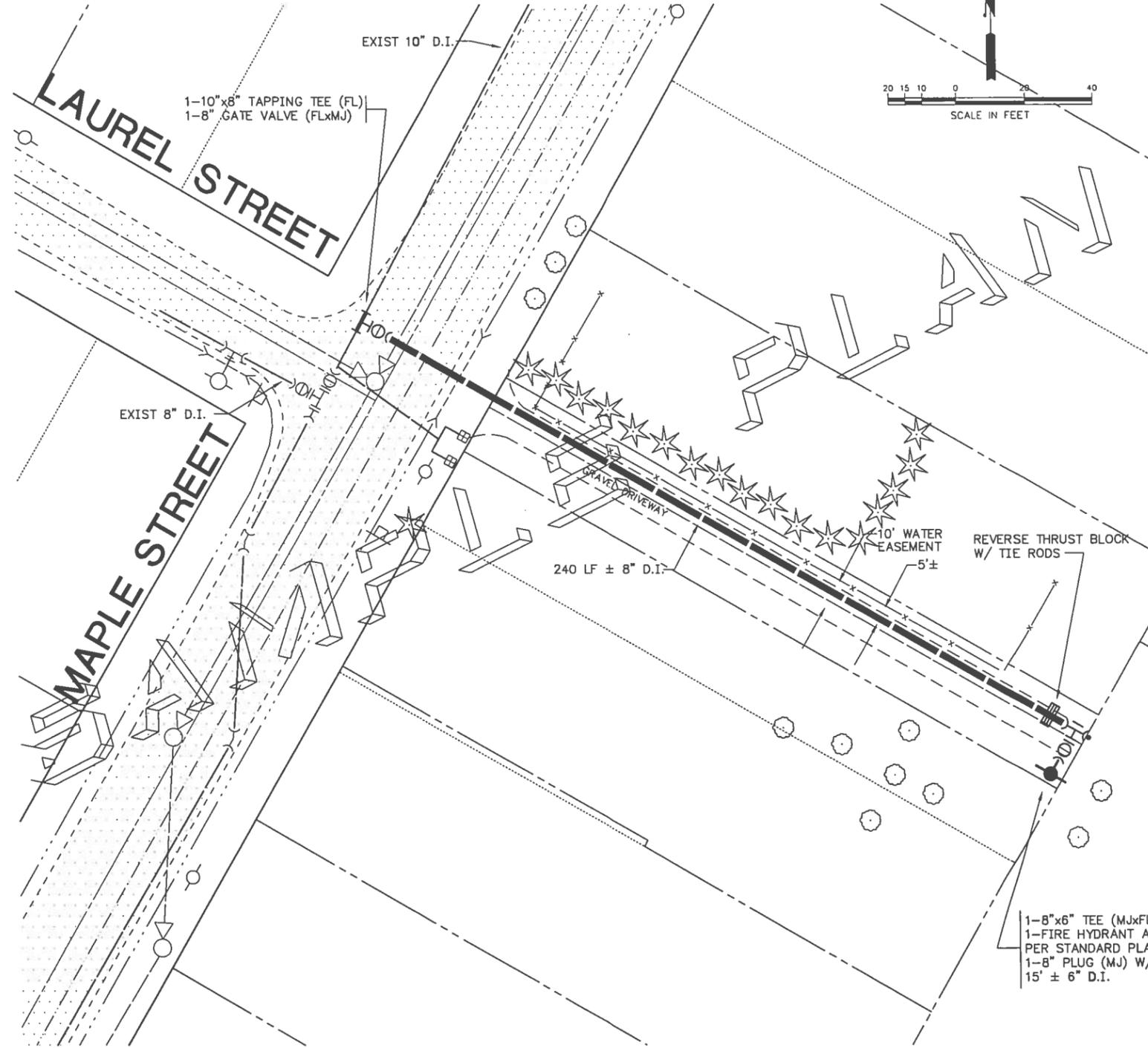
Scale: Horiz. 1"=50' Sheet 1
Vert. 1"=5' Of -
Job No. DE #

NUMBER - NAME - DATE

GENERAL NOTES

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON

USE THE NOTES PROVIDED IN THE DEVELOPER MANUAL.



VICINITY MAP
NOT TO SCALE

LEGEND

	EXIST. DRIVEWAY / ACCESS
	EXIST. ASPHALT PAVEMENT
	EXIST. DITCH LINE
	EXIST. FENCE LINE
	EXIST. SEWER LINE
	EXIST. WATER LINE
	PROPOSED WATER LINE
	EXIST. CULVERT
	FIRE HYDRANT (FH)
	WATER VALVE (WV)
	BLOW-OFF ASSEMBLY
	PROPOSED WATER SERVICE
	EXISTING WATER SERVICE
	EXIST. UTILITY POLE
	EXIST. ROAD SIGN
	EXIST. TREES
	EXIST. UTILITY BOX

1-8"x6" TEE (MJxFL)
1-FIRE HYDRANT ASSEMBLY PER STANDARD PLAN 1
1-8" PLUG (MJ) W/ 2" TAP & PLUG
15' ± 6" D.I.



NAVD 88
LIST BENCHMARK LOCATION AND ELEVATION

WATER PLAN
SCALE 1" = 50'

DRAFTING NOTES

- STANDARD SHEET SIZE 22"x34"
- SCALES HORIZONTAL 1"=50 TO 1"=20'

No.	Date	By	Chd	Revision

TOWN OF
LA CONNER



CHS ENGINEERS, LLC
12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chsengineers.com

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

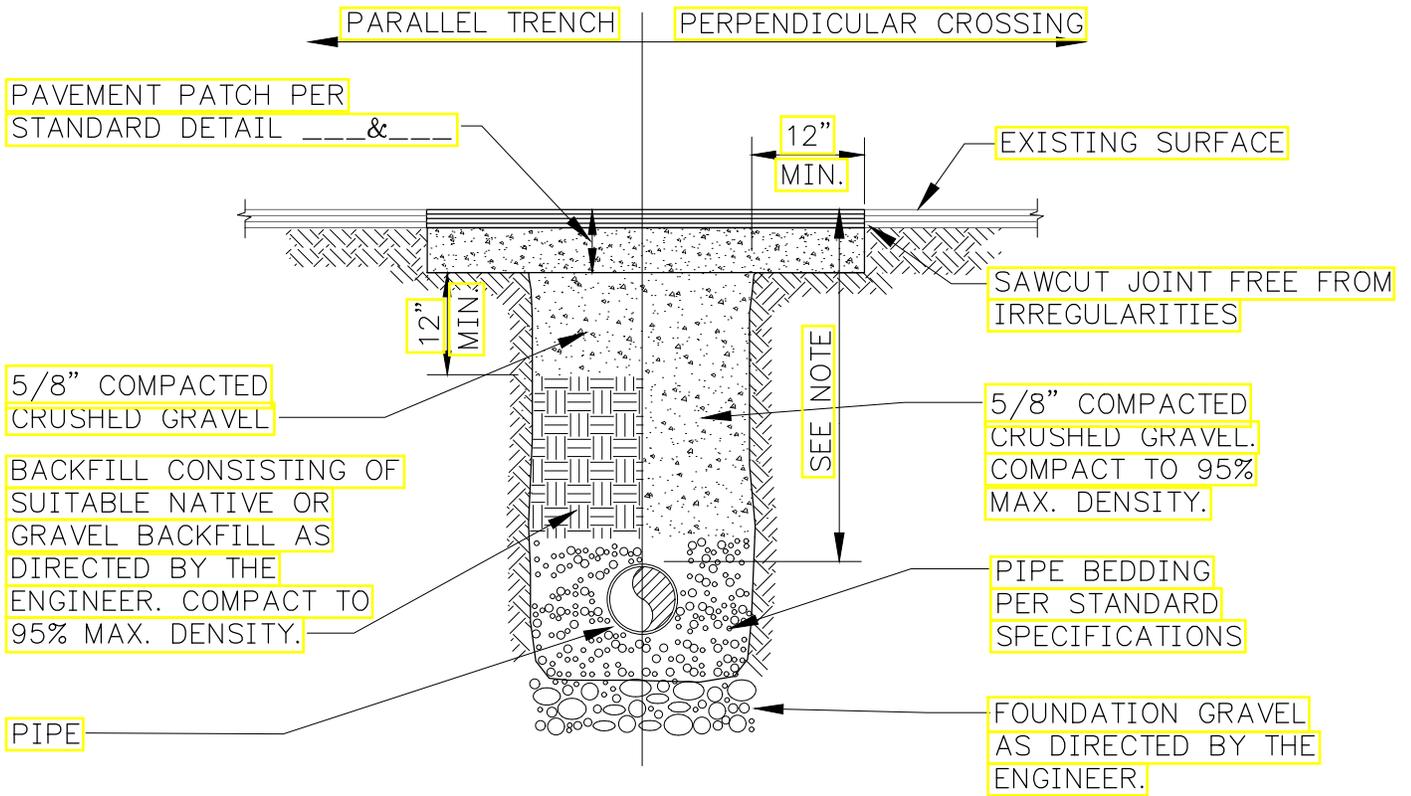
PROJECT NAME
WATER PLAN

Scale:	Sheet 1
Horiz. 1"=50'	Of -
Vert. 1"=5'	Of -
Job No.	DE #

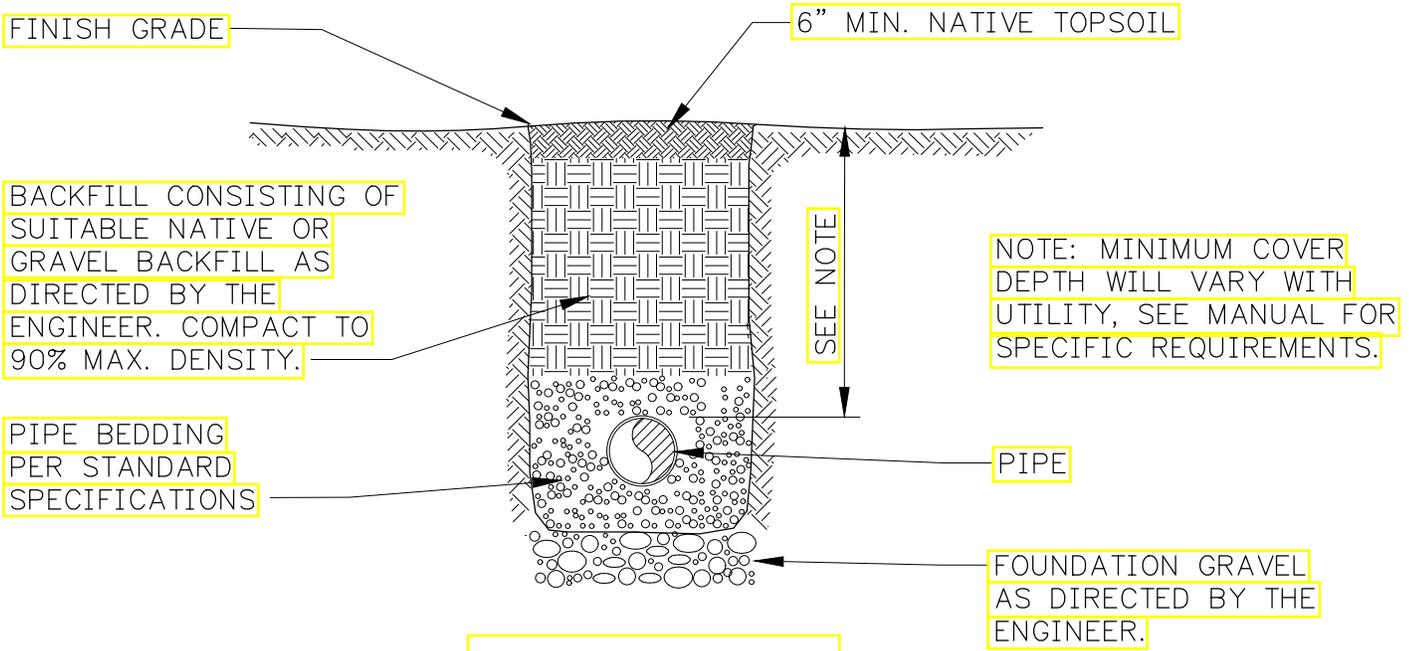
CALL 2 BUSINESS DAYS BEFORE YOU DIG
1-800-424-5555

APPROVED BY TOWN PUBLIC WORKS DEPT.
BY _____ DATE _____

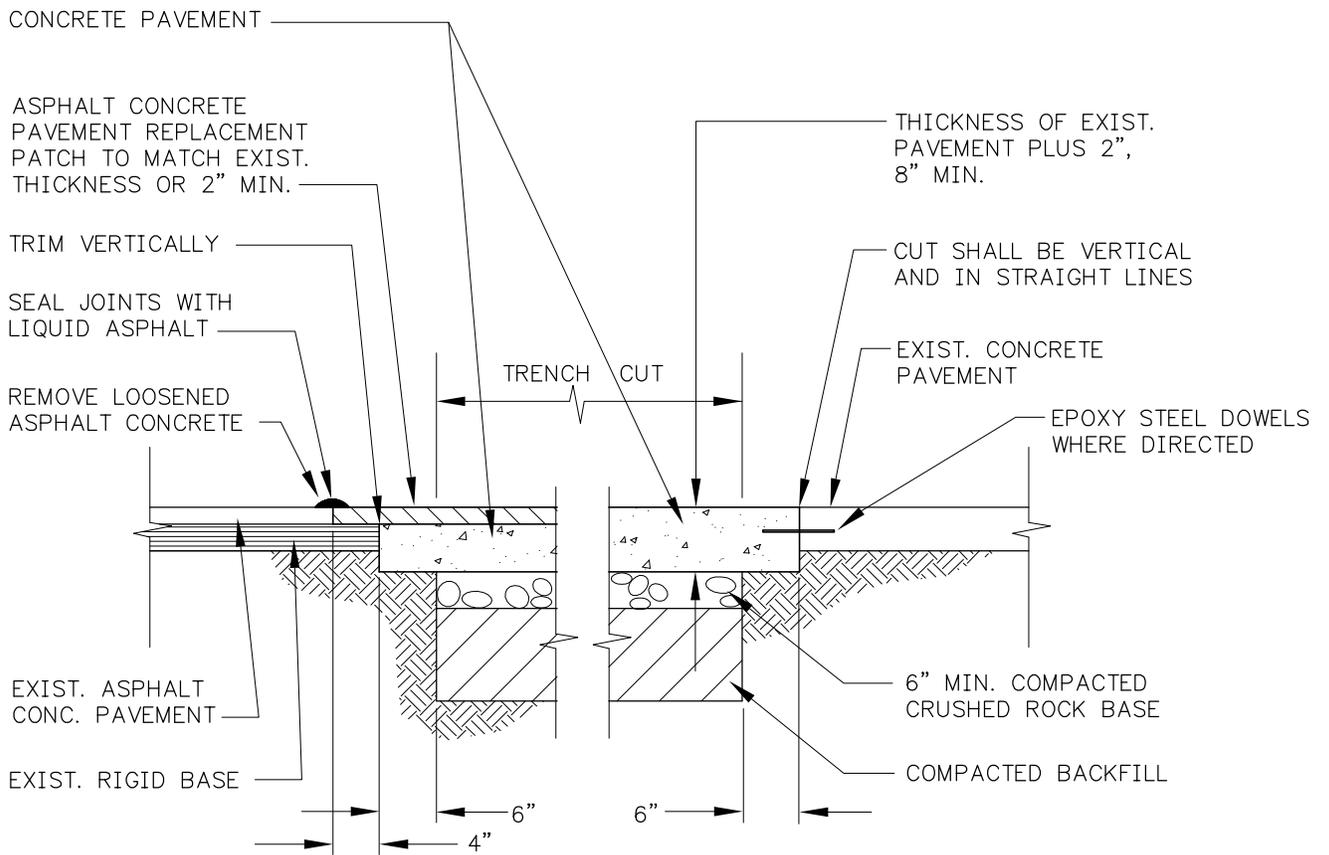
NUMBER - NAME OF - 1:1 22x34 XX-XX-07



**PAVEMENT REPAIR SECTION
TRENCH SECTION IN ROADWAY**



**TRENCH SECTION
IN UNIMPROVED AREAS**



**RIGID PAVEMENT WITH
ASPHALTIC CONCRETE SURFACE**

CEMENT CONCRETE PAVEMENT

NOTE: TRENCHING THROUGH EXISTING CONCRETE ROADWAY PANELS WILL REQUIRE REPLACEMENT OF FULL PANEL TO NEAREST COLD JOINT. MINIMUM HALF-PANEL REPLACEMENT WITH DOWELS REQUIRES PRIOR APPROVAL FROM TOWN.

G2 RIGID PAVEMENT PATCHING

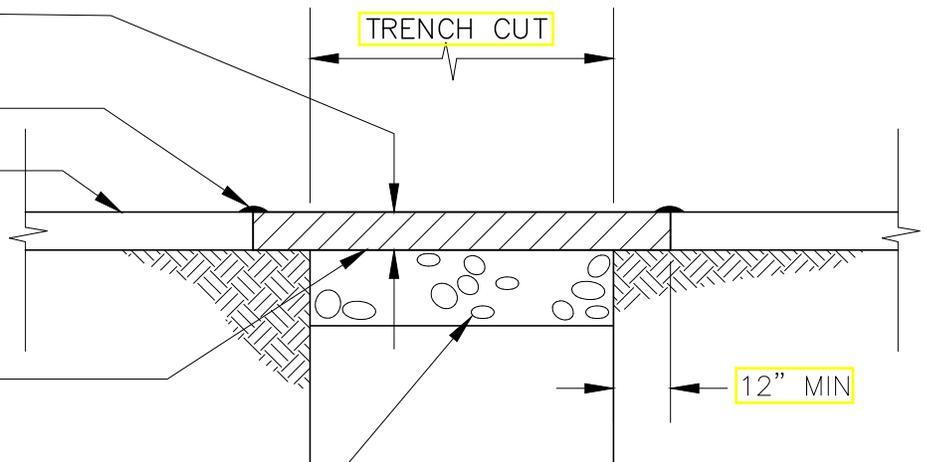
TOTAL THICKNESS TO EQUAL
OR EXCEED EXIST. PAVEMENT
THICKNESS, 4" MIN.

SEAL JOINTS WITH LIQUID
ASPHALT (TYP.)

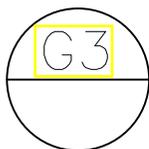
EXIST. A.C. SURFACING

4" MIN. ASPHALT
CONCRETE PATCH

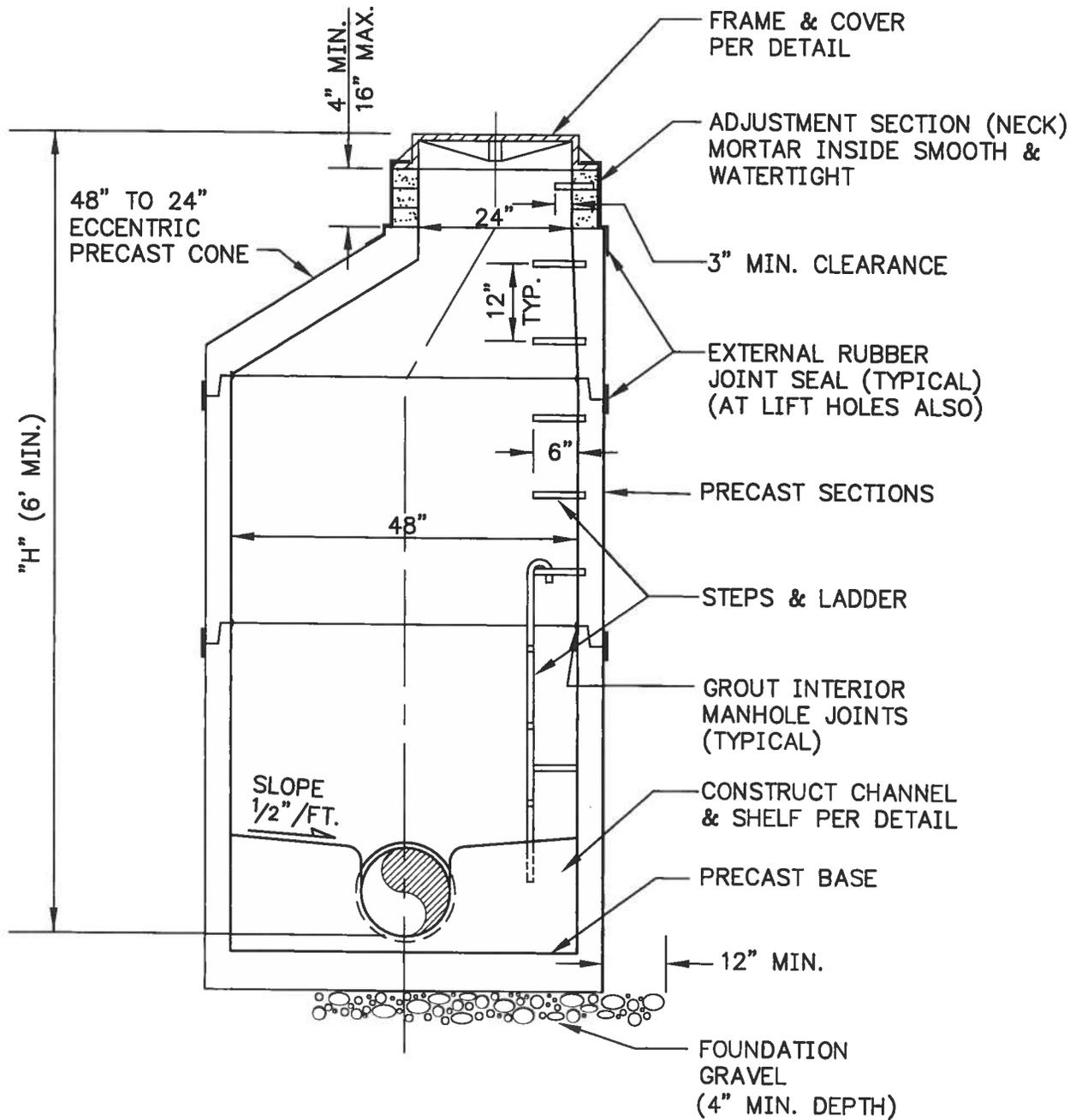
CRUSHED ROCK BASE,
6" MIN. OR THICKNESS
OF EXIST. BASE



NOTE: ASPHALT TREATED BASE MAY BE SUBSTITUTED FOR THE FIRST LIFT
ASPHALT CONCRETE AND CRUSHED BASE. SEE SPECIFICATIONS.



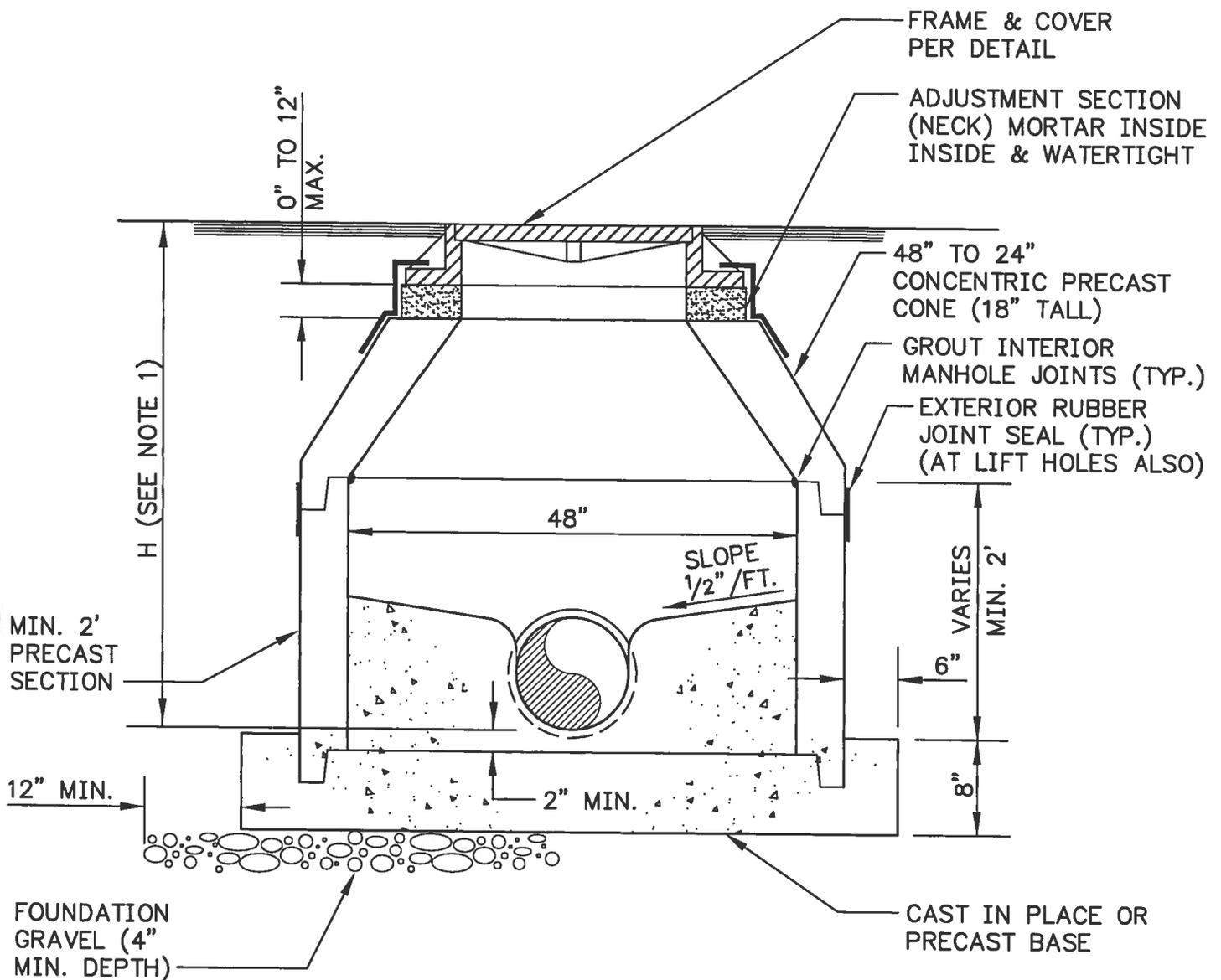
ASPHALT CONCRETE PATCHING



NOTES:

1. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR.
 - B. 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"

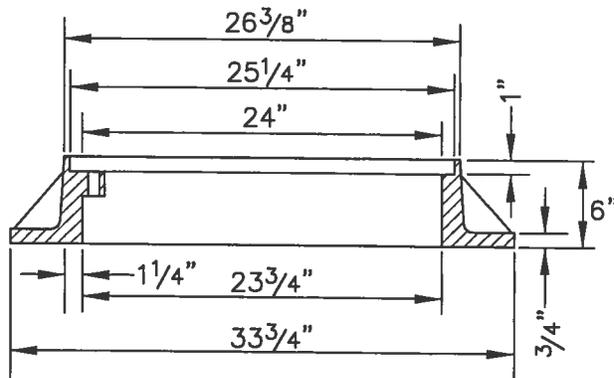
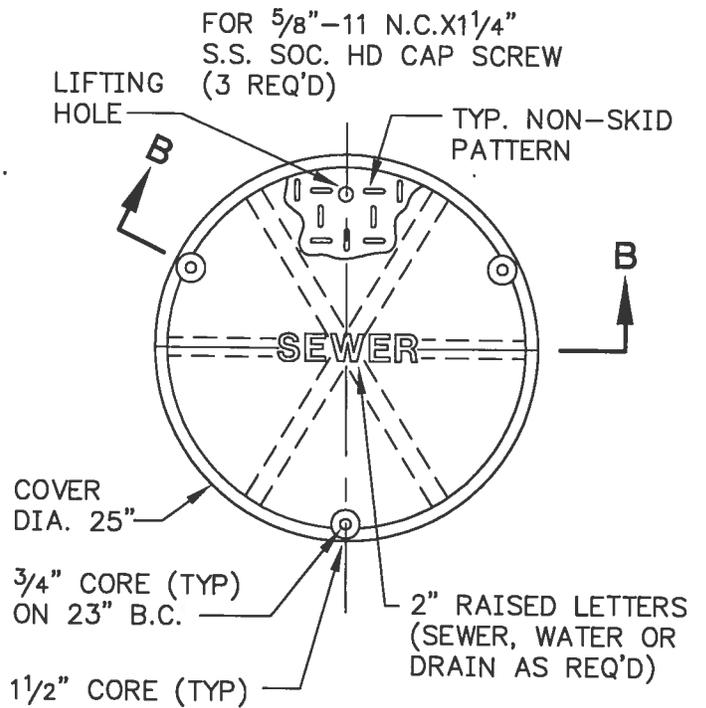
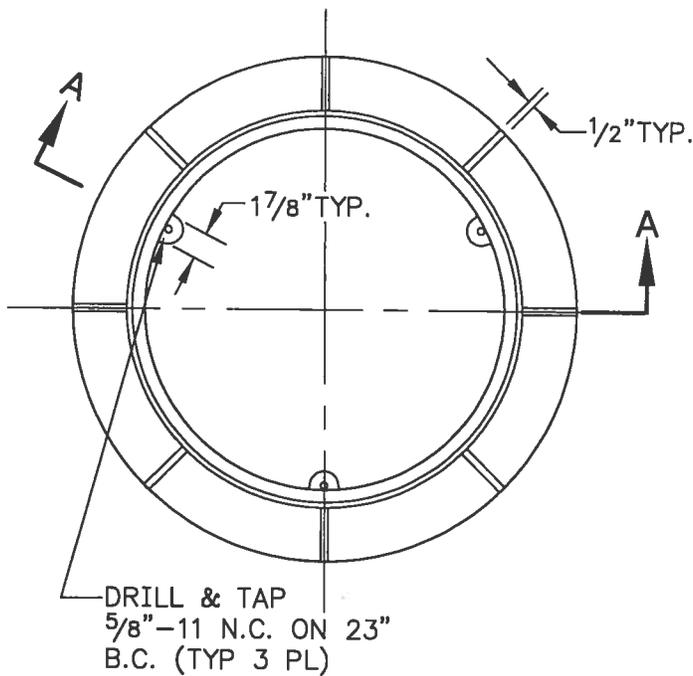
S1 TYPE I - 48" MANHOLE



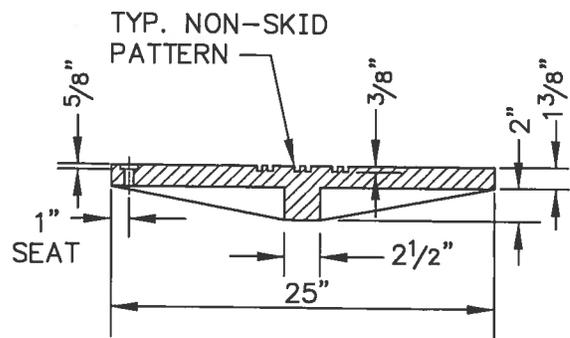
NOTES:

1. MAXIMUM H IS 5'. MINIMUM H IS 3'-8"
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR
5. EXTERNAL JOINT SEAL SHALL BE "BEST SEAL" OR APPROVED EQUAL

S2 TYPE IIIA - 48" MANHOLE



SECTION A-A

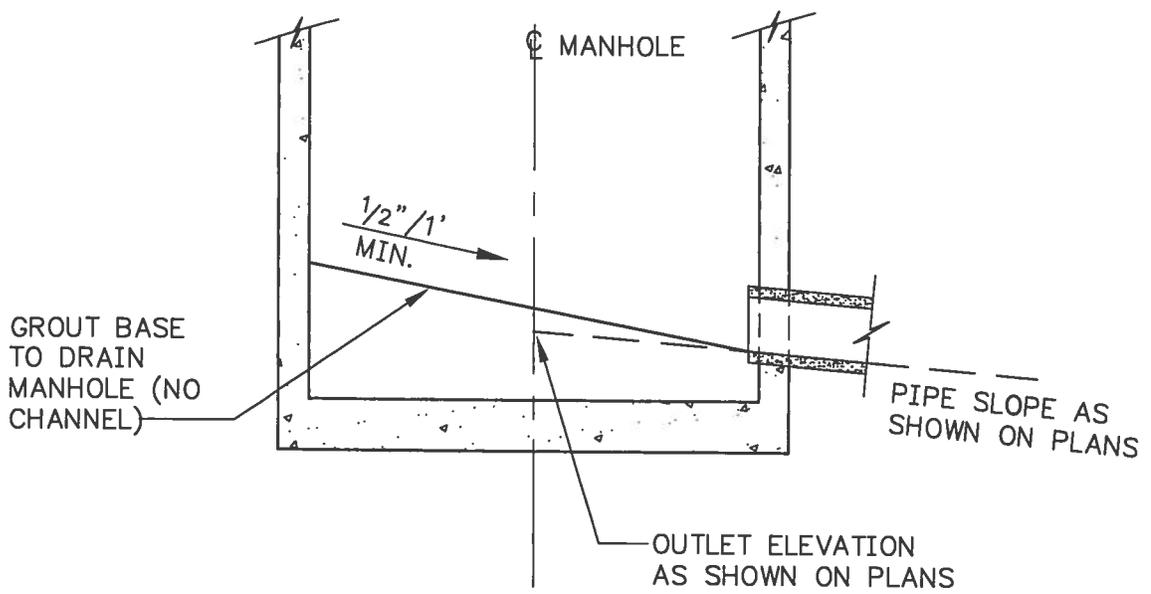


SECTION B-B

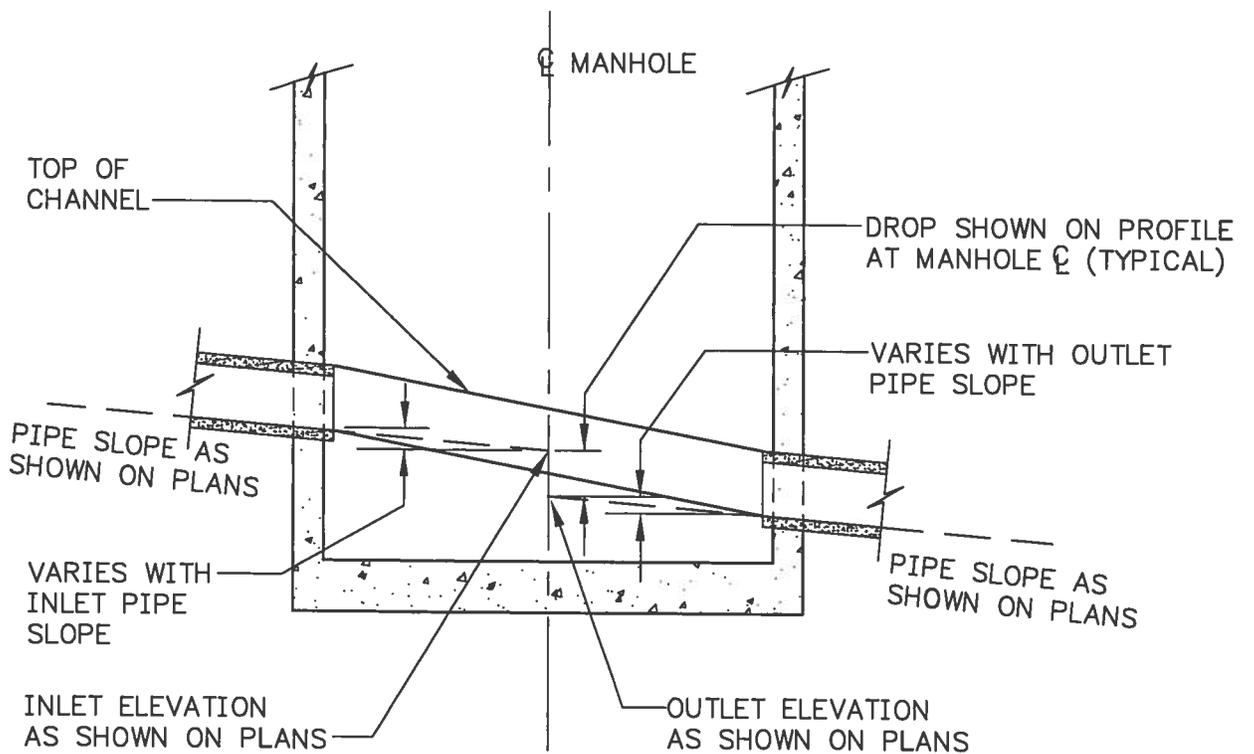
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE 7/8" LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME, SS HEX CAP SCREWS
5. SEE SPECIFICATION O2605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

S3 MANHOLE FRAME AND COVER

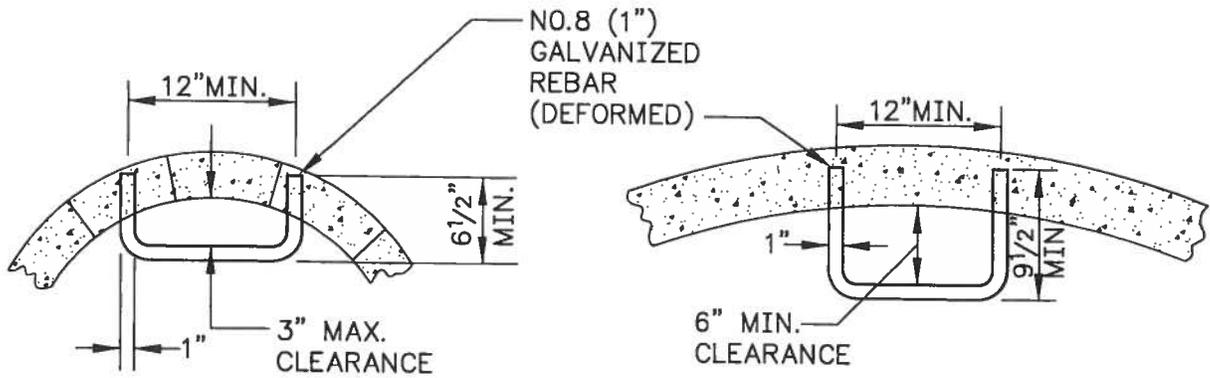


TERMINAL MANHOLE



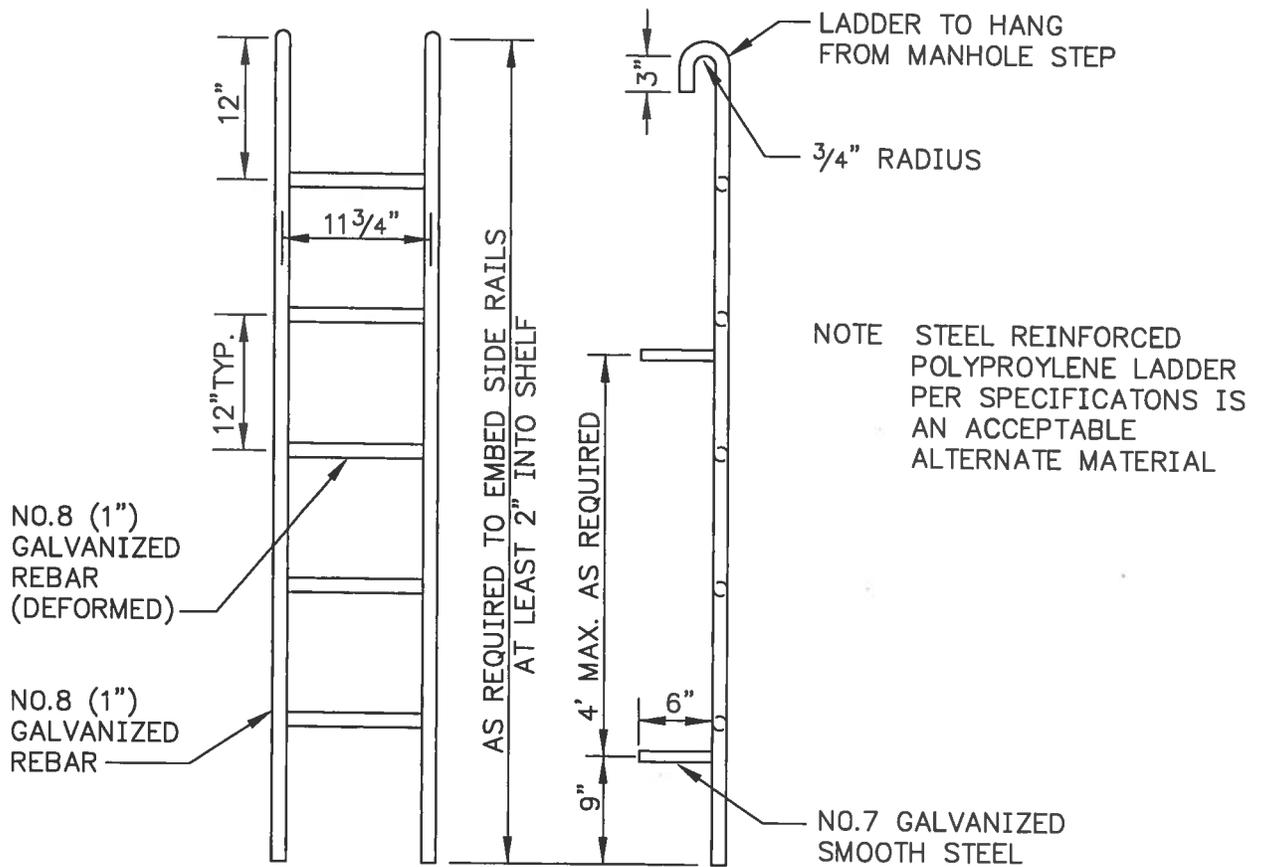
MAIN-LINE MANHOLE

S4 MANHOLE CHANNELING



ADJUSTMENT RING HAND HOLD

TYPICAL MANHOLE STEP

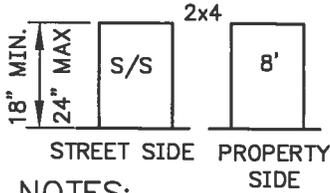
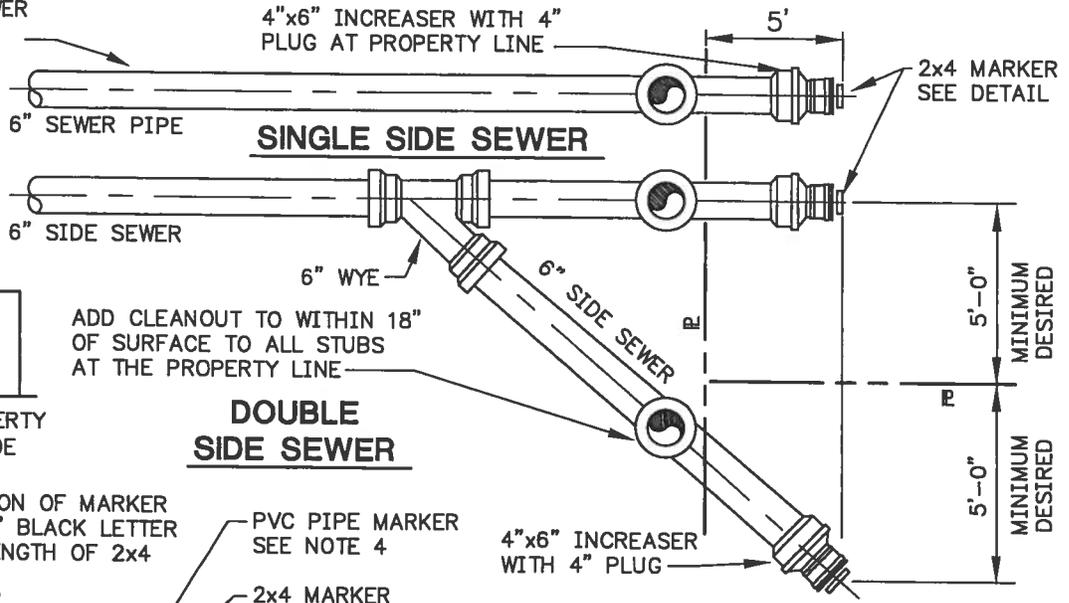


PREFABRICATED LADDER

NOTE STEEL REINFORCED
POLYPROPYLENE LADDER
PER SPECIFICATONS IS
AN ACCEPTABLE
ALTERNATE MATERIAL

S5 MANHOLE STEPS AND LADDER

LOCATION OF SIDE SEWER TO BE SET IN FIELD



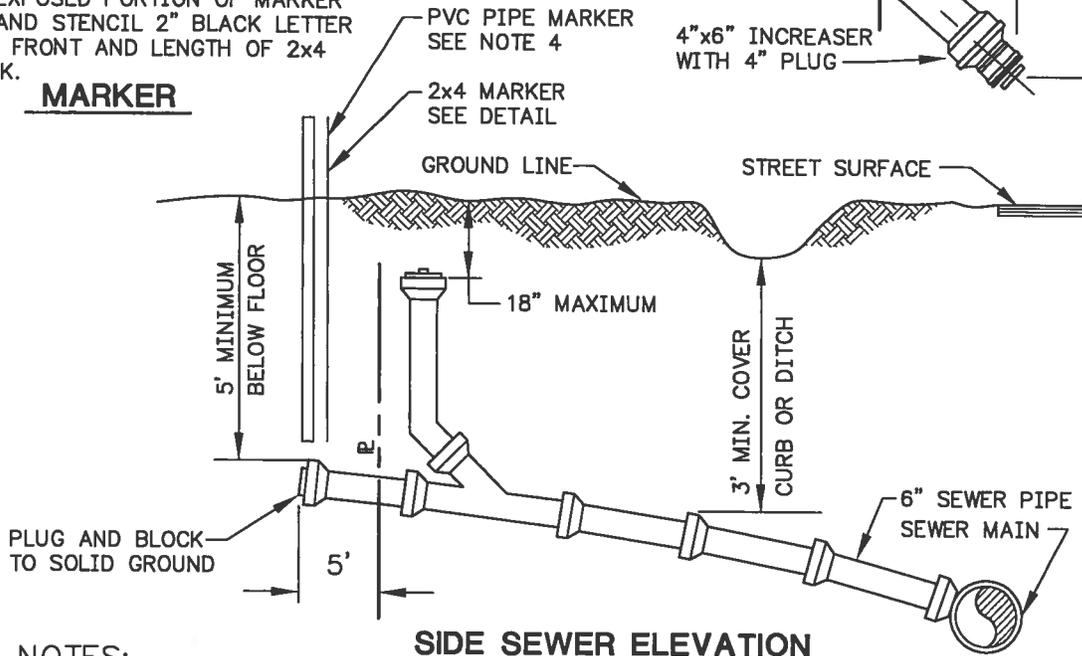
ADD CLEANOUT TO WITHIN 18" OF SURFACE TO ALL STUBS AT THE PROPERTY LINE

DOUBLE SIDE SEWER

NOTES:

PAINT EXPOSED PORTION OF MARKER WHITE AND STENCIL 2" BLACK LETTER S/S ON FRONT AND LENGTH OF 2x4 ON BACK.

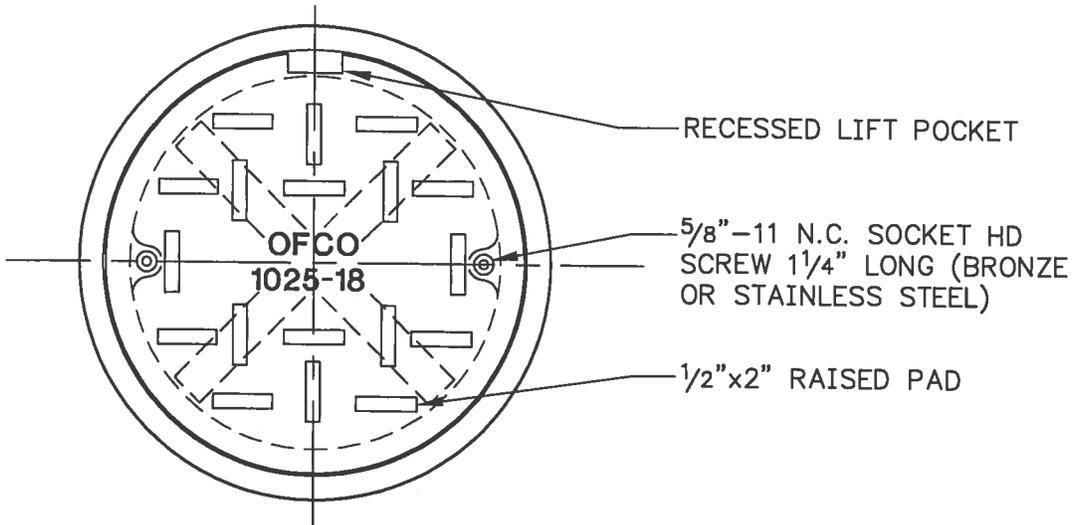
MARKER



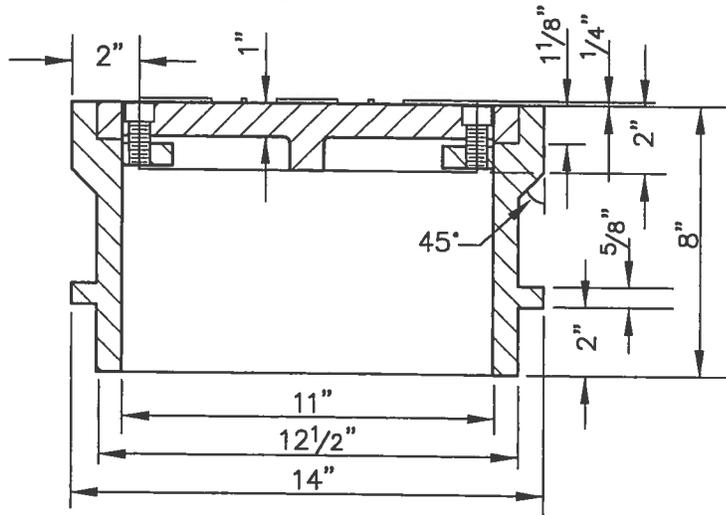
NOTES:

1. UNLESS OTHERWISE SHOWN ON PLAN, SIDE SEWER SHALL BE SLOPED 2% UP FROM SEWER LINE OR SHALL BE MIN. 5' COVER AT PROPERTY LINE OR 3.5' LOWER THAN THE LOWEST HOUSE ELEVATION, WHICHEVER IS LOWER.
2. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL
4. MINIMUM SLOPE = 2%
5. A 1 1/4" WHITE PVC PIPE, ASTM 2241 SDR 21 200 PSI SHALL BE PLACED VERTICALLY AT THE END OF EACH STUB AND SHALL RISE TWO FEET ABOVE FINISH GRADE LEVEL OR AS APPROVED BY SWSSD. BOTH ENDS OF THE PVC PIPE SHALL HAVE CAPS GLUED ON AND THE PIPE INTERIOR KEPT CLEAN FOR THE PURPOSE OF FUTURE DEPTH MEASUREMENT.
6. PIPE SHALL BE PVC ASTM D3034.

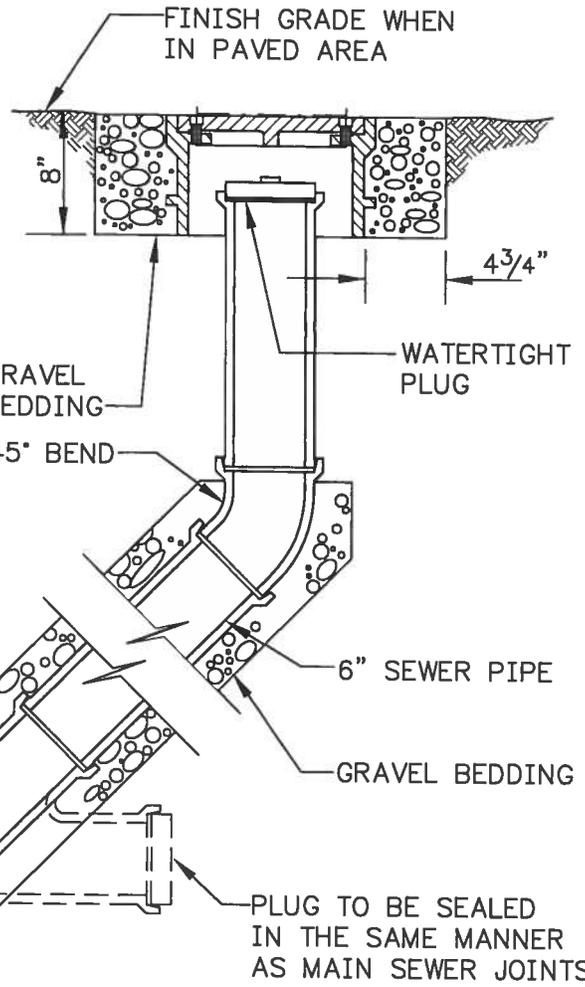
S6 STREET SIDE SEWER



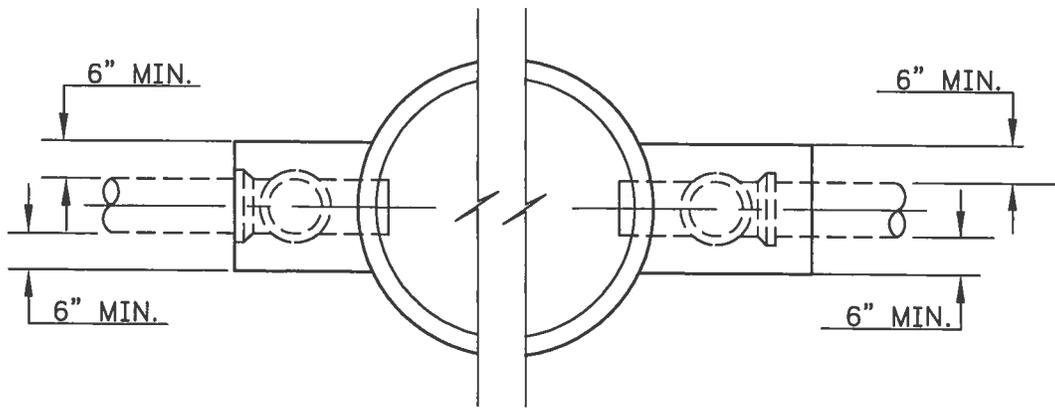
PLAN



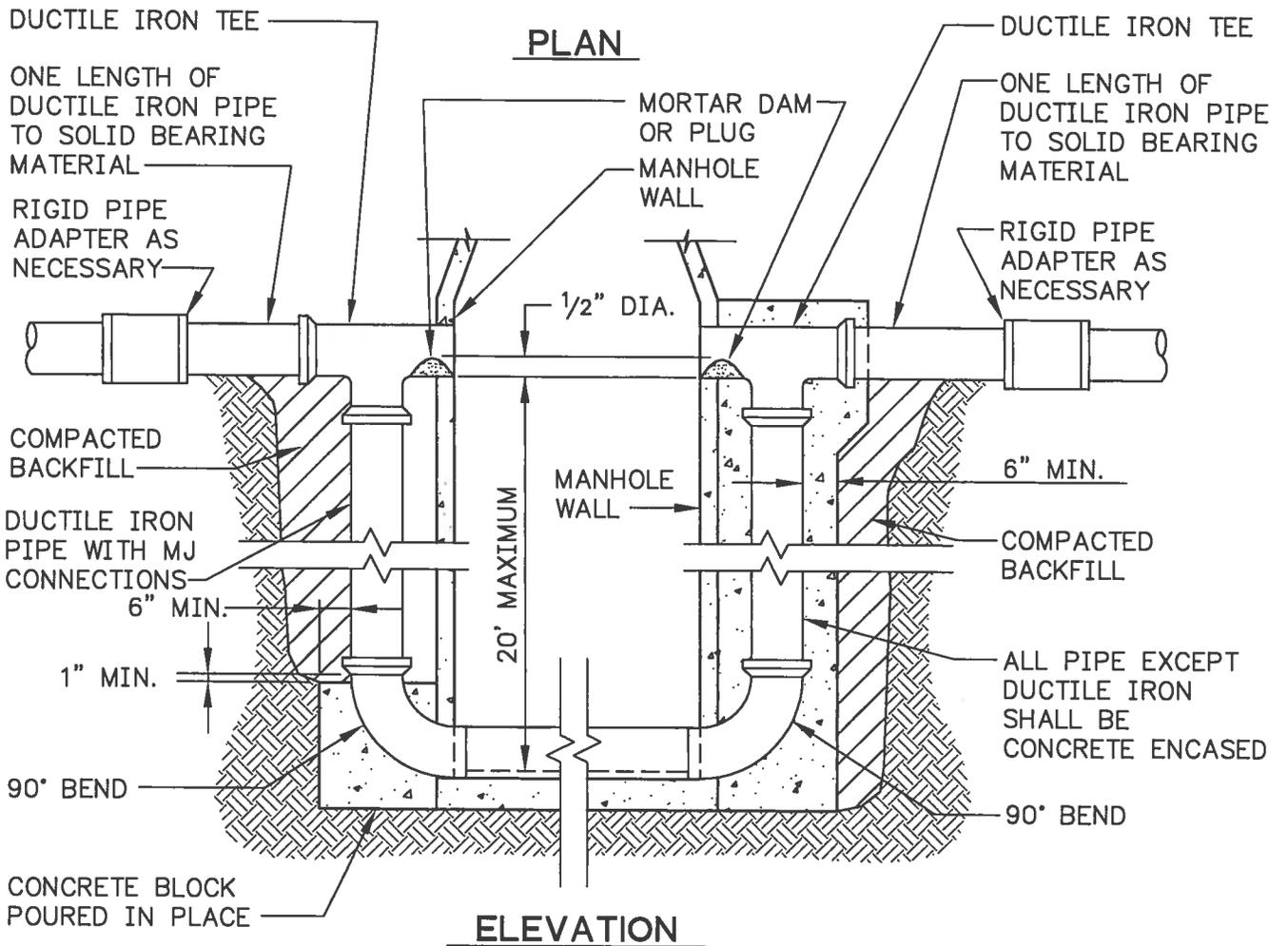
**ELEVATION
CAST IRON RING AND COVER**



S7 SEWER CLEANOUT



PLAN



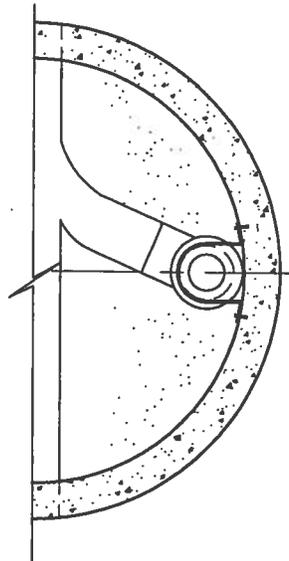
ELEVATION

DUCTILE IRON ALTERNATIVE

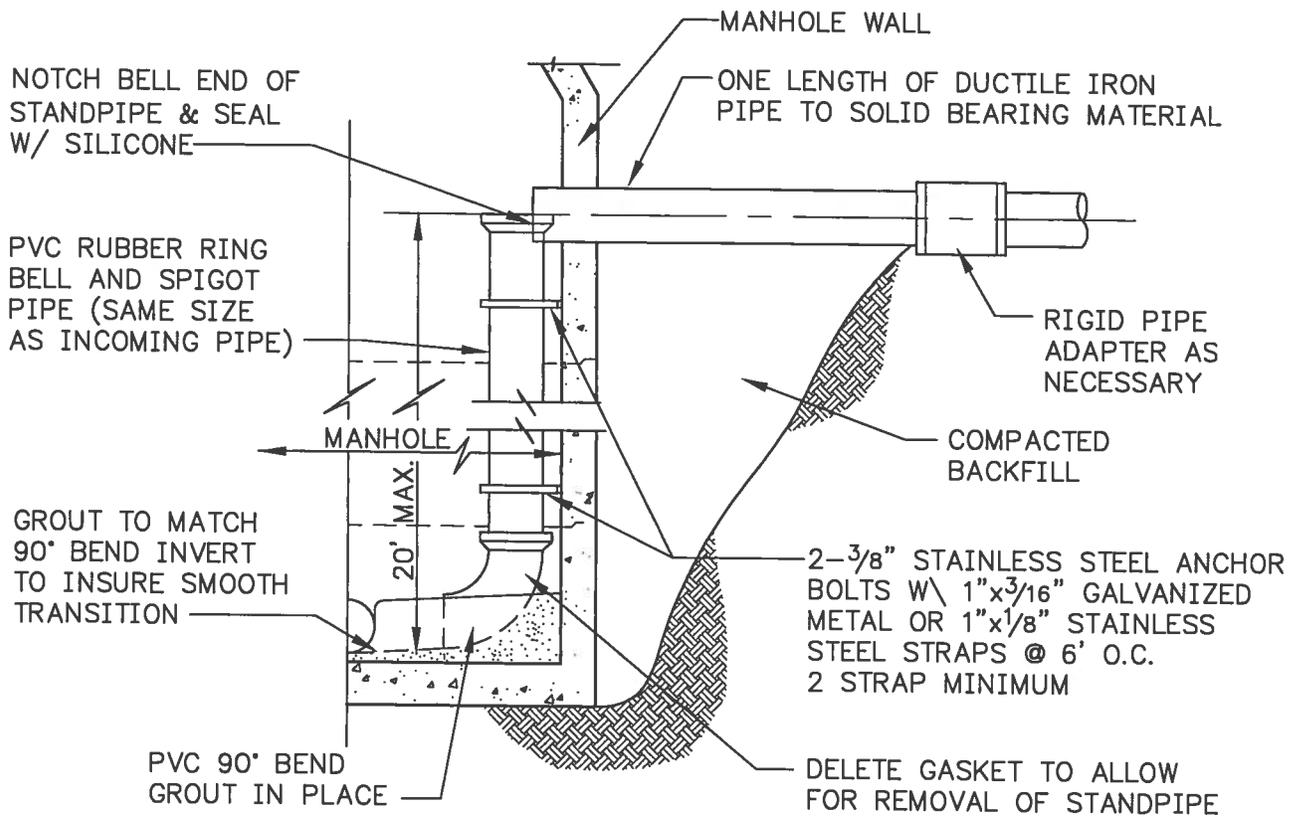
CONCRETE ENCASED ALTERNATIVE



OUTSIDE DROP MANHOLE CONNECTION



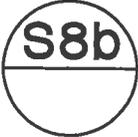
PLAN

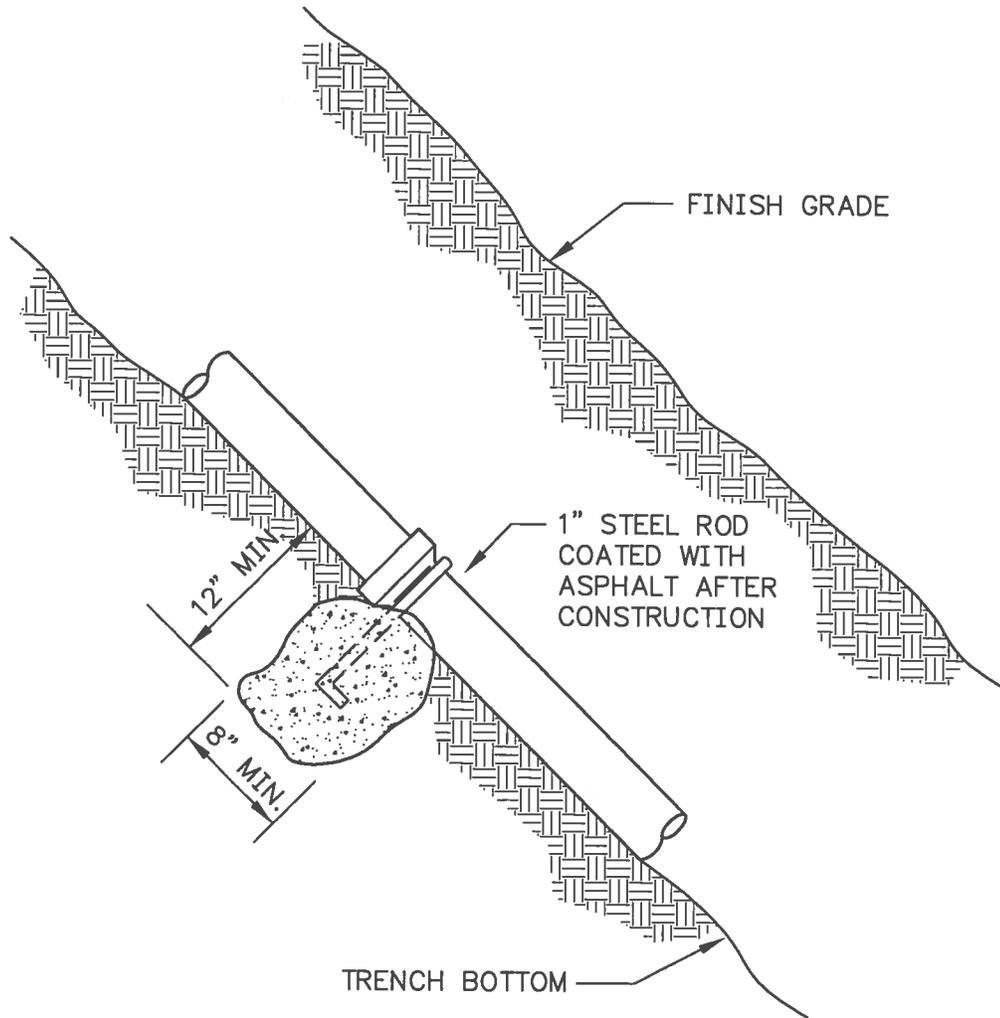


ELEVATION

NOTE: THIS ASSEMBLY TO BE USED ONLY WITH SPECIFIC AUTHORIZATION

**INSIDE DROP
MANHOLE CONNECTION**

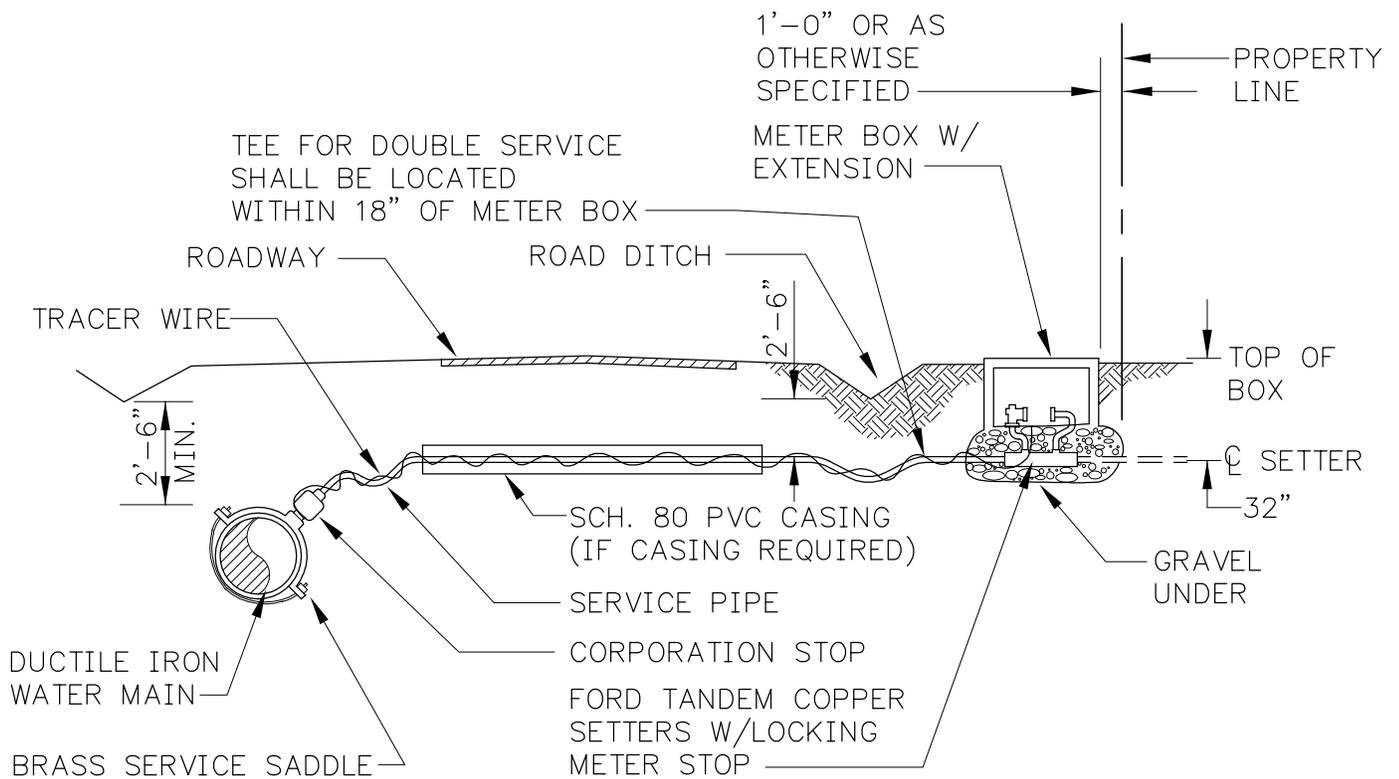




NOTES:

1. POUR BLOCKING AGAINST UNDISTURBED SOIL.
2. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
3. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20-30%, 20' ON GRADES OF 35-50%, AND 16' ON GRADES OVER 50%.

S9 PIPE ANCHOR



PARTS FOR SINGLE SERVICE

- 1- $\frac{3}{4}$ " IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 1- $\frac{3}{4}$ " BRASS MALE x INSERT ADAPTER (FORD PTM-1)
- 1- $\frac{3}{4}$ " x 12" COPPER SETTER WITH LOCKING METER STOP AND DUAL CHECK VALVE (FORD VBHC72-12W-11-33 DP x DP)
- 1-PLASTIC METER BOX (CARSON 1419)
- 1-PLASTIC METER BOX EXTENSION (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

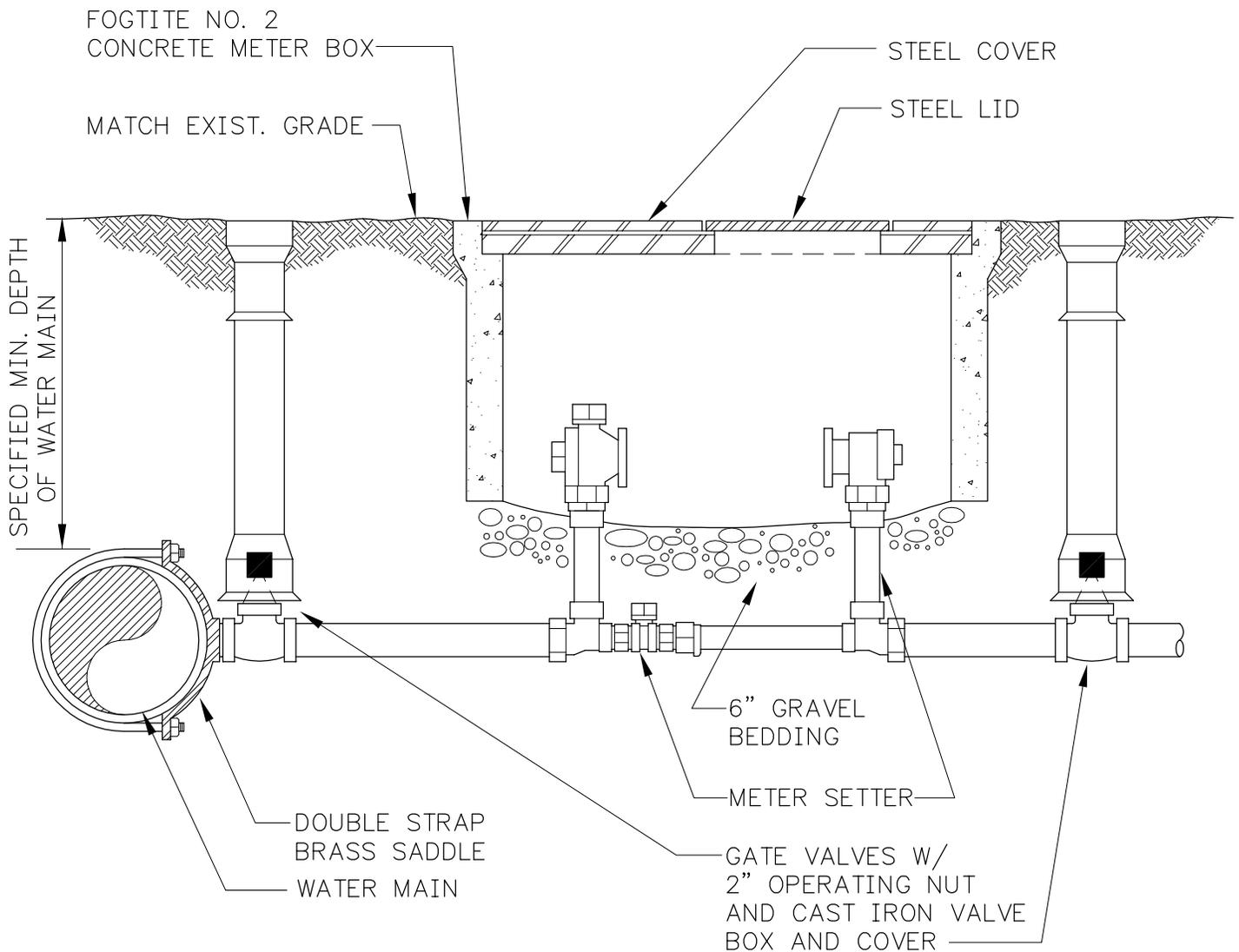
PARTS FOR DOUBLE SERVICE

- 1-1" IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1-1" BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1-1" BRASS GRIPPER TEE $\frac{3}{4}$ " x $\frac{3}{4}$ " x 1" (FORD T666-334G)
- 2- $\frac{3}{4}$ " BRASS STREET ELLS
- 2- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 2- $\frac{3}{4}$ " x 12" COPPER SETTERS WITH LOCKING METER STOPS AND DUAL CHECK VALVES (FORD VBHC72-12W-11-33 DP x DP)
- 2- $\frac{3}{4}$ " BRASS MIPT x INSERT ADAPTERS (FORD PTM-1)
- 2-PLASTIC METER BOXES (CARSON 1419)
- 2-PLASTIC METER BOX EXTENSIONS (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

NOTES:

1. WATER SERVICE LINE SHALL BE 200 PSI IPS PE 3408, ASTM-2239 (DRISCO ULTRA-HI MOLECULAR PE-3408)
2. USE BRASS DOUBLE STRAP SADDLE ON MAINS 10" AND LARGER.
3. WHERE FORD MATERIALS ARE CALLED OUT, EQUAL PRODUCTS ARE ACCEPTABLE

W1
3/4" AND 1" WATER SERVICE

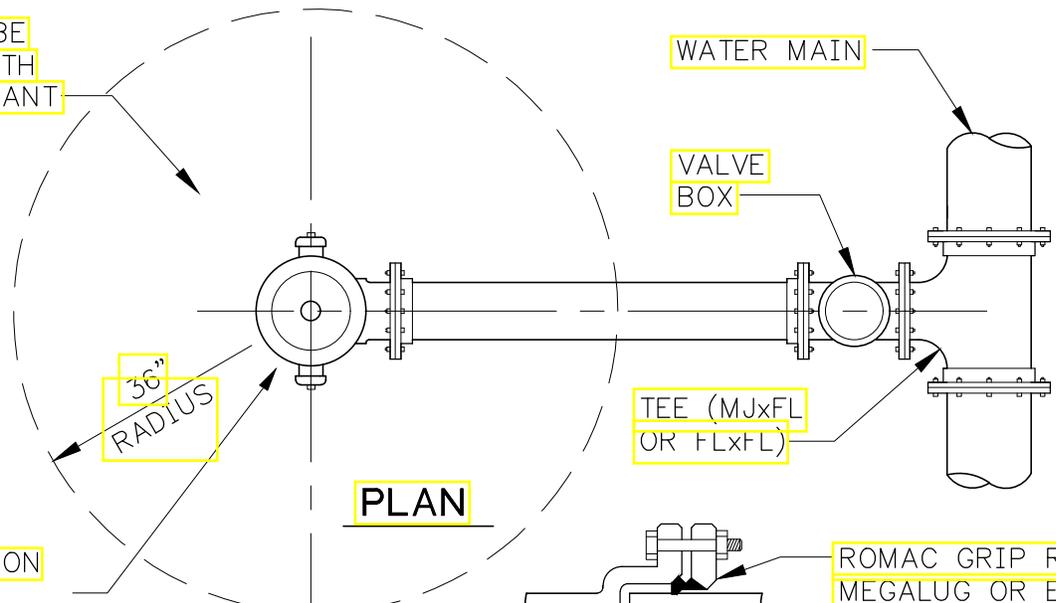


PARTS FOR 1½" AND 2" SERVICE

- 1 – DOUBLE STRAP BRASS SADDLE WITH BRONZE STRAP
- 4 – FORD PACKJOINT COUPLINGS/PLASTIC PIPE
- SETTERS: 1½" FORD VBH6612BX LENGTH WITH LOCKING BYPASS
 2" FORD VBH7712BX LENGTH WITH LOCKING BYPASS
 (SETTER LENGTH WILL BE DETERMINED BY TOWN)
- CONCRETE METER BOX WITH STEEL COVER AND METER LID
 FOGTITE NO. 2
- 2 – GATE VALVES: 2 INCH-RESILIENT WEDGE SEATED (APWA C-509)
 1½ INCH-BRASS
- 2 – CAST IRON VALVE BOX WITH COVER
- WATER SERVICE LINE 200 PSI IPS PE 3408, ASTM D-2239

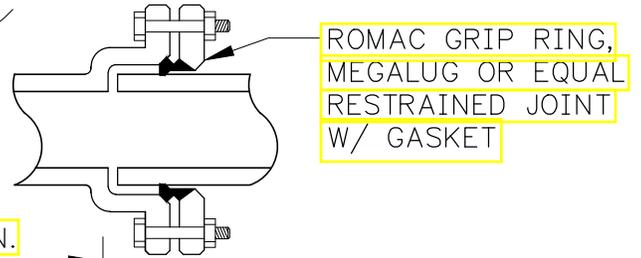
W2
1½" AND 2" WATER SERVICE

SURFACE TO BE GRADED SMOOTH AROUND HYDRANT



PLAN

HYDRANT:
CLOW MEDALLION
SERIES 2545



DETAIL A

PROPERTY LINE

36" MIN.

36" MIN.

(UNLESS DIRECTED OTHERWISE)

(6' MIN. FROM TRAVEL LANE)

STORZ STYLE NO. S-37 5" RIGID FEMALE ADAPTER (DO NOT PAINT)

BREAK AWAY FLANGE

3" MIN.
6" MAX.

18" MIN.
24" MAX.

FACE OF CURB

CAST IRON VALVE BOX AND COVER

SLOPE

SPOOL LENGTH TO SUIT TRENCH DEPTH

VARIABLE (50' MAX.)

WATER MAIN

POLYWRAP SPOOL

15LB. ASPHALTIC FELT OR FILTER FABRIC

6 CU. FT. MIN. GRAVEL POCKET

6" GATE VALVE (FLxMJ)

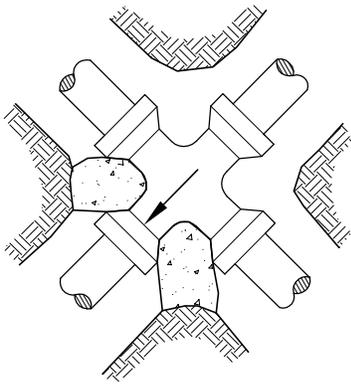
SOLID CONCRETE BEARING BLOCK 12"x12"x4" MIN. SIZE

6" DUCTILE IRON PIPE SPOOL W/ POLYWRAP AND ROMAC GRIP RINGS, MEGALUGS OR EQUAL. (RESTRAIN ALL JOINTS) SEE DETAIL A

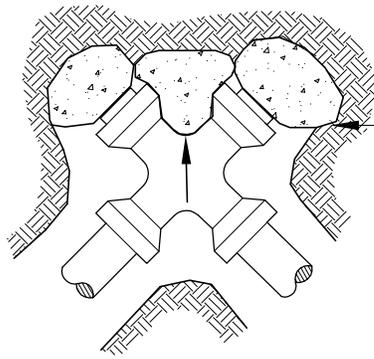
ELEVATION

W3

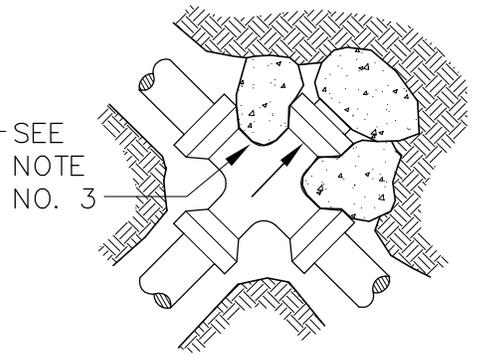
FIRE HYDRANT ASSEMBLY



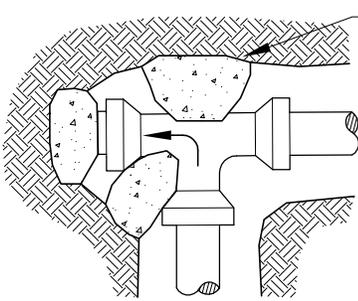
UNBALANCED CROSS



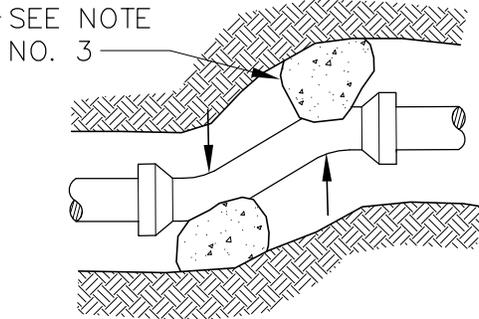
PLUGGED CROSS



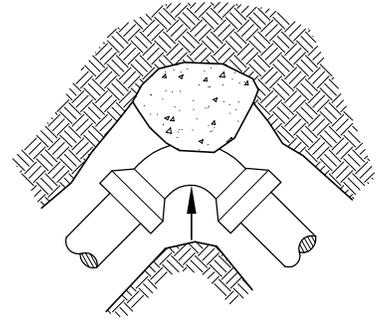
PLUGGED CROSS



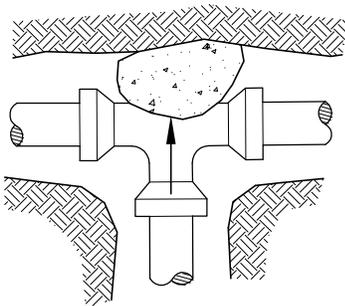
PLUGGED TEE



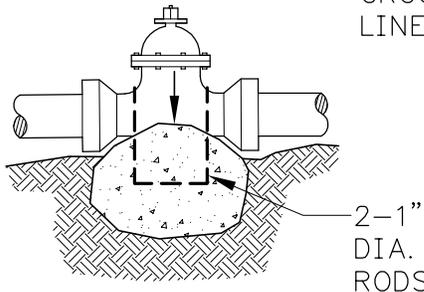
OFFSET



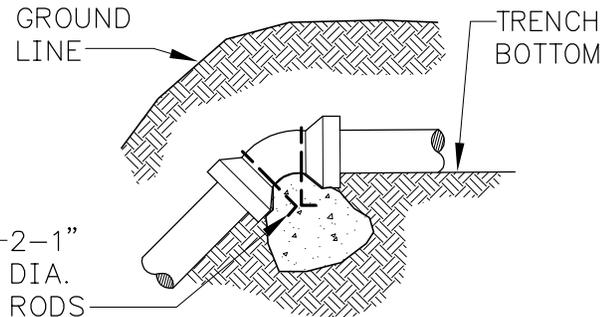
HORIZONTAL BEND



TEE



VALVE

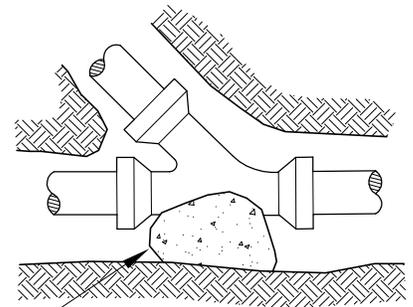


VERTICAL BEND

NOTES:

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITION AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. BLOCKING REQUIRED IF PLUGS NOT SECURED BY BOLTING OR ADEQUATE STRAPS.

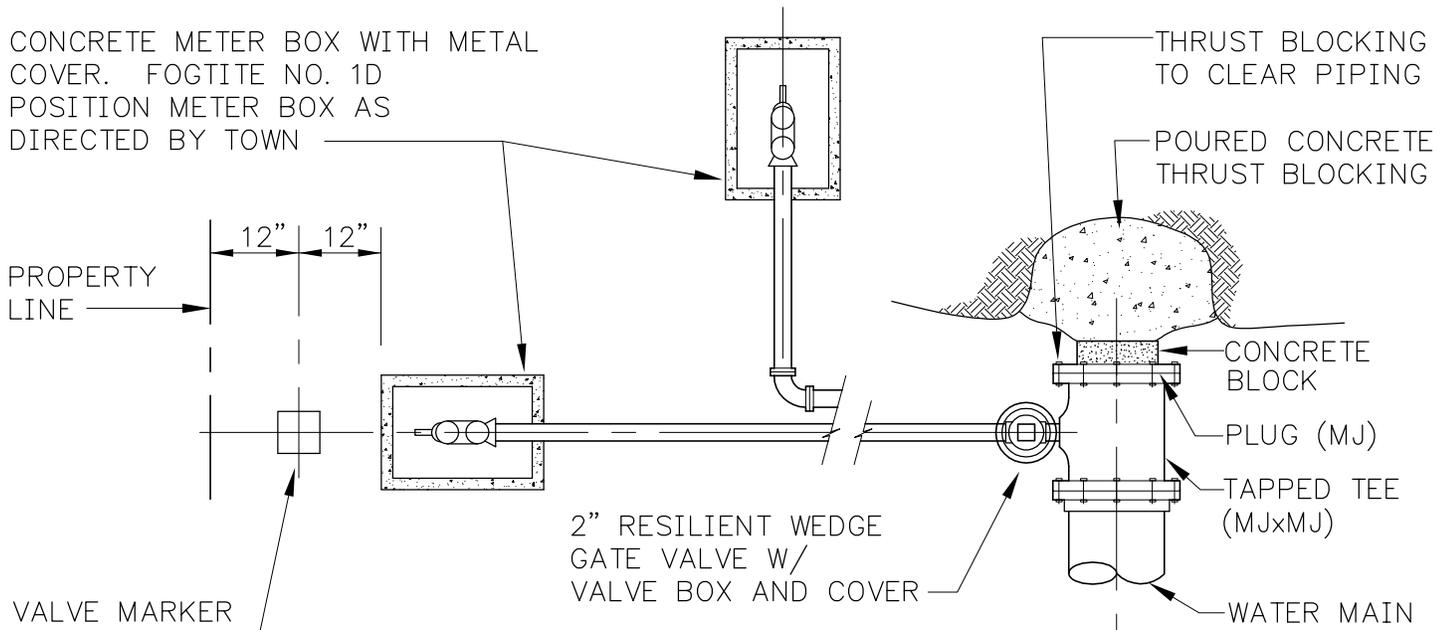
SEE NOTE NO. 3



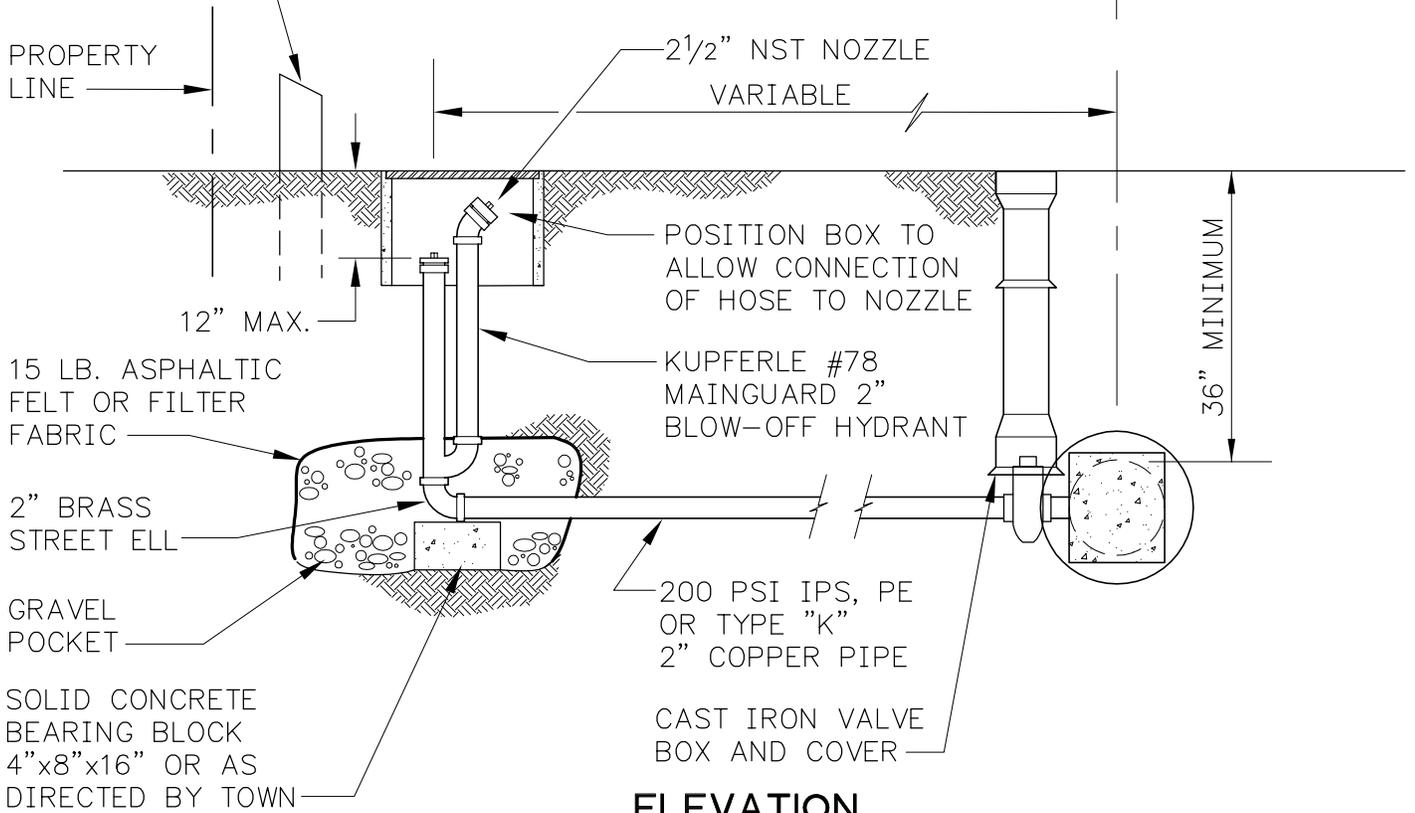
"Y" BRANCH



CONCRETE THRUST BLOCKING



PLAN

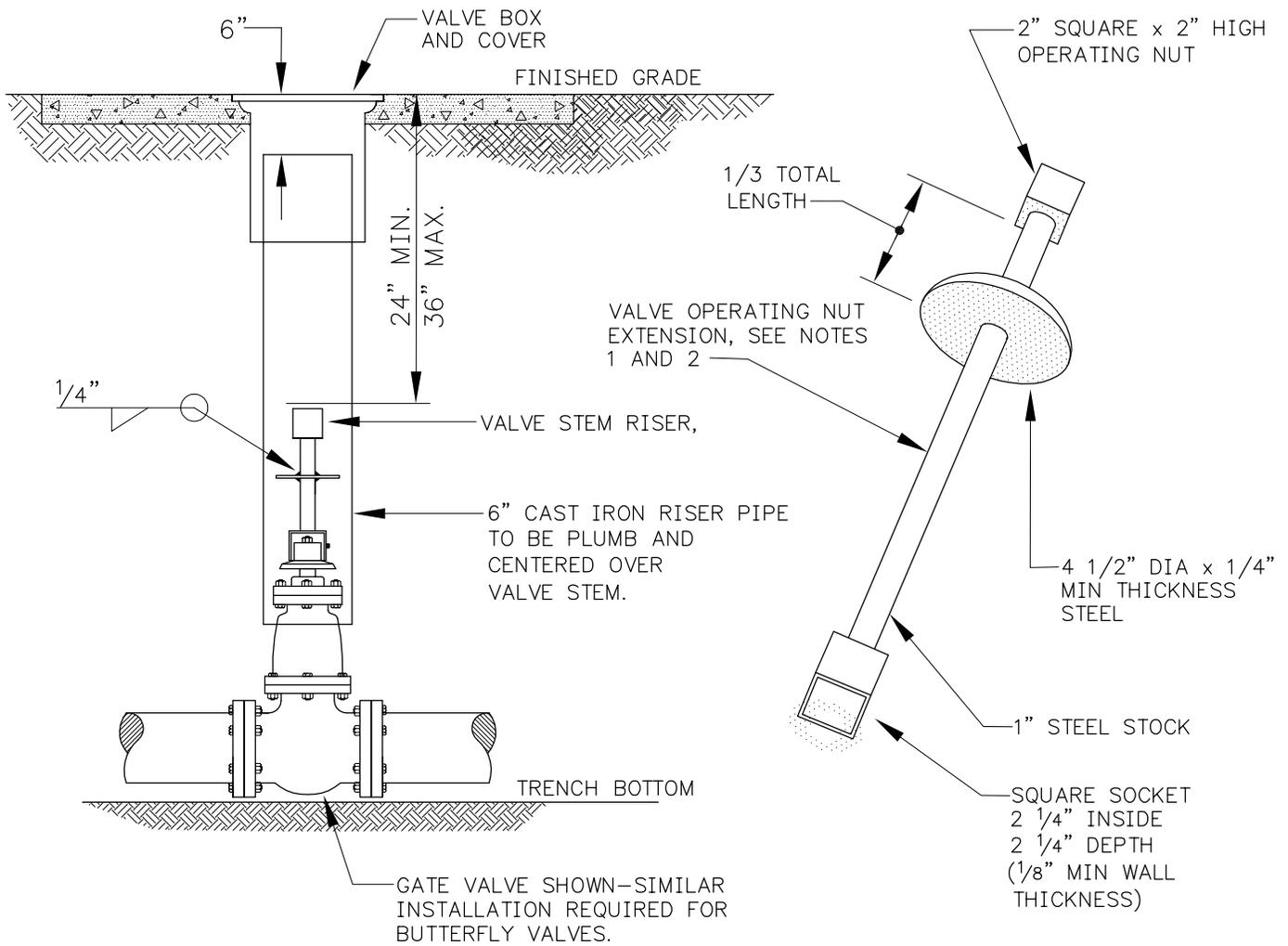


ELEVATION

NOTES:

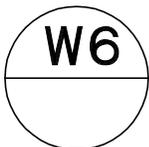
1. PAINT PIPE THREADS WITH ASPHALT PAINT AFTER ASSEMBLY.
2. VALVE AND ALL FITTINGS TO BE BRASS.
3. PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
4. PAINT VALVE MARKER POST PER TOWN REQUIREMENTS.

W5 BLOWOFF ASSEMBLY

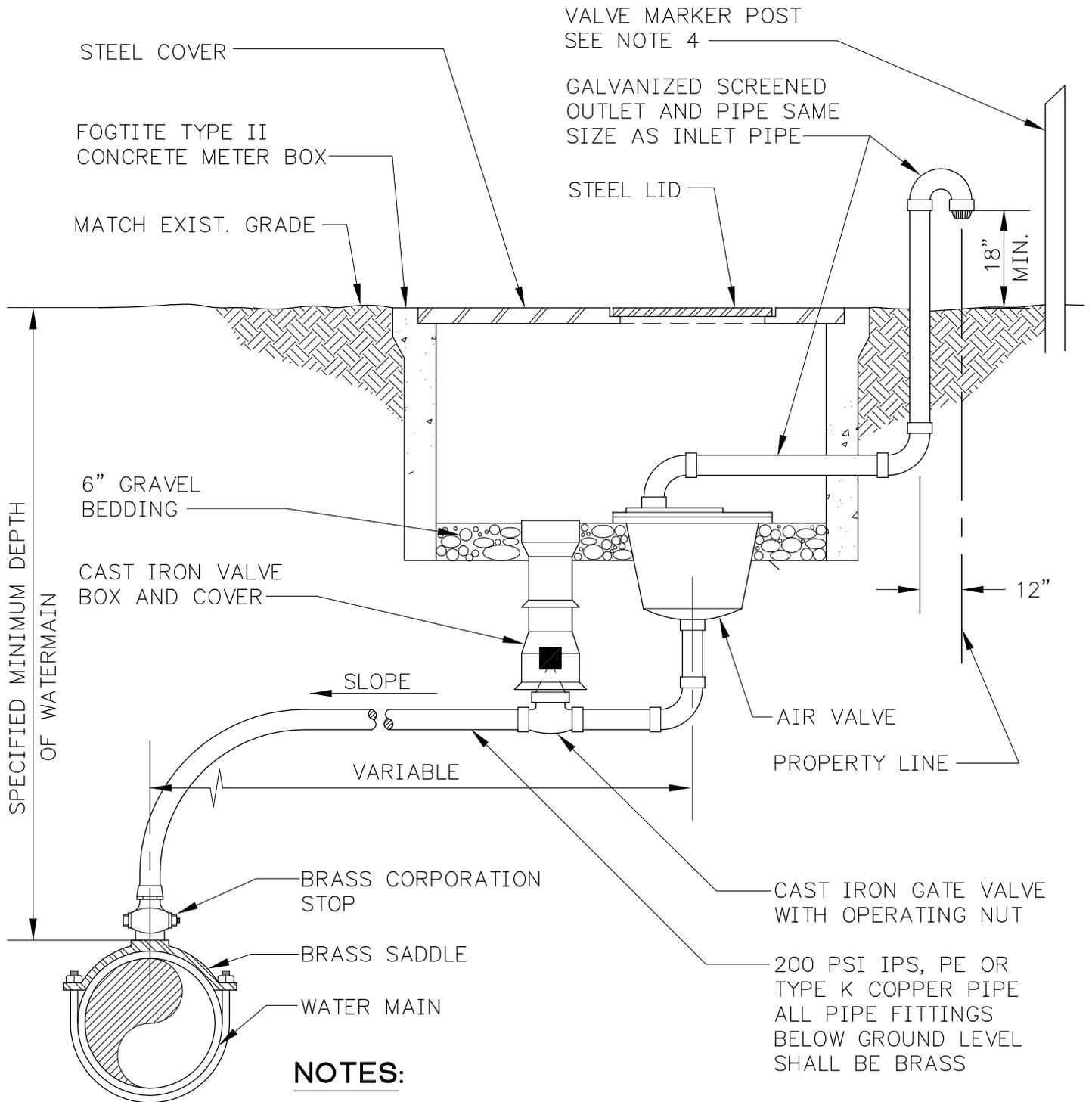


NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.



W6 VALVE OPERATING NUT EXTENSION



NOTES:

1. VALVE AND PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. VALVE MARKER POST TO BE PAINTED PER TOWN STANDARD. TOWN TO DETERMINE LOCATION.

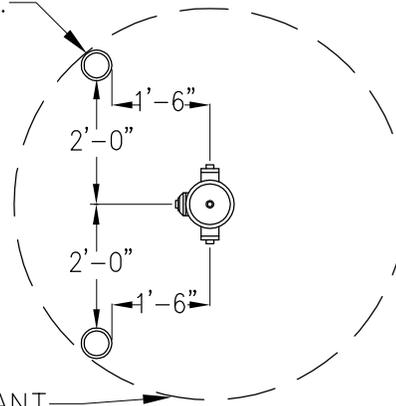
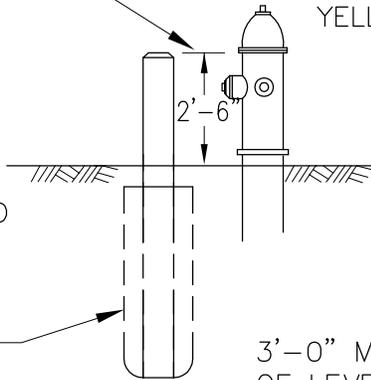


AIR RELEASE VALVE ASSEMBLY

LEVEL WITH BONNET
FLANGE OF HYDRANT

HYDRANT GUARD POST SHALL BE 9" DIA
BY 6" LONG PRECAST CONCRETE POST
EQUAL TO FOG-TITE METER SEAL CO.
PAINT WITH TWO COATS OSHA SAFETY
YELLOW, ENAMEL.

CONCRETE BACKFILL
TO 6" FROM GROUND
WHERE SPECIFIED.
ARTH BACKFILL
COMPACTED IN 6"
LAYERS ELSEWHERE.

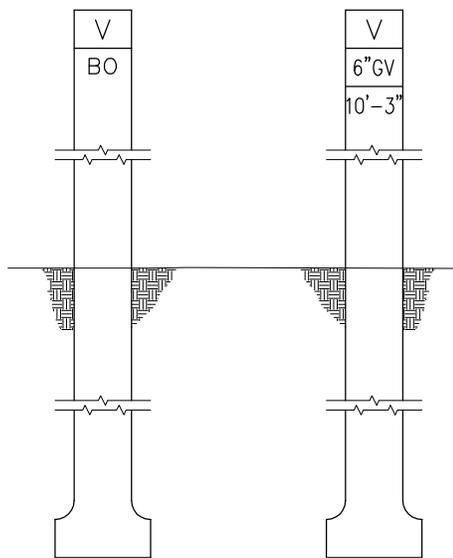


3'-0" MIN. RADIUS
OF LEVEL GROUND
AROUND FIRE HYDRANT

ELEVATION

PLAN

FIRE HYDRANT GUARD POST



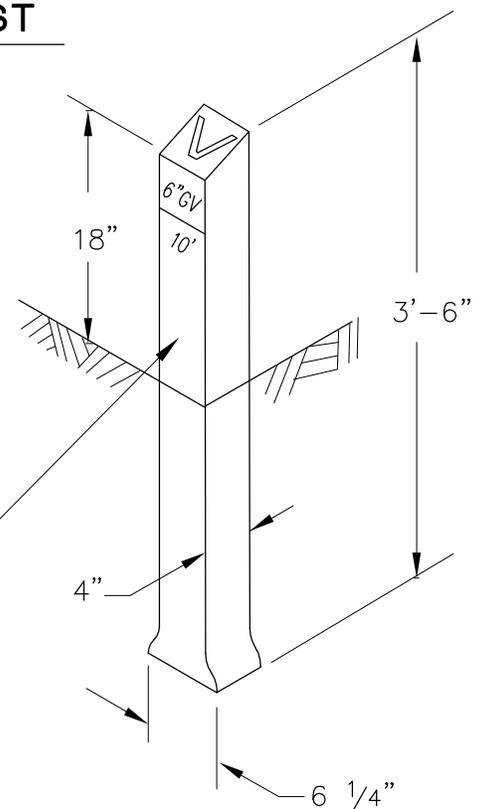
FRONT VIEW

FRONT VIEW

(FOR BLOW-OFF
ASSEMBLY)

(FOR GATE VALVE)

VALVE MARKER POST
SHALL BE EQUAL TO
FOG-TITE METER CO.
PAINT AS SPECIFIED
FOR HYDRANT GUARD
POST. PAINT TYPE
AND SIZE OF VALVE
AND DISTANCE FROM
THE VALVE MARKER TO
THE VALVE ON THE POST
WITH NEATLY STENCILED
BLACK ENAMEL NUMBERS,
1" IN HEIGHT.

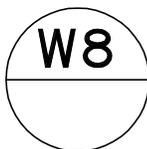


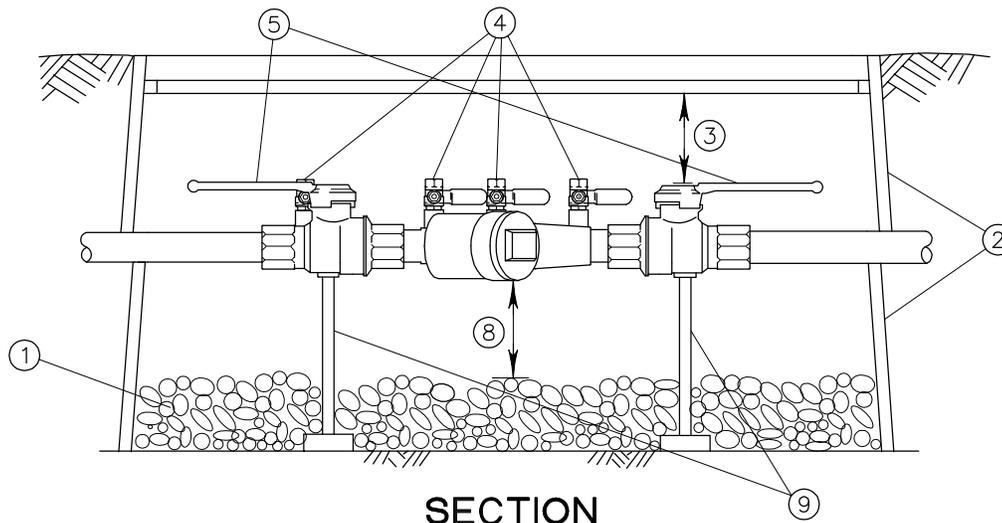
VALVE MARKER POST

NOTES:

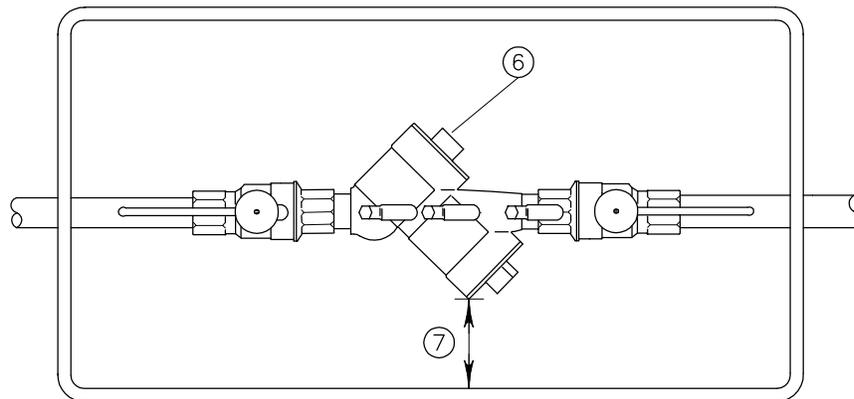
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY THE TOWN.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

**VALVE MARKER POST
HYDRANT GUARD POST**





SECTION

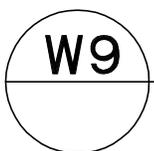


PLAN

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO NO. 2 METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
- ③ A MAXIMUM DISTANCE OF 6" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDE WAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE DEVICE AND THE DRAIN ROCK.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.

GENERAL NOTE

THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION AND ANNUALLY, AND WHEN MOVED OR REPAIRED. ALL INSTALLATION MUST MEET MANUFACTURERS SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.



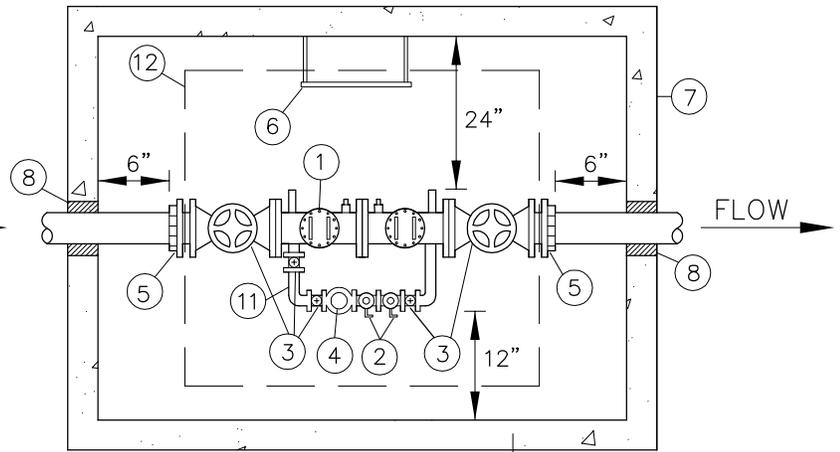
DOUBLE CHECK VALVE ASSEMBLY

NOTES:

1. TOWN WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY TOWN. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE & GATE VALVE REQUIRED ON MAIN.
6. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE W/ DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
7. ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS W/ VEHICULAR TRAFFIC.
9. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.

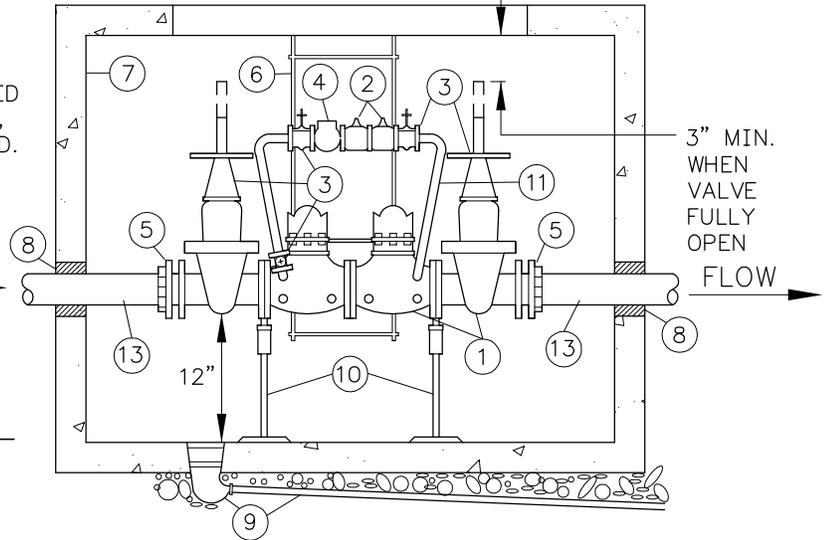
PLAN

FLOW →



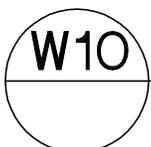
ELEVATION

FLOW →

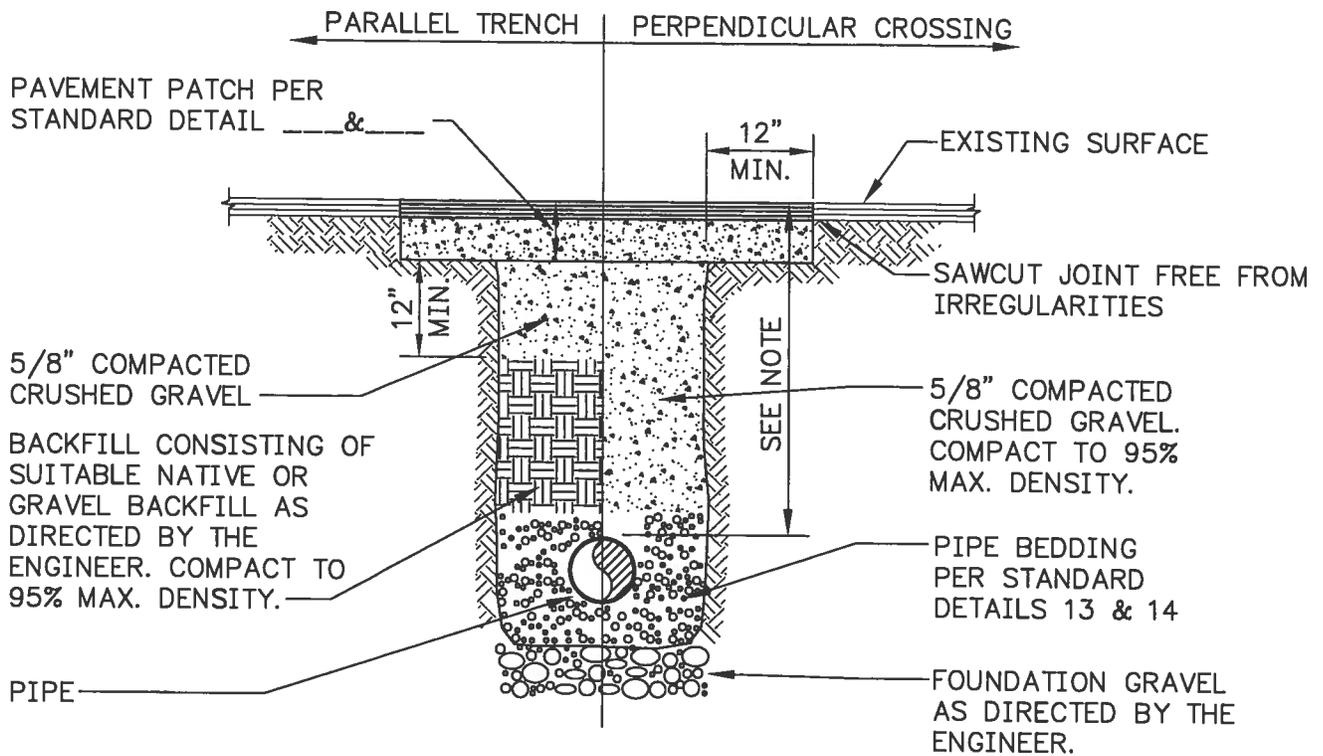


- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED O.S.&Y. VALVES & (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED BALL VALVES & (4) RESILIENT SEATED TEST COCKS.
- ③ EACH VALVE SHALL BE MARKED W/ MODEL NUMBER W/ DESIGNATION OF RESILIENT SEAT, SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED W/ A MIN. OF 4 MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ "TOUCH READ" SYSTEM.
- ⑤ UNI-FLANGE W/ SETSCREWS.
- ⑥ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ⑦ CONCRETE VAULT W/ A MIN. OF 2, 3'x3' ALUM. DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑧ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE W/ WELDED FLANGE OR ANCHOR BLOCKS.
- ⑨ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE.
- ⑩ TWO ADJUSTABLE PIPE STANCHIONS.
- ⑪ ALL PLUMBING FOR BY-PASS TO BE COPPER & BRASS.
- ⑫ ACCESS TO BE CENTERED OVER METER.
- ⑬ CL. 52 D.I., M.J. W/ RETAINER GLANDS.

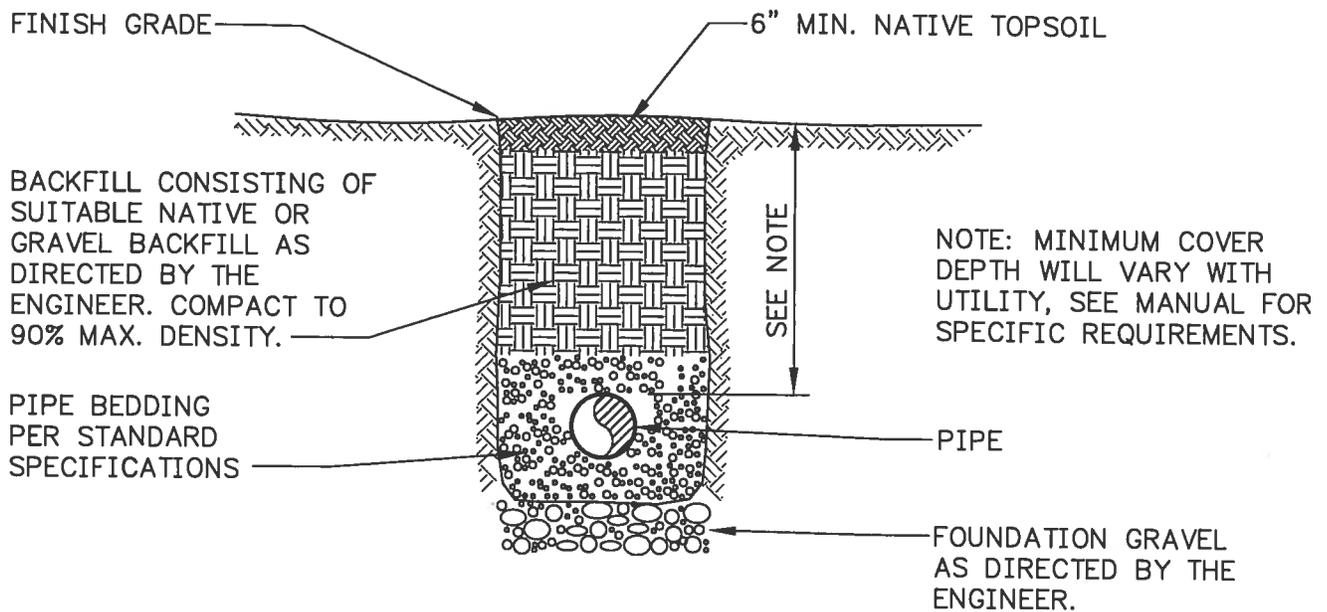
SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332



DOUBLE CHECK DETECTOR ASSEMBLY

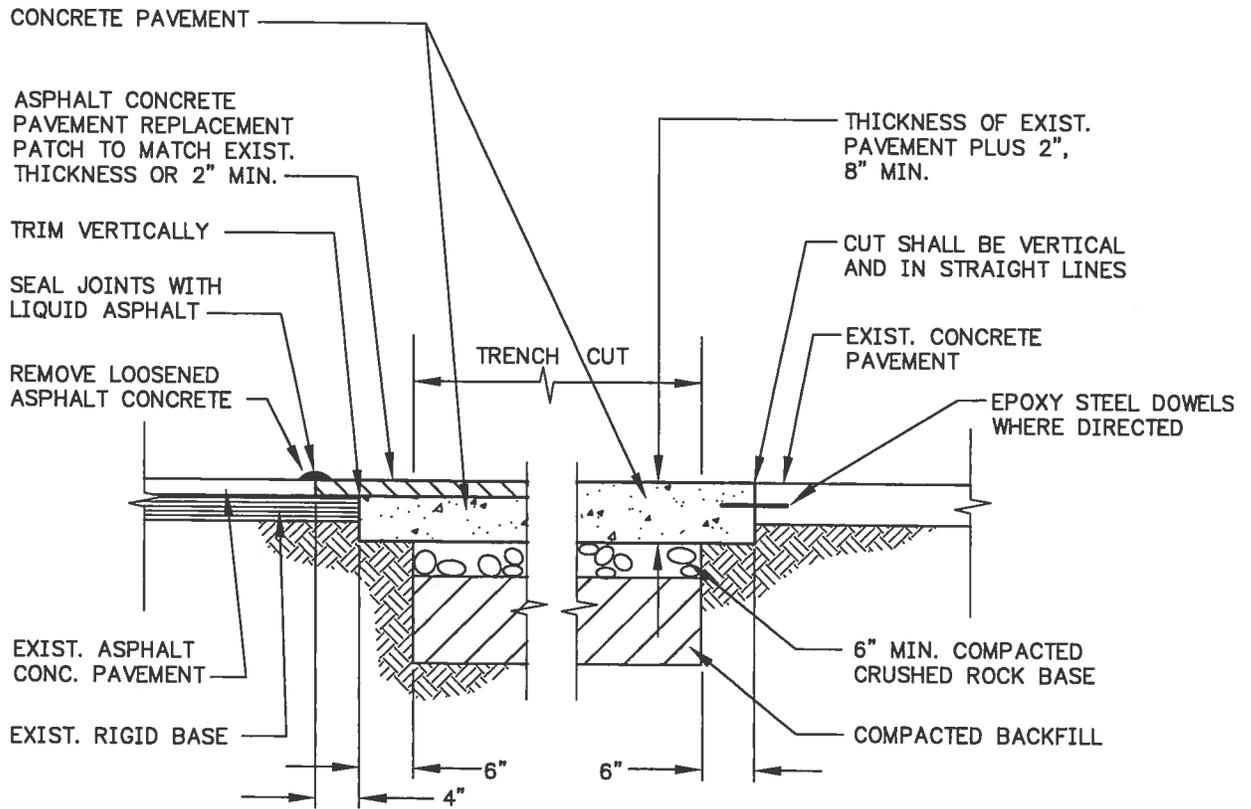


**PAVEMENT REPAIR SECTION
TRENCH SECTION IN ROADWAY**



**TRENCH SECTION
IN UNIMPROVED AREAS**

G1 TYPICAL TRENCH SECTION



**RIGID PAVEMENT WITH
ASPHALTIC CONCRETE SURFACE**

CEMENT CONCRETE PAVEMENT

NOTE: TRENCHING THROUGH EXISTING CONCRETE ROADWAY PANELS WILL REQUIRE REPLACEMENT OF FULL PANEL TO NEAREST COLD JOINT. MINIMUM HALF-PANEL REPLACEMENT WITH DOWELS REQUIRES PRIOR APPROVAL FROM TOWN.

G2 RIGID PAVEMENT PATCHING

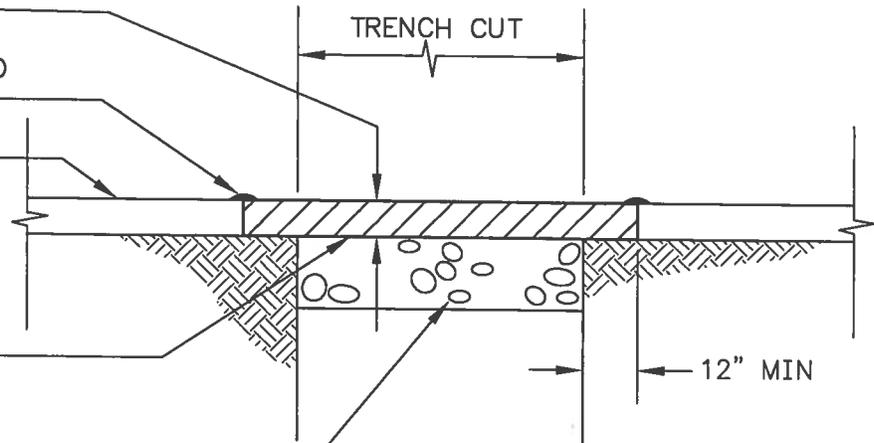
TOTAL THICKNESS TO EQUAL
OR EXCEED EXIST. PAVEMENT
THICKNESS, 4" MIN.

SEAL JOINTS WITH LIQUID
ASPHALT (TYP.)

EXIST. A.C. SURFACING

4" MIN. ASPHALT
CONCRETE PATCH

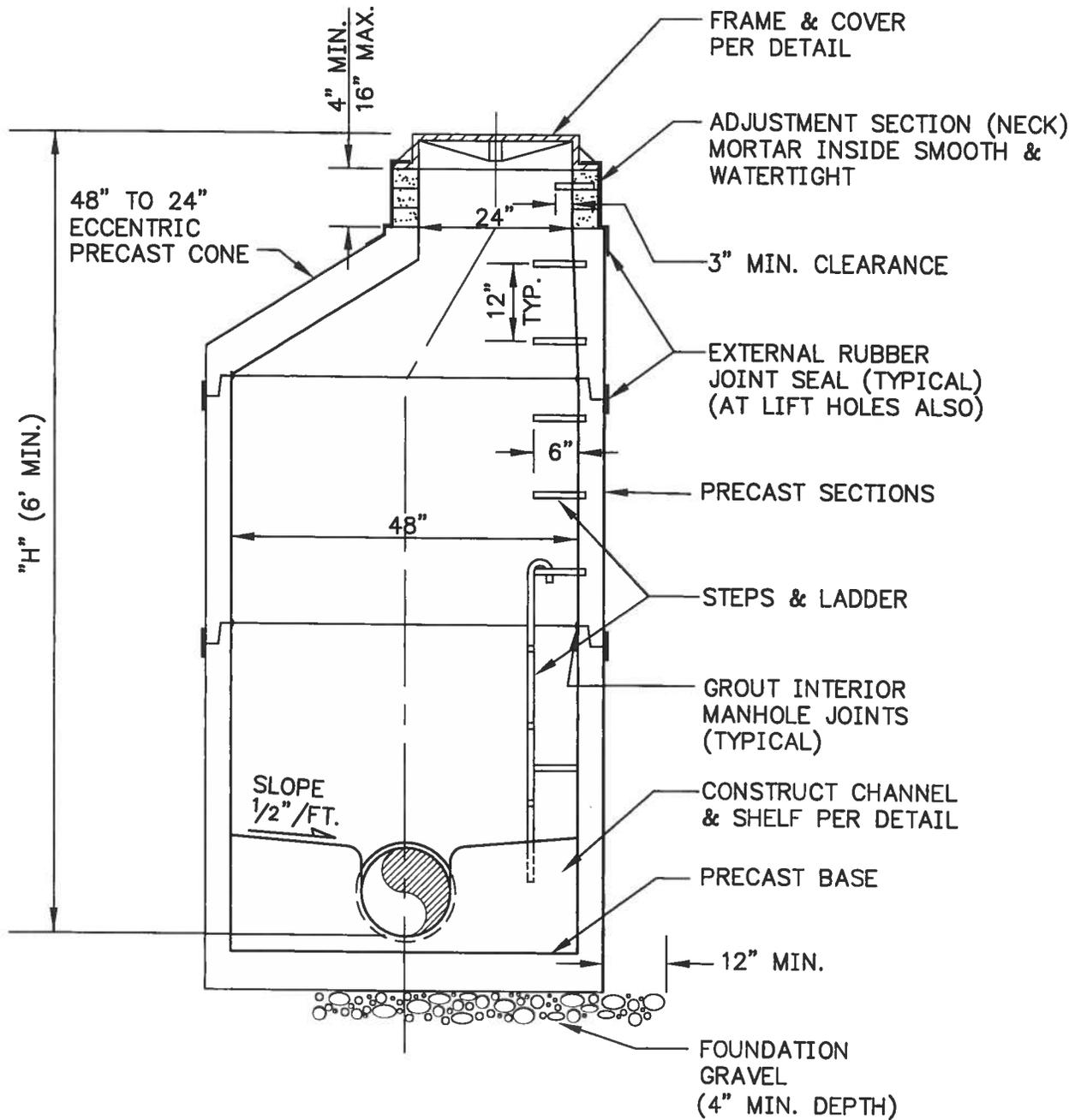
CRUSHED ROCK BASE,
6" MIN. OR THICKNESS
OF EXIST. BASE



NOTE: ASPHALT TREATED BASE MAY BE SUBSTITUTED FOR THE FIRST LIFT
ASPHALT CONCRETE AND CRUSHED BASE. SEE SPECIFICATIONS.

G3

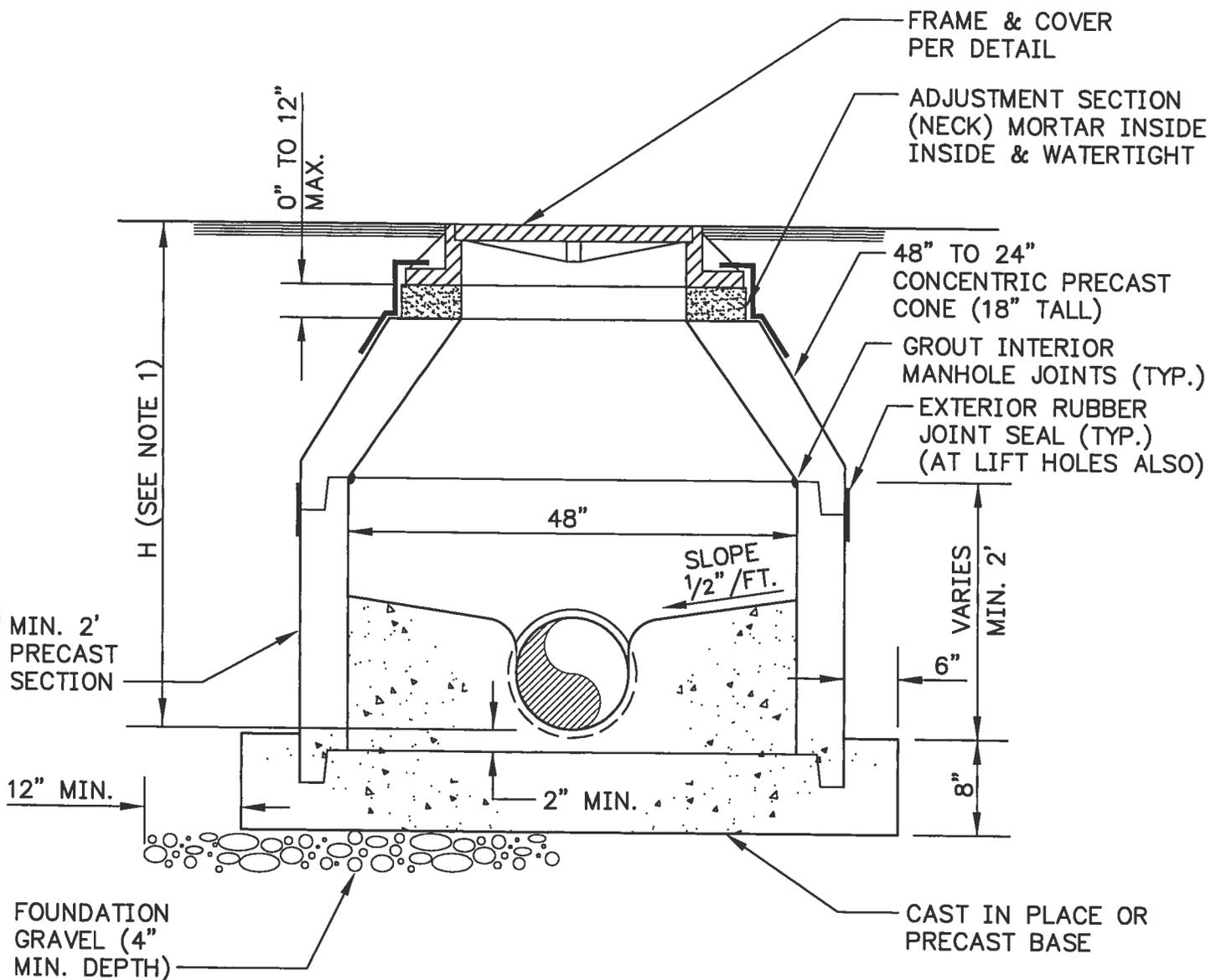
ASPHALT CONCRETE PATCHING



NOTES:

1. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR.
 - B. 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"

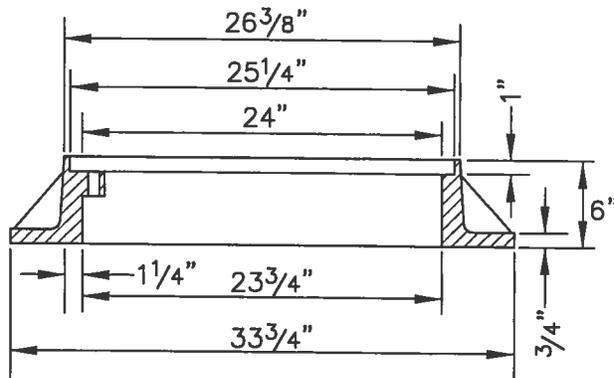
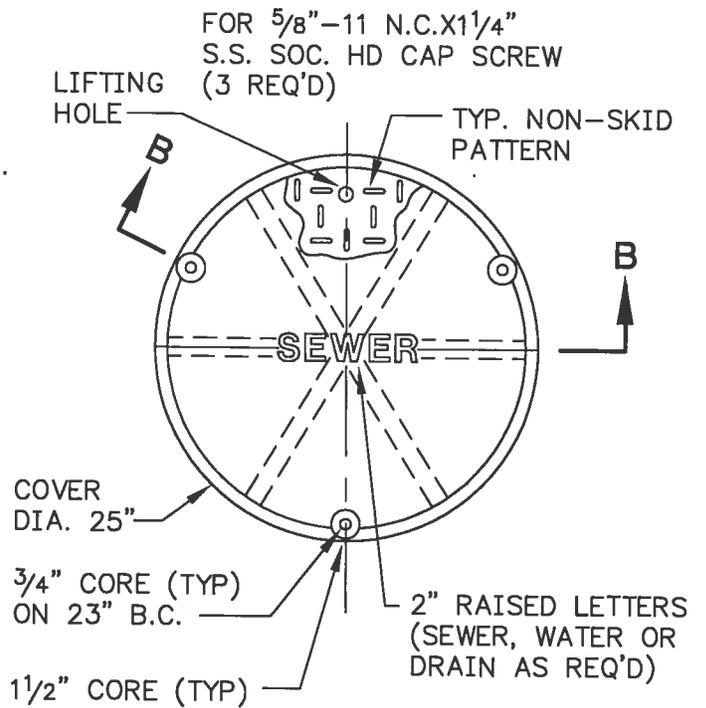
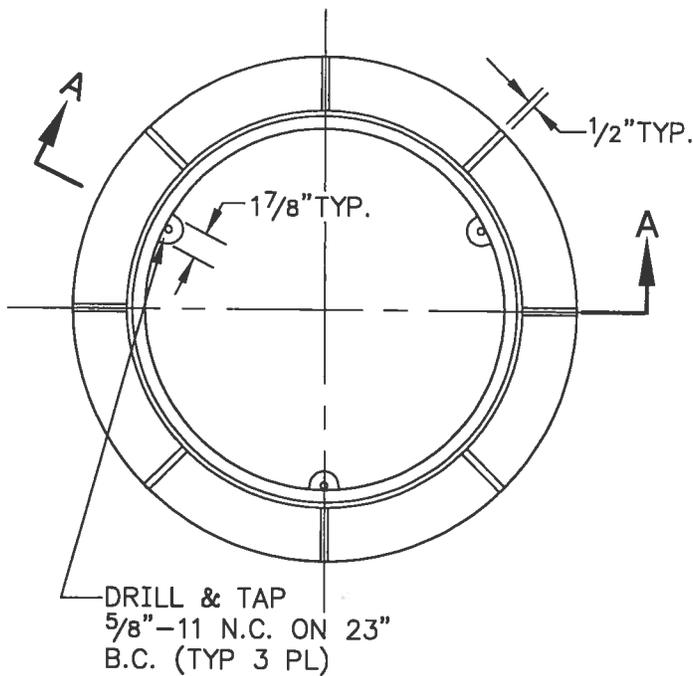
S1 TYPE I - 48" MANHOLE



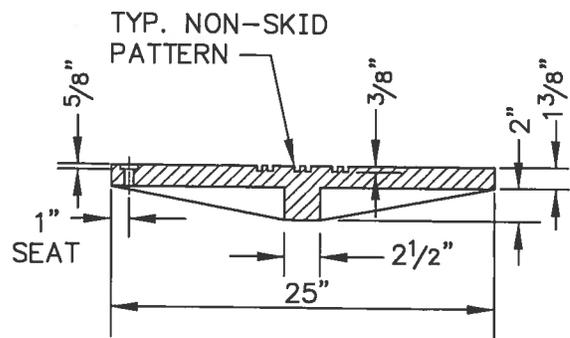
NOTES:

1. MAXIMUM H IS 5'. MINIMUM H IS 3'-8"
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR
5. EXTERNAL JOINT SEAL SHALL BE "BEST SEAL" OR APPROVED EQUAL

S2 TYPE IIIA - 48" MANHOLE



SECTION A-A

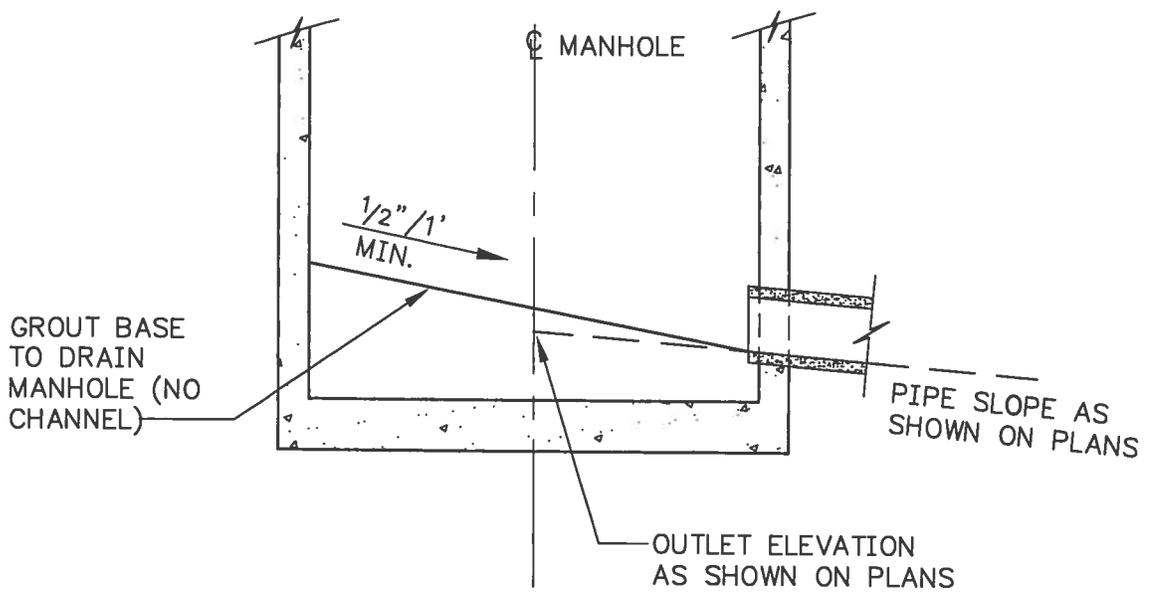


SECTION B-B

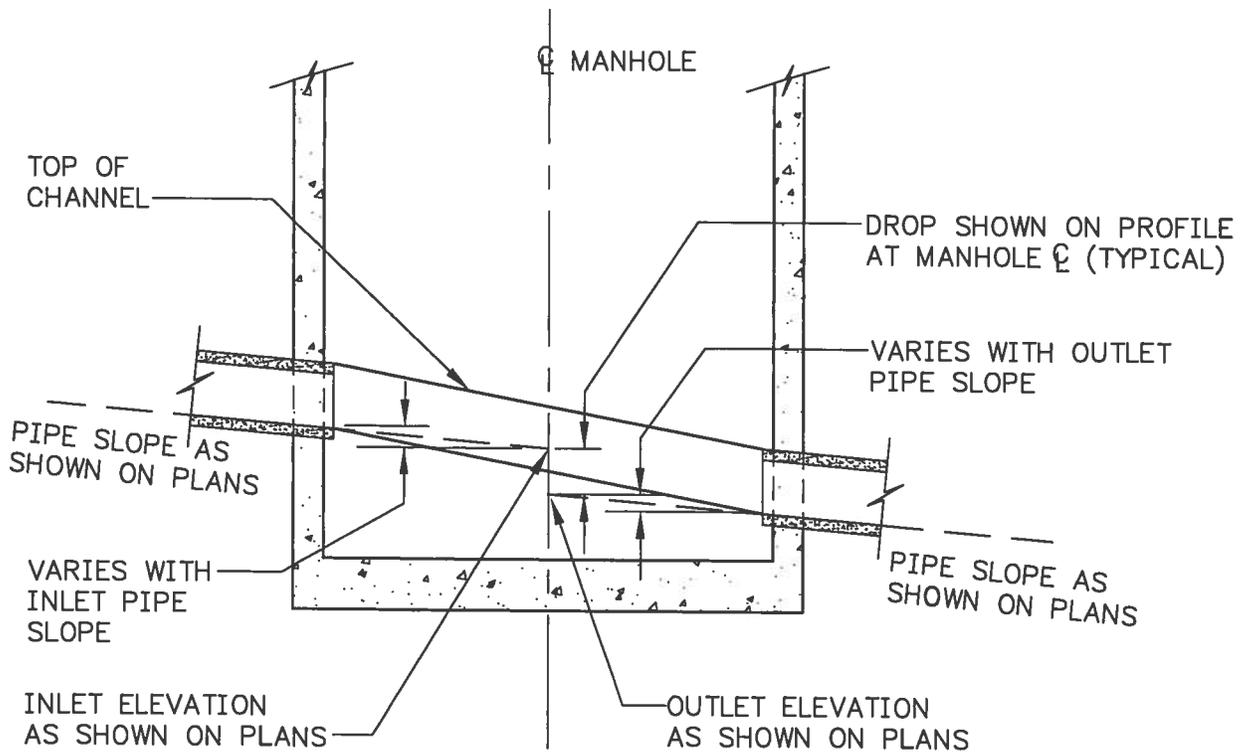
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE 7/8" LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME, SS HEX CAP SCREWS
5. SEE SPECIFICATION O2605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

S3 MANHOLE FRAME AND COVER

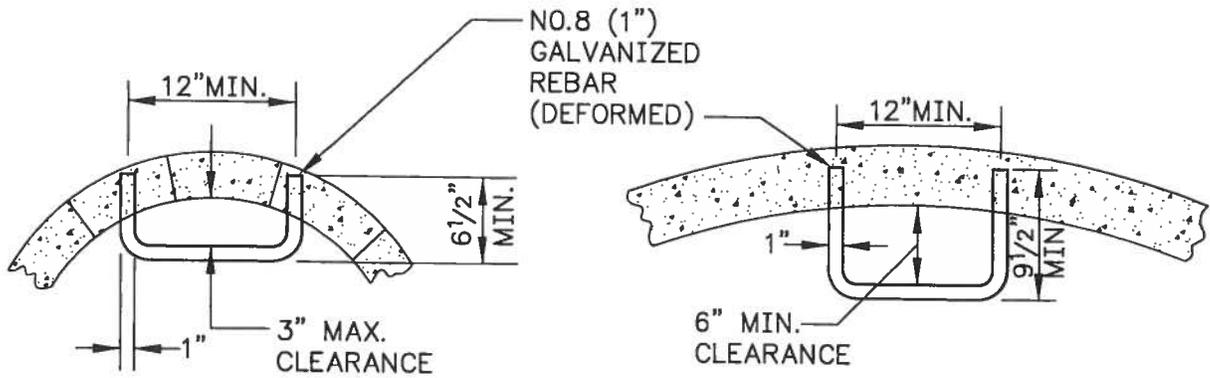


TERMINAL MANHOLE



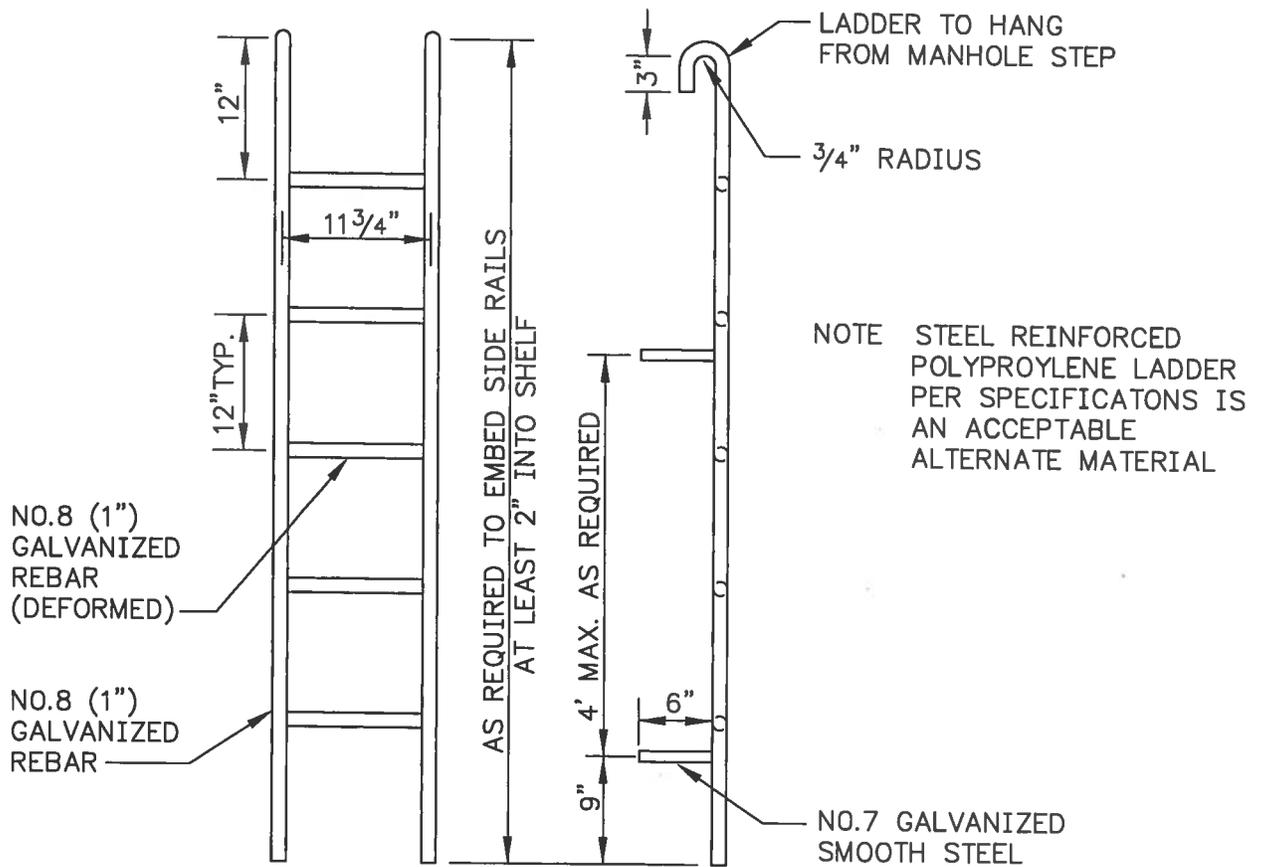
MAIN-LINE MANHOLE

S4 MANHOLE CHANNELING



ADJUSTMENT RING HAND HOLD

TYPICAL MANHOLE STEP

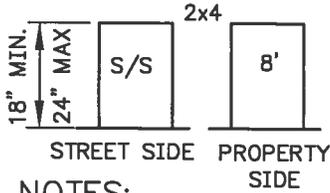
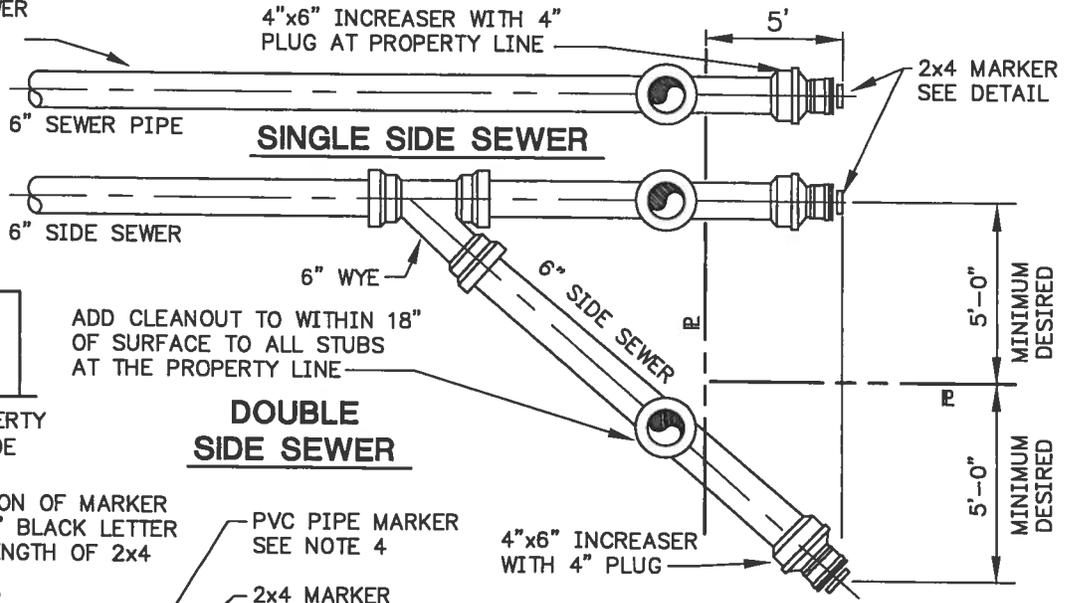


PREFABRICATED LADDER

NOTE STEEL REINFORCED
POLYPROPYLENE LADDER
PER SPECIFICATONS IS
AN ACCEPTABLE
ALTERNATE MATERIAL

S5 MANHOLE STEPS AND LADDER

LOCATION OF SIDE SEWER TO BE SET IN FIELD



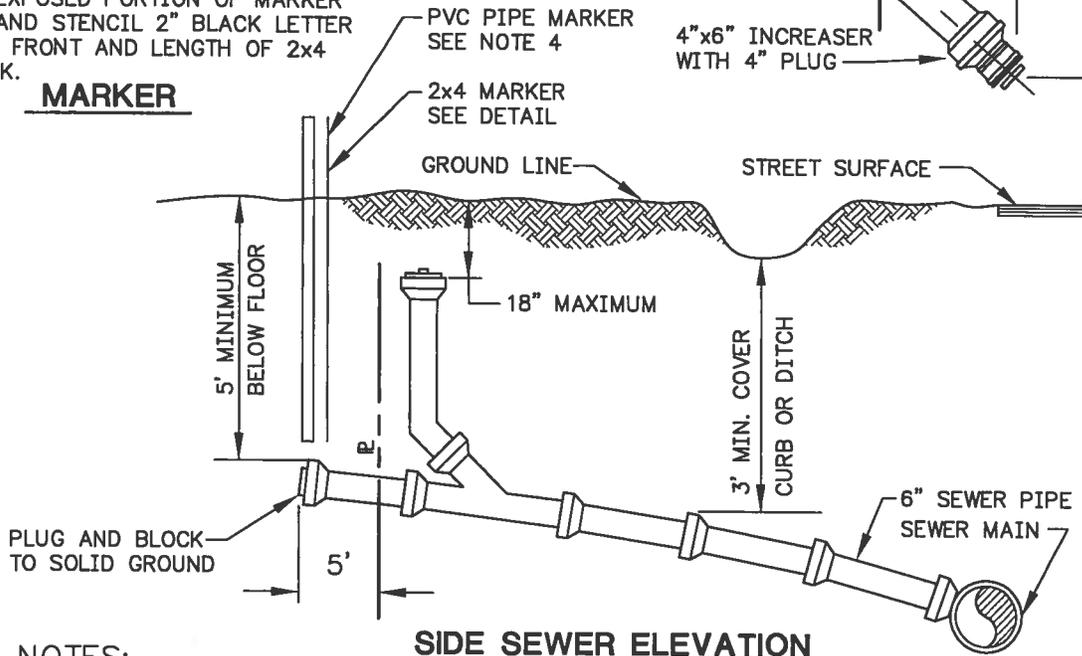
ADD CLEANOUT TO WITHIN 18" OF SURFACE TO ALL STUBS AT THE PROPERTY LINE

DOUBLE SIDE SEWER

NOTES:

PAINT EXPOSED PORTION OF MARKER WHITE AND STENCIL 2" BLACK LETTER S/S ON FRONT AND LENGTH OF 2x4 ON BACK.

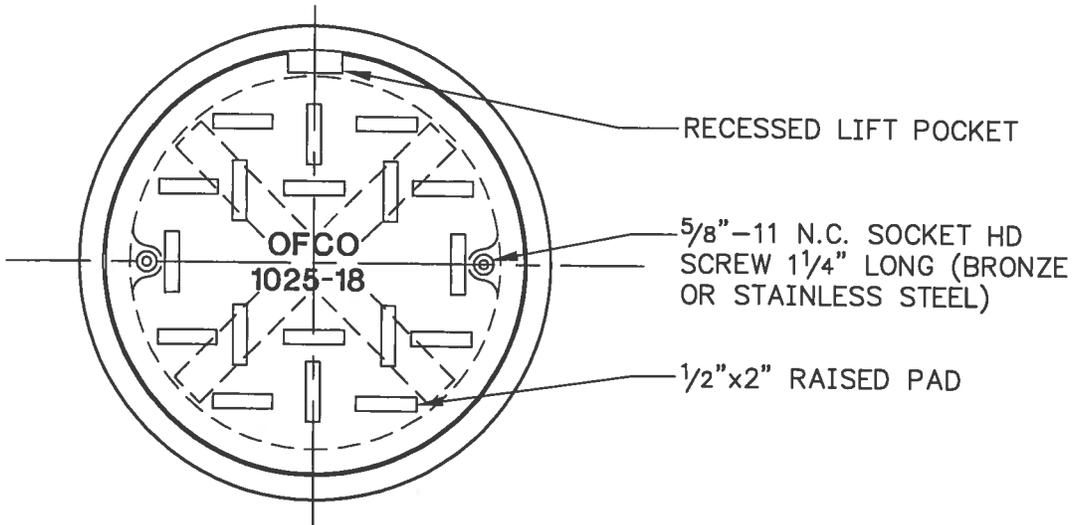
MARKER



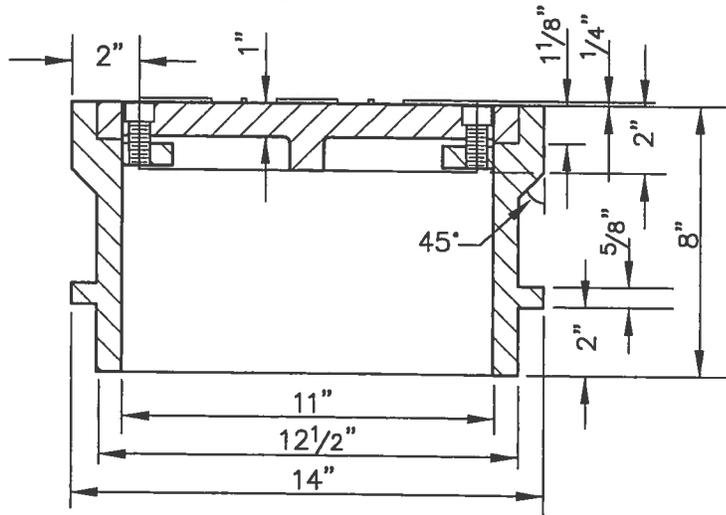
NOTES:

1. UNLESS OTHERWISE SHOWN ON PLAN, SIDE SEWER SHALL BE SLOPED 2% UP FROM SEWER LINE OR SHALL BE MIN. 5' COVER AT PROPERTY LINE OR 3.5' LOWER THAN THE LOWEST HOUSE ELEVATION, WHICHEVER IS LOWER.
2. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL
4. MINIMUM SLOPE = 2%
5. A 1 1/4" WHITE PVC PIPE, ASTM 2241 SDR 21 200 PSI SHALL BE PLACED VERTICALLY AT THE END OF EACH STUB AND SHALL RISE TWO FEET ABOVE FINISH GRADE LEVEL OR AS APPROVED BY SWSSD. BOTH ENDS OF THE PVC PIPE SHALL HAVE CAPS GLUED ON AND THE PIPE INTERIOR KEPT CLEAN FOR THE PURPOSE OF FUTURE DEPTH MEASUREMENT.
6. PIPE SHALL BE PVC ASTM D3034.

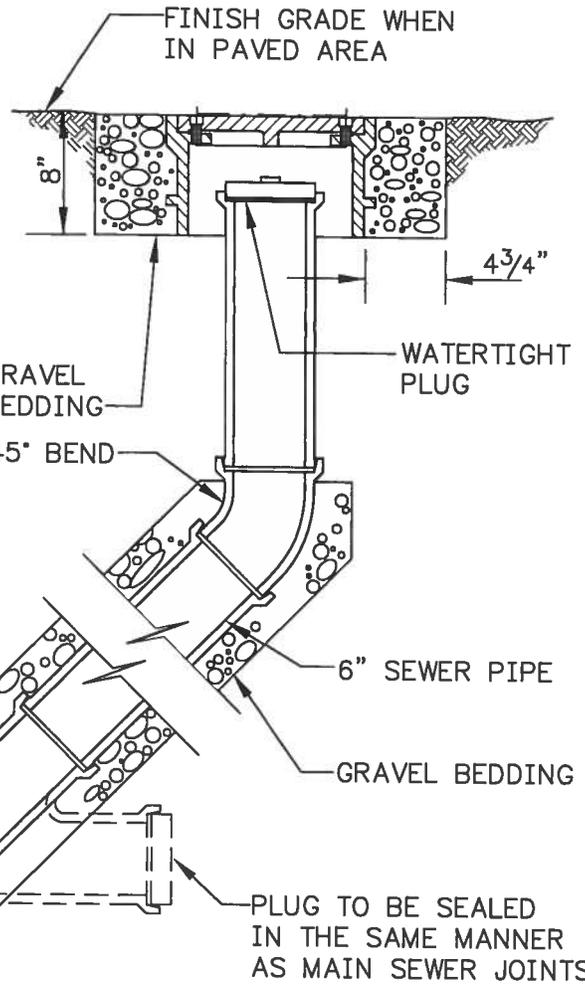
S6 STREET SIDE SEWER



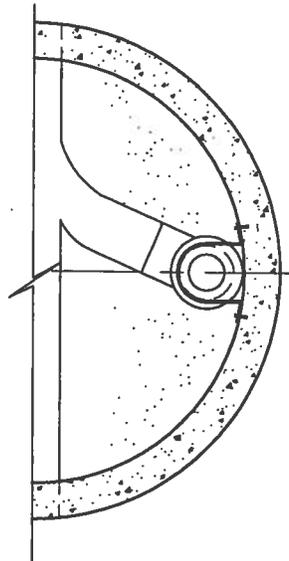
PLAN



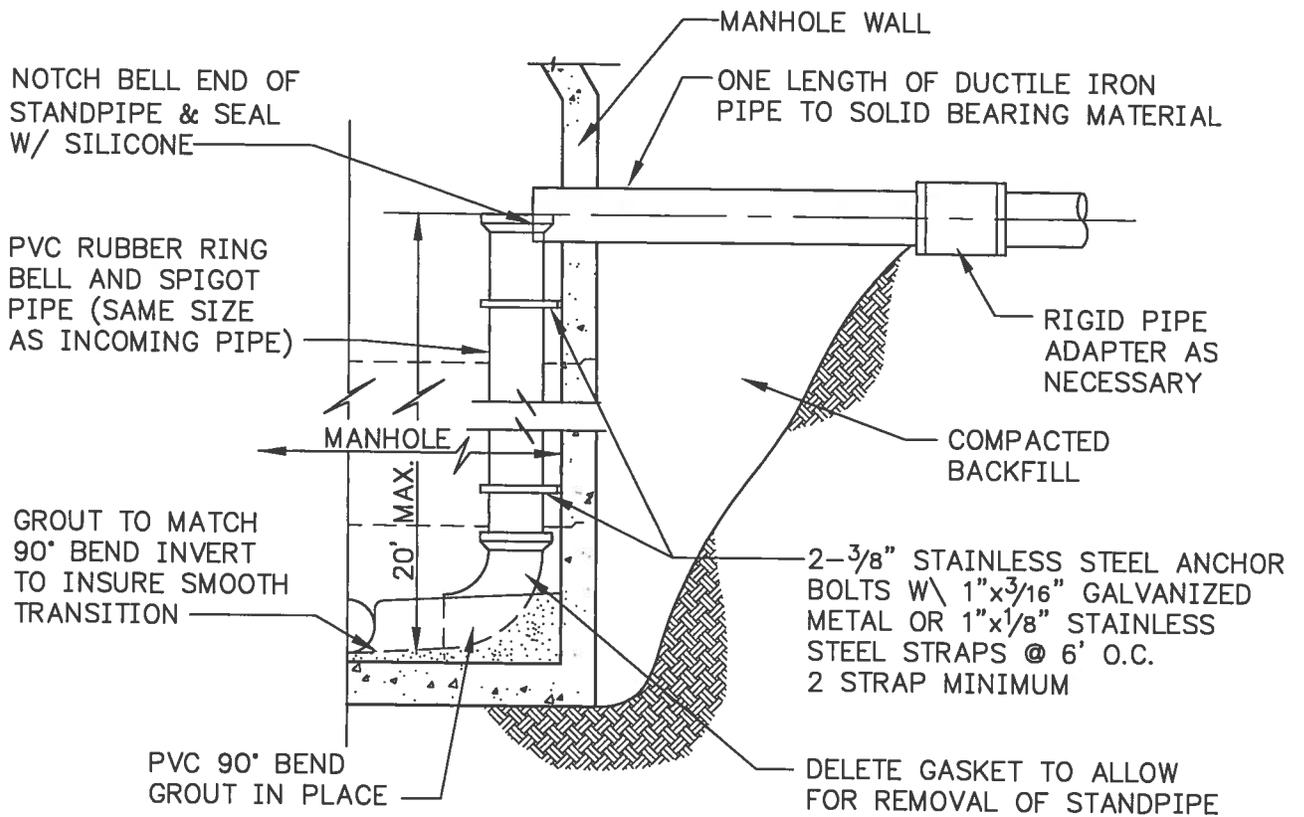
**ELEVATION
CAST IRON RING AND COVER**



S7 SEWER CLEANOUT



PLAN

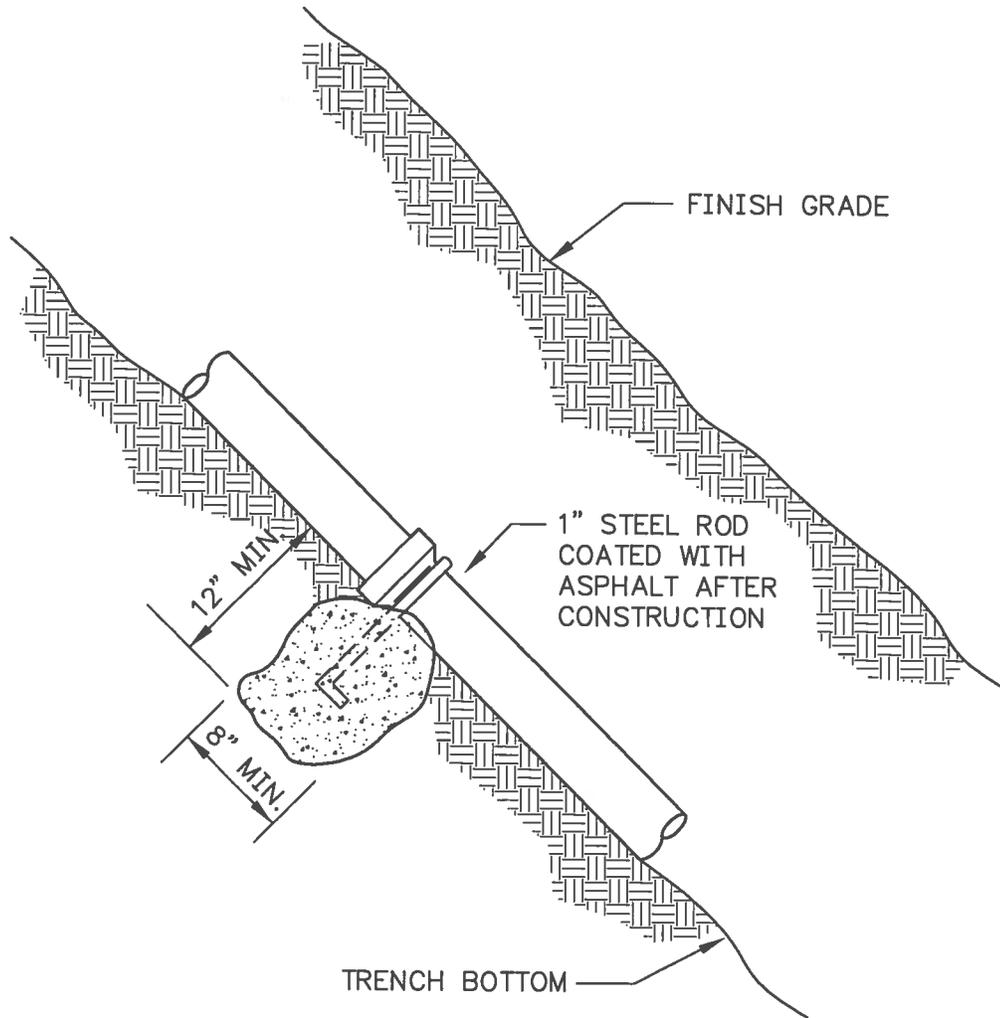


ELEVATION

NOTE: THIS ASSEMBLY TO BE USED ONLY WITH SPECIFIC AUTHORIZATION

**INSIDE DROP
MANHOLE CONNECTION**

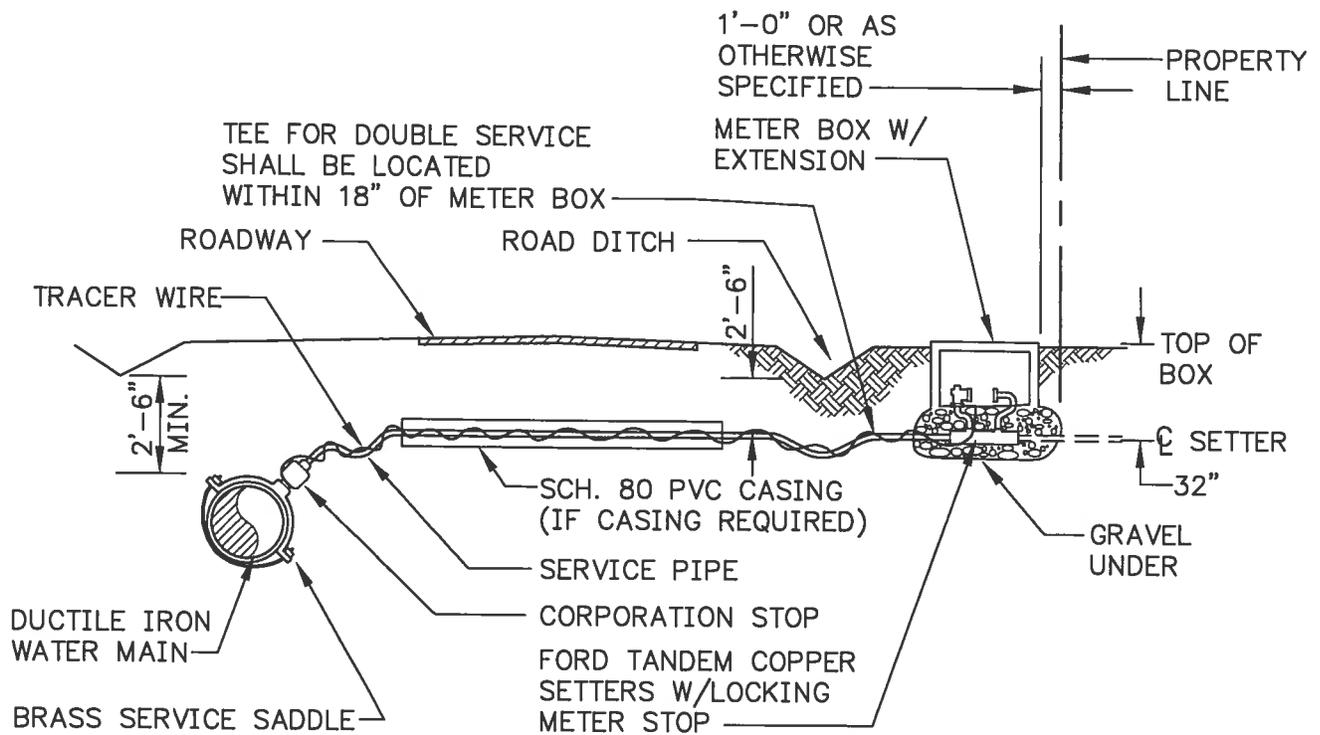
S8b



NOTES:

1. POUR BLOCKING AGAINST UNDISTURBED SOIL.
2. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
3. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20-30%, 20' ON GRADES OF 35-50%, AND 16' ON GRADES OVER 50%.

S9 PIPE ANCHOR



PARTS FOR SINGLE SERVICE

- 1- $\frac{3}{4}$ " IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 1- $\frac{3}{4}$ " BRASS MALE x INSERT ADAPTER (FORD PTM-1)
- 1- $\frac{3}{4}$ " x 12" COPPER SETTER WITH LOCKING METER STOP AND DUAL CHECK VALVE (FORD VBHC72-12W-11-33 DP x DP)
- 1-PLASTIC METER BOX (CARSON 1419)
- 1-PLASTIC METER BOX EXTENSION (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

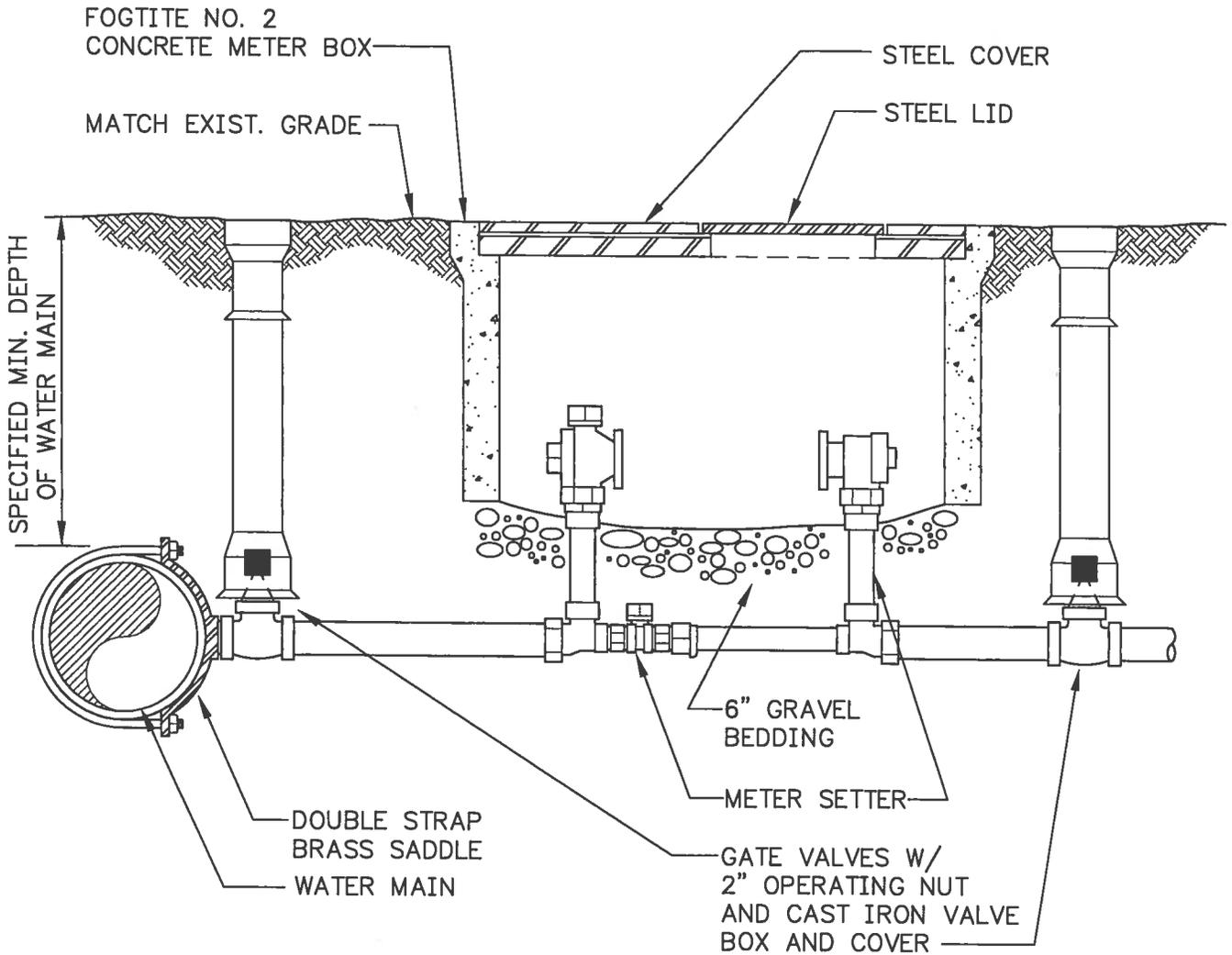
PARTS FOR DOUBLE SERVICE

- 1-1" IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1-1" BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1-1" BRASS GRIPPER TEE $\frac{3}{4}$ " x $\frac{3}{4}$ " x 1" (FORD T666-334G)
- 2- $\frac{3}{4}$ " BRASS STREET ELLS
- 2- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 2- $\frac{3}{4}$ " x 12" COPPER SETTERS WITH LOCKING METER STOPS AND DUAL CHECK VALVES (FORD VBHC72-12W-11-33 DP x DP)
- 2- $\frac{3}{4}$ " BRASS MIPT x INSERT ADAPTERS (FORD PTM-1)
- 2-PLASTIC METER BOXES (CARSON 1419)
- 2-PLASTIC METER BOX EXTENSIONS (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

NOTES:

1. WATER SERVICE LINE SHALL BE 200 PSI IPS PE 3408, ASTM-2239 (DRISCO ULTRA-HI MOLECULAR PE-3408)
2. USE BRASS DOUBLE STRAP SADDLE ON MAINS 10" AND LARGER.
3. WHERE FORD MATERIALS ARE CALLED OUT, EQUAL PRODUCTS ARE ACCEPTABLE

W1 $\frac{3}{4}$ " AND 1" WATER SERVICE

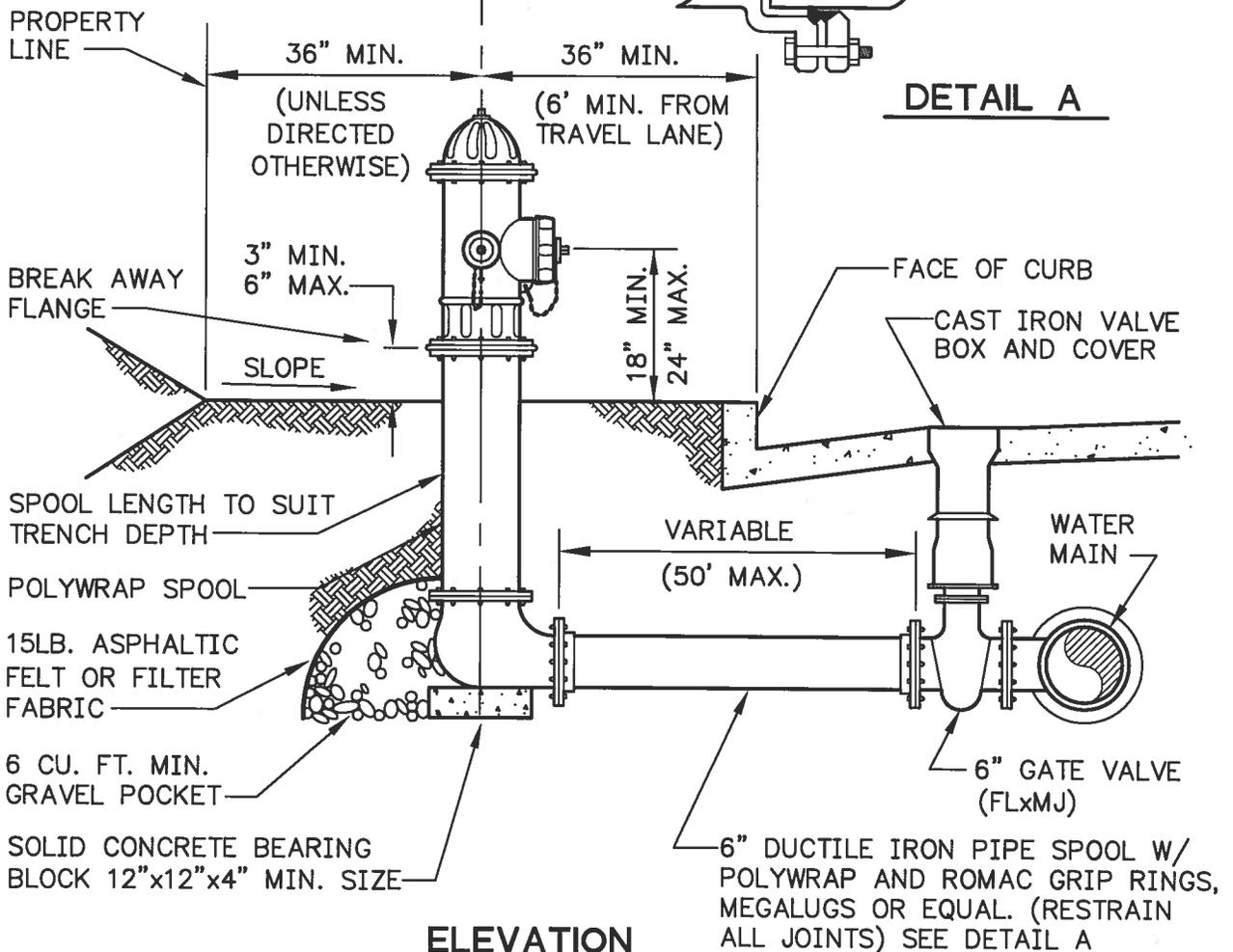
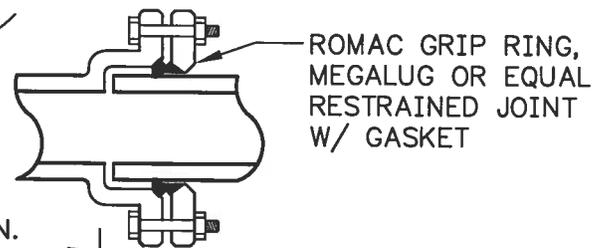
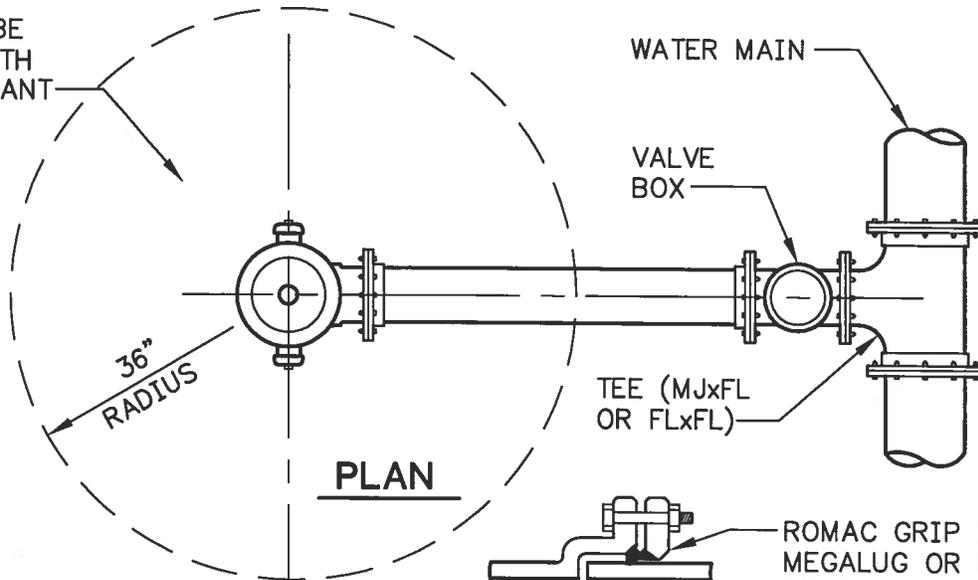


PARTS FOR 1½" AND 2" SERVICE

- 1 - DOUBLE STRAP BRASS SADDLE WITH BRONZE STRAP
- 4 - FORD PACKJOINT COUPLINGS/PLASTIC PIPE
- SETTERS: 1½" FORD VBH6612BX LENGTH WITH LOCKING BYPASS
2" FORD VBH7712BX LENGTH WITH LOCKING BYPASS
(SETTER LENGTH WILL BE DETERMINED BY TOWN)
- CONCRETE METER BOX WITH STEEL COVER AND METER LID
FOGTITE NO. 2
- 2 - GATE VALVES: 2 INCH-RESILIENT WEDGE SEATED (APWA C-509)
1½ INCH-BRASS
- 2 - CAST IRON VALVE BOX WITH COVER
- WATER SERVICE LINE 200 PSI IPS PE 3408, ASTM D-2239

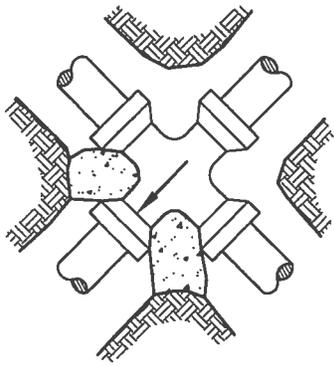
W2 1½" AND 2" WATER SERVICE

SURFACE TO BE GRADED SMOOTH AROUND HYDRANT

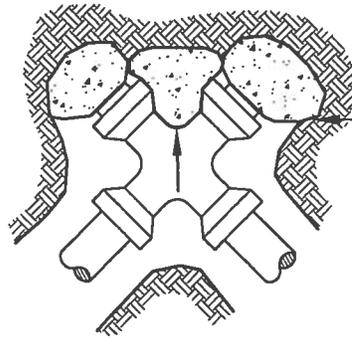


W3

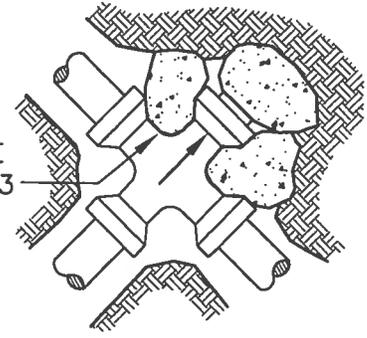
FIRE HYDRANT ASSEMBLY



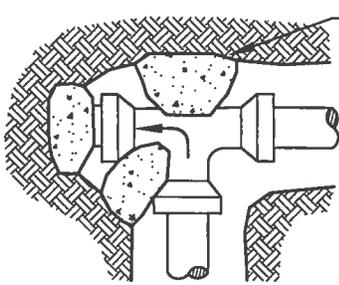
UNBALANCED CROSS



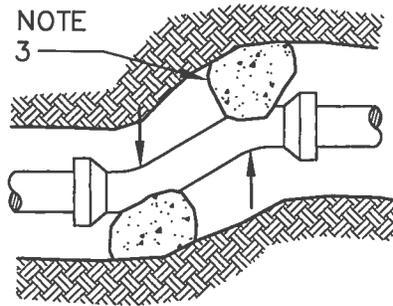
PLUGGED CROSS



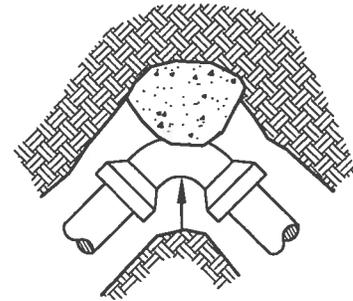
PLUGGED CROSS



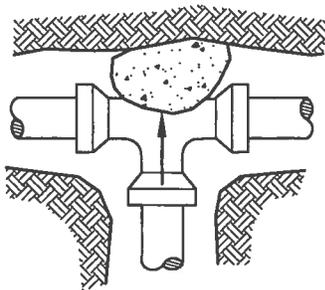
PLUGGED TEE



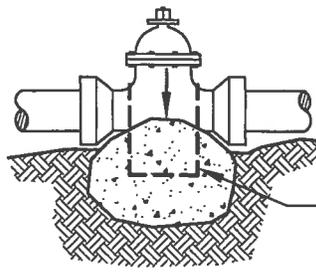
OFFSET



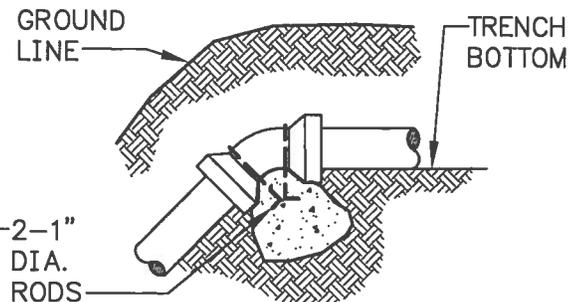
HORIZONTAL BEND



TEE



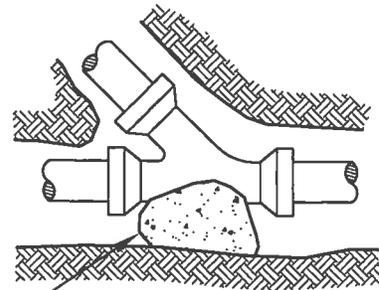
VALVE



VERTICAL BEND

NOTES:

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITION AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. BLOCKING REQUIRED IF PLUGS NOT SECURED BY BOLTING OR ADEQUATE STRAPS.



"Y" BRANCH



CONCRETE THRUST BLOCKING

CONCRETE METER BOX WITH METAL COVER. FOGTITE NO. 1D
 POSITION METER BOX AS DIRECTED BY TOWN

PROPERTY LINE

12" 12"

VALVE MARKER POST

2" RESILIENT WEDGE GATE VALVE W/
 VALVE BOX AND COVER

THRUST BLOCKING TO CLEAR PIPING

POURED CONCRETE THRUST BLOCKING

CONCRETE BLOCK

PLUG (MJ)

TAPPED TEE (MJxMJ)

WATER MAIN

PLAN

PROPERTY LINE

2 1/2" NST NOZZLE
 VARIABLE

12" MAX.

POSITION BOX TO ALLOW CONNECTION OF HOSE TO NOZZLE

15 LB. ASPHALTIC FELT OR FILTER FABRIC

KUPFERLE #78 MAINGUARD 2" BLOW-OFF HYDRANT

36" MINIMUM

2" BRASS STREET ELL

GRAVEL POCKET

200 PSI IPS, PE OR TYPE "K" 2" COPPER PIPE

SOLID CONCRETE BEARING BLOCK 4"x8"x16" OR AS DIRECTED BY TOWN

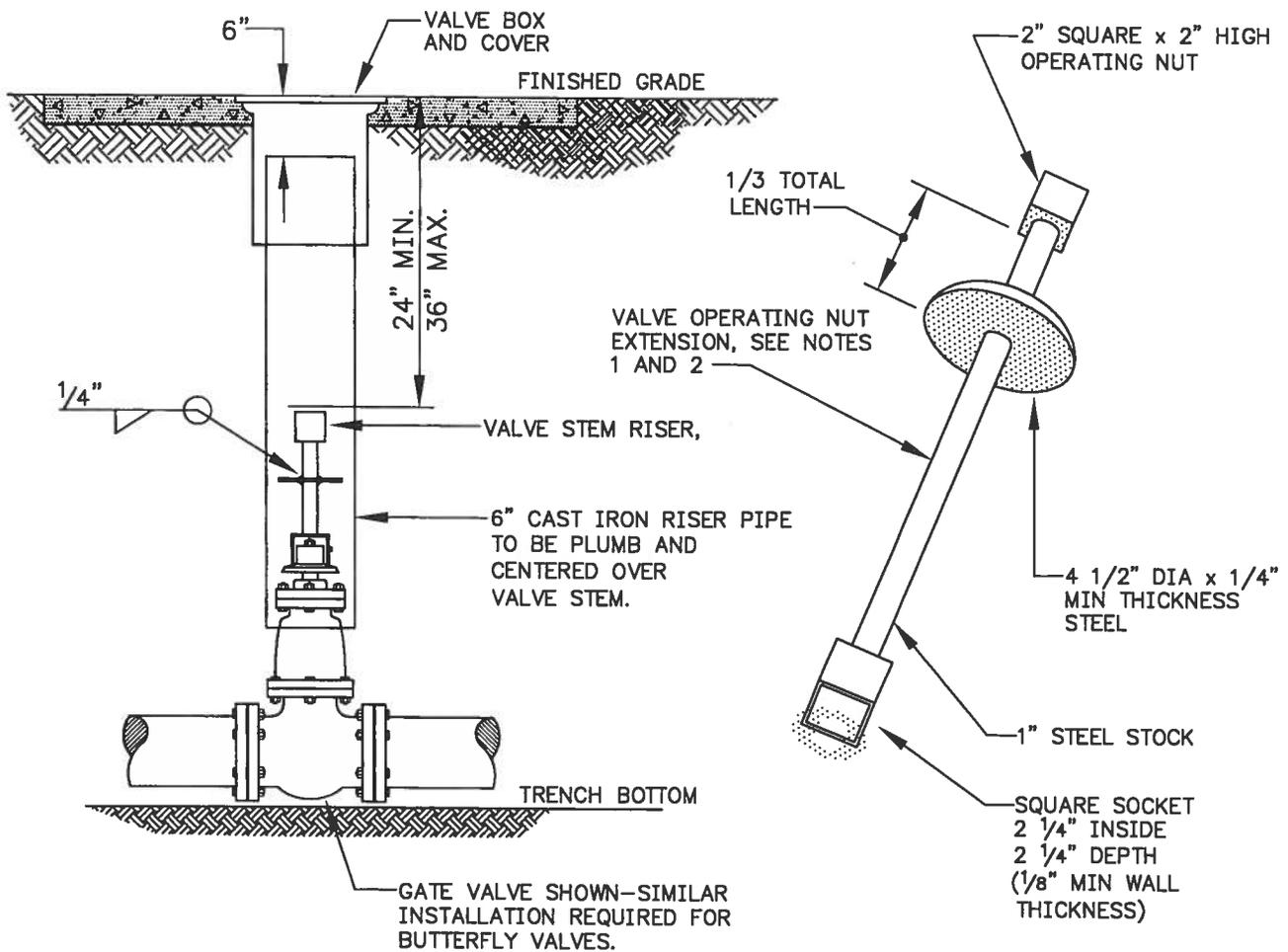
CAST IRON VALVE BOX AND COVER

ELEVATION

NOTES:

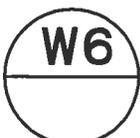
1. PAINT PIPE THREADS WITH ASPHALT PAINT AFTER ASSEMBLY.
2. VALVE AND ALL FITTINGS TO BE BRASS.
3. PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
4. PAINT VALVE MARKER POST PER TOWN REQUIREMENTS.

W5 BLOWOFF ASSEMBLY

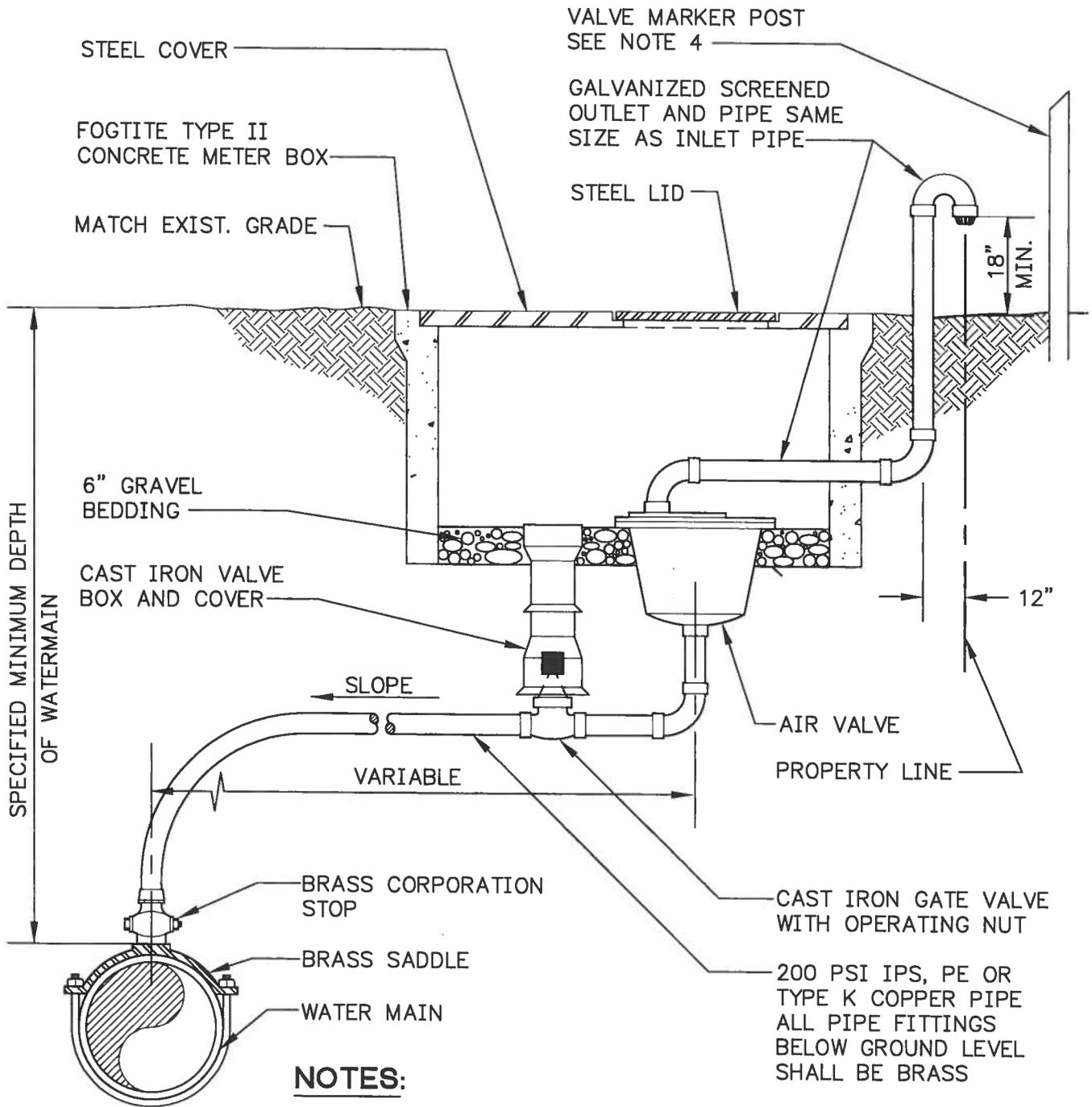


NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.



W6 VALVE OPERATING NUT EXTENSION

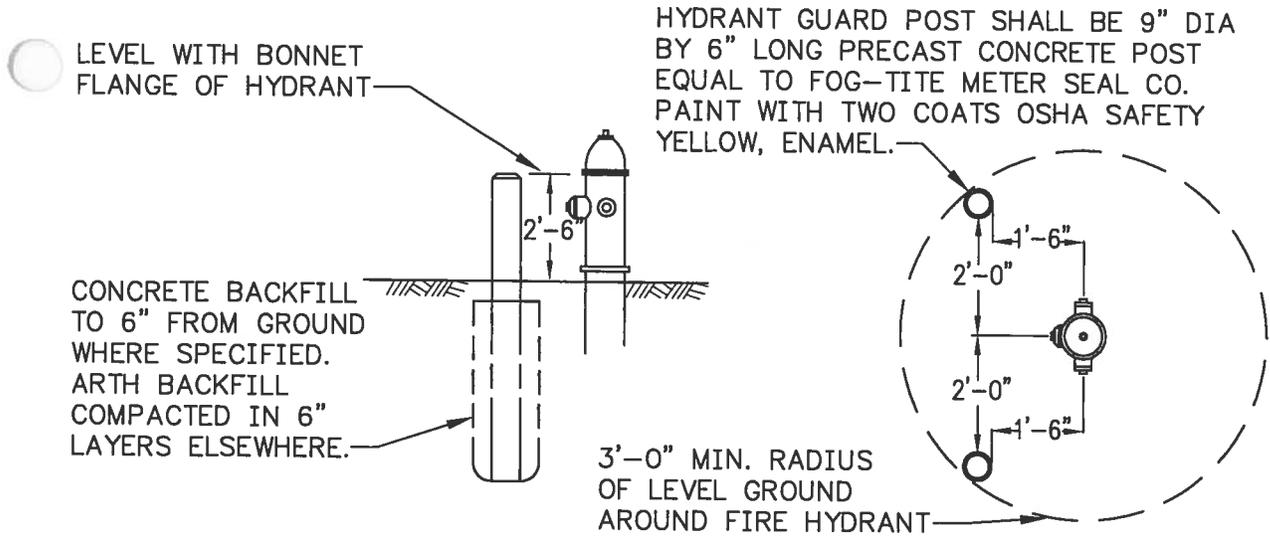


NOTES:

1. VALVE AND PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. VALVE MARKER POST TO BE PAINTED PER TOWN STANDARD. TOWN TO DETERMINE LOCATION.



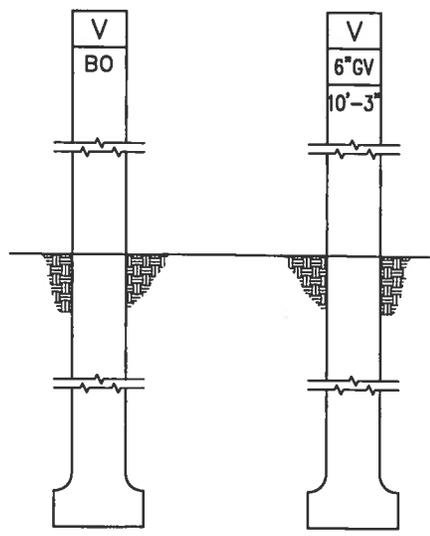
AIR RELEASE VALVE ASSEMBLY



ELEVATION

PLAN

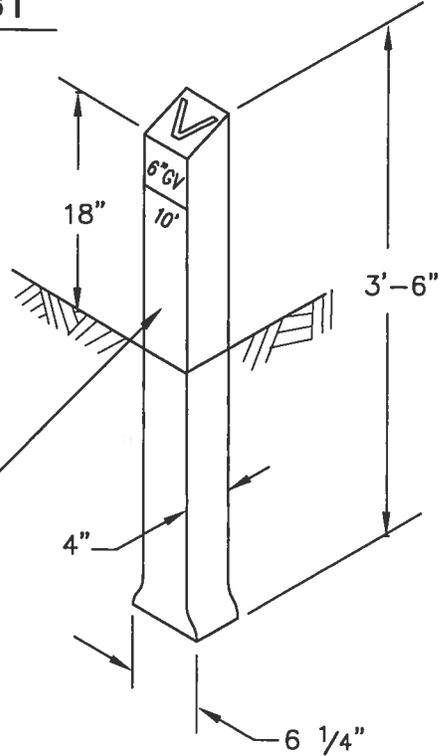
FIRE HYDRANT GUARD POST



FRONT VIEW
(FOR BLOW-OFF ASSEMBLY)

FRONT VIEW
(FOR GATE VALVE)

VALVE MARKER POST SHALL BE EQUAL TO FOG-TITE METER CO. PAINT AS SPECIFIED FOR HYDRANT GUARD POST. PAINT TYPE AND SIZE OF VALVE AND DISTANCE FROM THE VALVE MARKER TO THE VALVE ON THE POST WITH NEATLY STENCILED BLACK ENAMEL NUMBERS, 1" IN HEIGHT.

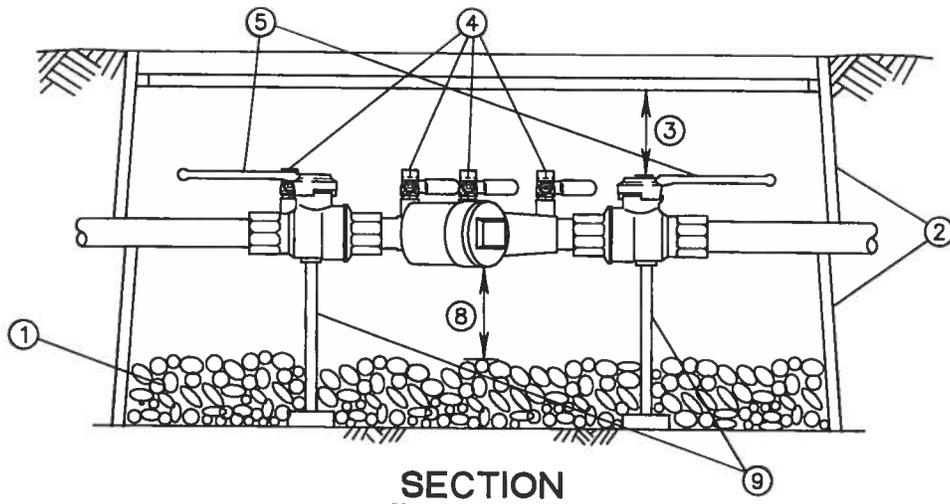


VALVE MARKER POST

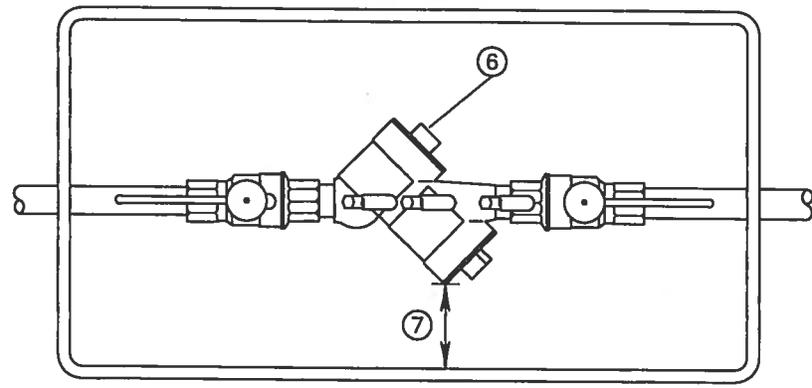
NOTES:

1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY THE TOWN.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

W8 VALVE MARKER POST
HYDRANT GUARD POST



SECTION



PLAN

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO NO. 2 METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
- ③ A MAXIMUM DISTANCE OF 6" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDE WAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE DEVICE AND THE DRAIN ROCK.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.

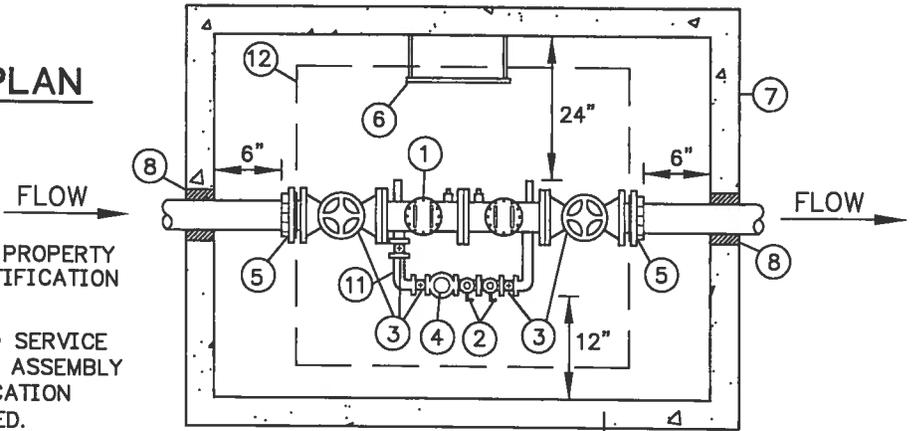
GENERAL NOTE

THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION AND ANNUALLY, AND WHEN MOVED OR REPAIRED. ALL INSTALLATION MUST MEET MANUFACTURERS SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.

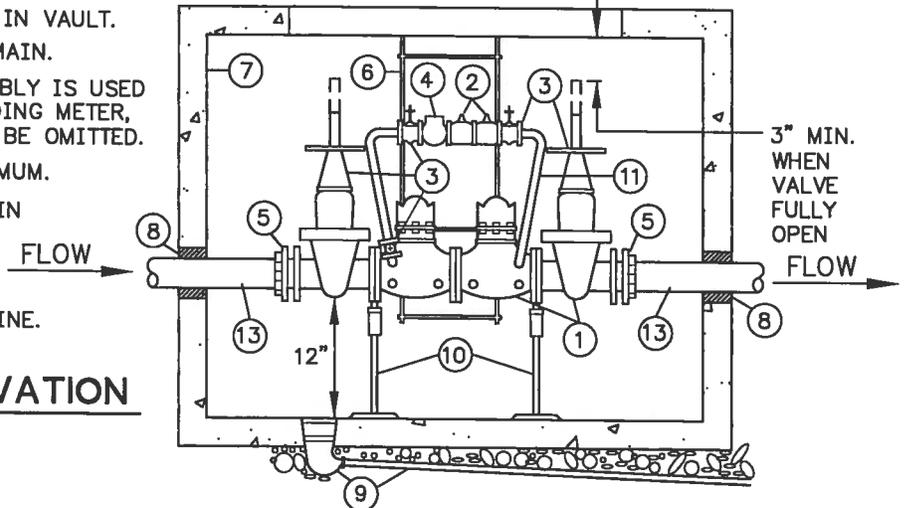
NOTES:

1. TOWN WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY TOWN. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE & GATE VALVE REQUIRED ON MAIN.
6. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE W/ DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
7. ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS W/ VEHICULAR TRAFFIC.
9. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.

PLAN



ELEVATION



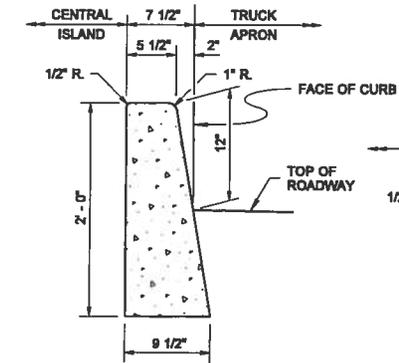
- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED O.S.&Y. VALVES & (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED BALL VALVES & (4) RESILIENT SEATED TEST COCKS.
- ③ EACH VALVE SHALL BE MARKED W/ MODEL NUMBER W/ DESIGNATION OF RESILIENT SEAT, SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED W/ A MIN. OF 4 MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ "TOUCH READ" SYSTEM.
- ⑤ UNI-FLANGE W/ SETSCREWS.
- ⑥ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ⑦ CONCRETE VAULT W/ A MIN. OF 2, 3'x3' ALUM. DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑧ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE W/ WELDED FLANGE OR ANCHOR BLOCKS.
- ⑨ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE.
- ⑩ TWO ADJUSTABLE PIPE STANCHIONS.
- ⑪ ALL PLUMBING FOR BY-PASS TO BE COPPER & BRASS.
- ⑫ ACCESS TO BE CENTERED OVER METER.
- ⑬ CL. 52 D.I., M.J. W/ RETAINER GLANDS.

SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332

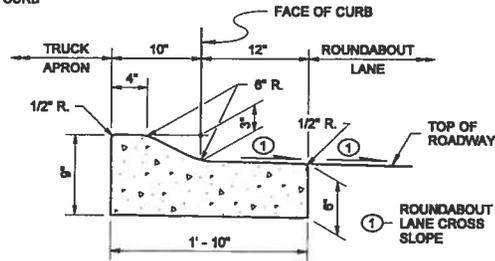
W10 DOUBLE CHECK DETECTOR ASSEMBLY

GENERAL NOTE

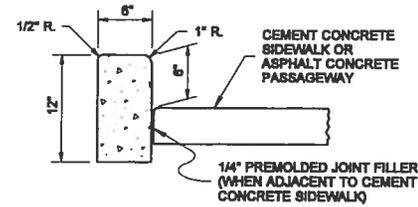
See Standard Plan F-3 for Curb Expansion and Contraction Joint spacing.



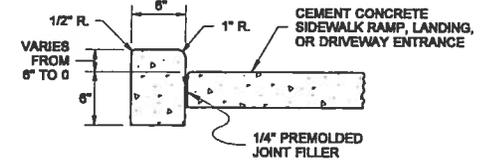
**ROUNDABOUT TRUCK APRON
INNER CEMENT CONCRETE CURB**



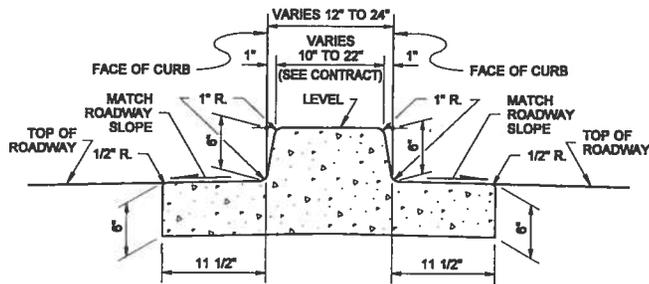
**ROUNDABOUT TRUCK APRON
OUTER CEMENT CONCRETE
CURB AND GUTTER**



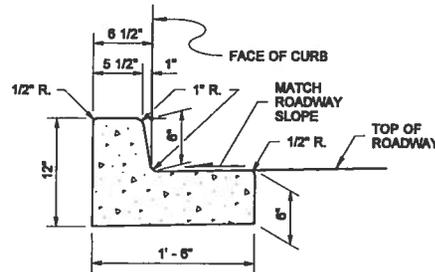
**CEMENT CONCRETE
PEDESTRIAN CURB**



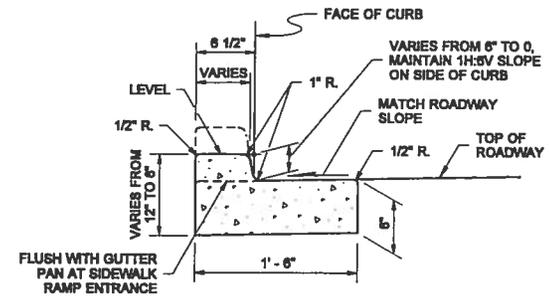
**CEMENT CONCRETE
PEDESTRIAN CURB
AT SIDEWALK RAMPS & LANDINGS,
AND DRIVEWAY ENTRANCES**



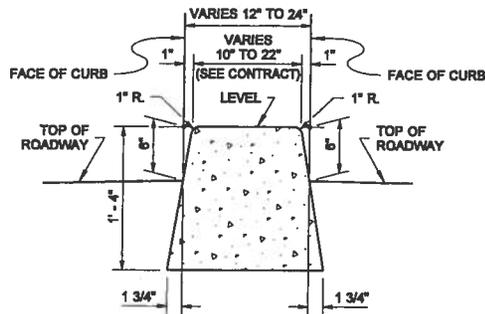
**DUAL-FACED CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



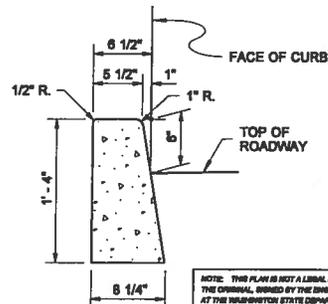
**CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



**DEPRESSED CURB SECTION
AT SIDEWALK RAMPS AND
DRIVEWAY ENTRANCES**

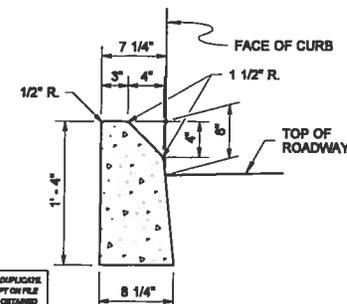


**DUAL-FACED CEMENT
CONCRETE TRAFFIC CURB**



**CEMENT CONCRETE
TRAFFIC CURB**

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**MOUNTABLE CEMENT
CONCRETE TRAFFIC CURB**



EXPIRES MAY 16, 2003

**CEMENT CONCRETE
CURBS**

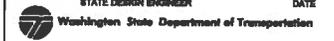
STANDARD PLAN F-1

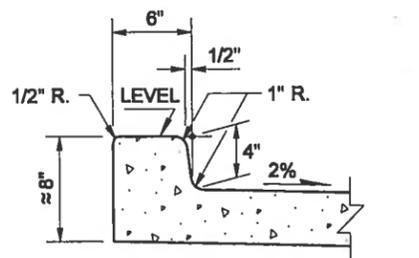
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 12-17-02

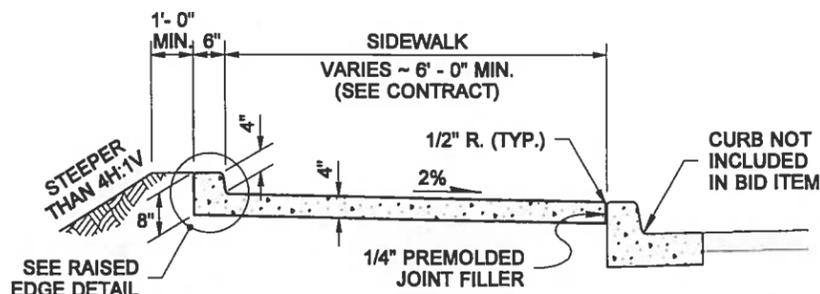
STATE DESIGN ENGINEER DATE



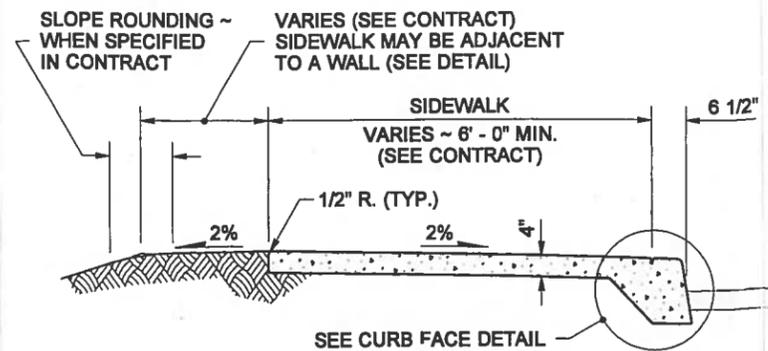


NOTE: EXTEND SIDEWALK TRANSVERSE JOINTS TO INCLUDE RAISED EDGE

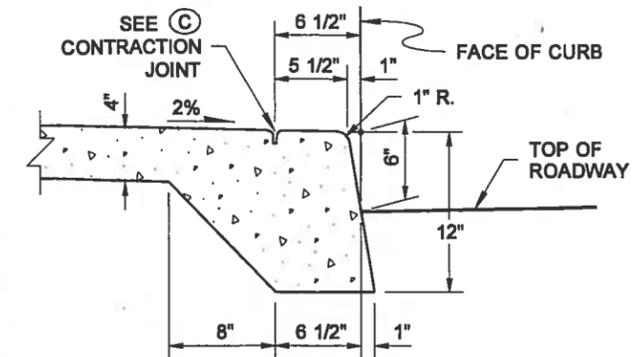
RAISED EDGE DETAIL



CEMENT CONCRETE SIDEWALK WITH RAISED EDGE

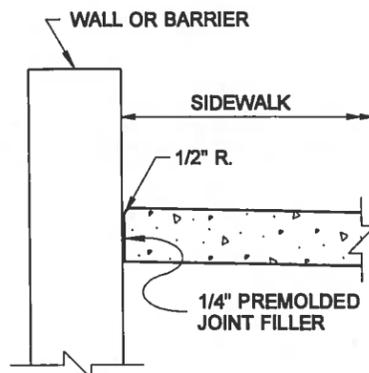


MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK

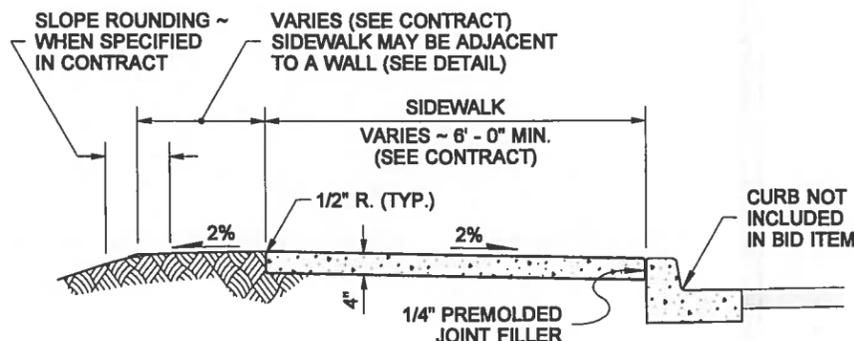


NOTE: EXTEND SIDEWALK TRANSVERSE EXPANSION JOINTS TO INCLUDE CURB (FULL DEPTH)

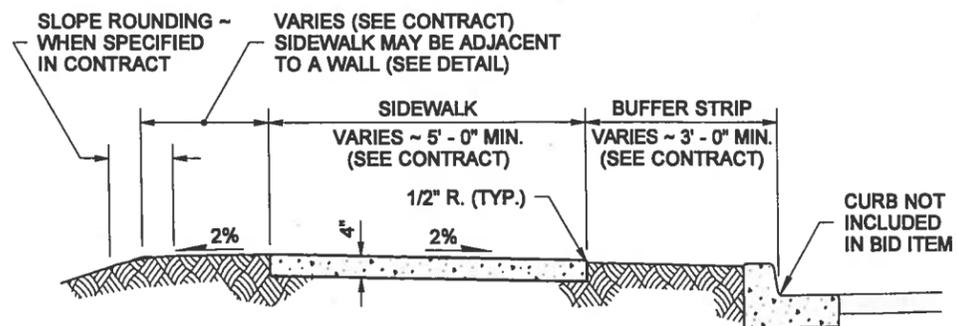
CURB FACE DETAIL



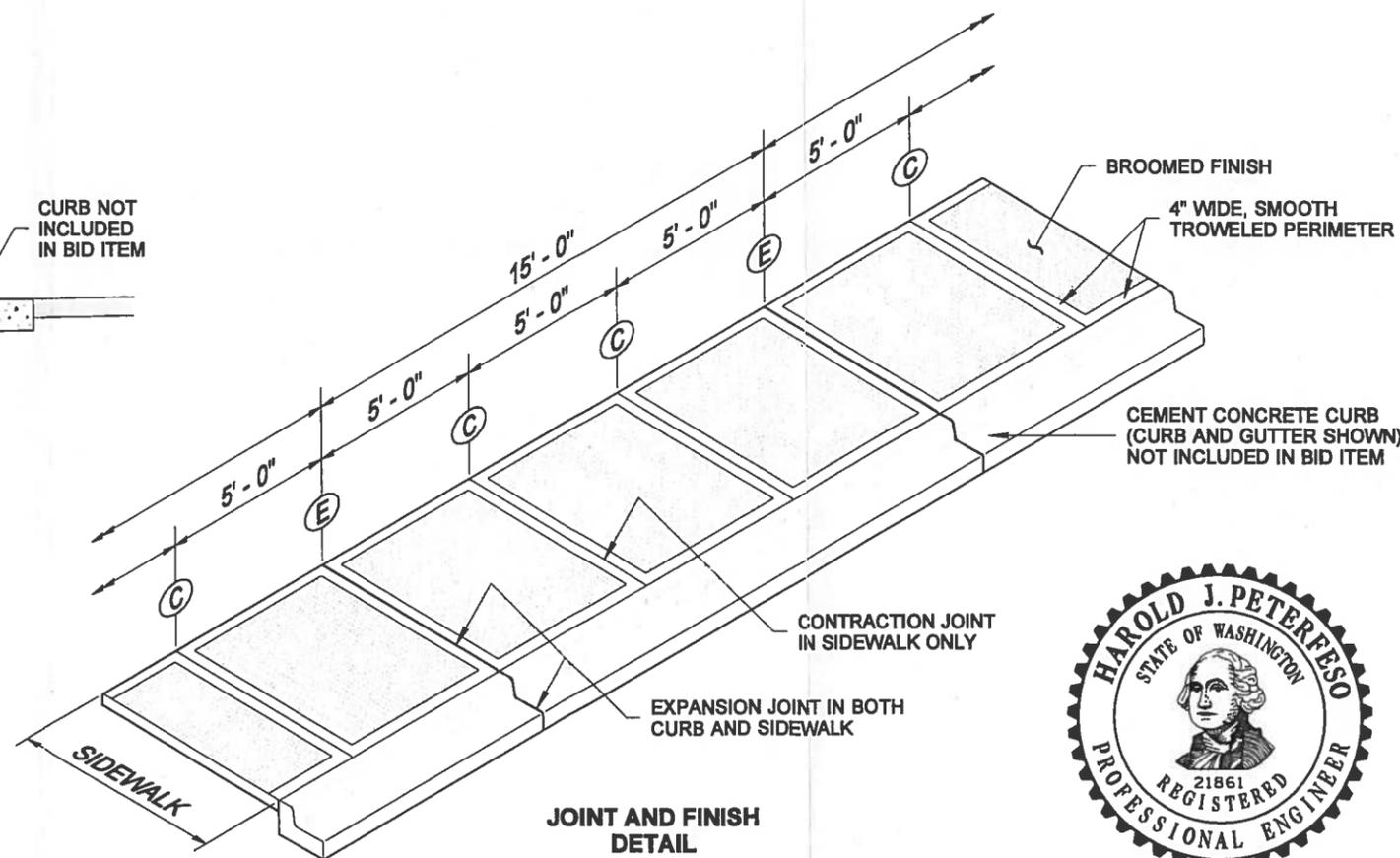
SIDEWALK ADJACENT TO WALL DETAIL



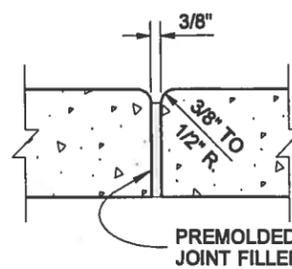
CEMENT CONCRETE SIDEWALK ADJACENT TO CURB



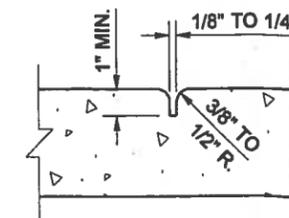
CEMENT CONCRETE SIDEWALK ADJACENT TO BUFFER STRIP



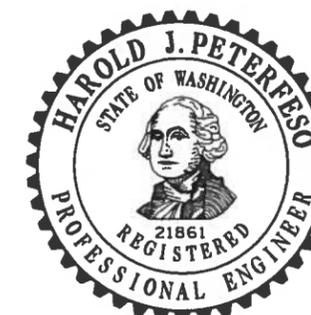
JOINT AND FINISH DETAIL



(E) EXPANSION JOINT



(C) CONTRACTION JOINT



EXPIRES MAY 16, 2003

CEMENT CONCRETE SIDEWALK STANDARD PLAN F-3

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

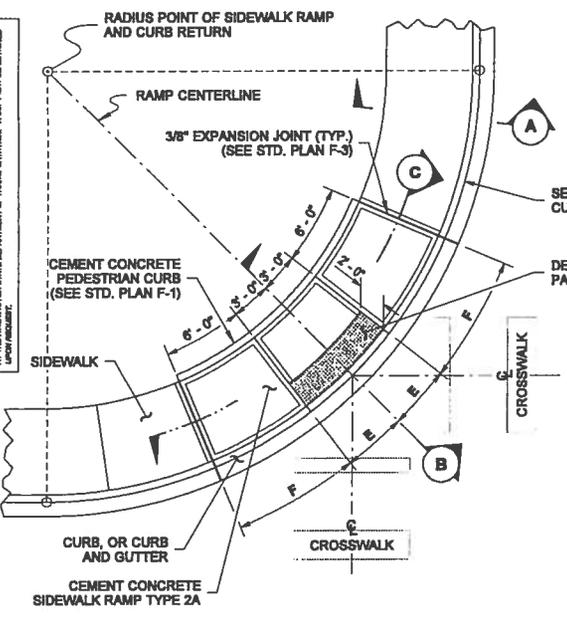
Harold J. Peterfeso 01-13-03

STATE DESIGN ENGINEER DATE

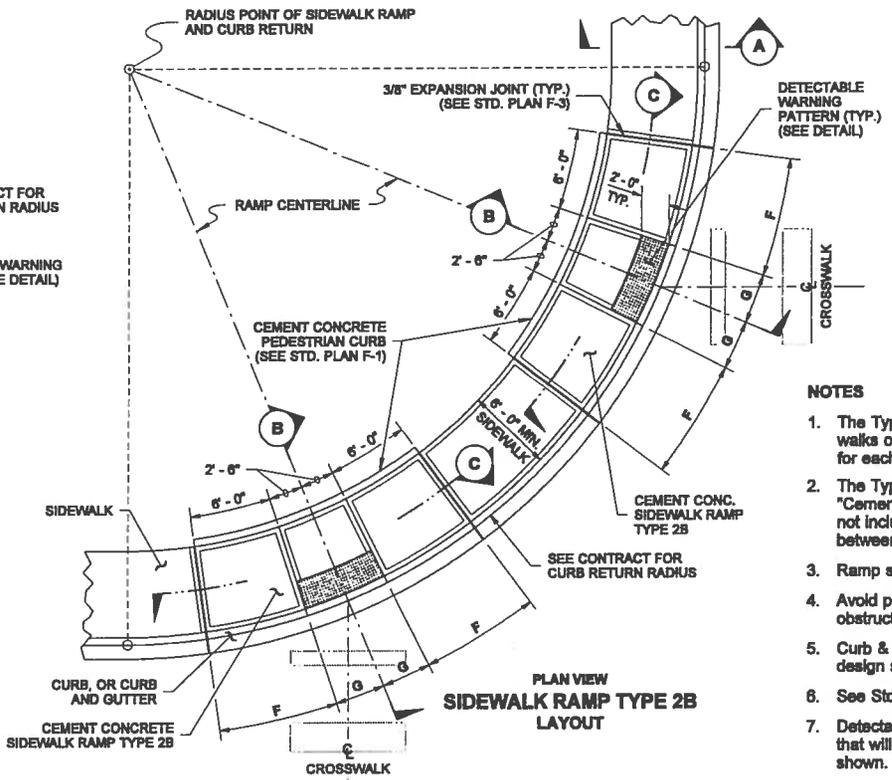


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NOTE: THIS PLAN AND SECTION DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS, LATEST EDITION, AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, LATEST EDITION, AT THE DISCRETION OF THE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.



PLAN VIEW
SIDEWALK RAMP TYPE 2A
LAYOUT



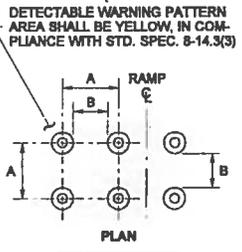
PLAN VIEW
SIDEWALK RAMP TYPE 2B
LAYOUT

RADIUS (AT CURB FACE)	E	F	G
20 FEET	4' - 5 1/4"	6' - 10 1/2"	3' - 8 1/2"
30 FEET	3' - 10"	7' - 6"	3' - 2 1/4"
40 FEET	3' - 7"	7' - 2"	3' - 0"
50 FEET	3' - 5 1/2"	6' - 10 3/4"	2' - 10 1/2"
60 FEET	3' - 4 1/2"	6' - 8 3/4"	2' - 8 1/2"
70 FEET	3' - 3 3/4"	6' - 7 1/2"	2' - 6"
80 FEET	3' - 3 1/4"	6' - 6 1/2"	2' - 8 1/2"
90 FEET	3' - 2 3/4"	6' - 5 1/2"	2' - 8 1/4"
100 FEET	3' - 2 1/2"	6' - 5"	2' - 6"

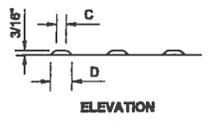
INTERMEDIATE RADII CAN BE INTERPOLATED

NOTES

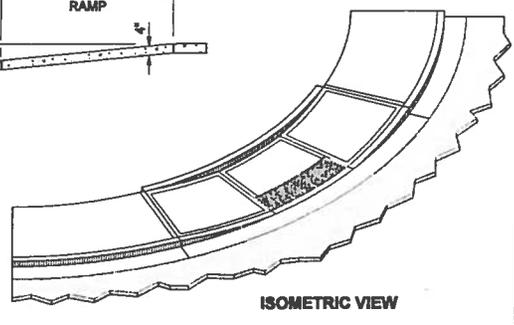
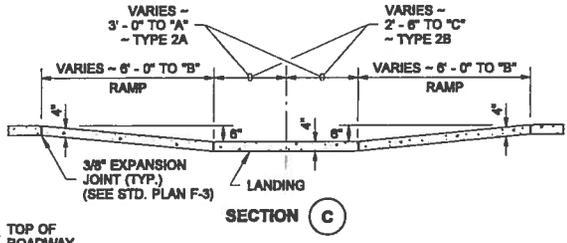
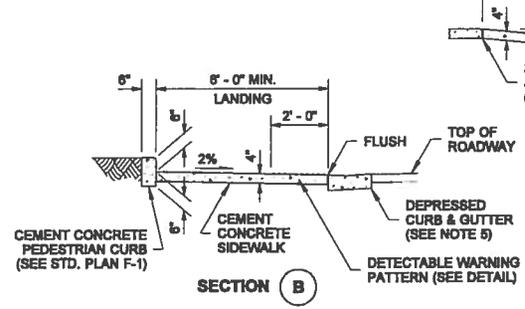
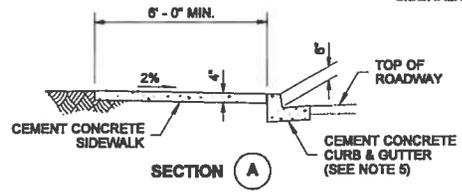
1. The Type 2A Ramp is used to provide access to two crosswalks only when it is infeasible to provide a separate ramp for each crosswalk.
2. The Type 2B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 2B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-1 for curb details.
6. See Std. Plan F-3 for sidewalk joint placement and details.
7. Detectable warning patterns may be created by any method that will achieve the truncated dome dimensions and spacing shown.



	MIN.	MAX.
A	1 5/8"	2 3/8"
B	5/8"	1 1/2"
C	7/16"	3/4"
D	7/8"	1 7/16"



ELEVATION
TRUNCATED DOMES (SEE NOTE 7)
DETECTABLE WARNING
PATTERN DETAIL.



EXPIRES MAY 16, 2007

**SIDEWALK RAMP
TYPES 2A & 2B
WITH LAYOUTS
STANDARD PLAN F-3b**

SHEET 1 OF 1 SHEET

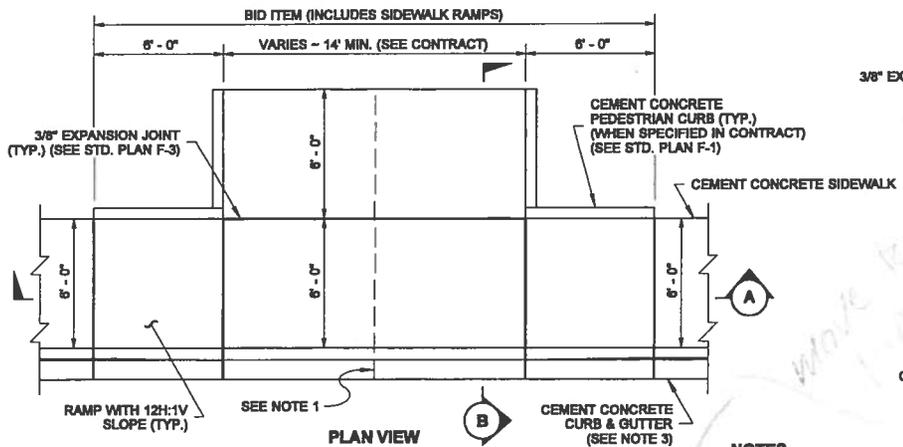
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Harold J. Peterfeso 09-02-05

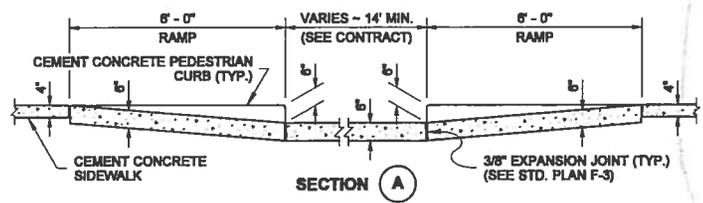
STATE DESIGN ENGINEER DATE



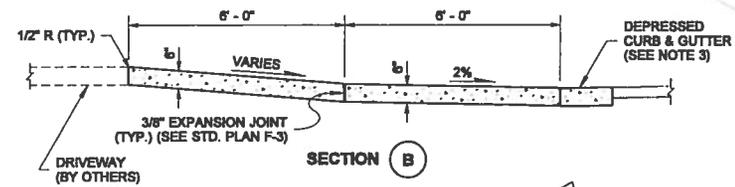
Washington State Department of Transportation



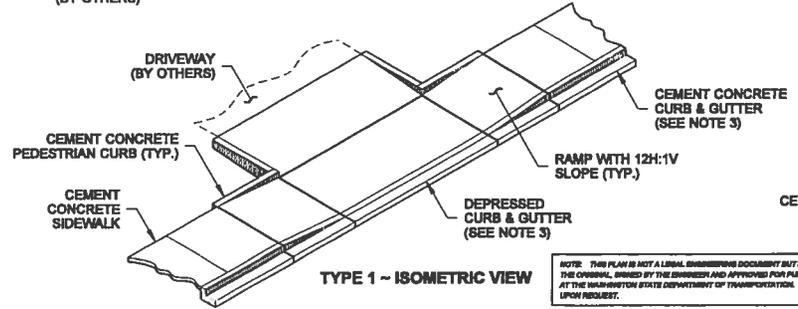
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 1



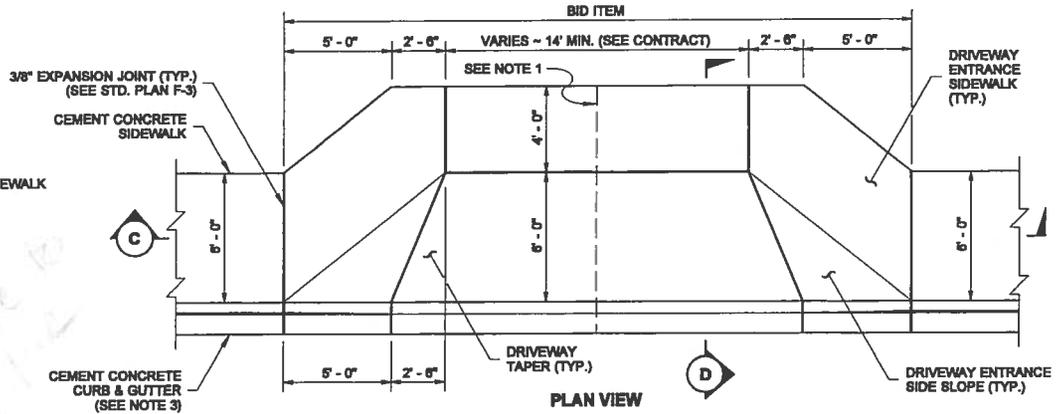
SECTION A



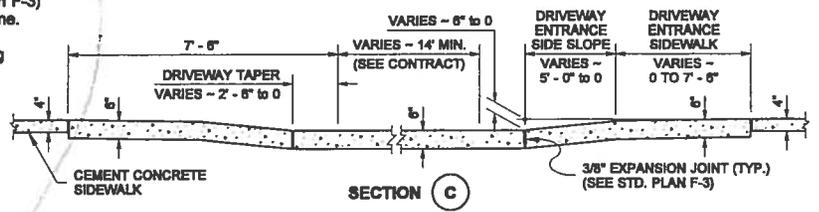
SECTION B



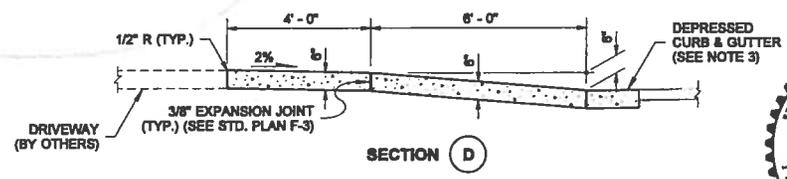
TYPE 1 ~ ISOMETRIC VIEW



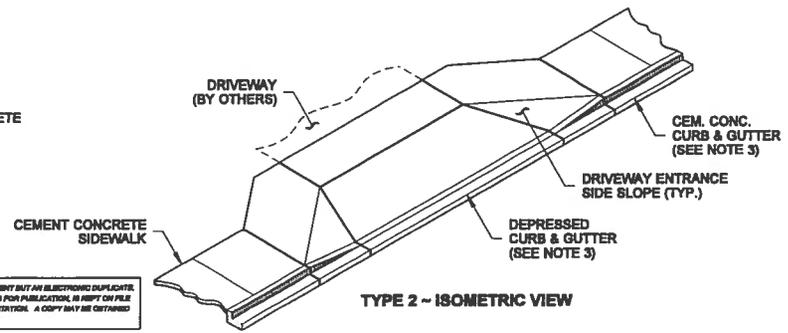
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 2



SECTION C



SECTION D



TYPE 2 ~ ISOMETRIC VIEW

NOTES

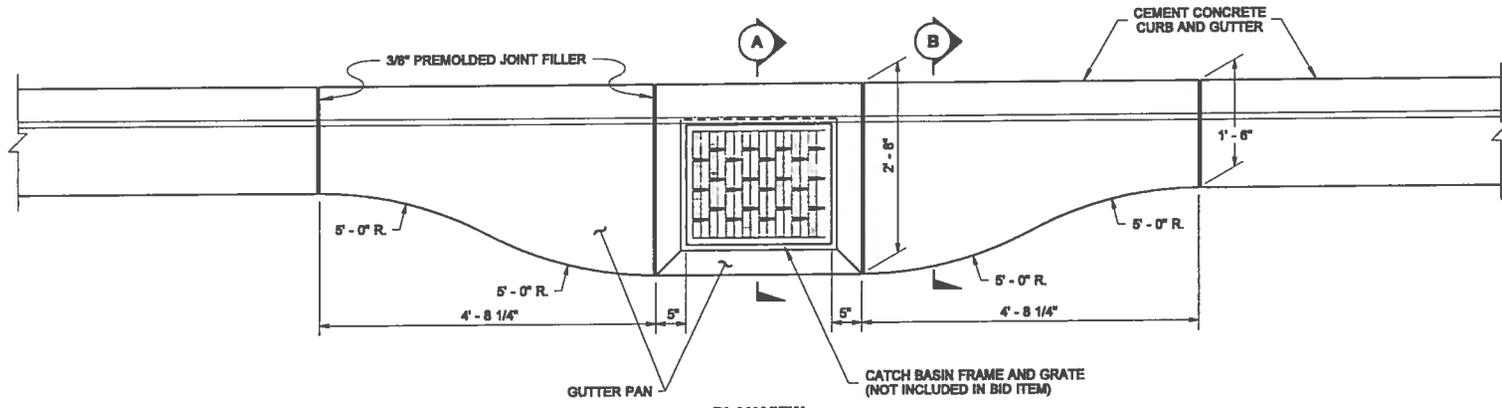
1. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Standard Plan F-3) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.
2. See Std. Plan F-3 for sidewalk details.
3. Curb and gutter shown, see the Contract Plans for the curb design specified. See Std. Plan F-1 for curb details.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

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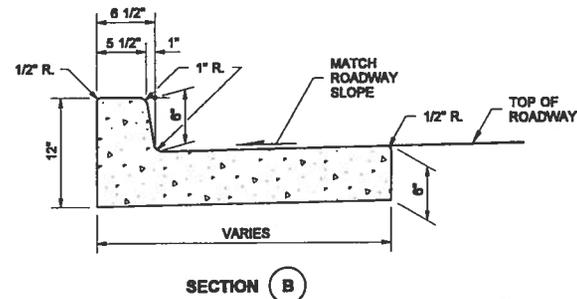
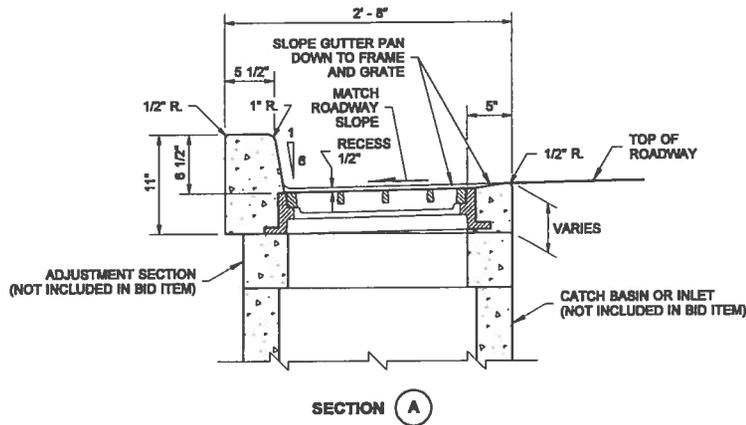


CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3 & 4 STANDARD PLAN F-4

SHEET 1 OF 2 SHEETS
 APPROVED FOR PUBLICATION
Harold J. Peterfeso 01-13-03
 STATE DESIGN ENGINEER DATE
 Washington State Department of Transportation



PLAN VIEW
CATCH BASIN GUTTER PAN



EXPIRES MAY 16, 2003

CEMENT CONCRETE CURB AND GUTTER PAN
STANDARD PLAN F-1a

SHEET 1 OF 1 SHEET

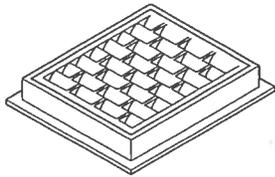
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STATE DESIGN ENGINEER DATE

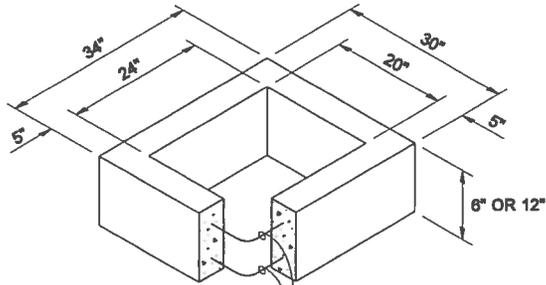
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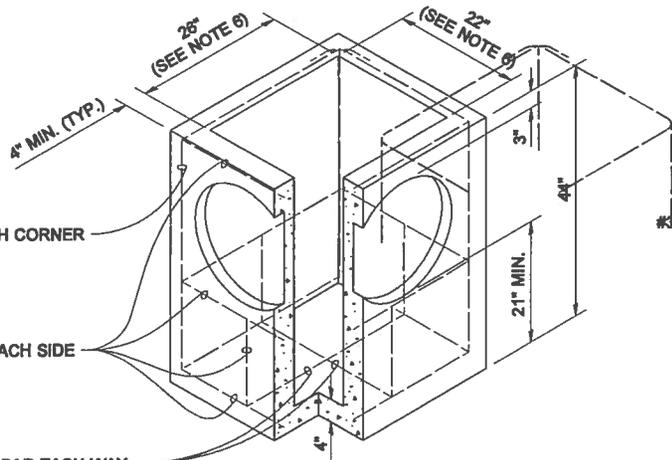
FRAME AND VANED GRATE



ONE #3 BAR HOOP FOR 6" HEIGHT
TWO #3 BAR HOOPS FOR 12" HEIGHT

RECTANGULAR ADJUSTMENT SECTION

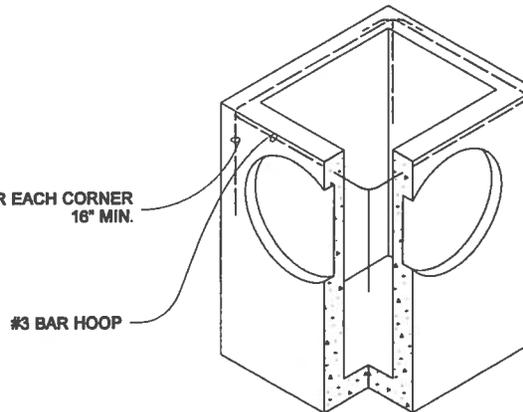
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PRECAST BASE SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP * (STD. SPEC. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. 9-05.12(2))	15"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE



SEE NOTE 1
ALTERNATIVE PRECAST BASE SECTION

NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.
3. The maximum depth from the finished grade to the pipe invert shall be 5'.
4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
5. The precast base section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.
6. The opening shall be measured at the top of the precast base section.
7. All pickup holes shall be grouted full after the basin has been placed.



EXPIRES JULY 1, 2007

CATCH BASIN TYPE 1

STANDARD PLAN B-1

SHEET 1 OF 1 SHEET

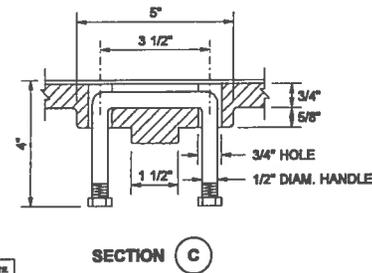
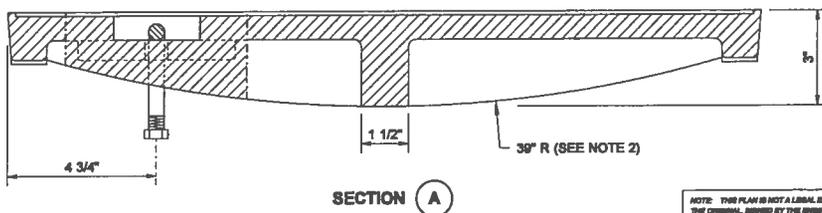
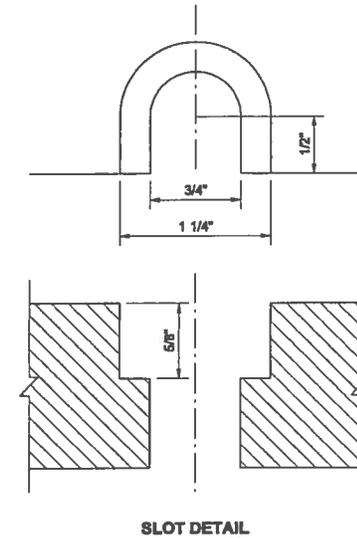
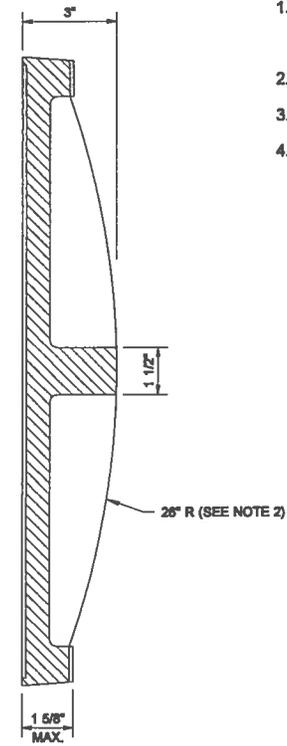
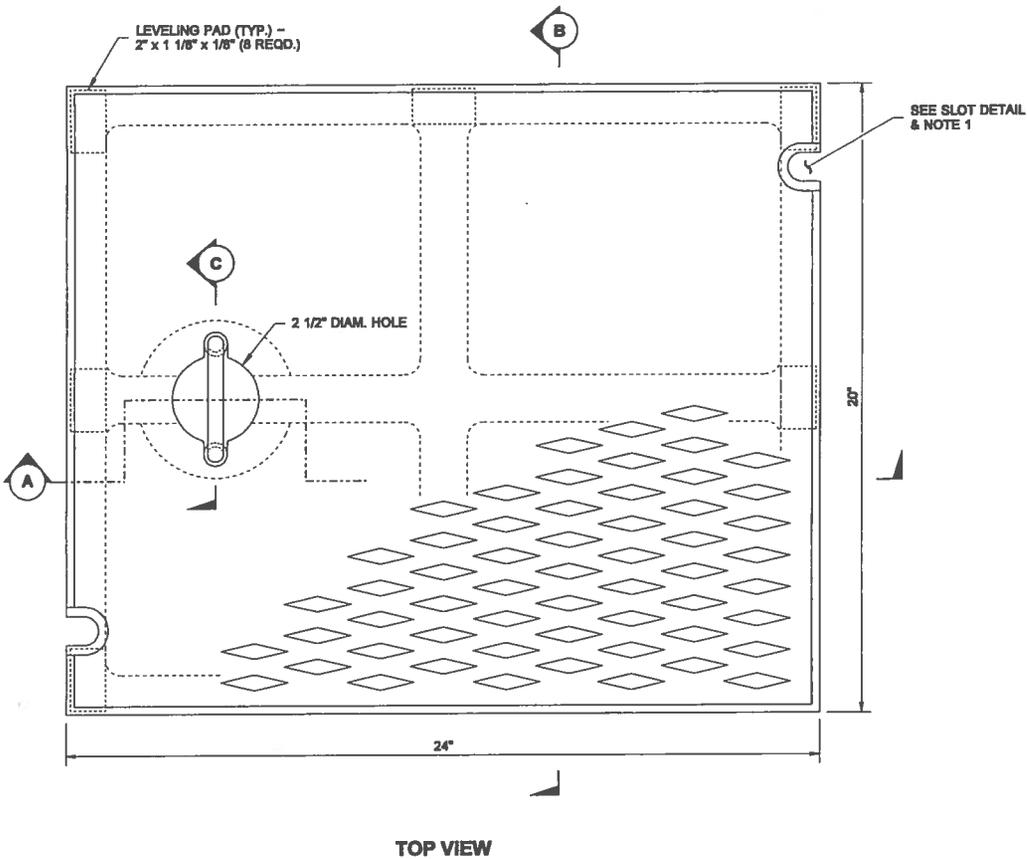
APPROVED FOR PUBLICATION

Harold J. Peterfeso 11-08-05

STATE DESIGN ENGINEER DATE



Washington State Department of Transportation



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NOTES

1. When bolt down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Alternate reinforcing rib designs are acceptable.
3. Refer to Standard Specification 9-05.15(2) for additional requirements.
4. For frame details, see Standard Plan B-2a.

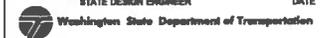


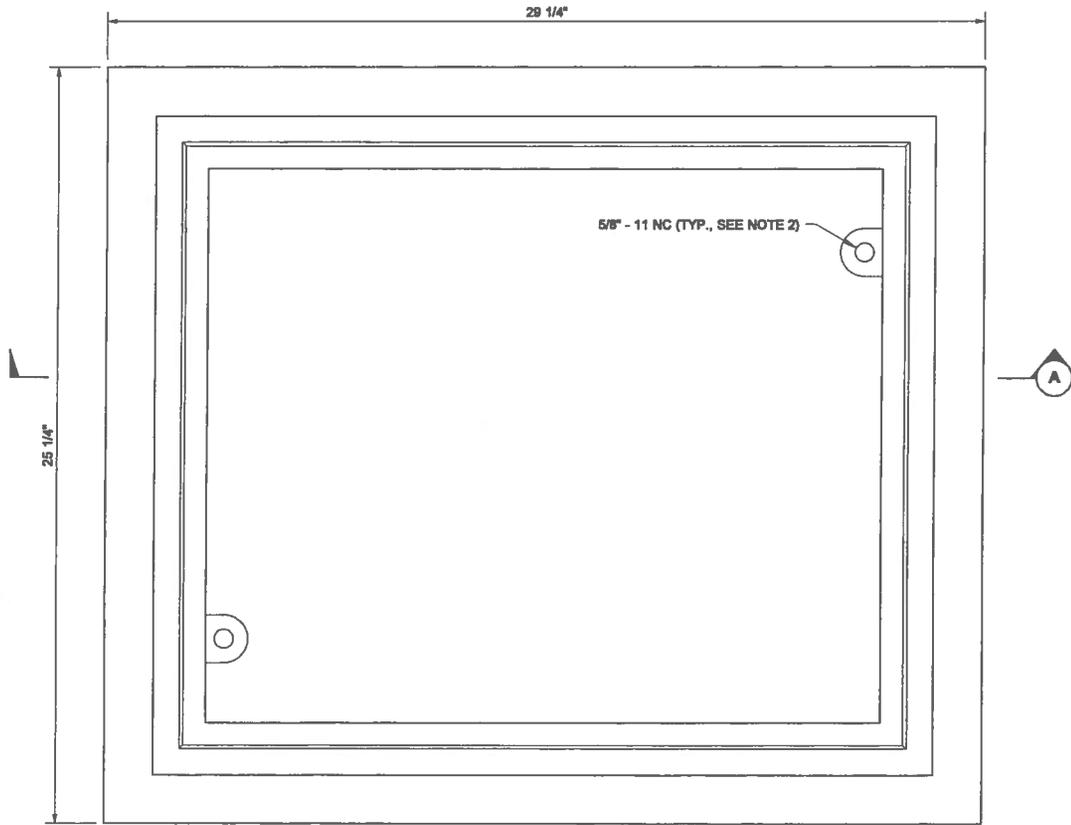
**SOLID METAL COVER
FOR CATCH BASIN
STANDARD PLAN B-2**

SHEET 1 OF 1 SHEET

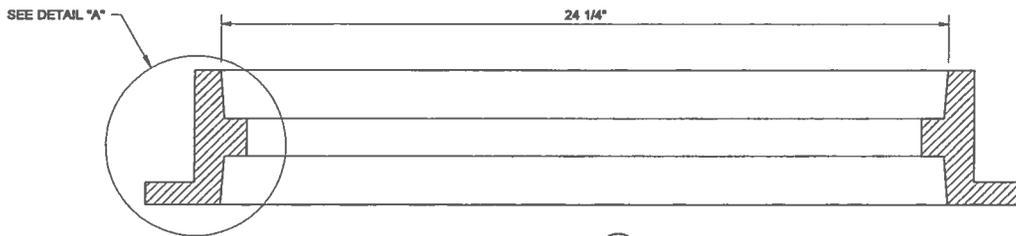
APPROVED FOR PUBLICATION

Harold J. Peterfeso 02-25-05
STATE DESIGN ENGINEER DATE





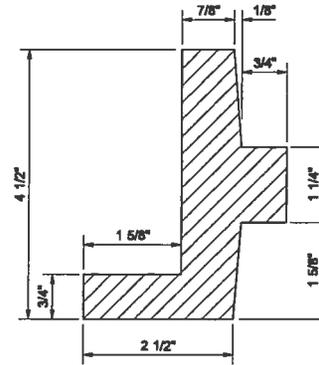
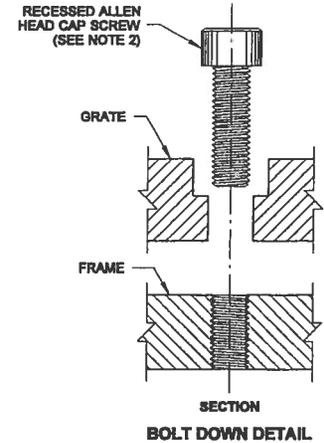
TOP VIEW



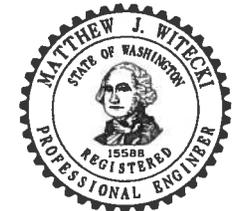
SECTION A

NOTES

1. This frame is designed to accommodate 20" x 24" grates or covers as shown on Standard Plans B-2, B-2b, B-2c and B-2d.
2. When bolt down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC x 2" allen head cap screw. Location of bolt down holes varies among different manufacturers
3. Refer to Standard Specification 9-05.15(2) for additional requirements.



DETAIL "A"



EXPIRES JULY 1, 2005

**REVERSIBLE FRAME FOR
CATCH BASIN OR
CONCRETE INLET
STANDARD PLAN B-2a**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 02-25-05

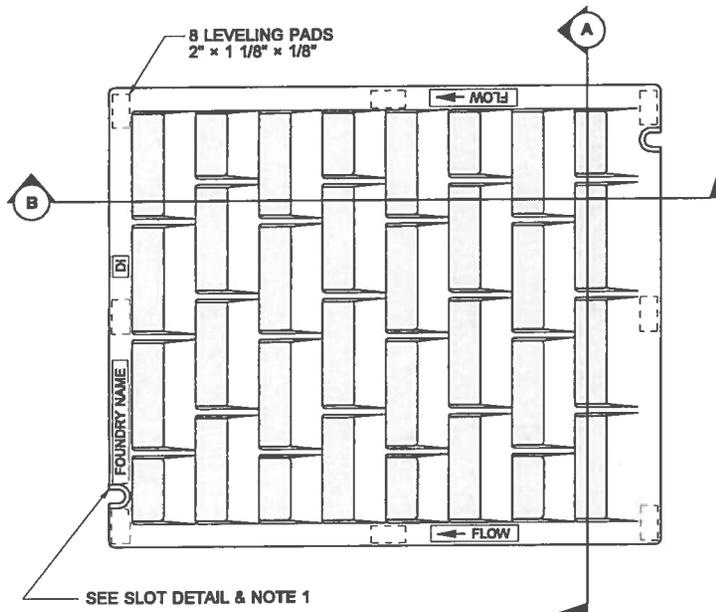
STATE DESIGN ENGINEER

DATE

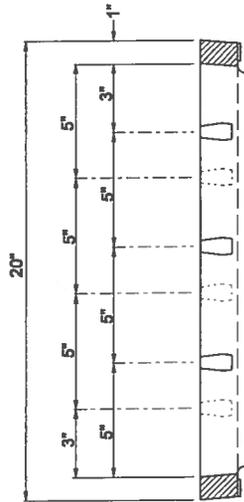


Washington State Department of Transportation

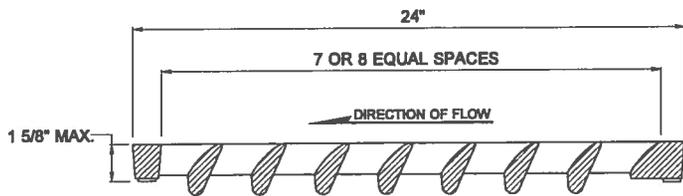
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PLAN VIEW



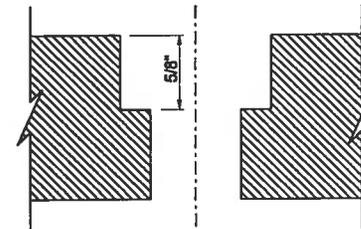
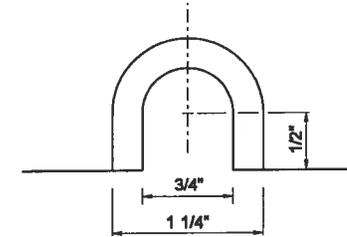
SECTION A



SECTION B

NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frames. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



SLOT DETAIL



EXPIRES JULY 1, 2003

**VANED GRATE FOR
CATCH BASIN AND
CONCRETE INLET
STANDARD PLAN B-2b**

SHEET 1 OF 1 SHEET

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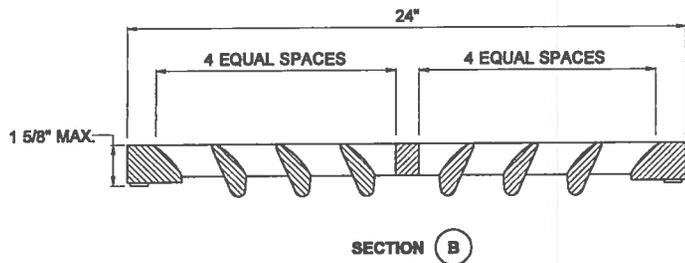
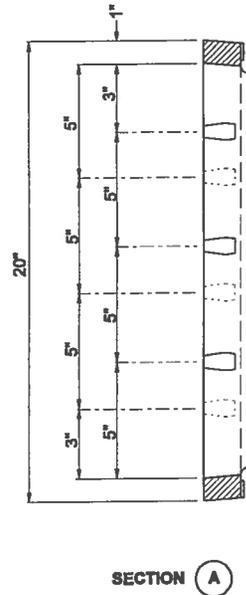
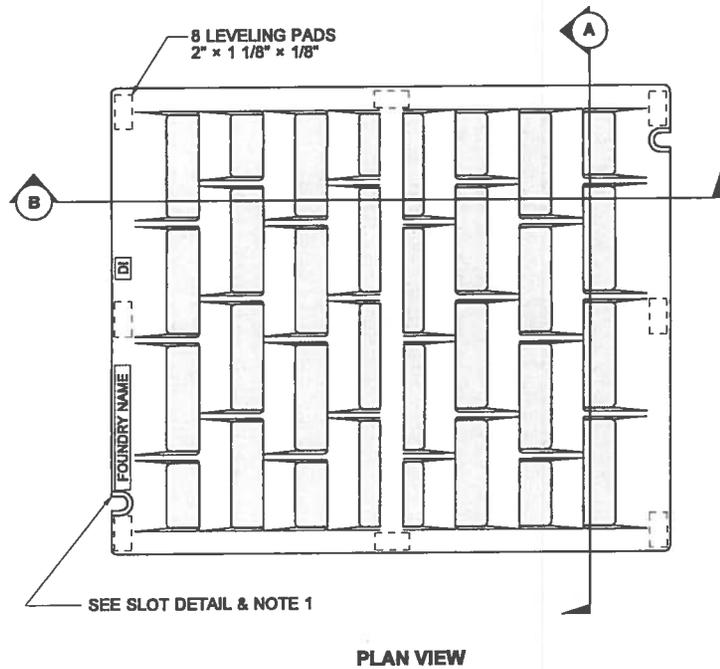
APPROVED FOR PUBLICATION

Harold J. Peterfeso 06-17-02

STATE DESIGN ENGINEER DATE

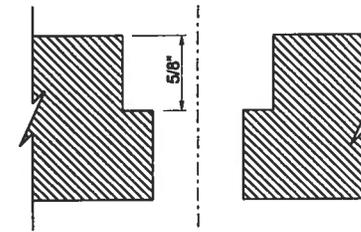
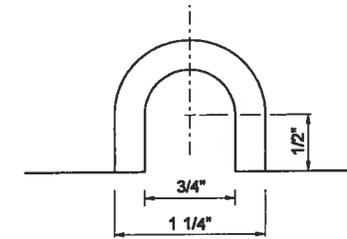


05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC
DATE	REVISION	BY



NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



SLOT DETAIL



EXPIRES JULY 1, 2003

**BI-DIRECTIONAL VANED
GRATE FOR CATCH BASIN
AND INLET
STANDARD PLAN B-2c**

SHEET 1 OF 1 SHEET

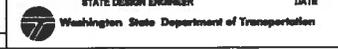
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, DRAWN BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

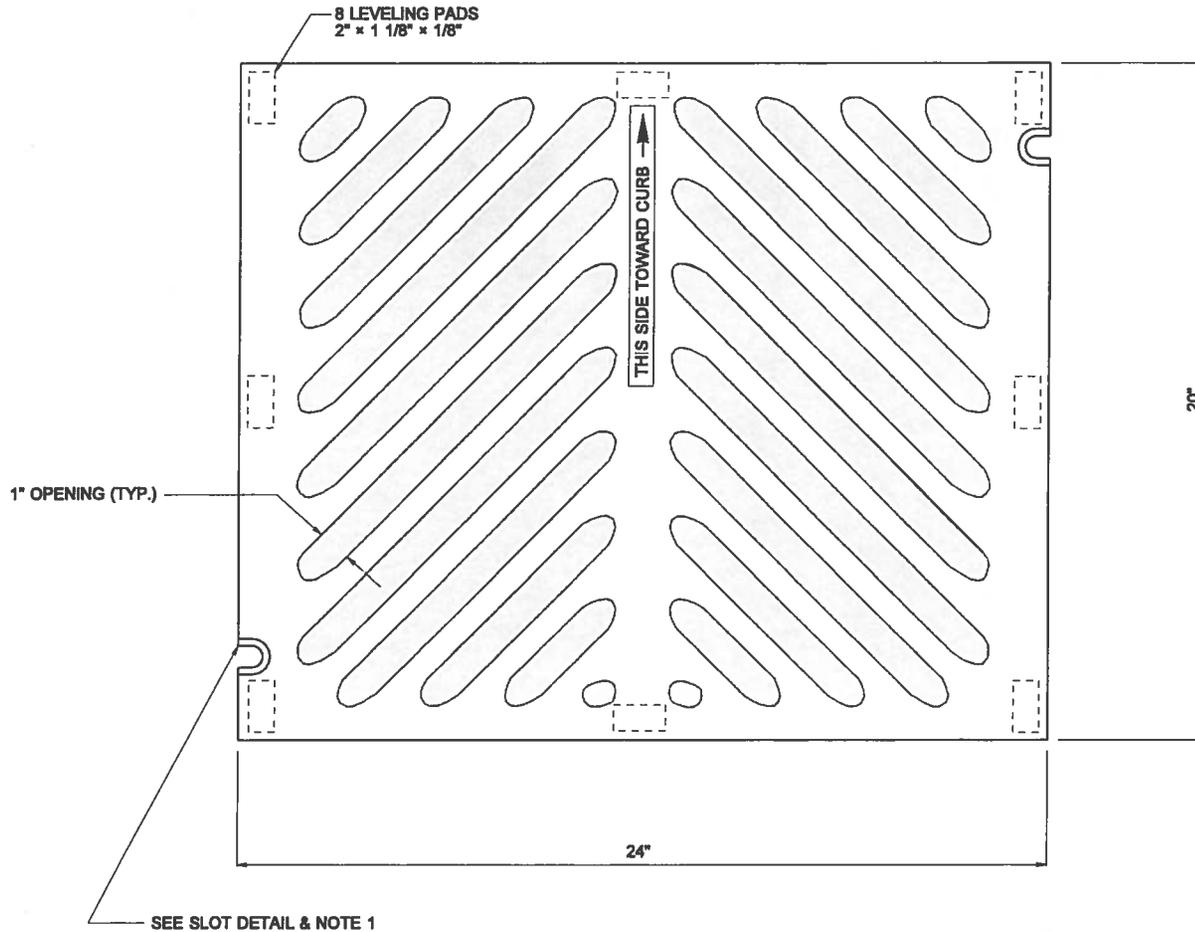
APPROVED FOR PUBLICATION

Harold J. Peterfeso 06-17-02

STATE DESIGN ENGINEER DATE

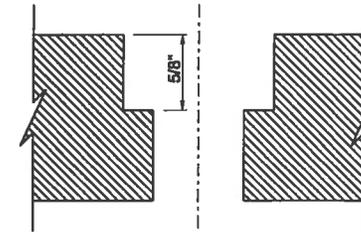
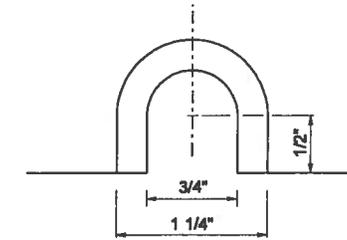
05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC
DATE	REVISION	BY





NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.
4. The thickness of the grate shall not exceed 1 5/8".



SLOT DETAIL



EXPIRES JULY 1, 2003

**HERRINGBONE GRATE FOR
CATCH BASIN
AND INLET
STANDARD PLAN B-2d**

SHEET 1 OF 1 SHEET

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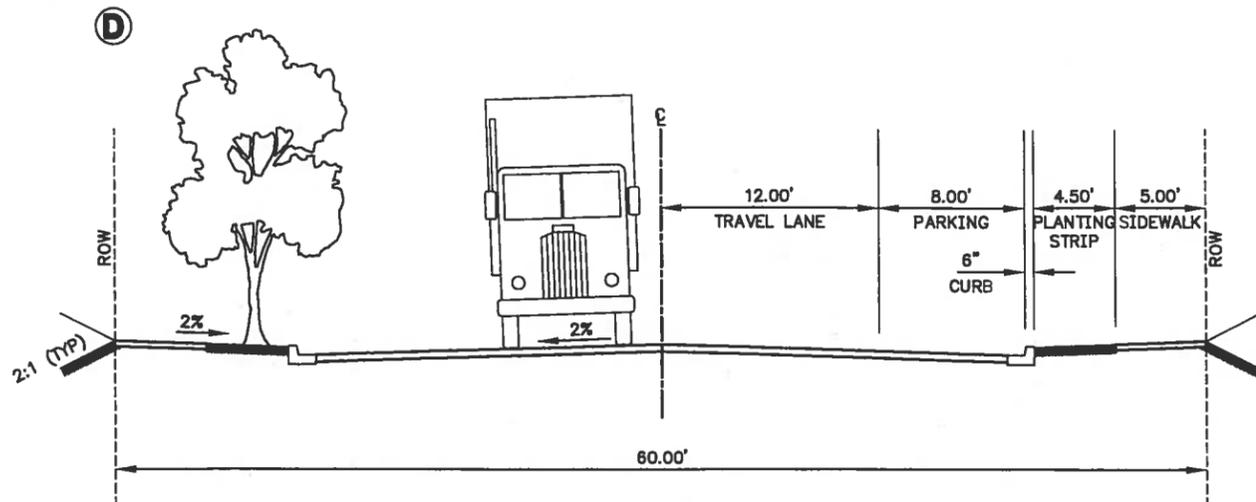
APPROVED FOR PUBLICATION

Harold J. Peterfeso 06-17-02

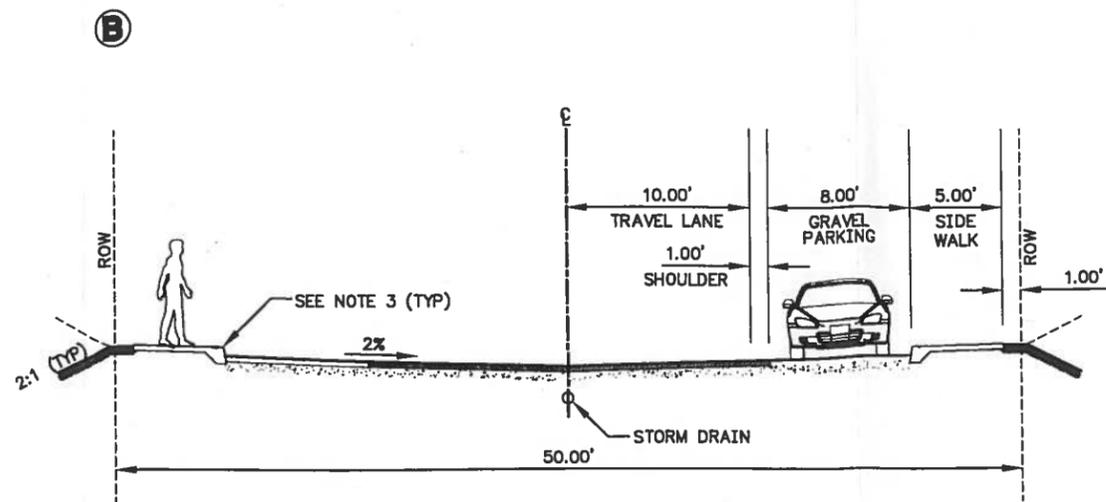
STATE DESIGN ENGINEER DATE



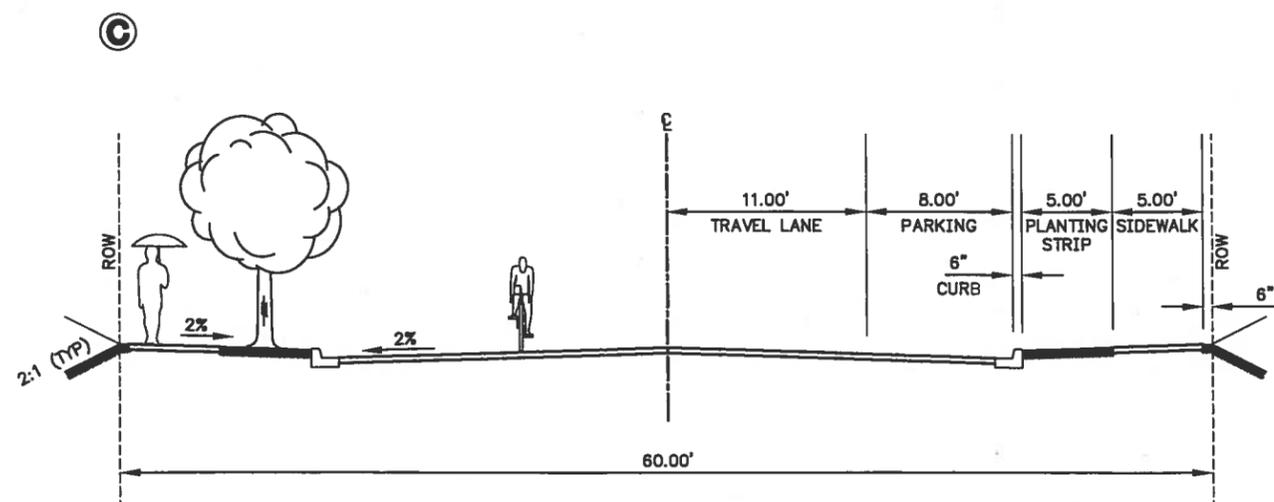
Washington State Department of Transportation



COMMERCIAL AND INDUSTRIAL ACCESS STREETS

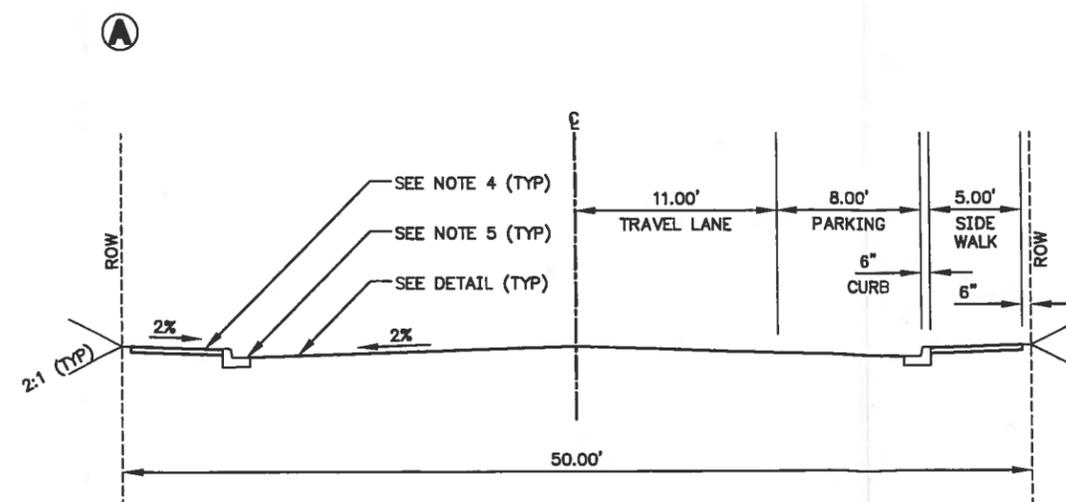


RESIDENTIAL ACCESS STREETS



COLLECTOR STREETS

Current code for



MINIMUM DESIGN STANDARDS FOR RESIDENTIAL ACCESS STREET FOR FULL PLAT

NOTES:

1. USE WSDOT STANDARD PLANS FOR GEOMETRY AND DIMENSIONS, EXCEPT AS MODIFIED HEREIN.
2. GRADES SHALL NOT EXCEED 15 PERCENT EXCEPT WITHIN APPROVED HILLSIDE SUBDIVISIONS.
3. WSDOT STANDARD PLAN F-3, MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK.
4. WSDOT STANDARD PLAN F-3, CEMENT CONCRETE SIDEWALK.
5. WSDOT STANDARD PLAN F-1, CEMENT CONCRETE TRAFFIC CURB AND GUTTER.
6. AT RESIDENTIAL STREET INTERSECTIONS, INSTALL SIDEWALK BULBS USING A 20-FOOT RADIUS. SEE WSDOT SIDEWALK DETAILS: A GUIDE FOR WASHINGTON LOCAL AGENCIES AND TRIBES, MAY 2000, FIGURE 2-8C, AND ADAPT IT TO THESE STREET STANDARDS. SEE NOTE 8 FOR RAMP.
7. AT ALL OTHER INTERSECTIONS, PROVIDE A 20-FOOT CURB RETURN RADIUS AND RESTRICT PARKING NEAR THE INTERSECTION IN ORDER TO PROVIDE AN APPROPRIATE LINE OF SIGHT TO SIDEWALK USERS WHO ARE NEARING THE CROSSWALK.
8. INSTALL SIDEWALK RAMPS AT ALL INTERSECTIONS. USE WSDOT STANDARD PLAN F-3B, MODIFIED TO FIT EACH INTERSECTION CONDITION. FOR INSTANCE, AT AN ARTERIAL INTERSECTION, THE RAMP GEOMETRICS WILL ENCROACH UPON THE PLANTING STRIP IN ORDER TO MAINTAIN A 60-FOOT RIGHT-OF-WAY (ROW).
9. INSTALL DRIVEWAYS ACCORDING TO WSDOT STANDARD PLAN F-4, TYPE 4; MODIFY TO INTEGRATE WITH THESE STREET STANDARDS.

300408-DE Manual Update 2006 Manual (RoadProfile.dwg) 1:1 2/23/04 05-19-06

No.	Date	By	Clk.	Appr.	Revision

CHS 12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500

CHS ENGINEERS, LLC TEL (425) 637-3693 FAX (425) 637-3694

Drawn By N.H.	Date 05-06	Checked By SG	Date 05-06
Designed By DJ	Date 05-06	Approved By SG	Date 05-06

Scale:
Horiz. 1"=5'
Vert. N/A
Job No.
200408

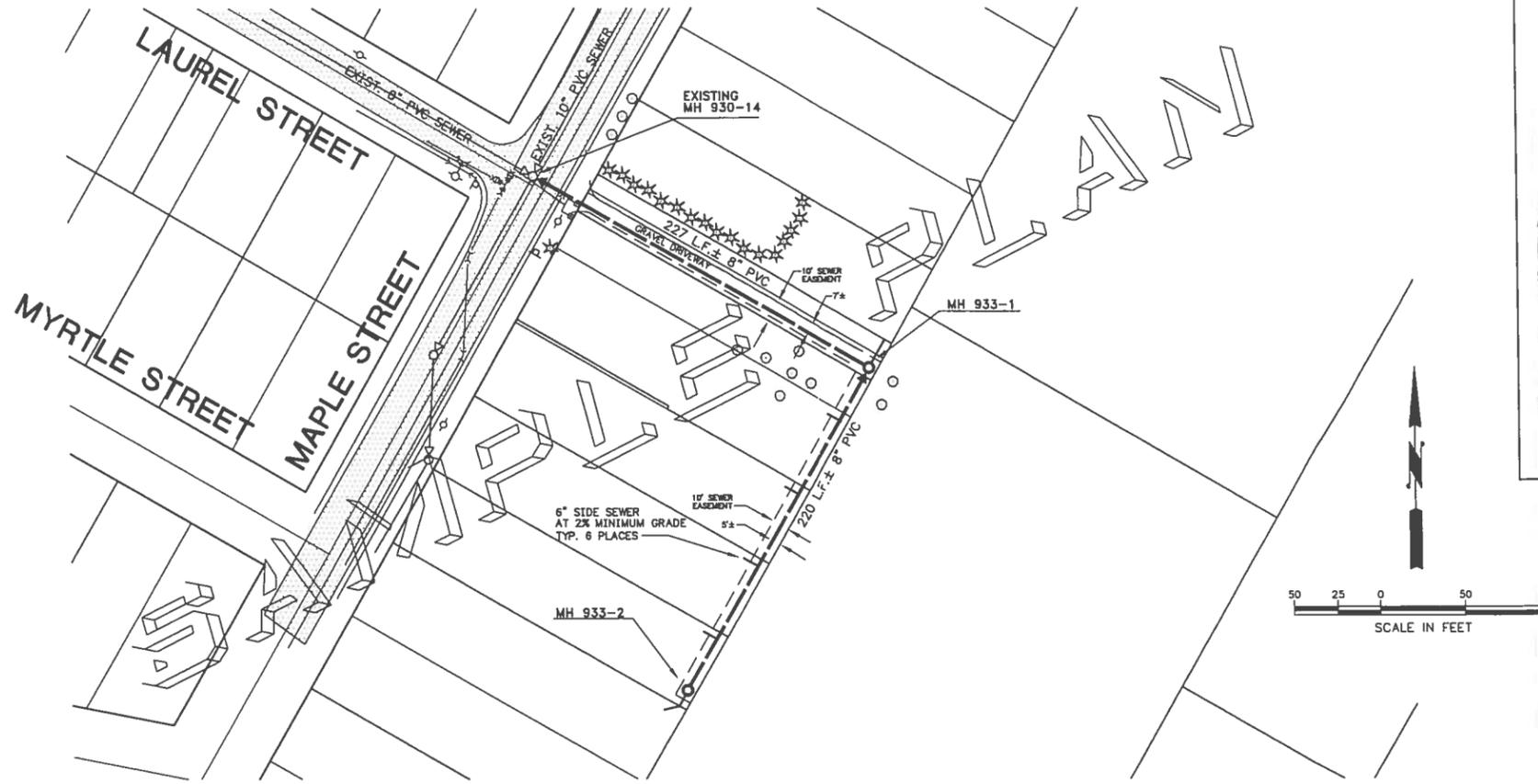
TOWN OF LA CONNER
ROADWAY SECTIONS

Sheet NO.
Of NO.
NO.

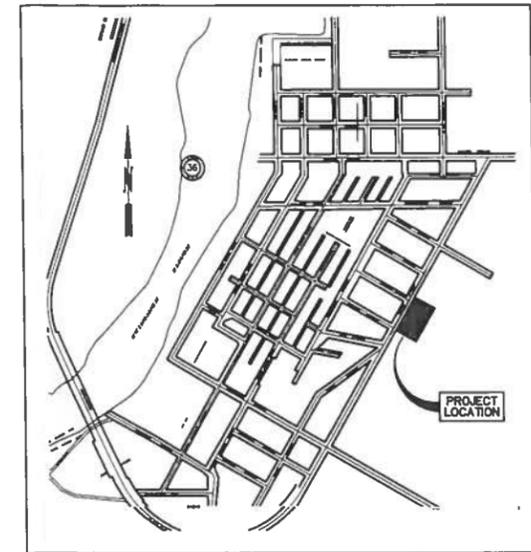
GENERAL NOTES

USE THE NOTES PROVIDED IN THE PROJECT MANUAL.

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON



SEWER PLAN
SCALE 1" = 50'

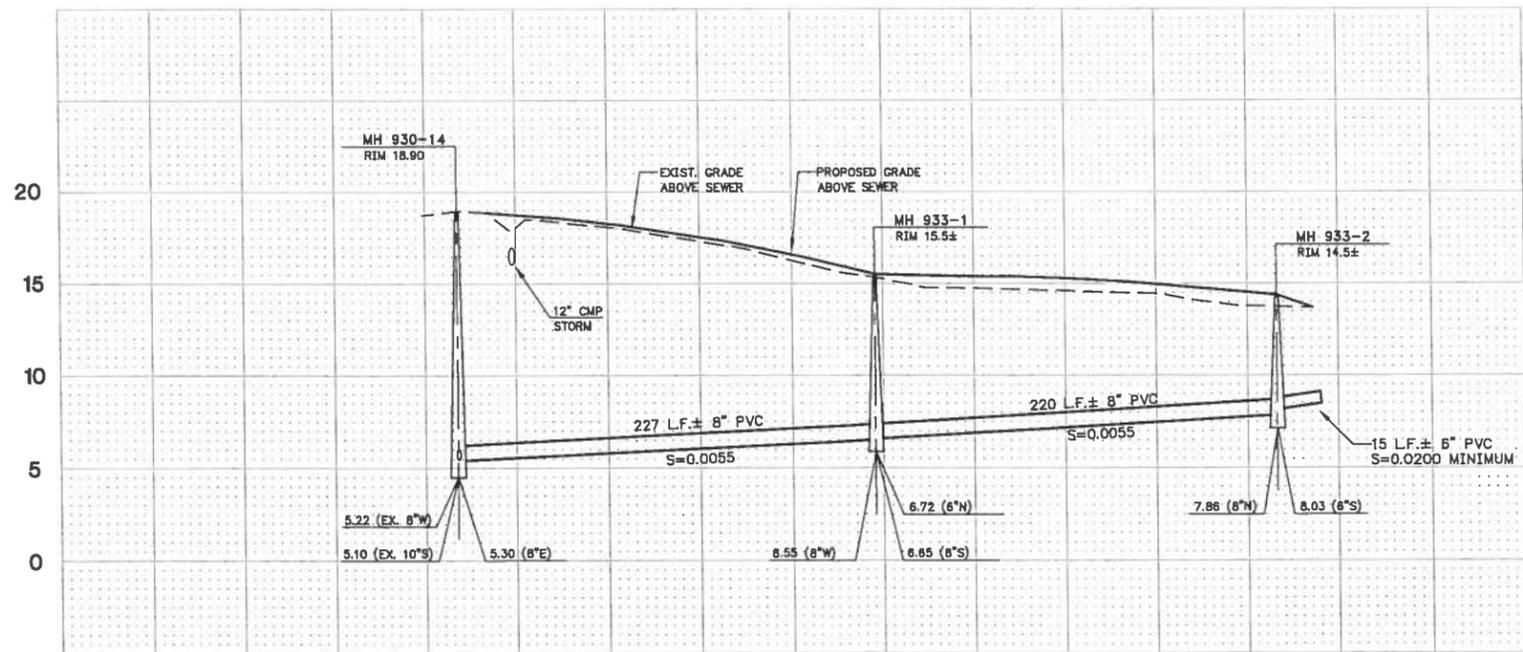


VICINITY MAP

NOT TO SCALE

LEGEND

- GRAVEL
- EXIST. ASPHALT PAVEMENT
- EXIST. DITCH LINE
- EXIST. FENCE LINE
- EXIST. SEWER LINE
- EXIST. WATER LINE
- PROPOSED SEWER LINE
- EXIST. CULVERT
- FIRE HYDRANT (FH)
- WATER VALVE (WV)
- BLOW-OFF ASSEMBLY
- PROPOSED WATER SERVICE
- EXISTING WATER SERVICE
- EXIST. UTILITY POLE
- EXIST. ROAD SIGN
- EXIST. TREES
- EXIST. UTILITY BOX



SEWER PROFILE
SCALE HORIZ 1" = 50'
VERT 1" = 5'

DRAFTING NOTES

1. STANDARD SHEET SIZE 22"x34"
2. MANHOLE NUMBERS ASSIGNED BY TOWN
3. SCALES HORIZONTAL 1"=50 TO 1"=20'
VERTICAL 1"=5 OR 1"=10'

TOWN OF LA CONNER



12807 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chsengineers.com

CHS ENGINEERS, LLC

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

PROJECT NAME
SANITARY SEWER
PLAN AND PROFILE

Scale: Sheet 1
Horiz. 1"=50'
Vert. 1"=5'
Job No. Of -
DE #

CALL 2 BUSINESS DAYS BEFORE YOU DIG
1-800-424-5555

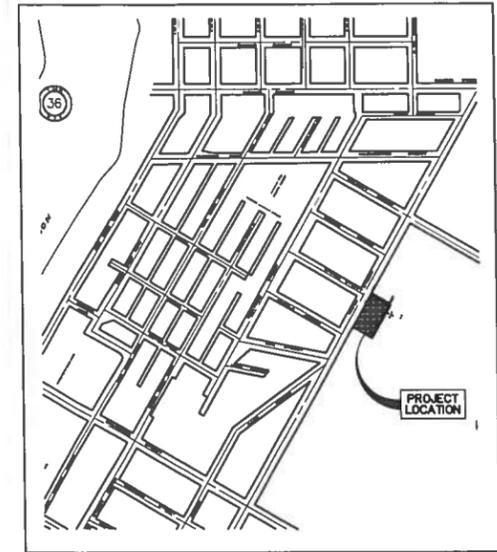
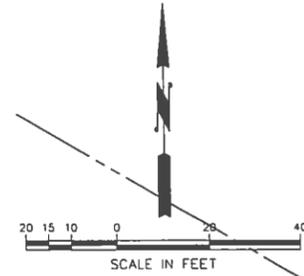
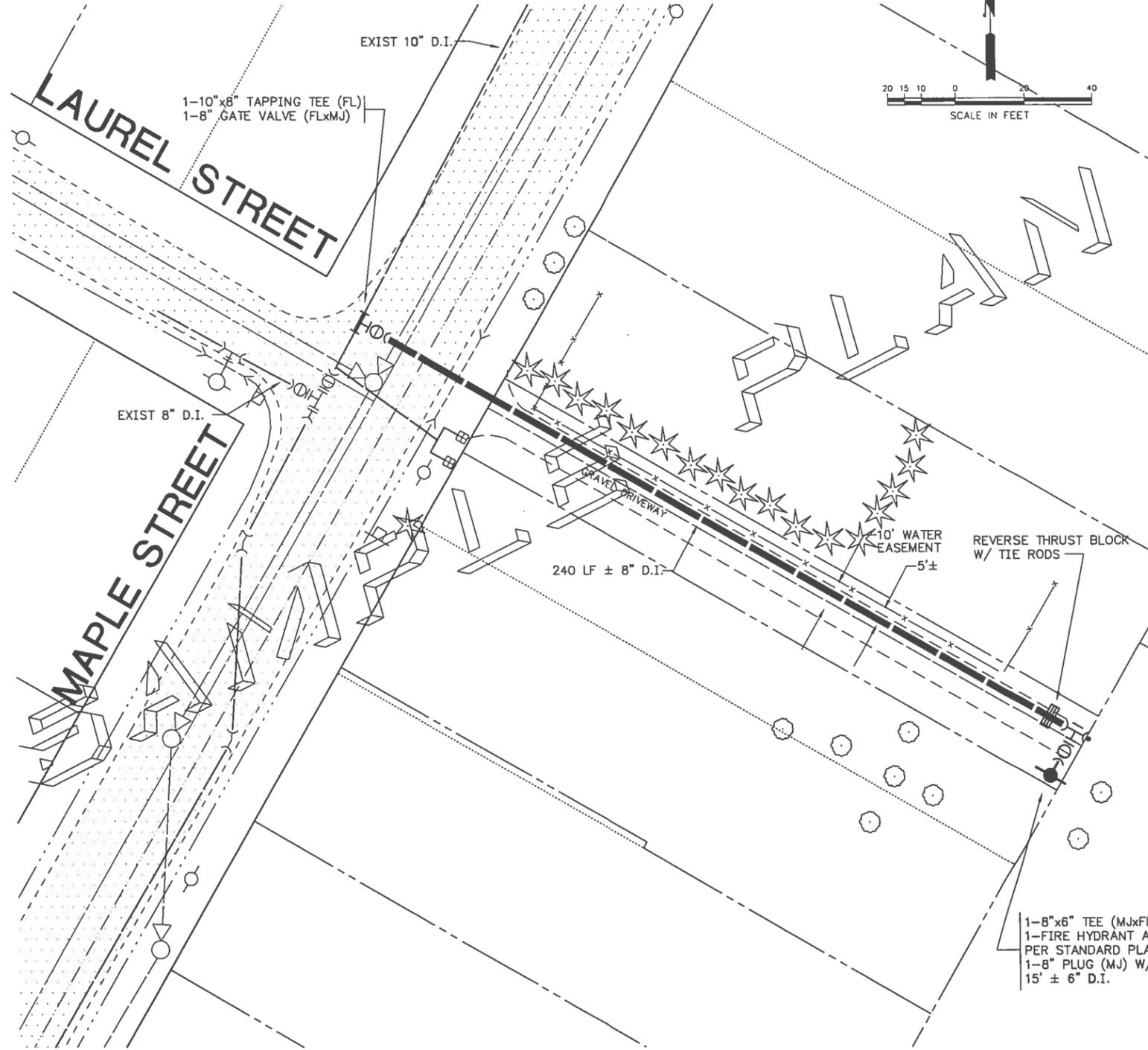
APPROVED BY TOWN PUBLIC WORKS DEPT.
BY _____ DATE _____

NUMBER - NAME - DATE

GENERAL NOTES

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON

USE THE NOTES PROVIDED IN THE DEVELOPER MANUAL.



VICINITY MAP

NOT TO SCALE

LEGEND

- EXIST. DRIVEWAY / ACCESS
- EXIST. ASPHALT PAVEMENT
- EXIST. DITCH LINE
- EXIST. FENCE LINE
- EXIST. SEWER LINE
- EXIST. WATER LINE
- PROPOSED WATER LINE
- EXIST. CULVERT
- FIRE HYDRANT (FH)
- WATER VALVE (WV)
- BLOW-OFF ASSEMBLY
- PROPOSED WATER SERVICE
- EXISTING WATER SERVICE
- EXIST. UTILITY POLE
- EXIST. ROAD SIGN
- EXIST. TREES
- EXIST. UTILITY BOX



NAVD 88
LIST BENCHMARK LOCATION AND ELEVATION

- 1-8"x6" TEE (MJxFL)
- 1-FIRE HYDRANT ASSEMBLY PER STANDARD PLAN 1
- 1-8" PLUG (MJ) W/ 2" TAP & PLUG
- 15' ± 6" D.I.

WATER PLAN

SCALE 1" = 50'

DRAFTING NOTES

1. STANDARD SHEET SIZE 22"x34"
2. SCALES HORIZONTAL 1"=50 TO 1"=20'

TOWN OF
LA CONNER



12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chasingengineers.com

CHS ENGINEERS, LLC

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

PROJECT NAME

WATER PLAN

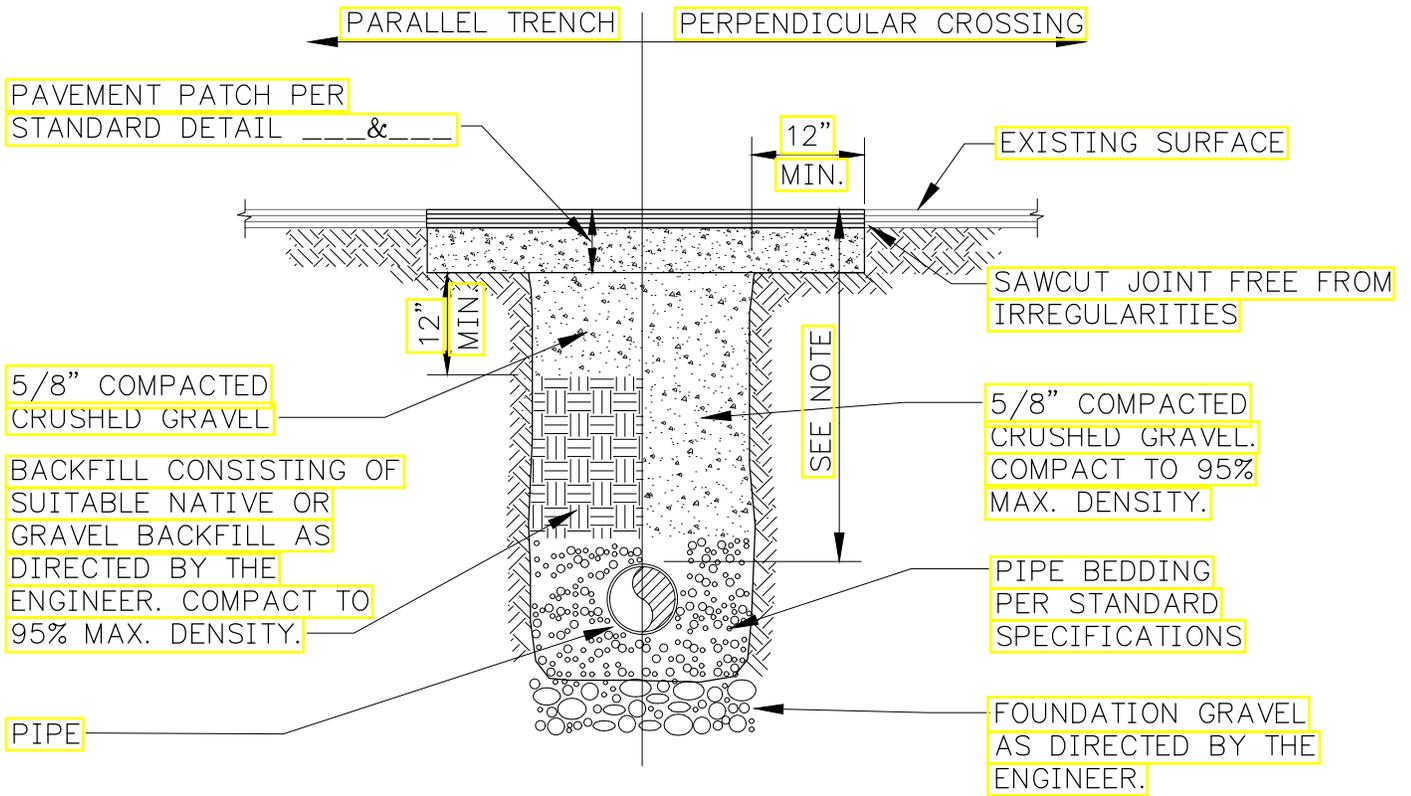
Scale:	Sheet 1
Horiz. 1"=50'	Of -
Vert. 1"=5'	Of -
Job No.	DE #

CALL 2 BUSINESS DAYS BEFORE YOU DIG
1-800-424-5555

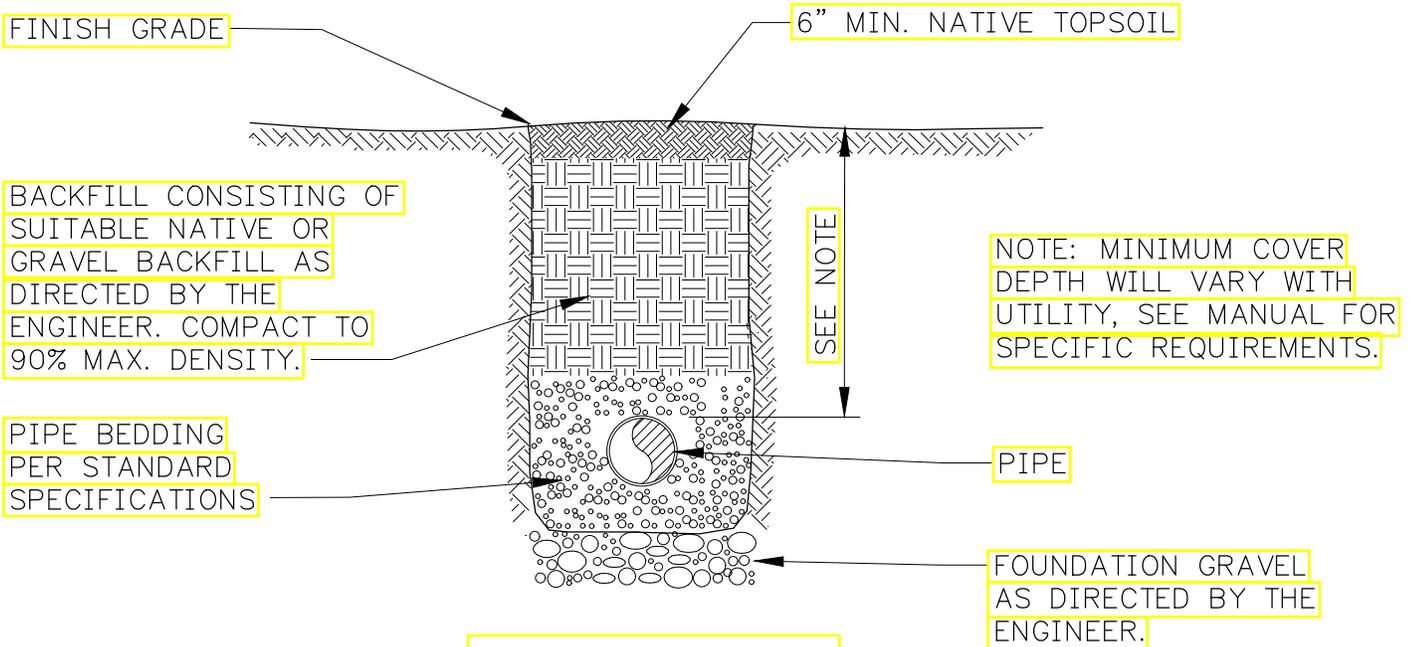
APPROVED BY TOWN PUBLIC WORKS DEPT.

BY _____ DATE _____

NUMBER - NAME OF - 1:1 22x34 XX-XX-07

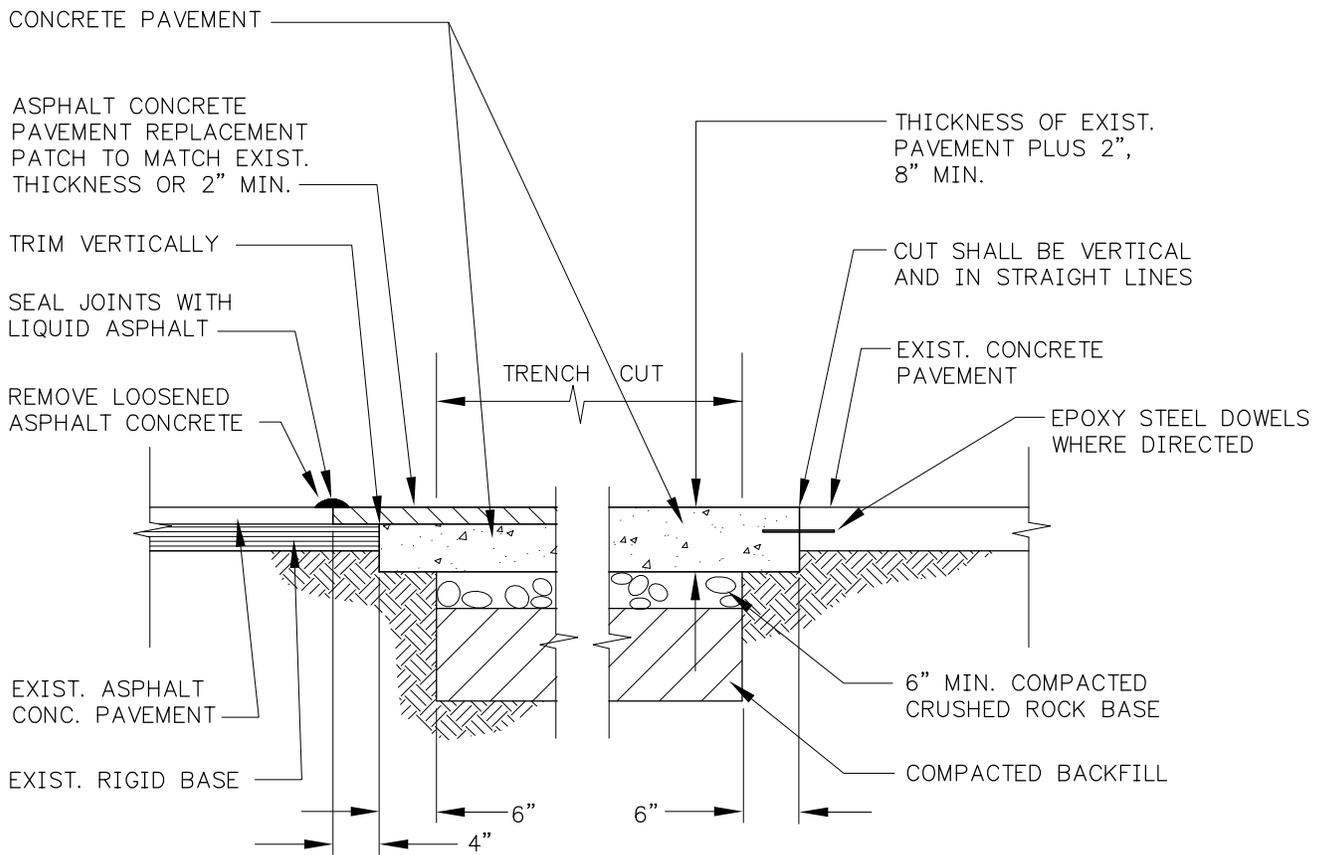


**PAVEMENT REPAIR SECTION
TRENCH SECTION IN ROADWAY**



**TRENCH SECTION
IN UNIMPROVED AREAS**

G1 **TYPICAL TRENCH SECTION**



**RIGID PAVEMENT WITH
ASPHALTIC CONCRETE SURFACE**

CEMENT CONCRETE PAVEMENT

NOTE: TRENCHING THROUGH EXISTING CONCRETE ROADWAY PANELS WILL REQUIRE REPLACEMENT OF FULL PANEL TO NEAREST COLD JOINT. MINIMUM HALF-PANEL REPLACEMENT WITH DOWELS REQUIRES PRIOR APPROVAL FROM TOWN.

G2 RIGID PAVEMENT PATCHING

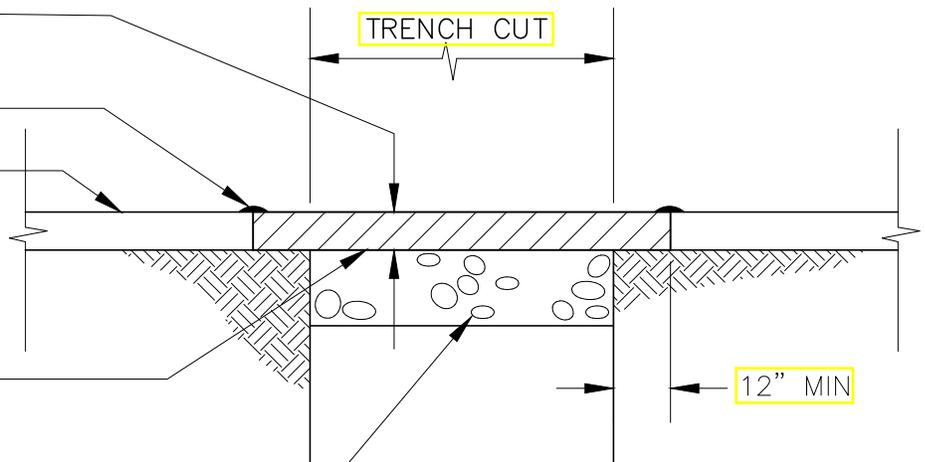
TOTAL THICKNESS TO EQUAL
OR EXCEED EXIST. PAVEMENT
THICKNESS, 4" MIN.

SEAL JOINTS WITH LIQUID
ASPHALT (TYP.)

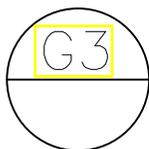
EXIST. A.C. SURFACING

4" MIN. ASPHALT
CONCRETE PATCH

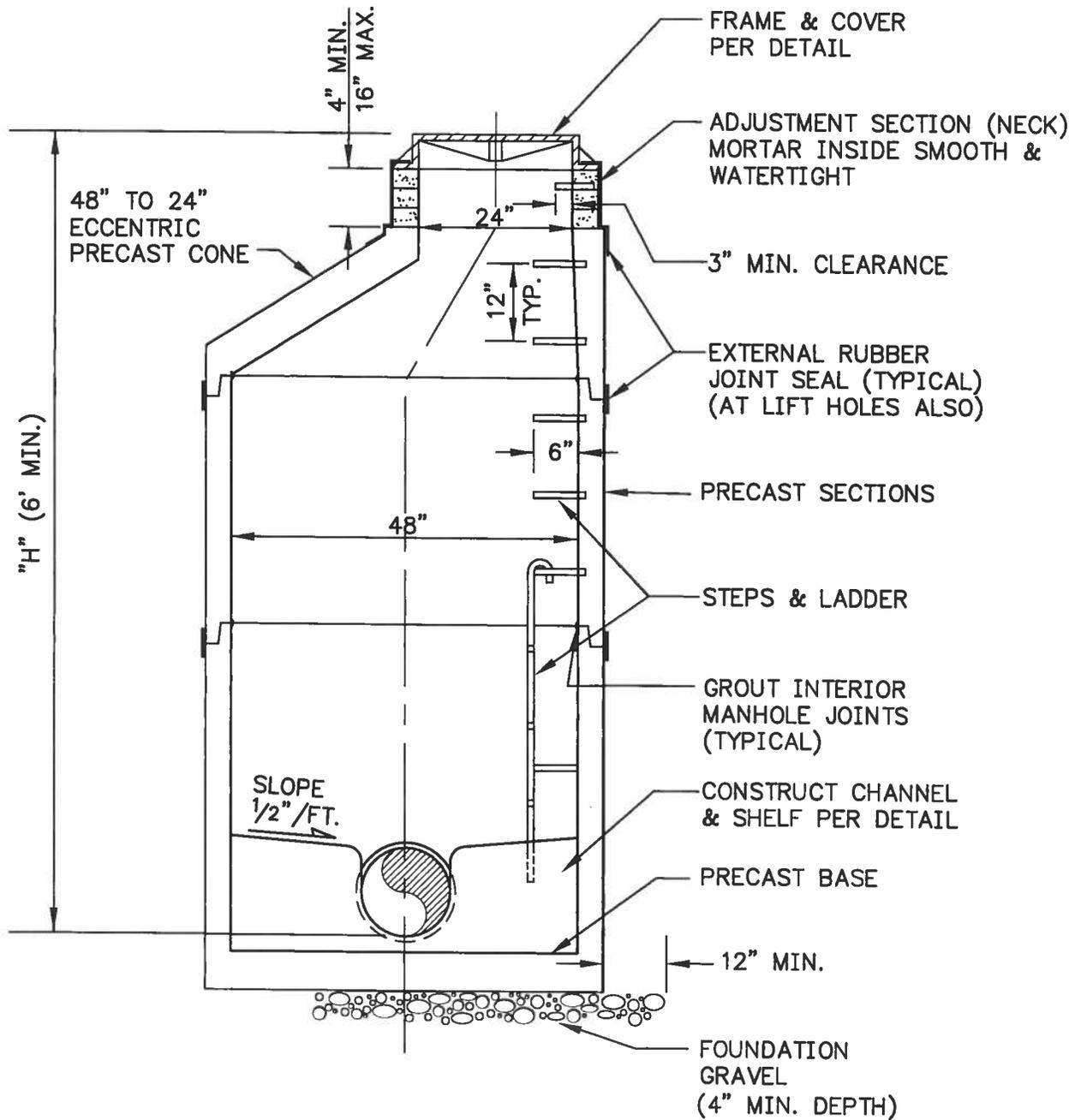
CRUSHED ROCK BASE,
6" MIN. OR THICKNESS
OF EXIST. BASE



NOTE: ASPHALT TREATED BASE MAY BE SUBSTITUTED FOR THE FIRST LIFT
ASPHALT CONCRETE AND CRUSHED BASE. SEE SPECIFICATIONS.



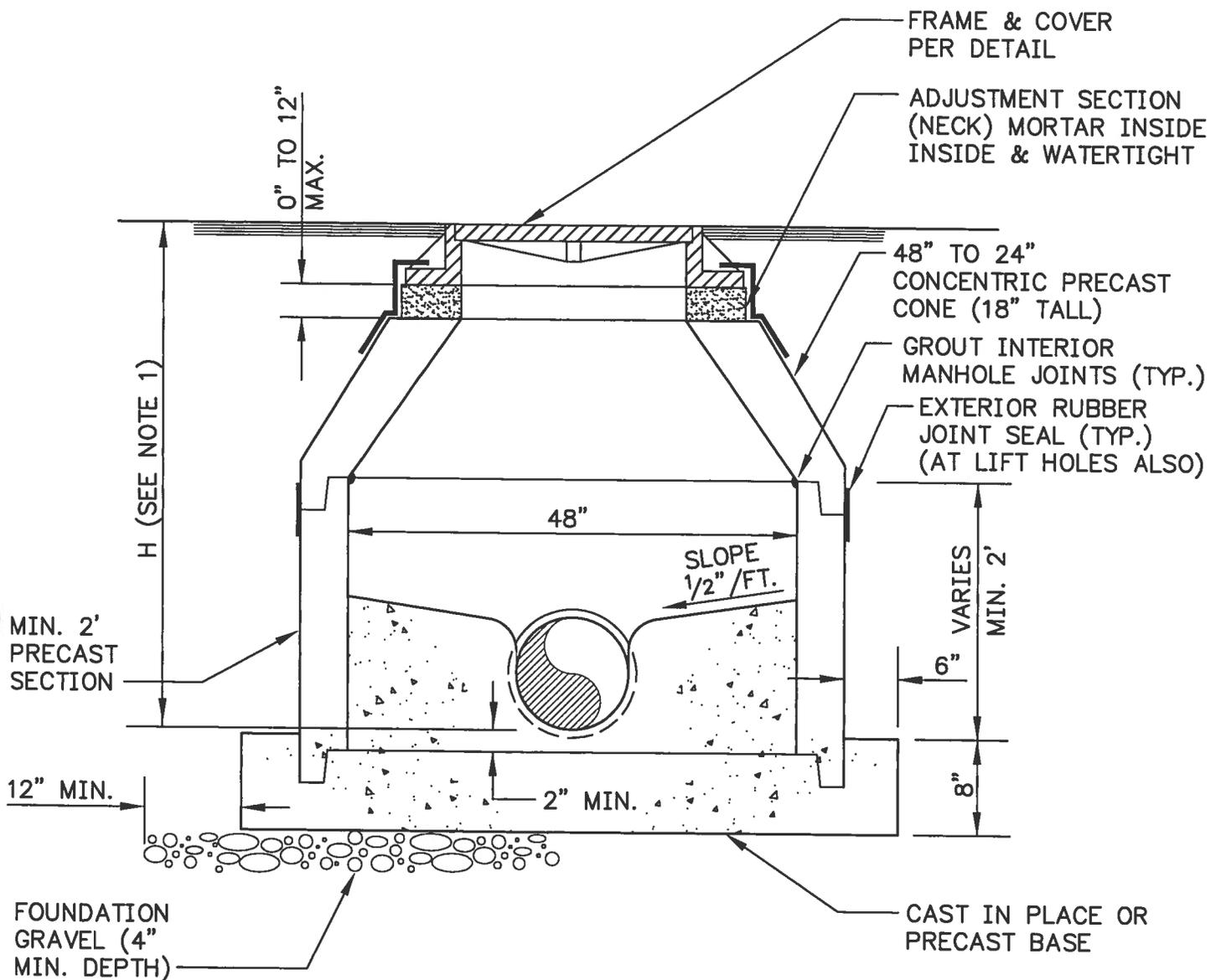
ASPHALT CONCRETE PATCHING



NOTES:

1. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR.
 - B. 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"

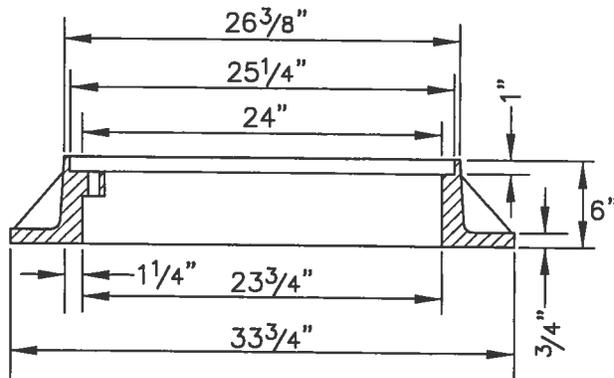
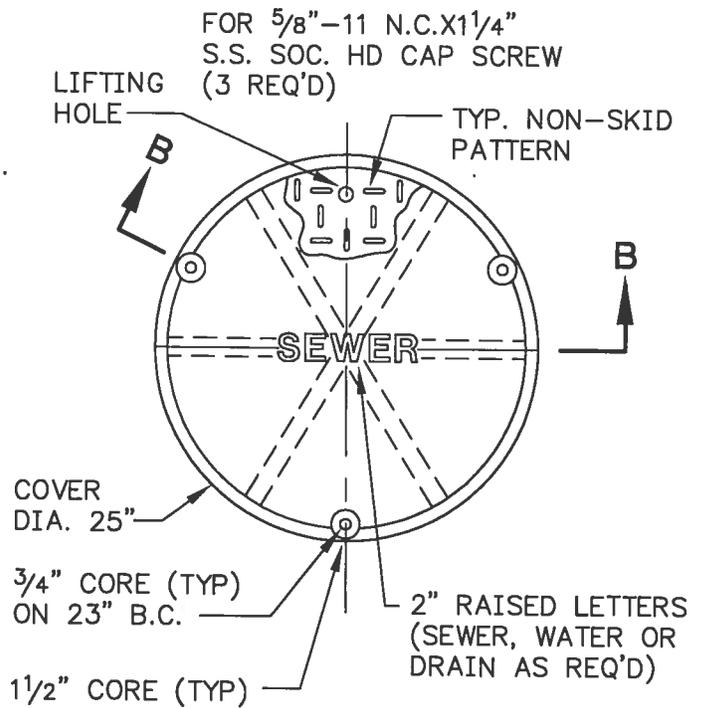
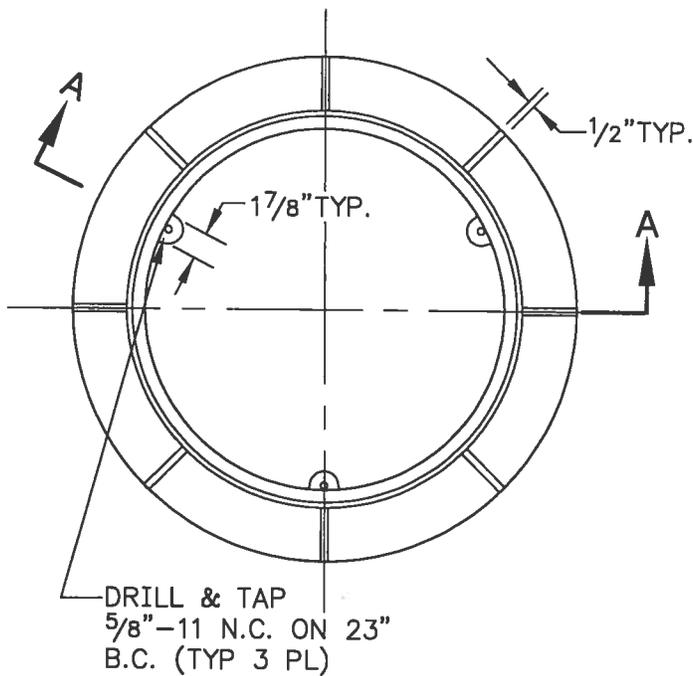
S1 TYPE I - 48" MANHOLE



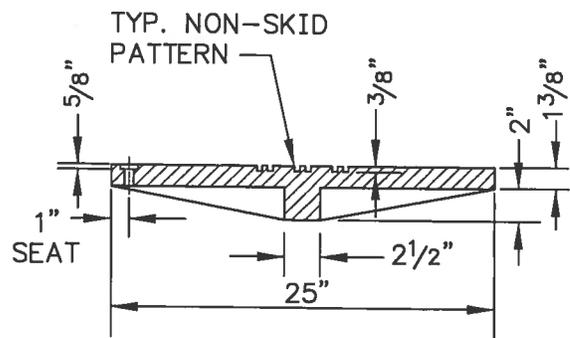
NOTES:

1. MAXIMUM H IS 5'. MINIMUM H IS 3'-8"
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR
5. EXTERNAL JOINT SEAL SHALL BE "BEST SEAL" OR APPROVED EQUAL

S2 TYPE IIIA - 48" MANHOLE



SECTION A-A

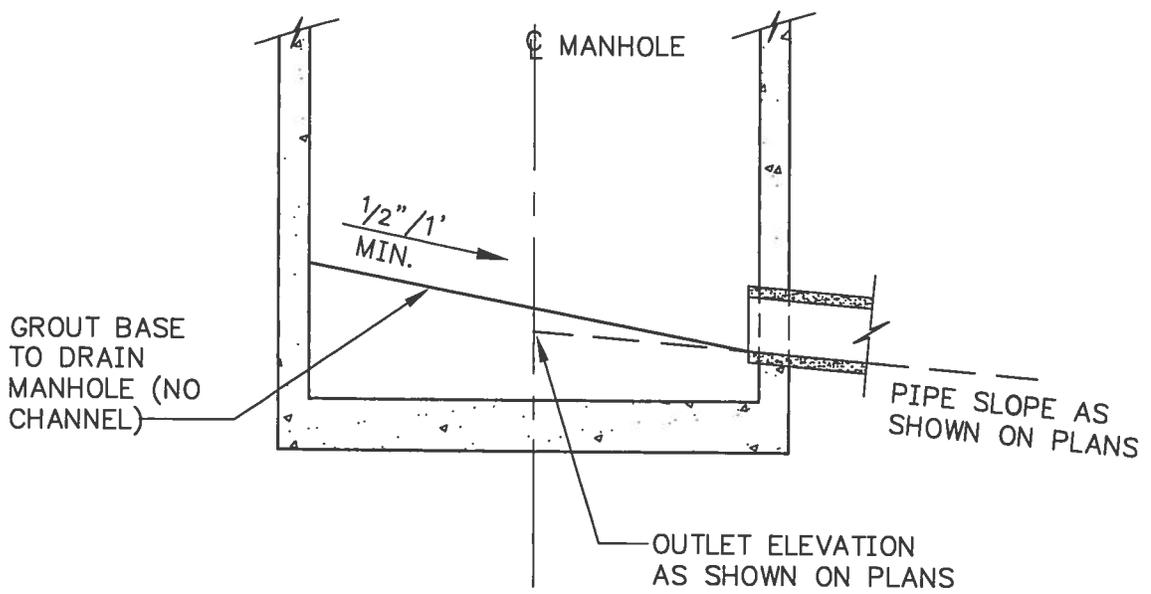


SECTION B-B

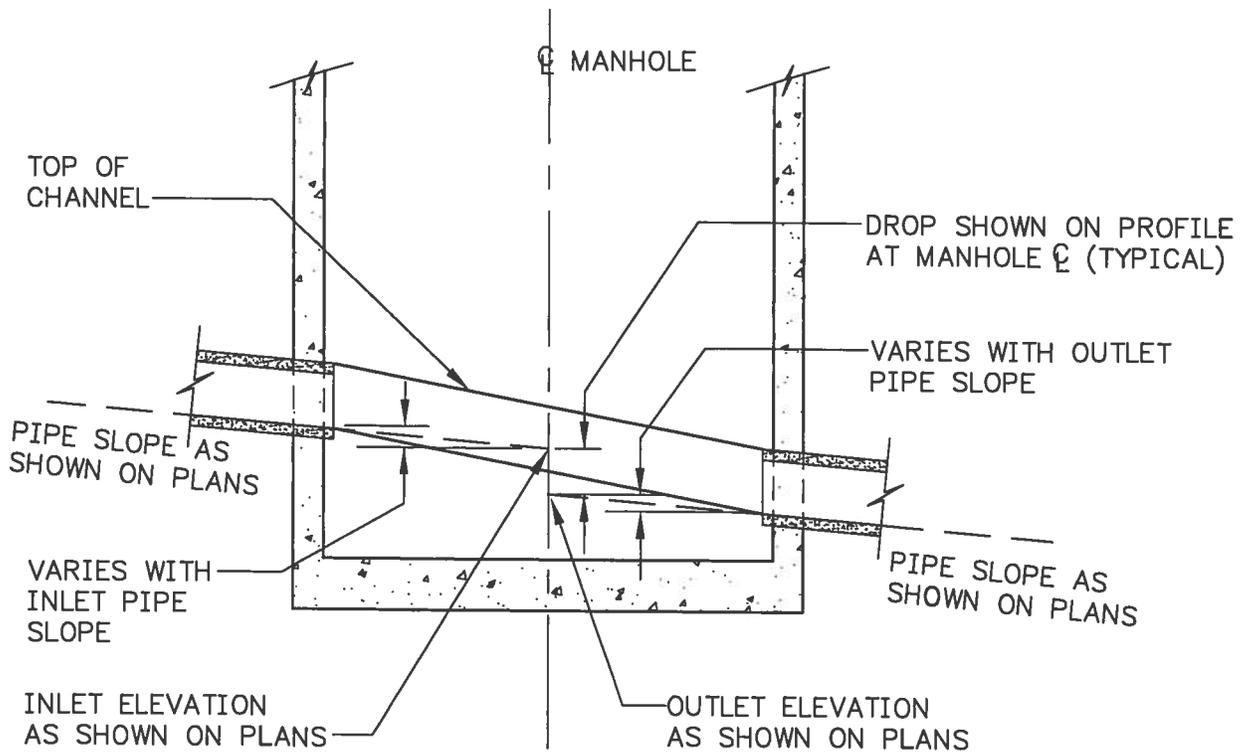
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE 7/8" LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME, SS HEX CAP SCREWS
5. SEE SPECIFICATION O2605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

S3 MANHOLE FRAME AND COVER

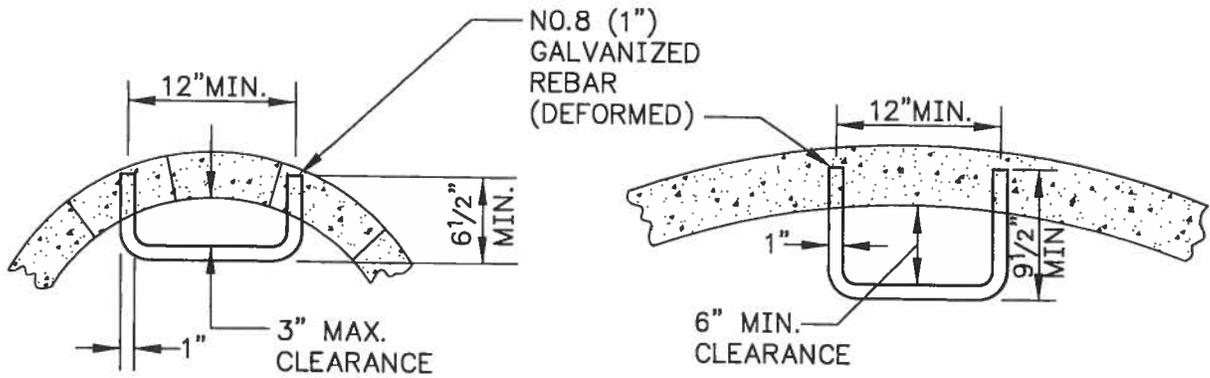


TERMINAL MANHOLE



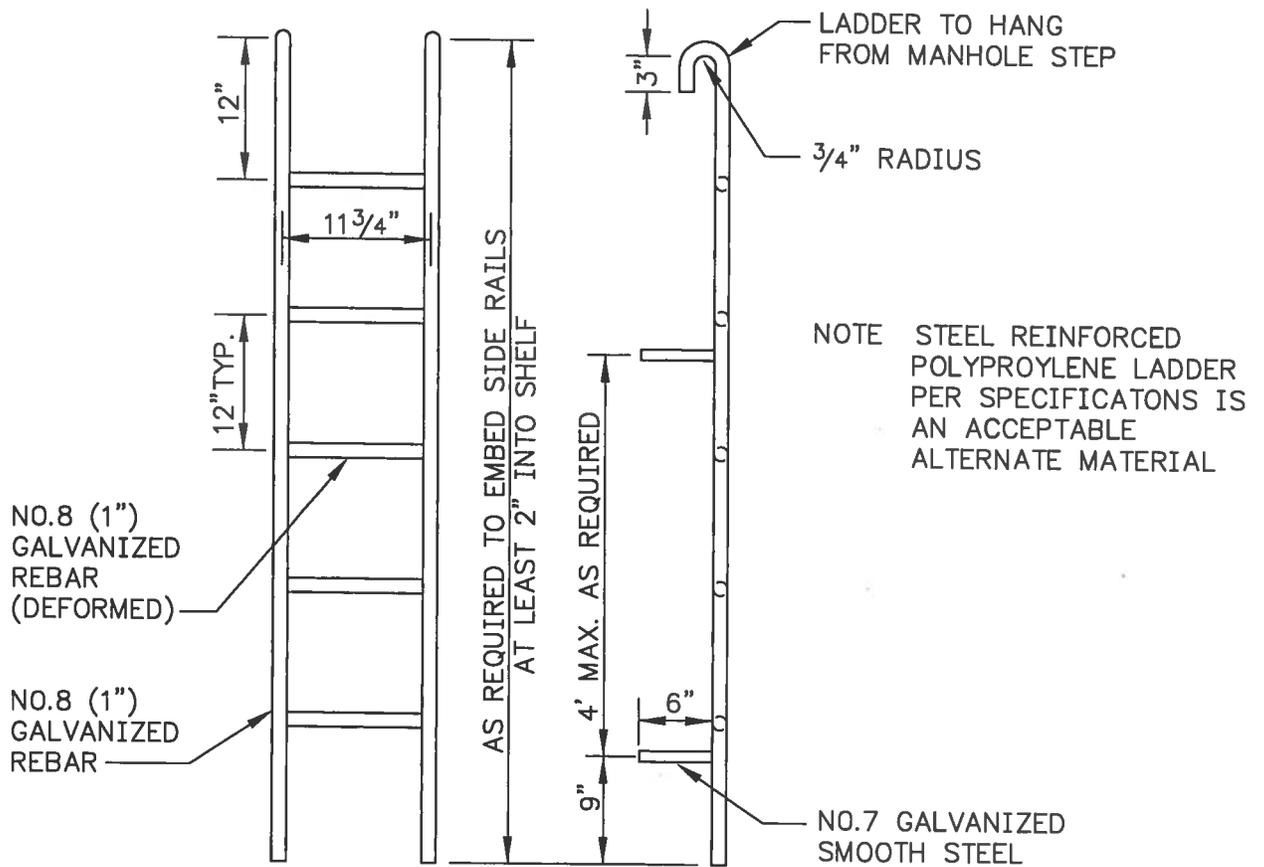
MAIN-LINE MANHOLE

S4 MANHOLE CHANNELING



ADJUSTMENT RING HAND HOLD

TYPICAL MANHOLE STEP

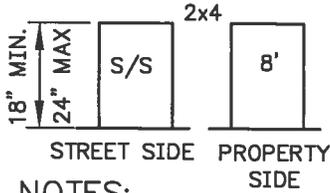
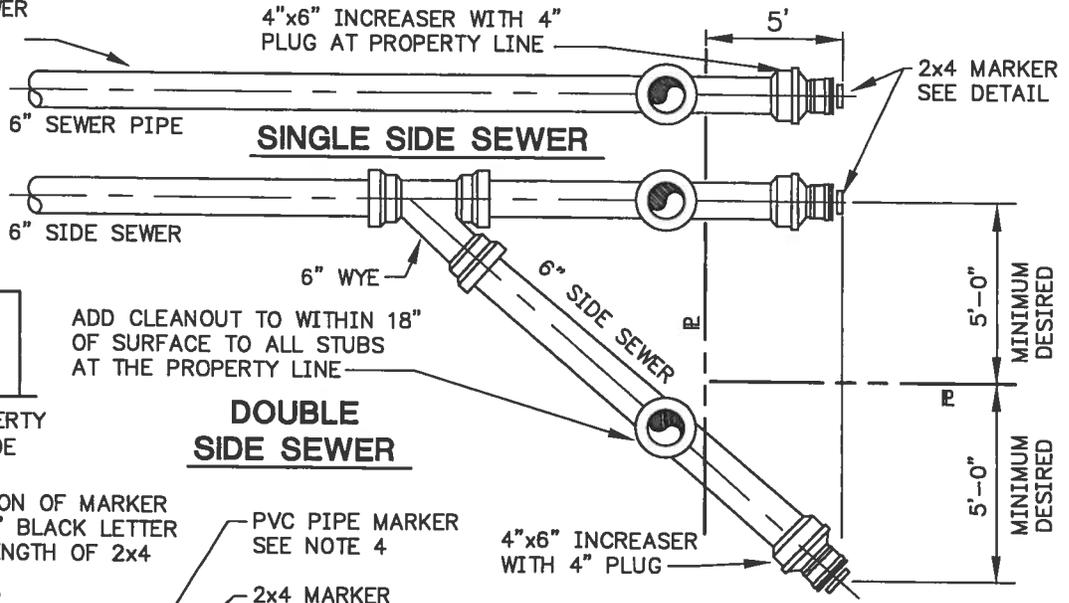


PREFABRICATED LADDER

NOTE STEEL REINFORCED
POLYPROPYLENE LADDER
PER SPECIFICATONS IS
AN ACCEPTABLE
ALTERNATE MATERIAL

S5 MANHOLE STEPS AND LADDER

LOCATION OF SIDE SEWER TO BE SET IN FIELD



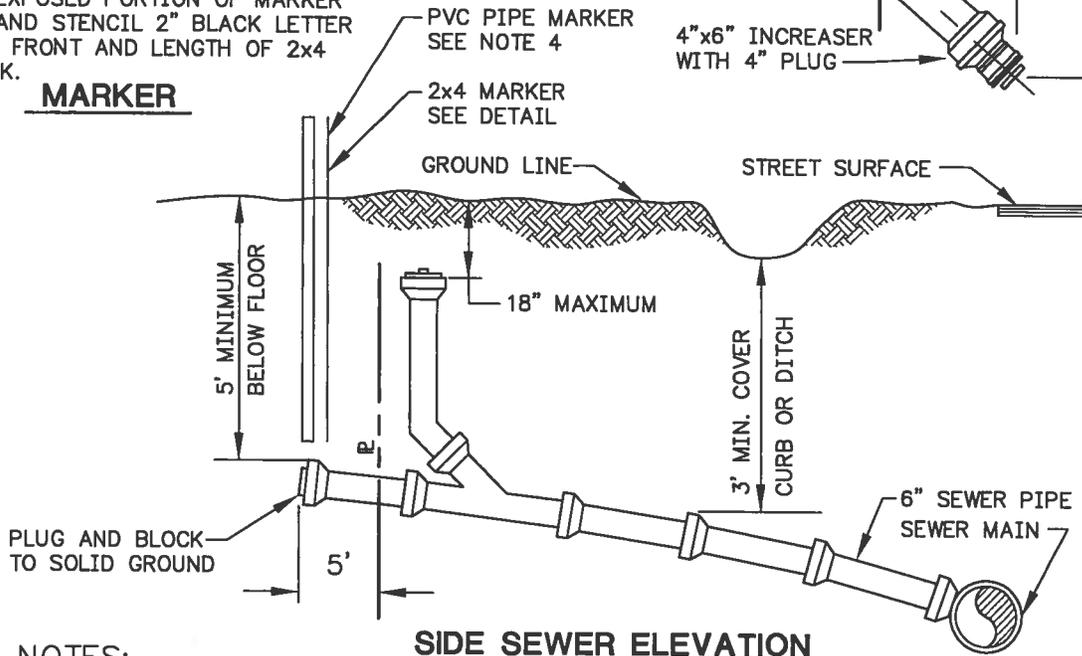
ADD CLEANOUT TO WITHIN 18" OF SURFACE TO ALL STUBS AT THE PROPERTY LINE

DOUBLE SIDE SEWER

NOTES:

PAINT EXPOSED PORTION OF MARKER WHITE AND STENCIL 2" BLACK LETTER S/S ON FRONT AND LENGTH OF 2x4 ON BACK.

MARKER

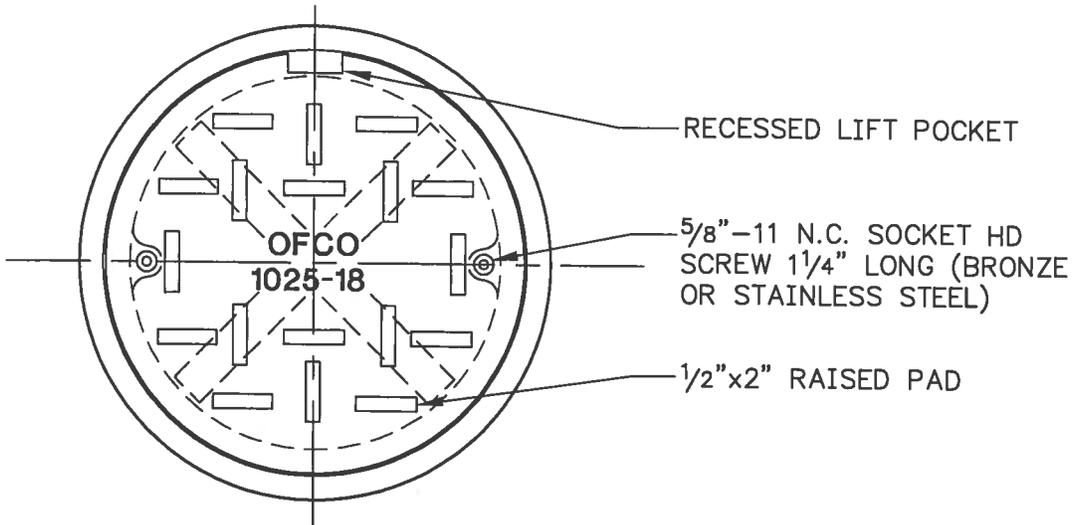


NOTES:

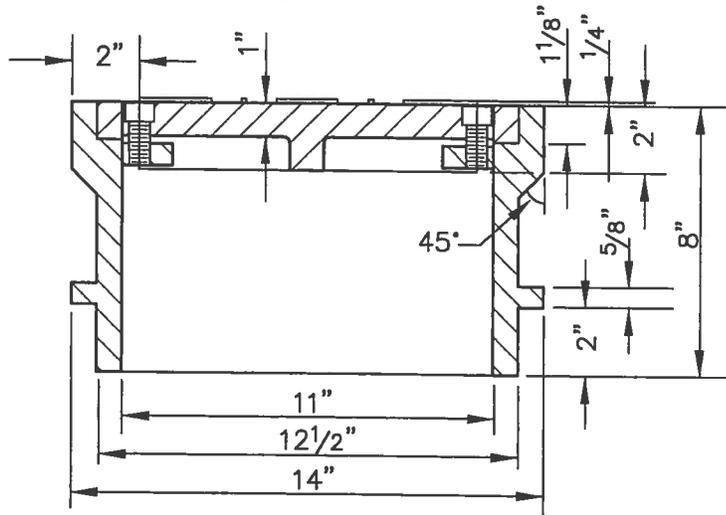
SIDE SEWER ELEVATION

1. UNLESS OTHERWISE SHOWN ON PLAN, SIDE SEWER SHALL BE SLOPED 2% UP FROM SEWER LINE OR SHALL BE MIN. 5' COVER AT PROPERTY LINE OR 3.5' LOWER THAN THE LOWEST HOUSE ELEVATION, WHICHEVER IS LOWER.
2. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL
4. MINIMUM SLOPE = 2%
5. A 1 1/4" WHITE PVC PIPE, ASTM 2241 SDR 21 200 PSI SHALL BE PLACED VERTICALLY AT THE END OF EACH STUB AND SHALL RISE TWO FEET ABOVE FINISH GRADE LEVEL OR AS APPROVED BY SWSSD. BOTH ENDS OF THE PVC PIPE SHALL HAVE CAPS GLUED ON AND THE PIPE INTERIOR KEPT CLEAN FOR THE PURPOSE OF FUTURE DEPTH MEASUREMENT.
6. PIPE SHALL BE PVC ASTM D3034.

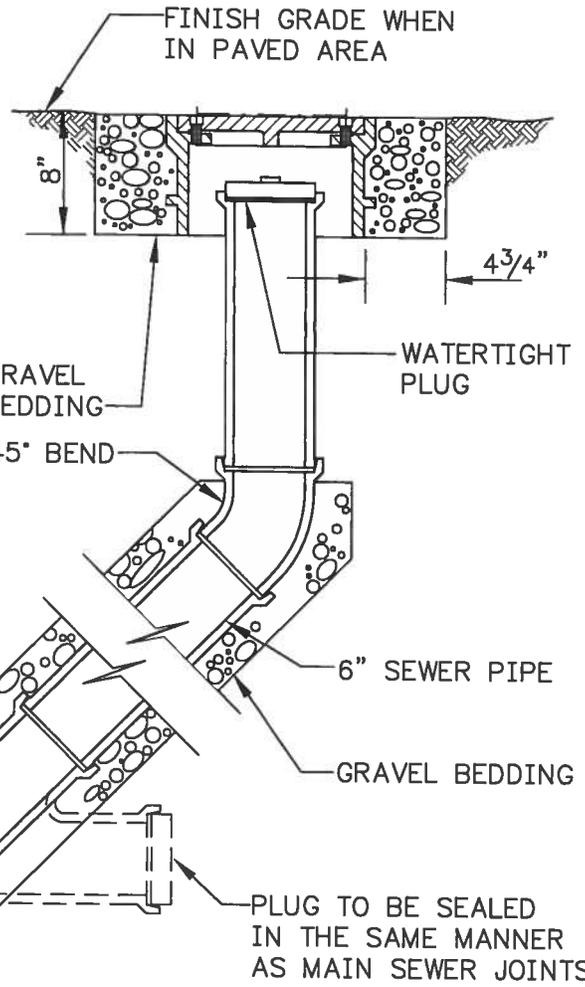
S6 STREET SIDE SEWER



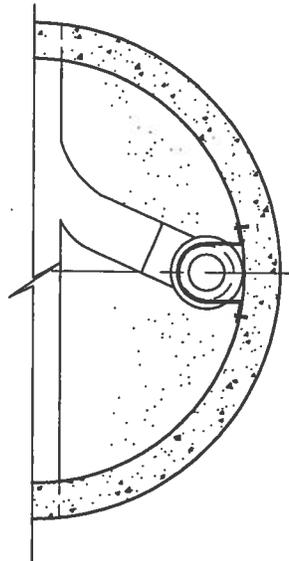
PLAN



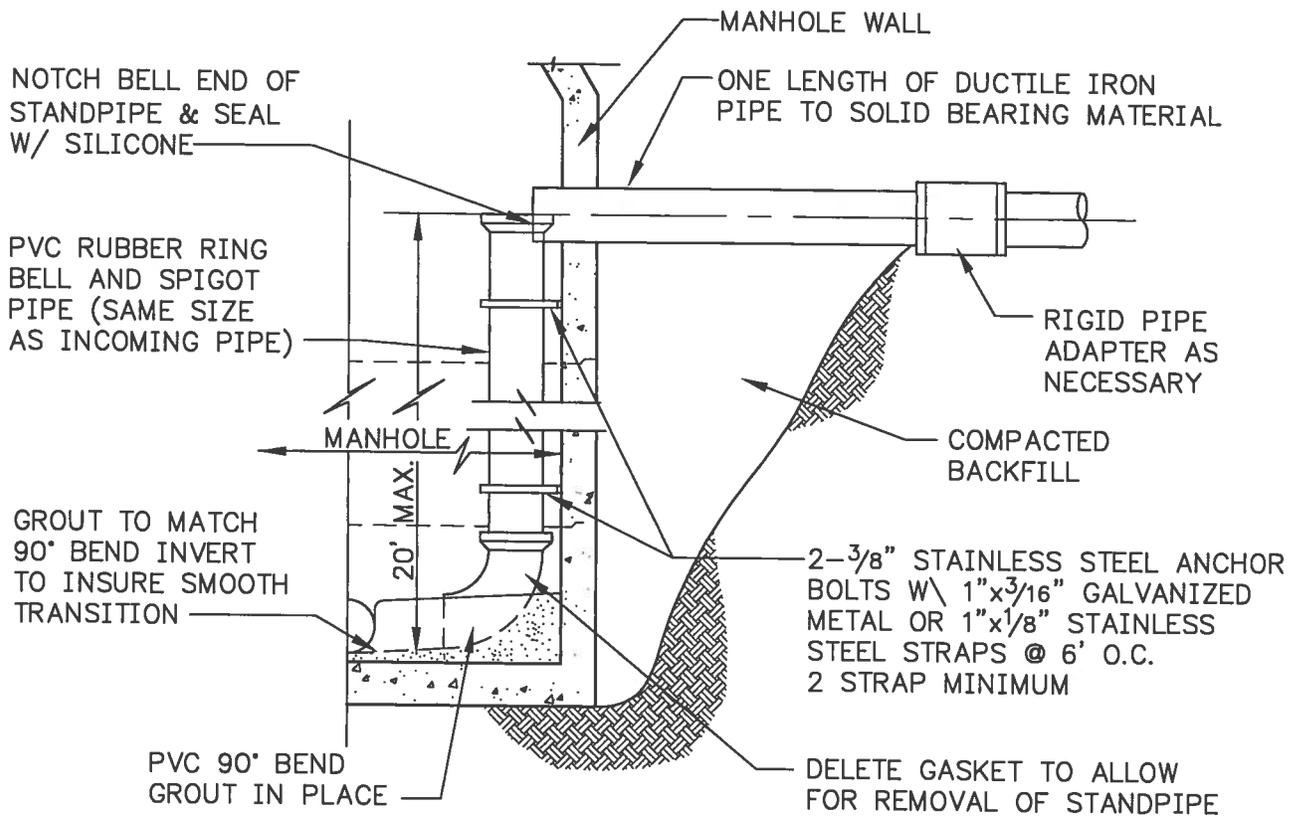
**ELEVATION
CAST IRON RING AND COVER**



S7 SEWER CLEANOUT



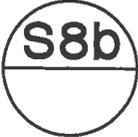
PLAN

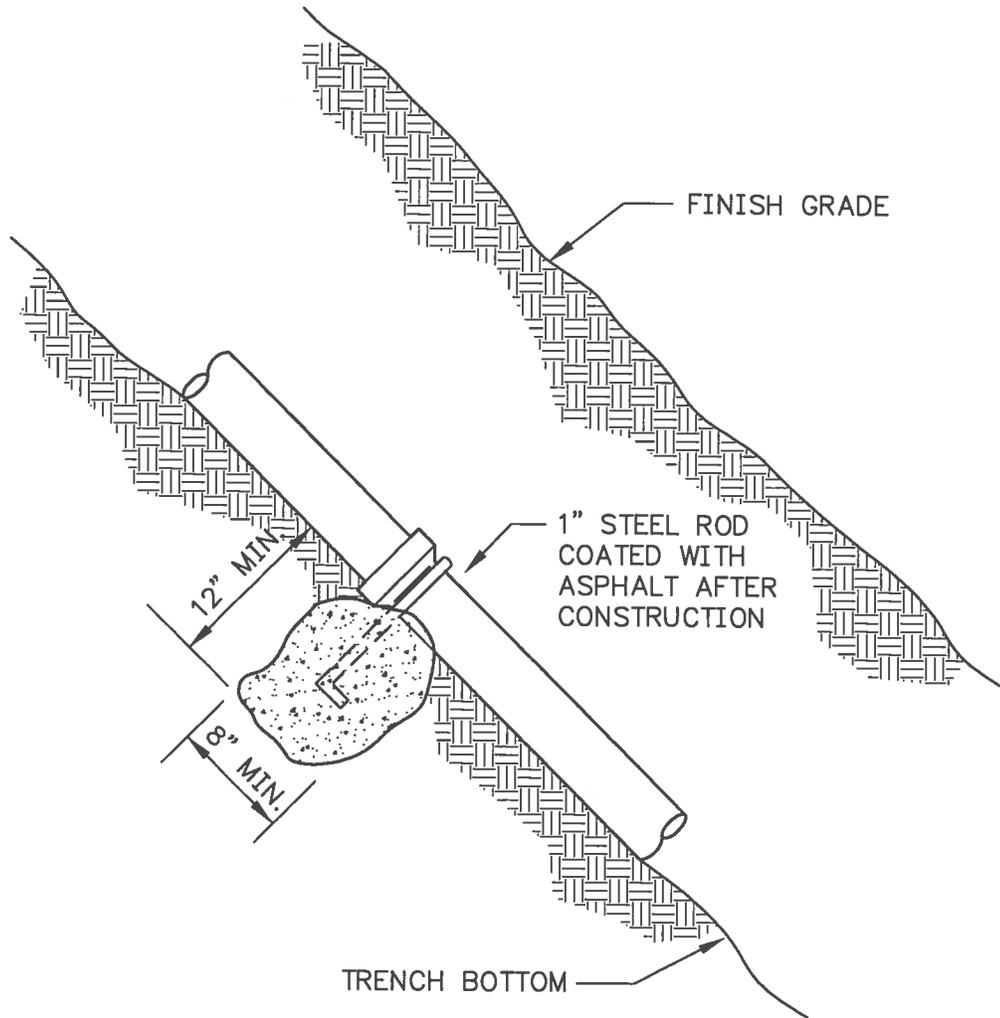


ELEVATION

NOTE: THIS ASSEMBLY TO BE USED ONLY WITH SPECIFIC AUTHORIZATION

**INSIDE DROP
MANHOLE CONNECTION**

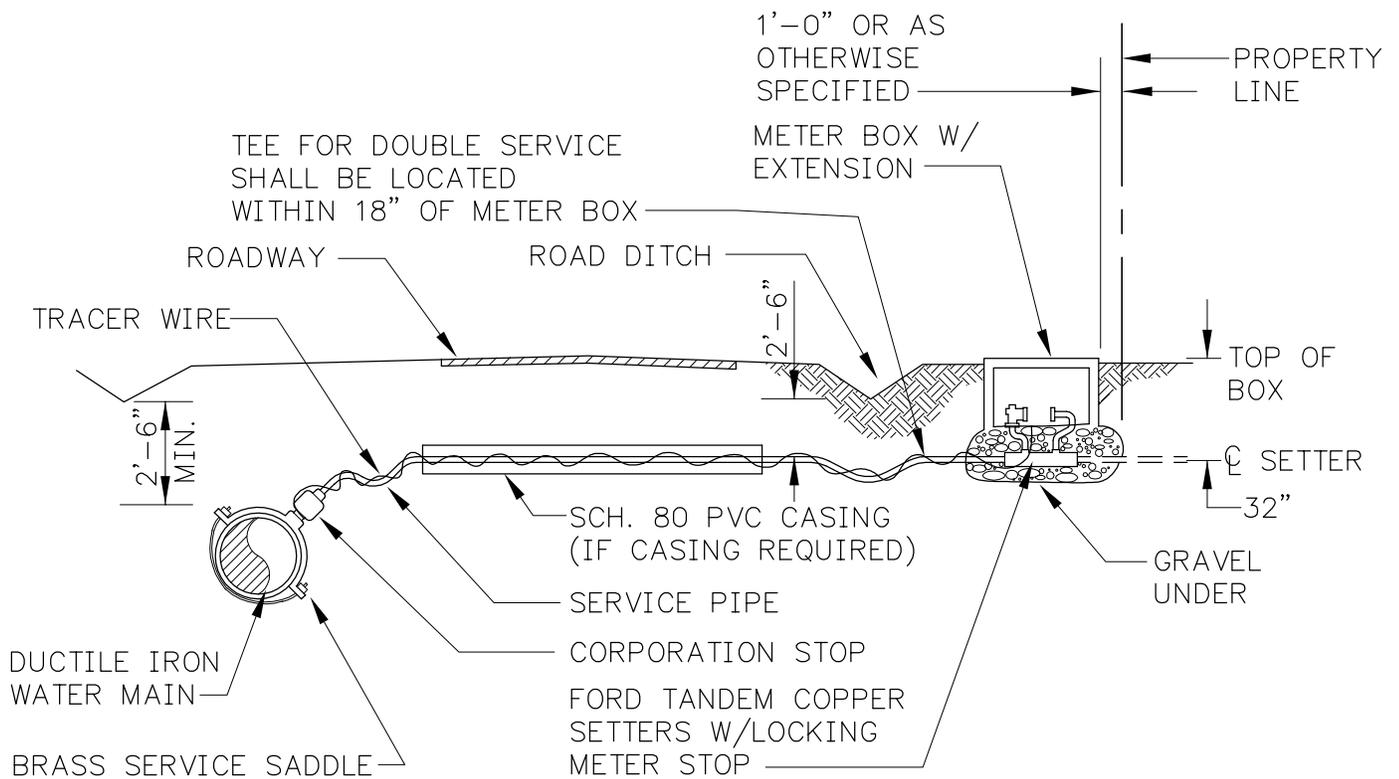




NOTES:

1. POUR BLOCKING AGAINST UNDISTURBED SOIL.
2. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
3. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20-30%, 20' ON GRADES OF 35-50%, AND 16' ON GRADES OVER 50%.

S9 PIPE ANCHOR



PARTS FOR SINGLE SERVICE

- 1- $\frac{3}{4}$ " IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 1- $\frac{3}{4}$ " BRASS MALE x INSERT ADAPTER (FORD PTM-1)
- 1- $\frac{3}{4}$ " x 12" COPPER SETTER WITH LOCKING METER STOP AND DUAL CHECK VALVE (FORD VBHC72-12W-11-33 DP x DP)
- 1-PLASTIC METER BOX (CARSON 1419)
- 1-PLASTIC METER BOX EXTENSION (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

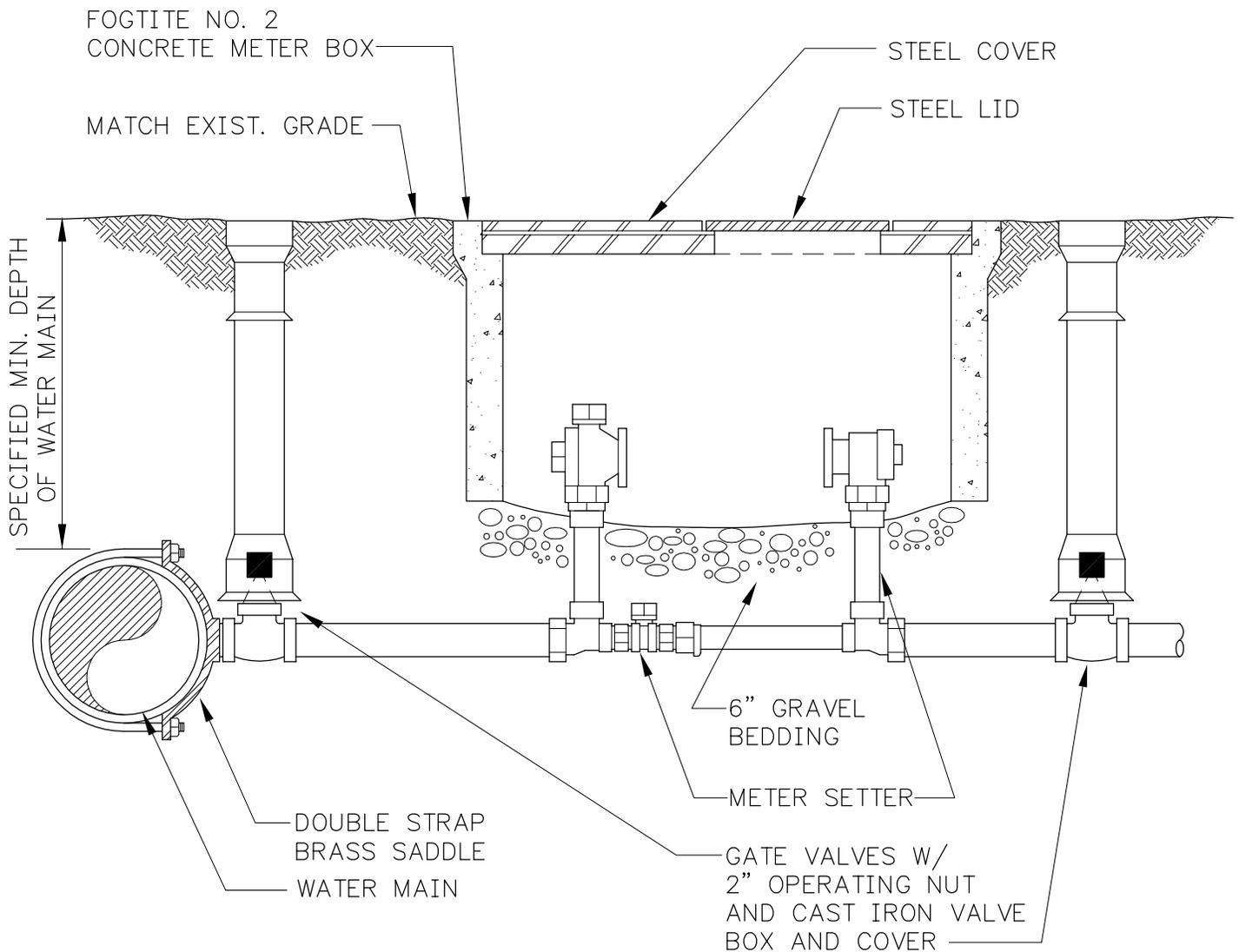
PARTS FOR DOUBLE SERVICE

- 1-1" IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1-1" BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1-1" BRASS GRIPPER TEE $\frac{3}{4}$ " x $\frac{3}{4}$ " x 1" (FORD T666-334G)
- 2- $\frac{3}{4}$ " BRASS STREET ELLS
- 2- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 2- $\frac{3}{4}$ " x 12" COPPER SETTERS WITH LOCKING METER STOPS AND DUAL CHECK VALVES (FORD VBHC72-12W-11-33 DP x DP)
- 2- $\frac{3}{4}$ " BRASS MIPT x INSERT ADAPTERS (FORD PTM-1)
- 2-PLASTIC METER BOXES (CARSON 1419)
- 2-PLASTIC METER BOX EXTENSIONS (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

NOTES:

1. WATER SERVICE LINE SHALL BE 200 PSI IPS PE 3408, ASTM-2239 (DRISCO ULTRA-HI MOLECULAR PE-3408)
2. USE BRASS DOUBLE STRAP SADDLE ON MAINS 10" AND LARGER.
3. WHERE FORD MATERIALS ARE CALLED OUT, EQUAL PRODUCTS ARE ACCEPTABLE

W1
3/4" AND 1" WATER SERVICE

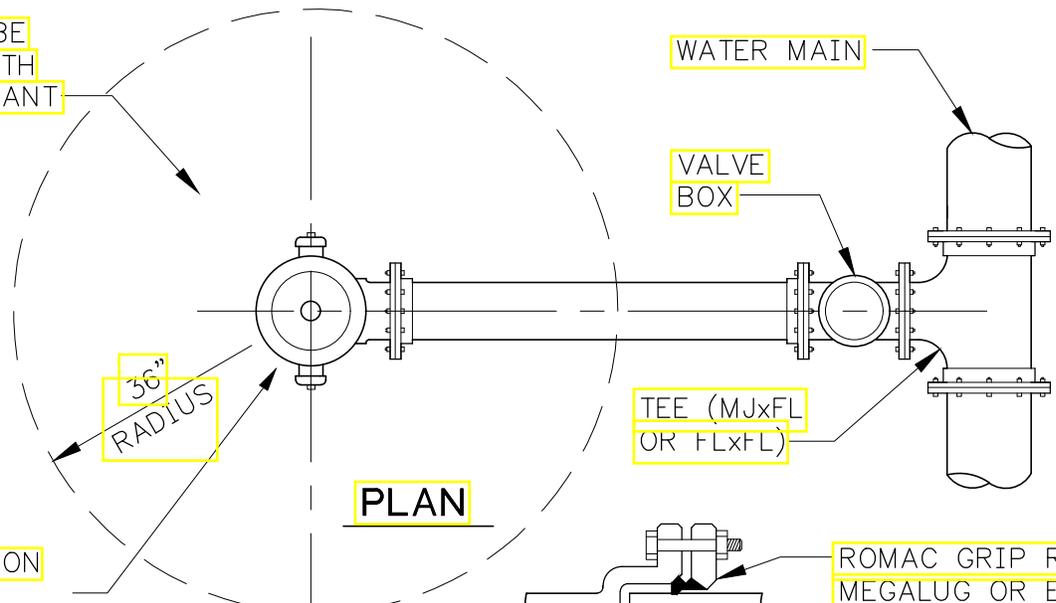


PARTS FOR 1½" AND 2" SERVICE

- 1 – DOUBLE STRAP BRASS SADDLE WITH BRONZE STRAP
- 4 – FORD PACKJOINT COUPLINGS/PLASTIC PIPE
- SETTERS: 1½" FORD VBH6612BX LENGTH WITH LOCKING BYPASS
2" FORD VBH7712BX LENGTH WITH LOCKING BYPASS
(SETTER LENGTH WILL BE DETERMINED BY TOWN)
- CONCRETE METER BOX WITH STEEL COVER AND METER LID
FOGTITE NO. 2
- 2 – GATE VALVES: 2 INCH-RESILIENT WEDGE SEATED (APWA C-509)
1½ INCH-BRASS
- 2 – CAST IRON VALVE BOX WITH COVER
- WATER SERVICE LINE 200 PSI IPS PE 3408, ASTM D-2239

W2 1½" AND 2" WATER SERVICE

SURFACE TO BE GRADED SMOOTH AROUND HYDRANT



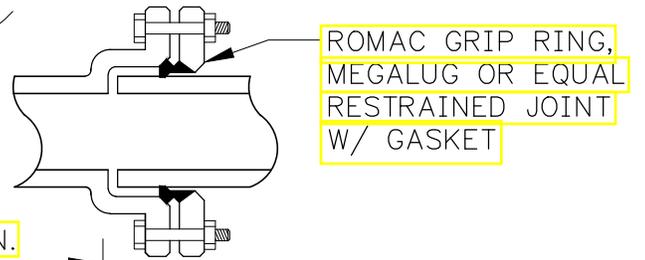
WATER MAIN

VALVE BOX

TEE (MJxFL OR FLxFL)

PLAN

HYDRANT:
CLOW MEDALLION
SERIES 2545



ROMAC GRIP RING, MEGALUG OR EQUAL RESTRAINED JOINT W/ GASKET

DETAIL A

STORZ STYLE NO. S-37 5" RIGID FEMALE ADAPTER (DO NOT PAINT)

PROPERTY LINE

36" MIN.

36" MIN.

(UNLESS DIRECTED OTHERWISE)

(6' MIN. FROM TRAVEL LANE)

BREAK AWAY FLANGE

3" MIN.
6" MAX.

SLOPE

18" MIN.
24" MAX.

FACE OF CURB

CAST IRON VALVE BOX AND COVER

SPOOL LENGTH TO SUIT TRENCH DEPTH

VARIABLE
(50' MAX.)

WATER MAIN

POLYWRAP SPOOL

15LB. ASPHALTIC FELT OR FILTER FABRIC

6 CU. FT. MIN. GRAVEL POCKET

6" GATE VALVE (FLxMJ)

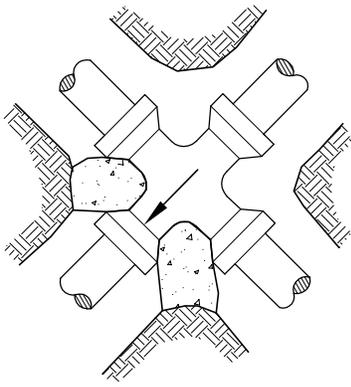
SOLID CONCRETE BEARING BLOCK 12"x12"x4" MIN. SIZE

6" DUCTILE IRON PIPE SPOOL W/ POLYWRAP AND ROMAC GRIP RINGS, MEGALUGS OR EQUAL. (RESTRAIN ALL JOINTS) SEE DETAIL A

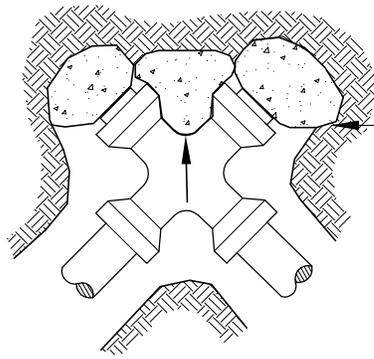
ELEVATION

W3

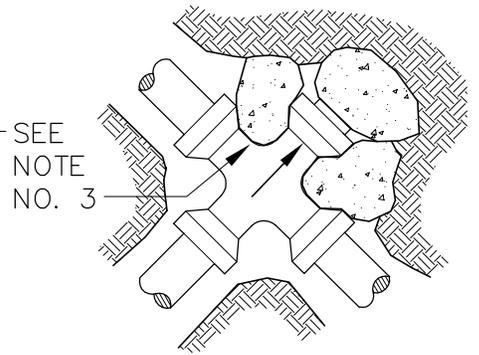
FIRE HYDRANT ASSEMBLY



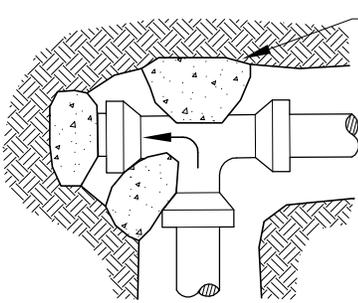
UNBALANCED CROSS



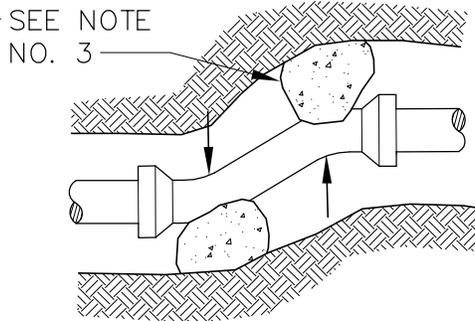
PLUGGED CROSS



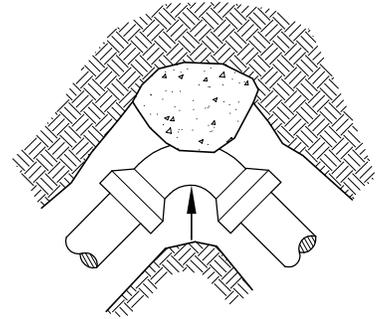
PLUGGED CROSS



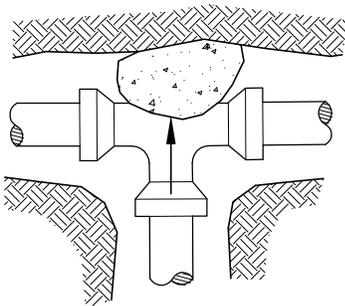
PLUGGED TEE



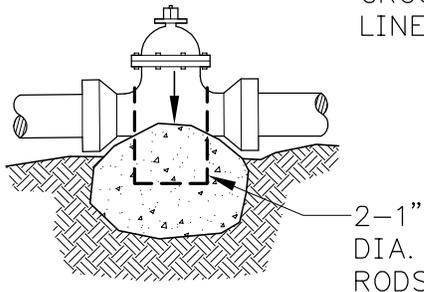
OFFSET



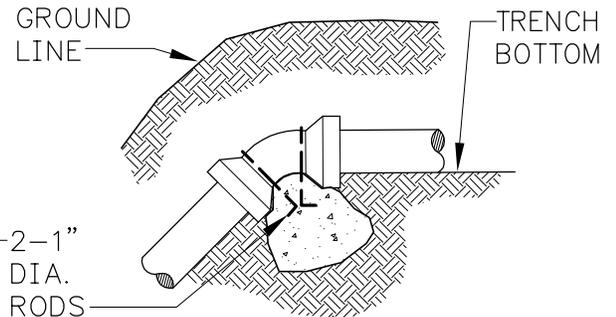
HORIZONTAL BEND



TEE



VALVE

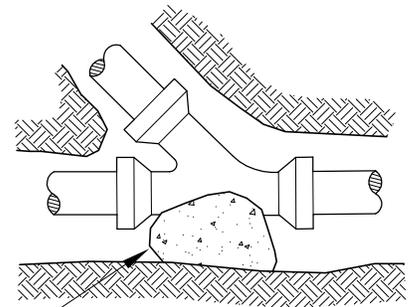


VERTICAL BEND

NOTES:

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITION AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. BLOCKING REQUIRED IF PLUGS NOT SECURED BY BOLTING OR ADEQUATE STRAPS.

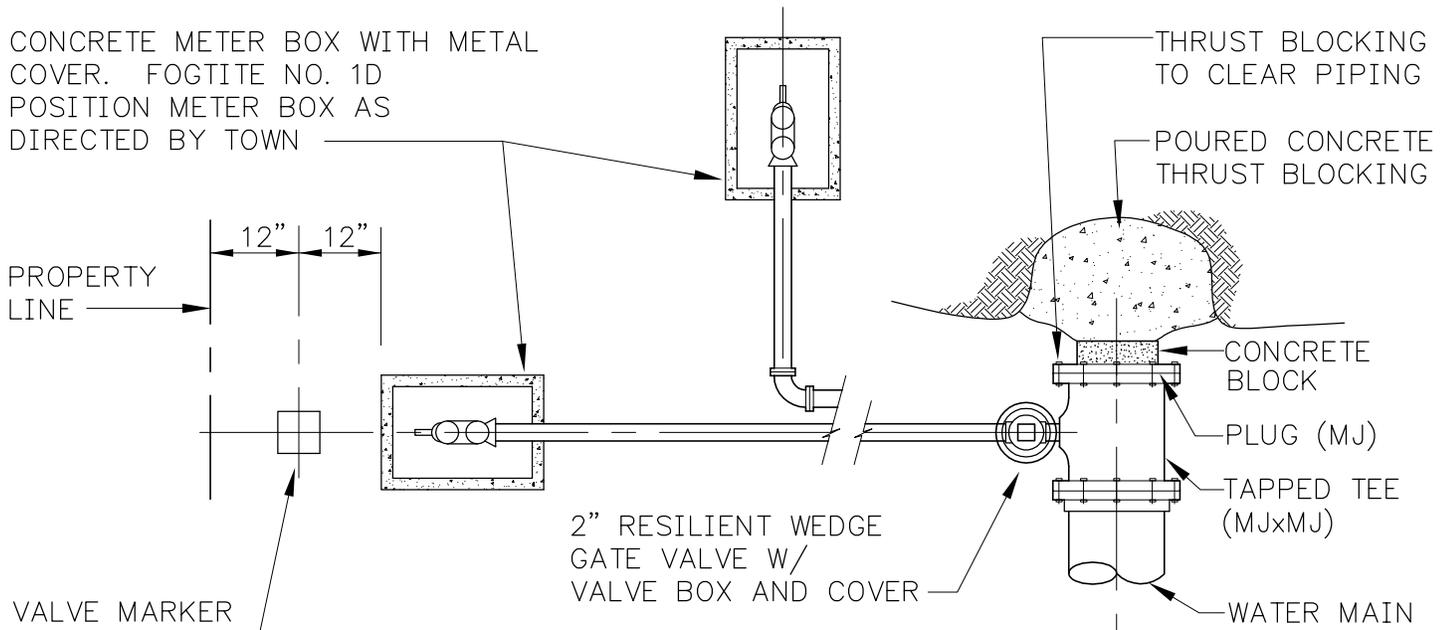
SEE NOTE NO. 3



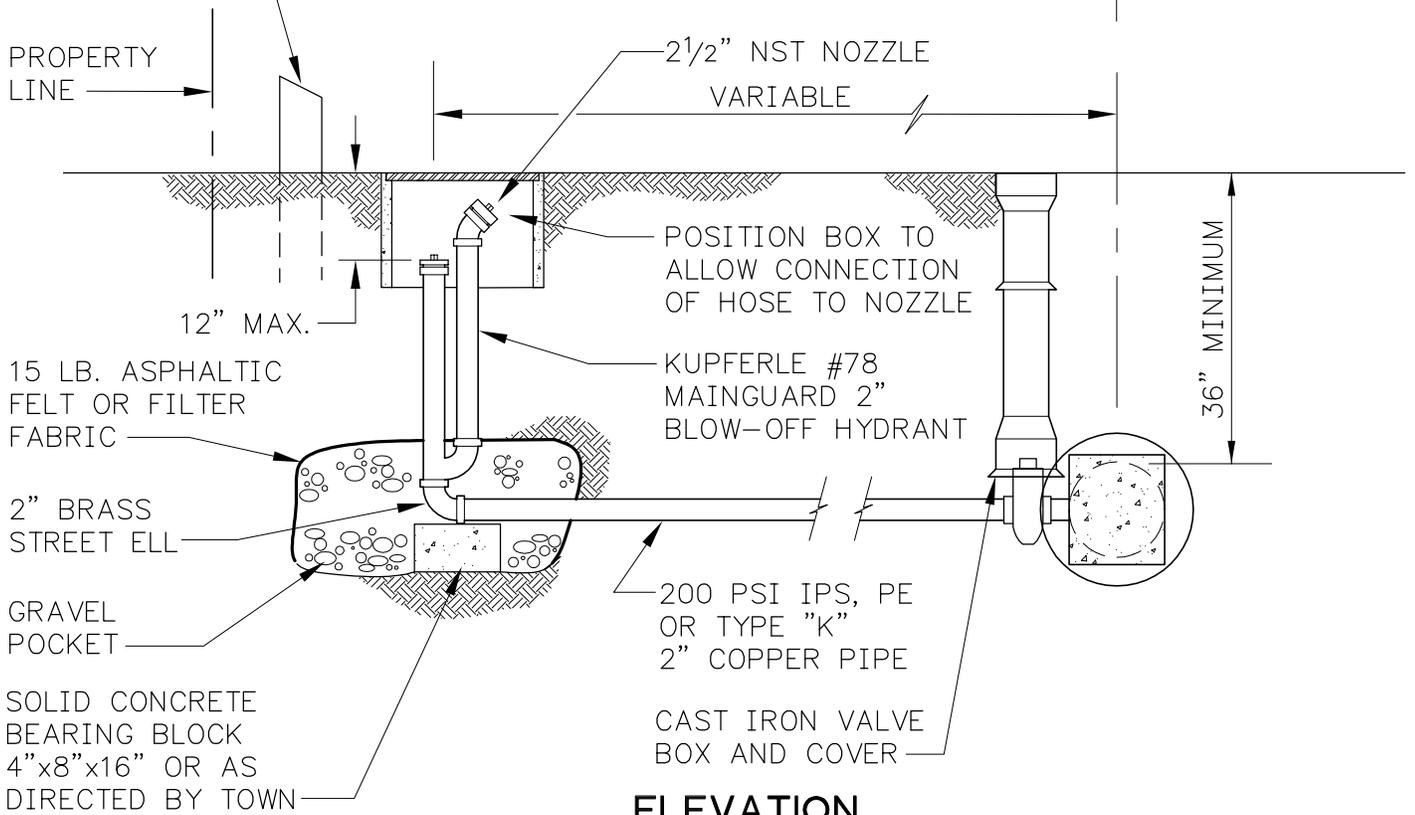
"Y" BRANCH



CONCRETE THRUST BLOCKING



PLAN

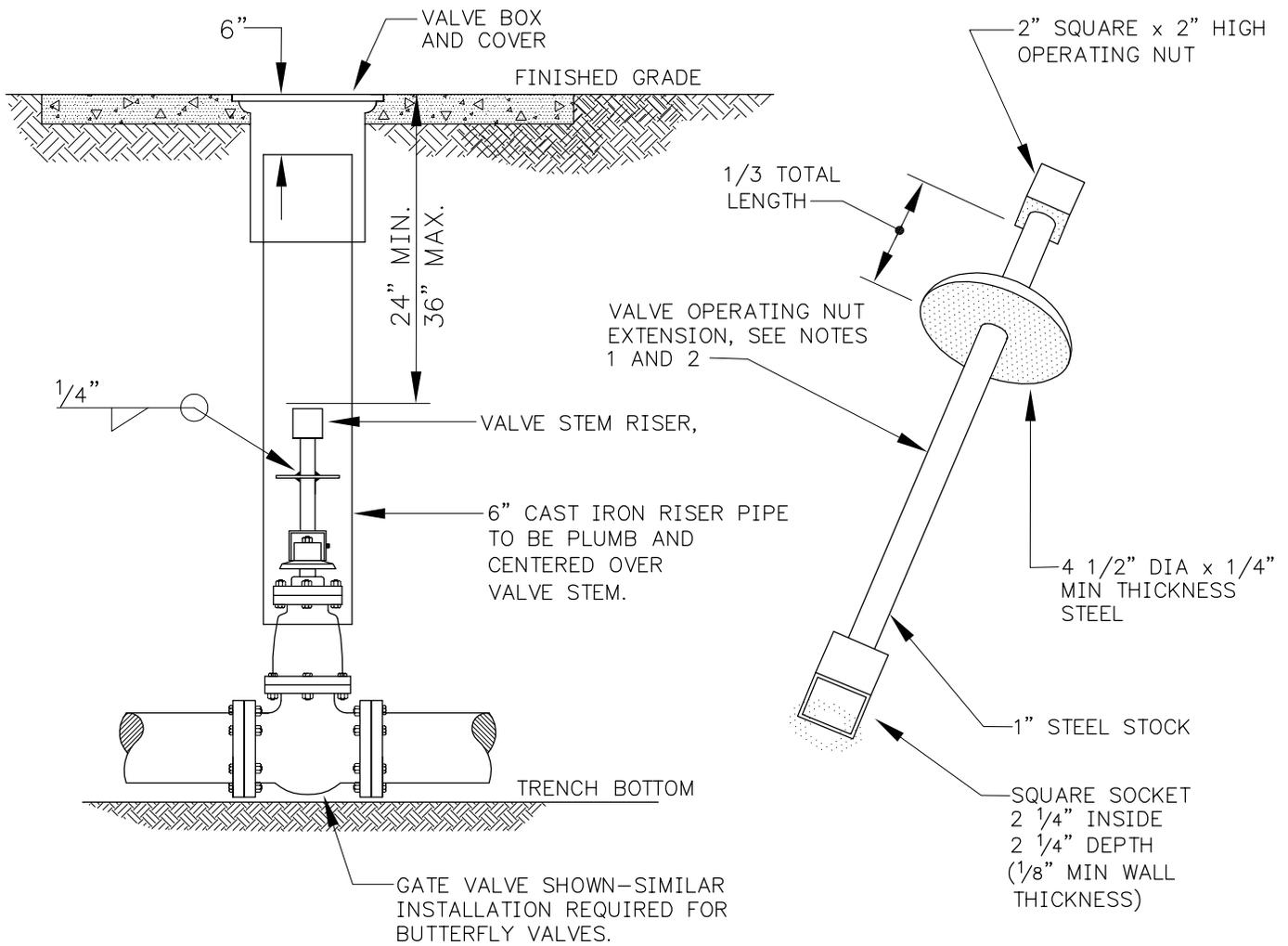


ELEVATION

NOTES:

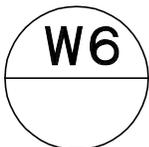
1. PAINT PIPE THREADS WITH ASPHALT PAINT AFTER ASSEMBLY.
2. VALVE AND ALL FITTINGS TO BE BRASS.
3. PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
4. PAINT VALVE MARKER POST PER TOWN REQUIREMENTS.

W5 BLOWOFF ASSEMBLY

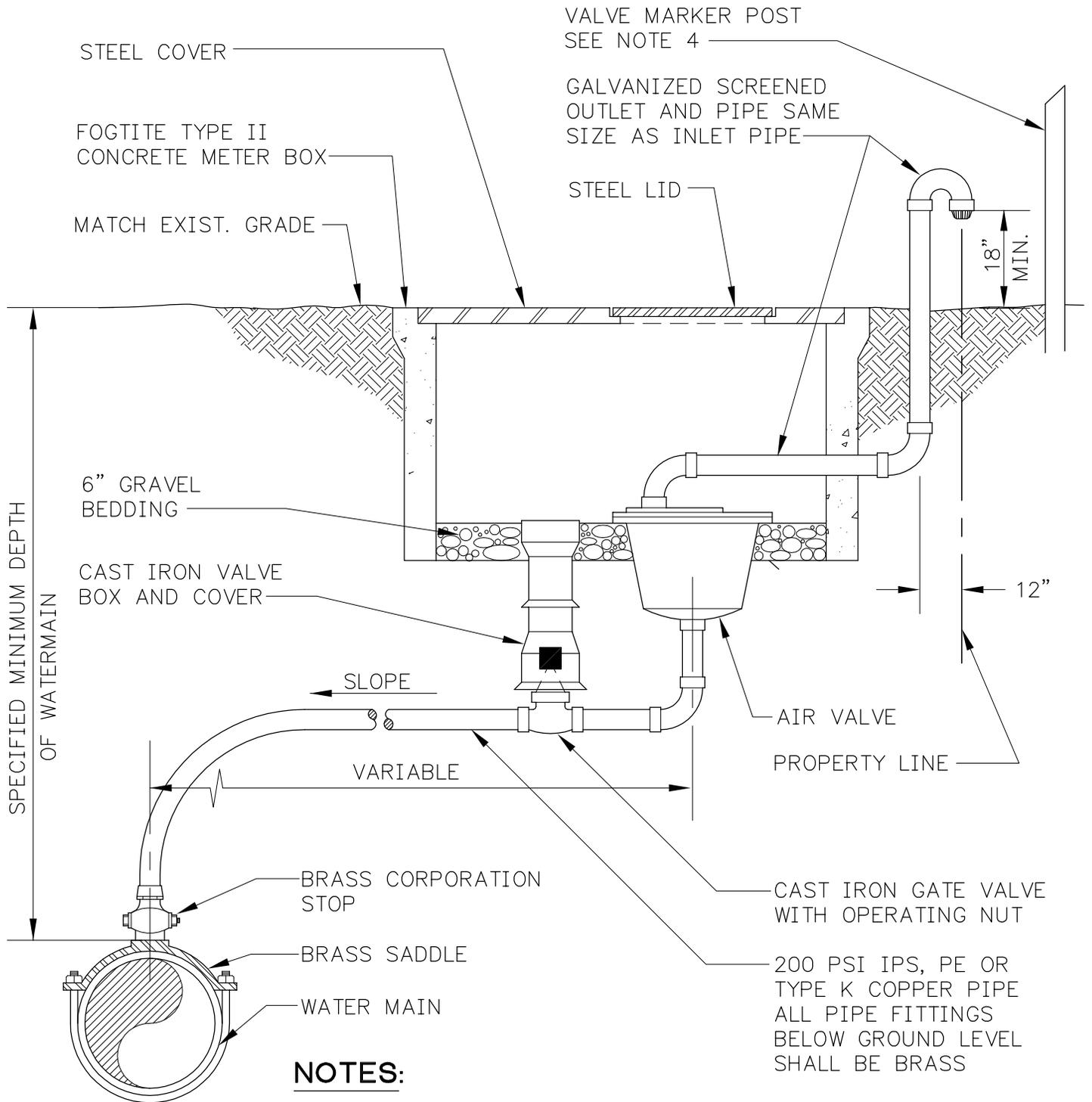


NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.



W6 VALVE OPERATING NUT EXTENSION



NOTES:

1. VALVE AND PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. VALVE MARKER POST TO BE PAINTED PER TOWN STANDARD. TOWN TO DETERMINE LOCATION.

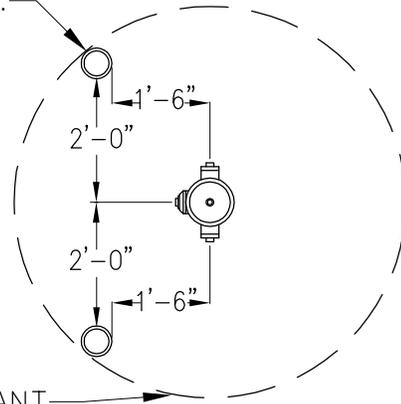
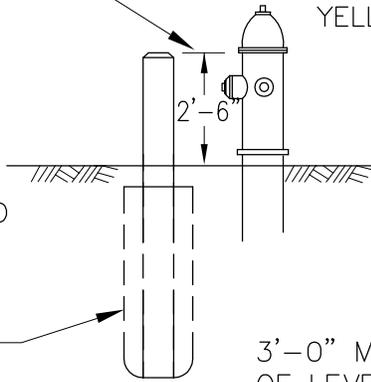


AIR RELEASE VALVE ASSEMBLY

LEVEL WITH BONNET
FLANGE OF HYDRANT

HYDRANT GUARD POST SHALL BE 9" DIA
BY 6" LONG PRECAST CONCRETE POST
EQUAL TO FOG-TITE METER SEAL CO.
PAINT WITH TWO COATS OSHA SAFETY
YELLOW, ENAMEL.

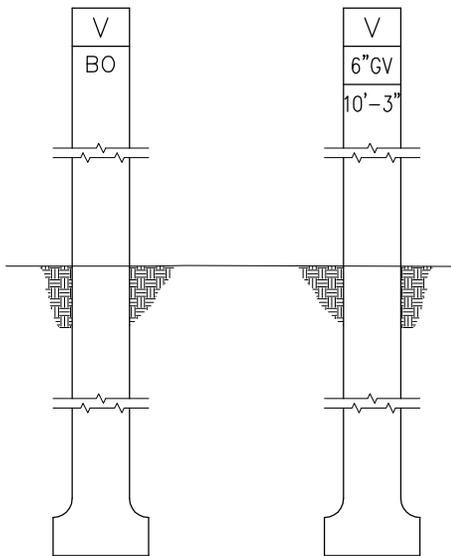
CONCRETE BACKFILL
TO 6" FROM GROUND
WHERE SPECIFIED.
ARTH BACKFILL
COMPACTED IN 6"
LAYERS ELSEWHERE.



ELEVATION

PLAN

FIRE HYDRANT GUARD POST



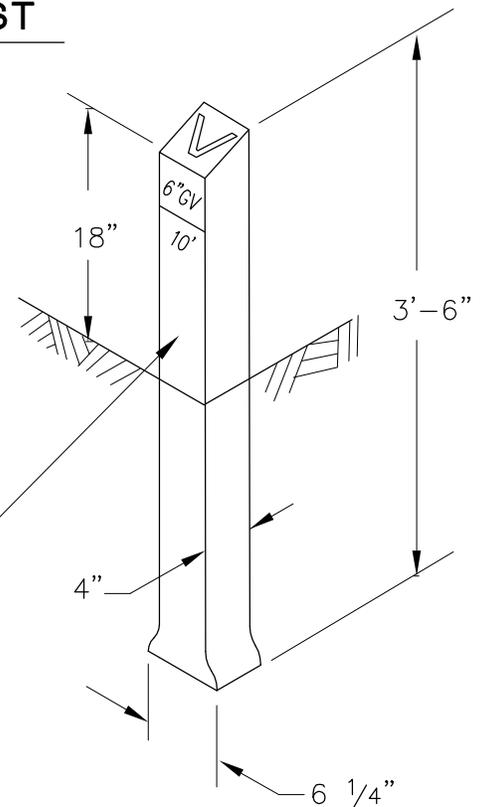
FRONT VIEW

FRONT VIEW

(FOR BLOW-OFF
ASSEMBLY)

(FOR GATE VALVE)

VALVE MARKER POST
SHALL BE EQUAL TO
FOG-TITE METER CO.
PAINT AS SPECIFIED
FOR HYDRANT GUARD
POST. PAINT TYPE
AND SIZE OF VALVE
AND DISTANCE FROM
THE VALVE MARKER TO
THE VALVE ON THE POST
WITH NEATLY STENCILED
BLACK ENAMEL NUMBERS,
1" IN HEIGHT.

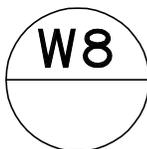


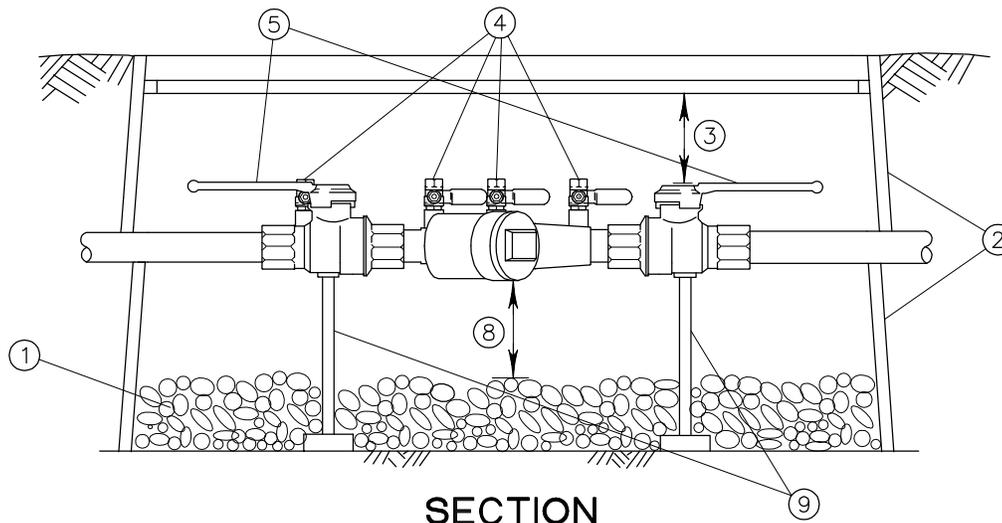
VALVE MARKER POST

NOTES:

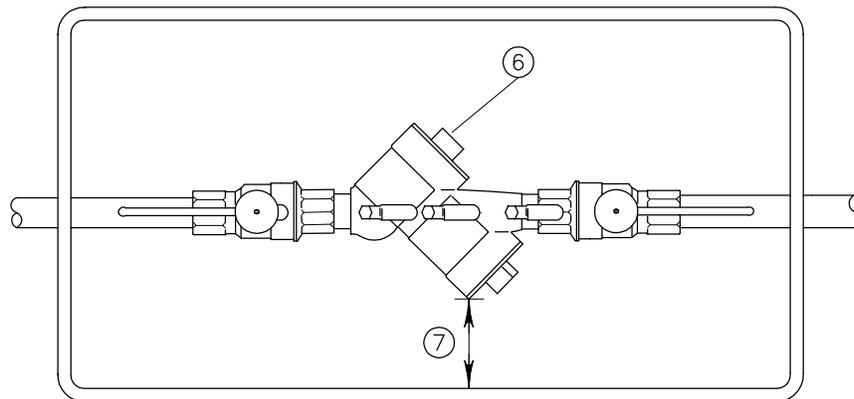
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY THE TOWN.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

**VALVE MARKER POST
HYDRANT GUARD POST**





SECTION

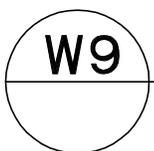


PLAN

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO NO. 2 METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
- ③ A MAXIMUM DISTANCE OF 6" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDE WAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE DEVICE AND THE DRAIN ROCK.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.

GENERAL NOTE

THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION AND ANNUALLY, AND WHEN MOVED OR REPAIRED. ALL INSTALLATION MUST MEET MANUFACTURERS SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.



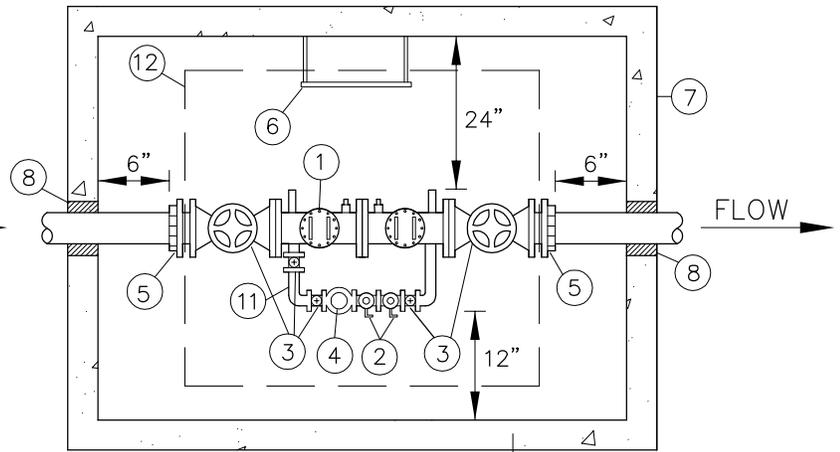
DOUBLE CHECK VALVE ASSEMBLY

NOTES:

1. TOWN WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY TOWN. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE & GATE VALVE REQUIRED ON MAIN.
6. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE W/ DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
7. ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS W/ VEHICULAR TRAFFIC.
9. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.

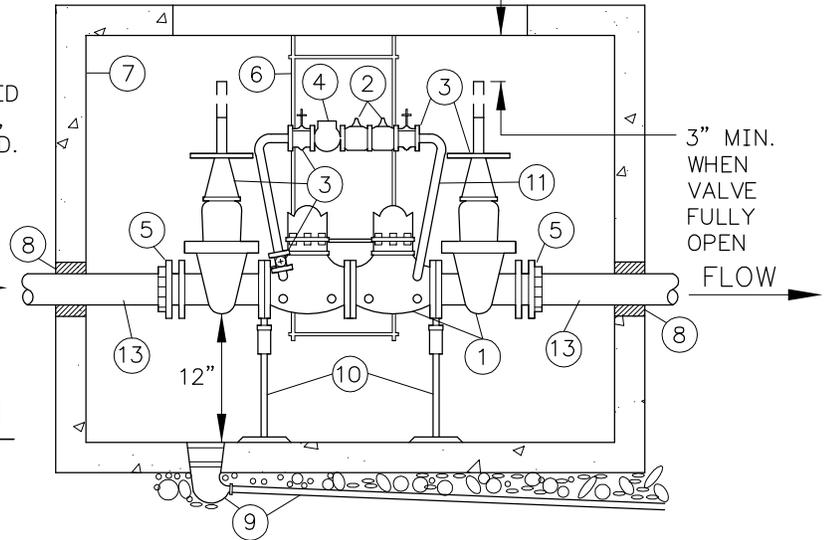
PLAN

FLOW →



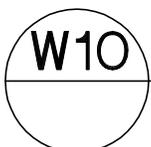
ELEVATION

FLOW →

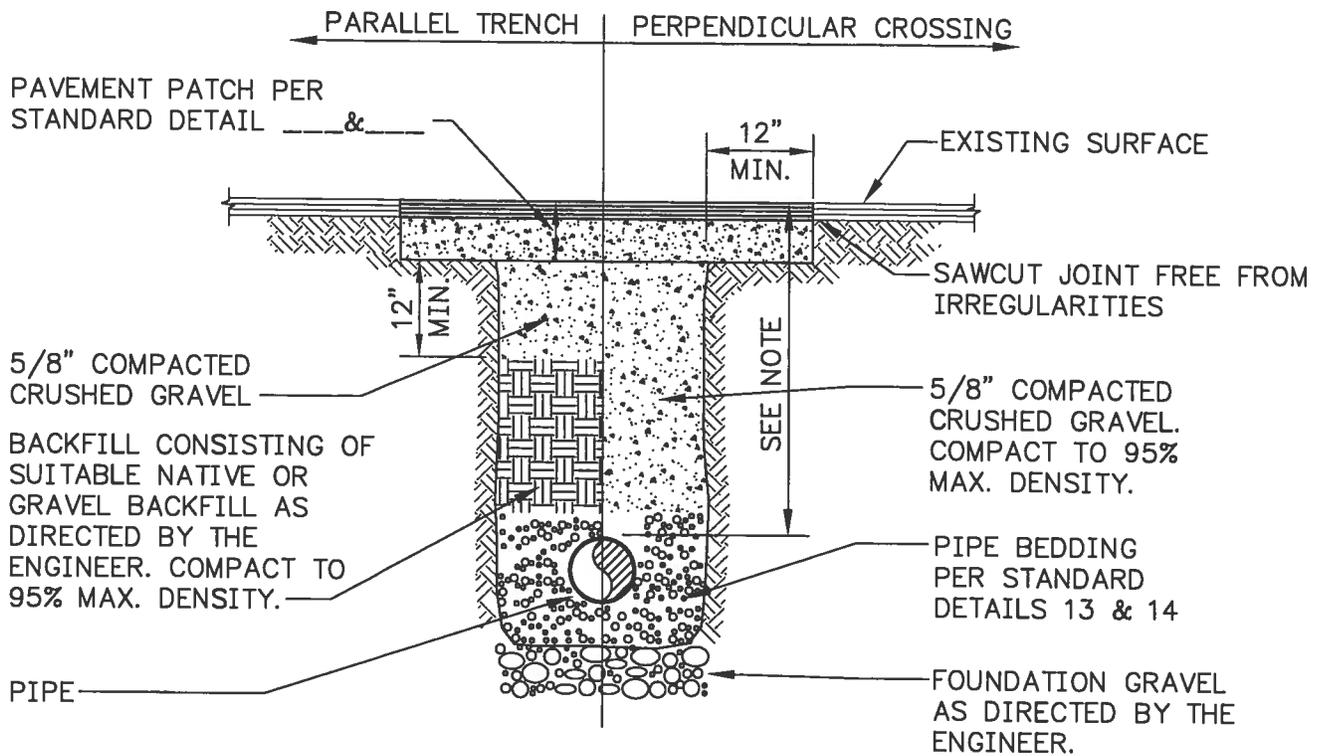


- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED O.S.&Y. VALVES & (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED BALL VALVES & (4) RESILIENT SEATED TEST COCKS.
- ③ EACH VALVE SHALL BE MARKED W/ MODEL NUMBER W/ DESIGNATION OF RESILIENT SEAT, SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED W/ A MIN. OF 4 MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ "TOUCH READ" SYSTEM.
- ⑤ UNI-FLANGE W/ SETSCREWS.
- ⑥ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ⑦ CONCRETE VAULT W/ A MIN. OF 2, 3'x3' ALUM. DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑧ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE W/ WELDED FLANGE OR ANCHOR BLOCKS.
- ⑨ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE.
- ⑩ TWO ADJUSTABLE PIPE STANCHIONS.
- ⑪ ALL PLUMBING FOR BY-PASS TO BE COPPER & BRASS.
- ⑫ ACCESS TO BE CENTERED OVER METER.
- ⑬ CL. 52 D.I., M.J. W/ RETAINER GLANDS.

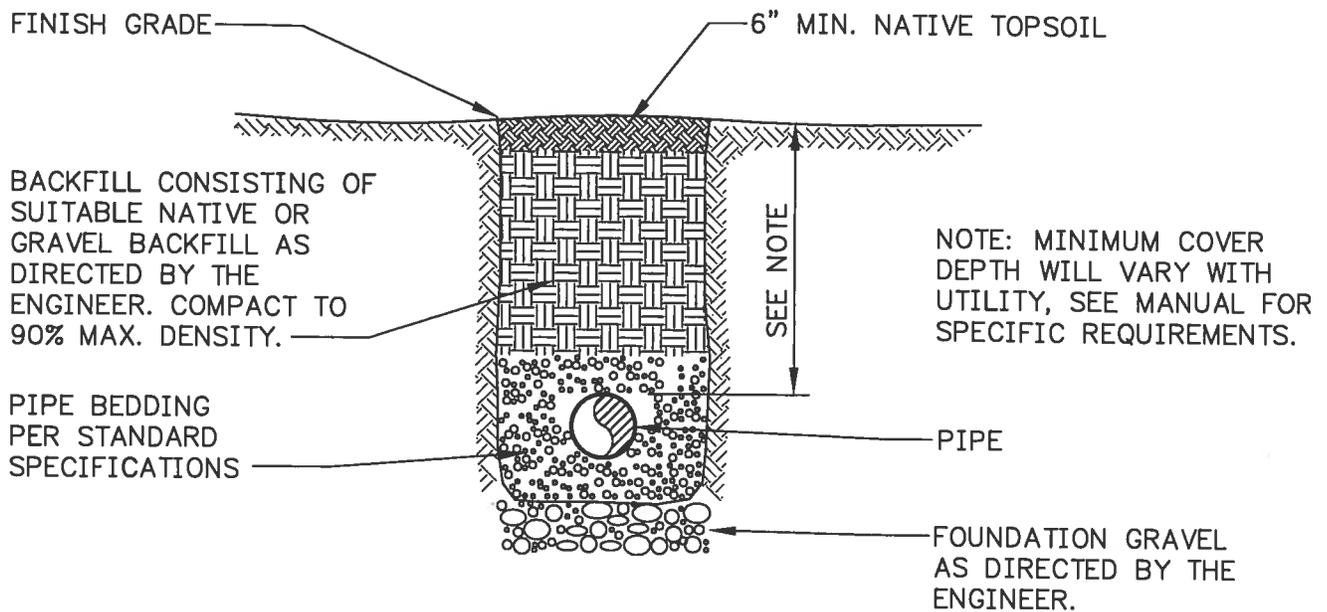
SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332



DOUBLE CHECK DETECTOR ASSEMBLY

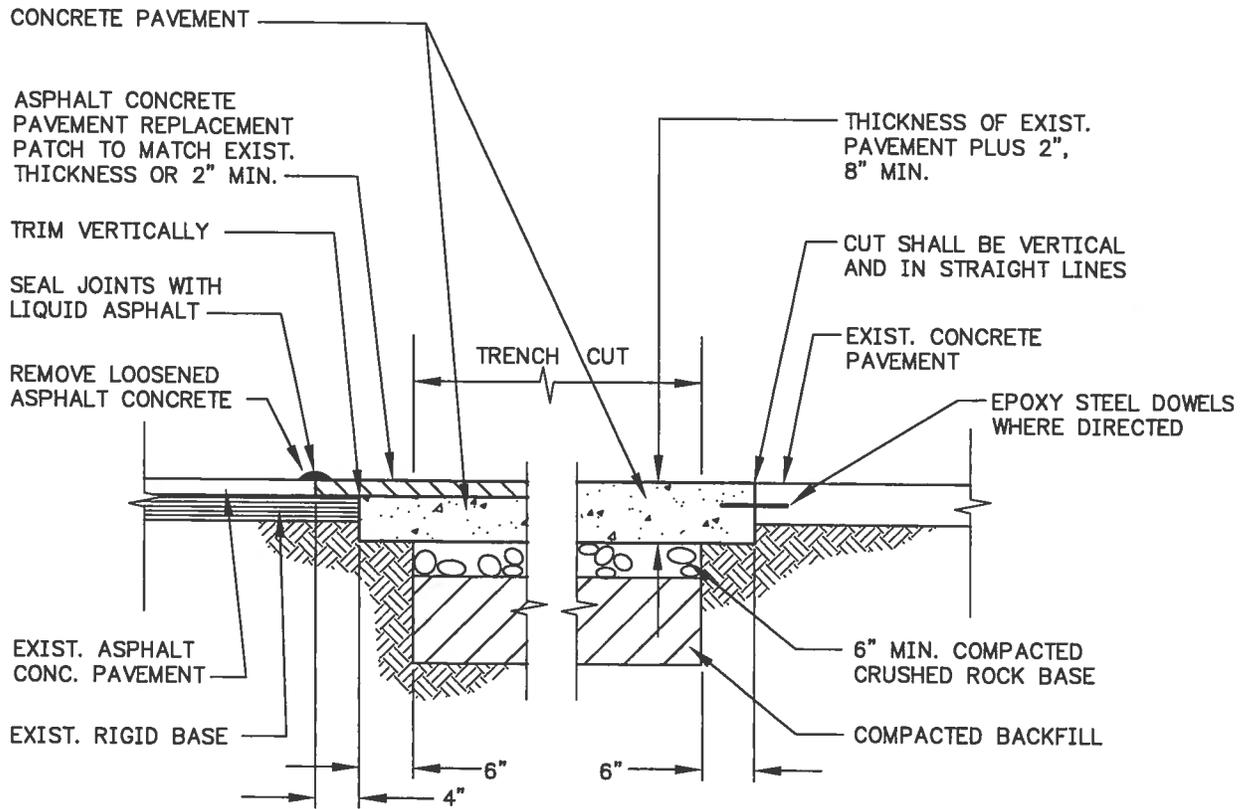


PAVEMENT REPAIR SECTION
TRENCH SECTION IN ROADWAY



TRENCH SECTION
IN UNIMPROVED AREAS

G1 **TYPICAL TRENCH SECTION**



RIGID PAVEMENT WITH
ASPHALTIC CONCRETE SURFACE

CEMENT CONCRETE PAVEMENT

NOTE: TRENCHING THROUGH EXISTING CONCRETE ROADWAY PANELS WILL REQUIRE REPLACEMENT OF FULL PANEL TO NEAREST COLD JOINT. MINIMUM HALF-PANEL REPLACEMENT WITH DOWELS REQUIRES PRIOR APPROVAL FROM TOWN.

G2 RIGID PAVEMENT PATCHING

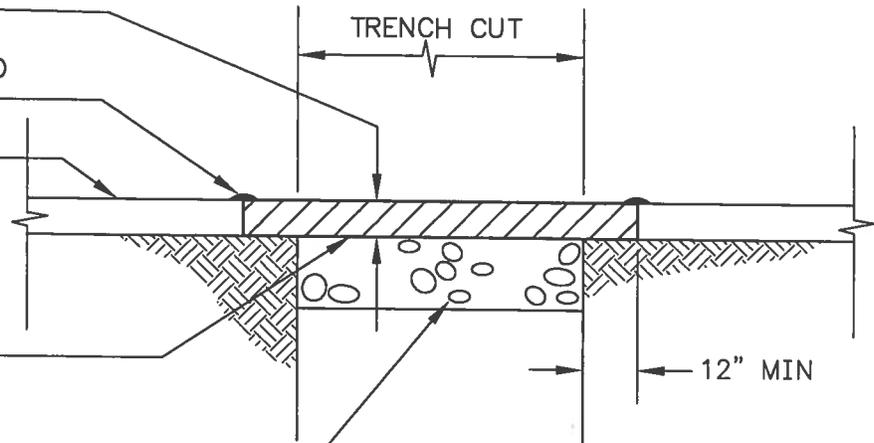
TOTAL THICKNESS TO EQUAL
OR EXCEED EXIST. PAVEMENT
THICKNESS, 4" MIN.

SEAL JOINTS WITH LIQUID
ASPHALT (TYP.)

EXIST. A.C. SURFACING

4" MIN. ASPHALT
CONCRETE PATCH

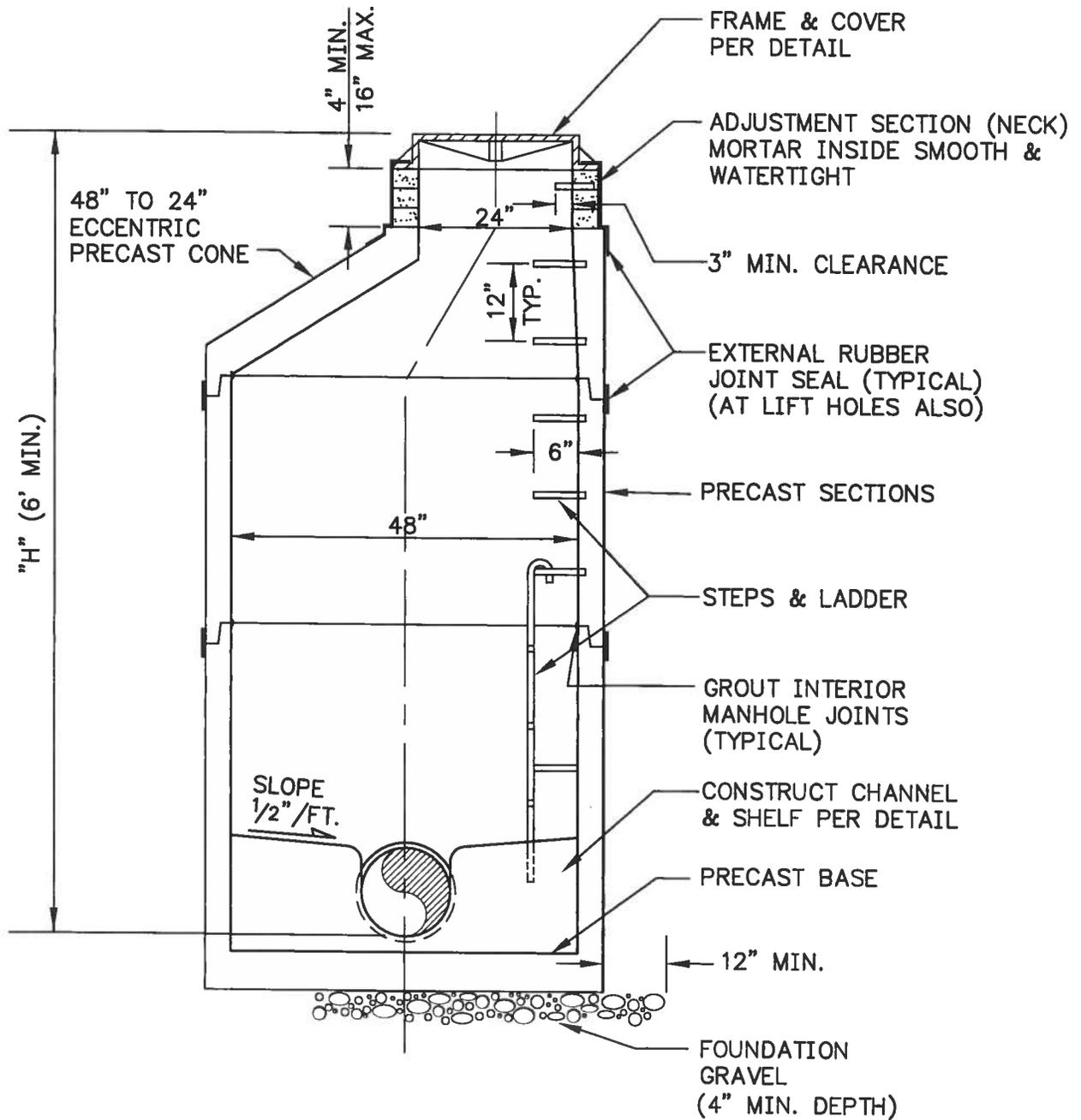
CRUSHED ROCK BASE,
6" MIN. OR THICKNESS
OF EXIST. BASE



NOTE: ASPHALT TREATED BASE MAY BE SUBSTITUTED FOR THE FIRST LIFT
ASPHALT CONCRETE AND CRUSHED BASE. SEE SPECIFICATIONS.

G3

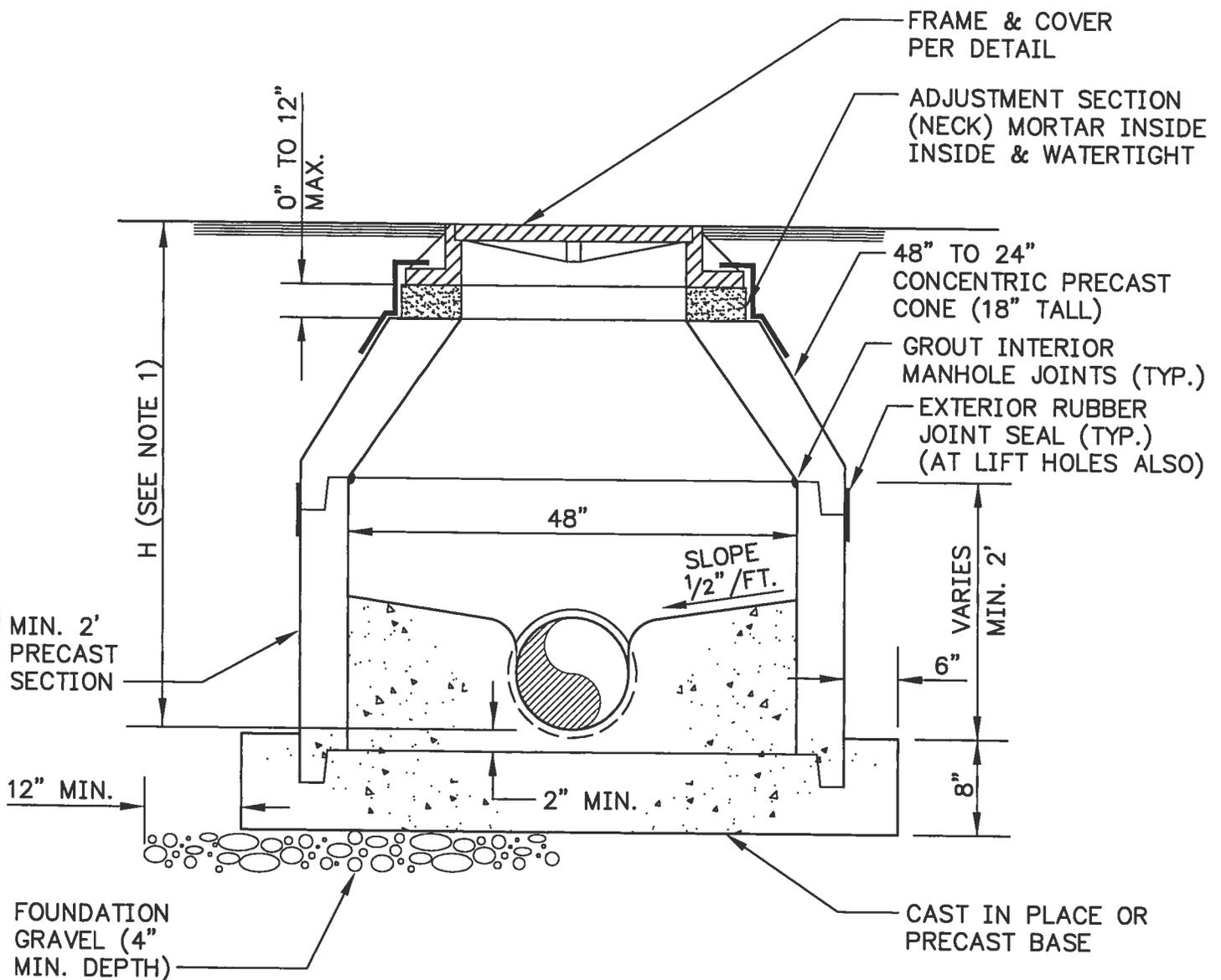
ASPHALT CONCRETE PATCHING



NOTES:

1. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR.
 - B. 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"

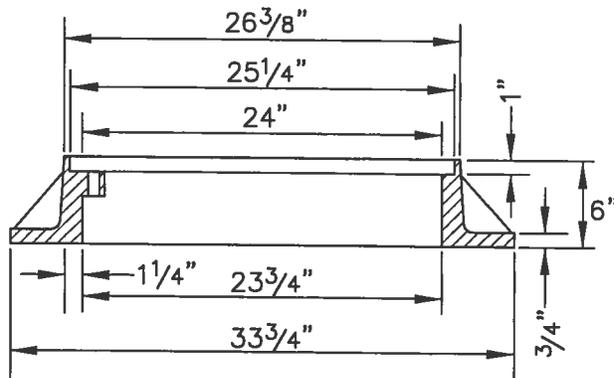
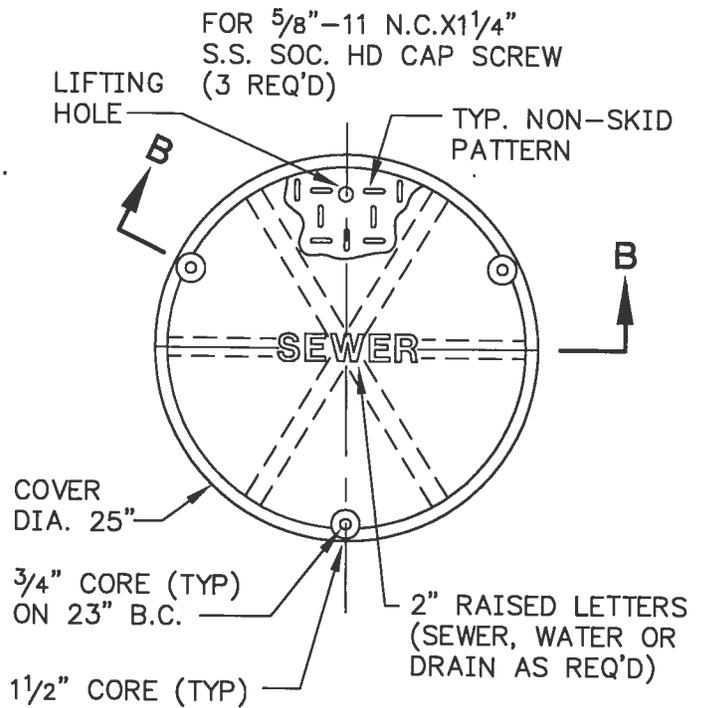
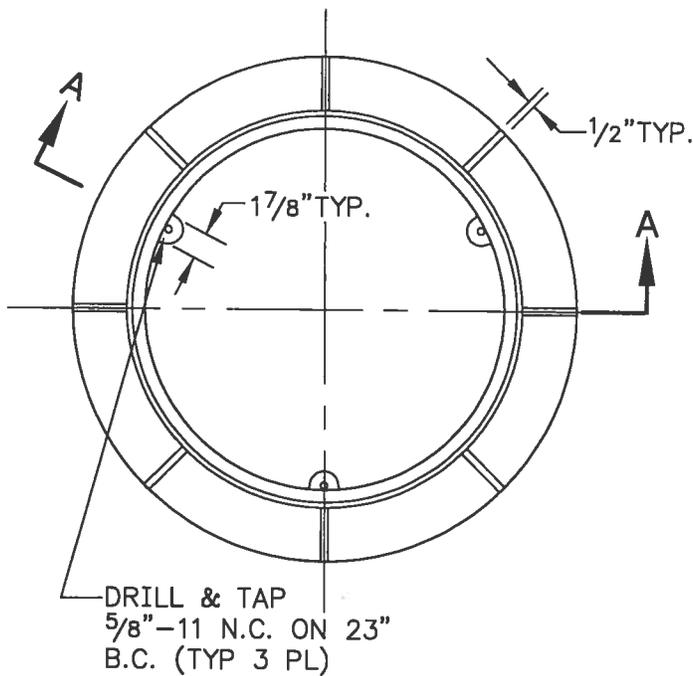
S1 TYPE I - 48" MANHOLE



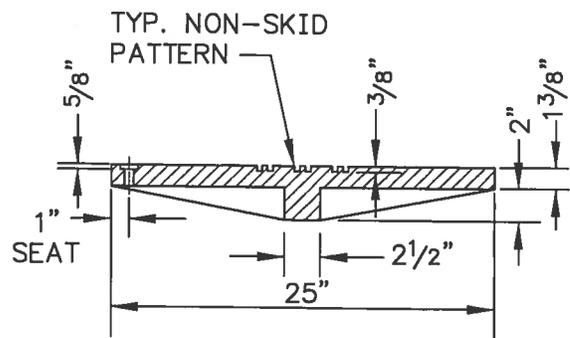
NOTES:

1. MAXIMUM H IS 5'. MINIMUM H IS 3'-8"
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR
5. EXTERNAL JOINT SEAL SHALL BE "BEST SEAL" OR APPROVED EQUAL

S2 TYPE IIIA - 48" MANHOLE



SECTION A-A

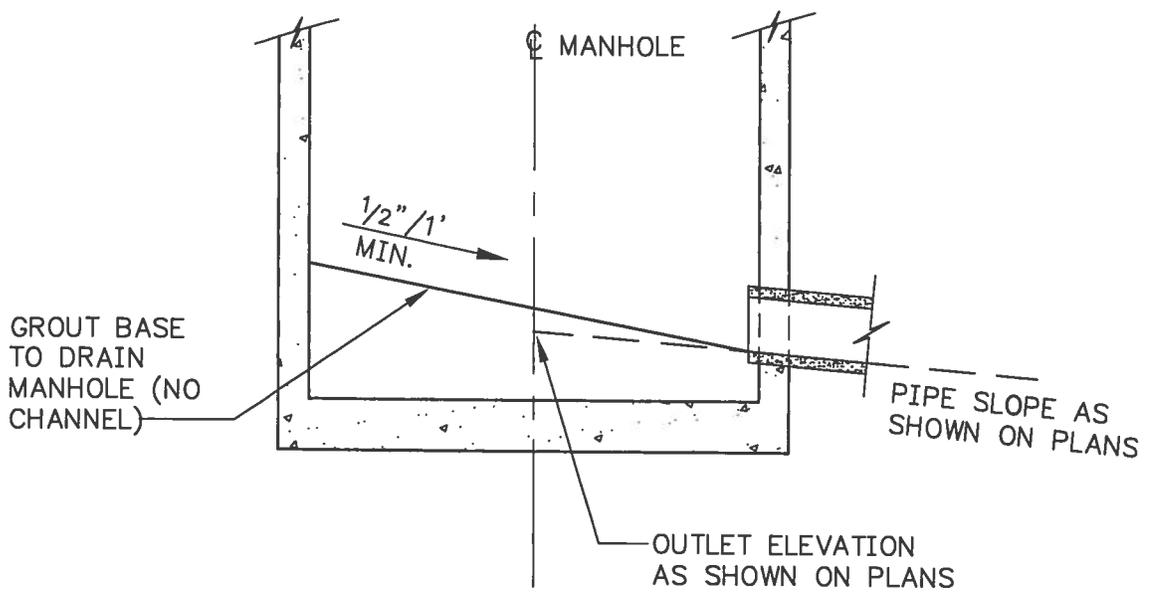


SECTION B-B

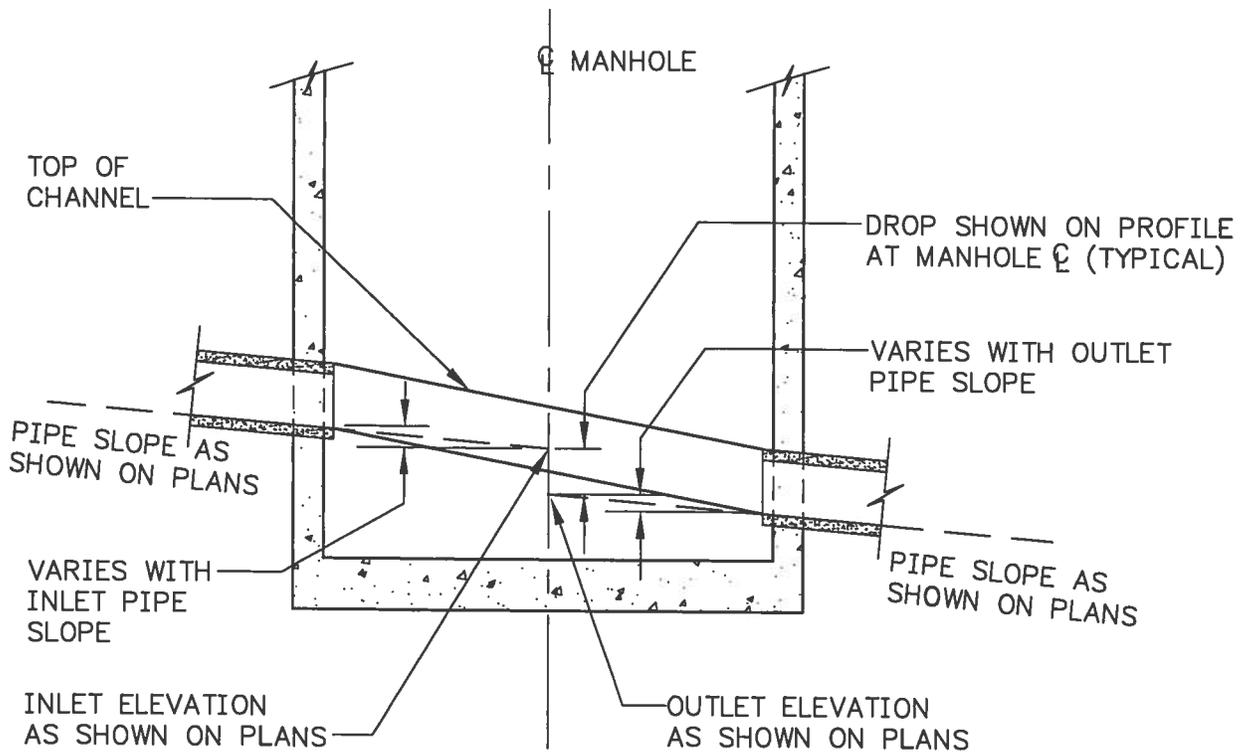
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE 7/8" LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME, SS HEX CAP SCREWS
5. SEE SPECIFICATION O2605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

S3 MANHOLE FRAME AND COVER

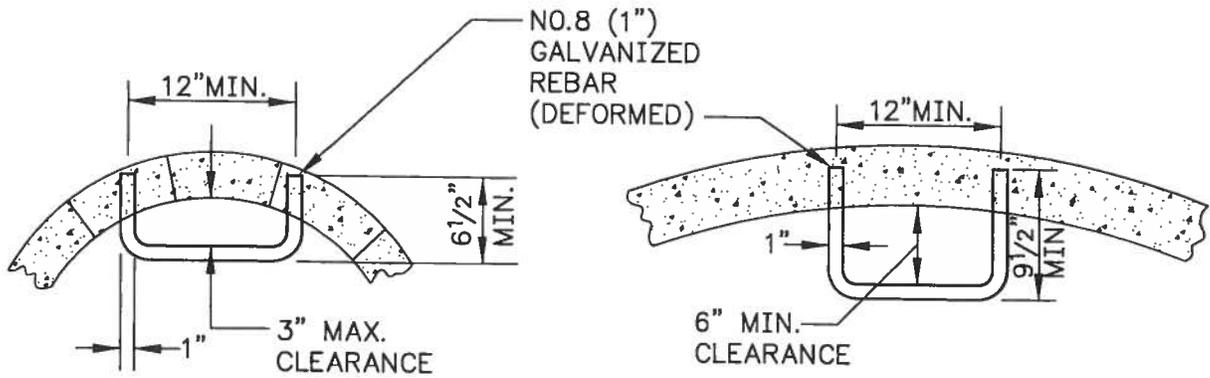


TERMINAL MANHOLE



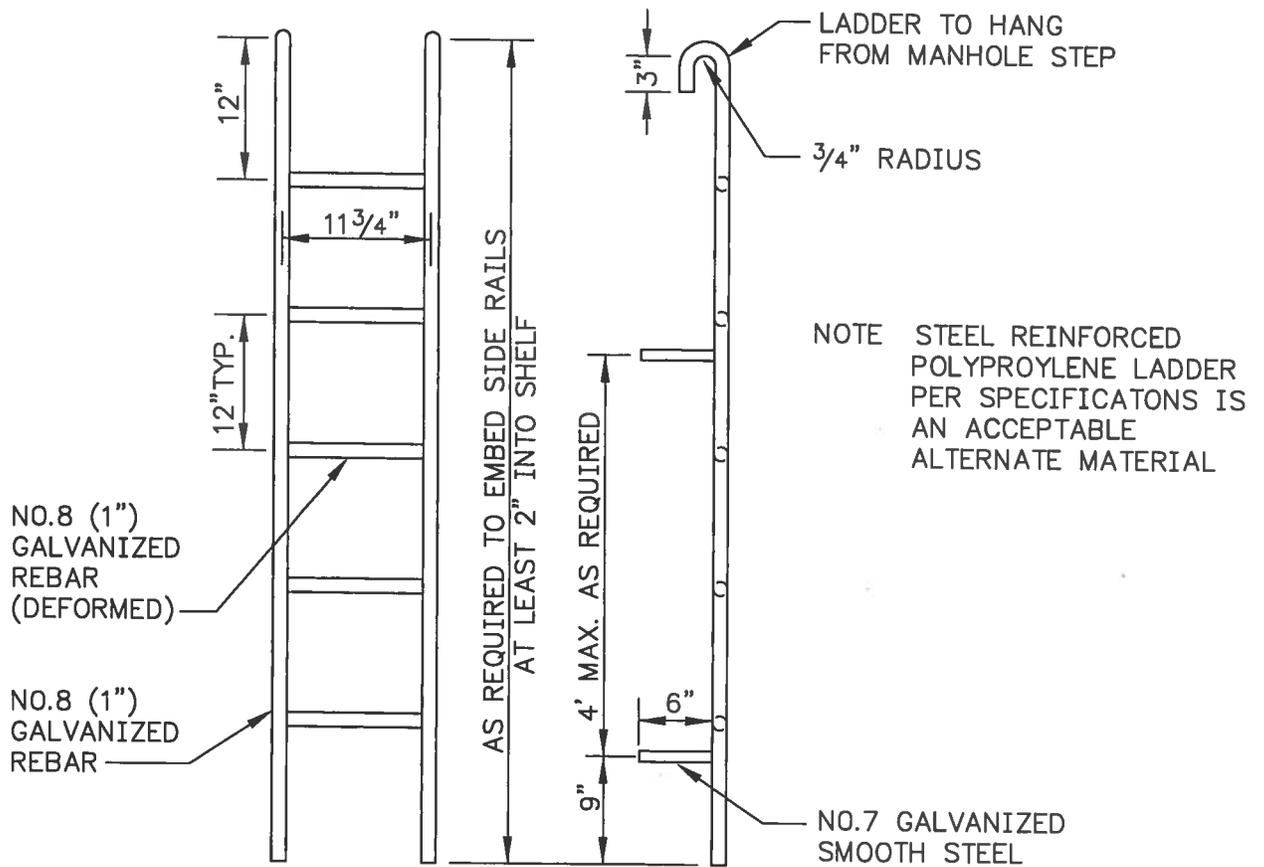
MAIN-LINE MANHOLE

S4 MANHOLE CHANNELING



ADJUSTMENT RING HAND HOLD

TYPICAL MANHOLE STEP

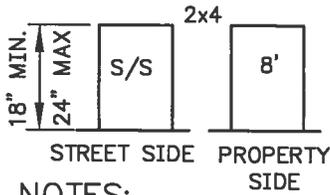
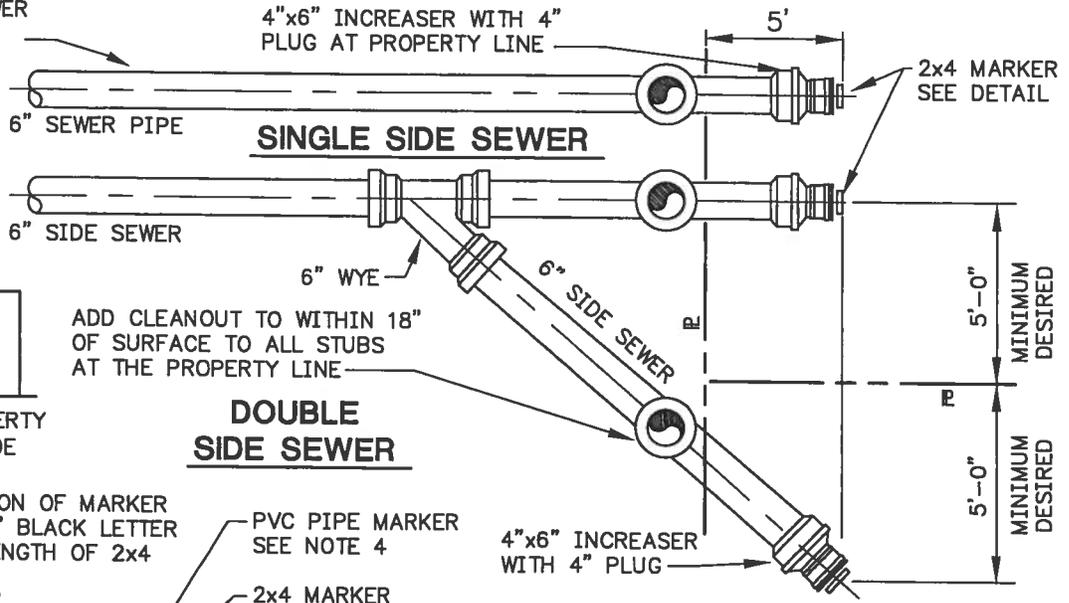


PREFABRICATED LADDER

NOTE STEEL REINFORCED
POLYPROPYLENE LADDER
PER SPECIFICATONS IS
AN ACCEPTABLE
ALTERNATE MATERIAL

S5 MANHOLE STEPS AND LADDER

LOCATION OF SIDE SEWER TO BE SET IN FIELD



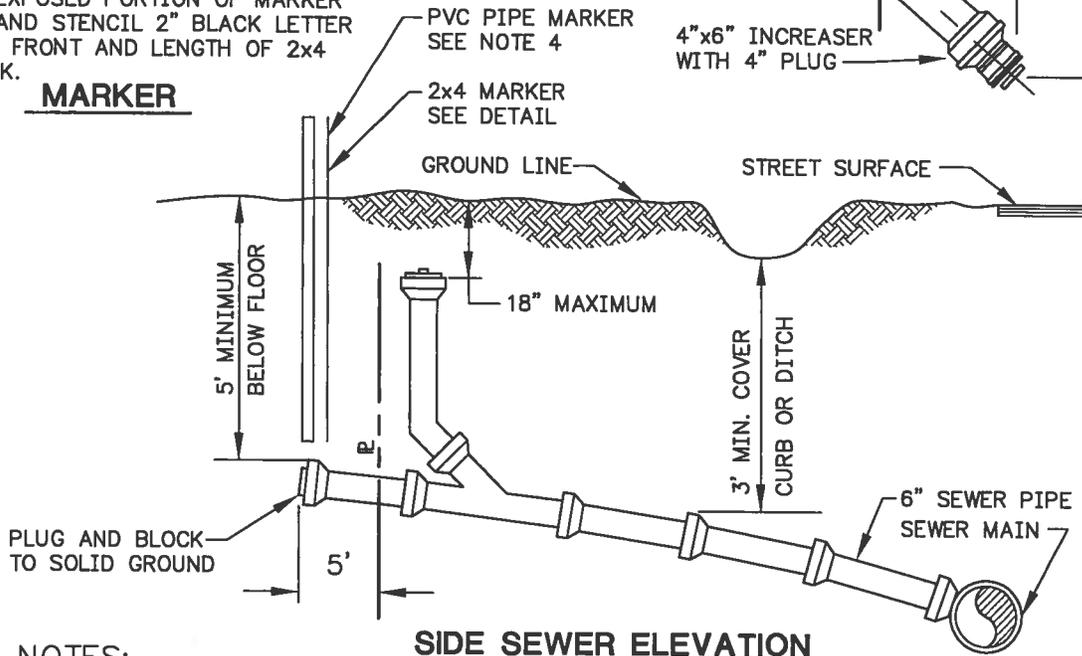
ADD CLEANOUT TO WITHIN 18" OF SURFACE TO ALL STUBS AT THE PROPERTY LINE

DOUBLE SIDE SEWER

NOTES:

PAINT EXPOSED PORTION OF MARKER WHITE AND STENCIL 2" BLACK LETTER S/S ON FRONT AND LENGTH OF 2x4 ON BACK.

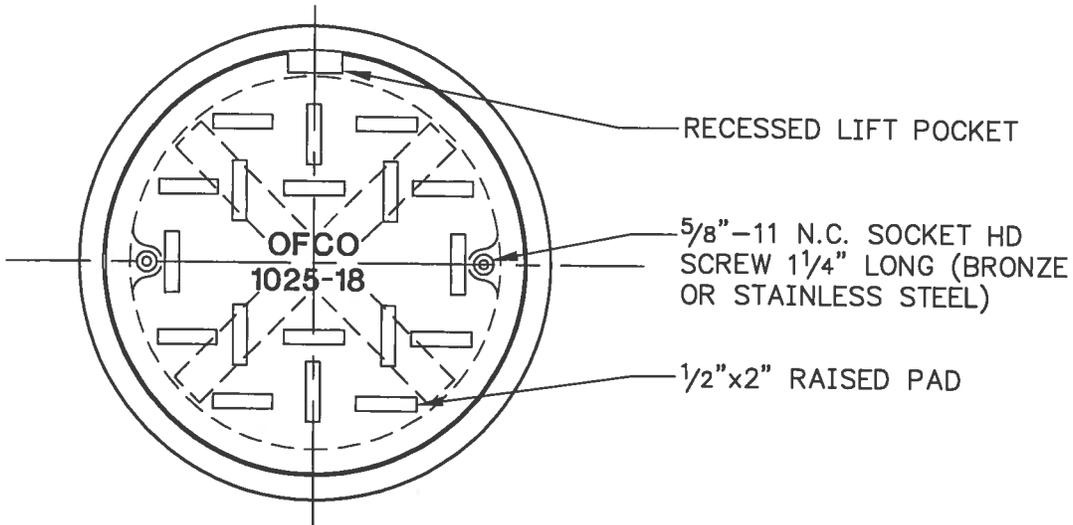
MARKER



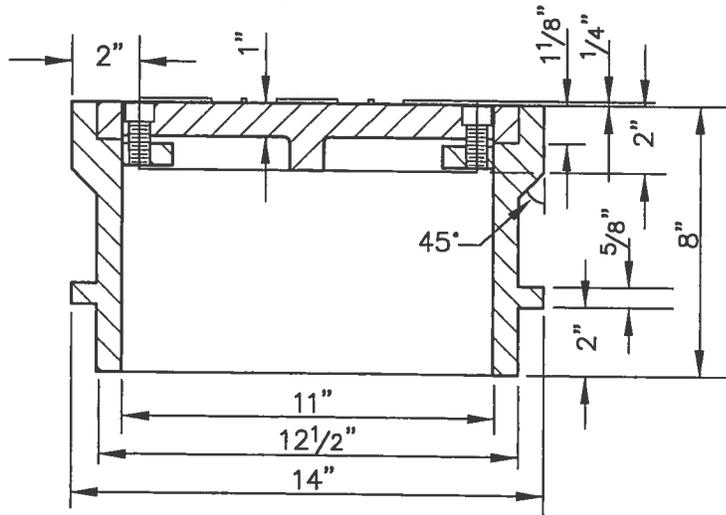
NOTES:

1. UNLESS OTHERWISE SHOWN ON PLAN, SIDE SEWER SHALL BE SLOPED 2% UP FROM SEWER LINE OR SHALL BE MIN. 5' COVER AT PROPERTY LINE OR 3.5' LOWER THAN THE LOWEST HOUSE ELEVATION, WHICHEVER IS LOWER.
2. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL
4. MINIMUM SLOPE = 2%
5. A 1 1/4" WHITE PVC PIPE, ASTM 2241 SDR 21 200 PSI SHALL BE PLACED VERTICALLY AT THE END OF EACH STUB AND SHALL RISE TWO FEET ABOVE FINISH GRADE LEVEL OR AS APPROVED BY SWSSD. BOTH ENDS OF THE PVC PIPE SHALL HAVE CAPS GLUED ON AND THE PIPE INTERIOR KEPT CLEAN FOR THE PURPOSE OF FUTURE DEPTH MEASUREMENT.
6. PIPE SHALL BE PVC ASTM D3034.

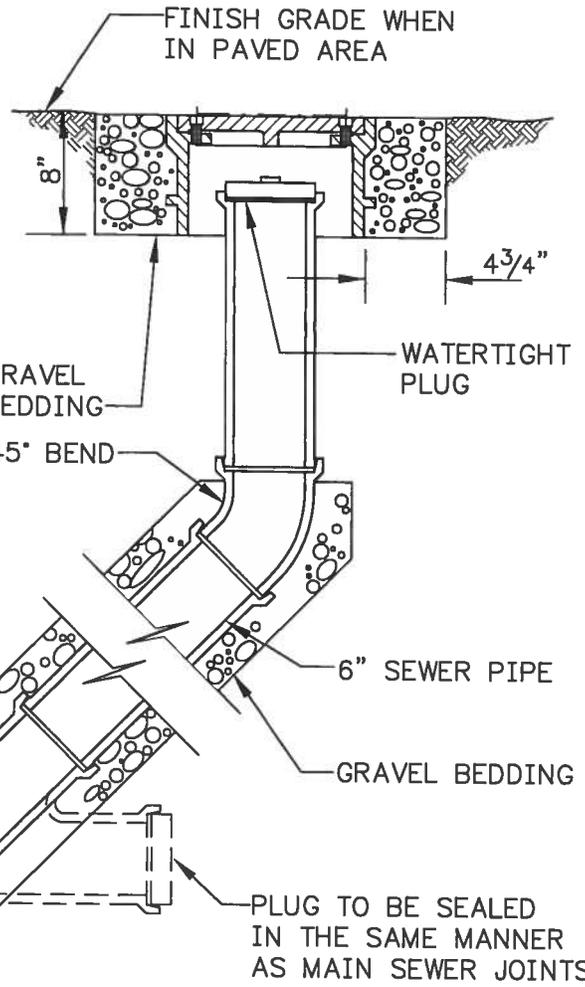
S6 STREET SIDE SEWER



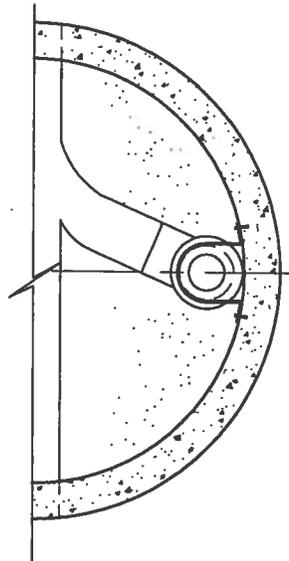
PLAN



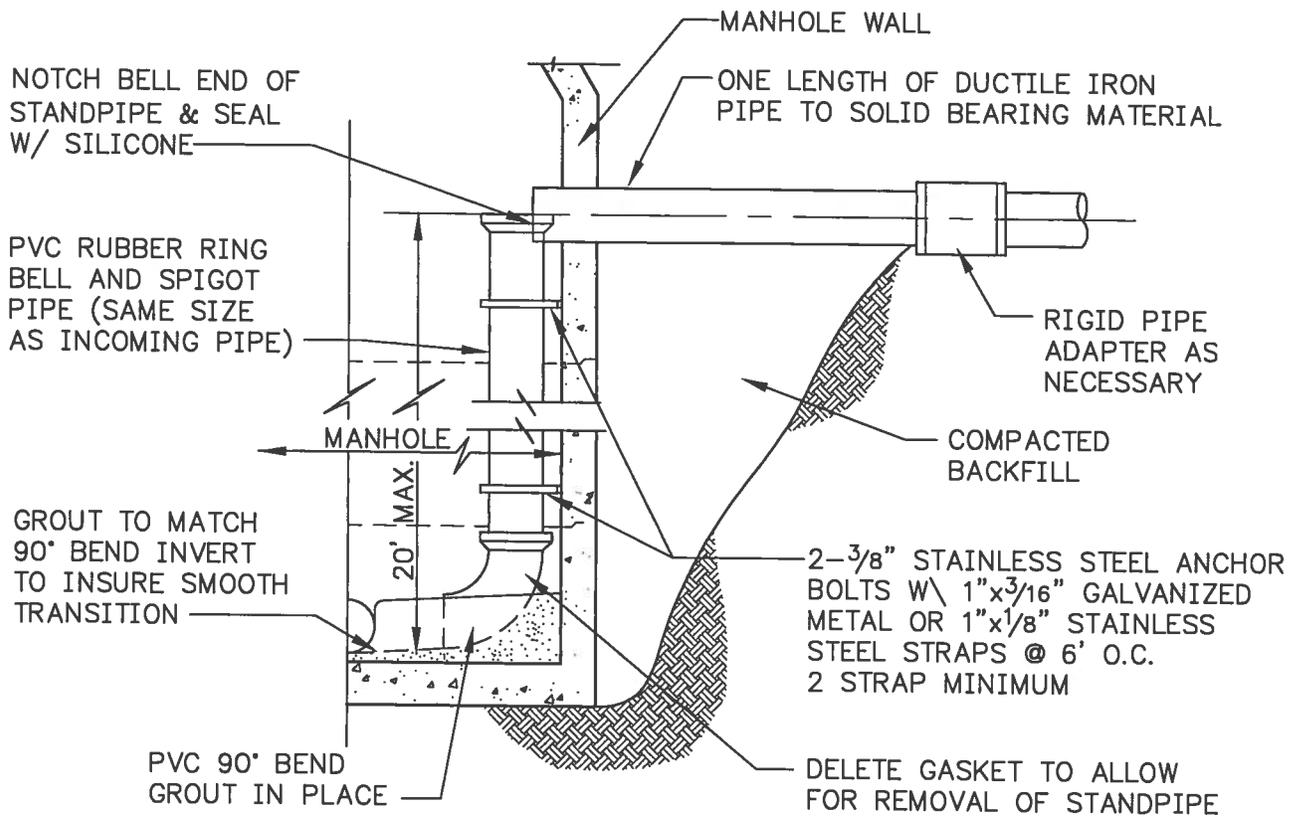
**ELEVATION
CAST IRON RING AND COVER**



S7 SEWER CLEANOUT



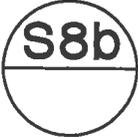
PLAN

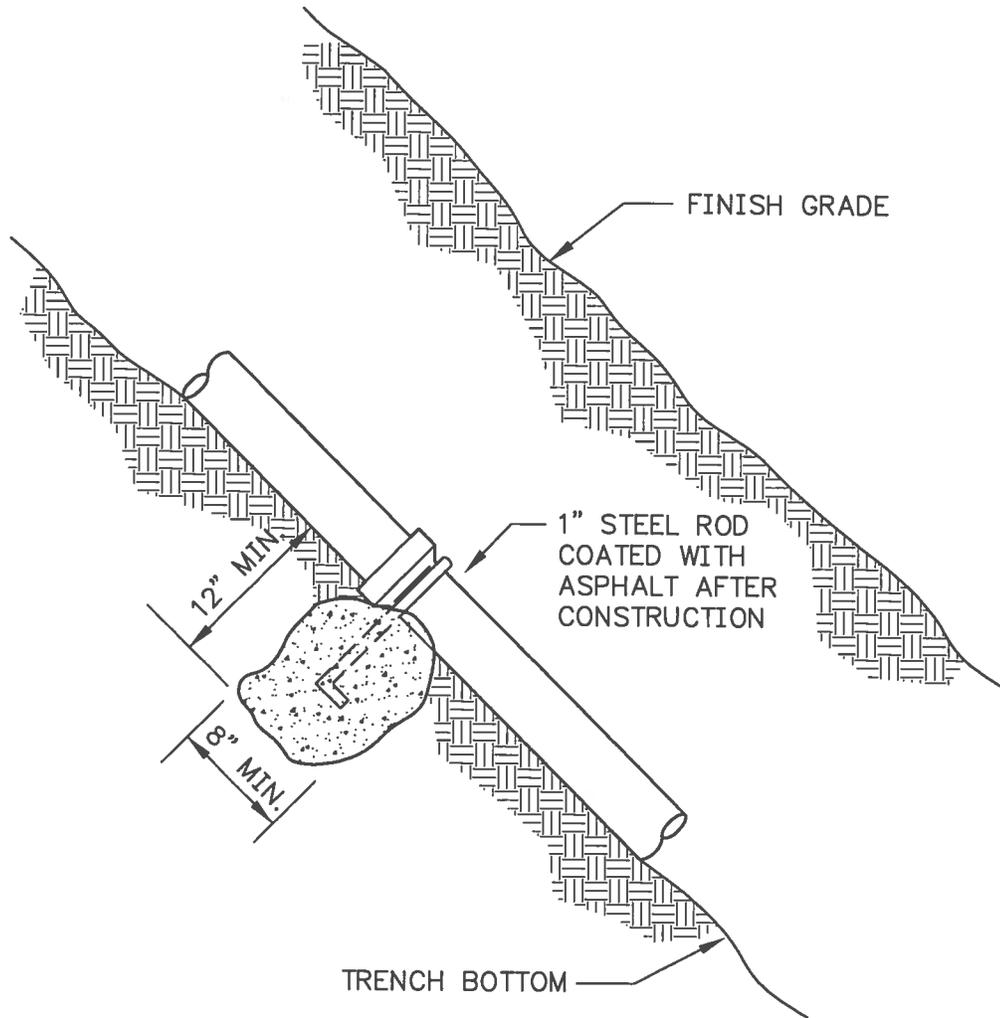


ELEVATION

NOTE: THIS ASSEMBLY TO BE USED ONLY WITH SPECIFIC AUTHORIZATION

**INSIDE DROP
MANHOLE CONNECTION**

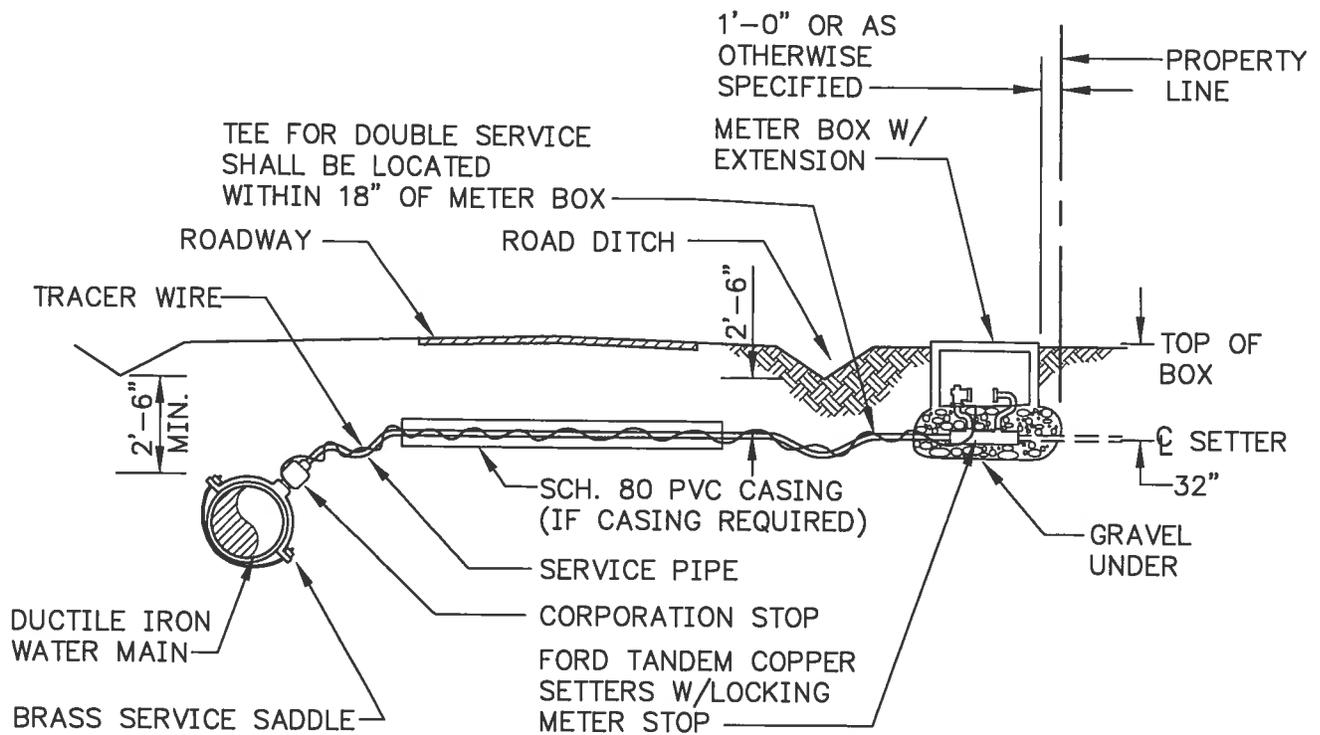




NOTES:

1. POUR BLOCKING AGAINST UNDISTURBED SOIL.
2. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
3. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20-30%, 20' ON GRADES OF 35-50%, AND 16' ON GRADES OVER 50%.

S9 PIPE ANCHOR



PARTS FOR SINGLE SERVICE

- 1- $\frac{3}{4}$ " IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 1- $\frac{3}{4}$ " BRASS MALE x INSERT ADAPTER (FORD PTM-1)
- 1- $\frac{3}{4}$ " x 12" COPPER SETTER WITH LOCKING METER STOP AND DUAL CHECK VALVE (FORD VBHC72-12W-11-33 DP x DP)
- 1-PLASTIC METER BOX (CARSON 1419)
- 1-PLASTIC METER BOX EXTENSION (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

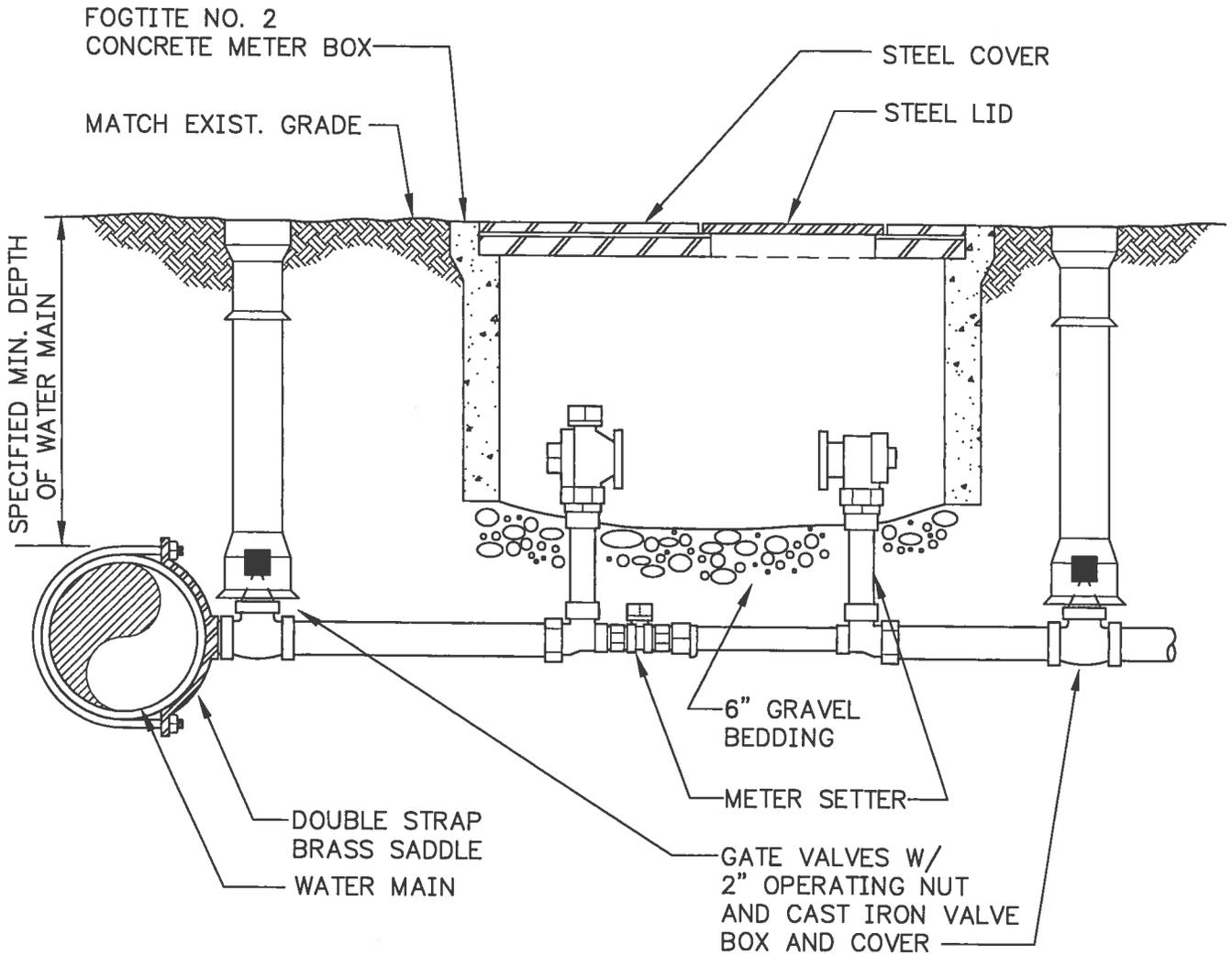
PARTS FOR DOUBLE SERVICE

- 1-1" IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1-1" BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1-1" BRASS GRIPPER TEE $\frac{3}{4}$ " x $\frac{3}{4}$ " x 1" (FORD T666-334G)
- 2- $\frac{3}{4}$ " BRASS STREET ELLS
- 2- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 2- $\frac{3}{4}$ " x 12" COPPER SETTERS WITH LOCKING METER STOPS AND DUAL CHECK VALVES (FORD VBHC72-12W-11-33 DP x DP)
- 2- $\frac{3}{4}$ " BRASS MIPT x INSERT ADAPTERS (FORD PTM-1)
- 2-PLASTIC METER BOXES (CARSON 1419)
- 2-PLASTIC METER BOX EXTENSIONS (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

NOTES:

1. WATER SERVICE LINE SHALL BE 200 PSI IPS PE 3408, ASTM-2239 (DRISCO ULTRA-HI MOLECULAR PE-3408)
2. USE BRASS DOUBLE STRAP SADDLE ON MAINS 10" AND LARGER.
3. WHERE FORD MATERIALS ARE CALLED OUT, EQUAL PRODUCTS ARE ACCEPTABLE

W1
3/4" AND 1" WATER SERVICE

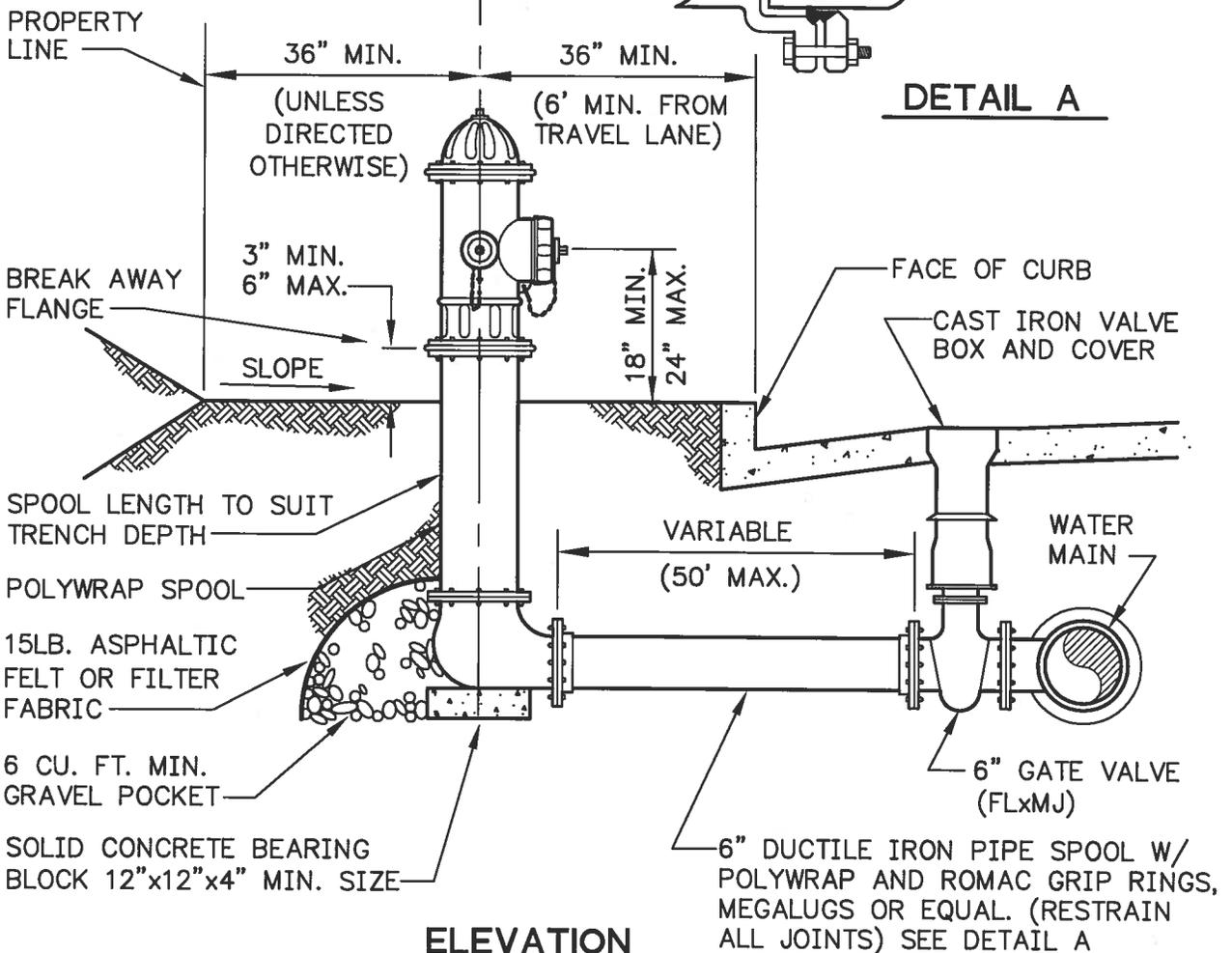
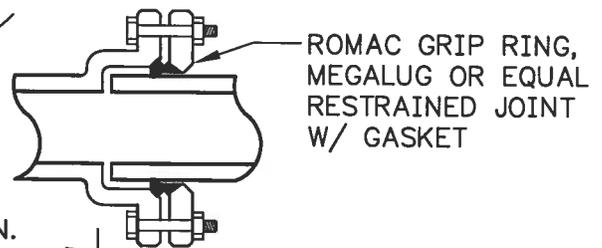
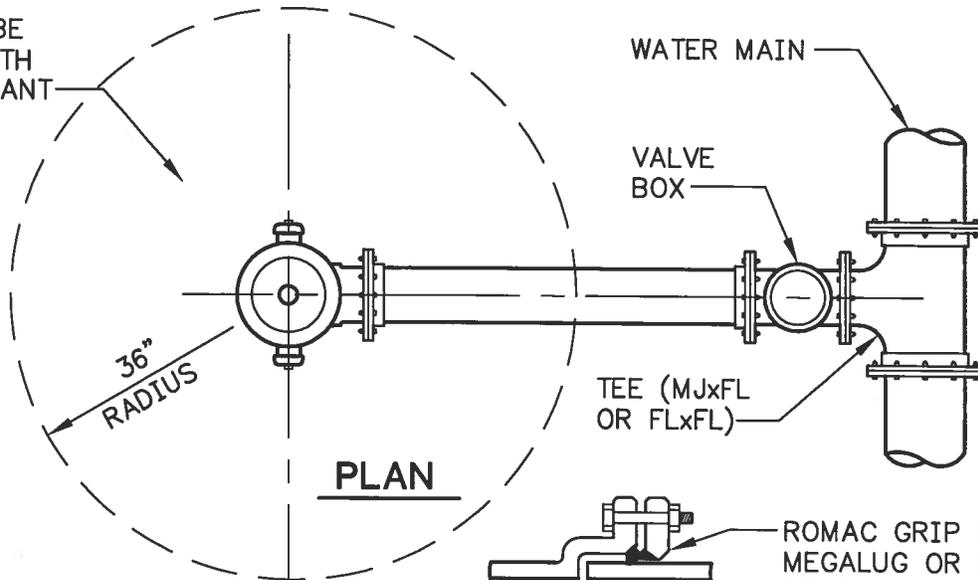


PARTS FOR 1½" AND 2" SERVICE

- 1 - DOUBLE STRAP BRASS SADDLE WITH BRONZE STRAP
- 4 - FORD PACKJOINT COUPLINGS/PLASTIC PIPE
- SETTERS: 1½" FORD VBH6612BX LENGTH WITH LOCKING BYPASS
2" FORD VBH7712BX LENGTH WITH LOCKING BYPASS
(SETTER LENGTH WILL BE DETERMINED BY TOWN)
- CONCRETE METER BOX WITH STEEL COVER AND METER LID
FOGTITE NO. 2
- 2 - GATE VALVES: 2 INCH-RESILIENT WEDGE SEATED (APWA C-509)
1½ INCH-BRASS
- 2 - CAST IRON VALVE BOX WITH COVER
- WATER SERVICE LINE 200 PSI IPS PE 3408, ASTM D-2239

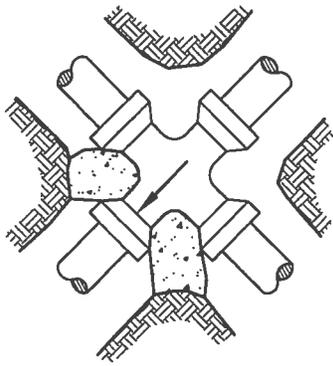
W2 1½" AND 2" WATER SERVICE

SURFACE TO BE GRADED SMOOTH AROUND HYDRANT

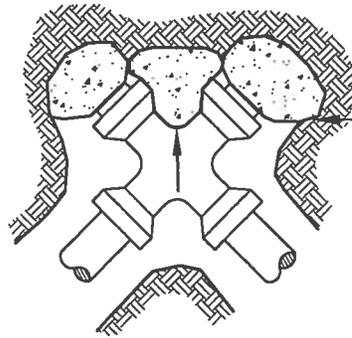


W3

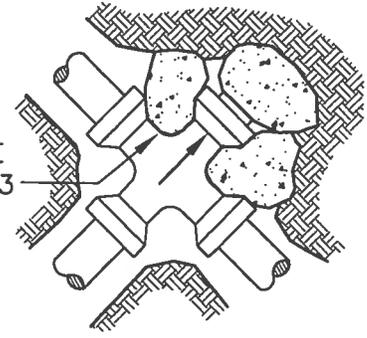
FIRE HYDRANT ASSEMBLY



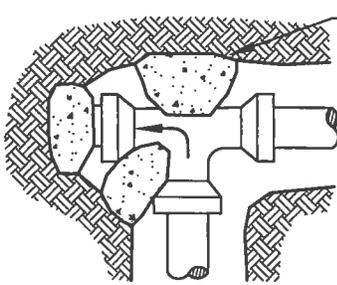
UNBALANCED CROSS



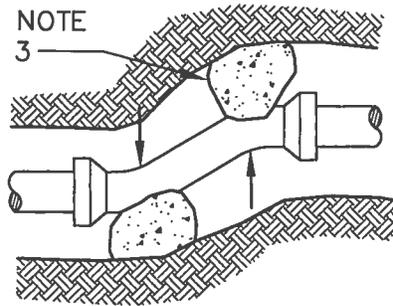
PLUGGED CROSS



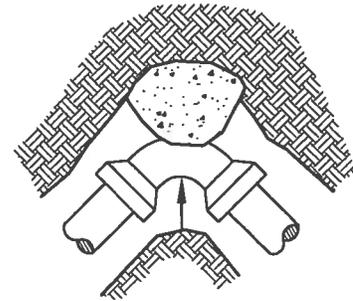
PLUGGED CROSS



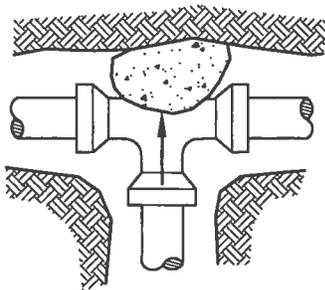
PLUGGED TEE



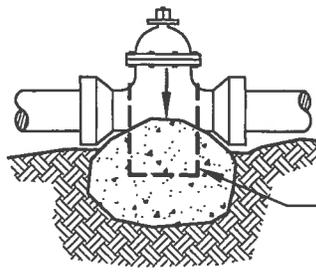
OFFSET



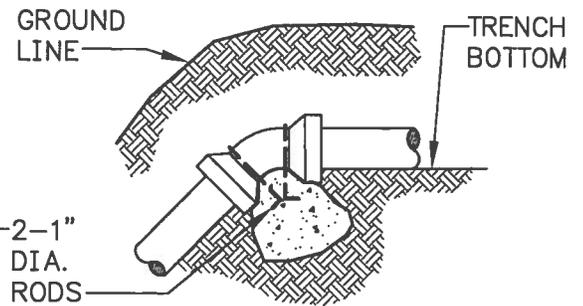
HORIZONTAL BEND



TEE



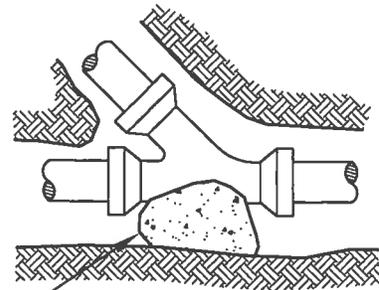
VALVE



VERTICAL BEND

NOTES:

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITION AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. BLOCKING REQUIRED IF PLUGS NOT SECURED BY BOLTING OR ADEQUATE STRAPS.



"Y" BRANCH



CONCRETE THRUST BLOCKING

CONCRETE METER BOX WITH METAL COVER. FOGTITE NO. 1D
 POSITION METER BOX AS DIRECTED BY TOWN

PROPERTY LINE

12" 12"

VALVE MARKER POST

2" RESILIENT WEDGE GATE VALVE W/
 VALVE BOX AND COVER

THRUST BLOCKING TO CLEAR PIPING

POURED CONCRETE THRUST BLOCKING

CONCRETE BLOCK

PLUG (MJ)

TAPPED TEE (MJxMJ)

WATER MAIN

PLAN

PROPERTY LINE

2 1/2" NST NOZZLE
 VARIABLE

12" MAX.

POSITION BOX TO ALLOW CONNECTION OF HOSE TO NOZZLE

15 LB. ASPHALTIC FELT OR FILTER FABRIC

KUPFERLE #78 MAINGUARD 2" BLOW-OFF HYDRANT

36" MINIMUM

2" BRASS STREET ELL

GRAVEL POCKET

200 PSI IPS, PE OR TYPE "K" 2" COPPER PIPE

SOLID CONCRETE BEARING BLOCK 4"x8"x16" OR AS DIRECTED BY TOWN

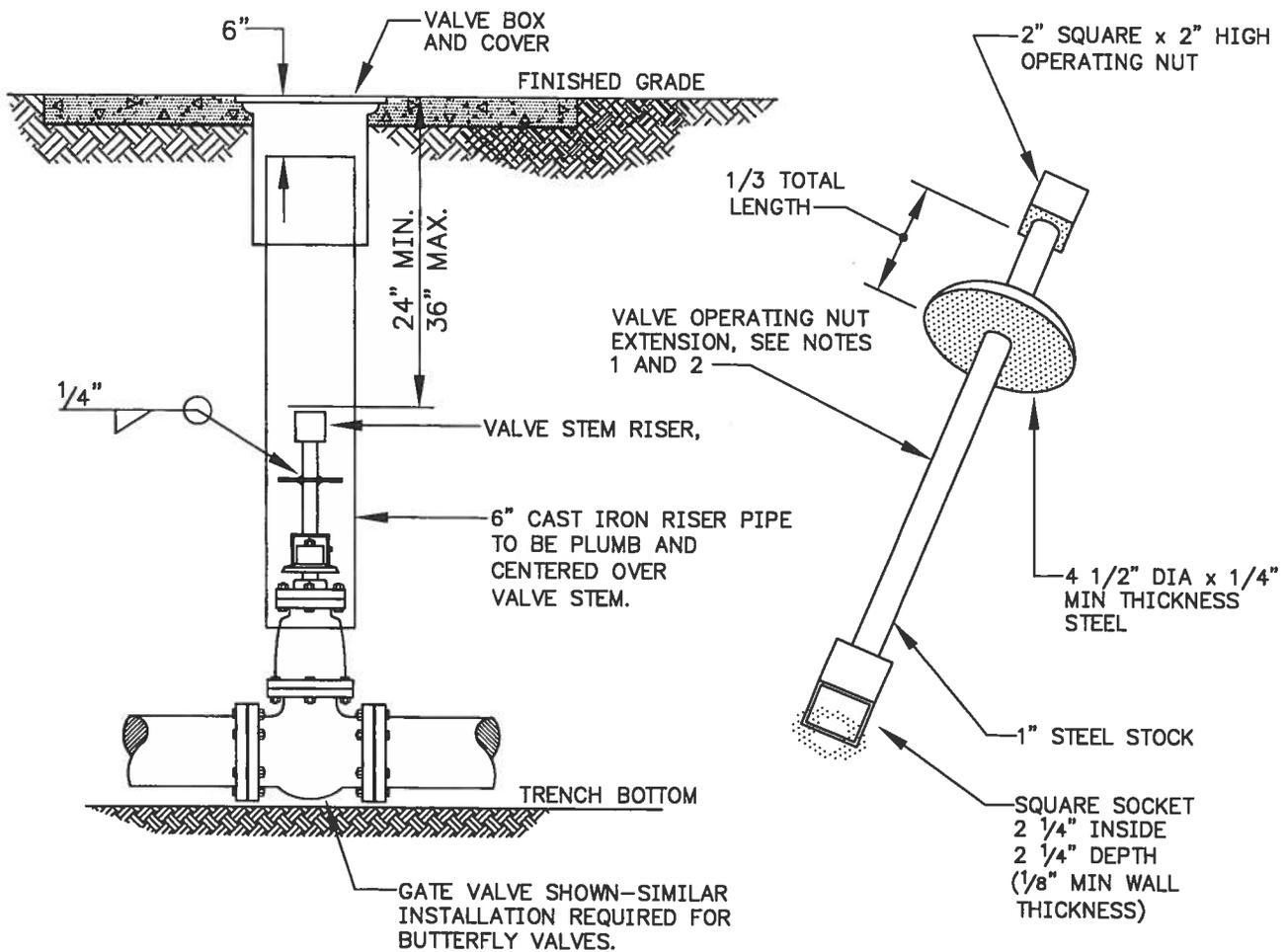
CAST IRON VALVE BOX AND COVER

ELEVATION

NOTES:

1. PAINT PIPE THREADS WITH ASPHALT PAINT AFTER ASSEMBLY.
2. VALVE AND ALL FITTINGS TO BE BRASS.
3. PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
4. PAINT VALVE MARKER POST PER TOWN REQUIREMENTS.

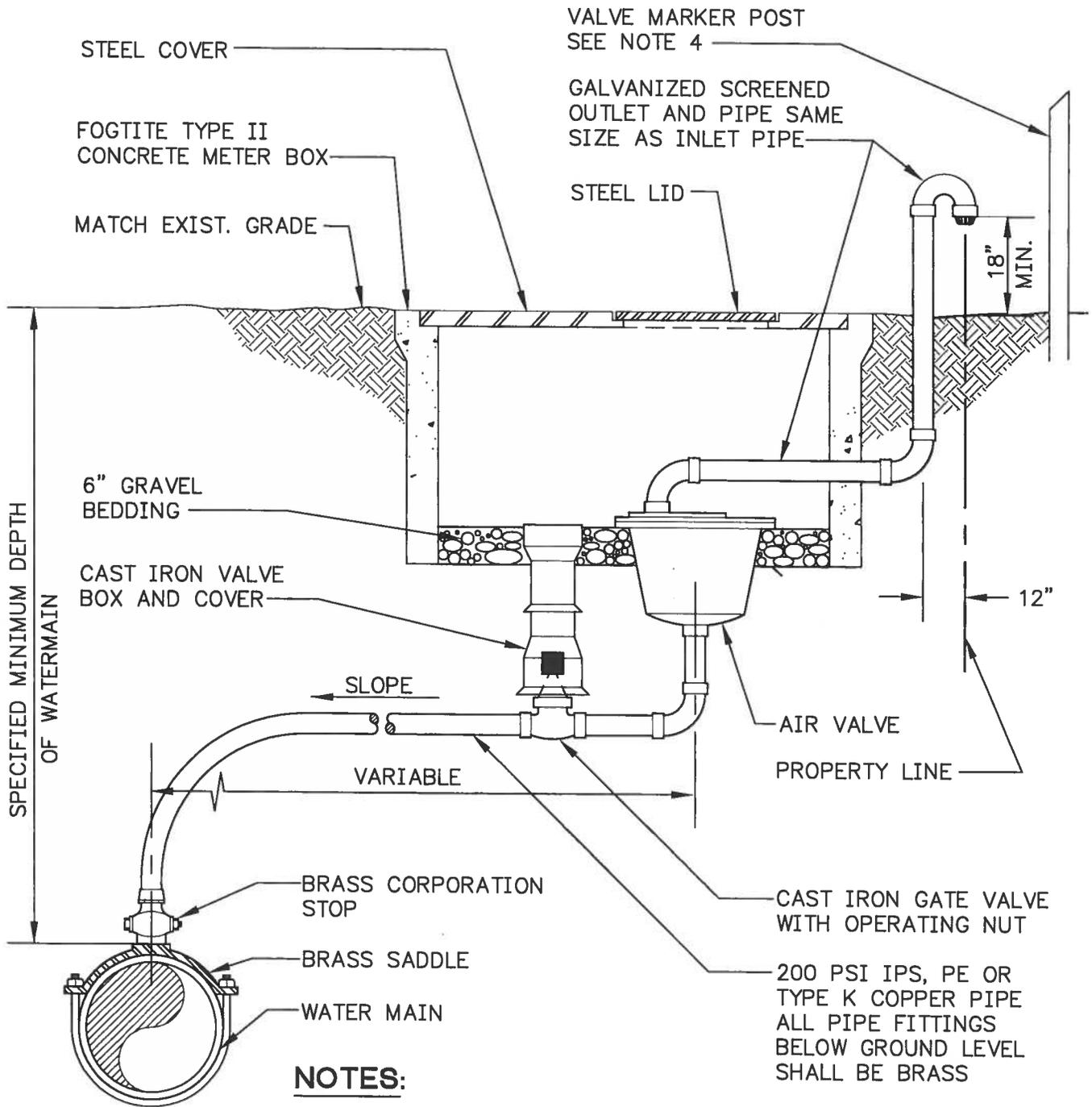
W5 BLOWOFF ASSEMBLY



NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.

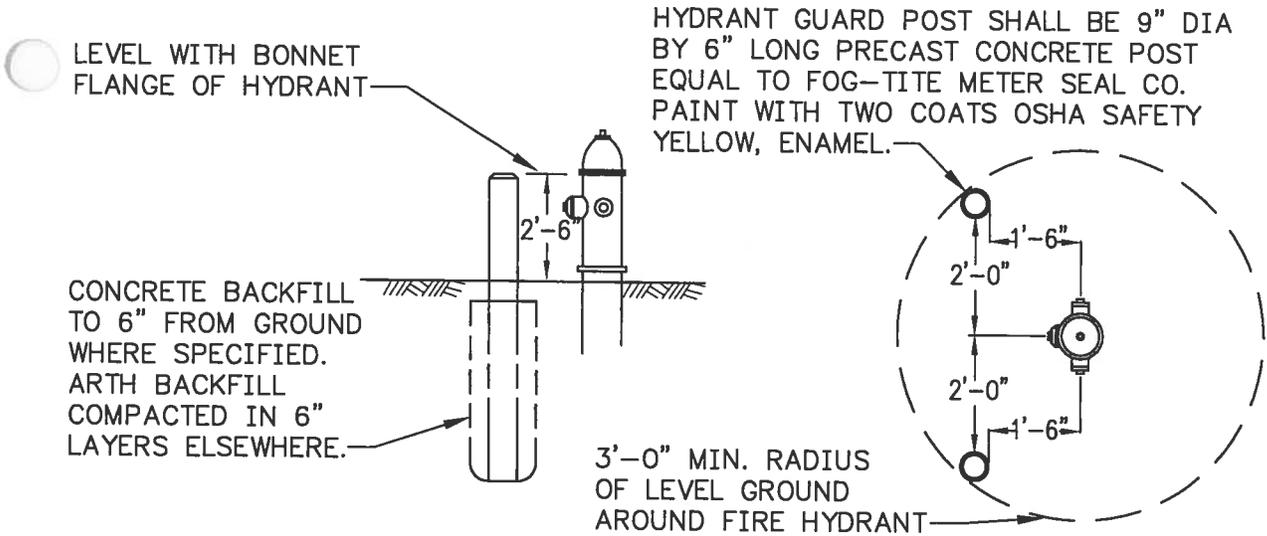
W6 VALVE OPERATING NUT EXTENSION



NOTES:

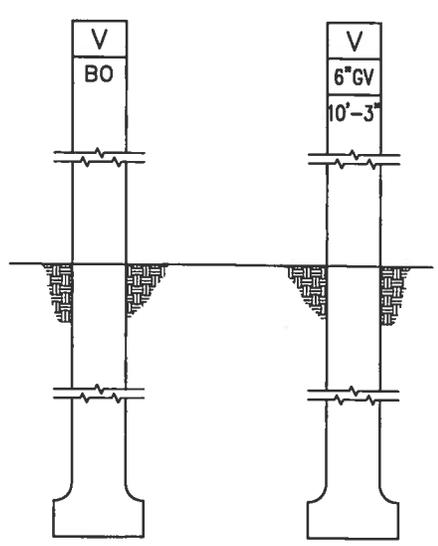
1. VALVE AND PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. VALVE MARKER POST TO BE PAINTED PER TOWN STANDARD. TOWN TO DETERMINE LOCATION.

W7 AIR RELEASE VALVE ASSEMBLY



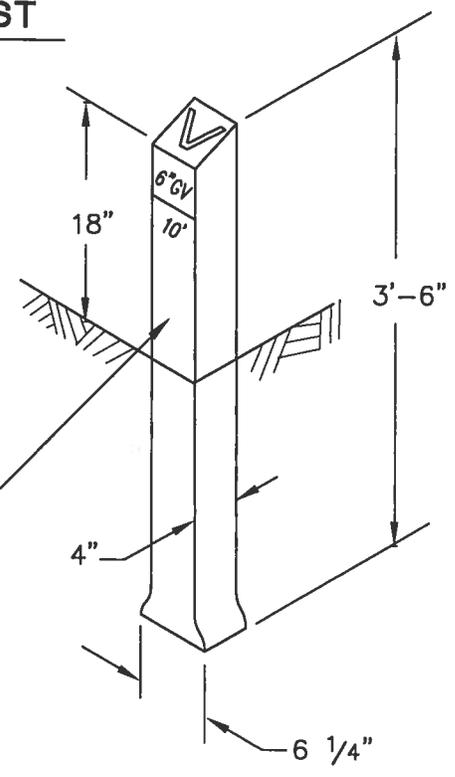
ELEVATION PLAN

FIRE HYDRANT GUARD POST



FRONT VIEW FRONT VIEW
(FOR BLOW-OFF ASSEMBLY) (FOR GATE VALVE)

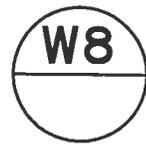
VALVE MARKER POST SHALL BE EQUAL TO FOG-TITE METER CO. PAINT AS SPECIFIED FOR HYDRANT GUARD POST. PAINT TYPE AND SIZE OF VALVE AND DISTANCE FROM THE VALVE MARKER TO THE VALVE ON THE POST WITH NEATLY STENCILED BLACK ENAMEL NUMBERS, 1" IN HEIGHT.



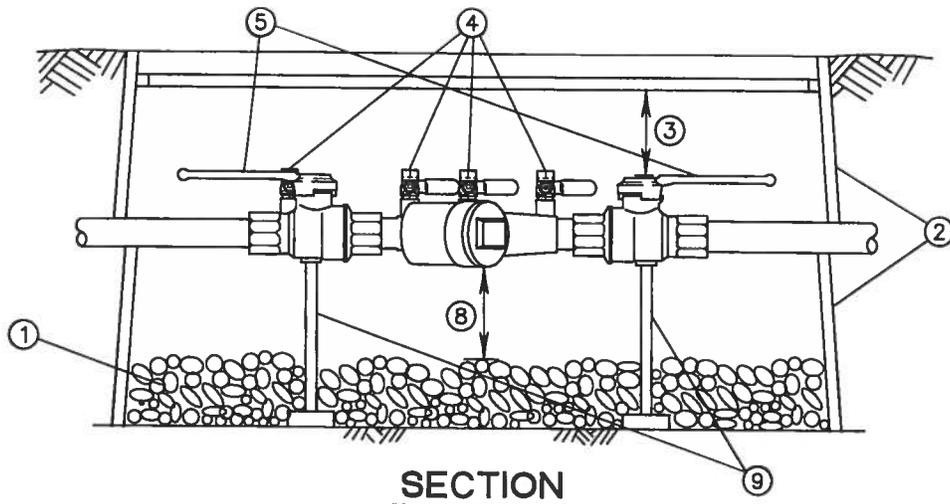
VALVE MARKER POST

NOTES:

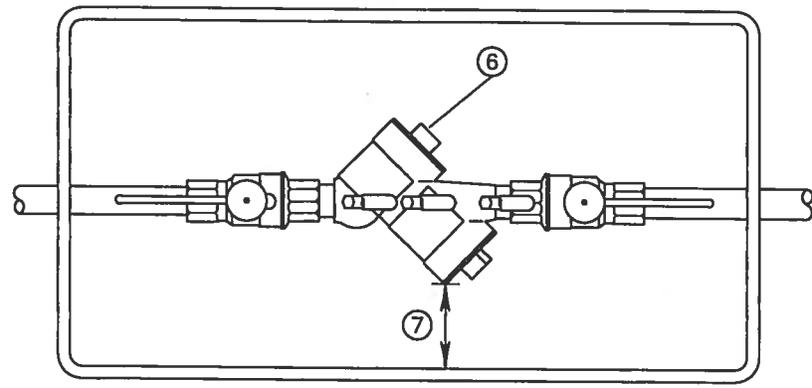
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY THE TOWN.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.



VALVE MARKER POST
HYDRANT GUARD POST



SECTION



PLAN

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO NO. 2 METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
- ③ A MAXIMUM DISTANCE OF 6" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDE WAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE DEVICE AND THE DRAIN ROCK.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.

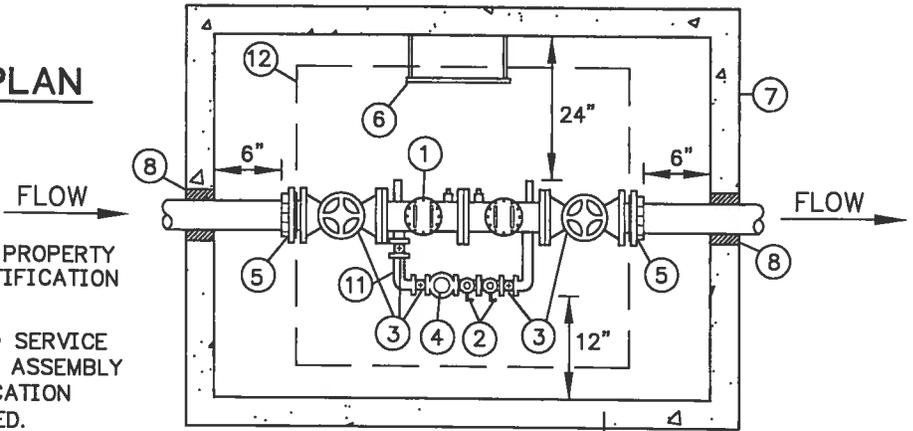
GENERAL NOTE

THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION AND ANNUALLY, AND WHEN MOVED OR REPAIRED. ALL INSTALLATION MUST MEET MANUFACTURERS SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.

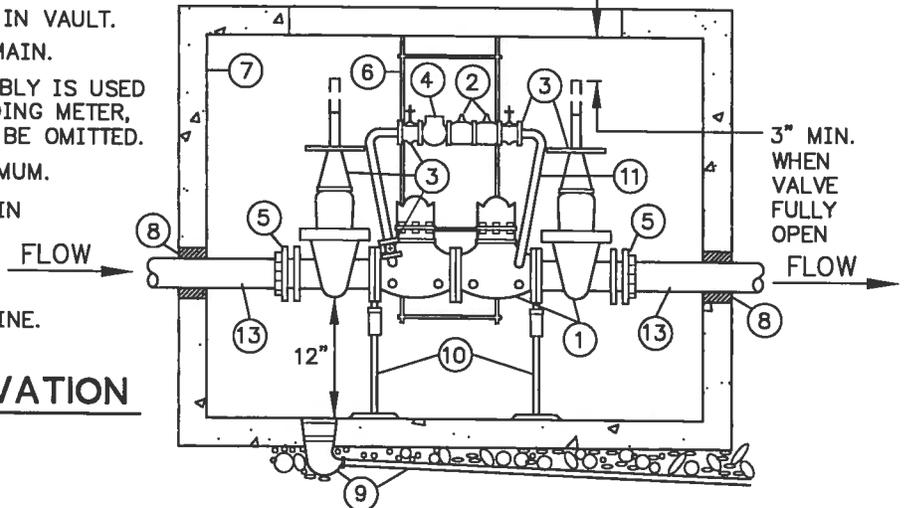
NOTES:

1. TOWN WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY TOWN. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE & GATE VALVE REQUIRED ON MAIN.
6. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE W/ DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
7. ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS W/ VEHICULAR TRAFFIC.
9. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.

PLAN



ELEVATION



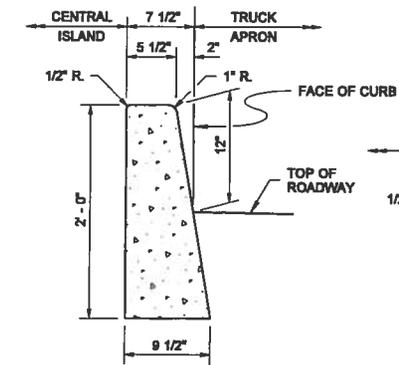
- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED O.S.&Y. VALVES & (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED BALL VALVES & (4) RESILIENT SEATED TEST COCKS.
- ③ EACH VALVE SHALL BE MARKED W/ MODEL NUMBER W/ DESIGNATION OF RESILIENT SEAT, SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED W/ A MIN. OF 4 MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ "TOUCH READ" SYSTEM.
- ⑤ UNI-FLANGE W/ SETSCREWS.
- ⑥ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ⑦ CONCRETE VAULT W/ A MIN. OF 2, 3'x3' ALUM. DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑧ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE W/ WELDED FLANGE OR ANCHOR BLOCKS.
- ⑨ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE.
- ⑩ TWO ADJUSTABLE PIPE STANCHIONS.
- ⑪ ALL PLUMBING FOR BY-PASS TO BE COPPER & BRASS.
- ⑫ ACCESS TO BE CENTERED OVER METER.
- ⑬ CL. 52 D.I., M.J. W/ RETAINER GLANDS.

SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332

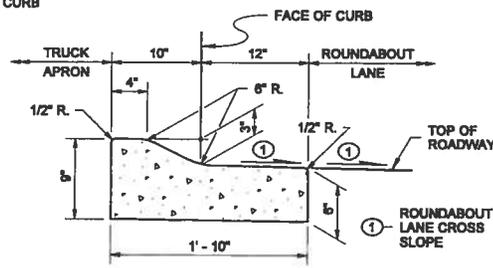
W10 DOUBLE CHECK DETECTOR ASSEMBLY

GENERAL NOTE

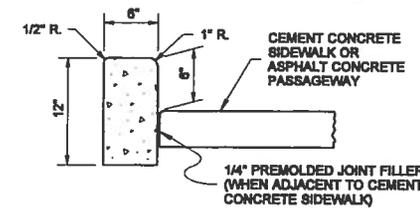
See Standard Plan F-3 for Curb Expansion and Contraction Joint spacing.



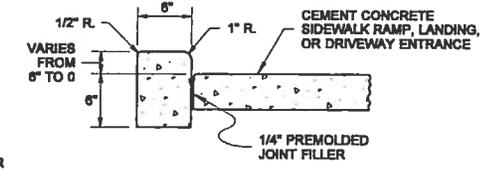
**ROUNDABOUT TRUCK APRON
INNER CEMENT CONCRETE CURB**



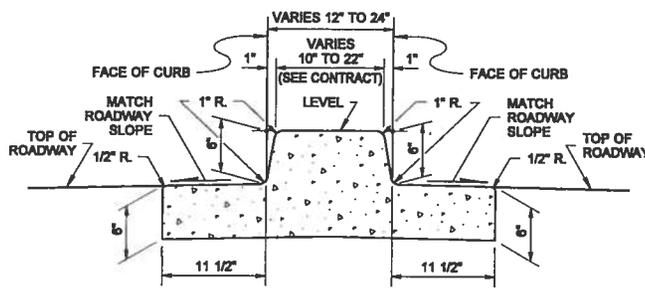
**ROUNDABOUT TRUCK APRON
OUTER CEMENT CONCRETE
CURB AND GUTTER**



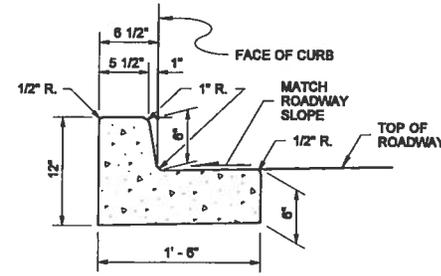
**CEMENT CONCRETE
PEDESTRIAN CURB**



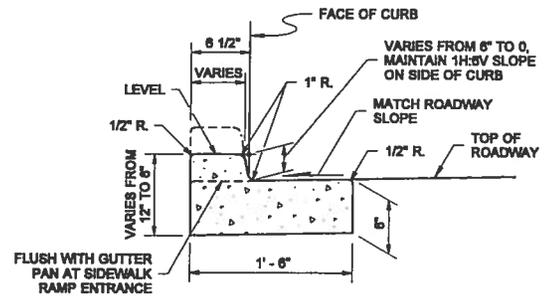
**CEMENT CONCRETE
PEDESTRIAN CURB
AT SIDEWALK RAMPS & LANDINGS,
AND DRIVEWAY ENTRANCES**



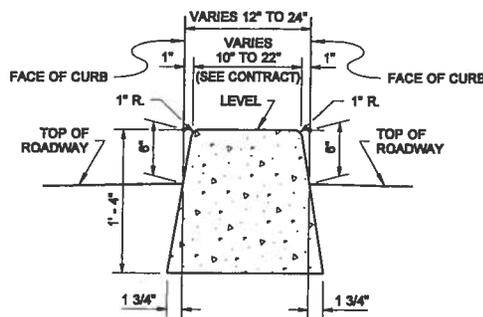
**DUAL-FACED CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



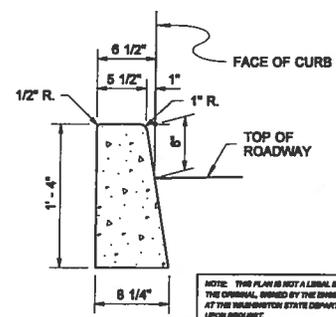
**CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



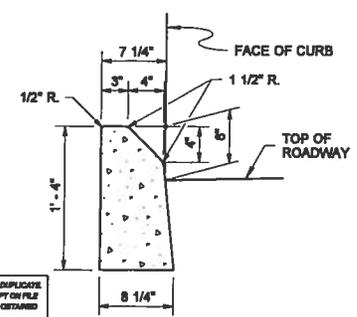
**DEPRESSED CURB SECTION
AT SIDEWALK RAMPS AND
DRIVEWAY ENTRANCES**



**DUAL-FACED CEMENT
CONCRETE TRAFFIC CURB**

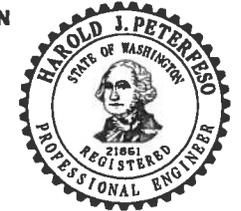


**CEMENT CONCRETE
TRAFFIC CURB**



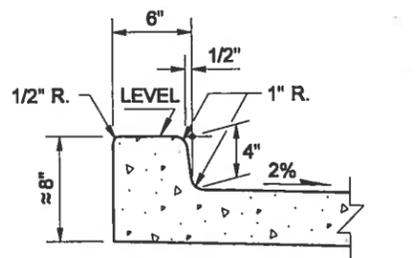
**MOUNTABLE CEMENT
CONCRETE TRAFFIC CURB**

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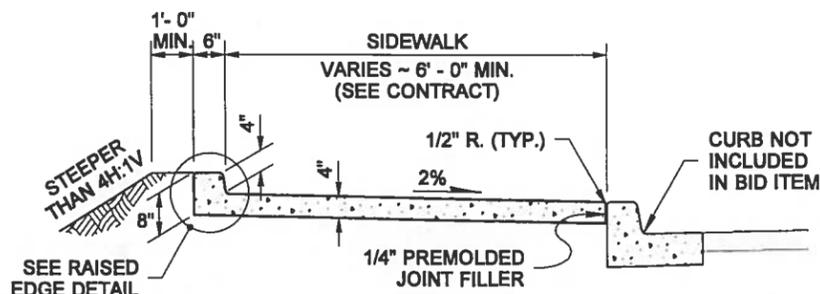
**CEMENT CONCRETE
CURBS
STANDARD PLAN F-1**
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Harold J. Peterfeso 12-17-02
STATE DESIGN ENGINEER DATE
Washington State Department of Transportation

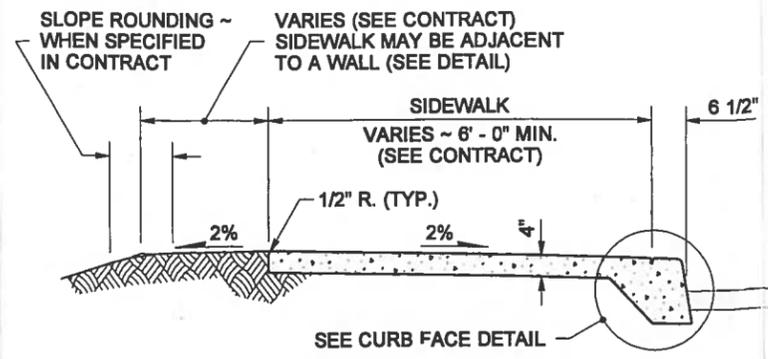


NOTE: EXTEND SIDEWALK TRANSVERSE JOINTS TO INCLUDE RAISED EDGE

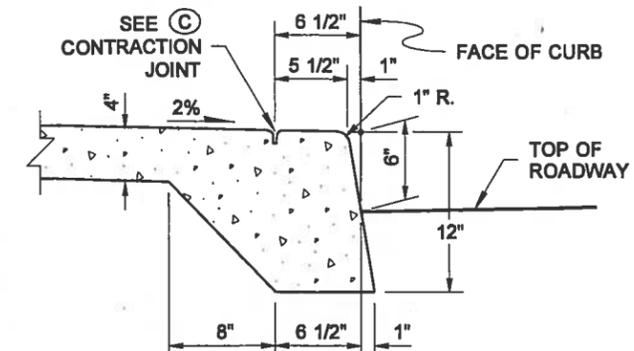
RAISED EDGE DETAIL



CEMENT CONCRETE SIDEWALK WITH RAISED EDGE

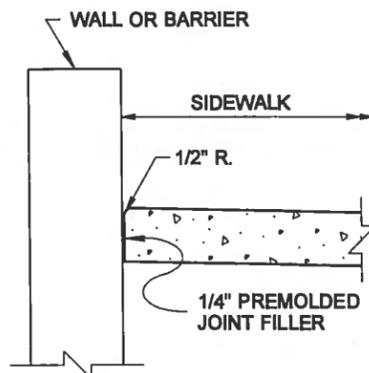


MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK

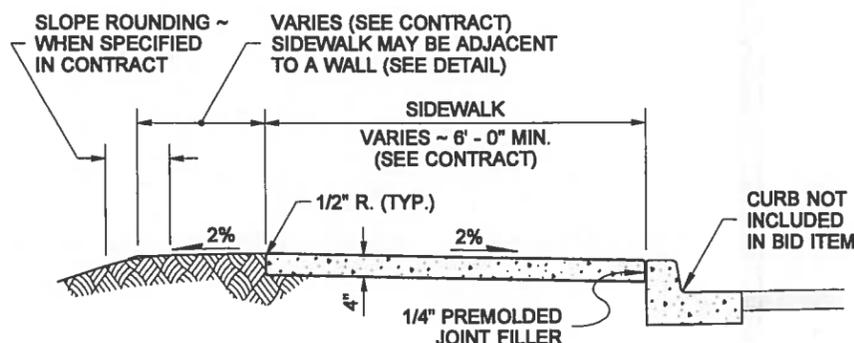


NOTE: EXTEND SIDEWALK TRANSVERSE EXPANSION JOINTS TO INCLUDE CURB (FULL DEPTH)

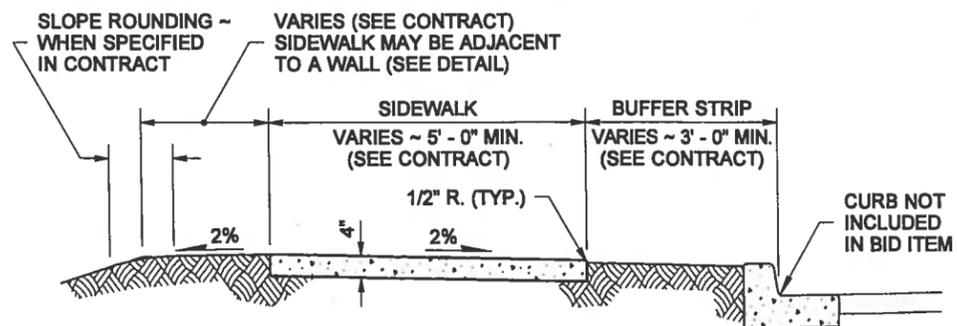
CURB FACE DETAIL



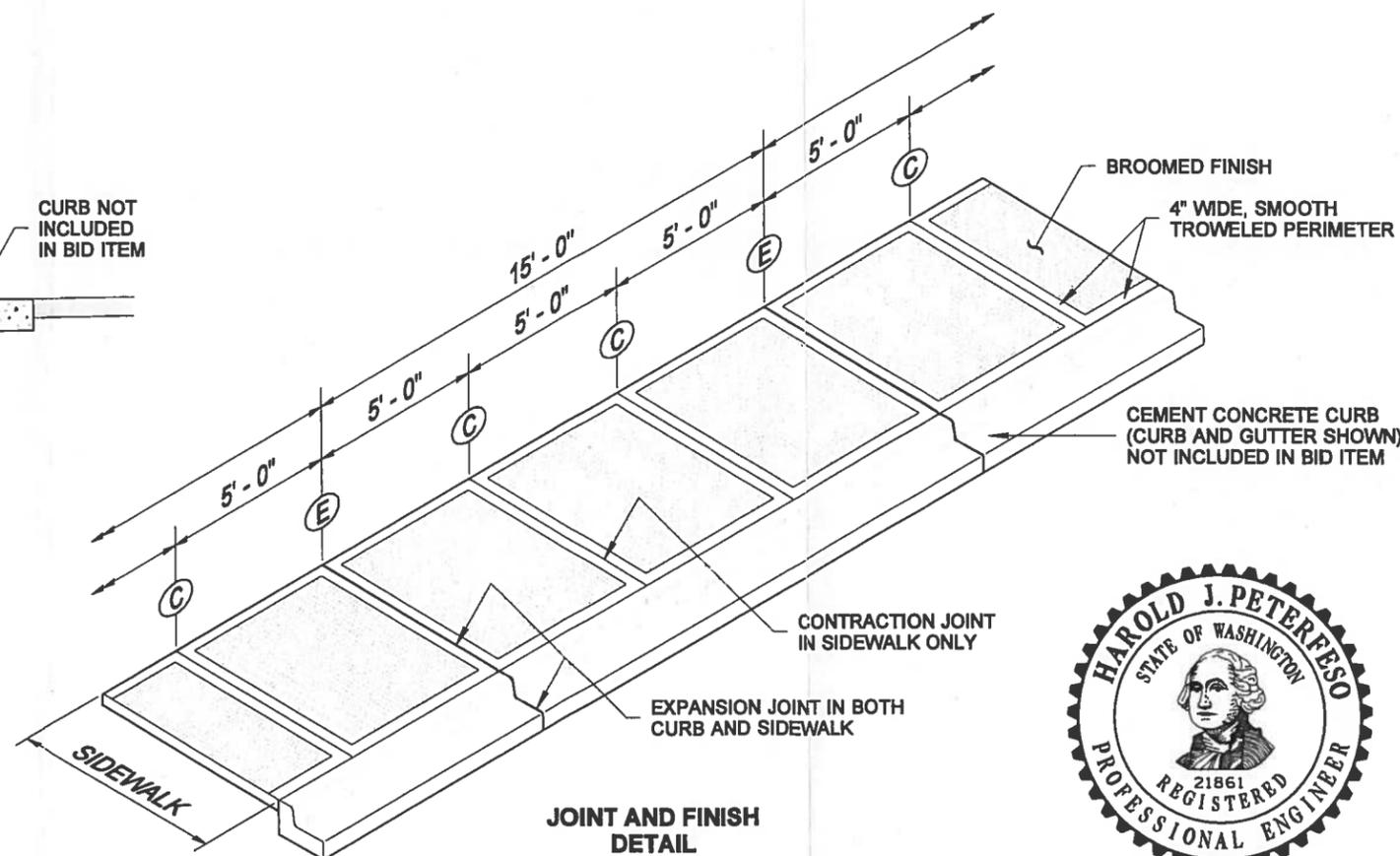
SIDEWALK ADJACENT TO WALL DETAIL



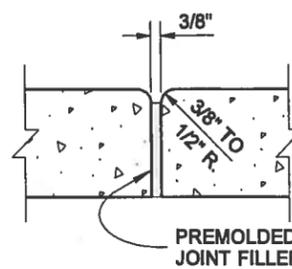
CEMENT CONCRETE SIDEWALK ADJACENT TO CURB



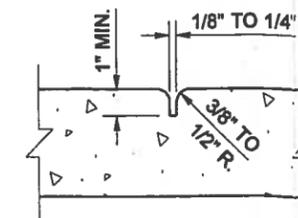
CEMENT CONCRETE SIDEWALK ADJACENT TO BUFFER STRIP



JOINT AND FINISH DETAIL



(E) EXPANSION JOINT



(C) CONTRACTION JOINT



EXPIRES MAY 16, 2003

CEMENT CONCRETE SIDEWALK STANDARD PLAN F-3

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

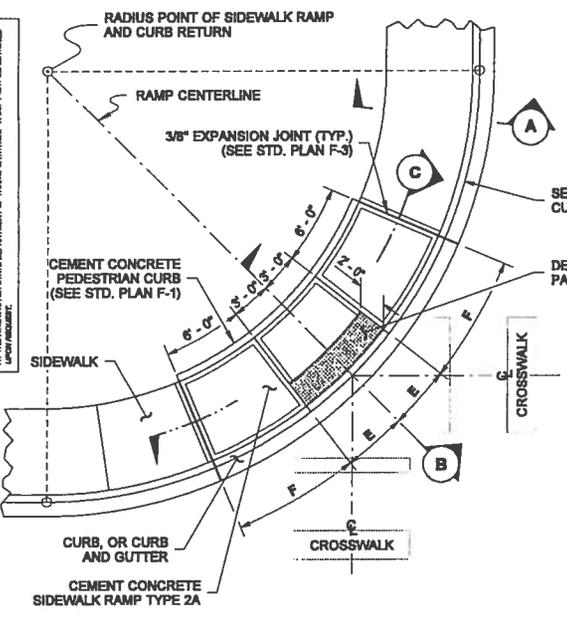
Harold J. Peterfeso 01-13-03

STATE DESIGN ENGINEER DATE

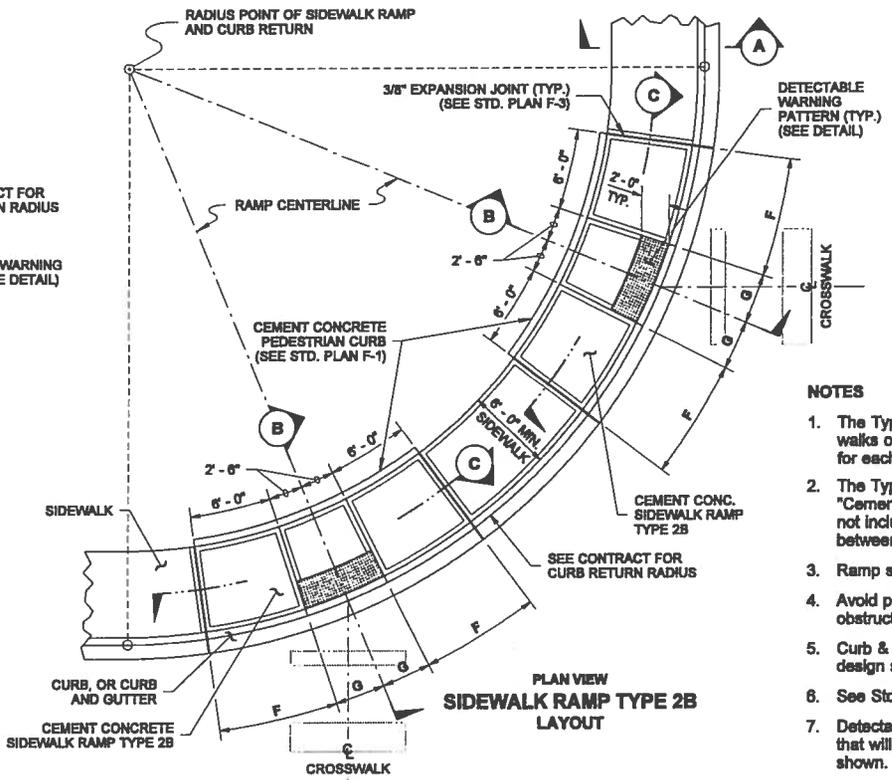
Washington State Department of Transportation

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NOTE: THIS PLAN AND SECTION DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS, LATEST EDITION, AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF THE STATE HIGHWAY SYSTEM, LATEST EDITION, AND APPROVED SUPPLEMENTAL SPECIFICATIONS TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF THE STATE HIGHWAY SYSTEM, LATEST EDITION, AT THE DISCRETION OF THE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.



PLAN VIEW
SIDEWALK RAMP TYPE 2A
LAYOUT



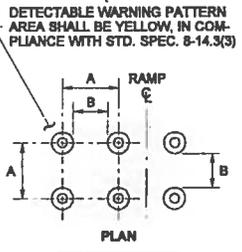
PLAN VIEW
SIDEWALK RAMP TYPE 2B
LAYOUT

RADIUS (AT CURB FACE)	E	F	G
20 FEET	4' - 5 1/4"	6' - 10 1/2"	3' - 8 1/2"
30 FEET	3' - 10"	7' - 6"	3' - 2 1/4"
40 FEET	3' - 7"	7' - 2"	3' - 0"
50 FEET	3' - 5 1/2"	6' - 10 3/4"	2' - 10 1/2"
60 FEET	3' - 4 1/2"	6' - 8 3/4"	2' - 8 1/2"
70 FEET	3' - 3 3/4"	6' - 7 1/2"	2' - 6"
80 FEET	3' - 3 1/4"	6' - 6 1/2"	2' - 8 1/2"
90 FEET	3' - 2 3/4"	6' - 5 1/2"	2' - 8 1/4"
100 FEET	3' - 2 1/2"	6' - 5"	2' - 6"

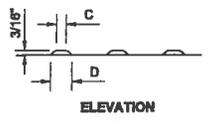
INTERMEDIATE RADII CAN BE INTERPOLATED

NOTES

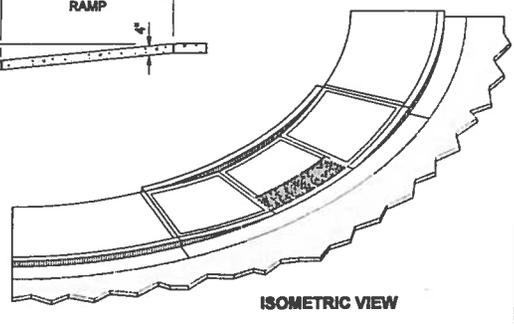
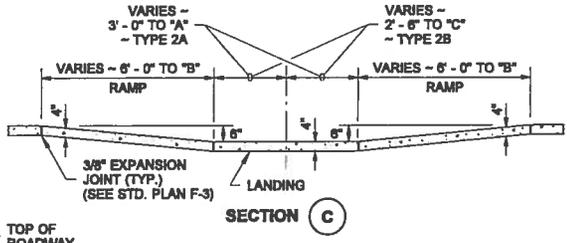
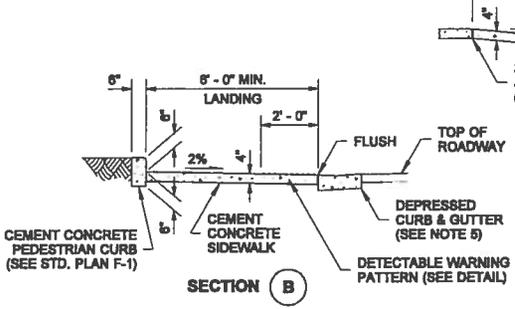
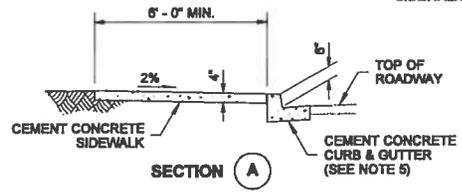
1. The Type 2A Ramp is used to provide access to two crosswalks only when it is infeasible to provide a separate ramp for each crosswalk.
2. The Type 2B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 2B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-1 for curb details.
6. See Std. Plan F-3 for sidewalk joint placement and details.
7. Detectable warning patterns may be created by any method that will achieve the truncated dome dimensions and spacing shown.



	MIN.	MAX.
A	1 5/8"	2 3/8"
B	5/8"	1 1/2"
C	7/16"	3/4"
D	7/8"	1 7/16"



ELEVATION
TRUNCATED DOMES (SEE NOTE 7)
DETECTABLE WARNING
PATTERN DETAIL.



ISOMETRIC VIEW



EXPIRES MAY 16, 2007

**SIDEWALK RAMP
TYPES 2A & 2B
WITH LAYOUTS
STANDARD PLAN F-3b**

SHEET 1 OF 1 SHEET

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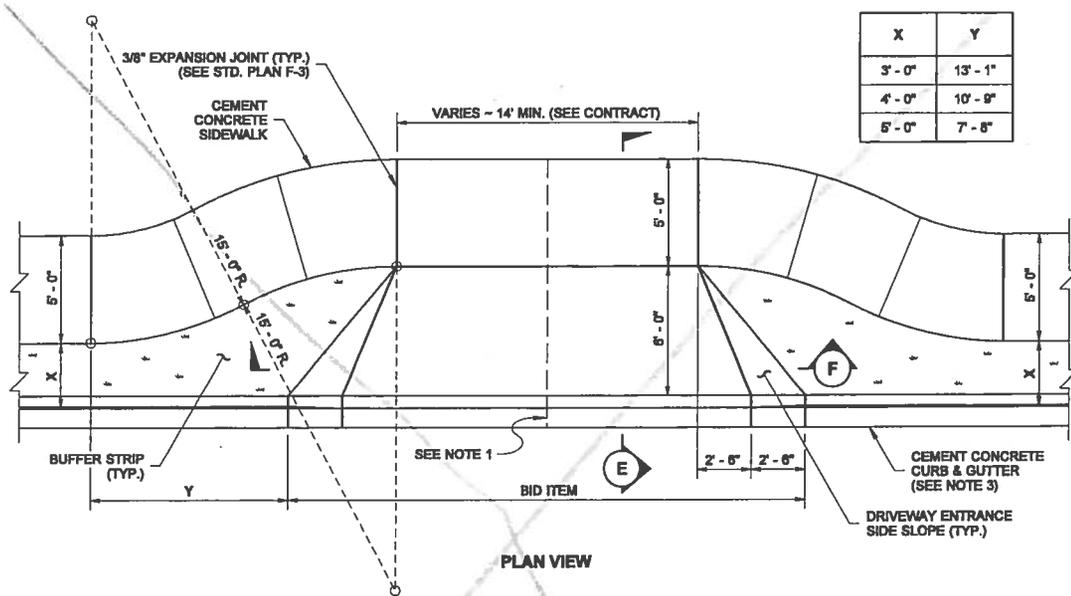
Harold J. Peterfeso 09-02-05

STATE DESIGN ENGINEER DATE

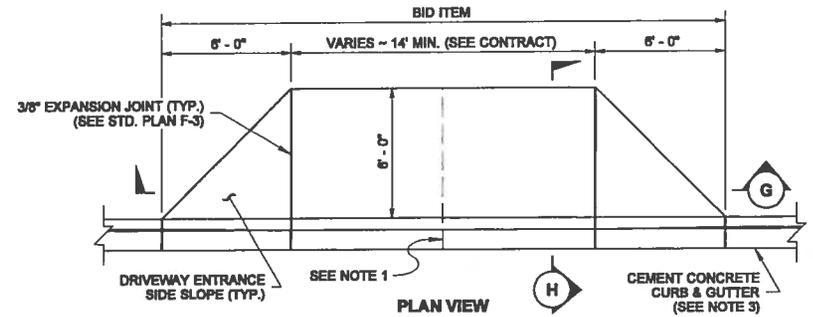


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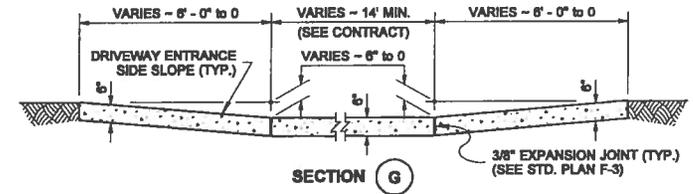
X	Y
3'-0"	13'-1"
4'-0"	10'-8"
5'-0"	7'-8"



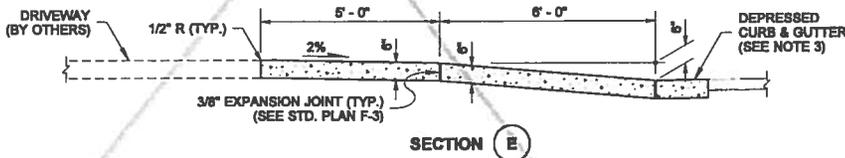
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 3



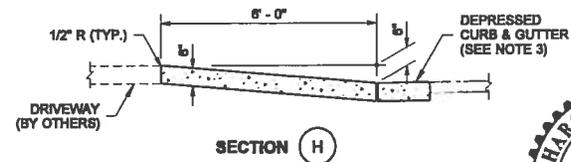
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 4



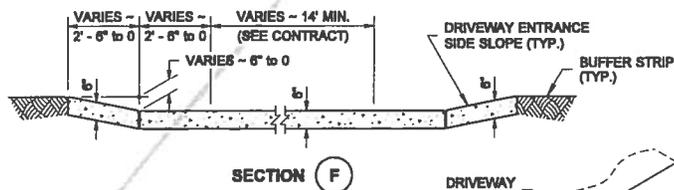
SECTION G



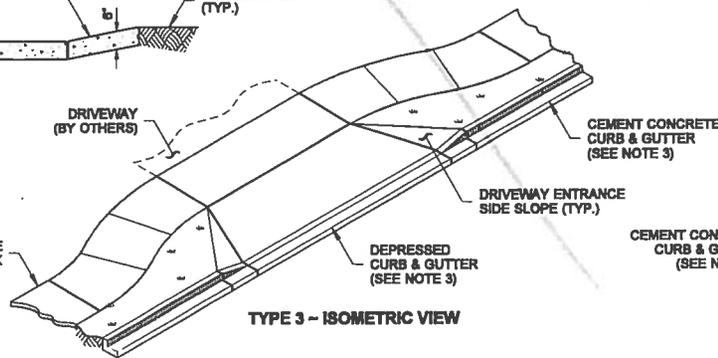
SECTION E



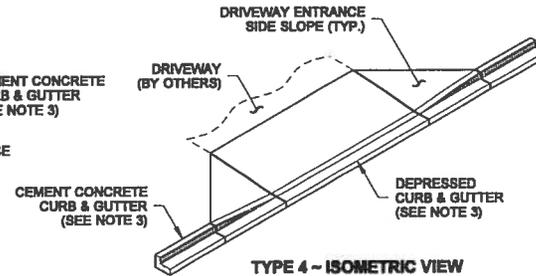
SECTION H



SECTION F



TYPE 3 - ISOMETRIC VIEW



TYPE 4 - ISOMETRIC VIEW

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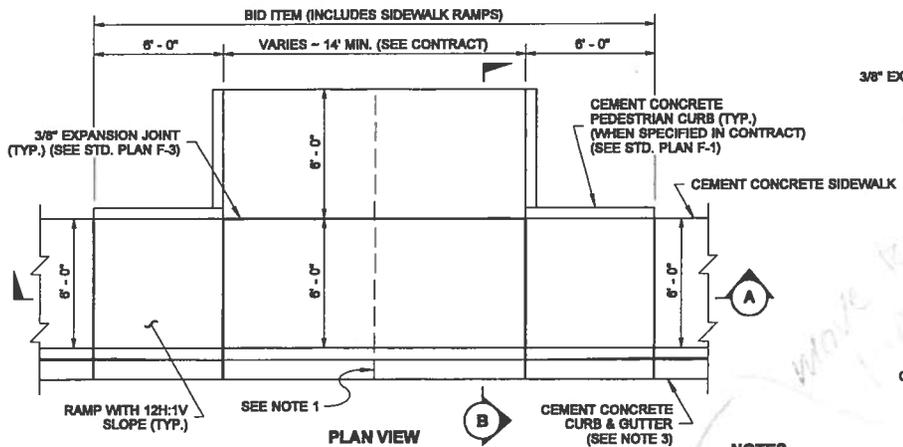


EXPIRES MAY 16, 2003
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3 & 4
STANDARD PLAN F-4
 SHEET 2 OF 2 SHEETS

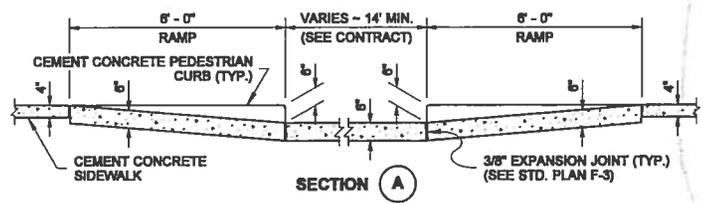
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Harold J. Peterfeso 01-13-03
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 Washington State Department of Transportation

Add notes from page 1. (It will not be included in manual.)

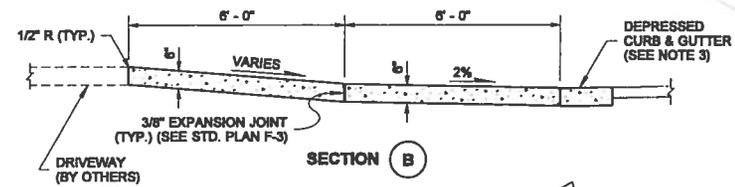
OKay



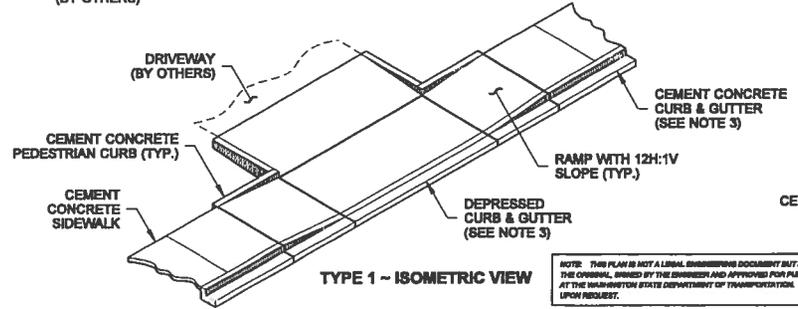
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 1



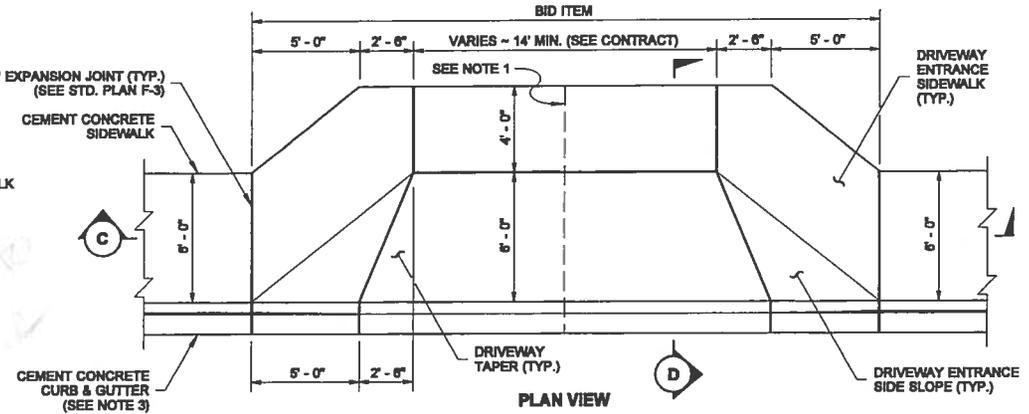
SECTION A



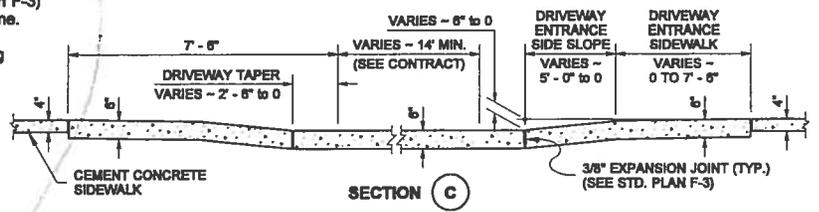
SECTION B



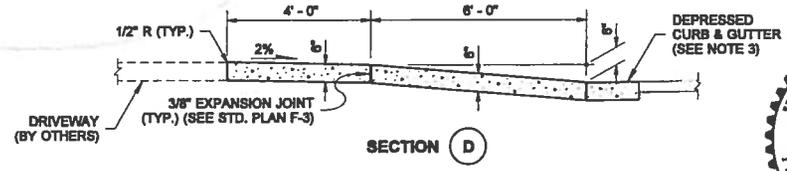
TYPE 1 ~ ISOMETRIC VIEW



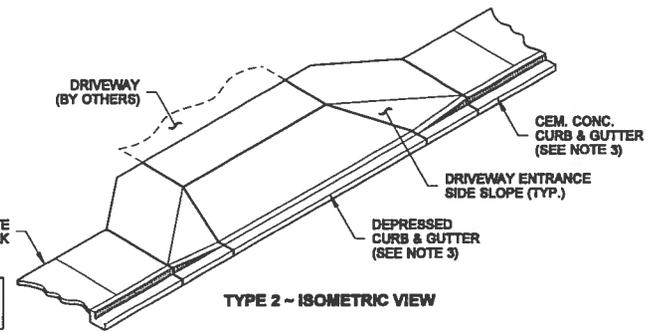
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 2



SECTION C



SECTION D

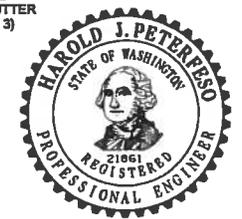


TYPE 2 ~ ISOMETRIC VIEW

NOTES

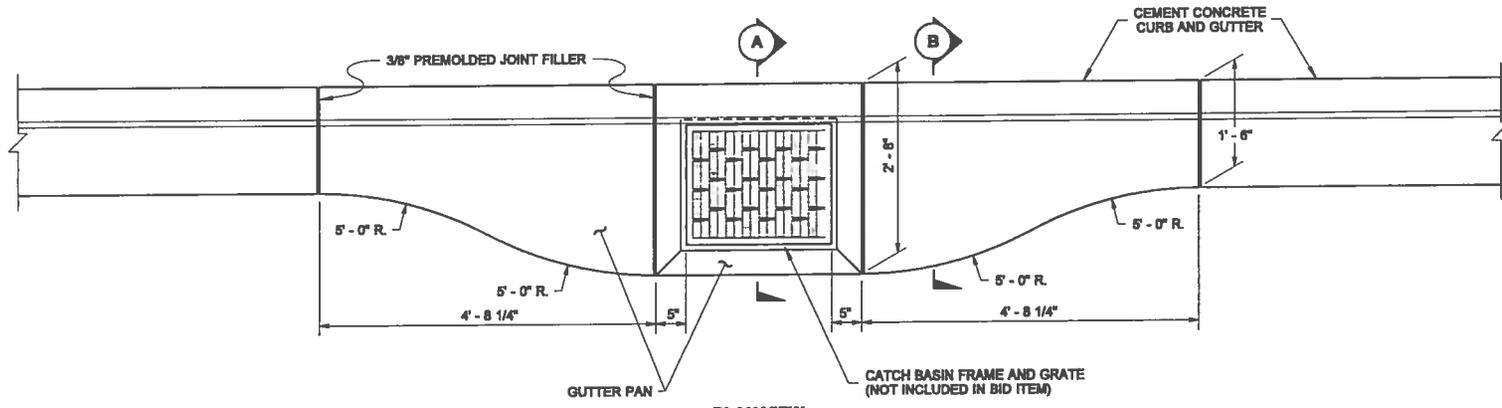
1. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Standard Plan F-3) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.
2. See Std. Plan F-3 for sidewalk details.
3. Curb and gutter shown, see the Contract Plans for the curb design specified. See Std. Plan F-1 for curb details.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

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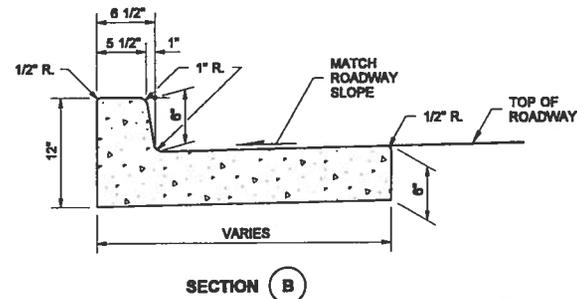
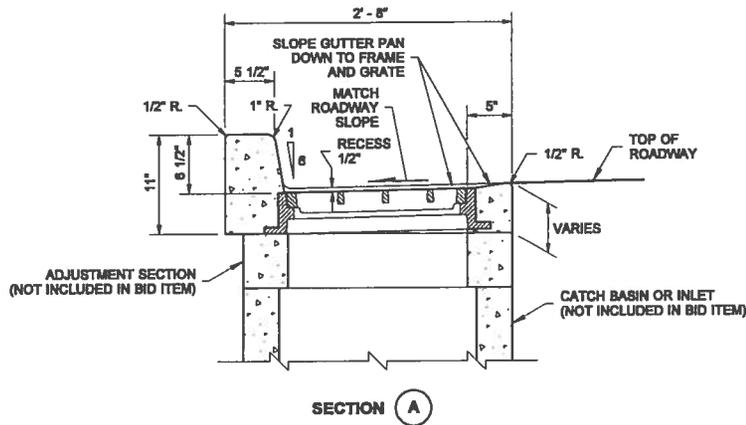


CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3 & 4 STANDARD PLAN F-4

SHEET 1 OF 2 SHEETS
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Harold J. Peterfeso 01-13-03
 STATE DESIGN ENGINEER DATE
 Washington State Department of Transportation



PLAN VIEW
CATCH BASIN GUTTER PAN



EXPIRES MAY 16, 2003

CEMENT CONCRETE CURB AND GUTTER PAN
STANDARD PLAN F-1a

SHEET 1 OF 1 SHEET

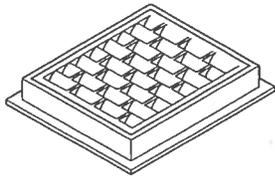
APPROVED FOR PUBLICATION

Harold J. Peterfeso 12-17-02
STATE DESIGN ENGINEER DATE

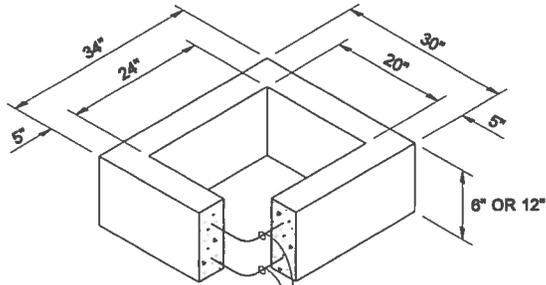
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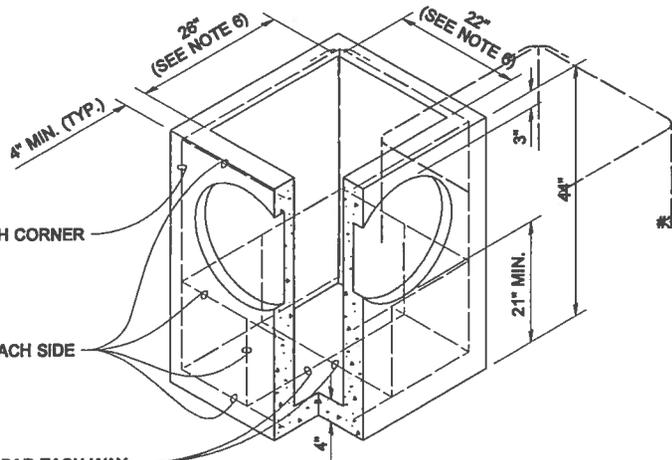
FRAME AND VANED GRATE



ONE #3 BAR HOOP FOR 6" HEIGHT
TWO #3 BAR HOOPS FOR 12" HEIGHT

RECTANGULAR ADJUSTMENT SECTION

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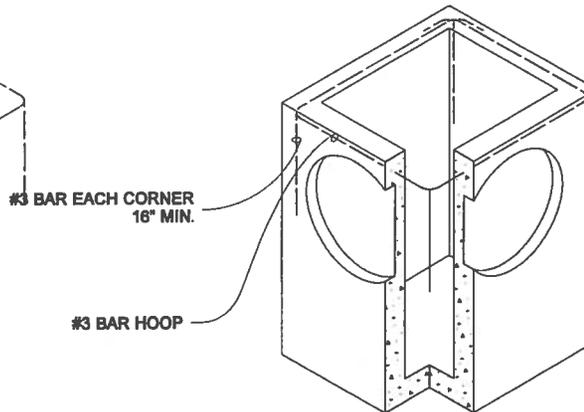
PRECAST BASE SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP * (STD. SPEC. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. 9-05.12(2))	15"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.
3. The maximum depth from the finished grade to the pipe invert shall be 5'.
4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
5. The precast base section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.
6. The opening shall be measured at the top of the precast base section.
7. All pickup holes shall be grouted full after the basin has been placed.



SEE NOTE 1
ALTERNATIVE PRECAST BASE SECTION



EXPIRES JULY 1, 2007

CATCH BASIN TYPE 1

STANDARD PLAN B-1

SHEET 1 OF 1 SHEET

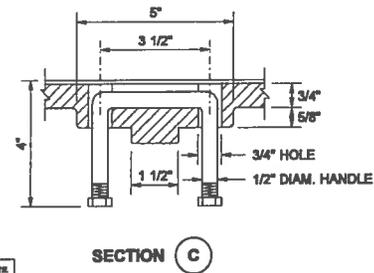
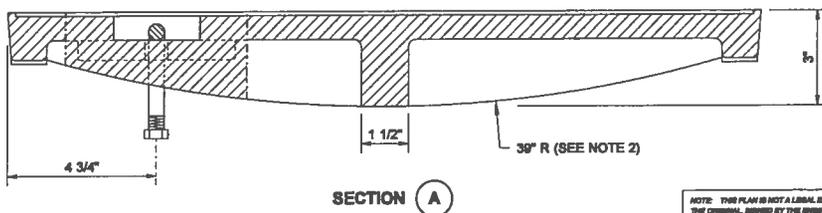
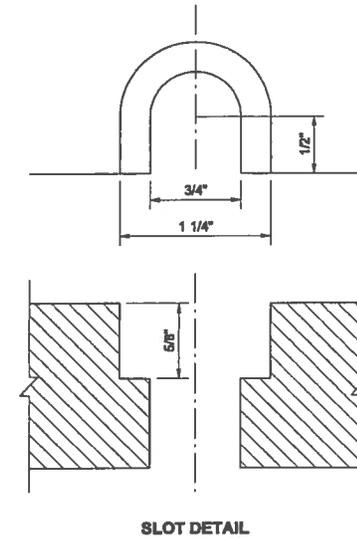
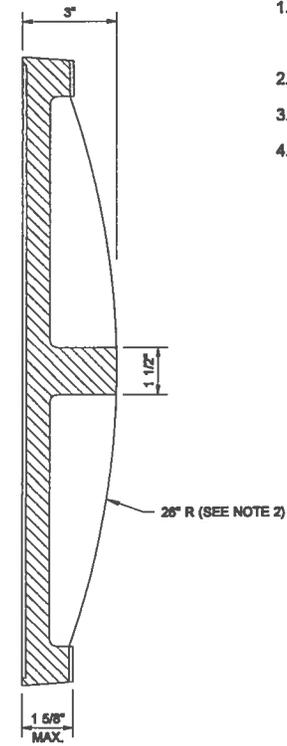
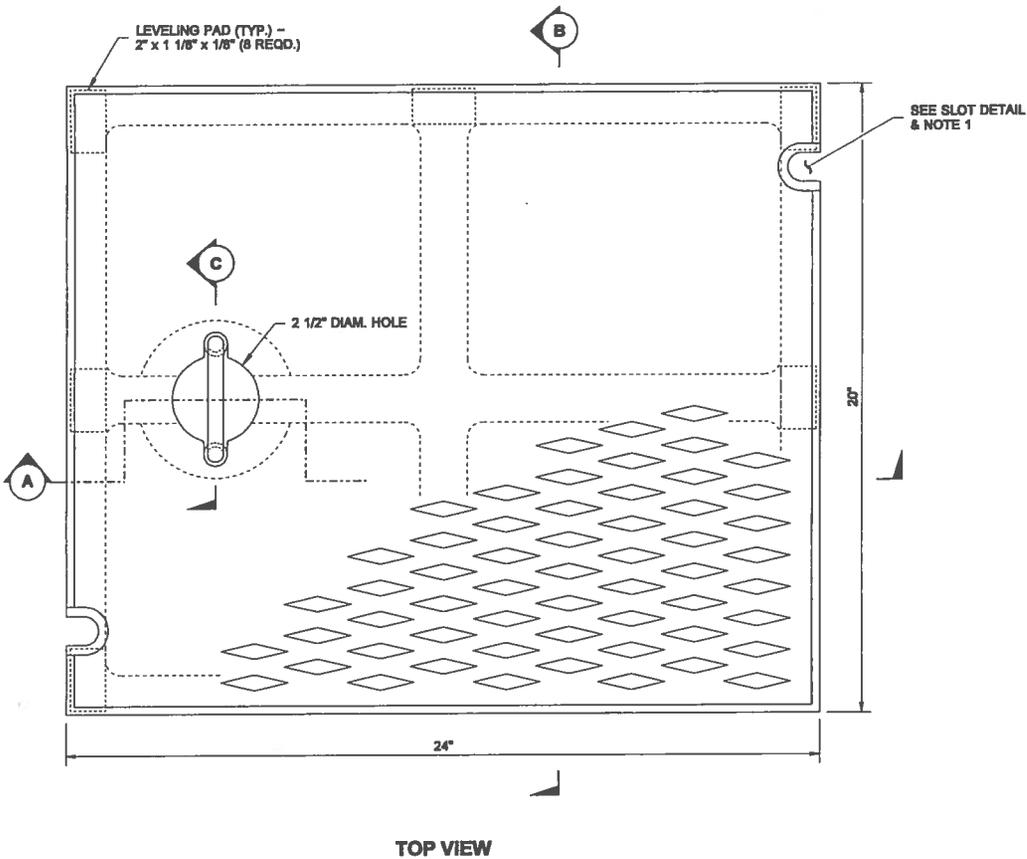
APPROVED FOR PUBLICATION

Harold J. Peterfeso 11-08-05

STATE DESIGN ENGINEER DATE



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NOTES

1. When bolt down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Alternate reinforcing rib designs are acceptable.
3. Refer to Standard Specification 9-05.15(2) for additional requirements.
4. For frame details, see Standard Plan B-2a.



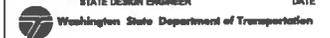
EXPIRES JULY 1, 2005

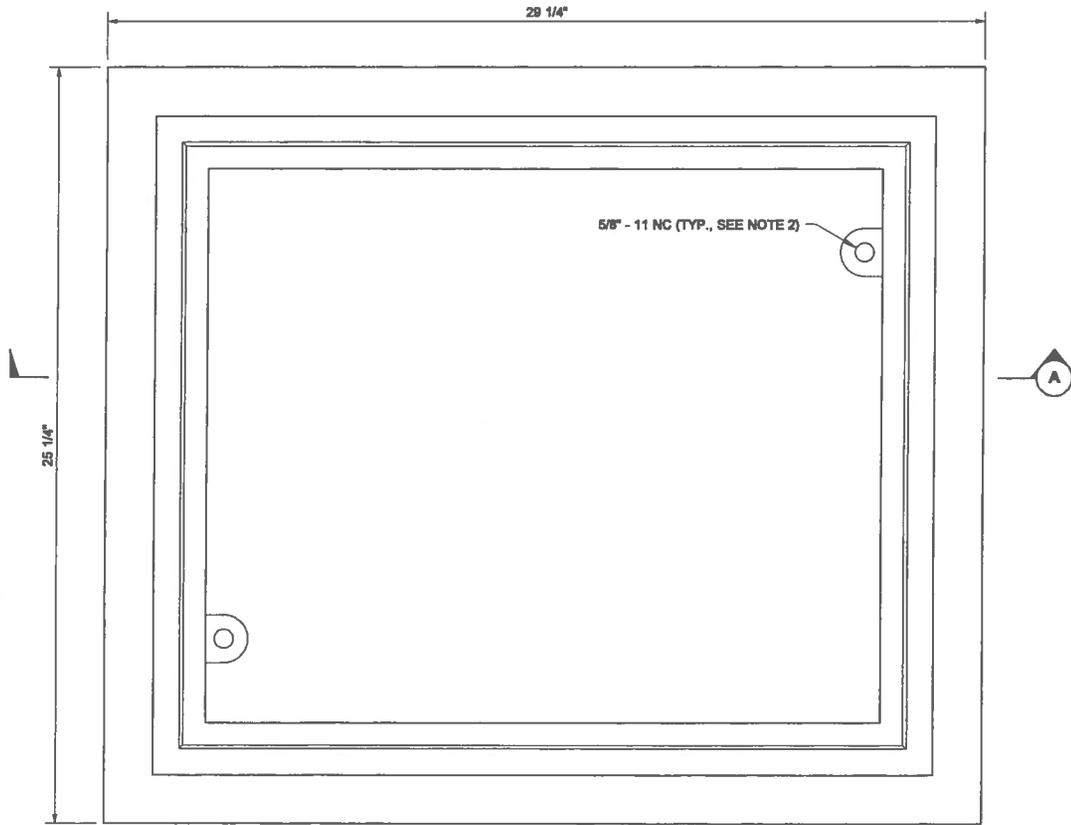
**SOLID METAL COVER
FOR CATCH BASIN
STANDARD PLAN B-2**

SHEET 1 OF 1 SHEET

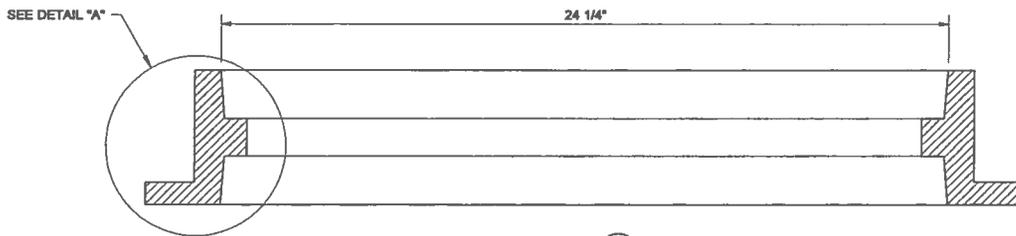
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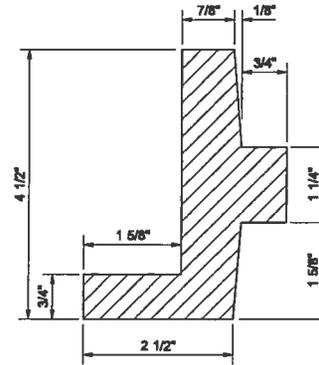
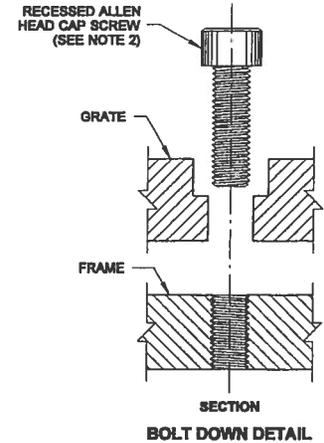
TOP VIEW



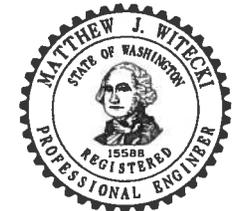
SECTION A

NOTES

1. This frame is designed to accommodate 20" x 24" grates or covers as shown on Standard Plans B-2, B-2b, B-2c and B-2d.
2. When bolt down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC x 2" allen head cap screw. Location of bolt down holes varies among different manufacturers
3. Refer to Standard Specification 9-05.15(2) for additional requirements.



DETAIL "A"



EXPIRES JULY 1, 2005

**REVERSIBLE FRAME FOR
CATCH BASIN OR
CONCRETE INLET
STANDARD PLAN B-2a**

SHEET 1 OF 1 SHEET

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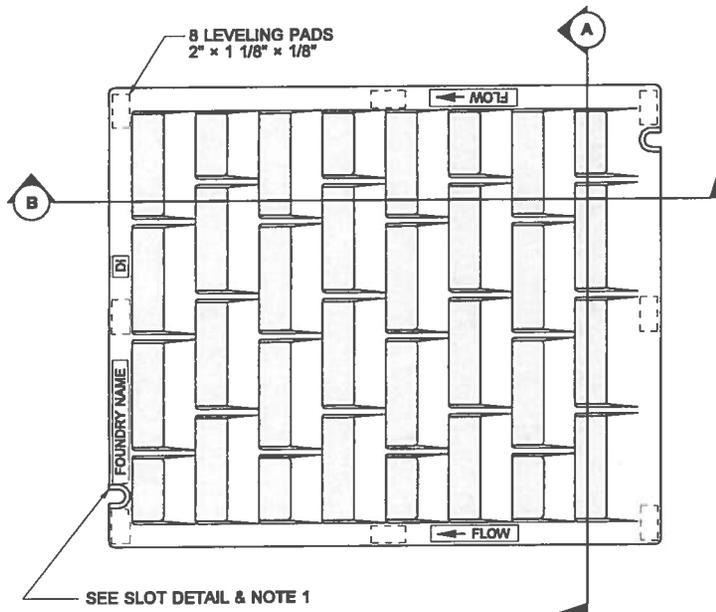
STATE DESIGN ENGINEER

DATE

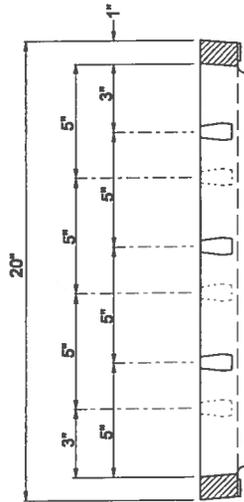


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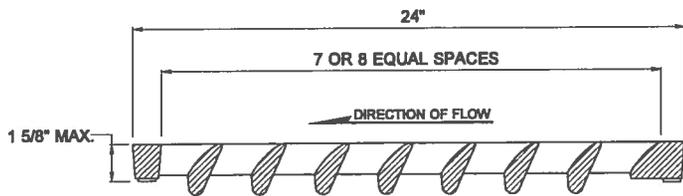
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PLAN VIEW



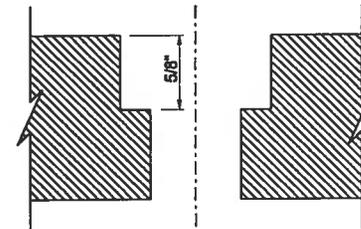
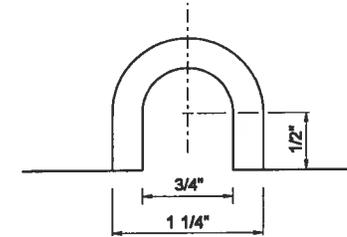
SECTION A



SECTION B

NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frames. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



SLOT DETAIL



EXPIRES JULY 1, 2003

**VANED GRATE FOR
CATCH BASIN AND
CONCRETE INLET
STANDARD PLAN B-2b**

SHEET 1 OF 1 SHEET

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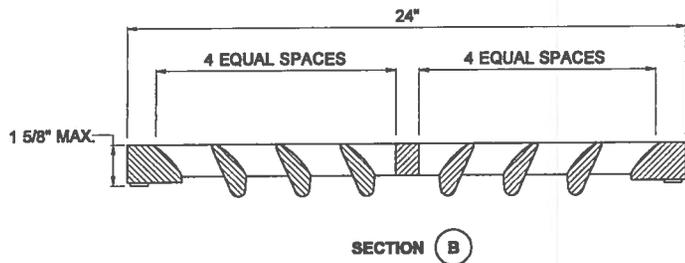
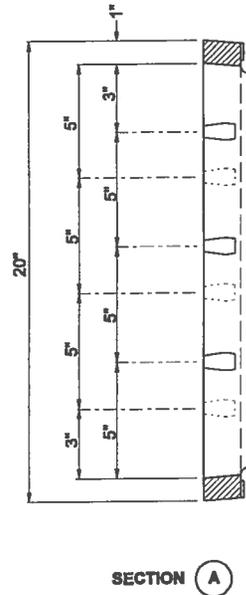
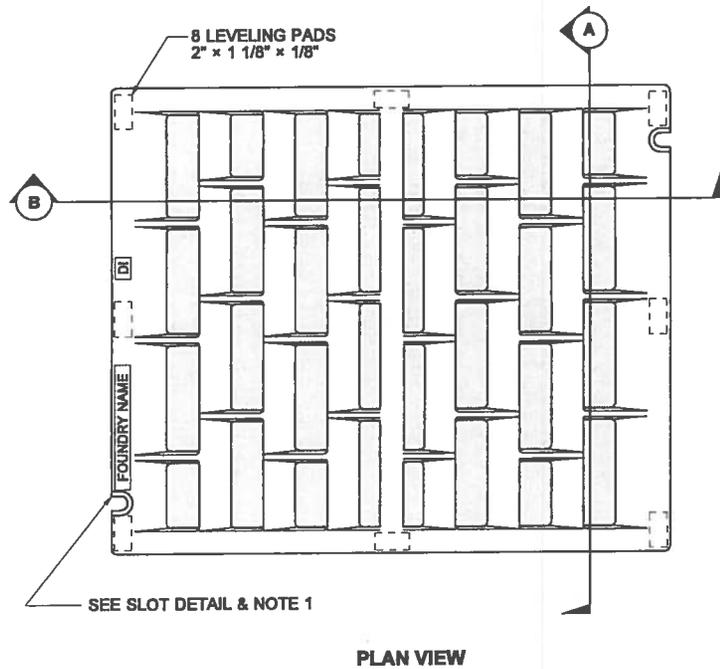
Harold J. Peterfeso 06-17-02

STATE DESIGN ENGINEER DATE



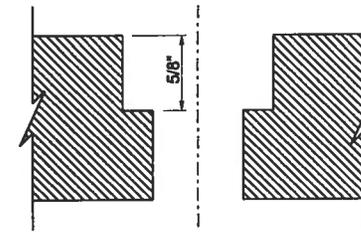
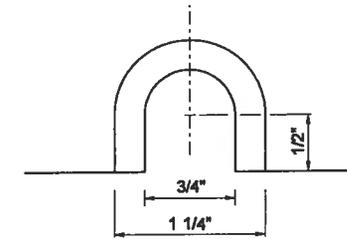
Washington State Department of Transportation

05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC
DATE	REVISION	BY



NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



SLOT DETAIL



EXPIRES JULY 1, 2003

**BI-DIRECTIONAL VANED
GRATE FOR CATCH BASIN
AND INLET
STANDARD PLAN B-2c**

SHEET 1 OF 1 SHEET

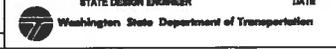
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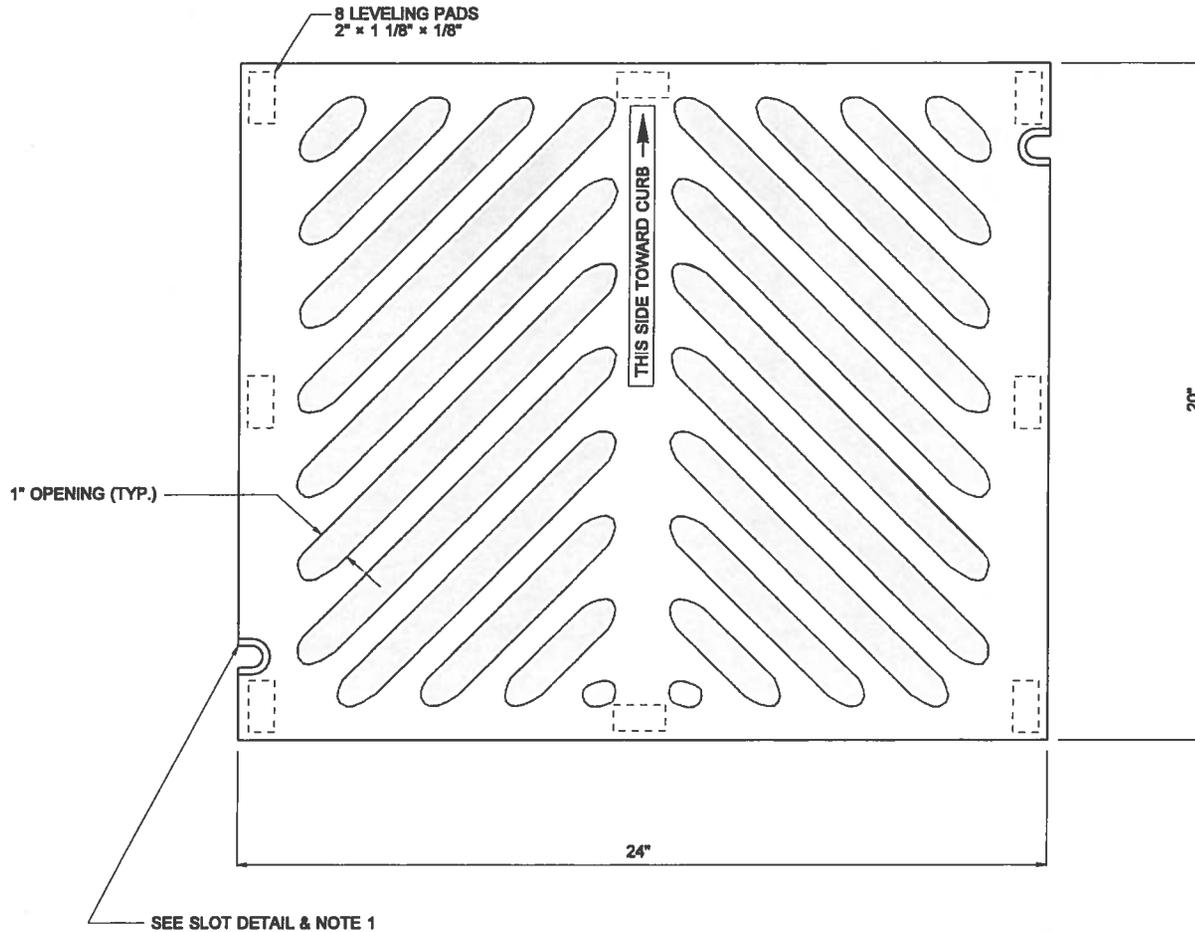
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STATE DESIGN ENGINEER DATE

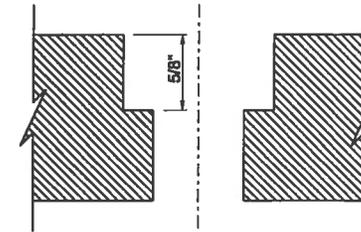
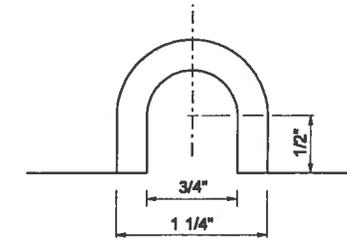
05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC
DATE	REVISION	BY





NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.
4. The thickness of the grate shall not exceed 1 5/8".



SLOT DETAIL



EXPIRES JULY 1, 2003

**HERRINGBONE GRATE FOR
CATCH BASIN
AND INLET
STANDARD PLAN B-2d**

SHEET 1 OF 1 SHEET

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SECTION E: SPECIFICATIONS, PLANS, AND STANDARD DETAILS

This section provides specifications that provide minimum standards for infrastructure improvements, examples of plans for specific utilities, and standard details for the Town's infrastructure.

Specifications

Division 1 – General Construction Provisions

- 01001 Specification Structure
- 01045 Cutting and Patching
- 01050 Field Engineering
- 01070 Abbreviations and Symbols
- 01090 Reference Standards
- 01210 Preconstruction Conferences
- 01340 Shop Drawings, Project Data, and Samples
- 01410 Testing Laboratory Services
- 01420 Inspection Services
- 01545 Protection of Work and Property
- 01550 Access and Haul Roads
- 01560 Temporary Controls
- 01570 Traffic Regulation
- 01600 Material and Equipment
- 01650 Testing, Startup, and Operation
- 01700 Contract Closeout
- 01710 Cleaning
- 01720 Project Record Documents

Division 2 – Site Work

- 02050 Demolition
- 02110 Site Clearing
- 02140 Dewatering
- 02150 Shoring
- 02161 Rock Walls
- 02202 Rock Excavation
- 02222 Excavating, Backfilling, and Compacting for Utilities
- 02275 Sedimentation Control
- 02300 Pipe Boring and Jacking
- 02575 Pavement Repair and Resurfacing
- 02605 Manholes and Cleanouts
- 02610 Pipe and Fittings
- 02640 Valves
- 02645 Hydrants
- 02660 Water Lines
- 02720 Storm Drainage
- 02730 Sanitary Sewers

- 02732 Sewer Force Mains
- 02760 Existing Utilities/Facilities Underground and Overhead
- 02990 Landscape Restoration

Plans

- Roadway Sections
- Example of sewer plan
- Example of water plan

Standard Details

General:

- G1 Typical Trench Section
- G2 Rigid Pavement Patching
- G3 Asphalt Concrete Patching

Sewer:

- S1 Type I – 48” Manhole
- S2 Type IIIA – 48” Manhole
- S3 Manhole Frame and Cover
- S4 Manhole Channeling
- S5 Manhole Steps and Ladder
- S6 Street Side Sewer
- S7 Sewer Cleanout
- S8a Outside Drop Manhole Connection
- S8b Inside Drop Manhole Connection
- S9 Concrete Pipe Anchor

Water:

- W1 ¾” and 1” Water Service
- W2 1½” and 2” Water Service
- W3 Fire Hydrant Assembly
- W4 Concrete Thrust Blocking
- W5 Blowoff Assembly
- W6 Valve Operating Nut Extension
- W7 Air Release Valve Assembly
- W8 Valve Marker Post/Hydrant Guard Post
- W9 Double Check Valve Assembly
- W10 Double Check Detector Assembly

Storm and Roadway Features:

- WSDOT F-3b Sidewalk Ramp
- WSDOT F-4 Driveway Entrance
- WSDOT F-1a Curb and Gutter
- WSDOT B-1 Catch Basin Type 1
- WSDOT B-2 Catch Basin Cover
- WSDOT B-2a Catch Basin Frame

WSDOT B-2b Catch Basin Vaned Grate
WSDOT B-2c Catch Basin Bi-Directional Vaned Grate
WSDOT B-2d Catch Basin Herringbone Grate

SECTION E: SPECIFICATIONS, PLANS, AND STANDARD DETAILS

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- 01600 Material and Equipment
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- 02990 Landscape Restoration

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- Example of water plan

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- G3 Asphalt Concrete Patching

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- S7 Sewer Cleanout
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- S8b Inside Drop Manhole Connection
- S9 Concrete Pipe Anchor

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- WSDOT F-1a Curb and Gutter
- WSDOT B-1 Catch Basin Type 1
- WSDOT B-2 Catch Basin Cover
- WSDOT B-2a Catch Basin Frame

WSDOT B-2b Catch Basin Vaned Grate
WSDOT B-2c Catch Basin Bi-Directional Vaned Grate
WSDOT B-2d Catch Basin Herringbone Grate

SECTION 01001

SPECIFICATION STRUCTURE

1. GENERAL

1.1 FORMAT

- A. This specification is organized on the format promulgated by the Construction Specification Institute (CSI format).
- B. This format assigns permanent numbers to all divisions and sections and, so far as possible, assigns permanent places in the specifications to all products, processes, activities and construction requirements. A number is assigned that will not change from specification to specification.
- C. Division, section and subsection numbers that are not required are omitted from the Specification.
- D. Reference to an Article is a numbered clause in the General Conditions.

1.2 INDEX

- A. All sections required for a complete Contract appear in the index. Sections not required are omitted.
- B. Bidders and Contractors should check sections present against the index to assure the presence of all required sections of the Contract.

1.3 ARRANGEMENT

- A. The Project Manual is organized as follows:
 - 1. Procedural and legal documents in the opening sections.
 - 2. Specifications in divisions numbered 1 to 16.
- B. No attempt has been made in these specifications or plans to segregate work covered by any trade or subcontractor under one specification. Such segregation and establishment of subcontract limits shall be solely a matter of specific agreement between the Contractor and his subcontractors and shall not be based upon an inclusion, segregation or arrangement in or of these specifications. The Contractor and subcontractor in each case is warned that work included in any subcontract may be divided between several general specifications and that each general specification or subhead of the Technical Specifications may include work covered by two or more subcontracts in excess of any one subcontract.

- C. The Contractor shall be responsible for all work shown or specified, regardless of location in the Contract Documents.

1.4 LANGUAGE

- A. These Specifications are written in imperative and abbreviated form.
- B. This imperative language of the technical sections is directed at the Contractor, unless specifically noted otherwise.
- C. Incomplete sentences shall be completed by inserting "shall", "the Contractor shall", and "shall be", and similar mandatory phrases by inference in the same manner as they are applied to notes on the drawings. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases.
- D. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated imperatively or otherwise.

* * * END OF SECTION * * *

SECTION 01045

CUTTING AND PATCHING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Pavement Repair and Resurfacing: Section 02575
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 METHODS

- A. Execute cutting (including excavating), fitting, or patching of work, required to:
 - 1. Make several parts fit properly.
 - 2. Remove and replace defective work.
 - 3. Remove and replace work not conforming to requirements of Contract Documents.
 - 4. Install specified work in existing construction.
- B. Do not endanger any work by cutting or altering work or any part of it.
- C. Do not cut or alter work of another contractor.

1.3 SUBMITTALS

- A. Submit written notice to Engineer requesting consent to proceed prior to cutting which affects structural safety of project, or work of another contractor.
- B. Submit notice to Engineer, designating the time the work will be uncovered, to provide for observation.

1.4 PAYMENT FOR COSTS

- A. Contractor shall pay for all costs caused by ill-timed, unnecessary or defective work or work not conforming to Contract Documents, including costs for additional services of Engineer.

2. PRODUCTS

2.1 MATERIALS

- A. For replacement of work removed: Contractor shall comply with Specifications for type of work to be done.

3. EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of work, including elements subject to movement or damage during construction.

3.2 PREPARATION (PRIOR TO CUTTING)

- A. Provide shoring, bracing and support as required to maintain structural integrity of all portions of the project.

3.3 PERFORMANCE

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- B. Execute excavating and backfilling as specified in Excavating, Backfilling and Compacting for Utilities.
- C. Restore work that has been cut or removed.

* * * END OF SECTION * * *

SECTION 01050

FIELD ENGINEERING

[added due to pipeline section and Owner's review of surveyor selection]

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

D. Inspection Services: Section 01420.

1.3 GENERAL REQUIREMENTS

A. The Contractor shall protect and preserve in their original position all stakes, points, or marks set for the work.

G. Detailed staking will usually be done after clearing of right of way has been completed.

1.4 REQUIREMENTS FOR PIPELINES

A. Where line and grade is carried by stringline in the case of pipeline construction, not less than three (3) points shall be in use at one time.

B. Grades shall be checked by the Contractor and if the points do not line up, the work shall be immediately stopped, and the cause remedied before proceeding with the work.

C. Other methods of transferring line and grade may be used providing that such methods can be checked by the Engineer at not less than three points in each section of pipe between manholes before backfilling is started. Permission to use any specific method will not relieve the Contractor of his responsibility to meet any requirement of other sections of this Specification.

D. Line and grade shall be checked for each piece of pipe laid.

1.6 CONTRACTOR PROVIDED STAKES

A. Staking when performed by Contractor shall be done by qualified licensed surveyors.

B. Prior to the Contractor conducting any survey work, the Contractor shall submit to the Owner evidence of the qualifications of the person(s) he will assign to do the survey work for the project. The Owner reserves the right to disallow the person(s) selected by the Contractor for surveying if, in the Owner's opinion, the person is not qualified to do the work. The Contractor shall select another surveyor and submit qualifications to the Owner until a qualified person is approved by the Owner.

- C. Control points shown on the drawings or outlined in the Special Provisions shall be utilized to stake out the project.
- D. Field notes shall be kept in standard bound notebooks in a clear, orderly manner consistent with standard engineering practice including titles, numbering and indexing.
- E. The Contractor shall provide the Owner with a copy of all field notes including references to monuments and property corners.

* * * END OF SECTION * * *

SECTION 01070

ABBREVIATIONS AND SYMBOLS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Definitions: General Conditions

1.2 ABBREVIATIONS

A. Whenever the following abbreviations are used on the plans, specifications, proposals and contracts, they shall be construed to mean the words and terms as listed below.

B. Duplicate Definitions shall be interpreted in context of use.

A

AASHTO	American Association of State Highway and Transportation Officials
AC	Asbestos Cement or Asphaltic Concrete
ACI	American Concrete Institute
AFBMA	Anti Friction Bearing Manufacturers Assoc.
AFF	Above Finish Floor
AGA	American Gas Association
AGC	Associated General Contractors of America
AGMA	American Gear Manufacturer Association
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASAE	American Society of Agriculture Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association

B

BTU British thermal unit
BTUH British thermal units per hour

C

C Centigrade/Celsius
CB Catch Basin
CBMA Certified Ballast Manufacturers Association
CFM Cubic feet per minute
CFS Cubic feet per second
CL² Chlorine Solution
CMP Corrugated Metal Pipe
CO Clean Out
CPM Critical path method
CRSI Concrete Reinforcing Steel Institute

D

D Drain
DFP Douglas Fir Plywood Association
DI Ductile Iron
DIPRA Ductile Iron Pipe Research Association

E

EA Each
EEO Equal Employment Opportunity
E/P Edge of Pavement
EPA Environmental Protection Agency (Federal)

F

F Fahrenheit
FCA Flanged Coupling Adapter
FED SPEC Federal Specification
FHWA Federal Highway Administration
FL Flanged
FPM Feet per minute
FT,FT²,FT³ Foot, square feet, cubic feet

G

GA Gage, gauge
GAL Gallon
GALV Galvanized
GCE Grit Chamber Effluent
GPD Gallons per day
GPH Gallons per hour
GPM Gallons per minute

H

HB	Hose Bib
HDPE	High Density Polyethylene
HOA	Hand-off-auto
HP	Horsepower or High Point
HR	Hour
HT	Height
Hz	Hertz

I

ID	Inside Diameter
IE	Invert Elevation
IEEE	Institute of Electrical and Electronics Engineers
IN,IN ² ,IN ³	Inch, square inches, cubic inches
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America

J

JIC	Joint Industry Conference of Hydraulic Manufacturers
-----	--

K

KV	Kilovolt
KVA	Kilovolt ampere
KVAR	Reactive kilovolt amperes
KW	Kilowatts
KWH	Kilowatt hours

L

L	Length
LB	Pounds
LF	Linear feet
LS	Lump Sum

M

M	Thousand
MA	Milliamperes
MBTUH	One thousand British thermal units per hour
MGD	Million gallons per day
mg/l	Milligrams per liter
MIN	Minute
MJ	Mechanical Joint
ML	Mixed Liquor
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
MV	Millivolts
MVA	Megavolt amperes

N

NAMM	National Association of Metal Manufacturers
NBFU	National Bureau of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NPC	National Plumbing Code
NPT	National pipe thread
NRS	Non-rising stem
NLMA	National Lumber Manufacturers Association

O

OD	Outside diameter
OECI	Overhead Electric Crane Institute
OSHA	Occupational Safety and Health Act
OZ	Ounce

P

PCA	Portland Cement Association
ph	Hydrogen ion concentration
PH	Phase
PPM	Parts per million
PSF	Pounds per square foot
PSI	Pounds per square inch
PSIG	Pounds per square inch gauge
PT	Pint
PVC	Polyvinyl chloride

Q

R

RAS	Return Activated Sludge
RPM	Revolutions per minute

S

S	Slip
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Manufacturers Association
Sc	Scum
SCFM	Standard cubic feet per minute
SE	Secondary Effluent
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SQFT	Square foot
SQIN	Square inch
SQMI	Square mile
SSPC	Steel Structures Painting Council
SW	Service Water (Effluent)

I

THD Threaded
TOW Top Of Wall

U

UBC Uniform Building Code
UL Underwriter's Laboratory
UPC Uniform Plumbing Code

V

V Volt

W

W Plant Water
WAS Waste Activated Sludge
WCLIB West Coast Lumber Inspection Bureau
WWF Welded Wire Fabric
WWPA Western Wood Products Association

X

Y

Z

* * * END OF SECTION * * *

SECTION 01090
REFERENCE STANDARDS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. All Divisions: As referenced

1.2 AUTHORITY

- A. Contractor is responsible to conform to all codes and regulations legally in effect at the location of the project.
- B. Contractor shall conform to all requirements and regulations of the authority administering such codes and regulations.

1.3 REFERENCE CODES

- A. Contractor shall conform to all codes and sections thereof as may be referred to in the specifications.
- B. Referenced codes are, by such reference, incorporated into this Contract as if set forth herein in full.

1.4 SPECIFICATIONS INCORPORATED BY REFERENCE

- A. Where Federal, AWWA, ASTM, or any other standard specifications are referred to, or included by reference, the latest issue and/or amendment thereto published at the date of issue of the Advertisement for Bids shall be incorporated in the Contract by said reference as if set forth herein in full.

* * * END OF SECTION * * *

SECTION 01210

PRECONSTRUCTION CONFERENCES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- F. Shop Drawings, Project Data and Samples: Section 01340
- H. Traffic Regulation: Section 01570
- I. Material and Equipment: Section 01600

1.2 SCHEDULE

- A. the Owner will schedule a preconstruction meeting.
- B. Present at the meeting to represent the Contractor shall be at least the official in charge of the project, the project superintendent, a representative with authority to speak for each of his principle subcontractors, and other representatives as he may deem expedient.
- C. The Owner and/or his representatives shall be present as required.
- D. Proceedings of meeting to be recorded and distributed to interested parties.

1.3 AGENDA

- A. Both Owner and Contractor shall be prepared to speak to the following:
 - 1. Name and field address of job superintendent.
 - 2. Emergency phone and/or operator.
 - 3. Date of construction start.
 - 4. Date of Notice to Proceed.
 - 5. Notification of utilities concerned, fire, police, schools, etc.
 - 6. Coordination with other contractors.
 - 7. Permits: county, city, state fisheries, government agencies as required.
 - 8. Inspector: name, authority.
 - 9. Field office (location).
 - 10. Shop drawing submittals.
 - 11. Responsibility for lines and grades.
 - 12. Minimum wage rates and posting of wage rate determination.
 - 16. Periodic monthly payments including date for submittal.
 - 18. Safety requirements and special hazards.
 - 19. Insurance and bonds.
 - 20. Traffic control.
 - 21. Construction signs.
 - 22. Drawings revised to conform to construction records.
 - 23. Beneficial occupancy.

24. Retention of Contract records.
25. Guarantees and warranties.
26. Operation and maintenance manuals.
27. Non-discrimination notice.
28. Project signs.
29. Testing.
30. Progress meetings.
31. Complaint procedure.
32. Job photos.
33. Other matters concerning construction.

* * * END OF SECTION * * *

SECTION 01340

SHOP DRAWINGS, PROJECT DATA AND SAMPLES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: Section 01410
- B. Project Record Documents: Section 01720

1.2 SCHEDULE

- A. Prepare and submit a schedule listing dates for submission and dates that reviewed shop drawings, project data and samples will be needed.
- B. Fabrication of an item or construction work shall not start before the Engineer has taken action on the shop drawing submittal. Any work shall be entirely at the Contractor's risk.
- C. The Engineer will not accept for payment work performed by the Contractor that may be affected by materials, equipment, or methods of work not submitted in a timely manner so that final review can be accomplished before the affected work is complete.
- D. Incomplete shop drawings or submittal rejected by the Engineer shall not be basis for claim for delay.

1.3 SUBMITTALS

- A. Shop drawings shall be submitted and reviewed in the following manner:
 - 1. The Contractor shall review, stamp with his approval and submit postpaid with such promptness as to cause no delay in his work or in that of any other contractor, the required number of copies of all shop drawings, schedules, data, and samples required for the work of the various trades determined necessary by the Engineer, required in the General Conditions and/or described elsewhere in the Project Manual.
 - 2. Shop drawings shall establish the actual detail of all manufactured or fabricated items. All shall be drawn to scale and be completely dimensioned.
 - 3. Provide on each drawing a clear space for the Engineer's and/or Owner's review and approval stamps and comments.
 - 4. It shall be the Contractor's responsibility to clearly note on the shop drawings, and in writing specifically call to the Engineer's attention, any changes that vary from the Contract Drawings and Specifications. No review of the shop drawings by the Engineer shall relieve the Contractor of full responsibility and at his own cost and expense to

comply with the Contract Documents unless the changes are clearly noted and in writing called to the Engineer's attention as above provided, in which event subsequent acceptance by the Engineer in writing shall be authority for the change or changes proposed in the shop drawings.

5. If corrections are required, the Contractor shall make the corrections required by the Engineer . The Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections requested on previous submissions.
6. Shop drawings shall give complete information necessary for the fabrication and installation of all component parts of the equipment, structure, facility, etc. In the case of structural drawings, they shall include the location, type, size, and extent of all welds, if any are necessary. Manufacturers' standard details, catalogues, advertising literature, etc., shall not necessarily constitute all of the shop drawings required for any unit or facility. Additional shop details designed for the particular project shall be furnished when required by the Engineer. Shop drawings of electrical equipment shall include complete diagrams of electrical circuitry.
7. The Engineer's review of and placement of shop drawing review stamp on any shop drawing is understood to be an acceptance of the character of the details and not a check of any dimension or quantity and will not relieve the Contractor from responsibility for errors of any sort in shop drawings data or schedules, whether or not such errors are found by the Engineer in his review of such details.
8. The Engineer's review of and placement of shop drawing review stamp on any shop drawing will not relieve the Contractor of responsibility for consequences due to deviations from the Contract Documents unless the Contractor has called attention to such deviations in writing by a letter accompanying the drawings at the time of submission and the Engineer accepts such deviations in writing.
9. No changes will be made in any drawing after it has been reviewed except by the consent or direction of the Engineer in writing.

C. Samples shall be submitted in the same manner as shop drawings.

1. Samples to be physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.
 - a. Office samples: of sufficient size and quantity to clearly illustrate:
 - (1) Functional characteristics of product or material, with integrally related parts and attachment devices.
 - (2) Full range of color samples.
 - b. Field samples and mockups

- (1) Erect at project site location acceptable to Engineer
 - (2) Construct each required sample or complete mock-up, including work of all trades required in finished work.
 - (3) Coordinate sampling of natural materials with Field Engineer.
2. If any test sample fails to meet the specification requirements, all previous approvals will be withdrawn and such materials or equipment, which fail the testing, shall be subject to removal and replacement by the Contractor with materials or equipment meeting the specification requirements.
 3. Affected finish work shall not be commenced until the Engineer has given written approval for the field samples.

1.4 CONTRACTOR RESPONSIBILITY

- A. By approving and submitting shop drawings and samples, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents and that there is no conflict with other submittals that may affect the work of another contractor or the Owner.
- B. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the job site and shall be available to the Engineer.

* * * END OF SECTION * * *

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

1. GENERAL

1.1 REQUIREMENTS

- A. Unless otherwise specifically excepted, construction photographs will be required on the following projects.
 - 1. All pipelines on easements.
 - 2. All sewer projects.
 - 3. All projects other than pipelines with a contract price in excess of \$250,000.
- B. Photographs shall be 3" x 5" size or larger, glossy finish, in color and unmounted.
- C. All photographs shall be taken by an acceptable commercial photographer hired by the Contractor who shall coordinate his schedule with the Engineer.
- D. Each photograph shall be marked with date and identification.
- E. Each photograph must show flagged positions of route of pipeline and easement number.
- F. The preconstruction photographs shall be delivered to and approved by the Engineer, prior to beginning of construction.

1.2 PROJECTS OTHER THAN PIPELINES

- A. Contractor shall furnish a set of construction color photographs each month to show the general progress of construction.
- B. The first set of photographs shall be taken before the Contractor moves on the site and the last shall be taken after completion.
- C. Within three (3) days before or after the first day of the month, photographs shall be taken as follows:
 - 1. One panoramic view of the whole project.
 - 2. Enough shots of each structure to indicate the state of progress to date.
- D. Three (3) copies of the pictures shall be delivered to the Engineer by the 15th of the month they were taken.

1.3 PIPELINES

- A. A minimum of one preconstruction and one post-construction color photograph shall be taken of each lot or parcel of private property upon which sewer construction takes place.
- B. Final photographs shall be taken as nearly as possible from the same locations as the preconstruction photographs.
- C. At least one photograph on each sewer run from manhole to manhole.
- D. At least one photograph every 300 feet on pipelines other than sewer.
- E. On large lots or lots with extensive improvements several photographs shall be taken.
- F. One (1) file of all photographs shall be delivered to the Engineer and one (1) to the Owner.

* * * END OF SECTION * * *

SECTION 01410
TESTING LABORATORY SERVICES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Testing Requirements: Various Sections

1.2 BIOLOGICAL TESTING

- A. Biological tests required for disinfection of domestic water systems shall be by a laboratory approved by the Health Department or other authority having jurisdiction.

1.3 CONTRACTOR WILL PAY FOR SERVICES OF AN INDEPENDENT TESTING LABORATORY FOR:

- A. Soils gradation, moisture density standards determination, and in place density tests per Division 2.
- B. Concrete: Mix design, consistency, air content, yield, compressive test cylinder casting and compression testing per Section 03300.
- C. Other materials and/or workmanship specified in Divisions 2 through 16.

1.4 LIMITATION

- A. Employment of a testing laboratory shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract.

1.5 QUALIFICATION OF LABORATORY

- A. Meet basic requirements of ASTM E329, "Standard Specification for Agencies Engaged in Construction Inspection and/or Testing".
- B. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during most recent tour of inspection; with memorandum of remedies of any deficiencies reported by inspection.

- C. Testing Equipment:
 - 1. Calibrated at maximum 12 month intervals by devices of accuracy traceable to National Bureau of Standards.
 - 2. Submit copy of certificate of calibration, made by accredited calibration agency.

1.6 LABORATORY DUTIES, AUTHORITY AND LIMITATION

- A. Cooperate with Engineer and Contractor.
- B. Provide qualified personnel promptly on notice.
- C. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards: ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of Contract Documents.
- C. Promptly notify Engineer and Contractor of irregularities or deficiencies of work that are observed during performance of services.
- D. Promptly submit 2 copies of report of inspections and tests to Engineer, in addition to those required by the Contractor including:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing Laboratory name and address.
 - 4. Name and signature of Inspector.
 - 5. Date of inspection of sampling.
 - 6. Record of temperature and weather.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location in project.
 - 10. Type of inspection or test.
 - 11. Results of test.
 - 12. Observations regarding compliance with Contract Documents.
- F. Perform additional services as required.
- G. Laboratory is not authorized to:
 - 1. Release, revoke, alter, or enlarge on, requirements of Contract Documents.
 - 2. Approve or accept any portion of work.

1.7 RESPONSIBILITIES OF CONTRACTOR

- A. Cooperate with laboratory personnel and provide access to work.

- B. Provide to laboratory, preliminary representative samples of materials to be tested in required quantities.
- C. Furnish copies of mill test reports.
- D. Furnish casual labor and facilities:
 - 1. To provide access to work to be tested.
 - 2. To assist laboratory personnel to obtain and handle samples at the site.
 - 3. To facilitate inspections and tests.
 - 4. For laboratory's exclusive use for storage and curing of test samples.
- E. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- F. Laboratory tests: Where such inspection and testing are to be conducted by an independent laboratory or agency, the sample or samples of materials to be tested shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at his expense.

* * * END OF SECTION * * *

SECTION 01420

INSPECTION SERVICES

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: Section 01410

1.2 AUTHORITY AND DUTIES OF INSPECTORS

- A. Inspectors are placed on the work to keep the Project Engineer informed as to the progress of the work and the manner in which it is being done; to keep records; act as liaison between the Contractor and the Project Engineer; also to call the attention of the Contractor to any deviations from the Contract Documents, but failure of the Inspector to call to the attention of the Contractor to faulty work or deviations from the Contract Documents shall not constitute acceptance of said work.
- B. The Inspector may reject or accept materials and equipment to be incorporated in the work and such specific items as he is authorized to accept.
- C. When any material has been accepted by the Inspector, it passes from his control to the control of the Contractor and remains there until the job, as a whole, is complete. Since the Inspector cannot control how the material is used, the responsibility for its safety and proper use will be the Contractor's. Until the job is finally completed, the Contractor might do work that changes or modifies work previously done and even though at any given time a piece of work might be well done and acceptable in quality, the responsibility for keeping it in that condition until the job is completed is the sole responsibility of the Contractor. For this reason, it is impossible to accept, finally, any portion of a project until the project as a whole is acceptable and control of said project is withdrawn from the Contractor by final official written acceptance by the Owner.
- D. Since one of the Inspector's primary interests is to see that work on the project progresses expediently and in a workmanlike manner, he may at various times offer suggestions to the Contractor that the Contractor may or may not follow, at his discretion. Such suggestions are never to be considered as anything but suggestions and involve no assumption of responsibility, financial or otherwise, by either the Inspector himself, the Engineer, or the Owner.
- E. Any personal assistance which an Inspector may give the Contractor will not be construed as the basis of any assumption of responsibility in any manner, financial or otherwise, by the Inspector, the Engineer, or the Owner.

- F. The Engineer is not and does not purport to be a Safety Engineer and is not engaged in that capacity by the Owner and shall have neither authority nor responsibility to enforce construction safety laws, rules, regulations, procedures or the safety of persons on and about the construction site.
- G. The presence or absence of an Inspector on any job will be at the sole discretion of the Engineer, and such presence, or absence, of an Inspector will not relieve the Contractor of his responsibility to obtain the construction results specified in the Contract Documents.
- H. The Inspector will not be authorized to approve or accept any portion of the work, to make changes in the work, or to issue instructions contrary to the Contract Documents, such approvals, acceptances, or instructions, when given, must be in writing and signed by the Project Engineer. The Inspector will have authority to reject defective material; however, the failure of the Inspector to reject defective material or any other work involving deviations from the Contract Documents will not constitute acceptance of such work.
- I. Nothing in this subsection shall in any way be so construed as to require or to place responsibility for, the method, manner or supervision of the performance of the work upon the Inspector, the Engineer, or the Owner. Such responsibility rests solely with the Contractor.

1.3 EXAMINATION OF MATERIALS

- A. The neglect or failure on the part of the Engineer to condemn or reject substandard material or work shall not imply an acceptance of the materials or work. The Contractor shall furnish, at his own expense, such labor as may be required to enable the Engineer to make a thorough inspection and culling of the materials, and the Contractor shall bear the costs of all laboratory or other testing called for in these Specifications.
- B. Where required by the Specifications, the Engineer will examine certain materials such as masonry materials, concrete, aggregates, etc., at the manufacturer's plant prior to their delivery to the job site. The Contractor shall bear the cost of such material inspection including the Inspector's time, travel time and transportation expense and any other costs incurred, or chargeable to, or by, such material inspection. These inspection costs shall be billed to the Contractor at the Engineer's current billing rate. Transportation expense shall be billed at current rate. All such material inspection charges will be billed directly to the Contractor by the Owner and said costs shall be a lien against the Contractor's work.

* * * END OF SECTION * * *

SECTION 01545

PROTECTION OF WORK AND PROPERTY

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Access and Haul Roads: Section 01550
- B. Temporary Controls: Section 01560
- C. Pavement Repair and Resurfacing: Section 02575
- D. Existing Utilities/Facilities - Underground and Overhead:
Section 02760
- E. Landscape Restoration: Section 02990

1.2 PUBLIC AND PRIVATE PROPERTY

- A. The Contractor shall protect and maintain all underground or aboveground utilities and structures affected by the work and all lawns, shrubs, trees, fences, rockeries, etc., and parking strips or private property crossed by or adjacent to his operation, and any damage shall be repaired and restored by the Contractor to the satisfaction of the Owner.
- B. The Contractor will be responsible for all damage to roads, highways, ditches, bulkheads, walls, bridges, culverts, utilities, barricades, lights, or other property, caused by the work, whether such damage be at the site of the work or caused by transporting or hauling to or from the work; and he shall repair or replace, or arrange for the repair or replacement of all such damage to the satisfaction of the Owner. Any material damaged by the Contractor's operations shall be replaced with new material.
- C. Whenever construction work is undertaken on easement, right-of-way, or franchise, all work shall be confined to the limits of such easement, right-of-way, or franchise, and accomplished so as to cause the least amount of disturbance and a minimum amount of damage.
- D. Completion of work across private property shall be carried out in one continuous operation of construction of the facilities with the immediate restoration and cleanup of the construction area. If the Contractor fails to perform such construction and restoration continuously as herein provided, the Owner may give the Contractor a written notice to so perform, and in event of failure by the Contractor to complete such construction and restoration within 72 hours of such notice, the Owner may complete the installation and restoration on such private property to the extent the Owner deems advisable and the cost of all work, labor, materials, and expenses incurred by the Owner in so doing shall be paid by the Contractor .
- E. Particular care shall be exercised to see that the topsoil from the trench is preserved and replaced in its original location. It shall be

the Contractor's responsibility to strip such topsoil from the trench, or construction area, and stockpile it in such a manner that it may be replaced, by him, upon completion of construction.

- F. Wherever it may be necessary for the Contractor to trench through any lawn areas, the sod shall be carefully cut and rolled and replaced after ditches have been water settled, or otherwise properly compacted. All work shall be done in a manner calculated to leave the lawn area clean of earth and debris and in a condition as near as possible to that which existed before work was started.
- G. The Contractor shall not remove, even temporarily, any trees or shrubs that exist on easements across private property or in parking strips, without first having notified the property owners or authorities maintaining same.
- H. Ornamental trees and shrubbery shall be carefully removed with the earth surrounding their roots, wrapped in burlap and replanted in their original positions within 48 hours. Ornamental trees or shrubbery that is destroyed or damaged by the Contractor, whether on public or private property, shall be replaced by the Contractor with material of equal quality, and no additional compensation will be allowed for such replacement.
- I. It is expressly understood that the Contractor shall, in particular, restore all such easements and rights-of-way to a condition equal to its original condition and in a condition satisfactory to the property owners and the Owner. It is also understood that any private improvements made in public rights-of-way are included in the above category.

1.3 TREES

- A. All existing trees and shrubs that are to be protected and that are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency or owner and to the satisfaction of said agency and/or owner.
- B. The Contractor shall immediately notify the Engineer and/or owner if any tree, which is to be protected, is damaged by his operations. If, in the opinion of said agency or the owner, the damage is such that replacement is necessary, the Contractor shall replace the tree at his own expense.
- C. Replacement trees shall be of a like size and variety as the tree damaged, or, if of a smaller size, the Contractor shall pay to the owner of said tree a compensatory payment acceptable to the tree owner not to exceed the cost of replacing the tree as determined from quotes obtained by the tree owner from a minimum of two local nurseries. The size of the replacement trees shall be not less than 1-inch diameter nor less than 6 feet in height.

- D. When trimming is permitted, symmetry of the tree shall be preserved. No stubs or splits or torn branches shall be left. Clean cuts shall be made close to trunk or large branch. Spikes shall not be used for climbing live trees. All cuts over 1-1/2 inches in diameter shall be coated with an asphaltic emulsion material.

1.4 EASEMENTS

- A. Reference numbers of easements are shown on drawings.
- B. The Contractor shall meet and fulfill all covenants and stipulations of each easement obtained by the Owner.
- C. Copies of all easements and special covenants are on file in the office of the Owner, which is incorporated in this Contract by this reference, as if set forth herein in full.

1.5 ACQUISITION OF EASEMENTS

- A. The Owner has obtained or is in the process of obtaining the easements required for this project.
- B. If the Owner has not obtained all of the easements, it is anticipated that there may be additional stipulations and covenants on the remaining easements. It is also anticipated that the Owner may purchase certain items on easements, such as large trees within the permanent easement, thereby relieving the Contractor from the responsibility of restoring or protecting same.

1.6 COVENANTS ON EASEMENTS NOT LISTED

- A. Work shall not be started on any private right-of-way or easement until clearance is given the Contractor by the Engineer.

1.7 EASEMENT RELEASE

- A. Where work is done on easements, the Contractor shall obtain a written statement (see following form) of satisfactory restoration from each property owner involved, and furnish a copy of said statement to the Engineer. The statement will be required before the work will be accepted by the Owner provided, however, that where the Contractor contends that the property owner is making unreasonable demands, he shall submit a list of such demands to the Owner in writing. If in the opinion of the Owner, such demands are unreasonable, the Contractor may be excused from the necessity of obtaining a written statement of satisfactory restoration from the property owner making such unreasonable demand.

EASEMENT NO. _____

CONTRACT NO. _____

PROPERTY OWNER'S APPROVAL OF EASEMENT RESTORATION

We, the undersigned owner(s) of property identified as

(Address or Property Description)

do hereby approve and accept the restoration work done by

the Contractor on the construction of pipelines on easements over and across my (our) property.

SIGNED _____

DATE _____

1.8 CARE OF EXISTING FACILITIES

- A. The Contractor shall take adequate precautions to protect existing sidewalks, curbs, pavements, utilities, adjoining property, and structures, and to avoid damage thereto, and he shall at his own expense completely repair any damage thereto caused by his operation.
- B. Access for firefighting equipment shall be maintained at all times.

1.9 SHORING, BRACING, ETC.

- A. The Contractor shall shore up, brace, underpin, and protect, as may be necessary, all foundations and other parts of all existing structures adjoining the site of the Project that are in any way affected by the excavation or other operations connected with the completion of the work .
- B. Whenever any notice is required to be given by the Owner or the Contractor to any adjoining or adjacent landowner or other party before commencement of any work, such notice shall be given by the Contractor.
- C. The Contractor shall indemnify the Owner and save it harmless from any damages on account of settlements or the loss of lateral or subjacent support of adjoining property and from all loss or expense and all damages for which the Owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

1.10 EMERGENCIES

- A. Whenever the Contractor's work could endanger the safety of life or property including adjoining property or property in the immediate proximity of the Project, the Contractor shall take all reasonable precautions to prevent threatened loss or injury therefrom.

1.11 EXISTING UTILITIES/FACILITIES - UNDERGROUND AND OVERHEAD

- A. The Contractor shall protect existing utilities/facilities, both overhead and underground as provided in Section 02760.

1.12 TEMPORARY FENCE

- A. The Contractor shall be responsible for the erection of temporary fence as required to protect his own work area.
- B. The Contractor shall be responsible for erection and maintenance of temporary fencing or other facilities as required to retain livestock and/or periodic security of existing fenced areas.

- C. Temporary fencing on facilities shall remain in place until the permanent fencing, as originally installed, is replaced under the restoration requirements of the Contract or as shown on the Contract Drawings.

* * * END OF SECTION * * *

SECTION 01550
ACCESS AND HAUL ROADS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Traffic Regulation: Section 01570

1.2 PRIVATE ACCESS

- A. Where required by the Contract or choice of the Contractor access may be over private land.
- B. Access will be maintained by and at the expense of the Contractor.
- C. Comply with local regulations and permits.
- D. Comply with all legal requirements to include, as a minimum, written permission of private owners.
- E. Control dust, noise, and traffic in compliance with local laws and regulations.
- F. Leave private property in a condition satisfactory to the Owner and as indicated by a written release.

1.3 PUBLIC ACCESS AND HAUL ROADS

- A. Comply with all laws and regulations.
- B. All streets in the construction area used by Contractor's trucks or any other equipment hauling material to and from the area, whether within the Contract limits or adjacent thereto, shall be kept clean and shall be serviced by continuous use of sprinkling trucks to allay dust.
- C. Unsurfaced roads and streets may receive an application of dust oil to allay dust.
- D. Dust control shall continue until streets are accepted by the public agency responsible for maintenance or the Contractor is relieved of responsibility by such agency.
- F. Any damage to roadway surfaces that results from the direct or indirect activities of the Contractor's operation shall be repaired by the Contractor to the satisfaction of the responsible agency.

* * * END OF SECTION * * *

SECTION 01560

TEMPORARY CONTROLS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Protection of Work and Property: Section 01545
- B. Access and Haul Roads: Section 01550
- C. Traffic Regulation: Section 01570
- D. Landscape Restoration: Section 02990

1.2 LAWS

- A. Requirements of federal, state, and local statutes and regulations dealing with temporary controls described in this section shall be strictly adhered to by the Contractor.

1.3 CONSTRUCTION CLEANING

- A. The Contractor shall keep the site of the work and other areas used by him in a neat and clean condition, and free from any accumulation of rubbish.
- B. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste.
- C. The Contractor shall keep his haul roads free from dirt, rubbish, and unnecessary obstructions resulting from his operations.
- D. Equipment and material storage shall be confined to areas approved by the Engineer.
- E. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws.

1.4 AIR POLLUTION CONTROL

- A. The Contractor shall not discharge smoke, dust or other contaminants into the atmosphere that violate the regulations of any legally constituted authority.
- B. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent his operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity.

- C. The Contractor shall comply with specific requirements of air quality control laws.
- D. The Contractor shall be responsible for any damage resulting from any dust originating from his operations.
- E. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Owner.

1.5 EROSION CONTROL

- A. Contractor shall provide temporary erosion control work required by state or local agencies during the life of the contract. This work is intended to provide prevention, control, and abatement of water pollution/erosion within the limits of the project, and to minimize damage to the work, adjacent property, streams, and other bodies of water.
- B. The Contractor shall coordinate this temporary water pollution/erosion control work with the permanent drainage and erosion control work that may be specified in the Contract to the extent practicable to ensure that effective and continuous water pollution/erosion control is maintained during the construction of the Project.
- C. Clearing and grubbing operations shall be so scheduled and performed such that grading operations and permanent erosion control features can follow immediately. If the project conditions do not permit this scheduling, temporary water pollution/erosion control measures will be required between successive construction stages.
- D. The area of excavation, borrow, and embankment operations in progress will be limited commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other permanent erosion control measures current according to the accepted schedule.
- E. If the Engineer determines that water pollution and/or erosion could occur due to seasonal limitations, the nature of the material, or the Contractor's progress, temporary water pollution/erosion control measures shall be taken immediately.
- F. The Engineer may require the Contractor's operations to be scheduled so that permanent erosion control features will be installed concurrently with or immediately following grading operations.
- G. Compliance with the requirements of this section shall not relieve the Contractor from his responsibility to comply with other provisions of the contract.

1.6 NOISE CONTROL

- A. Comply with state and local requirements as to allowable noise levels during construction.
- B. Equip all internal combustion engines in vehicles and construction equipment with effective mufflers.
- C. Prevent noise disturbance to adjoining property owners and the public.
- D. Construction operations shall be restricted to between the hours of 7:00 AM and 7:00 PM Monday through Friday without specific approval by the Owner except in emergencies.

1.7 SANITARY PROVISIONS

- A. The Contractor shall provide and maintain sanitary facilities for the use of his employees and the Engineer. The Contractor shall comply with the requirements and regulations of the agencies or organizations having jurisdiction over sanitary and health conditions and of other bodies or offices having jurisdiction thereof. He will permit no public nuisances.
- B. The Contractor shall establish a regular collection of all sanitary and organic wastes.
- C. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Owner and in accordance with all laws and regulations pertaining thereto.

1.8 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture.
- B. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

1.9 PROVISION FOR WATER COURSES

- A. The Contractor shall provide for the flow of all water courses, sewers, or drains intercepted or disturbed by the Contractor during the progress of the work, and shall replace the same in as good condition as he found them or shall make such final provisions for them as necessary.
- B. The Contractor shall not obstruct the gutter of any street, but shall use all proper measures to provide for the free passage of surface water.

- C. The Contractor shall make provisions to take care of all surplus water, mud, silt, or other runoff pumped from excavations or resulting from sluicing or other operations, and shall be responsible for any damage, of whatever nature, resulting from his failure so to provide.
- E. All work adjacent to or in the vicinity of marine waters or fresh water courses shall be accomplished in accordance with the requirements of the agencies having jurisdiction.

1.10 FISHERIES PERMIT

- A. All construction work in the vicinity of existing creeks, rivers, and lakes shall be subject to the provisions of state regulations.
- B. A copy of any applicable permit is available at the office of the Owner for examination by bidders.
- C. The Contractor shall conform to the requirements of the permits issued for this project.
- D. Each Contractor shall secure separate approval from the Department of Fish and Wildlife concerning his proposed construction methods, operation, and scheduling that will affect the waterways or lakes, and shall conform to the requirements of this department to preserve the aquatic resources. The authorized representatives of the Department of Fisheries shall be the sole judges as to the effect of the Contractor's operations on the aquatic life in the streams and waterways.
- E. In the event said agency waives jurisdiction or does not approve the Contractor's method of operations, the Contractor shall secure written notice to that effect prior to construction.
- F. The Contractor may be held liable for any damage to fish life or habitat that results from failure to comply with the provisions of this section.

1.11 ARCHAEOLOGICAL OR CULTURAL RESOURCES

- A. The Contractor is advised that construction work is subject to the provisions of state and federal laws and regulations pertaining to the preservation of archaeological and cultural resources.
- B. In the event that any archaeological or cultural resources are uncovered during the course of construction, all work shall cease until an inspection and evaluation of the site has been made by an archaeologist to ensure that archaeological data are properly preserved. The Contractor shall notify the Owner who will in turn notify the proper authorities.

* * * END OF SECTION * * *

SECTION 01570

TRAFFIC REGULATION

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Access and Haul Roads: Section 01550

1.2 MATERIALS AND CONTRACT

- A. Signs, warnings, light signals, bypass layouts, scheduling and routes shall conform to the requirements of U.S. Department of Transportation Federal Highway Administration "Manual on Uniform Traffic Control Devices", latest edition, as amended by local or state agency.

1.3 MAINTENANCE OF TRAFFIC

- A. The Contractor shall conduct his work so as to interfere as little as possible with public travel, and shall at his own expense provide and maintain suitable bridges, detours, or other temporary facilities for the accommodation of public or private travel including mail delivery, and shall give reasonable notice to the owners of private drives before interfering with them provided, however, that such maintenance of traffic will not be required where the Contractor has obtained permission from the owners or tenants of private property, or the proper public authority, or both, to obstruct traffic within the said limits and time agreed upon.
- B. Access for firefighting equipment, police, and ambulance services shall be provided at all times and the Contractor shall keep the local authorities informed at all times of the location of construction operations and fire lanes.
- C. The Contractor shall also notify the authorities in charge of any municipal, private, or school transportation systems at least 48 hours in advance of road closures that will force a change in the regular routing of the transportation system. The Contractor shall also provide maintain suitable detour routes for the system.
- D. Highway and arterial crossings shall be made in such a way that no more than half of the roadway is closed to traffic at any time, except where suitable detours or other arrangements are agreed to by the agency having jurisdiction.

1.4 COMPLIANCE WITH LOCAL REQUIREMENTS

- A. The Contractor shall comply with all applicable state and local requirements for closure of streets.
- B. The Contractor shall provide barriers, guards, lights, signs, temporary bridges, flagmen and watchmen advising the public of detours and construction hazards.
- C. The Contractor shall also be responsible for compliance with additional public safety requirements that may arise during construction.
- D. The Contractor shall furnish and install and, upon completion of the work, promptly remove all temporary signs and warning devices.

1.5 TRAFFIC CONTROL PLAN

- A. Not less than ten days before beginning construction, the Contractor shall prepare and submit a general construction traffic control plan for the entire project, showing how detour routes will be signed and controlled.
- B. The traffic control plan shall include and make provision for at least the following items:
 - 1. Maintain at least one lane of traffic during construction in all streets and roads wherever possible.
 - 2. Employ flagpersons to direct traffic as required to ensure safe vehicular traffic.
 - 3. Provide for the protection of pedestrians at all times.
 - 4. Provide, install, and maintain all signs, barricades, posts, guards, and notices whenever a street must be completely closed.
 - 5. Provide for passage of local vehicles to businesses and homes.
 - 6. Provide for passage and access of emergency vehicles, police, fire, and disaster units at all times. Assume liability for any damages resulting from failure to provide said access.

1.6 STORAGE OF MATERIALS AND EQUIPMENT

- A. Materials or equipment shall not be stored where it will interfere with the free and safe passage of public traffic.
- B. The Contractor shall remove all equipment and other obstructions from that portion of the roadway to be opened for use by public traffic at the end of each day's work and at other times when construction operations are suspended for any reason.

- C. Materials or other obstructions shall not be placed within 20 feet of fire hydrants, which shall at all times be readily accessible to the fire department, nor within ten feet of United States mailboxes.

1.7 MAINTENANCE OF POSTAL SERVICE

- A. The Contractor shall be responsible for determining and complying with the United States Post Office's requirements for maintaining postal service within the project area and along related detour routes.
- B. Where required by street closures or excessive interferences, the Contractor shall move mailboxes to temporary locations designated by the post office and, when such closures are terminated, shall return the mailboxes to locations and conditions satisfactory to the owners and the post office.
- C. Other mailboxes removed or damaged by the Contractor shall be placed to the satisfaction of the owners and the post office within 24 hours of their removal or damage.

* * * END OF SECTION * * *

SECTION 01600

MATERIAL AND EQUIPMENT

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Shop Drawings, Project Data, and Samples: Section 01340

1.2 PRODUCTS LIST

- A. As soon as possible but not more than thirty (30) days after date of Notice to Proceed, submit copies of complete list of all products that are proposed for installation as substitutions or product options.
- B. Tabulate list by each specification section.

1.3 CONTRACTOR'S OPTIONS

- A. Unless otherwise specifically provided, all workmanship, equipment, materials and articles incorporated in the work are to be new and of the best available grade of their respective kinds.
- B. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
- C. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equivalent" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.
- D. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed.

1.4 SUBSTITUTIONS

- A. Submit request for substitution in accordance with requirements for submittal of shop drawings (Section 01340) and the following additional requirements.
 - 1. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
 - 2. Itemized comparison of proposed substitution with product or method specification.
- B. In making request for substitution, Contractor represents:
 - 1. He has personally investigated proposed product or method, and determined that it is equivalent or superior in all respects to that specified.
 - 2. He will provide the same guarantee for substitution as for product or method specified.

3. Contractor agrees to pay for all costs under separate contracts and Engineer's redesign costs.
- C. The above shall not be construed to mean that any substitution for materials and equipment will be allowed.

1.5 MATERIAL CERTIFICATION

- A. Upon request of the Engineer, the Contractor's material suppliers may be required to furnish a certification from a recognized testing laboratory, certifying that the material supplied is in full conformance with the Contract Documents.

1.6 ADDITIONAL ENGINEERING COSTS

- A. Additional engineering costs accruing as a result of checking and/or redesign of substitutions will be charged to the Contractor and billed by the Owner at the Engineer's current established rates.

1.7 INSTALLATION

- A. All materials, appliances, fixtures, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with such instructions as are commonly furnished by the manufacturers, unless herein specified to the contrary.
- B. The Contractor shall use experienced millwrights, acceptable to the Engineer, in the installation and aligning of the equipment.
- C. Manufacturers' instructions for handling, protecting, installation, lubrication and alignments of the equipment, shall be followed to the letter, with attendant penalties for insufficient performance.
- D. No piping or valves shall be supported by means of its connection to any mechanical equipment. Pipe connections to equipment must be disconnected upon request to permit inspection and determination that the piping is not transmitting stresses to the equipment.
- E. All motor flexible couplings shall be disconnected and checked with an indicator for misalignment after all other installation work has been completed unless the equipment installation instructions specifically prohibit this.
- F. The Contractor must allow a representative of the Owner to observe the indicator readings and approve or disapprove prior to recoupling.

1.8 PUMPS AND PIPING

- A. All pump and piping installations shall fully meet the standards of the Hydraulic Institute.

* * * END OF SECTION * * *

SECTION 01650
TESTING, STARTUP AND OPERATION

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Testing Laboratory Services: Section 01410
- B. Inspection Services: Section 01420
- C. Contract Closeout: Section 01700
- D. Operation and Maintenance Data: Section 01730

1.2 RESPONSIBILITY

- A. The Contractor shall provide all materials, supplies and labor necessary to efficiently complete the testing, startup and operation.
- B. All power and utility bills shall be paid by the Contractor up to and including the day of final acceptance of the Contract by the Owner. If not paid, these charges shall be treated as claims against the Contractor.
- C. If the Owner chooses to commence operations prior to final acceptance, the Owner will assume payment of all power and utility charges effective the day that operation is assumed by the Owner and notice is given in writing.

1.3 SCHEDULE

- A. Placing all phases of the project in service shall consist of three parts: testing, starting and operations.
- B. Not less than thirty (30) days before anticipated time for beginning the testing, the Contractor will submit to the Engineer for approval, a complete plan for:
 - 1. Schedules for tests.
 - 2. Detail schedules of procedures for startup.
 - 3. Complete schedule of events to be accomplished during startup.
 - 4. Schedule operator training as specified.
 - 5. An outline of work remaining under the Contract that will be carried out concurrently with the operation phases.
- C. Notify the Engineer of the approximate date that water or sewage will be required for operation.

1.4 TESTING

- A. Testing shall consist of individual tests and checks made on equipment intended to provide proof of performance of units and proper operation of unit controls together with such necessary tests whether or not described elsewhere in these Specifications to

ensure proper alignment, size, condition, capability, strength, proper adjustment, lubrication, pressure, hydraulic tests, leakage tests, and all other checks deemed necessary by the Engineer to determine that all materials and equipment are of specified quality, properly situated, anchored and in all respects ready for use.

- B. All gravity sewer pipe and pressure piping shall be tested as required by these specifications and applicable codes.
- C. Tests on individual items of equipment, pipelines, vessels, structures, tanks, controls and other items shall be as described in various sections describing such items.
- D. Testing will be done by the Contractor in the presence of an Inspector designated by the Engineer. Records of all official tests will be made by the Inspector.
- E. During tests, the Contractor shall correct any defective work discovered or that is not in first class operating condition.

1.5 STARTUP

- A. Startup shall consist of testing by a simulated operation (using clear water to be furnished by the Contractor), all operational equipment and controls. The purpose of these tests shall be to check that all equipment will function under operating conditions, that all interlocking controls and sequences are properly set and that the facility will function as an operating unit.
- B. Checks for leakage of tanks, ponds, piping, valves, gates and all other hydraulic systems and structures will be made.
- C. Factory representatives of all major units will be present for the startup phase. The test shall continue until it is demonstrated that all malfunctioning controls and machinery are corrected.
- D. The startup shall not begin until all tests required by these Specifications have been completed and approved by the Engineer.
- E. The Contractor may, if approved by the Engineer, conduct the hydraulic testing of pumps, aerators and other equipment requiring large volumes of liquid simultaneously with the startup test. If required by the Owner, the Contractor shall dispose of the water used by pumping to waste.

1.6 OPERATION

- A. Operation of the facility shall be immediately started after completion of testing and startup and after satisfactory repairs and adjustments have been made and providing supply and disposal facilities furnished by others are available. If these facilities are not available, the plant will be closed down and no further testing or operation by the Contractor will be required. The Contractor,

however, will be responsible that all details required by the Contract shall remain in good order until final acceptance of the whole Contract.

- B. The facility will be operated by personnel placed on the project by the Owner who will perform all duties and operate all equipment.
- C. Taking possession and use of the facility shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents.
- D. If such prior use increases or causes refinishing of completed work, the Contractor shall be entitled to such extra compensation or extension of time or both, as the Engineer may determine.

* * * END OF SECTION * * *

SECTION 01700

CONTRACT CLOSEOUT

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Protection of Work and Property: Section 01545
- B. Testing, Startup and Operation: Section 01650
- C. Cleaning: Section 01710
- D. Project Record Documents: Section 01720
- E. Operation and Maintenance Data: Section 01730
- F. Spare Parts and Maintenance Materials: Section 01750

1.2 SUBSTANTIAL COMPLETION

- A. Engineer will make an inspection after receipt of Contractor's certification, together with Owner's representative.
- B. If it appears to the Engineer that work is substantially complete, the Engineer may, with the Owner's approval, issue a Certificate of Substantial Completion, with appropriate conditions, accompanied by a list of the items to be completed and corrected, as verified and amended by Engineer. Omission of any item from the list shall not relieve the Contractor from responsibility to complete all the work in accordance with the Contract.
- C. Owner occupancy of Project or designated portion of Project:
 - a. Contractor shall perform final cleaning in accordance with Section 01710.
- D. Contractor shall complete all the work within the time designated in the Certificate, or if not so designated within a reasonable time.
- E. Warranties: warranty periods begin with the date of final acceptance. However, in connection with any specific equipment certified by the Engineer as completed and its use or operation thereof for its intended purpose is assumed by the Owner, the warranty period for such equipment shall begin with the beginning date of such use or operation.

1.3 FINAL INSPECTION

- A. The Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been completed in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Project is completed, and ready for final inspection.
- B. Engineer will make final inspection within a reasonable time after receipt of certification.

- C. Should Engineer consider that work is complete in accordance with requirements of Contract Documents, he shall request Contractor to make project closeout submittals.

1.5 CLOSEOUT

- E. At the close of the Contract the Contractor shall:
 - 1. Pay all utility bills.
 - 2. Remove all electrical, sanitary, gas, telephone, water, offices and any other temporary service equipment that may remain.
 - 3. Arrange for transfer of electrical, and water accounts to the Owner's name.

- F. Deliver evidence of compliance with requirements of governing authorities:
 - 1. Certificates of Inspection:
 - a. Mechanical:
 - (1) As required by codes.
 - b. Electrical:
 - (1) State or city as required.
 - (2) Megger by electrical subcontractor.

1.9 POST-CONSTRUCTION INSPECTION

- A. Prior to expiration one year from Date of Substantial Completion or Final Acceptance, Engineer may make visual inspection of Project in company with Owner and Contractor to determine whether correction of work is required, in accordance with provisions of General Conditions.

- B. For guarantees beyond one year, Engineer will make inspections at request of Owner, after notification to Contractor.

- C. Owner will promptly notify Contractor, in writing, of any observed deficiencies.

* * * END OF SECTION * * *

SECTION 01710

CLEANING

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Cutting and Patching: Section 01045
- B. Temporary Controls: Section 01560
- C. Contract Closeout: Section 01700

1.2 GENERAL REQUIREMENTS

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.3 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accord with the applicable federal, state and local safety standards.
- B. Hazards control:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes that create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws:
 - 1. Do not burn or bury rubbish and waste materials on project site unless approved by local fire and air pollution authorities.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.

2. PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3. EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- D. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- E. The Contractor shall clean the right-of-way, material sites, and all ground the Contractor occupied to do the work periodically throughout the duration of the project. All rubbish, surplus materials, discarded materials, and debris shall be removed from the site and disposed of properly. At a minimum, the Contractor shall conduct such periodic cleaning for each 1,000 feet of pipeline installed, prior to proceeding with installation of additional pipeline. Such cleaning shall also occur immediately prior to weekends, holidays, extended work stoppages, or at the direction of the Owner or other regulatory agencies having jurisdiction.

3.2 FINAL CLEANING OF STRUCTURES

- A. Employ experienced workmen, or professional cleaners, for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
- D. Repair, patch and touch up marred surfaces to specified finish; match adjacent surfaces.
- E. Broom clean paved surfaces; rake clean other surfaces of grounds.
- F. Clean windows.
- G. Replace air conditioning filters if units were operated during construction.
- H. Clean ducts, blowers and coils, if air conditioning units were operated without filters during construction.

- I. Maintain cleaning until project is occupied by Owner.

3.3 FINAL CLEANUP OF PIPELINES

- A. Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do.
- C. Refer to specific sections for detail requirements for cleanup of pipelines.

3.4 GENERAL CLEANUP

- A. Before final acceptance, the Contractor shall remove and obliterate, insofar as feasible, all objects or disturbances of the ground that mar the landscape and were caused by his operations, whether or not part of the improvement.
- B. Rubbish, excess materials, temporary structures, and discarded equipment shall be removed and disposed of.
- C. Temporary haul roads shall be scarified and bladed to blend with surroundings.
- D. Remove snags, down trees, brush, and stumps.
- E. Fill holes and grade to smooth land contours. Shape ends of cuts and fills to fit adjacent terrain.
- F. Hand rake disturbed areas to remove loose objects including rock and clods in excess of two inches in any dimension.
- G. Sweep pavement, curb and gutter, sidewalks, and driveways.

* * * END OF SECTION * * *

SECTION 01720

PROJECT RECORD DOCUMENTS

1. GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Shop Drawings, Project Data and Samples: Section 01340
- B. Construction Photographs: Section 01380
- C. Operation and Maintenance Data: Section 01730

1.2 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of:
 - 1. Contract Drawings.
 - 2. Project Manual.
 - 3. Addenda.
 - 4. Reviewed Shop Drawings.
 - 5. Change Orders.
 - 6. Other Modifications to Contract.
 - 7. Field Test Records.
 - 8. Maintenance Data Delivered with Equipment.
- B. Make documents available at all times for inspection by Engineer and Owner.

1.3 RECORDING

- A. Do not permanently conceal any work until required information has been recorded.
- B. Keep documents current.
- C. Contract Drawings: Legibly mark to record actual construction:
 - 1. Depths of various elements of foundation in relation to variances from plan.
 - 2. Horizontal and vertical location of underground utilities and appurtenances and references to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by Change Order or Field Order.
 - 6. Details not on original Contract Drawings.
 - 7. Side sewer locations including stubs and tees.
- D. Specifications and Addenda: Legibly mark up each Section to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 2. Changes made by Change Order or Field Order.
 3. Other matters not originally specified.
- E. Shop Drawings: Maintain as record documents; legibly annotate drawings to record changes made after review.

* * * END OF SECTION * * *

SECTION 02050

DEMOLITION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Clearing: Section 02110
- B. Grading: Section 02210
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222
- D. Pavement Repair and Resurfacing: Section 02575

1.2 PROTECTION

- A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.
- B. Pavement may be cut only where authorized and only to the extent specified.
- C. Any material damaged by Contractor's operations shall be replaced with new material by the Contractor.

1.3 CUTTING PAVEMENT, CURBS AND WALKS

- A. Unless specified otherwise by the authority having control over the pavement, curbs and walks, cutting and replacement shall be as specified in Section 02575.

1.4 PRIVATE DRIVEWAYS, CULVERTS AND MISCELLANEOUS

- A. Pipe laying operations and street improvements in certain areas may necessitate temporary removal of mail boxes, private driveways, drains, service lines, conduits, etc. to facilitate construction. In the event that the Contractor finds it necessary to remove the above mentioned items, it is to be understood that it will be his responsibility to restore these items in a manner equal to their original condition. The Contractor shall maintain adequate temporary provisions for domestic deliveries and utilities service and access to firefighting equipment.
- B. The preceding requirement will be the same for any temporary removal of road culverts whether under state, county or private jurisdiction.
- C. The Contractor shall make every effort to prevent blocking private driveways for more than a reasonable time and shall make such driveways immediately accessible on order of the Owner.

1.5 REMOVAL OF STRUCTURES

- A. Break up basement floors to promote drainage.

- B. When salvageable material is to remain the Owner's property, the Contractor shall remove it and deliver it to site designated by the Engineer or project documents. Any material not designated as the Owner's property will belong to the Contractor. The Contractor shall store or dispose of such material at suitable disposal site or at his storage yard.
- C. Work crews shall be provided with proper protective clothing and equipment.
- D. Waste and abandoned asbestos materials and materials, clothing, etc. used in asbestos handling and removal shall be disposed of in a manner consistent with the regulations and provisions cited above.
- E. The Contractor (person or organization removing asbestos with certified asbestos workers) shall assume ALL risk and all liability for the removal and disposal of the asbestos and the Contractor shall comply with all federal, state and local laws, statutes and regulatory agency regulations and requirements including but not limited to the requirements relating to environmental pollutants and the requirements relating to the removal and disposal of asbestos. The Contractor shall ensure that the asbestos removal is pursuant to all state and federal laws and regulations. The Contractor shall be responsible for any and all fines or penalties that may be levied due to the Contractor's violation of any of the aforementioned laws and regulations.

1.6 ASBESTOS REMOVAL

- A. The Contractor shall conduct all work related to existing asbestos materials in accordance with WISHA safety regulations and provisions of WAC 296-62-077, WAC 296-65, and the requirements of the regional air pollution control authority. Advance notice of work on asbestos materials may be required.
- B. Work crews shall be provided with proper protective clothing and equipment.
- C. Waste and abandoned asbestos materials and materials, clothing, etc. used in asbestos handling and removal shall be disposed of in a manner consistent with the regulations and provisions cited above.
- D. All costs associated with the demolition and abandonment of asbestos material shall be considered incidental to the work; no additional compensation will be made to the Contractor.
- E. The Contractor (person or organization removing asbestos with certified asbestos workers) shall assume ALL risk and all liability for the removal and disposal of the asbestos and the Contractor shall comply with all federal, state and local laws, statutes and regulatory agency regulations and requirements including but not limited to the requirements relating to environmental pollutants and the

requirements relating to the removal and disposal of asbestos. The Contractor shall insure that the asbestos removal is pursuant to all state and federal laws and regulations. The Contractor shall be responsible for any and all fines or penalties that may be levied due to the Contractor's violation of any of the aforementioned laws and regulations.

* * * END OF SECTION * * *

SECTION 02110

SITE CLEARING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Demolition: Section 02050
- C. Grading: Section 02210
- D. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 PROTECTION

- A. Streets, roads, adjacent property and other work to remain shall be protected throughout the work.

2. PRODUCTS

2.1 MATERIALS

- A. Materials shall be at the Contractor's option.

3. EXECUTION

3.1 SURVEY STAKING IN UNCLEARED EASEMENTS

- A. Centerlines of utility lines shall be flagged prior to clearing and it shall be the Contractor's responsibility to set his own offsets for clearing limits.
- B. When the clearing is done, the survey for the utility construction shall be accomplished as per Section 01050.

3.2 CLEARING

- A. Clearing work shall be performed within the confines of the area indicated on the Drawings, or in the Specifications.
- B. Debris resulting from said clearing shall be disposed of by the Contractor and the right-of-way cleaned up in a neat and workmanlike manner.
- C. No logs, stumps, rocks, etc., shall be left lying in the right-of-way or on adjacent property without specified written approval by the Owner.
- D. All trees shall be felled within the area to be cleared except those marked to be left standing, or required by easement stipulations or by contract to be left standing, shall be close cut parallel to the ground, removed, and disposed of.

- E. No trees or shrubbery in public right-of-way shall be cut except by approval of the Engineer.

3.3 GRUBBING

- A. All trees or stumps within five (5) feet of the pipeline shall be removed.
- B. Grubbing will be performed where designated on the drawings or as specified herein and shall include removal from the ground of all stumps, roots, buried logs and other vegetation not otherwise provided for and the removal and disposal of the refuse.
- C. In areas to be filled to a depth of three (3) feet or more above the natural ground all tree stumps and brush shall be cut off not more than three (3) inches from the ground and removed. Stumps may remain at the Contractor's option.

3.4 DAMAGED VEGETATION

- A. Neatly trim torn limbs and trunk and severed roots.
- B. Apply wound paint to above-ground wounds.
- C. Remove and replace in kind all vegetation damaged extensively.

3.5 DISPOSAL

- A. Contractor shall comply with all laws and rules that govern **burning** and shall secure necessary permits.
- B. When burning is permitted, it shall be done under the constant care of competent watchmen such that surrounding property or vegetative cover is not damaged.
- C. Contractor may sell any saleable material.

* * * END OF SECTION * * *

SECTION 02140

DEWATERING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Temporary Controls: Section 01560
- B. Excavating, Backfilling and Compaction for Utilities: Section 02222
- C. Sedimentation Control: Section 02275

1.2 QUALITY CONTROL

- A. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.
- B. The Contractor shall employ an independent qualified Professional Engineer with experience in similar dewatering problems to review and approve the Contractor's proposed method of dewatering and to, at least weekly, inspect the Contractor's operations and provide a report to the Engineer.
- C. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.
- D. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points should be established and observed at frequent intervals to detect any settlement that may develop.
- E. The responsibility for conducting the dewatering operation in a manner that will protect adjacent structures and facilities rests solely with the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

2. PRODUCTS

2.1 EQUIPMENT

- A. Before operations begin, the Contractor shall have available on the site of work sufficient pumping equipment and/or other machinery to assure that the operation of the dewatering system can be maintained.

3. EXECUTION

3.1 METHODS

- A. Dewatering shall be done by such method as the Contractor may elect.
- B. Dewatering, sufficient to maintain the groundwater level at or below the surface of trench bottom or base of the foundation gravel shall be accomplished prior to excavation and placing of pipeline or concrete. The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the excavation.
- C. The normal water table shall be restored to its natural level in such a manner as to not disturb the pipe, its foundation and structures.
- D. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.
- E. Dispose of water so as not to cause injury to public or private property or to cause a nuisance or menace to the public and in accordance with the requirements of regulatory agencies.
- F. Permanent piping systems shall not be incorporated in the dewatering system.

* * * END OF SECTION * * *

SECTION 02150

SHORING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 QUALITY ASSURANCE

- A. Where the depth of excavation exceeds 20 (twenty) feet the Contractor's shoring systems shall be designed and inspected by a registered professional engineer with experience in the work, all in accordance with federal, state and local safety requirements (the most stringent requirement prevailing).
- B. Where the depth of excavation is less than 20 (twenty) feet, the Contractor shall provide, place and maintain responsibility for shoring, sheeting, bracing, sloping or otherwise support the sides of trenches and excavations, including embankments by a means of sufficient strength to protect employees. Such shoring and associated responsibilities shall be in accordance with federal, state and local safety requirements (the most stringent requirement prevailing).

1.3 SUBMITTAL

- A. For shoring systems to be used for depth of excavation greater than 20 (twenty) feet, submit material indicating compliance with federal, state and local safety requirements for shoring systems. Specifically, the material shall indicate that such systems have been designed by a registered professional engineer with experience in the work.

2. PRODUCTS

2.1 SHORING SYSTEMS

- A. Materials used shall be at the Contractor's option.

3. EXECUTION

3.1 SAFETY REQUIREMENTS

- A. Shoring shall be placed in accordance with federal, state and local safety requirements (the most stringent requirement prevailing).

3.2 SHORING SYSTEMS

- A. Unless otherwise provided, the Contractor shall provide all shoring systems needed to protect the work, adjacent property and improvements, utilities, pavement, etc., and to provide safe working conditions in the trench.
- B. Removal of any or all shoring systems from the trench shall be accomplished in such a manner as to fulfill all of the above requirements and shall also be accomplished in such a manner as to prevent any damage to the work.
- C. Damages resulting from improper shoring or from failure to shore shall be the sole responsibility of the Contractor.
- D. Whether shoring systems shall be left in place or removed shall be at the option of the Contractor, provided that removal of any and all shoring used in trench or structure excavation shall be accomplished in the manner as to prevent the settlement of the pipes or other work and to prevent increased backfill loading which might overload the pipe or walls of the structure.

Shoring shall be removed to a minimum of 5 feet below the final grade.
- E. Should the Owner order that any shoring be left in place, the Contractor shall not remove the same but will receive payment for the materials left in place at the market value thereof.

3.3 SPECIAL REQUIREMENT FOR FLEXIBLE PIPE

- A. Shoring to be removed, or moveable trench shields or boxes, shall be located at least 2 pipe diameters away from the pipe if the bottom of the shoring, shield or box extends below the top of flexible pipe, unless a satisfactory means of reconsolidating the bedding or side support material disturbed by shoring removal can be demonstrated.
- B. Damages resulting from improper shoring or failure to shore shall be the sole responsibility of the Contractor.

* * * END OF SECTION * * *

SECTION 02161

ROCK WALLS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Grading: Section 02210

1.2 SUBMITTALS

- A. Location of quarry where the proposed materials are to be secured.
- B. Secure approval of source before delivery of materials to site.

2 PRODUCTS

2.1 ROCK MATERIAL

- A. Hard, sound and durable.
- B. Free from segregation, seams, cracks and other defects tending to destroy its resistance to weather.
- C. Density of at least 155 pounds per cubic foot.
- D. Nearly rectangular as possible.
- E. Uniform in size for each size.
- F. Rock for top 3 feet range in size from 400-800 pounds. Each lower 3 feet zone shall be 400 pounds heavier than the rock than the upper zone.
- G. Unload rock at site to segregate the rock by size range.

2.2 BACKFILL MATERIAL

- A. Same material as rock material except shall consist of quarry spalls.
- B. Maximum size - six inches.
- C. Minimum size - two inches.

3. EXECUTION

3.1 PREPARATION

- A. Excavate a trench, not less than six (6) inches or more than one (1) foot in depth below subgrade in excavation sections or below the existing ground level in embankment sections.
- B. Do not disturb private property.
- C. Areas on which the rockery is to be placed shall be trimmed and dressed to conform to the elevation or slope indicated.
- D. Construction will start as soon as possible upon the shaping of the cut or fill section.
- E. Correct any problems or repair any damage caused by delay at no additional cost to the Owner.

3.2 ROCK PLACEMENT

- A. Rocks shall be carefully placed by mechanical equipment and in a manner such that the longitudinal axis of the rock shall be at right angles or perpendicular to the rock wall face.
- B. Larger rocks shall be placed at the base of the wall so that the wall will be stable and have a stable appearance.
- C. Rocks shall have all inclining faces sloping to the back of the rockery.
- D. Each row of rocks will be seated as tightly and evenly as possible on the rock below in such a manner that there will be no movement between the two.
- E. Rock selection and placement shall be such that there will be no open voids in the exposed face of the wall over six (6) inches across in any direction.
- F. Rocks shall be placed and keyed together with a minimum of voids.
- G. Voids between the rocks shall be chinked on the back with quarry rock to eliminate any void sufficient to pass a 2-inch square probe.
- H. Stones to extend through the wall.
- I. Final course shall have a continuous appearance and be placed to minimize erosion of the backfill material.
- J. Maximum of six inch tolerance permitted between the designated slope plane and the finished wall.
- K. Construct wall one course at a time in embankment areas as adjoining embankment is constructed.

3.3 WALL BACKFILL

- A. Place material to an 8-inch minimum thickness between the wall and the cut or fill material after each course of rocks.
- B. Place in lifts to an elevation approximately six (6) inches below the course of rocks placed.
- C. Backfill material on the bearing surface of the rock course will be removed before setting the next course.

3.4 REJECTED MATERIAL

- A. Remove rejected material from job site.
- B. Repair or replace walls not meeting these specifications.

* * * END OF SECTION * * *

SECTION 02202

ROCK EXCAVATION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Grading: Section 02210
- C. Excavating, Backfilling, and Compacting for Utilities: Section 02222
- D. Underground Utilities/Facilities - Underground and Overhead: Section 02760

1.2 DEFINITIONS

- A. Solid rock, firmly cemented unstratified masses or conglomerate deposits possessing the characteristics of solid rock not ordinarily removed without systematic drilling and blasting, and any boulder, masonry, or concrete except pavement and sidewalks and curbs, exceeding 2/3 cubic yard in volume.

1.3 QUALITY ASSURANCE

- A. Assign a qualified blasting specialist of mature experience that is specialized in the use of explosives to the blasting operation, and maintain on a full-time basis during the time that blasting is in progress.
- B. Blasting specialist shall have a valid state powder license, as required.
- C. Comply with federal, state and local safety codes concerning transportation, handling, storage and use of explosives.
- D. Comply with requirements of road agency when project is on public right-of-way.

1.4 SUBMITTAL

- A. Schedule outlining time and locations of all drilling and blasting operations.
- B. Preblast survey report shall be submitted prior to start of blasting.

1.5 PERMITS

- A. Contractor shall be responsible for obtaining any federal, state, or local permits required for the transportation, storage, or use of explosives.

1.6 PRE-BLAST SURVEY

- A. Contractor shall conduct a pre-blast survey of the interior and exterior of every structure identified as being within a zone of potential damage from adjacent blasting within a minimum of 100 feet each side of the blasting area.
- B. Survey to be conducted by a person experienced in said surveys.
- C. Prepare a photographic or videotape record outlining specific structural defects as well as general condition of each structure:
 - 1. Photographs shall be 3" x 5" minimum size, glossy finish, in color and unmounted.
 - 2. All photographs shall be taken by an acceptable commercial photographer hired by the Contractor.
 - 3. Each photograph shall be marked with date and identification.
- D. Provide a written record including at least the following items:
 - 1. Date and time of inspection.
 - 2. Name of inspector.
 - 3. Location.
 - 4. Signature of person granting the approval for inspection.
 - 5. Name of person refusing approval to inspect.
 - 6. Description of specific structural defects as well as general condition of each structure.
 - 7. Other criteria recommended by blasting specialists.
- E. Provide the Engineer and Owner with one (1) copy each of the photographs and written report prior to start of any work within the area in question.

1.7 NOTIFICATION

- A. The Contractor shall notify the Engineer, police department, and fire department 24 hours in advance of detonating any charges.
- B. Provide ample warning to all persons within the vicinity prior to blasting.
- C. Erect warning signs.
- D. Station personnel to warn people prior to blasting.

2. PRODUCTS

2.1 MATERIALS

- A. Use explosive and initiators as recommended by the blasting specialist.
- B. Use any standard cartridge explosives prepared and packaged by explosive manufacturing firms.

3. EXECUTION

3.1 TECHNIQUES

- A. In excavating rock, the Contractor shall exercise care and use precautionary methods so as to not break down, loosen, or otherwise damage the supporting rock below the subgrade line.
- B. The Contractor shall be responsible for the methods used and for any damage resulting from his operations.
- C. The slopes of all rock cuts shall be scaled and dressed to a safe, stable condition by removing all loose spalls and rocks not firmly keyed to the rock slope and by removing all overhanging rock that may be a hazard to workmen or public.
- D. The Contractor shall drill, blast, and excavate short test sections to determine the blasting method, hole spacing, and charge best suited to the material encountered, in order to obtain the desired rock fracture, and make necessary adjustments.

3.2 PROTECTION

- A. Contractor shall control flying rock by proper spacing of charges and by placing blast mats or mounding soil over the shots after loading.
- B. Contractor shall control noise due to blasting by proper stemming and cover of blast holes, control of blasting during heavy cloud cover, and shall control time of blasting to conform to specific requirements at each site.
- C. Air blast pressures exerted on structures shall be kept below limits that may damage the structure.
- D. All damage caused by Contractor's blasting operations shall be repaired at no additional cost to the Owner. Contractor shall be responsible for receiving and negotiating claims for damage.

3.3 WASTE MATERIAL

- A. All shot rock removed from the excavation must be hauled to a waste site secured by the Contractor unless the material can be used for backfill or embankment included in the project.
- B. Material used in the project must conform to the requirements of these specifications.

3.4 LIMITS OF ROCK EXCAVATION

- A. Excavate to minimum of 6 inches below bottom of pipe barrel and sufficient distance outside of pipe to install pipe and bedding.
- B. Maximum width of trench shall be 24 inches wider than the pipe barrel.
- C. Excavate to minimum of 6 inches below structure subgrade unless otherwise specified.
- D. Excavate to subgrade for roadways.

* * * END OF SECTION * * *

SECTION 02222

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Demolition: Section 02050
- B. Site Clearing and Grubbing: Section 02110
- C. Rock Excavations: Section 02202
- D. Grading: Section 02210
- E. Excavating, Backfilling and Compacting for Structures:
Section 02221
- F. Sedimentation Control: Section 02275
- G. Water Lines: Section 02660
- H. Sanitary Sewers: Section 02730
- I. Sewer Force Mains: Section 02732
- J. Existing Utilities/Facilities-Underground and Overhead:
Section 02760
- K. Shoring: Section 02150
- L. Dewatering: Section 02140

1.2 CLASSIFICATION

- A. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics.
- B. The Contractor shall make his own estimate of the kind and extent of materials which will be encountered in the excavation.

1.3 QUALITY CONTROL ASSURANCE

- A. Soils and backfill: Moisture density standard ASTM D1557 or AASHTO T-180 method unless otherwise specifically approved.
- B. In-place density determination: Sandcone method ASTM D1556 or nuclear method ASTM D2922.
- C. Classification of soils: ASTM D2487.
- D. Quality control monitoring of subgrade backfill and embankment materials and construction by certified independent laboratory approved by Engineer and secured and paid for by the Contractor.

1.4 SUBMITTALS

- A. Import backfill gradation and moisture density compaction curve test reports.
- B. Embankment and native backfill materials gradations and moisture density standards curve test reports.

- C. Certification of gradation and compliance with referenced standards and moisture density standards test reports.
- D. Density test results in approved format.
- E. At any time the Contractor shall change the source and/or stockpile from which materials are obtained, certificates of gradation for these new sources will also be required.
- F. During construction, the Owner may elect to have further gradation testing completed on the materials being furnished by the Contractor. This testing will be at the expense of the Owner, however, the Contractor shall provide material samples as may be necessary to complete this testing and these material samples will be furnished from material available on the job site or from the Contractor's source and/or supplier.
- G. Controlled Density Fill (CDF): Furnish a certificate with each truckload of CDF product delivered to the site, indicating the composition and quality of the mix. Include size and weight of each aggregate, amount of cement, amount of water and amount and kind of any additives.

2. PRODUCTS

2.1 BACKFILL MATERIALS

- A. These materials shall be native materials and as described in this section.

2.2 GRAVEL BEDDING MATERIAL

- A. Bedding for rigid pipe: Bedding material shall consist of clean, granular, well graded screened or crushed sand and gravel material conforming to the following gradation when tested in accordance with ASTM D422:

<u>Sieve Size</u> <u>Square Opening</u>	<u>Percent Passing</u> <u>by Weight</u>
3/4 inch	100
3/8 inch	95 - 100
No. 8	0 - 10
No. 200	0 - 3

- B. Bedding for flexible pipe: Bedding material shall be a clean screened or crushed sand/gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D422:

<u>Sieve Size</u> <u>Square Opening</u>	<u>Percent Passing</u> <u>by Weight</u>
3/4 inch	100

3/8 inch	70 - 100
No. 4	55 - 100
No. 10	35 - 95
No. 20	20 - 80
No. 40	10 - 55
No. 100	0 - 10
No. 200	0 - 3

- C. Minimum sand equivalent shall be 35 in accordance with ASTM D2419.

2.3 BACKFILL GRAVEL

- A. All backfill gravel shall consist of naturally occurring screened or crushed gravel.
- B. Shall be essentially free from wood waste or other extraneous or objectionable materials.
- C. Shall have such characteristics of size and shape that it will compact readily and shall meet the following test requirements:

Stabilometer "R" Value	72 min.
Swell Pressure	0.3 psi max.
Maximum Particle Size	3 in.
Passing 1/4" Sq. Opening	25% min.
Passing No. 200 Sieve	10% max.
All percentages are by weight	

Dust Ratio: $\frac{\% \text{ Passing No. 200 Sieve}}{\% \text{ Passing No. 40 Sieve}}$	2/3 max.
Sand Equivalent (ASTM D2419)	30 min.

- D. Backfill gravel material retained on a 1/4-inch square sieve shall contain not more than 0.20% by weight of wood waste.
- E. The Contractor shall provide the Engineer with a certificate of gradation or sieve analysis from a qualified testing laboratory for backfill gravel.

2.4 NATIVE MATERIAL

- A. Selected soil free from roots or other organic material, debris, or frozen material.
- B. Maximum size to 6 inches with no stone larger than 4 inches in upper 6 inches of fill.
- C. Free of excess moisture.
- D. Processed to uniform measure and texture necessary to obtain specified density.

2.5 FOUNDATION GRAVEL

- A. At least two basic trench-bottom conditions commonly cause problems: (1) where silty soils or fine sandy soils are encountered, they will usually flow in the presence of a stream of water, and (2) where clays, peats, or other soft materials are encountered, they may become saturated with water, but do not usually break down into fine particles and flow as do the silts or sands mentioned above.
- B. Contractor's attention is called to conditions for use of the material as outlined in Paragraph 3.5 of this section.
- C. Condition (1) Material: Where Condition (1) is encountered, the following foundation gravel has been found by experience usually to be adequate. Foundation gravel shall consist of clean bank run sand and gravel, free from dirt, roots, topsoil, and debris and contain not less than 35% retained on a 1/4-inch sieve and with all stones larger than two (2) inches removed. Such gravel must only be used in a dry trench bottom, free from quicksand or running sand.
- D. Condition (2) Material: Where Condition (2) is encountered, Class A or Class B foundation gravel listed below, has been found by experience usually to be adequate. Other material may, however, be found more desirable by the Contractor:

<u>Sieve Size</u> <u>Square Opening</u>	<u>Class A</u> <u>% Passing</u>	<u>Class B</u> <u>% Passing</u>
2-1/2"	98 - 100	95 - 100
2"	92 - 100	75 - 100
1-1/2"	72 - 87	30 - 60
1-1/4"	58 - 75	0 - 15
3/4"	27 - 47	0 - 1
3/8"	3 - 14	---
No. 4	0 - 1	---

- E. Foundation gravel shall contain no pieces larger than five (5) inches, measured along the line of greatest dimension.

2.6 RIGID INSULATION

- A. Insulation shall be closed-cell, extruded polystyrene foam.
- B. The insulation shall have a typical five year aged thermal conductivity, k factor of 0.2 Btu/hr/sq.ft./°F/in when tested at 75° F mean temperature in accordance with ASTM C518.
- C. Minimum compressive strength of 25 psi when tested in the vertical direction in accordance with ASTM D1621.
- D. Maximum water absorption of 0.3% by volume when tested in accordance with ASTM C272.

2.7 CONTROLLED DENSITY FILL (CDF)

- A. CDF shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a non-segregating, self-consolidating, and free-flowing material which will result in a hardened, dense, non-settling, and excavatable fill.
- B. CDF shall be used as fill above utilities wherever non-settling backfill is required or as a hydraulic barrier between coarse and fine grained soil.
- C. CDF shall be batched and mixed in accordance with Section 6-02.3 of the WSDOT/APWA Specifications. Materials are as follows:
- | | |
|--------------------|-----------------------------------|
| 1. Portland Cement | AASHTO M 85 or
WSDOT/APWA 9-01 |
| 2. Fly Ash | Class F |
| 3. Aggregates | WSDOT/APWA 9-03.1(2)B |
| 4. Water | WSDOT/APWA 9-25 |
| 5. Admixtures | WSDOT/APWA 9-23.6 |
- D. CDF shall be used in the following proportions for one cubic yard. Batch weights may vary depending on specific weights of aggregates.
- | | |
|---|-------|
| • Maximum gallons of mixing water per cubic yard | 50 |
| • Pounds of cement per cubic yard | 50 |
| • Pounds. of fly ash per cubic yard | 250 |
| • Pounds of dry aggregate per cubic yard, Class 1
or 2 sand as per WSDOT/APWA 9-03.1(2)B | 3,200 |
| • | |
- E. CDF shall be batched to provide a flowing, non-segregating mix, with a slump between 6 inches and 8 inches.

3. EXECUTION

3.1 TRENCHING

- A. Material shall be excavated from trenches and piled adjacent to the trench and maintained so that the toe of the slope of the spoil material is at least two (2) feet from the edge of the trench.
- B. Material shall be piled in such a manner that will cause a minimum of inconvenience to public travel.

- C. Free access shall be provided to all fire hydrants, water valves and meters, and clearance shall be left to enable the free flow of storm water in all gutters, conduits, and natural watercourses.
- D. Ledge rock, boulders, or stones shall be removed to provide a minimum clearance of six (6) inches under and around the pipe.
- E. Contractor shall keep excavations free of water in accordance with Section 02140.
- F. Contractor is responsible for shoring in accordance with Section 02150.

3.2 TRENCHING FOR WATER LINES

- A. Trenching shall be dug to true and smooth bottom grades in accordance with the lines given by the Engineer.
- B. Trench widths shall not exceed 30 inches maximum or 1.5 times outside diameter of the pipe plus 18 inches whichever is greater.
- C. Standard excavation equipment shall be adjusted so as to excavate the narrowest ditch possible.
- D. Depth of trenching for water mains shall be such as to give a minimum cover of 36 inches over the top of the pipe unless otherwise specified.
- E. Deeper excavation may be required due to localized breaks in grade, or to install the new main under existing culverts or other utilities where necessary.
- F. Where profile of pipeline and ground surface is shown on the plans, pipeline shall be laid to elevation shown, regardless of depth.
- G. Excavation shall be to such depth that the minimum cover over the valve nuts shall be one foot.
- H. The length of trench excavated in advance of pipe laying shall be kept to a minimum and in no case shall length of open trench exceed 400 feet unless specifically authorized by the Engineer.
- I. Trenches shall be over excavated below the specified grade to provide for bedding material specified.

3.3 TRENCHING FOR SEWERS AND DRAINS

- A. Trenches must be of sufficient width to permit proper jointing of the pipe and backfilling of material along the sides of the pipe.
- B. Trench width at the surface of the ground shall be kept to the minimum amount necessary to install the pipe in a safe manner.

- C. Trenches wider than the maximum specified may result in a greater load of overburden than the pipe is designed for, and consequently, if the maximum trench width is exceeded by the Contractor, the Contractor shall at his own expense, provide pipe of higher strength classification, or provide a higher class of bedding where necessary to ensure that the pipe will not be overloaded.
- D. The normal maximum permissible trench width, at the bottom of the trench and up to a point at the crown of the pipe, shall be 1.5 times the inside diameter plus 18 inches or 40 inches, whichever is greater.
- E. Excavation for manholes and other structures shall be sufficient to provide a minimum of 12 inches between their outside surfaces and the sides of the excavation.
- F. The length of trench excavated in advance of the pipe laying shall be kept to a minimum, and in no case shall it exceed 150 feet unless specifically authorized by the Engineer.
- G. Trenches shall be excavated below the barrel of the pipe a sufficient distance to provide for bedding material specified.

3.4 TRENCHING FOR SEWER FORCE MAINS

- A. Trenches shall be dug to true and smooth bottom grade and in accordance with the lines given by the Engineer.
- B. Trench widths shall not exceed 30 inches maximum or 1.5 times outside diameter of the pipe plus 18 inches whichever is greater.
- C. Standard excavation equipment shall be adjusted so as to excavate the narrowest ditch possible.
- D. The depth of trenching shall be such as to give a minimum cover of 48 inches over the top of the pipe unless otherwise specified.
- E. Where profile of pipeline and ground surface is shown on the plans, pipeline shall be laid to elevation shown regardless of depth.
- G. Trench shall be graded so that there is an upward slope at all times from low point to high point.
- H. The length of trench excavated in advance of the pipe laying shall be kept to a minimum and in no case shall length of open trench exceed 400 feet unless otherwise specifically authorized by the Engineer.
- I. Trenches shall be overexcavated below the specified grade to provide for bedding material specified.

3.5 PIPE FOUNDATIONS

- A. Where the trench bottom is in a material which is unsuitable for foundation or which will make it difficult to obtain uniform bearing for the pipe, such material shall be removed and a stable foundation provided in accordance with Standard Detail entitled "Foundation Gravel and Backfill".
- B. Proper preparation of foundation and placement of foundation material, where required, shall precede the installation of all pipe.

This shall include the necessary preparation of the native trench bottom and/or the top of the foundation material to a uniform grade so that the entire length of pipe rests firmly on a suitable properly compacted material.
- C. Gravel to be used for foundation purposes shall be of a type and gradation to provide a solid compact bedding in the trench. Because trench conditions vary, foundation gravel requirements will change.
- D. Neither approval or disapproval of the foundation material proposed by the Contractor shall relieve him of his responsibility for providing adequate pipe foundation and guaranteeing his work as elsewhere required by the Contract.
- E. Unsuitable material for foundation purposes below the depth required for the specified bedding shall be removed and replaced with suitable foundation gravel.
- F. Excavated materials shall be disposed of at an approved waste site.

3.6 PIPE BEDDING

- A. Placement of bedding material in the pipe zone shall be as specified in the section regarding the pipeline being constructed.

3.7 BACKFILLING

- A. Pipe bedding and backfill to 6 inches over the top of the pipe shall be completed before backfilling operations are started.
- B. The Contractor shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by pushing the material from the end of the trench into, along, and directly over the pipe so that the material will be applied in the form of a rolling slope rather than by side filling which may damage the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as to protect the pipe.
- C. Compaction equipment used above the pipe zone shall be of a type that does not injure the pipe.

- D. Provide for the proper maintenance of traffic flow and accessibility as may be necessary.
- E. Make adequate provisions for the safety of property and persons.
- F. Temporary shoring shall be removed unless specifically authorized in writing.
- G. Dewatering shall be continued until the trench is completely backfilled.
- H. Brush, stumps, logs, planking, disconnected drains, boulders, etc., shall be removed from the material to be used for backfilling the trench.
- I. Where original excavated material is unsuitable for trench backfill, backfill gravel shall be placed. The unsuitable material shall be removed to a disposal area. Backfill gravel shall be used for backfill only where original material is unsuitable and upon approval by the Engineer.
- J. Where it is required that a blanket of select material or bank run gravel be placed on top of the native backfill, the backfill shall be placed to the elevations shown on the plans, or to the elevation the Engineer may direct, and shall be leveled to provide for a uniform thickness of the selected material. Compaction of the native material shall be as required by the Owner and shall be performed prior to placing the select material.
- K. Backfill gravel: Wherever a trench is excavated in a paved roadway, sidewalk or other area where minor settlements would be detrimental and where the native excavated material is not suitable for compaction as backfill, the trench shall be backfilled to such depth as the Engineer may direct with Backfill Gravel.
- L. CDF: CDF shall be placed as shown on the drawings, or wherever mechanical compaction cannot be achieved due to physical space and/or clearance limitations (not allowing access for mechanical compaction equipment) and where additional excavation to provide the required space and/or clearance is not practical or possible. CDF shall be used as fill above utilities wherever non-settling backfill is required.

3.8 GENERAL COMPACTION REQUIREMENTS

- A. Requirements of this section shall apply unless more stringent requirements are established by the local agency involved.
- B. When working in an existing traveled roadway, restoration and compaction must be achieved as the trench is backfilled so as to maintain traffic.
- C. Trench backfill under roadway shall be mechanically compacted to 95% of maximum density except for trenches over 8 feet in depth.

- D. In the case of trenches over 8 feet deep, backfill at depths over 4 feet may be compacted by either water settling or mechanical compaction. The top four feet of the trench line shall then be mechanically compacted to 95%.
- E. In any trench in which 95% density cannot be achieved with existing backfill, the top 4 feet shall be replaced with backfill gravel mechanically compacted to 95%.
- F. When working in areas outside of proposed traveled roadway or on landscaped easements, backfill gravel shall be mechanically compacted to 95% density.

3.9 MECHANICAL COMPACTION

- A. Method of compaction shall be at Contractor's option.
- B. The Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density.
- C. In-place compaction tests may be made. Contractor shall remove and recompact material that does not meet specified requirements.

3.10 INSULATION BOARD INSTALLATION

- A. Prior to placement of the insulation board, the subgrade shall be leveled and compacted to provide a smooth, firm foundation.
- B. Insulation board shall be placed 12 inches above the pipe line whenever shown on the drawing.
- C. The insulation shall be 2 feet wide and extend 5 additional feet along the length of pipe after minimum cover has been achieved.
- D. Insulation shall be anchored prior to backfilling using a minimum of two 6-inch by 3/8-inch wooden skewers per board, driven at an angle to the vertical and flush to the surface of the insulation.
- E. Layering of insulation to obtain the specified thickness shall be allowed as long as all joints are overlapped at least 6 inches.

3.11 CONTROLLED DENSITY FILL (CDF)

- A. Haul excavated material immediately to waste; install and bed pipe per Section 02660 and other applicable sections.
- B. Mix and deliver CDF in commercial concrete ready mix trucks. CDF shall be discharged from the mixer by any reasonable means (which does not segregate the material) into the area to be filled.
- C. Contain CDF at either end of the excavation by bulkhead or earth fill.

- D. Place CDF using suitable equipment to avoid injury to or displacement of installed utility lines, manholes, and other structures. CDF shall not be placed on frozen ground.
- E. Vibrate fill with concrete vibrators during placement for complete consolidation, 95% minimum.
- F. Provide steel plates to span utility trench and prevent traffic contact with the CDF for at least 12 hours but not more than 24 hours, or until fill has set sufficiently to prevent rutting.
- G. Placement of CDF shall be scheduled during favorable weather conditions. At the time of placement, the temperature must be at least 40° F. Mixing and placing shall stop when the temperature is 38° F or less and falling. Each filling stage shall be as continuous an operation as practical.

* * * END OF SECTION * * *

SECTION 02275

SEDIMENTATION CONTROL

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Site Clearing: Section 02110
- B. Grading: Section 02210
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222
- D. Landscape Restoration: Section 02990

1.2 QUALITY CONTROL

- A. Conform to regulatory requirements including the latest edition of the Washington Department of Ecology's Stormwater Management Manual for Western Washington.

1.3 SCHEDULE

- A. Required sedimentation control facilities must be constructed and in operation prior to land clearing and/or other construction to ensure that sediment-laden water does not enter the natural drainage system.
- B. Sediment facilities shall be maintained in a satisfactory condition until such time that clearing and/or construction is completed and the potential for on-site erosion has passed.
- C. The implementation, maintenance, replacement, and additions to erosion/sedimentation control systems shall be the responsibility of the Contractor.

2. PRODUCTS

2.1 PLANTING MATERIALS

Refer to Section 02990

2.2 STRAW

- A. Shall be in an air-dried condition free of noxious weeds, weed seeds, and other materials detrimental to plant life.
- B. Shall be seasoned before baling or loading and shall be acceptable to the Engineer.

2.3 JUTE MATTING

- A. Be of a uniform open plain weave of unbleached, single jute yarn treated with a fire retardant chemical.
- B. The yarn shall be of a loosely twisted construction and shall not vary in thickness by more than 1/2 of its normal diameter.
- C. Furnished in rolled strips 48 inches wide by approximately 50 yards long.
- D. Average weight of 0.92 pounds per square yard with an allowable tolerance of plus or minus 1 inch in width and 5% in weight.

2.4 FILTER FABRIC

- A. Filter fabric for the erosion protection barriers shall be Mirafi 140 or equivalent.

2.5 WIRE

- A. Wire for the erosion protection barriers shall be 2 x 2 mesh, 14 gauge galvanized wire.

2.6 SUPPORT POSTS

- A. Support posts for the erosion protection barriers shall be 2-inch by 4-inch, Doug-FR No. 1 or better wood posts or 1-1/2-inch by 4/8-inch medium weight steel fence posts.

2.7 CLEAR PLASTIC COVERING

- A. Clear plastic covering for protection of slopes and cuts shall meet the requirements of the NBS Voluntary Product Standard, PS 17 for polyethylene sheeting having a minimum thickness of 6 mil.

2.8 SEDIMENT RETENTION WATTLE

- A. Wattles shall be a straw-filled tube of flexible netting material. The wattles shall be manufactured by a company whose principle business is wattle manufacturing and shall be a machine-produced tube of compacted rice straw that is Certified Weed Free Forage. The netting shall consist of seamless, high-density polyethylene and ethyl-vinyl-acetate and contain ultraviolet inhibitors

3. EXECUTION

3.1 EROSION CONTROL

- A. Erosion control provisions shall meet or exceed the requirements of the local agency having jurisdiction.
- B. When provisions are specified and shown on the Drawings, they are the minimum requirements.

- C. Contractor shall not permit sediment-laden waters to enter drainage facilities.
- D. As construction progresses and seasonal conditions dictate, more siltation control facilities may be required. It shall be the responsibility of the Contractor to address new conditions that may be created and to provide additional facilities over and above minimum requirements as may be required.

3.2 SILTATION/SEDIMENTATION PONDS

- A. Siltation/sedimentation ponds shall be installed on site to desilt all stormwater or water pumped from excavations.
- B. If additional siltation control is required, check dams or silt fences may be placed in ditches receiving stormwater from areas disturbed by construction.
- C. Siltation/sedimentation ponds shall be constructed in accordance with the requirements of the agencies having jurisdiction over facilities to receive discharge from siltation/sedimentation ponds.

3.3 FILTER FABRIC FENCES

- A. Filter fabric fence shall consist of filter fabric fastened to wire fabric with staples or wire rings.
- B. Wire shall be fastened to posts set at 4-foot centers.
- C. Fabric shall be buried into ground approximately 8 inches to prevent silt from washing under fabric.
- D. Fence shall be located to catch silt and prevent discharge to drainage courses.

3.4 STRAW BALE FILTER

- A. Installed in drainage way to catch silt.
- B. Dig bales into ground approximately 6 inches and stake in place with 2 wooden stakes in each bale.
- C. Bales to extend above anticipated surface of stream.

3.5 SEDIMENT RETENTION WATTLE

- A. Install wattles in the trench, ensuring that no gaps exist between the soil and the bottom of the wattle. The ends of adjacent wattles should be tightly abutted so that no opening exists for water or sediment to short-circuit the system. Alternately, wattles may be lapped, 6" minimum, to prevent sediment passing through the field joint.

- B. Wooden stakes should be used to fasten the wattles to the soil. When conditions warrant, a straight metal bar can be used to drive a "pilot hole- through the wattle and into the soil.

3.6 PLACING JUTE MATTING

- A. Seed and fertilizer shall be placed prior to placing of matting.
- B. Jute matting shall be unrolled parallel to the flow of water. Where more than 1 strip of jute matting is required to cover the given area, it shall overlap the adjacent mat a minimum of 4 inches. The ends of matting shall overlap at least 6 inches with the upgrade section on top.
- C. The up-slope end of each strip of matting shall be staked and buried in a 6-inch deep trench with the soil firmly tamped against the mat. Three stakes per width of matting (1 stake at each overlap) shall be driven below the finish ground line prior to backfilling of the trench.
- D. The Engineer may require that any other edge exposed to more than normal flow of water or strong prevailing winds be staked and buried in a similar manner.
- E. Check-slots shall be placed between the ends of strips by placing a tight fold of the matting at least 6 inches vertically into the soil. These shall be tamped and stapled the same as upslope ends. Check-slots must be spaced so that one check-slot or one end occurs within each 50 feet of slope.
- F. Edges of matting shall be buried around the edges of catch basins and other structures as herein described. Matting must be spread evenly and smoothly and in contact with the soil at all points.
- G. Matting shall be held in place by approved wire staples, pins, spikes or wooden stakes driven vertically into the soil. Matting shall be fastened at intervals not more than 3 feet apart in 3 rows for each strip of matting, with 1 row along each edge and 1 row alternately spaced in the middle. All ends of the matting and check slots shall be fastened at 6-inch intervals across their width. Length of fastening devices shall be sufficient to securely anchor matting against the soil and driven flush with the finished grade.

3.7 PLACING CLEAR PLASTIC COVERING

- A. Clear plastic covering shall be installed on erodible embankment slopes as shown in the plans or as designated by the Engineer.
- B. The clear plastic covering shall be installed immediately after completion of the application of roadside seeding.
- C. The Contractor shall maintain the cover tightly in place by using sandbags or tires on ropes with a minimum 10-foot grid spacing in all directions. All seams shall be taped or weighted down full length. There shall be at least a 12-inch overlap of all seams.

- D. The Contractor shall be responsible to immediately repair all damaged areas.

3.8 EXISTING DRAINAGE FACILITIES

- A. Should a storm sewer or culvert become blocked or have its capacity restricted due to silt discharged from Contractor's operations, the Contractor shall make arrangements with the jurisdictional agency for the cleaning of the facility at no additional expense to the Owner.

3.9 DRAINAGE DIVERSION

- A. Contractor shall divert offsite surface runoff water around the site as may be required.
- B. Drainage shall be restored to condition existing prior to construction unless otherwise shown on the Drawings.

* * * END OF SECTION * * *

SECTION 02300
PIPE BORING AND JACKING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Sanitary Sewers: Section 02730

1.2 REQUIREMENTS OF CONTROLLING AGENCY

- A. All work shall be done in accordance with the requirements of the road or railroad agency in control of the facility being bored or jacked.

2. PRODUCTS

2.1 MATERIALS

- A. All materials selected by the Contractor shall meet the minimum requirements of the controlling agency or the construction requirements.
- B. Where casing size and thickness is shown on drawing, it is minimum size and thickness permitted. Contractor is permitted to use larger size or thicker walled casing if, in his opinion; it is required because of soil or other job conditions.
- C. Minimum thickness of casing wall shall meet requirement of road or railroad agency involved.

3. EXECUTION

3.1 INSTALLATION OF ENCASING PIPE

- A. Where shown on the Plans, the Contractor shall install the pipe in a large encasing pipe.
- B. The encasing pipe shall be installed by jacking, tunneling, augering, or by a combination of these methods.
- C. The encasing pipe shall normally extend from ditch-line on each side of the pavement or as shown on the drawings or in the road permit. No excavation shall be made closer than 6 feet from the edge of the pavement or as directed by the road or railroad agency. Exact length shall be approved by the road or railroad agency involved.
- D. During jacking, augering, or tunneling operations, care shall be exercised to prevent caving ahead of the pipe, which will cause

voids outside the pipe. If voids occur, the Contractor shall backpack the voids with sand and pea gravel and fill the voids with a pumped Portland cement grout.

3.2 TUNNELING

- A. Tunneling will not be allowed except by the liner plate method and unless approved by the road or railroad agency involved.
- B. Liner plates shall be assembled and installed in accordance with the manufacturer's instructions and specifications and in accordance with accepted tunneling methods using poling plates or shields of a strength equal to that of the liner plates.

3.3 CARRIER PIPE INSTALLATION

- A. The pipeline shall be skidded into position inside the casing pipe using suitable skids and blocked into position.
- B. The annular space between the carrier pipe and the casing pipe or tunnel liner shall be filled by sluicing or blowing sand or pea gravel into the space unless otherwise specified. Care shall be exercised to ensure that the entire space is filled and that the pipe is not disturbed during the placement of the backfill between the pipe and the casing.
- C. The Contractor shall remove the carrier pipe and reinstall it if the pipe is not within the tolerances shown on the drawings and as specified.

* * * END OF SECTION * * *

SECTION 02575
PAVEMENT REPAIR AND RESURFACING

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Traffic Regulation: Section 01570
- B. Demolition: Section 02050
- C. Site Clearing: Section 02110
- D. Excavation, Backfilling and Compacting for Utilities: Section 02222
- E. Cast-in-Place Concrete: Section 03300

1.2 QUALITY ASSURANCE

- A. Qualifications of asphalt concrete producer: Use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot-mix, hot-laid asphalt concrete.

1.3 PAVING QUALITY REQUIREMENTS

- A. General: In addition to other specified conditions, comply with following minimum requirements:
 - 1. Comply with requirements of road agency having jurisdiction.
 - 2. Provide final surfaces of uniform texture, conforming to required grades and cross-sections.
 - 3. Patches shall match existing grade and cross-section unless the standard details are more stringent or as otherwise directed by the road agency.
- B. Surface Smoothness:
 - 1. Test finished surface of each asphalt concrete course for smoothness using a 10-foot straight edge applied parallel to and at right angles to centerline of paved areas.
 - 2. Surfaces will not be acceptable if exceeding 0.25 inch in 10 feet unless more rigid requirements are established by the road agency.

1.4 SUBMITTALS

- A. Certify that materials comply with specification requirements.
- B. Certificate to be signed by asphalt concrete producer and Contractor.

1.5 JOB CONDITIONS

- A. Weather limitations:
 - 1. Construct only when temperatures are above minimum specified in WSDOT's standard specifications unless waived by road agency having jurisdiction.

2. Do not construct pavement or base when the base surface is wet or contains an excess of moisture that would prevent uniform distribution and the required penetration.
- B. Grade control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.
 - C. Traffic control:
 1. Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.
 2. Provide flagmen, barricades, warning signs, and warning lights for movement of traffic and safety and to cause the least interruption of work.
 3. See Section 01570 for additional requirements.

1.6 ROAD AND STREET RESTORATION REQUIREMENTS

- A. The Contractor's responsibility as to road restoration shall include, but not be limited to, proper backfill and compaction of excavation, shaping and general restoration of the roadway, restoration of public and private improvements when damaged by construction, restoration of drainage facilities, scarification of existing surfacing, if required, removal of debris and surplus material, and all other requirements of these Specifications. In addition, upon completion of the above restoration, backfill gravel and crushed gravel or crushed rock surfacing shall be placed where required, in the opinion of the Engineer.
- B. Unless otherwise specifically authorized by the authority responsible for the roadway, the final grade and cross-section shall conform to applicable road agency standard cross sections. In case of existing private roads, they shall conform to the roadway that existed prior to construction.
- C. Manhole rings, valve boxes, and monument cases shall be adjusted as necessary to be flush with the restored surface.
- D. The Contractor shall comply with all requirements of all permits for installation of pipelines in authorized rights-of-way.
- E. The Contractor will place and maintain sufficient and proper lights and barricades at all locations on roads not accepted by the road agency involved.
- F. After completion of pipeline installation, the Contractor shall clean drainage ditches and restore all existing drainage structures that he may have damaged during the course of construction. He shall also comply with all drainage requirements of the agency involved upon which the agency's acceptance of the roads is conditioned.
- G. The Contractor shall restore any private improvement on road rights-of-way including, but not limited to, culverts, driveways, curbs, sidewalks, parking strips, parking areas, or other permanent

improvements, whether or not a permit for such improvements has been obtained.

- I. All streets in the construction area as well as any unpaved streets used by Contractor's trucks or any other equipment hauling material to and from the area, whether within the construction area or adjacent thereto, and any unpaved streets used as detours during the construction shall be serviced with an application of or continuous use of sprinkler trucks to allay the dust. The sprinkling of the dust on roads or streets will continue until accepted by the road agency or the roads or streets have been graveled or resurfaced.
- J. It is specifically understood and agreed that the Contractor is responsible for complying with all requirements of the road agency necessary to obtain written acceptance of the roads by the agency concerned.
- K. Until accepted in writing by the road agency, the Contractor will maintain all roads in a condition satisfactory to the agency concerned. This shall include periodic grading of all streets on which traffic is allowed wherever, in the opinion of the Engineer, such grading is required. A suitable motor grader shall be available for this work.
- L. Any settlement that occurs during the first year after final contract acceptance shall be repaired by the Contractor at his expense.

2. PRODUCTS

2.1 CRUSHED SURFACING

- A. Crushed surfacing shall be manufactured from ledge rock, talus, or gravel. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material.
- B. Crushed surfacing shall meet the following requirements for grading and quality:

<u>Sieve Size</u> <u>Square Opening</u>	<u>Percent Passing</u> <u>by Weight</u>
1 inch	100
3/4	70-100
3/8	50-80
No. 4	35-65
No. 10	25-50
No. 40	15-30
No. 200	0-10

- C. The portion of crushed aggregate retained on a No. 10 sieve shall have a minimum of 75% of the particles with at least one fractured face.

- D. The portions passing the No. 40 sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6.
- E. The portions passing No. 10 sieve shall have a percentage of wear of not greater than 35% when tested in the Los Angeles machine.

2.2 ASPHALT CONCRETE PAVEMENT

- A. Asphalt-concrete pavement shall conform to WSDOT's technical requirements for plant mix asphalt concrete

2.3 ASPHALT TREATED BASE

- A. Asphalt-treated base shall conform to WSDOT's technical requirements for asphalt-treated base.

2.4 CONCRETE

- A. Refer to Section 03300.

3. EXECUTION

3.1 GENERAL PAVEMENT REPAIR REQUIREMENTS

- A. Pavement patching shall be scheduled to accommodate the demands of traffic and shall be performed as rapidly as possible to provide maximum safety and convenience to public travel.
- B. The placing and compaction of the trench backfill and the preparation and compaction of the subgrade shall be in accordance with the requirements of Section 02222 of these Specifications.
- C. Prior to trench excavation in pavement surfaces, straight vertical trim lines shall be cut in order to minimize breakage and cracking of the remaining surfacing.
- D. Before the patch is constructed, all pavement cuts shall be trued so that the marginal lines of the patch will form a rectangle with straight edges and vertical faces. The use of a concrete saw will not be required for asphalt pavement.
- E. After completion of the patches, the entire roadway surface shall be cleaned by brooming or such other methods as may be required. The early completion of this phase of the restoration is required, not only to facilitate public relations, control dust, and alleviate traffic problems, but also to prevent the further break-up and cracking of the existing asphalt mat. If, in the opinion of the Engineer, the Contractor is not diligently pursuing the work in such a manner as to place the patch as soon as reasonably possible, the Contractor may be required to retrim and remove any and all cracked areas in such a manner to produce a straight uniform edge.

- F. Finished grade and cross section of patch shall match grade and cross-section of existing pavement, unless the standard details are more stringent.

3.2 ASPHALT CONCRETE TRENCH PATCH

A. Preparation:

1. As soon after compacting the trench backfill and placing and compacting backfill gravel, where required, the Contractor shall place and compact crushed surfacing in the trench area to a minimum depth of four (4) inches or depth to match the original cross-section, whichever is greater.
2. A tack coat of asphalt applied at the rate of 0.02 to 0.08 gallons per square yard of retained asphalt shall be applied through the use of mechanical equipment to all surfaces on which any course of asphalt concrete is to be placed or abutted. The spreading equipment shall be capable of uniformly distributing asphalt materials over any area in controlled amounts and shall be equipped with hand operated spray equipment for use only on inaccessible and irregularly shaped areas.
3. The tack coat shall be a heated cutback asphalt or emulsified asphalt, mixing grade. The emulsified asphalt may be mixed with water at the rate of 1 to 2 parts water to 1 part of emulsified asphalt.

B. Two-lift patch:

1. Immediately after completion of placing the base, the Contractor shall place a two-inch minimum compacted thickness of asphalt concrete surfacing. The final surface of this lift shall be not lower than 1/2 inch below the existing surface.
2. If the existing pavement is more than two inches, the first lift of asphalt concrete shall be of the same depth as the existing pavement.
3. The Contractor may substitute an equal amount of asphalt treated base for crushed surfacing and first lift of asphalt concrete.
4. A tack coat shall be placed over the patch area. Asphalt concrete modified so that maximum size aggregate is 1/2 inch shall be placed over the tack coat. Prior to rolling, the aggregate in the asphalt concrete shall be hand raked back from the edges and rolled in such a manner to produce a uniform "feather" edge over the existing surface. The minimum compacted thickness of the second lift over the trench area shall be one inch.
5. Where excess settlement of the first patch occurs, a leveling course shall be used to prevent the thickness of the second lift from exceeding two inches.
6. The edge of the patch shall be sealed by painting with a cut-back asphalt or SS-1 emulsion and immediately covered with sand and heated.

C. Single-lift patch:

1. Immediately after completion of placing the base, the Contractor shall place a two-inch minimum thickness of asphalt concrete surfacing.
2. If the existing pavement is more than two inches the asphalt concrete shall be of the same depth as the existing pavement.
3. The edge shall be hand raked to produce a smooth edge where the patch abuts the existing pavement.
4. The thickness shall be adjusted so that a smooth uniform grade exists after rolling.
5. The edge of the patch shall be sealed by painting with a cut-back asphalt or SS-1 emulsion and immediately covered with sand and heated.

3.3 CEMENT CONCRETE PAVEMENT PATCH

- A. After the subgrade for the pavement has been compacted and constructed to line and grade, the cement concrete pavement patch shall be placed, compacted, and struck off to the grade of the adjacent pavement.
- B. Minimum thickness shall be eight inches or the thickness of the existing pavement plus two inches, whichever is greater.
- C. Through and dummy joints shall be placed and edged to match existing joints.
- D. The surface shall be finished and brushed with a fiber brush.
- E. Approved curing compound shall be placed on the finished concrete immediately after finishing.
- F. Concrete used in patches shall be in accordance with Section 03300 unless Type III cement is required because of urgency of opening the street to traffic.

3.4 RIGID TYPE PAVEMENT RESURFACED WITH ASPHALT CONCRETE

- A. Cement concrete patch shall be placed as specified above for cement concrete pavement patch except that the surface of the cement concrete portion of the patch shall be left low enough to accommodate the asphalt portion of the patch. Brush finishing will not be required.
- B. Curing shall be accomplished with an asphalt emulsion cut back with water.
- C. Asphalt concrete or bituminous plant mix shall not be placed until the day after the cement concrete has been placed.
- D. The edges of the existing asphalt pavements and castings shall be painted with hot asphalt cement or asphalt emulsion immediately before placing the asphalt patching material.

- E. The asphalt concrete pavement shall then be placed leveled and compacted to conform to the adjacent paved surface.
- F. All joints between the new and original asphalt pavement shall be painted with hot asphalt or asphalt emulsion and be covered with dry paving sand before the asphalt solidifies.

3.5 ASPHALT CONCRETE PAVEMENT

- A. Full-width asphalt concrete pavement shall conform to the WSDOT's technical requirements.
- B. After the subgrade has been properly prepared and compacted, a minimum of two inches of asphalt concrete pavement Class B shall be placed and compacted.
- C. If the existing pavement is more than two inches thick, asphalt concrete shall be of the same depth as existing pavement prior to construction.
- D. The edges of the existing asphalt pavements and castings shall be painted with hot asphalt cement or asphalt emulsion immediately before placing the asphalt patching material.
- E. The asphalt concrete pavement shall then be placed, leveled, and compacted to conform to established cross-section and grade and to match adjacent paved surface.
- F. The edge of the new pavement shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with sand and heated.

3.6 ASPHALT CONCRETE OVERLAY

- A. Before construction of an asphalt concrete pavement overlay on an existing surface, all fatty asphalt patches, grease drippings, and other objectionable matter shall be removed from the existing pavement. Excess asphalt joint filler shall be removed and premolded joint filler shall be removed to at least one-half inch below the surface of the existing pavement. Existing pavement or bituminous surfaces shall be thoroughly cleaned by sweeping to remove dust and other foreign matter.
- B. Prior to placing asphalt concrete, a tack coat shall be applied using a heated cutback asphalt or emulsified asphalt at the rate of 0.02 to 0.05 gallons per square yard.
- C. When the surface of the existing pavement or old base is irregular, it shall be brought to uniform grade and cross section as required by the road agency involved. Preleveling of uneven or broken surfaces over which asphalt concrete is to be placed is required and may be accomplished by the use of asphalt concrete placed with a motor patrol grader, a paving machine, by hand raking, or by

a combination of these methods. After placement, the asphalt concrete used for preleveling shall be compacted with rollers.

- D. When asphalt concrete pavement is to be constructed over an existing paved or oiled surface, in addition to the preparation as outlined hereinbefore, all holes and small depressions shall be filled with an appropriate class of asphalt concrete mix. The surface of the patched area shall be leveled and compacted thoroughly. All previous patches that have settled shall be preleveled so that depth of overlay does not exceed two inches in thickness.
- E. After preparation of the base, a one-inch minimum compacted full width layer of asphalt concrete shall be placed on top of an existing paving surface. Surfacing shall be placed in such a manner as to prevent disturbing existing drainage. Surfacing shall be feathered out as required to meet existing driveways, catch basins, traffic control pads, street intersections, etc., and shall include thickened edge paving where it now exists.
- F. The edges of the overlay shall be sealed by painting with a cutback asphalt or SS-1 emulsion and immediately covered with dry sand and heated.

3.7 BITUMINOUS SURFACE TREATMENT REPLACEMENT

- A. Unless otherwise specified, all light bituminous surface treatment shall be replaced with a one-inch asphalt concrete overlay over a crushed surfacing base.
- B. Base shall consist of four inches of crushed surfacing.

3.8 CRUSHED SURFACING

- A. Existing crushed surfacing shall be replaced with new material.
- B. Thickness of course shall be as directed by the Owner.
- C. When the utility line is along the shoulder of a roadway, the Contractor may be directed to place a course of crushed surfacing along shoulder of the roadway. Thickness shall be as required by the road agency.
- D. During dry periods, the Engineer may require water sprinkling prior to and during the placement of crushed surfacing

3.9 TEMPORARY TRENCH PATCH

- A. The Contractor may be required to furnish and install a temporary trench patch when specifically directed by the Owner or as provided on the Plans.
- B. Area to be patched shall be cleaned out and graded to the bottom of the base course. Any loose asphalt shall be removed.

- C. Place a patch consisting of a 2-inch minimum course of crushed surfacing base and a 2-inch minimum course of cold asphalt plant mix placed over the trench area.
- D. Both the base and surface course shall be placed and compacted so that the finished surface will match the grade and cross-section of the existing pavement.
- E. Surface of pavement shall be cleaned of all dirt and debris before opening to traffic.
- F. The Contractor shall maintain temporary patch until the permanent patch is installed.

3.10 CEMENT CONCRETE CURBS AND GUTTERS

- A. Constructed with air entrained concrete.
- B. Side forms shall rest throughout their length on firm ground and shall be full depth of the curb. They shall be either metal of suitable gauge for the work or surfaced "construction" grade lumber not less than two (2) inches (commercial) in thickness. Forms shall be cleaned and well oiled prior to use. Forms used more than one time shall be cleaned thoroughly and any forms that have become worn, splintered, or warped shall not be used again. Forms shall be adequately supported to prevent deflection or movement.
- C. The foundation shall be watered thoroughly before the concrete is placed.
- D. Concrete shall be well tamped and spaded or vibrated in the forms.
- E. Exposed surfaces shall be finished full width with a trowel and edger. Remove forms of all roadway face of curbs within 24 hours of placement of concrete and treat with a float finish. The top and face of the curb shall receive a light brush finish and the top of the gutter shall receive a broom finish.
- F. Joints shall be spaced to match joints in the abutting pavement. If the abutting pavement is not jointed or the curb or gutter is not abutting pavement, joints in the curb and gutter shall be spaced at 15-foot intervals. These joints shall be 1/8-inch minimum thickness and constructed to a minimum depth of 1 inch by sawing or scoring with a tool which leaves the corners rounded and destroys aggregate interlock to a depth specified. Expansion joints, filled to full cross-section with filler 1/4-inch thick shall be placed in the curb and gutter to match joints in the abutting pavement, at structures, at curb returns, and where shown in the plans.
- G. Cure for 72 hours by one of the methods specified in Section 03300.

- H. Curb and gutter may be constructed by the use of slip-form equipment provided the completed curb or gutter retains its shape, grade, and line. Finishing, joints, and curing shall be as provided above.
- I. Top of the form shall not depart from grade more than 1/8 inch when checked with a 10-foot straight edge. Alignment shall not vary more than ¼ inch in 10 feet.

3.11 ASPHALT CONCRETE CURBS AND GUTTERS

- A. Placed, shaped and compacted true to line and grade with machine capable of shaping and compacting the materials to the required cross section.
- B. Provide tack coat of asphalt applied to the surface upon which asphalt concrete curb is to be placed immediately prior to placing of curb.

3.12 CEMENT CONCRETE SIDEWALKS

- A. The concrete in the sidewalks shall be air entrained concrete in accordance with the requirements of Section 03300.
- B. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be straight, free from warp and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.
- C. The foundation shall be brought to the grade required and well wetted before placing the concrete.
- D. Place concrete in the forms and strike off with a heavy iron-shod straight edge; trowel surface smooth with a steel trowel as soon as surface can be worked. After troweling and before jointing or edging, the surface of the walk shall be lightly brushed in a transverse direction with a soft brush. On grades of over 4%, the surface shall be finished with a stipple brush.
- E. Joints shall be constructed at the locations and of the sizes as indicated in the plan.
- F. The concrete shall be cured for at least 72 hours by means of moist burlap or quilted blankets. Exclude all traffic, both pedestrian and vehicular, during curing period.

3.13 PAVEMENT MARKINGS

- A. The Contractor shall restore any and all pavement striping and traffic buttons damaged during construction.

- B. Restoration shall be in accordance with the current standards of the road agency involved.

3.15 ADJUSTING MANHOLES TO GRADE

- A. The Contractor shall adjust manhole castings to final grade by adding brick and/or mortar under the casting and patching with asphalt concrete. Paving adjusting rings will not be allowed.
- B. The Contractor shall exercise extreme care in preventing foreign material from entering the manhole.
- C. All manholes shall be adjusted to grade after the asphalt concrete surfacing has been placed. Disturbed area around cover shall be patched and sealed to the satisfaction of the road agency having jurisdiction.
- D. The Contractor shall take care not to extend the manholes above finished grade.

3.16 ADJUSTING MONUMENT CASES AND VALVES BOXES TO GRADE

- A. Monument cases and/or valve boxes shall be adjusted to final grade and patched with asphalt concrete.
- B. Adjustment shall be made after the resurfacing.
- C. Patching around monument cases and/or valve boxes shall be done to the satisfaction of the road agency having jurisdiction.
- D. Valve boxes shall be adjusted to the satisfaction of the utility having jurisdiction.
- E. The Contractor shall take care not to extend the monument cases and/or valve boxes above the finished grade.

* * * END OF SECTION * * *

SECTION 02605

MANHOLES AND CLEANOUTS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Shoring: Section 02150
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222
- D. Sanitary Sewer: Section 02730

1.2 QUALITY ASSURANCE

- A. Testing by manufacturer:
 - 1. Manufacturer shall test all material as required by these Specifications and the Standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meets or exceeds the specification requirements.
 - 3. No material shall be delivered until test results and certifications are in the possession of the Engineer.
 - 4. The Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all material testing operations.

2. PRODUCTS

2.1 PRECAST MANHOLES

- A. Precast concrete manholes shall conform to the requirements of ASTM C478 except as specifically modified herein.
- B. Joints between precast elements used for sanitary sewers shall be tongue and groove designed to accommodate a rubber gasket joint similar to pipe joints conforming to ASTM C443. Design of joints shall be approved by the Engineer before manufacture. Shop drawings shall be submitted for review. Variations in joint dimensions shall meet the gasket design .
- C. Joints between precast sections used for storm sewers may be rubber gasketed or cement mortar.
- D. Base sections shall be made with the base slab integral with the wall in such a manner to achieve a completely watertight structure.

Design of base shall be in accordance with the following table for all manholes up to 25 feet deep using Grade 60 reinforcing steel.

<u>Manhole Inside Diameter</u>	<u>Minimum Base Thickness</u>	<u>Minimum Steel-Sq.In/LF Both Directions</u>	
		<u>Separate Base</u>	<u>Base Integral With Wall</u>
48"	6"	0.23	0.15
54"	8"	0.19	0.19
72"	8"	0.35	0.24
96"	12"	0.39	0.29

- E. Proportion of Portland cement in concrete mixture shall be not less than 564 pounds per cubic yard of concrete.
- F. Openings to receive pipes shall be circular, and shall be sized to equal the outside diameter of the pipe to be inserted in the joint plus the manhole wall thickness.
- G. The manufacturer may produce each manhole riser and base in one section if approved by the Engineer.
- H. Cones with diameter at small end of 36 inches shall be not less than 24 inches in height. Cones with a diameter at the small end of 24 inches shall be not less than 17 inches in height.
- I. The openings in the top slab shall be eccentrically located so as to provide at least 6 inches minimum radial distance from the edge of the opening to the outer edge of the slab but not more than 2.5 inch off-set distance from the edge of the opening to the inside face of the standard section.
- J. Unless otherwise provided, steps shall be installed in each section so that sections placed together in any combination will provide a continuous vertical ladder.

2.2 MANHOLE PIPE ENTRY COUPLINGS

- A. Manhole entry coupling for PVC pipe connections to manholes shall provide a watertight joint and utilize a rubber ring to seal against the pipe. The coupling's exterior surface shall be sand impregnated epoxy or similar rough surface to insure adhesion with the mortar.
- B. Resilient connectors conforming to ASTM C923 may be used at the Contractor's option. Such connectors shall not be cast-in-place in precast structures.

2.3 DROP MANHOLES

- A. Drop manholes shall be an inside drop or outside drop as specified and constructed in accordance with the Standard Details.

- B. One length of ductile iron pipe shall be provided outside the manhole, to reach original solid bearing ground.
- C. An outside drop manhole shall be fabricated with the drop outside the manhole section as shown on the details.
- D. An inside drop shall be fabricated with polyvinyl chloride pipe as detailed on the details.

2.4 MANHOLE STEPS AND LADDER

- A. Conform to applicable requirements of ASTM C478 and as shown on the details.
- B. Conform to OSHA or WISHA requirements, whichever is more stringent.
- C. Designed so that foot cannot slide off the ends.
- D. Vertical spacing at 12 inches.
- E. Project uniformly inside wall.
- F. Shall be deformed bar conforming to ASTM A615, intermediate or standard grade, hot bent and galvanized after bending. For bending, the temperature shall be at least 1600°F. Galvanizing shall conform to ASTM A123. As an alternative, steps may be steel reinforced polypropylene. The reinforcement shall be ½-inch Grade 60 deformed reinforcing bar per ASTM A615. Polypropylene shall conform with ASTM D4101.
- G. Design utilizing other materials or shapes that conform to the requirements of this specification may be used upon written approval of the Engineer.
- H. Step dimensions and pattern shall conform to the details.
- I. Ladders: Base sections of precast manholes may be provided with a ladder made of aluminum or steel galvanized after fabrication, as shown on the Standard Details. Ladder shall be adjusted so that it is in line with manhole steps above and extends out the same distance from the wall as the steps above. Ladder shall be securely imbedded and grouted into channel shelf. As an alternative, ladder may be steel reinforced polypropylene. Ladder rungs shall be reinforced with ½-inch Grade 60 reinforcing bar per ASTM A615. Ladder rails shall be reinforced with 9/16-inch cold drawn bar. Polypropylene shall conform with ASTM D4101.

2.5 CAST METAL FRAMES AND COVERS

- A. Conform to Manhole Frame and Cover Detail.

- B. Frames shall be gray-iron conforming to the requirements of AASHTO M105 (ASTM A48), Grade 30B. Covers shall be ductile iron conforming to ASTM A536, Grade 80-55-06.
- C. Be free of porosity, shrink cavities, cold shuts, or cracks or any surface defects which would impair serviceability.
- D. Repair of defects by welding or by the use of "smooth-on" or similar material will not be permitted.
- E. Manufacturer shall certify that the product conforms to the requirements of these specifications.
- F. Apply a bituminous coating to all surfaces. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the casting.
- G. The Owner shall have the right to require inspection and approval of all castings prior to painting.
- H. Machine finish the horizontal seating surface and inside vertical recessed face of the frame, and the horizontal seating surface and vertical outside edge of the cover to the following tolerances.
 1. Frame +3/32 inch to -3/32 inch. Cover +3/32 inch to -3/32 inch.
 2. Cover shall not rock when it is seated in any position in its frame.
 3. There shall be not more than 3/16 of an inch side play in any direction between the cover and the frame when any cover is placed in any position in its frame. All covers shall be interchangeable within the dimensions shown on the details.
- I. All frames and covers shall be identified by the name or symbol of the manufacturer in a plainly visible location when the frame and cover is installed. In addition to the manufacturer's identification, when ductile iron is furnished, the material shall be identified by the notation "DUC" or "DI". The manufacturer's identification and the material identification shall be adjacent to each other and shall be minimum 1/2-inch to maximum 1-inch high letters recessed to be flush with the adjacent surfaces.
- J. Cover shall have type of service indicated on cover with two-inch raised letters such as WATER, SEWER OR DRAIN.
- K. Cover shall be the bolt-down type with separate provision for lifting/removal per detail.

2.6 CLEANOUT FRAMES AND COVERS

- A. Conform to Sewer Cleanout Detail

2.7 MANHOLE COLLAR

- A. Manhole collar shall be constructed of concrete with 3,000 psi concrete prepared from ASTM C150 Type I or II Portland cement or of cold mix asphaltic concrete.
- B. Collar shall extend vertically from grade (top of cover elevation) to bottom of highest adjustment ring. Collar shall extend a minimum of 12 inches measured radially beyond the manhole cover frame.

3. EXECUTION

3.1 MANHOLE INSTALLATION

- A. Manholes shall be constructed of precast units and/or cast-in-place concrete.
 - 1. Maintain the design slope between manholes. Check all intermediate grade stakes by means of a taut grade wire between at least three intermediate grade stakes. The use of a laser for maintaining pipe slope does not preclude the use of grade stakes or the checking of said stakes. In the event that the grade stakes do not line up, the work shall be stopped until the situation is corrected.
 - 2. Ensure that all sewers run at a constant grade and alignment between manholes.
- B. Foundations:
 - 1. Adequate foundations for all manhole structures shall be obtained by removal and replacement of unsuitable material with well-graded granular material, or by tightening with coarse ballast rock, or by such other means as provided for foundation preparation of the connected sewers.
 - 2. Where water is encountered at the site, all cast-in-place base or monolithic structures shall be placed on a one-piece waterproof membrane to prevent any movement of water into the fresh concrete.
 - 3. Place base on a well-graded granular bedding course conforming to the requirements for sewer bedding, not less than 4 inches in thickness and extending either to the limits of the excavation or to a minimum of 12 inches outside the outside limits of the base section. In the latter case, the balance of the excavated area shall be filled with select material, well tamped to the level of the top of the bedding to positively prevent any lateral movement of the bedding when the weight of the manhole is placed upon it.
 - 4. Bedding course shall be firmly tamped and made smooth and level to assure uniform contact and support of the precast elements.
- C. Precast base section:
 - 1. Place on the prepared bedding so as to be fully and uniformly supported in true alignment.

2. Make sure that all entering pipes can be inserted on proper grade.
- D. Cast-in-place bases:
1. At least 6 inches in thickness. Extend at least 6 inches radially outside of the manhole wall.
 2. Concrete shall have minimum of 4000 psi 28-day compression strength.
 3. Place first precast section on the cast-in-place base structure before the base has taken initial set and adjust to true grade and alignment with all inlet pipes installed so as to form an integral, watertight unit or mortar the section into a suitable groove provided in the top of the cast-in-place base.
 4. The first section shall be uniformly supported by the base concrete, and shall not bear directly on any of the pipes.
- E. Precast sections:
1. Placed and aligned to provide vertical sides and vertical alignment of the ladder rungs.
 2. The completed manhole shall be true to dimensions and watertight.
 3. Lift holes shall be thoroughly wetted and then be completely filled with mortar, smoothed, and pointed both inside and out to ensure watertightness.
 4. Steel loops must be removed and the remaining void shall be covered with mortar, smoothed, and pointed.
- F. Pipe connections:
1. Provide flexible joint at a distance from the face of the manhole of not more than 1-1/2 times the nominal pipe diameter or 12 inches, whichever is greater, for all rigid pipes entering or leaving any manhole.
 2. No flexible joint shall be placed within 10 feet of the manhole wall, when flexible pipe is used.
 3. Firmly compact bedding under pipe within the area of the manhole excavation.
 4. Openings through which pipes enter the structure are completely and firmly rammed full of mortar to ensure watertightness.
 5. Provide a watertight joint where flexible PVC pipe enters the manhole wall by utilizing a manhole entry coupling that is mortared into the wall. Where resilient connectors are used, the Contractor shall extend the channel into the connector to insure pipe support and a watertight joint. Resilient connectors shall be installed in accordance with the manufacturer's requirements.
- G. Channels:
1. Constructed in field.
 2. Conform accurately to the sewer grade and bring together smoothly with well rounded junctions.

3. Channel sides shall be carried up vertically to the crown elevation of the various pipes.
 4. Shelf between channels shall be constructed with concrete and smoothly finished and warped evenly with slopes to drain.
- H. Manhole cover:
1. Final elevation and tilt of cover shall conform to the restored street surface unless otherwise specified.
 2. Warping of surfacing to meet grade of castings will not be allowed.
 3. Provide not less than 4 inches or more than 16 inches of grade rings between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to street grade or ground surface.
 4. Both inside and outside of the grade rings shall have a smooth uniform mortar finish to ensure a watertight seal.
- I. Backfill:
1. Extend around manhole and at least one pipe length into each trench.
 2. Hand place and tamp selected native material up to an elevation of 6 inches above the crown of all entering pipes.
- J. Manhole Collar:
1. Contractor shall install either a concrete or asphalt collar of sufficient size around the neck and frame to hold assembly in place in traffic areas.

3.2 CONNECTIONS TO EXISTING MANHOLES

- A. The Contractor shall verify the existing manhole invert elevations prior to construction.
- B. Excavate completely around the existing manhole to ensure against unbalanced loading on the manhole.
- C. Keep the manhole in operation at all times and take precautions necessary to prevent any debris or other materials from entering the sewer.
- D. Contractor may be required to install a tight pipeline bypass through the existing channel. If the connection is to a dead end manhole, the outlet shall be plugged watertight with a metal mechanical screw type plug. Plug shall be secured to the ladder with a rope or chain.
- E. Bring laterals into the existing manhole so that the crowns of the two incoming pipes are at the same elevation unless otherwise specified.

- F. Reshape the existing base to provide a channel equivalent to that specified for a new manhole. Ensure that the new system slopes towards the existing manhole.
- G. The Contractor shall be responsible for repairing all damage to the manholes resulting from his operations.

3.3 CLEANOUTS

- A. Sewer cleanouts shall be constructed as shown on the standard plan.
- B. All materials incorporated into the cleanout structure shall meet the requirements of the various applicable sections of these specifications.
- C. Pipe joints shall be the type specified for sewer pipe used.
- D. The trench excavation shall be made in such a manner as to provide an undisturbed base upon which the pipe shall be placed.
- E. Bedding around and under the pipe shall be tamped.

* * * END OF SECTION * * *

SECTION 02610

PIPE AND FITTINGS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Water Lines: Section 02660
- D. Storm Drainage: Section 02720
- E.. Sanitary Sewers: Section 02730
- F. Sewer Force Mains: Section 02732

1.2 QUALITY ASSURANCE

- A. Testing by Manufacturer:
 - 1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
 - 3. No material shall be delivered until test results and certifications are in the possession of the Engineer.
 - 4. Engineer shall have free access to all testing and records pertaining to material to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all material testing operations.
- B. Joint tests are intended for qualification of joint design and shall be considered to be a qualification test to establish the adequacy of the manufacturer's joint design. The manufacturer shall certify that tests have been performed within the last year with pipes equivalent in size and design and that they have passed the test enumerated in the specifications. Tests may be waived for pipes of different strength class if joint design is the same as the pipe tested.

2. PRODUCT

2.1 DUCTILE IRON PIPE

- A. For underground pressure pipelines (water main and sewer force main), conform to AWWA C150/C151 and shall be Pressure Class 350, unless otherwise specified. For above grade pressure pipelines (pump stations), conform to AWWA C150/C151 and shall

be thickness Class 52, unless otherwise specified. For gravity pipelines, conform to ASTM A746 and shall be thickness Class 50, unless otherwise specified.

- B. Joints shall be mechanical joint or push-on joint and shall conform to AWWA C111 (ANSI A21.11).
- C. Pipe and fittings shall have a cement mortar lining conforming to AWWA C104 (ANSI A21.4).

2.2 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (4 INCHES AND OVER)

- A. Conform to AWWA C900.
- B. Outside diameter equal to ductile iron pipe and with gasket bell ends.
- C. Minimum wall thickness shall be equal to or greater than dimension ratio (DR) of 18 (150 psi) unless otherwise specified.
- D. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM F477.
- E. All PVC water pipe shall be considered flexible conduit.

2.3 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (UNDER 4 INCHES)

- A. Conform to ASTM D2241.
- B. Pipe material shall be PVC 1120, PVC 1220 or PVC 2120.
- C. Minimum wall thickness shall be equal or greater than a standard dimension ratio (SDR) of 21 unless otherwise specified.
- D. Pipe shall bear the National Sanitation Foundation Seal for use to transport potable water.
- E. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM F477.

2.4 DUCTILE IRON AND GRAY IRON FITTINGS

- A. Use for ductile iron or PVC pipe.
- B. Conform to AWWA C110 (ANSI A21.10) or AWWA C153 (ANSI 1921.53) as indicated.
- C. Joint shall conform to AWWA C111 (ANSI A21.11).
- D. Dimensions of fittings and design of bell may be modified to conform with the pipe being used.
- E. Cement mortar lining conforming to AWWA C104 (ANSI A21.4).

- F. Gaskets for flat faced or raised faced flanges shall be 1/8-inch thick neoprene having a durometer of 60 plus or minus 5.
- G. Gaskets for flanges having a recess machined to receive an "O" ring shall be neoprene and shall have the dimensions and durometer as recommended for the particular service application by the flange manufacturer.
- H. Provide type, material and identification mark for bolts and nuts.

2.5 STEEL PIPE (4 INCHES AND SMALLER)

- A. Conform to ASTM A120.
- B. Schedule 40, unless otherwise specified.
- C. Fitting shall be malleable iron screw type conforming to ANSI B16.3.
- D. Pipe and fittings shall be hot dipped, galvanized inside and out.

2.6 STEEL PIPE (OVER 4 INCHES)

- A. Conform to AWWA C200.
- B. Design Pressure 150 psi.
- C. Design stress 50% of yield strength.
- D. All pipe and fittings shall receive coal tar protective treatment in accordance with AWWA C203.
- E. Field couplings shall be compression style coupling.
- F. When flanges are required, they shall conform to AWWA C207.
- G. All couplings shall be coated the same as pipe.

2.7. FLEXIBLE COUPLINGS

- A. Use for connection between plain end pipe of same or different material.
- B. Sleeve: Gray iron ASTM A126 Class B or ductile iron ASTM A536. Ends have a smooth inside taper for uniform gasket seating.
- C. Followers: Ductile iron ASTM A536.
- D. Gaskets: Grade 30 specially compounded rubber of all new materials.

- E. Bolts and nuts: High strength low alloy steel with heavy, semi-finished hexagon nuts to AWWA C111 (ANSI-A21.11).

2.8 WATER SERVICE PIPE:

- A. Copper Tubing:
 - 1. Copper tubing shall conform to the requirements of ASTM B88, Type K, annealed. Use for connection between plain end pipe of same or different material.
 - 2. The tubing shall be coupled using flare-type compression fittings, conforming to the requirements of AWWA C800, minimum 150 psi working pressure.
- B. Polyethylene Pipe:
 - 1. Polyethylene Pipe to be used for water service lines 2 inches in size and smaller shall conform to the requirements of AWWA C901 Class 160 pse manufactured with PE 3406 material.
 - 2. Bear the seal of the National Sanitation Foundation for potable water pipe.
 - 3. Joints shall be made in accordance with the manufacturer's recommendations. Solvent welded pipe joints will not be permitted.
- C. Polybutalene Pipe:
 - 1. Polybutalene pipe to be used for water service lines 2 inches in size and smaller shall conform to the requirements of AWWA C902 Class 160 psi.
 - 2. Bear the seal of the National Sanitation Foundation for potable water pipe.
 - 3. Joints shall be made in accordance with the manufacturer's recommendations. Solvent welded pipe joints will not be permitted.
- D. Compression Couplings:
 - 1. Compression couplings for use in connecting plain end water service pipes shall be applicable for the type of pipe being coupled.
 - 2. Compression couplings shall have armored gaskets when similar metal pipes are being joined.
- E. Insulating Couplings:
 - 1. Insulating couplings shall be required at any point of connection of two dissimilar metallic pipes (i.e., copper to galvanized iron or steel).

2.9 WATER SERVICE MATERIALS

- A. Saddles:
 - 1. Shall be ductile iron, bronze, or stainless steel, double straps or band type with standard tapping to match service requirements.

- B. Corporation Stops:
 - 1. Conform to AWWA C800.
 - 2. Corporation stops for use with saddles shall be or bronze alloy with inlet I.P. standard thread and outlet thread compatible with connection piping with no special adapters.
 - 3. Corporation stops for direct tapping shall be bronze alloy with AWWA tapered thread inlet and outlet thread compatible with connecting pipe without special adapters.
- C. Meter Stops:
 - 1. Meter stops shall be angle pattern with lock wings.

2.10. CONCRETE PIPE, NONREINFORCED

- A. Concrete pipe under 12 inches in diameter shall be nonreinforced concrete pipe conforming to ASTM C14, Class 2, except as otherwise provided.
- B. Joints shall conform to ASTM C443.
- C. A differential load test shall be performed on the joints in addition to the joint tests specified in ASTM C443. The test section for the differential load test shall be supported on blocks so that one of the pipes is suspended freely between adjacent pipe bearing only on the joints. A force of 150 pounds per inch of diameter shall be applied over an arc of not less than 120° along a longitudinal distance of 12 inches immediately adjacent to one of the couplings. There shall be no visible leakage when the joint is subjected to 10 psi of hydrostatic pressure for a minimum of 10 minutes.
- D. Proportion of Portland cement in concrete mixture shall be not less than 564 pounds per cubic yard of concrete.

2.11 CONCRETE PIPE, REINFORCED

- A. Concrete pipe 12 inches and over in diameter shall be reinforced concrete pipe conforming to ASTM C76, Class IV, except as otherwise provided.
- B. Joints shall conform to ASTM C443.
- C. Non-reinforced concrete pipe conforming to ASTM C14 may be substituted for reinforced concrete pipe provided that the three-edge strength is equal to or greater than the ultimate specified for ASTM C76 pipe.
- D. Basis of acceptance of pipe shall be the three edge bearing tests for load to produce 0.01 inch crack and the ultimate strength material tests outlined in ASTM C76 and by visual inspection.
- E. A differential load test shall be performed on the joints of all pipe 24 inches and less in diameter in addition to the joint tests specified in ASTM C443. The test section for the differential load test shall be supported on blocks so that one of the pipes is suspended freely

between adjacent pipe bearing only on the joints. A force of 240 pounds per inch of diameter shall be applied over an arc of not less than 120° along a longitudinal distance of 12 inches immediately adjacent to one of the couplings. There shall be no visible leakage when the joint is subjected to 10 psi of hydrostatic pressure for a minimum of 10 minutes.

- F. Proportion of Portland cement in concrete mixture shall be not less than 564 pounds per cubic yard of concrete.

2.12. VITRIFIED-CLAY PIPE

- A. Conform to ASTM C700.
- B. Joints shall conform to ASTM C425.

2.13 POLYVINYL CHLORIDE (PVC) SEWER PIPE

- A. Conform to ASTM D3034, SDR 35, or ASTM F789.
- B. Joints shall conform to ASTM D3212 using a restrained rubber gasket conforming to ASTM F477.
- C. Fittings shall be injection molded tees or factory solvent welded saddle tees. Saddles fastened to pipe with external bands are not acceptable on any new system, unless specifically approved by the Engineer.
- D. All PVC sewer pipe shall be considered flexible conduit.
- E. Maximum size - 12 inches.

2.14 TEE FITTINGS FOR SEWERS

- A. Unless otherwise specified, all tee connections shall be 6 inches inside diameter and shall be factory made.
- B. All fittings shall be the same material as the pipe, unless otherwise specified. Cast iron fittings may be used for ductile iron pipe.
- C. Fittings shall have sufficient strength to withstand handling and load stresses normally encountered.
- D. All fittings shall be sealed with plugs of same material as the pipe and gasketed with the same gasket material as the pipe joint.

2.15 GALVANIZED CORRUGATED STEEL PIPE:

- A. Conform To The Requirements Of AASHTO Designation M36, 16 Gauge Unless Otherwise Provided.
- B. Coated uniformly inside and out with asphalt coating to meet the requirements of AASHTO Designation M190.

- C. Coupling band shall meet the requirements of AASHTO m36 and wide enough to cover at least two annular corrugations. Gasket shall be provided.
- D. When specified, galvanized steel end sections shall be flared, beveled shop-assembled units to serve as structural, hydraulic and aesthetic end treatment to corrugated steel culverts by threaded rods, by riveting or bolting per manufacturer's standard procedure. End sections shall have a turned down lip or toe plate at the wide end to act as a cut-off. The material for the end section shall be galvanized steel meeting the requirements of AASHTO M36 or same gauge as pipe.

2.16 CORRUGATED ALUMINUM ALLOY CULVERT PIPE

- A. Conform to the requirements of AASHTO Destinations M196, 16 gauge unless otherwise noted.
- B. Aluminum coupling bands shall meet the requirements for galvanized corrugated steel pipe and shall be by the same manufacturer as the pipe.
- C. End sections shall comply with AASHTO Designation M196 and applicable requirements for galvanized metal end sections.

2.17 POLYETHYLENE ENCASING

- A. Polyethylene film shall be manufactured of virgin polyethylene material confirming to the requirements of ASTM D-1248-68 Polyethylene Plastics Molding and Extrusion Materials.
- B. Polyethylene film shall have a minimum nominal thickness of 0.008 m (8 mils). The minus tolerance of thickness shall not exceed 10 percent of the nominal thickness.
- C. Tube size for each pipe diameter shall be as listed below:

Nominal Pipe <u>Diameter</u>	Flat Tube <u>Width</u>
3	14
4	16
6	20
8	24
10	27
12	30
14	34
16	37
18	41
20	45
24	54
30	67

2.18 DETECTABLE LOCATOR TAPE

- A. The tape shall consist of a minimum 4.0 mil thickness, inert polyethylene plastic which is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil, with a minimum 1/3-mil metallic foil. The tape shall be at least three inches (3") in width and shall be solid blue with identifying print in black letters. The tape shall have printed thereon the following or similar as commercially available:

"CAUTION - BURIED WATERLINE BELOW"

or

"CAUTION - BURIED SEWER LINE BELOW"

as appropriate.

The identifying lettering shall be minimum 1" high and repeated continuously the full length of the tap. In no instance shall the spacing of the individual segment of the identifying message be greater than eighteen inches (18").

- B. Detectable locator tape shall be installed 18 inches above the pipe it identifies. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement of tape and to ensure its integrity. The remainder of the trench is then backfilled in accordance with applicable specifications.

3. EXECUTION

3.1 INSTALLATION

- A. Install pipe in accordance with specification section for pipeline being installed.

* * * END OF SECTION * * *

SECTION 02640

VALVES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Pipe and Fittings: Section 02610

1.2 QUALITY ASSURANCE

- A. Testing by Manufacturer:
 - 1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specification requirements.
 - 3. No materials shall be delivered until test results and certifications are in the hands of the Engineer.
 - 4. Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all materials testing operations.

2. PRODUCTS

2.1 GATE VALVES - (UNDER 12 INCHES)

- A. Conform to AWWA C509.
- B. Iron body, bronze stem, resilient wedge.
- C. O-ring stuffing box.
- D. Open counter-clockwise unless otherwise specified.
- E. Non-rising stem type.
- F. Equipped with 2-inch standard operating nut.
- G. Mechanical joint or push-on joint suitable for installation with the type and class of pipe being used or flanged where detailed.
- H. All flange faces shall be machined. Flanges shall be drilled to straddle vertical centerline.

2.2 GATE VALVES - (12-INCHES AND LARGER)

- A. Conform to applicable provisions of Article 2.1 for gate valves under 12 inches and the following additional requirements.
- B. Arranged for operation in the horizontal position.
- C. Equipped with bronze tracks fastened into a groove or slot within the valve body casting, together with bronze rollers, shafts, bushings and scrapers.
- D. Gears shall be cut tooth steel gears, housed in heavy cast iron extended type grease cases.
- E. Equipped with bypass of the size adopted as standard in the AWWA specification.
- F. Provide three certified copies of performance tests, as specified in Section 5 of AWWA C509 to the Engineer for review.

2.3 BUTTERFLY VALVES

- A. Conform to AWWA C504, Class 250B.
- B. Suitable for direct burial.
- C. Mechanical joint or push on joint suitable for installation with type and class of pipe being used or flanged where detailed.
- D. Standard O-ring shaft seal.
- E. Operator shall be traveling nut or worm gear type, sealed, gasketed and permanently lubricated for underground service.
- F. Operator shall be designed to withstand all anticipated operating torques and designed to resist submergence in ground water.
- G. Equipped with a standard two-inch operating nut.
- H. Open counter-clockwise.
- I. Flanges shall be drilled to match fittings.

2.4 STEM EXTENSION

- A. Provide stem extension with standard operating nut and self-centering rockplate support for all valves with operating nut more than 4 feet below grade to raise operating nut to within 36 inches of the ground surface.

2.5 VALVE BOXES

- A. Provide for all buried valves.

- B. Valve boxes and tops shall be cast iron 2 piece slip joint type.
- C. Lengths suitable for the particular project or as specified.
- D. Base corresponding to size of valve.
- E. Cover shall have the word "Water" cast on it.

2.6 VALVE MARKER POST

- A. Shall have a 4-inch minimum square section and a minimum length of 42 inches, with beveled edges.
- B. Contain at least one No. 3 bar reinforcing steel.
- C. Paint exposed portion of the marker posts with two (2) coats of concrete paint in a color selected by the Owner.
- D. Stencil the size of the valve and the distance in feet and inches to the valve on the face of the post, using black paint and a stencil which will produce letters 2 inches high.

2.7 COMBINATION AIR RELEASE VALVE

- A. Designed to operate with potable water under pressure to allow entrapped air to escape from the pipeline.
- B. Body and cover: Cast iron conforming to ASTM A48, Class 30.
- C. Floats: Stainless steel conforming to ASTM A240 and designed to withstand 1,000 psi pressure.
- D. Seats: Buna N rubber.
- E. Internal Parts: Stainless steel or bronze.
- F. Designed to withstand 300 psi pressure with normal operating pressure under 100 psi.
- G. Manufactured by APCO or equivalent with following listed orifice sizes:

<u>Model No.</u>	<u>Size of Valve</u>	<u>Large Orifice</u>	<u>Small Orifice</u>
143C	1"	1"	5/64"
145C	2"	2"	3/32"
147C	3"	3"	3/32"

- H. Vault shall be precast concrete meter box or utility vault as indicated on the detail.

2.8 COMBINATION SEWAGE AIR AND VACUUM RELEASE ASSEMBLY

- A. Combination sewer air and vacuum release assembly shall consist of an air release valve and an air and vacuum valve.
- B. Valves shall be constructed for minimum pressure of 150 psi. Some valves may operate at certain times at less than 20 psi. Supplier shall evaluate normal operating conditions for each valve and furnish a valve capable of seating under normal conditions.
- C. Assembly shall be manufactured by APCO or equivalent, Series 400.
- D. Air release valves shall be especially adopted for use with sewage and shall be designed to vent gases under pressure:
 - 1. Body and cover: Cast iron conforming to ASTM A48, Class 30.
 - 2. Float and pins in mechanism: Stainless steel conforming to ASTM A240. Float shall be designed to withstand a minimum pressure of 1,000 psi. Float stem shall be elongated to provide an air gap between the mechanism and the sewage.
 - 3. Seats: Bronze.
 - 4. Mechanisms: Bronze or stainless steel.
- E. The sewage air and vacuum valve shall be specially designed for use with sewage and shall be designed to vent large quantities of air when filling the line and to allow air to re-enter the line when the line is being drained:
 - 1. Body, cover and baffle: Conforming to ASTM A48, Class 30.
 - 2. Two floats having a common stainless steel float guide shall be provided. Floats shall be stainless steel conforming to ASTM A240 and designed to withstand a minimum pressure of 1,000 psi.
 - 3. Seats: Buna N rubber.
 - 4. Float stem and guides: Bronze or stainless steel.
- F. Valves shall be provided with quick disconnect couplings and valves to permit backflushing without dismantling.
- G. Vault Cover:
 - 1. Design Load: H-20 traffic load 300 PSF minimum.
 - 2. Door Leaf: 5/16-inch steel diamond pattern plate.
 - 3. Access door shall be single leaf type, Utility Vault Co. or equivalent.
 - 4. Door and frame shall be for dimensions shown.
 - 5. Provide spring assisted operators for opening and hold open arm with release handle.
 - 6. Provide recessed padlock hasp.
 - 7. Hardware shall be cadmium plated. Factory finish shall be prime coat of red oxide applied to steel doors and frames.

- H. Vault shall be precast concrete utility vault as manufactured by utility vault company or equivalent designed for H-20 traffic loads.
- I. Vent shall be galvanized steel pipe.

2.9 VALVE VAULT HEATER

- A. Provide when insulated vault is specified.
- B. Conform to requirements of National Electric Code (NEC) latest edition.
- C. Provision of electrical service is incidental to heater installation.

2.10 TAPPING SLEEVE AND VALVE ASSEMBLY

- A. Furnished with flanged inlet end connections having a machined projection on the flanges to mate with a machined recess on the outlet flanges of the tapping sleeves and crosses.
- B. Outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint connections, except that the outside of the hub shall have a large flange for attaching a drilling machine.
- C. Seat opening of the valves shall be larger than normal size to permit full diameter cuts.
- D. Tapping sleeves shall be cast iron, stainless steel, epoxy-coated steel, or other approved materials.

3. EXECUTION

3.1 GATE VALVE OR BUTTERFLY VALVE INSTALLATION

- A. Valves shall be accurately set at places designated on the drawings.
- B. Inspect each valve for defects.
- C. Adjust stuffing boxes to ensure watertightness without binding the stem.
- D. Set valve and valve box plumb.
- E. Set lower casting of valve box so that it is supported by a styrofoam collar not less than 2 inches in thickness.
- F. Tamp backfill around valve box to a minimum distance of 3 feet on all sides or to face of trench.
- G. Set valve box cover flush with surface.

3.2 VALVE MARKER POST

- A. Where required, set valve marker post at edge of right of way opposite the valve.
- B. Leave 18 inches of post exposed above grade.

3.3 INSTALLATION OF COMBINATION AIR RELEASE VALVE

- A. Install in accordance with standard detail.
- B. Locate so that high point of water main is vented.
- C. Pipe between main and valve shall slope upward.
- D. Locate valve adjacent to property line unless otherwise indicated.

3.4 INSTALLATION OF COMBINATION SEWAGE AIR AND VACUUM RELEASE ASSEMBLY

- A. Install in accordance with standard detail.
- B. Locate so that high point of sewage force main is vented.
- C. Adjust grade of force main so that valve assembly can be properly installed.
- D. Pipe shall slope upward from force main to valve assembly.
- E. Locate valve adjacent to property line unless otherwise indicated.

3.5 BLOCKING

- A. Provide blocking for valve not connected to fitting with bolted connection.

3.6 TESTING

- A. Test valves along with pipeline in which they are installed.

* * * END OF SECTION * * *

SECTION 02645

HYDRANTS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Excavating, Backfilling and Compacting for Utilities: Section 02222
- C. Pipe and Fittings: Section 02610
- D. Valves: Section 02640
- E. Water Lines: Section 02660

1.2 QUALITY ASSURANCE

- A. Testing by Manufacturer:
 - 1. Manufacturer shall test all materials as required by these Specifications and the standards referenced.
 - 2. Manufacturer shall submit to the Engineer two (2) copies of all test results which shall include a certification that materials to be delivered are represented by the samples tested and that such delivered materials meet or exceed the specifications requirements.
 - 3. No materials shall be delivered until test results and certifications are in the hands of the Engineer.
 - 4. Engineer shall have free access to all testing and records pertaining to materials to be delivered to the job site.
 - 5. The Engineer may elect to be present at any or all materials testing operations.

2. PRODUCTS

2.1 FIRE HYDRANTS

- A. Conform to AWWA C502 except as herein modified.
- B. Main valve opening of the hydrant shall be a minimum of 5-inch diameter.
- C. Provide mechanical or flanged joint outlet with an auxiliary gate valve and valve box. Suitable lugs for anchor rods shall be provided.
- D. One pumper nozzle to match Owner's existing pattern, two (2) two and one-half inch (2-1/2") hose nozzles shall be provided.
- E. Provide pentagon operating nuts.

- F. Open by turning counterclockwise.
- G. Nozzles and operating nuts shall be identical with the Owner's existing equipment or as elsewhere provided.
- H. Nozzles shall be equipped with bronze nipples screwed into the hydrant and locked in place.
- I. Depth of clear cover over the pipe shall be three feet (3') unless larger depth or cover is required where the hydrant is installed.
- J. Provide sidewalk flange and safety stem coupling which will allow hydrant barrel to separate with minimum damage.
- K. Interior and exterior of hydrant to have an epoxy coating. Exterior color of "International Yellow".
- L. The Contractor shall furnish the location of the nearest point at which replacement working parts are stocked.
- M. Hydrant barrel extension standard of manufacturer of hydrant provided.
- N. Hydrants shall be as manufactured by CLOW Medallion – Series 2500, or approved equal.

2.2 GUARD POST

- A. Precast concrete 8 inches in diameter by six feet long constructed with concrete having minimum strength of 3500 psi.
- B. Reinforcing shall consist of minimum of five No. 3 deformed steel bars.

2.3 YARD HYDRANTS

- A. Frost Proof Hose Bibbs:
 1. Type: Non-freeze, exposed head, stop and waste post hydrant with non-turning operating rod with free-floating compression closure valve, drain port, and operating key lock.
 2. Size: 1-inch.
 3. Hose Connection: 1-inch American National straight.
 4. Rating: 150 psi.
 5. End: Screwed.
 6. Casing: Bronze.
 7. Casing Guard: Cast aluminum.
 8. Exposed Head: Bronze.
 9. Interior Parts: All bronze.
- B. Curb Stop and Waste Valves:
 1. Type: 90° turn plug, solid tee head, with check and drain port.
 2. Size: Same as line size.

3. Rating: 150 psi.
4. Body and Trim: Bronze.
5. Ends: Screwed.
6. Operators: Two portable tee wrenches supplied to service all buried yard curb stop and waste valves.
7. Service Boxes: Cast iron, 2 1/2-inch minimum shaft diameter, cast iron lids marked "Water".

3. EXECUTION

3.1 SETTING HYDRANTS

- A. Hydrants shall be inspected in the field upon arrival to ensure proper working order.
- B. Hydrants shall be installed in accordance with the standard detail.
- C. Hydrants shall not be installed within 3 feet of a traveled roadway.
- D. A minimum 3-foot radius unobstructed working area shall be provided around all hydrants.
- E. Sidewalk flange shall be set 2 inches above finished grade.
- F. Hydrants shall be set on concrete blocks.
- G. Hydrant drain shall waste into a pit of 1-1/4-inch minimum washed rock situated at the base of the hydrant as shown in the detail.
- H. Hydrant laterals under 50 feet long shall consist of a section of 6-inch ductile iron pipe from the main to the hydrant and shall include an auxiliary gate valve set vertically and placed in the line as indicated in the detail.
- I. Hydrant branches over 50 feet long shall consist of a section of 8 inch ductile iron pipe and include required reducer to connect to hydrant.
- J. Hydrants shall be restrained as shown in the detail. Shackle rods shall be cleaned and painted after installation with 2 coats of asphalt varnish, or with such other bituminous paint as may be approved by the Engineer.
- K. The exposed portion of the hydrant shall be painted with one field coat. The type and color of the paint will be designated by the Owner.
- L. Any new or existing hydrant not in service shall be identified by covering with a burlap or plastic bag.
- M. Install guard posts only where specifically directed by the Owner.

3.2 RESETTING OR RELOCATING EXISTING HYDRANTS

- A. Conform to applicable requirements for setting new hydrants.
- B. Materials requirements to be adjusted to field conditions.

3.3 HYDRANT BARREL EXTENSIONS

- A. Provide where required due to placement of main at greater than normal depth or for adjustment to surface grade.

3.4 TESTING

- A. Test hydrants along with pipeline on which they are installed.

* * * END OF SECTION * * *

SECTION 02660

WATER LINES

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Inspection Services: Section 01420
- C. Dewatering: Section 02140
- D. Shoring: Section 02150
- E. Excavating, Backfilling and Compacting for Utilities: Section 02222
- F. Pipe and Fittings: Section 02610
- G. Valves: Section 02640
- H. Hydrants: Section 02645
- I. Existing Utilities/Facilities-Underground and Overhead:
Section 02760

1.2 QUALITY ASSURANCE

- A. Testing before acceptance:
 - 1. The Engineer may require that the first section of pipe, not less than 1,000 feet in length, installed by each of the Contractor's crews, be tested in order to qualify the crew and/or the material.
 - 2. Pipelaying shall not be continued more than an additional 1,000 feet until the first section has been tested successfully.
- B. Final acceptance:
 - 1. Prior to final inspection all pipelines shall be flushed and cleaned of all debris, disinfected and hydrostatically tested.
 - 2. Any corrections required shall be made at the expense of the Contractor and the line retested.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Conform to Section 02222.

2.2 ALTERNATE PIPE MATERIALS

- A. Pipe used for water line construction may be either ductile iron, or polyvinyl chloride pressure pipe as specified in Section 02610 unless otherwise specified.
- B. Pipe for water services shall be as indicated on the detail for the utility and as specified in Section 02610.
- C. When ductile iron pipe is specified, no substitute is permitted.
- D. Steel pipe shall be used only where specifically called for on the drawings.

3. EXECUTION

3.1 BEDDING FOR RIGID PIPE

- A. Bedding for rigid pipe except ductile iron shall be as specified in Section 02222.
- B. Unless otherwise ordered, bedding for ductile iron may be native bedding material, free of stones.
- C. Bedding shall be carefully placed under the pipe and to a depth of at least six (6) inches over the top of the pipe.
- D. Bedding shall be thoroughly rammed and tamped around the pipe with the proper tools, so as to provide firm and uniform support over the full length of all pipe, valves and fittings.
- E. Care shall be taken to prevent any damage to the pipe or its protective coating.

3.2 BEDDING FOR FLEXIBLE PIPE

- A. Material to be used for bedding for flexible pipe shall be sand/gravel material as specified in Section 02222.
- B. Bedding shall be placed in more than one lift. The first lift is to provide at least a 4-inch thickness under any portion of the pipe and shall be placed before the pipe is installed, and shall be spread smoothly so that the pipe is uniformly supported along the barrel.
- C. Subsequent lifts of not more than 6-inch thickness shall be installed to 6 inches over the crown of the pipe and individually compacted to 90 percent of maximum density.

3.3 PIPE LAYING

- A. Pipe laying shall be done in accordance with the Specifications and instructions of the manufacturer of the kind of pipe used.

- B. Tools designed especially for installing each particular type and kind of pipe shall be used.
- C. Short lengths and field cut joints:
1. Short lengths of pipe supplied by the manufacturer shall be used to provide the proper spacing of valves, tees or special fittings.
 2. Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by a special pipe cutter.
 3. Pipe ends shall be square with the longitudinal axis of the pipe and shall be reamed and otherwise smoothed so that good connections can be made.
 4. Threads shall be cleanly cut.
 5. Flaring of copper tubing shall be accurately and smoothly done.
 6. All operations for any connection shall be carefully done in accordance with the manufacturer's instructions.
- D. Laying of pipe on curves:
1. Long radius curves, either horizontal or vertical, may be laid with standard pipe by deflections at the joints or by the use of shorter lengths of pipe.
 2. When pipe is laid on a curve, the pipe shall be jointed in a straight alignment and then deflected to the curved alignment.
 3. Where field conditions require deflection or curves not anticipated by the Plans, the Contractor shall use deflected joints, short lengths or special fittings as required. No additional payment will be made for laying pipe on curves as shown on the Plans or for field changes involving pipe deflected at the joints. When special fittings not shown on the Plans are required to meet field conditions, additional payment will be made for fittings.
 4. Maximum deflections at pipe joints and laying radius for various pipe lengths shall be as recommended by the pipe manufacturer.
- E. Contamination prevention:
1. Pipe, fittings and valves shall be carefully cleaned of all dirt and foreign material as they are placed.
 2. Open ends of pipe and fittings shall be plugged with a temporary watertight plug whenever work is stopped and/or when water in the trench threatens to enter the pipe.
 3. Groundwater shall be excluded from the pipe at all times.
 4. Particular care shall be exercised to guard against the entrance of sewage into the water line trench during the course of construction. All sewer lines, house side sewers or other subsurface drains should be located prior to excavation. Adequate provision shall be made for the flow of sewers, drains, and other watercourses during construction.

- F. Condition of pipe and fittings:
 - 1. The interior of all pipe, fittings and other accessories stockpiled on the project shall be kept free of dirt and other foreign matter at all times.
 - 2. Each pipe, fitting or other accessory shall be carefully inspected and thoroughly cleaned of any dirt or foreign matter that might be present on the inside.
 - 3. Cleaning shall be accomplished prior to lowering the pipe or other accessories into the trench.
 - 4. Care shall be taken to keep materials internally clean after the pipe is placed in the trench.

3.4 BLOCKING AND BRACING

- A. Blocking and bracing of the pipe and fittings shall be placed so as to secure bearing on undisturbed earth.
- B. Blocking and bracing size shall be determined by the Contractor and shall be of sufficient proportions and installed so as to withstand the required test pressure and operating conditions.
- C. Concrete shall be placed in back of all fittings with unbalanced thrust. Pre-cast blocking shall not be used.
- D. Blocking shall not be covered up until it has been seen by the Engineer.
- E. Blocking shall be formed so that bolts, joints, gaskets, and flanges of adjacent joints are clear of the concrete and so that bolts and joints can be dismantled without removing the concrete.
- F. At tees and crosses where future mains connect, a pre-cast concrete brick may be used between fittings and thrust block.

3.5 CONNECTION TO EXISTING WATER MAINS

- A. An approved backflow prevention assembly (double check valve assembly or better) must be used on the supplying water line when filling the new water main during disinfection and flushing. The assembly and supply piping must be removed or isolated during hydrostatic pressure testing of the new main.
- B. Type of connections shall be as shown on the Drawings.
- C. Wet tap connections made without shutting off the existing line shall be made unless otherwise approved by the Owner.
- D. Connections to the existing water main shall not be made without first making the necessary arrangements with the Owner in advance.
- E. Work shall not be started until all of the materials, equipment and labor necessary to properly complete the work are assembled on the site.

- F. When work is once started on this connection, it shall proceed continuously without interruption and as rapidly as possible until completed. No shut-off of mains will be permitted overnight or over weekends or holidays.
- G. If the connection to the existing system involves turning off the water, the Contractor shall be responsible for notifying the residents affected by the shut-off. The Owner will advise which owners are to be notified.
- H. The Contractor may be required to perform the connection during times other than normal working hours.
- I. The Contractor shall not operate any valves on the existing system without specific permission of the Owner.
- J. The types of connections are varied and suggested pipe arrangements have been shown on the Plans. In general, they involve deflecting new pipe to match the existing pipe alignment and utilization of necessary fittings and new pipe. For the installation of these connections, the surfaced portion of the road shall not be penetrated unless the connecting point is directly under it. For connection by any other method, the Contractor shall furnish a detailed sketch for approval not less than one week prior to the expected construction.
- K. Interior of pipe and fittings used in making connections shall be swabbed or sprayed with a 1% solution of hypochlorite before they are installed.
- L. Exterior of main shall be cleaned and interior surface of tapping sleeve shall be dusted with calcium hypochlorite powder before tapping sleeve is installed.
- M. Installation of tapping tee shall be tested with air or water at a minimum pressure of 100 psi before cutting into the existing line.
- N. Any replacement pipe used for cutting into existing mains shall be same material and strength as existing pipe except that ductile iron may be substituted for other materials.

3.6 EXISTING SYSTEM MAINTENANCE

- A. The Contractor shall acquaint himself with all aspects of the existing system prior to starting construction on new mains. Pertinent information concerning existing system may be obtained from the Owner and from the Owner's records.
- B. Materials, fittings, pumps, equipment and qualified personnel must be available on the project at all times during construction, so that in the event of damage to or disruption of the existing water system service there will be immediate repair and restoration by the Contractor. Any unnecessary delay in repairs or service restoration

due to Contractor's failure to adhere to these requirements shall be reason to immediately suspend any further new main installation until repairs are completed to the Owner's satisfaction.

- C. Existing water services shall be located by the Contractor prior to beginning work so that it may be properly protected and maintained in service during construction and during the changeover from the existing pipes to the pipe installed under this Contract.

3.7 SERVICE CONNECTIONS

- A. Service connections to water mains except ductile iron Class 52 or stronger shall be made using saddles of the size and type suitable for use with the pipe being installed.
- B. Ductile iron Class 52 or stronger may be direct tapped with a corporation stop.
- C. The depth of trenching for service connection piping shall be such as to provide cover over the top of the pipe as shown on the service detail.
- D. Particular care shall be exercised to assure that the main is not damaged by installation of the service line.
- E. Service lines shall be cut using a tool or tools specifically designed to leave a smooth, even, and square end on the piping material to be cut. Cut ends shall be reamed to the full inside diameter of the pipe.
- F. Where shown in the plans, existing water service connections shall be reconnected to the new water mains installed under this Contract using the materials specified. The location of water service connections shall be verified in the field by the Contractor.
- G. Pipe materials used to extend or replace existing water service lines shall be in accordance with utilities standard details for new service.
- H. Insulating couplings shall be used at any connection between galvanized steel or iron pipe and copper pipe.
- I. Contractor shall arrange his work to minimize interruptions of water service to existing water customers.
- J. Line shall be installed, tested and disinfected up to point of connection prior to interruption of service.
- K. Customer shall be notified prior to shutting off service. Time that water is shut off shall be held to a minimum.

3.8 HYDROSTATIC PRESSURE TEST

- A. Water mains and appurtenances (including water service connections on new water mains) shall be tested in sections of convenient length under a hydrostatic pressure equal to 150 psi in excess of that under which they will operate.
- B. The pumps, gauges, plugs, saddles, corporations, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the Contractor.
- C. Pipeline shall be backfilled sufficiently to prevent movement of pipe under pressure.
- D. Thrust blocks shall be in place and time allowed for the concrete to cure before testing.
- E. Procedure:
 - 1. The mains shall be filled with water and all air removed prior to starting the test.
 - 2. The test shall be accomplished by pumping the main up to the required pressure; stop the pump for fifteen (15) minutes, and then pump the main up to the test pressure again.
 - 3. The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering 1 gallon per revolution. The meter to be approved by the Engineer.
 - 4. Acceptability of the test will be determined by two factors:
 - a. The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which

L = Allowable leakage, gallons/hour
 N = No. of joints in the length of pipeline tested
 D = Nominal diameter of the pipe in inches
 P = Average test pressure during the leakage test, psig
 - b. There shall not be an appreciable or abrupt loss in pressure during the fifteen (15) minute test period.
 - 5. Gauges used in the test shall be accompanied with satisfactory certifications of accuracy from a laboratory approved by the Engineer.
- F. All tests shall be made with the hydrant gate valves open and pressure against the hydrant valve. After the test has been completed, each gate valve shall be tested by closing each in turn and relieving the pressure beyond. This test of the gate valve will

be acceptable if there is no immediate loss of pressure on the gauge when the pressure comes against the valve being checked.

- G. Sections to be tested shall normally be limited to 1,500 feet.
- H. Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

3.9 DISINFECTION OF MAINS

- A. Before being placed in service, all new water mains and repaired portions of, or extensions to, existing mains shall be chlorinated and a satisfactory bacteriological report obtained.
- B. Temporary or permanent physical connections shall not be allowed between the existing distribution system and non-disinfected pipelines constructed under this Contract without a State Department of Health approved backflow preventer (double check valve assembly or better) temporarily installed in the connecting line.
- C. Main sterilization shall be accomplished by either of the following two methods at the Contractor's option. No other method of sterilization will be accepted by the Engineer, unless, prior to use, the Contractor obtains written approval from the Engineer.
- D. Method No. 1:
 - 1. A chlorine gas-water mixture, or dry chlorine gas may be applied by means of a chlorinator, or the gas may be fed directly from a chlorine cylinder equipped with the proper devices for regulating the flow, and the effective diffusion of gas within the pipe. Use of the chlorinator is preferred to direct feed from the cylinder.
 - 2. The preferable point of application for the chlorinating agent is at the beginning of the pipeline extension, or any valved section thereof, and through a corporation cock inserted in the horizontal axis of the pipe. The water injector for delivering the gas-water mixture into the pipe may be supplied from a tap on the pressure side of the gate valve controlling the flow into the pipeline extension. In a new system, application may be at the pumping station, elevated tank, standpipe, or reservoir.
 - 3. Water from the existing distribution system, or other source of supply, shall be controlled to flow very slowly into the newly laid pipeline during application of the chlorine. The rate of chlorine gas-water mixture or dry gas feed shall be in such proportion that the rate of water entering the newly laid pipe will be at least 50 parts per million.
 - 4. Back pressure, causing a reversal of flow in the pipe being treated, shall be prevented.
 - 5. Treated water shall be retained in the pipe at least twenty-four (24) hours. After this period, the chlorine

- residual at pipe extremities and at other representative points shall be at least twenty-five (25) parts per million.
6. In the process of chlorinating newly laid water pipe, all valves or other appurtenances shall be operated while the pipeline is filled with the chlorinating agent.
 7. Following chlorination, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity, until the replacement water throughout its length, upon test, shows the absence of chlorine or in the event chlorine is normally used in the source of supply, until the tests shall show a residual not in excess of that carried by the system.
 8. Should the initial treatment prove ineffective, the chlorination procedures shall be repeated until tests show that the water sample from the newly laid pipe conforms to the requirements of this Specification.
- E. Method No. 2:
1. A mixture of either calcium or sodium hypochlorite of known chlorine content and water may be substituted as an alternative for liquid chlorine. (Typical commercial products of this type are HTH, Perchloron, Clor, Purex, etc.).
 2. Prepare a solution containing approximately 5% available chlorine by weight, in the case of HTH or Perchloron, at 70% available chlorine, use 6 pounds per 10 gallons of water. In the case of Clor, at 15% available chlorine, add 2 parts of water to 1 part of Clor. For other strength compounds, adjust dilutions accordingly.
 3. To prepare the chlorine compound-water mixture, first make a paste, and then thin to a slurry, to ensure getting all active ingredients into solution. The prepared solution shall be injected by means of a hypochlorinator, or hand or engine operated pump. Retention time, parts per million and pumping into the newly laid pipe shall follow the conditions outlined under Method No. 1 for chlorine applications.
 4. Provisions for flushing and bacteriological testing under this alternative shall be the same as those described in Method No. 1 above.
- F. Before placing the lines in service, a satisfactory report or approval shall be received by the Owner on samples collected from representative points in the new system.
- G. Sterilized sample bottles and/or instructions shall be obtained by the Contractor from the laboratory where the samples will be tested unless the Owner directs otherwise. Bacteriological test samples will be taken by the Owner. Corporation stops shall be inserted in the main by the Contractor at all locations required to take bacteriological test samples. If original test samples prove unsatisfactory, a charge of \$25.00 will be made for processing each additional sample.
- H. Discharge of hypochlorinated water to surface waters is strictly prohibited. The environment to which the chlorinated water is to be discharged shall be inspected by the Owner and, if there is any

question that the chlorinated discharge will cause damage to the environment, a reducing agent shall be applied to the water to be wasted to neutralize the chlorine residual remaining in the water. Disposal may be made to any available sanitary sewer provided the rate of disposal does not overload the sewer and the disposal is approved by the sewer agency having jurisdiction. The sewer agency shall be given 48 hours advance notice of such disposal. Where necessary, federal, state, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

3.10 FLUSHING THE MAINS

- A. Upon completion of pipe laying, chlorination and pressure testing, all dirt and foreign matter shall be removed by a thorough flushing through all hydrants, blowoffs or other approved means. Each section of newly laid pipe between valves or dead ends shall be flushed independently, and fire hydrants or other dead end appurtenances shall be flushed simultaneously with the parent line. A minimum flushing velocity of 2.5 fps shall be developed in the main.
- B. The Contractor shall be responsible for scheduling and organizing his work so as to use flushing water only during off-peak hours and in the most economical manner.
- C. Taps required by the Contractor for temporary or permanent release of air, chlorination or flushing purposes shall be provided by the Contractor as a part of the construction of water mains.
- D. No flushing shall be performed without the prior approval of the Owner.

3.11 CHLORINATING CONNECTIONS TO EXISTING WATER MAINS AND WATER SERVICE CONNECTIONS

- A. The chlorinating procedure to be followed shall be as specified in AWWA Standard C651. All closure fittings shall be swabbed with a very strong chlorine solution at least as strong as liquid household bleach (5-6% Cl).

3.12 PLACING IN OPERATION

- A. Upon completion of the work and before its final acceptance, the entire system shall be put in operation under normal pressure and operated at that pressure for a period of not less than ten (10) days by the Contractor.
- B. Any leaks or defects in the construction of the system that may develop, shall be repaired and the test continued until the system is practically watertight.
- C. No provision of this Section shall be construed as waiving any provision of the Contractor's guarantee.

* * * END OF SECTION * * *

SECTION 02720

STORM DRAINAGE

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Inspection Services: Section 01420
- D. Dewatering: Section 02140
- E. Shoring: Section 02150
- F. Excavating, Backfilling and Compacting for Utilities: Section 02222
- G. Manholes and Cleanouts: Section 02605
- H. Pipe and Fittings: Section 02610
- I. Existing Utilities/Facilities - Underground and Overhead:
Section 02760

1.2 QUALITY ASSURANCE

- A. Testing before acceptance: The Engineer may require that the first section of pipe, not less than 300 feet in length, installed by each of the Contractor's crews be tested in order to qualify the crew and/or the material. Pipelaying shall not be continued more than an additional 300 feet until the first section shall have been tested successfully.
- B. Final acceptance: Prior to final inspection all pipelines shall be flushed and cleaned and all debris removed. Before storm drains are accepted, all lines shall be tested for leakage as specified herein and inspected for line and grade by checking each section between catch basins for alignment. A full circle of light shall be seen by looking through the pipe at a light held in the catch basin at the opposite end of the section of storm drain being inspected.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Refer to Section 02200.

2.2 GENERAL REQUIREMENTS FOR PIPE MATERIAL

- A. Pipe used for storm drainage construction may be of nonreinforced concrete, reinforced concrete, vitrified clay, polyvinyl chloride, ductile iron, galvanized corrugated steel pipe or corrugated aluminum alloy as specified in Section 02610 unless otherwise provided.

- B. All pipe shall have flexible watertight joints utilizing rubber gaskets.
- C. All pipe shall meet the minimum strength requirements as specified for concrete pipe unless otherwise provided. Any rigid pipe material substituted for the class specified shall have a minimum three-edge strength equal to or greater than that of the concrete pipe class indicated. Flexible pipe of the class specified herein or on the drawings shall be considered equivalent in load supporting capacity to rigid pipe as indicated, unless otherwise specified.
- D. When ductile iron pipe is specified, no substitute is permitted.
- E. Design is based on smooth wall pipe with a Manning friction factor of $n = 0.013$. Contractor may substitute larger size corrugated pipe upon approval of the Engineer. Review will be based on using a friction factor of $n = 0.024$.

2.3 CATCH BASINS AND INLETS

- A. Catch basins and inlets may be constructed of precast units, concrete masonry units, or of concrete or clay brick, or cast-in-place concrete, all in accordance with the drawings.
- B. Precast units shall conform to the applicable requirements of ASTM C478.

2.4 FRAME AND GRATE FOR CATCH BASINS AND INLETS

- A. Conform to Standard Drawings.
- B. Casting for metal frame shall be cast steel, cast iron, or ductile iron.
- C. Casting for grates shall be cast steel or ductile iron.
- D. Steel castings shall conform to the requirements of ASTM A27, Standard Specification for Steel Castings, Carbon, for General Application, Grade 70-36.
- E. Cast iron castings shall conform to the requirements of ASTM A48, Class 30.
- F. Ductile iron castings shall conform to the requirements of ASTM A536, Grade 80-55-06.
- G. Repair of defects by welding shall not be permitted.
- H. Dimensions to have $\pm 1/16$ inch tolerance.
- I. Machine or grind supporting pads for solid non-rocking bearing in any of four possible positions in frame.
- J. Foundry name shall be embossed on top of grate. Lettering to be recessed 1/16 inch.

- K. Material used for grate shall be designated by embossing "DI" (ductile iron) or "CS" (cast steel) near manufacturer's name.

3. EXECUTION

3.1 INSTALLATION

- A. Conform to applicable requirements of Section 02730 except as modified herein.

3.2 BEDDING FOR CORRUGATED METAL PIPE

- A. Material for sidefill around and to the crown elevation of corrugated metal pipe shall be selected and shall not contain stones larger than 3 inches in greatest dimension, frozen lumps, roots, or moisture in excess of that permitting through compaction.
- B. Material placed within the pipe compaction zone shall be brought up simultaneously on each side of the pipe to the top of the pipe and compacted to 90% density as defined by Section 02222.

3.3 TREATMENT OF ALUMINUM PIPE

- A. Whenever plain aluminum pipe is used where it will be in contact with concrete or concrete pipe, all aluminum surfaces in contact with the concrete or concrete pipe shall be painted with 2 coats of asphalt paint.

3.4 CATCH BASINS AND INLETS

- A. Construction details for catch basins and inlets shall follow all applicable provisions for construction of manholes.
- B. Backfill around catch basins shall be placed around the catch basins and compacted in successive layers six (6) inches in thickness and up to six (6) inches over the crown of the highest pipe connected to the catch basin.
- C. The inlet frame may be either cast into a concrete collar or set flange down on concrete adjustment blocks and mortared.
- D. Inlet frame shall not be grouted to final grade until the final elevation of the pavement, gutter, ditch, or sidewalk in which it is to be placed has been established.
- E. Location of catch basins will be staked by the Engineer.
- F. All openings in the walls of catch basins constructed with precast sections for the insertion of pipe connections and outlet trap castings shall, after pipe or castings have been placed to their final position, be grouted tightly in place to present an inside and outside surface conforming to the Standard Details.
- G. The spigot end of the pipe shall be cut square with the last point of contact with the inside wall surface.

* * * END OF SECTION * * *

SECTION 02730

SANITARY SEWERS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Inspection Services: Section 01420
- D. Dewatering: Section 02140
- E. Shoring: Section 02150
- F. Excavating, Backfilling and Compacting for Utilities: Section 02222
- G. Manholes and Cleanouts: Section 02605
- H. Pipe and Fittings: Section 02610
- I. Sewer Force Mains: Section 02732
- J. Existing Utilities/Facilities-Underground and Overhead: Section 02760

1.2 QUALITY ASSURANCE

- A. Testing before acceptance:
 - 1. The Engineer may require that the first section of pipe, not less than 300 feet in length, installed by each of the Contractor's crews be tested in order to qualify the crew and/or the materials.
 - 2. Pipelaying shall not be continued more than an additional 300 feet until the first section shall have been tested successfully.
- B. Final acceptance:
 - 1. Prior to final inspection all pipelines shall be flushed and cleaned and all debris removed.
 - 2. Before sewer lines are accepted, all lines shall be tested as specified herein and inspected for line and grade by checking each section between manholes for alignment. A full circle of light shall be seen by looking through the pipe at a light held in the manhole at the opposite end of the section of sewer line being inspected.
 - 3. All lines shall be tested for leakage.
 - 4. Deflection test shall be performed on all flexible pipe.
 - 5. Owner may elect to perform a TV inspection.
 - 6. Any corrections required shall be made and the line retested.

1.3 PROTECTION OF LIVE SEWERS

- A. All existing live sewers including septic tanks and drain fields shall remain in service at all times. Adequate provision shall be made for disposal of existing sewage flow if any existing sewers are damaged.
- B. Any damage to the Owner's existing system shall be repaired to a condition equal to or better than that existing prior to the damage at no cost to the Owner.
- C. The existing system is discharged through some sewers with flat grades and in some cases through lift stations. All water accumulating during construction shall be removed from the new sewers and shall not be permitted to enter the existing system. The Contractor will be required to flush out the existing lines and/or repair lift stations or other facilities if gravel, rocks, or other debris are permitted to enter the existing lines.
- D. The physical connection to an existing manhole or sewer line shall not be made until so authorized by the Owner. This authorization will not be given until all upstream lines have been completely cleaned, all debris removed, and, where applicable, a pipe temporarily placed in the existing channel and sealed.

1.4 USE OF SEWERS PRIOR TO COMPLETION

- A. The Owner hereby reserves the right to make use of any portion of the work prior to completion of the entire Contract without invalidating the Contract and without constituting acceptance of any of the work.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Refer to Section 02222.

2.2 GENERAL REQUIREMENTS FOR PIPE MATERIAL

- A. Pipe used for sewer construction may be nonreinforced concrete, reinforced concrete, vitrified clay, polyvinyl chloride (PVC) or ductile iron as specified in Section 02610 unless otherwise provided.
- B. All pipe shall have flexible watertight joints utilizing rubber gaskets.
- C. All pipe shall meet the minimum strength requirements as specified for concrete pipe unless otherwise provided. Any rigid pipe material substituted for the class specified shall have a minimum three-edge strength equal to or greater

than that of the concrete pipe class indicated. Flexible pipe of the class specified herein or on the drawings shall be considered equivalent in load supporting capacity to rigid pipe as indicated, unless otherwise specified.

- D. When ductile iron pipe is specified, no substitute is permitted.

3. EXECUTION

3.1 SURVEY LINE AND GRADE

- A. The Contractor shall constantly check line and grade of the pipe and in the event they do not meet specified limits, the work shall be immediately stopped, the Engineer notified, and the cause remedied before proceeding with the work.

3.2 BEDDING

- A. Proper preparation of foundation, placement of foundation material where required, and placement of bedding material shall precede the installation of all sewer pipe. This shall include the necessary preparation of the native trench bottom and/or the top of the foundation material as well as placement and compaction of required bedding material to a uniform grade. Backfill material around the pipe will be placed in a manner to meet requirements specified herein.
- B. If no bedding class is specified for rigid pipe, Class B bedding shall be provided.
- C. Class F bedding shall be provided for all flexible pipe.
- D. The pipe bedding shall be placed so that the entire length of the pipe will have full bearing on the bedding. No blocking of any kind shall be used to adjust the pipe to grade except when used with embedment concrete. Bell holes shall be dug to ensure uniform support along the pipe barrel.
- E. It may be necessary to change bedding classifications and the limits thereof during the progress of the construction, consistent with the requirements outlined under the definitions and requirements of the various classifications contained herein.
- F. Where unauthorized excavation has been made below the established grade, the Contractor shall provide, place and compact suitable bedding material to the proper grade elevation.
- G. Classification of bedding:
 - 1. Class A (Special Concrete Bedding) shall consist of a pipe cradle constructed of Portland cement concrete containing not less than four (4) sacks of cement per yard. Maximum aggregate size shall be 1/2 inch.

Maximum slump shall be 4 inches. The Contractor shall protect pipe against flotation during the pouring of the concrete. The bottom of the trench shall be fully compacted before placement of pipe or cradle. Cradle construction shall conform to the Standard Detail.

2. Class B (Normal Gravel Bedding) shall consist of the leveling of the bottom of the trench and/or the top of the foundation material at the appropriate elevation, and the furnishing and placing of bedding materials under the pipe and along the sides of the pipe. Minimum thickness of the layer of bedding material required under any portion of the pipe shall be four inches for all pipe sizes of 27 inches diameter and smaller, and six inches for all pipe sizes of 30 inches diameter and larger. Bedding shall extend up to the spring-line of rigid pipe. Bedding material shall be carefully placed and firmly compacted to provide a firm, uniform cradle for the pipe.
3. Class C (Shallow Gravel Bedding) shall meet the requirements outlined for Class B bedding except that bedding material need be placed only to the lower quadrant of the pipe. This type of bedding will be used only where specifically designated on the Plans and only for shallow pipelines.
4. Class D (Native Bedding) shall consist of carefully excavating the trench to proper grade and placing select native material around the pipe. Native bedding shall be used only where specifically called for or specifically authorized by the Engineer.
5. Class F bedding shall be placed in more than one lift. The first lift to provide at least 4-inch thickness under any portion of the pipe shall be placed before the pipe is installed and shall be spread smoothly so that the pipe is uniformly supported along the barrel. Subsequent lifts of not more than 6-inch thickness shall be placed to 6 inches over the crown on the pipe and individually compacted to 90% of maximum density. Material shall be pipe bedding material described in Section 02222.

3.3 PIPE LAYING

- A. Laying of sewer pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared.
- B. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surfaces.
- C. Pipe laid shall be retained in position by mechanical means or otherwise, so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. Wherever moveable shoring (steel box) is used in the ditch, pipe shall be restrained by use of a

winch mounted in the downstream manhole and a line of sufficient strength threaded through the pipe and set tightly before each move. Any indication that joints are not being adequately held shall be sufficient reason to require this or other equivalent method of restraint, whether or not moveable shoring is being used.

- D. Variance from established line and grade shall not be greater than $1/32$ of an inch per inch of pipe diameter, not to exceed $1/2$ inch provided that such variation does not result in a level or reverse sloping invert; provided also that variation in the invert elevation between adjoining ends of pipe, due to non-concentricity of joining surface and pipe interior surfaces, does not exceed $1/64$ inch per inch of pipe diameter, $1/2$ inch maximum.
- E. The sewer pipe shall be laid upgrade from point of connection on the existing sewer or from a designated starting point. The sewer pipe shall be installed with the bell end forward or upgrade.
- F. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with a temporary plug.
- G. As the pipe is installed, it shall be backfilled with the specified bedding material and selected native material up to an elevation 6 inches above the pipe crown, taking care that the backfill is in contact with the entire periphery of the pipe. The backfill shall be carefully placed and firmly compacted such that the subsequent backfilling operations will not disturb the pipe in any way.
- H. Pipe branches, stubs, or other open ends that are not to be connected immediately shall be plugged with approved material consistent with these Specifications and secured in place.
- I. The markings on reinforced concrete pipe indicating the minor axis of the elliptical reinforcement shall be placed in a vertical plane (top to bottom) when the pipe is laid.
- J. Install concrete anchors on sewers laid on slopes of 20% or greater in accordance with Standard Detail.

3.4 PIPE JOINTING

- A. All extensions, additions and revisions of the sewer system, unless otherwise specified, shall be made with sewer pipe jointed by means of a flexible gasket, which shall be fabricated and installed in accordance with these Specifications.
- B. Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other

foreign material. Any gaskets so disturbed shall be removed and replaced, cleaned, and relubricated if required before the jointing is attempted.

- C. Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.
- D. Sufficient pressure shall be applied in making the joint to ensure that it is home, as described in the installation instructions provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to ensure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted.
- E. At the end of the work day, the last pipe laid shall be blocked to prevent creep during "down time."
- F. Pipe required to be laid on curved alignment shall be joined in straight alignment and then be deflected, joint by joint. Special care shall be taken in blocking the pipe just previously laid, by tamped fill or otherwise, to resist the misaligning forces generated during compression of the joints being made.
- G. For dissimilar pipes where suitable adaptor couplings are not available, the jointing shall be accomplished with a special factory fabricated coupling.

3.5 SIDE SEWERS

- A. All applicable Specifications given herein for sewer construction shall apply to side sewers.
- B. Provide side sewers extending to the right of way line for all properties adjacent to main line sewer unless otherwise directed by the Owner.
- C. Unless authorized in writing by the Owner, excavation for main line sewers shall not begin more than 1,000 feet ahead of the completion of side sewer construction in the public right-of-way.
- D. Sewers are designed to serve the downstream side of properties. Exceptions shall be as directed by the Owner at the time of construction. Such exceptions shall be marked by a stake or other suitable marker. Contractor shall be responsible that a "tee" be located in the main line opposite each marker and shall construct a side sewer to terminate at

the property lines, edge of easements, or as otherwise directed by the Owner.

- E. The Contractor shall be responsible that the side sewer depth at the property line is 5 feet below the floor to be served, or 6 feet below street centerline, whichever is deeper. Where the property is vacant, the side sewer shall be constructed on a slope of 2% unless otherwise approved in writing by the Owner.
- F. Side sewers shall not be installed as vertical risers, but shall be laid on a slope not to exceed two feet vertical to one foot horizontal.
- G. Side sewers shall be constructed with a maximum deflection not to exceed manufacturer's recommendations. Larger changes in direction shall be made by use of standard 1/8 bends.
- H. Plugs shall be installed at end of line and blocked to withstand test pressures without leakage.
- I. A 1-1/4-inch white PVC pipe, ASTM 2241 SDR 21 200 psi shall be placed vertically at the end of each stub and shall rise 2 feet above finish grade level. Both ends of the PVC pipe shall have caps glued on and the pipe interior kept clean for the purpose of future depth measurement.
- J. General requirements for side sewer construction are shown on Standard Detail entitled "Street Side Sewer". Any side sewer contractor shall also satisfy all requirements relating to side sewer construction as set forth in the "Infrastructure Improvements Project Manual". Side sewer inspection for work under the Contract will be performed without charge to the Contractor.
- K. No side sewers shall be constructed inside private property unless approved in writing by the Owner.
- L. The Contractor shall not backfill any side sewers until the Owner has visually inspected and approved the installation. Should any such work be covered up without such approval or consent it must, if required by the Owner, be uncovered for examination at the Contractor's expense.

3.6 CLEANING

- A. Before acceptance testing is performed, the pipe installation should be reasonably clean. The pipe shall be cleaned either before or after.
- B. The Contractor shall furnish an inflatable rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the Contractor, be used without a tag line; or a rope or cord may be fastened to the

ball to enable the Contractor to know and control its position at all times. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water shall be introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. In the event cemented or wedged debris or a damaged pipe shall stop the ball, the Contractor shall remove the obstruction and/or repair any damaged pipe. All visible leaks showing flowing water in pipelines or manholes shall be stopped even if the test results fall within the allowable leakage.

3.7 LEAKAGE TESTING

A. General requirements:

1. All sanitary sewer pipe and appurtenances shall be cleaned and tested after backfill by the low-pressure air test method. Pipe over 36 inches in diameter may be tested a joint at a time with the water exfiltration method or by low-pressure air test.
2. All work involved in cleaning and testing sewer lines between manholes shall be completed within fifteen (15) working days after the backfilling of sewer lines and structures.
3. The Contractor shall furnish all labor, materials, tools and equipment necessary to make the test, clean the lines, and - perform all work incidental thereto.
4. Precautions shall be taken to prevent joints from drawing during tests, and any damage resulting from tests shall be repaired by the Contractor.
5. In the event that the Contractor elects to test large-diameter pipe one joint at a time, leakage allowances for water exfiltration per 100 feet shall be converted to allowances per joint by dividing by the number of joints occurring in 100 feet.
6. If the pipe installation fails to meet these requirements, the Contractor shall determine the source or sources of leakage, and he shall replace all defective materials or workmanship. The completed pipe installation shall then be retested as required to meet the requirements of this test.

B. Low-pressure air test:

1. Recommended procedure:
 - a. Pipe may be tested with or without pre-wetting.
 - b. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
 - c. If the pipe to be tested is submerged in groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the pipe and determine the pressure in the probe when air passes slowly through it. This is the back pressure due to groundwater submergence over the end of the probe. All

- gauge pressures in the test should be increased by this amount.
- d. Add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to 4.0 psig in excess of any groundwater backpressure.
 - e. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any failures are observed, bleed off air and make necessary repairs.
 - f. After an internal pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
 - g. After that two-minute period, disconnect air supply.
 - h. When pressure decreases to 3.5 psig over groundwater backpressure, start stopwatch. Determine the time in seconds that is required for the internal air pressure to drop 1.0 psig. This time interval should then be compared with the time required by Specification.
2. Safety precautions:
 - a. Plugs used to close the sewer pipe for the air test must be securely braced to prevent the unintentional release of a plug that could become a high velocity projectile. Gauges, air piping manifold, and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device designed to relieve pressure in the pipe under test at 6 psi.
 3. Basis of acceptance:
 - a. Concrete and clay pipe (36 inches and under): The rate of air loss shall not exceed 0.003 CFM per square foot of internal pipe surface except that the computed rate for the test shall be not less than 2 CFM nor more than 3.5 CFM.
 - b. Other pipe materials: The time for the test shall be four (4) times that computed for concrete and clay pipe.
 - c. Pipe over 36 inches in diameter: Each joint shall show no appreciable loss of pressure when held for thirty (30) seconds.
 4. Limit of test section:
 - a. Pipe under 36 inches in diameter shall be tested from manhole to manhole or such shorter lengths as the Contractor may choose.
 - b. Pipe over 36 inches in diameter shall be tested one joint at a time.
 5. Excessive infiltration:

- a. The Engineer may require an infiltration test if it appears that there is excessive infiltration after air tests are completed. The Engineer shall also be the sole judge of whether or not this test is required. Excessive infiltration shall be cause for rejection.

C. Exfiltration test:

1. Exfiltration test shall be used only if specifically authorized by the Engineer.
2. Contractor may fill the pipe any time up to 24 hours prior to the time of exfiltration testing to permit normal absorption into the pipe walls.
- 3.. Leakage shall be no more than 0.28 gph per inch diameter per 100 feet of sewer, with a hydrostatic head of six feet above the crown at the upper end of the test section, or above the natural groundwater table at the time of test, whichever is higher.
4. Where the test head is other than six feet, the measured leakage shall not exceed 0.28 gph per inch diameter per 100 feet times the ratio of the square root of the test head to the square root of six.
5. The length of pipe tested shall be limited so that the pressure at the lower end of the section tested does not exceed 16 feet of head above the invert, and in no case shall be greater than 700 feet or the distance between manholes when greater than 700 feet.
6. It shall be the Contractor's responsibility to determine the level of the water table at each manhole.

D. Infiltration Test:

1. Infiltration test shall be used only if specifically authorized by the Engineer.
2. Infiltration testing shall take place only when the natural groundwater table is above the crown of the higher end of the test section.
3. Infiltration test leakage shall not exceed 0.16 gph per inch diameter per 100 feet, when the natural groundwater head over the pipe is two feet or less above the crown of the pipe at the upper end of the test section.
4. Where the natural groundwater head is more than two feet, the measured leakage shall not exceed 0.16 gph per inch diameter per 100 feet times the ratio of the square root of the natural groundwater head to the square root of 2.
5. The length of pipe tested shall not exceed 700 feet or the distance between manholes when greater than 700 feet.

3.8 DEFLECTION TEST FOR FLEXIBLE PIPE

- A. Sanitary sewers constructed of flexible pipe shall be deflection tested not less than 30 days after the trench backfill and compaction has been completed.

- B. The test shall be conducted by pulling a solid pointed mandrel with a circular cross section with diameter equal to 95% of the inside pipe diameter through the completed pipeline. Minimum length of circular portion shall be equal to the diameter of the pipe.
- C. Testing shall be conducted on a manhole-to-manhole basis and shall be done after the line has been completely flushed out with water.
- D. Contractor will be required, at his expense, to locate and repair any sections failing to pass the test and to retest the section.

3.9 VIDEO INSPECTION

- A. The Owner may at his option require any or all sewers to be inspected by the use of a video camera before final acceptance. The costs incurred in making the initial inspection shall be borne by the Owner.
- B. If pipe is checked for grade, a device will be attached in front of the camera to measure the depth of any ponding water.
- C. Any observed defects or ponded water with a depth of over 3/4 inch shall be cause for the rejection of the line.
- D. The Contractor shall be responsible for all costs incurred in any video inspection performed solely for the benefit of the Contractor.

3.10 REPAIRS

- A. Any pipe or appurtenance, which has been laid or jointed, that is not in conformance with the Specifications shall be repaired or be removed and replaced.
- B. Any concrete pipe or manhole with any continuous crack having a surface width of 0.01 inch or more extending for a length of 12 inches or more regardless of position in the wall of the pipe or main shall be removed and replaced.
- C. Repair bands or clamps or concrete collars shall not be used to repair defective pipe.

* * * END OF SECTION * * *

SECTION 02732

SEWER FORCE MAINS

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Field Engineering: Section 01050
- B. Inspection Services: Section 01420
- D. Dewatering: Section 02140
- E. Shoring: Section 02150
- F. Excavating, Backfilling and Compacting for Utilities: Section 02222
- G. Manholes and Cleanouts: Section 02605
- H. Pipe and Fittings: Section 02610
- I. Water Lines: Section 02660
- J. Sanitary Sewer: Section 02730
- K. Existing Utilities/Facilities - Underground and Overhead:
Section 02760

1.2 QUALITY ASSURANCE

- A. Testing before acceptance
 - 1. The Engineer may require that the first section of pipe, not less than 300 feet in length, installed by each of the Contractor's crews be tested in order to qualify the crew and/or the material.
 - 2. Pipelaying shall not be continued more than an additional 300 feet until the first section shall have been tested successfully.
- B. Final acceptance:
 - 1. Prior to final acceptance all pipelines shall be flushed and cleaned of all debris and the line tested as specified herein.
 - 2. Any corrections required shall be made at the expense of the Contractor and the line retested.

2. PRODUCTS

2.1 BEDDING MATERIALS

- A. Conform to Section 02222.

2.2 PIPE MATERIALS

- A. Pipe used for sewer force main may be ductile iron or PVC pressure pipe as specified in Section 02610, unless otherwise noted.

3. EXECUTION

3.1 INSTALLATION

- A. Bedding and pipe laying of force mains shall conform to the applicable provisions for water lines as set forth in Section 02660.
- B. Minimum depth of cover shall be 42 inches unless otherwise shown on the Drawings.
- C. Pipe shall be laid on a uniform grade with no sags or overbends between high and low points shown on the Drawings.
- D. Cover of sewage air valve assembly vault shall be accurately adjusted to grade and slopes of ground surface.

3.2 BLOCKING AND BRACING

- A. Blocking and bracing of the pipe and fittings shall be placed so as to secure bearing on undisturbed earth.
- B. Blocking and bracing size shall be determined by the Contractor and shall be of sufficient proportions and installed so as to withstand the required test pressure and operating conditions.
- C. Concrete shall be placed in back of all fittings with unbalanced thrust. Pre-cast blocking shall not be used.
- D. Blocking shall not be covered up until it has been seen by the Engineer.
- E. Blocking shall be formed so that bolts, joints, gaskets, and flanges of adjacent joints are clear of the concrete and so that bolts and joints can be dismantled without removing the concrete.
- F. At tees and crosses where future mains connect, a pre-cast concrete brick may be used between fittings and thrust block.

3.3 PRESSURE TESTS

- A. Sewer force mains shall be subjected to the hydrostatic test described in Section 02660 except that pressure tests shall be made at a pressure equal to twice the working pressure of the pipe line or 75 psi in excess of the working pressure of the line, whichever is greater, unless otherwise specified.
- B. The pumps, gauges, plugs, saddles, corporations, miscellaneous hose and piping, and measuring equipment necessary for

performing the test shall be furnished and operated by the Contractor.

- C. Pipeline shall be backfilled sufficiently to prevent movement of pipe under pressure.
- D. Thrust blocks shall be in place and time allowed for the concrete to cure before testing.
- E. Procedure:
 - 1. The mains shall be filled with water and all air removed prior to starting the test.
 - 2. The test shall be accomplished by pumping the main up to the required pressure; stop the pump for fifteen (15) minutes, and then pump the main up to the test pressure again.
 - 3. The quantity of water required to restore the pressure shall be accurately determined by pumping through a positive displacement water meter with a sweep unit hand registering 1 gallon per revolution. The meter shall be approved by the Engineer.
 - 4. Acceptability of the test will be determined by two factors:
 - a. The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the formula:
$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which:
L = Allowable leakage, gallons/hour
N = No. of joints in the length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Average test pressure during the leakage test, psig
 - b. There shall not be an appreciable or abrupt loss in pressure during the fifteen (15) minute test period.
 - 5. Gauges used in the test shall be accompanied with satisfactory certifications of accuracy from a laboratory approved by the Engineer.
- F. Sections to be tested shall normally be limited to 1,500 feet.
- G. Prior to calling out the Engineer to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

* * * END OF SECTION * * *

SECTION 02760
EXISTING UTILITIES/FACILITIES
UNDERGROUND AND OVERHEAD

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Inspection Services: Section 01420
- B. Grading: Section 02210
- C. Excavating, Backfilling and Compacting for Utilities: Section 02222

1.2 LEGAL REQUIREMENTS-UNDERGROUND FACILITIES

- A. The Contractor shall, before commencing excavation in any area, comply with the provisions of any applicable laws relating to or governing the identification, location, marking, and responsibility for protecting and repairing of underground facilities.
- B. Whenever there may be a conflict between the provisions of any law and the provisions of these specifications, the provisions of law shall control.

1.3 DEFINITIONS

- A. Utility means any facility or item placed above or below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephonic or telegraphic communication, cablevision, electric energy, petroleum products, gas, gaseous vapors, hazardous liquids, or other substances and including, but not limited to pipes, sewers, conduits, cables, valves, lines, wires, manholes, and attachments.
- B. Pipe zone is defined as extending from the bottom of the required excavation to six (6) inches over the top of the pipe.

1.4 IDENTIFICATION

- A. All underground utilities known by the Owner to be in the proposed area of excavation are identified on the project plan.
- B. The underground utilities identified on the plans have not and cannot be precisely located by the Owner or its agents or engineers and location is approximate only because such information is within the control of the owners of the underground utilities. The Owner does not warrant the location of underground utilities.
- C. NOTICE: Overhead electrical service lines are generally not shown on the drawings. Electrical transmission lines shown on the drawings are located by point-to-point, power pole-to-power pole con-

nections. The transmission cables or wires may be located on either side of the drawing location depending upon the configuration of the crossarms on the power poles or towers. Line voltage is not shown.

- D. Other overhead utility lines are generally not shown on the drawings.

1.5 NOTIFICATION

- A. It is the responsibility of the Contractor to give notice to the Owner or owners of any utilities known or suspected to be within the area of any proposed excavation or construction activities.
- B. The Contractor is responsible to have the locations of underground utilities marked by the utility owners prior to beginning excavation.
- C. The Contractor is responsible for determining the extent of any hazard created by electrical power in all areas and shall follow procedures during construction as required by law and regulation. Prior to construction, the Contractor shall meet with utility owners and determine the extent of hazards and remedial measures and shall take whatever precautions may be required.
- D. The Contractor's attention is directed to federal, state, and local safety codes relative to limitations of work in proximity to overhead power lines.

1.6 QUALITY ASSURANCE

- A. The Contractor will be required to have available a pipe finder and a person capable in its use and to utilize same to satisfy himself as to the exact location of such underground facilities in the interest of avoiding unnecessary damage, maintenance costs, and to ensure continuity of customer service.
- B. Contractors shall cooperate with utility owners to aid in locations and maintenance of existing utilities.

1.7 ELECTRICAL TRANSMISSION AND SERVICE LINES

- A. Since neither the Engineer nor the Owner can anticipate the construction methods or techniques and equipment to be used by the Contractor in performing the work, the extent of the possibility of the Contractor's equipment and personnel coming in contact with electrical transmission lines cannot be fully anticipated, and there is no representation that all electrical transmission lines are shown on the plans.
- B. The Contractor is charged with the responsibility of observing and investigating the presence of any electrical transmission lines which might impinge on his work whether overhead or underground and shall consult with and utilize the information given by utility owners

and operators to determine the extent of any hazards and remedial measures required, and follow appropriate safety procedures.

1.8 ABOVE GROUND UTILITIES

- A. Existing above ground utilities, whether shown on the drawings or not, shall be maintained, relocated, rerouted, removed and restored as may be necessary by the Contractor in a manner satisfactory to owners and operators of the utilities.

1.9 UTILITY SERVICE LATERALS

- A. Minor underground utility service lines, including but not limited to sanitary sewer services, gas services, water services, house or yard drains, and electricity or telephone services and driveway culverts shall be maintained, relocated, rerouted, removed and restored by the Contractor with the least possible interference with such services.

1.10 RESTORATION BY UTILITY OWNER

- A. The right is reserved by owners of public utilities and franchises to enter upon any street, road, right-of-way, or easement for the purpose of maintaining their property and for making necessary repairs or adjustments caused by the Contractor's operations.
- B. The Contractor shall save the Owner harmless of any costs so incurred in restoration of a utility damaged by the Contractor except in special cases outlined above, and subject to the provisions of any law.

1.11 RESTORATION OF DRAINAGE FACILITIES

- A. Where it is necessary for drainage facilities to be removed and replaced, existing pipe and catch basins may be reinstalled when approved by the agency having jurisdiction.
- B. The materials shall be cleaned.
- C. When it is necessary to replace existing pipe or catch basins, the new materials shall be of equal strength and similar design to existing materials.
- D. Installation shall be in accordance with the applicable provisions of these specifications.

* * * END OF SECTION * * *

SECTION 02990

LANDSCAPE RESTORATION

1. GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Protection of Work and Property: Section 01545
- B. Site Clearing: Section 02110
- C. Trenching, Backfilling, and Compacting for Utilities: Section 02221

1.2 SUBMITTALS

- A. Duplicate copies of a statement signed by the vendor certifying that each lot of seed has been tested by a recognized seed testing laboratory within 6 months before the date of delivery on the project.
- B. Duplicate copies of certification from grower certifying the grass species and locations of field from which sod was cut.

1.3 JOB CONDITIONS

- A. Areas landscaped and/or seeded prior to construction shall be restored to their original condition.
- B. Unless otherwise specified, the Contractor shall have the option of reseeded or resodding lawn areas that are disturbed during construction.
- C. A cover crop shall be sown in all areas other than landscaped areas that are excavated or disturbed during construction. Cover crop seeding shall follow backfilling operations by not more than three weeks. Weekly seeding shall be required for projects in which all backfilling cannot be completed in three weeks.
- D. All plants or shrubs within landscaped areas that are damaged during construction shall be replaced with plants equal to that existing prior to construction. Any covenants to stipulations in easements shall be adhered to.
- E. All areas shown on the Plans to be planted, seeded or sodded shall be accomplished in accordance with this section.

2. PRODUCTS

2.1 TOPSOIL

- A. Topsoil that is required to be furnished by the Contractor from a source other than the area upon which it will be placed shall consist of fertile, friable soil, preferably of a loamy character, typical of the

topsoil common to the locality and it shall contain a normal amount of organic matter.

- B. It shall be obtained from arable land and shall be free from subsoil, refuse and other deleterious substances. It shall be reasonably free from brush, roots, heavy clay, sticks and other litter and shall contain no stones or gravel larger than 1/2 inch in diameter.
- C. It shall be free of toxic amounts of either acid or alkaline elements and be capable of sustaining healthy plant life.
- D. It shall be approved by the Engineer before placement.

2.2 SEED

- A. Grasses and legumes for cover crop seed shall conform to the standards of State Department of Agriculture. Seed shall be furnished in standard containers on which shall be shown the following information:
 - 1. Common name of seed.
 - 2. Lot number.
 - 3. Net weight.
 - 4. Percentage of purity.
 - 5. Percentage of germination (in case of legumes percentage of germination to include hard seed).
 - 6. Percentage of weed seed content and inert material clearly marked for each kind of seed in accordance with applicable state and federal laws.

2.3 FERTILIZER

- A. General:
 - 1. Fertilizer shall be a standard commercial grade of organic or inorganic fertilizer of the kind and quality specified herein. It may be separate or in a mixture containing the percentage of total nitrogen, available phosphoric acid, and water-soluble potash in the amounts specified.
 - 2. All fertilizers shall be furnished in standard unopened containers with weight, name of plant nutrients, and manufacturer's guaranteed statement of analysis clearly marked, all in accordance with state and federal laws.
 - 3. Fertilizer shall be ground to a fineness as required for the method of application.
- B. Lawn fertilizer:

Total nitrogen	7%
Available phosphoric acid.....	16%
Water-soluble potash	18%
- C. Cover crop fertilizer:

Total nitrogen	12%
Available phosphoric acid.....	12%
Water-soluble potash	12%

2.4 MULCH

- A. Wood cellulose fiber:
 - 1. Wood cellulose fiber mulch shall be specially processed wood fiber containing no growth or germination inhibiting factors and shall be dyed a suitable color to facilitate inspection of the placement of the material.
 - 2. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form a homogeneous slurry.
 - 3. Each package shall be marked by the manufacturer to show the air dry weight content.
- B. Peat:
 - 1. Peat shall be a natural domestic product of either sphagnum moss, reed or sedge peat, taken from a freshwater site, free from lumps, roots and stones.
- C. Straw:
 - 1. All straw mulch material shall be in an air dried condition free of noxious weeds, weed seeds, and other materials detrimental to plant life.
 - 2. Straw shall be seasoned before baling or loading.
 - 3. Straw mulch shall be suitable for spreading with mulch blower equipment.

2.5 SOD

- A. Imported sod:
 - 1. Sod shall be of first quality turf grass sod composed of acceptable grass mixtures, relatively weed free.
 - 2. Sod shall be machine cut to a uniform soil thickness not less than 3/4 inch or more than 1 inch. Individual sod pieces shall be cut to a standard width and to an acceptable length that provides for efficient and proper installation.
 - 3. Sod shall be harvested, delivered and installed within a 48-hour period.
 - 4. The Contractor, upon request, shall submit one standard piece of sod for the Engineer's approval.
- B. Native sod:
 - 1. Native sod shall be replaced in the lawn of original removal.
 - 2. The area of sod to be removed shall be laid out in squares or strips of such size as to provide easy handling and matching. The sod shall then be carefully cut along these lines taking care to keep all cuts straight and strips of the same width. After the sod has been cut vertically, it shall be removed to a uniform depth with an approved type of sod cutter. This operation shall be performed in such manner as to ensure uniform thickness of sod throughout the operation.
 - 3. As the sod scalping proceeds, the sod strips shall be placed in neat piles at convenient locations and from then on they shall be maintained in a damp condition continuously until

the sod strips are replaced on the lawn. In no case shall the sod remain in piles longer than 10 days before replacement on the lawn.

2.6 PLANT MATERIALS

- A. Plants shall be healthy, in vigorous growing condition, and be guaranteed true to size, name and variety. Nomenclature shall be listed in Standardized Plant Names, Second Edition, 1942.
- B. Size and quality shall be equal to existing plants or as shown on the Plans. Plants shall be No. 1, nursery grown, freshly dug, of normal growth and habit, free from diseases and insects.

3. EXECUTION

3.1 LAWN SEEDING

- A. All areas to be put into lawn shall have a minimum depth of 6 inches of topsoil.
- B. Immediately prior to placing topsoil, the surface area upon which it is to be placed shall be cleaned of objectionable matter and the area be smoothed and compacted.
- C. The finish grade of all areas to be put into lawn shall be smooth, without visible depressions or mounds and shall be flush with the top of adjoining curbs, walks and drives.
- D. After establishing the finish grade, all areas shall be hand raked, rolled and again hand raked, removing all rocks, weeds and debris.
- E. Commercial fertilizer shall be applied at the rate of 8 pounds per 1,000 square feet.
- F. Lawn seed shall be seeded over all areas to be put into lawn at the rate of 3 pounds per 1,000 square feet.
- G. After seeding, ground horticultural peat moss shall be spread 1/4 inch deep with an approved spreader over all seeded areas.
- H. The exact time for seeding will be determined by actual weather conditions. The normal satisfactory periods for seeding shall be considered as being between March 1 and May 1 and between September 15 and October 20.
- I. When delays in operations carry the work beyond the most favorable planting season, or when weather conditions are such that satisfactory results are not likely to be obtained for any stage of the seeding operations, the Contractor will stop the work and it shall be resumed only when the desired results are likely to be obtained or when approved alternates or corrective measures and procedures are adopted.

- J. Maintenance shall commence immediately on planting and the lawn area shall be kept damp for 10 days to 2 weeks. Protect all seeded areas by watering, mowing and replanting as necessary for at least 30 days and as long as necessary to establish a uniform stand of grass, and a minimum of 2 cuttings.

3.2 SOD

- A. Prior to placing the strips of sod, the scalped area shall be carefully shaped to proper grade and be thoroughly compacted. Wherever the construction operations have resulted in the placement of unsuitable or poorer soils in the area to be resodded, the surface shall be left low and covered with topsoil.
- B. The finished grade, after shaping and compacting the topsoil, shall be thoroughly dampened prior to and immediately before replacing the sod.
- C. The sod shall be replaced to the required grade, taking care to butt each piece tightly against the adjacent one.
- D. Upon completion, the sod shall be dampened and rolled with a lawn roller.
- E. All sod shall be kept moist during the first week after sodding. Water shall be provided for each of the next three weeks to provide a minimum of 2 inches of moisture per week.

3.3 COVER CROP SEEDING

- A. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet or otherwise untillable.
- B. Seed may be sown by one of the following methods:
 - 1. Hydro-seeded, which utilizes water as the carrying agent, and maintains continuous agitation through paddle blades. It shall have an operating capacity sufficient to agitate, suspend and mix into a homogeneous slurry of the specified amount of seed and water or other material. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic discharge spray nozzles that will provide a uniform distribution of the slurry.
 - 2. Blower equipment with an adjustable disseminating device capable of maintaining a constant, measured rate of material discharge that will ensure an even distribution of seed at the rates specified.
- C. Grass seed shall be seeded at the rate of 130 pounds per acre.
- D. Fertilizer shall be applied at the rate of 300 pounds per acre.
- E. Wood cellulose fiber shall be applied at the rate of 1 ton per acre.

- F. The exact time for seeding will be determined by actual weather conditions. The normal satisfactory period for seeding shall be considered between March 1 to June 1 and September 1 to November 1 unless otherwise authorized by the Owner except that the Contractor may perform seeding operations from June 1 to September 1 provided that he waters the new grass to the satisfaction of the Owner.
- G. When delays in operations carry the work beyond the most favorable planting season, or when weather conditions are such that satisfactory results are not likely to be obtained for any stage of the seeding operations, the Contractor will stop the work and it shall be resumed only when the desired results are likely to be obtained or when approved alternates or corrective measures and procedures are adopted.
- H. The Contractor shall protect all seeded areas from erosion until final inspection and acceptance has been made. Areas damaged by erosion shall be repaired by the Contractor at his own expense.

3.4 PLANTING PITS

- A. Trees: Vertical sides, flat bottom, circular or square 6-inch minimum planting soil below ball and/or roots, diameter or side dimension 2 feet greater than root system or ball diameter.
- B. Shrubs conform to A above except diameter or side dimension 1 foot greater than ball diameter or root.
- C. Bulbs, bedding plants and ground cover: 12 inches below finished grade.

3.5 PLANTING TREES, SHRUBS, GROUND COVER, BULBS AND BEDDING PLANTS

- A. Use planting soil beneath and around cavity between plant ball or roots and pit sides. Tamp base firmly, place plant or tree, tamp soil in layers, thoroughly water each layer, loosen and fold burlap away from top of ball into pit. Fill balance of cavity with planting soil. Soak and continuously maintain adequate moisture.
- B. Use approved root transplanting compounds and herbicides for bulbs and plants to prevent disease and assure best plant growth.
- C. Leave watering "saucers" around each plant.
- D. Support trees immediately after planting by staking and/or guying to maintain trees in plumb position.
- E. Apply mulch where shown or noted on the Drawings. Mulch depth 3 inches unless otherwise noted.
- F. Fertilize all trees, shrubs and ground covers at time of planting.

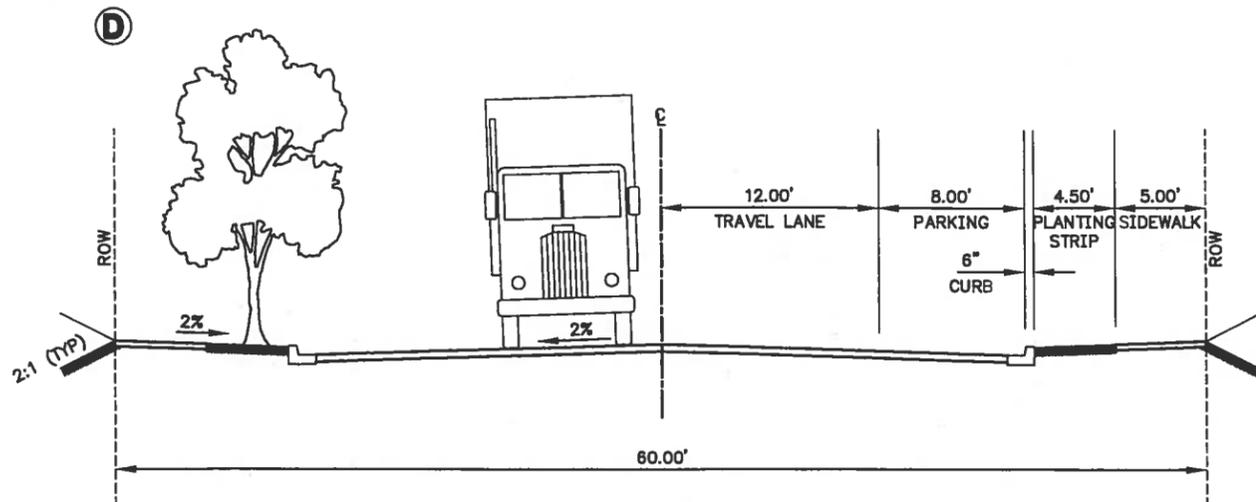
3.6 FINAL INSPECTION

- A. Final inspection for seeded areas will not be made until thirty (30) days following completion of all seeding, fertilizing, and mulching as specified. Damage caused by the Contractor to areas that have been seeded or sodded shall be repaired and/or replaced by the Contractor at his own expense.

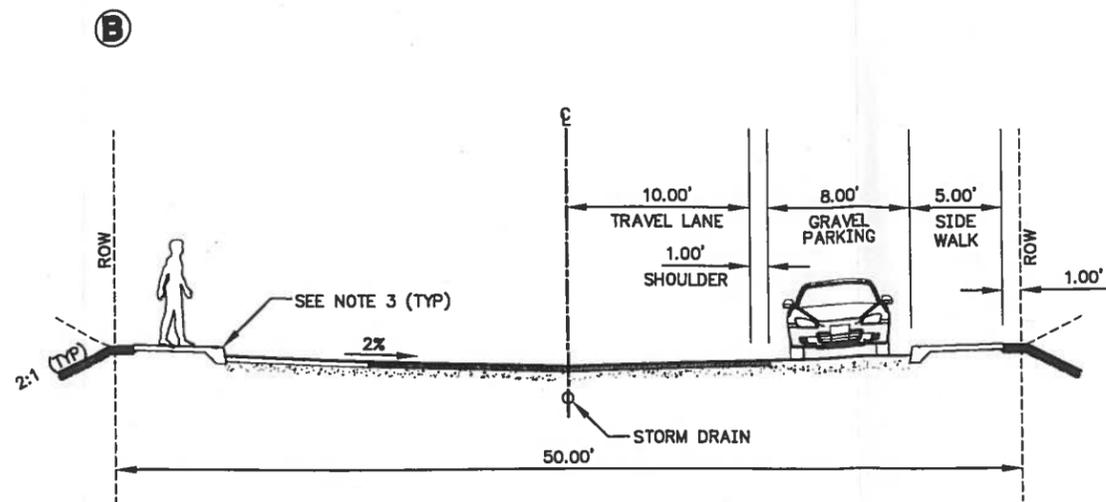
3.7 GUARANTEE

- A. Guarantee of planting and seeding shall continue for one year from date of final project acceptance. Contractor shall replace all plants or sod dead or dying within the guarantee period, or reseed lawns and cover crop where required. Guarantee shall include both materials and labor. Replacements shall be the same as originally planted.

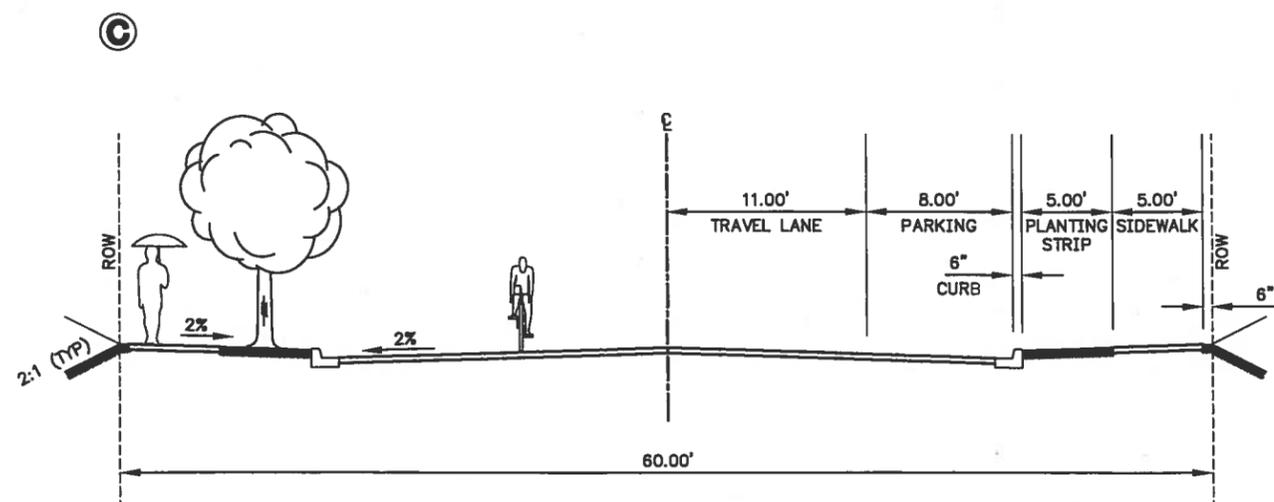
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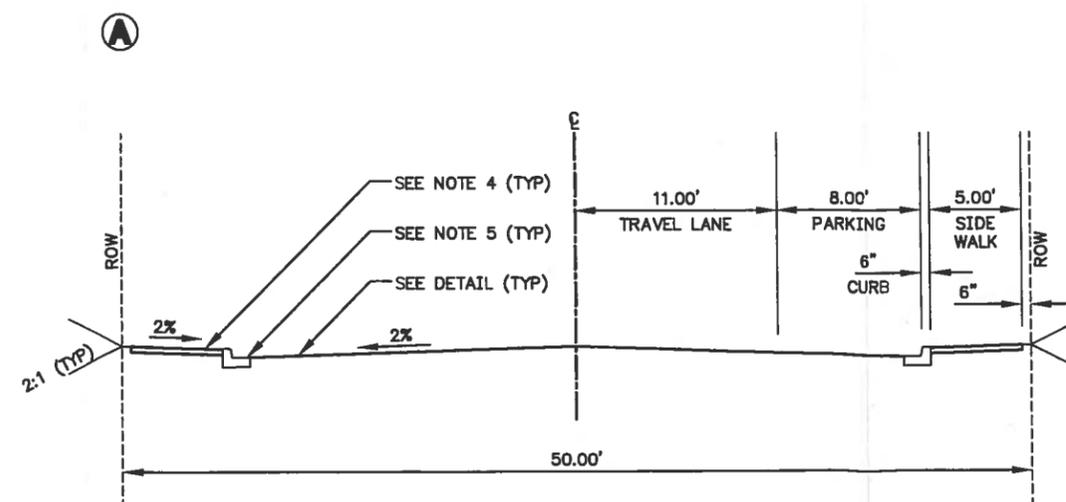
COMMERCIAL AND INDUSTRIAL ACCESS STREETS



RESIDENTIAL ACCESS STREETS



COLLECTOR STREETS



MINIMUM DESIGN STANDARDS FOR RESIDENTIAL ACCESS STREET FOR FULL PLAT

NOTES:

1. USE WSDOT STANDARD PLANS FOR GEOMETRY AND DIMENSIONS, EXCEPT AS MODIFIED HEREIN.
2. GRADES SHALL NOT EXCEED 15 PERCENT EXCEPT WITHIN APPROVED HILLSIDE SUBDIVISIONS.
3. WSDOT STANDARD PLAN F-3, MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK.
4. WSDOT STANDARD PLAN F-3, CEMENT CONCRETE SIDEWALK.
5. WSDOT STANDARD PLAN F-1, CEMENT CONCRETE TRAFFIC CURB AND GUTTER.
6. AT RESIDENTIAL STREET INTERSECTIONS, INSTALL SIDEWALK BULBS USING A 20-FOOT RADIUS. SEE WSDOT SIDEWALK DETAILS: A GUIDE FOR WASHINGTON LOCAL AGENCIES AND TRIBES, MAY 2000, FIGURE 2-8C, AND ADAPT IT TO THESE STREET STANDARDS. SEE NOTE 8 FOR RAMPS.
7. AT ALL OTHER INTERSECTIONS, PROVIDE A 20-FOOT CURB RETURN RADIUS AND RESTRICT PARKING NEAR THE INTERSECTION IN ORDER TO PROVIDE AN APPROPRIATE LINE OF SIGHT TO SIDEWALK USERS WHO ARE NEARING THE CROSSWALK.
8. INSTALL SIDEWALK RAMPS AT ALL INTERSECTIONS. USE WSDOT STANDARD PLAN F-3B, MODIFIED TO FIT EACH INTERSECTION CONDITION. FOR INSTANCE, AT AN ARTERIAL INTERSECTION, THE RAMP GEOMETRICS WILL ENCROUGH UPON THE PLANTING STRIP IN ORDER TO MAINTAIN A 60-FOOT RIGHT-OF-WAY (ROW).
9. INSTALL DRIVEWAYS ACCORDING TO WSDOT STANDARD PLAN F-4, TYPE 4; MODIFY TO INTEGRATE WITH THESE STREET STANDARDS.

Current code for

300408-DE Manual Update 2006 Manual (RoadProfile.dwg) 1:1 2/25/04 05-19-06

No.	Date	By	Clk.	Appr.	Revision

CHS 12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500

CHS ENGINEERS, LLC TEL (425) 637-3693 FAX (425) 637-3694

Drawn By N.H	Date 05-06	Checked By SG	Date 05-06
Designed By DJ	Date 05-06	Approved By SG	Date 05-06

Scale:
Horiz. 1"=5'
Vert. N/A
Job No.
200408

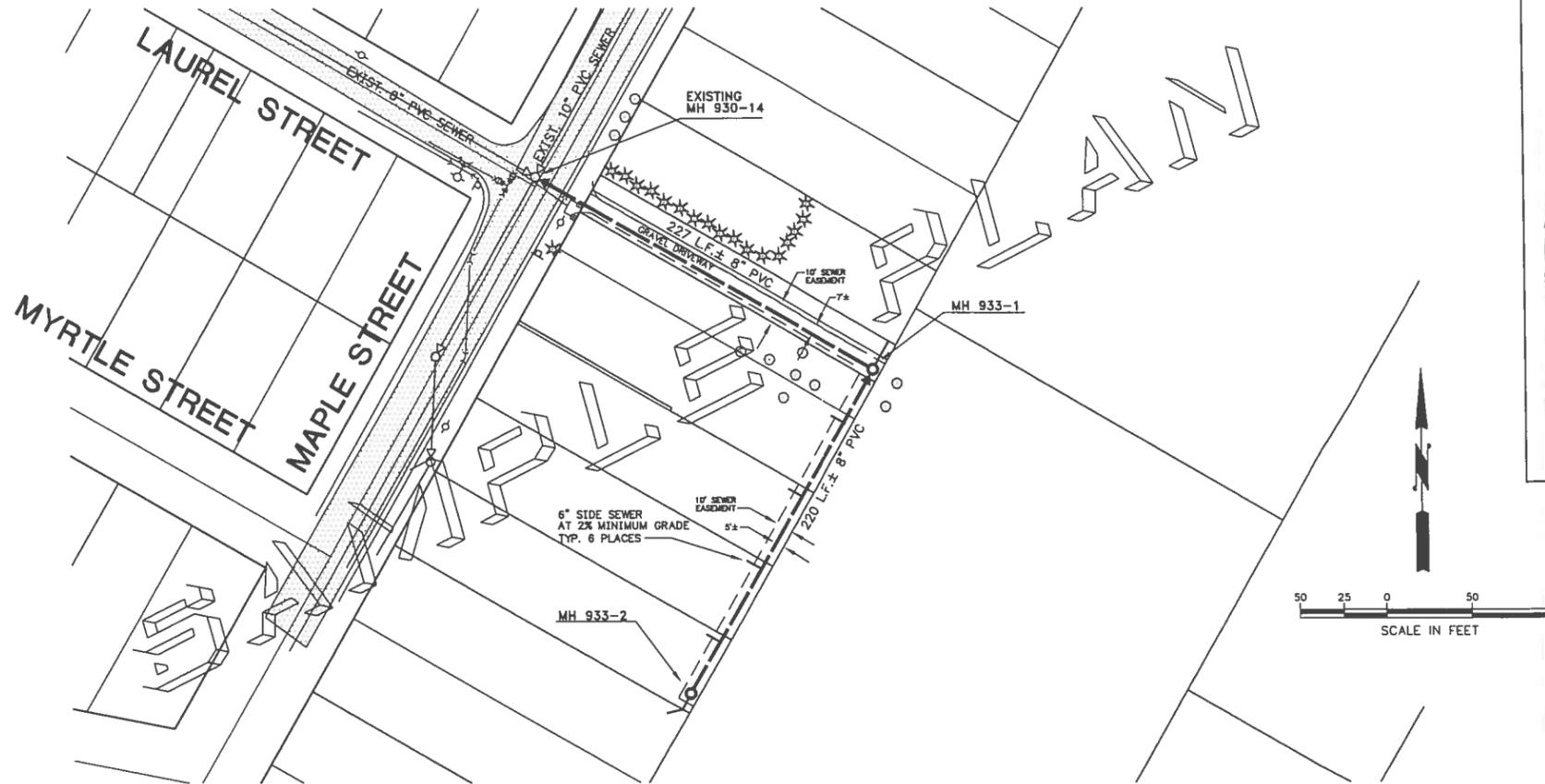
TOWN OF LA CONNER
ROADWAY SECTIONS

Sheet **NO.**
Of **NO.**
NO.

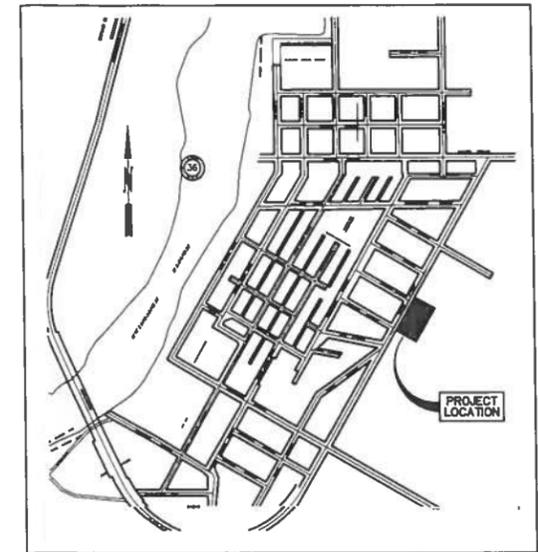
GENERAL NOTES

USE THE NOTES PROVIDED IN THE PROJECT MANUAL.

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON



SEWER PLAN
SCALE 1" = 50'

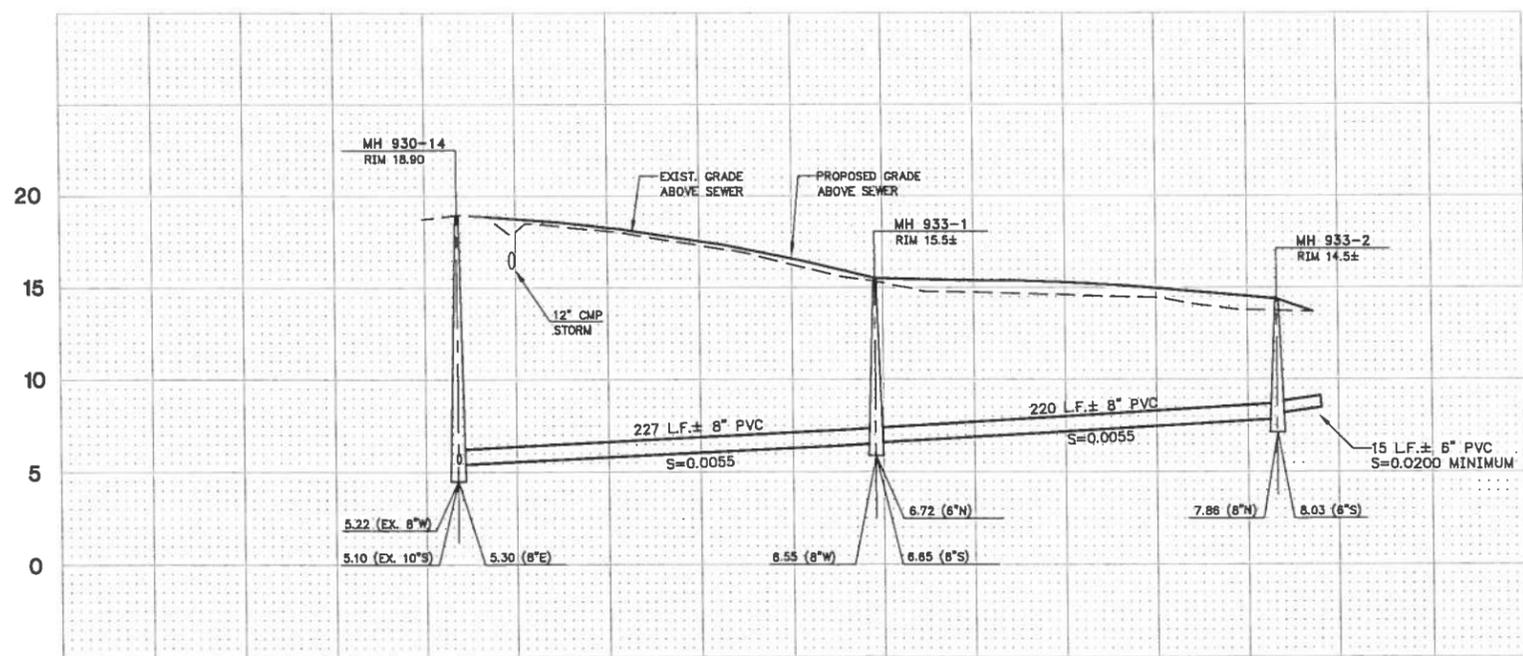


VICINITY MAP

NOT TO SCALE

LEGEND

- GRAVEL
- EXIST. ASPHALT PAVEMENT
- EXIST. DITCH LINE
- EXIST. FENCE LINE
- EXIST. SEWER LINE
- EXIST. WATER LINE
- PROPOSED SEWER LINE
- EXIST. CULVERT
- FIRE HYDRANT (FH)
- WATER VALVE (WV)
- BLOW-OFF ASSEMBLY
- PROPOSED WATER SERVICE
- EXISTING WATER SERVICE
- EXIST. UTILITY POLE
- EXIST. ROAD SIGN
- EXIST. TREES
- EXIST. UTILITY BOX



SEWER PROFILE
SCALE HORIZ 1" = 50'
VERT 1" = 5'

DRAFTING NOTES

1. STANDARD SHEET SIZE 22"x34"
2. MANHOLE NUMBERS ASSIGNED BY TOWN
3. SCALES HORIZONTAL 1"=50 TO 1"=20'
VERTICAL 1"=5 OR 1"=10'

No.	Date	By	Ckd	Revision

TOWN OF
LA CONNER



CHS ENGINEERS, LLC
12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chsengineers.com

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

PROJECT NAME
SANITARY SEWER
PLAN AND PROFILE



NAVD 88
LIST BENCHMARK LOCATION
AND ELEVATION

CALL 2 BUSINESS DAYS BEFORE YOU DIG
1-800-424-5555

APPROVED BY TOWN PUBLIC WORKS DEPT.
BY _____ DATE _____

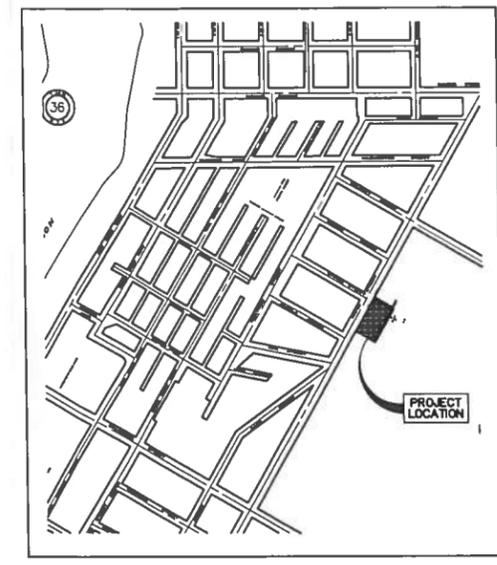
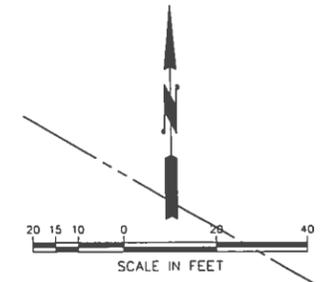
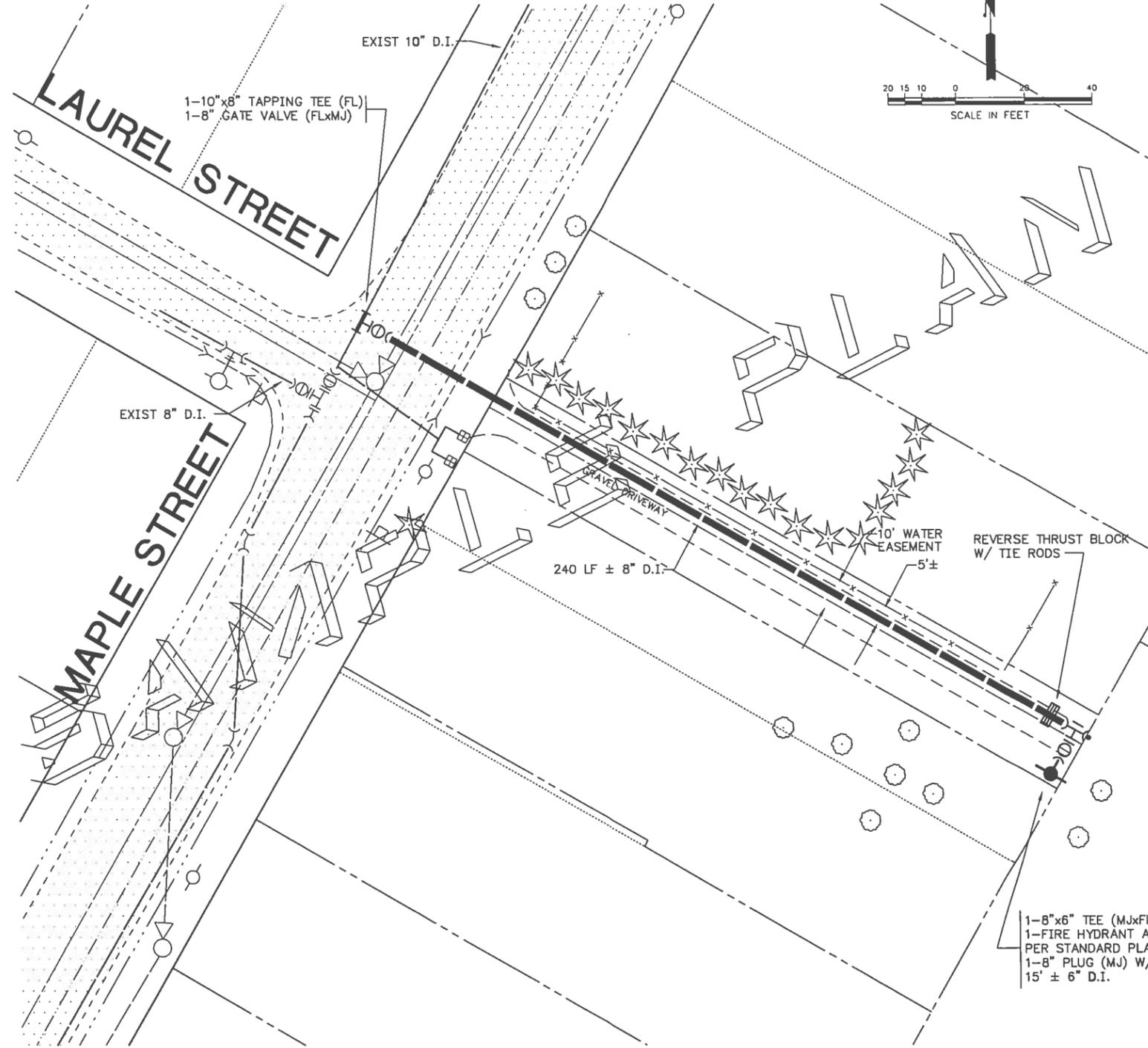
Scale: Horiz. 1"=50' Sheet 1
Vert. 1"=5' Of -
Job No. DE #

NUMBER - NAME - I.I. 22-34 XX-XX-07

GENERAL NOTES

A PORTION OF SECTION _____, TOWNSHIP _____ NORTH, RANGE _____ EAST, W.M., SKAGIT COUNTY, WASHINGTON

USE THE NOTES PROVIDED IN THE DEVELOPER MANUAL.



VICINITY MAP
NOT TO SCALE

LEGEND

	EXIST. DRIVEWAY / ACCESS
	EXIST. ASPHALT PAVEMENT
	EXIST. DITCH LINE
	EXIST. FENCE LINE
	EXIST. SEWER LINE
	EXIST. WATER LINE
	PROPOSED WATER LINE
	EXIST. CULVERT
	FIRE HYDRANT (FH)
	WATER VALVE (WV)
	BLOW-OFF ASSEMBLY
	PROPOSED WATER SERVICE
	EXISTING WATER SERVICE
	EXIST. UTILITY POLE
	EXIST. ROAD SIGN
	EXIST. TREES
	EXIST. UTILITY BOX



NAVD 88
LIST BENCHMARK LOCATION AND ELEVATION

WATER PLAN
SCALE 1" = 50'

DRAFTING NOTES

- STANDARD SHEET SIZE 22"x34"
- SCALES HORIZONTAL 1"=50 TO 1"=20'

No.	Date	By	Chd	Revision

TOWN OF
LA CONNER



CHS
CHS ENGINEERS, LLC
12507 BEL-RED ROAD SUITE 101
BELLEVUE, WA 98005-2500
TEL (425) 837-3693 - FAX (425) 837-3694
www.chsengineers.com

Drawn / Date	Designed / Date	Checked / Date
XX / -07	XX / -07	XX / -07

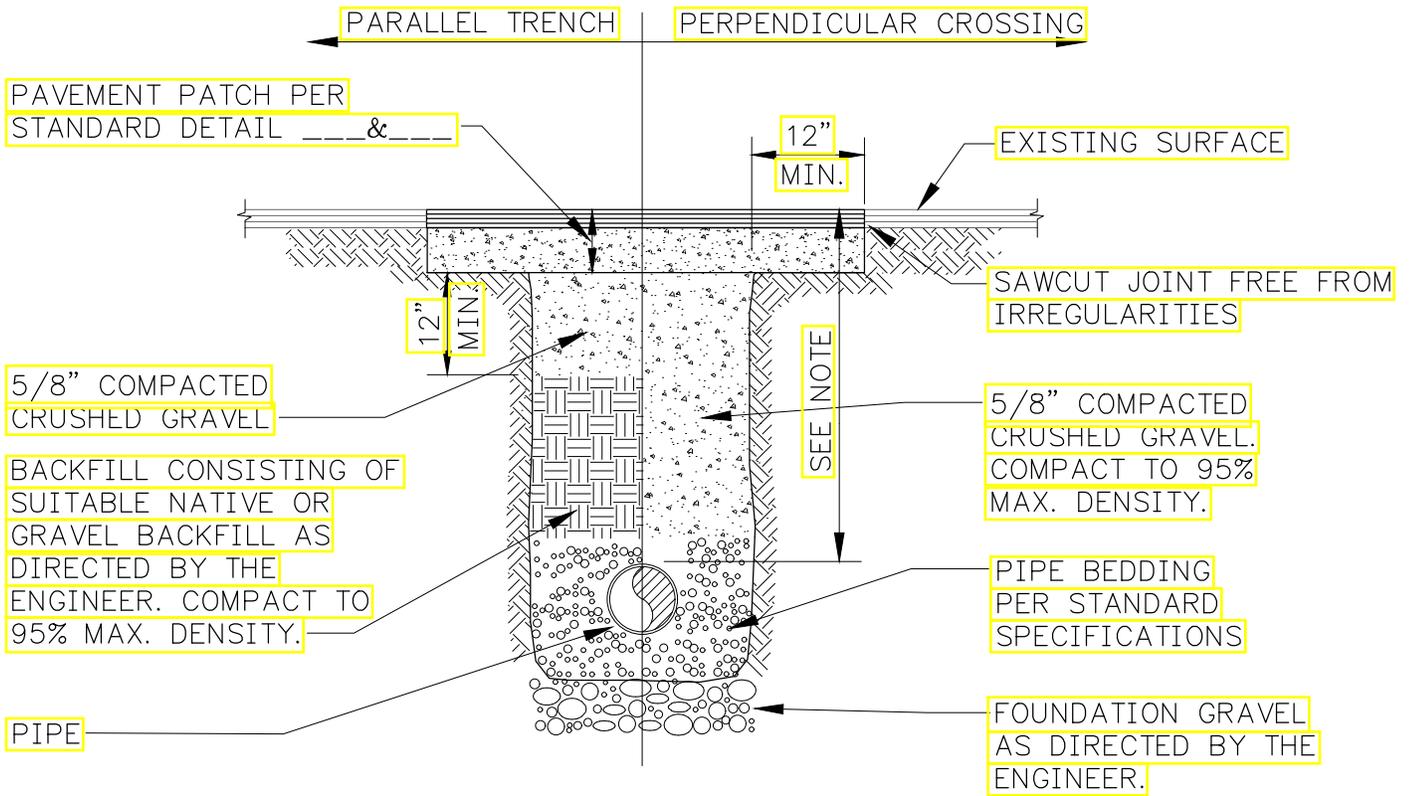
PROJECT NAME
WATER PLAN

Scale:	Sheet 1
Horiz. 1"=50'	Of -
Vert. 1"=5'	Of -
Job No.	DE #

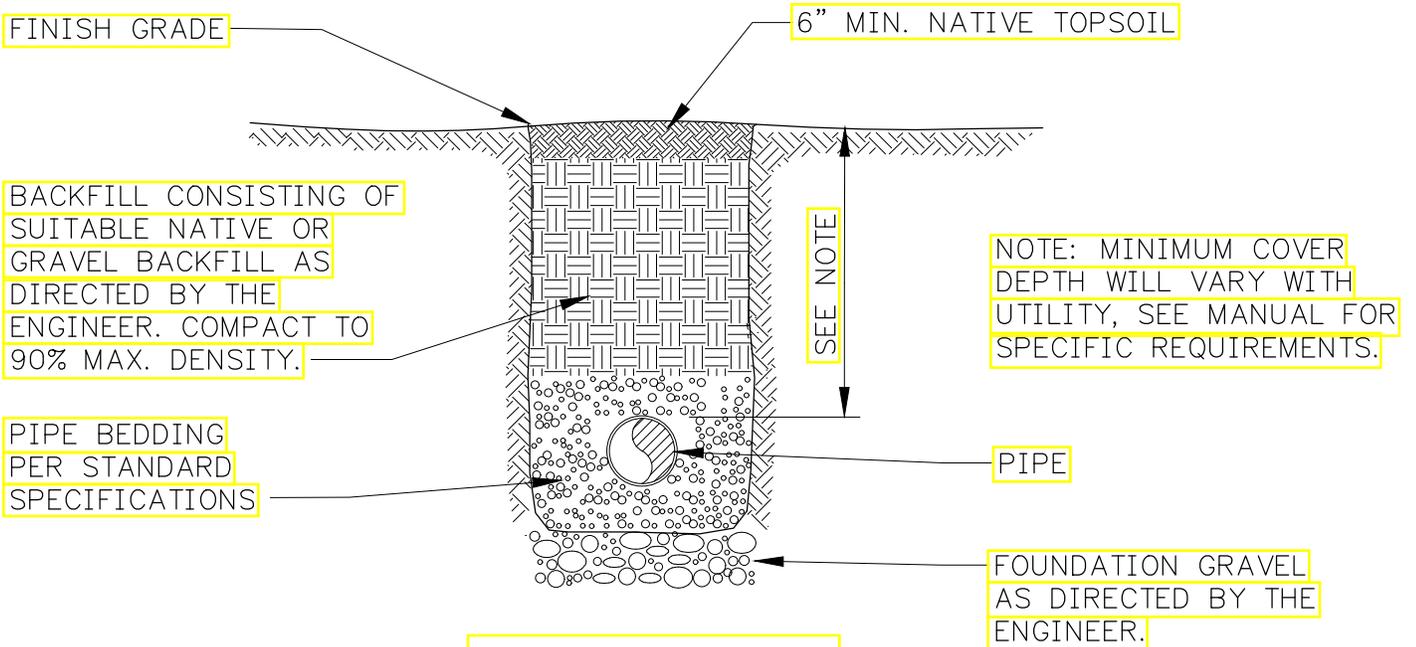
CALL 2 BUSINESS DAYS BEFORE YOU DIG
1-800-424-5555

APPROVED BY TOWN PUBLIC WORKS DEPT.
BY _____ DATE _____

NUMBER - NAME OF - 1:1 22x34 XX-XX-07

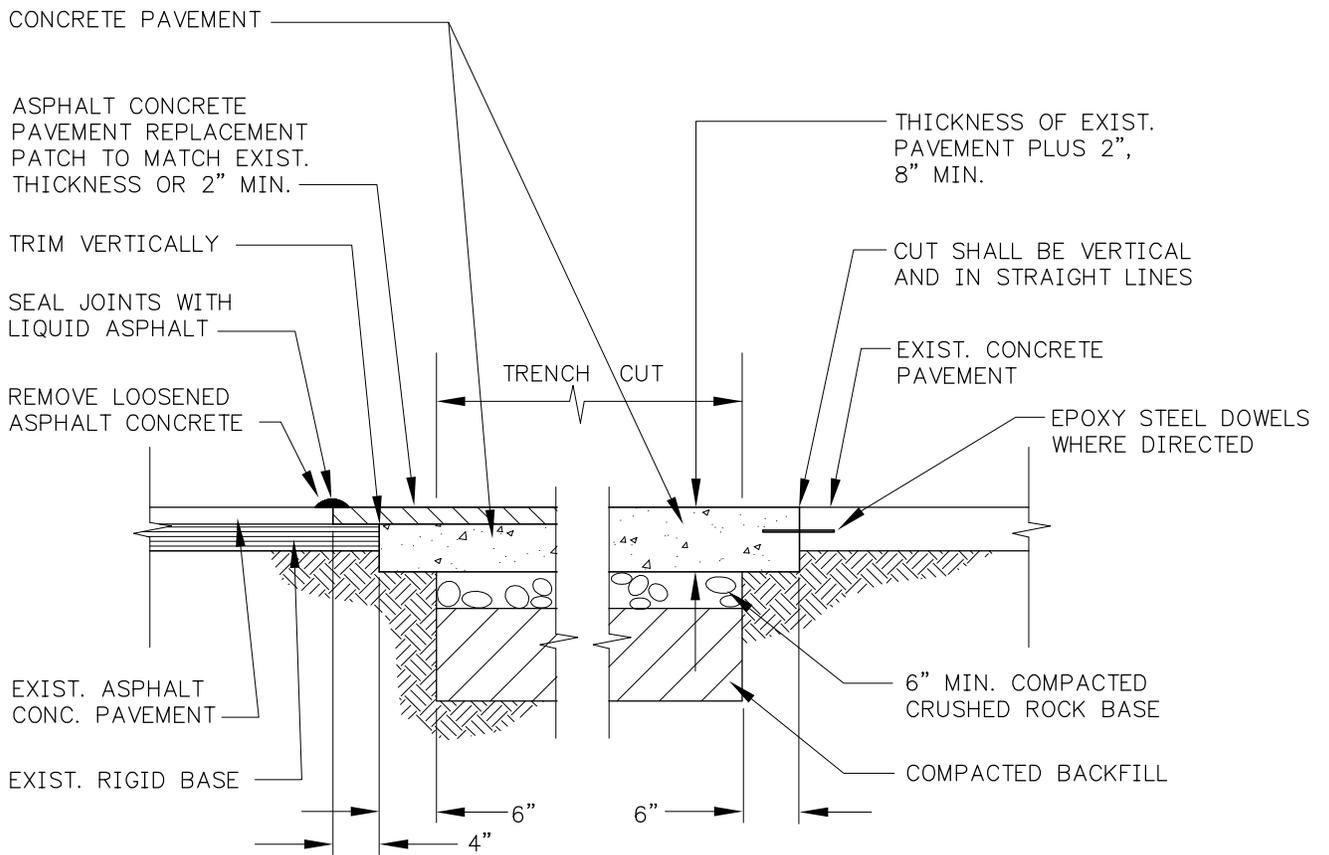


**PAVEMENT REPAIR SECTION
TRENCH SECTION IN ROADWAY**



**TRENCH SECTION
IN UNIMPROVED AREAS**

G1 **TYPICAL TRENCH SECTION**



**RIGID PAVEMENT WITH
ASPHALTIC CONCRETE SURFACE**

CEMENT CONCRETE PAVEMENT

NOTE: TRENCHING THROUGH EXISTING CONCRETE ROADWAY PANELS WILL REQUIRE REPLACEMENT OF FULL PANEL TO NEAREST COLD JOINT. MINIMUM HALF-PANEL REPLACEMENT WITH DOWELS REQUIRES PRIOR APPROVAL FROM TOWN.

G2 RIGID PAVEMENT PATCHING

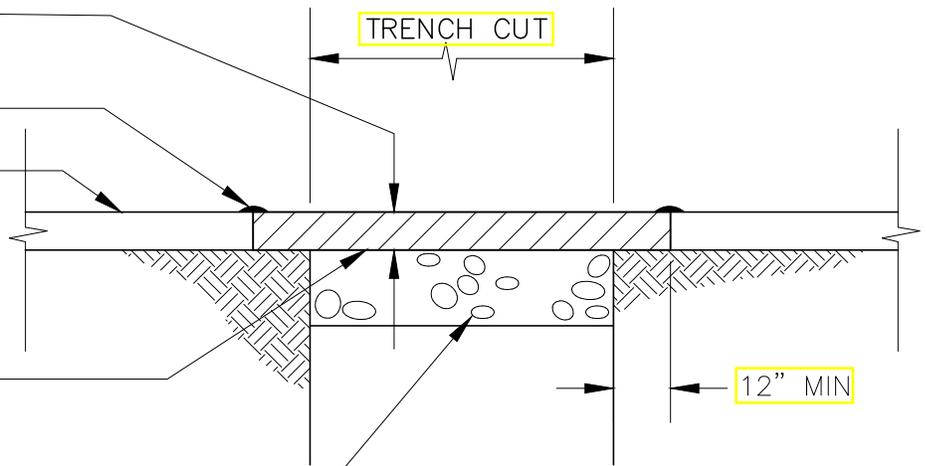
TOTAL THICKNESS TO EQUAL
OR EXCEED EXIST. PAVEMENT
THICKNESS, 4" MIN.

SEAL JOINTS WITH LIQUID
ASPHALT (TYP.)

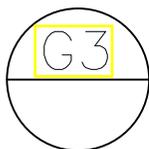
EXIST. A.C. SURFACING

4" MIN. ASPHALT
CONCRETE PATCH

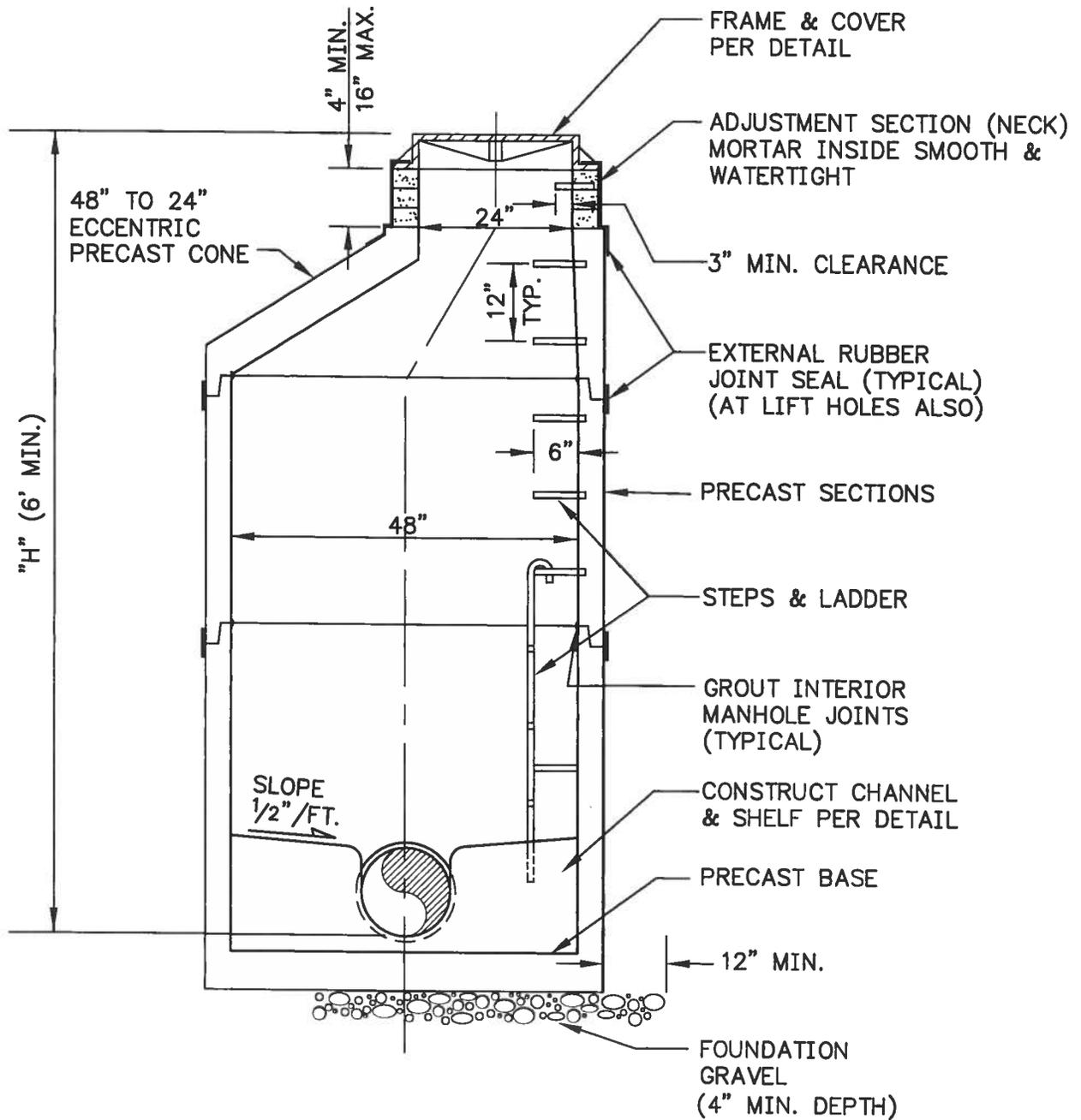
CRUSHED ROCK BASE,
6" MIN. OR THICKNESS
OF EXIST. BASE



NOTE: ASPHALT TREATED BASE MAY BE SUBSTITUTED FOR THE FIRST LIFT
ASPHALT CONCRETE AND CRUSHED BASE. SEE SPECIFICATIONS.



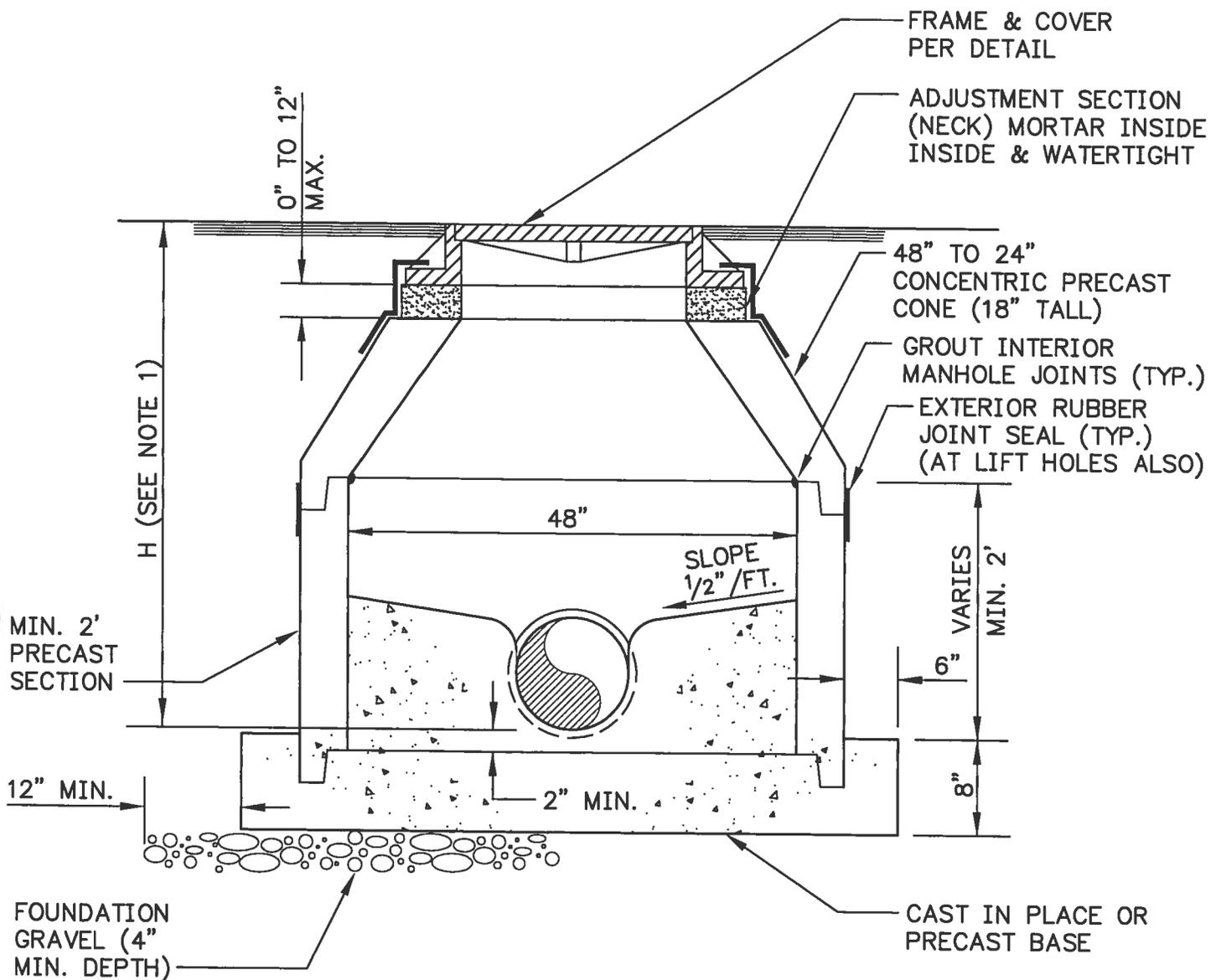
ASPHALT CONCRETE PATCHING



NOTES:

1. WALL OPENING REQUIREMENTS FOR PIPE:
 - A. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR.
 - B. 8" MINIMUM BETWEEN HOLES
 - C. MAXIMUM PIPE SIZE 21"

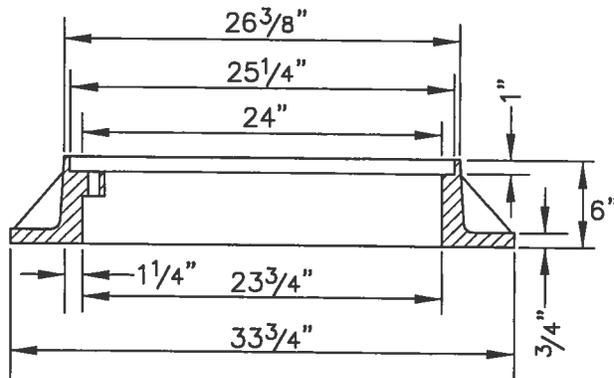
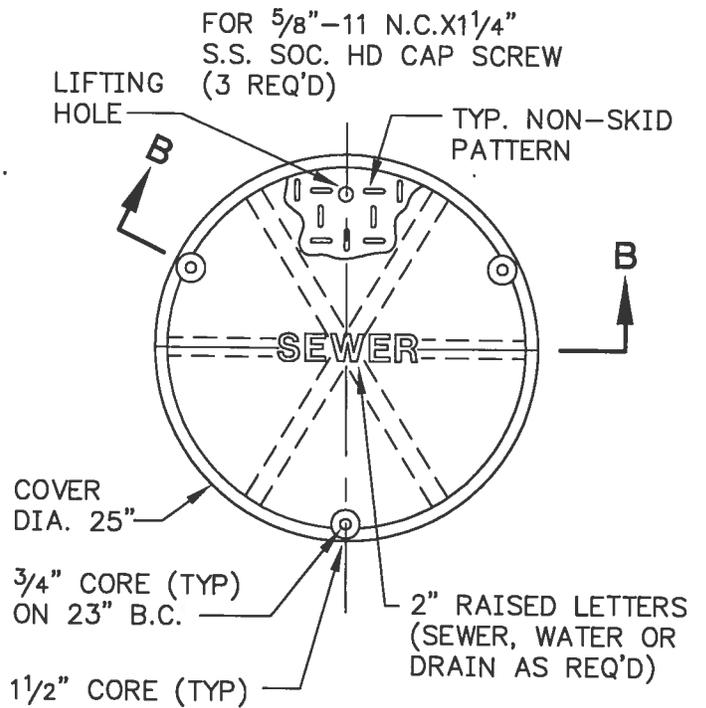
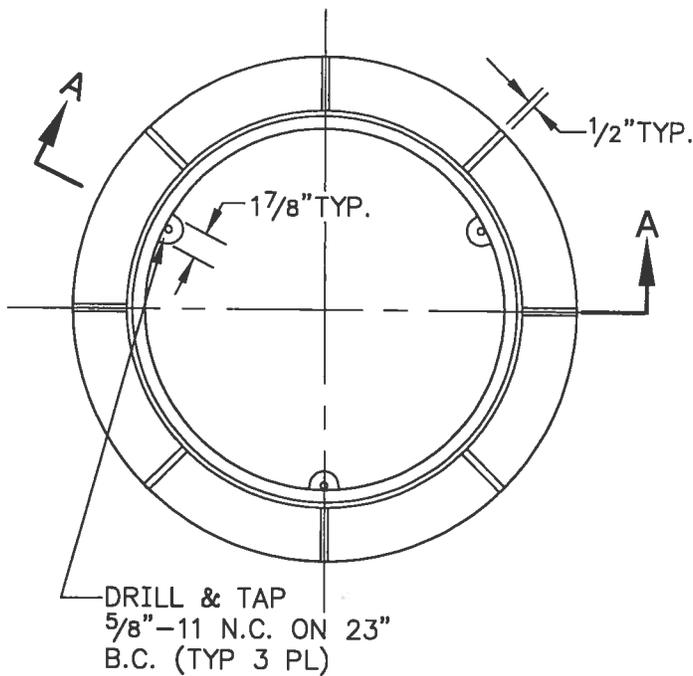
S1 TYPE I - 48" MANHOLE



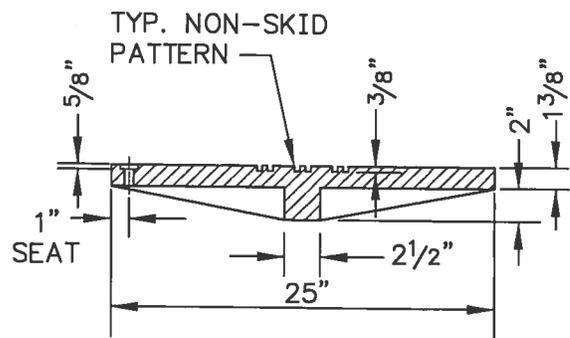
NOTES:

1. MAXIMUM H IS 5'. MINIMUM H IS 3'-8"
2. TO BE USED ONLY WITH PRIOR AUTHORIZATION
3. MAXIMUM PIPE SIZE 12"
4. HOLE SIZE AS REQUIRED FOR KOR-N-SEAL WEDGE KORBAND PIPE CONNECTOR OR GASKETED COLLAR
5. EXTERNAL JOINT SEAL SHALL BE "BEST SEAL" OR APPROVED EQUAL

S2 TYPE IIIA - 48" MANHOLE



SECTION A-A

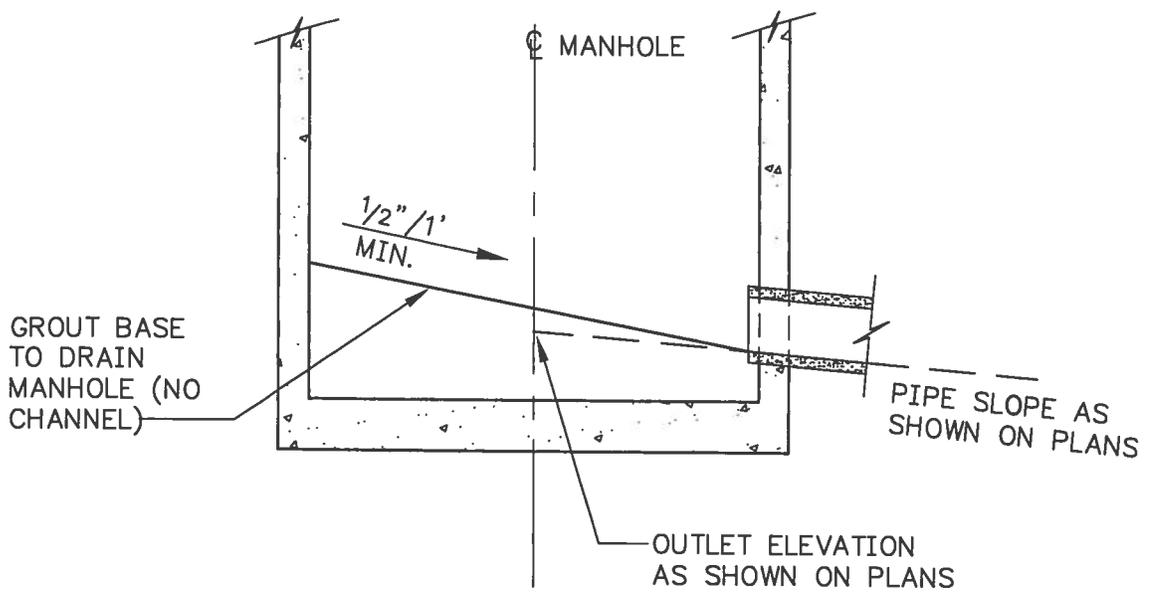


SECTION B-B

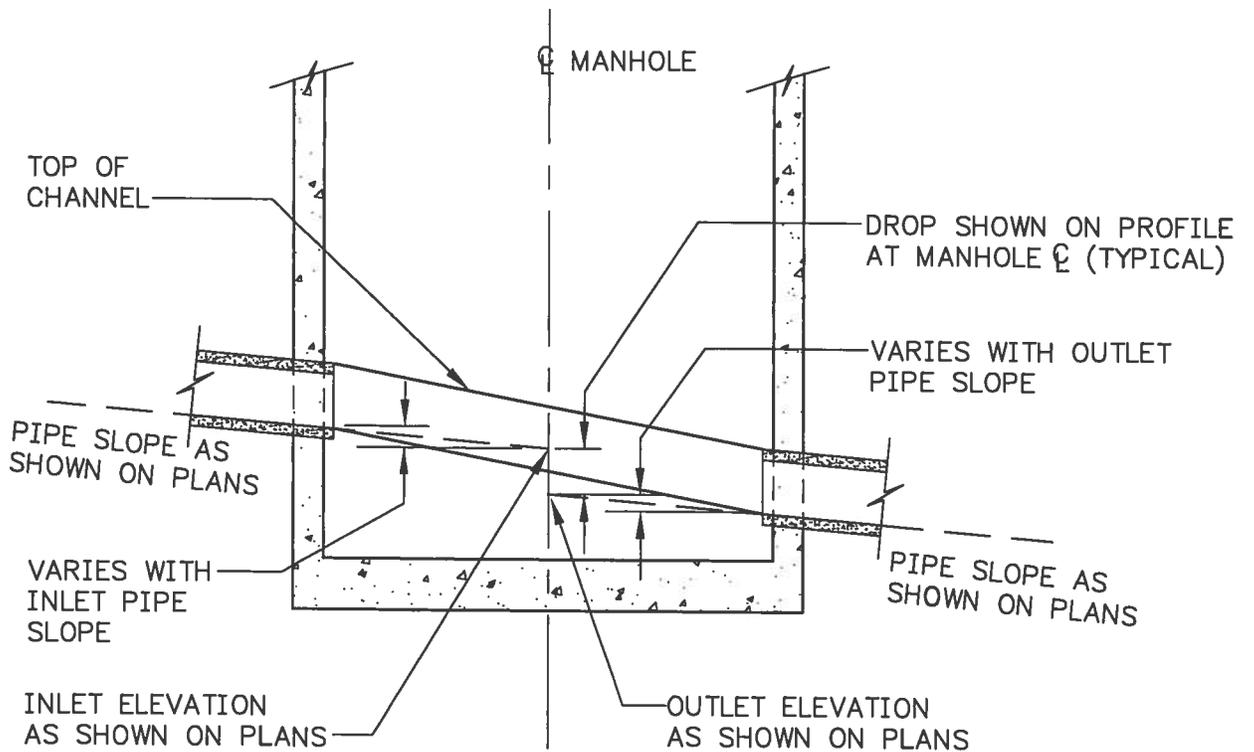
NOTES:

1. DRILL LUG HOLES FULL DEPTH
2. BOLT COVER TO LUGS IN RING
3. PROVIDE 7/8" LIFTING HOLE
4. DUCTILE IRON COVER, CAST IRON FRAME, SS HEX CAP SCREWS
5. SEE SPECIFICATION O2605 FOR ADDITIONAL REQUIREMENTS
6. FRAME AND COVER PER APWA

S3 MANHOLE FRAME AND COVER

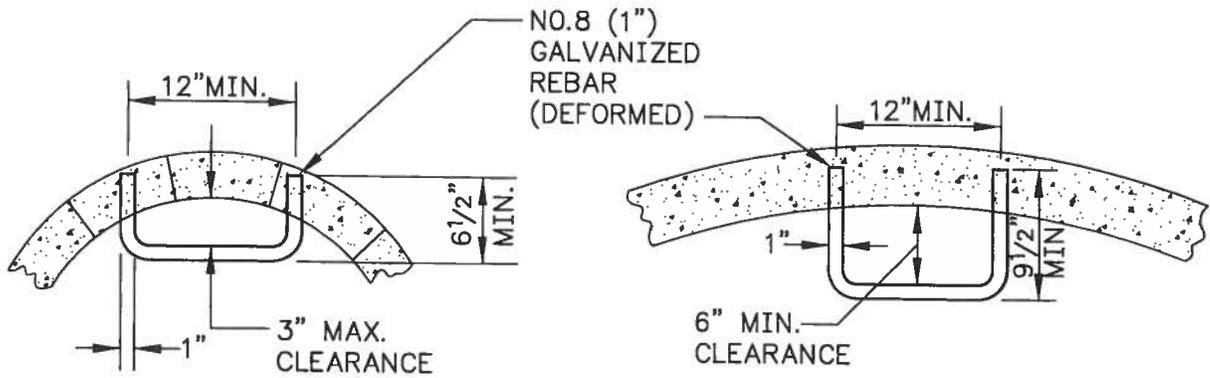


TERMINAL MANHOLE



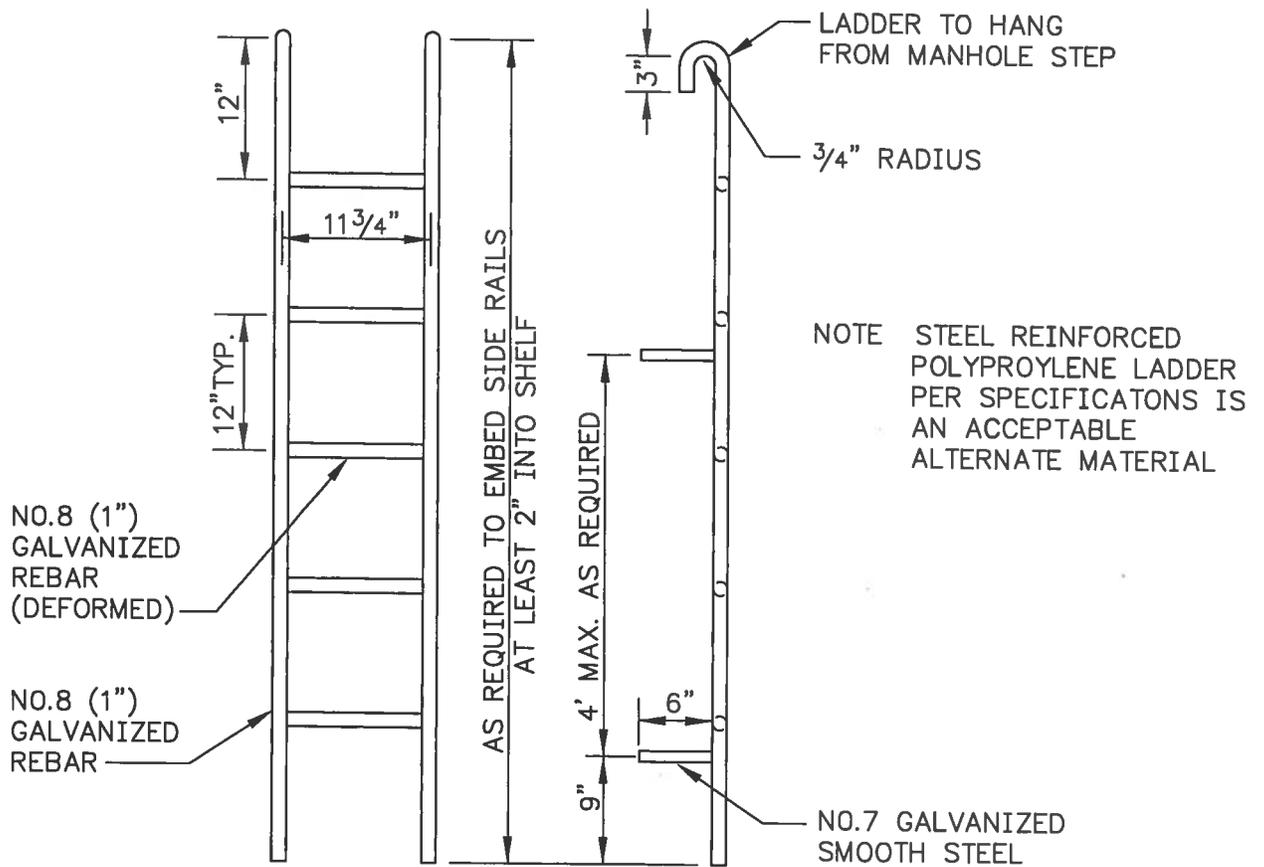
MAIN-LINE MANHOLE

S4 MANHOLE CHANNELING



ADJUSTMENT RING HAND HOLD

TYPICAL MANHOLE STEP

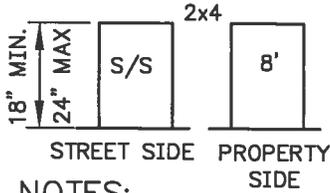
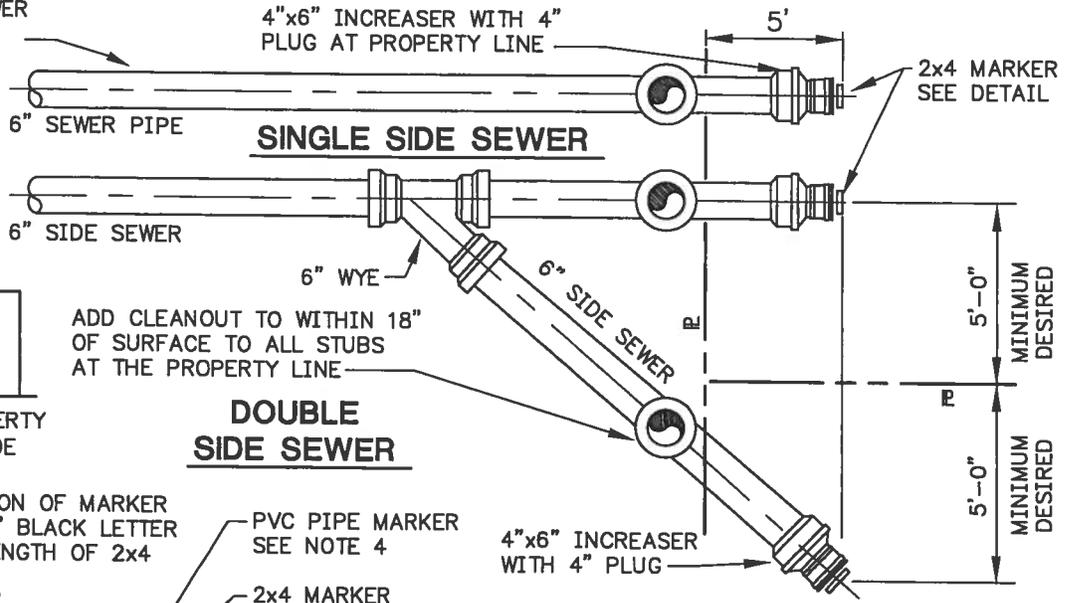


PREFABRICATED LADDER

NOTE STEEL REINFORCED
POLYPROPYLENE LADDER
PER SPECIFICATONS IS
AN ACCEPTABLE
ALTERNATE MATERIAL

S5 MANHOLE STEPS AND LADDER

LOCATION OF SIDE SEWER TO BE SET IN FIELD



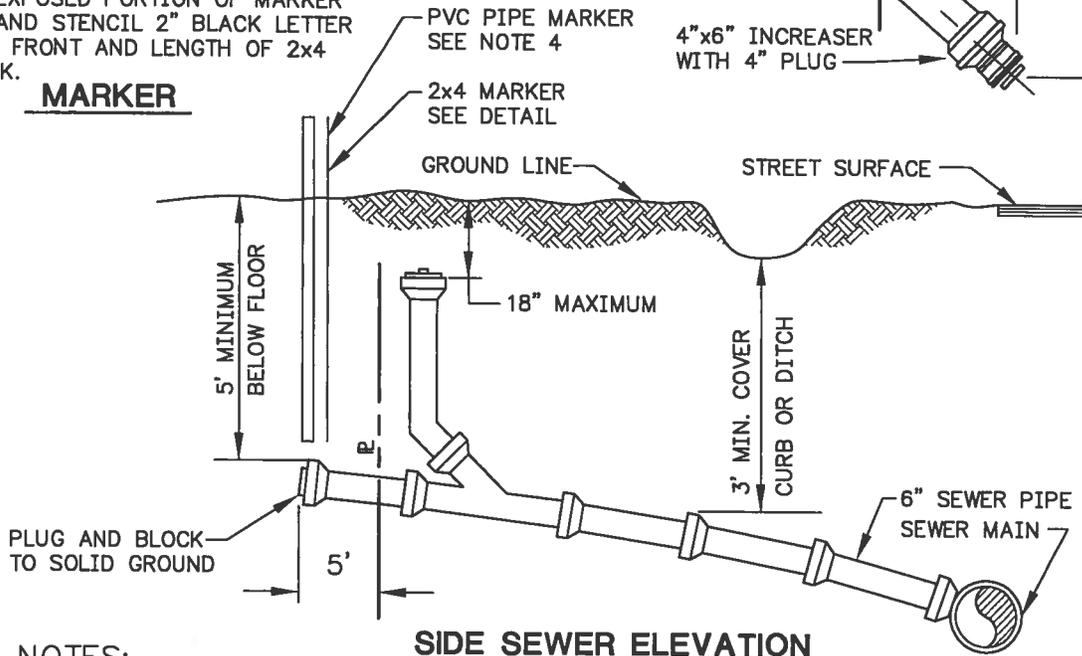
ADD CLEANOUT TO WITHIN 18" OF SURFACE TO ALL STUBS AT THE PROPERTY LINE

DOUBLE SIDE SEWER

NOTES:

PAINT EXPOSED PORTION OF MARKER WHITE AND STENCIL 2" BLACK LETTER S/S ON FRONT AND LENGTH OF 2x4 ON BACK.

MARKER

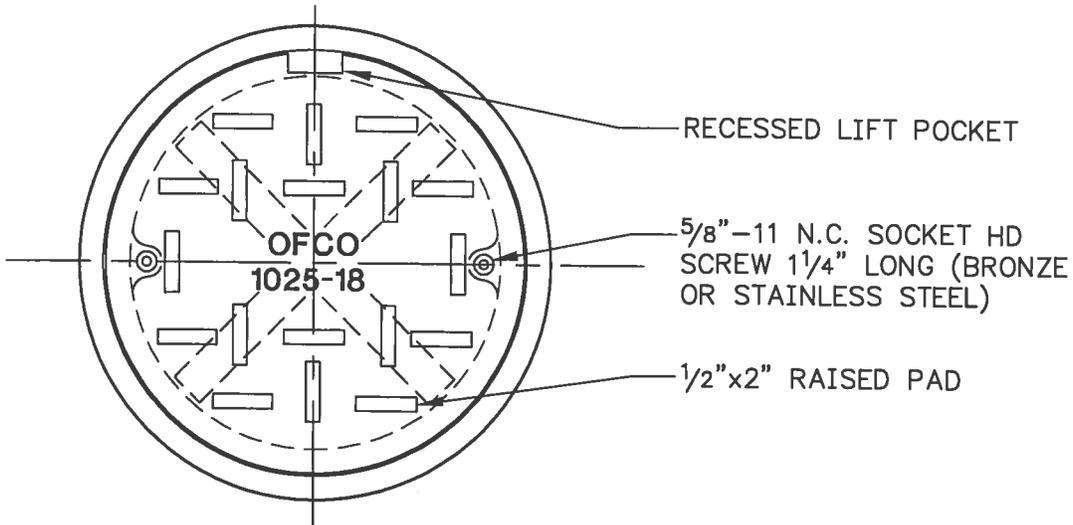


NOTES:

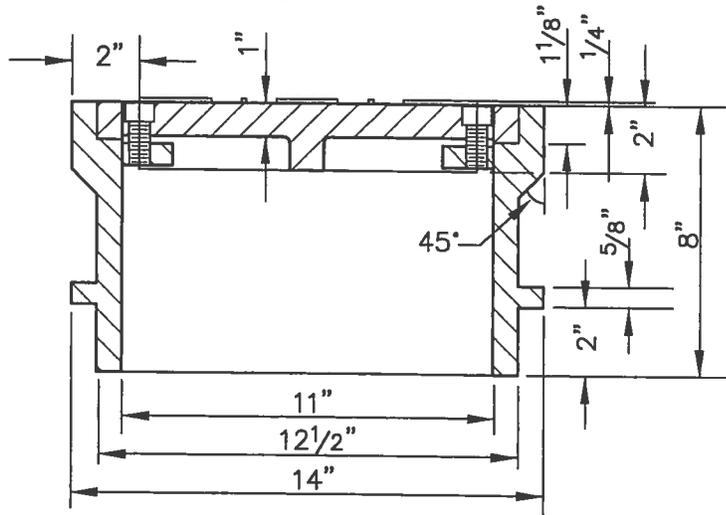
SIDE SEWER ELEVATION

1. UNLESS OTHERWISE SHOWN ON PLAN, SIDE SEWER SHALL BE SLOPED 2% UP FROM SEWER LINE OR SHALL BE MIN. 5' COVER AT PROPERTY LINE OR 3.5' LOWER THAN THE LOWEST HOUSE ELEVATION, WHICHEVER IS LOWER.
2. 6" MINIMUM SIZE PIPE TO PROPERTY LINE. MAXIMUM DEFLECTION PER JOINT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. MAXIMUM SLOPE = 2 VERTICAL : 1 HORIZONTAL
4. MINIMUM SLOPE = 2%
5. A 1 1/4" WHITE PVC PIPE, ASTM 2241 SDR 21 200 PSI SHALL BE PLACED VERTICALLY AT THE END OF EACH STUB AND SHALL RISE TWO FEET ABOVE FINISH GRADE LEVEL OR AS APPROVED BY SWSSD. BOTH ENDS OF THE PVC PIPE SHALL HAVE CAPS GLUED ON AND THE PIPE INTERIOR KEPT CLEAN FOR THE PURPOSE OF FUTURE DEPTH MEASUREMENT.
6. PIPE SHALL BE PVC ASTM D3034.

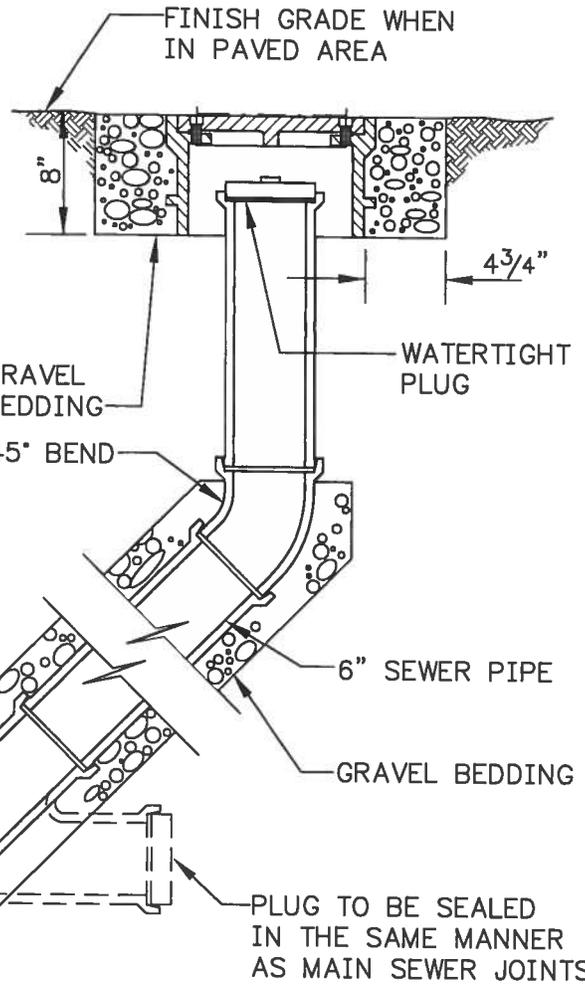
S6 STREET SIDE SEWER



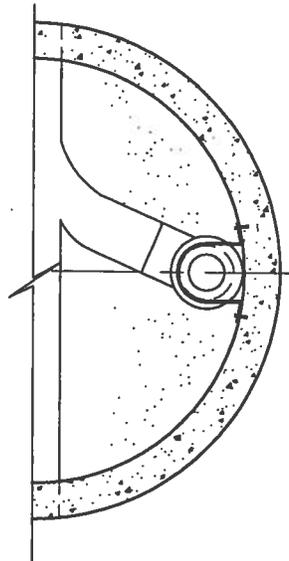
PLAN



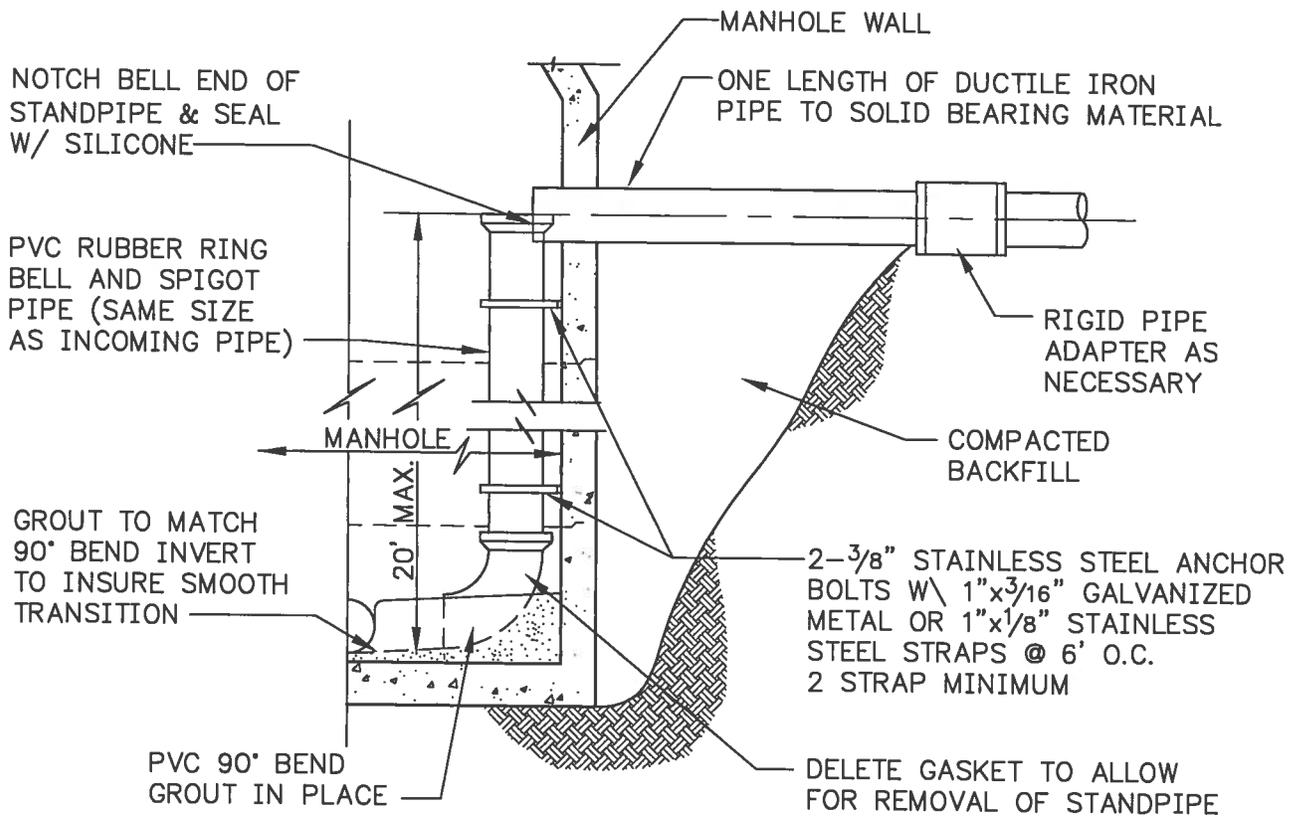
**ELEVATION
CAST IRON RING AND COVER**



S7 SEWER CLEANOUT



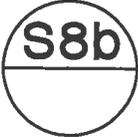
PLAN

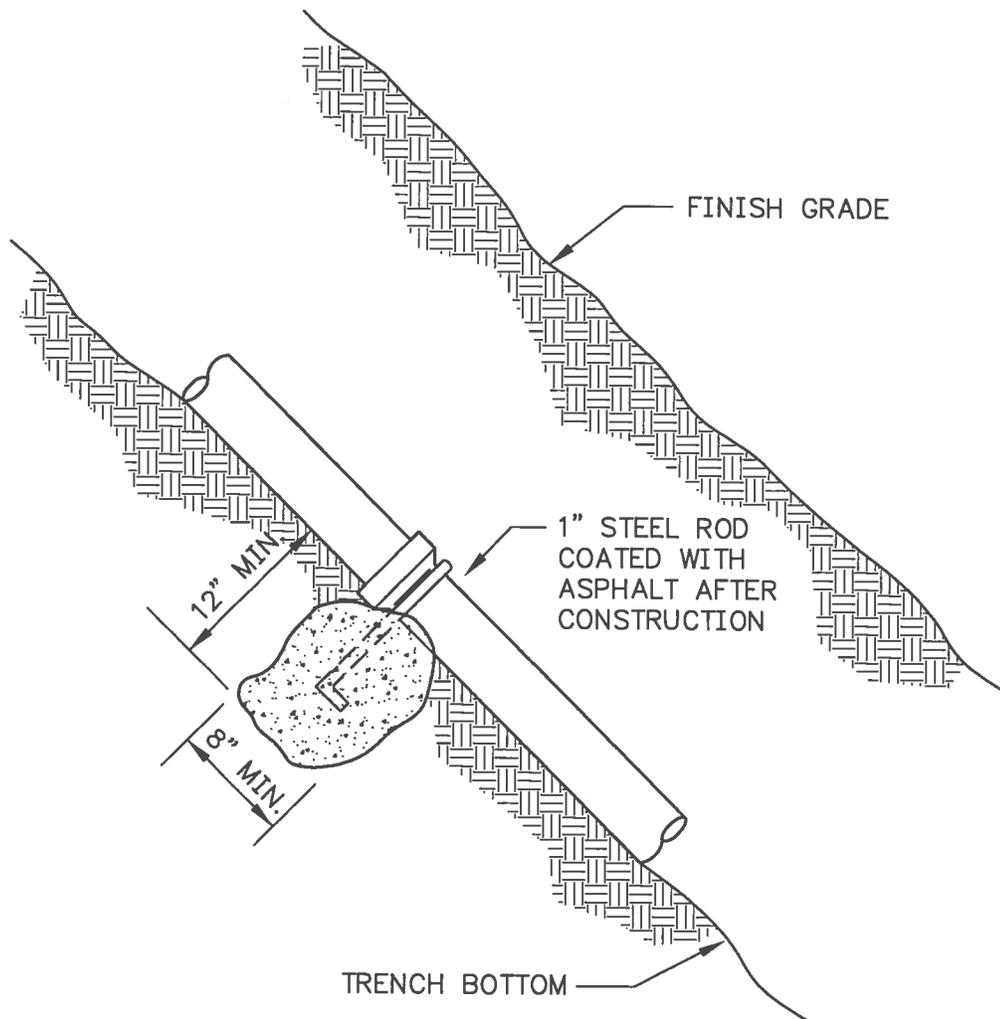


ELEVATION

NOTE: THIS ASSEMBLY TO BE USED ONLY WITH SPECIFIC AUTHORIZATION

**INSIDE DROP
MANHOLE CONNECTION**

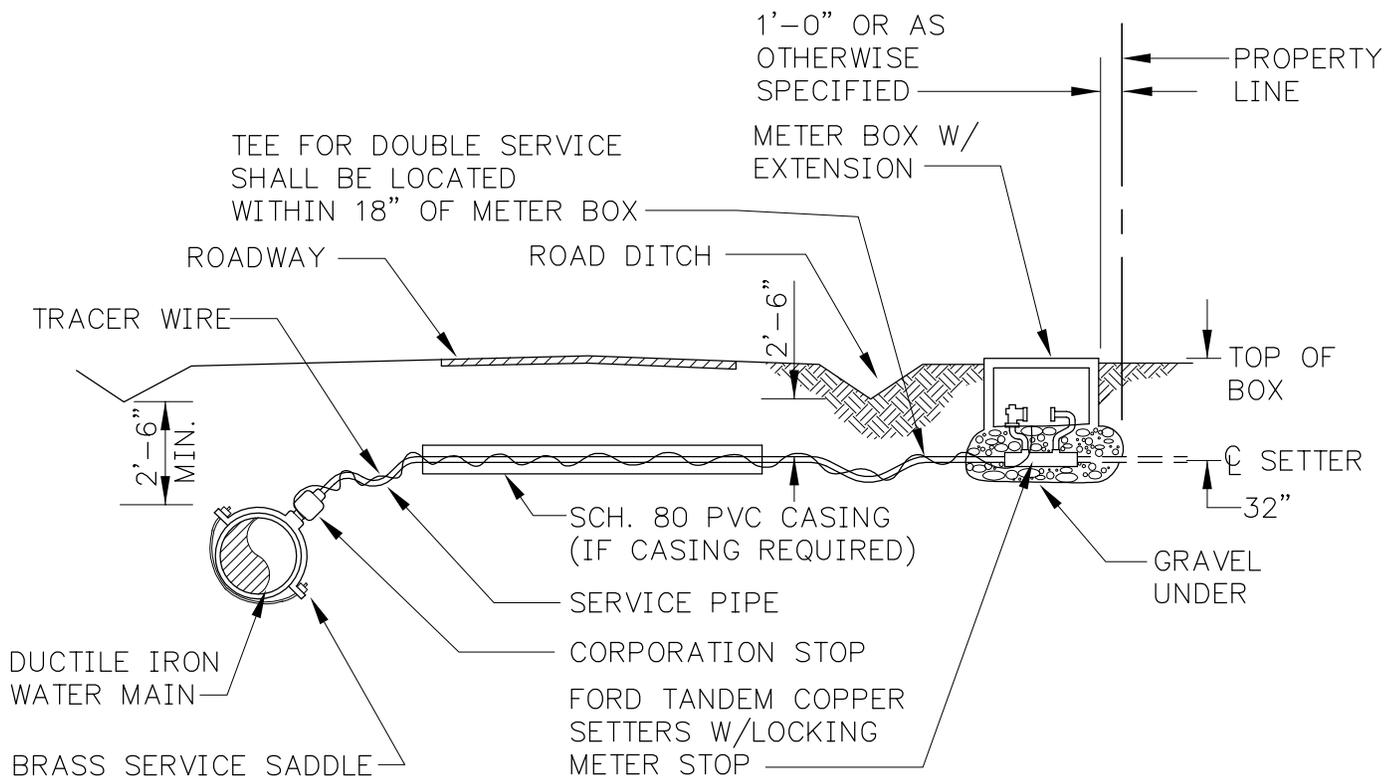




NOTES:

1. POUR BLOCKING AGAINST UNDISTURBED SOIL.
2. MINIMUM STRENGTH OF CONCRETE TO BE 2500 PSI.
3. MINIMUM SPACING BETWEEN ANCHORS TO BE 36' ON GRADES OF 20-30%, 20' ON GRADES OF 35-50%, AND 16' ON GRADES OVER 50%.

S9 PIPE ANCHOR



PARTS FOR SINGLE SERVICE

- 1- $\frac{3}{4}$ " IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 1- $\frac{3}{4}$ " BRASS MALE x INSERT ADAPTER (FORD PTM-1)
- 1- $\frac{3}{4}$ " x 12" COPPER SETTER WITH LOCKING METER STOP AND DUAL CHECK VALVE (FORD VBHC72-12W-11-33 DP x DP)
- 1-PLASTIC METER BOX (CARSON 1419)
- 1-PLASTIC METER BOX EXTENSION (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

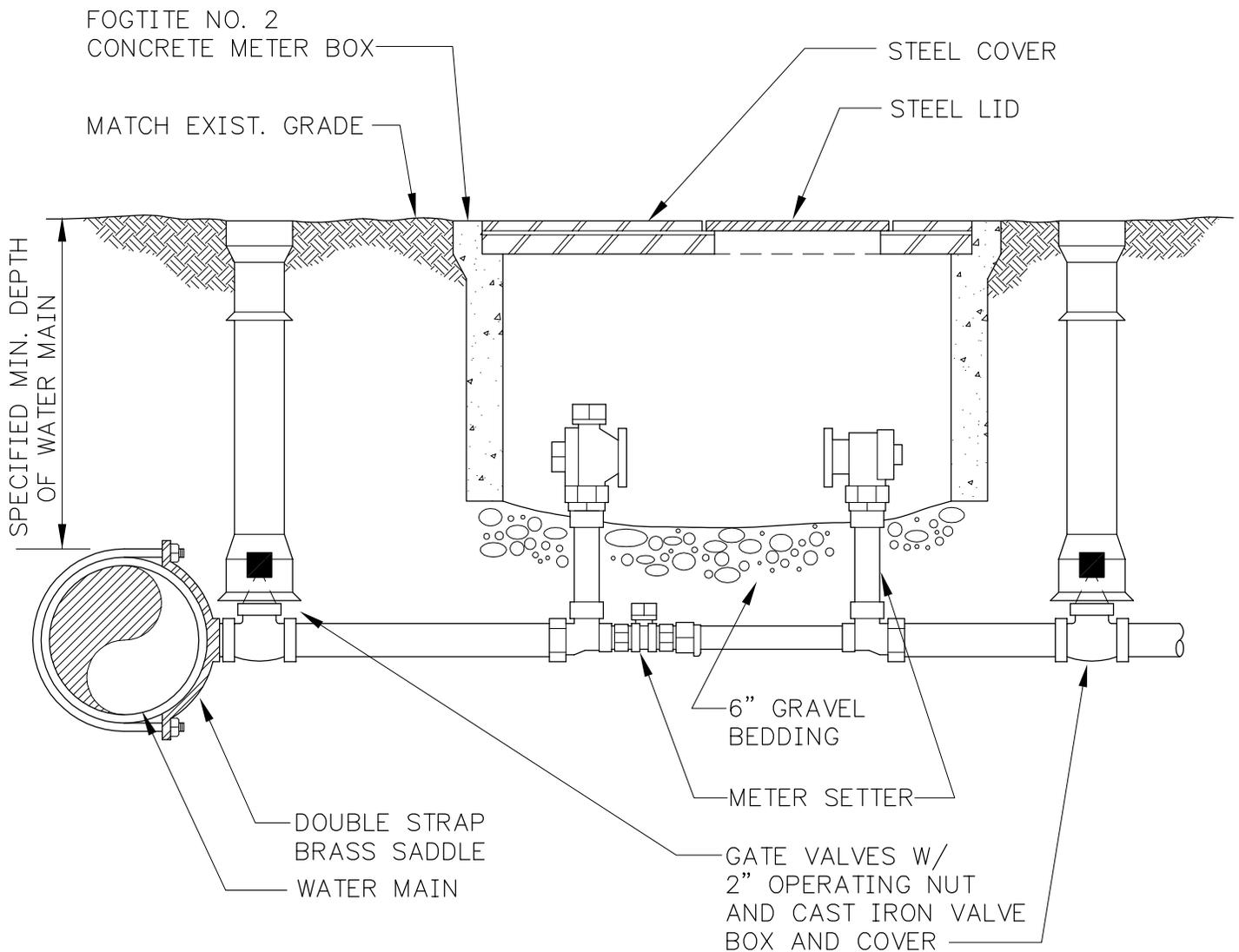
PARTS FOR DOUBLE SERVICE

- 1-1" IPT x MAIN SIZE BRASS SERVICE SADDLE
- 1-1" BRASS MIPT x GRIPPER CORPORATION STOP (FORD F-1101G)
- 1-1" BRASS GRIPPER TEE $\frac{3}{4}$ " x $\frac{3}{4}$ " x 1" (FORD T666-334G)
- 2- $\frac{3}{4}$ " BRASS STREET ELLS
- 2- $\frac{3}{4}$ " BRASS MIPT x GRIPPER ADAPTER (FORD C86-33G)
- 2- $\frac{3}{4}$ " x 12" COPPER SETTERS WITH LOCKING METER STOPS AND DUAL CHECK VALVES (FORD VBHC72-12W-11-33 DP x DP)
- 2- $\frac{3}{4}$ " BRASS MIPT x INSERT ADAPTERS (FORD PTM-1)
- 2-PLASTIC METER BOXES (CARSON 1419)
- 2-PLASTIC METER BOX EXTENSIONS (CARSON 1419)
- 1-SETTER LOCK (FIROMATIC #93180100 OR EQUAL)

NOTES:

1. WATER SERVICE LINE SHALL BE 200 PSI IPS PE 3408, ASTM-2239 (DRISCO ULTRA-HI MOLECULAR PE-3408)
2. USE BRASS DOUBLE STRAP SADDLE ON MAINS 10" AND LARGER.
3. WHERE FORD MATERIALS ARE CALLED OUT, EQUAL PRODUCTS ARE ACCEPTABLE

W1
3/4" AND 1" WATER SERVICE

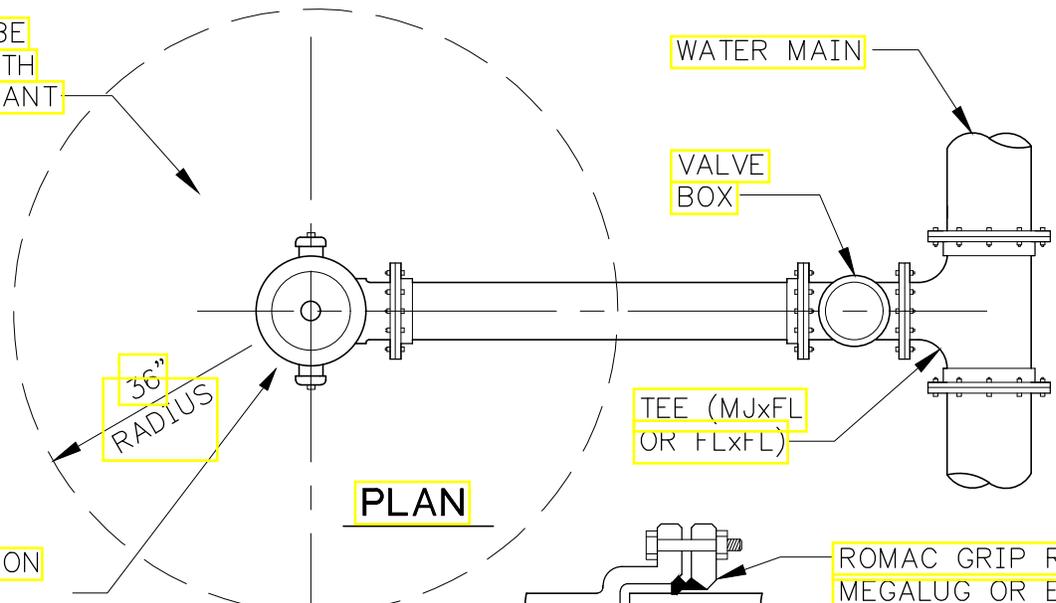


PARTS FOR 1½" AND 2" SERVICE

- 1 – DOUBLE STRAP BRASS SADDLE WITH BRONZE STRAP
- 4 – FORD PACKJOINT COUPLINGS/PLASTIC PIPE
- SETTERS: 1½" FORD VBH6612BX LENGTH WITH LOCKING BYPASS
2" FORD VBH7712BX LENGTH WITH LOCKING BYPASS
(SETTER LENGTH WILL BE DETERMINED BY TOWN)
- CONCRETE METER BOX WITH STEEL COVER AND METER LID
FOGTITE NO. 2
- 2 – GATE VALVES: 2 INCH-RESILIENT WEDGE SEATED (APWA C-509)
1½ INCH-BRASS
- 2 – CAST IRON VALVE BOX WITH COVER
- WATER SERVICE LINE 200 PSI IPS PE 3408, ASTM D-2239

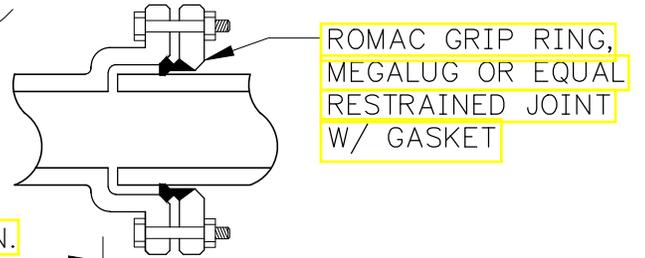
W2 1½" AND 2" WATER SERVICE

SURFACE TO BE GRADED SMOOTH AROUND HYDRANT



PLAN

HYDRANT:
CLOW MEDALLION
SERIES 2545



DETAIL A

PROPERTY LINE

36" MIN.

36" MIN.

(UNLESS DIRECTED OTHERWISE)

(6' MIN. FROM TRAVEL LANE)

STORZ STYLE NO. S-37 5" RIGID FEMALE ADAPTER (DO NOT PAINT)

BREAK AWAY FLANGE

3" MIN.
6" MAX.

18" MIN.
24" MAX.

FACE OF CURB

CAST IRON VALVE BOX AND COVER

SLOPE

SPOOL LENGTH TO SUIT TRENCH DEPTH

VARIABLE
(50' MAX.)

WATER MAIN

POLYWRAP SPOOL

15LB. ASPHALTIC FELT OR FILTER FABRIC

6 CU. FT. MIN. GRAVEL POCKET

6" GATE VALVE (FLxMJ)

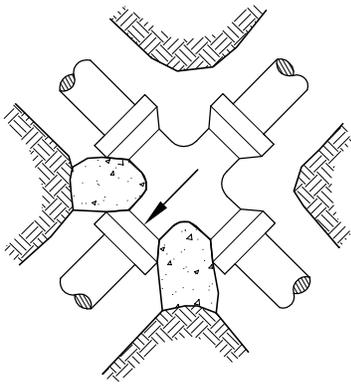
SOLID CONCRETE BEARING BLOCK 12"x12"x4" MIN. SIZE

6" DUCTILE IRON PIPE SPOOL W/ POLYWRAP AND ROMAC GRIP RINGS, MEGALUGS OR EQUAL. (RESTRAIN ALL JOINTS) SEE DETAIL A

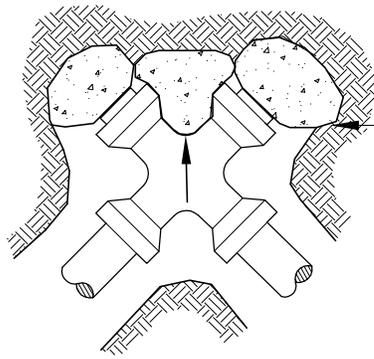
ELEVATION

W3

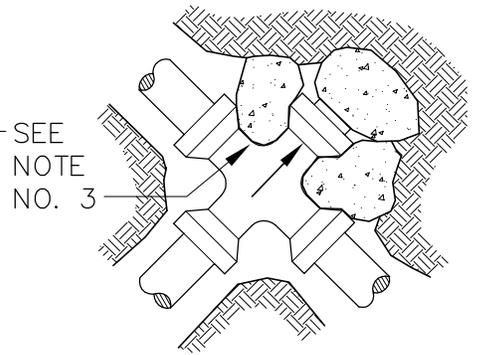
FIRE HYDRANT ASSEMBLY



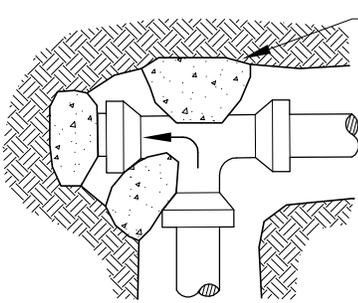
UNBALANCED CROSS



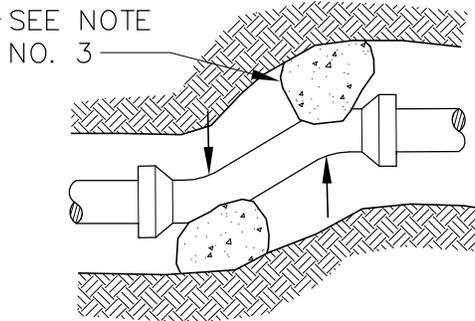
PLUGGED CROSS



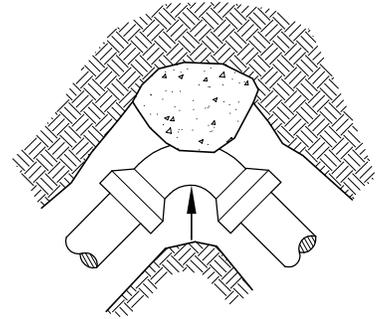
PLUGGED CROSS



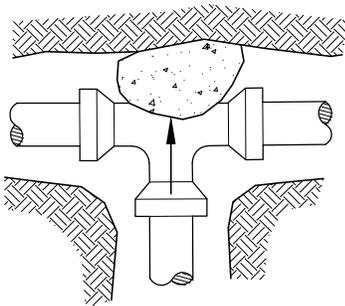
PLUGGED TEE



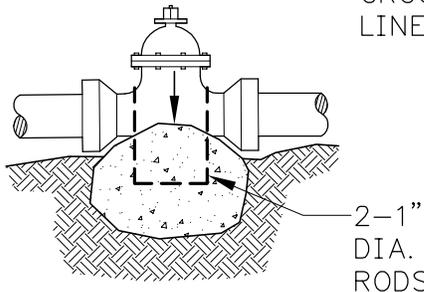
OFFSET



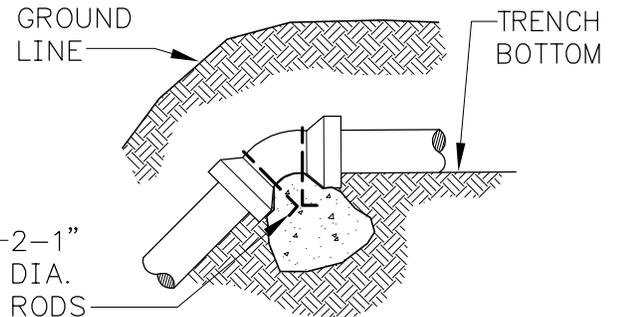
HORIZONTAL BEND



TEE



VALVE

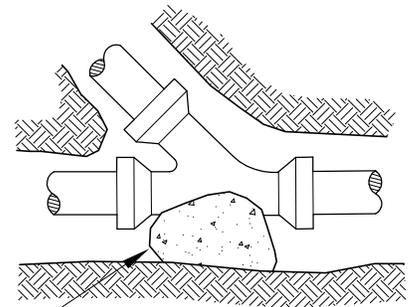


VERTICAL BEND

NOTES:

1. SIZE OF BLOCK TO BE DETERMINED BY THE CONTRACTOR, TO BE ADEQUATE FOR SOIL CONDITION AND PRESSURE INVOLVED.
2. ALL BLOCKING TO BE ON UNDISTURBED MATERIAL.
3. BLOCKING REQUIRED IF PLUGS NOT SECURED BY BOLTING OR ADEQUATE STRAPS.

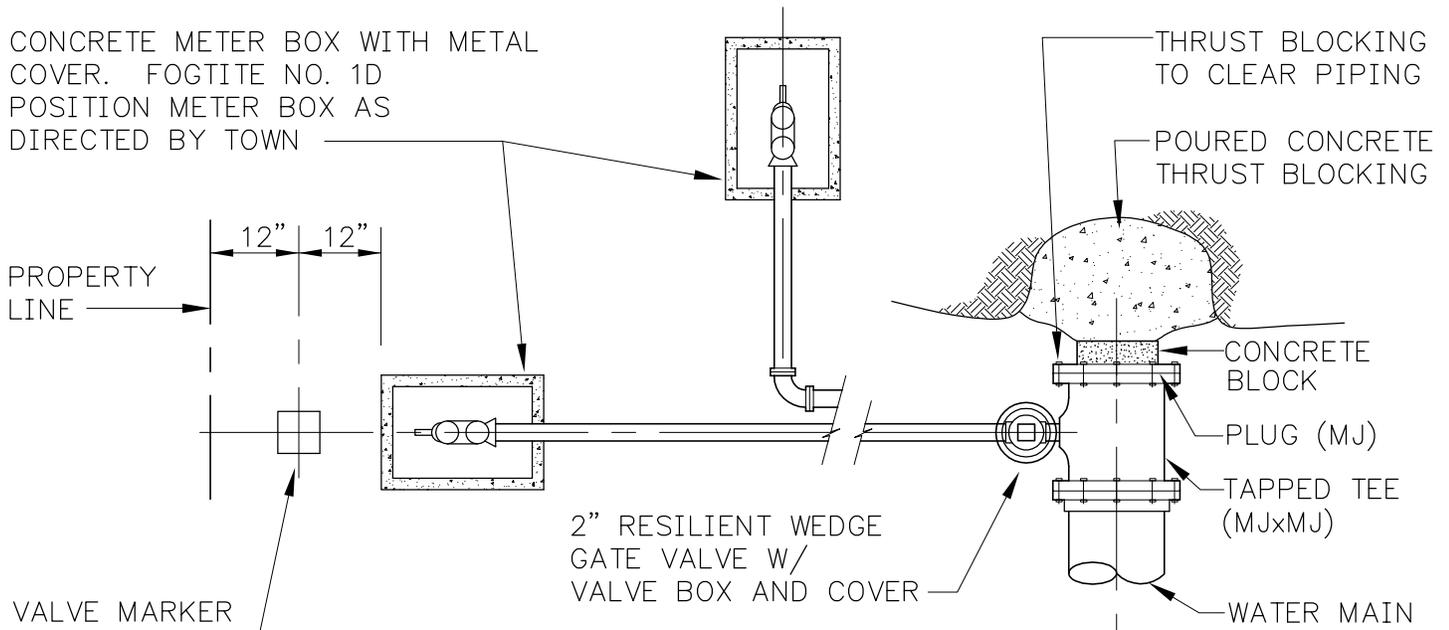
SEE NOTE NO. 3



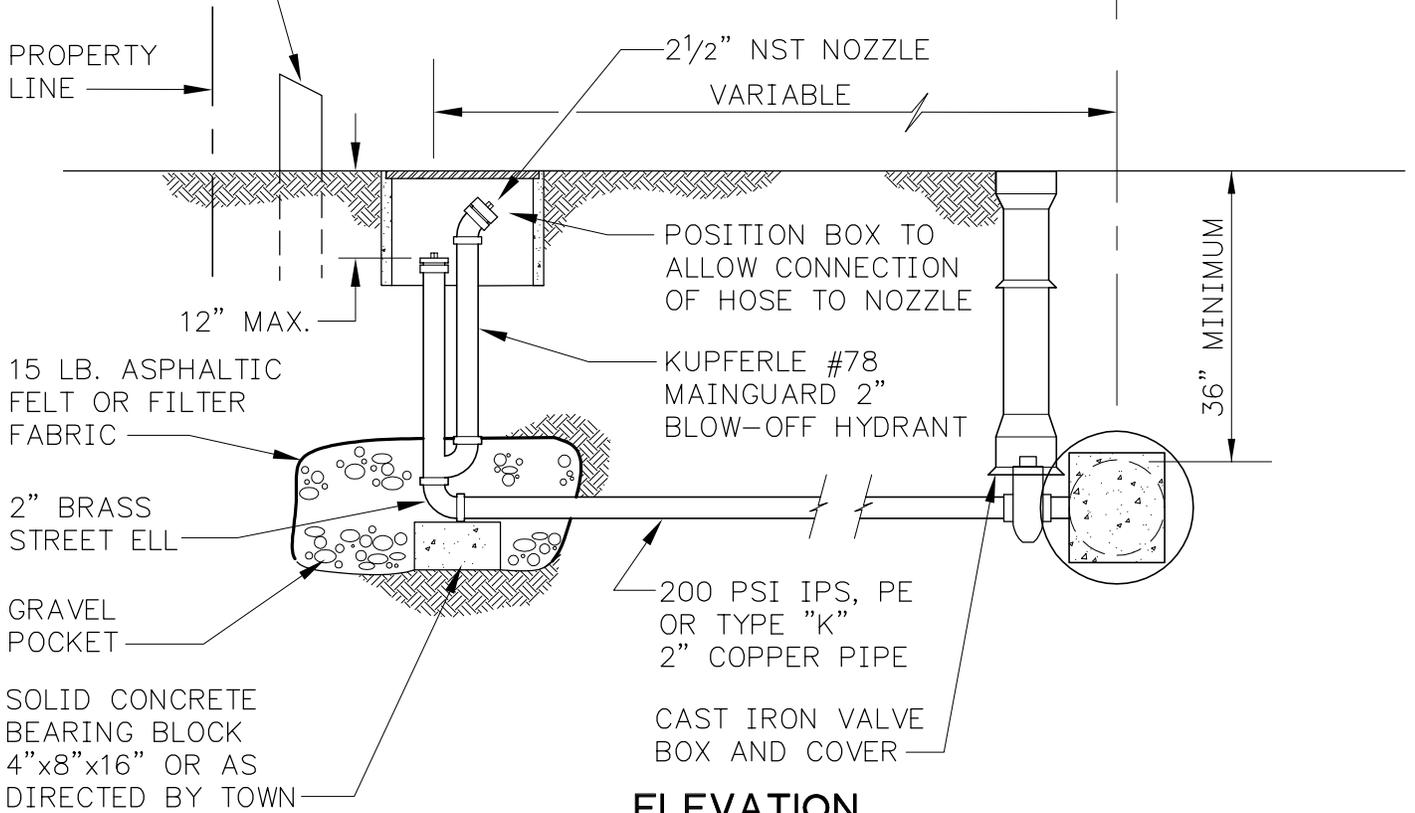
"Y" BRANCH



CONCRETE THRUST BLOCKING



PLAN

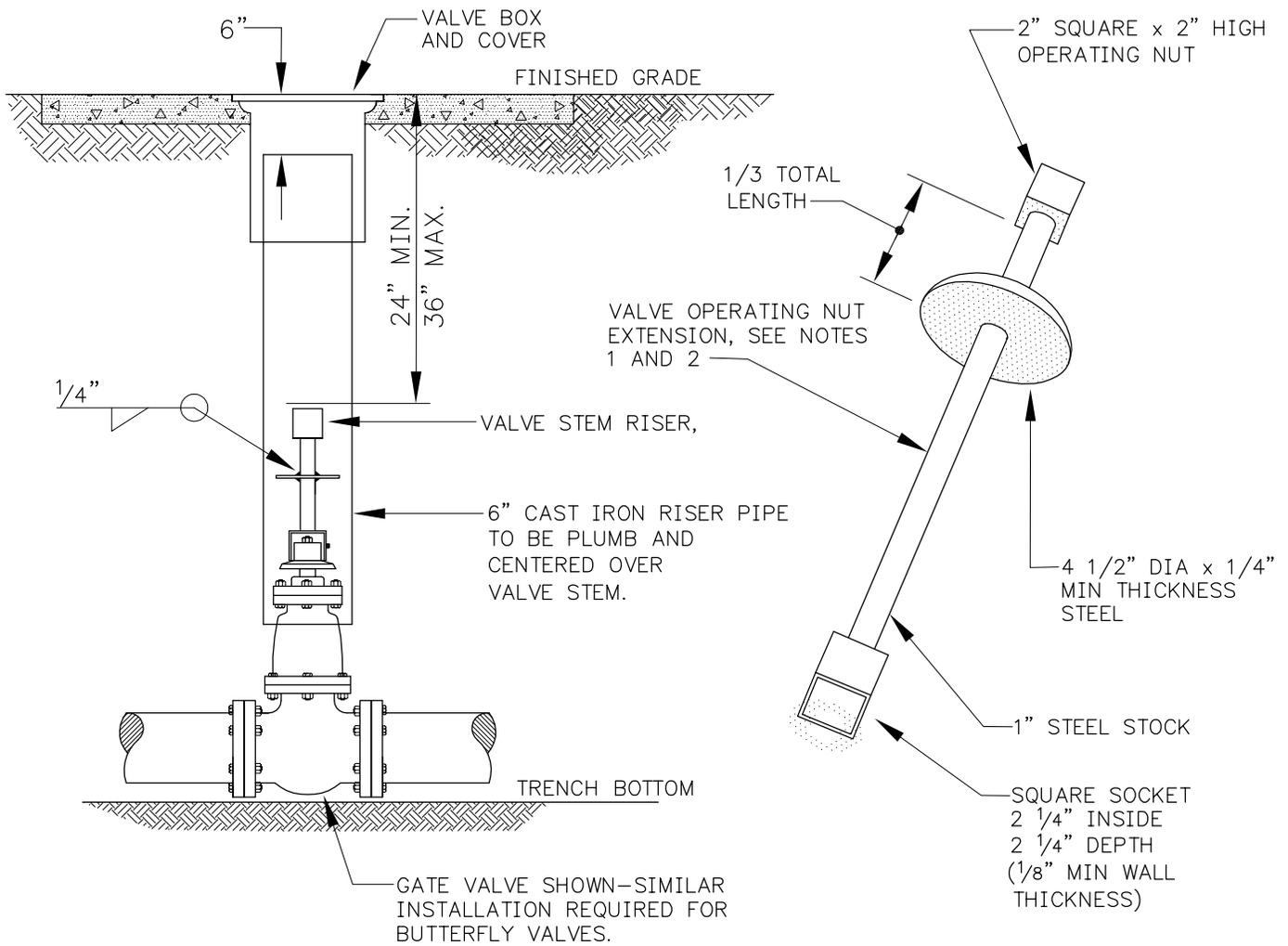


ELEVATION

NOTES:

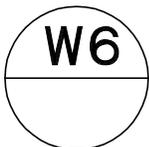
1. PAINT PIPE THREADS WITH ASPHALT PAINT AFTER ASSEMBLY.
2. VALVE AND ALL FITTINGS TO BE BRASS.
3. PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
4. PAINT VALVE MARKER POST PER TOWN REQUIREMENTS.

W5 BLOWOFF ASSEMBLY

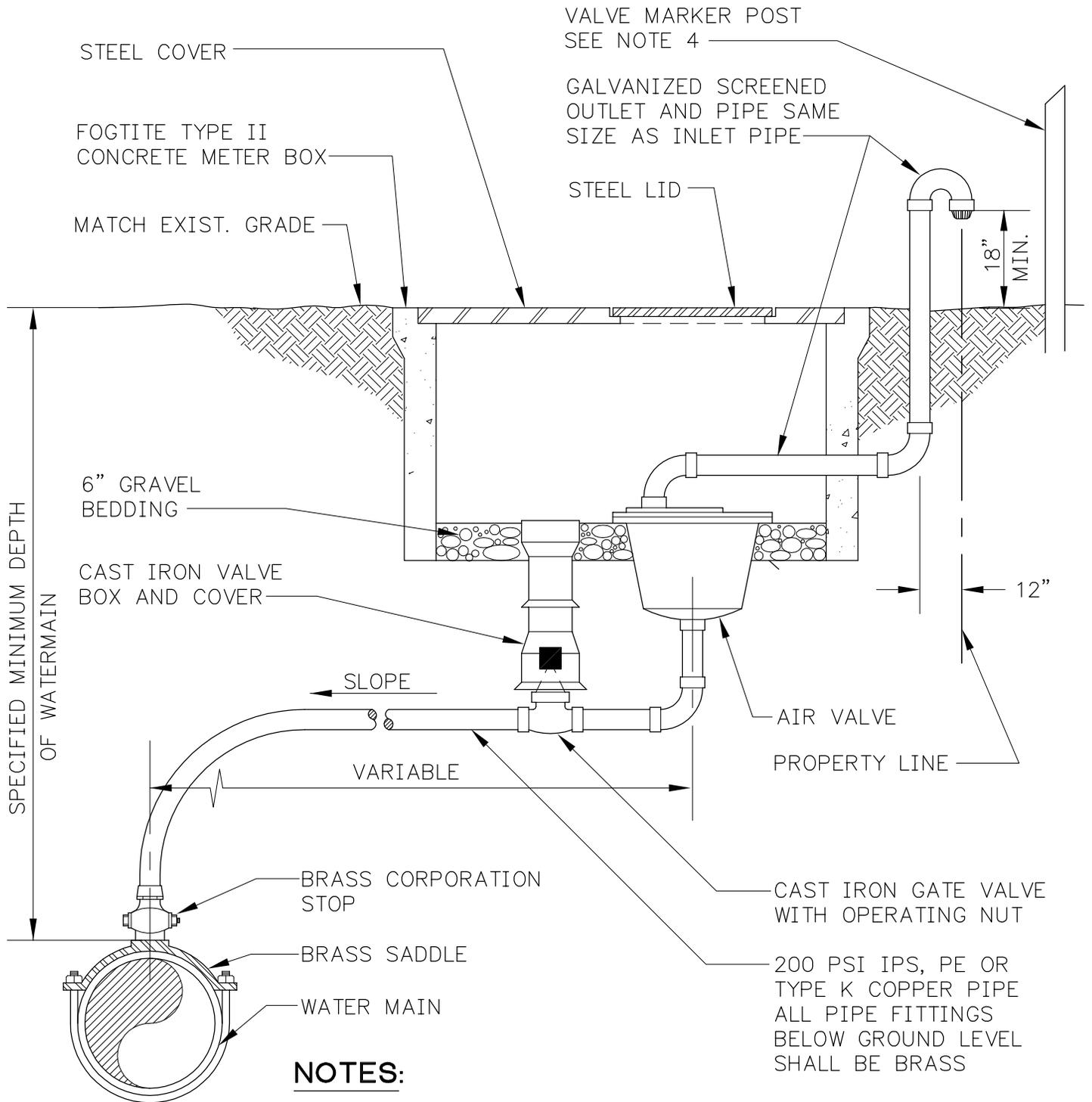


NOTES:

1. VALVE OPERATING NUT EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION WILL BE ALLOWED PER VALVE.
2. ALL VALVE OPERATING NUT EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.



W6 VALVE OPERATING NUT EXTENSION



NOTES:

1. VALVE AND PIPING TO VALVE TO BE 2" UNLESS OTHERWISE NOTED ON PLAN.
2. LOCATE AT HIGH POINT OF MAIN.
3. TAP TOP OF MAIN.
4. VALVE MARKER POST TO BE PAINTED PER TOWN STANDARD. TOWN TO DETERMINE LOCATION.

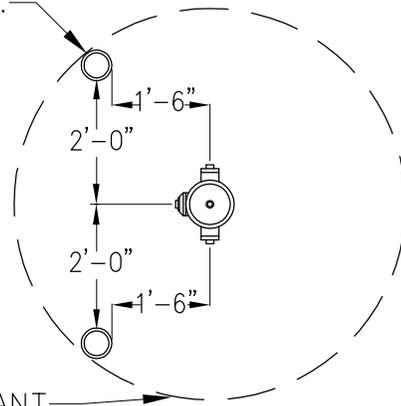
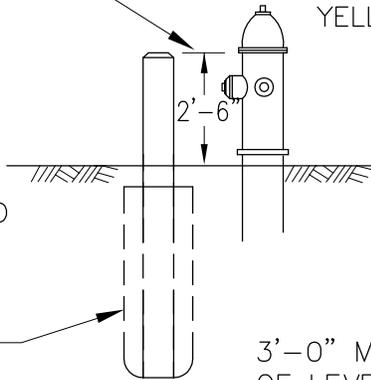


AIR RELEASE VALVE ASSEMBLY

LEVEL WITH BONNET
FLANGE OF HYDRANT

HYDRANT GUARD POST SHALL BE 9" DIA
BY 6" LONG PRECAST CONCRETE POST
EQUAL TO FOG-TITE METER SEAL CO.
PAINT WITH TWO COATS OSHA SAFETY
YELLOW, ENAMEL.

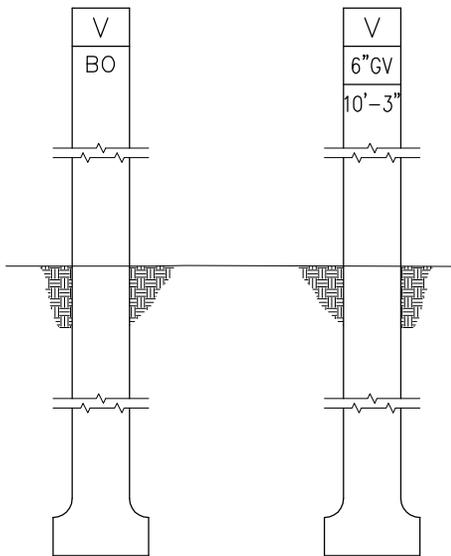
CONCRETE BACKFILL
TO 6" FROM GROUND
WHERE SPECIFIED.
ARTH BACKFILL
COMPACTED IN 6"
LAYERS ELSEWHERE.



ELEVATION

PLAN

FIRE HYDRANT GUARD POST



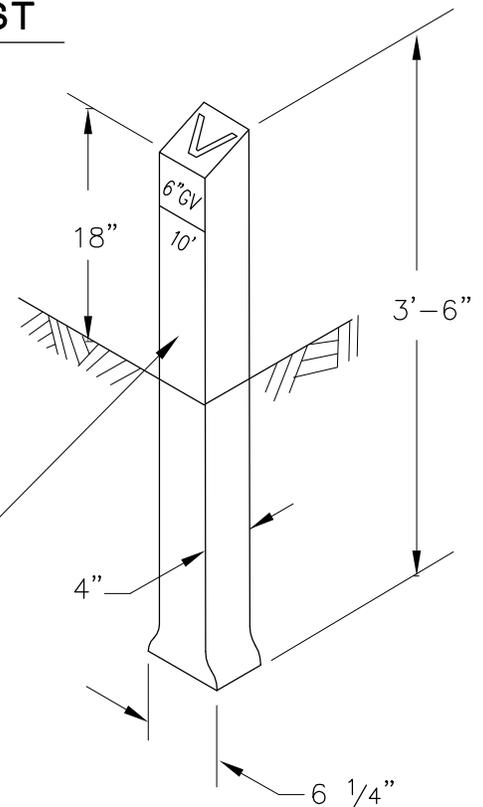
FRONT VIEW

FRONT VIEW

(FOR BLOW-OFF
ASSEMBLY)

(FOR GATE VALVE)

VALVE MARKER POST
SHALL BE EQUAL TO
FOG-TITE METER CO.
PAINT AS SPECIFIED
FOR HYDRANT GUARD
POST. PAINT TYPE
AND SIZE OF VALVE
AND DISTANCE FROM
THE VALVE MARKER TO
THE VALVE ON THE POST
WITH NEATLY STENCILED
BLACK ENAMEL NUMBERS,
1" IN HEIGHT.

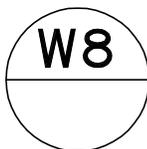


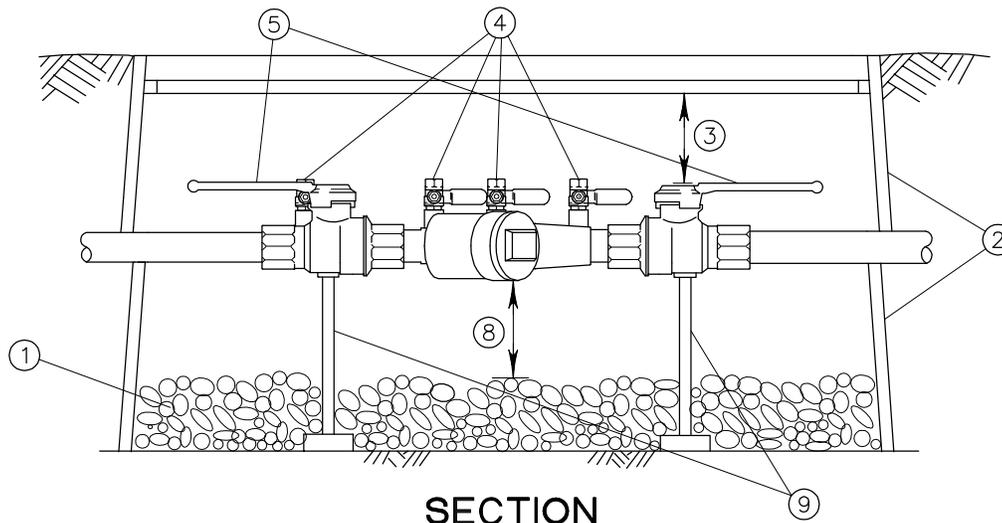
VALVE MARKER POST

NOTES:

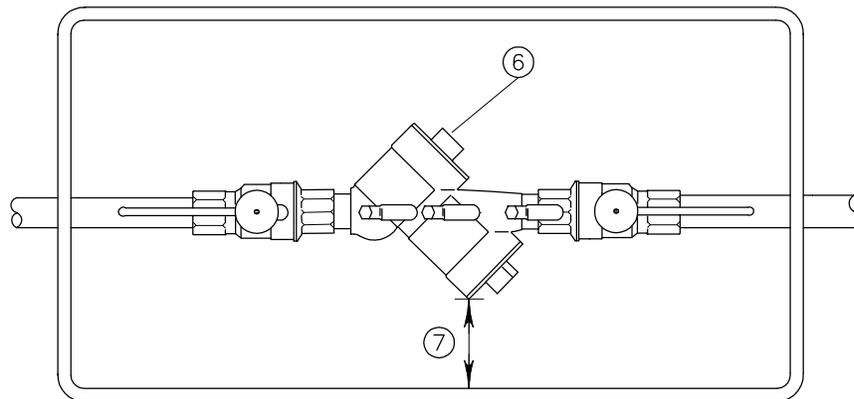
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY THE TOWN.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

**VALVE MARKER POST
HYDRANT GUARD POST**





SECTION

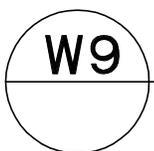


PLAN

- ① IF DAYLIGHT DRAIN SYSTEM CANNOT BE PROVIDED THEN INSTALL A 6" MINIMUM LAYER OF 1" ROUND WASHED GRAVEL AT THE BOTTOM OF THE BOX.
- ② TWO NO. 2 METER BOXES STACKED ON TOP OF EACH OTHER OR APPROVED EQUAL.
- ③ A MAXIMUM DISTANCE OF 6" BETWEEN THE UNDERSIDE OF THE LID AND THE HIGHEST POINT OF THE DEVICE IS REQUIRED.
- ④ THE DEVICE MUST BE EQUIPPED WITH FOUR RESILIENT SEATED TEST COCKS WITH PLUGS INSTALLED. THE ASSEMBLY MUST ALSO BE INSTALLED WITH THE TEST COCKS FACING UP OR TO ONE SIDE.
- ⑤ THE DEVICE MUST ALSO BE EQUIPPED WITH TWO RESILIENT SEATED SHUT OFF VALVES.
- ⑥ THE DEVICE MUST BE INSTALLED HORIZONTALLY.
- ⑦ A MINIMUM DISTANCE OF 6" BETWEEN THE SIDE OF THE BOX AND THE TEST COCKS WHEN THEY ARE INSTALLED SIDE WAYS.
- ⑧ A MINIMUM DISTANCE OF 1 FOOT BETWEEN THE LOWEST POINT OF THE DEVICE AND THE DRAIN ROCK.
- ⑨ SUPPORTS WILL BE REQUIRED ON 2" AND LARGER DEVICES AS SHOWN.

GENERAL NOTE

THE D.C.V.A. CHOSEN MUST BE ON THE MOST RECENT WASHINGTON STATE APPROVAL LISTING. THE D.C.V.A. MUST BE TESTED BY A WASHINGTON STATE CERTIFIED BACKFLOW ASSEMBLY TESTER AT TIME OF INSTALLATION AND ANNUALLY, AND WHEN MOVED OR REPAIRED. ALL INSTALLATION MUST MEET MANUFACTURERS SPECIFICATIONS AND THE MINIMUM STANDARDS OF THE U.P.C.



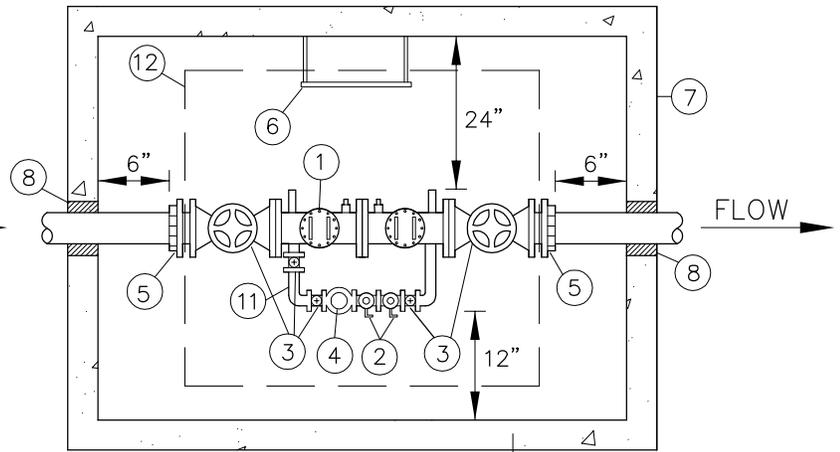
DOUBLE CHECK VALVE ASSEMBLY

NOTES:

1. TOWN WILL DETERMINE IF REDUCED PRESSURE PRINCIPAL DEVICE IS REQUIRED.
2. ASSEMBLY TO BE MAINTAINED BY PROPERTY OWNER/CUSTOMER & ANNUAL CERTIFICATION REQUIRED.
3. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE BACKFLOW PREVENTION ASSEMBLY IS APPROVED BY TOWN. CERTIFICATION FOLLOWING INSTALLATION REQUIRED.
4. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
5. TEE & GATE VALVE REQUIRED ON MAIN.
6. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE W/ DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
7. ALL CLEARANCES SHOWN ARE MINIMUM.
8. VAULTS SHALL NOT BE INSTALLED IN AREAS W/ VEHICULAR TRAFFIC.
9. UL/FM METER REQUIRED IF POTABLE SERVICE ALSO PROVIDED FROM FIRE PROTECTION SERVICE LINE.

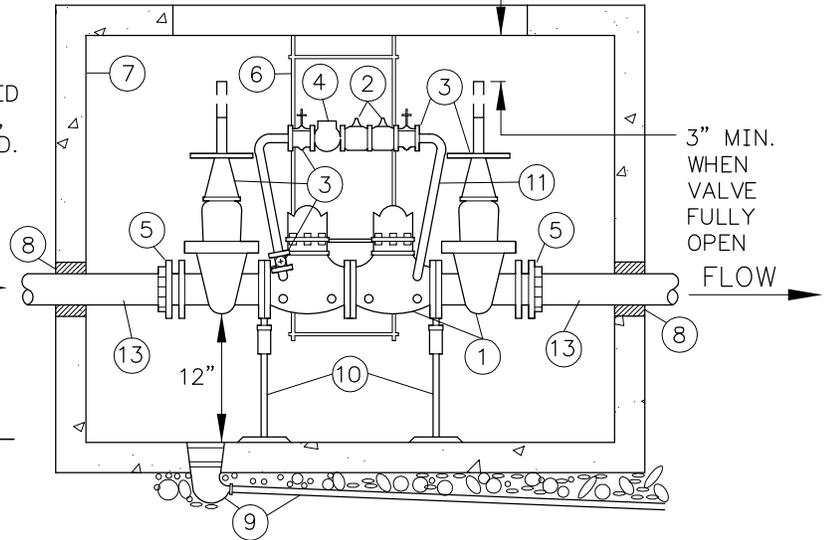
PLAN

FLOW →



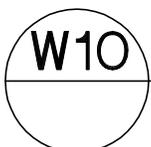
ELEVATION

FLOW →



- ① STATE APPROVED DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED O.S.&Y. VALVES & (4) RESILIENT SEATED TEST COCKS, & BRASS OR COPPER DETECTOR BY-PASS.
- ② STATE APPROVED 3/4" DOUBLE CHECK VALVE ASSEMBLY, COMPLETE W/ (2) RESILIENT SEATED BALL VALVES & (4) RESILIENT SEATED TEST COCKS.
- ③ EACH VALVE SHALL BE MARKED W/ MODEL NUMBER W/ DESIGNATION OF RESILIENT SEAT, SUCH AS "RS" OR "R", WHICH MUST BE CAST, MOLDED, OR AFFIXED ONTO THE BODY OR BONNET OF THE VALVE. ALL FERROUS BODIED VALVES SHALL BE COATED W/ A MIN. OF 4 MLS. OF EPOXY OR EQUIVALENT POLYMERIZED COATING.
- ④ 5/8"x3/4" METER (CUBIC FEET READING)-SENSUS METER W/ "TOUCH READ" SYSTEM.
- ⑤ UNI-FLANGE W/ SETSCREWS.
- ⑥ ONE GALVANIZED STEEL LADDER TO BE SECURED TO VAULT.
- ⑦ CONCRETE VAULT W/ A MIN. OF 2, 3'x3' ALUM. DIAMOND PLATE DOORS RATED FOR H2O LOADING, MARKED "WATER". DOORS SHALL BE LW HATCH OR EQUAL W/ SPRING LIFT & RECESSED PADLOCK HASP. PAINTED ALUM. SIGN TO BE MOUNTED ON UNDERSIDE OF HATCH "CONFINED SPACE. ENTRY BY PERMIT ONLY". VAULT SHALL BE EQUAL TO UTILITY VAULT CO. MODEL LISTED IN TABLE BELOW.
- ⑧ WATER TIGHT GROUT. RESTRAIN INLET/OUTLET PIPE W/ WELDED FLANGE OR ANCHOR BLOCKS.
- ⑨ DRAIN, SLOPE TO DAYLIGHT WHERE APPLICABLE.
- ⑩ TWO ADJUSTABLE PIPE STANCHIONS.
- ⑪ ALL PLUMBING FOR BY-PASS TO BE COPPER & BRASS.
- ⑫ ACCESS TO BE CENTERED OVER METER.
- ⑬ CL. 52 D.I., M.J. W/ RETAINER GLANDS.

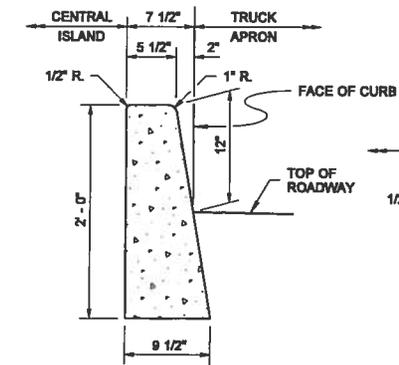
SIZE	MIN. VAULT SIZE (INSIDE)			UTIL. VAULT CO. MODEL	UTIL. VAULT CO. COVER
	W	L	H		
3"	4'-2"	4'-8"	3'-3"	675-WA	675-2-332P
4"	4'-6"	5'-3"	3'-8"	675-WA	675-2-332P
6"	4'-8"	6'-6"	4'-5"	675-WA	675-2-332P
8"	5'-0"	7'-8"	5'-3"	687-LA	687-TL-2-332
10"	5'-2"	8'-8"	6'-1"	5106-LA	5106-TL3-332



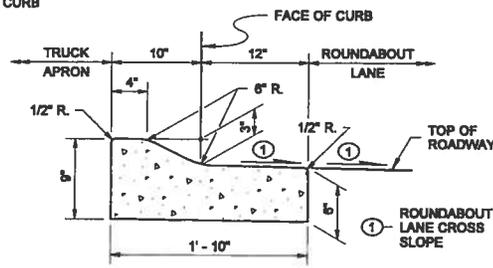
DOUBLE CHECK DETECTOR ASSEMBLY

GENERAL NOTE

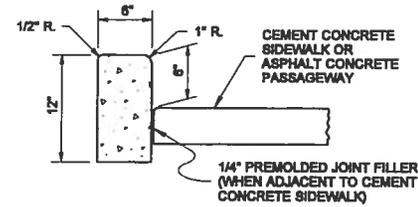
See Standard Plan F-3 for Curb Expansion and Contraction Joint spacing.



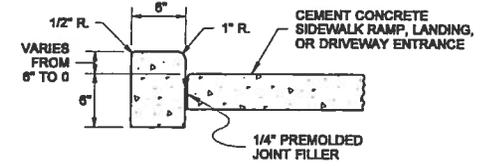
**ROUNDABOUT TRUCK APRON
INNER CEMENT CONCRETE CURB**



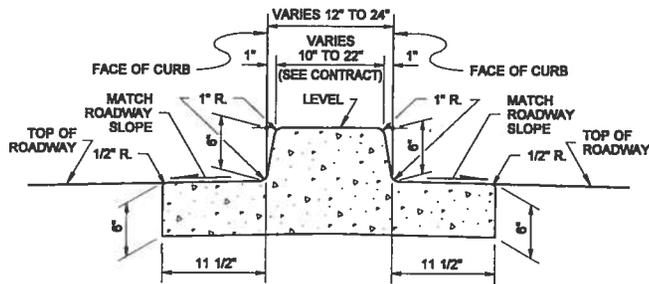
**ROUNDABOUT TRUCK APRON
OUTER CEMENT CONCRETE
CURB AND GUTTER**



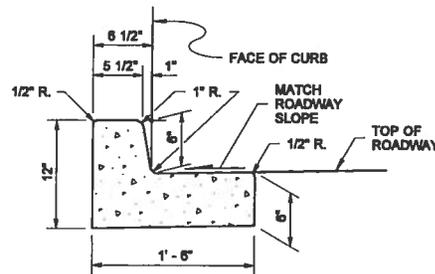
**CEMENT CONCRETE
PEDESTRIAN CURB**



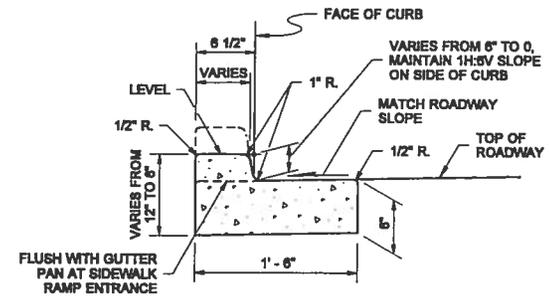
**CEMENT CONCRETE
PEDESTRIAN CURB
AT SIDEWALK RAMPS & LANDINGS,
AND DRIVEWAY ENTRANCES**



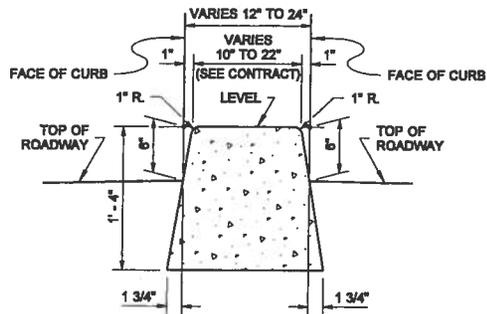
**DUAL-FACED CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



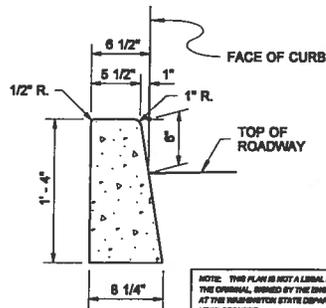
**CEMENT CONCRETE
TRAFFIC CURB AND GUTTER**



**DEPRESSED CURB SECTION
AT SIDEWALK RAMPS AND
DRIVEWAY ENTRANCES**

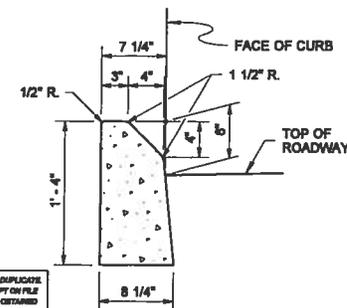


**DUAL-FACED CEMENT
CONCRETE TRAFFIC CURB**

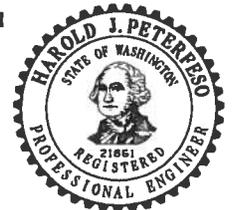


**CEMENT CONCRETE
TRAFFIC CURB**

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**MOUNTABLE CEMENT
CONCRETE TRAFFIC CURB**



EXPIRES MAY 16, 2003

**CEMENT CONCRETE
CURBS**

STANDARD PLAN F-1

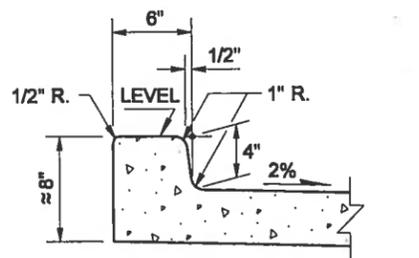
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 12-17-02

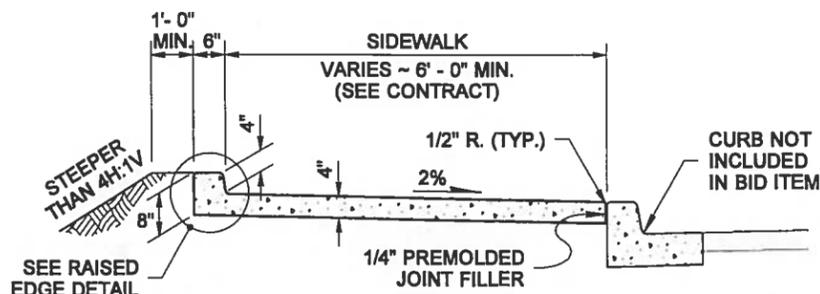
STATE DESIGN ENGINEER DATE



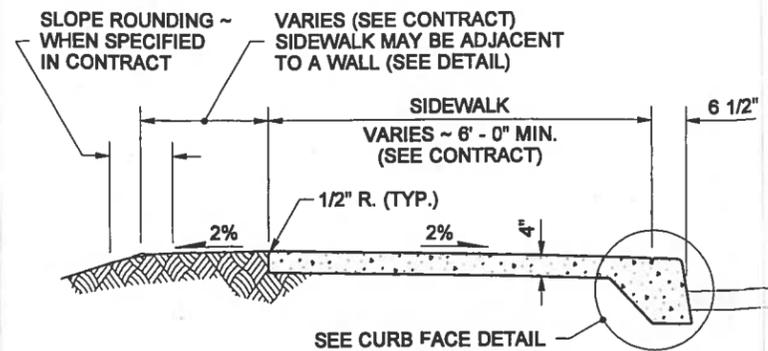


NOTE: EXTEND SIDEWALK TRANSVERSE JOINTS TO INCLUDE RAISED EDGE

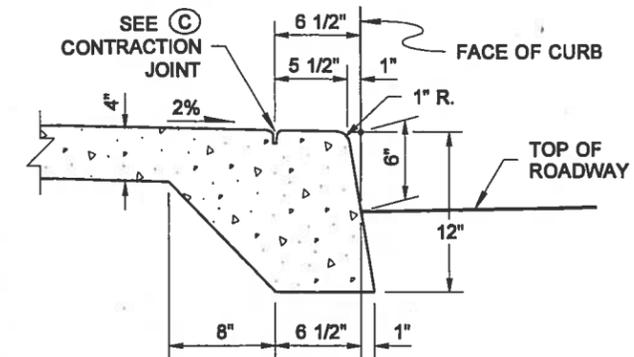
RAISED EDGE DETAIL



CEMENT CONCRETE SIDEWALK WITH RAISED EDGE

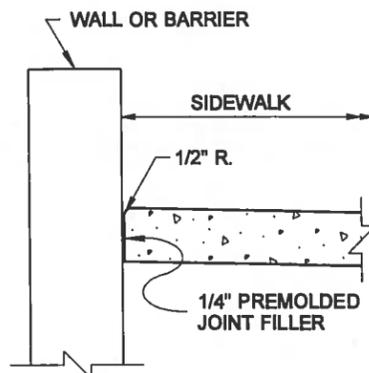


MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK

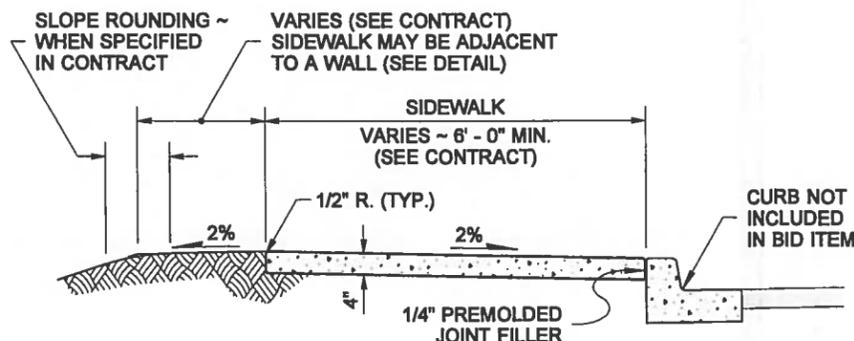


NOTE: EXTEND SIDEWALK TRANSVERSE EXPANSION JOINTS TO INCLUDE CURB (FULL DEPTH)

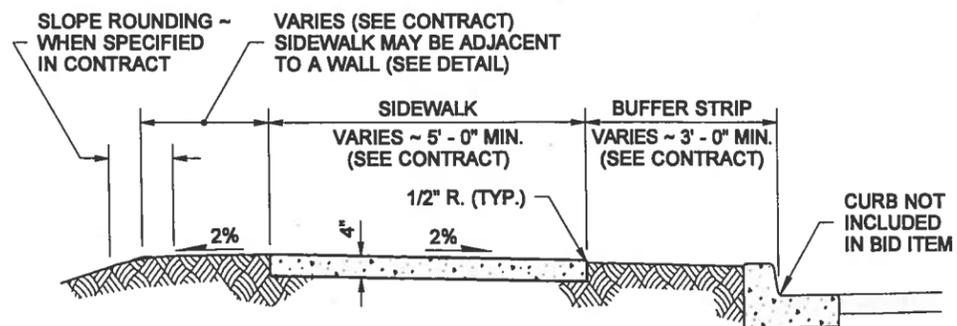
CURB FACE DETAIL



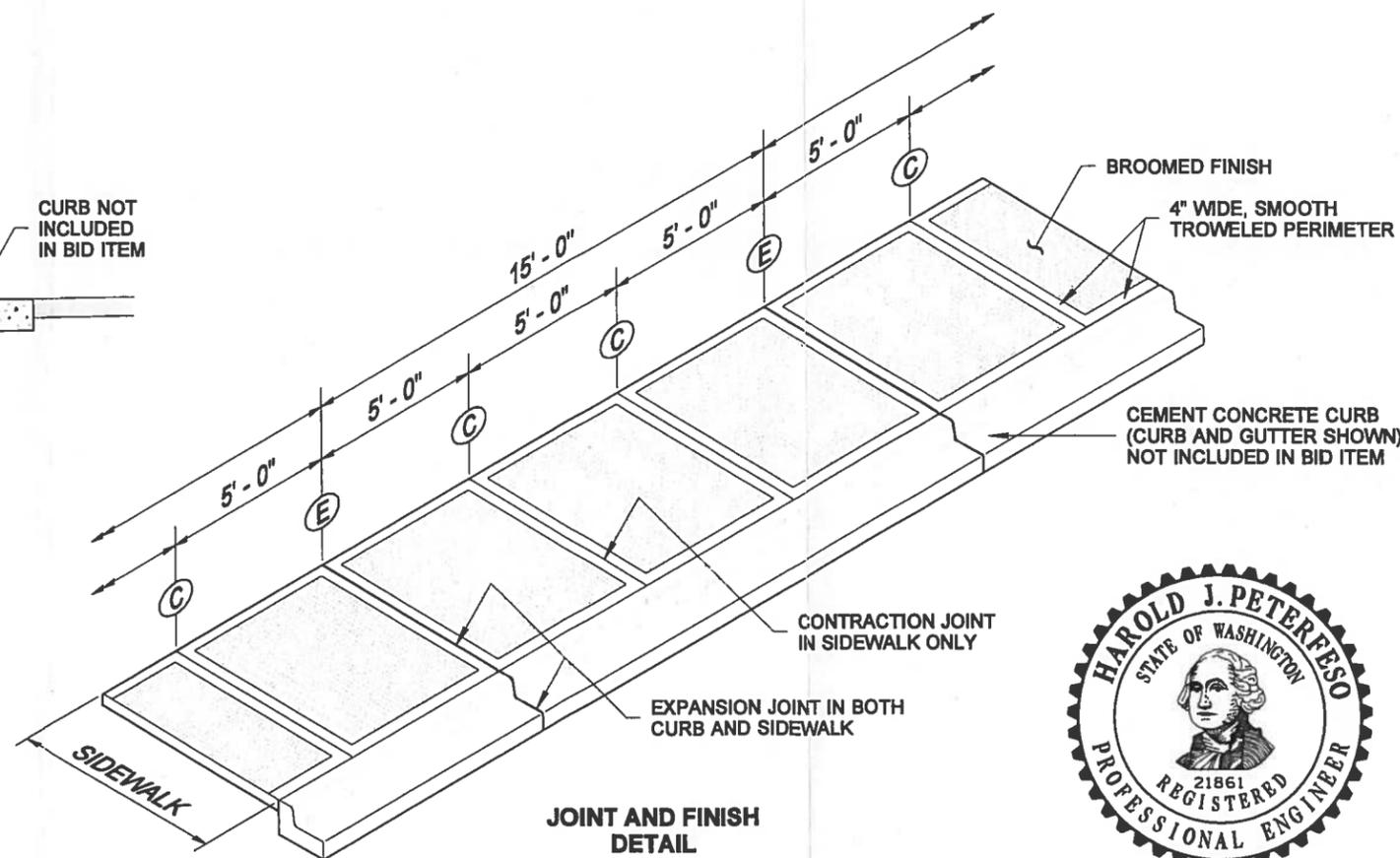
SIDEWALK ADJACENT TO WALL DETAIL



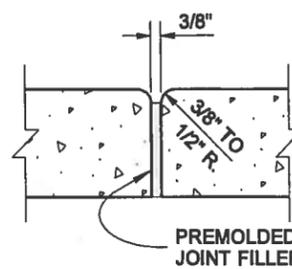
CEMENT CONCRETE SIDEWALK ADJACENT TO CURB



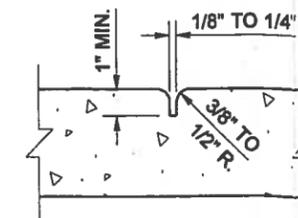
CEMENT CONCRETE SIDEWALK ADJACENT TO BUFFER STRIP



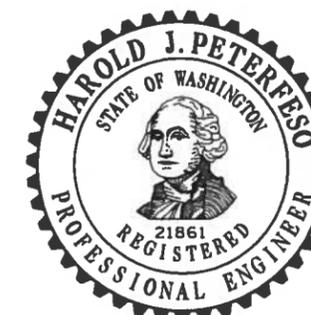
JOINT AND FINISH DETAIL



(E) EXPANSION JOINT



(C) CONTRACTION JOINT



EXPIRES MAY 16, 2003

CEMENT CONCRETE SIDEWALK STANDARD PLAN F-3

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

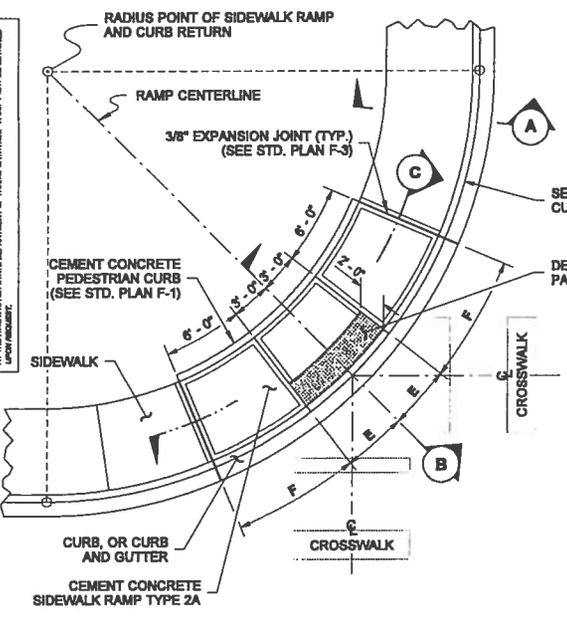
Harold J. Peterfeso 01-13-03

STATE DESIGN ENGINEER DATE

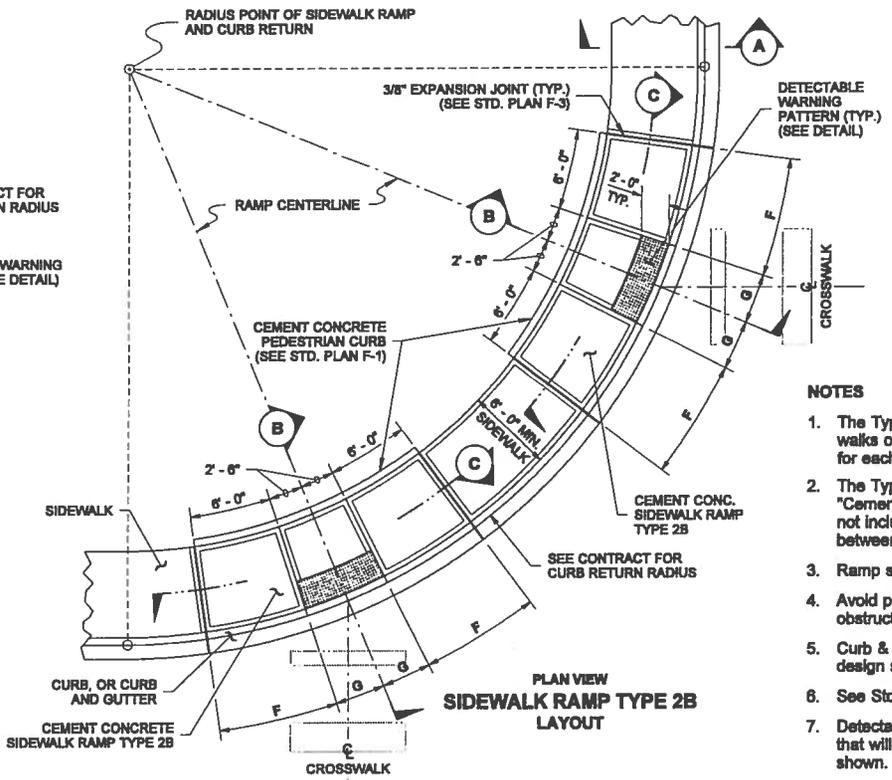
Washington State Department of Transportation

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NOTE: THIS PLAN AND SECTION DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS, LATEST EDITION, AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, LATEST EDITION, AT THE DISCRETION OF THE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.



PLAN VIEW
SIDEWALK RAMP TYPE 2A
LAYOUT



PLAN VIEW
SIDEWALK RAMP TYPE 2B
LAYOUT

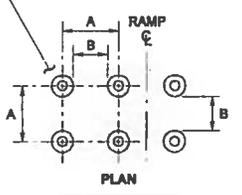
RADIUS (AT CURB FACE)	E	F	G
20 FEET	4' - 5 1/4"	6' - 10 1/2"	3' - 8 1/2"
30 FEET	3' - 10"	7' - 6"	3' - 2 1/4"
40 FEET	3' - 7"	7' - 2"	3' - 0"
50 FEET	3' - 5 1/2"	6' - 10 3/4"	2' - 10 1/2"
60 FEET	3' - 4 1/2"	6' - 8 3/4"	2' - 8 1/2"
70 FEET	3' - 3 3/4"	6' - 7 1/2"	2' - 6"
80 FEET	3' - 3 1/4"	6' - 6 1/2"	2' - 8 1/2"
90 FEET	3' - 2 3/4"	6' - 5 1/2"	2' - 8 1/4"
100 FEET	3' - 2 1/2"	6' - 5"	2' - 6"

INTERMEDIATE RADII CAN BE INTERPOLATED

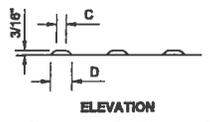
NOTES

1. The Type 2A Ramp is used to provide access to two crosswalks only when it is infeasible to provide a separate ramp for each crosswalk.
2. The Type 2B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 2B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-1 for curb details.
6. See Std. Plan F-3 for sidewalk joint placement and details.
7. Detectable warning patterns may be created by any method that will achieve the truncated dome dimensions and spacing shown.

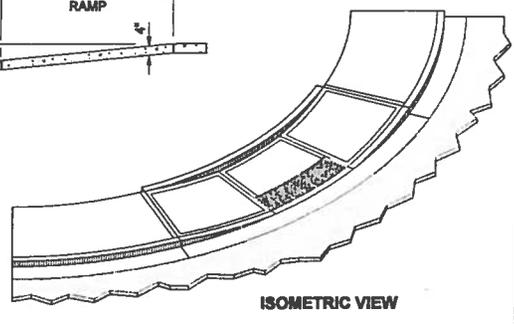
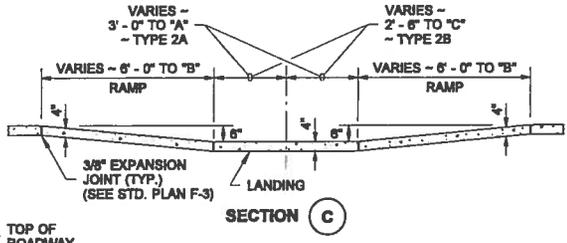
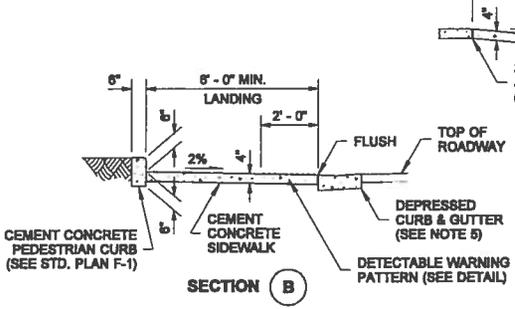
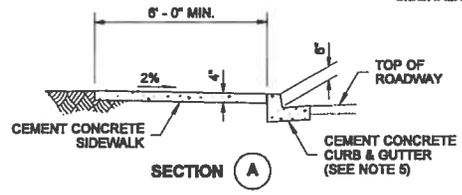
DETECTABLE WARNING PATTERN AREA SHALL BE YELLOW, IN COMPLIANCE WITH STD. SPEC. 8-14.3(3)



	MIN.	MAX.
A	1 5/8"	2 3/8"
B	5/8"	1 1/2"
C	7/16"	3/4"
D	7/8"	1 7/16"



ELEVATION
TRUNCATED DOMES (SEE NOTE 7)
DETECTABLE WARNING
PATTERN DETAIL.



ISOMETRIC VIEW



EXPIRES MAY 16, 2007

**SIDEWALK RAMP
TYPES 2A & 2B
WITH LAYOUTS
STANDARD PLAN F-3b**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

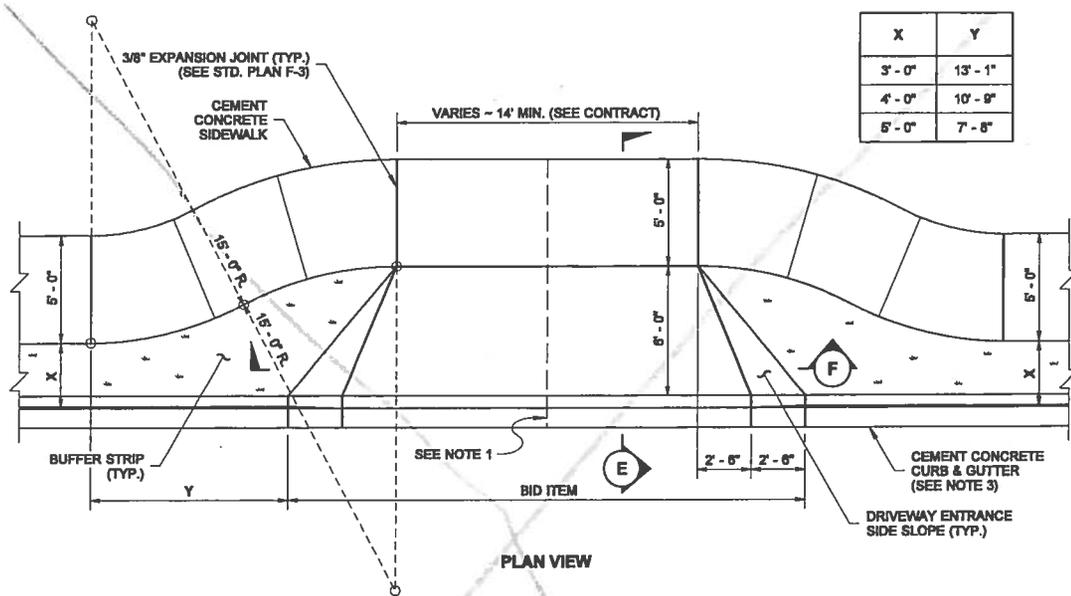
Harold J. Peterfeso 09-02-05

STATE DESIGN ENGINEER DATE

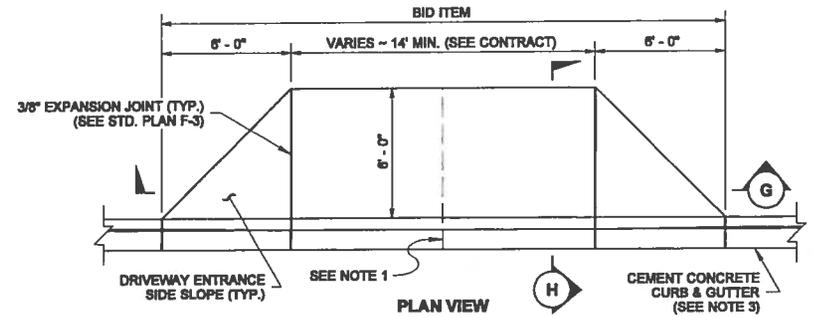


Washington State Department of Transportation

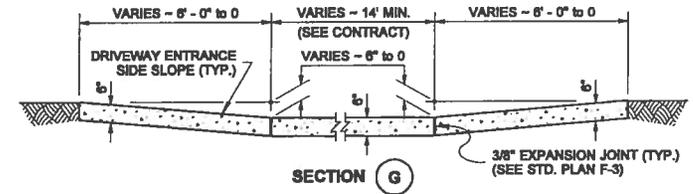
X	Y
3'-0"	13'-1"
4'-0"	10'-8"
5'-0"	7'-8"



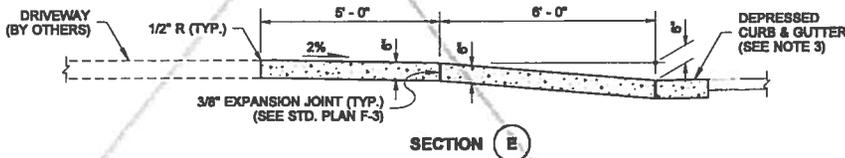
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 3



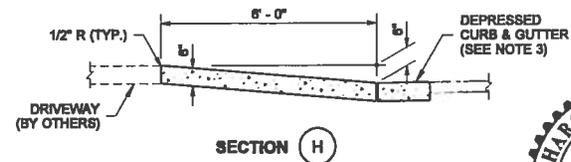
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 4



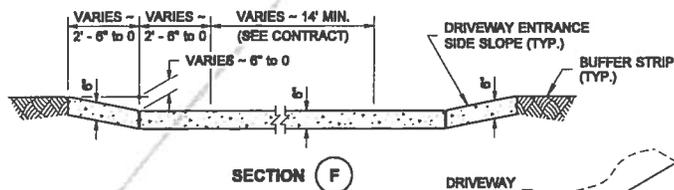
SECTION G



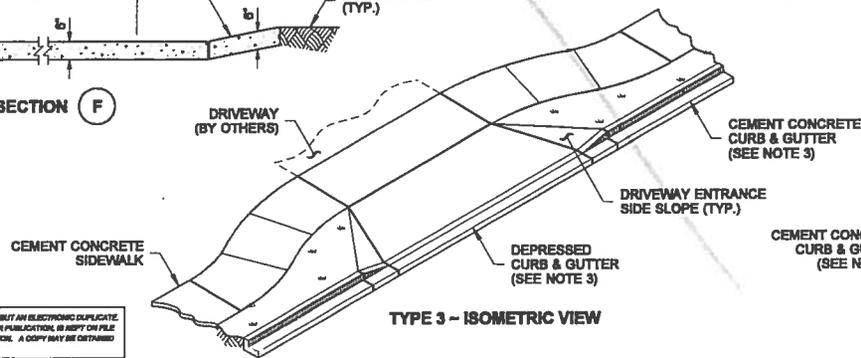
SECTION E



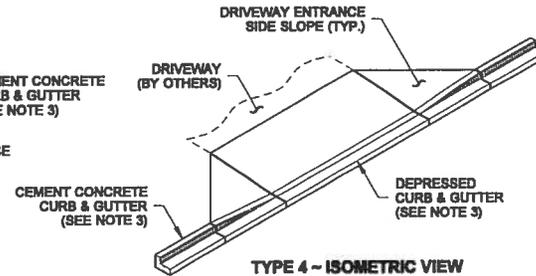
SECTION H



SECTION F



TYPE 3 - ISOMETRIC VIEW



TYPE 4 - ISOMETRIC VIEW

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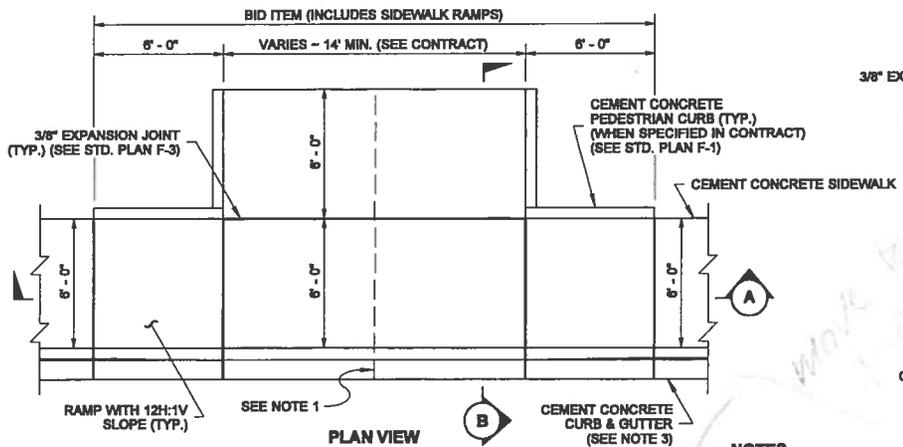


EXPIRES MAY 16, 2003
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3 & 4
STANDARD PLAN F-4
 SHEET 2 OF 2 SHEETS

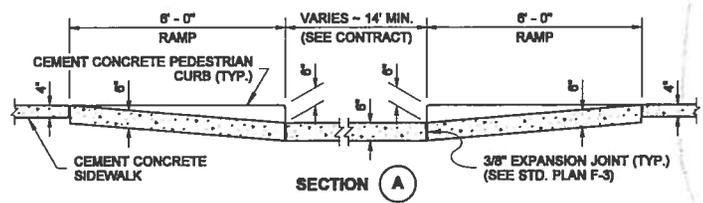
APPROVED FOR PUBLICATION
Harold J. Peterfeso 01-13-03
 STATE DESIGN ENGINEER DATE
 Washington State Department of Transportation

Add notes from page 1. (It will not be included in manual.)

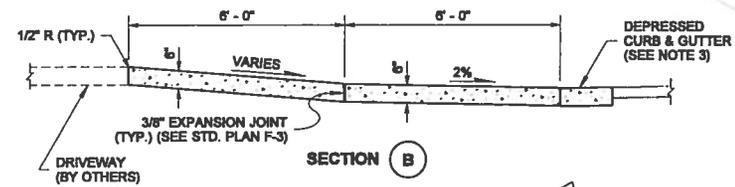
OKay



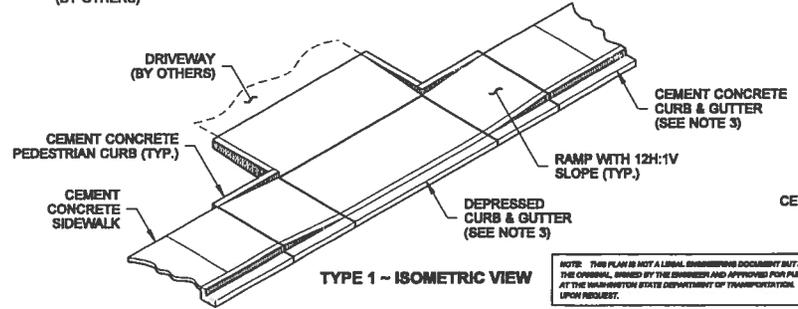
CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 1



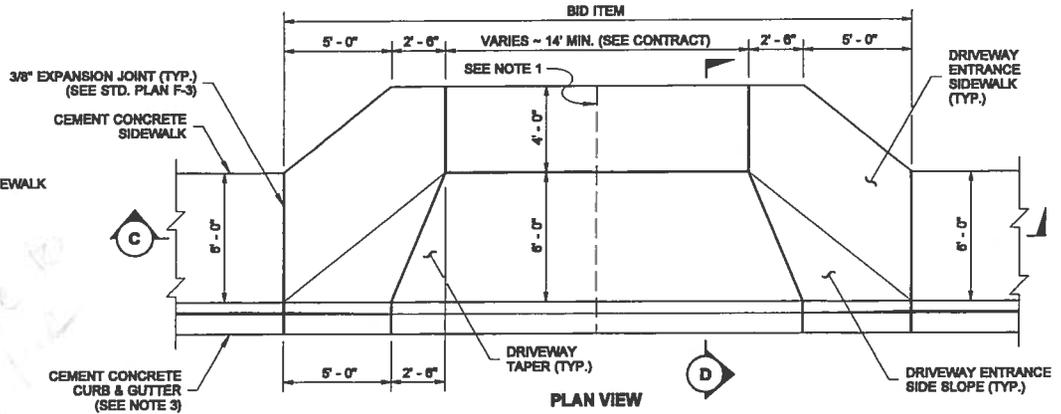
SECTION A



SECTION B

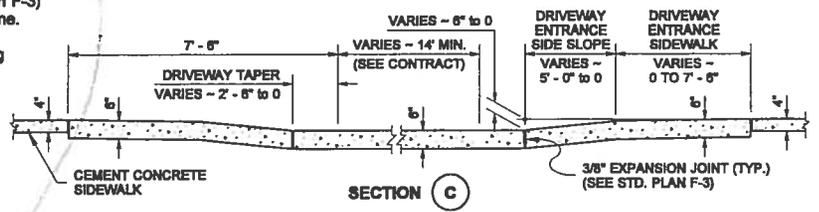


TYPE 1 ~ ISOMETRIC VIEW

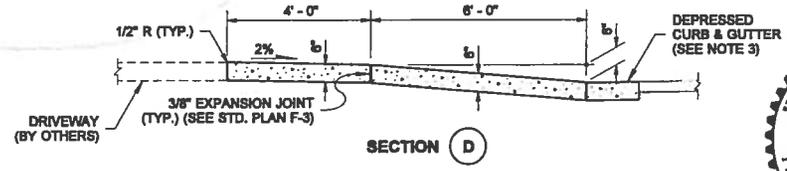


CEMENT CONCRETE DRIVEWAY ENTRANCE TYPE 2

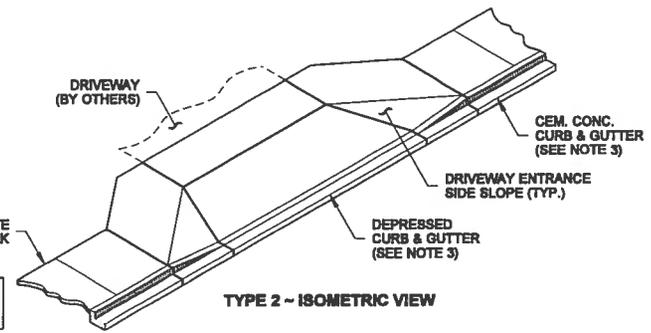
- NOTES**
1. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Standard Plan F-3) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.
 2. See Std. Plan F-3 for sidewalk details.
 3. Curb and gutter shown, see the Contract Plans for the curb design specified. See Std. Plan F-1 for curb details.
 4. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.



SECTION C



SECTION D



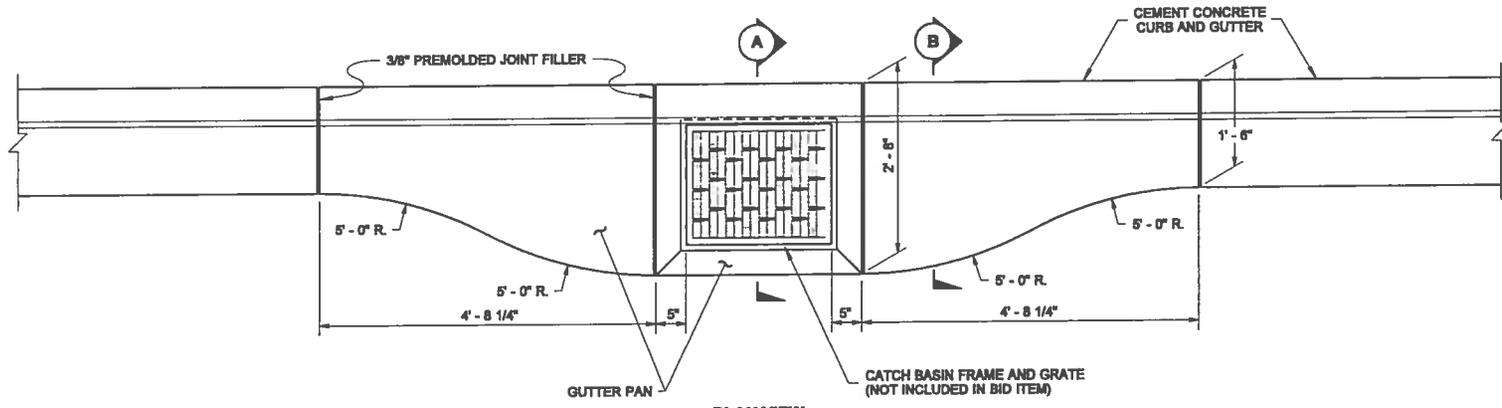
TYPE 2 ~ ISOMETRIC VIEW

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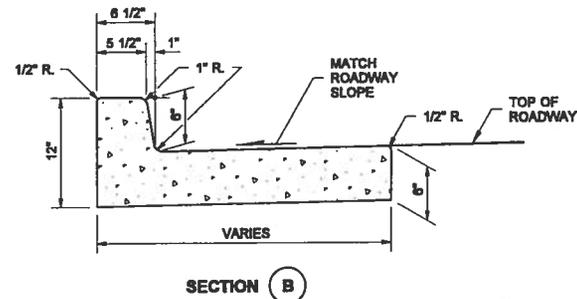
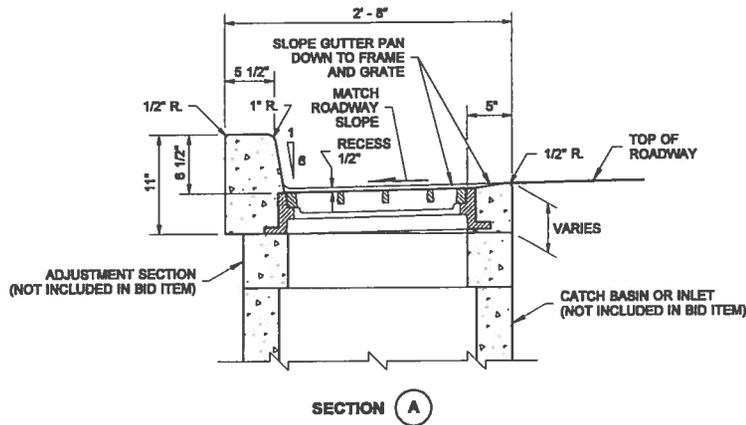


CEMENT CONCRETE DRIVEWAY ENTRANCE TYPES 1, 2, 3 & 4
STANDARD PLAN F-4

SHEET 1 OF 2 SHEETS
 APPROVED FOR PUBLICATION
Harold J. Peterfeso 01-13-03
 STATE DESIGN ENGINEER DATE
 Washington State Department of Transportation



PLAN VIEW
CATCH BASIN GUTTER PAN



EXPIRES MAY 16, 2003

CEMENT CONCRETE CURB AND GUTTER PAN
STANDARD PLAN F-1a

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

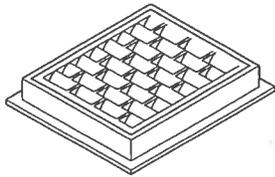
Harold J. Peterfeso 12-17-02

STATE DESIGN ENGINEER DATE

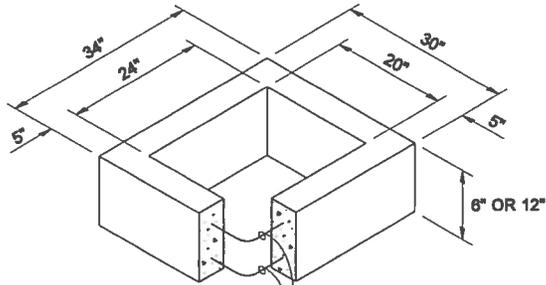
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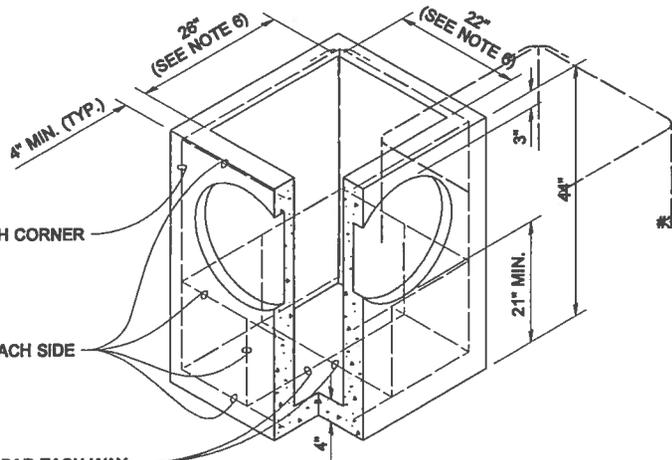
FRAME AND VANED GRATE



ONE #3 BAR HOOP FOR 6" HEIGHT
TWO #3 BAR HOOPS FOR 12" HEIGHT

RECTANGULAR ADJUSTMENT SECTION

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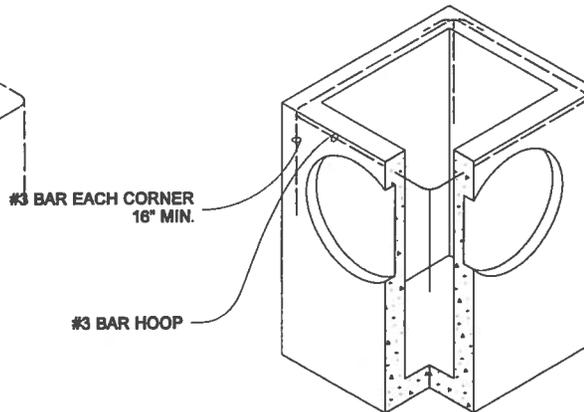
PRECAST BASE SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP * (STD. SPEC. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. 9-05.12(2))	15"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.
3. The maximum depth from the finished grade to the pipe invert shall be 5'.
4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
5. The precast base section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.
6. The opening shall be measured at the top of the precast base section.
7. All pickup holes shall be grouted full after the basin has been placed.



SEE NOTE 1
ALTERNATIVE PRECAST BASE SECTION



EXPIRES JULY 1, 2007

CATCH BASIN TYPE 1

STANDARD PLAN B-1

SHEET 1 OF 1 SHEET

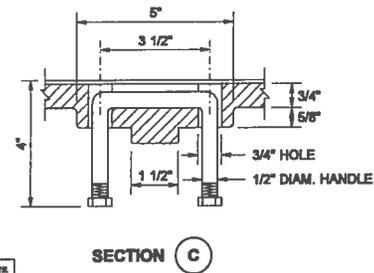
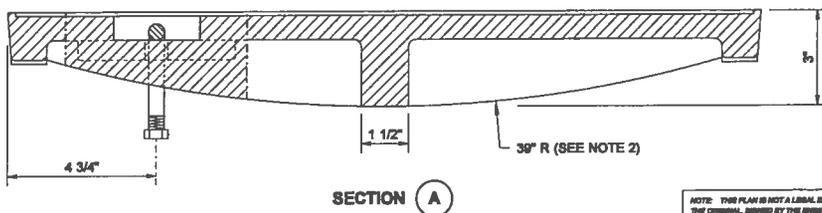
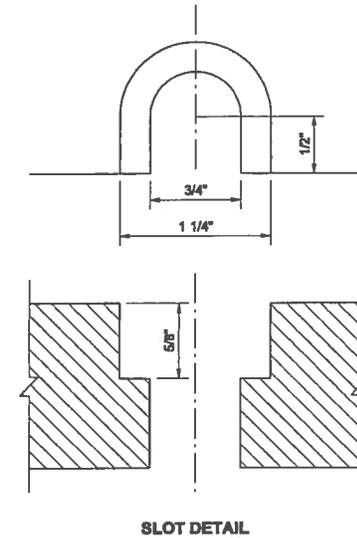
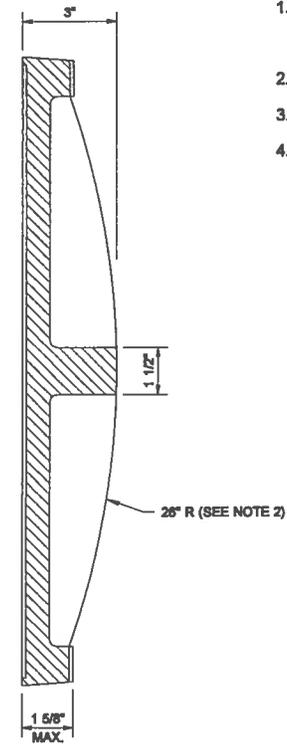
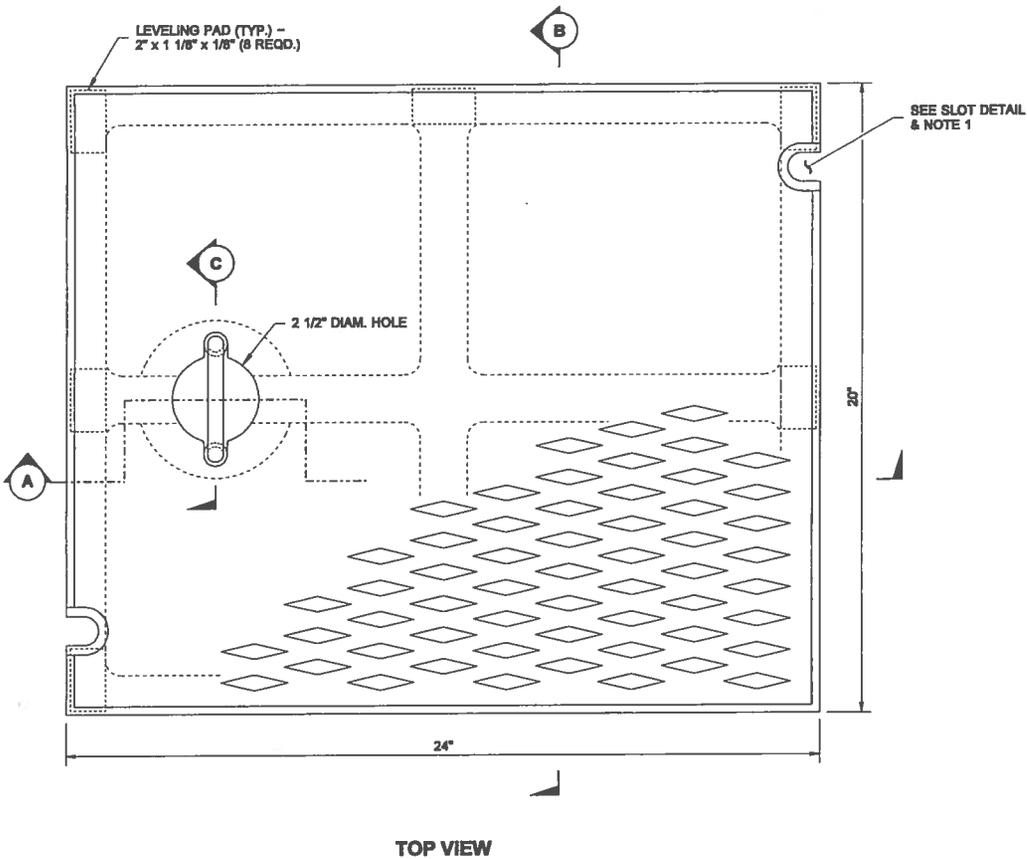
APPROVED FOR PUBLICATION

Harold J. Peterfeso 11-08-05

STATE DESIGN ENGINEER DATE



Washington State Department of Transportation



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NOTES

1. When bolt down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Alternate reinforcing rib designs are acceptable.
3. Refer to Standard Specification 9-05.15(2) for additional requirements.
4. For frame details, see Standard Plan B-2a.



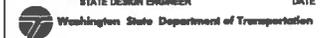
EXPIRES JULY 1, 2005

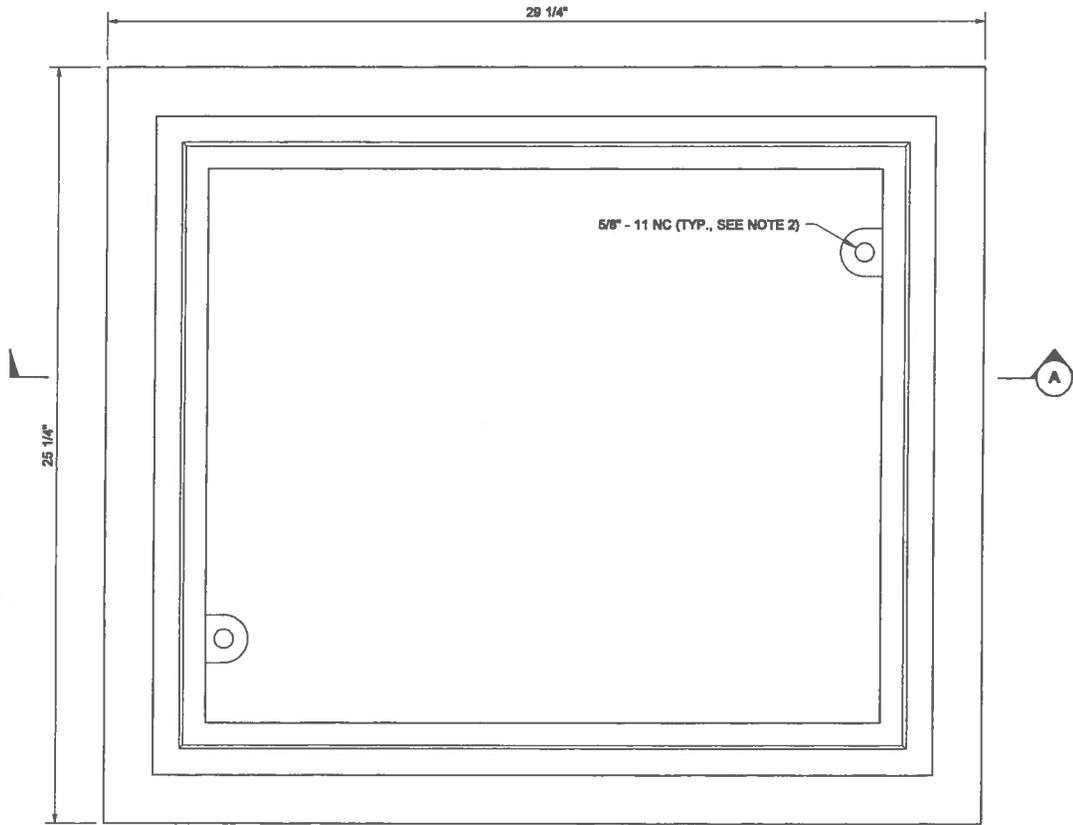
**SOLID METAL COVER
FOR CATCH BASIN
STANDARD PLAN B-2**

SHEET 1 OF 1 SHEET

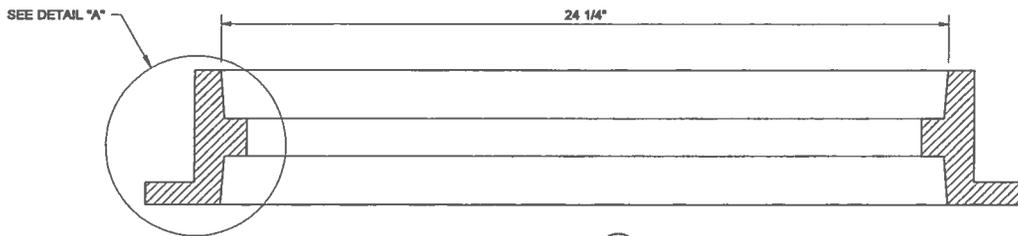
APPROVED FOR PUBLICATION

Harold J. Peterfeso 02-25-05
STATE DESIGN ENGINEER DATE





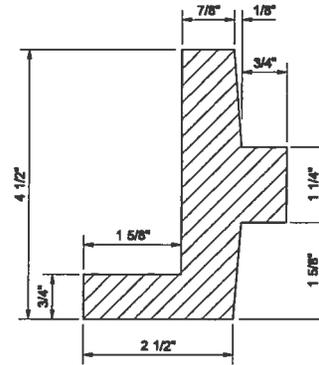
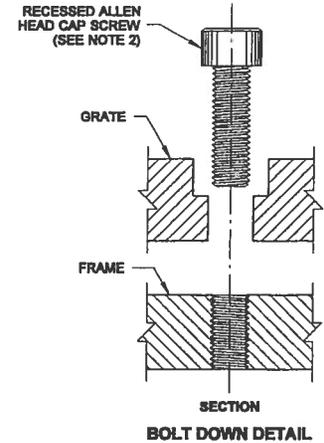
TOP VIEW



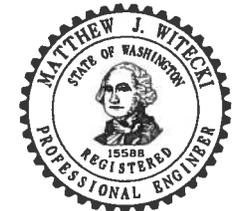
SECTION A

NOTES

1. This frame is designed to accommodate 20" x 24" grates or covers as shown on Standard Plans B-2, B-2b, B-2c and B-2d.
2. When bolt down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC x 2" allen head cap screw. Location of bolt down holes varies among different manufacturers.
3. Refer to Standard Specification 9-05.15(2) for additional requirements.



DETAIL "A"



EXPIRES JULY 1, 2005

**REVERSIBLE FRAME FOR
CATCH BASIN OR
CONCRETE INLET
STANDARD PLAN B-2a**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso 02-25-05

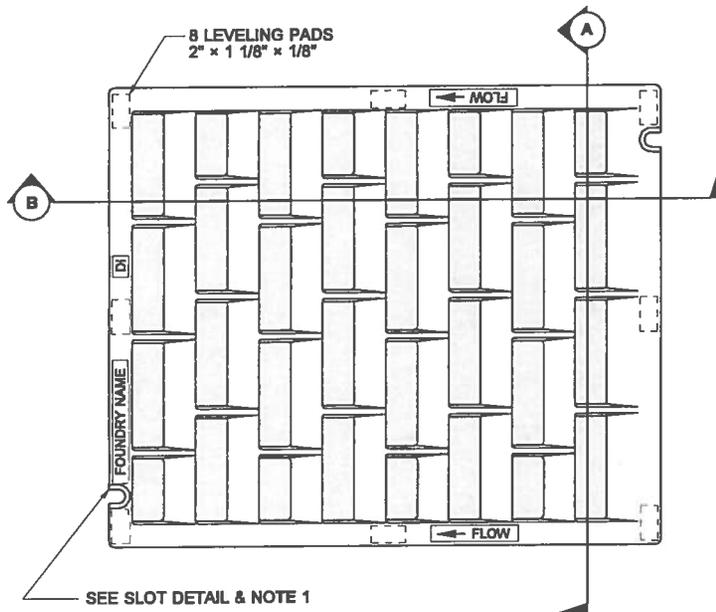
STATE DESIGN ENGINEER

DATE

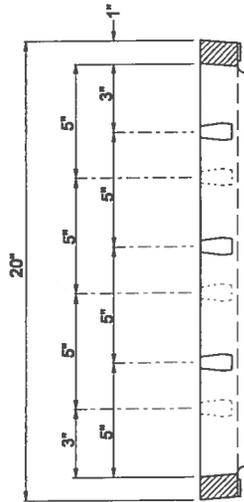


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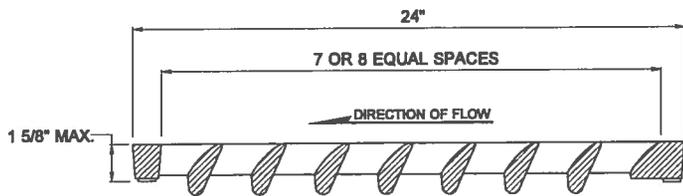
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PLAN VIEW



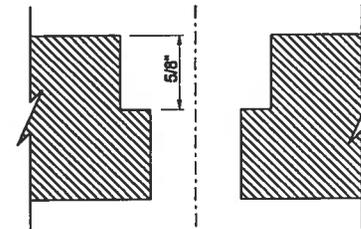
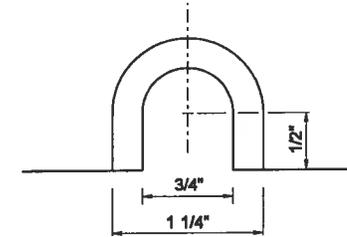
SECTION A



SECTION B

NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frames. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



SLOT DETAIL



EXPIRES JULY 1, 2003

**VANED GRATE FOR
CATCH BASIN AND
CONCRETE INLET
STANDARD PLAN B-2b**

SHEET 1 OF 1 SHEET

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Harold J. Peterfeso 06-17-02

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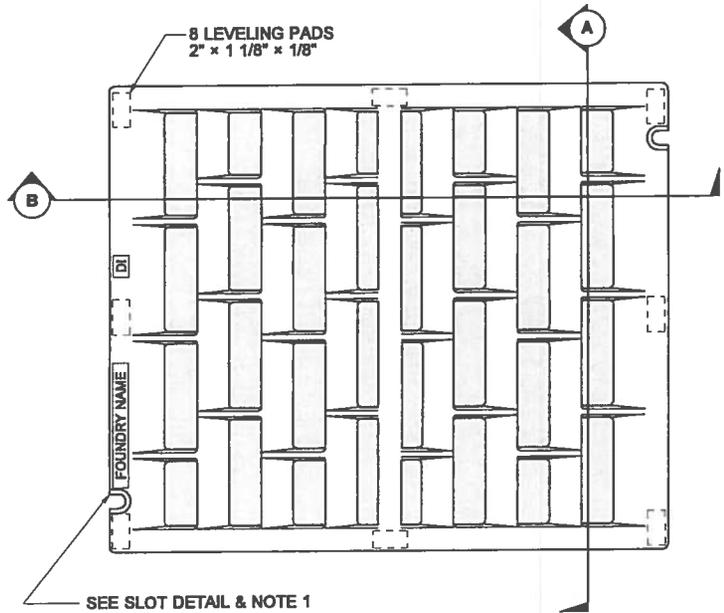


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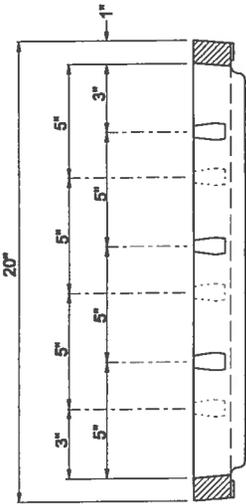
05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC
DATE	REVISION	BY

NOTES

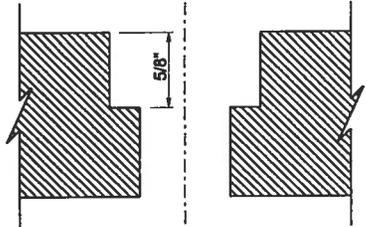
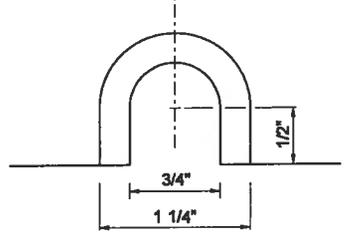
1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.



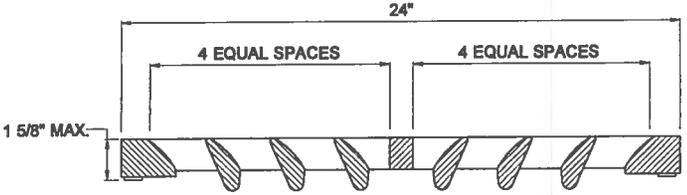
PLAN VIEW



SECTION A



SLOT DETAIL



SECTION B

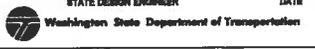


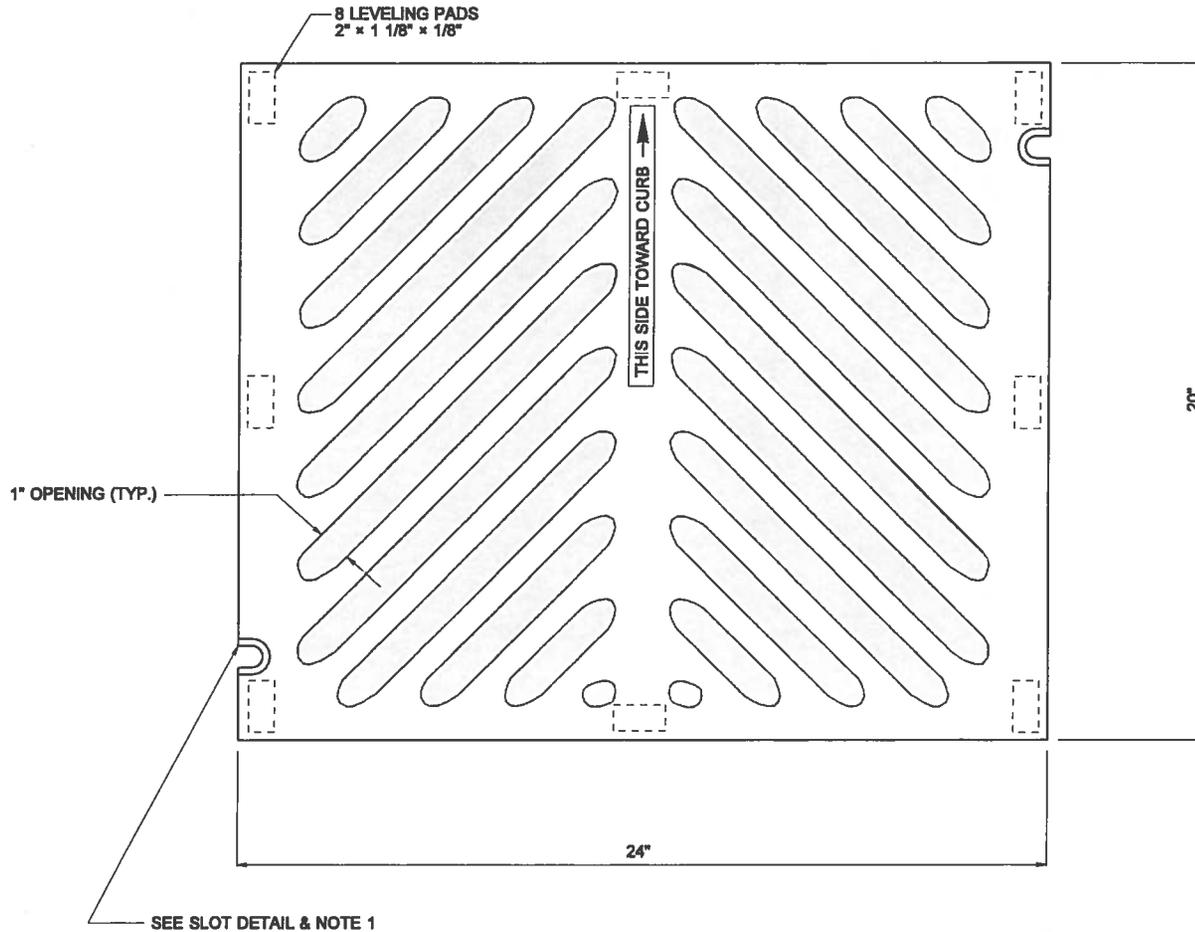
EXPIRES JULY 1, 2003

BI-DIRECTIONAL VANED GRATE FOR CATCH BASIN AND INLET
STANDARD PLAN B-2c

SHEET 1 OF 1 SHEET

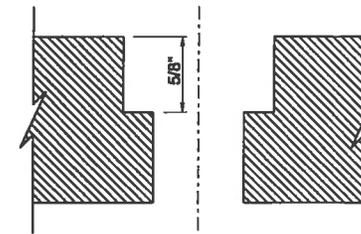
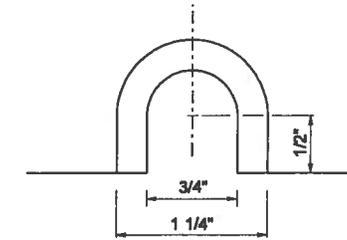
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APPROVED FOR PUBLICATION Harold J. Peterfeso 06-17-02 STATE DESIGN ENGINEER DATE			
05/2002	DELETED VANE DETAIL; ADDED SLOT DETAIL; REVISED NOTES.	RC	
DATE	REVISION	BY	





NOTES

1. When bolt down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt down slots varies among different manufacturers.
2. Refer to Standard Specification 9-05.15(2) for additional requirements.
3. For frame details, see Standard Plan B-2a.
4. The thickness of the grate shall not exceed 1 5/8".



SLOT DETAIL



EXPIRES JULY 1, 2003

**HERRINGBONE GRATE FOR
CATCH BASIN
AND INLET
STANDARD PLAN B-2d**

SHEET 1 OF 1 SHEET

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