City of Homer

Standard Construction Specifications

2011 Edition

CITY OF HOMER

STANDARD CONSTRUCTION SPECIFICATIONS

2011 Edition

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Produced April 2011

GENERAL PROVISIONS

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SECTION 10.01 DEFINITIONS

In these specifications and the contract, the following words or expressions shall be understood to have the meaning given below:

AASHTO	-	American Association of State Highway & Transportation Officials
ACI	-	American Concrete Institute
ANSI	-	American National Standard Institute
API	-	American Petroleum Institute
APWA	-	American Public Works Association
ASA	-	American Standard Association
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing & Materials
AWS	-	American Welding Society
AWWA	-	American Water Works Association
COHSCS	-	City of Homer Standard Construction Specifications
IEEE	-	Institute of Electrical & Electronics Engineers
ISO	-	Insurance Service Office
NEC	-	National Electrical Code
NEMA	-	National Electrical Manufacturer Association
NESC	-	National Electric Safety Code
OSHA	-	Occupational Safety and Health Act
UBC	-	Uniform Building Code

Act of God – "Act of God" shall mean an earthquake, flood, cyclone or other cataclysmic phenomenon of nature. A rain, windstorm, high water, or other natural phenomenon of unusual intensity for a specific locality, but which might reasonably have been anticipated from historical records of the general locality, shall not be construed as an "Act of God."

Addenda (Addendum) - "Addenda" shall mean written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the Contract Documents.

Assembly – "Assembly" shall mean the Common Council of the City of Homer.

Bid – The offer or proposal of a bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder – Any individual, firm, partnership, corporation, or combination thereof formally submitting a Bid for the work contemplated, or any portion thereof, acting directly or through an authorized representative.

Bidding Documents – The Invitation to Bid, Bid Guarantee, Provisions, Specifications, Forms, Schedules, Bidders Checklist, proposed Contract Documents, and all Addenda.

Bid Guarantee – The security furnished by the Bidder as a guarantee to enter into a Contract for the Work contemplated if the Bidder is awarded the Contract.

Bonds - Performance and Payment bonds and other instruments of security.

Change Order – Any written agreement entered into between the Contractor and the Owner to supplement or clarify or alter the plans, specifications, or contract, or to otherwise provide for extra work, contingencies, alterations in plans, and other matters not contemplated by or adequately described in the plans and specifications.

City – Municipality of the City of Homer, Alaska.

Construction Schedule – "Construction Schedule" shall mean the time and activities plan for completion of the work prepared in the format required by the Contract Documents.

Contract – The written agreement executed by the City and the Contractor covering the performance of the work.

Contractor - The individual, firm or corporation undertaking the execution of the work under the terms of the contract and acting directly or through its agents or employees.

Contract Completion Date – The calendar date specified in the proposal for the full completion of all Work required by the Contract Documents, except as otherwise provided in the Contract.

If a number of calendar days is specified in the proposal for the completion of the Contract, the Contract Completion Date will be those specified number of days after the effective date of the Notice to Proceed, including authorized time extensions.

Contract Documents – The plans, specifications, agreements, performance and payment bond, including all agreed modifications thereof incorporated in the documents before their execution and all agreements of a supplemental nature that may be entered into during the progress of the work.

Date of Substantial Completion – For all construction contracts, the term "date of substantial completion of work" shall mean that date upon which the improvements which are the subject matter of the Contract, are accepted as essentially completed and available for Owner's beneficial use for the purposes and in a manner intended by the Owner.

Days –

a. Calendar

Unless otherwise designated in the SPECIAL PROVISIONS, days as used in the Contract Documents will be understood to mean calendar days.

b. Working

A working day is defined as any day on which the Contractor is required to work by the Contract Documents or any other day not otherwise defined herein as a non-working day.

c. Non-Working

A non-working day is defined as Saturday, Sunday, a recognized holiday, a day on which the Contractor is specifically required by the Special Provisions to suspend construction operations, or a day on which a suspension order is in effect. Recognized holidays shall be: New Year's Day, Washington's Birthday, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day

Drawings – The maps, plans, sheets, or other graphic illustrations listed and referred to in the Contract.

Extra Work – Work not within the original scope of work but is determined by the Engineer to be essential for the satisfactory completion of the contract.

Design Engineer - Shall mean the Engineering Consultant under contract to the City to prepare the plans and specifications.

Engineer – Shall mean the City's designated representative.

Fair Cost Estimate – The Design Engineer's estimate as announced at the bid opening.

Final Acceptance Date – The date of final acceptance of the contract shall be defined as that date at which the project has been constructed, cleaned up, and all warranty periods have been completed in accordance with the Plans and Specifications and pursuant to *Article 5.13 – Final Inspection*.

It is mutually agreed between parties to the Contract that no payment by the Owner shall constitute an acceptance of unauthorized or defective work or improper material.

Projects may be accepted in respect to construction at such time as they are entirely completed; however, on projects consisting of several disconnected streets, sewer lines, or water lines, the Engineer may accept any of these separate sections if he so elects. Continuous sewer or water projects will not be accepted until completed in their entirety.

Force Account Work – Work performed by the Contractor at the direction of the Engineer, for which no item is provided in the contract and for which no unit price or lump sum basis can be agreed upon.

Furnish – Purchase and deliver to the Project.

Indicated – Shown, noted or specified on the Drawings, or a combination thereof.

Install – Set in place and make usable.

Inspector – The authorized representative of the Engineer or City assigned to observe the work.

Liquidated Damages – The amount prescribed herein to be paid to the City, or to be deducted from any payments due or to become due the Contractor, for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the specifications or as extended by Change Order.

The liquidated damage amount shall only apply to damages and expenses the Owner may incur as a result of a delay in placing the facility (or material) in use and operation, exclusive of third party damages or claims.

Municipality – City of Homer, Alaska

Necessary – Needed, as reasonably inferred from the Contract Documents, in order to make the Work complete and available for use.

Notice to Proceed – The written communication, issued by the Owner to the Contractor authorizing him to proceed with the Work, which establishes the time of commencement and date of completion.

"Or Equal" – Whenever a material, article, or piece of equipment is identified on the plans or in the specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard; and any material, article, or equipment of other manufacturers and vendors which will perform in an equal or better manner the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Engineer, of equal or better substance and function.

The burden of proof that an alternate material, article or piece of equipment is indeed equal, and the cost of the burden of proof, shall be borne by the proposer.

Owner – City of Homer, Alaska, acting through its legally constituted officials, officers, employees, or agents.

Performance and Payment Bond – The form of security approved by the City, furnished by the Contractor and his surety guaranteeing the complete and faithful performance of all the obligations and conditions placed upon the Contractor by the contract.

Plans – The maps, plans, and drawings as listed and referred to in the "Contract Documents" together with any additional maps, plans, or drawings, and any supplemental drawings furnished by the Engineer.

Project Manager – The authorized representative of the City assigned to manage the contract administration and construction progress and quality control of the project. The terms Project Manager, Engineer, and City's Representative may or may not be synonymous.

Samples – Physical examples which illustrate materials, equipment, or workmanship and establish standards by which Work or a product will be judged.

Shop Drawings – All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor and which illustrate the equipment, material or some portion of the work.

Special Provisions – That portion of the Specifications entitled SPECIAL PROVISIONS containing specific clauses setting forth conditions or requirements peculiar to the work and supplementary to the Standard Specifications.

Specifications – The directions, requirements, explanations, terms, and provisions pertaining to the various features of the work to be done, the manner and method of performance, and the manner and method of measurement and payment.

Street Closure – Any action which renders one or more lanes of a street unusable to vehicular traffic.

Subcontractor – Any individual, firm or corporation, partnership or joint venture acting for or on behalf of the Contractor in the performance of a part of the contract. This does not include those working for hire or suppliers of material or equipment except that production of materials or supplies at the project site shall be deemed as being produced by a subcontractor where such is not produced by the Contractor's own forces and equipment.

Supplemental Specifications – Supplemental Specifications are those adopted subsequent to the Standard Specifications and generally involve alterations to standard specifications or the addition of a new construction item

Surety – The company or association which is legally bound to the Owner for the acceptable performance of the contract, and for payment of all the Contractor's obligations arising out of the contract. Where applying to the "Proposal Guaranty," it refers to the Company or Association which will forfeit the sum of the Guarantee if the Bidder fails to execute the Contract after the Bid is accepted by the City.

Time and Material Work – Work performed by the Contractor at the written direction of the Engineer for which no item is provided in the Contract and for which no unit price or lump sum basis can be agreed upon.

Unit Price – "Unit Price" shall mean the amount bid by the Contractor for furnishing one unit of construction, the quantities being subject to adjustment within the limits specified in the Contract Documents.

Units of Construction –

a. Basic Unit of Construction

An elementary part of the total construction which includes like materials and labor, is repetitive in nature, and is readily and economically measurable, i.e., 'cubic yard of concrete in place', 'linear foot of pipe installed', or 'pound of reinforcing steel furnished'.

b. Lump Sum Unit of Construction

A part of the total construction which combines various quantities of unlike materials, equipment, and labor into a separate piece of construction where the component materials, equipment, and labor are not in themselves readily and economically measurable, i.e., 'Pumping station complete', includes pumps, excavation, concrete, electrical work, backfill, etc.

Utility Company – The person, corporation, company, agency, or other entity which furnishes service through, operates, or owns, a conduit, pipe, wire, cable, or other transmission line for the purpose(s) of petroleum and petroleum products, electricity, sanitary sewer, communications, water, natural gas, and storm sewer.

Work – Work shall be understood to mean the furnishing of all labor, materials, equipment, and other incidentals necessary or convenient for the successful completion of the project or the portion of the project involved and the carrying out of all the duties and obligations imposed by the contract.

Written Notice – A written communication delivered in person to the individual or to a member of a firm or to an officer of the corporation for whom it is intended, or if delivered or sent by mail to the last business address stated in the Contract Documents.

SECTION 10.02 BID REQUIREMENTS AND CONDITIONS

Article 2.1 Examination of Plans, Specifications, Special Provisions, and Site Work

All bidders are required to be on record with the Homer City Clerk as owning a copy of the current edition of the City of Homer Standard Construction Specifications and the plans and specifications of the project being bid.

The Bidder is expected to examine carefully the site of the proposed work, the proposal, plans, specifications, and Contract Documents before submitting a bid. The submission of a Bid will be an admission that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements and accuracy of the plans, specifications, special provisions, and term of the Contract. The failure or neglect of a Bidder to receive or examine any of the Bid Documents shall in no way relieve the Bidder from any obligations with respect to their Bid, or to the Contract. Misinterpretation or reputed lack of knowledge concerning the Bid will not serve as a basis for a claim for additional compensation.

The City will make available to prospective bidders, upon request and at the office of the Design Engineer, prior to Bid opening, any information that he may have as to subsurface conditions and surface topography at the work site. Investigations conducted by the Design Engineer of subsurface conditions were made for the purpose of study and design, and neither the City nor the Design engineer assumes any responsibility whatever in respect to the sufficiency or accuracy of borings, or of the logs of test borings, or of their investigations that have been made, or of the interpretations made thereof, and there is no warranty or guarantee, either expressed or implied, that the conditions indicated by such investigations are representative of those existing throughout the project, or any part thereof, or that unforeseen developments may not occur. No claim for additional compensation will be allowed which is based upon lack of knowledge of the project site and its improvements.

Logs of test borings or topographic maps showing a record of the data obtained by the Design Engineer's investigations of surface and subsurface conditions that are made available or bound herewith shall not be considered a part of the Contract Documents, said logs representing only the opinion of the Design Engineer as to the character of the materials encountered by him in his investigations, and is provided only for the convenience of the Bidders.

Information derived from inspection of logs of test borings, of topographic maps, or from drawings showing the location of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.

Oral questions may be presented at a pre-bid conference if one is provided for in the Bidding Documents. Interpretations, corrections, or changes, if any, to the Bidding Documents shall be made by Addendum. Bidders shall not rely upon interpretations, corrections, or changes made in any other manner, including orally at the pre-bid conference. Interpretations, corrections, and changes shall not be binding unless included in an Addendum.

Article 2.2 Method for Clarifications

Any Bidder in doubt as to the true meaning of any part of the plans, specifications, or other documents must submit to the City a written request for an interpretation thereof. The Bidder submitting the request will be responsible for its prompt delivery not less than seven (7) days prior to the date set for opening of Bids. Replies will be issued by Addenda mailed or delivered to all parties recorded by City as having received the Bidding Documents. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications are not binding.

Article 2.3 Preparation of Bids

a. Preparation and Submission

Preparation and submission of Bids shall be submitted on the forms contained in the Contract Documents. A completed Bid consists of two fully executed but separate parts:

PART A and **PART B**.

1. **PART A** consists of:
   a) The Bid Form with the required price information
   b) The Bid Bond

2. **PART B** consists of:
   a) The Addenda Acknowledgement
   b)* EEO-1 Certification

* Include this item if the Contractor or Subcontractor employs at least fifty employees and/or the Contract is for at least $50,000.

PART A and PART B shall each be submitted in separate, opaque, sealed envelopes marked with the project title and name and address of the Bidder.

b. Form

The Bid will provide for a quotation of a price, or prices, for one or more items, which may be lump sum bids, alternate prices, scheduled items resulting in a Bid on a unit of construction or a combination thereof. All blank spaces in the Bid form shall be filled. A Bid Price shall be indicated for each item listed therein, or the words "No Bid", "No Charge", or other appropriate phrase shall be entered. Bids received without all such items completed will be considered non-responsive. If erasure or other changes appear on the forms, each such erasure or change must be initialed by the person signing the Bid.

Bid forms must be completed in ink or typewriter. The Bid price of each item on the form must be stated in words and numerals; in case of a conflict, words will take precedence. In case of discrepancy between unit price and totals, unit prices will prevail. The City reserves the right to waive any defects or irregularities under this subparagraph.

c. Alternate Bids

Alternate Bids will not be considered unless specifically requested.

d. Qualified Bids

Qualified Bids will not be allowed.

e. Acknowledge Addenda

Bid packet "B" shall contain an acknowledgement or receipt of Addenda.

Failure to include the acknowledgement of Addenda shall result in the Bid being rejected as non-responsive.

f. Bid Form Error

No consideration will be given by the City to a claim of error unless such claim is made to the City in writing within two (2) hours after the time of Bid Opening. Written notification shall consist of a letter delivered to the City Clerk supporting evidence of the error, within 24 hours after time of Bid Opening (excluding Saturday, Sunday and legal holiday), to allow consideration of the claim for error. Supporting evidence shall be original documents used to compute the Bids. The City shall be the sole judge of a claim of Bid Error.

Article 2.4 Bid Guarantee

Bids must be accompanied by a certified check, or cashier's check drawn on a bank in good standing, or a Bid Bond issued by a Surety authorized to issue such bonds in the State where the work is located in the amount of five percent (5%) of the total amount of the Bid submitted. This Bid Security shall be given as a guarantee that the Bidder will not withdraw his Bid for a period of thirty (30) days after the Bid Opening and if awarded the Contract, the successful Bidder will execute the attached Contract, and furnish a properly executed Performance and Payment Bond as specified in these instructions. The Bid Guarantee shall name the City of Homer as payee or beneficiary.

The Attorney-in-Fact (Resident Agent) who executes this bond on behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.

Bids submitted without a Bid Bond will be considered non-responsive and will not be publicly read or considered.

Article 2.5 Bids to Remain Open

All Bids shall remain open for thirty (30) days after the day of the Bid Opening but the City may, at its sole discretion, release any Bid and return the Bid Security prior to that date.

SECTION 10.03 AWARD AND EXECUTION OF CONTRACT

Article 3.1 Bidder Qualifications

Before the Bid is considered for award, the City will require the apparent low Bidder to submit the Contractor's Questionnaire. This document shall be submitted to the City Clerk within two (2) working days from the time of the Bid Opening. The Bidder's qualifications, which shall be listed upon the Contractor's Questionnaire, will include: a listing of Bidder's previous Contracts of a nature similar to that being bid upon; a listing of Bidder's staff to include managerial, and technical, who will be available for use in the execution of the Contract; and the listing of the projects to which Bidder is currently obligated or anticipates being obligated during the period of this Contract. The City may also require a current financial statement prepared by a certified public accountant.

The City shall also require that within two (2) working days after the time of Bid Opening, the apparent low bidder submit one of the following to the office of the City Clerk:

1. **For Corporations:**

Most recent copy of Articles of Incorporation, By-Laws **and** a current copy of a Resolution of its Board of Directors, granting the authority of the officer signing on behalf of the corporation.

2. **For Co-partnership:**

Most recent copy of the Partnership Agreement and a statement signed by all partners granting authority to the partner signing the Bid.

3. **For Joint Venture:**

A current copy of the Joint Venture Agreement and a statement signed by authorized persons of each party to the Joint Venture. Each Party to the Joint Venture shall comply with the above requirements for Corporations, Co-Partnerships, or Individuals, as applicable.

Failure to fully complete and respond in the manner prescribed shall result in the rejection of the Bid as non-responsive.

If signature on Bid is by an agent other than an officer of a corporation or a member of a co-partnership, a Power of Attorney must either be on file with the City Clerk prior to opening or submitted with the Bid in Packet B.

A Bidder will be deemed to be unqualified to perform the Contract if, after review and verification of the representations included upon the Contractor's Questionnaire submitted by the Bidder, the following conditions appear:

a. Bidder does not have sufficient prior experience (or an acceptable substitute therefore, as described below) with projects of a similar nature in technical, managerial, and financial requirements to that in the present Contract being Bid.

b. Bidder does not have sufficient financial capability to undertake the obligations of the Contract. A determination in this respect will be made when the City, upon review of the probable cash flow needs of the Contractor for this particular Contract (to include payroll, costs of material and supplies, equipment rental costs, and any other direct or incidental costs of the Contract), determines that Contractor does not have sufficient financial resources to enable him to continue to satisfy his financial obligations under the Contract. The City will consider all other pertinent financial data required by this clause and submitted by the Contractor.

c. Bidder does not have sufficient staff, equipment, or plant available to perform the Contract. City's determination in this matter will be based upon that represented by Bidder in his completion of the Contractor's Questionnaire documents discussed above.

d. Bidder has a consistent history of unsatisfactory performance of Contracts of this or similar nature, regardless of whether such Contracts existed between City and the Contractor, or other parties and the Contractor.

Bidder's representations concerning his qualifications will be construed as a covenant under the Contract. Should it appear that Bidder has made a material misrepresentation on his Contractor's Questionnaire form, the City shall have the right to terminate the Contract for Contractor's breach, and the City may then pursue such remedies as exist elsewhere under this Contract, or as otherwise are provided at law or equity.

The City of Homer's Credit Policy states that "No Contractor, the hiring of whom is under the control of the City, shall be hired for contractual services if shown to be on the delinquent list." The Delinquent List" consists of the following:

> On the Port and Harbor Aging Report, any customer who has charges in the 60 day or over column will be considered delinquent. On the Water and Sewer Aging Report, any customer who has charges in the 30 day or over column will be considered delinquent.

Any determination that a Bidder is unqualified will be made by the City. Such determination will be made in writing and include a thorough discussion of why the Bidder is deemed unqualified. A letter will be sent to the Bidder deemed unqualified, stating the reasons for such determination, and the Bidder's right to request a review of this determination by appeal to the Homer City Council.

Article 3.2 Receipt and Opening of Bids

a. Time of Opening

Bids shall be submitted prior to the time specified in the Invitation to Bid and the exact date and hour of receipt of Bids will be recorded. Late Bids will not be considered, but will be held unopened until the time of award and then returned to the Bidder, unless other disposition is requested or agreed to by the Bidder.

The official time shall be shown in the Invitation to Bid.

b. Oral, Telephonic, and Facsimile Bids

Oral, telephonic, and facsimile Bids will not be considered. Modification by facsimile, of Bids already submitted, will be considered if received prior to the time fixed in the Invitation to Bid. Facsimile modifications shall indicate the amount of the revised Bid and shall be signed by a properly authorized agent, officer, or partner.

c. City's Responsibility

No responsibility will be attached to any officer or employee of the City for the premature opening of, or the failure to open, a Bid or facsimile modification not properly addressed and identified.

d. Opening of PART A and PART B

PART B of the Bid will be opened first and if found complete and responsive, PART A will be opened. If PART B is found to be incomplete, the bid will be non-responsive and PART A will not be opened and the Bid will not be considered.

Article 3.3 Withdrawal of Bids

Bids may be withdrawn on written or facsimile request received from bidders, prior to the time specified for opening. Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with the Instructions to Bidders.

Article 3.4 Multiple Bids

Multiple bids offered by a single Bidder shall result in the rejection of all bids by that bidder.

Article 3.5 Bidders Present

At the time and place specified for the opening Bids, contents of the bids will be made public for the information of Bidders and others properly interested, who may be present either in person or by representation.

Article 3.6 Action On Bids

The City reserves the right to reject any or all Bids, and to waive any informalities and irregularities in Bidding or award of Contract. In accordance with the City of Homer Procurement Regulations, the following provisions shall apply:

a. When the Bidding documents contain a basic bid and alternates, only the total of the basic bid and the alternates to be awarded shall be used to determine the low Bidder.

When the Bidding documents contain a basic bid and additive alternates, the low bidder will be determined by the lowest combination of the basic bid and as many additive alternates as may be chosen in the order listed in the Bid. However, the City of Homer may bypass any additive alternate whose selection would cause the Contract to exceed the funds available.

When the Bidding documents contain deductive alternates, the low Bidder will be determined by the lowest basic bid. If the lowest basic bid exceeds the funds available, the low bidder will be determined by eliminating deductive alternates in the order listed in the Bid until the award can be made within the available funds. The City of Homer may bypass any deductive alternate to maximize the use of available funds.

b. The City reserves the right to reject any Bid which exceeds the Fair Cost Estimate by more than fifteen percent (15%).

c. Any bids found to have arithmetic errors or other pricing ambiguities which affect the total Bid price may be rejected. In evaluating Bids, the City will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, alternatives, and unit prices if requested in the Bid forms. The City may consider the qualifications and experience of subcontractors, and may reject the Bid of any Bidder or Subcontractor who does not pass any such evaluation to City's satisfaction.

d. **Unbalanced Bids** - Submission of unbalanced bids is not allowed. An unbalanced bid is when, for a variety of reasons, a contractor raises the prices on certain bid items and decreases the prices on others proportionately so that the bid for the total job remains unaffected. Unit bid prices for each individual item shall accurately reflect the true cost of performing the work and each item shall bear its proportionate share of costs and overhead, and profit. In the case of increased quantities, or where additional work is paid for under unit prices bid, no claim for extra expense other than the bid price will apply except as allowed in *Section 10.04, Article 4.3 Increased or Decreased Quantities*. In the case of decreased quantities, the decrease will be calculated using the unit bid price. No claims for additional expense or loss of anticipated profits shall apply, except as allowed in *Section 10.04, Article 4.3 Increased or Decreased Quantities*. Bids may be rejected if, in the opinion of the Engineer, the Bid is unbalanced.

e. Local Bidder Preference

1. It is the policy of the City of Homer to give preference to City of Homer residents, workers, businesses, contractors, producers and dealers to the extent consistent with law.

2. A contract or purchase shall be awarded to a local bidder where the bid by such local bidder is, in all material respects, comparable to the lowest responsible non-local bid if the amount bid by such local bidder does not exceed the lowest non-local bid by more than the following percentages, unless such an award is contrary to state or federal law or regulation or unless the Council, at its discretion, determines prior to giving notice soliciting bids that the provisions of this section shall not apply to the contract or purchases:

Non - local bid is:	Local bid is not more than:
$0 - $ 500,000.00	5 percent higher than non-local bid
$0 - $1,000,000.00	5 percent higher than non-local bid on first $500,000.00 and 2.5 percent higher than non-local bid on amount in excess of $500,000.00 to $1,000,000.00

No additional adjustment for bids above $1,000,000.00

3."Local bidder," for purposes of this section, means a person or firm who:

a. Holds a current Alaska Business License to provide such goods or services, and such other Alaska regulatory licenses as are required to provide such goods or services; and

b. Submits a bid for goods or services under the name appearing on the person's or firm's current Alaska Business License; and

c .Has maintained and staffed a place of business within the boundaries of the City of Homer for a period of at least six (6) months immediately preceding the date of the bid and intends to permanently maintain such place of business in the future; and

d. Is registered in the Kenai Peninsula Borough to collect sales tax and locally provides the products and services sought; and

e. Is not delinquent in the payment of any taxes, charges, or assessments owing to the City of Homer on account of that business.

4. The City Manager may require such documentation or verification by the person or firm claiming to be a local bidder as is deemed necessary to establish the requirements of this section.

5. Local bidder's preference does not apply to sale or other disposal of personal property in chapter 18.30 of the City Code.

Article 3.7 Amount of Contract

The amount of the Contract shall be understood to be the total sum of the amounts computed from the approximate quantities and unit prices or the lump sum as given in the proposal form. Where prices are given on alternate items, only the amounts of the alternates accepted by the City will be included in the total.

Article 3.8 Award of Contracts

a. Notice of Award

The acceptance of the Bid will be written Notice of Award, mailed or delivered to the location designated in the Bid. In the event of failure of the lowest responsible Bidder to sign and return the Contract with acceptable Performance and Payment Bonds and Certificate of Insurance as prescribed herein, the City may award the Contract to the next lowest responsible Bidder.

b. Execution of Contract

1) By Contractor: The Bidder whose bid is accepted shall execute the Contract and furnish the required bonding, Insurance Certificates, and Department of Labor's Notice of Work within ten (10) days after receiving the Notice of Award. The Notice of Work submittal shall be date stamped from the Department of Labor. The date the Contract is executed by the Owner is the Contract date. The rights and obligations provided for in the Contract shall become effective and binding upon the parties as of the Contract date. Failure or neglect to execute the Contract within the time specified shall constitute a breach of the agreement effected by the acceptance of the Bid

The amount of the bid guarantee of the successful Bidder who fails or neglects to execute the Contract after proper Notification of the acceptance of the Bid, shall be retained by the Owner as liquidated damages for such breach.

2) By Owner: Upon receipt of at least two copies signed by the Contractor, the properly authorized Owner representatives will execute the documents within ten (10) working days. The Notice to Proceed will also be issued within (10) days of complete execution of the Contract unless otherwise specified in the Special Provisions. The Engineer, or authorized representative, and his address shall be designated in the Notice to Proceed. The Contract shall be deemed to be completely executed when at least two (2) copies thereof, accompanied by the required bonds, liability, and other necessary insurance, and signed by the contractor, are executed by the Owner. The rights and obligations, provided for in the contract shall become effective and binding upon the parties only after its formal execution on behalf of the Owner.

Article 3.9 Contractor to Furnish Performance and Payment Bond

If the Bidder fails to provide the required Performance Bond and Payment Bond within ten (10) days from the date on which the Bidder is notified of being the successful Bidder, the Bid Bond and the amount thereof shall be forfeited to the City.

The Performance and Payment Bond shall be in the amounts according to the following schedule:

Contract Amount	Performance and Payment Bond Amount
Over $10,000	Performance Bond 50% Payment Bond 50%

The bonds shall be maintained in force during the continuance of this Contract and shall be intended for the faithful performance of the Contract in all respects, including but not limited to payments for all materials, labor, etc., and no Contract shall be binding until the said bonds are furnished and approved by the Owner. No work may commence until the bonds have been approved by the Owner. All alterations, extensions of time, extra and additional work, and other changes authorized by the Contract Documents may be made without securing the consent of the surety, or sureties, of the Contract bond. Power of Attorney for the official signing the bond for the surety company must be submitted with the bond.

Article 3.10 Guarantee and Warranty Section

The Contractor and its Surety shall guarantee all items of materials, equipment, and workmanship against defects for a period of one year beginning on the date of Certificate of Completion.

The Contractor shall immediately attend to warranty repairs. If the defect, in the opinion of the City, is of such nature as to demand immediate repair, the City shall make such repair and the cost thereof shall be borne by the Contractor.

Article 3.11 License Requirements

Contractors and Subcontractors, in order to perform public work in the State of Alaska, are required to hold State of Alaska Contractor's licenses of the class required to perform the specified work. General Contractors licenses are necessary where more than two (2) distinct trades are required to perform the work. Contractors and Subcontractors are also required to hold current Alaska Business Licenses in order to perform public work in the State of Alaska. Contractor's License, and Business License numbers shall be inserted in the appropriate place on the Bid Form. Evidence of Subcontractors' compliance with the above shall be submitted to the Engineer before starting subcontract work on public work Contracts.

Article 3.12 Compliance with Law

Contractors and Subcontractors shall comply with all applicable statutes, ordinances, federal, state, or local laws of any government entity having jurisdiction in the project area.

SECTION 10.04 SCOPE OF WORK

Article 4.1 Intent of the Plans and Specifications

The true intent of the plans and specifications is to provide for the execution and completion in every detail of the work described in the Contract Documents. Except as otherwise specifically provided, the Contractor shall furnish all labor, tools, implements, machinery, supplies, materials, and incidentals, and shall do all things necessary to perform and to complete, according to the plans and specifications, the work to be done under the Contract.

Article 4.2 Estimates of Quantities Approximate Only

It is expressly agreed that the quantities shown in the Bid form whether for a "Unit Price Contract" or in connection with a "Lump Sum Contract," given under the heading "Schedule of Contract Prices" are approximate only for use as a basis for comparison of Bids and are not to be taken to be either representations or warranties. The Owner does not expressly nor by implication agree that the actual amount of work will correspond therewith.

Article 4.3 Increased or Decreased Quantities

The Owner reserves the right to increase or decrease the quantity of any item or portion of the work or to omit portions of the work; also to make such alterations or deviations, additions to, or omissions from the plans and specifications as may be determined during the progress of the work to be necessary and advisable for the proper completion thereof. No re-negotiation of unit prices will be considered unless one of the following conditions is satisfied:

a. The total quantity changes result in a total Contract Cost increase or decrease of twenty-five percent (25%) or more.

b. The actual quantity of work for any major item differs by more than twenty-five percent (25%) of the estimated quantity stated in the Contract for such item. A major item is defined as any item, unless otherwise indicated on the drawings or designated in the Special Provisions, for which the Contract price amounts to ten percent (10%) or more of the total Contract price as determined by the original quantities and the unit contract prices.

Where the total Contract Cost decreases by twenty-five percent (25%) or more and/or the actual final quantity of work for any major item is less than the estimated quantity stated in this Contract by more than twenty-five percent (25%), the Contractor will be paid at the Contract unit price for those items of work actually performed and, in addition, may request compensation for the loss of indirect costs, and profit on those indirect costs, on

the quantity of work represented by the difference between the actual quantity and the estimated quantity of work less twenty-five percent (25%) thereof. Indirect costs and profit on indirect costs shall be considered as a total of fifteen percent (15%) of the unit price of a major item or ten percent (10%) of the original item amount, if a major item is not involved.

Article 4.4 Changed Conditions

a. The Contractor shall promptly, within two (2) working days and before such conditions are disturbed, give a written notice to the Engineer of:

1) subsurface or latent physical conditions at the site which differ materially from those indicated in this Contract, or

2) unknown physical conditions at the site of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.

b. The Engineer shall investigate the site conditions promptly after receiving the written notice. If the conditions do materially differ and cause an increase or decrease in the Contractor's cost of, or of the time required for, performing any part of the work under this Contract, whether or not changed as a result of the conditions, an equitable adjustment shall be made under this clause and the Contract modified in writing accordingly.

c. No request by the Contractor for an equitable adjustment to the Contract under this clause shall be allowed unless the Contractor has given the written notice required; provided, however, the time prescribed in "A" above for giving written notice may be extended by the Engineer.

d. No request by the Contractor for an equitable adjustment to the Contract for differing site conditions shall be allowed if made after final payment under this Contract.

Article 4.5 Disposal Sites

Except as otherwise stated in the SPECIAL PROVISIONS, the Contractor shall make his own arrangements and assume all costs in connection with disposal sites. Disposal sites shall be located and maintained in such a manner as to prevent public nuisance.

The Contractor shall obtain written permission from the property owner or owners for such disposal sites and shall furnish the Engineer with a copy of this permission. The written permission shall specifically provide that the property owner will not hold the City of Homer, its employees, agents, or consultants liable for use of or damage to this property. The Contractor shall be held liable for any trespass and property damage incurred outside of the disposal site.

SECTION 10.05 CONTROL OF WORK

Article 5.1 Authority of the Engineer

The Engineer shall be the City's representative and shall observe the Work in progress on behalf of the City and will be identified at the time of the Notice to Proceed. The Engineer shall not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the work. Visits and observations made by the Engineer shall not relieve the Contractor of his obligation to conduct comprehensive inspections of the work and to furnish materials and perform acceptable work, and to provide adequate safety precautions, in conformance with the intent of the Contract. The Work will not be considered completed until approved by the Engineer and accepted by the City. The Contractor shall at all times carry out and fulfill the written instructions and written directions of the Engineer regarding the Contract Documents.

The Engineer shall, in all cases, make determinations on any and all questions which may arise concerning the quality, quantity, and acceptability of materials furnished and work performed; the manner and rate of progress of the performance of all work; the interpretation of plans, specifications, and contract documents.

In the case of the termination of the employment of the Engineer, the Owner shall appoint a capable and reputable Engineer whose status under the Contract shall be that of the former Engineer. The Owner shall give the Contractor notice of such appointment in writing.

If the Contractor determines that instructions, clarifications, or directions issued by the Engineer constitute a change in the requirements of the Contract Documents, he may make claim as provided under *Article 5.22, Claims for Damage or Extra Work.*

Article 5.2 Interpretation of Contract, Specifications, and Plans

These specifications, plans, special provisions, and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work.

In case of conflict in the requirements and provisions as set out by the Contract, the specifications, or the plans, such conflict shall be resolved by the acceptance of the following order of precedence for the various Contract Documents: **1)** Change orders; **2)** the Contract bearing the signature of the City and the Contractor; **3)** addenda; **4)** the written Bid of the Contractor; **5)** Special Provisions; **6)** General Provisions; **7)** Technical Specifications; **8)** Contract Drawings (plans); **9)** Instructions to Bidders. Figure dimensions on the drawings will be used in preference to scaling the drawings. If

dimensions are omitted, operations shall not be started on that part of the construction until the necessary dimensions have been obtained from the Engineer in an Engineer's Instruction or on a Contract Drawing.

The apparent silence of the specifications and plans as to any detail or the apparent omission from them of a detailed description concerning any point, shall be regarded as meaning that only the best general practice is to prevail and that only approved material and workmanship of first quality are to be used.

The Contractor shall take no advantage of any errors or omissions in the specifications and plans or of any discrepancies in or between same. Work knowingly performed by the Contractor as a result of an error or omission in the plans or specifications where such error or omission is not called to the attention of the Engineer shall be at the Contractor's risk.

Article 5.3 Plans, Materials, Equipment, and Workmanship

a. Plans, Shop and Supplemental Drawings

The Contractor will be supplied with five (5) sets of specifications and prints of the drawings (plans) showing the project in detail, together with all Addenda thereto. Additional copies of the contract specifications and drawings may be obtained from the Engineer on the following basis:

Full or partial set of contract drawings	$ 4.00 per sheet
Each book of contract specifications	$50.00 per book
Homer Standard Construction Specifications	$50.00 per book

General drawings showing such details necessary to give a comprehensive idea of the construction contemplated will be included in the plans; but the Contractor shall submit to the Engineer for review such additional shop details, settings, schedules, product data (including illustrations, performance charts, brochures, diagrams and other information to illustrate materials or equipment for some portion of the work), and other such supplemental drawings (collectively, "Submittals") as may be required for the construction of any part of the work. Any work done, or material ordered prior to the approval of such Submittals by the Engineer shall be at the Contractor's risk.

All shop drawings, product data, and other Submittals shall be made in such a manner that clear and legible reproductions can be made from them. Any Submittals which are, in the Engineer's opinion, carelessly prepared, erroneous or unchecked, will be returned to the Contractor for redrawing and checking, and after such redrawing and checking shall be resubmitted to the Engineer.

Shop drawings for structural steel items, structures, or miscellaneous iron items shall consist of shop details, erection and other working plans showing dimensions, sizes of material, lists of field rivets and bolts, details, and other information necessary for the complete fabrication and erection of all such metal work.

Shop drawings for structural elements shall consist of such detailed plans as may be reasonably required for the successful prosecution of the work and which are not included in the plans furnished by the Engineer. These may include plans for false work, bracing, centering and form work, masonry layout diagrams, bar schedule for steel reinforcement, shop details for pre-cast concrete items, and installation drawings or instructions. All structural shop drawings shall be sealed by a Registered Professional Engineer.

The Contractor shall submit, with such promptness as to cause no delay in his own work or in that of any other Contractor, four (4) copies of each Submittal required for the work. The Engineer will check and return two (2) copies of such Submittals only for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Review of Submittals by the Engineer or Owner is subject to the limitations of *Paragraph 5.3.j Limited Scope of Review and Approval*. The approval of any Submittal by the Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Engineer's attention to such deviations at the time of submission and secured the Engineer's written approval, nor shall it relieve him from responsibility for errors of any sort in the items submitted.

The Contract Bid prices shall include the cost of furnishing all Submittals and the Contractor will be allowed no extra compensation for such Submittals. The Contractor shall keep one copy of all Submittals (including shop drawings) and specifications on the work, in good order, available to the Engineer and to his representatives at the construction site.

b. Material Substitutes and "Or Equals"

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 of other Suppliers may be submitted to the Engineer for review under the circumstances described below.

The Contractor shall furnish the Engineer the complete list of proposed desired substitutions together with such engineering and catalog data as the Engineer may require, in sufficient time prior to their use to give the Engineer adequate time for his review. Failure on the part of the Contractor to supply data to the Engineer prior to ordering or using such alternate material or equipment will not relieve the Contractor of furnishing acceptable material or equipment as required by the Engineer.

The Contractor shall abide by the Engineer's judgement when proposed substitute materials or items of equipment are judged to be unacceptable and shall furnish the originally specified material or item of equipment in such case. The Engineer will approve or disapprove proposed substitutions in writing within a reasonable time. No substitute materials shall be used unless approved in writing.

c. Materials Approval Data

Only materials conforming with the specified requirements in the Contract Documents shall be used in the work.

Before delivery to the job site of any material to be used in the work, the Contractor shall have provided to the Engineer for review and approval such product data, samples or other submittal needed to demonstrate the way the Contractor proposes to conform to the requirements and design concept expressed in the Contract Documents. The approval of any material or source of supply by the Engineer will not imply that all material from that source will be approved, and should material from an approved source fail to maintain a quality meeting the requirements of the specifications, use of material from that source shall be discontinued, and the Contractor shall furnish approved material from other sources. Regardless of prior approval, any material incorporated into the work which fails to meet the requirements may not be allowed to be incorporated in the work. Material which after approval has, for any reason, become unsuitable for use, shall be rejected and not used.

The approval of any Submittal for materials by the Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Engineer's attention to such deviations at the time of submission and secured the Engineer's written approval, nor shall it relieve him from responsibility for errors of any sort in the items submitted.

The Contractor shall check and approve the item described by the Product Data with the Contract Documents for deviations and errors prior to submittal to the Engineer for approval. It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available.

Satisfactory proof of compliance with the specifications shall be submitted in one of the following ways:

1. Manufacturer's Certificate

For standard labeled stock products of standard manufacture which give a record of satisfactory performance in similar work over a period of not less than two (2) years, the Owner may accept a notarized statement from the manufacturer certifying that the product conforms to the applicable specification.

2. Mill Certificates

For materials, where such practice is the usual standard, the Owner may accept manufacturer's certified mill and laboratory certificate.

3. Laboratory Certification

The Owner may accept a certificate from a commercial testing laboratory satisfactory to

him certifying that it has tested the product submitted within a period acceptable to the Owner, and that it conforms to the specifications.

d. Storage of Materials

Materials shall be stored in such a manner as to insure the preservation of their quality and fitness for use. When considered necessary to protect materials against dampness, or to keep them clean and free from dust, dirt, or other detrimental matter, suitable sheds, platforms and covers shall be provided. Materials shall be stored in such a manner as to facilitate inspection.

e. Defective Materials

All materials not conforming to the requirements of the material specifications shall be considered as defective. No defective material, the defects of which have been subsequently corrected, shall be used until approval has been given. Upon failure on the part of the Contractor to remove, repair, or replace defective material when so ordered by the Engineer, the Owner shall have authority to remove, repair, or replace such defective material and to deduct all costs so incurred from any money due or to become due the Contractor. Defective material not permitted for use shall be immediately removed from the site or disposed of as directed by the Engineer.

f. Materials Furnished by the Owner

Materials specifically indicated shall be furnished by the Owner. The fact that the Owner is to furnish material is conclusive evidence of its acceptability for the purpose intended, and the Contractor may continue to use it until otherwise directed. If the Contractor discovers any defects in material furnished by the Owner, he shall notify the Engineer. Unless otherwise noted or specifically stated, materials furnished by the Owner, which are not of local occurrence, are considered to be f.o.b. the nearest freight station. The Contractor shall be prepared to unload and properly protect all such material from loss or damage after receipt of material at the point of delivery.

g. Manufacturer's Directions

Manufactured articles, material, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer. Instructions and directions for any owner-furnished materials and equipment will be furnished to the Contractor by the Engineer.

h. Equipment Approval Data

The Contractor shall submit to the Engineer for review and approval four (4) copies of catalog data, as required by the Contract Documents, for the manufactured items of equipment and all components. Catalog data may include specified performance data, material description, rating, capacity, working pressure, material gauge or thickness, brand name, catalog number, and general type, as requested by the Engineer.

The Submittal shall be compiled by the Contractor and approved by the Engineer before any of the equipment is delivered to the job site. After written approval, this Submittal shall become a part of the Contract, and may not be deviated from except upon written approval of the Engineer.

The approval of catalog data by the Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless he has in writing called the Engineer's attentions to such deviations at the time of submission and secured the Engineer's written approval, nor shall it relieve him from responsibility for errors of any sort in the items submitted. The Contractor shall check and approve the work described by the catalog data with the Contract Documents for deviations and errors prior to submission to the Engineer for approval.

It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements, including those for connections, and shall order such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

Where equipment requiring different arrangement of connections from those shown is approved, it shall be the responsibility of the Contractor to install the equipment to operate properly, and in harmony with the intent of the drawings and specifications and to make all changes in the work required by the different arrangement of connections.

After approval by the Engineer, the Contractor shall furnish three (3) copies of such catalog data of all process equipment or components thereof together with operating and maintenance instructions.

Photocopies of catalog data are not allowed as submittals for operating and maintenance manuals. **Original catalog cuts are required for these manuals**.

i. Testing

All tests shall be made in accordance with approved methods as described and designated in the specifications. When tests of materials are required, such tests, unless otherwise noted in the Technical Specifications, shall be made by a testing laboratory approved by the Engineer and at the expense of the Owner. The Contractor shall afford such facilities as may be required for collecting and forwarding samples and shall hold the materials represented by the samples until tests have been made and the materials found equal to the requirements of the specifications or to approved samples. The Contractor in all cases shall furnish the required samples without charge.

In the absence of any definite specification or reference to a specification in the technical specifications or in the special provisions for the particular project involved, it shall be understood that such materials and tests shall meet the specifications and requirements of the American Society for Testing and Materials.

Wherever in the specifications a particular specification of a Society for Testing and Materials is referred to by number, it shall be understood that such reference shall include

all amendments and additions thereto adopted by such organizations prior to the award of the Contract.

Re-tests of materials in constant use may be required periodically by the Owner. Required re-testing shall be accomplished at the expense of the Contractor when materials have previously been tested and have not met the requirements of the specifications.

j. Limited Scope of Review and Approval

The Engineer will review and approve or take other appropriate action upon the Contractor's Submittals such as shop drawings, or catalog product data and samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Engineer's action will be taken with such reasonable promptness as to cause no delay in the Work or in the activities of the Owner, Contractor, or separate contractors, while allowing sufficient time in the Engineer's professional judgment to permit adequate review. Review of such Submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Engineer's review of the Contractor's Submittals shall not relieve the Contractor of the warranty obligations under *Article 7.11, Correction of Work After Final Payment*.
The Engineer's review or approval of Submittals shall not constitute review or approval of the Contractor's safety program or safety precautions, all of which remain the sole responsibility of the Contractor, as more fully described in *Article 6.5, Industrial Safety*. Unless otherwise specifically so stated by the Engineer, review or approval of Submittals shall not constitute approval of any construction means, methods, techniques, sequences or procedures. The Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

Article 5.4 Cooperation with Other Contractors

The Contractor shall conduct his operations so as to interfere as little as possible with those of other Contractors or Subcontractors on or near the work. It is expressly understood that the Owner has the right and may award other Contracts in connection with the work so long as it does not interfere with the work under this Contract.

Article 5.5 Contractor to Have Representative at Work Site

The Contractor shall within five (5) days after the Notice to Proceed, name the Superintendent, the Safety Supervisor required by *Article 6.5, Industrial Safety* and file with the Engineer a list of all persons who are authorized to sign documents on behalf of the Contractor to fully bind the firm.

The Contractor shall at all times have a competent Superintendent or Foreman capable of reading and thoroughly understanding the plans and specifications as his agent on the work, who shall have authority to receive instructions from the Engineer or his authorized

representatives. The Superintendent or Foreman shall have full authority to execute the orders or directions of the Engineer without delay and to supply promptly such materials, tools, plant, equipment, and labor as may be required, regardless of whether or not the work is to be performed by the Contractor's own forces or those of a Subcontractor.

The Contractor shall not employ or continue to employ on the project, a Project Construction Manager, Superintendent or Foreman who is unsatisfactory to the Owner.

The fact that an approved Subcontractor is performing any portion of the work shall not relieve the Contractor of this requirement. The Owner has the authority to require the Contractor to designate the chain of command at the pre-construction conference or at any time thereafter.

Article 5.6 Certified Payrolls

All Contractors who perform work on a public construction Contract shall file with the Alaska Department of Labor, Labor Law Compliance Division, and the Owner, a certified payroll on Friday of each week that covers the preceding week.

Article 5.7 Notice to Contractors

Any written notice to the Contractor which may be required by law or by the provision of the specifications may be served on said Contractor or his representative, either personally or by mailing to the address given in the Contract.

Article 5.8 Notice by Contractors

Wherever in the specifications the Contractor is required to notify the Engineer concerning the work, or concerning any complaint which he may have to make, or for any reason, it shall be understood that such notification is to be made in writing, delivered to the Engineer or his representative in person, or mailed to the office of the Engineer at the address given in the official "Notice to Proceed."

Article 5.9 Construction Surveying by the Contractor

The Contractor shall perform all surveying and staking essential for the completion of the project in conformance with the plans and specifications, and shall perform all the necessary calculations required to accomplish the work. Staking, surveying, computations, and calculations shall be accomplished in accordance with standard engineering and surveying practice.

The Owner will provide a benchmark and sufficient centerline points or references thereto, at the beginning of the project, to enable the establishment of the planned elevations and centerline by the Contractor.

The Contractor shall use competent personnel and suitable equipment for the layout work required and shall furnish all stakes, templates, straight edges, and other devices necessary for checking and maintaining points, lines and grades.

The Contractor shall be responsible for the supervision of the construction surveying personnel and any errors resulting from the operations of said personnel shall be corrected at the expense of the Contractor, and at no additional cost to the Owner.

The Owner may randomly spot check the Contractor's surveys to insure that the work is within the order of accuracy required, but the Owner assumes no responsibility for the accuracy of the work.

The Contractor shall perform all staking necessary to delineate clearing and grubbing limits; all cross sections necessary for determination of excavation and embankment quantities, including intermediate and re-measure cross sections; all staking of culverts, utilities, structures, and appurtenances, and other features required for successful completion of the work.

If necessary, forty-eight hours shall elapse between the completion of clearing limits staking and the beginning of the clearing and grubbing operations to allow for coordination with affected property owners.

The Contractor's surveyor shall make a conscious attempt to locate all property corners and monuments along the route of work, and shall reference those corners that may be disturbed due to this work. At the completion of the project, the Contractor shall restore all disturbed property corners and monuments at no additional cost to the Owner. This work shall be performed by a land surveyor registered in the State of Alaska or under his immediate direction.

The Contractor's surveyor shall maintain accurate and up-to-date as-built measurements of the ongoing construction. Upon completion of the project, the Contractor shall provide the Owner with one set of redline record drawings and survey notes. This work shall be under the direct supervision of a professional land surveyor, licensed in the State of Alaska, who shall stamp the survey notes and record drawings.

The Owner may retain up to five (5) percent of the total contract amount until the record drawings are received in a satisfactory form.

Article 5.10 Protection of Property

a. The Contractor shall continuously maintain adequate protection of all its construction, the Owner's property, and the adjacent public and private property from damage, injury, or loss arising from construction. The Contractor shall pay for any damage, injury, or loss resulting from inadequate protection. The Contractor shall maintain adequate insurance coverage to protect the work from loss until the work is accepted for Owner occupation and operation.

b. The Contractor shall not enter upon public or private property for any purpose without obtaining permission from the proper public authority or private property owner. Construction on state highways, or any public right-of-way shall meet the requirements of the authority having jurisdiction over such right-of-way. It shall be

the Contractor's responsibility to notify said authority before beginning construction to ascertain that the schedule of operations proposed is satisfactory to the authority.

c. Wherever construction under the Contract is undertaken on easements or rights-of-way over private property, or public right-of-way franchise, all construction operations shall be confined to the limits of such easement, right-of-way or franchise and to be completed so as to cause the least amount of disturbance and a minimum amount of damage.

d. Construction across public or private property shall be carried out in one (1) continuous operation with immediate restoration and cleanup of the construction area. If the Contractor should fail to perform such construction, restoration and cleanup continuously, the Owner may give the Contractor a written notice to do so. In the event of failure by the Contractor to complete such construction, restoration and cleanup within five (5) days after receipt of such notice, the Owner may complete same to the extent the Owner deems advisable. The cost of all labor, material, supervision, and other expenses incurred by the Owner in so doing shall be paid by the Contractor to the Owner and if not so paid, shall be deducted from any payments due the Contractor under the Contract.

e. The Contractor shall protect and maintain all underground or above ground utilities and structures affected by its construction and all lawns, shrubs, trees, fences, and other improvements on property crossed over or adjacent to its operations, and shall repair and restore in a satisfactory manner at its expense all damage resulting from the Contractor's operations. The Contractor shall be responsible for all damage caused by its construction to roads, highways, ditches, walls, bridges, culverts, utilities, barricades, lights, or other property, whether such damage be at the Project site or elsewhere, and the Contractor shall repair or replace at its own expense all such damage in a satisfactory manner.

f. It is expressly understood that the Contractor shall restore all easement and right-of-way property to a condition equal to its original condition. Before beginning construction the Contractor shall file with the Engineer properly identified and dated photographs of such property as may be designated on the Contract Drawings or described in the Special Conditions.

g. Protection of Water Resources. The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acid or harmful materials, both on and off the premises, and shall comply with applicable federal, state, and municipal laws concerning pollution of waterways while performing work under this Contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, and sewage from entering established drainages.

The Contractor shall control the discharge of mud, debris, or turbid water from impacting surface or subsurface waters, wetlands, estuaries, or private property. Environmental laws and regulations of the United States and the State of Alaska shall be observed by the Contractor at all times.

h. Dust and Mud Control

1. The Contractor shall maintain all excavations, embankments, stockpiles, access roads, waste areas, borrow areas, and all other work areas free from excess dust and mud to such a reasonable degree as to avoid causing a hazard or nuisance to others.

2. All existing paved areas and roadways, especially heavily traveled roads, adjacent to the project construction site or used as haul roads shall be kept clean of dirt, mud, and debris resulting from the Contractor's operation during the construction period.

Article 5.11 Inspection of Construction

a. The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work performed under the contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the City. All work shall be conducted under the general direction of the Engineer and is subject to the City's or Engineer's inspections and tests at all places and at all reasonable times, before acceptance, to ensure strict compliance with the terms of the contract.

b. The Owner, Engineer or their representatives shall be allowed access to all parts of the work at all times and to the preparations, fabrication or manufacture of the materials or equipment to be used, and shall be furnished with every reasonable facility for ascertaining whether or not the work as performed is in accordance with the requirements and the intent of the plans and specifications.

c. Any Owner or Engineer tests or inspections pursuant to this *Article 5.11* are for the sole benefit of the Owner and do not:

1. Relieve the Contractor of responsibility for providing adequate quality control measures;

2. Relieve the Contractor of responsibility for safety at any time or for damage to or loss of the material before acceptance;

3. Constitute or imply acceptance; or

4. Affect the continuing rights of the Owner after acceptance of the completed work.

d. Inspectors are not authorized to alter or waive the provisions of the Contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications.

e. If the Engineer requests it, the Contractor shall, at any time before final acceptance of the work, remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore portions of the work to the

standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering or removing, and the replacing of the coverage or the making good of the parts removed, shall be paid for as "extra work", but should the work so exposed or examined prove unacceptable, the covering or removing, and replacing of the covering and the making good of the parts removed, shall be at the Contractor's expense under the terms of *Article 5.18, Cleaning Up.*

f. If the Contractor does not promptly replace or correct rejected work, the City may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor, or (2) terminate for default the Contractor's right to proceed.

g. When any unit of government, political subdivisions, utility, or corporation is to pay a portion of the cost of the work covered by this Contract, its respective representatives shall have the right to inspect the work. Such inspection shall in no sense make any unit of government, political subdivision, utility, or corporation a party to this Contract, and shall in no way interfere with the rights of either party hereunder.

Article 5.12 Temporary Erosion Control During Construction

The Contractor shall provide all temporary erosion control measures necessary during construction for the prevention of water pollution, erosion, and/or siltation. These measures are for the protection of all streams, lakes, ponds, wetlands, and tidal waters.

The Contractor is directed to Alaska State regulations which state that no person may conduct an operation which causes or contributes to a violation of water quality standards set forth in 18AAC70.

Unless a temporary erosion control plan during construction is specifically called out and included in the drawings and other contract documents, the Contractor shall provide a Storm Water Pollution Prevention Plan (SWPPP) describing temporary erosion control measures to be employed during construction. The SWPPP shall be delivered to the Engineer within ten (10) days of the effective date of the Notice to Proceed or five (5) days before the commencement of work, whichever is the earlier date. The Engineer will review and accept or reject the plan within five (5) working days. The accepted temporary erosion control measures shall be in place immediately after the Contractor mobilizes to the job site and before any construction begins.

Temporary erosion and sediment control measures include such items as silt fences, sedimentation ponds, interception embankments and channels, check dams, rock lining, mulching, jute matting, seeding, sodding, and other erosion control devices as required. Where erosion is expected to be a severe problem, clearing, grubbing, grading, filling, and other operations shall be scheduled and performed such that permanent erosion control measures follow immediately. Permanent erosion control measures are those work items specified elsewhere in the Contract Documents which are intended to provide permanent erosion control such as paving, seeding, and other measures as required.

Temporary erosion control measures shall remain in place and in good working condition until work is complete under the Contract. The continued maintenance of these

temporary erosion control items and replacement of damaged items shall be the ongoing responsibility of the Contractor. Under *COHSCS Section 10.05* of these Contract Documents the Engineer may suspend work if the Contractor fails to carry out the requirements of the temporary erosion control plan. After suspension of the work, the Owner may perform or contract the performance of the erosion control measures and deduct those costs from the Contractor's progress payments.

Payment for this work shall be considered incidental to the Contract and no separate payments shall be made unless otherwise identified in the Bid Schedule.

Article 5.13 Final Inspection

The Contractor shall, upon completion of all work involved, notify the Engineer in writing of completion and request a semi-final inspection of the project. This inspection will be performed in the presence of representatives of the City, the Engineer, and the Contractor. The Contractor, at his expense, will be prepared to expose all gate valve risers and manhole lids to allow inspection during the semi-final inspection and the final inspection. Copies of a list of deficiencies, if any, indicated by this inspection will be promptly furnished to the Contractor for remedial action. When all corrective action has been completed, the Contractor shall notify the City and an acceptance inspection will be performed. When this inspection verifies correction of the listed deficiencies, **and all as-builts and/or manuals are submitted and approved**, the Engineer will issue a **Certificate of Completion** and accept requests for a Final Pay Estimate. **The Contractor shall submit a Certificate of Compliance along with the Final Pay Application.**

When Final Inspection reveals uncorrected listed deficiencies, the above outlined procedure shall be repeated and any cost related thereto will be deducted from any money due the Contractor. This cost will include, but is not limited to, salaries, administrative, and transportation costs.

Article 5.14 Suspension of Work

When, in the judgement of the Engineer, unfavorable weather, or other conditions warrant the granting of a suspension order, the Engineer shall issue to the Contractor a written order to suspend work wholly or on any part of the Contract. When conditions are again favorable for prosecution of the work the Engineer shall issue to the Contractor a written order to resume the suspended work. Orders to suspend work will not be written for intermittent shutdowns due to weather conditions except under the provisions of *Section 10.05, Article 5.28, Limitations of Operations.* The Contractor shall take every precaution to prevent any damage or unreasonable deterioration of the work during the time it is suspended. Suspension of the work by the Engineer shall not furnish any grounds for claims by the Contractor for damages or extra compensation, but the period of such suspensions shall be taken into consideration in determining the revised date for completion as hereinafter provided. The Contractor shall not suspend work under the Contract without the written order of the Engineer as stated in the preceding paragraph. Questions as to the necessity of suspending any portion of the work shall be determined by the Engineer.

Upon failure of the Contractor to carry out the orders of the Engineer or to perform work under the contract in accordance with its provisions, the Engineer may suspend the work for such period as he may deem necessary. Time lost by reason of such suspension or in replacing the improper work or material shall not furnish any grounds to the Contractor for claiming an extension of time or extra compensation, and shall not release the Contractor from damages or liability from failure to complete the work within the time prescribed.

In the event that a suspension of work is ordered in writing by the Engineer for an extended period of time due to unsuitable weather, the Contractor, at his own expense, shall do all work necessary to provide a safe, smooth and unobstructed roadway through the construction area for use by public traffic, and particularly for access to abutting property, during the period of suspension. If the Contractor fails to do the work as above specified, the City will perform such work and deduct the cost thereof from any monies due or to become due the Contractor.

In the event that a suspension of work for an extended period of time is ordered in writing by the Engineer due to unsuitable weather or unforeseen conditions and, in the opinion of the Engineer, the Contractor has prosecuted the work with energy and diligence prior to the time of suspension of operations and has so constructed the temporary roadway or detour that it may be maintained by routine maintenance forces of the Owner during the period of suspension, maintenance will be borne by the Owner at no cost to the Contractor.

In the event that a suspension of work for an extended period of time is ordered in writing by the Engineer on oiling or resurfacing projects which do not require disturbing the existing traveled surface and on which the existing surface or shoulders have not been disturbed by the Contractor, the City will maintain the roadway at no cost to the Contractor during the period of suspension.

If a suspension of work for an extended period, under which the City assumes the responsibility of maintenance, it is granted in writing by the Engineer, the City will assume no responsibility except for routine maintenance which shall include and be restricted to the following:

a. Maintenance of the traveled roadway and/or detour surface.

b. Maintenance of roadway surface drainage along roadway and/or detour.

Any areas which are closed to traffic shall be maintained and safeguarded by the Contractor at his own expense.
In the event that the City has assumed maintenance of a project during a period of suspension, the Contractor agrees to accept the roadway or detour as it has been maintained by the City and no claim for extra payment shall be made on account of its condition or in the manner in which the maintenance has been performed by the City. Such suspensions of work shall not relieve the Contractor of his responsibility of restoring the roadway and its slopes to the designated roadway section at his unit

Contract prices and for performing all other remaining work in accordance with the Contract.

An extended period of time as expressed in these specifications is intended to mean shutdowns ordered in writing by the Engineer to cover extended shutdowns due to winter or seasonal weather, or extended shutdowns due to delays occasioned by the failure of another Contractor to complete a portion of the work on which progress of the Contract is dependent, or for other causes approved by the Engineer.

Article 5.15 (Deleted)

Article 5.16 Protection of Work During Suspension

If it should become necessary, for any reason, to stop work, the Contractor shall open proper drainage ditches, erect temporary structures where necessary, prepare the work so there will be minimum interference with traffic, and take every precaution to prevent any damage or unreasonable deterioration of the work during the time the work is closed. Unless otherwise provided in the work suspension order, the Contractor will be responsible for all damage to the work that may occur during suspensions of work the same as though the damage has occurred while the work was in progress.

Article 5.17 Final Trimming of Work

The work to be done under the Contract shall include such repair work as may be necessary to overcome such deterioration as may occur on some portions of the work while other portions of the work are being performed. The project shall be in a neatly trimmed and well finished condition throughout at the time of completion and acceptance.

Article 5.18 Cleaning Up

At any time during the progress of construction that clean up is not keeping pace with the rest of the work in the opinion of the Engineer, the Contractor shall, at the direction of the Engineer, suspend all operations on the major items of work until the premises are cleaned up to the satisfaction of the City. Any additional expense involved will be the sole responsibility of the Contractor and the City will not be held liable for this additional expense.

Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean up the right-of-way and all properties on which he has operated in the construction of the project, including removing all construction equipment, removing and disposing of all discarded materials, rubbish, and debris. He shall tear down, remove, and dispose of all construction plant structures erected by or for him or by or for his Subcontractors or employees on the right-of-way or on property controlled by the City. He shall do all things necessary to put the whole of the right-of-way and such other property controlled by the City as he may occupy, in a neat, clean, and orderly condition. It is further understood and agreed that any such equipment and material of all kinds belonging to the Contractor that is not removed, as herein provided within thirty (30)

days after the date upon which all other work to be done under the Contract is completed, or within such longer times as may be agreed upon in writing between Contractor and the Engineer, shall become the property of the City without obligation to the Contractor or to any party to whom he may transfer title.

Nothing in the above clause shall be construed as relieving the Contractor from his obligation to clean up the right-of-way and the sites of his operations and to remove and dispose of debris, waste materials, etc., in accordance with other provisions of the Contract.

All street or traffic control signs, mailboxes, newspaper boxes, property corner markers, survey monuments, and utility markers removed to facilitate or damaged by the Contractor's operations shall be restored by the Contractor unless otherwise directed.

Article 5.19 Easements and Rights-of-Way

The City will provide the work limits, right-of-way and/or easements for the work. Information regarding the width and status of easements is shown on the plans; special conditions pertaining to easements are listed in the SPECIAL PROVISIONS. The Contractor shall confine his operation to the designated easement areas and observe all restrictions.

The Contractor will be responsible for any trespass upon adjacent property or injury thereto, resulting from or in connection with his operations. The Contractor shall be liable for any claims that may be made on account of trespass or damage of any kind to private property, and shall provide written certification of full restoration or satisfactory arrangements prior to final acceptance of the work. The Contractor shall not have the right to remove material from a right-of-way, easement or work area unless otherwise provided in the Contract Documents.

Should the Contractor desire to go outside the existing right-of-way or easement to operate his equipment, stockpile material, or intrude on private property with any phase of the construction, the Contractor shall provide the City with written permission from the property owner before entering onto such property.

The written permission shall specifically provide that the property owner will not hold the City liable for use of or damage to his property. The Contractor shall be held liable for any trespass and property damage incurred outside of the easement area.

The City will attempt to contact property owners and request that they remove personal property within the right-of-way prior to the beginning of construction. However, when fences, trailers, sheds, oil barrels, machinery, mailboxes and other miscellaneous personal property have not been removed and which interfere with construction, the Contractor shall remove these items of personal property from the right-of-way or easement to the property owner's lot or as directed by the Engineer. Any damage to the above items as a result of construction under this Contract will be repaired or the item replaced in kind by the Contractor. Care shall be exercised so that the property owner is inconvenienced as little as possible when items are removed. In the case of interrupting fuel services from

oil barrels, service shall be restored to the property owner immediately after moving the barrel.

Article 5.20 Unauthorized and Defective Work

Any work, not in accordance with the plans and specifications whether the result of poor workmanship, or defective materials, found to exist during construction or within one (1) year of final acceptance by the City shall be removed immediately and replaced by work and materials which shall conform to the specifications, or shall be remedied otherwise in an acceptable manner authorized by the Engineer. Work done contrary to the instructions of the Engineer, or beyond the lines shown on the plans, or any extra work done without authority, will not be considered as authorized and will not be paid for by the City. Work so done may be ordered by the Engineer to be removed or replaced at the Contractor's expense.

If the Contractor fails to correct unauthorized or defective work, the Owner may, three (3) days after a written notice to the Contractor, correct such deficiencies and deduct the cost thereof from any payment due the Contractor without prejudice to any other remedy.

Article 5.21 Additional or Extra Work

Upon the written order of the Engineer, the Contractor shall perform such additional or extra work that may or may not be included under or covered by Contract prices, as may be necessary for the satisfactory completion of the project. If the work is of a kind for which a specification is given herein, it shall be performed in accordance with that specification subject to any supplemental or additional specifications, plans and instructions as the Engineer may issue. If the work is of a kind not covered by a specification given herein, it shall be performed in accordance with such requirements as may be issued by the Engineer.

The City will pay for additional or extra work at the stipulated unit prices, or at the stipulated lump sum prices given in the Bid form, or on a force account basis as described in these specifications. Payment for extra work will be made only when it has been authorized by the Engineer in writing prior to performance of the work. In the case of a negotiated proposal the Contractor shall furnish a price breakdown with his proposal itemized as required by the Engineer. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all materials, labor, equipment, subcontract and overhead costs as well as profit and shall cover all work involved to accomplish the modification, whether deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification thereof shall also be furnished. The proposal together with the price breakdown and time extension justification shall be furnished by such date as may be specified by the Engineer.

Article 5.22 Claims for Damage or Extra Work

a. City:

If the Contractor shall claim compensation from the City for any injury or damage sustained by reason of any acts of the City or its agents, he shall, within five (5) days after the act causing (sustaining) such damage, submit a written statement of the nature of the damage sustained, to the Engineer. The notice to the Engineer shall state that the Contractor intends to hold the City liable for such damages and shall set forth substantially the time and place of the injury or damage, the manner in which it occurred, the nature of the act or occurrence in question, the extent of the injury or damage so far as known, and the names and addresses of witnesses known to the claimant. Any notice required by (a) of this section shall be under oath or affirmation. Failure to give notice of injury or damage as required by (a) of this section or failure to present a claim within the time and in the manner provided therein shall bar any action upon said claim.

b. Extra Cost:

If the Contractor claims that any instructions by drawings or otherwise involve extra cost or any extension of time, he shall notify the City in writing within ten (10) days after the receipt of such instructions and in any event before proceeding to execute the work. No such claim shall be valid unless made in accordance with the terms of this section.

c. Claims for Weather:

The Contractor shall have no claims against the City for damages for any injury to work, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the Engineer, the Contractor has made all reasonable efforts to protect the materials, equipment and work, he may be granted reasonable time to make proper repairs, renewals and replacements of the work.

Article 5.23 Prosecution of Work

The work to be done under the Contract shall not commence until written "Notice to Proceed" has been received by the Contractor.

Performance of the work to be done under the Contract shall be commenced within ten (10) days after receipt of written "Notice to Proceed" from the City, unless later commencement of the work is authorized by the Engineer.

From time of commencement of the work to the time of completion, the work shall be prosecuted vigorously and continuously and always in accordance with a schedule which will insure completion within the specified time limit. There shall be no voluntary shutdown or slowing of operations without prior approval of the Engineer. Limitations of operations due to weather conditions will be governed by *Article 5.28 Limitations of Operations.*

If it appears to the Engineer that the rate of progress being made is not such as will insure the completion of the work within the specified time limit, it shall be within the authority of the City, upon notification by the Engineer, to require the Contractor to provide additional equipment and men and to take such other steps as may be necessary to insure completion as specified.

Article 5.24 Progress Schedule and Requirements for Overtime Work

a. Schedule:

The Contractor shall, within five (5) days or within such time as determined by the Engineer, before commencement of the work, prepare and submit to the Engineer for approval a Construction Progress Schedule in the form of a time-scaled bar chart showing the order in which the Contractor proposes to carry on the work, the date on which he will start the several salient features, including procurement of materials, plant and equipment and the contemplated dates for completing same. This schedule shall be named the "As Planned" schedule and shall indicate appropriately the percentage of work scheduled for completion at any time. The Engineer may upon written request require the Contractor to submit an updated progress schedule at any time during the Contract but not more often than once a month. All subsequent schedules shall be measured against the "As Planned" schedule.

b. Forces:

The Contractor shall furnish sufficient forces, construction plant and equipment and shall work such hours, including night shifts and overtime operations, as may be necessary to insure the completion of the work in accordance with the approved "As Planned" progress schedule. If the Contractor's actual progress fails to meet the "As Planned" construction schedule, the Contractor shall increase its work force and equipment as required to bring the actual progress of its operations into conformance with said schedule without additional cost to the Owner.

Article 5.25 Unusual Working Hours

The Contractor shall give the Engineer twenty-four (24) hours advance notice of his intention to work overtime, nights, Sundays, or holidays, or any time outside the usual working hours. In no case will the Contractor do any such work without first notifying the Engineer to permit arrangements for proper inspection.

Article 5.26 Subletting or Assignment of Contract

If any part of the work to be done under the Contract is subcontracted, the subcontracting shall be done in accordance with the following provisions:

The Contractor shall notify the Engineer in writing of the names of all Subcontractors, together with a summary of the extent and character of the work to be done by each Subcontractor. If for sufficient reason, at any time during the progress of the work, the Engineer determines that any

Subcontractor is incompetent or undesirable, he will notify the Contractor accordingly and the Contractor will take immediate steps to correct the performance of the Subcontractor.

Subletting by Subcontractors shall be subject to the same regulations. The City will not approve of the subcontracting of more than fifty percent (50%) of the work to be done under the Contract.

The Contractor shall be fully responsible to the City for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them. Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the City.

Insofar as is practicable, the Contractor shall make payment for Subcontract work in the same units and on the same basis of measurements as apply under the main Contract. The City will not be responsible for loss resulting from the Contractor's failure to do so. In making payment to Subcontractors, the Contractor shall protect himself against the possibility of overpayment and he shall assume such losses as may result from overpayment.

Article 5.27 Assignments

The Contractor shall not assign the Contract or assign any monies due or to become due under the Contract without previous written consent of the City. No assignment of the Contract by the Contractor shall be valid unless it contains a provision wherein funds to be paid to the assignee under the assignment are subject to all the Contractor's obligations under the Contract.

Article 5.28 Limitations of Operations

Operations on the various units or portions of the work shall be conducted during the times and at the locations specified in the Contract Documents or as may be approved by the Engineer. No part of the work shall be undertaken without his approval, and no work shall be carried on contrary to his instructions.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorization from the Engineer, is authorized to act, at his discretion, to prevent such threatened loss or injury; and he shall so act if instructed to do so by the Engineer. Any compensation claimed by the Contractor on account of such emergency work, shall be processed according to *Article 5.21, Additional or Extra Work***.**

The Contractor shall not perform excavation, backfill or other earthwork when weather conditions are such that the desired grades, tolerances, compactions or other performance standards as outlined in these Contract Documents cannot be met.

When unfavorable weather makes it impractical to secure desired results, the Contractor may request from the Engineer a written order to suspend work, in whole or in part, for an intermittent or extended period of time. The period of the suspension will be taken into consideration in determining the revised date for completion. It shall be the Contractor's responsibility to maintain and protect the work and provide for traffic flow during intermittent shutdowns. The City may assume maintenance during extended shutdowns and shall be governed by the provisions of *Article 5.14, Suspension of Work.*

Article 5.29 Workmen and Equipment

The Contractor shall employ only competent and efficient laborers, mechanics, or artisans. Whenever, in the opinion of the Engineer, any employee is or becomes unsatisfactory for the work assigned to the employee, the Contractor shall, upon written request of the Engineer, remove said employee from the work.

The Contractor shall furnish to the Engineer, upon request, a list of all equipment, tools, and machines to be utilized to perform the work under this Contract, in his possession or available to him. Said equipment, tools, and machines shall be subject to inspection by the Engineer, shall comply with applicable safety regulations, and shall be maintained in a satisfactory and safe working condition at all times.

If the Contractor does not promptly repair or replace non-complying equipment, tools, or machines utilized in the Work, the City may terminate the Contractor's right to proceed.

Article 5.30 Time of Completion of Work and Extension of Time Limit Including Liquidated Damages

Time is of the essence in the Contract. Therefore, the work to be done under the contract shall be completed in its entirety within the time specified in the bid; provided however, that the Engineer may at his discretion recommend that the City extend the time for completion of the work without invalidating any of the provisions of the Contract and without releasing the surety.

Extensions of time, when recommended by the Engineer, will be based upon the effect of delays to the project as a whole and will not be recommended for non controlling delays to minor portions of the work unless it can be shown that such delays were the direct cause of the delay in the progress of the project as a whole. Governmental regulations, priorities, labor disputes, strikes, fires, and required "Extra Work" may constitute such a delay; in addition, Federal government restrictions arising out of the National Defense or War Program and resulting in inability to obtain materials, equipment, or labor may constitute such a delay.

Change in plans and increases in the quantities of work to be performed will be considered cause for extension of time only when they are of such nature and when they occur at such times that they materially and necessarily affect the completion time of the project.

The liquidated damage amount shall not cover any damages or expenses the Owner may incur as a result of the Contractor's unexcused delay in completing any portion or all of the project, which delay results in whole or in part in delay, disruption, hindrance, interference, damages or expenses to any third party. The Contractor shall remain liable for the full amount of any such delay, damages or expenses suffered by any third party without limitation by any liquidated damage provision set forth in this Contract.

Delay caused by failure of the City or its representatives to act promptly in the carrying out of its obligations and duties under the Contract will be considered cause for extension of time only when and to such extent as such failure actually prevents completion of the work within the specified time.

Time extensions requested by the Contractor shall be made to the Engineer in writing within ten (10) days of the date on which the alleged delay is said to have occurred and any claim for extension of time shall state explicitly the reasons therefor.

Should the Contractor fail to file such written claim for extension of time within the period provided therefor, he thereby shall have abandoned any claim therefor.

In naming the prices for completion of the work within the time specified it shall be understood and agreed the work shall be completed within that time. If, however, said work is not completed within the time named in the Contract, as extended to cover the total days of delay allowed in the paragraphs above, the City may deduct and retain as liquidated damages out of any sum then due the Contractor at time of such delinquency, or later, the sum of $350/day unless otherwise specified in the Contract for each and every calendar day that the date of final completion of each Contract is delayed. In submitting a bid and signing the Contract, the Contractor thereby shall have agreed to these provisions and, furthermore, that the sum deducted and retained is not a penalty but a reimbursement to the City for damages which the city will have sustained by reason of such delayed completion. Damages so liquidated are understood to include the additional cost to the City for engineering supervision, interest charges, overhead, and other indirect costs.

The amount due the City from the Contractor under the foregoing provisions shall be deducted from any monies then due or to become due said Contractor under the Contract, and such deductions shall not in any degree release the Contractor from further obligations in respect to the fulfillment of the entire Contract, nor any right which the City may have to claim, sue for, and recover compensation and damages for nonperformance or breach of Contract.

Article 5.31 Termination of Contract by City

If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail to supply enough properly skilled workmen or proper materials for the efficient prosecution of the work, or if he should fail to make prompt payment to subcontractors for material or persistently disregard laws, ordinances, or the instruction of the Engineer, or otherwise be

guilty of a substantial violation of any provisions of the Contract, then the City, upon the certificate of the Engineer that, in his opinion, sufficient cause exists to justify such action, may without prejudice to any other right or remedy and after giving the Contractor and his surety ten (10) days concurrent written notice, terminate the services of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method it may deem expedient.

In the event such action is taken by the City, the Contractor shall not be entitled to receive any further payment until the work is completed. On completion of the work, determination shall be made by the Engineer of the total amount the Contractor would have been entitled to receive for the work under the terms of the Contract, had he himself completed the work. If the difference between said total amount and the sum of all amounts previously paid to the Contractor, which difference will hereinafter be called the "unpaid balance," exceeds the expense incurred by the City in completing the work, including expense for additional managerial and administrative services, such excess will be paid to the Contractor, with the consent of the Surety. If, instead, the expense incurred by the City exceeds the unpaid balance, the amount of the excess shall be paid to the City by the Contractor or his Surety.

The expense incurred by the City as herein provided, and the damage incurred through the Contractor's default, shall be as determined and certified by the Engineer.

In addition to and apart from the above mentioned rights of the City to terminate the Contractor, it is expressly understood that the Contract may be cancelled at the election of the City for any willful failure or refusal on the part of the Contractor to faithfully perform the Contract according to all of its terms and conditions; provided, however, that in the event the City should cancel the Contract, neither the Contractor nor his surety shall be relieved from damages or losses suffered by the City on account of the Contractor's said breach of Contract.

It is understood and agreed that the City may, at its discretion, avail itself of any or all of the above rights or remedies and that the involving of any one of the above rights or remedies will not prejudice or preclude the City from subsequently invoking any other right or remedy set forth above or elsewhere in the Contract.

In the case of termination of this Contract before completion from any cause whatsoever, the Contractor, if notified to do so by the City, shall promptly remove any part or all of his equipment and supplies from the property of the City. Failure to do so will authorize the City to remove such equipment and supplies from its property at the expense of the Contractor.

Article 5.32 Termination of Work for City's Convenience

At any time during the term of this contract, the City may terminate the work, in whole or in part, for any reason that the Engineer shall determine to be in the best interest of the City. Any such termination shall be effected by delivery of a Notice of Termination to the Contractor, specifying that the termination is for the convenience of the City; the

extent to which performance of the work under the Contract is terminated; and the date upon which such termination becomes effective.

After receipt of a Notice of Termination the Contractor shall:

1. Stop work under the contract on the date and to the extent specified in the Notice of Termination;

2. Place no further orders of subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the work under the contract as is not terminated;

3. Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

4. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, the cost of which would be reimbursable, in whole, or in part, in accordance with the provisions of the contract;

5. Submit to the Engineer a list, certified as to quantity and quality, of any or all items of termination inventory exclusive of items the disposition of which had been directed or authorized by the Engineer;

6. Transfer to the Engineer the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would be required to be furnished to the City.

7. Take such action as may be necessary, or as the Engineer may direct, for the protection and preservation of the property related to the contract which is in the possession of the Contractor and in which the City has or may acquire any interest.

The Contractor shall proceed immediately with the performance of the above obligations notwithstanding any delay in determining or adjusting the amount of any item of reimbursable cost under this clause.

When the City orders termination of work, effective on a certain date, all completed units of work within each pay item as of that date will be paid for at the contract unit price. Payment for materials included in the material inventory described in item 5 above will be paid at actual cost delivered to the project or storage site, including transportation charges. Allowable total markup on the actual cost shall be 15%.

After receipt of a Notice of Termination, the Contractor shall submit to the Engineer his claim for alleged additional damages or cost not covered above or elsewhere in these specifications as provided *in Section 10.05 Article 5.22 Claims for Damage or Extra Work.* In no event, however, will loss of anticipated profits be considered as part of any settlement.

Article 5.33 Use of Completed or Uncompleted Portions

The City shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding that the time for completing the entire work or such portions may not have expired, and such taking and use shall be deemed an acceptance of that work completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the completion of uncompleted work or causes refinishing of completed work, the Contractor may be entitled to extra compensation, or extension of time or both. Claims for additional compensation shall follow procedures set forth in *Article 5.22 Claims for Damage or Extra Work*. The City shall be responsible for routine maintenance or damages caused by its use of such portions of the Work.

Article 5.34 Contractor's Right to Stop Work or Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of three (3) months, through no act or fault of the Contractor or of anyone employed by him or if the City should fail to pay the Contractor within thirty (30) days of its presentation, any sum certified by the Engineer and approved by the City, then the Contractor may, upon seven (7) days written notice to the City and Engineer, stop work or terminate this Contract and recover from the City payment for all work executed and any loss sustained upon any plant or materials and reasonable profit and damages.

Article 5.35 Disposal Sites

Except as otherwise stated in the specifications, the Contractor shall make his own arrangements for and shall assume all costs in connection with disposal sites or areas. Any and all disposal sites or areas shall be in such locations and so maintained, that they shall be neither offensive nor become a menace to public health and welfare. Disposal sites must be approved by the City.

The Contractor shall obtain written permission from the property owner or owners for such disposal sites and furnish the Engineer with a copy of this agreement. The written permission shall specifically provide that the property owner will not hold the City of Homer, its employees, agents or consultants liable for use of or damage to this property. The Contractor shall be held liable for any trespass and property damage incurred outside of disposal area.

Prior to construction, the Contractor shall submit a description of his plan for disposing of unsuitable materials and waste resulting from the Work under this Contract. If any material is placed in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed areas.

Article 5.36 Load Restrictions

The Contractor shall comply with all legal road restrictions as set forth in "Alaska Oversize and Overwidth Permit Manual," current edition, and current revisions to Title 17, Chapter 25, of the Alaska Administrative code in the hauling of materials on public

roads beyond the limits of the project, and on all public roads within the project limits that are scheduled to remain in use upon completion of the project.

Any load restrictions applicable to roadway or structures within the project limits will be given in the special provisions. A special permit will not relieve the Contractor of liability for damage which may result from the moving of equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or the roadway or to any other type of construction will not be permitted. No loads will be permitted on a concrete pavement, base, or structure before the expiration on the curing period. In no case shall legal limits be exceeded unless permitted in writing. The contractor shall be responsible for all damage done by his equipment.

Article 5.37 Claims for Adjustments and Disputes

If the Contractor becomes aware of any act or occurrence which may form the basis of a claim, he shall immediately inform the Engineer. If the matter is not resolved within seven (7) days, the Contractor shall, within the next fourteen (14) days, submit written notice of the facts which may form the basis of the claim. In addition, the Contractor shall submit the claim in writing to the Engineer within sixty (60) days of the submission of the written notice of the facts unless the Engineer agrees in writing to an extension of time for good cause shown. Good cause shown shall include time for the Contractor to prepare his claim, and the Engineer shall grant an extension of not more than sixty (60) days for the preparation of the claim. The Contractor agrees that unless these written notices are provided, the Contractor will have no entitlement to additional time or compensation for any such act or occurrence. The Contractor shall, in all cases, continue diligent performance of the Contract.

In presenting the written claim, the Contractor shall specifically include the following:

a. The facts and circumstances surrounding the claim;

b. The Contract provisions under which the claim is made;

c. The bid items and quantities, if any, upon which the claim is based; and

d. The specific relief requested, including the additional compensation claimed and the basis upon which it was calculated or the additional time requested and the basis upon which it was calculated.

The Owner will render a decision on the claim within sixty (60) days of receipt of the full and complete written claim. Any change in the Contract sum resulting from such claim shall be authorized by Change Order.

This decision shall be final and conclusive unless it is fraudulent or unless the Contractor commences court action in the Court within the jurisdiction and venue provisions of the Contract within one hundred twenty (120) days from receipt thereof.

SECTION 10.06 LEGAL RELATIONS AND RESPONSIBILITIES

Article 6.1 Laws to be Observed

The Contract shall be governed by the laws of the State of Alaska. The Contractor at all times shall observe and comply with all federal, state and local laws, ordinances, and regulations in any manner affecting the conduct of the work, and all such orders or decrees as exist at present and those which may be enacted or promulgated by legislative bodies or tribunals having any jurisdiction or authority over the work, and shall indemnify and save harmless the City and the officers, employees and agents (including the Engineer) of the City against any claim or liability arising from or based on the violation of any such laws, ordinances, regulations, orders or decrees, whether such violations be by the Contractor, his Subcontractors or his employees.

Protection of Water Resources. The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acid or harmful materials, both on and off the premises, and shall comply with applicable federal, state, and municipal laws concerning pollution of waterways while performing work under this Contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, and sewage from entering established drainages.

Article 6.2 Permits

The Contractor will obtain all licenses necessary to perform the Work and will obtain all necessary permits except those that the Owner will obtain. The Owner will obtain all those permits which may be necessary for approval of the project including permits from the U.S. Corps of Engineers, U.S. Fish and Wildlife Service, State Department of Fish and Game, State Department of Environmental Conservation and the State Department of Transportation unless otherwise specified in the special provisions. All permits and licenses, either temporary or permanent, which are required by the Federal government, the State of Alaska, the City of Homer, or any other government unit, including public utilities, which are necessary for the prosecution of the work shall be obtained and shall be paid for by the Contractor except for water connect permit fees which shall be paid by the City. This requirement shall be binding upon the Contractor although the prosecution of the work may be in the hands of a Subcontractor. It shall be the Contractor's responsibility to secure all permits and licenses, either temporary or permanent, to give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as specified herein. The Contractor shall also be responsible for requesting all code compliance inspections.

For work to be performed within the State rights-of-way, a utility permit which authorizes the use of State rights-of-way for location of the utility, will be obtained by the City. Prior to award of the Contract, the apparent low bidder shall obtain from the applicable agency approval for the method, plans and schedule of construction for any work to be performed within the right-of-way.

Before starting the work, the Contractor shall apply for a construction permit which will outline specific methods and procedures. The permit will be issued to the Contractor by the applicable agency prior to the start of any work within the concerned rights-of-way. In all cases a valid construction permit must exist while the Contractor is working within rights-of-way of the State. Failure on the part of the Contractor to comply with any or all stipulations set forth in the construction permit shall be sufficient cause for the City to suspend the Contractor from working within the rights-of-way of the State.

Article 6.3 Patented Devices, Materials, and Processes

The Contractor assumes the responsibility of defending any and all suits or actions brought for the infringement of any patent claimed to be infringed by any material, device, plan, method or process to be incorporated in the work and/or required to be used in connection with the work to be done under the Contract, including all attorney's fees and court costs, and he shall indemnify and save harmless the City, the officers, employees, and agents (including the Engineer) of the City from all claims of and suits or actions for infringement of patents.

Article 6.4 Sanitary Provisions

The Contractor shall observe all rules and regulations of the State and local health officials, and shall take such precautions as are necessary to avoid creating conditions which are not sanitary. The Contractor shall provide and maintain in a neat and sanitary condition such accommodations for use of his employees as may be necessary to comply with the requirements of public health officials. He shall permit no public nuisance at any place over which he has control.

Article 6.5 Industrial Safety

a. Safety Precautions and Programs

The Contractor alone shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

1. The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury, or loss.

2. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

3. When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the work,

the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

4. The Contractor shall develop and maintain, for the duration of this Contract, a safety program that effectively incorporates and implements all required safety provisions.

5. The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent, unless otherwise designated by the Contractor, in writing, to the Owner and Engineer.

6. Acts of the Owner or Engineer in conducting construction review of the work is not intended to include any review or approval of the accuracy or performance of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

7. The Contractor shall not load or permit any part of the construction site to be loaded beyond its safe structural capacity.

b. Safety of Persons and Property

The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons (including its employees and the public) and property in connection with the performance of the Contract.

The 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 employees on the work and other persons who may be affected thereby;

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, and utilities not designated for removal, relocation, or replacement in the course of construction.

c. Financial Responsibility for Injury, Loss, or Damage

Damages resulting from personal injury (including death) or loss to any property caused directly or indirectly, in whole or in part, by the Contractor, any subcontractor, supplier, or any other person or organization directly or indirectly employed by any contractor, subcontractor, or supplier to perform or furnish any of the work, or anyone for whose acts any of them may be liable, shall be remedied by the Contractor with no change in the contract price or contract time, except such damage, injury, or loss attributable to

unforeseen causes beyond the control of and without the fault of or negligence of the Contractor, including but not restricted to acts of God, of the public enemy, or governmental authorities.

The Contractor's duties and responsibilities for the safety and protection of the work shall continue until final acceptance, except as otherwise expressly provided in connection with substantial completion. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under *Article 6.15 Responsibility for Damages.*

d. Emergencies

In emergencies affecting the safety or protection of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the City, is obligated to act to prevent threatened damage, injury, or loss. The Contractor shall give the Engineer prompt written notice if the Contractor believes that any significant changes in the work or variations from the contract documents have been caused thereby. If the City determines that a change in the contract documents is required because of the action taken in response to an emergency, a contract change will be authorized by one of the methods indicated in the Contract, as determined by the Engineer.

e. Notice and Reporting

If death, serious injury, or serious damage occurs on the job site, such incident shall be reported immediately by the telephone or messenger to both the Engineer and the Owner. The Contractor shall thereafter submit a written report to the Engineer and Owner within three days of the occurrence. The Contractor also shall promptly report, in writing, to the Engineer all accidents whatsoever arising out of or in connection with the performance of the work, whether on or adjacent to the site, giving full details and statements of witnesses. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident or incident, the Contractor shall promptly report the facts, in writing, to the Engineer, giving full details of the claim.

Article 6.6 Public Safety

The Contractor shall conduct the work in a manner that minimizes the inconvenience to traffic on intersections and connecting streets and to persons conducting commercial enterprises or residing along the route of the work.

Entrances to residences, garages, service stations, business places, and driveways of all kinds shall not be blocked. Temporary bridges, ramps or culverts shall be provided and maintained at entrances to properties where vehicular traffic is necessary and shall be adequate in width and strength for the service required. Satisfactory means of ingress and egress for persons residing or having occasion to transact business along the route of the work shall be maintained at all times. All work involved in providing for construction, maintenance, and use of private roads or driveways, etc., shall not be paid for directly but shall be considered a subsidiary obligation of the Contractor covered under other Contract items. Proper notification and arrangements thereof for interruption

of such access shall be the responsibility of the Contractor. All culverts, private or otherwise, which are disturbed will be replaced or repaired at the expense of the Contractor.

Article 6.7 Traffic

It will be the Contractor's responsibility to maintain all detour routes, haul routes, and streets under construction. This includes grading, dust control and minor drainage work necessary to keep the streets or roads in good condition throughout the construction period. Detour routes and haul routes must be approved by the Engineer in advance and shall be left in a condition at least equal to their condition immediately prior to being opened by the Contractor.

The Contractor shall, at his own expense and without further orders, provide, erect, and maintain barricades, fences, signs, flagmen, flags, torches and lights as may be necessary or as may be ordered by the Engineer to insure the safety of the public as well as those engaged in connection with the work. All regulatory signs, warning signs, guide signs, barricades, direction arrows, and route markers will conform to the provision of Section 5 of the "Manual of Uniform Traffic Control Devices" (published by U.S. Government Printing Office). Traffic control devices must be set up prior to the start of construction or maintenance operations and shall be properly maintained during the time such special conditions exist. When no longer required, they shall be removed. Where operations are performed in stages, only these devices which pertain to the stage in progress shall be visible. When traffic control devices do not apply, they shall be covered or out of the view of traffic. All traffic control devices shall be kept in proper position, clean, and legible at all times. All barricades and sign supports shall be neatly constructed and shall not appear makeshift or hastily thrown together. They shall be repaired, cleaned or repainted as needed to keep up their appearance. Oil burning torches shall not be placed so close to signs or barricades as to scorch them or deposit soot on them.

Special care shall be taken to see that weeds, shrubbery, construction material or equipment, and spills are not allowed to obscure any sign, light or barricade. All barricades and signs will be illuminated one-half hour before sunset to one-half hour after sunrise.

It shall be the Contractor's responsibility to maintain all barricades, flags, torches or lights throughout the night hours, weekends, holidays, or other periods of inactivity and to check these warning devices at least once every eight (8) hours to assure that they are in the proper position and are operating properly.

The Contractor shall also inform the Engineer, in writing, of the name(s) and phone number(s) of the person(s) who is (are) personally responsible for the maintenance of the warning devices. In the event of an emergency when this (these) person(s) cannot be reached, the City reserves the right to take appropriate precautions. If it becomes necessary to exercise this right by having the City's forces, or others, erect the necessary barricades, torches or lights, the Contractor shall be charged a minimum of $100 for each such trip to the job site. Such charge will be deducted from any payment due the Contractor. Charges in excess of $100 shall be determined by the amount of equipment

and men necessary for the work to be done. Action by the City to erect barricades, signs or lights does not relieve the Contractor of his indemnification obligation set forth in safety responsibilities set forth in *Articles 6.5 and 6.15.*

Streets will be closed only as approved by the Engineer. The Contractor shall so conduct his operations as to offer the least possible inconvenience to the public, and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the people. Local traffic shall be provided access to private properties at all times unless otherwise approved by the Engineer. Emergency traffic such as police, fire, and disaster units shall be provided reasonable access at all times. No two adjacent parallel streets may be closed to emergency traffic at one time. The Contractor shall give the Engineer forty-eight (48) hour advance notice (excluding Saturdays, Sundays, and holidays) before closing any street or performing major work on these streets. It will be the Contractor's responsibility to notify the Engineer daily of any change in plans to close or open any street or alley regardless of the length of time the street or alley is to be closed or opened.

Special pedestrian detours are often necessary in areas adjacent to new construction or demolition of existing structures. The Engineer shall determine when walkways are required. Plans for walkways must be approved by the Engineer.

Since it is not practical or possible to prescribe detailed standards of application for the many diverse maintenance and construction activities that might conceivably arise, modifications of the traffic control requirements and sign size may be required to fit special circumstances.

Article 6.8 Barricades, Warning Signs, and Flagmen

The Contractor shall at his expense and without further or other orders provide, erect and maintain at all times during the progress or temporary suspension of the work suitable barricades, fences, signs, or other adequate warnings or protection, and shall provide, keep and maintain such danger lights, signals, and flagmen as may be necessary or as may be ordered by the Engineer to insure the safety of the public as well as those engaged in connection with the work. All barricades and obstructions shall be protected at night by signal lights which shall be suitably distributed and illuminated from sunset to sunrise. Barricades shall be of substantial construction and shall be suitably painted to increase their visibility at night.

If flagmen are necessary for the purpose of protection and safety to traffic, such flagmen shall be furnished at the Contractor's expense. The signs to be furnished and used by the Contractor in directing, controlling and safeguarding traffic shall conform with the standard sign designs specified in the Manual of Uniform Traffic Control Devices, 2003 edition or subsequent editions.

The Contractor's responsibility for the safeguarding of traffic as specified above shall cease when the work included in the Contract is accepted as complete.

Article 6.9 Drainage

The Contractor shall provide and maintain all water courses, gutters and drains which are interrupted by his work and shall replace all in as good condition as he found them.

Article 6.10 Air and Water Pollution Laws

The attention of the Contractor is called to statutes of the State and City relating to the pollution of water and air. The Contractor shall carry out his operations in conformity with the applicable sections of State and City statutes and all regulations which are adopted pursuant thereto.

Article 6.11 Safeguarding of Excavations

The Contractor shall provide such safeguards and protections around and in the vicinity of the excavations he makes as may be necessary to prevent and avoid the occurrence of damage, loss, injury and death to property and persons because of such excavations. Liability for any such damage, loss, injury or death shall cease when all work done under the Contract is completed and accepted by the City, except as otherwise noted.

Article 6.12 Use of Explosives

Unless provided for in the Special Provisions, the use of explosives will not be permitted.

Article 6.13 Utilities

a. Plans:

Locations of utilities shown on the drawings are not exact. The Owner shall not be held liable for damages to utilities incurred during construction due to deficiencies or omissions of the Drawings or these provisions. At least 48 hours prior to commencing work, the Contractor shall contact all local utility companies to obtain underground locates and shall protect the utilities:

The Contractor shall notify the utility companies of any damage and shall have repaired, at his own expense, any damage to underground utilities and structures where such damage is due to the failure of the Contractor to properly inform himself beforehand of the probable existence and location of underground utilities, or where such damage is due to the failure of the Contractor to exert due care and caution in his construction operations.

b. Protecting Utilities:

Whenever the construction is within the area of other public utilities (water, sewer, electrical, communications, or gas, overhead or underground) and the utility has to be temporarily raised, lowered, guyed, shored or braced or otherwise protected during construction, it shall be done at the expense of the Contractor and shall be included in the contractor's Bid price for that item of work in place. If construction endangers support of

communication or power poles, the agency having jurisdiction shall be notified and the poles shall be adequately protected to the satisfaction of the agency at the expense of the Contractor, before construction is started.

c. Changing Location of Utilities

It is the intent of the plans that no utilities will be moved to facilitate construction of the improvements provided for in this Contract, except as otherwise noted on the plans or in the specifications.

The Engineer shall not determine that an existing utility must be moved unless it cannot be guyed, shored, braced or by-passed by ordinary construction procedures. However, if it will be moved by the utility company having jurisdiction over the utility, it will be done at no charge to the Contractor. The Contractor shall be solely responsible for coordinating his work schedule with any relocation work of the utility company. If the work of the Contractor is delayed because of any delays, acts or omissions caused by the utility company in its relocation work, the Contractor shall have no claim against the City for that reason, other than for an extension of time equal to that of the delay in which to complete the Contract.

d. Exposed Utilities

Whenever a line of communication or electrical underground cable conduit, conduit bank, or gas line is to be exposed and the exact location and depth is not known, the utility company shall be notified and excavation by the Contractor shall not be started until a representative of the utility company is present to aid the Contractor in the location of the utility. Wherever a utility is exposed, it shall be backfilled with original material unless otherwise specified by the Engineer. All utilities, cable ducts, pipes or poles encountered must be adequately supported to prevent breakage or fatigue.

e. Utility Locate Requirement:

Upon receipt of written notification from any of the public agencies listed in this paragraph that the Contractor has caused damage to any facility, equipment or installation of that agency and that the Contractor failed to request a locate service at least two (2) normal business days prior to the damage, or if the locate service was properly requested, that the damage was not proximately caused by an error in the locate service, the City of Homer will withhold from forthcoming Contract payments, including advances, an amount sufficient to cover the damage. The term "normal business day" means the hours between 8:00 a.m. and 5:00 p.m., Monday through Friday. The amount sufficient to cover the damage shall be designated by the agency providing notification of damage and may include the total cost of repair, including overhead, and three hundred dollars ($300.00) to cover legal expenses.

Article 6.14 Utilities – Connections

Whenever the plans and specifications require connections to be made to City or privately owned utility lines or services, the Contractor shall, unless otherwise specified

in the special provisions, be responsible for making the connection to the utility line, or have the utility company make the connection, at the point(s) indicated on the drawings. The Contractor shall be responsible for making all necessary applications to the utility company, for paying all fees and for performing any work associated with making the connections which is not performed by the utility company. The Contractor is not responsible for bringing utility lines to the point of connection. The Contractor shall pay all costs for utility service prior to the Date of Substantial Completion.

Article 6.15 Responsibility for Damages

The Contractor shall be responsible for all damages to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or that may result from, any act, omission, or neglect of the Contractor, his Subcontractors, or his employees in the performance of the work to be done under this Contract.

The Contractor shall indemnify and save harmless the City, its officers and employees, from all suits, actions, or claims of any kind brought because of any injuries or damages received or sustained by any person, persons or property on account of the operations of the said Contractor; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in constructing the work; or because of any claims or amounts recovered from any infringements of patent, trademark or copyright; or from any claims or amounts arising or recovered under the "Workman's Compensation Act," or any other law, ordinance, order, or decree; and so much of the money due the said Contractor under and by virtue of his Contract as may be considered necessary by the City for such purpose, may be retained for the use of the State; or, in case no money is due, his surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the City.

It is specifically agreed between the parties executing this Contract that it is not intended by any of the provisions of any part of the Contract to make the public, or any member thereof, a third party beneficiary hereunder, or to authorize anyone not a party to this Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this Contract.

Article 6.16 Restoration of Damaged Property

All damage and injury to property that may be caused or that may result from the carrying out of the work to be done under the Contract, or from any act, omission or neglect of the Contractor, his Subcontractor, or his employees, shall promptly be made good by the Contractor either by the repairing, rebuilding, or replacing of the property damaged, or in some other manner satisfactory to the City of such property. In case of failure on the part of the Contractor to promptly and satisfactorily make good such damage or injury, the City may, without notice to the Contractor, proceed to repair, rebuild, or replace such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under the Contract.

In applying the provisions stated above, the repairing, rebuilding or replacing of damaged property shall be understood to include the providing of any temporary facilities that may be needed to maintain normal service until the required repairing, rebuilding or replacing is accomplished.

Article 6.17 Contractor's Responsibility for Work

Until final acceptance of the Contract, the Contractor shall be held responsible for any injury or damage to the work or to any part thereof by the action of the elements, and he shall make good at his own expense all injuries or damages to any portion of the work before its completion and final acceptance.

Article 6.18 Insurance

a. General:

Before the execution of the Contract, the Contractor shall obtain all insurance required under this section; nor shall he allow any Subcontractor to commence work until the Subcontractor also has obtained similar insurance applicable to his work. The Contractor shall maintain insurance throughout the life of this Contract including the guarantee and maintenance period.

Proof of the required insurance shall be provided to the City in the form of a Certificate of Insurance, showing the type and the amounts of insurance, the policy number, expiration date and signed by an authorized representative of the insurance company. Each Certificate of Insurance shall state that the policy or policies have been endorsed whereby the insurance company will provide not less than thirty (30) days written notice to the City of any material change, cancellation, or non-renewal of the insurance policies. All insurance policies required under this Article shall name the City as an additional insured for the purposes of the Project and shall contain a waiver of subrogation against the City.

The Contractor, its principals, partners, employees, agents, representatives, heirs or assigns, hereby agrees to protect, defend, save harmless and indemnify the City, its officials, employees and authorized representatives or its successors against any loss, cost, damage, suits, expense, judgment or liability of any kind whatsoever from or by reason or on account of, as a result of work or activities or any nature whatsoever arising directly or indirectly under this Contract including any claims for injury to person or property or death to the parties or to employees of the Contractor or its principals or of the City.

The Contractor shall purchase and maintain appropriate insurance for maritime employees subject to Federal jurisdiction including both the United States Longshoremen and Harbor Workers Compensation Act and Federal Maritime Employers Liability Law (Jones Act).

b. The Contractor shall provide the following types of insurance:

1. Worker's Compensation	Minimum Limits
Employer's Liability and Workers' Compensation as required by Alaska State Workers' Compensation Statutes.	Statutory

U.S. Longshoremen & Harbor Workers' (USL&H) if required.

2. Comprehensive General Liability	Minimum Limits
Single Limit	$1,000,000
Aggregate	$2,000,000

- Bodily Injury & Property Damage Liability
- Premises Operations
- Blanket Contractual
- Broad Form Property Damage
- Personal Injury
- Independent Contractors
- Collapse and Underground
- Professional Errors and Omissions if required in Instruction to Bidders

3. Comprehensive Automobile Liability	Minimum Limits
Bodily Injury and Property Damage, including All owned, hired and non-owned vehicles	$1,000,000

c. Builder's Risk:

Builder's Risk Insurance may be required as specified in the special provisions.

Article 6.19 Payment of Bills by Contractors

The Contractor shall promptly make full payment for labor, material supplies and provisions, at such times as they become due and payable, to all persons supplying said Contractor or his Subcontractor with labor, services, materials, supplies or provisions for the prosecution of the work provided for in the Contract, and he shall not permit any lien or claim to be filed or prosecuted against the City for or on account of any labor, services, material, supplies or provisions furnished.

In the event that said Contractor fails, neglects, or refuses to make prompt and full payment of any claim for labor, services, materials, supplies or provisions furnished by any person in connection with the Contract as said claim becomes due, whether said labor, services, materials, supplies or provisions to be performed or furnished for said Contractor or for his Subcontractor, then, and in such event, the City may withhold the amount of such claim by the person or persons furnishing such labor, services, materials,

supplies, or provisions and deduct the amount thereof from funds, due or to become due said Contractor by the City as provided herein. The deduction for any such amounts because of claims in the manner herein authorized will not, however, relieve the Contractor or his surety from his or its obligations with respect to any unpaid claims. Sums withheld for the purpose named herein will be paid to the Contractor upon certifications that said claims have been paid. The City may, at its sole election and without liability to the Contractor or any third party, deposit any sums withheld pursuant to this Article 6.19 with the Clerk or Court for the Third Judicial District for resolution of the Contractor and his Subcontractor's competing claim to said sums. In no case shall the City make payment on any claim directly to the Subcontractor or supplier.

Article 6.20 Suits of Law Concerning the Work

Should a suit of law be entered into either by the Contractor or his Surety against the City or by the City against the Contractor or his Surety, the suit of law shall be tried in the judicial district of the state in which the work was or is to be performed.

If one of the questions at issue is the satisfactory performance of the work by the Contractor and should the appropriate court of law judge the work of the contractor to be unsatisfactory, the Contractor or his Surety shall reimburse the City for all legal and all other expenses (as may be allowed and set by the court) incurred by the City because of the suit of law and, further, it is agreed that the City may deduct such expense from any sum or sums then or that may become due the Contractor under the Contract.

If any clause or condition of the Contract is held as a matter of law to be unenforceable or unconscionable, the remainder of the Contract shall be enforceable without such clause.

Article 6.21 State of Alaska Prevailing Wage Scale

The Contractor shall comply with the provisions of Title 36, Chapter 05 of the Alaska Statutes requiring the Contractor to pay not less than the current prevailing rate of wages.

The Contractor and his Subcontractors shall pay all employees unconditionally and not less than once a week. Wages may not be less than those stated in the advertised specifications regardless of the contractual relationship between the Contractor or Subcontractors and laborers, mechanics, or field surveyors. The scale of wages to be paid shall be posted by the Contractor in a prominent and easily accessible place at the site of the work. The City may withhold so much of the accrued payments as determined by the State of Alaska Department of Labor, necessary to pay laborers, mechanics, or field surveyors employed by the Contractor or Subcontractor the difference between **(a)** the rates of wages required by the Contract to be paid laborers, mechanics, or field surveyors in the work, and **(b)** the rates of wages in fact paid to laborers, mechanics, or field surveyors when less than the wages required by the Contract.

If it is found that a laborer, mechanic, or field surveyor employed by the Contractor or Subcontractor has been or is being paid a rate of wages less than the rate of wages required by the Contract to be paid, the State or its Political Subdivision may, by written notice to the Contractor, terminate his right to proceed with the work or the part of the

work for which there is a failure to pay the required wages and to prosecute the work to completion by Contract or otherwise, and the Contractor and his sureties are liable for excess costs for completing the work.

Article 6.22 Equal Employment Opportunity

The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, age, marital status, or who is a "qualified individual with a disability" (as that phrase is defined in the Americans with Disabilities Act of 1990). The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, national origin, ancestry, age, sex, marital status, or mental or physical impairment/disability. Such action shall include without limitation: employment, upgrading, demotion, or transfer, recruitment or recruiting advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provision of this nondiscrimination clause.

SECTION 10.07 MEASUREMENT AND PAYMENT

Article 7.1 Method of Measurement and Computation

All work completed under the Contract shall be measured by the Engineer according to United States standard measures. The methods of measurement and computation to be used in the determination of the quantities of materials furnished and the quantities of work performed under the Contract shall be the methods outlined in these specifications or by those methods generally recognized as good engineering practice, which, in the opinion of the Engineer, give the greatest accuracy consistent with practicable application.

When any vehicle delivers to the project classified fill or backfill of any kind, bedding material, leveling course, or pavement materials, the driver of the vehicle shall give to the Inspector a legible "original" weight ticket with the following information:

1. Vehicle identification number.

2. Tare weight of the vehicle(s)

3. Gross weight of the loaded vehicle(s) as registered on the scale.

4. Sequential ticket number, date, pay item in words, and project location.

5. Pit location and name of scale operator

The Owner will not pay for that portion of the load in excess of the legal gross weight.

Vehicle(s) shall be tared a minimum of once daily by the scale operator. The Engineer may request additional tares to be done at any time the scale is operational. The Engineer may also require that he be present when tares are done.

If, at the material source, the Contractor does not have a computer-generated or machine printed weight ticket system, the Contractor shall furnish competent scale operators to weigh all materials measured and paid for on a weight basis. The scale operator(s) shall operate the scale (s) and keep records as directed by the Engineer, including the information as listed in the above five items. No direct payment will be made for furnishing scale operator(s), equipment, and expendables required, the costs thereof being considered an incidental Contractor obligation. The accuracy of all scales, both private and commercial, is the responsibility of the Contractor. The Contractor shall maintain scales according to the specifications, tolerances and regulations for commercial weighing and measuring devices contained in the National Bureau of Standards, Handbook 44, as adopted by Alaska Statute, Section 45.75.50 (d).

Article 7.2 Scope of Payment

The Contractor shall accept the compensation as herein provided as full payment for the Work. The Contractor shall do all things necessary to perform and to complete the Work according to the Contract Documents, including but not limited to furnishing all labor, tools, implements, machinery, supplies, materials, water, heat, utilities, transportation, and permits necessary to perform the Work. The Contractor shall be responsible for all loss, damage, or liability arising from the nature of the Work or from the action of the elements or from any unforeseen difficulties which may be encountered. Work paid for under one item will not be paid for under another item.

The contract price shall constitute full compensation for furnishing all plant, labor, equipment and materials, and performing all operations required to complete the Work as specified and shown on the drawings or otherwise directed. Notwithstanding the omission or mention of any incident or incidental work, the contract price and payment shall also constitute full compensation for all work incident or incidental to completion of the items, unless such work is otherwise specifically mentioned for separate payment under another bid item. In the event any work is required by the specifications or by the bidding schedule, and is not directly incident or incidental to the completion of any such items, the contract price or prices for all enumerated items shall also constitute full compensation of such work.

In this section, the terms "construct, install, erect, place, and prepare", shall be construed to mean that the bid item(s) is/are complete, in place, and approved by the Engineer.

Article 7.3 Quantities and Unit Price

a. Lump Sum

The Contractor shall include in the Contract sum all allowances named in the Contract Documents for items (or for the entire work) which are to be paid under a lump sum price and shall cause the work so covered to be done for such sums. Should the Engineer direct that additional work be required or work deleted under a lump sum price item, the Contract sum will be adjusted therewith by negotiation. No demand for expense or profit other than those included in the lump sum price will be allowed.

b. Unit Prices

The total amount to be paid under the Contract for items for which unit prices are named will be calculated on the basis of the unit prices named in the Bid for the quantities of work actually incorporated into the finished project.

Article 7.4 Payment for Force Account (Extra) Work

When extra work is ordered by the Engineer to be done on a force account basis by the Contractor, such work will be paid for on the basis of actual cost to the Contractor plus an allowance of twenty-five percent (25%) of actual cost for overhead and profit thereof, except for rental on equipment from others, authorized by the Engineer to be used on the

work in which case the allowance will be ten percent (10%.) On subcontract work the allowance to the Contractor for profit, superintendence, and general expense shall be ten percent (10%) of the Subcontractor's bill for such work performed. The percentage allowance to be made to the Contractor (or Subcontractor) will be made on all of the items as follows:

Actual cost for labor used in the work will be made at the rates actually paid plus direct overhead on labor such as but not limited to welfare or fringe benefit payments, social security, accounting, insurance, etc., to the laborers and foremen by the Contractor or Subcontractor unless these rates are in excess of the current local prevailing wage rates, in which event, payment will be made at the local prevailing wage rate. The time allowed will be the number of hours worked directly on force account operation.

Actual cost for purchased materials, equipment, and supplies used on force account work will be made at the prices billed to the Contractor or Subcontractor by the supplier, less all discounts. The Contractor or his Subcontractor shall take advantage of all possible discounts on bills for materials and supplies, and such discounts may be subtracted from the total amounts of bills regardless of any failure of the Contractor or Subcontractor to take advantage of same. Freight and express on materials and supplies will be considered to be a part of the cost and will be paid for as materials and supplies.

Materials and supplies produced by the Contractor or Subcontractor will be paid for at prices to be agreed upon between the Contractor and the Engineer, which prices will be no greater than the prices at which the materials and supplies can be obtained elsewhere.

Where the use of rental equipment is authorized by the Engineer, rental on such equipment used will be based on the rates actually paid by the Contractor or Subcontractor unless these rates are in excess of the current local rates, or unless the equipment is owned by the Contractor or Subcontractor, in either of which events payments will be made at the rates to be agreed upon between the Contractor and the Engineer prior to beginning work, which rates will in no case be greater than the current local rates.

For equipment rented on a daily or hourly basis, rental will be allowed for only those days or hours during which the equipment is in actual use. For equipment rented on a monthly basis, straight time rental will be allowed from the day the equipment is first used on the particular piece of force account work until and including the last day on which it is used on the particular work, provided the equipment is not used on other work during the period, and provided further that the equipment is not idle for a continuous period of more than six (6) days. No rental will be allowed for any parts of idle periods of lengths greater than six days or for any time during which the equipment is used on other work.

The rental allowed for equipment will in all cases be understood to cover all fuel, supplies, repairs, and renewals and no further allowance will be made for those items unless specific agreement to that effect is made in writing before the work is commenced. Individual pieces of equipment having a value of five hundred dollars ($500) or less will be considered to be tools or small equipment, and no rental will be allowed on such.

The percentage allowances made to the Contractor in accordance with the terms outlined above will be understood to be reimbursement and compensation for all superintendence, use of tools and small equipment, overhead expenses, bond cost, insurance premiums, profits, indirect costs and losses of all kinds, and all other items of cost not specifically designated herein as items involved are furnished or incurred by the Contractor or by the Subcontractor. No other reimbursement, compensation or payment will be made for any such services, costs or other items.

Should any percentage allowance or other corresponding allowance be made by the Contractor to a Subcontractor (other than specified herein), in connection with force account work, such allowance shall be at the sole expense of the Contractor and the Contractor will not be reimbursed or otherwise compensated for the same by the City.

Only efficient and competent laborers and foremen shall be employed on force account work, and only tools and equipment in good condition and suitable for the work shall be used. The Engineer shall have authority to dismiss from force account work any laborer or foreman whose efficiency is, in his opinion, below that of the average of the Contractor's forces, and to refuse to allow the use of tools and equipment which, in his opinion, are not suitable for the work. Laborers and foremen dismissed and/or tools and equipment rejected shall be replaced by the Contractor to the satisfaction of the Engineer.

Article 7.5 Force Account Bills

Bills for force account work must show in payroll form the dates, names, hours worked each day, rates of pay, and amounts paid to each individual employed on such work, and must give in detail the nature of the work done by each. The equipment used, hours of operation and agreed rates must also be shown. Bills for materials must be fully itemized, showing dates of delivery, quantities, unit prices, amounts, and discounts, and must be accompanied by receipted invoices covering every item.

All bills for payment on force account work must be submitted in triplicate, must state the number of the Contract under which the work was performed, and must be approved by the Engineer. Failure to present an estimate within thirty (30) days after the close of the month in which the work covered was performed shall constitute a waiver on the part of the Contractor of his right to present such bill thereafter or to receive payment therefor.

Article 7.6 Progress Payments

During the progress of the work the Contractor may request progress payments for work done during the preceding calendar month. Such request must be accompanied by an updated progress schedule if requested by the Engineer. Progress payments may include reimbursement for materials stored at an approved site provided proof of payment by the Contractor is given.

No later than the tenth (10^{th}) day of each month the Contractor shall furnish such data necessary for the engineer to make an estimate of the amount of work completed and of the value of such completed work including an estimate of the amount and value of

acceptable material to be incorporated in the completed work which has been delivered and properly stored at or near the site or at an acceptable location to the Engineer. With these estimates as a base, a partial payment shall be equal to the value of completed work as computed from the Engineer's estimate, plus the value of acceptable materials which are in a condition or state of fabrication ready to be incorporated in the completed structure and which are held in storage on or near the work, the value of such materials computed in accordance with these specifications, less such amounts as may be deductible or as may be owing and due the City for any cause, and less an amount to be retained in protection of the City's interests. The Contractor shall furnish prior to the submission of his first progress payment estimate, a breakdown on his lump sum Bid item or items which will be reviewed by the City as to propriety of distribution of the total cost to the various accounts.

Payments to the Contractor will be made no later than twenty-one (21) working days following submission of a properly completed pay request to the Engineer.

The estimates upon which partial payments are based are not represented to be accurate estimates, and all quantities shown therein are subject to correction in the final estimate. If the Contractor uses such estimates as a basis for making payment to Subcontractors, he does so at his own risk, and he shall bear all loss that may result.

The making of partial payments under the Contract, either before or after the date set for completion of the work, shall not operate to invalidate any of the provisions of the Contract or to release the surety.

At the time payment is made for any materials which have been stored at or near the site, the Ownership of such materials shall be vested in the City, and they shall remain in storage until used on the work. Such materials shall not be used on other work.

Until such time as the work is accepted by the City, retainage shall be withheld in accordance with the following schedule:

Contract Completion Percentage	**Retainage Percentage**
0 to 75%	**10%**
76 to 95%	**5% ***
over 95%	**5% ***

*****May be reduced to these percentages depending upon satisfactory performance and adherence to the Contractor's progress schedule, clean-up, Contract completion cost and other factors, in the judgement of the Engineer.

The City shall pay Contractors interest on retainage in accordance with the special provisions.

The Engineer may withhold or, on account of subsequently discovered evidence, nullify the whole or any part of any payment certificate to such extent as may be deemed necessary to protect the City from loss on account of:

a. Defective work not remedied.

b. Claims as provided herein.

c. Failure of the Contractor to make payments properly to Subcontractors or for material or labor.

d. A reasonable doubt in the opinion of the Engineer that the Contract can be completed for the balance then unpaid.

e. Damage to another Contractor or Subcontractor.

f. Unsatisfactory prosecution of the work by Contractor.

g. Errors in partial payment requests.

h. Bankruptcy, receivership or insolvency of, or the pendency of such proceedings against the Contractor.

i. Costs of the City for engineering or other work as provided in the Contract Documents to be reimbursed to the City by the Contractor.

j. Failure of the Contractor to complete any part of the construction in accordance with the Construction Schedule.

Article 7.7 Advances on Materials

For materials delivered and held in storage upon the work site (or near the site of the work if approved by the Engineer), allowances will be made in the partial payments to the Contractor. These allowances shall be in amounts not exceeding one hundred percent (100%) of the net cost to the Contractor of the material f.o.b. the work site and from such allowances there shall be retained the percentages regularly provided for in connection with partial payments.

At the option of the Engineer, no allowances for materials shall be made on any partial estimate unless the total allowable value for all materials on hand is at least one thousand dollars ($1,000) and no allowance shall be made upon any single class of material the value of which is not at least five hundred dollars ($500). The inventory of materials for which advances are requested shall be kept to a reasonable size as approved by the Engineer. No allowance shall be made upon fuels, supplies, forms, lumber, falsework, or other materials, or on temporary structures of any kind, which will not become an integral part of the finished construction.

As a basis for determining the amount of advances on material, the Contractor shall make invoices available to the Engineer, together with evidence of payments, insurance, freight bills, and other information concerning the materials in question, as the Engineer may request. Should there be reasonable evidence, in the opinion of the Engineer, that the Contractor is not making prompt payments for material on hand, allowances for material on hand will be omitted from partial payment.

Article 7.8 Allowance for Materials Left on Hand

Materials not required by the unit or lump sum prices named in the proposal but delivered to the work at the order of the Engineer but left unused due to changes in plans, will, if the materials are not practicably returnable for credit, be purchased from the Contractor by the City at an actual cost (without percentage allowance or profit), and shall thereupon become the property of the City.

Article 7.9 Final Estimate and Payment

Upon completion of the work, final inspection, and issuance of a Certificate of Completion by the City, the Engineer will accept request for the Final Payment in accordance with the schedule outlined in *Article 7.6 Progress Payments.*

Final payment shall not be made until the Certificate of Compliance has been received as per *Section 10.08, Certificate of Compliance*, and an approved copy of the Departments of Labor's Notice of Completion has been submitted to the City.

Final payment shall be subject to the conditions of the Performance and Payment Bond, legal and contractual rights of the City, required warranties, and correction of faulty construction after final payment. The City shall have the right to retain from any payment then due the Contractor, so long as any bills or claims remain unsettled and outstanding, a sum sufficient, in the opinion of the City, to provide for the payment of the same. It is also understood and agreed that, in case of any breach by the Contractor of the provisions hereof, the City may retain from any payment or payments, which may become due hereunder, a sum sufficient, in the opinion of the City, to compensate for all damages occasioned by such breach, including in such damages any damages arising out of delay on the part of the Contractor.

Article 7.10 Suspension of Payments

No partial or final payment shall be made as long as any order made by the Engineer to the Contractor in accordance with the specifications remains in noncompliance.

Article 7.11 Correction of Work After Final Payment

Neither the final Certificate of Completion nor final payment nor progress payment shall relieve the Contractor from responsibility for paying all costs resulting from faulty materials or workmanship supplied under this Contract, and unless otherwise specified, he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which appear within a period of one year from the date of final acceptance. The City shall give notice of observed defects with reasonable promptness. The Contractor shall initiate corrective action within five (5) days after written notification from the City. The Contractor's Surety will be notified of any existing defects not corrected within the above specified time.

Article 7.12 Payments

Payments under the Contract shall be paid in cash by the City unless otherwise provided by the Special Provisions of these specifications.

SECTION 10.08 CERTIFICATE OF COMPLIANCE

No final payment shall be made until the Contractor shall file with the Engineer, prior to acceptance of the work, a **notarized** Certificate of Compliance in the form substantially as follows: "I (we) hereby certify that all work has been performed and materials supplied in accordance with the plans, specifications and Contract Documents for the above work, and that:

Not less than the prevailing rates of wages, as required by the Alaska State Statute, have been paid to laborers, workmen, mechanics, or others employed on this work;

There have been no unauthorized substitutions of Subcontractors; nor have any subcontracts been entered into without the names of the Subcontractors having been submitted to the Engineer prior to the start of such subcontractor work;

No Subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Engineer together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associations and/or others have been paid."

Attached to this Certificate of Compliance is an approved Department of Labor Notice of Completion Form for this project.

CITY OF HOMER

STANDARD CONSTRUCTION SPECIFICATIONS

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GENERAL DIVISION 100

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SECTION 101 MOBILIZATION AND DEMOBILIZATION

101.1 General

This item shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to and from the project site; and for all other work and operations which must be performed, or costs incurred, prior to beginning work on the various items on the project. Also included in this item is all work necessary to remove labor, materials, and equipment from the project site and to clean up all project work areas.

101.2 Method of Measurement

a. When five percent (5%) of the original contract amount is earned from other bid items, fifty percent (50%) of the amount of mobilization and demobilization, or five percent (5%) of the original contract amount, whichever is lesser, will be paid.

b. When ten percent (10%) of the original contract amount is earned from other bid items, one hundred percent (100%) of the amount of mobilization and demobilization, or ten percent (10%) of the original contract amount, whichever is lesser, will be paid.

101.3 Basis of Payment

Mobilization and demobilization will be paid at the contract lump sum bid. No adjustments shall be made in the contract price for mobilization and demobilization due to over-runs or under-runs in pay item quantities.

Payment will be made under:

Item	Description	Unit
101	Mobilization and Demobilization	Lump Sum

SECTION 102 CONSTRUCTION SURVEYING BY THE CONTRACTOR

102.1 General

This item of work shall be performed in accordance with *Section 10.05, Article 5.9 of the General Provisions.*

102.2 Monumentation

The Contractor shall install a permanent metal marker having magnetic properties at all intersections, center of cul-de-sacs, and PIs where intervisible. If the PIs are not intervisible, the PCs and PTs shall be monumented. In paved roads the monuments shall be a minimum of ½" x 6" set flush to the paving. In gravel roads the monuments shall be a minimum of ½" x 30" with a 2-1/2" minimum diameter metal cap showing the year set, registration number of the surveyor and the monument identification. In accordance with AS 34.65.03, a Record of Survey shall be filed for all monuments established and shall show the Homer Grid Coordinates for at least two monuments on the survey.

Prior to the establishment of construction stakes, a monument search shall be conducted and a record made in the survey control field book stating which monuments were found and which ones were not found. Record plats within the construction limits should be obtained by the Contractor to assist in monument recovery. If a record of monument recovery does not exist to verify that a search was conducted for all monumentation, then the Contractor will be held responsible to satisfy all claims by land owners and public agencies for re-monumentation at no additional expense to the City.

The Contractor shall replace any monument that exists within the project construction limits if it is disturbed or removed due to project activity. All monumentation disturbed or removed shall be replaced with the same type monument, or a monument approved by the Engineer. If the monument had a self identifying cap, then a new cap shall be attached bearing the same information which was stamped on the original cap. The new cap shall bear the license number of the Surveyor and the year the monument was replaced. Monuments that are located in gravel road surfaces, fill slopes, back slopes, or ditches shall be installed six (6) inches below the finished surface. When a monument cannot be re-established in the proper location, then one or more reference marks shall be established. The establishment of reference marks shall be coordinated with the Engineer.

102.3 Construction

The Contractor shall perform all surveying and staking essential for the completion of the project in conformance with the plans and specifications and shall perform all the necessary calculations required to accomplish the work. This will include but is not limited to:

a. Laying out the project baseline at minimum 50' stations from the basis of horizontal and vertical control provided by the Owner on the plans;

b. Cross-sectioning original ground and establishing slope stakes at the "catch points" of the design template at original ground, at minimum 50' stations noting the offset distance from the baseline of the vegetation limits at each station; slope stakes shall be in place a minimum of two (2) working days prior to the beginning of excavation of the staked area.

c. Cross-sectioning the sub-grade at minimum 50' stations after excavation for determination of excavation;

d. Establishing hubs at centerline and shoulders for finished grade at minimum 50' stations;

e. Providing any control needed to establish the horizontal and vertical position of any item on the plans for which specific horizontal and vertical parameters have been established; and

f. Providing as-builts of features discovered during construction and not on plans.

The Contractor shall provide a plot of the "original ground" and "after excavation" cross-sections to the Owner at a minimum of 1" = 10' horizontal and 1" = 5' vertical scale including the design template and slope "catch points." The Contractor will provide the area of each cross-section for excavation as well as a total volume computation for the entire project based on in-place volumes as determined by the average end areas of these cross-sections.

Original ground cross sections and slope stake information for earthwork quantities shall be recorded on staking sheets provided by the Contractor and approved by the Engineer. The post excavation cross sections for pay quantity calculations shall be recorded at the same locations and upon the same staking sheets as the original measurements. The Contractor shall provide the Engineer with copies of the staking sheets at any time.

The Contractor shall be responsible for the supervision of the construction surveying personnel, and any errors resulting from the operations of said personnel shall be corrected at the expense of the Contractor, and at no additional cost to the Owner.

Field notes shall be kept in standard bound notebooks in a clear, orderly, and neat manner consistent with standard surveying practice, including titles, numbering, and indexing. The field books shall be available for inspection by Owner's project personnel at any time. Copies of the field books shall be provided to the Owner at the completion of the project.

The Contractor shall use competent personnel and suitable equipment for the layout work required and shall furnish all stakes, templates, straightedges and other devices necessary for checking and maintaining points, lines and grades.

Surveys shall be done under the direction of a licensed surveyor registered for practice in the State of Alaska.

102.4 Method of Measurement

Measurement of this item will be by a percentage of project completion.

102.5 Basis of Payment

Payment will be made under:

Pay Item	Description	Unit
102	Construction Surveying	Lump Sum

SECTION 103 TRAFFIC SAFETY, MAINTENANCE, AND RESTORATION OF ROADS AND STREETS

103.1 General

This work shall consist of the necessary measures to protect and maintain traffic during the life of the contract, including the furnishing of such personnel, equipment, and devices as may be required to insure safety of the traveling public.

A traffic plan shall be submitted to the Engineer at the pre-construction conference for approval prior to initiation of any construction work. This plan shall include, as a minimum, the type/location of signs to be erected and the type/location of barricades required for any street closure, etc.

103.2 Construction Requirements

Construction shall be conducted so as to cause as little inconvenience as possible to owners of property abutting the project site. The Contractor shall provide and maintain, in a safe passable condition, temporary approaches, crossings, intersections with trails, streets, businesses, parking lots, residences, garages, and farms. When the abutting owner's access road, across the right-of-way line, is to be eliminated and replaced under the Contract, the existing access shall not be closed until the replacement access facility is available, unless previous permission is granted in writing from the affected party. A copy of the written permission shall be provided to the Engineer prior to closing the access.

Open trenches, ditches, pavement edge drop-offs and other excavations and hazardous areas shall be protected with barricades and shall be delineated.

When the Contractor is required to maintain traffic by grading roadway excavation and embankment areas, the construction shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times. The surface of the roadbed shall be properly crowned for drainage. In advance of other grading operations, sufficient fill shall be placed at culverts and bridges to permit traffic to cross unimpeded. Partial width construction techniques shall be employed when the traffic is routed through roadway cuts or over embankments which are under construction. The material shall be excavated or placed in layers, and the construction activities shall be alternated from one side to the other, with traffic routed over the side opposite the one under construction.

During the removal or laying of culvert pipe, a maximum time of one hour of road closure may be extended to the Contractor, providing the removal and laying of the pipe can not be completed for one-half width of the roadway and provided the detour can not be constructed around the culvert being laid. Closures shall be scheduled so as not to delay buses and peak-hour traffic. Where so provided on the plans, or otherwise

approved, the Contractor may bypass traffic over a detour route. When no longer required, the detour shall be removed and the approaches obliterated.

When, in the opinion of the Engineer, conditions are such that the safety and/or convenience of the traveling public is adversely affected, the Contractor shall be immediately notified in writing. The notice shall state the defect(s) and the corrective action(s) required. In the event that the Contractor does not take corrective action within twenty-four (24) hours, the City may order such work from outside forces and suspend all work on the project until satisfactory corrective action is performed. The cost of work performed by outside forces shall be deducted from any moneys due the Contractor under the terms of the Contract.

103.3 Traffic Maintenance During Suspension of Work

Prior to suspension of work, the Contractor shall make passable and open to traffic portions of the project and temporary roadways, or portions thereof as may be agreed upon between the Contractor and the Engineer, for the temporary accommodation of necessary traffic during the anticipated period of suspension.

If the suspension is seasonal, maintenance of the temporary route or line of travel agreed upon will be by, and at the expense of the City, except as hereinafter specified. A seasonal suspension shall be maintained until an order is issued to the Contractor for the resumption of construction operations.

When work is resumed, the Contractor shall: replace or renew all work or materials lost or damaged because of such temporary use of the project; remove, to the extent directed by the Engineer, all work or materials used in the temporary maintenance; and shall complete the project in every respect as though its prosecution had been continuous. Additional work caused by such suspensions and for reasons beyond the control of the Contractor, will be paid for by the City at contract unit prices or at prices established for extra work.

103.4 Construction Signing

The Contractor shall furnish, erect, move, and remove as required and directed, series C construction signs and barricades, and/or temporary guide markers and pavement markers required to adequately and safely inform and direct the traveling public and satisfy legal requirements.

All construction signs shall be kept clean, mounted to the required height, and placed effectively day and night. All signs and markers shall indicate the actual existing conditions and be moved, removed, relocated, or changed immediately to reflect changed conditions. The number of signs indicated on the Alaska DOT & PF Standard Drawings are a minimum and the Contractor shall have an adequate supply available for immediate

use as required. The Engineer may require additional signs placed if unsafe conditions exist.

103.5 Method of Measurement

Traffic maintenance shall be measured by lump sum for all work described in this section and be paid by a percentage of project completion.

103.6 Basis of Payment

Payment at the lump sum price shall be full compensation for furnishing all labor, materials, and equipment as may be required to protect and maintain traffic and to insure the safety of the traveling public.

Payment will be made under:

Pay Item	Description	Unit
103	Traffic Maintenance	Lump Sum

STANDARD CONSTRUCTION SPECIFICATIONS

FOR EARTHWORK

DIVISION 200

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STANDARD CONSTRUCTION SPECIFICATIONS FOR EARTHWORK
DIVISION 200

201.1 GENERAL

The work covered by these specifications consists of providing all plant, labor, equipment, supplies, material, transportation, handling, and storage, and performing all operations pertaining to the: **1)** Construction of sub-base for parking lots, streets, alleys, curbs, gutters, sidewalks and bike trails; **2)** Construction for all trench excavation, backfill, bedding, and foundation material for utility installation; and **3)** Excavation and backfill for building structures and retaining walls.

201.2 DEFINITIONS

Backfill - Material placed in an excavated area.

Bedding - Ground or support in which pipe is laid.

Borrow - Material used as fill and/or backfill which is obtained from a source other than required excavation.

Compaction - The expulsion of air from a soil mass by tamping by hand or machine to achieve required density in soils.

Disposal Site - Any area where waste from construction is placed.

Excavation - Area or material removed to provide a suitable base for improvement.

Fill - Fill is considered to be material placed above the original or natural ground lines.

Leveling Course - Leveling course consists of the processed gravel placed above the sub-base.

Non-Frost Susceptible Material - Non-organic soil containing less than three percent (3%), by weight, of grains smaller than .02mm obtained from minus three inch (3") material.

Sub-base - The sub-base is that material which is placed above the sub-grade and below the leveling course.

Sub-grade or Bottom Excavation - The sub-grade is that material below the bottom of excavation and upon which the sub-base material is placed.

Trench - Any excavation for a utility or drainage system.

Unsuitable or Unusable Material - Unsuitable or unusable material may consists of any material, which in the opinion of the Engineer is inadequate for use in the proposed construction.

201.3 Applicable Standards

The latest revision of the following standards of the American Society for Testing and materials *(ASTM)* and the American Association of State Highway Transportation Officials *(AASHTO)* are hereby made a part of these specifications:

ASTM C-29	Test for Unit Weight of Aggregate
ASTM C-117	Test for Materials Finer than No. 200 Sieve in Aggregates by Washing.
ASTM C-131	Test for Resistance to Abrasion of Small Size Course Aggregate by Use of the Los Angeles Machine.
ASTM C-136	Test for Sieve or Screen Analysis of fine and Course Aggregates
ASTM D-422	Test for Particle Size Analysis of Soil
ASTM D-424	Test for Plastic Limit and Plasticity Index of Soils
AASHTO M-147	Materials for Aggregate and Soil-Aggregate, Sub-base, Base, and Surface Courses
ASTM D-1557	Modified Proctor Density
AASHTO T-180-D	Test for Moisture-Density Relations of Soil
AASHTO T-205	Test for Field Determination of Density of Soil In-Place
AASHTO T-238	Test for Density of Soil In Place by Nuclear Method

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 the 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.

201.5 Compaction Standards

The required density of fill and backfill shall meet the requirements as outlined in *Section 205 Classified Fill and Backfill, 205.3 Construction, Section 214 Mechanical*

Compaction, 214.2 Construction, of this division. In areas outside of road rights-of-way, the density shall be as required by the contract documents or as directed by the Engineer.

Where compaction density is specified, the maximum density shall be determined in accordance with the current requirements of ASTM D-1557 Standard Methods.

201.6 Subsurface Investigation

Information pertaining to subsurface exploration, borings, test pit locations, and other preliminary investigations may appear in the Bidding Documents or may be available at selected locations for review by the Bidder. This information, if provided, was acquired for design purposes only, and is not considered adequate for construction. The Owner does not warrant the correctness of the soils investigation or of any interpretation, deduction, or conclusion given in the report relative to subsurface conditions. The Bidder shall make his own deductions and conclusions as to the nature of the materials to be excavated, the difficulties of making and maintaining the required excavations, the difficulties which may arise from subsurface conditions, and of doing any other work affected by the subsurface conditions, and shall accept full responsibility therefore.

201.7 Weather Limitations

Unless otherwise authorized by the Engineer, fill and backfill material, base course, and leveling course shall not be placed when the atmospheric temperature is below thirty-five degrees (35°) Fahrenheit. When the temperature falls below thirty-five (35) degrees Fahrenheit, it shall be the responsibility of the Contractor to protect all areas of completed work against any detrimental effect. Any areas of work that are damaged by weather shall be reconditioned, reshaped, and re-compacted by the Contractor in conformance will the requirements of the contract documents and without additional cost to the Owner.

SECTION 202 CLEARING AND GRUBBING

202.1 General

The work under this section consists of performing removal of all vegetation, brush, trees, logs, tree stumps, roots and root mat to a Contractor provided disposal site and the preservation from damage of all items designated to remain. Limits of clearing and grubbing shall be in conformance with right-of-way easements, contractual stipulations, and directions by the Engineer. The Contractor's surveyor shall mark the limits of clearing prior to any construction activity.

202.2 Construction

The Contractor shall protect and preserve all objects designated to remain. Paint required for cut or scarred surfaces of trees or shrubs selected for retention shall be an approved asphaltum base paint prepared especially for tree surgery.

All surface objects and all trees, stumps, roots, brush, berm piles, boulders, and other protruding obstructions not designated to remain shall be cleared and grubbed. Undisturbed stumps, roots, and inorganic, solid objects which are located more than 4 feet (4') below the new roadway sub-grade are excluded unless designated by the Engineer for removal.

The Engineer may permit sound stumps to be cut off not more than 6 inches (6") above the existing ground in areas outside the limits of the new roadway cut and embankment areas.

All burning shall be done in accordance with applicable laws and ordinances. All burning shall be constantly supervised and controlled by competent watchmen at such times and in such a manner that the surrounding forest cover and other adjacent property will not be jeopardized.

Clearing debris piles shall not block any traffic way or stream or drainage channel at any time. Clearing debris piles shall not be located in areas that will hinder the operations of City snow removal or utility maintenance equipment. Emergency vehicles and school buses will be afforded unobstructed passage through the project.

Clearing debris may be disposed of at locations off of the project with written permission of the property owners on whose property the materials and debris are placed. The Contractor shall make all arrangements with the property owner for obtaining suitable disposal locations, and the costs involved with private property disposal shall be included in the bid price.

The Contractor shall take whatever cautions necessary to protect private property, utility transformers, pedestals, and underground or overhead cables from damage during tree falling and clearing operations.

202.3 Method of Measurement

The measurement of clearing and grubbing shall be by lump sum or by the acre. The method of measurement for any individual project shall be as specified in the Bid Schedule.

202.4 Basis of Payment

Payment shall include full compensation for all mobilization and demobilization, clearing, grubbing, disposal, and clearing debris.

Payment shall be made under the following unit

Bid Item	Description	Unit
202	Clearing and Grubbing	Lump Sum or (Acre)

SECTION 203 REMOVAL OF OBSTRUCTIONS

203.1 General

This work shall consist of the removal, wholly or in part, and satisfactory disposal or relocation as directed by the Engineer, of all fences, structures, abandoned vehicles and 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 in the Contract. Also included in the work will be the removing and resetting of mailboxes and newspaper delivery tubes and the preservation from injury and defacement of all vegetation and objects not scheduled to be removed.

203.2 Construction

The Contractor shall either raze, remove and relocate, or remove and dispose as directed by the Engineer all foundations, fences and other obstructions, any portions of which are in the right-of-way, except utilities and those for which other provisions have been made for removal. Basements or cavities left by structure removal shall be filled to the level of the surrounding ground and, if within the prism of construction, shall be compacted in accordance with *Section 205 Classified Fill and Backfill*.

Existing mail boxes and newspaper delivery tubes within the limits of the project shall be removed and temporarily reset at locations designated by the Engineer. The boxes and tubes shall be installed in such a position that their usefulness will not be impaired. Any posts, boxes, tubes or other material broken or damaged by the Contractor shall be repaired or replaced at no additional cost to the City.

The Contractor shall exercise reasonable care when relocating private property.

No metal pipes, wires, or cables may be placed in any embankment and no debris may be placed under any city street.

All waste areas shall be graded to drain.

Combustible debris shall be burned or otherwise disposed of in an approved manner.

Culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic.

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

When designated on the plans to be abandoned in place, flexible pipe shall have the ends crushed and flattened before covering; other conduits shall be securely plugged by an approved method.

The Contractor will not be allowed to operate valves or fire hydrants that are in use on an active water system. The City will provide personnel when needed and when scheduled. Except in an emergency the Contractor should allow twenty-four (24) hours notice for assistance by the City's personnel.

203.3 Method of Measurement

When the Contract stipulates that payment will be made for removal of obstructions on a lump sum basis, the item, Removal of Obstructions, will include all structures and obstructions encountered within the right-of-way in accordance with the provisions of this section.

Temporary relocation of mail boxes and tubes will not be measured for payment, but will be considered incidental to this item of work.

203.4 Basis of Payment

The accepted quantities of removal of obstructions, determined as provided above will be paid for at the Contract lump sum price and will be full compensation for removing and disposing of the obstructions in accordance with the Contract.

The price shall also include salvage of materials removed, their custody, preservation, storage in the right-of-way, and disposal as provided herein.

Payment will be made under:

Pay Item	Description	Unit
203	Removal of Obstructions	Lump Sum

SECTION 204 EXCAVATION FOR TRAFFIC WAYS

204.1 General

This item consists of furnishing all plant, labor, equipment, supplies, and material in performance of all operations pertaining to the excavation of unsuitable and/or surplus material for streets, alleys, access roads, parking lots, sidewalks, curbs, gutter, and bike trails.

204.2 Construction Surveys

The surveying shall be completed in accordance with the *General Provisions, Section 10.05, Control of Work; Article 5.9, Construction Surveying by the Contractor*, and in accordance with *Division 100, Section 102* of these specifications.

204.3 Miscellaneous

Public property laying within the right-of-way, such as signs and markers, that interfere with construction shall be removed and reset at the time and place as directed by the Engineer or his designated representative. Any damage by the Contractor shall be repaired or the item replaced in kind at the Contractor's expense. Temporary signs must be installed in place of removed traffic control signs.

A disposal site for non-salvageable materials shall be provided by the Contractor.

All existing key boxes, clean-outs, manholes, etc., shall be located and exposed by the Contractor and carefully protected during the course of the work**. The Contractor, in conjunction with the Public Works Department, shall check all City owned utilities prior to the start of the construction and record their condition.** All manholes, catch basins, clean-outs, etc., will be checked for damage resulting from the Contractor's operation prior to the final acceptance by the Owner. The Contractor is responsible for restoring all existing utilities to pre-existing conditions.

All existing City utilities requiring adjustment to grade shall be adjusted by the Contractor in accordance with the applicable Standard Details. Payment for such adjustment shall be as specified under the applicable section of these specifications.

204.4 Unusable and Usable Excavation

Unusable excavation shall consist of all excavation which is excess or not suitable for classified fill or backfill as determined by the Engineer.

Usable excavation shall consist of material from excavation that is designated by the Engineer as suitable for fill or backfill.

If suitable soil conditions are encountered at elevations different from those indicated on the drawings, the Engineer may direct, in writing, that the excavation be carried to elevations either above or below those specified.

The Contractor shall control the banks of all excavated areas as necessary to prevent movement of soil in areas supporting existing foundations or slabs.

Unauthorized excavation beyond the plan limits shall be filled with a suitable compacted material at no cost to the Owner. Sub-excavation that is authorized by the Engineer shall be paid at the Contract unit price for Unusable Excavation. The Engineer may require additional surveyed cross sections to determine the quantities of excavation or sub-excavation.

The excavation shall be uniformly shaped so that classified backfill material can be properly placed and compacted. The excavated area shall be feathered to adjoining areas where suitable material is found. Excavated areas shall not be backfilled until approved by the Engineer.

It shall be the responsibility of the Contractor during construction to keep all embankments and excavation well shaped and drained. The sub-grade shall be maintained, compacted in cut sections if required, and kept free of leaves, sticks or other debris.

The Contractor shall perform whatever work necessary to prevent flow and accumulation of surface water or ground water in excavations. Unless otherwise provided in the special provisions, all work associated with pumping or de-watering shall not be paid for directly, but shall be considered as a subsidiary obligation of the Contractor.

204.5 Utilization or Disposal of Excavated Material

Excavated material conforming to the specifications for fill and backfill shall be used where practical for fill and backfill as directed by the Engineer. Usable excavation shall be compacted in accordance with *Section 214 Mechanical Compaction***,** of this division. When not used on the project site, the material shall be hauled away to the Contractor provided disposal site unless otherwise stated in special provisions.

204.6 Excavation Methods

The Contractor shall utilize whatever methods and equipment necessary to excavate to the limits designated by the drawings and specifications and authorized by the Engineer, except that no equipment or method may be utilized that, because of its action, deteriorates the sub-grade, making additional excavation necessary beyond the limits originally authorized.

Borrow material shall not be placed until after the usable excavation has been incorporated into the fill areas.

204.7 Method of Measurement

Authorized excavation and sub-excavation shall be measured in its original position by surveyed cross sections prior to the beginning of excavation operations. After the excavation is completed, a second set of cross sections shall be taken at the same locations as the original ground measurements.

The volume of excavation shall be computed by the average end area method based upon the original ground cross sections and cross sections taken after excavation is completed.

If the nature of the excavation is such that cross sectioning is unsafe or impractical, excavation may be measured by the cubic yard, truck volume measure.

Truck volume measure must be agreed, in writing, prior to initiating the work. Truck count tickets will be serialized and delivered to the Engineer at the end of each work shift. Any truck count ticket not so delivered within twenty-four (24) hours from the subject work shift may not be considered for payment.

204.8 Basis of Payment

Payment shall be made under the following units:

Bid Item	Description	Unit
204	Excavation	Cubic Yard (or Truck Count)

SECTION 205 CLASSIFIED FILL AND BACKFILL

205.1 General

The work under this section consists of performance of all operations pertaining to the placement of classified fill and backfill.

205.2 Material

The Contractor shall furnish a sieve analysis (gradation) performed by a certified lab according to the following schedule, unless otherwise specified in the Special Provisions of the Project:

Type I	One analysis per 2000 ton, or 1000 CY
Type II	One analysis per 2000 ton, or 1000 CY
Type III	One analysis per 1000 ton, or 500 CY
Leveling Course	One analysis per 500 ton, or 250 CY

Classified fill and backfill shall contain no lumps, frozen material, organic matter or other deleterious matter. It shall have a plasticity index not greater than six (6) as determined by ASTM D-424 and shall conform to one of the following types, as required by the drawings and specifications:

a. Type I

Materials furnished by the Contractor for use as classified fill and/or backfill shall be graded within the limitation of Table I. Gravelly material shall have a coefficient of uniformity greater than four (4), and sandy material shall have a coefficient of uniformity greater than six (6). Type I material shall be non-frost susceptible.

TABLE I

U.S. Std. Sieve	Cumulative % Passing
3”	100
3/8”	56-100
#10	30-64
#40	9-34
#200	0-6

b. Type II

Materials furnished by the Contractor for use as Type II classified fill and/or backfill shall be graded within the limitations of Table II.

TABLE II

U.S. Std. Sieve	Cumulative % Passing
8”	100
3”	66-100
½”	32-100
#4	20-60
#10	12-50
#40	2-30
#100	0-14
#200	0-10

c. Type III

Materials furnished by the Contractor for use as Type III classified fill and/or backfill shall be crushed aggregate material with at least fifty percent (50%) of the coarse aggregate having at least one fresh mechanically fractured face and graded within the limits of Table III.

TABLE III

U.S. Std. Sieve	Cumulative % Passing
Coarse Aggregate	
2”	100
1-1/2”	90-100
1”	70-100
¾"	60-90
3/8”	45-75
Fine Aggregate	
#4	30-60
#8	22-52
#40	8-30
#200	0-6

d. Type IV

Materials furnished by the Contractor for use as Type IV classified fill and/or backfill shall be an approved material consisting of sand or gravel with a maximum of twelve percent (12%) passing the 200 sieve.

205.3 Construction

The sub-grade shall be cleared of all debris and organic material. 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.

When embankment material is to be placed and compacted on hillsides or against existing embankments with slopes greater than 4:1, the new fill shall be continuously benched into the existing embankment. Benching shall be of sufficient width to permit operations of placing and compacting equipment. Earthen material removed from the existing slope during benching operations shall not be measured as excavation. Benching is considered incidental to other pay items of work.

Whenever an existing roadway surface lies within three (3) vertical feet below the new roadway subgrade, such old surface will be scarified to a depth of six (6") inches and recompacted.

Embankment shall not be placed over frozen ground except when written permission is received.

Roadway embankment shall be placed in horizontal layers twelve (12") inches in depth (loose measurement) for the full width of the embankment, and shall be compacted as specified before the next layer is placed. Spreading equipment shall be used on each lift to obtain uniform thickness prior to compacting. Continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Compaction equipment shall be routed uniformly over the entire surface of each layer.

If continued hauling over a partially completed embankment causes loss of stability as evidenced by pumping, rutting, or other damage, the Contractor shall repair the damaged embankment at his own expense and adjust his hauling equipment and procedures so as to avoid further damage.

During grading operations, the roadbed surface shall be adequately crowned and drained at all times.

The maximum dimensions of any particle of the embankment material shall not be greater than two-thirds (2/3) of the compacted thickness of the layer in which it is placed unless specified elsewhere. Portions of any layer in which the embankment 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 the Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

The Engineer may permit lifts in excess of twelve (12") inch thickness when fill or backfill is placed over swampy or saturated ground, or where he is satisfied that the Contractor's methods and equipment will consistently produce the specified density.

205.4 Method of Measurement

Classified fill or backfill material obtained from borrow pits will be measured in tons (2,000 lbs./ton) of material delivered and placed in accordance with these Specifications.

Imported fill and backfill will be weighed on a scales certified by the State of Alaska. Weight tickets will be serialized and witnessed at the time of weighing by a Contractor-furnished weighman. The Engineer may at any time verify load weights and the weighing process.

Each load of fill or backfill arriving on the project must be accompanied by a weight ticket. Imported backfill that is not accompanied by a weight ticket shall not be considered for payment.

Where excavation of unsuitable material beyond the lines and grades shown on the plans is ordered in writing, the measurement of Classified backfill will include the material required for replacement. No measurement will be made for imported fill placed beyond the authorized lines and grades or for quantities placed outside the limits of the authorized excavation or embankment.

205.5 Basis of Payment

Payment shall be made under the following units:

Bid Item	Description	Unit
204	Type ( ) Fill and Backfill	Ton

SECTION 206 LEVELING COURSE

206.1 General

The work under this section consists of performing all operations necessary to complete construction of the leveling course upon a prepared sub-base.

206.2 Material

The leveling course shall consist of crushed gravel, rock, sand, or other approved material. The aggregate shall be free from lumps, balls of clay, or other objectionable matter. The portion of the material retained on a No. 4 sieve shall be known as coarse aggregate. Both coarse and fine aggregates shall conform to the quality requirements of AASHTO M-147.

The acceptance of the leveling course gradation will be based upon samples taken by the City from the roadway. It is the Contractor's responsibility to sample the aggregates during production in accordance with the schedule in *Section 205.2 Material*.

a. Coarse Aggregate

The coarse aggregate material conforming to the requirements specified above shall have a percentage of wear not to exceed fifty (50) after five hundred (500) revolutions, as determined by the current requirements of ASTM C-131. It shall consist of angular fragments reasonably uniform in density and quality, and reasonably free from thin and elongated pieces, dirt and other objectionable material. At least seventy percent (70%) of the coarse aggregate particles shall have one (1) or more mechanically fractured faces.

b. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter. The fine aggregate, either naturally combined with the coarse aggregate or separately obtained and mixed therewith, shall be of such character that the composite material will conform to the gradation and other requirements specified.

c. Gradation

The composite mixture of coarse aggregate and fine aggregate, processed as hereinafter specified, shall conform to the following gradation limits:

Sieve Size	Percent Passing by Weight
1"	100
3/4"	70-100
3/8"	50-80
No. 4	35-65
No. 8	20-50
No. 40	8-30
No. 200	0-6

206.3 Construction

The leveling course shall be placed to the lines, grades and thickness shown on the drawings and shall consist of the materials herein before specified. The leveling course shall provide a smooth, stabilized, compacted and uniformly graded surface upon which to place the asphalt pavement.

a. Preparation of Existing Roadway

Roadway preparation shall consist of scarifying, shaping, wetting, and compacting of the existing roadway to a minimum density of ninety-five percent (95%) in accordance with ASTM D-1557. Roadway surfaces shall be cleaned of all foreign substances and debris. Any ruts or soft yielding spots that may appear in the roadway surface shall be corrected by loosening, removing and adding approved material, reshaping and re-compacting the affected areas to the lines and grades shown on the plans and to the specified density requirements.

b. Placing

The approved leveling course material shall be deposited and spread in a uniform layer to the required contour and grades and to such loose depth that when compacted to the density required will achieve the specified thickness. The material shall be spread uniformly on the prepared sub-base from moving vehicles or spreading boxes, then leveled to the required contour and graded with blade graders. Portions of the layer which become segregated in spreading shall be re-mixed to the required gradation.

c. Compacting

The leveling course shall be compacted to at least ninety-five percent (95%) of maximum density in accordance with ASTM D-1557. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and inequalities. If at any time the mixture is excessively moistened by rain, it shall be aerated by means of blade graders, harrows, or other approved equipment until the moisture content is such that the surface can be re-compacted and finished as stated above. If paving is required as a part of the Contract, the finished leveling course shall be maintained by the Contractor in the above condition until the pavement is applied.

d. Smoothness Test

The surface of the leveling course, when finished, shall not show any deviation in excess of three-eighths of an inch (3/8") within ten (10) linear feet, in any direction. Any deviation in excess of this amount shall be corrected by loosening, adding, or removing material and reshaping and compacting to satisfy the above requirement.

206.4 Method of Measurement

Leveling course shall be measured by tons delivered, placed, and accepted in accordance with these specifications.

206.5 Basis of Payment

Payment shall be made under the following unit.

ITEM	DESCRIPTION	UNIT
206	Leveling Course	Ton

SECTION 207 TRENCH EXCAVATION AND BACKFILL

207.1 General

The work under this section consists of providing all materials and performance of all operations pertaining to items of work involved in excavation, bedding, backfill and compaction of trenches.

207.2 Description

This work shall consist of all excavation and backfill of trenches as specified for pipe installation and other miscellaneous items as specified in this Section.

a. Trench Section

Trench depth shall be as shown on the drawings, specified, and as staked in the field by Contractor. Trench width at or below the top of the pipe shall be of a width that will allow compaction equipment to be utilized at the sides of the pipe. Trenches shall be of the necessary width for proper laying of pipe or conduit and the banks shall be sloped so as to conform to the prevailing safety requirements.

207.3 Construction

a. Trench Excavation

The Contractor shall perform all excavation of every description and whatever substance encountered including rock and permafrost. Excavation will be to the extent indicated on the drawings, and as staked in the field by the Contractor. All excavated materials for backfill shall be placed at a distance from the trench section that conforms to all State and/or Federal Safety Codes.

The 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 four hundred feet (400') of trench shall be open in advance of pipe or conduit installation unless authorization, in writing, is obtained from the Engineer. Unless otherwise indicated in the drawings and specifications, all excavations will be open cut. There shall be no more than one hundred feet (100') of open trench at the end of the work day, unless approved by the Engineer.

Where rock or permafrost is encountered, it shall be removed as shown on the drawings or as directed by the Engineer, and shall be replaced with approved material.

b. Dewatering of Trench

When it is specifically called for on the drawings and/or in the special provisions of the contract documents, the Contractor shall submit as a part of his proposal the method to be

used in the dewatering of the trench section. When dewatering is not called for specifically, it shall be considered incidental to other pay items of work.

c. Bedding

All pipe shall be placed in Class B or C bedding, as specified.

Bedding materials, for the type specified, shall conform to the requirements of *Section 211, Bedding, 211.2, Materials,* of this division.

Where Class B or C bedding material is available from trench excavation, the Contractor shall use care to separate it from unsuitable material. Class B or C bedding material shall be placed under and around the pipe in lifts not to exceed twelve inches (12") and compacted to ninety-five percent (95%) of maximum density. In no case shall bedding material be placed above the spring line of the pipe in a single lift.

Where Class B or C bedding materials are encountered in the trench bottom, the trench shall be accurately graded to provide uniform bearing and support for each section of the pipe for its entire length, except for the portion of the pipe sections where it is necessary to excavate for the bell holes and other type joints and for the proper sealing of the joints. Bell holes and depressions for joints shall be dug after the trench bottom has been graded. 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. Where unsuitable material such as, but not limited to hard pan or rock is encountered, the trench shall be over-excavated so a minimum of six inch (6") depth of bedding material is required to bring the trench bottom up to the specified grade. This bedding material shall be compacted to ninety-five percent (95%) of maximum density prior to the installation of the pipe. If the Engineer determines that excavated material is unsuitable for bedding, he may direct the Contractor to "Furnish Bedding Material."

d. Trench Backfill

Trench backfill is defined as the placement of material above the level of bedding material. Material for backfill shall be obtained from trench excavation if the material is suitable or conforms to the specifications for backfill. If the Engineer determines that excavated material is unsuitable for trench backfill, he may direct the Contractor to "Furnish Backfill." Backfill shall be placed in lifts and compacted in such a manner that ninety percent (90%) of maximum density is obtained. No separate payment will be made for compaction to ninety (90%) of maximum density unless otherwise stated in the plans or special provisions. Backfill shall not contain broken bituminous pavement or Portland Cement Concrete, and shall be placed in accordance with *Section 205 Classified Fill and Backfill.*

Trench backfill construction in traffic ways shall conform to *Section 210, Foundation Material.*

e. Cleanup

This item consists of cleanup and finishing of all construction areas to their original condition or better.

207.4 Method of Measurement

Trench excavation and compaction will be considered incidental to *Divisions 500 and 600* of these specifications. Imported trench backfill shall be paid at the Contract price for the foundation material, or by letter of agreement.

207.5 Basis of Payment

None

SECTION 208 COMPACTION CONTROL BY THE CONTRACTOR

208.1 General

The Contractor shall provide field compaction testing for quality control based upon the following schedule or as specified in the Special Provisions.

One compaction test per 400 lineal feet per lift of classified fill

The generation of the maximum density curves and the field density testing shall be certified by an Engineer registered in the State of Alaska. The Contractor shall space the testing uniformly throughout the project earthwork. Copies of all proctor curves and field density test results shall be made available immediately to the City's representative.

If a field density test does not meet the contract compaction requirements, the Contractor shall initiate additional compaction efforts. Additional lifts of earthwork shall not be placed over a zone that has failed a field density test, until a passing test has been achieved. All re-testing of failed areas shall be performed by the Contractor at no additional cost to the City.

The Owner reserves the right to perform independent, field density testing to confirm the results of the Contractor's quality control program.

208.2 Compaction Standards

Maximum density shall be based upon ASTM D-1557, Modified Proctor Density.

208.3 Method of Measurement

No measurement will be made for this item of work.

208.4 Basis of Payment

Payment will be made under the following unless not included in the Bid Schedule. If not included in the Bid Schedule, this item will be considered incidental:

BID ITEM	DESCRIPTION	UNIT
208	Compaction Control by the Contractor	Lump Sum

SECTION 210 FOUNDATION MATERIAL

210.1 General

This work shall consist of furnishing, placing, and compacting imported foundation material in areas of sub-excavation, in utility trenches, and in other areas as directed.

210.2 Materials

Foundation material shall meet the requirements of Type II classified fill as described in *Section 205 Classified Fill and Backfill (2.b.).*

210.3 Construction

Foundation material shall be placed in lifts not to exceed twelve inches (12") and compacted to ninety percent (95%) of maximum density.

210.4 Method of Measurement

Foundation material shall be paid at the contract unit price per ton delivered, placed, shaped, and compacted. Each truck load delivered to the project must be accompanied by a delivery ticket.

210.5 Basis of Payment

Payment for this item shall be made under:

BID ITEM	DESCRIPTION	UNIT
210	Foundation Material	Ton

SECTION 211 FURNISH BEDDING MATERIAL

211.1 General

The Work under this Section consists of performance of all operations pertaining to providing Class B and C bedding material for underground utilities.

211.2 Materials

a. Class "B" Bedding

Material for Class "B" Bedding shall conform to the specifications for Type I backfill in *Section 205.2a, Classified Fill and Backfill,* of this division, and in addition shall contain material no larger than three-fourths inch (3/4").

b. Class "C" Bedding

Material for Class "C" Bedding shall conform to the specifications for Type II backfill in *Section 205.2b, Classified Fill and Backfill,* of this division, with one hundred percent (100%) of the material passing the two inch (2") sieve.

211.3 Construction

Placement of Class B or C bedding shall conform to the requirements of *Section 207, Trench Excavation and Backfill, 207.3 Construction, C. Bedding,* of this division.

211.4 Method of Measurement

Measurement of Class B and Class C bedding shall not be made but shall be considered incidental to the utility to be constructed.

211.5 Basis of Payment

Payment shall be made under the following units:

None

SECTION 214 MECHANICAL COMPACTION

214.1 General

The work under this section consists of the performance of all operations pertaining to mechanically compacting backfill to the specified density.

214.2 Construction

Backfill under traffic ways and building structures shall be compacted to ninety-five percent (95%) of Modified Proctor maximum density, unless otherwise noted and approved by the Engineer. Trench backfill shall be compacted to ninety percent (90%) of modified Proctor maximum density from a point six (6) inches above the top of pipe to the bottom of the roadway or building template.

The backfill material shall be placed in horizontal lifts not exceeding twelve inches (12") in thickness and compacted. Any excavations improperly filled shall be reopened to the depth required for proper compaction, then refilled and compacted at the Contractor's expense. The use of water, in excess of the quantity required to obtain specified density with optimum moisture content, to settle or compact the backfill, will not be permitted.

214.3 Method of Measurement

Mechanical compaction shall be considered incidental to all divisions of these specifications.

214.4 Basis of Payment

None

SECTION 215 PIPE CASING AND BORING

215.1 General

The work under this section consists of performing all operations necessary for furnishing and placing a casing by jacking and/or boring under a roadway.

215.2 Materials

Materials shall be as required by the contract documents.

215.3 Construction

The method of boring or jacking a casing shall be optional to the Contractor, except that prior to commencing jacking or boring operations, the Contractor will be required to furnish evidence to the Engineer showing that his planned method of jacking and boring has worked satisfactorily in other areas under similar conditions. The excavation at both ends of the boring shall be included under the Pipe Casing and Boring Pay Unit.

The pipe within the casing shall be arrested from movement by sand filling or wood slats and banding according to the Standard Detail of these specifications.

The Contractor is responsible for repairing any damage to the roadway or structural fill being penetrated by the casing.

All boring pits shall be adequately signed and barricaded to protect the public from entering the pit.

215.4 Method of Measurement

Measurement shall be from end to end of the casing accepted and completed. No measurement will be made for trench excavation and backfill where casing is installed. No compensation will be made for casing installation abandoned or aborted due to deviations in excess of allowable tolerances.

Payment shall include compensation for all boring pit excavations and backfill and for the repair of any damage done to areas surrounding the boring operations.

215.5 Basis of Payment

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
215	Pipe Casing and Boring	Linear Foot

SECTION 219 REMOVAL OF EXISTING PAVEMENT

219.1 General

The work under this section consists of performance of all operations pertaining to the removal and disposal of asphaltic pavement in accordance with the limits indicated on the drawings and as directed by the Engineer.

The Contractor will remove existing pavement (parking areas, driveways, etc.), within the right-of-way to a line one foot (1') back of the proposed improvements during the initial clearing/excavation operations. Further removal will be as directed by the Engineer in order to provide a proper transition between new and existing pavement. The intent is to minimize unnecessary removal of pavement.

219.2 Construction

Pavement shall be removed by the Contractor in a manner that will produce a straight, uniform edge along the section removed. The method of producing the straight edge shall be by cutting the section with an air chisel, or other methods approved by the Engineer. The Contractor shall dispose of the removed pavement at a Contractor provided storage area.

219.3 Method of Measurement

Pavement removed will be measured by the square yard of pavement designated for removal.

219.4 Basis of Payment

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
219	Remove Existing Pavement	Square Yard

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STANDARD CONSTRUCTION SPECIFICATIONS FOR

PORTLAND CEMENT CONCRETE

DIVISION 300

INDEX

SECTION 301 GENERAL

301.1 General

The work covered by these specifications consists of providing all plant, labor, equipment, supplies, material, transportation, handling, and storage, and performing all operations in connection with the placement of Portland Cement Concrete in accordance with the specifications and the drawings.

301.2 Applicable Standards

The latest revision of the following standards of the American Society for Testing and Materials (ASTM), the American Society of State Highway and Transportation officials (AASHTO), and the State of Alaska Department of Transportation and Public Facilities are hereby made a part of these specifications.

ASTM A-185	AASHTO M-55	Specification for Welded Steel Wire Fabric for Concrete
ASTM A-615	AASHTO M-31	Specification for Billet-Steel Bars for Concrete Reinforcement
ASTM C-31	AASHTO T-23	Method of Making and Curing Concrete Compression and Flexture Test Specimens in the Field
ASTM C-33		Specification for Concrete Aggregates
ASTM C-330		Specification for Lightweight Aggregates For Structural Concrete
ASTM C-39	AASHTO T-22	Test for Compressive Strength of Molded Concrete Cylinders
ASTM C-40	AASHTO T-21	Test for Organic Impurities in Sands for Concrete
ASTM C-42	AASHTO T-24	Method of Securing, Preparing, and Testing Specimens from Hardened Concrete for Compression and Flexture Strengths.

ASTM C-90		Hollow Load-Bearing Concrete Masonry
ASTM C-94	AASHTO M-157	Specification for Ready-Mix Concrete
ASTM C-150	AASHTO T-119	Specifications for Portland Cement
ASTM C-156	AASHTO T-155	Test for Water Retention Efficiency of Liquid Membrane-Forming Compounds And Impermeable Sheet Materials for Curing Concrete
ASTM C-171	AASHTO M-171	Specification for Waterproof Paper for Curing Concrete
ASTM C-172	AASHTO T-141	Sampling Fresh Concrete
ASTM C-172	AASHTO M-226	Viscosity Graded Asphalt Cement, Table (3)
ASTM C-192	AASHTO T-126	Method of Making and Curing Concrete Compression and Flexture Test Specimens in the Laboratory.
ASTM C-226	AASHTO M-134	Specifications for Air-Entraining Additions For use in the Manufacture of Air-Entrain-ing Portland Cement
ASTM C-231	AASHTO T-152	Test for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C-260	AASHTO T-154	Specifications for Air-Entraining Admixture For Concrete
ASTM C-270		Mortar for Unit Masonry (Including Tentative Revision)
ASTM C-309	AASHTO M-148	Specification for Liquid Membrane Forming Compounds for Curing Concrete
ASTM C-494	AASHTO M-194	Specifications for Chemical Admixtures for Concrete
ASTM D-994	AASHTO M-33	Specifications for Preformed Expansion Joint Filler for Concrete (Bituminous Type)

AASHTO M-6	Specification for Fine Aggregate for Portland Cement Concrete
AASHTO M-32	Specification for Cold Drawn Steel Wire For Concrete Reinforcement Cement
AASHTO M-80	Specification for Coarse Aggregate for Portland Concrete

301.3 Materials

a. Reinforcing Steel

Concrete reinforcing shall be deformed steel bars conforming to the requirements of ASTM A-615, Grade 60 (AASHTO M-31). It shall be free from loose scales and excessive rust coatings of any character that will reduce the bond between steel and concrete.

If reinforcing bars are to be welded, these specifications shall be supplemented by requirements assuring satisfactory weldability in conformity with AWS D12.1, "Recommended Practices for Welding Reinforcing Steel, Metal Inserts and Connections in Reinforced Concrete Construction." Reinforcing steel shall not be welded without the permission of the Engineer.

b. Welded Steel Wire Fabric

The welded steel wire fabric shall be cold-drawn steel wires or galvanized, fabricated into mesh formed by the process of electric welding. The grade of wire shall conform to AASHTO M-32. Welded Steel Wire Fabric shall conform to ASTM Specification A-185 (AASHTO M-55).

c. Cement

The cement shall be of a recognized standard brand of Portland Cement conforming to the specification requirements listed below and of a type listed below:

SPECIFICATION	TYPE PORTLAND CEMENT
ASTM C-150	TYPE I, III*
AASHTO M-85	TYPE I, III*

*Type III cement may be used upon authorization of the Engineer, subject to the following modification:

> Minimum design strength shall be achieved in seven (7) days in lieu of the twenty-eight (28) days required for Type I cement.

For architectural concrete, only one brand of cement shall be used unless otherwise approved by the Engineer. When no type cement is specified, the requirements of Type I shall govern.

Cement reclaimed from cleaning bags or leaking containers shall not be used.

d. Water

Water used for the mixing of concrete shall be clean and free of oil or acid and shall not contain salt, alkali or organic matter. Mixing water shall be potable.

e. Aggregates

Aggregates for Portland Cement Concrete shall be graded as required by the ASTMC 33 Specification: clean, hard gravel and coarse sand, non-frost susceptible material, and free of deleterious (organic) matter, and coatings of silt or clay. The gradations shall be determined by standard laboratory sieves with square openings. Material retained on a No. 4 screen shall be classified as coarse aggregate, which shall conform to the requirements of AASHTO M-80 and have the following limits of gradation:

COARSE AGGREGATE FOR PCC

Designated Sizes (AASHTO Gradation)		Percent by Weight Passing Laboratory Sieve Having Square Openings in Inches						
		2	1 ½	1	¾	½	3/8	No.4
#67	¾" to #4	---	---	100	90-100	---	20-55	0-10*
#4	1 ½ to ¾"	100	90-100	20-55	0-15	---	0-5	---

* Not more than five percent (5%) shall pass a sieve #8

All material passing a No. 4 sieve shall be classified as fine aggregate and shall conform to the requirements of AASHTO M-6 and having the following gradation:

FINE AGGREGATE FOR PCC

SIEVE SIZE	% PASSING SIEVE
Passing a 3/8 inch sieve	100
Passing a #64 inch sieve	95-100
Passing a #8 inch sieve	80-100
Passing a #16 inch sieve	45-80
Passing a #30 inch sieve	25-60
Passing a #50 inch sieve	10-30
Passing a #100 inch sieve	2-10

Aggregates shall consist of washed sand and gravel; fine and coarse aggregates shall be regarded as separate ingredients. Aggregates for normal weight concrete shall conform to the requirements of ASTM C-33 and aggregates for light weight concrete shall conform to the requirements of ASTM C-330.

The maximum size of coarse aggregates shall not exceed one and one-half inches (1-1/2"), nor one-fifth (1/5) of the narrowest dimension between the forms, nor three-fourths (3/4) of the clear spacing between reinforcing bars, nor one-third (1/3) the depth of slabs. The combined aggregates, coarse and fine, shall be of such composition of sizes that when separated on the No. 4 sieve, the weight passing shall not be less than thirty percent (30%) nor greater than fifty percent (50%) of the total weight.

The volume removed by sedimentation shall not exceed three percent (3%). Proportioning of the coarse and fine aggregate shall be obtained by weight. The weighing equipment shall be accurate within one percent (1%) of the net weight of the batch and shall permit adjustment for variations in the water content in the aggregate. Batching for fractional sacks of cement will not be permitted unless the cement is weighed for each batch. The water added shall be measured by an approved, calibrated device capable of metering within one percent (1%) of the total amount of water to be used for each batch.

f. Air-Entrainment

Air-entrainment agents shall be used in all concrete. Entrainment shall be achieved by the addition of an approved air-entraining mixture to the concrete mix. Air-entrainment shall conform to the requirements of ASTM C-231 (AASHTO T-152). Refer to *301.6 Mix Requirements for Classes of Concrete* of this section for air-entrainment percentages for each class of concrete.

g. Curing Materials

Curing materials shall be one (1) of the following types as approved by the Engineer

1. Kraft paper conforming to the requirements of ASTM C-171 (AASHTO M-171).

2. Mats of commercial quality and of a type used for curing concrete.

3. Burlap of commercial quality weighing not less than fourteen ounces (14oz.) per square yard.

4. Membrane curing compound conforming to the requirements of ASTM C-309 (AASHTO M-148.)

h. Expansion Joints

Pre-molded joint filler for use in expansion joints shall conform to the requirements of ASTM D-994 (AASHTO M-33.)

301.4 Mix

Portland Cement concrete may be mixed at a central mixing plant or in transit mixers. All mixing equipment and operations shall conform to the requirements of C-94 (AASHTO M-157.) All concrete shall be delivered to the work site thoroughly mixed to a uniform color and show uniform distribution of aggregates throughout the mixture. The minimum temperature of the fresh concrete after placement, and for the first 72 hours, shall be 50 degrees Fahrenheit.

Concrete shall be delivered to the project site, discharged from the truck completely, and be in the forms ready for vibration within one and one-half (1-1/2) hours after introduction of the cement to the aggregates. At the discretion of the Engineer, the above period may be extended one (1) minute for every degree of temperature at which the concrete is delivered below seventy degrees (70°) Fahrenheit to a maximum total time of two (2) hours.

In hot weather, or under conditions contributing to quick setting of the concrete, a discharge time less than one and one-half (1-1/2) hours may be required by the Engineer.

The use of non-agitating equipment for transporting concrete will not be permitted. The mixing drums of transit-mix trucks shall be thoroughly washed after discharging each load to prevent the accumulation of an adherent layer of concrete. The discharge of particles of hardened concrete with any batch will be sufficient grounds for the rejection of the entire batch. On curb, gutter, and sidewalk work, transit mix trucks shall be operated parallel to the forms while discharging.

The addition of water to the mix at the job site will not be permitted except with the approval of the Engineer.

301.5 Sub-base

Prior to placement of forms, the Engineer shall inspect the sub-base to insure that it is smooth, compacted, and free of soft or yielding spots and that compaction at optimum moisture is at least ninety-five percent (95%) of maximum density. Back-filling within the forms will be permitted if the sub-base is brought to the above specification and care is taken to maintain the forms to line and shape elevations.

301.6 Mix Requirements for Classes of Concrete

The minimum mix requirements for classes of concrete shall be as set forth below, unless otherwise specified in the contract documents.

	CLASS OF CONCRETE						
	C – 6	B – 3	B – 6	A – 3	A – 6	AA – 3	AA – 6
Minimum Cement Contents In Sacks/Cy	4.5	5.0	5.0	5.5	5.5	6.0	6.0
Maximum Water Content Ration in Gal/Sack	6.5	6.5	6.5	6.5	6.5	5.75	5.5
Slump Range in Inches	1-5	2-4	1-3.5	2-4	1-3.5	2-4	1-2
Entrained Air Range in Percentage	3-6	4-7	3-6	4-7	3-6	4-7	3-6
Coarse Aggregate (AASHTO Gradation)	#4 & #67	#67	#4* & #67	#67	#4* & #67	#67	#4* & #67
Fine Aggregate	Shall conform to AASHTO M-6 gradation						
Minimum Design Strength (f's), psi	2000	2500	2500	3000	3000	3500	3500

Minimum design compressive strength specification shall be achieved in twenty-eight (28) days.

*****The coarse aggregate for Class B-6, A-6 and AA-6 concrete shall be furnished in two separate sizes.

301.7 Ready-Mixed Concrete

Ready-mixed concrete shall conform to the requirements of ASTM C-94 (AASHTO M-157). It is the responsibility of the Contractor to furnish to the Engineer, for each batch of concrete and before unloading at the site, a delivery ticket from the manufacturer on which is printed, stamped or written, information concerning said concrete as follows:

a. Name of Ready-Mix batch plant.

b. Serial number of ticket.

c. Date and truck number.

d. Name of Contractor.

e. Specific designation of Project (name and location).

f. Specific class of concrete in conformance with that employed in specifications.

g. Amount of concrete (cubic yards).

h. Time loaded or first mixing of cement and aggregate.

i. Type of cement.

j. Admixtures and amount of same.

k. Slump requested by the Contractor and recorded in inches.

l. Percentage of entrained air requested by the Contractor.

301.8 Sampling and Testing

The Engineer shall take concrete samples for concrete cylinders in accordance with AASHTO T-141. Samples shall not be taken at the beginning or end of discharge. Making and curing the specimens shall be done in accordance with AASHTO T-23. Testing and sampling shall be done by the Engineer.

Slump tests shall be taken in accordance with AASHTO T-119 or ASTM C-150. Slump tests shall be taken by the Engineer.

Should the analysis of any test cylinder not meet the requirements of these specifications, its representative concrete shall be removed and replaced at the Contractor's expense.

301.9 Weather Limitations

Placement of concrete shall be prohibited at an ambient air temperature of less than forty degrees (40°) Fahrenheit or where the foundation material is frozen, except in special situations where authorized by the Engineer.

Exemption from the temperature clause of these specifications shall be considered under the following conditions:

a. A written proposal shall be submitted by the Contractor to the Engineer outlining a procedure for maintaining the temperature of the concrete placed of at least fifty degrees (50°) Fahrenheit for seventy-two (72) hours where Type III cement has been used. When the temperature is reduced, the drop in temperature must be gradual and not exceed thirty degrees (30°) Fahrenheit in the first twenty-four (24) hours.

b. Salt, chemicals or other material shall not be mixed with the concrete to prevent freezing.

c. Placement of concrete shall be prohibited whenever there is standing water in the forms, the sub-grade is yielding due to saturation, or rain is threatening.

301.10 Cleanup

When all concrete work has been completed and cured, the Contractor shall remove the forms, stakes, blocking, and concrete spoil from the site. The area adjoining the concrete that was excavated to permit the construction and placement of forms shall be filled with select material, and the slopes and parking areas, if any, shall be filled, shaped and smoothed to the level as shown on the typical sections.

SECTION 302 CONCRETE CURB AND GUTTER

302.1 General

This work shall consist of the construction of curb, gutter, or combination curb and gutter in conformance with the plans.

302.2 Materials

Material shall conform to *Section 301* of this division. Concrete shall conform to the requirements of *Section 301.6 Concrete, Class AA-3*.

302.3 Construction

Cast in Place Concrete Curbing

a. Excavation: Excavation shall be made to the required grade, and the base upon which the curb is to be placed shall be graded and compacted to ninety-five percent (95%) of ASTM D-1557 maximum density.

b. Erecting Forms: Forms shall be of wood or metal, straight, free from warp and of such construction that there will be no interference to the inspection of grade or alignment**.** All forms shall extend to the full depth of the curb and shall be braced and secured sufficiently so that no deflection from the plan alignment occurs during the placement of concrete.

All forms shall be set to the lines, grade, and dimensions shown on the drawings. The forms shall be thoroughly braced and secured to resist deformation or displacement under load, and shall be installed to permit easy removal without hammering or prying against the fresh concrete. The top of the forms shall not deviate more than one-eighth inch (1/8") in ten (10) feet, and the alignment of forms shall be within one-fourth inch (1/4"' in ten (10) feet.

Before placement of concrete, steel forms shall be lightly oiled with a good grade form oil. Excess oil shall be removed by wiping with clean rags, dampened in diesel or fuel oil. Wooden forms may be oiled in the same manner as metal forms, or they may be watered immediately in advance of the placement of concrete. Watering of the form shall be done with clean water of the same quality as that specified for mixing water, and only when the atmospheric temperature is not less than forty (40) degrees Fahrenheit. Concrete shall not be placed until all forms have been inspected and approved by the Engineer. Wherever form work is exposed to pedestrian traffic, bridges (not attached to the forms) shall be provided at all regular pedestrian crossings where it is required to maintain safety standards. Barricades and other safety features shall be installed as necessary.

c. Placing: The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of the concrete. Forms shall not be splashed with concrete in advance of placing.

Concrete shall be handled from the transport vehicle to the point of final placement in a continuous manner and as rapidly as is practicable. The rate of placement shall not exceed the rate at which the various placing and finishing operations can be performed in accordance with these specifications. Concrete shall not be allowed to free-fall more than three (3) feet.

Compaction of concrete placed in the forms shall be by vibration. Forms shall be left in place until the concrete has set sufficiently so that they can be removed without damaging the concrete. Immediately upon removal of the forms the exposed concrete face shall be rubbed to a uniform surface. **No Plastering will be permitted**.

If approved by the Engineer, concrete curbing may be constructed by the use of a curb forming machine. The roadway grade upon which the curb machine will travel must be graded to a smooth condition and accepted by the Engineer.

1. Pumping Concrete – Concrete may be placed by pumping provided the Contractor demonstrates that the pumping equipment to be used will effectively handle the particular class of concrete with the slump and air content specified and that it is so arranged that no vibrations result that might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned. Slump tests shall be taken at the discharge end of the pipe.

2. Concrete Deposited Under Water – If conditions render it impossible or inadvisable in the opinion of the Engineer to de-water excavations before placing concrete, the Contractor shall deposit under water, by means of a tremie or pump, a seal course of concrete of sufficient thickness to thoroughly seal the cofferdam. The concrete shall be carefully placed in a compact mass and shall not be disturbed after being deposited. Still water shall be maintained at the point of deposit.

A tremie shall consist of a watertight tube having a diameter of not less than ten (10) inches with a hopper at the top.

3. Placing Anchor Bolts - Anchor bolt assemblies conforming to the details shown shall be accurately secured in the forms in the positions shown on the plans, before any concrete is placed in the forms. The positions shall be checked and any adjustments made as soon as the concrete has been placed.

When pipe sleeves or pre-cast holes are provided, no water shall be allowed to freeze in the cavity. When anchor bolts are installed in pipe sleeves or pre-cast holes, the cavity shall be completely filled with grout at the time the grout pads are constructed or at the time the bearing assemblies or masonry plates are placed.

d. Stripping Forms and Finishing: The face form of the curb shall be stripped at such time in the early curing as will enable inspection and correction of all irregularities that appear thereon.

Forms shall not be removed until the concrete has set sufficiently to retain its true shape. The face of the curb shall be troweled with a tool cut to the exact section of the curb and at the same time maintain the shape, grade, and alignment of the curb. Both front and back edges shall be troweled to a radius of one half inch (1/2".) Final finish shall be obtained by brooming the surface, including the troweled edge, to a gritty finish after all free moisture has disappeared from the surface. Sprinkling of the cement or sand for blotting will not be permitted.

It is the intent of this specification to insure the highest quality of workmanship in the construction and finishing of PCC curb and gutter.

Unsightly or poorly finished surfaces will be considered grounds for rejection of the work involved.

All defective areas shall be removed and replaced at the Contractor's expense, unless permission to patch is granted by the Engineer. Such permission shall not be construed as an acceptance of the work, or as a waiver of the Engineer's right to require the complete removal of the work, if in his opinion, the patch does not satisfactorily restore the quality or appearance of the surface.

Should patching be permitted, the area shall be chipped clean to a depth of one inch (1") perpendicular to the surface and saturated with clean water prior to being patched. The patch shall be made with a mortar extracted from fresh concrete by passing it through a three-eighth inch (3/8") screen. The mortar shall be thoroughly compacted and screeded off slightly higher than the surrounding surface to allow for contracting or setting after the maximum shrinkage has taken place. After one (1) to two (2) hours, the patch shall be troweled to the same finish as the surrounding area and shall be cured as specified herein. The use of special patching material will be permitted if approved by the Engineer.

e. Curing: Concrete shall be cured for at least seventy-two (72) hours. Curing shall be by means of moist burlap or other approved methods. During the curing period all traffic and pedestrians shall be excluded.

Curing compounds shall be applied to all exposed surfaces immediately after finishing. Transparent curing compounds shall contain a dye of sufficient strength to render the film distinctly visible on the concrete for a minimum period of four (4) hours after application.

If, at any time during the curing period, any of the forms are removed, a coat of curing compound shall be applied immediately to the exposed surface. The curing compound shall be applied in sufficient quantity to obscure the natural color of the concrete. Additional coats shall be applied if the Engineer determines that the coverage is not adequate. The concrete shall be cured for the minimum period of time set forth below.

Type I Portland Cement Concrete----------5 days
Type III Portland High-Early-Strength Cement Concrete----------3 days

When forms are removed before the expiration of the curing period, the edges of the concrete shall be protected with moist earth, or sprayed with curing compound.

Other standard methods of curing the curb and gutter may be used upon approval of the Engineer. Concrete shall not be placed unless curing compounds and necessary equipment for applying such is on the project site.

f. Expansion and Contraction Joints:

1. 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 (AASHTO M-33.) This material shall extend the full width of the structure and shall be cut to such dimensions that the base of the expansions joint shall extend to the subgrade and the top shall be depressed not less than one-quarter (1/4) inch nor more than one-half (1/2) inch below the finished surface of the concrete. The material shall be of one (1) 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. After the concrete has set, the expansion joints shall be filled flush to the finish concrete surface with asphalt cement, two hundred (200) to three hundred (300) penetration.

Application temperature of the sealing asphalt shall be between 250 degrees and 350 degrees Fahrenheit. Sealing asphalt shall be applied by pouring from a bucket with a V-shaped spout, equipped with a positive shutoff to prevent spilling or dripping of asphalt. Before sealing, the joint shall be cleaned of all dirt, gravel, concrete mortar, and other extraneous material. Sealing shall be done in a neat workmanlike manner.

2. Contraction Joints: Transverse contraction joints, cut to a depth of one (1) inch, prior to the final set of the concrete, shall be tooled in the sidewalks at intervals of five (5) feet, and at ten (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 made to match where practicable.

g. Acceptance: The Engineer may check the hydraulic performance of the gutter flow line by placing a flow of water into the gutter. Any lengths of gutter which do not transmit water as designed shall be removed and the correct flow line established with fresh concrete at no additional cost to the Owner.

302.4 Method of Measurement

Curbing will be measured by the linear foot along the face of the curb. No deduction will be made for catch basin inlet grates.

Curb bedding material will be measured by the ton or cubic yard.

302.5 Basis of Payment

The accepted quantity of curb and gutter shall be paid at the contract unit price, complete and in place.

Payment will be made under:

PAY ITEM	DESCRIPTION	UNIT
302	Curb and Gutter, Type	Linear Foot

SECTION 303 PORTLAND CEMENT CONCRETE SIDEWALKS

303.1 General

The work covered under this section consists of all work necessary for the provision of Portland Cement Concrete sidewalks.

303.2 Materials

The Portland Cements Concrete, joint filler, reinforcing steel, and curing materials shall conform to *Division 300 – Standard Construction Specifications for Portland Cement Concrete – Section 301.3 Materials*. Concrete mix for sidewalks shall conform to the requirements for Class AA-3.

303.3 Construction

a. Excavation and Embankment

Excavation and embankment for sidewalks shall be as described in *Division 200 – Standard Construction Specifications for Earthwork*. Where directed by the Engineer, unsuitable material in the subgrade shall be removed to a specific depth and then backfilled with classified fill. Payment will not be allowed for excavation below grade and for backfill materials required when such excavation is caused by negligence of the Contractor.

Embankment shall be compacted to 95% maximum density in accordance with *Division 200, Article 1.5 Compaction Standards.* In areas that are inaccessible to normal compaction equipment, approved tampers shall be used.

Before the forms are set, the subgrade shall be graded to within one (1) inch of established grade and the area between the sidewalk and the adjacent private property line shall be shaped to line, grade, and section shown on the plans.

b. Forms and Grading

Forms shall conform to requirements outlined in *Section 302 Concrete Curb and Gutter*. Wood forms against unexposed concrete surfaces shall be No. 2 common lumber or better. Those against surfaces to be exposed shall be dressed and matched boards of uniform thickness, and widths not exceeding ten (10) inches. A rigid nonporous and waterproof sheet material may be used provided the end result will be a smooth unmarked concrete surface without waves, fins, or other noticeable markings.

Plywood conforming to the requirements for form work, as set forth by the American Plywood Association, may be used against both exposed and unexposed concrete surfaces. This plywood shall be not less than five (5) ply and at least nine-sixteenth (9/16) inches thick. Low areas in the subgrade shall be backfilled with classified fill or with suitable native material as directed by the Engineer. The backfill shall then be compacted to 95% maximum density and any fry areas in the subgrade shall be thoroughly

dampened prior to the time the concrete is placed. No payment will be made for water and the work of placing, and costs thereof shall be considered incidental to the construction of the concrete sidewalk.

c. Placing and Finishing Portland Cement Concrete Sidewalk

The subgrade shall be properly compacted and brought to specified grade before placing concrete. The subgrade shall be thoroughly dampened immediately prior to the placement of the concrete. Forms shall not be splashed with concrete in advance of placing.

Concrete shall be handled from the transport vehicle to the point of final placement in a continuous manner and as rapidly as is practicable. The rate of placement shall not exceed the rate at which the various placing and finishing operations can be performed in accordance with these specifications. Concrete shall not be allowed to free-fall more than three (3) feet.

The concrete shall be spread uniformly between the forms and thoroughly compacted with a steel shod strike-board. After the concrete has been thoroughly compacted and leveled, it shall be floated with wood floats and finished at the proper time with a steel float. Joints shall be edged with a one-quarter (1/4) inch radius edger and the sidewalk edges shall be tooled with a one-half (1/2) inch radius edger. The surface shall be brushed with a fiber hair brush of an approved type in a transverse direction except that at a driveway and alley crossing it shall be brushed longitudinally.

The sidewalk shall be divided into panels by scoring one (1) inch deep every five (5) feet. Refer to *Section 302.3 f. Expansion and Contraction Joints* for requirements for contraction and expansion joints. The expansion joints shall be placed at all structures such as catch basins and manholes, at driveways, and at all points of tangency and points of curvature.

Forms shall be left in place until the concrete has set sufficiently so that they can be removed without damaging the concrete. Immediately upon removal of the forms the exposed concrete face shall be rubbed to a uniform surface. **No Plastering will be permitted**.

Pumping Concrete: Concrete may be placed by pumping provided the Contractor demonstrates that the pumping equipment to be used will effectively handle the particular class of concrete with the slump and air content specified and that it is so arranged that no vibrations result that might damage freshly placed concrete. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. When pumping is completed, the concrete remaining in the pipeline, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients. After this operation, the entire equipment shall be thoroughly cleaned. Slump tests shall be taken at the discharge end of the pipe.

Concrete Deposited Under Water: If conditions render it impossible or inadvisable in the opinion of the Engineer to de-water excavations before placing concrete, the Contractor shall deposit under water, by means of a tremie or pump, a seal course of concrete of sufficient thickness to thoroughly seal the cofferdam. The concrete shall be carefully placed in a compact mass and shall not be disturbed after being deposited. Still water shall be maintained at the point of deposit.

A tremie shall consist of a watertight tube having a diameter of not less than ten (10) inches with a hopper at the top.

Placing Anchor Bolts: Anchor bolt assemblies conforming to the details shown shall be accurately secured in the forms in the positions shown on the plans, before any concrete is placed in the forms. The positions shall be checked and any adjustments made as soon as the concrete has been placed.

When pipe sleeves or pre-cast holes are provided, no water shall be allowed to freeze in the cavity. When anchor bolts are installed in pipe sleeves or pre-cast holes, the cavity shall be completely filled with grout at the time the grout pads are constructed or at the time the bearing assemblies or masonry plates are placed.

Additional requirements for placing and finishing concrete in cold weather shall be as outlined in *Section 301.9 Weather Limitations*.

d. Curing and Protection

The curing materials and procedures outlined in *Section 302.3* shall prevail. The curing agent shall be applied immediately after brushing and be maintained for a period of five (5) days.

The Contractor shall have, readily available, sufficient protective covering such as waterproof paper or plastic membrane to cover the pour of an entire day in event of rain or other unsuitable weather.

The sidewalk shall be protected against damage or defacement of any kind until it has been accepted by the City. Sidewalk which is not acceptable to the Engineer because of damage or defacement shall be removed and replaced at the expense of the Contractor.

Additional requirements for curing in cold weather shall be as outlined in *Section 301.9 Weather Limitations.*

303.4 Measurement

Sidewalks shall be measured per square yard, complete in place, for both four (4) and six (6) inch thickness.

303.5 Basis of Payment

Pay Item	Description	Unit
303	Concrete Sidewalk, thickness	Square Yard

STANDARD CONSTRUCTION SPECIFICATIONS

FOR ASPHALT CONCRETE PAVEMENT

DIVISION 400

INDEX

SECTION 401 GENERAL

401.1 General

Asphalt concrete pavement placed under this contract shall conform to Section 401 of the State of Alaska Department of Transportation and Public Facilities, Standard Specifications for Highway Construction, 1988 unless otherwise stated. All references to the "State" are changed to the "City."

The following changes apply to the above mentioned Standard Specifications:

401.2 Composition of Mixtures

Delete this Article in its entirety and substitute the following:

a. **At least fifteen (15) days prior to the production of asphalt concrete the Contractor shall submit the Job Mix Design to the City.** The Job Mix Design shall be performed by a certified laboratory experienced in Asphalt Mix Design by the Marshall Method. Proposals by the Contractor shall be within the master range of required sieve analysis for the particular type of mix and should be determined to take full advantage of the job tolerances as state below.

Sieve Size or Item	Tolerance % Passing
No. 4 and above	+/- 7.0
No. 10	+/- 6.0
No. 40	+/- 4.0
No. 200	+/- 3.0
Asphalt %	+/- 0.5

The above permissible variations from the Job Mix Design shall not cause the use of any mix to fall outside the broad band specification.

The Engineer may require an increased asphalt content of up to 0.5% above that indicated by the Job Mix Design criteria.

Mix Design Method

The Job Mix Design method shall be determined according to the Marshall Method, as set forth in the "The Asphalt Institute Manual, Series No. 2 (MS-2), Second Edition." The Job Mix Design shall be in accordance with the following Marshall criteria for medium traffic:

Compaction	50 blows, each end of specimen
Stability	750 pounds, minimum
Flow	8 to 18 (0.01 inches)
Percent Air Voids	3 to 5
Percent Voids in Mineral Aggregate	14 to 16

b. The Asphalt Concrete used shall be Type II.

c. The Asphalt Cement shall be AC 5.

d. The percentage of Asphalt Cement shall be 5.0% to 8.0%.

401.3 Compaction

Add the following to Article 401- 3.12:

The completed pavement shall have a density equal to or greater than ninety-two percent (92%) of the theoretical maximum density and equal to or greater than ninety-six percent (96%) of a laboratory specimen made from the same day's mix.

When requested by the Engineer, the Contractor shall provide test samples from the finished asphalt surface at no cost to the Owner. All samples shall be cored from the completed pavement and shall be a minimum of four inches (4") in diameter. The Contractor shall supply and finish new asphalt voids left by the sampling within 24 hours.

401.5 Joints

Add the following to Article 401 – 3.13:

When the first lane is paved, the longitudinal centerline joint shall be hand compacted with a lute (asphalt rake) prior to compaction by the breakdown roller.

401.6 Contract Price Adjustments

Delete Article 401 – 4.02 in its entirety and substitute the following:

Asphalt Concrete Pavement that exceeds the allowable specification tolerances listed in Article 401-2., Composition of Mixtures, will be removed from the project and replaced with fresh, specification mixture at no additional cost to the Owner.

401.7 Basis of Payment

Delete the second paragraph in Article 401 – 5.01 and substitute the following:

Anti-stripping additive shall be added to the asphalt in the amount of one-fourth (1/4) of one percent (1%) by weight of asphalt. No separate payment shall be made for anti-stripping additive.

Payments shall be made under:

ITEM	DESCRIPTION	UNIT
401	Asphalt Pavement	Ton

SECTION 402 PAINTED TRAFFIC MARKINGS

402.1 General

Painted Traffic Markings placed under this Contract shall conform to Section 670 of the State of Alaska Department of Transportation and Public Facilities, Standard Specifications for Highway Construction, 1988 unless otherwise stated. All references to the "State" are changed to the "City."

402.2 Types of Lines

The roadway shall be striped under the following schedule:

Centerline: 4-inch wide double yellow stripes for the full length of paving improvements.

Fog Lines: 4-inch wide single white stripes each side of roadway. The fog line shall be located ten feet (10') from centerline.

402.3 Basis of Payment

Payment shall be made under:

ITEM NO.	DESCRIPTION	UNIT
402	Painted Traffic Markings	Lump Sum

SECTION 403 RECYCLED ASPHALT PAVING (RAP)

403.1 General

The work under this section consists of furnishing all materials and performing all operations necessary to complete placement and construction of a recycled asphalt paving (RAP) surface on an existing prepared subbase.

403.2 Material

The RAP shall consist of crushed gravel, rock, sand, or other approved material. The aggregate shall be derived from recovered AC pavement and be free from lumps, balls of clay, or other objectionable matter, and shall be durable and sound. The portion of material retained on a No. 4 sieve shall be know as coarse aggregate.

RAP is to be delivered to the job site in an unheated condition. Delivery of heated material to the job site will be rejected unless previously approved by the Engineer.

A. Coarse Aggregate

The coarse aggregate material conforming to the requirement specified above shall have a percentage of wear not to exceed 50 after 500 revolutions, as determined by the current requirements of ASTM C-131. It shall consist of angular fragments reasonably uniform in density and quality, and reasonably free from thin elongated pieces, dirt, and other objectionable material. At least fifty (50) percent of the coarse aggregate particles shall have at least two (2) mechanically fractured faces. Asphalt extraction and sieve analysis shall be performed in accordance with ASTM D 2172 – A or B, AASHTO T-164 –A or B, and AASHTO T-30.

B. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter. The fine aggregate, either naturally combined with coarse aggregate or separately obtained and mixed therewith, shall be of such character that the composite material will conform to the gradation and other requirements specified.

C. Gradation

The composite mixture of coarse aggregate and fine aggregate, processed as hereinafter specified, shall conform to the following gradation limits:

SIEVE SIZE	PERCENTAGE PASSING BY WEIGHT
1”	100
¾”	70-100
3/8”	50-85
#4	35-65
#10	20-50
#40	10-30
#80	5-20
#200	2-10

Asphalt Content : 2.7% - 4.7%
Moisture Content : 3.5% Maximum

The asphalt content of RAP delivered to the project shall be determined on the individual extraction test results and not on average of extractions conducted.

403.3 Construction

The RAP shall be placed to the lines, grades, and thickness shown on the Drawings and shall consist of the materials hereinbefore specified. The RAP shall provide a smooth stabilized paved surface on which vehicular traffic can drive.

A. Preparation of Subbase

The subbase shall be compacted to 95% of maximum density. Graded material which is excessively wet shall be aerated by means of blade graders, harrows, or other suitable equipment until the moisture content is satisfactory.

B. Placing

The approved RAP material shall be deposited and spread uniformly on the prepared subbase in one uniform layer to the required contour and grades and to such loose depth that when compacted to the density required, will achieve the specified thickness. Portions of the layer which become segregated in spreading shall be re-mixed to the required gradation.

C. Compacting

The RAP shall be compacted to at least 95% of maximum density as per AASHTO T-180d. In all places not accessible to the rolling equipment, the mixture shall be compacted with tamping equipment capable of attaining the specified density. Blading, rolling, and tamping shall continue until the surface is smooth and free from waves and inadequacies. If at any time the mixture is determined to be above or below optimum moisture, it shall be aerated by means of blade graders, harrows, or other approved equipment or moisture added until the moisture content is such that the surface can be re-compacted and finished as above. In-place compaction shall be accomplished with a

double-drum vibratory asphalt compactor with a minimum of 15,000 pounds of dynamic force per drum. All requests for equipment substitution shall require a current certification test, identifying the capability of the equipment to meet required specifications.

D. Smoothness Test

The surface of the RAP, when finished, shall not show any deviation in excess of 3/8 inch when tested with a ten (10) foot straight-edge applied parallel with, and at right angles to, the centerline of the area to be paved. Any deviation in excess of this amount shall be corrected by loosening, adding, or removing material and reshaping and compacting to satisfy the above requirement.

The Contractor shall furnish a ten (10) foot long straight-edge and shall, in the presence of the Engineer, straight-edge test the entire surface.

403.4 Measurement

The RAP shall be measured in tons of materials delivered and placed in accordance with these specifications and adjusted for excess moisture as hereinafter provided. Said measurement may include moisture up to a maximum of 3.5% of dry weight of the material.

When tests by the Engineer indicate that moisture contents in excess of 3.5% may be occurring consistently, the frequency of testing will be increased as necessary and the results averaged over a period of one week. When this average is greater than 3.5%, the tonnage as measured over the above period shall be reduced by the difference. No credit will be due the Contractor when moisture content is less than 3.5%. Testing will be done in accordance with AASHTO Designation: T255-76 (1982).

403.5 Basis of Payment

Payment for this work shall be full payment for all work described in this section and shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
403	Furnish & Install RAP	Ton

STANDARD CONSTRUCTION SPECIFICATIONS

FOR SEWER SYSTEMS

DIVISION 500

INDEX

SECTION 501 GENERAL

501.1 General

The work covered by these specifications consists of providing all plant, labor, equipment, supplies, material, transportation, handling and storage, and performing all operations necessary to complete the construction for pipe laying, jointing, and testing of sanitary sewers.

Requirements for earthwork including trench excavating and backfill are specified in *Division 200 Standard Construction Specifications for Earthwork*.

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 Offcials (AASHTO), the American Standards Association (ASA), and the American Water Works Association (AWWA) are hereby made a part of these specifications.

ASTM A-48 AND ASTM A-438	Strength Requirements for Manhole Frames and Covers.
ASTM A-746 / (AWWA C-151)	Ductile Iron Pipe
ASTM C-6	Hydrated Lime
ASTM C-14	Specification for Non Reinforced Concrete Pipe.
ASTM C-76	Specification for Reinforced Concrete
ASTM C-150	Specification for Portland Cement
ASTM C-478 / (AASHTO – 199)	Specification for Precast Reinforced Concrete
ASTM D256	Test methods for D-C Resistance of Plastics
ASTM D2321	Practice for Underground Installation of Thermoplastic Sewer Pipe

ASTM D3034	Specification for type of PSM Poly (vinyl chloride, PVC) Sewer Pipe and Fittings
ASTM D3035	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter
ASTM D3350	Specification for Polyethylene Plastic Pipe and Fittings Materials
AASHTO M-45	Sand for Cement Mortar
AWWA C-100	Ductile Iron Fittings
AWWA C-104	Cement Mortar for Ductile Iron Pipe
AWWA C-104 / (ASA A-21.4)	Cement Mortar for Cast Iron Pipe
AWWA C-111	Rubber Gasket Fittings for Ductile Iron Pipe
ASA A-21.10	Cast Iron Fittings
ASA A-21.11	Cast Iron Joints

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 eighteen inches (18") or a horizontal distance of ten feet (10'). In such cases, refer to *Division 700, Section 705 Sewer Encasement,* and *Section 706 Relocate Water Main.*

501.4 Surveys

The Contractor will lay out (in the field) the alignment and grade of work to be done under the Contract. When once laid out, the Contractor shall be responsible for the preservation of all line stakes, grade stakes, and hubs. In the event of their loss or destruction, the Contractor shall pay all costs for their proper replacement. The Contractor shall be responsible for, and pay all costs for the transfer of, the control points from the reference hubs to such hubs or batter boards as required or needed for the prosecution of the work. A ground line profile will be made by the Contractor.

The ground line profile refers to the elevation of the ground directly above the centerline of pipe and the grade line refers to the elevation of the invert of pipe, except where otherwise noted.

The City of Homer will furnish the Contractor with a list of all pertinent bench marks, necessary for control points, and other information for control of the Work. Prior to utilizing information such as bench marks, etc., it shall be the Contractor's responsibility to verify bench mark elevations by checking between at least two (2) bench marks. The Contractor shall protect the bench marks and control points provided by the Engineer and properly reference them off. The contractor shall be responsible for any necessary replacement.

As-built measurements shall be done by the Contractor and, prior to final acceptance, the Contractor will furnish the City of Homer with record drawings and survey notes.

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 be Class A-3. Concrete Work shall conform to *Division 300, Portland Cement Concrete* of these specifications.

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 (1) part cement and three (3) parts sand. The addition of lime is not permitted.

SECTION 502 FURNISH AND INSTALL PIPE

502.1 General

The work under this section consists of the performance of all operations pertaining to furnishing and installing pipe for sanitary sewer systems.

502.2 Material

a. General: All piping shall be in accordance with the contract documents and shall conform to the size and class shown and specified.

b. Ductile Iron Pipe: Ductile iron pipe shall conform to requirements of ASTM Z-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 ductile iron and shall conform to AWWA C-100 for Class "D" fittings, except that so called "short body" fittings, otherwise meeting AWWA Specifications may be used. Rubber gasket joints for ductile iron pipe fittings shall conform to the requirements of AWWA C-111.

c. Joints shall conform to the requirements of: ASTM C-14 and ASTM C-443. Joints shall be of the "O" Ring type and shall be subject to the approval of the Engineer as to configuration. All repair clamps shall be approved stainless steel clamps.

d. High Density Polyethylene Pipe (HDPE): The pipe and fitting material shall have a cell classification of 345434C in accordance with ASTM D3350. In addition, the material must exceed 1000 hours when tested in accordance with the Ring Environmental Stress Crack Resistance Test (Radar Ring Test) with fewer than 20 percent failures. Also, the extruded pipe shall have impact strength greater than 3 ft-lbs/ inch when tested in accordance with ASTM D256 Izod Impact Test.

The pipe shall be homogenous 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 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. **The individual performing the fusing procedure must hold a current certification for fusing HDPE as stated in Title 49.1 DOT Certification.**

All HDPE mainline shall be installed with No. 6 bare copper locate trace wire. Trace wire will be secured to the top of the pipe with tape or other approved method at minimum ten foot intervals.

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 Standard Specification for Earthwork, Section 207 Trench Excavation and Backfill*, of these specifications.

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.

The allowance tolerance is per twenty linear feet.

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 eighteen inches (18") in diameter, variance shall not exceed 0.05 feet.

During the progress of the work, the 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 to the Contractor by the Engineer. The Contractor shall provide qualified personnel to use such instruments and who shall have the duty and responsibility for placing and maintaining such construction guides.

If the method of transferring grades from the offset hubs to the pipe requires batter boards, they shall be at least 1" x 6" supported on 2" x 4" stakes or approved metal rods and shall be placed every twenty-five feet (25'). At least three (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 the 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 observation shall be subject to the approval of the Engineer. If intermittent back-filling is allowed, back-filling shall be accomplished in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and backfill*, of these specifications. All trench excavation and compaction shall be considered incidental to pipe laying. Imported trench backfill which is requested by the Engineer or called out on the plans will be paid under the appropriate pay item or by letter of agreement.

c. Pipe Laying: All pipe shall be laid with class C Bedding unless otherwise required by the contract documents or directed by the Engineer.

Pipe laying shall not progress ahead of back-filling of ditches more than four hundred feet (400'). 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 unless otherwise required by the Contract documents or directed by Engineer. 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 that 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 the 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 the City. 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 construction project for which the Contractor is responsible.

d. Bedding of Ductile Iron Pipe for Sewer Main: The use of ductile iron may eliminate the need for pipe bedding materials above the spring line of a pipe. Native materials may be used where bedding material above the spring line is eliminated; however, it must be compacted to ninety percent (90%) maximum density.

e. Laying Instructions: All 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 (1') above the pipe, is frozen. Backfill material shall not contain frozen material. The trench shall not be left open during freezing weather in order to prevent the temperature of the material near the pipe from freezing. Caution tape clearly identifying sewer shall be laid in the trench two feet (2') over and centered on the pipe.

f. Testing:

1. General

The 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 the 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 the 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 the Engineer. The Contractor shall have the option of choosing only one (1) 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.

All testing shall be considered a subsidiary 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 sections.

2. Exfiltration Test (Using Water)

On completion of a section of sanitary sewer between manholes or otherwise, the Engineer shall require the ends of all pipe be plugged, including service connections, and the pipe subjected to a hydrostatic pressure test. Generally all testing is to be conducted after back-filling, prior to resurfacing and after service connections are made.

A minimum head of six feet (6') feet of water above the crown at the upper end of the test section shall be maintained for a period of four (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 (1) hour period, the measured loss shall not exceed the rate of fifty (50) gallons per inch diameter per mile per twenty-four (24) hours.

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 theses requirements and re-testing shall be at the expense of the Contractor.

The maximum length of sanitary sewer for the above allowable leakage test shall be one thousand feet (1,000'). If it is not apparent that leakage test results between any two (2) manholes is satisfactory, then the Engineer may require subsequent tests to establish the more exact location of the leakage areas. Any section of sanitary sewer between any two

(2) manholes that does not meet the above requirements shall be rejected and the 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)

The Contractor shall furnish all facilities and personnel for conducting the test under the observation of the Engineer. The equipment and personnel shall be subject to the approval of the Engineer.

The Contractor may desire to make an air test prior to back-filling for his own purpose. However, the acceptance air test shall be made after back-filling has been completed and compacted. Generally all testing is to be conducted after back-filling, prior to resurfacing and after service connections are made.

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 four (4.0) pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. At least two (2) minutes shall be allowed for temperature stabilization before proceeding further.

The pipeline shall be considered acceptable when tested at an average pressure of four (4.0) 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 clean-out structures does not exceed two (2.0) cubic feet per minute, or the following table may be utilized as a guideline for a satisfactory test by air for pipe sizes as shown:

Pipe Diameter	Allowable Pressure Drop in Ten Minutes
8”	2.7 PSI
10”	2.1 PSI
12”	1.8 PSI
15”	1.4 PSI
18”	1.2 PSI
24”	0.9 PSI

Pressure gauges shall be incremented in not more than ½ pound increments for accurate tests.

If the pipe installation fails to meet test requirements, the 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 the Contractor are acceptable to the 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. The 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 ten pounds per square inch (10psi).

4. Infiltration Test

Infiltration testing may be allowed at the Engineer's option when the natural ground water table is six feet (6') above the crown of the higher end of the test section. The maximum allowable limit for infiltration shall not exceed the rate of fifty (50) gallons per inch diameter per mile per twenty-four (24) hours.

The 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 the Engineer to observe and record the actual leakage.

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

5. Check of Line and Grade

After back-filling 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 thirty inches (30") 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 on straight sewer runs. A physical inspection of the interior of all sanitary sewer line thirty inches (30") in diameter and above will be made before acceptance. Any excess deviation in line and grade shall be corrected by the Contractor prior to final acceptance of the project.

502.4 Method of Measurement

Measurement for all sizes of pipe shall be based on the horizontal centerline distances and will be from center to center of manholes or from center of manholes to center of clean-out wye.

502.5 Basis of Payment

Payment shall be made under the following units:

ITEM	DESCRIPTION	PAY UNIT
502	Furnish and Install Sewer Pipe	Linear Foot

SECTION 503 MANHOLES

503.1 General

The work under this section consists of the performance of all operations pertaining to the construction and installation of sanitary sewer manholes complete with frames and covers.

503.2 Material

Material used in construction of manholes shall conform to the requirements of ASTM C-478-69. Cones shall be Type (A), 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 one (1) part cement and three (3) parts sand. The joints shall be made 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 thirty thousand pounds per square inch (30,000 psi) minimum, conforming with the requirements of ASTM A-48 and the requirements for transverse breaking load shall be two thousand (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, the Contractor shall submit Shop Drawings of the locking devise for approval of the Engineer.

Pre-molded plastic gasket for manhole construction shall be as manufactured by K. T. Snyder Company, Inc., Ram-Nek Gasket Division, 2100 Travis Street, Houston, Texas or equal.

Refer to Section 300 General, 301.6 Mix Requirements for Classes of Concrete, for specifications pertaining to Class A-3 concrete as required in forming manhole inverts.

Z-LOK Cast-in Boots shall be installed in all inlets and outlets of manholes for sanitary sewer. Z-LOK Boots are manufactured by A-LOK Products, Inc., 697 Main St., Tullytown Pennsylvania 19007.

The inflow preventer shall conform to the standard detail as shown in these Specifications.

Wrapidseal Manhole Encapsulation System material will be installed at all manhole joints according to manufacturer’s installation guidelines.

503.3 Construction

a. General

Installation of manholes shall be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill*, of these specifications.

The manhole frames and covers shall be brought to the grades shown on the drawings. Manhole rings shall be set in and made secure by use of a plastic gasket pipe joint sealer. (In existing paved streets, manhole 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.

All exterior joints, including grade rings and surface castings, shall be wrapped with Wrapidseal Manhole Encapsulation System and be installed according to the manufacturer's recommendations**.**

All portions of pre-cast manholes must be approved by the Engineer prior to installation on the sanitary sewer systems. The Contractor shall provide timely notice (at least two (2) working days in advance of installation) to allow time for the Engineer to arrange for necessary inspections. Installation of manhole sections will not be allowed prior to the Engineer's written approval. This approval does not relieve the Contractor of the responsibility for protection of manholes against damage during handling and installation.

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.

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 shall have a minimum piping stub-out of nine feet (9').

In the case of poured-in-place manhole construction, if the Contractor elects to accomplish the manhole construction utilizing more than one (1) 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 and poured in place, or may be constructed by laying a full section of sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. The flow of the manhole outside the channels shall be smooth and shall slope toward the channels at a grade of one-inch (1") per foot.

503.4 Method of Measurement

Manholes shall be measured as units complete in place.

503.5 Basis of Payment

Separate payment will not be allowed for frames, covers, and inflow preventer inserts; but shall be included in the unit price for manholes.

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
503	Construct Manhole	Each

SECTION 504 WATERTIGHT MANHOLE FRAMES, COVERS, AND INSERTS

504.1 General

The work under this Section consists of the performance of all operations pertaining to the furnishing and installation of watertight manhole frames, covers, and watertight inserts.

504.2 Material

Z-LOK Cast-in Boots shall be installed in all inlets and outlets of manholes for sanitary sewer to allow differential settlement of the pipe and manhole wall to take place. Where Z-LOK Boots are used, grout shall only be installed on the inside of the manhole.

Watertight frames and covers for manholes and similar appurtenances shall be of cast iron and conform to the dimension shown on 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 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.

Inflow protection inserts shall be provided for all new manholes in accordance with the standard details of these specifications.

504.3 Construction

Installation shall be performed in accordance with the manufacturers written instructions and the standard details of these specifications.

All exterior joints, including grade rings and surface castings, shall be wrapped with Wrapidseal Manhole Encapsulation System and be installed according to the manufacturer's recommendations

504.4 Method of Measurement

Watertight manhole frames, covers, and inflow protection inserts shall not be measured separately, but shall be considered incidental to *Item 503, Manholes*.

504.5 Basis of Payment

None

SECTION 505 CONNECTIONS TO EXISTING MANHOLES

505.1 General

The work under this section consists of the performance of all operations pertaining to the work required for connection to existing manholes.

505.2 Construction

Excavation and backfill for connections to existing manholes shall be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill,* of these specifications.

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 existing manhole. The downstream pipe in manholes shall be screened to prevent 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 the 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 the Engineer's prior written approval and the provision of adequate debris and sand traps, and sumps, upstream from the connection.

505.3 Method of Measurement

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

505.4 Basis of Payment

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 the following unit:

ITEM	DESCRIPTION	UNIT
505	Connection to Existing Manhole	Each

SECTION 506 CONSTRUCT DROP CONNECTION

506.1 General

The work under this section consists of providing all operations pertaining to furnishing and installing drop sewer connections to manholes.

506.2 Materials

Pipe and fittings used in the construction of drop connections for sanitary sewers shall conform to the requirements of AWWA C-151 for Class 50 pipe and AWWA C-100 for Class "D" fittings and the standard details.

506.3 Construction

Excavation and backfill for the construction of drop connections shall be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill* of these specifications.

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

Refer to *Division 300 Standard construction Specifications for Portland Cement Concrete, Section 301 General* of these specifications for requirements pertaining to Class A-3 concrete.

506.4 Method of Measurement

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

506.5 Basis of Payment

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
506	Construct Drop Sewer Connection	Each

SECTION 507 CONSTRUCT BEAVER SLIDE

507.1 General

The work under this section consists of providing all operations pertaining to the construction and installation of beaver slides in a manhole.

507.2 Material

Refer to *Division 300 Standard Construction Specifications for Portland Cement Concrete Section 301 General,* of these specifications for requirements pertaining to Class A-3 concrete as required in forming beaver slide inverts.

507.3 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 the 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 these specifications.

507.4 Method of Measurement

Beaver slides shall be measured as units complete in place.

507.5 Basis of Payment

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
507	Construct Beaver Slide	Each

SECTION 508 CONSTRUCT SANITARY SEWER CLEANOUT

508.1 General

The work under this section consists of providing all materials and operations pertaining to construction and installation of cleanouts.

508.2 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 in the standard detail of these specifications.

508.3 Construction

Excavation and backfill for the construction of sewer cleanouts shall be in accordance with *Division 200, Section 207 Trench Excavation and Backfill*, of these specifications.

508.4 Measurement

Cleanouts will be measured as units, complete in place.

508.5 Basis of Payment

Item	Description	Unit
508	Construct Sanitary Sewer Cleanout	Each

SECTION 510 SANITARY SEWER SERVICE CONNECTIONS

510.1 General

The work under this section consists of providing all operations pertaining to the construction required for sanitary sewer service connections.

510.2 Materials

All sanitary sewer service connects shall be constructed with the following materials:

a. Cast iron with "Ty-seal" joints.

b. Cast iron with "no-hub" joints, joined only with a "Romac repair clamp" style LSS1 six inches (6") or longer or equal.

All services with less than five feet (5') of cover shall be insulated with sufficient two inch (2") DOW Styrofoam "HI" to provide an equivalent of five feet (5') of soil cover. The insulation shall be two feet (2') in width and shall be placed no closer than six inches (6") above the pipe and no further than one foot (1') above the pipe, centered.

IFCO 725-P saddle or equal shall be secured with a double strap or a single stainless steel band of two and one-half inches (2-1/2") inches or more in width.

510.3 Construction

Excavation and backfill for sanitary sewer service connections shall be in accordance with *Division 200, Standard Specifications for Earthwork, Section 207, Trench Excavation and Backfill*, of these specifications.

The service connections shall be bedded with non-frost susceptible material, with a fine granular texture containing no material larger than one and one-half inches (1-1/2"). The bedding shall be laid the full extent of ditch and up to the spring line of the service connect. Piping may be bedded with native soils if approved in advance by the Engineer.

Construction shall be in accordance with the standard details of these specifications. Multiple connections to the sewer main shall not be made any closer together than three feet (3'). 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 be allowed on mains twelve inches (12") and larger. Tee saddles will be the only saddles allowed on mains smaller than twelve inches (12"). All service connections to sanitary sewer mains shall be approved cast iron or "Ty-seal" pipe. Saddles shall be placed over a hole sawed no larger than one-eighth inch (1/8") larger than the inside diameter of the service line. 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.

Sanitary sewer service connections, shall be installed to the edge of right-of-way or the edge of the permanent easement of the lot being served and shall be permanently marked by means of a two by four (2" x 4") board installed vertically from the end of the service stubout and extending three feet (3') above grade, painted white and stenciled with the word "Sewer" in white, two-inch (2") high letters. A minimum 1/2"x 2' long stick of rebar shall be installed alongside the 2x4 board as shown in the standard details.

As-built measurements shall be the station of the service connection at the main plus a minimum of two (2) ties to prominent features and when possible ties to property corners. An as-built elevation of the stub end invert is required.

Minimum slopes shall be as follows:

4"	2.08%	.0208	feet per foot (1/4" per foot)
6"	1.00%	.0100	feet per foot
8"	0.40%	.0040	feet per foot
10"	0.28%	.0028	feet per foot
12"	0.22%	.0022	feet per foot

510.4 Method of Measurement

Sanitary sewer service connections shall be measured as completed units in place. This item will include all materials, excavation, installation, compaction, and installation of Class "B" bedding. Imported backfill will be paid separately as a bid item or by letter of agreement.

510.5 Basis of Payment

Payment shall not be made for any service which does not include the as-built stub end elevation and horizontal location as stipulated above.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
510	Sanitary Sewer Service Connection (size)	Each

SECTION 511 ADJUST MANHOLE CONE

511.1 General

This item consists of furnishing all labor, equipment, and materials necessary to adjust existing manhole cones to finish grade as shown on the plans and in accordance with the applicable standard details of these specifications.

511.2 Material

All materials used in the adjustment of manhole cones shall conform to the requirements for manholes as outlined in the standard construction specifications for sanitary sewer systems and storm drain systems, unless otherwise approved by the Engineer.

511.3 Construction

The Contractor shall adjust the manhole cones in accordance with the applicable standard detail or as called out on the plans. Any damage to manholes resulting from construction under this item shall be repaired or the damaged portion replaced at the Contractor's expense.

All exterior joints, including grade rings and surface castings, shall be wrapped with Wrapidseal Manhole Encapsulation System and be installed according to the manufacturer's recommendations

511.4 Method of Measurement

Manhole cone adjustments will be measured per unit, complete in place.

511.5 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.07 Measurement and Payment*, and shall include full payment for all work described in this Section and all work outlined on the applicable standard detail, unless otherwise noted.

Payment for cone adjustment shall include full compensation for changes in height. In no case will payment for both ring and cone adjustments be made for the same manhole.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
511	Adjust Manhole Cone	Each

SECTION 512 ADJUST MANHOLE RING

512.1 General

This item consists of furnishing all labor, equipment and materials necessary to adjust existing manhole rings to finish grade as shown on the plans and in accordance with the applicable standard details of these specifications.

512.2 Material

All materials used in the adjustment of manhole rings shall conform to the requirements for manholes as outlined in the standard construction specifications for sanitary sewer systems and storm drain systems, unless otherwise approved by the Engineer.

512.3 Construction

The Contractor shall adjust the manhole rings in accordance with the applicable standard detail in these specifications. Any damage to manholes resulting from construction under this item shall be repaired or the damaged portion replaced at the Contractor's expense.

All exterior joints, including grade rings and surface castings, shall be wrapped with Wrapidseal Manhole Encapsulation System and be installed according to the manufacturer's recommendations

512.4 Method of Measurement

Manhole ring adjustments will be measured per unit, complete in place.

512.5 Basis of Payment

Basis of payment for this item shall include full payment for all work described in this Section and all work outlined on the applicable standard detail, unless otherwise noted.

Payment for ring adjustment shall include full compensation for changes in height. In no case will payment for both ring and cone adjustments be made for the same manhole.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
512	Adjust Manhole Ring	Each

SECTION 513 ADJUST CLEANOUT

513.1 General

This item consists of furnishing all labor, equipment, and materials necessary to adjust existing sanitary sewer cleanouts to finished grade as shown on the plans.

513.2 Construction

All cleanout adjustments shall be accomplished as directed by the Engineer. Any damage to the cleanout or sewer main resulting from work under this item shall be repaired or replaced at the Contractor's expense.

513.3 Method of Measurement

Cleanout adjustments shall be measured per unit, complete in place.

513.4 Basis of Payment

The contract unit prices per each for cleanout adjustments shall be full compensation for furnishing all equipment and labor necessary to complete the work as specified. Materials required to adjust cleanouts shall be incidental to this item.

Payment will be under:

ITEM	DESCRIPTION	PAY UNIT
513	Adjust Cleanout	Each

SECTION 514 POLYETHYLENE ENCASEMENT

514.1 General

The work under this section consists of providing all operations pertaining to the furnishing and installation of one layer of polyethylene encasement on all ductile iron pipe, if required in the plans and specifications.

514.2 Material

The polyethylene encasement material for pipe shall be 8 mils thick and conform to the most current edition of AWWA C105/ ANSI A21.5.

514.3 Construction

The polyethylene encasement shall be installed 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 "Installation Guide for Ductile Iron Pipe."

514.4 Method of Measurement

Measurement on all sizes of polyethylene encasement for pipe shall be the same as the measurement of the pipe installed.

514.5 Basis of Payment

Payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for the word described in this section.

Payment will be made under:

ITEM	DESCRIPTION	PAY UNIT
514	Polyethylene Encasement	Linear Foot

STANDARD CONSTRUCTION SPECIFICATIONS FOR

WATER SYSTEMS

DIVISION 600

INDEX

SECTION 601 GENERAL

601.1 General

This division of the Standard Construction Specifications covers the construction of all water facilities that will be supplied water by the Homer Water Utility.

601.2 Applicable Standards

The most recent revision of the following standards of the American Society for Testing and Materials (ASTM) and 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 D256	Test Methods for D-C Resistance of Plastics and Electrical Insulating Materials.
ASTM D3035	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
ASTM D3261	Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for PE Plastic Pipe and Tubing
ASTM D3350	Specification for Polyethylene Plastic Pipe and Fitting Materials
AWWA C-104	Cement Mortar Lining for Cast Iron and Ductile Iron Pressure Pipe Fittings.
AWWA C-105	Polyethylene Encasement for Gray and Ductile Iron Piping.
AWWA C-110	Gray Iron and Ductile Iron Fittings
AWWA C-111	Rubber Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe Fittings
AWWA C-115	Flanged Cast Iron and Ductile Iron Pipe with Threaded Flanges
AWWA C-150	Thickness Design for Ductile Iron Pipe
AWWA C-151	Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds

AWWA C-500	Gate Valves
AWWA C-502	Dry Barrel Fire Hydrants
AWWA C-600	Installation of Cast Iron Water Mains
AWWA C-601	Disinfecting Water Mains
AWWA C-800	Threads for Underground Service Line Fittings
AWWA C-901	Standard for Polyethylene (PE) Pressure Pipe and Tubing
AWWA B-88	Standard Specifications for Copper Water Tube

601.3 Surveys

The Contractor will lay out in the field the alignment and grade for work to be done under the Contract. When once so laid out, the Contractor shall be responsible for the preservation of all line stakes, grade stakes, and hubs. In the event of their loss or destruction, the Contractor shall pay all costs for their proper replacement. Offset hubs and stakes shall be set for each fitting and grade-break on a line parallel to and at a uniform distance from the line of pipe. The Contractor shall be responsible for, and pay all costs for, the transfer of the control points from the reference hubs to such hubs or batter boards as required for the prosecution of the work. A ground line profile will be made by the Contractor.

The ground line profile refers to the elevation of the ground directly above the centerline of pipe, and the grade line refers to the elevation of the bottom of pipe, except where otherwise noted.

The Engineer will furnish the Contractor with a list of all pertinent bench marks necessary for vertical control of the work. Prior to utilizing information such as bench marks, etc., it shall be the Contractor's responsibility to verify bench marks and control points provided by the Engineer and properly reference them. The Contractor shall pay for any necessary replacement.

As-built measurement will be done by the Contractor on all fittings, grade-breaks, and utility crossings. The Contractor shall, prior to final acceptance, provide the City of Homer with record drawings and field notes.

SECTION 602 FURNISH AND INSTALL PIPE

602.1 General

The work under this section consists of the performance of all work required for the furnishing and installation of water pipe, fittings, and tie rods. The Contractor shall install them in accordance with these specifications and in conformity with the lines and grades as shown on the drawings, unless otherwise approved.

602.2 Material

a. Ductile Iron Pipe

Ductile Iron Pipe shall conform to the requirement of AWWA C-151, with cement mortar lining conforming to the requirements of AWWA C-104. Class 52 Pipe shall be used for all pipe.

Fittings shall be of a minimum two hundred fifty (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 C-110. Rubber gasket joints for ductile iron pipe and fittings shall conform to the requirements of AWWA C-111.

b. 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 B-88 for Type K soft copper as manufactured by the American Brass Company, or equal.

c. Joint Tie Rods

Tie rods shall be threaded black iron or mild steel and shall be located symmetrically around the perimeter of the pipe, using anchoring lugs of standard manufacture for attachment where required. Tie rods shall be three-quarter inch (3/4") diameter on pipes twenty-four inches (24") and less and one inch (1") diameter on pipes thirty inches (30") and over. There shall be two (2) rods on pipes twelve inches (12") and less; four (4) each on pipes fourteen inches (14") to sixteen inches (16") inches in diameter; six (6) each on pipes eighteen inches (18") in diameter; eight (8) each on pipe twenty-two inches (22") to twenty-four inches (24") in diameter; twelve (12) each on pipes forty-two inches (42") in diameter; and fourteen (14) each on pipes forty-eight inches (48") in diameter.

d. High Density Polyethylene Pipe

The pipe and fitting material shall have a cell classification of 345434C or better in accordance with ASTM D3350. In addition, the material must exceed 1000 hours when

tested in accordance with the ASTM F1248, the Ring Environmental Stress Crack Resistance Test with fewer than 50 percent (50%) failures. The extruded pipe shall have impact strengths greater than three feet pounds per inch (3 ft.# / inch), in accordance with the ASTM D256 Izod Impact Test. The material shall be listed by the NSF (National Sanitation Foundation) for potable water service **and be indicated as such on the pipe.**

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. **The individual performing the fusing procedure must hold a current certification for fusing HDPE as stated in Title 49.1 DOT Certification.**

Bolts for flanged connections will meet the minimum standard ASTM A307A unless otherwise noted.

All HDPE mainline shall be installed with No. 6 bare copper locate trace wire. Trace wire will be secured to the top of the pipe with tape or other approved method at minimum ten foot intervals.

e. Material Limitations

Copper, ductile iron, and HDPE are the only pipe materials allowed on water service connections or extensions. HDPE is only approved for services 2" and larger. Galvanized pipe shall not be allowed in underground water systems.

602.3 Construction

a. Trench Excavation and Backfill

The Contractor shall provide all trench excavation and backfill and compaction necessary to install pipe in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and Backfill* of these specifications.

Caution tape clearly indicating water will be installed two feet (2') and centered on the pipe.

b. 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 to not damage the pipe, pipe coating or lining. Before installation, the pipe and appurtenances shall be examined by the 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 the Engineer.

Rubber gaskets shall be stored in a cool, dark place to prevent damage from the direct rays of the sun.

c. Installation

Installation shall be in accordance with the requirements of AWWA C-600. 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 plugged during the laying operation to keep the interior clean.

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 the Contractor at his expense and in a manner satisfactory to the Engineer. At a sufficient distance, prior to encountering a known obstacle or connection into an existing pipe, the 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 special parts and/or fittings to suit actual conditions. All connections made under pressure shall be witnessed by City of Homer Public Works personnel.

Pipe ends left for future connections shall be plugged, or capped, and anchored as shown on the drawings or as directed by the Engineer. The end of the pipe shall be marked by means of a two by four (2" x 4") extending from the face of the pipe to two feet (2') above finish grade. The 2" x 4" marker shall be painted white and stenciled with the word "Water" in black two inch (2") high letters. A minimum ½"x 2' piece of rebar shall be driven alongside the 2x4 and flush with the finished grade.

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe.

Concrete thrust blocks and mechanical restraints of the type shown on the standard details shall be installed where the pipe line terminates or changes alignment, utilizing a tee, cross, bend or similar fitting. Either poured-in-place or pre-cast thrust blocks are

acceptable if the minimum base area is sufficient as shown in the standard details. Concrete for the thrust blocks shall be Class C-6 as described in *Division 300 Standard Construction Specifications for Portland Cement Concrete, Section 300.1 General, 301.6 Mix Requirements for Classes of Concrete* of these specifications.

If the Contractor elects to use poured-in-place thrust blocks, all pipe and fittings exposed to concrete will be double wrapped with four (4) mil polyethylene film prior to placement of the concrete.

d. Alignment and Grade

The pipe shall be so laid in the trench that after the line is completed, the bottom of the pipe conforms accurately to the grades and alignment given by the Engineer. A maximum two-tenths foot (2/10') deviation from design elevations and alignment will be allowed. The pipe shall be generally straight to visual observation as determined by the Engineer.

Both line and grade shall be checked and recorded in a field book for each piece of pipe and appurtenances laid. The Contractor shall have instruments such as a transit and level for transferring alignment and grades from offset hubs. He shall also 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. The Contractor will furnish to the 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 the Engineer and shall be accomplished in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and Backfill, 207.3 Construction,* of these specifications. The Contractor shall provide true, correct, and certified record drawings of the survey notes, to the Engineer.

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 offsets, shall not exceed the manufacturer's recommendations for the type of pipe being installed.

If the alignment requires deflection in excess of the above limitations, the 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 special segments.

e. Jointing of Metal Pipe

The Contractor has the option of using either mechanical or push-on joints. All joints shall conform to the requirements of AWWA C-600.

The Contractor will be required to use mechanical joints on all hydrant leads. The Engineer has the option of checking any or all mechanical joints to assure proper torque as specified by the manufacturer.

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 C-110 for 250 pound pressure ratings.

602.4 Flushing and Testing

Prior to any tests performed, all newly installed water facilities, including fire lines, shall be open bore flushed. The Contractor, at his option, shall perform the disinfection and hydrostatic tests in any order of sequence. The Contractor is made aware, that in the event the disinfection 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 the Engineer.

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. The Contractor shall furnish, install, and remove all fittings and pipes necessary to perform the flushing, at no additional cost to the City of Homer. Under no circumstances will open bore flushing through hydrants or reduced outlets be permitted. The use of reducers will not be allowed.

It will be the contractor's responsibility to notify the Engineer and the City of Homer's Public Works Department forty-eight (48) hours in advance of any flushing operations. All flushing of newly constructed mains will be done between the hours of 8:00 a.m. and 4:00 p.m. weekdays, unless otherwise authorized by the City of Homer. Any and all overtime costs incurred by the Public Works Department will be charged to the Contractor. The City of Homer will not be responsible for any flushing costs caused by the Contractor's negligence through faulty workmanship, or erosion from the flushing waters.

b. Hydrostatic Testing

All mains shall be chlorinated, flushed, and pressure tested by the Contractor before service connections are made.

A hydrostatic test will be conducted on all newly constructed water mains, fire hydrant leads, and stub-outs, after "open bore" flushing, in the presence of City of Homer representatives in accordance with the requirements of AWWA C-600 unless hereinafter modified. The Contractor, at his option, can either use a pressure test or a leakage test.

The Contractor shall furnish all necessary assistance, equipment, labor, materials, and supplies necessary to complete the test to the satisfaction of the Engineer. The 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, the 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 the 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 one hundred pounds per square inch (100 psi) greater than static line pressure but not less than one hundred fifty pounds per square inch (150 psi) any place within the system being tested. The duration of each hydrostatic pressure test for ductile iron pipe shall be thirty (30) minutes. After the required test pressure has been reached, the pumping will be terminated. If the pressure remains constant for thirty (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, the Contractor has the option to perform a leakage test on that section. The Contractor shall furnish all 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:

$$L=\frac{ND(P)^{0.5}}{7400}$$

L = Allowable leakage in gallons per hour.
N = Summation of mechanical and push on joints in lengths 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 two (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 two (2) hour period, the preceding portion of that test will be declared void. Cracked or defective pipes,

gaskets, mechanical joints, fittings, valves, or hydrants discovered as a consequence of the hydrostatic tests shall be removed and replaced with sound material at the Contractor's expense. The test shall then be repeated until the results are satisfactory.

Pressure testing of HDPE piping shall be in accordance with the manufacturer's recommendations.

c. Disinfection

Chlorine shall be used for disinfection. Chlorine shall be applied by one (1) of the following methods:

1. Liquid chlorine gas-water mixture
2. Direct chlorine gas feed
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 dosage of forty to fifty parts per million (40 to 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 ten parts per million (10 ppm) chlorine shall be produced in all parts of the water main and retained for a minimum period of twenty-four (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.

CHLORINATION

Pipe Diameter	Dosage (oz.) per 100 Feet
4”	.60 oz
6”	1.35 oz
8”	2.75 oz
10”	4.30 oz
12”	6.19 oz
16”	11.00 oz
20”	17.00 oz

The above table is to be used as a guide for chlorinating mains by the calcium hypochlorite and water mixture method. The given dosage per one hundred feet (100’) results in a chlorine solution of forty to fifty parts per million (40 to 50 ppm).

This dosage takes into account that Contractors more frequently used granular HTM or HTH, which is sixty-five percent (65%) pure. If another chlorinating agent is used, the dosage must be adjusted. Concentrations in excess of 100 ppm will result in rejection of the disinfection test, immediate flushing of the line, and the injection of a new mixture of chlorine solution.

d. Test and Air Vent Copper Pipe Removal

After completion of testing, all test and air vent copper pipe shall be removed and the corporation stop closed at the main, in the presence of the Engineer.

602.5 Method of 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 twenty-five percent (25%), in which case measurement will be by actual pipe length.

602.6 Basis of Payment

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 compaction shall be incidental to the Bid Item provided in this item of work. Imported backfill shall be paid under the appropriate pay item or by letter of agreement.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
602	Furnish and Install Water Main	Linear Foot

SECTION 603 FURNISH AND INSTALL VALVES

603.1 General

The work covered by these specifications consists of the performance of all work required for furnishing and installing valves, including valve boxes and marker posts.

603.2 Material

a. Gate Valves

Gate valves shall be iron body, fully bronze mounted, resilient wedge, parallel seat valves as manufactured in accordance with the requirements of AWWA C-500, Gate Valves for Ordinary Water Works Service. All valves shall be non-rising stem type with an O-ring seal and a two inch (2") square operating nut, and shall open counter clockwise. Valves shall have mechanical joint or flanged ends as specified.

b. Butterfly Valves

Butterfly valves shall be of the rubber-seated tight-closing type. They shall meet or exceed the performance requirements of AWWA C-504 for operational pressure of one hundred fifty pounds per square inch (150 psi) working pressure and three hundred pounds per square inch (300 psi) hydrostatic pressure.

Mechanical joint valve ends shall be as per AWWA Specification C-110 and C-111 of the latest revision, and "Short-Body" in accordance with the requirements of Table II of AWWA C-504. Accessories (bolts, glands and gaskets) shall be supplied by the valve manufacturer.

Valves must use full AWWA C-504 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 C-126 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 AWWA C-504-80, except that no retaining fasteners or other hardware shall be permitted in the flow streams.

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 an 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 two (2) turns per inch of valve diameter for ninety degrees (90°)

of closure travel at a maximum pull of eighty (80) pounds. All valves shall open counter clockwise and be equipped with two inch (2") square AWWA operating nut.

- Butterfly valves twenty inches (20") and less: In the event that the shaft is turned down to fit connections to the operator, the limits of AWWA C 504-80, Section 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 twenty inches: The valve shaft shall be of two 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 AWWA C 504 Section 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. Air Relief Valves

Air relief valves shall be supplied as directed in the contract documents.

e. 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 be not less than five inches (5"). Minimum thickness of the metal shall not be less than five-sixteenth inch (5/16"). Castings shall be smooth and workmanship shall be first class. Valve boxes shall be provided with dust covers.

Valve boxes shall be of sufficient length for the pipe cover depth on the profile drawings and in accordance with the standard details, of these specifications.

Valve boxes shall be supplied with valve operator extension rods such that the maximum depth from the ground surface to the operator nut does not exceed three (3) feet.

f. Markers

Valve boxes shall be marked with markers consisting of two and one-half inch (2-1/2") O. D. galvanized steel pipe sections, seven feet (7') in length, with three feet (3') buried in the ground. Markers shall be shop painted "Caterpillar Yellow" and painted with stenciled two inch (2") 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 fifty feet (50') unless otherwise directed by the Engineer. Markers shall carry the notation:

VB (feet) (direction)

When valve boxes are located in a paved area, the valve marker posts are not required. The Contractor's surveyor shall provide a minimum of two swing ties from prominent nearby physical features to each valve box located in paved areas.

603.3 Construction

The Contractor shall provide all trench excavation, backfill, and compaction necessary to install valves in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and Backfill* of these specifications.

Valves and valve boxes shall be installed where shown on the drawings. 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 back-filling. The valve shall be inspected by the Engineer in the open and closed positions to insure that all parts are in working condition.

In areas where running sand is encountered, provisions shall be made to restrict the sand from entering the bottom section of the valve box.

The Contractor shall expose all valve boxes for pre-final and final inspection. After final inspection of the valves located in unpaved areas, florescent surveying flagging shall be placed directly over the valve box lid and covered with gravel to facilitate location in the future.

603.4 Method of Measurement

The quantity to be paid for shall be the actual number of valves of each class and size (including valve boxes and marker posts) furnished, installed, and accepted.

603.5 Basis of Payment

Payment shall include full payment for all work described in *Section 603*. Trench excavation and compaction shall be considered incidental to bid items as provided in this section. Imported gravel backfill will be paid under the appropriate pay item or by letter of agreement.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
603	Furnish and Install Gate Valve, Valve Box and Marker	Each
	Furnish and Install Butterfly Valve, Valve Box and Marker	Each
	Furnish and Install Pressure Reducing Valve – All Required	Each Each
	Furnish and Install Air Relief Valve All Required	Each

SECTION 604 FURNISH AND INSTALL FIRE HYDRANTS

604.1 General

The work covered by these specifications consists of the performance of all work required for the furnishing and installation of "L-Base" Fire Hydrant Assemblies, including the fire hydrant leg pipe, auxiliary gate valve, valve box, tie back rods, guard rails and fire hydrants.

604.2 Materials

a. Fire Hydrants

Fire hydrants shall conform to the requirements of AWWA C-502 for Dry Barrel Fire Hydrants. Fire hydrants shall be American Darling B-62-B; to include, without limitation, the following:

1. All fire hydrants shall be supplied with a five and one-fourth inch (5-1/4") main valve opening.

2. All connections shall be mechanical joint unless otherwise indicated in the contract documents.

3. Single pumper hydrants shall be furnished with two and one-half inch (2-1/2") hose connections and one (1) four and one-half inch (4-1/2") pumper connection.

4. Unless otherwise required by the contract documents, all hydrants shall be furnished with a barrel length that will allow seven foot (7') bury.

5. The main valves shall be of the compression type, where water pressure holds the main valve closed permitting easy maintenance or repair of the entire barrel assembly from above the ground without the need of a water shut-off.

6. All fire hydrants shall be furnished with a breakaway flange of the type that 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.

7. 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 "Caterpillar Yellow."

8. Operating and nozzle nuts shall be pentagon shaped with one and one-half inch (1-1/2") point to flat measurement.

9. Hose nozzle threading shall be in conformance with NFPA #194 for National (American) Standard Fire Hose Coupling Screw Threads.

10. All working parts shall be bronze or noncorrosive metal in accordance with the requirements of AWWA C-502.

11. All hydrants shall be left hand opening (counter clockwise).

12. All hydrants shall have drain outlets at the base of the barrel. **Brass manufacturer plugs must be installed prior to installation.**

b. Gate Valve and Valve box

All gate valves and valve boxes shall be furnished and installed in accordance with *Section 603, Furnish and Install Valves,* of this division.

c. Tie Rods / Mechanical Restraints

Tie rods are not approved for new construction. The use of tie-rods requires approval form the Engineer. If used, all tie rods must be three-fourths inch (3/4") O. D. black iron or mild steel.

Megalug series 1100 mechanical joint restraints shall be used on all mechanical joints.

d. Guard Posts

The Contractor shall install guard posts at each hydrant installation in accordance with the standard details of these specifications. If, in the opinion of the Engineer, the guard posts are not to be installed, they shall be delivered to the City of Homer Public Works Shop. Measurement and payment for guard posts shall be incidental to the Bid Item, Furnish and Install Fire Hydrant Assembly.

604.3 Construction

The Contractor shall provide all trench excavation, and compaction necessary to install the fire hydrant assembly in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and Backfill* of these specifications. Imported backfill shall be paid under the appropriate pay item or by letter of agreement.

The Contractor shall install the hydrant assemblies in accordance with the standard details of these specifications.

All fire hydrant legs shall be installed level. The fire hydrant barrel shall be installed plumb. Any adjustments to the fire hydrant traffic flange on a city of Homer Contract shall be made by the Contractor at no cost to the City of Homer.

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, the Contractor shall paint in two inch (2") black lettered stencils, the direction and distances, to the nearest one-tenth foot (1/10'), the distance to the valve box on the face of the fire hydrant directly below the bonnet flange.

604.4 Method of Measurement

The method of measurement to furnish and install fire hydrants shall be as follows:

a. Single Pumper Fire Hydrants

Fire hydrants, complete with, six inch (6") leg to main, six inch (6") auxiliary gate valve and valve box, and guard post installation shall be paid for as a unit as set forth in the Bid Schedule. The price shall include full compensation for furnishing and installing single pumper hydrants as shown in the standard details of these specifications.

604.5 Basis of Payment

Shall include full payment for all work described in *Section 604*.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
604	Furnish and Install Fire Hydrant Assembly (Single Pumper)	Each

SECTION 606 WATER SERVICE LINES

606.1 General

The work under this section consists of performing all operations necessary for excavation, backfill, and compaction required for water service connections and all other miscellaneous items as specified in this section. The Contractor shall make the actual connection, lay the service line and thaw wire, and set the key box. All mains shall be chlorinated, flushed, and pressure tested by the Contractor before service connections are made.

606.2 Material

a. Pipe

Ductile iron pipe Class 52, HDPE, or soft drawn seamless copper, Type K, shall be used for all service lines. All services 1 ½" and smaller shall be constructed of Type K copper.

b. Corporation Stop, Curb Stop, Curb Box

- Corporation stops shall be flare type, brass only. Mueller brand only is accepted.
- Curb stops shall be flare type, brass only. Mueller brand only is accepted.
- Iron pipe thread corporation stops and curb stops will be used for HDPE service lines. Poly Cam HDPE/IP fittings shall be used for connection of the HDPE to the service valves.
- Curb boxes must be furnished with stationary operating rods. Mueller brand only is accepted.

The curb box shall provide a clear and unobstructed access to a valve or curb stop to enable the City of Homer operation of the valve or curb stop. Key boxes or valve boxes shall be of an acceptable construction as outlined in the standard specifications, *Section 603.3, Furnish and Install Valves, Article 603.2,* materials and standard details.

606.3 Construction

a. Excavation and Backfill

The Contractor shall provide all excavation, backfill, and compaction necessary to install water source lines in accordance with *Division 200, Standard Construction Specifications for Earthwork, Section 207, Trench Excavation and Backfill* of these specifications.

b. Service Connection

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 one and one half inches (1 1/2") and smaller shall be constructed of seamless, soft drawn, Type K copper. All two inch (2") service connections shall be made of HDPE. Services larger than 2" shall be of ductile iron or HDPE as shown on the plans. All ductile iron pipe installations shall be flushed, hydrostatic tested, and disinfected as outlined in *Section 602, Furnish and Install Pipe* of this division.

The Contractor shall make the connection to the City of Homer's main water supply in a manner consistent with the standard specifications and standard details. A water service shall not cross property lines or adjoining lots, unless shown otherwise on the plans. The key box shall be installed no closer than five feet (5') from adjoining property lines. The connections shall be inspected by the Engineer or appointed representative at the time the connection is made or the excavation be exposed in its entirety for his inspection.

A water service connection will not have more than one (1) union every one hundred feet (100').

c. Excavation

Excavation for service connections shall be unclassified and the Contractor shall excavate whatever substances are encountered to the depth required for the connections. Depth for water service connections will be a minimum of seven feet (7') below proposed finished grade. The seven foot (7') depth below finished grade shall be maintained five feet (5') past the footings, before the depth shall be less than less than seven feet (7'). Variations in depth from the depth stated above will not be grounds for additional payment. It shall be the Contractor's responsibility to familiarize himself with depth of water mains for the project. The portion of the right-or-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). The Contractor shall excavate for water connections in such a manner that the excavation is ninety degrees (90°) to the street line, whenever possible. The ditch shall be long enough to allow the key box to be set at the property line.

Trenches shall be of sufficient width at the bottom to allow for laying of the particular service (minimum width will be two and one-half feet (2-1/2') for single services). Excavation of all fill materials to virgin ground is required to provide safety for workmen utilizing the trench.

The Contractor shall expose the mains to be tapped for distances of four feet (4') in length. Excavation on both sides of the pipe shall be carried to the bottom of the pipe. Excess excavation below the required level shall be backfilled and compacted with sand or gravel at the Contractor's expense as directed by the Engineer.

No water service shall be installed within a horizontal distance of ten feet (10') from a sewer service.

The Contractor shall be responsible for, and shall bear the expenses incurred, in the event that a main should be damaged during excavation or back-filling. The City of Homer's Public Works Department will be notified immediately of any damage and will provide oversight of the repair. The City of Homer Public Works Department will provide personnel for operation of all gate valves and may provide personnel and/or equipment necessary for the repair. The Contractor shall bear the cost of all materials, labor and other expenses incurred by the City.

All on-property installations shall be constructed to the same standard as off-property installations.

d. Backfill

Trench backfill shall commence only after the water service lines and appurtenances have been properly completed and inspected. The backfill material, free from large clods or stones, shall be placed by the Contractor in conformance with the codes and regulations of the City of Homer. Backfill shall be placed and compacted in conformance with *Section 207 Trench Excavation and Backfill*, of these specifications.

The Contractor shall exercise due care in back-filling to keep the service box and thaw wire vertical and in place. In the event the service box or thaw wire is displaced, the 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 the Contractor's expense.

Backfill shall not be placed in frozen trenches.

A plastic or rubber coated #2 copper thaw wire shall be attached to the corporation stop on three-fourth inch (3/4") and one inch (1") corporation stops by an approved method. On one and one-half inch (1-1/2") and two inch (2") connections, the thaw wire shall be attached to the saddle on the main.

e. Hydrostatic Testing

All ¾" through 2" water service lines, fittings, and connections will be inspected for leaks under system pressure prior to backfilling. All water service lines larger than 2" shall undergo the requirements for Flushing, Hydrostatic Testing, and Disinfection as specified in *Section 602.4* of these specifications.

606.4 Method of Measurement

Trench excavation, compaction, and service line installation for water service connections shall be measured as completed units. Imported gravel backfill will be paid under the appropriate pay item or by letter of agreement.

606.5 Basis of Payment

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.

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
606	Water Service Connection	Each

SECTION 607 ADJUST VALVE BOX

607.1 General

This item consists of furnishing all labor, equipment and materials necessary to adjust existing mainline valve boxes to finish grade as shown on the plans and in accordance with the applicable standard details of these specifications.

607.2 Materials

All materials used in the adjustment of mainline valve boxes shall conform to the requirements for mainline valve boxes as outlined in *Section 603 Furnish and Install Valves.*

607.3 Construction

All valve box adjustments will be accomplished as directed by the Engineer. Any damage to a mainline valve or valve box resulting from construction under this item shall be repaired or the damaged portion replaced at the Contractor's expense.

Valve operator extension rods shall be installed whenever the depth to the valve operating nut exceeds 36 inches. The costs of furnishing and installing the extension rods shall be considered incidental to *Item 607*.

607.4 Method of Measurement

Mainline valve box adjustments will be measured per unit, complete in place.

607.5 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.07*, and shall include full payment for all work described in this section and all work outlined on the applicable standard details of these specifications, unless otherwise noted.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
607	Adjust Valve Box to Finish Grade	Each

SECTION 608 POLYETHYLENE ENCASEMENT

608.1 General

The work under this section consists of providing all operations pertaining to the furnishing and installation of one layer of polyethylene encasement on all ductile iron pipe, if required in the plans and specifications.

608.2 Material

The polyethylene encasement material for pipe shall be 8 mils thick and conform to the most current edition of AWWA C105/ ANSI A21.5.

608.3 Construction

The polyethylene encasement shall be installed 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 "Installation Guide for Ductile Iron Pipe."

608.4 Method of Measurement

Measurement on all sizes of polyethylene encasement for pipe shall be the same as the measurement of the pipe installed.

608.5 Basis of Payment

Payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for the word described in this section.

Payment will be made under:

ITEM	DESCRIPTION	PAY UNIT
608	Polyethylene Encasement	Linear Foot

STANDARD CONSTRUCTION SPECIFICATIONS FOR

MISCELLANEOUS CONSTRUCTION

DIVISION 700

INDEX

SECTION 701 GENERAL

701.1 General

The work covered by these specifications consists of furnishing all plant, labor, equipment, and materials and/or construction of miscellaneous facilities as provided in this division.

701.2 Applicable Standards

The latest revision of the following standards of the American Society for Testing and materials (ASTM), the American Association of State Highway and Transportation Officials (AASHTO), The Alaska Department of Transportation and Public Facilities, Standard Specifications for Highway Construction, 1988 are hereby made a part of these Specifications.

ASTM A-112	Specification for Zinc Coated (Galvanized) Steel Tie Wires
ASTM A-120	Specification for Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses.
ASTM A-121	Specification for Zinc Coated (Galvanized) Steel Barbed Wire
ASTM A-153	Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A-227	Specification for Hard-Drawn Steel Spring Wire
ASTM A-307	Specification for Low-Carbon Steel Externally and Internally Threaded Standard Fasteners
ASTM A-392	Specification for Zinc Coated (Galvanized) Steel Chain Link Fence Fabric
AASHTO M-133	Specification for Preservatives and Pressure Treatment Processes for Timber
AASHTO M-145	Classification of Soils
AASHTO M-180	Specification for Corrugated Sheet Steel Beams for Highway Guard Rail
AASHTO M288-90	Requirements for Protected Drainage, Erosion Control Applications, and Medium Survivability Separations Applications

SECTION 702 GEOTEXTILE SYNTHETIC FABRIC

702.1 General

The placement of synthetic fabric shall be as recommended by the manufacturer and as shown on the plans.

702.2 Material

a. Woven Fabric

The synthetic woven fabric shall, at a minimum, meet the specifications of Amoco Propex 2002, or equal, and as approved by the Engineer.

Synthetic Fabric Minimum Specifications:

Properties	Test Method	Value
• Grab Tensile Strength (lbs)	ASTM D 4632	200
• Elongation (%)	ASTM D 4632	15
• Trapezoid Tear (lbs)	ASTM D 4533	75
• Puncture (lbs)	ASTM D 4833	90
• Mullen Burst (psi)	ASTM D 3786	400
• Ultra Violet Stability (Strength Retained %)	ASTM D 4355	70
• Apparent Opening Size CW02215 (US Sieve Size)	ASTM D 4751	50
• Permittivity (1/sec)	ASTM D 4491	.05
• Vertical Water Flow Rate (GPM / SF)	ASTM D 4491 (Falling Head)	4

b. Non-woven Fabric

The synthetic non-woven fabric shall at a minimum meet the specifications of Amoco Propex 4545, or equal, and as approved by the Engineer.

Synthetic Fabric Minimum Specifications

Properties	Test Method	Value
• Grab Tensile Stregth (lbs)	ASTM-D 4632	90
• Grab Elongation (%)	ASTM-D 4632	50
• Mullen Burst (lbs/square in.)	ASTM-D 3786	185
• Puncture (lbs)	ASTM-D 4833	55
• Trapezoid Tear	ASTM-D 4533	40

• UV Resistance (%@_hr)	ASTM-D 4355	70
• Apparent Opening Size	ASTM-D 4751	70
• Permittivity (sec -1)	ASTM-D 4491	2.1
• Flow Rate (gal/min/sq.ft.)	ASTM-D 4491	155

702.3 Construction

The sub-grade shall be shaped according to the typical section on the plans and shall be free of large rocks, sticks, and deleterious material. Fabric shall be installed full roadway width or as shown on the plans. Fabric shall be joined with adjacent pieces of fabric by overlapping. Sections shall be overlapped a minimum of three feet (3'), or as shown on the plans.

Where fabric passes through a horizontal curve, the practice of back lapping on the inside of the curve will be permitted. Where manholes and valve boxes will protrude through the fabric, the fabric shall be neatly cut in the shape of the manhole or the valve box. A second piece of fabric shall then be cut in the same manner and placed on top of the main fabric. The second piece shall extend at least four feet (4') in all directions from the manhole or valve box. Fill and backfill shall be dumped and spilled over the fabric. No equipment shall operate either directly on the fabric or on less than one foot (1') of classified backfill.

702.4 Method of Measurement

Synthetic fabric shall be measured by the net square yard of ground surface covered. No additional measurement will be made for patches required around manholes and valve boxes or for laps required at fabric joints.

702.5 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.7* and shall be full payment for work described in this section.

Payment will be made under

ITEM	DESCRIPTION	UNIT
702 (W)	Woven Geotextile Fabric	Square Yard
702 (N)	Non-woven Geotextile Fabric	Square Yard

SECTION 703 GEOGRID BASE REINFORCEMENT

703.1 General

The placement of geogrid base reinforcement shall be in accordance with the recommendation of the manufacturer and as shown on the plans.

703.2 Material

The geogrid base reinforcement material shall be Biaxial Geogrid Reinforcement Matting BX 1100 as manufactured by the Tensar Corporation, 1210 Citizens Parkway, Morrow, Georgia 20260, or equal, and as approved by the Engineer.

The geogrid matting shall be an integrally formed biaxially oriented polymer grid structure with a high tensile modulus. The geogrid matting shall maintain its reinforcement and interlocking capabilities under repeated dynamic loads and shall be resistant to ultraviolet light, and biological and chemical degradation.

The geogrid shall also conform to the property requirements listed below:

Product Properties	Units	MD Values[1]	XMD Values[1]
• Aperture Dimensions[2]	inch	1	1.3
• Minimum Rib Thickness[2]	inch	.03	.03
Load Capacity			
• True Initial Modulus in Use[3]	1b./ft.	17,140	27,420
• True Tensile Strength @2% Strain[3]	1b./ft.	280	450
• True Tensile Strength @5% Strain[3]	1b./ft.	580	920
Structural Integrity			
• Junction Efficiency[4]	%	93	N/A
• Flexural Stiffness[5]	mg-cm	250,000	N/A
• Aperture Stability[6]	kg-/deg	3.2	N/A
Durability			
• Resistance to Installation Damage[7]	%SC/%SW/%GP	90/83/70	N/A
• Resistance to Long Term Degradation[8]	%	100	N/A

Notes

1. Unless indicated otherwise, values sown are minimum average roll values determined in accordance with ASTM-D4759.
2. Nominal Dimensions.
3. True resistance to elongation when initially subjected to a load measured via ASTM D6637 without deforming test materials under load before measuring such resistance or employing “secant” or “offset” tangent methods of measurement so as to overstate tensile properties.
4. Load transfer capability measured via GRI-GG2-87. Expressed as a percentage of ultimate tensile strength.

5. Resistance to bending force measured via ASTMD-5732-95, using specimens of width tow ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs (as a "ladder"), and of length sufficiently long to enable measurement of the overhang dimension. The overall Flexural Stiffness is calculated as the square root of the product of machine-and cross-machine-direction Flexural Stiffness values.
6. Resistance to in-plane rotational movement measured by applying a 20kg-cm moment to the central junction of a 9 inch x 9 inch specimen restrained at its perimeter (US Army Corps of Engineers Methodology of Torsional Rigidity).
7. Resistance to loss of load capacity or structural integrity when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW), and crushed stone classified as poorly graded gravel (GP). The geogrid shall be sampled in accordance with ASTM D5818 and load capacity shall be measured in accordance with ASTM D6637.
8. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments measured via EPA 9090 immersion testing.

703.3 Construction

The geogrid shall be installed to the lines and grades shown on the plans. The geogrid shall be lapped a minimum of one and one-half feet (1-1/2') at all joints. The geogrid shall be oriented such that the roll length runs parallel to the street centerline. Overlaps shall be oriented to ensure that the subsequent backfill material does not lift the edge of the geogrid.

Placement of the backfill shall be accomplished by dumping from trucks riding on top of the backfill material. No equipment or vehicles will be permitted to travel directly on the geogrid.

703.4 Method of Measurement

Geogrid base reinforcement shall be measured by the net square yard of ground surface covered.

703.5 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for work described in this section.

Payment will be made under:

ITEM	DESCRIPTION	PAY UNIT
703	Furnish and Install Geogrid Base Reinforcement	Square Yard

SECTION 704 INSULATION

704.1 General

This work shall consist of furnishing and installing below grade, polystyrene insulation board insulation at the locations shown on the plans.

704.2 Material

The insulation board shall be high strength, low water absorption, high density expanded polystyrene material as manufactured by Western Insulfoam of Anchorage, Alaska or an approved equal, and which meets or exceeds the following physical properties:

a.	Density	2.0 PFC
b.	Compressive Strength (ASTM D1621)	35 PSI @ 5% Deformation
c.	Water Absorption (ASTM C272)	0.25% Maximum
d.	Thermal Conductivity (AST< C518, Type IX)	0.22 BTU/HR-FT-DEG F @ 75 DEG

704.3 Construction

Prior to placement of the insulation board, the sub-grade shall be leveled and compacted to provide a smooth, firm foundation. The insulation board shall be placed to the lines, grades, and thickness shown on the plans.

Layering of insulation to obtain the required thickness will be allowed as long as all joints are lapped a minimum of six inches (6”).

The insulation board shall be covered with approved material of two inch (2”) maximum size, end dumped in a one foot (1’) lift. This initial lift shall be spread and compacted for the full width of the insulation prior to the placement of subsequent lifts. The Contractor shall insure that the back-filling operations do not break or displace the insulation board. Insulation board that is damaged or displaced by the back-filling operations shall be replaced at no cost to the City.

704.4 Method of Measurement

The accepted quantity of insulation board shall be paid by the board foot in place, whereby one board foot (1bf) equals a volume twelve inches (12”) square by one inch (1”) thick.

704.5 Basis of Payment

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
704	Furnish & Install 4” Thick Insulation	Board Foot

SECTION 705 SEWER ENCASEMENT

705.1 General

The work under this section consists of providing all operations pertaining to encasing sewer mains with concrete as shown on the drawings or directed by the Engineer.

705.2 Construction

A sewer line that **is not** designed to the same requirements as a potable water pipe (for example: concrete or steel pipe) must be concrete-encased or double-pipe-encased with structural support if:

1. it crosses above a water main;

2. it runs within a closer horizontal distance of ten feet (10') to a water main, or;.

3. the vertical separation is less than eighteen inches (18") edge to edge (outside diameter of a water main;

4. it crosses above or below a water main at any vertical distance where the sewer line joints are less than nine feet (9') from the water line joints;

5. it is required otherwise by local, state, or federal standards/regulations.

A sewer line that **is** designed to the same requirements as a potable water pipe such as ductile iron or a non-shearing equal must be concrete-encased or double-pipe-encased with structural support when:

1. it has a vertical separation distance of less than eighteen inches (18") edge to edge of a water main, or;

2. it crosses above or below a water main and the sewer line joints are less than nine feet (9') from water line joints (measured horizontally from the intersection of the crossing);

3. it cannot withstand a pressure test to ensure watertightness;

4. it is required otherwise by local, state, or federal standards/regulations.

In any case, the Engineer may direct encasement to protect the integrity of the water or sewer system. Design plans, reports, or drawings supporting a request for a lesser vertical or horizontal distance between water and sewer lines must be sealed by a registered Engineer and have approval from ADEC.

Encasement, as required above, shall envelop the sewer line for a distance of ten feet (10') each side of a crossing. The thickness of encasement, including that of the pipe joints, shall not be less than four inches (4"). Where the eighteen inch (18") vertical separation cannot be maintained, the water main shall be relocated (or constructed) as in *Division 700, Section 706 Relocate Water Main*. (Refer to the standard details of these specifications.)

Ductile Iron encasement may be substituted for concrete when approved by the Engineer.

705.3 Measurement

Encasing sewer mains with concrete will be measured by each encasement. Excavation in excess or normal trench excavation required to install the encasement shall be considered incidental

705.4 Basis of Payment

Payment for this work shall be in accordance with *Section 10.07*, and shall be full payment for the work described in this section.

Payment will be made under:

ITEM	DESCRIPTION	PAY UNIT
705	Sewer Encasement	Each

SECTION 706 RELOCATE WATER MAIN

706.1 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 indicate approximate location only. The Engineer shall have final say as to whether the main is raised or lowered.

706.2 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. If the water main elevation is below the sewer line elevation, refer to *Section 705 Sewer Encasement*. The Contractor may employ either of the following methods for raising or lowering a water main.

1. The Contractor 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.

2. The water main may be raised or lowered using four (4) pipe bends not to exceed 22 ½ degrees. In special cases only, and when approved by the Engineer in advance, 45 degree bends may be used.

Thrust blocks may be required if shown on the plans.

The method of lowering and the materials to be used shall be approved by the Engineer prior to commencing work. The Contractor shall give forty-eight (48) hours notice to the City of Homer, Public Works Department and the Engineer, prior to any planned water shut-down.

706.3 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 relocate.

706.4 Basis of Payment

Payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for work described in this section.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
706	Relocate Water Main	Each

SECTION 707 STANDARD SIGNS

707.1 General

This item consists of furnishing and installing standard signs and post assemblies per State of Alaska DOT/PF, Standard Specifications for Highway Construction 2004, Sections 615 and 730. The sign location (s) shall be as shown on the plans or as directed by the Engineer.

707.2 Construction

Construction shall generally conform to DOT-PF, Section 615 and ADOT-PF Standard Drawings S-000.00, S-05.00, S-20.00, and S-30.01. Unless otherwise indicated, sign posts shall be 2"x 2" perforated steel tubing with 2 ½" x 2 ½" soil embedment sleeve. The soil embedment sleeve may be driven, provided the method of driving does not cause damage to the sleeve.

If the soil embedment sleeve is installed by excavating, the space around the posts shall be backfilled to finish ground with selected earth of sand, free of rocks or deleterious material, placed in layers approximately 6" to 12" thick, and thoroughly compacted.

All surplus excavated material shall be disposed of along the adjacent roadway as directed by the Engineer.

Existing signs that are removed and relocated shall conform to the details shown on the plans or as directed.

707.3 Method of Measurement

The quantity of Standard Regulatory, Warning and Guide signs for permanent installation to be paid for shall be the total of new signs erected in place. Temporary construction and maintenance signs shall not be measured for payment unless called for in the contract bid schedule.

Unless otherwise indicated, temporary removal and relocation of existing signs shall be considered incidental work. No measurement and payment will be made.

707.4 Basis of Payment

Basis of Payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for work described in this section.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
707	Furnish & Install Standard Sign	Each

SECTION 708 SEEDING

708.1 General

This work shall consist of preparing the ground surface, followed by application of seed, fertilizer, lime (if required), and mulch material, all in conformity with these specifications and at locations shown on the plans.

It is the intent of these specifications that a living vegetative cover will be provided in the areas indicated on the plans or established by the Engineer.

All seeded areas shall be maintained for the term of the Contract. Watering of seeded areas, if required, shall be performed at no additional cost to the Owner.

708.2 Materials

		PERCENT OF MIX (by weight)	
TYPE	VARIETY	TYPE I	TYPE II
Red Fescue	Pennlawn	25%	20%
	Boreal		
	Arctared		
Hard Fescue	Durar (Festula Quiana)	25%	
Kentucky Blue	Merion	15%	10%
	Nugget	15%	
Annual Ryegrass		10%	70%
Other		10%	

Application rates shall be at a minimum of two pounds per 1000 square feet (2#/1000 s.f.) or as directed by the Engineer.

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 with 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 acid, and potassium as required by the soil analysis or as specified in the special provisions. The fertilizer shall contain slow release nitrogen and shall be supplied in the form of inorganic chemicals to the amount of at least seventy-five percent (75%) of the nitrogen carrying agents.

Tolerances of the chemical ingredients shall be plus or minus two percent (2%). No cyanamid compounds or hydrated lime will be permitted in mixed fertilizers.

Limestone shall contain not less than eighty-five percent (85%) of calcium and magnesium carbonates. Agricultural ground limestone suitable for application by a fertilizer spreader shall conform to the following gradation:

Sieve Designation	Minimum Percent Passing (by weight)
No. 10	100
No. 20	90
No. 100	50

Fertilizer and limestone for the use in a hydraulic sprayer shall be soluble or ground to a fineness that will permit complete suspension of insoluble particles in water.

Application rates for fertilizer shall be at fifteen (15) to twenty (20) pounds per 1000 square feet or as directed by the Engineer. Application rates for lime, if required, shall be at fifty (50) pounds per 1000 square feet or as directed by the Engineer.

708.3 Soil Preparation

After grading of areas has been completed in conformity with the lines and grades shown on the plans or as staked by the Engineer in the field, and before beginning seeding operations, the areas to be seeded shall be cultivated to provide a reasonably firm but friable seedbed. Cultivation shall be carried to a depth of two inches (2") or as directed by the Engineer. On slopes steeper than 3:1, depth of cultivation may be reduced as directed. All cultivated areas shall be raked or cleared of stones, two inches (2") in diameter and larger, and all weeds, plant growth, sticks, stumps, and other debris or irregularities which might interfere with the seeding operations, growth of grass, or subsequent maintenance of the grass covered areas.

708.4 Seeding Seasons

All seeding and fertilizing shall be performed between May 15 and August 15. Seeding at other than the specified dates shall only be allowed upon written permission of the Engineer.

No seeding shall be done during windy conditions or when climatic conditions or ground conditions would hinder placement or proper growth.

708.5 Application Methods

Seed, fertilizer, ground limestone and mulch material may be placed by the following methods:

a. Hydraulic Method

Seeding by hydraulic methods shall consist of furnishing and placing a slurry made of seed, fertilizer, ground limestone, dried peat moss or cellulose wood fiber, and water.

The dried peat moss or cellulose fiber and limestone 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 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 which are not practical to seed from the nozzle unit situated on the roadbed.

b. Dry Methods

Mechanical spreaders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, 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 and then incorporated in one operation to a minimum depth of two inches (2”). Seeded areas shall be compacted within twenty-four (24) hours from the time the seeding is completed, weather and soil conditions permitting, by cultipacker, roller or other equipment satisfactory to the 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 nor shall heavy soils be compacted at all if so directed by the Engineer.

Hand broadcasting may be substituted provided that the rate of application for both seed and nutrient is twice that of dry mechanical methods and that the end result required is attained.

708.6 Maintenance of Seeded Areas

The Contractor shall protect seeded areas against traffic by warning signs or barricades, as approved by the Engineer. Surfaces gullied by water or otherwise damaged following seeding shall be repaired by re-grading, re-seeding and re-mulching, as directed and the Contractor shall otherwise maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

The seeded areas shall be watered by the Contractor as required for proper germination and growth. Equipment used in watering shall be capable of reaching all seeded areas from the traveled way.

No extra compensation will be paid to the Contractor for work incurred under maintenance of seeded areas.

708.7 Method of Measurement

The quantity of seeding to be paid for shall be the number of 1000 square foot units, measured to the nearest 0.1 unit on the ground surface.

When hydraulic seeding methods are used, mixing water in the hydraulic application will not be measured for payment.

The quantity of seeding specified shall include all cultivating, seed, limestone, if required, fertilizer, and mulch material of the type specified, completed, and accepted.

708.8 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.07*, and shall be full payment for work described in this section.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
708	Seeding (Type I)	1,000 Sq. Ft.

When more than one type of seeding is specified for any pay item, letter suffixes will be included in order to differentiate between the different types.

SECTION 709 SOIL STABILIZATION

709.1 General

This work consists of furnishing, placing, and maintaining soil stabilization matting material on the areas and according to the details shown on the plans or specified herein.

709.2 Material

a. Jute Mesh

Jute mesh shall be cloth of a uniform, open, plain weave of undyed and unbleached single jute yarn. The yarn shall be of a loosely twisted construction and it shall not vary in thickness more than one-half (1/2) its nominal diameter. Jute mesh shall be furnished in rolled strips and shall meet the requirements as follows:

1. Width – forty-eight inches (48”), plus or minus one inch (1”).

2. 78 warp – end per width of cloth (minimum).

3. 41 weft – ends per yard (minimum).

4. Weight to an average 1.22 pounds per linear yard with a tolerance of plus or minus five percent (5%).

Staples shall be U-shaped and shall be approximately six inches (6”) long and one inch (1”) wide. Machine made staples may be of No. 11 gauge or heavier steel wire. Hand made staples shall be made from twelve-inch (12”) lengths of No. 9 gauge or heavier steel wire.

b. Excelsior Blankets

Excelsior blankets shall consist of machine produced mat of curled wood excelsior of eighty percent (80%) six inch (6”) or longer fiber length, with consistent thickness and the fiber evenly distributed over the entire area of the blanket. The topside of each blanket shall be made smolder resistant without the use of chemical additives. Excelsior blankets shall be furnished in rolled strips and shall meet the requirements as follows:

1. Width – forty-eight inches (48”), plus or minus one inch (1”).

2. Length – one hundred eighty feet (180’), average.

3. Weight per roll – seventy-eight (78) pounds, plus or minus ten percent (10%).

Staples shall be made of wire 0.091 inches in diameter or greater, "U" shaped. Size and gauge will vary with soil conditions.

709.3 Construction Requirements

This work shall be accomplished within forty-eight (48) hours after finish grading of the sub-grade or of topsoil completion. If seeding is specified, then the work shall be completed within twenty-four (24) hours after seed has been placed.

Matting material shall not be applied on days when the wind or rain would cause undue erosion or displacement of the material.

The soil shall not be disturbed more than necessary. Use of vehicles and tracked equipment will be permitted by the Engineer only if such use does not cause rutting and displacement of the sub-grade or topsoil.

709.4 Surface Requirements

The surface shall be smoothed and all gullies and potholes backfilled prior to applying the matting. All rocks or clods larger than two inches (2") in size and all sticks and other foreign material which will prevent contact of the matting and the surface shall be removed. If the surface of the sub-grade or topsoil is extremely dry, watering may be required by the Engineer prior to placement of the matting. No additional payment shall be made for such watering.

709.5 Application

The matting shall be spread uniformly at the locations designated by the Engineer in the field and shall be loose enough to allow sunlight to penetrate and air to circulate, but dense enough to shade the ground, reduce the rate of water evaporation and prevent or reduce water or wind erosion.

a. Jute Mesh

Jute matting shall be held in place by approved wire staples, pins, spikes, or wooden stakes driven vertically into the soil. Matting shall be fastened at intervals not more than three feet (3') apart in three (3) rows for each strip of matting with one (1) row along each edge and one (1) row alternately spaced in the middle. All ends of the matting and check slots shall be fastened at six-inch (6") intervals across their width.

Check slots shall be spaced so that one check slot, junction slot, or anchor slot of the jute mesh occurs every seventy-five feet (75') on gradients of less than 4% and every fifty feet (50') on gradients of more than 4%. On slope drains, a check slot or an end slot shall occur every twenty-five feet (25').

Edges of matting shall be buried around the edges of catch basins and other structures as herein described. Matting must be spread evenly and smoothly and in contact with the soil at all points.

b. Excelsior Blankets

Excelsior blankets shall be unrolled with the netting on top and the fibers in contact with the soils over the entire area. In ditches, the blankets shall be applied in the direction of flow, butted at the ends and sides. On open slopes, the blankets shall be applied either horizontally or vertically to the slope. Ends and sides shall be butted. Staples shall be spaced approximately two linear yards apart on each side, and one row in the center alternately spaced between each side. Use a common row of staples on adjoining blankets.

If seeding is specified, the excelsior blankets shall be placed within twenty-four (24) hours after the seed has been placed.

709.6 Maintenance and Repair

The Contractor shall maintain the areas covered by matting until all work on the project has been completed and accepted. Prior to acceptance of the work, the damaged areas shall be re-shaped, re-seeded, and the matting satisfactorily repaired or replaced as herein specified at no additional cost to the City.

709.7 Method of Measurement

The quantity of soil stabilization matting to be paid for shall be the number of 1000 square foot units, measured on the slope of the ground surface to the nearest 0.1 unit.

709.8 Basis of Payment

Basis of payment for this item shall be in accordance with *Section 10.07*, and shall include full payment for all work described in this section and the plans and specifications.

Payment will be made under:

ITEM	DESCRIPTION	UNIT
709	Soil Stabilization Matting	1000 Sq. Ft.

SECTION 710 TOPSOIL

710.1 General

The work under this section consists of providing all operations pertaining to furnishing, transporting, and spreading of topsoil.

710.2 Materials

Topsoil furnished by the Contractor shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. It shall be shredded and reasonably free from roots, hard clay, coarse gravel, stones larger than one inch (1") in any diameter, noxious weeds, tall grass, brush, sticks, stubble, or other litter and shall have indicated by a healthy growth of crops, grasses, trees or other vegetation that it is free draining and non-toxic. Topsoil to contain not more than ten percent (10%) gravel by dry weight of total sample. For the purposes of this specification, gravel is defined per ASTM D-422, modified to include only material passing 1-inch (1") and retained on the No. 4 sieve.

Topsoil shall conform to the following requirements:

TOPSOIL MIX

Organic Material	Not less than 40% nor more than 60% by volume (15-20% by dry weight).
Silt	Not less than 20% by volume (25-45% by dry weight).
Sand	Not less than 20% nor more than 30% by volume (35-55% by dry weight).

The Contractor shall notify the Engineer of the location from which he proposes to furnish topsoil at least thirty (30) calendar days prior to delivery of topsoil to the project from that location. The topsoil and its source will be inspected and tested by the Engineer before approval will be granted for its use.

All topsoil shall be fertilized as follows:

Sufficient fertilizer shall be applied to the topsoil such that the total natural and applied constituents are within the following ranges:

Nitrogen	21-35 PPM
Phosphoric Acid	11-20 PPM
Potassium	76-150 PPM
Limestone	Sufficient to Attain a pH of 6.0 to 7.0

The Contractor shall furnish soil analysis test reports which verify this. Fertilizer shall be applied at the rates indicated by the soil tests and worked into the topsoil to a uniform depth of two inches.

Organic material for incorporation into topsoil, shall be partially decomposed peat moss. Organic material shall be from a source above the water table. Peat Moss may require chopping or shredding to insure thorough mixing with the topsoil.

710.3 Construction

The topsoil shall be evenly spread on the designated areas to a depth of four inches (4") after settlement and compaction unless a different depth is called for on the Plans. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work. Adjacent roadway surfaces shall be kept clean during hauling and spreading operations.

After spreading has been completed, large clods, stones larger than one inch (1") in any diameter, roots, stumps, and other litter shall be raked and removed.

710.4 Method of Measurement

Measurement shall be the number of 1000 square foot units measured to the nearest 0.1 unit on the ground surface.

710.5 Basis of Payment

Payment for this work shall be in accordance with *Section 10.07 Measurement and Payment* of these specifications, and shall include full payment for all work described in *Section 713*.

Unit cost payment shall be made on the following basis:

ITEM	DESCRIPTION	UNIT
710	Top Soil (depth)	1000 Sq. Ft.

STANDARD CONSTRUCTION SPECIFICATIONS FOR

STORM DRAIN SYSTEMS

DIVISION 800

INDEX

SECTION 801 GENERAL

801.1 General

The work covered by these specifications consists of providing all plant, labor, equipment, supplies, transportation, handling, storage, and performance of all operations necessary to complete the construction for pipe laying, jointing, and testing of storm drain systems and culverts.

Requirements for earthwork, including trench excavation and backfill, is specified in *Division 200 Standard Construction Specifications For Earthwork.*

801.2 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), the American Water Works Association (AWWA), and the State of Alaska Department of Transportation and Public Facilities, Standard Specifications for Highway construction, 1988 Edition are hereby made a part of these specifications.

ASTM A-48 and ASTM A-438	Strength Requirements for Manhole Frames and Covers
ASTM C-76	Specification for Reinforced Concrete
ASTM C-150	Specification for Portland Cement
ASTM C-478 – (AASHTO-199)	Specification for Precast Reinforced Concrete
ASTM A-746 – (AWWA C-145)	Ductile Iron Pipe
AASHTO M-36	Corrugated Steel Pipe and Fittings
AASHTO M-45	Sand for Cement Mortar
AASHTO M-190	Bituminous Coating of CMP
AASHTO M-196	Corrugated Aluminum Pipe & Fittings

801.3 Surveys

The Contractor shall be responsible for the preservation of all line stakes, grade stakes, and hubs. In the event of their loss or destruction, the Contractor shall pay all costs for their proper replacement. The line and grade for pipe lines shall be given from reference hubs offset from each manhole or cleanout. The Contractor shall be responsible for the transfer of the control points from the reference hubs to such hubs or batter boards as he may desire or need for the prosecution of the work. A ground line profile shall be run prior to construction and made available immediately to the Engineer. The ground line profile centerline of pipe and the grade line refers to the elevation of the invert of pipe, except where otherwise noted.

801.4 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 be Class A-3. Concrete work shall conform to *Division 300 Portland Cement Concrete* of the specifications.

b. Cement for Mortar

Cement for mortar used in the construction of storm drains 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 (1) part cement and three (3) parts sand. The addition of lime is not permitted.

SECTION 802 FURNISH AND INSTALL PIPE

802.1 General

The work under this section consists of the performance of all operations pertaining to furnishing and installing pipe for storm drain systems and culverts.

In the case of City-furnished pipe, the City shall allot to the project pipe to accomplish the work in amounts exactly matching the Contractor's pay quantities for pipe. Any surplus pipe left over from this allotment at the end of the project shall be returned from the Contractor's job sites to the City's designated pipe yard. If the Contractor withdraws from the City's pipe yard more than the amount required to match the payment quantities, the Contractor shall pay the City on the basis of the City's invoice price for pipe (including freight), plus 10% overhead to reimburse the City for handling, warehousing, inspection, and administration.

802.2 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 one pipe length of the station indicated on the drawings.

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 conform to the requirements of AASHTO M-36.

2. Aluminum: Corrugated aluminum pipe shall conform to the requirements of AASHTO M-196.

All CMP fittings shall be fabricated in a workmanship-like manner, develop the full strength of the material being joined, and when finished, will conform to the appropriate requirements of AASHTO M-36 and AASHTO M-196.

The joining of corrugated steel and aluminum pipe shall be made through the use of coupling bands applied as recommended by the manufacturer and approved by the Engineer. The minimum width of corrugated culvert bands shall be 12 inches for pipe 12 inches or less, and 24 inches for pipe greater than 12 inches in diameter. The Engineer allows dimple bands only with prior approval.

Dissimilar metals may only be used in extending in-place metal CMPs and reattachment 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.

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 the 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.

a. End Sections for Corrugated Metal Pipe

Galvanized steel and aluminum end sections shall be flared, beveled, shop-assembled units designed to serve as structural, hydraulic, and aesthetic end treatment to corrugated metal pipe culverts. They may be attached to culverts by threaded bolts or 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 end to act as a cutoff.

Material for steel end sections shall be galvanized steel conforming to the requirements of AASHTO M-36. The gage shall be as outlined:

16 Ga.:	Through 24" round or 29" X 18" Pipe-arch
14 Ga.:	30" round and 36" X 22" Pipe-arch 36" round and 43" X 27" Pipe-arch
12 Ga.:	Over 36" round and 43"X 27" Pipe-arch (Except that the center panels of 60" round 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" round and larger, and for 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 gage than the end section.

Materials for aluminum end sections shall conform to the requirements of AASHTO M-196 and fabrications shall comply with the requirements above.

802.3 Construction

a. Pipe Grade and Alignment

Variance of individual pipe sections (20 LF) from established line and grade should 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 eighteen inches (18") diameter, tolerance shall not exceed 0.05 feet.

During the progress of the Work, the 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. The Contractor shall provide qualified personnel to use such instruments and they shall have the duty and responsibility for placing and maintaining such construction guides.

If the method of transferring grades from the offset hubs to the pipe requires batter boards, they shall be at least 1" X 6" supported by 2" X 4" stakes or approved metal rods and shall be placed every 25 feet. At least three 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 the 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 approval of the Engineer. If intermittent backfilling is allowed, backfilling shall be accomplished in accordance with *Division 200 Standard Construction Specifications for Earthwork, Section 207 Trench Excavation and Backfill*, of these specifications.

b. Pipe Laying

All pipes shall be laid with Class C Bedding unless otherwise required by the contract documents or directed by the 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 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. Each section of pipe shall be properly supported to insure true alignment and an invert which is smooth and shall not impede the flow. 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 pipes or fittings.

802.4 Method of Measurement

Measurements for all sizes of pipe shall be based on horizontal distances and shall be from center to center of maholes, from the center of manholes to center of catch basins, from center of manholes to center of cleanout wyes, and from center of manhole to the end of pipe excluding flared end sections, and from end of pipe to end of pipe excluding flared end sections.

Culvert connecting bands and bolts are considered incidental to this item of work. Flared end sections shall be measured and paid separately.

802.5 Basis of Payment

Payment for the work shall be in accordance with *Section 10.07 Measurement and Payment* of these specifications and shall include full payment for all work described in *Section 802*.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
802	Furnish and Install CMP Size	Linear Foot
802-E	Furnish and Install CMP End Section	Each

SECTION 803 SUBDRAINS

803.1 General

The work under this section consists of the performance of all operations pertaining to furnishing and installing subdrains.

803.2 Material

The Contractor shall use perforated steel, perforated aluminum, polyethylene, or corrugated metal pipe as noted.

Corrugated metal pipe shall conform to the provisions of *Section 802 Furnish and Install Pipe* of this division. Perforations shall be located and sized in accordance with the requirements of AASHTO M-36. The top row of holes shall not be less than 22 ½ degrees below the horizontal axis.

Polyethylene pipe shall be corrugated single-wall pipe as manufactured by Advanced Drainage Systems, Inc. or approved equal and shall conform to AASHTO M-252 for material and perforation specifications. Perforations shall be cleanly cut so as not to restrict the inflow of water, and be uniformly spaced along the length and circumference of the pipe. The top row of holes shall not be less than 22 1/2 degrees below the horizontal axis. Perforations shall be centered in the corrugation valleys. The water inlet area shall be a minimum of one square inch per lineal foot of pipe. Perforations may be slots or holes. Slots shall be a maximum of one-tenth of an inch wide. Holes shall not exceed 3/16" diameter.

Geotextile fabric shall conform to *Section 702.B, Geotextile Synthetic Fabric Non-woven Fabric,* of these specifications.

803.3 Construction

Refer to the standard details for construction of subdrains. Each phase of construction shall be accomplished in accordance with the applicable sections of these specifications.

Excavation and backfill for furnishing and installing subdrains shall be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill,* of these specifications. Furnishing and installing subdrains shall be in accordance with *Section 802 Furnishing and Installing Pipe*.

803.4 Method of Measurement

Subdrains shall be measured per linear foot. The price shall include all work and materials necessary to furnish and install the subdrain, filter sock, connecting appurtenances, and to provide the filter gravel as shown on the drawings.

803.5 Method of Payment

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
803	Install Subdrain (Size)	Linear Foot

SECTION 804 MANHOLES AND CATCH BASIN MANHOLES

804.1 General

The work under this section consists of performance of all work required for the construction of storm drain manholes and catch basins, complete with frames and covers.

804.2 Material

Materials used in the construction of 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.

Each precast concrete barrel section shall be set and sealed by the use of a pre-molded plastic gasket pipe joint sealer as manufactured by K.T. Snyder Co., Inc. Ram-Nek Gasket Division, 2100 Travis Street, Houston, Texas, or equal.

Cement for mortar used in the construction of manholes shall conform to the requirements of ASTM C-150, Type II. Sand shall be composed of one (1) part cement and three (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. The addition of lime is not allowed.

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.

Refer to *Division 300 Standard Construction Specifications for Portland Cement Concrete Section 301, Article 301.4 Mix Requirements for Classes of Concrete*, for specifications pertaining to Class A-3 concrete as required in forming manhole inverts. Catch basin manhole castings shall be in accordance with the standard details of these specifications.

804.3 Construction

a. General

Excavation and backfill for the construction of storm drain manholes and catch basin manholes shall be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill,* of these specifications. The manhole rings and covers shall be brought to the grades shown on the Drawings unless otherwise approved by the Engineer. Manhole rings shall be set in a full bed of mortar and made secure.

All portions of precast manholes must be approved by the Engineer prior to installation in the storm drain system. The contractor shall provide timely notice (at least two working days in advance of casting) to allow time for the Engineer to arrange for necessary tests. Installation of manhole sections without the Engineer's written approval shall not be allowed. This approval does not relieve the Contractor of the responsibility for protection of manholes against damage during handling and installation.

Manholes shall be installed at the location shown on the drawings. The primary leads shall enter radially at the invert elevations specified. The base section shall be set plumb, upon 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 stoppered 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 stubouts; over 12-feet in dept shall have 18-foot stubouts.

Manholes with poured-in-place bases shall utilize keyed construction joints in non-continuous pours. Precast concrete barrel sections shall be set and sealed with a premolded plastic gasket. Pre-molded plastic gaskets for sealing pre-cast concrete barrel sections for manholes 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 line.

b. Storm Drain Manholes and Catch Basin Manholes

Storm drain manholes shall be constructed in accordance with the drawings, details and standard details. Pipe sections shall extend inside the manhole structure wall so that the pipe will be flush with the cement mortar used in providing a smooth, regular, watertight surface. The pipe shall project outside the manhole sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around the pipe.

804.4 Method of Measurement

Manholes and catch basin manholes shall be measured as units complete in place. Depth of manholes and catch basin manholes shall be based upon a measurement to the nearest foot from top of casting to the top of the base slab.

804.5 Basis of Payment

Payment for this work shall include payment for all work described in *Section 804*.

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
804	Storm Drain Manhole	Each

SECTION 805 MANHOLE FRAMES AND COVER

805.1 General

The work under this section consists of the performance of all work required for the construction of manhole frames and covers.

805.2 Material

Frames and covers for manholes and similar appurtenances shall be of cast iron and conform to the dimensions shown on the standard details of these specifications. The requirement of tensile strength of the gray iron shall be 30,000 PSI minimum in accordance with the requirements of ASTM 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 in the standard details.

805.3 Construction

Provide manhole frames and covers as indicated on the drawings and in accordance with the standard details of these specifications.

805.4 Method of Measurement

No measurement will be made for this item of work. This item shall be considered incidental to *Section 804 Manholes and Catch Basin Manholes*.

805.5 Basis of Payment

None

SECTION 806 CONSTRUCT CATCH BASIN

806.1 General

The work under this section consists of the performance of all operations pertaining to the construction and installation of catch basins.

806.2 Materials

Materials used in the construction of catch basins shall conform to the requirements of ASTM M-478 and as shown on the plans.

Cement for mortar used in the construction of catch basins shall conform to the requirements of ASTM C-150, Type II. Sand shall conform to the requirements of AASHTO M-45.

806.3 Construction

Excavation and backfill for the construction of catch basins shall be in accordance with *Division 200 for Earthwork, Section 207 Trench Excavation and Backfill*, of these specifications. Pipe sections shall extend inside the manhole structure wall so that the pipe will be flush with the cement mortar used to in providing a smooth, regular, watertight surface. The pipe shall project outside the manhole sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around the pipe.

The catch basin rings and covers shall be brought to the grades shown on the drawings unless otherwise approved by the Engineer. The Contractor may accomplish final setting of the casting by wedging it up with masonry materials as approved by the Engineer. The casting shall then be set in a full bed of mortar and made secure.

Mortar used in the construction of catch basins shall be composed of one (1) part cement and three (3) parts sand. All joint and connections are to be mortared. The joints shall be made so as to produce a smooth, regular, watertight surface. Water shall be added in minimum amounts to provide plasticity in placing the mortar. The addition of lime is not allowed.

Refer to *Division 300 Standard construction Specifications for Portland Cement Concrete Section 301, Article 301.4 Mix Requirements for Classes of Concrete for Specification Pertaining to Class A-3 Concrete*, which shall be used in the formation of catch basing base slabs.

806.4 Method of Measurement

Catch Basins shall be measured as units complete in place.

806.5 Basis of Payment

Payment shall be made under the following units:

ITEM	DESCRIPTION	UNIT
806	Construct Catch Basin	Each

SECTION 807 CONNECTIONS TO EXISTING MANHOLES

807.1 General

The work under this section consists of the performance of all operations pertaining to the construction required for connections to existing manholes.

807.2 Construction

Excavation and backfill for the construction required for connections to existing manholes should be in accordance with *Division 200 Standard Specifications for Earthwork, Section 207 Trench Excavation and Backfill,* of these specifications. Connections to existing manholes shall be made in a workmanlike manner. The invert shall be brought in to the existing manhole at the elevation shown on the plans. The downstream pipe in manholes shall be screened to prevent entry of mortar or other debris from entering the system.

Pipe sections shall extend inside the manhole structure wall so that the pipe will be flush with the cement mortar used to in providing a smooth, regular, watertight surface. The pipe shall project outside the manhole sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around the pipe.

807.3 Method of Measurement

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

807.4 Basis of Payment

Where the connection is made to a pipe stubbed out of the existing manhole, no payment shall be allowed for the connection.

Payment shall be made under the following unit:

ITEM	DESCRIPTION	UNIT
807	Connect to Existing Storm Drain Manhole	Each

CITY OF HOMER
DEPARTMENT OF PUBLIC WORKS

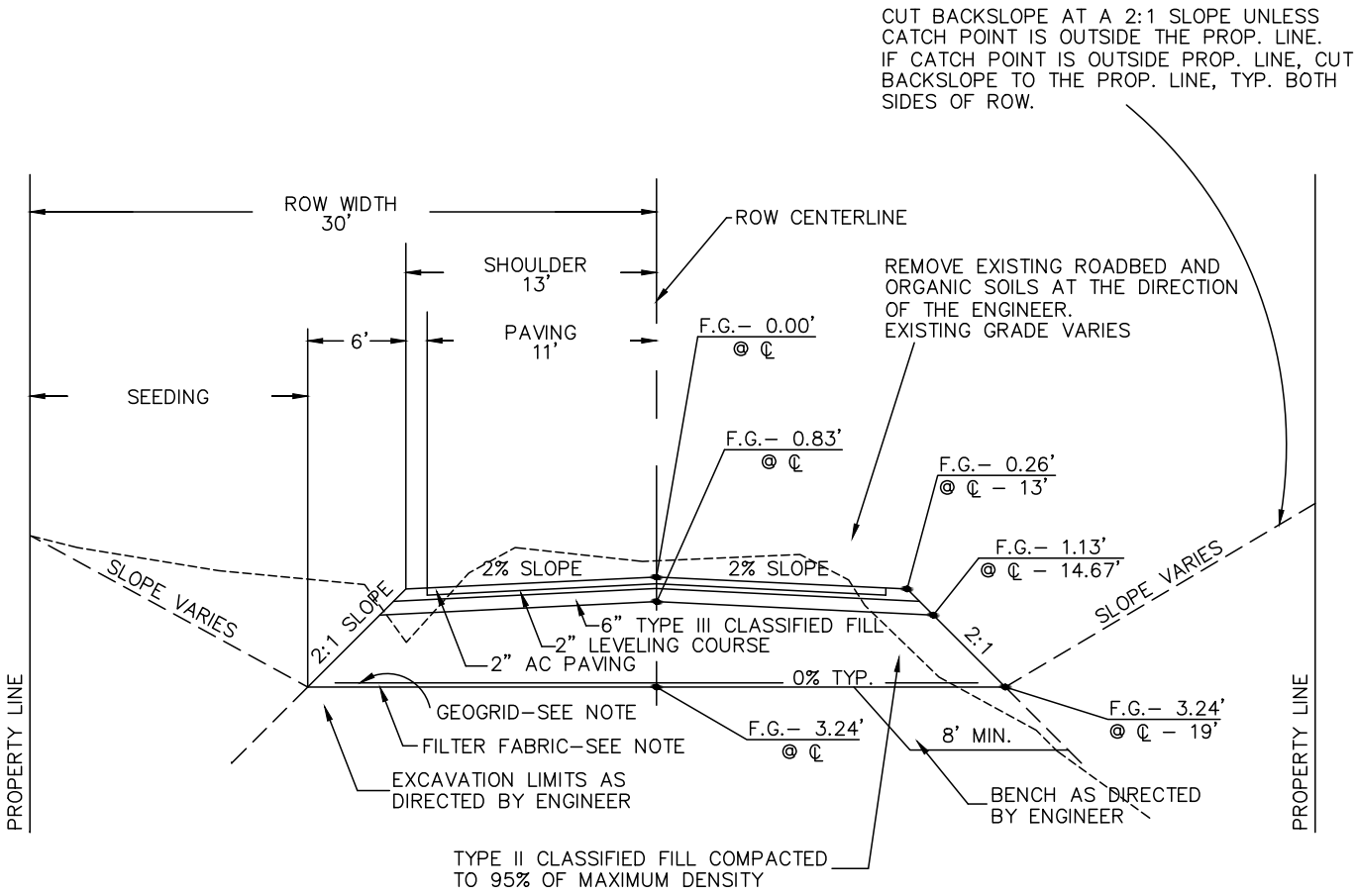
STANDARD CONSTRUCTION DETAILS

TABLE OF CONTENTS

Water System

Miscellaneous

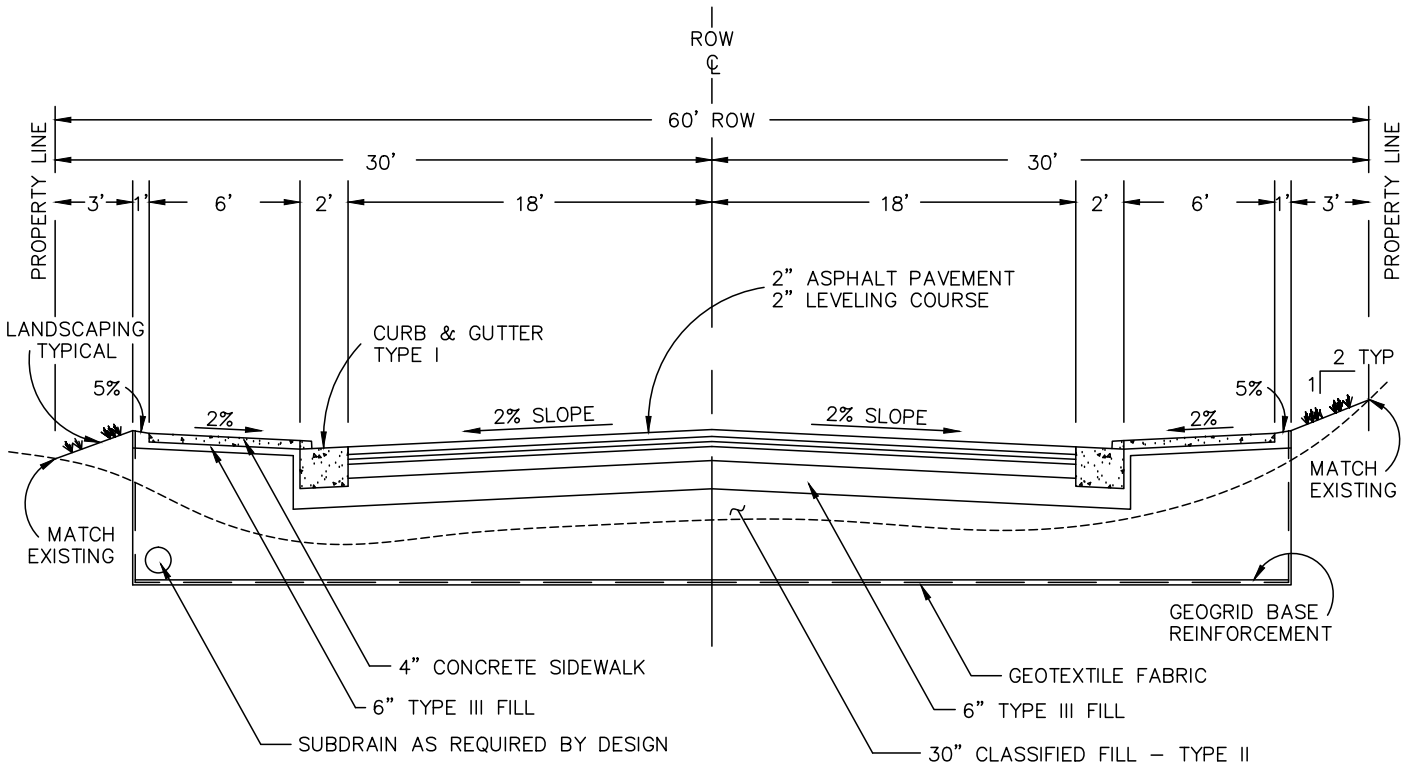
Storm Drain



NOTES:

1. PLACE GEOGRID AND FILTER FABRIC A MINIMUM OF 1' AND A MAXIMUM OF 2' FROM EACH EDGE OF THE EXCAVATION.
2. TYPICAL CROSS SECTION MAY VARY BASED ON R.O.W. WIDTH, GEOTECHNICAL AND DESIGN INFORMATION.

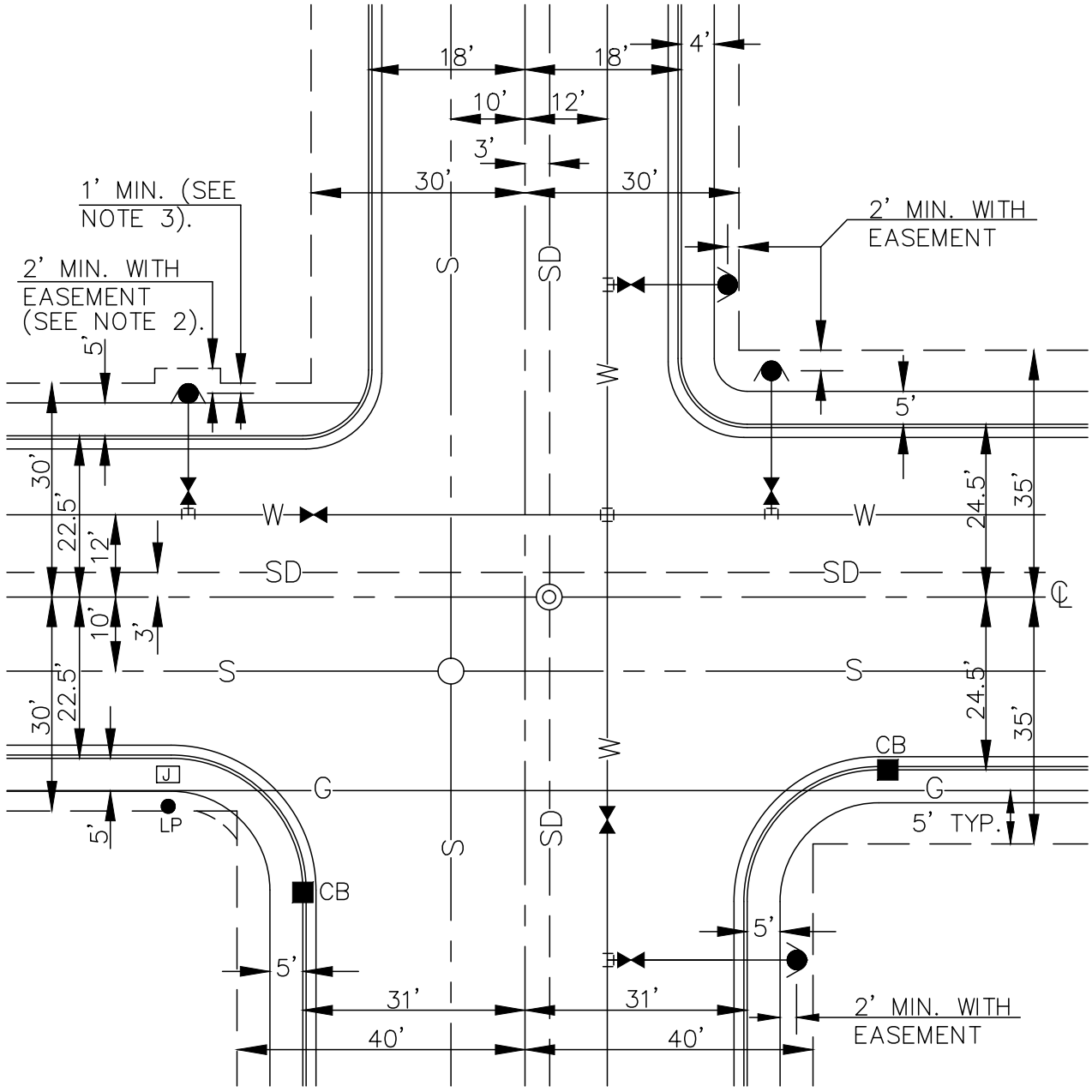
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 2/2007	TYPICAL ROADWAY SECTION RURAL	DETAIL # **200.01**



NOTES:

1. TYP. CROSS SECTION MAY VARY BASED ON ROW WIDTH, GEOTECH & DESIGN INFORMATION.

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	# TYPICAL ROADWAY SECTION URBAN (CURB, GUTTER + SIDEWALK)	DETAIL # **200.02**



G — GAS LINE
S — SANITARY SEWER LINE
SD — STORM DRAIN LINE
W — WATER LINE
℄ — ROADWAY CENTERLINE

NOTES:

1. OFFSETS ARE TO CENTER OF UTILITY.
2. ADDITIONAL RIGHT-OF-WAY MAY BE REQUIRED TO MEET MINIMUM SET-BACKS FOR HYDRANTS.
3. HYDRANT MUST BE SET-BACK A MINIMUM OF 5' FROM BACK OF CURB OR 1' FROM EDGE OF SIDEWALK.
4. CURB TO CURB DIMENSIONS SHOWN ARE TYPICAL EXAMPLES ONLY.

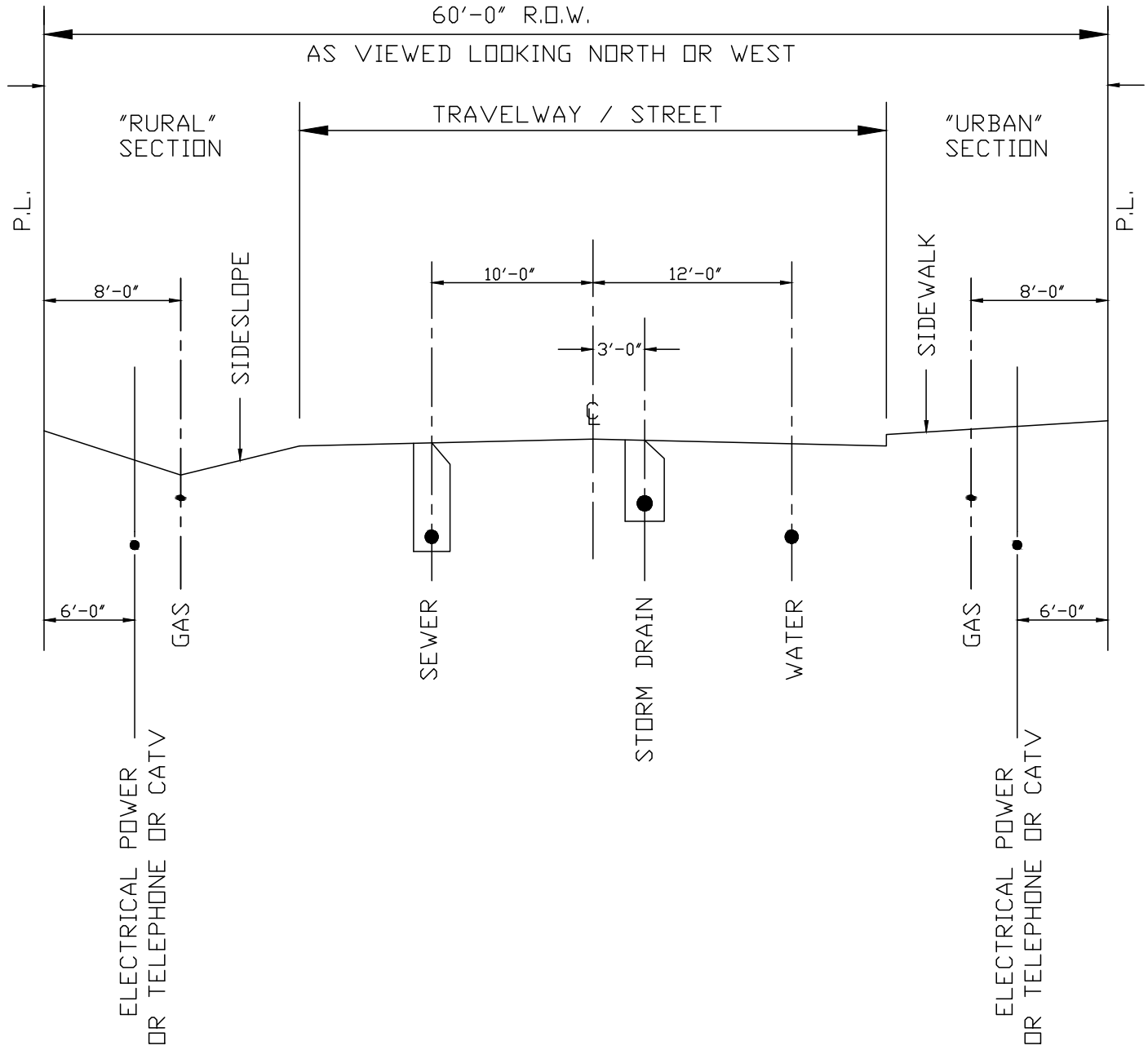
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

REVISED: 6/99

STANDARD LOCATION FOR NEW UTILITIES

DETAIL # 200.03



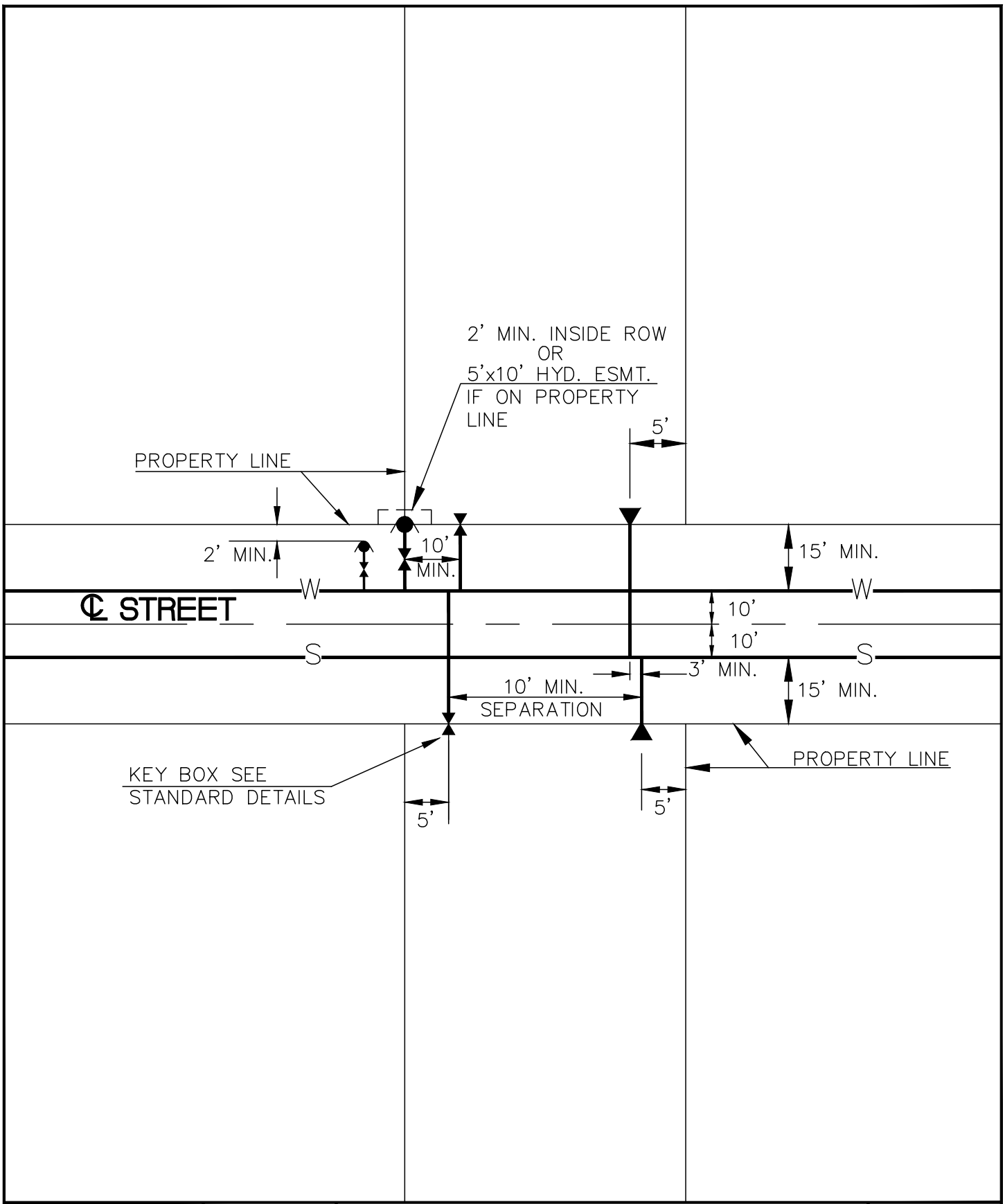
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

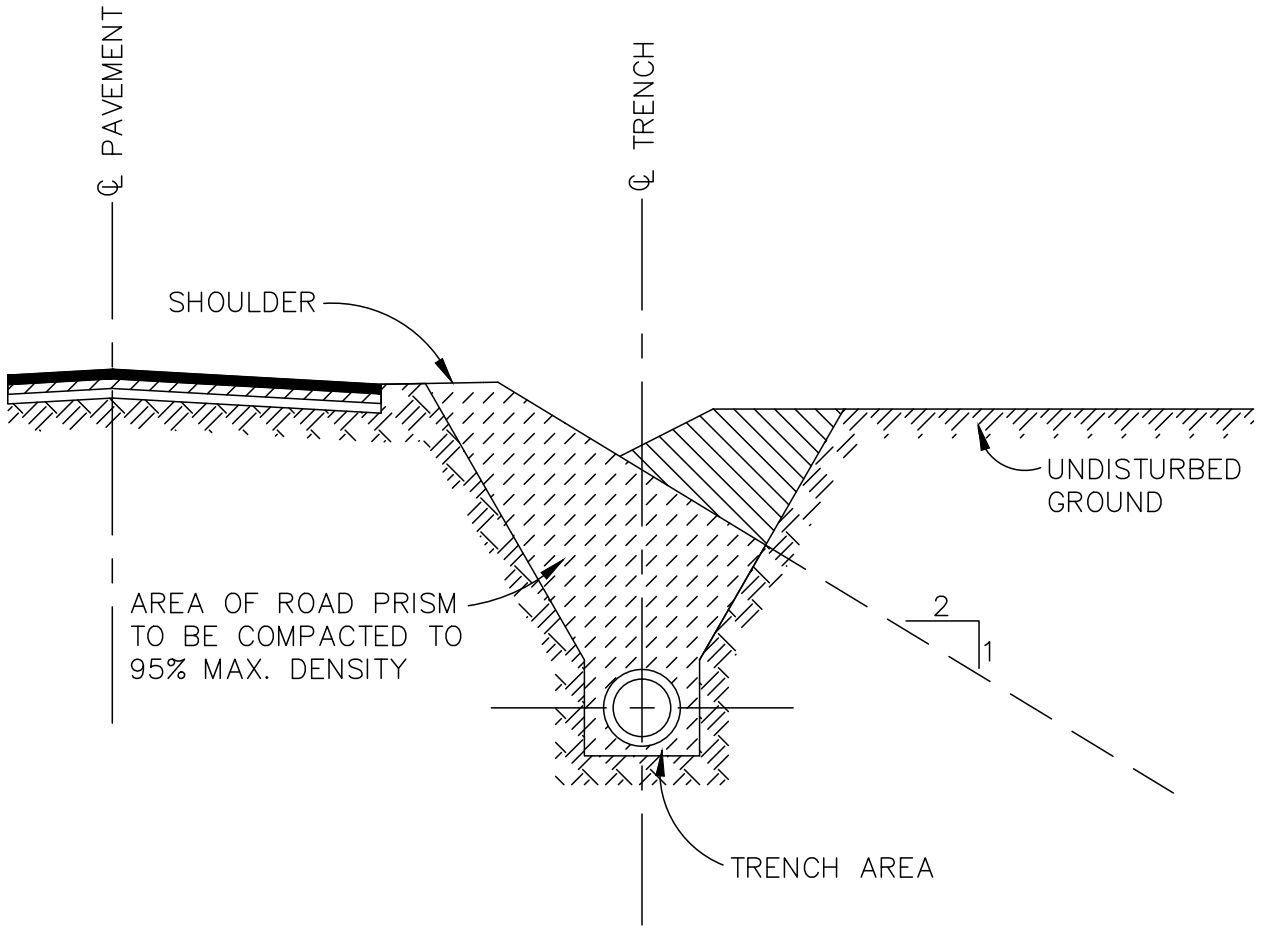
REVISED: 6/99

TYPICAL UTILITY LOCATIONS

DETAIL # **200.04**

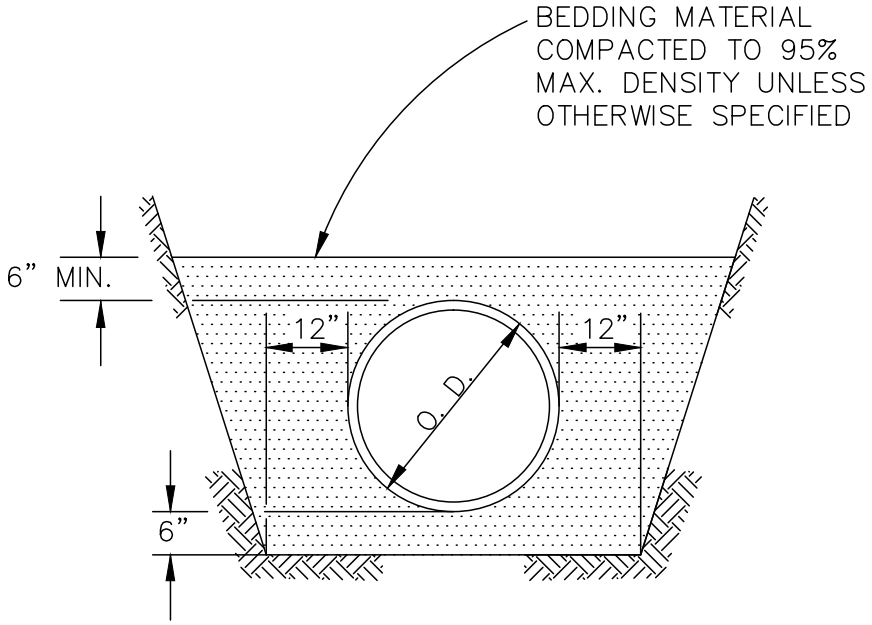


CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	TYPICAL WATER AND SEWER LOCATIONS	DETAIL # 200.05



1. ALL MATERIAL THAT IS TO BE BACKFILLED WITHIN THE ABOVE–DESCRIBED AREA WILL BE REPLACED IN ONE FOOT LIFTS & COMPACTED TO A MINIMUM OF 95%.
2. THIS BACKFILL WILL BE FREE OF ANY EXTENSIVE CLAYS & ORGANIC MATERIALS.
3. THE COMPACTION OF THIS BACKFILL WILL BE ACCOMPLISHED BY MECHANICAL MEANS WITHOUT THE AID OF WATER.
4. THE DITCH LINE WILL BE RESHAPED IN SUCH A MANNER AS TO ALLOW PROPER DRAINAGE & THE SHOULDER OF THE ROAD WILL BE REPLACED AT A UNIFORM SLOPE NOT TO EXCEED 2 TO 1.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	COMPACTION OF BACKFILL WITHIN RIGHT-OF-WAY	DETAIL # 200.06



NOTES:
1. TRENCH WALL SLOPE WILL VARY WITH SOIL STRENGTH AND CHARACTER
2. O.D. = OUTSIDE DIAMETER OF PIPE.
3. BEDDING MATERIAL IS CLASS B OR C.
4. BEDDING TO SPRING LINE ONLY FOR DUCTILE IRON PIPE.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	CLASS B AND C BEDDING	DETAIL # **200.07**

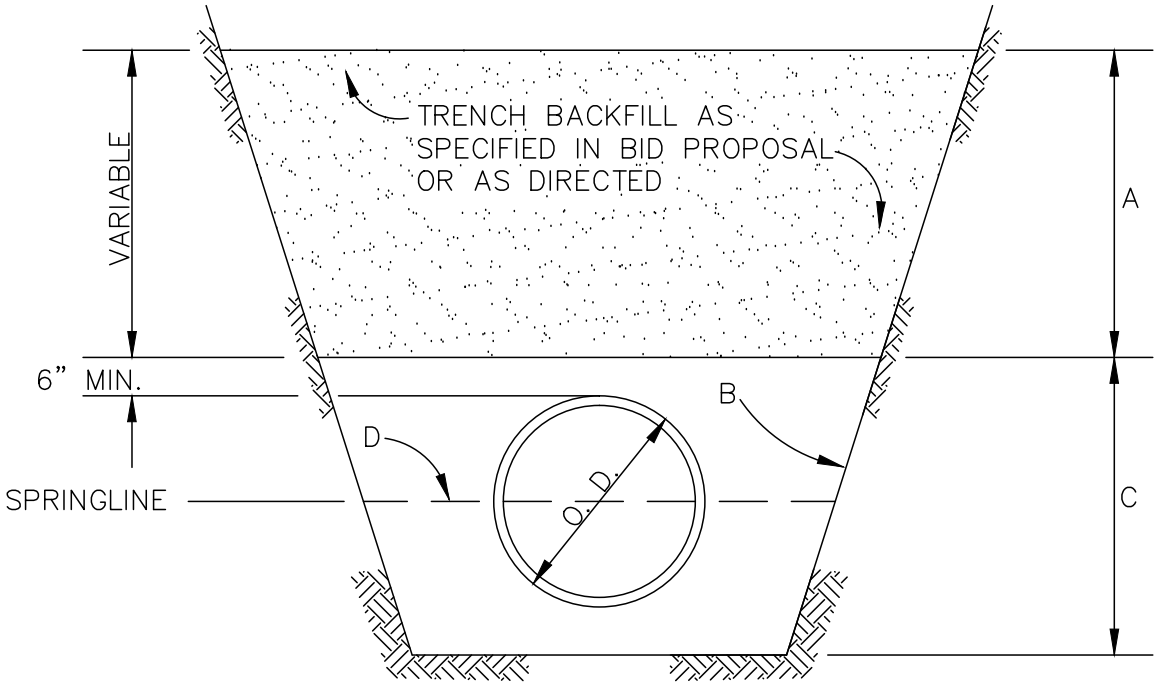
NOTES:

(A) TRENCH BACKFILL MATERIAL PLACED AND COMPACTED TO DEPTHS AS DETERMINED BY THE ENGINEER.

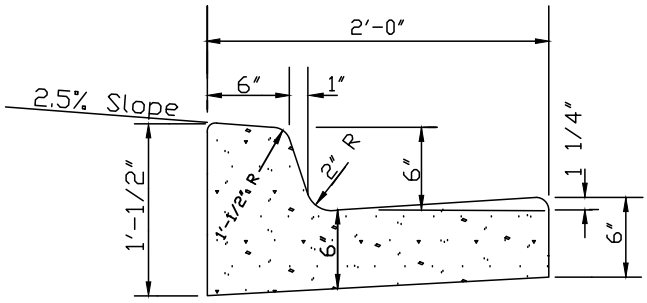
(B) TRENCH WALL SLOPES WILL VARY WITH SOIL STRENGTH AND CHARACTER. SLOPES TO CONFORM TO SAFETY STANDARDS.

(C) CLASS "B" OR "C" BEDDING.

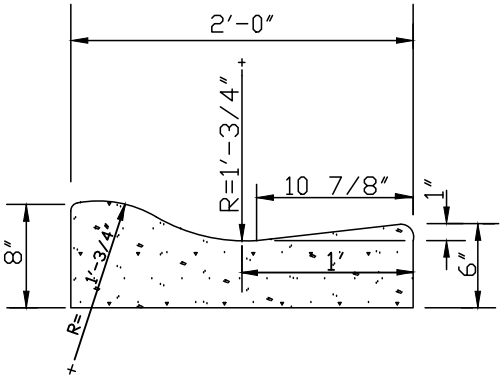
(D) BEDDING TO SPRING LINE ONLY WHEN DUCTILE IRON PIPE IS INSTALLED.



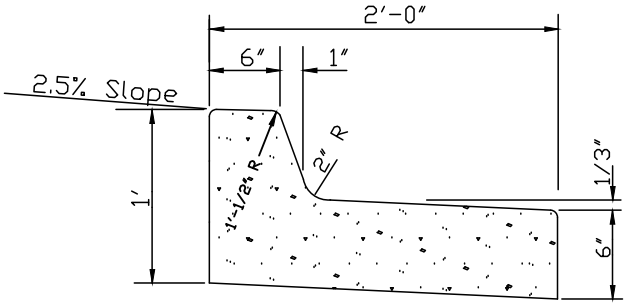
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NONE REVISED: 6/99	TRENCH BACKFILL	DETAIL # 200.08



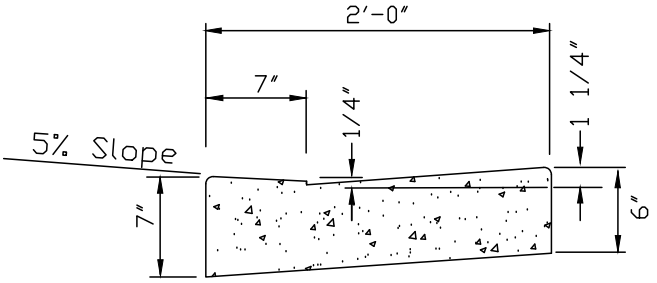
CURB & GUTTER
TYPE 1



ROLLED CURB & GUTTER
TYPE 2



CURB & GUTTER
TYPE 3

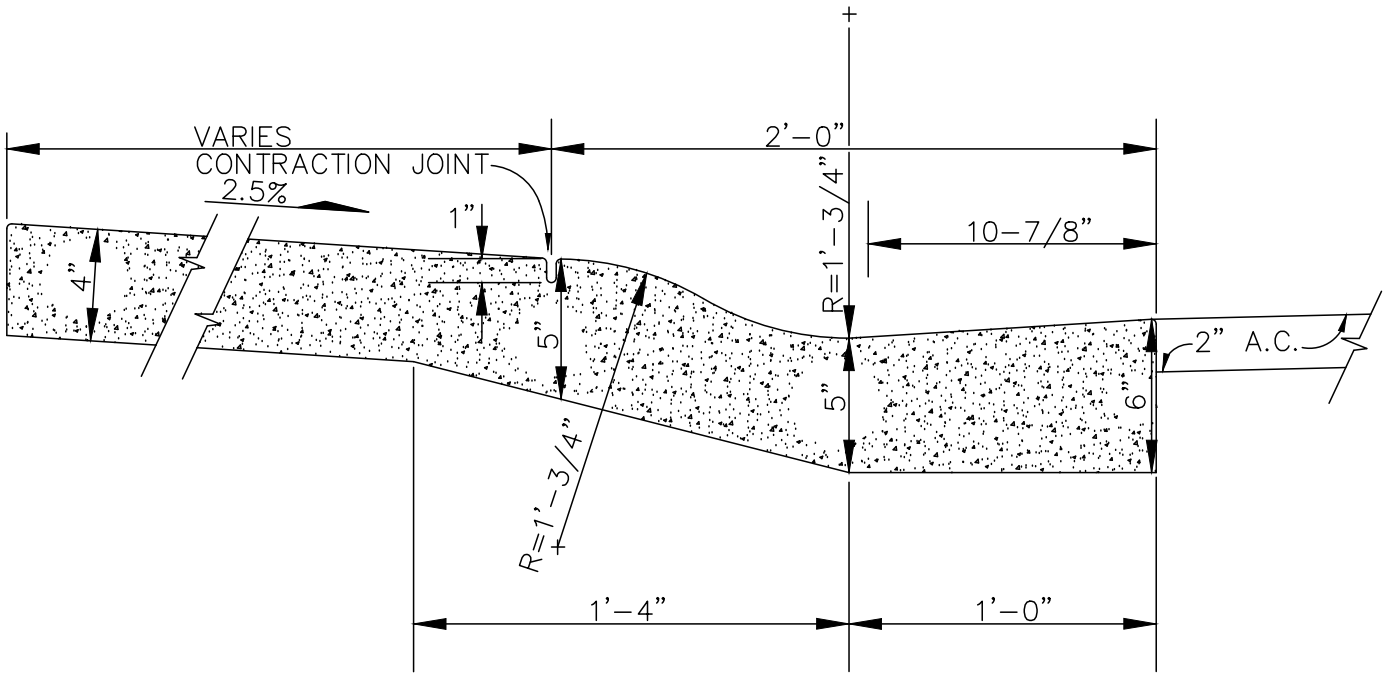


DEPRESSED CURB & GUTTER
(USED AT CURB CUTS)
TYPE 4

NOTE:

BOTH FRONT AND BACK EDGES OF THE CURB & GUTTER SHALL BE TROWELED TO A RADIUS OF ONE-HALF (1/2) INCH.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	CURB AND GUTTER CROSS SECTIONS	DETAIL # 300.01

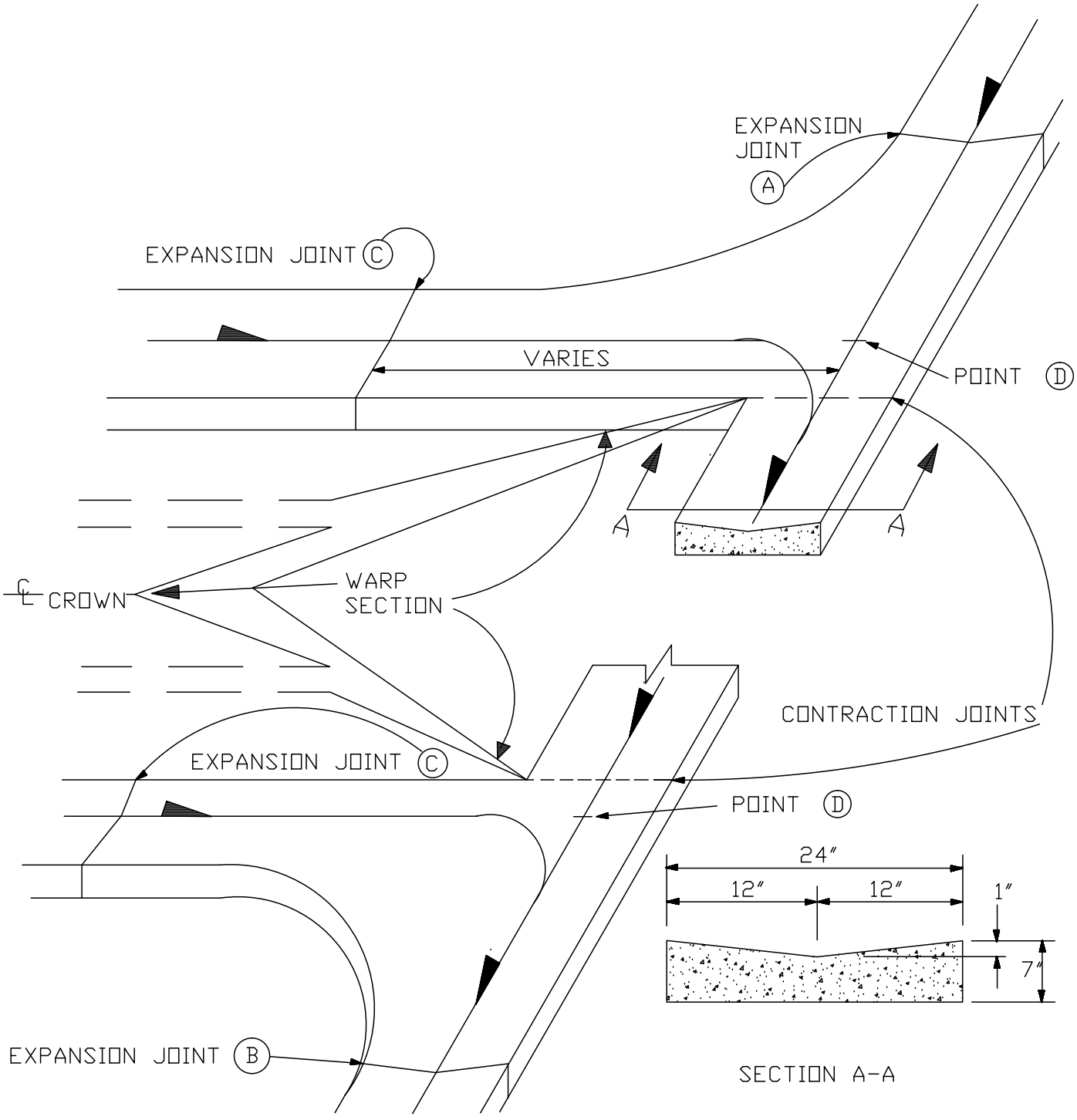


NOTES:

1. MONOLITHIC SIDEWALK AND CURB & GUTTER MAY BE SUBSTITUTED AS AN ALTERNATE TO THE ROLLED CURB & GUTTER AND SIDEWALK.

2. BOTH FRONT AND BACK EDGES OF THE CURB & GUTTER AND SIDEWALK SHALL BE TROWELED TO A RADIUS OF ONE-HALF (1/2) INCH.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	MONOLITHIC SIDEWALK CURB AND GUTTER SECTION	DETAIL # 300.02

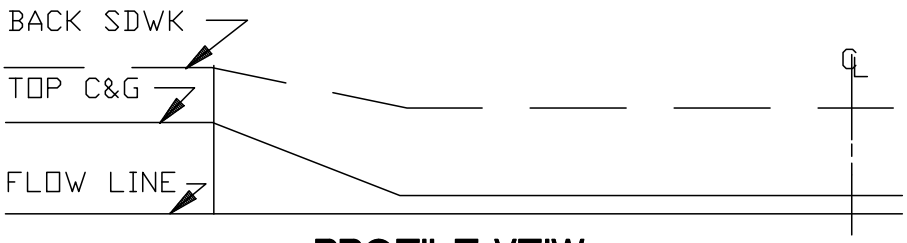


SECTION A-A

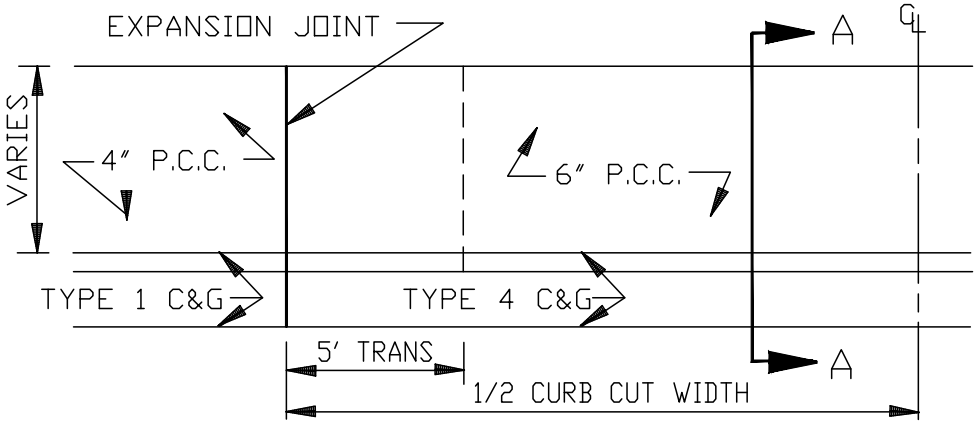
NOTE:

P.C.C. VALLEY GUTTER WILL BE PAID FOR PER LINEAR FOOT UNDER BID ITEM "P.C.C. VALLEY GUTTER". LENGTHS SHALL BE MEASURED ALONG THE STRAIGHT FLOW LINE BETWEEN EXPANSION JOINTS "A&B" AND FROM EXPANSION JOINT "C" TO THE INTERSECTION OF THIS STRAIGHT FLOW LINE (POINT "D") BOTH SIDES.

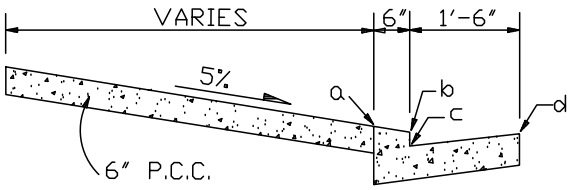
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	P.C.C. VALLEY GUTTER	DETAIL # 300.03



PROFILE VEIW



PLAN VIEW



SECTION A-A

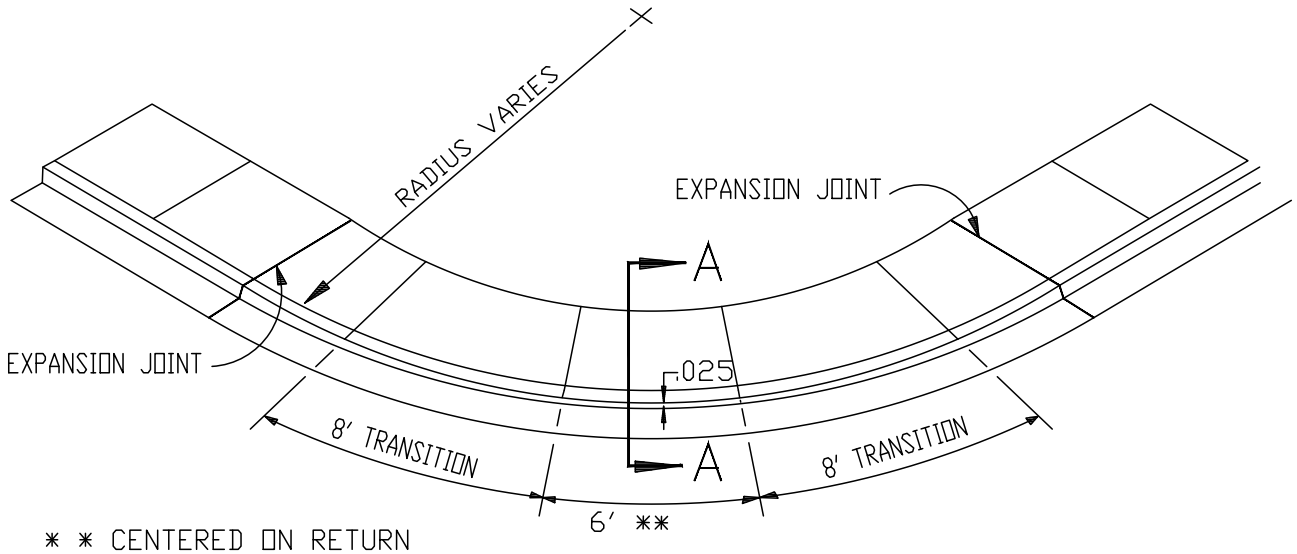
a	b	c	d
0.00	-0.025	-0.050	-0.025

SCALE: NTS

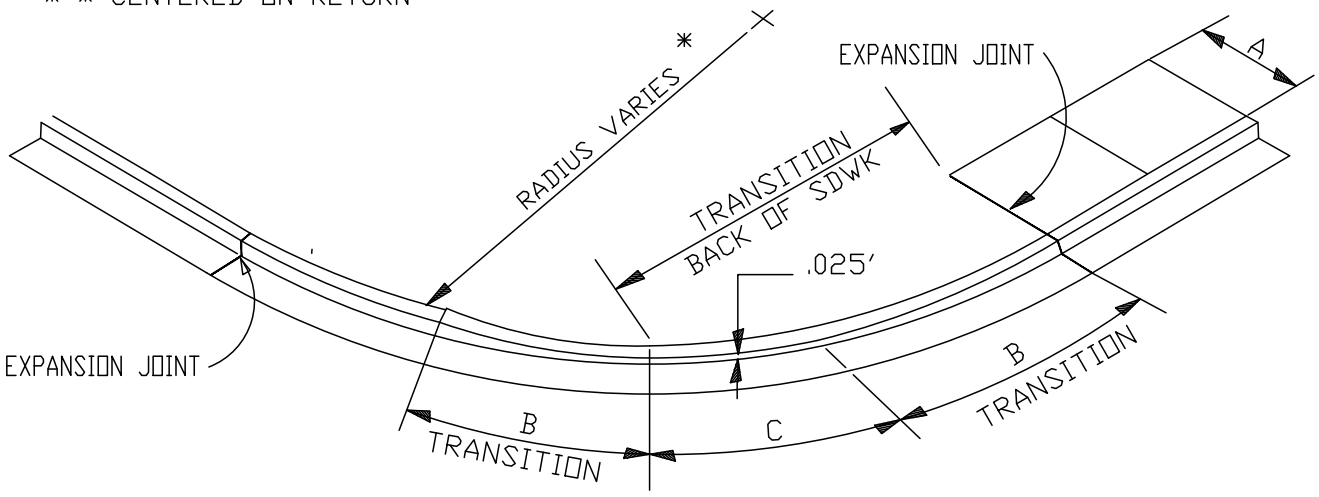
REVISED: 6/99

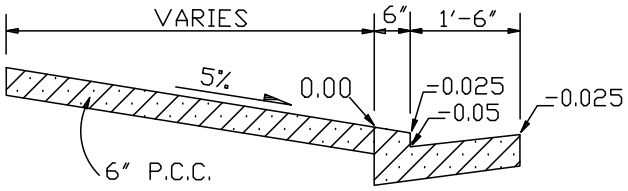
STANDARD CURB-CUT AND ALLEY RETURN

DETAIL # 300.04



* * CENTERED ON RETURN





SECTION A-A

RADIUS*	A	B	C
15'	4'	5.5'	5.7'
20'	4'	6.4'	6.5'
20'	5'	9.0'	5.5'
25'	4'	7.1'	7.2'
25'	5'	10.1'	6.0'
30'	4'	7.8'	7.9'
30'	5'	11.0'	6.6'

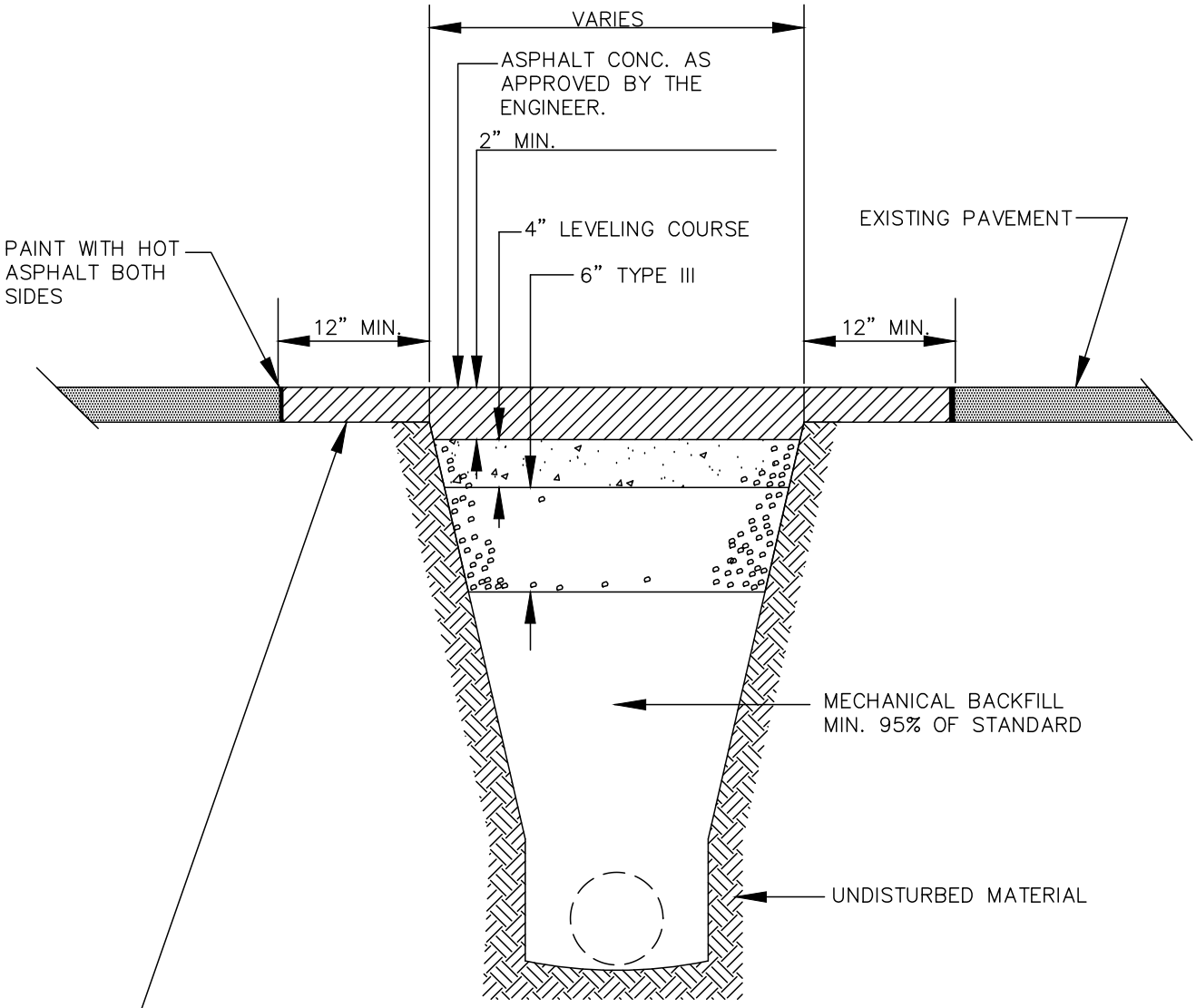
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

REVISED: 6/99

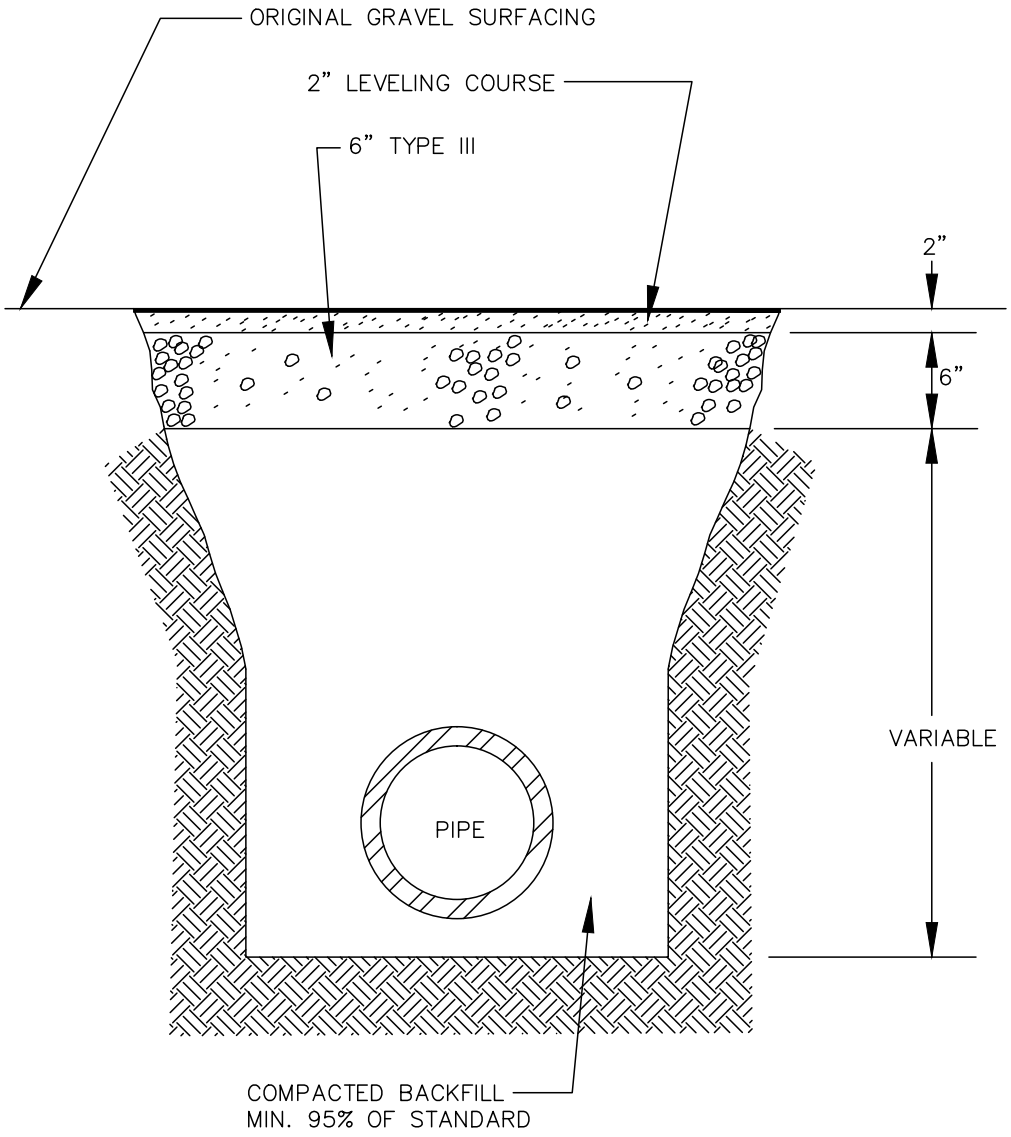
STANDARD CURB RETURN

DETAIL # **300.05**



AFTER DITCH BACKFILL HAS BEEN COMPACTED AN ADDITIONAL 12" WILL BE REMOVED FROM EACH EDGE OF THE ORIGINAL CUT. THE ENGINEER MAY REQUIRE MORE THAN THE 12" ADDITIONAL CUT IF THE EXISTING PAVEMENT HAS BEEN LIFTED IN THE REMOVAL PROCESS OR IF THE JOINT DOES NOT OCCUR ON UNDISTURBED MATERIAL. CUTS MAY BE MADE WITH A SAW OR AIR CHISEL.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	# PAVEMENT CUT REPLACEMENT	DETAIL # **400.01**



CITY OF HOMER · ALASKA · MARCH 31, 1964

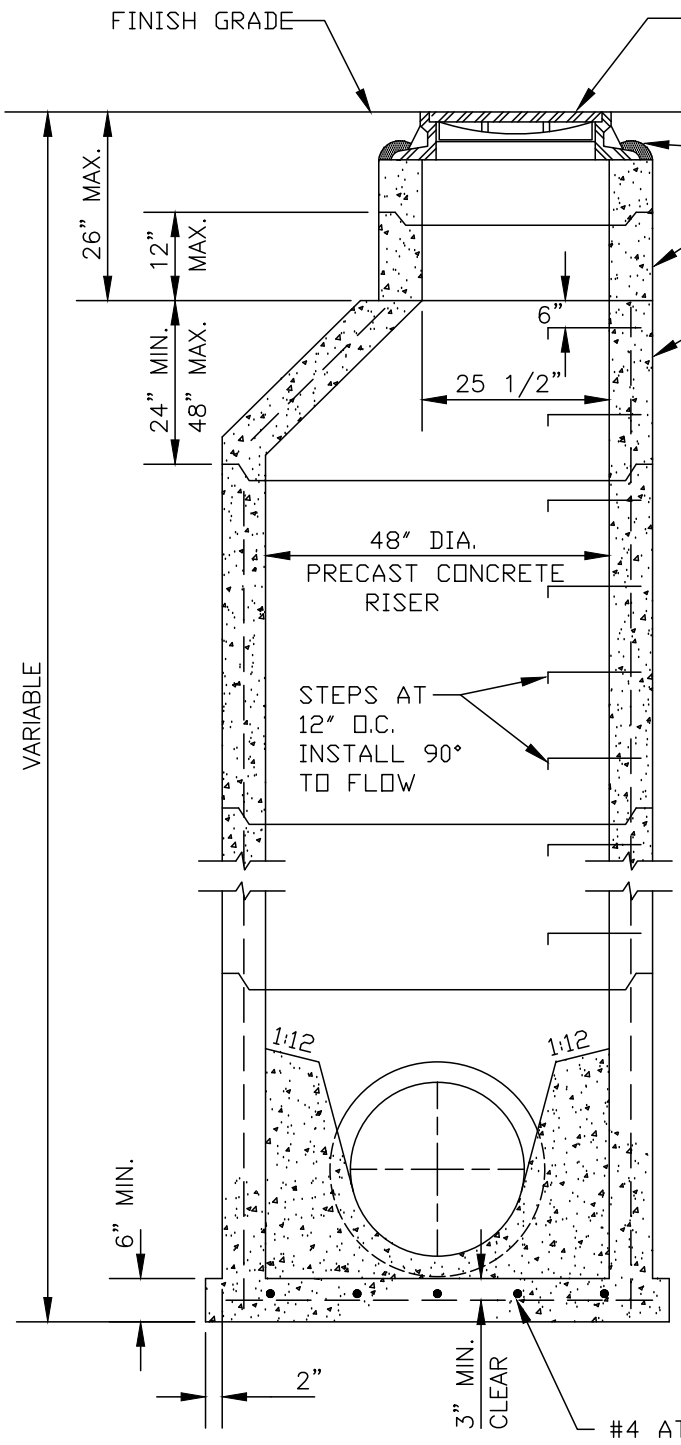
SCALE: NTS

REVISED: 6/99

RESURFACING DETAIL
TYPICAL GRAVEL SECTION

DETAIL #

400.02



NOTES:

1. MIN. STEEL REQ'D FOR BARREL AS PER A.S.T.M. C-478-69 SHALL BE IMBEDDED IN BASE SO THAT FIRST BARREL SECTION IS CONNETED WITH BASE.
2. RAM-NEK GASKETS ALL BARREL JOINTS.
3. ALL MANHOLE SECTIONS SHALL CONFORM TO A.S.T.M. C-478-69.
4. "JET SET", "ALL CRETE" OR EQUAL, AT PIPE CONNECTION WITH PRECAST BASE.
5. NO REBAR TO EXTEND INTO PIPE OPENING.
6. MAXIMUM ALLOWABLE HEIGHT IN GRADE RINGS IS 12" FOR NEW CONSTRUCTION.
7. ALL EXTERIOR JOINTS, INCLUDING GRADE RINGS AND SURFACE CASTINGS, SHALL BE WRAPPED WITH WRAPIDSEAL MANHOLE ENCAPSULATION SYSTEM.

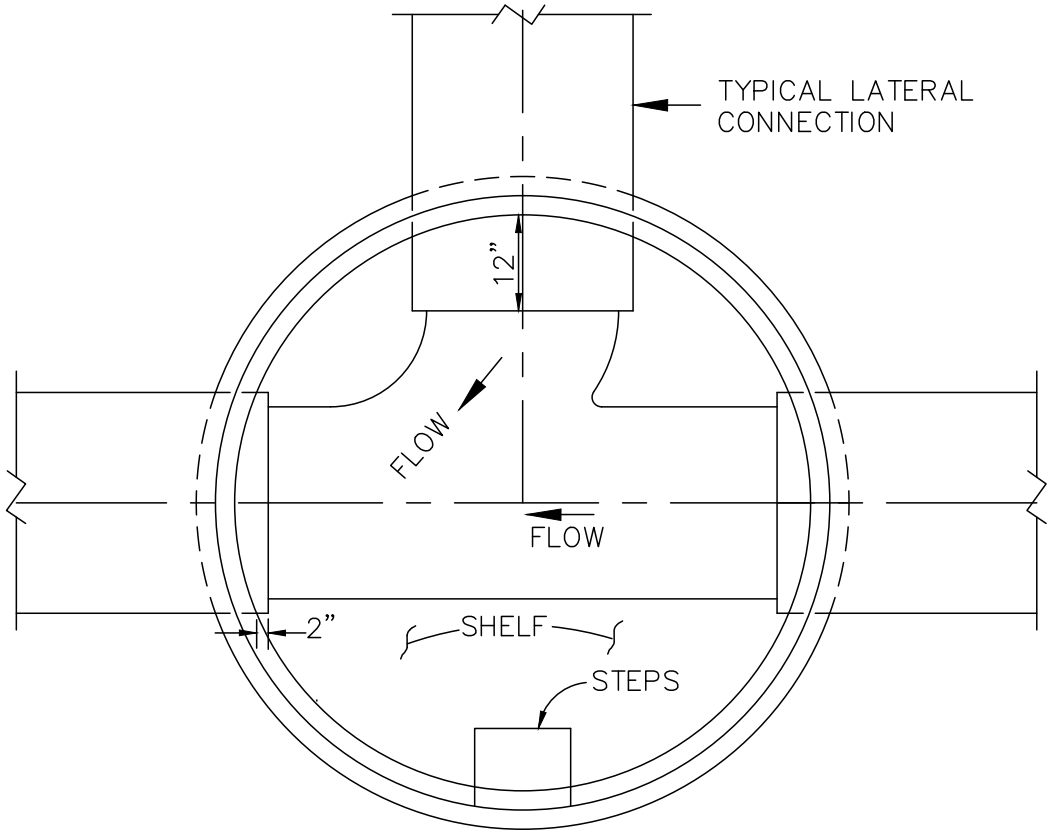
CITY OF HOMER - ALASKA - MARCH 31, 1964

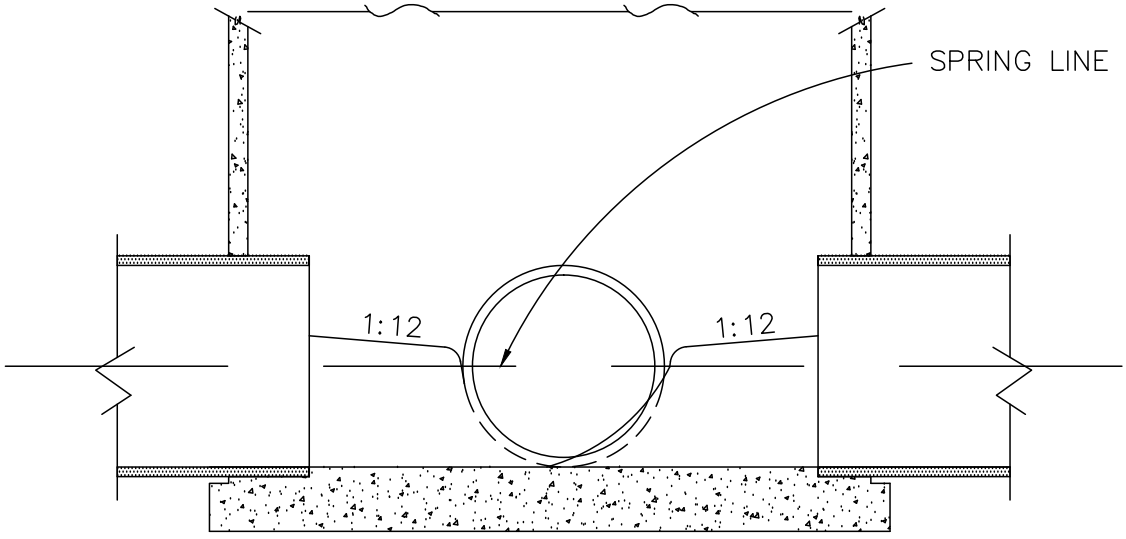
SCALE: N.T.S.

REVISED: 4/2011

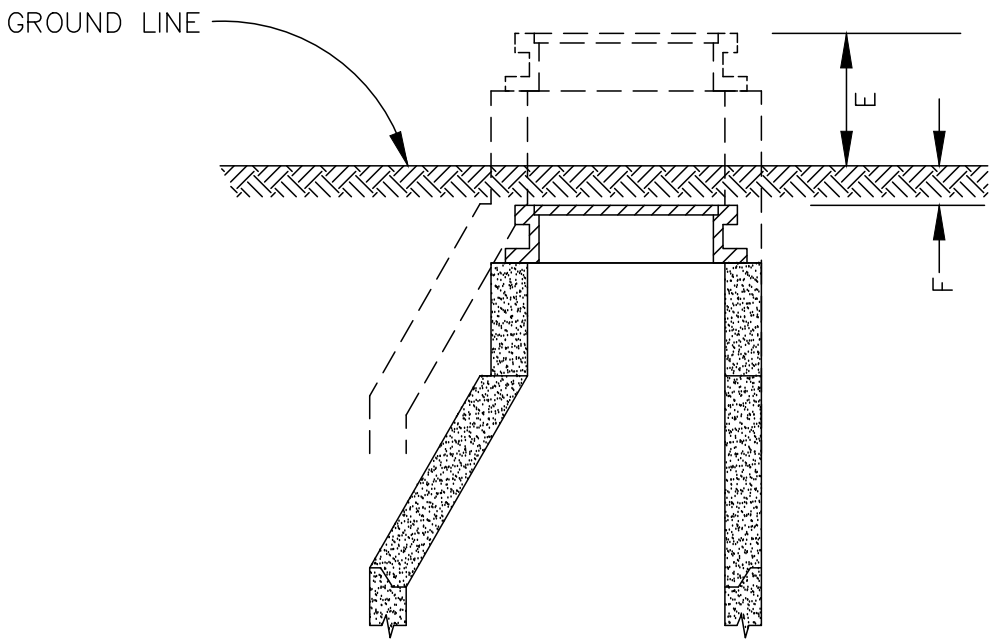
SANITARY SEWER MANHOLE TYPE A PIPE DIA. 8" TO 24"

DETAIL # 500.01





CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER TYPE A AND B MANHOLE BASE PLAN	DETAIL # **500.02**



LOCATION	E	F
BACKYARDS, GRAVEL STREETS, AND ALLEY AREAS WHERE TRAVELED.		6"
UNDEVELOPED AND SWAMPY AREAS.	24" MIN	
R.O.W.S OUTSIDE TRAFFIC AREAS.	6"	
PAVED STREETS.		1/2"

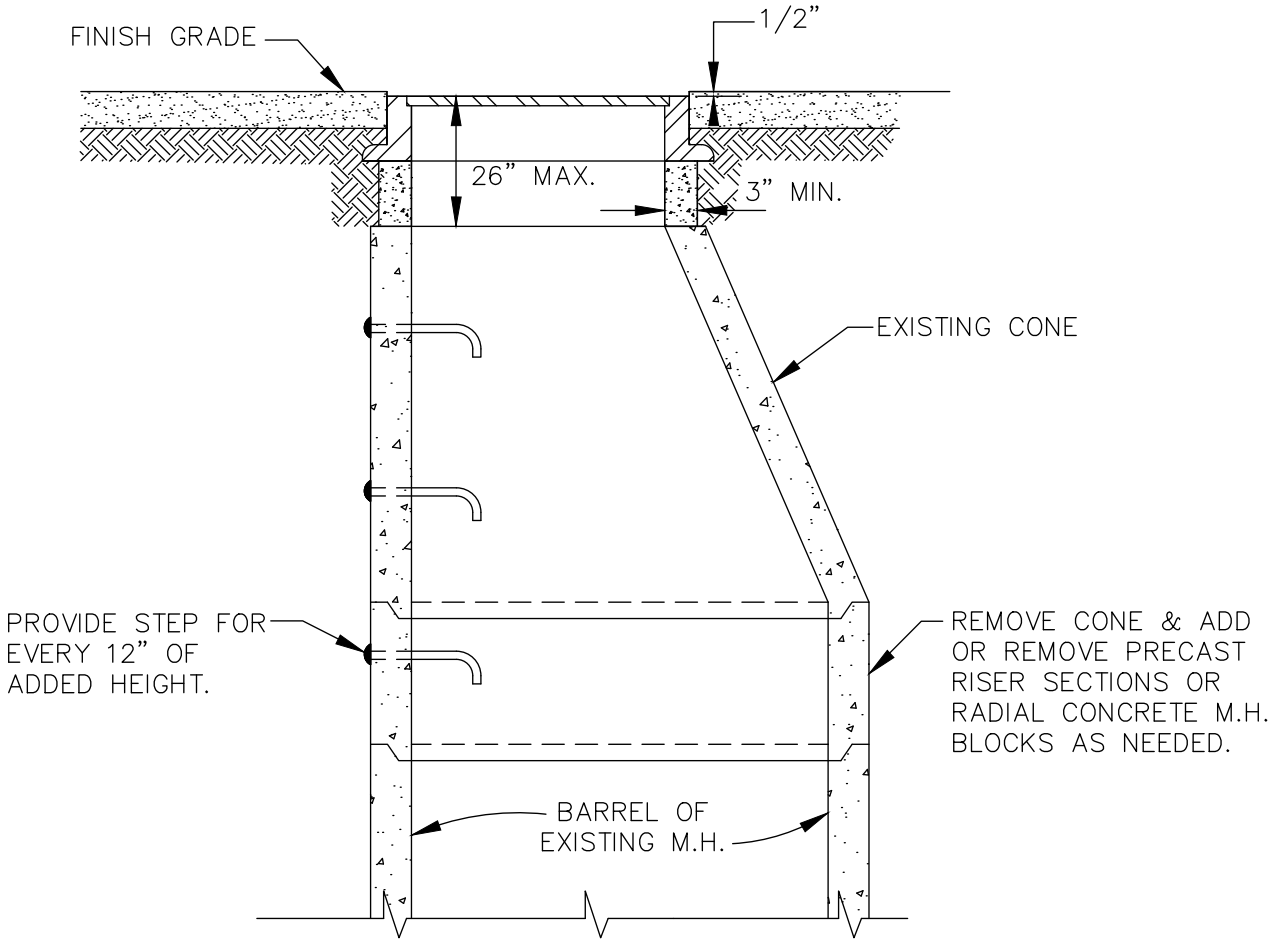
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

REVISED: 6/99

SANITARY SEWER MANHOLE HEIGHTS

DETAIL # 500.03

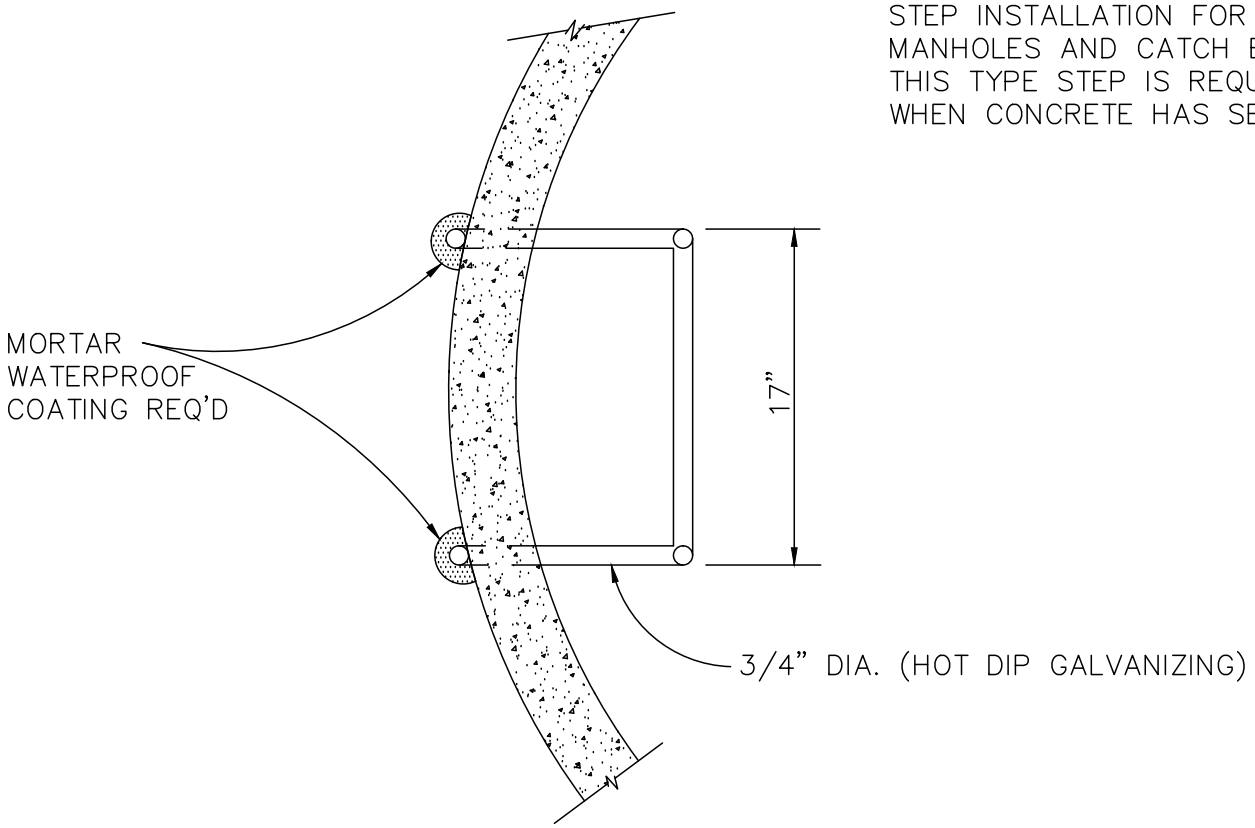


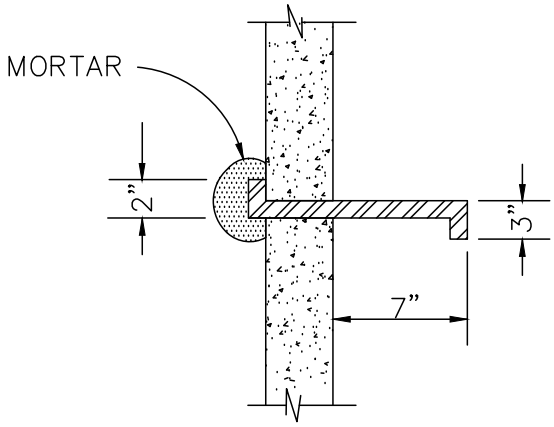
NOTES

1. ALL PERTINENT SECTIONS OF THE STANDARD SPECIFICATIONS WILL APPLY.
2. RESET RING IN FULL BED OF MORTAR.
3. REFER TO ASTM DESIGNATION C-478-69 FOR DESIGN AND STRENGTH REQUIREMENTS.
4. RESET CONE IN RAM-NEK OR EQUAL.
5. ALL EXTERIOR JOINTS, INCLUDING GRADE RINGS AND SURFACE CASTINGS, SHALL BE WRAPPED WITH WRAPIDSEAL MANHOLE ENCAPSULATION SYSTEM.

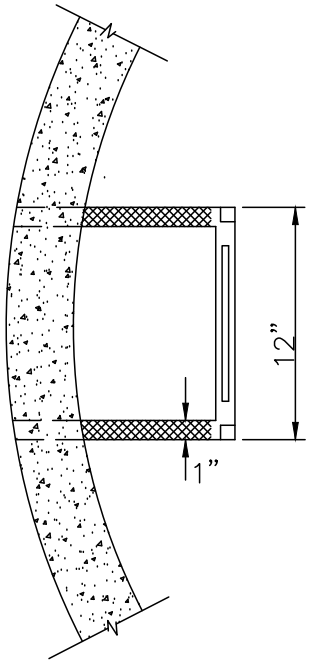
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 4/2011	SANITARY SEWER MANHOLE CONE ADJUSTMENT	DETAIL # 500.04

NOTE:
STEP INSTALLATION FOR MANHOLES AND CATCH BASINS. THIS TYPE STEP IS REQUIRED WHEN CONCRETE HAS SET.

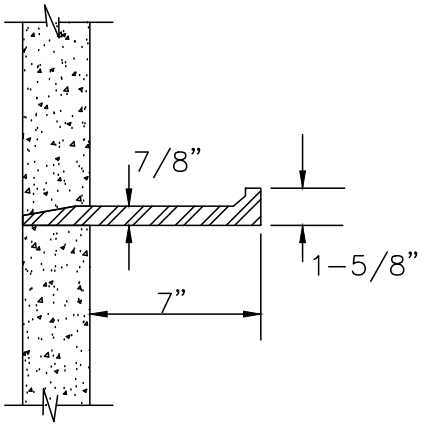




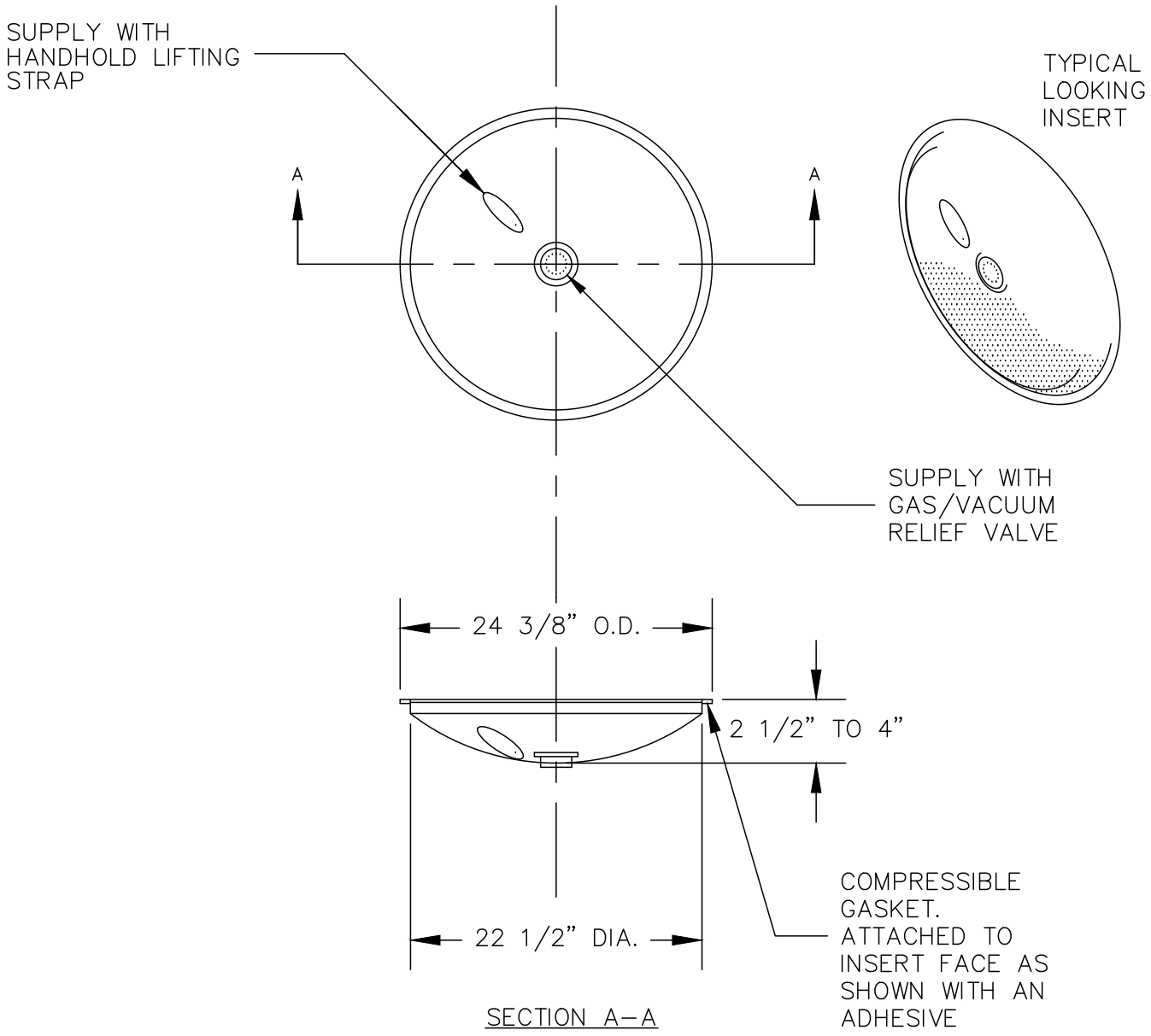
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER MANHOLE STEP	DETAIL # 500.05



NOTE:
CAST IRON STEPS MUST BE INSTALLED DURING MANHOLE SECTION POUR OR BEFORE CONCRETE SETS.
NEENAH CASTING No. R–1981–N OR EQUAL.



CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER MANHOLE STEP (ALTERNATE)	DETAIL # 500.06

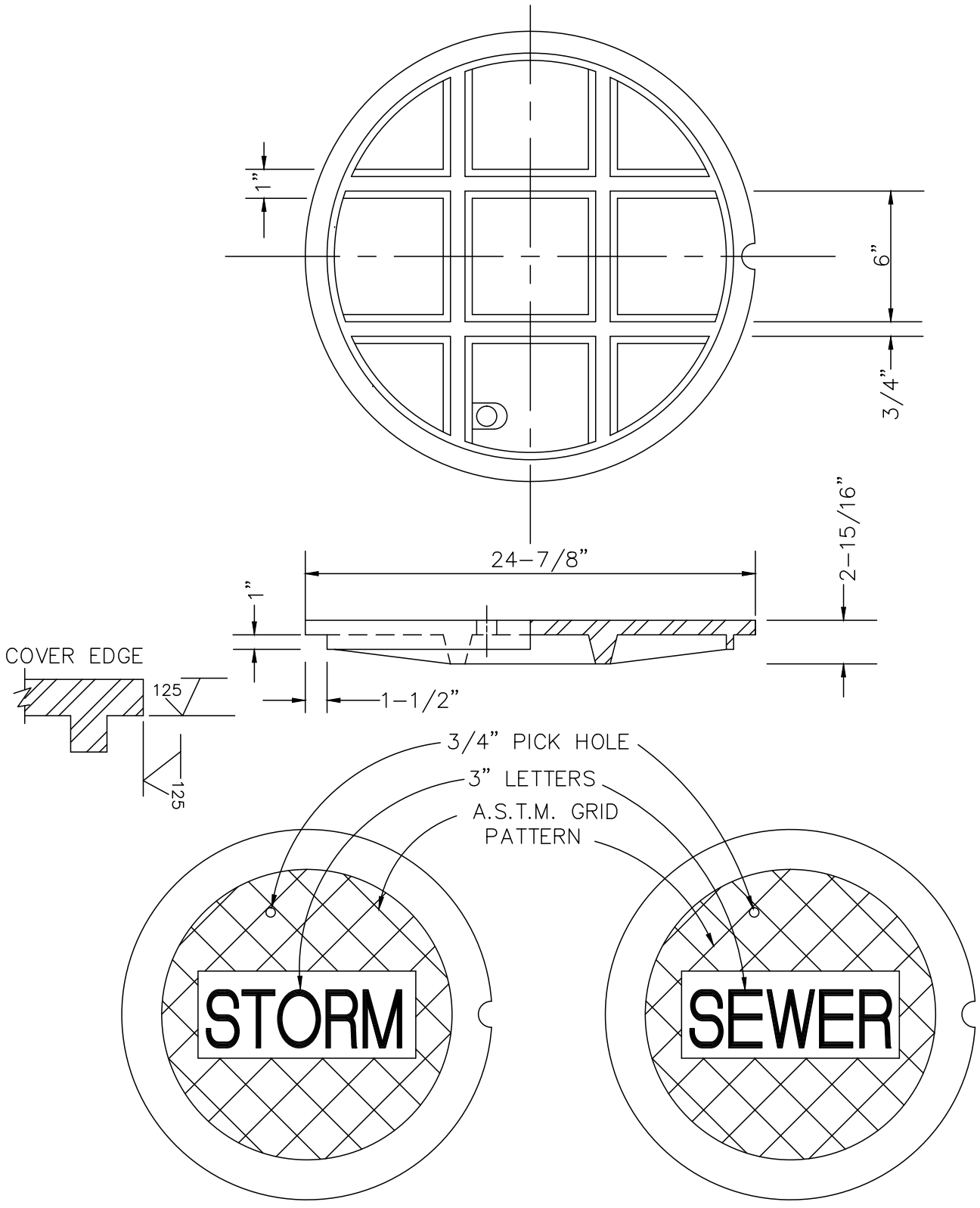


SECTION A–A

NOTES:

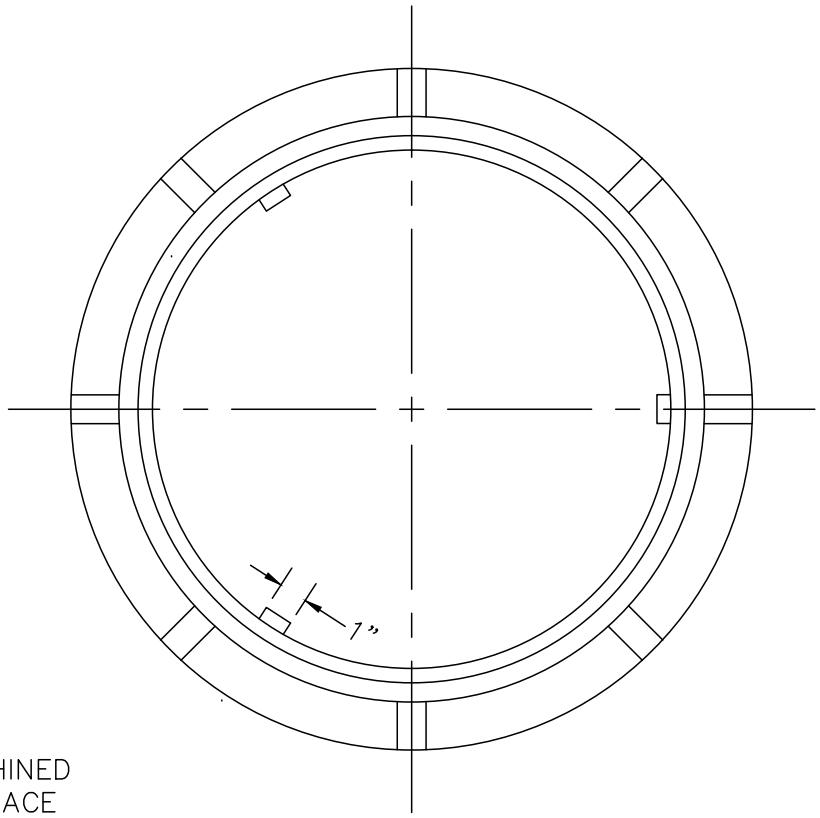
1. INSERT MATERIAL: ABS OR PE
AVAILABLE FROM : FRW INDUSTRIES, INC.
14882 ROSEBUD, CONROE, TX 77303

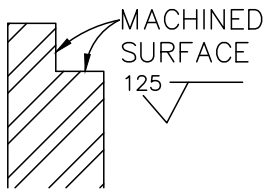
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER MANHOLE COVER INSERT (INFLOW PREVENTER)	DETAIL # 500.07



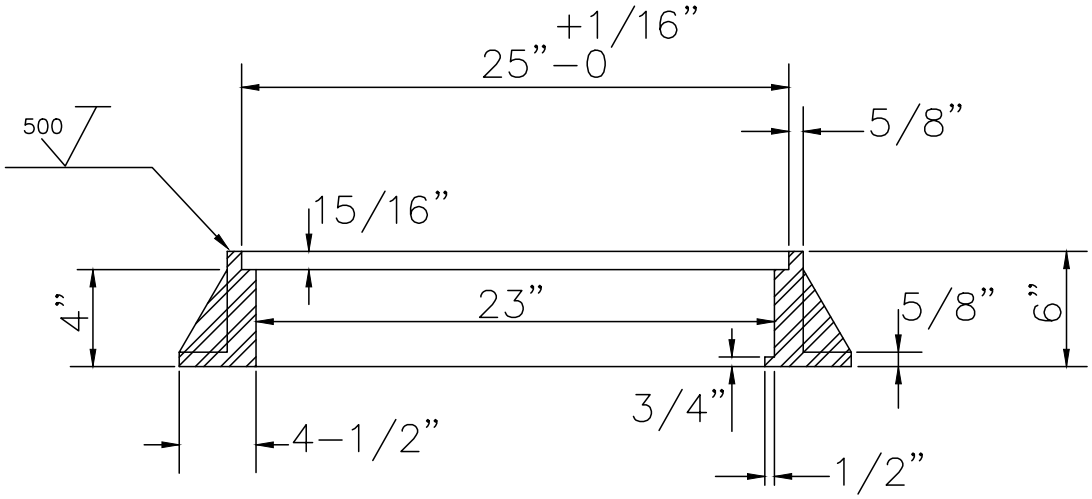
NOTE: ALL MANHOLE LIDS PLACED WITHIN A ROADWAY SECTION SHALL BE RATED FOR HEAVY VEHICLE TRAFFIC.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER MANHOLE COVER	DETAIL # 500.08

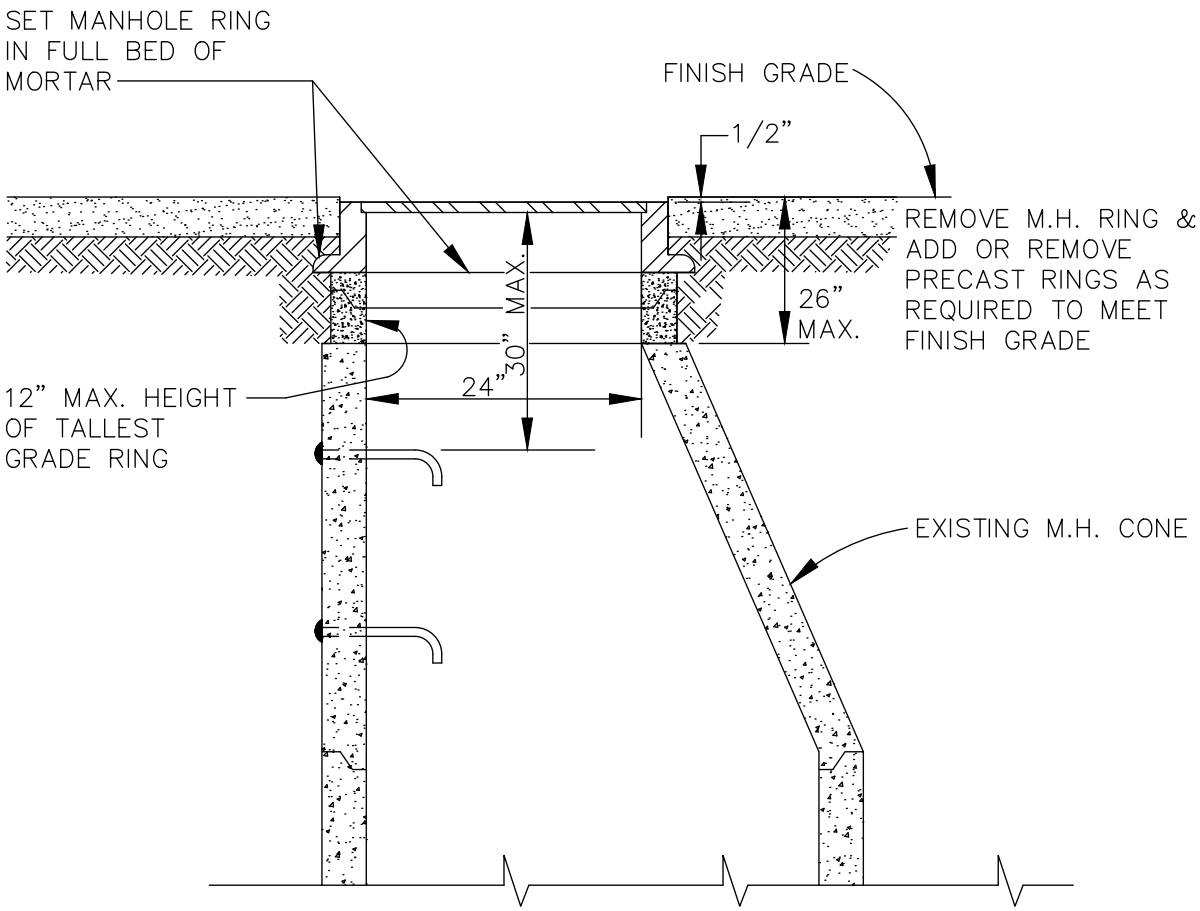




FRAME



CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER MANHOLE FRAME	DETAIL # **500.09**

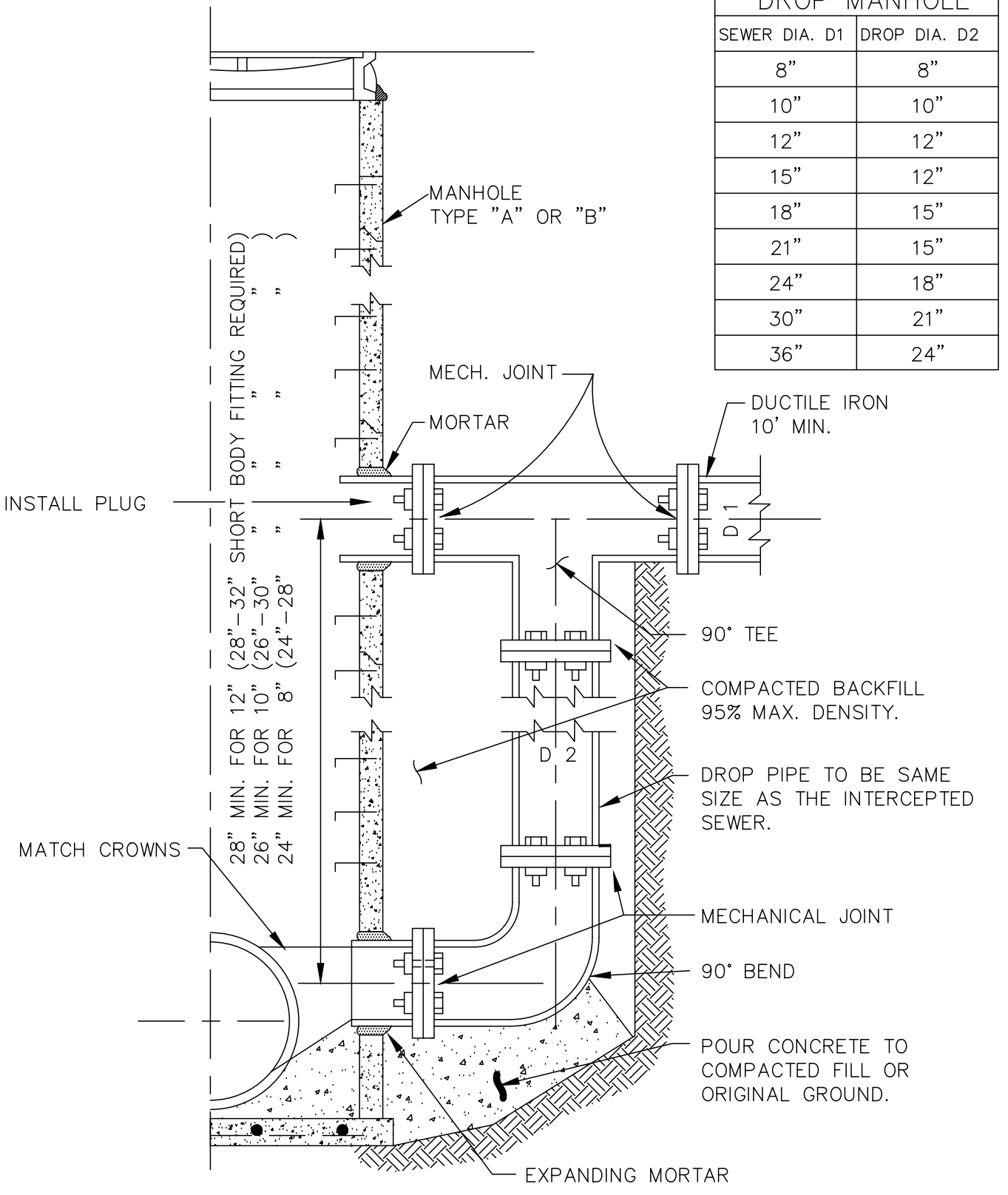


NOTES:

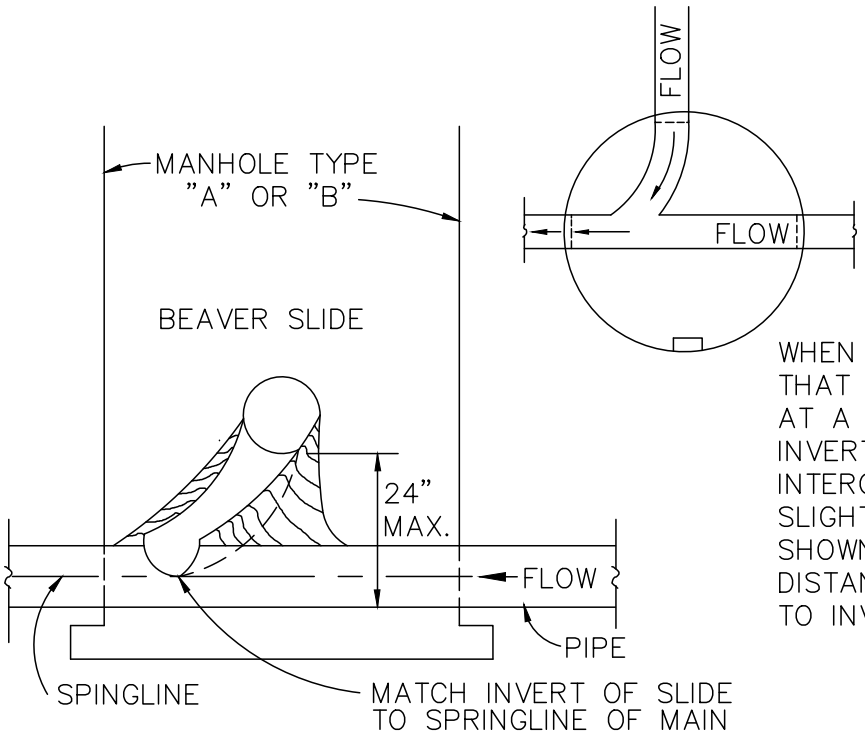
1. ALL PERTINENT SECTIONS OF THE STANDARD SPEC. WILL APPLY.
2. REFER TO ASTM DESIGNATION C-478-69 FOR DESIGN AND STRENGTH REQUIREMENTS.
3. WHEN AN ADJUSTMENT OF GREATER THAN 18" IN GRADE RINGS IS REQUIRED, A CONE ADJUSTMENT SHALL BE MADE.
7. ALL EXTERIOR JOINTS, INCLUDING GRADE RINGS AND SURFACE CASTINGS, SHALL BE WRAPPED WITH WRAPIDSEAL MANHOLE ENCAPSULATION SYSTEM.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 4/2011	SANITARY SEWER MANHOLE RING ADJUSTMENT	DETAIL # 500.10

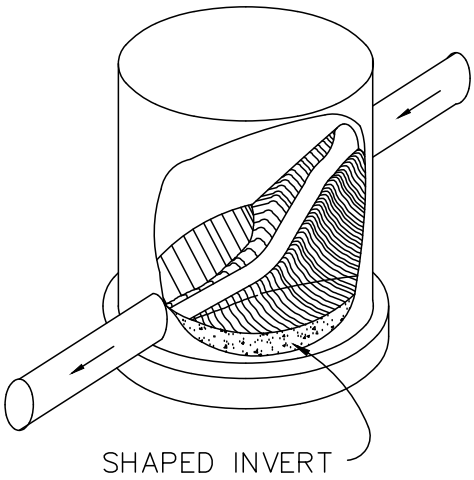
DROP MANHOLE	
SEWER DIA. D1	DROP DIA. D2
8"	8"
10"	10"
12"	12"
15"	12"
18"	15"
21"	15"
24"	18"
30"	21"
36"	24"

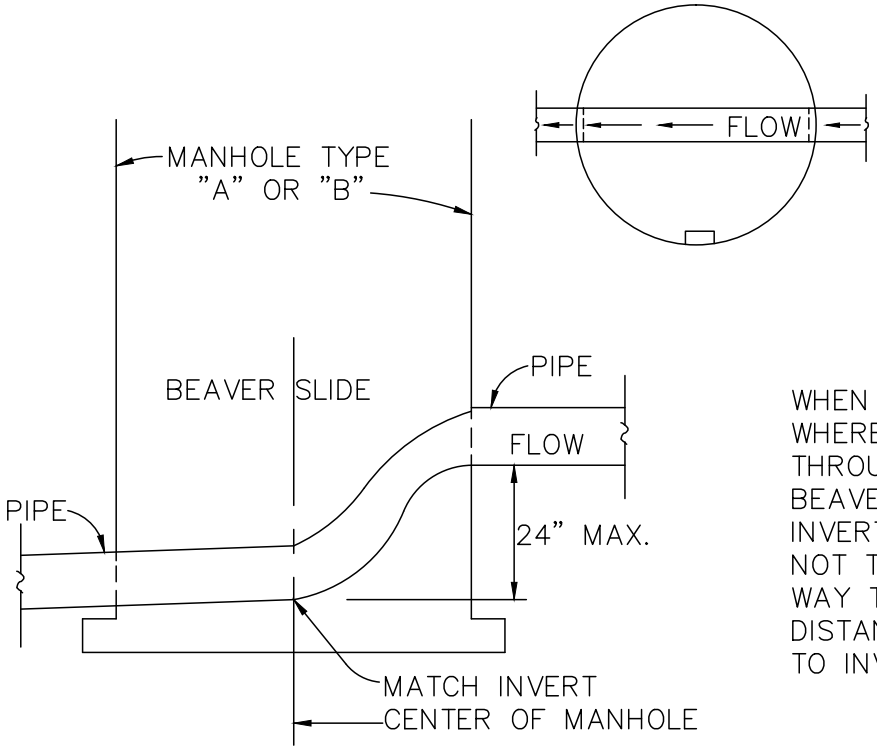


CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: N.T.S. REVISED: 6/99	SANITARY SEWER DROP CONNECTION TYPE A + B MANHOLE	DETAIL # 500.11



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.

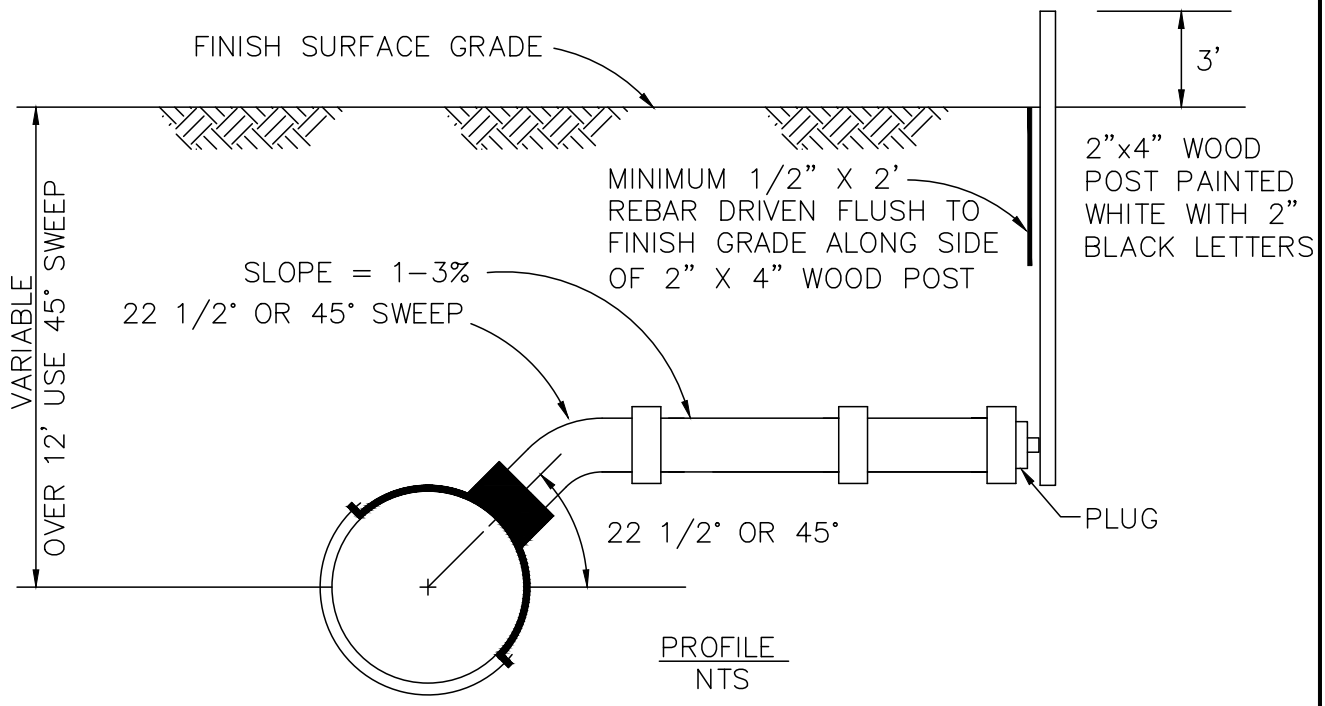




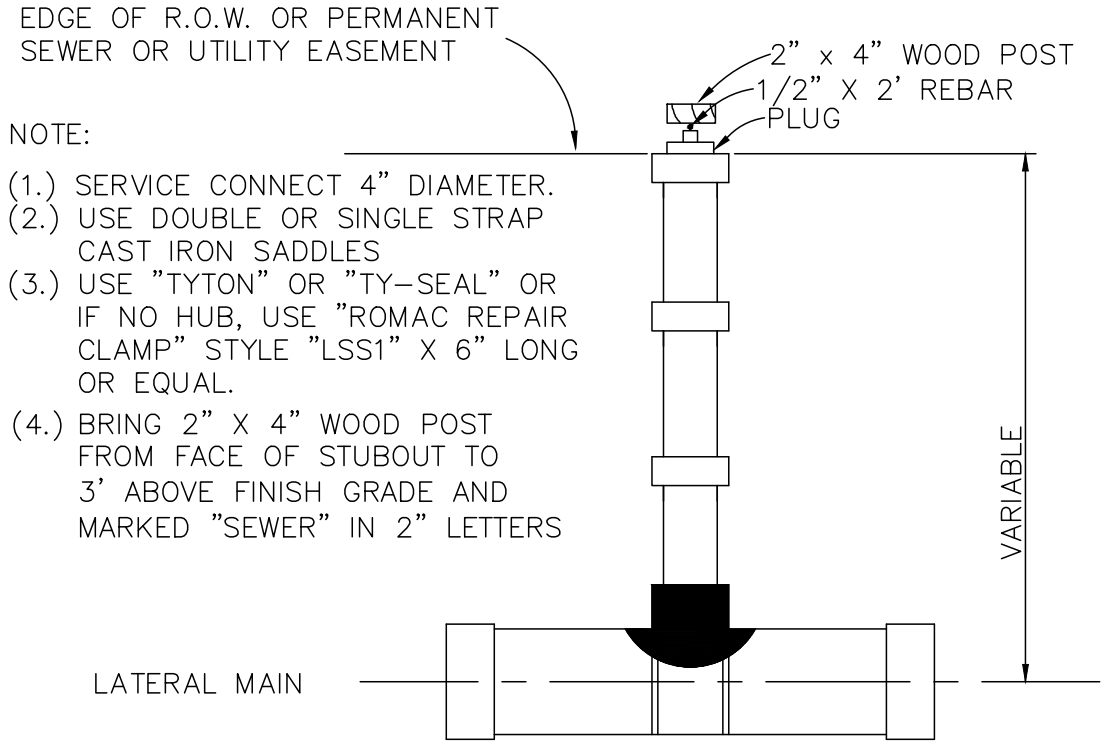
WHEN INSTALLING A BEAVER SLIDE WHERE THE FLOW IS STRAIGHT THROUGH THE MANHOLE, THE BEAVER SLIDE IS TO MATCH THE INVERT OF THE EXISTING LINE AND NOT TO EXTEND MORE THAN HALF-WAY THROUGH THE MANHOLE.
DISTANCE MEASURED FROM INVERT TO INVERT.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER TYPICAL BEAVER SLIDE TYPE A + B MANHOLE	DETAIL # 500.12

NOTE: BRING 2"x4" WOOD POST 3' ABOVE FINISH SURFACE GRADE.



PROFILE
NTS

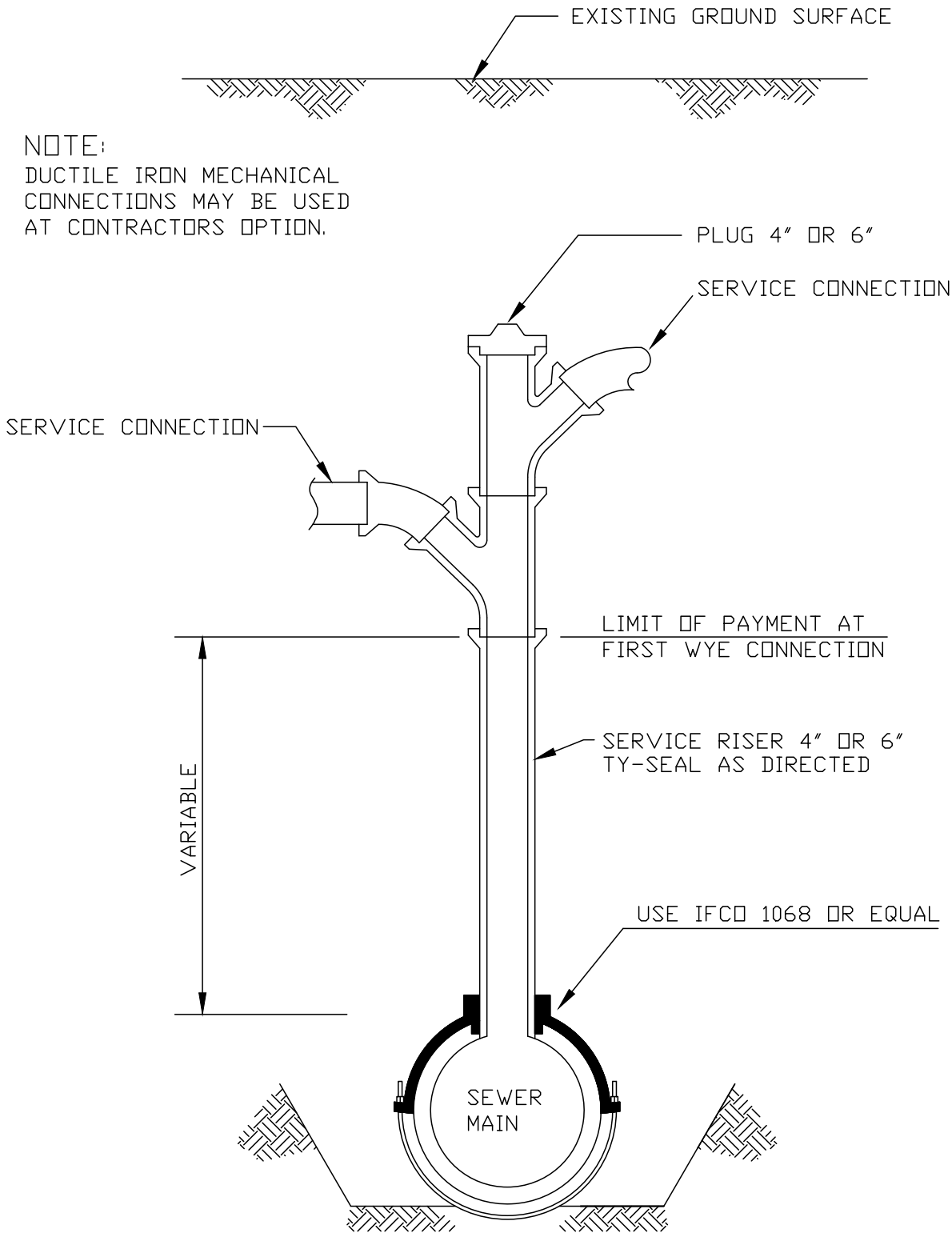


NOTE:

(1.) SERVICE CONNECT 4" DIAMETER.
(2.) USE DOUBLE OR SINGLE STRAP CAST IRON SADDLES
(3.) USE "TYTON" OR "TY-SEAL" OR IF NO HUB, USE "ROMAC REPAIR CLAMP" STYLE "LSS1" X 6" LONG OR EQUAL.
(4.) BRING 2" X 4" WOOD POST FROM FACE OF STUBOUT TO 3' ABOVE FINISH GRADE AND MARKED "SEWER" IN 2" LETTERS

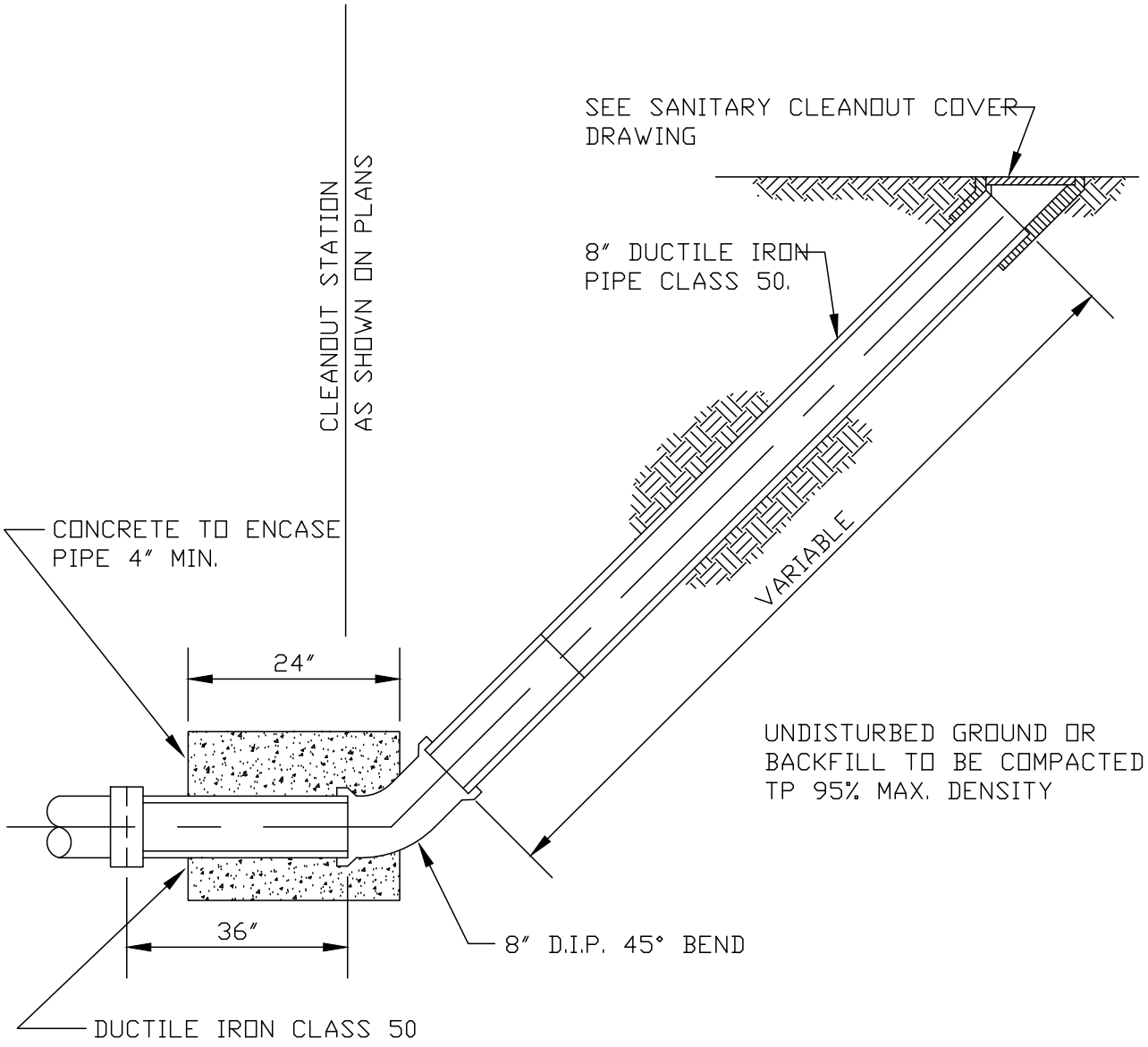
PLAN
NTS

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 2/2007	SANITARY SEWER SERVICE CONNECTION	DETAIL # 500.13



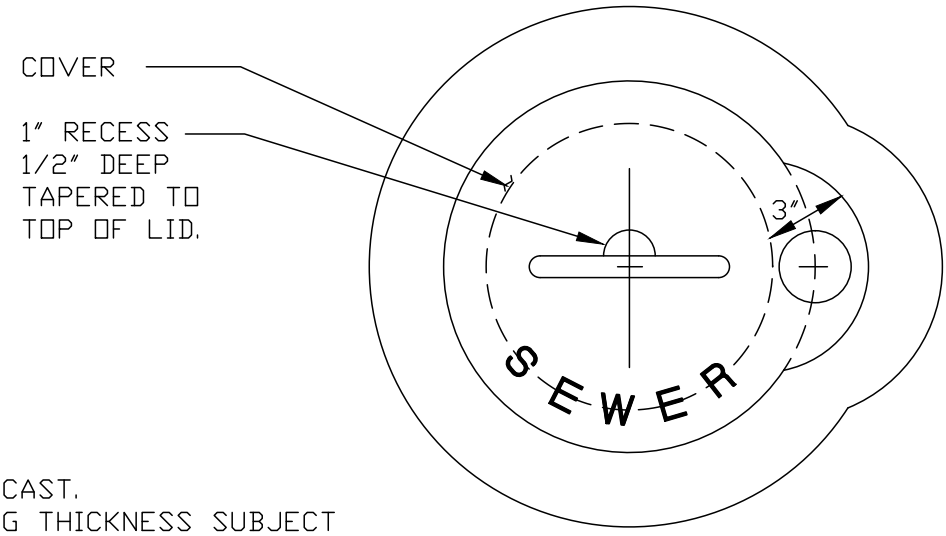
NOTE: USE TOP ENTRY TAP IF SEWER MAIN IS 10' DEEP OR GREATER.

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	**SANITARY SEWER** **SERVICE RISER/TOP ENTRY** **FOR DEEP SEWER - DUCTILE IRON**	DETAIL # **500.14**



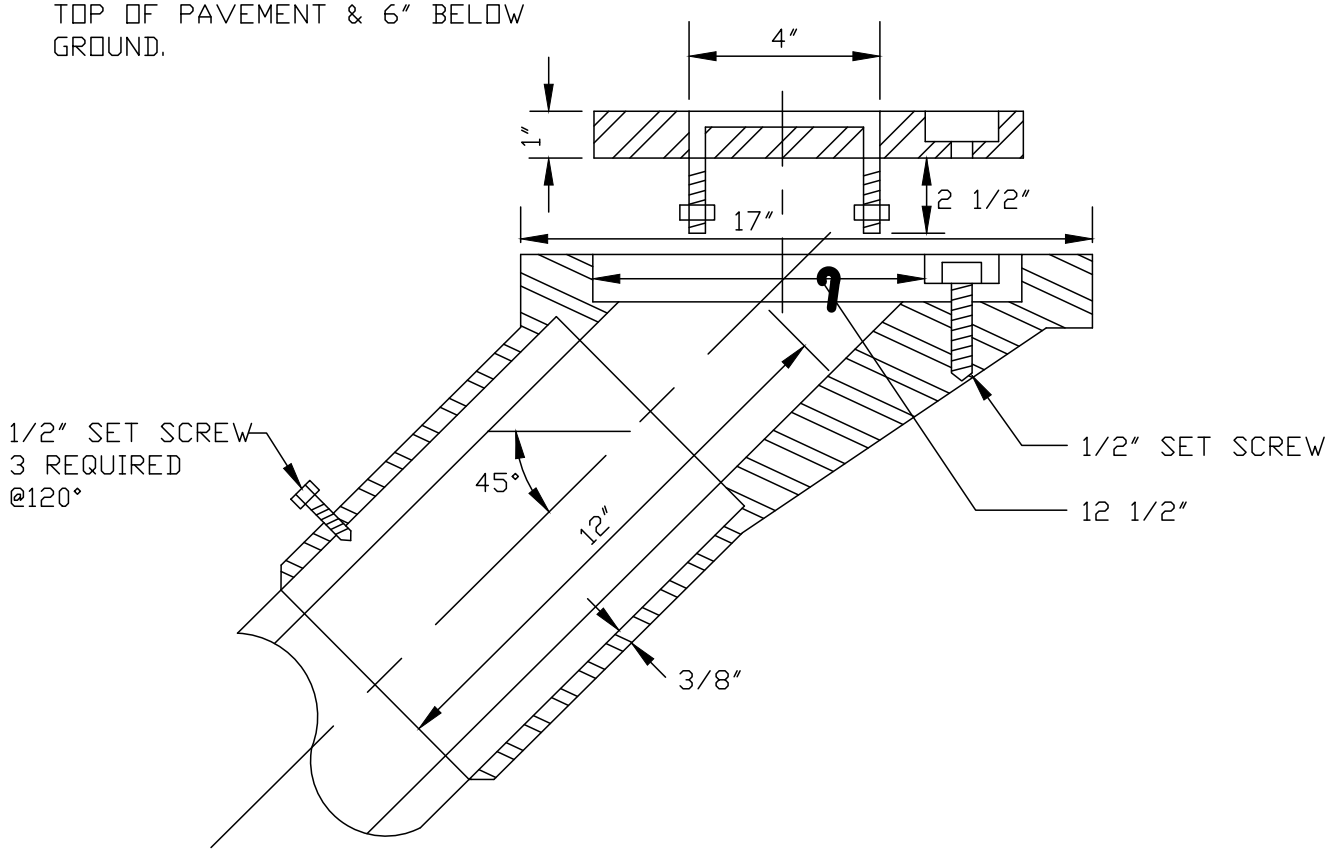
NOTE: WHEN D.I. PIPE WITH MECHANICAL JOINT IS USED CONCRETE ENCASEMENT IS NOT NECESSARY

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	# SANITARY SEWER CLEANOUT	DETAIL # 500.15

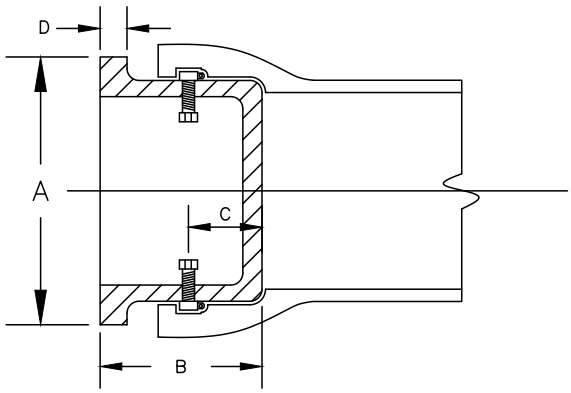


NOTE:

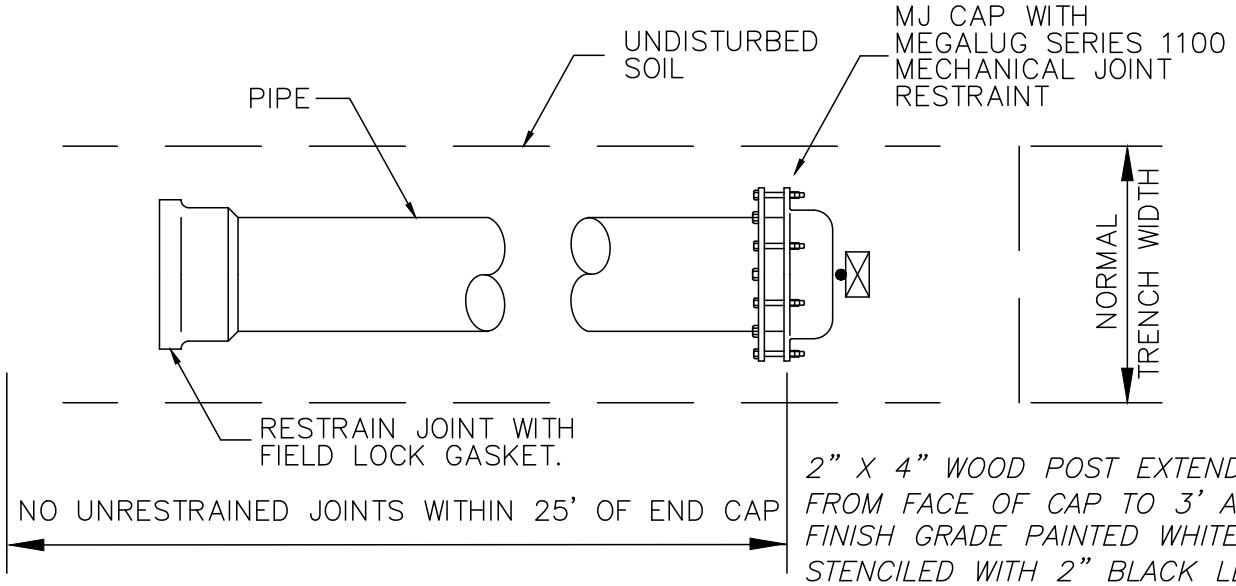
1. TO BE CAST.
2. CASTING THICKNESS SUBJECT TO FOUNDRY REQUIREMENTS.
3. CASTING MUST BE SIZED TO 8" AND OVER, CLASS 22 C.I. OR CLASS 50 D.I. PIPE.
4. COVER SHALL BE 1/4" BELOW TOP OF PAVEMENT & 6" BELOW GROUND.



CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SANITARY SEWER CLEANOUT COVER	DETAIL # 500.16



SIZE	PRESSURE RATING PSI (SET-SCREWS PROVIDE RESTRAINT)	A	B	C	D	SET-SCREWS LENGTH	SET-SCREWS SIZE	SET-SCREWS NUMBER
4	250	4.80	5 1/8	2 5/16	1	7/8	5/8	4
6	250	6.90	5 1/4	2 3/8	1	1 1/4	5/8	4
8	250	9.05	5 5/8	2 5/8	1 1/16	1 1/4	5/8	6
10	250	11.10	5 3/4	2 9/16	1 1/8	1 1/4	3/4	6
12	250	13.20	5 3/16	2 9/16	1 3/16	1 1/4	3/4	6
14	250	15.30	7	3 5/8	1 1/4	2	7/8	10
16	250	17.40	7 1/16	3 5/8	1 5/16	2	7/8	10
18	250	19.50	7 1/8	3 5/8	1 3/8	2	7/8	12



2" X 4" WOOD POST EXTENDING FROM FACE OF CAP TO 3' ABOVE FINISH GRADE PAINTED WHITE AND STENCILED WITH 2" BLACK LETTERS "WATER". DRIVE A MINIMUM 1/2" X 2' STICK OF REBAR ALONGSIDE OF POST FLUSH TO THE GROUND

NOTES:

1. ALL MECHANICAL JOINT (MJ) FITTINGS, INCLUDING VALVES AND END CAPS, SHALL BE RESTRAINED WITH MEGALUG SERIES 1100, MECHANICAL JOINT RESTRAINTS OR APPROVED EQUAL.
2. ALL MECHANICAL JOINT RESTRAINTS SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.

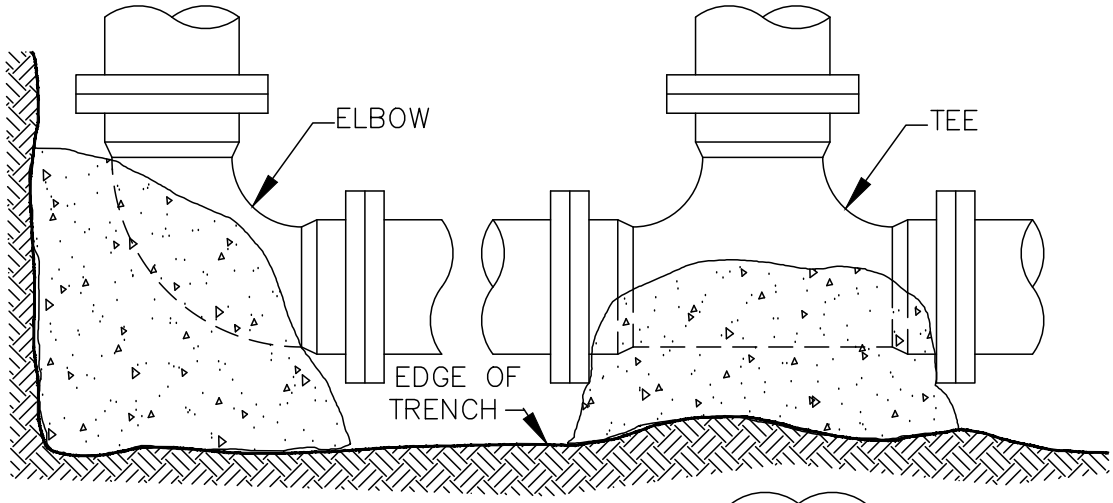
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

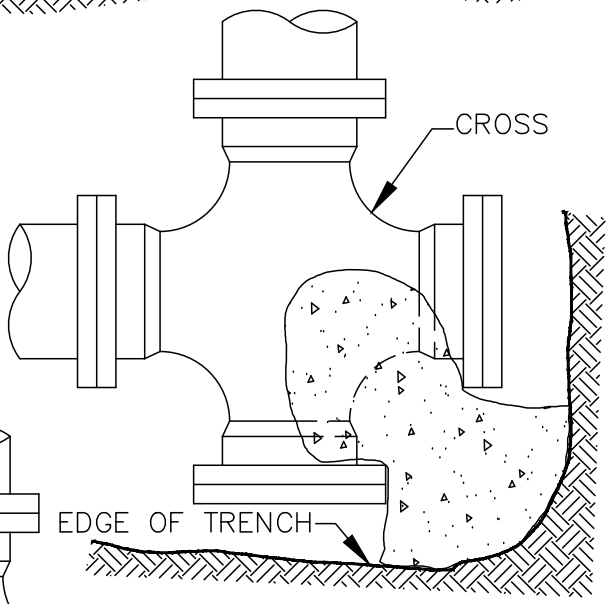
REVISED: 2/2007

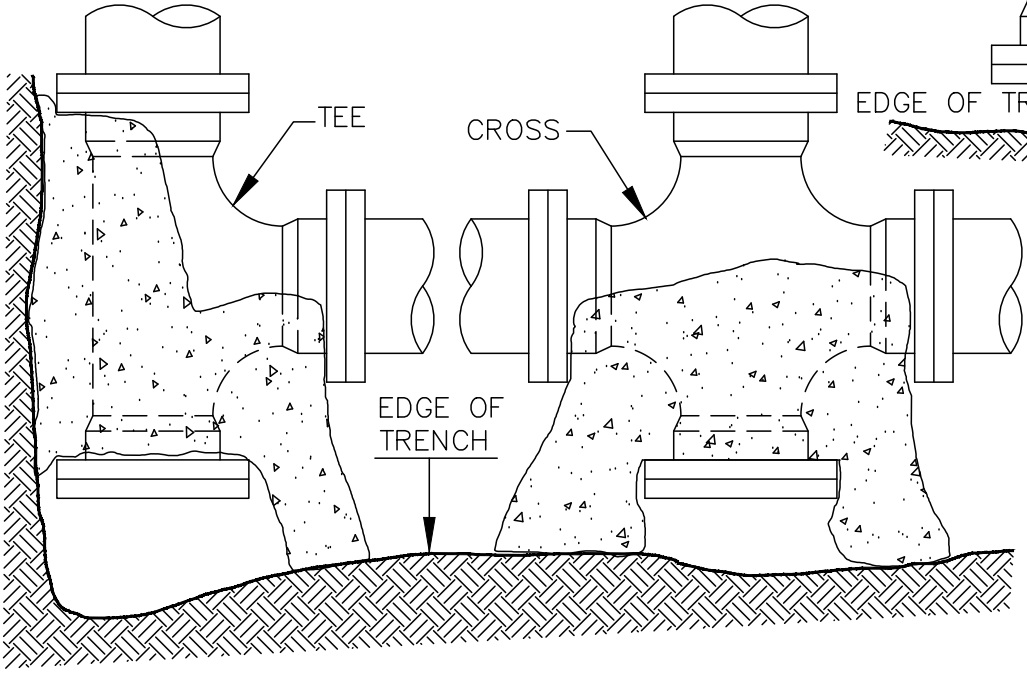
PLUG AND CAP FOR BELL AND SPIGOT PIPE

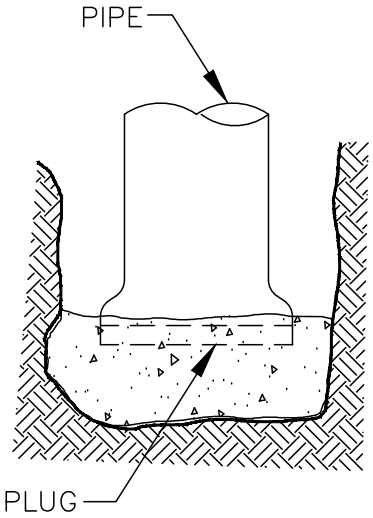
DETAIL # **600.01**



PIPE SIZE	MIN. BASE AREA SQ. FT.		
	90° BEND	45° BEND	PLUG
6"	2.0	1	2.0
8"	2.5	1.5	2.5
10"	4.5	2.5	4.5
12"	6	3.5	6
14"	8	4.5	8
16"	10.5	6	10.5
24"	24	13	24





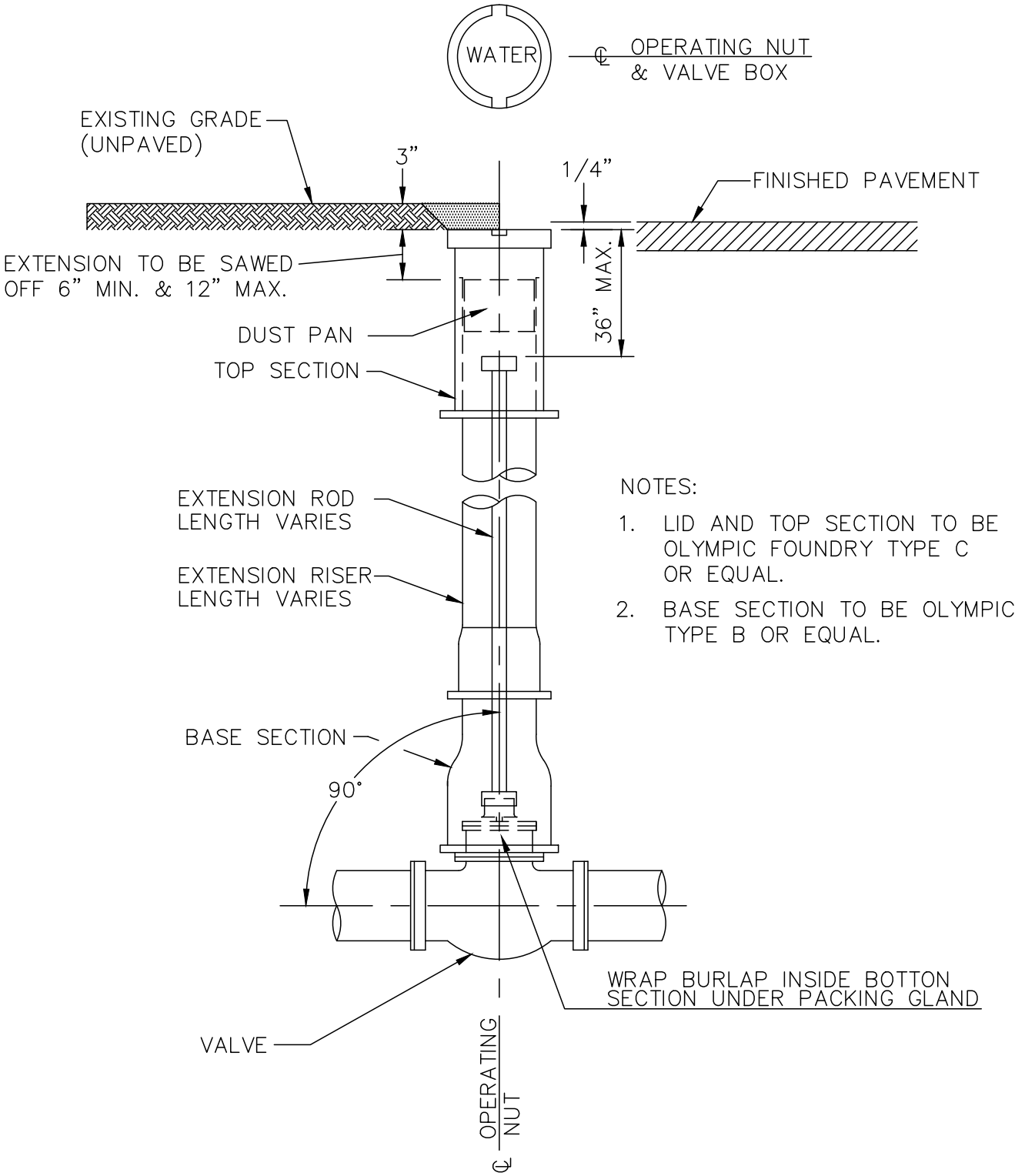


SCALE: NTS

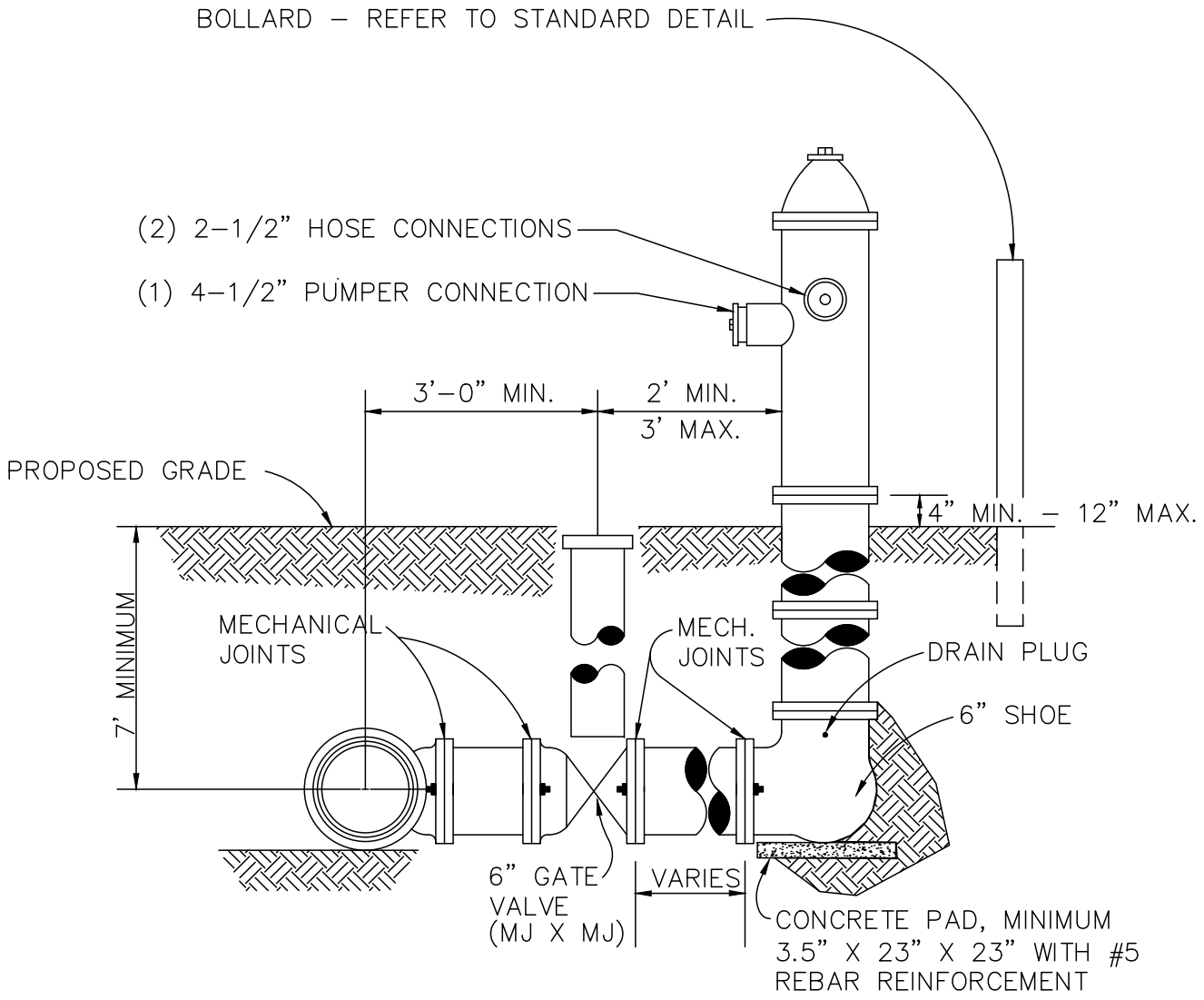
REVISED: 6/99

THRUST BLOCK

DETAIL # **600.02**



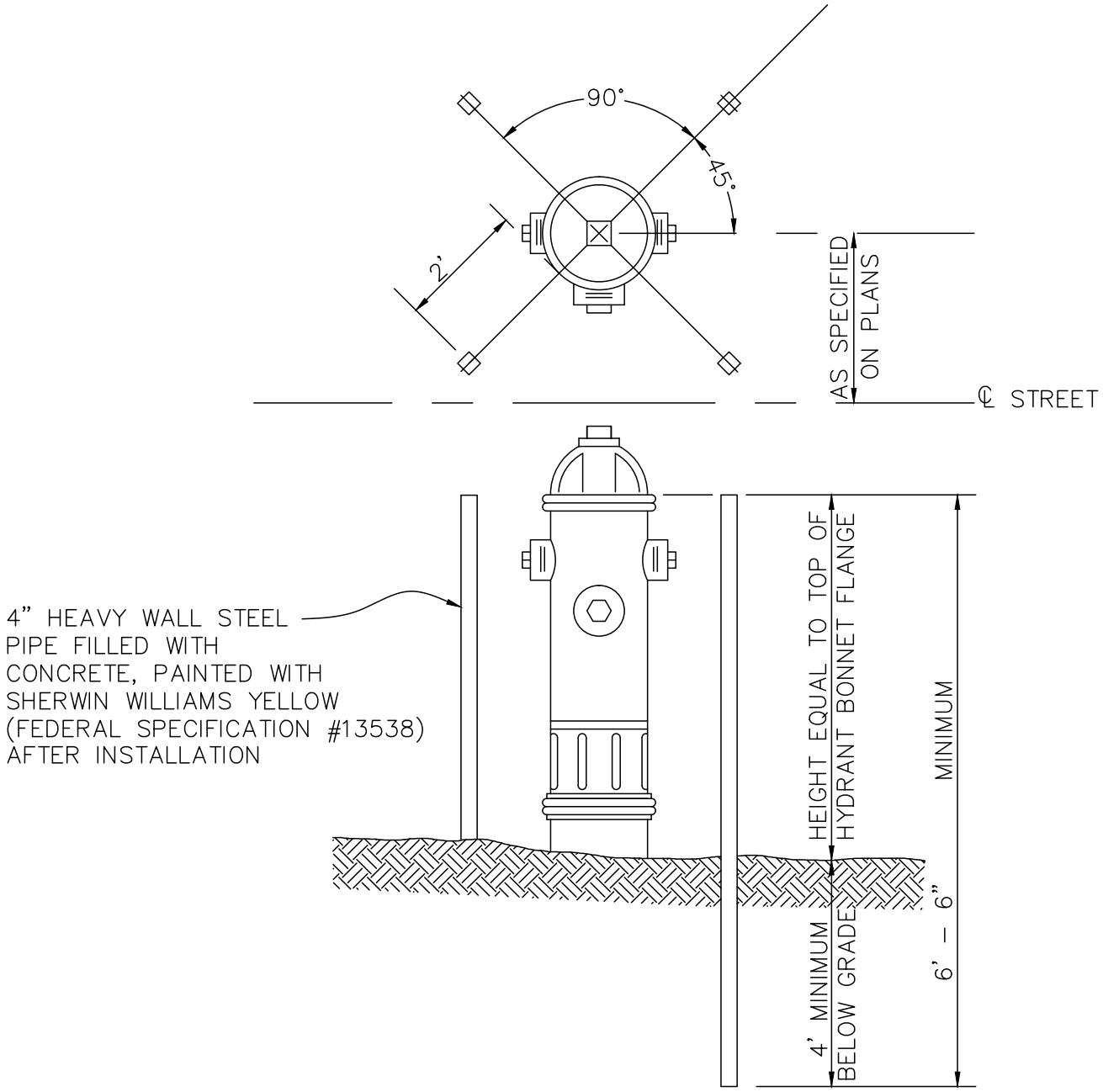
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	TYPICAL VALVE BOX	DETAIL # 600.03



HYDRANT INSTALLATION NOTES:

1. HYDRANT BARREL MUST BE INSTALLED PLUMB AND THE LEG MUST BE INSTALLED LEVEL.
2. DRAIN PLUG TO BE INSTALLED BY CONTRACTOR.
3. ALL HYDRANTS SHALL BE PAINTED WITH SHERWIN/WILLIAMS YELLOW (FEDERAL SPECIFICATION #13538).
4. AUXILLIARY GATE VALVE BOX TO BE INSTALLED ACCORDING TO DETAIL FOR TYPICAL VALVE BOX.
5. USE MEGALUG RESTRAINTS ON ALL MECHANICAL JOINTS

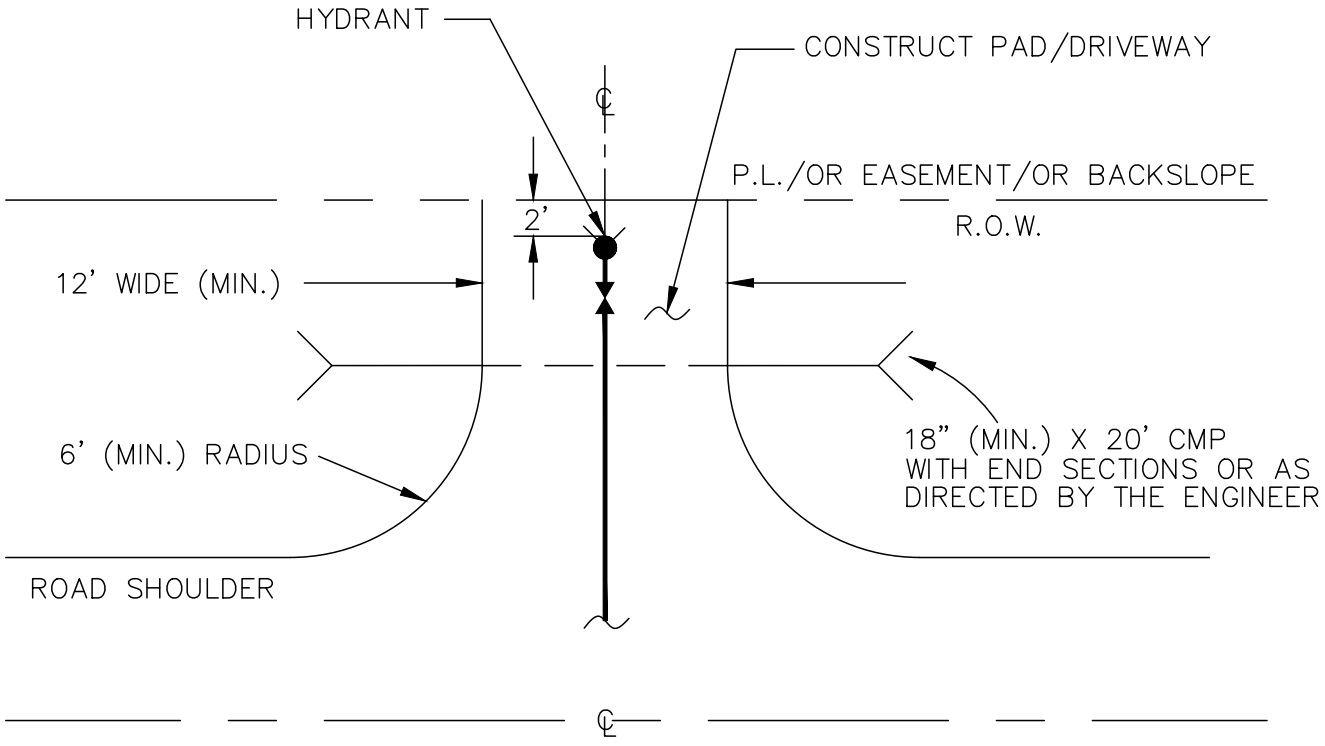
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 1/2008	SINGLE PUMPER "L" BASE HYDRANT ASSEMBLY	DETAIL # 600.04



NOTES:

1. GUARD POSTS WILL BE FURNISHED & INSTALLED BY THE CONTRACTOR.
2. POSTS SHALL BE LOCATED TO ALLOW UNRESTRICTED ACCESS TO PUMPER AND HOSE CONNECTIONS.

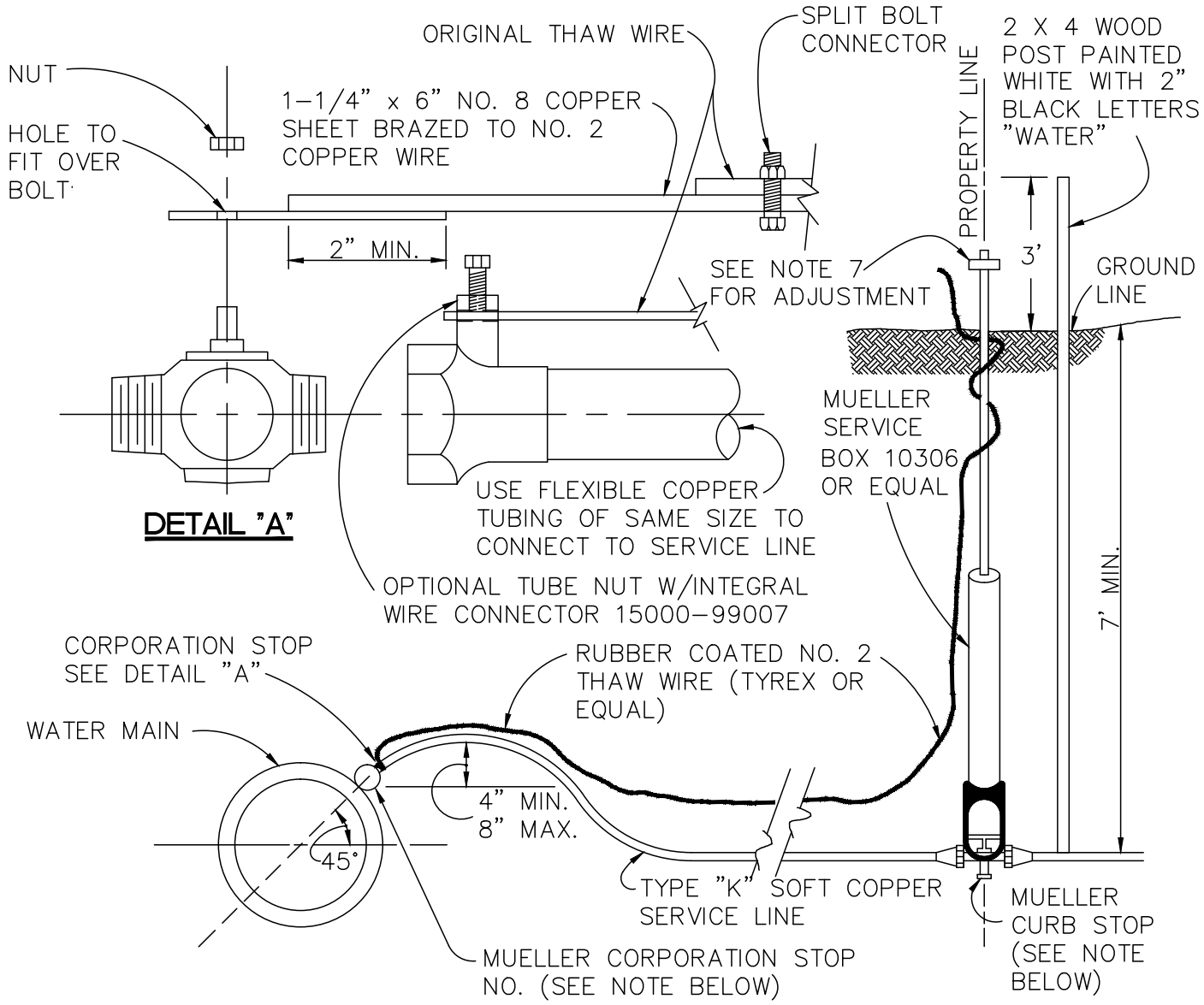
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 2/2007	HYDRANT GUARD POSTS	DETAIL # **600.05**



NOTES:

1. MATCH CULVERT INVERTS TO BOTTOM DITCHLINE GRADE OR DESIGN ELEVATIONS AS SHOWN ON PLANS.
2. CULVERT BEDDING MATERIAL SHALL BE TWO INCH MAXIMUM SIZE SAND OR SANDY GRAVEL FOR A MINIMUM DISTANCE OF SIX INCHES AROUND CULVERT.
3. THREE INCH MAXIMUM GRANULAR GRAVEL FILL MATERIAL IS REQUIRED FOR TOP TWO FEET OF THE DRIVEWAY.
4. TOP COURSE MATERIAL SHALL MATCH THE EXISTING GRAVEL ROAD SURFACE BUT IN NO CASE SHALL EXCEED TWO INCHES IN SIZE.
5. DRIVEWAY SHALL BE CONSTRUCTED ON A MINUS 3% GRADE FROM THE SHOULDER OF THE ROAD TO THE PROPERTY LINE OR AS DIRECTED BY THE ENGR.
6. DRIVEWAYS CONSTRUCTED ONTO PAVED ROADS MUST BE PAVED WITH TWO INCHES AC FROM PAVED ROAD SURFACE TO THE FIRE HYDRANT OR AS DIRECTED BY THE ENGR.
7. CULVERT MATERIAL SHALL BE TYPE (CMP) CORRUGATED METAL PIPE GALVANIZED STEEL ONLY, CONFORMING TO ASHTO M-36 OR M-218 AND ASTM-A-444. CORRUGATIONS MAY BE EITHER ANNULAR OR HELICAL. CULVERT END SECTIONS SHALL BE GALVANIZED STEEL.

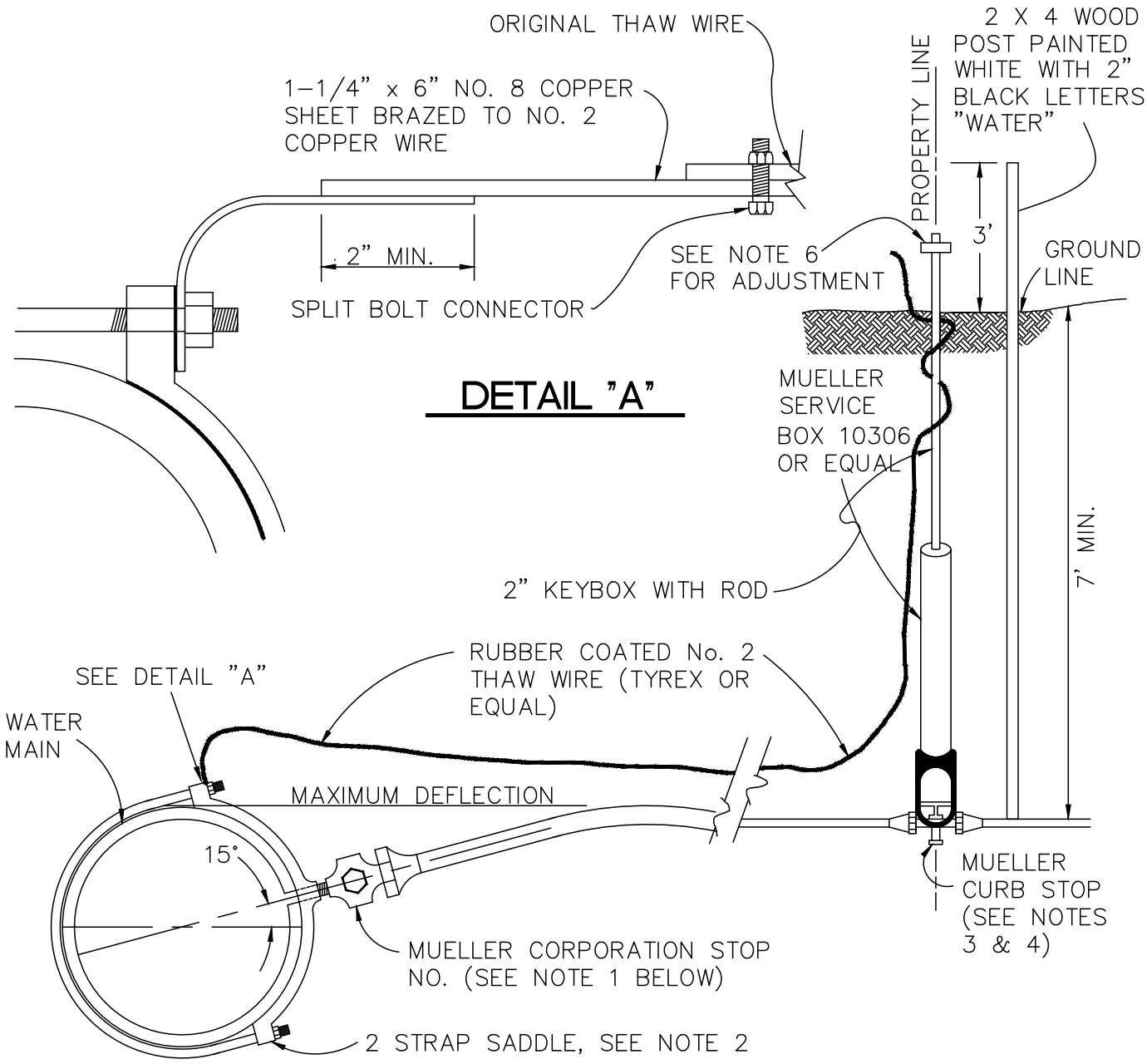
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	FIRE HYDRANT ACCESS PAD	DETAIL # 600.06



NOTES:

1. USE MUELLER CORPORATION STOP NO. 15025 FOR PIPE-THREAD SADDLES.
2. USE MUELLER CORPORATION STOP NO. 15000 FOR STEEL PIPE.
3. USE MUELLER CURB STOP NO H-15214 FOR COPPER TO COPPER CONNECTIONS.
4. ROD TO BE ATTACHED TO CURB STOP WITH NO. 6 GUAGE COPPER WIRE, NO SUBSTITUTIONS.
5. MUELLER SERVICE CLAMP TO BE USED ON ALL PLASTIC PIPE, DOUBLE STRAP OR EQUAL.
6. HDPE MAINLINES SHALL UTILIZE A SIDEWALL BRANCH SADDLE WITH INTEGRAL BRASS CC THREAD INSERT TO RECIEVE CORPORATION STOP.
7. CURB BOX FINISH ELEVATION SHALL BE AS FOLLOWS:
   - PAVED AREA .5" BELOW FININSH GRADE
   - GRAVEL AREA 1"-3" BELOW FINISH GRADE
   - YARD/UNDEVELOPED AREA 0" TO 3" ABOVE FINISH GRADE

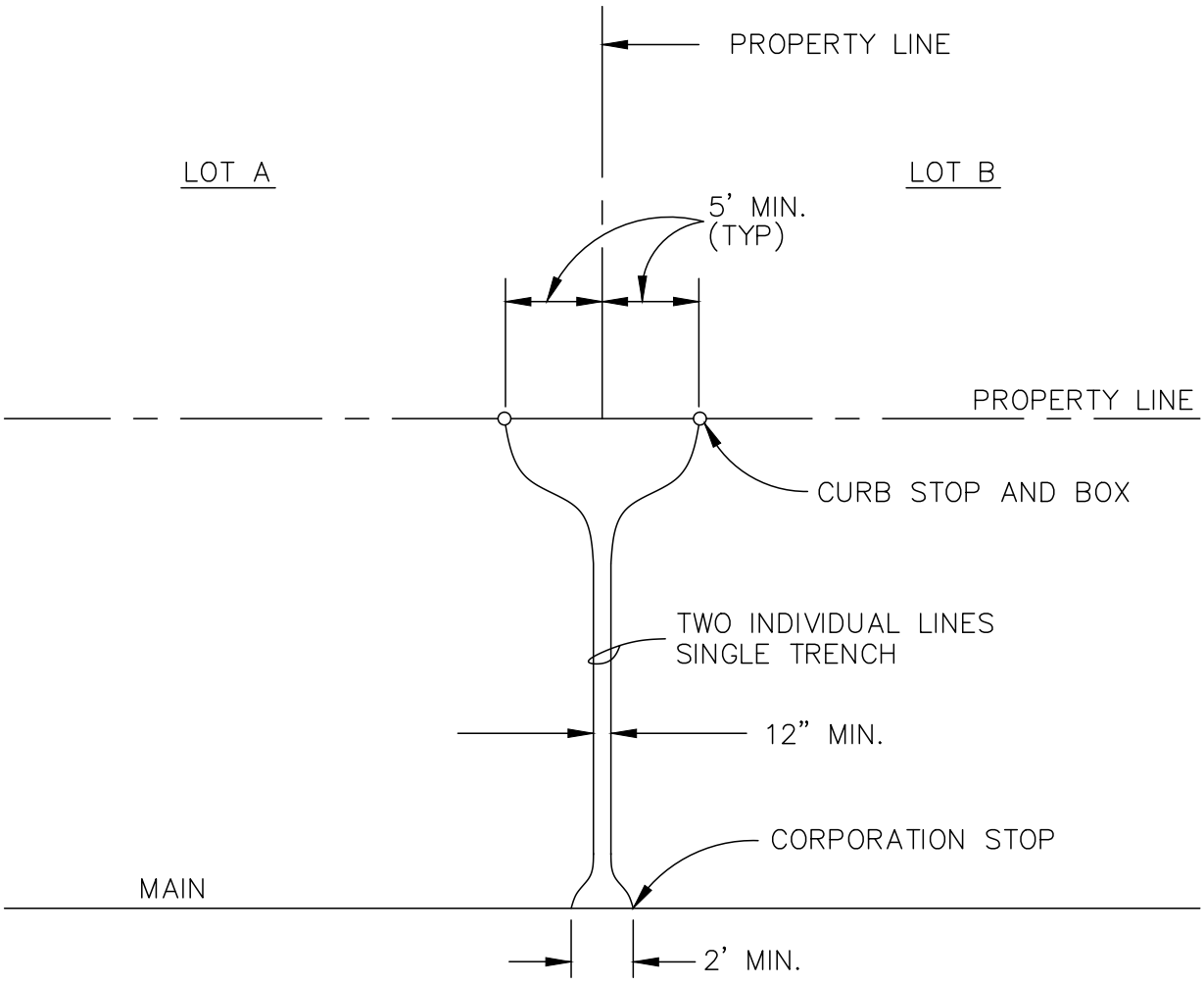
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 2007	WATER SERVICE CONNECT 1"	DETAIL # 600.07



NOTES

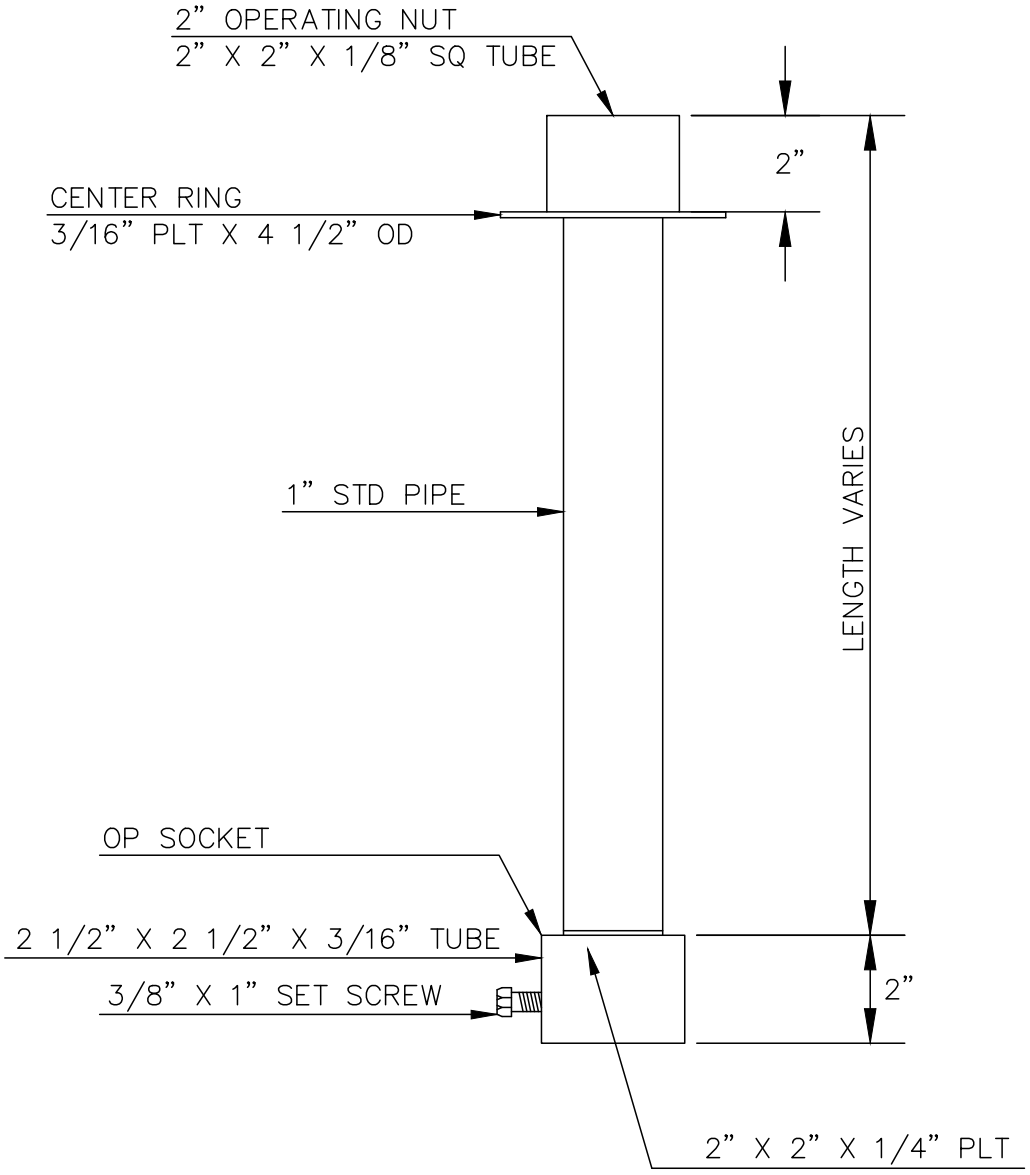
1. USE MUELLER CORPORATION STOP NO. 15025 OR EQUAL.
2. MUELLER SERVICE CLAMP WITH (2) TWO STRAPS OR EQUAL SHALL BE USED ON ALL PIPE.
3. ROD TO BE ATTACHED TO CURB STOP WITH NO. 6 GAUGE COPPER WIRE–NO SUBSTITUTIONS.
4. USE MUELLER CURB STOP NO. H15214 ORISEAL.
5. HDPE MAINLINES SHALL UTILIZE A SIDEWALL BRANCH SADDLE WITH INTEGRAL BRASS CC THREAD INSERT TO RECIEVE CORPORATION STOP.
6. CURB BOX FINISH ELEVATION SHALL BE AS FOLLOWS:
   - PAVED AREA .5" BELOW FININSH GRADE
   - GRAVEL AREA 1"–3" BELOW FINISH GRADE
   - YARD/UNDEVELOPED AREA 0"–3" BELOW FINISH GRADE

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 2/2007	WATER SERVICE CONNECT 1-1/2" AND 2"	DETAIL # 600.08



PLAN

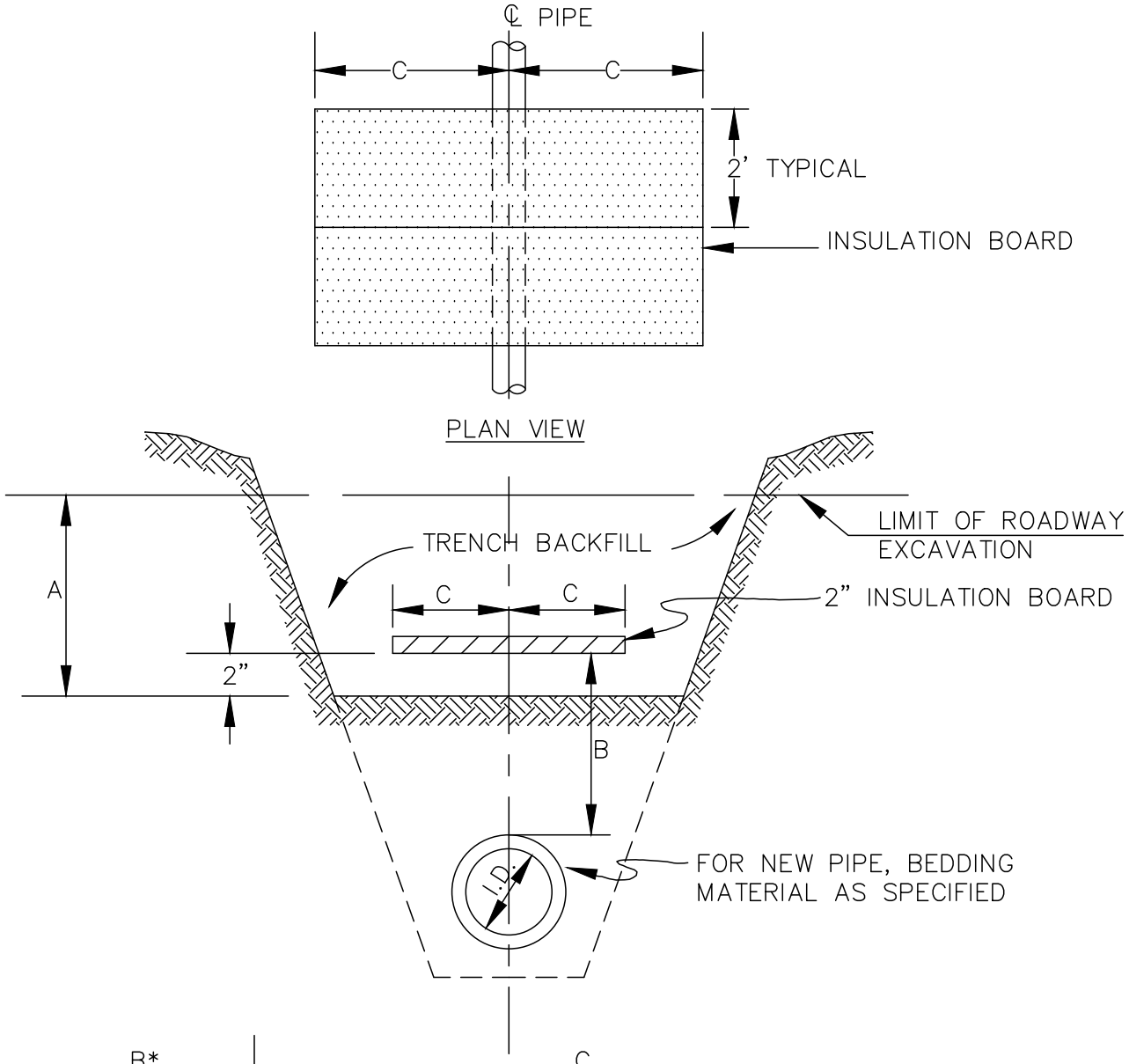
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NONE REVISED: 6/99	DOUBLE WATER SERVICE	DETAIL # **600.09**



NOTES:

1. ALL 3/16" PAINTED ASPHALT TAR BLACK.
2. RODS SHALL BE AS MANUFACTURED BY WESTEEL CO. STEEL FABRICATORS, 8001 7TH AVE. SOUTH, SEATTLE, WA 98108, (206) 767-4224

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	GATE VALVE EXTENSION ROD	DETAIL # 600.10



B*	C			
	NEW MAIN	EXISTING MAIN	NEW SERVICE CON.	EXISTING SERVICE CON.
1'	2'		1'	
1' to 3'		2'		2'
3' to 5'		3'		3'
5' to 7'		4'		4'

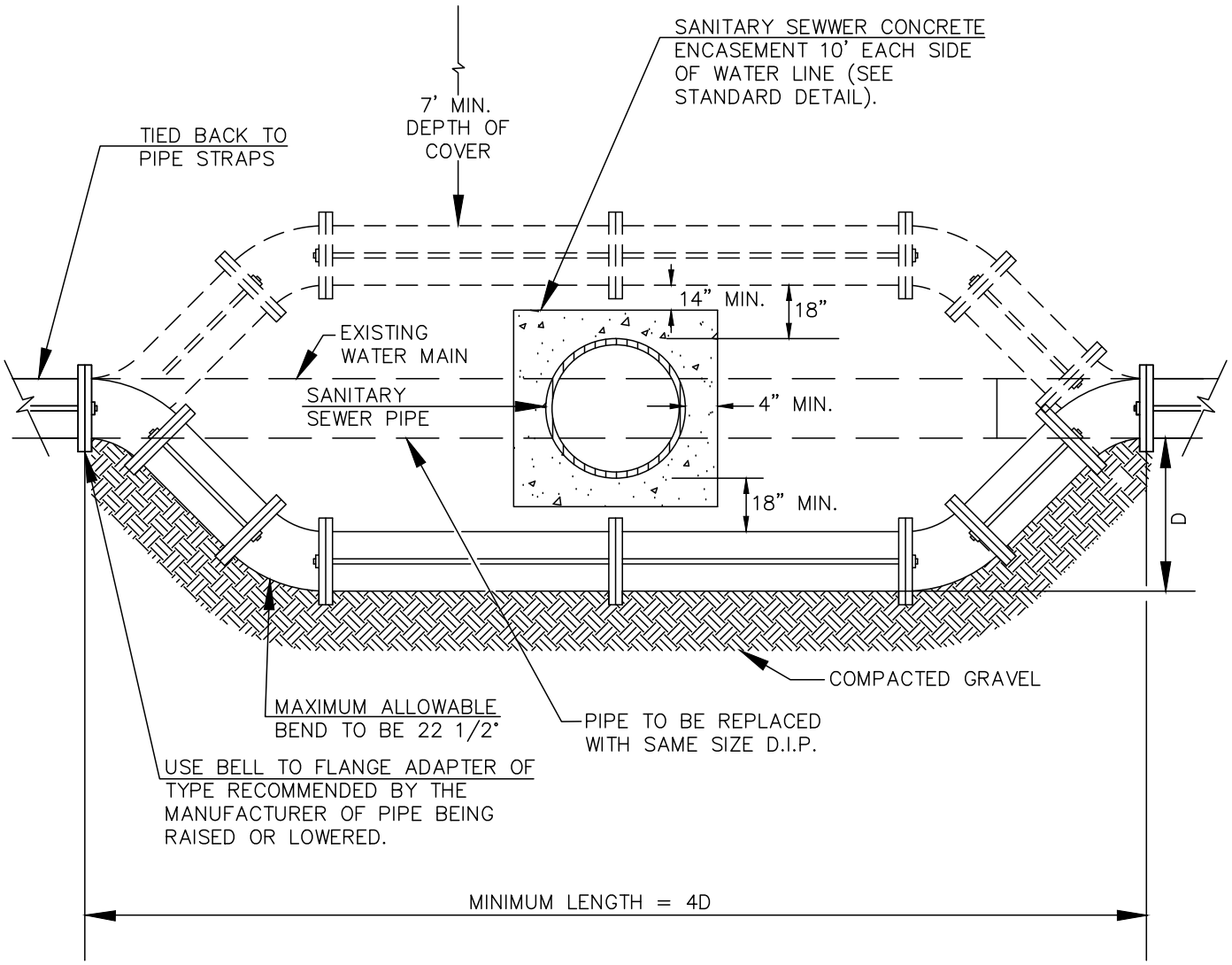
* AS NOTED ON PLANS

A= DEPTH FOR PAYMENT UNDER "TRENCH EXCAVATION AND BACKFILL" WHERE INSULATION IS PLACED OVER EXISTING PIPE

NOTES:

1. THIS DETAIL APPLIES ONLY WHERE INSULATION IS REQUIRED BY THE PLANS.
2. MAXIMUM I.D. = 12"

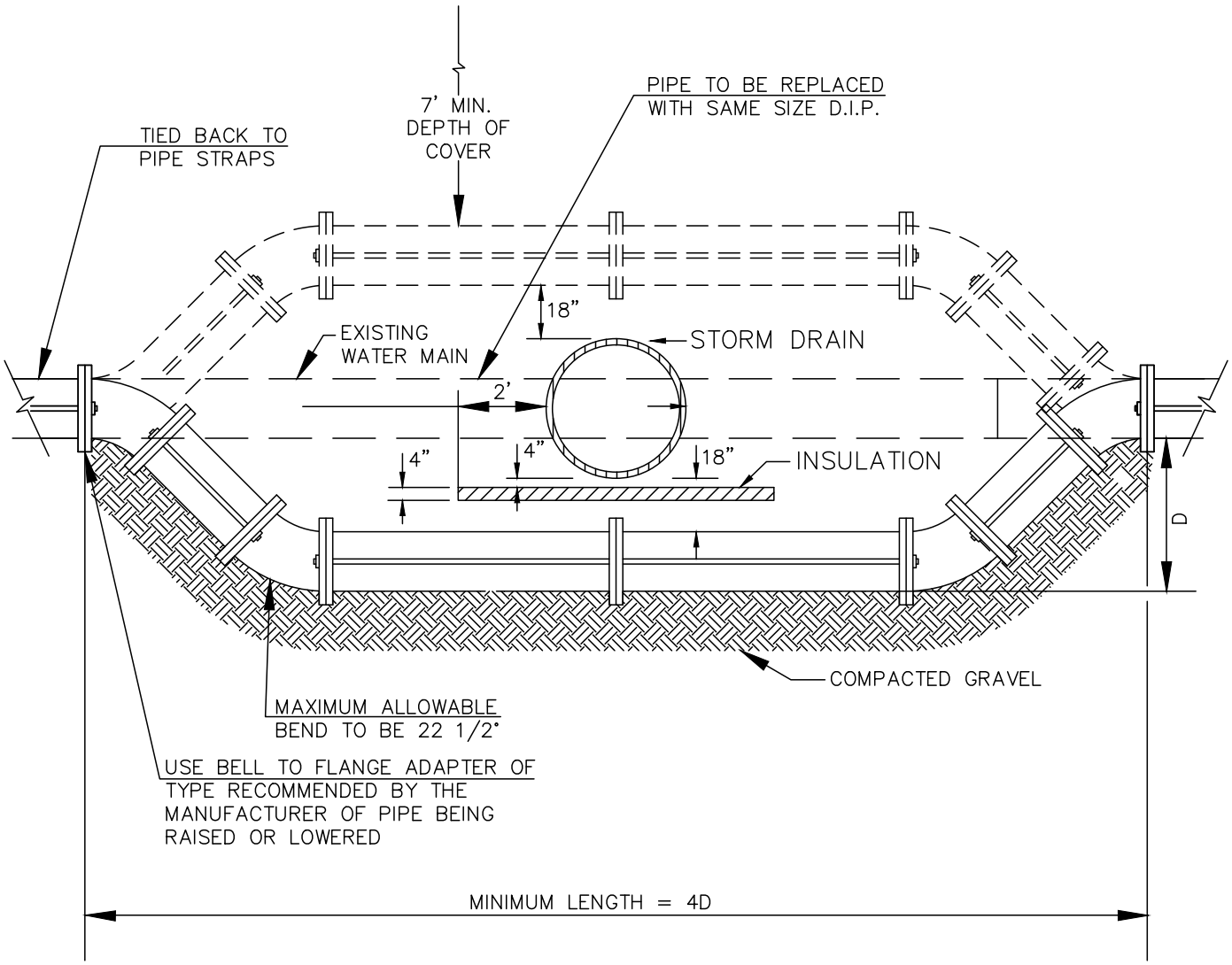
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	PIPE INSULATION	DETAIL # 700.01



NOTE: ALL JOINTS TO BE TIED TOGETHER WITH 3/4" THREADED ROD. TIE RODS TO BE SUPPORTED EACH 27' TO INSURE A SYMMETRICAL LOCATION.

EVERY EFFORT SHOULD BE MADE TO RELOCATE WATER MAIN LINE UNDER THE SEWER MAIN LINE.

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	**RELOCATE WATER MAIN** **(SANITARY SEWER)**	DETAIL # **700.02**



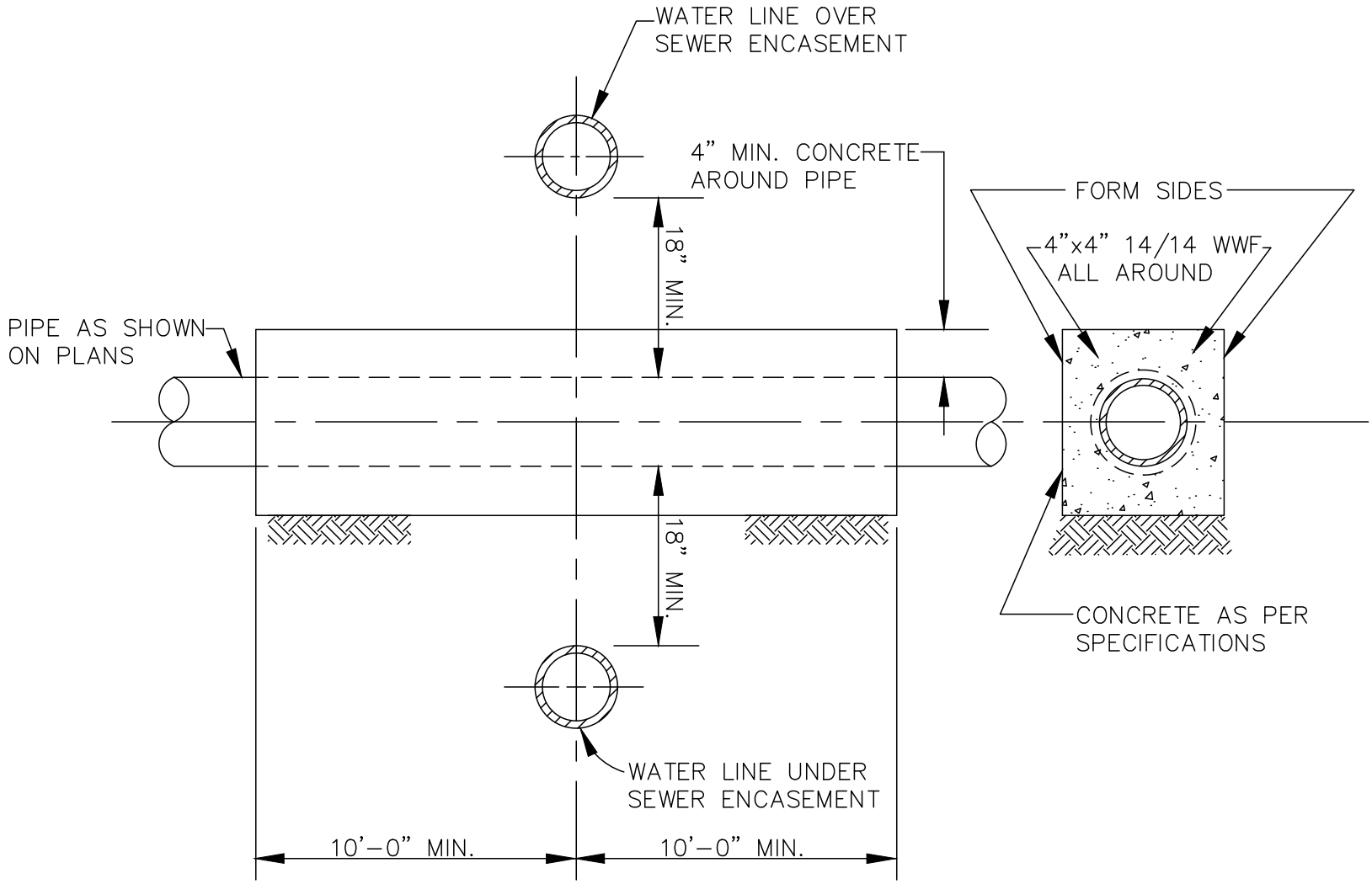
NOTES:

1. ALL JOINTS TO BE TIED TOGETHER WITH 3/4" THREADED ROD OR EQUAL.
2. RELOCATED WTAR LINE SHALL BE NO LESS THAN 18" DISTANCE FROM STORM SEWER LINE.
3. INSULATION SHALL BE POSITIONIED NO LESS THAN (4) FOUR INCHES FROM STORM SEWER.
4. MINIMUM VERTICAL SEPARATION IS (18") EIGHTEEN INCHES UNLESS INSULATED WITH (4) FOUR INCHES OF RIGID BOARD INSULATION IN CON-FORMANCE WITH SECTION 70.18 INSULATIONN. (2" STOCK WITH OVERLAPPING JOINTS)

CITY OF HOMER · ALASKA · MARCH 31,1964	SCALE: NTS REVISED: 6/99	# RELOCATE WATER MAIN (STORM DRAIN)	DETAIL # **700.03**

NOTES:

1. DUCTILE IRON PIPE OR OTHER APPROVED CONNECTIONS MAY BE USED IN LIEU OF CONCRETE ENCASEMENT.
2. CONCRETE SHALL HAVE A MIN. COMPRESSIVE STRENGTH OF 3000 PSI.
3. ENCASEMENT NOT REQUIRED ON PIPE 24" OR LARGER.



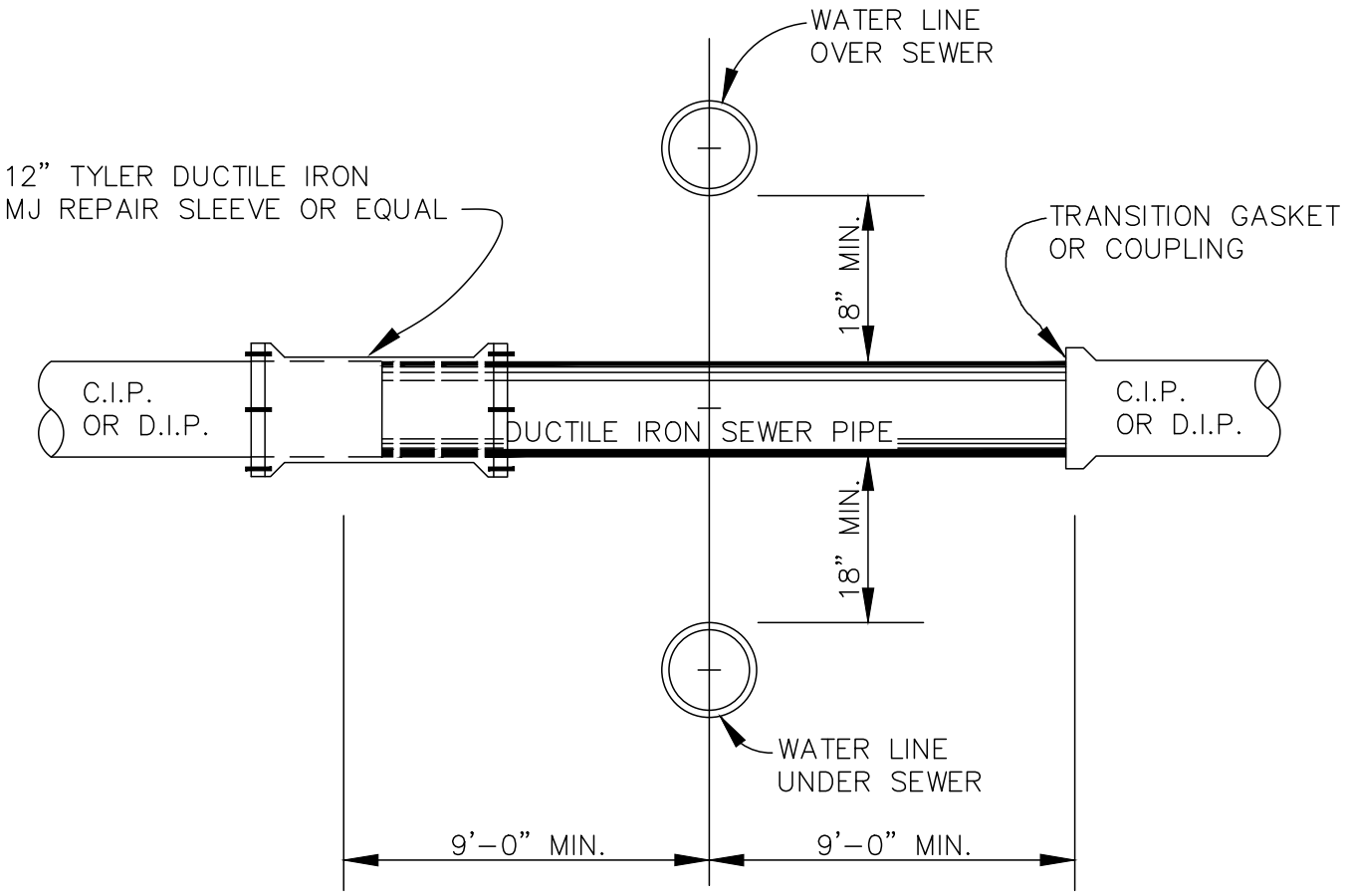
SCALE: NTS

REVISED: 6/99

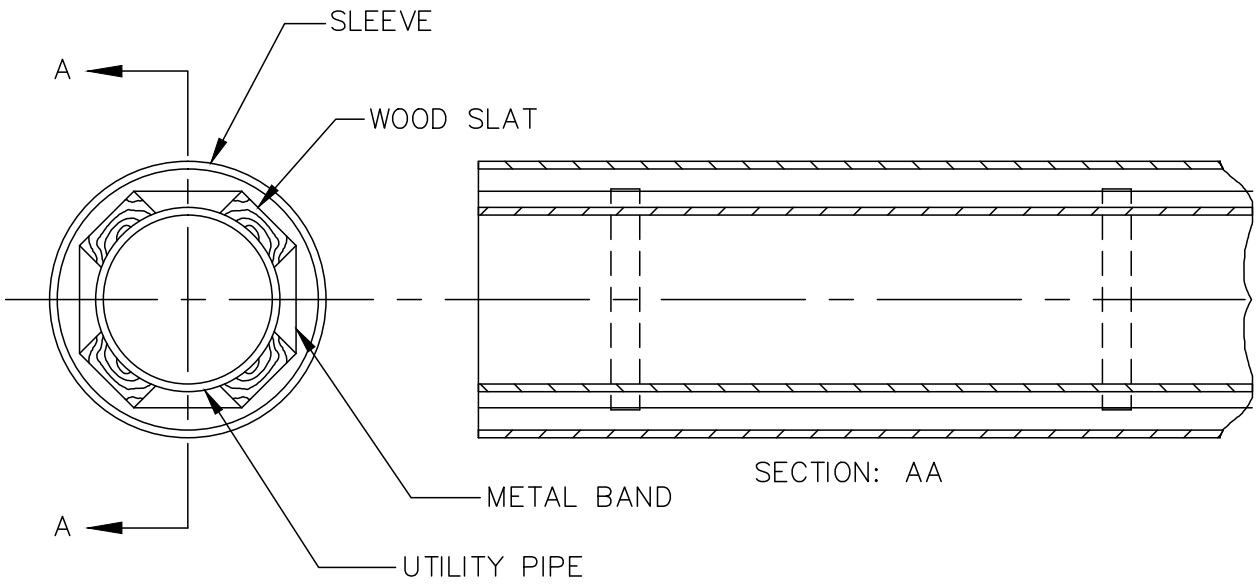
SEWER ENCASEMENT

DETAIL # **700.04**

DUCTILE IRON SEWER PIPE ALTERNATE IN
LIEU OF CONCRETE SEWER ENCASEMENT



CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 2/2007	SEWER ENCASEMENT ALTERNATE	DETAIL # 700.05



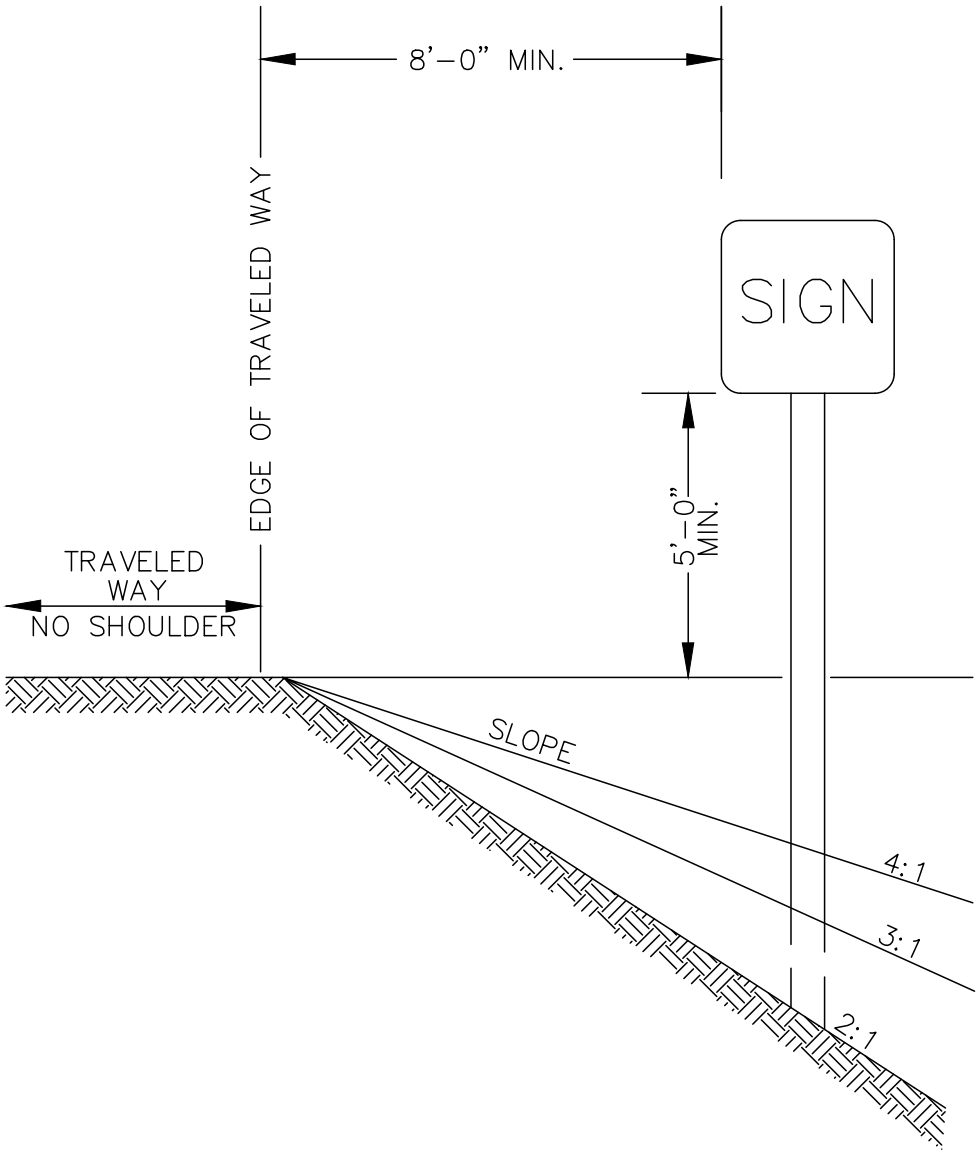
NOTES:

1. SLEEVE/CASING PIPE SHALL BE EITHER WELDED OR STAINLESS STEEL CASING PIPE SCHEDULE 40 WALL OR CORRUGATED METAL PIPE (CMP) GAUGE 0.064 INCHES MIMIMUM WALL (PIPE SIZE SHALL BE PER TABLE).
2. IN NO CASE SHALL THE NUMBER OF SLATS AROUND THE PIPE BE LESS THAN THREE AND THE THICKNESS OF THE SLATS SHALL BE AS APPROVED BY THE ENGINEER.
3. SLATS SHALL BE PLACED BETWEEN EACH PIPE JOINT, AND NEVER OVER THE JOINT, OR AS DIRECTED BY THE ENGINEER. THICKNESS OF THE SLATS SHALL BE GREAT ENOUGH SO THAT THE PIPE RESTS ON THE WOOD AND NOT ON THE JOINTS (i.e. BELL FLANGES, ETC.).
4. METAL BANDS SHALL BE AS APPROVED BY THE ENGINEER.
5. THE SLAT MATERIAL SHALL BE EITHER REDWOOD OR WESTERN CEDAR.

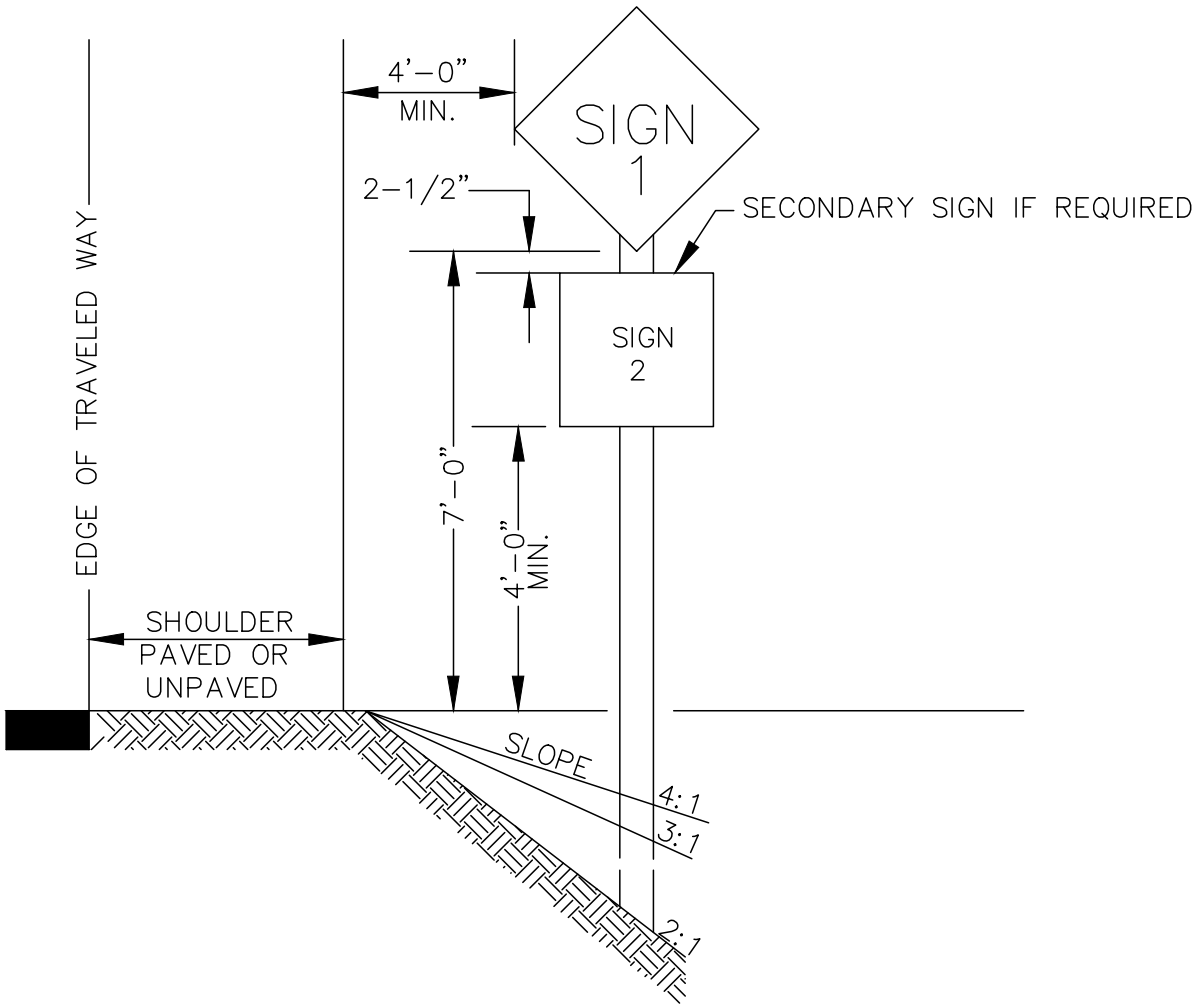
TABLE

UTILITY PIPE	SLEEVE/CASING PIPE SIZE (INCHES)
1"	2" WOOD SLATS OPTIONAL
2X1"	4" FOR K-COPPER WATER
4"	8" SERVICE LINES
6"	12"
8"	15"
10"	20"
12"	24"

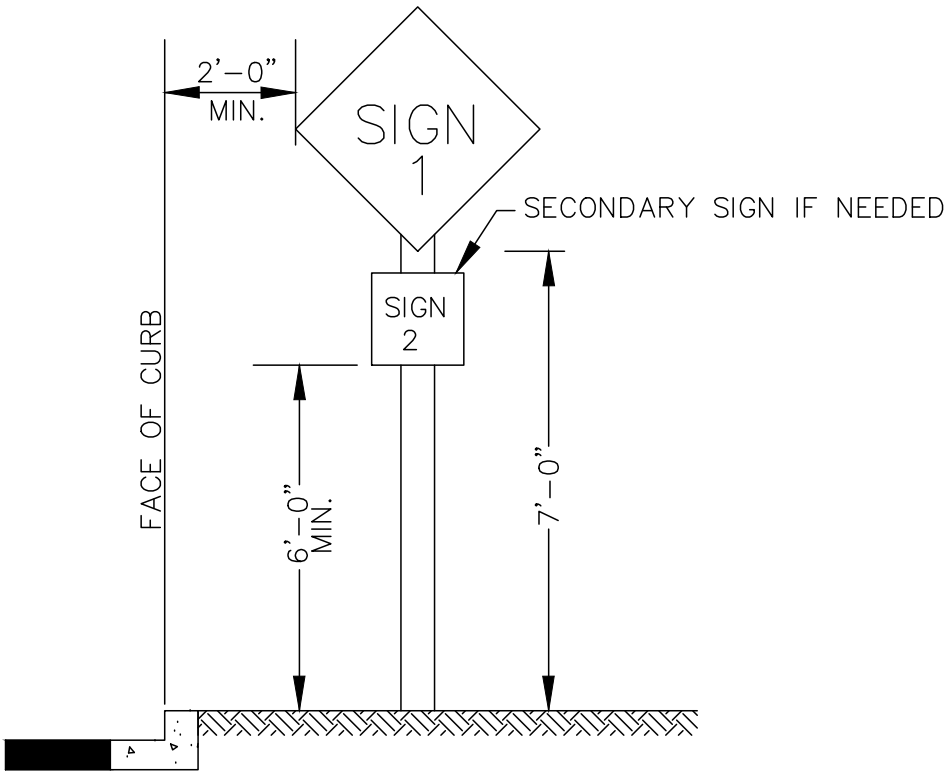
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	BORED ENCASEMENT	DETAIL # 700.06



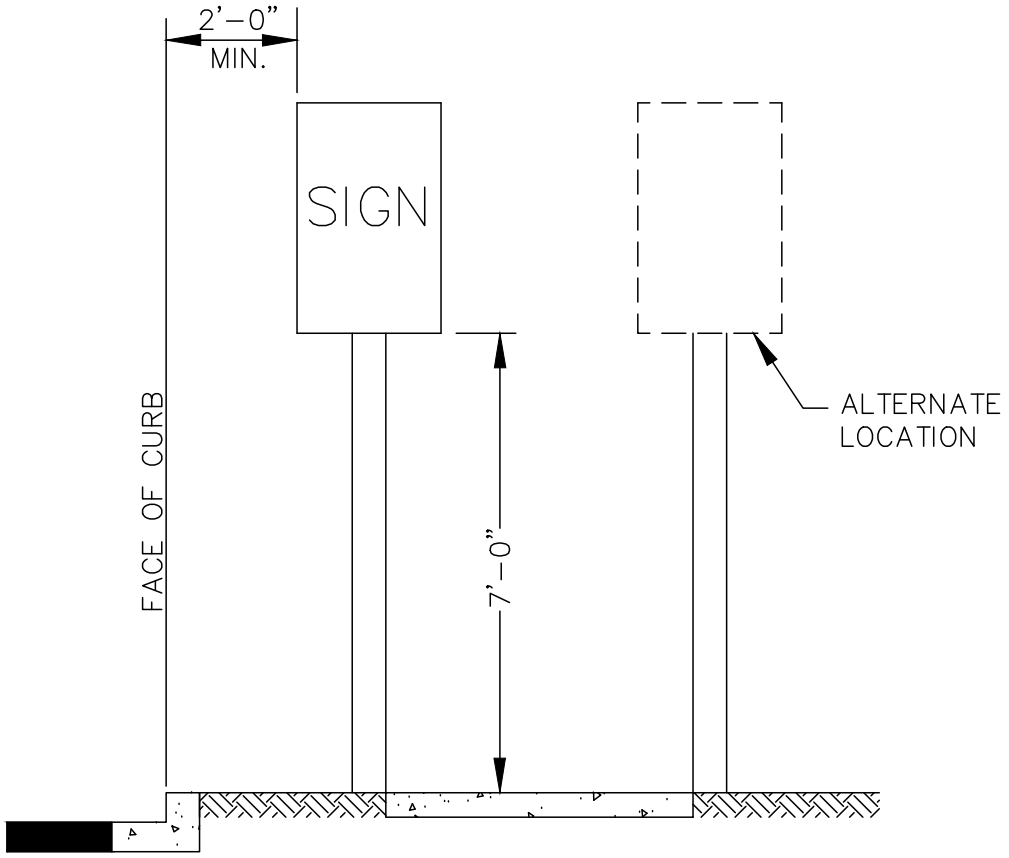
CITY OF HOMER - ALASKA - MARCH 31,1964	SCALE: NTS REVISED: 6/99	SIGN PLACEMENT NO CURB OR SHOULDER	DETAIL # 700.07



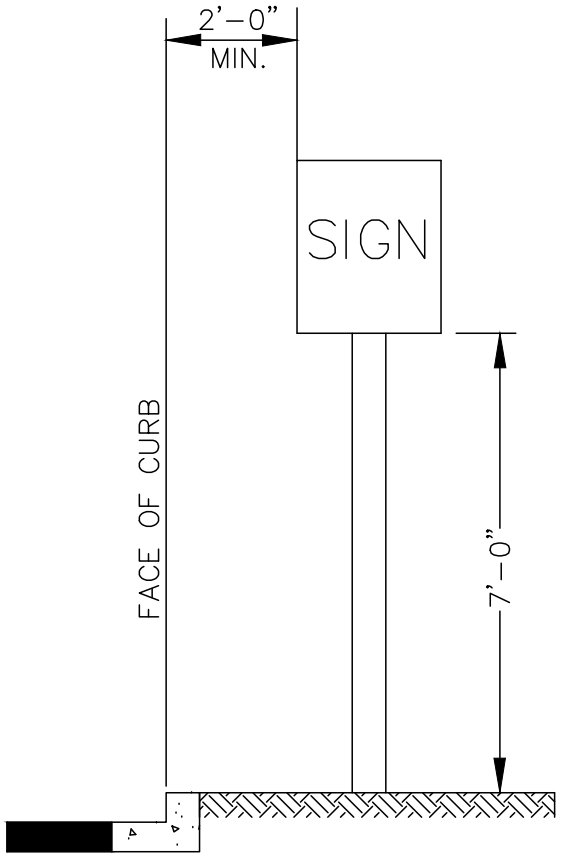
CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SIGN PLACEMENT SHOULDER WITHOUT CURB	DETAIL # 700.08



CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SIGN PLACEMENT CURB WITHOUT SIDEWALK	DETAIL # 700.09

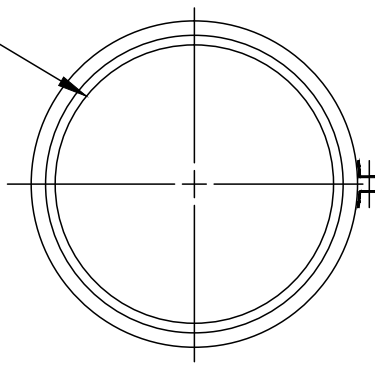


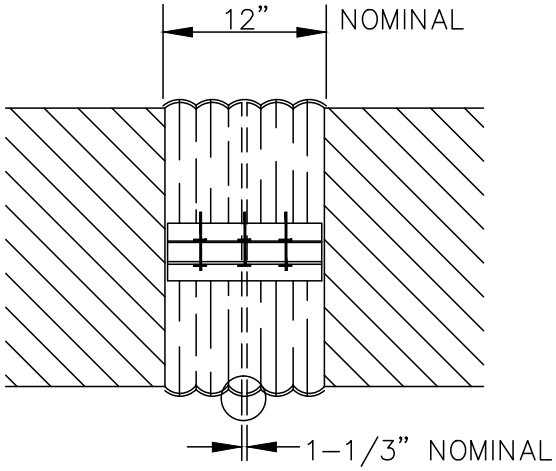
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	SIGN PLACEMENT CURB WITH SIDEWALK AND PARKWAY	DETAIL # **700.10**



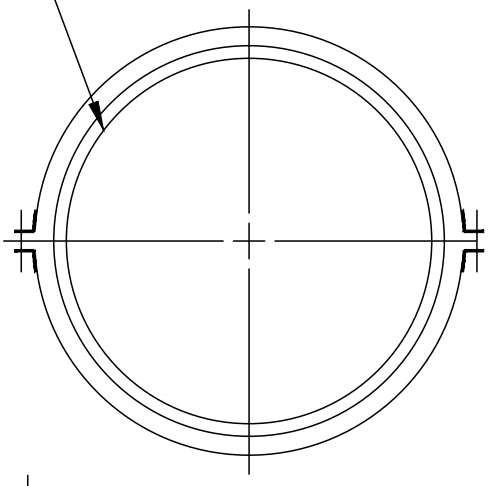
CITY OF HOMER · ALASKA · MARCH 31,1964	SCALE: NTS REVISED: 6/99	SIGN PLACEMENT CURB WITH SIDEWALK	DETAIL # **700.11**

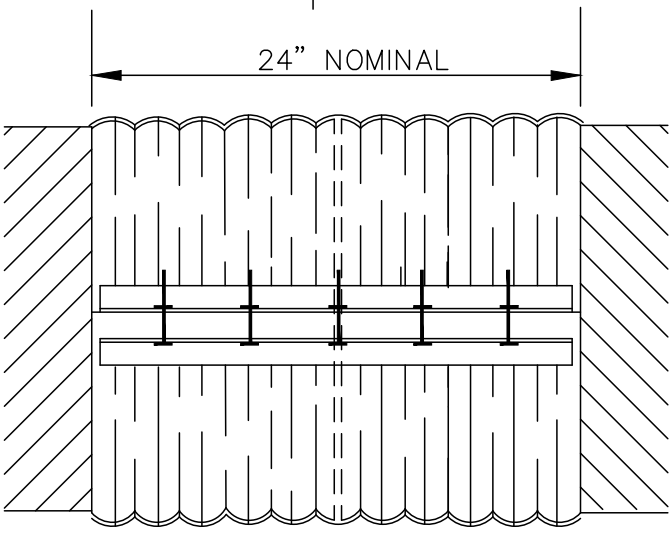
PIPE DIAMETER 12" THRU 36"
ONE PIECE BAND





PIPE DIAMETER 48" THRU 96" TWO PIECE
BAND, 108" THRU 120" THREE PIECE BAND

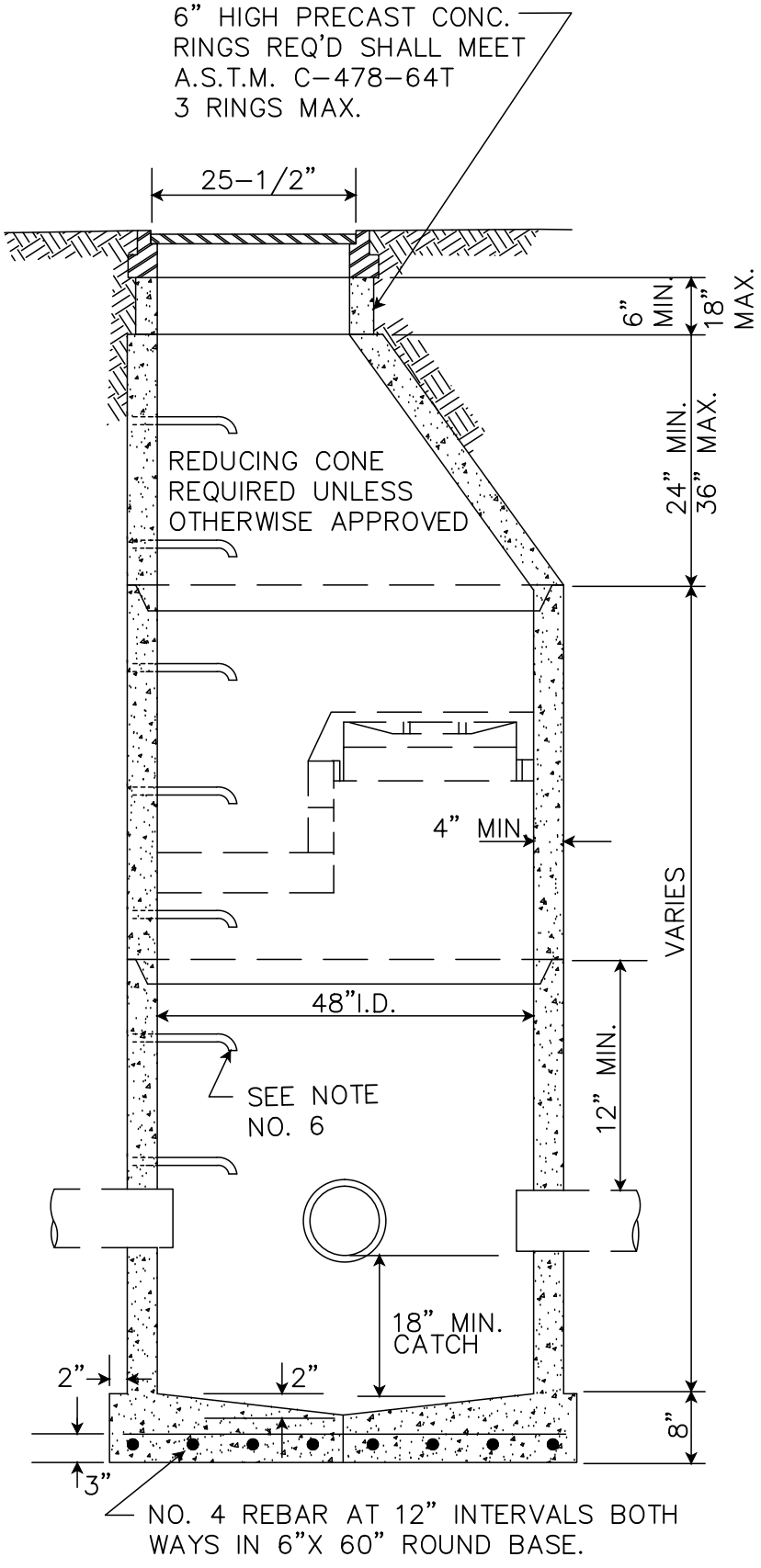




NOTES:

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 AMD 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.

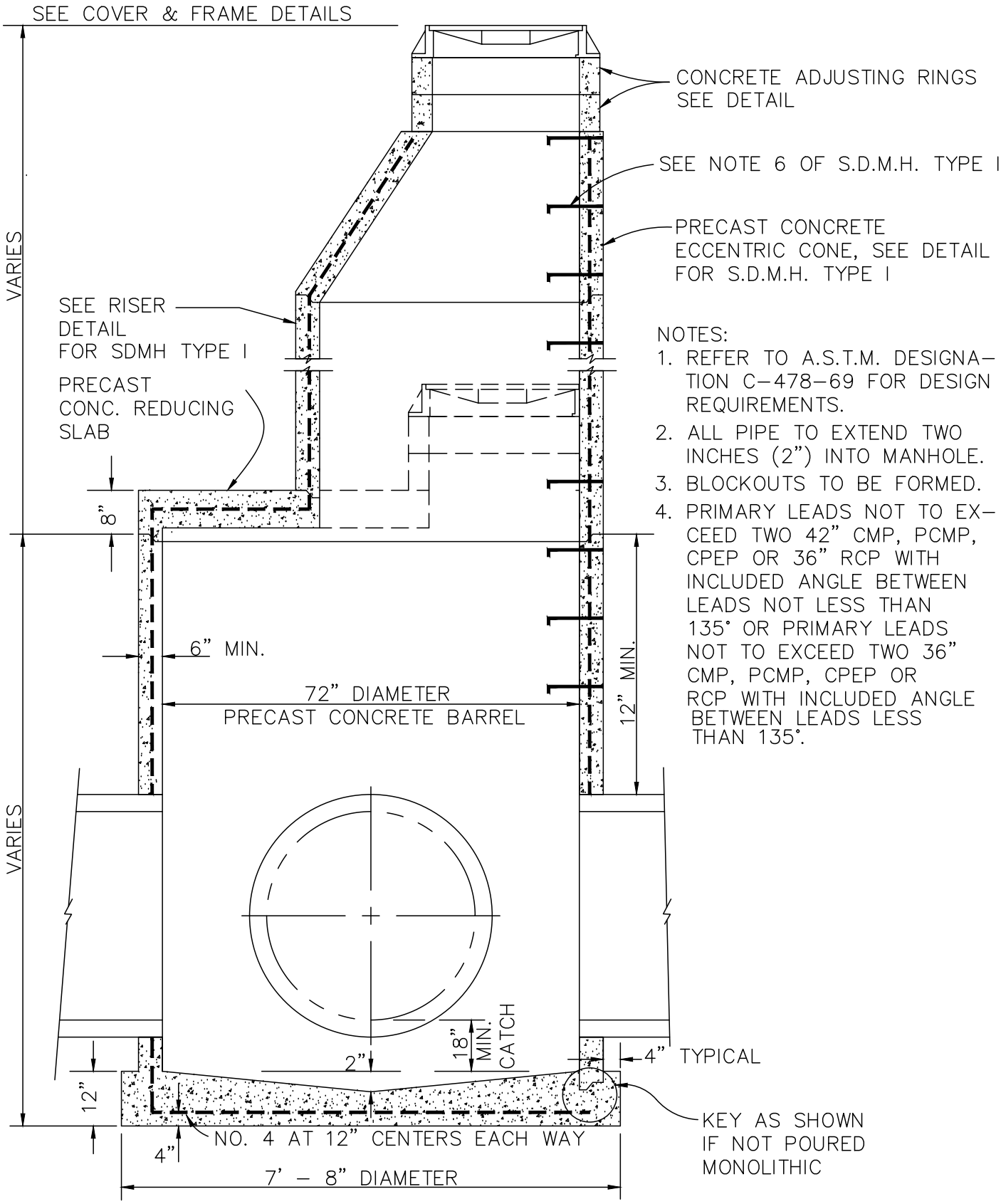
CITY OF HOMER · ALASKA · MARCH 31,1964	SCALE: NTS REVISED: 11/87	# STORM DRAIN CORRUGATED METAL PIPE BAND DETAIL	DETAIL # **800.01**



NOTES:

1. REFER TO A.S.T.M. DESIGNATION C-470-69 FOR DESIGN RE-QUIREMENTS.
2. SEE MANHOLE FRAME & COVER DETAIL
3. MIN. STEEL REQ'D FOR BARREL AS PER A.S.T.M. C-478-69 SHALL BE IMBEDDED IN BASE SO THAT FIRST BARREL SECTION IS CONNECTED WITH BASE.
4. PRIMARY LEADS NOT TO EXCEED 30" CMP, PCMP, CPEP OR 27" RCP WITH INCLUDED ANGLE BETWEEN LEADS NO LESS THAN 135° OR PRIMARY LEAD NOT TO EXCEED 24" CMP, PCMP, CPEP OR 21" RCP WITH INCLUDED ANGLE LESS THAN135°.
5. BLOCKOUTS TO BE FORMED.
6. RUNGS TO BE PLACED 12" ON CENTER ON UNOBSTRUCTED SIDE OF MANHOLE 18" MAX. FROM BOTTOM OF MANHOLE & 6" MAX. FROM TOP OF CONE. IF UNOB-STRUCTED SIDE NOT AVAILABLE, BOTTOM RUNG TO BE PLACED 6" OVER SMALLEST PIPE. SEE RUNG (MANHOLE STEP) DETAIL

CITY OF HOMER - ALASKA - MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE TYPE I	DETAIL # 800.02



NOTES:

1. REFER TO A.S.T.M. DESIGNATION C–478–69 FOR DESIGN REQUIREMENTS.
2. ALL PIPE TO EXTEND TWO INCHES (2") INTO MANHOLE.
3. BLOCKOUTS TO BE FORMED.
4. PRIMARY LEADS NOT TO EXCEED TWO 42" CMP, PCMP, CPEP OR 36" RCP WITH INCLUDED ANGLE BETWEEN LEADS NOT LESS THAN 135° OR PRIMARY LEADS NOT TO EXCEED TWO 36" CMP, PCMP, CPEP OR RCP WITH INCLUDED ANGLE BETWEEN LEADS LESS THAN 135°.

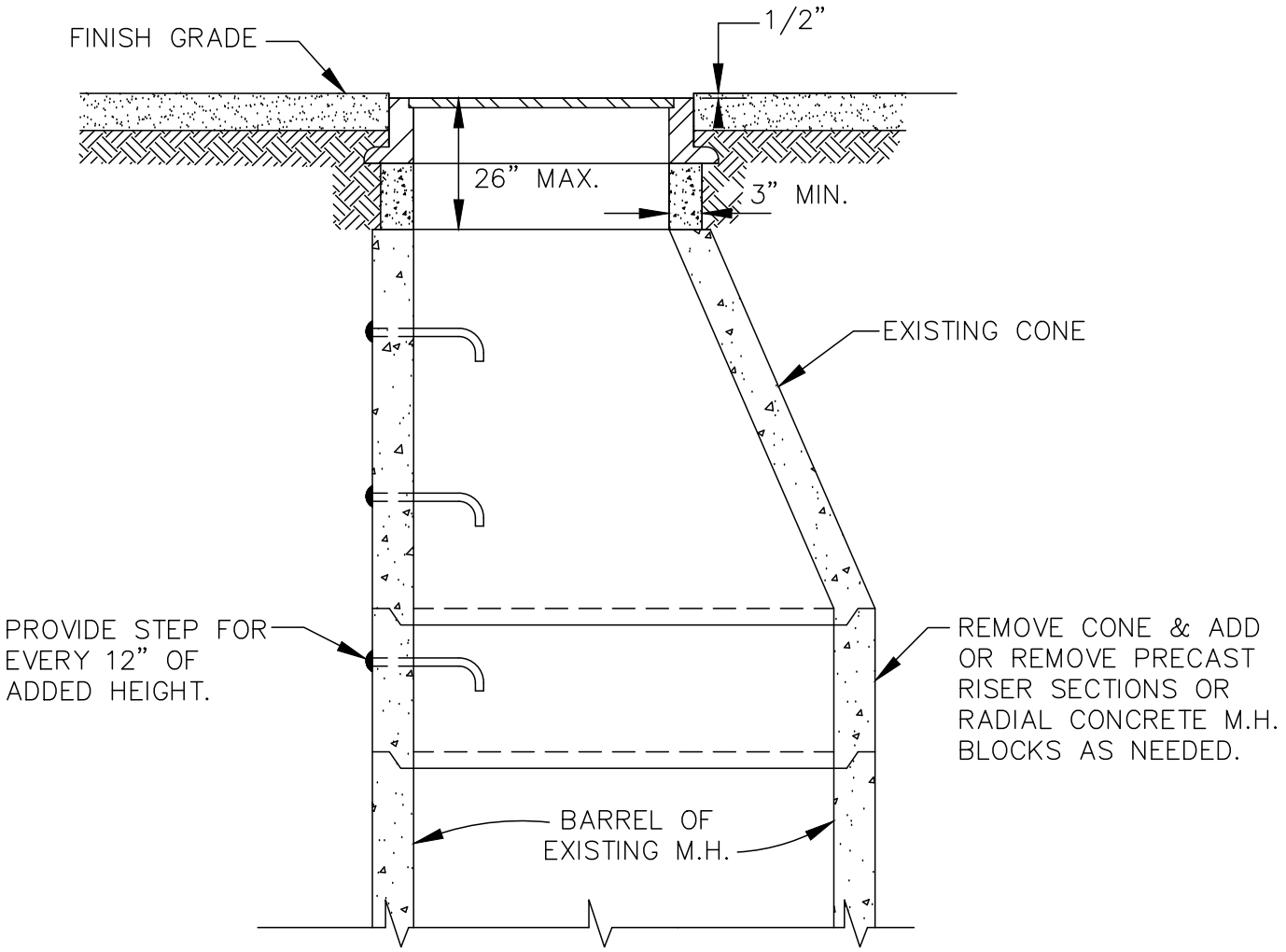
CITY OF HOMER · ALASKA · MARCH 31, 1964

SCALE: NTS

REVISED: 6/99

STORM DRAIN MANHOLE TYPE II

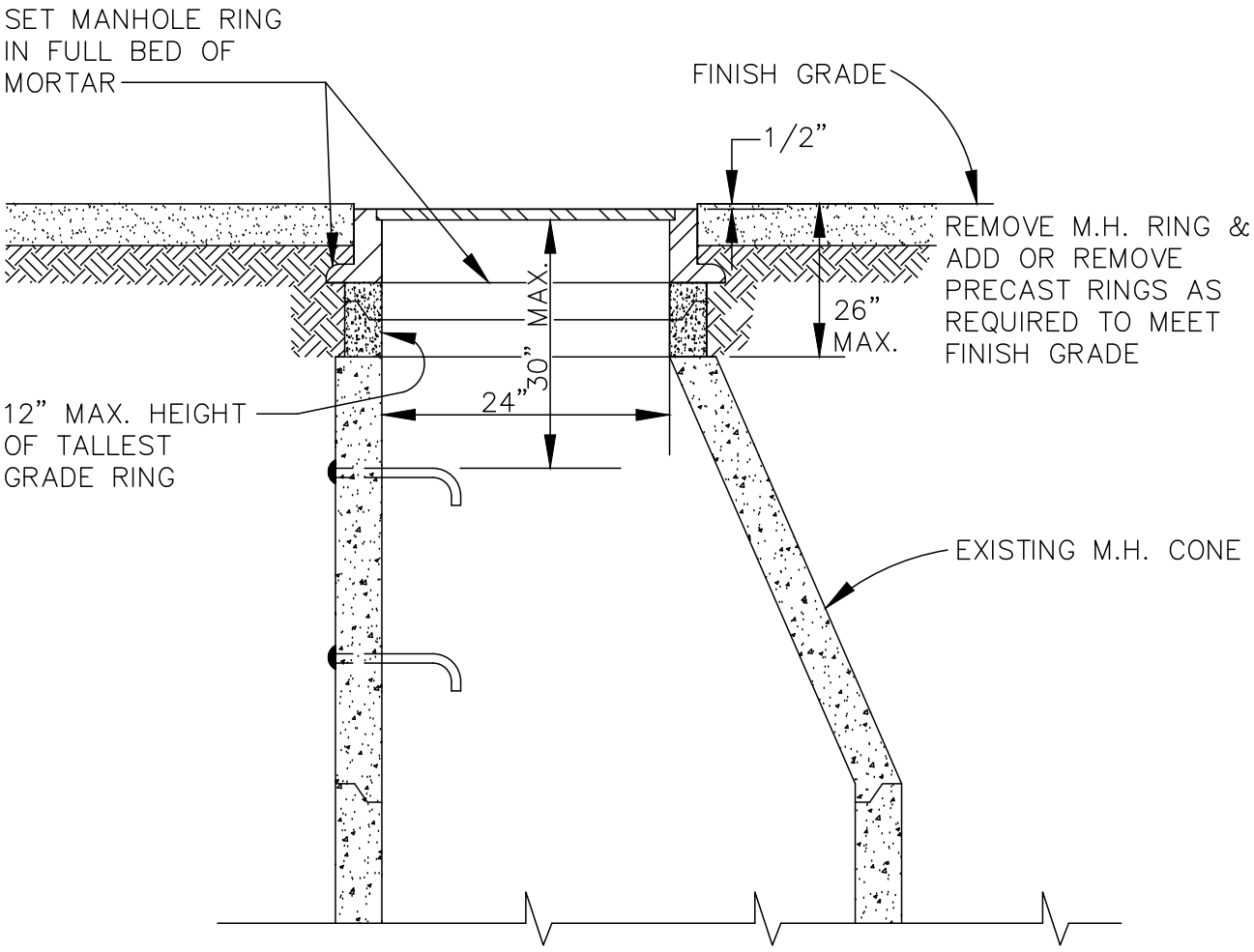
DETAIL # **800.03**



NOTES

1. ALL PERTINENT SECTIONS OF THE STANDARD SPECIFICATIONS WILL APPLY.
2. RESET RING IN FULL BED OF MORTAR.
3. REFER TO ASTM DESIGNATION C-478-69 FOR DESIGN AND STRENGTH REQUIREMENTS.
4. RESET CONE IN RAM-NEK OR EQUAL.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE CONE ADJUSTMENT	DETAIL # **800.04**

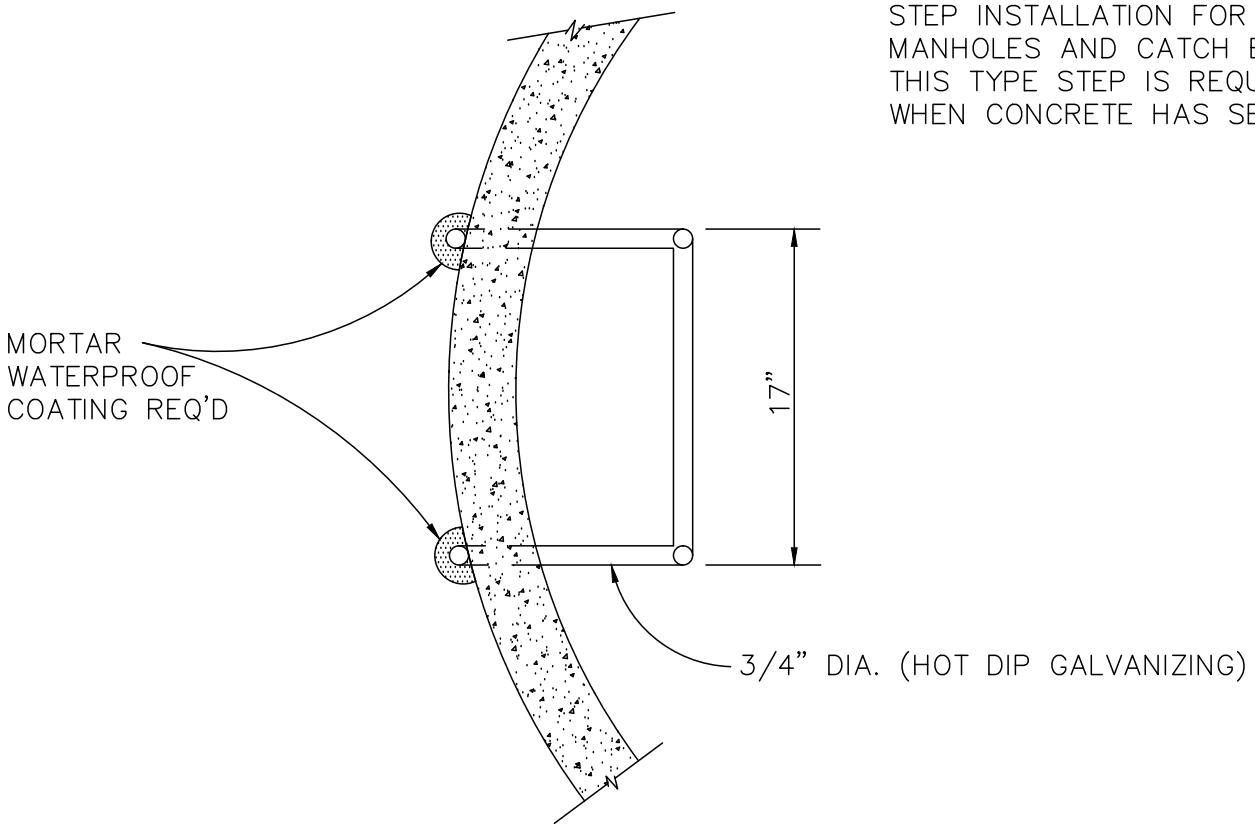


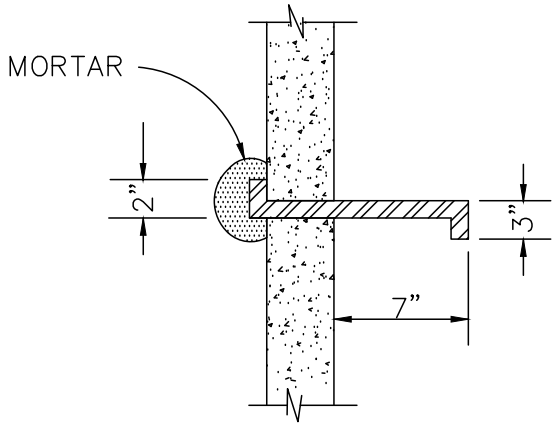
NOTES:

1. ALL PERTINENT SECTIONS OF THE STANDARD SPEC. WILL APPLY.
2. REFER TO ASTM DESIGNATION C-478-69 FOR DESIGN AND STRENGTH REQUIREMENTS.
3. WHEN AN ADJUSTMENT OF GREATER THAN 18" IN GRADE RINGS IS REQUIRED, A CONE ADJUSTMENT SHALL BE MADE.

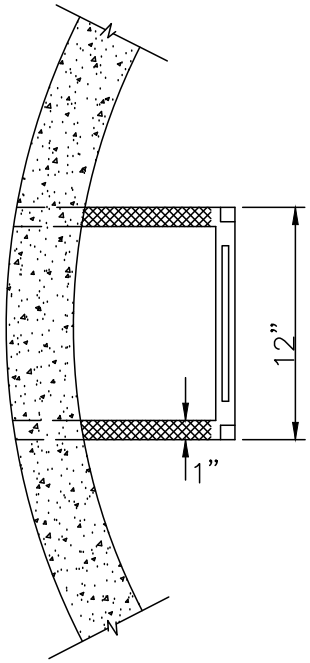
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE RING ADJUSTMENT	DETAIL # 800.05

NOTE:
STEP INSTALLATION FOR MANHOLES AND CATCH BASINS. THIS TYPE STEP IS REQUIRED WHEN CONCRETE HAS SET.



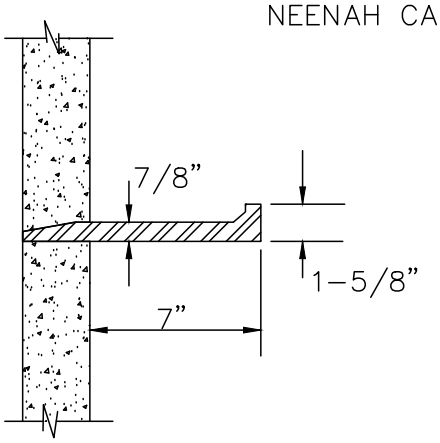


CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE STEP	DETAIL # 800.06

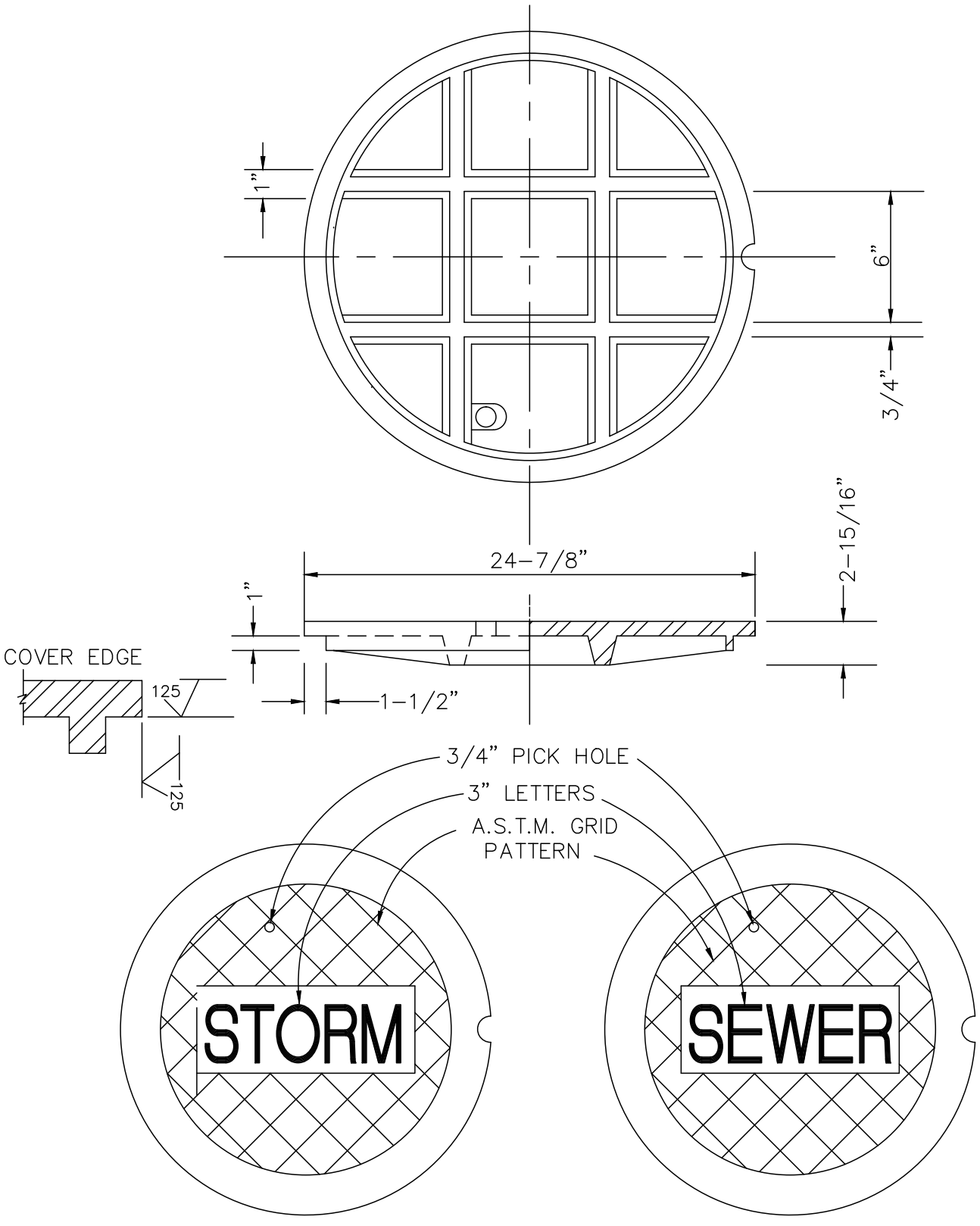


NOTES:
CAST IRON STEPS MUST BE INSTALLED DURING MANHOLE SECTION POUR OR BEFORE CONCRETE SETS.

NEENAH CASTING No. R–1981–N OR EQUAL.

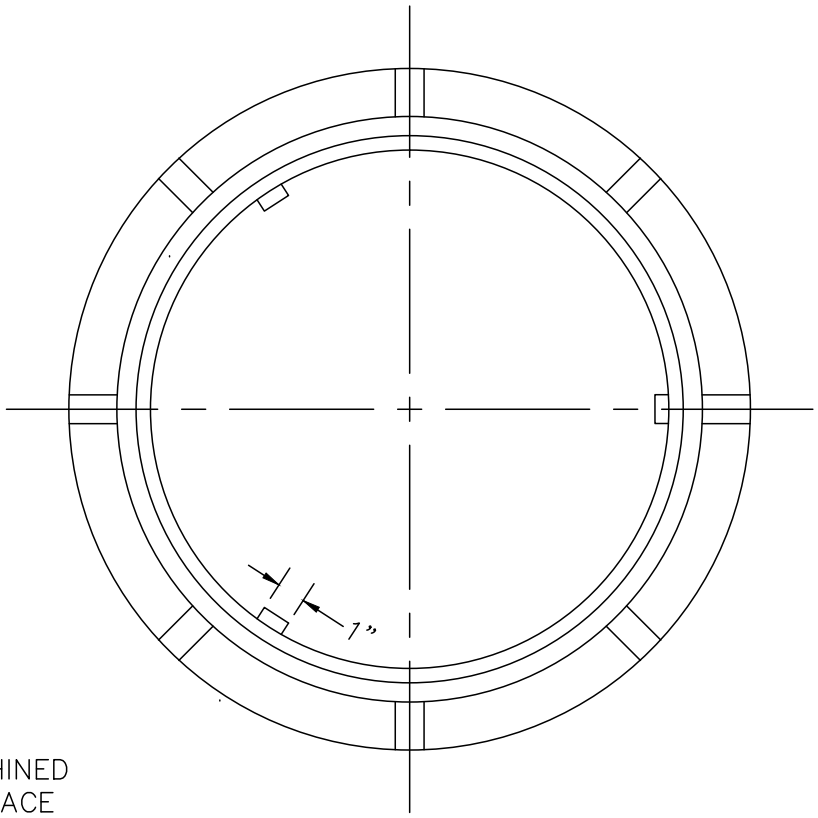


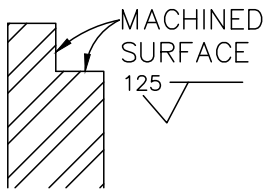
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE STEP (ALTERNATE)	DETAIL # 800.07



NOTE: ALL MANHOLE LIDS PLACED WITHIN A ROADWAY SECTION SHALL BE RATED FOR HEAVY VEHICLE TRAFFIC.

CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE COVER	DETAIL # 800.08





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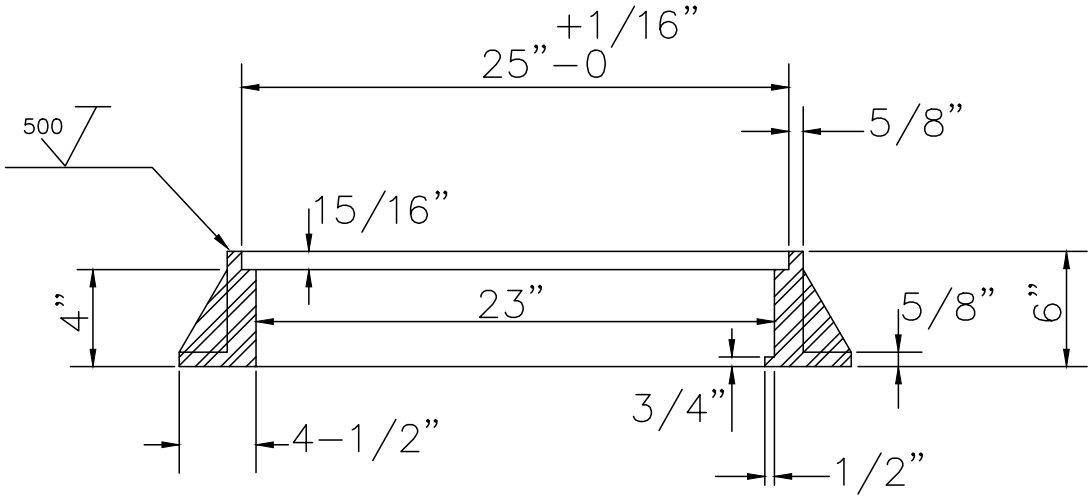
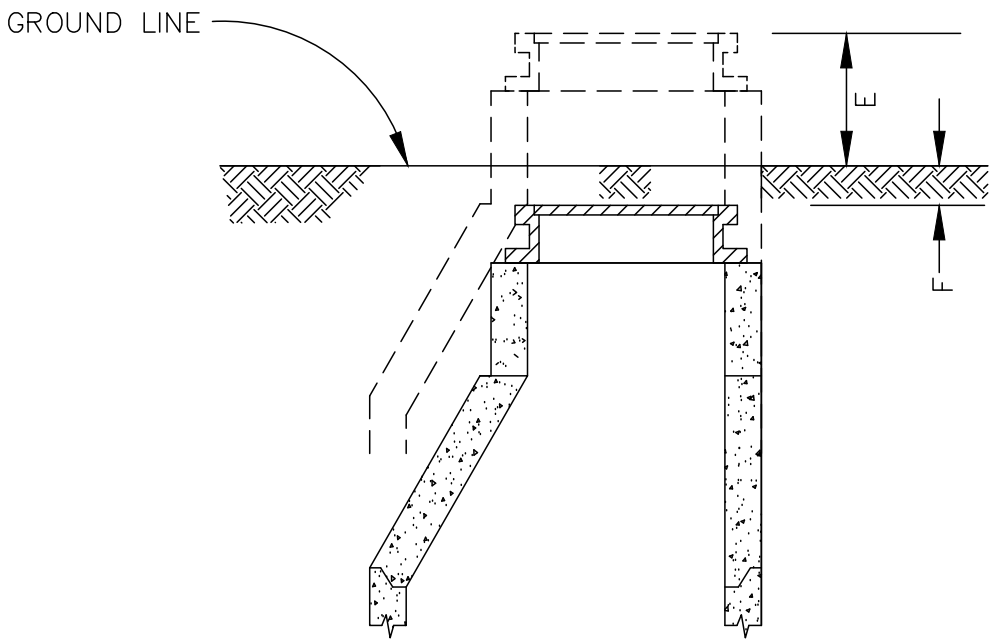


CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	STORM DRAIN MANHOLE FRAME	DETAIL # 800.09



LOCATION	E	F
BACKYARDS, GRAVEL STREETS, AND ALLEY AREAS WHERE TRAVELED.		6"
UNDEVELOPED AND SWAMPY AREAS.	24" MIN	
R.O.W.'S OUTSIDE TRAFFIC AREAS.	6"	
PAVED STREETS.		1/2"

CITY OF HOMER · ALASKA · MARCH 31, 1964

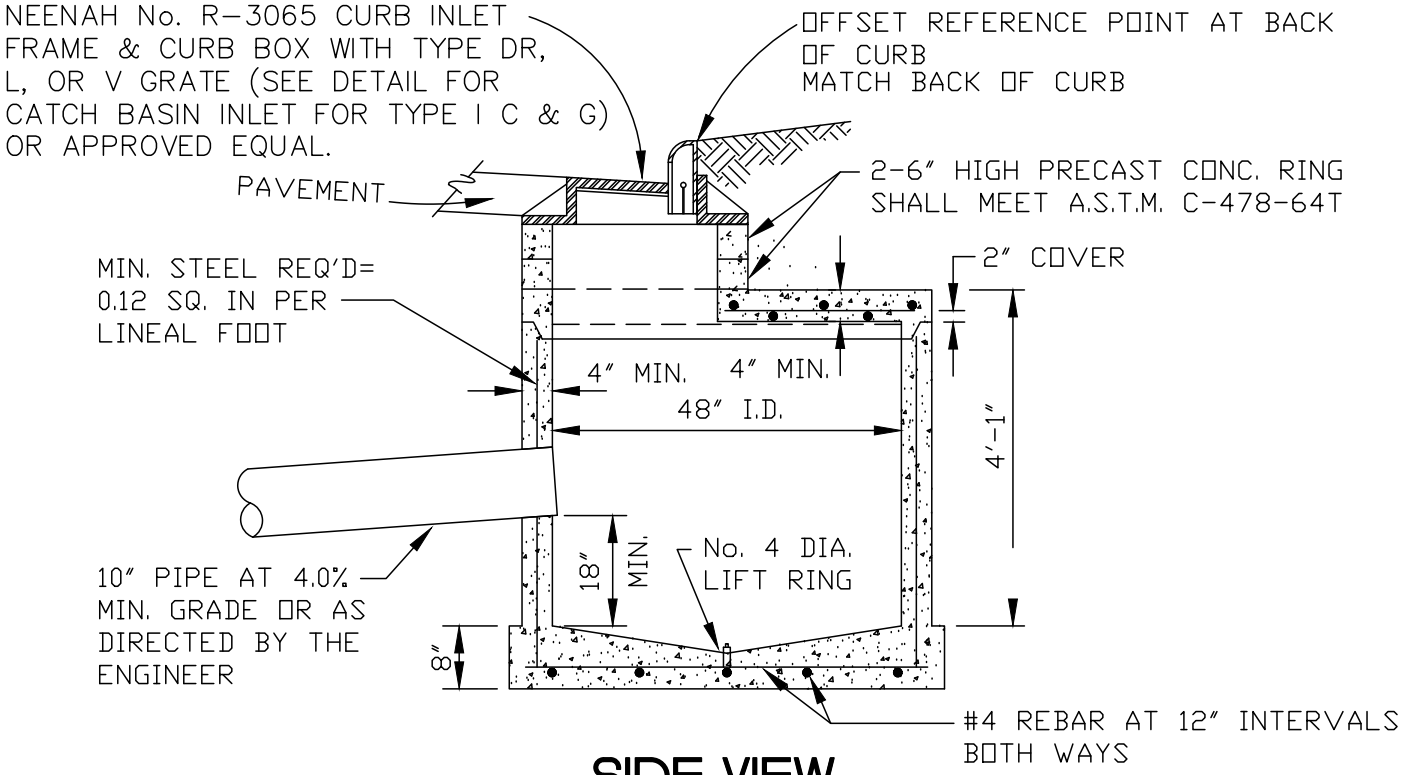
SCALE: NTS

REVISED: 6/99

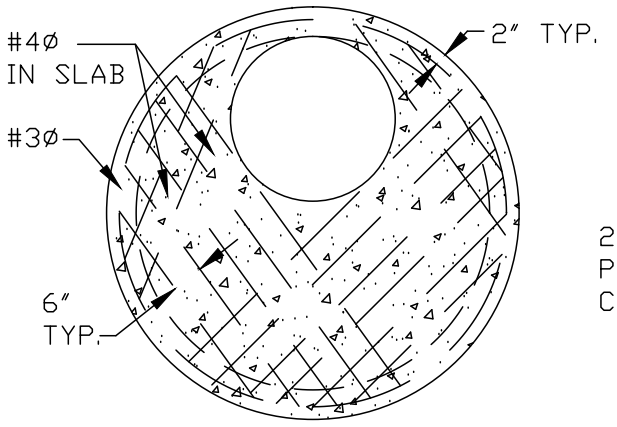
STORM DRAIN MANHOLE HEIGHTS

DETAIL #

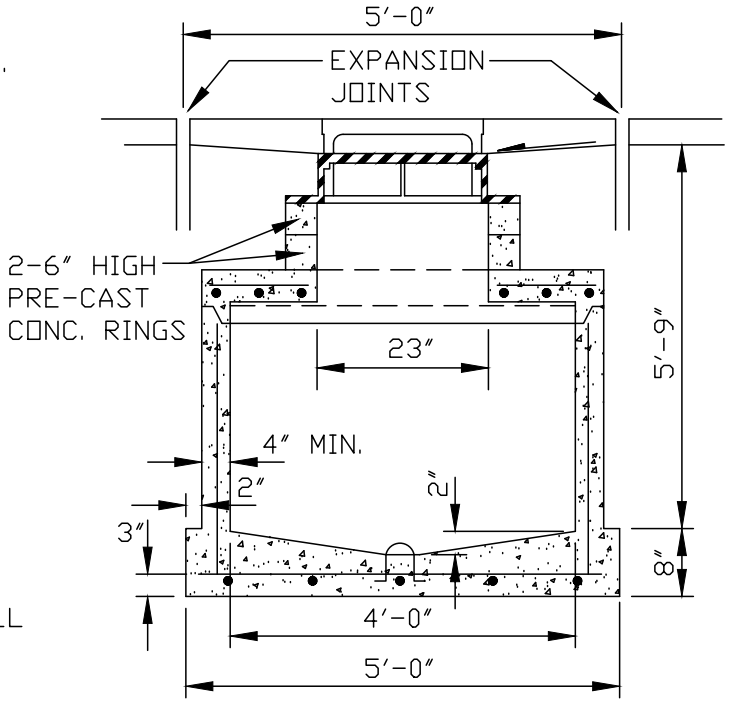
800.10



SIDE VIEW



REDUCING SLAB

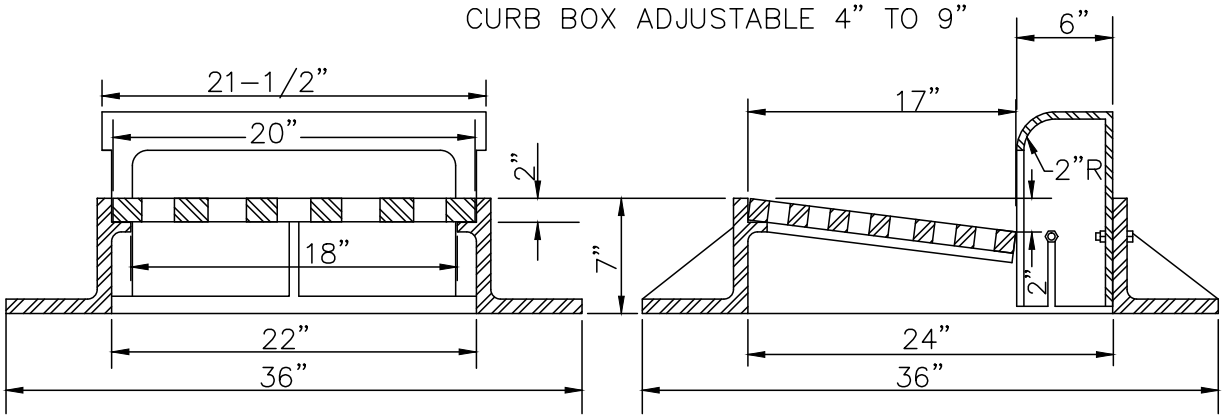


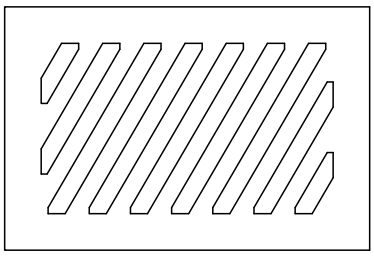
FRONT VIEW

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 C-478-64T FOR DESIGN REQUIREMENTS.
3. AT CATCH BASIN, DELETE CONC. CURB & GUTTER, PAVE TO FACE OF CATCH BASIN INLET.

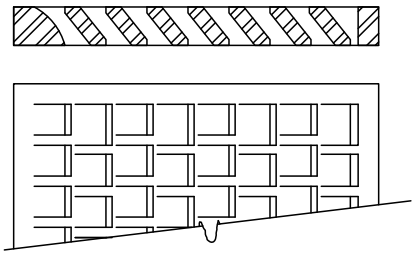
CITY OF HOMER · ALASKA · MARCH 31, 1964	SCALE: NTS REVISED: 6/99	**STORM DRAIN** **PRECAST CATCH BASIN** **FOR TYPE 1 CURB + GUTTER**	DETAIL # **800.11**



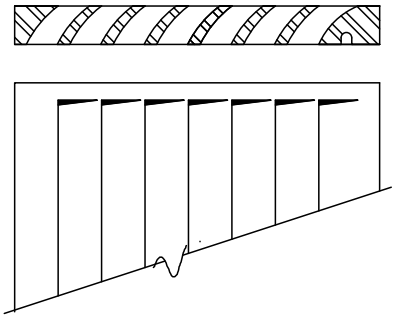


CURB INLET FRAME, GRATE AND CURB BOX

ILLUSTRATING NEENAH R-3065 WITH TYPE DR REVERSIBLE GRATE. FOR OPPOSITE HAND FLIP GRATE TOP TO BOTTOM.



ALTERNATE TYPE L GRATE



ALTERNATE TYPE V GRATE

CITY OF HOMER · ALASKA · MARCH 31,1964	SCALE: NTS REVISED: 6/99	**STORM DRAIN CATCH BASIN INLET FOR TYPE 1 CURB + GUTTER**	DETAIL # 800.12