



STANDARD CONSTRUCTION SPECIFICATIONS & STANDARD DETAILS

2012 EDITION

CITY OF KODIAK
ENGINEERING DEPARTMENT
2410 Mill Bay Road, Kodiak, AK 99615
907-486-8065 / FAX: 907-486-8066

CITY OF KODIAK

STANDARD CONSTRUCTION SPECIFICATIONS

<u>DIVISION</u>	<u>DESCRIPTION</u>
—	STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT
100	MODIFICATIONS AND ADDITIONS TO STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT
200	EARTHWORK
300	PORTLAND CEMENT CONCRETE
400	ASPHALT SURFACING
500	SANITARY SEWERS
600	WATER SYSTEMS
700	STORM DRAIN SYSTEMS
800	MISCELLANEOUS
—	STANDARD DETAILS

CITY OF KODIAK
STANDARD DETAILS



STANDARD CONSTRUCTION SPECIFICATIONS & STANDARD DETAILS

2012 EDITION



**CITY OF KODIAK
ENGINEERING DEPARTMENT**

2410 Mill Bay Road, Kodiak, AK 99615
907-486-8065 / FAX: 907-486-8066

**Engineers Joint Documents Committee
Design and Construction Related Documents
Instructions and License Agreement**

Instructions

Before you use any EJCDC document:

1. Read the License Agreement. You agree to it and are bound by its terms when you use the EJCDC document.
2. Make sure that you have the correct version for your word processing software.

How to Use:

1. While EJCDC has expended considerable effort to make the software translations exact, it can be that a few document controls (e.g., bold, underline) did not carry over.
2. Similarly, your software may change the font specification if the font is not available in your system. It will choose a font that is close in appearance. In this event, the pagination may not match the control set.
3. If you modify the document, you must follow the instructions in the License Agreement about notification.
4. Also note the instruction in the License Agreement about the EJCDC copyright.

License Agreement

You should carefully read the following terms and conditions before using this document. Commencement of use of this document indicates your acceptance of these terms and conditions. If you do not agree to them, you should promptly return the materials to the vendor, and your money will be refunded.

The Engineers Joint Contract Documents Committee ("EJCDC") provides **EJCDC Design and Construction Related Documents** and licenses their use worldwide. You assume sole responsibility for the selection of specific documents or portions thereof to achieve your intended results, and for the installation, use, and results obtained from **EJCDC Design and Construction Related Documents**.

You acknowledge that you understand that the text of the contract documents of **EJCDC Design and Construction Related Documents** has important legal consequences and that consultation with an attorney is recommended with respect to use or modification of the text. You further acknowledge that EJCDC documents are protected by the copyright laws of the United States.

License:

You have a limited nonexclusive license to:

1. Use **EJCDC Design and Construction Related Documents** on any number of machines owned, leased or rented by your company or organization.
2. Use **EJCDC Design and Construction Related Documents** in printed form for bona fide contract documents.
3. Copy **EJCDC Design and Construction Related Documents** into any machine readable or printed form for backup or modification purposes in support of your use of **EJCDC Design and Construction Related Documents**.

You agree that you will:

1. Reproduce and include EJCDC's copyright notice on any printed or machine-readable copy, modification, or portion merged into another document or program. All proprietary rights in **EJCDC Design and Construction Related Documents** are and shall remain the property of EJCDC.
2. Not represent that any of the contract documents you generate from **EJCDC Design and Construction Related Documents** are EJCDC documents unless (i) the document text is used without alteration or (ii) all additions and changes to, and deletions from, the text are clearly shown.

You may not use, copy, modify, or transfer EJCDC Design and Construction Related Documents, or any copy, modification or merged portion, in whole or in part, except as expressly provided for in this license. Reproduction of EJCDC Design and Construction Related Documents in printed or machine-readable format for resale or educational purposes is expressly prohibited.

If you transfer possession of any copy, modification or merged portion of EJCDC Design and Construction Related Documents to another party, your license is automatically terminated.

Term:

The license is effective until terminated. You may terminate it at any time by destroying **EJCDC Design and Construction Related Documents** altogether with all copies, modifications and merged portions in any form. It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to destroy **EJCDC Design and Construction Related Documents** along with all copies, modifications and merged portions in any form.

Limited Warranty:

EJCDC warrants the CDs and diskettes on which **EJCDC Design and Construction Related Documents** is furnished to be free from defects in materials and workmanship under normal use for a period of ninety (90) days from the date of delivery to you as evidenced by a copy of your receipt.

There is no other warranty of any kind, either expressed or implied, including, but not limited to the implied warranties of merchantability and fitness for a particular purpose. Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

EJCDC does not warrant that the functions contained in **EJCDC Design and Construction Related Documents** will meet your requirements or that the operation of **EJCDC Design and Construction Related Documents** will be uninterrupted or error free.

Limitations of Remedies:

EJCDC's entire liability and your exclusive remedy shall be:

1. the replacement of any document not meeting EJCDC's "Limited Warranty" which is returned to EJCDC's selling agent with a copy of your receipt, or
2. if EJCDC's selling agent is unable to deliver a replacement CD or diskette which is free of defects in materials and workmanship, you may terminate this Agreement by returning EJCDC Document and your money will be refunded.

In no event will EJCDC be liable to you for any damages, including any lost profits, lost savings or other incidental or consequential damages arising out of the use or inability to use **EJCDC Design and Construction Related Documents** even if EJCDC has been advised of the possibility of such damages, or for any claim by any other party.

Some states do not allow the limitation or exclusion of liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you.

General:

You may not sublicense, assign, or transfer this license except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign, or transfer any of the rights, duties, or obligations hereunder is void.

This Agreement shall be governed by the laws of the State of Virginia. Should you have any questions concerning this Agreement, you may contact EJCDC by writing to:

Arthur Schwartz, Esq.

General Counsel
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314

Phone: (703) 684-2845
Fax: (703) 836-4875
e-mail: aschwartz@nspe.org

You acknowledge that you have read this agreement, understand it and agree to be bound by its terms and conditions. You further agree that it is the complete and exclusive statement of the agreement between us which supersedes any proposal or prior agreement, oral or written, and any other communications between us relating to the subject matter of this agreement.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

Copyright © 2007 National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

The copyright for this EJCDC document is owned jointly by the four EJCDC sponsoring organizations and held in trust for their benefit by NSPE.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

	Page
Article 1 – Definitions and Terminology	1
1.01 Defined Terms.....	1
1.02 Terminology	5
Article 2 – Preliminary Matters	6
2.01 Delivery of Bonds and Evidence of Insurance.....	6
2.02 Copies of Documents.....	6
2.03 Commencement of Contract Times; Notice to Proceed.....	6
2.04 Starting the Work	7
2.05 Before Starting Construction	7
2.06 Preconstruction Conference; Designation of Authorized Representatives	7
2.07 Initial Acceptance of Schedules.....	7
Article 3 – Contract Documents: Intent, Amending, Reuse	8
3.01 Intent.....	8
3.02 Reference Standards.....	8
3.03 Reporting and Resolving Discrepancies.....	8
3.04 Amending and Supplementing Contract Documents.....	9
3.05 Reuse of Documents	10
3.06 Electronic Data.....	10
Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points.....	10
4.01 Availability of Lands	10
4.02 Subsurface and Physical Conditions	11
4.03 Differing Subsurface or Physical Conditions.....	11
4.04 Underground Facilities	13
4.05 Reference Points	14
4.06 Hazardous Environmental Condition at Site.....	14
Article 5 – Bonds and Insurance	16
5.01 Performance, Payment, and Other Bonds	16
5.02 Licensed Sureties and Insurers	16
5.03 Certificates of Insurance	16
5.04 Contractor’s Insurance	17
5.05 Owner’s Liability Insurance	18
5.06 Property Insurance	18
5.07 Waiver of Rights	20
5.08 Receipt and Application of Insurance Proceeds.....	21

5.09	Acceptance of Bonds and Insurance; Option to Replace	21
5.10	Partial Utilization, Acknowledgment of Property Insurer	21
Article 6 – Contractor’s Responsibilities		22
6.01	Supervision and Superintendence.....	22
6.02	Labor; Working Hours.....	22
6.03	Services, Materials, and Equipment	22
6.04	Progress Schedule	23
6.05	Substitutes and “Or-Equals”	23
6.06	Concerning Subcontractors, Suppliers, and Others.....	25
6.07	Patent Fees and Royalties	27
6.08	Permits.....	27
6.09	Laws and Regulations	27
6.10	Taxes	28
6.11	Use of Site and Other Areas	28
6.12	Record Documents.....	29
6.13	Safety and Protection	29
6.14	Safety Representative.....	30
6.15	Hazard Communication Programs	30
6.16	Emergencies	30
6.17	Shop Drawings and Samples	30
6.18	Continuing the Work.....	32
6.19	Contractor’s General Warranty and Guarantee.....	32
6.20	Indemnification	33
6.21	Delegation of Professional Design Services	34
Article 7 – Other Work at the Site		35
7.01	Related Work at Site	35
7.02	Coordination.....	35
7.03	Legal Relationships.....	36
Article 8 – Owner’s Responsibilities.....		36
8.01	Communications to Contractor.....	36
8.02	Replacement of Engineer.....	36
8.03	Furnish Data	36
8.04	Pay When Due	36
8.05	Lands and Easements; Reports and Tests.....	36
8.06	Insurance	36
8.07	Change Orders.....	36
8.08	Inspections, Tests, and Approvals	37
8.09	Limitations on Owner’s Responsibilities	37
8.10	Undisclosed Hazardous Environmental Condition	37
8.11	Evidence of Financial Arrangements	37
8.12	Compliance with Safety Program.....	37
Article 9 – Engineer’s Status During Construction		37
9.01	Owner’s Representative	37
9.02	Visits to Site	37

9.03	Project Representative	38
9.04	Authorized Variations in Work	38
9.05	Rejecting Defective Work	38
9.06	Shop Drawings, Change Orders and Payments.....	38
9.07	Determinations for Unit Price Work	39
9.08	Decisions on Requirements of Contract Documents and Acceptability of Work.....	39
9.09	Limitations on Engineer's Authority and Responsibilities	39
9.10	Compliance with Safety Program.....	40
Article 10 –	Changes in the Work; Claims	40
10.01	Authorized Changes in the Work	40
10.02	Unauthorized Changes in the Work	40
10.03	Execution of Change Orders.....	41
10.04	Notification to Surety.....	41
10.05	Claims.....	41
Article 11 –	Cost of the Work; Allowances; Unit Price Work	42
11.01	Cost of the Work	42
11.02	Allowances	45
11.03	Unit Price Work	45
Article 12 –	Change of Contract Price; Change of Contract Times	46
12.01	Change of Contract Price	46
12.02	Change of Contract Times	47
12.03	Delays.....	47
Article 13 –	Tests and Inspections; Correction, Removal or Acceptance of Defective Work	48
13.01	Notice of Defects	48
13.02	Access to Work	48
13.03	Tests and Inspections	48
13.04	Uncovering Work.....	49
13.05	Owner May Stop the Work.....	50
13.06	Correction or Removal of Defective Work	50
13.07	Correction Period.....	50
13.08	Acceptance of Defective Work.....	51
13.09	Owner May Correct Defective Work	51
Article 14 –	Payments to Contractor and Completion	52
14.01	Schedule of Values.....	52
14.02	Progress Payments	52
14.03	Contractor's Warranty of Title	55
14.04	Substantial Completion.....	55
14.05	Partial Utilization	56
14.06	Final Inspection.....	56
14.07	Final Payment.....	57
14.08	Final Completion Delayed.....	58
14.09	Waiver of Claims	58

Article 15 – Suspension of Work and Termination	58
15.01 Owner May Suspend Work	58
15.02 Owner May Terminate for Cause	58
15.03 Owner May Terminate For Convenience.....	60
15.04 Contractor May Stop Work or Terminate	60
Article 16 – Dispute Resolution	61
16.01 Methods and Procedures	61
Article 17 – Miscellaneous	61
17.01 Giving Notice	61
17.02 Computation of Times	61
17.03 Cumulative Remedies	62
17.04 Survival of Obligations	62
17.05 Controlling Law	62
17.06 Headings.....	62

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. Resolving Discrepancies:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 Amending and Supplementing Contract Documents

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by

Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application 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 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 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; and

- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

- a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
- c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
- d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

- a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
- b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

- 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or

- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 100

TABLE OF CONTENTS

DIVISION 100	MODIFICATIONS AND ADDITIONS TO STANDARD GENERAL	
	CONDITIONS OF THE CONSTRUCTION CONTRACT	1
ARTICLE 1	DEFINITIONS AND TERMINOLOGY	1
ARTICLE 4	AVAILABILITY OF LANDS, SUBSURFACE AND PHYSICAL	
	CONDITIONS, HAZARDOUS ENVIRONMENTAL	
	CONDITIONS, AND REFERENCE POINTS	2
ARTICLE 5	BONDS AND INSURANCE	2
ARTICLE 6	CONTRACTOR'S RESPONSIBILITY	5
ARTICLE 11	COST OF THE WORK, ALLOWANCES, AND UNIT	
	PRICE WORK	9
ARTICLE 14	PAYMENTS TO CONTRACTOR AND COMPLETION	10
ARTICLE 16	DISPUTE RESOLUTION	11
ARTICLE 18	MEASUREMENT FOR PAYMENT	11
ARTICLE 19	ADDITIONAL REQUIREMENTS	14

**DIVISION 100 - MODIFICATIONS AND ADDITIONS
TO STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT**

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

- 1.01 *Defined Terms.* Add the following to the list of defined terms in Paragraph A:
53. *City* -- The City of Kodiak
54. *Contingent Sum* -- When the Bid Schedule contains a Contingent Sum pay item, the work covered shall be performed only upon written order of Engineer and payment will be made as specified in the order.
55. *Holidays* -- In the State of Alaska, legal holidays occur on:
1. New Year's Day - January 1
 2. Martin Luther King, Jr. Day - Third Monday in January
 3. Presidents' Day - Third Monday in February
 4. Seward's Day - Last Monday in March
 5. Memorial Day - Last Monday in May
 6. Independence Day - July 4
 7. Labor Day - First Monday in September
 8. Alaska Day - October 18
 9. Veteran's Day - November 11
 10. Thanksgiving Day - Fourth Thursday in November
 11. Christmas Day - December 25
 12. Every Sunday
 13. Every day designated by public proclamation by the President of the United States or the Governor of the State as a legal holiday.
56. *Incidental* -- Not paid for directly. Compensation for such work is included in the payment for other items of work and no separate payment will be made.
57. *Inspector* -- Engineer's authorized representative assigned to make detailed inspections of Contract performance.
58. *Major Contract Item* -- Any Contract item for which the product of the Bid Quantity and the Unit Bid Price equals 5% or more of Contract Award amount.
59. *Minor Contract Item* -- Any Contract item for which the product of the Bid Quantity and the Unit Bid Price equals less than 5% or more of the Contract Award amount.
60. *Original Ground (OG)* -- The ground surface prior to the initiation of the proposed work.

61. *Pavement Structure* -- The combination of subbase, base course (leveling course), and surface course placed on a subgrade to support the traffic load and to distribute it to the roadbed or subgrade.
62. *Special Conditions* -- Additions and revisions to the Standard Specifications covering conditions peculiar to an individual project.
63. *Subgrade* -- The top surface of the embankment fill or excavation upon which the pavement structure is constructed.
64. *Traffic Control Plan (TCP)* -- A Drawing of one or more specific Plans that detail the routing of pedestrian and/or vehicular traffic through or around a construction area including the location of all traffic control devices.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS, AND REFERENCE POINTS

4.04 *Underground Facilities.* Delete Item A.2.b. and substitute the following:

- b. Before starting construction, Contractor shall request all Utility Owners to locate their utilities and at points of possible conflict, Contractor shall uncover the located utilities.

Add the following:

4.07 *Fire Hydrant Usage.* Contractor shall secure a hydrant permit from the City for each hydrant used as a source of temporary water used for construction. These permits will be issued to Contractor at no charge, however, Contractor shall meet all of the conditions of said permits. In addition, Contractor shall provide a gate valve assembly and backflow preventer at each hydrant as a shut-off valve for the temporary water system used for construction. Contractor shall be responsible for any damage that results to the hydrant(s) as a result of these activities and shall repair such damage at no cost to Owner.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

Delete the first sentence of Paragraph A and replace with the following:

Contractor shall furnish performance and payment bonds in accordance with Kodiak City Code chapter 3.12, Public Construction.

5.02 *Licensed Sureties and Insurers*

Add the following after the last sentence of Paragraph A.:

Insurance companies shall be rated "Excellent" or "Superior" by A.M. Best Company, or be

specifically approved by the Owner.

5.04 *Contractor's Insurance.* Add the following to Paragraph B.2:

The limits of liability for the insurance shall provide coverage for not less than the following amounts:

- A. Workers compensation, disability benefits, and other similar employee benefit acts, and damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees as proved in Paragraphs 5.04.A.1 and 5.04.A.2 of the Standard General Conditions:
 - 1. State: statutory in accordance with AS 23.30.045.
 - 2. Employer's Liability or "Stop Gap": \$1,000,000.
 - 3. Federal and Maritime: As applicable, Contractor shall provide statutory coverage under Federal Compensation Acts such as, but not limited to the Defense Base Act, the Federal Employee's Liability Act (FELA), Longshore and Harbor Worker's Compensation Act, the Jones Act, and any other coverage required under Federal or State laws pertaining to workers in or on navigable waters.
- B. Contractor's Liability Insurance under Paragraphs 5.04.A.3 through 5.04.A.5 of the General Conditions shall provide the following minimum limits and conditions:
 - 1. General Aggregate: \$2,000,000.
 - 2. Products - Completed Operations Aggregate: \$2,000,000.
 - 3. Personal and Advertising Injury (per person/organization with employment exclusion deleted): \$1,000,000.
 - 4. Each Occurrence (bodily injury and property damage): \$1,000,000.
 - 5. Fire Damage (any one fire): \$50,000.
 - 6. Medical Expenses (any one person): \$5,000.
 - 7. Property Damage liability insurance will remove the explosion, collapse, and underground exclusion and provide broad form property damage coverage.
- C. Automobile Liability under Paragraphs 5.04.A.6 of the General Conditions shall provide for the following for owned, non-owned, rented, or hired vehicles:

Combined Single Limit (bodily injury and property damage): \$1,000,000.
- D. Provide Excess Liability and Umbrella insurance providing protection for at least the hazards insured under the primary liability policies with the following limits:

1. General Aggregate: \$2,000,000.
2. Each Occurrence: \$2,000,000.

5.04 Contractor's Insurance. Delete Paragraph B.4 and replace with the following:

4. Contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by Contractor pursuant to Paragraph 5.03 will so provide);

5.06 *Property Insurance*. Delete the first sentence of Paragraph 5.06.A and replace it with the following:

Contractor shall purchase and maintain property insurance upon the Work at the site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the supplementary Conditions or required by Laws or Regulations).

Add the following to Paragraph 5.06.A.1 :

Owner will provide a written list of names of all known entities to be named as additional insureds on the property insurance. Any change or addition to the list will be given in writing to Contractor at least 7 days prior to the that entity performing work at the site. Additional insureds shall at least include all those listed in Paragraph 5.03 of the General Conditions.

Delete Paragraph 5.06.B and substitute the following:

Contractor shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

Add the following to Paragraph 5.06.D of the General Conditions:

Property insurance furnished under this Contract shall have deductibles no greater than \$5,000 for all sublimits except for earthquake and flood insurance. Deductibles for earthquake and flood insurance shall not exceed 5% of value at risk subject to a \$100,000 maximum.

Delete Paragraph 5.06.E and substitute the following in its place:

If Owner requests in writing that other special perils be included in property insurance policies under Paragraphs 5.06.A and 5.06.B of the General Conditions, Contractor shall, if possible, include such insurance and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to commencement of the work at the site, Contractor shall, in writing, advise Owner whether or not such other insurance has been procured by Contractor.

5.08 *Receipt and Application of Insurance Proceeds.* Delete Paragraph 5.08.A and substitute the following:

Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Contractor shall deposit in separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged work shall be repaired or replaced, the moneys so received applied on account thereof and the work added to the cost thereof covered by an appropriate Change Order or Written Amendment.

Delete Paragraph 5.08.B and substitute the following:

Contractor, as fiduciary, shall have power to adjust and settle any loss with the insureds unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Contractor's exercise of power. If such objections were made, Contractor, as fiduciary, shall make settlement with the insurers in accordance with such agreements as the parties in interest may reach. If no such agreement among the parties in interest is reached, Contractor, as fiduciary, shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor, as fiduciary, shall give bond for the proper performance of such duties.

5.10 *Partial Utilization, Acknowledgment of Property Insurer.* Add the following:

The property insurance shall contain no partial occupancy restrictions on utilization of the Project by Owner for the purpose intended.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITY

6.03 *Services, Materials, and Equipment.* Add the following:

D. When the Bid Schedule calls for payment for material by weight, provide one of the following:

1. Commercial Weighing System: Permanently installed commercial scales.
2. Project Weighing System: Acceptable automatic digital scales and scale house.

Provide scales that record weight at least to the nearest 100 pounds. Maintain scale accuracy to within 0.5% of the correct weight throughout the range of use. Do not use spring balances.

Do not use belt conveyor scales to determine pay weight. Belt conveyor scales may be used to proportion plant blends and mixtures if the scales meet the general requirements for weighing equipment and are calibrated according to the manufacturer's instructions.

Batch weights may be used to determine pay quantities when the batching equipment includes an approved and certified automatic weighing, cycling, and monitoring system.

Maintain the accuracy of scales according to the Specifications, tolerances and regulations for commercial weighing and measuring devices contained in the National Institute of Standards and Technology (formally known as the National Bureau of Standards), Handbook 44, as adopted by AS 45.75.050.(d). All commercial scales are subject to approval according to the Weights and Measures Act, AS 45.75. Have scales reinspected, as directed, to ensure their accuracy, and sealed to prevent tampering or other adjustment after certification.

Provide a weatherproof housing for platform scales to protect the recording equipment and allow the scale operator convenient access to the weigh indicator, scale computer, ticket printer, and the sequential printer. Furnish sanitary lavatory facilities, heating, adequate electrical lighting and 120-volt, 60-cycle power for the scale house.

Furnish competent scale operators to operate the system.

Weighing System: Provide an electronic computerized weighing system (ECWS) with the following capabilities:

- a. Computer.
 - 1) Provide a scale computer that can store project numbers and all Pay Item descriptions for multiple projects and products that are weighed with the scale system.
 - 2) The scale computer must store the following for each hauling vehicle used on the Project:
 - a) Vehicle identification number marked on the vehicle
 - b) Tare weight
 - c) Maximum allowable gross vehicle weight (MAVW)

Make sure the scale operator tares vehicles at least once a day.
Perform additional tares, as directed, during hauling operations.
Perform tares in the presence of Engineer, when requested.

- b. Tickets: Furnish a ticket print that prints a legible, serially numbered weigh ticket for Engineer with the following information on each ticket in the order listed. All weights must be at least to the nearest 100 pounds:

- 1) Project number
- 2) Item number and description
- 3) Date weighted
- 4) Time weighed
- 5) Ticket number
- 6) Vehicle Identification Number
- 7) MAVW
- 8) Gross weight
- 9) Tare weight
- 10) Net weight
- 11) Subtotal item net weight for each haul unit since start of shift
- 12) Accumulated item net weight for all haul units since start of shift

After printing, the weigh ticket must automatically advance to a perforation so it can be torn off and handed to the driver.

Manually weigh and record weights for up to 48 hours during a printer malfunction or break-down, when Engineer gives you prior written authorization. The manual weighting operation must meet all other Contract requirements.

Unless Engineer gives prior written authorization, you will not receive payment for any material weighted without using the ECWS.

6.10 *Taxes.* Add the following:

- B. Contractor may be exempt from City sales tax for materials incorporated into the project which meet the requirements of Kodiak City Code (KCC) 3.08.050 and for which Contractor has applied for, and been granted, an exemption in accordance with KCC 3.08.060.

6.12 *Record Documents.* Add the following:

- B. Progress pay estimates will not be processed if Engineer determines that Contractor has failed to keep the “as-built” as specified.

6.13 *Safety and Protection.* Add the following:

6.17 *Shop Drawings and Samples.* Delete Paragraph A.1.a and substitute the following:

Submit 5 copies of all Shop Drawings.

Delete Paragraph A.2.b and substitute the following:

Submit 4 of each required sample.

ARTICLE 11 - COST OF THE WORK, ALLOWANCES, AND UNIT PRICE WORK

11.01 *Cost of Work.* Delete Paragraph A.5.c. and substitute the following:

Equipment: For any machinery or special equipment (other than small tools) which has been authorized by Engineer, Contractor shall receive the rental rates in the current edition and appropriate volume of the "Rental Rate Blue Book for Construction Equipment", published by Primedia Information Inc., 10 Lake Drive, Hightstown, NJ 08520-5397. Hourly rental rates shall be determined as follows:

The established hourly rental rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 176 and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

The adjusted monthly rate is that resulting from application of the rate adjustment formula in order to eliminate replacement cost allowances in machine depreciation and contingency cost allowances.

Attachments shall not be included unless required for the time and materials work.

For equipment not listed in The Blue Book, Contractor shall receive a rental rate as agreed upon before such work is begun. If agreement cannot be reached, Engineer reserves the right to establish a rate based on similar equipment in the Blue Book or prevailing commercial rates in the area.

These rates shall apply for equipment used during Contractor's regular shift of 10 hours per day. Where the equipment is used more than 10 hours per day, either on Contractor's normal work or on time and materials, and either on single or multiple shifts, an overtime rate, computed as follows, shall apply:

The hourly overtime rate is the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, and multiplied by the area adjustment factor, plus the estimated hourly operating cost.

Equipment which must be rented or leased specifically for work required under this Section shall be authorized in writing by Engineer. Contractor shall be paid Invoice Price plus 15%.

When it is necessary to obtain equipment from sources beyond the Project limits exclusively for time and materials work, the actual cost of transferring the equipment to the site of the work and return will be reimbursed. Where the move is made by common carrier, the move-in allowance will be limited to the amount of the paid freight bill or invoice. If Contractor hauls the equipment with his own forces, the allowance will be limited to the rental rate for the hauling unit plus operator wages. In the event that the equipment is transferred under its own power, the moving allowance will be limited to 2 of the normal hourly rental rate plus operator's wages. In the event that the move-out is to a different location, payment will in no instance exceed the amount of the move-in. Move-in allowance shall not be made for equipment brought to the Project for time and materials work which is subsequently retained on the Project and utilized for completion of Contract items, camp maintenance, or related work.

Equipment ordered to be on a stand-by basis shall be paid for at the stand-by rental rate for the number of hours in Contractor's normal work shift, but not to exceed 8 hours per day. The stand-by rental rate shall be computed as follows:

The hourly stand-by rate shall be equal to the adjusted monthly rate for the basic equipment plus the adjusted monthly rate for applicable attachments, both divided by 352, all multiplied by the area adjustment factor.

Time will be recorded to the nearest 1/4 hour for purposes of computing compensation to Contractor for equipment utilized under these rates.

The equipment rates as determined above shall be full compensation for providing the required equipment and no additional compensation will be made for other costs such as, but not limited to, overhead and profit, fuels, lubricants, replacement parts or maintenance costs. Cost of repairs, both major and minor, as well as charges for mechanic's time utilized in servicing equipment to ready it for use prior to moving to the Project and similar charges will not be allowed.

11.03 Unit Price Work. Delete Paragraph 11.03.0C and substitute the following:

- D. Payment to Contractor for Unit Price items shall be made only for the actual quantities of work performed and accepted or materials furnished, in conformance with the Contract. When the accepted quantities of work or materials vary from the quantities stated in the Bid Schedule, Contractor shall accept as payment in full, payment at the original Contract Unit Prices for the quantities of work and materials furnished, completed and accepted, except as provided below:
1. When the accepted quantity of a major Contract item varies more than 25% above or below the Bid Quantity, either party to the Contract may request an equitable adjustment in the Contract Unit Price of that item.
 2. When the final quantity of work is greater than 125% of the Bid Quantity, the equitable adjustment shall be made only for those units which are in excess of 125% of the Bid Quantity.

3. When the final quantity of work is less than 75% of the Bid Quantity, the equitable adjustment shall be made for those units of work done and accepted, except that the total payment for the item shall not exceed 75% of the total amount Bid for the item.
4. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the conditions above apply and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.02 *Progress Payments.* Delete Paragraph A.3 and substitute the following:

At any time Engineer finds that satisfactory progress is not being made, he may retain an amount equal to 10% of the total amount earned from all subsequent progress payments. This retainage may be reduced at such time as Engineer finds that satisfactory progress is being made.

In Paragraph C.1, change 10 days to 30 days.

14.07 *Final Payment.* In Paragraph C.1, change 30 days to 120 days.

Add the following Paragraph to 14.07.C.:

1. Final Payment is subject to the reporting and withholding requirements of AS 36.05.045. Owner is not responsible for any delay in final payment due to Contractor failing to file reports and pay fees required Statute, nor any delay in the Department of Labor and Workforce Development to process such reports.
- B. 14.08 *Final Completion Delayed.* Add the following: If, through no fault of Owner, final completion of the Work remains incomplete after the expiration of the Contract time, the sum per calendar day given in the following schedule shall be deducted from any monies due Contractor. If no money is due Contractor, Owner shall have the right to recover said sum from Contractor, the surety or both. The amount of these deductions is to reimburse the City for estimated additional Contract administration expenses incurred as a result of Contractor's failure to complete the work within the time specified. Such deductions are liquidated damages and are not to be considered as penalties.

**DAILY CHARGE FOR LIQUIDATED DAMAGES
FOR EACH CALENDAR DAY OF DELAY**

ORIGINAL CONTRACT AMOUNT		DAILY CHARGE
FROM MORE THAN	TO AND INCLUDING	
\$0	\$100,000	\$300
100,000	500,000	550
500,000	1,000,000	750
1,000,000	2,000,000	1,000
2,000,000	5,000,000	1,500
5,000,000	10,000,000	2,500
10,000,000	-----	3,000

- C. The daily charges may be terminated at or following the final inspection, if the City has determined that the work is substantially complete and is in a condition for safe and convenient use by the public. This shall not be construed as a contractual right and its application will be contingent upon Contractor's diligence in completing the remaining items of work.
- D. Permitting Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the City of any of its rights under the Contract.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures.* Add the following to 16.01.C.3: The appropriate venue is the court sitting in the City of Kodiak, 3rd Judicial District, Alaska.

Add the following:

ARTICLE 18 - MEASUREMENT FOR PAYMENT

18.01 *General.*

- A. Whenever it is provided in the Contract that certain work is incidental or it is stated that certain provisions or work be without extra compensation; it is understood in both cases that Contractor's compensation for such work is to be included in the payment for other items of work.
- B. When more than one type of material or work is specified for a Pay Item, letter, or numeric suffixes, included within the parenthesis following the Pay Item number, will

differentiate the types.

- C. Lump Sum items will not be measured for payment. The Bid Amount is complete payment for all work described in the Contract and necessary to complete that item. Quantities shown for Lump Sum items are approximate. Unless otherwise stated, no adjustment in the Lump Sum Price to be paid will be made if the quantity furnished is more or less than the estimated quantity.

18.02 *Measurement of Quantities*

- A. All work completed under the Contract will be measured according to the United States standard measure.
- B. Unless otherwise specified, work will be measured as follows:
 - 1. Linear foot (LF): Measurement will be from end to end, in-place, parallel to the centerline of the item or ground surface upon which such items are placed.
 - 2. Station (STA): A station when used as a definition or term of measurement will be 100 linear feet.
 - 3. Square feet (SF): Measurement will be made parallel to the surface being measured. No deductions will be made for individual fixtures having an area of 9 SF or less. Transverse measurement for area computation will be the neat dimensions shown on the Drawings or ordered in writing.
 - 4. Acre (ac): 43,560 SF. Measurement will be made horizontally, unless specified on the ground surface. No deductions will be made for individual fixtures having an area of 500 SF or less.
 - 5. Cubic Yard (CY). Measurement will be made at the location specified and using one of the following methods:
 - a. Average End Area: End areas are calculated as the area between original ground cross section and the final cross section. Volume of material is calculated using the average of end areas multiplied by the distance along centerline between end areas.
 - b. Computer Generated Surfaces: A computed volume between original ground surface and the final cross section using a computer generated surfaces.
 - c. Structures will be measured according to neat lines shown on the Drawings or as altered to fit field conditions.
 - d. When requested by Contractor and approved in writing, material specified to be measured by the cubic yard may be weighed and such weights will be converted to cubic yards for payment purposes. Factors for conversion

from weight measurement to volume measurement will be determined by Engineer and shall be agreed to by Contractor before such method of measurement of pay quantities is used.

- e. Material to be measured by volume in the hauling vehicle will be measured by the cubic yard at the point of delivery. Vehicles for this purpose may be of any acceptable size or type provided that the body is of such shape that the actual contents may be readily and accurately determined. Vehicles shall be loaded to and payment made on the measured vehicle volume and loads shall be leveled when directed. When legal loads are applicable, the approved volume measurement shall not exceed the legal capacity of the vehicle.
- 6. Timber and insulation board will be measured by the board-foot incorporated in the work. Measurement will be based on nominal width and thickness and the extreme length of each piece.
- 7. Ton: 2,000 lb. The term “ton” will mean the short ton consisting of 2,000 pounds avoirdupois.

Measurement will be made by one of the following methods:

- a. Commercial weighing system. Use permanently installed and certified commercial scales.
- b. Project weighing system.
- c. Invoices: If bulk material is shipped by truck and is not passed through a mixing plant, furnish a supplier’s invoice with net weight or volume converted to weight. Periodic check weighing may be required.

Trucks used to haul material being paid for by weight shall be weighed empty at least once daily and at such times as directed. Each truck shall bear a plainly legible identification mark.

Due to possible variations in the specific gravity of the aggregates, the weight used may vary from the Bid Quantities and no adjustment in Contract Unit Price will be made because of such variation.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., such identification will be the nominal weights or dimension. Unless more stringently controlled by tolerances in cited Specification, manufacturing tolerances established by the industries involved will be accepted.

Add the following:

ARTICLE 19 - ADDITIONAL REQUIREMENTS

19.01 *Local Bid.*

A. City Ordinance 3.12.060 Local Bid Preference.

1. Notwithstanding Section 3.12.040, the council shall direct an Award of a Contract for the purchase of personal property or services or for the construction, repair, or improvement of City facilities after competitive bidding to a Local Bidder, who is also a responsible Bidder, if that Bid does not exceed the otherwise lowest Bid by more than 10% or \$30,000, whichever is less.
2. For the purpose of this Section, "Local Bidder" shall mean a responsible Bidder who had, at the time of Bid Award, maintained a business office or store within the Borough of Kodiak Island which was open for business on a substantially full-time basis and staffed by at least one full-time employee for at least one year.
3. This Section does not govern purchases of personal property or services authorized by Section 3.12.020.030 (Ord 942, 1992; Ord 744, 1985; Ord 695-13, 1983; Ord 578-1, 1980; Ord 47-9-1 (part), 1976).

19.02 *Local Hire.*

A. Ordinance 3.12.085 Local Hire Preference.

1. Under any Contract for the construction, repair, or alteration of public improvements funded in whole or in part by City funds, or funds which, in accordance with a Federal grant, State grant, or otherwise, the City expends or administers, and to which the City is a signatory to the construction contract, the worker hours shall be performed at least fifty percent by bona fide residents of the Borough of Kodiak Island. To the extent there are not sufficient Borough resident workers qualified and available for work, a Contractor shall be exempted from the provision of this Section to the extent of such unavailability.
2. For the purpose of this Section, a bona fide resident is a person who maintains, and has maintained for at least thirty days, a domicile in the Borough. Domicile is the true and permanent home of a person from which that person has no present intention of removing and to which that person intends to return whenever away from that home. (Ord 764-1, 1985).

19.03 *Local Sales Tax.*

The City sales tax is 6%. Contractor can request an exemption for materials purchased for, and incorporated into, the Project.

19.04 Equal Opportunity Requirements

During the performance of this Contract, Contractor agrees as follows:

- A. Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- B. Contractor will, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.
- C. Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice to be provided advising the labor union of worker's representative of Contractor's commitments under Section 202 of Presidential Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- D. Contractor will comply with all provisions of Presidential Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the U.S. Secretary of Labor.
- E. When required by Engineer, Contractor will furnish all information and reports required by Presidential Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the U.S. Secretary of Labor or pursuant thereto, and will permit access to his books, records, and accounts by Owner or anyone Owner shall designate for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- F. In the event of Contractor's noncompliance with the nondiscrimination clauses of this Contract, or with any such rules, regulations, or orders, this Contract may be cancelled, terminated, or suspend in whole or in part and Contractor may be declared ineligible for further Contracts.
- G. Contractor will include the provisions of Paragraphs 1 through 6 in every Subcontract or Purchase Order so that such provisions will be binding upon each Subcontractor or vendor. Contractor will take such action with respect to any Subcontract or Purchase Order as Owner may direct as a means of enforcing such provisions, including sanctions of noncompliance.

19.05 Minimum Wages.

- A. State Minimum wages shall be paid in accordance with Chapter 52, Session Laws of Alaska, as approved March 23, 1959 and any revisions thereto. Sections 36.05.070 and 36.05.090 of the Alaska Statutes are hereby incorporated into these Specifications. A copy of the State of Alaska's Minimum Rates of Pay will be included in each set of documents.
- B. Federal.
 - 1. Contractor shall post, at appropriate conspicuous points at the site of the project, a schedule showing all determined minimum wage rates for the various classes of laborers and mechanics to be engaged in work on the project under this Contract and all deductions, if any, required by law to be made from unpaid wages actually earned by the laborers and mechanics so engaged.
 - 2. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and at least once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act 29 CFR Part 3), the full amounts due at time of payment computed at wage rates not less than those contained in the wage determination decision of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between Contractor and such laborers and mechanics. For the purpose of this clause, contributions made or costs reasonably anticipated under Section (1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics, subject to the provisions of 29 CFR 5.5(a) (1)(iv). Also, for the purpose of this clause, regular contributions made or costs incurred for more than a weekly period under plans, funds, or programs but covering the particular weekly period, are deemed to be constructively made or incurred during such weekly period.
 - 3. Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under Contract, shall be classified or reclassified conformably to the wage determination, and a report of the action taken shall be sent to the Secretary of Labor. In the event the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers and mechanics to be used, the question shall be referred to the Secretary for final determination.
 - 4. Whenever the minimum wage rate prescribed in the Contract for a class or laborers or mechanics includes a fringe benefit which is not expressed as an hourly wage rate and Contractor is obligated to pay a cash equivalent of such a fringe benefit, an hourly cash equivalent thereof shall be established. In the event of the fringe benefit, the question shall be referred to the Secretary of Labor for determination.

5. Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon act, or any bona fide fringe benefits not expressly listed in Section 1(b)(2) of the Davis-Bacon Act, or otherwise not listed in the wage determination decision of the Secretary of Labor which is included in this Contract, only when the Secretary of Labor has found, upon the written request of Contractor that the applicable standards of the Davis-Bacon Act have been met. Whenever practicable, Contractor should request the Secretary of Labor to make such findings before the making of the Contract. In the case of un-funded plans and programs, the Secretary of Labor may require Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
 6. The specified wage rates are minimum rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in this Contract. Contractor shall adjust all disputes in regard to the payment of wages in excess of those specified in this Contract.
 7. If Contractor does not make payments to a trustee or other third person, he may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing benefits under a plan or program of a type expressly listed in the wage determination decision of the Secretary of Labor which is a part of this Contract. Provided however the Secretary of Labor has found upon the written request of Contractor that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- C. The following Laws or Regulations are included in the Contract Documents, by reference, as mandated by statute or for the convenience of Contractor. Other Laws and Regulations apply which are not included herein, and are within Contractor's duty and responsibility for compliance thereto:
1. Payment for Overtime; AS Contractor23.10.060.
 2. Employment Preference: AS 36.10.010 to AS 36.10.100 .
 3. AS 18.80.220,.
 4. Wage rates on public construction: AS 36.05.010 through AS 36.05.120.
 - a. Wage rates in Specifications and Contracts for public works AS 36.05.070Contractor.
 - b. The schedule of minimum hourly wage rates, as determined by the Commissioner of the Department of Labor of the State of Alaska is available from the Department of Labor and Workforce Development

website at <http://labor.alaska.gov/lss/pamp600.htm>.

5. Forest Products Preference:
6. Local bid preference: KCC 3.12.060
7. Labor Requirements; public improvements projects: KCC 3.12.085

19.06 Payrolls and Basic Records.

- A. Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records will contain the name and address of each such employee, his correct classification, rates of pay (including rates of contributions or costs anticipated of the types described in Section 1(b)(2) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics so affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.
- B. Contractor will submit weekly a copy of all payrolls to the State. The copy shall be accompanied by a statement signed by the employer or his agent indicating that the payrolls are correct and complete, that the wage rates contained therein are not less than those determined by the Secretary of Labor and that the classifications set forth for each laborer or mechanic conform with the work he performed. A submission of a "Weekly Statement of Compliance" which is required under this Contract and the Copeland regulations of the Secretary of Labor (29 CFR, Part 3) and the filing with the initial payroll or any subsequent payroll of a copy of any findings by the Secretary of Labor under 29 CFR 5.5(a)(a)(iv) shall satisfy this requirement. The Prime Contractor shall be responsible for the submission of copies of payrolls of all Subcontractors. Contractor shall make the records required under the labor standards clauses of the Contract available for inspection by authorized representatives of Owner and the Department of Labor, and shall permit such representatives to interview employees during working hours on the job.

19.07 Apprentices.

Apprentices shall be permitted to work as such only when they are registered, individually, under a bona fide apprenticeship program registered with the State apprenticeship agency which is recognized by the Bureau of Apprenticeship and Training, U.S. Department of Labor; or if no such recognized agency exists in a State, under a program registered with the Bureau of Apprenticeship and Training, U.S. Department of Labor. The allowable ratio of apprentices to journeymen in any craft

classification shall not be greater than the ratio permitted to Contractor as to his entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered as above, shall be paid the wage rate determined by the Secretary of Labor for the classification of work he actually performed. Contractor or his Subcontractor will be required to furnish written evidence of the registration of his program and apprentices as well as the appropriate ratios and wage rates, for the area of construction prior to using any apprentices on the Contract work.

19.08 Anti-Kickback.

Contractor shall comply with the Copeland Anti-Kickback Act and Regulations of the Secretary of Labor (29 CFR Part 3) which are herein incorporated by reference.

19.09 Overtime.

- A. No Contractor or Subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics, including watchmen and guards, shall require or permit any laborer or mechanic in any work week in which he is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such work week unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all hours worked in excess of eight hours in any calendar day or in excess of forty hours in such work week, as the case may be.
- B. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in Subparagraph (A), Contractor and any Subcontractor responsible therefore shall be liable to any affected employee for his unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States (in the case of work done under Contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the clause set forth in Subparagraph (A), in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of eight hours or in excess of the standard work week of forty hours at the regular wage or for more than 8 hours a day without payment of the overtime wages required by the clause set forth in Subparagraph (A).
- C. Withholding for unpaid wages and liquidated damages. Owner may withhold from any monies payable on account of work performed by Contractor or Subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in Subparagraph (B).
- D. Subcontracts. Contractor shall insert in any Subcontracts and clauses set forth in Subparagraphs (a), (b), and (c) of these paragraphs and also a clause requiring the Subcontractors to include these clauses in any lower tier Subcontracts which they may

enter into, together with a clause requiring this insertion in any further Subcontracts that may in turn be made.

19.10 Interest of Member of or Delegate to Congress.

No member of or delegate to congress or resident commissioner shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but his provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

19.11 Other Prohibited Interests.

No officer of Owner who is authorized in such capacity and on behalf of Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any Subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer, or inspector of or for Owner who is authorized in such capacity and on behalf of Owner to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract, or in any part thereof, any material supply Contract, Subcontract, insurance Contract, or any other Contract pertaining to the project.

19.12 Provisions Required by Law Deemed Inserted.

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 200

TABLE OF CONTENTS

DIVISION 200 - EARTHWORK	1
SECTION 201 GENERAL.....	1
SECTION 202 CLEARING AND GRUBBING	4
SECTION 203 EXCAVATION	7
SECTION 204 CLASSIFIED FILL AND BACKFILL.....	15
SECTION 205 LEVELING COURSE.....	18
SECTION 206 TRENCH EXCAVATION AND BACKFILL	20
SECTION 207 REMOVAL OF STRUCTURES AND OBSTRUCTIONS.....	23
SECTION 208 RIPRAP	26
SECTION 209 DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL	28
SECTION 210 FURNISH FILTER MATERIAL.....	29

DIVISION 200 - EARTHWORK

SECTION 201 GENERAL

Article 201.1 Description

This work consists of excavating soil, rock and muck materials and placement and compaction of fill and backfill materials.

Article 201.2 Definitions

- A. Backfill: Material placed in an excavated area.
- B. Bedding: Ground or support in which pipe is laid.
- C. Borrow: Approved fill and/or backfill which is not obtained from required excavation.
- D. Compaction: Tamping by hand or machine to achieve required density in soils.
- E. Disposal Site: Any approved area where waste from construction is placed.
- F. Excavation: Any cut, cavity, trench, or depression in the earth surface formed by earth removal. Removal of material not removed under some other item, which is removed to provide a suitable subgrade for improvement. Excavation may be further defined as:
 - 1. Common Excavation: Silt, clay, sand, gravel, and granular materials other than rock or muck.
 - 2. Rock Excavation: Rock which cannot be excavated without blasting, fracturing with a hydraulic hammer, or ripping.
 - 3. Unclassified Excavation: All materials of whatever character may be encountered in the work. May include rock, common, or muck.
 - 4. Muck Excavation: Soils and organic matter which in the opinion of Engineer is not suitable for use in the proposed construction regardless of moisture content.
- G. Fill: Fill is considered to be material placed above the original or natural ground line.
- H. Subbase: The subbase is that material which is placed above the subgrade and below the leveling course.
- I. Subgrade: The subgrade is that material below the bottom of excavation and upon which the subbase material is placed.
- J. Trench: A narrow excavation in relation to its length. In general, the depth is greater than the width, but the width of a trench, measured at the bottom is not greater than 15 feet. Any excavation for a utility or drainage system.

- K. Unsuitable or Unusable Material: Any material which does not meet Specifications for the intended purpose.

Article 201.3 Applicable Standards

The latest revision of the following standards of the American Society for Testing and Materials (ASTM), the Western Alliance for Quality Transportation Construction (WAQTC), and the American Association of State Highway Transportation Officials (AASHTO) are hereby made a part of these Specifications:

ASTM C131	Los Angeles Abrasion, Small-Size Coarse Aggregate
ASTM C535	Los Angeles Abrasion, Large-Size Coarse Aggregate
ASTM C88	Sulfate Soundness
ASTM D422	Particle Size Analysis
ASTM D1557	Modified Proctor
ASTM D4253	Maximum Soil Density by Vibratory Method
ASTM D 4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D6938	Standard Test Method for in Place Density and water Content of Soil and Soil Aggregate by Nuclear Methods (Shallow Depth)
ATM T 313	Standard Test Method for Determining the Degradation Value of Aggregates

WAQTC FOP
for AASHTO T335 Determining the Percentage of Fracture in Coarse Aggregate

Article 201.4 Equipment

All equipment, tools, and machines used in the performance of the work covered by these Specifications shall be subject to the approval of Engineer and shall comply with all applicable safety requirements. All equipment used on the Project shall be adequately maintained and shall be the proper equipment for the work being accomplished so as to produce the result required by the Contract Documents.

Article 201.5 Compaction Standards

Where compaction is specified, the maximum soil density shall be determined in accordance with ASTM D1557 or ASTM D4253, as applicable. These test methods often produce an unrealistically high or low maximum density for some of Kodiak's fill materials. In such cases, modified laboratory test methods and/or field compaction trials, meeting the approval of Engineer, shall be used to determine a maximum density to be used for compaction control.

Approved materials shall be placed and compacted at approximately the optimum moisture content. Materials may require drying or uniform watering prior to compaction in order to bring the moisture in the material to approximate optimum moisture content.

Material shall be compacted to the specified percentage of the maximum density.

If the percentage is not specified the following shall apply:

- * Compact all pipe bedding and materials within traveled ways or within the influence zone of footings to not less than 95% of the maximum density.
- * Compact materials in all other locations to not less than 85% of the maximum density.

In-place field densities will be determined in accordance with ASTM D6938 and ASTM D3017.

Article 201.6 Weather Limitations

Material shall not be placed on frozen ground. Any areas of the work that are damaged by weather (rain, snow, freezing conditions, etc.) shall be removed and replaced, reconditioned, reshaped, and/or recompacted by Contractor in conformance with the requirements of the Contract Documents without additional cost to Owner.

Article 201.7 Underground Utilities

Underground utilities shall be continuously supported during backfill placement and compaction. Work in excavations shall comply with all applicable safety regulations.

END OF SECTION 201

SECTION 202 CLEARING AND GRUBBING

Article 202.1 Description

This work shall consist of clearing, grubbing, removing and disposing of all vegetation and debris within designated areas of the Project, except such objects as are designated to remain or are to be removed in accordance with other Sections of these Specifications. This work shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.

Article 202.2 Construction

Engineer will designate the limits of work and all trees, shrubs, plants and other things to remain. Contractor shall preserve all things designated to remain.

Survey stakes, boundary markers, bench marks and tie points shall be preserved until such time as their usefulness has ceased and permission for their destruction is given by Engineer.

- A. Clearing: Cut and dispose of all trees, down timber, stubs, brush, bushes and debris from all areas designated.

Fell trees toward the center of the area to be cleared, in order to minimize damage to the trees that are to be left standing. Remove and dispose of trees unavoidably falling outside the specified limits. Cut trees and brush to a height of not more than 6 inches above surrounding ground.

Clearing for Pedestrian/Bicycle Pathways/Sidewalks: Overhanging limbs shall be pruned and treated to 2 feet on either side of (or to right-of-way if less than 2 feet) and to 9 feet above the pathway.

In borrow areas, clear only as much ground as is reasonably expected to be used for borrow.

Remove all surface boulders 12 inches or larger.

- B. Grubbing: Remove and dispose of all stumps, roots, moss, grass, turf, debris or other objectionable material within the excavation limits. Grub any other areas designated on the Drawings or in the Special Provisions.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed shall be backfilled with suitable materials and compacted in accordance with the Specifications.

Locate and protect existing underground facilities. Damage to the pipeline or other facilities shall be repaired at Contractor's expense.

Grub all cleared areas to a minimum depth of one foot, unless approved otherwise by Engineer.

- C. Hand Clearing: Cut and dispose of all trees, down timber, stubs, brush, bushes and debris from all areas designated with minimal disturbance to grass and/or moss cover. Do not use equipment on wheels or tracks in areas designated as hand clearing, except as stated below.

Where shown on the Drawings, you may use a mechanical brush cutter, provided such work is performed within the time frame specified in the Special Provisions.

- D. Selective Tree Removal: Cut and dispose of selected trees as designated by Engineer, and which are located outside the normal clearing and grubbing limits. Engineer may designate the trees to be removed under this Item at any time during the life of the Contract, subject to conditions in Subarticle C. Hand Clearing. Cut off designated trees no more than 6 inches above the ground surface.
- E. Disposal: Dispose of all vegetation and debris removed by clearing or grubbing in accordance with Section 209, Disposal of Unusable or Surplus Material.

Article 202.3 Measurement

By one or more of the following methods:

- A. Acre: The number of acres acceptably cleared and/or grubbed within the limits as staked. Only areas shown on the Drawings or staked for clearing and/or grubbing will be measured for payment.

Existing roadways, lakes, ponds, stream beds and other areas not covered by trees or brush will not be included for measurement. Other areas which do not require clearing and/or grubbing will be so staked and will not be included in the measurement.

- B. Lump Sum: No measurement will be made.
- C. Each: Trees designated to be removed under this Item will be measured by the number of trees acceptably removed, and disposed of, regardless of size.

Article 202.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Backfill and compaction of holes left from removal of stumps or other objects will be incidental.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
202(1)	Clearing	Acre

202(2)	Clearing	Lump Sum
202(3)	Grubbing	Acre
202(4)	Grubbing	Lump Sum
202(5)	Clearing and Grubbing	Acre
202(6)	Clearing and Grubbing	Lump Sum
202(7)	Hand Clearing	Acre
202(8)	Hand Clearing	Lump Sum
202(9)	Selective Tree Removal	Each

END OF SECTION 202

SECTION 203 EXCAVATION

Article 203.1 Description

This work consists of excavating, hauling or disposing of all material, not being removed under some other Item, which is encountered within the limits of the work necessary for the construction of the Project. Conform to the Specifications, lines, grades, depths and typical cross sections shown on the Drawings or as established by Engineer. Contractor may utilize whatever methods and equipment is deemed necessary to excavate to the limits designated by the Drawings and Specifications and authorized by Engineer, except that no equipment or method may be utilized that because of its action deteriorates the subgrade making additional excavation necessary beyond the limits originally authorized. All excavation will be classified as described in Section 201.

Article 203.2 Construction

Perform all necessary clearing and grubbing prior to beginning excavation operations in any area. Keep excavation areas free draining as much as possible at all times as work progresses. Finish the excavation to reasonably smooth and uniform surfaces.

Excavate material only within the limits on the Drawings or as directed. Prevent disturbing of material and vegetation outside of the excavation limits.

When unsuitable material is encountered at the required depth of excavation, remove the unsuitable material and backfill with approved material, as directed by Engineer. Measure the quantity of over excavation by a method approved by Engineer before the backfill is placed.

Soils that cannot be properly compacted may be designated as unsuitable. Dispose of all unsuitable or surplus excavated material in accordance with Section 209, Disposal of Unusable or Surplus Material.

The excavation depth shall be as shown on the Drawings. The depth shall be not less than six inches below the invert of water, sanitary sewer, and storm drain lines.

The bottom of the excavation shall be of a width that is adequate for proper performance of the work, that will allow compaction equipment to be utilized effectively and complies with the Drawings and Specifications.

Article 203.3 Blasting Requirements for Excavation in Rock

Blasting to be performed by Contractor shall be accomplished in accordance with the following:

- A. Blasting Consultant: When required by the Special Provisions, Contractor shall retain the services of a specialized Blasting Consultant whose experience and qualifications are acceptable to Engineer. The consultant shall be an expert in the field of drilling and blasting who derives his primary source of income from providing specialized blasting and/or blasting consulting services. The consultant shall not be an employee of

Contractor, explosives manufacturer, or explosives distributor. The Blasting Consultant's resume shall be submitted at the time of the preconstruction conference. This person shall have a minimum of 10 years experience with blast design and significant involvement as a Blasting Specialist for a minimum of 5 major rock excavation projects involving controlled blasting. A list of these projects containing a description of the projects, details of the Blast Plans, and modifications made during the projects shall be submitted with the Blasting Consultant's resume. The list shall also contain the names and telephone numbers of Project Owners with sufficient knowledge of the Projects to verify the submitted information. The Blasting Consultant shall be approved by Engineer prior to the beginning of any drilling or blasting work, and then be available on the job site at other times as required.

- B. Blaster in Charge: Contractor shall designate a Blaster in Charge who is a person authorized to act on behalf of Contractor and is licensed by the State and local regulatory agency to possess, transport, and use explosives. The Blaster in Charge shall be an employee of Contractor or blasting Subcontractor, and shall be on-site during all loading and blasting operations.
- C. Comprehensive Blasting Plan: Not less than two (2) weeks prior to commencing drilling and blasting operations, or at any time Contractor proposes to change the drilling and blasting methods, Contractor shall submit a Blasting Plan to Engineer for Review. The Blasting Plan shall contain the full details of the drilling and blasting patterns and controls Contractor proposes to use for both the controlled and production blasting. The Blasting Plan shall contain the following minimum information:
 - 1. Station limits of cut or lift.
 - 2. Drawing with plan and section views of proposed drill pattern including free face, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, and subdrill depth.
 - 3. Loading diagram showing type and amount of explosives, primers, initiators and location and depth of stemming.
 - 4. Initiators sequence of blast holes including delay times and delay system.
 - 5. Manufacturer's data sheets for all explosives, primers, and initiators to be employed.
 - 6. Powder factor.

Review of the drilling, blasting, and excavation procedures by Engineer shall not relieve Contractor of his responsibility for the accuracy and adequacy of the plan for obtaining adequate breakage, using proper detonation procedures and following proper safety procedures prior to and after blasting.

- D. Blasting Records: Contractor shall prepare and submit a blast record for each blast. The blast record shall be signed by the designated Blaster in Charge and submitted on the day

of the blast and document the following:

1. Actual dimensions of the shot including hole diameter, hole depths, burden, spacing, subdrilling, stemming, powder loads, powder factor and timing.
 2. A drawing or sketch showing direction of the face, and physical shot layout.
 3. Location of blast in relation to the Project stationing and elevation.
 4. Date and times of loading and detonation of blast.
 5. Name of person in responsible charge of loading and firing.
 6. Comments by Blaster in Charge regarding damage to existing facilities, adjacent property, or completed work, misfires, fly rock occurrences, unusual results, or unusual effects.
- E. Public Notice: When blasting within 1,000 feet of an existing structure, Contractor shall notify the owner or occupant of the structure 24 hours in advance of the exact time the blast will occur.
- F. Protection of and Coordination with Utilities: Contractor shall provide protection to public and private utilities. When blasting within 1,000 feet of an existing utility or if, in the opinion of Engineer, a blast could possibly damage an existing facility, Contractor shall notify the owner of the facility 24 hours in advance of the exact time the blast will occur. Should utility service be interrupted, damages will be assessed to Contractor for repairs and for each hour that the service is interrupted.

Contractor shall coordinate and schedule leakage testing of water lines, or electronic listening when impossible to isolate water line, and video inspection of sewer lines within 1,000 feet of blasting operations prior to beginning blasting operations and again after completion of all blasting operations.

Contractor shall provide 48 hours notice to the City of Kodiak for scheduling a leakage test and video inspection. Since testing requires shutting off the water line, testing must be coordinated with affected businesses. The City of Kodiak will determine the time and date for Contractor to conduct testing. Testing will probably be scheduled for night time or early morning.

Contractor shall furnish all necessary labor, equipment, materials, and supplies necessary to complete the test to the satisfaction of Engineer. The City of Kodiak will shut off the valves necessary to isolate the section of line to be tested. The duration of each leakage test shall be 2 hours, and during the test the main shall be subjected to a constant test pressure of 100 psi. The test pump shall be valved to ensure that constant test pressure is maintained throughout the test. Measure and record the leakage in gallons per hour (gal/hr).

If the test pressure decreases below 100 psi during the 2-hour period, the preceding portion of that test will be declared void.

If the leakage after blasting operations is greater than 0.5 gal/hr more than the leakage prior to blasting operations, Contractor shall locate and repair the waterline to reduce the leakage to at least the same value as prior to blasting.

Sewer lines will be video inspected before and after blasting. If on the sole opinion of Engineer and the City Public Works Director the sewer line has been damaged, Contractor shall repair the sewer line to the satisfaction of the Public Works Director.

- G. **Pre-Blast Condition Survey:** Contractor shall arrange for a pre-blast survey of any nearby buildings, structures, or utilities that may potentially be at risk from blasting damage. Contractor shall be responsible for any blast damage resulting from blasting. The pre-blast survey records shall be made available to Engineer for Review.
- H. **Vibration Control and Monitoring:** Contractor shall arrange for vibration monitoring when blasting within 1,000 feet of buildings, structures, or utilities. The ground vibrations shall be controlled by the use of properly designed delay sequences and allowable charge weights per delay. Allowable charge weights per delay shall be based on vibration levels that will not cause damage. Carrying out trial blasts and measuring vibration levels shall establish the allowable charge weights per delay. In no case shall the maximum peak particle velocity (PPV) exceed the following:

STRUCTURE TYPE	MAXIMUM PPV (inches per second)
Standard Construction Timber Frame, Brick, and Concrete Buildings	2.0
Reinforced Concrete Structures	4.0
Steel Structures	4.0
Buried Utilities	2.0
Wells and Aquifers	2.0
Green Concrete (less than 7 days)	1.0

Older deteriorated structures or utilities and structures housing sensitive equipment may require lower peak particle velocity limits than given in this table. Also, buried pipelines owned by private utility companies or bridge structures owned by other agencies are sometimes subject to lower limiting values imposed by the owner of the structure.

Contractor shall monitor each blast with an approved seismograph located, as approved, between the blast area and the closest structure subject to blast damage. The seismograph used shall be capable of recording particle velocity for three (3) mutually perpendicular components of vibration in the range generally found with controlled blasting.

Peak particle velocity of each component shall not be allowed to exceed the safe limits of the nearest structure subject to vibration damage. Contractor shall retain the services of a qualified Vibration Specialist to establish the safe vibration limits. The Vibration Specialist shall also interpret the seismograph records to insure that the seismograph data shall be effectively utilized in the control of the blasting operations with respect to the existing structures. A qualified Vibration Specialist is defined as a person with technical training in blasting vibration monitoring and control. The specialist must have had direct responsibility for establishing vibration limitations on at least five (5) projects. This Specification does not preclude the possibility that the Blasting Consultant, if qualified, could also function as the Vibration Specialist. The Vibration Specialist used shall be subject to Engineer's approval.

Data recorded for each shot shall be furnished to Engineer prior to the next blast and shall include the following:

1. Identification of instrument used.
 2. Name of qualified observer and interpreter person(s) designated by the vibration specialist as qualified.
 3. Distance and direction of recording station from blast area.
 4. Type of ground at recording station and material on which the instrument is sitting.
 5. Maximum particle velocity in each component.
 6. A dated and signed copy of seismograph readings record.
- I. Flyrock Control: Before the firing of any blast in areas where flying rock may result in personal injury, unacceptable delays, or damage to utilities, property or the work, the rock to be blasted shall be covered with blasting mats, soil, or other equally serviceable material, to prevent flyrock.
- If flyrock from the construction site lands on private property, all blasting operations shall cease until Contractor reviews the site and determines the cause of, and solution to the flyrock problem. Before blasting proceeds, Contractor shall submit a written report to Engineer for his approval that identifies the cause of the flyrock and recommends changes to control the flyrock.
- J. Coordination with Federal Aviation Administration (FAA): If required by the Special Provisions, Contractor shall coordinate with the FAA to set up a 1,000 feet above ground level Controlled Firing Area (CFA) restriction covering the blast areas. The following shall be accomplished:
1. Contractor shall contact the Kenai Automated Flight Service Station (Kenai AFSS) 1 (800) 992-7433 24 hours prior to blasting to notify the FAA of his blasting schedule or any changes in the blasting schedule.

2. Contractor shall provide personnel to act as aircraft watch attendants as required to provide continuous observation of the airspace in all directions from the blast zone. They shall be in continuous contact with the person in responsible charge for firing.
 3. For the purpose of protecting aircraft, no flyrock will be allowed higher than 500 feet above ground level.
- K. General: If in the opinion of Engineer, the methods of excavation required herein or adopted by Contractor are unsatisfactory in that they result in excessive rock throw, do not produce a uniform slope and shear face within the neatlines specified, or cause excessive damage to the final rock slope, Contractor shall adopt revised methods, by drilling, blasting, and excavating short sections until a technique is developed that will produce the acceptable results.

All rock that is loose, hanging, or creating a dangerous situation shall be removed during or upon completion of excavation as an integral sequence as each lift is excavated. Drilling of the next lift will not be allowed until this is completed.

Article 203.4 Horizontal Drain Holes

If required by the Drawings or directed by Engineer, drain holes to relieve water conditions in rock backslopes may be required. Minimum hole diameter shall be 3 inches and lengths shall not exceed 40 feet. Location and slope of horizontal drains will depend on conditions encountered and as directed by Engineer, but will not exceed the limits of the equipment in use on the Project for controlled blasting or production holes. Holes shall be flushed with water upon completion to remove drill fines. Pipes may be required in highly weathered or badly broken rock to keep the holes open.

Article 203.5 Dewatering

Dewatering will be required when necessary to successfully perform the construction or compact fill and backfill in accordance with the Specifications. Contractor shall obtain all permits required by law for construction dewatering. Copies of all permits shall be submitted to Engineer prior to commencing dewatering.

Water from dewatering shall comply with Section 803 EROSION AND POLLUTION CONTROL and may not be directed into the storm drain system unless the City of Kodiak Public Works Director specifically approves such discharge.

No separate payment shall be made for dewatering, and any dewatering effort shall be considered incidental to the Bid Item under construction or to the Contract.

When it is specifically called for on the Drawings and in the Special Provisions of the Contract, Contractor shall submit a dewatering plan.

Article 203.6 Measurement

Areas of instability or potential slides ordered removed by Engineer will be measured by re-sectioning.

Excavation measurement will be by the cubic yard measured in original position.

Rock excavation in trenches will be measured by the cubic yard to neat lines. The neat line will be measured vertical from the bottom of the trench to the top surface of rock two feet outside the pipe, conduit or structure the trench is intended for.

Controlled Blasting will be measured by the linear foot of drilled hole.

Horizontal Drains will be measured by the linear foot of drilled hole.

If the work is bid as pay item 2037, Common Excavation, Lump Sum, no measurements will be made.

No measurement will be made for:

- A. Hauling of material
- B. Overbreak material
- C. Water or other liquids
- D. Slope rounding excavation
- E. Providing a Blasting Consultant and Vibration Specialist
- F. Providing and coordinating personnel to act as aircraft watch attendants
- G. Coordinating, scheduling, and conducting water line leakage tests
- H. Over excavation or backfill necessary to remove disturbed or frozen soils caused by the method of excavating or by exposing thawed soils to freezing conditions.
- I. Disposal of unusable excavated material.

Article 203.7 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
203(1)	Common Excavation	Cubic Yard

203(2)	Unclassified Excavation	Cubic Yard
203(3)	Muck Excavation	Cubic Yard
203(4)	Rock Excavation	Cubic Yard
203(5)	Controlled Blasting	Linear Foot
203(6)	Horizontal Drain Holes	Linear Foot
203(7)	Common Excavation	Lump Sum
203 (8)	Unclassified Excavation	Lump Sum
203 (9)	Muck Excavation	Lump Sum
203 (10)	Rock Excavation	Lump Sum

END OF SECTION 203

SECTION 204 CLASSIFIED FILL AND BACKFILL

Article 204.1 Description

This work consists of furnishing and placement of fill and backfill.

Article 204.2 Material

- A. Classified Material, Type A, shall contain no muck, frozen material, roots, sod or other deleterious matter. It shall have a plasticity index not greater than 6 as determined in accordance with ASTM D4318. It shall have 20 to 55% by weight of particles passing the No. 4 sieve and not more than 6% by weight of particles that pass the No. 200 sieve as determined in accordance with ASTM D422. The percent passing the No. 200 sieve will be based on the minus 3-inch fraction of the material.
- B. Classified Material, Type B, shall contain no muck, frozen material, roots, sod or other deleterious matter. It shall have a plasticity index not greater than 6 as determined in accordance with ASTM D4318. It shall consist of not more than 10% by weight of particles that pass the No. 200 sieve as determined in accordance with ASTM D422. The percent passing the No. 200 sieve will be determined on the minus 3-inch fraction of the material.
- C. Classified Material, Type C, shall consist of earth, sand, gravel, rock, or combinations thereof, and shall contain no muck, peat, frozen material, roots, sod or other deleterious matter, and shall be compactable to the requirements of the Drawings and Specifications.

Article 204.3 Construction

Perform all necessary clearing, grubbing and excavation prior to beginning fill or backfill operations in any area. Keep excavation and fill areas free draining at all times as the work progresses. All depressions or holes below the general area surface level, whether caused by removal of debris or unacceptable material, or otherwise, shall be backfilled with approved material and compacted to the specified density and to a level, uniform surface before the placement of other layers. Finish the fill or backfill to reasonably smooth and uniform surface.

Construct the fill and backfill with classified material conforming to the requirements of this Section. Classified material may be obtained from unclassified excavation, rock excavation, common excavation or borrow.

When the volume of suitable excavation is not sufficient for constructing the fill to the grades indicated, furnish the necessary borrow from approved sources. The source and acceptability of the borrow is subject to approval. All test pits, explorations, and laboratory testing required to evaluate the acceptability of borrow are incidental.

Classified fill and backfill shall not be placed on seasonally frozen ground unless authorized in writing, nor on ground having a slope greater than 1 vertical to 4 horizontal (1V:4H).

Bench slopes that are steeper than 1V:4H, when measured at right angles to the roadway or fill area, when fill is to be placed and compacted on hillsides, or when new fill is to be compacted against existing embankments, or when fill is built half-width at a time. Continuously bench over those areas as the work is brought up in layers. Make benches wide enough to permit placing and compacting operations. Begin each horizontal cut at the intersection of the original ground and the vertical side of the previous bench. Incorporate material cut out, and deemed suitable, into the new fill and recompact along with the new material. Benching is incidental.

The specified material shall be constructed at the locations and to the lines and grades indicated on the Drawings. The material shall be placed and spread uniformly in successive layers not exceeding 12 inches thick. (The layers shall not exceed 6 inches thick when using hand operated compaction equipment.) Each layer shall be compacted in accordance with the requirements of Section 201. Reasonable time shall be provided Engineer to make field density determinations prior to placement of successive layers of material.

The maximum dimensions of any particle in the classified fill and backfill shall not be greater than 2/3 of the compacted thickness of the layer in which it is placed. The top 6 inches of classified fill and backfill shall have a maximum particle size of 3 inches.

Portions of any layer in which the classified fill and backfill material becomes segregated shall be removed and replaced with satisfactory material or shall be added to and remixed to secure proper gradation as directed by Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

Article 204.4 Measurement

Classified fill and backfill will be measured by cubic yard, by cubic yard vehicle measure or per ton.

If the work is bid as pay item 204(4), Classified Material, Lump Sum, no measurements will be made.

Article 204.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

When more than one class of Classified Material is specified for any Pay Item, letter suffixes shall be included within the parenthesis of the item numbers in order to differentiate between the different classes.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
204(1_)	Classified Material, Type ____	Cubic Yard
204(2_)	Classified Material, Type ____	Cubic Yard Veh. Mea.
204(3_)	Classified Material, Type ____	Ton

204(4_)

Classified Material, Type _____

Lump Sum

END OF SECTION 204

SECTION 205 LEVELING COURSE

Article 205.1 Description

This work consists of furnishing and installing leveling course on the prepared subbase.

Article 205.2 Material

The leveling course shall consist of crushed stone or crushed gravel, consisting of sound, tough, durable pebbles or rock fragments of uniform quality. The material shall be free from clay balls, vegetable matter or other deleterious matters. Leveling course shall meet the following requirements:

A. Material Quality

PROPERTY	TEST METHOD	Specification
Percent of Wear (LAR)	ASTM C131	50 Max.
Degradation Value	ATM T13	20 Min.
Percent Fracture (Single Face)	WAQTC FOP for AASHTO T335	70 Min.
Plasticity Index	ASTM D4318	6 Max.
Sodium Sulfate Soundness	AASHTO T104	9 Max. (5 Cycles)

B. Gradation

SIEVE SIZE	LEVELING COURSE GRADATION D-1
1"	100
3/4"	70-100
3/8"	50-80
No. 4	35-65
No. 8	20-50
No. 50	8-30
No. 200	0-6

Article 205.3 Construction

Leveling course shall be placed to the lines, grades, and thickness shown on the Drawings. The leveling course shall be compacted to at least 95% of the maximum density. The finished

surface shall be tested with a 10-foot straight edge. The variance of the surface from the testing edge of the straightedge between 2 contacts with the surface shall not exceed 3/8-inch.

Article 205.4 Measurement

Leveling course will be measured by the cubic yard, square yard, or per ton.

Article 205.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
205(1)	Leveling Course	Cubic Yard
205(2)	Leveling Course	Ton
205(3)	Leveling Course	Square Yard

END OF SECTION 205

SECTION 206 TRENCH EXCAVATION AND BACKFILL

Article 206.1 Description

This work consists of excavating and backfilling or disposing of all materials required for the construction of culvert, storm drain, water, sanitary sewer, and other pipe systems.

Unless otherwise specified, trench excavation shall include all pumping, hauling, draining, sheeting, bracing, and incidentals required for proper execution of the work.

Article 206.2 Materials

- A. Bedding material to 6 inches above the pipe shall meet the requirement for Classified Material, Type A and shall also pass the 2-inch sieve. Bedding material for copper water services shall also pass the 3/4-inch sieve.
- B. Trench backfill in traffic areas that is above the bedding and below the structural pavement section shall meet the requirements of Classified Material, Type C or better.
- C. Trench backfill outside traffic areas that is above the bedding shall be native material.
- D. Pavement or structural section backfill shall meet the requirement for the applicable lift of material.
- E. Foundation backfill shall meet the requirements of Classified Material, Type A.

Use all suitable material from the trench excavation for bedding and backfill prior to using material from another source.

Article 206.3 Construction

- A. Trench excavation includes removal of all materials, including rock, when encountered, to the depth shown on the Drawings. The depth shall not be less than 6 inches below the invert of water, sanitary sewer, and storm drain lines. The bottom of the excavation shall be of a width that is adequate for proper performance of the work and that will allow compaction equipment to be utilized effectively

Where maximum trench width is limited, as shown on the Drawings, Contractor shall provide trench shoring or support systems as necessary to insure that the trench width does not exceed the established limits.

Contractor shall erect and maintain continuous trench barricades to prevent access around all excavations left open at the end of the work day.

Contractor shall provide and maintain adequate barricades to insure public safety at all times during the prosecution of the work. When excavated material is to be stockpiled on areas of natural vegetation that is not scheduled for removal, a geotextile fabric shall be

placed on the vegetation to limit damage to the existing vegetation prior to stockpiling any material.

Time is of the essence; therefore, Contractor shall not begin excavation of the trench until all materials, equipment, and personnel are present to complete the work in the most expedient manner. Not more than 400 feet of trench shall be open in advance of pipe or conduit installation unless authorization, in writing, is obtained from Engineer. There shall be no more than 100 feet of open trench at the end of the work day, unless approved by Engineer.

- B. Trench backfill, including bedding, shall be placed in accordance with Section 204, Classified Fill and Backfill, and compacted to meet the following requirements:
 - 1. Bedding: Minimum of 95% of the maximum density.
 - 2. Within Traffic Areas: Minimum of 95% of the maximum density.
 - 3. Outside Traffic Areas: Minimum of 85% of the maximum density.
- C. Bedding: All pipe shall be placed in bedding. Bell holes and depressions for joints shall be dug after the trench bottom has been graded and, in order that the pipe will rest on the prepared bottom for as nearly its full length as practical, bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Bedding below the bottom of pipe shall be compacted to the required density prior to installation of the pipe and placement of the remaining bedding.
- D. Sheet piling, shoring, and bracing includes design, installation, use and removal of all sheet piling, shoring, bracing and shielding. Design, installation, and use of the system selected by Contractor shall be in accordance with all applicable safety regulations.

If shoring or sheet piling is left in the trench, sheet piling must be driven lower than the bottom of the pipe and cut off one foot or more below ground surface. No transverse bracing will be permitted to remain.
- E. Dispose of all unusable material in accordance with Section 209, Disposal of Unusable or Surplus Material.
- F. Cleanup and finish all construction areas to their original condition or better.

Article 206.4 Measurement

Measurement of trench excavation and backfill will be per linear foot of horizontal distance. On sanitary sewer and storm drain construction, measurement will be from center to center of manholes, from center of manhole to center of catch basins, from center of manhole to center of cleanout wye, from center of manhole to end of out-fall piping not including end sections. On all other construction, measurement will be from station to station as shown on the Drawings.

When trench excavation and backfill, does not appear in the Bid Schedule, trench excavation and backfill required to complete other Items of Work will be incidental to those Items of Work except that excavation and disposal of unsuitable material required from below a plane 6 inches below the invert elevation of pipes will be paid for as extra work.

Any backfill or bedding material required whose source is other than Project excavation will be paid for at the Contract Unit Price for the material being used or as extra work if no Unit Price has been established.

Shoring, sheeting and bracing is incidental to Trench Excavation and Backfill and will not be measured for payment.

Article 206.5 Basis of Payment

Rock excavation will be measured and paid for as provided in Section 203, Excavation. If rock excavation is not included in the Bid Schedule, the rock excavation will be paid for at negotiated prices or at the Cost of the Work.

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

ITEM NO.	DESCRIPTION	UNIT
206(1)	Trench Excavation and Backfill - Storm Drain (various depths)	Linear Foot
206(2)	Trench Excavation and Backfill - Water and Sewer (various depths)	Linear Foot
206(3)	Pipe Bedding Material	Ton
206(4)	Pipe Bedding Material	Linear Foot

END OF SECTION 206

SECTION 207 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Article 207.1 Description

This Work consists of the removal and satisfactory disposal of all fences, guardrail, structures, old pavements, abandoned utilities and any other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of under other items listed in the Bid Schedule. This section also includes the backfilling of the resulting trenches, holes, and pits. When the Bid does not include Pay Items for removal of structures and obstructions as set out in this Section, perform such work under Section 203 Excavation or as specified. Also included in the work will be the removing and resetting of mailboxes and newspaper delivery tubes and the preservation from injury or defacement of all vegetation and objects not scheduled for removal.

Article 207.2 Construction

- A. General: Raze, remove and dispose of all buildings and foundations, structures, fences and other obstructions any portions of which are within the right-of-way, except utilities and those for which other provisions have been made for removal.

Fill basements, or cavities left by structure removal, to the level of the surrounding ground and, if within the prism of construction, compact backfill as specified under Section 204.

Stockpile all salvaged materials which are designated for use on the Project at approved locations.

- B. Do not remove manholes, inlets, valves or any other portion of the sewer or water systems until the new systems are in operation or suitable arrangements have been made for the diversion, interruption, or a temporary system has been installed.

When flexible pipe is designated on the Drawings to be abandoned in-place, crush and flatten the ends before covering. Securely plug other conduits by an approved method.

Remove the substructures of existing structures down to the natural stream bottom and remove those parts outside of the stream down 2 feet below natural ground surface. Where such existing structures lie wholly or in part within the limits for a new structure, remove such portions as necessary to accommodate the new structure.

- C. Removal of Pipe: When the Bid Schedule contains an item for the "Removal of Culvert Pipe", the pipe to be removed will become the property of Contractor.

When storm drainpipe is to be removed from an existing manhole, fill holes with 3,000-psi (minimum) cement grout.

- D. Removal of Pavement, Sidewalks, and Curbs: Dispose of all concrete pavement, leveling course, sidewalks, curbs, gutter, etc., designated for removal, in an acceptable manner.

In removing pavements, curbs, walks, driveways and similar structures, all cuts where an abutting structure or a part of a structure is to be left in-place shall have clean, vertical cuts made true to designated lines.

If Special Provisions require asphalt pavements be delivered to the City, the asphalt pavement shall be crushed to a 6-inch maximum size.

- E. **Dispose of Asbestos Materials:** Any asbestos-containing materials removed from an excavation during performance of the Work shall be disposed of in accordance with Section 209, Disposal of Unusable or Surplus Material, considered hazardous waste and disposed of in accordance with 18 AAC 60.450 and other applicable state and federal regulations.
- F. **Relocate Overhead Utilities and Poles:** Relocation of overhead utilities and poles will be performed by others. Contractor shall coordinate relocation of overhead utilities and poles with the governing utility company. This includes, but is not limited to, coordinating with KEA for power pole and electrical line relocation and ACS and/or GCI for phone and cable line relocation.
- G. Unless stated otherwise in the plans Contractor has the option of abandoning the water and sanitary sewer pipes in place. When abandoning in place Contractor shall either crush the pipe or properly plug both ends of the pipe. Pipe shall be abandoned as directed by Owner. No payment will be made for abandoning water and sewer pipes in place, or for removing and disposing of water and sewer pipes.
- H. **Relocate Mailbox Cluster:** Relocate existing mailbox clusters where indicated on the Drawings. Mailbox clusters shall be temporarily reset at a United States Postal Service (USPS) approved location out of the project limits until construction has been completed. Coordinate work activities involving existing USPS facilities with the Kodiak Postmaster, (907) 486-4721. Provide the USPS at least 14 calendar days notice to allow them to notify postal customers, arrange temporary mail service, and remove their mailbox units from the concrete pads. Accomplish each pad construction within 48 hours after the USPS has removed the mailbox unit and notify the Postmaster no later than 24 hours after each new pad is completed so the USPS can reinstall their mailbox units.

Article 207.3 Measurement

Removal of sanitary sewer and water mains and service lines will not be measured for payment under this Section and will be incidental to Sections 502 and 602, Furnish and Install Pipe and Sections 511 and 606, Connect to Existing Sewer Service and Water Service Lines.

Coordinate Structure Relocation shall be measured per lump sum and include all Work required to coordinate all structure and utility relocation shown on the Drawings as “by others” with the owner of the structure or governing utility company.

Relocate mailbox cluster is measured per each, regardless of the number of mail boxes or the size, thickness, or weight of the concrete pads. Coordination with the USPS and final grading around the pad is subsidiary.

Measurement will be by the units indicated, as follows:

- A. Lump Sum. No measurement will be made.
- B. Square Foot. Length times average width before removal.
- C. Foot. Length before removal.
- D. Each. Each completed unit removed or installed. Newspaper tubes will not be measured.

Article 207.4 Basis of Payment

Payment for Item 207(1), Remove Structures and Obstructions includes payment for removing and disposing, relocating, or replacing in-kind all structures and obstructions encountered within the right-of-way or outside the right-of-way that are not paid for under a separate pay item, under the provisions of this Section.

Payment for items 207(2), 207(3), 207(4), 207(6) through 207(10), and 207(12) through 207(15) includes payment for salvage or materials removed, their custody, preservation, storage on the right-of-way and disposal as provided.

Payment for Items 207(10) includes payment for removal, temporary relocation, and final installation of mail boxes and newspaper tubes.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
207(1)	Remove Structures and Obstructions	Lump Sum
207(2)	Remove Pavement	Square Foot
207(3)	Remove Sidewalk or Concrete Pad	Square Foot
207(4)	Remove Culvert Pipe	Linear Foot
207(5)	Remove Sanitary Sewer Pipe	Linear Foot
207(6)	Remove Manhole	Each
207(7)	Remove Junction Box	Each
207(8)	Remove Catch Basin	Each
207(9)	Remove Curb and Gutter	Linear Foot
207(10)	Relocate Mailbox Cluster	Each
207(11)	Remove Storm Drain Pipe	Linear Foot
207(12)	Remove Existing Sign	Each
207(13)	Remove Concrete Stairs	Lump Sum
207(14)	Remove Concrete Retaining Wall	Linear Foot
207(15)	Coordinate Structure Relocation	Lump Sum

END OF SECTION 207

SECTION 208 RIPRAP

Article 208.1 Description

This work consists of furnishing and placing a protective covering of stone as shown on the Drawings or as directed by Engineer.

Article 208.2 Materials

Stone for this work shall be hard angular quarry stones and have a percentage of wear of not more than 50 at 500 revolutions as determined by ASTM C535. The least dimension of any piece of stone shall be not less than 1/4 its greatest dimension. Stones shall meet the following gradation requirement for the class specified:

	% Lighter			
Weight (lb)	Class I	Class II	Class III	Class IV
5,400				90-100
2,000				0-50
1,400			90-100	
700			0-50	
400		90-100		0-15
200		0-50		
50	90-100			
25	0-50	0-15	0-15	

Article 208.3 Construction

A footing trench shall be excavated along the toe of the slope when shown on the Drawings. The stones shall be handled or dumped into place so as to secure a stone mass of the thickness, height and length shown on the Drawings, or as staked, with a minimum of voids.

Undesirable voids shall be filled in with small stones or spalls. The rock shall be manipulated sufficiently by means of a bulldozer, rock tongs, or other suitable equipment to secure a reasonably regular surface and mass stability.

Riprap protection shall be placed to its full course thickness at one operation and in such manner as to avoid displacing the underlying material. Placing of riprap protection in layers or by dumping into chutes or by similar methods likely to cause segregation will not be permitted.

All material going into riprap protection shall be so placed and distributed that there will be no large accumulation or area composed largely of either the larger or smaller sizes of stone.

Unless otherwise authorized by Engineer, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to prevent mixture of embankment and riprap material.

Contractor shall provide a level compacted area of sufficient size to dump and sort typical loads of riprap at approved location(s). He shall further dump loads specified in this area and assist Engineer as needed to sort and measure the stones in the load for the purpose of determining if the riprap is within Specifications. Mechanical equipment as needed to assist in this sorting shall be provided by Contractor at no additional cost to the Owner.

Article 208.4 Method of Measurement

The quantity of riprap to be paid for shall be the number of cubic yards measured by neat line measure, or tons, completed and accepted in-place.

Article 208.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Excavation and backfill required for placement of riprap will not be paid for directly but will be considered incidental.

When more than one class of riprap is specified for any Pay Item, letter suffixes shall be included within the parentheses of the item numbers in order to differentiate between the different classes.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
208(1_)	Riprap, Class____	Cubic Yard
208(2_)	Riprap, Class____	Ton

END OF SECTION 208

SECTION 209 DISPOSAL OF UNUSABLE OR SURPLUS MATERIAL

Article 209.1 General

This work consists of properly disposing of all unusable or surplus material originating from other items of the Work including, but not limited to: Section 202, Clearing and Grubbing, Section 203, Excavation; Section 206, Trench Excavation and Backfill; and Section 207, Removal of Structures and Obstructions.

Article 209.2 Construction

Contractor shall dispose of unusable and surplus material at a lawful, permitted disposal site.

If material is to be disposed on private property, obtain the written permission of the property owner(s) and a waiver of all claims against the City of Kodiak for any damage to such lands which may result. Obtain all permits required by law for such disposal or fill placement. A copy of the written permission, waiver of claims, and permits shall be provided to Engineer prior to disposal.

Disposal of Asbestos Materials: Any asbestos-containing materials removed from an excavation or structure shall be considered hazardous waste and disposed of in accordance with 18 AAC 60.450 and other applicable state and federal regulations. All asbestos-containing materials shall be disposed at an approved disposal facility.

Article 209.3 Measurement

Disposal of unusable or surplus material will be measured by cubic yard, by cubic yard vehicle measure or per ton.

If the work is bid as pay item 209(4), Disposal of Unusable or Surplus Material, Lump Sum, no measurements will be made.

Article 209.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

If Disposal of Unusable or Surplus Material is not included in the Bid Schedule then this is considered incidental to other items of the Work and no separate payment will be made.

ITEM NO.	DESCRIPTION	UNIT
209(1)	Disposal of Unusable or Surplus Material	Cubic Yard
209(2)	Disposal of Unusable or Surplus Material	Cubic Yard Veh. Mea.
209(3)	Disposal of Unusable or Surplus Material	Ton
209(4)	Disposal of Unusable or Surplus Material	Lump Sum

END OF SECTION 209

SECTION 210 FURNISH FILTER MATERIAL

Article 210.1 General

This Work under this Section consists of performance of all operations pertaining to providing filter material.

Article 210.2 Materials

Filter material shall be gravel or sand consisting of crushed or naturally-occurring granular material. It shall be free of clay particles and conforming to the gradation requirements below.

The coarse aggregate material conforming to the requirements specified below shall have a percentage of wear not to exceed thirty (30) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131.

Requirements for Grading of Filter Material Gradation (% Passing)

Sieve	2"	1-1/2"	1"	3/4"	1/2"	3/8"	#4	#16	#50	#100	#200
Type A						100	95-100	45-80	10-30	0-10	0-3
Type B						100		0-5			
Type C	100	95-100		0-20		0-5					
Type D			100	90-100	50-70	20-50	0-10				0-1

Foundry sand and other material which may be cementitious or not suitable for water percolation shall not be used.

Article 210.3 Construction

Filter material is defined as the material which is placed below, above, and on each side of a perforated pipe to form a subdrain. Filter material may also be used directly in the trenches without a perforated pipe to form a French drain. Refer to Standard Detail 700-3 for construction of a subdrain.

Article 210.4 Measurement

Measurement of filter material shall be per ton or per linear foot of material placed in the trench.

Article 210.5 Basis of Payment

Payment will be made at the Contract price, per unit of measure for the Pay Item listed below that is included in the Bid Schedule.

Payment for placing filter material for French drains is included in Section 206 - Trench Excavation and Backfill.

Payment for placing filter material for subdrains is included in payment for Division 700, Section 703 – Fin Drains and Subdrains.

Payment for this item includes furnishing the required type of filter material.

Payment shall be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
210(1)	Filter Material (Type__)	Ton
210(2)	Filter Material (Type__)	Linear Foot

END OF SECTION 210

**CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS**

DIVISION 300

TABLE OF CONTENTS

DIVISION 300 - PORTLAND CEMENT CONCRETE.....	1
SECTION 301 GENERAL.....	1
SECTION 302 CONCRETE CURB AND GUTTER.....	2
SECTION 303 PORTLAND CEMENT CONCRETE SIDEWALKS.....	4
SECTION 304 PORTLAND CEMENT CONCRETE STRUCTURES.....	6
SECTION 305 PORTLAND CEMENT CONCRETE CURB RAMPS	8

DIVISION 300 - PORTLAND CEMENT CONCRETE

SECTION 301 GENERAL

Article 301.1 Description

This work consists of furnishing and placing Portland cement concrete.

Article 301.2 Referenced Standards

The following referenced standard applies to all Portland cement concrete (PCC) work. Work on the Project shall conform to all requirements of ACI 301, Standard Specifications for Structural Concrete, published by the American Concrete Institute, Detroit Michigan, except as modified by the requirements of these Contract Documents.

END OF SECTION 301

SECTION 302 CONCRETE CURB AND GUTTER

Article 302.1 Description

This work consists of constructing curbs, gutters, miscellaneous median shapes, and parking stops.

Article 302.2 Supplements to ACI 301-10

Part 2.3.1.5 Lateral alignment shall be within 1/4-inch in 10 feet.

Level alignment shall comply with ACI 117, Standard Specifications for Tolerances for Concrete Construction and Materials, Section 12 B Pavements and Sidewalks.

Part 4.2.2.6 Work on the Project shall conform to all requirements of ACI 306.1, Standard Specification for Cold Weather Concreting, published by the American Concrete Institute, Detroit, Michigan, except as modified by the requirements of these Contract Documents.

Part 4.2.2.8 The maximum water-cementitious material ratio shall be 0.45. The minimum compressive strength in 28 days shall be 4,500 psi.

Part 5.1.2.1.e Advance notification of concrete placement is required. Engineer shall be notified at least 24 hours prior to placing concrete.

Part 5.3.2.1.a Wet weather protection procedures must be submitted and accepted prior to concrete placement.

Part 5.3.1.4 Subgrade must be inspected and approved prior to concrete placement.

Part 5.3.1.4 Subgrade soils shall be compacted to a minimum of 95% of the maximum density in accordance with Division 200 - Earthwork.

Part 5.3.2.6 Expansion and Contraction Joints:

Expansion Joints: Expansion joints shall be placed along all structures and about all features that project into, through, or against the concrete. An expansion joint shall be constructed at the intersection of sidewalks; between sidewalk crossings and sidewalks; between curbs and sidewalks (except parallel curb); and at the beginning and end of curb returns. Expansion joint material shall conform to the requirements of ASTM D 994. This material shall extend the full width of the curb and shall be cut to such dimensions that the base of the expansion joint shall extend to the subgrade and the top shall be depressed not less than 1/4-inch nor more than 1/2-inch below the finished surface of the concrete. The material shall be of one piece in the vertical dimension and shall be securely

fastened in a vertical position to the existing concrete face against which fresh concrete is to be placed.

Contraction Joints: Transverse contraction joints shall be cut to a depth of one inch prior to the final set of the concrete. All contraction joints shall be tooled at 10-foot intervals in the curb and gutter. Where the sidewalk adjoins the curb (parallel to it) contraction joints in the sidewalk and curb shall be at the same locations where practicable.

Part 5.3.4.2 A broom finish is required.

Article 302.3 Measurement

Curb, curb noses, or integral curb and gutter shall be measured per linear foot along the face of the curb. Valley Gutter shall be measured along the straight flow line between expansion joints.

Article 302.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Extra payment will not be made for depressed curb or special sections.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
302(1)	Curb and Gutter (Type)	Linear Foot
302(2)	Valley Gutter	Linear Foot

END OF SECTION 302

SECTION 303 PORTLAND CEMENT CONCRETE SIDEWALKS

Article 303.1 Description

This work consists of furnishing and installing portland cement concrete sidewalks.

Article 303.2 Supplements to ACI 301-10

Part 4.2.2.6 Work on the Project shall conform to all requirements of ACI 306.1, Standard Specification for Cold Weather Concreting, published by the American Concrete Institute, Detroit, Michigan, except as modified by the requirements of these Contract Documents.

Part 4.2.2.8 The maximum water-cementitious material ratio shall be 0.45. The minimum compressive strength in 28 days shall be 4,500 psi.

Part 5.1.2.1.e. Advance notification of concrete placement is required. Engineer shall be notified at least 24 hours prior to placing concrete.

Part 5.3.2.1.a Wet weather protection procedures must be submitted and accepted prior to concrete placement.

Part 5.3.1.4 Subgrade must be inspected and approved prior to concrete placement.

Part 5.3.1.4 Subgrade soils shall be compacted to a minimum of 95% of the maximum density in accordance with Division 200 - Earthwork.

Part 5.3.2.6 Expansion and Contraction Joints:

Expansion Joints: Expansion joints shall be placed along all structures and about all features that project into, through, or against the concrete. An expansion joint shall be constructed at the intersection of sidewalks; between sidewalk crossings and sidewalks; between curbs and sidewalks (except parallel curb); and at the beginning and end of curb returns. Expansion joint material shall conform to the requirements of ASTM D 994. This material shall extend the full width of the curb and shall be cut to such dimensions that the base of the expansion joint shall extend to the subgrade and the top shall be depressed not less than 1/4-inch nor more than 1/2-inch below the finished surface of the concrete. The material shall be of one piece in the vertical dimension and shall be securely fastened in a vertical position to the existing concrete face against which fresh concrete is to be placed.

Contraction Joints: Transverse contraction joints shall be cut to a depth of one inch prior to final set of the concrete, shall be tooled at 5-foot intervals in the sidewalk. All contraction joints shall be tooled at 5-foot intervals in the curb and gutter. Where the sidewalk adjoins the curb (parallel to it)

contraction joints in the sidewalk and curb shall be at the same location where practicable.

Part 5.3.4.2 A broom finish is required. The broom finish shall be in a transverse direction, except at driveway and alley crossings where it shall be in a longitudinal direction.

Article 303.3 Measurement

Sidewalks shall be measured per square yard, complete in-place, for both 4 and 6-inch thicknesses.

Article 303.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
303(1)	PCC Sidewalk	Square Yard

END OF SECTION 303

SECTION 304 PORTLAND CEMENT CONCRETE STRUCTURES

Article 304.1 Description

This work consists of furnishing and installing portland cement concrete structures, including retaining walls, head walls, and miscellaneous concrete.

Article 304.2 Supplements to ACI 301-10

- Part 3.2.1.1 Reinforcing bars shall be ASTM A 615, Grade 60, deformed (unless indicated otherwise on the Drawings).
- Part 3.2.1.6 Welded wire fabric shall be ANSI/ASTM A 82, plain, cold drawn steel double annealed No. 16 wire (unless indicated otherwise on the Drawings).
- Part 4.2.2.6 Work on the Project shall conform to all requirements of ACI 306.1, Standard Specification for Cold Weather Concreting, published by the American Concrete Institute, Detroit, Michigan, except as modified by the requirements of these Contract Documents.
- Part 4.2.2.8 The maximum water-cementitious material ratio shall be 0.45. The minimum compressive strength in 28 days shall be 4,500 psi.
- Part 5.1.2.1.e Advance notification of concrete placement is required. Engineer shall be notified at least 24 hours prior to placing concrete.
- Part 5.3.2.1.a Wet weather protection procedure must be submitted and accepted prior to concrete placement.
- Part 5.3.1.4 Subgrade must be inspected, tested and approved prior to concrete placement.
- Part 5.3.1.4 Subgrade soils shall be compacted to a minimum of 95% of the maximum density in accordance with Division 200 - Earthwork.

Article 304.3 Measurement

Concrete shall be measured per cubic yard for structures and retaining walls. Measurement will be determined from the neat line dimension. Where sidewalks are constructed in conjunction with retaining walls, the sidewalk shall be measured under the provisions of Section 303 - Portland Cement Concrete Sidewalks.

Article 304.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Extra payment will not be made to Contractor if he places additional concrete over and above the neat line volume to facilitate his operation and save on form work.

No additional payment shall be made for excavation and backfill around retaining walls and structures. Payment for disposal of unusable excavation and classified fill shall be in accordance with Section 200 - Earthwork.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
304(1)	Portland Cement Concrete	Cubic Yard
304(2)	Concrete Stairs	Lump Sum
304(3)	Concrete Retaining Wall	Cubic Yard

END OF SECTION 304

SECTION 305 PORTLAND CEMENT CONCRETE CURB RAMPS

Article 305.1 Description

This Work consists of performing all operations pertaining to furnishing and constructing Portland Cement Concrete curb ramps with a detectable warning surfacing in conformance with the plans, details, and these specifications.

Article 305.2 Materials

Each curb ramp shall be constructed in conformance with the Drawings. Materials and installation shall meet the requirements of Section 303, Portland Cement Concrete Sidewalks.

No troweled pattern shall be applied to the curb ramps. Provide coarse broom finish for ramps.

Coarse broom finish shall be perpendicular to direction of pedestrian traffic. Contractor shall float and trowel all surfaces to receive the coarse broom finish. Seeding the surface with aggregate shall not be allowed.

Any significant difference in texture or appearance between two adjacent concrete panels, as determined by Engineer, shall result in removal and replacement of concrete panels by Contractor at no additional cost to the Owner.

Detectable Warning Strip:

Each detectable warning strip panel shall have a truncated domed surface 24 inches in width, and a flanged underside. The truncated domes shall have a height of 0.200 inches, a diameter of 0.900 inches, and a center-to-center spacing of 1.6 inches minimum and 2.4 inches maximum, measured between the most adjacent domes, or as directed by Engineer. The underside flanges shall have a height of 1.275 inches, a minimum thickness of 0.125 inches and spacing no greater than 2.820 inches apart. Each flange shall have a minimum of three each, 0.625-inch holes spaced equally apart. Contractor shall provide panels safety yellow in color.

Contractor shall provide Armor Tile Cast-In-Place In-Line Dome Tactile Panel detectable warning strip panel(s), manufactured by:

Engineered Plastics, Inc.
360 International Drive, Ste. 100
Williamsville, N.Y. 1422 1
Phone: 1-800-682-2525
or an approved equal.

Article 305.3 Construction

Contractor shall construct each curb ramp and install the detectable warning strip panel(s) in conformance with the plans, details, the manufacturer's recommendations, and these specifications.

No later than five days prior to construction of the curb ramps, Contractor shall submit to Engineer for review and approval, a layout drawing for each curb ramp to resolve issues related to pattern repeat, tile cuts, expansion joints, control joints, ramp curves, ramp end returns and surface interfaces, and truncated dome spacing.

Contractor shall install and finish the P.C.C. in accordance with the plans, C.K.S.S., and these specifications prior to installation of the detectable warning strip panel(s). Contractor shall tamp the panel(s) with a small sledge hammer with a 2" x 6" x 20" wood tamping plate, or lightly vibrate into the fresh concrete to ensure that the panel's field level (base of truncated dome) is flush with the adjacent concrete and top back of curb. Ensuring that the panel's field level is flush with the adjacent concrete surface permits proper water drainage and eliminates potential tripping hazards. Contractor shall ensure that the back edge of the detectable warning strip panel(s) form a smooth arc and is parallel to the top back of the curb.

Immediately after the panel placement, Contractor shall check and adjust accordingly the panel's field level to be flush with the adjacent concrete surface. Following final field-level adjustment(s), place suitable 25-pound weights, conforming to the manufacturer's recommendations, on each panel and additional weights at panel-to-panel joints as necessary to provide a solid contact between the panel underside and the concrete.

During and after the panel installation and concrete curing time, Contractor shall ensure that there is no walking, leaning, or any external forces placed on the panel, thereby causing a void between the underside of the panel and the concrete.

After the concrete has cured, Contractor shall remove the protective plastic wrap. If "concrete bleeding" occurs between the panels, Contractor shall remove the residue without damage to the panel surfaces, in accordance with the manufacturer's recommendation.

Contractor shall maintain, on-site, an electronic level, a 5' diameter circle template, and a 3'x 5' rectangular template. Template may be of any material, including paper. Contractor shall, when requested, demonstrate to Engineer that there are adequate landing and turning areas that meet the dimensions and slopes required on the plans.

Backfill and grade areas disturbed by curb ramp construction and restore ground surface as shown on plans.

Article 305.4 Measurement

Curb ramps shall be measured per square yard furnished, constructed, and accepted in-place.

The Work paid for under "Detectable Warnings" is measured by the actual horizontal square footage of detectable warning tiles furnished, installed, and accepted in place.

Article 305.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
305(1)	PCC Curb Ramp	Square Yard
305(2)	Detectable Warnings	Square Foot

END OF SECTION 305

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 400

TABLE OF CONTENTS

DIVISION 400 - ASPHALT SURFACING	1
SECTION 401 GENERAL.....	1
SECTION 402 ASPHALT CONCRETE PAVEMENT	3
SECTION 403 SEAL COAT.....	10
SECTION 404 TACK COAT	14
SECTION 405 REMOVE AND REPLACE EXISTING ASPHALT SURFACING	16
SECTION 406 PAVEMENT ROTOMILLING.....	17

DIVISION 400 - ASPHALT SURFACING

SECTION 401 GENERAL

Article 401.1 Description

This work consists of furnishing and constructing hot mix asphalt concrete pavement. The work may consist of placing one or more courses of hot mix asphalt pavement on a previously prepared base, tack coat, seal coat, and/or removal of existing asphalt pavement.

Article 401.2 Applicable Standards

The latest revision of the following standards of the American Society for Testing and Materials (ASTM), American Association of State Highway and Transportation Officials (AASHTO), and Alaska Test Methods (ATM) are hereby made a part of these Specifications:

AASHTO T 195	Standard Specification for Determining Degree of Particle Coating of Bituminous-Aggregate Mixtures
ASTM C 88	Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 131	Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Abrasion Machine.
ASTM D 140	Practice for Sampling Bituminous Materials
ASTM D 422	Method for Particle-Size Analysis of Soil
ASTM D 977	Specification for Emulsified Asphalt
ASTM D 979	Practice for Sampling Bituminous Mixtures
ASTM D 995	Specification for Requirements for Mixing Plants for Hot-Mixed, Hot Laid Bituminous Paving Mixtures
ASTM D 1559	Test Method for Asphalt Content of Bituminous Mixtures by the Nuclear Method
ASTM D 2041	Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures (MSG/Rice)
ASTM D 2172	Test Method for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2397	Specification for Cationic Emulsified Asphalt

ASTM D 2726	Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D 2950	Test Method for Density of Bituminous Concrete in Place by Nuclear Method
ASTM D 4318	Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D 4125	Test Method for Asphalt Content of Bituminous Mixtures by Nuclear Method
ASTM D 5361	Standard Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing
ASTM D 5444	Standard Test Method for Mechanical Size Analysis of Extracted Aggregate
ATM T 4	Standard Test Method for Determining the Percentage of Fracture Particles
ATM T 13	Standard Test Method for Determining the Degradation Value of Aggregates
ATM T 14	Standard Method of Test for Determining Anti-Strip Requirements of Bitumen-Aggregate Mixtures.

Article 401.3 Materials and Inspection

Submit material test reports and certifications for all asphalt, asphalt cements, aggregate, and additive products to be incorporated into the work. Representative samples of each material shall be submitted, in sufficient quantities for testing, at the request of Engineer.

Engineer or his authorized representative shall at all time have access to all portions of the paving plant, aggregate plant, storage yards, and other facilities for producing and processing the material. Contractor will provide means and assist in sampling on request.

END OF SECTION 401

SECTION 402 ASPHALT CONCRETE PAVEMENT

Article 402.1 Description

This work consists of constructing one or more courses of plant-mixed hot asphalt concrete pavement on a previously prepared surface, as specified and in conformance with the lines, grades, and depths shown on the Drawings.

Article 402.2 Composition of Mixture - Job Mix Design

Contractor shall submit, at his expense, a Job Mix Design stamped by a Professional Engineer registered in the State of Alaska. The Job Mix Design and aggregate quality tests shall have been completed no more than 18 months prior to the date of the Notice-to-Proceed for the current Project. The aggregates used in the Job Mix Design must be used for the current Project for the Job Mix Design to be valid. Furnish the Job Mix Design to Engineer at least 5 days before the production of asphalt concrete mixture. Submit samples to Engineer, upon request, for Job Mix Design verification testing. Do not produce asphalt concrete mixture for payment until the Job Mix Design is approved.

The Job Mix Design shall be performed using the most current edition of Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types, MS-2, published by the Asphalt Institute.

DESIGN PARAMETER	CLASS A	CLASS B	CLASS C
Minimum Stability, Pounds	1,800	1,200	750
Flow	8 - 14	8 - 16	8 - 18
Voids in Total Mix, Percent	3 - 5	3 - 5	3 - 5
Compaction, No. of Blows Each Side of Test Specimen	75	50	35
Voids Filled with Asphalt, Percent	65 - 75	65 - 78	70 - 80
Dust-Asphalt Ratio	0.6 - 1.4	0.6 - 1.4	N/A
Minimum Voids in the Mineral Aggregate (VMA)			
Type I	12.0	11.0	N/A
Type II	13.0	12.0	N/A
Type III	14.0	13.0	N/A

BROAD BAND GRADATION			
SIEVE SIZE	TYPE I	TYPE II	TYPE III
1"	100		
3/4"	80 - 90	100	
1/2"	60 - 84	75 - 90	100
3/8"	48 - 78	60 - 84	80 - 90
No. 4	28 - 63	33 - 70	44 - 81
No. 8	14 - 55	19 - 56	26 - 70
No. 16	9 - 44	10 - 44	16 - 59
No. 30	6 - 34	7 - 34	9 - 49
No. 50	5 - 24	5 - 24	6 - 36
No. 100	4 - 16	4 - 16	4 - 22
No. 200	3 - 7	3 - 7	3 - 7

MATERIAL CHARACTERISTIC	TOLERANCE (NARROW BAND)
*1"	0
3/4"	±6.0
1/2"	±6.0
3/8"	±6.0
No. 4	±6.0
No.8	±6.0
No. 16	±5.0
No. 30	±4.0
No. 50	±4.0
No. 100	±3.0
No. 200	±2.0
Asphalt, Percent	±0.5

* Tolerances for the largest sieve specified will be plus 0% and minus 1%.

The approved Job Mix Design will specify the target values for gradation, the target value for asphalt cement content, the Maximum Specific Gravity (MSG) of the mix, the additives, and the allowable mixing temperature range.

Target gradation values in the Job Mix Design for the type and class of asphalt concrete specified shall be within the broad band, but will have the full tolerances applied for acceptance.

- A. Asphalt Materials: Provide the grade of asphalt cement specified in the Specifications or on the Drawings . When not specified, the grade of asphalt cement shall be either PBA-2 or AC-5.
- B. Antistrip Additives: Use antistrip agents in the proportions determined by ATM T 14 and included in the approved Job Mix Design. At least 70% of the aggregate shall remain coated when tested according to ASTM T 14.
- C. Coarse Aggregate (retained on the No. 4 sieve): Crushed stone or crushed gravel consisting of sound, tough, durable rock of uniform quality. Free from clay balls, vegetative matter or other deleterious matters. Not coated with dirt or other finely divided mineral matter. The asphalt aggregates shall meet the following requirements:

MATERIAL CHARACTERISTIC	REQUIREMENT
Percent of Wear	45 maximum
Degradation Value	20 minimum
Percent Sodium Sulfate Loss	9 maximum (5 cycles)
Percent Fracture	80 minimum (single face)
Thin B Elongated Pieces	8% maximum

- D. Fine Aggregate (passing the No. 4 sieve): The plasticity index of the fraction passing the No. 40 sieve shall not exceed 4.0. The weighted loss shall not exceed 15% when the soundness is determined using sodium sulfate.

Article 402.3 Construction

- A. Weather Limitations: Do not place the asphalt concrete mixture on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place asphalt concrete mixture for a leveling course unless the roadway surface temperature is 40 degrees Fahrenheit or warmer.
- B. Equipment, General: Use equipment in good working order and free of asphalt concrete mixture buildup. Make all equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of asphalt concrete mix.
- C. Asphalt Mixing Plant: Use an asphalt plant designed to dry aggregates, maintain accurate temperature control, and accurately proportion asphalt cement and aggregates. Calibrate

the asphalt plant prior to mixture production and supply calibration data to Engineer on request. Calibrate the metering systems and scales to the accuracy specified in ASTM D995. Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the asphalt concrete mixture. Provide safe aggregate and asphalt cement sampling locations.

Do not use proportioning (batch) belt scales for weighing material for payment. Weigh scales used with a storage silo may be used to weigh the final product for payment, provided the scales are certified.

- D. Hauling Equipment: Haul asphalt mixtures in trucks with tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution or other manufactured asphalt release agent. Do not use petroleum fuel as an asphalt release agent. Cover the asphalt concrete mixture in the hauling vehicle, when required.
- E. Asphalt Pavers: Use self-propelled units equipped with a heated vibratory screed. Control grade and cross slope with automatic grade and slope control devices. Use an erected string line, a mobile string-line (ski), sonar controls/agg-techs or other approved grade follower, to automatically actuate the paver screed control system. Use grade control on either (a) both the high and low sides or (b) grade control on the high side and slope control on the low side.

Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation. Equip the hopper with a distribution system to place the asphalt concrete mixture uniformly in front of the screed.

Use a screed assembly that produces a finished surface of the required smoothness, thickness and texture without tearing, shoving or displacing the asphalt concrete mixture. Heat and vibrate screed extensions. Place auger extensions within 10 inches of the screed extensions or per written manufacturer's recommendations.

The use of a "Layton Box" or equivalent towed paver is allowed on bicycle paths, sidewalks, and driveways or in areas of limited accessibility at the discretion of Engineer.

- F. Rollers: Use steel-wheel static and vibratory rollers. Pneumatic-tire rollers may also be used and, if available, should be used on the wearing surface. Operate rollers according to manufacturer's instructions. Self-propelled rollers shall be capable of reversing without backlash. Use rollers that are specifically designed to compact hot asphalt concrete mixtures. Only properly functioning rollers will be allowed on the hot asphalt pavement.
- G. Preparation of Existing Surface: Prepare existing surfaces in conformance with the Drawings and Specifications. Clean existing paved surfaces of loose material.

Prior to placing the asphalt concrete mixture, uniformly coat contact surfaces of curbing, gutters, saw-cut pavement, cold joints, manholes, and other structures with tack coat material.

Allow prime coat to cure and emulsion tack coat to break before placement of asphalt concrete mixture.

- H. Preparation of Aggregates and Mixing: Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. Asphalt concrete mixture containing soot or fuel is unacceptable and will not be accepted.

Combine the aggregate, asphalt cement and additives in the mixer in the amounts required by the Job Mix Design. Mix to obtain 98% coated particles when tested according to AASHTO T 195.

- I. Temporary Storage: Silo type storage bins may be used provided that the characteristics of the mixture are not altered. Signs of visible segregation, heat loss, changes in appearance from the Job Mix Design, change in the characteristics of asphalt cement, lumpiness, or stiffness, or un-coated particles of the mixture are causes for immediate rejection.
- J. Placing and Spreading: Place the asphalt concrete mixture upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute asphalt concrete mixture. Use hand tools to spread, rake, and lute the asphalt concrete mixture in areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop-off exceeds 2 inches.

Do not pave against new concrete curbing until it has cured for at least 72 hours.

- K. Compaction: Thoroughly and uniformly compact the asphalt concrete mixture by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

Compact the asphalt concrete mixture to a minimum of 93% of the maximum specific density (MSD). The in-place density of the asphalt concrete mixture will be measured using nuclear density gauges and/or cores. Contractor shall promptly patch all core holes with hot asphalt concrete.

- L. Joints: Minimize the number of joints. Ensure that all joints have the same texture and smoothness as other sections of the course.

Improperly formed joints resulting in surface irregularities shall be removed to full depth, replaced with new material, and thoroughly compacted at Contractor's expense.

Precut all pavement removal to a neat line with a power saw or by other approved method.

Form transverse joints by saw-cutting back on the previous run to expose the full depth of the course; or use a removable bulkhead. Skew transverse joints between 15 to 25 degrees.

Offset the longitudinal joints in one layer from the joint in the layer immediately below by at least 6 inches. Align the joints of the top layer at the centerline or lane lines. Where preformed marking tape striping is required, offset the longitudinal joint in the top layer not more than 6 inches from the edge of the stripe.

Compact all joints to at least 91% of the maximum specific density (MSD). Change the method of joint construction, if necessary, to meet density requirements.

- M. Surface Tolerance: The surface will be tested after final rolling at selected locations using a 10-foot straightedge. Remove and replace variations from the testing edge, between any two contacts, of more than 3/16-inch.
- N. Patching Defective Areas: Remove any asphalt concrete mixture that becomes contaminated with foreign material, is segregated, or is in any way determined by Engineer to be defective. Do not skin patch. Remove defective materials for the full thickness of the course. Cut the pavement so that all edges are vertical, the sides are parallel to the direction of traffic and the ends are skewed between 15 to 25 degrees. Coat edges with a tack coat and allow to cure or break. Place and compact fresh asphalt concrete mixture to grade and smoothness requirements.

Article 402.4 Measurement

- A. Asphalt Concrete Pavement will be measured by ton using measured weight, by square yard, or linear foot.
- B. Weight measurement of asphalt concrete mixture shall be based on weigh tickets from a certified scale. Contractor shall provide the weigh tickets at no expense to Owner. The quantity paid for shall not exceed 105% of the tonnage determined on the basis of the average in-place density, the specified neat line thickness, and the completed area of pavement as shown on the Drawings plus any additional areas as authorized by Engineer in writing.
- C. Square yard measurement of asphalt concrete pavement shall be based on the completed area of pavement as shown on the Drawings plus any additional areas as authorized by Engineer in writing. The thickness of the asphalt concrete shall not be less than the thickness called for in the Specifications or shown on the Drawings.
- D. Linear foot measurement of asphalt concrete pavement shall be per linear foot along the centerline of constructed bike trail or sidewalk.
- E. Linear foot measurement of asphalt pavement sidewalk shall be per linear foot of street centerline stationing.

Article 402.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Asphalt Concrete Pavement may be further classified on the Bid type and thickness.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
402(1)	Asphalt Concrete Pavement, Type IIB	Ton
402(4)	Asphalt Concrete Sidewalk, Type IIIB	Linear Foot

END OF SECTION 402

SECTION 403 SEAL COAT

Article 403.1 Description

This work consists of an application of asphalt material with or without cover coat material, applied as hereinafter specified.

Article 403.2 Materials

- A. Asphalt: Emulsified asphalts shall comply with the latest edition of ASTM D 977. Cationic Emulsified Asphalt shall comply with the latest edition of ASTM D 2397.
- B. Cover Coat Aggregates: Crushed stone or crushed gravel, and consisting of sound, tough, durable pebbles or rock fragments of uniform quality. Free from clay balls, vegetable matter or other deleterious matters, and shall have no adherent films or coating of dirt, clay, dust or other deleterious matter that could impede adherence of the bituminous material. Wash the aggregate if necessary. Meet the following requirements:

MATERIAL CHARACTERISTIC	REQUIREMENT
Percent of Wear	45 maximum
Degradation Value	20 minimum
Percent Sodium Sulfate Loss	9 maximum (5 cycles)
Percent Fracture	90 minimum (single face)

SIEVE SIZE	TYPE 2 COVER AGGREGATE	TYPE 3 COVER AGGREGATE		
		GRADING A	GRADING B	GRADING C
2"	-	-	-	100
3/8"	100	100	100	90 - 100
No. 4	85 - 100	85 - 100	60 - 100	10 - 30
No. 8	-	0 - 25	0 - 10	0 - 8
No. 50	0 - 20	-	-	-
No. 200	0 - 1	0 - 1	0 - 1	0 - 1

- C. Antistrip Additives: Use antistrip agents in the proportions determined by ATM T 14. At least 70% of the aggregate shall remain coated when tested according to ATM T 14.

Article 403.3 Construction

- A. Weather Limitations: Do not apply asphalt material to a wet surface, or when the surface

temperature is below 40 degrees Fahrenheit, or when weather conditions would prevent the proper penetration and adhesion of the cover aggregate.

B. Equipment: Use the following or its approved equivalent:

1. Distributor: Able to apply asphalt material uniformly at even heat on variable widths of surface up to 15 feet wide at readily determined and controlled rates from 0.05 to 0.50 gallons per square yard, with uniform pressure, and with an allowable variation from any specified application rate not to exceed 0.02 gallons per square yard. Equip with a heater, tachometer, pressure gauges, calibrated tank, thermometer for measuring temperature of tank contents, power unit for the pump and full circulation spray bars adjustable laterally and vertically.
2. Broom: A rotary power broom or power vacuum sweeper.
3. Rollers: Self-propelled pneumatic tired rollers having gross loads adjustable to apply 200 to 350 pounds per inch of rolling width as directed. Tire pressure or contact pressure may be specified for pneumatic tire rollers. Operate pneumatic tire rollers at a maximum speed of 5 miles per hour.

C. Spreader: Self-propelled aggregate spreader of approved design.

1. Preparation of Surface: Clean the roadway surface of all loose material immediately before applying asphalt.

Cover all utility appurtenances and monumentation to prevent contact with asphalt. Existing improvements, such as curb, gutter, sidewalk and catch basin inlets shall be protected to prevent contact with asphalt.

2. Applying Asphalt Material: Apply asphalt material to an approved surface by means of a pressure distributor in a uniform, continuous spread and within the temperature range specified.

Heat the asphalt and apply at a temperature within the specified range.

Apply asphalt material at the rate specified. If the texture of the surface is such that asphalt material penetrates the surface, a preliminary application of 0.05 to 0.10 gallons per square yard of surface may be required.

Use building paper at the beginning of each spread. Remove and dispose of used building paper. The distributor shall be moving forward at proper application speed at the time the spray bar is opened. Correct any skipped areas or deficiencies. Do not exceed maximum application rate at overlaps.

Suspend spreading asphalt material early enough in the day to permit the termination of traffic control prior to darkness. Apply asphalt material to only one designated traffic lane at a time. Cover the entire width of the lane in one operation.

Spread the asphalt material not more than 6 inches wider than the width covered by the cover coat material. Do not allow asphalt material to chill, setup, or dry prior to spreading the cover coat material.

Do not allow the distributor to drip on the surface of the traveled way.

- D. Application of Cover Coat Material: Moisten the cover coat material with water the day before the aggregate is to be used. At the time of spreading, the aggregate shall be surface dry or slightly damp.

Immediately following the application of the asphalt material, spread the specified quantity of cover coat material. Do not allow the tires of the trucks or aggregate spreader to contact the wet asphalt material.

Cover any deficient areas with additional material immediately after the cover coat material is spread. Begin rolling immediately for the full width of the aggregates, and continue until 3 complete coverages are obtained. Complete pneumatic tire rolling the same day the asphalt and cover coat materials are applied.

After the application of the cover coat material, lightly broom the surface and maintain for period of 4 days or as directed. Maintenance of the surface includes the distribution of cover coat material over the surface to absorb any free asphalt material. Do not displace imbedded material. Sweep excess material from the entire surface by means of rotary brooms at the time directed.

When applying asphalt material without a cover coat, begin rolling the asphalt material immediately upon application and continue until there is no evidence of kneading action. Make at least one complete roller coverage of the road surface.

Do not permit traffic on the seal coat until rolling is completed. Provide traffic control on seal coats to limit vehicle speed to 15 miles per hour for a period of 24 hours.

Article 403.4 Measurement

Seal coat will be measured by square yard. Square yard measurement shall be based on the completed area of seal coat as shown on the Drawings plus any additional areas as authorized by Engineer in writing.

Article 403.5 Basis Payment

Payment will be made at the Contract Price, per unit of measurement for each Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
403(1)	Seal Coat	Square Yard

END OF SECTION 403

SECTION 404 TACK COAT

Article 404.1 Description

This work consists of furnishing and placing asphalt on a prepared surface according to these Specifications.

Article 404.2 Material

Use materials that conform to one of the following:

- A. STE-1, Special Tack Emulsion as defined by the Alaska Department of Transportation and Public Facilities.
- B. CSS-1 thinned with an equal amount of fresh water.

Article 404.3 Construction

- A. Weather Limitations: Do not apply tack coat to a wet surface or when the roadway surface temperature is below 40 degrees Fahrenheit.
- B. Equipment: A distributor able to apply asphalt material uniformly at even heat on variable widths of surface up to 15 feet wide at readily determined and controlled rates from 0.05 to 0.50 gallons per square yard, with uniform pressure, and with an allowable variation from any specified application rate not to exceed 0.02 gallons per square yard. Equip with a heater, tachometer, pressure gauges, calibrated tank, thermometer for measuring temperature of tank contents, power unit for the pump and full circulation spray bars adjustable laterally and vertically.
- C. Preparation of Surface to be Treated: Clean and patch the existing surface to receive the treatment. Remove irregularities to provide a reasonably smooth and uniform surface. Remove and replace unstable corrugated areas with suitable patching materials. Clean the edges of existing pavements, which are to be adjacent to new pavement, to permit the adhesion of asphalt materials.
- D. Application of Asphalt Material: Apply tack coat uniformly with a pressure distributor at a rate of 0.05 to 0.15 gallons per square yard, as directed.

Apply the tack coat in such a manner as to offer the least inconvenience to traffic and to permit 1-way traffic without pickup or tracking of the asphalt material.

All tack coated surfaces shall be covered by paving by the end of the day.

Article 404.4 Measurement

Tack coat shall be considered incidental to Section 402, Asphalt Concrete Pavement, and no measurement shall be made.

END OF SECTION 404

SECTION 405 REMOVE AND REPLACE EXISTING ASPHALT SURFACING

Article 405.1 Description

This work consists of removing, disposing of, and replacing existing asphaltic surfacing, including leveling course and existing traffic markings, as indicated on the Drawings.

Article 405.2 Materials

All materials used shall conform to the requirements of the City of Kodiak Standard Specifications and other agencies (if any) having jurisdiction over the pavement being replaced.

Article 405.3 Construction

All construction practices, tests and other controls shall conform to Division 200 - Earthwork and Division 400 - Asphalt Surfacing.

Asphaltic concrete paving replacement will be performed by utilizing a mechanical spreader and will be compacted by a mechanical roller weighing not less than 10 tons, except that where the area of the asphalt replacement patch is less than 300 square feet, a mechanical spreader need not be employed.

Small areas inaccessible to roller shall be tamped to produce a compaction and surface texture equivalent to that produced by the specified rolling. Hand tampers shall have a maximum tamping face of 50 square inches and a minimum weight of 25 pounds.

Article 405.4 Measurement

Removing, disposing of, and replacing existing asphalt surfacing, including leveling course, will be measured per square yard, complete in-place.

Article 405.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
405(1)	Remove and Replace Existing Asphalt Surfacing	Square Yard

END OF SECTION 405

SECTION 406 PAVEMENT ROTOMILLING

Article 406.1 General

The Work under this Section consists of furnishing all plant, labor, supervision, equipment, and material for performing all operations necessary for the removal and disposal of pavement to a depth designated on the Drawings with a power-operated profile machine designed for this specific purpose.

Article 406.2 Construction

Pavement shall be removed by rotomilling, planning, or grinding to a final surface smooth enough for temporary traffic and repaving with no additional preparation other than sweeping and application of a tack coat. Additional rotomilling, grinding, or milling by the power-operated profile machine may be necessary around manhole covers, valve boxes, survey monument cases, etc. The depth of asphalt removal under this Section may vary.

Contractor shall dispose of the removed pavement tailings at a location designated by the COK Public Works Department. Contractor shall coordinate the exact location with the COK Public Works Department.

Article 406.3 Measurement

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Article 406.4 Basis of Payment

Payment for this Work shall be in accordance with Division 10, Section 10.07 Measurement and Payment, and shall include full payment for all Work described in this Section.

Payment shall be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
406(1)	Pavement Rotomilling	Square Yard

END OF SECTION 406

CITY OF KODIAK

STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 500

TABLE OF CONTENTS

DIVISION 500 - SANITARY SEWERS	1
SECTION 501 GENERAL.....	1
SECTION 502 FURNISH AND INSTALL PIPE	4
SECTION 503 MANHOLES.....	10
SECTION 504 CONNECTIONS TO EXISTING MANHOLES	13
SECTION 505 CONSTRUCT SANITARY SEWER DROP CONNECTION	14
SECTION 506 CONSTRUCT BEAVER SLIDE.....	15
SECTION 507 DEEP SANITARY SEWER SERVICE RISERS	16
SECTION 508 SANITARY SEWER SERVICES	17
SECTION 509 REMOVE AND DISPOSE OF EXISTING CESSPOOLS OR SEPTIC TANKS AND CONNECT EXISTING SERVICE	20
SECTION 510 SANITARY SEWER CLEANOUT	22
SECTION 511 UNINTERRUPTED SANITARY SEWER SERVICE	23
SECTION 512 UNINTERRUPTED SANITARY SEWER SERVICE.....	25
SECTION 513 ADJUST SANITARY SEWER MANHOLE CONE TO FINISH GRADE	26

DIVISION 500 - SANITARY SEWERS

SECTION 501 GENERAL

Article 501.1 Description

This work consists of all operations necessary to complete the construction for pipe laying, jointing, and testing of sanitary sewers.

Article 501.2 Applicable Standards

The latest revision of the following standards of the American Society of Testing and Materials (ASTM), the American Association for State Highway and Transportation Officials (AASHTO), the American Standards Association (ASA), and the American Water Works Association (AWWA) are hereby made a part of these Specifications.

ASTM A48	Standard Specification for Gray Iron Castings
ASTM A438	Standard Test Method for Traverse Testing of Gray Cast Iron
ASTM A746	Standard Specification for Ductile Iron Gravity Sewer Pipe
ASTM C14 or ASTM C14M	Standard Specification for Non-Reinforced Concrete Sewer, Storm Drain, and Culvert Pipe [Metric]
ASTM C76 or ASTM C76M [Metric]	Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime
ASTM C478 or ASTM 478M [Metric]	Standard Specification for Precast Reinforced Concrete Manhole Sections
ASTM D256	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D2321	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

ASTM D3034	Standard Specification for Type of PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
AASHTO M45	Standard Specification for Aggregate for Masonry Mortar
AWWA C104/ ANSI A21.4	Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C105/ ANSI A21.5	Standard Polyethylene Encasement for Ductile Iron Pipe Systems
AWWA C110/ ANSI A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings for Water
AWWA C111/ ANSI A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151/ ANSI A21.51	American National Standard for Ductile-Iron Pipe, Centrifugally Cast
AWWA C901	Standard for Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. Through 3 In., for Water Service

Article 501.3 Required Clearance from Water Mains

During construction of a sewer line, a water main may be encountered and field changes may be necessary to meet the required minimum vertical separation distance of 18 inches and a horizontal distance of 10 feet. Contractor shall document all field changes in accordance with Section 805, Construction Surveying.

Article 501.4 Surveys

Survey shall be performed in accordance to Division 800 - Miscellaneous, Section 805, Construction Surveying.

Article 501.5 Concrete and Mortar

- A. Miscellaneous Concrete: All concrete used in the construction of sanitary sewer systems with the exception of precast manholes, manhole risers, cones, and reinforced concrete pipe shall conform to Division 300 - Portland Cement Concrete.
- B. Mortar: Cement for mortar used in the construction of sanitary sewer systems shall conform with the requirements of ASTM C-150, Type II. Sand shall conform with the

requirements of AASHTO M-45. The mortar shall be composed of one part cement and 3 parts sand. The addition of lime is not permitted.

END OF SECTION 501

SECTION 502 FURNISH AND INSTALL PIPE

Article 502.1 Description

This work consists of furnishing and installing pipe for sanitary sewer systems.

Article 502.2 Material

- A. General: All piping shall be in accordance with the Contract Documents conforming to the size and class shown and specified. Changes in class shall be made within 2 of a pipe length of the station indicated on the drawings. The use of pipe containing asbestos materials is prohibited. The polyethylene encasement material for all ductile iron and cast iron pipe shall conform to the most current edition of AWWA C105/ANSI A21.5.
- B. Ductile Iron Pipe: Ductile iron pipe shall conform to requirements of ASTM A 746 (AWWA C 151) and Cement Mortar shall conform to the requirements of AWWA C 104. Class 50 pipe shall be used, unless otherwise required by the Contract Documents. Fittings shall be cast iron conforming to AWWA C-104 except "short body" fittings meeting AWWA Specifications may be used. Rubber gasket joints for ductile iron pipe fittings shall conform to the requirements of AWWA C-111.
- C. High Density Polyethylene Pipe (HDPE): The pipe and fitting material shall have a cell classification of 445574C in accordance with ASTM D3350. In addition, the material must exceed 1,000 hours when tested in accordance with the Ring Environmental Stress Crack Resistance Test (Radar Ring Test) with fewer than 20% failures. Also, the extruded pipe shall have impact strength greater than 3 Ft#/in. when tested in accordance with the ASTM D 256 (Charpie Impact Test).

The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties.

Butt fusion of the pipe and fittings shall be performed in accordance with the pipe manufacturer's recommendations as to equipment and technique. The fusion operation shall be performed by an individual who has demonstrated the ability to fuse polyethylene pipe in the manner recommended by the pipe supplier.

- D. Polyvinyl Chloride (PVC) Pipe: PVC sewer pipe shall conform to ASTM D3034 SDR 35 or F789 and is defined as flexible conduit. Joints shall conform to ASTM D3212 using a restrained rubber gasket conforming to ASTM F477. Fittings shall be injection molded tees or factory solvent welded saddle tees. Saddles fastened to pipe with external bands are not acceptable on any new system, unless specifically approved by Engineer. Maximum size shall be 12 inches.

Article 502.3 Construction

- A. Excavation and Backfill: Excavation and backfill for furnishing and installation of

sanitary sewer pipe shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

- B. Polyethylene encasement shall be installed for all ductile iron and cast iron pipe in strict conformance to the methods described in the most current editions of AWWA C105/ANSI A21.5 and the Ductile Iron Pipe Research Association's "A Guide for the Installation of Ductile Iron Pipe."
- C. Pipe Grade and Alignment: Variance of individual pipe sections from established line and grade shall not be greater than those listed in the table below, providing that such variance does not result in a level or reverse sloping invert.

DIAMETER (INCHES)	ALLOWANCE TOLERANCE (FEET)	DIAMETER (INCHES)	ALLOWANCE TOLERANCE (FEET)
8	0.03	14	0.04
10	0.03	16	0.04
12	0.03	18*	0.05

*Note: For all pipe sizes over 18 inches in diameter, variance shall not exceed 0.05 feet.

The practice of pushing in uncompacted backfill over a section of pipe to provide a platform for transit and level alignment and grade observations shall be subject to the approval of Engineer. If intermittent backfilling is allowed, backfilling shall be accomplished in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

- D. Pipe Laying: Pipe laying shall in all cases proceed upgrade with the spigot ends of the pipe pointing in the direction of the flow. Each pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe. The alignment of the installed pipe shall appear straight to visual observation and shall be such that a full circle of light can be seen between manholes, etc., when sighting along all points of the pipe circumference. Each section of pipe shall be handled carefully and placed accurately; the spigot end shall be fully inserted. Care shall be exercised to avoid over-insertion. Each section of pipe shall be properly supported to insure true alignment and an invert which is smooth and free from roughness or irregularity.

At all times, when work is not in progress, open ends of pipe and fittings shall be securely and satisfactorily closed so that no undesirable substance will enter the pipe or fittings.

Where a Project outfalls into an existing sanitary sewer, construction of physical connection to the existing line shall be delayed until all upstream underground construction, including exfiltration testing, is complete and accepted unless special permission is granted by Engineer. Care shall be exercised during construction, flushing, and testing operations of the connecting link to assure that water is not diverted into any

portion of a sanitary sewer line in service or a sanitary sewer line which is not a portion of the Project for which Contractor is responsible.

- E. Bedding of Pipe: Sanitary sewer pipe and sanitary sewer service connections shall be bedded in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.
- F. Pipe shall be laid in accordance with the manufacturer's recommendations. Pipe shall not be laid when the bottom of the ditch or the sides to one foot above the pipe are frozen. Backfill material shall not contain frozen material. The trench shall not be left open during freezing weather so that temperature of the material near the pipe goes below freezing.
- G. Testing

- 1. General: Contractor shall clean and flush all sanitary sewer pipe installed prior to testing and final inspection.

All sanitary sewer pipe installed shall be subject to either an infiltration test or an exfiltration test. In those areas where, in the opinion of Engineer, the water table is high enough to subject the pipe to a satisfactory infiltration test, it is not anticipated that an exfiltration test shall be required. In checking leakage, there will be no allowance made for external hydrostatic head.

Where in the opinion of Engineer, the water table is not high enough to provide a satisfactory infiltration test, an exfiltration test shall be required.

The type of test (either infiltration or exfiltration) shall be determined by Engineer. Contractor shall have the option of choosing only one method (air or water) of testing for each section tested.

All wyes, tees, or ends of side sewer stubs and service connections shall be plugged or capped and the plug or cap shall be securely fastened to withstand the internal test pressures. Such plugs or caps shall be readily removable and their removal shall provide a socket suitable for extending the lateral connection.

Contractor shall coordinate with COK Public Works to perform video inspection of newly installed sanitary sewer upon completion of each continuous section of mainline pipe, which connects new or existing sanitary sewer manholes and optionally throughout pipe installation.

All testing shall be considered a incidental obligation under Furnish and Install Pipe and extra payment will not be allowed for this portion of work.

The lengths of service connections shall be included in the computations to determine the allowable leakage for the test section.

2. Exfiltration Test (Using Water): Upon completion of a section of sanitary sewer between manholes or otherwise, Engineer shall require that the ends of all pipe be plugged, including service connections, and the pipe subjected to a hydrostatic pressure. Generally, all testing is to be conducted after backfilling, prior to resurfacing and prior to connection of services.

A minimum head of 6 feet of water above the crown at the upper end of the test section shall be maintained for a period of 4 hours during which time it will be presumed that full absorption of the pipe body has taken place and thereafter for a further period of one hour for the actual test of leakage. During this 1-hour period, allowable leakage in gal/hr. shall not exceed 0.0002 DL for D in inches and L in feet.

The above listed leakage rate shall also be applied to infiltration from ground water and infiltration or exfiltration in greater amounts will be cause for rejection of the sanitary sewer and all repairs necessary to meet these requirements and retesting shall be at the expense of Contractor.

The maximum length of sanitary sewer for the above allowable leakage test shall be 1,000 feet. If it is not apparent that leakage test results between any 2 manholes is satisfactory, then Engineer may require subsequent tests to establish the more exact location of the leakage areas. Any section of sanitary sewer between any 2 manholes that does not meet the above requirements shall be rejected and Contractor, at his expense, shall make the necessary repairs to the sanitary sewer to meet the requirements, and shall make subsequent tests after repairs to assure compliance with the Specifications.

3. Exfiltration Test (Using Air): Contractor shall furnish all facilities and personnel for conducting the test under the observation of Engineer. The equipment and personnel shall be subject to the approval of Engineer. Joints only may be tested in pipe 36 inches in diameter, or larger at the option of Contractor.

Contractor may desire to make an air test prior to backfilling for his own purpose. However, the acceptance air test shall be made after backfilling has been completed, and compacted.

Immediately following the pipe cleaning, the pipe installation shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation until the internal air pressure reaches 4 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least 2 minutes shall be allowed for temperature stabilization before proceeding further.

The pipeline shall be considered acceptable when tested at an average pressure of 4 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe, if:

The total rate of air loss from any section tested in its entirety between manholes or between manholes and cleanout structures does not exceed 2

cubic feet per minute, or the following table may be utilized as a guideline for a satisfactory test by air for pipe sizes shown:

PIPE DIAMETER	ALLOWABLE PRESSURE DROP IN TEN MINUTES
8 Inches	2.7 psi
10 Inches	2.1 psi
12 Inches	1.8 psi
15 Inches	1.4 psi
18 Inches	1.2 psi
24 Inches	0.9 Psi

Pressure gauges shall be incremented in not more than 2-pound increments for accurate tests.

If the pipe installation fails to meet test requirements, Contractor shall determine at his own expense the source or sources of leakage, and he shall repair (if the extent and type of repairs proposed by Contractor are acceptable to Engineer), or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this test or the alternative water exfiltration test before being considered acceptable.

Safety braces shall be required to hold plugs in place and to prevent the sudden release of the compressed air. Due to the large forces that could be exerted by an escaping plug during the testing of the pipe, workmen shall not be allowed in the manholes in which plugs have been placed while tests are being conducted. Contractor's testing equipment shall be arranged in such a manner that a pressure relief device will prohibit the pressure in the pipeline from exceeding 10 psi.

4. Infiltration Test: Infiltration testing may be allowed at Engineer's option when the natural ground water table is 6 feet above the crown of the higher end of the test section. The maximum allowable limit for infiltration shall not exceed the rate of 0.0002 DL for D in inches and L in feet.

Contractor shall furnish all tools, equipment, and labor necessary to complete the tests and shall verify from his own observations, or preliminary tests, that each line conforms with this Specification before requesting Engineer to observe and record the actual leakage.

Engineer may require Contractor to repair obvious leaks even though the total length of the test section falls within the maximum allowable leakage for the test used.

- a. Check of Line and Grade: After backfilling and cleaning, but before final

acceptance, all sections of installed line may be checked for line and grade. Excluding service connections, all size sanitary sewer mains 30 inches and smaller in diameter may be checked for line and grade by closed circuit television. A full circle of light must be seen and no pipe misplaced in line or grade. A physical inspection of the interior of all sanitary sewer line 30 inches in diameter and above will be made before acceptance. Any excess deviation in line and grade shall be corrected by Contractor prior to Final Acceptance of the Project.

Article 502.4 Measurement

Measurement for all sizes of pipe shall be based on the horizontal distances and will be from center to center of manholes or from center of manholes to center of cleanout bend. Polyethylene encasement for ductile iron and cast iron pipe shall not be measured separately.

Article 502.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
502(1)	Furnish and Install (Size) Sewer Main	Linear Foot

END OF SECTION 502

SECTION 503 MANHOLES

Article 503.1 Description

This work consists of furnishing and installing sanitary sewer manholes complete with frames and covers.

Article 503.2 Material

- A. Materials used in the construction of manholes shall conform to the requirements of ASTM C 478 (AASHTO M 199) and the Standard Details of these Specifications. Cones shall be Type (B), eccentric, unless otherwise approved.

Cement for mortar used in the construction of manholes shall conform to the requirements of ASTM C 150, Type II. Sand shall conform with AASHTO Specification M 45. The mortar shall be composed of 1 part cement and 3 parts sand. The joints shall be constructed so as to produce a smooth, regular watertight surface. Only enough water shall be added to provide plasticity in placing the mortar.

The tensile strength of the gray cast iron for manhole frames and covers shall be 30,000 psi minimum, conforming with the requirements of ASTM A 48. The requirement for transverse breaking load shall be 2,000 pounds, conforming with the requirements of ASTM A 438. Contact surfaces between frames and covers shall conform to the Standard Details of these Specifications. Where lockable manhole covers are specified, Contractor shall submit Shop Drawings of the locking device for approval of Engineer.

Each precast concrete barrel and cone section shall be set upon and sealed with pre-molded plastic gasket which shall meet AASHTO M 198, ASTM C 990, or Federal Specification SS-S-210.

Refer to Division 300 - Portland Cement Concrete for Specifications pertaining to concrete as required in forming manhole inverts.

- B. Materials used in Watertight frames and covers for manholes and similar appurtenances shall be of cast iron and conform to the dimension shown in the applicable Standard Details. The requirement for tensile strength of the gray cast iron shall be 30,000 psi minimum in accordance with the requirements of ASTM A 48 and the requirement for transverse cutting load shall be 2,000 pounds in accordance with the requirements of ASTM A 438. Contact surfaces between frames and covers shall be machined to provide a uniform contact surface. Manhole covers shall have identification letters as shown on the Standard Details.

Article 503.3 Construction

- A. General: Excavation and backfill for furnishing and installing sanitary sewer manholes shall be in accordance with Division 200 - Earthwork.

All portions of precast manholes must be approved by Engineer prior to installation in the sanitary sewer systems. Engineer must be notified at least 24 hours in advance of installation to allow time for the inspection.

The manhole frames and covers shall be brought to the grades shown on the Drawings. Manhole adjusting rings shall be set in and made secure by use of a plastic gasket pipe joint sealer. (In paved streets manhole adjusting rings shall be mortared to prevent settlement).

Use of, and installation of pre-molded plastic gaskets for manhole construction shall be strictly in accordance with the manufacturer's printed instructions. Gaskets shall be trimmed on the inside of the manhole to prevent the excess gasket material from entering the sanitary sewer lines.

Manholes shall be installed at the locations shown on the Drawings such that primary leads enter radially at the invert elevations specified. The base section shall be set plumb on a prepared surface.

In the case of poured-in-place manhole construction, if Contractor elects to accomplish the manhole construction utilizing more than one continuous concrete pour, a keyed construction joint shall be used. These manholes shall have poured-in-place bases.

- B. Sanitary Sewer Manhole Invert Construction: The invert channels shall be smooth and semicircular in shape conforming to the inside of the connecting sewer section. Changes in directions of flow shall be made by forming a smooth radius sized to allow adequate access of a TV camera and/or maintenance equipment into the served sewer pipe. Changes in size and grades of the channels shall be made gradually and evenly. The invert channels may be formed directly in the concrete of the manhole base, or may be formed and poured in-place, or may be constructed by laying a full section of sewer pipe through the manhole and cutting out the top half after the surrounding concrete has hardened. The floor of the manhole outside the channels shall be smooth and shall slope towards the channels at a grade of one inch per foot.

Article 503.4 Measurement

Manholes shall be measured as units complete in-place.

Article 503.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for Pay Item listed below that is included in the Bid Schedule.

Separate payment will not be allowed for frames and covers or watertight frames and covers but shall be included in the Unit Price for manholes.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
503(1_)	Construct Sanitary Sewer Manhole (Type)	Each

END OF SECTION 503

SECTION 504 CONNECTIONS TO EXISTING MANHOLES

Article 504.1 Description

This work consists of furnishing and installing connections to existing manholes.

Article 504.2 Construction

Excavation and backfill for connections to existing manholes shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Connection to existing manholes shall be made in a workmanlike manner, shall be tight and have smooth flow surfaces and curves. The invert shall be brought into the existing manhole at the elevation shown on the Drawings. An expanding type grout (jet set or equal) shall be used in connecting sewer pipe to the existing manhole. The downstream pipe in manholes shall be screened to prevent entry of mortar or other debris from entering the system.

Where a connection is made to an existing sanitary sewer manhole, the base shall be broken out if necessary to form a smooth channel in accordance with the construction requirements of a new manhole. Connections to existing sanitary sewer manholes will be allowed only after all portions of Contractor's work tributary to the connection point has been cleaned and flushed, inspected and tested. Under certain conditions, connections prior to the completion of the system may be permitted subject to Engineer's prior written approval and the provision of suitable and adequate debris and sand traps and sumps upstream from the connection.

Article 504.3 Measurement

Connection to existing manholes shall be measured as complete units in-place.

Article 504.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Where the connect is made to a pipe stubbed out of the existing manhole, payment will not be allowed for the connect.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
504(1)	Connection to Existing Manhole	Each

END OF SECTION 504

SECTION 505 CONSTRUCT SANITARY SEWER DROP CONNECTION

Article 505.1 Description

This work consists of furnishing and installing drop sewer connections to manholes.

Article 505.2 Materials

Pipe and fittings used in the construction of drop connections for sanitary sewers shall conform to the requirements of AWWA C 151/ANSI A21.51 for Class 50 pipe, and AWWA C104/ANSI A21.4 for fittings, and the Standard Details of this Specification.

Article 505.3 Construction

Excavation and Backfill for furnishing and installing sanitary sewer drop sewer connections shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Over-excavation under drop connection shall require compaction of not less than 95% of the maximum density prior to installation of the pipe and fittings, or the concrete cradle.

Refer to Division 300 - Portland Cement Concrete for requirements pertaining to concrete as required in constructing drop connections.

Article 505.4 Measurement

Drop sewer connections shall be measured as units, complete in-place.

Article 505.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
505(1)	Construct Sanitary Sewer Drop Connection	Each

END OF SECTION 505

SECTION 506 CONSTRUCT BEAVER SLIDE

Article 506.1 Description

This work consists of furnishing and installing beaver slides in a manhole.

Article 506.2 Material

Refer to Division 300 - Portland Cement Concrete for requirements pertaining to concrete as required in forming beaver slide inverts.

Article 506.3 Construction

Beaver slides shall be constructed to provide a smooth and continuous channel directed into and with the flow of the receiving sewer and in accordance with the Standard Details of these Specifications.

Beaver slides are required where the invert of the connecting sewer is above the crown of the receiving sewer and the drop in the manhole does not exceed the maximum height shown on the Standard Details of this Specification.

Article 506.4 Measurement

Beaver slides shall be measured as units complete in-place.

Article 506.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
506(1)	Construct Beaver Slide	Each

END OF SECTION 506

SECTION 507 DEEP SANITARY SEWER SERVICE RISERS

Article 507.1 Description

This work consists of furnishing and installing deep sanitary sewer service risers.

Article 507.2 Material

All deep sanitary sewer service riser connections shall be constructed with ductile iron with "Tyton" joints.

Article 507.3 Construction

Excavation and backfill for furnishing and installing deep sanitary sewer service risers shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Where cast iron bolt-on or banded service connections are used, the pipe shall be cut with a mechanical hole cutter and the connection bolted on in accordance with the Contract Documents.

Article 507.4 Measurement

Service risers for deep sanitary sewer connections shall be measured as complete units in-place.

Article 507.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
507(1)	Deep Sewer Service Riser (Size)	Each

END OF SECTION 507

SECTION 508 SANITARY SEWER SERVICES

Article 508.1 Description

This work consists of furnishing and installing sanitary sewer service connections. All connections and private improvements intended for public ownership shall require:

- A. Permitting and conformance with the Kodiak City Codes (either on or off property in the City service area).
- B. Forty-eight hours (excluding non-working days) notification shall be given to the City of Kodiak prior to making the connection available for inspection.

Article 508.2 Material

All sanitary sewer service connects shall be constructed with ductile iron with "Tyton" joints.

All services with less than 6 feet of cover shall be insulated with at least 3 inches of rigid board insulation in conformance with Division 800 - Miscellaneous, Section 807, Insulation.

Connection to main shall be made with a Romac CB style saddle or equal and shall be secured with a double strap or a single stainless steel band of 2-1/2 inches or more in width.

Article 508.3 Construction

Excavation and backfill for furnishing and installing sanitary sewer service connections shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Construction shall be in accordance with the Standard Details of this Specification. Multiple connections shall not be made any closer together than 3 feet. The terminus of the house connection shall be sealed with a suitable stopper. Taps, where allowed for installation of saddles on to sewer pipes, shall be made with a mechanical hole cutter as manufactured by the Pilot Manufacturing Company or equal. Tee and wye saddles will not be allowed on mains unless specifically called out on the drawings or directed by Engineer. All service connections to sanitary sewer mains shall be approved ductile iron or "Ty-seal" pipe. Sanitary sewer service connections shall not be installed within 10 feet horizontally of a water service line.

Saddles shall be placed over a circular hole sawed 1/8-inch larger than the inside diameter of the saddle. The strap(s) shall be tightened in accordance with the manufacturer's instructions and centered over the hole sawed in the pipe being tapped. The hole shall be made above the spring line of the main being tapped.

Where no existing service exist, sanitary sewer service connections shall be installed to the edge of right-of-way or edge of permanent easement of the lot being served and shall be permanently marked by means of a 2x4 extending 2 feet above grade, painted green.

Where connections to existing service, prior to tapping the sewer main the existing sewer service

shall be exposed at the property line or permanent utility easement, whichever is further from the sewer main, and required minimum pipe slope shall be confirmed in accordance with this section. If minimum pipe slope cannot be obtained at that location, or if the service is closer than 5 feet to the side of the property, or if the service is not on the property at the right-of-way, expose the service at the structure and required minimum pipe slope shall be confirmed. The new service shall extend to the structure with a cleanout at the connection location. If minimum pipe slope cannot be obtained, Contractor shall notify the Engineer immediately.

Contractor shall connect to existing sewer service with a ROMAC clamp.

All sewer services with between 3.5 and 5 feet of cover shall be insulated with at least 2 inches of rigid board insulation. Shallower services shall have at least 4 inches of insulation.

As-built measurements shall be the station of the service connection at the main plus a minimum of 2 ties to permanent prominent features and, when possible, ties to property corners.

Minimum slopes shall be as follows:

PIPE DIAMETER	SLOPE
4 Inches	2.08% 0.0208 feet per foot (1/4-inch per foot)
6 Inches	1.00% 0.0100 feet per foot
8 Inches	0.40% 0.0040 feet per foot
10 Inches	0.28% 0.0028 feet per foot
12 Inches	0.22% 0.0022 feet per foot

Upon exposing a stub-out Contractor is required to insure that the line is free and clear of obstructions prior to connection with the service extension.

If the service line is found to be either plugged or to have reverse grade, Contractor is required to notify the City of Kodiak immediately or be liable for correcting the misalignment or unplugging the line at his expense.

An Inspector for the City of Kodiak shall be present when initial connection, or service line extension is made to the Utility line, without exception.

The City will not approve any installation which is not in accordance with the Uniform Plumbing Code and City of Kodiak Standard Specifications. Contractor shall not start the excavation for main line tap or on-site service until a permit is obtained. All permits must be posted on the job at the time of the inspection.

Article 508.4 Measurement

Sanitary sewer service connections shall be measured as completed units in-place. This item will include all materials, excavation, installation, compaction, backfill, and bedding.

There will be no measurement for rock excavation and it will incidental to the work.

There will be no measurement of bedding or backfill quantities and all bedding and backfill materials are incidental to the work.

There will be no measurement for materials or work between the right-of-way and the structure necessary to make the connection or to replace landscaping, fences, walls, walkways, etc. These tasks will be incidental to the pay item Sewer Service Extension.

Article 508.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment for Item 508(1-_), Sanitary Sewer Service Connect, includes work within the right-of-way.

Payment for Item 508(2-_), Sewer Service Extension, includes work on private property necessary to connect to the existing service.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
508(1-_)	Sanitary Sewer Service Connect (Size)	Each
508(2-_)	Sewer Service Extension (Size)	Each

END OF SECTION 508

SECTION 509 REMOVE AND DISPOSE OF EXISTING CESSPOOLS OR SEPTIC TANKS AND CONNECT EXISTING SERVICE

Article 509.1 Description

This work consists of providing all operations pertaining to removal and disposing of existing cesspools or septic tanks and connection of existing service. If cesspools or septic tanks are encountered during construction, Contractor shall either defer construction of the main trunk through the cesspools until such time as all downstream construction has been completed, tested and accepted or Contractor may proceed with construction provided that the waste from the house service connection is accommodated continuously until satisfactory connection to the sewer main can be made.

Article 509.2 Construction

Where Contractor must remove cesspools or septic tanks from the trench area the following procedures shall apply:

- A. The liquid and sludge from the existing structure shall be pumped into a watertight container, and transported to and disposed of at a sanitary sewer manhole to be designated by Engineer or at one of the manholes to be constructed under this Contract, subject to approval of Engineer. Care shall be exercised in transporting cesspool liquid and sludge so that no spillage occurs during transport and disposal.
- B. Contractor shall then remove the remaining sludge, septic tank, cesspool or privy pit, logs or cribbing, and any saturated gravel remaining in the trench area, and shall dispose of this material at a Contractor provided disposal area.
- C. Contractor shall then fill the void created by removal of the cesspool in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.
- D. As soon as the downstream portion of the new sewer has been tested and accepted Contractor shall replace the existing service to the property line and connect the existing house service to the main. Connection shall be made in a workmanlike manner and at a uniform grade to accommodate the existing service.

Article 509.3 Measurement

Removal of existing cesspool or septic tank, replacing the existing service to the property line and connecting existing house service to the new sewer shall be measured as one pay item. Disposal of logs, cribbing, tanks and saturated gravel shall be measured as unsuitable material. Material to fill the void after removal of structure shall be measured and paid for in accordance with Division 200 - Earthwork.

Article 509.4 Basis for Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
509(1)	Remove Cesspool and Connect Sewer Service	Each

END OF SECTION 509

SECTION 510 SANITARY SEWER CLEANOUT

Article 510.1 Description

This work consists of furnishing and installing sanitary sewer cleanouts.

Article 510.2 Material

Material used in the construction of sanitary sewer cleanouts shall conform to the requirements of AWWA C-151, for Class 50 ductile iron pipe and AWWA C104/ANSI A21.4 fittings and as shown on the Standard Detail of this Specification.

Article 510.3 Construction

Excavation and backfill for the construction of sewer cleanouts shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Article 510.4 Measurement

Cleanouts will be measured as units, complete in-place.

Article 510.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
510(1)	Sanitary Sewer Cleanout	Each

END OF SECTION 510

SECTION 511 UNINTERRUPTED SANITARY SEWER SERVICE

Article 511.1 Description

This work consists of providing all planning, coordination, and operations pertaining to the bypass pumping of sewer flows around those portions of the sewage facilities to be rehabilitated or replaced. It shall be Contractor's responsibility to maintain uninterrupted sanitary sewer service to all residents within and adjacent to the work area. Interruptions of up to four hours will be permitted at individual sewer service lines after 48-hours notice has been given to affected residents. Sanitary service to any given structure shall not be interrupted more than once in a 24-hour period. Existing flows include those from any upstream collection system components that contribute to the project sewer mains or manhole facilities.

Article 511.2 Material

All sanitary sewer service materials shall be in accordance with Section 508 Sanitary Sewer Services.

Article 511.3 Construction

Complete, temporary pumping systems capable of accommodating the peak wastewater flow of

660 gallons per minute and able to pass 3-inch solids shall be provide to ensure uninterrupted sewer service. Contractor is cautioned that the estimated wastewater flows do not include contributions from any infiltration or inflow that may exist at the time of work. Contractor's pumping system capacity shall make appropriate allowances for such additional flows. Suction lines and surface bypass piping shall be butt-fused, high-density polyethylene (HDPE).

Contractor shall submit a sewage bypass plan for City of Kodiak's approval detailing the scheduled deployment of pumps, hoses, and other equipment necessary to maintain continuous sewer service during construction. At a minimum, the bypass plan shall include the proposed pump, pump placement, and layout of suction, surface bypass, and discharge piping.

Prior to construction and no later than the pre-construction conference, Contractor shall submit the method to be used in the maintenance of existing sewage flows during construction.

The City of Kodiak REPRESENTATIVE shall review and approve, in writing, the method for sewage bypass as submitted by Contractor. If in the opinion of the City of Kodiak

REPRESENTATIVE Contractor's method does not meet current construction standards and practices, Contractor shall resubmit his method and receive written approval by Engineer prior to construction.

Contractor shall ensure that all flows are properly accommodated. The pumping system shall be such that the hydraulic gradient both upstream and downstream of the piping being bypassed will not reach elevations that will cause damage to the properties being served.

This will require close attention to the elevation of the upstream head needed to actuate the pumping cycle and the rate of discharge flow from the pumps. Contractor shall be liable for all damages which result from sewage flow's not being properly maintained during the progress of the work, including all damages to private property, which occur as a direct or indirect result of inadequate control of wastewater flows. Contractor is reminded that if a noise permit is required for after-hours pumping and the permit is unattainable for certain locations, such lack of attainability shall not be cause for claim for additional compensation or time extension.

Under no circumstances shall Contractor allow the discharge of sewage into a storm drain facility or directly on or in the ground. No excavations will be permitted to facilitate this work except that required by the plans. The installation and maintenance of portable sanitary sewer facilities (portable toilets) shall be one (1) unit per four (4) residences (housing units), and at least one (1) unit on each side of the street. These units shall include hand sanitation devices, shall be properly vented, stocked, cleaned as necessary, or as determined by Engineer, and overall maintained in clean working order.

Article 511.4 Measurement

Uninterrupted sanitary service will not be measured for payment and will be subsidiary to Section 502, Furnish and Install Pipe.

END OF SECTION 511

SECTION 512 RAISE OR LOWER SEWER SERVICE

Article 512.1 General

The Work under this Section consists of all operations pertaining to raising or lowering of existing sanitary sewer services when the grade(s) of such services interfere with a utility under construction. Every effort has been made in the preparation of the Drawings to avoid conflict in grades with existing sewers; however, there may be some locations where conflict occurs.

Article 512.2 Construction

Where a conflict in grade occurs, Contractor shall be required to excavate the sewer service from the point of interception sufficient distance to raise or lower the sewer service such that the grade conflict will be eliminated. Minimum grade of the sewer service shall be maintained in accordance with Section 508, Sanitary Sewer Service. In no case will the length of raising or lowering of the sanitary sewer service exceed fifty feet (50'). All excavation, backfill, and pipe laying shall be performed in accordance with the provisions of this Division and Division 200 - Earthwork.

Article 512.3 Measurement

Raising or lowering sewer services will be measured as units, complete in place.

Article 512.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Any materials needed to complete the raising or lowering of a sewer service shall be provided by Contractor and considered incidental to the price bid for this item. Compaction, where required, will also be considered incidental to the Contract.

Payment shall be made under the following unit:

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
512(1)	Raise or Lower Sewer Service	Each

END OF SECTION 512

SECTION 513 ADJUST SANITARY SEWER MANHOLE CONE TO FINISH GRADE

Article 513.1 General

The Work under this Section consists of providing all operations pertaining to the adjustment of existing manhole cones to finish grade. All broken and/or missing manhole components are to be replaced with new materials furnished and installed by Contractor in accordance with these Specifications.

Article 513.2 Material

All materials used in the adjustment of manhole cones including mortar, steps, barrel sections, premolded plastic gaskets, etc., shall conform to the requirements for manholes as outlined in Section 503, Manholes. Radial concrete manhole blocks may be used for upward adjustments in certain cases if approved by Engineer.

Article 513.3 Construction

Contractor shall remove the existing cone and add to or remove portions of the barrel of each manhole requiring a cone adjustment. Each precast concrete barrel and cone section shall be set upon and sealed with a premolded plastic gasket which shall meet AASHTO M-198, ASTM C990, or Federal Specification SS-SS-210. Any damage to manholes resulting from construction under this Contract shall be repaired or the damaged portion replaced at Contractor's expense. All inverts, benchwalls, and/or catch areas shall be left clean and free from any foreign materials.

Contractor shall adjust the manhole cone to finish grade prior to placement of pavement. Cutting of new asphalt for adjustments is not acceptable. Any adjustment(s) requiring cutting of new asphalt shall not be paid and shall be deducted from the plan quantity.

Article 513.4 Measurement

Manhole cone adjustments shall be measured as units, complete in place.

Article 513.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment for cone adjustments shall include compensation for changes in height per the applicable Standard Details, unless otherwise directed by the Engineer. In no case will payment for both ring and cone adjustments be made for the same manhole.

Payment shall be made under the following unit:

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
513(1)	Adjust Sanitary Sewer Manhole Cone	Each

END OF SECTION 513

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 600

TABLE OF CONTENTS

DIVISION 600 - WATER SYSTEMS	1
SECTION 601 GENERAL	1
SECTION 602 FURNISH AND INSTALL PIPE	3
SECTION 603 FURNISH AND INSTALL VALVES	12
SECTION 604 FURNISH AND INSTALL FIRE HYDRANTS	15
SECTION 605 FIRE LINES	18
SECTION 606 WATER SERVICE LINES.....	21
SECTION 607 RAISE OR LOWER WATER SERVICE	25
SECTION 608 REMOVE FIRE HYDRANT ASSEMBLY	27
SECTION 609 REPLACE VALVE BOX.....	29
SECTION 610 RESET VALVE BOX SECTIONS BELOW FINISHED GRADE..	30
SECTION 611 REPLACE TOP SECTION OF VALVE BOX.....	32
SECTION 612 ABANDON PIPELINE IN PLACE	34
SECTION 613 CONNECT TO EXISTING WATER SYSTEM.....	36
SECTION 614 RELOCATE WATER MAIN.....	37
SECTION 615 ADJUST KEY BOX.....	39

DIVISION 600 - WATER SYSTEMS

SECTION 601 GENERAL

Article 601.1 Description

This work consists of constructing or reconstructing all water facilities that will be distributing water supplied by the City of Kodiak.

Article 601.2 Applicable Standards

The most recent revision of the following standards of the American Society for Testing and Materials (ASTM) and the American Water Works Association (AWWA) are hereby made a part of these Specifications:

ASTM A126	Standard Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings
ASTM B88 or B88M [Metric]	Standard Specification for Seamless Copper Water Tubing
ASTM D256	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D3261	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350	Standard Specification for Polyethylene Plastic Pipe and Fittings Materials
AASHTO M45	Standard Specification for Aggregate for Masonry Mortar
AWWA C104/ ANSI A21.4	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
AWWA C105/	Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C110/ ANSI A21.10	Ductile-Iron and Gray-Iron Fittings
AWWA C111/ ANSI A21.11	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and fittings
AWWA C115/ ANSI A21.15	Flanged Ductile-Iron Pipe with Ductile-Iron or Gray Iron Threaded Flanges

AWWA C151/ ANSI A21.51	Ductile-Iron Pipe, Centrifugally Cast
AWWA C303	Concrete Pressure Pipe, Bar-Wrapped, Steel Cylinder Type,
AWWA C500	Metal-Seated Gate Valves for Water Supply Service
ANSI/ AWWA C502	Dry-Barrel Fire Hydrants
ANSI/ AWWA C504	Rubber-Seated Butterfly Valves 3 in. (75mm) through 72 in. (1800mm)
ANSI/ AWWA C600	Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C651	Disinfecting Water Mains
ANSI/ AWWA C800	Underground Service Line Valves and Fittings
AWWA C901	Standard for Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. (13mm) through 3 in. (76mm), for Water Service

Current Uniform Fire Code (UFC) adopted by the City of Kodiak and local amendments, National Fire Codes, Volume I and Volume II, 2006 Codes and Standards, National Fire Protection Association.

Article 601.3 Survey

Survey shall be performed by Contractor as per Division 800 - Miscellaneous, Section 805, Construction Surveying.

END OF SECTION 601

SECTION 602 FURNISH AND INSTALL PIPE

Article 602.1 Description

This work consists of furnishing and installing water pipe, fittings, and straps in accordance with these Specifications and in conformity with the lines and grades as shown on the drawings, unless otherwise approved.

Article 602.2 Material

A. General: The use of pipe containing asbestos materials shall be prohibited. All piping shall be in accordance with the Contract Documents conforming to the size and class shown and specified. Changes in class shall be made within one-half of a pipe length of the station indicated on the drawings. The polyethylene encasement material for all ductile iron and cast iron pipe shall conform to the most current edition of AWWA C105/ANSI A21.5.

B. Ductile Iron Pipe: Ductile Iron Pipe shall conform to the requirements of AWWA C151, with cement mortar lining conforming to the requirements of AWWA C104/ANSI A24.1. Class 52 pipe shall be used for all pipe between 3 and 20 inches in diameter. The Class for pipes larger than 20 inches in diameter will require approval by the City of Kodiak prior to installation.

Fittings shall be a minimum of 250 pounds pressure rating, mechanical joint or all bell, lined or unlined, either cast iron or ductile iron, unless otherwise required by the Contract Documents. All fittings shall conform to the requirements of AWWA C110/ANSI A21.10. Rubber gasket joints for ductile iron pipe and fittings shall conform to the requirements of AWWA C111/ANSI A21.11.

C. Copper Service Pipe: Pipe used under this Specification shall be soft-drawn, seamless, annealed copper pipe suitable for use as underground service water connections for general plumbing purposes and shall comply with the requirements of ASTM B88 for Type K soft copper as manufactured by the American Brass Company, or equal.

D. Contractor shall provide a submittal on the proposed method of joint restraint. Where restrained pipe lengths are not shown on the drawings Contractor shall submit calculations for thrust restraint and required lengths of pipe to be restrained. Thrust blocks shall be utilized where shown, or approved by Engineer.

1. Restraint Joint: Unless otherwise detailed on the drawings, pipe joints shall be push-on rubber gasket type conforming to AWWA C111. Joint restraint for fittings, valves and piping deflection points shall utilize EBAA Iron MEGALUG, Romac Industries Grip Ring, U.S. Pipe Field LOK Gasket System, or approved equal.

2. Joint Tie Rods: Tie back rods and/or tie back rod and shackle assemblies will not be acceptable thrust restraining system for valves, fittings or pipe deflection points.

- E. High Density Polyethylene Pipe: The pipe and fitting material shall have a cell classification of 445574C in accordance with ASTM D3350. In addition, the material must exceed 1,000 hours when tested in accordance with the Ring Environmental Stress Crack Resistance Test (Radar Ring Test) with fewer than 20% failures. Also, the extruded pipe shall have impact strengths greater than 15 Ft#/in. at 32 degree Fahrenheit when tested in accordance with the ASTM D 256 Charpie Impact Test. The material shall be listed by the N.S.F. for potable water service and shall be precompounded. In-plant blending will not be allowed.

The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties.

Butt fusion of the pipe and fittings shall be performed in accordance with the pipe manufacturer's recommendations as to equipment and technique. The fusion operation shall be performed by an individual who has demonstrated the ability to fuse polyethylene pipe in the manner recommended by the pipe supplier.

- F. Material Limitations: Copper and ductile iron pipe are the only pipe materials allowed on water service connections. Galvanized pipe, asbestos-cement pipe and the use of lead-tipped gaskets shall be prohibited.

Article 602.3 Construction

- A. Excavation and Backfill: Excavation, bedding, and backfill must conform with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.
- B. Polyethylene encasement shall be installed for all ductile iron and cast iron pipe in strict conformance to the methods described in the most current editions of AWWA C105/ANSI A21.5 and the Ductile Iron Pipe Research Association's "A Guide for the Installation of Ductile Iron Pipe."
- C. Materials Delivery: Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in a sound, undamaged condition. Particular care shall be taken not to injure the pipe, pipe coating, or lining. Before installation, the pipe and appurtenances shall be examined by Engineer for defects.

The pipe shall not be strung out along the shoulders of the road for long distances if it causes inconvenience to the public. The amount of pipe strung at the job site shall be at the discretion of Engineer.

Rubber gaskets shall be stored in a cool, dark place to prevent damage from the direct rays of the sun.

- D. Installation: Installation shall be in accordance with the requirements of ANSI/AWWA C600. The interior of the pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench. The pipe shall be kept clean during laying operation by plugging.

Pipe and appurtenances shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other suitable equipment. Under no circumstances shall any of the pipe or appurtenances be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Poles used as levers or skids shall be of wood and shall have broad, flat faces to prevent damage to the pipe and coating.

The trench bottom shall be graded to provide uniform support for the pipe barrel. Water shall be kept out of the trench by pumping, if necessary, until the jointing is completed. When work is not in progress, open ends of the pipe, fittings, and valves shall be securely plugged so that no trench water, earth or other substances will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by Contractor at his expense and in a manner satisfactory to Engineer. At a sufficient distance, prior to encountering a known obstacle or tie into an existing pipe, Contractor shall expose and verify the exact location of the obstacle or pipe so that proper alignment and/or grade may be determined before the pipe sections are laid in the trench and backfilled. The connections shall be made by using specials and/or fittings to suit actual conditions.

Pipe ends left for future connections shall be plugged, or capped, and anchored as shown on the drawings or as directed by Engineer. Contractor shall install vertically an 8-foot wood post, directly over the end of pipe.

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe.

- E. Alignment and Grade: The pipe shall be so laid in the trench so that after the line is completed, the bottom of the pipe conforms accurately to the grades and alignment given by Engineer. A maximum 0.2-foot deviation from design elevation and alignment will be allowed. The pipe shall be generally straight to visual observation as determined by Engineer.

Both line and grade shall be checked and recorded in a field book for each piece of pipe and appurtenances laid. Contractor shall have instruments such as a transit and level for transferring alignment and grades from offset hubs. He also shall have in his employ a person who is qualified to use such instruments and who shall have the responsibility of placing and maintaining such construction guides. Contractor will furnish to Engineer a copy of the surveyor's notes for the newly-installed pipe and appurtenances. The practice of placing backfill over a section of pipe to provide a platform for instruments shall be subject to the approval of Engineer and shall be accomplished in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

All adjustments to line and grade shall be done by scraping away or filling the earth under the body of the pipe and not by blocking or wedging up. Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or off-sets shall not exceed the manufacturer's recommendations.

If the alignment requires deflection in excess of the above limitations, Contractor shall furnish special bends to provide angular deflections within the limits allowable. Short-radius curves and closures shall be formed by shorter lengths of pipe, bevels, or fabricated specials.

- F. Jointing of Metal Pipe: Contractor has the option of using either mechanical or push-on joints. All joints shall conform to the requirements of ANSI/AWWA C600.

Whenever flange connections are shown on the drawings, called for in the Specifications, or required in the work, the flange and fittings shall conform to the requirements of AWWA C110/ANSI A21.10 for 250-pound pressure ratings.

Joint restraint shall be installed where the pipe line terminates, or a tee, cross, bend, or similar fitting is installed changing pipe alignment.

Contractor shall field demonstrate to Engineer the installation and/or construction of each joint restraint system used. Contractor shall provide Engineer a minimum of 48 hours notice excluding non-working days, to coordinate the review of the field demonstration. Contractor shall certify that the joint restraint system is installed in accordance with the manufacturer's instructions. Where approved by Engineer, or shown on the drawings poured-in-place concrete thrust blocks shall be constructed as shown on the Standard Details. Concrete for the thrust blocks shall conform to Division 300 - Portland Cement concrete. If poured-in-place thrust blocks are used, all pipe and fittings exposed to concrete shall be double wrapped with 4-mil polyethylene film prior to placement of the concrete.

- G. Existing Distribution System: Contractor shall not operate existing distribution system valves. Contractor shall provide 48 hours (excluding non-working days) notice to the City for requests to operate existing distribution system valves.
- H. Connections to Existing Water Systems: Contractor shall provide 72 hours (excluding non-working days) written notice to Engineer, the City of Kodiak and the Kodiak Fire Department prior to anticipated main line flow interruptions and/or physical connection to existing water systems. It shall be Contractor's responsibility to coordinate "turn-off" and "turn-on" with Engineer. Only City of Kodiak personnel are allowed to "turn-off" and "turn-on" existing distribution valves.

Contractor shall be responsible for minimizing interruptions to water service. Contractor shall provide written notification (door hangers) to all affected Property Owners or residents 48 hours prior to interruption of any utility services. The written notice(s) shall be reviewed and approved by Engineer prior to distribution. When authorized by Engineer, water services may be shut-off between the hours of 8 am and 5 pm. Disruption of water service to any structure shall be limited to 9 hours in any 24 hour period. A penalty of \$100/hour/service shall be assessed for each water service disruption in excess of 9 hours. Where indicated Contractor shall furnish and install a temporary water system.

Contractor shall sequence the connections to the existing water system in a manner that limits disruptions to customers. The sequencing of water system connections shall be approved by Engineer prior to beginning the connection work. Contractor may be required to complete each connection and that segment of new water main being connected; tested, disinfected, and flushed prior to start of the next connection.

- I. Temporary Water Systems: When specified, or shown on the drawings Contractor shall provide a temporary water system. The work consists of the performance of all operations pertaining to the coordination, planning, design, furnishing, construction, installation, maintenance, and removal of temporary water service to current customers in the Project area during the construction of this Project. The intent is for Contractor to maintain water service to customers in the Project areas specified during construction activities.

Contractor shall submit a Temporary Water System(s) Plan for the temporary water system to Engineer for approval prior to beginning the work on such systems. The Plan shall identify the type of system, the design, the method of construction, and the maintenance and operation procedures to be used.

Contractor shall comply with current applicable health standards and the following criteria:

1. The primary water feeder pipe shall be a minimum of 2-1/2-inch diameter.
2. Fire hydrants may be used as a source for a temporary water system if the drain is plugged prior to use and unplugged after use.
3. Potable water system and water quality shall conform to 18 AAC 80 Alaska Drinking Water Standard.
4. All systems shall be installed with a backflow prevention device where connection is made to the City's water system
5. System shall maintain an operating pressure of 20 psi at maximum usage.

Contractor shall submit in writing, 48 hours prior to the system's activation, the name and telephone number of a contact person and at least one alternate who shall be available on a 24-hour, 7 days per week basis, for the repair and maintenance of the temporary water system. In the event that Contractor fails to repair and/or maintain the temporary system to the satisfaction of Engineer, the City will perform the repair and/or maintenance with all associated costs for said repair and/or maintenance deducted from the total contract amount.

All temporary water service equipment shall be disinfected per ANSI/AWWA C652-86 Disinfection of Water Storage Facilities and ANSI/AWWA C651-86 Disinfection of Water Mains. All temporary water service equipment and the entire temporary water service system shall be properly disinfected to the satisfaction of these standards, as witnessed by Engineer, prior to use or connection of any temporary services. Contractor shall coordinate with Engineer and provide 2 work days notice prior to the disinfection

activity and connection of any water service. All bacteriological samples, as required under these Specifications, shall be done by a testing laboratory certified for such testing by the State of Alaska.

Contractor shall secure a hydrant permit from the City for each hydrant used. These permits will be issued to Contractor at no charge, however, Contractor shall meet all of the conditions of said permits. In addition, Contractor shall provide a gate valve assembly at each hydrant as a shut-off valve for the temporary water system. Contractor shall be responsible for any damage that results to the hydrant(s) as a result of these activities and shall repair such damage at no cost to Owner.

Article 602.4 Flushing and Testing

Prior to any tests performed, all newly installed water facilities, including fire lines, shall be open-bore flushed. Contractor shall perform the disinfection followed by the hydrostatic testing. Contractor is made aware that in the event repairs are made on the system in order to pass the hydrostatic test, then the open bore flush, and the disinfection will be null and void and shall be repeated to the satisfaction of Engineer after the repairs are made.

Contractor shall submit in writing for Engineer to review and approve a schedule and procedure for the flushing and testing of all newly installed pipe. When in the opinion of Engineer the flushing and testing schedule is deficient, inadequate, improper, or conditions are such that the existing distribution system will be adversely impacted by service disruptions, Engineer will notify Contractor in writing. Such notification to Contractor will include the corrective action to be taken. Contractor shall adhere to the flushing and testing schedule, and comply with any corrective action notifications issued by Engineer. The City of Kodiak's representative must be present for all testing and flushing.

Disinfection will not be allowed until all open bore flush pipes are removed and the water system is sealed. A request to supply water for testing, disinfection, and flushing shall be scheduled in writing to the City at least 48 hours (excluding non-working days) prior to obtaining City supplied water. The request for testing, disinfection, and flushing water supply will be subject to water availability. In the event of high water demand, or low water availability within the City water system, meeting Contractor's schedule may not be possible.

- A. Flushing: All newly installed water facilities shall be "Open-Bore" flushed to remove any foreign matter. "Open-Bore" flushing shall be accomplished prior to hydrostatic testing and disinfection at each extremity of the main, including all stub-outs and dead ends. Contractor shall furnish, install and remove all fittings and pipes necessary to perform the flushing, at no additional cost to the City. Under no circumstances will open-bore flushing through hydrants or reduced outlets be permitted.

It will be Contractor's responsibility to notify Engineer and the City of Kodiak in writing 48 hours excluding non-working days in advance of any flushing operations. Flushing water mains may have to be performed outside of regular working hours depending on availability of water, as authorized by the City. The City will not be responsible for any cost incurred by Contractor for flushing.

- B. Disinfection: Chlorine shall be used for disinfection. Chlorine shall be applied by one of the following methods: 1) liquid chlorine gas-water mixture, 2) direct chlorine gas feed, or 3) calcium hypochlorite and water mixture. Calcium hypochlorite shall be comparable to commercial products known as HTH, Perchloren or Machochlor. The chlorinating agent shall be applied at the beginning of the section adjacent to the feeder connection, insuring treatment of the entire line. Water shall be fed slowly into the new line with chlorine applied in amounts to produce a minimum dosage of 40 ppm to a maximum of 50 ppm. Application of the chlorine solution shall continue until the required dosage is evident at all extremities of the newly laid line.

Chlorine gas-water mixture shall be applied by means of a solution-feed chlorinating device. Chlorine gas shall be fed directly from a chlorine cylinder equipped with a suitable device for regulating the rate of flow and the effective diffusion of gas within the pipe. Calcium hypochlorite shall be injected or pumped into the water main. During the chlorination process, all intermediate valves and accessories shall be operated. Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into the line supplying the water. Hydrostatic testing of a water line containing the chlorine mixture will not be allowed.

A residual of not less than 5 ppm chlorine shall be produced in all parts of the water main and retained for a minimum period of 24 hours. After which this residual shall be flushed from the line at its extremities until the replacement water tests are equal chemically and bacteriologically to those of the permanent source of supply. In no instance shall a water main be chlorinated before "Open-Bore" flushing.

- C. Hydrostatic Testing: A hydrostatic test shall be conducted on all newly constructed water mains, fire hydrant leads and stub-outs after "Open-Bore" flushing in the presence of a City representative in accordance with the requirements of ANSI/AWWA C600 unless hereinafter modified. Contractor, at his option, can either use a pressure test or a leakage test.

Contractor shall furnish all necessary assistance, equipment, labor, materials, and supplies necessary to complete the test to the satisfaction of Engineer. Contractor shall provide calibration records to Engineer for the pressure gauge used during testing. Contractor shall suitably valve-off or plug the outlet to the existing or previously-tested water main at his expense, prior to making the required hydrostatic test. Prior to testing, all air shall be expelled from the pipe. If permanent air vents are not located at all high points, Contractor shall, at his expense, install corporation cocks at such points so the air can be expelled as the line is slowly filled with water.

All main valves, fire hydrant auxiliary valves, fire hydrant main valves, and plugs shall be tested. All intermediate valves within the section being tested will be closed and reopened as directed by Engineer during the actual test. Only static pressure will be allowed on the opposite side of the end valves of the section being tested.

All hydrostatic testing will be performed through test copper. Use of fire hydrant and service connections for testing will not be allowed.

The hydrostatic pressure shall be 150 psi. The duration of each hydrostatic pressure test shall be 30 minutes. After the required test pressure has been reached, the pumping will be terminated. If the pressure remains constant for 30 minutes without the aid of a pump, that section of line will not be subject to any future hydrostatic test.

If a hydrostatic pressure test fails on any section, Contractor has the option to perform a leakage test on that section. The City of Kodiak will furnish the test gauge and measuring device; Contractor shall furnish all other necessary assistance, equipment, labor, tools, materials and supplies necessary to conduct the test.

Leakage for a newly-installed main is determined by the following formula:

$$L = \frac{ND(P)^{0.5}}{7400}$$

Where:

L = Allowable leakage in gallons per hour.

N = Summation of mechanical and push on joints in length of pipe tested.

D = Diameter of pipe in inches.

P = Test pressure in pounds per square inch.

The duration of each leakage test shall be 2 hours, and during the test the main shall be subjected to the constant test pressure as defined above. The test pump shall be valved to ensure that constant test pressure is maintained throughout the test and all excess water returned to the supply tank.

If the pressure decreases below the required test pressure during the 2-hour period, the preceding portion of that test will be declared void. Cracked or defective pipe, gaskets, mechanical joints, fittings, valves, or hydrants discovered as a consequence of the hydrostatic tests shall be removed and replaced with sound material at Contractor's expense. The test shall then be repeated until the results are satisfactory.

Contractor shall notify Engineer and City in writing 48 hours in advance excluding non-working days, prior to any test and shall notify Engineer 2 hours in advance of the scheduled time if the test is to be canceled. In the event Engineer has not been notified of cancellation and Contractor is not prepared for the test as scheduled, Contractor shall reimburse Engineer for all expenses incurred. These will include, but not be limited to, salaries, transportation and administrative costs.

- D. Test and Air Vent Copper Pipe Removal: After completion of testing, all test and air vent copper pipe shall be removed and the stop closed at the main, capped or plugged in the presence of Engineer.

Article 602.5 Measurement

Measurement for furnishing and installing water main shall be per linear foot of horizontal distance of the various sizes as set forth in the Bid Schedule. Measurement will be from station to station as staked in the field and as shown on the drawings, except where the grade exceeds 25%, in which case measurement will be by actual pipe length. No separate measurement will be made for connections to existing water systems, temporary water systems, flushing, testing or disinfection.

Article 602.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Fittings and appurtenances as shown on the drawings or not specifically identified for payment under a separate pay item but required for normal completion of water main installation, will be considered incidental and shall be included in the linear foot cost of the water main. Trench excavation and backfill shall be paid for under Division 200, Section 206, Trench Excavation and Backfill. Polyethylene encasement for ductile iron and cast iron pipe shall not be measured separately.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
602(1_)	Furnish and Install (Size) Water Main	Linear Foot

END OF SECTION 602

SECTION 603 FURNISH AND INSTALL VALVES

Article 603.1 Description

This work consists of furnishing and installing valves, valve boxes, and marker posts.

Article 603.2 Material

- A. Gate Valves: Gate valves shall be iron body, fully bronze mounted, double disc, parallel or resilient seat valves as manufactured in accordance with the requirements of AWWA C500 "Metal-Seated Gate Valves for Water Supply Service." All valves shall be nonrising stem type with an "O" Ring seal and a 2-inch square operating nut, and shall open counterclockwise. Valves shall be mechanical joint ends.
- B. Butterfly Valves: Butterfly valves shall be of the rubber-seated tight-closing type. They shall meet or exceed the performance requirements of AWWA C504 for operational pressures of 150 psi working pressure and 300 psi hydrostatic pressure.

Mechanical joint valve ends shall be per AWWA C110/ANSI 21.10 and AWWA C111/ANSI 21.11 of the latest revision, and "Short-Body" in accordance with the requirements of Table 2 of ANSI/AWWA C504. Accessories (bolts, glands, and gaskets) shall be supplied by the valve manufacturer.

Valves must use full ANSI/AWWA C504 Class 150 B valve shaft diameter and full Class 150 B underground service operator torque rating throughout entire travel to provide capability for operation in emergency service.

Valve body shall be high strength cast iron ASTM A126 Class B. For valves with the rubber seat mounted on the disc, the mating surface in the body shall be 304 or 316 steel. For valves containing the rubber seat in the body, the method of seat retention shall be in accordance with the requirements of ANSI/AWWA C504, except that no retaining fasteners or other hardware shall be permitted in the flow stream.

Valve operators, unless otherwise required by the Contract Documents, shall be of the traveling nut type, sealed, gasketed, and lubricated for underground service and capable of withstanding on overload input torque of 450 ft-lbs. at full open or closed position without damage to the valve or valve operator. The number of turns to operate the valve shall be a minimum of 2 turns per inch of valve diameter for 90 degrees of closure travel at a maximum pull of 80 pounds. All valves shall open counterclockwise and be equipped with 2-inch square AWWA operating nut.

Butterfly valves 20 inches and less: The valve shaft shall be one piece extending full size through valve bearings, disc and shaft seal. In the event that the shaft is turned down to fit connections to the operator, the limits of ANSI/AWWA C504, Sec. 3.3.2 shall be strictly observed. Carbon steel shafts, if used, shall have 304 or 316 stainless steel journals with static seals to isolate the interior of the disc and the shaft from the water.

Butterfly valves over 20 inches: The valve shaft shall be of 2-piece stub shaft type, made of 18-8 Type 304 stainless steel. Valve bearings and shaft seals for valves of all sizes shall meet the requirements of ANSI/AWWA C504 Sec. 3.6 and 3.7 respectively, with the following additional requirements:

1. Sleeve bearings shall have a maximum coefficient of friction of 0.1.
 2. For underground service, packing shall be pressure-energized chevron or "O" ring type, not requiring adjustment and suitable for permanent duty.
- C. Pressure Reducing Valves: Pressure reducing valves shall be supplied as directed in the Contract Documents.
- D. Valve Boxes: Valve boxes shall be cast iron of sliding, adjustable height type with round or oval bottom hood sections to fit over the top of the valve. The top section shall be recessed to receive a close fitting "eared" lid with the word "water" cast into it. Internal diameter of the smallest section shall not be less than 5 inches. Minimum thickness of the metal shall not be less than 5/16-inch. Castings shall be smooth and the workmanship shall be acceptable to Engineer.

Valve boxes shall be of sufficient length for the pipe cover depth on the profile drawings and in accordance with the Standard Detail of these Specifications.

- E. Markers: Valve boxes shall be marked with markers consisting of 1-1/2-inch O.D. galvanized steel pipe sections, 7 feet in length, with 3 feet buried in the ground. Markers shall be shop painted "Caterpillar Yellow" and painted with stenciled 2-inch black numerals, showing the appropriate references. Markers shall be located on the nearest property line, due north, south, east or west of the valve at a maximum distance of 50 feet, unless otherwise directed by Engineer. Markers shall not be required where valve boxes are located in paved areas. Markers shall carry the notation:

VB
(feet) (direction)

- F. Live Tap Connections: Contractor shall perform all live tap connections. Contractor shall notify Engineer and the City 48 hours (excluding non-working days) prior to installation of the live tap connection. Contractor shall be responsible for, and shall bear the expenses incurred, in the event that a water main should be damaged during excavation, connection or backfilling.

Article 603.3 Construction

Contractor shall provide all trench excavation, backfill, and compaction necessary to install valves in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Valves or valve boxes shall be installed where shown on the drawings. Butterfly valve operators shall be placed on the side of the main nearest the property line. On fire line installations a valve shall be placed outside the building so that all fire hydrants will remain in service in the event water service to the building must be shut off for any reason.

Valves shall have the interiors cleaned of all foreign matter before installation. If the valve is at the end of the line, it shall be plugged prior to backfilling. The valve shall be inspected by Engineer in the open and closed positions to insure that all parts are in working condition.

Provisions shall be made to restrict the soils from entering the bottom section of the valve box. Wrap burlap inside the bottom section under the packing gland and wrap 3 layers of non-woven geotextile fabric around the outside of the valve and base section of the valve box and secure the fabric at the top and bottom with wire or tape.

Contractor shall expose all valve boxes for pre-final and final inspection.

Article 603.4 Measurement

The quantity to be paid shall be the actual number of valves of each class and size (including valve boxes and marker posts) furnished, installed and accepted.

Article 603.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
603(1_)	Furnish and Install (Size) Gate Valve, Valve Box, and Marker	Each
603(2_)	Furnish and Install (Size) Butterfly Valve, Valve Box, and Marker	Each

END OF SECTION 603

SECTION 604 FURNISH AND INSTALL FIRE HYDRANTS

Article 604.1 Description

This work consists of furnishing and installing of "L-Base" fire hydrant assemblies, including the fire hydrant leg pipe, auxiliary gate valve, valve box, restrained joints, guard posts, and fire hydrants.

Article 604.2 Materials

A. Fire Hydrants: Fire hydrants shall conform to the requirements of ANSI/AWWA C502 for Dry Barrel Fire Hydrants. Fire hydrants shall be Mueller 5-1/4 Centurian (3-port) Model Number A-423 or other pre-approved Mueller model number. No substitutions are permitted.

1. All fire hydrants shall be supplied with a 5-1/4-inch main valve opening.
2. All single pumper hydrants shall be furnished with a 6-inch ANSI Class 125 standard mechanical-joint end with 2 cast-on lugs for tie-backs.
3. All connections shall be mechanical-joint unless otherwise indicated in the Contract Documents.
4. Unless otherwise required by the Contract Documents, all hydrants shall be furnished with a barrel length that will allow a minimum of 6 feet of bury.
5. All fire hydrants shall be furnished with a breakaway flange which allows both barrel and stem to break clean upon impact from any angle. Traffic flange design must be such that repair and replacement can be accomplished above ground.
6. Painting and coating shall be in accordance with cited AWWA Specifications. After installation, the hydrant section from the traffic flange to the top of the operating nut shall be painted "Safety Orange".
7. Operating and nozzle nuts shall be pentagon shaped with 1-1/2-inch point to flat measurements.
8. Hose nozzle threading shall be in conformance with NFPA No. 194 for National (America) Standard Fire Hose Coupling Screw Threads).
9. All working parts shall be bronze or noncorrosive metal in accordance with the requirements of ANSI/AWWA C502.
10. All hydrants shall be left-hand opening (counter clockwise).
11. All hydrants shall be self-draining.

B. Auxiliary Gate Valves: All gate valves and valve boxes shall be furnished and installed in

accordance with Section 603 - Furnish and Install Valves.

- C. Restrained Joints: All joints shall be restrained. Unless otherwise detailed on the Drawings, pipe joints shall be push-on rubber gasket type conforming to AWWA C111. Restrained joints shall be constructed with EBAA Iron MEGALUG, Romac Industries Grip Ring, U.S. Pipe Field LOK Gasket system, or approved equal.
- D. Tie Rods: All tie rods must be 3/4-inch O.D. black iron or mild steel.
- E. Guard Posts: Contractor shall install guard posts at each hydrant installation in accordance with the Standard Details of these Specifications. If, in the opinion of Engineer, the guard posts are not to be installed, they shall be delivered to the City of Kodiak storage yard. Measurement and payment for guard posts shall be incidental to the Bid Item "Furnish and Install Fire Hydrant Assembly."

Article 604.3 Construction

Contractor shall provide all trench excavation, backfill and compaction necessary to install the fire hydrant assembly in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Fire hydrant legs shall be constructed in accordance with Section 602, Furnish and Install Pipe Using Restrained Joints. All fire hydrant legs shall be installed level. The fire hydrant barrel shall be installed plumb. Any adjustment to fire hydrants directed by Engineer shall be made by Contractor at no cost to the City.

Hydrants installed but not available for use shall be covered with burlap and securely tied.

In lieu of valve box markers for the auxiliary gate valves, Contractor shall paint in 2-inch black lettered stencils, the direction and distances to the nearest 1/10-foot the distance to the valve box on the face of the fire hydrant directly below the bonnet flange.

Drain plug shall be removed from the bottom of the fire hydrant.

Article 604.4 Measurement

The method of measurement to furnish and install fire hydrants shall include fire hydrants, complete with 6-inch leg to main, 6-inch auxiliary gate valve and valve box, guard post installation, and joint restraint as shown in the Standard Details.

Article 604.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
604(1)	Furnish and Install Fire Hydrant Assembly (Single Pumper)	Each
604(2)	Furnish and Install Fire Hydrant Assembly (Double Pumper)	Each

END OF SECTION 604

SECTION 605 FIRE LINES

Article 605.1 Description

This work consists of furnishing and installing fire lines including joint restraint, fittings, valves, and valve boxes.

Article 605.2 Material

Refer to Section 602, Furnish and Install Pipe.

Article 605.3 Construction

- A. General: A fire line that originates at a water utility main has the primary purpose of providing fire protection inside a building. No connections, other than those for additional fire protection, will be allowed on the fire line outside the building. Domestic water obtained from a fire line will be connected inside the building.

Valves and valve boxes shall be installed where shown on the Drawings.

- B. Excavation and Backfill: Contractor shall provide all excavation, backfill, and compaction necessary to install fire lines in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.
- C. Materials Delivery: Materials Delivery shall be in accordance to Section 602.
- D. Installation: Installation shall be in accordance with Section 602, amended as follows: Joint restraint shall be installed for a distance of 40 feet in both directions from all fittings and mechanical joints.
- E. Alignment and Grade: Alignment and Grade shall be in accordance to Section 602 - Furnish and Install Pipe.
- F. Jointing of Metal Pipe: Contractor has the option of using either mechanical or push-on joints. All joints shall be made in conformance with AWWA C-600. Contractor will be required to use mechanical joints on all hydrant leads. Engineer has the option of checking any or all mechanical joints to assure proper torque as specified by the manufacturer.

Butterfly valves shall be used on lines 16 inches and larger. Refer to Section 603 - Furnish and Install Valves.

Article 605.4 Fire Hydrants and Valve Boxes

Refer to Section 604, Furnish and Install Fire Hydrant, Article 604.2.A and Section 603, Furnish and Install Valves.

Article 605.5 Flushing and Testing

Prior to any tests performed, all newly installed fire lines shall be open bore flushed. Contractor shall coordinate flushing, testing and disinfection with the City of Kodiak as specified in Section 602, Furnish and Install Pipe. Contractor, at his option, shall perform the disinfection, hydrostatic, and continuity test. Hydrostatic testing of a water line containing a chlorine mixture shall not be allowed. Contractor is made aware, that in the event the disinfection tests has been performed and repairs are made on the system in order to pass the hydrostatic test, all previous tests, including open bore flushing, shall be declared void and shall be repeated to the satisfaction of Engineer.

- A. Hydrostatic Testing: A hydrostatic test will be conducted on all newly constructed fire lines, fire hydrant leads and stubouts after "Open-Bore" flushing in the presence of a City of Kodiak Inspector in accordance with the requirements ANSI/AWWA C600. Contractor shall furnish all necessary assistance, equipment, labor, materials, and supplies (except the test pressure gauge) necessary to complete the test to the satisfaction of Engineer.

All main line valves, fire hydrant auxiliary valves, fire hydrant main valves, and plugs shall be tested. All intermediate valves within the section being tested will be closed and re-opened as directed by the City during the actual test. Only static pressure will be allowed on the opposite side of the end valves of the section being tested.

All hydrostatic testing will be performed through test copper or fire line riser in building. Use of fire hydrants and service connections for testing will not be allowed.

All fire lines and stubouts for future fire line connections shall be hydrostatically pressure tested at 200 psi for 2 hours, in accordance with the Fire Underwriter's requirements as outlined in the National Fire Codes.

If the pressure decreases below the required test pressure during the 2-hour period, the preceding portion of that test will be declared void. Cracked or defective pipe, gaskets, mechanical joints, fittings, valves, or hydrants discovered as a consequence of the hydrostatic tests shall be removed and replaced with sound material at Contractor's expense. The test shall then be repeated until the results are satisfactory. Use of leakage tests shall not be allowed.

- B. Disinfection: Refer to Section 602, Furnish and Install Pipe.
- C. Test and Air Vent Copper Removal: Refer to Section 602, Furnish and Install Pipe.

Article 605.6 Measurement

Measurement for furnishing and installing fire lines shall be per linear foot of horizontal distance of the various sizes as set forth in the Bid Schedule. Measurement will be from station to station as staked in the field and as shown on the drawings, except where the grade exceeds 25%, in which case measurement will be by actual pipe length.

Article 605.7 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Fittings and appurtenances as shown on the drawings or not specifically identified for payment under a separate pay item but required for normal completion of fire lines installation, will be considered incidental and shall be included in the linear foot cost of the fire lines. Excavation and backfill shall be paid for under Division 200 - Earthwork, Section 206 Trench Excavation and Backfill.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
605(1_)	Furnish and Install (Size) Fire Line	Linear Foot

END OF SECTION 605

SECTION 606 WATER SERVICE LINES

Article 606.1 Description

This work consists of furnishing and installing water service lines including fittings, key boxes, and valve boxes. All connections and private improvements intended for public ownership shall require:

- A. Permitting and conformance with the Kodiak City Code (either on or off property in the City services area).
- B. Forty-eight hours (excluding non-working days) notification shall be given to the City of Kodiak prior to making the connection available for inspection.

Article 606.2 Material

- A. Pipe: Ductile iron pipe or soft drawn seamless copper type "K" shall be used for all service lines.
- B. Key Box, Valve Box: The key box or valve box shall provide a clear and unobstructed access to a curb stop or valve to enable the City operation of the curb stop or valve. Key boxes or valve boxes shall be installed in the standard location as shown in the Standard Details.

Key boxes shall be of an acceptable construction as outlined in this Article for construction and as shown in the Standard Details for Typical Water Service Connects. Key boxes for services stubbed to property lines for future use shall be installed with a standard location marker. The standard location marker shall be a wood 2"x4"x8' protruding above the ground 3 feet, painted blue and stenciled with the word "water" in white 2-inch high letters.

Valves shall be of an acceptable construction as outlined in Section 603 - Furnish and Install Valves, and the Standard Details for Typical Valve Box. Valves shall be installed with a standard marker as defined in Section 603 - Furnish and Install Valves.

Article 606.3 Construction

- A. Excavation and Backfill: Contractor shall provide all excavation, backfill, and compaction necessary to install water source lines in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.
- B. Service Connections: A corporation stop or main valve shall be installed at a point in the service line as close to the main water supply as possible. There shall be line pressure in the main at all times connections are being made. All service lines 2 inches and smaller shall be constructed of seamless, soft drawn, type "K" copper. All service connections larger than 2 inches shall be made of ductile iron. All ductile iron pipe installations shall be flushed, hydrostatic tested, and disinfected as outlined in Section 602, Furnish and

Install Pipe.

In the event a Contractor elects to make the connection to a City of Kodiak main water supply, it shall be installed in a manner consistent with the Standard Specifications and Standard Details. A water service line shall not cross property lines of adjoining lots. The key box shall be installed no closer than 5 feet from adjoining property lines. The connection shall be inspected by a City of Kodiak Inspector at the time the connection is made or the excavation be exposed in its entirety for his inspection.

No unions will be allowed in the right-of-way on newly constructed service lines. Service lines shall not be installed within 10 feet horizontally of sanitary sewer, or storm drain lines. Service lines shall be installed horizontally, perpendicular to the water main and right-of-way, and buried a minimum depth of 6 feet below finish grade.

- C. Excavation & Backfill: Excavation, bedding, and backfill must conform to Division 200 - Earthwork, Section 206, Trench Excavation and Backfill. Depth for water service connections will be a minimum of 6 feet below proposed finished grade. The 6-foot depth below finished grade shall be maintained to the property line. Variations in depth from the depth stated above will not be grounds for additional payment. It shall be Contractor's responsibility to familiarize himself with the depth of water mains for the Project. The portion of the right-of-way that extends from the main to the key box (curb stop) will be excavated in such a manner that will allow the service connection to be installed horizontally (no slope). Contractor shall excavate for water connections in such a manner that the excavation is 90 degrees to the street line, whenever possible. The ditch shall be long enough to allow the key box to be set at the property line.

Contractor shall expose the mains to be tapped for distance of 4 feet in length. Excavation on both sides of the pipe shall be carried to the bottom of the pipe.

No water service shall be within a horizontal distance of 10 feet from the sewer service.

Contractor shall be responsible for, and shall bear the expenses incurred, in the event that a main should be damaged during excavation or backfilling.

All on-property installations shall be constructed to the same standard as off-property installations.

Backfill: At such time as Engineer may direct, but only after the service lines and appurtenances have been properly completed and inspected, the trenches and appurtenant structures shall be backfilled.

Contractor shall exercise due care in backfilling to keep the service box and thaw wire vertical and in-place. In the event the service box or thaw wire is displaced, Contractor will be required to excavate and restore the service box and thaw wire to the proper position. Any work necessary to restore the service box and thaw wire to the proper position will be performed at Contractor's expense.

A thaw wire constructed to a No. 2 copper plastic or rubber coated wire shall be attached on the main side of the corporation stop by an approved method.

- D. Disconnects: If an existing service line is replaced by a new service or becomes unusable due to a replat of the property, it shall be disconnected at the main, at no cost to the City. The disconnect shall be witnessed by a City of Kodiak inspector.
- E. Hydrostatic Testing: All newly installed water mains and all new services shall be subject to a hydrostatic pressure test of 150 pounds of pressure. This pressure test may be performed at the same time that the hydrostatic test is performed on the new water main. A bleeder will be installed at each service line key box and extended 1-foot above the existing ground. The bleeder will be capped after testing is complete. The bleeder may not be used for the on-property system and must be disconnected at the time of the on-property hook-up.
- F. Connection to Existing Water Service: Includes furnishing and installing a new water service line between the water main and property line and connecting to existing water service. If the existing water service at the property line is closer than 10 feet to the sewer service or closer than 5 feet to the side of the property, or is not on the property, or if there is a water meter on the property, then a new section of 1-inch service copper line shall be run from the new curb stop to the nearest practical connection point on the existing line from the structure. If a water meter is present, it shall be removed and the new service copper shall extend to that location. If the water service line only has 3.5 to 5 feet of cover, 2 inches of rigid board insulation shall be installed over the pipe as shown on the Drawings, shallower services shall have a minimum of 4 inches of insulation.

A new thaw wire, constructed of a No. 2 copper, plastic or rubber coated wire, shall be attached on the main side of the corporation stop by an approved method. The existing thaw wire will be completely removed.

As-built measurements shall be the station of the service connection at the main plus a minimum of two (2) swing ties from the curb box to permanent prominent features and, when possible, ties to property corners.

An Inspector for the City of Kodiak shall be present when initial connection between the new water main and existing water service is made, without exception. The City will not approve any installation that is not in accordance with the Uniform Plumbing Code and City of Kodiak Standard Specifications.

Article 606.4 Measurement

Furnish and install water service line shall be measured as a completed unit in-place and in operation from the water main to the key box, and from the key box to the existing line, removing water meters, replacing landscaping, fences, walls, walkways, etc., including all materials, excavation, installation, compaction, insulation, backfill and bedding.

There will be no measurement for rock excavation.

Article 606.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Fittings and appurtenances as shown on the drawings or not specifically identified for payment under a separate pay item but required for normal completion of water service line installation, will be considered incidental and shall be included in the linear foot cost of the water service lines.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
606(1)	Furnish and Install Water Service Line, 1"	Each
606(2)	Furnish and Install Water Service Line, 2"	Each

END OF SECTION 606

SECTION 607 RAISE OR LOWER WATER SERVICE

Article 607.1 Description

This work consists of raising or lowering existing water services when the grade(s) of such services interfere with the storm drain or sanitary sewer line under construction including, but not limited to, trench excavation and backfill, compaction, furnishing trench backfill, disposal of unsuitable or surplus material, and water line piping.

Article 607.2 Materials

Materials used to raise, or lower water services shall be approved by Engineer.

Article 607.3 Construction

Where a conflict in grade occurs between the proposed storm drain, or sanitary sewer line and a water service connect, Contractor shall excavate the water service from the point of interception for a sufficient distance as required to raise or lower the water service such that the grade conflict will be eliminated. In no case will the length of raising or lowering of the water service exceed 50 feet. If the clearance between the raised or lowered water service and the storm drain, or sanitary sewer line is less than 3 feet, or if the service is raised within 6 feet of finish grade, Insulation Board (R-18) shall be installed and paid in accordance with Division 800 - Miscellaneous, Section 807, Insulation; however, in no case shall the vertical separation distance between the service connection and the storm drain be less than 18 inches. All water service joints within 10 feet of the storm drain, or sanitary sewer line shall be heat shrink wrapped, heat shrink wrap sleeves shall be approved by Engineer. Prior to wrapping sleeves all joints shall be visually inspected for leakage under line pressure. All excavation, backfill, and pipe laying shall be performed in accordance with the applicable provisions of Division 200 - Earthwork and Division 600 - Water Systems. Any materials needed to complete the raising or lowering of a water service shall be provided by Contractor and considered incidental to the Contract.

Article 607.4 Measurement

Measurement for raising or lowering water service lines shall be measured per unit, complete in-place.

Article 607.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Fittings and appurtenances not specifically identified for payment under a separate Bid Item, but required for normal completion of raising or lowering water service lines, will be considered incidental and shall be included in the unit cost of the work.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
607(1)	Raise or Lower Water Service	Each

END OF SECTION 607

SECTION 608 REMOVE FIRE HYDRANT ASSEMBLY

Article 608.1 Description

This work consists of the removal and disposal of the existing fire hydrant assembly including the fire hydrant, thaw pipes, valve box(es) and all pipe to the water main. The work shall also include plugging existing pipe, installation of restraining joints, placement of thrust block(s), all trench excavation and backfill to remove the fire assembly and pipe, furnishing trench backfill, and mechanical compaction in accordance to the Drawings.

Article 608.2 Materials

All materials utilized in removing the fire hydrant assembly and all earthwork associated with removal of the fire hydrant assembly shall conform to Division 200 - Earthwork.

Article 608.3 Construction

All construction practices shall conform to Division 200 - Earthwork and Division 600 - Water Systems.

Contractor shall provide all assistance, labor, materials, supplies, trench excavation, backfill, and compaction to successfully complete the removal of the fire hydrant assembly.

End pipe and plug shall be restrained in conformance with Section 602.

Contractor shall provide a disposal site for all material including pipe, valve, valve boxes, and earthwork removed. Providing the disposal site shall be considered incidental to the Project and no separate payment shall be made. A disposal site shall be provided by Contractor. The fire hydrant assembly shall be salvaged and delivered to the City of Kodiak. Delivering the fire hydrant assembly to the City shall be considered incidental to the Project and no separate payment shall be made.

Article 608.4 Measurement

Measurement for removal of the fire hydrant assembly, plugging pipe, installation of restraining joint(s), placement of thrust block(s), and all earthwork associated with the removal will be measured per unit and accepted by Engineer.

Article 608.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
608(1)	Remove Fire Hydrant Assembly	Each

END OF SECTION 608

SECTION 609 REPLACE VALVE BOX

Article 609.1 General

The Work under this Section consists of performing all operations pertaining to the removal, disposal, and replacement of mainline, service line, fire line, and/or fire hydrant valve boxes that have become separated and/or misaligned to such an extent as to require replacement, from the top of the valve to final finished grade, including the replacement of all valve box sections, lids, and dust pans.

Article 609.2 Material

All materials used in the replacing valve boxes shall conform to the requirements defined in Section 603 - Furnish and Install Valves and the Standard Details.

Backfill shall be Type II Classified material to the subgrade elevation.

Article 609.3 Construction

All construction shall be in accordance with the provision of Section 603 – Furnish and Install Valves.

All locations where replacing a valve box is required shall be excavated to the top of the valve and conform to the procedures outlined in Section 603 - Furnish and Install Valves, concerning installation of the valve box and the Standard Details.

Article 609.4 Measurement

Valve boxes replacement will be measured per unit, complete in place.

Article 609.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment shall be made under the following unit:

ITEM	UNIT
Replace Valve Box	Each

END OF SECTION 609

SECTION 610 RESET VALVE BOX SECTIONS BELOW FINISHED GRADE

Article 610.1 General

The Work under this Section includes all operations pertaining to the reconnection of mainline, service line, fire line, and/or fire hydrant valve box sections that have separated below finish grade. Work under this Section also includes the requirements of the Drawings and applicable sections of this Division and Division 200 - Earthwork. All broken and/or missing valve box components are to be replaced with new materials furnished and installed by Contractor in accordance with these specifications.

Article 610.2 Material

All materials used in the reconnection of mainline and fire hydrant valve boxes shall conform to the requirements defined in Section 603 - Furnish and Install Valves and the Standard Details.

Backfill shall be Type II Classified material to the subgrade elevation.

Article 610.3 Construction

All construction shall be in accordance with the provision of Section 603 – Furnish and Install Valves.

All locations where reconnections are required shall be excavated to the depth required to perform the reconnection. Contractor shall be responsible for removing the liner inside the valve box casing and determining the location of the separation. Care shall be used to ensure that soil or other foreign matter does not enter the valve box standpipe.

Article 610.4 Measurement

Resetting Valve Box Section Below Finish Grade will be measured per unit, complete in place. The same valve shall not be paid for under this pay item if it is paid for under Section 609 - Replace Valve Box. In particular, related work includes, but is not limited to, removal of debris from inside the valve box standpipe, trench excavation and backfill, disposal of unsuitable or surplus material, mechanical compaction, adjust mainline valve box to finish grade, replace broken valve box components, and classified materials. No separate measurement for payment will be made.

Article 610.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment shall be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
610	Reset Valve Box Sections Below Finished Grade	Each

END OF SECTION 610

SECTION 611 REPLACE TOP SECTION OF VALVE BOX

Article 611.1 General

The Work under this Section consists of performing all operations for the removal, disposal, and replacement of mainline, service line, fire line, and fire hydrant valve box top section(s), lid(s), and dust pan(s) that are missing or damaged in the opinion of Engineer. Contractor is to provide all labor, materials and supervision required to furnish and install new valve box components needed to rehabilitate existing valve boxes.

Under this Section, rehabilitation of existing valve boxes can include the following items of Work:

Removal and replacement of valve box lids.

Removal and replacement of valve box dust pans.

Removal and replacement of valve box top sections.

The valve box components to be removed and replaced for a specific valve box are identified in the Drawings. Contractor is to reuse those components that are not to be replaced in assembly of the rehabilitated valve box.

Article 611.2 Material

Materials used in this Work shall conform to the requirements of Section 603, Article 603.2 - Material.

Article 611.3 Construction

Contractor shall excavate around the valve box as needed to access the Work. All excavation, shoring, dewatering, backfill and compaction efforts required to access the Work shall be per Division 200 – Earthwork. All importation of fill and/or disposal of unsuitable material, excavation, and backfill efforts shall be considered incidental to Work, and will not be paid separately.

Upon completion of the Work, Contractor shall restore the existing grades and surrounding area to preconstruction conditions. Any pavement, sidewalk, curb and gutter, landscaping, and/or other improvements disturbed and/or damaged by the valve box rehabilitation effort shall be restored by Contractor to preconstruction conditions. Restoration of these conditions shall be considered incidental to the Work, and will not be paid separately.

Contractor shall remove and replace those valve box components identified in the Drawings. The rehabilitated valve box shall be configured according to the requirements of this Division and the Standard Details.

Contractor shall use care in protecting those component parts of the existing valve box and shall

return all parts that are to be reused in the rehabilitated valve box to the COK Public Works.

Article 611.4 Measurement

Rehabilitated valve box assemblies shall be measured as units complete in place with the components identified in the Drawings replaced and accepted by Engineer.

All effort required to complete the Work, including excavation, shoring, dewatering, backfilling, restoration of Work area to existing preconstruction conditions, and/or other items of Work needed to complete the Replace Top Section of Valve Box effort shall be considered incidental to the completion of the Work and shall not be paid for separately.

Article 611.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

ITEM NO.	DESCRIPTION	UNIT
611(1)	Remove and Replace Valve Box Lids	Each
611(2)	Remove and Replace Valve Box Dust Pan	Each
611(3)	Remove and Replace Valve Box Top Section	Each

END OF SECTION 611

SECTION 612 ABANDON PIPELINE IN PLACE

Article 612.1 General

The Work under this Section includes all operations pertaining to the abandonment of pipeline in place. Where shown on the Drawings, or otherwise directed by Engineer, Contractor shall abandon an existing pipeline in place in accordance with the requirements of this Section.

Article 612.2 Material

Sand slurry shall consist of a mixture of water and sand with an approximate ratio of seven (7) gallons of water per cubic foot of sand. Sand may consist of native material with a particle size distribution such that one hundred percent (100%) of the material passes the No. 4 U.S. Standard Sieve and contains no lumps, frozen material, organic matter, or other deleterious material.

Article 612.3 Construction

Wherever existing pipe is to be abandoned in place, Contractor shall empty the line of all water, fill the pipe full with sand slurry, and plug the ends. Placement of the sand slurry shall be by means of a tremie pipe or other method that shall enable uniform placement of the sand slurry throughout the length of the pipe being abandoned. Contractor shall demonstrate the entire pipe to be abandoned has been filled prior to the installation of end caps. Validation shall include placement of a predetermined volume of sand slurry into the pipe to be abandoned.

In the event the pipeline to be abandoned is cracked or crushed, Contractor shall excavate to the next joint of pipe and install the plug. Crushed pipe sections or portions thereof shall be removed and disposed of by Contractor.

All excavation, shoring, dewatering, disposal of unsuitable material, backfilling, and compactive effort required for completion of this Work shall conform to the requirements of Division 200 – Earthwork.

During the execution of this effort, Contractor shall maintain vehicular traffic and pedestrian access as required in Section 802 - Traffic Maintenance.

Contractor shall restore the Work area to preconstruction conditions.

Contractor shall notify the Engineer twenty-four (24) hours in advance of abandoning each main and shall provide safe access for the inspection of the process.

Article 612.4 Measurement

Measurement of quantities of pipeline to be abandoned in place shall be per lineal foot of pipeline to be abandoned for each nominal pipeline size. Length shall include pipeline that is removed due to damaged ends.

Removal and disposal of pipeline sections that have damaged ends and cannot be plugged in place shall be considered incidental to the Abandon Pipeline in Place scope of Work identified in this Section.

Any excavation, shoring, dewatering, disposal of unsuitable material, backfilling, compactive effort, maintenance of vehicular traffic and/or pedestrian access, paving, landscaping, or restoration of existing preconstruction conditions necessary to complete the Abandon Pipeline in Place scope of Work identified in this Section that is not specifically address by a separate bid item shall be considered incidental to the Work completed under this Section. Costs incurred for completion of these incidental Work items are considered including in the unit cost bid for completion of the Work in this Section.

Article 612.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

ITEM NO.	DESCRIPTION	UNIT
612(1)	Abandon Pipeline in Place (Pipeline Nominal Size) (Type of Pipe)	Linear Foot

END OF SECTION 612

SECTION 613 CONNECT TO EXISTING WATER SYSTEM

Article 613.1 General

No connections to a COK water main may be made without first applying for a permit from the Public Works Department and paying all applicable fees. The Public Works Department may choose to perform the work with City staff, hire a subcontractor to perform the work, approve the permittee or the permittee's contractor to perform the work or any combination of these methods.

The Public Works Department will have sole authority regarding the type of connection. Depending on the location and purpose of the connection, the Public Works Department may require a live tap or installation of any combination of pipe fittings and valves.

Article 613.2 Material

All materials proposed for use must comply with these Standard Specifications and Standard Details.

Article 613.3 Construction

All construction must comply with these Standard Specifications and Standard Details. No work may be covered until inspected and approved by the Public Works Department. Work that is covered prior to receiving approval shall be re-excavated and fully exposed at no cost to the City.

Construction of connections to existing water mains shall be in accordance with this Division and Section 602 - Furnish and Install Pipe.

Article 613.4 Measurement

Connect to existing water main shall be measured per each unit, complete in place.

Article 613.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

ITEM NO.	DESCRIPTION	UNIT
613(1)	Connect to Existing Water Main (Identify Location, Type of Pipe and Nominal Pipe Size)	Each

END OF SECTION 613

SECTION 614 RELOCATE WATER MAIN

Article 614.1 General

The Work under this Section consists of providing all operations pertaining to relocating water mains. In the preparation of the Drawings, efforts have been made to determine exact elevations of live utilities; however, elevations of utilities shown are not represented as exact and are shown to include approximate location only. Engineer shall have the final say as to whether the main is raised or lowered.

Article 614.2 Construction

Where a water main crosses the location of a sewer, the water main shall be raised or lowered sufficiently to permit a minimum (outside diameter) vertical distance of eighteen inches (18") from the sewer line. Contractor may employ either of the following methods for raising or lowering a water main. He may raise or lower lengths of the water main as necessary on either side of the proposed sewer to allow the main to pass under or over the sewer, providing the deflection at any joint does not exceed the pipe manufacturer's recommendations, or the water main may be raised or lowered using four (4) pipe bends not to exceed twenty-two and one-half degrees (22 ½°). In special cases only, and when approved by Engineer in advance, forty-five degree (45°) bends may be used. The method of lowering and materials to be used shall be approved by Engineer prior to commencing Work. Contractor shall give seventy-two (72) hours notice to COK and Engineer prior to any planned water shutoff.

Water lines two inches (2") in diameter and smaller shall not be construed as water mains.

Any necessary lowering of water lines two inches (2") or smaller shall be included under the conditions set forth in the General Provisions for the moving and relocation of utilities occupying space within the area of construction. With the approval of Engineer, Contractor may lower water lines two inches (2") in diameter or smaller, but separate payment shall not be made for such lowering. The cost shall be included in the unit bid price as specified in Division 200, Section 206 - Trench Excavation and Backfill.

Article 614.3 Measurement

Raising or lowering existing water mains will be measured as units complete in place without regard to the diameter of the water main or length required to be lowered.

Article 614.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment shall be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
614(1)	Relocate Water Main	Each

END OF SECTION 614

SECTION 615 ADJUST KEY BOX

Article 615.1 General

The Work under this Section consists of providing all materials, equipment and labor and performing all operations necessary for adjusting existing key boxes to finished height and/or finished grade. All broken and/or missing keybox components are to be replaced with new materials furnished and installed by Contractor in accordance with these specifications.

Article 615.2 Material

All materials used in the key box adjustment shall conform to the requirements defined in Section 606 - Water Service Lines and the Standard Details.

Article 615.3 Construction

Key boxes to be adjusted will be identified by Engineer. In all cases the maximum height of the adjusted key box will be flush with the final ground surface. If excavation is required to adjust the key box, the ground surface will be restored to its original condition unless otherwise indicated in the Drawings. Contractor shall be responsible for ensuring that the valve box is vertical, clean, to proper grade, and readily accessible for operation of the valve.

Any damage to a key box resulting from construction under this Contract shall be repaired or the damaged portion replaced at Contractor's expense. Adjustments to key boxes to be lowered will include cutting excessive length of key box, threading, and installing threaded unions to complete adjustments. Only threaded joints will be allowed. "Quickconnect" style connections assembled with set screws will not be accepted.

Where key box is located in concrete slab, adjustment will include cutting concrete, installing pavement riser and lid, and restoring disturbed area to original condition.

Contractor shall adjust the key box to finish grade prior to placement of asphalt pavement. After-the-fact cutting of new asphalt for adjustments is not accepted. Any adjustment(s) requiring cutting of new asphalt shall not be paid and shall be deducted from the quantity.

Article 615.4 Measurement

Adjusting key boxes will be measured per unit, complete in place.

Article 615.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment shall be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
615(1)	Adjust Key Box	Each
615(2)	Adjust Key Box (Concrete Slab or Asphalt Paving)	Each

END OF SECTION 615

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 700

TABLE OF CONTENTS

DIVISION 700 - STORM DRAIN SYSTEMS	1
SECTION 701 GENERAL.....	1
SECTION 702 FURNISH AND INSTALL PIPE	3
SECTION 703 FIN DRAINS AND SUBDRAINS	9
SECTION 704 MANHOLES AND CATCH BASIN.....	11
SECTION 705 CONSTRUCT STORM DRAIN DROP CONNECTION.....	14
SECTION 706 STORM DRAIN CLEANOUT	15
SECTION 707 CONNECT TO EXISTING STORM DRAIN	16
SECTION 708 CONNECTIONS TO EXISTING MANHOLES OR CATCH BASINS.....	17
SECTION 709 ADJUST CATCH BASIN TO FINISH GRADE	18
SECTION 710 CONSTRUCT OPEN DITCH	19
SECTION 711 CULVERT	21
SECTION 712 OIL AND GRIT SEPARATOR.....	22

DIVISION 700 - STORM DRAIN SYSTEMS

SECTION 701 GENERAL

Article 701.1 Description

This work consists of constructing or reconstructing storm drain systems and culverts.

Article 701.2 Applicable Standards

The latest revision of the following standards of the American Society for Testing and Materials (ASTM), the American Association for State Highway and Transportation Officials (AASHTO), and the American Water Works Association (AWWA) are hereby made part of this Specification.

ASTM A 48 and ASTM A 438	Standard Specification for Gray Iron Castings
ASTM C 76	Specification for Reinforced Culvert, Storm Drain, and Sewer Pipe
ASTM C 150	Specification for Portland Cement
ASTM C 478 (AASHTO 199)	Specification for Precast Reinforced Concrete Manhole Sections
ASTM A746 (AWWA C 151)	Ductile Iron Gravity Sewer Pipe
AASHTO M 36	Corrugated Steel Pipe & Fittings
AASHTO M 45	Sand for Cement Mortar
AASHTO M 190	Bituminous Coating of CMP
AASHTO M 196	Corrugated Aluminum Pipe & Fittings
AASHTO M 245-82	Precoated Galvanized Steel Culverts and Under-drains
AASHTO M 246-80	Precoated Galvanized Steel Sheets for Culverts and Underdrains
AASHTO M 274	Corrugated Aluminized Pipe and Fittings
AASHTO M 252	Corrugated Polyethylene Tubing 3"-10"diameter
AASHTO M 294	Corrugated Polyethylene Pipe, 12" diameter and larger
ASTM D 1248-81	Polyethylene Plastics Molding and Extrusion Materials, Type III, High Density

ASTM D 2774	Underground Installation of Thermoplastic Pressure Piping
ASTM D 3035	Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D 3261	Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D 3350	Polyethylene Plastics Pipe and Fittings Materials

Article 701.3 Surveys

Survey shall be performed in accordance to Division 800 - Miscellaneous, Section 805, Construction Surveying.

Article 701.4 Concrete and Mortar

- A. Miscellaneous Concrete: All concrete used in the construction of storm drains with the exception of precast manholes, manhole risers, cones, and catch basin barrels shall conform to Division 300 - Portland Cement Concrete.
- B. Mortar: Cement for mortar used in the construction of storm drain shall conform with the requirements of ASTM C-150, Type II. Sand shall conform with the requirements of AASHTO M-45. The mortar shall be composed of 1 part cement and 3 parts sand. The addition of lime is not permitted.

END OF SECTION 701

SECTION 702 FURNISH AND INSTALL PIPE

Article 702.1 Description

This work consists of furnishing and installing pipe for storm drain systems.

Article 702.2 Material

- A. General: All piping shall conform to the size and class shown and specified. Changes in class shall be made within one-half of a pipe length of the station indicated.
- B. Corrugated Metal Pipe (CMP): Corrugated metal pipe is intended to refer to both steel and aluminum. The pipe shall conform to the following Specifications:
 - 1. Steel: Corrugated steel pipe shall meet the requirements of AASHTO M 36.
 - 2. Aluminum: Corrugated aluminum pipe shall conform to the requirements of the AASHTO M 196.

All CMP fittings shall be fabricated in a workmanship-like manner, develop the full strength of the material being joined, and finished to conform to the appropriate requirements of AASHTO M 36 and AASHTO M 196.

Jointing for corrugated steel and aluminum pipe shall be made through the use of coupling bands applied as recommended by the manufacturer and approved by Engineer.

Dissimilar metals may only be used in extending in-place metal CMP and re-attachment of dissimilar metal end sections provided an electrical insulating material, at least 1/16-inch in thickness, is used to separate the dissimilar materials.

All angles, bolts, and nuts shall be as recommended by the manufacturer for the type of pipe used and as approved by Engineer.

The metal gauge for pipe to be used shall be in accordance with the Contract Documents.

If bituminous coating of CMP is required, the bituminous coating shall conform to the requirements of AASHTO M 190.

All welding performed by Contractor on aluminum pipe shall incorporate the use of 4043 or 5356 alloy for welding wire. The welding shall be accomplished by either the "TIG" (tungsten, inert gas shielded) or "MIG" (metal arc welding, inert gas shielded) process.

End Section for Corrugated Metal Pipe: Galvanized steel and aluminum end sections shall be flared, beveled, shop-assembled units to serve as structural, hydraulic and esthetic treatment to corrugated metal pipe culverts. They may be attached to culverts by threaded bolts, by riveting or bolting in accordance with the manufacturer's standard procedure. End sections shall have a turned-down lip or toe plate at the wide end to act

as a cutoff. Materials for steel end sections shall be galvanized steel conforming to the requirements of AASHTO M 36. The gauge shall be as follows:

- 16 Gauge: Through 24 inches in diameter or 29" X 18" pipe-arch
- 14 Gauge: 30" in diameter and 36" X 22" pipe-arch
36" in diameter and 43" X 27" pipe-arch
- 12 Gauge: Over 36" in diameter and 43" X 27" pipe-arch
(except that the center panels of 60 inches in diameter and larger
and 72" X 44" pipe-arch and larger, shall be 10 Ga.)

Galvanized stiffener angles shall supplement the usual reinforced side edges for 60 inches in diameter and larger, 79" X 49" pipe-arch and larger.

If the end section is shop attached to a stub of pipe, the pipe stub shall not be lighter in gauge than the end section.

Materials for aluminum end sections shall comply with the provisions of AASHTO M 196 and fabrication shall comply with the requirements above.

- C. Precoated Corrugated Metal Pipe (PCMP): All precoated corrugated metal pipe and connecting bands shall be coated to meet the AASHTO M 245 and M 246 and the coating shall be 10 mils minimum thickness each side. All exposed edges including any perforated hole edges shall be coated with a liquid coating supplied by the supplier of the precoated corrugated pipe. All metal utilized for the precoated metal pipe shall conform to Section 702, Furnish and Install Pipe, Article 702.2, Material, Subsection B. Corrugated Metal Pipe. All metal pipe utilized shall have a nominal wall thickness of 16 gauge for pipes 21 inches and larger and 18-gauge for pipes 18-inches and smaller, unless otherwise noted.
- D. Corrugated Polyethylene Pipe (CPEP): Corrugated Polyethylene pipe shall conform to the following Specifications:
 - 1. Three inches through 10 inches diameters: the requirements of AASHTO M 252.
 - 2. Twelve inches and larger diameters: the requirements of AASHTO M 294.

The Corrugated Polyethylene Pipe covered by these Specifications is classified as follows:

Type C - This pipe shall have a full circular cross-section with a corrugated surface both inside and outside. Corrugations may be either annular or helical.

Type S - This pipe shall have a full circular cross-section, with an outer corrugated pipe wall and a smooth inner liner. Corrugations may be either annular or helical.

Type CP - This pipe shall be Type C with perforations.

Type SP - This pipe shall be Type S with perforations.

All CPEP fittings shall be rotational or blow molded and shall conform to the fitting requirements of AASHTO M 252 or M 294.

Jointing for 3-inch to 10-inch CPEP shall be with couplings corrugated to match the pipe corrugations or with push-on couplings with locking devices.

Jointing for 12-inch and larger CPEP shall be made through the use of couplings, corrugated to match the index in the pipe corrugations and in a width not less than 3/4 of the nominal pipe diameter. All couplings shall be manufactured to lap equally to a distance on each jointed pipe, to no less than the diameter of the pipe and shall provide a positive means of closure. CPEP may be connected to CMP or may be used between or connected to dissimilar metals.

All flared end sections and saddles shall be constructed of the same material as the pipe and shall be factory assembled units to serve as structural, hydraulic, and/or aesthetic end treatment to CPEP culverts. Connections to the CPEP shall be as recommended by the manufacturer. The cost of the end section and saddles shall be incidental to the pipe.

E. High Density Polyethylene Pipe (HDPEP): High density polyethylene pipe shall conform the following Specifications:

1. The polyethylene resin shall be classified by ASTM D 1248 as Type III, Class C, Category 5. Grade P34, and have a minimum ASTM D 3350 cell classification of 335434C and a designation of PE 3408 by the Plastic Pipe Institute.
2. The polyethylene compound shall be suitably protected against degradation by ultra-violet light by means of a 2% concentration of carbon black, well dispersed by pre-compounding in with the resin (by the resin manufacturer).
3. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same Specification from the same raw material supplier. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other deleterious defects, and shall be identical in color, density, melt index, and other physical properties.
4. The pipe shall be designed according to the ISO modified formula in ASTM D 3035. The design pressure rating shall be expressed in terms of the static working pressure in psi for water at 73.4 degrees Fahrenheit according to ASTM D 2837. The minimum allowable pressure rating for gravity sewer pipe shall be 52 psi.
5. Jointing of the pipe lengths to one another shall be by means of thermal butt fusion. Butt fusion of pipes shall be performed in accordance with the pipe manufacturer's recommendations for equipment and technique, using the correct size equipment and technique. Butt fusion will be performed only by personnel certified as competent by the polyethylene material supplier.

6. Contractor shall provide butt fusion equipment compatible with the piping system being used as necessary to complete all joints on the Project. All costs in connection with this equipment shall be included in the Price Bid for pipe installation.
7. Provide wall pipes or wall fitting as recommended by the pipe manufacturer to connect storm drain and catch basin drain pipes to manholes and catch basins.
8. Installation of all components shall be accomplished using the manufacturer's own recommendations. Unless Contractor's personnel are certified in the installation of polyethylene pipe, the pipe suppliers shall provide pipe personnel to instruct Contractor in the handling, installation, and testing of their products. Technical representative services, if necessary, will be at Contractor's expense.
9. Random tests of field joints will be made by Engineer, as necessary, as a quality control measure. Contractor shall be responsible for removal or repair of unsatisfactory butt fusion joints.

Article 702.3 Construction

- A. Excavation and Backfill: Excavation and backfill for furnishing and installing pipe shall be in accordance with Division 200 - Earthwork.
- B. Pipe Grade and Alignment: Variance of individual pipe sections from established line and grade shall not be greater than those listed in the table below, providing that such variance does not result in a level or reverse sloping invert.

DIAMETER INCHES	ALLOWANCE TOLERANCE FEET	DIAMETER INCHES	ALLOWANCE TOLERANCE FEET
8	0.03	14	0.04
10	0.03	16	0.04
12	0.03	18*	0.05

*Note: For all pipe sizes over 18 inches in diameter, tolerance not to exceed 0.05 feet.

During the progress of the work, Contractor shall provide instruments such as transits, levels, laser devices, and other facilities for transferring grades from offset hubs or for setting of batter boards or other construction guides from the control points and bench marks provided by Contractor. Contractor shall provide qualified personnel to use such instruments and who shall have the duty and responsibility for placing and maintaining such construction guides. Contractor shall notify Engineer 48 hours prior to taking measurements on newly installed section of line and/or appurtenances for record documents.

If the method of transferring grades from the offset hubs to the pipe require batter-boards, they shall be at least 1-inch by 6-inch supported on 2-inch by 4-inch stakes or approved metal rods and shall be placed every 25 feet. At least 3 boards must be in-place at any given time to facilitate checking of line and grade. Both line and grade shall be checked for each piece of pipe laid, except at tunnels where methods acceptable to Engineer shall be used to carry forward line and grade.

The practice of pushing in uncompacted backfill over a section of pipe to provide a platform for transit and level alignment and grade observations shall be subject to the approval of Engineer. If intermittent backfilling is allowed backfilling shall be accomplished in accordance with Division 200 - Earthwork.

Due to the flexibility of the CPEP, Contractor shall exert due care while placing bedding and/or filter material and compacting adjacent to and over the pipe. All placement bedding and/or filter material and compaction shall be as per the manufacturer's recommendations or as approved by Engineer.

Contractor shall exert due care in handling the precoated corrugated metal pipe or while placing bedding and/or filter material around the pipe so as not to damage the coating. Contractor shall obtain a liquid coating supplied by the precoated corrugated metal supplier which will be painted over scratched or cut sections of the pipe.

- C. Pipe Laying: All pipe shall be laid with Class A Material unless otherwise required by the Contract Documents or directed by Engineer.

Pipe laying shall in all cases proceed upgrade. Each pipe shall be laid true to line and grade and in such a manner as to form a close concentric joint with the adjoining pipe. The alignment of the installed pipe shall appear straight to visual observations and shall be such that a full circle of light can be seen between manholes, etc., when sighting along all points of the pipe circumference. Each section of pipe shall be handled carefully and placed accurately. Each section of pipe shall be properly supported to insure true alignment and an invert which is smooth and free from roughness or irregularity. On helical pipe, the laps shall not impede the flow and all seams shall be aligned uniformly for the length of the run. At all times, when work is not in progress, open ends of pipe and fittings shall be securely and satisfactorily closed so that no undesirable substances shall enter the pipe or fittings. All pipe shall be laid in accordance with the respective manufacturer's recommendations. Pipe shall not be laid when the bottom of the ditch or the sides to one foot above the pipe are frozen. Backfill containing frozen material shall not be placed, nor shall the trench be left open during freezing weather so that temperature of the material near the pipe goes below freezing.

Article 702.4 Measurement

Measurement for all sizes of pipe shall be based on the horizontal distances and shall be from center to center of manholes, from the center of manholes to center of catch basins, from center of manholes to center of cleanout wye, and from center of manhole to end of pipe including end sections.

Culvert connecting bands and bolts are considered incidental to this item of work. End sections shall be measured and paid separately.

Article 702.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
702(1_)	Furnish and Install (Size) CPEP, Type ____	Linear Foot
702(2_)	Furnish and Install (Size), Type ____ End Sections	Each

END OF SECTION 702

SECTION 703 FIN DRAINS AND SUBDRAINS

Article 703.1 Description

This work consists of furnishing and installing fin drains and subdrains.

Article 703.2 Material

- A. All pipe shall be in accordance with Section 702, Furnishing & Installing Pipe.
- B. Geocomposite drain vertical member manufactured from synthetic, nonbiodegradable material consisting of a structural core providing in-plane high flow capacity under cross-plane compressive stress with the following properties:

PROPERTY	TEST METHOD	REQUIREMENT
Thickness (cross-plane) 1.5 psi Loading	ASTM D 1777	3/16-inch Minimum
Crushing Strength (cross-plane)	ASTM D 1621	35 psi Minimum
Transmissivity (in-plane) 0.25 Drainage Gradient 15 psi Pressure	ASTM D 4716	8 Gal/Min/Ft. Minimum

- C. Subsurface Drainage geotextile meeting the requirements of Division 800 - Miscellaneous Earthwork, Section 808, Geotextile.

Article 703.3 Construction

Refer to the Standard Detail of these specifications for construction of fin drains and subdrains, respectively. Each phase of construction shall be accomplished in accordance with the applicable Sections of these Specifications. Excavation and backfill for furnishing and installing of subdrains shall be in accordance with Division 200 - Earthwork.

Where fin drain is to be installed on slopes, it may be necessary to adjust the location of the fin drain to better fit actual conditions. The slopes shall be reviewed by Engineer prior to installation and necessary adjustments made prior to Contractor installing the fin drain.

The geocomposite drain and the perforated pipe shall be totally enclosed in drainage geotextile and shall be installed in accordance with the manufacturer's recommendation.

Article 703.4 Measurement

Measurement for all sizes of fin drain shall be based on the horizontal distances and shall be from center to center of manholes, from the center of manholes to center of catch basins, from center of manholes to center of cleanout wye, and from center of manhole to end of pipe including flared end sections.

Pipe to daylight the fin drain using non-perforated corrugated polyethylene pipe will be measured per lineal foot of pipe. This is not intended to include other storm drain or culvert systems that the fin drain connects to and is being paid for under other Bid Items.

If filter material (aggregate) is specified as part of the subdrain, then measurement of the subdrain includes the filter material and no separate payment will be made.

Article 703.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment for fin drains shall include trench excavation and backfill, furnishing and installing pipe, geocomposite drain, furnishing and placing filter material and subsurface drainage geotextile.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
703(1)	Fin Drain	Linear Foot
703(2)	Subdrain	Linear Foot

END OF SECTION 703

SECTION 704 MANHOLES AND CATCH BASIN

Article 704.1 Description

This work consists of furnishing and installing storm drain manholes and catch basins complete with frames and covers.

Article 704.2 Material

- A. Frames and Covers: The requirement for tensile strength of the gray cast iron shall be 30,000 PSI minimum in accordance with the requirements of ASTM A-48 and the requirement for transverse breaking load shall be 2,000 pounds in accordance with the requirements of ASTM A-438. Contact surfaces between frames and covers shall conform to the Standard Details of these Specifications. Catch basin castings shall be in accordance with the Standard Details of these Specifications.
- B. Watertight frames and covers for manholes and similar appurtenances shall be of cast iron and conform to the dimension shown in the Standard Details. The requirement for tensile strength of the gray iron shall be 30,000 psi minimum in accordance with the requirements of ASTM A 48 and the requirement for transverse breaking load shall be 2,000 pounds in accordance with the requirements of ASTM A 438. Contact surfaces between frames and covers shall be machined to provide a uniform contact surface. Manhole covers shall have identification letters as shown on the Standard Details.
- C. Reinforced Concrete Manholes: Material used in the construction of reinforced concrete manholes shall conform to the requirements of ASTM C-478 and the Standard Details of these Specifications. Cones shall be Type (B), eccentric, unless otherwise approved. Forty-eight-inch reinforced concrete pipe may be used for manhole riser sections as an alternate. This pipe shall conform to the requirements of ASTM C-76 with a minimum thickness of 5 inches.

Each precast concrete barrel section shall be set and sealed by use of a pre-molded plastic gasket pipe joint sealer which meets AASHTO M 198, ASTM C990 or Federal Specification SS S-210.

Cement for mortar used in the construction of manholes shall conform with the requirements of ASTM C-150, Type II. Sand shall conform with the requirements of AASHTO M-45. The mortar shall be composed of 1 part cement and 3 parts sand. The joints shall be constructed so as to produce a smooth, regular, watertight surface. Water shall be added in minimum amounts to provide plasticity in placing the mortar.

Refer to Division 304 - Portland Cement Concrete for Structures Specifications pertaining to concrete as required in forming manhole inverts.

- D. Corrugated Metal Pipe Manholes: Materials used in the construction of the Corrugated Metal Pipe Manholes shall conform to the applicable requirements of AASHTO M-36, AASHTO M-196, and Section 702, Furnish and Install Pipe, and in accordance with the

Article 704.3 Construction

- A. General: Excavation and backfill for the construction of storm drain manholes and catch basin manholes shall be in accordance with Division 200 - Earthwork.

All portions of the manholes must be approved by Engineer prior to installation in the storm drain system. Engineer must be notified at least 24 hours in advance of installation to allow time for inspection. Installation of manhole sections without Engineer's written approval shall not be allowed. This approval does not relieve Contractor of the responsibility for protection of manholes against damage during handling and installation.

The manhole frames and covers shall be brought to grades shown on the Drawings unless otherwise approved by Engineer. Manhole rings shall be set in a full bed of mortar and made secure.

Manholes shall be installed at the location shown on the Drawings and primary leads shall enter radially at the invert elevations specified. The base section shall be set plumb on a prepared surface.

Where indicated on the Drawings, a stub shall be provided for future connections to the manhole. The stub shall be sized and positioned as indicated. The end of the stub shall be stopped with a wooden plug, concrete biscuit, or other adequate methods to prevent water, earth or other substances from entering the pipe. Manholes up to 12 feet in depth shall have 9-foot stub-outs, over 12 feet in depth shall have 18-foot stub-outs.

In the case of poured-in-place manhole construction, if Contractor elects to accomplish the manhole construction utilizing more than one continuous concrete pour, a keyed construction joint shall be used. These manholes shall have poured-in-place bases. Precast concrete barrel sections shall be set and sealed with pre-molded plastic gasket. Pre-molded plastic gaskets for sealing pre-cast concrete barrel sections for manholes shall meet AASHTO M 198, ASTM C990, or Federal Specification SS S-210 and shall be installed in accordance with the manufacturer's recommendations. Gaskets shall be trimmed on the inside of the manhole to prevent the excess gasket material from entering the storm sewer lines.

- B. Storm Drain Manholes and Catch Basins: Storm drain manholes and catch basins shall be constructed in accordance with the Standard Details. With reinforced concrete manholes, after the mortar has firmly set, the pipe is to be cut off evenly so that not more than 2 inches of the pipe protrudes into the manhole.

Article 704.4 Measurement

Manholes and catch basin manholes shall be measured as units complete in-place.

Article 704.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Separate payment will not be allowed for frames and covers or watertight frames and covers but shall be included in the Unit Prices for manholes.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
704(1_)	Construct Storm Drain Manhole (Type)	Each
704(2_)	Construct Storm Drain Catch Basin	Each

END OF SECTION 704

SECTION 705 CONSTRUCT STORM DRAIN DROP CONNECTION

Article 705.1 Description

This work consists of furnishing and installing drop storm sewer connections to manholes.

Article 705.2 Material

Pipe and fittings used in the construction of drop connections for storm sewer shall conform to the requirements of Section 702, Furnish and Install Pipe, and the Standard Details.

Article 705.3 Construction

Excavation and backfill for the construction of drop storm drain sewer connection to manhole shall be in accordance with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Over-excavation under drop connection shall require compaction of not less than 95% of the maximum density prior to installation of the pipe and fittings, or the concrete cradle.

Refer to Division 300 - Portland Cement Concrete for Specifications pertaining to concrete as required in constructing drop connection.

Article 705.4 Measurement

Drop sewer connections shall be measured as units, complete in-place.

Article 705.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
705(1)	Construction Storm Drain Drop Connection	Each

END OF SECTION 705

SECTION 706 STORM DRAIN CLEANOUT

Article 706.1 Description

This work consists of furnishing and installing storm drain cleanouts.

Article 706.2 Material

Materials used in the construction of storm drain cleanouts shall conform to the Standard Details of these Specifications.

Article 706.3 Construction

Excavation and backfill for the construction of storm drain cleanouts shall be in accordance to with Division 200 - Earthwork, Section 206, Trench Excavation and Backfill.

Article 706.4 Measurement

Cleanouts shall be measured as units, complete in-place.

Article 706.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
706(1)	Construct Storm Drain Cleanout	Each

END OF SECTION 706

SECTION 707 CONNECT TO EXISTING STORM DRAIN

Article 707.1 General

The Work under this section includes all material, labor, and equipment necessary for connection; of eight inch (8") CPEP Type C to the storm drain system.

Article 707.2 Material

Provide eight inch (8") CPEP (Type C) Pipe in conformance to Section 702, Furnish and Install Pipe.

Connect to the existing storm drain with a eight inch (8") tee, saddle, tapping pipe such as Inserta TEE made by inserta Fittings Co., or approved equal, of a type recommended by the pipe manufacturer and shall be secured with a double strap or a single stainless steel band of 2-1/2 inches or more in width.

Article 707.3 Construction

Excavation and backfill for the connection to existing storm drain is incidental to the bid item connect to existing storm drain. The number and approximate location of connections to existing storm drain are shown on the Drawings.

Article 707.4 Measurement

Connect to existing storm drain is measured as units complete in-place.

The Work under this Section includes all materials, equipment, and work required to connect to existing storm drain as indicated on the Drawings and in accordance with this Division and Division 200 – Earthwork. Materials, equipment, and Work considered incidental to Reconnect Footing Drain Service, shall include, but are not limited to the following:

Section 203 Excavation, Section 206 Trench Excavation and Backfill, Section 702 Furnish and Install Pipe, and Section 204 Classified Fill and Backfill.

Article 707.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
707(1)	Connect to Existing Storm Drain	Each

END OF SECTION 707

SECTION 708 CONNECTIONS TO EXISTING MANHOLES OR CATCH BASINS

Article 708.1 General

The Work under this Section consists of the performance of all operations pertaining to the construction required for connections to existing manholes or catch basins.

Article 708.2 Construction

Excavation and backfill for connections to existing manholes or catch basins shall be in accordance with Division 200, Section 206 - Trench Excavation and Backfill.

Connections to existing manholes or catch basins shall be made in a workmanlike manner. The invert shall be brought into the existing manhole at the elevation shown on the Drawings. The downstream pipe in manholes shall be screened to prevent entry of mortar or other debris from entering the system.

After connection is made to a storm drain manhole and the mortar holding the pipe in place has set, cut the pipe off evenly so that no more than two inches (2") of pipe protrudes into the manhole and any screening shall be removed.

Article 708.3 Measurement

Connection to existing manholes shall be measured as complete units in place.

Article 708.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
708(1)	Connect to Existing Storm Drain Manhole	Each
708(2)	Connect to Existing Storm Drain Catch Basin	Each

END OF SECTION 708

SECTION 709 ADJUST CATCH BASIN TO FINISH GRADE

Article 709.1 General

The Work under this Section consists of providing all operations pertaining to the adjustment of existing catch basins to finish grade.

Article 709.2 Material

All materials used in the adjustment of catch basins shall conform to the requirements for catch basins as outlined in Section 55.09 - Construct Catch Basin.

Article 709.3 Construction

Rotational as well as vertical displacement of the catch basin top and casting might occur. All adjustments will be accomplished as directed by Engineer. Any damage to catch basins resulting from construction under this Contract shall be repaired or the damaged portion replaced at Contractor's expense.

Grade adjustment rings must be set centered over the catch basin cone or lid opening with no lateral offset. No more than a one-quarter inch (1/4") lateral offset is permitted between grade adjustment rings. Total cumulative offset between grade adjustment rings shall not exceed one-half inch (1/2"). Catch basin frames shall be set centered on the opening with a maximum lateral offset of one-half inch (1/2") permitted.

Article 709.4 Measurement

Catch basin adjustments shall be measured as units, complete in place.

Article 709.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment shall be made under the following unit.

ITEM NO.	DESCRIPTION	UNIT
709(2)	Adjust Catch Basin to Finish Grade	Each

END OF SECTION 709

SECTION 710 CONSTRUCT OPEN DITCH

Article 710.1 General

The Work under this Section consists of the performance of all Work required for the excavation, embankment and spreading of material necessary to construct an open ditch.

Article 710.2 Construction

A. Excavation

Excavation shall be to the grade and ditch cross section shown on the Drawings. The final ditch shall have no projections of roots, stumps, rock or similar matter. Material hauled from the job site for disposal shall be paid for under Division 200, Section 209 - Disposal of Unusable or Surplus Material.

B. Embankment

Embankment shall be to the shape and at the location shown on the Drawing. The type of material utilized to construct ditch banks and dikes shall be as noted on the Drawing, or as approved by Engineer. If additional material is required for embankment, it will be paid for under Division 200 - Earthwork.

C. Stabilization

Open ditches with longitudinal slopes of 5 percent or greater shall be temporarily stabilized within 24 hours of establishing final grade until such time that permanent stabilization is achieved. Temporary stabilization shall consist of lining with a rolled erosion control product, plastic sheeting, non-erosive rock material with an average minimum size of 4 inches, or as approved by Engineer.

D. Cleanup

Contractor shall maintain the ditch and keep it open and free from all debris, as directed by Engineer until final acceptance.

Article 710.3 Measurement

Measurement for open ditch construction shall be per linear foot along the slope of the ditch.

Article 710.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment shall be made on the following basis:

ITEM NO.	DESCRIPTION	UNIT
710(1)	Construct Open Ditch	Linear Foot

END OF SECTION 710

SECTION 711 CULVERT

Article 711.1 General

The Work under this Section consists of the performance of all materials and operations required to furnish and install culverts.

Article 711.2 Construction

Excavation and backfill for furnishing and installing of culverts shall be in accordance with Division 200, Section 206 - Trench Excavation and Backfill.

Contractor shall furnish and install culverts as shown on the Drawings. The pipe shall be installed to the alignment and grades as required by the Drawings. Pipe materials shall meet the Specifications included in Section 501 - General and Section 502 - Furnish and Install Pipe, of this Division. The pipe shall be installed so that there is a minimum of twelve inches (12") of cover over the pipe before the placement of surfacing materials. Excavation, backfilling, compaction, and grading or ditching necessary to direct water into or out of the culvert, are incidental items and no separate payment shall be made.

Where additional backfill material is required, it shall be classified fill or backfill in accordance with Division 200, Section 204 – Classified Fill and Backfill and as directed by Engineer. Disposal of unusable material shall be paid under "Unusable Excavation" or "Disposal of Unsuitable or Surplus Material" as designated in the Bid Proposal.

Article 711.3 Measurement

Measurement of culverts shall be per linear foot along the slope of the pipe from end to end.

Article 711.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment shall be made on the following basis:

ITEM NO.	DESCRIPTION	UNIT
711(1)	Culvert (Pipe Size, Type, Gauge, Shape)	Linear Foot

END OF SECTION 711

SECTION 712 OIL AND GRIT SEPARATOR

Article 712.1 General

The Work under this section consists of performing all operations pertaining to constructing a storm drain oil and grit separator, complete with manhole structure, frames, covers, and diversion apparatus as shown on the Drawings, or as Engineer directs.

Article 712.2 Description

The oil and grit separator is a below-grade structure consisting of a prefabricated diversion apparatus fastened securely to the inside of a concrete storm drain manhole. The separator is designed to remove oil and sediment from stormwater and to bypass flows during peak events to prevent scour of accumulated sediment.

Contractor shall furnish and install an oil and grit separator, Stormceptor Model, manufactured by:

Rinker Materials/Stormceptor
800 NE Tenney Road, Suite 413
Vancouver, WA 98685
Phone: 503-572-9894
FAX: 503-296-2023

In State Contacts:
D & S Concrete, Inc.
2140 East Dimond Boulevard
Anchorage, AK 99507
Phone: 907-349-6031
FAX 907-349-4597

or an approved equal.

The Stormceptor must be sized appropriately to satisfy Alaska Department of Environmental Conservation stormwater treatment criteria.

Article 712.3 Materials

All excavation, backfill, and compaction required to install the oil and grit separator is incidental to this item. Contractor shall backfill the excavation with Classified Material, Type II. If foundation material is required, it will be paid under the bid item Classified Material, Type II.

The oil and grit separator shall conform to the requirements of Section 704 - Manholes and Catch Basin and the Drawings. The diversion apparatus shall conform to the requirements of the oil and grit separator manufacturer's specifications.

Article 712.4 Construction

Contractor shall install the separator in accordance with Section 704 - Manholes and Catch Basin and with the separator unit manufacturer's specifications.

Contractor shall backfill around the oil and grit separator with a minimum of three feet (3') Type II Classified Fill and Backfill to the full depth of the manhole, compacted in accordance with

Division 200, Section 204 - Classified Fill and Backfill. Classified Fill and Backfill is incidental to this pay item, and no separate payment shall be made.

Article 712.5 Measurement

Oil and grit separator is measured as a complete unit in place and shall include the concrete manhole, diversion apparatus, frames, covers, and classified backfill. All clearing and grubbing or excavation, and providing Type II Classified Fill and Backfill, disposal of unusable or unsuitable material necessary to construct the oil and grit separator, is incidental to this Work item. Foundation backfill, if required, will be paid pursuant to Division 200, Section 204 – Classified Fill and Backfill.

Article 712.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
712(1)	Oil and Grit Separator (Model #)	Each

END OF SECTION 712

CITY OF KODIAK
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 800

TABLE OF CONTENTS

DIVISION 800 – MISCELLANEOUS.....	1
SECTION 801 MOBILIZATION AND DEMOBILIZATION	1
SECTION 802 TRAFFIC MAINTENANCE	2
SECTION 803 EROSION AND POLLUTION CONTROL	15
SECTION 804 TEMPORARY EROSION AND POLLUTION CONTROL	21
SECTION 805 CONSTRUCTION SURVEYING	24
SECTION 806 STANDARD SIGNS	27
SECTION 807 INSULATION	35
SECTION 808 GEOTEXTILE	37
SECTION 809 TRAFFIC MARKINGS	41
SECTION 810 SEEDING.....	52
SECTION 811 TOPSOIL.....	56
SECTION 812 FENCE	59
SECTION 813 RECONSTRUCT MANHOLE.....	66
SECTION 814 ADJUST MANHOLE TO FINISH GRADE	68
SECTION 815 ADJUST VALVE BOX TO FINISH GRADE	69
SECTION 816 ADJUST CLEANOUT TO FINISH GRADE	70
SECTION 817 SOIL STABILIZATION.....	71
SECTION 818 RECONSTRUCT DRIVEWAY	74
SECTION 819 MODULAR BLOCK RETAINING WALL.....	76
SECTION 820 LANDSCAPING (TREES AND SHRUBS).....	79
SECTION 821 TEST PITS	89
SECTION 822 REMOVE GUARDRAIL	90
SECTION 823 GUARDRAIL	91

DIVISION 800 - MISCELLANEOUS

SECTION 801 MOBILIZATION AND DEMOBILIZATION

Article 801.1 Description

This work consists of preparatory work and operation, including but not limited to operations necessary to move personnel, equipment and other facilities; to perform all other work and operations, including costs incurred, before beginning work on the project; and to complete similar demobilization activities, including submittals such as as-builts, certificates, payrolls, equipment warranties, etc.

Article 801.2 Method of Measurement

- A. When you earn 4% of the original contract amount from other bid items: 40% of the amount Bid for mobilization and demobilization, or 4% of the original contract amount, whichever is less, will be paid.
- B. When you earn a total of 8% of the original Contract Amount from other bid items: An additional 40% of the amount Bid for mobilization and demobilization, or 4% of the original Contract Amount, whichever is less, will be paid.
- C. When the letter of project completion has been issued: An additional 15% of the amount Bid for mobilization and demobilization, or 1-1/2% of the original contract amount, whichever is less, will be paid.
- D. Any remaining balance of the amount Bid for this item will be paid after all submittals required under the Contract are received.

Article 801.3 Basis of Payment

Payment will be made at the Contract Price per unit of measurement for the Pay Item listed below that is included in the Bid Schedule, in partial payments as described above.

When Item 801(1), Mobilization and Demobilization does not appear in the Bid Schedule, mobilization and demobilization will be incidental.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
801(1)	Mobilization and Demobilization	Lump Sum

END OF SECTION 801

SECTION 802 TRAFFIC MAINTENANCE

Article 802.1 Description

This work consists of protecting and controlling traffic during the Contract. This work includes, but is not limited to, furnishing, erecting, maintaining, replacing, cleaning, moving, and removing the traffic control devices required to ensure the traveling public's safety. This work also includes all administrative responsibilities necessary to implement this work.

Maintain all roadways and pedestrian and bicycle facilities affected by the work in a smooth and passable condition. Construct and maintain approaches, crossings, intersections, and other necessary features throughout the project for the life of the Contract.

Article 802.2 Definitions

- A. ATM: When used in this Section, ATM stands for the Alaska Traffic Manual, which is the latest edition of the MUTCD with Alaska Supplement.
- B. ASDS: Alaska Sign Design Specifications Manual.
- C. Traffic: The movement of vehicles, pedestrians, and bicyclists through road construction, maintenance operations, utility work, or similar operations.
- D. Traffic Control Plan (TCP): A Drawing or Drawings indicating the method or scheme for safely guiding and protecting motorists, pedestrians, bicyclists, and workers in a traffic control zone. The TCP depicts the traffic control devices and their placement and times of use.

Article 802.3 Traffic Control Plan

Implement an approved TCP before beginning work within the project limits.

The TCP includes, but is not limited to, signs, barricades, cones, plastic safety fence, sequential arrow panels, portable changeable message board signs, special signs, warning lights, portable concrete barriers, crash cushions, flaggers, pilot cars, interim pavement markings, temporary lighting, temporary roadways, and all other items required to direct traffic through or around the traffic control zone according to these Specifications and the ATM. Address in the TCP's placement of traffic control devices, including location, spacing, size, mounting height, and type. Include code designation, size, and legend per the ATM and the ASDS.

When a TCP is included in the Drawings, use it, modify it, or design an alternative TCP. When a TCP is omitted from the Drawings, provide one according to this Section and the ATM.

Submit new or modified TCPs to Engineer for approval. Allow one week for Engineer to review any TCP or each subsequent correction. You may change an approved TCP during construction provided you allow 48 hours for review and Engineer approves the changes.

In all TCPs, Drawings, and Standard Drawings, show the minimum required number of traffic control devices. If unsafe conditions occur, Engineer may require additional traffic control devices.

Article 802.7 Materials

Provide materials for traffic control devices conforming to the following requirements:

- A. Signs: Permanent construction signs, construction signs, and special construction signs including sign supports shall conform to the requirements of Standard Signs, the Alaska Traffic manual, and the ASDS. The size of each special construction sign shall be clearly and neatly marked in 3-inch high black numerals on its back.
- B. Barricades and Vertical Panels: Use wood, metal, or plastic barricades and vertical panel supports that conform to the ATM. Use Type III Barricades at least 96 inches long.
- C. Portable Concrete Barriers: For each direction of traffic, equip barriers with at least 2 side-mounted retroreflective pavement marking tape mounted 6 inches below the top of the barrier. Use yellow reflectors or tape if you use barriers at centerline. Use white reflectors or tape if you use barriers on the roadway shoulder.
- D. Warning Lights: Use Type A (low intensity flashing), Type B (high intensity flashing) or Type C (steady burn) warning lights that conform to the ATM.
- E. Drums: Use plastic drums that conform to the requirements of the ATM.
- F. Traffic Cones and Tubular Markers: Use traffic cones and tubular markers that conform to the requirements of the ATM. Use traffic cones and tubular markers at least 28 inches high. Use only reflectorized cones and tubular markers.
- G. Interim Pavement Markings: Apply markings according to the manufacturer's recommendations. Use either:
 - 1. Paint conforming to one of the following:
 - a. AASHTO M 248, Type F (Alkyd Resin), or
 - b. FSS TT-P-19D(1) Paint, Latex (Acrylic Emulsion, Exterior).
 - 2. Beads conforming to AASHTO M 247 Type 1, with a moisture resistant coating.
 - 3. Preformed Marking Tape (removable or non-removable) conforming to Section 809, Traffic Markings, Article 809.2.C. Temporary Raised Pavement Markers for Short-Term Operations, Seal Coats, and Surface Treatments:
 - a. Marker: L-shaped polyurethane body with retroreflective tape on the top vertical section, with a self-adhesive base. Reflectorize both faces of the yellow marker and one face of the white marker. Make the marker body

of 1/16-inch minimum thickness polyurethane conforming to Table 802-1 with vertical leg approximately 2 inches high by 4 inches wide and base approximately 1-1/8-inch wide.

- b. Reflective Tape: Metallized polycarbonate microprism retroreflect material with acrylic backing or equal, a minimum 1/4-inch wide by 4 inches long. Provide the minimum optical performance shown in Table 802-2 for an observation angle of 0.2°.
- c. Protective Cover: Where chip seals, slurry seals, or tack coats are to be utilized after placement of the temporary raised pavement markers, furnish markers with a protective cover made of clear flexible polyvinyl chloride.
- d. Adhesive. Pressure-sensitive material, a minimum of 1/8-inch thick and 3/4-inch wide, factory-applied to the marker base with release paper.

TABLE 802-1

PROPERTY	RESULT	ASTM TEST METHOD
Specific Gravity	1.19	D 792
Hardness	80A	D 2240
Tensile Strength (Min. psi)	4600	D 412
Ultimate Elongation	330	D 412
Modulus @ 300% (Min. psi)	1000	D 412
Stiffness		
@ -20° F (Min. psi)	1700	D 1053
@ 72° F (Min. psi)	900	D 1053
Compression Set		
22 Hours @ 160° F Max %	65	D 395
Taber Abrasion CS17 Wheel Wt Loss mg/1,000 Cycles	3	----

TABLE 802-2

HORIZONTAL ENTRANCE ANGLE	SPECIFIC INTENSITY*	
	WHITE	YELLOW
0 Degrees	3.5	3.0
30 Degrees	2.7	1.7

* Candelas per footcandle of illumination at the reflector on a plane perpendicular to the incident light.

- H. High-Level Warning Devices: Use high-level warning devices that conform to the ATM.
- I. Temporary Crash Cushions: Provide temporary crash cushions that pass Test Level 3, National Cooperative Highway Research Program (NCHRP), Report 350. Provide the manufacturer's certification to Engineer. Do not use permanent crash cushions as temporary crash cushions. Use sand or water filled crash cushions only when the forecasted temperature during their use is above 40° F.
- J. Sequential Arrow Panels: Use Type A (2 feet x 4 feet), Type B (2.5 feet x 5.0 feet) or Type C (4 feet x 8 feet) panels that conform to the ATM.
- K. Portable - Changeable Message Board Signs:
 - 1. Message sign panel large enough to display 3 lines of 9 inch high characters.
 - 2. Eight character display per message line.
 - 3. Fully programmable message module.
 - 4. The capacity to create, preview, and display new messages and message sequences.
 - 5. A waterproof, lockable cover for the controller keyboard.
 - 6. An operator's manual, a service manual, and a wiring diagram.
 - 7. Quick release attachments on the display panel cover.
 - 8. Variable flash and sequence rates.
 - 9. Manual and automatic dimming capabilities on lamp bulb matrix models.
 - 10. Locate the bottom of the sign panel at least 7 feet above the pavement.
 - 11. Operate with a battery pack a minimum of 2 hours under full load.

- L. Plastic Safety Fence. Use one 4-foot high construction orange fence manufactured by one of the following companies, or an approved equal:
 - 1. “Safety Fence” by Services and Materials Company, Inc., 2200 South “J” S Street, Elwood, Indiana, 46036. Telephone (800) 428-8185.
 - 2. “Flexible Safety Fencing” by Carsonite, 1301 Hot Springs Road, Carson City, Nevada, 89706. Telephone (800) 648-7974.
 - 3. “Warning Barrier Fence” by Plastic Safety Systems, Inc., P.O. Box 20140, Cleveland, Ohio, 44120. Telephone (800) 662-6338.
- M. Temporary Sidewalk Surfacing: Provide temporary sidewalk surfacing as required by an approved TCP and the following:
 - 1. Use plywood at least 1/2-inch thick for areas continuously supported by subgrade. Use plywood at least 1-inch thick for areas that are not continuously supported.
 - 2. Do not use unsupported 1-inch plywood longer than 2-1/2 feet.
 - 3. Use plywood with regular surfaces. Do not overlap plywood joints higher than one inch.
 - 4. Use a method that will withstand 25 mph wind velocities to hold temporary surface in-place.
- N. Traffic cones, candles, drums, and delineators meeting requirements of American Traffic Safety Services Association (ATSSA).

Article 802.8 General Construction Requirements

Keep the work, and portions of the project affected by the work, in good condition to accommodate traffic safely. Provide and maintain traffic control devices and services inside and outside the project limits, day and night, to guide traffic safely.

Unless otherwise provided in this Section, keep all roadways, business accesses, and pedestrian facilities within the project limits open to traffic. Obtain Engineer’s approval before temporarily closing residential, commercial, or street approaches. Provide access through the project for emergency vehicles and school and transit buses. Properly sign and/or flag all locations where you must redirect or stop the traveling public.

Stop your equipment at all points of intersection with the traveling public unless an approved TCP shows otherwise.

Continue to operate all illumination and signalization. When moving approach lanes, realign signal heads as necessary according to the ATM. Coordinate any modifications to existing traffic signals with the agency that maintains and operates them. Operate flood lighting at night according to the ATM. Adjust flood lighting so that it does not shine into oncoming traffic.

Provide and maintain safe routes for pedestrians and bicyclists through or around traffic control zones at all times, except when regulations prohibit pedestrians or bicyclists.

Whenever construction activity encroaches onto the safe route in a traffic control zone, Contractor shall station a flagger at the encroachment to assist pedestrians and bicyclists past the construction activity.

Article 802.9 Roadway Characteristics During Construction

Obtain an approved TCP before reducing existing roadway lane and shoulder widths before starting construction. Maintain a clear area with at least 2 feet between the edge of traveled way and the work area. Use barricades, traffic cones, or drums to delineate this area. Place traffic control devices on the work side of the clear area. Space them according to the ATM.

If you are allowed to maintain traffic on an unpaved surface, conduct construction to provide a smooth and even surface that public traffic can use at all times. Properly crown the roadbed surface for drainage.

You may detour traffic when the Drawings or an approved TCP allows it. Maintain detour routes so that traffic can proceed safely. When detours are no longer required, obliterate the detour. Topsoil and seed appropriate areas.

If you cannot maintain 2-way traffic on the existing roadway or detour, you may use half-width construction or a road closure if it is shown on an approved TCP. Make sure the TCP indicates closure duration and conditions. Schedule roadway closures so you do not delay school buses and peak-hour traffic. For road closures, post closure-start and road-reopen times at the closure site, within view of waiting traffic.

Article 802.10 Public Notice

Make sure the Worksite Traffic Supervisor gives notices of major changes, delays, lane restrictions, or road closures to local officials and transportation organizations, including but not necessarily limited to:

- Alaska Carriers Association
- Alaska Trucking Associations
- Alaska State Troopers
- Local Police Department
- Local Fire Department
- Public Works Director
- School and Transit Authorities
- Local Emergency Medical Services

Provide the Alaska State Troopers, local police and fire department with the radio frequencies used on the project and the 24-hour telephone numbers of the Worksite Traffic Supervisor and the Project Superintendent. Tell them to use these numbers to alert you when emergency

vehicles must pass through the project. When notified of emergencies, use all equipment and make every necessary effort to expedite rapid passage.

Article 802.11 Traffic Control Devices

Before starting construction, erect permanent and temporary traffic control devices required by the approved TCPs. Use traffic control devices only when they are needed. Engineer will determine advisory speeds when necessary.

For lane closures on multilane roadways, use sequential arrow panels. During hours of darkness, when required by the approved TCP, use flashing warning lights to mark obstructions or hazards and steady-burn lights for channelization.

Use only one type of traffic control device in a continuous line of delineating devices, unless otherwise noted on an approved TCP. Use drums or Type II barricades for lane drop tapers.

During non-working hours and after completing a particular construction operation, remove all unnecessary traffic control devices. Store all unused traffic control devices in a designated storage area which does not present a nuisance of visual distraction to traffic. If sign panels are post mounted and cannot be readily removed, cover them entirely with either metal or plywood sheeting. Completely cover signal heads with bags.

Keep signs, drums, barricades, and other devices clean at all times.

Use only traffic control devices that meet the requirements of ATSSA "Quality Standard for Work Zone Traffic Control Devices."

Immediately replace any devices provided under this Section that are lost, stolen, destroyed, inoperable, or deemed unacceptable while used on the project. Stock repair parts for each Temporary Crash Cushion used on the project. Repair damaged crash cushions within 24 hours.

All items paid under this Section remain Contractor's property, unless stated otherwise. Remove them after completing the project.

- A. Embankments: Install portable concrete barrier, plastic drums, barricades, tubular markers, plastic safety fence, and cones, as specified on the Drawings or TCPs to delineate open trenches, ditches, other excavations, and hazardous areas when they exist along the roadway for more than one continuous work shift. Close trenches and excavations at the end of continuous work shift.
- B. Adjacent Travel Lane Paving: When paving is deeper than 2 inches, and you cannot finish paving adjacent travel lanes or paved shoulders to the same elevation before the end of the paving shift, install one of the following, as appropriate: CW24-1 (Uneven Lanes), CW8-9A (Low Shoulder), CW14-3 (No Passing Zone), R4-1 (Do Not Pass), and R4-2 (Pass With Care). If the section is longer than 1/2 mile, place additional signs every 1,500 feet.
- C. Fixed Objects: Use flashing warning lights on all vehicles when they are working within

15 feet of the edge of traveled way. Use emergency flashers, flashing strobes, or rotating beacons.

Locate private vehicles, idle construction equipment, construction material stockpiles and other items deemed by Engineer to be fixed objects at least 30 feet from the edge of traveled way at all times. Do not park equipment in medians.

If you cannot meet the preceding restrictions because of land features or lack of right-of-way, park equipment as far away as practical but at least 15 feet from the edge of traveled way, as approved by Engineer. Use drums or Type II barricades with flashing warning lights to delineate parked equipment. These traffic control devices are incidental.

- D. Flagging: Furnish trained and competent flaggers and all necessary equipment, including lighting of the flagging position during nighttime operations, to control traffic through the traffic control zone. Engineer will approve each flagging operation before it begins and direct adjustments as conditions change.

Flaggers must maintain their assigned posts at all times, unless another qualified flagger relieves them, or you no longer need to flag traffic. Remove, fully cover, or lay down flagger signs when no flagger is present. Keep the flaggers' area free of encumbrances, such as parked vehicles, so that flaggers can be seen easily.

Provide approved equipment for 2-way radio communications between flaggers when flaggers are not in plain, unobstructed view of each other.

- E. Street Sweeping and Power Brooming: Keep free of loose material all paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where our operations have deposited loose material. Use a street sweeper that can collect materials rather than eject them to the shoulder of the road.

- F. Watering: Furnish, haul, and place water for dust control and pavement flushing, as directed. Use water trucks that can provide a high-pressure water stream to flush the pavement and a light-water spray to control dust. If the flushing operations contaminate or fill adjacent catch basins, clean and restore them to their original condition. This requirement includes sections of roadway off the project where flushing is required. Engineer will control water application.

If you take water from a lake, stream, or other natural water body, first obtain a water removal permit from the Alaska Department of Natural Resources. Comply with the Alaska Department of Fish and Game screening requirements for all water removal operations.

- G. Portable Changeable Message Board Signs: Furnish Changeable Message Signs when approved on a TCP. Display only messages approved on the TCP. Follow application guidelines in the ATM.

Article 802.12 Authority of the Engineer

When Engineer believes existing conditions may adversely affect the traveling public's safety and/or convenience, you will receive a written notice. The notice will state the defect(s), the corrective action(s) required, and the specified time to complete such action(s). In no case shall this time exceed 24 hours. If you fail to take corrective action(s) within the specified time, Engineer will immediately close down the offending operations until you correct the defect(s). Engineer may require outside forces to correct unsafe conditions. The cost of work by outside forces will be deducted from any monies due under the terms of this Contract.

Article 802.16 Interim Pavement Markings

Place permanent or interim pavement markings according to this Article, details shown on the Drawings, and approved TCPs before opening existing paved roadways, temporary paved roadways, detours, interim paving lifts, and roadways with seal coats and surface treatments for more than one continuous work shift. This work may include restriping the existing roadway before beginning construction, before seasonal suspension, and/or after seasonal suspension.

Remove conflicting pavement markings.

Mark existing roadway sections that will be opened to traffic during the winter. Mark over the existing lines and markings, unless shown otherwise on the Drawings or an approved TCP.

Maintain all interim pavement markings for their intended life including re-application when necessary. There will be no compensation to upgrade interim pavement markings required for work operations lasting up to 2 weeks.

Use only temporary raised pavement markers or removable preformed retroreflective marking tape as interim pavement markings on final pavement surfaces. Completely remove and dispose of them when you place the final markings. Completely remove any residual adhesive that might misguide motorists. Place final pavement markings on finished pavement surfaces and interim pavement surfaces before suspending work for the winter.

Stage construction so that you do not route traffic over conflicting markings for more than one continuous work shift. If you route traffic over conflicting markings during a work shift, delineate the roadway with a complement of warning signs, channelizing devices, and flaggers as required by the ATM.

Use only temporary raised pavement markers as interim markings on seal coat and surface treatment pavements. Install the markers according to the manufacturer's instructions before applying the asphalt surface material and cover coat. Remove the vinyl protective covers after applying the asphalt pavement.

On multicourse surface treatments, install the temporary raised pavement markers after applying the full width of the first layer of cover coat. Install the markers on each day's completed surface before removing the pilot car operations and allowing unescorted traffic on the surface treatment.

Article 802.17 Method of Measurement

Quantities will not be measured during winter suspension of work.

- A. Traffic Maintenance: By the calendar day or Lump Sum. This item consists of all labor, materials, and equipment required to provide the Worksite Traffic Supervisor, all required TCPs and public notices, the Construction Phasing Plan and maintenance of all roadways, approaches, crossings, intersections, and pedestrian and bicycle facilities, as required. This item also includes any Traffic Control Devices required.
- B. Traffic Control Device Items: By the number of units of each in the Traffic Control Rate Schedule that is installed and accepted in-place.

Special Construction Signs. By the total area of legend-bearing sign panel. Warning lights, high-level warning devices, vertical panels, and sign supports required for individual traffic control devices including flaggers' paddles, are incidental to their respective Bid items. If a required incidental item is not installed and operational on a traffic control device, the device is not measured.

- C. Portable Concrete Barrier: By each nominal 10-foot section placed to protect or channelize traffic as specified on the approved TCPs. Each transition piece (sloping end) will be measured as a single section. For the initial placement and each subsequent relocation when moved more than 10 feet in any direction.
- D. Temporary Crash Cushions: By each installation. Repair of temporary crash cushions is incidental.
- E. Interim Pavement Markings: By the single-stripe station. A single stripe is a marking or a temporary raised pavement marker 4 inches wide. Wider striping is measured in multiples of 4 inches. Centerline gaps are not deducted from measurements.
- F. Flagging and Pilot Car: By the hour for the actual number of hours supported by certified payroll and approved by Engineer. Transportation to and from the worksite is incidental.
- G. Street Sweeping and Power Brooming: By the hour for the actual number of hours supported by certified payroll and approved by Engineer. Time required to empty the sweeper is incidental.
- H. Watering: By the 1,000-gallon of water applied. Engineer will specify measurement by weight or volume. If by weight, weight is converted to gallons at 8.34 pounds per gallon. If by volume, volume is converted to gallons at 7.48 gallons per cubic foot.
- I. Portable Changeable Message Board Signs: By the calendar day for each sign, as shown on an approved TCP and displaying an approved message.
- J. Plastic Safety Fence: By the linear foot, as placed, to protect or channelize pedestrian traffic as shown on an approved TCP. Payment will be made for the initial placement.

Any adjustments in configuration of the fence at the same location that does not result in an increased amount of fence is not measured. Opening and closing the fence to gain access to and from the worksite is not measured.

- K. Temporary Sidewalk Surfacing: By the square yard as shown on an approved TCP.
- L. No measurement required to provide a 24-hour toll free (1-800-###-####) "hotline road report" telephone with a prerecorded message, and weekly notices with daily updates. All work will be incidental to Item 802(1) or 802(2), Traffic Maintenance.

Article 802.18 Basis of Payment

Items required by this Specification that are not included on a unit price basis on the Bid Schedule or not included in other items are incidental to Item 802(1) or 802(2) Traffic Maintenance, except the following:

Traffic Price Adjustment

Item 802(6), Traffic Control, will be paid on a contingent sum basis at the unit rate value contained in the following Traffic Control Rate Schedule unless otherwise provided.

Engineer does not require a change order/directive for Item 802(6) Traffic Control.

TRAFFIC CONTROL RATE SCHEDULE

TRAFFIC CONTROL DEVICE	PAY UNIT	UNIT RATE
Construction Signs	Each/Day	\$ 6.50
Special Construction Sign	Square Foot	\$28.00
Type II Barricade	Each/Day	\$ 3.30
Type III Barricade	Each/Day	\$ 11.00
Traffic Cone or Tubular Marker	Each/Day	\$ 1.10
Drums	Each/Day	\$ 3.30
Sequential Arrow Panel	Each/Day	\$55.00
Portable Concrete Barrier	Each	\$80.00
Temporary Crash Cushion/Redirective	Each	\$2,500.00
Pilot Car	Hour	\$73.00
Watering	M Gallon	\$25.00
Street Sweeping	Hour	\$175.00
Plastic Safety Fence	Foot	\$ 1.00
Portable Changeable Message Board Sign	Calendar Day	\$130.00
Temporary Sidewalk Surfacing	Square Yard	\$18.00
Flexible Markers	Each	\$60.00
Removal of Pavement Markings	Lineal Foot	\$ 1.25
Interim Pavement Markings		
Painted Markings	Station	\$ 30.00
Removable Preformed Markings	Station	\$130.00
Temporary Raised Pavement	Station	\$15.00
Markings		
Word or Symbol Markings	Each	\$ 40.00

The Bid Schedule will reflect a contingent sum amount to provide adequate traffic control for the project.

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
802(1)	Traffic Maintenance	Calendar Day
802(2)	Traffic Maintenance	Lump Sum
802(3)	Permanent Construction Signs	Lump Sum
802(4)	Special Construction Signs	Square Foot
802(5)	Flagging	Hour
802(6)	Traffic Control	Contingent Sum

END OF SECTION 802

SECTION 803 EROSION AND POLLUTION CONTROL

Article 803.1 Description

This work consists of planning, providing, and maintaining control of erosion, water pollution, and hazardous materials contamination on projects that result in a total land disturbance of equal to or greater than 1 acre.

This work shall also include installation of silt fences as shown on the Drawings or as directed by Engineer.

Article 803.2 Definitions

- A. Erosion and Sediment Control Plan (ESCP): The City's general plan for the permanent and temporary control of erosion and sedimentation during construction of the project as contained in the Drawings and Specifications, and supplemented by the State of Alaska Guide to Preparing Erosion Prevention and Sediment Control Plans and Best Management Practices for Construction Erosion and Sediment Control. The City has prepared the ESCP and it is attached in the Special Provisions Appendix "Permits".
- B. Storm Water Pollution Prevention Plan (SWPPP): The detailed site-specific Plan prepared by Contractor for the temporary and permanent control of erosion and sedimentation during construction of the project. The SWPPP is based upon the ESCP, according to guidance provided in the Alaska Pollutant Discharge Elimination System Construction General Permit for Storm Water Discharges from Construction Sites (APDES CGP) administered by the Alaska Department of Environmental Conservation (ADEC).
- C. Hazardous Material Control Plan (HMCP): Contractor's Detailed Plan for the prevention, containment, cleanup, and disposal of hazardous waste material, including petroleum products generated by construction equipment or activities. Included in the HMCP is a list of quantities and types of equipment and materials available on the site where hazardous substances are stored. The Plan also describes how and where Contractor will carry out and control construction equipment fueling and maintenance activities.
- D. Electronic Notice of Intent (eNOI) to utilize the APDES CGP for Alaska. This is an electronic entry process submitted through the ADEC website giving notice to the ADEC that Contractor will conduct the work in compliance with the APDES CGP. The APDES CGP authorizes discharges of storm water from construction activities. Contractor prepares the eNOI, and submits it to the ADEC upon approval of the City for approval.
- E. Electronic Notice of Termination (eNOT) of coverage under the APDES CGP for Alaska. This is an electronic entry process submitted through the ADEC website that constitutes notice that Contractor has stabilized the project site or when an Operator of a construction activity, as defined in the APDES CGP, changes. Contractor prepares the eNOT, and submits it to the ADEC once final stabilization of the project site has been completed. Contractor shall notify Engineer of intent to file eNOT prior to submitting to the ADEC.

- F. Final Stabilization is when all soil disturbing activities at the site have been completed and Contractor has established a uniform perennial vegetative cover, with a density of 70% of the preconstruction cover for unpaved areas not covered by permanent structures, or Contractor has employed equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles). Engineer determines when final stabilization has occurred.
- G. Project Summary is a brief description of the activities covered under the APDES CGP. This shall be on a single sheet and shall describe the areas that Contractor will disturb to the nearest acre, the primary pollutants expected from the activities, and the type of treatment Contractor will provide.
- H. Best Management Practices (BMP) is defined as any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution.

Article 803.3 Submittals

Submit the following items for approval a minimum of 5 days prior to the preconstruction conference:

- A. Draft Storm Water Pollution Prevention Plan (SWPPP).
- B. Hazardous Material Control Plan (HMCP).
- C. Electronic Notice of Intent (eNOI).
- D. Project Summary.

Engineer will review submittals within 14 calendar days. If required for approval, modify the submittals within 5 calendar days of receiving comments from Engineer.

The SWPPP shall be prepared and stamped by a professional Engineer currently registered in the State of Alaska. The City will review the draft SWPPP, and either approve it, or recommend changes. Make all necessary revisions to obtain the City's approval of the SWPPP. The approved SWPPP becomes the project SWPPP and Contractor and the City shall sign and certify it in accordance with the APDES CGP.

Implement all measures in the SWPPP and ensure that it remains current.

Once Engineer approves the SWPPP, Engineer will submit the City's eNOI to the ADEC electronically through the ADEC website. Do not begin earth disturbing work until the following 2 items have been received in writing:

- 1. City approval of the SWPPP
- 2. Verification that 7 calendar days have passed since Engineer submitted the eNOI to the ADEC and the eNOI was posted to the ADEC website.

Post the following at the construction site:

1. APDES Permit number if available.
2. Name and telephone number of Contractor's local contact person.
3. Project Summary.
4. The location of a SWPPP available for viewing by the public.

Amend the SWPPP within 7 days, when requested by Engineer.

Prior to project closeout and demobilization, Contractor and Engineer shall review the project to determine if all areas disturbed by construction meet the requirements for final stabilization. When final stabilization has been accomplished, submit a request to Engineer to submit the eNOT to the ADEC website.

Article 803.4 Storm Water Pollution Prevention Plan

Prepare a SWPPP that covers all ground disturbing activities designated by the Contract including off-site support activities. Examples of support activities are concrete or asphalt batch plants, equipment staging yards, overburden and material stockpiles, excavated material disposal areas, borrow areas, etc., activities only for that permitted project. In contrast, the definition of commercial operations that the SWPPP cannot cover under this permit, are those operations that serve multiple unrelated projects and would continue to operate after project completion.

A detailed description of the required contents of the SWPPP is found in the 2011 APDES CGP for construction activities in Alaska. The SWPPP shall follow the format presented in the APDES CGP and address all storm water discharge control and management issues identified in the ESCP.

Article 803.5 Hazardous Material Control Plan Requirements

Comply with all state and federal regulations that pertain to the handling, storage, cleanup, and disposal of petroleum products or other hazardous substances. Prepare the HMCP detailing a Fueling and Maintenance Plan for equipment and machinery. Identify locations where fueling and maintenance activities are to take place, and any controls to contain the accidental spillage of petroleum products. Provide a list and estimate quantities in the HMCP of potentially hazardous materials, including petroleum products that shall be used and/or stored on the site. Identify a Plan for the disposal of waste petroleum products and/or other hazardous wastes generated by the project in the HMCP. Additionally, detail a Plan for prevention, containment, cleanup and disposal of soil and water contaminated by accidental spills, and a Plan for encountering unexpected contaminated soil and water during construction in the HMCP.

Article 803.6 Materials

Accomplish erosion and pollution control measures utilizing BMP as specified in the SWPPP and HMCP. Undertake ground disturbing activities after the seeding deadline only under the following conditions:

- A. The SWPPP describes the actions to be taken to control storm water runoff after the seeding deadline.
- B. Personnel, materials, and equipment are on hand to accomplish the control measures identified in the SWPPP.
- C. Stabilize all disturbed areas against erosion within 14 days of the temporary or permanent cessation of work on the slopes. Stabilization practices may include mulching, geotextile, sod, covering with sheet plastic, or other equivalent measures.

The silt fence filtration material shall meet the requirements of Section 808, Geotextile.

The silt fence support framework shall be finished 2-inch x 4-inch wood, 6-inch diameter wood, No. 6 rebar with PVC sleeves, iron pipe, or other posts capable of supporting the installation, as approved by Engineer.

The mesh support shall be WWF 6x6 W1xW1 or as approved by Engineer.

Article 803.7 Construction Requirements

Comply with all requirements of the APDES CGP for Alaska, and implement all temporary and permanent measures identified in the SWPPP and Drawings until Engineer has submitted the eNOT to the ADEC. The City and Contractor shall share responsibility for inspecting, and Contractor's representative shall prepare inspection reports per the requirements of the APDES CGP. Compliance with the APDES CGP does not reduce Engineer's authority to direct additional erosion control measures deemed appropriate. The City reserves the right to hire another Contractor to perform this work if Contractor is unresponsive or Engineer cannot reach a suitable agreement with Contractor.

Prior to the start of construction, Contractor, his representative, the professional Engineer who stamped the SWPPP, and Engineer shall have an on-site inspection to discuss the SWPPP implementation.

Contractor shall be responsible for the containment, cleanup, and disposal of all construction related discharges of petroleum fuels, oil, and/or other substances hazardous to the land and water. Contractor shall also be responsible for performing all fueling operations in a safe and environmentally responsible manner. Performance of this activity shall comply with the requirements of 18 AAC 75 and Title 46 of the Alaska Statutes.

Silt fences shall be installed prior to any work in or near the locations shown on the Drawings. Install additional silt fencing at other sites as directed by Engineer.

Do not remove the silt fence until the slopes have been stabilized from further erosion as determined by Engineer. Remove and dispose of the silt fence off the project. Cut the fabric off at ground level and remove the wire and posts. Do not discharge silt into the wetlands or water bodies when removing the silt fence. If sediment height in excess of 4 inches above ground remains, spread the sediment on the roadway side of the fence location and seed immediately in accordance with Section 618, Seeding.

Article 803.8 Method of Measurement

Item 803(1), Erosion and Pollution Control Administration, will not be measured for payment. Engineer's acceptance will constitute measurement.

Item 803(2), Erosion and Pollution Control, will be measured in the manner specified in the directive authorizing the work.

Item 803(3), Silt Fence, will be measured by the linear foot along the top of the fence.

Article 803.9 Basis of Payment

Item 803(1), Erosion and Pollution Control Administration, will be full compensation for administration of erosion control including Drawing preparation and amendments, inspection, monitoring, reporting and record keeping.

Item 803(2), Erosion and Pollution Control, will be full compensation for providing all labor, equipment, and materials required to accomplish the work, as specified in the directive authorizing the work.

Item 803(3), Silt Fence, will be full compensation for all labor, equipment and materials required to furnish, install, maintain and remove the silt fence in accordance with these Specifications.

Failure to perform the following items diligently: 1) pursue work required by the approved SWPPP, 2) respond to inspection recommendations and/or deficiencies in the SWPPP, and 3) implement erosion and sedimentation controls identified by Engineer, will result in a permanent Price Adjustment under Item 803(4). If Contractor does not respond within 2 hours of Engineer's directive, then an amount equal to 5% of the total amount earned from all previous and subsequent progress payments on the Contract or \$50,000 whichever is greater, will be withheld, and a permanent Price Adjustment made equivalent to:

- A. \$500 per hour for the first 4 hours of non-action;
- B. \$1,000 per hour for every hour over 4, but less than 10; and
- C. \$1,500 per hour for every hour over 10 hours of non-action.

The Price Adjustment will cease when Engineer has accepted corrective actions. The City reserves the right to hire another Contractor to do corrective action, and to reduce the Contract Amount by this cost plus the cost to the City implementing another Contract.

In addition, Engineer will make a Price Adjustment equivalent to any penalties levied against the City by the ADEC or any other state and/or federal agencies for violations of the Clean Water Act and the APDES CGP if the City is issued a Notice of Violation by these agencies. This Price Adjustment shall be the actual cost of any fines levied against the City. An amount equal to the maximum fine for the violation will be withheld temporarily until Engineer knows the actual cost of the fine. Engineer will release the difference, excluding any Price Adjustments upon satisfactory completion of the requirements of the APDES CGP. Contractor shall also be responsible for the payment of his own fines.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
803(1)	Stormwater Pollution Prevention Plan	Lump Sum

END OF SECTION 803

SECTION 804 TEMPORARY EROSION AND POLLUTION CONTROL

Article 804.1 Description

This work consists of temporary control measures as shown on the Drawings, or ordered during the life of the Contract, to control temporary erosion and water pollution on projects that disturb less than 1 acre. This work shall include preparation of a Temporary Erosion and Pollution Control (TEPC) Plan. Contractor shall conduct construction activities in accordance with the approved TEPC Plan.

Article 804.2 Temporary Erosion and Pollution Control Plan

At least 5 days prior to the preconstruction conference, Contractor shall submit for approval by the City, a TEPC Plan consisting of the following:

- A. Methods for clearing and grubbing.
- B. Plan for installation of temporary erosion and sediment control measures, in accordance with the State of Alaska Guide to Preparing Erosion Prevention and Sediment Control Plans and Best Management Practices for Construction Erosion and Sediment Control, including, but not limited to, the following:
 - 1. Excavation and embankment construction;
 - 2. Construction of temporary and permanent drainage features;
 - 3. Construction in and around water bodies and wetlands; and
 - 4. Haul roads and material sites.
 - 5. List of quantities, types and suppliers of materials to be used.
- C. Disposal of waste material.
- D. Containment, cleanup, and disposal of such substances, as well as the methods to be utilized for disposing of, petroleum products or other hazardous substances generated by construction equipment or activities. The Plan shall also include a list of the quantities and types of materials available on-site to be utilized for hazardous substance containment and cleanup activities.

The City will review the TEPC Plan for approval within 5 working days. If corrections or modifications are necessary to the Plan, the corrected Plan shall be resubmitted by Contractor within 5 days of receipt of the comments.

Article 804.3 Construction Requirements

Engineer shall limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and direct Contractor to provide immediate permanent or

temporary pollution control measures to prevent contamination of adjacent streams, lakes, ponds or other areas of water impoundment. As necessary, such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, seeding or other control devices or methods as necessary to control erosion. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage, that are needed prior to installation of permanent pollution control features, but are not associated with permanent control features on the project.

Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in his accepted schedule.

Cut slopes shall be seeded and mulched as the excavation proceeds to the extent considered desirable and practicable.

Where erosion is likely to be a problem, clearing and grubbing operations shall be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise temporary erosion control measures may be required between successive construction stages. The surface area of erodible earth material exposed at one time by clearing and grubbing shall not exceed 5 acres without written approval.

Engineer shall limit the area of excavation, borrow and embankment operations in progress commensurate with Contractor's capability and progress in keeping the finish grading, mulching, seeding and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event of conflict between these requirements and pollution control laws, rules or regulations of other federal or state or local agencies, the more restrictive laws, rules or regulations shall apply.

Contractor shall be responsible for the containment, cleanup, and disposal of all construction-related discharges of petroleum fuels, oil, and/or other substances hazardous to the land and water. Performance of this activity shall comply with the requirements of 18 AAC 75 and Title 46 of the Alaska Statutes.

Article 804.4 Method of Measurement

The method of measurement shall be as specified in the order authorizing the work.

Article 804.5 Basis of Payment

Temporary erosion and pollution control work required, which is not attributed to Contractor's negligence, carelessness or failure to install permanent controls, will be paid for as specified in the order authorizing the work.

In the event that temporary erosion and pollution control measures are required due to Contractor's negligence, carelessness or failure to install permanent controls as a part of the

work as scheduled and as ordered, such work shall be performed by Contractor at his own expense.

In case of repeated failures on the part of Contractor to control erosion, pollution and/or siltation, Engineer reserves the right to employ outside assistance or to use his own forces to provide the necessary corrective measures. Such incurred direct costs plus project engineering costs will be charged to Contractor and appropriate deductions made from Contractor's monthly progress estimate.

Temporary pollution control may include construction work outside the right-of-way where such work is necessary as a result of roadway construction. Temporary erosion and pollution control in connection with Contractor furnished material sources shall be at the expense of Contractor.

The erosion control features installed by Contractor shall be acceptably maintained by Contractor.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
804(1)	Temporary Erosion and Pollution Control	Contingent Sum

END OF SECTION 804

SECTION 805 CONSTRUCTION SURVEYING

Article 805.1 Description

This work consists of all surveying and staking essential for completion of the project and performing the necessary calculations required to accomplish the work in conformance with the Drawings and Specifications and standard engineering practice.

Preserve and restore land monuments and property corners which are within the project limits.

Furnish and install survey monuments and monument cases in conformance with the Drawings or as directed.

Adjust existing monuments and monument cases to conform to the new elevations.

Article 805.2 Project Control

All surveying involving property lines or monuments shall be done by, or under the direction of, a Registered Land Surveyor licensed in the State of Alaska.

Engineer may provide reference horizontal and vertical control to facilitate construction staking or Engineer may choose not to provide reference horizontal and vertical control on projects. Whichever the case, it is solely Contractor's responsibility to establish or check all survey control prior to starting any staking activity to ensure the project is properly located and constructed according to the construction documents. If discrepancies are found between the control and the construction documents, Contractor shall notify Engineer immediately.

A. Monumentation

1. General Description: A monument is defined as a relatively permanent material object used to physically mark a point on the earth which was determined by a land surveying process. The term monument will be deemed generic to identify public land corners, private property corners and public agency vertical and horizontal control networks. If a question arises as to the validity of a found object being a monument it should be submitted to Engineer for clarification prior to its disturbance or removal.
2. Existing Monuments Search: Prior to setting construction stakes or starting clearing and grubbing, a monument search shall be conducted. A record of which monuments were found and which ones were not found shall be certified by the Registered Surveyor and submitted to the Engineer. At the completion of ground disturbing activities, a second monument search will be performed and all monuments found on the preconstruction survey will be certified to be still undisturbed or to have been replaced. If the preconstruction survey is not performed as required there will be no payment on the construction survey item. If the post ground disturbing survey is not performed and all missing monuments replaced, the City, after first notifying the Contractor shall replace the missing

monuments and the invoice cost of this work plus a 25 percent management fee shall be deducted from payments to Contractor.

3. Set and File Record Of Monument: Monuments shall be set as shown on the Drawings. Primary monuments shall be permanently set according to the latest version of the Alaska Society of Professional Land Surveyors' *Standards of Practice Manual* and shall comply with AS 34.65.040. Proof of Recording shall be submitted to Engineer in the form of a copy of the Monument of Record bearing the State District Recorder's stamp.

Article 805.3 Cross Sections

Contractor shall perform all cross sections necessary for determination of excavation and fill or backfill quantities, including intermediate and/or remeasure cross sections as may be required. Cross sections shall be required before excavation activity begins unless otherwise specified. When clearing and grubbing is included in the Contract the original cross sections shall be taken immediately after grubbing is complete. The cross section data used to compute the pay quantities must be submitted to Engineer in electronic form on request. No payment will be made if Engineer determines that insufficient data was gathered to reasonably compute the pay quantities.

Article 805.4 As-Built Surveys and Record Drawings

As-built survey measurements shall be required for all constructed facilities and improvements which vary from the dimensions, lines, grades, locations, or materials as shown on the Drawings. As-built information shall be marked on a clean set of Drawings and be submitted to Engineer at the completion of construction activity. The Drawings shall be clearly stamped "Record Drawings". No final project payment will be made to Contractor until the Record Drawings have been submitted to and approved by Engineer.

Article 805.5 Method of Measurement

The method of measurement for surveying services shall be a Lump Sum cost item on the Bid Schedule. The Lump Sum cost for Construction Survey Measurement shall include all project control, project staking, monumentation, and quantities measurement for payment by Unit Price as required by the construction documents.

When the Bid Schedule contains an item, Three Person Survey Crew, the measurement will be the cost per hour for a crew. The item, Three Person Survey Crew, shall be used only for extra, additional, or unanticipated work required for changes in the project as directed by Engineer. If staking for extra or unanticipated work is performed by a 2-person survey crew, payment shall be made at 75% of the Bid Amount per hour of a 3-person crew. Additional survey requiring one person shall be paid at 45% of the Bid Amount per hour of a 3-person crew.

Office engineering and computer time required for survey calculations when required, is incidental to other survey work.

Article 805.16 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
805(1)	Construction Survey Measurement	Lump Sum
805(2)	Survey Monument Installed in Monument Case	Each
805(3)	Survey Monument Installed	Each
805(4)	Three Person Survey Crew	Hour
	END OF SECTION 805	

SECTION 806 STANDARD SIGNS

Article 806.1 Description

This work consists of furnishing and installing standard signs and delineators. The location and type of installation will be as shown on the Drawings or as designated. Work under this Section includes removing and relocating and removing and disposing of existing signs and markers.

Article 806.2 Materials

- A. Sheet Aluminum: Use alloy 6061-T6, 5052-H36, 5052-H38, or recycled aluminum meeting alloy 3105, as specified in ASTM B 209. Meet the thickness of aluminum sheet designated on the Drawings. Verify alloy and temper designations by mill certification.

Treat the aluminum base metal sheets with chromate conversion coating for aluminum conforming to the requirements of ASTM B 449, Class 2. Handle the cleaned and coated base metal only by a mechanical device or by operators wearing clean cotton or rubber gloves. After cleaning and coating operations, protect the panels at all times from contact or exposure to greases, oils, dust or other contaminants.

Make each sign panel a continuous sheet for all lengths 6 feet or less in the horizontal direction. Use no more than one vertical splice for signs up to 12 feet in length and 4 feet or less in height.

Meet the panel dimensions specified with a tolerance of 1/16-inch. Furnish metal panels that are cut to size and shape and free of buckles, warp, dents, cockles, burrs and any other defects resulting from fabrication. Complete all possible fabrication, including shearing, cutting, and punching of holes prior to the base metal preparation.

- B. High Density Overlaid Plywood: Construct plywood sign panels, for Construction and Maintenance Signs, of high density plywood, exterior type Grade B-C or better. Meet the requirements in "Products Standard PS 1-66 for Softwood Plywood, Construction and Industrial" published by the Products Standards Section of the U.S. Department of Commerce.

Use high density type overlay, with the following properties:

1. Minimum weight of 60 pounds per thousand square feet of surface.
2. Minimum thickness of 0.012-inch before pressing.
3. Contain a minimum resin content of 45% based on the dry weight of the impregnated fiber.
4. Contain sufficient resin content to bond itself to the plywood.

SINGLE PANEL SIGNS	THICKNESS, INCHES, MINIMUM
Up to and including 18 inches wide	3/8
Over 18 inches wide	1/2
Plywood shields on destinations signs	3/8
Multiple Panel Signs	5/8

Prime the sign back with one coat of white exterior enamel undercoat and finish with one coat of white exterior enamel. Use primer recommended by the supplier of the finish coat which is completely compatible.

Before applying reflective sheeting:

- a. Clean the surface thoroughly with lacquer thinner, heptane, benzene, or solvent recommended by sheeting manufacturer.
- b. Sand the surface with light sandpaper or steel wool and wipe dry and clean with clean cloth.

C. Reflective Sheeting: Meet AASHTO M 268, for the type specified.

D. Sign Posts: Use the type and size of posts designated on the Drawings.

1. Metal Pipe Posts

- a. Fabricated from steel pipe meeting the requirements of ASTM A 53 Standard Weight (Schedule 40) Type E or S, Grade B. Furnish square posts with 7/16-inch diameter holes drilled or punched as necessary to permit mounting of the sign.
- b. Hot dip galvanized in a manner conforming to AASHTO M 111 after fabrication. When cutting metal posts after hot dip galvanizing minimize damage to the zinc coating and protect all exposed surfaces by treating the exposed area.
- c. Repair galvanized surfaces that are abraded or damaged at any time after the application of the zinc coating meeting the applicable provisions of AASHTO M 36.

2. Perforated Steel Posts

- a. Meet the standard specification for cold-rolled carbon steel sheets commercial quality, ASTM A 653 and ASTM A 924. Fabricate posts with sheets of 12 gauge steel (0.105 inch) that are zinc coated, both sides in accordance with ASTM A 525, coating designation G 90. Form posts into a steel tube, roll to size, and weld in the corner.

- b. Perforate all members for their entire length with 7/16 (0.4375)-inch diameter holes on 1-inch center.
- c. Furnish members that are straight and with a smooth, uniform finish, with no splices.
- d. Ensure that all perforations and cut off ends are free from burrs.
- e. Ensure that consecutive sizes will telescope freely with a minimum of play.

3. Finished Wooden Posts

- a. Meet AASHTO M 168, except that sweep (circular deviation from a straight line) shall not exceed 0.08-foot in 10 feet.
- b. Pressure treat wooden posts with one of the following:
 - 1) Pentachlorophenol in light oil solvent
 - 2) Acid Copper Chromite
 - 3) Ammoniacal Copper Arsenate
 - 4) Chromated Copper Arsenate
 - 5) Chromated Zinc Arsenate
 - 6) Chromated Zinc Chloride
 - 7) Copperized Chromated Zinc Chloride

Use the methods specified in AASHTO M133 and Best Management Practices for the Use of Treated Wood in Aquatic Environments (BMPs), published by the Western Wood Preservers Institute, 601 Main Street, Suite 405, Vancouver, WA 98660 (Telephone: 800-279-9663), except do not incise lumber posts for signs. Meet the minimum retention of preservative specified for "Posts."

- c. Treat all field cuts and holes in wooden posts by thoroughly swabbing, spraying or brushing with 2 coats of the same type of preservative as initially used. Apply wood preservative when the moisture content of the wood is less than 25% and there is no free moisture on the surface. Protect posts treated during wet weather from moisture. Apply wood preservative with suitable brush or other means that will result in adequate penetration.

4. Wide Flange Posts

- a. Steel: Meet ASTM A 36.

- b. Hot dip galvanize in a manner conforming to AASHTO M 111 after fabrication. When cutting galvanized metal posts, minimize damage to the zinc coating and treat the exposed area as follows.
 - c. Repair galvanized surfaces that are abraded or damaged at any time after the application of the zinc coating in accordance with the applicable provisions of AASHTO M 36.
- 5. Flanged Channel Posts
 - a. Aluminum conforming to ASTM B 221, alloy 6061-T6.
 - b. Steel conforming to ASTM A 36.
 - c. Galvanize steel posts in accordance with AASHTO M 111.
- E. Delineator Posts: Durable plastic material conforming to the dimensions and colors shown on the Drawings. Resistant to ultraviolet light, ozone and hydrocarbon damage and remain flexible at a temperature of minus 40° F. Provide posts with reflectors that are capable of self-erecting and remaining serviceable after 5 head-on impacts at 55 mph and 10 impacts at 35 mph with an automobile at an air temperature of plus 40° F.
- F. Acrylic Prismatic Reflectors: Meet AASHTO M 290 and the dimensions and colors shown on the Drawings.
- G. Shop Drawings: Submit all signs that require the use of the Alaska Sign Design Specifications (ASDS) letter width and spacing charts for approval before fabrication. Submit 4 sets of collated shop drawings prepared according to Article 6.17 of the General Conditions. Show the following on each sign drawing:
 - 1. Dimensions of all horizontal and vertical characters and spaces
 - 2. Overall dimensions
 - 3. Sign material and sheeting material type
 - 4. Panel thickness
 - 5. Legend and letter series
 - 6. Whether the sign will be framed
- H. Sign Fabrication: Use Type III reflective sheeting (for lettering, symbols, borders, and background) on sheet aluminum panels for all signs except the following:
 - 1. Orange Background Signs: Use either Type II or Type III reflective sheeting on sheet aluminum, plastic, or plywood panels. Use sheet aluminum if the sign is for permanent installation.

2. Railroad Crossbucks and Vertical Crossbuck Support Panels: Use 3M “Dimond Grade VIP”, Stimsonite 6200, or approved equal on sheet aluminum panels.
3. Non-Illuminated Overhead Signs: Use 3M “Dimond Grade VIP”, Stimsonite 6200, or approved equal on sheet aluminum panels.

Use a manufacturer-recommended clear coat on all screened signs.

Use sign layouts (including characters, symbols, corner radii, and borders) that conform to the ASDS.

Frame all rectangular signs over 53 inches (measured along the horizontal axis) and all diamond shape signs 60 inches x 60 inches and larger. Construct the frames of aluminum as indicated on the Drawings.

- I. Sign Posts and Bases: Use sign posts and bases of the types specified. The structural aspects of design and materials for sign supports must comply with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Do not splice sign posts.

Use Class A concrete for steel-reinforced slip base and breakaway base foundations that conforms to the requirements of Division 300 - Portland Cement Concrete.

- J. Delineators: Use delineator assemblies that conform to the requirements shown on the Drawings. Fabricate flexible delineators using Type III, IV, or V Reflective Sheeting.

Article 806.3 Construction Requirements

- A. Place wooden posts in excavated holes to the depth shown on the Standard Drawing.
- B. Backfill the space around the posts in the holes to finish ground with selected earth or sand, free of rocks or deleterious material. Place backfill in layers approximately 6 inches to 12 inches thick and thoroughly compact it.
- C. Dispose of surplus excavated material neatly along the adjacent roadway as directed.
- D. Install flexible delineator posts according to the manufacturer’s recommendations.
- E. Attach sign panels to posts, electroliers, traffic signal standards, bridge rails, piers and abutments using the types and sizes of fastening hardware shown on the Drawings.
- F. If using existing signs and mileposts that are removed and relocated, ensure they conform to the details shown on the Drawings or as directed.
- G. Deliver all existing sign panels, posts, and hardware designated for salvage to the City Maintenance Yard as directed by Engineer or specified in the Drawings or Special Provisions. Replace all panels damaged by Contractor negligence at no additional cost to the City.

- H. All materials and finished signs are subject to inspection and acceptance in-place.
 - 1. Surfaces exposed to weathering must be free of defects in the coating that impair serviceability or detract from general appearance or color match.
 - 2. Finished signs must be clean and have no chatter marks, burrs, sharp edges, loose rivets, delaminated reflective sheeting, or aluminum marks. Do not make repairs to the face sheet.
- I. Install the various breakaway assemblies according to the manufacturer's written instructions.
- J. Secure the anchors in templates and install them according to the manufacturer's written instructions.
- K. Finish the foundation according to these tolerances:
 - 1. Do not use more than 2 shims per coupling.
 - 2. Do not use more than 3 shims to plumb each post.
- L. Remove and replace all foundations requiring more than 3 shims to plumb a post without extra compensation.
- M. Construct the top of any foundation located on a slope so that the finished slope passes through the center of the foundation. Grade the area 2-foot up and down slope of the foundation edge so that no portion of the foundation projects above the surrounding slope and water will drain away from the foundation.
- N. Attach a label to the back of all standard signs in the lower right corner. Make the label at least 16 square inches and specify the year the sign was purchased from the manufacturer. Show the last 2 digits of the year in clear and bold numbers. Manufacture the label from Type I or brighter reflective sheeting. Use background and legend colors conforming to Table 806.1

**TABLE 806.1
DECAL COLORS**

YEAR	BACKGROUND	LEGEND COLOR
XXX1	Yellow	Black
XXX2	Red	White
XXX3	Blue	White
XXX4	Green	White
XXX5	Brown	White
XXX6	Orange	Black
XXX7	Black	White
XXX8	White	Black
XXX9	Purple	White
XXX0	Strong Yellow-Green	Black

Central values and tolerance limits for each color, as referenced in the Manual of Urban Traffic Control Devices (MUTCD), are available from the Federal Highway Administration, (HHS-30), 400 7th St. SW, Washington, D.C. 20590

Article 806.4 Sign Placement and Installation

Sign locations are approximate and subject to field adjustment by Engineer.

Do not allow the top of the embedded steel tube to extend more than 2 inches above the surrounding ground and concrete foundation.

On all signs, install 2-inch diameter wind washer, colored to match the sign face, between the fastener head and the sign. Use rust-resistant washers fabricated from a material equal in strength to the sign blank.

Mount signs on mast arms level.

Bring existing signs that are to remain, into conformance with Standard Drawing S-05. Keep existing signs in service until they are no longer needed.

Article 806.5 Method of Measurement

- A. Standard Signs and Object Markers: By the total area of legend-bearing sign panel erected in place. No deductions in quantity for corner rounding will be made. Nominal dimensions for sign sizes indicated on the Drawings will be used to calculate sign pay quantities. Actual areas for signs will be measured, except octagons and round signs will be measured as rectangles. Only one side of each double-faced sign will be measured for

payment.

Posts, bases, and mounting hardware are considered incidental.

- B. Removal and Relocation: Per each sign, complete and accepted in final position.
- C. Delineators: Per each, complete in-place. A single delineator consists of one post equipped with 2 reflectors.
- D. Salvage Sign: Per each sign delivered to the Public Works Maintenance Yard, in acceptable condition.

When Pay Items 806(2), 806(3), and 806(6) do not appear on the Bid Schedule, this work is incidental to other 806 Items.

Article 806.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
806(1)	Standard Sign	Square Foot
806(2)	Remove and Relocate Existing Sign	Each
806(3)	Remove and Relocate Milepost	Each
806(4)	Delineator, Rigid	Each
806(5)	Delineator, Flexible	Each
806(6)	Salvage Sign	Each

END OF SECTION 806

SECTION 807 INSULATION

Article 807.1 Description

This work consists of providing all operations including labor and materials pertaining to placement of insulation. The insulation shall be an extruded or expanded polystyrene insulation board in conformance with the Drawings and these Specifications.

Article 807.2 Materials

The insulation boards shall conform to the requirements of AASHTO M 230, Type VI and have a maximum water absorption by weight of 10%, as determined by ASTM C272. The insulation board shall be rigid, homogeneous, and essentially unicellular.

Article 807.3 Construction Requirements

Prior to the placing of the insulation board, the area shall be bladed, shaped and compacted in accordance with Division 200, Earthwork. Place a sand blanket leveling course at least 2 inches thick. Each board shall be set accurately to the line and grade established and in such a manner as to insure its being held firmly in-place by driving a minimum of two 1/4-inch x 8-inch wood dowels per panel. Insulation shall be placed to the required thickness consisting of a minimum of 2 layers of insulation board. All joints between layers shall be staggered.

The insulation board shall be covered with approved material of 2-inch maximum size, end dumped in a 1-foot lift, and spread and compacted for the full width of the insulation layer prior to placing subsequent lifts. Spreading and compacting equipment shall be approved prior to its use.

Conventional construction equipment shall be allowed to operate on the compacted lift.

Article 807.4 Method of Measurement

The quantity to be paid will be the number of square feet of insulation board, including transitions, regardless of thickness, complete and accepted.

Article 807.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
807(1)	Insulation Board	Square Foot

END OF SECTION 807

SECTION 808 GEOTEXTILE

Article 808.1 General

This work consists of furnishing, placing, maintaining, and removing, separation reinforcement, subsurface drainage, erosion control and sediment control geotextile as shown in the Drawings or as directed.

Article 808.2 Materials

Separation: Meet AASHTO M288 for Separation (medium survivability), except that the minimum permittivity of the fabric shall be 0.05 sec^{-1} .

Reinforcement: Meet AASHTO M288 for Separation (high survivability), except that the minimum permittivity of the fabric shall be 0.08 sec^{-1} .

Subsurface Drainage: Meet AASHTO M288 for Subsurface Drainage, except that the minimum permittivity of the fabric shall be 0.1 sec^{-1} .

Erosion Control: Meet AASHTO M288 for Erosion Control, except that the minimum permittivity of the fabric shall be 0.1 sec^{-1} .

Sediment Control: Meet AASHTO M288 for Sediment Control, except the minimum permittivity of the fabric shall be 0.05 sec^{-1} .

Article 808.3 Construction

A. Geotextile for embankment separation and reinforcement.

1. Surface Preparation: Prepare the surface by removal of stumps, brush, boulders, and sharp objects. Fill holes and large ruts with material shown on the Drawings or as approved.
2. Geotextile Placement: Unroll geotextile directly onto the prepared surface. Stretch geotextile to remove any creases or wrinkles. Do not expose geotextiles to the elements for longer than 5 days after removal of protective covering.
 - a. Separation: Lay geotextile for embankment separation parallel to roadway centerline. On horizontal curves, place the fabric in segments with butt ends cut to match and sewn or overlapped. On tangents, straighten the geotextile and sew or overlap butt ends.
 - b. Reinforcement: Lay geotextile for embankment reinforcement perpendicular to the roadway centerline. Join segments by sewing or an approved bonding or attachment process.

3. **Joining:** Join geotextile for embankment separation by sewing or overlapping. Join geotextile for reinforcement by sewing. Use other attachment methods, if approved.
 - a. Sew seams with a Butterfly or J-Seam. Use a double-thread chain stitch (lock stitch). Bring adjacent sections of geotextile together and fold so that the stitching penetrates 4 layers of geotextile for the full seam length. Make the stitching line 13-inches (± 3 -inches) from the folded edge of the seam and at least 2-inches from the free edge of the geotextile. Illustrations showing correct stitch formation and seam configurations are provided in Figure 1.2 (page 21) of the FHWA publication, Geosynthetic Design & Construction Guidelines, FHWA-HI-95-038, May 1995.
 - b. Overlapped sections must overlap a minimum of 3 feet. Overlap successive geotextile sheets in the direction of flow so that the upstream sheet is placed over the downstream sheet and/or upslope over downslope. In trenches, where overlapped seams are constructed in the longitudinal trench direction, make the overlap equal to the width of the trench.
4. **Material Placing and Spreading:** Following placement of the geotextile on the prepared surface, place cover material of the type shown on the Drawings. Use methods for placing cover material which minimizes tearing and/or excessive stretching of the geotextile. In underwater applications place the geotextile and the required thickness of cover material in the same day. Maintain proper overlap and geotextile continuity. Maintain a minimum depth of 12 inches of cover material between the geotextile and the wheels or tracks of the construction equipment. Do not exceed the allowable drop heights for cover material shown in the following table.

INDIVIDUAL STONE MAX. WEIGHT (LB.)	ALLOWABLE DROP HEIGHT	
	UNPROTECTED GEOTEXTILE	PROTECTED GEOTEXTILE*
<5	3	3
5-25	0	3
>25	0	0**

* Protected geotextile is defined as having a gravelly covering (cushion layer) of 4 inches minimum thickness.

** If stones greater than 25 pounds must be dropped or if a height of drop greater than 3 feet is required, then perform field trials to determine the maximum height of safe drop without damaging the geotextile.

If sewn or bonded seams are used, place the cover material and spread in only one direction for the entire length of the geotextile. On weak subgrades spread the cover

material simultaneously with dumping to minimize the potential of a localized subgrade failure.

- B. Subsurface Drainage: In trenches, after placing the drain aggregate, fold the geotextile over the top of the aggregate to produce a minimum overlap of one foot, for trenches greater than 1-foot wide. In trenches less than 1-foot wide, make the overlap equal to the width of the trench. Then cover the geotextile with the subsequent course of material.
- C. Erosion Control: Place and anchor geotextile on the approved surface so it will not be torn or excessively stretched by placement of the overlying materials anchor the terminal ends of the geotextile using key trenches or aprons at the crest and toe of slope, as shown on the Drawings. Other temporary or permanent anchoring methods may be used, subject to approval.
- D. Sediment Control: Install geotextile on posts in a vertical position and support by a wire mesh fence or self-support system. Set at the height specified in the Contract. Secure the bottom 18 inches of the geotextile on the upslope side of the fence as shown on the Drawings. Backfill trench with tamped soil. Join adjacent sections of geotextile only at posts with a minimum of 6 inches overlap.
- E. Geotextile Repair
- F. Separation, Substance & Erosion: Overlay torn area with geotextile with a minimum 3-foot overlap around the edges of the torn area. Ensure that the patch remains in-place when material is placed over the affected area.
- G. Reinforcement: Sew or bond according to Joining above.

Article 808.4 Method of Measurement

Separation, Subsurface, & Erosion: By the square yard, in final position, determined by multiplying plan neat line width by the measured length parallel to installation centerline along the ground surface, for installation acceptably completed. No allowance will be made for overlap, whether at joints or patches.

Article 808.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
808(1)	Geotextile, Separation	Square Yard
808(2)	Geotextile, Reinforcement	Square Yard
808(3)	Geotextile, Subsurface	Square Yard
808(4)	Geotextile, Erosion Control	Square Yard
808(5)	Geotextile, Sediment Control	Square Yard

END OF SECTION 808

SECTION 809 TRAFFIC MARKINGS

Article 809.1 General

This work consists of furnishing and placing traffic markings. Perform all work according to these Specifications and the applicable portions of the ATM. Traffic markings shall be of the type, color, dimensions, and locations shown on the Drawings.

Article 809.2 Materials

Use materials that conform to the following:

- A. Traffic Paint: Use one of the following:
 - 1. AASHTO M 248, Type F (Alkyd Resin), or
 - 2. FSS TT-P-19D(1) Paint, Latex (Acrylic Emulsion, Exterior), or
 - 3. The current State of Alaska DOT&PF Maintenance Specification for pavement marking paint.
- B. Glass Beads: Meet AASHTO M247 Type I, with a moisture resistant coating.
- C. Preformed Pavement Marking:
 - 1. General Requirements
 - a. Reflectorized Plastic Pavement Markings and Legends: Furnish a pliant polymer or homogenous preformed ribbon 1/16-inch thick and of specified width, containing glass spheres uniformly distributed throughout the entire cross section. Furnish type that is designed to be inlaid on hot asphalt pavement or attached to existing bituminous pavement with a precoated pressure adhesive or liquid contact cement as herein specified.
 - b. Use legends and symbols conforming to the applicable shapes and sizes in the Alaska Traffic Manual and the Drawings.
 - c. Ensure that the plastic marker will mold itself to pavement contours, breaks, faults, etc. at normal pavement temperatures and fuse with itself and with previously applied markings of the same composition under normal conditions of use.
 - 2. Composition Requirements: Furnish marker with the following materials uniformly distributed throughout its cross-sectional area, and with a reflective layer of beads bonded to the top surface:

MATERIAL	COMPOSITION BY WEIGHT (MIN.)
Resins & Plasticizers	20%
Pigments	30%
Graded Glass Beads	25%

3. Physical Requirements:

- a. Tensile Strength: Minimum tensile strength of 100 psi when tested according to ASTM D 638.
- b. Plastic Pull Test: A test specimen made by cutting two 1-inch by 3-inch pieces of the plastic and attaching a 1-inch by 1-inch area at the end of each piece to the other, shall support a dead weight of 4 pounds for not less than 5 minutes at a temperature of between 68° F and 86° F.
- c. Pigmentation: Select and blend the pigments to provide a marking film which includes titanium dioxide for white markers and medium chrome yellow for yellow markers conforming to standard highway colors through the expected life of the film.
- d. Glass Beads: Colorless glass with a minimum index of refraction of 1.50 when tested using the liquid oil immersion method. Use beads of size and quality to meet the performance requirements for the plastic.
- e. Skid Resistance: meet a minimum skid resistance value of 40 BPN for the surface of the plastic using ASTM E 303.
- f. Reflectance: Meet the following initial minimum reflectance values for white and yellow films at 0.2° and 0.5° observation angles and 86.0° entrance angle using FSS FED-STD-370. The photometric quantity to be measured shall be specific luminance (SL), and shall be expressed as millicandelas per square foot per foot candle ($\text{med}^\circ \text{Ft}^{-2} \text{ }^\circ \text{fc}^{-1}$). The test distance shall be 50 feet and the sample size shall be a 24-inch x 30-inch rectangle.

The angular aperture of both the photoreceptor and light projector shall be 6 minutes of arc. The reference center shall be the geometric center of the sample, and the reference axis shall be taken perpendicular to the test sample.

	WHITE		YELLOW	
OBSERVATION ANGLE	0.2°	0.5°	0.2°	0.5°
SPECIFIC LUMINANCE	1,360	760	820	510

g. Reflectivity Retention Tests: Meet the following test requirements:

- 1) Taber Abraser Simulation Test: Using a taber abraser with an H-18 wheel and a 125-gram load, the sample shall be inspected at 50, 100, and 200 cycles, under a microscope, to observe the extent and type of bead failure.

No more than 10% of the beads shall be lost due to popout and the predominant mode of failure shall be “wear down” of the beads.

- 2) Qualitative Test: Bead bond strengths shall be judged under a microscope with a magnification of 5X. The beads, when removed, shall show a portion of the polymer bead bond retained with the beads.

h. Certification: In lieu of running the tests required by this Article, provide a certification from the manufacturer stating the product conforms to these requirements.

i. Effective Performance Life: Provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface remains stable.

The plastic shall be weather resistant and through normal traffic wear, shall show no appreciable fading, lifting, or shrinkage and shall show no significant tearing, roll back, or other signs of poor adhesion.

4. Application: Vendor shall furnish a mechanical applicator for the installation of a 4-inch wide pressure sensitive adhesive coated material. Mechanical applicator to be provided on location for the duration of the installation period.

D. Raised and Recessed Pavement Markers: Reflectors for both raised and recessed pavement markers shall consist of an acrylic plastic shell filled with tightly adherent potting compound. The shell shall contain 1 or 2 glass-covered prismatic reflective faces as called for on the Drawings to reflect incidental light from a single or opposite directions.

1. Shell: Molded Methyl Methacrylate conforming to ASTM D 788, Gr. 8.
2. Overall Dimensions: 4-inch x 4-inch x 3/4-inch.

3. Each reflective surface shall have a minimum area of 3 square inches and be located on a 30° angle from a horizontal plane.
4. The optical requirements of the reflective faces for an observation angle of 0.2° shall be not less than the following when the incident light is parallel to the base of the reflector:

HORIZONTAL ENTRANCE ANGLE	SPECIFIC INTENSITY*		
	WHITE	YELLOW	RED
0 Degrees	3	1.8	.75
20 Degrees	1.2	.72	.30

* Candelas per footcandle of illumination at the reflector on a plane perpendicular to the incident light.

5. Install the temporary raised pavement markers utilizing an approved raised pavement marker flexible bituminous adhesive.
6. The color of the raised pavement markers shall match the color of the marking for which they supplement, substitute, or serve as a positioning guide.
7. Filler shall be a potting compound selected for strength, resilience, and adhesion.

Thin, smooth, untempered glass shall be bonded to the prismatic reflective faces to provide an extremely hard and durable abrasion resistant surface.

Construct the iron casting for the raised pavement markers of modular iron conforming to ASTM A 536.

E. Methyl Methacrylate Pavement Markings

1. **Quality Requirements:** The markings shall be formulated and manufactured from new materials. It shall be free from defects and imperfections that might adversely affect the serviceability of the finished product. It shall be free from dirt and other foreign material and cure within the time specified to a tough serviceable film. Part "A" resin system shall be Methyl methacrylate based. Part "B" shall be either benzoyl peroxide powder for Type I or benzoyl peroxide in liquid plasticizer for all other types.

Submit a manufacturer certification for both the Methyl Methacrylate material and glass beads to ensure that the materials furnished conform to these Specifications.

2. Performance Properties

- a. No Track Time: Material shall be track free after 15 minutes when applied at 40 mils (ASTM D711).
- b. Hardness: Shore Durometer, A-1, 80 minimum after 24 hours.
- c. Tensile Strength: At break, minimum 125 psi (ASTM D 638M).
- d. Percent Elongation: Minimum 20% (ASTM D 638M).
- e. Water Absorption: Maximum 0.5% (ASTM D 570).
- f. Chemical Resistance: The material shall show no effect after 7-day immersion in anti-freeze, motor oil, diesel fuel, gasoline, calcium chloride, sodium chloride, or transmission fluid.
- g. Ultra-Violet Light: Ultra-violet light shall have no effect.
- h. Skid Resistance: Minimum 45 (ASTM E 303) in units (British pendulum).
- i. Reflectivity: 200 millicandella, minimum initial.
- j. Viscosity:

Spray Material: 5,000 - 12,000 cps (ASTM D 2196 Method B, LV Model, Spindle #4 at 60 RPM). Dura-Stripe Type V material or approved equal.

3. Composition: The composition is at the discretion of the manufacturer, but shall be essentially comprised of resins, reactive monomers, pigments, plasticizer, benzoyl peroxide, aggregate, and glass beads. When mixed in the stated ratio, the material shall cure to 99% minimum by weight and volume solids.

- F. Glass Beads for Methyl Methacrylate Pavement Markings: Meet the following requirements:

BEADGUN POSITION >	FRONT √	REAR √
GLASS TYPE >	1.5 RI*, Sinker	1.5 RI*, Floater
COATING >	Adhesion (ACO2)	Fluorocarbon
SIEVE SIZE	PERCENT PASSING BY WEIGHT √	PERCENT PASSING BY WEIGHT √
No. 16	100	100
No. 20	90-100	100
No. 30		75-95
No. 40	10-35	
No. 50	0-10	15-35
No. 80	0-5	
No. 100		0-15
DROP RATE #/ft³ >	65	40

*Refractive Index

Submit a manufacturer certification for both the Methyl Methacrylate material and glass beads to ensure that the materials furnished conform to these Specifications.

Article 809.3 Construction Requirements

Install interim pavement markings meeting Section 802 if permanent markings are not installed prior to opening the roadway to traffic.

A. Paint

1. Apply paint only to pavements that are clean, dry, and warmer than 40° F.
2. Remove all dirt, oil, grease, and other foreign matter from the surfaces to be painted in a satisfactory manner.
3. Apply the paint at the rate of 80 square feet per gallon (approximately 20 mils wet film thickness). This rate is effectively 22 gallons of paint per mile of solid 4-inch stripe. A tolerance not to exceed 10% will be allowed for film thickness or yield.
4. Apply glass beads over the wet painted stripes in a uniform pattern at the rate of 6 pounds of beads, plus or minus 0.1 pound, per 1 gallon of paint. Pressure-apply the beads using a mechanical dispenser mounted not more than 12 inches behind the paint dispenser.

5. Use equipment for highway lane striping that is specifically designed and manufactured for that purpose by a company experienced in the design and manufacture of such equipment. Minimum requirements include the capability of striping two 4-inch yellow centerlines and one 4-inch white edge line simultaneously. This equipment shall be approved by Engineer prior to use on the project. The markings shall have clear-cut edges, true and smooth alignment, and uniform film thickness.
- B. Preformed Marking Tapes (PMT): Apply the PMT material as directed by the manufacturer by either the inlay or overlay method. Use the inlay method whenever new asphalt concrete is placed. Use the overlay method to apply markings to existing pavement.

Store all PMT materials between 60°F and 80° F for at least 24 hours prior to installation. During installation, maintain field stockpiles at the required storage temperature.

For the inlay method, embed the pavement markings in the asphalt concrete surface with a conventional steel wheeled roller. The surface temperature of the mat shall be the warmest temperature possible without deforming the marking. The minimum allowable surface temperature, taken within 1/4-inch of the top of the mat, is 120° F.

If the application of the PMT materials falls behind the paving operation to the extent that the markings are not being applied at the minimum acceptable temperature, slow the paving operation to match the rate of the marking laydown. Resume full paving operations after demonstrating that you have sufficiently skilled personnel to install the markings within the required temperature limits.

When applying pavement markings by the overlay method, ensure the surface is clean and dry and is at least 60° F and rising. Broom the surface clean. Remove any dust using compressed air. Apply a coat of primer/adhesive activator according to the manufacturer's recommendations. Install and roll the markings with a minimum 200-pound pneumatic roller.

- C. Raised and Recessed Pavement Markers. Install raised and recessed pavement markers per the manufacturer's instructions.

Cut or dado the finished pavement surface with a concrete saw to produce a slot with dimensions as shown on the Drawings or recommended by the manufacturer. Clean and dry the slots using compressed air. Install a reflective marker of the color indicated with an epoxy adhesive recommended by the marker manufacturer.

- D. Methyl Methacrylate Pavement Markings: Prepare the roadway areas to receive Methyl Methacrylate pavement markings according to the manufacturer's recommendations. Clean, dry, and remove contaminants such as curing agents, surface oils, or existing road marking materials prior to applying pavement marking material. The surface temperature of the roadway shall be in the range of 32° F to 100° F for stripe application. Thoroughly dry the roadway surface. Do not apply striping to new asphalt until the asphalt has lowered to a temperature of 90° F behind the paver.

Apply Methyl Methacrylate marking material with equipment designed and capable of properly mixing at the point and time of application according to the manufacturer's recommendations.

Provide installation instructions for the Methyl Methacrylate markings a minimum of 15 days prior to application. Retain a copy of the instructions for use on the project.

Apply markings for lane lines, edge lines, and center lines at a thickness of 1/16-inch. The drop on rate of application shall be as specified in Article 809.2, Glass Beads for Methyl Methacrylate Pavement Markings. Measure Type V spray without glass beads. Tolerance is ± 4 mils. Measure the thickness utilizing a wet film thickness gauge. Collect a sample on a 6-inch x 12-inch flat sheet of 1/16-inch thick aluminum placed in the path of the striping guns. Take the sample without beads. Apply the glass beads for Type V sprayed material by double bead gun, one gun directly in front of the spray unit and another directly behind.

Apply transverse type Methyl Methacrylate pavement markings at a thickness of 1/8-inch. This includes crosswalks, stop bars, symbols, transverse markings between gore and channelization striping, and legend markings. Apply using Type V material, sprayed method. Apply Sinkers beads specified in Article 809.2, Glass Beads for Methyl Methacrylate Pavement Markings.

- E. Paint Removal: Remove all existing traffic markings that are in conflict with the striping details shown on the Drawings, an approved TCP, or any temporary striping as directed. Do not paint over existing markings.

Remove pavement markings to the fullest extent possible by any method that does not materially damage the surface or texture of the pavement or surfacing. As the work progresses, remove sand or other material deposited on the pavement as a result of removing traffic stripes and markings. Accumulations of sand or other material that might interfere with drainage or constitute a hazard to traffic will not be permitted.

Before making any change in the traffic pattern, remove, or obliterate pavement markings that may create confusion to motorists.

Where using blast cleaning to remove pavement markings or objectionable material within 10 feet of a lane occupied by public traffic, immediately remove the residue (including dust) after contact between the sand and the surface being treated. For such

removal, use a vacuum attachment operating concurrently with the blast cleaning operation or by other approved methods.

Repair any damaged pavement or surfacing caused by the pavement marking removal operation.

- F. Preliminary Spotting: Provide the necessary control points at intervals including all changes of direction and changes in the basic configuration of striping such as at the beginning and ending of no-passing zones on a 2-way, 2-lane roadway. Use these points in preliminary spotting of lines before striping is commenced. Perform preliminary spotting of the lines to be painted and obtain approval for all spotting before striping begins. Preliminary spotting is required for all longitudinal striping, with spacing of spots not to exceed 50 feet.

Reference the lines and markings to be replaced at their existing locations prior to performing any work that may disturb them.

- G. Tolerances for Lane Striping: Keep work within the following allowable tolerances:

1. Length of Stripe: ± 6 inches in 40 feet.
2. Width of Stripe: $\pm 3/8$ -inch.
3. Lane Width: ± 4 inches from the widths shown on the Drawings. Measured from the edge of pavement or edge of traveled way to center of lane line or between the centers of adjacent lane lines.
4. Stripes or Tangent: Do not vary more than 1-inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.
5. Stripes on Curves: Uniform in alignment with no apparent deviations from the true curvature.
6. All Stripes: Keep within 4 inches from the planned alignment when measured to the center of the stripe.

Article 809.4 Method of Measurement

Traffic markings will be measured by one of the following methods:

- A. Lump Sum Basis: No measurement of quantities will be made.
- B. Station Basis: By the horizontal distance along centerline from beginning to end of each stripe pattern, excluding gaps for intersections or other openings. Skip stripes will be measured as 1/4 of this distance.
1. Single Stripe: A longitudinal marking less than 6 inches wide, such as, but not limited to, a single center line or edge stripe.

- 2. Double or Wide Stripe: A longitudinal marking greater than 6 inches wide, such as, but not limited to, double center lines, and auxiliary lane lines.
- C. Square Foot Basis: Transverse pavement marking lines 6 inches or more wide will be measured on a square meter basis.
- D. Each: All other transverse markings will be measured on a unit basis with each separate word or symbol constituting a unit.

Raised or recessed pavement markers will be measured per each unit installed complete.

When Item 809(9) Removal of Pavement Markings, is not shown on the Bid Schedule, it will be incidental to other items of work.

Article 809.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be full compensation for cleaning of pavement, painting traffic markings, application of preformed pavement markings, glass beads, installing raised or recessed pavement markers, furnishing paint, glass beads, preformed marking tape, and all other materials necessary to complete the work prescribed in this section.

For traffic markings which do not conform to the requirements of this section but which are allowed to remain in-place, payment will be adjusted as follows:

- A. Lump Sum: When payment is on a Lump Sum basis, the Price Reduction will be the product of the Lump Sum Price times the length of non-conforming markings divided by the total length of markings. For the purpose of this calculation, stripe lengths will be considered as continuous with no deduction for skips or breaks, for each 4-inch width stripe being applied, except that double centerline stripe (No Pass) will be considered as one stripe.
- B. Unit Prices: When payment is on a Unit Price basis, no payment will be made for those units which are not in conformance.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
809(1)	Painted Traffic Markings	Lump Sum
809(2)	Single Stripe	Station
809(3)	Double or Wide Stripe	Station
809(4)	Transverse Pavement Marking Lines	Square Foot
809(5)	Transverse Markings, Words and Symbols	Each
809(6)	Preformed Pavement Markings	Lump Sum
809(7)	Raised Pavement Marker	Each
809(8)	Recessed Pavement Marker	Each
809(9)	Removal of Pavement Markings	Station
809(10)	Methyl Methacrylate Pavement Markings	Lump Sum
809(11)	Methyl Methacrylate Transverse Pavement Marking Lines	Square Foot
809(12)	Methyl Methacrylate Transverse Markings, Words and Symbols	Each
809(13)	Painted Parking Lot Markings	Lump Sum

END OF SECTION 809

SECTION 810 SEEDING

Article 810.1 General

This work consists of preparing the ground surfaces for the application and maintenance of seeded areas, fertilization, lime application, watering, and mulching at locations shown on the Drawings or established by Engineer.

All seeding shall be performed between May 1 and September 1. Seeding at other than the specified dates, will only be allowed upon written approval from Engineer. Seeding shall not be done during windy conditions or when climatic or ground conditions would hinder placement or proper germination of seed mixes.

Article 810.2 Materials

A. Seed: Seed shall conform to one of the following seed mix types and application rates.

SCHEDULE A: LAWN MIX APPLICATION RATE: 5 LBS./1,000 SF

SEED TYPE	PROPORTION BY WEIGHT	PURITY	GERMINATION
Annual Ryegrass	5%	90%	85%
Kentucky Bluegrass	30%	90%	85%
Nugget	25%	90%	85%
Alene			
Boreal Fescue	40%	90%	85%

SCHEDULE B: NO MOW MIX APPLICATION RATE: 8 LBS./1,000 SF

SEED TYPE	PROPORTION BY WEIGHT	PURITY	GERMINATION
Alyeska Polar Grass	40%	95%	95%
Red Fescue (Arctared)	20%	95%	85%
Boreal Red Fescue	30%	98%	85%
Annual Ryegrass (Lolium)	10%	85%	80%

B. Fertilizer: Fertilizer shall be of standard commercial types supplied separately or in mixtures, and furnished in moisture proof containers. Each container shall be marked with the weight and the manufacturer's guaranteed analysis of the contents showing the percentage for each ingredient contained therein. The proportion of chemical ingredients furnished shall be a mixture such as to provide the total available nitrogen, phosphoric,

and potassium as required by the soil analysis or as specified in the Special Provisions.

Tolerances of the chemical ingredients shall be plus or minus 2%.

No cyanamid compounds or hydrated lime will be permitted in mixed fertilizers.

- C. Limestone: Limestone shall contain not less than 85% of calcium and magnesium carbonates. Agricultural ground limestone suitable for application by a fertilizer spreader shall conform to the following gradation:

MINIMUM PERCENT

SIEVE DESIGNATION	PASSING BY WEIGHT
No. 10	100
No. 20	90
No. 100	50

Fertilizer and limestone for use in a hydraulic sprayer shall be soluble or ground to a fineness that will permit complete suspension of insoluble particles in water.

- D. Mulch: Shall be dried shredded peat moss; or cellulose wood or paper fibre such as "Astromulch", "Silvafibre", "Conwed", or approved equal.
- E. Water: Water used in all operations shall be of potable quality.

Article 810.3 Application

- A. Soil Preparation: After grading of areas has been completed in conformity with the lines and grades shown on the Drawings, and before beginning seeding operations, the areas to be seeded shall be cultivated to provide a reasonably firm but friable seed bed. Cultivation shall be carried to a depth of 2 inches. On slopes steeper than 3:1 depth of cultivation may be reduced as directed by Engineer. All cultivated areas shall be raked or cleared of stones 1-inch in diameter and larger; all weeds, plant growth, sticks, stumps, and other debris or irregularities which might interfere with the seeding operation, germination of seed, or subsequent maintenance of the seed covered areas.
- B. Fertilizer: Fertilizer shall be applied at a rate to provide 2 pounds actual Nitrogen per 1,000 SF of area. In the absence of soil tests and direction from Engineer, Contractor shall apply 16-16-16 at the rate of 12.5 pounds per 1,000 square feet. Fertilizer shall be in accordance with Article 810.2, Materials, of these Specifications.
- C. Limestone: Limestone, whether in liquid or dry form, shall be applied at a sufficient rate to attain a soil pH between 6.0 and 7.0.
- D. Application Methods: Apply seed mixtures as specified under Article 810.2.A of this Section at rates as specified and/or as directed by Engineer. Seed, fertilizer, limestone,

mulch, and water may be applied by the following methods:

1. Hydraulic Method: Seeding by hydraulic methods shall consist of furnishing and placing a slurry made of seed, fertilizer, dried peat moss or cellulose wood fiber and water.

The dried peat moss or cellulose wood fiber shall be added to the water slurry in the hydraulic seeder after the proportionate amounts of seed and fertilizer have been added. The slurry mixture shall then be combined and applied in such a manner that the rate of application will result in an even distribution of all materials.

Hydraulic seeding equipment shall be capable of maintaining a continuous agitation so that a homogeneous mixture can be applied through a spray nozzle. The pump shall be capable of producing sufficient pressure to maintain a continuous, non-fluctuating spray capable of reaching the extremities of the seeding area with the pump unit located on the roadbed. Sufficient hose shall be provided to reach areas not practical to seed from the nozzle unit situated on the roadbed.

2. Dry Method: Mechanical spreader, seed drills, landscape seeder, cultipacker seeder, fertilizer spreader, or other approved mechanical spreading equipment may be used when seed and fertilizer are to be applied in dry form.

Fertilizer shall be spread separately at the specified rates then incorporated in one operation to a minimum depth of 2 inches. Seeded areas shall be compacted within 24 hours from the time the seeding is completed, weather and soil conditions permitting, by cultipacker, roller or other equipment satisfactory to Engineer. Compacting equipment shall be operated at right angles to the slope. Compaction shall not be performed when the soil is in such condition that it will be picked up by the equipment.

3. Hand Method: Hand broadcasting by means of portable, hand operated mechanical spreaders or "by Hand", may be substituted for the preceding 2 methods provided that the application rate is twice that of the dry method, and that the application is applied in a minimum of 2 passes over the areas to be seeded, (at 90 degrees to one another in order to assure uniform and even coverage to all seeded surfaces).

Article 810.4 Maintenance

Contractor shall protect seeded areas from damage from all traffic; whether people, animals, on or off road vehicles, or any other causes which may damage newly seeded and maintained surfaces. Protect seeded areas against traffic using approved warning signs and barricades. Surfaces damaged shall be repaired by regrading, reseeding (including all specified amendments), as directed by Engineer, at no additional cost to the Owner. Contractor shall otherwise maintain seeded areas in a satisfactory condition until Final Acceptance of the work.

Water the seeded areas as required for proper germination and growth, as directed.

Contractor shall apply during the maintenance period, one application of fertilizer (16-16-16) at the rate of 7 pounds per 1,000 square feet, on the 45th day of the maintenance period.

Article 810.5 Measurement

The quantity of seeding to be paid for shall be the number of 1,000-square foot units, measured to the nearest 0.1 unit on the ground surface. The quantity of seeding specified shall include all cultivating, seed, limestone (if required), fertilizer and mulch material of the type specified, completed and accepted.

Article 810.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
810(1)	Seeding (Schedule)	1,000 SF

When more than one type of seeding is specified for any Pay Item, letter suffixes shall be included in order to differentiate between different types.

END OF SECTION 810

SECTION 811 TOPSOIL

Article 811.1 General

This work consists of furnishing and spreading topsoil where shown on the Drawings.

Article 811.2 Materials

A. Topsoil: Furnish a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. Meet the following:

1. Reasonably free from roots, clods, hard clay, noxious weeds, tall grass, brush, sticks, stubble, or other litter, and be free-draining and non-toxic.
2. Contain between 3% and 20% organic matter as determined by loss-on-ignition of oven dried samples using ATM 203, Organic Content of Soils.
3. Grading Requirements:

SIEVE	PERCENT PASSING
2-Inch	100
No. 4	85 - 100
No. 10	60 - 100
No. 200	10 - 50

Notify Engineer of the source of the topsoil at least 30 calendar days prior to delivery of topsoil to the project from that location. Engineer will inspect and test the topsoil and its source before approval will be granted for its use.

Unsuitable topsoil sources may be used if, prior to delivery to the project, sufficient organic matter in the form of pulverized peat moss or rich organic soil from other sources is thoroughly mixed with the topsoil to provide a product conforming to the above requirements.

Use the application rates, determined by Engineer, of fertilizer and limestone per acre of ground area of topsoil based on soil analysis tests so that the total natural and applied chemical constituents are as follows:

Nitrogen	1.0-lb. Minimum - 1.5-lb. Maximum per, 100 square feet
Phosphoric Acid	1.0-lb. Minimum - 2.0-lb. Maximum per, 100 square feet
Potassium	1.0-lb. Minimum - 2.0-lb. Maximum per, 100 square feet

LIMESTONE REQUIREMENTS

SOIL Ph	LIMESTONE, TONS PER ACRE
Above 6.0	0
5-0 - 6.0	1.5
Below 5.0	3.0

Article 811.3 Placing

Spread the topsoil evenly on the designated areas to the depth (after settlement) shown on the Drawings. Do not place when the ground or topsoil is frozen, excessively wet, or in a condition detrimental to the work. Keep the roadway surfaces clean of topsoil during hauling and spreading operations.

Article 811.4 Maintenance and Repair

Maintain the areas covered by topsoil until subsequent seeding or landscaping is accomplished. Complete any repairs or topsoil replacement, including damage or loss resulting from winter shutdown, without extra compensation.

Article 811.5 Method of Measurement

Topsoil will be measured by the number of 1,000-square foot units, measured to the nearest 0.1, measured on the slope of the ground surface.

Stockpiling and rehandling of topsoil during the stripping operations or during placement are incidental.

Topsoil repair, maintenance, and replacement are incidental.

Topsoil placed in planting beds is incidental to the work described in Section 820 Landscaping and no payment shall be made under this section.

Article 811.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
811(1)	Topsoil	1,000 Square Foot

END OF SECTION 811

SECTION 812 FENCE

Article 812.1 General

This work consists of providing all operations pertaining to construction of chain link fencing and resetting fence.

Article 812.2 Materials

- A. Chain Link Fence: Material used in the construction of chain link fencing shall be in accordance with the Standard Details of these Specifications and the requirements of the "Chain Link Fence Manufacturers Institute", as described below.
- B. General: Posts, gate frames, braces, rails, stretcher bars, and truss rods shall be of steel; reinforcing wires shall be of high carbon steel; and gate hinges, post caps, barbed-wire supporting arms, stretcher bar bands, and other parts shall be of steel, malleable iron or equal except that ties and clips may be of aluminum.

Workmanship shall be of good quality. Parts shall be formed accurately to dimensions. All steel and iron parts shall be zinc coated after fabrication, using zinc Grade "E" in accordance with Federal Specifications QQ-Z-351.

The weight of the zinc coating per square foot of actual surface shall average not less than 1.2 ounces and no individual specimen shall show less than 1.0 ounces. Zinc-coated surfaces shall be free from imperfectly coated spots, bruised or scaled coating, drops of zinc, sharp projections, and sal ammoniac spots.

Posts, gate frames, rails, and braces shall conform to the dimensions and weights shown in Table No. 1, Article 813.3.

- C. Fabric: Fencing fabric shall be zinc coated by the hot-dip process after fabrication. The zinc coating shall be commercially uniform. It shall not have less than 1.2 ounces per square foot when tested. Fabric gauge shall be as shown in Table 3, Article 812.3.
- D. Gates: Gates shall be swing or sliding, single or double, as specified, complete with latches, stops, keepers, hinges, or rollers and roller tracks, and, when so specified, with provisions for 3 strands of barbed wire above the fabric.

Gate frames shall be constructed of tubular members, and shall be constructed in a manner such as to provide a rigid frame and ample strength and shall be free from sag and twist. Where a barbed wire top is specified, the end members of gate frames shall be extended approximately one foot above the top member and arranged for attaching 3 uniformly spaced strands of barbed wire and furnished with bands or other suitable method for securely attaching the wire. Fabric shall be attached securely to the gate frame at intervals not to exceed 15 inches.

Hinges shall be of heavy pattern, of adequate strength for the gate, and with large bearing surfaces for clamping them in position. The hinges shall not twist or turn under the action of the gate. The gates shall be capable of being opened and closed easily by one person.

Latches, stops and keepers shall be provided for all gates. Latches shall have the plunger-bar arranged to engage the gate stop, except that for single gates with openings less than 10 feet wide, a forked latch may be provided. Latches shall be arranged for locking. Center stops shall consist of a device arranged to be set in concrete and to engage the plunger of the bar latch of double gates. No stop is required for single gates. Keepers shall consist of a mechanical device for securing the free end of the gate when in the full open position.

- E. Posts: Posts shall be of the lengths specified and shall be tubular, except that line posts may be H-beam. Dimension and weight shall conform to Table I, Article 6.3 unless otherwise specified.
- F. Post Braces: Post braces shall be provided for each gate, corner, pull, and end post for use with fabric 5 feet or more in height, and shall consist of a round tubular brace extending to each adjacent post at mid-height of the fabric, and a truss consisting of a rod not less than 3/8 inches in nominal diameter from the adjacent post back to the gate, corner, pull, or end post, with a turnbuckle or other equivalent provision for adjustment.
- G. Post Tops: Post tops shall consist of ornamental tops or combination tops and barbed-wire supporting arms, as specified. When so specified or when a top rail is to be provided, the top shall be provided with a hole suitable for the through passage of the top rail. The post tops shall fit over the outside of the posts and shall exclude moisture from the tubular posts.
- H. Barbed-Wire Supporting Arms: Barbed-wire supporting arms, when specified to be furnished, shall be at an angle of approximately 45°, and shall be fitted with clips or other means for attached 3 lines of barbed-wire. The top outside wire shall be approximately 12 inches horizontally from the fence line and the other wires spaced uniformly between the top of the fence fabric and the outside barbed-wire.
- I. Top Rails: Top rails shall be round (tubular), shall be in lengths not less than 18 feet and shall be fitted with couplings for connecting the lengths into a continuous run. The coupling shall be not less than 6 inches long, shall provide a substantial connection, and shall allow for expansion and contraction of the rail. Suitable ties or clips shall be provided in sufficient number for attaching the fabric securely to the top rail at intervals not exceeding 2 feet. Means shall be provided for attaching the top rail to each gate, corner, pull, and end post.
- J. Stretcher Bars: Stretcher bars shall not be less than 3/16-inch by 3/4-inch and shall be of lengths one inch less than the full height of the fabric with which they are to be used. The stretcher bars shall be arranged for attaching the fabric to all terminal posts by threading through the fabric, by bands, or by other positive mechanical means.

- K. Ties or Clips: Ties or clips of adequate strength shall be provided for attaching the fabric to line posts.
- L. Fabric Bands: Fabric bands of adequate strength shall be provided for attaching the fabric and stretcher bars to all terminal posts.
- M. Tension Wires: A bottom tension wire shall be provided unless otherwise specified. Top tension wire shall be provided, when so specified, in lieu of a top rail. The tension wires shall be of coiled spring wire not less than 7 gauge plus or minus 0.005-inch in diameter. Ties or clips shall be provided for attaching each wire to the fabric at intervals not exceeding 2 feet.
- N. Barbed-Wire: Barbed-wire shall consist of 2 strands of 12-1/2-gauge wire with 14 gauge 4-point barbs spaced approximately 5 inches apart. All wire shall be zinc coated with a minimum coating of 0.80 ounces per square foot of surface area on 12-1/2 gauge wire.
- O. Vinyl Clad Fencing: Those components specified to be vinyl-clad or coated shall have a vinyl covering 10 to 14 mils in thickness. Fabric is to be 9 gauge wire. Products are to be Colorbond II as manufactured by Colorguard Corporation, or approved equal.

Article 812.3 Tables

TABLE 1
DIMENSIONS AND WEIGHTS

USE AND SECTION		OUTSIDE DIAMETER OR DIMENSIONS, NOMINAL	WEIGHT PER FOOT NOMINAL
End, corner, and pull posts (tubular for fabric heights): 6 feet and less Over 6 feet:	Round Round	Inches 2.375 2.875	Pounds 3.65 5.79
Gate posts for nominal width of gate, single, or one leaf of double 6 feet and less: Gate with 13 feet and less:	Round Round	2.875 4.00	5.79 9.10
Gate width over 13 feet to 18 feet, including: Gate width over 18 feet	Round Round	6.625 8.625	18.97 24.70
Gates: Exterior frames for fabric heights: Less than 6 feet 6 feet and over	Round Round	1.660 1.90	1.806 2.085
Interior bracing heights: Less than 6 feet 6 feet and over	Round Round	1.315 1.660	1.055 1.806

USE AND SECTION		OUTSIDE DIAMETER OR DIMENSIONS, NOMINAL	WEIGHT PER FOOT NOMINAL
Rails and post braces (Tubular)	Round	1.660	1.806
Intermediate post for fabric heights: 6 feet and less: Tubular H-Section	Round	1.90 1.875x1.625x.113	2.72 2.70
Over 6 feet Tubular H-Section	Round	2.375 2.25x1.95x.143	3.65 4.10

TABLE 2
PERMISSIBLE TOLERANCE IN DIMENSIONS AND WEIGHTS

TUBULAR DIAMETER	TOLERANCE O.D.	TOLERANCE LBS./FT.
Up to 1-1/2" inclusive 2" and over	$\pm 1/64"$ - $1/32"$ $\pm 1\%$ - 1%	$\pm 5\%$ $\pm 5\%$
H-Section 1.875x1.625 2.25 x 1.95	$\pm .0625"$ $\pm .0937"$	$\pm 5\%$ $\pm 5\%$

Note: Where tolerance are not specified in this table or elsewhere in this Specification, standard commercial tolerances shall apply.

TABLE 3

HEIGHT OF FABRIC	MESH SIZE	GAGE	NOMINAL DIAMETER OF WIRE
36" thru 144"	2"	6	0.192"
36" thru 144"	2"	9	0.148"
36" thru 84"	2"	11	0.120"
96" thru 144"	1-3/4"	11	0.120"

Reset Fence: All materials which can be re-used shall be salvaged from the existing fence and provided to the owner of the fence. If the owner does not want the materials, Contractor shall properly dispose of the materials. Reset fence shall be constructed with new materials which as nearly as possible duplicate the kind of materials in the original installation. The quality of the new materials shall meet normally accepted standards.

Nails, staples, fastening wires or devices, and all materials required for the construction of such anchors, end posts or other portions of the fence which can be replaced more efficiently than they can be moved, shall be furnished by Contractor.

If the Property Owner elects to replace any of the existing fencing materials with other materials in better condition, he shall furnish and deliver such materials to the site of the work.

Article 812.4 Construction

A. Chain Link Fence:

1. Grading: All trees, brush, and other obstacles which would interfere with the construction of the fence shall be removed and disposed of at a Contractor-provided disposal area and shall be considered incidental. The fence shall be constructed in such a manner as to follow a smooth profile. Throughout the fence length the distance between the ground surface and the bottom tension wire shall not be greater than 4 inches, nor less than 2 inches. Where excavation is necessary to meet this requirement, the ground will be graded level not less than one foot on either side of the fence and backslopes of 1-1/2 to 1 (1.5h:1v) provided. Where backfill is necessary to meet this requirement, natural surface vegetation will be removed prior to placing fill material. The top of the fill shall be level for one foot on either side of the fence line and the shoulder slopes shall be 0.5h:1v. Grading for all specific conditions shall be such that water will not be allowed to pond in the immediate area of the fence. Where drainage is required across the fence line, Engineer shall be consulted and channels provided in accordance with his decision.

2. Posts: All posts shall be set in Portland Cement Concrete footings in accordance to Division 300. The tops of the footings shall be level with the ground, shall be crowned to provide drainage and shall be troweled smooth. The dimensions of the footings shall be as shown on the Drawings. The footings shall be allowed to cure for a period of at least 7 days before attaching fabric.

The posts shall be set vertical and shall be of uniform and equal height above the ground with a maximum horizontal spacing of 10 feet center-to-center. On straight runs, pull posts shall be provided at intervals not to exceed 500 linear feet. Changes in line of 30° or more shall be considered as corner posts. Steep slopes and abrupt changes in topography may require changes in various elements of the fence. The chain link fabric shall be stretched taut and securely fastened to end, corner, or gate posts. The top edge of the fabric shall be fastened to the top rail, and the lower edge of the fabric shall be fastened to the bottom tension wire.

3. Fabric: Fabric shall be placed on the side specified, stretched taut, and securely fastened to the posts. Fastening to end, gate, corner and pull posts shall be with stretcher bars and fabric bands spaced at intervals of 15 inches or less. Fastening to line posts shall be with ties or clips at 15-inch intervals.

Rolls of wire fabric shall be joined by weaving a single strand into the ends of the rolls to form a continuous mesh. Horizontal splices will not be permitted.

4. Top Rail: Top rails shall pass through the ornamental tops of the line posts, forming a continuous brace from end to ends of each stretch of fence. Lengths of tubular top rail shall be joined by sleeve couplings. Top rails shall be securely fastened to terminal posts by pressed steel fittings or other appropriate means.
5. Tension Wire: One continuous length of tension wire shall be used between pull posts. Sufficient tension shall be applied to avoid excess sag between the posts. Tension Wires shall be tied or otherwise fastened to end, gate, corner or pull posts by methods approved by Engineer.
6. General Appearance: All runs of fence shall present the same general appearance and the product of one manufacturer only will be accepted, except for items which do not influence the appearance of the completed fence. The fence shall be the product of a manufacturer who has demonstrated by actual installations or a similar nature that its product is of the type required. No used, rerolled, or open-seam steel will be permitted in posts, gate frames, rails or braces.
7. Reset Fence: The fence shall be set in close conformity with the line shown on the Drawings or as directed by Engineer. The quality of construction shall meet or exceed the quality of the original fence and shall meet or exceed normally accepted standards.

Article 812.5 Measurement

Chain link fencing will be measured by length in lineal feet, in-place, from outside to outside of end or corner posts, except for the space occupied by gates.

Gates will be measured per each, complete in-place for a particular size.

Resetting fence will be measured by length in linear feet in final position.

Article 812.6 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
812(1)	Chain Link Fence (Heights & Gauge)	Linear Foot
812(2)	Gate (Type and Size)	Each
812(3)	Reset Fence	Linear Foot
END OF SECTION 812		

SECTION 813 RECONSTRUCT MANHOLE

Article 813.1 General

This work consists of reconstructing existing sanitary sewer and storm drain manholes and catch basins.

Article 813.2 Materials

All materials, used in reconstructing manholes, shall conform to the requirements of Division 500 - Sanitary Sewer and Division 700 - Storm Drain Systems.

Article 813.3 Construction

A. Reconstruction existing manhole by using one or more of the following methods:

1. Bring the manhole frame and cover to grade if you remove the cone for lowering.
2. Raise the manhole frame and cover more than 12 inches.
3. Reconstruct a portion of the manhole with no change in line or grade.
4. Tap one or more additional pipes into an existing manhole.
5. Move the manhole cone out of the wheel path or curb line. Rotate the cone to align the manhole or inlet casting, if necessary. Align the access stairs by rotating the barrel sections or install new steps.

Reconstruct the manhole to the required elevation so that it conforms to Drawing details. Complete this work according to the requirements for new construction. Reuse material only if Engineer approves.

Re-align existing manholes that fall within the paved roadway surface so that the casting is not in the driving lane wheel path or in the gutter pan flow line.

In roadways, set the manhole frame and cover flush with or no more than 1/2 to 3/4-inch below the finished pavement surface. In walkways and bicycle paths, set the manhole frame flush with the surface.

Article 813.4 Measurement

Reconstruction of manholes and catch basins will be measured on a basis of units complete in-place accepted by Engineer.

Article 813.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
813(1)	Reconstruct Existing Manhole	Each
813(2)	Reconstruct Existing Catch Basin	Each

END OF SECTION 813

SECTION 814 ADJUST MANHOLE TO FINISH GRADE

Article 814.1 General

This work consists of providing all operations pertaining to the adjustment of existing manholes and catch basins to finish grade by adjustment of rings.

Article 814.2 Material

All materials used in the adjustment of manholes including mortar, rings, block, etc., shall conform to the requirements for manholes as outlined in Division 500 and Division 700, Sanitary Sewer and Storm Drain Systems, respectively. Radial concrete manhole blocks may be used for upward adjustments in certain cases if approved by Engineer.

Contractor may utilize Neenah R-1979 Series Manhole Adjusting Rings or an approved equal, for adjusting the manhole to finished grade.

Article 814.3 Construction

- A. Rings: Contractor shall adjust the manhole rings in accordance with applicable standard details.
- B. Any damage to manholes resulting from construction under this Contract shall be repaired or the damaged portion replaced at Contractor's expense. All inverts, bench walls, and/or catch areas shall be left clean and free from any foreign materials.

Article 814.4 Measurement

Manhole and catch basin adjustments will be measured per unit, complete in-place, as accepted by Engineer.

Article 814.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
814(1)	Adjust Manhole To Finish Grade	Each
814(2)	Adjust Catch Basin To Finish Grade	Each

END OF SECTION 814

SECTION 815 ADJUST VALVE BOX TO FINISH GRADE

Article 815.1 General

This work consists of providing all operations pertaining to adjustment of existing mainline or hydrant valve boxes to finish grade.

Article 815.2 Material

All materials used in the adjustment of mainline valve boxes shall conform to the requirements in Division 600 - Water System.

Article 815.3 Construction

All valve box adjustments will be accomplished as directed by Engineer. Any damage to a mainline valve box resulting from construction under this contract shall be repaired or the damaged portion replaced at Contractor's expense. Contractor shall be responsible to assure that the valve box is vertical, clean, to proper grade and readily accessible for operation of the valve.

Article 815.4 Measurement

Mainline valve box adjustments will be measured per unit, complete in-place as accepted by Engineer.

Article 815.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
815(1)	Adjust Valve Box to Finish Grade	Each

END OF SECTION 815

SECTION 816 ADJUST CLEANOUT TO FINISH GRADE

Article 816.1 General

This work consists of providing all operations pertaining to adjustment of existing storm drain and sanitary sewer cleanouts to finish grade.

Article 816.2 Material

All materials used in the adjustment of cleanouts shall conform to the requirements for cleanouts as outlined in the Division 500 - Sanitary Sewers and Division 700 - Storm Drain Systems.

Article 816.3 Construction

All adjustments will be accomplished as directed by Engineer. Any damage to cleanouts resulting from construction under this Contract shall be repaired or the damaged portion replaced at Contractor's expense.

Article 816.4 Construction

Contractor shall adjust the cleanout to finish grade prior to placement of asphalt pavement. After-the-fact cutting of new asphalt for adjustments will not be accepted. Any adjustment(s) requiring cutting of new asphalt shall not be paid and shall be deducted from the plan quantity.

Article 816.5 Measurement

Cleanout adjustments will be measured per unit, complete in-place.

Article 816.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
816(1)	Adjust Cleanout to Finish Grade	Each

END OF SECTION 816

SECTION 817 SOIL STABILIZATION

Article 817.1 General

This work consists of furnishing, placing, and maintaining mulch or matting material where shown on the Drawings or as directed.

Article 817.2 Material

Use materials that conform to the following:

A. Mulch: Use one of the following:

1. Contains no growth or germination inhibiting factors.
2. Will remain in uniform suspension in water under agitation and will blend with grass seed, fertilizer, and other additives to form a homogeneous slurry.
3. Will form a blotter-like ground cover on application, having moisture absorption and percolation properties and the ability to cover and hold grass seed in contact with soil.
4. Dyed a suitable color to facilitate inspection of its placement.

Ship the mulch material in packages of uniform weight (plus or minus 5%) and bearing the name of the manufacturer and the air-dry weight content.

Use a commercial tackifier on all slopes steeper than 2:1. Use the amount recommended by the manufacturer.

B. Dried Peat Moss: Partially decomposed fibrous or cellular stems and leaves of any of several species of Sphagnum mosses with the following characteristics:

1. Chopped or shredded to allow distribution through normal hydraulic type seeding equipment and capable of being suspended in water to form part of a homogenous slurry.
2. Free from woody substances and mineral matter such as sulphur or iron and with a pH value of between 4.0 and 6.5.
3. Furnished in an air dry condition and contain less than 35% moisture by weight. Have a water holding capacity of not less than 800% by weight on an oven dry basis.
4. Non-toxic.

C. Matting: Use one of the following:

1. Burlap: Standard weave with a weight of 4.2 to 12.25 ounces per square yard.
 2. Jute Mesh Fabric: Cloth of a uniform, open plain weave of undyed and unbleached single jute yarn.
 - a. Width: 45 to 48 inches \pm 1 inch.
 - b. 78 warp-ends per width of cloth (minimum).
 - c. 45 weft-end per foot (minimum).
 - d. Weight: 1.3 pounds per linear yard, \pm 5%.
 3. Woven Paper of Sisal Mesh Netting: Woven from twisted yarns available in rolls 45 inches to 48 inches wide. Mesh may vary from closed to open weave, ranging from 1/8 to 1/4-inch openings. Shrinkage after wetting shall not exceed 20% of the surface area.
 4. Knitted Straw Mat: Commercially manufactured erosion control blanket. Netting shall be photodegradable and the thread shall be biodegradable. Straw shall be from oats, wheat, rye, or other approved grain crops that are free from noxious weeds, mold, or other objectionable material. May contain coconut or fiber to reinforce the straw. Follow the manufacturer's published recommendations.
 5. Woven/Curled Wood Blanket: Machine produced mat of curled wood shavings with a minimum of 80% 6-inch or longer fibers, with consistent thickness and the fibers evenly distributed over the entire area of the blanket. The top side of the blanket shall be covered with biodegradable extruded plastic mesh. Smolder resistant without the use of chemical additives.
- D. Staples: U-shaped staples for anchoring matting, approximately 6 inches long and 1-inch wide. Machine-made: No. 11 gage or heavier steel wire. Hand-made 11-inch lengths of No. 9 gage or heavier steel wire.

Article 817.3 Construction Requirements

- A. Surface Preparation: Smooth the surface and backfill all gullies and potholes before application.
- Remove all sticks and other foreign material that prevent contact of the mulch or matting and surface.
- Ensure that the surface is moist at the time of placement.
- E. Application: Apply mulch material at the rate specified in the Special Provisions
- If seeding is specified, complete the application of mulch or matting within 24 hours after seed is placed.

Staple matting every 5 feet at joints and edges or as recommended by the manufacturer.

Do not use vehicles or equipment which cause rutting or displacement of the subgrade or topsoil.

- F. Maintenance: Reshape and reseed any damaged areas and repair the mulch or matting, as required.

Article 817.4 Method Measurement

Mulching and matting will be measured by the number of 1,000-square foot units, measured to the nearest 0.1 unit, measured on the slope of the ground surface.

Water, maintenance, and repair are incidental.

Article 817.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment will be made under:

ITEM NO.	DESCRIPTION	UNIT
817(1)	Mulching	Square Yard
817(2)	Matting	1,000 Square Foot

END OF SECTION 817

SECTION 818 RECONSTRUCT DRIVEWAY

Article 818.1 Description

The Work under this Section consists of the performance of all operations pertaining to removing, disposing of, re-grading and replacing existing driveway approaches, including surfacing, leveling course and any landscaping amenities, as indicated on the drawings.

Driveway reconstruction consists of installing a section of driveway that provides a smooth transition from the existing driveway to the street improvements. The transition length shall be measured from the back of curb and shall be as shown on the drawings or as directed by Engineer.

Article 818.2 Materials

All materials used in the reconstruction of driveways shall conform to the requirements for Portland Cement Concrete in accordance with City of Kodiak Standard Specifications (CKSS) Division 400 and asphalt concrete pavement in accordance with CKSS Division 300 for concrete driveways. Subbase material shall conform to the requirements of Type A Classified Fill and Backfill as outlined in CKSS Section 204 Classified Fill and Backfill.

Article 818.3 Construction

All materials used in the reconstruction of driveways shall conform to the City of Kodiak Standard Specifications (CKSS) Division 400 for asphalt concrete pavement and in accordance with CKSS Division 300 for concrete driveways.

Contractor shall neatly and cleanly saw cut and remove existing driveway surfacing.

Contractor shall saw cut the full depth of asphalt pavement and concrete surfaces. If any portion of the remaining asphalt or concrete surfacing is under cut or damaged during construction operations, Contractor shall saw cut, remove, and replace the affected area at no additional cost to the City of Kodiak.

Contractor shall reconstruct existing driveways with gravel, asphalt pavement, or concrete surfacing to match existing conditions. Contractor shall match the thickness of existing materials or the following, whichever is greater: gravel surfacing: 1.5 foot of Type A Classified Fill subbase, 6 inches leveling course; asphalt pavement: 1.5 foot of Type A Classified Fill subbase, 2 inches of leveling course base, and 2 inches of asphalt pavement surfacing; Portland cement concrete (PCC): 1.5 foot of Type A Classified Fill subbase, 2 inches of leveling course base, and 4 inches of PCC surfacing.

Contractor shall perform asphalt paving by utilizing a mechanical spreader and compacted by a mechanical roller weighing not less than ten (10) tons, except that where the area of the asphalt replacement patch is less than three hundred (300) square feet, a mechanical spreader need not be employed.

Contractor shall stamp small inaccessible areas to produce a compression and surface texture equivalent to that produced by the specified rolling. Hand tampers shall have a maximum tamping face of fifty (50) square inches and minimum weight of twenty-five (25) pounds.

Contractor shall maintain access and parking accommodations for each resident during driveway work. Contractor shall notify and coordinate with the affected resident(s) prior to any necessary driveway closures.

Article 818.4 Measurement

Driveway reconstruction is measured per square yard of replaced driveway surface complete and in place for the type of surface. No separate measurement is be made for asphalt, classified backfill, unusable excavation, or leveling course as these items are incidental to the Work item. No payment is made for temporary relocation of driveways or required driveway maintenance during construction.

Article 818.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Item listed below that is included in the Bid Schedule.

Payment will be made under:

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
818(1)	Reconstruct Driveway - Gravel	Square Yard
818(2)	Reconstruct Driveway - Asphalt	Square Yard
818(3)	Reconstruct Driveway - Concrete	Square Yard

END OF SECTION 818

SECTION 819 MODULAR BLOCK RETAINING WALL

Article 819.1 Description

The Modular Block Retaining Walls shall be constructed at the locations shown on the plans and as provided in these specifications. The Modular Block Retaining Walls to be constructed shall consist of a precast modular masonry product specifically engineered for the retention of earth. The modular units shall be a gravity system. The pins shall also be connected to geogrid reinforcement where indicated in the Plans or working drawings.

Contractor shall submit a modular block system to Engineer for approval. The submittal for the modular block retaining walls shall include complete working drawings for the wall system in accordance with paragraph 6.17 Shop Drawings and Samples, of the Standard General Conditions of the Construction Contract. Contractor shall verify the existing ground elevations and conditions at the site before preparing the final working drawings. The working drawings shall contain all information required for the proper construction of the system and any required revisions or additions to drainage or other facilities. The working drawings shall be supplemented with calculations for the particular installation. The working drawings and calculations shall demonstrate the internal stability as well as the external stability of the modular block retaining wall and shall be signed and sealed by an engineer who is registered as a Civil Engineer in the State of Alaska. Contractor shall allow Engineer three (3) weeks to review the working drawings and calculations after a complete set of working drawings and calculations are submitted by Contractor.

Heights, lengths, and depths of Modular Block Retaining Wall systems may vary somewhat from the Plans, as approved by Engineer.

The height and length to be used for any system shall be minimum for the system that will effectively retain the earth behind the structure for the loading conditions, profile, or slope lines shown on the plans or on the approved working drawings. In addition, if the Plans show limiting parameters for the systems, the system selected shall conform to those parameters.

The construction of the Modular Block Retaining Wall system shall conform to the details shown on the plans and shall be constructed in accordance with the manufacturer's instructions. The supplier shall provide technical assistance and training to Contractor. Contractor shall provide evidence of prior installation experience with the specific product being used.

Article 819.2 Materials

Materials furnished for the Modular Block Retaining Walls shall conform to the following:

GENERAL. Contractor shall make his own arrangements to purchase and/or manufacture the pre-cast modular block units, attachment devices, and all necessary components as shown on the Plans. Materials not conforming to the Plans or specifications shall not be used without written consent from Engineer.

1. Modular Block Units. The units shall be precise in conformance with the manufacturer's requirements and the following additions:
 - a. Handling, Storage, and Shipping: All units shall be handled, stored, and shipped in such a manner as to protect them from chipping, discoloration, cracks, and fractures.
 - b. Rejection: Units shall be rejected because of failure to meet any of the requirements specified above. In addition, any of the following defects shall be sufficient cause for rejection.
 - 1) Defects caused by faulty casting.
 - 2) Defects indicating honeycombed or open texture concrete.
 - 3) Cracked or severely chipped units.
 - 4) Unreasonable color variation on front face of unit.
 - c. Color: Block color shall be brick red or an approved option. Contractor shall submit samples of colors to Engineer for approval.
2. Soil Reinforcing and Attachment Devices. All reinforcing and attachment devices shall be carefully inspected to ensure they are true to size and free from defects that may impair strength and durability. The geogrid shall meet the requirements of AASHTO Standard Specifications for Highway Bridges, latest Edition, and per the modular block unit supplier's design recommendations.
3. Backfill Materials. All backfill materials for modular block retaining walls shall conform to the requirements of the materials specified in the Drawings.

Article 819.3 General Requirements

The foundation for the Modular Block Retaining Wall structure shall be graded level for a width as shown on the Plans or shop drawings. Prior to wall erection, the foundation backfill shall be compacted to meet the requirement specified in the Drawings. Any foundation soils found to be unsuitable shall be removed and replaced with backfill as per the Drawings.

Article 819.4 Wall Erection

A field representative from the proprietary modular block wall system being used shall be available during the erection of the wall upon request of Engineer. The services of the representative shall be at no additional cost to the Owner.

Precast masonry block units shall be placed so that their final position is battered per the manufacturer's recommendations. The masonry block units shall be placed in successive horizontal lifts in the sequence shown on the working drawings as backfill placement proceeds. While placing backfill material behind the first course of masonry block units, place backfill material at the front of the units. Remove all excess backfill material from the top surface of all masonry block units prior to placement of the next course of masonry block units.

Backfill Placement. Backfill placement shall closely follow erection of each course of masonry blocks. Backfill shall be placed in such a manner as to avoid any damage or disturbances of the wall materials or misalignment of the facing panels. Any wall materials that become damaged during backfill placement shall be removed and replaced at Contractor's expense. Contractor shall correct any misalignment or distortion of the masonry block units due to placement of backfill outside the limits of this specification.

Backfill shall be in accordance with Section 204, Classified and Backfill.

Ride-on mechanical compaction equipment shall be operated no closer than 5 feet from the masonry unit back face. Compaction within 5 feet of the back face of the wall facing shall be performed with hand operated equipment.

At the end of each day's operation, Contractor shall slope the last level of backfill away from the wall to rapidly direct water runoff from the wall face. In addition, Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

Article 819.5 Method of Measurement

Modular Block Retaining Walls will be measured by the square foot of wall face measured along the face of the wall, and including that part of wall which is below grade as indicated on the Plans or working drawings. Measurement shall take place prior to fill or backfill. Measurement shall be vertical face, not parallel to batter angle.

Article 819.6 Basis of Payment

The contract price paid per square foot of wall face for Modular Block Retaining Walls shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in the modular block retaining wall.

Payment will be made under:

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
819(1)	Modular Block Retaining Wall	Square Foot

END OF SECTION 819

SECTION 820 LANDSCAPING (TREES AND SHRUBS)

Article 820.1 General

A. DESCRIPTION

1. Landscaping includes but is not limited to the following:
 - a. Construction of planting beds
 - b. Fine grading
 - c. Planting of trees and shrubs
 - d. Placing of shredded bark mulch
 - e. Fertilizing
 - f. Maintenance during warranty period

B. SCOPE OF WORK

1. Contractor shall provide all work described in this section, described elsewhere in the Specifications, and indicated on the Drawings.
2. This section is organized solely for the convenience of Owner and Engineer. The work described below in this section is to be governed by all relevant sections of the specifications even though cross-references may or may not be stated explicitly.
3. The Drawings and Specifications are complementary to each other; what is described or indicated in one is as binding as if called for in both.

C. REFERENCES

1. Codes and standards referenced in this and subsequent articles of this section shall become a part of the Specifications to the extent of their applicability to the particular product, method, assembly or system under consideration. In case of conflict, the most stringent shall govern.
 - a. ANSI Z 60.1-2004 American Standard for Nursery Stock, (Published by the American Association of Nurserymen, Inc., 230 Southern Building Washington D.C. 20005).
 - b. State of Alaska, Department of Environmental Conservation concerning applications of herbicides, pesticides, and inspections.

1. *American Standard for Nursery Stock*, ANSI Z60.1 American Nursery and Landscape

Association, Washington, D.C., latest edition.

2. *Sunset New Western Garden Book*, Lane Publishing Company, Menlo Park, California, latest edition.
3. *Landscape Plants for Alaska*, University of Alaska Fairbanks Cooperative Extension Publication, latest edition.
4. *ANSI Standard A300 - American National Standards for Tree Care Operations - Tree, Shrub, and other Woody Plant Maintenance - Standard Practices*. American National Standards Institute, New York, New York, latest edition.
5. *ANSI Standard Z133 - Safety Requirements for Arboriculture American National Standard for Tree Care Operations*. American National Standards Institute, New York, New York.
6. *Manual of Woody Landscape Plants*, Michael A. Dirr, Stipes Publishing, LLC, 5th Edition, Champaign, Illinois.

D. SUBMITTALS

1. Fertilizer: Certificate, bearing manufacturer's guaranteed analysis. Submit 14 days prior to installation.
2. Plants: Source of plants including nursery location, address, and phone contact, bill of sale/invoice, nursery certificate, locked nursery tag with Owner and Contractor clearly identified, and proof of purchase shall be provided 30 days prior to planting for review and approval. This preliminary submittal does not relieve Contractor from final plant acceptance upon delivery to the site.
3. Shredded Bark Mulch: Submit sample of shredded bark mulch, source location, address and phone contact, bill of sale/invoice 14 days prior to installation for review and approval. Wood chips are not acceptable.
4. Substitutions: Submit requests for substitutions 30 days prior to planting.
5. Maintenance Schedule: Submit 30 days prior to installation for approval by the Owner's Representative. Maintenance Schedule shall indicate:
 - a. Watering schedule for trees, shrubs and, ground covers including deep watering.
 - b. Plant inspections.
 - c. Pruning.
 - d. Fertilization/Liming.

E. PRODUCT DELIVERY, STORAGE, HANDLING, AND REPLACEMENT

1. Deliver fertilizer in original unopened containers, each bearing manufacturers guaranteed analysis, name, trade names, and conformance with governing regulations and law.
2. Store materials in areas protected against harmful weather until product is used.
3. Remove unacceptable products from the job site immediately and replace with material acceptable to Owner's Representative.

F. NOTICES

1. Notify Owner's Representative 48-hours before planting, and 48-hours prior to Substantial Completion Inspection.
2. Notify Owner's Representative a minimum of two weeks before Owner assumes maintenance.
3. Notices to be provided in writing.

G. PROJECT/SITE CONDITIONS

1. Ensure potable water is available prior to the beginning of any planting operations and throughout the maintenance period.

H. PLANT MATERIAL INSPECTION

1. Onsite inspection: All plant material shall undergo a general inspection by Owner's Representative prior to planting. Its primary purpose is to ensure that the specified plant material has been brought to site with appropriate size, rootball size and condition, branching structure and health. No planting shall take place prior to this approval. It is the intent of Owner to avoid repeating installation tasks and to reduce the amount of disturbance plant replacements cause in already installed landscape beds.

Contractor shall notify Owner's Representative 48 hours prior to planting. This inspection shall under no circumstance nullify or influence the outcome of the inspection at Substantial Completion Inspection.

I. MAINTENANCE/WARRANTY

1. Provide a one-year maintenance and warranty period for all plant materials. Replacement plants for dead or damaged plant material will have an extended one-year maintenance and warranty period starting from the time of installation, or as approved by Owner's Representative.

Article 820.2 Materials

A. FERTILIZER

1. Provide 8-32-16 for the trees and shrubs as required.
2. Standard commercial types in moisture-proof containers. Each container shall be marked with the weight and the manufacturer's guaranteed analysis.
3. Tolerances of the chemical ingredients shall be plus or minus two percent.
4. No Cyanamid compounds or hydrated lime will be permitted in mixed fertilizers.

B. TREES, SHRUBS, AND GROUND COVERS

1. Substitutions: No substitutions will be accepted except with written permission given by Owner's Representative 30 days prior to planting. Oversize or exceptionally heavy plants are acceptable if the size of the ball or spread of the roots is proportionately increased to satisfaction of Owner's Representative in accordance with ANSI Z-60.1- 2004. Broken, loose, or manufactured balls will be rejected.
2. Quality: All plants shall be typical of the species or variety. All plants shall have normal, well-developed branches and vigorous root systems with no signs of being rootbound. They shall be undamaged, healthy, vigorous, and free from defects, disfiguring knots, abrasions of the bark, sunscald injuries, plant diseases, insect eggs, borers, and all other forms of infection.
3. Staking: All trees shall be staked as shown on Drawings.
4. Size and Grading Standards: Conform to ANSI Z60.1-2004.
5. Delivery: Protect from injury and desiccation. Plants coming from out-of-state certified growers and/or suppliers shall be certified by Federal authorities to be free from disease and infestation. Any inspection certificates required by law to this effect shall accompany each shipment invoiced or order of stock, and shall be filed with Owner's Representative.
6. Inspection: No plant material shall be planted by Contractor until it is inspected and approved by the Owner's Representative prior to planting. All rejected material shall be immediately removed from the site and replaced with approved material at no additional cost to the Owner.

C. WATER

1. Potable
2. Provide equipment using onsite source or Contractor provided source.

D. MULCH

Mulch shall consist of shredded bark mulch, wood chips or rock mulch as specified on the Drawings. Material shall be uniform in size, color, quality and overall appearance. Mulch shall be free of material injurious to plant growth. Sources of mulch should be free of weeds and invasive plant parts or seeds. Sawdust, dirt, garbage, or other debris mixed in the mulch is not acceptable. Contract shall submit two pounds of proposed mulch for inspection by Engineer.

1. Wood Chips

Wood chips shall consist of wood projects having a size of two and one-half inch (2-1/2") minus with a thickness not greater than three-eighths inch (3/8"). Wood chips shall be uniform in overall appearance, color, quality, and size and are subject to approval by Engineer. Wood chips are to be free of sawdust, dirt, twigs, excessive bark, or any other debris.

2. Shredded Bark Mulch

Shredded bark mulch shall consist of shredded bark and wood. Maximum length of any individual component shall be two inches (2") and a minimum of seventy-five percent (75%) of the mulch shall pass through a one inch (1") screen. Mulch shall be free of invasive weeds, seeds, or propagules. The bark mulch shall have the characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a good growth medium for plants. Shredded bark mulch may contain up to fifty percent (50%) shredded wood material. Wood chips are not acceptable. Bark mulch containing shredded wood shall be aged a minimum of one year prior to installation. Bark mulch shall be free of soil, rocks, and weeds.

3. Rock Mulch

Rock mulch shall be three to four inch (3" to 4") washed river rock, uniform in size. All fines shall be screened from the aggregate within a one-quarter inch (1/4") tolerance. Rock mulch shall be composed of round rocks that may be varied in color. The material shall be free of organic and inorganic debris and trash.

Article 820.3 Construction

A. INSPECTION

1. Examine subgrade areas for defects that will adversely affect the work.
2. Start of work shall mean acceptance of interfacing areas as capable of producing an acceptable job.
3. Do not plant until plant material has been inspected and determined acceptable by Owner's Representative.

4. Immediately remove all rejected materials from construction site.

B. EXISTING UNDERGROUND OBSTRUCTIONS

1. Request utility locates from local utilities.
2. Coordinate with mechanical, electrical, and other trades installing new underground work to determine their exact locations.
3. Should uncharted or incorrectly charted utilities be encountered notify Owner's Representative immediately.
4. Cooperate with Owner's Representative and utility companies in keeping their services in operation. Repair any damage to active underground utilities due to landscaping negligence.

C. PREPARATION OF PLANTS

1. Balled and burlapped plants shall have a solid ball of earth of minimum specified size held in place securely by burlap and stout rope.

D. PLANTING

1. Time of Planting: Start planting as early as practical and prudent in the spring and as approved by Owner's Representative.
2. Setting Plants: Each plant shall be planted in an individual planting pit or large planting beds as indicated on Drawings. All plants shall be set to finished grade ensuring that the base of the plant will not get buried too deep or too high.
3. Plant Orientation: At his option Owner's Representative shall approve orientation of plants.
4. No filling will be permitted around trunks or stems. Contractor shall remove wire baskets and burlap from the planting area. If a pulp nursery pot is used, it shall be removed from the planting area. Excess excavation from all holes shall be removed from the site or placed as approved by the Owner's Representative.
5. Backfilling, Planting Pits, and Planting Beds: Backfill in maximum six-inch layers with approved topsoil. Planting pits and beds shall be backfilled carefully to fill all voids and to avoid breaking root ball or bruising roots. Tamp backfill firm to prevent settlement. When pit is nearly filled, water thoroughly and allow water to soak away. If settling of the backfill occurs after watering, add more backfill to bring to finish grade.
6. For tree and shrub plantings in landscape beds, install shredded bark mulch around plants as shown on Drawings, but at a minimum of three inches in depth. No bark mulch shall be required where seeding is called for on Drawings. Remove mulch from the stems of trees and shrubs at a six-inch radius.

7. Watering: Thoroughly water each plant immediately following planting. Contractor shall follow the approved watering schedule and watering procedure throughout the duration of the planting and maintenance period of the Contract.
8. Pruning and Repair: All plants shall be neatly pruned and/or clipped to remove dead or diseased limbs in a manner that preserves the natural character of the plants. No plants shall be pruned or clipped prior to delivery. Broken or badly bruised branches shall be removed with a clean cut. All pruning shall be done with clean, sharp tools in accordance with standard nursery practice. All accidental damage to trees and shrubs occurring during the course of planting operations, which is not so great as to necessitate removal of a branch or replacement of a plant, shall promptly be treated as required in accordance with recognized horticultural practices. Pruning cuts shall not be painted. Under no circumstances shall leaders be pruned or damaged.
9. Staking: All trees shall be staked as shown on Drawings.

E. WASTE DISPOSAL

1. Dispose of unsuitable earth, debris, and unused plant materials legally off the site. Acceptable excavation from planting holes may be incorporated in grading operations.

F. MAINTENANCE/WARRANTY

1. General

- a. Provide a one-year maintenance and guarantee for all plantings beginning at the time of acceptance of the installation as complete. Perform all watering, weeding, pruning, fertilizing, and pest control necessary to maintain the plants in a vigorous, healthy condition. Obtain all certifications required to handle pesticides and herbicides.
- b. A Substantial Completion acceptance inspection shall be conducted upon installation of all plantings. No partial acceptance will be allowed. Contractor shall immediately remedy punch list items after inspection and request approval of outstanding items. A one-year warranty and continuing maintenance shall commence upon completion of punch list items. No partial acceptance will be granted for Substantial Completion.
- c. Scope of Maintenance: Furnish all labor, materials, equipment, supervision, traffic control, transportation, and secure all necessary permits and licenses required to maintain an attractive and healthy landscape. Meet requirements of the approved maintenance schedule.
- d. Work Force: Contractor shall have on his staff, supervisory personnel experienced in landscape maintenance. The crew is to be experienced and familiar with maintaining plant material in sub-arctic conditions.
- e. Materials: Shall conform to bid specifications.

- f. Replacement of Damaged Improvements: Repair and replace dead or damaged improvements within 14 days of written notice from Owner's Representative at no additional cost to Owner. Replacement plants will have an additional one-year maintenance and warranty commencing from the date of replacement.

2. Warranty

- a. Upon approval of Substantial Completion, commence a one-year warranty period and provide continuing maintenance.
- b. Owner's Representative shall have the right to periodically inspect the site during the warranty period.
- c. All planted areas which are found to be dead, or in an unhealthy or unsightly condition shall be replaced with new, healthy stock subject to the approval of Owner's Representative at no additional expense to Owner. This installation shall be subject to an additional one-year maintenance and warranty period commencing from the date of replacement.

3. Maintenance: Trees and Shrubs

- a. Watering: Deep water all trees and shrubs providing water penetration throughout the root zone to depth of planting pits in accordance with the following schedule:
 - i. Deep water all trees and shrubs at least twice a week during the first 90 days of the maintenance period. If these 90 days extend past September 30, the deep watering is to cease on that date and resume on May 1.
 - ii. Trees and shrubs shall then be deep watered at least once a week through the end of the maintenance period.
 - iii. Watering is not required between October 1 and May 1.
 - iv. If at any time during the maintenance period weather conditions (such as extended period with no rain or continuous drying winds) cause plant root zone to dry out, Owner's Representative may direct Contractor to deep water all trees and shrubs. This supplemental watering is to be done immediately and at no additional cost to the Owner.
 - v. Water applications shall be applied at a rate that will provide moisture penetration throughout the entire root ball with a minimum of run-off.
 - vi. In addition, Contractor shall deep water all evergreen plants just prior to freezeup in order to minimize over-wintering desiccation.
- b. Pruning: Trees and shrubs shall be pruned to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached; which have radial orientation so as to not overlay one another; to reduce

toppling and wind damage by thinning out crowns; to maintain a natural appearance, or intended shape, and to balance the crown with the roots. Under no circumstance will stripping of lower branches ("raising up") of young trees be permitted. Lower branches shall be retained in a tipped back or pinched condition with as much foliage as possible to promote caliper trunk growth. The primary pruning of deciduous trees is to be done during the dormant season. Damaged trees or those that constitute health or safety hazards shall be pruned at any time of the year as required. Do not prune leader.

- c. **Staking and Guying:** Inspect and adjust at least four times per year to prevent girdling of trunks or branches, and to prevent rubbing that causes bark wounds. Tree stakes damaged or missing, regardless of the cause, shall be immediately replaced by Contractor at no cost to Owner. All tree stakes are to be removed by Contractor at the end of the one-year maintenance and guarantee period at no additional cost to Owner. Owner maintains the right to leave staking in place beyond the required maintenance period without compensation to Contractor for staking materials.
- d. **Plant Repair and Cleanup:** Plant repair shall occur after plant materials have been damaged, such as broken branches from ice, snow, wind, and equipment. Repair shall include pruning, treating wounds and guying and staking as necessary.
- e. **Fertilize:**
 - i. One month following installation in accordance with the Fertilizer Schedule.
 - ii. **Trees:** Spring of each year and in July in accordance with schedule. Fertilizer shall be placed by drilling holes in the ground from the drip line of the tree to the trunk and placing the fertilizer in the holes.
 - iii. **Shrubs:** Spring and in July in accordance with maintenance fertilizer schedule. Leaves of the plants should be dry at the time of application. Thoroughly water fertilizer into ground.

Maintenance Fertilize Schedule

Plant Type	Fertilizer	Application Rate
Trees	8-32-16	1/3 lb. for each 1" cal.
Shrubs	8-32-16	1/3 lb. for each 18" plant

- iv. **Diseases and Pests:** Apply State/Federally approved pesticide or insecticide as necessary to maintain plant materials in a healthy and growing condition.
- v. **Other Maintenance Requirements:** Spray coniferous trees with antidesiccant in accordance with manufacturer's recommendations in the fall of each year of the maintenance period.
- vi. Contractor shall maintain plant pits in a weed-free condition. Weed removal shall be a routine maintenance activity that periodically occurs, as approved by the owner's Representative.

- f. Cleanup: Keep the project site clean and free of excess equipment, materials and rubbish at all times.
- 4. Final Acceptance: Request Final Acceptance inspection one week prior to required inspection. Shall be held approximately one year from acceptance of Substantial Completion.
 - a. All items must be healthy and appear to be well maintained.
 - b. Owner's Representative will accept items that have been maintained in satisfactory manner for the specified maintenance/warranty period. Those items that have been planted for over three months of a growing period may be accepted by Owner's Representative if displaying healthy growth. Owner's Representative reserves the right to require one-year maintenance and warranty of plant materials that were installed as replacements.

Article 820.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Items listed below that are included in the Bid Schedule.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
820(1)	Trees (by species and size as indicated on Drawings)	Each
820(2)	Shrubs (by species and size as indicated on Drawings)	Each
820(3)	Ground Cover (by species and size)	Each
820(4)	Perennials (by species and size)	Each

END OF SECTION 820

SECTION 821 TEST PITS

Article 821.1 Description

The work under this Section consists of performing all operations pertaining to digging test pits to verify existing horizontal and vertical utility locations where indicated in the Drawings.

Article 821.2 Construction

Test pits shall be performed prior to beginning utility construction. Contractor shall obtain horizontal and vertical locations for the utilities in question and provide updated utility locate information to Engineer for evaluation before proceeding with construction. Engineer will revise the design and issue updated Drawings to Contractor as needed.

Article 821.3 Method of Measurement

Each test pit will be measured per unit. Test pit dimensions are assumed to be 10 ft X 10 ft at the ground surface.

Article 821.3 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for the Pay Items listed below that are included in the Bid Schedule.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
821(1)	Test Pit	Each

END OF SECTION 821

SECTION 822 REMOVE GUARDRAIL

Article 822.1 General

The Work under this Section consists of providing all operations and furnishing all equipment and materials pertaining to the removal and salvage or disposal of guardrail designated for removal on the Drawings or as directed by Engineer.

Article 822.2 Construction

Contractor shall remove the guardrail, bolts, and supporting posts and deliver them to a location as directed by Engineer. If guardrail and supporting posts are not salvaged, Contractor shall dispose of the material in accordance with Section 209, Disposal of Unusable or Surplus Material..

Excavation and backfill required in the removal of the guardrail, bolts, and supporting posts is incidental to the bid item. Contractor shall backfill the excavation with native non organic material.

Article 822.3 Measurement

Removal and salvage or disposal of the guardrail, bolts, and supporting posts is measured per linear foot along the face of the guardrail. Delivery of guardrail and associated components to Engineer-designated location or disposal is incidental to the pay item and no additional payment will be made.

Article 822.4 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment is made under the following unit:

ITEM NO.	DESCRIPTION	UNIT
822(1)	Remove Guardrail	Linear Foot

END OF SECTION 822

SECTION 823 GUARDRAIL

Article 823.1 General

The Work under this Section consists of providing all operations pertaining to the construction of guardrails.

Only one type of material shall be used on any one specific guardrail installation, unless otherwise approved by the Engineer.

Article 823.2 Material

- A. Steel rail elements shall conform to the requirements of AASHTO M-180, Class B, unless a lighter weight rail is specifically called for on the Drawings or in the Specifications. Terminal sections shall not be less than twelve (12) gauge.
- B. The bolts and nuts shall be galvanized steel and shall conform to the requirement of ASTM A-153, Class C and ASTM A-307.
- C. Guardrail posts shall be of either wood or steel as specified.
 - 1 Wood posts shall be grade posts and timbers, or better, as rated by the West Coast Lumber Inspection Bureau, and shall be fabricated from one of the following timber species, unless otherwise approved: a) Douglas Fir; b) Western Pine; c) Larch, or; d) Hemlock. The length and cross-section of the posts shall be as shown on the Standard Details unless otherwise noted. Timber posts shall be treated with one of the following preservative treatments: a) Creosote Oil; b) Creosote-coal tar solution; c) Creosote-petroleum solution; d) Pentachlorophenol. Preservative treatments for wood shall conform to the applicable requirements of AASHTO M-133.
 - 2 Steel posts shall be of the section and length as specified or as shown on the Drawings. They shall be of copper bearing steel when so specified. Steel shall conform to the requirements of ASTM A 36 for the grade specified, or, for new railroad rail posts, of ASTM A 1 for the unit weight of rail specified.

The posts shall be galvanized or shop painted as specified.

Article 823.3 Construction

The construction of guardrails shall be in conformance with the manufacturer's recommendations, the Standard Details, and as directed by Engineer.

Article 823.4 Measurement

Guardrails will be measured per linear foot along the face of the rail, including end sections.

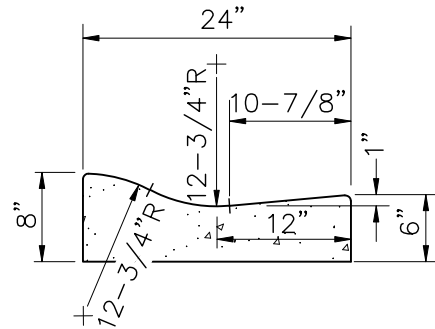
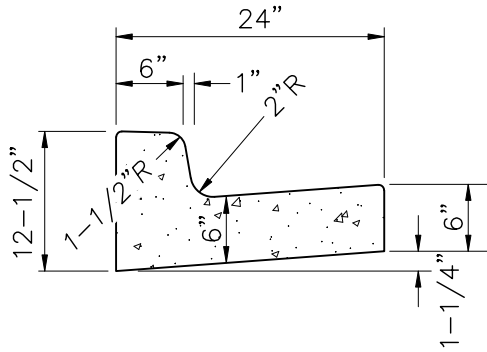
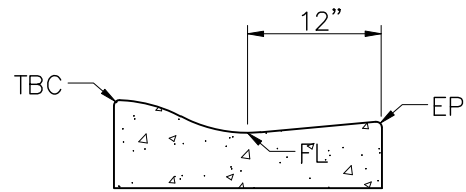
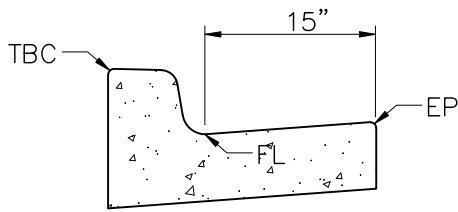
Article 823.5 Basis of Payment

Payment will be made at the Contract Price, per unit of measurement for each of the Pay Items listed below that is included in the Bid Schedule.

Payment shall be made under the following unit:

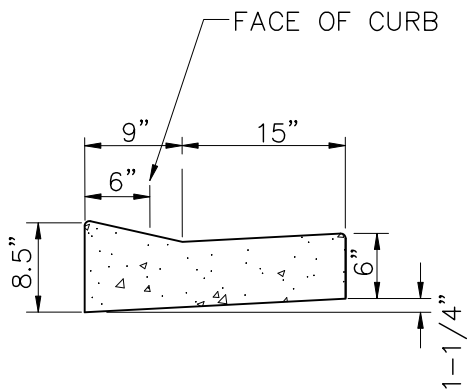
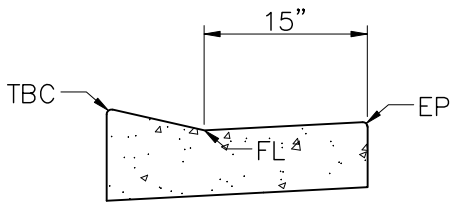
ITEM NO.	DESCRIPTION	UNIT
823(1)	Guardrail (Gauge)	Linear Foot

END OF SECTION 823



STANDARD CURB & GUTTER (TYPE 1)

ROLLED CURB & GUTTER (TYPE 2)



DEPRESSED CURB & GUTTER (TYPE 3)

CURB TYPE	ELEVATION @		
	EP=	FL=	TBC=
TYPE 1	CL-WXS	EP-0.07'	FL+0.51'
TYPE 2	CL-WXS	EP-0.08'	FL+0.25'
TYPE 3	CL-WXS	EP-0.07'	FL+0.17'

ABBREVIATIONS:

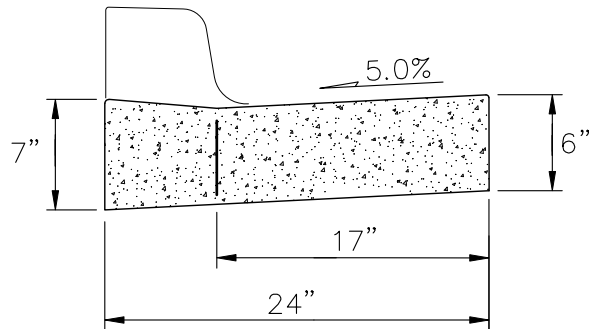
CL- CENTERLINE ELEVATION
W- DISTANCE PERPENDICULAR TO
CENTERLINE MEASURED FROM
CENTERLINE TO EDGE OF PAVEMENT
EP- EDGE OF PAVEMENT
FL- FLOW LINE
TBC- TOP BACK OF CURB
S- SLOPE OF ROAD



SCALE:
NTS
APPROVED:
REVISED:
7/12

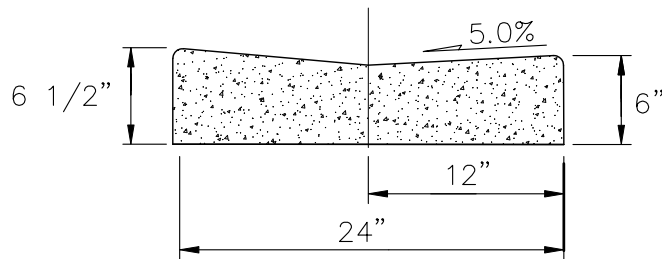
CURB AND GUTTER CROSS SECTIONS

SECTION:
302
DETAIL #
300-1



**P.C.C. CURB AND GUTTER
TYPE 1A**

(FOR USE IN CURB RAMPS)



**P.C.C. CURB AND GUTTER
TYPE 2A**

(FOR USE IN CURB RAMPS)

NOTES:

1. TRANSITION CURBS TO MAINTAIN CONSTANT FLOWLINE ACROSS CURB RAMP AND AROUND CURB RETURN PER THE DRAWINGS.



SCALE:
NTS
APPROVED:

REVISED:
7/12

**ACCESIBLE (TYPE 1A/2A)
CURB AND GUTTER
SECTIONS**

SECTION:
302
DETAIL #
300-2

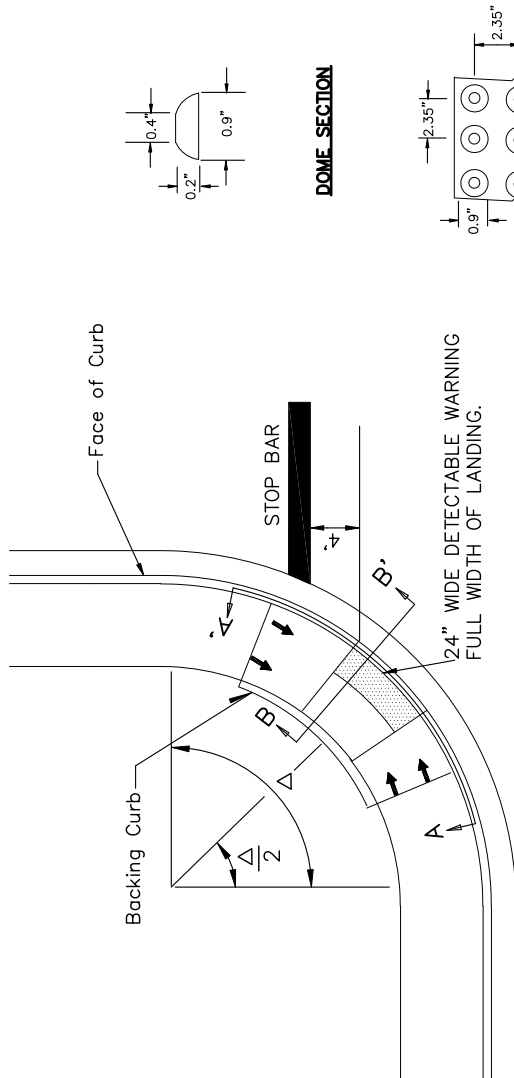


SCALE:
NTS
APPROVED:

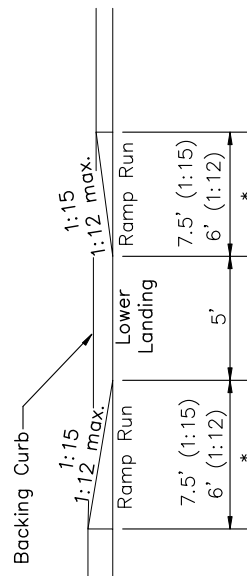
REVISED:
7/12

PARALLEL CURB RAMP

SECTION:
305
DETAIL #
300-3

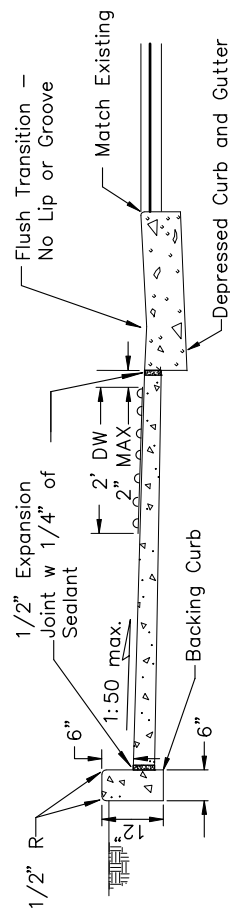


SKewed INTERSECTION



* See note 2

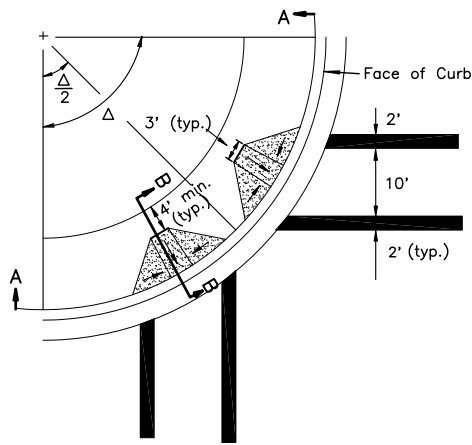
PROFILE A-A'



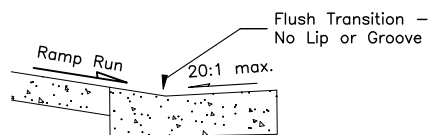
SECTION B-B'

CURB RAMP NOTES

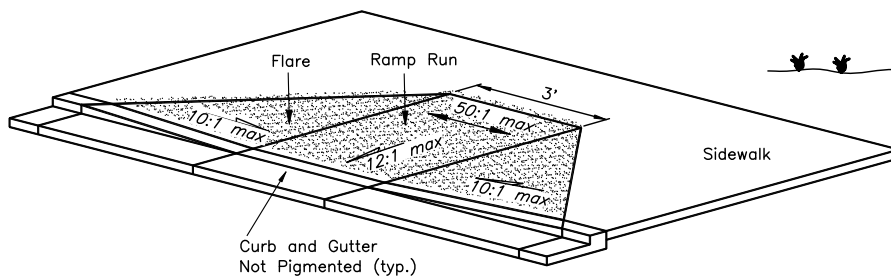
1. CURB RAMPS SHALL BE CENTERED WITHIN THE CURB RETURN. CROSSWALK STRIPES SHALL BE CENTERED ON BOTTOM LANDING. STOP BARS SHALL BE LOCATED 4' BEHIND BOTTOM LANDING...
2. LANDINGS, AT TOPS AND BOTTOMS OF PARALLEL RAMPS, SHALL BE 5' LONG AND HAVE A MAXIMUM 2% SLOPE IN ALL DIRECTIONS. WHEN EXISTING SIDEWALK ADJACENT TO RAMP EXCEEDS 2% SLOPE, IT SHALL BE REMOVED AND PAID FOR UNDER "REMOVAL OF SIDEWALK OR CONCRETE APRON" OR "REMOVE EXISTING PAVEMENT" AND REPLACED UNDER "PCC SIDEWALK" (4" THICK) OR A.C. PAVEMENT (CLASS III B) UP TO 5' BEYOND CURB RAMP OR CURB RETURN, WHICHEVER IS FURTHER.
3. MAXIMUM RAMP SLOPE SHALL BE 1' VERTICAL TO 12' HORIZONTAL (1:12), WITH A 2% CROSS SLOPE, FOR ALL NEW CONSTRUCTION.
4. RAMP WIDTH SHALL BE THE WIDTH OF THE SIDEWALK/TRAIL, OF WHICH AT LEAST 36" SHALL BE FREE OF OBSTRUCTIONS.
5. ALL SLOPES ARE IN REFERENCE TO THE HORIZONTAL.
6. NEWLY CONSTRUCTED PCC CURB RAMPS WHICH JOIN EXISTING PCC SIDEWALKS SHALL HAVE TWO (2) #5 X 1' REBAR KEYED 6" INTO THE EXISTING PCC SIDEWALK FOR EACH SIDE OF THE CURB RAMP 2 - 3 INCHES FROM THE MATCHING CORNER POINTS/COLD JOINTS.
7. PAYMENT FOR ALL PCC CURB & GUTTER, INCLUDING TRANSITION AND MODIFIED PCC CURB AND GUTTER, SHALL BE PAID UNDER THE BID ITEM "CURB & GUTTER, ALL TYPES."
8. BACK OF RAMP CURB: FORM CURB AS DIRECTED BY THE ENGINEER TO MATCH EXISTING GROUND. PAYMENT FOR THIS CURB SHALL BE MADE UNDER THE BID ITEM "PCC CURB RAMP" AND NO ADDITIONAL PAYMENT SHALL BE MADE. PAYMENT FOR GRADING SHALL BE INCIDENTAL TO BID ITEM "CURB RAMP" AND NO ADDITIONAL PAYMENT SHALL BE MADE. TOPSOIL (4" DEPTH) AND SEED SHALL BE PLACED ON DISTURBED GRASS AREAS.
9. RAMPS SHALL HAVE A BROOMED FINISH RUNNING PERPENDICULAR TO THE DIRECTION OF TRAVEL.
10. RAMP LOCATIONS MAY BE ADJUSTED TO ENSURE MINIMUM 36" CLEARANCE AROUND SIGNAL POLES, CATCH BASINS, J-BOXES, SIGNS, AND POWER POLES. PRIOR TO PLACEMENT OF CONCRETE, THE RAMP LAYOUT AND LOCATION SHALL BE APPROVED BY THE ENGINEER.
11. IF FLOWLINE SLOPE EXCEEDS 2%, RAMP LENGTH SHOWN IN DETAILS MUST BE INCREASED TO MAINTAIN 1:12 RAMP SLOPE TO A MAXIMUM OF 8' IN LENGTH.
12. RAMPS SHALL HAVE THE OUTSIDE EDGES AND JOINTS TRIMMED WITH A 1/4-INCH RADIUS EDGING TOOL.
13. DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES.
14. DETECTABLE WARNING TILES SHALL BE ARMOR TILE CAST-IN-PLACE IN-LINE TACTILE PANELS; MANUFACTURED BY ENGINEERED PLASTICS, INC., OR APPROVED EQUAL. THE TILES SHALL BE COLORED SAFETY YELLOW.



**Two Crossing Directions
At Corner**



DETAIL "C"



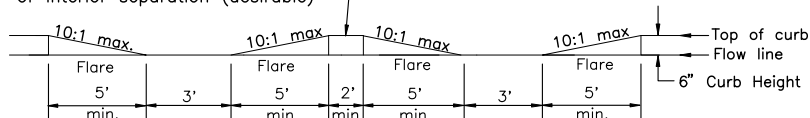
Sidewalk

Curb and Gutter
Not Pigmented (typ.)

*Narrow to existing
sidewalk width, if
necessary, beyond the
radius point (typ.).*

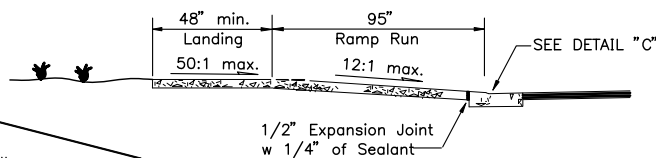
**One Crossing Direction
At Corner**

Mid point of radius = mid point
of interior separation (desirable)



PROFILE A-A

** Adjust width of inner separation to keep ramp runs within the
inner edges of marked crosswalks or, if crosswalks aren't marked,
within the area a standard marked crosswalk would enclose.*



SECTION B-B

NOTES.

Mid-Block

1. Perpendicular curb ramps require approximately 12' of sidewalk width. Use parallel or combination parallel/perpendicular curb ramps for narrower widths.
2. A single central curb ramp (not shown) should be used only when installing two ramps is not feasible. When used, applicable layout details should correspond with those shown on the mid-block detail.
3. See plans for ramp type at particular locations.
4. Ramp runs and flares shall be concrete, regardless of whether the sidewalk is asphalt or concrete.
5. Ramp runs shall fall within the inner edges of marked crosswalks or, if crosswalks are not marked, within the area a standard marked crosswalk would enclose.
6. Ramp run and flare lengths shown pertain to 6" curb heights and no longitudinal sidewalk slope. For other heights and slopes, increase or decrease run and flare lengths to maintain the slopes shown.
7. Where sidewalk slope makes it necessary to lengthen a ramp run to avoid exceeding the allowable slope, it should not be made longer than 10 feet for a 6" curb height or, in general, 20 times the curb height. Similarly, a flare should not be made longer than 6 feet for a 6" curb height or, in general, 12 times the curb height. The slopes resulting from those run or flare lengths are acceptable, even if they exceed the maximum slopes shown.
8. Concrete for ramp runs and flares shall have a coarse broomed finish running parallel to the curb.
9. Ramp runs and flares shall be colored full depth with 2 pounds of Davis Color 160 per sack of concrete.
10. As the One Crossing Direction detail shows, if pedestrians cross in only one direction from a radius, a single curb ramp should be located as if there were two so another can be added later, if needed.
11. Drainage inlets should not be located within marked crosswalks, or, if crosswalks aren't marked, within the area a standard marked crosswalk would enclose. If that is unavoidable, accessible grates, with openings no greater than 1/2" in any direction, shall be used.
12. The 10:1, 12:1, and 50:1 slopes shown are the steepest slopes allowed by law (except as provided under note 7). Special care should be taken to not exceed these slopes.
13. Flares may be replaced with a vertical curb at locations where access to the side of a ramp run is blocked by poles, utility boxes, other obstructions, or by a non-accessible surface such as a dirt planter strip. See Standard Drawing I-20 for details.
14. Ramp runs shall be perpendicular to the face of curb.

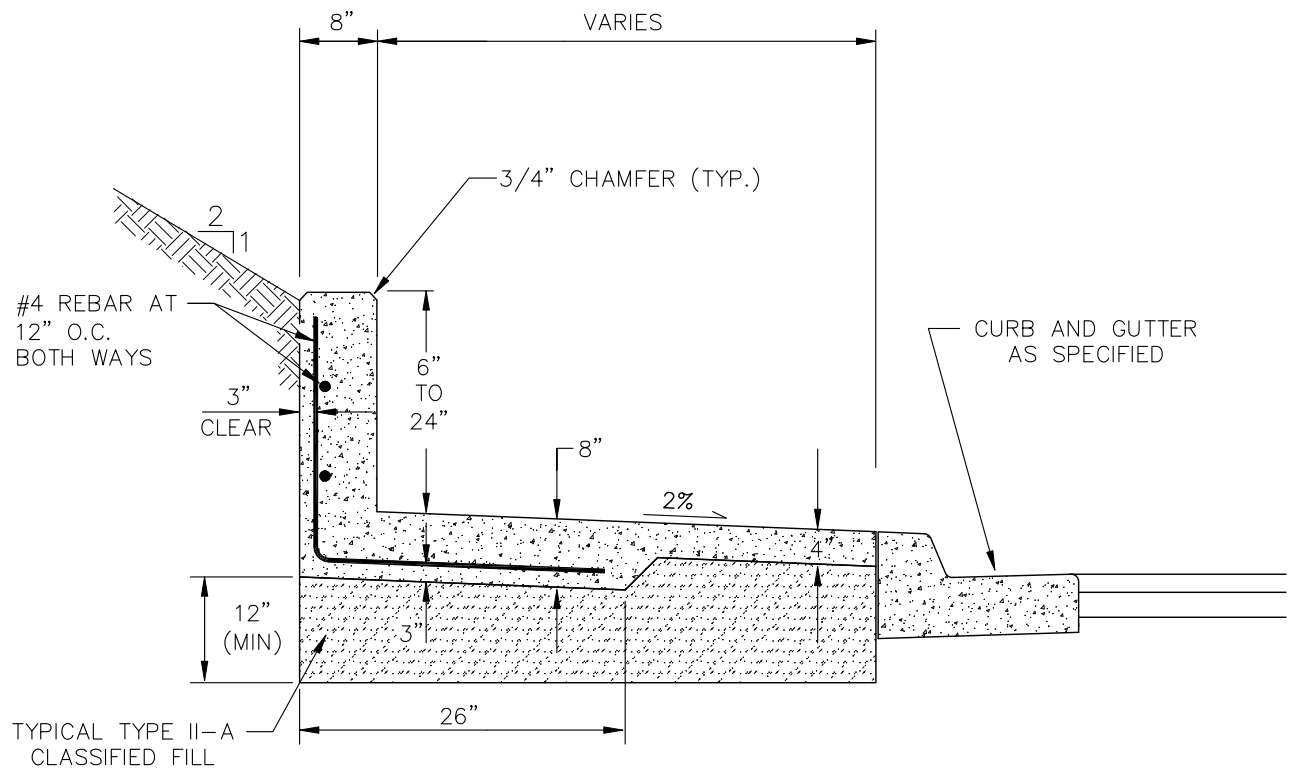


SCALE:
NTS
APPROVED:

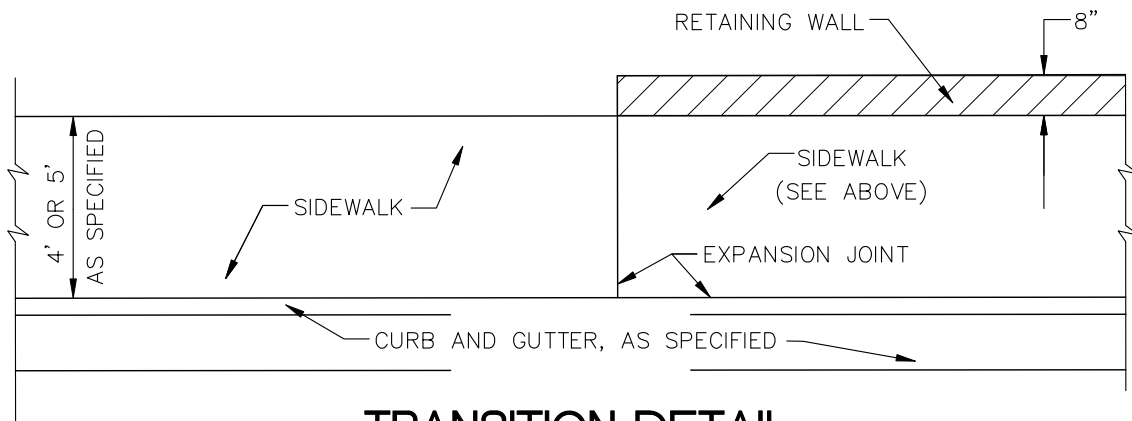
REVISED:
7/12

PERPENDICULAR CURB RAMP

SECTION:
305
DETAIL #
300-4



SIDEWALK RETAINING WALL



TRANSITION DETAIL (PLAN VIEW)

NOTES:

1. STANDARD CURB AND GUTTER SECTION NOT INCLUDED IN UNIT BID PRICE FOR RETAINING WALL.
2. PLACE ONE CUBIC FOOT OF POROUS BACKFILL MATERIAL AROUND WEEP HOLE AS SHOWN.
3. PROVIDE 3/4" CHAMFER AT ALL OUTSIDE EDGES.

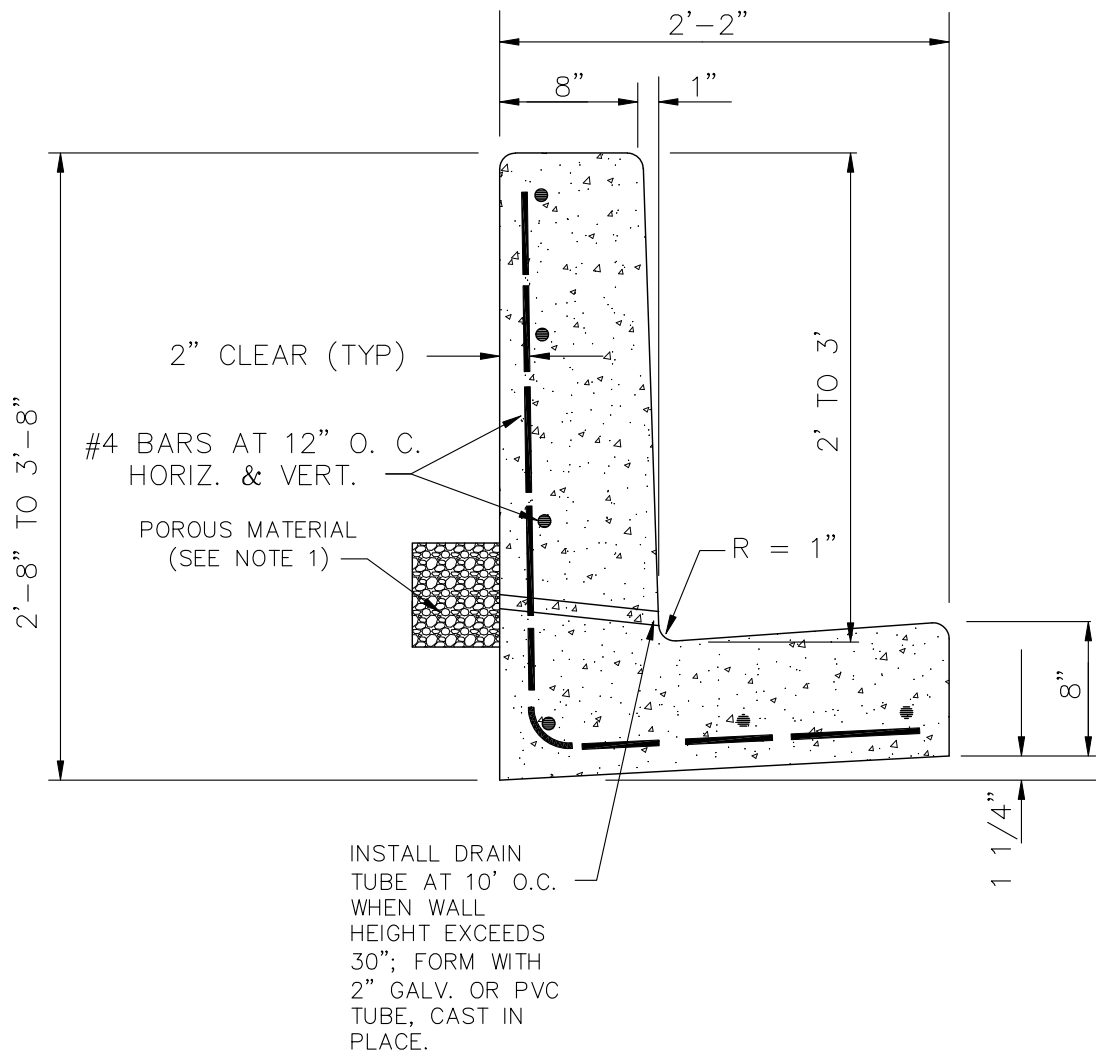


SCALE:
NTS
APPROVED:

REVISED:
7/12

SIDEWALK RETAINING WALL **6" TO 24"**

SECTION:
304
DETAIL #
300-5



NOTE:

1. PLACE ONE CUBIC FOOT OF POROUS BACKFILL MATERIAL AROUND WEEP HOLE AS SHOWN
2. PROVIDE 3/4" CHAMFER AT ALL OUTSIDE EDGES.

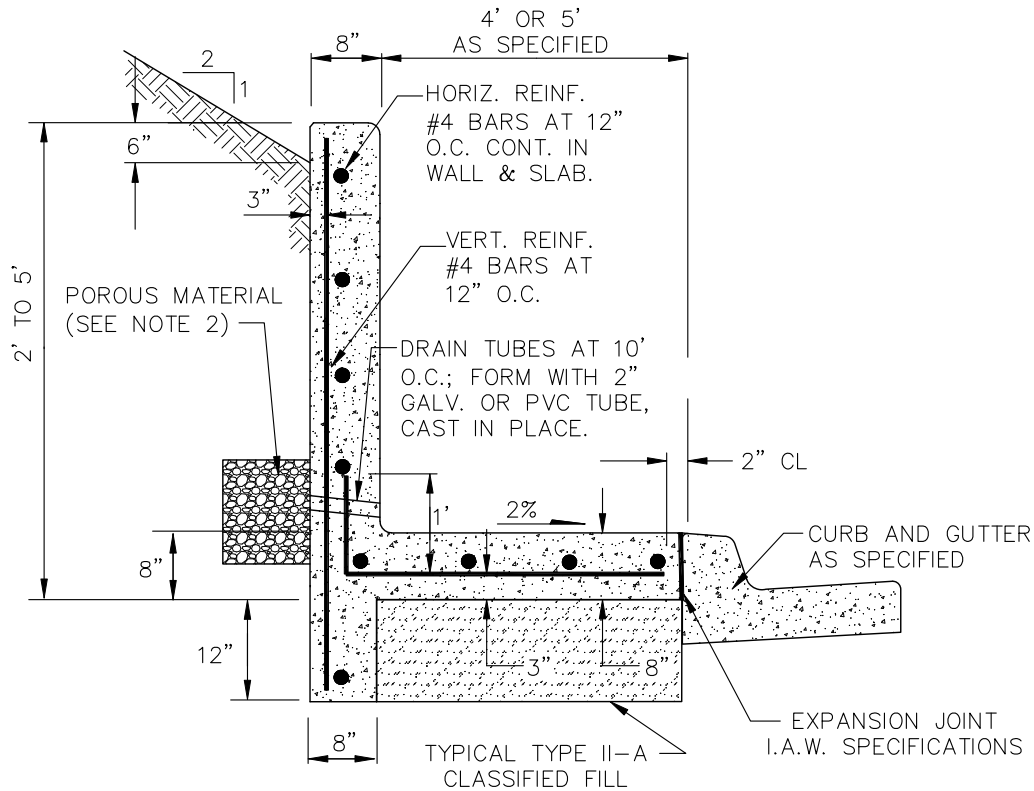


SCALE:
NTS
APPROVED:

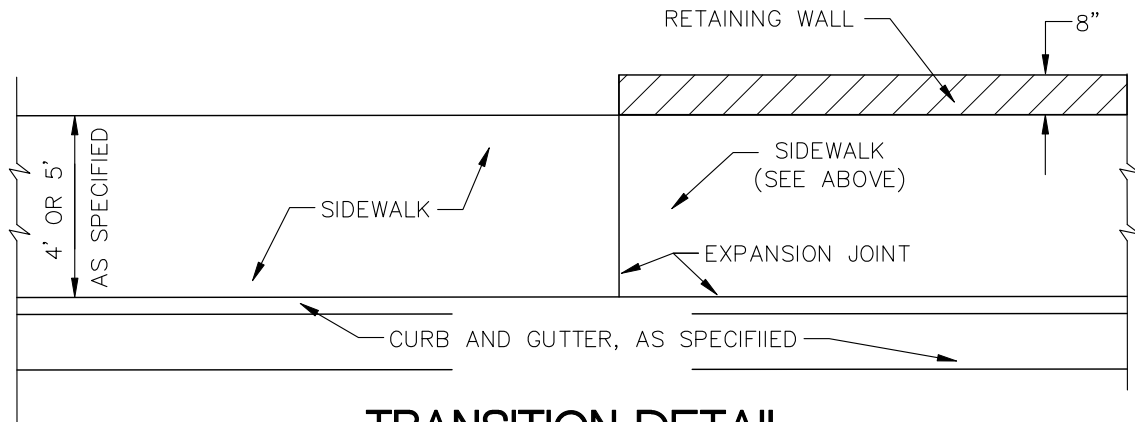
REVISED:
7/12

CURB TYPE RETAINING WALL **2' TO 3'**

SECTION:
304
DETAIL #
300-6



SIDEWALK RETAINING WALL



TRANSITION DETAIL (PLAN VIEW)

NOTES:

1. STANDARD CURB AND GUTTER SECTION NOT INCLUDED IN UNIT BID PRICE FOR RETAINING WALL.
2. PLACE ONE CUBIC FOOT OF POROUS BACKFILL MATERIAL AROUND WEEP HOLE AS SHOWN.
3. PROVIDE 3/4" CHAMFER AT ALL OUTSIDE EDGES.

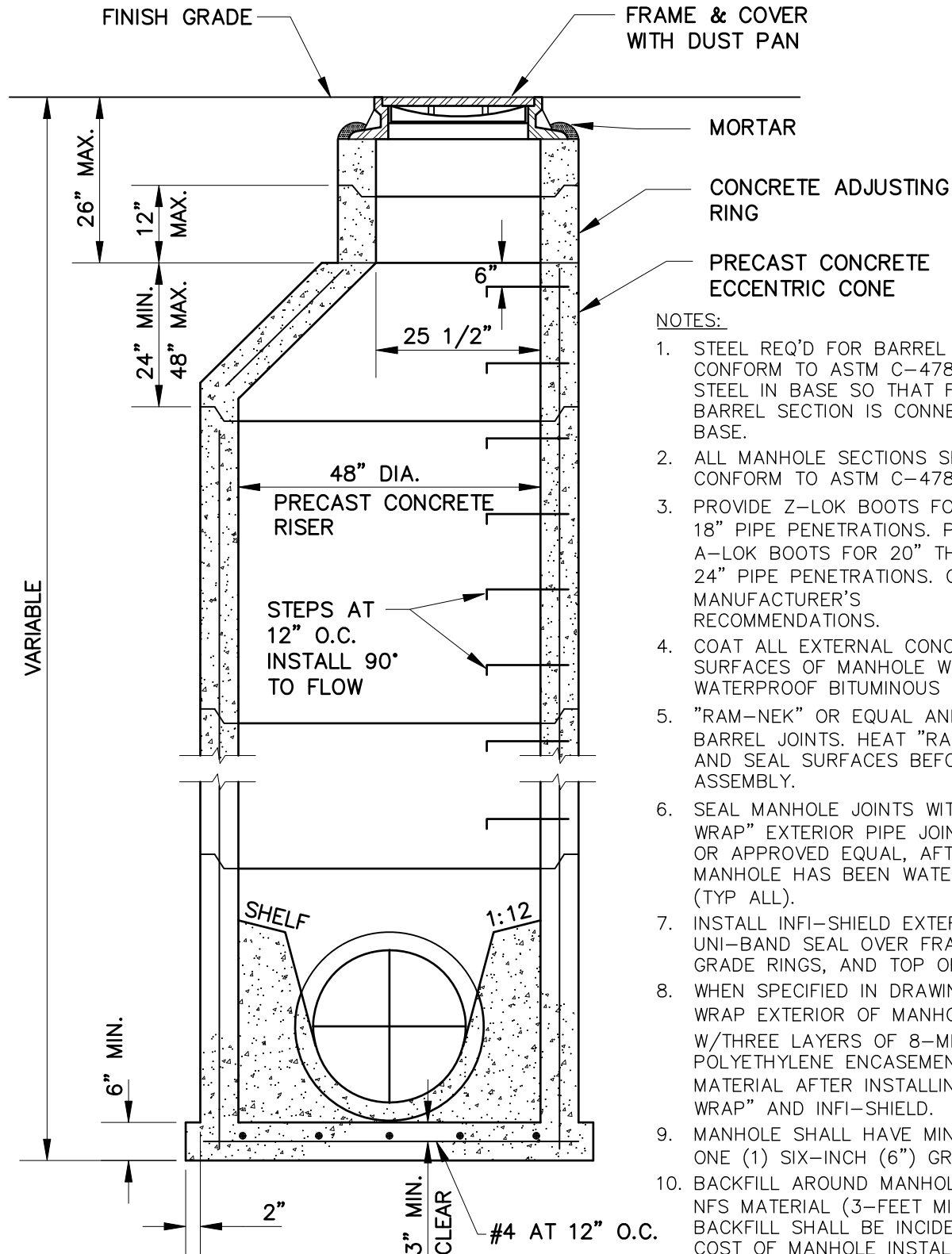


SCALE:
NTS
APPROVED:

REVISED:
7/12

SIDEWALK RETAINING WALL **2' TO 5'**

SECTION:
304
DETAIL #
300-7



NOTES:

1. STEEL REQ'D FOR BARREL SHALL CONFORM TO ASTM C-478. IMBED STEEL IN BASE SO THAT FIRST BARREL SECTION IS CONNECTED WITH BASE.
2. ALL MANHOLE SECTIONS SHALL CONFORM TO ASTM C-478.
3. PROVIDE Z-LOK BOOTS FOR 8" TO 18" PIPE PENETRATIONS. PROVIDE A-LOK BOOTS FOR 20" THROUGH 24" PIPE PENETRATIONS. GROUT PER MANUFACTURER'S RECOMMENDATIONS.
4. COAT ALL EXTERNAL CONCRETE SURFACES OF MANHOLE WITH WATERPROOF BITUMINOUS COATING.
5. "RAM-NEK" OR EQUAL AND PRIME BARREL JOINTS. HEAT "RAM-NEK" AND SEAL SURFACES BEFORE FINAL ASSEMBLY.
6. SEAL MANHOLE JOINTS WITH "MAC WRAP" EXTERIOR PIPE JOINT SEALER OR APPROVED EQUAL, AFTER MANHOLE HAS BEEN WATERPROOFED (TYP ALL).
7. INSTALL INFI-SHIELD EXTERNAL UNI-BAND SEAL OVER FRAME, GRADE RINGS, AND TOP OF CONE.
8. WHEN SPECIFIED IN DRAWING WRAP EXTERIOR OF MANHOLE W/THREE LAYERS OF 8-MIL THICK POLYETHYLENE ENCASMENT MATERIAL AFTER INSTALLING "MAC WRAP" AND INFI-SHIELD.
9. MANHOLE SHALL HAVE MINIMUM OF ONE (1) SIX-INCH (6") GRADE RING.
10. BACKFILL AROUND MANHOLE WITH NFS MATERIAL (3-Feet MINIMUM). BACKFILL SHALL BE INCIDENTAL TO COST OF MANHOLE INSTALLATION.

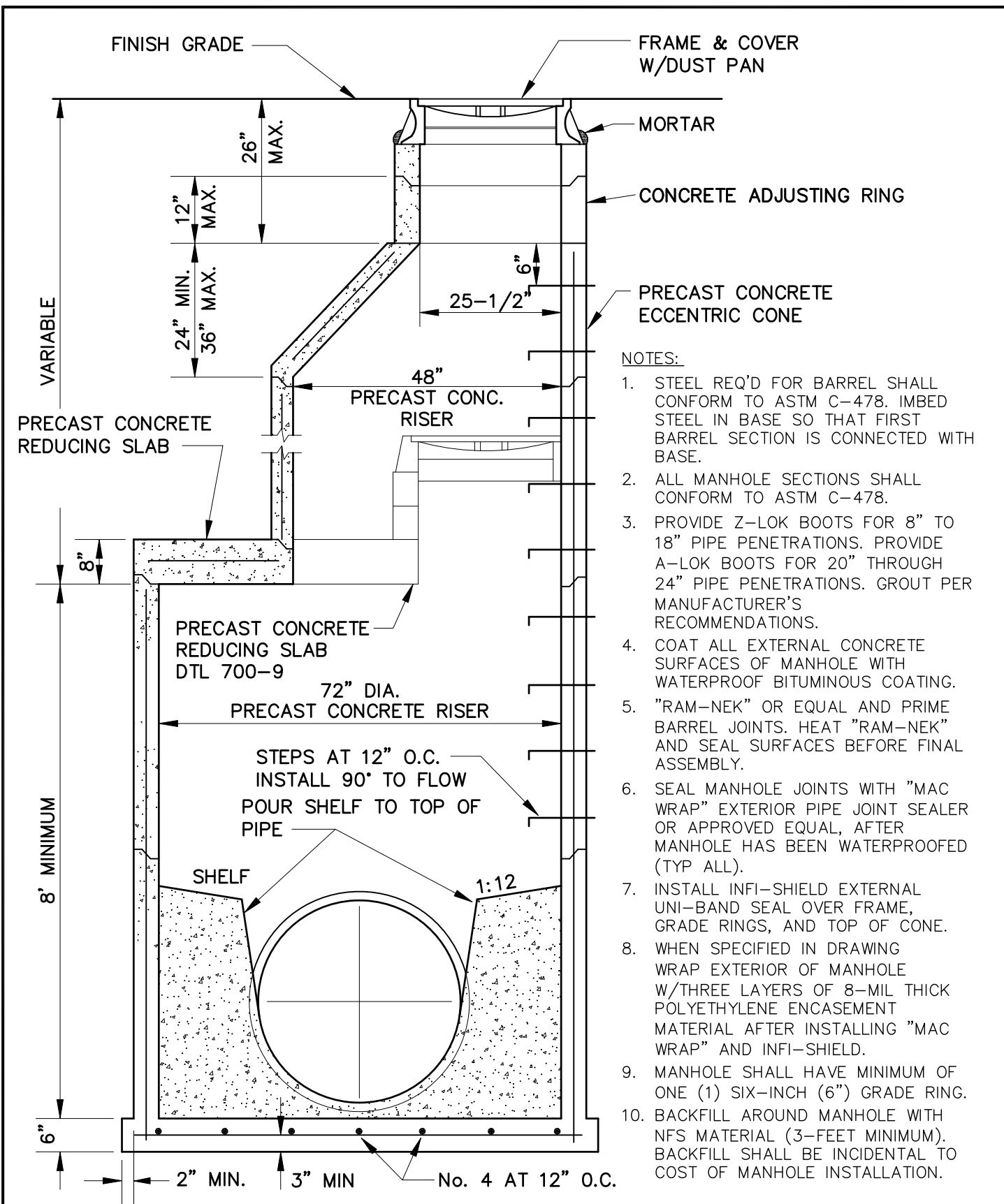


SCALE:
NTS
APPROVED:

REVISED:
7/12

SANITARY MANHOLE TYPE A

SECTION:
503
DETAIL #
500-1



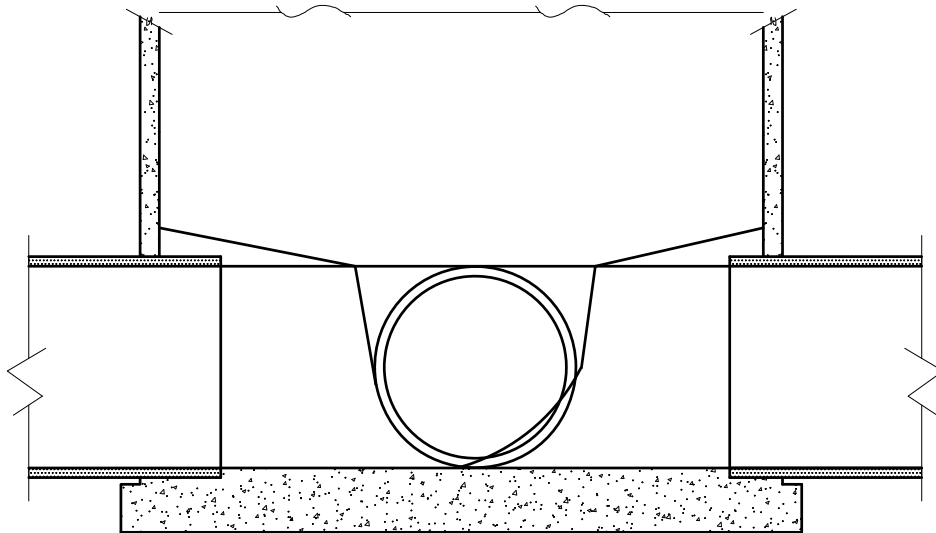
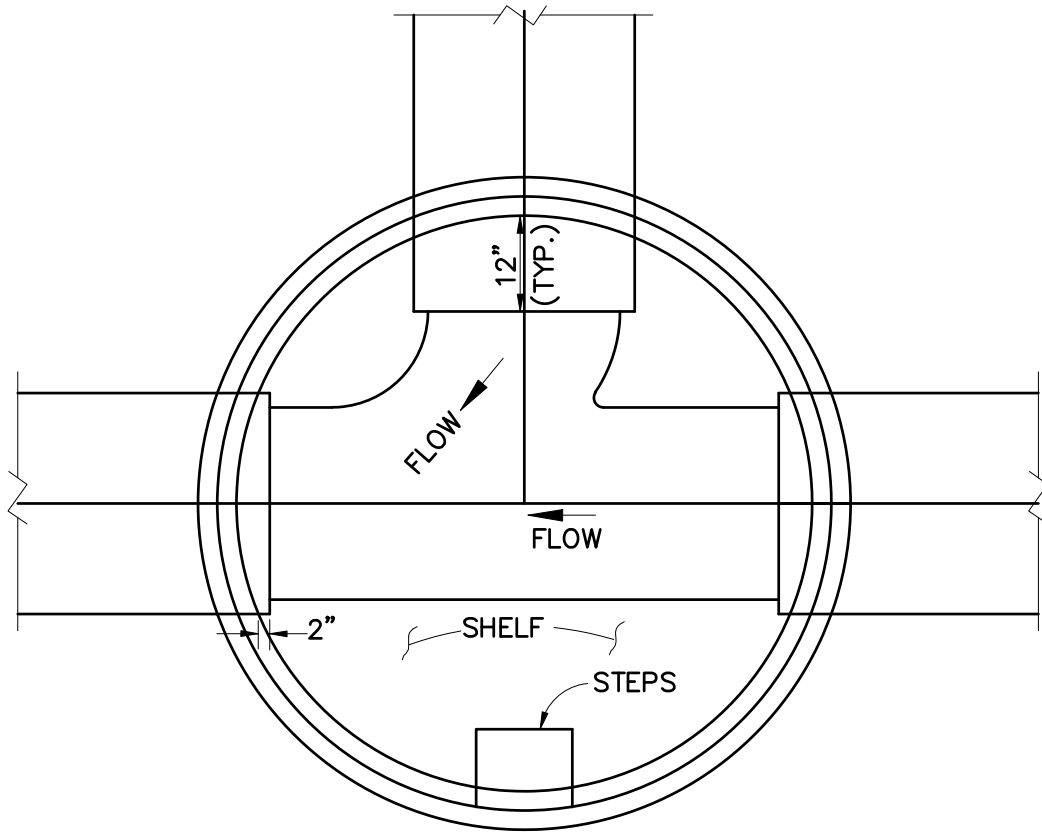
SCALE:
NTS
APPROVED:
REVISED:
7/12

SANITARY MANHOLE TYPE B

SECTION:
503
DETAIL #
500-2



- KEY AS SHOWN IF NOT POURED
MONOLITHIC.

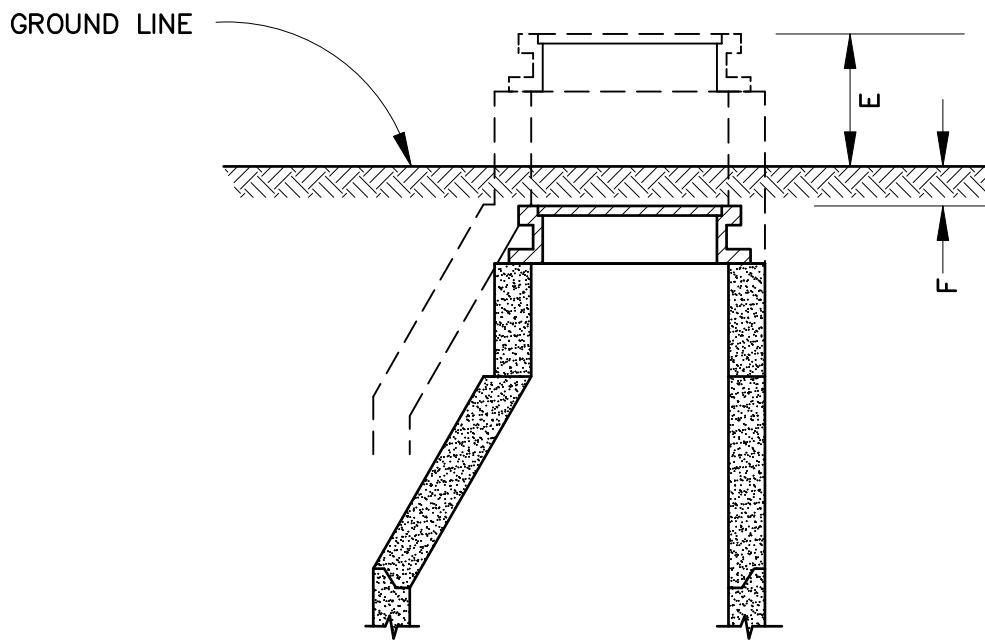


SCALE:
NTS
APPROVED:

REVISED:
1/00

TYPE A AND B MANHOLE BASE PLAN

SECTION:
503
DETAIL #
500-4



LOCATION	E	F
BACKYARDS, GRAVEL STREETS, AND ALLEY AREAS WHERE TRAVELED.		6"–12"
UNDEVELOPED AND SWAMPY AREAS.	24" MIN	
R.O.W.S OUTSIDE TRAFFIC AREAS.	6"	
PAVED STREETS.		1/2"–3/4"

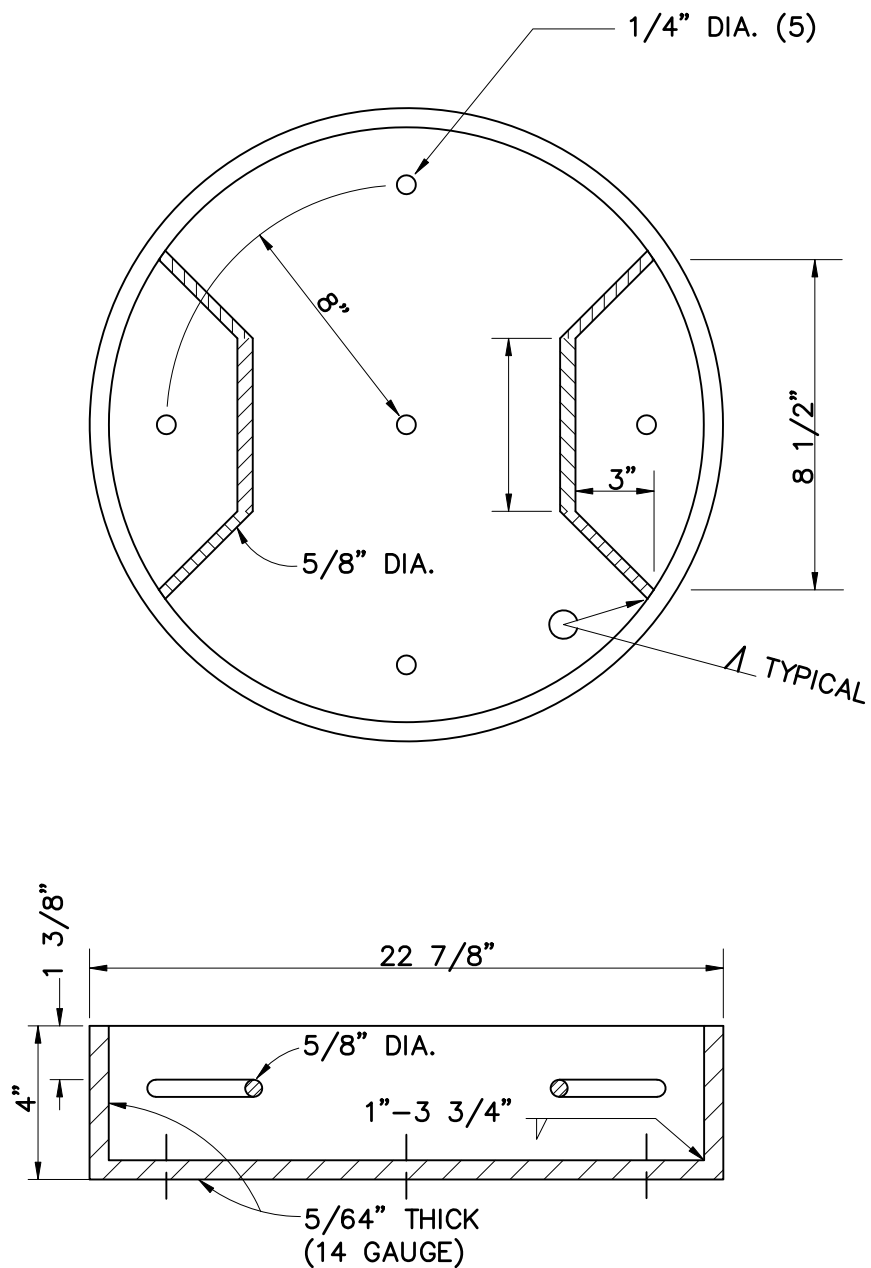


SCALE:
NTS
APPROVED:

REVISED:
1/00

MAHNOLE HEIGHTS

SECTION:
503
DETAIL #
500–5



NOTE:
FINISH: PAINT PAN WITH BLACK ENAMEL.

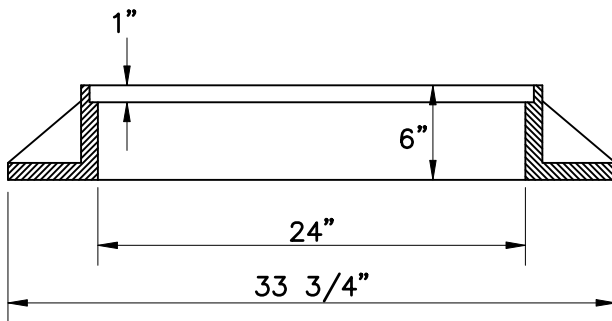
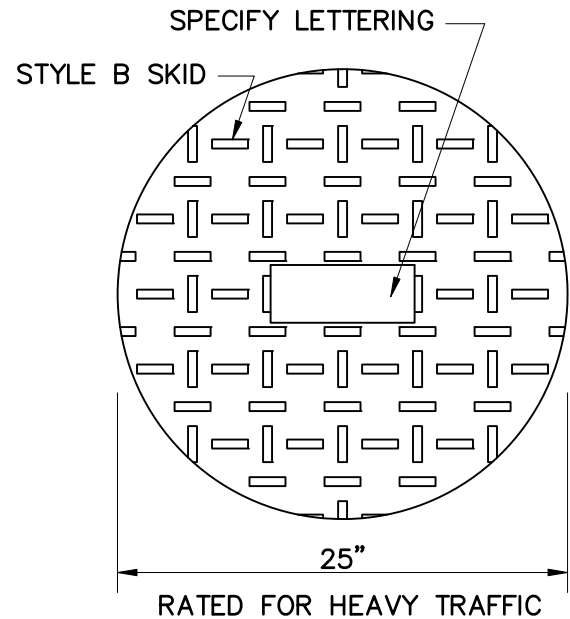
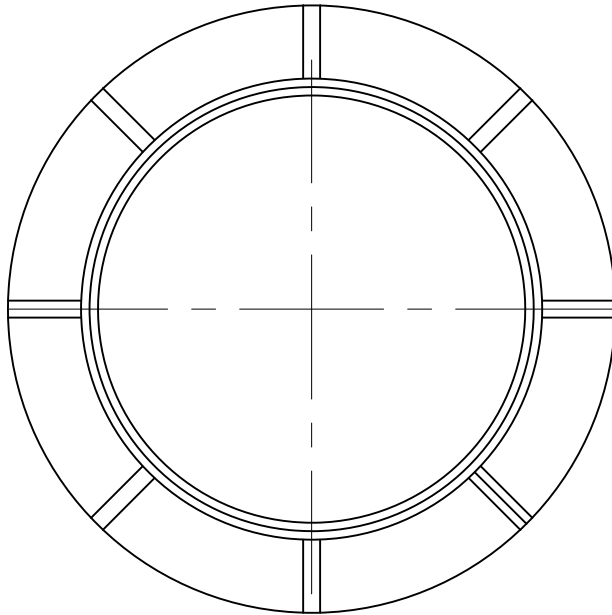


SCALE:
NTS
APPROVED:

REVISED:
1/00

DUST PAN

SECTION:
503
DETAIL #
500-6



NOTE:

USE EAST JORDAN IRON WORKS, INC — MODEL 3717 FRAME
& COVER, WITH A POCKET LIFT HANDLE AND CONSTRUCTED
OF DUCTILE IRON OR EQUIVALENT.

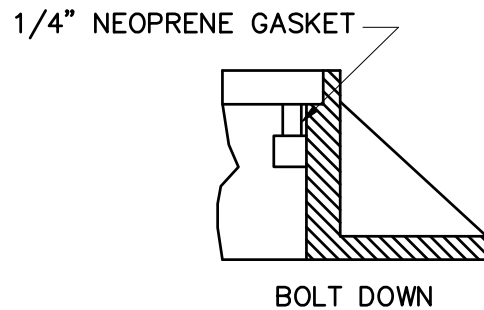
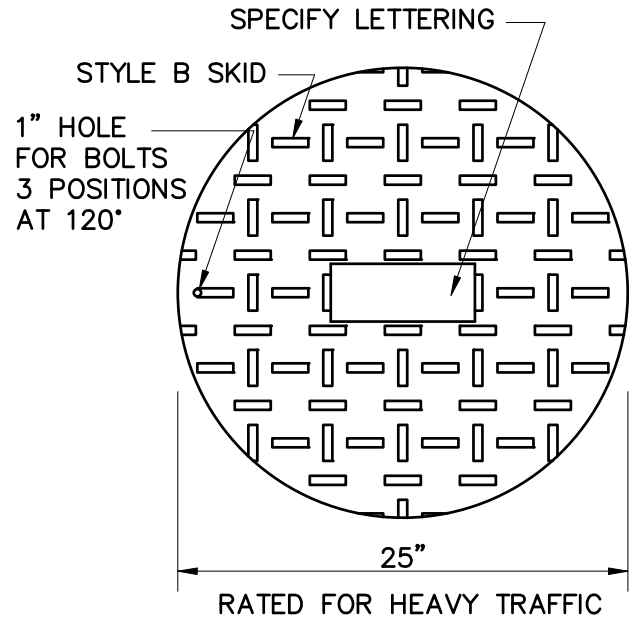
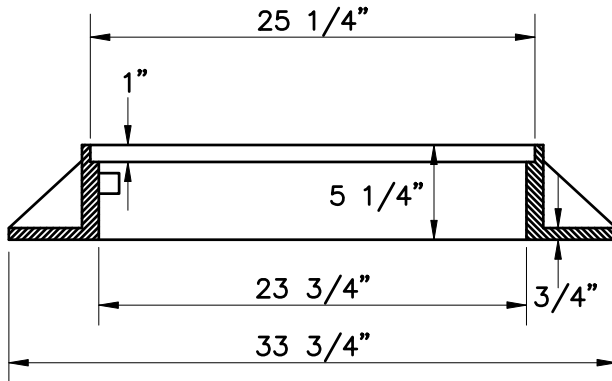
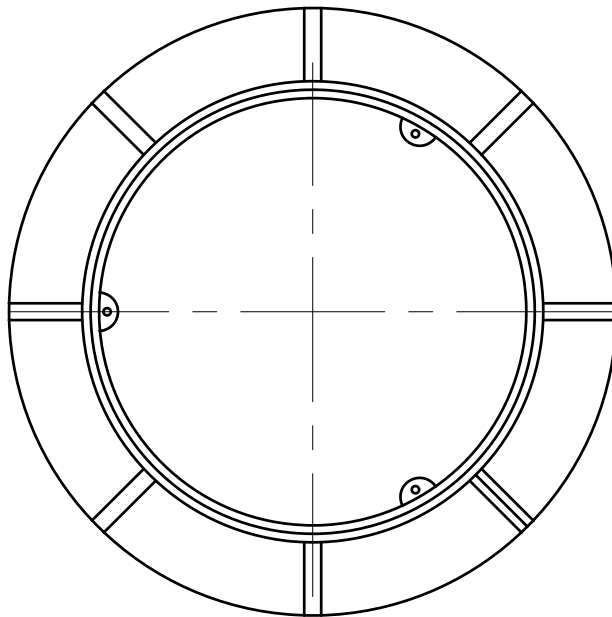


SCALE:
NTS
APPROVED:

REVISED:
7/12

MANHOLE COVER AND FRAME

SECTION:
503
DETAIL #
500-7



NOTE:

USE EAST JORDAN IRON WORKS – MODEL 3717
FRAME & COVER BOLTED ASSEMBLY, WITH A POCKET
LIFT HANDLE AND CONSTRUCTED OF DUCTILE IRON OR
EQUIVALENT.

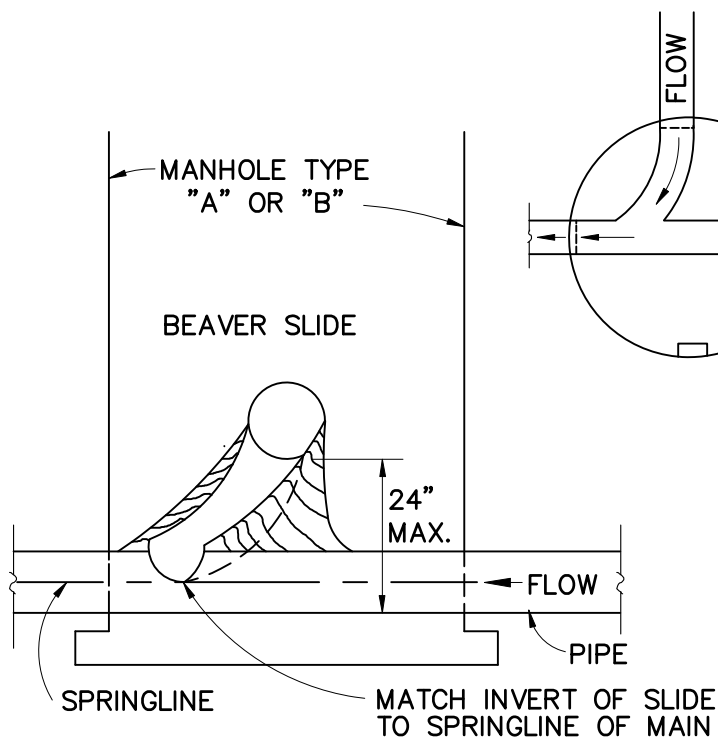


SCALE:
NTS
APPROVED:

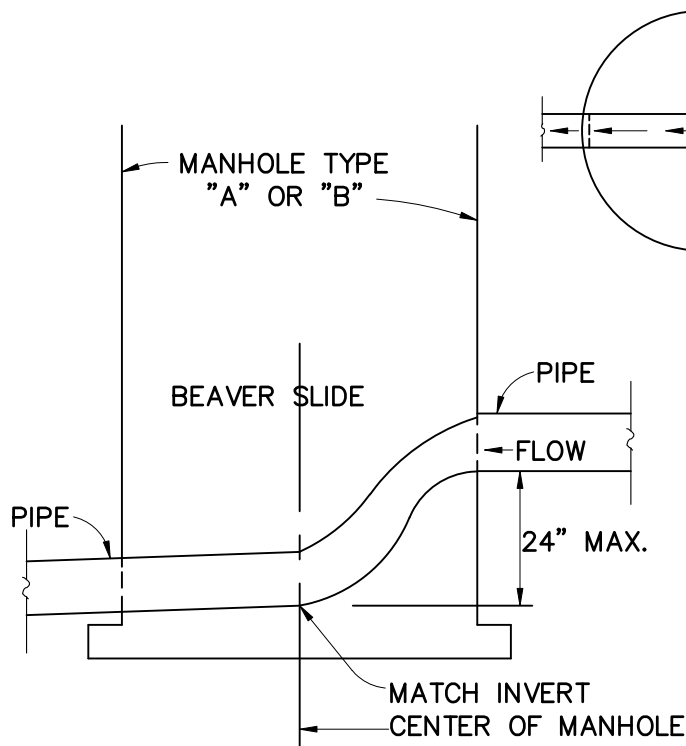
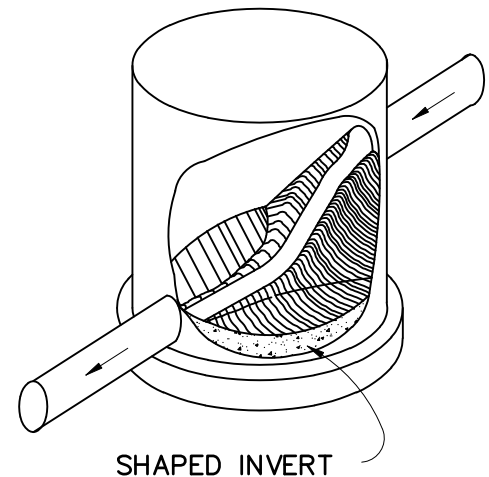
REVISED:
7/12

BOLT - DOWN WATERTIGHT MANHOLE RING AND COVER

SECTION:
503
DETAIL #
500-8



WHEN INSTALLING A BEAVER SLIDE THAT INTERCEPTS AN EXISTING SEWER AT A RIGHT ANGLE, THE CONNECTING INVERT OF THE BEAVER SLIDE IS TO INTERCEPT THE EXISTING SEWER SLIGHTLY ABOVE THE SPRINGLINE AS SHOWN. DISTANCE MEASURED FROM INVERT TO INVERT.



WHEN INSTALLING A BEAVER SLIDE WHERE THE FLOW IS STRAIGHT THROUGH THE MANHOLE, THE BEAVER SLIDE IS TO MATCH THE INVERT OF THE EXISTING LINE AND NOT TO EXTEND MORE THAN HALF-WAY THROUGH THE MANHOLE. DISTANCE MEASURED FROM INVERT TO INVERT.

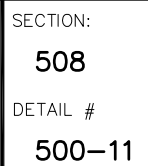


SCALE:
NTS
APPROVED:

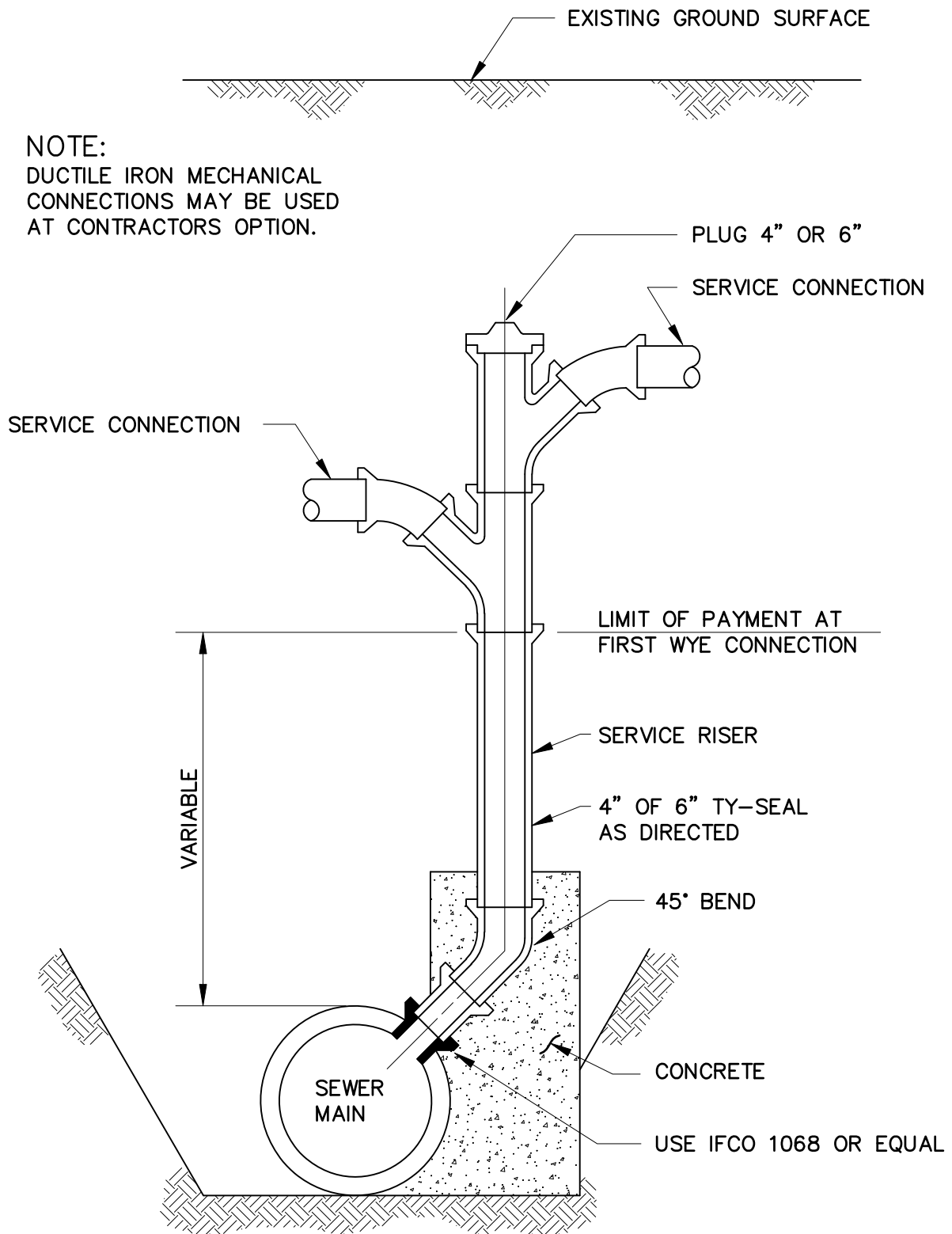
REVISED:
1/00

TYPICAL BEAVER SLIDE TYPE A & B MANHOLE

SECTION:
506
DETAIL #
500-10



NOTE:
DUCTILE IRON MECHANICAL
CONNECTIONS MAY BE USED
AT CONTRACTORS OPTION.



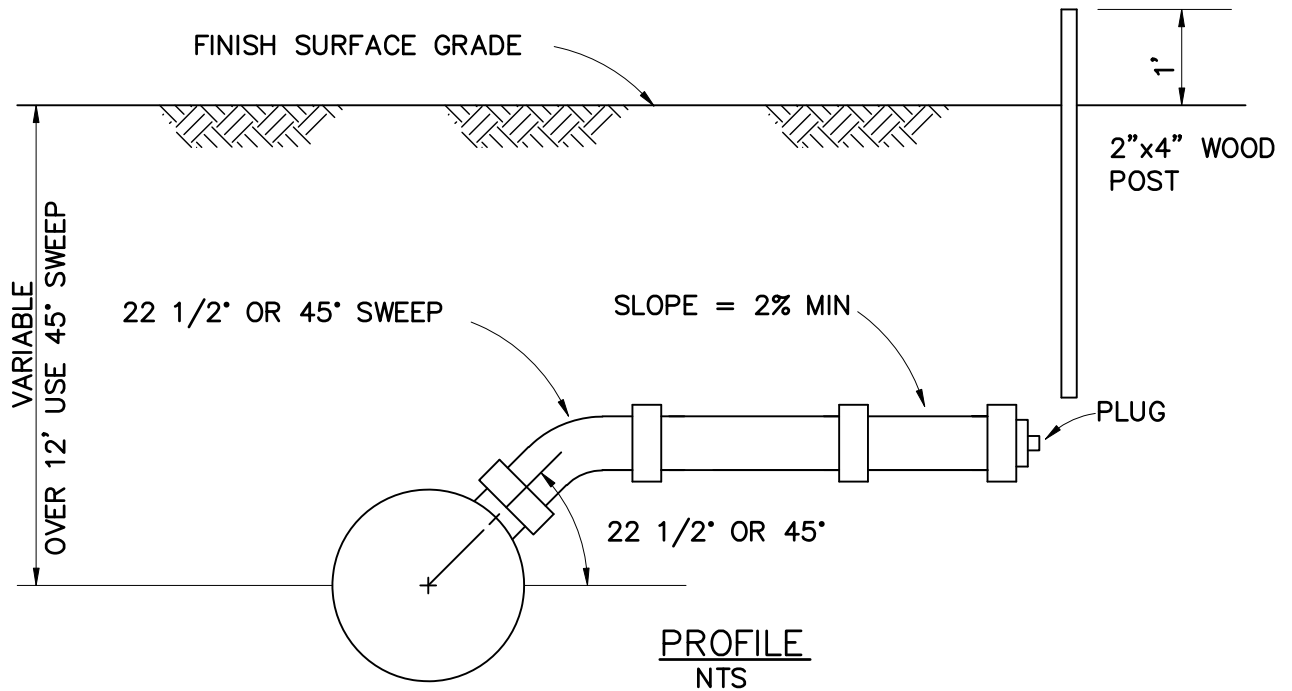
SCALE:
NTS
APPROVED:

REVISED:
1/00

SERVICE RISER/SIDE ENTRY FOR DEEP SEWER - DUCTILE IRON

SECTION:
508
DETAIL #
500-12

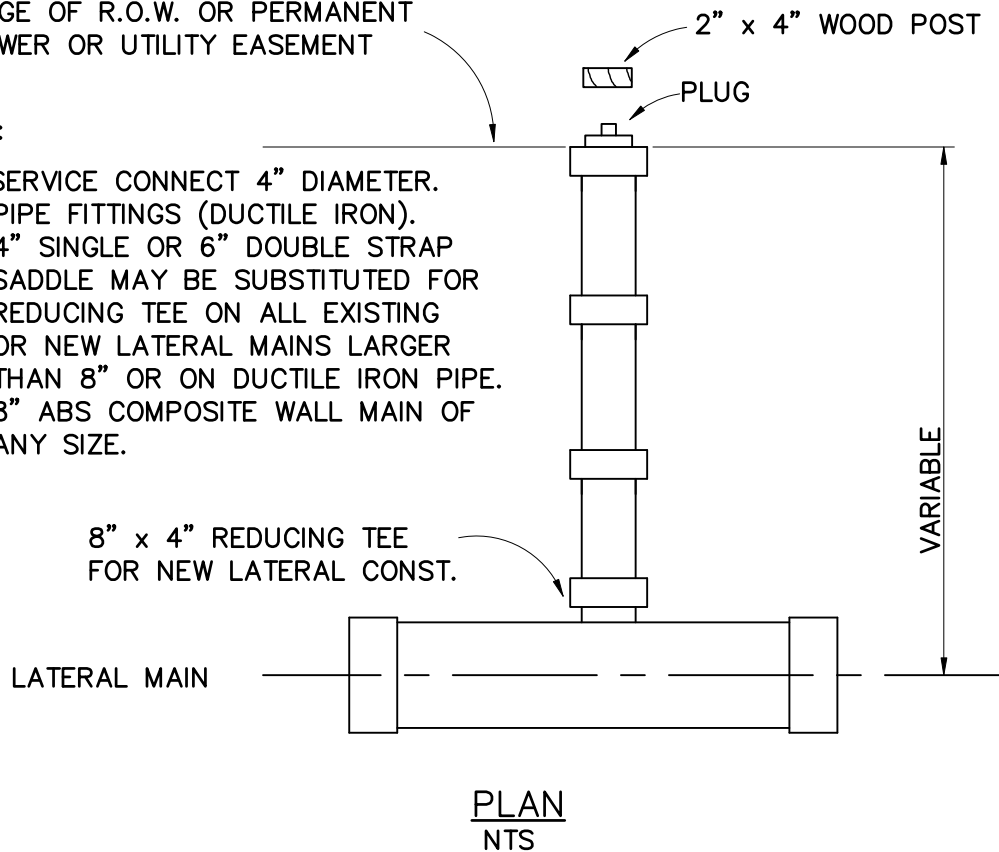
NOTE: BRING 2"x4" WOOD POST 1' ABOVE
FINISH SURFACE GRADE.



EDGE OF R.O.W. OR PERMANENT
SEWER OR UTILITY EASEMENT

NOTE:

- (1.) SERVICE CONNECT 4" DIAMETER.
- (2.) PIPE FITTINGS (DUCTILE IRON).
- (3.) 4" SINGLE OR 6" DOUBLE STRAP SADDLE MAY BE SUBSTITUTED FOR REDUCING TEE ON ALL EXISTING OR NEW LATERAL MAINS LARGER THAN 8" OR ON DUCTILE IRON PIPE. 8" ABS COMPOSITE WALL MAIN OF ANY SIZE.

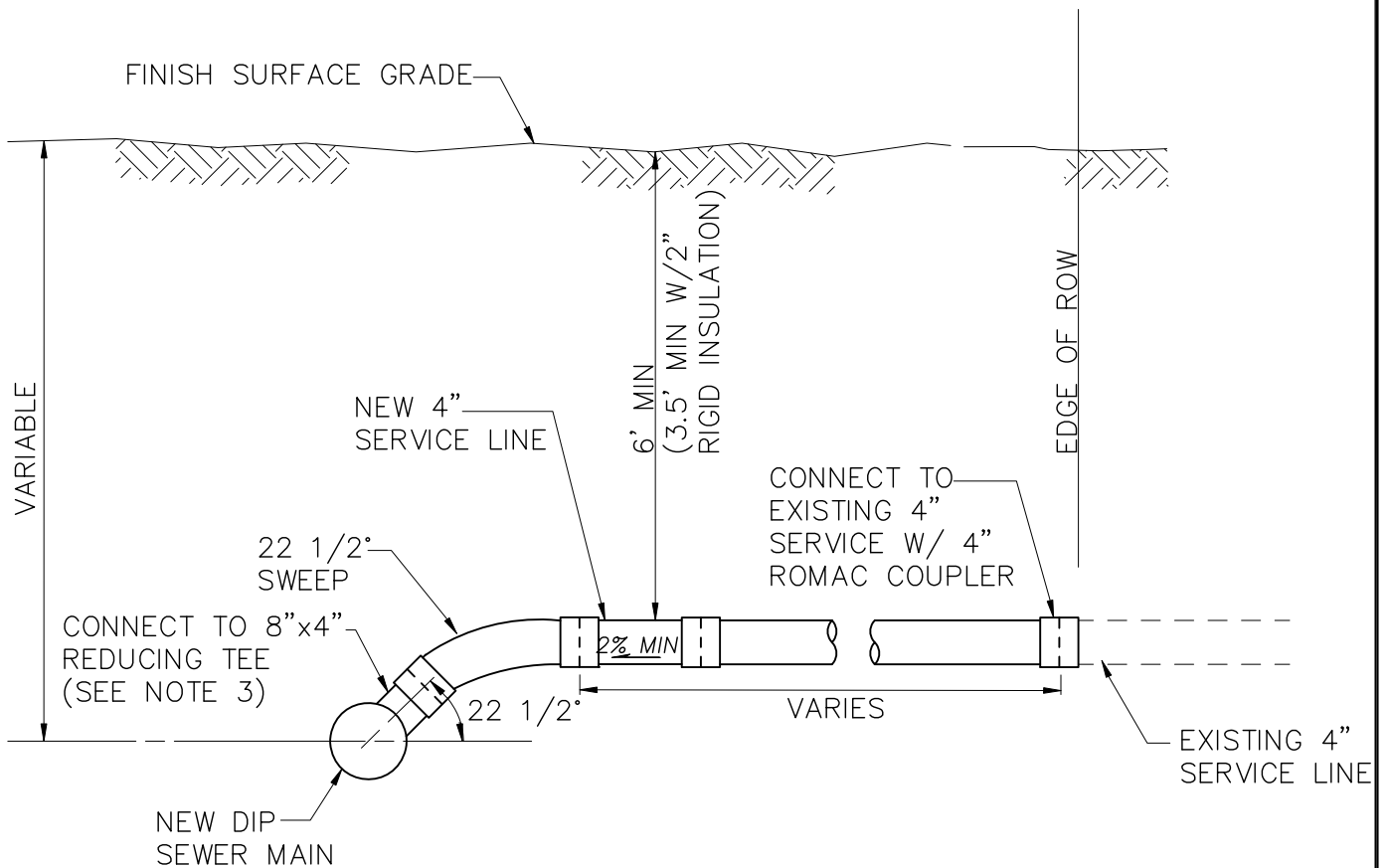


SCALE:
NTS
APPROVED:

REVISED:
7/12

SEWER SERVICE CONNECTION (R.O.W. ONLY)

SECTION:
508
DETAIL #
500-13



NOTES:

1. ALL SEWER SERVICE PIPE SHALL BE 4" DIAMETER.
2. ALL PIPE AND FITTINGS SHALL BE DUCTILE IRON.
3. 4" SINGLE STRAP SADDLE MAY BE SUBSTITUTED FOR REDUCING TEE.
4. WHERE SEWER MAIN IS NOT DEEP ENOUGH TO CONNECT SEWER SERVICE WITH SWEEP USE ALTERNATE 4" SEWER SERVICE CONNECTION AS DIRECTED BY THE ENGINEER.

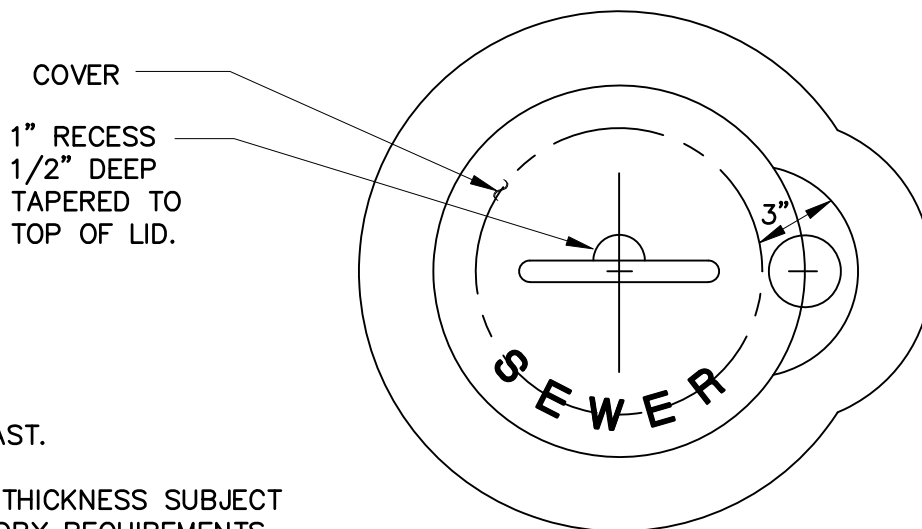


SCALE:
NTS
APPROVED:

REVISED:
7/12

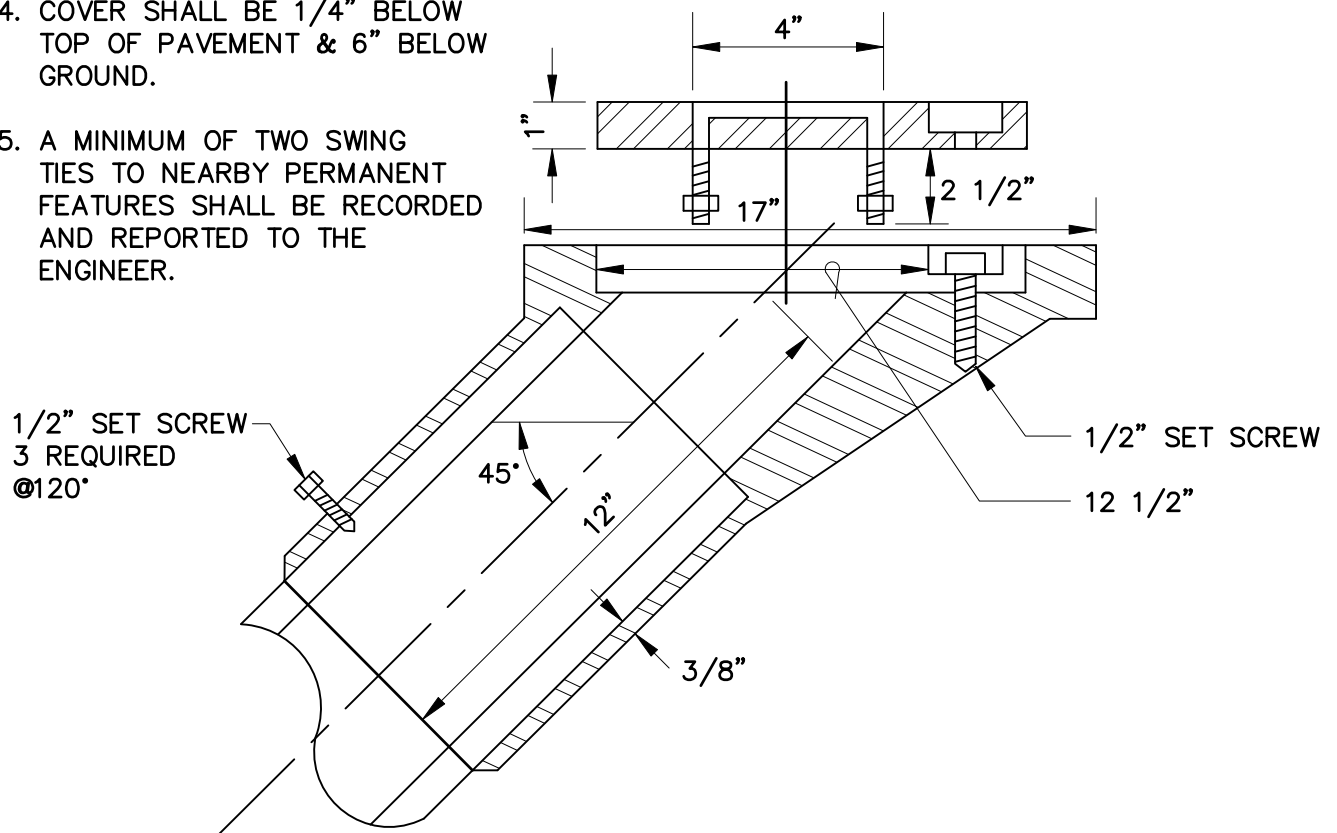
TYPICAL 4" SEWER SERVICE CONNECTION

SECTION:
508
DETAIL #
500-14



NOTES:

1. TO BE CAST.
2. CASTING THICKNESS SUBJECT TO FOUNDRY REQUIREMENTS.
3. CASTING MUST BE SIZED TO 8" AND OVER, CLASS 22 C.I. OR CLASS 50 D.I. PIPE.
4. COVER SHALL BE 1/4" BELOW TOP OF PAVEMENT & 6" BELOW GROUND.
5. A MINIMUM OF TWO SWING TIES TO NEARBY PERMANENT FEATURES SHALL BE RECORDED AND REPORTED TO THE ENGINEER.

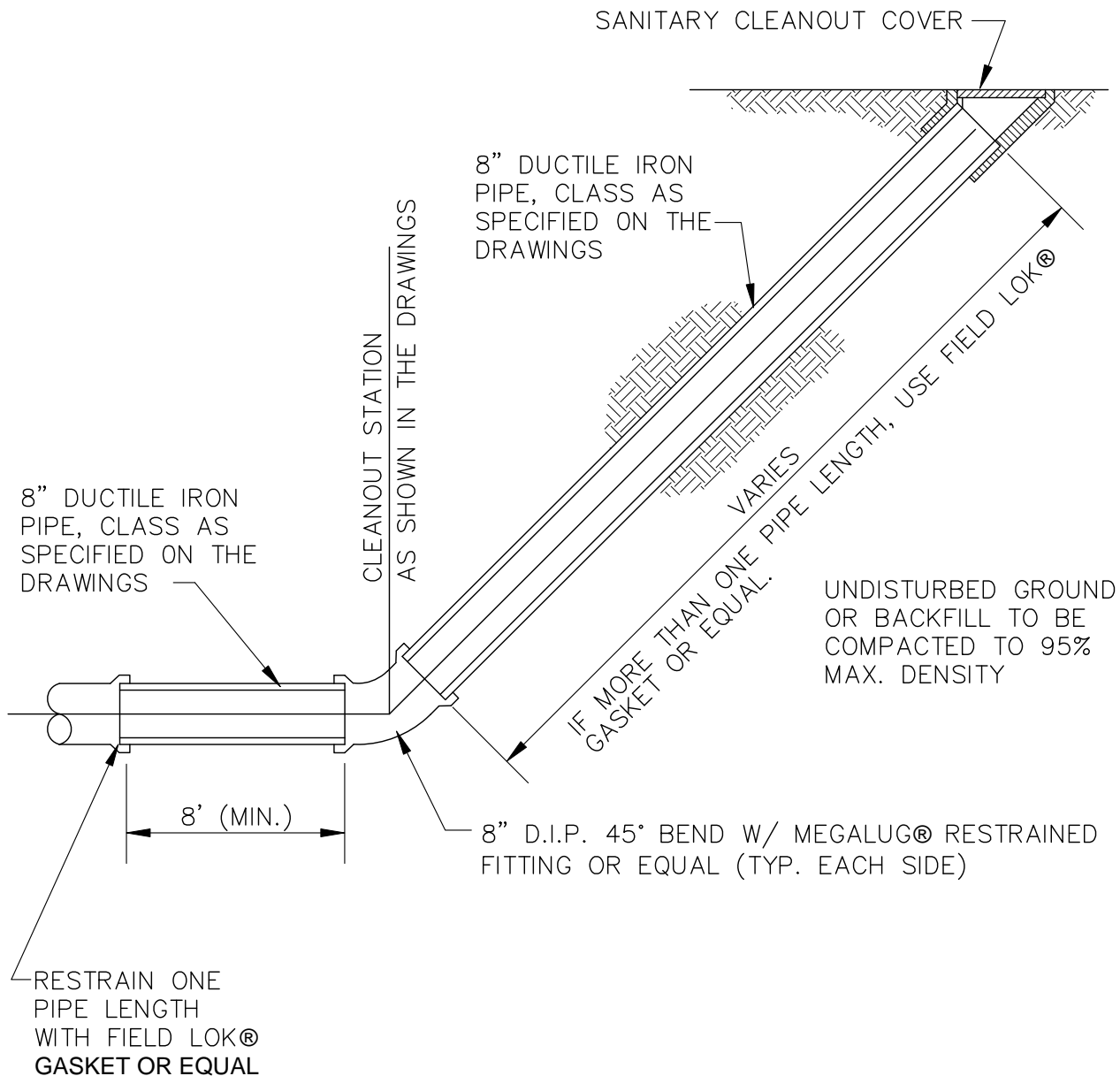


SCALE:
NTS
APPROVED:

REVISED:
1/00

SANITARY CLEANOUT COVER

SECTION:
510
DETAIL #
500-15



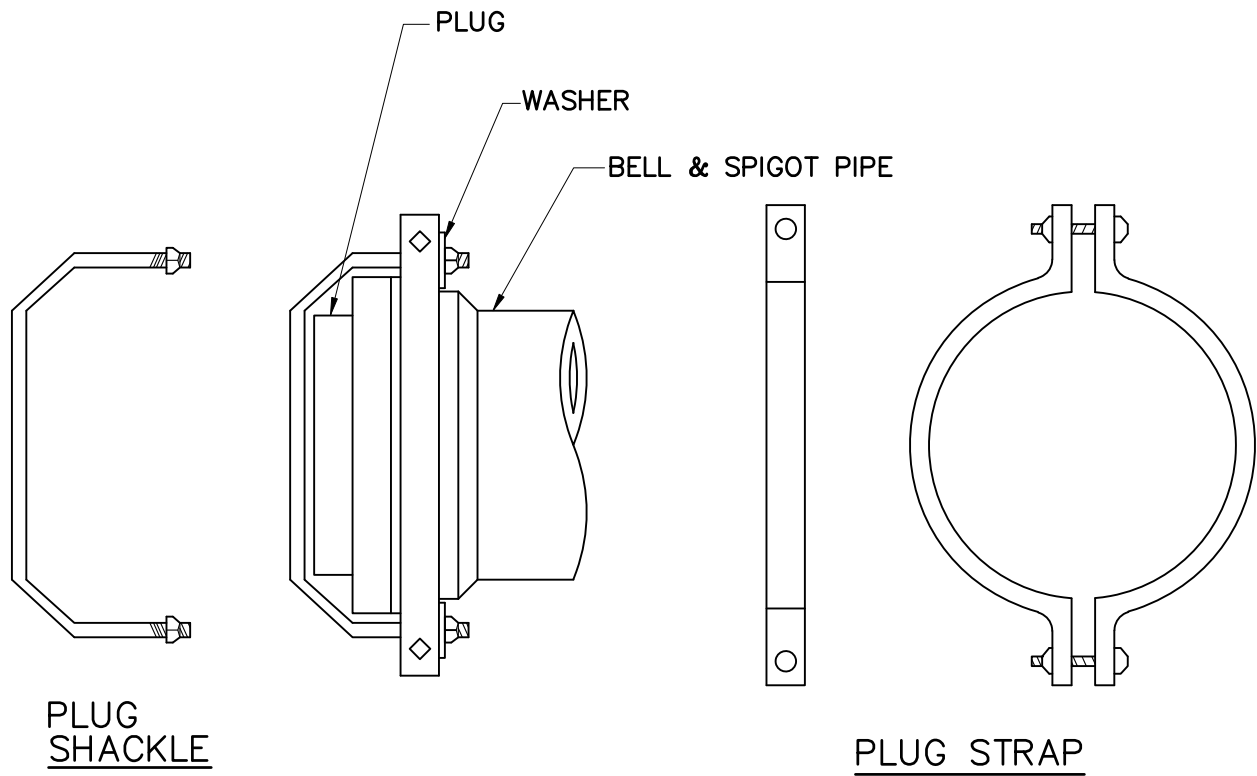
SCALE:
NTS
APPROVED:

REVISED:
1/00

SANITARY CLEANOUT

SECTION:
510
DETAIL #
500-16

SECTION:
502
DETAIL #
500-17



NOTES:

1. DIMENSIONS VARY WITH SIZE OF PIPE.
2. SHACKLE & STRAP TO BE USED ON ALL BELL & SPIGOT PIPE 6" OR LARGER.
3. COST OF THIS FITTING TO BE INCLUDED IN BID PRICE OF PIPE.

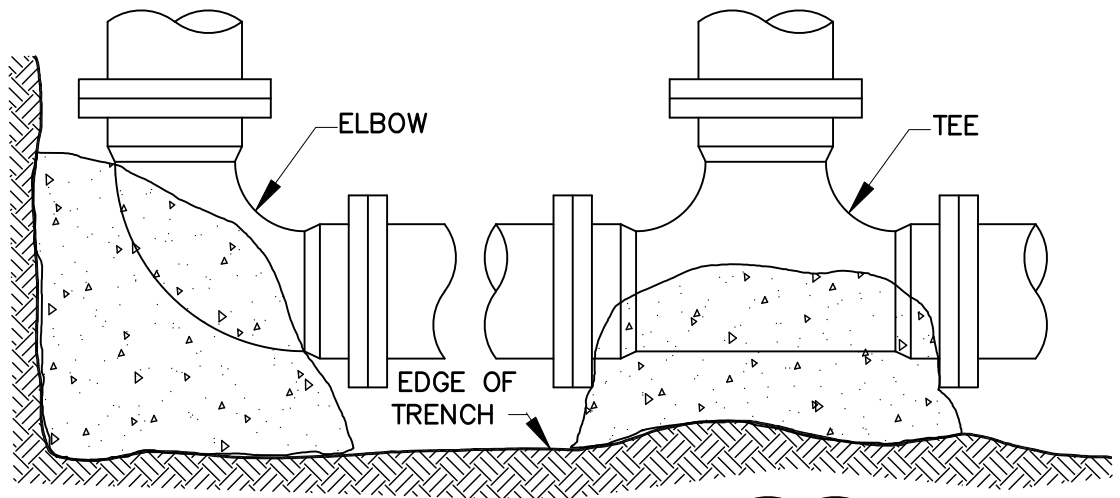


SCALE:
NTS
APPROVED:

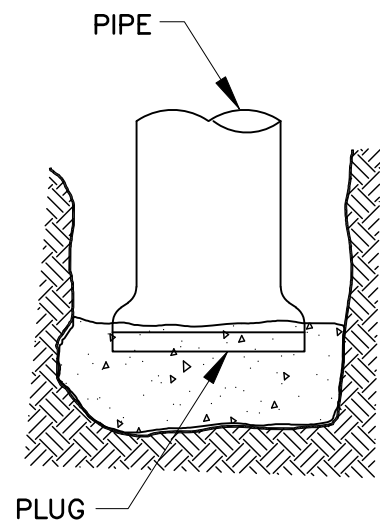
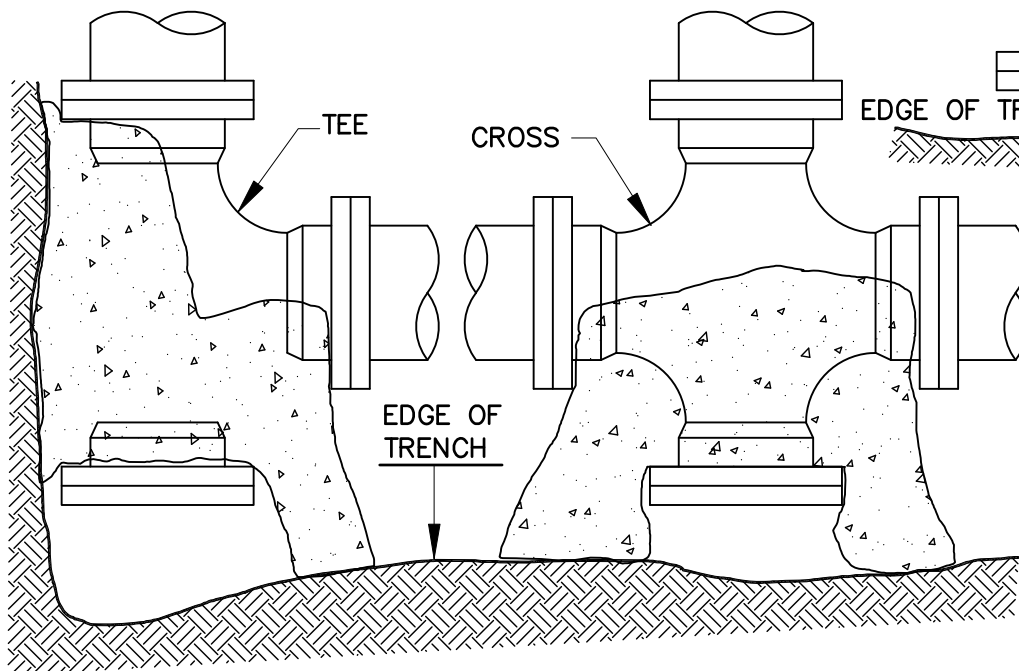
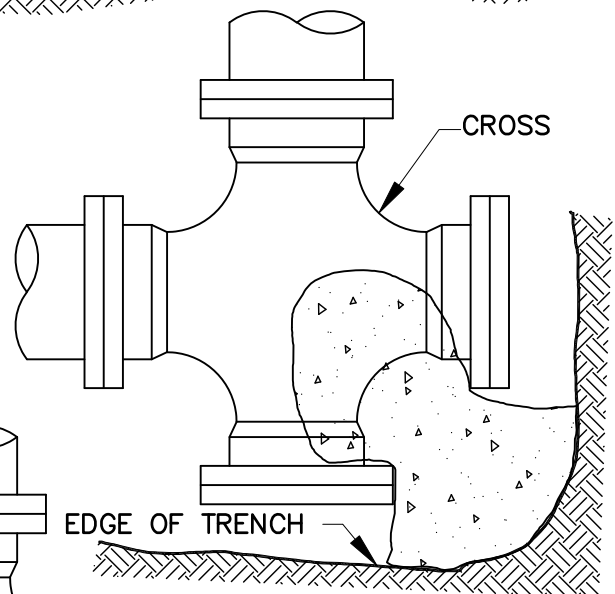
REVISED:
1/00

**PLUG AND SHACKLE
FOR BELL AND SPIGOT PIPE**

SECTION:
602
DETAIL #
600-1



PIPE SIZE	MIN. BASE AREA SQ. FT.		
	90° BEND	45° BEND	PLUG
6"	2.0	1.0	2.0
8"	2.5	1.5	2.5
10"	4.5	2.5	4.5
12"	6.0	3.5	6.0
14"	8.0	4.5	8.0
16"	10.5	6.0	10.5
24"	24.0	13.0	24.0

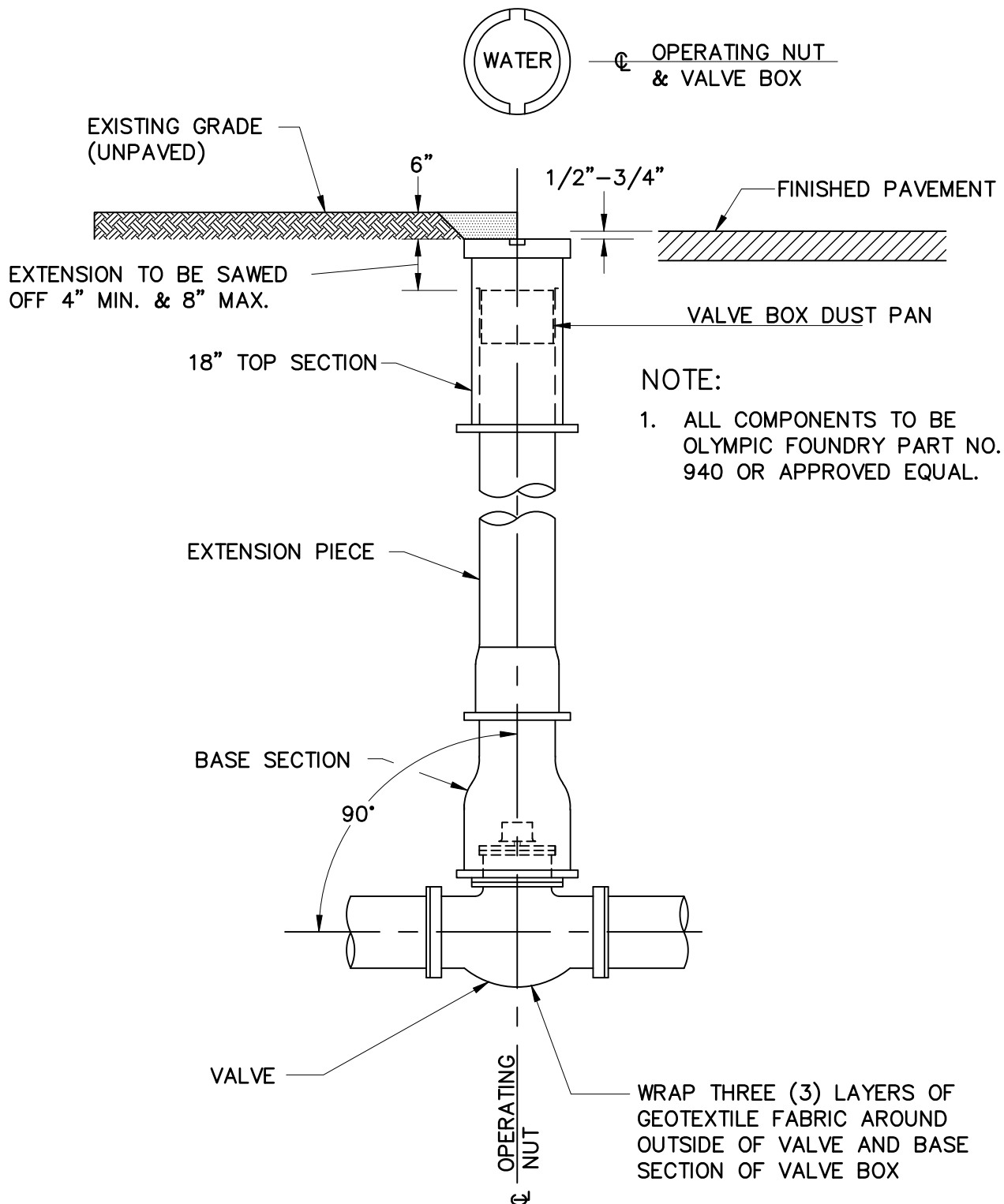


SCALE:
NTS
APPROVED:

REVISED:
1/00

THRUST BLOCK

SECTION:
602
DETAIL #
600-2

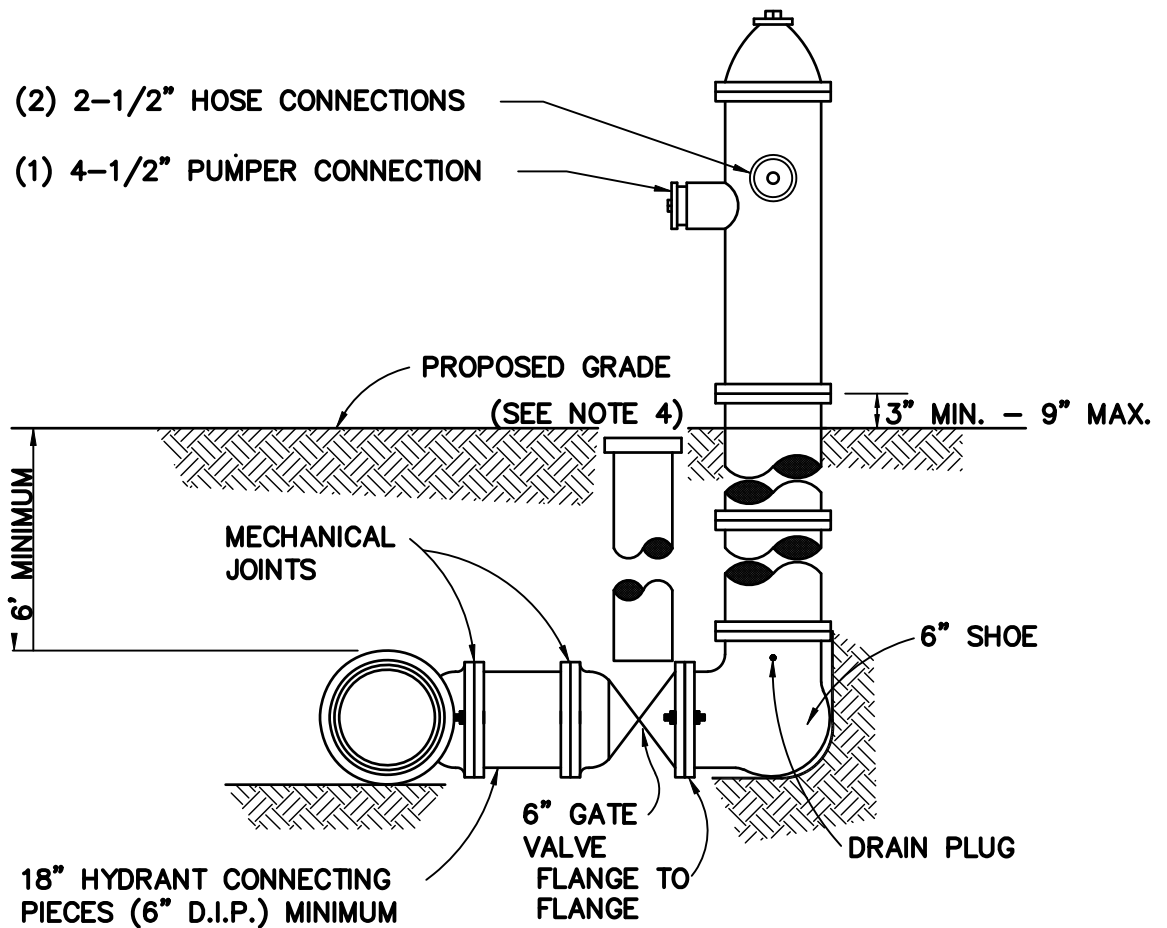


SCALE:
NTS
APPROVED:

REVISED:
7/12

TYPICAL VALVE BOX VALVES LARGER THAN 2"

SECTION:
603
DETAIL #
600-3



HYDRANT INSTALLATION NOTES:

1. HYDRANT BARREL MUST BE INSTALLED PLUMB AND THE LEG MUST BE INSTALLED LEVEL.
2. DRAIN PLUG TO BE REMOVED BY CONTRACTOR.
3. ALL HYDRANTS SHALL BE PAINTED SAFETY ORANGE.
4. AUXILIARY GATE VALVE BOX TO BE INSTALLED ACCORDING TO TYPICAL VALVE BOX DETAIL.
5. ALL JOINTS SHALL BE RESTRAINED.

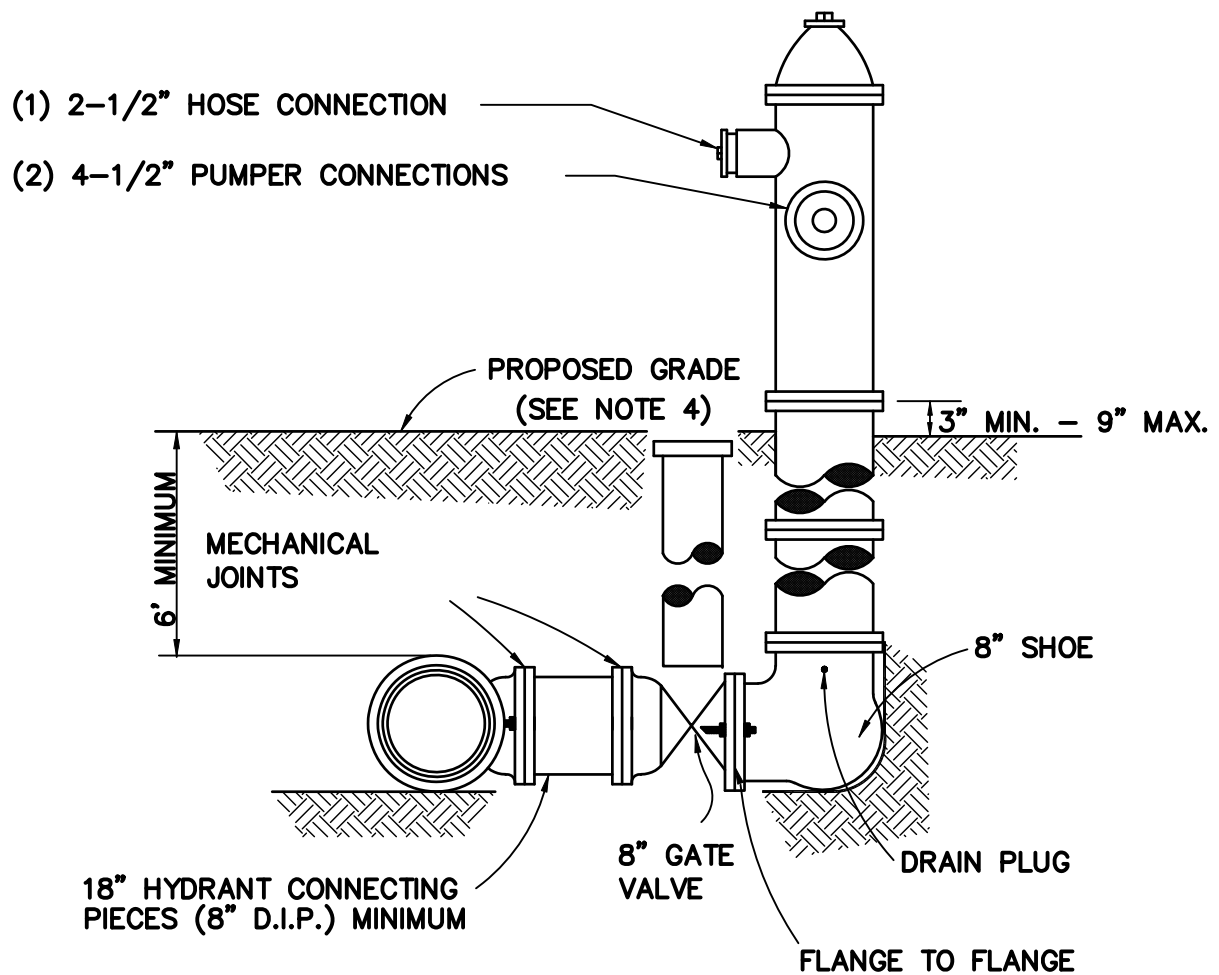


SCALE:
NTS
APPROVED:

REVISED:
2/13

SINGLE PUMPER HYDRANT ASSEMBLY

SECTION:
604
DETAIL #
600-4



HYDRANT INSTALLATION NOTES:

1. HYDRANT BARREL MUST BE INSTALLED PLUMB AND THE LEG MUST BE INSTALLED LEVEL.
2. DRAIN PLUG TO BE REMOVED BY CONTRACTOR.
3. ALL HYDRANTS SHALL BE PAINTED SAFETY ORANGE.
4. AUXILIARY GATE VALVE BOX TO BE INSTALLED ACCORDING TO TYPICAL VALVE BOX DETAIL.
5. ALL JOINTS SHALL BE RESTRAINED.

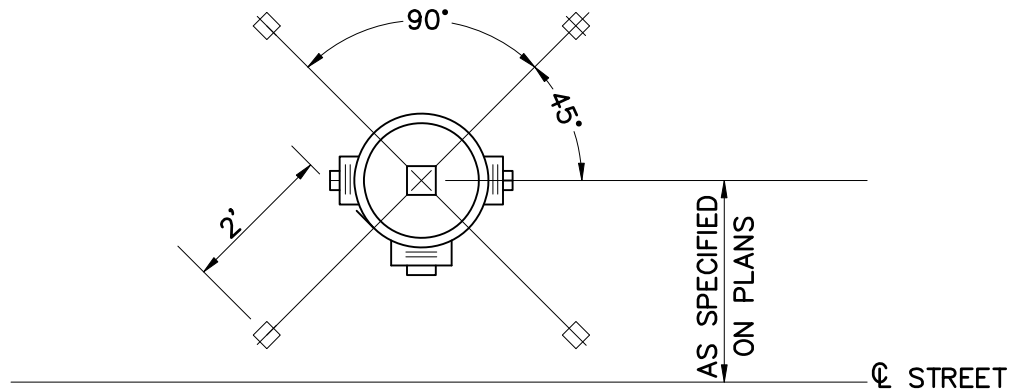


SCALE:
NTS
APPROVED:

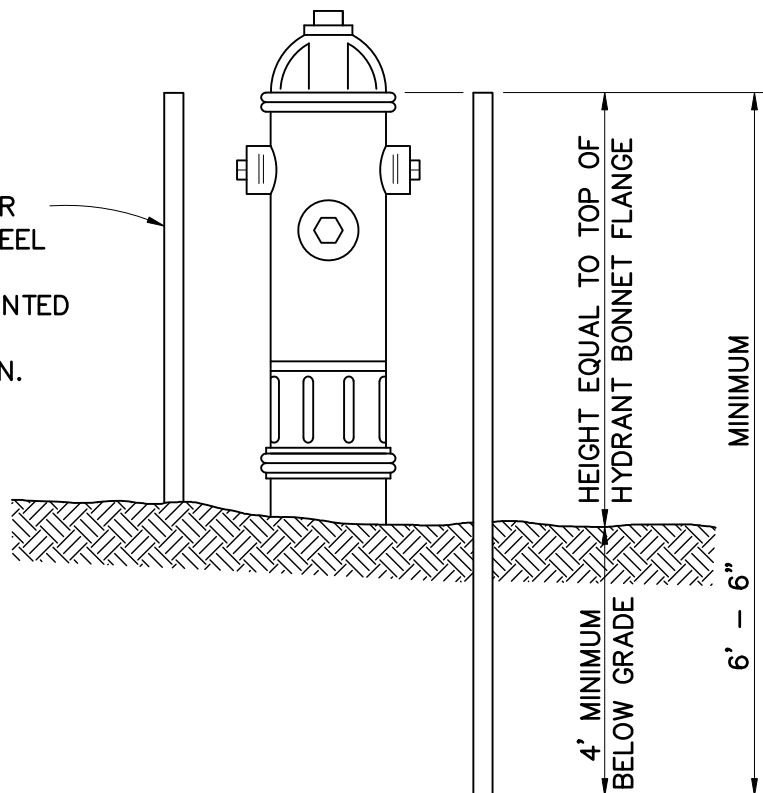
REVISED:
2/13

DOUBLE PUMPER HYDRANT ASSEMBLY

SECTION:
604
DETAIL #
600-5



90# GUARD RAIL OR
4" HEAVY WALL STEEL
PIPE FILLED WITH
CONCRETE AND PAINTED
SAFETY ORANGE
AFTER INSTALLATION.



NOTES:

1. GUARD POSTS SHALL BE FURNISHED & INSTALLED BY THE CONTRACTOR.
2. POSTS SHALL BE LOCATED TO ALLOW UNRESTRICTED ACCESS TO PUMPER AND HOSE CONNECTIONS.

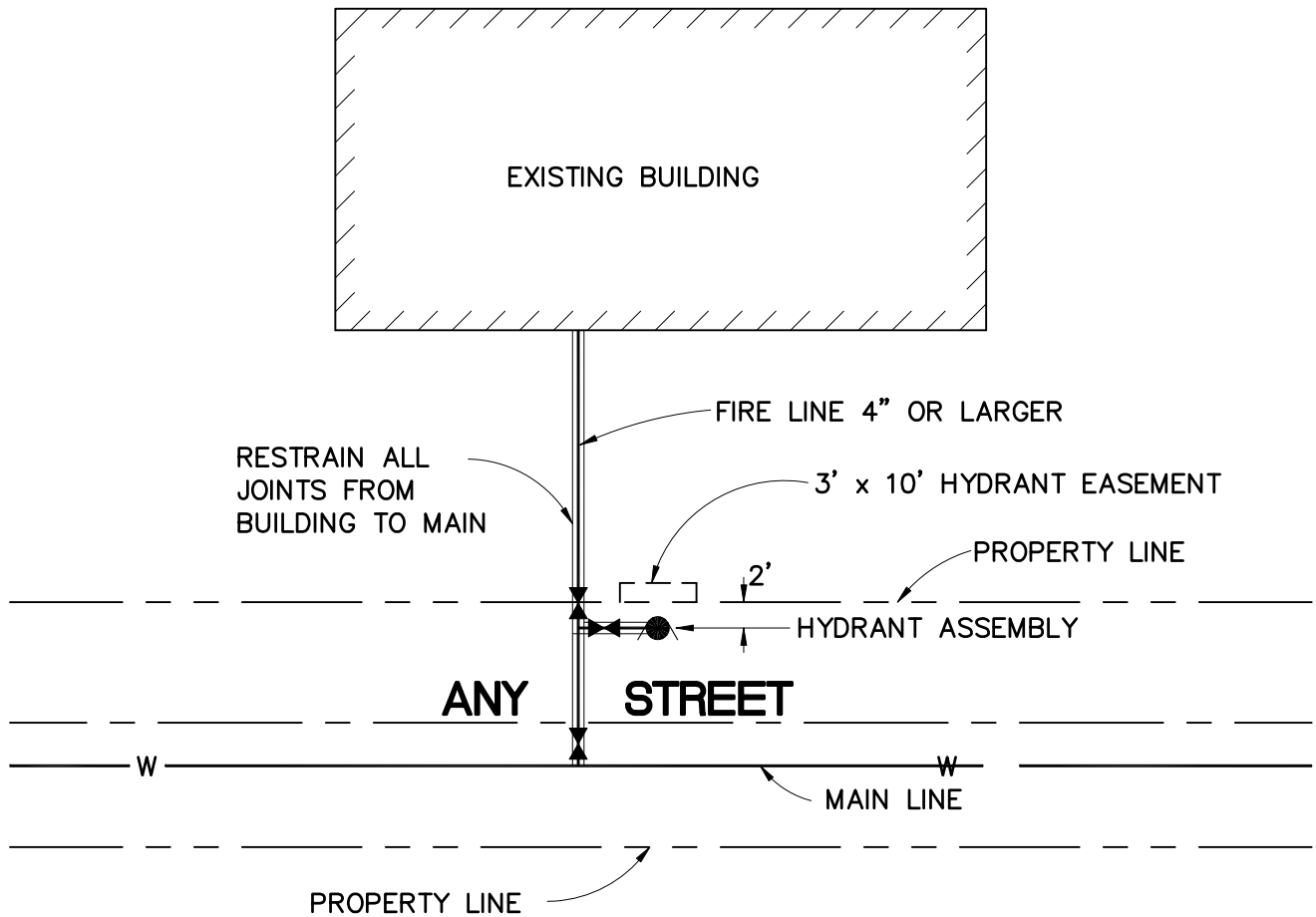


SCALE:
NTS
APPROVED:

REVISED:
1/00

HYDRANT GUARD POSTS

SECTION:
604
DETAIL #
600-6



NOTE:

ON FIRE LINE INSTALLATIONS, ALL JOINTS SHALL BE RESTRAINED FOR A DISTANCE OF 40 FEET BOTH DIRECTIONS FROM ALL FITTINGS.

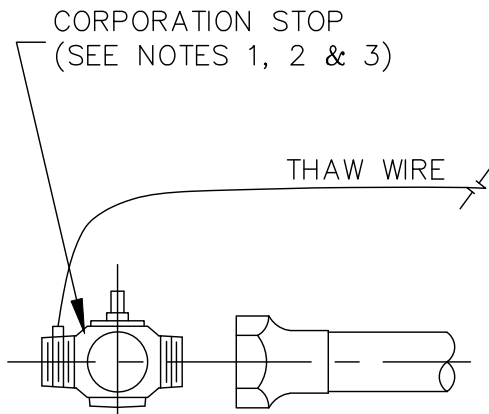


SCALE:
NTS
APPROVED:

REVISED:
1/00

**TYP. CONNECT OF HYDRANT ON
FIRE LINE SERVICE CONNECT**

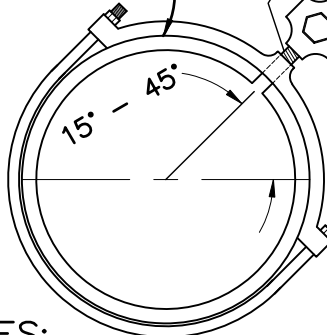
SECTION:
605
DETAIL #
600-7



DETAIL "A"

MUELLER CORPORATION STOP (SEE NOTE 1 & 3 BELOW)

WATER MAIN



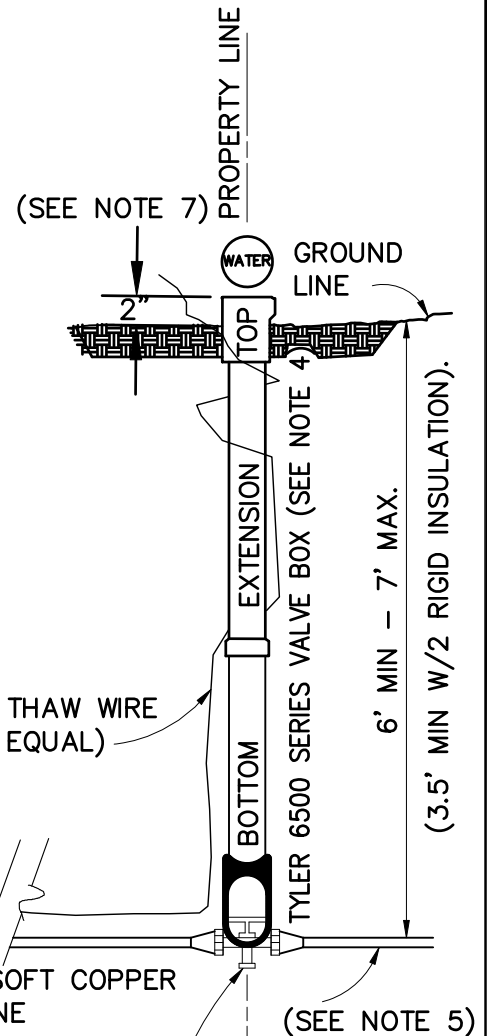
RUBBER COATED NO. 2 THAW WIRE (TYREX OR APPROVED EQUAL)

4" MIN.
8" MAX.

TYPE "K" SOFT COPPER SERVICE LINE

2 STRAP SADDLE (SEE NOTE 6)

CURB STOP (SEE NOTE 2)



NOTES:

1. CORPORATION STOP: 300psi, FLARED FITTINGS, MUELLER B-25000 OR APPROVED EQUAL.
2. CURB STOP: 300psi, FLARED FITTINGS, MUELLER B-25204 OR APPROVED EQUAL.
3. USE BURNDY TYPE GAR GROUND CONNECTOR (2/0 SOL-250) BETWEEN THE CORPORATION STOP AND THE MAIN AS SHOWN IN DETAIL "A"
4. USE TYLER 6500 SERIES SERVICE BOX OR APPROVED EQUAL. LID SHALL BE STAMPED "WATER". USE MUELLER H-15062 STRAIGHT FEMALE COPPER FLAIR THREAD X COPPER FLAIR NUT, TO CONNECT CURB STOP TO 3/4" COUPLING COPPER.
5. SIZE OF EXISTING LINE MAY VARY. INSTALL FITTING TO MATCH EXISTING SERVICE UNLESS OTHERWISE NOTED.
6. USE DOUBLE STRAP TAPPING SADDLE, MUELLER, ROMAC, SMITH-BLAIR OR APPROVED EQUAL. SINGLE STRAP SADDLES ARE ACCEPTABLE FOR PIPE DIAMETERS OF 8" AND SMALLER.
7. 2" BURY IN UPAVED DRIVEWAYS, 2" STICKUP ELSEWHERE.



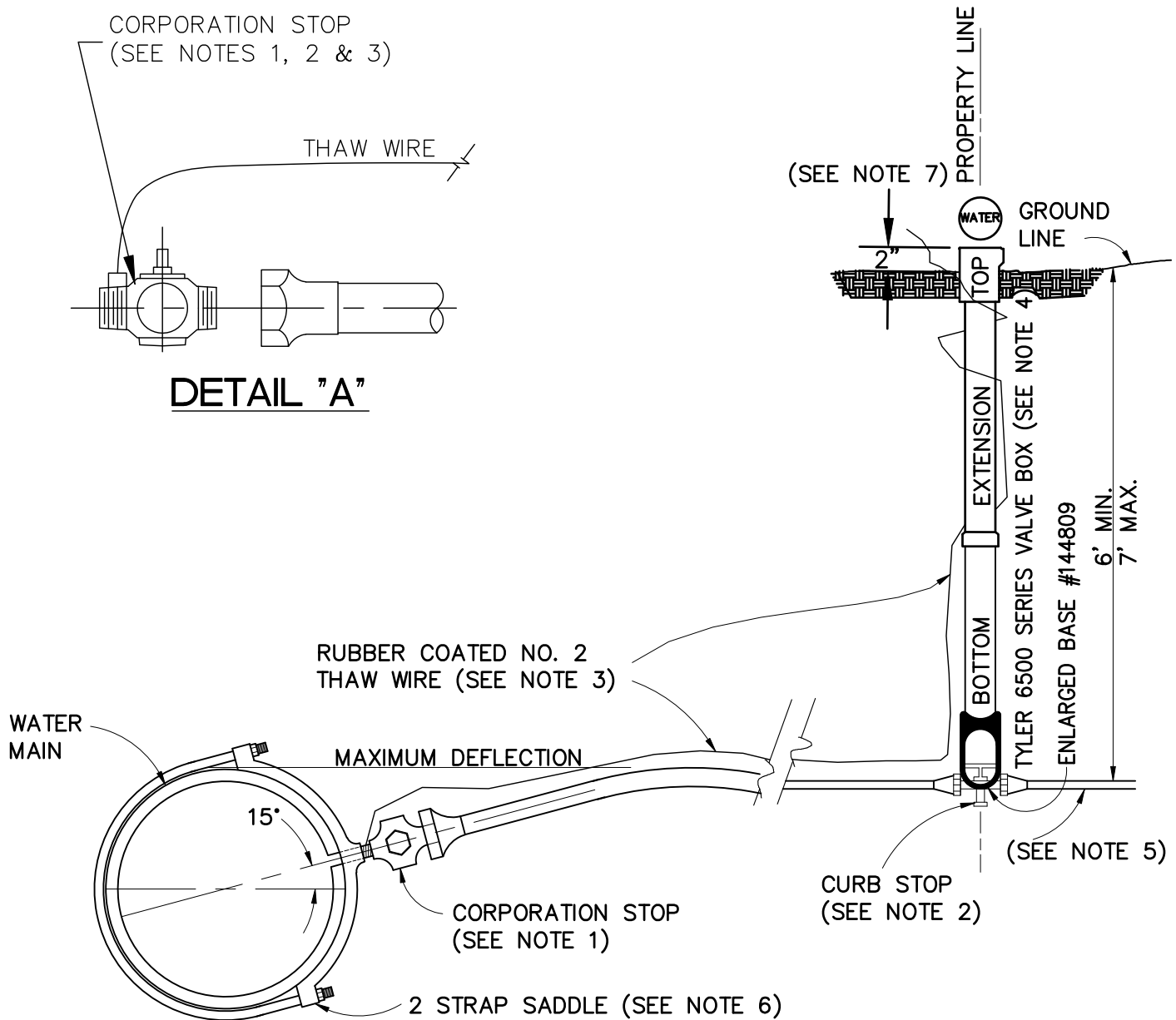
SCALE:
NTS
APPROVED:

REVISED:
7/12

WATER SERVICE CONNECT

1"

SECTION:
606
DETAIL #
600-8



NOTES

1. USE MUELLER CORPORATION STOP NO. B-25000 OR APPROVED EQUAL
2. CURB STOP: 300psi, FLARED FITTINGS, MUELLER B-25204 OR APPROVED EQUAL.
3. USE BURNDY TYPE GAR GROUND CONNECTOR (2/0 SOL-250) BETWEEN THE CORPORATION STOP AND THE MAIN AS SHOWN IN DETAIL "A"
4. USE TYLER 6500 SERIES SERVICE BOX OR APPROVED EQUAL. LID SHALL BE STAMPED "WATER".
5. SIZE OF EXISTING LINE MAY VARY. INSTALL FITTING TO MATCH EXISITING SERVICE UNLESS OTHERWISE NOTED.
6. USE DOUBLE STRAP TAPPING SADDLE, MUELLER, ROMAC, SMITH-BLAIR OR APPROVED EQUAL.
7. 2" BURY IN UNPAVED DRIVEWAYS, 2" STICKUP ELSEWHERE.

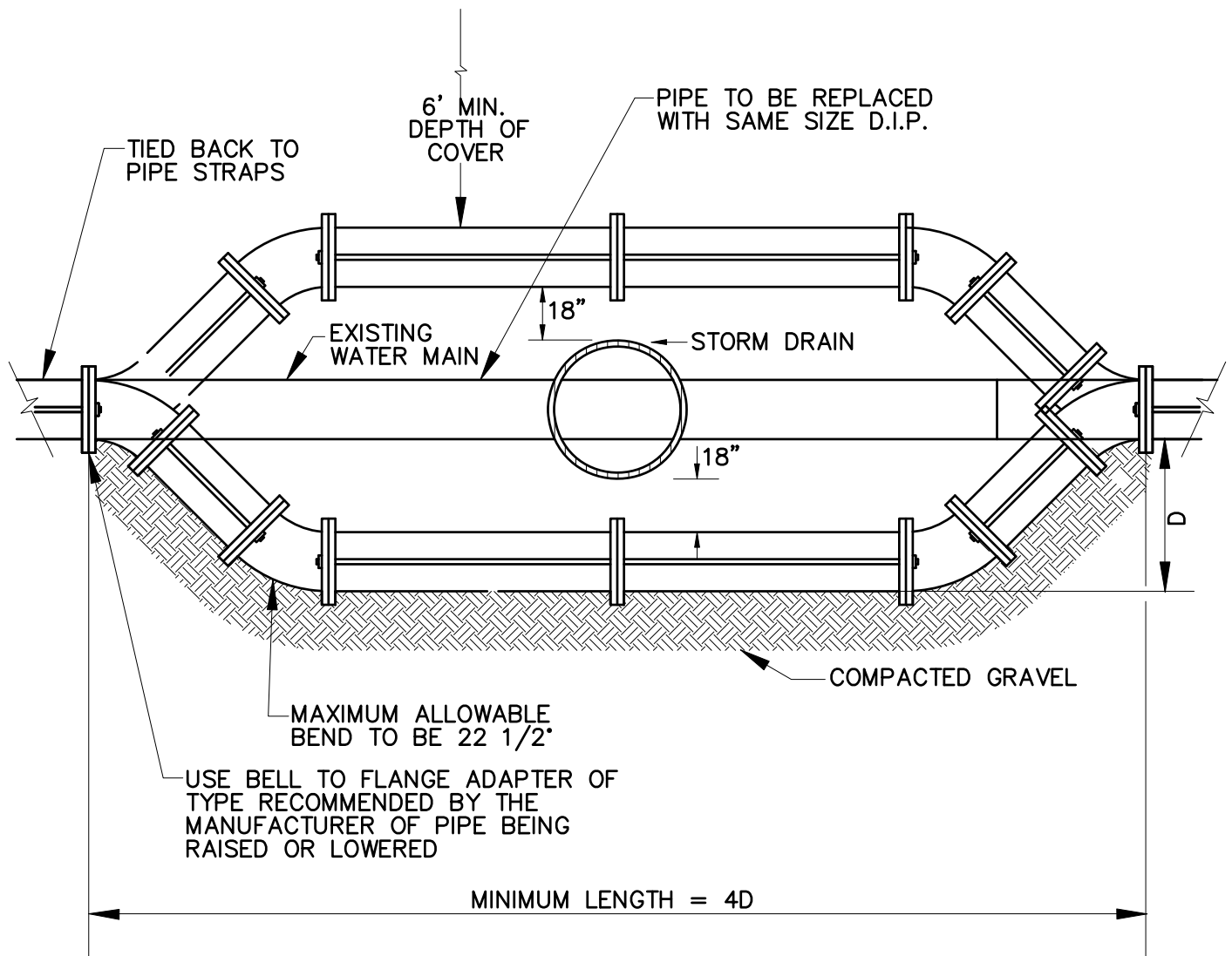


SCALE:
NTS
APPROVED:

REVISED:
7/12

WATER SERVICE CONNECT 1-1/2" AND 2"

SECTION:
606
DETAIL #
600-9



NOTES:

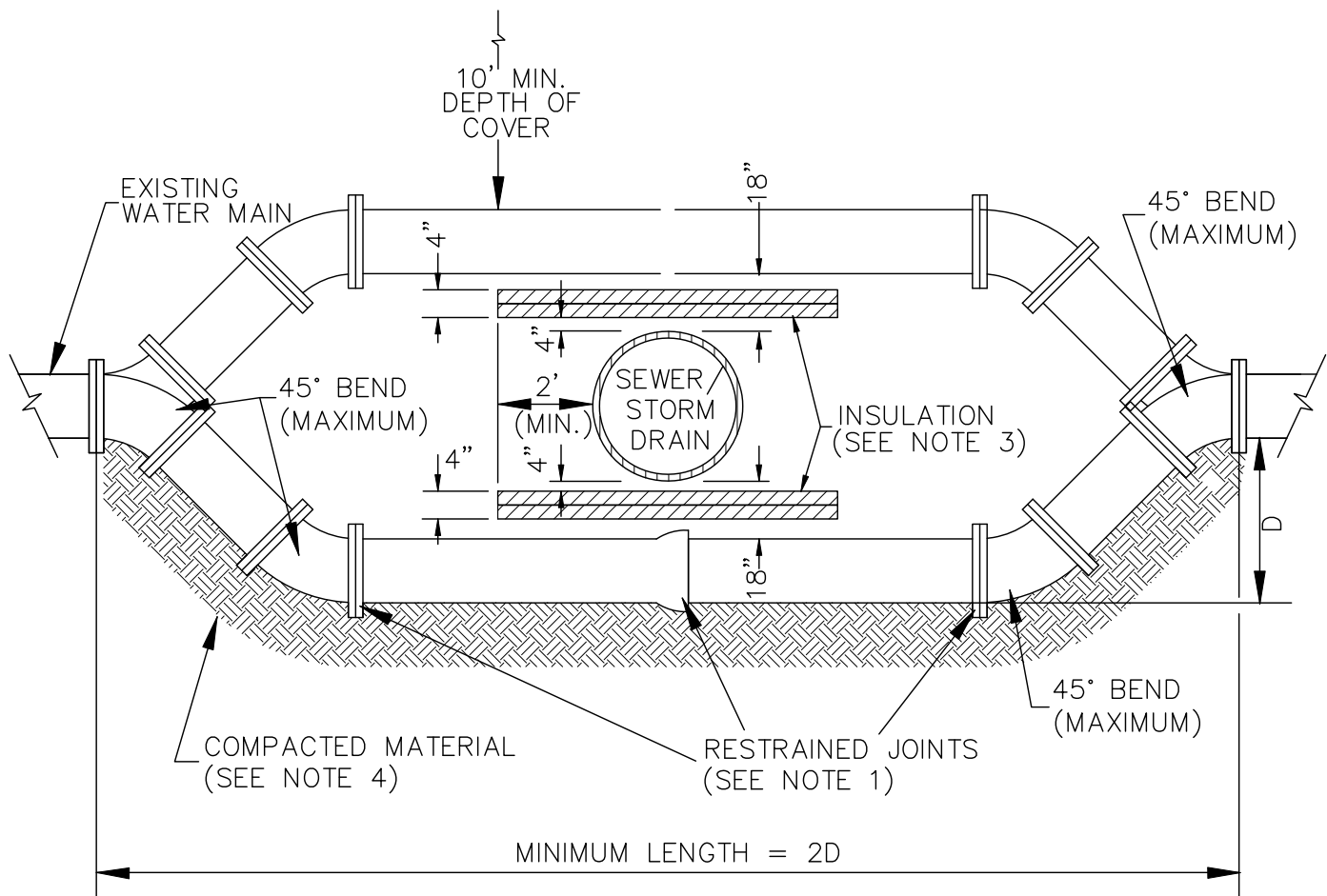
1. ALL JOINTS TO BE TIED TOGETHER WITH $\frac{3}{4}$ " THREADED ROD OR EQUAL.
2. RELOCATED WATER LINE SHALL BE NO LESS THAN 18" DISTANCE FROM STORM SEWER LINE.
3. MINIMUM VERTICAL SEPARATION IS (18") EIGHTEEN INCHES.



SCALE:
NTS
APPROVED:
REVISED:
1/00

RELOCATE WATER MAIN (STORM DRAIN)

SECTION:
MISC
DETAIL #
600-10



NOTES:

1. ALL PIPE AND FITTINGS SHALL BE RESTRAINED BY USE OF MEGALUG® AND/OR FIELD LOCK GASKETS OR EQUAL.
2. RELOCATED WATER MAIN SHALL HAVE A MINIMUM SEPARATION OF 18". IF 18" OF SEPARATION CANNOT BE MAINTAINED BETWEEN WATER AND SEWER OR STORM AN ADEC WAIVER IS REQUIRED.
3. RIGID BOARD INSULATION SHALL BE HIGH DENSITY EXTRUDED POLYSTYRENE, MIN. 60 P.S.I., EQUIVALENT TO R-20 PER FOUR INCH (4") THICKNESS. INSULATION SHALL BE BE POSITIONED NO LESS THAN OR EQUAL TO FOUR INCHES (4") FROM STORM SEWER.
4. ALL BACKFILL MATERIAL AROUND RELOCATED WATER MAIN SHALL BE NFS AND COMPACTED TO 95% MAX. DENSITY.
5. ALL MATERIALS USED TO RELOCATE WATER LINE SHALL BE APPROVED BY THE ENGINEER.



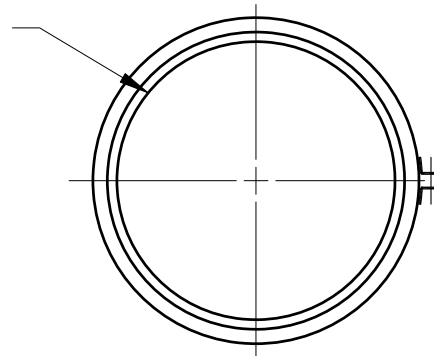
SCALE:
NTS
APPROVED:

REVISED:
7/12

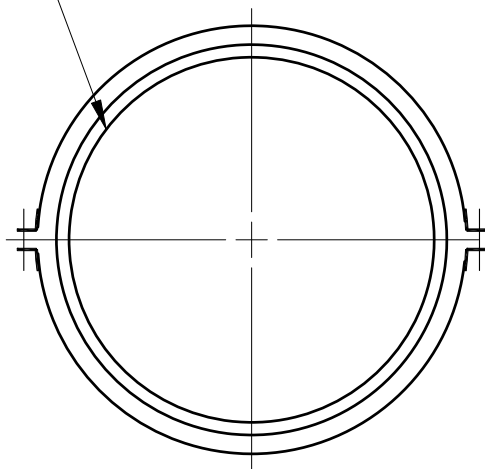
RELOCATE WATER MAIN (SANITARY SEWER/STORM DRAIN)

SECTION:
MISC
DETAIL #
600-11

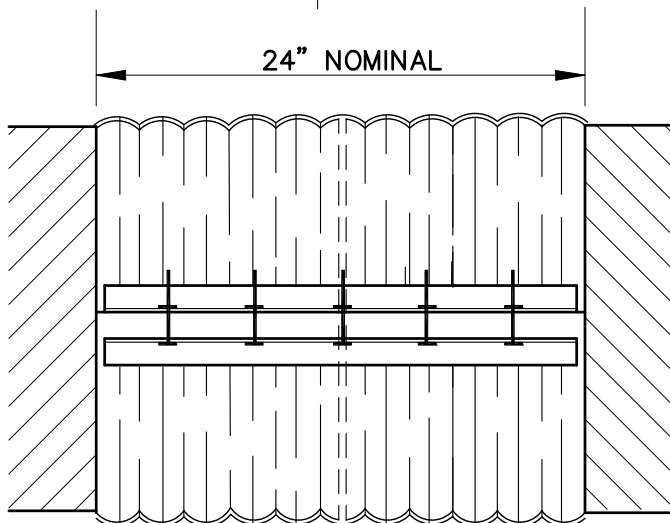
PIPE DIAMETER 12" THRU 36"
ONE PIECE BAND



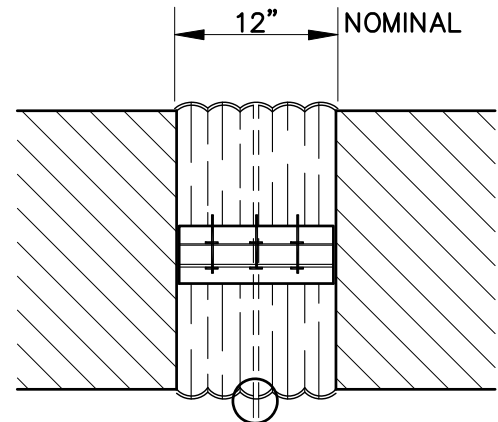
PIPE DIAMETER 48" THRU 96" TWO PIECE
BAND, 108" THRU 120" THREE PIECE BAND



24" NOMINAL



12" NOMINAL



1-1/3" NOMINAL

NOTES:

1. 12" THRU 36" PIPE ENDS RE-CORRUGATED TO ANNULAR 2 VALLEYS MIN. PER END.
2. 48" THRU 120" PIPE ENDS RE-CORRUGATED TO ANNULAR 4 VALLEYS MIN. PER END.
3. BAND ANGLES TO BE 2"x2"x12" GA. MIN.
4. BAND MATERIAL AND FABRICATION PER AASHTO M36 AND AASHTO M218
12" THRU 120" BANDS TO BE 16 GAUGE.
5. DIMPLED TYPE CONNECTING BANDS ALLOWED ONLY WHERE FITTINGS ARE USED IN NEW OR EXISTING CONSTRUCTION, FOR REPAIRS TO DAMAGED CMP AND FOR EXTENSIONS TO CMP WITHOUT ANNULAR ENDS. BANDS TO BE SIZED PER ABOVE SCHEDULE. (MIN. 12")
6. BOLT SIZE SHOULD BE 1/2" DIAMETER BY 8" LONG. NUTS SHALL BE PROVIDED WITH A WASHER.

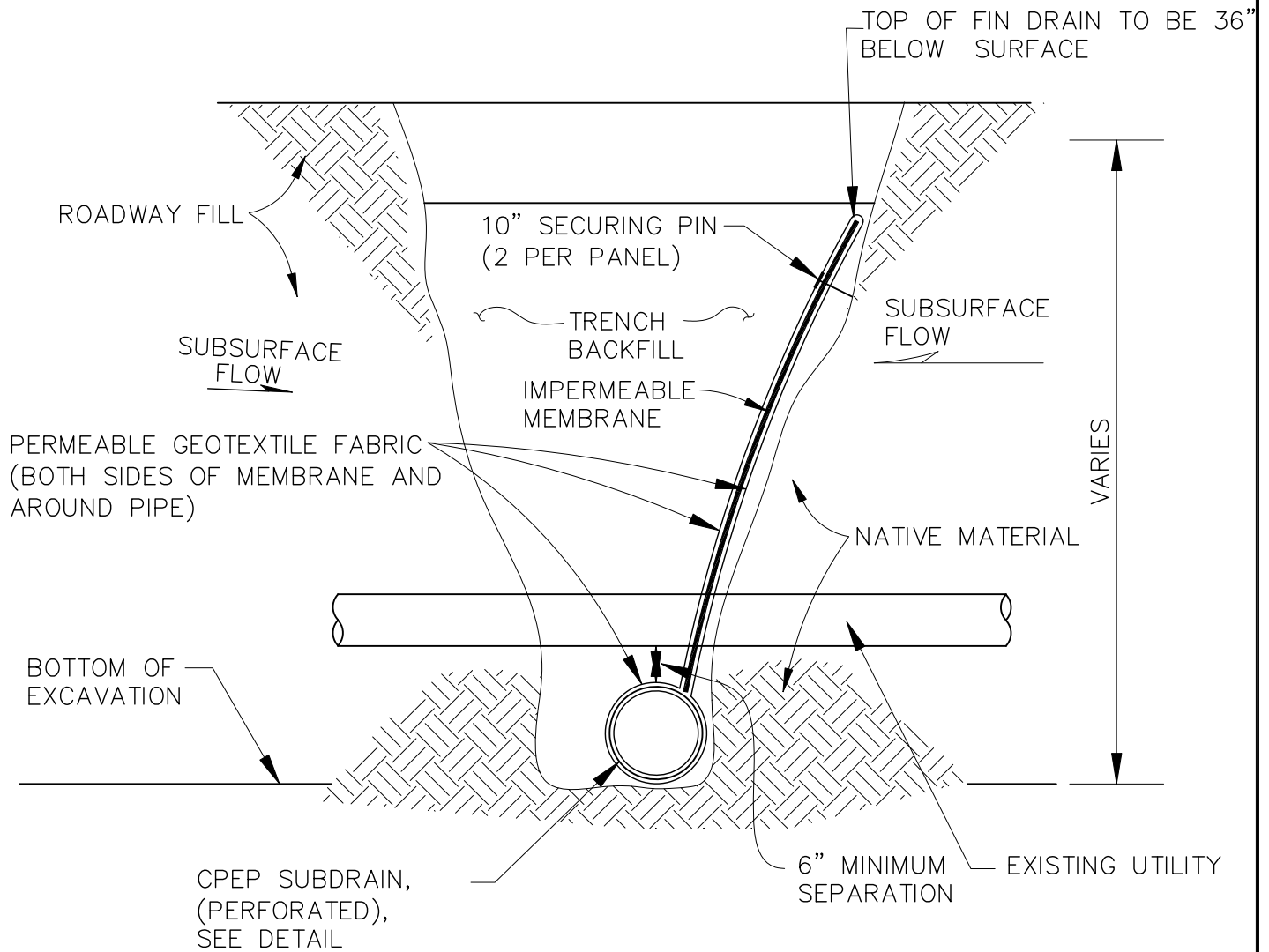


SCALE:
NTS
APPROVED:

REVISED:
1/00

CORRUGATED METAL PIPE BAND DETAIL

SECTION:
702
DETAIL #
700-1



NOTES:

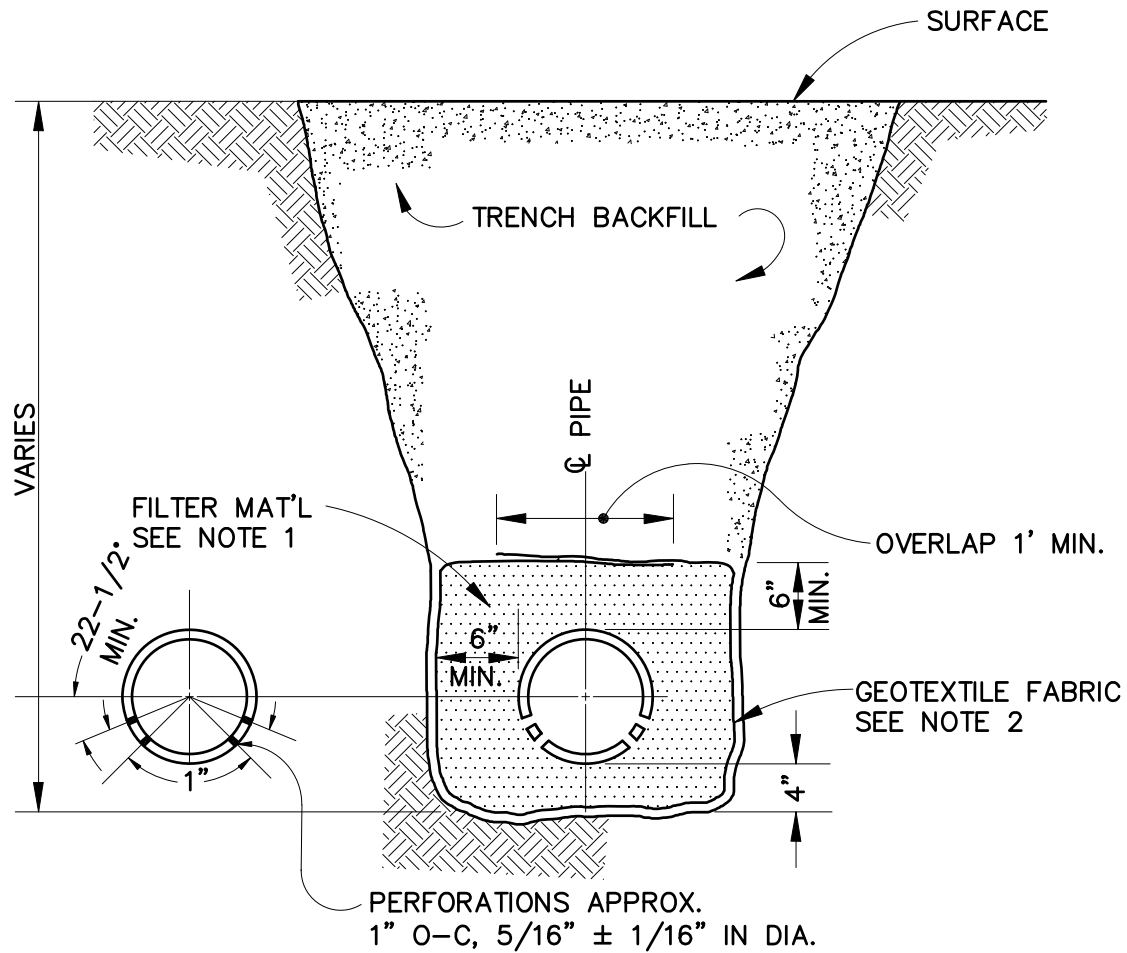
1. FIN DRAIN SHALL HAVE END CAPS FOR EXPOSED ENDS.
2. FIN DRAIN SHALL BE MIRADRAIN 5000 (FOR DOUBLE SIDED DRAINAGE) OR APPROVED EQUAL.



SCALE:
NTS
APPROVED:
REVISED:
7/12

FIN DRAIN DETAIL

SECTION:
703
DETAIL #
700-2



NOTE:

1. FILTER MATERIAL SHALL BE TYPE D @ 95% COMPACTION AND SHALL BE INCIDENTAL TO THE PAY ITEM "SUBDRAIN".
2. GEOTEXTILE FABRIC SHALL BE A NON-WOVEN MATERIAL AS PER THE SPECIFICATION UNLESS OTHERWISE SPECIFIED AND SHALL BE INCIDENTAL TO THE PAY ITEM "SUBDRAIN".

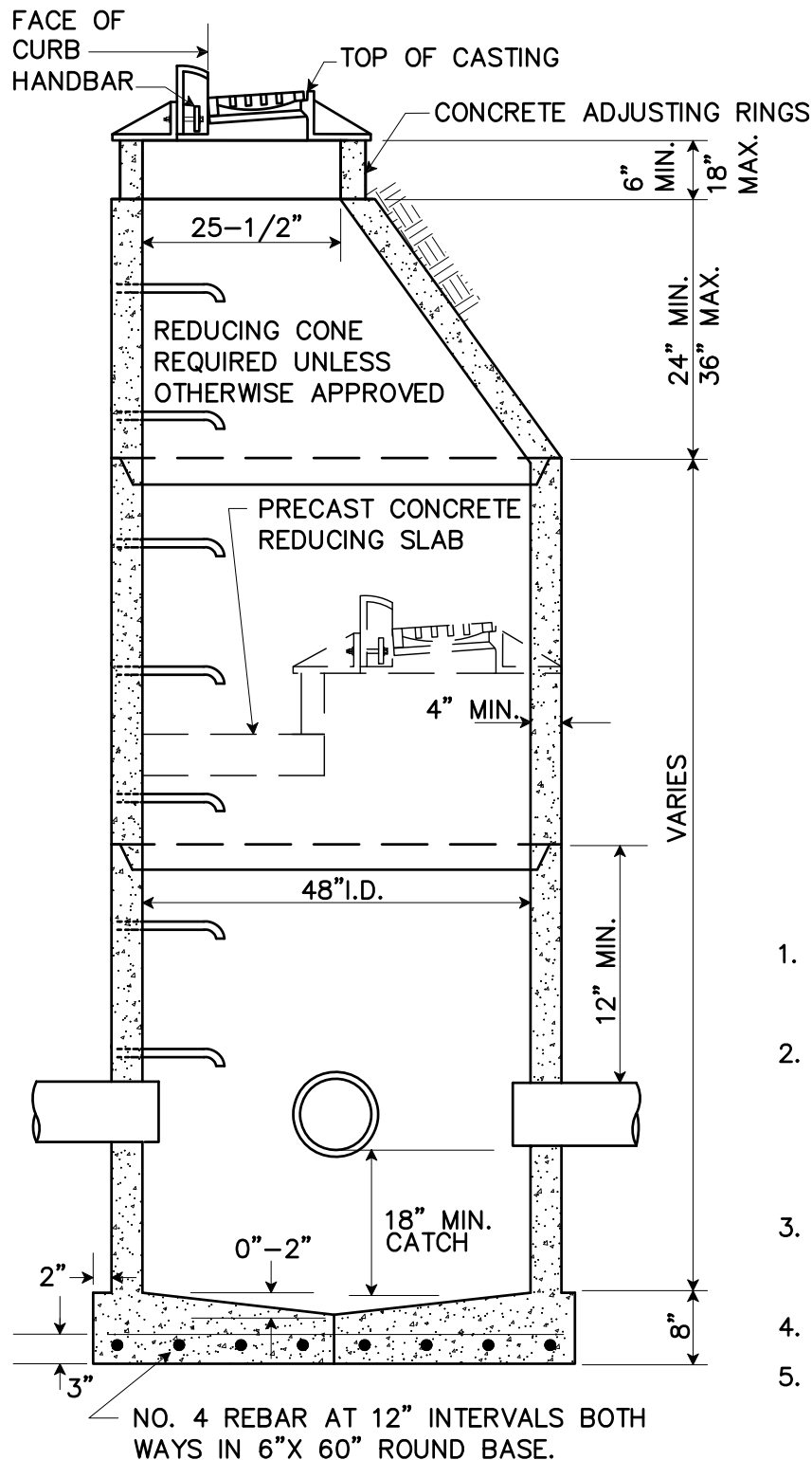


SCALE:
NTS
APPROVED:

REVISED:
7/12

SUBDRAIN

SECTION:
703
DETAIL #
700-3



NOTES:

1. All drainage structures and appurtenances shall meet the requirements of ASTM C-478.
2. Minimum steel required for barrel as per ASTM-478 shall be imbedded in base so that the first barrel section is connected to the base by continuous steel.
3. Cast-In-Place structures may be used if approved by the Engineer.
4. All blockouts shall be formed.
5. Steps shall be placed 12" O.C. on the unobstructed side of the structure, 20" from top of casting and 18" maximum from manhole base.

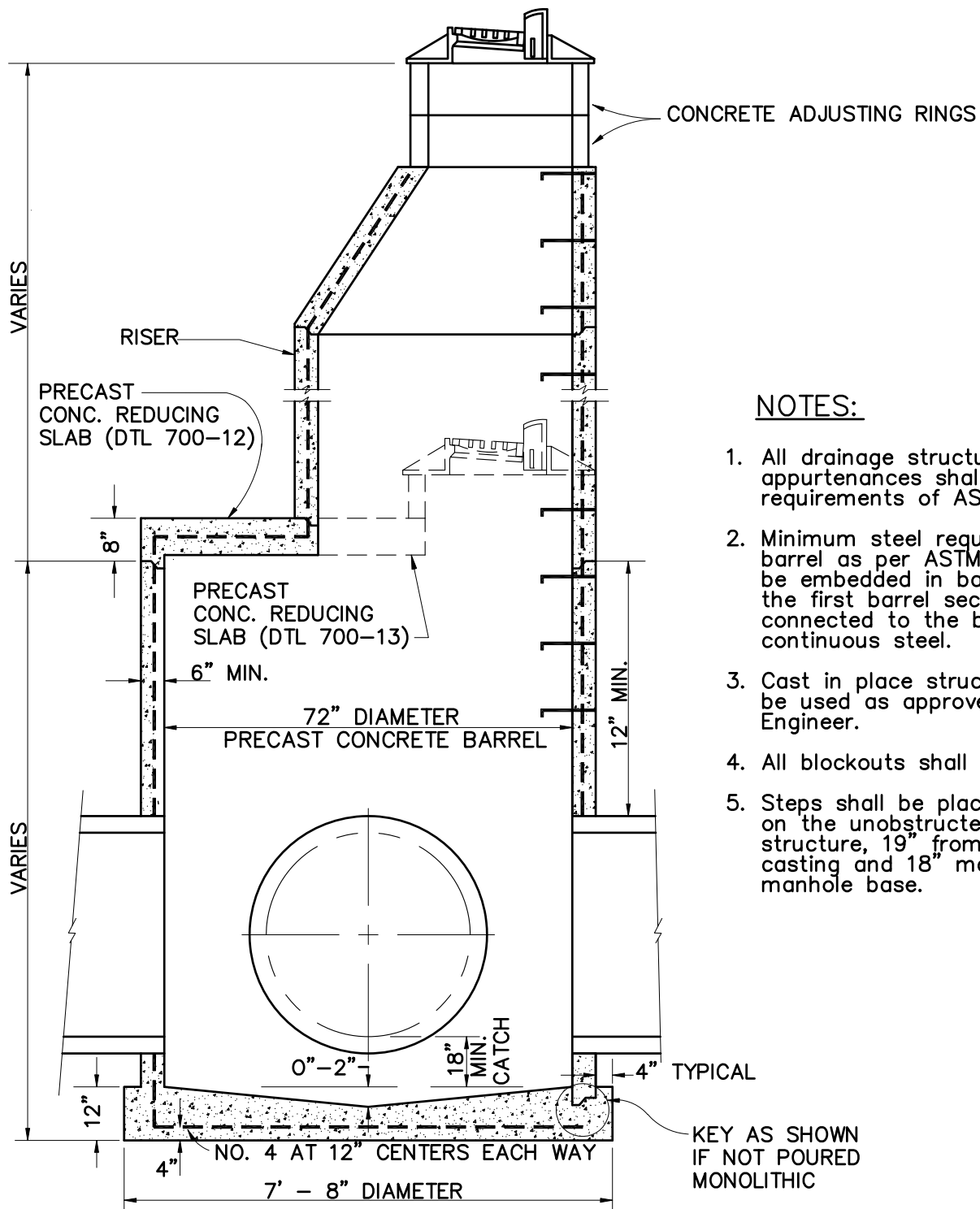


SCALE:
NTS
APPROVED:

REVISED:
7/12

TYPE I STORM DRAIN MANHOLE

SECTION:
704
DETAIL #
700-4



NOTES:

1. All drainage structures and appurtenances shall meet the requirements of ASTM C-478.
2. Minimum steel required for barrel as per ASTM C-478 shall be embedded in base so that the first barrel section is connected to the base by continuous steel.
3. Cast in place structures may be used as approved by the Engineer.
4. All blockouts shall be formed.
5. Steps shall be placed 12" O.C. on the unobstructed side of the structure, 19" from top of casting and 18" maximum from manhole base.

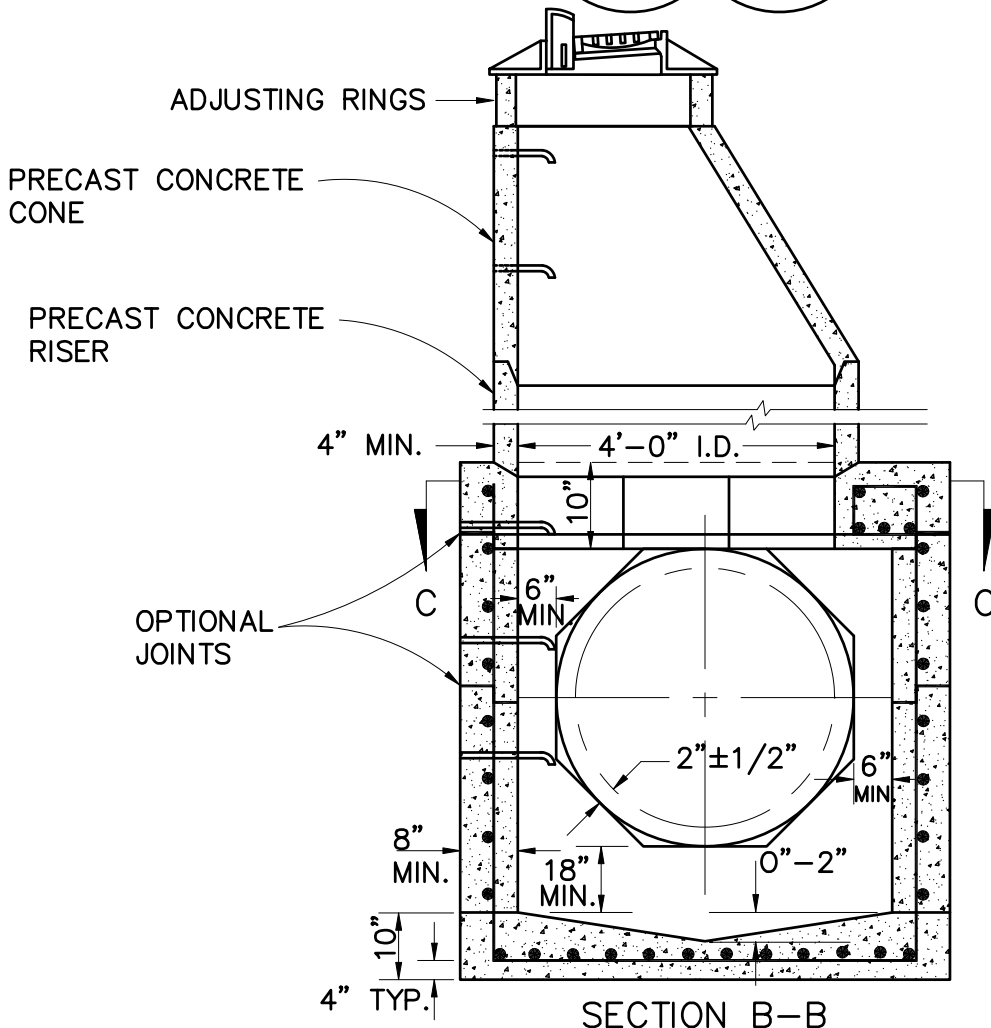
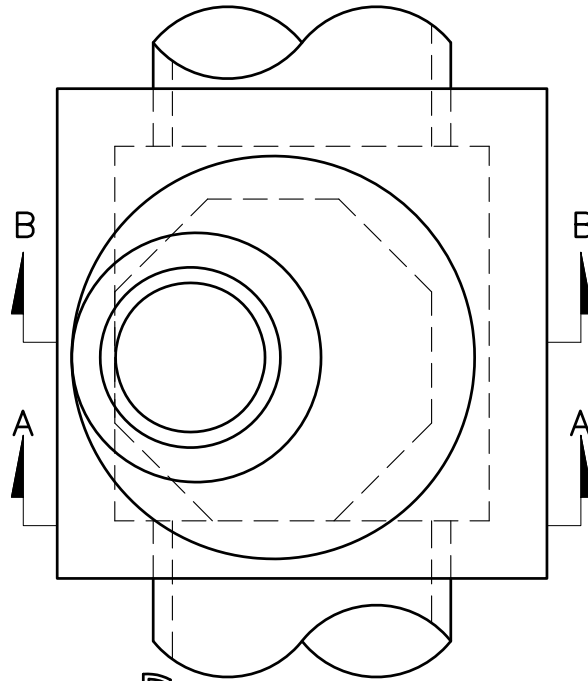


SCALE:
NTS
APPROVED:

REVISED:
7/12

TYPE II STORM DRAIN MANHOLE

SECTION:
704
DETAIL #
700-5



FOR NOTES AND
SECTIONS A-A & C-C
SEE DETAIL 700-7



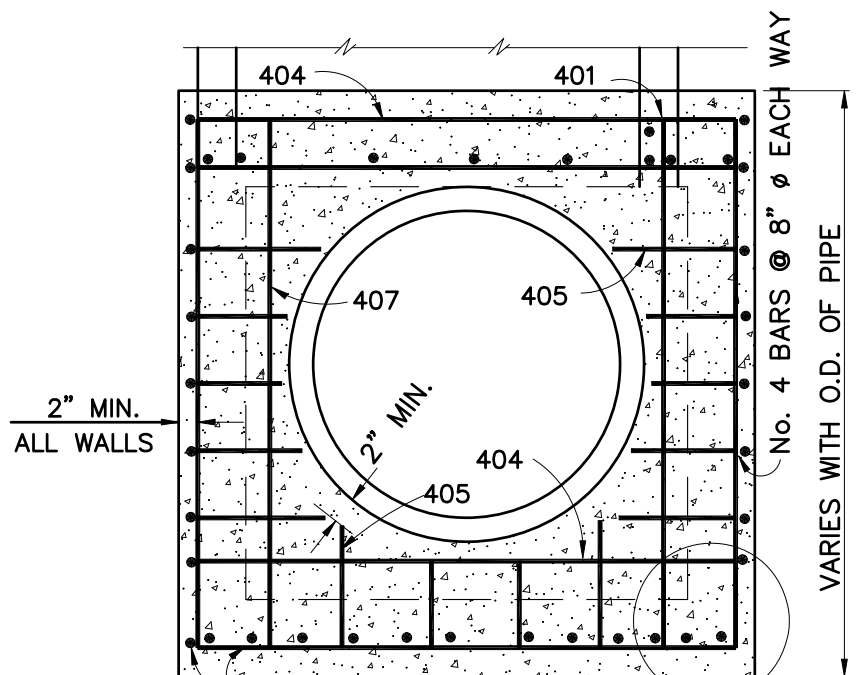
SCALE:
NTS
APPROVED:

REVISED:
7/12

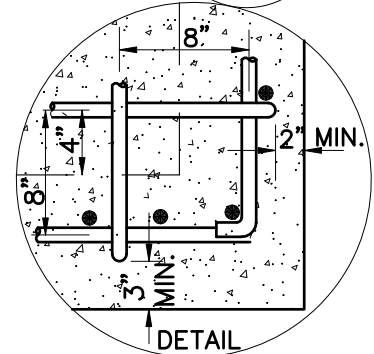
TYPE III STORM DRAIN MANHOLE

SECTION:
704
DETAIL #
700-6

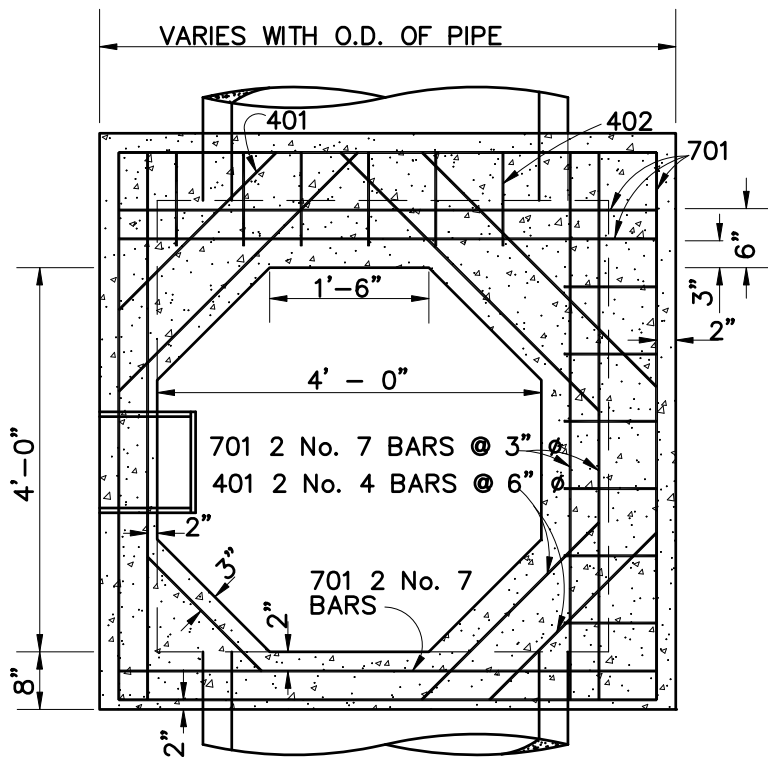
BAR LIST



401 No. 4 BARS
@ 6" ϕ
SECTION A - A



DETAIL



SECTION C - C

NOTES:

1. All drainage structures shall meet the requirements of ASTM C-478.
2. Details for structure above large reducing slab are same as for storm drain Manhole, Type I.
3. All storm drain manholes and inlets shall have minimum 18 inch sumps. Manholes with petroleum separators shall have 24 inch minimum sumps.
4. Rubber gasket joints are shown. Grouted joints or "Ram Neck" type gasket joints are acceptable alternatives.
5. Minimum clearance between manhole joint and wall penetration or between two wall penetrations shall be 12 inches.
6. Circumferential wall reinforcing shall be double or single circular cage with total of 0.40 square inch per foot both ways spaced as per A.S.T.M. C-478.8.
7. Additional wall reinforcement is required at all joints. A circular cage 12 inches wide and centered as shown and have a total area of 0.20 square inches per foot both ways.
8. All penetrations shall be formed.
9. Hole in eccentric reducing slab is to be 48 inches when additional manhole sections are required. Above hole shall be 36 inches when grade ring and casting sit directly on slab.
10. Steps shall be placed 12 inches O.C. on the unobstructed side of the structure, 19 inches from top of casting and 18 inches maximum from manhole base.
11. Reinforcement for top of eccentric reducing slab shall be welded wire mesh with minimum area of 0.12 square inch per foot both ways.

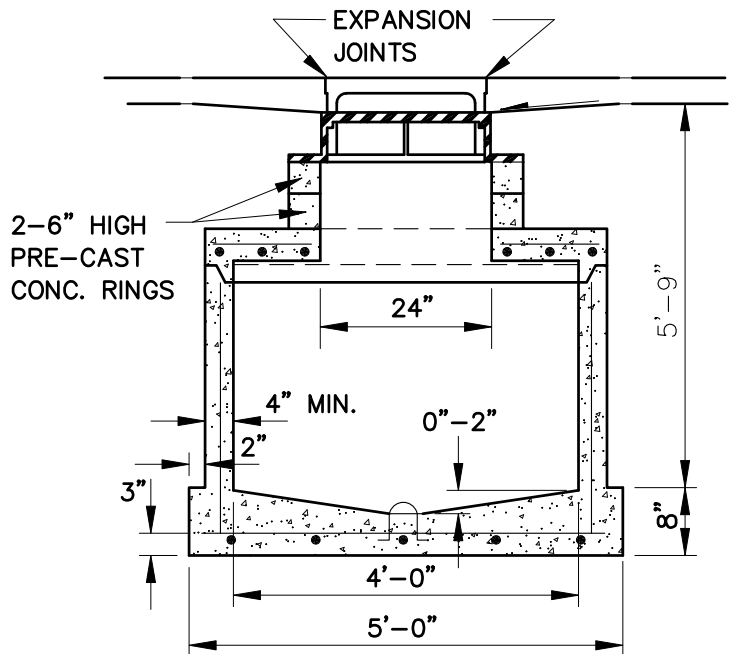
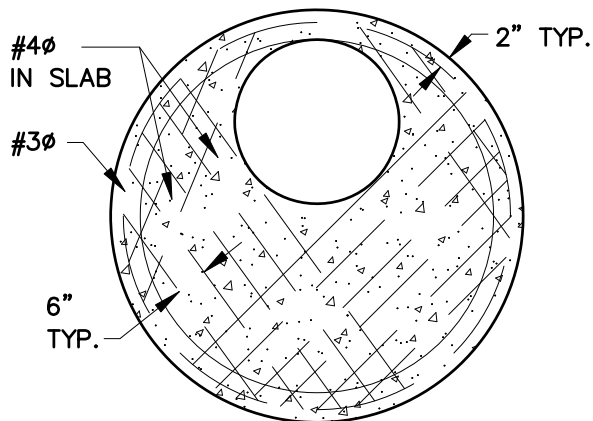
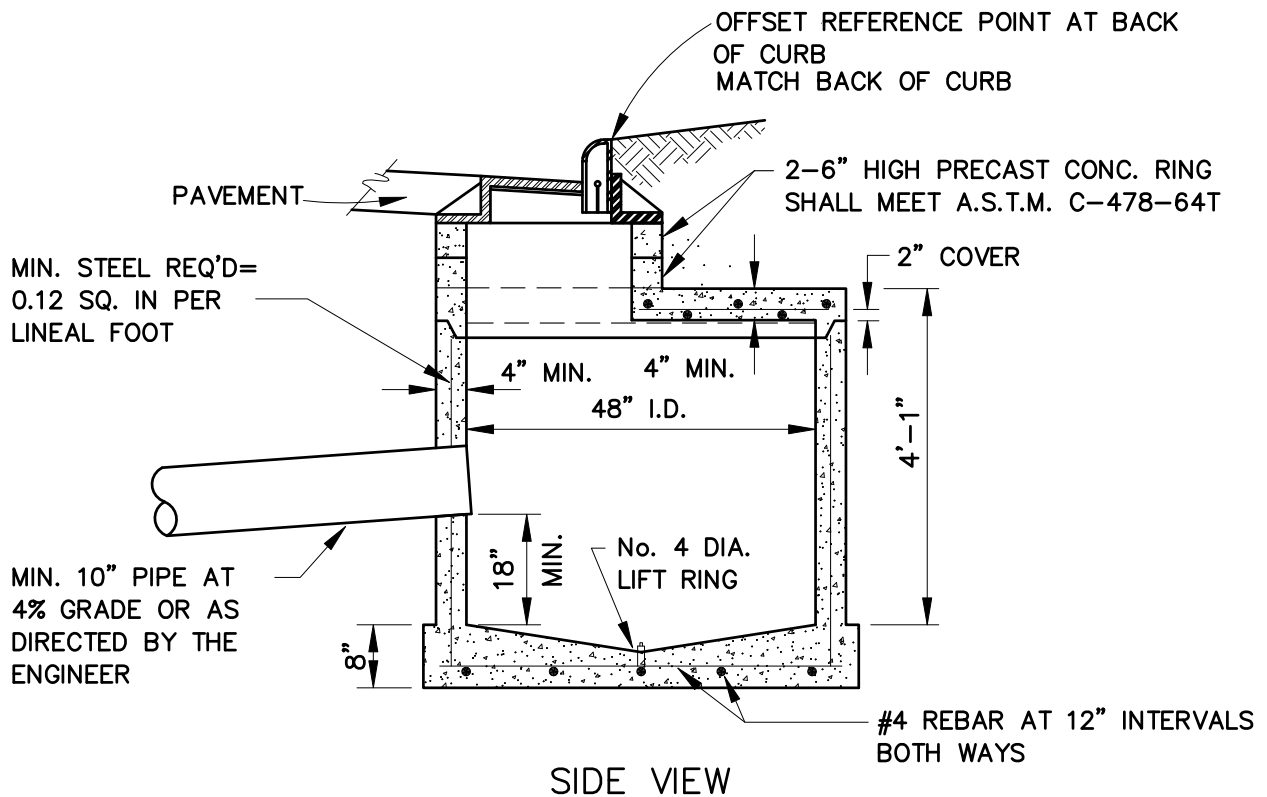


SCALE:
NTS
APPROVED:

REVISED:
1/00

TYPE III PRECAST CONCRETE REDUCING SLAB

SECTION:
704
DETAIL #
700-7



NOTES:

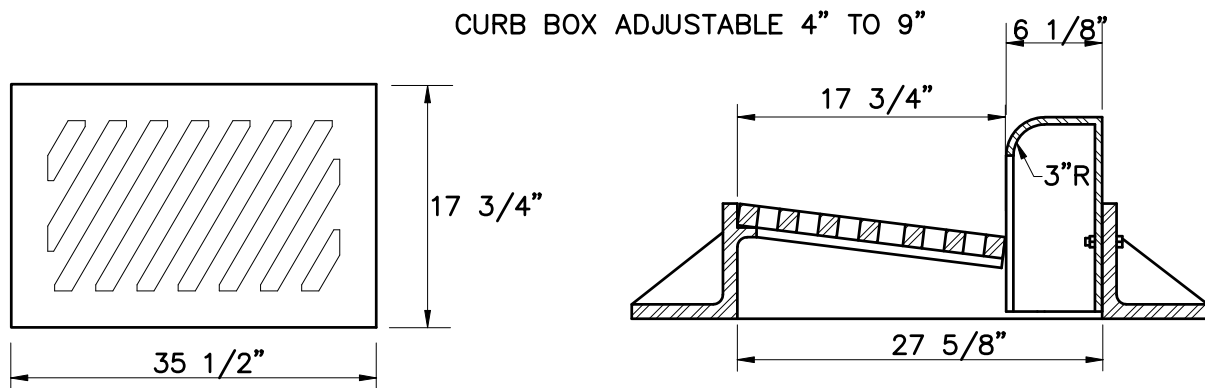
1. COMPRESSIVE STRENGTH OF CONC. SHALL BE MINIMUM 4000 P.S.I. EXCEPT BASE SLAB WHICH MAY BE 3000 P.S.I. BASE & BARREL SHALL BE CONNECTED BY CONTINUOUS STEEL.
2. SEE ASTM 478 FOR DESIGN REQUIREMENTS.
3. AT CATCH BASIN, DELETE CONC. CURB & GUTTER, PAVE TO FACE OF CATCH BASIN INLET.



SCALE:
NTS
APPROVED:
REVISED:
2/04

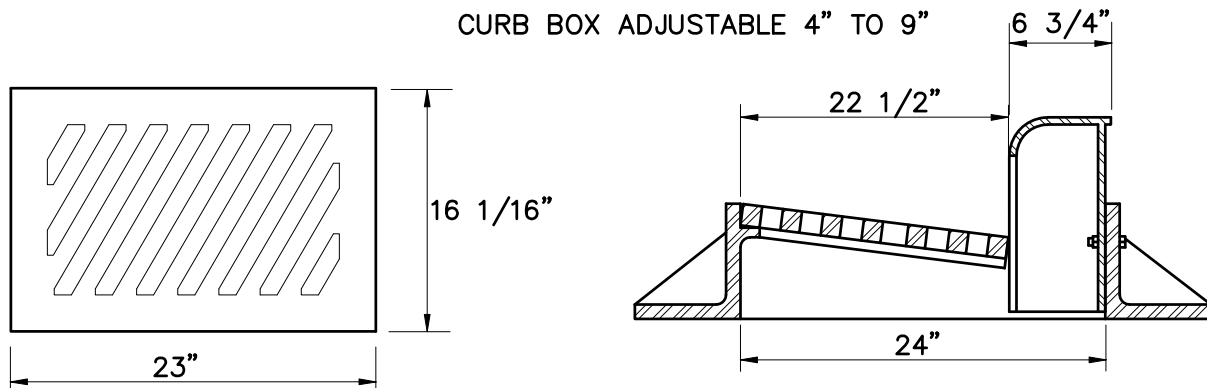
PRECAST CATCH BASIN

SECTION:
704
DETAIL #
700-8



700-9a EAST JORDAN IRON WORKS MODEL 7030 OR APPROVED EQUAL

STANDARD CURB AND GUTTER CURB FRAME/GRATE/HOOD



700-9b EAST JORDAN IRON WORKS MODEL 7010 OR APPROVED EQUAL

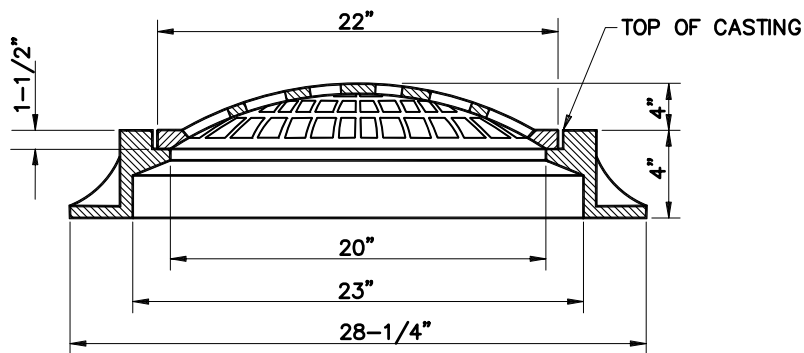


SCALE:
NTS
APPROVED:

REVISED:
7/12

CATCH BASIN INLET FOR STANDARD CURB AND GUTTER

SECTION:
704
DETAIL #
700-9a, 9b



FIELD INLET FRAME & GRATE

EST JORDAN IRON WORKS 1130 FRAME & COVER FOR STORM DRAIN MANHOLES WHERE FIELD INLETS ARE SPECIFIED. FIELD INLET FRAME AND GRATE SHALL HAVE A TOTAL WEIGHT OF NOT LESS THAN 535 LBS.

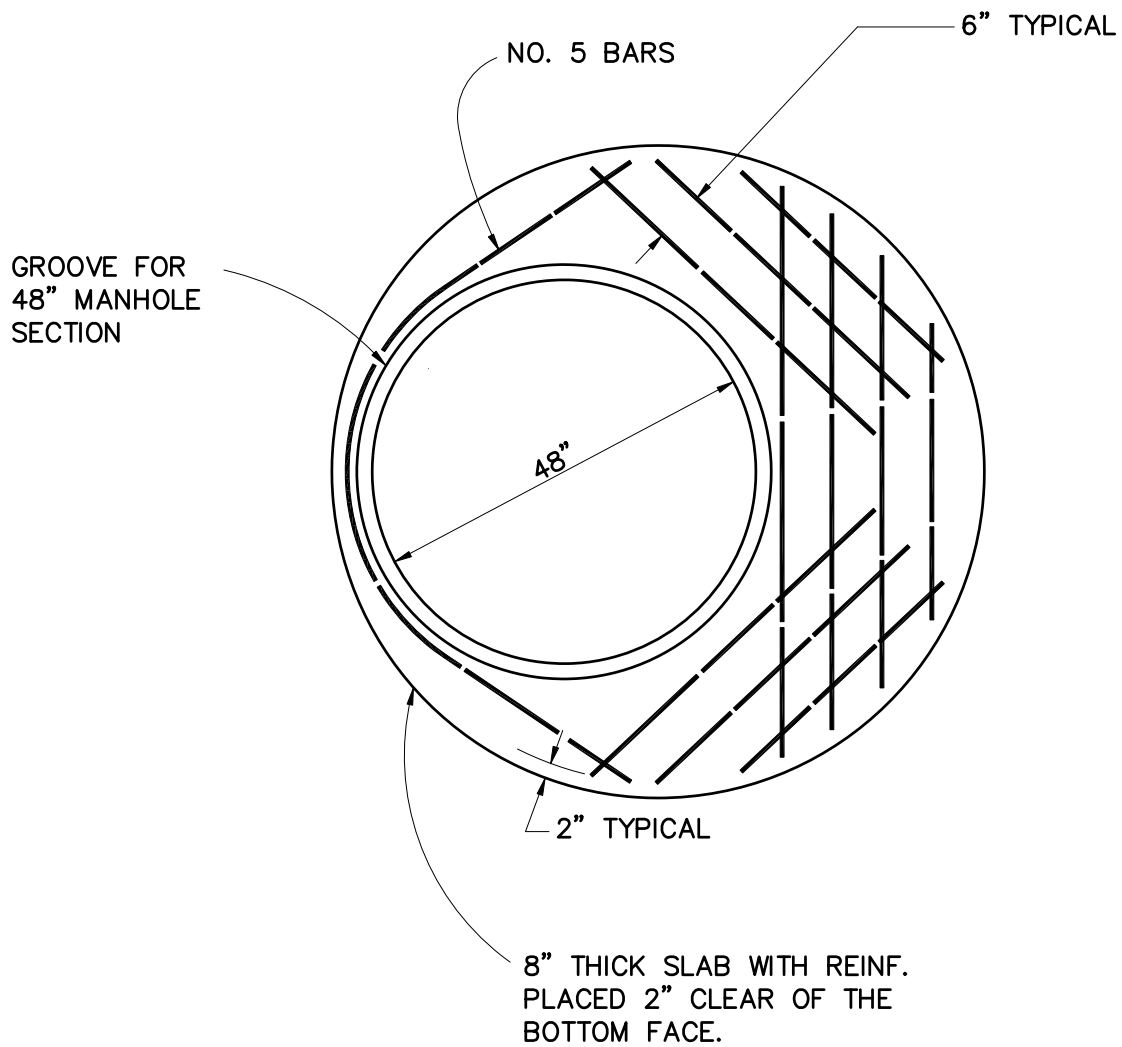


SCALE:
NTS
APPROVED:

REVISED:
7/12

FIELD INTLET FRAME AND GRATE

SECTION:
704
DETAIL #
700-11

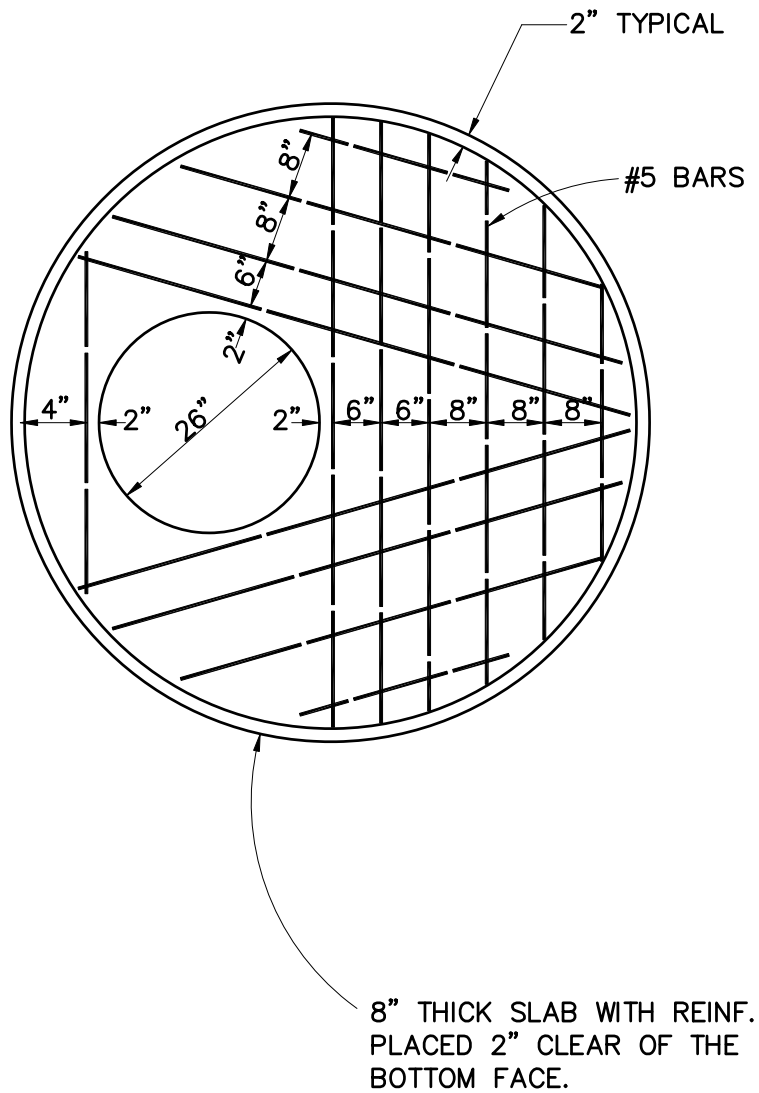


SCALE:
NTS
APPROVED:

REVISED:
1/00

PRECAST CONCRETE REDUCING SLAB (72" TO 48")

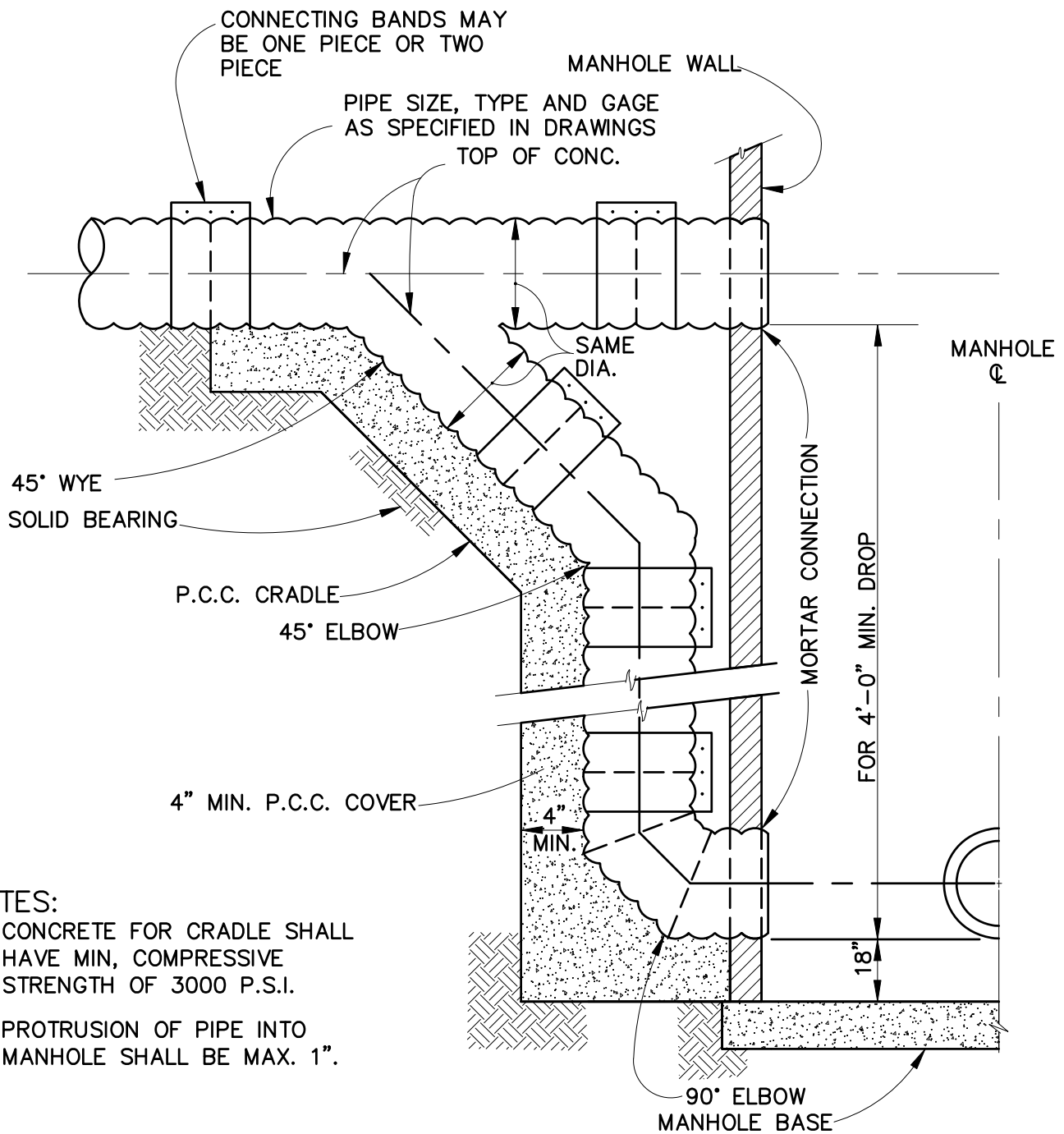
SECTION:
704
DETAIL #
700-12



SCALE:
NTS
APPROVED:
REVISED:
1/00

PRECAST CONCRETE REDUCING SLAB 72" OR 48" TO 26"

SECTION:
704
DETAIL #
700-13



NOTES:

1. CONCRETE FOR CRADLE SHALL HAVE MIN. COMPRESSIVE STRENGTH OF 3000 P.S.I.
2. PROTRUSION OF PIPE INTO MANHOLE SHALL BE MAX. 1".

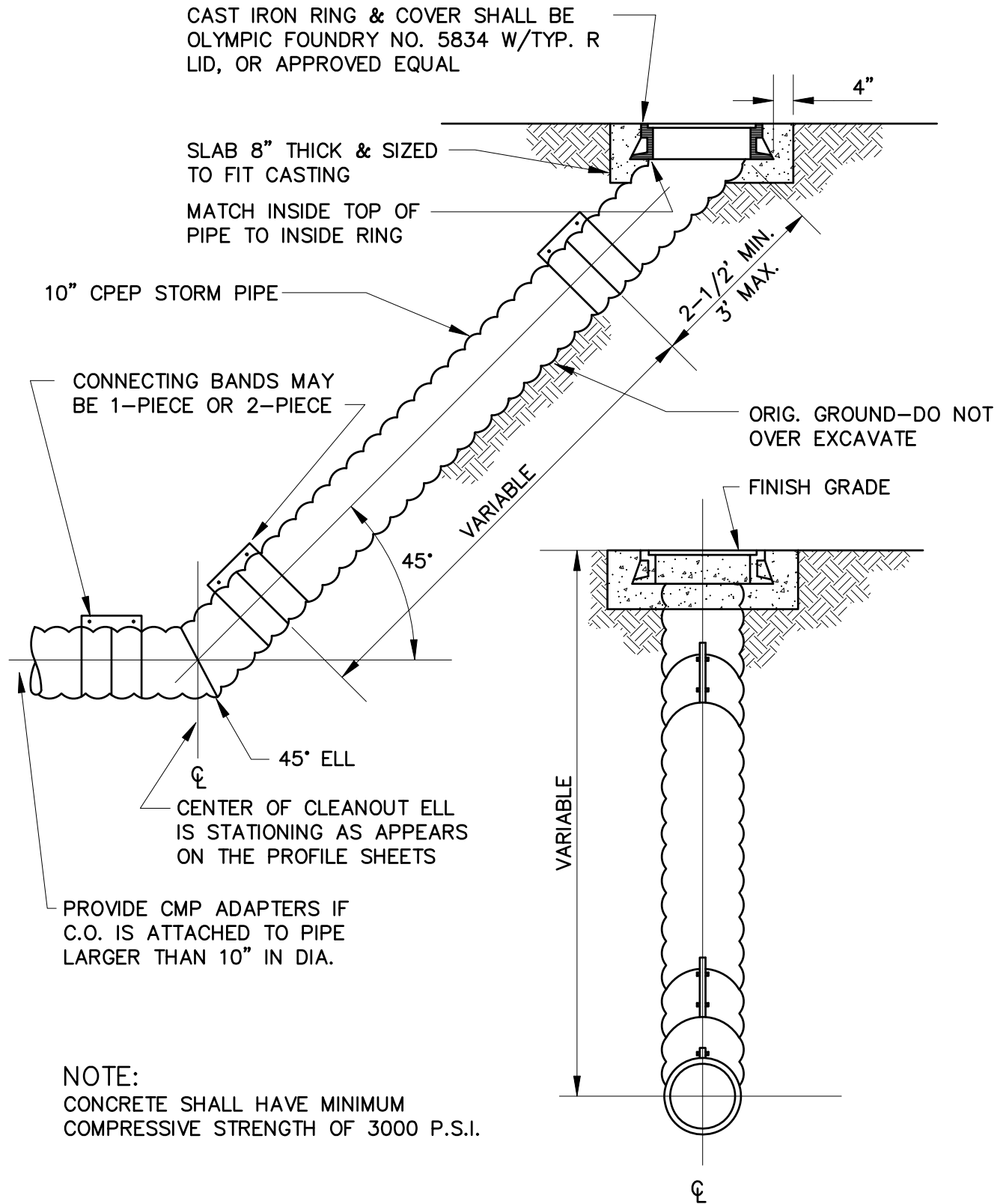


SCALE:
NTS
APPROVED:

REVISED:
7/12

STORM DRAIN DROP CONNECTION (4' MIN. DROP)

SECTION:
705
DETAIL #
700-15

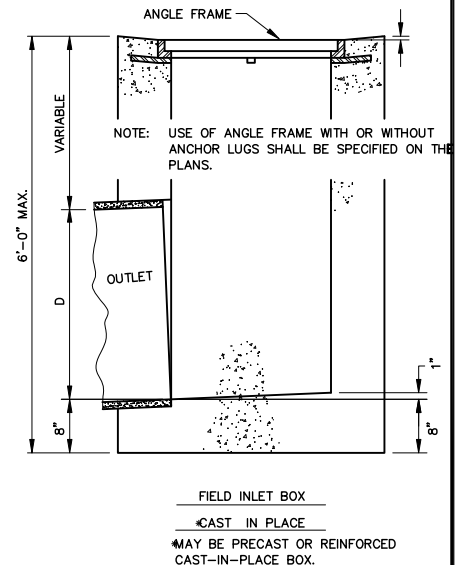
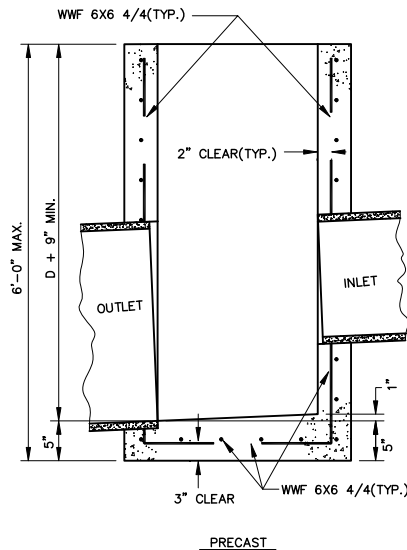
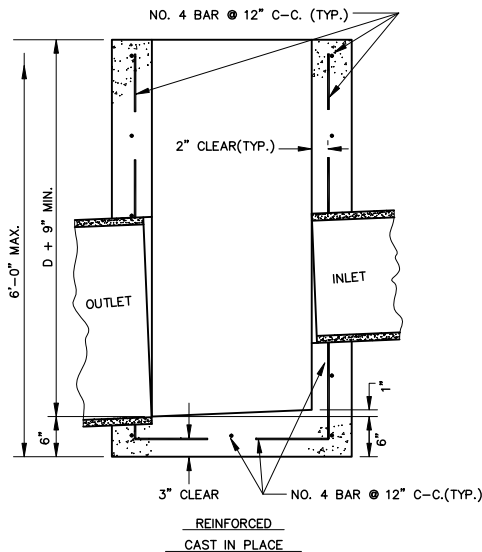
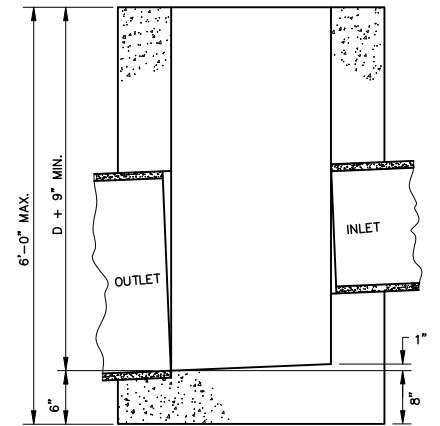
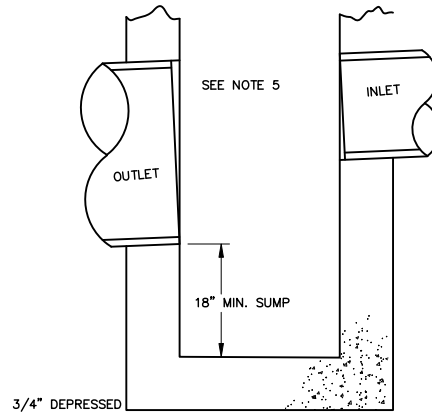
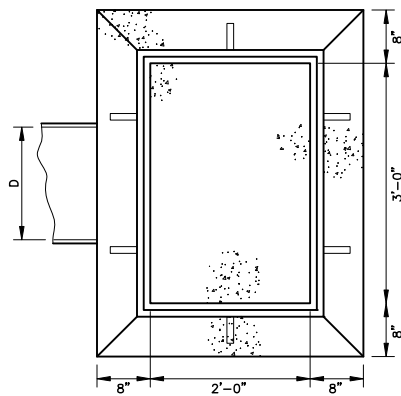
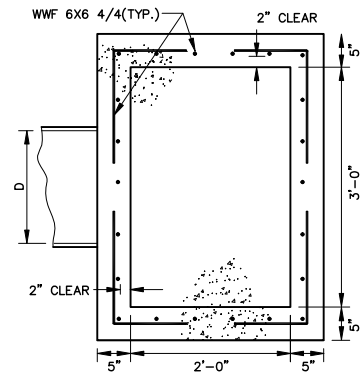
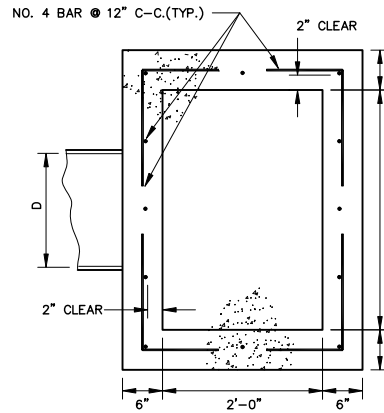
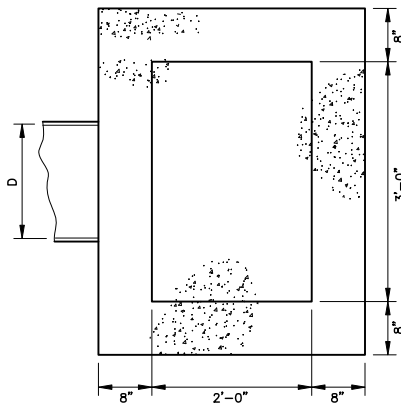


SCALE:
NTS
APPROVED:

REVISED:
7/12

STORM DRAIN CLEANOUT

SECTION:
706
DETAIL #
700-16



GENERAL NOTES:

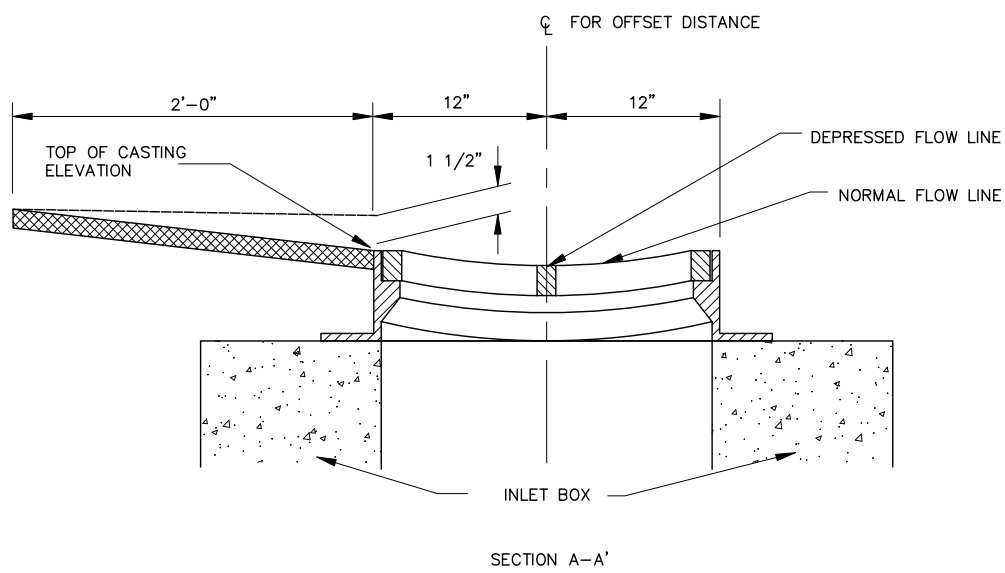
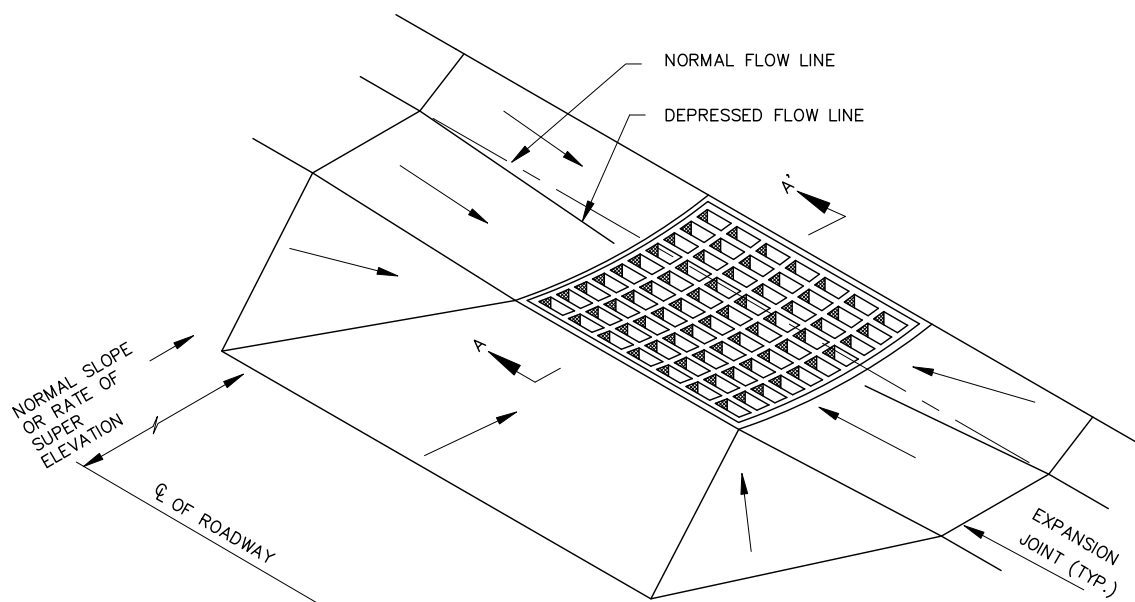
1. CAST IN PLACE CONCRETE INLET BOX SHALL BE PER SECTION 304, PORTLAND CEMENT CONCRETE STRUCTURES.
2. CONCRETE INLET BOX DEPTH AND LOCATION SHALL BE SHOWN ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
3. SHAPE FLOORS TO DRAIN.
4. CONCRETE INLET BOX SHALL BE PARALLEL TO ROADWAY CENTERLINE UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
5. SHALL BE SPECIFIED ON PLANS WHEN INLETS REQUIRE A SUMP.
6. DETAILS SHOWN ARE TO INDICATE GENERAL DESIGN ONLY. DIMENSIONS AND DESIGN MAY VARY AMONG THE MANUFACTURERS. EXCEPT INLET GRATE OUTSIDE DIMENSION SHALL BE AS SHOWN ON THIS DRAWING.
7. MINIMUM CASTING WEIGHT SHALL BE 450LBS. FOR GUTTER INLET FRAME AND GRATE.



SCALE:
NTS
APPROVED:
REVISED:
7/12

BOX TYPE CATCH BASIN

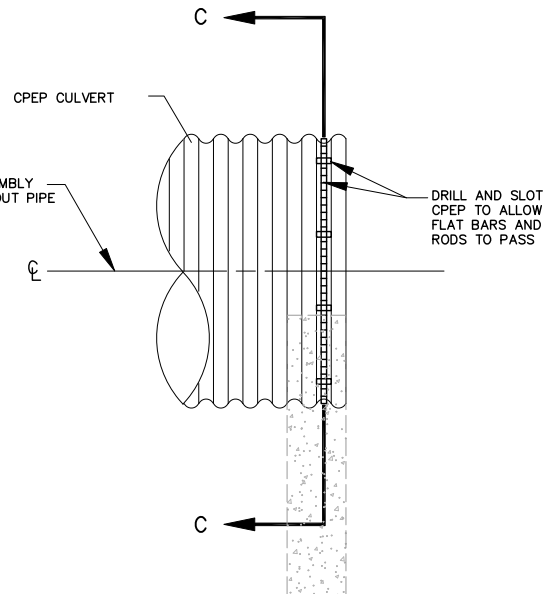
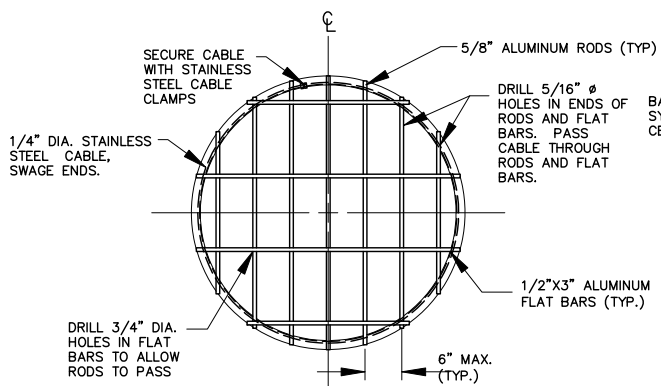
SECTION:
704
DETAIL #
700-17



SCALE:
NTS
APPROVED:
REVISED:
7/12

GUTTER INSTALLATION FOR BOX TYPE CATCH BASIN

SECTION:
704
DETAIL #
700-18



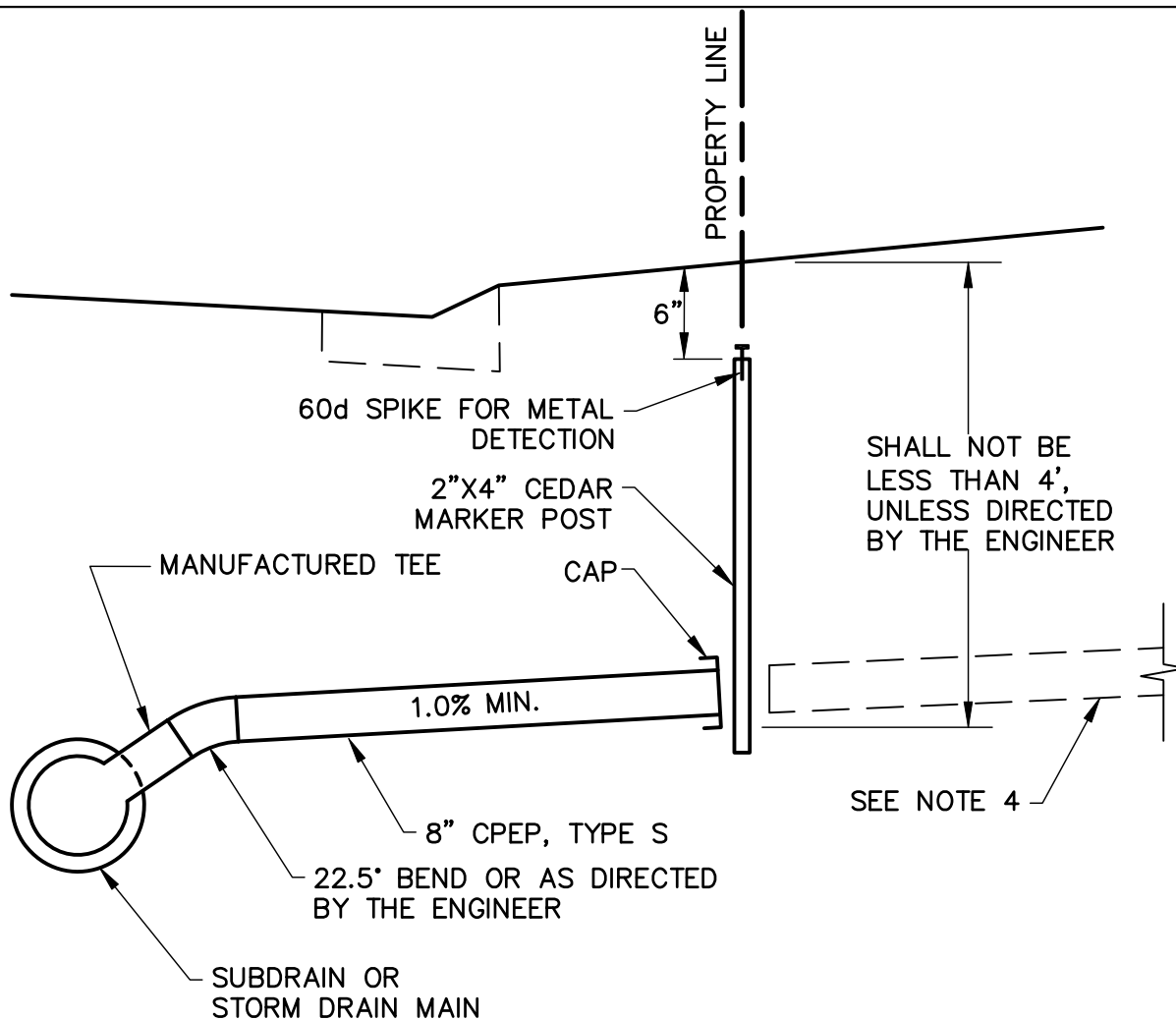
CPEP CULVERT BAR GUARD



SCALE:
NTS
APPROVED:
REVISED:
7/12

CPEP CULVERT BAR GUARD

SECTION:
711
DETAIL #
700-19



NOTES:

1. FINAL LOCATION OF THE FOOTING DRAIN SERVICE MAY BE ADJUSTED BY THE ENGINEER.
2. BACKFILL WITH TYPE II CLASSIFIED FILL AND BACKFILL WITHIN ROAD PRISM. BACKFILL WITH NATIVE MATERIAL BEHIND CURB.
3. WHEN FOOTING DRAIN CONNECTS DIRECTLY TO A MANHOLE. OMIT THE 22 1/2' BEND AND CONSTRUCT THE INVERT A MINIMUM OF 1' ABOVE THE DOWNSTREAM INVERT.
4. CONNECT TO ON-PROPERTY FOOTING DRAIN WHEN PRESENT AT PROPERTY LINE AND OMIT MARKER POST. CONTRACTOR SHALL ADAPT AND PROVIDE BELL-REDUCER OR COUPLING CONNECTION TO EXISTING FOOTING DRAIN OF WHATEVER PIPE SIZE AND TYPE AND RESOLVE CONNECTION DETAILS WITH PROPERTY OWNER AND THE ENGINEER. CONNECTION TO EXISTING FOOTING DRAIN SHALL BE INCIDENTAL TO THIS PAY ITEM, AND NO ADDITIONAL PAYMENT SHALL BE MADE.

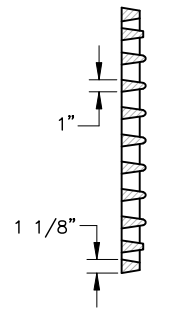


SCALE:
NTS
APPROVED:

REVISED:
7/12

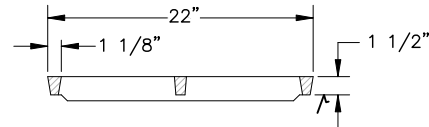
FOOTING DRAIN SERVICE

SECTION:
707
DETAIL #
700-20

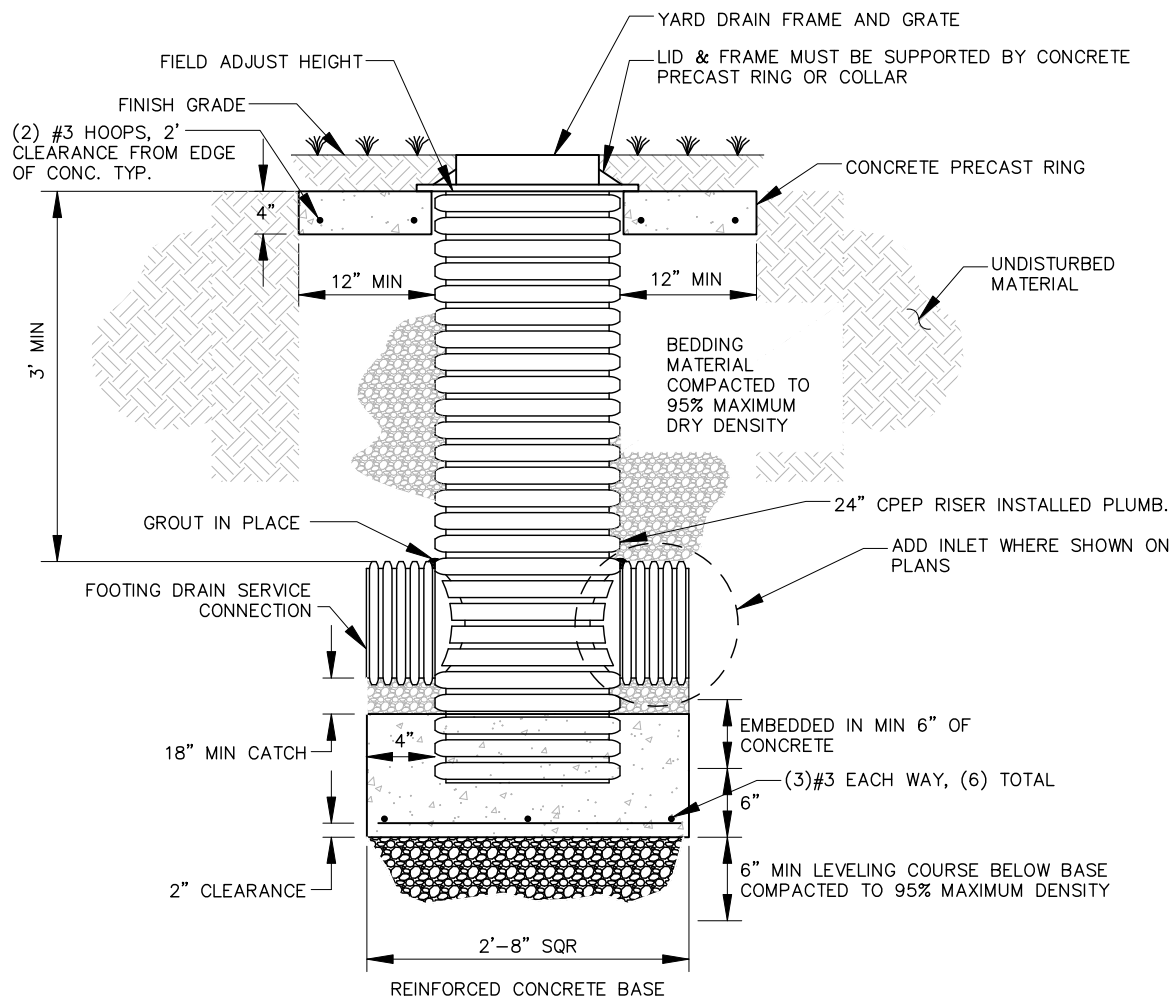


GRATE TOP VIEW

GRATE SECTION



GRATE SECTION



SCALE:
NTS
APPROVED:

REVISED:
7/12

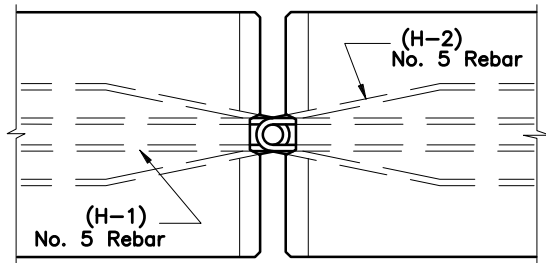
YARD DRAIN

SECTION:

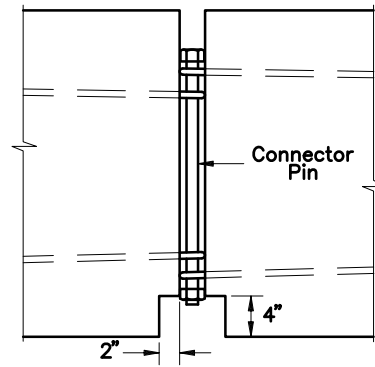
704

DETAIL #

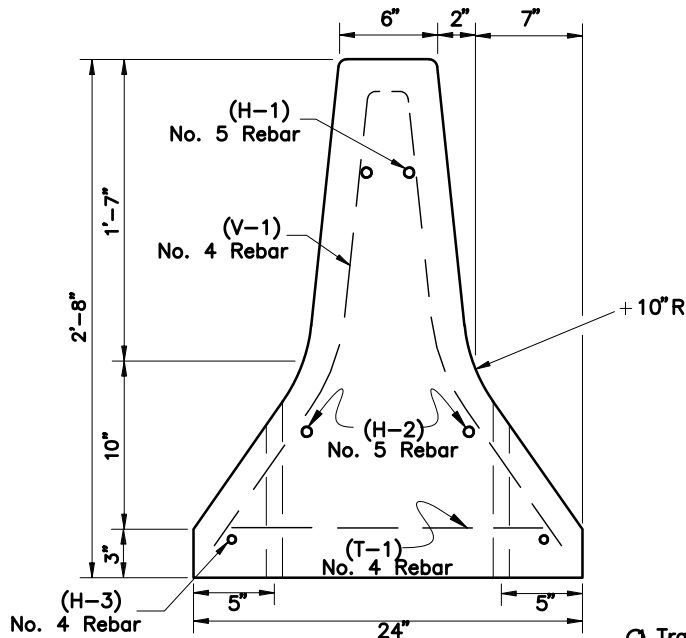
700-21



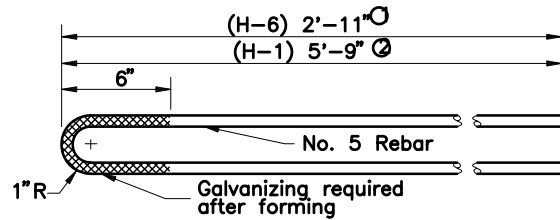
PLAN DETAIL



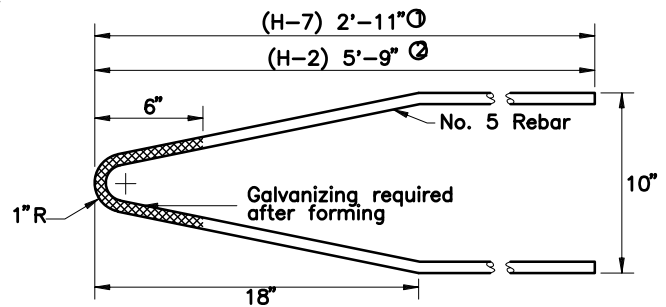
ELEVATION DETAIL



SECTION A-A

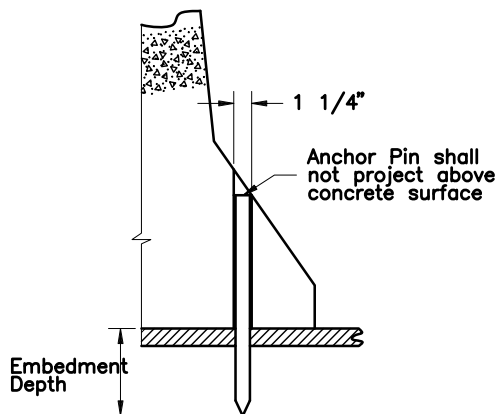


TOP CONNECTION HOOK



○ Transition Section
⊗ Normal Section

BOTTOM CONNECTION HOOK



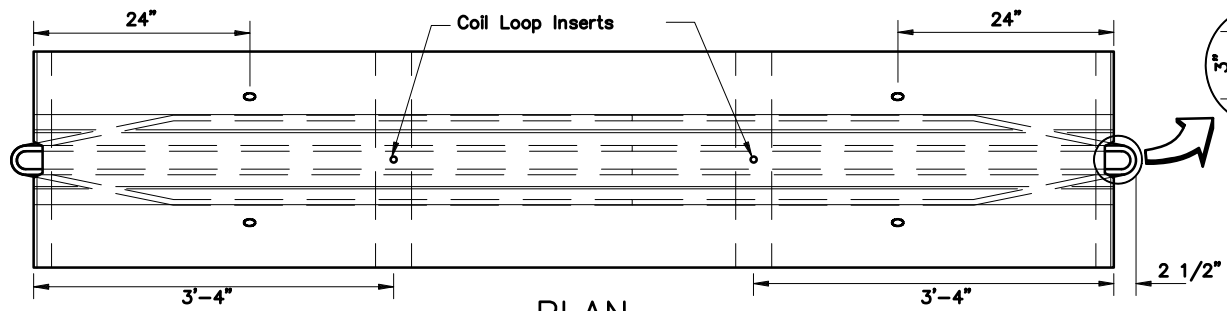
ANCHOR PIN
PLACEMENT DETAIL



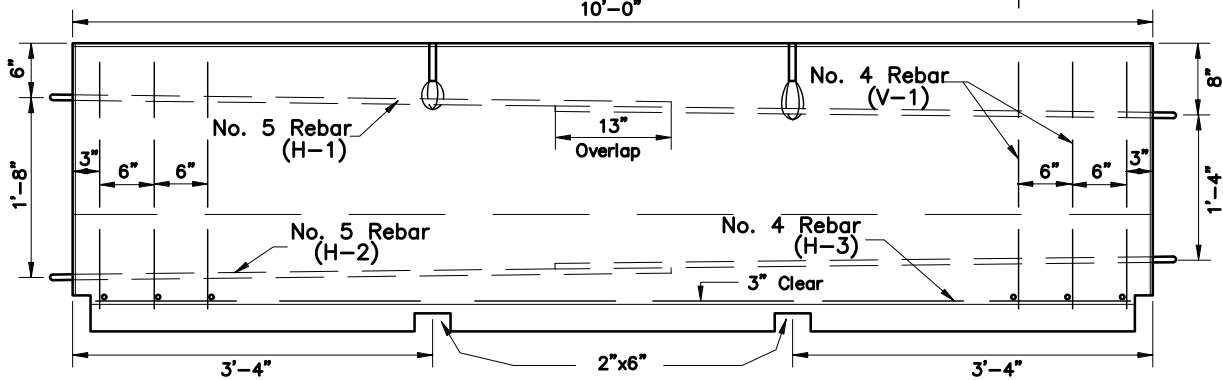
SCALE:
NTS
APPROVED:
REVISED:
1/00

PRECAST CONCRETE BARRIERS

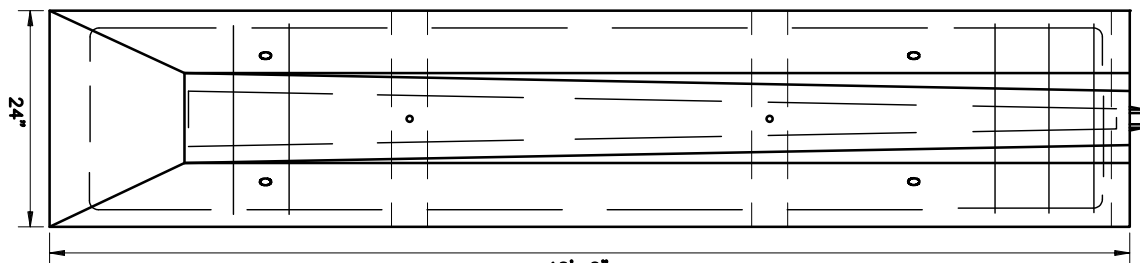
SECTION:
802
DETAIL #
800-1



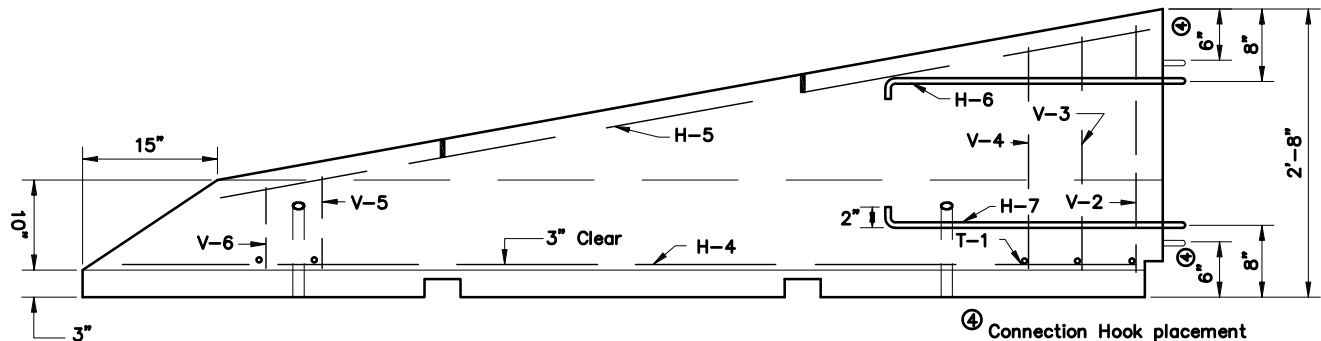
PLAN



ELEVATION



TRANSITION PLAN



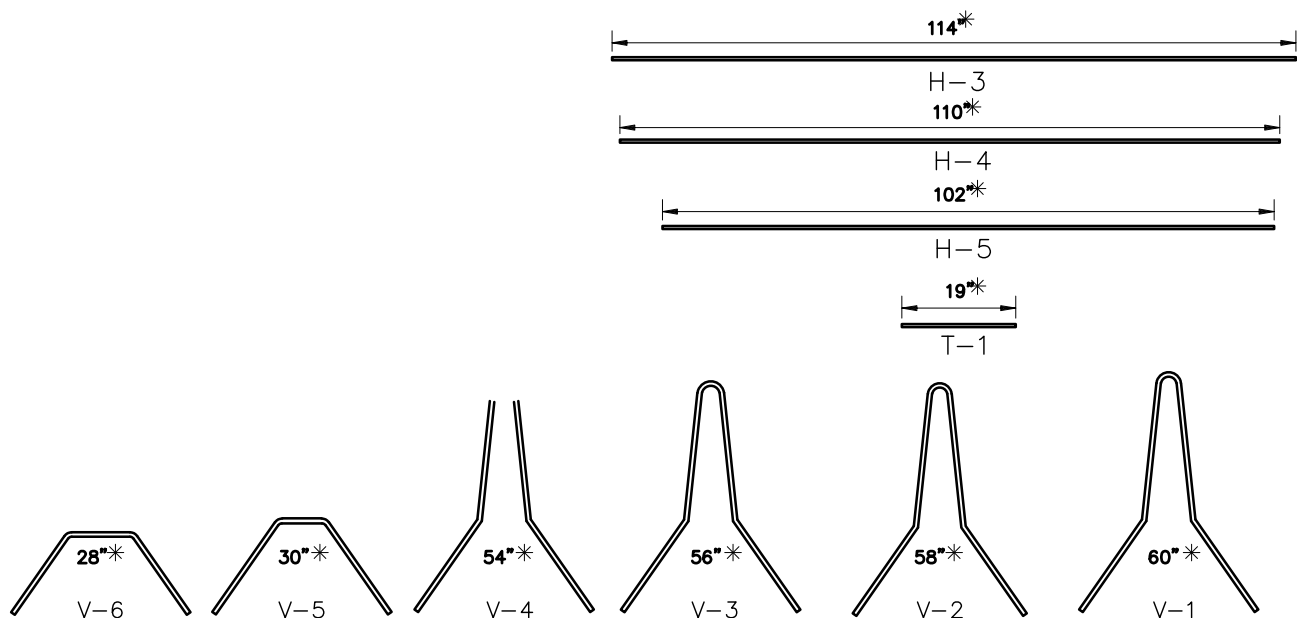
TRANSITION ELEVATION



SCALE:
NTS
APPROVED:
REVISED:
1/00

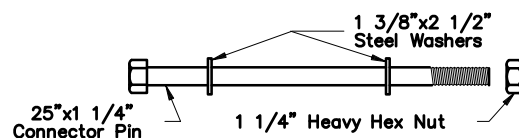
PRECAST CONCRETE BARRIERS

SECTION:
802
DETAIL #
800-2

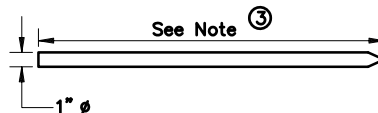


*Length of No. 4 Rebar

REINFORCING STEEL



CONNECTOR PIN



ANCHOR PIN

- ③ Anchor Pin length shall be of sufficient length for minimum embedment depth as follows:
- | | |
|--------------------|-----|
| Concrete Pavements | 5" |
| Asphalt Pavements | 15" |
| Unpaved Areas | 24" |

GENERAL NOTES:

- Concrete shall be air entrained with minimum compressive strength of 3,000 p.s.i.
- Concrete clear cover for reinforcing steel bars shall be a minimum of two inches except as shown otherwise.
- Two one inch coil loop inserts per section with a minimum of 4,000 pounds capacity per insert.
- All exposed hardware, except coil loop inserts, shall be galvanized in accordance with AASHTO M 232.
- Reinforcing steel bars shall conform to AASHTO M 31-86, grade 60.
- Anchor pins shall conform to AASHTO M 183 steel.
- Connector pin, washers, and heavy hex nuts shall conform to AASHTO M 164-86.
- Four anchor pins per unit shall be required for those units as shown on plans requiring anchoring.
- Tapered transition sections shall be used only on trailing ends, flared ends beyond clear zones, or low speed urban locations with a speed of 30 mph or less.

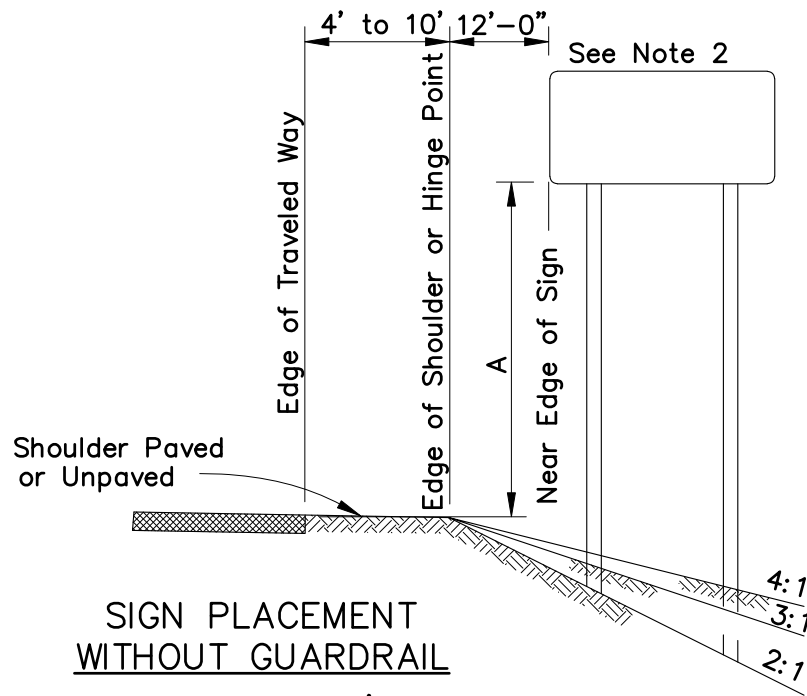


SCALE:
NTS
APPROVED:

REVISED:
1/00

PRECAST CONCRETE BARRIERS

SECTION:
802
DETAIL #
800-3

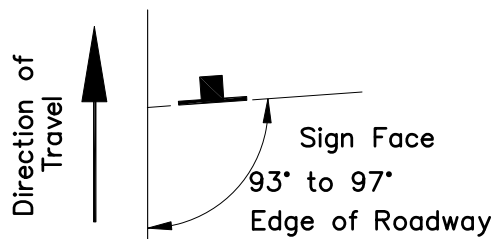


SIGN PLACEMENT WITHOUT GUARDRAIL SUBGRADES OVER 28', ALL SLOPES

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

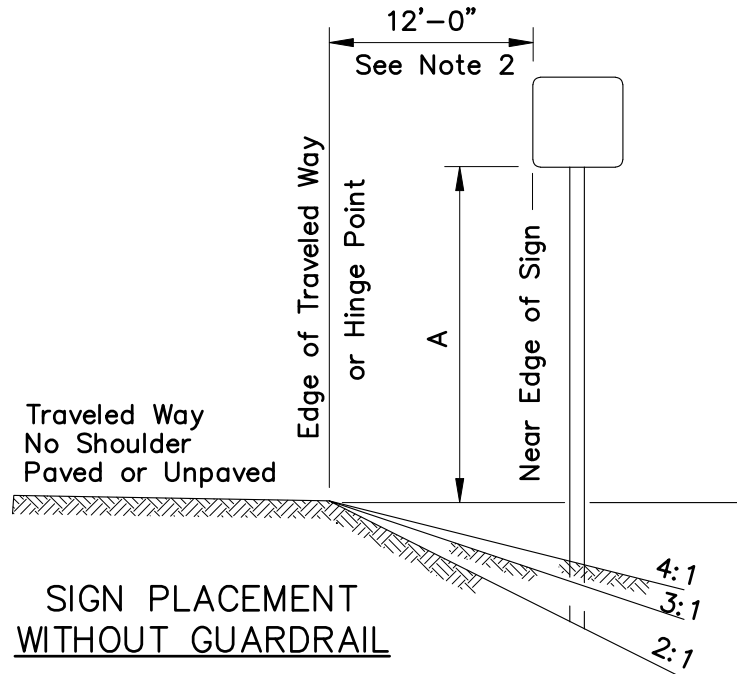
1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.



SCALE:
NTS
APPROVED:
REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-4



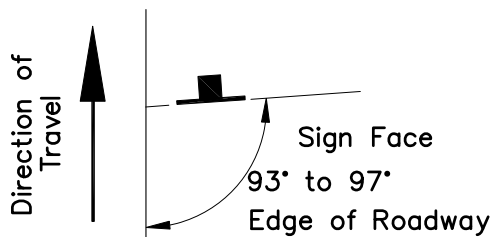
SIGN PLACEMENT WITHOUT GUARDRAIL

SUBGRADES 24' TO 28', ALL SLOPES

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.

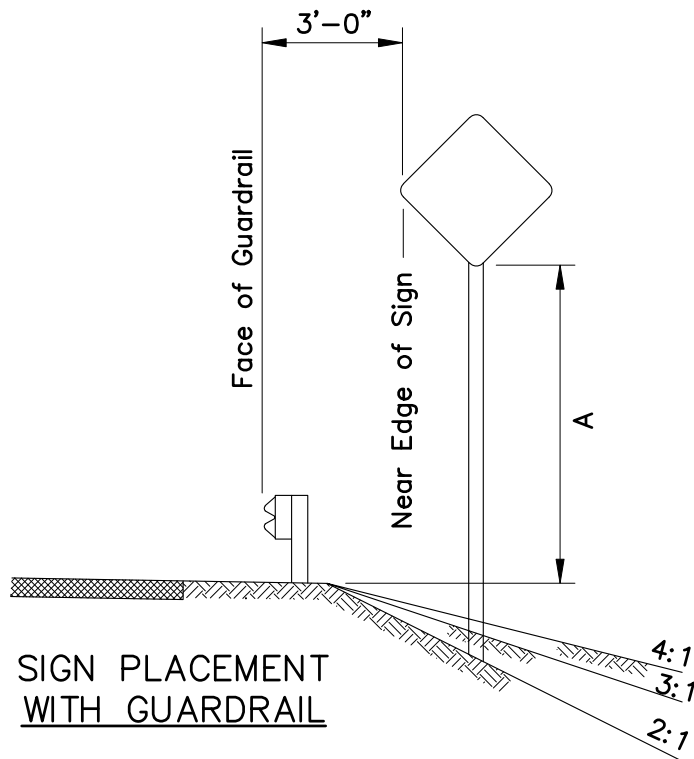


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-5

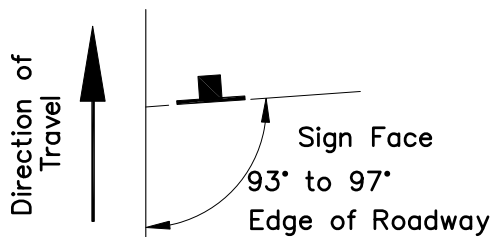


ALL SUBGRADES, ALL SLOPES

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.

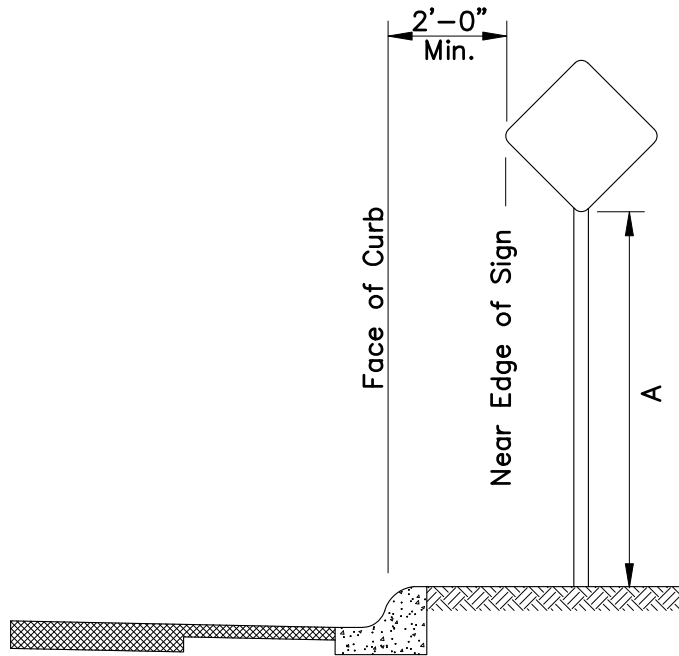


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-6



SIGN PLACEMENT CURB WITHOUT SIDEWALK

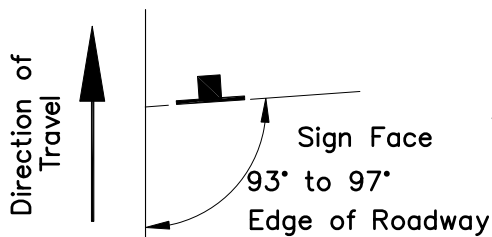
DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.



SIGN POSITIONING

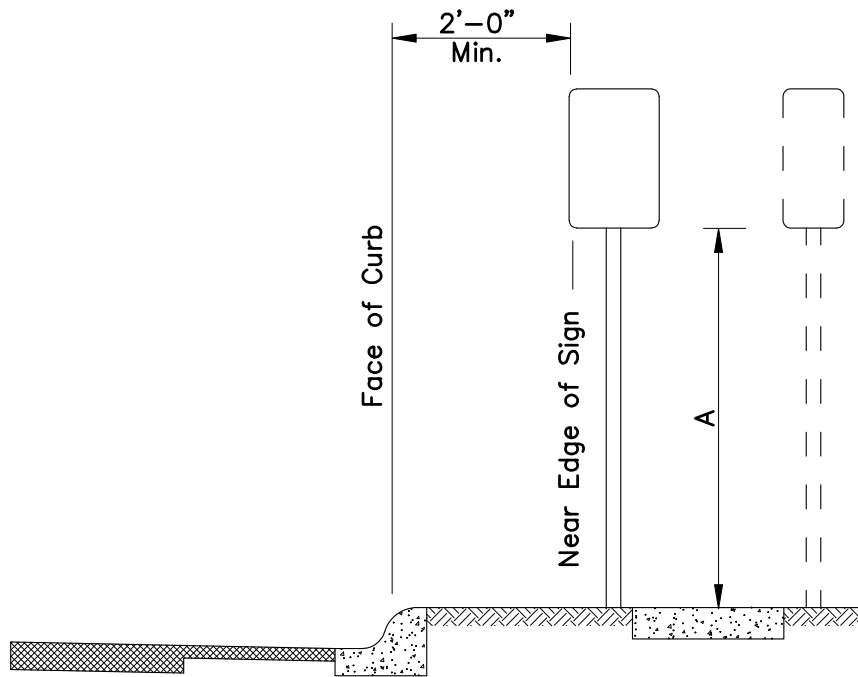


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-7



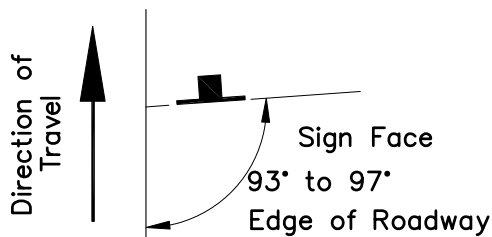
CURB WITH PARKWAY AND SIDEWALK

(If R/W width permits, signs should be placed behind sidewalk.)

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.



SCALE:
NTS
APPROVED:

REVISED:
1/00

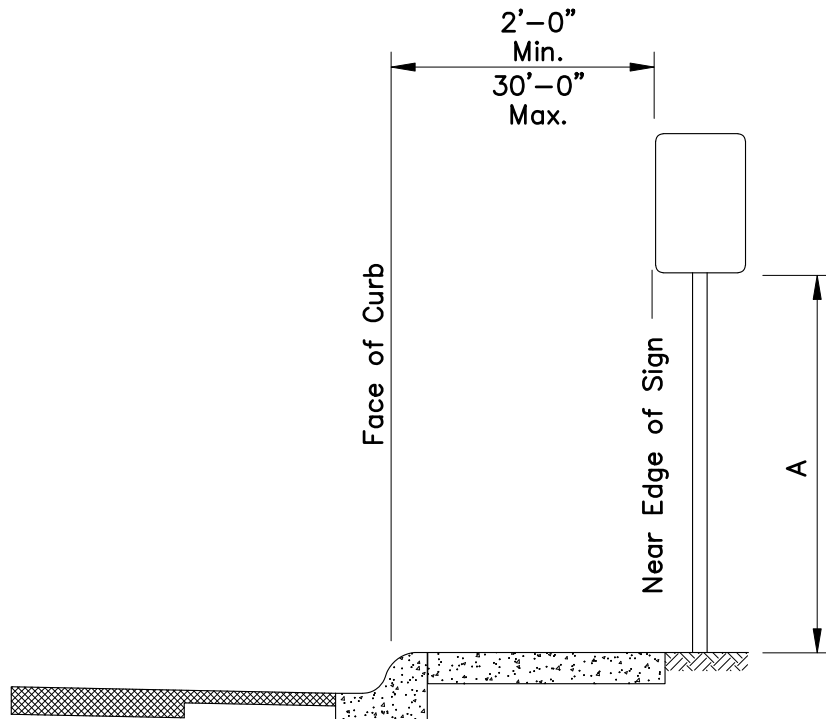
SIGN LOCATION POST MOUNTED

SECTION:

806

DETAIL #

800-8

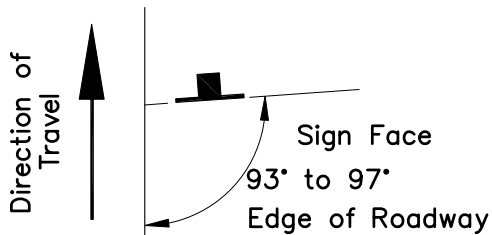


SIGN PLACEMENT CURB WITH SIDEWALK WITHOUT PARKWAY

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.

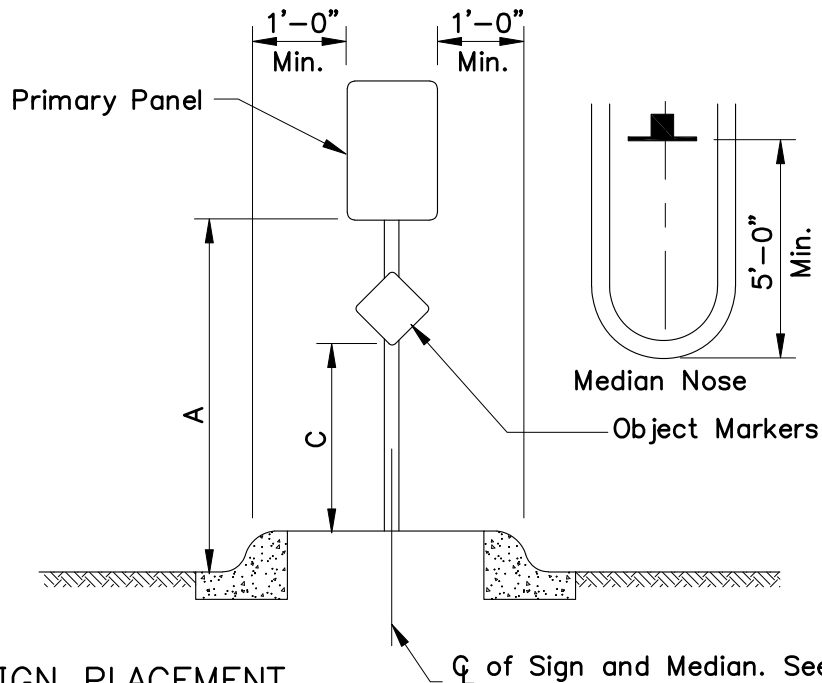


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-9



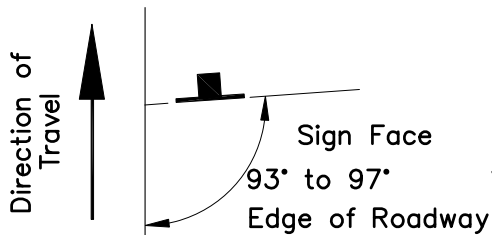
SIGN PLACEMENT MEDIANS

Minimum 4' Width for Signing

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add 0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.

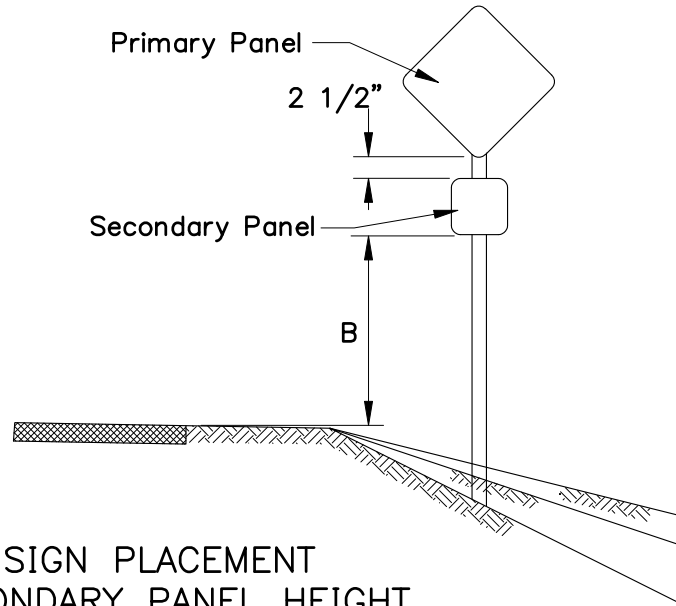


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION POST MOUNTED

SECTION:
806
DETAIL #
800-10

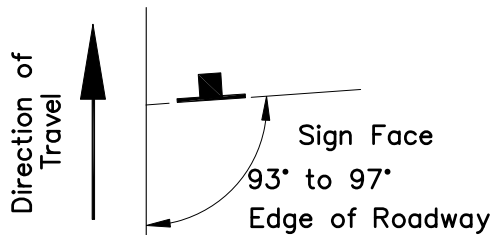


SIGN PLACEMENT **SECONDARY PANEL HEIGHT** **ALL TWO PANEL MOUNTING**

DIMENSION TABLE

ROADWAY PAVED	DIMENSION		
	A	B	C
RURAL	5'-0"	5'-0"	5'-0"
URBAN	7'-0"	7'-0"	7'-0"

NOTE: For Unpaved Roadway Add
0'-6" to Dimensions.



SIGN POSITIONING

GENERAL NOTES:

1. Signs in median shall be placed at midpoint of median up to a maximum distance of 20 ft. from Edge of Traveled Way. When appropriate, signs opposing directions shall be placed back to back.
2. Unless shown on plans, or as directed by the Engineer, the standard sign offset is 12'. The minimum shall be 2'-0".
3. Where local condition requires signs over sidewalk, they shall be mounted on a single post with a cantilever or unbalance style mount and a minimum of 7'-0" clearance over sidewalk, unless noted otherwise on the plan sheet.

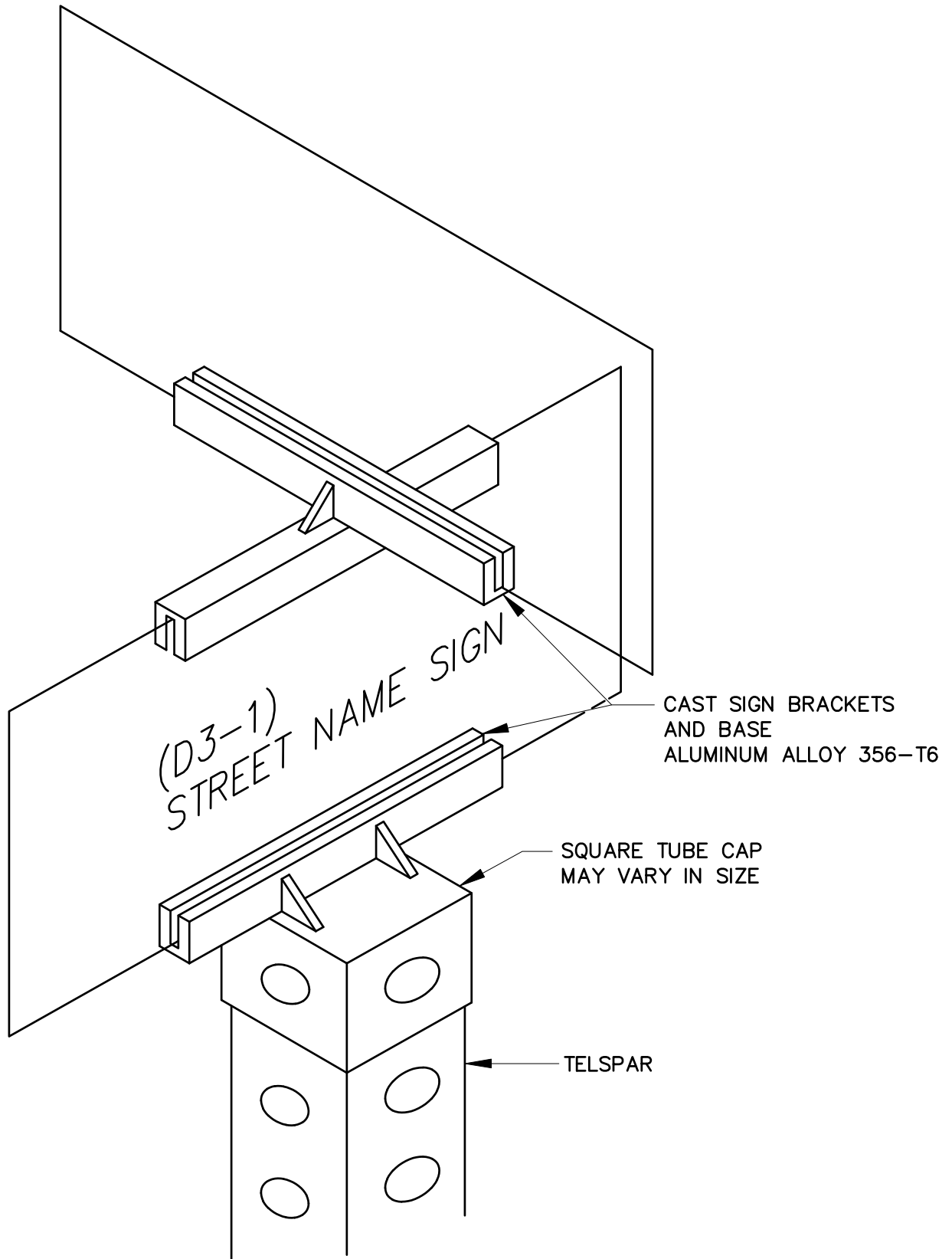


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN LOCATION **POST MOUNTED**

SECTION:
806
DETAIL #
800-11

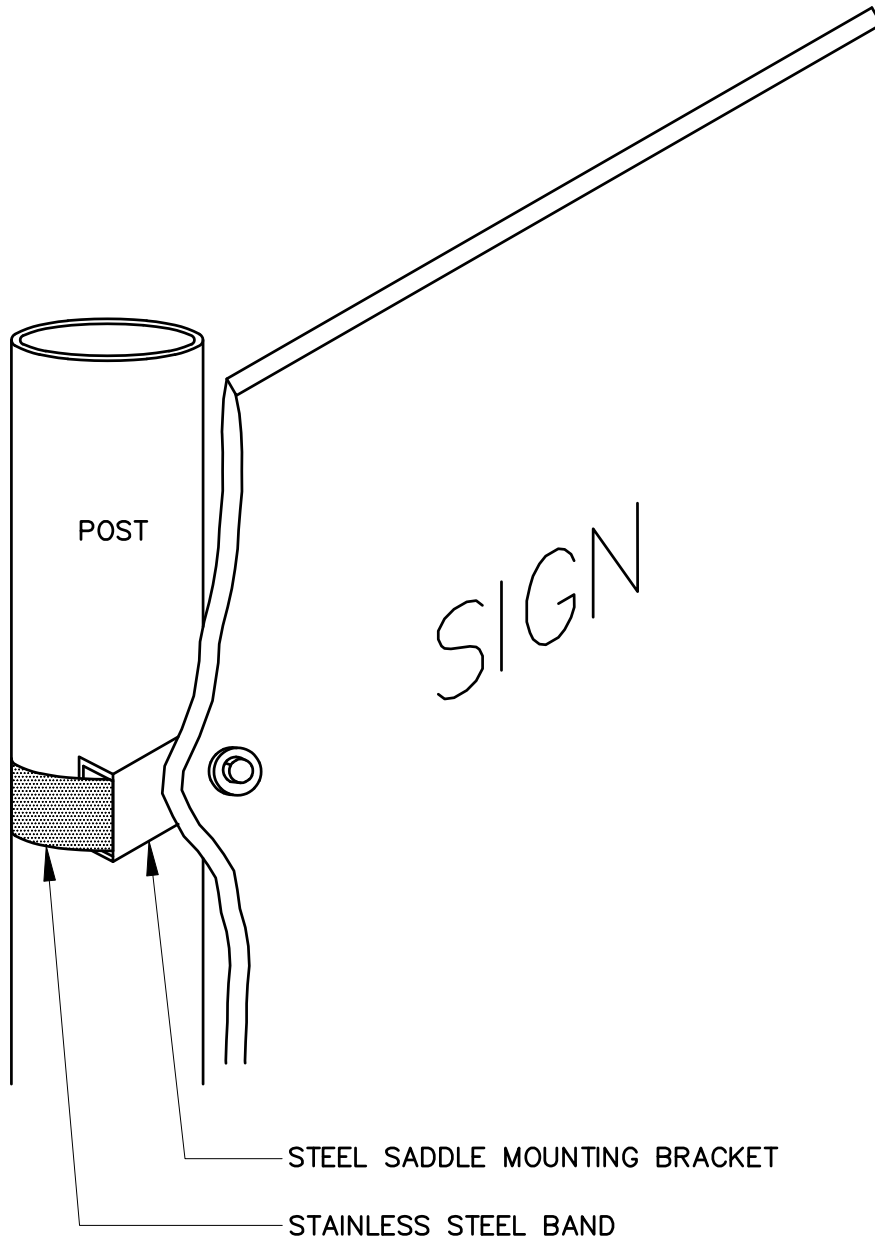


SCALE:
NTS
APPROVED:

REVISED:
1/00

STREET NAME SIGNS

SECTION:
806
DETAIL #
800-12

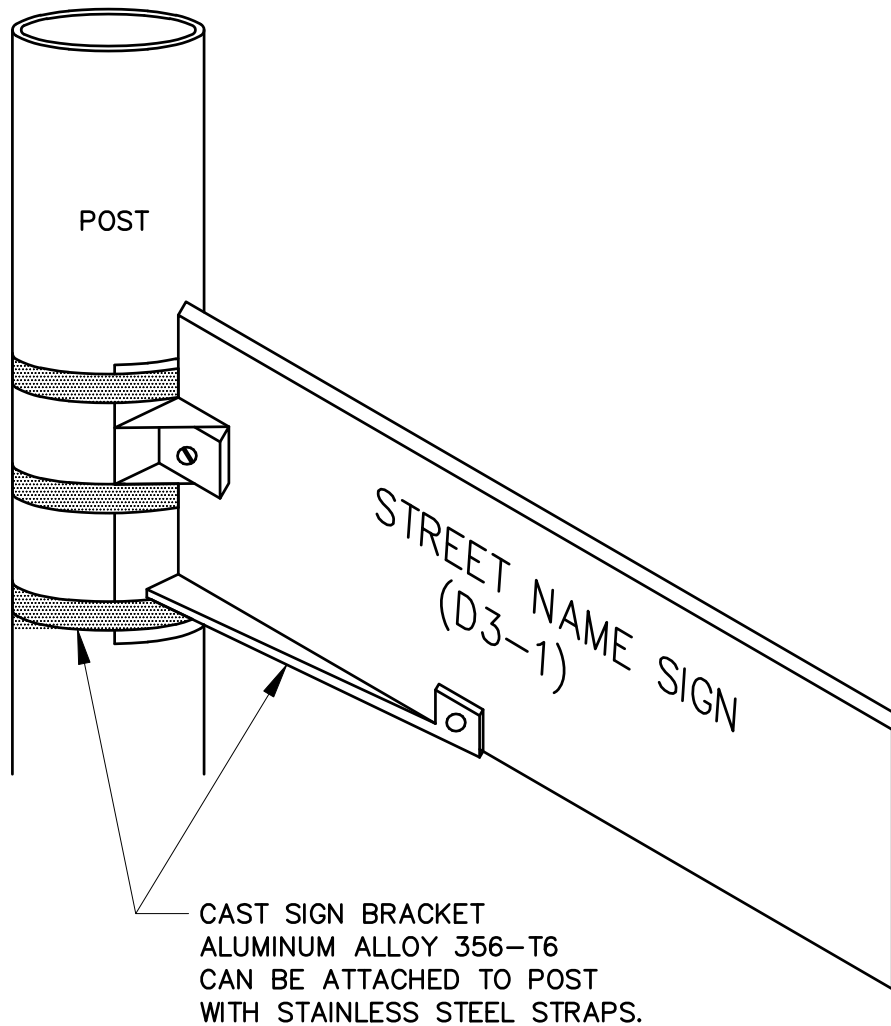


SCALE:
NTS
APPROVED:

REVISED:
1/00

SIGN ON EXISTING POST

SECTION:
806
DETAIL #
800-13

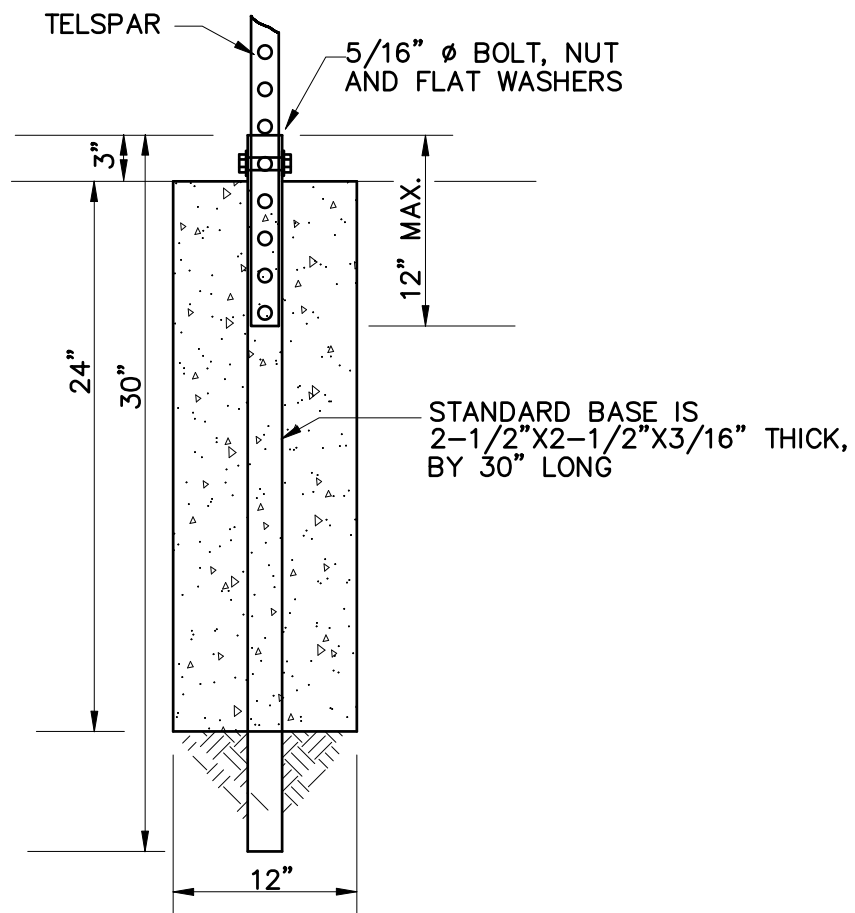


SCALE:
NTS
APPROVED:

REVISED:
1/00

D3-1 ON EXISTING POST

SECTION:
806
DETAIL #
800-14

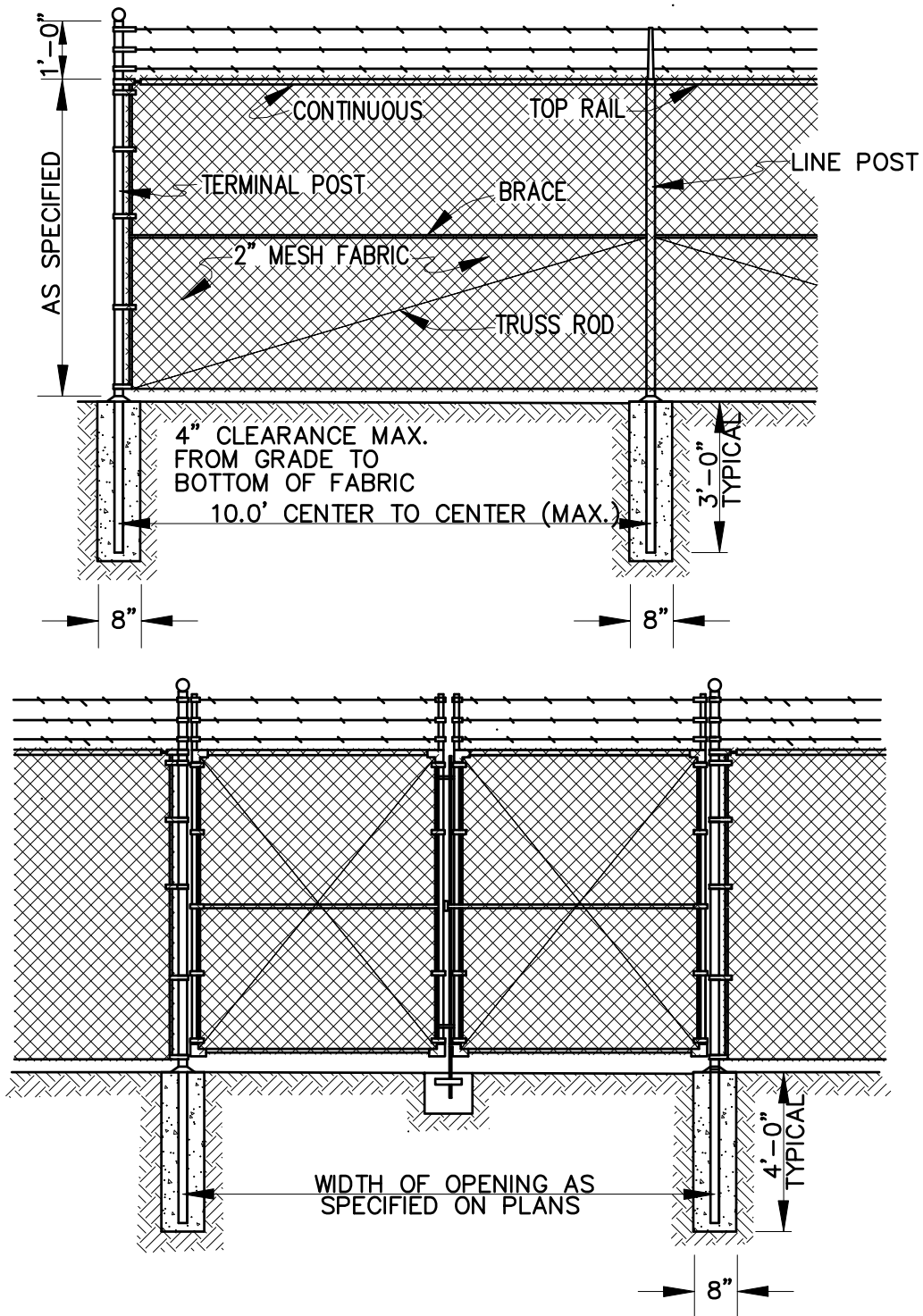


SCALE:
NTS
APPROVED:

REVISED:
1/00

CONCRETE FOUNDATION FOR SIGN POST

SECTION:
806
DETAIL #
800-15



NOTES:

1. GAUGE OF FABRIC TO BE SPECIFIED ON PLANS.
2. SIZE OF TUBULAR STEEL FOR GATE FRAMES IS SPECIFIED IN STANDARD CONSTRUCTION SPECIFICATION FOR CHAIN LINK FENCES.

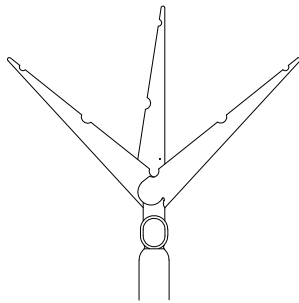
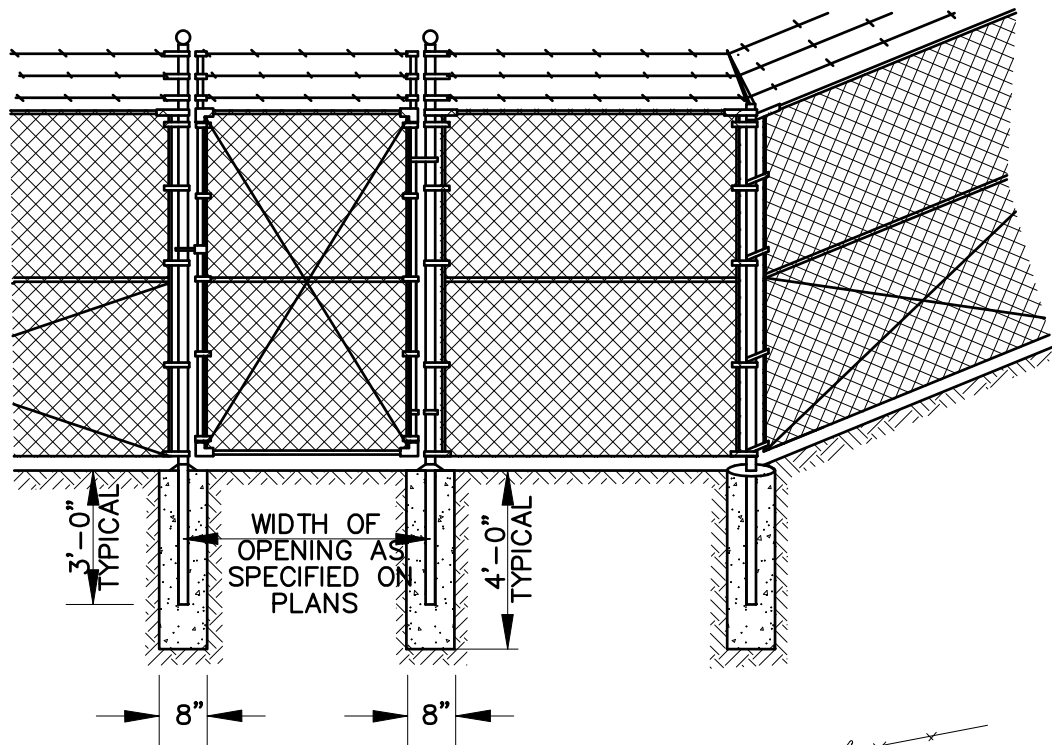


SCALE:
NTS
APPROVED:

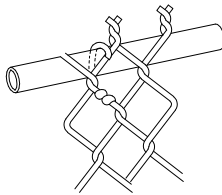
REVISED:
1/00

FENCE DETAILS

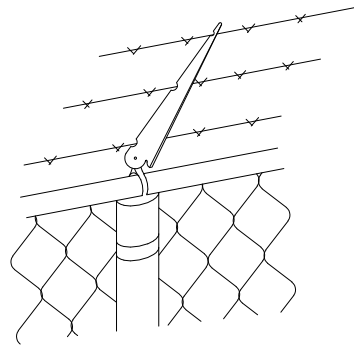
SECTION:
812
DETAIL #
800-16



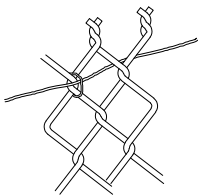
H-H EYETOP
LINETOP FITTING



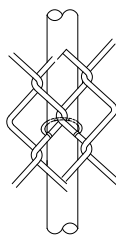
METHOD OF TYING
FABRIC TO TOP RAIL



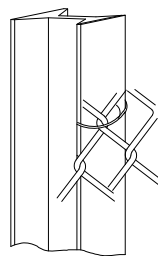
TOP FINISH OF
STEEL GUARD POST



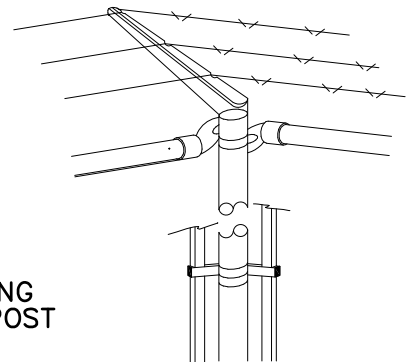
METHOD OF TYING
FABRIC TO COIL
SPRING TENSION WIRE



METHOD OF TYING
FABRIC TO TUBULAR
POST



METHOD OF TYING
FABRIC TO H-POST



CORNER POST
CONNECTION

NOTE:

1. SIZE OF TUBULAR STEEL FOR GATES IS SPECIFIED IN STANDARD CONSTRUCTION SPECIFICATIONS FOR CHAIN LINK FENCES.



SCALE:
NTS
APPROVED:

REVISED:
1/00

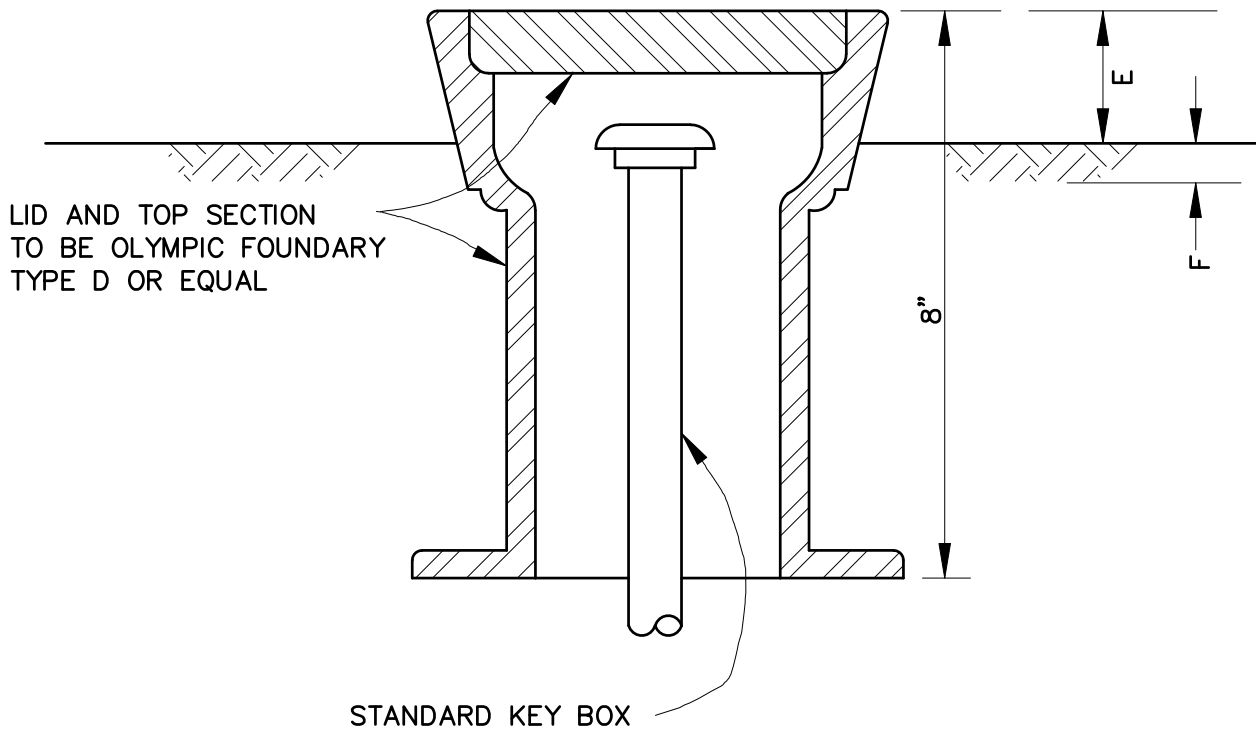
FENCE DETAILS

SECTION:

812

DETAIL #

800-17



NOTES:

1. TYPICAL INSTALLATION WHEN KEY BOX FALLS WITHIN ASPHALT PAVEMENT, CONCRETE WALK OR DRIVE.
2. A MINIMUM OF TWO SWING TIES TO NEARBY PERMANENT FEATURES SHALL BE RECORDED AND REPORTED TO THE ENGINEER.

LOCATION	E	F
BACKYARDS, GRAVEL STREETS, AND ALLEY AREAS WHERE TRAVELED.		6"–12"
UNDEVELOPED AND SWAMPY AREAS.	24" MIN	
HIGHWAY R.O.W.S OUTSIDE TRAFFIC AREAS.	6"	
PAVED STREETS.		1/2"– 3/4"

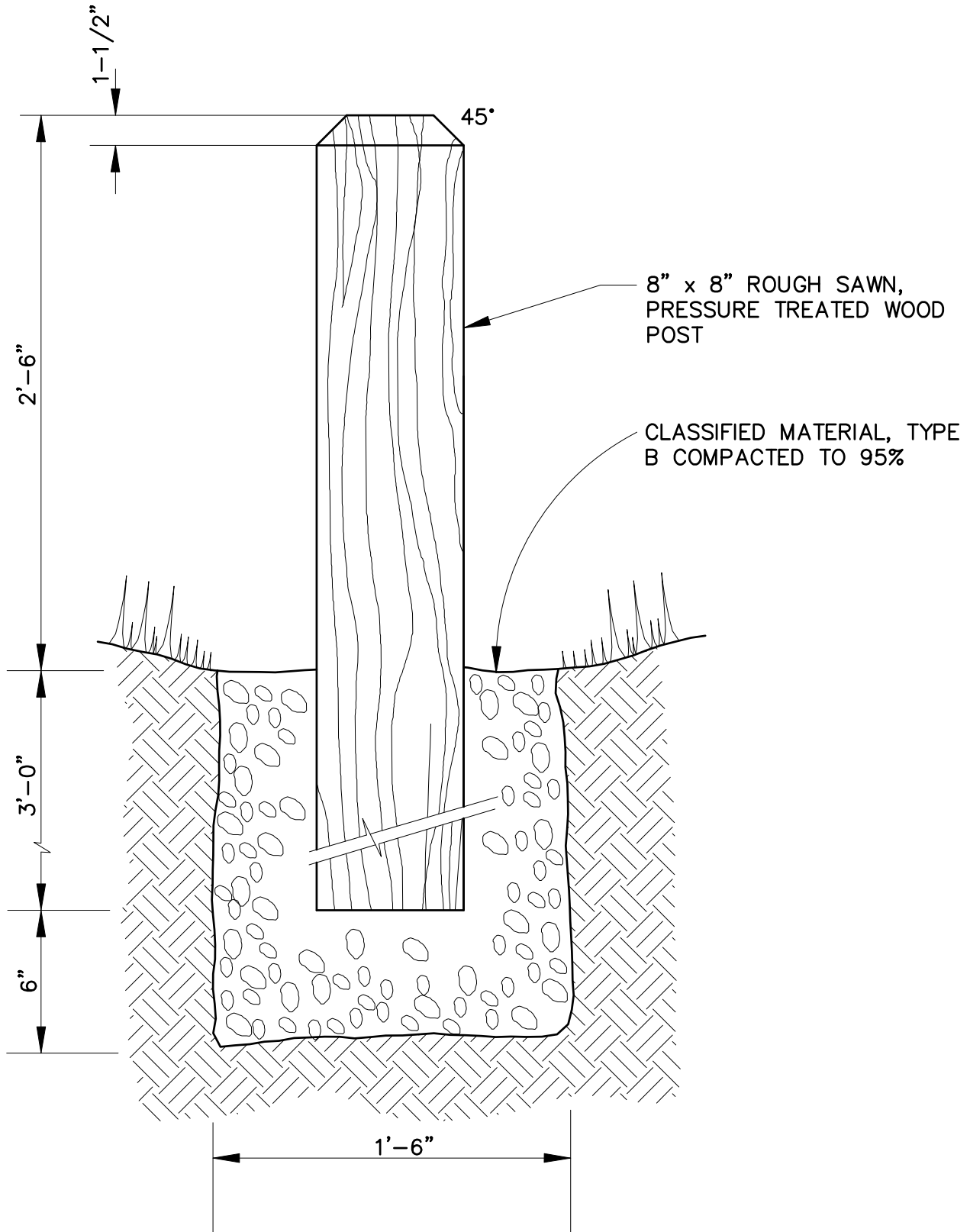


SCALE:
NTS
APPROVED:

REVISED:
1/00

ADJUST SERVICE KEY BOX

SECTION:
815
DETAIL #
800–18



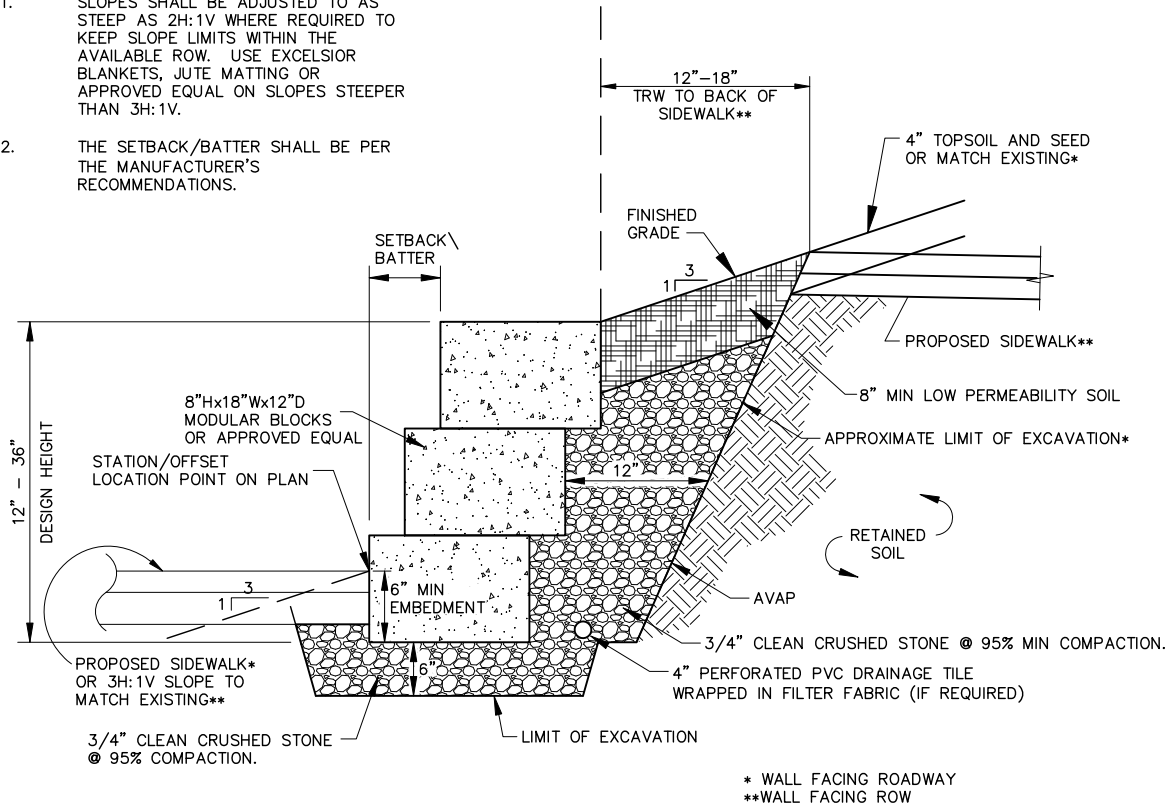
SCALE:
NTS
APPROVED:
REVISED:
1/00

SOLID BOLLARD

SECTION:
MISC.
DETAIL #
800-19

NOTES:

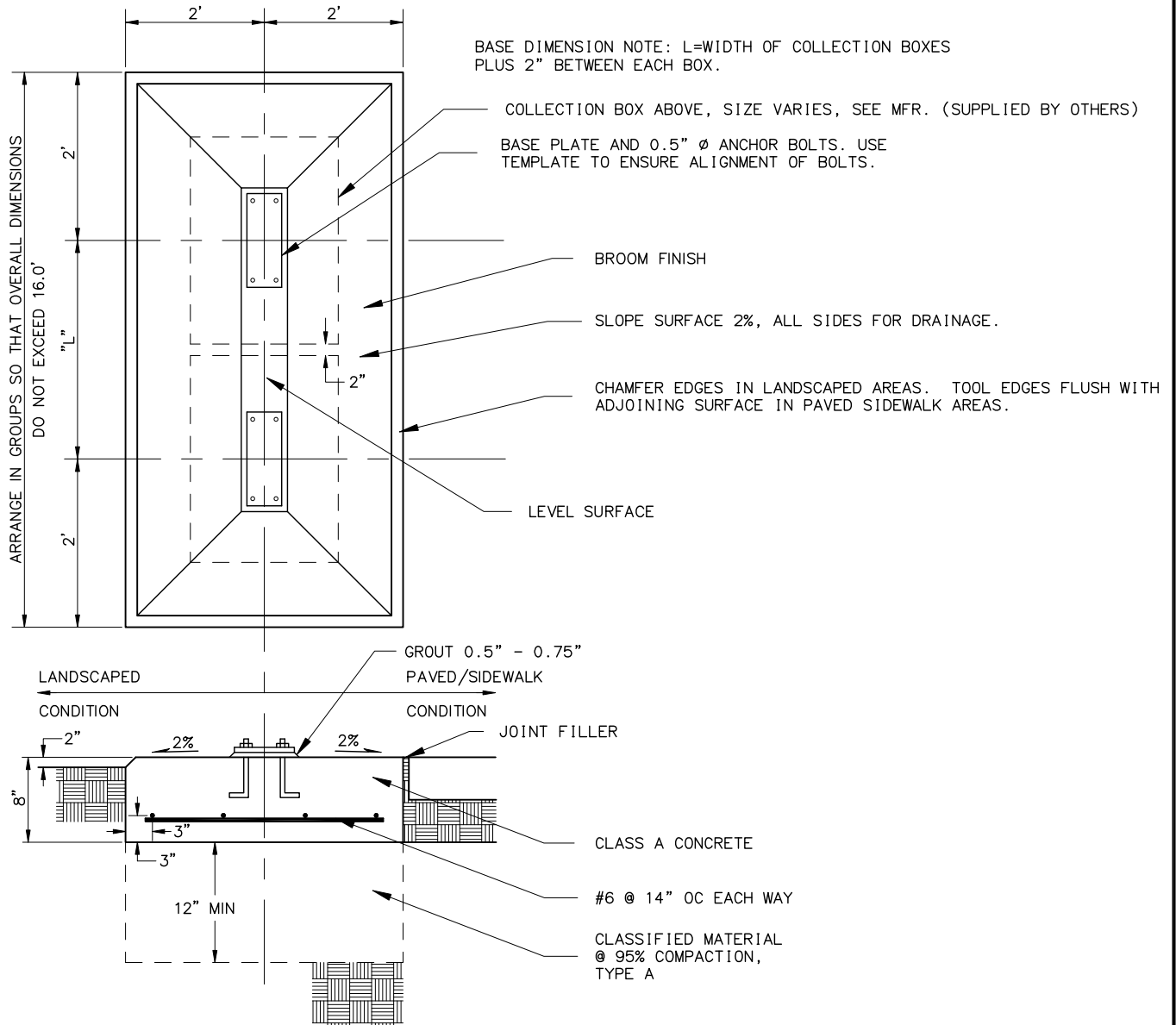
1. SLOPES SHALL BE ADJUSTED TO AS STEEP AS 2H:1V WHERE REQUIRED TO KEEP SLOPE LIMITS WITHIN THE AVAILABLE ROW. USE EXCELSIOR BLANKETS, JUTE MATTING OR APPROVED EQUAL ON SLOPES STEEPER THAN 3H:1V.
2. THE SETBACK/BATTER SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS.



SCALE:
NTS
APPROVED:
REVISED:
7/12

MODULAR WALL TYPICAL SECTION-GRAVITY WALL

SECTION:
819
DETAIL #
800-21



NOTES:

1. ANCHOR BOLTS: PROVIDED BY USPS WITH TEMPLATE. PHONE: (907) 562-5808
2. THIS BASE DETAIL CAN BE USED FOR NEIGHBORHOOD DELIVERY AND COLLECTION BOX UNITS (NDCBU), CLUSTER BOXES AND PARCEL LOCKERS WITH 4" X 10" BOLT PATTERN.
3. REQUIRED EXPANSION BOLT CAPACITY, BASED ON CALCULATED DESIGN
LOAD = 3.1 KIP TENSION, 2 KIP SHEAR.



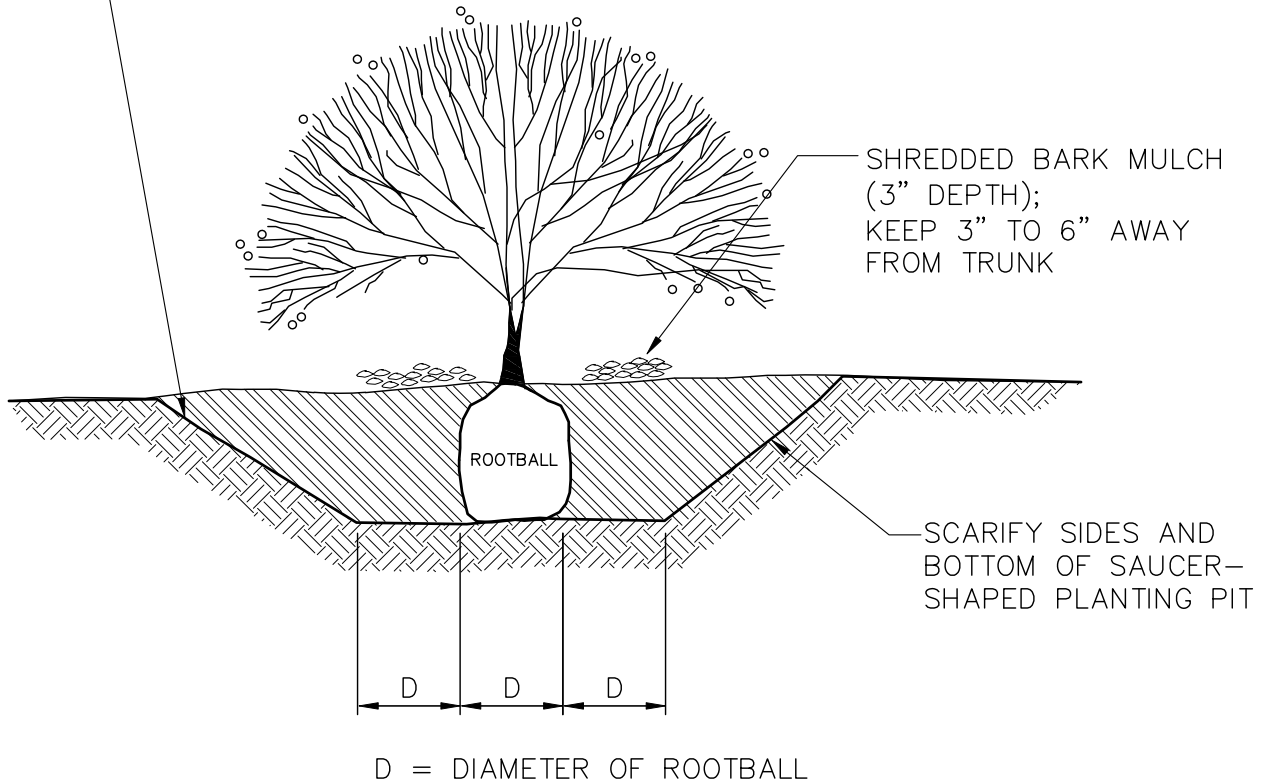
SCALE:
NTS
APPROVED:

REVISED:
7/12

MAIL PAD DETAIL

SECTION:
MISC.
DETAIL #
800-22

BACKFILL WITH TOPSOIL;
THOROUGHLY WATER BACKFILL
AS TO PREVENT AIR POCKETS. DO
NOT TAMP OR COMPACT. DO NOT
FERTILIZE AT TIME OF PLANTING.



NOTES:

1. DEPTH VARIES DEPENDING ON ROOTBALL THICKNESS.
2. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER.

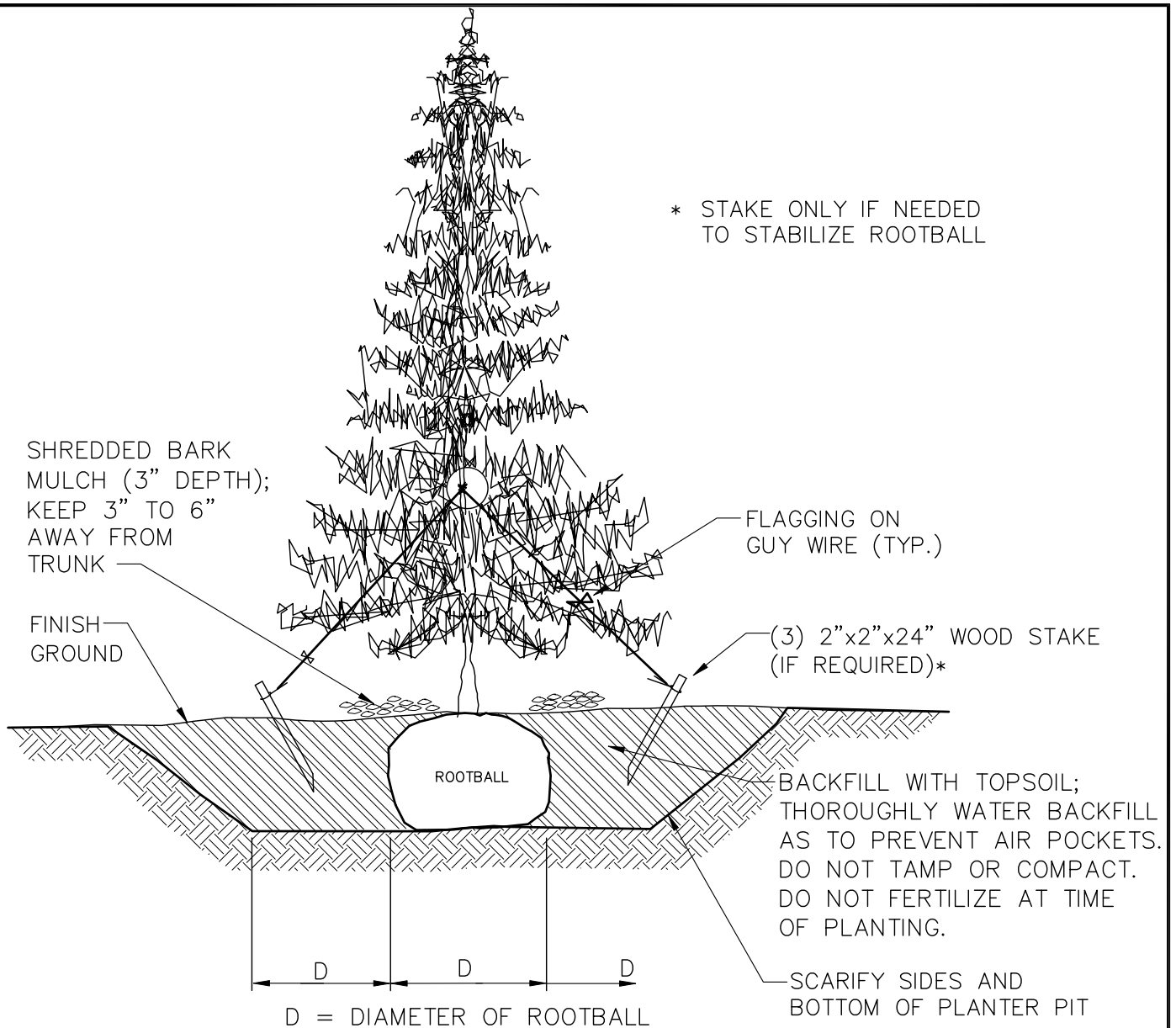


SCALE:
NTS
APPROVED:

REVISED:
11/11

SHRUB PLANTING DETAIL

SECTION:
820
DETAIL #
800-23



NOTES:

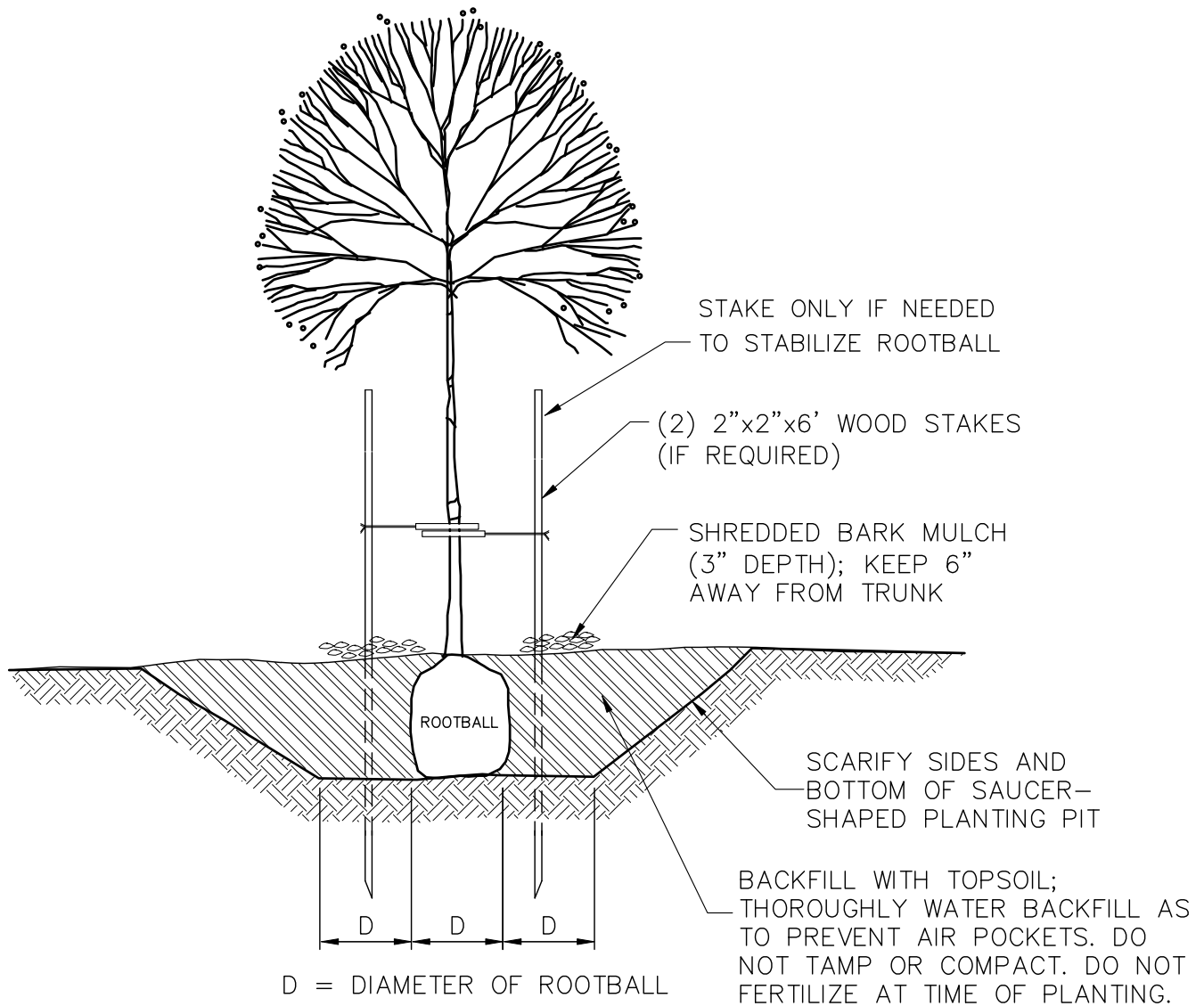
1. CONTRACTOR SHALL COMPLETELY REMOVE WIRE BASKETS AND BURLAP
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE THREE 2"x2"x24" WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED AT ANGLE. DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.



SCALE:
NTS
APPROVED:
REVISED:
7/12

CONIFER PLANTING DETAIL

SECTION:
820
DETAIL #
800-24



NOTES:

1. CONTRACTOR SHALL COMPLETELY REMOVE WIRE BASKETS, BURLAP, AND CONTAINERS
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE TWO 2"x2"x6' WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED 24" DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.

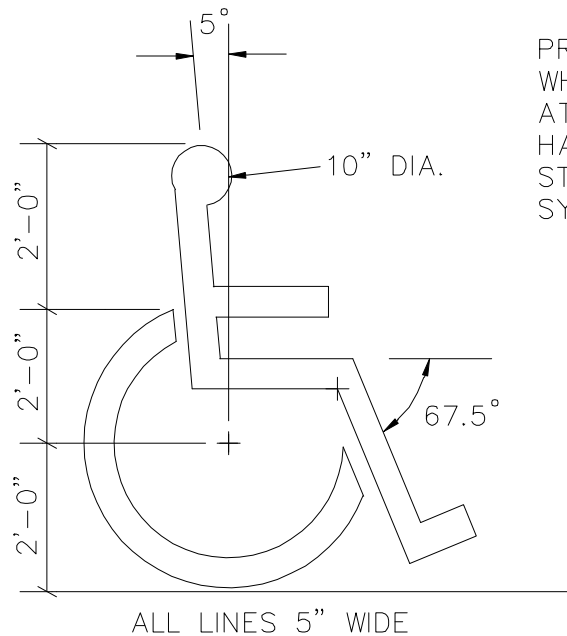
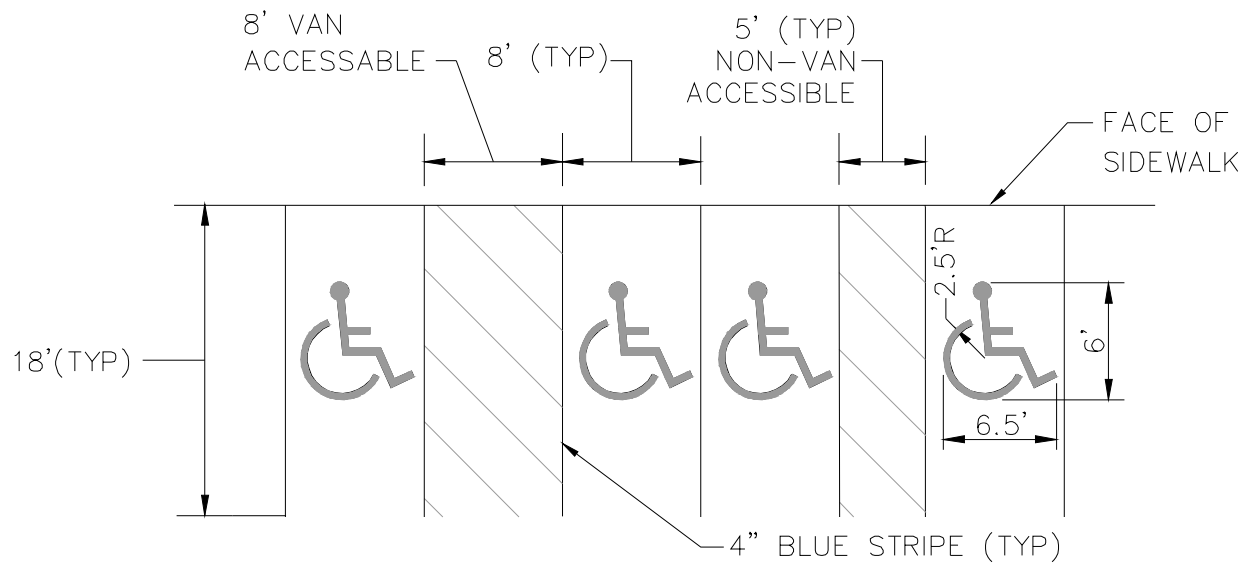


SCALE:
NTS
APPROVED:

REVISED:
7/12

DECIDUOUS TREE PLANTING DETAIL

SECTION:
820
DETAIL #
800-25



PROVIDE PAINTED WHEELCHAIR SYMBOL AT EACH DESIGNATED HANDICAP PARKING STALL. CENTER SYMBOL IN STALL

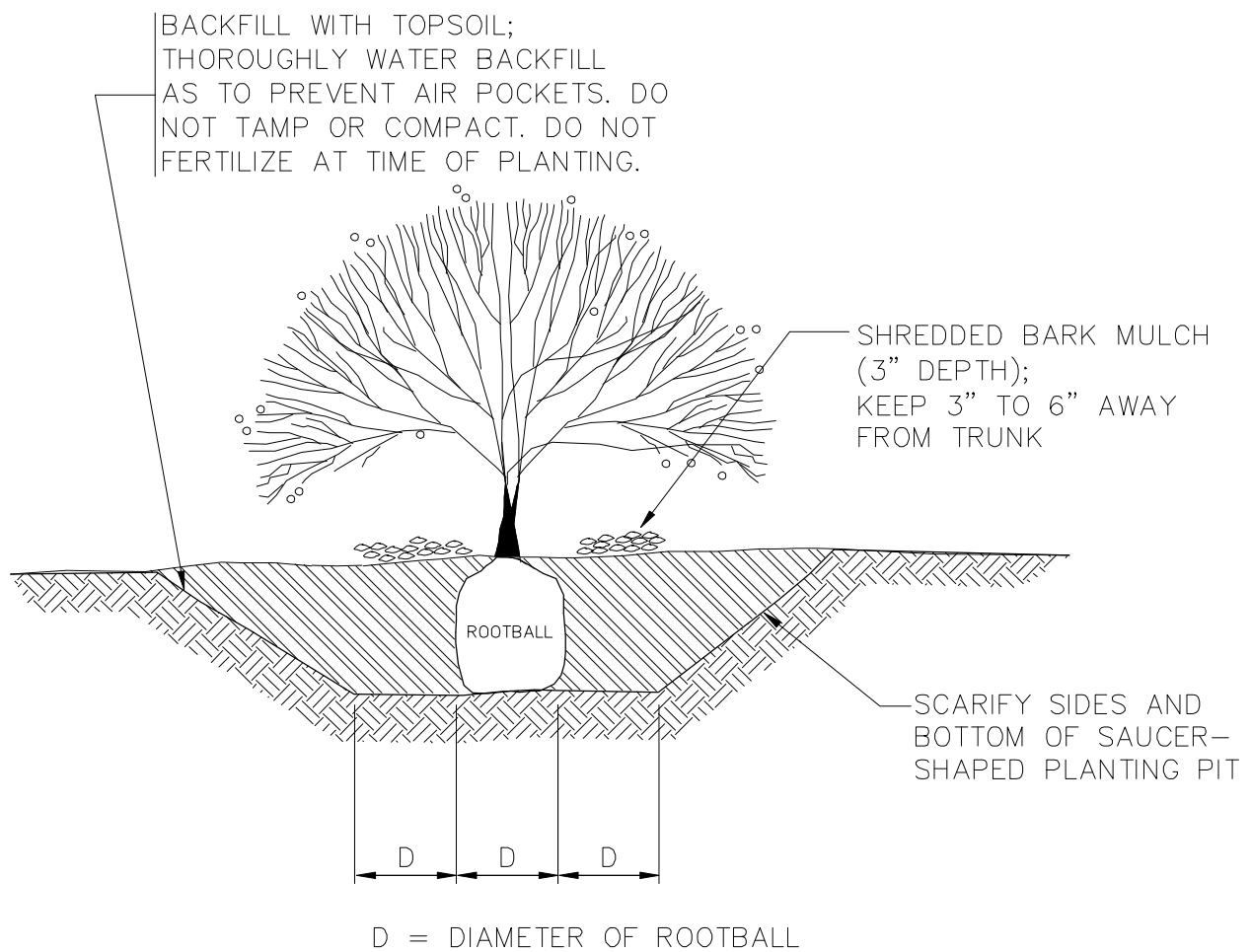


SCALE:
NTS
APPROVED:

REVISED:
11/11

HANDICAP STRIPING

SECTION:
800
DETAIL #
800-24



NOTES:

1. DEPTH VARIES DEPENDING ON ROOTBALL THICKNESS.
2. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER.



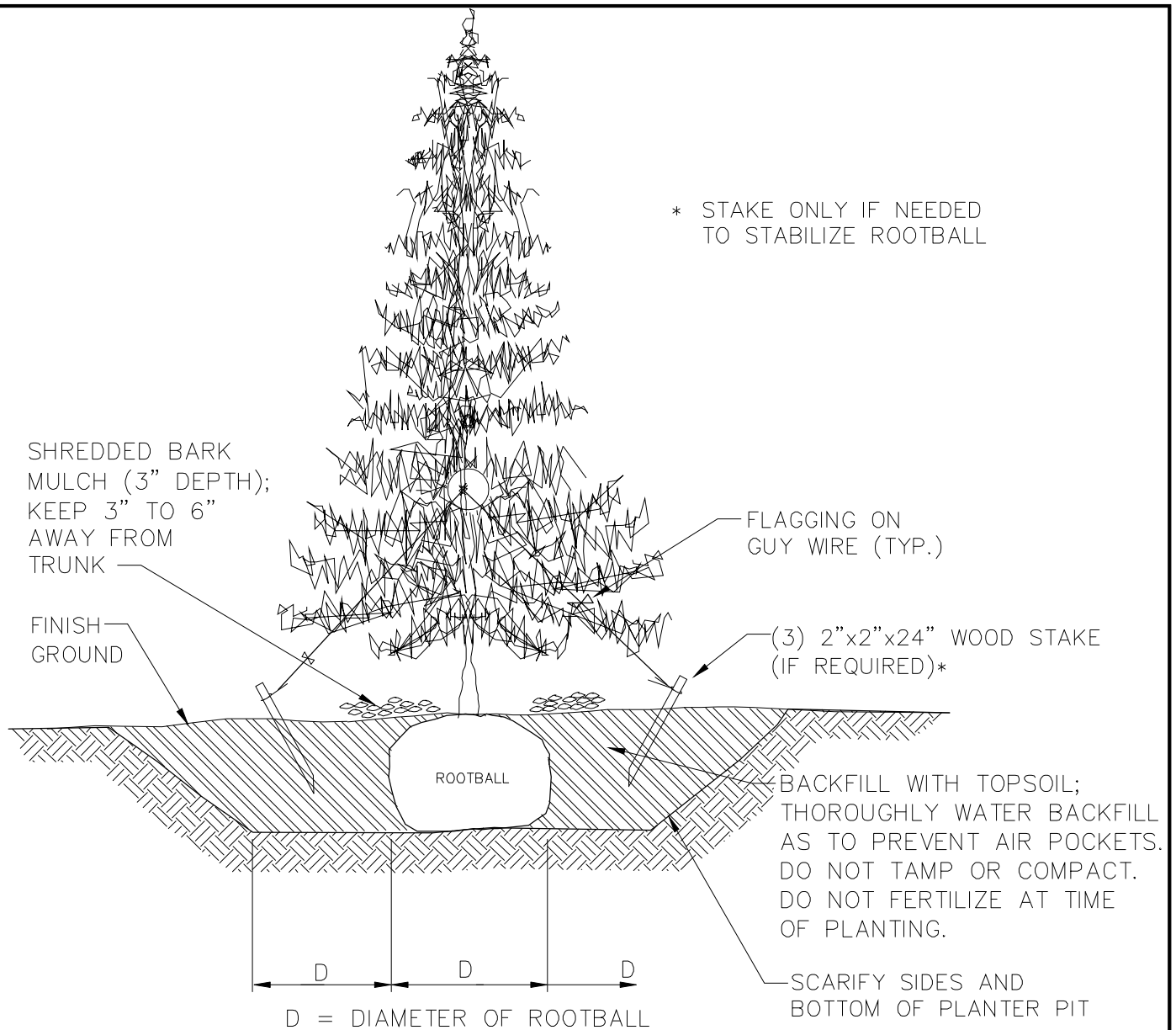
SCALE:
NTS
APPROVED:

REVISED:
11/11

SHRUB PLANTING DETAIL

SECTION #
800

DETAIL #
800-25



NOTES:

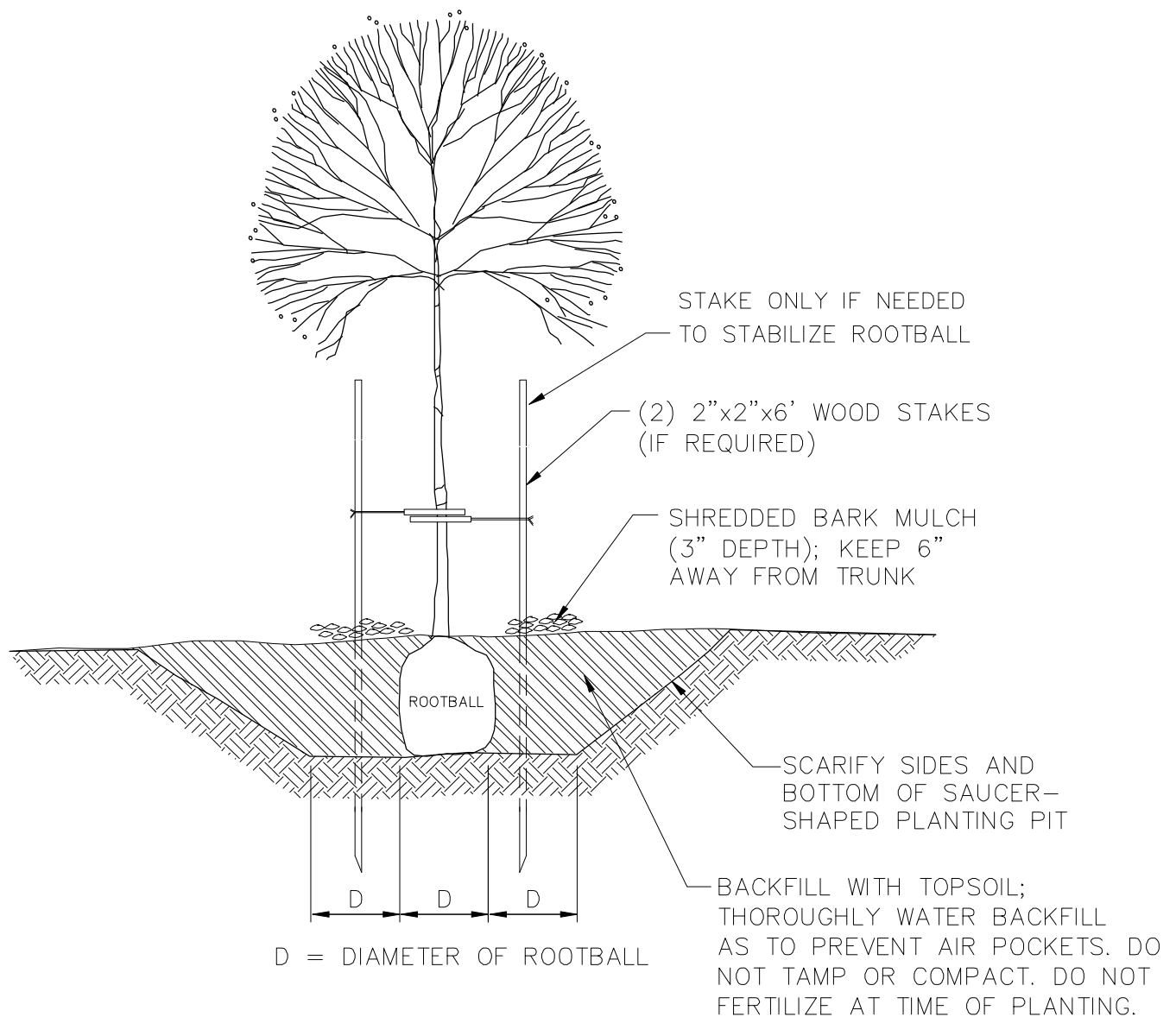
1. CONTRACTOR SHALL CUT BURLAP AND REMOVE A MINIMUM OF 1/2 FROM PLANTING PIT. CONTRACTOR SHALL COMPLETELY REMOVE WIRE BASKETS.
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE THREE 2"x2"x24" WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED AT ANGLE. DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.



SCALE:
NTS
APPROVED:
REVISED:
11/11

CONIFER PLANTING DETAIL

SECTION:
800
DETAIL #
800-26



NOTES:

1. CUT BURLAP AND WIRE BASKET, PEEL DOWN, REMOVE OR LAY FLAT IN BOTTOM OF PLANT PIT. REMOVE CONTAINERS.
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENEED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE TWO 2"x2"x6' WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED 24" DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.

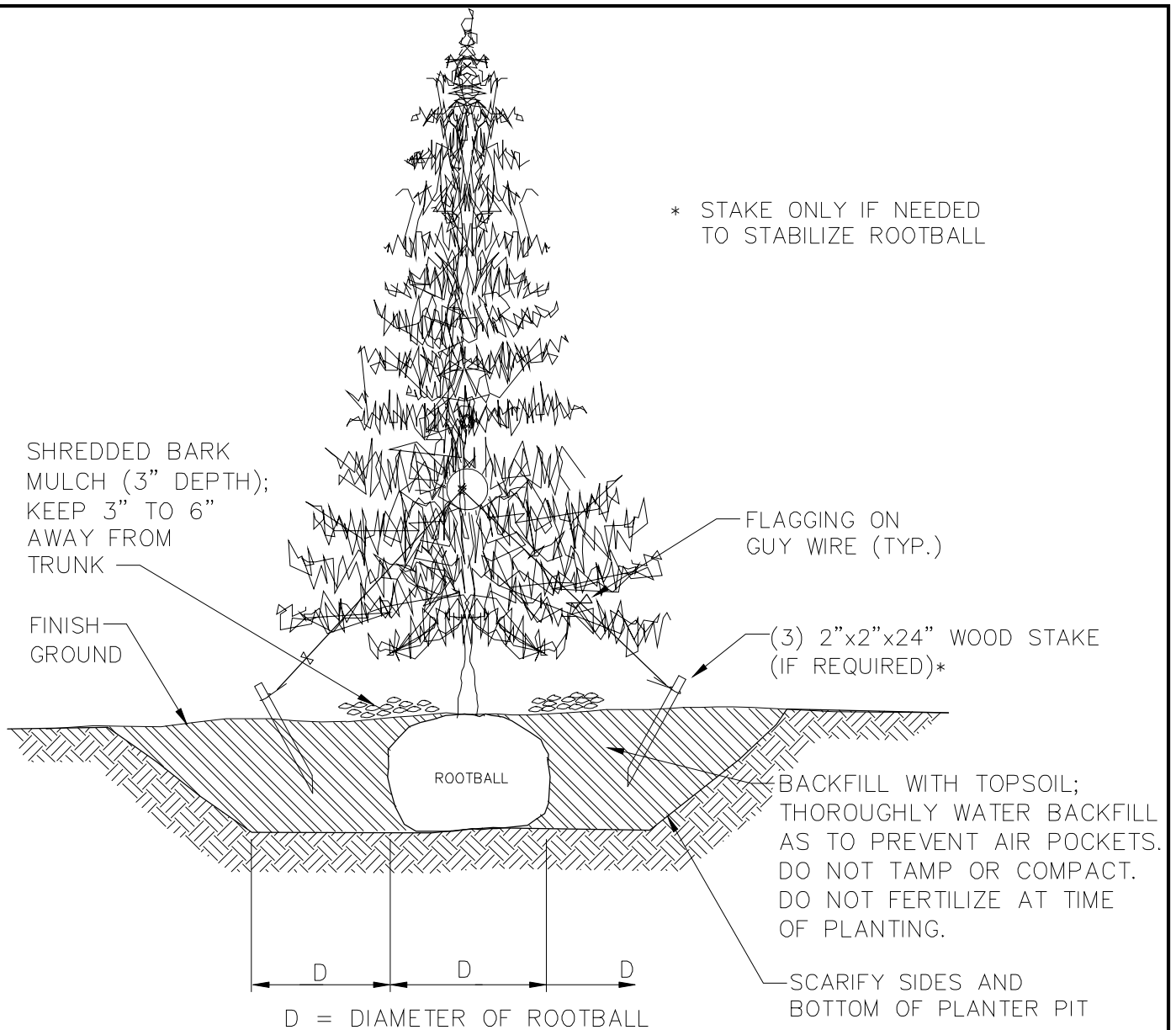


SCALE:
NTS
APPROVED:

REVISED:
11/11

DECIDUOUS TREE PLATING DETAIL

SECTION:
800
DETAIL #
800-27



NOTES:

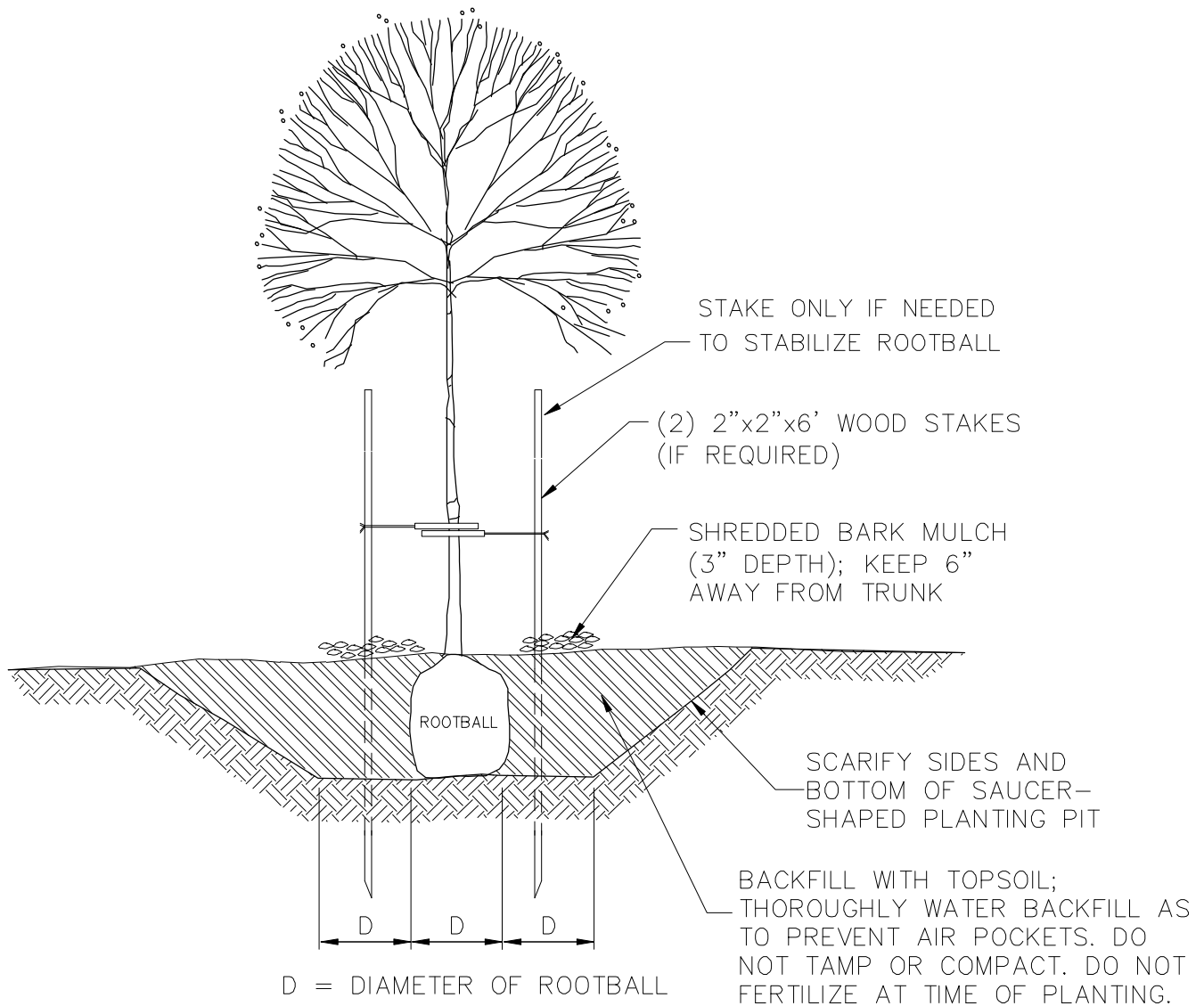
1. CONTRACTOR SHALL COMPLETELY REMOVE WIRE BASKETS AND BURLAP
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE THREE 2"x2"x24" WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED AT ANGLE. DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.



SCALE:
NTS
APPROVED:
REVISED:
5/12

CONIFER PLANTING DETAIL

SECTION:
800
DETAIL #
800-28



NOTES:

1. CONTRACTOR SHALL COMPLETELY REMOVE WIRE BASKETS, BURLAP, AND CONTAINERS
2. DEPTH OF PLANT PIT VARIES DEPENDING ON ROOTBALL THICKNESS. SOIL SHALL BE LOOSENED AND SUITABLE FOR ROOT GROWTH. TOP WIDTH OF PLANT PIT SHALL BE 4-5 TIMES ROOTBALL DIAMETER. SET ROOTBALL ON SOLID GROUND TO PREVENT SETTLING. PLANT TREE TRUNK WITH TRUNK FLARE AT OR UP TO 1" ABOVE FINISHED GROUND.
3. USE TWO 2"x2"x6' WOOD STAKES WHEN SPECIFIED ON DRAWINGS OR REQUIRED BY THE ENGINEER. EMBED 24" DO NOT PENETRATE ROOTBALL. USE SOFT, FLEXIBLE MATERIAL FOR TIES. GUY AT APPROXIMATELY 1/3 TREE HEIGHT. REMOVE GUY AFTER ONE YEAR. DO NOT STAKE TREE RIGID, IT MUST MOVE IN THE WIND.



SCALE:
NTS
APPROVED:

REVISED:
5/12

DECIDUOUS TREE PLATING DETAIL

SECTION:
800
DETAIL #
800-29