Standard Specifications

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Details

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SECTION 100 – INFORMATION FOR BIDDERS

INFORMATION FOR BIDDERS

SECTION 101 – PRINTED PROPOSAL FORMS

1.01 The bidder will be furnished with the Proposal Form by the Engineer. The Proposal Form shall state:

A. The location and description of the proposed work to be constructed.

B. Estimate of various quantities of work to be performed and materials to be furnished.

C. The time in which the work must be completed.

D. The amount of "Proposal Guaranty" which must accompany the Proposal.

E. The date and time of the opening of the Proposal.

F. Any special provisions or requirements which vary from or are not contained in the standard specifications.

1.02 All paper bound with or attached to the Proposal Forms are a necessary part thereof and must not be detached.

SECTION 102 – VARIATION IN ESTIMATED QUANTITIES

2.01 The contractor may reasonably expect a variation in the estimated quantities from the actual quantities and no claims will be allowed for anticipated profits, for loss of profits, or for damage of any sort because of a difference between the estimate of any item and the amount of the item actually required. The owner reserves the right to eliminate items from the Proposal when such is deemed in its best interest.

SECTION 103 – EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.01 It shall be the responsibility of each Bidder before submitting a Bid, to:

A. Examine the contract documents thoroughly.

B. Visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work.

C. Consider federal, state, and local laws and regulations that may affect cost, progress, performance or furnishing of the Work.

D. Study and carefully correlate Bidder's observations with the Contract Documents.

E. Notify the Engineer of all conflicts, errors or discrepancies in the Contract Documents. Any interpretation of the Contract Documents will be made only by addendum. The Owner will not be responsible for any other explanations or interpretations of the Contract Documents.

SECTION 104 – BID GUARANTEE

4.01 For paving, utility, and building projects, each bid shall be accompanied by:

A. A Bidder's Bond in the amount of 5 Percent of the bid made payable to the City of Minot, North Dakota (NDCC 40-22-20, 48-02-04).

4.02 For Sidewalk, Curb and Gutter projects, each shall be accompanied by:

A. A Bidder's Bond executed fully by bidder and surety, in the amount of $500.00 (NDCC 40-29-07, 40-31-03).

4.03 For service connection projects, each bid shall be accompanied by:

A. A certified check in the amount of $500.00, payable to the City of Minot (NDCC 40-28-07).

4.04 All such checks and Bidder's Bonds will be returned to the respective unsuccessful bidders within ten (10) days after the award is made except those the Owner elects to hold until the successful bidder has executed the Contract. Thereafter all checks and Bidder's Bonds will be returned within ten (10) days.

SECTION 105 – SIGNING PROPOSALS

5.01 If the Proposal is made by an individual, his/her name and post office address must be shown and the Proposal must be signed.

5.02 If the Proposal is made by a firm or partnership, the name and post office address of each member of the firm or partnership must be shown and the Proposal must be signed by an authorized member of the firm or partnership.

5.03 If the Proposal is made by a corporation, the person signing the Proposal must show the name of the State under the law of which the corporation was chartered and the names, titles, and business addresses of the President, Secretary, and Treasurer, and signed by a corporation officer.

SECTION 106 – DELIVERY OF PROPOSALS

6.01 All bids must be placed in a sealed envelope upon the outside of which there is disclosed the following information:

A. The work covered by the bid.

B. The name of the person, firm, or corporation submitting the bid.

6.02 The envelope containing the bid bond must also include a copy of the bidder's license or license renewal.

6.03 Proposals may be mailed to the City Auditor or submitted in person. No bids will be received after the time set for opening them. A bidder may withdraw his/her Proposal without prejudice to him/herself, provided he/she files a written request with the City Auditor not later than the day before bids are to be opened.

SECTION 107 – OPENING OF PROPOSALS

7.01 Proposals will be opened publically and read by the City Clerk, at the date set in the Advertisement for Proposals or Notice to Contractors. Bidders or their authorized agents are invited to be present and are permitted to examine any bid after opening.

SECTION 108 – IRREGULAR PROPOSALS

8.01 Proposals may be rejected if they show any omission, alteration of form, additions not called for, conditional alternate bids, or irregularities of any kind which may tend to make the Proposal indefinite or ambiguous as to its meaning.

SECTION 109 – DISQUALIFICATION OF BIDDERS

9.01 Any or all Proposals will be rejected if there is a reason for believing that collusion exists among the bidders and all participants in such collusion will not be considered in the future Proposals for the same work.

9.02 Proposals in which the prices obviously are unbalanced as determined by the Engineer will be rejected. No Contract will be awarded except to responsible bidders capable of performing the class of work contemplated.

9.03 The bidder shall furnish a complete statement of his/her experience and of the amount of capital and equipment available for the proposed work, if so requested by the City Council or the Engineer.

SECTION 110 – AWARD OF CONTRACTS

10.01 Any or all bids may be rejected or informalities in bids may be waived at the option of the Owner.

10.02 The award of the Contract is contingent upon securing an acceptable bid which will fall within the amount of the funds available for construction of the project.

10.03 The contract will be awarded to the lowest responsible bidder.

SECTION 111 – LOWEST RESPONSIBLE BIDDER

11.01 In determining “Lowest Responsible Bidder”, in addition to price, the following factors will be considered:

A. The ability, capacity and skill of the bidder to perform the Contract or provide the services required.

B. Whether the bidder can perform the Contract or provide the service promptly, or within the time specified, without delay or interference.

C. The character, integrity, reputation, judgment, experience, and efficiency of the bidder.

D. The quality of performance of previous Contracts or service.

E. The previous and existing compliance by the bidder with laws and ordinances relating to the Contract or service.

F. The sufficiency of the financial resources and ability of the bidder to perform the Contract or provide the service.

G. The quality, availability, and adaptability of the supplies, or contractual services to the particular use required.

H. The ability of the bidder to provide future maintenance and service for the use of the subject of the Contract.

I. The number and scope of the conditions attached to the bid.

SECTION 112 – ACCEPTANCE OF PROPOSALS AND ITS EFFECT

12.01 Within thirty (30) days after the opening of the Proposals, the Owner will act upon them. The acceptance of a Proposal will be a notice in writing signed by a duly authorized representative of the Owner, and no other act of the Owner shall be necessary to constitute acceptance of a Proposal. The acceptance of a Proposal shall bind the successful bidder to execute the required Contract.

SECTION 113 – TIME FOR EXECUTING CONTRACT AND DAMAGES FOR FAILURE TO EXECUTE

13.01 Any bidder whose Proposal shall be accepted will be required to execute the Contract and furnish Contractor's Bond required under Section 114 hereof, within ten (10) days after notice that the Contract has been awarded to him/her. Failure to do so shall constitute a breach of the Agreement effected by the acceptance of the Proposal.

13.02 The damages to the Owner for such breach will include loss from interference with his/her construction program and other items whose accurate amount will be difficult or impossible to compute. The amount of the bidder's check or bond accompanying the Proposal for such bidder shall be retained by the Owner as liquidated damages for such breach.

13.03 The City Council shall be authorized, the same as if the bond or bid contained an expressed stipulation to that effect, to cause such work to be done, or complete the work, or contract with some other contractor to do or complete the necessary work and to charge against the Bond the difference between actual cost to the City of such improvements and the sum which it would cost if the defaulting bidder compiled with their bid.

SECTION 114 – CONTRACTOR'S BOND

14.01 The successful bidder shall within the time fixed by the City Council for executing the Contract, file with the City Auditor, a Contractor's Bond in a sum equal to the full amount of the Contract. Such Contractor's Bond shall be executed by the bidder or Contractor as principal and a surety company, authorized to do business in the State of North Dakota and in a form satisfactory to the City Attorney of the City of Minot.

14.02 Such bond shall be made payable to the City, and shall be conditioned that he/she will faithfully perform the work bid for in accordance with the terms of and within the time provided for in such Contract, and pursuant to the plans and specifications and Proposal for such work on file in the City Auditor's Office and pay for all labor and materials used in such work, all taxes of any nature, Workmen's Compensation charges, and all other obligations arising out of his/her performance of the Contract. In case of default on the part of the bidder or Contractor to perform such work as provided in the Contract, the sum named in the bond shall be taken and held to be fixed and liquidated damages in favor of the City and full amount thereof may be recovered from said bidder and his/her sureties in an action by the City against them on said bond.

SECTION 115 – BOND SUFFICIENCY

15.01 The sufficiency of any bond filed by the bidder shall be determined by the City Council at the time of considering bids. If the Council shall at any time deem the bond of a Contractor insufficient either in the form or as to sureties it may require the successful bidder or Contractor to furnish a new bond to be approved by the City Council within such reasonable time as the Council may fix.

15.02 If the bidder or Contractor shall fail to furnish such new bond within the required time after notice for him/her to do so, his/her Contract may be cancelled and in that event the Contractor's Bond shall be liable the same as if the Contractor had failed to perform his/her Contract.

SECTION 116 – CONTRACTOR CONFERENCE

16.01 Approximately one (1) week prior to the bid opening date to be set forth in the "Advertisement for Proposals" all interested bidders are invited to a meeting with the engineer to be held in the Council Chambers at City Hall or the City Engineers Office. This meeting is optional at the request of the City Engineer or any prospective bidder. If any prospective bidder is interested in such a meeting, they should contact the City Engineer.

SECTION 117 – PLAN AND SPECIFICATION DEPOSIT

17.01 Plans and specification will be supplied by the Engineer. A fee of $25.00 will be charged for the City of Minot Standard Specification and Details and $25.00 for a plan set up to 5 plan sheets, and $40.00 for more than 5 plan sheets. All supplemental specifications and materials will be included in the cost of the plan. This fee shall be non-refundable and shall be charged to all plan holders including contractors, subcontractors, suppliers, and builders' service exchanges.

END OF SECTION

SECTION 200 – GENERAL CONDITIONS

GENERAL CONDITIONS

SECTION 201 – DEFINITIONS

1.01 The following are definitions found commonly in the City of Minot 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 Minot, North Dakota.

C. Engineer: Is the City Engineer of Minot, North Dakota, 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, free of charge, four (4) copies of drawings and special Specifications reasonably necessary for execution of the work. All additional copies will be furnished at reproduction cost. This section does not pertain to copies of Standard Specifications, the cost of which is set forth in Section 117 of the Information for Bidders.

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 his 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. All contractors working within the City of Minot right-of-way must hold a valid license, issued by the City of Minot, for the work they are performing.

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 It shall be the Contractor's responsibility to locate with the aid of a City Inspector, all utility services before any construction.

14.03 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 City Engineer.

15.02 No road or street shall be closed to the public except with the permission of the City 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 City 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 Minot, 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 Minot 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 Minot to stop the work until a qualified representative is present or can be cause for the City of Minot 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 (Minot City Council) of his determination that the affected work be accepted and remain in place. In this event, the Engineer will document his 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 his 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 15 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 Engineer and the City Manager. The City Manager shall notify the City Council regarding the change order within 24 hours of its approval.

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 City Engineer of the City of Minot. 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 15% 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.

1. 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%.

L. 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 ACCEPTACE OF THE WORK

42.01 Before any work is considered final and ready for acceptance by the City of Minot; 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 two year warrantee period will begin, and the work shall become the maintenance responsibility of the City of Minot.

SECTOIN 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 – MEASUREMENT OF QUANTITIES

47.01 The quantities of work performed will be computed by the Engineer on the basis of measurements taken by the Engineer, or authorized representative, and these measurements shall be final and binding.

47.02 All work computed under the Contract shall be measured by the Engineer according to the United States Standard Measurements and Weights. Measurements for various items will be made as provided in the specifications.

SECTION 248 – FINAL PAYMENT

48.01 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 249 – GUARANTEE

49.01 The Contractor guarantees all work constructed under the Contract for a period of two (2) years 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.

49.02 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.

49.03 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.

49.04 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.

SECTION 250 – SAFETY

50.01 The Contractor and sub-contractors shall perform the work in compliance with the latest North Dakota Safety Code adopted by the North Dakota Workman's Compensation Bureau.

50.02 Safety apparel meeting the ANSI/ISEA 107-2004, as Revised, Standard for High Visibility Safety Apparel and Headwear, shall be worn when working in the right-of-way.

SECTION 251 – TRAFFIC SIGNING REQUIREMENTS

51.01 The Contractor shall provide for all required traffic control devices as shown on the Traffic Control Plan included with the Plans. All equipment and devices must be in place before any work commences in the area affected by the Traffic Control Plan.

51.02 If no Traffic Control Plan is included with the Plans, the Contractor shall prepare and submit a Traffic Control Plan to the Engineer at least one week prior to commencement of work. The City of Minot Traffic Division may be available to the Contractor to determine signing requirements. However, any assistance provided by the Traffic Division shall in no way relieve the Contractor of their responsibility to provide proper traffic control pursuant to the Manual on Uniform Traffic Control Devices, part VI, US Department of Transportation, Federal Highway Administration, 2003, as revised or as adopted.

51.03 Existing signs of any type that interfere with construction shall be removed and replaced in the same location by the Contractor, at no cost to the Owner, unless otherwise noted.

SECTION 252 – DISCOVERY OF CULTURAL AND ENVIRONMENTAL ITEMS

52.01 In the event of a cultural or threatened/endangered species find during any phase of construction, the following procedure will be followed:

A. Construction shall be halted immediately, with as little disruption to the find as possible and works shall not resume in the vicinity until approved by the Engineer.

B. The Contractor shall notify the Owner, who shall contact the State Historical Preservation Officer.

C. The State Historic Preservation Officer may decide to have an archaeologist inspect the site and make recommendations about the steps needed to protect the site, before construction is resumed.

D. Any claim made by the Contractor for down time or additional work required by the State Historic Preservation Officer shall be classified as extra work. See Section 233 – Extra Work

E. Should any artifacts, housing sites, ect, be uncovered, the same procedure shall be followed as outlined for an archaeological find.

F. Failure to notify the Engineer within 24 hours shall result in the Contractor being liable for all stand-by costs, all damage incurred, and all other associated costs.

SECTION 253 – SUBSTITUTE AND (OR EQUAL) PROVISIONS

53.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or those substitute or "or-equal" materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents established a standard of required type, function, and quality to be met by any proposed substitute or "or-equal" item. No item of material or equipment will be considered by Engineer as a substitute or "or equal" item unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approved any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

53.02 The following procedure shall be followed to determine the equivalency of any material that is not directly referred to in these specifications:

A. The Contractor shall submit a sample of the proposed product, with all the available literature, to the Engineer.

B. The Engineer will determine equivalency of the proposed product.

C. The decision of the Engineer as to equivalency of the proposed product shall be final.

53.03 Any variation in the design concept of the proposed product, as compared to listed products, shall be grounds for rejection.

53.04 Availability of parts, costs of parts, and work involved in replacing said parts, can also be used by the Engineer in making his decision as to equivalency.

SECTION 254 – NORTH DAKOTA PREFERENCE

54.01 Unless prohibited by federal law or regulation, and except for those projects being funded by federal aid funds, the Contractor must give preference to the employment of bona fide North Dakota residents, with preference given first to honorably discharged disabled veterans and veterans of the armed forces of the United States, who are deemed to be qualified in the performance of the work to be performed by the Contractor. (See NDCC Chapter 43-07 for further requirements).

SECTION 255 – SPECIAL TESTING REQUIREMENTS

55.01 On all projects not under direct supervision of the City of Minot Engineering Department, the tests detailed in Section 600 – Project Testing Requirements must be taken by an independent qualified person or agency and certified copies of the results must be submitted to the City Engineer.

55.02 The specific testing requirements are listed in each relevant specification section or are outlined in Section 600 – Project Testing Requirements.

SECTION 256 – CITY DATUM

56.01 The City of Minot requires all projects constructed in the City right-of-way to use the National Geodetic Vertical Datum of 1929 (NGVD29).

56.02 All plans and specifications for work within the City right-of-way must have the NGVD29 datum printed on the Plan and referenced in the Specification.

SECTION 257 – SUBDIVISION MAINTENANCE AND ESCROW

57.01 The developer of all commercial, industrial, and residential subdivisions within the City of Minot shall be responsible for maintenance responsibilities for the sanitary sewer, storm sewer, water system, and roadway section. Maintenance responsibilities of the developer shall include snow clearing when the street section is not fully improved to a paved section.

57.02 The maintenance period shall be until 90% of the parcels within the subdivision have received a certificate of occupancy from the City's Inspection Department with a maximum time period of 3 years from the date of street construction acceptance by the City of Minot.

57.03 The developer shall supply the City of Minot with funds placed in an escrow account accessible to the City of Minot for repairs to infrastructure within the City right of way or easement with public infrastructure. The amount to be placed in escrow shall be:

$1000 per platted parcel within the subdivision.

57.04 Escrow fees per parcel are due at the time of construction plan submittal to the City of Minot. The number of parcels to be constructed will be counted to obtain the escrow amount to be paid to the City of Minot.

57.05 During the maintenance period, the City of Minot shall conduct inspections of all infrastructure within the subdivision. Damage to roadway and utilities caused by poor workmanship, or development activities which includes work done by others on individual parcels within the subdivision shall be repaired according to the City of Minot Standard Specifications.

57.06 If the developer refuses or does not have the ability to complete the repairs, the City of Minot will use the supplied escrow funds to hire a contractor to complete the repairs.

57.07 Once all repairs have been completed after the maintenance period, the City of Minot shall assume all maintenance responsibilities of the subdivision within the public right of way and easements dedicated to public utilities. Any remaining escrow funds will then be returned to the developer.

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 City Engineer, the Contractor shall pay to the City of Minot 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 - $2,000,000	$1,100
$2,000,000 - $3,000,000	$1,300
$3,000,000 - $5,000,000	$1,550
$5,000,000 - $8,000,000	$1,900
$8,000,000 - Up	$2,400

1.02 The Contractor understands that the following clause is part of the construction contract whether it does or does not appear in said contract.

A. The time limit for the completion of the Work herein provided for is of the essence of this Contact, and in case Contractor shall fail to complete the Work hereunder, within the time aforesaid, or within such extensions of time, as may be allowed by the City Engineer, the Contractor agrees to pay the City $_____ (this blank will be filled in with the appropriate daily figure from the above schedule) dollars for each and every day the time consumed in said performance and completion exceeds the time hereinbefore allowed for that purpose, which said sum, in view of the difficulty in ascertaining the loss which City will suffer by reason of delay in the performance of the Work hereunder is hereby agreed upon, fixed and determined by the parties hereto as liquidated damages that City will suffer by reason of said delay and default, and not as a penalty; and City shall and may deduct and retain the amount of such liquidated damages out of the money which may be due or become due under this Contract.

1.04 Liquidated Damages for Sidewalk, Curb & Gutter Project

A. In the yearly Sidewalk, Curb & Gutter Contract, the Contractor is given a specific amount of work to complete each month. If the Contractor fails to complete such work in the time allowed, the liquidated damages set forth in the above table shall be invoked.

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.

2.02 The Contractor is requested to make special note of the following paragraphs taken from the City Ordinances:

A. 31-44: No person except City Employees in performance of their official duties shall open or cause to be opened any fire hydrant without written permission of the Superintendent of Water and Sewer.

B. 1-8: The doing of any act prohibited or declared to be unlawful by this Code, or the omission or failure to perform any act or duty required by this Code, is, unless another penalty is specified, punishable by fine in a sum not exceeding five hundred dollars ($500.00) and imprisonment not to exceed thirty (30) days, or by both such fine and imprisonment. Each day any person violates any provision of this Code shall constitute a separate offense.

C. It shall be the responsibility of the Contractor to secure permission from the Superintendent of Water and Sewer at least 24 hours before any hydrant is used. Such permission will be given by the Superintendent only after he has determined that the usage will not be a detriment to the water system or to Fire Department operations.

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 Minot 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 – Portland Cement Concrete Pavement.

L. Section 3200 – Concrete Curb and Gutter.

M. Section 3300 – Concrete Walk, Medians, and Driveways.

N. Section 3700 – Lawns and Grasses.

1.03 References

A. NDDOT Field Testing Manual.

B. AASHTO Testing Procedures.

C. ASTM Testing Procedures.

1.04 Submittals

A. All testing reports for City projects or for projects that will be constructed in City right-of-way, will be submitted or copied to the City Engineer's Office.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

3.01 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)	1/600 SY or 1/STA 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) Aggregate Base	1/600 SY or 1/STA Whichever is More Frequent	100% Maximum Density (AASHTO T-99)
(c) Utility Trench Backfill	1/100 LF at Various Depths	100% Maximum Density (AASHTO T-99) within 1 foot of subgrade, otherwise 95% Maximum Density with ±3% optimum moisture.
(d) Utility Service Trench Backfill	50% of Total Services 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.

3.02 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, Zero Drop in Pressure
2. Total Coliform (Bacteria)	2/Test Section, maximum of 1200 LF	2 passing tests per test section taken 24 hours apart.

3.03 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 deflection
2. Closed Circuit TV Inspection (Televise)	Manhole to Manhole	Accurate to 1 ft, label each run, audio description of condition, STA location for service, DVD and paper report submittal

3.04 Concrete

Type of Construction:	**Concrete**	
Test Required	**Frequency**	**Specification**
1. Air Entrainment	1/150 CY or 1/Day, Whichever is More Frequent	ASTM C 231 (%)
2. Slump	1/150 CY or 1/Day, Whichever is More Frequent	ASTM C 143

3. Compressive Strength	1/150 CY or 1/Day, Whichever is More Frequent	ASTM C39 & ASTM C31
4. Temperature	1/150 CY or 1/Day, Whichever is More Frequent	ASTM C1064 (F)

3.05 Bituminous Paving

Type of Construction:	**Bituminous Paving**	
Test Required	**Frequency**	**Specification**
1. Gradation		
(a) Chip Seal Cover Aggregate	1/250 Tons	AASHTO T-27 & AASHTO T-10
(b) Plant Mix Aggregate Gradation	1/1000 Tons	AASHTO T-27 & AASHTO T-11
2. Percent Fractured Faces	1 per Job	NDDOT 4
3. Asphalt Binder Content (%)	1/1000 Tons	One sample from flow meter readings or bitumen cutoff report.
4. Density		
(a) Air Voids	1/1500 SY Lot	91% Maximum Theoretical Density (Rice) (AASHTO T-209), 2-4% air voids
(b) Cores	10% of Lots	Plan Thickness and 91% Maximum Theoretical Density (Rice) (NDDOT 2)

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.

3.06 Lawns and Grasses

Type of Construction:	**Lawns and Grasses**	
Test Required	**Frequency**	**Specification**
1. Seed Mixture	1 per Seed Mixture	Submit seed bag tags to Engineer

3.07 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 City Engineer.

3.08 Measurement and Payment

A. All required passing tests shall be paid for by the Owner. All failing tests shall be paid for by the Contractor.

B. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 800 – PRICE AND PAYMENT PROCEDURES

PRICE AND PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 Section Summary

A. Administration and procedural requirements for processing applications for payment and pricing of work.

1.02 Bid Unit Prices

A. Provide access to the work and assist Engineer in measuring and determining Bid Unit Price work.

B. If the Contractor delivers and places more of any material that is required to perform the work and causes the materials to be wasted, the Owner reserves the right to deduct the wasted quantity from the final measurement for that Bid Item.

C. Unit prices shall include all necessary materials, cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

D. Measurement and payment will be for the actual quantity installed, unless otherwise indicated by the Engineer.

1.03 Payment Procedures

A. Each Application for Payment shall be consistent with previous applications as certified by the Engineer and paid for by the City of Minot.

1. The Application for Payment form will be provided by the Engineer at the pre-construction conference.

2. Include amounts of Change Orders approved on or before the last day of the construction period covered by the Application on a separate page.

B. Progress Payment Times: A schedule with the processing dates for each progress payment will be provided at the pre-construction conference.

1. The Contractor shall submit the Application for Payment no later than 12:00 noon on the payment processing dates indicated on the schedule.

2. The period covered by each Application for Payment is one month, ending at the end of the day prior to the payment processing date indicated on the schedule.

3. Progress payments shall be submitted to the Engineer by 4:30 p.m. on the processing dates. Any revisions or additions provided after that time shall not be considered until the next Application for Payment.

C. Application Preparation: Complete every entry of every form. Each Application must be signed by a person authorized to sign legal documents on behalf of the Contractor. Engineer will return incomplete applications without action.

D. Transmittal: Applications for Payment may be faxed or emailed to the Engineer by 12:00 noon on the payment processing dates to expedite processing. The Contractor shall submit 1 signed and notarized original copy of each Application for Payment to the Engineer by 4:30 p.m. on the next business day following payment processing dates.

E. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.

2. Contractor's Construction Schedule (preliminary if not final).

3. Products list.

4. Schedule of unit prices.

5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.

6. Report of preconstruction conference.

7. Certificates of insurance and insurance policies.

8. Performance and payment bonds.

F. Application for Semi-Final Payment: Submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

G. Application for Final Payment: Submit an Application for Final Payment with releases and supporting documentation not previously submitted and accepted, including but not limited to the following:

1. Affidavit of Contractor indicating that all persons who have furnished labor, materials and services in connection to the project have been paid in full.

2. Final Contract Change Order to balance quantities with the net change from bid price.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Measurement and Payment

A. All work and costs of this Section shall be incidental to the Project.

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. A period of fifteen (15) days will be required if an outside consultant must be used.

B. Allow enough time for review of the submittal by the Engineer, no Contract Time extension will be granted for failure to transmit submittals in advance of the work.

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.

B. At least once a month, provide the Engineer with a revised schedule. Identify areas where progress is ahead or behind schedule.

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. The minimum sheet size shall be 8-1/2 inch x 11 inch. No sizes above 11x17 will be allowed. Non-legible copies will not be reviewed.

C. 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.

D. 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 Operation and Maintenance Manuals

A. Conform to the requirements of Section 1400 of this Specification.

3.05 Test Reports

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

3.06 Specification Section Submittals

A. Each section in this Specification may have submittals required for the work. Follow the requirements of this section and section 206.

3.07 Measurement and Payment

A. All work and costs of this Section shall be incidental to the Project.

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. Provide incidental labor and facilities to obtain, handle, and store samples at Project Site or source. Provide adequate quantities of representative samples of materials, transportation of samples to the testing agency, facilitate tests and inspections for storing and curing of test samples.

1.06 Testing Agency Responsibilities

A. Conduct and interpret tests and inspections and state in each report whether tested inspected work complies with or deviates from the requirements.

B. Notify Engineer and Contractor immediately of irregularities or deficiencies observed in the work during performance of its services.

C. Provide qualified personnel.

D. Provide interpretation of test results when requested by the Engineer.

E. Submit a certified written report of each service performed.

1.07 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

1.08 Limits on Testing Agency Authority

A. Laboratory has no authority to release, revoke, alter, or increase the Contract Document requirements.

B. Laboratory may not accept or approve any portion of the work.

C. Laboratory has no authority to stop the work.

D. Laboratory may not perform any duties of the Contractor.

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.

1.10 Manufacture's Field Services

A. Engage a qualified representative to observe field conditions, conditions of surfaces and installations, quality of workmanship, start-up of equipment, and test, adjust, and balance of equipment.

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 FACILITES 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 and Sewer 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 MUTCD, 2003 as revised.

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.

3.07 Measurement and Payment

A. A Bid Item has been provided for Traffic Control. Measurement is by Lump Sum (LS). This shall be considered payment in full for all labor, equipment, and materials associated with the required Traffic Control devices for the entire project. This bid item shall include but not be limited to furnishing, installing, and relocating the traffic control due to various road closures, daily maintenance, and ultimate removal of all such devices over the duration of the Contract or as directed by the Engineer. Partial payments will be made as follows:

First Partial Payment	50% of Traffic Control Item
Percent of Original Contract Earned – 50	75% of Traffic Control Item
Percent of Original Contract Earned – 100	100% of Traffic Control Item

B. When individual traffic control items are listed in the Proposal, each shall be paid for by the type and unit specified. All costs for transport, setup, and takedown including multiple setups shall be included in the price for the item.

B. Mobilization: Shall be paid for by lump sum (LS). Price shall include all materials, labor, and equipment necessary for mobilizing on site. If the amount bid for Mobilization exceeds 5 Percent of the Total Base Bid, the Owner reserves the right to withhold the portion in excess of 5 Percent until 95 Percent of the original Contract is earned. Partial payments for mobilization shall be made as follows:

First Partial Payment	50% of Mobilization Paid
Percent of Original Contract Earned – 25	70% of Mobilization Paid
Percent of Original Contract Earned – 50	90% of Mobilization Paid
Percent of Original Contract Earned – 100	100% of Mobilization Paid

C. All other work and costs of this Section shall be incidental to the Project.

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

B. Section 3700 – Lawns and Grasses

1.03 References

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

1. Section 708.02 – Seeding, Sodding, and Mulching
2. Section 708.03 – Erosion Control Blanket and Turf Reinforcement Mat
3. Section 708.04 – Riprap and Aggregate Cushion
4. Section 708.05 – Fabric Formed Slope Protection
5. Section 708.07 – Silt Fence
6. Section 708.08 – Fiber Rolls
7. Section 708.09 – Floating Silt Curtain
8. Section 708.10 – Stabilized Construction Access
9. Section 709 – Geotextile Fabrics
10. Section 856 – Erosion Control Blanket and Turf Reinforcement Fabric.

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 .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 Section708.02C3-5

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 .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.

3.04 Measurement and Payment

A. Bid Items have been provided for temporary erosion control measures and devices. Payment at the Bid Unit Price will be considered compensation in full for all work necessary to complete the Bid Item in full, including installation, maintenance, sediment removal, repairs, and removals.

1. Silt Fence: Measurement will be made by linear foot (LF) of material specified on the plans.

2. Stabilized Construction Entrance: Measurement will be made by each (EA) entrance installed.

3. Storm Drain Inlet Protection: Measurement will be made by each (EA) inlet protection installed.

4. Erosion Control Blanket and Turf Reinforcement Mat: Measurement will be made by the square yard (SY) for each type of material specified on the plans.

5. Ditch Check: Measurement shall be by the lineal foot (LF) for the type of ditch check specified on the Plan.

6. Velocity Check: Measurement shall be by the lineal foot (LF) for the type of velocity check specified on the Plan.

7. Dust Control: Measurements shall be based on units of M (1000) gallons (MGAL).

8. Temporary Cover Crop: Measurements will be made by the acre (Ac), and shall include seeding, cover crop, and soil preparation.

B. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 1300 – PRODUCT REQUIREMENTS

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.01 Section Summary

A. Requirement for products used in the work.

1.02 Submittals

A. Submit the following items consistent with Information to Bidders and the General Conditions:

1. Written request for approval with supporting documentation.

B. Submit the following items:

1. Shop drawings for named products and “or equal” products.

2. Written request for approval for substitute items, including supporting documentation.

1.03 Product Substitutions and “or equal” procedures

A. Procedures during bidding.

1. Conform to the Information to Bidders and General Conditions Sections of this Specification.

B. Procedures during construction.

1. Scheduling of Submittals: Conform to the Contractor’s Schedule of Submittals.

2. Submittal Procedures: Conform to the requirements of Section 900 – Submittal Procedures.

3. Items not approved as “or-equal” may be resubmitted as a substitute item.

4. Engineer will review substitute item requests that conform to conditions stated below. The Contractor shall make written applications to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1. Shall certify that the proposed substitute item will:

a. perform adequately the functions and achieve the results called for by the general design,

b. be similar in substance to that specified, and

c. be suited to the same use as that specified;

2. will state:

a. the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b. whether or not use of the proposed substitute item in the work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

c. whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3. will identify:

a. all variations of the proposed substitute item from that specified, and

b. available engineering, sales, maintenance, repair, and replacement services;

4. and shall contain an itemized estimate of all costs or credits that will results directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

5. The following supporting documentation will also be required:

a. Drawing and Specifications.

b. Installation lists.

c. Performance data, including equipment capacity, strengths, weights, and dimensions.

d. Catalog cut-sheets.

e. Lists of deviations from and exceptions to the Specifications.

f. Detailed information for all buy-out items, including motors and drives.

g. Lists of materials of construction.

h. Maintenance schedules of equipment, including buy-out items.

i. Other information deemed necessary at the discretion of the Engineer.

6. Incomplete submittals will be returned to Contractor without review.

7. Engineer shall not have to prove that an item is not an "or-equal".

8. Owner does not have to accept proposed substitute items.

1.04 Substitute Items

A. Procedures during bidding.

1. Conform to the Information to Bidders and General Conditions Sections of this Specification.

B. Procedures during construction.

1. Alternate materials or equipment items accepted by the Owner and included in the award of Contract become named materials or equipment.

2. Submittal Procedures: Conform to the requirements of Section 900 – Submittal Procedures.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Delivery of Equipment and Materials

A. Transport and handle products in accordance with manufacturer's instructions.

B. Handle and lift products only at designated lift points and by methods to avoid damage to equipment and materials.

C. Store loose granular materials to prevent mixing with foreign materials. Store fabricated products above ground.

D. Protect products subject to discoloration or deterioration.

E. Store and protect products which are subject to damage by the elements and according to manufactures instructions.

F. Traffic control required for all deliveries to and from the Project Site shall be the responsibility of the Contractor. All safety measures are the sole responsibility of the Contractor.

3.02 Storage and Handling of Equipment and Materials

A. Protect from damage all materials and equipment to be used in the completed facility.

B. Storage and hazardous areas must be protected by a chain link fence around the perimeter of the area. This fencing is in addition to any other fencing required for the Project Site containment.

3.03 Measurement and Payment

A. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 1400 – OPERATION AND MAINTENANCE MANUALS

OPERATIONS AND MAINTENANCE MANUALS

PART 1 – GENERAL

1.01 Section Summary

A. Requirements for preparing Operation and Maintenance Manuals.

1.02 Sequencing and Scheduling

A. Before placing the equipment in operation, all Operation and Maintenance Manuals must be approved by the Engineer.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 Submittal Procedures

A. Submit 2 sets of Operation and Maintenance Manuals for review by the Engineer at least 15 days prior to requesting an inspection for substantial completion.

B. Submit 3 approved and final sets of detailed equipment drawings and explicit instructions on the operation and maintenance of each piece of equipment furnished on the Project at least 15 days before any final inspection.

3.02 Operation and Maintenance Manuals

A. Manuals are required for all equipment, accessories, devices, ect. that require adjustment, maintenance, operation, or repairs by the Owner's personnel, including driver, motors, controls, ect. All information shall be supplied by the appropriate equipment manufacturers, neatly bound in rigid cover ring binders by the Contractor, and properly indexed.

Manuals shall include record shop drawings and copies of factory certified tests. Each manual shall contain at the minimum, the following information where applicable:

1. Operation and Maintenance Manuals shall be clearly identified as operation and maintenance manual.

2. All performance and design characteristics and unit identification, such as model and serial numbers and performance curves.

3. All accessories or options furnished with unit.

4. Complete instructions on lubrication, testing, balancing, ect.

5. List of recommended lubricants.

6. Step-by-step instructions for startup, shutdown, repair and overhaul.

7. Parts list and parts diagram.

8. Wiring diagrams.

9. Control Diagrams.

10. Operating Procedures.

11. Copy of approved/revised shop drawings.

12. Listing of spare parts the Owner should keep on hand as recommended by the manufacturer.

13. Name and phone number of supplier where repair parts or additional information can be obtained.

B. Each manual shall be specifically for the items actually installed. Where manuals show a number of models or options, the manual shall be clearly marked to indicate what was furnished and which instructions apply to the furnished unit.

C. Superfluous information pertaining to other models, options, ect. not furnished shall be clearly crossed out or otherwise eliminated.

3.03 Measurement and Payment

A. All work and costs of this Section shall be incidental to the Project.

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. Section 107.10 – Inert Waste Disposal

2. Section 202 – Removal of Structures, Obstructions, Surfacing, and Miscellaneous Items.

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. Meet with owners of signs and structures for requirements of salvage, storage, and replacement.

I. 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. All holes within 10 feet of sidewalks shall be filled, suitably marked or covered immediately.

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 and Concrete Pavement: Saw pavement full depth, along the removal line. Saw cuts shall be marked by the Engineer.

1. Bituminous pavement may be coulter cut as long as the edges of the cut are straight and uniform.

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 Pavement Reclamation

A. The existing surface shall be utilized until reclaiming has been completed.

B. The Contractor shall provide a 48 hour notice before reclamation shall begin.

C. The existing pavement shall be pulverized and blended to the width and depth shown on the plans in one or more passes so the entire mass of material is uniformly blended/mixed.

D. The Contractor shall not pulverize any more pavement that can be spread, shaped, and compacted in one working day.

E. No additional compensation will be made for any materials, whether on-site or imported, to maintain the drivable surface.

3.08 Remove Curb and Gutter

A. Remove Curb & Gutter – Concrete

1. The Contractor shall saw cut the curb & gutter full depth then remove the section marked by the Engineer. Damage caused by the Contractor to curb not marked for removal shall be replaced by the Contractor.

B. Remove Curb & Gutter – Asphalt

1. The removal section for asphalt curb & gutter shall be considered the curb section plus 18 inches from the face of the curb.

3.09 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.

3.10 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.

3.11 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.

a. Street identification signage shall be maintained at all times due to its importance to the 911 emergency response system.

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.

3.12 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.

3.13 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.

3.14 Measurement and Payment

A. Payment at the Bid Unit Price will be considered compensation in full for all work necessary to complete the Bid Item in full, including removal, salvage, storage, disposal, and reinstallation.

1. Saw Pavement: Per lineal foot (LF), full depth.

2. Saw Curb and Gutter: Shall be paid for by the lineal foot (LF), full depth.

3. Remove Bituminous Pavement: Shall be paid for by the square yard (SY), without regard to thickness.

4. Remove Driveway Pavement: Shall be paid for by the square yard (SY), for the type specified, without regard to thickness.

5. Reclaim Bituminous Pavement: Shall be paid for by the square yard (SY), without regard to thickness.

6. Mill Pavement: Shall be paid for by the square yard (SY), for the depth specified in the Plan. Price shall include the cost for sweeping the surface when milling is complete.

7. Remove Curb and Gutter: Shall be paid for by the lineal foot (LF) as specified for the type of curb and gutter to be removed.

8. Remove Sidewalk: Shall be paid for by the square yard (SY) without regard to thickness.

9. Remove Existing Pipe: Per lineal foot (LF), for the size and type specified on the Plan.

10. Remove Manhole: By each (EA) structure removed.

11. Remove Inlet: By each (EA) inlet removed.

12. Remove Hydrant: By each (EA) hydrant removed.

13. Remove Gate Valve: By each (EA) gate valve removed.

14. Salvage and Reinstall Fence: Per lineal foot, for the size and type specified on the Plan.

15. Salvage and Reinstall Sign: By each (EA).

16. Salvage and Reinstall Mailbox: By each (EA) or lump sum (LS).

B. All other work and costs of this Section shall be incidental to the Project.

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. Section 107.10 – Inert Waste Disposal

2. Section 201 – Clearing and Grubbing

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 activites.

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.

3.07 Measurement and Payment

A. The bid items below shall include removal, loading, hauling, disposing of material, and restoration of depressions.

1. Clearing and Grubbing: Shall be paid for by the square yard (SY).

2. Remove Tree: Shall be determined by measuring the diameter 2 feet above the ground and must be 4” or greater in diameter. Removal shall be measured by each (EA).

3. Topsoil Striping: Shall be incidental to the Project.

4. Remove Brush: Shall be incidental to the Project.

5. Remove windfall/deadfall: Shall be incidental to the Project.

6. Trimming: Shall be incidental to the Project.

B. All other work in this section shall be incidental to the Project.

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

1.03 References

A. American Society of Testing Materials (ASTM)

1. A48 – Specification for Gray Iron Casting.

2. C6 – Specification for Normal Finishing Hydrating Lime.

3. C150 – Specification for Portland Cement Concrete (Rings and Mortar).

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 ¼ inch to a maximum of ½ inch thick. Wipe the inner surfaces of the units clean. Seal around and underneath all castings with mortar.

F. All adjustment units exterior shall be wrapped with Geotextile fabric except sanitary sewer, which shall be wrapped with an exterior chimney seal.

G. No shims of any kind will be allowed for adjustment.

H. 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.

3.04 Measurement and Payment

A. The cost to adjust castings and valve boxes for new structures shall be included in the price of that structure.

B. Adjust Casting: Item shall be paid for by each (EA). The item will include removal and salvaging of existing casting, adjustment units, adhesion material, resetting of casting and all pavement patching items. Each adjustment will only be paid for once, regardless of the number of pavement lifts or sequencing.

C. Adjust Valve Box: Item shall be paid for by each (EA). Item shall include the complete adjustment of valve box including any excavations and pavement patching necessary for adjustment. Each adjustment will only be paid for once, regardless of the number of pavement lifts or sequencing.

D. All other work and costs of this Section shall be incidental to the Project.

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 6 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 ± 3% of optimum.

3. 95% Standard Proctor for areas with no paved or structural improvements. Moisture content shall be within ± 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.

3.06 Measurement and Payment

A. Common Excavation: Shall be measured by the cubic yard (CY) and will include all labor and costs to excavate, load, haul, place and dispose of materials. The Engineer will cross section the original material and final cut and the average end area will be used to compute the volume excavated.

B. Muck Excavation: Shall be measured by the cubic yard (CY) and will include all labor and costs to excavate, load, haul and dispose of materials. The Engineer will cross section the original material and final cut and the average end area will be used to compute the volume excavated.

C. Common Borrow: Shall be measured by the cubic yard (CY) compacted and will include all labor and costs to excavate, load, haul, and place the materials. The Engineer will cross section the original material and final cut and the average end area will be used to compute the volume excavated.

D. Granular Borrow: Shall be measured by the cubic yard (CY) compacted and will include all labor and costs to excavate, load, haul, and place the materials. The Engineer will cross section the original material and final cut and the average end area will be used to compute the volume excavated.

E. Geotextile Fabric: Shall be measured by the square yard (SY) and shall include all costs for placement. No payment for overlap shall be made.

F. All other work and costs of this Section shall be incidental to the Project.

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.

3.04 Measurement and Payment

A. 12” Subgrade Preparation: Shall be measured by the square yard (SY) along the centerline of the road for the width of the roadway 1 foot behind each curb line.

B. All other work and costs of this Section shall be incidental to the Project.

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. No onsite granular material may be used for bedding.

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 Improved Pipe Foundation

A. Conform to NDDOT Spec 816.03B Class 2 Permeable Trench Backfill.

1. No onsite granular material may be used for improved pipe foundation.

2.03 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 ± 3% optimum moisture content except the top 1 foot below the subgrade elevation which shall be compacted to 100 Percent Standard Proctor with ± 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.

3.05 Measurement and Payment

A. Trench Excavation: Excavation and backfill of trench and pipe bedding shall be included in the price of pipe provided.

B. Improved Pipe Bedding: Shall be paid for by lineal foot (LF) 6 inches deep below the pipe bedding. Payment shall include Geotextile fabric. The required overlap and sewing of the joint shall be incidental.

1. For example, if a 2 foot thickness of improved pipe bedding is required, the payment would be for 3 – 6 inch lifts totaling 3 feet of quantity for each lineal foot of pipe installed.

2. No payment will be made unless directed by the Engineer.

3. No payment will be made for rock used for dewatering purposes unless specified.

C. Imported Backfill: Shall be measured by the cubic yard (CY) compacted and will include all labor and costs to excavate, load, haul, and place the materials. The Engineer will cross section the original material and final cut and the average end area will be used to compute the volume excavated.

D. Temporary Bracing or Sheeting: Considered part of excavation costs and no extra payment shall be provided.

E. Dewatering: Shall be considered incidental unless a bid item is provided.

F. All other work and costs of this Section shall be incidental to the Project.

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. C104 – American National Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. C105 – American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

3. C111 – American National Standard for Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

4. C116 – American National Standard for Protective Fusion Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.

5. C151 – American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.

6. C153 – American National Standard for Ductile-Iron Compact Fittings, 3 Inch Through 24 Inch, and 54 Inch Through 64 Inch, for Water Service.

7. C219 – Standard for Bolted, Sleeve-Type Couplings for Plain-End Pipe.

8. C502 – Standard for Dry-Barrel Fire Hydrants.

9. C504 – AWWA Standard for Rubber-Seated Butterfly Valves.

10. C508 – AWWA Swing Check Valves or Waterworks Service, 2 Inch Through 24 Inch.

11. C515 – AWWA Standard for Reduced Wall Resilient-Seated Gate Valves for Water Supply Service.

12. C512 – AWWA Standard for Air Release, Air Vacuum, and Combination Air Valves.

13. C550 – Protective Interior Coating for Valves and Hydrants.

14. C600 – AWWA Standard for Installation of Ductile-Iron Water Main and Their Appurtenances.

15. C651 – AWWA Standard for Disinfecting Water Mains.

16. 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 and Sewer Superintendent and City 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 Minot 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 Ductile Iron Pipe (DIP):

A. All Ductile Iron Pipe shall conform to AWWA C151/A21.51.

B. Cement-mortar lining shall conform to AWWA C104/A21.4.

C. Pipe Class:

1. Class 52: diameters less than 20 inches.

2. Class 51: diameter greater than and equal to 20 inches.

D. Wrap all pipe with pipe encasement material, minimum 8 mil thickness.

E. Ductile Iron Pipe shall only be allowed if design conditions warrant or if approved by the Engineer.

2.03 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. All fittings shall be Ductile Iron with 250 psi working pressure.

C. All fittings shall be fusion bonded epoxy coated, 6-8 mil nominal thickness and shall conform to AWWA C550 and AWWA C116/A21.16.

D. Wrap all fittings with pipe encasement material.

E. 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; or American Darling B-62-B.

C. Two 2-1/2 inch hose nozzles and One 4-1/2 inch pumper nozzle. Nozzle caps shall be attached with metal chains. Pumper nozzle shall face the street.

D. Hose and pumper threads shall conform to City of Minot Standards.

1. Thread number 6038-80430.

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. Fiberglass Flag: Hydrafinder Hydrant Marker, or approved equal.

1. White fiberglass rod, with 4 red reflective bands without a bulb end. Attached to top bolt.

2. 54 inches long, 3/8 inch diameter.

J. Break-off flange with breakable rod.

K. All bolts, nuts, and hardware shall be stainless steel.

L. Hydrants shall be restrained with thrust blocks and mega-lugs or tie rods.

M. Standpipe above traffic flange shall be painted traffic yellow, the bonnet and caps shall be painted red.

N. Maximum fire hydrant spacing shall be 400 feet.

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 Butterfly Valve and Box

A. All butterfly valves shall conform to AWWA C504.

B. Conform to AWWA C504, Class 150B valve shaft diameter.

C. Valve Body: Class 150B valve bodies shall be ASTM A126, Class B gray iron or ASTM A536 Grade 65-45-12 ductile iron.

1. Minimum working pressure of 250 psi.

D. Valve Disk: Shall be seated to provide 360° continuous uninterrupted seating surface.

E. Operator: Shall be traveling nut type sealed, gasketed, and lubricated for underground service.

F. All hardware shall be stainless steel.

G. Test plug shall be brass.

H. Standard 2 inch operating nut.

I. Mechanical joint ends conforming to AWWA C111/A21.11.

J. Butterfly valves and valve boxes shall be wrapped in pipe encasement material.

K. Boxes shall be 3 piece cast iron, screw type.

L. Adjustment for 8 foot – 6 inch cover.

M. Drop style covers, with "WATER" on the top.

2.07 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.

2.08 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.

2.09 Insulation

A. Conform to NDDOT Spec 868.

1. Minimum thickness shall be 3 inches.

2.10 Tracer Wire

A. Conform to the applicable requirements of NEMA W70.

B. Attach to bolt on break off flange of the hydrant.

C. Use #8 copper insulated and rated for underground service.

D. Shall be connected to all valves and fire hydrants.

E. All directional bore tracer wire shall be woven stainless steel.

2.11 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.

2.12 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.

2.13 Water Meters

A. Meters shall be have meter pits with a minimum of 8 foot 6 inch cover to protect against frost and must have a concrete floor.

B. All meters shall be installed with a check valve.

C. Manhole shall follow 2.13C-D of this Section.

2.14 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.

E. Underground Piping for Fire Protection

1. Contact the Minot Fire Department (701-857-4740) with any questions or to witness installation, testing, or flushing of the fire protection system.

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.

F. Attached fiberglass flag to the top of the hydrant using a flange bolt.

G. Deliver to the Superintendent of Water and Sewer an extra hydrant flag for each new hydrant installed.

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
16 Inch	6
18 Inch	6
20 Inch	8
24 Inch	10

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 Marking Tape

A. Tape shall be installed 2 feet above the top of all water mains.

3.08 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.

3.09 Protection

A. Existing hydrants and valves shall only be operated by Public Works Staff; Contractor must contact the Water and Sewer 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.

3.10 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: No 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.

3.11 Measurement and Payment

A. Water Main Pipe: Shall be paid for by the lineal foot (LF) for each size and type specified on the Plans. Costs shall include all materials and labor for installing the pipe complete and in place as specified, including all joint restraints, pipe encasement, marking tape, and granular bedding.

B. Fittings: Shall be paid for by each (EA) for the size and type specified on the Plans or shall be paid for by the pound (LB) as stated by the manufacturer for each fitting. Fittings shall include all materials and labor for the complete installation as specified.

C. Valve and Box: Shall be paid for by each (EA) for the size and type specified on the Plans and shall include all materials and labor for the complete installation as specified.

D. Fire Hydrants: Shall be paid for by each (EA) and shall include all materials and labor costs for the complete installation as specified.

E. Insulation: Shall be paid for by board foot (BD FT) and shall include all materials and labor for the complete installation as specified including granular bedding.

F. Tapping Gate Valve and Sleeve: Shall be paid for by each (EA) for the size and type specified on the Plan and shall include all materials and labor for the complete installation as specified including the Valve Box.

G. Water Meter and Manhole: Shall be paid for by each (EA) for the size and type specified on the Plan and shall include all materials and labor for the complete installation as specified.

H. Transition Coupling: Shall be paid for by each (EA) for the size and type specified on the Plan and shall include all materials and labor for the complete installation as specified.

I. Connect to Existing Water Main: Shall be paid for by each (EA) and shall include all materials and labor for the complete connection including all fittings.

J. Water Main Flushing and Testing: Shall be considered incidental to the installation of water main.

K. All other work and costs of this Section shall be incidental to the Project.

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.

B. Submit to the Engineer for review:

1. Curb stop location (station).

2. Two ties to 2 permanent structures (house corners, manholes, catch basins, fire hydrants. Do not tie curb boxes to gate valves).

3. Length of service line.

B. Final payment will not be made until all service information is submitted to and reviewed by the Engineer.

PART 2 – PRODUCTS

2.01 Water Service Pipe

A. Copper

1. All water service lines 1 inch through 2 inch shall be Copper, Type K, Soft Annealed Temper and shall conform to ASTM B88.

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, all "or equal" submittals shall follow Section 253 of this Specification.

Water Service Appurtenances				
Item	Service Pipe Size	Flared Type Valves & Fittings for Type K Copper Pipe		
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.

2. Stationary rods must be stainless steel with a length of 72 inches.

2.03 Marking Tape

A. Tape shall be 3 inch width, non-detectable type.

B. Tape shall be blue with black lettering with words “CAUTION WATER LINE BELOW”.

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.

2. Place water line marking tape 2 feet above the top of all water service lines.

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 10 inch 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.

L. Supplemental Requirements

1. For any property served by the City of Minot, the City is responsible to the first or master curb stop or gate valve. Subsequent subdivision of the property necessitating a split of the water service and curb stops, gate valves, pipe, and fittings installed after the master curb stop or gate valve shall be the responsibility of the property owner(s).

3.02 Measurement and Payment

A. Water Service Pipe: Shall be paid for by the lineal foot (LF) for the size and type specified on the Plans. Price shall include all pipe, fittings, laying, excavation and backfilling, and testing.

1. Granular backfill around the corporation stop and gooseneck shall be incidental.

2. Fence post markers shall be incidental to installing water services.

B. Service Tap: Shall be paid for by each (EA) for the size and type specified on the Plan. Service tap shall include tapping saddle and corporation stop and all materials and labor necessary to install the service tap.

C. Curb Stop and Box: Shall be paid for by each (EA) for the size and type specified on the Plan.

D. Reconnect Existing Services: Shall be paid for by each (EA) for the size and type specified on the Plan. Price shall include all materials and labor needed to reconnect the existing service to the new water main.

E. All other work and costs of this Section shall be incidental to the Project.

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 4000 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. All drop manholes shall be PVC lined according to manufacturers recommendations with Ameron T-Lock, or approved equal.

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 or approved equal.

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 as approved by the City Engineer.

2.04 Ductile Iron (DIP) Sewer Main Pipe

A. All DIP sewer main pipe and fittings shall conform to AWWA C151.

B. Joints shall be mechanical or push-on type and conform to AWWA C111.

C. All DIP shall have a protective interior lining and shall be PROTECTO 401 Ceramic Epoxy, or equal, and shall be 40 mil thick. The pipe must be marked stating the lining product used and the date applied.

D. All DIP shall be encased in polyethylene pipe encasement.

2.05 Marking Tape

A. Tape shall be 3 inch width, non-detectable type.

B. Tape shall be green with black lettering with words “CAUTION SEWER LINE BELOW”.

2.06 Manhole Chimney Seals

A. Internal Chimney Seals, Cretex Specialty Products or approved equal.

1. The sleeve and extensions shall have a minimum thickness of 3/16 inches and shall be made from a high quality rubber compound conforming to the applicable material requirements of ASTM C-923, with a minimum 1500 psi tensile strength, a maximum 18% compression set and hardness (durometer) of 48+5.

2. The expansion bands shall be integrally formed from 16 gauge stainless steel conforming to the applicable material requirements of ASTM C-923, Type 304, with no welded attachments. The expansion bands shall have a minimum adjustment range of 2-1/2 diameter inches and a positive locking mechanism which secures the band in its expanded position after tightening.

B. External Chimney Seals, Cretex X-Lite External Seal or approved equal.

1. The frame seal shall remain flexible allowing for repeated vertical movement of the frame of not less than 2 inches and/or repeated horizontal movement of not less than 1/2 inch. The sleeve portion of the seal shall have a nominal vertical height of 7 inches, 11 inches, 16 inches or 20 inches. The sleeve shall have a minimum thickness of 60 mils and shall be made from a high quality EPDM rubber suitable for both above and below grade applications. A full circumferential butyl rubber strip conforming to ASHTO M-198 shall be positioned and attached ¼ inch from the bottom inside edge of the sleeve. The butyl rubber strip shall be 1-½ inch wide by ¼ inch thick. A form fitted flange gasket shall be used on the base flange of the manhole frame casting and shall be EPDM rubber with a hardness (durometer) of 40±5. The top compression band shall be "C" shaped to uniformly compress the flange gasket and mechanically lock the seal onto the base flange of the manhole frame casting.

   Both the top and bottom compression bands shall have a take-up mechanism capable of developing a minimum of 400 lbs. of torque.

2.07 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. Unless otherwise specified, the costs for all by pass pumping shall be incidental to the Project.

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 Internal Chimney Seals, Cretex Specialty Products or approved equal.

A. Apply internal chimney seal only after adjustment to finished grade is complete.

B. Install chimney seal as directed by the manufacturer.

C. Secure the chimney seal to the casting and structure to prevent infiltration.

D. Internal chimney seals shall be installed only when directed by the Engineer.

3.08 External Chimney Seals, Cretex X-Lite External Seal or approved equal.

A. Clean surface of casting and adjustment units to allow external chimney seal to fasten to structure.

B. Install external chimney seal as directed by the manufacturer.

C. All sanitary manholes shall have an external chimney seal installed and shall be included in the price for the manhole.

3.09 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.

4. Televising

   a. Contractor must clean all lines prior to televising.

   b. It shall be the contractors responsibility to have the sanitary sewer televised.

c. Contractor shall provide a DVD copy of the televising with audio description and printed stationing of each lateral service accurate to the foot. Each run shall be identified by location and manhole to manhole description.

3.10 Measurement and Payment

A. Sanitary Sewer Pipe: Shall be paid for by the lineal foot (LF) for each size, type, and depth range specified on the Plans. Price shall include all materials and labor necessary for installation, including all excavation, bedding, backfilling, and compaction. Pipe shall be measured from connection point or from center to center of manholes.

B. Manhole Structure: Shall be paid for by each (EA) for the diameter specified on the Plan up to 8 foot in depth. Price shall include manhole structure, frame and casting, external seal, and adjustment to finish grade surface.

C. Manhole Riser Section: Shall be paid for by the lineal foot (LF) for the diameter specified on the Plan greater than 8 foot in depth. Measurement shall be from the rim elevation to the invert of the manhole and shall include all materials and labor necessary for installation.

D. Outside Drop Inlet Pipe: Shall be paid for by the lineal foot (LF) measured from the outlet invert to the inlet invert. Price shall include pipe, pipe encasement, base slab, fittings, and concrete collar.

E. Wyes: Shall be paid for by each (EA) for the size and type specified on the Plan. Price shall include all materials and labor necessary for installation.

F. Riser Pipe: Shall be paid for by the lineal foot (LF) measured vertically from centerline of sewer main to the top of the elevation. Price shall include all materials and labor necessary for installation including concrete reinforcement around the wye and riser.

G. Connect to Existing System: Shall be paid for by each (EA) and shall include all material and labor costs necessary for the connection including fittings, core drilling, and reconstruction of existing inverts.

H. Plug: Shall be paid for by each (EA) for the size and type specified on the Plan.

I. Bulkhead and Abandon Existing Sewer: Shall be paid for by each (EA) bulkhead completed and shall include the cost of filling the existing sewer line as specified.

J. Internal Seal: Item shall be paid for by each (EA). Item shall include the complete installation with all parts necessary for installation. Item shall only be installed when directed to do so by the Engineer.

K. All other work and costs of this Section shall be incidental to the Project.

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.

B. Final payment will not be made until all service information is submitted to and reviewed by the Engineer.

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 Marking Tape

A. Tape shall be 3 inch width, non-detectable type.

B. Tape shall be green with black lettering with words "CAUTION SEWER LINE BELOW".

2.03 Pipe Bedding

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

2.04 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.

1. Sewer pipe marking tape shall be installed as specified in Section 2300.

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 10” gate valve box section with lid shall be installed to protect the cleanout.

3.04 Measurement and Payment

A. PVC Service Pipe: Shall be paid for by the lineal foot (LF) for each size and type specified on the Plan. Measurement will be along the axis of the pipe without regard to fittings. Price shall include all materials and labor necessary for installation including excavation, bedding, necessary fittings, backfill and compaction.

B. Reconnect Existing Service: Shall be paid for by each (EA) connection to the existing service pipe. Price shall include all materials and labor required to make the connection.

C. Cleanout: Shall be paid for by each (EA) cleanout installed as specified.

D. No Bid Items have been provided for plugs or 2 X 4 wood markers, these costs shall be included in the price per lineal foot for PVC Service Pipe.

E. All other work and costs of this Section shall be incidental to the Project.

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 2800 – Subsurface Drainage

E. 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 4000 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 Trash Racks

A. All grates and hardware shall conform to ASTM A153.

B. Size and configuration of bars shall be shown on the detail plate.

C. Trash rack must be securely attached to the end section.

D. Trash rack only required on outlet sections.

2.06 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.

2.07 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 bypass 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. Deviation from grade in excess of 0.05 percent may be cause for rejection and remove and replace pipe at the Contractor's expense.

B. Lay pipe upgrade with tongue/spigot ends pointing in the direction of flow.

C. Joints shall be wrapped with Geotextile fabric 24 inches wide centered on the joint and secured to the pipe.

D. 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 Minot.

E. 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.

3.09 Measurement and Payment

A. Storm Sewer Pipe: Shall be paid for by the lineal foot (LF) for each size, type, class, and depth increment specified. Measurements shall be from center to center of manholes. Price shall include all materials and labor necessary including excavation, pipe, Geotextile fabric, bedding and backfill.

B. Catch Basin, Catch Basin Manhole, and Manhole Structure: Shall be paid for by each (EA) for the size and type specified on the Plan up to 8 feet in depth. Price shall include all material and labor necessary to install the structure including the casting frame and cover, adjusting rings, and adjustment to finish grade.

C. Structure Overdepth: Shall be paid for by the lineal foot (LF) for structure depths greater than 8 feet. Measurement will be made from rim elevation to invert. Price shall include all materials and labor necessary for installation of manhole riser sections.

D. Slotted Drain: Shall be paid for by the lineal foot (LF) for the size and type specified on the Plan. Measurement shall be from the end cap of the CSP to the end of the CSP inserted in the structure. Price shall include all materials and labor necessary including fabricated slotted drain system, rebar, and fittings.

E. Flared End Section with Trash Guard: Shall be paid for by each (EA) for the size and type specified on the Plan. Price shall include all material and labor necessary for installation including tie bars and Trash Guard.

F. Rip Rap: Shall be paid for by the cubic yard (CY) delivered and in place. Price shall include Geotextile fabric and aggregate cushion.

G. Bulkhead: Shall be paid for by each (EA) and shall include all materials and labor necessary for complete installation.

END OF SECTION

SECTION 2800 – SUBSURFACE DRAINAGE

SUBSURFACE DRAINAGE

PART 1 – GENERAL

1.01 Section Summary

A. Underground drainage pipe not covered in storm sewer section.

1.02 Related Sections

A. Section 2000 – Trench Excavation and Backfill.

B. Section 2700 – Storm Sewer.

1.03 References

A. American Society of Testing Materials (ASTM)

1. D1784 – Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (PVC) Compound.

2. F758 – Smooth-Wall Poly (Vinyl Chloride) (PVC) Plastic Under Drain Systems for Highway, Airport, and Similar Drainage.

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

1. Section 816 – Aggregates.

2. Section 858 – Geotextile Fabrics.

PART 2 – PRODUCTS

2.01 PVC Pipe

A. Conform to ASTM F758.

B. Minimum cell classification of 12364C as found in ASTM D1784.

C. Size shall be 6 inch. Minimum pipe stiffness of 46.

D. Joints shall be bell and spigot with either gaskets conforming to ASTM D3212 or PVC cemented joints.

E. Perforations shall be circular at 3-1/4 ±1/4 inch on center. Maximum hole size shall be 3/8 inch with minimum size 3/16 inch, arranged in 4 rows along the full length of the pipe.

2.02 Aggregates

A. Permeable Trench Backfill (class 2) conforming to NDDOT Spec Section 816.

2.03 Geotextile Fabric

A. Separation fabric type S1, conforming to NDDOT Spec Section 858.

PART 3 – EXECUTION

3.01 General

A. Drain tile location is shown on the Plans in a general way. Contractor should expect minor variations in location.

B. Conform to layout on detail plate.

3.02 Pipe Installation

A. Construct to location and elevation shown on the Plan or as directed by the Engineer.

B. Construct trench 18 inches wide and 18 inches deep.

C. Pipe grade shall be as indicated on the Plan but at a minimum not flatter than 1 in 250.

D. Geotextile fabric shall be placed in the trench with the drain tile resting at the bottom. Aggregate shall be placed on top of the pipe up to the surface. Fabric should then be overlapped at the surface.

E. Seal upstream end of pipe.

F. Drain tile shall be connected to storm structure as indicated on the plan. Core drill a connection if a precast connection does not exist. A headwall shall be installed when drain tile daylights to surface.

G. Drain tile cleanouts shall be installed where indicated on the Plan. Cleanout shall include a wye and riser to the surface with an iron cap.

3.03 Measurement and Payment

A. Drain Tile: Shall be paid for by the lineal foot (LF) measured along the axis without regard for fittings. Price shall include excavation, pipe, Geotextile fabric, and aggregate.

B. Connect Drain Tile to Structure: Shall be paid for by each (EA) and shall include all materials and labor necessary for connection.

C. Headwall: Shall be paid for by each (EA) and shall include all materials and labor necessary for installation.

D. Drain Tile Cleanout: Shall be paid for by each (EA) and shall include all materials and labor necessary for installation including the wye, riser, and cap.

E. All other work and costs of this Section shall be incidental to the Project.

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 using the stringline technique to check 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 using the stringline method. 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.

3.05 Measurement and Payment

A. Aggregate Base, Class 5: Shall be measured by the ton (TN) of material compacted in place as determined by weight tickets delivered to the Engineer.

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 0.10 Gal/SY. The Engineer can adjust the quantity as low as 0.05 Gal/SY 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.

    e. Densities per sublot will be taken at random with a minimum of 1 nuclear density (ASTM D2950) per sublot, and the mean density in each sublot shall equal or exceed the specified density. A minimum of 10 Percent of the sublots shall be cored.

5. City required testing shall be followed according to Section 600 – Project Testing Requirements.

6. 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.

7. All pavement surfaces shall be ¼ inch above all curb edges, manholes, gate valves, and inlets.

8. 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. Coulter 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 Leveling

A. Bituminous leveling shall be done by use of a blade in lifts up to 3 inches thick.

B. The leveling course shall be compacted by ordinary compaction methods.

C. The surface to be leveled shall be tacked and the same bituminous pavement material as the next lift shall be used.

D. The area to be leveled shall be detailed in the plan or located in the field by the Engineer.

3.05 Crack Sealing

A. Cracks less than ¾ inch wide shall be routed to a depth not to exceed ¾ of the router bit diameter. Cracks larger than ¾ 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.

3.06 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 City 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. (Incidental)

7. Traffic signs shall be temporarily installed warning traffic with the phrase “Fresh Oil Loose Rock.” The signs shall remain in place until the maintenance period is complete. The number of signs shall be shown in the Proposal. The location shall be determined by the Contractor.

8. Temporary marking tabs shall be required on previously striped streets. Color shall match existing striping. Temporary marking tabs shall meet NDDOT D-704-3 detail. All costs of temporary markings are incidental. Temporary marking tabs shall be removed after permanent markings are in place.

9. 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.

10. 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 City Engineer.

2. Application rates shall be specified on the Plan or as directed by the Engineer.

3.08 Measurement and Payment

A. Bituminous Tack Coat: Shall be paid for by gallons (Gal) measured at 60° F. The costs for cleaning the surface prior to placement shall be included in the cost. The cost for tacking exposed edges of pavement or curb shall be included in the cost of Patching or Hot Bituminous Pavement.

B. Hot Bituminous Pavement: Shall be paid for by the ton (TN) for the aggregate and asphalt binder specified. The price shall include both aggregate and binder material and shall include all materials, labor, and equipment necessary for placement. Contractor shall provide the Engineer weight tickets for measurement.

C. Bituminous Patch: Shall be paid for by the square yard (SY) and shall include the aggregate base, tack, and bituminous pavement as specified in the Plan. Price shall include all materials and labor necessary for complete installation of patch.

D. Bituminous Leveling: Shall be paid for by the ton (TN) and shall include all equipment, labor, and materials as specified including bituminous tack coat.

E. Bituminous Seal Oil, CRS-2P: Shall be paid for by the gallon (Gal) measured at 60° F. The costs for cleaning the surface prior to placement shall be included in the cost.

F. Cover Coat Aggregate, Class 41: Shall be paid for by the square yard (SY), measured in the field.

G. Blotter Sand, Class 44: Shall be paid for by the ton (TN).

H. Crack Sealing – Routed: Shall be paid for by the lineal foot (LF). Price shall include all materials and labor necessary to complete the work including routing, cleaning with compressed air, sealant, and paper protection.

I. Crack Sealing – Non-Routed: Shall be paid for by the lineal foot (LF). Price shall include all materials and labor necessary to complete the work including cleaning with compressed air, sealant, and paper protection.

J. Fog Coat, CSS-1h: Shall be paid for by the gallon (Gal) measured at 60° F. Price shall include all materials and labor necessary to complete the work including cleaning the surface prior to placement.

K. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3100 – PORTLAND CEMENT CONCRETE PAVEMENT

PORTLAND CEMENT CONCRETE PAVEMENT

PART 1 – GENERAL

1.01 Section Summary

A. Construction of Portland Cement Concrete Pavements.

1.02 Related Sections

A. Section 2900 – Aggregate Base Course.

B. Section 3200 – Concrete Curb and Gutter

1.03 References

A. American Society of Testing Materials (ASTM)

1. C33 – Standard Specification for Concrete Aggregates.

2. C150 – Standard Specification for Portland Cement.

3. C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

4. C390 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

5. A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

6. D6690 – Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

B. American Association of State Highway and Transportation Officials (AASHTO)

1. M-295 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

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

1. Section 550 – Portland Cement Concrete Pavement.

2. Section 802 – Portland Cement Concrete.

3. Section 808 – Concrete Admixtures.

4. Section 810 – Concrete Curing Materials.

5. Section 816 – Aggregates.

6. Section 820 – Fly Ash.

7. Section 826 – Joint Materials.

8. Section 836 – Reinforcing Steel.

1.04 Submittals

A. Contractor shall submit the following to the Engineer at least 7 days before construction:

1. Concrete Mix Design.

2. Fly Ash Certification (if used).

3. Steel Reinforcing Certification and Shop Drawings from the Manufacturer.

PART 2 – PRODUCTS

2.01 Cement

A. Conform to NDDOT Spec Section 802 except as modified herein:

1. Cement shall be Type 1 or Type 1A.

2. Concrete shall be class AE: 6 sacks (94lb) per CY.

3. Minimum compressive strength shall be 4000 psi at 28 days.

2.02 Aggregate

A. Fine Aggregate

1. Conform to NDDOT Spec Section 816.01

B. Coarse Aggregate

1. Conform to NDDOT Spec Section 816.02, Size No. 3.

2.03 Water

A. Use only potable water, free of contaminants.

2.04 Fly Ash

A. Conform to NDDOT Spec Section 820 for fly ash requirements.

B. Fly Ash will be permitted for use up to a maximum of 20 Percent by weight.

C. The certifications required in Section 820 will be required if the Contractor elects to use fly ash. The mix design and certification will be reviewed by the Engineer.

2.05 Admixtures

A. Air Entrainment

1. Conform to AASHTO M 182.

2. Air content shall be between 5-8 Percent by volume of the freshly mixed concrete. Concrete with air content below 5 Percent or above 8 Percent will be rejected.

B. Chemical Admixtures

1. Conform to AASHTO M 194.

2.06 Reinforcing Steel

A. Conform to NDDOT Spec Section 836 except as modified herein:

1. All dowel bars and tie bars shall be epoxy coated.

2.07 Concrete Curing Materials

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

2.08 Jointing Materials

A. Conform to NDDOT Spec Section 826.02A, Hot Applied Joint Sealant, Type 1.

PART 3 – EXECUTION

3.01 Pavement Installation

A. Conform to NDDOT Spec Section 550 except as modified herein:

1. Rumble strips shall not be installed unless called for in the Plans.

2. Silicon Sealants shall not be used. All joint sealants shall be hot poured type.

3. The Contractor is not required to imprint information required in Section 550.04.J.7.

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

5. Profile Index pay adjustments shall not be used. Areas of excess roughness shall be removed and replaced at the expense of the Contractor.

6. Pavement thickness shall not vary by more than 0.3 inches. Pavement that is deficient by 0.3 inches or more shall be removed and replaced at the expense of the Contractor.

7. Reinforcing steel shall not be more than ½ inch out of specified tolerance. Reinforcing steel out of tolerance by ½ inch shall cause the concrete to be rejected and shall be replaced at the expense of the Contractor.

8. The Contractor shall stamp the pavement on each side of all expansion joints with the Contractor's name and year the work was done. The stamp shall have letters 5/8 inch high and shall imprint the concrete 1/8 inch deep.

3.02 Field Quality Control

A. Testing shall follow the requirements of Section 600 – Project Testing Requirements.

3.03 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.

3.04 Measurement and Payment

A. _IN Non-Reinforced Concrete Pavement Cl. AE – Doweled: Shall be paid for by the square yard (SY) and shall include all materials and labor necessary for installation of concrete pavement including all reinforcement, curing, sawing, and sealing of joints.

1. High Early Strength Concrete shall not be subject to a price increase from the Contractor unless High Early Strength is specifically requested by the Engineer and no bid item is provided. In that case, the negotiated price for High Early Strength shall not exceed 20 Percent of the Contract price paid per cubic yard for standard concrete.

B. All other work and costs of this Section shall be incidental to the Project.

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 5-8 Percent by volume of the freshly mixed concrete. Concrete with air content below 5 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. Minimum curb radii at intersections is 25 feet.

D. Construct transitions at inlets as shown in the details.

E. Construct Curb ramp and driveway depressions as shown in the details.

F. 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.

G. All curb shall be Type 1, high back curb and gutter. Surmountable curb and gutter will be allowed only with the approval of the City Engineer.

H. 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.

B. Valley gutters shall only be used when it is impractical to install storm sewer and shall be considered a last resort.

C. Concrete valley gutters shall be the only acceptable method of conveying cross street drainage.

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 ¼ of the depth of the concrete.

3. A 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.

3.11 Measurement and Payment

A. Concrete Curb and Gutter: Shall be paid for by the lineal foot (LF) for the type specified on the Plan. Price shall include all materials and labor necessary for installation including reinforcing (where specified), curing, and cold weather techniques (if applicable).

B. 48 Inch Wide Valley Gutter: Shall be paid for by the square yard (SY). Measurement shall be made from end radius to end radius in length multiplied by 4 feet width.

C. All other work and costs of this Section shall be incidental to the Project.

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 an Excavation/Sidewalk Permit from the City of Minot.

D. Private homeowners must include their Home Owner’s Insurance Policy information when applying for a permit.

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 5-8 Percent by volume of the freshly mixed concrete. Concrete with air content below 5 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.

H. The Contractor shall stamp the pavement on each side of all expansion joints with the Contractor's name and year the work was done. The stamp shall have letters 5/8 inch high and shall imprint the concrete 1/8 inch deep.

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 60 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 ¼ 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 1/4 inch, measured with a 10 foot straight edge will be considered unacceptable.

B. Any surface area holding water 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 ½ 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 High Early Strength Concrete

A. High early strength concrete shall be designed to provide a water/cementitous ratio of 0.40.

B. High early strength shall achieve a minimum compressive strength of 3000 psi in 48 hours.

C. High Early Strength Concrete shall not be subject to a price increase from the Contractor unless High Early Strength is specifically requested by the Engineer and no bid item is provided. In that case, the negotiated price for High Early Strength shall not exceed 20 Percent of the Contract price paid per cubic yard for standard concrete.

3.09 Backfilling

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

3.10 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.

3.11 Measurement and Payment

A. Commercial Concrete Driveway Pavement: Shall be paid for by the square yard (SY) 6 inches thick. Price shall include all materials and labor required for installation including aggregate base construction.

B. Residential Concrete Driveway Pavement: Shall be paid for by the square yard (SY) 6 inches thick. Price shall include all materials and labor required for installation including aggregate base construction.

C. 5 Foot Concrete Sidewalk: Shall be paid for by the square yard (SY) 4 inches thick. Price shall include all materials and labor required for installation including aggregate base construction.

D. Truncated Dome Panel: Shall be paid for by the square foot (SF) of units installed in the concrete. Price shall include all finishing and sealing of joints if required.

E. Concrete Median Pavement: Shall be paid for by the square yard (SY) for the thickness specified on the Plan. Price shall include all materials and labor required for installation including aggregate base construction.

F. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3400 – POST MOUNTED TRAFFIC SIGNS

POST MOUNTED TRAFFIC SIGNS

PART 1 – GENERAL

1.01 Section Summary

A. Furnishing, fabricating, and installing highway signs, delineators, and supporting structures.

1.02 References

A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction” (NDDOT Spec.) 2008 Edition, as revised.

1. Section 754 – Highway Signs.

2. Section 894 – Highway Signs and Posts.

B. Manual on Uniform Traffic Control Devices (2003 Edition, as revised).

PART 2 – PRODUCTS

2.01 Sign Material

A. All sign backing material shall comply with section 894.01 of the NDDOT Spec.

1. Flat sheet aluminum: minimum of 0.08 inches thick.

B. All sheeting material shall comply with section 894.02 of the NDDOT Spec.

1. All signs: minimum of Type III High Intensity Prismatic.

C. All pigmented plastic film shall comply with section 894.03 of the NDDOT Spec.

D. All letters, numerals, symbols, and border materials shall comply with section 894.04 of the NDDOT Spec.

2.02 Posts and Hardware

A. All hardware material for signs shall comply with section 894.05.A of the NDDOT Spec.

B. All post materials shall comply with section 894.05.B of the NDDOT Spec.

2.03 Delineators

A. All delineator materials shall comply with section 894.06 of the NDDOT Spec.

2.04 Sampling and Testing

A. All sampling and testing of materials shall be according to section 894.07 of the NDDOT Spec.

2.05 Structures for Overhead Signs

A. Materials used for the structures of overhead signs shall comply with section 894.08 of the NDDOT Spec.

PART 3 – EXECUTION

3.01 Construction Requirements

A. Locating and Positioning Signs and Sign Structures: According to section 754.03.A of NDDOT Spec.

B. Sign Fabrication: According to section 754.03.B of NDDOT Spec.

C. Packaging, Labeling, Handling, and Shipping: According to section 754.03.C of NDDOT Spec.

D. Label (Handling, Storage, and Installation Instructions): According to section 754.03.D of NDDOT Spec.

E. Erection of sign Supports and Delineators: According to section 754.03.E of NDDOT Spec.

1. When sign installation occurs in a permanent surface, a 4 inch PVC sleeve shall be installed around the post for the thickness of the permanent surface. The cost shall be included in the sign price.

F. Mounting Flat Sheet Signs Type III A and III B Sheeting: According to section 754.03.F of NDDOT Spec.

G. Removing and Resetting Signs and Supports: According to section 754.03.G of NDDOT Spec.

H. Remove Sign Foundations: According to section 754.03.H of NDDOT Spec.

I. Overlay Panel Sign Refacing: According to section 754.03.J of NDDOT Spec.

J. Auxiliary Signs: According to section 754.03.K of NDDOT Spec.

3.02 Measurement and Payment

A. Sign: Shall be paid for by the square foot (SF) measured to the nearest tenth of a square foot for the size and type specified on the Plan. Price shall include all materials and labor necessary for sign installation including all hardware, posts, and concrete foundation.

B. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3500 – PAVEMENT MARKINGS

PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 Section Summary

A. Furnishing and installing specified pavement markings at the designated locations.

1.02 Related Sections

A. Section 3000 – Hot Bituminous Pavement.

1.02 References

A. North Dakota Department of Transportation "Standard Specifications for Road and Bridge Construction," 2008 Edition, as revised.

1. Section 762 – Pavement Marking.

2. Section 880 – Pavement Markings.

B. Manual on Uniform Traffic Control Devices (2003 Edition, as revised).

PART 2 – PRODUCTS

2.01 Materials

A. All pavement marking materials used shall be in conformance with Section 762 and Section 880 of the NDDOT Spec except as modified herein:

1. Paint: Section 880.01.

a. Water based meeting Specification 880.01C.

2. Glass Beads: Section 880.02.

3. Plastic Pavement Marking Film: Section 880.03.

4. Preformed Plastic Marking Film: Section 880.04.

5. Preformed Patterned Pavement Marking Film: Section 880.05.

6. Short Term Pavement Marking: Section 880.06.

7. Construction Zone Marking: Section 880.07.

8. Raised Pavement Markers: Section 880.08.

9. Epoxy Paint Pavement Marking: 880.09.

a. Type 1 epoxy paint.

2.02 Equipment

A. All equipment used for the installation of pavement markings shall be in compliance with section 762.03 of the NDDOT Spec.

PART 3 – EXECUTION

3.01 General

A. A project layout of the pavement striping and marking shall be prepared and submitted to the Engineer for approval 48 hours before any installation work.

3.02 Preparation

A. Surfaces to which various pavement markings will be applied shall be prepared in such a way as to comply with section 762.04B of the NDDOT Spec.

3.03 Traffic Control

A. All equipment and devices used for traffic control during pavement marking operations shall be in compliance with section 762.04C of the NDDOT Spec.

3.04 Application

A. Pavement Marking Paint & Glass Beads

1. Method of Application, Application Dates and Temperatures, Rate of Application, and Short-term Pavement Markings shall be according to section 762.04.D.1 of the NDDOT Spec.

B. Plastic Pavement Marking Film

1. The application of plastic pavement marking film shall be according to section 762.04.D.2 of the NDDOT Spec.

C. Preformed Patterned Pavement Marking Film

1. The application of preformed patterned pavement marking film shall be according to section 762.04.D.3 of the NDDOT Spec.

D. Pavement Marking Sheeting

1. The application of pavement marking sheeting shall be according to section 762.04.D.4 of the NDDOT Spec.

E. Raised Pavement Markers

1. The installation of raised pavement markers shall be according to section 762.04.D.5 of the NDOT Spec.

A. Epoxy Paint and Glass Beads

1. The application of epoxy paint and glass beads shall be according to section 762.04.D.6 of the NDDOT Spec.

3.05 Inspection and Acceptance

A. The inspection and acceptance of various pavement markings and the correction of defects/penalties will be according to section 762.04.E.1-4 of the NDDOT Spec.

3.06 Measurement and Payment

A. Lines: Shall be paid for by the lineal foot (LF) for the size, type, and color specified on the Plan. Measurement will be by the actual quantity applied as specified.

B. Messages – Grooved: Shall be paid for by the square foot (SF) for the size, type, and color specified on the Plan. Price shall include all materials and labor needed for installation including grooving surface pavement.

C. Mask Pavement Marking: Shall be paid for by the square foot (SF) for all lines and messages shown to be marked on the Plan or as directed by the Engineer.

D. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3600 – STREET LIGHTING

STREET LIGHTING

PART 1 – GENERAL

1.01 Section Summary

A. Street lighting construction requirements and materials.

1.02 References

A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction,” 2008 Edition, as revised.

1. Section 770 – Highway Lighting.

B. National Electric Code, as revised.

C. North Dakota State Electrical Board, recommendations as revised.

D. City of Minot Ordinances, as approved.

E. Serving utility, as recommended.

1.03 Submittals

A. Contractor shall follow submittal instructions found in Section 900 – Submittal Procedures.

1. Before any of the materials are delivered to the job, submit to Engineer complete Shop Drawings for each item indicated.

2. Include catalog numbers, performance data, dimensions and other descriptive information.

3. Shop Drawings may be in the form of printed catalog sheets showing all necessary information and shall be bound together, neatly indexed, and tabbed.

4. Each Shop Drawing folder shall be stamped, initialed, and dated by Contractor to indicate he has thoroughly reviewed them.

5. Shop drawings not in conformance with Specifications will be returned to Contractor without review.

6. Two copies will be retained by Engineer after review and balance will be returned to contractor.

7. Provide Shop Drawing for:

   a. Cable.

   b. Conduit.

   c. Standards.

   d. Luminaires.

   e. Junction boxes.

   f. Feed points.

B. Manuals

1. Upon completion of Work of this Section and as condition of its acceptance, Contractor shall compile one Manual in loose-leaf binder.

2. List project name, date, Contractor's name, address and telephone number on exterior label of Manual.

3. Include an index sheet indicating each major piece of equipment, supplier and supplier's telephone number. Provide tabbed dividers indicating major groupings of equipment.

4. Manual information shall be included for all equipment/material where Shop Drawings are required. Also include all installation, operation and maintenance data packaged with all equipment.

PART 2 – PRODUCTS

2.01 Feeder and Distribution Circuits

A. All feeders and distribution circuits shall be of the multiple type, 120/240 volt, 1N and shall consist of two or three conductors constituting one or two 120 volt circuits. The plans clearly indicate where three wire (2-120 V. circuits) and two wire (1-120 V. circuit) are to be installed.

B. The system shall be laid out as shown on the plans and distribution circuits shall be routed as shown.

C. Individual lamp circuits are to be fused in the base of each lighting standard with Buss type HEB or equal. Tape fuse kits with ½ lapped layer of scotch 88 for a distance of 1½" each side of joint with conductor. Fuse holders to be complete with proper fuse to protect luminaire ballast. The neutral conductor shall be solidly connected, unfused, throughout system.

2.02 Underground Conductors

A. The underground circuit conductors for street light luminaires and receptacles shall be three single conductors or two single conductors, stranded copper, 600 volt, USE insulated, for direct burial.

B. Conductors shall be continuous from pole base to pole base or from feedpoint to pole base. Splicing conductors underground will not be allowed unless designated on plan or approved by Engineer. Conductor to be placed in trench, minimum of 24" below grade.

C. All conductors to be routed into and out of pole base. Conductors in base shall be identified: i.e., Feedpoint No.__- Circuit No.__ and Phases A or B and Neutral. Utilize plastic ear markers for cattle. Mark tab with permanent ink. Print neatly.

2.03 Junction Boxes

A. Provide junction boxes at locations shown on drawings. Junction boxes to be installed in boulevard or as shown on drawings. Top of junction boxes to be same elevation as top of adjacent curb or sidewalk. See detail on drawing.

B. Provide slack loop in conductors not being spliced so conductor can be pulled up out of junction box to a minimum of 24" above ground.

C. Provide Blackburn type USL insulated street lighting connectors for all splicing.

1. No. USL-11 Straight splice

2. No. USL-30 Three conductor splice

3. No. USL-40 Four conductor splice

4. No. USL-50 Five conductor splice

5. No. USL-60 Six conductor splice

D. Tape connector kits with ½ lapped layer of rubber or synthetic rubber tape and one layer of scotch 88 for a distance of 1½" each side of joint.

2.04 Street Light Feed Points

A. Pad-Mounted Feed Points

1. Feed point enclosure to be as shown with two doors, front doors complete with locking device utilizing a padlock. Padlocks to be furnished by City. Enclosure sides and top to be solid - no louvers.

2. Concrete pad to be sized as shown and shall extend a minimum of 6" beyond feed point enclosure on all four sides. Provide 4 x 4 14/14 wire fabric mesh cut to fit around block outs. Provide 1" chamfer all around and down vertical sides to minimum of 2" below grade. Concrete to have a minimum strength of 3000 PSI in 28 days. Minimum of 5.75 bags cement per cubic yard. Concrete pad shall be placed 5 feet behind the back of curb.

3. Electric panel to be rated 120/240 volt with 100 amp two pole main breaker. Provide 40 amp single pole breakers for each 120 volt street light circuit, one 15 amp single pole breaker for control circuit and one 20 amp single pole breaker for receptacle. Paint handle of 15 amp breaker red.

4. Street light relays to be RCOC type MR-UC No. 6342 (N.O. contact). Provide one relay for each three wire street light circuit (2-120V).

5. Provide a single pole switch (1900 box and raised switch cover). Switch to be connected into control circuit to bypass photocell for daytime test of street lights. Mark "Test Switch" with 3/4" x 3" nameplate.

6. Provide duplex receptacle (1900 box and raised cover).

7. Provide ½" x 10' ground rod in blocked out area below cabinet. Bond all conduits, relay cabinets, electric panel cabinet, enclosure and neutral.

8. Provide photo cell for control of relays, Bell No. 1101, or equal. Mount on side of enclosure. Direct photocell to North.

9. Exact field location of pad mounted and pole mounted feed points, as shown on plans, to be determined by Engineer.

10. Nameplates

    a. Photo off-set printed on thermosetting laminated plastic or phenolic core and melamine surface.

    b. Mount in front of feed point with combination of aluminum round head screws and 3M adhesive similar to Type EC-847.

    c. Black background with white characters.

    d. 1-1/2" x 6" with legend:

        “Keep Out” (3/8" letters)

“City of Minot, North Dakota” (1/4" letters)

“Street Light Control” (1/4" letters)

e. Center all legends on nameplate.

B. Service

1. Provide 120/240 volt single phase service from serving utility transformer.

2. Service to be 3 #2 AWG type USE conductors installed direct burial between feed point and serving utility transformer.

3. Install in trench separate from underground street light feeder circuitry. Costs for service lateral to be included with feed point Bid Item, not Trenching Item.

4. Route 2" service entrance stub-out conduit inside of feed point, to panel main circuit breaker via meter socket.

5. Meter socket as per serving utility requirements, including manual bypass.

6. Pad-mounted transformer

a. Provide sufficient conductor length for utility company to terminate at transformer secondary bushings.

b. Provide pad for utility company transformer as required. Coordinate requirement with utility company.

2.05 Street Light Standard Foundations

A. Concrete shall have a minimum design compressive strength of 3000 psi.

2.06 Street Light Standards

A. The street light poles shall be numbered as directed by the City of Minot Traffic Division. Numbers shall be 2 inches tall, black on white background. They shall be UV resistant vinyl outdoor type. Install 5 feet above finished grade, facing the adjacent street.

B. Type A – Fiberglass Round Tapered Direct Burial Pole 14' MH

1. Fiberglass lighting pole shall be round, hollow, and of uniform taper along its length. The pole shall be non-conductive and chemically inert.

2. The butt-end of the fiberglass pole shall be enlarged and square to increase resistance to rotation and provide maximum ground bearing resistance.

3. The pole shall be designed with a minimum safety factor of 2:1 and have no more than a 10% deflection at full wind loading.

4. The pole shall be capable of supporting 1.3 EPA (Effective Projected Area) at 80 mph with a 1.3 gust factor.

5. The pole shall deflect no more than 5% of the above-ground length with 100 pounds of lateral top load. The pole shall be capable of withstanding 450 pounds of top load before failure.

6. The surface of the pole shall have a smooth finish. The finish color shall be Federal Standard Color No. 36231-grey. Coloration will be throughout the entire wall thickness of the pole.

C. Type B – Concrete 29' MH

1. American Concrete Corporation - 800 B28-H66 - Sky Grey.

D. Types C & C-1 – Steel Galvanized Standards 40' MH

1. Steel light standards shall be steel, galvanized, of one or two piece construction. Galvanizing shall be in accordance with ASTM A-123. The shaft shall have only one longitudinal weld and shall have a minimum yield strength of 50,000 P.S.I. Shaft may be round or octagonal.

2. The Davit type mast arm shall be constructed of same material and by same method as the shaft. Mast arm shall have a tenon adaptor for luminaire mounting.

3. The anchor shall be a one piece steel casting secured to the lower end of the shaft by two continuous welds. One weld shall be inside the base at the bottom of the shaft and the other shall be on the outside of the shaft at the top of the anchor base. The welded connection shall develop the full strength of the adjacent shaft section. The anchor base shall be complete with bolts, washers, shims and bolt covers with cap screws for attaching covers to base. Grounding lug to be provided inside of base.

4. A handhole shall be provided in shaft opposite the road side of the pole. Hand holes to be a minimum of 4" x 6" with reinforced frame and removable cover. Cover to be secured in place with tamper proof screws. Provide City with a minimum of six (6) tamper proof screw removal tools.

2.07 Street Light Luminaire

A. Type A Luminaire

1. Holophane Utility Luminaire Series with 100 watt HPS regulated HPF ballast, Type III distribution, or approved equal.

2. Holophane Utility Postop Series - 100W HPS - Type III Distribution, Cat. No. PTU100HP12BG3B

B. Type B & C Luminaire

1. Type 'B' shall be a totally enclosed high pressure sodium luminaire with integral high power factor regulated ballast. Luminaries shall be all of one manufacturer similar and equal to:

a. American Electric Lighting

150W HPS - Cat. No. 54-56262-6S or 54-56263-6R

250W HPS - Cat. No. 154-6232-6J or 154-6233-60

400W HPS - Cat. No. 154-6243-8T or 154-6243-60

b. General Electric

150W HPS - Cat. No. M2AR15S1H1GMS31

250W HPS - Cat. No. M2AR25S1H1GMS31

400W HPS - Cat. No. M2AR40S1H1GMS31

2. Type B - concrete pole/6' bracket/150W HPS.

3. Type C - steel pole/Davit arm/250 or 400W HPS.

C. High Pressure Sodium lamps to be 100W - 9500 Lumens, 150W, 16,000 lumens, 250W - 30,000 lumens and 400W - 50,000 lumens. General Electric or Phillips.

D. Luminaires shall consist of head with ballast and socket, and glass (Borax) optical assembly. Heads to be of aluminum casting designed for internal wiring and shall be furnished with 2 inch slip fitter for horizontal mounting. Luminaires shall be adjustable plus or minus five degrees from horizontal.

E. The ballast shall be of an integral high power factor, regulator type, 120 volt with 115 and 125 volt taps provided and suitable for cold weather starting at an ambient temperature of minus thirty degrees F. (-30^{o}F.). Provide data listing start and normal operating currents.

2.08 Post Wiring, Bonds and Grounds

A. All post wiring between cable or neutral wires, and the luminaires or convenience outlet, shall be No. 12 A.W.G. copper stranded, (THWN/THHN) 600 volt cable of the same type specified for the underground distribution circuits.

B. In each post, one feeder lead (hot wire) and one neutral wire shall be run from the cable in the base to each luminaire.

C. The feeder leads to the luminaire shall extend from the cable in the post base through a Buss type HEB in line fuse holder with a type FNM 10 ampere fuse. The fuse housing shall be supported by the conductors at the level of the post hand hole. Sufficient excess conductor length shall be provided to permit withdrawal of the fuse holder through the hand hole for purposes of fuse installation and inspection. The neutral wire shall not be fused.

D. Ground all metal standards. Bond to ground conductor and to ground rod.

PART 3 – EXECUTION

3.01 Lighting System Installation

A. The 120 volt distribution circuits, consisting of single conductor cables, quantity and size as designated on the drawings, installed direct burial underground in boulevards, shall be installed in conduits under the streets and drives and when rising up into feed points.

B. Conductors installed direct burial in trench or in conduit shall be installed to a depth of not less than twenty four inches (24") below finished grade. Under streets, drives and sidewalks conductor shall be installed not less than 24" below underside of concrete, asphalt or hard surface.

C. Provide 2" PVC (heavy wall - Schedule 40) in trench areas designated on plans.

D. Provide steel rigid galvanized conduits under existing hard surfaced driveways, streets and alleys by jacking or heavy wall plastic (PVC) installed with "mole" or drilling device. Conduits shall extend 12" beyond each side of roadway or alley surface. Rigid conduit shall be complete with plastic bushings; PVC conduits to be complete with bell end fittings. Conduits under gravel or dirt driveways or streets to be laid in trench a minimum of 24" below bottom of hard surface or grade.

E. If an obstruction is encountered when "jacking" or "drilling" conduit under a concrete or asphalt street, driveway or alley or for any other reason it becomes impractical to install the conduit in this manner, the Engineer or his authorized representative may grant the contractor permission to cut the street, drive or sidewalk with a concrete saw so conduit can be trenched into place. The width of the concrete or asphalt to be removed and the depth of the saw cutting shall be performed as directed by the Engineer or his authorized representative. No extra payment will be made for cutting the concrete or asphalt. Cost of installing conduit by this method shall be included in the price for 2" conduit jacked or pulled in place. Street "cuts" shall not be started until permission is granted by Engineer - in writing.

F. Where conduits cross streets, drives, etc., a maximum of six (6) conductors may be installed in a single 2" conduit.

G. Conduit shall be sloped to provide drainage. Provide sand pocket at lower end.

H. Rigid steel conduit ends shall be carefully reamed to provide a smooth surface for conductor. Provide plastic bushing on all rigid steel conduit ends. PVC conduit ends shall be terminated with bell type fittings. Close up conduit by inserting a loose stopper plug of 'dry oakum' or similar material to prevent earth from entering the conduit.

I. Two inch (2") PVC conduit shall be provided for the risers at the pad mounted feed points and 2" rigid steel galvanized at pole mounted feedpoints. Do not seal lower end of conduits at pole mounted feedpoints.

J. During installation, the cable shall be handled with care. Do not bend or kink cable to a radius of less than six (6) times cable diameter.

K. All cables run through conduit shall be pulled by hand and shall not be strained in any manner in so doing. Provide a slack loop in conductors prior to entering any conduit that rises vertically.

L. The street light branch circuit feeders consist of two 120 volt circuits routed underground from pole to pole. Street lights are alternated on circuits. Both circuits shall be brought up into pole for splicing and marking.

M. Where conduit or pipe is not used, cable shall be packed in sand to provide a cushion and to facilitate drainage in the following manner; Excavate trench to required depth minimum of 27" (Exception: 48" from feed points in residence back yards to boulevards) then fill with 3 inches of clean, washed sand, leveled and lightly tamped; the three (3) or two (2) single conductor cables shall be laid loosely in the trench and spaced. Conductor crossovers shall be avoided. Contractor shall use a paddle template just ahead of 3" sand cover operation to insure proper spacing. Cover conductors with not less than 3 inches of sand. Sand shall be leveled and lightly tamped about the sides and over the cable. The trench shall then be filled and finished in the regular manner. (See trench detail on plans). Exception: If Engineer approves specific excavation as being free of rock and debris, contractor may use said backfill without sand cushion.

N. Where excavations for cables or conduits are made as above provided, the backfill shall be compacted, in 4" lifts or layers, to density as specified under paragraph on "Tamping".

O. Provide 6" wide red plastic marker tape near top of trench (6" below final grade) in all trenches. Tape to read "Caution - Buried Electric Cable". Cost to be a part of trenching price.

P. This arrangement of circuits requires no splicing of cable underground and splicing will only be allowed in junction boxes, pole bases or feed point cabinets.

Q. A minimum of 10 Percent spare pole/luminaire/lamp assemblies, rounded up to the nearest whole number shall be delivered to the City of Minot unless otherwise stated in the Proposal.

3.02 Street and Sidewalk Crossings

A. When it is necessary to cross under a street or sidewalk, the Contractor shall bore underneath and install a conduit for the utility. If conditions do not allow for a bore, the utility may be open cut but only after written permission is obtained from the City Engineer.

B. All damage caused by utility installation shall be repaired by the Contractor including all settlements caused by open cut or trenchless methods.

3.03 Field Quality Control and Acceptance

A. Each segment of underground circuitry shall be tested with a megohm-meter prior to termination in order to ensure no damage to the conductors or insulation has occurred during installation. Meter shall read infinite resistance at a minimum of 500 volts.

B. The Contractor shall be responsible for the lighting system and any damage or maintenance required prior to final acceptance by the City of Minot. Completion of the inspection checklist and submittal of record drawings to the Engineer shall constitute acceptance by the City of Minot.

3.04 Measurement and Payment

A. Type A Street Light Units: Shall be paid for by each (EA) as specified on the Plan. Price for each unit shall include the following:

1. Luminaire with ballast and 100W HPS lamp.

2. Fiberglass direct burial pole with Post Top Mounting tenon 14.0' MH.

3. Pole wiring and connections to underground circuits.

4. Fuse holder and fuse.

5. Tamped backfill and trim ring.

6. Unit set in place and ready for operation.

B. Copper Circuit Conductors: Shall be paid for by the lineal foot (LF) for the size and type specified on the Plan. Measurement shall be made from center to center of pole, box, or feed point.

C. 2 Inch Conduit: Shall be paid for by the lineal foot (LF) installed by the method specified on the Plan. Cost shall include all materials and labor necessary for installation.

D. Trenching – 27 Inches Deep: Shall be paid for by the lineal foot (LF). Price shall include all materials and labor necessary for completion of the work including sand cushion, marking tape, excavation and backfill.

E. New Feed Point: Shall be paid for by each (EA) as specified on the Plan. Price for each Feed Point shall include the following:

1. Concrete pad.

2. Painted metal enclosure.

3. Panelboard with breakers.

4. Relays.

5. Photocell and bypass switch.

6. Servicing receptacle.

7. Conduit, wire and inter-connections.

8. Meter socket.

F. Spare Poles: Shall be paid for by each (EA) unit delivered to the City of Minot.

G. Spare Luminaries: Shall be paid for by each (EA) unit delivered to the City of Minot.

H. Restoration: Unless specified as a bid item, shall not directly be paid for but shall be included in other items.

I. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3700 – LAWNS AND GRASSES

LAWNS AND GRASSES

PART 1 – GENERAL

1.01 Section Summary

A. Restoration of construction areas using topsoil, seed, mulch, and other materials.

1.02 Related Sections

A. Section 1200 – Temporary Erosion and Sediment Control.

B. Section 1800 – Excavation and Embankment.

1.03 References

A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction,” 2008 Edition, as revised.

1. Section 203 – Excavation and Embankment.

2. Section 708 – Erosion Control.

3. Section 856 – Erosion Control Blanket and Turf Reinforcement Mat.

1.04 Submittals

A. Provide Engineer verification of seed type used on the project.

1.05 Quality Assurance

A. At the end of the warranty period, a final inspection shall be made to determine areas of insufficient growth of the specified seed type. Areas of insufficient growth shall be re-seeded and established at the sole expense of the Contractor.

PART 2 – PRODUCTS

2.01 Topsoil

A. Topsoil shall consist of loose, friable, loamy topsoil free of excess acid, alkali, and objectionable amounts of sod. Topsoil shall have demonstrated the growth of healthy crops or grasses.

2.02 Fertilizer

A. Conform to fertilizer requirements of NDDOT Spec Section 708.02B.1.e. or as modified by the Engineer.

2.03 Seed

A. Seeding in developed urban areas shall conform to the following mixture:

Class V - Urban Seed Mixture		
Common Name	**Bulk Rate lb/acre**	**% of Mixture Component**
Bluegrass – Park	72	60
Ryegrass – Fineleaf Perennial	36	30
Red Fescue, creeping	12	10
Totals	**120**	**100.00**

B. Seeding in areas not regularly maintained shall conform to NDDOT Class II or III seed mixtures as specified on the Plan.

2.04 Sod

A. Conform to NDDOT Spec Section 708.02B.2

2.05 Mulch

A. Conform to NDDOT Spec Section 708.02B.3

2.06 Erosion Control Blanket

A. Conform to NDDOT Spec Section 856.01

PART 3 – EXECUTION

3.01 General

A. Prior to beginning restoration activities, the Contractor will review the site with the Engineer to determine the extent of restoration to take place.

B. The Contractor shall notify the Engineer in advance before placing topsoil in the event that the Engineer will have the topsoil tested.

C. All finish grading activities shall be completed and accepted by the Engineer prior to topsoil placement.

D. The Contractor shall comply with the seeding dates as stated in the NDDOT Spec. The Contractor assumes full risk is he seeds outside the specified seeding dates. All areas not established or damaged due to erosion resulting from seeding outside the recommend dates shall be repaired at no cost to the Owner.

E. No seeding shall occur when sustained wind velocities exceed 20 mph, in standing water, or on frozen ground.

F. Areas of inadequate or non-uniform coverage shall be re-seeded at the Contractor's expense.

3.02 Seedbed Preparation

A. Conform to NDDOT Spec Section 708.02.C.1 except as modified herein:

1. Topsoil shall be placed 6 inches thick, areas that settle or hold water will be repaired by the Contractor.

2. Unless otherwise stated in the Contract Documents, Type C seedbed preparation shall be used.

3.03 Sowing Seed

A. Conform to NDDOT Spec Section 708.02.C.1 except as modified herein:

1. A Brillion seeder is an acceptable piece of equipment for sowing seed as long as it places seed at the specified depth and rate and rolls in a single operation.

2. Seed shall be sown at the rate specified.

3.04 Hydro-Mulch

A. In all urban areas where a manicured lawn will be installed, the seed must be covered with hydro-mulch conforming to NDDOT Spec Section 708.02.C.3.

3.05 Straw Mulch

A. Conform to NDDOT Spec Section 708.02.C.4

3.06 Sod

A. Conform to NDDOT Spec Section 708.02.C.2

3.07 Erosion Control Blanket

A. Shall be installed after the seedbed has been prepared and seeded. The blanket shall be installed according to NDDOT Spec Section 708.03.C.1.

3.08 Measurement and Payment

A. Seeding: Shall be paid for by the square yard (SY) or by the acre (Ac) for the type and class specified on the Plan. Price shall include all materials and equipment necessary for installation including preparation of seedbed, seed, hydro-mulch, disk anchoring and related activities, and maintenance.

B. Erosion Control Blanket: Shall be paid for by the square yard (SY) for the type of blanket specified on the Plan. Price shall include all materials and labor necessary for installation including preparation of seedbed, seed, blanket, staples, and maintenance.

C. Sod: Shall be paid for by the square yard (SY) complete and in place. Price shall include all materials and labor necessary for installation including soil preparation, sod, staking, and maintenance.

D. Topsoil for Type C Seeding: Shall be paid for by the cubic yard (CY) in its original position in the borrow area or in the hauling unit.

E. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 3800 – TRAFFIC SIGNALS

TRAFFIC SIGNALS

PART 1 – GENERAL

1.01 Section Summary

A. Traffic signal construction requirements and materials.

B. Traffic signal design and installation shall fully comply with the NDDOT Standard Specifications for Road and Bridge Construction, except as modified herein.

1.02 References

A. North Dakota Department of Transportation “Standard Specifications for Road and Bridge Construction,” 2008 Edition, as revised.

1. Section 772 – Highway Traffic Signals

2. Section 896 – Highway Traffic Signals.

B. National Electric Code, as revised.

C. North Dakota State Electrical Board, recommendations as revised.

D. City of Minot Ordinances, as approved.

E. Serving utility, as recommended.

1.03 Submittals

A. Contractor shall follow submittal instructions found in Section 900 – Submittal Procedures.

1. Before any of the materials are delivered to the job, submit to Engineer complete Shop Drawings for each item indicated.

2. Include catalog numbers, performance data, dimensions and other descriptive information.

3. Shop Drawings may be in the form of printed catalog sheets showing all necessary information and shall be bound together, neatly indexed, and tabbed.

4. Each Shop Drawing folder shall be stamped, initialed, and dated by Contractor to indicate he has thoroughly reviewed them.

5. Shop drawings not in conformance with Specifications will be returned to Contractor without review.

6. Two copies will be retained by Engineer after review and balance will be returned to contractor.

7. Provide Shop Drawing for:

    a. Cable.

    b. Conduit.

    c. Feed Point Cabinet.

    d. Feed Point Equipment.

    e. Traffic Signal Standards.

    f. Combination Standards.

    g. Traffic Signal Heads.

    h. Pedestrian Heads.

    i. Pedestrian Push Buttons.

    j. Traffic Signal Controller and components

    k. Traffic Signal Controller Cabinet

    l. Video Detection.

    m. Battery Backup System.

    n. Emergency Vehicle Pre-Emption.

B. The Engineer shall provide two detailed sets of the traffic signal cabinet wiring diagrams to the City of Minot. Schematic diagrams of the circuitries shall be included in the wiring diagram submittal.

C. Manuals

1. Upon completion of Work of this Section and as condition of its acceptance, Contractor shall compile one Manual in loose-leaf binder.

2. List project name, date, Contractor's name, address and telephone number on exterior label of Manual.

3. Include an index sheet indicating each major piece of equipment, supplier and supplier's telephone number. Provide tabbed dividers indicating major groupings of equipment.

4. Manual information shall be included for all equipment/material where Shop Drawings are required. Also include all installation, operation and maintenance data packaged with all equipment.

5. All wiring diagrams and schematic diagrams shall be included.

PART 2 – PRODUCTS

2.01 Rigid Conduit

A. Shall conform to NDDOT Spec Section 896.02.

2.02 Conductors

A. Shall conform to NDDOT Spec Section 896.03.

2.03 Pull Box

A. Shall conform to NDDOT Spec Section 896.04.

B. Shall be of a polymer concrete type.

2.04 Saw Slot Sealant

A. Shall conform to NDDOT Spec Section 896.05.

2.05 Feed Points

A. Shall conform to NDDOT Spec Section 896.06.

2.06 Traffic Signal Standards

A. Shall conform to NDDOT Spec Sections 772.03H and 896.07 except as modified herein:

1. Traffic signal system mast arms and shafts shall be painted yellow. The yellow color shall be No. 13538 of Federal Standard No. 595.

2. The pole of the traffic signal standard shall be designed to include a transformer base.

3. Transformer bases shall be painted yellow in color.

2.07 Traffic Signal Standard Foundations

A. Shall have a minimum design compressive strength of 3000 psi.

2.08 Traffic Signal Heads

A. Shall conform to NDDOT Spec Section 896.08 except as modified herein:

1. Traffic signal head mounting hardware shall be painted yellow. The yellow color shall be No. 13538 of Federal Standard No. 595.

2. Traffic signal housing shall be painted yellow. The yellow color shall be No. 13538 of Federal Standard No. 595.

3. Traffic signal head indications shall be LED.

4. Traffic signal backplates shall be aluminum and shall be louvered.

5. Traffic signal head backplates shall have a yellow 1-inch wide retroreflective border. The boarder shall be installed around the perimeter of the face of the backplate. Sheeting shall be Type IX reflective sheeting with a smooth surface, a distinct interlocking diamond seal pattern, and orientation marks visible on the face. The border shall have an aggressive pressure sensitive adhesive that is protected by a removable liner. Border shall have a sheeting that consists of prismatic lenses formed in a transparent synthetic resin that is sealed.

2.09 Pedestrian Heads

A. Shall conform to NDDOT Spec Section 896.09 except as modified herein.

B. Pedestrian head indications shall be LED.

C. Pedestrian heads shall be cast aluminum.

2.10 Pedestrian Push Button and Pedestrian Push Button Post

A. Shall conform to NDDOT Spec Section 896.10 except as modified herein:

1. Pedestrian pushbutton posts and pushbutton housing shall be painted yellow. The yellow color shall be No. 13538 of Federal Standard No. 595.

2.11 Traffic Signal Heads

A. Shall conform to NDDOT Spec Section 896.08.

B. Backplates shall be louvered aluminum.

C. Backplates shall be painted black.

2.12 Traffic Signal Controller Cabinet

A. Shall conform to NDDOT Spec Section 896.13 except as modified herein:

1. The traffic signal controller cabinet shall be a NEMA TS-2 cabinet.

2. The signal system shall be metered separately from any lighting feed points.

3. The traffic signal controller cabinet shall be fully compatible with the controller and equipment.

2.13 One spare camera, interface panel, and video detection processor shall be provided to the City of Minot.

B. The traffic signal controller cabinet shall be pad-mounted.

1. Padlocks to be furnished by the City of Minot.

2. Concrete pad shall extend a minimum of 6” beyond the enclosure on all four sides. Provide 4X4 14/14 wire mesh cut to fit around block outs. Provide 1” chamfer all around and down vertical sides to a minimum of 2” below grade. Concrete shall have a minimum strength of 3000 PSI in 28 days. Minimum of 5.75 bags cement per cubic yard. Location of concrete pad and cabinet location to be approved by the Engineer.

C. Each signal system shall be metered separately and shall not include street lighting feedpoints.

2.13 Traffic Signal Controller

A. Shall conform to NDDOT Spec Section 896.14, except as modified herein.

B. The volume density controller shall be a NEMA Standard TS-2 Type 1.

C. The traffic signal controller shall be Econolite and shall utilize Aries software.

D. The controller shall have traffic counting capability.

E. The controller shall be equipped with a battery backup system.

2.14 Battery Backup System

A. Shall be an Uninterruptible Power Supply (UPS) of an “on-line” type and shall provide power conditioning while operating in normal mode and backup mode.

B. The battery backup system shall be sized to provide a minimum of 2 hours of full signal operation and a minimum of 8 hours of flash mode operation when in providing backup power to the traffic signal system.

C. The battery backup system shall have the capability of and the auxiliary contacts necessary to place the traffic signal system in flash mode.

D. The UPS shall incorporate full diagnostic function and full power management.

E. The battery backup system shall be housed in a separate cabinet and be installed on a separate pad from the signal controller cabinet. The location of the cabinet shall be approved by the Engineer. The cabinet shall be of natural aluminum finish.

2.15 Emergency Vehicle Pre-Emption (EVP)

A. Shall conform to NDDOT Spec Section 896.17, except as modified herein:

1. Shall be Opticom™.

2. Shall be entirely compatible with existing EVP equipment used in the City of Minot.

3. The Contractor shall notify the City of Minot Fire Chief of EVP testing and date of operation.

2.16 Video Detection System

A. The video detection system shall utilize Aeries software and be fully compatible with the traffic signal controller.

B. Each camera in the video detection system shall IP-addressable.

C. The video detection system shall have the capability to support a number of cameras equivalent to the number of approaches into the intersection.

D. The system shall be designed to withstand and operate in all weather conditions.

E. The video detection system shall accurately detect all vehicles.

F. The video detection system shall transmit real-time, continuous, digital video to a remote computer utilizing digital subscriber lines (DSL). Each video camera at the intersection shall exhibit these digital video capabilities.

G. Digital streaming shall be MPEG-4 video output.

H. Shall be capable of traffic data collection.

I. Housing for each camera shall be a completely dust and water-tight NEMA-4 enclosure.

J. Each camera shall be manufactured with a temperature-controlled faceplate heater.

K. The video detection system and its outputs shall be fully compatible with the controller system.

PART 3 – EXECUTION

3.01 Traffic Signal System Installation shall comply with Section 772 and Section 896 of the North Dakota Department of Transportation "Standard Specifications for Road and Bridge Construction," 2008 Edition, as revised.

A. A minimum of two additional conduit runs of a 2-inch diameter shall be installed in each new controller foundation. The spare conduits shall be capped.

B. A spare conduit of a 2-inch diameter shall be installed in each signal standard foundation. The spare conduit shall be capped.

C. A working slab shall be designed and provided for the controller. The working slab shall be 6 feet wide, extend past the controller foundation at a minimum of 4 feet, and shall tie-in with the controller foundation. The top of the slab shall extend 2 inches above finished grade and, if applicable, matched to adjacent sidewalk grade.

D. All field cables installed by the Contractor shall be labeled. The labeling materials shall be approved by the City of Minot and the labels shall be readable without moving the cables. The cabinet wiring system shall include the following labels, in addition to information required by the NDDOT Standard Specifications:

1. Labels shall be provided for the video detection cameras and shall be located on the detector panel adjacent to their termination point.

2. The signal head control cables shall be labeled on the field wire terminals and shall include the corresponding direction and phase number.

3. The Emergency Vehicle Pre-Emption field wire terminals and the associated indicator lights shall be labeled with the corresponding phase number and direction.

4. The pedestrian push button cables shall be labeled on the field wire terminals and shall include the corresponding direction and phase number.

5. Labels shall be provided for the video detection cameras and shall be located on the detector panel adjacent to their termination point.

E. All conduits entering and exiting pull boxes shall be sealed with duct seal.

F. The traffic counting capability of the controller shall be fully operational.

G. The confirmation light for the EVP shall be at the same location on the mast arm as the EVP detectors.

H. Coordination with the appropriate electrical company shall be the responsibility of the Contractor.

I. Traffic signal system installation shall meet or exceed all requirements set forth by the respective manufacturer.

3.02 Field Quality Control and Acceptance

A. The Contractor shall perform a complete controller conflict monitor test prior to placing the signal in operation. The traffic heads shall not be unveiled prior to the complete controller conflict monitor test being performed. A conflict monitor maintenance record test form will be supplied to the Contractor by the City of Minot. Any instructions that must be followed completely before the signals are placed in operation will be supplied to the Contractor by the City of Minot.

B. Padlocks for the Traffic Control System shall be provided to the Contractor by the City of Minot.

C. The Contractor shall be responsible for the traffic signal system and any damage or maintenance required prior to final acceptance by the City of Minot. Completion of the inspection checklist and submittal of record drawings to the Engineer shall constitute acceptance by the City of Minot.

3.03 Measurement and Payment

A. Saw Slot: Shall be paid by Linear Foot (LF). Price for item shall include saw slot sealant and the installation of the saw slot sealant.

B. Cable Trench: Shall be paid by LF, as measured along the centerline of the trench.

C. Conduit: Shall be paid by LF for each size of conduit. The method used to install conduit shall be included in the bid item.

D. Underground Conductors: Shall be paid by LF.

E. Concrete Foundations: Shall be paid per Each.

F. Pull Box: Shall be paid per Each.

G. Feed Point: Shall be paid per Each.

H. Signal Standard: Shall be paid per Each, to include the signal pole, mast arm, transformer base, and paint.

I. Pedestrian Signal: Shall be paid per Each.

J. Controller Cabinet: Shall be paid per Each.

K. Controller: Shall be paid per Each.

L. Traffic Signal Heads: Shall be paid per each, based on the type of section head.

M. Pedestrian Push Button Post: Shall be paid per each.

N. Emergency Vehicle Pre-Emption Unit: Shall be paid per each.

O. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 4000 – LIFT STATIONS

LIFT STATIONS

PART 1 – GENERAL

1.01 Section Summary

A. Lift station control panels.

B. Related requirements include those established in the General Requirements – Division 1, Division 26, and 33 32 10 - wet pit sewage pump station.

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. Electronic copy of fully commented PLC ladder logic program. Provide password if one was used.

4. Electronic Copy of fully commented operator interface file. Provide password if one was used.

5. 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 control panels will be shipped telemetry ready, but all SCADA programming, configuration, and field commissioning will be by others. 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, as a business entity, 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. The Control Supplier shall have at least 5 references who are owners of successful, Allen Bradley based PLC control panels, provided by the Controls Supplier.

F. 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. Generator Receptacle shall be Appleton ADR20044.

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. Brady or equal.

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 (Mounted on swing door in front of overload relay. Provide rod extension kit that extends from swing door to reset push button on the overload relay.)

5. Pump 2 Overload Reset (Mounted on swing door in front of overload relay. Provide rod extension kit that extends from swing door to reset push button on the overload relay.)

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, floats and telemetry 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 (Qty. 5)

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.

W. Programmable Logic Controller

1. Used for telemetry and for transducer control of the lift station pumps.

2. Allen Bradley Micrologix 1400 1766-L32AWA with memory module. Select base unit and expansion I/O modules based upon I/O count.

3. In Addition to I/O count provide the following spare I/O:

a. Qty. 3 spare digital inputs.

b. Qty. 2 spare digital outputs.

c. Qty. 2 spare analog inputs

X. PLC I/O Count

1. Controls Supplier responsible for programming and testing all PLC I/O.

2. Digital Inputs (May need to be adjusted for more than 2 pumps)

a. Pump 1 Run

b. Pump 1 Seal Fail

c. Pump 1 Thermal Fail

d. Pump 1 Failure (based upon motor starter overload relay)

e. Pump 2 Run

f. Pump 2 Seal Fail

g. Pump 2 Thermal Fail

h. Pump 2 Failure (based upon motor starter overload relay)

i. Control Power Failure

j. UPS Failure

k. Enclosure High Temperature Alarm

l. Enclosure Low Temperature Alarm

m. Alarm Acknowledge

n. Lead-Lag Selector Switch in 1-2

o. Lead-Lag Selector Switch in 2-1

p. Wetwell Low Level Float

q. Wetwell Stop All Pumps Float

r. Wetwell Start Lead Pump Float

s. Wetwell Start Lag Pump Float

t. Wetwell High Level Float

u. Float Mode Active

v. Phase Failure (where applicable)

3. Digital Outputs

a. Pump 1 Start/Stop

b. Pump 2 Start/Stop

c. Wetwell Low Level Alarm Light

d. Wetwell High Level Alarm Light

e. Pump 1 Thermal Fail Alarm Light

f. Pump 2 Thermal Fail Alarm Light

g. Pump 1 Seal Fail Alarm Light

h. Pump 2 Seal Fail Alarm Light

i. Pump 1 Failure Alarm Light

j. Pump 2 Failure Alarm

4. Analog Inputs.

a. Pump Motor Current Transducer

Y. Operator Interface

1. Mounted on inner panel door. Used for alarm viewing, wetwell monitoring, data viewing (ex. pump motor current), and setpoint changes.

2. Provide an LCD Based 6” Grayscale touch screen display, Allen Bradley Panelview or Automation Direct C-more.

Z. System Description (This section to be modified if more than 2 pumps are required)

1. Control the pumps based on the wet well level using a four float system. As the level increases and reaches the start lead float the PLC shall start the lead pump. If the level continues to increase and reaches the start lag float the PLC shall start the lag pump. When the level decreases and reaches the stop pump pumps float the PLC shall stop all of the pumps.

2. A pump alternator selector switch shall be mounted on the inner door. When the switch is in 'AUTO' the pumps shall alternate the lead position after every cycle. When the switch is in the '1-2' position, pump 1 will always be the lead pump and pump 2 will always be the lag pump. When the switch is in the '2-1' position, pump 2 will always be the lead pump and pump 1 will always be the lag pump.

3. The stations high level float is set at an elevation above the elevations used for normal control of the pumps and a low level float is set at an elevation below the elevations used for normal control of the pumps. The floats are used for alarming purposes and to provide a backup control mode of the pumps which is entirely independent of the PLC.

4. Provide the required emergency control circuitry to backup the primary controls. If the wet well level increases and reaches the high level float in the wet well, override the primary controls and start pump 1 followed by pump 2 after an adjustable time delay. Pump 2 is only started if the time delay expires before the low level float is reached. A time delay shall be implemented for the high level float alarm. The high level float alarm time delay shall be adjustable and set such that the station can run in backup mode (between the high and low float) and not generate a high float alarm every time the backup mode cycles between the floats.

5. The backup control mode shall be latched and a door mounted reset push button shall be provided to allow the system to return back to normal operation. A door mounted pilot light shall illuminate when backup mode is active. The backup mode shall be designed such that the PLC is entirely isolated from controlling the pumps once backup mode is active. Any design which merely parallels the backup mode with the PLC control will not be acceptable. Any design which does not provide a latched backup mode will not be acceptable.

6. With the exception of the float mode active light, alarm lights on the inner door and the exterior alarm beacon shall flash until the operator presses the "Acknowledge" push button. Upon acknowledgment, the inner door alarm lights will remain on (solid) until the alarm condition is cleared.

7. PLC shall calculate Total Runtimes for pump 1, pump 2, and pump 1&2. PLC shall calculate daily summary information for pump 1 and pump 2. Summary information includes: daily runtime and daily cycles.

AA. Alarm thermostat

1. Provide a High and Low temperature alarm thermostats for the enclosure.

2. Stego or equal.

BB. Pump Motor Current Monitoring

1. Provide fixed core current transducer for monitoring pump motor current.

2. Provide a separate power distribution block such that the current transducer measures the current going to the motor starters only. Current transducer shall be located upstream of the motor starters.

3. Current transducer shall incorporate true RMS technology and be accurate on distorted waveforms such as VFD or SCR outputs and be accurate under noisy power conditions.

4. Current transducer shall have a 4-20 mA output and will be wired into an analog input on the PLC.

5. The operator interface shall be programmed to allow the operator to view the pump(s) current.

6. Current transducer shall be sized to accommodate the expected full load amps of both pumps running simultaneously.

7. Provide Acuamp ACTR or approved equal.

CC. Power Supplies

1. UL Listed

2. Switching style with 2% maximum point-to-point ripple voltage.

3. Overcurrent protection with automatic reset. Overvoltage protection with 120% minimum shutdown.

4. Environmental: Operating temperature of 14ºF to +140ºF, 20-90% relative humidity (non-condensing non freezing)

5. Din Rail mountable, with 10% voltage adjustment on front.

6. Idec PS5R or equal.

DD. SCADA Provisions

1. The controls supplier shall equip the control panel with the specified components to allow the control panel to be integrated into the City's existing telemetry system. The controls supplier shall provide all necessary equipment for 4-wire FSK or ethernet communication. Controls supplier shall coordinate with City to determine which mode of communication will be used. For 4-wire FSK communication, Bell 202 Modem shall be Data Connect Enterprise model number IG202V-RT modem. Power to communication equipment shall be wired such that it is UPS backed.

2. All SCADA programming, SCADA startup, and SCADA configuration will be provided by owner/contractor.

EE. Use Engraved-Plastic Labels, white letters on black background, to label all components on the inside panel door.

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 / non-SCADA operation. Startup and testing of the SCADA system are not the responsibility of the Controls Supplier. 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. Training shall be provided for a duration of not less than (1) eight (8) hour period.

END OF SECTION

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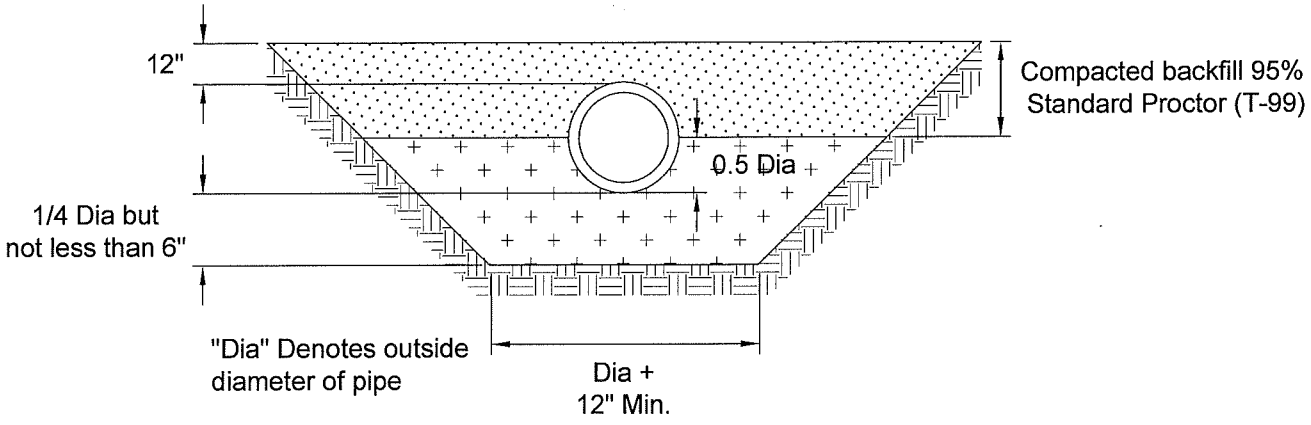
SECTION WAT-	WATER
WAT-1	HYDRANT DETAIL
WAT-2	HYDRANT DETAIL WITH VERTICAL BEND
WAT-3	GATE VALVE AND BOX INSTALLATION
WAT-4	BUTTERFLY VALVE AND BOX INSTALLATION
WAT-5	WATER MAIN WET TAP
WAT-6A	METER PIT 4"
WAT-6B	METER PIT 6"-8"
WAT-7	CONCRETE THRUST BLOCKING
WAT-8	WATERMAIN OFFSET



Load Factor 1.9
CLASS B

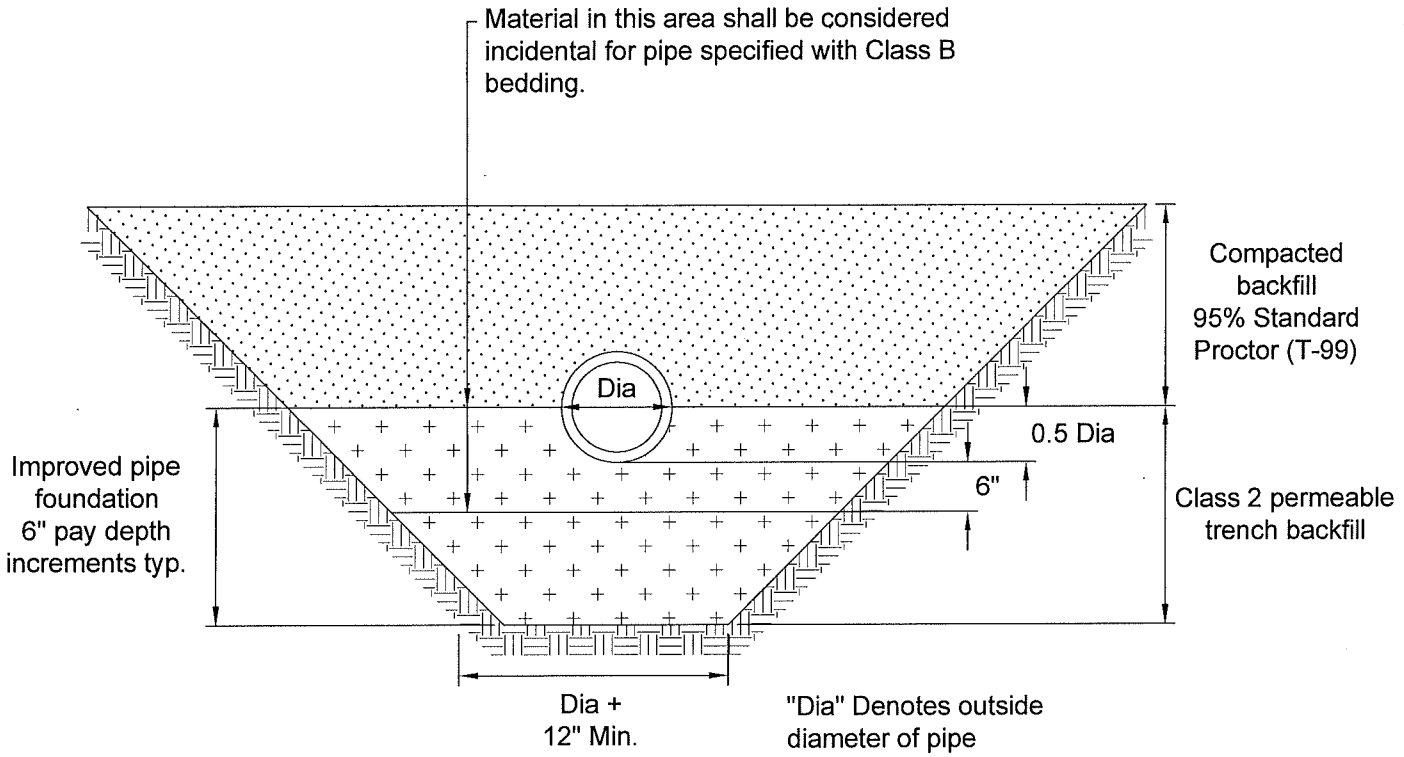
Hand shaped from granular bedding material.

City Plate No.:	BED-1
Last Revision:	11/10/2009
File:	BED_1.dwg

STANDARD DETAILS
BEDDING METHOD FOR RCP or DIP

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\BED_1.dwg

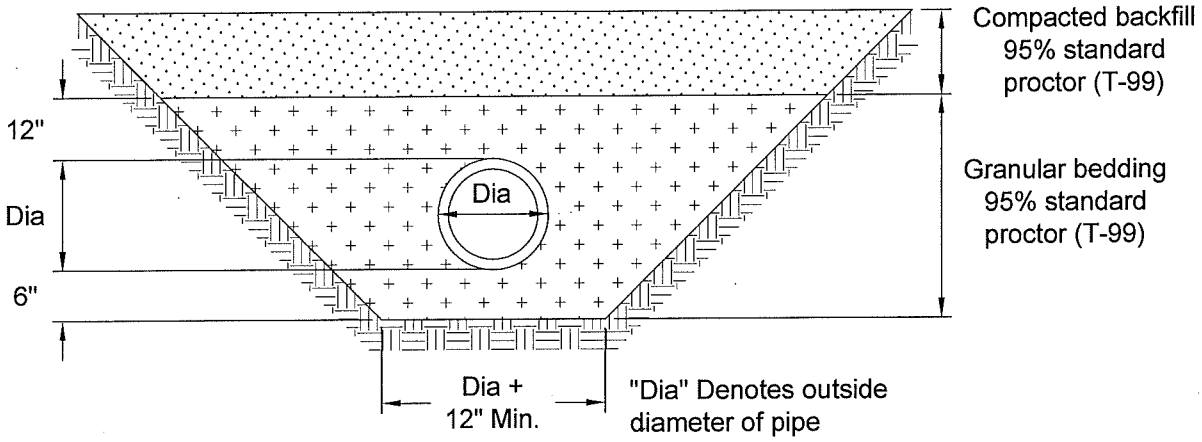


City Plate No.:	BED-2
Last Revision:	11/10/2009
File:	BED_2.dwg

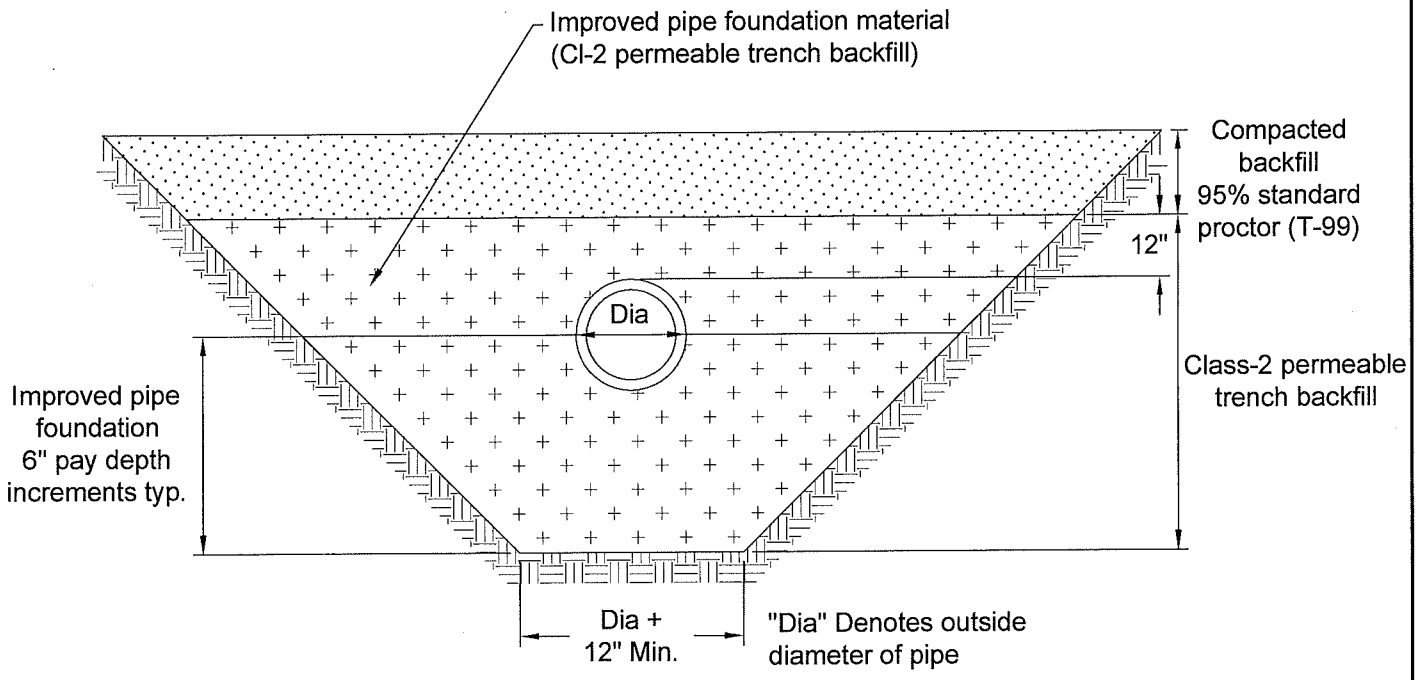
STANDARD DETAILS
IMPROVED FOUNDATION FOR RCP or DIP

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\BED_2.dwg



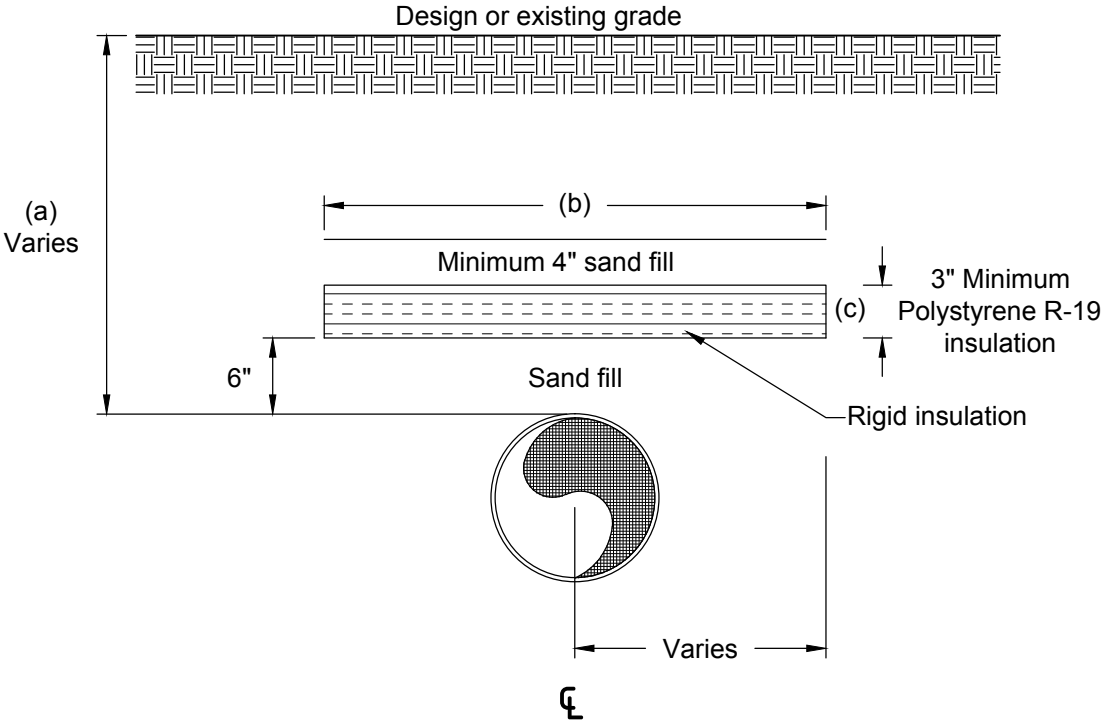
PIPE FOUNDATION & BEDDING IN GOOD SOILS



PIPE FOUNDATION & BEDDING IN POOR SOILS

M:\DETAIL PLATES\BED_3.dwg

City Plate No.: BED-3 Last Revision: 11/10/2009 File: BED_3.dwg	**STANDARD DETAILS** **BEDDING METHODS FOR PVC**	City of Minot ENGINEERING DEPARTMENT



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"

City Plate No.: BED-4
Last Revision: 1/21/2013
File: SAN_4.dwg

STANDARD DETAILS
INSULATION DETAIL

City of Minot
ENGINEERING DEPARTMENT

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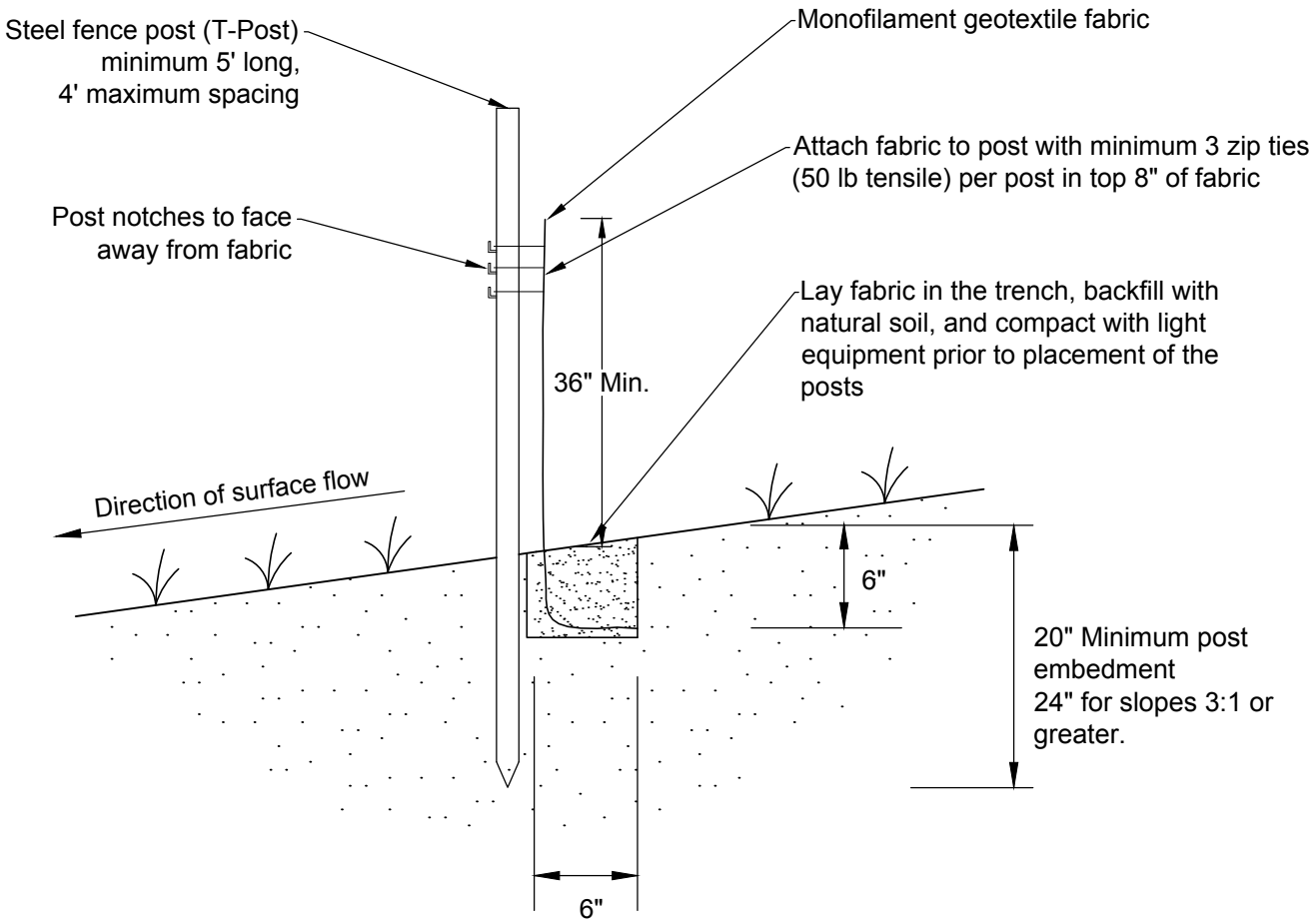
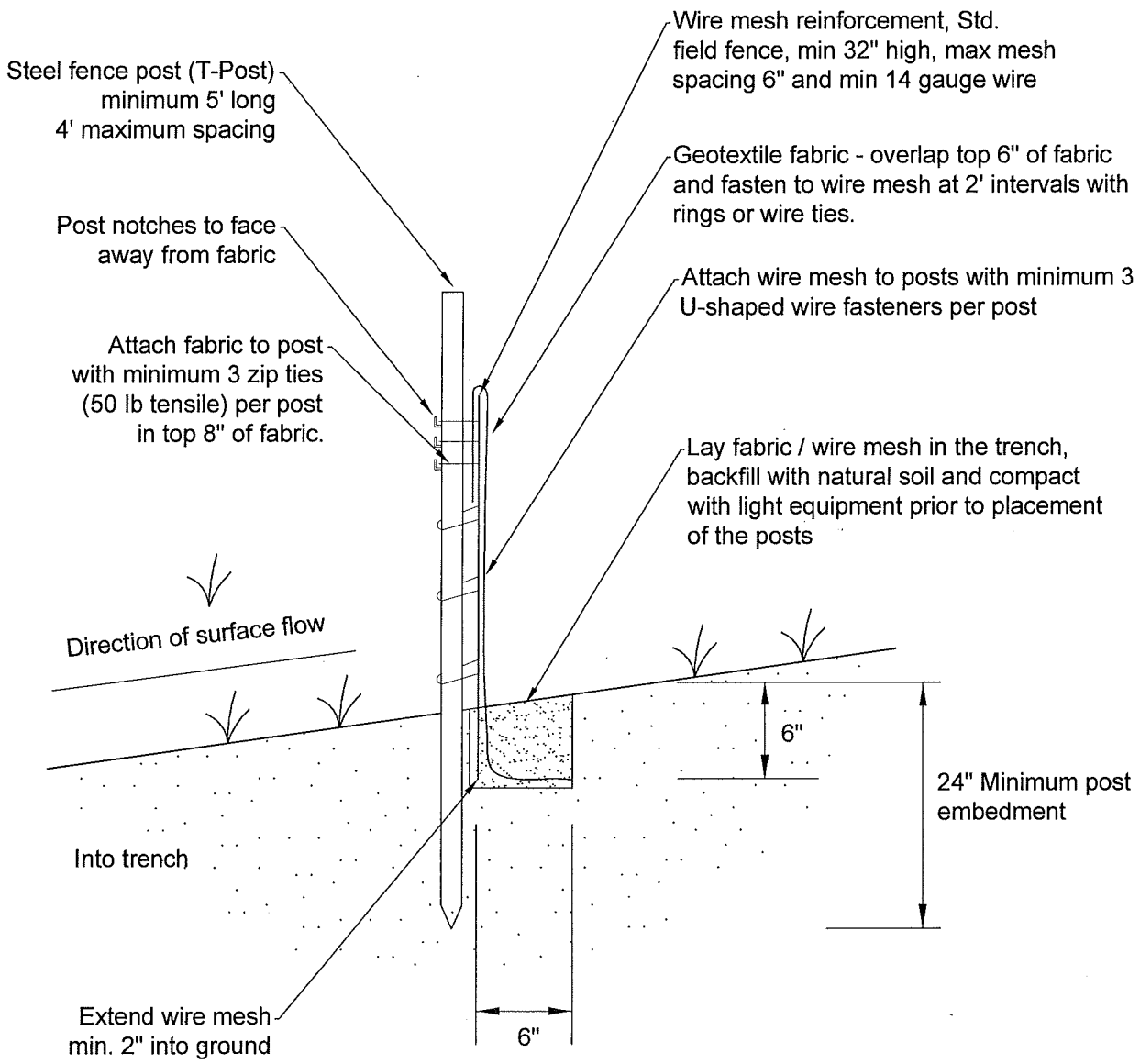


City Plate No.:	ERO-1
Last Revision:	9/24/2010
File:	ERO_1.dwg

STANDARD DETAILS
SILT FENCE
STANDARD

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\ERO_1.dwg

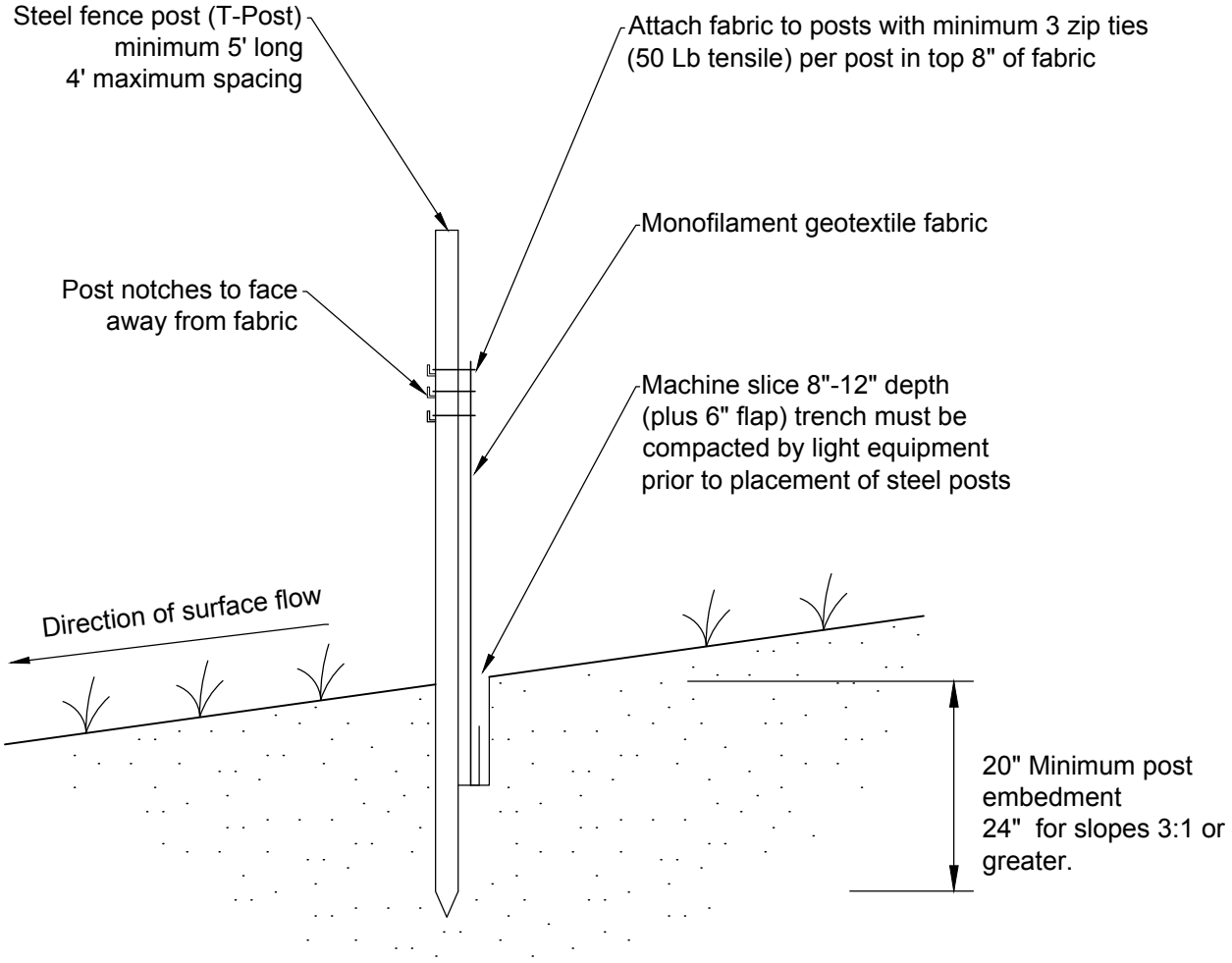


City Plate No.:	ERO-2
Last Revision:	11/10/2009
File:	ERO_2.dwg

STANDARD DETAILS
SILT FENCE
HEAVY DUTY

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\ERO_2.dwg



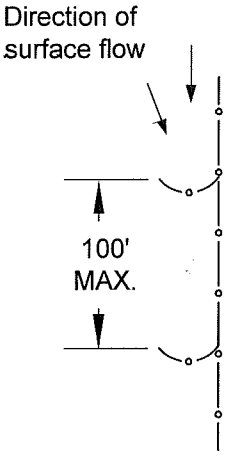
NOTE:
The machine sliced method (this detail) is the standard silt fence installation method. Heavy-duty (ERO-2) or standard (ERO-1) silt fence installation methods should only be used when approved or directed by the City.

City Plate No.: ERO-3 Last Revision: 9/24/2010 File: ERO_3.dwg	**STANDARD DETAILS** **SILT FENCE** **MACHINE SLICED**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\ERO_3.dwg

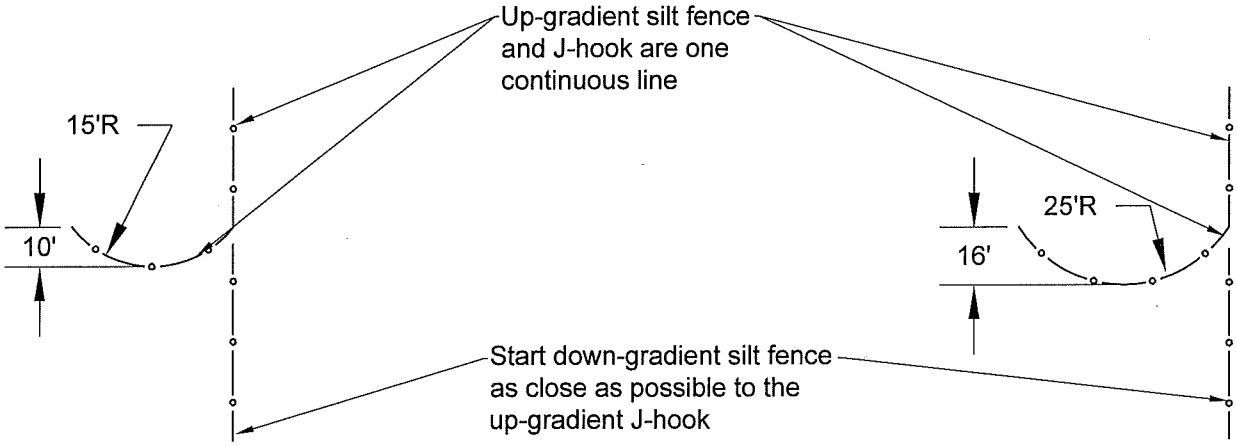
PLAN VIEW

I. SPACING REQUIREMENTS



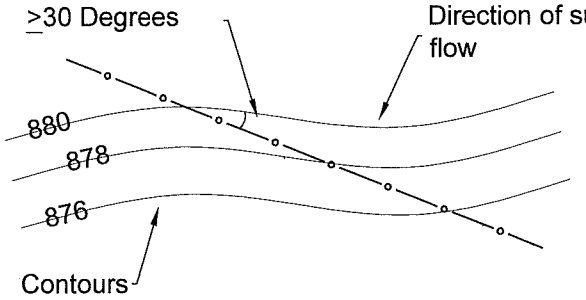
NOTE:
Spacing distances will vary, but are not to exceed 100 feet.

II. SIZING REQUIREMENTS: J15, J25



J15 - For catchment Area <0.25 Acres

J25 - For catchment Area ≥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.

City Plate No.: ERO-4 Last Revision: 11/10/2009 File: ERO_4.dwg	**STANDARD DETAILS** **SILT FENCE** **J-HOOK**	City of Minot ENGINEERING DEPARTMENT

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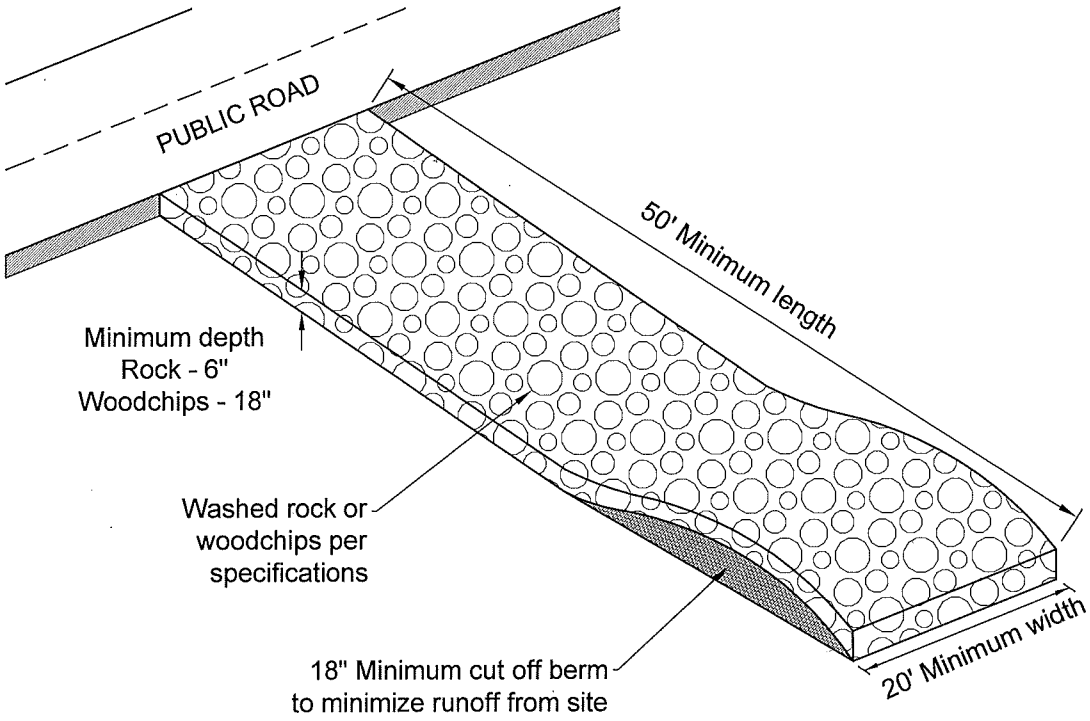


NOTES:

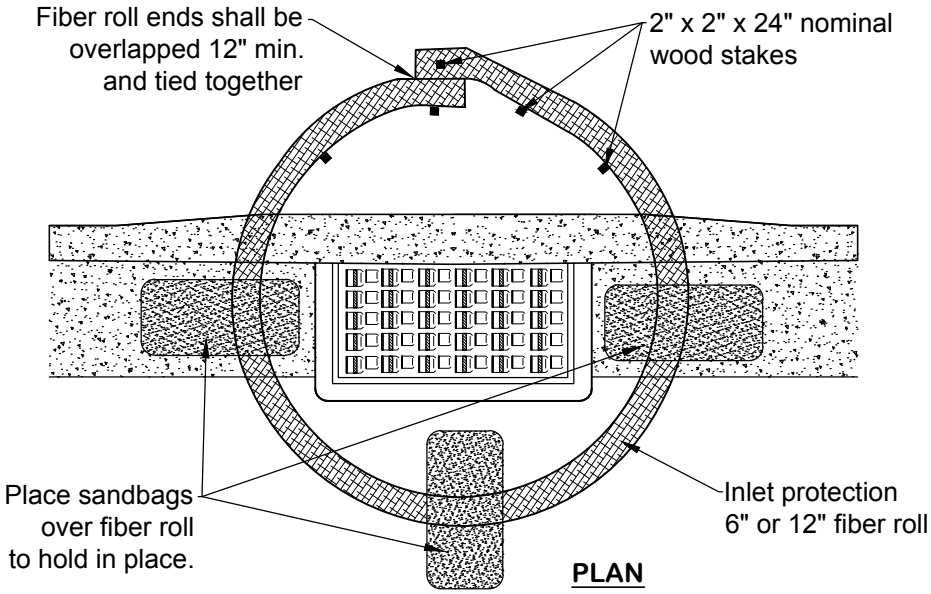
1. Filter fabric shall be placed under rock to stop mud migration through rock.
2. Filter fabric is not required under wood chips.
3. Entrance must be maintained regularly to prevent sedimentation on public roadways.
4. Curb and Gutter must be protected at all times from damage due to equipment or construction activities when crossing curb and gutter.

City Plate No.:	ERO-5
Last Revision:	11/10/2009
File:	ERO_5.dwg

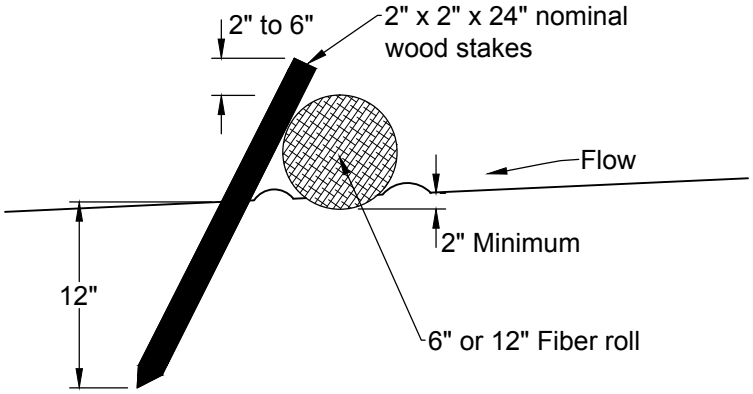
STANDARD DETAILS
CONSTRUCTION ENTRANCE ROCK AND WOODCHIPS

City of Minot
ENGINEERING DEPARTMENT

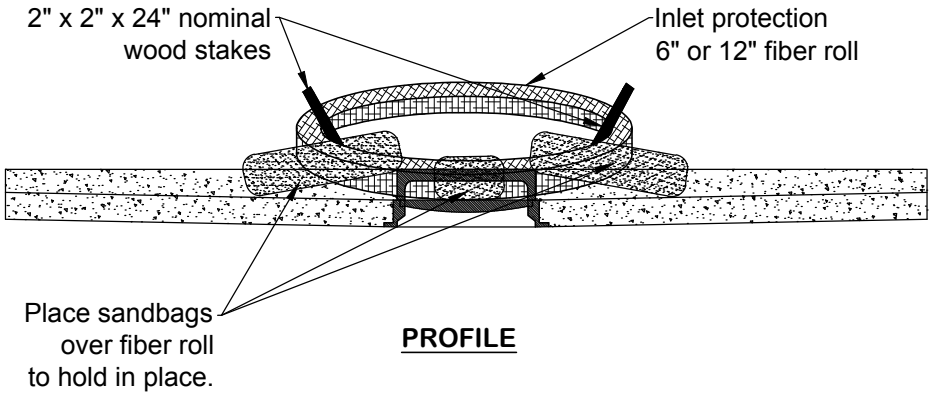
M:\DETAIL PLATES\ERO_5.dwg



PLAN



STAKING DETAIL



PROFILE

City Plate No.:	ERO-6
Last Revision:	9/24/2010
File:	ERO_6.dwg

STANDARD DETAILS
INLET PROTECTION
FIBER ROLL FOR CATCH BASIN

City of Minot
ENGINEERING DEPARTMENT

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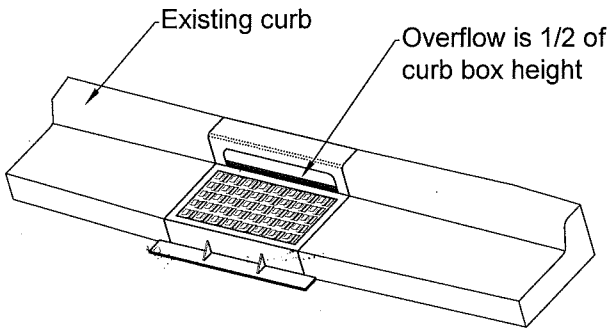
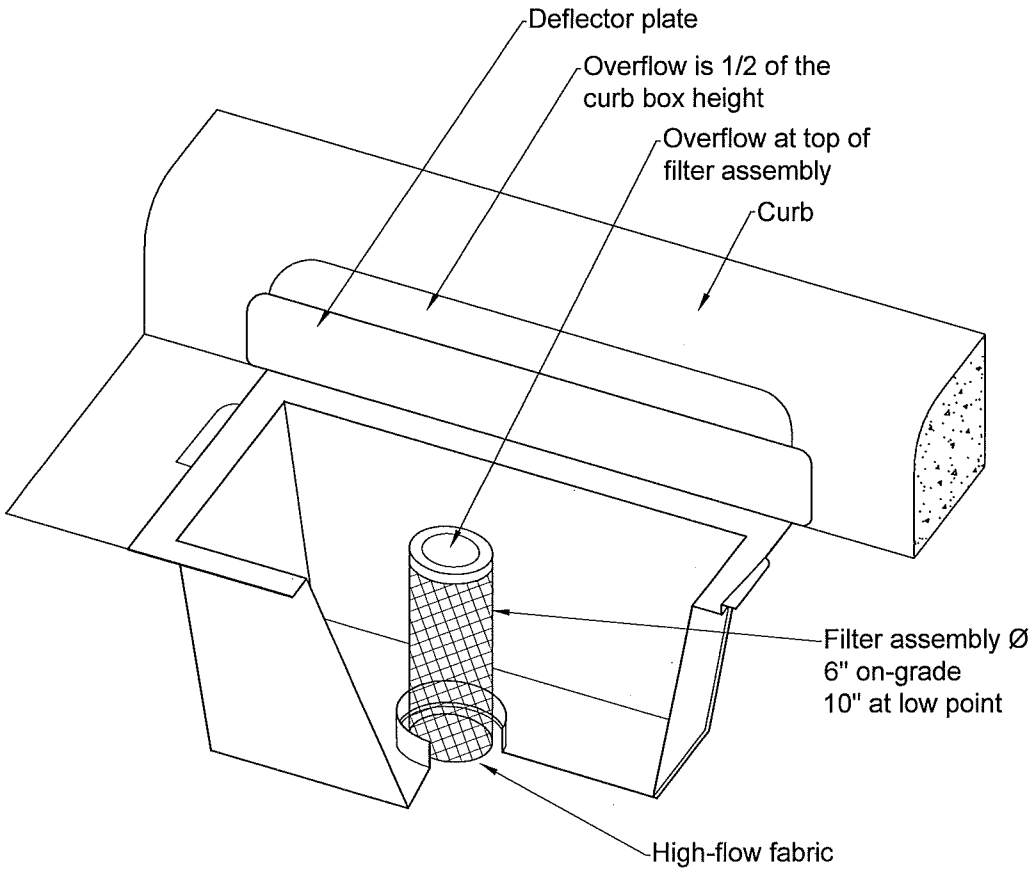


PLAN



Wimco road drain CG-23 high flow inlet protection curb and gutter model or City approved equal.

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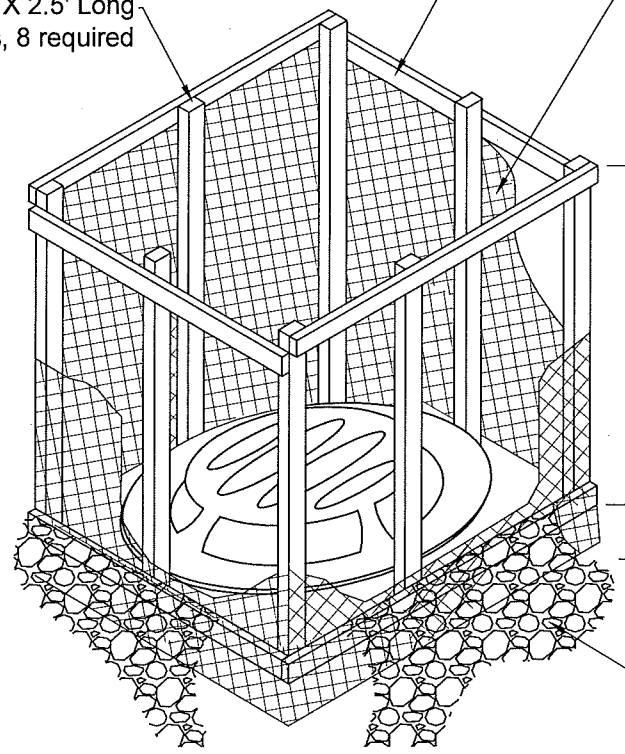
City Plate No.:	ERO-7
Last Revision:	11/10/2009
File:	ERO_7.dwg

STANDARD DETAILS
INLET PROTECTION
CATCH BASIN INSERT

City of Minot
ENGINEERING DEPARTMENT

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



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.

City Plate No.: ERO-8
Last Revision: 11/10/2009
File: ERO_8.dwg

STANDARD DETAILS
INLET PROTECTION
SILT BOX FOR BEEHIVE CASTING

City of Minot
ENGINEERING DEPARTMENT

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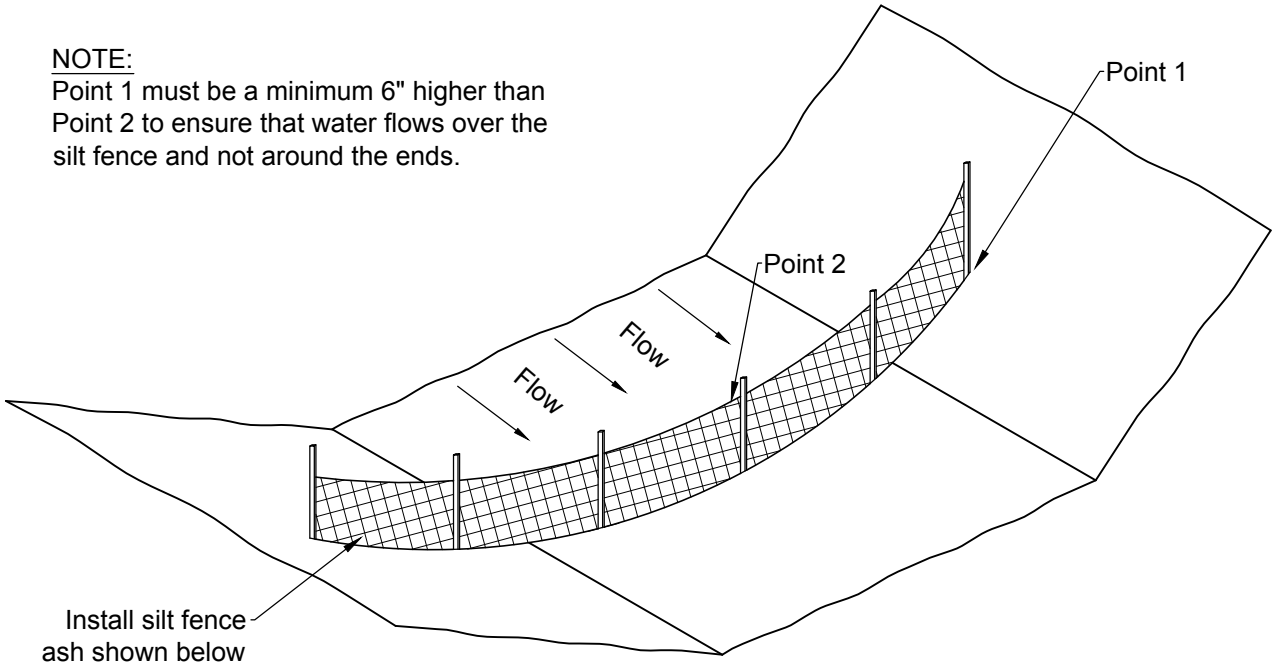
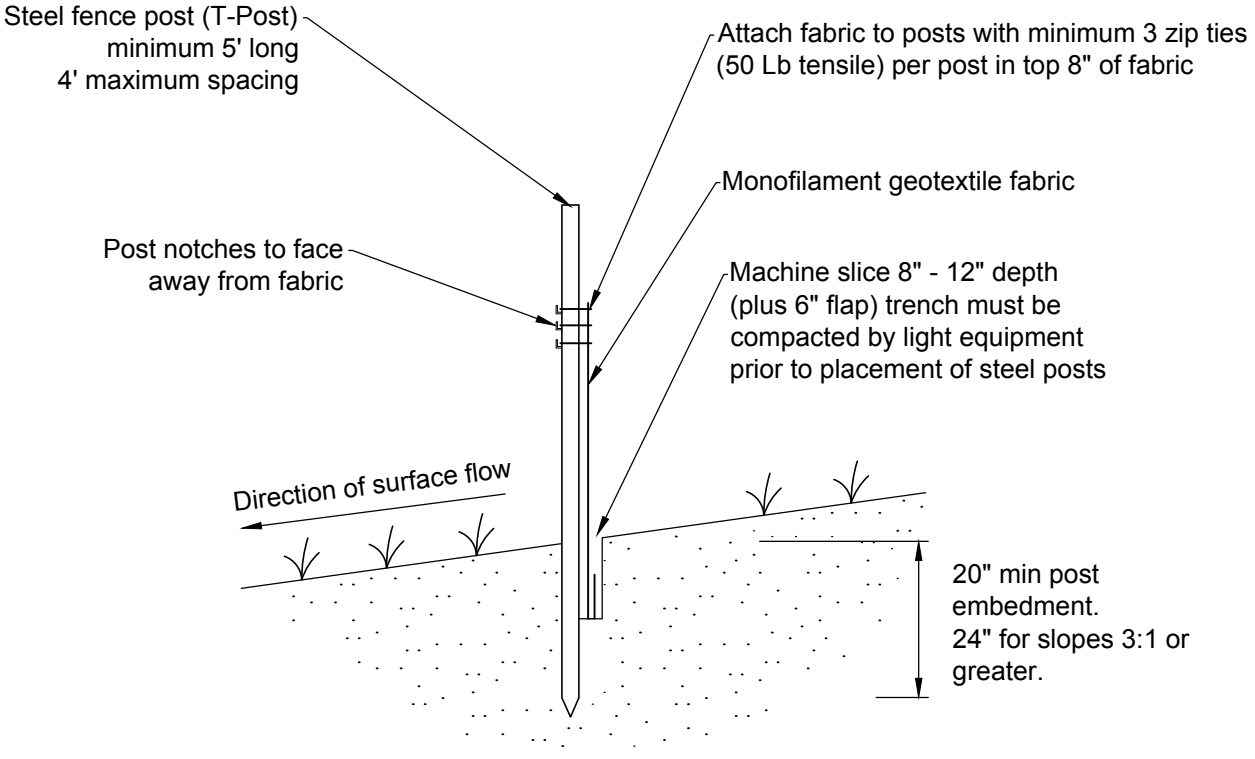
NOTE:
Point 1 must be a minimum 6" higher than Point 2 to ensure that water flows over the silt fence and not around the ends.





City Plate No.:	ERO-9
Last Revision:	9/24/2010
File:	ERO_9.dwg

STANDARD DETAILS
DITCH CHECK
MACHINE SLICED SILT FENCE

City of Minot
ENGINEERING DEPARTMENT

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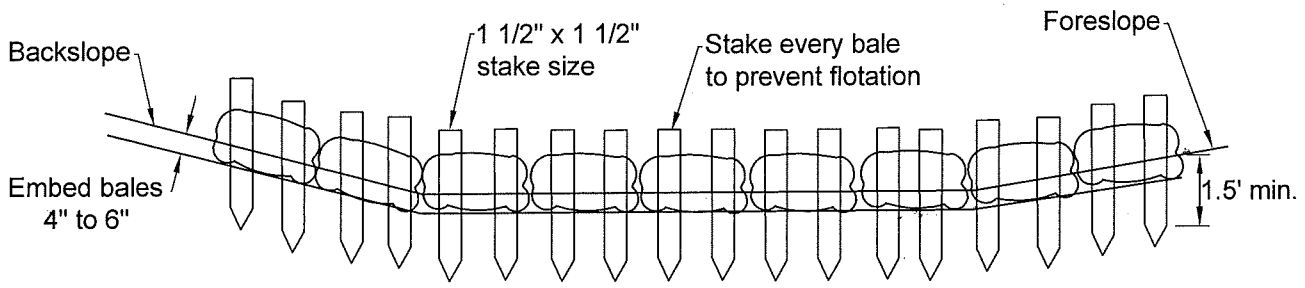
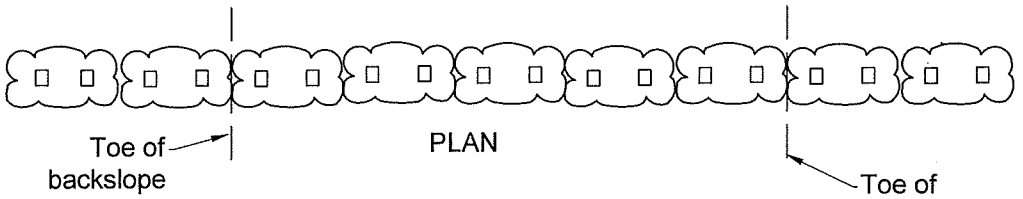
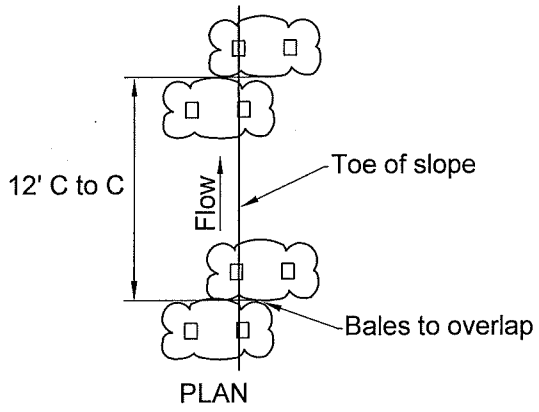


SECTION

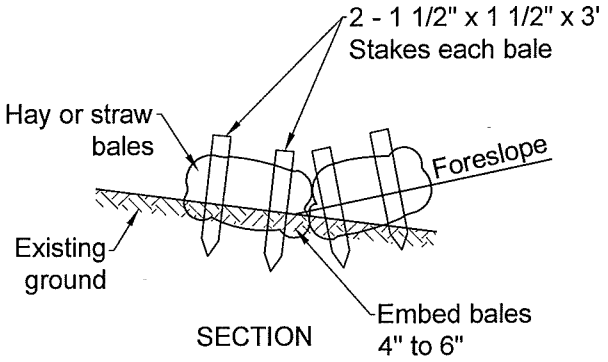


Type A to be used when existing ground slopes towards the highway embankment.

TYPE A



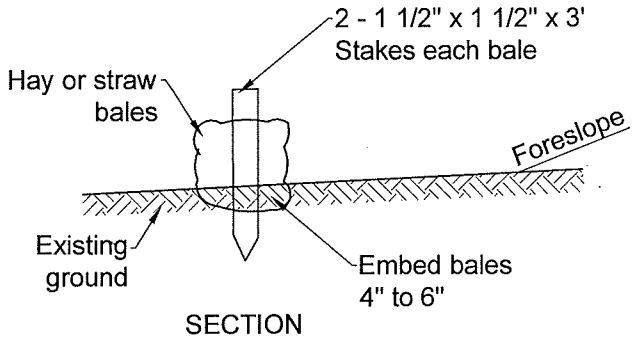
PLAN



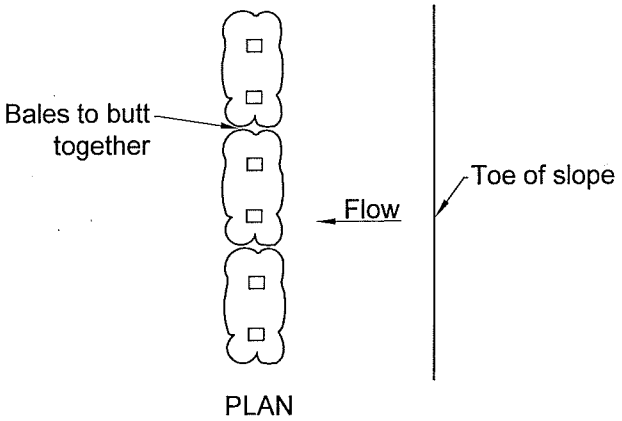
SECTION

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

TYPE B



SECTION

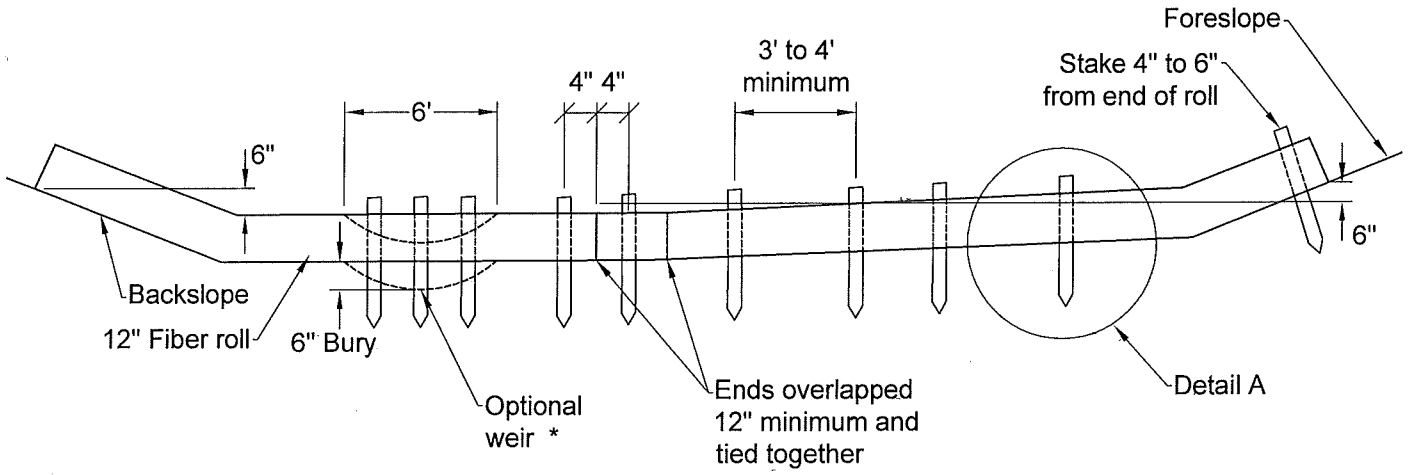


PLAN

TYPE C

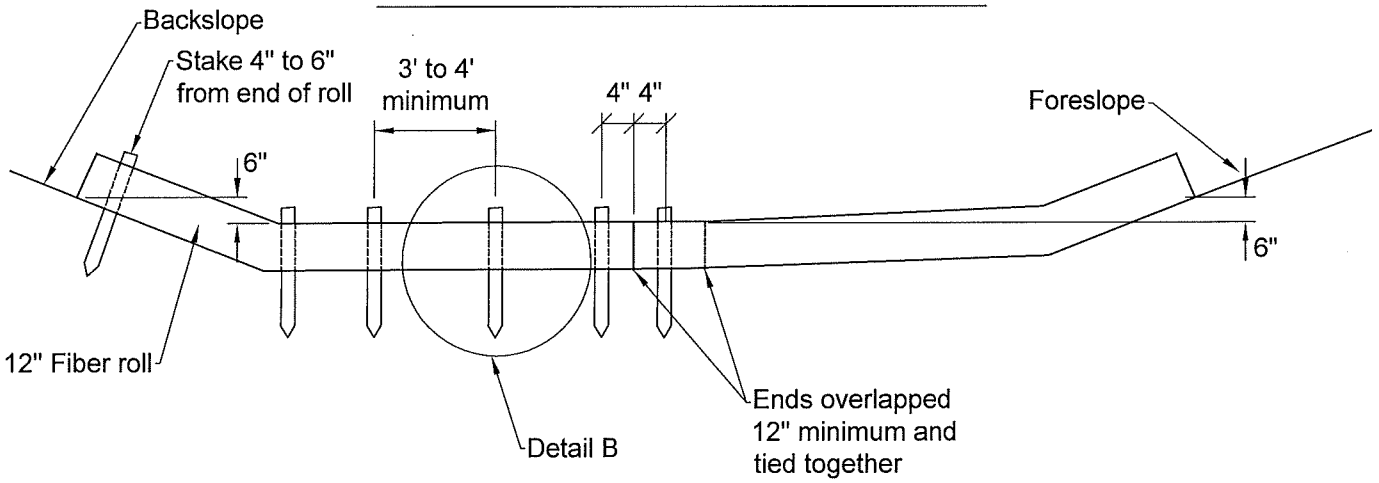
City Plate No.: ERO-10 Last Revision: 11/10/2009 File: ERO_10.dwg	**STANDARD DETAILS** **EROSION CHECKS** **BALED HAY OR STRAW**	City of Minot ENGINEERING DEPARTMENT

M:\DETAIL PLATES\ERO_10.dwg

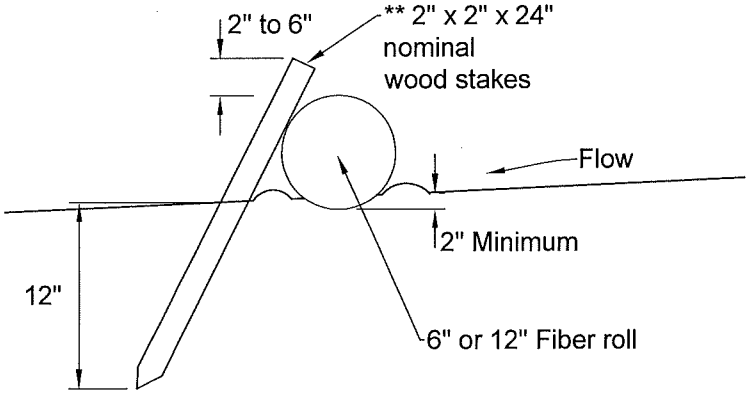


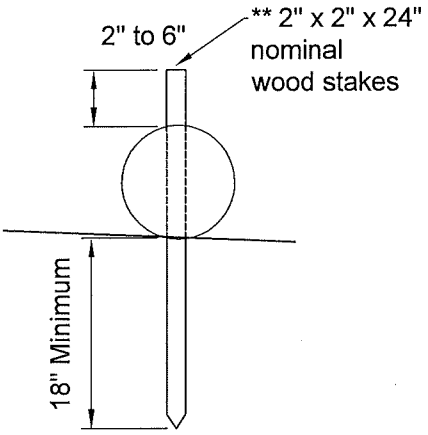
* Optional weir - Use in flat areas where there is potential for water to be backed up on adjacent property.

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.

City Plate No.: ERO-11 Last Revision: 11/10/2009 File: ERO_11.dwg	**STANDARD DETAILS** **EROSION CONTROL** **FIBER ROLL STAKING**	**City of Minot** ENGINEERING DEPARTMENT

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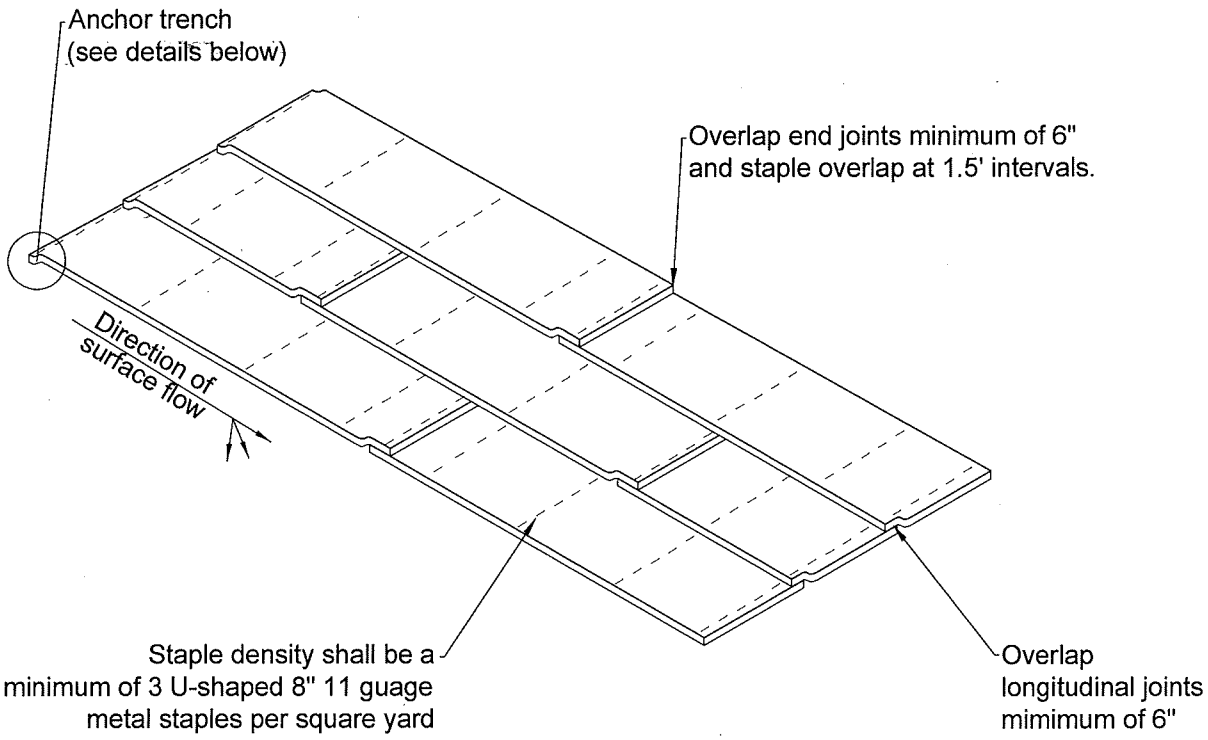
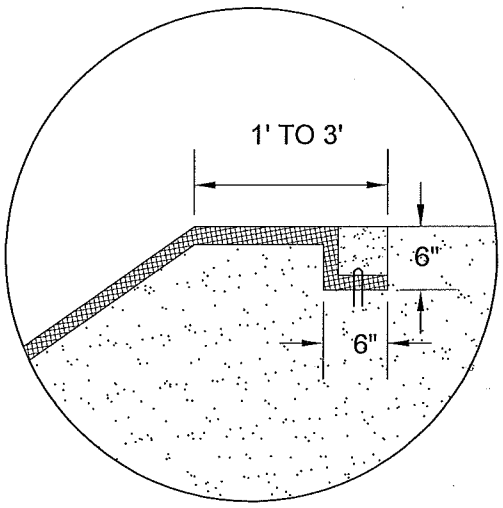


ANCHOR TRENCH

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.



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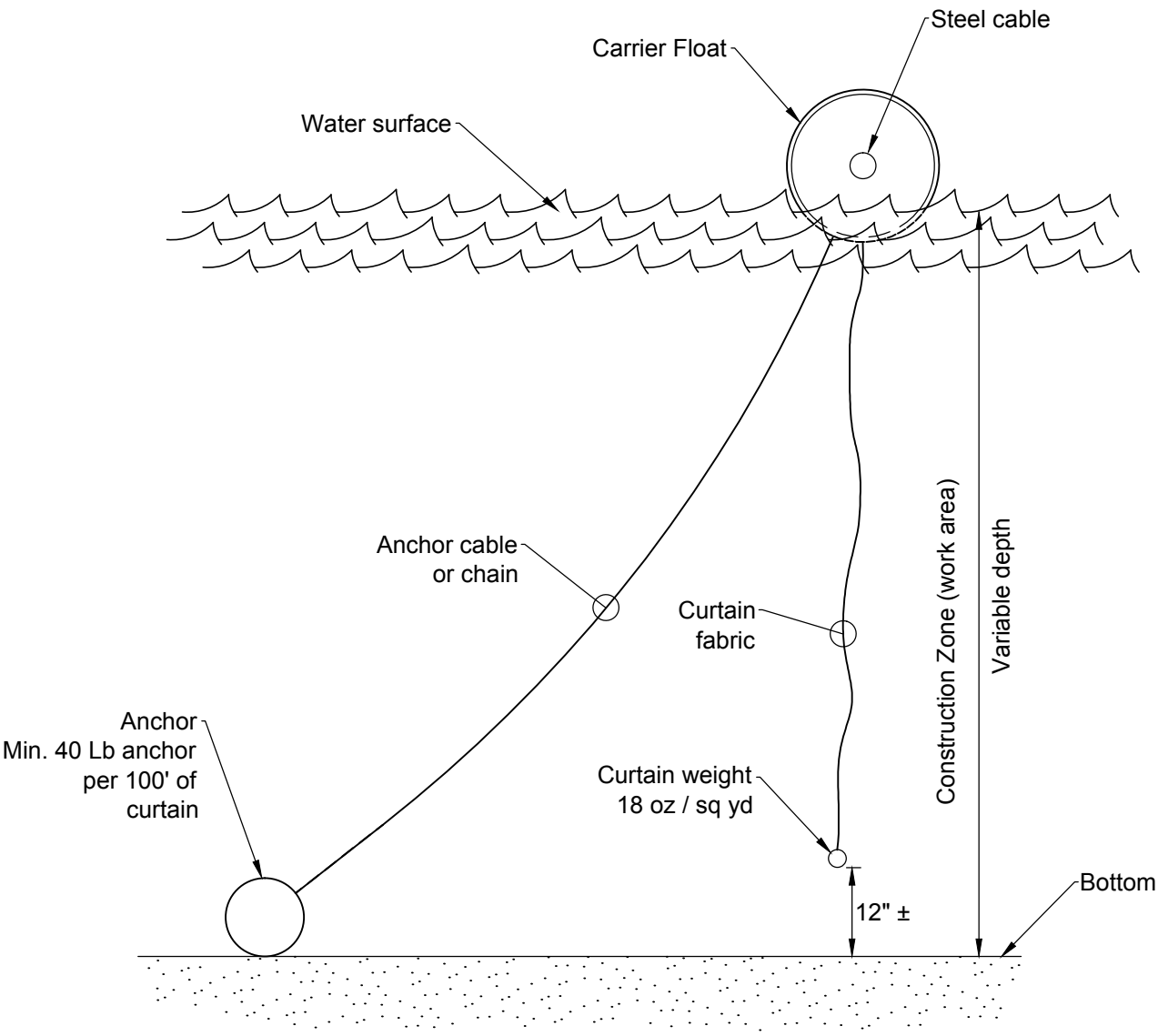
City Plate No.:	ERO-12
Last Revision:	11/10/2009
File:	ERO_12

STANDARD DETAILS
EROSION CONTROL BLANKET INSTALLATION

City of Minot
ENGINEERING DEPARTMENT



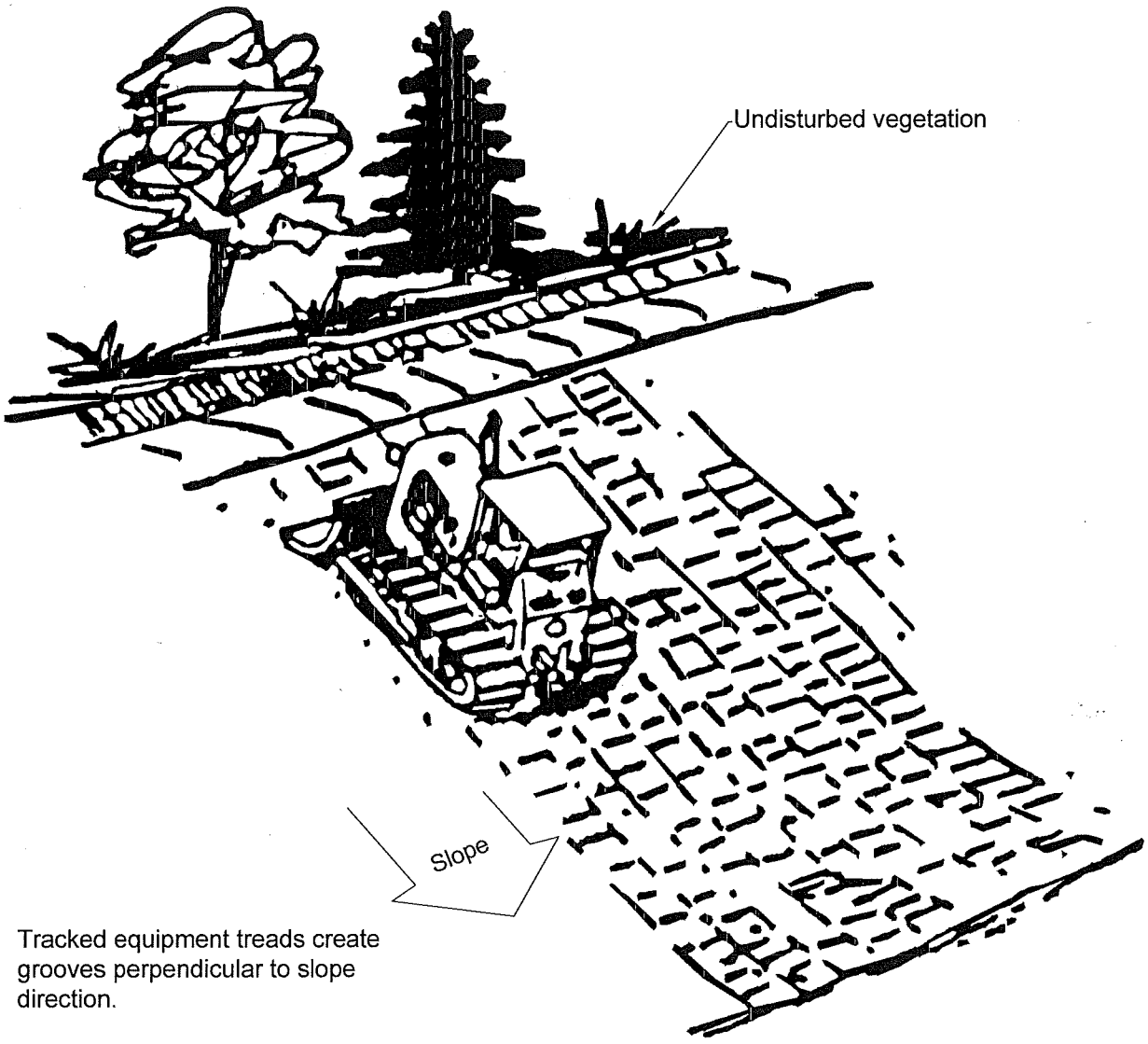
NOTE:
Double silt curtains should be spaced 10' apart.

City Plate No.:	ERO-13
Last Revision:	9/24/2010
File:	ERO_13.dwg

STANDARD DETAILS
FLOATING SILT CURTAIN

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\ERO_13.dwg



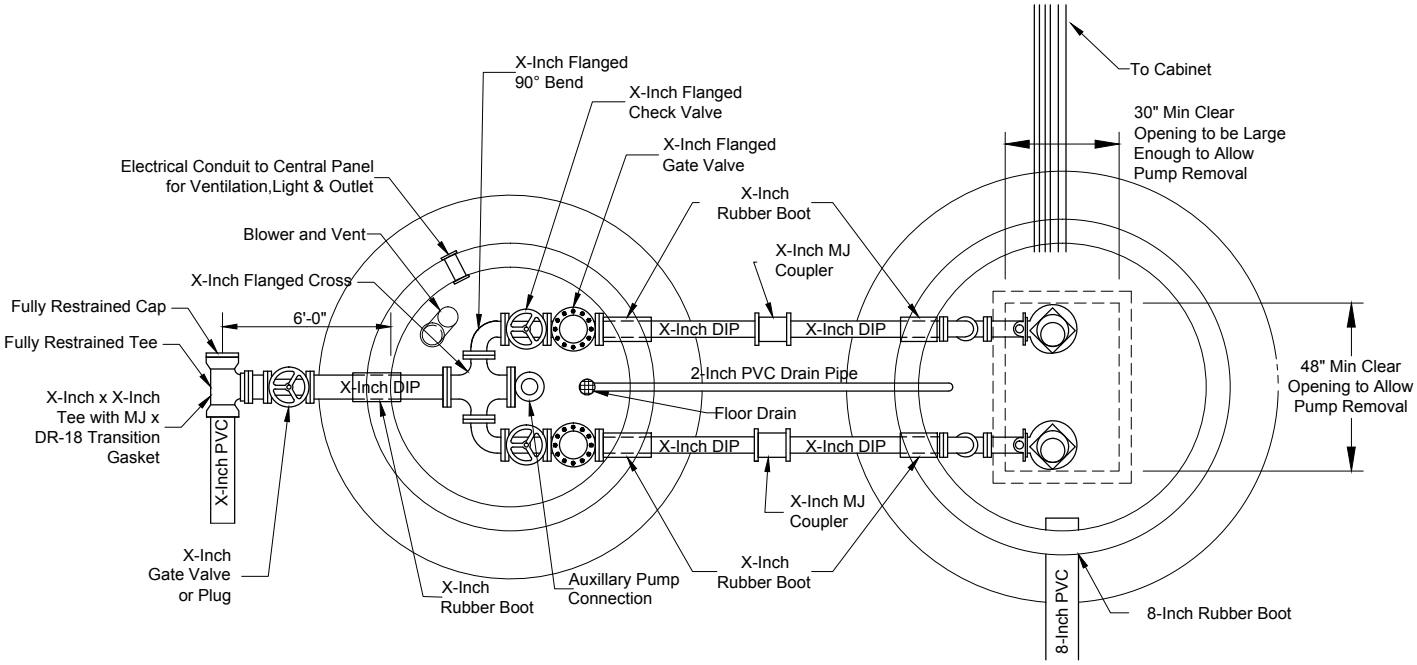
Tracked equipment treads create grooves perpendicular to slope direction.

NOTES:

1. All slopes with a grade equal to or steeper than 3:1 require slope tracking.
2. Slopes with a grade more gradual than 3:1 require slope tracking if the stabilization method is erosion control blanket or hydromulch.

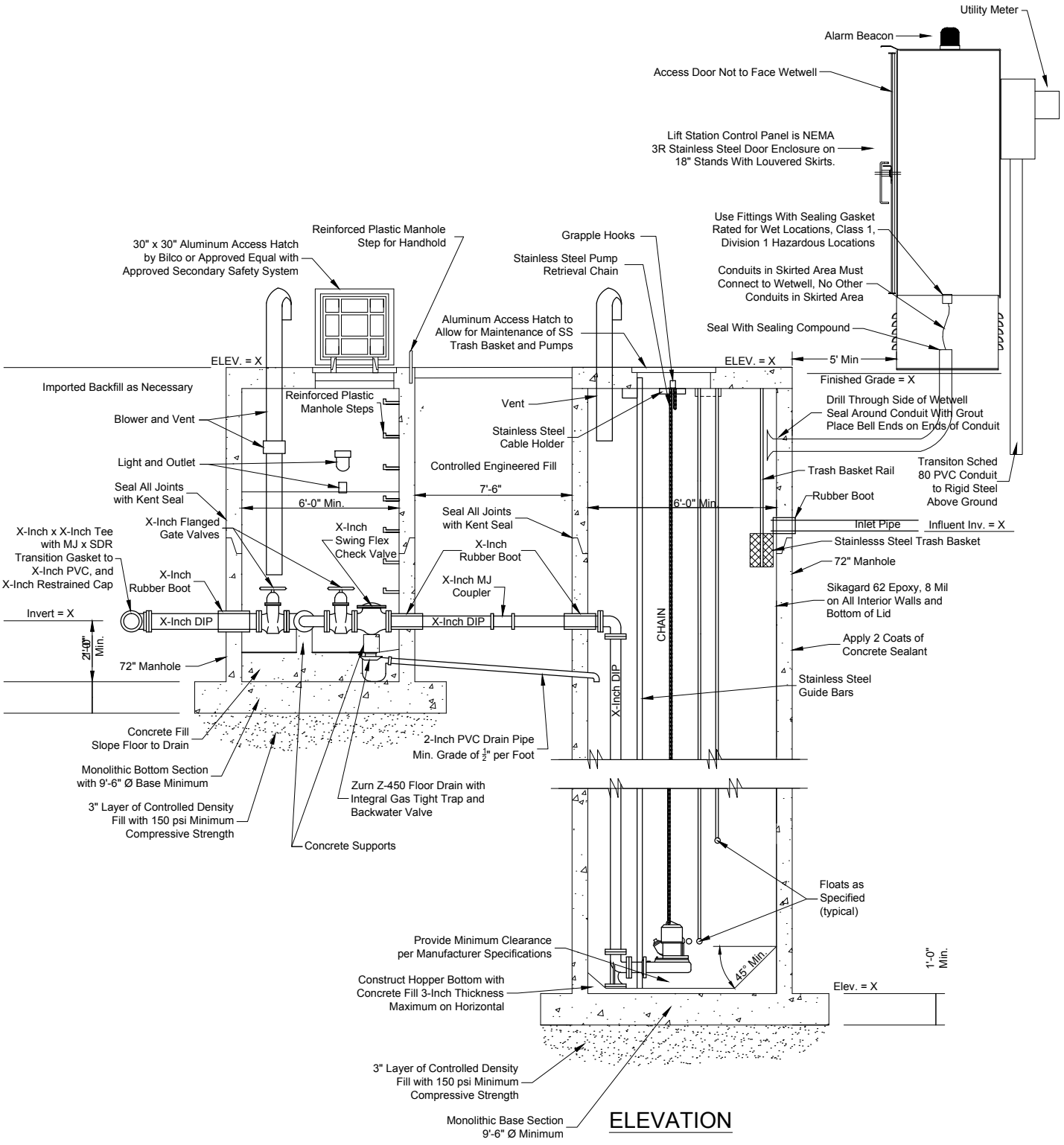
City Plate No.: ERO-14 Last Revision: 11/10/2009 File: ERO_14.dwg	**STANDARD DETAILS** **SLOPE TRACKING**	**City of Minot** ENGINEERING DEPARTMENT

M:\DETAIL PLATES\ERO_14.dwg



City Plate No.: P-01A Last Revision: 3/8/2012 File: P_01A.dwg	**STANDARD DETAILS** **LIFT STATION** **PLAN**	**City of Minot** ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\P_01A.dwg

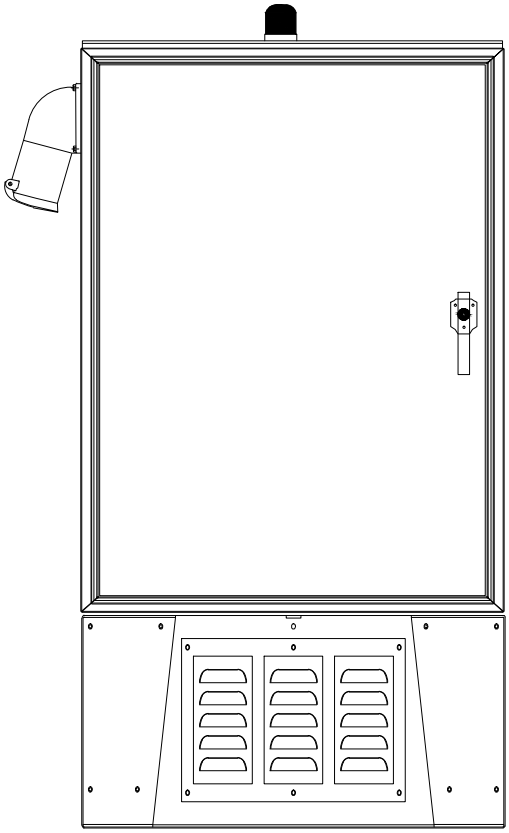


ELEVATION

City Plate No.: P-01B Last Revision: 1/25/2013 File: P_01B.dwg	**STANDARD DETAILS** **LIFT STATION** **PROFILE**	City of Minot ENGINEERING DEPARTMENT

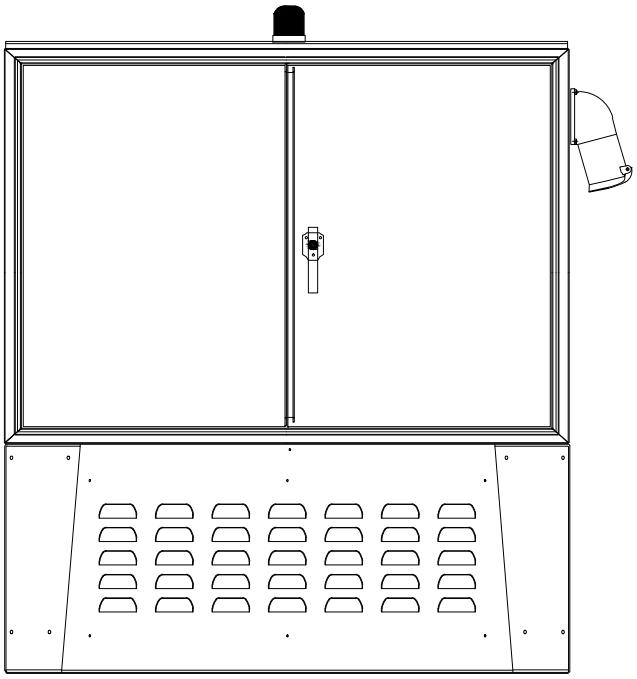
P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\P_01B.dwg

SINGLE DOOR VERSION



NEMA 3R PANEL - STAINLESS STEEL

TWO DOOR VERSION

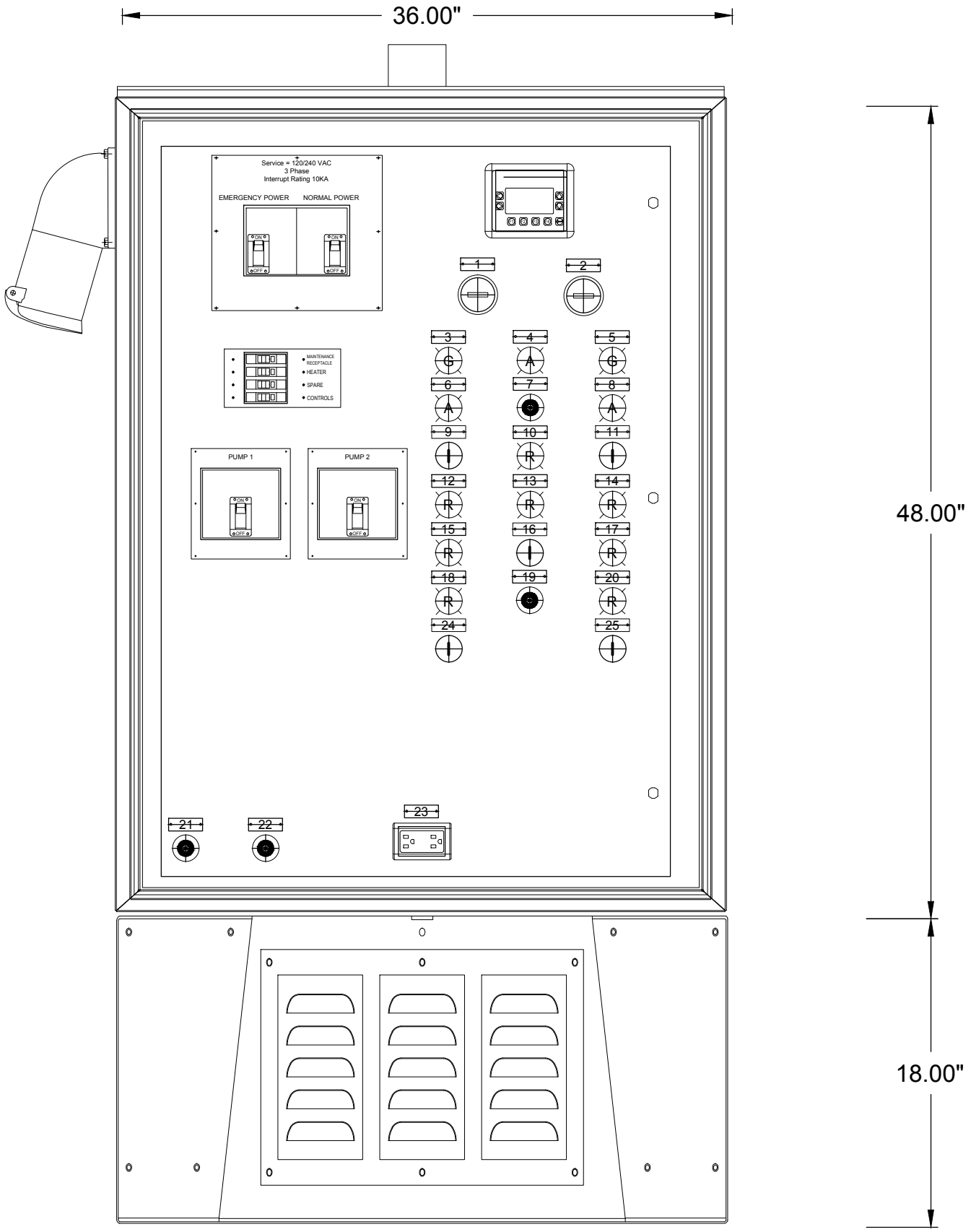


City Plate No.:	P-02
Last Revision:	1/3/2012
File:	P-02.dwg

STANDARD DETAILS
LIFT STATION
CONTROL PANEL

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\P_02.dwg



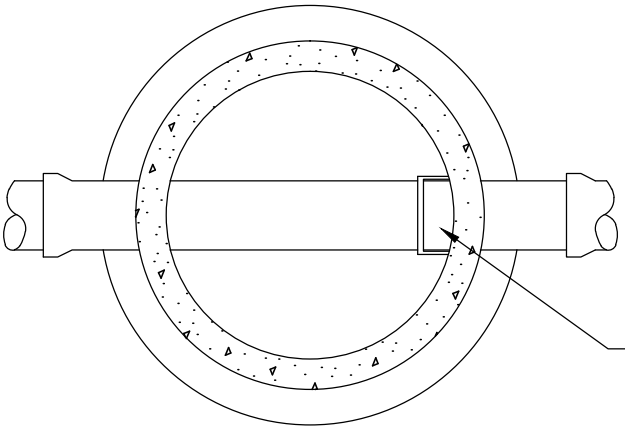
FRONT VIEW WITH OUTER DOOR OPEN

City Plate No.: P-03 Last Revision: 3/7/2012 File: P_03.dwg	**STANDARD DETAILS** **LIFT STATION CONTROL PANEL (SINGLE DOOR)**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\P-03.dwg

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

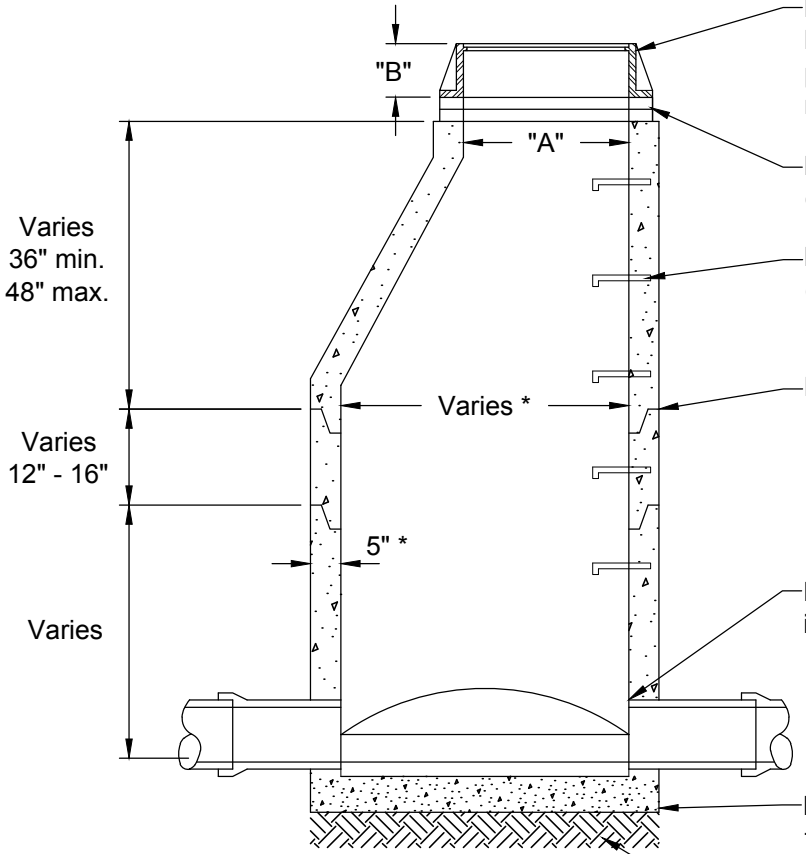
CASTING	LID TYPE	A	B
1642	B	27"	7"



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

PLAN

NOTE: Booted manhole considered acceptable alternate.



* Determined base on pipe size

Neenah frame and Type B cover or equal, lettered "Sanitary Sewer" with 2 concealed pick holes Type F. See specification for casting number

Minimum of 2, maximum of 6 concrete adjustment rings

Manhole steps, Neenah R1981J or equal, 16" on center. Aluminum steps approved.

Rubber o-ring gasket on all joints.

Precast invert required.

Block structures are not allowed.

Pipe shall be cut out flush with inside face of wall.

All doghouses shall be grouted on both inside and outside.

Minimum thickness of precast base is 6" for 14' deep or less, and increases 1" in thickness for every 4' of depth greater than 14'.

12" Aggregate base

SECTION

City Plate No.:	SAN-1
Last Revision:	1/21/2013
File:	SAN_1.dwg

STANDARD DETAILS
SANITARY SEWER MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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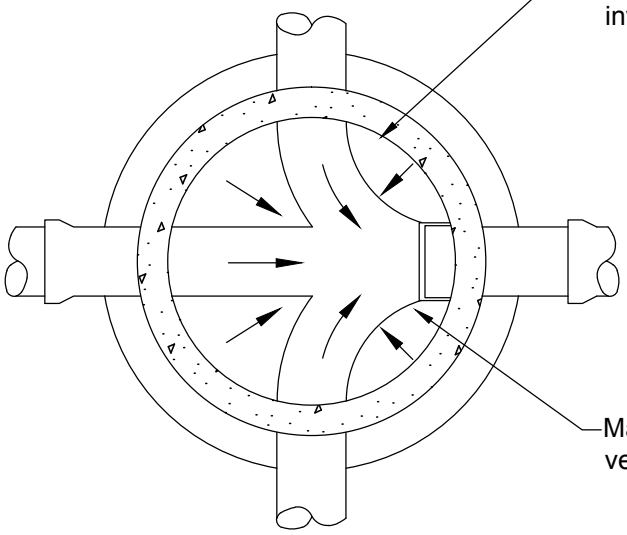
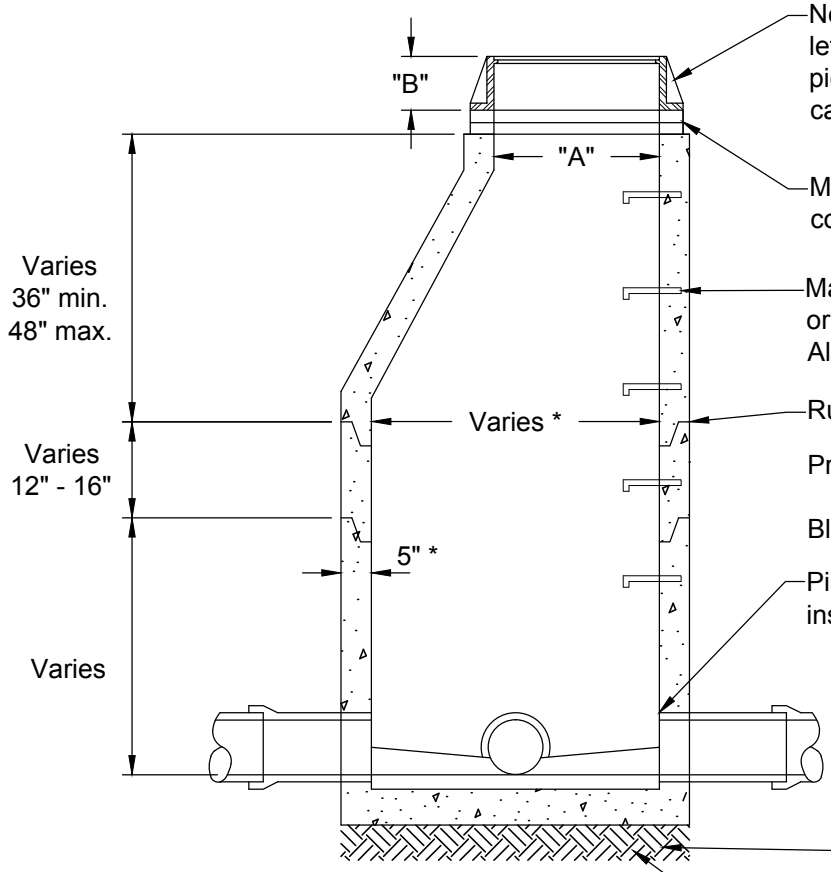


Precast invert must be 1/2 diameter of pipe and benches should be sloped 2" toward invert.

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



Neenah frame and Type B cover or equal, lettered "Sanitary Sewer" with 2 concealed pick holes Type F. See specification for casting number

Minimum of 2, maximum of 6 concrete adjustment rings

Manhole steps, Neenah R1981J or equal, 16" on center. Aluminum steps approved.

Rubber o-ring gasket on all joints.

Precast invert required.

Block structures are not allowed.

Pipe shall be cut out flush with inside face of wall.

NOTE: Booted manhole considered acceptable alternate.

All dog houses shall be grouted on both inside and outside.

Minimum thickness of precast base is 6" for 14' deep or less, and increases 1" in thickness for every 4' of depth greater than 14'.

12" Aggregate base

* Determined base on pipe size

SECTION

City Plate No.:	SAN-2
Last Revision:	1/21/2013
File:	SAN_2.dwg

STANDARD DETAILS
SANITARY SEWER
JUNCTION MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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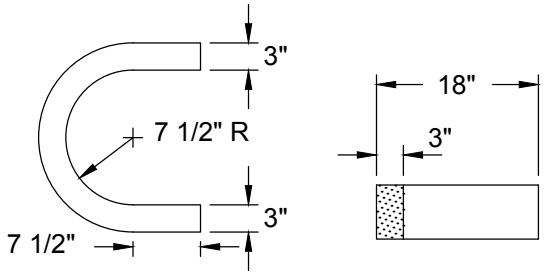
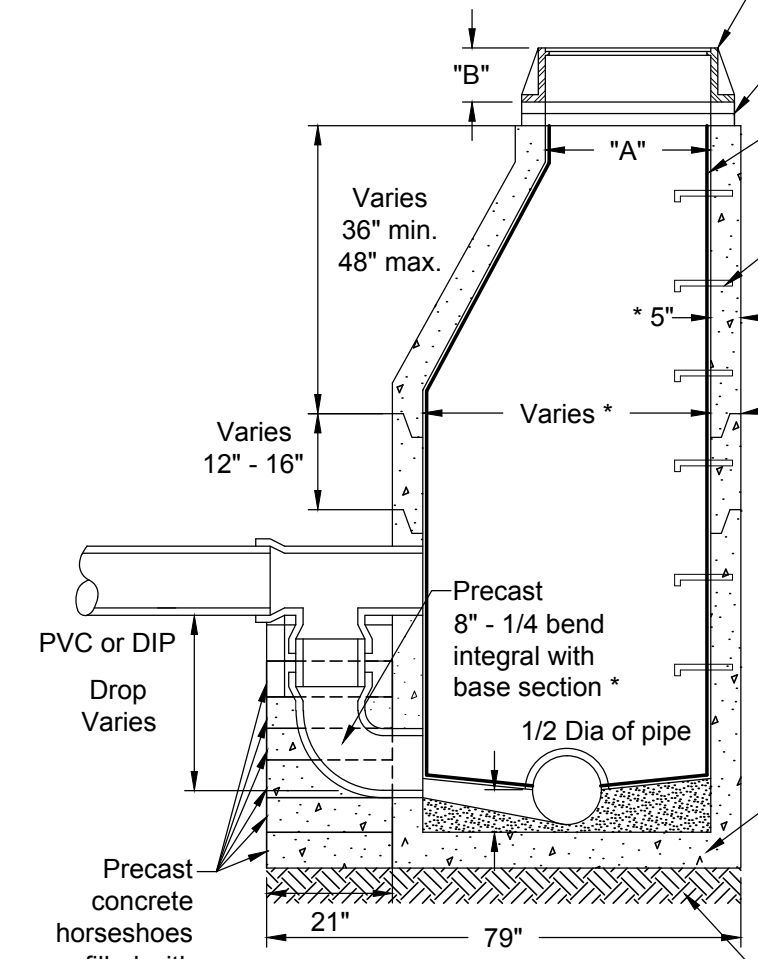


PLAN SECTION

HORSESHOE DETAILS

CASTING	LID TYPE	A	B
1642	B	27"	7"



Neenah frame and Type B cover or equal, lettered "Sanitary Sewer" with 2 concealed pick holes Type F. See specification for casting number.

Minimum of 2, maximum of 6 concrete adjustment rings.

All drop manholes shall be HDPE or PVC lined using Ameron T-lock or approved equal.

Manhole steps, Neenah R1981J or equal, 16" on center. Aluminum steps approved. Manhole steps shall be placed so that offset vertical portion of cone is facing downstream.

Rubber o-ring gasket on all joints.

Precast invert required.

Block structures are not allowed.

Pipe shall be cut out flush with inside face of wall.

All dog houses shall be grouted on both inside and outside.

Minimum thickness of precast base is 6" for 14' deep or less, and increases 1" in thickness for every 4' of depth greater than 14'.

* Determined base on pipe size

NOTE: Booted manhole considered acceptable alternate.

12" Aggregate base

SECTION

City Plate No.: SAN-3

Last Revision: 1/21/2013

File: SAN_3.dwg

STANDARD DETAILS
SANITARY SEWER
DROP INLET MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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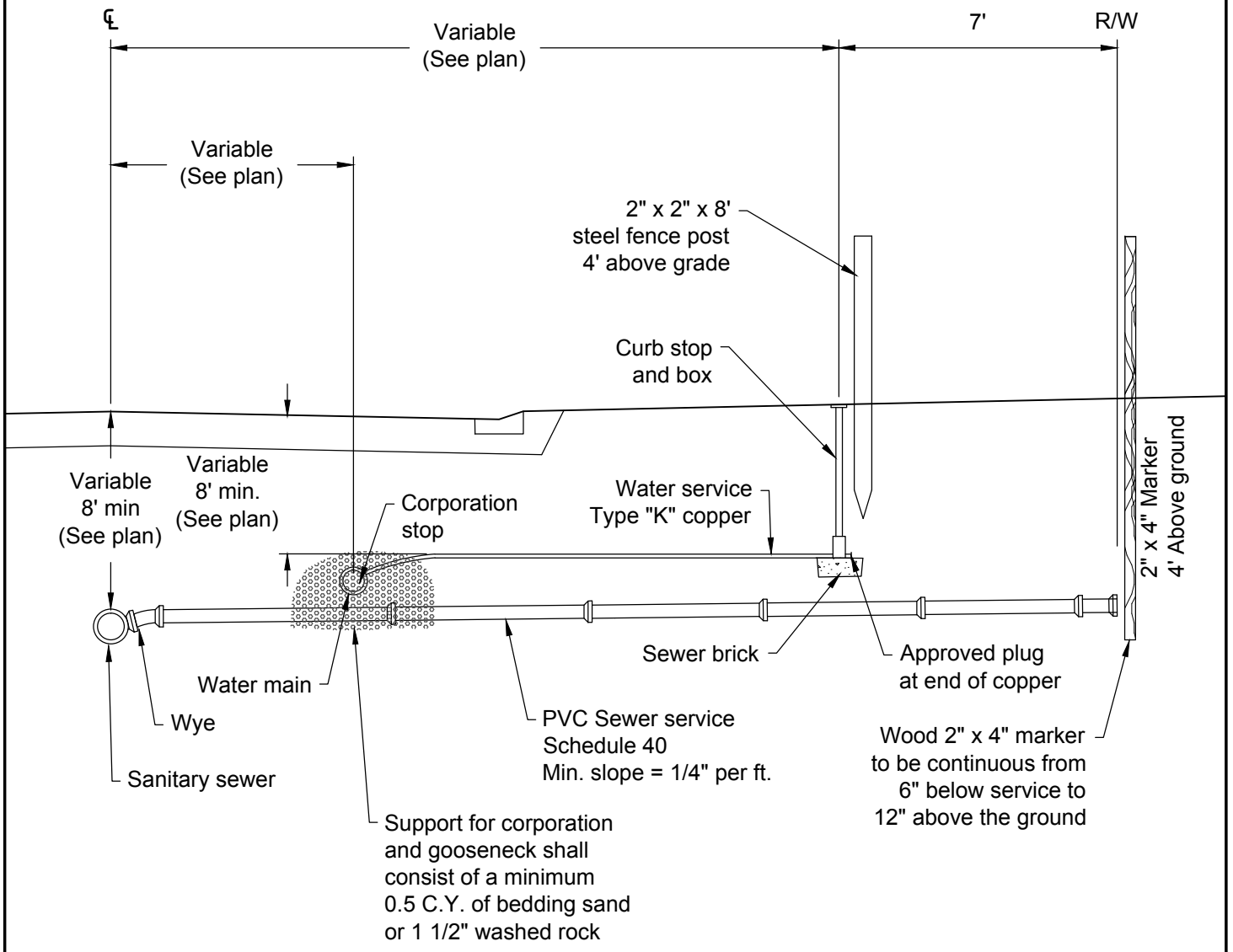

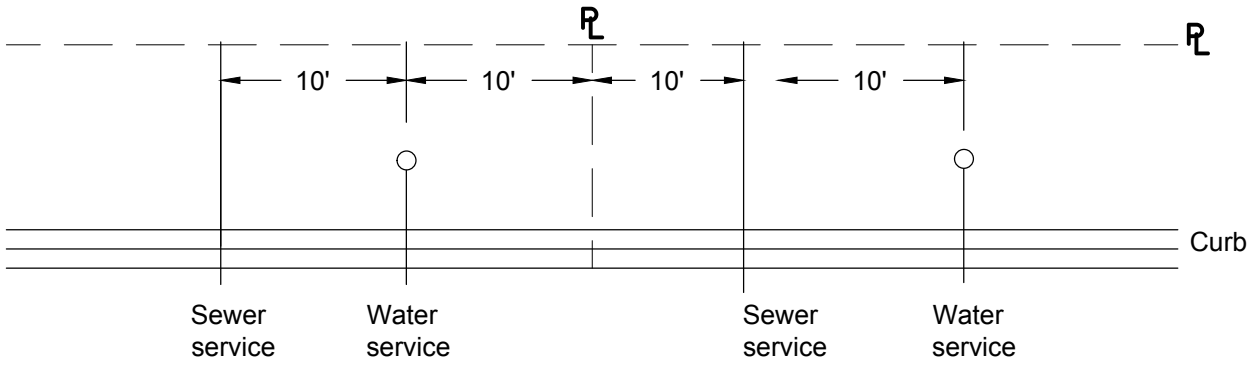

City Plate No.:	SER-1
Last Revision:	1/21/2013
File:	SER_1.dwg

STANDARD DETAILS
RESIDENTIAL PROPERTY SEWER & WATER SERVICE CONNECTIONS

City of Minot
ENGINEERING DEPARTMENT

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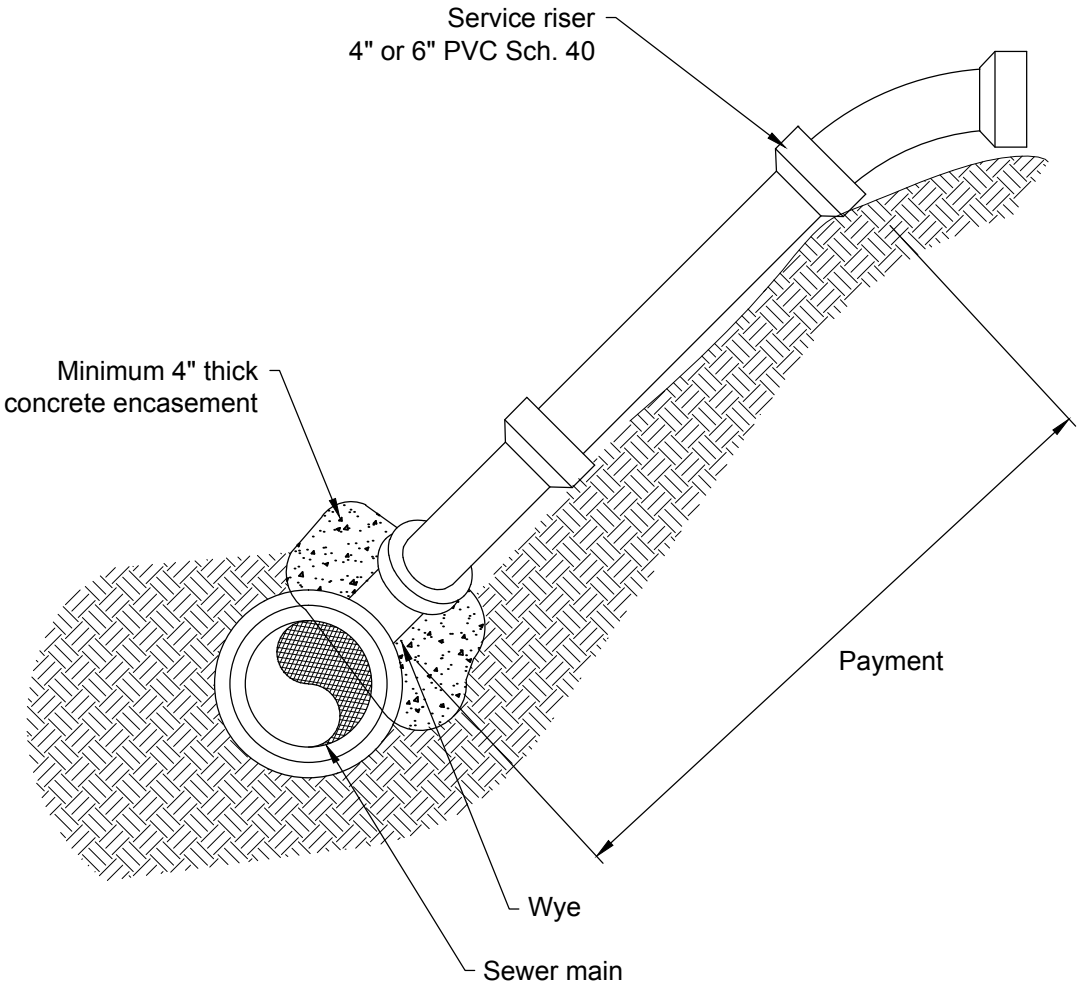

City Plate No.:	SER-2
Last Revision:	1/21/2013
File:	SER_2.dwg

STANDARD DETAILS
SERVICE RISER

City of Minot
ENGINEERING DEPARTMENT

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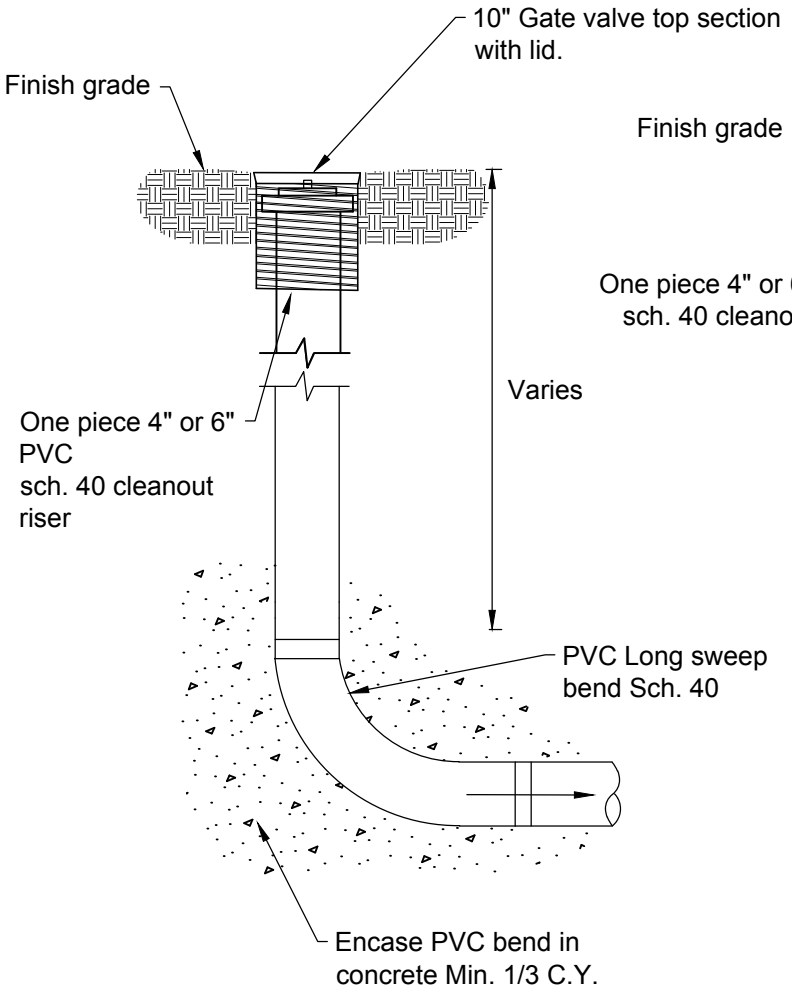
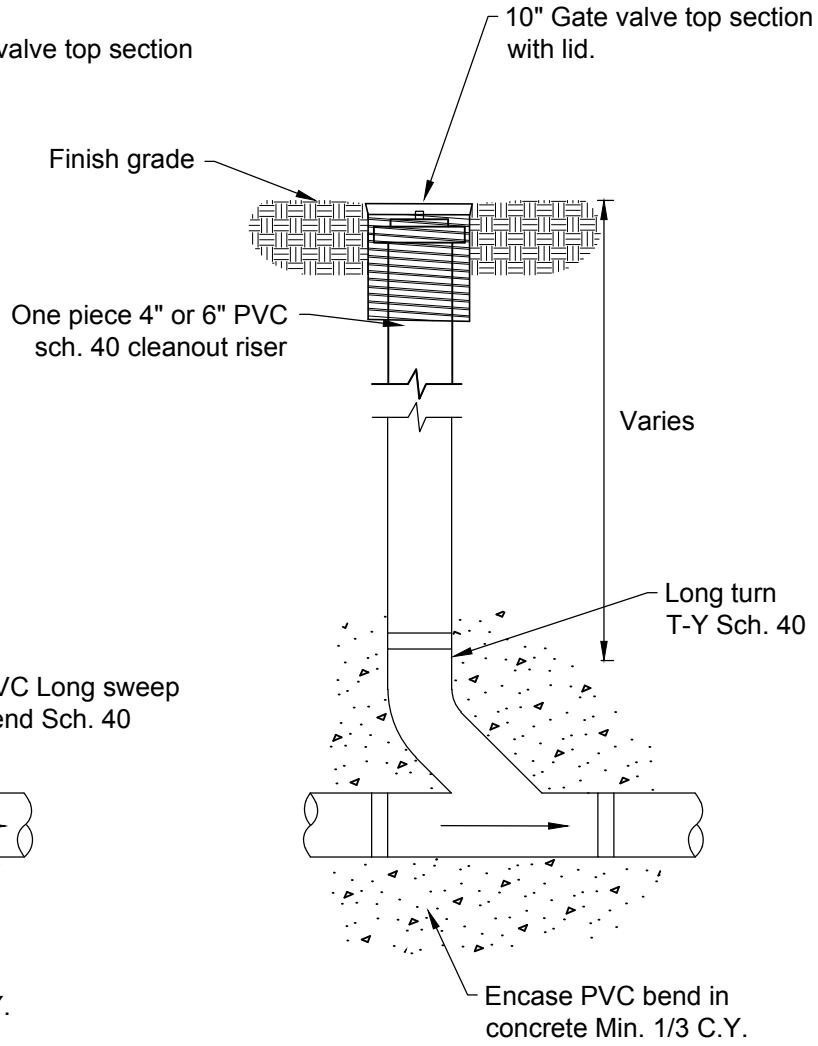
NOTE:
6" hub with threaded PVC plug do not glue



END OF LINE CLEANOUT

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



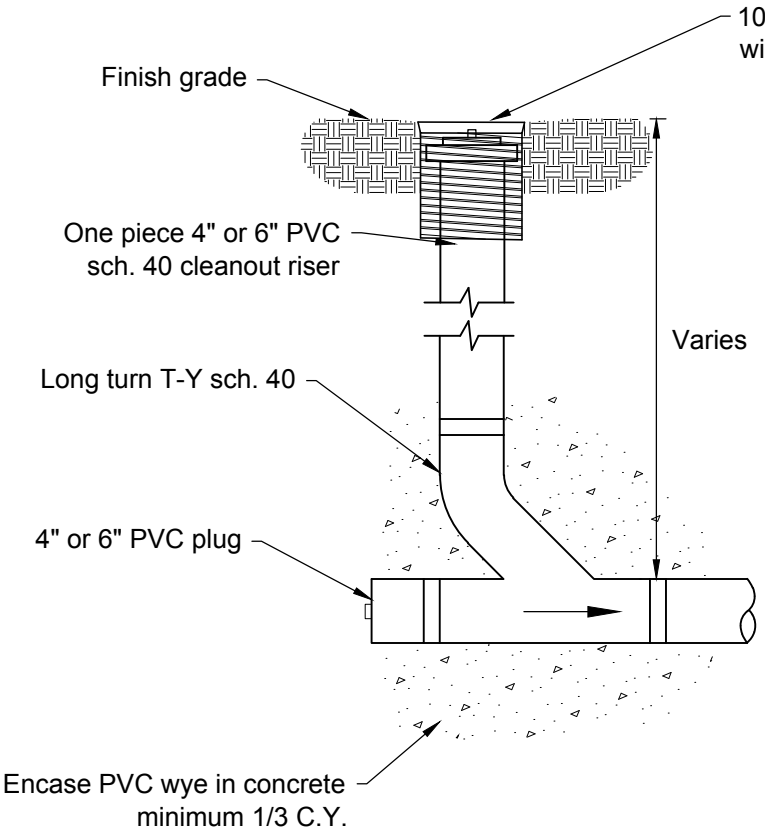
IN LINE CLEANOUT

City Plate No.:	SER-3
Last Revision:	9/24/2010
File:	SER_3.dwg

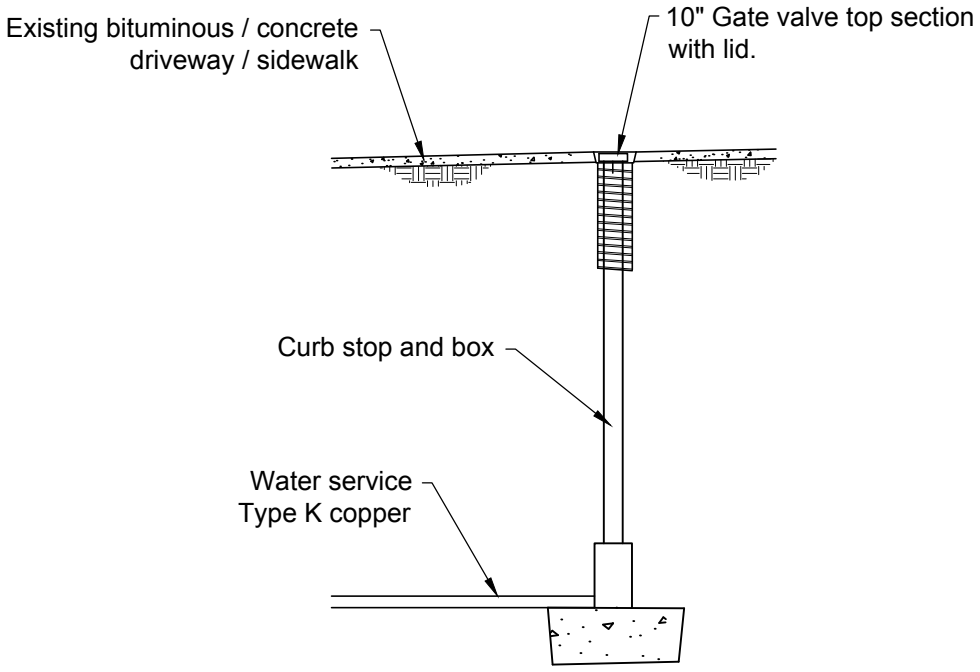
STANDARD DETAILS
PVC SERVICE LINE CLEANOUTS

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\SER_3.dwg



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

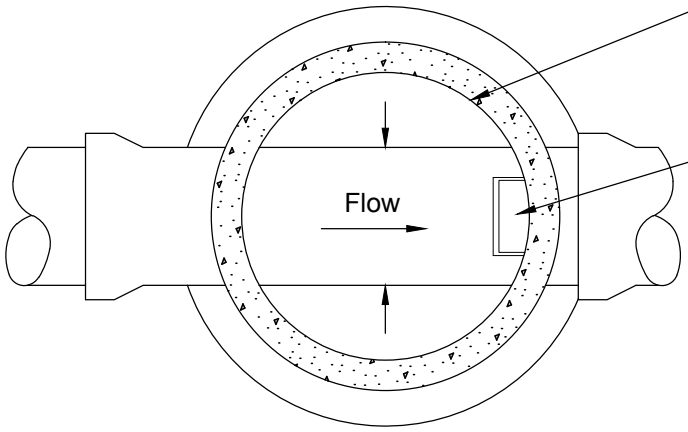


City Plate No.:	SER-4
Last Revision:	9/24/2010
File:	SER_4.dwg

STANDARD DETAILS
CASTING PROTECTION AT CLEANOUT & CURB STOP

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\SER_4.dwg



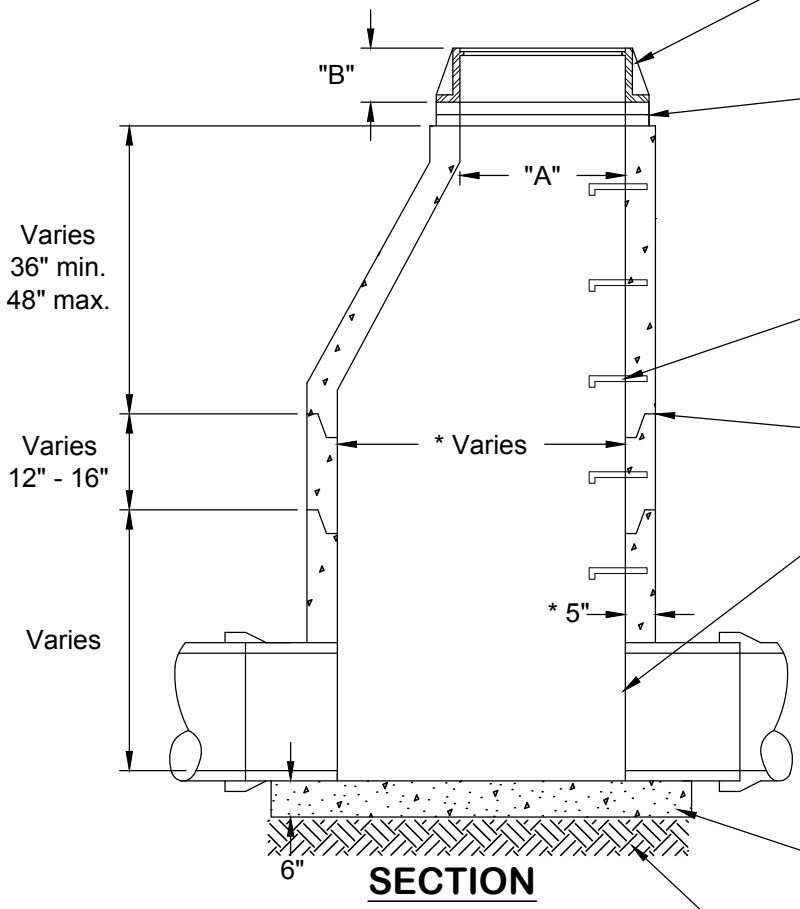
Grout bottom of manhole to 1/2 Ø at pipe and slope grout 2" toward invert

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

CASTING	LID TYPE	A	B
1642	B	27"	7"

No block structures are allowed.

PLAN



Neenah frame and cover or equal lettered "Storm Sewer", with 2 concealed pick holes Type F.

Minimum of 2, maximum of 6 concrete adjustment rings

Manhole steps, Neenah R1981J or equal, 16" on center Aluminum steps approved

Rubber o-ring gasket on all joints

Pipe shall be cut out flush with inside face of wall

Minimum slab thickness is 6" for 14' depth. Increase thickness 1" for every 4' of depth greater than 14' and reinforce with 6" x 6" mesh.

12" Aggregate base

SECTION

*Determined by pipe size

City Plate No.:	STO-1
Last Revision:	1/21/2013
File:	STO_1.dwg

STANDARD DETAILS
STORM SEWER MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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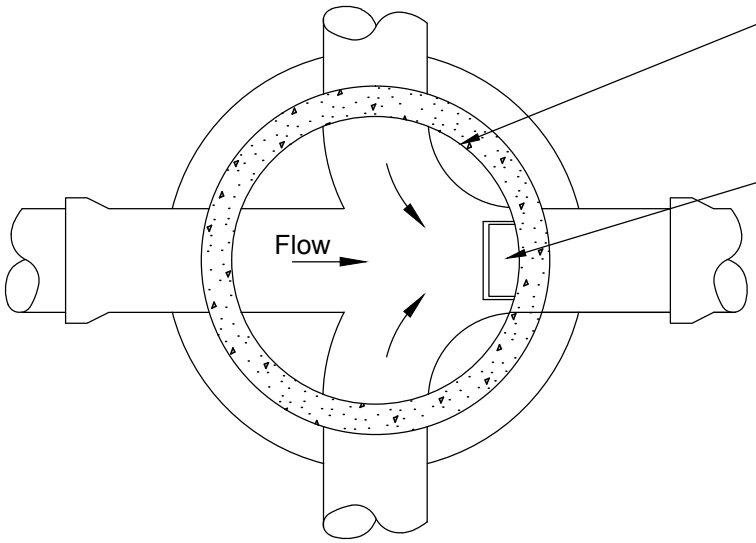


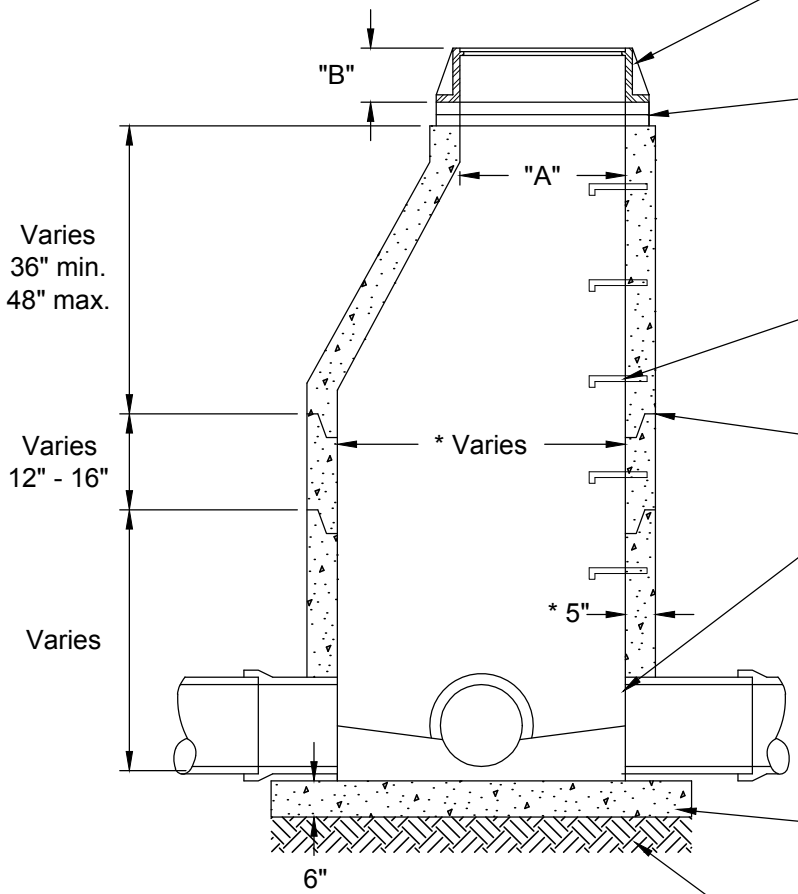
Grout bottom of manhole to 1/2 Ø at pipe and slope grout 2" toward invert

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

CASTING	A	B
R1642B	27"	7"

No block structures are allowed.

PLAN



Neenah frame and cover or equal lettered "Storm Sewer", with 2 concealed pick holes Type F.

Minimum of 2, maximum of 6 concrete adjustment rings

Manhole steps, Neenah R1981J or equal, 16" on center Aluminum steps approved

Rubber o-ring gasket on all joints

Pipe shall be cut out flush with inside face of wall

Minimum slab thickness is 6" for 14' depth. Increase thickness 1" for every 4' of depth greater than 14' and reinforce with 6" x 6" mesh.

12" Aggregate base

SECTION

*Determined by pipe size

City Plate No.:	STO-2
Last Revision:	11/23/2011
File:	STO_2.dwg

STANDARD DETAILS
STORM SEWER
JUNCTION MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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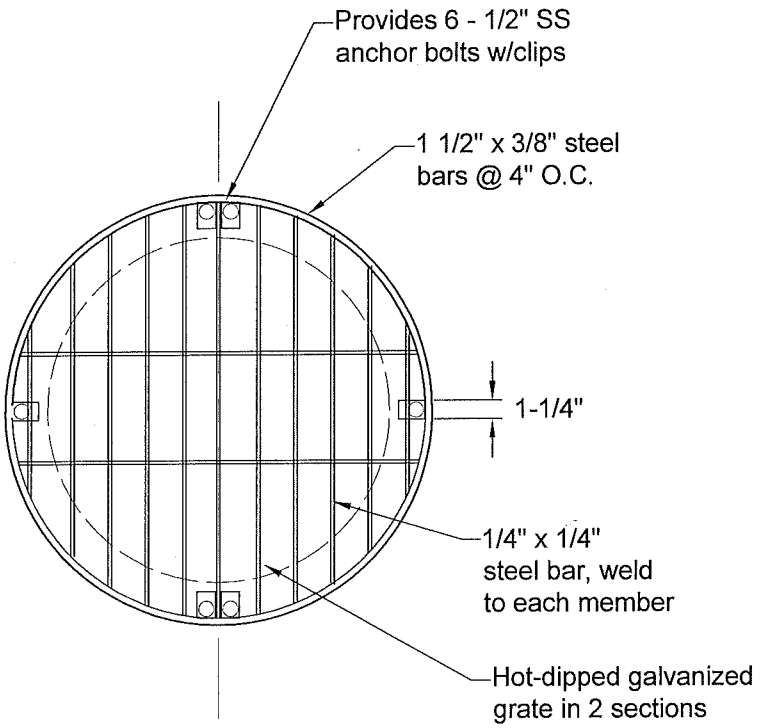
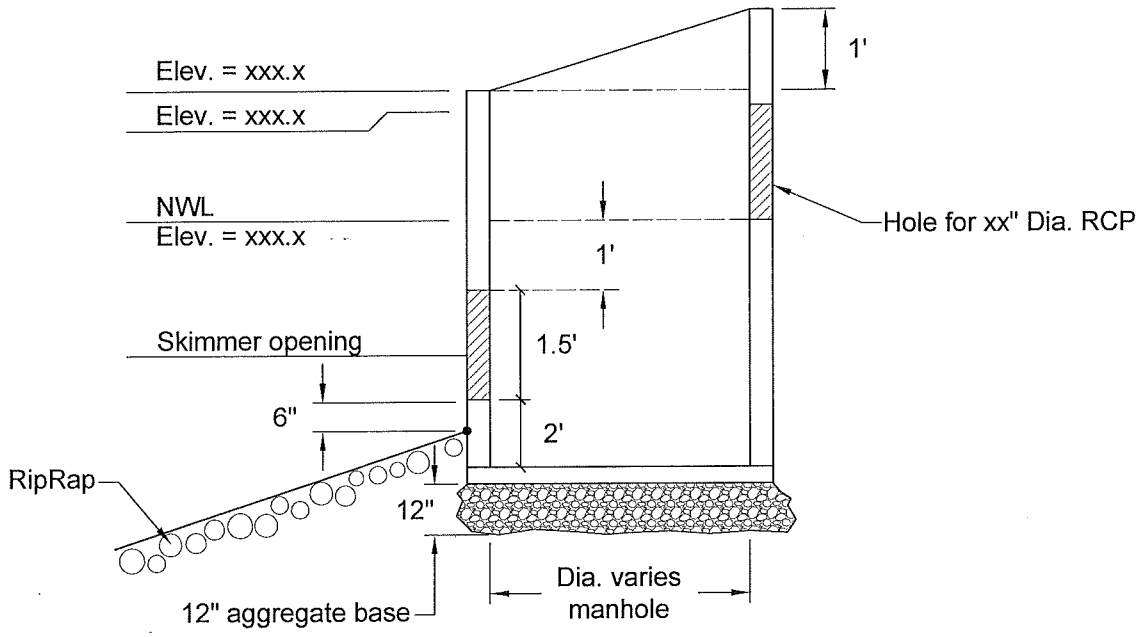


MH Diameter	Skimmer Opening
4'	3' x 1.5'
5'	5' x 1.5'
6'	6' x 1.5'

Haala Industries pond skimmer grates are an approved equal.

GRATE DETAIL



City Plate No.:	STO-3
Last Revision:	11/10/2009
File:	STO_3.dwg

STANDARD DETAILS
STANDARD SKIMMER STRUCTURE

City of Minot
ENGINEERING DEPARTMENT

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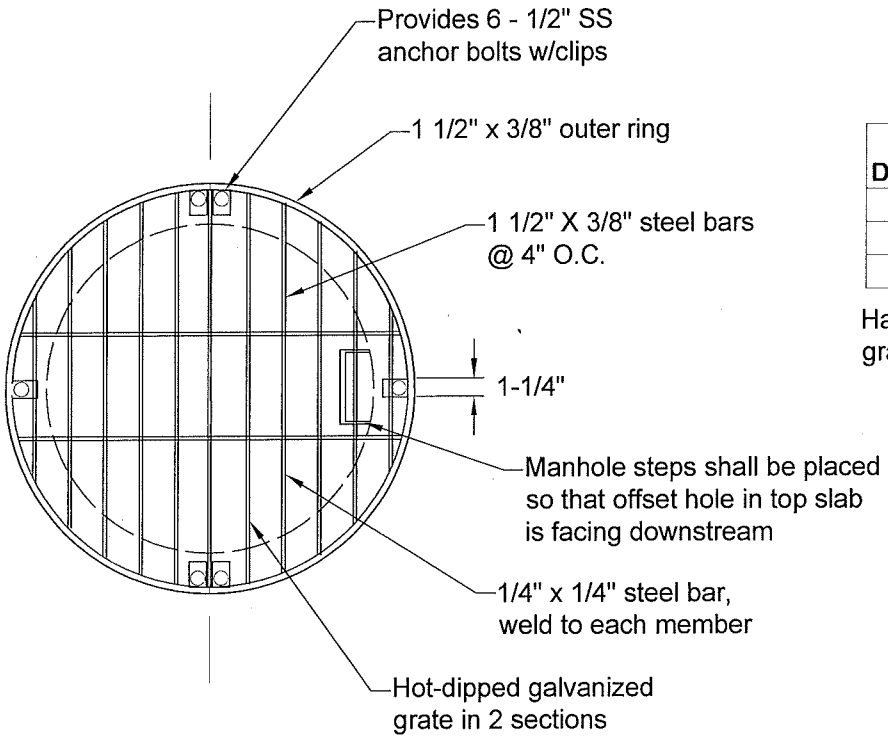
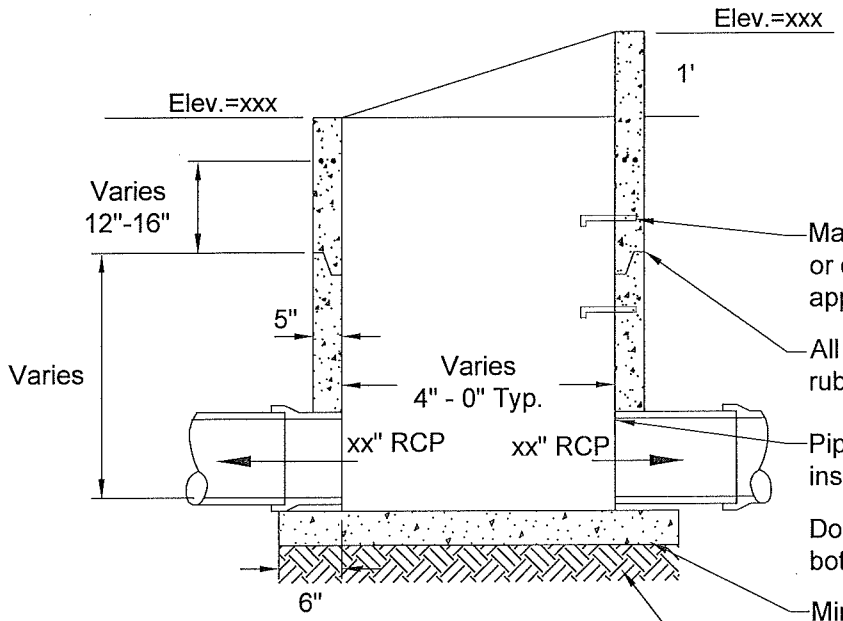


MH Diameter	Skimmer Opening
4'	4' x 1.5'
5'	5' x 1.5'
6'	6' x 1.5'

Haala Industries pond skimmer grates are an approved equal.

No block structures are allowed.

GRATE DETAIL



SECTION

Manhole steps, Neenah R1981J or equal, 16" O.C. Aluminum steps approved

All joints in manhole to have "O" ring rubber gaskets

Pipe shall be cut out flush with inside face of wall.

Doghouses must be grouted both inside and outside.

Minimum slab thickness is 6" for 14' of depth or less. Increase thickness 1" for every 4' of depth greater than 14', and reinforce with 6" x 6" 10/10 mesh.

12" Aggregate base

City Plate No.: STO-4
Last Revision: 11/10/2009
File: STO_4.dwg

STANDARD DETAILS
STANDARD OVERFLOW STRUCTURE

City of Minot
ENGINEERING DEPARTMENT

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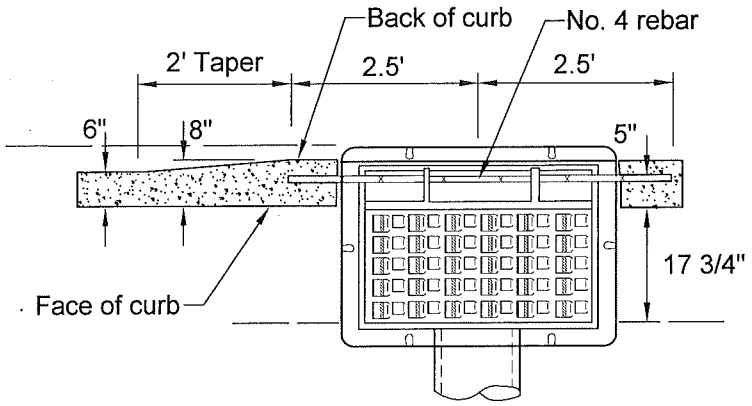
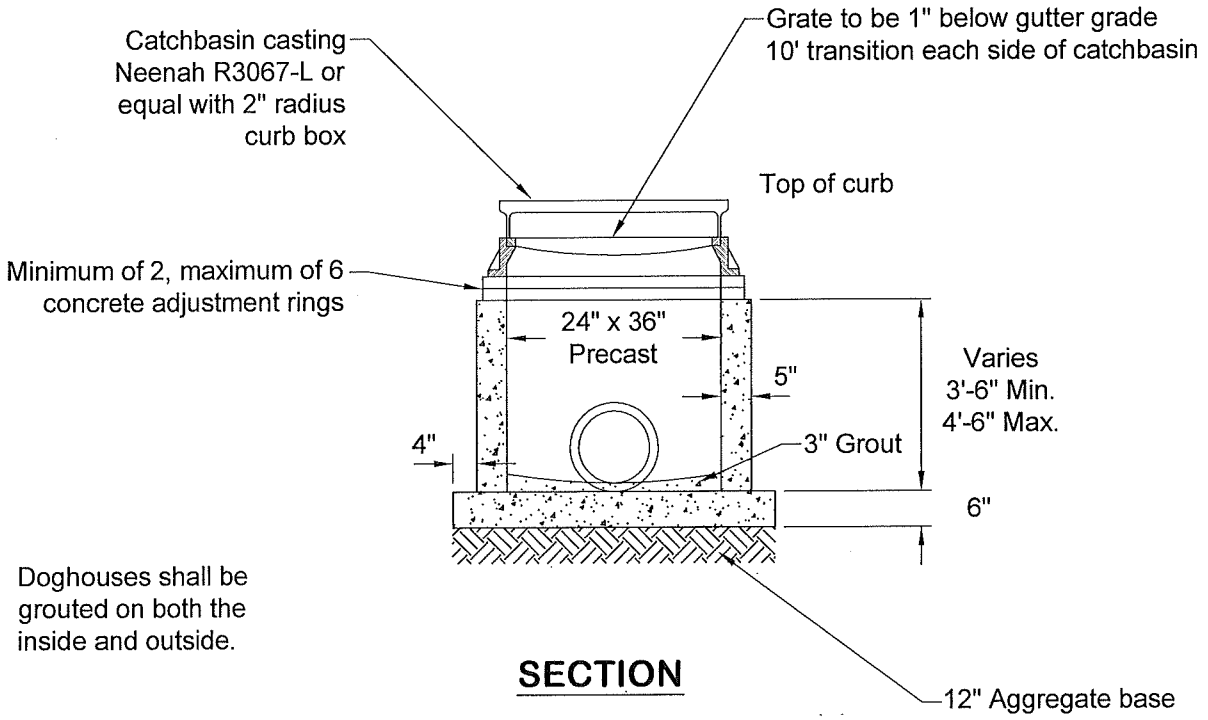


PLAN

No block structures are allowed.



Doghouses shall be grouted on both the inside and outside.

SECTION

City Plate No.: STO-5 Last Revision: 11/10/2009 File: STO_5.dwg	**STANDARD DETAILS** **CATCH BASIN**	City of Minot ENGINEERING DEPARTMENT

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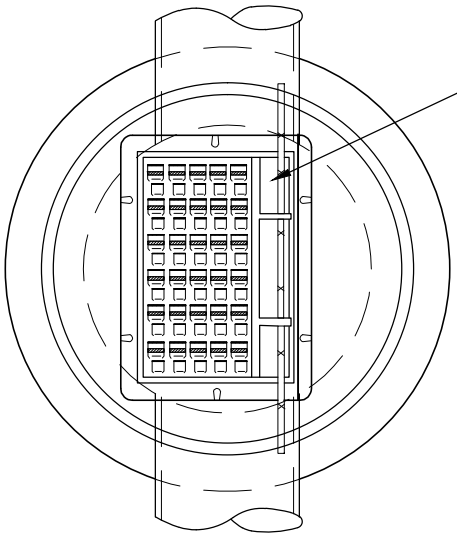
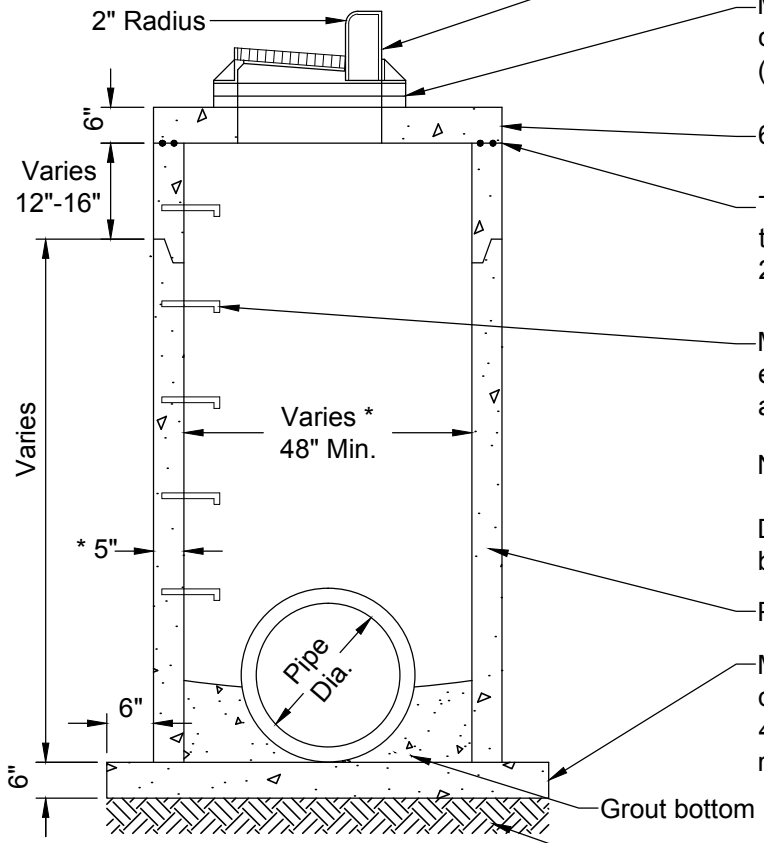


24" x 36" slab opening for Neenah R3067-L or equal

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



Neenah R3067-L casting or equal

Minimum of 2, maximum of 6 concrete adjustment rings (See STR-1 detail)

6" precast reinforced concrete slab

Top of barrel section under top slab to have flat top edge sealed with 2 beads of Ramnek or equal

Manhole steps, Neenah R1981J or equal, 16" o.c., aluminum steps approved

No block structures are allowed.

Doghouses shall be grouted on both the outside and inside.

Precast concrete section

Minimum slab thickness, 6" for 14' depth. Increase thickness 1" for each 4' of depth greater than 14' and reinforce with 6" x 6" 10/10 mesh.

Grout bottom

12" Aggregate base

* Determined by pipe size.

SECTION

City Plate No.:	STO-6
Last Revision:	1/23/2013
File:	STO_6.dwg

STANDARD DETAILS
CATCH BASIN
MANHOLE

City of Minot
ENGINEERING DEPARTMENT

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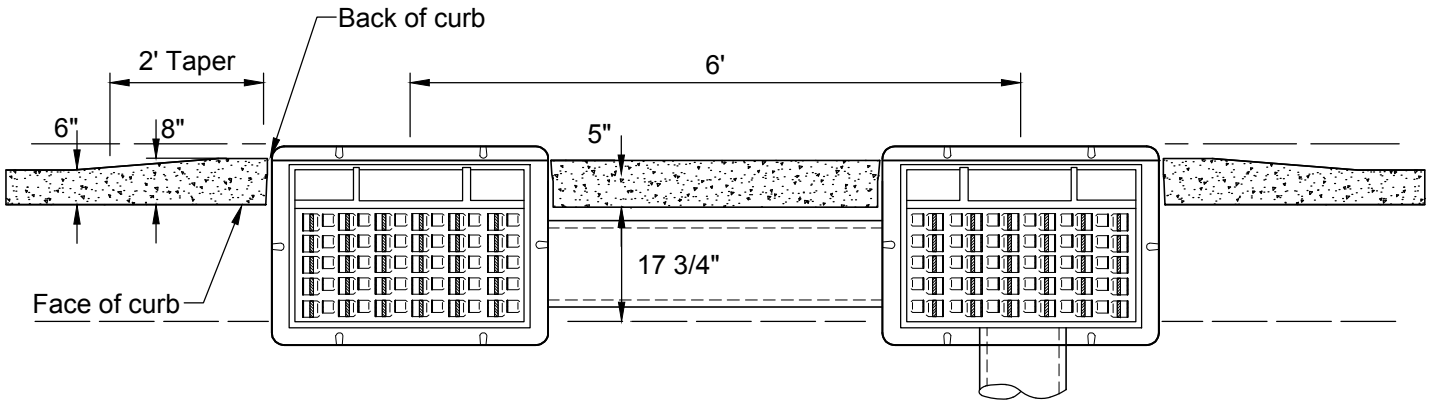
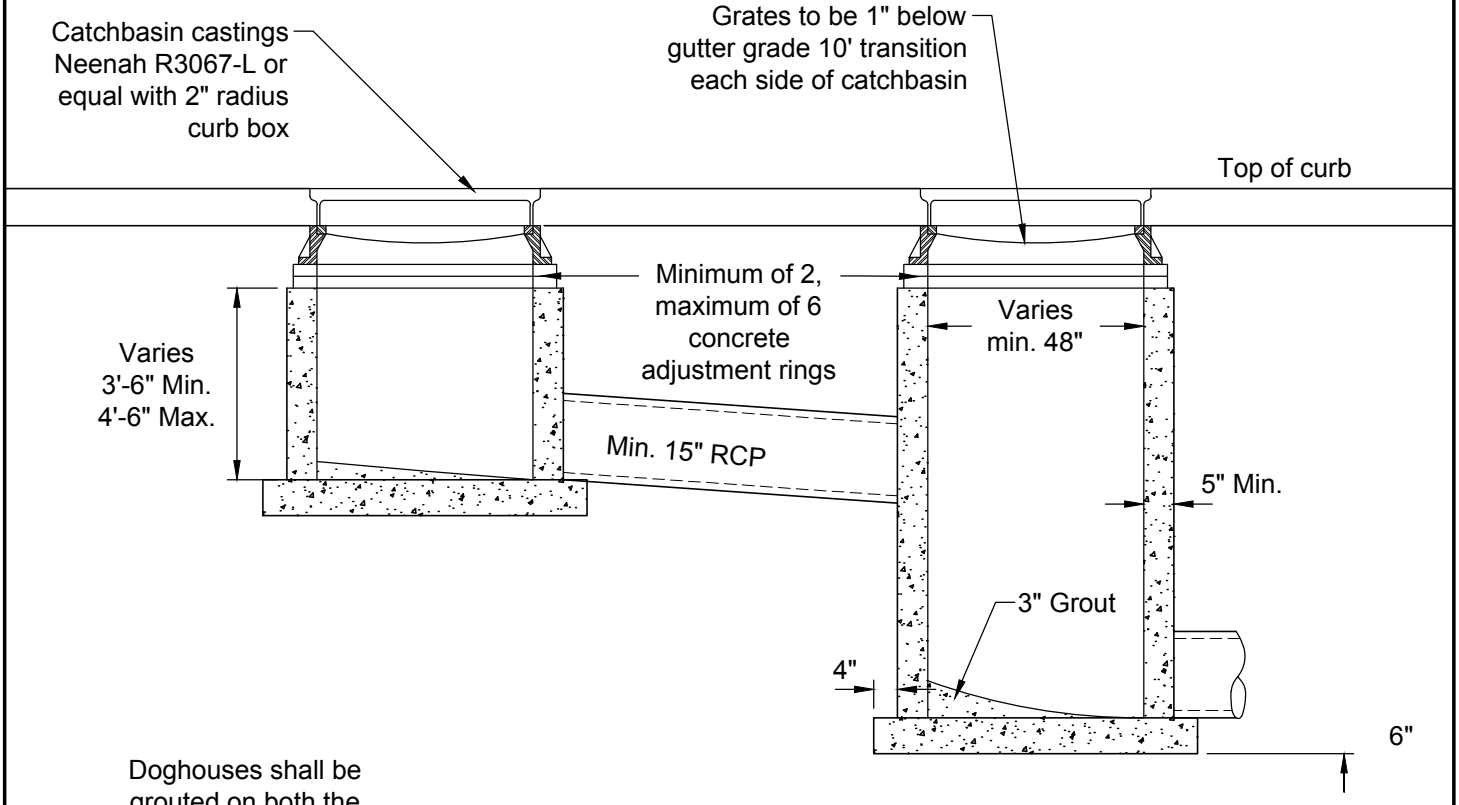


Note:
No concrete behind of on top of catch basin casting.
No block structures are allowed.

PLAN



Doghouses shall be grouted on both the inside and outside.

SECTION

City Plate No.:	STO-7
Last Revision:	1/23/2013
File:	STO_7.dwg

STANDARD DETAILS
DOUBLE CATCH BASIN

City of Minot
ENGINEERING DEPARTMENT

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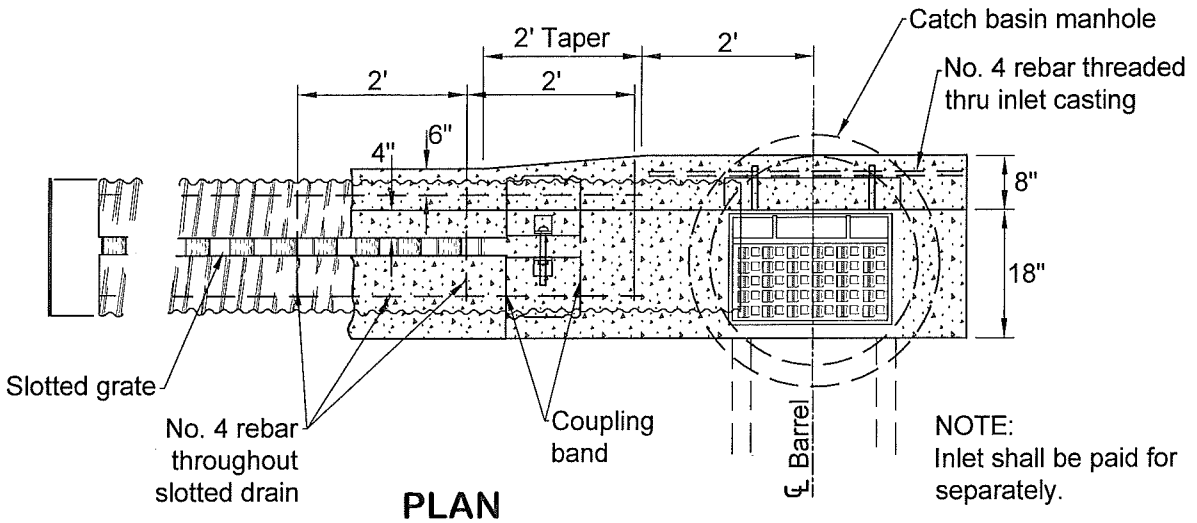
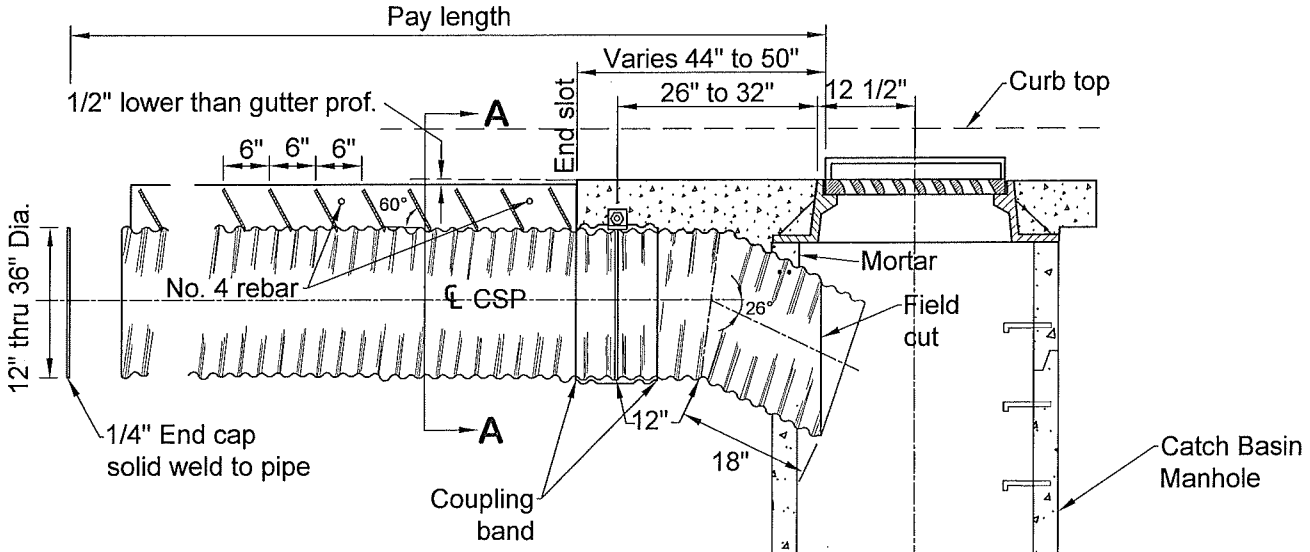
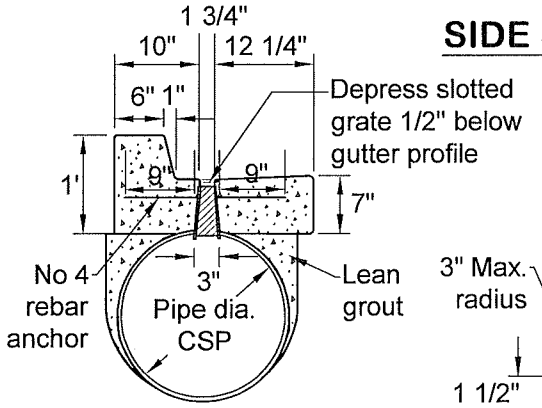


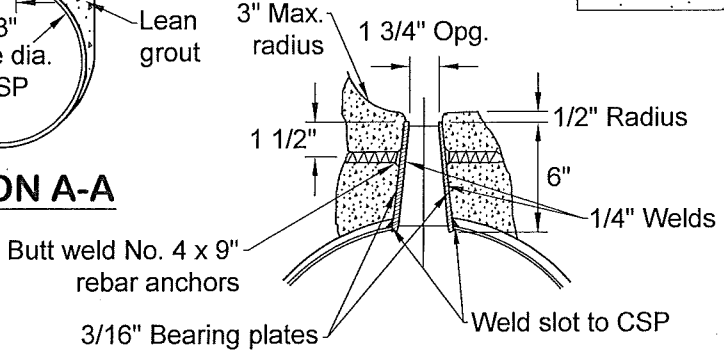
PLAN



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 grounted and all voids sealed.

City Plate No.:	STO-8
Last Revision:	11/10/2009
File:	STO-8,dwg

STANDARD DETAILS
INLET - SLOTTED DRAIN

City of Minot
ENGINEERING DEPARTMENT

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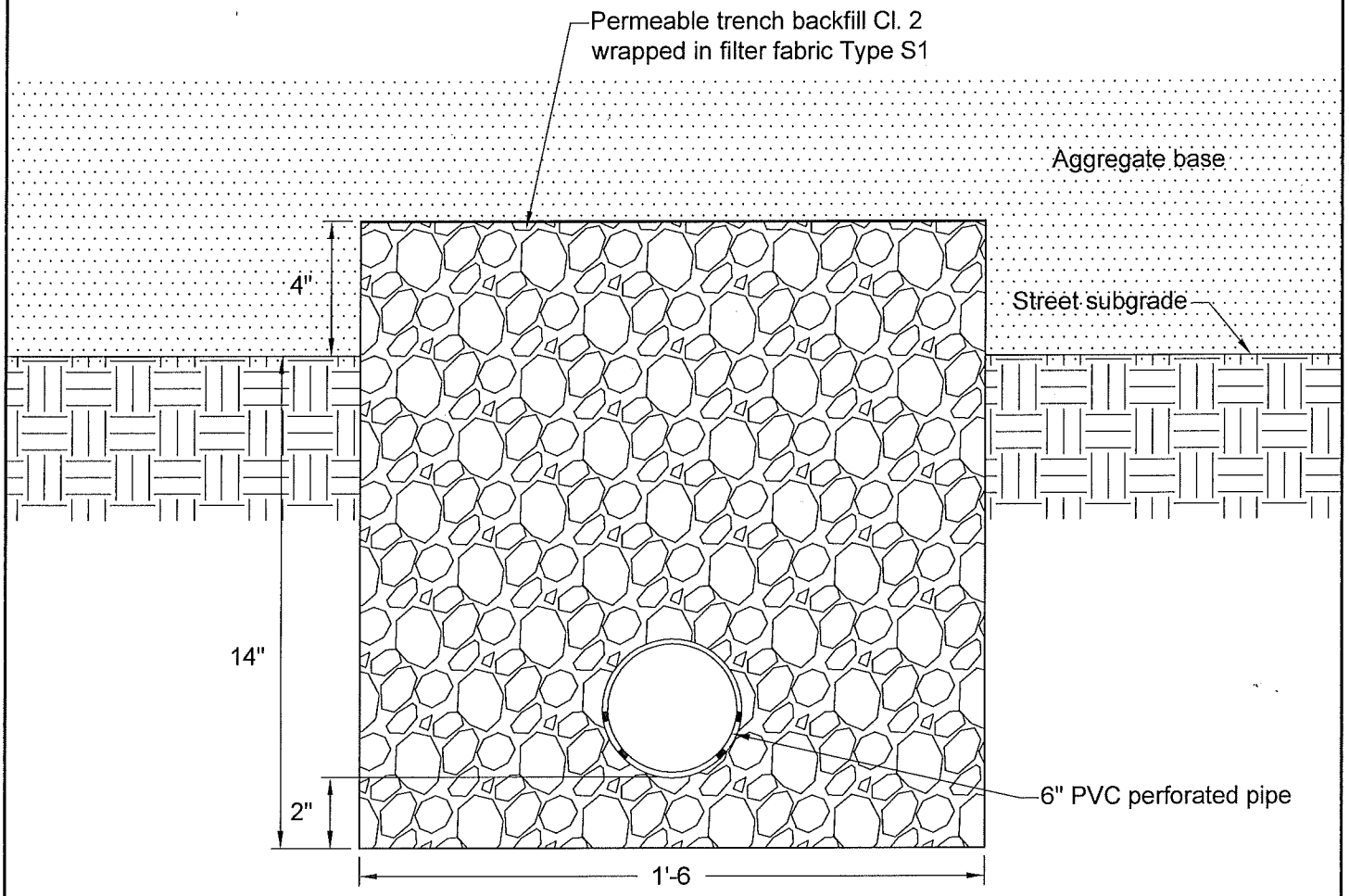
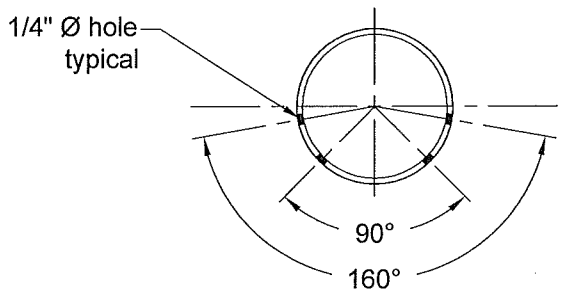


TRENCH DETAIL



PIPE DETAIL

City Plate No.: STO-9 Last Revision: 11/10/2009 File: STO_9.dwg	**STANDARD DETAILS** **PVC PERFORATED PIPE**	City of Minot ENGINEERING DEPARTMENT

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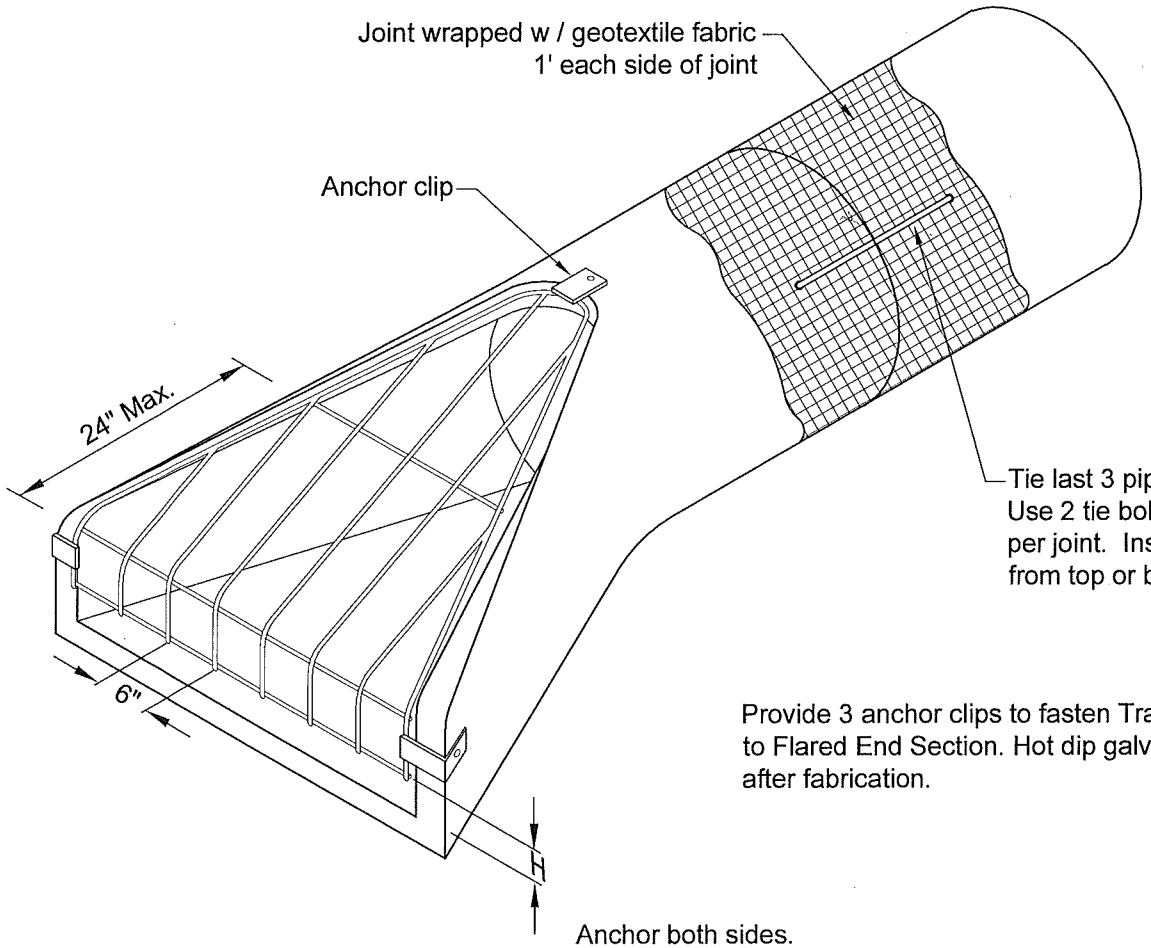
See City Plate No. STO-11 for riprap placement.



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"

City Plate No.: STO-10
Last Revision: 11/10/2009
File: STO_10.dwg

STANDARD DETAILS
FLARED END SECTION AND TRASH RACK

City of Minot
ENGINEERING DEPARTMENT

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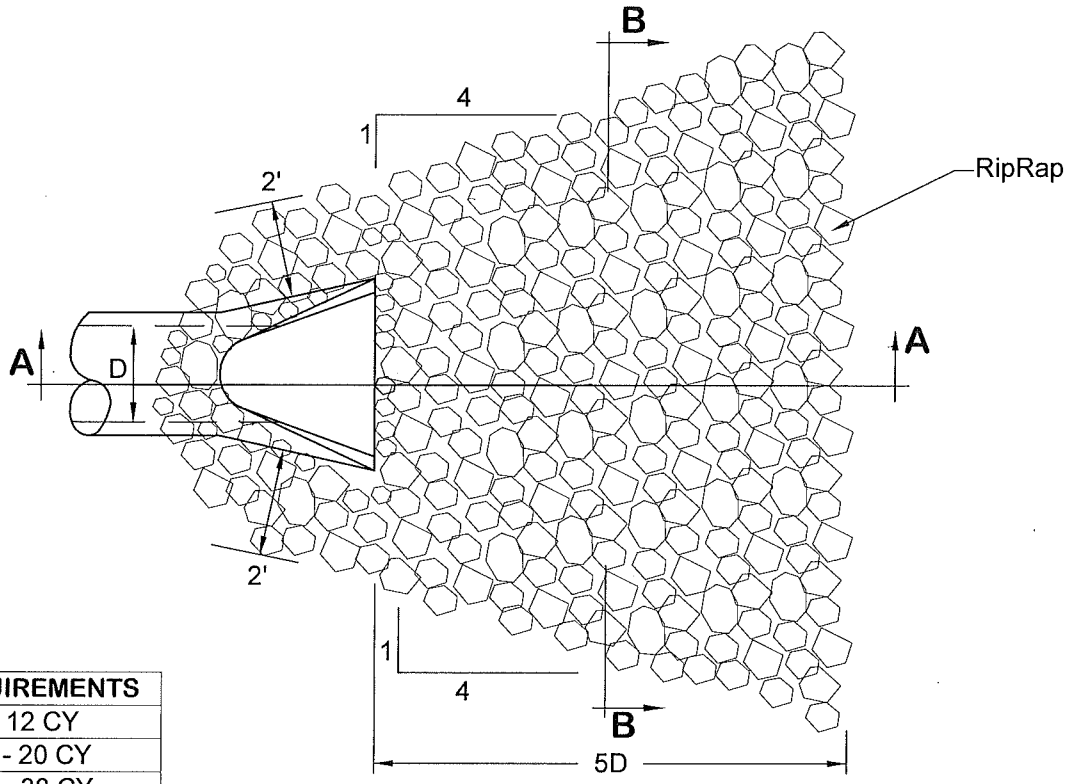
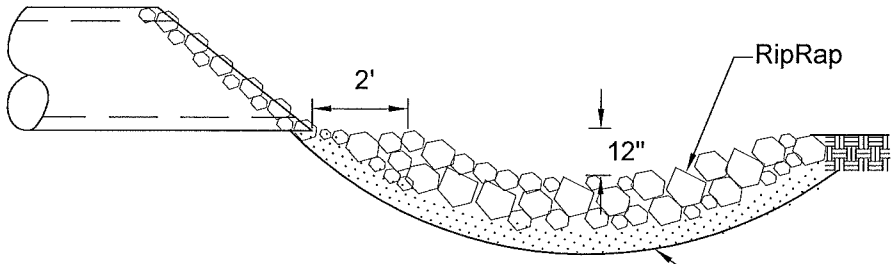


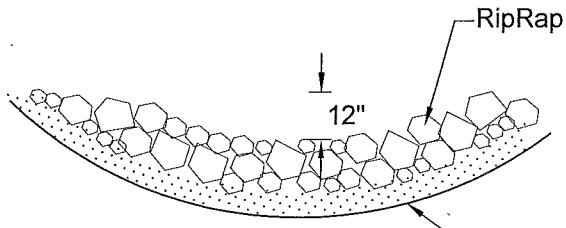
RIPRAP REQUIREMENTS	
12" - 18"	8 - 12 CY
21" - 33"	14 - 20 CY
36" - 48"	23 - 38 CY
54" and up	62 CY and up
One CY is approximately 2,800 Lbs.	

PLAN

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



SECTION A-A



SECTION B-B

City Plate No.: STO-11 Last Revision: 11/10/2009 File: STO_11.dwg	**STANDARD DETAILS** **RIPRAP AT OUTLETS**	City of Minot ENGINEERING DEPARTMENT

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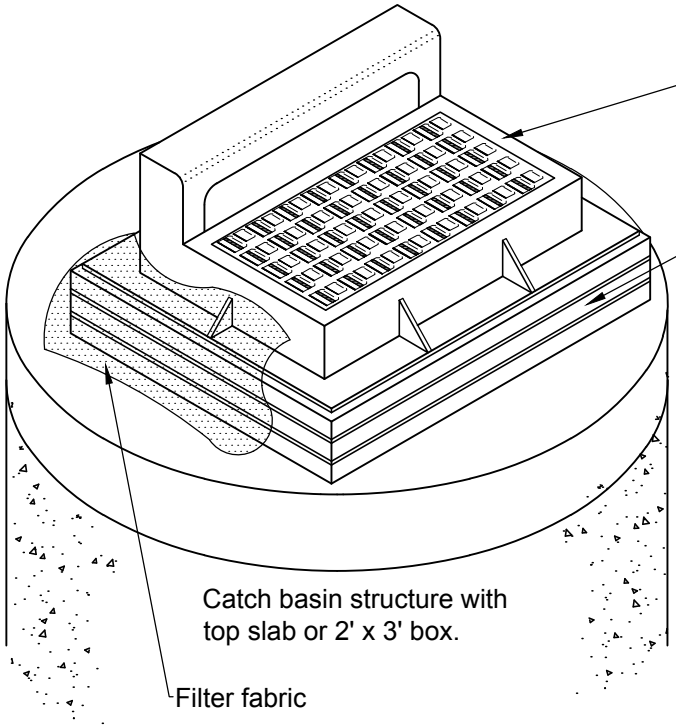
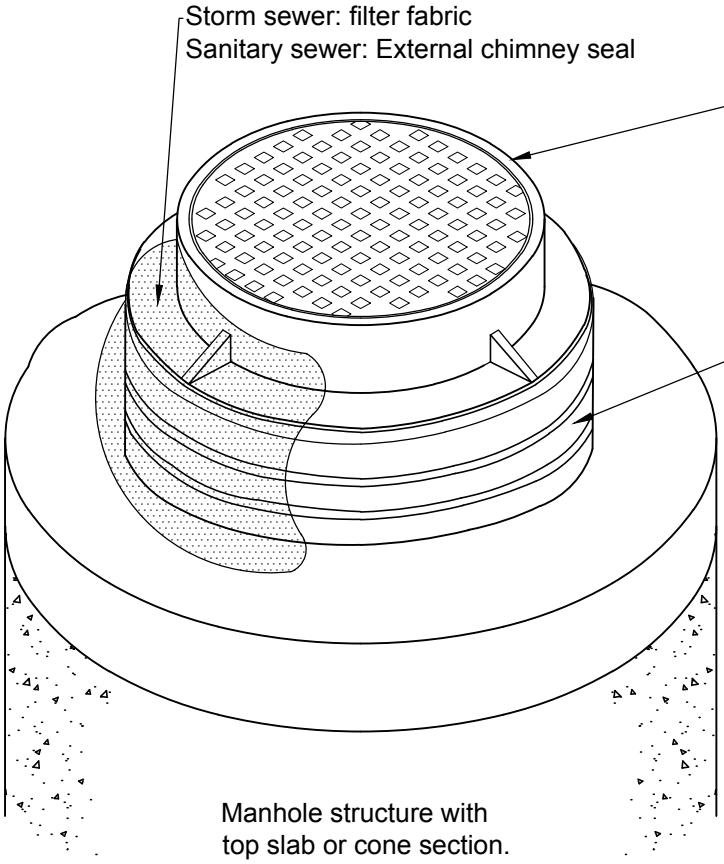


Neenah R3067-L catch basin frame and grate with 2" radius open.

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.



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

External chimney seals shall be required on all sanitary sewer manholes.

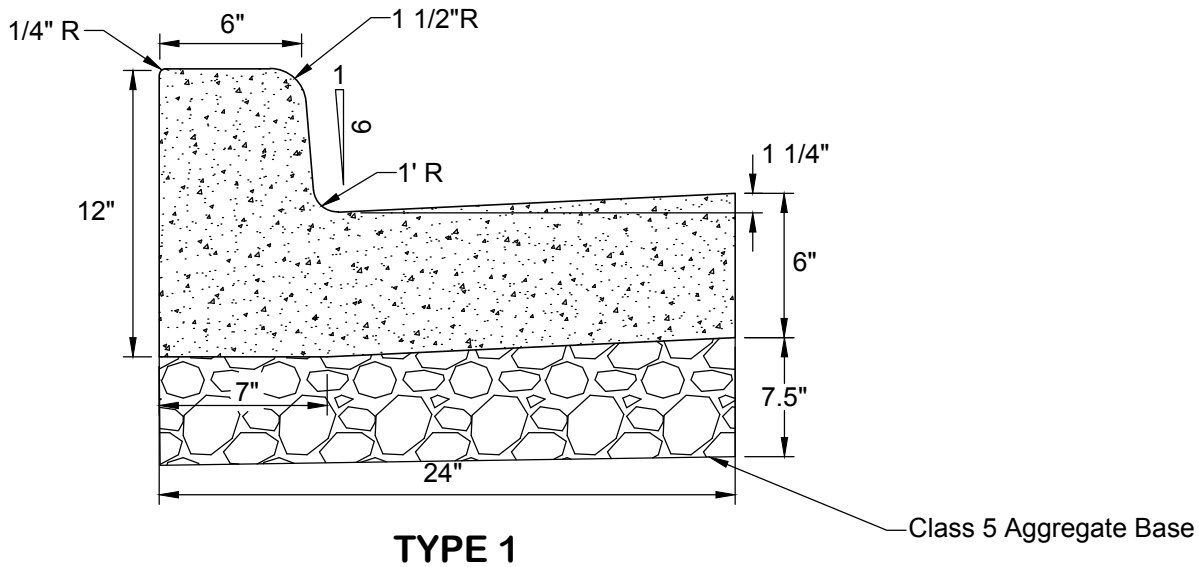
Concrete adjustment rings with 3/8" mortar between top slab and 1st ring, 1/4" minimum between all rings. Min. of 2", max. of 12" adjustment. Woven filter fabric then shall be wrapped around entire system as specified.

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

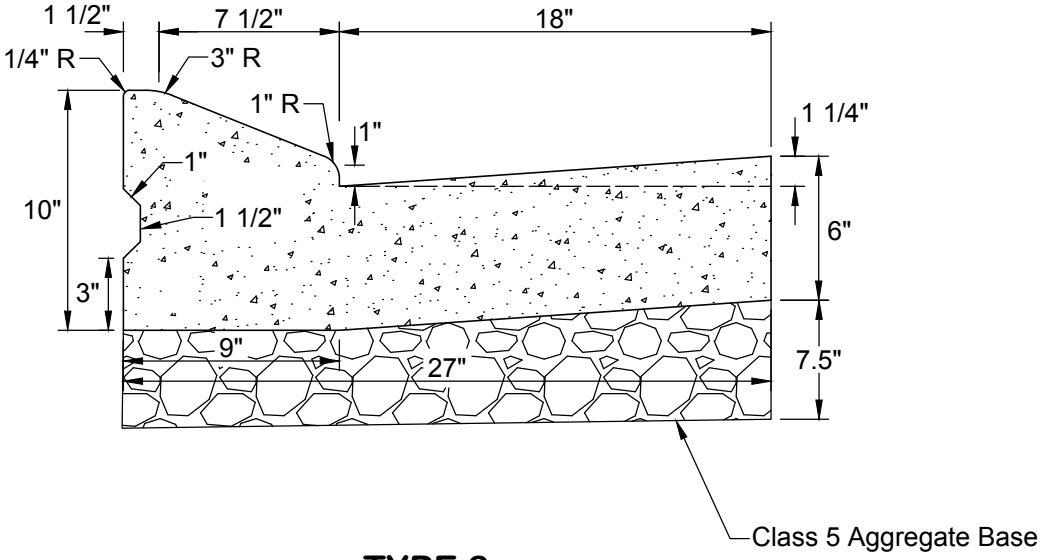
Interior manhole rings shall be neatly mortared. Rings shall be wiped clean.

City Plate No.: STR-1 Last Revision: 1/23/2013 File: STR_1.dwg	**STANDARD DETAILS** **CATCH BASIN AND MANHOLE ADJUSTMENT**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\STR_1.dwg



TYPE 1

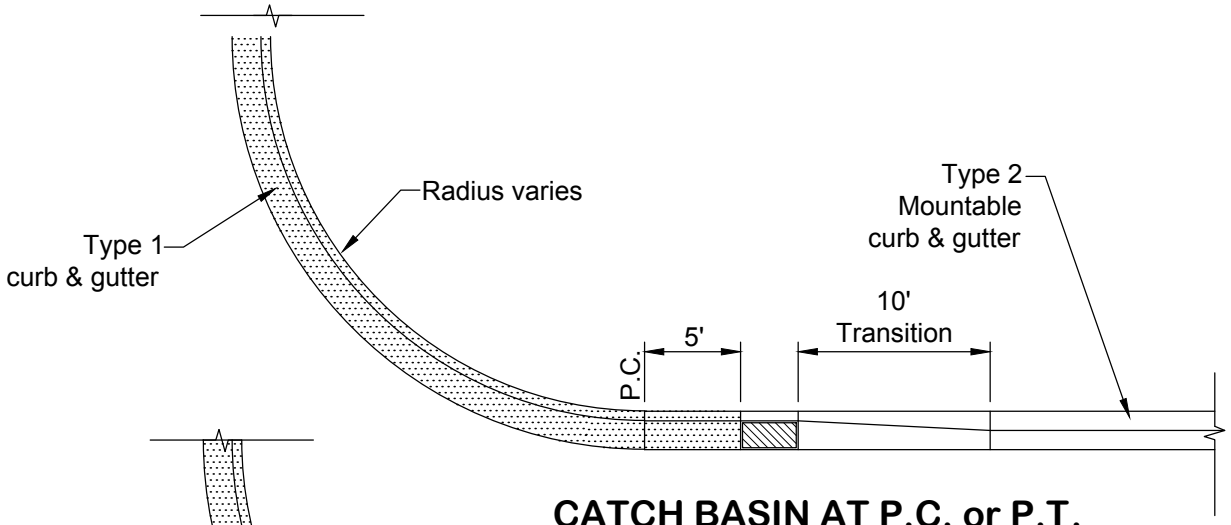


TYPE 2
(MOUNTABLE)

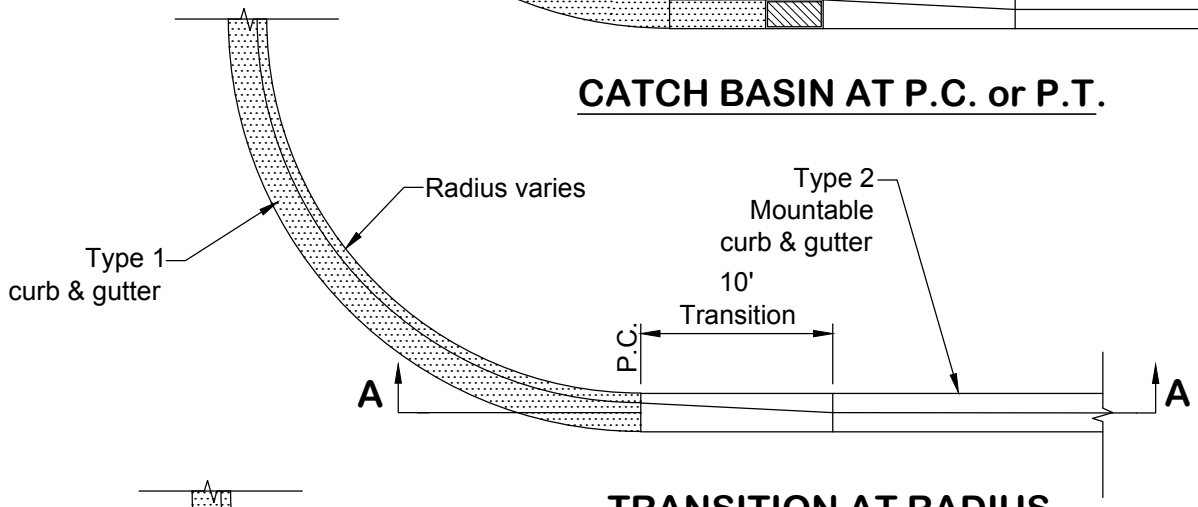
As approved by City Engineer.

City Plate No.: STR-2 Last Revision: 9/24/2010 File: STR_2.dwg	**STANDARD DETAILS** **CURB AND GUTTER**	City of Minot ENGINEERING DEPARTMENT

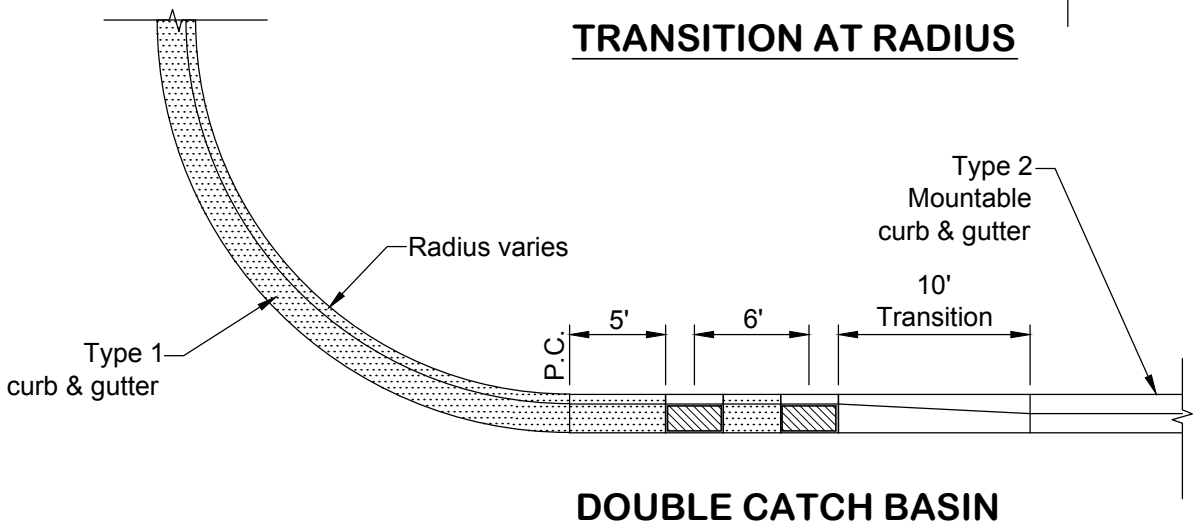
P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\STR_2.dwg



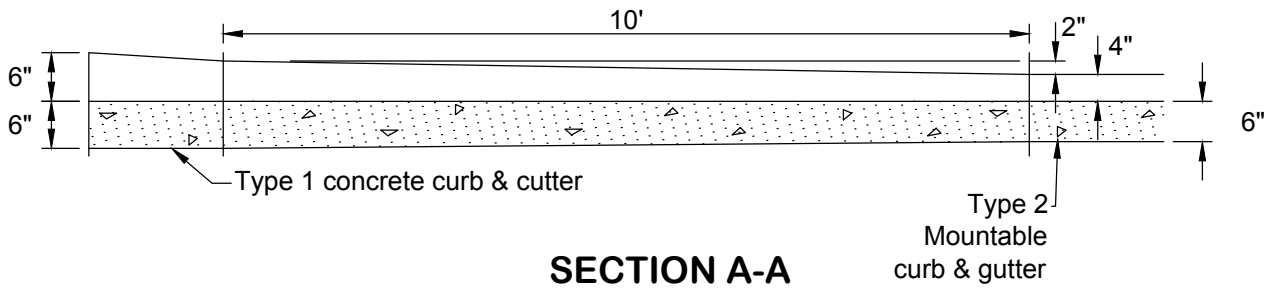
CATCH BASIN AT P.C. or P.T.



TRANSITION AT RADIUS



DOUBLE CATCH BASIN



SECTION A-A

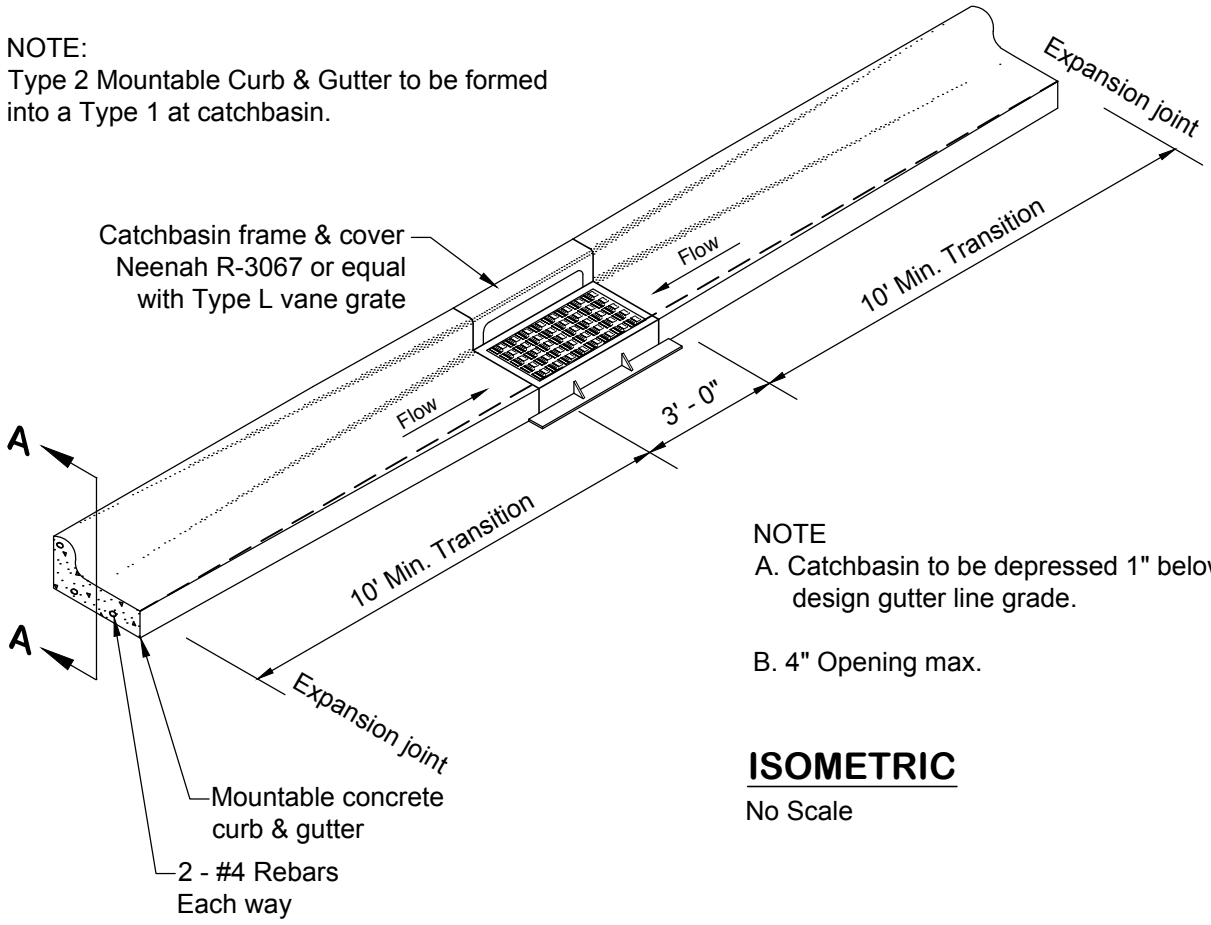
City Plate No.:	STR-3
Last Revision:	9/24/2010
File:	STR_3.dwg

STANDARD DETAILS
CONCRETE CURB & GUTTER TRANSITION

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\STR_3.dwg

NOTE:
Type 2 Mountable Curb & Gutter to be formed into a Type 1 at catchbasin.

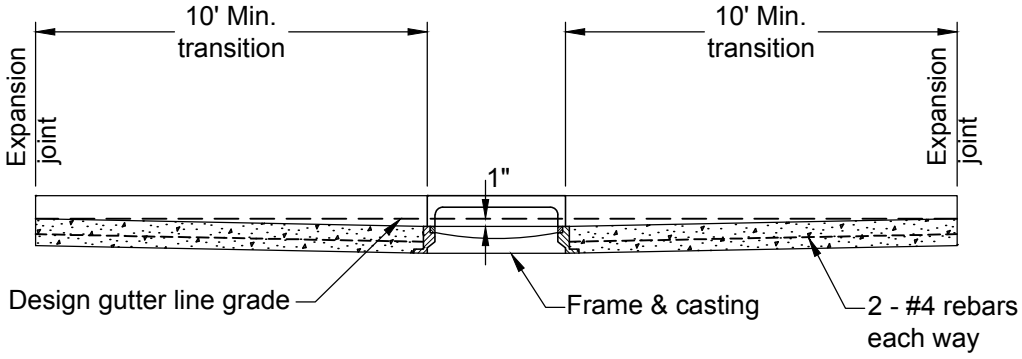


NOTE
A. Catchbasin to be depressed 1" below design gutter line grade.

B. 4" Opening max.

ISOMETRIC

No Scale

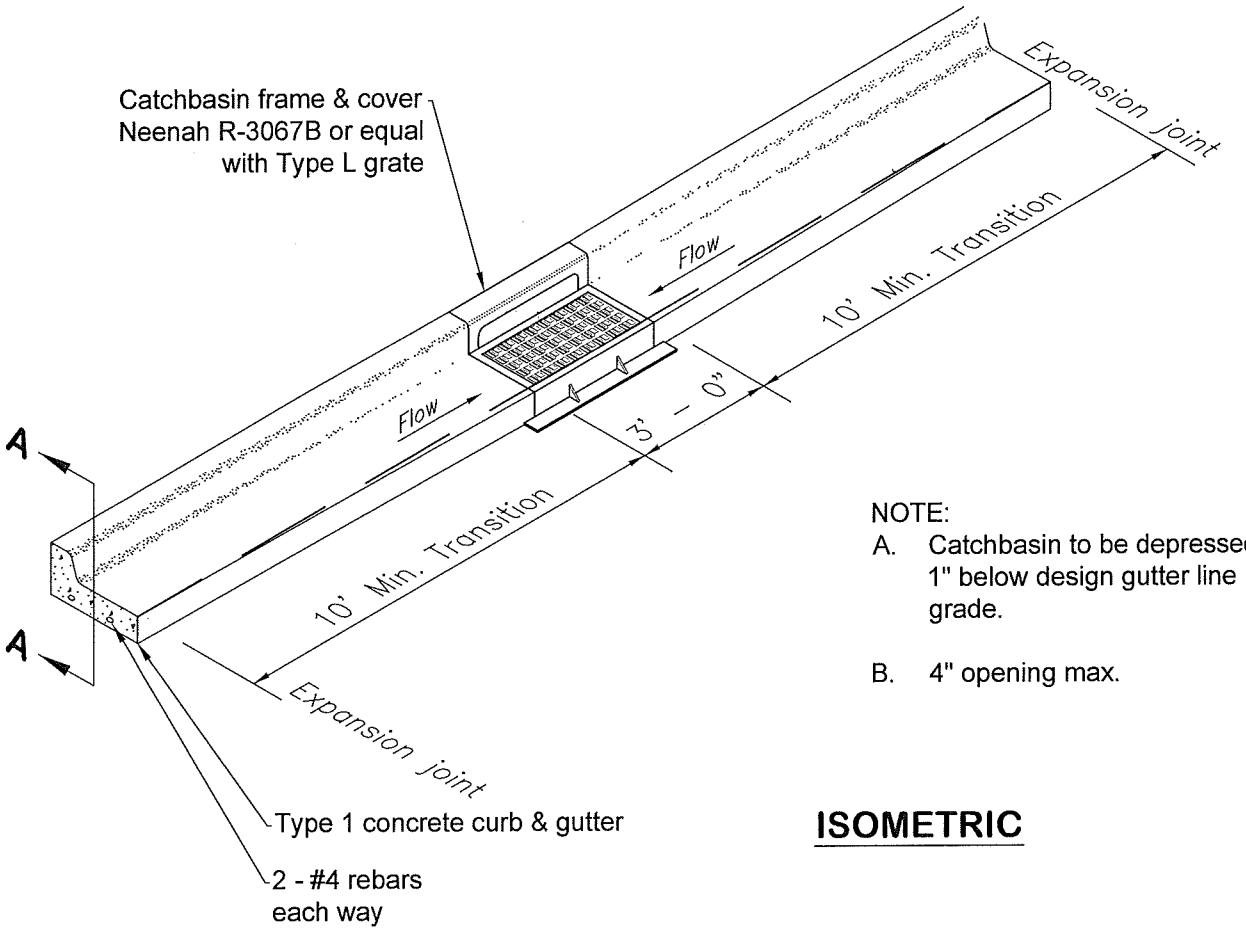


SECTION A-A

No Scale

City Plate No.: STR-4 Last Revision: 9/24/2010 File: STR_4.dwg	**STANDARD DETAILS** **MOUNTABLE CURB & GUTTER CONSTRUCTION AT CATCHBASIN**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3378 - 2011 Standard Specifications\Design\Plans & Specifications\2011 Standard Specifications\Detail Plates\STR_4.dwg

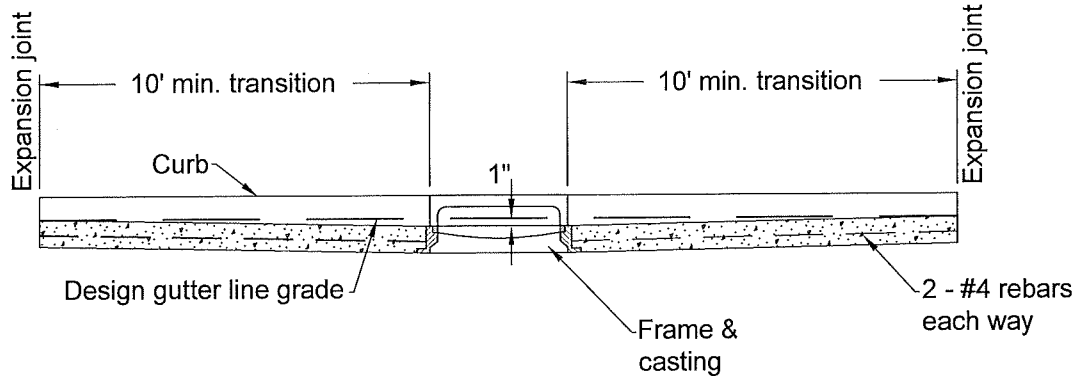


NOTE:

A. Catchbasin to be depressed 1" below design gutter line grade.

B. 4" opening max.

ISOMETRIC



SECTION A-A

City Plate No.:	STR-5
Last Revision:	11/10/2009
File:	STR_5.dwg

STANDARD DETAILS
TYPE I CURB AND GUTTER CONSTRUCTION AT CATCHBASIN

City of Minot
ENGINEERING DEPARTMENT

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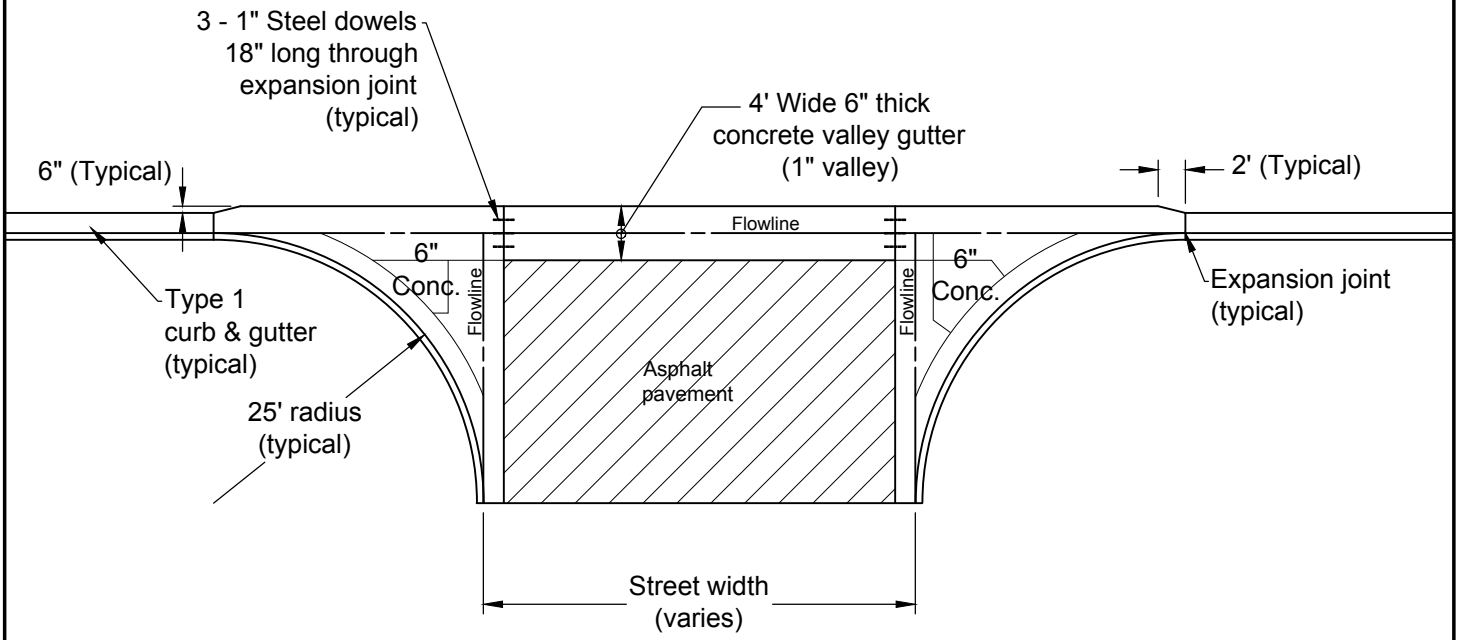

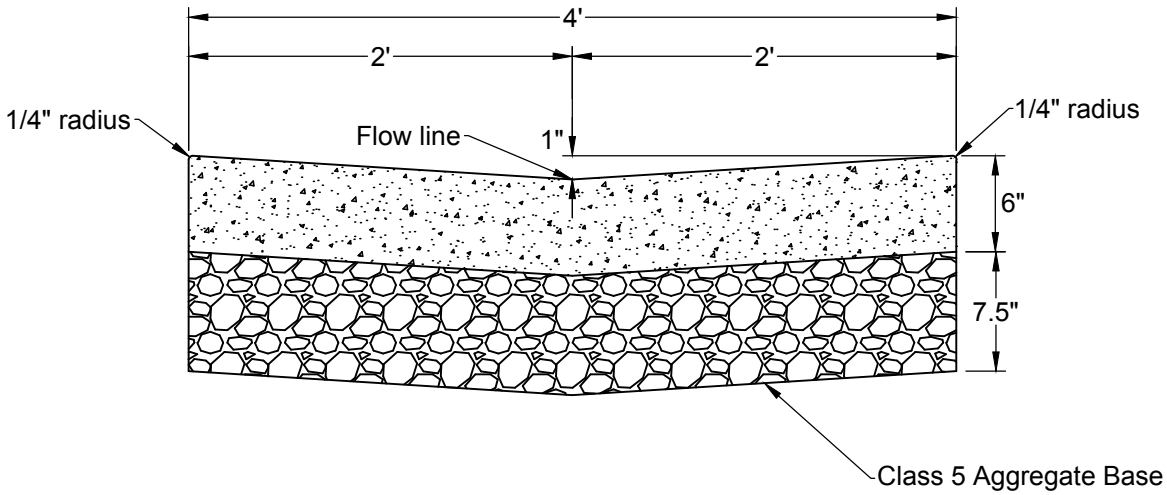

City Plate No.:	STR-6
Last Revision:	1/21/2013
File:	STR_6

STANDARD DETAILS
CONCRETE VALLEY GUTTER

City of Minot
ENGINEERING DEPARTMENT

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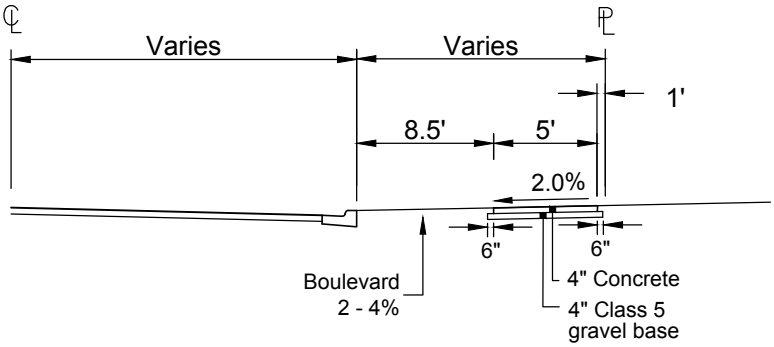
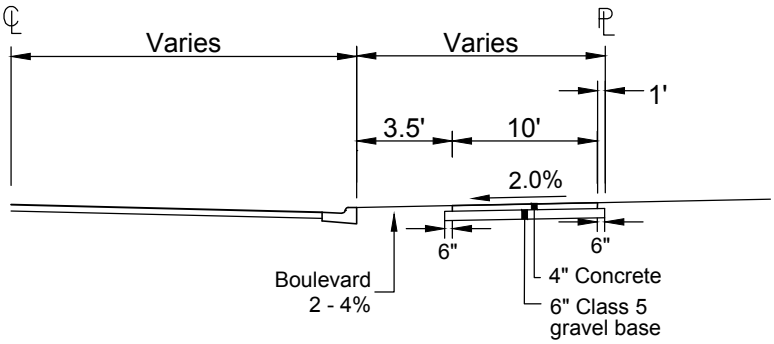


Broom finish

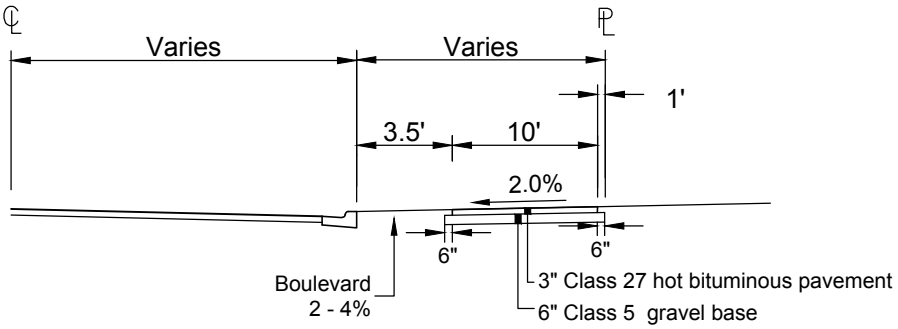
CONTRACTION JOINTS:
1. 5' Spacing tooled joints.
2. 3/4" Min depth.

TYPICAL CONCRETE SIDEWALK



Broom finish

TYPICAL CONCRETE SHARED USE PATH



TYPICAL BITUMINOUS SHARED USE PATH

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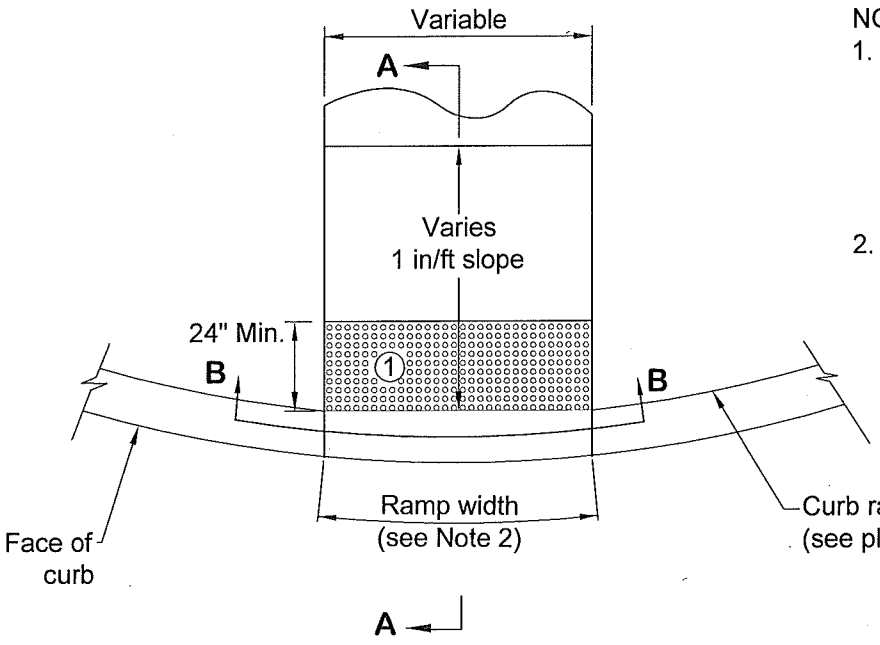
City Plate No.:	STR-7
Last Revision:	1/21/2013
File:	STR_7.dwg

STANDARD DETAILS
CONCRETE AND BITUMINOUS SIDEWALK AND PATHWAYS

City of Minot
ENGINEERING DEPARTMENT

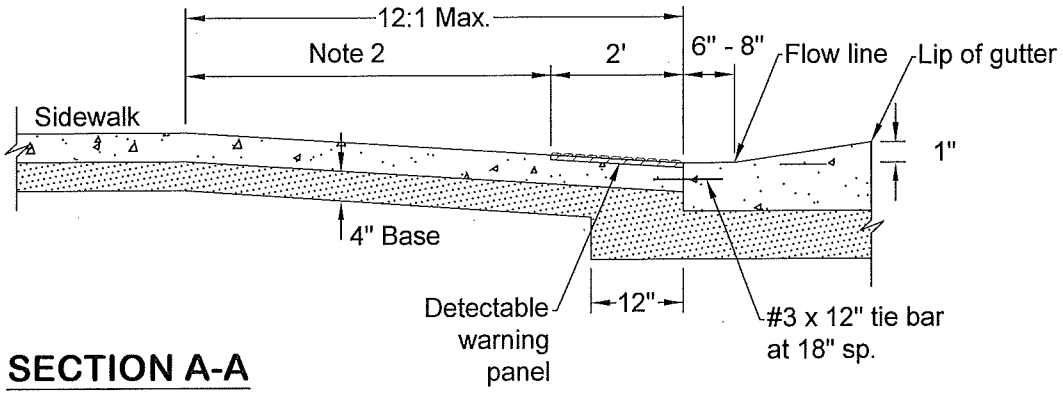


NOTES:

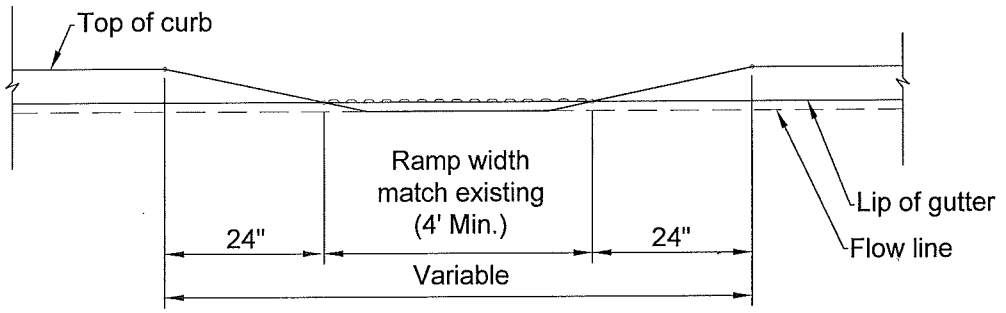
1. ADA required detectable warning panels shall be installed to match the ramp width (the usable portion of ramp).

2. For sidewalk installations, a 5' ramp width should be used. Where site conditions do not allow, a 4' ramp width may be used.

PLAN



SECTION A-A



SECTION B-B

City Plate No.: STR-8 Last Revision: 11/10/2009 File: STR_8.dwg	**STANDARD DETAILS** **PEDESTRIAN CURB RAMP** **PATHWAY / SIDEWALK**	City of Minot ENGINEERING DEPARTMENT

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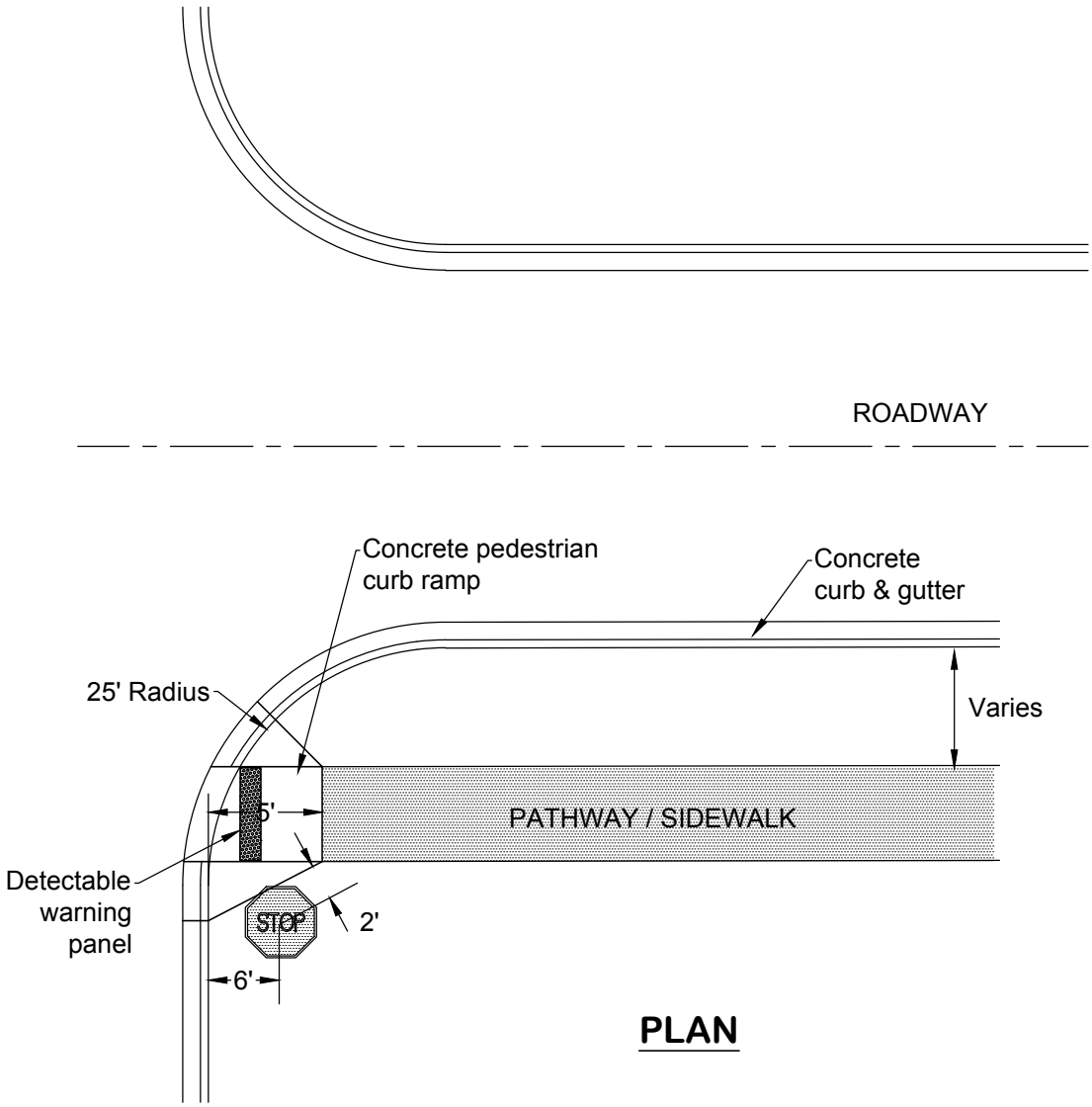
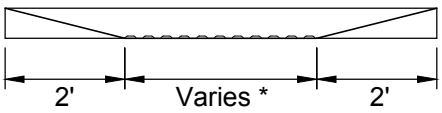


PLAN



* Same width as PATHWAY/TRAIL/SIDEWALK

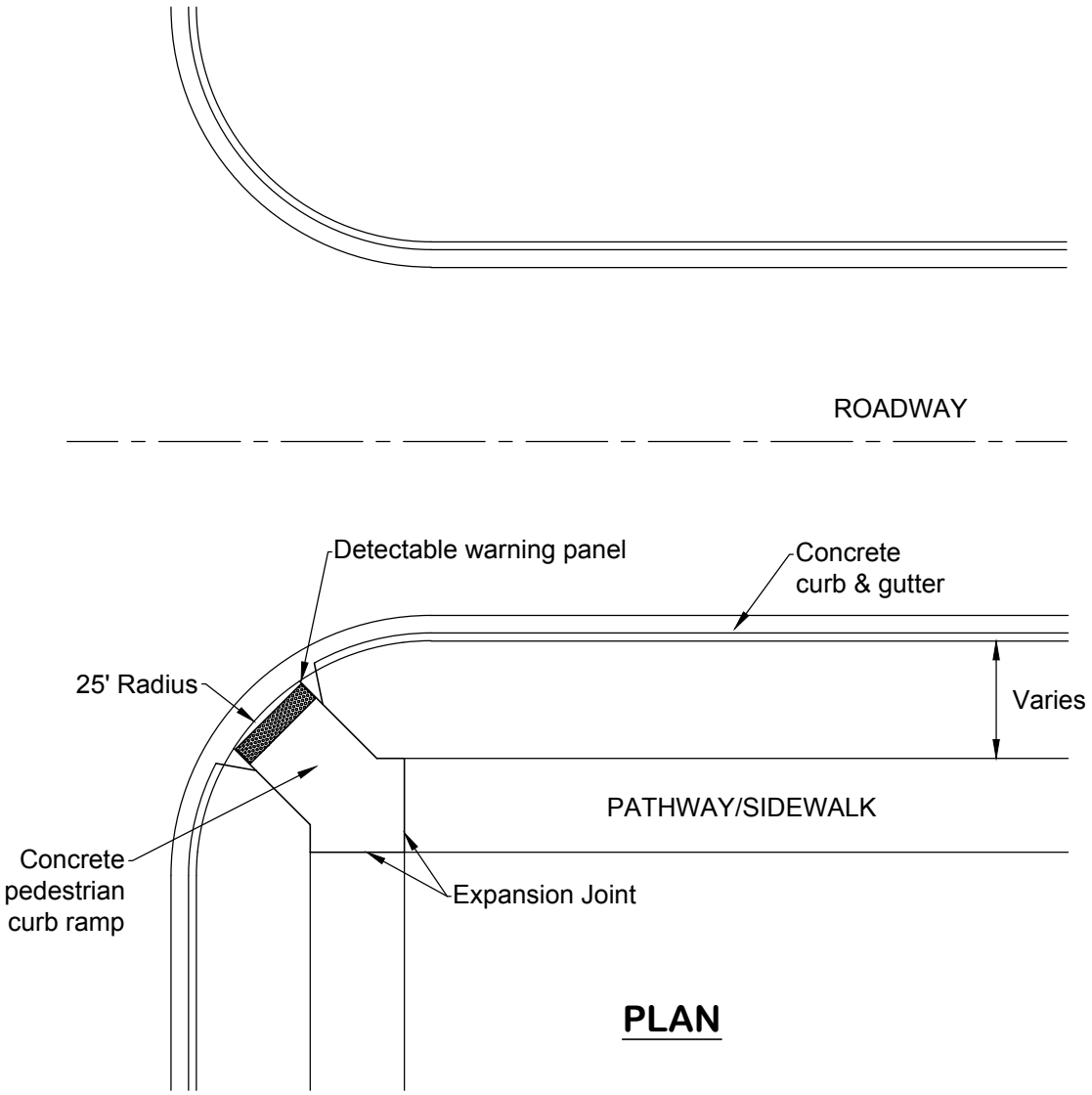
PROFILE

City Plate No.:	STR-9
Last Revision:	1/23/2013
File:	STR_9.dwg

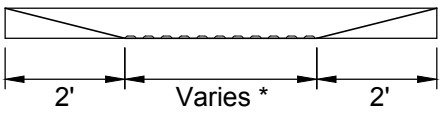
STANDARD DETAILS
PEDESTRIAN CURB RAMP
GENERAL LOCATION

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\STR_9.dwg



PLAN



* Same width as PATHWAY/SIDEWALK

* Install at mid-radius

PROFILE

City Plate No.:	STR-10
Last Revision:	1/21/2013
File:	STR_10.dwg

STANDARD DETAILS
DOUBLE PEDESTRIAN CURB RAMP
GENERAL LOCATION

City of Minot
ENGINEERING DEPARTMENT

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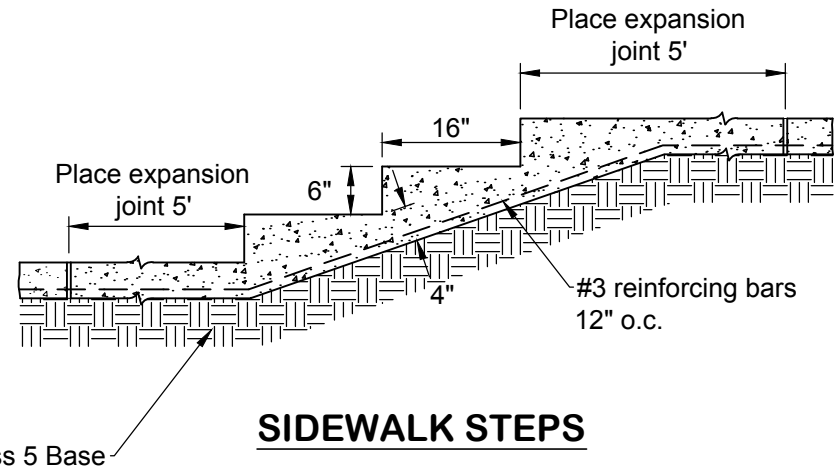
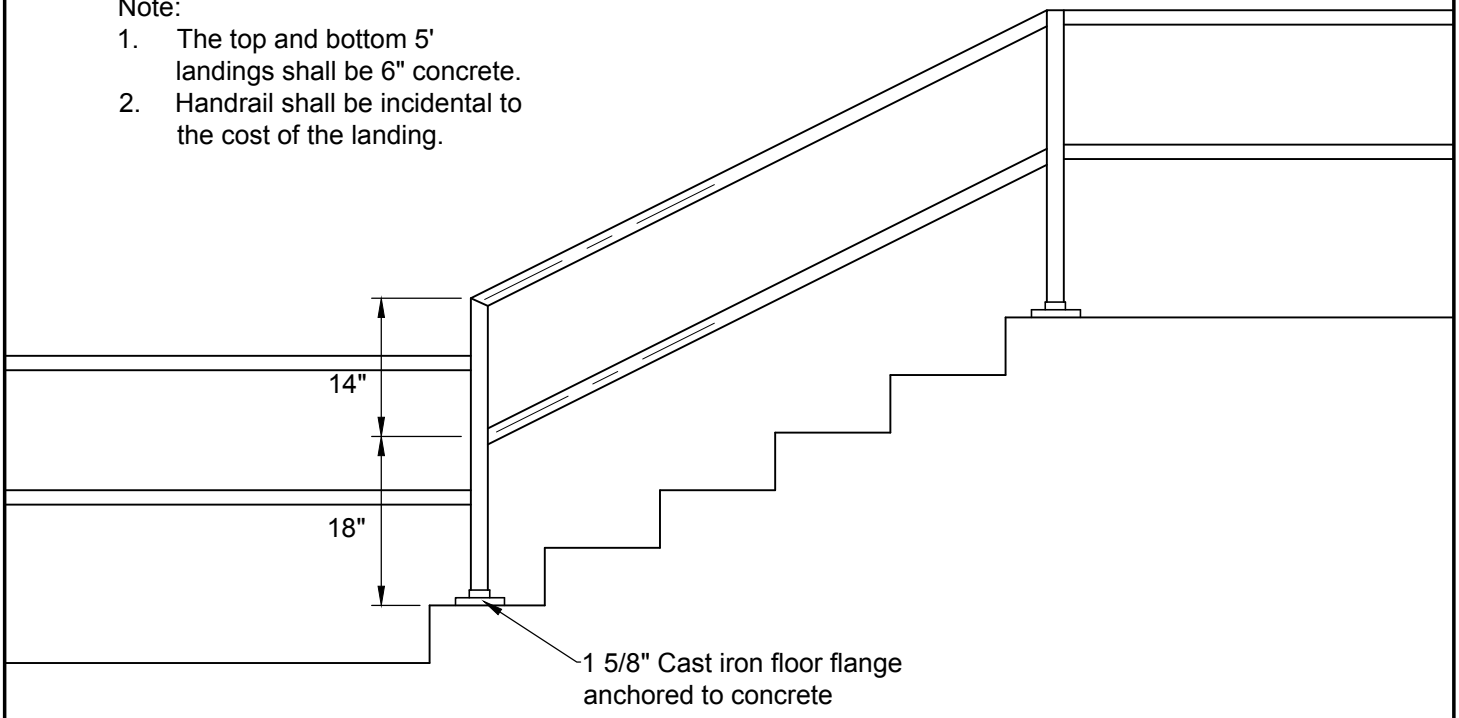


SIDEWALK STEPS

Note:
1. The top and bottom 5' landings shall be 6" concrete.
2. Handrail shall be incidental to the cost of the landing.



HANDRAIL

RAIL: 1 5/8" Standard straight galvanized steel pipe.

JOINTS: Welded or hollaender structural slip-on fittings or equal.

PAINT: One primer coat intended for galvanized steel and one finish coat, rustoleum.

City Plate No.: STR-11 Last Revision: 9/24/2010 File: STR_11.dwg	**STANDARD DETAILS** **SIDEWALK STEPS**	City of Minot ENGINEERING DEPARTMENT

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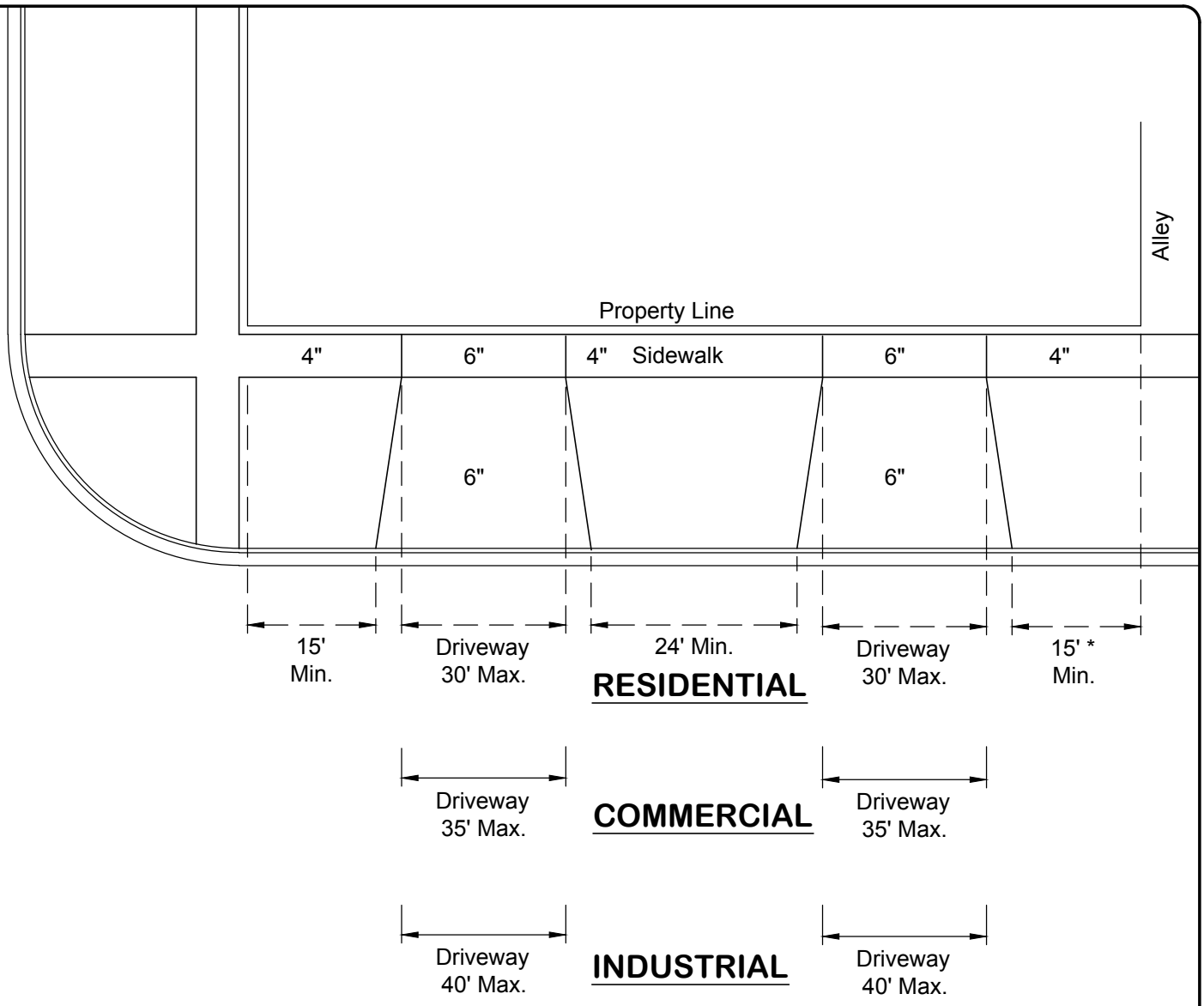

NOTE:

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.

* Some exceptions may apply. Contact the Engineering department.

City Plate No.: STR-12 Last Revision: 11/25/2011 File: STR_12.dwg	**STANDARD DETAILS** **DRIVEWAY PLACEMENT**	City of Minot ENGINEERING DEPARTMENT

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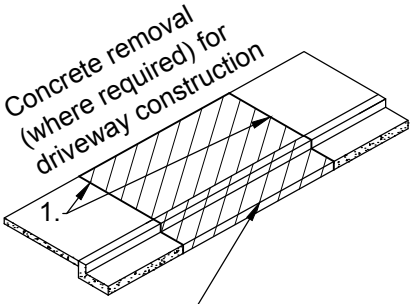
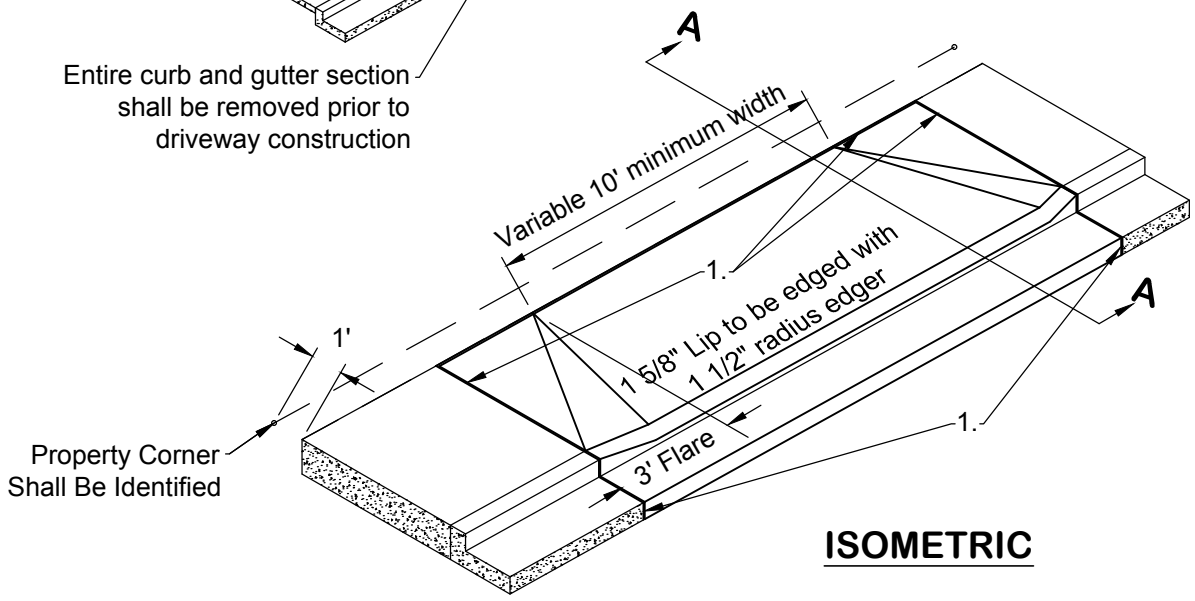


REMOVALS

Entire curb and gutter section shall be removed prior to driveway construction



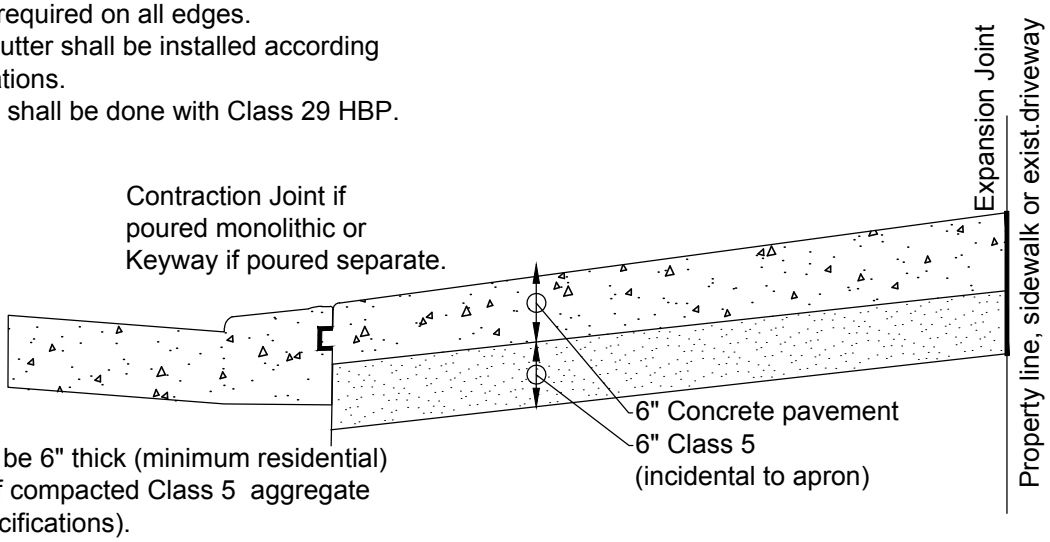
ISOMETRIC

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 specifications.
5. All patches shall be done with Class 29 HBP.



SECTION A-A

City Plate No.:	STR-13
Last Revision:	11/28/2011
File:	STR_13.dwg

STANDARD DETAILS
CONCRETE DRIVEWAY APRON
BOULEVARD 0 to 1 1/2 Ft

City of Minot
ENGINEERING DEPARTMENT

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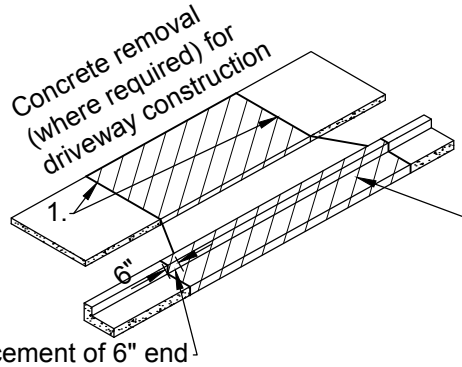
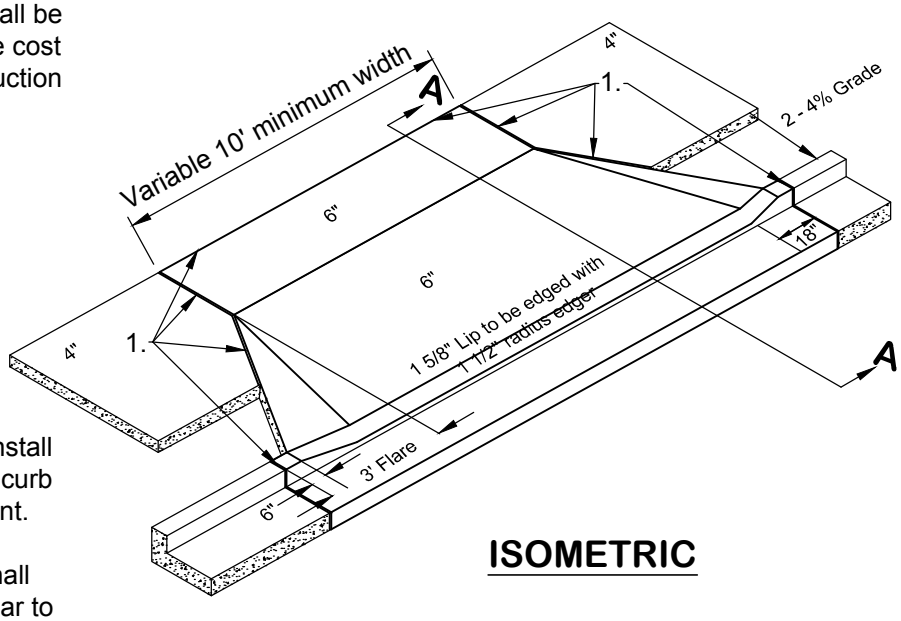
REMOVALS



Entire curb and gutter section shall be removed prior to driveway construction

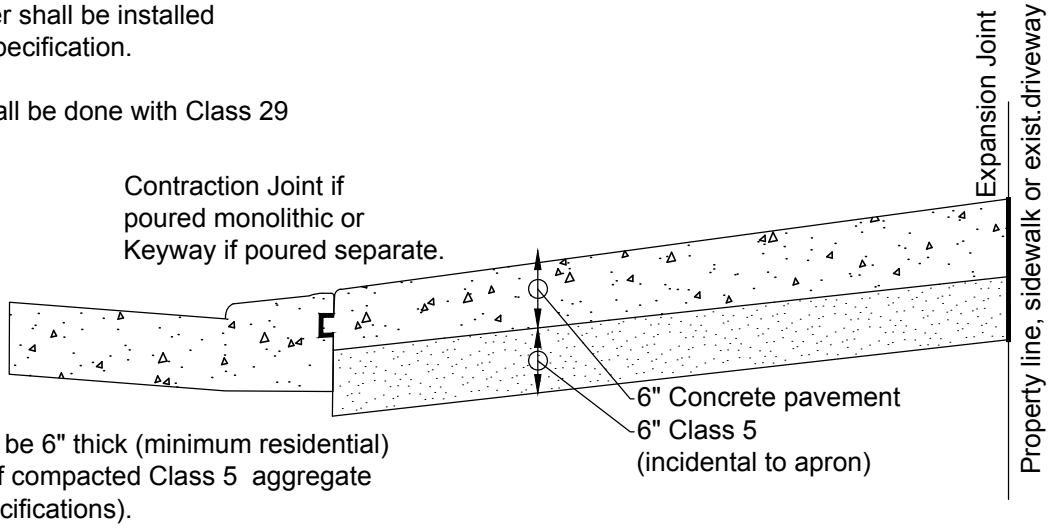
Replacement of 6" end sections shall be incidental to the cost of driveway construction



ISOMETRIC

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.
5. All patches shall be done with Class 29 HBP.



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

SECTION A-A

City Plate No.:	STR-14
Last Revision:	1/21/2013
File:	STR_14.dwg

STANDARD DETAILS
CONCRETE DRIVEWAY APRON
BOULEVARD 1 1/2 FT TO 4FT

City of Minot
ENGINEERING DEPARTMENT

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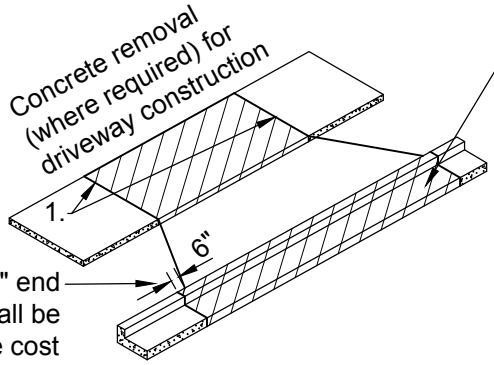
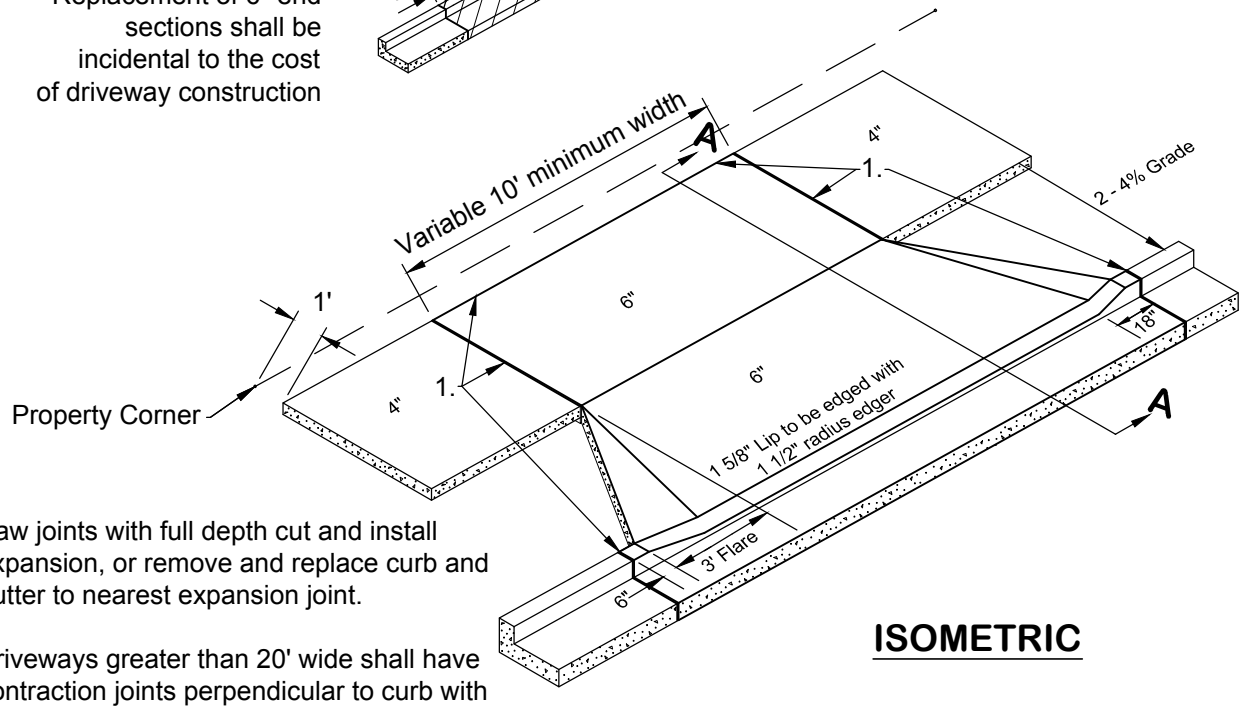


Entire curb and gutter section shall be removed prior to driveway construction

REMOVALS

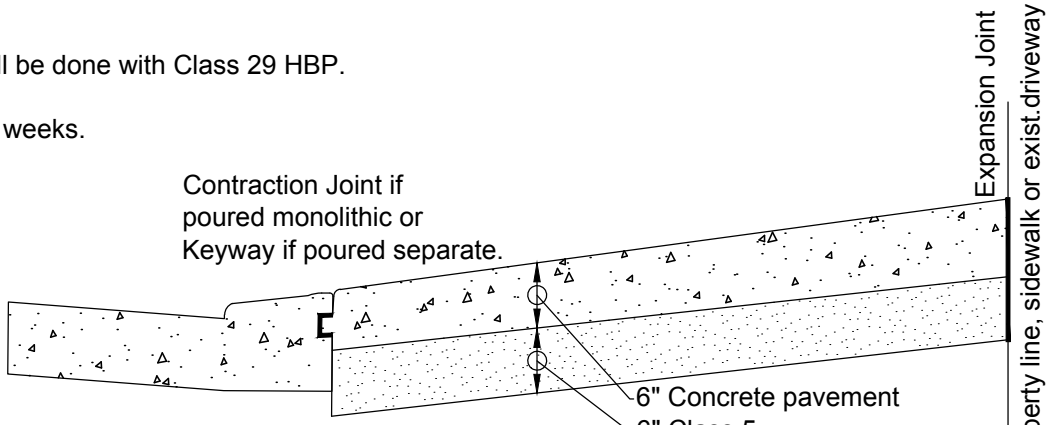
Replacement of 6" end sections shall be incidental to the cost of driveway construction



ISOMETRIC

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.
5. All patches shall be done with Class 29 HBP.
6. Backfill within 2 weeks.



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

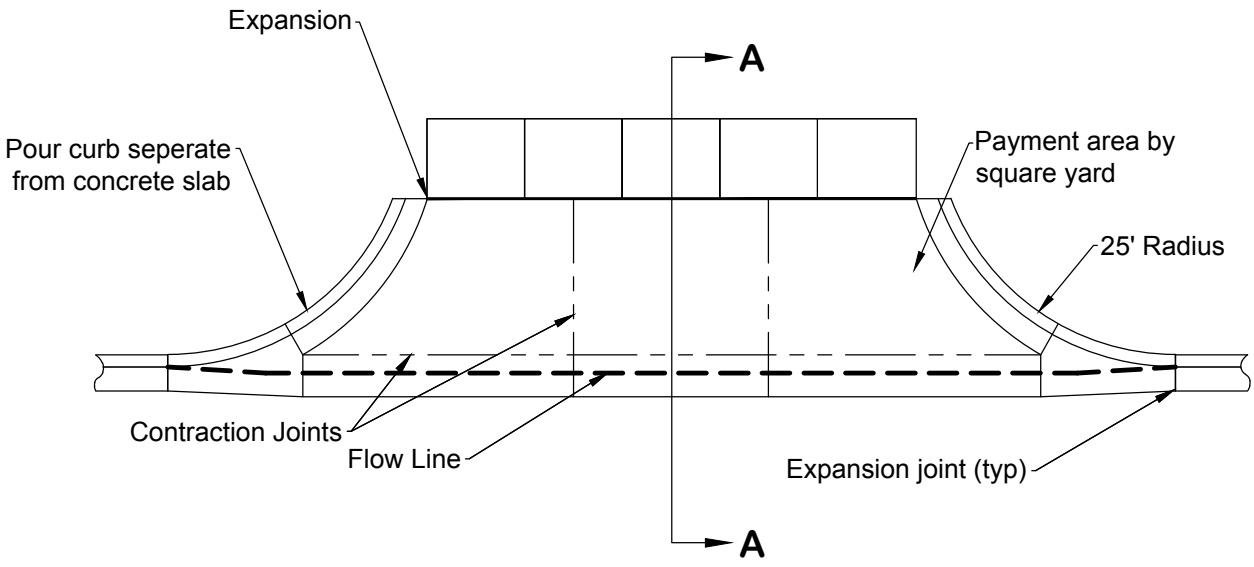
SECTION A-A

City Plate No.:	STR-15
Last Revision:	1/21/2013
File:	STR_15.dwg

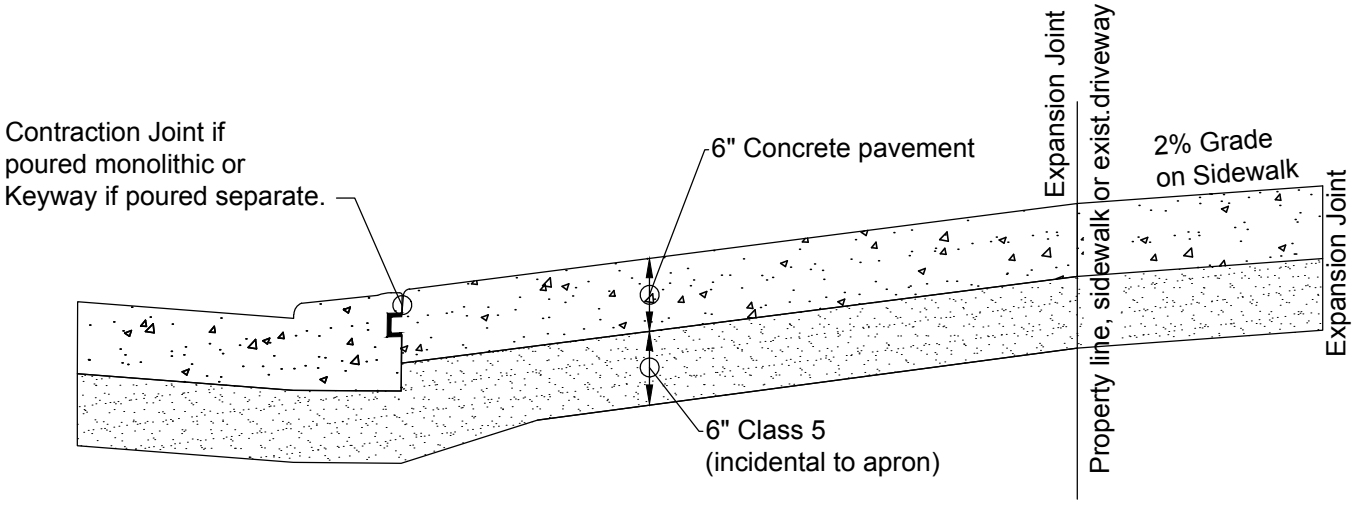
STANDARD DETAILS
CONCRETE DRIVEWAY APRON
BOULEVARD GREATER THAN 4'

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\STR_15.dwg



PLAN

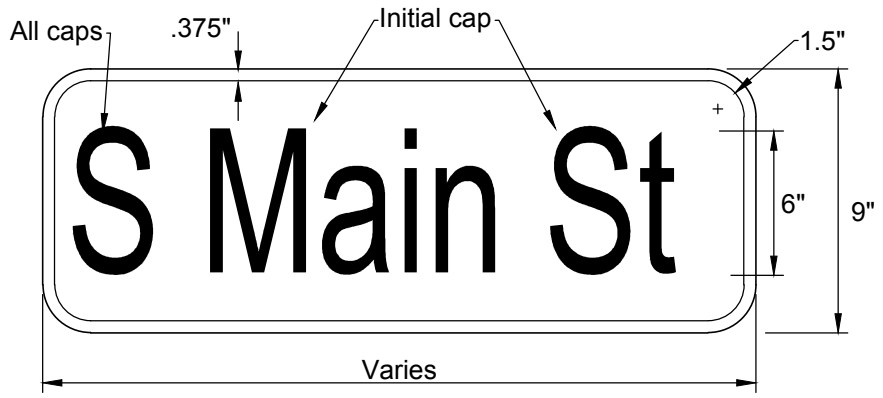


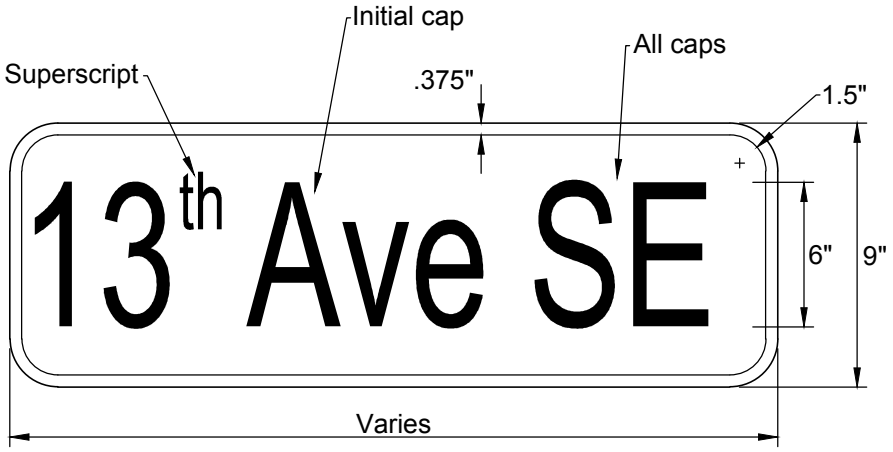
Concrete is to be 6" thick (minimum) and have 6" of compacted Class 5 aggregate base (see specifications).

SECTION A-A

City Plate No.: STR-16 Last Revision: 1/21/2013 File: STR_16.dwg	**STANDARD DETAILS** **CONCRETE DRIVEWAY APRON** **COMMERCIAL**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\STR_16.dwg





NOTE:

1. Series B font
2. 9" Tall blank
3. 6" tall lettering
4. Directions (NE, NW, SE, SW) in caps
5. St., Ave., initial letter cap rest lower case
6. Named streets first letter cap rest lower case
7. Numbered streets (i.e. 3rd, 5th) rd & th superscript
8. White letters on green background
9. White border 0.375 inch

City Plate No.: STR-17

Last Revision: 9/24/2010

File: STR_17.dwg

STANDARD DETAILS
STREET SIGNS

City of Minot
ENGINEERING DEPARTMENT

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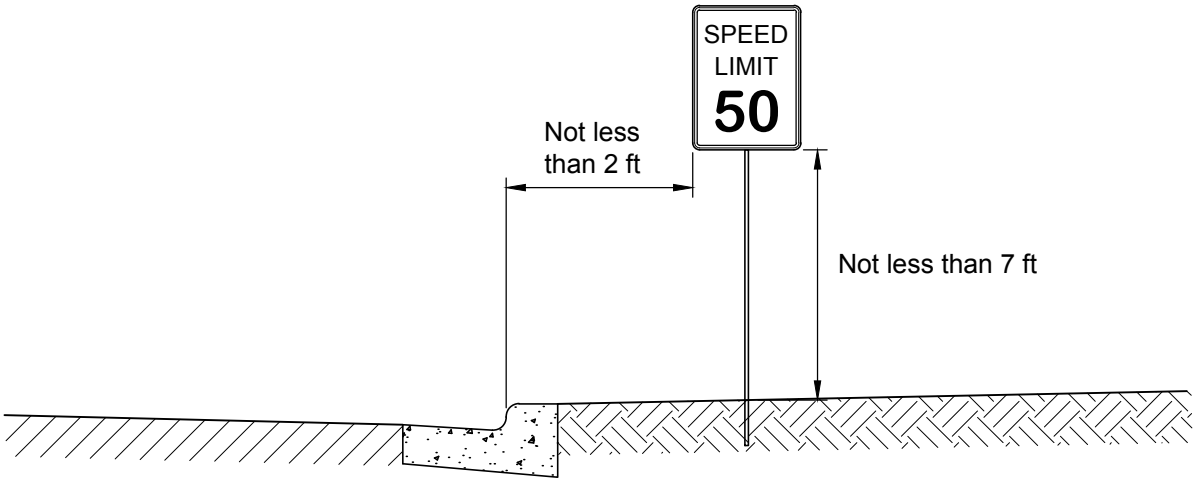
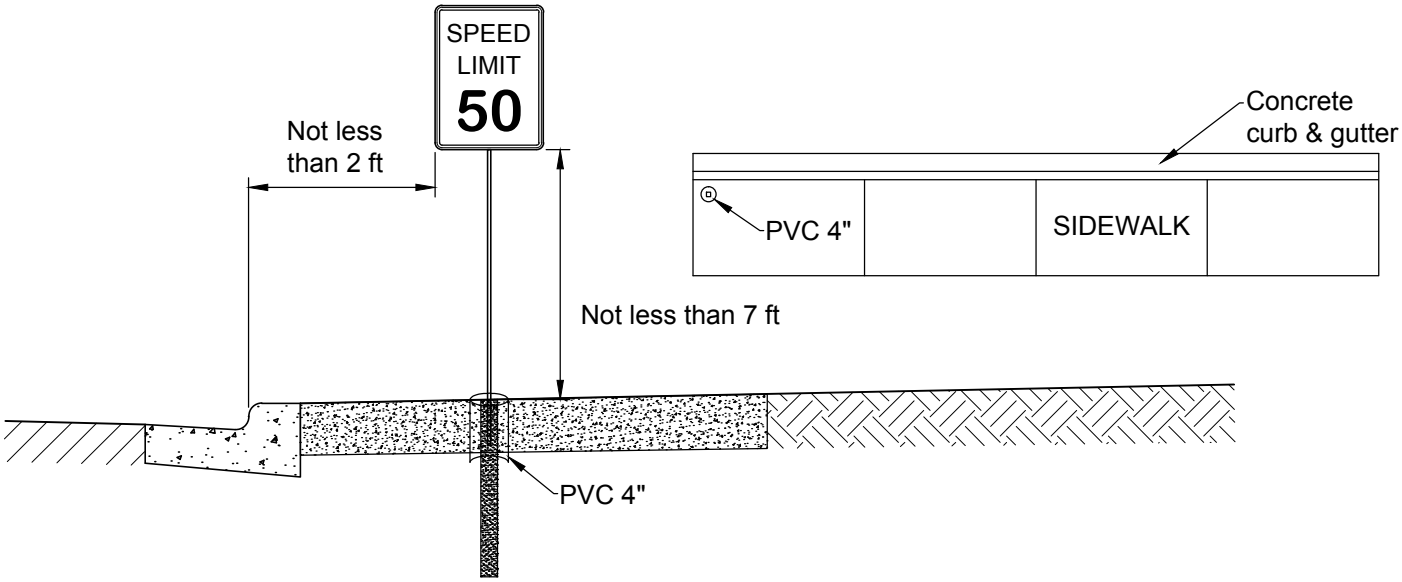
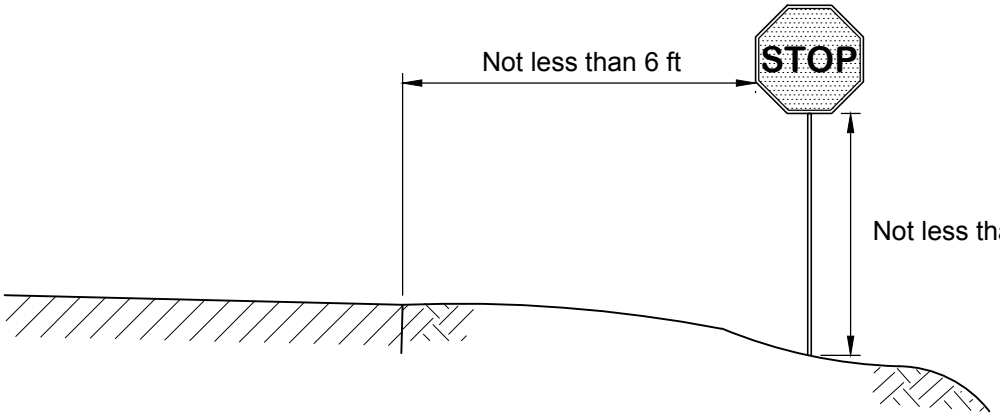


BUSINESS OR RESIDENCE DISTRICT



BUSINESS OR RESIDENCE DISTRICT - SIGN IN SIDEWALK



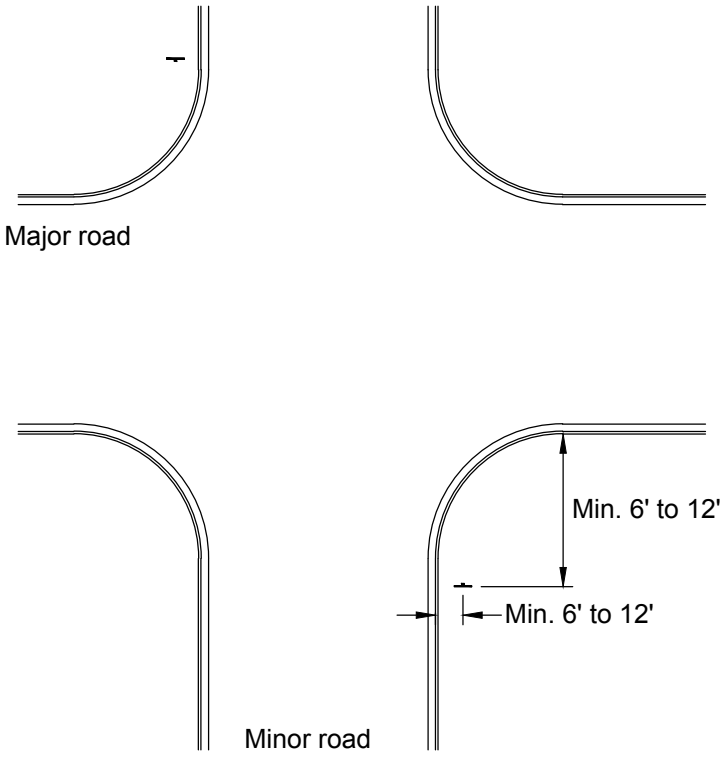
RURAL DISTRICT

City Plate No.:	STR-18
Last Revision:	12/5/2011
File:	STR_18.dwg

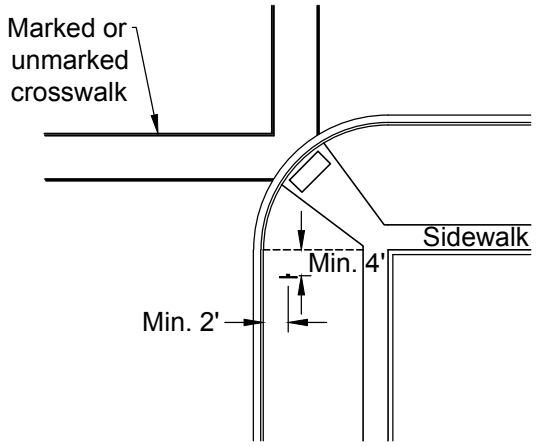
STANDARD DETAILS
TYPICAL SIGN INSTALLATION
LATERAL LOCATIONS

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\STR_18.dwg



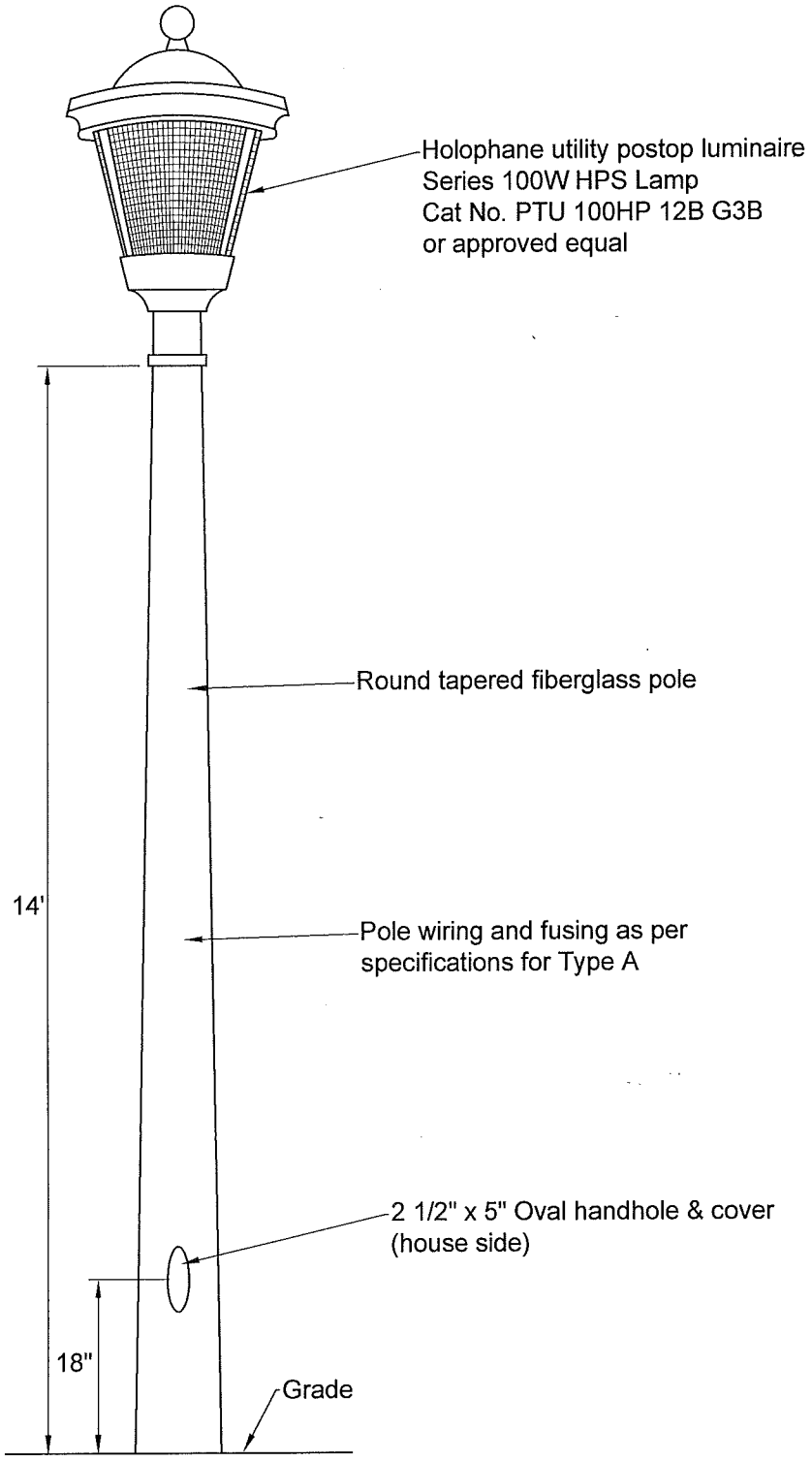
MINOR CROSSROAD



URBAN INTERSECTION

City Plate No.: STR-19	**STANDARD DETAILS** **TYPICAL SIGN INSTALLATION AT INTERSECTIONS**	City of Minot ENGINEERING DEPARTMENT
Last Revision: 1/21/2013		
File: STR_19.dwg		

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\STR_19.dwg



City Plate No.:	STR-20
Last Revision:	11/10/2009
File:	STR_20.dwg

STANDARD DETAILS
TYPE A POLE

City of Minot
ENGINEERING DEPARTMENT

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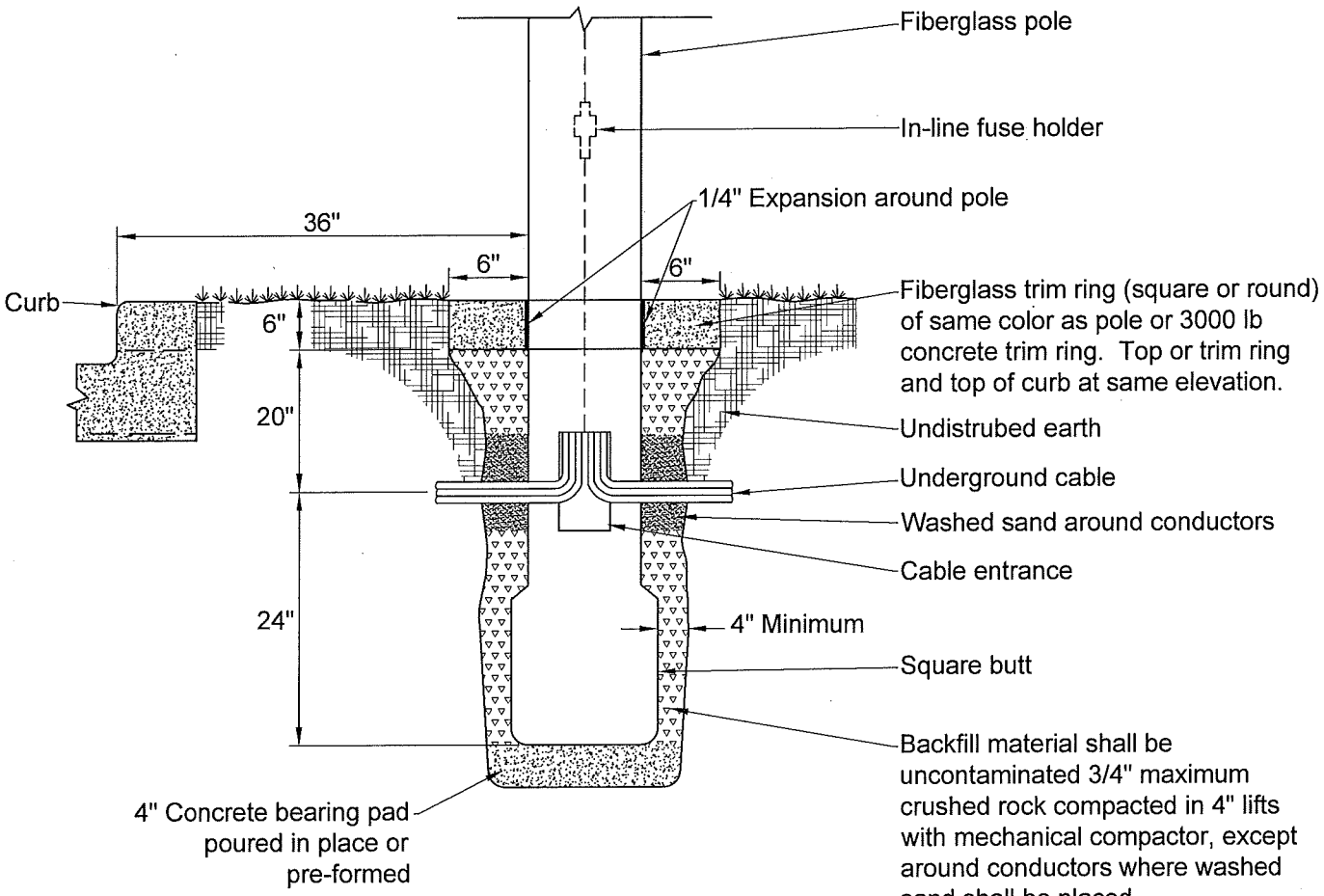
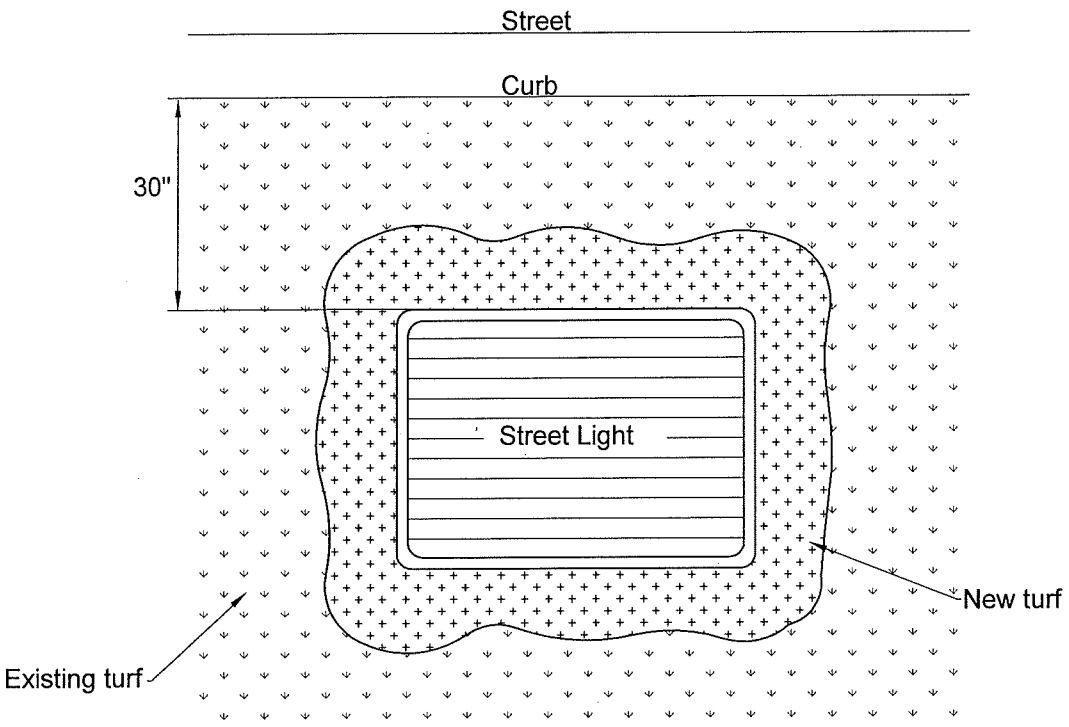


City Plate No.:	STR-21
Last Revision:	11/10/2009
File:	STR_21.dwg

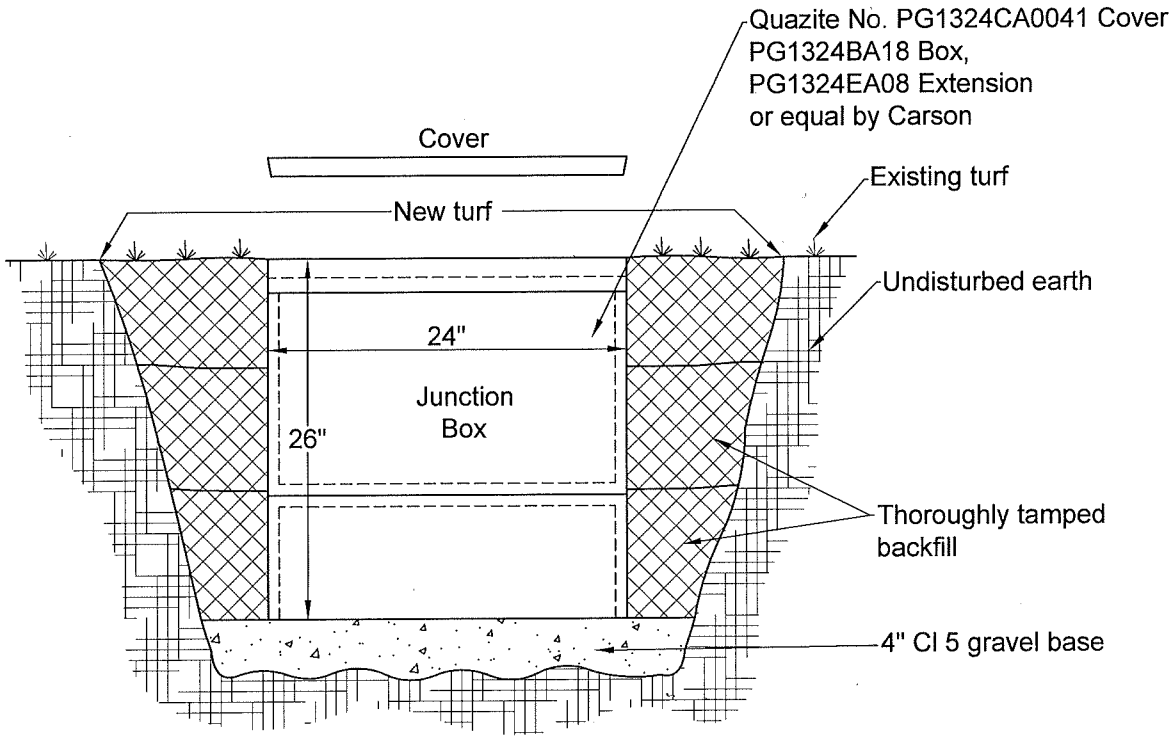
STANDARD DETAILS
TYPE A POLE BASE

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\STR_21.dwg



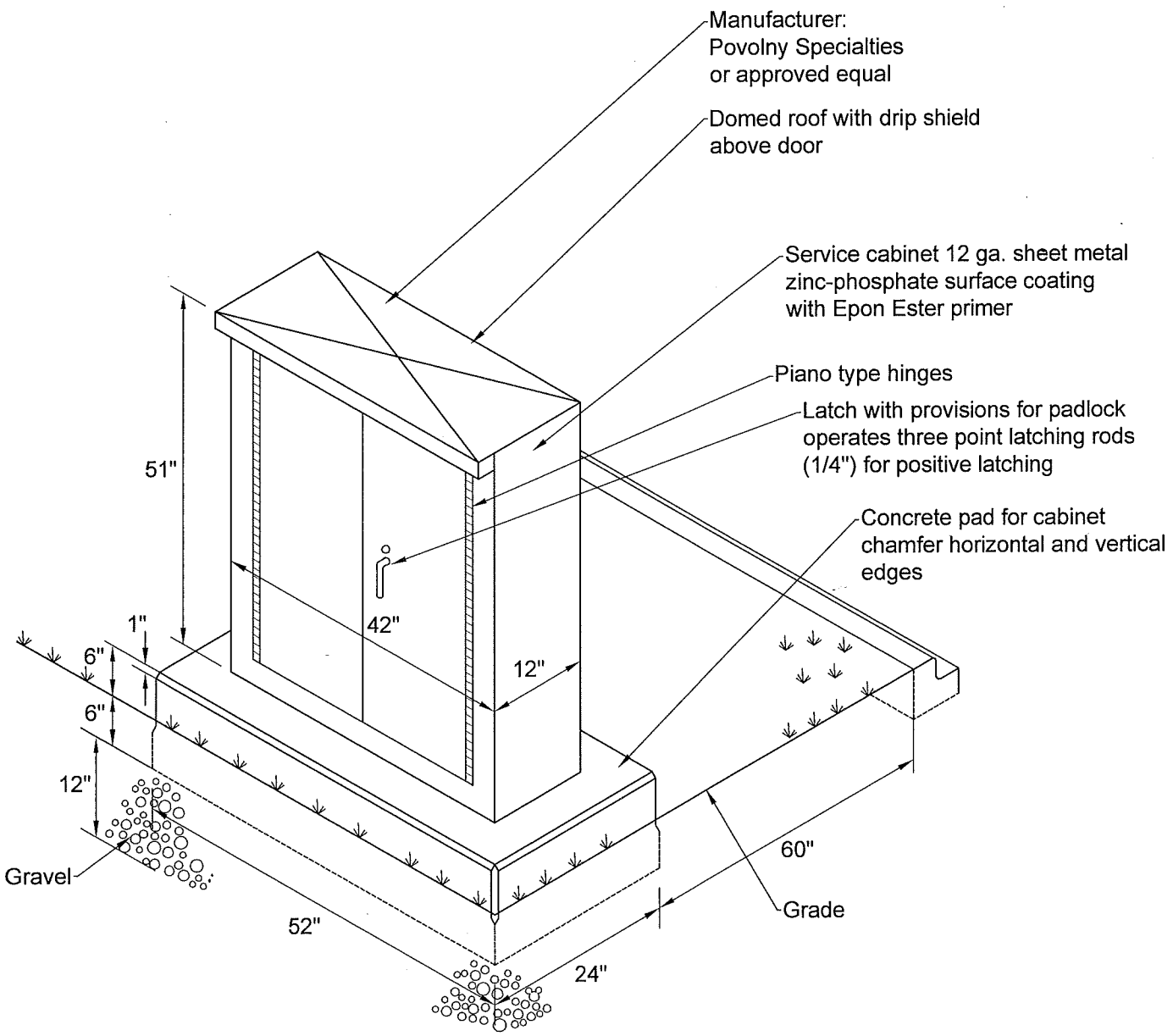
PLAN VIEW



NOTE:
Provide mouse holes as required
for existing and new conductors.

M:\DETAIL PLATES\STR_22.dwg

City Plate No.: STR-22 Last Revision: 11/10/2009 File: STR_22.dwg	**STANDARD DETAILS** **PULL BOX**	City of Minot ENGINEERING DEPARTMENT

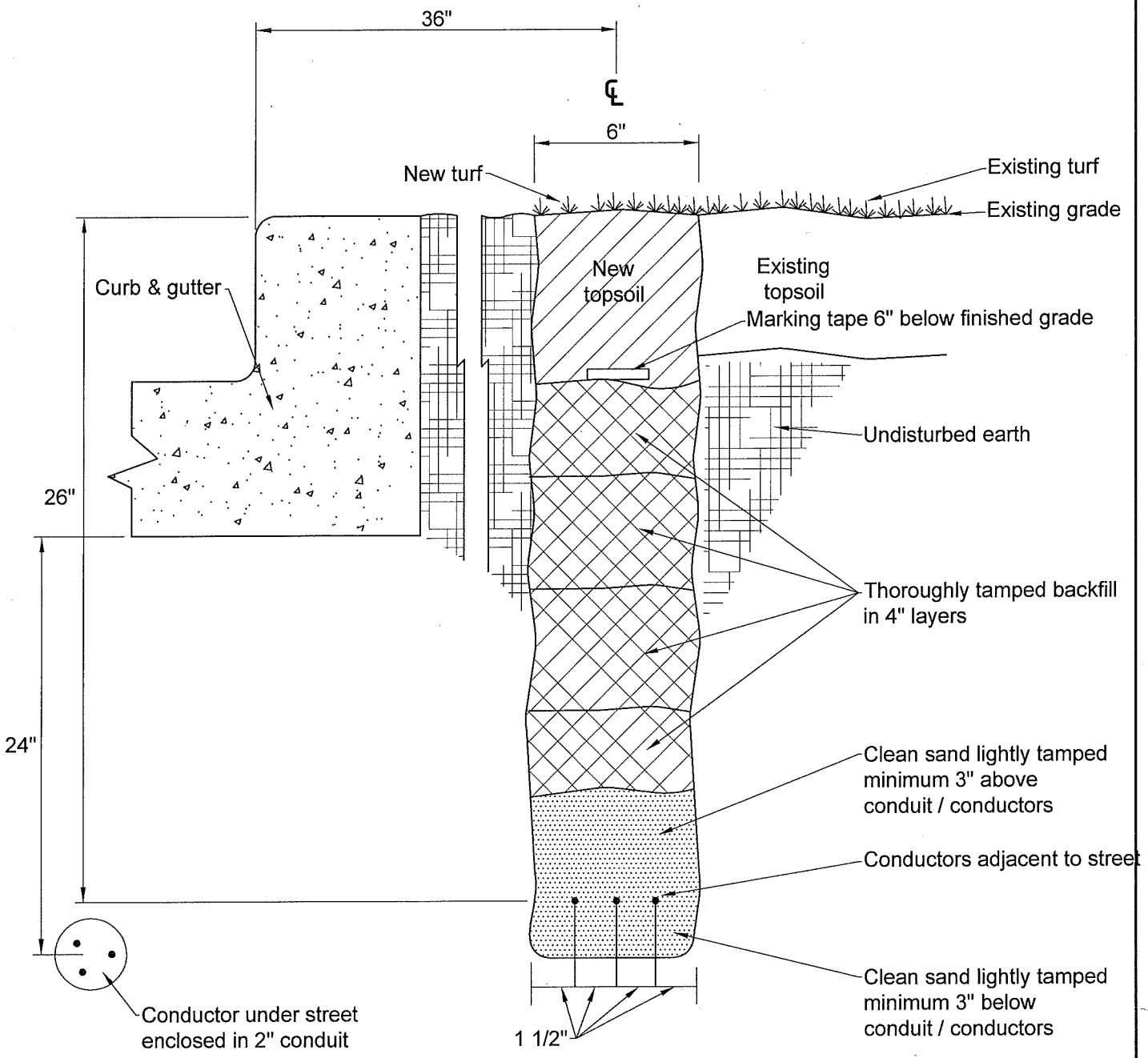


City Plate No.:	STR-23
Last Revision:	11/10/2009
File:	STR_23.dwg

STANDARD DETAILS
FEEDPOINT ENCLOSURE

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\STR_23.dwg

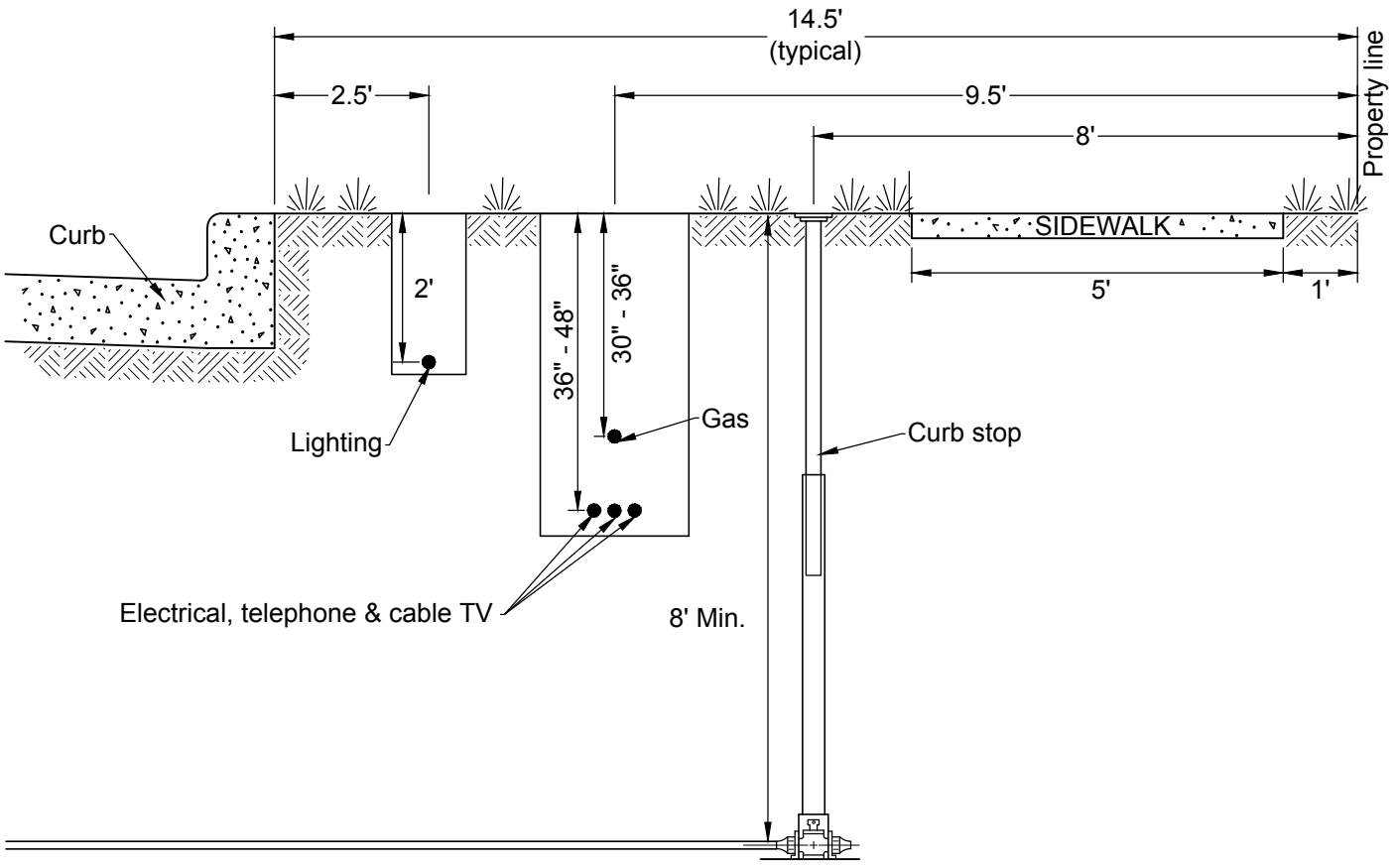


City Plate No.:	STR-24
Last Revision:	11/10/2009
File:	STR_24.dwg

STANDARD DETAILS
UNDERGROUND CABLE

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\STR_24.dwg



NOTES:

1. Placement in narrower boulevards shall be approved by the City Engineer.

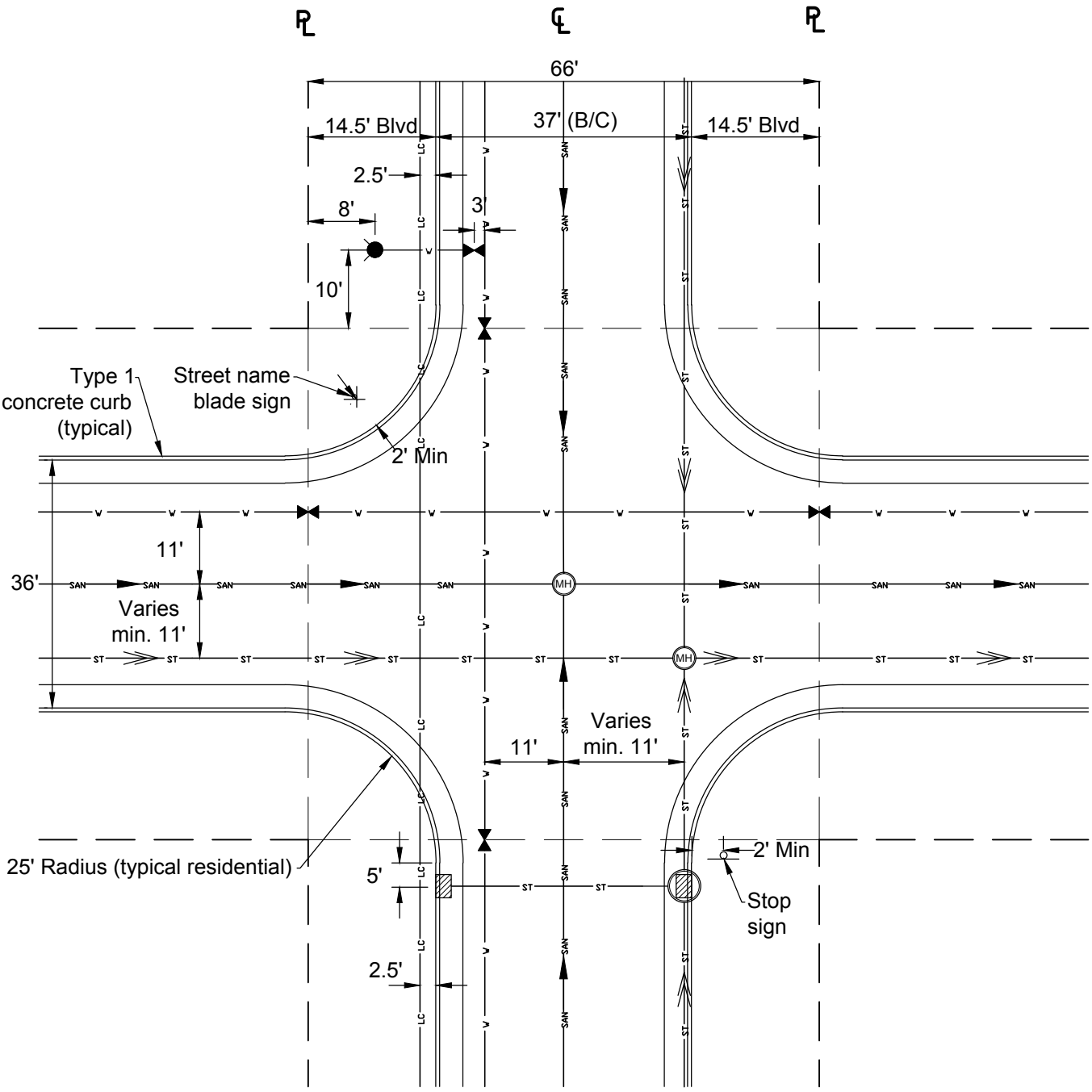
2. All utility trenches must be compacted to a minimum of 95% of maximum density (T-99).

City Plate No.:	STR-25
Last Revision:	11/25/2011
File:	STR_25.dwg

STANDARD DETAILS
TYPICAL UTILITY PLACEMENT IN BOULEVARD

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\STR_25.dwg



Right of Way
Storm Sewer
Sanitary Sewer
Water Main
Lighting conduit
Flow Direction
Manhole
Catch Basin Manhole
Catch Basin
Gate Valve
Hydrant

NOTE:

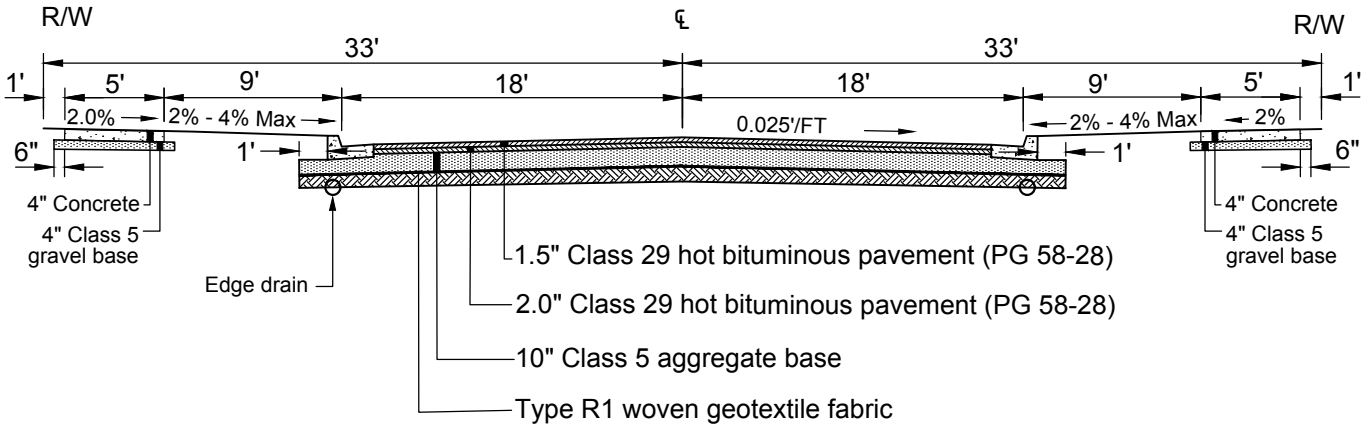
1. In intersections, valves shall be placed at the extensions of property lines.

City Plate No.:	STR-26
Last Revision:	11/25/2011
File:	STR_26.dwg

STANDARD DETAILS
TYPICAL INFRASTRUCTURE PLACEMENT

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\STR_26.dwg



NOTE:

1. R/W line to be minimum 0.30', maximum 0.50' above design ℄ elevation.
2. Top of Type-1 curb is level with design ℄ grade.
3. Roadway width from back of curb to back of curb is 37'.
4. Section shown above is the minimum residential section for typical soils. If poor soils are encountered, the Engineer shall design a thicker section, and where appropriate include edge drain.

City Plate No.:	STR-27
Last Revision:	1/21/2013
File:	STR_27.dwg

STANDARD DETAILS
TYPICAL PUBLIC STREET SECTION RESIDENTIAL

City of Minot
ENGINEERING DEPARTMENT

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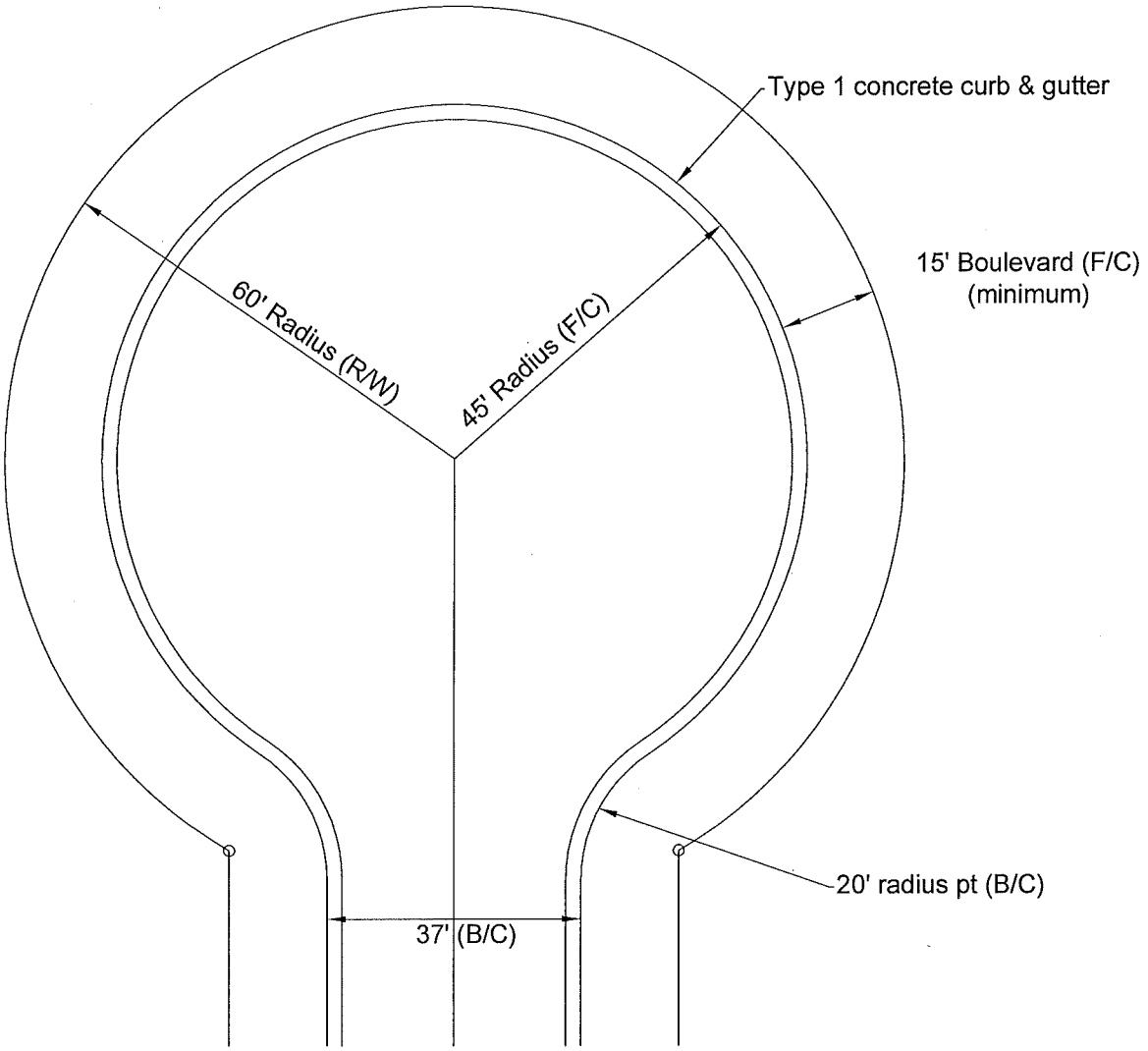

City Plate No.: STR-28 Last Revision: 11/10/2009 File: STR_28.dwg	**STANDARD DETAILS** **TYPICAL CUL-DE-SAC SECTION** **RESIDENTIAL**	**City of Minot** ENGINEERING DEPARTMENT

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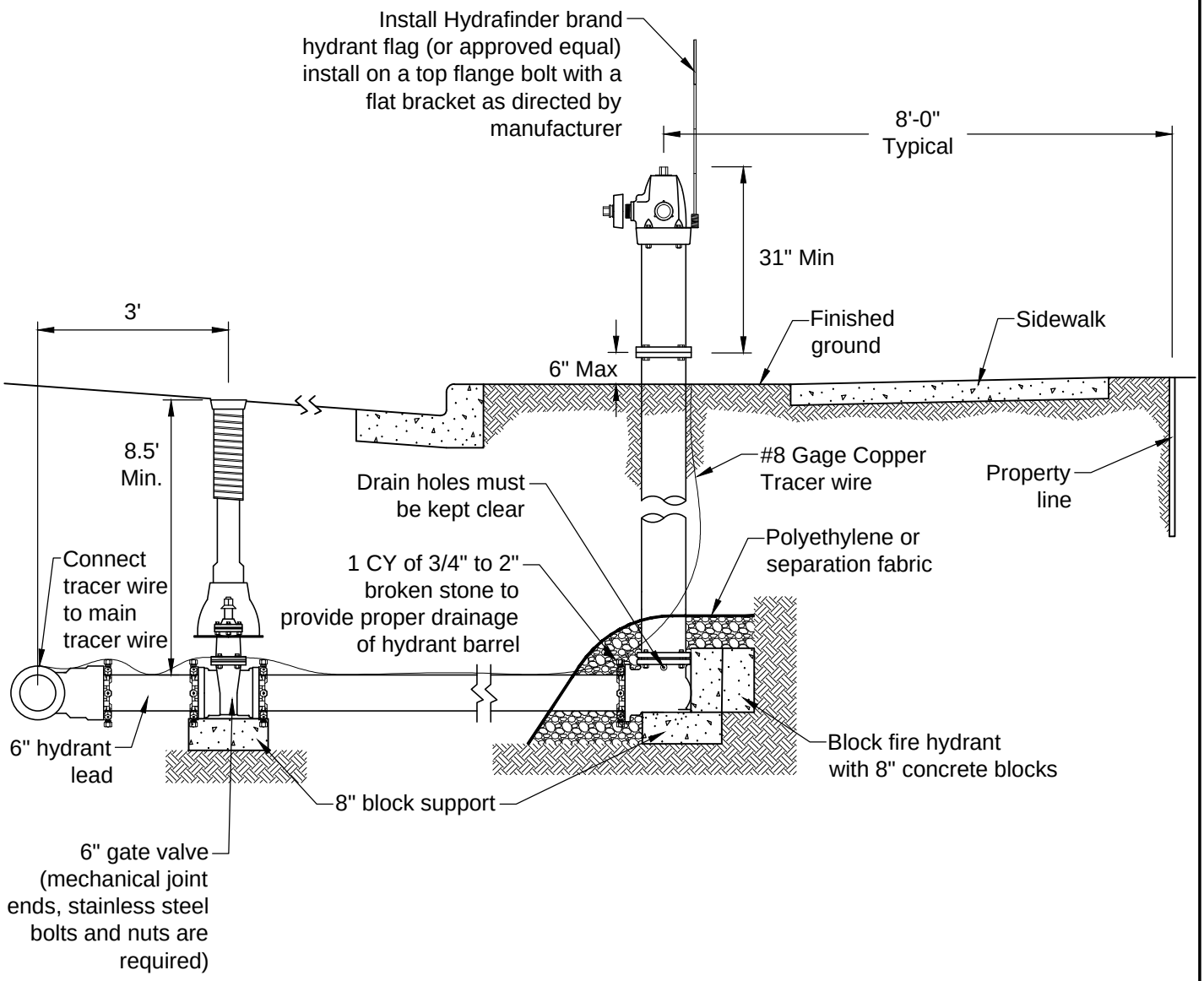
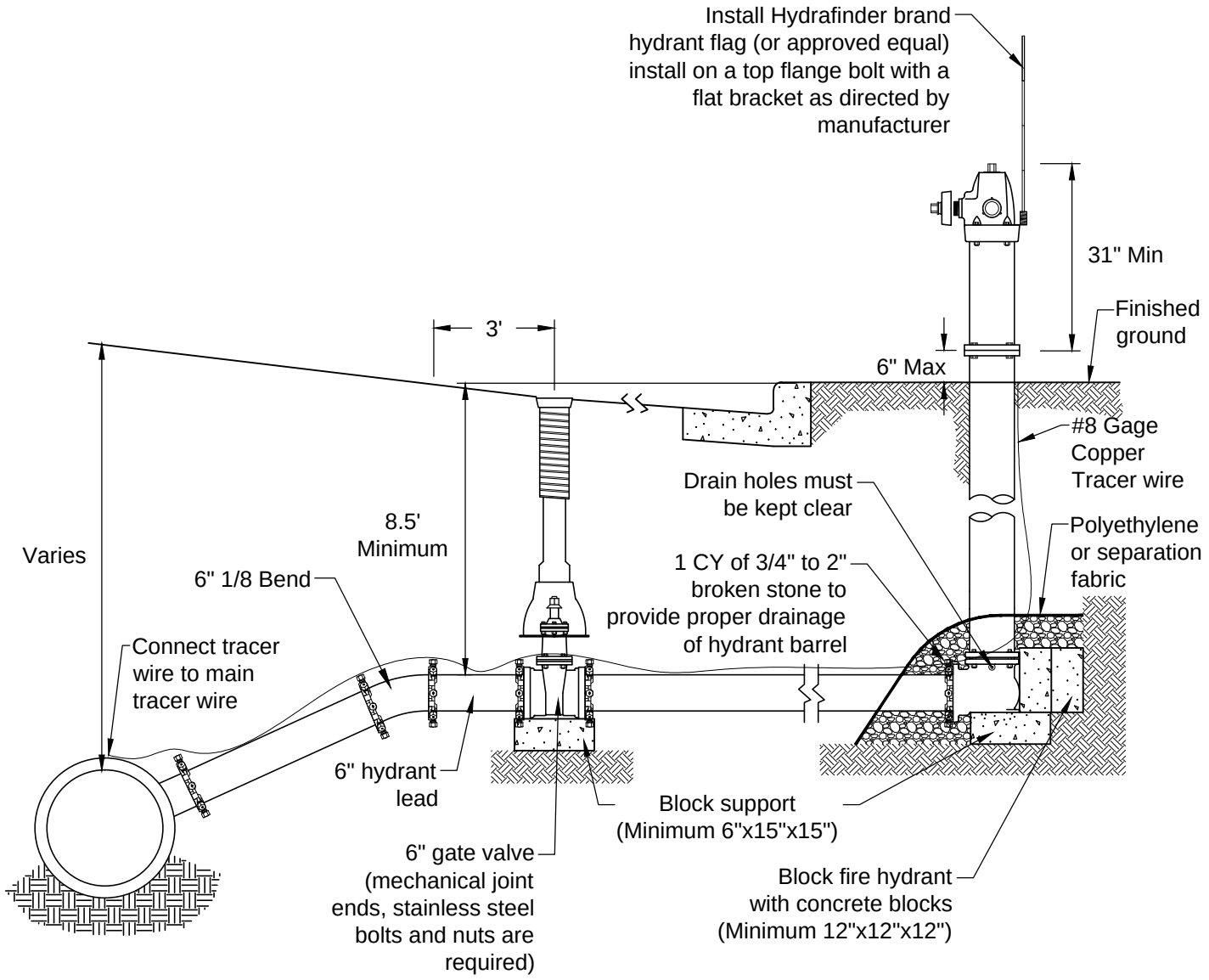


NOTES:

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

City Plate No.: WAT-1 Last Revision: 6/3/2013 File: WAT_1.dwg	**STANDARD DETAILS** **HYDRANT DETAIL**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\WAT_1.dwg



NOTES:

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

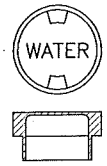
City Plate No.:	WAT-2
Last Revision:	6/3/2013
File:	WAT_2.dwg

STANDARD DETAILS
HYDRANT DETAIL WITH VERTICAL BEND

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\WAT_2.dwg

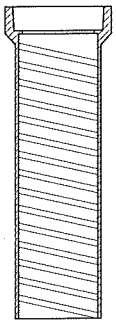
8.5' Minimum cover required over top of water main.



DROP LID

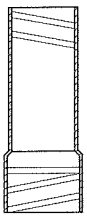
Tyler	No. 6860
Mueller	No. H-10361

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



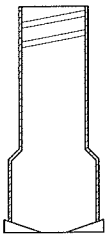
TOP

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



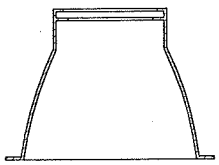
EXTENSION

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

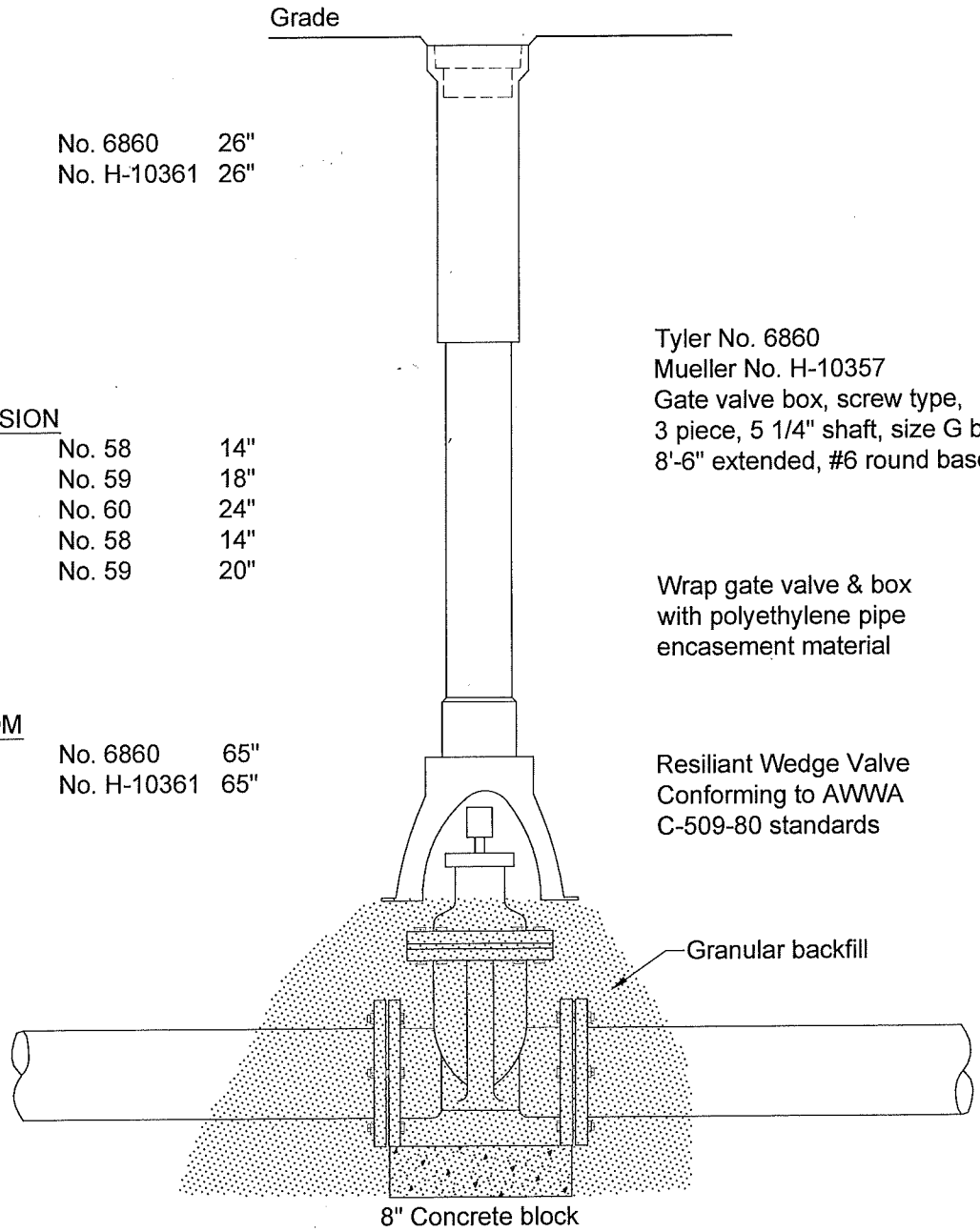


BOTTOM

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



BASE



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

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

City Plate No.:	WAT-3
Last Revision:	11/10/2009
File:	WAT_3.dwg

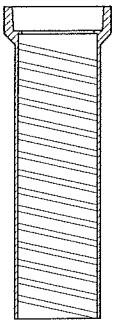
STANDARD DETAILS
GATE VALVE AND BOX INSTALLATION

City of Minot
ENGINEERING DEPARTMENT

M:\DETAIL PLATES\WAT 3.dwg

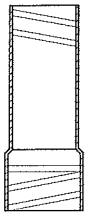
DROP LID

Tyler	No. 6850	
	No. 6860	
Mueller	No. H-10361	



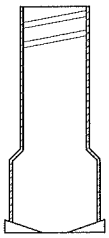
TOP

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



EXTENSION

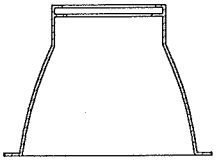
Tyler	No. 58	14"
	No. 59	18"
	No. 60	24"
Mueller	No. 58	14"
	No. 59	20"



BOTTOM

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

BASE



8.5' Minimum cover required over top of water main.

Grade

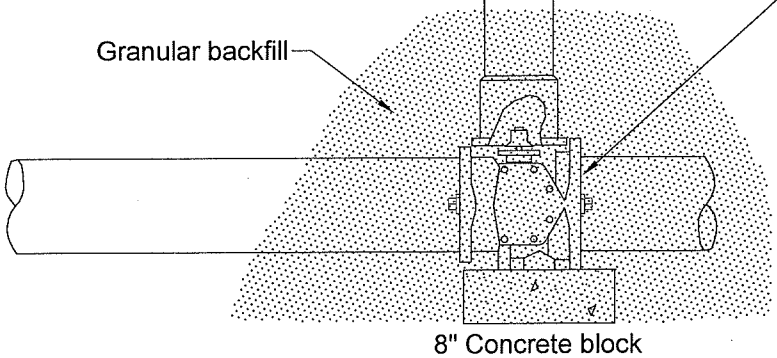
Adjust top to 1/4" below grade. Box to be set to provide 12" of adjustment.

Tyler No. 6850
Mueller No. H-10357
Gate valve box, screw type, 3 piece, 5 1/4" shaft, size G box, 8'-6" extended.

Wrap gate valve & box with polyethylene pipe encasement material.

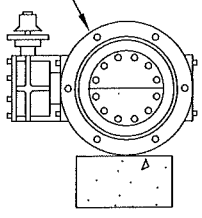
Butterfly Valve (14" or larger) Dresser 450, Pratt Groundhog, Kennedy, or equal.

Granular backfill



8" Concrete block

End View



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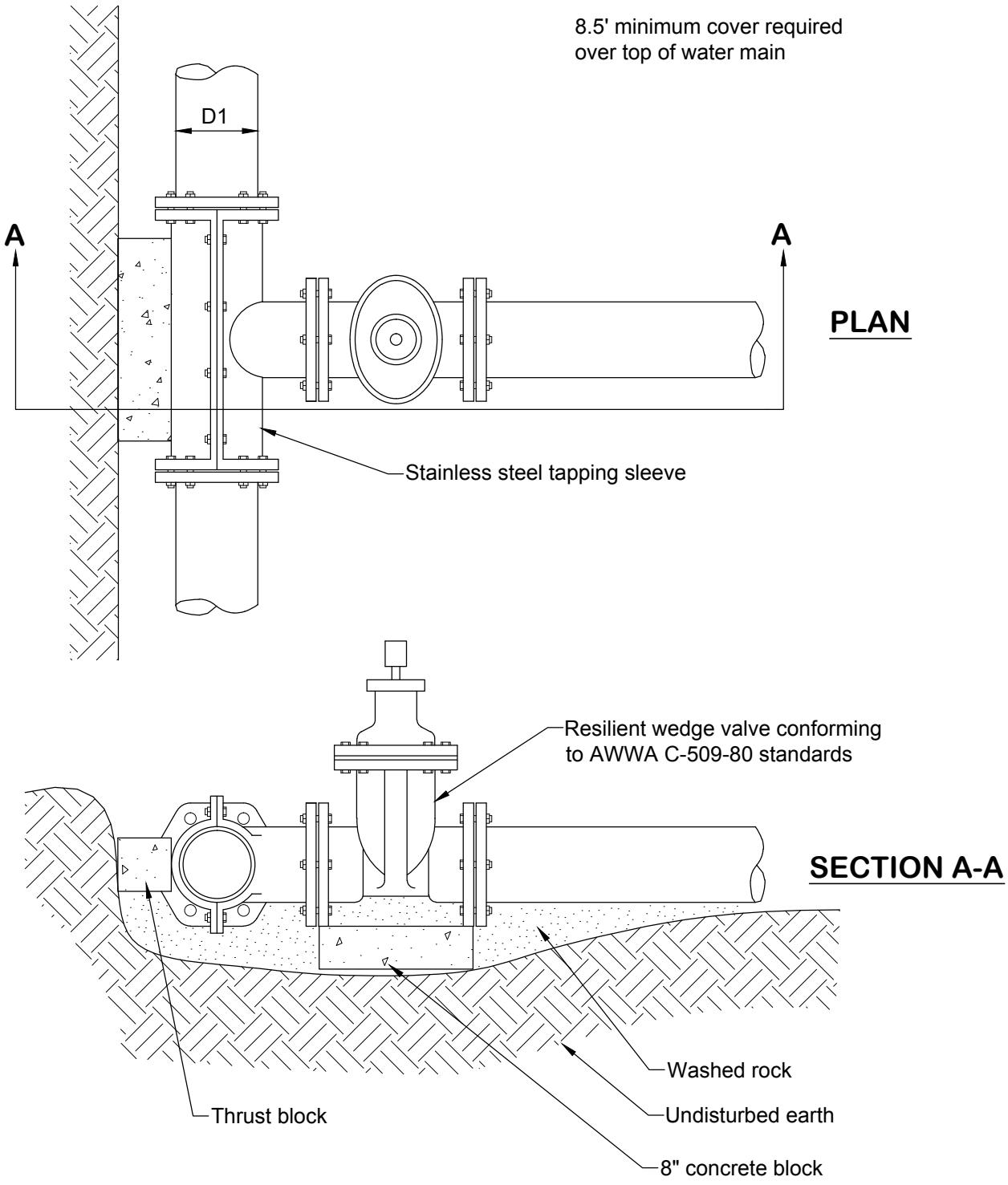
City Plate No.:	WAT-4
Last Revision:	11/10/2009
File:	WAT_4.dwg

STANDARD DETAILS
BUTTERFLY VALVE AND BOX INSTALLATION

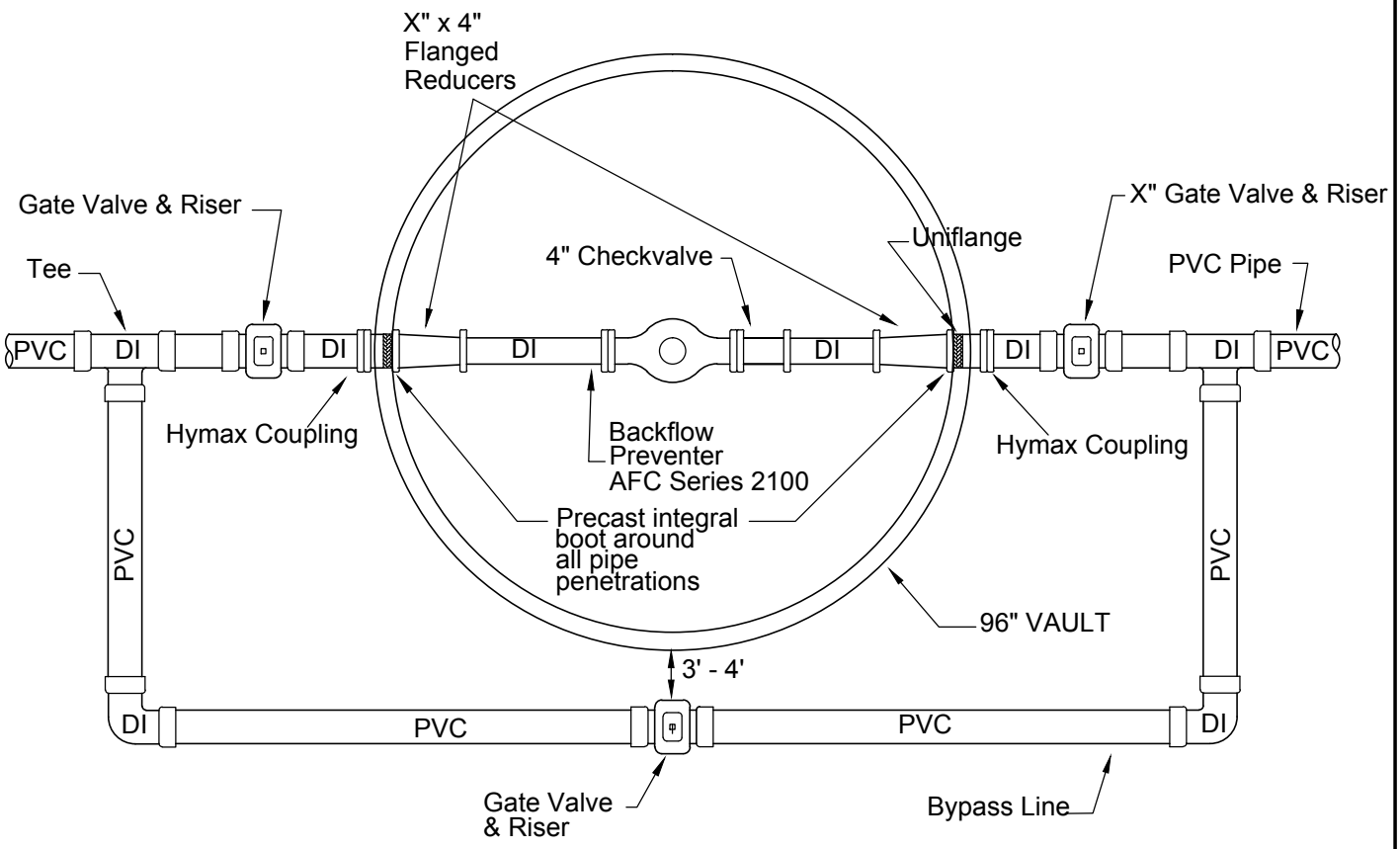
City of Minot
ENGINEERING DEPARTMENT



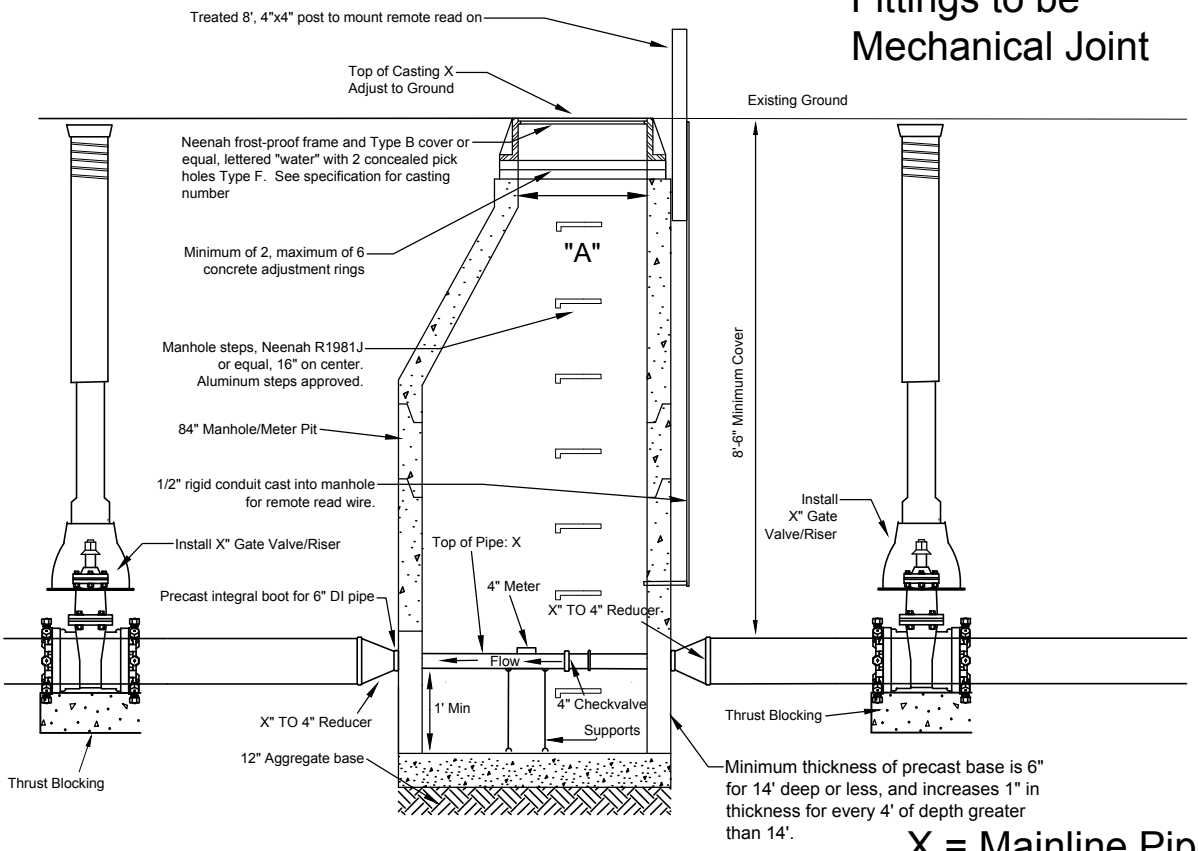
Note: All tapping gate valves shall be straight flange by MJ Flange.

City Plate No.: WAT-5 Last Revision: 1/21/2013 File: WAT_5.dwg	**STANDARD DETAILS** **WATER MAIN** **WET TAP**	City of Minot ENGINEERING DEPARTMENT

P:\PROJECTS\3667 - 2013 Standard Specifications\Detail Plates\WAT_5.dwg



Fittings to be
Mechanical Joint



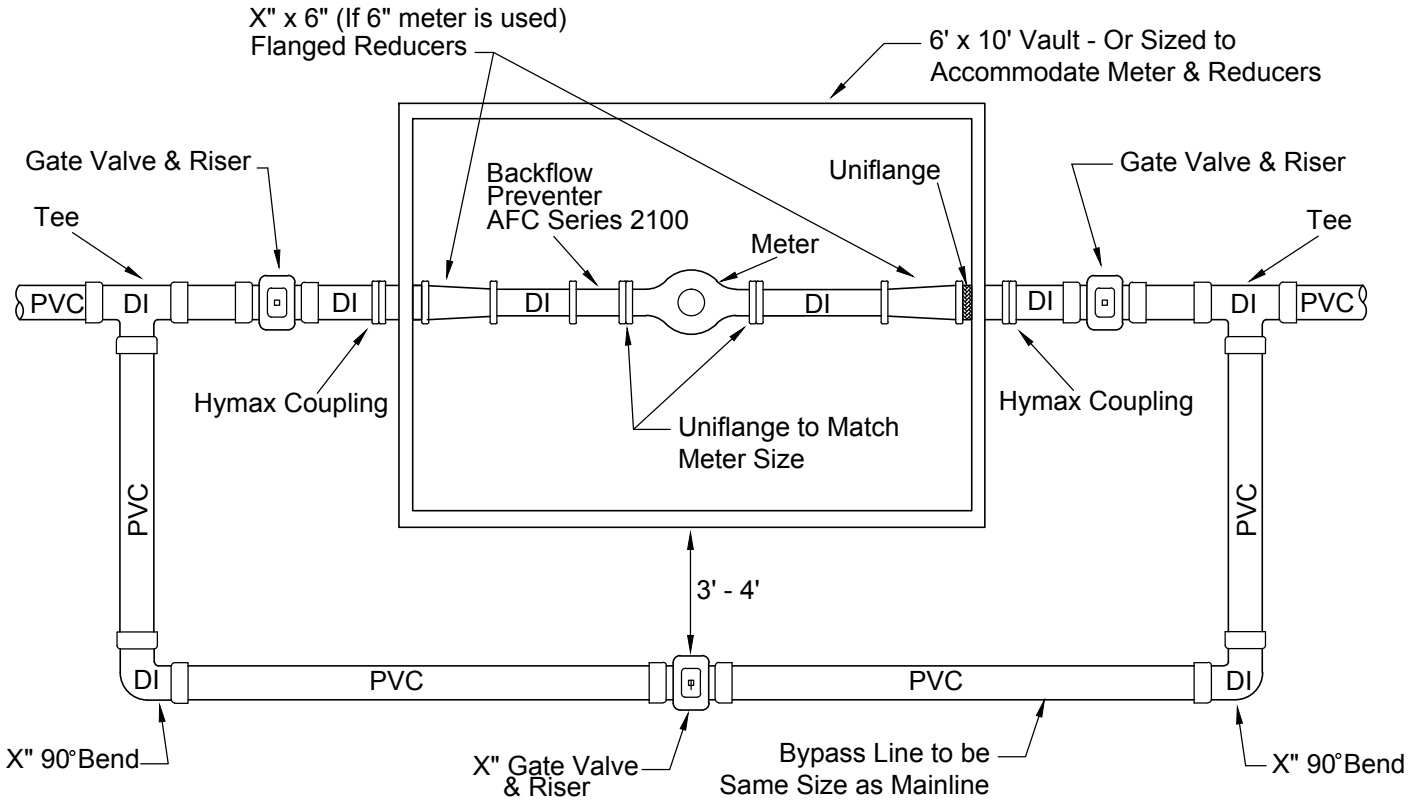
X = Mainline Pipe Size

City Plate No.:	WAT-6A
Last Revision:	3/8/2012
File:	WAT_6A.dwg

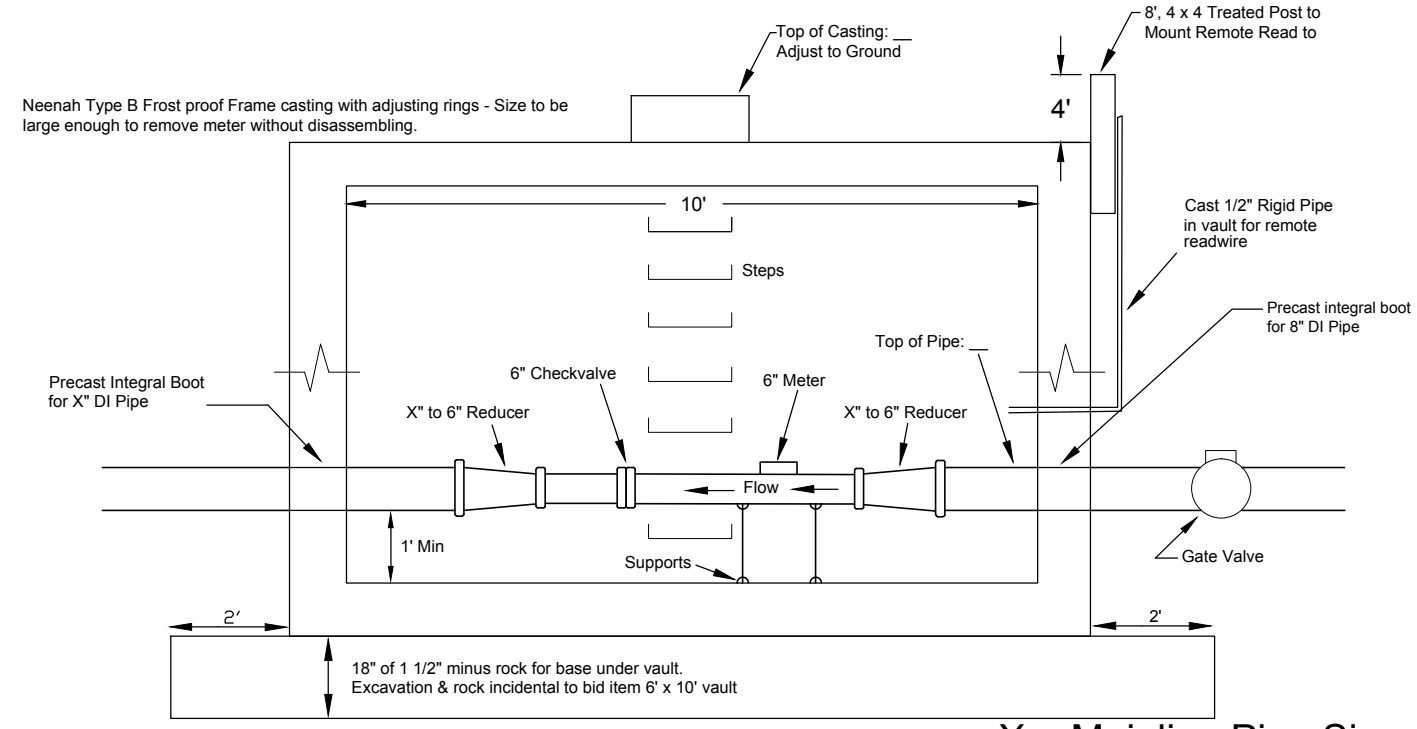
STANDARD DETAILS
METER PIT
4"

City of Minot
ENGINEERING DEPARTMENT

P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\WAT_6A.dwg



Fittings to be
Mechanical Joint



X = Mainline Pipe Size

City Plate No.:	WAT-6B
Last Revision:	1/4/2012
File:	WAT_6B.dwg

STANDARD DETAILS
METER PIT
6" - 8"

City of Minot
ENGINEERING DEPARTMENT

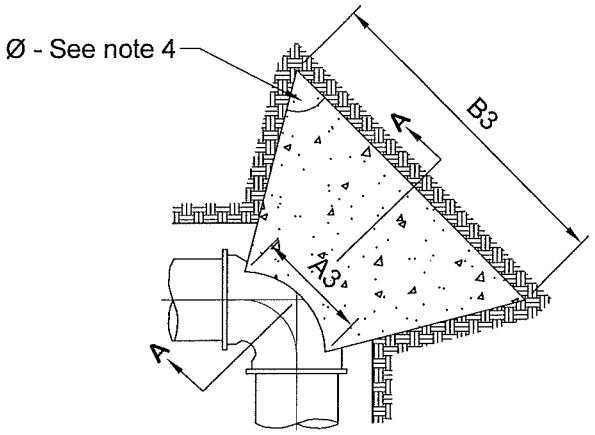
P:\PROJECTS\3506 - 2012 Standard Specifications\Detail Plates\WAT_6.5.dwg

NOTES:

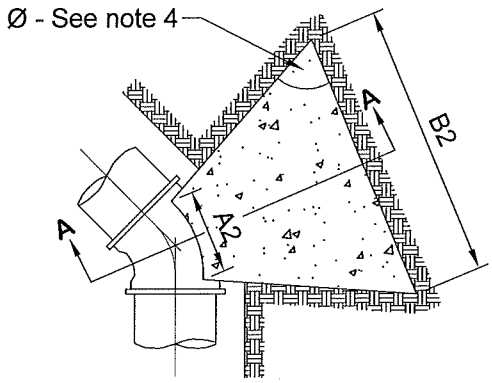
1. Shape of back of buttress may vary as long as poured against firm undisturbed earth.
2. Dimension C1, C2,& C3 should be large enough to make angle Ø equal to or larger than 45°.
3. Dimension A1, A2, & A3 should be as large as possible without interfering with MJ bolts.
4. Ø = 45° Minimum.
5. Place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

BUTTRESS DIMENSIONS

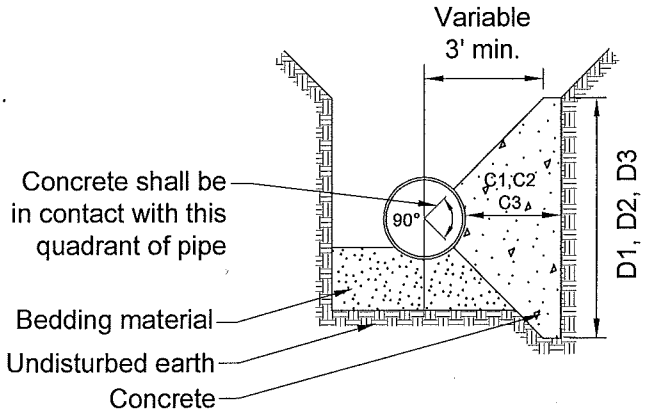
PIPE SIZE	22 1/2° BEND		45° BEND		90° BEND	
	B1	D1	B2	D2	B3	D3
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"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



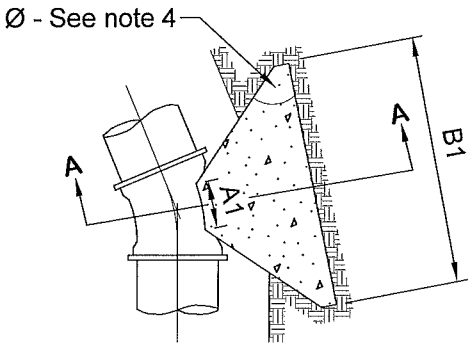
PLAN 90° BENDS



PLAN 45° BENDS



SECTION A-A



PLAN 22 1/2° BENDS

City Plate No.:	WAT-7
Last Revision:	11/10/2009
File:	WAT_7.dwg

STANDARD DETAILS
CONCRETE
THRUST BLOCKING

City of Minot
ENGINEERING DEPARTMENT

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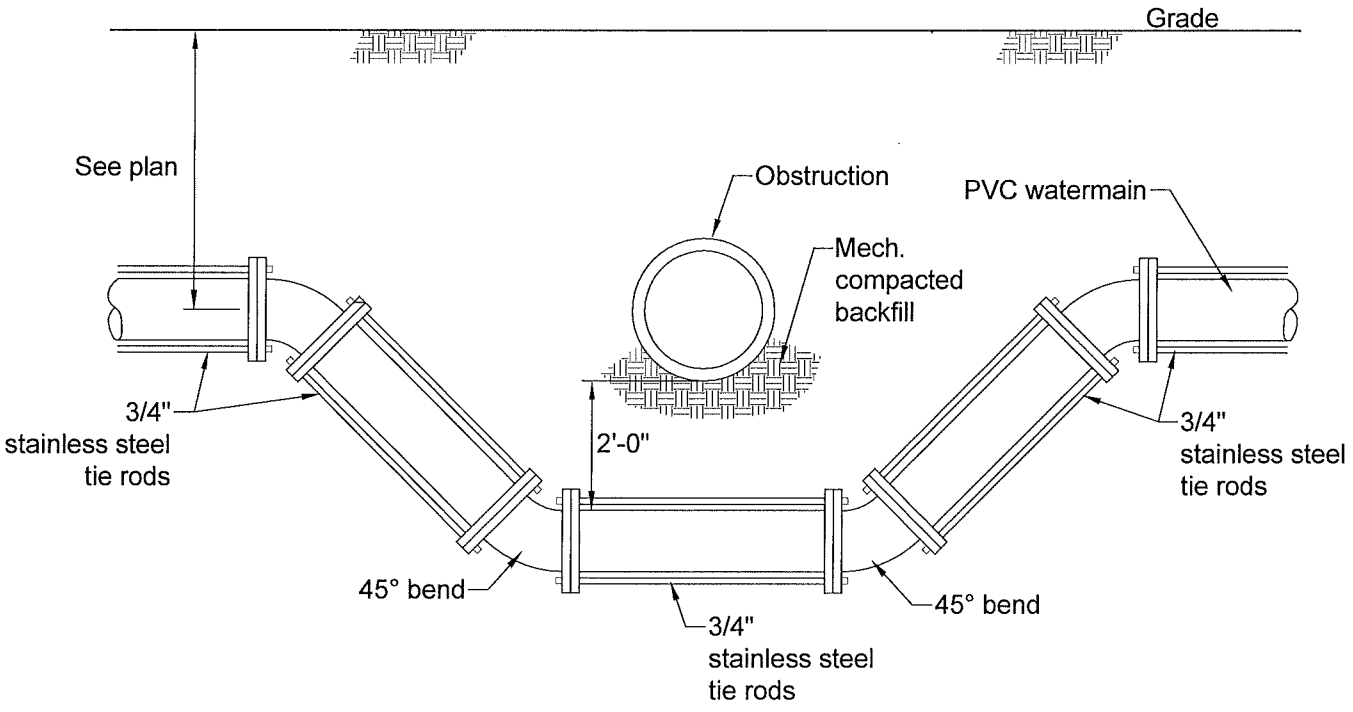

NOTE:

1. If insulation is required refer to SAN-4.
2. Mega-lugs shall be allowed in place of tie rods.

City Plate No.: WAT-8 Last Revision: 11/10/2009 File: WAT_8.dwg	**STANDARD DETAILS** **WATERMAIN** **OFFSET**	City of Minot ENGINEERING DEPARTMENT

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