



Standard Specifications

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Details

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SECTION 200 – GENERAL CONDITIONS

GENERAL CONDITIONS

SECTION 201 – DEFINITIONS

- 1.01 The following are definitions found commonly in the City of Bottineau Standard Specifications:
- A. Contract Documents: The Contract consists of the following documents: The Advertisement, Information for Bidders, The General Conditions of the Contract, Special Conditions of the Contract, the Specifications and Drawings, Special Specifications, the Contract, including all additions, deletions and modifications incorporated therein before execution of the Contract.
 - B. Owner: The Owner is the City of Bottineau, North Dakota.
 - C. Engineer: Is the designated City Engineer of Bottineau, North Dakota, which is Matthew T. Johnson of Wold Engineering, P.C. or his authorized representative.
 - D. Contractor: Is the Contractor named in the Contract Documents.
 - E. Proposal: Is the offer of a bidder to perform the work described in the Contract Documents when made out and submitted on the prescribed Proposal Form, properly signed and guaranteed.
 - F. Proposal Guaranty: Is the cashier's check and/or Bidder's Bond accompanying the Proposal submitted by the bidder, as a guaranty that the successful bidder will enter into a Contract with the Owner for construction of the work.
 - G. Contract: Is the agreement covering the performance of the work described in the Contract Documents including all supplemental agreements therein and all general and special provisions pertaining to the work and materials thereof.
 - H. Contractor's Bond: Is the approved form of security furnished by the Contractor and their Surety as a guaranty of good faith on the part of the Contractor to execute the work in accordance with the terms of the Contract.

- I. Written Notice: Shall be considered as served when delivered in person, sent by registered mail, or by email to the Contractor at the address shown on the Contract or to the Superintendent required under Section 223.23.01 of these general conditions.
- J. Specifications: Shall mean the legal and procedural documents, General Conditions of the Contract, together with modifications thereof, and the Detailed Specification Requirements, with all addenda thereto.
- K. Drawings: Are all general and detailed official drawings or reproductions of drawings pertaining to the work or to any structure connected therewith, including such working plans as may be furnished or approved by the Engineer from time to time as the work progresses.
- L. ASTM: American Society for Testing Materials
- M. AASHTO: American Association of State Highway and Transportation Officials
- N. NDDOT: North Dakota Department of Transportation
- O. AWWA: American Water Works Association
- P. SDR: Standard Dimension Ratio
- Q. DR: Dimension Ratio
- R. ANSI: American National Standards Institute
- S. WW-P: Federal Specification Prefix
- T. NDDOT-SS: North Dakota Department of Transportation Standard Specifications for Road and Bridge Construction, 2008 Edition, As Revised.

SECTION 202 – PRECONSTRUCTION CONFERENCE AND NOTICE TO PROCEED

- 2.01 Before the work can begin, a preconstruction conference must be held with the Engineer and Contractor. After the preconstruction conference is concluded, the notice to proceed can be given.
- 2.02 The mailing or delivery of a copy of the executed Contract to the Contractor or authorized agent constitutes the “Notice to Proceed”. The Contractor shall begin and shall prosecute the work regularly and uninterruptedly thereafter (unless otherwise directed in writing by the Owner) with such force as to secure the completion of the work within the time stated in the Proposal.

SECTION 203 – CONTRACTOR'S UNDERSTANDING

- 3.01 It is understood and agreed that the Contractor has by careful examination:
- A. Satisfied their self as to the nature of the work.
 - B. Conformation of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the work.
 - C. The General and local conditions.
 - D. All other matters which can in any way affect the work under this Contract.
- 3.02 No verbal agreement with any officer, agent or employee of the Owner, either before or after the execution of the Contract, shall effect or modify any of the terms or obligations herein contained.

SECTION 204 – INTENT OF DRAWINGS AND SPECIFICATIONS

- 4.01 The intent of the Drawings and Specifications is that the Contractor furnish all labor and materials, equipment and transportation necessary for the proper execution of the work unless specifically noted otherwise.
- 4.02 The Contractor shall do all the work shown on the Drawings and described in the Specifications and all incidental work considered necessary to complete the project in a substantial and acceptable manner, and to fully complete the work, ready for use, by the Owner.

SECTION 205 – DRAWINGS AND SPECIFICATIONS

- 5.01 Copies of the drawings and specifications furnished: The Engineer will furnish to the Contractor four (4) copies of drawings and special Specifications reasonably necessary for execution of the work.
- 5.02 Discrepancies in Drawings: Any discrepancies found between the Drawings and Specifications and site conditions or any errors or omissions in the Drawings or Specifications shall be immediately reported to the Engineer, who shall promptly correct such error or omission in writing. Any work done by the Contractor after their discovery of such discrepancies, errors or omissions shall be done at the Contractor's risk.
- 5.03 Dimensions: Figured dimensions shall govern over scaled dimensions.

- 5.04 Drawings and Specifications at the Job Site: One complete set of all Drawings and Specifications shall be maintained at the job site and shall be available to the Engineer or his representative at all times.

SECTION 206 – SHOP DRAWINGS

- 6.01 The Contractor shall provide shop drawings, settings, schedules, and such other drawings as may be necessary for the prosecution of the work in the shop and in the field as required by the Drawings, Specifications, or Engineer’s instructions.
- 6.02 The Contractor shall submit for approval two (2) copies of all shop drawings and descriptive data as applicable showing all features not fully detailed on the Contract Plans but essential for a complete coordinated installation.
- 6.03 The approval of shop drawings indicates only that the type and kind of equipment, general method of construction and/or detailing is satisfactory but shall not be construed as a complete check. The responsibility rests on the Contractor for the proper dimensioning, detailing of connections, and incorporating into the work satisfactory material and equipment meeting the requirements of the Contract Plans and Specifications.

SECTION 207 – SURVEYS

- 7.01 The Engineer shall establish all line and grade surveys necessary to provide cut/fill stakes at 25 foot intervals for curb and street grading, 50 foot intervals for sewer and water projects, and 100 foot intervals for wide-area grading projects. The Contractor shall transfer these grades and lines to the actual construction. More detailed surveying will be done at the contractor’s expense.
- 7.02 The Contractor shall exercise proper care in the preservation of stakes set for his use by the Engineer. If such stakes are damaged, lost, or removed by the Contractor’s operations, they shall be reset at their expense.
- 7.03 The Contractor shall protect from disturbance or damage all monuments and property markers until the Engineer has witnessed or otherwise referenced their locations and shall not remove them until directed.

SECTION 208 – INSURANCE

- 8.01 The Contractor shall not commence work under this Contract until they have obtained the insurance required under this paragraph and filed with the City Auditor necessary insurance certificates and such insurance has been approved

by the Owner. Nor shall the Contractor permit any sub-contractor to commence work on their sub-contract until the insurance required of the sub-contractor has been obtained and approved.

- A. Workman's Compensation and Employer's Liability Insurance shall be secured and maintained as required by the State of North Dakota.
- B. Public Liability, Bodily Injury, and Property Damage: Injury of one or more persons, and/or property damage:
 - 1. Per Accident \$1,000,000.00
- C. Automobile and Truck Public Liability, Bodily Injury, and Property Damage: Injury of one or more persons, and/or property damage:
 - 1. Per Accident \$1,000,000.00

SECTION 209 – PERMITS & LICENSING

9.01 All permits and licenses necessary for the prosecution of the work shall be secured and paid for by the Contractor.

SECTION 210 – LAWS TO BE OBSERVED

10.01 The Contractor shall give all notices and comply with all Federal, State, and local laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Engineer, the Contractor shall bear all costs arising there from.

SECTION 211 – ROYALTIES AND PATENTS

11.01 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof.

11.02 The Owner shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has information that the process or article specified is an infringement on a patent, they shall be responsible for such loss unless they promptly give such information to the Engineer.

SECTION 212 – INDEMNITY

12.01 The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against employees, in the execution of the work or in the guarding of it.

SECTION 213 – PROTECTION OF WORK

13.01 The Contractor shall, at their own expense, erect and maintain adequate sign, barricades, and warning lights and take all necessary precautions for the protection of the work and the safety of the public.

13.02 All barricades and obstructions shall be protected at night by signal lights which shall be kept burning from sunset to sunrise.

13.03 The Contractor will at all times until its completion and final acceptance protect his work, apparatus and material from accidental or other damage and shall make good any damages thus occurring, at their own expense.

13.04 The name and telephone number of the Contractor shall appear on all barricades set by them.

SECTION 214 – PROTECTION OF EXISTING UTILITIES

14.01 The Contractor, prior to excavation, shall determine the location of all existing utilities within the work area and shall exercise all due caution to prevent damage thereto during all excavation or backfilling operations.

14.02 Any utility damaged during construction shall be repaired by the Contractor at their expense. Existing manholes and gate valves shown on the drawings are to be used by the Contractor as general information only and are not to be construed, in any way, as relieving the Contractor of any responsibilities outlined in this Section.

SECTION 215 – PUBLIC SAFETY AND CONVEINIENCE

15.01 The Contractor shall at all times so conduct their work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property in a manner satisfactory to the Engineer.

- 15.02 No road or street shall be closed to the public except with the permission of the Engineer.
- 15.03 Fire hydrants on or adjacent to the work shall be kept accessible to the firefighting equipment at all times.
- 15.04 Temporary provisions shall be made by the Contractor to insure the use of sidewalks and the proper functioning of all gutters, storm sewer inlets, and drainage ditches, which shall not be obstructed except as approved by the Engineer.

SECTION 216 – ACCIDENTS

- 16.01 The Contractor shall provide, at the site, such equipment and medical facilities as are necessary to supply first-aid service to anyone who may be injured in connection with the work.
- 16.02 The Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work; which caused death, personal injury, or property damages, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer and the Owner.

SECTION 217 – ASSIGNMENT OF CONTRACT

- 17.01 The Contractor shall not sublet, sell, transfer, assign or otherwise dispose of the Contract or any portion thereof, or of their right, title or interest therein, or their obligation there under, without written consent of the Owner.

SECTION 218 – SUB-CONTRACTS

- 18.01 At the time specified by the Engineer, the Contractor shall submit in writing to the Owner for approval of the Engineer the names of any sub-contractors proposed for the work. Sub-contractors may not be changed except at the request or with the approval of the Engineer.
- 18.02 The Contractor shall remain responsible to the Owner for the acts and omissions of their sub-contractors. The Contract Documents shall not be construed as creating any contractual relation between any sub-contractor and the Owner. The Contractor shall bind every sub-contractor by the terms of the Contract Documents.

SECTION 219 – CONTRACTOR’S RESPONSIBILITY

- 19.01 The Contractor shall have charge of and be responsible for the entire work under this Contract until the completion, and any imperfect or unfaithful work which may be discovered any time before the final acceptance of work embraced in this Contract shall be corrected immediately upon request of the Owner or Engineer.
- 19.02 The Contractor shall maintain a work force on site each workday, except during inclement weather, during the Contract period until the project is completed. Any work days not worked will be taken into account on any Request for Extension of Time for Completion and/or assessment of liquidated damages.

SECTION 220 – RIGHTS OF VARIOUS INTERESTS

- 20.01 Wherever work being done by the Owner’s employees or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony.

SECTION 221 – ENGINEER’S RESPONSIBILITY AND AUTHORITY

- 21.01 The Engineer will require, on the Owner’s behalf, that the construction be performed by the Contractor in accordance with the Plans and Specifications.
- 21.02 The Engineer shall also have authority on behalf of the Owner to require the proper prosecution of the installation of the work to the extent that the forces of labor may be increased or decreased by his order to insure the execution of the Contract in the time and manner prescribed.
- 21.03 The Engineer shall, within a reasonable time after presentation, make decisions in writing on any claims between the Contractor and Owner; such decisions shall be regarded as final.

SECTION 222 – INSPECTION OF WORK

- 22.01 Inspectors may be stationed on the work to report to the Engineer as to the progress of the work, the manner in which it is being performed, and also to report whenever it appears that materials furnished and work performed by the Contractor fail to fulfill the requirements of the Specification and Contract.

- 22.02 The Inspector may direct the attention of the Contractor to such failure or infringement but such inspection shall not relieve the Contractor from any obligations to furnish acceptable materials or to provide completed construction that is satisfactory in every particular.
- 22.03 In case of any dispute arising between the Inspector and the Contractor as to material furnished or the manner of performing the work, the Inspector shall have the authority to reject materials, and/or suspend the work until the questions and issue can be referred to and decided by the Engineer.
- 22.04 Inspectors are not authorized to revoke, alter, enlarge, relay, or release any requirements of these specifications, or to issue instructions contrary to the plans and specifications. Inspectors shall in no case act as management of the work by the Contractor.

SECTION 223 – CONTRACTOR’S EMPLOYEES

- 23.01 Contractors Superintendent: A qualified superintendent, who is acceptable to the Engineer, shall be maintained on the work and give efficient supervision to the work until its completion. The superintendent shall have full authority to act in behalf of the Contractor, and all directions given to the superintendent shall be considered given to the Contractor. The Contractor shall remove from the project any superintendent unsatisfactory to the Engineer.
- 23.02 Character of Workmen: Any foreman or workman employed by the Contractor, who in the opinion of the Engineer, does not perform their work in a skillful manner, or appears to be incompetent or incorrigible shall be dismissed by the Contractor or their representatives when requested by the Engineer, and such persons shall not again be permitted to return to the work without the written consent of the Engineer.

SECTION 224 – MATERIALS, SERVICES, AND FACILITIES

- 24.01 It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, mechanics for labor, tools, equipment, equipment rental, water, light, power, transportation, superintendent, temporary construction of every nature whatsoever necessary to execute complete and deliver the work within the specified time.

SECTION 225 – WORKMANSHIP AND MATERIALS

- 25.01 All work done and all materials and equipment furnished by the Contractor shall strictly conform to the plans and specifications. Competent labor, mechanics, and tradesmen shall be used on all work.
- 25.02 The acceptance at any time of the materials by or in behalf of the Owner shall not be a bar to future rejection if they are subsequently found to be defective or inferior in quality or uniformity of the material specified.
- 25.03 Whenever any material shall be condemned by the Engineer such material shall be removed at once from the line of work at the Contractor's expense, and shall not be brought back.

SECTION 226 – INSPECTION AND TESTING OF MATERIALS

- 26.01 During the progress of the work, it shall be subject to the inspection of the Engineer, and the Contractor shall afford every reasonable facility and assistance to the Engineer to make such inspection thorough and intelligent.
- 26.02 The fact that the Engineer is at the job site shall not be taken as an acceptance of the Contractor's work or any part of it. The Contractor shall notify the Engineer upon completion of their Contract and the work shall be given final inspection and test by the Engineer and if all parts of the work are acceptable and comply with the intent of the Plans and Specifications, a recommendation of final acceptance will be made by the Engineer to the Owner.
- 26.03 Contractor shall submit to the Engineer from time to time or when called upon to do so, and without charge, samples or specifications of materials they propose to use.
- 26.04 For projects under the control of the City of Bottineau, the City shall call and pay for all materials testing, including locally supplied materials and on site tests such as density tests for soil and bituminous paving. Exceptions to this general condition shall include material certifications and tests provided by non-local suppliers, job mix formulas required for paving mixes and performance tests of certain materials in place such as watermain and sewermain pressure tests. Any re-tests required due to test failures shall be paid for by the contractor. The testing laboratory will be selected by the Engineer and all tests shall be in accordance with the standards of the ASTM, AASHTO, and other recognized standards.
- 26.05 For all work covered by the City of Bottineau Standard Specification and Details and done in the right of way or public easement, the engineer or their qualified representative must be present at all times to observe and inspect the work.

Failure by the engineer to be present at all times will be cause for the City of Bottineau to stop the work until a qualified representative is present or can be cause for the City of Bottineau to reject the work.

SECTION 227 – CONFORMITY WITH PLANS AND SPECIFICATIONS

- 27.01 All materials which do not conform to the requirements of the Contract Documents, are not equal to samples approved by the Engineer, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall be rejected. Any defective work whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause shall be removed within ten (10) days after written notice is given by the Engineer, and the work shall be re-executed by the Contractor. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance of any part of it.
- 27.02 In the event the Engineer finds the materials furnished, work performed, or the finished product not in conformity with the plans and/or specifications but that the portion of the work affected will, in his opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, he will advise the Owner (Bottineau City Council) of his determination that the affected work be accepted and remain in place. In this event, the Engineer will document their determination and recommend to the Owner a basis of acceptance which will provide for an adjustment in the contract price for the affected portion of the work. The Engineer's determination and recommended contract price adjustments will be based on good engineering judgment and such tests or retests of the affected work as are, in their opinion, needed.
- 27.03 The acceptance by the Owner of the Engineer's recommendation with respect to the adjustment in the Contract price shall constitute final determination of said adjustment. Thereafter, the changes in contract price shall be covered by contract modifications (change order or supplemental agreement) as applicable.

SECTION 228 – SUSPENSION OF WORK

- 28.01 The Engineer shall have the authority to suspend the work, wholly or in part, for such period or periods, as he may deem necessary, due to unsuitable weather, or such other conditions as are considered unfavorable for prosecution of work, or failure on the part of the contractor to carry out the provisions of the Contract or to supply materials meeting the requirements of the Specifications. The Contractor shall not suspend operation without the Engineer's permission.

SECTION 229 – OWNER’S RIGHT TO CORRECT DEFICIENCIES

29.01 If the Contractor shall neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner, after three (3) days written notice to the Contractor may, without prejudice to any other remedy he may have, correct such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

SECTION 230 – OWNER’S RIGHT TO TERMINATE CONTRACT

30.01 The Owner shall have the right to terminate the employment of the Contractor after giving seven (7) days written notice of termination to the Contractor in the event of any default by the Contractor and upon receiving written notice from the Engineer certifying cause for such action.

30.02 In the event of such termination the Owner may take possession of the work and of all materials, tools, and equipment thereon and may finish the work by whatever method and means he may select.

30.03 In such a case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

30.04 It shall be considered default by the Contractor whenever they shall:

- A. Undergo voluntary or involuntary bankruptcy, become insolvent, or assign his assets for the benefit of his creditor.
- B. Disregard or violate important provisions of the Contract Documents or Engineer’s instructions, or fail to prosecute the work according to the agreed schedule of completion, including extensions thereof.
- C. Fail to provide a qualified superintendent, competent workmen or subcontractors, or proper materials, or fail to make prompt payment therefore.

SECTION 231 – REMOVAL OF EQUIPMENT

- 31.01 At the termination of this Contract, or in the case of annulment of the Contract before completion, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of their equipment and supplies from the property of the Owner.
- 31.02 Should the Contractor fail to remove such equipment and supplies the Owner shall have the right to remove them at the Contractor's expense.

SECTION 232 – CHANGES IN THE WORK

- 32.01 The Owner may, as the need arises, order changes in the work through additions, deletions, or modifications without invalidating the Contract.
- 32.02 Compensation and time of completion affected by the changes shall be adjusted at the time of ordering such changes. The value of such changes shall be determined by unit prices named in the Contract.

SECTION 233 – EXTRA WORK: CHANGE ORDER AND FORCE ACCOUNT

- 33.01 If any work should be required for which no unit price for the supplying of material or the performance of such work is provided in the proposal, it shall be classified as Extra Work. However, it is specifically understood that if no bid items for the removal and replacement of paving, concrete, sod, or any other ground surface improvements are included in the Proposal, all such items disturbed shall be removed and replaced in original condition or better as non-pay items.
- 33.02 Written Change Order: For any extra work required, the Engineer for the Owner and the Contractor shall first attempt to negotiate a price by written change order. Consulting engineers hired by the Owner for any projects covered by these Standard Specifications shall be required to obtain approvals for any extra work as set forth hereinafter.
- A. The Engineer shall determine any and all quantities of materials necessary to accomplish the extra work.
 - B. The Contractor shall provide to the Engineer written quotes from suppliers for the price of the materials, an estimate of man-hours needed to perform the work together with wage and employee benefits information, and an estimate of hours for equipment to be used with rates to be charged for such equipment. The Contractor will be allowed to add 10 Percent to the total cost of the previous items.

- C. The Engineer and Contractor shall then negotiate a change order price and the written change order shall be prepared by the Engineer. If the price negotiated and agreed upon exceeds \$10,000 or 10% of the original contract amount, whichever is greater, the change order must be approved by the City Council.
 - D. No extra work covered by any change order shall be done by the Contractor without a valid change order. However, the Contractor may be allowed to proceed with extra work without formal change order approval if, in the opinion of the Engineer, the immediate commencement of the extra work will relieve a situation of hazard, or substantial inconvenience to the public. A change order (or force account agreement) shall be prepared thereafter.
- 33.03 If the Owner and the Contractor cannot agree to a price for extra work pursuant to the methods set forth hereinbefore, the extra work shall be done by force account. However, the final amount paid for extra work by force account shall not exceed the lowest price offered by the contractor in the change order process.
- 33.04 Extra work by force account shall not proceed without written approval from the Engineer. Extra work done by force account shall be handled and compensated in the following manner:
- A. Labor: For all laborers and supervisors in the direct charge of the specific operations, the Contractor will receive the wage paid for each hour the laborers and the supervisor are actually engaged in the Force Account Work, but not to exceed any rate of wage agreed to before beginning the work.
 - 1. The Contractor will receive actual costs paid to or on behalf of the workers for subsistence and travel allowance, health and welfare benefits, pension fund, or other fringe benefits when such amounts are required by collective bargaining agreement or employment contract generally applicable to the classes of labor employed in work, but excepting any amounts already included in wage rates paid. Any subsistence or travel allowance paid to workers shall be prorated according to the number of hours employed on the Force Account and other classes of work.
 - 2. The Contractor will be paid an amount equal to 15 Percent of the sum of the above items for overhead and profit.
 - B. Bond, Insurance, and Taxes: For premiums paid on additional bond, property damage, liability, workmen's compensation, and unemployment insurance, and for social security taxes on the Force

Account wages, the Contractor will receive the actual cost, to which the sum of 6% will be added. The Contractor shall furnish satisfactory evidence of the premium rates.

- C. Materials: For all materials accepted by the Engineer and permanently installed into the work, the Contractor will receive the actual cost (including transportation charges paid by the Contractor) of the material delivered, to which a sum equal to 10% will be added. For materials used in connection with (but not entered permanently into) the work, a reasonable depreciation will be allowed.
- D. Equipment: If the Engineer and Contractor cannot agree on equipment rates for force account work, the following method of determining equipment rates shall be used. For use of authorized equipment and additional traffic control devices required by the Force Account Work, the Contractor will receive rental rates determined according to the then current issue of the North Dakota Department of Transportation publication entitled "Rental Rates for Equipment and Traffic Control Devices". This manual shall constitute a part of this Specification. No percentage will be added to these rates.
 - 1. Procedures governing rented or owner-operated equipment, attachments, and accessories, types and quantity of equipment, measurement of equipment time, use of equipment in excess of 50 hours per week, stand-by time, and equipment charges will be set forth in the NDDOT publication "Rental Rates for Equipment and Traffic Control Devices".
- E. Miscellaneous: No additional allowance will be made for use of small tools not listed in the rental rate schedule or other costs for which no specific allowance has been provided.
- F. Subcontracting: For any Force Account or Extra Work performed by a Subcontractor with the written authorization of the Engineer, the Contractor will receive an additional allowance for administrative and overhead expense. The additional allowance will be a percentage of the total Force Account or Extra Work invoice equal to 10 Percent.
- G. Authority of the Engineer: The Engineer has authority to require alterations in equipment and labor force assigned to Force Account Work. The Engineer is also authorized to limit overtime work to that normally used on the project for work of similar nature, or to require overtime when an emergency exists, and to require the stopping of Force Account Work

when adverse conditions severely limit productivity.

- H. Daily Records: Each day the Contractor's representative and the Engineer shall compare and reconcile the records of labor, materials, and equipment used in the Force Account Work.
- I. Statements: The Contractor shall furnish the Engineer with duplicate itemized statements of the cost for the Force Account Work, detailed as follows:
 - 1. Payroll for laborers and foreman.
 - 2. Quantities of materials, prices, extensions, and transportation costs paid by the Contractor.

Statements shall be accompanied by receipted invoices for materials used, including transportation charges by the Contractor. The statements shall be adjusted when applicable to reflect any discounts offered by the supplier.

If materials used in the Force Account Work are not specifically purchased but are taken from the Contractor's stock, the Contractor shall furnish an affidavit certifying that such materials were taken from stock, that the quantity claimed was actually used, and that the price and transportation costs claimed are invoices.

The Engineer will prepare a summary statement of the Force Account Work which will be submitted to the Contractor for verification and signature. The value of the Force Account Work covered by approved statements will be included in progressive pay estimates.

- J. Compensation: Compensation provided by previous provisions of this Section shall be accepted by the Contractor as payment in full for Extra Work performed on a Force Account basis.
- K. Specialty Work: When the Engineer and Contractor determine a special service or item of work cannot be performed by the Contractor or authorized Subcontractors, the service or Extra Work item may be performed by a specialist.
- L. Invoices for such work on the basis of current market price may be accepted without complete itemization of labor, material, and equipment cost when it is not practicable and not according to established practice of the special service industry to provide such complete itemization. To compensate the Contractor for administrative and overhead costs, an allowance will be added to the specialty work invoice equal to 10%.

- M. Formal Audit: The Owner has the right to audit the Contractor's record with respect to extra work done by change order or force account.

SECTION 234 – OPERATIONS AND STORAGE AREAS

- 34.01 All operations of the Contractor, including storage of materials, shall be confined to areas authorized by the Owner. Any additional land and access thereto not shown on the drawings that may be required for temporary construction facilities or for storage of materials shall be provided by the Contractor with no liability to the Owner.

SECTION 235 – SCHEDULE OF COMPLETION

- 35.01 The Contractor shall submit at a reasonable time, as requested by the Engineer, schedules which shall show the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the several parts of the work and estimated dates of completion of the several parts. The Contract may specify that certain segments of the Contract must be completed before other segments are commenced by the Contractor. In this case, interim completion dates may be applied and liquidated damages enforced on segments not completed as required.

SECTION 236 – ORDER OF CONSTRUCTION

- 36.01 The Engineer shall have control of the order in which the various parts of the construction work are to be performed. The order of work as determined by the Contractor will be followed except where the Engineer determines that such order would not be to the best interest of the Owner or the general public.

SECTION 237 – EXTENSION OF CONTRACT TIME

- 37.01 A delay beyond the Contractor's control occasioned by an Act of God, or Act or omission on the part of the Owner or by strikes, lockouts, fire, ect., may entitle the Contractor to an extension of time in which to complete the work as determined by the Engineer; provided, however, that the Contractor shall immediately give written notice to the Engineer of the cause of such delay.
- 37.02 Delay in material shipping shall not be sufficient reason for an extension unless so determined by the Engineer. The granting of any extension of time shall not be the basis for any claim for extra costs incurred by the Contractor.

SECTION 238 – USE OF COMPLETED PORTIONS

38.01 The Owner shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding that the time for completing the entire work of such portions may not have expired; but such taking shall not relieve the Contractor of their responsibility to complete the project in accordance with the Contract Documents. If such prior use increases the cost of or delays the completion of uncompleted work 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.

SECTION 239 – PROTECTION OF PROPERTY

39.01 The Contractor shall, at their own expense, protect by falsework, braces, shoring or other effective means, all buildings, walls, fences, and other property along their line of work or affected directly by their work, against all damage and shall repair or repay the injured owners for such damage.

SECTION 240 – CORRECTIONS OF WORK BEFORE FINAL PAYMENT

40.01 The Contractor shall promptly remove from the premises all materials condemned by the Engineer as failing to conform to the Contract, whether incorporated in the Work or not, and the Contractor shall promptly replace and re-execute their own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of the Contractor destroyed or damaged by such removal or replacement.

SECTION 241 – DEDUCTION FOR UNCORRECTED WORK

41.01 If the Engineer deems it inexpedient to correct work injured or not in accordance with the Contract, an equitable deduction from the contract price shall be made therefore.

SECTION 242 – FINAL ACCEPTANCE OF THE WORK

42.01 Before any work is considered final and ready for acceptance by the City of Bottineau; the Contractor, Consultant Engineer (if applicable), and the City's representative shall perform a project walkthrough.

42.02 Any deficiencies in work will be documented by the Engineer or City and will be corrected before the warrantee period will be allowed to begin. Once the deficiencies are corrected, the City will be notified and asked to complete a final project walkthrough with the Contractor. If no other issues are found, the Work shall be considered final, the one year warrantee period will begin, and the work shall become the maintenance responsibility of the City of Bottineau.

SECTION 243 – WORK IN FREEZING WEATHER

43.01 Work may not continue in freezing weather, unless specifically authorized in writing by the Engineer.

SECTION 244 – CLEANING UP

44.01 The Contractor must keep all streets, alleys, and sidewalks as free from material and debris as the character or the Work will permit, and upon completion of any part of the Work, must within reasonable time, remove all surplus materials and debris, and leave right-of-way in acceptable conditions.

44.02 Failure to comply with this provision after due and proper notice has been given by the Owner, will be sufficient grounds for the Owner to proceed to clean up such material and debris and make such repairs, charging the same to the Contractor, who hereby agrees to the provisions as above set forth.

SECTION 245 – RELEASE OF LIENS

45.01 If required, the Contractor shall deliver to the Owner a complete release of all liens arising out of this Contract before the retained percentages or before the final payment is paid. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner such amounts as the Owner may have been compelled to pay in discharging such liens including all costs and a reasonable attorney's fee.

SECTION 246 – PROGRESS PAYMENTS

46.01 So long as the work herein contracted for is carried on in accordance with the provisions of the Contract, the Engineer will, on or before the first day of each month, make an approximate estimate of the value of the work performed during the previous month. Progress payments in the amount of 90 Percent of the estimate will be made to the Contractor in cash within approximately thirty (30)

days after preparation of the partial estimate by the Engineer and approval of the same by the Owner. The Owner may at times reserve and retain out of said payments all sums it may be authorized to reserve or retain.

46.02 The amount retained will be reduced to 5 Percent after completion of 50 Percent of the project and to 1 Percent after substantial completion of the project if the Engineer finds that progress is satisfactory and that final completion will not be jeopardized by such reduction.

46.03 For each progress payment, an additional \$1,000 shall be retained by the City until it has been determined by the State Commissioner of Labor that no action or fines are pending against the Contractor under the provisions of NDCC 43-07-20.

SECTION 247 – FINAL PAYMENT

47.01 The Engineer will, as soon as practicable after the completion and final acceptance of the Work, make a final estimate of the amount of work done under the Contract. This estimate shall be based on as-built measurements made by the Engineer, and based on unit prices in the Proposal plus all approved additions less all approved deductions and less previous payments made.

SECTION 248 – GUARANTEE

48.01 The Contractor guarantees all work constructed under the Contract for a period of one (1) year from the date of final acceptance against defects in material or workmanship. The Contractor shall bear the entire cost and expense of all repairs which may, from any imperfection in work or materials become necessary within that time.

48.02 If at any time within the period of guarantee, any of the work included in the guarantee shall, in the judgment of the Engineer, require any repair or reconstruction, he shall notify the Contractor to make the repairs required. Upon receipt of the notice, the Contractor shall proceed with such repairs and shall complete the same within a reasonable time.

48.03 If the Contractor shall neglect or fail to proceed with the repairs within twenty (20) days or if, in the opinion of the Engineer, the repairs do not admit of sufficient delay to issue said notice and to await the action of the Contractor, then the Owner shall have the right to cause such repairs to be made and the cost shall be paid by the Contractor. The liability of the bond given to secure the faithful performance of the Contract shall continue during the full guarantee period.

48.04 At the expiration of the guarantee period, the Contractor and their surety shall be released from further obligation under this Contract, providing the Engineer will certify to the Owner that the work performed under this Contract is in good and proper condition at the time.

END OF SECTION

SECTION 300 – SPECIAL CONDITIONS

SPECIAL CONDITIONS

SECTION 301 – LIQUIDATED DAMAGES

1.01 Should the Contractor fail to complete the work, including items requiring correction, at the time specified in the proposal, or within such extensions of time as may be allowed in writing by the Engineer, the Contractor shall pay to the City of Bottineau as and for liquidated damages for such failure of completion a sum of money based upon the value of such contract in accordance with the following schedule:

Original Contract Amount Over to and Including	Liquidated Damages per Calendar Day
\$0 - \$50,000	\$200
\$50,000 - \$100,000	\$400
\$100,000 - \$250,000	\$600
\$250,000 - \$500,000	\$750
\$500,000 - \$1,000,000	\$900
\$1,000,000 - Up	\$1,500

SECTION 302 – USE OF FIRE HYDRANTS AND VALVES

2.01 No person or Contractor shall operate any water system valve without permission from the Superintendent of Water and Sewer.

END OF SECTION

SECTION 600 – PROJECT TESTING REQUIREMENTS

PROJECT TESTING REQUIREMENTS

PART 1 – GENERAL

1.01 Section Summary

- A. Required testing frequency and procedures for City of Bottineau projects and projects in City right-of-way.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment. B. Section 1900 – Subgrade Preparation.
- C. Section 2000 – Trench Excavation and Backfill. D. Section 2100 – Water Main.
- E. Section 2200 – Water Main Services. F. Section 2300 – Sanitary Sewer.
- G. Section 2400 – Sanitary Sewer Services.
- H. Section 2700 – Storm Sewer.
- I. Section 2900 – Aggregate Base Course.
- J. Section 3000 – Hot Bituminous Pavement.
- K. Section 3100 – Concrete Curb and Gutter.
- L. Section 3200 – Concrete Walk, Medians, and Driveways.

1.03 References

- A. NDDOT Field Testing Manual.
- B. AASHTO Testing Procedures.
- C. ASTM Testing Procedures.

PART 2 – EXECUTION

2.01 Excavation, Embankment, and Aggregate Base.

Type of Construction:		Excavation, Embankment, and Aggregate Base	
Test Required	Frequency	Specification	
1. Gradation			
(a) Granular Borrow	1/500 Tons	Section 1800 2.01B	
(b) Aggregate Base	1/1000 Tons	NDDOT Class 5 Specification	
2. Moisture-Density (Standard Proctor)			
(a) Embankment Soil	1 per major soil	AASHTO T-99	
(b) Aggregate Base	1 per source	AASHTO T-99	
3. Compaction			
(a) Embankment Soil (subgrade)	1/1000 SY or 1/200 FT for Each Lift, Whichever is More Frequent	100% Maximum Density (AASHTO T-99) within 1 foot of subgrade, otherwise 95% Maximum Density with ±3% optimum moisture.	
(b) Utility Trench Backfill	1/400 LF at Various Depths	100% Maximum Density (AASHTO T-99) within 1 foot of subgrade, otherwise 95% Maximum Density with ±3% optimum moisture.	

- A. Compaction testing can be done by a nuclear density gauge.
- B. Compaction testing by sand cone method must be done on 10 Percent of compaction tests.

2.02 Water Main and Services

Type of Construction:		Water Main and Services
Test Required	Frequency	Specification
1. Hydrostatic Pressure	From Valve to Valve Maximum of 1200 LF	150 PSI for 2 hours, Max. 5 psi drop in Pressure
2. Total Coliform (Bacteria)	2/Test Section, maximum of 1200 LF	2 passing tests per test section taken 24 hours apart.

2.03 Sanitary Sewer and Services

Type of Construction:		Sanitary Sewer and Services
Test Required	Frequency	Specification
1. Deflection (Mandrel)	Manhole to Manhole	30 day minimum wait after installation before test, 5% maximum
2. Closed Circuit TV Inspection (Televise)	Manhole to Manhole	Optional test if Mandrel test indicates areas of concern.

2.04 Concrete

Type of Construction:		Concrete
Test Required	Frequency	Specification
1. Air Entrainment	1/200 CY or 1/Day, Whichever is More Frequent	ASTM C 231 (%)
2. Slump	1/200 CY or 1/Day, Whichever is More Frequent	ASTM C 143

3. Compressive Strength	1/200 CY or 1/Day, Whichever is More Frequent	ASTM C39 & ASTM C31
4. Temperature	1/200 CY or 1/Day, Whichever is More Frequent	ASTM C1064 (F)

2.05 Bituminous Paving

Type of Construction:		Bituminous Paving
Test Required	Frequency	Specification
1. Gradation		
(a) Chip Seal Cover Aggregate	1/400 Tons	AASHTO T-27 & AASHTO T-10
(b) Plant Mix Aggregate Gradation	1/1500 Tons	AASHTO T-27 & AASHTO T-11
2. Percent Fractured Faces	1 per Job	NDDOT 4
3. Asphalt Binder Content (%)	1/6 loads of Bitumen	One sample from bitumen cutoff report.

- A. When bituminous paving testing results are out of specification, the Engineer shall deduct payment from the bituminous paving quantity due the Contractor by following Section 408.05C.3 of the NDDOT Spec.

2.06 General

- A. Contractor shall assist Engineer in obtaining materials needed for conducting tests. Contractor will supply labor and equipment necessary for taking tests.
- B. Engineer shall determine all test locations.
- C. When the work does not meet test requirements, the Engineer shall have sole authority to reject the work and require the Contractor to take corrective action.
- D. The testing frequency in this Section may be adjusted with approval of the Engineer.

END OF SECTION

SECTION 900 – SUBMITTAL PROCEDURES

SUBMITTAL
PROCEDURES

PART 1 – GENERAL

1.01 Section Summary

- A. General procedures for submitting documentation during the course of the Contract.

1.02 Sequencing and Scheduling

- A. Upon receiving submittals, the Engineer will require ten (10) days to review the submittals.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Contractor’s Construction Schedule

- A. Submit preliminary schedule and progress schedule at the preconstruction conference consistent with Section 235 of the Specifications.

3.02 Emergency Contact List

- A. Before work can begin, submit a typed list of 24 hour on-call personnel for the Project. This list shall include all key personnel.

3.03 Shop Drawings and Manufactures’ Information

- A. Conform to the general requirements of Section 206 of this Specification, except as modified herein.

- B. Submit a minimum of 2 copies of shop drawings, plus the amount of copies the Contractor wants returned. Each copy shall contain the following information:
 - 1. Project title.
 - 2. Date of submission and date of any previous submission.
 - 3. Names of: Contractor, subcontractor, supplier, and manufacturer.
 - 4. Identification of product and Specification Section number.
 - 5. Identification of revisions from previous submittals.
 - 6. A 4x4 inch blank space for the Engineer's stamp.
- C. Engineer will stamp shop drawings and indicate requirements for Contractor's review or resubmittal as follows:
 - 1. No Exception Taken
 - 2. Make Corrections as Noted
 - 3. Revise and Resubmit
 - 4. Rejected See Remarks

3.04 Test Reports

- A. Submit 1 copy of all inspections, tests, and approvals required in the Specification.

END OF SECTION

SECTION 1000 – QUALITY REQUIREMENTS

QUALITY REQUIREMENTS

PART 1 – GENERAL

- 1.01 Section Summary
 - A. This section includes information on testing and inspection services and procedures for quality control and quality assurance.
- 1.02 Related Sections
 - A. Section 900 – Submittal Procedures
 - B. Section 200 – General Conditions
- 1.03 References
 - A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction” 2008 Edition, As Revised.
- 1.04 Submittals
 - A. Before construction may start, submit testing agency information for approval by the Engineer.
 - B. Submit copies of all testing agency test results or analysis consistent with Section 900 – Submittal Procedures.
 - C. Provide all Manufactures certificates of quality control or testing performance.
- 1.05 Tests and Inspections
 - A. Notify Engineer 48 hours in advance for tests and inspections.
 - B. Notify Engineer and Contractor immediately of irregularities or deficiencies observed in the work during performance of its services.
 - C. Provide qualified personnel.
- 1.06 Laboratory Reports
 - A. After each test and inspection, submit 1 copy of Laboratory Reports to the Engineer.

- B. Include in the report the following information:
 - 1. Date Issued
 - 2. Project Name and Number
 - 3. Name of the individuals performing tests and inspections
 - 4. Date, time, and location of sample, test, and inspection.
 - 5. Type of tests/re-tests and inspection/re-inspection, methods used for each
 - 6. Results of tests and conformance to Contract Documents
 - 7. Recommendations on re-testing or re-inspecting

1.09 Manufacturer's Certificates

- A. If requested by the Engineer, provide manufacture's certificate along with any shop drawings certifying that products meet or exceed specified requirements executed by a responsible officer.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Testing Responsibilities

- A. The Contractor shall be responsible for ensuring the quality of work meets the requirements of the Contract Documents.
- B. For specific test and inspection requirements, refer to each individual section for the related work and Section 600 – Project Testing Requirements.
- C. All work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 1100 – TEMPORARY FACILITIES AND CONTROLS

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 Section Summary

- A. Temporary facilities and utilities required during construction.

1.02 References

- A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Design”, 2008 Edition
- B. Manual on Uniform Traffic Control Devices (MUTCD), Latest Edition or as adopted.

1.03 Submittals

- A. Submit traffic control plan and include the following:
 - 1. Access, detour, and haul routes.
 - 2. Traffic control measures and devices.
 - 3. Contact information for 24 hr, 7 day a week on-call watch person/company in charge of traffic control.
 - 4. Permits or applications required by local authorities.
 - 5. Temporary facilities required.
- B. Submit a schedule for all temporary facilities and controls detailing coordination and timeframe for completion.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Mobilization

- A. Move equipment, materials, personnel, and all other items required to complete the work at the Project Site.

- B. Temporarily hold or relocate utilities and any miscellaneous structures, such as signs, power poles, guy wires, and mailboxes disturbed.

3.02 Signs and Mailboxes

- A. Remove, store, and replace all signs, posts, ect. that may be within the Project Site as directed by the Engineer.
- B. Remove existing mailboxes and posts, and place in the property owner's yard for them to store during construction. Install temporary mailboxes and a box for newspapers at locations determined by the Engineer or as shown on the drawings. Replace original mailbox when directed by the Engineer. Removal, temporary reinstallation, and replacement shall occur so mail delivery is not interrupted. Any mailboxes, posts, and appurtenances damages during construction shall be replaced with new at the expense of the contractor.

3.03 Temporary Utilities

- A. Provide and maintain all temporary facilities, controls, and utilities as long as needed to maintain safe and proper completion of the work. Remove temporary facilities, controls, and utilities as work progresses or as directed by the Engineer.
- B. Temporary Water for Construction
 - 1. Under no circumstances shall the Contractor operate any valves or hydrants to obtain water without the authorization of the Water Superintendent.

3.04 Temporary Construction

- A. Pumping and Dewatering
 - 1. Work to be performed may require draining, pumping, and dewatering, these items shall be considered incidental unless otherwise specified in a bid item.
 - 2. It shall be the sole responsibility of the Contractor to obtain permission from the City and/or landowner for the purposes installing equipment and discharging water.
 - 3. The Contractor shall protect the site and adjacent property from damages caused by dewatering and pumping.

4. The Contractor shall be responsible for designing the dewatering system, obtaining permission for discharging on private property, and obtaining the appropriate permits.

3.05 Project Traffic Control

- A. All traffic control devices shall conform to the latest version of MUTCD.
- B. No materials or equipment shall be placed on City streets that are open to traffic if it interferes with traffic flow.
- C. Field Quality Control
 1. Contractor shall inspect all traffic control devices daily for conformance to MUTCD. Any deficiencies must be corrected immediately.
 2. Furnish names, addresses, and phone numbers of at least 2 individuals who will be on call 24 hours a day, 7 days a week for placement and maintenance of traffic control devices.
 3. Provide access for emergency vehicles and buses to all properties at all times.
 4. Respond to any request by the Engineer to improve or correct the usage of traffic control devices within 1 hour of the time of notification.
 5. Keep all traffic control devices clean and in a legible condition. Damaged devices shall be removed immediately from service.

3.06 Temporary Barriers and Enclosures

- A. Provide approved temporary covers, enclosures, markers, and barriers as necessary to protect the work.
- B. Install safety fence around all excavations. Fence must enclose all excavations where work is suspended or the excavation must be filled in.

END OF SECTION

SECTION 1200 – TEMPORARY EROSION AND SEDIMENT CONTROL

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.01 Section Summary

- A. Temporary erosion and sedimentation control devices and techniques.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.

1.04 Submittals

A. Erosion Control Plans

1. Temporary Erosion Control Plan for use during construction activities.
2. Permanent Erosion Control Plan for site restoration after construction activities.
3. Storm Water Pollution Prevention Plan (SWPPP)
4. “Notice of Intent to Obtain Coverage Under NDPDES General Permit for Storm Water Discharge Associated with Construction Activity” (NOI).

1.05 Permits

A. NDPDES General Permit

1. Contractor shall acquire and maintain a NDPDES permit from the North Dakota Department of Health. The Contractor shall pay all fees associated with acquiring and maintaining the permit.

1.06 Sequencing and Scheduling

- A. Before starting any grading or construction activities, submit for approval all items listed in 1.04 of this Section and all permits listed in 1.05 of this Section.

- B. All temporary erosion control devices shall be installed before any construction may begin and shall remain in place and be maintained at all times, at the Contractor's expense.
- C. Permanent erosion control shall be installed as soon as construction shall allow.
- D. The Contractor is responsible for establishing permanent turf to avoid excessive soil erosion and for installation of landscaping and final project site stabilization.

PART 2 – PRODUCTS

2.01 Silt Fence

- A. Pre-fabricated silt fence will not be permitted. Any other variations in materials and/or devices shall be approved by the Engineer.
- B. Posts: Conform to NDDOT Spec 708.07.B1
 - 1. Wood
 - a. Length: Minimum 6 foot Green treated.
 - b. Width: 2 inch diameter round or 1-1/2 x 1-1/2 inch
 - 2. Steel
 - a. Length: Minimum 5 foot with projections for fastening wire or fabric and steel plate welded to bottom for extra support.
 - b. Minimum weight of 1.3lb/LF
- C. Fabric: Conform to NDDOT Spec 708.07.B3
 - 1. Minimum width of 36 inches
 - a. For specific properties conform to Table 1 in NDDOT Spec 708.07.B3
 - b. Monofilament Geotextile fabric shall be used when possible.

2.02 Stabilized Construction Access

- A. Aggregate
 - 1. Washed rock or woodchips.

- B. Geotextile Fabric
 - 1. Meet the requirements for R1 fabric according to NDDOT Spec Section 858.
- 2.03 Storm Drain Inlet Protection
 - A. Fiber Rolls
 - 1. 6 inch fiber rolls, minimum.
 - B. Sand Bags
 - C. Road Drain: Manufacturer: Wimco, LLC or approved equal.
 - D. Straw Bales
- 2.04 Ditch Checks and Velocity Checks
 - A. Silt Fence: Supported and Unsupported
 - B. Straw Bales
 - C. Fiber Rolls
- 2.05 Erosion Control Blanket
 - A. Shall meet the requirements of the type specified on the Plans, as detailed in NDDOT Spec Section 856, Table 856-1.
- 2.06 Dust Control
 - A. Water: free of any material which impedes flow through spraying device.

2.07 Temporary Cover Crop

A. Seed

1. Use NDDOT seed mix Class IV in all areas except for high maintenance areas where winter wheat shall be omitted and replaced with an equal amount of Rye seed by weight.

B. Cover Material

1. Conform to NDDOT Spec Section 708.02B3

PART 3 – EXECUTION

3.01 General

A. Conform to NDDOT Spec Section 708 except as modified herein:

1. Where not specifically stated, use Best Management Practices (BMPs) at a minimum
2. Only clear and grub, disturb, or grade areas necessary for construction.

B. Contractor shall inspect, maintain, and repair all erosion control devices after each rainfall greater than 0.5 inch and at a minimum once every week.

3.02 Installation

A. Silt Fence: Conform to NDDOT Spec 708.07

1. Bury bottom of silt fence a minimum of 6 inches, in a “J” configuration. The trench on the upstream side shall be filled with soil and compacted.
2. Splices shall only be at support posts and shall be 18 inches in overlap.
3. Posts shall be 4 feet apart and driven to a minimum of 20 inches into the ground. Depth shall be increased to 24 inches if on a slope 3:1 or greater.
4. Attach Geotextile fabric to posts with staples, wire, nails, or in accordance with manufactures specifications.

5. Silt fences should be continuous and transverse to flow and shall be placed so water cannot flow around the edge.
- B. Stabilized Construction Access: Conform to NDDOT Spec 708.10
1. If an access is constructed that restricts flow through a ditch, the Contractor shall determine the length and size of culvert needed to meet the conditions.
 2. If an access is constructed where topsoil exists, the topsoil shall be stripped before construction and replaced and reseeded after construction.
- C. Storm Drain Inlet Protection
1. Fiber Rolls
 - a. Fiber Rolls: Each roll shall be overlapped by 1 foot minimum and tied tightly together. Fiber rolls shall be trenched and staked according to Manufactures specifications.
 - b. Use 6 inch rolls for drop inlets and sheet flows down backslopes and foreslopes. Use 12 inch and 20 inch rolls in ditch bottoms, pipe inlets, and at the edge of right of way.
 - c. 2 inch x 2 inch stakes should be used to secure fiber rolls, angled such that the force of water would rotate the stakes vertically. Secure stakes a minimum of 1 foot in the ground.
 2. Sand Bags
 - a. Fill sand bags and secure ends so sand will not escape.
 - b. Place sand bags around inlet on all sides no closer than 1 foot from the inlet.
 3. Road Drains
 - a. Insert into catch basin as detailed in Manufacture's specifications. Inlet grate shall be able to be inserted over top of the device.
 4. Straw Bales
 - a. Bales must be tied together to prevent gaps in protection.

Also, they must be secured in place to avoid being displaced.

1. Bales are not allowed in street sections for inlet protection.

5. Silt Box

a. Silt box shall be constructed around the catch basin so that water must be filtered through the fabric.

D. Ditch Checks and Velocity Checks

1. Silt Fence

a. Conform to the requirements of 3.02A of this Section.

b. In high flow, high velocity situations, supported silt fence may be used. The mesh must be a minimum of 32 inches above the ground and have a maximum opening size of 6 inches x 6 inches. The wire shall be 14 gage and grade 60 and shall conform to ASTM A 116, Class 1 zinc coating for wire.

c. Straw bales may also be used in conjunction with slit fence for ditch and velocity checks.

2. Straw Bales

a. Bales must be packed tightly together to avoid gaps in protection.

b. Each bale must have 2 - 1 ½" x 1 ½" x3' stakes through each bale to secure them in place. Each stake must be driven into the ground a minimum of 18 inches.

3. Fiber Rolls

a. Conform to the requirements of 3.02C1 of this Section.

D. Erosion Control Blanket

1. All Erosion Control Blankets and Type 1 Turf Reinforcement Mat:

a. The area to be covered should be properly prepared and seeded before the blanket is applied. All rocks and clods over 1-1/2 inches in diameter, and all sticks and other foreign material shall be removed.

2. Type 2 Turf Reinforcement Mat
 - a. Conform to NDDOT Spec Section 708.03C2

E. Dust Control

1. Contractor shall apply water to areas where dust is being generated due to construction activities. The Contractor shall apply water as directed by the Engineer.

F. Temporary Cover Crop

1. Seed
 - a. Conform to NDDOT Spec Section 708.02C1
2. Cover Material
 - a. Conform to NDDOT Spec Section 708.02C3-5

3.03 Maintenance

A. Conform to NDDOT Spec Section 708 for maintenance information, and as follows:

1. The Contractor is responsible for inspection, maintenance, and repair of any washouts or accumulations of sediment that occur as a result of the grading or construction.
2. Inspection of all erosion control devices shall occur within 24 hours after a rainfall event of 0.5 inches or greater. At a minimum, one inspection per week must be conducted.
 - a. An inspection report shall be given to the engineer after every inspection.
3. Immediately remove any material that has been deposited onto public roadways. Remove all sediment within 24 hours.
4. Damage from the elements, Contractor's operation, or negligence shall be repaired at the Contractor's expense. Repair must be made before final acceptance.

END OF SECTION

SECTION 1500 – REMOVALS

REMOVALS

PART 1 – GENERAL

1.01 Section Summary

- A. Removal of structures, obstructions, surfacing, and miscellaneous items.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.

1.04 Definitions

- A. Remove: To eliminate or take away from the Project Site.
- B. Salvage: To save from loss or destruction so the item can be used again in a workable condition equal to the existing condition before removal.
- C. Abandon: To fill, bulkhead, or close off pipes and structures so no settlement or flow can occur.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 General

- A. All items or materials removed shall be taken off the Project Site at a location determined by the Contractor.
- B. All items or materials salvaged shall be stored or stockpiled at locations provided by the Contractor.

- C. Fill holes and depressions resulting from removal or salvage immediately consistent with Section 1800 – Excavation and Embankment.
- D. Provide a temporary driving surface for traffic operations where removal of driving surface has taken place on streets, driveways, or parking areas.
- E. Dispose of all removed items, except items identified for salvaging, in accordance to all laws, regulations, statutes, ect.
- F. Where removal work will be conducted around areas not to be disturbed or removed, the Contractor shall not damage those areas. If damage occurs, the Contractor shall repair those areas to original condition at no expense to the Owner.
- G. Develop a plan acceptable to Engineer and postal service for maintaining mail service. Temporary locations of mailboxes may be necessary; those locations are directed by the postal service.
- H. Contractor shall be responsible for locating and coordinating all utility relocations due to construction.

3.02 Protection

- A. Avoid disturbing any material beyond the project limits.
- B. Holes or depressions created by removals shall not be left open for more than one day.
- C. When possible, limit damage to existing turf.
- D. Do not store or place materials in passageways or other means of egress. Conduct operations with minimal amount of traffic interference.
- E. All street signs, traffic control signs, mailboxes, fences, ect. that interfere with construction shall be removed, stored safely, and replaced.
- F. Take all necessary precautions to protect personal, private, and public property in all areas of work.

3.03 Sawing Pavement

- A. Bituminous Pavement: Saw or coultter pavement full depth, along the removal line. Saw cuts shall be marked by the Engineer.

3.04 Sawing Curb and Gutter

- A. Saw curb and gutter full depth, along the removal line. Saw cuts shall be marked by the Engineer.

3.05 Remove Bituminous Surfacing

- A. Remove in accordance with NDDOT Spec 202.02E except as modified herein:
 - 1. Prior to restoring trench areas, all bituminous edges of the trench shall be sawcut.
 - 2. Remove bituminous in a manner such that remaining surfacing is not damaged.

3.06 Pavement Milling

- A. Surface shall be milled to the depth and cross section specified on the Plan or as directed by the Engineer.
- B. Care shall be taken when milling around structures and curb and gutter. Damaged surfaces shall be replaced or repaired to the satisfaction of the Engineer.
- C. Surface shall be swept clean after milling using a mechanical sweeper.

3.07 Remove Curb and Gutter

- A. Remove Curb & Gutter
 - 1. The Contractor shall saw cut the curb & gutter full depth and remove the section marked by the Engineer. Damage caused by the Contractor to curb not marked for removal shall be replaced by the Contractor.

3.08 Remove Sidewalk

- A. The sidewalk to be removed shall be marked by the Engineer. Damage caused by the Contractor or sidewalk not marked for removal shall be replaced.
- B. The sidewalk shall be saw cut full depth before being removed.

3.09 Remove Existing Pipe Sections

- A. Remove existing pipe encountered during excavation as indicated on the plans or as directed by the Engineer.
- B. Bulkhead the ends of existing lines to be abandoned but not removed. Use the appropriate caps or plugs. Formed concrete or brick and mortar can be used on gravity lines.
- C. The removal of portions of abandoned utility lines or conduits when required for new construction will be considered incidental work and no direct compensation will be paid.

3.10 Salvage and Reinstall

A. Signs:

- 1. In no case shall a street or traffic sign be removed or disturbed by the Contractor without contacting the Engineer and then only after satisfactory arrangements have been made for a temporary installation for its disposition.
- 2. Remove and salvage all posts, brackets, stringers, nuts, bolts, washers.
- 3. Use care against damage to in-place signs during storage and installation.
- 4. Remove signs damaged during construction and replace with new signs.

B. Mailboxes:

- 1. Remove and salvage existing mailboxes that interfere with the work or whose access is restricted due to the work.
- 2. Place at temporary locations as directed by the Engineer or as shown on the plans.
- 3. Removal, temporary re-installation, and replacement shall occur so that mail service is not interrupted.
- 4. Re-install mailboxes at locations directed by the engineer or as shown on the plans.

5. Mailboxes, posts, and appurtenances damaged during construction shall be replaced with new at no charge to the Owner.

C. Fences:

1. Salvage and store fence material where they are not in conflict with the work.
2. After completion of the work, reinstall the fence to the condition existing or better prior to removal.
3. The new fence installed shall be of the same size and type or of approved equal.

3.11 Field Quality Control

- A. Salvaged items to be reinstalled shall be of the same shape, dimension, location, and quality of the original item prior to construction.
- B. Items damaged during removal or salvaging operations shall be replaced with new material of equal type and quality of the damaged item when it was new.

3.12 Disposing of Material

- A. Burying of materials and debris is not allowed within the Project Site. The Contractor shall be responsible for disposing of removed materials off site and be in compliance with state and local regulations.

END OF SECTION

SECTION 1600 – PROJECT SITE CLEARING

PROJECT SITE CLEARING

PART 1 – GENERAL

1.01 Section Summary

- A. Clearing, grubbing, removing, and disposing of all vegetation and debris. Stripping and stockpiling of topsoil.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.

1.04 Definitions

- A. Brush: All bushes, shrubs, and other vegetation including small isolated trees with a diameter of 4” or less at a point 2 feet above the ground surface.
- B. Clearing: Cutting, removing, and disposing of trees, shrubs, bushes, windfalls, and other vegetation in the designated area.
- C. Grubbing: Removing and disposing of stumps, roots, and other remains in the designated area.
- D. Tree Trimming/Pruning: Cutting broken, damaged, or obstructing branches and installing wound dressing.
- E. Windfall/Deadfall: Trees and limbs laying on the ground in the removal area, and not caused by clearing activities.

PART 2 – PRODUCTS

2.01 Wound Dressing

- A. Asphalt based tree paint
- B. Other acceptable materials as approved by the Engineer.

PART 3 – EXECUTION

3.01 General

- A. The plans do not specifically identify all trees to be removed.
- B. Protect trees specifically identified in the plans or as directed by the Engineer in the field.
- C. Install the appropriate temporary erosion control measures ahead of site clearing activities.
- D. Review all tree removals and trimming with the Engineer in the field prior to any work. The Engineer will clearly mark all trees to be removed.
- E. After clearing and grubbing operations are complete, stockpile soils to prevent contamination with other materials.

3.02 Clearing and Grubbing

- A. Clearing Trees: Cut, remove, and dispose of trees and brush marked in the clearing area. Trees located within the boundary of the new construction shall be removed to a depth of 18 inches below the finished ground line or 3 feet below the final sub grade whichever is lower.
- B. Clearing brush: Cut even with the ground surface.
- C. Grubbing: Remove brush, stumps, roots, and other remains to a depth consistent with tree clearing.
- D. All depressions from clearing and grubbing operations shall be backfilled in accordance with Section 1800 – Excavation and Embankment.

3.03 Trimming and Pruning

- A. Trim all trees that are to be saved but interfere with construction activities. Paint all cuts with wound dressing.
- B. The Contractor and Engineer shall review the extent of tree trimming prior to construction with the intent to minimize damage to trees during construction.
- C. Upon completion of utility installation, the Contractor shall trim and dress all damaged tree limbs as directed by the Engineer.

3.04 Stripping

- A. After clearing and grubbing have been completed, strip sod and topsoil to a line 1 foot outside areas to be occupied by sidewalks, roadways, structures, or any other areas shown.
- B. Stockpile sufficient topsoil to re-spread to a uniform depth of 6 inches to all disturbed areas identified for seeding or sodding.
- C. Do not strip topsoil within the drip line (branch spread) of trees identified to remain.

3.05 Disposal

- A. Dispose of all cleared and grubbed material and debris outside of the right-of-way at a location selected by the Contractor.
- B. Contractor shall conform to local and state regulations when disposing of materials.
- C. Stripped materials shall not be used as embankment material.
- D. Onsite burial of any debris is not permitted.

3.06 Protection

- A. Protect all trees and shrubs indicated on the plans or by the Engineer from damage or removal.
- B. Protect the property surrounding the clearing area from damage by clearing and grubbing operations.

END OF SECTION

SECTION 1700 – ADJUSTMENT OF STRUCTURES

ADJUSTMENT OF STRUCTURES

PART 1 – GENERAL

1.01 Section Summary

- A. Adjustment of manholes, catch basins, gate valves, and other structures to plan grade.

1.02 Related Sections

- A. Section 2100 – Water Main
- B. Section 2300 – Sanitary Sewer
- C. Section 2700 – Storm Sewer

PART 2 – PRODUCTS

2.01 Adjustment Units

- A. Concrete
 - 1. Units shall be a minimum of 2 inches and a maximum of 6 inches thick.
 - 2. Units shall have a minimum compressive strength of 3000 psi and shall be steel reinforced.
 - 3. Units shall be adhered to the structure and casting by using either Portland Cement Concrete or Non-Shrink Hydrated Lime.

PART 3 – EXECUTION

3.01 General

- A. All finish grades of castings and valve boxes shall be 1/4 inches to 3/8 inches below the finish grade of the pavement.
- B. Perform work on adjustments after construction is to a point that the work will not become damaged by other construction activities.
- C. Clean all structures after adjustment to remove any sediment or mortar from the structure.

- D. All manhole and gate valve pick holes must be cleaned and accessible after paving operations.

3.02 Adjust Casting

- A. Casting adjustments will only be allowed after the first lift of pavement is placed.
- B. The raised castings shall not be exposed to traffic for more than 7 days. The raised casting must be ramped with bituminous pavement if traffic is allowed in the same lane as the raised casting. This cost shall be included in the price for adjustment.
- C. Clean the top of the structure to allow the concrete mortar to bond.
- D. Add or remove adjusting units as needed to achieve finished grade. A minimum of 2 and a maximum of 6 adjusting units will be allowed. A 6 inch adjusting unit is allowed and encouraged when possible.
- E. Apply mortar to the top and bottom of the adjusting units a minimum of $\frac{1}{4}$ inch to a maximum of $\frac{1}{2}$ inch thick. Wipe the inner surfaces of the units clean. Seal around and underneath all castings with mortar.
- F. No shims of any kind will be allowed for adjustment.
- G. Clean all excess mortar from the structure.

3.03 Adjust Valve Boxes

- A. The raised valve box shall not be exposed to traffic for more than 7 days. The raised valve box must be ramped with bituminous pavement if traffic is allowed in the same lane as the raised valve box. This cost shall be included in the price for adjustment.
- B. Valve boxes shall be adjusted by screwing the top section up or down to the finish surface elevation.
- C. Any material deposited in the valve box must be removed.

END OF SECTION

SECTION 1800 – EXCAVATION AND EMBANKMENT

EXCAVATION AND EMBANKMENT

PART 1 – GENERAL

1.01 Section Summary

- A. This section includes excavation, haul, placement and compaction of embankment materials.
- B. General excavation of ponds, channels, and other areas.

1.02 Related Sections

- A. Section 1500 – Removals
- B. Section 1600 – Project Site Clearing
- C. Section 1900 – Subgrade Preparation
- D. Section 2000 – Trench Excavation and Backfill

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.

1.04 Submittals

- A. Gradation test results
- B. Compaction test results
- C. Geotextile Fabric sample

1.05 Definitions

- A. Common Excavation: Shall include all excavations not otherwise classified.
- B. Muck Excavation: Muck excavation shall include materials that are organic in nature and unsuitable for embankment material.
- C. Borrow Excavation: Borrow excavation shall include materials obtained from locations outside of the Right of Way.
- D. Subgrade: Top of the surface underneath the Class 5 or subbase layer.

PART 2 – PRODUCTS

2.01 Soil Materials

- A. Embankment and Fill: Soil that is free of organic materials, frozen clumps, and large rocks. Also, the soil must be compactable to support the roadway above.
- B. Granular Borrow: Any pit run or crusher run material that is graded from course to fine such that the portion passing the #200 sieve divided by the portion passing the 1 inch sieve may not exceed 10 percent by mass.

2.02 Geotextile Fabric

- A. Conform to NDDOT Spec Section 858.01 Type R1 woven

PART3 – EXECUTION

3.01 General Construction Requirements

- A. Conform to NDDOT Spec Section 203.02F & G
- B. Contractor shall be responsible for locating and coordinating all utility relocations due to construction.
- C. Before any construction activities begin, erosion control must be in place.
- D. Strip and stockpile all topsoil to be used for restoration purposes.
- E. Prior to placement of the embankment material, the site must be reviewed by the Engineer.

3.02 Excavation

- A. Perform excavations to line, grade, cross section, and contours as detailed in the plans or as directed by the Engineer.
- B. If unsuitable materials are discovered, these materials will be excavated and removed at the direction of the Engineer. Excess common excavation shall be used as backfill unless directed otherwise by the Engineer. If the Contractor proceeds without the direction of the Engineer, all work and material to restore the roadbed to the proper grade will be at the Contractor's Expense.

- C. Protect the subgrade from weather events. Provide drainage away from the excavation to prevent washouts and damage to the subgrade.
- D. Remove all large rocks that are within 12 inches of the subgrade.

3.03 Compacting Embankments

- A. Place soil in layers not to exceed 12 inches. Place layers evenly to provide for uniform compaction.
- B. All embankments shall be compacted by specified density method:
 - 1. Under areas with proposed paved or structural improvements: 100% Standard Proctor from the proposed pavement subgrade elevation down 1 foot.
 - 2. 95% Standard Proctor from the bottom of the excavation up to 1 foot below the subgrade elevation. Moisture content shall be within \pm 3% of optimum.
 - 3. 95% Standard Proctor for areas with no paved or structural improvements. Moisture content shall be within \pm 3% of optimum.

3.04 Field Quality Control

- A. Engineer shall engage a qualified independent testing laboratory to perform geotechnical testing.
- B. Contractor shall assist the testing agency in performing field tests.
- C. If testing agency reports failing tests, Contractor shall correct the deficiencies until specified compaction is obtained.
- D. The minimum amount of testing must be completed as detailed in Section 600 – Project Testing Requirements.
- E. Before placement of granular base, subgrade will be checked by the Engineer.
 - 1. A tolerance of 0.04 feet above or below the finished subgrade elevation will be allowed.

3.05 Geotextile Fabric Installation

- A. Prepare subgrade in conformance with Section 1900 – Subgrade Preparation before Geotextile is installed.

- B. Conform to the NDDOT Spec Section 709.03A & E except as modified herein:
1. The first lift of aggregate applied above the fabric shall be a minimum of 8 inches.
 2. Metal pins will be allowed in lieu of stitching.
 3. Minimum overlap shall be 30 inches.

END OF SECTION

SECTION 1900 – SUBGRADE PREPARATION

SUBGRADE PREPARATION

PART 1 – GENERAL

1.01 Section Summary

- A. This work consists of scarifying, shaping, compacting, and maintaining the subgrade, or reshaping an existing roadway before constructing a base, or surface course.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 General

- A. Conform to NDDOT Spec Section 230.02B1 except as modified herein:
 - 1. Subgrade elevations shall not vary by more than 0.04 feet from the prescribed elevation.
 - 2. Scarification of subgrade must be approved by the Engineer before beginning the work. If the subgrade is unstable due to excessive moisture content, the subgrade shall be scarified and dried over a reasonable time period. When the material has been dried, it shall be returned to the roadbed and compacted to proper elevation and once again be test rolled. If the material continues to be unstable, the Engineer may authorize the removal of the material as muck excavation.

3.02 Compaction of Subgrade

- A. 100% Standard Proctor from the proposed pavement subgrade elevation down 1 foot.

3.03 Field Quality Control

- A. Subgrade will be checked by the Engineer after grading operations but before placement of aggregate.
 - 1. Subgrade will be test rolled using a Tandem Truck with a gross weight of 45,000 pounds. A failing test will be indicated by yielding and rutting of 1-1/2 inches or greater.
 - 2. Subgrade elevation will be checked by using a string line with a tolerance of 0.04 feet at any point checked.

END OF SECTION

SECTION 2000 – TRENCH EXCAVATION AND BACKFILL

TRENCH EXCAVATION AND BACKFILL

PART 1 – GENERAL

- 1.01 Section Summary
 - A. Trenching, backfilling, and compacting of underground infrastructure.
- 1.02 References
 - A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
- 1.03 Submittals
 - A. Gradation of each granular borrow material
 - B. Compaction Test results
- 1.04 Definitions
 - A. Bedding Material: Soil material surrounding the pipe that provide structural support, and secures the pipe true to line and grade.
 - B. Pipe Foundation: Soil material below the pipe that provides support.
 - C. Improved Pipe Foundation: Material used when unstable materials are encountered and added pipe support is needed.
 - D. Pipe Zone: The area of the trench measured from 1 foot above the pipe to the bottom of the excavation.
 - E. Sand Cushion: Aggregate bedding used around the pipe in the trench.
- 1.05 Warranty
 - A. Any trench settlements that occur during the warranty period shall be repaired in a manor acceptable to the Owner and at the expense of the Contractor.

PART 2 – PRODUCTS

2.01 Pipe Bedding Material

- A. Bedding material shall be screened pit run or crusher run sand.
 - 1. Onsite granular material may be used for bedding upon approval of the Engineer.
 - 2. Gradation shall be a material that is graded from course to fine such that the portion passing the #200 sieve divided by the portion passing the 1 inch sieve may not exceed 10 percent by mass.

2.02 Trench Backfill Material

- A. Suitable excavated materials from trench excavation shall be used.
- B. Material shall be free from organic materials, frozen clumps, large rocks, concrete and bituminous chunks, rubbish, and other materials deemed unsuitable.
- C. Questionable materials shall be reviewed by the Engineer before backfilling shall begin. The Contractor shall proceed at their risk if the Engineer was not consulted.

PART 3 – EXECUTION

3.01 Existing Utilities

- A. The Contractor shall locate and protect all utilities that interfere with trench excavation. The Contractor shall be required to remove and restore or protect the utility.
- B. The inverts of existing utilities shall be protected during construction. The Contractor is responsible for inspecting and cleaning, if necessary, all lines which have been compromised by construction activities.
- C. Backfill and compact around all existing utilities to 100 Percent Standard Proctor Density in lifts not to exceed 6 inches.
- D. Report and repair damage to utilities prior to backfill operations.

3.02 Trench Construction

- A. Construct trench to line and grade shown on the drawings or as directed by the Engineer.
- B. Excavate to a depth 6 inches below the bottom of the pipe to allow for bedding materials to be placed.
- C. Apply bedding materials in 6 inch lifts and compact to 95 Percent Standard Proctor Density or as recommend by the pipe manufacturer, whichever is denser.
- D. Remove any bedding and backfill that enters the pipe.
- E. Check line and grade of pipe for conformance to the drawings. Correct any deficiencies.

3.03 Trench Backfill

- A. Backfill material around all manholes, catch basins, valve boxes, curb boxes, and hydrants shall be compacted with hand operated motorized compactors. The maximum lift thickness shall be 6 inches.
- B. All manholes, catch basins, valve boxes, water vaults, and miscellaneous structures shall be backfilled with granular bedding material and shall be compacted with hand operated motorized compactors.
- C. Flexible Pipe Materials
 - 1. Granular bedding shall be provided, placed and compacted around the pipe to an elevation 12 inches above the pipe the full width of the trench. Bedding shall be compacted to 95 Percent Standard Proctor Density.
- D. Rigid Pipe Materials
 - 1. In ordinary trench conditions, granular bedding shall be used to the haunch line and compacted to 95 Percent Standard Proctor Density.
- E. All trench backfilling operations shall use suitable backfill and shall be compacted to 95 Percent Standard Proctor with $\pm 3\%$ optimum moisture content except the top 1 foot below the subgrade elevation which shall be compacted to 100 Percent Standard Proctor with $\pm 3\%$ optimum moisture content.

- F. Imported backfill shall be used as directed by the Engineer. The imported backfill shall be mixed with the onsite material to obtain the proper soil compaction. If in the Engineer's opinion, the onsite material cannot be compacted to specification, the Engineer shall direct the onsite material to be removed as muck excavation.

3.04 Field Quality Control

- A. Density tests shall be taken as specified in Section 600 of this Specification. The Engineer may determine that additional tests should be taken and their locations. The Contractor shall assist the Engineer in conducting the tests.
- B. Any failing tests shall be excavated and re-compacted until the density requirements are met.

END OF SECTION

SECTION 2100 – WATER MAIN

WATER MAIN

PART 1 – GENERAL

1.01 Section Summary

- A. This section includes product and installation requirements for water main pipe, gate valves, hydrants, fittings, and miscellaneous items.

1.02 Related Sections

- A. Section 1700 – Adjustment of Structures.
- B. Section 1800 – Excavation and Embankment.
- C. Section 2000 – Trench Excavation and Backfill.

1.03 References

- A. American Water Works Association (AWWA):
 - 1. C219 – Standard for Bolted, Sleeve-Type Couplings for Plain-End Pipe.
 - 2. C508 – AWWA Swing Check Valves or Waterworks Service, 2 Inch Through 24 Inch.
 - 3. C515 – AWWA Standard for Reduced Wall Resilient-Seated Gate Valves for Water Supply Service.
 - 4. C512 – AWWA Standard for Air Release, Air Vacuum, and Combination Air Valves.
 - 5. C550 – Protective Interior Coating for Valves and Hydrants.
 - 6. C651 – AWWA Standard for Disinfecting Water Mains.
 - 7. C900 – AWWA Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inch Through 12 Inch, for Water Distribution.

- B. American Society of Testing and Materials (ASTM):
 - 1. A48 – Gray Iron Castings
 - 2. A126 – Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- C. National Sanitation Foundation (NSF):
 - 1. 60 – Drinking Water Treatment Chemicals
 - 2. 61 – Drinking Water System Components
 - 3. All products (treatment chemicals and materials) that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI) / National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organizations accredited by ANSI to test and certify such products.
- D. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
 - 1. Section 744 – Insulation Board (Polystyrene)

1.04 Sequencing and Scheduling

- A. Notify the Water Superintendent and Engineer at least 48 hours before water service is interrupted.
- B. Notify all property owners effected by water service interruption 48 hours in advance.
- C. The City of Bottineau must open and close all existing valves. The Contractor is responsible for all water main flushing and shall contact the Engineer at least 24 hours in advance of flushing.
 - 1. The Contractor is responsible for erosion control and restoration from flushing activities. Super Chlorinated water shall be discharged appropriately.

1.05 Submittals

- A. Submit all shop drawings and manufacturers information prior to construction.

PART 2 – PRODUCTS

2.01 Polyvinyl Chloride Pipe (PVC)

- A. Pipe sizes 4 inch through 12 inch conform to AWWA C900. Pipe sizes 14 inch through 48 inch conform to AWWA C905 or as specified by the Engineer.
 - 1. Minimum water main pipe size is 8 inch. All hydrant leads shall be 6 inch.
- B. All sizes are Cast Iron Pipe O.D.
- C. Pipe shall be manufactured in accordance with the latest revision of AWWA C900 or C905 depending on size.
- D. All pipes shall be DR-18, 235 psi.

2.02 Fittings

- A. All fittings shall conform to AWWA C153/A21.53 and AWWA C111/A21.11 latest revision, and shall be mechanical joint with mega-lug restraints.
- B. Every other nut and T-bolt for mechanical joint fittings shall be 304 Stainless Steel suited for underground use.

2.04 Hydrants

- A. Hydrants shall conform to AWWA C502
- B. Waterous Pacer, WB-67-250.
- C. Two 2-1/2 inch hose nozzles and One 5 inch pumper nozzle. Nozzle caps shall be attached with metal chains. Pumper nozzle shall face the street.
- D. Hose and pumper threads shall by National Standard Thread.
- E. Hydrant caps shall be 1-5/16 inch pentagon style.
- F. Hydrant shall have 8 foot – 6 inch cover or 9 foot bury. Upper standpipe section shall be 22 inches, nozzles must be at least 31 inches from ground level.
- G. Minimum opening of 5-1/4 inches for 6 inch water lines, 6 inch mechanical joint pipe connection.

- H. Working pressure of 250 psi and tested up to 500 psi.
- I. Break-off flange with breakable rod.
- J. All bolts, nuts, and hardware shall be stainless steel.
- K. Hydrants shall be restrained with thrust blocks and mega-lugs or tie rods.

2.05 Gate Valve and Box

- A. All gate valves shall conform to AWWA C515.
- B. Bronze mounted, ductile iron body valves.
 - 1. Minimum working pressure of 250 psi.
- C. O-ring seals.
- D. All surfaces shall be fusion-bonded epoxy coated conforming to AWWA C550.
- E. Stainless steel hardware.
- F. Standard 2 inch operating nut.
- G. Mechanical joint ends conforming to AWWA C111/A21.11.
- H. Gate valves and valve boxes shall be wrapped in pipe encasement material.
- I. Boxes shall be 3 piece cast iron, screw type.
- J. Adjustment for 8 foot – 6 inch cover.
- K. Drop style covers, with “WATER” on the top.

2.06 Joint Restraint

- A. Mechanical Joint Restraint (mega-lug):
 - 1. All restraints shall be ductile iron.
 - 2. Working pressure must be at least 250 psi.
 - 3. Mega-lug and retainer glands are not allowed on cast iron pipe.
 - 4. All mechanical joint restraints must be wrapped with

pipe encasement materials.

B. Tie Rods: Shall be stainless steel.

2.07 Pipe Encasement

A. Shall be polyethylene and conform to AWWA C105/A21.5, Class C (Black), 8 mil, tube form. Material shall conform to ASTM A674.

2.08 Insulation

A. Conform to NDDOT Spec 868.

1. Minimum thickness shall be 3 inches.

2.09 Tapping Gate Valve & Sleeve

A. Tapping Sleeve Assembly:

1. Comply with MSS SP-60.

2. Include sleeve and valve compatible with drilling machine.

3. Stainless steel, two-piece bolted sleeve with mechanical joint outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.

B. Manufacturers:

1. Romac Industries

2. Power Seal – Pipeline Products Corp.

3. Ford.

C. Tapping Gate Valves:

1. Conform to Section 2100, 2.05. Valve must have flange for connection.

2.10 Check Valves

A. Conform to AWWA C508.

B. American Flow Control Series 2100 or approved equal.

1. Minimum working pressure of 250 psi.

- C. Resilient seated with optional back-flushing actuator.
- D. Conform to AWWA C116 and C550 for fusion-bonded epoxy coatings.
- E. All hardware shall be stainless steel.
- F. All valves shall have a mechanical indicator.

2.11 Transition Couplings

- A. Conform to AWWA C219.
- B. Manufacturers
 - 1. Hymax.

PART 3 – EXECUTION

3.01 Pipe Installation

- A. Pipe Handling
 - 1. All pipe shall be new, unused, and clean.
 - 2. All pipe cutting shall be according to manufactures instructions.
 - 3. Pipe shall be lowered in place in a manor not to damage the pipe.
- B. Trench Excavation and Backfill
 - 1. Conform to Section 2000 – Trench Excavation and Backfill.
- C. Granular Pipe Bedding
 - 1. Granular pipe bedding must be used and shall be in accordance with Section 2000 – Trench Excavation and Backfill.
- D. Pipe Laying
 - 1. No pipe shall be laid in water or unstable trench conditions.
 - 2. Pipe shall be laid true to location, line, and grade. No deviation is allowed unless specifically approved by the Engineer. All water main shall have a minimum of 8 foot – 6 inch cover.

3. The Contractor must protect their work at all times, no damage to the pipe is acceptable, no groundwater or debris shall be allowed to enter the pipe.

3.02 Fittings

- A. Fittings shall be secured to pipe using restrained mechanical joints (mega-lugs) conforming to AWWA C600.
- B. All fittings shall be installed with the appropriate restrained joints and with the appropriate thrust blocks which are poured or set against undisturbed earth.

3.03 Hydrants

- A. Set on an 8 inch solid concrete block.
- B. Use mega-lugs or steel rods on all joints to secure hydrant lead back to the main.
- C. Encase hydrant base with no less than one cubic yard of 3/4 inch to 1-1/2 inch washed rock. Ensure weep holes are surrounded by rock. Place 2 layers of polyethylene, minimum of 4 mil, or separation fabric, over the rock to prevent filling the voids with sediment.
- D. Encase hydrant barrel and base in pipe encasement.
- E. Hydrant must be installed plumb, no deviation is allowed.

3.04 Valves

- A. Set on 8 inch solid concrete block.
- B. Valves and boxes shall be set plumb. Operating nut must be in the center of the box.
- C. Top of valve box shall be set 1/4 to 3/8 inch below finish grade. Valve box shall have 1 foot of adjustment remaining.
- D. Valves shall be restrained with mega-lugs.

3.05 Joint Restraint

- A. All joints from hydrant back to the main must have joint restraints, either mega-lugs or tie rods.
- B. All dead end lines shall be secured back at least 2 joints including the plug with steel tie rods. The number of tie rods required depends on water main size as follows:

Pipe Size	Number of ¾ Inch Rods
6 Inch	2
8 Inch	2
12 Inch	4

3.06 Insulation

- A. Insulation shall be installed as shown on the Plans or as directed by the Engineer.
- B. Insulation shall have a 6 inch sand cushion above and below the board.

3.07 Pipe Crossings and Conflicts

- A. Water mains crossing sanitary sewer mains and services or storm sewers shall have a minimum of 18 inch vertical separation, and 10 foot separation from edge to edge with water main and sanitary sewer. When circumstances prevent 18 inch separation, the following construction methods must be followed:
 - 1. Sewers passing over or under water main must be constructed to water main standards. A full length of water main pipe must be centered on a full sewer pipe when crossing.
 - 2. The bedding and soil surrounding the crossing must be compacted to 100 Percent Standard Proctor.
- B. Water mains crossing storm sewers shall have a minimum of 2.5 feet of clearance. When circumstances prevent 2.5 feet of clearance, a minimum of 3 inches of insulation shall be used along with the requirements for sewer crossings.

3.08 Protection

- A. Existing hydrants and valves shall only be operated by Public Works Staff; Contractor must contact the Water Superintendent.
- B. Securely plug all water main openings to prevent debris and other substances from entering the water main.
- C. Protect all water main structures from damage during construction.

3.09 Disinfection and Testing

- A. General
 - 1. Contractor must perform all hydrostatic testing and disinfection.
 - 2. Engineer must visually inspect and verify all tests. A 48 hour notice must be given to the Engineer.
 - 3. Potable water must be used to fill pipe for testing and service tapping.
- B. Hydrostatic Pressure Test
 - 1. Minimum test pressure: 150 psi.
 - 2. Test duration: 2 hours
 - 3. Criteria: Maximum of 5 psi drop in pressure is allowed.
 - 4. Gauge shall be liquid filled, labeled in 1 lb or 2 lb increments.
 - 5. All water mains, services, dead ends, and hydrant leads shall be included in the test.
- C. Disinfection of Lines
 - 1. Prior to disinfection, all lines shall be flushed with high velocity water through fire hydrants.
 - 2. All lines shall be sterilized with an injected chlorine solution. Granular calcium hypochlorite shall not be used. Conform to AWWA B301A or B300.
 - 3. A minimum of 50 ppm chlorine residual shall be maintained during disinfection.

4. Chlorine solution shall remain in the system for a minimum of 24 hours and a maximum of 36 hours.
5. Extreme care shall be taken during disinfection to insure that super chlorinated water does not enter existing water mains or water supply.
6. After disinfection, the lines shall be flushed until chlorine concentrations are within normal operating levels (1 to 2 ppm).
7. A minimum of 1 test group per section with each section being a maximum of 1200 feet in length shall be taken. Each test group shall contain 2 bacteria tests taken 24 hours apart. If the tests show positive total coliform, the section being tested shall have failed and shall be retested.

END OF SECTION

SECTION 2200 – WATER SERVICES

WATER SERVICES

PART 1 – GENERAL

1.01 Section Summary

- A. This Section includes the construction of water main services including the corporation stop, service pipe, curb stop and box, and other items.

1.02 Related Sections

- A. Section 2000 – Trench Excavation and Backfill
- B. Section 2100 – Water Main

1.03 References

- A. AWWA C800 – Standard for Underground Service Line Fittings and Valves.
- B. ASTM B88 – Standard for Seamless Copper Water Tube, Type K, Soft Annealed Temper.
- C. National Sanitation Foundation (NSF):
 - 1. 60 – Drinking Water Treatment Chemicals
 - 2. 61 – Drinking Water System Components
 - 3. All products (treatment chemicals and materials) that may come into contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI) / National Sanitation Foundation (NSF) International Standards 60 and 61, as appropriate. A product will be considered as meeting these standards if so certified by NSF, the Underwriters Laboratories, or other organizations accredited by ANSI to test and certify such products.

1.04 Submittals

- A. Submit all shop drawings and manufacturers information prior to construction.

PART 2 – PRODUCTS

2.01 Water Service Pipe

A. Polyethylene Pipe

1. All water service lines 1 inch through 2 inch shall be polyethylene pipe material .
2. Minimum service size shall be 1 inch.

B. PVC

1. All water service lines 4 inch or larger shall be PVC DR-18. Pipe and fittings shall conform to requirements of Section 2100 – Water Main.

2.02 Water Service Appurtenances

A. The following table is a list of all acceptable water service appurtenances.

Water Service Appurtenances				
Item	Service Pipe Size	Flared Type Valves & Fittings for Type K Conner Pine		
Corporation Stop		Ford	A.Y. McDonald	Mueller
	1"	FB-600	4701B	B-25000
	2"	FB-600	4701B	B-25000
Tapping Saddle		Romac		
	1"	306		
	2"	306		
Curb Stop		Ford	A.Y. McDonald	Mueller
	1"	B22-444-M	6104	B25154
	2"	B22-777-M	6104	B25154
Curb Box		Ford	A.Y. McDonald	Mueller
	1"	EM2-80-56	5614	H-10300
	2"	EM2-80-57	5615	H-10304

B. Corporation Stops

1. Shall be AWWA taper thread inlet by flared copper outlet.

- C. Tapping Saddle
 - 1. All saddles must be a complete wrap around stainless steel type 304 with a minimum of 2 stainless steel bolts.
 - 2. Saddles are required on all service taps.
- D. Curb Stops
 - 1. All curb stops shall be flare by flare and include a solid copper disk on the property side of the curb stop.
 - 2. The property side of the curb stop must be protected from the elements at all times.
 - 3. Combination stop and waste valves or cocks shall not be installed underground.
- E. Curb Boxes
 - 1. Shall be Minneapolis Pattern.

PART 3 – EXECUTION

3.01 Service Installation

- A. All water services shall be a minimum of 8 feet below the ground surface.
- B. Field flaring shall be performed with current standards of the plumbing industry and manufacturers recommendations.
- C. All curb stop and boxes shall be marked with a steel fence post.
- D. Water Service Pipe
 - 1. Lines must be installed parallel and upstream of sanitary sewer lines. Water service lines must have a minimum of 10 foot horizontal separation and 18 inches of vertical separation.
- E. Corporation Stops
 - 1. Main must be pressurized when tapping “wet tap”.
 - 2. Encase corporation stop with sand bedding.
 - 3. Corporation stops shall be inspected by the Contractor for leaks prior to backfilling.

F. Service Saddles

1. Saddles must be secured in place before tapping can begin.
2. Dry tapping will not be allowed.

G. Curb Stops

1. Curb stops shall be supported on a solid sewer brick.
2. Curb stop shall be inspected by the Contractor for leaks prior to backfilling.
3. Curb stops located in driveways/sidewalks shall be protected with the top section of a Gate Valve top section, including the lid.

H. Curb Boxes

1. Boxes must be installed plumb in a vertical position.
2. Wrap all curb boxes with polyethylene pipe encasement.

I. Construct all trenches in accordance with Section 2000 – Trench Excavation and Backfill. Service trench settlements will be repaired in a manner acceptable to the Engineer at no cost to the Owner.

J. All new curb stops installed must have the unconnected side protected from the elements by installing a solid copper disk with the flare nut. The cost for the protection shall be incidental to the cost of the curb stop.

K. Reconnect Existing Water Services

1. No warranty is expressed or implied as to the location, size, or material type of existing service lines. The Contractor shall furnish and install all fittings required to make the connection.

END OF SECTION

SECTION 2300 – SANITARY SEWER

SANITARY SEWER

PART 1 – GENERAL

1.01 Section Summary

- A. This Section includes sanitary sewer pipe, manholes, and appurtenances.

1.02 Related Sections

- A. Section 1700 – Adjustment of Structures
- B. Section 2000 – Trench Excavation and Backfill

1.03 References

- A. American Society of Testing and Materials (ASTM)
 - 1. A48 – Specification for Gray Iron Castings.
 - 2. A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete.
 - 3. C139 – Specification for Concrete Masonry Units for Construction of Batch Basins and Manholes.
 - 4. C150 – Specification for Portland Cement.
 - 5. C206 – Specification for Finishing Hydrated Lime.
 - 6. C309 – Liquid Membrane-Forming Compounds for Curing Concrete.
 - 7. C478 – Specification for Precast Reinforced Concrete Manhole Sections.
 - 8. D698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - 9. D1784 – Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compounds.
 - 10. D1785 – Specification for PVC Plastic Pipe, Sch. 40, 80, and 120.
 - 11. D2321 – Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity – Flow Applications.

12. D3034 – Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
13. D3212 – Specifications for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
14. F477 – Specifications for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
15. F679 – Standard Specification for Poly(Vinyl Chloride) (PVC) Large- Diameter Plastic Gravity Sewer Pipe and Fittings.
16. F794 – Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
17. F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.

B. American Water Works Association (AWWA)

1. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
2. C151 – Ductile-Iron Pipe, Centrifugally Cast, for Water.

1.04 Submittals

- A. Submit all shop drawings and manufacturers information prior to construction.

PART 2 – PRODUCTS

2.01 Concrete and Mortar

- A. All concrete products shall use Type 1 Portland Cement (conform to ASTM C150), washed sand, and crushed aggregate free of deleterious materials.
- B. Mix designs shall be approved by the Engineer and must obtain 3000 psi compressive strength at 28 days.
- C. Use non-shrink mortar for brick work and sealing of structures. Use one part cement to 2 parts sand.

2.02 Manholes

- A. Manhole sections shall be precast and shall conform to ASTM C478.
- B. Joints: Shall be rubber o-ring gasket type.
- C. Bases:
 - 1. Shall be pre-cast and integral with bottom section of manhole.
 - 2. Invert shall be pre-cast and shall be graded to provide flow through the structure.
 - 3. Dead end manholes shall have the invert continue to the opposite side of the manhole.
- D. Outside Drops: Shall have upper and lower rubber boot connections. The drop pipe shall be supported by concrete horseshoes. All voids shall be filled with concrete.
- E. Manhole Steps: Shall be steel reinforced polypropylene steps. Steps shall be installed on the downstream side of the manhole.
- F. Pipe Connections: Manholes shall be cast with the appropriate size openings for the size of pipe shown on the plans. A rubber boot with a stainless steel band shall be installed with the fabrication on all new manholes.
- G. Manhole Castings:
 - 1. Neenah R-1642 lid type B.
 - 2. Machine cover and frame contact surface for non-rocking protection.
 - 3. Include 2 concealed pick holes, Type F.
 - 4. Shall be stamped "SANITARY SEWER" on the lid.

2.03 Polyvinyl Chloride (PVC) Sewer Main Pipe

- A. All PVC sewer main pipe and fittings shall conform to:
 - 1. ASTM D3034 for sizes 4 – 15 inch and ASTM F679 for sizes 18 – 24 inch unless the Engineer requires a higher standard.
- B. All pipes shall be bell and spigot.

- C. All pipe joints shall be push-on type and shall conform to ASTM D3212. All pipe shall have Elastomeric Seal (Gasket), polymer based synthetic rubber conforming to ASTM F477 which shall be bonded to the inner walls of the gasket recess of the bell socket. Natural rubber gaskets are not allowed.
- D. Each pipe shall be identified by name of manufacturer, nominal pipe size, and PVC cell classification.
- E. Minimum pipe size shall be 8 inch for sewer mains.
- F. For depths less than 20 feet, all pipe shall be a minimum of SDR-35. For pipes deeper than 20 feet, pipe shall be a minimum of SDR-26.
- G. For pipes larger than 15 inch, pipes shall conform to ASTM F679 with a minimum wall thickness for a minimum pipe stiffness of 46.
- H. PVC shall be used for all sewer main pipe unless conditions or design constraints warrant the use of another material and approved by the Engineer.

2.04 Sanitary Sewer Forcemain

- A. Pipe shall be manufactured in accordance with the latest revision of AWWA C900 or be rated for a pressure at least twice what the operating pressure of the pipe will be.

PART 3 – EXECUTION

3.01 General

- A. All trenching activities shall conform to Section 2000 – Trench Excavation and Backfill.
- B. By-Pass Pumping: When required, the Contractor shall be responsible for notification of existing sewer system users if service will be interrupted. The Contractor shall also install the system to maintain sewer flows during construction.

3.02 Installation of Pipe and Fittings

A. Connect to Existing System

1. Connections to existing manholes shall be made with a water tight boot with a stainless steel band.
2. All new manhole connections where a new hole must be made shall be made by coring the manhole and installing a new boot with stainless steel band.
3. Reconstruct manhole invert to allow for flow through the manhole.

B. Pipe Installation

1. Pipe shall be laid to the line and grade as shown on the Plan and/or staked in the field. No deviation is allowed unless directed by the Engineer. Deviation shall be cause for removal and relaying pipe at the Contractor's expense.
2. Lay pipe upgrade with spigot end in the direction of flow. Lubricate all joints and push pipes home. Ensure pipe is to line and grade before bedding and backfilling.
3. Contractor shall protect pipe during construction at all times. Any material that enters the pipe shall be removed. All pipes shall be clean before being put in service.

3.03 Manholes

- A. Shall be installed level. No deviation is allowed.
- B. Precast integral base shall be placed on compacted granular bedding.
- C. Install short precast manhole section (maximum of 16 inch height) below the eccentric cone or precast top slab.
- D. Vertical wall of the eccentric cone section shall be on the downstream side.
- E. Steps shall be placed over the downstream pipe. When pipe size is in excess of 24 inches, place steps where most appropriate for access.
- F. Install rings and casting in conformance to Section 1700 – Adjustment of Structures. A minimum of 2 rings must be installed.
- G. All pipe connections must be neatly sealed with

mortar. H. All lift holes must be mortared.

3.04 Service Connections

- A. Wye to be installed at a 45 degree angle to the horizontal.
- B. Risers shall be supported at the wye with concrete and shall be supported on undisturbed trench slope for the entire length.

3.05 Insulation

- A. Insulation shall be installed when sanitary sewer comes within 2.5 feet of storm sewer or when the pipe comes within 5 feet of the surface.

3.06 Bulkhead and Abandon Existing Lines

- A. Existing pipes and openings in manholes shall be sealed using mortar to obtain a water tight seal.
- B. Abandoned lines shall be filled with silica sand or flowable fill to completely fill the line to prevent collapse and groundwater infiltration.
- C. Before lines are abandoned, live services must be connected and in service to new sewer main.

3.07 Field Quality Control

A. General

- 1. Contractor shall provide all labor and materials necessary for inspections and tests.
- 2. Engineer shall be present and observe all required testing. Contractor shall notify Engineer 48 hours before testing.

B. System Cleanup

- 1. Contractor shall ensure pipe and manholes are clean and free of material.
- 2. If system is dirty due to Contractor negligence, the system will be cleaned at the sole expense of the Contractor. Jetting may be required. Complete before final inspection and televising.

C Testing

1. Testing shall begin only after the system has been cleaned.
2. Lamping: Engineer will verify installation is true to line and grade, joints are home, and deflection has not occurred.
3. Deflection Testing: Testing is required for all flexible pipe types (PVC, HDPE, CCF). Deflection testing shall occur at least 30 days after the main has been backfilled to finish grade. Testing shall be done in the presence of the Engineer. Deflections shall be determined by use of a mandrel.
 - a. Mandrel shall have a minimum diameter equal to 95 percent of the Average Internal Diameter of the pipe. The 5 percent deflection shall include deflection from burial and manufacturing process.
 - b. Mandrel shall be constructed of rigid steel, be non-adjustable, and have an odd number of legs (9 legs minimum). Its effective length shall not be less than its nominal diameter.
 - c. Owner reserves the right to measure the deflection at any time during the warranty period. Deflections greater than 5 percent shall be considered failure and the Contractor may be required to re-excavate, replace the pipe if necessary, re-compact the backfill and restore the surface with no additional costs to the Owner for such work.

END OF SECTION

SECTION 2400 – SANITARY SERVICES

SANITARY SERVICES

PART 1 – GENERAL

1.01 Section Summary

- A. Sanitary sewer service pipe installation and appurtenances.

1.02 Related Sections

- A. Section 2000 – Trench Excavation and Backfill
- B. Section 2300 – Sanitary Sewer

1.03 References

- A. American Society of Testing Materials (ASTM)
 - 1. D698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - 2. D2665 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.

1.04 Submittals

- A. Submit to the Engineer for review:
 - 1. Wye location (station).
 - 2. Depth of service.
 - 3. Length of service line.

PART 2 – PRODUCTS

2.01 Service Pipe

- A. Polyvinyl Chloride (PVC) Service Pipe
 - 1. Pipe shall conform to ASTM D2665.
 - 2. All pipes shall be bell and spigot.

3. Each pipe shall be identified by name of manufacturer, nominal pipe size, and PVC cell classification.
4. Minimum service size is 4 inch.
5. Minimum wall thickness is Schedule 40.
6. Solvent welded joints will be required and must be done in accordance with manufacturer's instructions.
7. New sanitary sewer connections shall be installed using an inline wye.
8. SDR 26 shall be acceptable for 6" services.

2.02 Pipe Bedding

- A. Bedding material shall conform to Section 2000 – Trench Excavation and Backfill.

2.03 Existing Service Connectors

- A. Connections to existing service pipe materials other than PVC shall be made with a strong back FERNCO.

PART 3 – EXECUTION

3.01 Pipe Installation

- A. Governing Code shall be North Dakota Plumbing Code and all City Ordinances that apply.
- B. Minimum grade shall be ¼ inch per foot unless directed by the Engineer.
- C. Lay pipe and fittings in accordance with Section 2300 – Sanitary Sewer.
- D. Service locations shall be shown on the Plans, at a minimum services must be downstream 10 feet from water services.
- E. Record all necessary information to comply with the submittal requirements of this Section.
- F. Plug end of service to protect the system.
- G. Mark end of service with a 2 X 4 wood post, painted green, extending from the service cap to 4 feet above the surface.

3.02 Reconnect Existing Sewer Services

1. No warranty is expressed or implied as to the location, size, or material type of existing service lines. The Contractor shall furnish and install all fittings required to make the connection.

3.03 Cleanouts

- A. Cleanouts shall be installed in service lines that exceed 100 feet in length. Cleanouts shall be spaced no greater than 100 feet apart, including the riser pipe.
- B. The cleanout wye shall be encased in concrete.
- C. Where the cleanout is extended to grade, a gate valve box section with lid shall be installed to protect the cleanout.

END OF SECTION

SECTION 2700 – STORM SEWER

STORM SEWER

PART 1 – GENERAL

1.01 Section Summary

- A. Construction of storm sewer systems including pipes, manholes, catch basins, and appurtenances.

1.02 Related Sections

- A. Section 1200 – Temporary Erosion and Sediment Control
- B. Section 1700 – Adjustment of Structures
- C. Section 2000 – Trench Excavation and Backfill
- D. Section 3200 – Concrete Curb and Gutter

1.03 References

- A. American Society of Testing Materials (ASTM)
 - 1. A48 – Specification for Gray Iron Castings.
 - 2. A153 – Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 3. A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - 4. C76 – Specification for Reinforced Concrete Culvert, Drain, and Sewer Pipe.
 - 5. C139 – Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
 - 6. C150 – Specification for Portland Cement.
 - 7. C206 – Specification for Finishing Hydrated Lime.
 - 8. C361 – Specification for Reinforced Concrete Low Head Pressure Pipe.

8. C443 – Specification for Joints for Circular Concrete Sewer and Pipe, Using Rubber Gaskets.
 9. C478 – Specification for Precast Reinforced Concrete Manhole Sections.
- B. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
1. Section 714 – Culverts, Storm Drains, Edge Drains, and Underdrains.
 2. Section 722 – Manholes, Catch Basins, and Inlets.
 3. Section 708.04 – Riprap and Aggregate Cushion.
 4. Section 858 – Geotextile Fabrics.
- 1.04 Submittals
- A. Contractor to supply the Engineer with shop drawings for all structures, castings, and other manufactured materials.

PART 2 – PRODUCTS

2.01 Concrete and Mortar

- A. All concrete products shall use Type 1 Portland Cement (conform to ASTM C150), washed sand, and crushed aggregate free of deleterious materials.
- B. Mix designs shall be approved by the Engineer and must obtain 3000 psi compressive strength at 28 days.
- C. Use non-shrink mortar for brick work and sealing of structures. Use one part cement to 2 parts sand.

2.02 Frames and Castings

- A. All frames and castings shall conform to ASTM A48, class 35 cast iron.
- B. The type and style of casting is shown on the Plan or is indicated on the detail plate.
- C. All storm manhole castings without a grate opening shall be stamped “STORM SEWER.”
- D. Covers shall have 2 concealed pick holes, Type F.

2.03 Storm Manholes and Catch Basins

- A. Structures shall conform to ASTM C478.
- B. All structures shall be precast, no block structures are allowed.
- C. All manhole joints shall have rubber o-ring gaskets meeting ASTM C443.
- D. Structure bases shall be precast concrete.
- E. Steps shall be steel reinforced polypropylene plastic.
- F. Catch Basin Manholes shall be the only approved junction structure where both inlet pipes and an opening for accepting storm water are needed.

2.04 Reinforced Concrete (RCP) Pipe

- A. General
 - 1. All reinforced concrete pipe shall conform to ASTM C76, wall B with circular reinforcing.
 - 2. Each pipe shall be marked with name of manufacturer, plant, date of manufacture, pipe class, and specification design.
- B. Tongue and Groove RCP
 - 1. Unless otherwise stated on the plan, this type of joint shall be specified.
 - 2. Gaskets shall be used only when specified or as directed by the Engineer.
 - 3. All joints shall be securely wrapped with Geotextile fabric.
- C. Bell and Spigot RCP
 - 1. Joints shall use o-ring gasket made of synthetic rubber.
 - 2. Bell and spigot joints shall conform to ASTM C361.

2.05 Slotted Inlet Drains

- A. Inlet Pipe: Shall be Corrugated Steel Pipe (CSP) of the size specified on the Plan and shall conform to AASHTO M36.
 - 1. Coupling band shall be 10-1/2 inches minimum with a 1/2 inch carriage bolt.
- B. Slotted Drain System: Shall be fabricated and attached to the CSP and shall be coated according to AASHTO M111.
 - 1. Butt welded No 4 rebar, 9 inches in length, with 1-1/2 inches of cover, shall be attached to the slots.
 - 2. Inlet slots shall have a 1-3/4 inch opening at the surface that will expand to 3 inches at the top of pipe.
 - 3. Inlet slots shall be vane type, spaced every 6 inches.

2.06 Rip Rap

- A. Material: Field stone or crushed stone not to exceed 12 inches in diameter but not less than 4 inches in diameter. Stone shall not be sandstone, shale, or soft limestone. Stone shall not abrade or crush.
- B. Geotextile Fabric: Shall be type RR or type R1 as defined by NDDOT Spec. Section 858.

PART 3 – EXECUTION

3.01 General

- A. All excavation and bedding requirements shall conform to the detail plates or Section 2000 – Trench Excavation and Backfill.
- B. Contractor shall be responsible for all by-pass pumping and drainage required during construction.
- C. Establish temporary erosion control as Specified in Section 1200 – Temporary Erosion and Sediment Control as soon as practical.

3.02 Connect to Existing

- A. Connect to Existing Structure
 - 1. Cut hole into side of structure and insert pipe flush with interior wall.

2. Mortar void between pipe and structure to provide a water tight seal. Apply mortar to give an even surface.
 3. Reconstruct invert to provide flow through the structure.
- B. Connect to Existing Pipe
1. Utilize tongue and groove joint if possible and wrap with Geotextile fabric.
 2. If butt joint must be used, wrap joint with Geotextile fabric and place a 12 inch thick and 12 inch wide concrete collar around the joint.

3.03 Pipe Installation

- A. Lay pipe to alignment, grade, and location staked in the field or shown on the Plans. No deviation is allowed unless approved by the Engineer.
- B. Lay pipe upgrade with tongue/spigot ends pointing in the direction of flow.
- C. Dirt or other foreign materials in the pipe must be removed prior to installation. Contractor is responsible for system maintenance until accepted by the City of Bottineau.
- D. Where storm sewer outlets to grade or where line is terminated by a flared end section, the last 3 joints shall be tied together with 2 U-bolt fasteners per joint and as recommended by the pipe manufacturer.

3.04 Structure Installation

- A. Shall be installed level. No deviation is allowed.
- B. Precast slab shall be placed on compacted granular bedding.
- C. Inverts shall be poured to half equivalent pipe size of the inlet and outlet pipe to allow for a free and uninterrupted flow. All surfaces must be smooth and slope to flow line. Preformed inverts are not allowed.
- D. Install short precast manhole section (maximum of 16 inch height) below the eccentric cone or precast top slab.
- E. Vertical wall of the eccentric cone section shall be on the downstream side.

- F. Steps shall be placed over the downstream pipe. When pipe size is in excess of 24 inches, place steps where most appropriate for access.
- G. Install rings and casting in conformance to Section 1700 – Adjustment of Structures. A minimum of 2 rings must be installed.
- H. All pipe connections must be neatly sealed with mortar and have a smooth finish.
- I. All lift holes must be mortared.

3.05 Slotted Drains

- A. Fabricate and install according to manufacturer’s instructions.
- B. Top of inlet slots shall be 1/2 inch below the surface of the concrete curb and gutter.
- C. Insert CSP into structure a maximum of 4 inches. Excess shall be cut off and void around pipe shall be sealed neatly with grout.

3.06 Bulkhead

- A. Bulkheads shall be built with non-shrink grout. Bulkhead shall provide a water tight seal.

3.07 Rip Rap

- A. In general, conform to NDDOT Spec Section 708.04 except as modified herein:
 - 1. Grout and wire mesh shall not be used unless specified on the Plan.
 - 2. Rip Rap placement size and shape shall be Specified on the Detail Plate.

3.08 Field Quality Control

- A. General
 - 1. Contractor shall provide all labor and materials necessary for inspections and tests.
 - 2. Engineer shall be present and observe all required testing. Contractor shall notify Engineer 48 hours before testing.

B. System Cleanup

1. Contractor shall ensure pipe and manholes are clean and free of material.
2. If system is dirty due to Contractor negligence, the system will be cleaned at the sole expense of the Contractor. Jetting may be required. Complete before final inspection.

C Testing

1. Testing shall begin only after the system has been cleaned.
2. Lamping: Engineer will verify installation is true to line and grade, joints are home, pipe has not broken, and deflection has not occurred.

END OF SECTION

SECTION 2900 – AGGREGATE BASE COURSE

AGGREGATE BASE COURSE

PART 1 – GENERAL

1.01 Section Summary

- A. Aggregate base course installation.

1.02 Related Sections

- A. Section 1900 – Subgrade Preparation
- B. Section 3000 – Hot Bituminous Pavement

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
 - 1. Section 302 – Salvaged Base Course, Aggregate Base Course, or Aggregate Surface Course.
 - 2. Section 816 – Aggregates

1.04 Submittals

- A. Submit gradation sample report for aggregate being used.

1.05 Sequence and Scheduling

- A. Prior to installing aggregate base, the subgrade must be test rolled for conformance to Specifications. The test must be witnessed by the Engineer. The subgrade must also be checked for line and grade tolerances.

PART 2 – PRODUCTS

2.01 Aggregate Base

- A. Conform to NDDOT Spec Section 816.03, Class 5 Aggregate Base.
 - 1. A minimum of 10% fractured faces shall be required.

PART 3 – EXECUTION

3.01 Preparation

- A. Before installation of aggregate base course, the subgrade shall be prepared as specified in Section 1900 – Subgrade Preparation and Geotextile fabric shall be installed and approved by the Engineer.

3.02 Aggregate Base Installation

- A. Conform to NDDOT Spec Section 302 except as modified herein:
 - 1. Aggregate that does not conform to specified gradation will be removed and replaced or will be blended with appropriate aggregate sizes to comply with specified gradation. No price reductions will be allowed.
 - 2. Aggregate base shall be compacted to 100 Percent Standard Proctor.
 - 3. Finished aggregate base surface shall not vary from Plan elevation by more than 0.04 feet.
- B. Weight tickets shall be delivered daily to the Engineer for aggregate brought to the site. Missing tickets shall not be paid.
- C. If the aggregate base is being wasted or placed excessively, the Owner reserves the right to deduct quantities that are in excess of Plan thickness.

3.03 Field Quality Control

- A. The Owner shall have an independent laboratory test the material for conformance to specifications. The Engineer will determine the test locations and the minimum number of tests according to Section 600 – Project Testing Requirements.
- B. Line and grade will be checked by the Engineer. The grade shall not vary by more than 0.04 feet from Plan elevation. Contractor shall provide Engineer notice when tolerances need to be checked.

3.04 Site Protection

- A. Contractor shall be responsible to protect the aggregate base from damage until it is covered by pavement. Aggregate base shall be free of ruts or other damage. Any damage will be repaired prior to being paved at the Contractor's expense.

END OF SECTION

SECTION 3000 – HOT BITUMINOUS PAVEMENT

HOT BITUMINOUS PAVEMENT

PART 1 – GENERAL

1.01 Section Summary

- A. Hot bituminous paving, bituminous tack, patching, and chip seals.

1.02 Related Sections

- A. Section 2900 – Aggregate Base Course

1.03 References

- A. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
 - 1. Section 400 – Bituminous Pavements
 - 2. Section 818 – Bituminous Materials

1.04 Submittals

- A. Contractor shall submit mix design to Engineer for approval prior to construction.
- B. Contractor shall be responsible for all Quality Control (QC) on the Project. The Contractor shall conduct tests and submit results to the Engineer as described in Section 409 of the NDDOT Spec.

PART 2 – PRODUCTS

2.01 Bituminous Paving Materials

- A. Bituminous Tack
 - 1. CSS-1h or SS-1h emulsified asphalt.
- B. Performance Graded (PG) Asphalt Cement
 - 1. Unless otherwise specified on the Plans, PG 58-28 asphalt cement shall be specified.

- C. Aggregate
 - 1. The minimum aggregate designation for bituminous pavement mixes on City streets shall be NDDOT Class 29 aggregate.
 - 2. Aggregate designation for driveways and bituminous trails shall be NDDOT Class 27 aggregate.

2.02 Chip Seal Materials

- A. Bituminous Seal
 - 1. CRS-2P
- B. Aggregate
 - 1. NDDOT Class 41 Modified aggregate.
- C. Blotter Sand
 - 1. NDDOT Class 44 blotter sand.

2.03 Crack Sealing

- A. Sealant
 - 1. Asphalt rubber sealant with a minimum of 20 Percent rubber and meeting ASTM-D3405.78 or Federal Specification SS-S-1401B.

2.04 Fog Coat

- A. Bituminous Fog Material
 - 1. A 50/50 blend of CSS-1h.

PART 3 – EXECUTION

3.01 General

- A. Before paving operations can begin:
 - 1. Aggregate base must be approved by the Engineer.
 - 2. Mix designs must be submitted and approved by the Engineer.
 - 3. All concrete curb and gutter construction must be complete and accepted.

4. Existing pavement that will receive another lift or will be chip sealed must be swept clean and be free of dirt and water.

3.02 Bituminous Paving Operations

- A. Paving operations shall conform to NDDOT Specification Section 408 except as modified herein:

1. All edges of existing pavement must be saw cut full depth or must be milled to provide a smooth transition for new pavement.
2. All concrete edges, including curb and gutter must be tacked prior to paving operations for all paving lifts.
3. Tack shall be applied between pavement layers at a rate of 0.05 Gal/SY. The Engineer can adjust the quantity up if necessary.
4. Compaction: Bituminous surface shall be compacted by Specified Density Compaction unless otherwise specified in the Plan.
 - a. The Contractor shall be responsible for the quality control (QC) portions of the mixture and compaction.
 - b. Minimum density shall be 91 Percent of Maximum Theoretical Density with 2-4 Percent air voids. Increase to 92 Percent for pavement classes greater than class 29.
 - c. The density of the compacted bituminous pavement shall be determined in sublots of 1,500 square yards per each lift.
 - d. Each day's haul will be considered a "lot" and each "lot" shall be divided into acceptance sublots not to exceed 1,500 square yards.
5. City required testing shall be followed according to Section 600 – Project Testing Requirements.
6. All pavement surfaces shall be ¼ inch above all curb edges, manholes, gate valves, and inlets.
7. The finished surface shall not vary by more than 3/8 inch when tested with a 10 foot straight edge applied parallel with or at right angles to the centerline.

3.03 Patching

- A. Patching areas shall be marked by the Engineer.
- B. All patches shall be saw cut full depth prior to removal. Coultter cutting shall be permitted as long as edges are cut straight. Removal of surfacing will be paid for separately.
- C. Removal of aggregate base and subgrade material shall be as detailed in the Plans or as directed by the Engineer. Quantities shall be paid for by Common Excavation.
- D. Edges of existing bituminous or concrete shall be tacked prior to placement of bituminous pavement.
- E. Bituminous patches shall be compacted by Ordinary Compaction unless patches are larger than 150 SY.

3.04 Crack Sealing

- A. Cracks less than $\frac{3}{4}$ inch wide shall be routed to a depth not to exceed $\frac{3}{4}$ of the router bit diameter. Cracks larger than $\frac{3}{4}$ inch do not need to be routed.
- B. All cracks shall be cleaned with compressed air.
- C. Sealant shall be applied at the rate necessary to fill the crack but shall not be excessively placed.
- D. Sealant shall be covered with paper to protect the sealant while curing.

3.05 Chip Seal

- A. Chip Seal operations shall conform to NDDOT Specification Section 420 except as modified herein:
 - 1. Prior to chip seal application, all patching, leveling, and crack sealing must be complete. All masking and structure protection must be in place and approved by the Engineer.
 - 2. Chip Seal work shall be completed by September 1st unless written permission is obtained by the Engineer.
 - 3. Steel wheel rollers shall not be allowed.
 - 4. Bitumen application rates shall be specified on the Plan or as directed by the Engineer. Aggregate shall be applied to cover the bitumen uniformly.

5. Blotter material shall be used when bleeding occurs. Material must be spread with a mechanical spreader.
6. Maintenance period shall be 14 days after completion of the entire project. The Contractor shall remove excess aggregate when so directed by the Engineer.
7. All weeds shall be removed in areas that will receive a chip seal, one week prior to application of seal oil. If a herbicide is used, the Contractor shall use caution to prevent damage to private property. The cost of removing the weeds shall be incidental.
8. Manholes and gate valves shall be protected prior to application of the seal coat. All coverings shall be tabbed or marked and shall be removed after the seal coat has been applied and rolled. All costs shall be incidental.

3.07 Fog Coat

- A. Fog Coat operations shall conform to NDDOT Specification Section 401 except as modified herein:
 1. Fog Coat work shall be completed by September 1st unless written permission is obtained by the Engineer.
 2. Application rates shall be specified on the Plan or as directed by the Engineer.

END OF SECTION

SECTION 3200 – CONCRETE CURB AND GUTTER

CONCRETE CURB AND GUTTER

PART 1 – GENERAL

1.01 Section Summary

- A. Construction of concrete curb and gutter.

1.02 Related Sections

- A. Section 2900 – Aggregate Base Course.
- B. Section 3000 – Hot Bituminous Pavement.
- C. Section 3300 – Concrete Walk, Medians, and Driveways.

1.03 References

- A. American Society of Testing Materials (ASTM)
 - 1. C260 – Air-Entraining Admixtures for Concrete.
- B. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
 - 1. Section 748 – Curb and Gutter.

1.04 Submittals

- A. Contractor shall submit mix design to Engineer before construction begins.
- B. All required testing results from Section 600 – Project Testing Requirements.

PART 2 – PRODUCTS

2.01 Concrete

- A. Concrete shall be class AE: 6 sacks (94lb) per CY.
 - 1. Minimum compressive strength shall be 4000 psi at 28 days.
- B. The Contractor may substitute fly ash in conformance with NDDOT Spec Section 820 with a maximum amount of 15 Percent by weight. The mix design must be approved by the Engineer prior to use.

2.02 Air Entrainment

- A. Air entrainment shall be required in all concrete.
 - 1. Conform to AASHTO M 182.
 - 2. Air content shall be between 4-8 Percent by volume of the freshly mixed concrete. Concrete with air content below 4 Percent or above 8 Percent will be rejected.

2.03 Expansion Joint Material

- A. Conform to AASHTO M 33 – Preformed Expansion Joint Filler for Concrete (Bituminous Type).

2.04 Concrete Curing Materials

- A. Concrete cure shall be white liquid-membrane type as Specified in NDDOT Spec Section 550.04 K.3.

PART 3 – EXECUTION

3.01 Installation of Curb and Gutter

- A. Provide copies of batch tickets of the concrete mixture to the Engineer when the material arrives on site.
- B. Construct concrete curb and gutter to the line, grade, and type shown on the Plan.
- C. Construct transitions at inlets as shown in the details.
- D. Construct Curb ramp and driveway depressions as shown in the details.
- E. Completed curb and gutter shall have an even, uniform appearance in surface contour and texture. Any curb and gutter not meeting these requirements shall be rejected.
- F. All curb shall be Type 1, high back curb and gutter.
- G. A minimum of ten (10) feet of curb will need to be removed and replaced when it is found that any section of curb must be replaced.

3.02 Valley Gutters

- A. Shall be made of concrete and shall be constructed according to the detail plate.

3.03 Aggregate Base

- A. Aggregate foundation shall conform to Section 2900 – Aggregate Base Course.

3.04 Joint Construction

A. Expansion Joints

1. Shall be installed every 100 feet and as close to lot lines as possible.
2. Shall be installed where driveway concrete ties into curb and gutter.
3. Shall be installed at curb transitions and at storm structures as shown on detail plates.

B. Contraction Joints

1. Shall be spaced a maximum of 10 feet apart.
2. All joints shall be stabbed or sawed to a sufficient depth to control cracking at the joint, at a minimum $\frac{1}{4}$ of the depth of the concrete.
3. A $\frac{3}{8}$ inch width tooled groove shall be made at each control joint.

3.05 Reinforcement

- A. Where shown on the Plan or in the details, install two (2) #4 steel rebar in the lower portion of the curb with a minimum of 2 inch coverage on all sides.

3.06 Finishing

- A. The surface of the curb shall have a broomed finish at right angles to the curb line.

3.07 Curing and Protection

- A. All surfaces shall be coated with a membrane curing compound within 30 minutes of finishing at the specified rate.
- B. Membrane curing compound shall be applied in 2 different directions perpendicular to each other.
- C. Freshly finished surface shall be protected, surfaces pitted by rain will be considered unacceptable. Curb and gutter damaged by traffic, rain, cold weather, or other causes occurring prior to final acceptance shall be removed and replaced at expense of the Contractor.

3.08 Cold Weather Concrete

- A. When temperatures are outside the recommended temperature ranges set forth by the NDDOT, the Contractor shall adhere to the requirements of Section 602.03G of the NDDOT Spec.
- B. A written request shall be submitted to the Engineer for approval before concrete can be placed at temperatures below 35 degrees. Concrete placed without approval shall be rejected.

3.09 Backfilling

- A. Allow at least 72 hours of cure time before the curb is backfilled.
- B. Any damage during backfilling operations is the responsibility of the Contractor.

3.10 Workmanship and Finish

- A. Any deviation in the design curvature of concrete edges in excess of 1/4 inch, measured with a 10 foot straight edge will be considered unacceptable.
- B. Acceptance of work by price reduction will not be allowed.

END OF SECTION

SECTION 3300 – CONCRETE WALKS, MEDIANS, AND DRIVEWAYS

CONCRETE WALK, MEDIANS, AND
DRIVEWAYS

PART 1 – GENERAL

1.01 Section Summary

- A. Construction of concrete walk, medians, and driveways.

1.02 Related Sections

- A. Section 1800 – Excavation and Embankment.
- B. Section 2900 – Aggregate Base Course.
- C. Section 3200 – Concrete Curb and Gutter.
- D. Section 3000 – Hot Bituminous Pavement.

1.03 References

- A. American Society of Testing Materials (ASTM)
 - 1. C260 – Air-Entraining Admixtures for Concrete.
- B. North Dakota Department of Transportation “Standard Specification for Road and Bridge Construction” 2008 Edition, As Revised.
 - 1. Section 748 – Curb and Gutter.
 - 2. Section 750 – Sidewalks and Driveways.

1.04 Submittals

- A. Contractor shall submit mix design to Engineer before construction begins.
- B. All required testing results from Section 600 – Project Testing Requirements.
- C. Before work commences, private Contractors must apply for and receive a Sidewalk Permit from the City of Bottineau.

PART 2 – PRODUCTS

2.01 Concrete

- A. Concrete shall be class AE: 6 sacks (94lb) per CY.
 - 1. Minimum compressive strength shall be 4000 psi at 28 days.
- B. The Contractor may substitute fly ash in conformance with NDDOT Spec Section 820 with a maximum amount of 20 Percent by weight. The mix design must be approved by the Engineer prior to use.

2.02 Air Entrainment

- A. Air entrainment shall be required in all concrete.
 - 1. Conform to AASHTO M 182.
 - 2. Air content shall be between 4-8 Percent by volume of the freshly mixed concrete. Concrete with air content below 4 Percent or above 8 Percent will be rejected.

2.03 Expansion Joint Material

- A. Conform to AASHTO M 33 – Preformed Expansion Joint Filler for Concrete (Bituminous Type). Metal, rubber, or fiber types of expansion material will not be accepted.

2.04 Concrete Curing Materials

- A. Concrete cure shall be white liquid-membrane type as Specified in NDDOT Spec Section 550.04 K.3.

2.05 Aggregate Base Material

- A. Class 5 aggregate base conforming to NDDOT Spec Section 816.

2.06 Truncated Dome Panels

- A. Armor-Tile Tactile Systems – Engineered Plastics.
- B. R-4984 Detectable Warning Plate – Neenah Foundry.
- C. All truncated domes must be federal yellow in color.

PART 3 – PRODUCTS

3.01 General

- A. The Contractor must maintain access to properties at all times while installing the concrete aprons. Multiple pours or temporary access must be provided for properties with only one access.
- B. Provide copies of batch tickets to the Engineer for verification of concrete mix design.
- C. Construct walks, medians, and driveways at the location and elevation indicated on the Plans.
- D. Construct driveway aprons, walks, and curb ramps according to the detail plates.
- E. Verify location of driveways in the field with the Engineer prior to placement.
- F. The completed concrete work shall give the appearance of uniformity in surface contour and texture, and shall be accurately constructed to line and grade. The required joints, edges, and flow lines shall show neat workmanship. Any work found to be unacceptable shall be rejected.
- G. Retempering of concrete that has partially hardened with or without additional materials or water is prohibited.

3.02 Aggregate Base

- A. Aggregate base shall be constructed in conformance with Section 2900 – Aggregate Base and as shown in the detail plates.
- B. Base shall be approved by the Engineer prior to placement of concrete.

3.03 Forms

- A. Shall conform to NDDOT Spec Section 750.03A.

3.04 Joint Construction

- A. Conform to NDDOT Spec Section 750.03G except as modified herein:
 - 1. Maximum contraction joint spacing shall be 5 feet for sidewalks, 10 feet for driveways.
 - 2. Maximum expansion joint spacing shall be 100 feet for sidewalks, and as shown on the detail for driveways.
 - 3. Match joints of adjacent concrete work when possible.
 - 4. All contraction joints shall be stabbed or sawed a minimum of $\frac{1}{4}$ the depth of the slab.
 - 5. Sawed joints shall be sawed within 24 hours after pouring the concrete.

3.05 Placing and Finishing

- A. Any deviation in the design curvature of concrete edges in excess of $\frac{1}{4}$ inch, measured with a 10 foot straight edge will be considered unacceptable.
- B. Any surface area holding water $\frac{1}{8}$ inch deep or greater will not be considered acceptable.
- C. Unacceptable work will be removed and replaced as directed by the Engineer. Acceptance of work by price reduction will not be allowed.

3.06 Pedestrian Curb Ramps

- A. Conform to manufacturers recommendations for placement.
- B. Truncated dome panels shall be placed on a minimum of 4 inches of wet concrete prior to finishing the surface of the adjacent concrete surface of the pedestrian ramp. The joint between the panel and concrete shall be edged with a $\frac{1}{2}$ inch radius edging tool.
- C. Conform to standard detail plate for typical size and dimensions as specified in NDDOT Spec Section 894.09. Conform to Plan information for specific ramp configurations.
- D. Seal all joints required by the manufacturer.

3.07 Curing and Protection

- A. All surfaces shall be coated with a white membrane curing compound within 30 minutes of finishing at the specified rate.
- B. White membrane curing compound shall be applied in 2 different directions perpendicular to each other.
- C. Freshly finished surface shall be protected, surfaces pitted by rain will be considered unacceptable. Curb and gutter damaged by traffic, rain, cold weather, or other causes occurring prior to final acceptance shall be removed and replaced at expense of the Contractor.

3.08 Backfilling

- A. Perform backfilling operations no sooner than 72 hours after placement of the concrete.

3.09 Cold Weather Concrete

- A. When temperatures are outside the recommended temperature ranges set forth by the NDDOT, the Contractor shall adhere to the requirements of Section 602.03G of the NDDOT Spec.
- B. A written request shall be submitted to the Engineer for approval before concrete can be placed at temperatures below 35 degrees. Concrete placed without approval shall be rejected.

END OF SECTION

SECTION 4000 – LIFT STATIONS

LIFT STATIONS

PART 1 – GENERAL

1.01 Section Summary

- A. Lift station control panels.

1.02 Documentation

- A. Follow the general requirements of Division 1.
- B. Provide 4 sets of submittals. Each submittal shall include:
 - 1. System schematic drawings.
 - 2. Dimension drawings.
 - 3. Complete bill of materials. Create a separate bill of materials for ship loose items.
 - 4. Equipment specification / data sheets for all products listed in bill of materials.
 - 5. Nameplate legend drawings.
 - 6. Control panel layout drawings.
- C. Provide 4 sets of operation and maintenance manuals. Include the following:
 - 1. Same items as provided in submittals.
 - 2. As-built drawings.
 - 3. One of the 4 sets of operation and maintenance manuals will be titled "Owner's Copy" and it will, in addition to items 1-4, contain original manufacturer's manuals for all products provided in the panel.

1.03 References

- A. National Fire Protection Association (NFPA)
 - 1. NFPA 70 – National Electrical Code (NEC)
2008.

- B. National Electrical Manufacturers Association (NEMA)
 - 1. NEMA ICS-2 – Industrial Control Devices, Controllers, and Assemblies.
 - 2. NEMA 250 – Enclosures for Electrical Equipment.
- C. International Electrotechnical Commission (IEC)
- D. UL – Underwriters Laboratories Inc.
 - 1. UL-698A – Industrial Control Panels Relating To Hazardous Locations With Intrinsically Safe Circuit Extensions.

1.04 General

- A. It is the intent of the Contract Documents that all equipment specified in this section of the specification be supplied by a single-source supplier (“Controls Supplier”) except as specifically indicated. Unless specifically indicated, the Controls Supplier shall assume full responsibility for furnishing, installing and field commissioning procedures so as to make the system operate per the intent of the contract documents.
- B. Except as specifically indicated, the work specified in this Section includes furnishing, installing, start-up, testing and adjusting of all required equipment, including instruments, equipment, hardware, software, wiring, accessory equipment, and training.
- C. It shall be the responsibility of the Controls Supplier to furnish complete and fully operating lift station control panels that automatically operate the respective lift stations on a stand-alone basis. The Controls Supplier shall be responsible for all details which may be necessary to properly install, adjust and place the control panels in stand-alone operation.

1.05 Quality Assurance

- A. The Controls Supplier shall have a minimum of 5 years experience in systems integration related to water and waste water control systems. Controls Suppliers without the required minimum experience as a business entity shall not be allowed to substitute experience of individuals in lieu of the required business experience.

- B. The Controls Supplier shall maintain a \$1,000,000 product liability insurance policy.
- C. The Control Supplier must maintain and operate a panel shop with both UL-508A and UL-698A labels.
- D. The Controls Supplier shall have PLC programmers and field service personnel who are permanent, full time employees.
- E. Contractor shall provide data supporting their compliance to the above items within 48 hours, upon request from the OWNER or ENGINEER.

PART 2 – PRODUCTS

2.01 Lift Station Control Panels

- A. The control panel shall be constructed in accordance with Underwriters Laboratories (UL) Standard 698A - "*Industrial Control Panels for Hazardous Locations*". In addition to intrinsically safe circuitry the 698A standard requires that the control panel comply with applicable portions of UL Standard 913 - "*Intrinsically-Safe Apparatus and Associated Apparatus for use in Class I, II and III, Division 1, Hazardous Locations*" and UL standard 508a - "*Industrial Control Panels*". The panel(s) shall be shop-inspected by UL, or constructed in a UL-recognized facility. Each completed panel shall bear a serialized UL label indicating acceptance under Standards 698A, 913, and 508A.
- B. Enclosures
 1. NEMA 3R tamper resistant polished stainless steel, 2 door enclosure with minimum dimensions of 48" H x 60" W x 18" D. The enclosure shall contain an interior sub-panel for mounting all control components and the enclosure shall be sufficiently large to accept all control components without crowding. The panel shall be of not less than 12 gauge type 304 stainless steel with continuously welded seams. The enclosure shall contain door and panel stiffeners as required. The front doors shall have a rolled lip and the door flanged and the corners ground smooth. All enclosure welding seams shall also be ground smooth.
 2. The doors shall be fastened to the enclosure with a continuous type stainless steel piano hinge and locking three-point minimum, stainless steel hardware. The inside of the door shall contain data

pockets. The sub-panel shall be painted white.

3. Enclosure shall have full-height dead-front inner 12 gauge carbon steel hinged doors that house all front-panel components including switches, indicating lights, running time meters, overload reset pushbuttons, and other controls that require operator access.
4. Circuit breakers that cannot be mounted directly to the inner door shall be elevated from sub-panel such that there operators are exposed through cut-outs on the inner door. The use of lever operators with extension shafts is prohibited.
5. The enclosure shall have thermostatically-controlled heaters to prevent condensation and freezing within the enclosure per the requirements on the Drawings and per the recommendations of the Supplier.
6. Insulated with ½" cell foam insulation. Insulation shall be mechanically secured.
7. 18 inch stainless steel floor stands, with stainless steel louvered skirts.

C. Service Entrance

1. Each lift station control panel shall be service entrance rated.
2. Provide mechanically interlocked Normal and Emergency Service circuit breakers. Size these breakers per the one-line diagrams included in the plan set.
3. Acceptable manufacturers for circuit breakers include: Allen Bradley or Cutler Hammer or approved equal.

D. Generator Receptacle

1. Each lift station control panel shall be equipped with a generator receptacle for emergency power.

E. Full Voltage Motor Starters

1. Starters shall be NEMA rated. The Controls Supplier shall size the motor starters as required, per the requirements of the pump supplier.

2. Provide external ambient compensated class 10 overload relays with bi-metallic heater elements. Overload relay shall be reset via push button on the inner door. Overload relays shall be NEMA rated and shall be sized to protect the motors. The Controls Supplier shall size the overloads as required, per the requirements of the pump supplier.
 3. Provide branch protection MCP style, magnetic trip only, breakers with adjustable trip. Use a UL listed combination motor controller per NEC 430.52.C.6. Size MCP such that instantaneous trip value is a maximum of 1300 percent of full-load current.
 4. Insure that the MCP style branch protection for each starter has a combination listed short circuit rating of at least 35 KAIC. Use the combination interrupt rating to properly calculate the control panels short circuit rating per UL508A supplement B.
 5. All motor starters shall be 480V 3-phase.
 6. Acceptable full voltage motor starter manufacturers include: Allen Bradley or Cutler Hammer or approved equal.
- F. Relays shall be of the plug-in type with associated sockets and retaining clips. The relays shall have dust covers. All contacts shall be rated for not less than 10 amps at 120 VAC. Relays shall have either 2 or 3 poles. Relays shall be as manufactured by Cutler-Hammer, Allen Bradley, Idec, or equal.
- G. All circuit breakers shall be UL labeled and shall be of the size shown on plans. All circuit breakers ahead of the transformer shall have an interrupting rating of not less than 35,000 amps, sym. Circuit breakers after the transformer shall have an interrupting rating of not less than 10,000 amps, sym.
- H. The control panel shall have an interrupt rating of not less than 35 KAIC. Use the UL508A supplement SB analytical method to determine the short-circuit current rating of the control panel. Insure that lowest component SCCR or overcurrent protective device interrupt rating for devices downstream of the transformer is 2KA or greater so that the transformer's primary overcurrent device (fuse) interrupt rating can be applied to the entire transformer circuit.

- I. The panel shall be equipped with an interior convenience receptacle that is accessible on the front of the inner door. This receptacle shall be a 15 amp, UL-listed ground fault interrupter.
- J. All field wiring shall be terminated on terminal blocks. Each terminal shall be of the flat head screw type. The contacts shall be capable of carrying 10 amps at 600 VAC. The contacts shall be large enough to accept up to and including No. 12 AWG wire.
- K. Number all terminals and tag all conductors on both ends to correlate with the schematic drawings. All conductor tags shall be computer printed shrink style.
- L. Surge Arrestors
 - 1. Panel shall include a surge protector for all incoming phases. Surge suppressor shall be TVSS type, UL1449 second edition. Square D or equal.
 - 2. Control circuit shall include a surge protector as indicated on drawings. UL 1449 recognized, with diagnostic indicator. Edco or equal.
- M. Phase Monitors
 - 1. Panel shall include a 3 phase power monitor for monitoring incoming 3 phase power. Phase monitor shall be Time Mark C2644 or equal.
 - 2. Control circuit shall include phase failure protection as indicated on drawings. PLC shall also monitor phase failure contact.
- N. Indicating Lights
 - 1. 30 mm, opaque colored lens.
 - 2. Heavy-duty, oil-tight.
 - 3. Push-to-test.

4. Provide the following lights on the inner door: Add additional lights, etc. if more than 2 pumps.
 - a. Pump 1 Run (Green)
 - b. Pump 2 Run (Green)
 - c. Pump 1 Thermal Fail (Red)
 - d. Pump 2 Thermal Fail (Red)
 - e. Pump 1 Seal Fail (Red)
 - f. Pump 2 Seal Fail (Red)
 - g. Pump 1 Fail (Red) – based upon contact from overload relay.
 - h. Pump 2 Fail (Red) – based upon contact from overload relay.
 - i. Wetwell High Level (Red)
 - j. Wetwell Low Level (Red)
 - k. Float Mode Active (Red)
 5. Indicator Lights shall be Cutler-Hammer Type T, Allen Bradley Bulletin 800T, Idec TWTD series, or equal.
- O. Inner Door Mounted Switches and Push Buttons
1. 30 mm, Heavy-duty, oil-tight.
 2. Pump 1 Hand-Off-Auto.
 3. Pump 2 Hand-Off-Auto.
 4. Pump 1 Overload Reset.
 5. Pump 2 Overload Reset.
 6. Lamp Test.
 7. Reset Backup Mode.
 8. Pump 1 Overtemp Reset.
 9. Pump 2 Overtemp Reset.

10. Acknowledge Alarms.
11. Lead-Lag Selector Switch. (3 position: 1-2, 2-1, Auto)
12. Switches and push buttons shall be Cutler-Hammer Type T, Allen Bradley Bulletin 800T, or Square D Class 9001 units, Idec TWTD series, or equal.

P. Uninterruptible Power Supply (UPS)

1. The UPS shall sustain operation of the control panel's PLC, transducer, and floats in the event of a power failure.
2. 120 VAC, 60 Hz, single phase input and output.
3. Minimum 900 VA capacity.
4. The control panel shall implement a control relay logic circuit that allows the UPS to be removed from the control panel and automatically provides the controls with bypass power. Additionally, this relay logic circuit shall provide a contact closure to the PLC that indicates a UPS failure.
5. Powerware or equal

Q. Elapsed Time Meters

1. Provide Qty. 3 (Pump 1 Run, Pump 2 Run, Pump 1&2 Run) add for additional pumps.
2. Six digit, hours and tenths.
3. Non-resettable.
4. Round, flush mounted.
5. Redington Model 722 or equal.

R. Enclosure Heater

1. Manufactured unit with metal housing with integrated fan and integral thermostat and 0 - 1000F adjustable range.
2. UL labeled.
3. 200 Watt.
4. Hoffman "Design-Aire", or equal.

- S. Alarm Beacon
 - 1. Weatherproof, vandal-proof unit with red polycarbonate globe and 120VAC lamp.
 - 2. Suitable for top mounting on panel.
 - 3. UL labeled.
 - 4. Edwards Model 104FLEDR or equal.

- T. Intrinsically-Safe Barriers
 - 1. Provide UL listed isolated switch style barriers for the float signals.

- U. Float Switches
 - 1. Polypropylene with encapsulated mechanical tilt (non-mercury) switch.
 - 2. Contact rating: 3 amps, 120 VAC, resistive.
 - 3. Operating differential: 1 inch, nominal.
 - 4. Extra flexible cord in length as required for application.

- V. Float Weight Kit
 - 1. Provide 8 lb vinyl coated cast iron boat anchor for securing the floats in the wetwell.
 - 2. Anchor shall be secured by a 3/32" stainless steel support cable.
 - 3. Floats and transducer shall be attached to the support cable.
 - 4. Use all stainless steel clamps and fittings.
 - 5. See contract drawings for details.

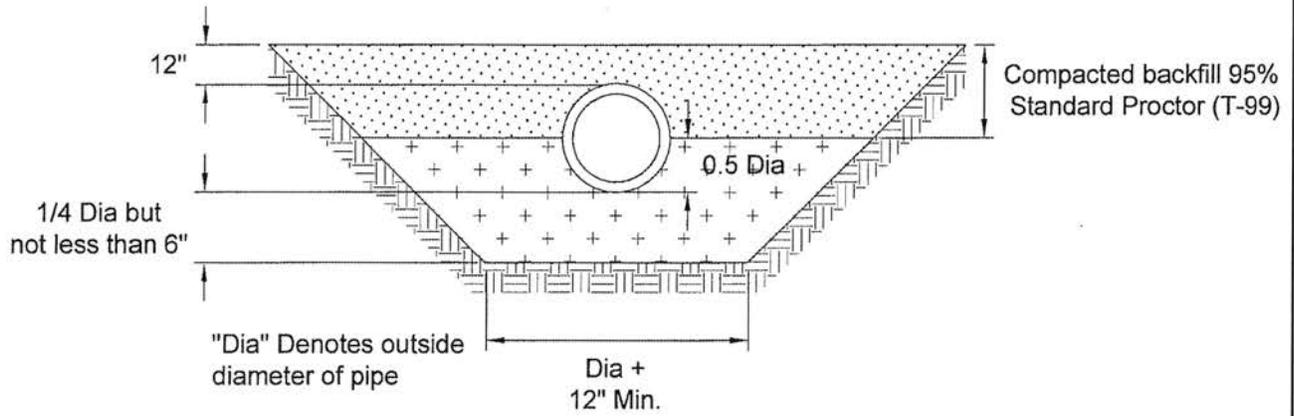
PART 3 – EXECUTION

3.01 Startup / Testing / Training

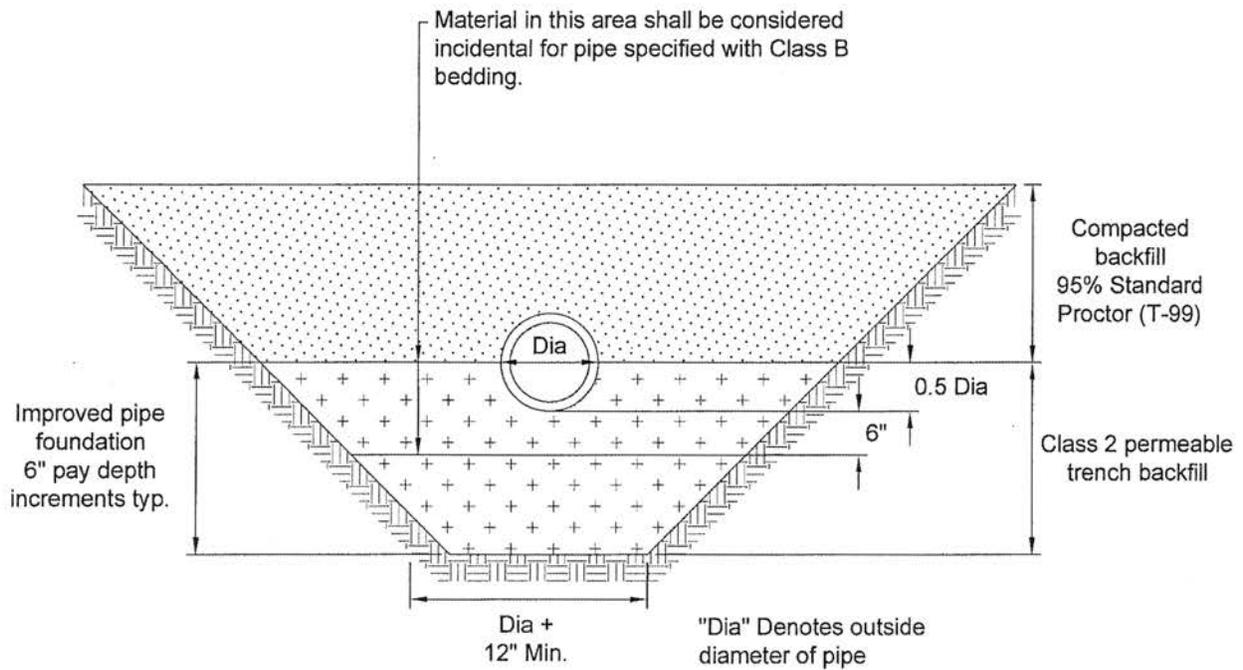
- A. The Controls Supplier shall provide a skilled technician for troubleshooting and startup of the lift station control panel in stand-alone operation. Provide all necessary field visits to fully test system before performing a witnessed test with Engineer and Owner.

- B. Coordinate installation, start-up, and testing with General Contractor and Engineer.
- C. Once witnessed testing is completed, the integrator is responsible for coordinating and providing training and instruction on the operation and maintenance of the equipment furnished in this section.

END OF SECTION



BEDDING METHOD FOR RCP



IMPROVED FOUNDATION FOR RCP

File Name:

BED-1.dwg

Last Revision:

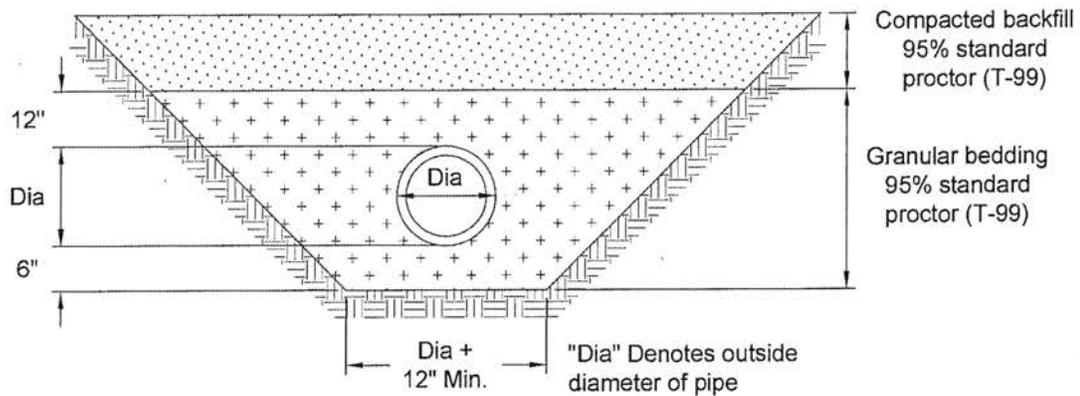
4/18/2013

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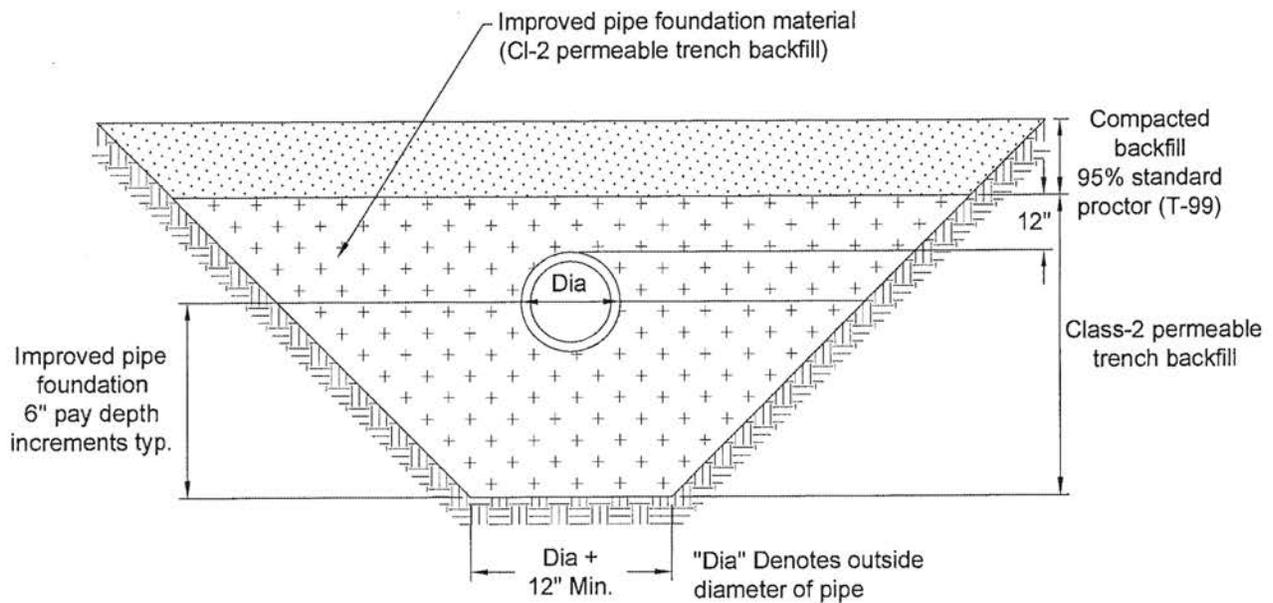
No Scale

STANDARD DETAILS
BEDDING METHOD
FOR RCP





PIPE FOUNDATION & BEDDING IN GOOD SOILS



PIPE FOUNDATION & BEDDING IN POOR SOILS

File Name:

BED-2.dwg

Last Revision:

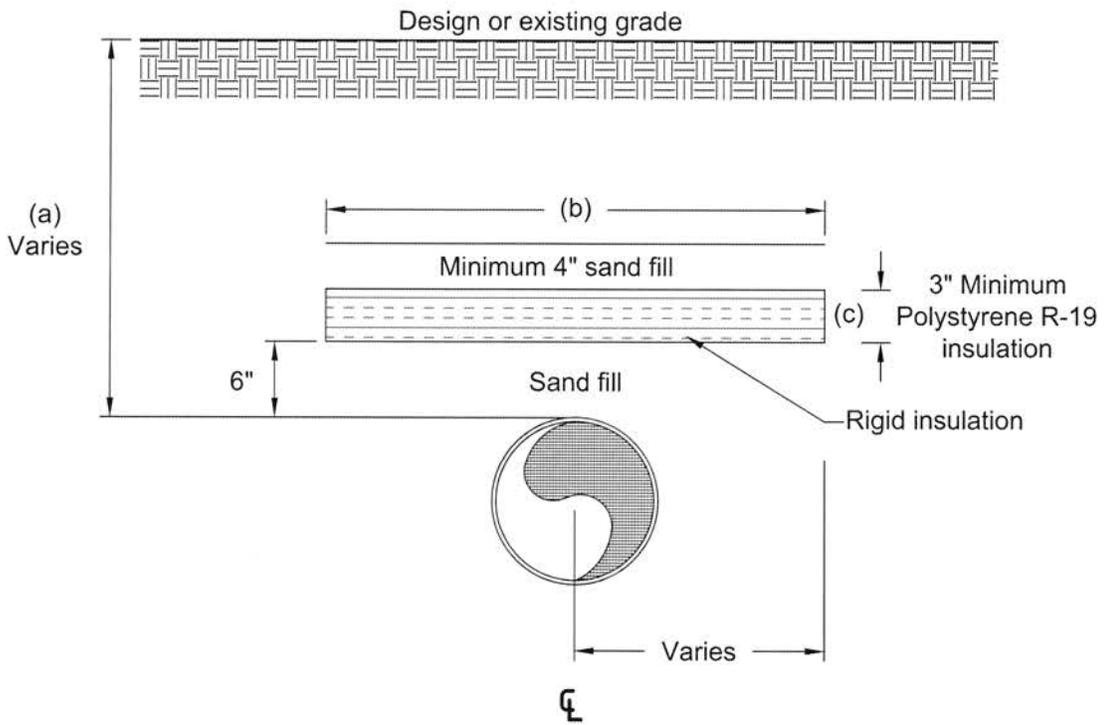
4/18/2013

Scale:

No Scale

STANDARD DETAILS BEDDING METHODS FOR PVC





NOTE:
 Pipe shall be centered under insulation unless otherwise specified.

Cover over pipe (a)	Width of insulation board (b)	Thickness of insulation board (c)
2'	11'	6"
3'	9'	5"
4'	7'	4"
5'	5'	3"
6' - 7'	3'	3"

File Name:

BED-3.dwg

Last Revision:

4/18/2013

Scale:

No Scale

STANDARD DETAILS
INSULATION
DETAIL



Steel fence post (T-Post)
minimum 5' long,
4' maximum spacing

Post notches to face
away from fabric

Monofilament geotextile fabric

Attach fabric to post with minimum 3 zip ties
(50 lb tensile) per post in top 8" of fabric

Lay fabric in the trench, backfill with
natural soil, and compact with light
equipment prior to placement of the
posts

36" Min.

Direction of surface flow

6"

20" Minimum post
embedment
24" for slopes 3:1 or
greater.

6"

File Name:

ERO-1.dwg

Last Revision:

4/18/2013

Scale:

No Scale

STANDARD DETAILS
SILT FENCE
STANDARD



Steel fence post (T-Post)
minimum 5' long
4' maximum spacing

Post notches to face
away from fabric

Attach fabric to post
with minimum 3 zip ties
(50 lb tensile) per post
in top 8" of fabric.

Direction of surface flow
←

Into trench

Extend wire mesh
min. 2" into ground

Wire mesh reinforcement, Std.
field fence, min 32" high, max mesh
spacing 6" and min 14 gauge wire

Geotextile fabric - overlap top 6" of fabric
and fasten to wire mesh at 2' intervals with
rings or wire ties.

Attach wire mesh to posts with minimum 3
U-shaped wire fasteners per post

Lay fabric / wire mesh in the trench,
backfill with natural soil and compact
with light equipment prior to placement
of the posts

6"

24" Minimum post
embedment

6"

File Name:

ERO-2.dwg

Last Revision:

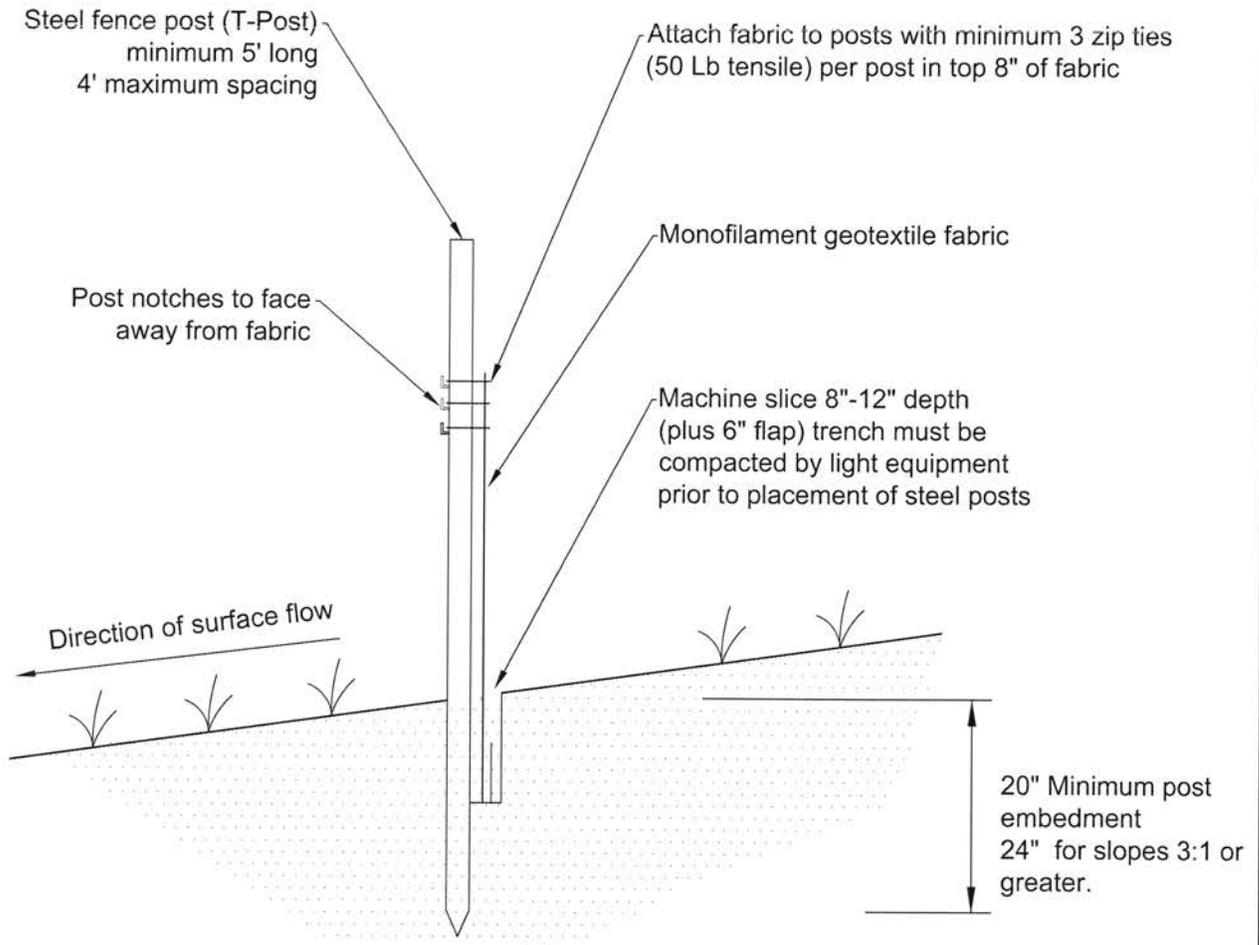
4/18/2013

Scale:

No Scale

STANDARD DETAILS
SILT FENCE
HEAVY DUTY





NOTE:
The machine sliced method (this detail) is the standard silt fence installation method. Heavy-duty (ERO-2) or standard (ERO-1) silt fence installation methods should only be used when approved or directed by the City.

File Name:	ERO-3.dwg
Last Revision:	4/18/2013
Scale:	No Scale

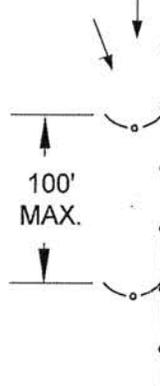
**STANDARD DETAILS
SILT FENCE
MACHINE SLICED**



PLAN VIEW

I. SPACING REQUIREMENTS

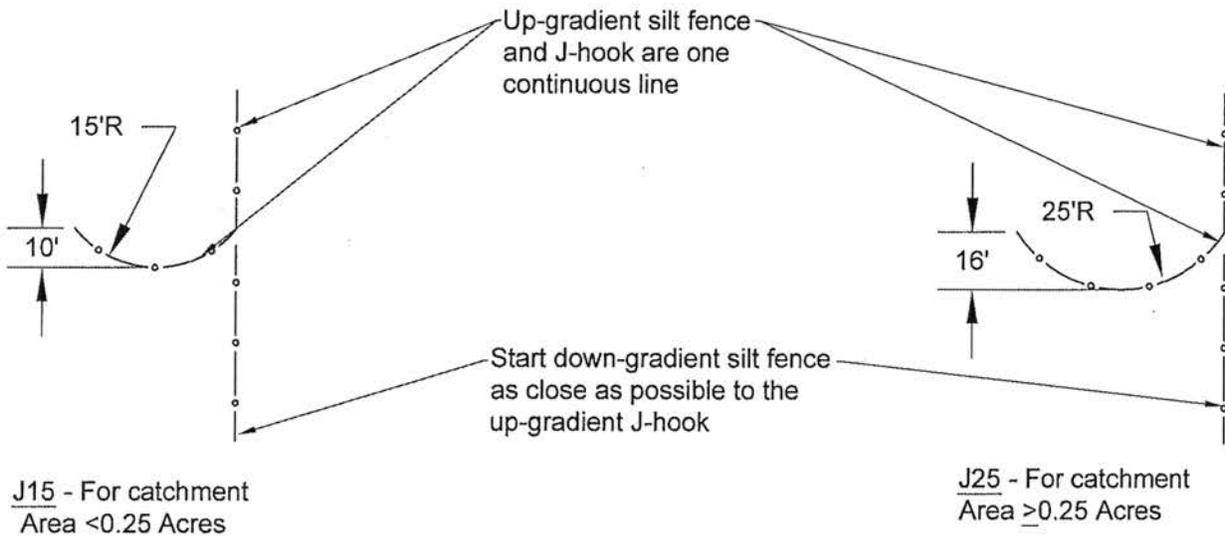
Direction of surface flow



NOTE:

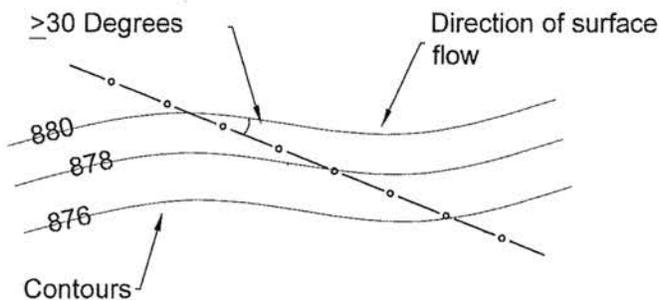
Spacing distances will vary, but are not to exceed 100 feet.

II. SIZING REQUIREMENTS: J15, J25



J15 - For catchment Area < 0.25 Acres

J25 - For catchment Area \geq 0.25 Acres



NOTE:

J-hooks shall be used when the silt fence is installed at an angle of 30 degrees or greater from parallel to the contours.

File Name:

ERO-4.dwg

Last Revision:

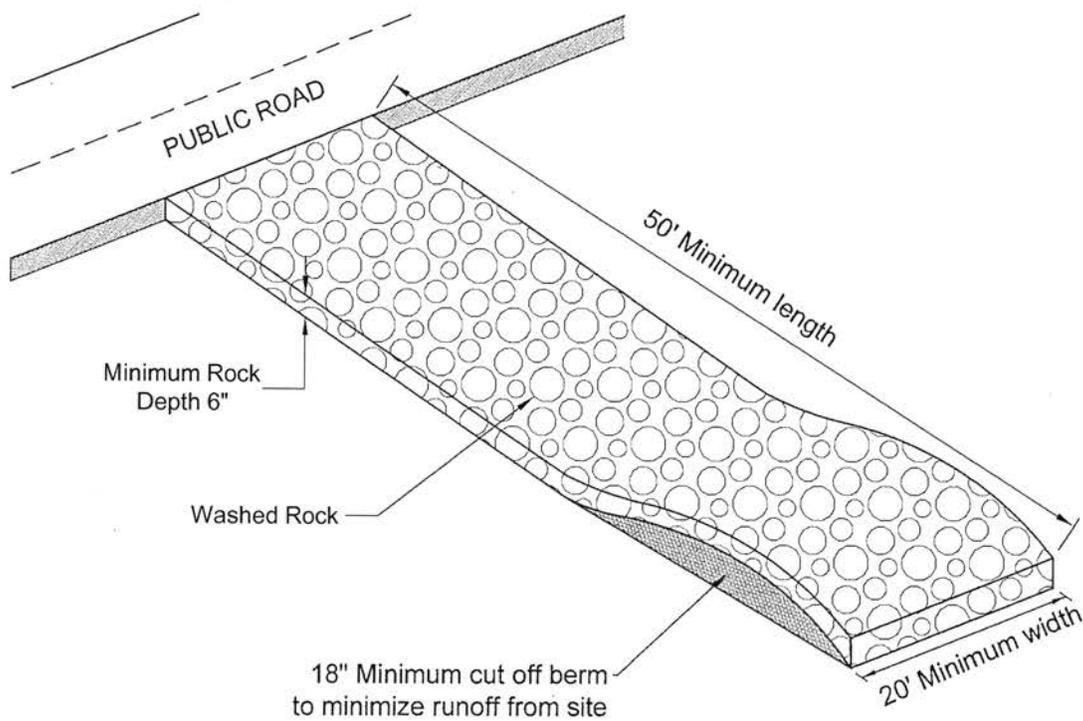
4/18/2013

Scale:

No Scale

STANDARD DETAILS
SILT FENCE
J-HOOK





Notes:

1. Filter Fabric shall be placed under rock to stop mud migration through rock.
2. Entrance must be maintained regularly to prevent sedimentation on public roadways.
3. Curb and Gutter must be protected at all times from damage due to equipment or construction activities when crossing curb and gutter.

File Name:

ERO-5.dwg

Last Revision:

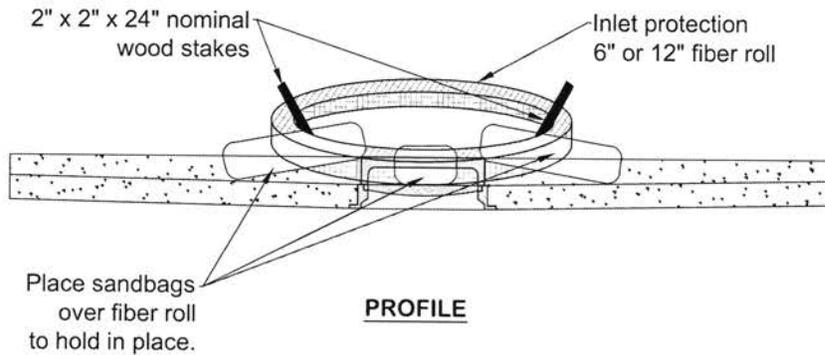
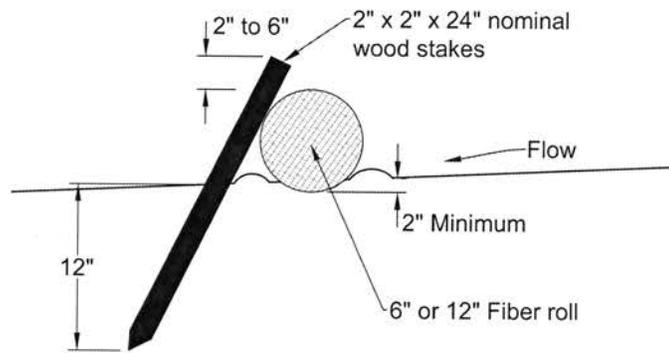
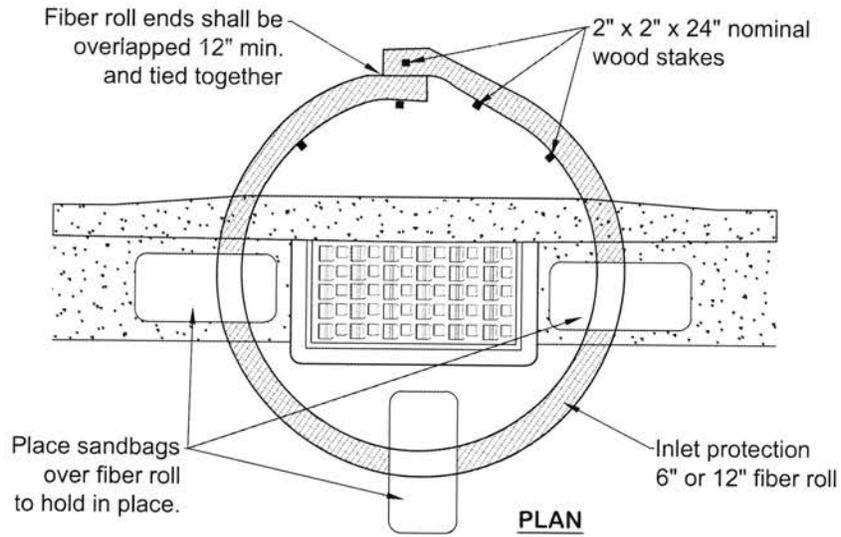
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
ROCK CONSTRUCTION
ENTRANCE**





File Name:

ERO-6.dwg

Last Revision:

4/18/2013

Scale:

No Scale

STANDARD DETAILS
INLET PROTECTION
FIBER ROLL FOR CATCH BASIN

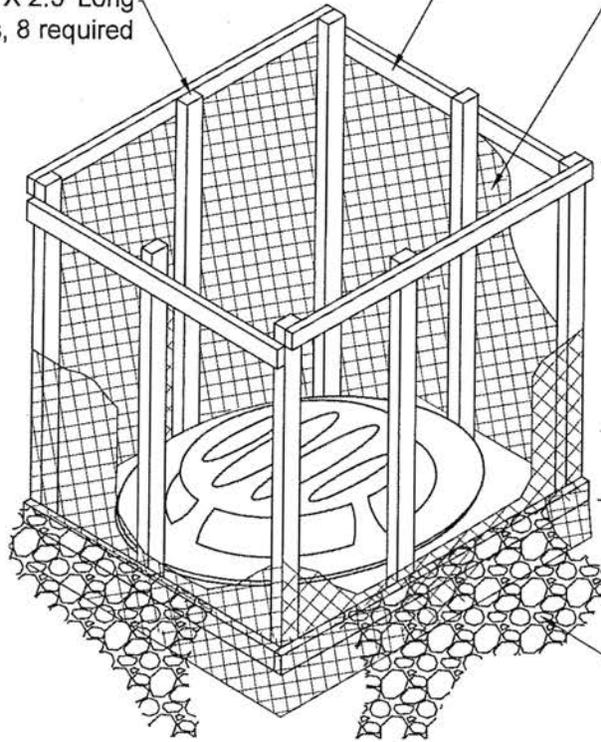


Wooden lath shall be nailed securely to the post member to secure filter fabric.

2" x 4" Horizontal members continuous around top and bottom fastened to each post using 2 - 20D common nails

2" X 4" X 2.5' Long wood posts, 8 required

Monofilament geotextile fabric
Additional 8 - 10" of fabric flap at bottom of box



2' - 6"

8 - 10" Fabric flap bury under rock to prevent underwashing

1 1/2" Washed rock
1' deep x 1' wide

NOTES:

1. Contractor shall construct silt box to fit around the inlet structure with 6" minimum clearance to edges of structure.
2. Silt box to be placed on an even surface 6" below structure opening.
3. Top of silt box to extend 18" minimum above existing grade.

File Name:

ERO-7.dwg

Last Revision:

4/18/2013

Scale:

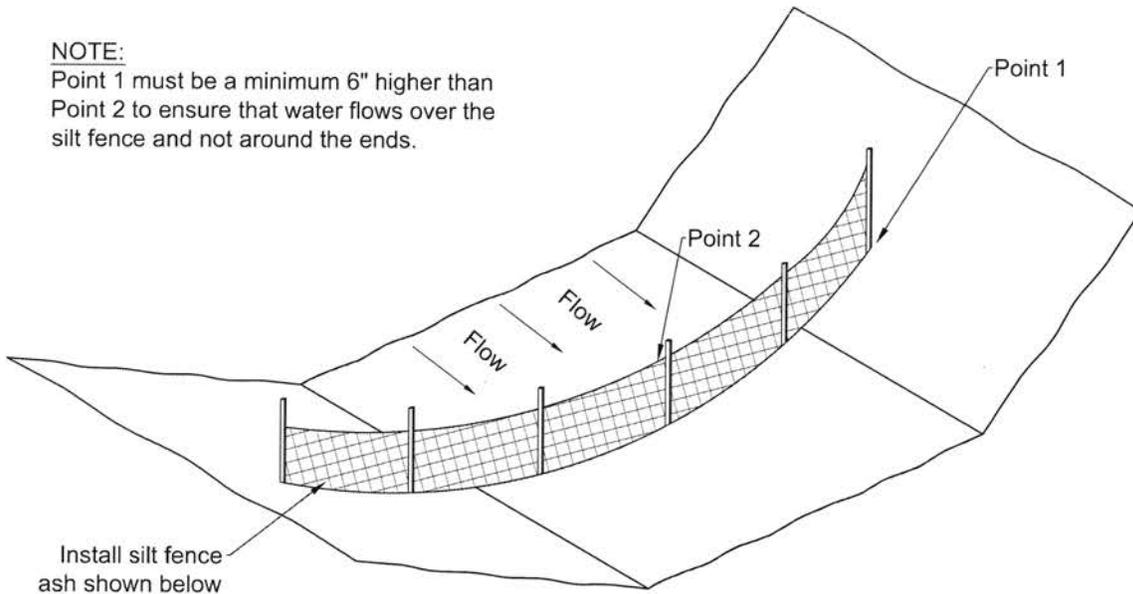
No Scale

STANDARD DETAILS
INLET PROTECTION SILT FENCE
FOR BEEHIVE CASTING



NOTE:

Point 1 must be a minimum 6" higher than Point 2 to ensure that water flows over the silt fence and not around the ends.



Steel fence post (T-Post)
minimum 5' long
4' maximum spacing

Attach fabric to posts with minimum 3 zip ties
(50 Lb tensile) per post in top 8" of fabric

Monofilament geotextile fabric

Post notches to face
away from fabric

Machine slice 8" - 12" depth
(plus 6" flap) trench must be
compacted by light equipment
prior to placement of steel posts

Direction of surface flow

20" min post
embedment.
24" for slopes 3:1 or
greater.

File Name:

ERO-8.dwg

Last Revision:

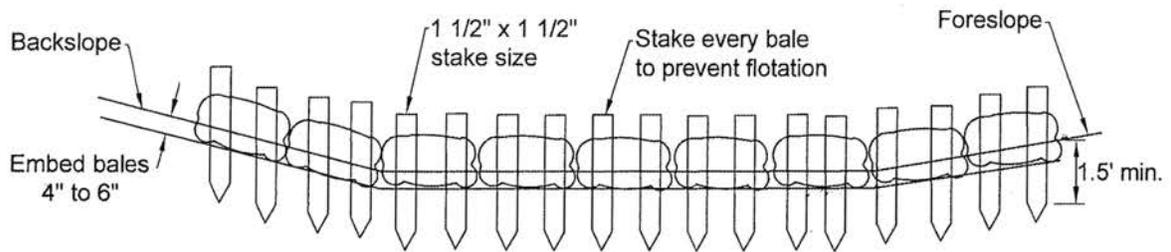
4/18/2013

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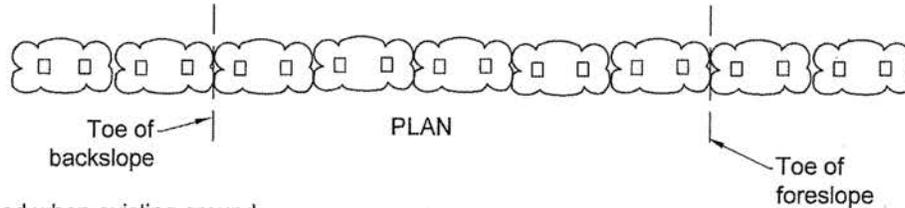
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STANDARD DETAILS
DITCH CHECK MACHINE
SLICED SILT FENCE





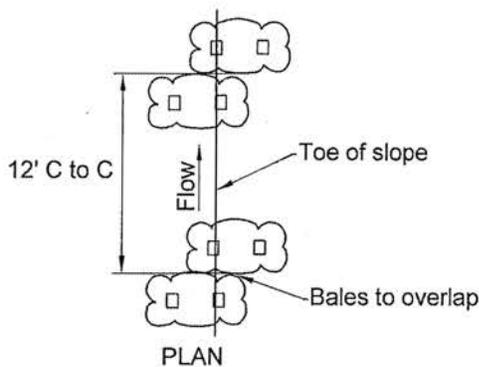
SECTION



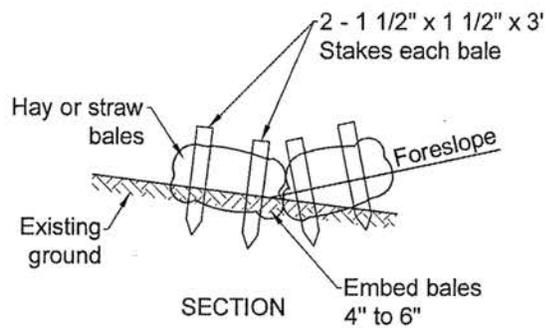
PLAN

Type A to be used when existing ground slopes towards the highway embankment.

TYPE A



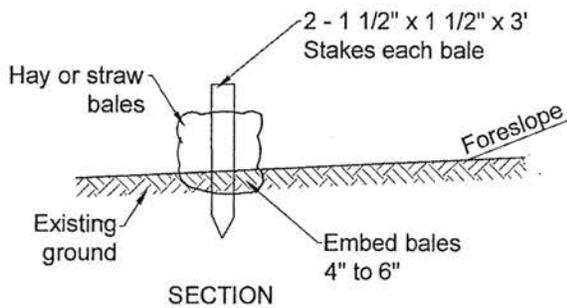
PLAN



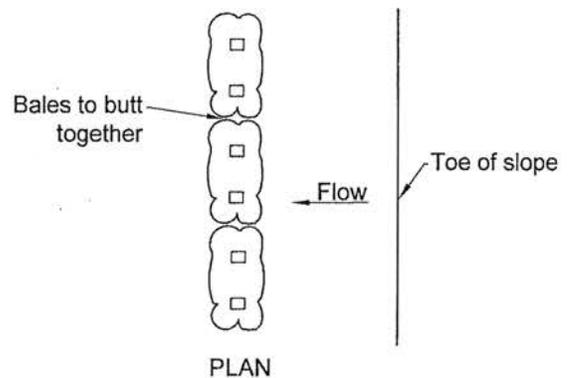
SECTION

Type B to be used when existing ground slopes away from the road embankment.

TYPE B



SECTION



PLAN

TYPE C

File Name:

ERO-9.dwg

Last Revision:

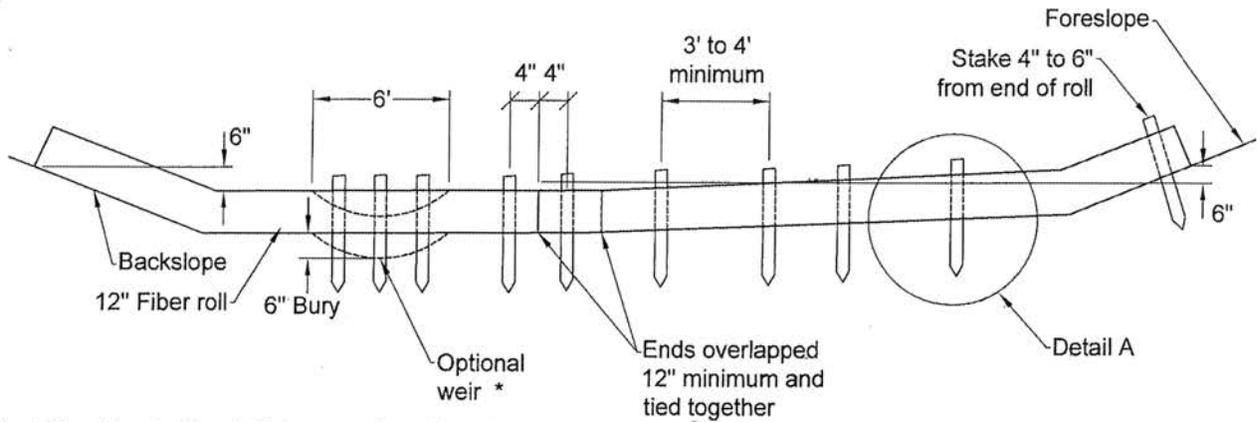
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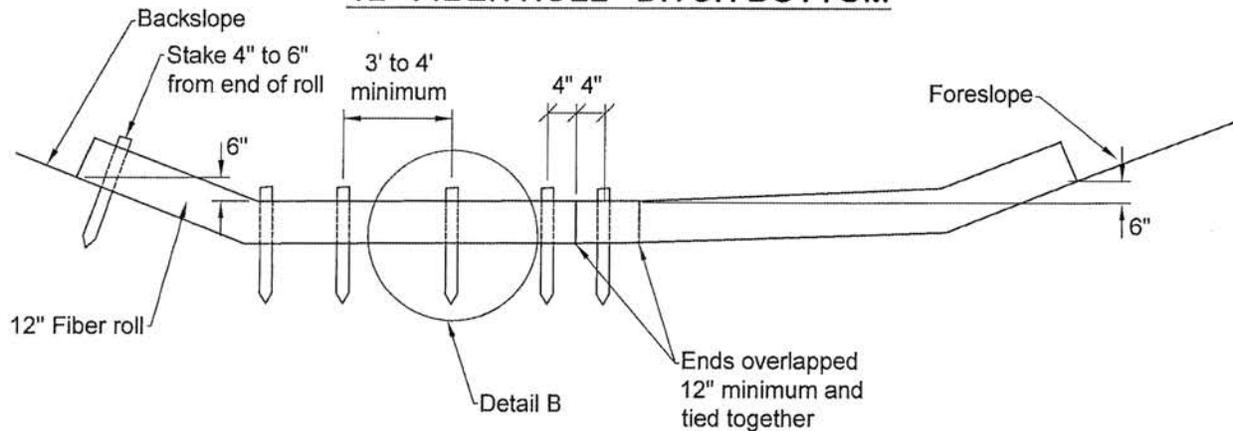
STANDARD DETAILS
EROSION CHECK
BALED HAY OR STRAW



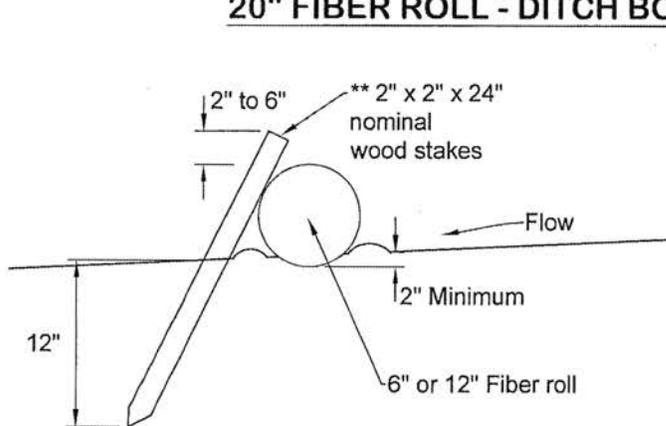


* Optional weir - Use in flat areas where there is potential for water to be backed up on adjacent property.

12" FIBER ROLL - DITCH BOTTOM

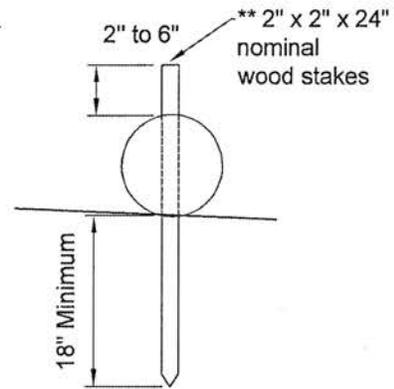


20" FIBER ROLL - DITCH BOTTOM



DETAIL A

6" or 12" Fiber Roll Staking Detail



DETAIL B

20" Fiber Roll Staking Detail

** Stakes spaced every 3-4 feet. Manufacturer may require stake through center of fiber roll. The fiber roll manufacturer's staking details supersede this staking detail.

File Name:

ERO-10.dwg

Last Revision:

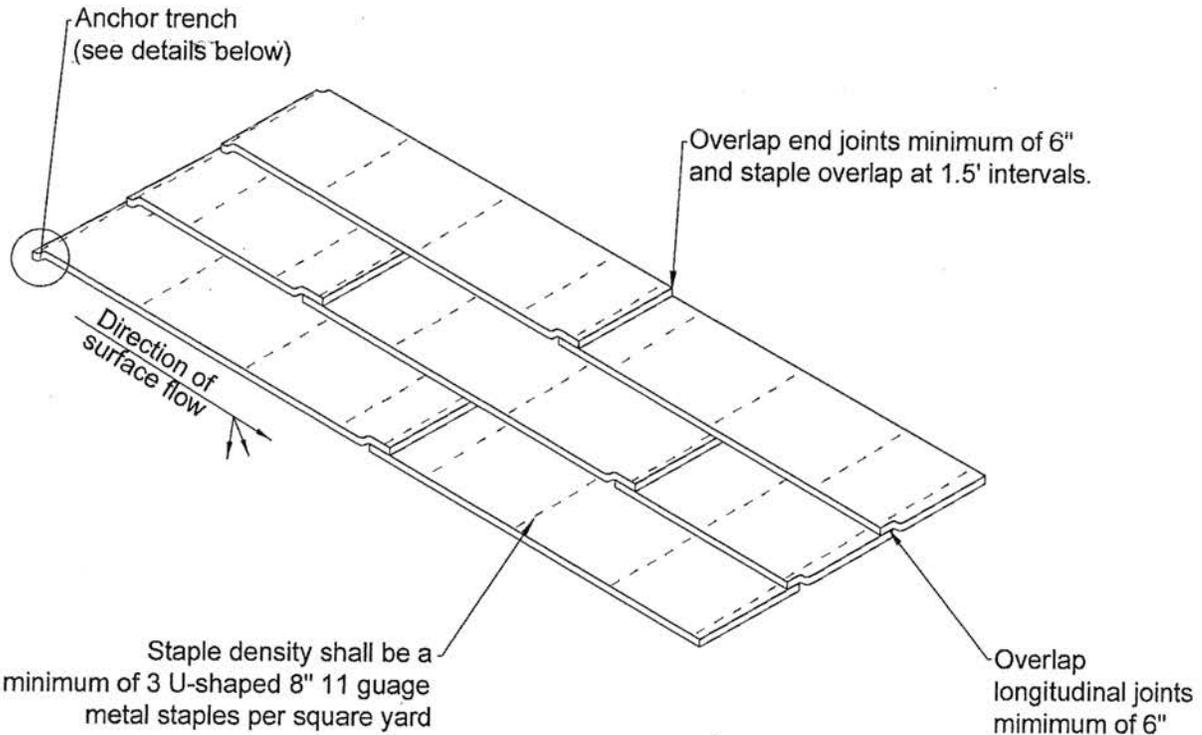
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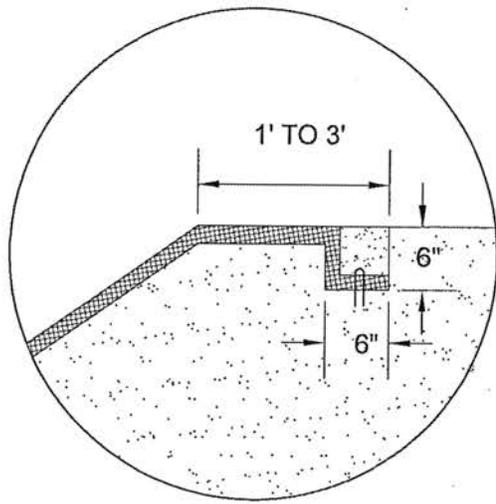
STANDARD DETAILS EROSION CONTROL FIBER ROLL STAKING





ANCHOR TRENCH

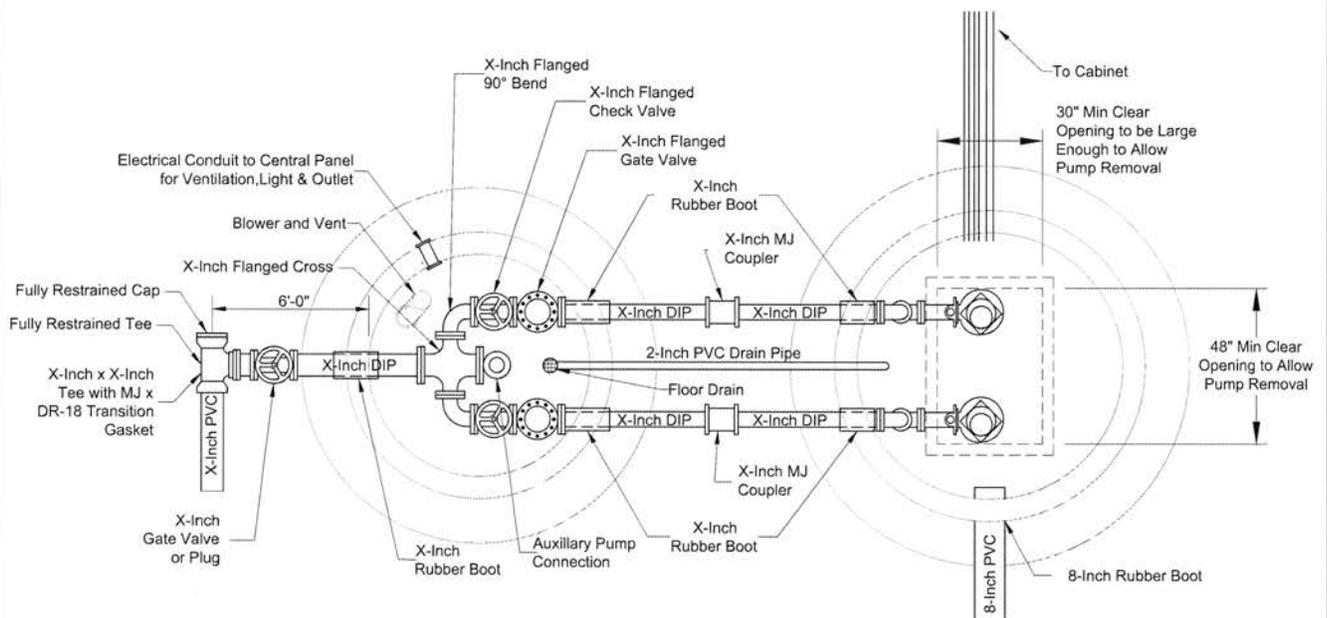
1. Dig 6" x 6" trench.
2. Lay blanket in trench.
3. Staple at 1.5' intervals.
4. Backfill with natural soil and compact.
5. Blanket length shall not exceed 100' without an anchor trench.



File Name:	ERO-11.dwg
Last Revision:	
Scale:	4/18/2013
	No Scale

**STANDARD DETAILS
EROSION CONTROL
BLANKET INSTALLATION**

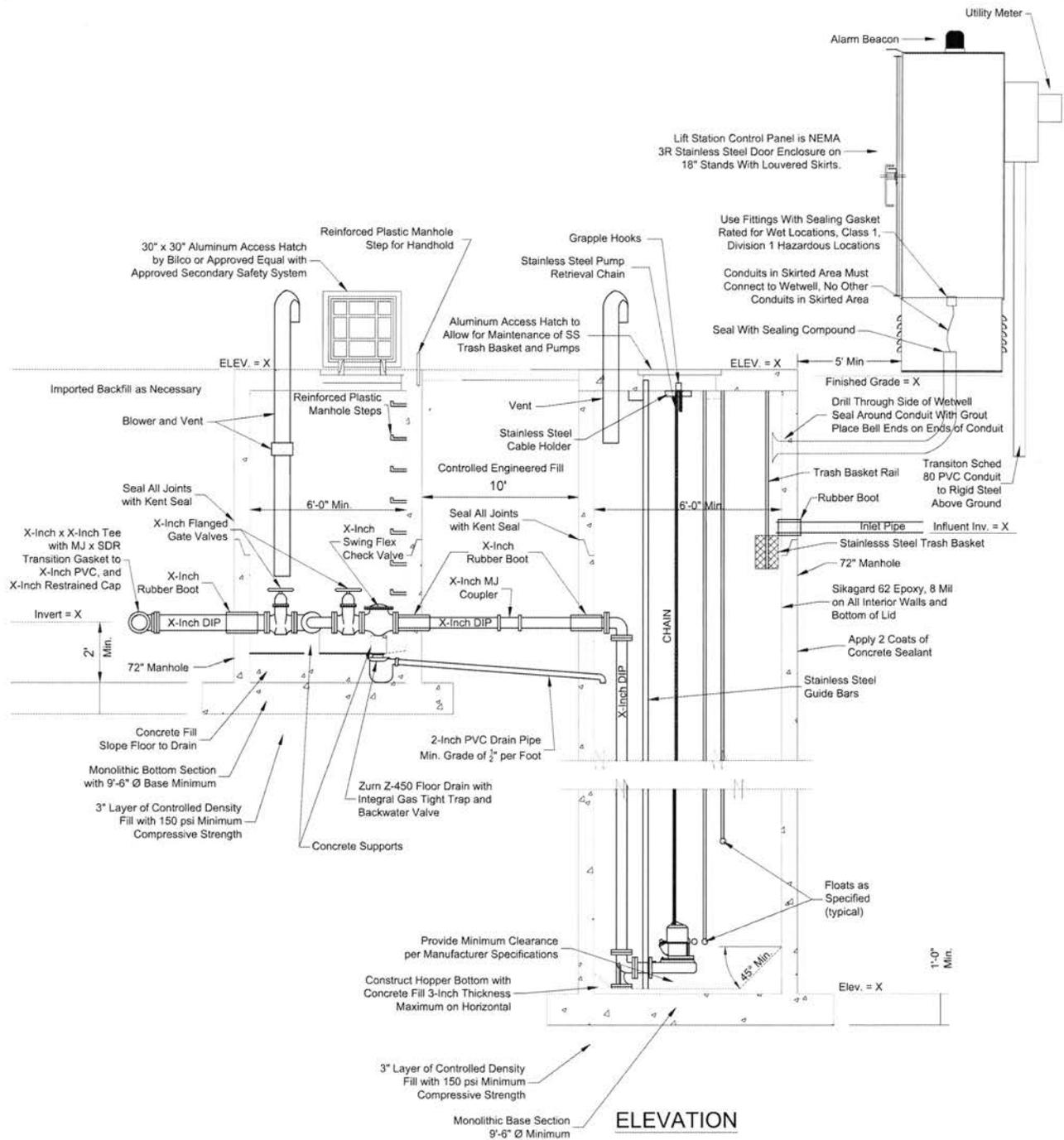




File Name:	P-01A.dwg
Last Revision:	4/18/2013
Scale:	No Scale

STANDARD DETAILS
LIFT STATION
PLAN





File Name:

P-01B.dwg

Last Revision:

4/18/2013

Scale:

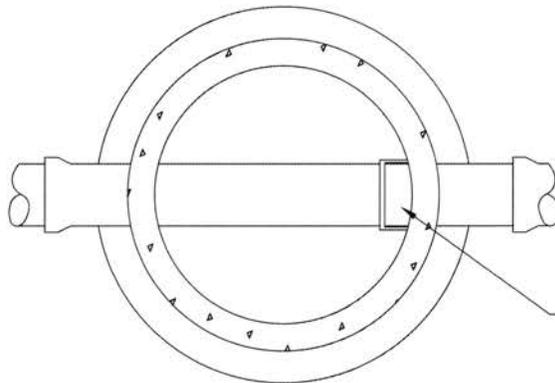
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STANDARD DETAILS LIFT STATION PROFILE



Precast invert must be be 1/2 diameter of the pipe and benches sloped 2" toward the invert.

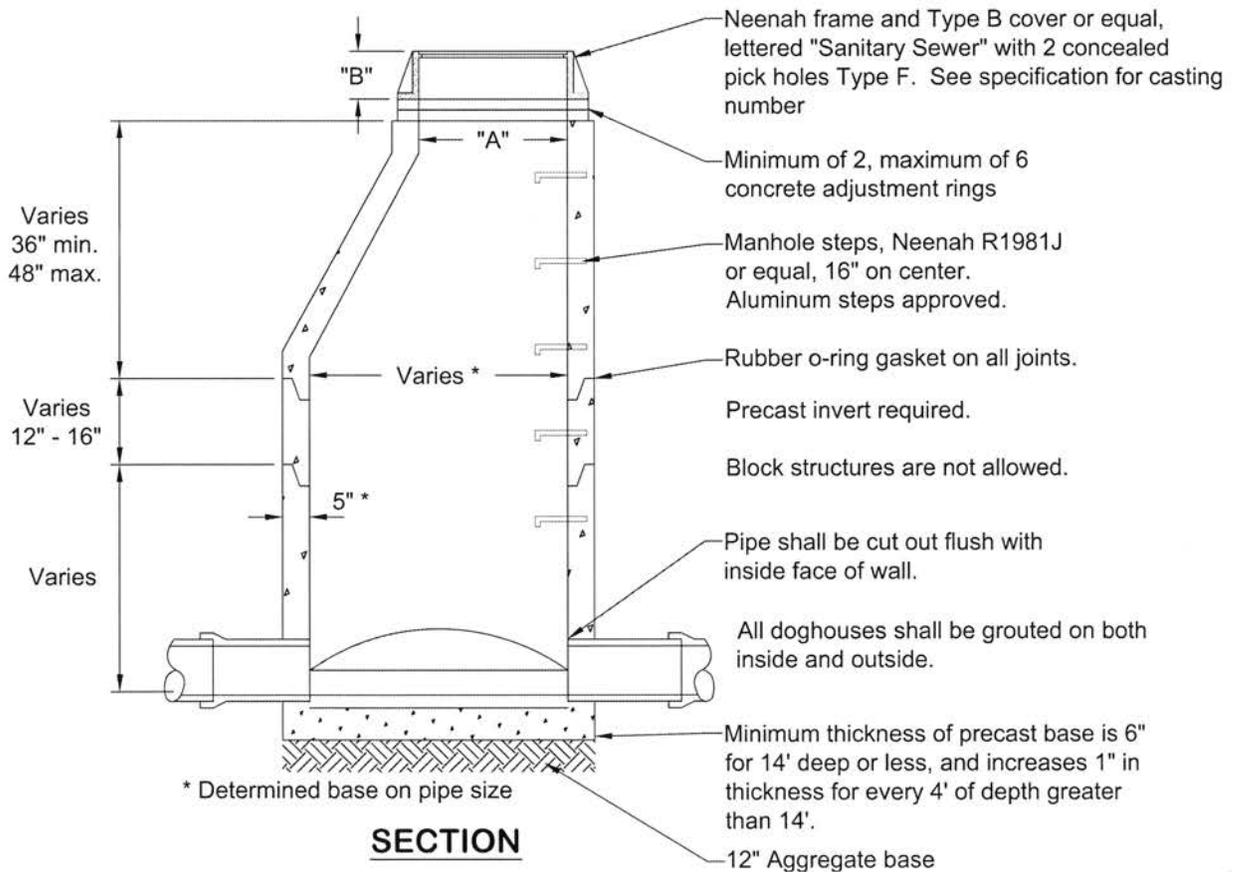
CASTING	LID TYPE	A	B
1642	B	27"	7"



Manhole steps shall be placed so that offset vertical portion of cone is facing downstream

PLAN

NOTE: Booted manhole considered acceptable alternate.



SECTION

File Name:

SAN-1.dwg

Last Revision:

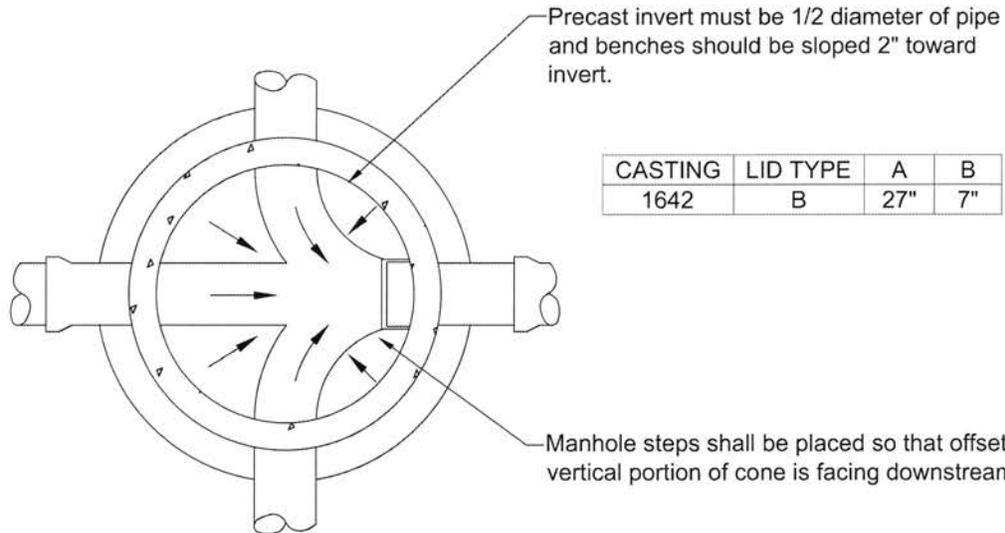
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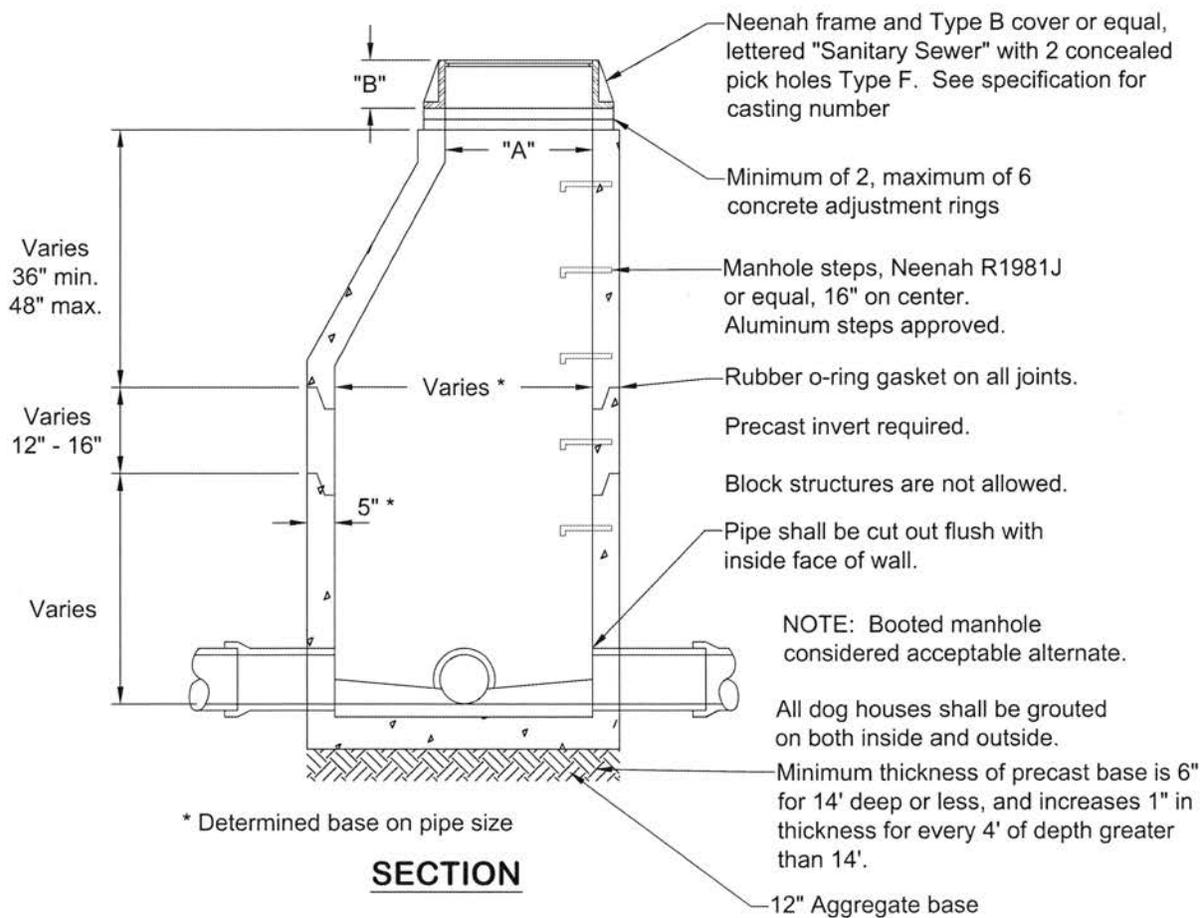
**STANDARD DETAILS
SANITARY SEWER
MANHOLE**





CASTING	LID TYPE	A	B
1642	B	27"	7"

PLAN

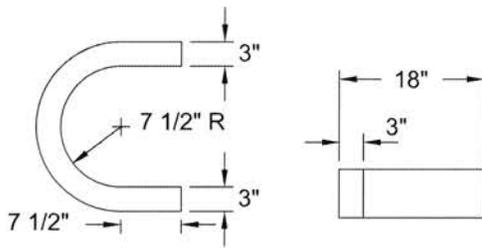


SECTION

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4/18/2013
Scale:
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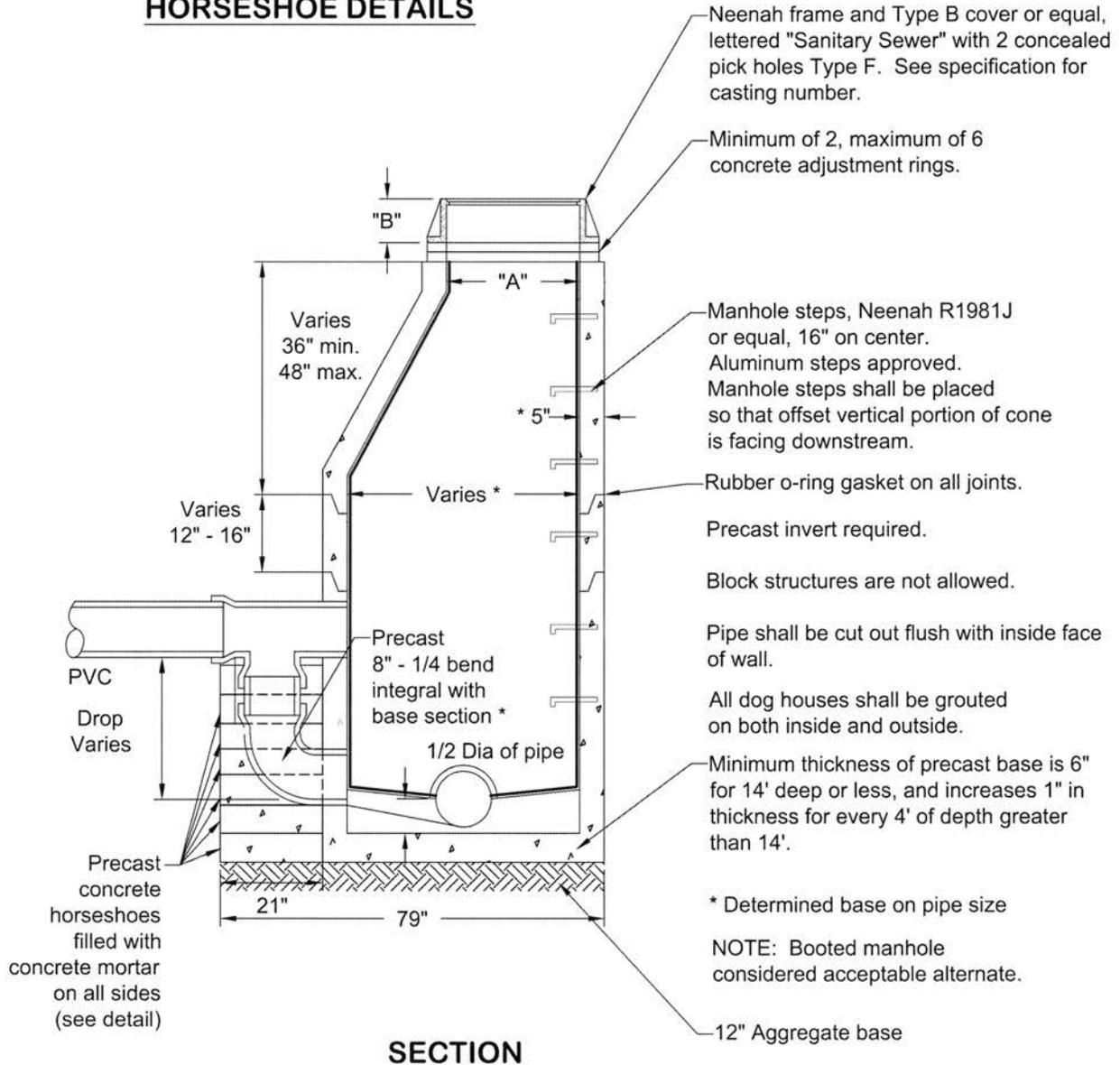
**STANDARD DETAILS
SANITARY SEWER
JUNCTION MANHOLE**





PLAN SECTION
HORSESHOE DETAILS

CASTING	LID TYPE	A	B
1642	B	27"	7"



SECTION

File Name:

SAN-3.dwg

Last Revision:

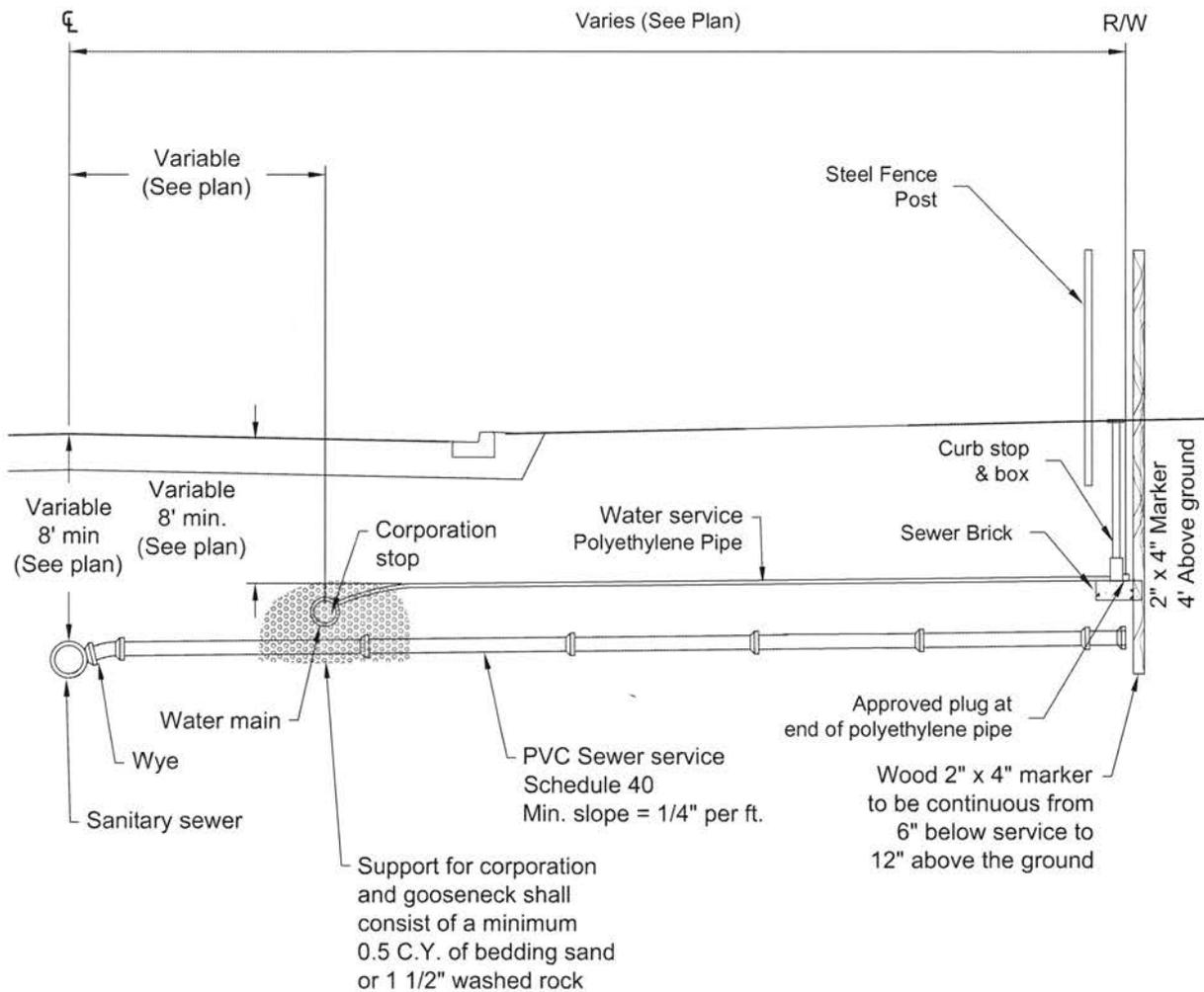
4/18/2013

Scale:

No Scale

STANDARD DETAILS
SANITARY SEWER
DROP INLET MANHOLE





File Name:

SER-1dwg

Last Revision:

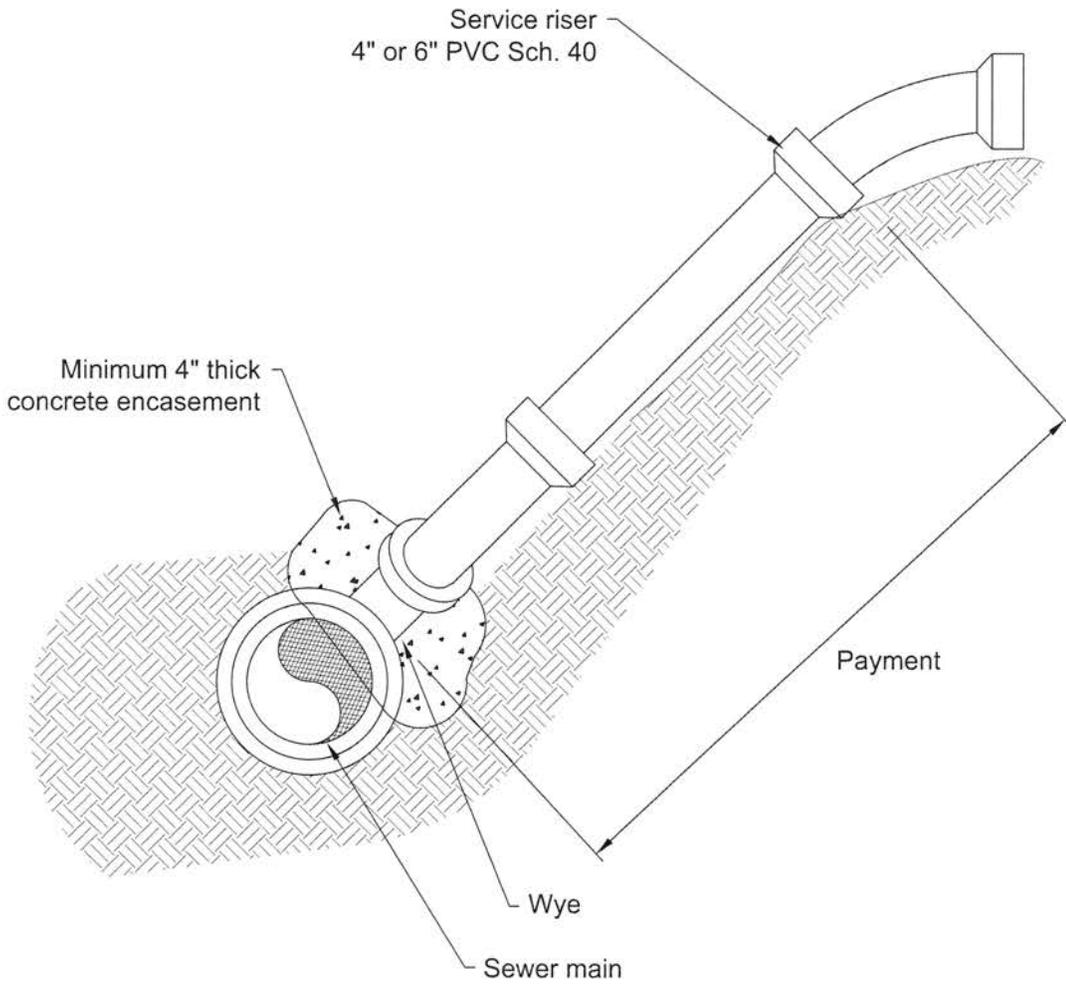
4/18/2013

Scale:

No Scale

STANDARD DETAILS
RESIDENTIAL PROPERTY SEWER
& WATER SERVICE CONNECTIONS





File Name:

SER-2.dwg

Last Revision:

4/18/2013

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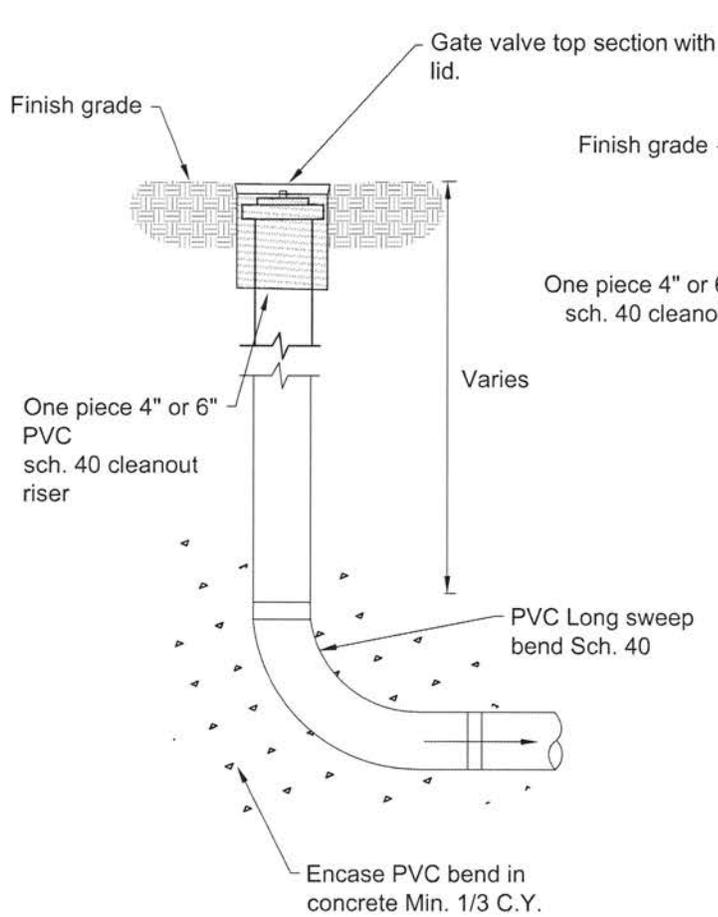
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STANDARD DETAILS
SERVICE RISER

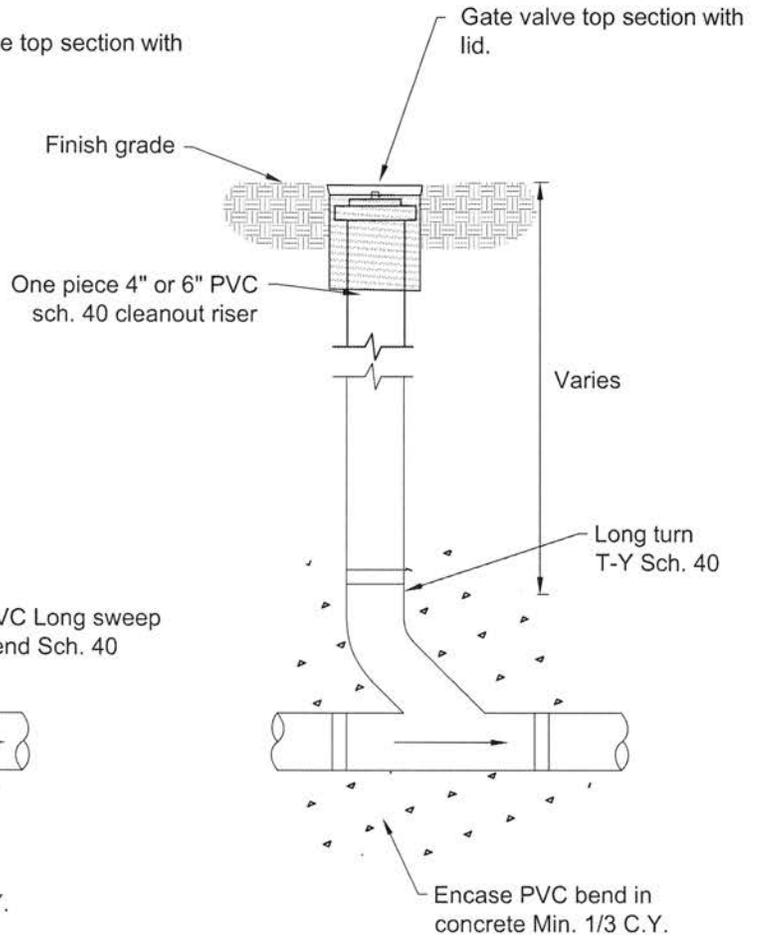


NOTE:
6" hub with threaded PVC
plug do not glue

NOTE:
Enclose long sweep bend or
combination wye in concrete
as shown.



END OF LINE CLEANOUT



IN LINE CLEANOUT

File Name:

SER-3.dwg

Last Revision:

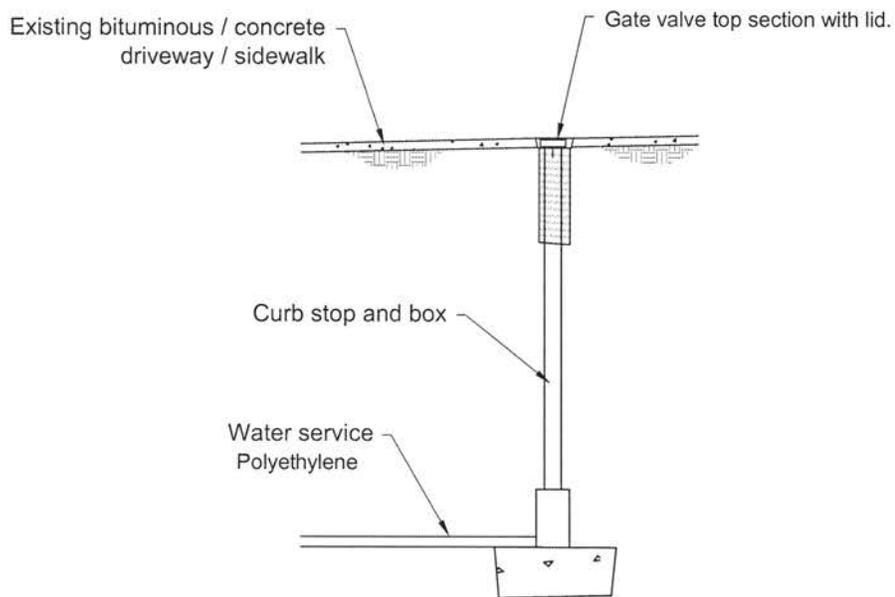
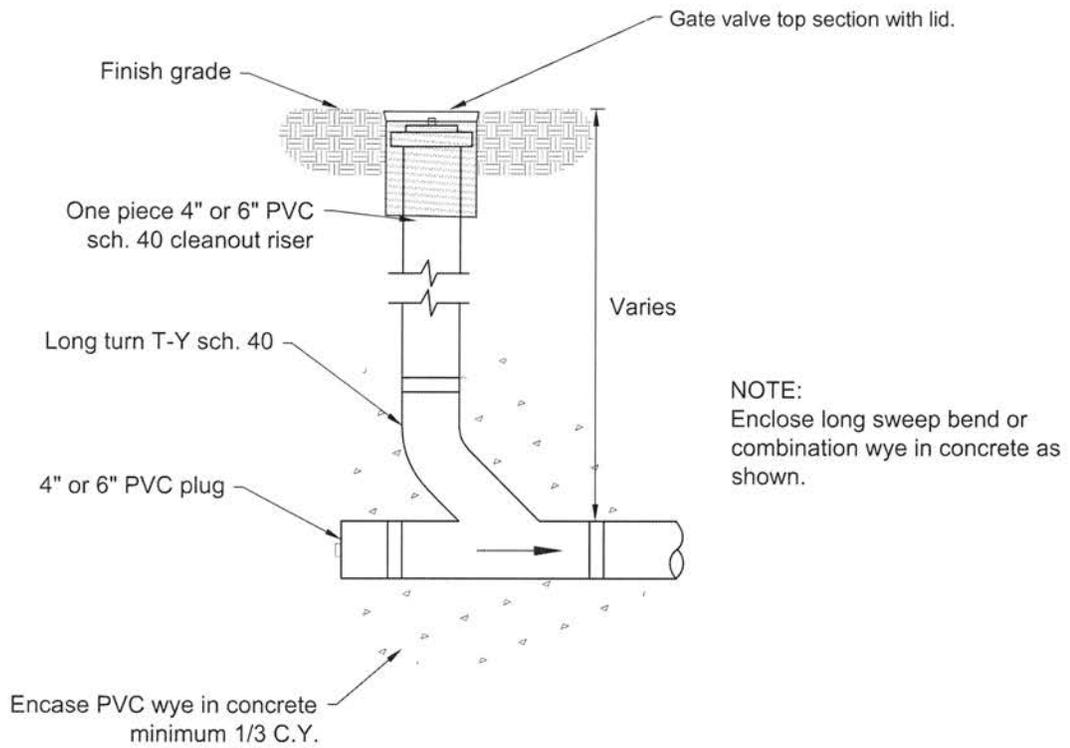
4/18/2013

Scale:

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STANDARD DETAILS
PVC SERVICE LINE
CLEANOUTS





File Name:

SER-4.dwg

Last Revision:

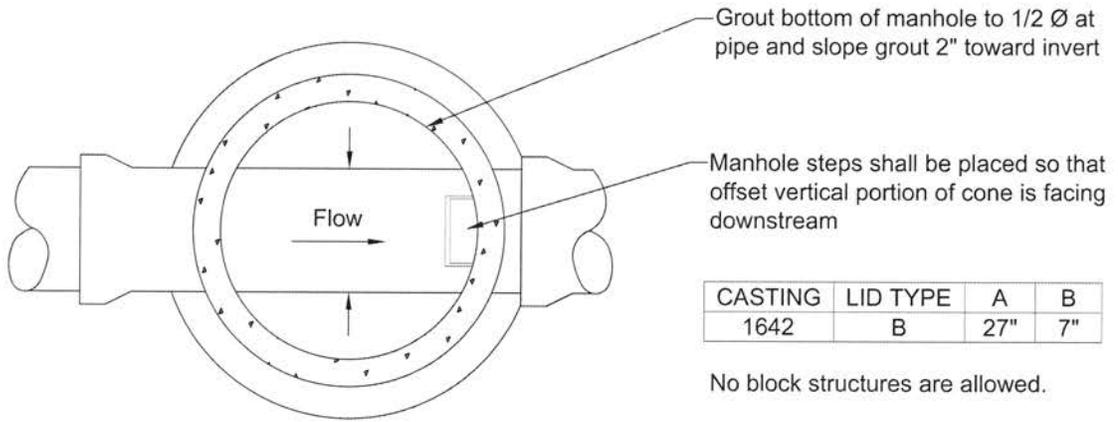
4/18/2013

Scale:

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**STANDARD DETAILS
CASTING PROTECTION
AT CLEANOUT & CURB STOP**

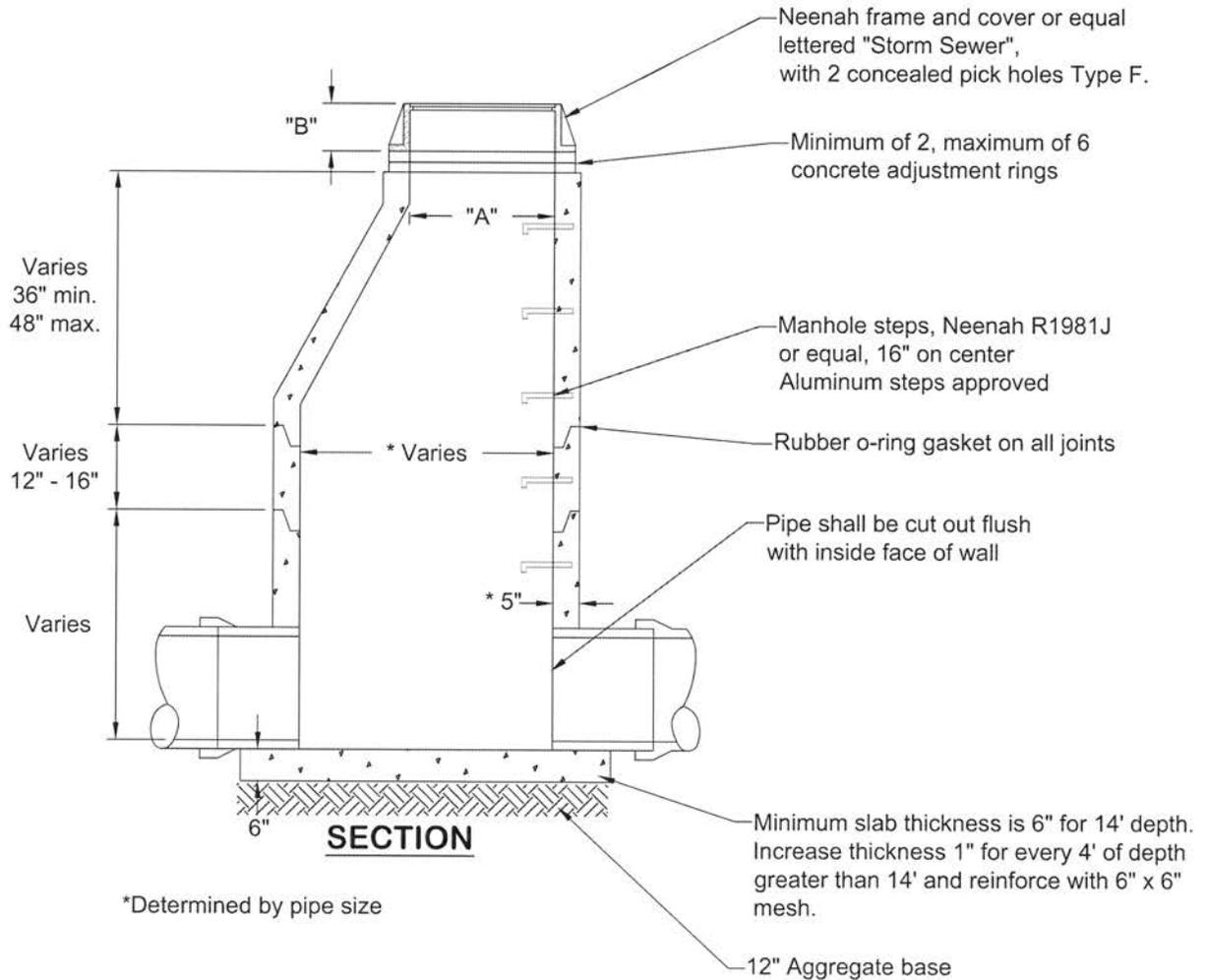




CASTING	LID TYPE	A	B
1642	B	27"	7"

No block structures are allowed.

PLAN



File Name:

STO-1.dwg

Last Revision:

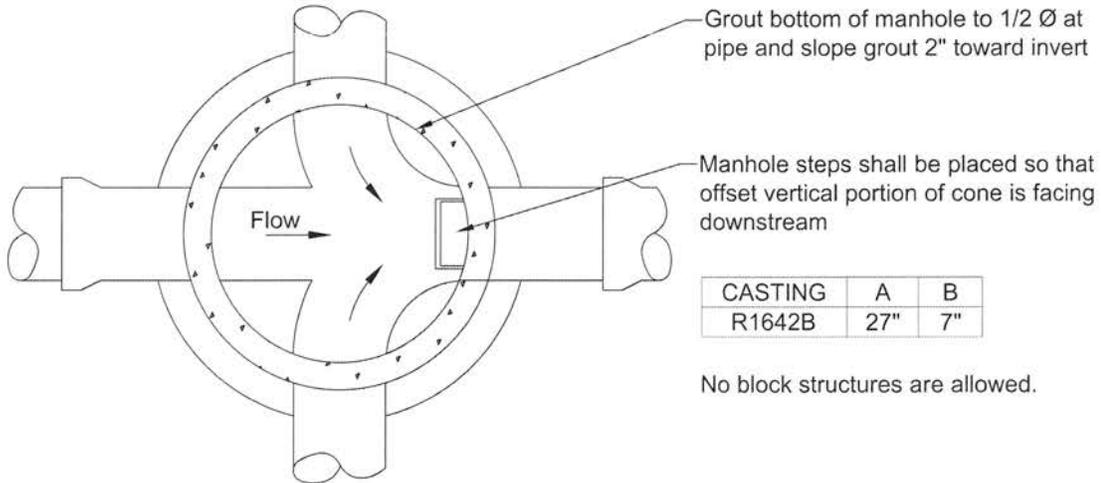
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
STORM SEWER
MANHOLE**

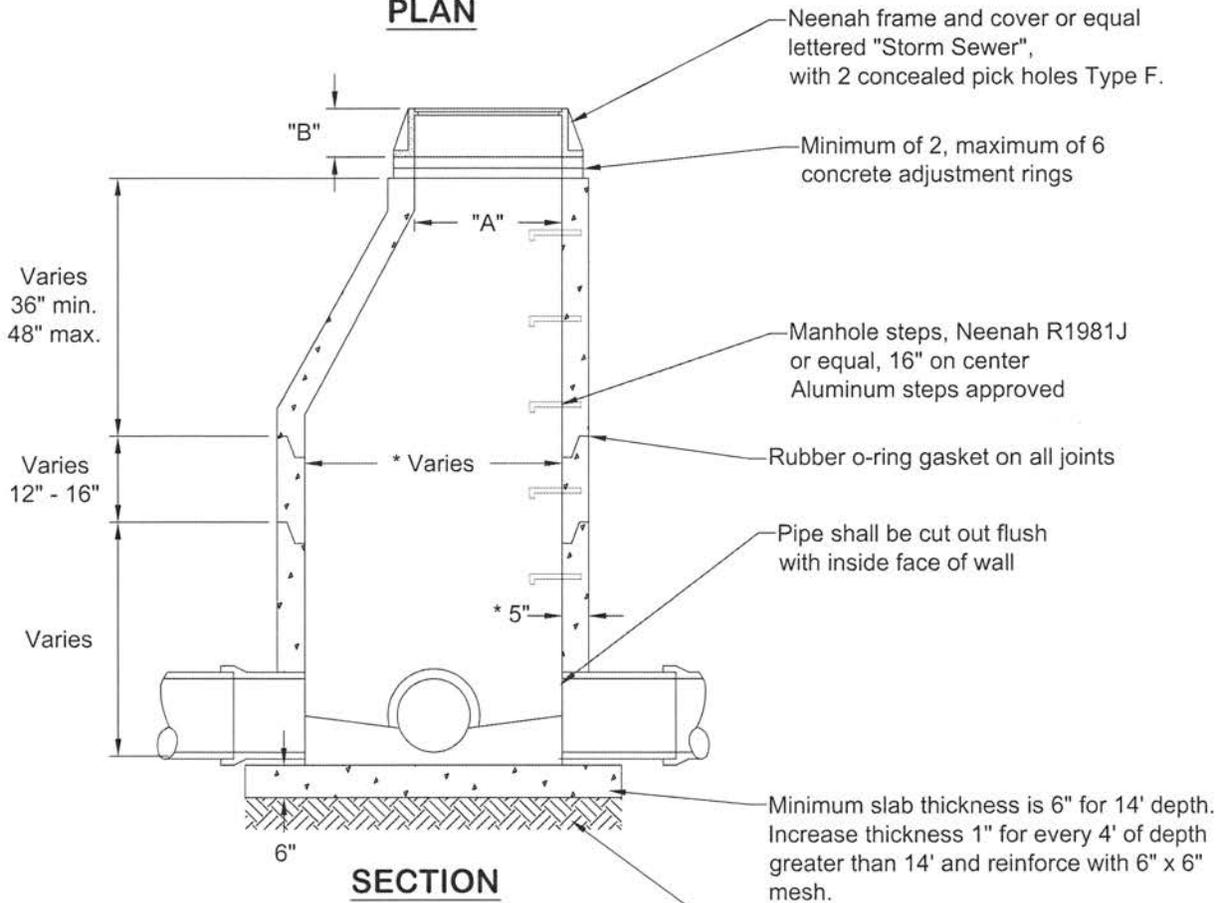




CASTING	A	B
R1642B	27"	7"

No block structures are allowed.

PLAN

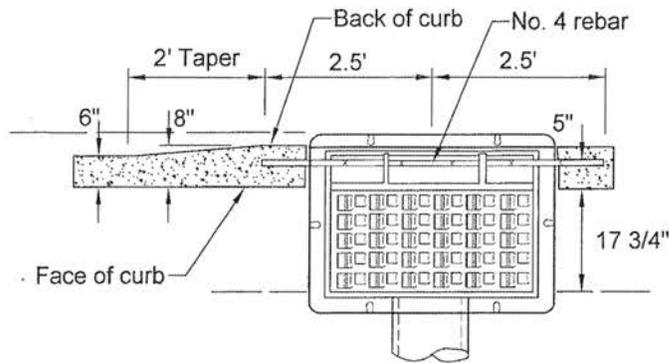


*Determined by pipe size

File Name:	STO-2.dwg
Last Revision:	4/18/2013
Scale:	No Scale

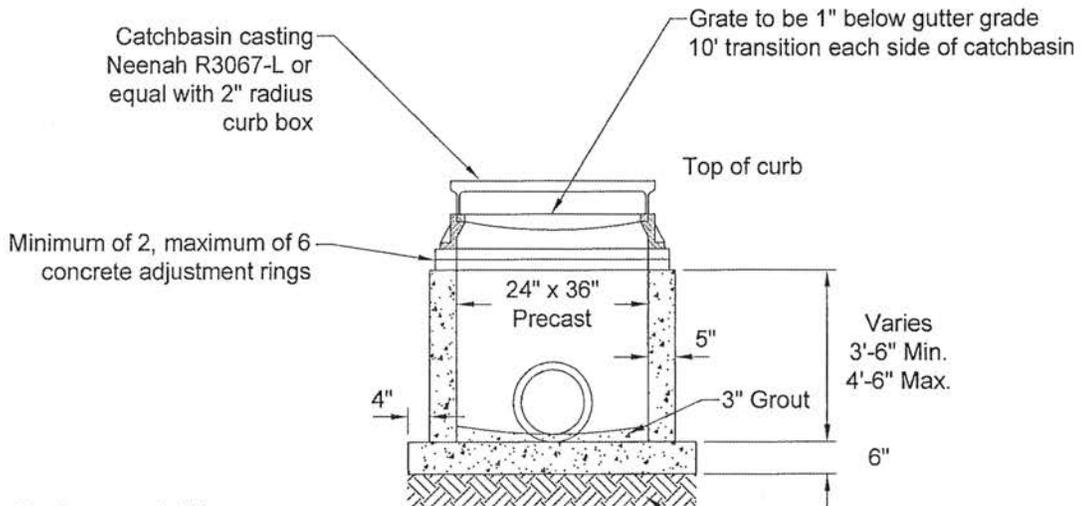
**STANDARD DETAILS
STORM SEWER
JUNCTION MANHOLE**





PLAN

No block structures are allowed.



SECTION

Doghouses shall be grouted on both the inside and outside.

File Name:

STO-3.dwg

Last Revision:

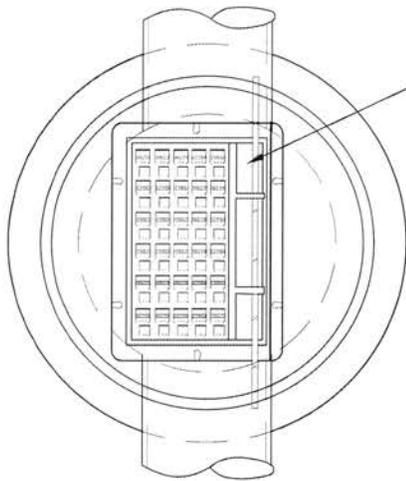
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Scale:

No Scale

**STANDARD DETAILS
CATCH BASIN**

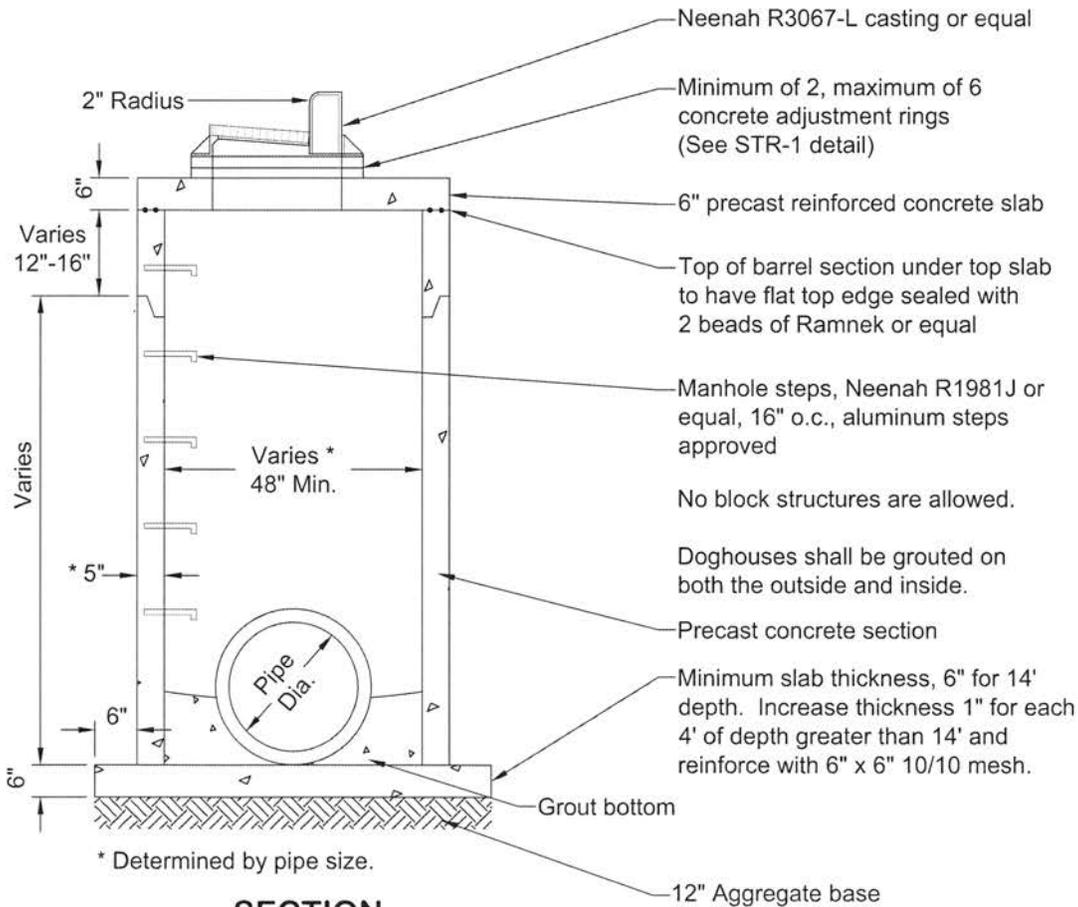




24" x 36" slab opening for Neenah R3067-L or equal

Dimension from back of curb to center of pipe	
MH Diameter	Measurement
4'	9" in from back of curb
5'	3" in from back of curb
6'	3" behind back of curb
7'	9" behind back of curb
8'	15" behind back of curb

PLAN



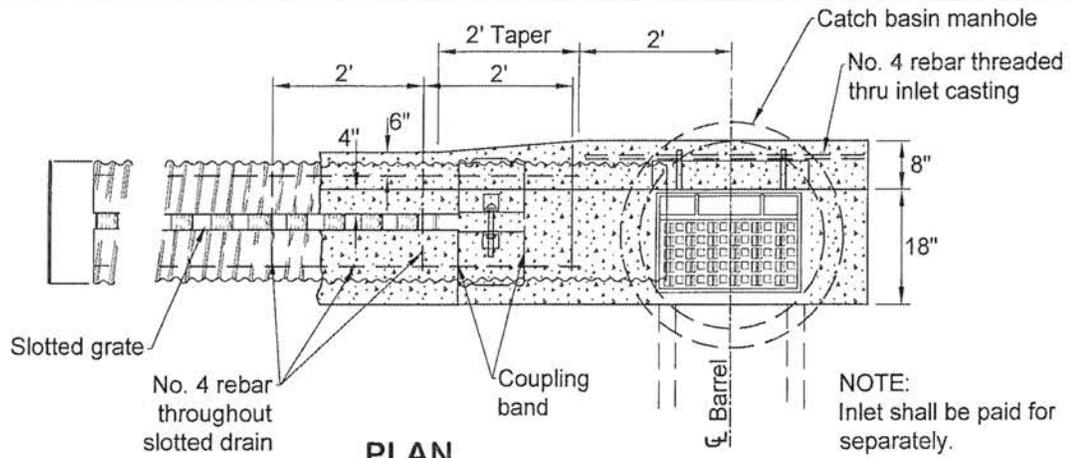
SECTION

* Determined by pipe size.

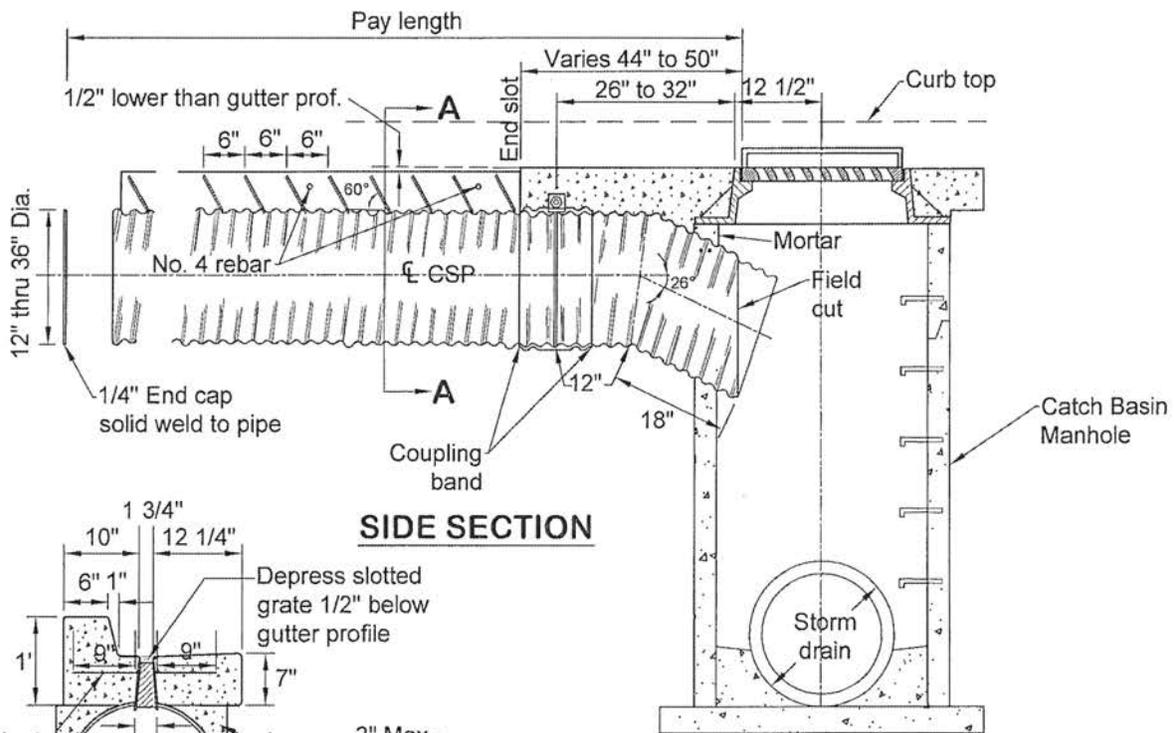
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Last Revision:	4/18/2013
Scale:	No Scale

**STANDARD DETAILS
CATCH BASIN
MANHOLE**

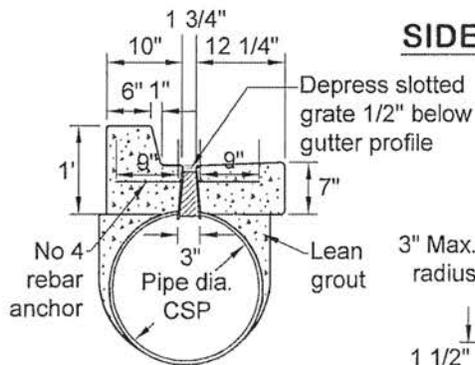




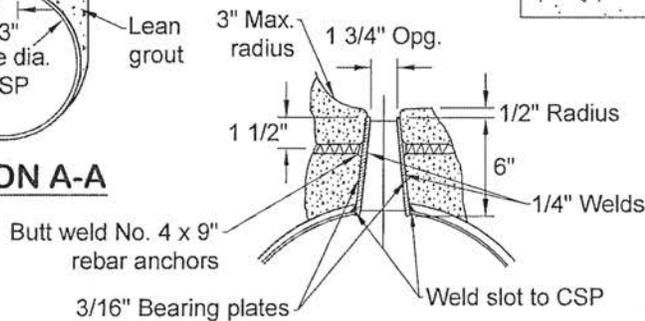
PLAN



SIDE SECTION



SECTION A-A



TYPICAL SECTION

NOTES:

1. All slotted drains must connect to a catch basin manhole.
2. Connection to manhole must be neatly grouted and all voids sealed.

File Name:

STO-5.dwg

Last Revision:

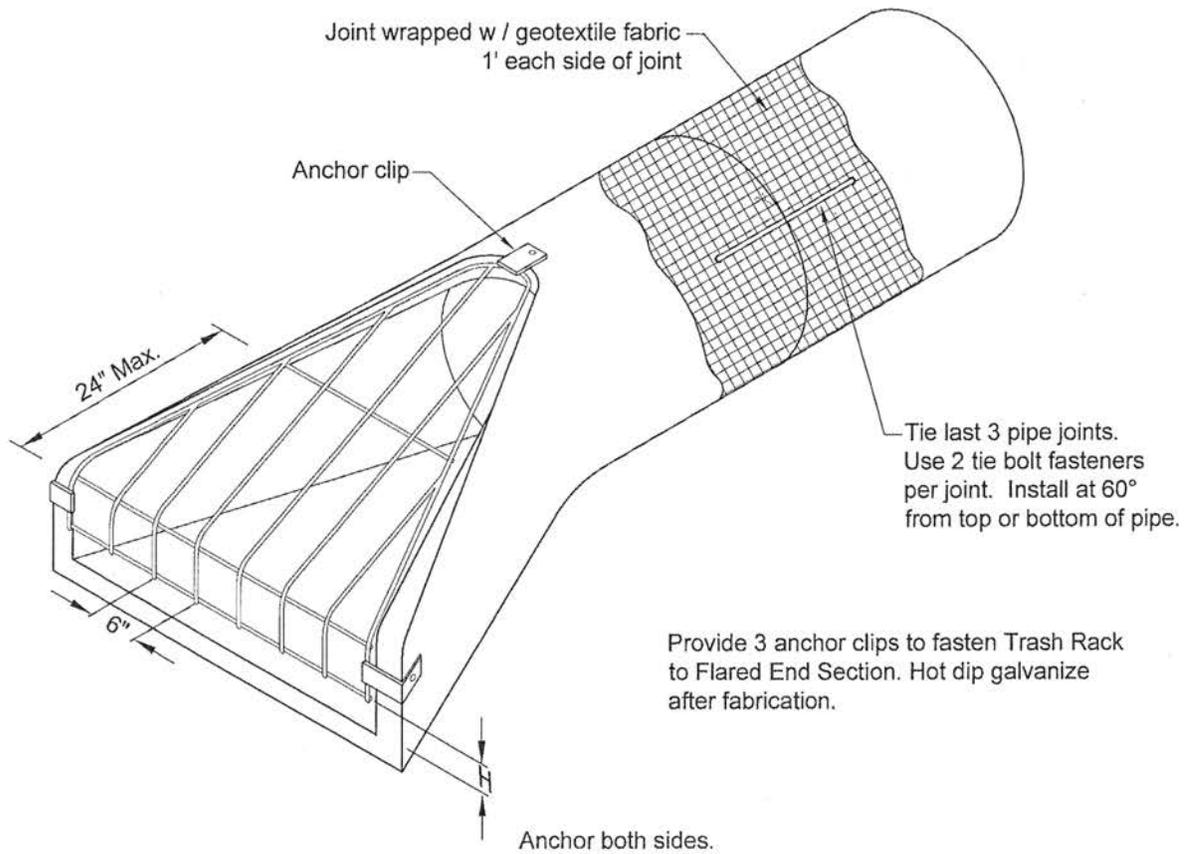
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
INLET-SLOTTED DRAIN**





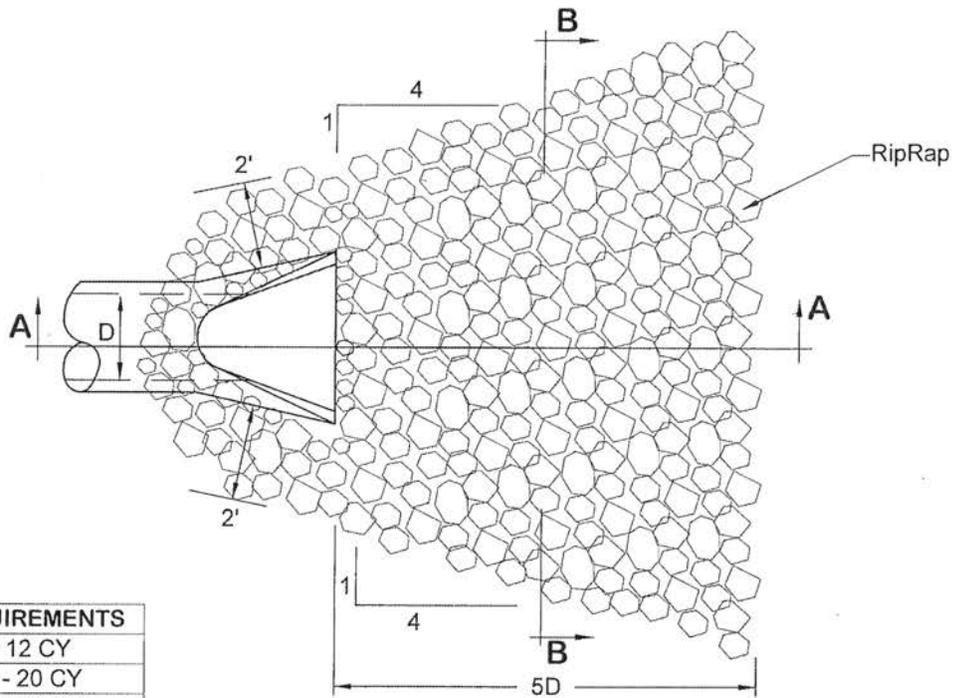
ISOMETRIC

Trash Rack Sizing			
Pipe Size	Bars	'H'	Bolts
12" - 18"	3/4 Ø	4"	5/8"
21" - 42"	1" Ø	6"	3/4"
48" - 72"	1 1/4" Ø	12"	1"

File Name:
STO-6.dwg
Last Revision:
4/18/2013
Scale:
No Scale

**STANDARD DETAILS
FLARED END SECTION
AND TRASH RACK**

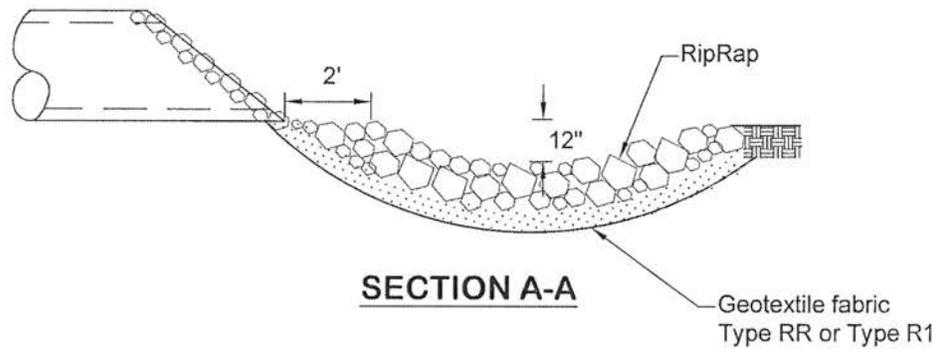




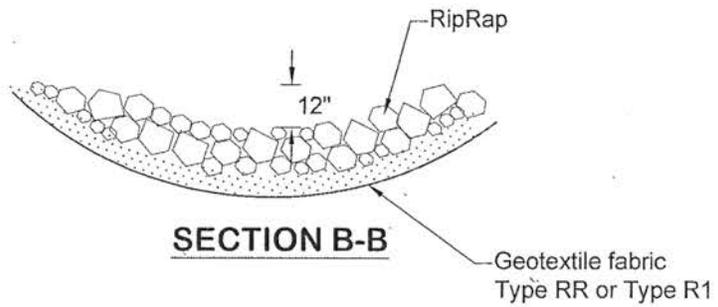
RIPRAP REQUIREMENTS	
12" - 18"	8 - 12 CY
21" - 33"	14 - 20 CY
36" - 48"	23 - 38 CY
54" and up	62 CY and up
One CY is approximately 2,800 Lbs.	

PLAN

NOTE:
Geotextile fabric required under RipRap Type RR or Type R1.



SECTION A-A



SECTION B-B

File Name:

STO-7.dwg

Last Revision:

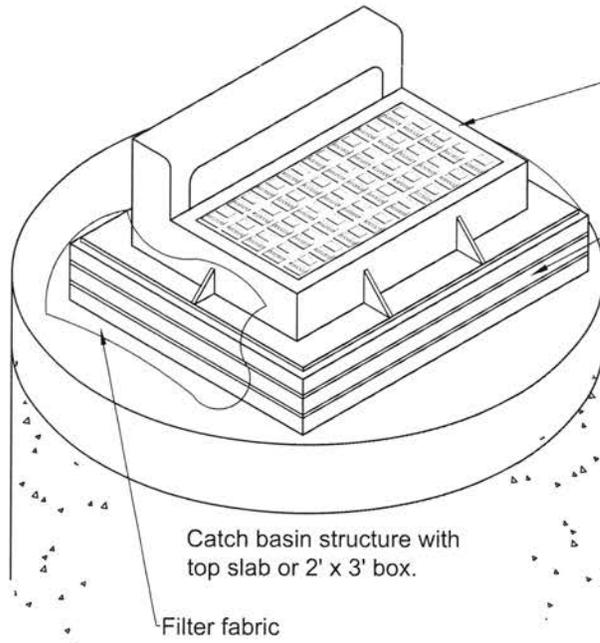
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
RIPRAP AT OUTLETS**





Neenah R3067-L catch basin frame and grate with 2" radius open.

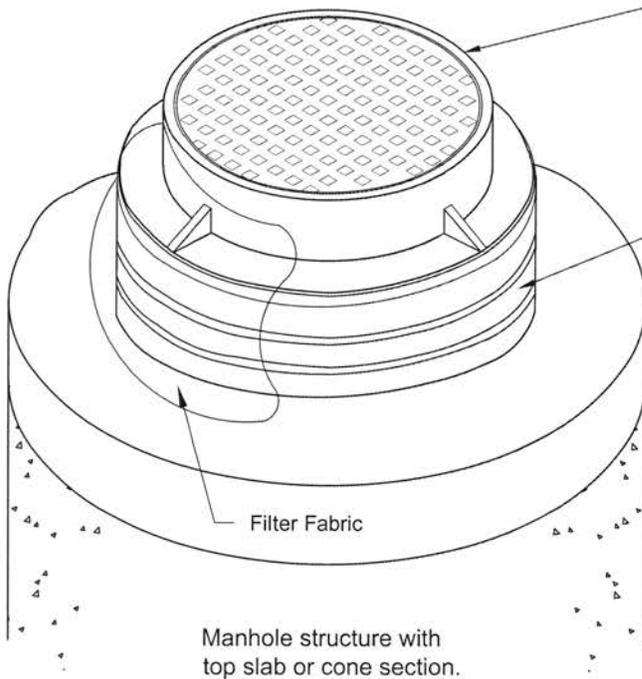
Concrete adjustment rings. Min. of 2, max. of 6, with a min. 3/8" mortar between top slab and first ring, 1/4" minimum between all rings. Woven filter fabric then shall be wrapped around entire system as specified.

No shims of any material are allowed. Adjustments must be made with mortar.

Interior catch basin rings shall be neatly grouted and sealed. The void underneath the casting shall be sealed with mortar.

Catch basin structure with top slab or 2' x 3' box.

Filter fabric



Neenah R1642B manhole frame and cover. Shall be furnished with 2 concealed pick holes and stamped "SANITARY SEWER" or "STORM SEWER".

Concrete adjustment rings with 3/8" mortar between top slab and 1st ring, 1/4" minimum between all rings. Min. of 2", max. of 12" adjustment. Woven filter fabric then shall be wrapped around entire system as specified.

No shims of any material are allowed. Adjustments must be made with mortar.

Interior manhole rings shall be neatly mortared. Rings shall be wiped clean.

Filter Fabric

Manhole structure with top slab or cone section.

File Name:

STR-1.dwg

Last Revision:

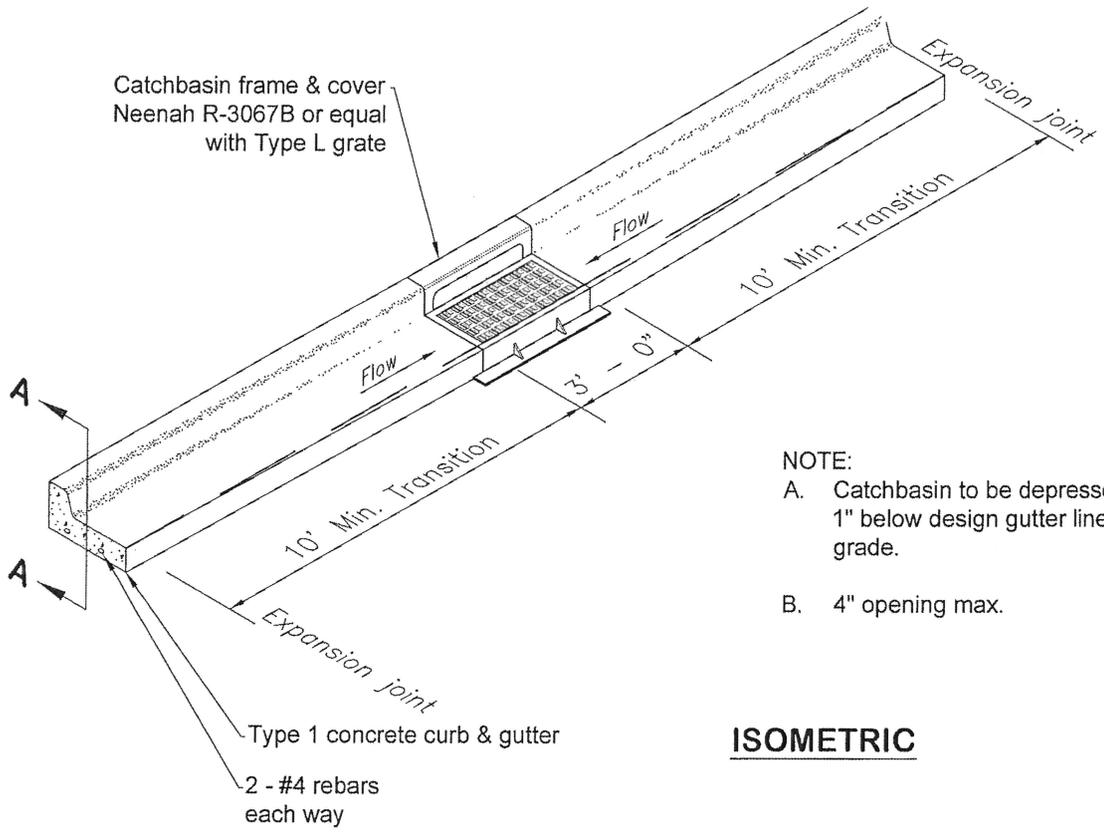
4/18/2013

Scale:

No Scale

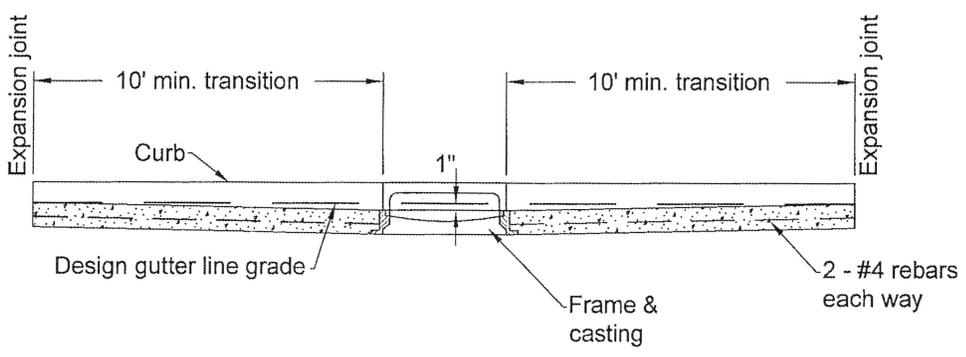
STANDARD DETAILS
CATCH BASIN AND
MANHOLE ADJUSTMENT





NOTE:
 A. Catchbasin to be depressed 1" below design gutter line grade.
 B. 4" opening max.

ISOMETRIC

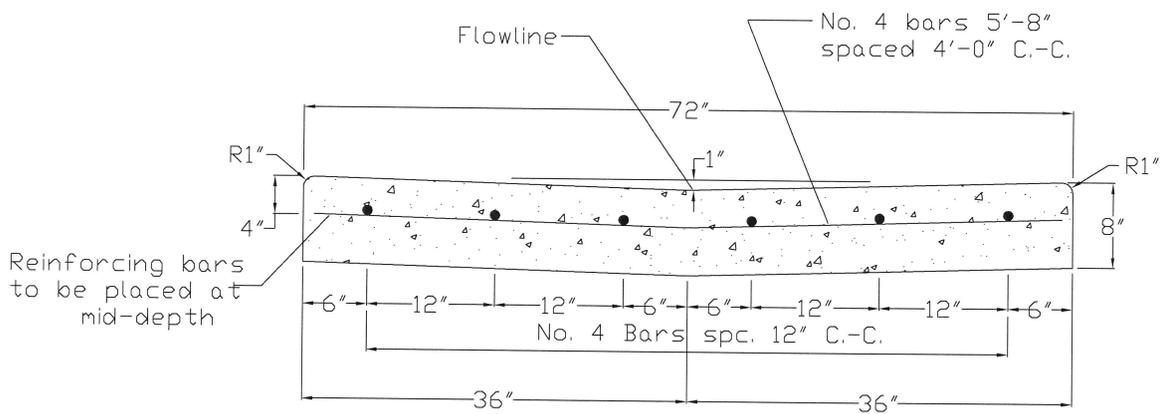


SECTION A-A

File Name:	STR-3.dwg
Last Revision:	4/18/2013
Scale:	No Scale

**STANDARD DETAILS
 TYPE I CURB AND GUTTER
 CONSTRUCTION AT CATCH BASIN**





72" Concrete Valley Gutter

File Name:

STR-4.dwg

Last Revision:

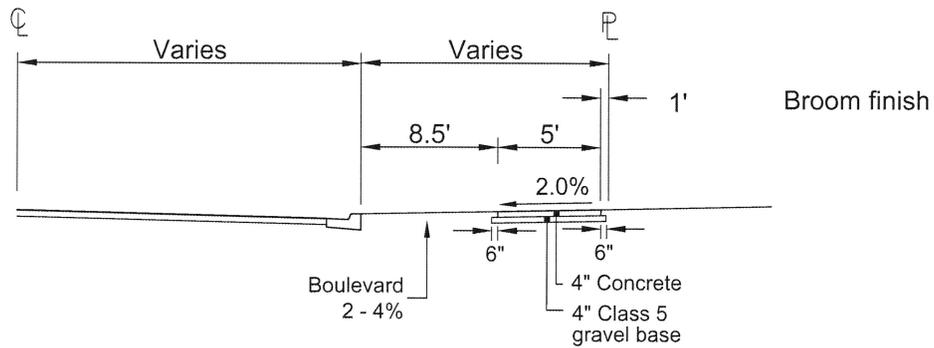
4/18/2013

Scale:

No Scale

STANDARD DETAILS
CONCRETE VALLEY GUTTER





TYPICAL CONCRETE SIDEWALK

CONTRACTION JOINTS:

1. 5' Spacing tooled joints.
2. 3/4" Min depth.

File Name:

STR-5.dwg

Last Revision:

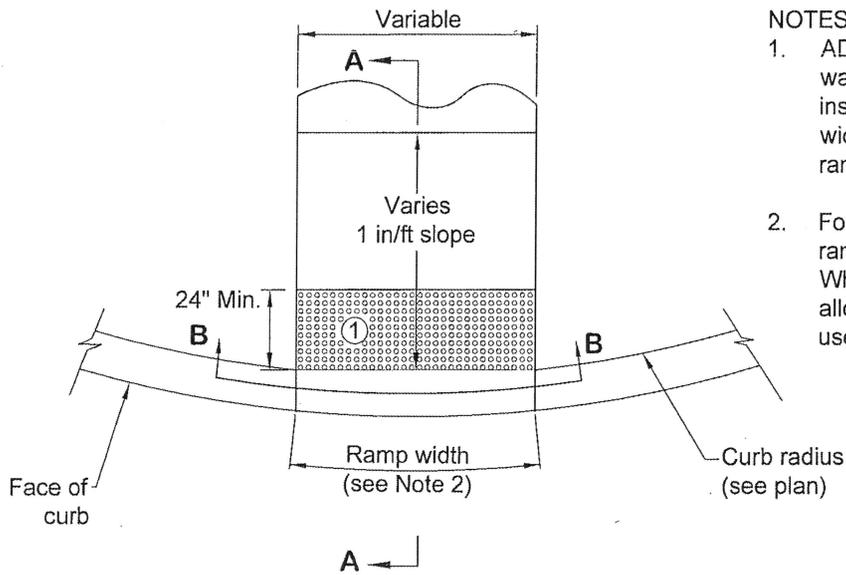
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
CONCRETE SIDEWALK**

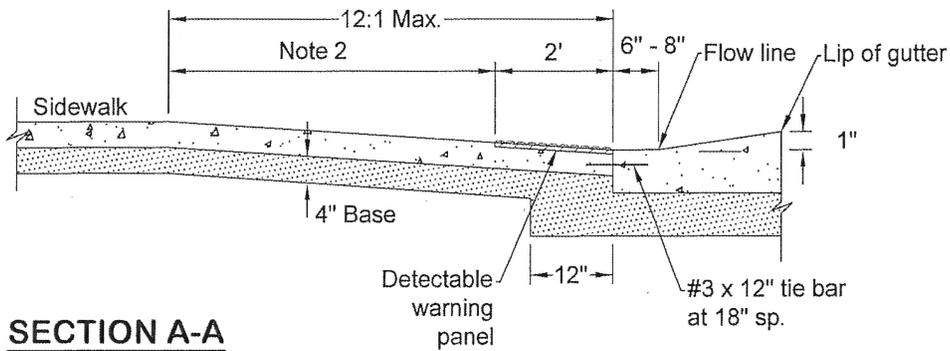




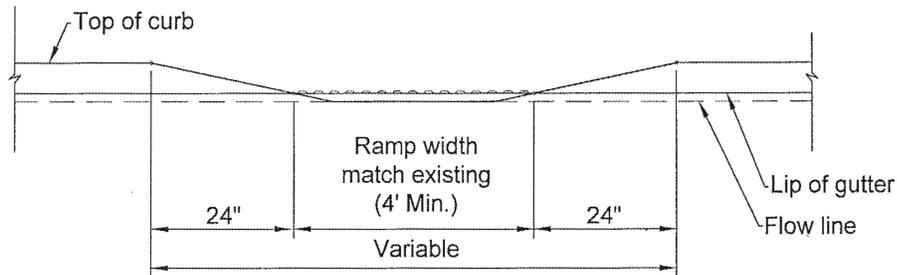
PLAN

NOTES:

1. ADA required detectable warning panels shall be installed to match the ramp width (the usable portion of ramp).
2. For sidewalk installations, a 5' ramp width should be used. Where site conditions do not allow, a 4' ramp width may be used.



SECTION A-A



SECTION B-B

File Name:

STR-6.dwg

Last Revision:

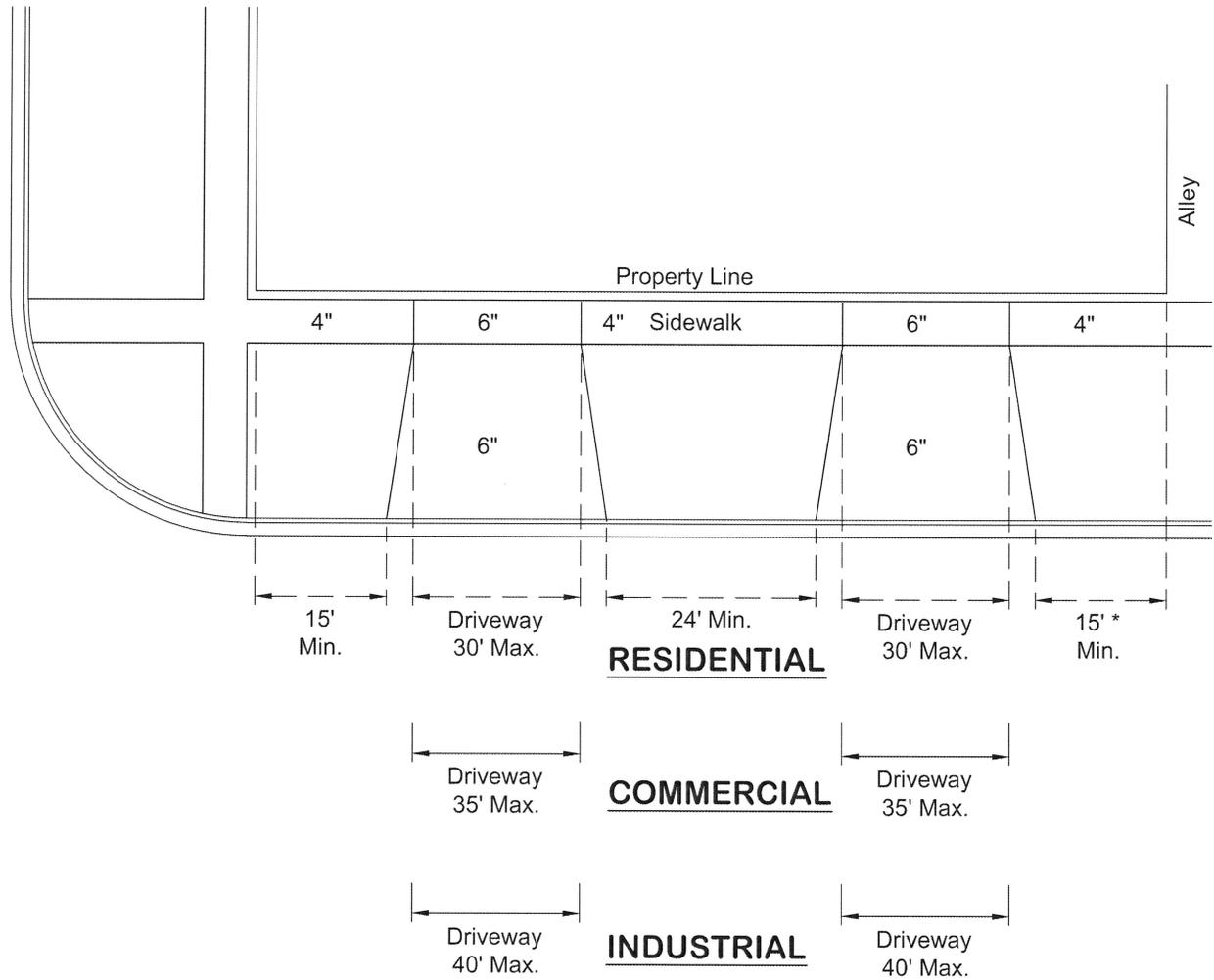
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
PEDESTRIAN CURB
RAMP SIDEWALK**





NOTE:

1. Maximum width of residential driveways are 30 feet or a total distance equal to 6 feet wider than the doors of an existing or proposed garage.
2. All concrete located in the driveway apron, including the sidewalk section shall be 6 inches.

File Name:

STR-7.dwg

Last Revision:

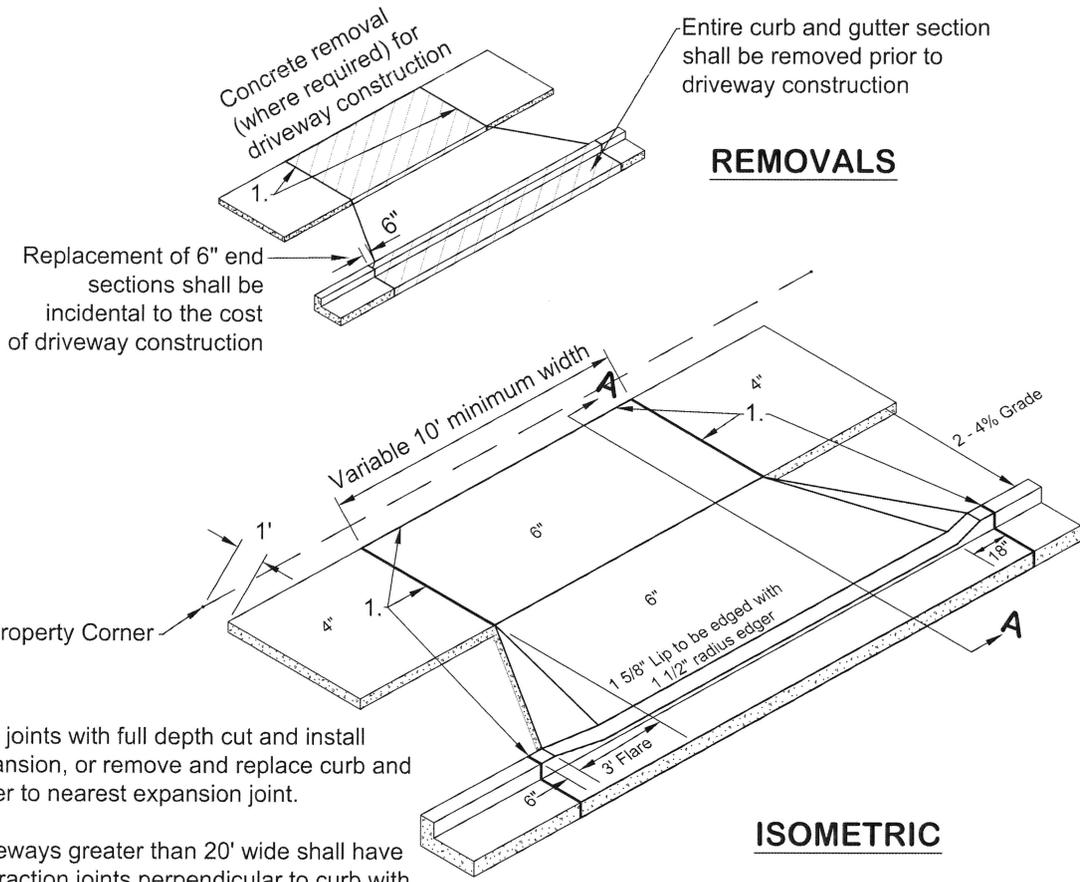
4/18/2013

Scale:

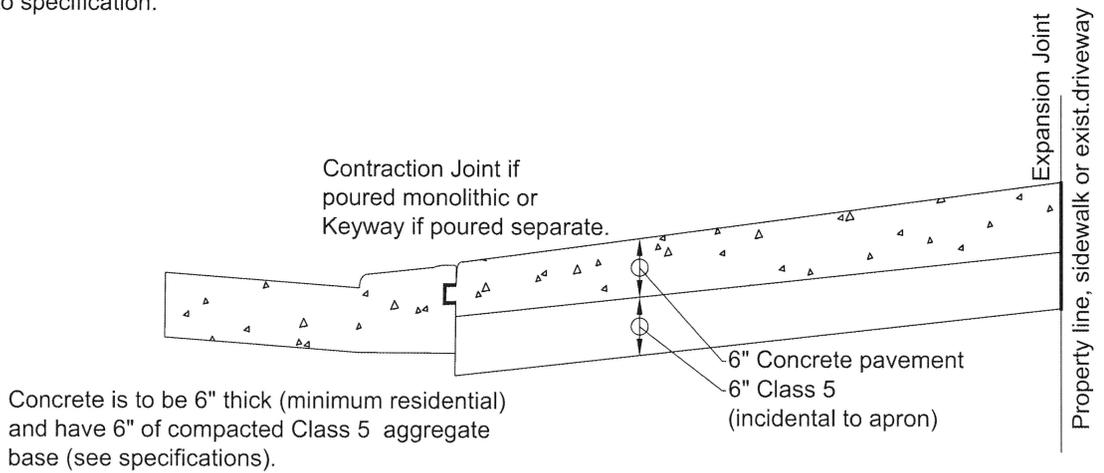
No Scale

**STANDARD DETAILS
DRIVEWAY PLACEMENT**





- NOTE:
1. Saw joints with full depth cut and install expansion, or remove and replace curb and gutter to nearest expansion joint.
 2. Driveways greater than 20' wide shall have contraction joints perpendicular to curb with minimum 10' spacing.
 3. Forms are required on all edges.
 4. Curb and gutter shall be installed according to specification.

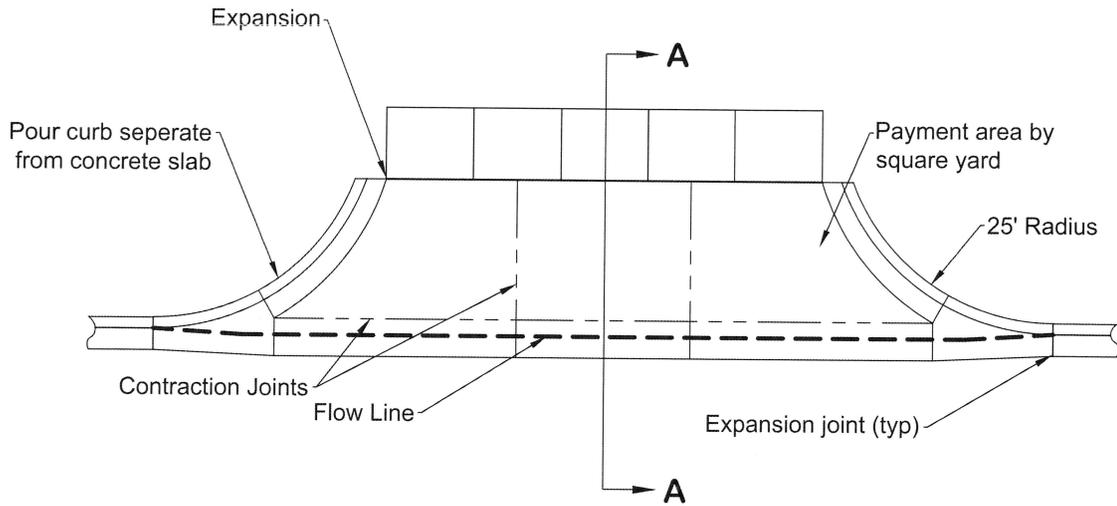


SECTION A-A

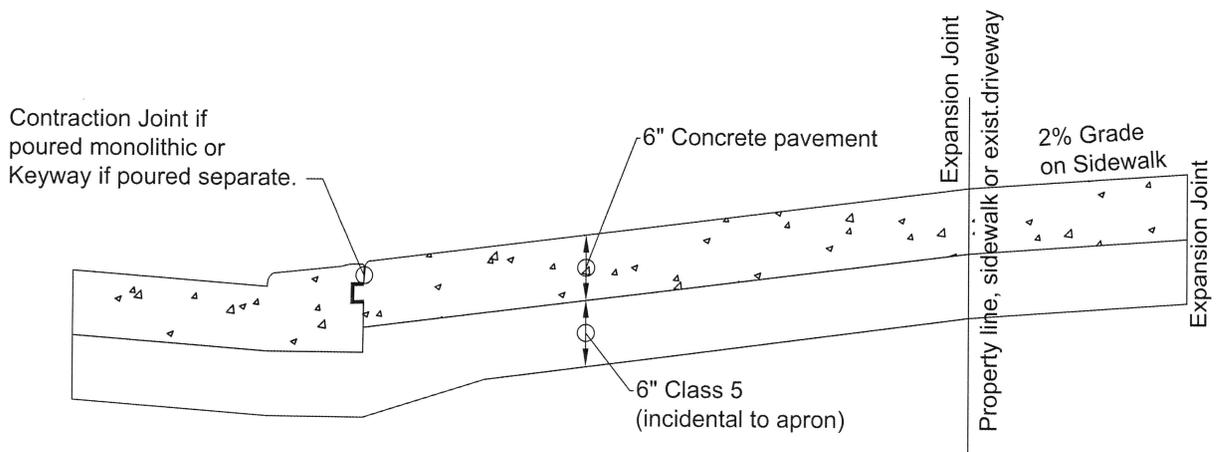
File Name:	STR-8.dwg
Last Revision:	4/18/2013
Scale:	No Scale

**STANDARD DETAILS
CONCRETE DRIVEWAY
APRON**





PLAN



Concrete is to be 6" thick (minimum) and have 6" of compacted Class 5 aggregate base (see specifications).

SECTION A-A

File Name:

STR-9.dwg

Last Revision:

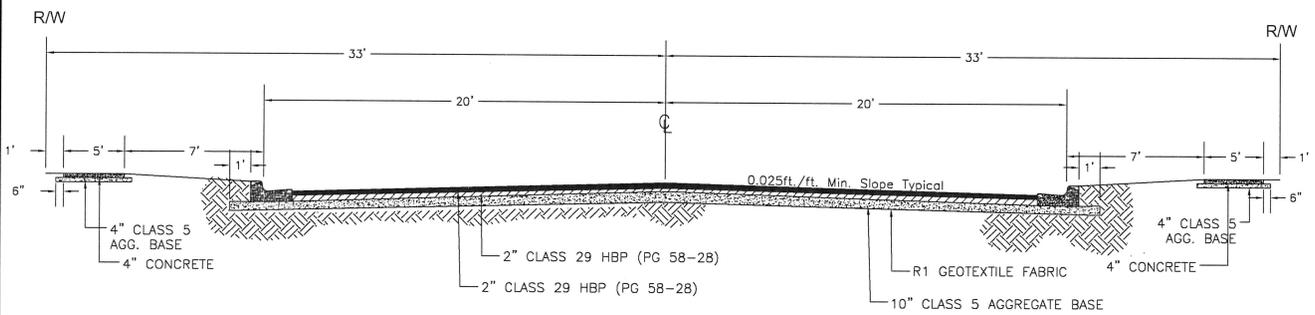
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
CONCRETE DRIVEWAY
APRON COMMERCIAL**





NOTES:

1. Top of Standard Curb and Gutter is level with design grade.
2. Roadway width from back of curb to back of curb is 41'.
3. Section shown above is the minimum residential section for typical soils. If poor soils are encountered, the Engineer shall design a thicker section.

File Name:

STR-10.dwg

Last Revision:

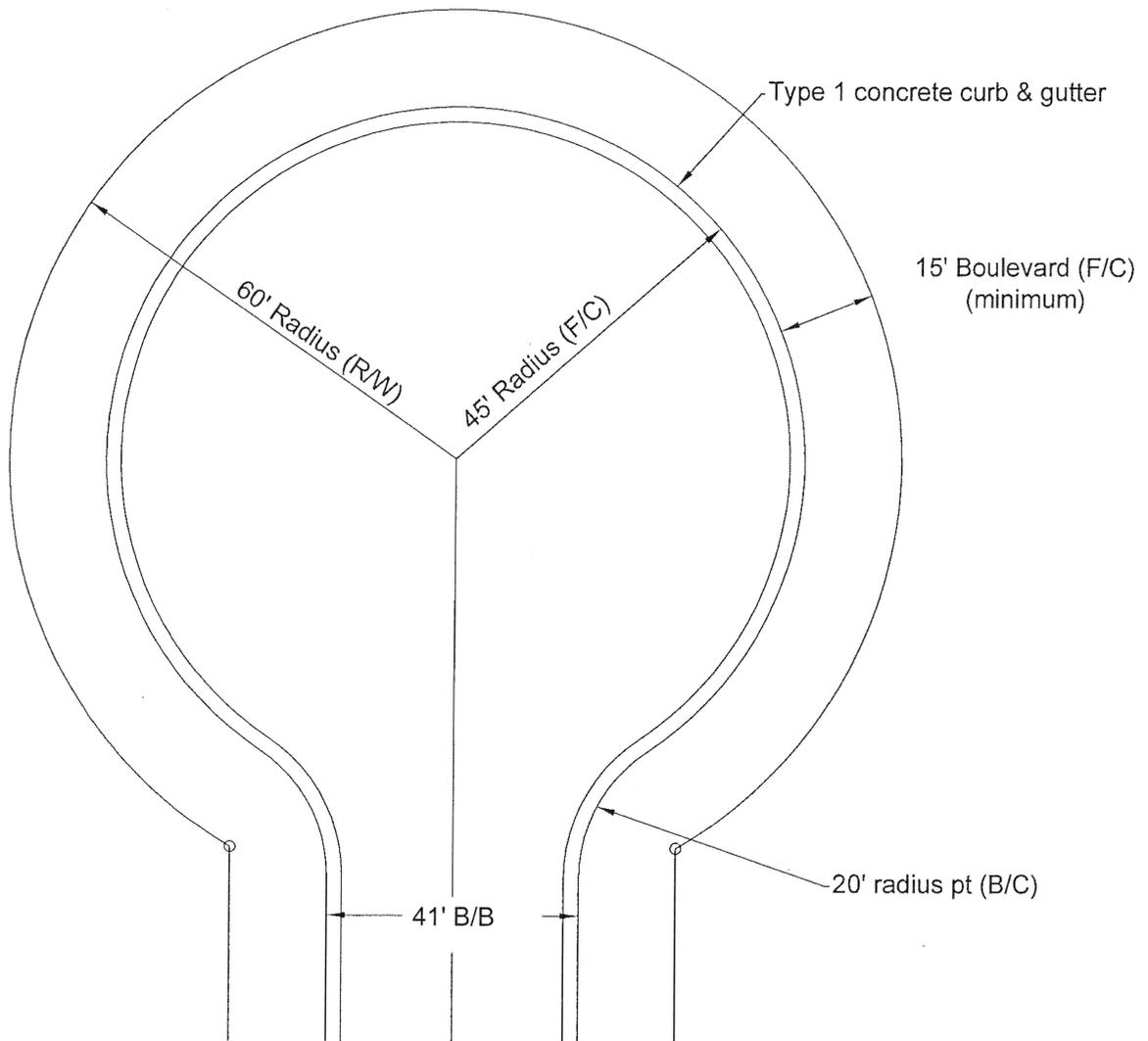
4/18/2013

Scale:

No Scale

STANDARD DETAILS
TYPICAL PUBLIC STREET
RESIDENTIAL SECTION





File Name:

STR-11.dwg

Last Revision:

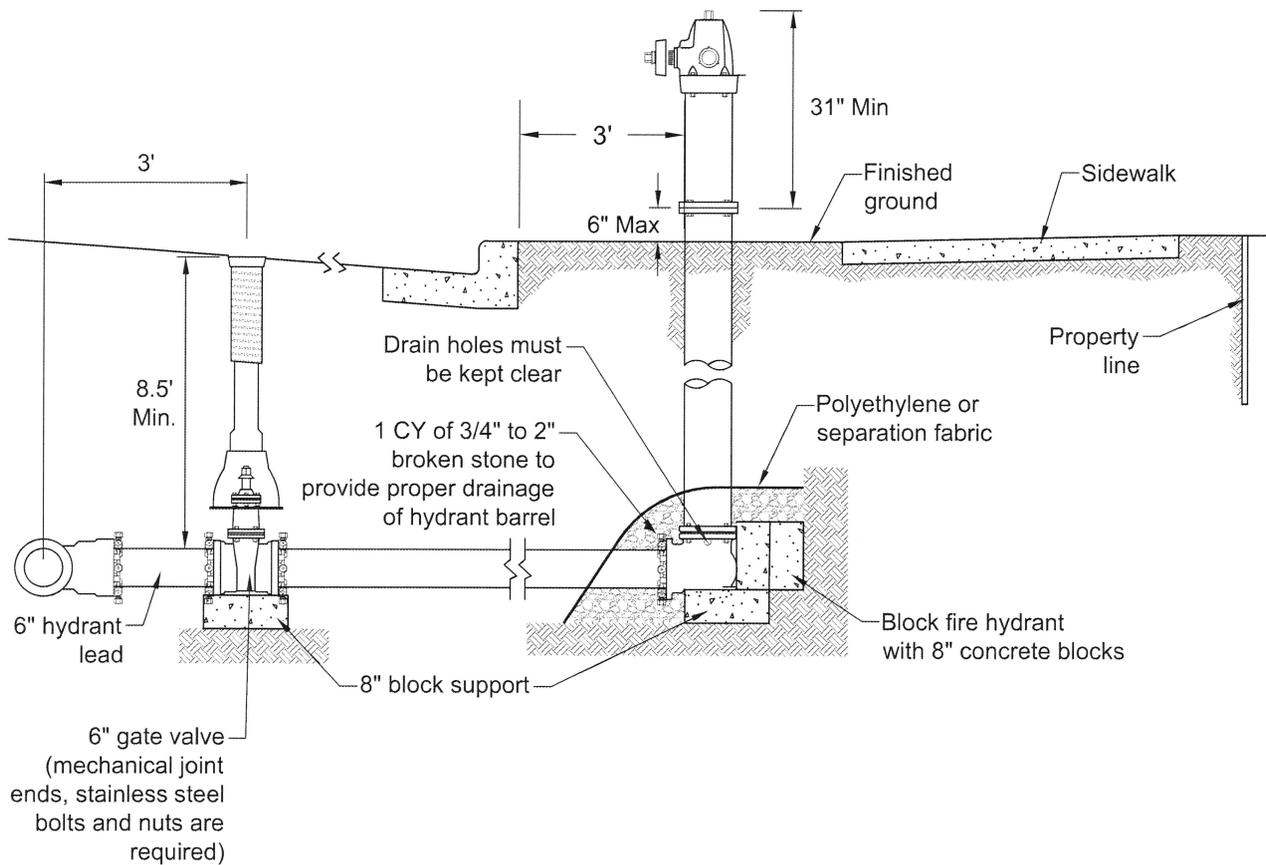
4/18/2013

Scale:

No Scale

STANDARD DETAILS
TYPICAL CUL-DE-SAC
RESIDENTIAL SECTION





NOTES:

1. Pumper connection shall face the street.
2. Hydrants shall be 9'-0" bury
3. 8 mil poly around hydrant barrel.

File Name:

WAT-1.dwg

Last Revision:

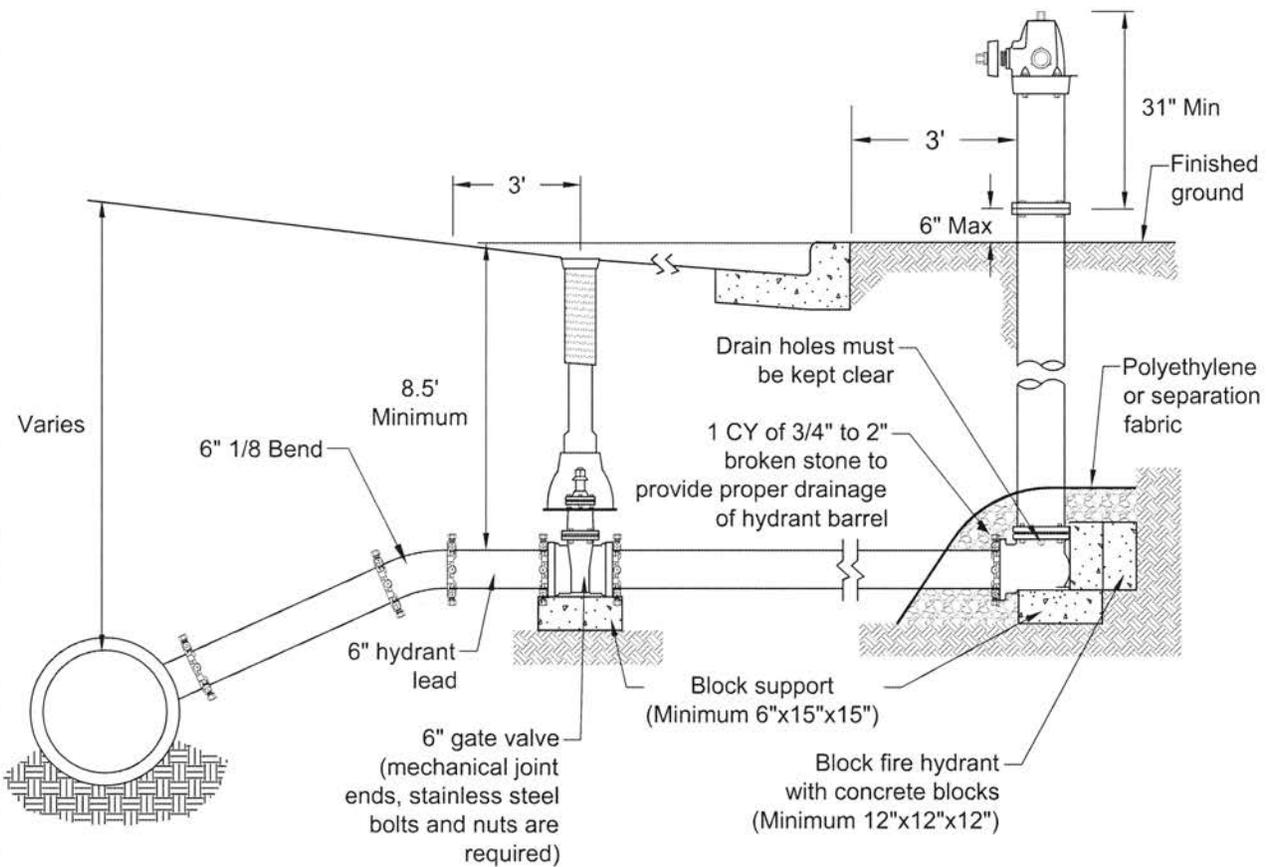
4/18/2013

Scale:

No Scale

STANDARD DETAILS
HYDRANT DETAIL





NOTES:

1. Pumper connection shall face the street.
2. Hydrant shall be 9'-0" bury.

File Name:

WAT-2.dwg

Last Revision:

4/18/2013

Scale:

No Scale

**STANDARD DETAILS
HYDRANT DETAIL
WITH VERTICAL BEND**





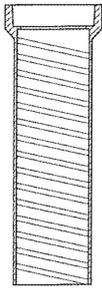
DROP LID

Tyler No. 6860
Mueller No. H-10361



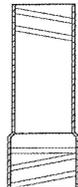
8.5' Minimum cover required over top of water main.

Adjust top to 1/4" below grade.
Box to be set to provide 12" of adjustment.



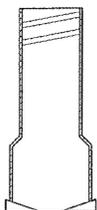
TOP

Tyler No. 6860 26"
Mueller No. H-10361 26"



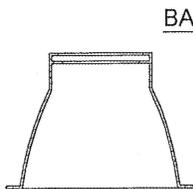
EXTENSION

Tyler No. 58 14"
 No. 59 18"
 No. 60 24"
Mueller No. 58 14"
 No. 59 20"



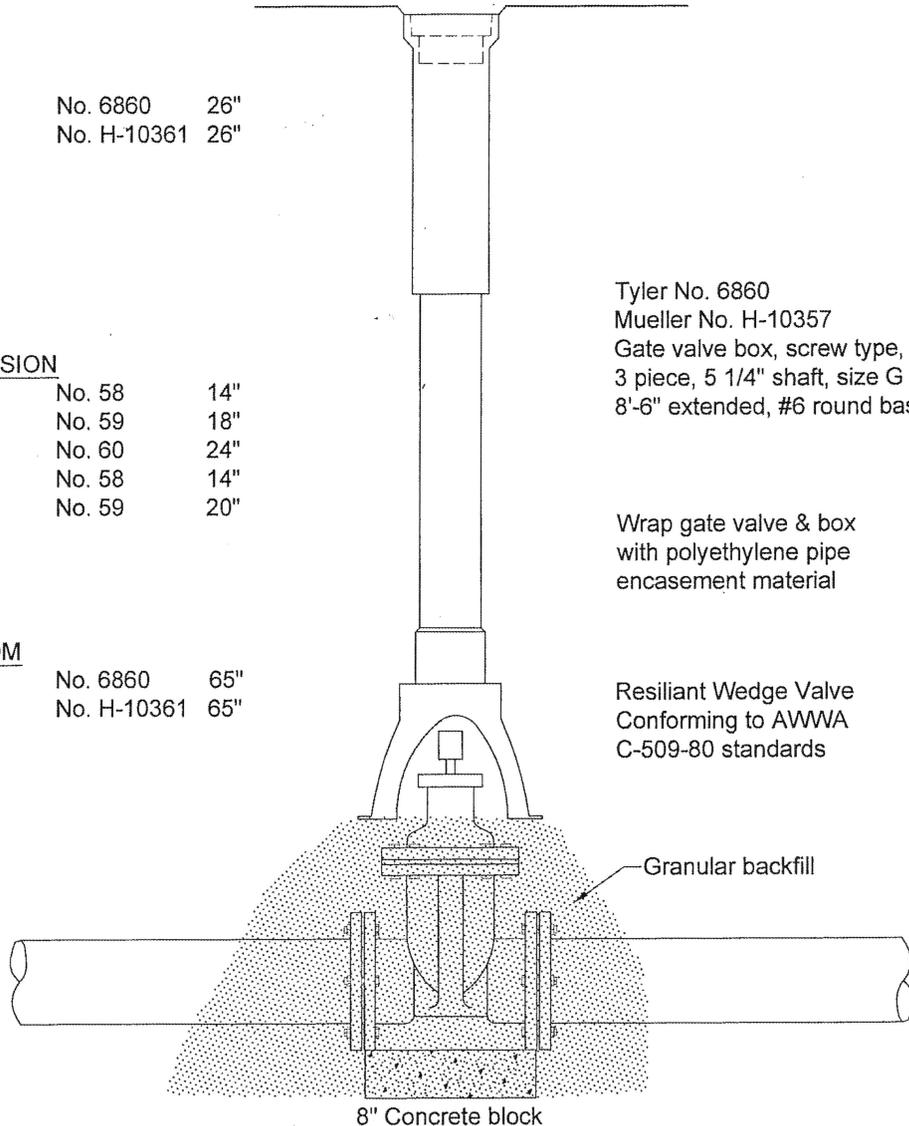
BOTTOM

Tyler No. 6860 65"
Mueller No. H-10361 65"



BASE

Grade



Tyler No. 6860
Mueller No. H-10357
Gate valve box, screw type,
3 piece, 5 1/4" shaft, size G box,
8'-6" extended, #6 round base

Wrap gate valve & box
with polyethylene pipe
encasement material

Resilient Wedge Valve
Conforming to AWWA
C-509-80 standards

Granular backfill

8" Concrete block

File Name:

WAT-3.dwg

Last Revision:

4/18/2013

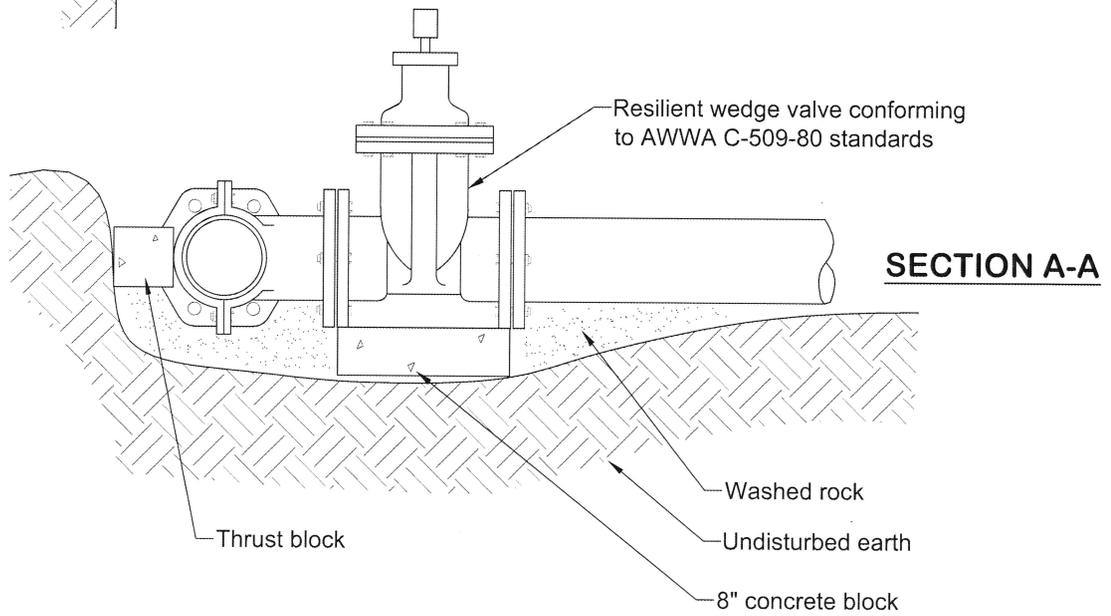
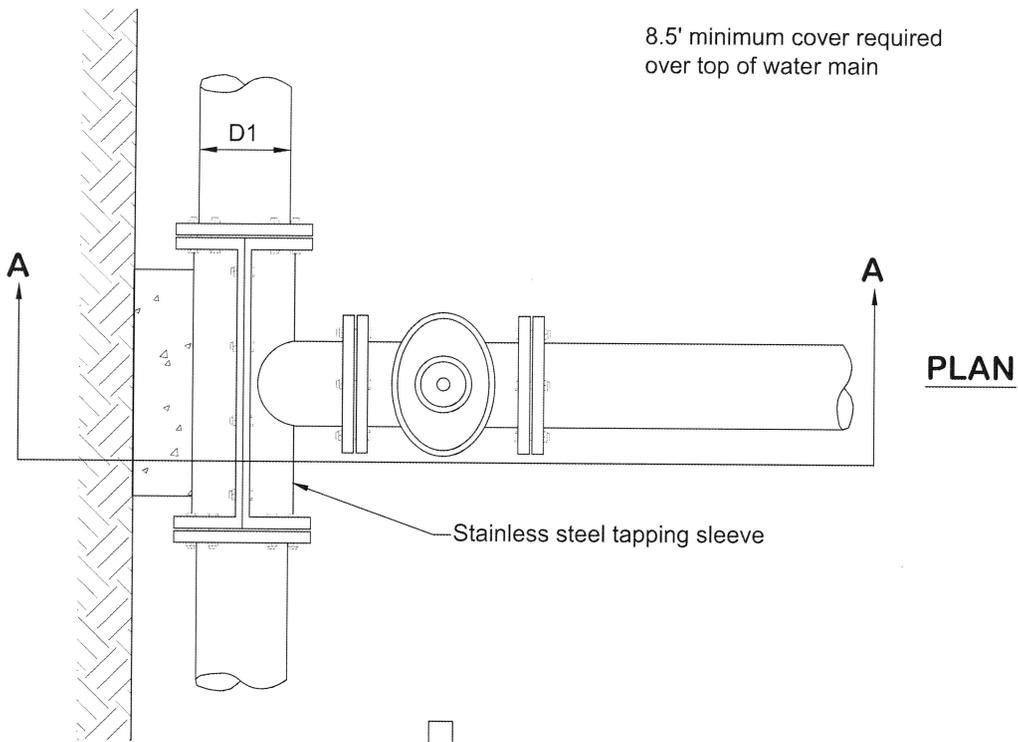
Scale:

No Scale

**STANDARD DETAILS
GATE VALVE AND BOX
INSTALLATION**



8.5' minimum cover required
over top of water main



Note: All tapping gate valves shall be straight flange by MJ Flange.

File Name:

WAT-4.dwg

Last Revision:

4/18/2013

Scale:

No Scale

STANDARD DETAILS
WATER MAIN
WET TAP

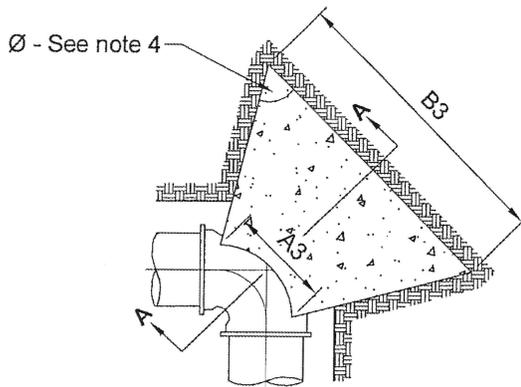


NOTES:

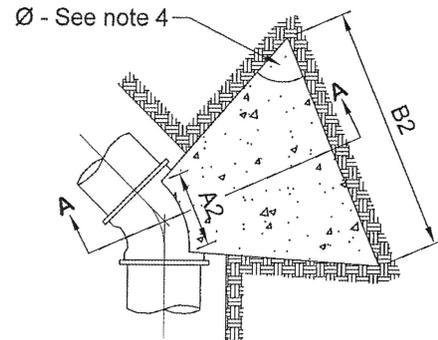
1. Shape of back of buttress may vary as long as poured against firm undisturbed earth.
2. Dimension C1, C2, & C3 should be large enough to make angle \emptyset equal to or larger than 45°.
3. Dimension A1, A2, & A3 should be as large as possible without interfering with MJ bolts.
4. $\emptyset = 45^\circ$ Minimum.
5. Place polyethylene between concrete & pipe.

BUTTRESS DIMENSIONS

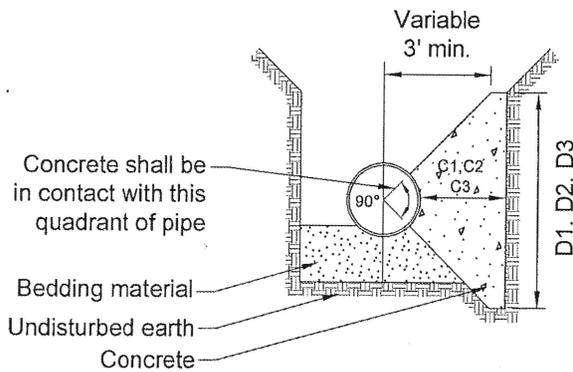
PIPE SIZE	22 1/2° BEND		45° BEND		90° BEND	
	B1	D1	B2	D2	B3	D3
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"
30"	-	-	9'-3"	6'-0"	17'-0"	6'-0"



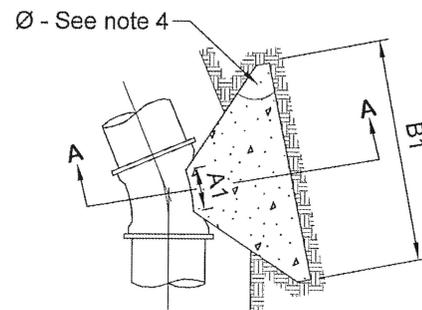
PLAN 90° BENDS



PLAN 45° BENDS



SECTION A-A



PLAN 22 1/2° BENDS

File Name:

WAT-5.dwg

Last Revision:

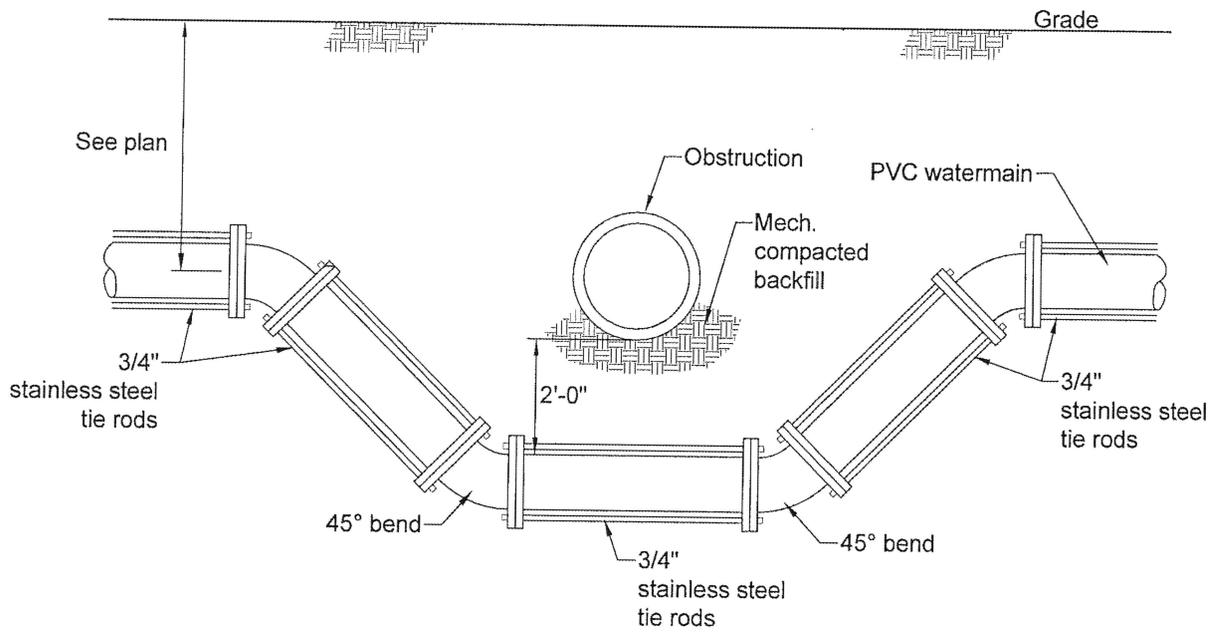
4/18/2013

Scale:

No Scale

**STANDARD DETAILS
CONCRETE
THRUST BLOCKING**





NOTE:

1. If insulation is required refer to BED-3
2. Mega-lugs shall be allowed in place of tie rods.

File Name:

WAT-6.dwg

Last Revision:

4/18/2013

Scale:

No Scale

STANDARD DETAILS
WATERMAIN
OFFSET

