PROJECT MANUAL

Construction Documents

FEH Project No. 2022221.02

Fairfield Middle School Expansion

Bid Issuance No. 1 - Bus Loop

Fairfield Middle School
404 W Fillmore Avenue
Fairfield, IA 52556

06-18-2026

FEH DESIGN
ARCHITECTURE / ENGINEERING / INTERIORS

SIOUX CITY, IA 712 252 3899 / DES MOINES, IA 515 288 2000 / DUBUQUE, IA 563 583 4900 / MILWAUKEE, WI 414 200 9660

CARL A. NELSON & CO. NELSON
Design-Builder | Construction Manager | General Contractor

FRENCH-RENEKER-ASSOCIATES
ENGINEERS & SURVEYORS

KED bluestone

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SECTION 00 01 11
NOTICE OF PUBLIC HEARING

To whom It May Concern:

You are hereby notified that on July 20, 2026 at 6:30 PM, Central Time, in the Fairfield Community School District Board Room at 403 S. 20th Street, Fairfield, IA 52556, there will be a public hearing on the proposed plans, specifications, form of contract and opinion of probable cost of the proposed improvements described thereby for the Middle School Expansion Bid Issuance No. 01 Bus Loop Project for FAIRFIELD COMMUNITY SCHOOL DISTRICT. Any person interested may appear and file written and/or oral objections to the proposed plans, specifications, form of contract, or cost of such improvement.

Proposed drawings, specifications, and form of contract may be examined at the Office of the Chief Financial Officer 403 S. 20th Street, Fairfield, IA 52556 and at FEH Design 951 Main Street, Dubuque, IA, 52001 from 8:00 A.M. to 4:00 P.M.

Published by order of the Fairfield Community School Board, Fairfield, Iowa.

By: Evan Marten

Title: Board Secretary

END OF SECTION

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SECTION 00 11 13
ADVERTISEMENT FOR BIDS

NOTICE OF LETTING

Description of Work

Construction of a Bus Loop for the existing middle school and Middle School Expansion Bid Issuance No. 01 Bus Loop Project. Work includes site development of a paved bus loop relocation. Sitework will consist of mass grading, finish grading, site utilities, demolition, site fencing, site paving, landscaping & seeding of greenspaces.

Architect:

FEH Design
951 Main Street
Dubuque, IA 52001

Construction Manager as Agent:

Carl A. Nelson & Company
1815 Des Moines Avenue
Burlington, Iowa 52601
Telephone: 319.754.8415
Fax: 319.753.2208

Bid Opening Time, Date and Location

Fairfield Community School District will receive Bids on or before 2:00 PM on July 14, 2026 at the Fairfield Community School District Administration Office, 403 S. 20th St. Fairfield, IA 52556; Attn.: Evan Marten, Chief Financial Officer. Bids received after this time will not be accepted. Bids will be publicly opened and read aloud following the closing of the above bid submission deadline at the location of bid submission.

The bids will be presented to and considered by the School Board for Fairfield Community School District at 6:30 PM July 20, 2026 in the School Board Conference Room at the Fairfield Community School District Administration Office located at 403 S. 20th Street, Fairfield, IA 52556, and such proposals received will be acted upon at such time and place or at such later time and place as may then be fixed.

Owner will issue an authorization letter and tax exemption certificate to the contractor and/or subcontractors for the purchase or use of building materials, supplies, and equipment to be used on this project only. DO NOT INCLUDE SALES TAX ON YOUR BID FORM.

No bid may be withdrawn for a period of 60 calendar days after the date of the scheduled closing time for the receipt of bids.

Type of Bid

Bids shall be based on a stipulated sum contract for multiple contracts.

Listing of Bid Packages:

Bid Package 01: Sitework, Site Utilities, Site Paving, Seeding & Electrical/Telecom

Examination of the Documents

The Bid Documents may be examined at the following:

FEH Design – 951 Main St Dubuque, IA 52001
Carl A. Nelson & Co. – 1815 Des Moines Ave, Burlington, IA 52601

Action Reprographics – Electronic Plan Room https://actionrepro.com/
Master Builders – Electronic Plan Room www.mbionline.com/plan-room-applications-information
(4100 Westown Pkwy, West Des Moines, IA 50266 515-288-8904)

Bid Documents may be ordered by contacting Action Reprographics Rapids. There will be a $200 refundable deposit required on the plans and specifications. MBI plan deposit cards are also an acceptable method of deposit for documents. Unsuccessful bidders must return their drawings and specifications to Rapids Reproductions or Carl A. Nelson & Company in good condition, and within 14 days of the award of contracts in order to receive a refund of their deposit.

Deposit checks shall be sent to Carl A. Nelson & Co. Burlington Office and made payable to Fairfield Community School District.

Bidding Documents will be available for pickup/ordering on June 26, 2026.

Bid Security and other Bonds

All bids shall be accompanied by a bid security in a separate sealed envelope as allowed by Section 26.14A of the Iowa Code. Bid security in the amount of 5% of the total bid in the form of certified check, credit union share draft, or surety bond written on an original AIA Document A310, Bid Bond is required for this project. The successful bidder will be required to provide surety Performance and Payment Bonds in an amount equal to one hundred percent (100%) of the Contract Sum. The surety providing bonds must have an (A-) A.M. Best rating or better or be listed on the U.S. Department of Treasury listing of approved sureties (Department Circular 570). The cost of the Bonds shall be included in the Contract Sum.

Schedule

Notice of Award will be issued within 60 days of the receipt of the bids.
Construction Period: Approximately 2 MONTHS

Pre-Bid Conference

A pre-bid conference will be held on July 1, 2026 at 10 AM in the middle school cafeteria. A walk of the site will occur after the meeting. Attendance is recommended but is not mandatory.

Owner's Right to Reject Bids

The Fairfield Community School District School Board reserves the right to reject any and all bids, to waive informalities and technicalities, and to enter such contracts as it deems in the best interest of the School District.

Bidders shall be prepared to submit a performance bond and payment bond conditioned on the faithful performance of the contract. Out-of-state bidders shall be prepared to submit an Out-of-State Contractor Bond to the Iowa Division of Labor in accordance with Chapter 91C of the Code of Iowa.

By virtue of statutory authority, a preference will be given to products and provisions grown and produced within the State of Iowa, and to Iowa labor to the extent lawfully required under Iowa law.

Iowa law provides that on public improvements a resident bidder shall be allowed preference as against a nonresident bidder from a state or foreign country which gives or requires a preference to bidders from that state or foreign country. The preference so allowed shall be equivalent to the preference given or required by the state or foreign country in which the nonresident bidder is a resident. All Bidders must include a completed Bidder Status Form with their bid. Failure to include the Bidder Status Form may result in the bid being deemed nonresponsive and rejected.

It is the intent of the Owner to award a contract or multiple contracts to the lowest responsible, responsive bidder provided the bid has been submitted in accordance with the bidding requirements. The Owner

reserves the right to waive informalities or irregularities. The Owner reserves the right to reject any or all bids.

Published by order of the School Board for Fairfield Community School District, Fairfield Iowa.

By: Evan Marten

Title: Chief Financial Officer

END OF DOCUMENT

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SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

To be considered, Bids shall be made in accordance with these Instructions to Bidders.

1.01 DEFINITIONS

A. **Definitions set forth** in General Conditions of Contract for Construction, 2009 Construction Manager – Adviser Edition, per Section 00 70 00.

B. **ARCHITECT** refers to FEH Design and their consultants.

C. **OWNER** refers to Fairfield Community School District.

D. **CONSTRUCTION MANAGER (CM)** refers to Carl A. Nelson & Company.

E. **BIDDING DOCUMENTS** include Instructions to Bidders, Bid Form, other sample bidding and contract forms, the Contract Documents, and any Addenda issued.

F. **ADDENDA** are written or graphic instruments issued prior to execution of Contract which modify or interpret Bidding Documents. Addenda will become part of Contract Documents.

G. **BID** refers to complete and properly signed proposal to do Project or designated portion thereof for sums stipulated therein, submitted in accordance with Bidding and Contract Documents.

H. **BASE BID** refers to sum stated in Bid for which Bidder offers to perform the Work.

I. **ALTERNATE** is an amount stated in Bid to be added and or deducted from Base Bid if corresponding change in Work, as described in Bidding Documents, is accepted.

J. **UNIT PRICE** is an amount stated in Bid as a price per unit of measure for materials, equipment or services, or a portion of Work as described in Bidding Documents.

K. **BIDDER** refers to a person or entity invited to submit a Bid. Any reference herein to Prime Bidder or Prime Contractor is to mean Bidder or Contractor, respectively.

L. **SUB-BIDDER** refers to person or entity that submits a Bid to a Bidder for materials, equipment or labor for a portion of the Work.

M. **BID PACKAGES** are defined in Section 01 10 00, Summary of Work.

1.02 PROCUREMENT OF DOCUMENTS

A. **Procurement of Documents by Bidders:** (See Section Invitation to Bid.)

1.03 EXAMINATION OF DOCUMENTS AND SITE

A. **Examination of Documents:** Bidders shall carefully examine entire contents of Contract Documents prepared for the Work to become thoroughly familiar with all requirements. The Plans for this improvement and the Specifications accompanying them shall be considered as a whole, and anything shown or called for in one and omitted in the other is as binding as if called for or shown by both. Figure dimensions shall in all cases be used in preference to scale

dimensions. Any work not herein specified which may be fairly implied as included in this improvement shall be done by this Contractor without extra pay.

B. Examination of the Site: Bidders should visit construction site to obtain first-hand knowledge of existing conditions, and conditions relative to the Work to be performed.

C. Additional Compensation: Contractors shall not receive extra payments for conditions, which can be determined by examining site and Contract Documents.

D. Pre-Bid Conference:

1. **Time and location** are as stipulated in the Advertisement for Bid.

2. **Attendance:**
   a. Contractors
   b. Subcontractors and suppliers
   c. Owner
   d. Architect/engineers
   e. Construction Manager

3. **Tentative Agenda:**
   a. General overview of owner's team
   b. General overview of documents
   c. General overview of schedule
   d. General overview of site logistics plan
   e. Questions and answers.

1.04 RESOLUTION OF DISCREPANCIES AND AMBIGUITIES

A. **General Requirements:** Submit written questions concerning Bidding Documents and existing site conditions at the construction site to the CM. Email questions to Carl A. Nelson & Company, Attn: Nick Liston email nliston@carlanelsonco.com and Will Porter email wporter@carlanelsonco.com . Replies will be issued to Bidders and Plan Rooms in the form of an Addendum to the Drawings and Specifications, and will become part of the Contract. The Architect, CM and Owner will not be responsible for oral clarifications. In no case shall a Bid be submitted in uncertainty. Questions received less than 5 business days before bid opening cannot be answered. Sub-Bidders are responsible for contacting Bidders prior to bid date for Addenda relating to their work.

1.05 SUBSTITUTION OF MATERIALS

A. General Requirement: To obtain approval to use unspecified products, Bidders shall have written requests submitted not less than 7 business days before bid date. Requests received after this time will not be considered. Requests shall be submitted to the CM on the form provided in Specification Section 01 62 11 and in accordance with Specification Section 01 62 10, Product Options and Substitution Requirements. If the product is acceptable, the Architect will approve the substitution and notice of approval will be noted in an Addendum issued to "Plan Rooms" and Bidders on record.

1.06 PREPARATION OF BIDS

1. BIDDING PROCEDURE
   a. Bids shall be submitted on unaltered Bid Form furnished in the Project Manual.
   b. Bidders may submit a combined bid for multiple Bid Packages; however, bidders must also submit individual bids for each Bid Package contained within their combined bid.
   c. Each Bid shall include the legal name of the Bidder, and shall show whether the Bidder is a corporation, a partnership, sole proprietor, or a joint venture.

i. Corporation – Signature of a duly authorized signing officer, their capacity in which the signing officer acts along with the corporate seal affixed to page.
ii. Partnership – Signature of all partners in the presence of a witness who will also sign. Affix seal.
iii. Joint Venture – Each party to the Joint Venture shall execute the Bid Form under their respective seals similar to the requirements of Partnership.
iv. Sole Proprietor – Signature of Sole Proprietor in the presence of a witness who will also sign.

d. Fill in all blank spaces for bid prices in ink or typewritten words, and submit one (1) copy. **No qualified or segregated bids will be accepted.**
e. Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an agent shall have a current Power of Attorney attached certifying the agent's authority to bind the Bidder.
f. Bidders submitting bids for bid package #1 shall use bid documents and bid form provided by Shive-Hattery, Inc.
g. Bid shall be submitted in an opaque, sealed envelope bearing on the outside the Bid Package #(s), Bidder's name, address and the Project's name.
h. Bid Security shall be enclosed in a separate opaque envelope bearing on the outside the Bidder's name, address, Project's name and the words "BID SECURITY".
i. Bids submitted by mail shall be submitted in a separate envelope with the words "BID ENCLOSED" on the outside.
j. Bids shall be deposited at the designated location prior to the time and date of receipt of Bids indicated in the Notice of Letting. Bids received after the time and date for receipt of Bids will not be considered for award.
k. Bidders shall complete and include a fully completed "Bidder Status Form" in the Bid Security Envelope. Failure to submit a fully completed Bidder Status Form with the bid may result in the bid being deemed nonresponsive and rejected.

2. BID SECURITY
a. Bid shall be accompanied by a Bid Bond or a Cashier's check of a sum no less than five (5) percent of Bid Sum/Price.
b. Endorse Bid Bond in name of Owner as oblige, signed and sealed by principal and surety authorized to do business in the State of Iowa.
c. Bid Bond of accepted Bidder will be returned after delivery to the Owner of the required Payment and Performance Bond by the accepted Bidder.

3. PERFORMANCE BONDS
a. A Performance and Payment Bond in the amount of 100 percent of the Contract Sum shall be submitted in duplicate to the Construction Manager, together with the executed Owner-Contractor Agreement within seven days after the award of the Contract. Such bonds shall be issued by a surety company acceptable to the Owner and properly licensed in the State of Iowa, and shall be on AIA Document A312

4. BID DOCUMENTS

1.07 MODIFICATION AND WITHDRAWAL OF BIDS

A. General Requirements:

1. A Bid may not be modified, withdrawn, or canceled by Bidder, without consent of Owner, during the 60-day period following time and date designated for receipt of Bids, and each Bidder so agrees in submitting its Bid. Bid proposals for alternates shall be valid as stipulated in Section 01 23 00, Alternates.

2. Prior to time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to party receiving Bids at place designated for

receipt of Bids. Such notice shall be in writing over signature of Bidder or by facsimile; if by facsimile, written confirmation over signature of Bidder shall be mailed and postmarked on or before date and time set for receipt of Bids. A change shall be so worded as not to reveal amount of original Bid.

3. Withdrawn Bids may be resubmitted up to date and time for receipt of Bids, provided that they are fully in conformance with these Instructions to Bidders.

1.10 DISQUALIFICATION OF BIDDERS

A. General Requirements: Owner reserves the right to accept or reject any or all Bids, or parts of Bids, and to waive formalities or informalities therein. For the purpose of determining the successful Bidder in the consideration of all Bids submitted, Owner reserves the right to accept or reject any or all alternates in any order as may appear in the best interests of the Owner. Owner reserves the right to disqualify Bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of Bidder.

B. Qualification of Bidder: In awarding the Contract, the Owner may take into consideration the Bidder's skill, facilities, capacity, experience, responsibility, previous work record, financial standing, safety and health experience. The inability of any Bidder to meet the requirements mentioned above may be cause for rejection of its Bid.

1.11 EXECUTION OF CONTRACT

A. Qualifications of Bidders: Bidders shall be prepared, if so, requested by Owner, to present evidence of his experience, qualifications and financial ability to carry out terms of the Contract.

B. Withdrawal of Bids: Bid may not be withdrawn for a period of 60 days after Bids are received and opened.

C. Alternates: The successful Bidder to whom the Contract has been awarded shall agree to the cost of alternates for the period after Bids have been received and opened noted in the Section 01 23 00, Alternates.

1.12 SALES TAX

A. Payment of Sales Tax:

1. The Owner shall furnish Contractor and all lower tier subcontractors with an Exempt Sales Tax Certificate Form for items incorporated into the Work and considered by State of Iowa to be exempt from Sales Tax. Taxpayer identification numbers will be required from all companies in order to issue the Exempt Sale Certificate.

2. This Exempt Sale Certificate does not apply to:

   a. Purchase of materials to be used but not incorporated into the Contract work, including but not limited to concrete form lumber, scaffolding, etc.

   b. Purchase or rental of machinery, equipment, or tools owned or leased by Contractor and used in performing the work.

1.13 EVALUATIONS OF BIDS

A. **Voluntary Alternates:** Voluntary alternates are encouraged but will not be considered in the determination of low responsive bidder.

B. **Consideration of Bids:** All properly identified bids and properly submitted bids received on time will be opened publicly and will be read aloud. An abstract of the bids will be made available to all bidders.

The Owner shall have the right to reject any and all bids, reject a bid not accompanied by the required check or security, reject a bid which is in any way incomplete or irregular, and to waive informalities.

The Owner will award the contract to the lowest responsible bidder, which will be based on factors pertinent to the matter, which may include the following:

1. The bidder's adherence to all conditions and requirements of the bid specifications.
2. The total bid price.
3. The bidder's general reputation and experience.
4. Evaluation of the bidder's ability to service College Community School District.
5. Prior knowledge of and experience with the bidder.
6. The needs and requirements of College Community School District.
7. The bidder's ability to meet delivery requirements.
8. All maintenance costs and warranty provisions.

Unless otherwise stated in the specifications, the Owner reserves the right to award the contract in whole or in part, whichever is in the best interests of the Owner. All tied bids shall be resolved in a manner, which is in the best interests of the Owner. The Owner reserves the right to waive informalities in the bid and to award to the bidder the Owner determines is in the Owners best interest.

C. **Examination of Bids:** All bids submitted shall be made available for examination by interested parties, immediately following the bid opening. Each interested party is requested to initial each page reviewed, indicating that the Proposal was examined.

All bids will be placed in the custody of the Owner until the Contract for the project has been awarded.

END OF SECTION

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SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

2.01 SEX OFFENDER ACKNOWLEDGMENT AND CERTIFICATION FORM (SEE ATTACHMENT 00 31 00A)

A. Sex Offender Acknowledgment and Certification Form; Each vendor, supplier, contractor, or professional services provider shall complete this form and return to the Owner before the company may involve the presence of the Company's employees upon the real property of the school(s) of the District. Review this form in its entirety.

2.02 HAZARDOUS MATERIALS REMOVAL AND ASBESTOS ABATEMENT REPORT (NOT USED)

A. Hazardous materials have been identified in the building and these findings are documented in a hazardous materials survey report prepared by others. The Owner has hired a separate contractor to abate all identified areas containing asbestos. Please refer to the hazardous materials survey report to identify potential asbestos containing materials that may be revealed during the demolition and construction process. All surveys, testing, and abatement are NOT a part of this construction contract. The hazardous materials survey report may be requested from the Owner and is not to be considered a part of the Construction Documents. Contractor is responsible for coordination of their work with the Owner and the Owner's abatement contractor.

2.03 SUBSURFACE INVESTIGATION REPORT (SEE ATTACHMENTS)

A. A copy of the geotechnical evaluation report with respect to the building site is included with this document:
   1. Terracon Project No. (see attachment 00 31 00b)
      a. Title: Fairfield Middle School
      b. Date:
      c. Prepared by: Terracon Consultants, Inc. Cedar Rapids, Iowa

B. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

2.04 IDNR NOTIFICATION FOR DEMOLITION (SEE ATTACHMENT 00 31 00E) (NOT USED)

A. A copy of the IDNR "Asbestos Notification of Demolition and Renovation" is included with this document.

B. This document must be filled out and submitted by the contractors performing demolition scopes of work with each bid package at least ten (10) working days before beginning the demolition activities. A copy of the Owner Provided Hazardous Materials Survey Report must be provided with this notification to the IDNR. It is this contractor's responsibility to coordinate with the owner and submit the Owner Provided report.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 00 31 00a
SEX OFFENDER ACKNOWLEDGMENT &
CERTIFICATION FORM

ACKNOWLEDGMENT AND CERTIFICATION

_____("Company") is providing services to the
[name]
Fairfield Community School District ("District") as a vendor, supplier, contractor, or professional services provider or is operating or managing the operations of a vendor, supplier, contractor or professional service provider. The services provided by the Company may involve the presence of the Company's employees upon the real property of the school(s) of the District.

The Company acknowledges that Iowa law prohibits a sex offender who has been convicted of a sex offense against a minor from being present upon the real property of the schools of the District. The Company further acknowledges that, pursuant to law, a sex offender who has been convicted of a sex offense against a minor may not operate, manage, be employed by, or act as a contractor, vendor, supplier, provider of services or volunteer at the schools of the District.

The Company hereby certifies that no one who is an owner, operator or manager of the Company has been convicted of a sex offense against a minor. The Company further agrees that it shall not permit any person who is a sex offender convicted of a sex offense against a minor to provide any services to the District in accordance with the prohibitions set forth above.

This Acknowledgment and Certification is to be construed under the laws of the State of Iowa. If any portion hereof is held invalid, the balance of the document shall, notwithstanding, continue in full legal force and effect.

In signing this Acknowledgment and Certification, the person signing on behalf of the Company hereby acknowledges that he/she has read this entire document, that he/she understands its terms, and that he/she not only has the authority to sign the document on behalf of the Company, but has signed it knowingly and voluntarily.

Dated:_____

_____
Company

By: _____

Printed Name:

Title:

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SECTION 00 41 26
BID FORM

CONTRACT BASED ON A STIPULATED SUM

PROJECT: Fairfield Middel School Expansion

OWNER: Fairfield COMMUNITY SCHOOL DISTRICT

SUBMITTED TO: Fairfield COMMUNITY SCHOOL DISTRICT

DATE: _____ *(Bidder to enter date)*

SUBMITTED BY: *(Bidder to enter name and address)*

_____*(Contractor)*

_____*(Address)*

_____*(City, State, Zip)*

_____*(Phone No., Fax No.)*

_____*(Email Address)*

□ a corporation organized and existing under laws of the State of _____.
□ a partnership
□ a sole proprietor

OFFER:

Having examined the Place of the Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by FEH Design for the above-mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Bid Package #(s)_____ Work for the Sum of:

Base Price: _____ Dollars

($_____) in lawful money of the United States of America.

ALTERNATES: Refer to section 01 23 00 for additional information. Indicate “Not Applicable” or “N/A” if Alternate Bid item is not related to Bid Package being bid upon.

UNIT PRICES:

Unit Price #1: Over-excavate of unsuitable soil bearing materials for below paving and replacement with structural fill materials properly compacted, beyond amount identified in Civil Drawings. Price to be stated as cost per cubic yard removed and replaced as specified. The same unit price shall be used to deduct from the contract amount for over excavation figured in the base bid that is not required. (Bid Package-01 only): $_____/CY

We have included the *Bid security* and a *Bidder Status Form* as required by the Instructions to Bidders.

All Iowa State Sales and Use Tax on materials incorporated into the Work are not included in the Bid Sum and a Sales Tax Exemption Certificate will be provided by the Owner. Sales tax for all materials not incorporated into the Work have been included in the Bid Sum.

The Contractor (Company) shall not be owned, operated, or managed by a registered sex offender who has been convicted of a sex offense against a minor in accordance with Iowa Code 692A.113. In addition, the Contractor shall not permit an employee, Subcontractor (Company) owned, operated, or managed by, or Subcontractor employee who is a registered sex offender convicted of a sex offense against a minor on real property of the schools of the Owner in accordance with Iowa Code 692A.113. The Contractor further acknowledges and certifies, by execution of the Contract with the Owner, that the services provided under this Contract comply with Iowa Code 692A.113, and shall fully execute and deliver copy of 'Acknowledgment and Certification' at the preconstruction meeting or prior to any workers being on-site, whichever is sooner.

ACCEPTANCE:

This offer shall be open to acceptance and is irrevocable for (60) sixty days from the bid closing date.

If this offer is accepted by the College Community School District within the time period stated above, we will:

- Execute a Contract Agreement within seven days of receipt of Notice of Award.
- Commence work in strict accordance with the Construction Manager's master schedule.
- Furnish the required Bonds and Insurance Certificates within seven days of receipt of Notice of Award in the forms described in General Conditions.

CONTRACT TIME:

We will complete the Work in accordance with the Construction Manager's master schedule.

ADDENDA:

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Price.

Addendum(s) ____ through ____.

SUBCONTRACTS:

The following Work will be performed by Subcontractors and coordinated by us:

SCOPE OF WORK	SUBCONTRACTOR
_____	_____
_____	_____
_____	_____

BID FORM SIGNATURE(S)

_____
(Bidder – print the full name of your firm)

_____
(Authorized signing officer, Title)
End of Bid Form

END OF SECTION

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SECTION 00 41 26.1
BIDDER STATUS

PART 1 GENERAL

1.1 ATTACHMENT

A. The Bidder Status Form 309-3001 (09-15), consisting of two (2) pages, is included as an attachment to this specification section and is part of the Contract Documents.

B. This form shall be completed and submitted with the bid in the Bid Security envelope.

END OF SECTION

Bidder Status Form

INCLUDE IN BID ENVELOPE

To be completed by all bidders — Part A

Please answer "Yes" or "No" for each of the following:

☐ Yes ☐ No My company is authorized to transact business in Iowa.
(To help you determine if your company is authorized, please review the worksheet on the next page).

☐ Yes ☐ No My company has an office to transact business in Iowa.

☐ Yes ☐ No My company's office in Iowa is suitable for more than receiving mail, telephone calls, and e-mail.

☐ Yes ☐ No My company has been conducting business in Iowa for at least 3 years prior to the first request for bids on this project.

☐ Yes ☐ No My company is not a subsidiary of another business entity or my company is a subsidiary of another business entity that would qualify as a resident bidder in Iowa.

If you answered "Yes" for each question above, your company qualifies as a resident bidder. Please complete Parts B and D of this form.

If you answered "No" to one or more questions above, your company is a nonresident bidder. Please complete Parts C and D of this form.

To be completed by resident bidders — Part B

My company has maintained offices in Iowa during the past 3 years at the following addresses:

Dates: _____ /_____ /_____ to _____ /_____ /_____ Address: _____

City, State, Zip: _____

Dates: _____ /_____ /_____ to _____ /_____ /_____ Address: _____

City, State, Zip: _____

Dates: _____ /_____ /_____ to _____ /_____ /_____ Address: _____

You may attach additional sheet(s) if needed. City, State, Zip: _____

To be completed by non-resident bidders — Part C

1. Name of home state or foreign country reported to the Iowa Secretary of State:

_____

2. Does your company's home state or foreign country offer preferences to resident bidders, resident labor force preferences or any other type of preference to bidders or laborers? ☐ Yes ☐ No

3. If you answered "Yes" to question 2, identify each preference offered by your company's home state or foreign country and the appropriate legal citation.

_____

_____

You may attach additional sheet(s) if needed.

To be completed by all bidders — Part D

I certify that the statements made on this document are true and complete to the best of my knowledge and I know that my failure to provide accurate and truthful information may be a reason to reject my bid.

Firm Name: _____

Signature: _____ Date: _____

You must submit the completed form to the governmental body requesting bids per 875 Iowa Administrative Code Chapter 156. This form has been approved by the Iowa Labor Commissioner.

Worksheet: Authorization to Transact Business

This worksheet may be used to help complete Part A of the Resident Bidder Status form. If at least one of the following describes your business, you are authorized to transact business in Iowa.

☐ Yes ☐ No My business is currently registered as a contractor with the Iowa Division of Labor.

☐ Yes ☐ No My business is a sole proprietorship and I am an Iowa resident for Iowa income tax purposes.

☐ Yes ☐ No My business is a general partnership or joint venture. More than 50 percent of the general partners or joint venture parties are residents of Iowa for Iowa income tax purposes.

☐ Yes ☐ No My business is an active corporation with the Iowa Secretary of State and has paid all fees required by the Secretary of State, has filed its most recent biennial report, and has not filed articles of dissolution.

☐ Yes ☐ No My business is a corporation whose articles of incorporation are filed in a state other than Iowa, the corporation has received a certificate of authority from the Iowa secretary of state, has filed its most recent biennial report with the secretary of state, and has neither received a certificate of withdrawal from the secretary of state nor had its authority revoked.

☐ Yes ☐ No My business is a limited liability partnership which has filed a statement of qualification in this state and the statement has not been canceled.

☐ Yes ☐ No My business is a limited liability partnership which has filed a statement of qualification in a state other than Iowa, has filed a statement of foreign qualification in Iowa and a statement of cancellation has not been filed.

☐ Yes ☐ No My business is a limited partnership or limited liability limited partnership which has filed a certificate of limited partnership in this state, and has not filed a statement of termination.

☐ Yes ☐ No My business is a limited partnership or a limited liability limited partnership whose certificate of limited partnership is filed in a state other than Iowa, the limited partnership or limited liability limited partnership has received notification from the Iowa secretary of state that the application for certificate of authority has been approved and no notice of cancellation has been filed by the limited partnership or the limited liability limited partnership.

☐ Yes ☐ No My business is a limited liability company whose certificate of organization is filed in Iowa and has not filed a statement of termination.

☐ Yes ☐ No My business is a limited liability company whose certificate of organization is filed in a state other than Iowa, has received a certificate of authority to transact business in Iowa and the certificate has not been revoked or canceled.

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SECTION 00 41 26.2
CERTIFICATE OF COMPLIANCE

SUBMIT WITH BID IN BID SECURITY ENVELOPE

Certification of Compliance with Iowa Code Section 692A.113

_____ certifies that the company listed below is not owned, managed or operated by a person that is a sex offender who has committed a sex offense against a minor.

Company: _____

Signature: _____

Title: _____

Date: _____

The portion of this form below shall be completed within ten (10) days of the execution of the Agreement or 10 days prior any employees or subcontract employees are on the Project site.

The company further certifies that as required by Iowa Code Section 692A.113, as added by Section 13 of S.F. 340, 2009 General Assembly the following employees or subcontractor employees are not registered sex offenders:

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

_____ ____ _____

END OF SECTION

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SECTION 00 52 00
AGREEMENT FORM

PART 1 GENERAL

1.1 FORM OF AGREEMENT: AIA A132-2019 STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, CONSTRUCTION MANAGER AS ADVISER EDITION

1.2 THE AGREEMENT TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.

1.3 RELATED REQUIREMENTS

A. Section 00 62 00 – AIA A132-2019 Exhibit A “Insurance and Bonds”

B. Section 00 72 00 - General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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AIA® Document A132® – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the day of in the year
(In words, indicate day, month, and year.)

BETWEEN the Owner:
(Name, legal status, address, and other information)

Fairfield Community School District
403 S. 20th St.
Fairfield, IA 52556

and the Contractor:
(Name, legal status, address, and other information)

Telephone Number:

for the following Project:
(Name, location, and detailed description)

Middle School Classroom Addition Project
404 W Fillmore Avenue
Fairfield, IA 52556

The Construction Manager:
(Name, legal status, address, and other information)

Carl A. Nelson & Company
1815 Des Moines Avenue
Burlington, IA 52601
Telephone Number: (319) 754-8415

The Architect:
(Name, legal status, address, and other information)

FEH Design
951 Main St.
Dubuque, IA 52001
Telephone Number:

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

AIA Document A232™–2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. The Work of this Contract is as follows as defined in the Contract Documents:

Bid Package No. __ – _____

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date set forth in the Notice to Proceed, unless otherwise approved by the Owner. If the Notice to Proceed does not specify a date of commencement of the Work, the Work shall commence no later than ten (10) days after the Notice to Proceed is issued, unless otherwise approved by the Owner.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion and Final Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the date of Substantial Completion of the Work of all of the Contractors for the Project will be:
(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

October 6, 2026

Final Completion of the entire Work shall be achieved within sixty (60) days of Substantial Completion.

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents and if different from the

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Substantial Completion date outlined in Section 3.3.1, if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:

(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

[ ] By the following date:

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be a Stipulated Sum, in accordance with Section 4.2 below.

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

§ 4.2.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2.2 The Stipulated Sum is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.2.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price

§ 4.2.4 Unit prices, if any:

(Identify the item and state the unit price, and quantity limitations, if any, to which the unit price will be applicable.)

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Item	Units and Limitations	Price per Unit ($0.00)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager at least fourteen (14) days before the next regularly scheduled meeting of the School Board, the Owner shall pay the certified amount to the Contractor not later than two weeks after approval by the School Board. If an Application for Payment is received by the Construction Manager after the application date fixed above, the Owner shall pay the certified amount not later than two (2) weeks after the next regularly scheduled meeting of the School Board held after the Construction Manager receives the Application for Payment or within thirty (30) days of receipt by the Owner for recommended approval, whichever is earlier.

§ 5.1.4 Progress Payments

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment. Preferred forms are AIA Form G732-2019 and G703-1992.

§ 5.1.4.2 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.4.3 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.4.3.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and
- **.5** Retainage withheld pursuant to Section 5.1.5.

§ 5.1.5 Retainage

The Owner shall withhold up to three percent (3%) of each progress payment made to Contractor under Section 5.1.4 in accordance with Iowa Code Chapter 573.

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§ 5.2 Final Payment

§ 5.2.1 The Owner shall pay the entire unpaid balance of the Contract Sum to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's Final Payment to the Contractor shall be made no earlier than thirty-one (31) days following approval and final acceptance of the Project by the Board of Directors (Owner) upon receipt and review of the Construction Manager's and/or Architect's final Certificate for Payment and recommendation for Final Acceptance. Final Payment may be contingent upon receipt of all lien waivers/Chapter 573 claim releases and other closeout documents and shall be subject to the conditions of and shall be paid in accordance with the provisions of Iowa Code Chapter 573 and Iowa Code Chapter 26**.**

§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at a rate equal to the rate specified by rule pursuant to Iowa Code Section 74A.2 or Iowa Code Section 573.14, whichever is less.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232–2019, unless otherwise mutually agreed upon by the parties.

§ 6.2 Binding Dispute Resolution

Any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:(Check the appropriate box.)

[**X**] Litigation in a court of competent jurisdiction.

In the event the Owner should prevail in any legal action arising out of the performance or non-performance of this Agreement, the Contractor shall pay, in addition to any damages, all expenses of such action including reasonable attorney's fees, all expert witness fees, costs, and litigation expenses incurred by the Owner, including those incurred on appeal. The term "legal action" shall be deemed to include any arbitration, administrative proceedings, and all actions at law or in equity, including appeals.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232–2019. For the avoidance of doubt, if the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, no termination fee shall be owed to the Contractor by the Owner.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

Zach Wiggle, Superintendent
Fairfield Community School District
403 S 20th Street, Fairfield, IA 52556
Phone: 319-520-8082
Email:zach.wigle@fairfieldsfuture.org

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§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

Telephone Number:
Email:

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and/or elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™–2019, Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Intentionally left blank

§ 8.7 Relationship of the Parties

The Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's best skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in a reasonably expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

§ 8.8 Other provisions:

The Contractor shall not be owned, operated, or managed by a registered sex offender who has been convicted of a sex offense against a minor in accordance with Iowa Code 692A.113. In addition, the Contractor shall not permit an employee, Subcontractor (Company) owned, operated, or managed by, or Subcontractor employee who is a registered sex offender convicted of a sex offense against a minor on real property of the Owner in accordance with Iowa Code 692A.113. The Contractor shall further acknowledge and certify by signing this Agreement that services provided under this Contract comply with Iowa Code 692A.113.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

.2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit

.3 AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

.4 Performance and Payment Bonds in one hundred percent (100%) of the Contract Amount.

.5 Drawings

Per the Drawing Index in ~~on Drawing~~ Specification Section 00 01 15

.6 Specifications

Per the Table of Contents in Specification Section- 00 01 10

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.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[ ] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:
(Insert the date of the E235-2019 incorporated into this Agreement.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement is entered into as of the day and year first written above.

OWNER_____	**CONTRACTOR**_____
OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
(Printed name and title)	*(Printed name and title)*

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OFF-SITE STORAGE AGREEMENT

Made this _____ day of _____ in the year _____.

Between the Owner:_____
(Name and Address)

and the Contractor:_____
(Name and Address)

the Project:_____
(Name, Address and Project Number)

The Owner and the Contractor understand and agree that a portion of the Total Completed and Stored To Date shown on Application for Payment No. _____ represents an amount for material and/or equipment to be furnished and installed under their Agreement dated _____, and that this material and/or equipment is to be stored at a location other than the site, as follows and under the following conditions:

_____
(Description of storage location and address)

_____
(Detailed description of material or equipment)

_____
(Detailed description of material or equipment continued)

_____
(Detailed description of material or equipment continued)

1. Materials and/or equipment stored at the above location shall be plainly tagged or marked by the Contractor as Property of:

_____
(Owner)

2. Title to stored materials and/or equipment shall pass to the Owner no later than the time of payment of the referenced Application for Payment.

3. Such materials shall be separately located and segregated by the Contractor from other materials at the place of storage. Photos of the stored materials and/or equipment shall be attached to this agreement by the Contractor.

4. Invoice(s) from your source for such materials and/or equipment to be stored shall be attached to this agreement

5. Such materials and/or equipment shall be kept free of any liens or encumbrances by the Contractor, and shall be kept adequately insured against loss to the Owner by theft, fire, or other casualty at the expense of the Contractor, and proof of such insurance shall be attached to this agreement.

6. Such material and/or equipment shall be stored as herein provided and moved to the site without delaying the Work and without expense to the Owner.

_____ Date:_____
(Contractor)

_____ Date:_____
(Owner)

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SECTION 00 62 00
EXHIBIT A, "INSURANCE AND BONDS" COVER

PART 1 GENERAL

1.1 INSURANCE AND BONDS: AIA DOCUMENT A132 – 2019 EXHIBIT A, "INSURANCE AND BONDS

1.2 THE REQUIREMENTS FOR INSURANCE AND BONDS TO BE EXECUTED ARE ATTACHED FOLLOWING THIS PAGE.

1.3 RELATED REQUIREMENTS

A. Section 00 52 00 - AIA A132-2019 Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

B. Section 00 72 00 - General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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AIA® Document A132® – 2019 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month, and year.)

for the following **PROJECT**:
(Name and location or address)

Middle School Classroom Addition Project
404 W Fillmore Ave
Fairfield, IA 52556

THE OWNER:
(Name, legal status, and address)

Fairfield Community School District
403 S. 20th St.
Fairfield, IA 52556

THE CONTRACTOR:
(Name, legal status, and address)

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A232™–2019, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a certificate evidencing the property insurance policy or policies required by Section A.2.3.

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A232™–2019, General Conditions of the Contract for Construction. Article 11 of A232™–2019 contains additional insurance provisions

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§ A.2.2 Liability Insurance

The Owner may purchase and maintain general liability insurance on terms and in limits determined by the Owner.

§ A.2.3 Required Property Insurance

§ A.2.3.1 The Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis, with the exception that the Policy may contain sub-limits that are less than the replacement cost of the entire project at the time of loss. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees. The Owner's property insurance shall only cover portions of the Work installed or stored on the site. All portions of the Work off-site shall be covered by the Contractor's insurance policies. The Contractor shall furnish an "Installation Floater" as a part of their insurance coverage, which shall cover materials destined for the jobsite or stored or in fabrication off site.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. The Owner shall be responsible for any losses that exceed sub-limits, if any.

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's, Construction Manager's, and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. ~~The Owner shall be responsible for any losses that exceed sub-limits, if any.~~

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Party that is the primary cause of a Builder's Risk Policy claim shall be responsible for any deductible amounts or self-insured retentions payments. If no Party is the primary cause of a claim, then the Owner shall be responsible for the deductible amounts or self-insured retentions payments. Except for deductible or self-insured retentions on flood, wind, hail and/or earthquake, the deductible or self-insured retentions on the Builder's Risk Policy shall not exceed $25,000 per claim.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance.

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The Contractor shall provide a certificate of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. The Certificates of Insurance shall be issued on AIA Document G705, Accord Form 25-S current form, or a form that provides, in a similar manner, the same information. Two identical certificates of insurance are required to be submitted to the following certificate holders:

Owner:
Fairfield Community School District
403 S. 20th St.
Fairfield, IA 52556
Attn: Zach Wiggle

Construction Manager:
Carl A. Nelson & Company
1815 Des Moines Avenue
Burlington, IA 52601
Attn: Nick Liston

The Contractor and their insurance carrier must fully disclose, in writing, along with the submission of their Certificates of Insurance, any and all judgments which have been, are in the process of pending claims filed, or knowledge of any or all potential claims which may, will be or already have reduced the available limits of coverage to be afforded and extended to the Owner. The Contractor will be responsible for purchasing additional coverage in order to provide the Owner with the insurance coverages as required. These certificates and the insurance policies required by this Article A.3 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner and others as required in Section A.3.1.3 as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self- insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability, excess or umbrella liability and pollution liability coverage to include (1) the Owner, the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the additional insured's liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance or required by law, whichever coverage is greater from an insurance company or insurance companies that has a current A.M. Best Rating of A-VI or better and is lawfully authorized to issue insurance in the jurisdiction where the Project is located. Such insurance shall protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. All policies must include a waiver of subrogation clause. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's

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completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

All liability policies except Worker's Comp shall be endorsed as follows: "The insurance company and the insured expressly agree and state that the purchase of this policy of insurance by the insured does not waive any of the defense of governmental immunity available to the insured under Iowa Code section 670.4 as it now exists or may be amended from time to time. The company and the insured further agree that this policy of insurance shall cover only its claims not subject to the defense of governmental immunity under Iowa Code section 670.4 as it now exists or may be amended from time to time" The certificate of insurance relating to all liability coverages shall state: "The insurance company and the insured expressly agree and state that granting additional insured status on this policy of insurance does not waive any of the defense of governmental immunity available to the School District OR Owner under Iowa Code chapter 670 as it now exists or may be amended from time to time".

§ A.3.2.1.1 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than «Five Million and No/100 Dollars» ($ «5,000,000») each occurrence, «Five Million and No/100 Dollars» ($«5,000,000») general aggregate, and «Five Million and No/100 Dollars» ($ «5,000,000») aggregate for products-completed operations hazard, providing coverage for claims including

- **.1** damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- **.2** personal injury and advertising injury;
- **.3** damages, other than to the Work itself, because of physical damage to or destruction of tangible property, including the loss of use of such property;
- **.4** bodily injury or property damage arising out of completed operations; and
- **.5** the Contractor's indemnity obligations under Section 3.18 of the General Conditions.
- **.6** The General Liability policy shall have the Designated Construction Project General Aggregate Limit endorsement attached – ISO form CG 2503 or its equivalent.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- **.1** Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- **.2** Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- **.3** Claims for bodily injury other than to employees of the insured.
- **.4** Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- **.5** Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- **.6** Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- **.7** Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- **.8** Claims related to roofing, if the Work involves roofing.
- **.9** Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.

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.10 Claims related to earth subsidence or movement, where the Work involves such hazards.

.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than «Three ~~Five~~ Million and No/100 Dollars» ($ ~~«5~~3,000,000~~»~~) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage. Automobile Liability insurance must include Contractual Liability.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Employer's Liability, Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation shall meet State of Iowa statutory limits. The Contractor's workers compensation policy must include form WC 000313, Waiver of Our Right to Recover from Others in favor of the Owner, the Architect and the Architect's consultants, and the Construction Manager and the Construction Manager's consultants.

§ A.3.2.6 Employers' Liability with policy limits not less than ~~«~~One Million and No/100 Dollars~~»~~ ($ ~~«~~1,000,000~~»~~) each accident, ~~«~~One Million and No/100 Dollars~~»~~ ($ ~~«~~1,000,000~~»~~) each employee, and ~~«~~One Million and No/100 Dollars~~»~~ ($ ~~«~~1,000,000~~»~~) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than ~~«~~One Million and No/100 Dollars~~»~~ ($ ~~«~~1,000,000~~»~~) per claim and ~~«~~One Million and No/100 Dollars~~»~~ ($ ~~«~~1,000,000~~»~~) in the aggregate with a deductible not to exceed Fifty Thousand Dollars ($50,000). The Professional Liability shall include prior acts coverage sufficient to cover all services rendered by Contractor. This coverage shall be continued in effect for the statute of repose duration in the state where the project is located. ~~-~~

§ A.3.2.9 If the Work of a specific Contractor involves the abatement, removal, disposal, transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than ~~«~~Two Million and No/100 Dollars~~»~~ ($ ~~«~~2,000,000~~»~~) per claim and ~~«~~Two Million and No/100 Dollars~~»~~ ($ ~~«~~2,000,000~~»~~)) in the aggregate.

~~**§ A.3.2.10** Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than «Two Million and No/100 Dollars» ($ «2,000,000») per claim and «Two Million and No/100 Dollars» ($ «2,000,000») in the aggregate.~~

§ A.3.3 Performance Bond and Payment Bond

The Contractor shall provide surety bonds covering faithful performance of the Contract and payment of obligations arising thereunder, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Performance Bond	~~«~~For the amount of 100% of the Contract Amount~~»~~
Payment Bond	~~«~~For the amount of 100% of the Contract Amount~~»~~

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Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement and shall be accompanied by a certified and current power of attorney for the attorney-in-fact, who executes the required bonds.

The cost of the bonds shall be included in the Contract Sum.

The surety providing bonds must have an (A-) A.M. Best rating or better or be listed on the U.S. Department of Treasury listing of approved sureties (Department Circular 570).

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:



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SECTION 00 72 00
GENERAL CONDITIONS

PART 1 GENERAL

1.1 FORM OF GENERAL CONDITIONS: AIA A232-2019 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER AS ADVISER EDITION.

1.2 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

1.3 RELATED REQUIREMENTS

A. Section 00 52 00 - AIA A132-2019 Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

B. Section 00 62 00 – AIA A132-2019 Exhibit A “Insurance and Bonds”

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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AIA® Document A232® – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:
(Name, and location or address)

Middle School Classroom Addition Project
404 W Fillmore Ave
Fairfield, IA 52556

THE CONSTRUCTION MANAGER:
(Name, legal status, and address)

Carl A. Nelson & Company
1815 Des Moines Avenue
Burlington, IA 52601
Telephone Number: (319) 754-8415

THE OWNER:
(Name, legal status, and address)

Fairfield Community School District
403 S. 20th St.
Fairfield, IA 52556

THE ARCHITECT:
(Name, legal status, and address)

FEH Design
951 Main St
Dubuque, IA 52001
Telephone Number:

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1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT AND CONSTRUCTION MANAGER

5 SUBCONTRACTORS

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

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9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. The Contract Documents also include the bidding requirements (advertisement or invitation to bid and Instruction to Bidders). Unless specifically enumerated in the agreements, the Contract Documents do not include sample forms and the Contractor's Bid.

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

§ 1.1.2.1 The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Construction Manager or Architect shall identify such unsigned Documents. No Contract shall be formed between the parties until all Contract Documents are executed by both parties.

§ 1.1.3 The Work. The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 Contractors. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 Separate Contractors. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 The Drawings. The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.8 The Specifications. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.9 Instruments of Service. Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.10 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not be liable for results of interpretations or decisions rendered in good faith.

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§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results in proper operating condition.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. In case of disputes over words and abbreviations which have well known or trade meanings, Architect's interpretation of terms shall be final. In case of Work or materials that are specified in the Contract Documents to be provided or supplied by more than one Contractor, each such Contractor shall be deemed to have included the Work and the Construction Manager shall determine who shall furnish Work and who shall submit a credit to Owner for the Work. For the avoidance of doubt, the following terms shall have the meaning assigned to them:

- **.1** Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- **.2** Provide, Furnish or Produce: To supply, plus install complete in place, tested and approved.
- **.3** Supply: To supply and deliver, unload, inspect for damage.
- **.4** Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, test and ready for use.
- **.5** The terms "approved," "required," and "as directed" refer to and indicate the work or materials that may be approved, required, or directed by the Architect acting as the Owner's representative.
- **.6** The terms "shown," "indicated," "noted," "scheduled," and terms of similar import, refer to requirements contained in the Contract Documents.
- **.7** The term "Trade Contractor" used in the Contract Documents shall mean Contractor.

§ 1.2.4 In the case of an inconsistency between Drawings and Specifications, or within either Document itself, not clarified by Addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. In any case of discrepancy, the facts are to be brought to the attention of the Architect for a decision or interpretation.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.4.1 In the event of conflict or discrepancies among the various provisions of the Contract Documents, the terms shall be interpreted in the following order of propriety:

- .1 Modifications to the Contract;
- .2 The Contract;
- .3 Supplementary Conditions;
- .4 General Conditions;

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.5 Drawings and Specifications.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Construction Documents, regardless of the media or format, as instruments of service, are the property of the ~~Owner~~Architect, whether the work for which they are made is executed or not. The Owner reserves the right to use the Construction Documents developed for the Project in such manner as the Owner may desire, subject to the provisions herein. The Owner shall not use or alter the Construction Documents without first notifying the Architect of its intended use or alteration of the Construction Documents. If Owner uses or alters the Construction Documents, it shall be at the Owner's sole risk and without liability or legal exposure of any type or kind to the Architect. Nothing contained herein shall be construed as in derogation of the Architect's copyrights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party listed in the Contract and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party listed in the Contract by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties may use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, or some other agreed upon document or form, to establish the protocols for the development, use, transmission, and exchange of digital data.

ARTICLE 2 OWNER

§ 2.1 General

The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Construction Manager and the Architect do not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.2 Intentionally Left Blank

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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§ 2.3.3 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site; provided the same are in the possession and control of Owner or can be obtained without unreasonable expense. The Contractor shall compare information furnished by the Owner (including surveys and soil tests with observable physical conditions) and the Contract Documents and on the basis of such review, shall report to the Owner and Architect any conflicts, errors or omissions. Contractor shall be responsible for any additional costs, delays and damages resulting from the Contractor's failure to immediately report any such errors, inconsistencies or omissions.

§ 2.3.6 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services; provided such information or services can be furnished without unreasonable expense to the Owner.

§ 2.3.7 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. Additional sets requested by the Contractor will be furnished by Owner at Contractor's expense, including costs incurred by the Owner related to reproduction, postage, and handling.

§ 2.3.8 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seventy-two (72) hours after receipt of notice from the Owner or such shorter times as may be reasonable under the Circumstances to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect or it may notify the surety and request it to assume the obligations of the Contractor within seventy-two (72) hours following receipt by Contractor and/or surety of written notice. In such case an appropriate Change Order or Construction Change Directive shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services and any attorney's fees made necessary by such default, neglect or failure. If current or future payments thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work strictly in accordance with the Contract Documents.

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§ 3.1.2.1 The Contractor shall supervise and direct the Work in an excellent and workmanlike manner, complete the work and everything properly incidental thereto as stated in the Project Manual and Drawings or reasonably implied therefrom and otherwise in accordance with Contract Documents. In no case shall the Contractor proceed with any portion of the Work in any uncertainty.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor. The Contractor waives any rights, claims, or causes of action against Owner as a result of activities or duties of the Architect in the Architect's administration of the Contract or representations made by the Architect in the Instruments of Service. The Contractor acknowledges any such rights, claims, or causes of action accrue against the Architect and Contractor may seek redress from Architect in the event that becomes necessary.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. The Contractor also represents that all Contract Documents for the Project have been examined; including those intended for work of trades not normally performed by the Contractor's own forces, and that it has become thoroughly familiar with all conditions which may pertain to or affect the Work under the Contract.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, including the ordering of any materials, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. No extra charge or compensation will be allowed to the Contractor on account of differences between actual dimensions and the measurements shown on the Drawings. All the component parts of the Work shall be carefully checked and laid out in order that the structure as a whole shall conform to the intent of the Contract Documents. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents. Any costs associated with Contractor's failure to immediately notify the Architect and the Owner of items listed above in writing shall be borne by the Contractor.

§ 3.2.3 The Contractor must make frequent inspections during the progress of the Work to confirm that Work previously performed by the Contractor is in compliance with the Contract Documents and applicable laws and regulations bearing on the performance of the Work and Referenced Standards and that portion of Work previously performed by the Contractor or by others are in proper condition to receive subsequent Work.

§ 3.2.4 If the Contractor believes that any portions of the Contract Documents do not comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, or any orders by code enforcement officials or the Owner or its designees acting in the capacity of building code inspectors or Referenced Standards, the Contractor must promptly notify the Owner, Construction Manager and the Architect of the non-compliance as provided in Section 3.2.6 and request direction before proceeding with the affected Work.

§ 3.2.5 The Contractor must promptly notify the Owner, Construction Manager and the Architect in writing of any apparent errors, inconsistencies, omissions, ambiguities, construction impracticalities or code violations discovered as a result of the Contractor's review of the Contract Documents including any differences between actual and indicated dimensions, locations and descriptions, and must give the Owner, Construction Manager and the Architect timely notice in writing of same and of any corrections, clarifications, additional Drawings or Specifications, or other information required to define the Work in greater detail or to permit the proper progress of the Work. The Contractor must provide similar notice with respect to any variance between its review of the Site and physical data and Site conditions observed.

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§ 3.2.6 If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered by the review required by Section 3.2, without prompt written notice to the Owner, Construction Manager and the Architect and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all claims relating thereafter are specifically waived.

§ 3.2.7 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.8 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Construction Manager and/or Architect for evaluating and responding to the Contractor's requests for information where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor acknowledges that it is the Contractor's responsibility to hire all personnel for the proper and diligent prosecution of the Work and the Contractor shall use its best efforts to maintain labor peace for the duration of the Project. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract Sum or extension of contract time.

§ 3.3.5 The Contractor shall follow all manufacturer's printed instructions covering details of installation where not in conflict with the Specifications. If there is a conflict between the manufacturer's printed instructions and the Plans and Specifications, the Contractor shall notify the Architect of the discrepancy and obtain the Architect's direction before proceeding with installation.

§ 3.3.6 Unless otherwise specified in the Specifications or by the Architect in writing to the Contractor, the Contractor shall order all materials in the maximum stock sizes available that conform with standard good practice of the trade.

§ 3.3.7 The Owner reserves the right to retain ownership of any materials or equipment that are a part of the existing facility. If material or equipment is to be removed from the site, the Contractor shall detach such items and before removing from site,

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obtain permission from the Owner, or his designee, to do so. All items not retained by Owner shall be removed and disposed of in a proper manner by the Contractor.

§ 3.3.8 Completed Work shall be left plumb, level, true to line or plane and anchored securely in place free from damage.

§ 3.3.9 The Contractor shall submit to the Owner's Authorized Contract Representative before construction begins one copy of Safety Data Sheets of hazardous substances to be stored on the Owner's premises or incorporated in the performance of this contract. The Contractor shall also keep Safety Data Sheets posted at the work site for all substances while these substances are on the Owner's premises. Hazardous substances shall be any substance which is covered by Iowa Law (Right to Know Rules). It is the Contractor's responsibility to obtain copies of the Safety Data Sheets and the Hazardous Communication Program which lists and describes hazardous substances stored on the Owner's premises and inform their employees of the potential exposure. This information is available in the administrative office of each building. Further details may be obtained from the Owner's Authorized Contract Representative.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Work required by the Contract Documents to be performed outside "normal" working hours or work the Contractor elects to perform outside "normal" working hours shall be completed at no additional cost to the Owner. If the Contractor elects to perform work outside the work hours established by the Construction Manager for the Contractor's convenience, the Contractor shall reimburse the Owner for any additional Architect or Construction Manager or other staffing costs incurred by the Owner. Any work outside the work hours established by the Construction Manager shall be scheduled with the Construction Manager two weeks in advance of the work taking place.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 After the Contract has been executed, the Owner, Construction Manager and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

.1 Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

.2 Represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

.3 Certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architects redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent;

.4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects; and

.5 Agrees to compensate the Architect for any redesign fees or costs necessitated by and associated with the product substitution.

§ 3.4.2.2 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect or Architect's Consultants, to evaluate the Contractor's proposed substitutions and to make agreed upon changes in the Contract Documents made necessary by the Owner's acceptance of such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. Persons permitted to perform Work under Contractor or any Subcontractor or Sub-Subcontractor shall meet all employment eligibility, safety training, security or drug/alcohol testing requirements required by law or by Owner. Any person not complying with all such requirements shall be immediately removed from the site.

§ 3.4.3.1 The Contractor shall be responsible for conducting a criminal background check and a check of the Iowa Sex Offender Registry as to all persons working on Owner property or in Owner buildings. This includes all employees of the Contractor or

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any sub-contractor, all Independent Contractors, Casual Laborers, Workers obtained through Union Halls or Hiring Halls, and all other individuals present on Owner property at any time during the performance of the Contract. No person shall be permitted to work on Owner property if on the Sex Offender Registry as a result of a conviction of a crime against a minor. The Contractor will notify the Owner in advance for any proposed Contractor employee with a felony conviction and such person will not be placed on-site without prior Owner approval. The Contractor must have records available for the Owner to inspect upon request to verify that background/sex offender checks have been performed as required herein. The Owner reserves the right to order the Contractor to remove any person from the Owner's Work who the Owner determines to be a threat to safety of students, Owner employees, other workers, parents, visitors, or otherwise. All workers must follow Owner regulations and rules as to building access and security.

§ 3.4.3.2 The Contractor, and those working under their jurisdiction, shall be licensed to perform business in the State of Iowa and provide a copy of their Iowa Workforce Development Division of Labor Services Contractor Registration, conform to local labor laws of the State of Iowa and all other laws, ordinances and legal requirements affecting the Work.

§ 3.4.3.3 Contractor shall strictly abide by all laws relating to employment eligibility verifications and shall employ only persons who are legally able to work.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. The Contractor further warrants that the workmanship will comply with all applicable laws, building codes, rules and regulations. Work, materials, or equipment not conforming to these requirements may be considered defective. If requested by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 The Contractor's general warranty and any additional or special warranties are not limited by the Contractor's obligations to specifically correct defective or nonconforming Work as provided in Article 12, or are they limited by any other remedies provided in the Contract Documents. The Contractor shall also be liable for any damage to property or persons (including death) including consequential and direct damages relating to any breach of the Contractor's general warranty or any additional or special warranties required by the Contract Documents.

§ 3.5.3 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4. The Owner may require additional special warranties in connection with approval of "Or-Equals" or Substitutions, Allowance items, Work that is defective or nonconforming, or the acceptance of nonconforming Work pursuant to Article 12. In the case of work performed by Subcontractors and where warranties are required, the Contractor shall secure warranties from said Subcontractors addressed to and in favor of the Owner. The Contractor shall deliver copies of same to Architect through the Construction Manager upon completion of work. Delivery of said warranties shall not relieve the Contractor from any obligations assumed under any other provision of Contract.

§ 3.6 Taxes

At the time this Agreement is issued, the Owner will issue an "Exemption Authorization Letter" and a "Designated Exemption Entity, Iowa Construction Sales Tax Exemption Certificate" for the purchase or use of building materials, supplies for this Project to the extent permitted by law. Other requirements with respect to this provision are set forth within the Project Manual.

§ 3.6.1 Bidders shall be responsible for informing themselves of tax laws, requirements, regulations, and interpretations as they apply to this Project.

§ 3.6.2 The Contractor shall not include in the bid State of Iowa and Local Option Sales and Use Tax for building materials that will be incorporated into real property for this project. Each Bid Package Contractor shall provide a list of Subcontractors and Sub-subcontractors with their federal Identification Number to the Owner. The Owner will issue exemption certificates to Contractors, Subcontractors, and Sub-subcontractors in order to eliminate tax from the construction materials following award of contract. If material is purchased outside the State of Iowa and the other states requires that the Contractors, Subcontractors,

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and Sub-subcontractors and suppliers to pay sales tax, they are recommended to include this price in their bid unless they are able to obtain a sales tax refund from said state.

§ 3.6.3 The Contractor shall submit required sales tax exemption information within ten (10) days of the date of the Agreement between Owner and Contractor.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 Unless otherwise -specified in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 The Contractor shall take note and comply with all governing laws, rules and regulations affecting the performance of the Work. This may include such laws, rules and regulations as: (1) Licensing of Contractors for special requirements, e.g. hazardous waste removal; (2) Requirements for special construction permits; (3) Exemption from sales tax, if applicable; (4) Wage rates and employment requirements when required by law or by Owner; (5) Local labor requirements; and (6) Non-discriminatory hiring practices. Contractor shall participate in all equal employment opportunity programs applicable to the Project. If the Contractor, or any of its Subcontractors, performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume complete responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than fourteen (14) days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.7.6 The Contractor is responsible for scheduling inspections related to the performance of its Work and ensuring Work is complete for inspections. Any costs associated with re-inspection caused by irregularities, deficiencies or non-conforming Work will be borne by the responsible contractor including compensation for the Architect's, Architect's Consultant's and Construction Manager's Additional Services related to evaluation of the problem and development of an acceptable solution.

§ 3.7.7 The State of Iowa, its agencies, and its political subdivisions, including cities, school districts, and public utilities are required by Iowa Code 73A.21 to require a reciprocal resident bidder and resident labor force preference. If the Contractor is a non-resident bidder, the Contractor is required to specify in the bid and the Agreement between the Owner and Contractor whether any preference is in effect in the nonresident bidder's state or country at the time of this bid and identify the source of the regulations.

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§ 3.7.8 Compliance with Law Provision: the Contractor agrees that it will comply with all applicable Federal, State and local laws, statutes, codes, rules, and regulations having jurisdiction over Contractor's performance of the Work for the Project. Contractor shall take all necessary precautions to keep the site and work in compliance with the safety and health regulations for construction issued by the Bureau of Labor Standards of the U.S. Department of Labor as well as the Occupational Safety and Health Standards, as amended and as enforced by the State of Iowa.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site at all times during performance of the Work, including work of the Contractor's subcontractors. Any change in superintendent personnel must be approved by the Owner in writing. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Other communications shall be similarly confirmed on written request in each case. The approved superintendent will work in this position until completion of the Work unless they shall no longer be in the Contractor's employ or is released at the request of the Architect, Construction Manager and/or Owner. Any change in superintendent or necessary assistants must be approved by Owner in writing.

§ 3.9.2 The Contractor, as soon as practicable (but no later than ten (10) days) after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of the proposed superintendent and key personnel in regular attendance at the Project site. Within fourteen (14) days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ the proposed superintendent or other key personnel to whom the Owner, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.9.4 The superintendent or superintendents shall be thoroughly competent with full experience in all phases of the Work to be performed under this Contract. Anyone not deemed capable of directing all trades involved in the Work shall be replaced or supplemented immediately upon request, by someone who is satisfactory. After a satisfactory superintendent has been assigned, they shall not be withdrawn without the consent of the Construction Manager, Architect and/or Owner.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly (but no more than fourteen (14) days) after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in refining the Project schedule, a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment

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of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised monthly or as otherwise requested by the Owner, Construction Manager, or Architect. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors. Each monthly update of the schedule shall include a narrative including:

.1 A description of the status of the schedule;
.2 A discussion of current and anticipated delays;
.3 A discussion of progress of critical path activities;
.4 A discussion of the critical path for the remainder of the Project; and
.5 A listing and discussion of logic changes and duration changes.

§ 3.10.2 The Contractor, promptly (but no more than fourteen (14) days) after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. The Contractor shall display a current Project schedule at the site for reference and reliance by the Owner, Architect and Construction Manager. These shall be available to the Construction Manager, Architect, and Owner, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data, and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

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§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors. The Contractor must provide the Owner, Architect and Construction Manager with copies of all submittals made to regulatory agencies.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and approved by the Architect. The Contractor must correct at its cost, and without any adjustment in Contract Time, any Work the correction of which is required due to the Contractor's failure to obtain approval of a submittal required to have been obtained prior to proceeding with the Work, including, but not limited to, correction of any conflicts in the Work resulting from such failure.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Construction Manager and Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Construction Manager and Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to reasonably rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner, the Architect, and the Construction Manager shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Construction Manager and

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Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Architect's and Construction Manager's review of the Contractor's submittals will be limited to examination of an initial submittal plus one re-submittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid the Architect and/or Construction Manager for evaluation of additional re-submittals.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, Owner's written directives and policies, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.13.3 Contractor shall perform the Work so as to cause a minimum of inconvenience to and interruption of the Owner's operations. Any and all interruptions of the operations of the Owner necessary for the performance of the Work shall be noted in the progress schedule and the Contractor shall additionally give the Owner one week advance notice, through communication with the Construction Manager, of such interruption as to allow the Owner to adjust operations accordingly. Contractor's failure to give the Owner timely notice of such intentions shall place the responsibility of any resulting delays or additional costs solely with the Contractor.

§ 3.13.4 Except as may be specifically provided in the Contract Documents, the Contractor shall provide all necessary temporary facilities, including power, water, sanitation, scaffolding, storage, and security. If Owner makes any such facilities available to Contractor, it is without representation or warranty as to their adequacy for Contractor's use and Contractor shall indemnify, defend, and hold Owner harmless from and against any claims arising out of Contractor's use of such facilities.

§ 3.13.5 The Contractor shall not bring or permit any Subcontractor, supplier or anyone else for whom the Contractor is responsible, to bring on the site any asbestos, PCB's petroleum, hazardous waste or radioactive materials (except for proper use in performing the Work).

§ 3.13.6 The Contractor shall return all improvements on, or about the site, streets, and adjacent properties which are not indicated to be altered, removed, or otherwise changed, to the conditions which existed prior to start of Work. The Contractor shall protect existing structures or other features from damage by any of Contractor's operations on the site.

§ 3.13.7 Before making any shipments of materials or equipment to the project site, the Contractor shall ascertain that the project site is in a condition to receive the shipment. If materials or equipment should be delivered to the project site and the project site is not in condition to receive the materials or equipment, the materials or equipment shall be removed from the project site and properly stored off-site at the expense of the Contractor or its Subcontractor. All deliveries shall be coordinated through the Construction Manager. The Construction Manager will not provide any labor or equipment to unload deliveries for any Contractor or its Subcontractors.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. Contractors shall be responsible for cutting and patching not specifically indicated on the drawings but required for completion of their Work. Cutting and patching shall be kept to a minimum by careful planning and through providing holes, sleeves, anchors, inserts, or other built-in items as Work progresses and then only to the extent required to properly place, support, hang, anchor, or install materials and equipment. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents. All patching is subject to Architect and Construction Manager's acceptance. Unauthorized or careless cutting will not be permitted. No structural member shall be cut unless approved by the Architect or Architect's Consultants.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate

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Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 Cutting and patching of construction work, or excavation and backfilling in or about the building shall be done under the direct supervision of the Contractor for that portion of Work being altered, who shall be responsible to see that patching and backfilling is accomplished by using proper labor, material, equipment and methods consistent with the requirements for other similar construction.

§ 3.14.4 Each Contractor is responsible for all cutting, fitting, patching, excavation and backfill required to complete its Work, including uncovering portions of the Work to provide for installation of ill-timed work; removing and replacing defective work; removing and replacing work not conforming to the requirements of the Contract Documents; and removing samples of installed work as specified for testing.

§ 3.14.5 The Contractor shall provide: all necessary shoring, bracing and other supports to assure the structural safety of that portion of the work; all necessary devices and methods to protect other portions of the project from damage including, but not limited to, temporary partitions and dust enclosures as required; and all necessary protection from the elements for that portion of the project which may be exposed by cutting and patching work, and pumping to maintain excavations free from water.

§ 3.14.6 The Contractor shall restore work which has been cut or removed and install new products to provide completed Work in accordance with the requirements of the Contract Documents. The Contractor shall refinish entire surfaces as necessary to provide an even finish to match adjacent finishes. For continuous surfaces, the Contractor shall refinish to the nearest intersection and, for an assembly, shall refinish the entire unit.

§ 3.14.7 If a dispute arises between Trade Contractors as to their responsibility for cutting, fitting, patching, excavation or backfill, as required by the foregoing sections or elsewhere in the Contract Documents, the Construction Manager may have such work completed and charge the cost thereof to the appropriate Contractors.

§ 3.14.8 The Contractor shall submit a written request to the Construction Manager which shall be subject to review and approval of the Architect, prior to executing any cutting, alteration or excavation which affects the work of the Owner, Contractors or Separate Contractors or which may affect the structural safety of any portion of the Project. This request shall include, as a minimum, the effect on the work of the Owner, Contractors or Separate Contractors or on the structural safety of the project, the necessity for doing the cutting, alteration or excavations, a description of the proposed work and the extent of refinishing to be done.

§ 3.14.9 The Contractor shall report, in writing, any unsatisfactory conditions to the Construction Manager in writing and shall not proceed with the cutting, alteration or excavation until he has received further instructions from the Construction Manager.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor and its Subcontractors shall at all times keep the premises and surrounding area free from accumulation of waste materials, fire hazards, and rubbish caused by operations under the Contract. Furthermore, Contractor and its Subcontractors shall keep their individual work areas neat and orderly throughout the duration of the Project. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project. The Contractor shall police all daily clean-up assigning clean up to related subcontract work. All clean-up not done daily, shall be done by the Contractor. The Project shall be kept neat and free of debris at all times.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, and Architect with access to the Work in preparation and progress wherever located. Work will be performed in accordance with the Contract Documents, the Applicable Building Code, and other applicable law governing the Contractor's performance of the Work. No delays resulting from compliance with applicable laws or regulations may form the basis for any claim by the Contractor for delay damages or additional compensation or for any claim by the Contractor for delay damages or additional compensation or for any extensions of the Contract Time. The Contractor must not permit work outside of hours established in the Contract Documents on a Saturday, Sunday or State or federal holiday without the written consent of the Owner, given after prior written notice to the Architect

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and any other applicable consultants, such consent, if given, may be conditioned upon payment by the Contractor of the Owner's, Construction Manager and Architect's and any other applicable consultants' additional costs and fees, testing or regulatory agency costs incurred in monitoring such off-hours Work. The Contractor must notify the Owner and/or Construction Manager as soon as possible if Work must be performed outside such times in the interest of the safety and protection of persons or property at the Site or adjacent thereto, or in the event of any emergency. In no event shall the Contractor permit Work to be performed at the Site without the presence of the Contractor's superintendent and person responsible for the protection of persons and property at the Site and compliance with all applicable laws and regulations, if different from the superintendent.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner, Construction Manager, and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner, Architect, or Construction Manager. However, if an infringement of a copyright or patent is reasonably suspected or discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Construction Manager and Architect, and their agents, representatives, and employees (Indemnitees) from and against any and all claims, damages, causes of action, losses and expenses, including, but not limited to, attorney's fees, arising out of or resulting from or in connection with the performance of the Work, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by an Indemnity. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity or contribution which would otherwise exist, as to any party or person described in Contract Documents.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 In the event the Owner should prevail in any legal action arising out of the performance or non-performance of this Agreement, the Contractor shall pay, in addition to any damages, all expenses of such action including reasonable attorney's fees, all expert witness fees, costs, and litigation expenses incurred by the Owner, including those incurred on appeal. The term "legal action" shall be deemed to include any arbitration, administrative proceedings, and all actions at law or in equity, including appeals.

§ 3.19 Miscellaneous Contractor Responsibilities

§ 3.19.1 The Contractor agrees to adhere to the Federal Occupational Safety Act, State and local safety regulations, and the Construction Manager's Safety Program, so as to avoid injury or damage to persons or property, and to be directly responsible for damage to persons and property resulting from failure to do so.

§ 3.19.2 If the Construction Manager issues a safety notice to the Contractor and the Contractor fails to take corrective action immediately to insure compliance with said safety regulations and/or removal of rubbish and debris resulting from his Work that is creating a hazard, the Construction Manager shall rectify the hazard(s) with the cost of same to the reimbursed to the Owner without further notice to the Contractor.

§ 3.19.3 The Contractor agrees to notify the Construction Manager's representative on the job site of all accidents resulting in bodily injury or property damage shall provide the Construction Manager's representative with a copy of all accident reports on appropriate forms. All reports shall be signed by the Contractor or his authorized representative and submitted within twenty-four (24) hours of occurrence.

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§ 3.19.4 The Contractor agrees to adequately and properly protect its Work during construction and after completion of a task until substantial completion.

§ 3.19.5 The Contractor agrees that all disputes concerning the jurisdiction of trades shall be adjusted in accordance with any plan for the settlement of jurisdictional disputes which may be in effect, either nationally or in the locality in which the Work is being done.

§ 3.19.6 The Contractor shall submit to the Construction Manager upon request, copies of orders placed for the various materials required for the Project, or authentic stock lists if such material is normally a stock item. Order copies need not reflect prices, but should indicate type of material, quantity, vendor name and address, etc. The Contractor shall be required to submit to the Construction Manager a monthly Material Status Report, or more often if required by the Construction Manager, as a prerequisite for the monthly progress payment. The Contractor shall notify the Construction Manager immediately upon learning of a change in status of any material, equipment or supplies.

§ 3.19.7 The Contractor agrees to maintain an adequate force of experienced workers and the necessary materials, supplies and equipment to meet the requirements of the Construction Manager and other trades in order to maintain construction progress schedules, as established by the Construction Manager and Owner. In the event that its force is, in the judgment of the Construction Manager, inadequate to meet the established schedules during the regular work hours, the Contractor agrees to work sufficient overtime hours or increase its work force to meet such schedules at no extra cost to the Owner.

§ 3.19.8 The Contractor agrees to employ competent administrative, supervisory and field personnel to accomplish the Work, including layout and engineering and preparation and checking of shop drawings.

§ 3.19.9 The Contractor shall insure that construction tools, equipment, temporary facilities, and other items used in accomplishing the Work, whether purchased, rented or otherwise provided by the Contractor or provided by others, are in a safe, sound and good condition, they must be capable of performing the functions for which they are intended, and maintained in conformance with applicable laws and regulations.

§ 3.19.10 Contractor shall use, at all times on the Work, only such labor as will in no way whatsoever disturb or affect labor employed by the Owner or other Contractors on the site, and Contractor's employees shall work in harmony with all such employees and Contractors. Contractor shall consult with Construction Manager before making any disputed work assignments.

§ 3.19.11 Contractor shall assign to and maintain on the Work, a force of experienced employees, equipment and tools in first class operating condition, adequate to complete the Work within the prescribed time schedule, and shall furnish careful, efficient and experienced business administration and supervision of the work force.

§ 3.19.12 Any of Contractor's assigned personnel or subcontractors whom the Owner may consider to be incompetent, careless, insubordinate or otherwise objectionable, or whose conduct or presence is considered to be detrimental to the best interests of the Project, or who are not required for the Work, shall be removed at Owner's request. Owner shall not incur any liability, responsibility or obligation whatsoever in regard to exercising its rights herein either to Contractor or any other person.

§ 3.19.13 Contractor shall in all respects comply with, and shall cooperate with the Owner in enforcing, all site procedures, conditions and rules established by the Owner which affect any of the Work being performed for the Project or at the Jobsite, including, but not limited to: Project schedules; access; security; traffic and solicitation; work and storage areas; utilities; safety; medical and first aid facilities; fire and explosion precautions; pollution; sanitation; cleanup and work conditions. Contractor shall be required to attend all Jobsite or Project meetings held by the Owner in regard to site control, procedures, schedule or coordination.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement. The Architect may be an Engineer or Architect lawfully licensed by the State to practice architecture or engineering or an entity, licensed by the State to lawfully practice architecture or engineering. The Architect is referred to throughout the Contract documents as if singular in number, whether the Architect is a solo practitioner or a firm. The term "Engineer," "Architect/Engineer," "Engineer/Architect," "Architect's authorized representative," "Engineer's authorized representative," or "Architect/Engineer's authorized representative" shall mean "Architect" as defined in Section 2.3.2.

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§ 4.1.2 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

§ 4.1.3 Duties, responsibilities, and limitations of authority of the Construction Manager and Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Construction Manager, Architect, and Contractor. Consent shall not be unreasonably withheld, but may be conditioned in the Owner's discretion.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect, as a representative of the Owner, shall attend regular monthly construction meetings and shall visit the site at intervals appropriate to the stage of construction, or as otherwise agreed to by Owner and Architect and/or as otherwise required in Section 4.3.3, to observe and evaluate the Work to become generally familiar with the progress and quality of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, is proceeding in accordance with the Contract Documents. However, the Architect shall not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect shall keep the Owner and the Construction Manager reasonably informed about the progress and quality of the Work, and report to the Owner and Construction Manager in writing any (1) known deviations from the Contract Documents and from the most recent construction schedule, and (2) defects and deficiencies observed in the Work. The Architect will provide the Owner with monthly written observation reports and construction update minutes as the Project progresses.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies of the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed and when otherwise necessary even when work is not being performed as mutually determined by the Owner and Construction Manager. The Construction Manager will determine if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work. The Architect shall report to the Owner known deviations from the Contract Documents in writing.

§ 4.2.6 Communications. The Owner shall endeavor to communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Construction Manager otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract

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Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, 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 Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager. The Architect and Construction Manager will review the initial submittal and one (1) re-submittal. If further review is required on more than one (1) re-submittal (i.e. second, third or more re-submittal) the Architect will do so on an hourly basis. The Architect and Construction Manager will then charge the Owner for this additional service (as provided in the Agreement between the Architect and Owner and Construction Manager and Owner) and the Owner will then deduct the sum due for those additional services occasioned by excessive re-submittals from the amount due to the Contractor at the next application for payment. In addition, if submittals are provided either incomplete or requiring other submittals in order to conduct an appropriate review, and the Contractor requests review of these "incomplete" submittals, they will be reviewed on an hourly basis as set forth above.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect 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 or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

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§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon in writing or otherwise with reasonable promptness.

§ 4.2.19 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor and will not be liable for results of interpretations or decisions so rendered in good faith.

§ 4.2.20 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 The Contractor, within ten (10) days after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager and Architect, of the persons or entities proposed for each principal portion of the Work,

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including those who are to furnish materials or equipment fabricated to a special design along with a list of actual materials or equipment they are furnishing. Within fourteen (14) days of receipt of the information, the Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection. The Contractor shall update this list throughout the Project and keep Owner, Architect and Construction Manager advised of any new Subcontractors employed.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor met all criterial set forth in the Contract Documents and was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required. Acceptance or rejection of any subcontractor shall not relieve the Contractor of performance of Work as called for under the Contract Documents, nor shall acceptance of a particular subcontractor be construed as acceptance of any particular process or material.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.2.5 Manufacturers and Fabricators

§ 5.2.5.1 Not later than thirty (30) days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner, through the Construction Manager, the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment and systems identified in the General Requirements (Division 1 of the Specifications) and, where applicable the name of the installing Subcontractor. The Construction Manager may reply within fourteen (14) days to the Contractor in writing stating:

- **.1** whether the Owner or the Construction Manager has a reasonable objection to any such proposed person or entity, or
- **.2** that the Construction Manager requires additional time to review.

§ 5.2.5.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Construction Manager has made reasonable and timely objection.

§ 5.3 Subcontractor Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, that the Contractor, by these Contract Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2

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and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Intentionally left blank

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15 within forty-eight (48) hours of the occurrence or discovery of the potential of an occurrence of the delay or action that will result in making a claim.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Construction Manager shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 Each Contractor and their Subcontractors shall cooperate with and coordinate their Work with all other Contractors, Separate Contractors, Subcontractors, Construction Manager and Owner to facilitate the general progress of the Project and to prevent delay of others. The Contractor shall afford the Owner's own forces, Separate Contractors, Construction Manager and other Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents. Each Contractor or Subcontractor shall provide layout drawings, rough-in detail sheets and other pertinent information directly to the Construction Manager to coordinate all phases of the Work. For coordination with the Owner's equipment or materials, information shall be obtained from the Owner, through the Construction Manager. After timely notification by the Contractor of the need to accomplish a particular phase or element of the Work, other contractors shall, within reasonable time, perform their Work so as not to delay or impede the Contractor.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's or other Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, because of the Contractor's delays, improperly timed activities, defective construction, or lack of coordination. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays,

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improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor causes to completed or partially completed construction, or to property of the Owner, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, other Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents. No claim for an addition to the maximum Contract sum shall be considered a valid claim unless a written change order procedure is followed as outlined in this Article. Verbal authorization for changes must be supported by written approval before being considered valid.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 Required documentation and allowable costs for changes in the Work, whether covered by Section 7.2 or 7.3, shall be as follows:

.1 Before the submission of the Contractor's first change proposal but in no case more than thirty (30) days after being awarded the Contract, the Contractor and its Subcontractors shall submit billable labor rates for straight time and overtime itemized by each trade and classification involved in the Project on a form provided by the Construction Manager. Billable labor rates shall be based on the actual rate paid to the workmen in accordance with Contractor's standard practice or established labor agreements. Payroll taxes, insurance and fringe benefits on labor shall be documented in detail and be only the actual costs incurred which may include mandatory fringe benefits required by Contractor's standard practice or established labor agreements, FICA taxes, state and federal unemployment taxes, workmen's compensation insurance net of discounts and experience modification rate and general liability cost if and to the extent paid on the basis of labor cost. No other costs or overhead will be allowed as burden on labor. The billable labor rates shall be approved in writing by the Owner or Construction Manager before being incorporated in a change order.

.2 The Contractor shall submit change proposals covering a contemplated Change Order within ten (10) days after request of the Owner, or the Construction Manager or within ten (10) days of the event giving rise to the Contractor's claim for a change in the Contract Sum or Contract time. No increase in the Contract Sum or extension of the Contract Time will be allowed the Contractor for the cost or time involved in making change proposals.

.3 Change proposals shall define or confirm in detail the Work which is proposed to be added, deleted, or changed and must include any adjustment which the Contractor believes to be necessary in (i) the Contract Sum, or (ii) the Contract Time.

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.4 The following allowable cost for change proposals shall be itemized as provided in this Section. The Contractor shall submit an itemized list of quantities with the applicable unit costs and extended price for each, in such form and detail as required by the Construction Manager. At a minimum, the detailed breakdown shall include and indicate the items listed below:

.4.1 Labor costs based on approved billable rates including estimated or actual hours broken down by work element;

.4,2 Quantities of materials and actual unit prices of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed at their actual costs including trade and quantity discounts. Significant material unit prices shall be documented with vendor quotes;

.4.3 In any proposal with material, equipment and supply credits, the credit shall be based on the actual Contract cost of the material (including trade and quantity discounts) less any charges actually incurred for handling or returning a material which has been delivered. No cancellation, restocking or similar charge will be allowed unless actually incurred by the purchaser and generally will not be allowed when the product has not been shipped;

.4.4 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4.5 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, if any, directly related to the change;

.4.6 Costs of direct line supervision directly attributable to the change; and

.4.7 The cost of subcontracted or sub-subcontracted work computed and documented in the same way and subject to the same conditions as the Contractor;

§ 7.1.5 Allowable fees for overhead and profit for changes in the Work, whether covered by Section 7.2 or 7.3, shall be as follows:

.1 The maximum fee that will be allowed for overhead and profit shall be (values are expressed as a percentage of the cost of the change) is ten percent (10%) maximum mark-up for work performed by employees of the Contractor, Subcontractor, or Sub-subcontractor; and five percent (5%) Contractor mark-up for work performed by a Subcontractor or Sub-subcontractor. In no case shall the cumulative fee paid by the Owner, regardless of the number of tiers of Contractors or Subcontractors, be greater than twenty percent (20%).

.2 The fee percentages allowed above shall be deemed to include, and no further addition allowed the Contractor, Subcontractor or Sub-subcontractor for (i) field and office supervision and administration, including the field superintendent and non-working foremen; (ii) general insurance except that allowed as part of labor burden; (iii) use or replacement of hand tools; (iv) shop burden; (v) engineering costs; (vi) costs of general safety measures; (vii) or any other costs except those enumerated under Section 7.1.4.

.3 For changes that involve both added and credited amounts, the fee shall be applied only to the net difference where the net amount is positive.

.4 In the event an individual change results in a credit exceeding $5,000, a reasonable credit for bond expense and overhead and profit or commission shall be provided to the Owner.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect, and Contractor, stating their agreement upon all of the following:

.1 The change in the Work;
.2 The amount of the adjustment, if any, in the Contract Sum; and
.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 If the Owner determines that a change proposal is appropriate, the Construction Manager will prepare and submit a request for a Change Order or Contract Amendment providing for an appropriate adjustment in the Contract Sum or Contract

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Time, or both, for further action by the Owner. No such change is effective until the Owner, Construction Manager and Architect sign the Change Order.

§ 7.2.3 The forms used to process a Change Order will include a change order form similar to AIA Document G701/CMA, Change Order.

§ 7.2.4 The Contractor's signature on a Change Order shall constitute a full, final, and complete waiver and settlement of any and all claims, demands, and causes of action that Contractor has, or may have in the future, arising out of or relating to the Change Order and the occurrences, acts, omissions, or events upon which the Change Order is based. No "reservation of rights" or other attempt by Contractor to preserve present or future claims arising out of or relating to the Change Order (or arising out of or relating to the cumulative effect of the Change Order in combination with other Change Orders) shall be effective unless Owner and Contractor shall both agree, in a separate writing signed by both parties contemporaneously with Contractor's execution of the Change Order, to the specific terms, conditions, scope, and duration of such reservation of rights.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order and upon prior written approval of the Owner.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager, Owner, and Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Costs and fees for the purposes of this Section 7.3.4 shall be limited to those specified in Section 7.1.4 and 7.1.5.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both

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additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Construction Manager and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Construction Manager that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial~~Final~~ Completion of the Work.

§ 8.1.2 The date of commencement of the Work shall be the earliest date when all required paperwork, bonds and insurance certificates are in place and all Contract Documents have been executed by all parties.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the Contract Time specified. If Contractor's Work falls behind schedule for reasons that are not excused under the terms of the Contract, Contractor shall add additional workers or shifts, and/or work overtime as necessary to maintain the Construction Schedule. The Work shall not be suspended or shut down but shall progress continuously with sufficient labor and supervision at all times unless otherwise approved by the Owner. If work is interrupted due to normal weather conditions, the time lost shall be made up during weekends.

§ 8.2.4 The Contractor must conform to the most recently approved Construction Schedule. The Contractor must complete the indicated Work or achieve the required percentage of completion, as applicable, within any interim completion dates established in the most recently approved Construction Schedule.

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§ 8.2.5 The Contractor represents that its bid includes all costs, overhead and profit which may be incurred throughout the Contract Time and the period between Substantial and Final Completion. Accordingly, the Contractor may not make any claim for delay damages based in whole or in part on the premise that the Contractor would have completed the Work prior to the expiration of the Contract Time but for any claimed delay.

§ 8.2.6 If the Contractor's progress is not maintained in accordance with the approved Construction Schedule, or the Owner determines that the Contractor is not diligently proceeding with the Work or has evidence reasonably indicating that the Contractor will not be able to conform to the most recently approved Construction Schedule, the Contractor must, promptly and at no additional cost to the Owner, take all measuresurers necessary to accelerate its progress to overcome the delay and ensure that there will be no further delay in the progress of the Work and notify the Owner.

§ 8.2.7 The Owner reserves the right to issue a written directive, through the Construction Manager, to accelerate the Work that may be subject to an appropriate adjustment, if any, in the Contract Sum. If the Owner requires an acceleration of the Construction Schedule and no adjustment is made in the Contract Sum, or if the Contractor disagrees with any adjustment made, the Contractor must file a claim as provided in Article 15 or the same will be deemed to be conclusively waived.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (2) by changes ordered in the Work; (3) by fire, unusual and unavoidable delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation; or (5) by other causes that the Contractor asserts and the Architect, based on his or her professional judgment and the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine. A time extension shall be Contractor's sole remedy and compensation for all such delays other than those resulting from the acts or negligence of the Owner, the Architect, the Construction Manager or the Owner's separate contractors (collectively "Owner Caused Delays"). For proven Owner Caused Delays, the Contractor may recoup the actual costs resulting from such delays, but not for any additional profit or fee.

§ 8.3.1.1 If in the opinion of the Construction Manager and Architect, the Work is behind where it is supposed to be in the Project Time Schedule or it is likely that the Work will not be substantially complete by the applicable date for Substantial Completion, the Contractor, upon written notice from the Construction Manager and without additional cost or compensation, will increase its work force and, if requested by the Construction Manager, work such overtime to make up for the delay. Should the Contractor fail to increase its work force, work overtime, or proceed to make up for the delay to the satisfaction of the Construction Manager or the Owner, the Construction Manager or Owner, in addition to other remedies under this Agreement and other Contract Documents, will have the right to cause other Contractors to work overtime and to take whatever other action is deemed necessary to avoid delay in the Substantial Completion of the Work and of the Project, and the cost and expense of such overtime and other action will be borne by the Contractor and may be set off against sums due the Contractor.

§ 8.3.1.2 In the event of a concurrent delay attributable to any cause within the control of the Contractor and any other cause, the Contractor shall not be entitled to Contract Time extension or recovery of any actual costs for delay time that is concurrent.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed by a proposed Change Order or Construction Change Directive so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall

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be equitably adjusted.

§ 9.2 Schedule of Values

The Contractor shall submit a schedule of values to the Construction Manager, within thirty (30) days before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least thirty (30) days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment for operations completed in accordance with the schedule of values. Such application shall be on AIA Document G732 CMA and by AIA Document G703 or such other form as may be prescribed by the Owner and shall be notarized and supported by such data substantiating the Contractor's right to payment as the Owner or Construction Manager may require, such as copies of requisitions from Subcontractors and material suppliers. If the Contract Documents required the Owner to retain a portion of the payments until some future time, the Applications for Payment shall clearly state the percentage and the amount to be retained. Once the Application is approved by the Construction Manager and Architect, the Application for Payment must be submitted for approval to the Owner's Board of Directors at their next regularly scheduled meeting. The application must be received by the Board Secretary's office at least one week prior to the scheduled meeting for it to be included in that meeting's scheduled business.

§ 9.3.1.1 Such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment must be consistent with the approved Schedule of Values and shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work and for which Absolute Bills of Sale and bailment Agreements on the forms attached to the Agreement as Exhibits have been submitted to the Construction Manager. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.3.4 The Owner, in making partial payment, will retain five percent (3%) of the approved value of the Work performed under the Contract as of the date of the application for payment until final completion and acceptance of all Work covered by the Contract, or as otherwise required by law.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction

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Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven (7) days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's

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opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a Separate Contractor or other Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
.7 repeated failure to carry out the Work in accordance with the Contract Documents.
.8 service work not attended to;
.9 evidence of lack of careful workmanship;
.10 unworkmanlike or over expeditious construction; or
.11 lack of attention to the special field duties specified.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.6 Progress Payments

§ 9.6.1 After the Construction Manager has issued a Certificate for Payment and after the Architect has reviewed and authorized the issued Certificate for Payment or Project Certificate for Payment to the Owner, the Owner shall approve payment with Contractor to receive payment by the last day of the following month. Until Substantial Completion, the Owner will pay ninety-five percent (97%) of the amount due the Contractor on account of progress payments and the Owner will withhold five percent (3%) retainage as allowed by Iowa law. ~~If this is a public works project then this needs to be changed to 3%. Please take this red wording out.~~

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Construction Manager will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Owner, Construction Manager and Architect on account of portions of the Work done by such Subcontractor.

§ 9.6.4 Before the Contractor receives a progress payment, the Contractor must certify in writing that, in accordance with contractual arrangements, Subcontractors and suppliers:

.1 Have been paid from the proceeds of previous progress payments; and
.2 Will be paid in a timely manner from the proceeds of the progress payment currently due.

In the event the Contractor has not paid or does not pay as certified, such failure constitutes a ground for termination under Section 14.2 of the Contract. Contractor shall submit Applications for Payment to Construction Manager on a monthly basis

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or as otherwise specified in the Contract Documents. Once the Construction Manager submits a completed Application for Payment with its Certificate of Payment to the Owner, the Owner within thirty (30) days after its receipt of a Request for Payment from the Construction Manager shall pay the approved amount contained in the Request for Payment to the Contractor.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 Issuance of a Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents. The Contractor and its Surety agree any issuance of a project certificate for payment, payment on the Contract Sum, or any use or occupancy of the Work will in no way relieve them of the obligation to completely fulfill or accomplish all obligations of the Contract, including warranty of the Work, and that they waive any actual or alleged rights of subrogation or action against the Owner, Architect, or Construction Manager as a result of any such occupancy. At any time, the Surety shall have the right to examine the status of the Work, as well as any payments, and may request the Owner to withhold additional sums as it considers appropriate to protect its interests.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of an Iowa Code Chapter 573 claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the Iowa Code Chapter 573 claim or other claim for payment has been asserted.

§ 9.6.9 Payment to the Contractor will be made by the Owner from cash on hand from such sources as may be legally available, as determined by the Owner.

§ 9.7 Failure of Payment

If Owner does not pay the Contractor within sixty (60) days after the Contractor submits an Application for Payment to the Construction Manager, the Contractor may file a claim in accordance with Article 15 of this Contract.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use, subject only to completion of minor punch list items, the absence of which does not interfere with the Owner's intended use of the Project. The Contractor assumes the responsibility for notifying the Construction Manager in writing when ready for final review of the Work. This letter to the Construction Manager shall include the date after which the Contractor will be ready for final review of the Work. Designated portions of the Work will be reviewed separately.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the Contract Documents so that the

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Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 After Substantial Completion, the Contractor shall coordinate its activities with the Owner's use of the substantially completed Work and shall diligently complete the remaining Work, without delay or interruption, within sixty (60) days of the issuance of the Substantial Completion Certificate. If the Contractor fails to complete its Work with the allotted sixty (60) days, the Owner may invoke its right to carry out the work under Article 2, Subparagraph 2.5 or the Owner may invoke its right to terminate the contract under Article 14, Subparagraph 14.2.

§ 9.8.6 The Certificate of Substantial Completion and accompanying Punch List must be submitted to the Owner and Contractor for execution, which will constitute their written acceptance of responsibilities assigned to them in such Certificate. The Contractor shall reimburse the Owner for any Architect's and Construction Manager's additional services or attorney's fees incurred as a result of Contractor's failure to finally complete the Work within sixty (60) days after the date specified in the Contract Documents for Project Substantial Completion, or subsequently modified by change orders or dates established in the Certificate of Substantial Completion. For purposes of this paragraph "incurred as a result of" includes any architectural fees charged to Owner as Additional Fees under the Contract due to the fact that the services were performed sixty (60) days (or some other amount of time specified in the Owner/Architect Agreement and/or Owner/Construction Manager Agreement) after Substantial Completion. The nature of the services performed (and whether they would have otherwise been performed as normal closeout services at some point under Basic Services) is not relevant to the Contractor's obligations for reimbursement under this section if the Contract between the Owner and Architect or Contract between Owner and Construction Manager states that any and all services and related fees are defined as Additional Services solely because they were performed more than sixty (60) days (or some other amount of time specified in the Owner/Architect Agreement and/or Owner/Construction Manager Agreement) after Substantial Completion.

§ 9.8.7 Unless otherwise required by Iowa law, retainage shall be released no earlier than thirty-one (31) days after completion and final acceptance by the Owner of all Work required by the Contract.

§ 9.8.8 If the Owner withholds an amount from the retainage payment to the Contractor, the Owner will provide a reason the request is being denied to the Contractor within thirty (30) calendar days of the receipt of the request.

§ 9.8.9 Warranties required by the Contract Documents will commence on the Date of Substantial Completion of the Work unless otherwise provided in the Certificate of Substantial Completion or the Contract Documents.

§ 9.8.10 Upon execution of the Certificate of Substantial Completion, the Contractor will deliver custody and control of such Work to the Owner. The Owner will thereafter provide the Contractor reasonable access to such Work to permit the Contractor to fulfill the correction, completion and other responsibilities remaining under the Contract and the Certificate of Substantial Completion.

§ 9.8.11 Unless otherwise provided in the Certificate of Substantial Completion, the Contractor must complete or correct all items included in the final Punch List within sixty (60) days, subject to the availability of special order parts and materials, after the Date of Substantial Completion.

§ 9.8.12 At the time of Substantial Completion, in addition to removing rubbish and leaving the building "broom clean," the Contractor must replace any broken or damaged materials, remove stains, spots, marks and dirt from decorated Work, clean all fixtures, vacuum all carpets and wet mop all other floors, replace HVAC filters, clean HVAC coils, and comply with such additional requirements, if any, which may be specified in the Contract Documents.

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§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage provided such occupancy or use is consented to by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 When the Contractor has completed or corrected all items on the final Punch List and considers that the Work is complete and ready for final acceptance, the Contractor must give written notice to the Owner, Architect and Construction Manager and request a final inspection of the Work as provided in Section 9.10.2. The Contractor's notice and request for a final inspection must be accompanied by a final Application for Payment and the Submittals required by Section 9.10.3.

§ 9.10.2 Upon receipt of the Contractor's notice and request for final inspection, the Owner, Construction Manager and the Architect will promptly make such inspection and, when the Owner, Construction Manager and the Architect concur that the Work has been fully completed and is acceptable under the Contract Documents, the Construction Manager will issue a Certificate of Final Completion to the Owner. The Contractor's notice and request for final inspection constitutes a representation by the Contractor to the Owner that the work has been completed in full and strict accordance with terms and conditions of the Contract Documents. The Construction Manager will promptly notify the Contractor if the Owner or the Architect do not concur that the Work is finally complete. In such case, the Contractor must bear the cost of any additional services of the Owner, Construction Manager or the Architect until the Work is determined to be finally complete.

§ 9.10.3 Final payment will be made no earlier than thirty-one (31) days following approval by the Owner at a regularly scheduled Board Meeting upon receipt of all Lien Waivers and/or Chapter 573 Claim Releases, Sales Tax information, and all other required closeout documents, and subject to the conditions of and in accordance with the provisions of Iowa Code Chapter 573 and Iowa Code Chapter 26. Owner may withhold from final payment any and all amounts required to reimburse the Owner for all costs, fees (including reasonable attorney's fees) it incurred as a result of any Chapter 573 Claims filed on the Project. Neither final payment nor any remaining retained percentage will become due until the Contractor submits the following documents to the Construction Manager and/or Architect:

- **.1** An Affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner), have been paid or otherwise satisfied, submitted on AIA Document G706, Affidavit of Payment of Debts and Claims (latest edition) or such other form as may be prescribed by the Owner;
- **.2** A release or waiver of liens or Chapter 573 Claims on behalf of the Contractor and a similar release or waiver on behalf of each Subcontractor and supplier, accompanied by AIA Document G706A, Affidavit of Release of Liens (latest edition) or such other form as may be prescribed by the Owner;
- **.3** A certificate evidencing that the Contractor's liability insurance and Performance Bond remain in effect during the one-year correction period following Substantial Completion as set forth in Section 12.2.2.1 and 12.2.2.2;
- **.4** A written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Document;
- **.5** Consent of surety to final payment, submitted on AIA Document G707 (latest edition) or other form prescribed by the Owner;

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.6 Other data required by the Owner establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be prescribed by the Owner;
.7 All warranties and bonds required by the Contract Documents; and
.8 Record Documents as provided in Section 3.11 and return of Contract Documents as provided therein.

§ 9.10.4 Intentionally left blank

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11 No assignment by the Contractor of any principal contract or any part thereof, or of the funds to be received thereunder by the Contractor, will be recognized unless such assignment has had the written approval of the Owner and the Surety has been given due notice of such assignment and has furnished written consent thereto. In addition to the usual recitals in the Assignment Contract, the following language must be set forth:

"It is agreed that the funds to be paid to the Assignee under this Assignment are subject to prior lien/claims for services rendered on materials supplied for the performance of all Work called for in said Contract, in favor of all persons, firms or corporations rendering such services supplying such materials."

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
.4 construction or operations by the Owner, Separate Contractors, or other Contractors.

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

§ 10.2.2.1 This is a drug free (controlled substances), alcohol free, tobacco free and weapon free project. The manufacture, distribution, dispensing, possession, or use is prohibited on or adjacent to the Owner's property. Owner's property shall include, but not be limited to, inside private Contractor or employee-owned vehicles while parked on Owner property.

§ 10.2.3 The Contractor shall implement, 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 the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 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 and shall give Owner reasonable advanced notice.

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§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault, acts, operations, methods, or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.5.1 Contractor's required remedial actions for damage and loss to property referred to in Clauses 10.2.1.2 and 10.2.1.3 shall repair the damaged materials and surfaces to their original condition, or better, to the satisfaction of the Owner. All such repairs are the responsibility of the Contractor and shall be accomplished at no additional cost to the Owner.

§ 10.2.6 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, Construction Manager and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 The Contractor shall have a written safety program for the protection of persons and property. Contractor's safety program shall be submitted to the Construction Manager within ten (10) days of the date of the Agreement between Owner and Contractor. The Construction Manager will review the safety program and monitor Contractor implementation. The Contractor, not the Owner, shall be entirely responsible and liable for the safety of persons and property. The review of the safety program and monitoring of Contractor implementation by the Construction Manager does not shift that responsibility and liability to the Owner or Construction Manager. The Construction Manager reserves the right to suspend work activity or deny access to the site of the Contractor's, Subcontractor's, Sub-subcontractor's and their employees' work for repeated safety program rules violations.

§ 10.2.9 This is a hard hat and safety glasses project. Use of personal protective equipment (PPE) will be required at all times and shall be modified to protect against hazards associated with certain Work activities. The Construction Manager reserves the right to stop or suspend work for Contractor's, Subcontractor's, Sub-subcontractor's and their employees' failure to properly use PPE.

§ 10.2.10 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding twenty (21) days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the

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Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately, and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Construction Manager, Architect, their consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances. No product containing asbestos, Polychlorinated Biphenyl (PCB), lead-based materials or any other hazardous material identified by the United States Environmental Protection Agency shall be knowingly incorporated into the Work.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting the safety of persons or property, the Contractor must take all necessary action, without the necessity for any special instruction or authorization from the Owner, Construction Manager or Architect, to prevent threatened damage, injury or loss. The Contractor must promptly, but in all events with twenty-four (24) hours of the emergency, report such action in writing to the Owner, Construction Manager and Architect. If the Contractor incurs additional costs on account of or is delayed by such emergency, the Contractor may request a change in the Contract Sum or Contract Time to account for such additional costs or delay in accord with Articles 7, 8 and 15. The Contractor must file any such request within ten (10) days of the emergency or it is deemed waived. Any adjustment in the Contract Sum or Contract time shall be limited to the extent that the emergency work is not attributable to the fault or neglect of the Contractor or otherwise the responsibility of the Contractor under the Contract Documents.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to

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be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform both the Contractor and the Construction Manager, separately and in writing, prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice directly to the Contractor, and separately to the Construction Manager, of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this Section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor, Architect, and Construction Manager for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect or Construction Manager upon written authorization from Owner, be uncovered for their examination and be replaced at the Contractor's expense without change in the Contract Time. The Contractor shall give timely notice to the Architect through the Construction Manager of the readiness of the Work to be observed.

§ 12.1.2 If a portion of the Work has been covered that the Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or Architect may request upon written authorization from the Owner to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion, and whether or not fabricated, installed or completed unless the Owner elects to accept the Work as provided for under Section 12.3. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense. Work rejected before final completion shall be corrected prior to processing of the Contractor's Final Application and Certificate for Payment.

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§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within two (2) years after the date of Substantial Completion of the Work or designed portion thereof or after the date for commencement of warranties established under any other provision of the Contract Documents, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. Before commencing correction of the Work, Contractor shall submit to the Owner a written description of its proposed repair. This proposal must be approved by the Construction Manager and Architect before the Contractor commences the repair. Once the Contractor has completed the repair work, it shall notify the Owner, Construction Manager and Architect who shall promptly review the corrected Work. If the Construction Manager, Architect or the Owner rejects the corrected Work, the Contractor shall continue with the repairs until such time as the Construction Manager, Architect and the Owner accept the corrected Work. Where the Contractor corrects defective work during the initial two (2) year period after Substantial Completion, if the Owner discovers defects in the corrected Work within one (1) year after the repairs are made, then the Contractor shall be obligated, upon written notice from the Owner, to correct such defects within one (1) year from the date that repairs were made.

§ 12.2.2.2 The two-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 Intentionally left blank

§ 12.2.2.4 Prior to the expiration of two (2) years from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance.

§ 12.2.3 Intentionally left blank

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the two-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.2.6 If the Contractor fails or refuses to correct the Work in accordance with its obligations under the Contract Documents after written notice from the Owner, then the Owner may correct the Work and the Contractor shall be liable for the costs to correct the Work, any related architectural, engineering or other consulting costs, attorney's fees and expenses, and fines or penalties, if any. Any amounts due to the Owner from the Contractor under this Section may be withheld from the balance of the Contract Sum not yet paid.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be affected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by and construed in accordance with the laws of the State of Iowa.

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§ 13.2 Successors and Assigns

The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor must schedule all tests, inspections or specific approvals required by law or the Contract Documents so as to avoid any delay in the Work. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded.

§ 13.4.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Construction Manager and Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Construction Manager's and Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Construction Manager for transmittal to the Architect.

§ 13.4.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.4.7 In addition to the tests required by this Section 13.4, the Owner may at any time arrange for other tests, inspections and specific approvals to be performed by others selected by the Owner, at the Owner's expense. The Contractor must cooperate with the Owner and provide access to the Work for such tests, inspections and approvals.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the then current interest rate for stamped warrants pursuant to Iowa Code Section 74A.2 or the rate established under Iowa Code Section

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573.14 Code of Iowa, whichever is less.

§ 13.6 Conformance with Laws

The Contractor shall conform in all respects with the provisions of the Federal Civil Rights Act, the Code of Iowa, Chapter 216 Civil Rights Commission and the rules and regulations adopted thereto by the Iowa Civil Rights Commission. The Contractor shall not discriminate against any employee or applicant because of race, color, creed, religion, sex, national origin, ancestry, age, familial status, sexual orientation, gender identity, ethnic background, genetic information, physical or mental handicap or any other protected class under state or federal law. The Contractor shall comply with all applicable federal, state and local, laws, rules, regulations, ordinances, policies and procedures, including the Owner's policies and procedures and the Iowa Smoke Free Air Act. The Contractor shall require similar clauses in all of its subcontracts for service or materials.

§ 13.7 Owner's Right to Occupy

Owner shall have the right to occupy, without prejudice to rights of either party, any completed or largely completed portion of structure or Work, notwithstanding the fact that time for completing entire Work, or such portion thereof, may not have expired. Such occupancy and use shall not be an acceptance of Work taken or used.

§ 13.8 Rebates

Owner shall have the right to apply for, and secure all rebates which are available when Bids are received. Contractor shall provide invoices, itemizations, and cooperation to the Owner in this regard.

§ 13.9 Drug Free and Smoke Free Zone

The Owner's property is a drug-free and tobacco-free zone under Iowa law. In furtherance of this standard, the Contractor shall establish and maintain a safe and efficient work environment for all employees, free from the effects of smoke, alcohol, controlled substances and illicit drugs.

.1 Smoking and the use of smokeless tobacco shall be prohibited at all times on Owner's property, including parking lots and inside of any private vehicles on Owner's property.

.2 The manufacture, distribution, dispensing, possession, or use of alcohol, controlled substances and illicit drugs is prohibited on or adjacent to the project site and all of the Owner's property at all times.

.3 Illicit drug use is the use of illegal drugs and the abuse of alcohol and other drugs, including anabolic steroids.

.4 Controlled substances are drugs specifically identified and regulated under state and federal law and include, but are not limited to, opiates, narcotics, cocaine, methamphetamines, and other stimulants, depressants, hallucinogenic substances and marijuana.

.5 The Contractor will strictly enforce these prohibitions among its own employees and its Subcontractors and their employees at all times. Employees who violate these prohibitions will be subject to disciplinary action by their employers up to and including termination and may be denied access to the site of the Work.

.6 Violation of this Section shall also constitute sufficient grounds for termination of the Contract or any subcontract without damage or penalty to Owner.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

The Contractor has no right to stop Work as a consequence of non-payment. In the event of any disagreement between the Contractor and Owner involving the Contractor's entitlement to payment, the Contractor's only remedy is to file a Claim in accordance with Article 15. The Contractor must diligently proceed with the Work pending resolution of the Claim. If, however, an Application for Payment has been approved for payment by the Owner, and the Owner fails to make payment within sixty (60) days of the approval for payment by the Owner, the Contractor may upon ten (10) days written notice to the Owner, stop Work if payment is not made by the Owner within ten (10) days following the notice.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor:

.1 fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 fails to comply with any applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;

.4 fails to perform the Work in accordance with the Contract Documents or otherwise breaches any provision of the Contract Documents;

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.5 anticipatorily breaches or repudiates the Contract;
.6 fails to make satisfactory progress in the prosecution of the Work required by the Contract; or
.7 endangers the performance of this Contract.

§ 14.2.2 The Owner may terminate the Contract, in whole or in part, whenever the Owner determines that sufficient grounds for termination exist as provided in Subsection 14.2.1. The Owner will provide the Contractor with a written notice to cure the default. If the default is not cured, the termination for default is effective on the date specified in the Owner's written notice. However, if the Owner determines that default contributes to the curtailment of an essential service or poses an immediate threat to life, health, or property, the Owner may terminate the Contract immediately upon issuing oral or written notice to the Contractor without any prior notice or opportunity to cure. In addition to any other remedies provided by law or the Contract, the Contractor must compensate the Owner for additional costs that foreseeably would be incurred by the Owner, whether the costs are actually incurred or not, to obtain substitute performance. A termination for default is a termination for convenience if the termination for default is later found to be without jurisdiction.

§ 14.2.3 Upon receipt of written notice from the Owner of termination, the Contractor must:

.1 Cease operations as directed by the Owner in the notice and, if required by the Owner, participate in an inspection of the Work with the Owner, Construction Manager and the Architect to record the extent of completion thereof, to identify the Work remaining to be completed or corrected, and to determine what temporary facilities, tools, equipment and construction machinery are to remain at the Site pending completion of the Work;
.2 Complete or correct the items directed by the Owner, and take actions necessary, or that the Owner may direct, for the protection and preservation of any stored materials and equipment and completed Work;
.3 Unless otherwise directed by the Owner, remove its tools, equipment and construction machinery from the Site, and
.4 Except as directed by the Owner, terminate all existing subcontracts and purchase orders and enter into no further subcontracts or purchase orders.

§ 14.2.4 Following written notice from the Owner of termination, the Owner may:

.1 Take possession of the Site and of all materials and equipment thereon, and at the Owner's option, such temporary facilities, tools, construction equipment and machinery thereon owned or rented by the Contractor that the Owner elects to utilize in completing the Work;
.2 Accept assignment of subcontracts and purchase orders, and
.3 Complete the Work by whatever reasonable method the Owner may deem expedient.

§ 14.2.5 Upon termination for cause, the Contractor must take those actions described in Section 14.2.3, and the Owner may take those actions described in Section 14.2.4, subject to the prior rights of the Contractor's Surety.

§ 14.2.6 When the Owner terminates the Contract for cause, the Contractor is not entitled to receive further payment until the Work is completed and the costs of completion have been established.

§ 14.2.7 If the unpaid balance of the Contract Sum less amounts which the Owner is entitled to offset from the unpaid Contract balance, including actual or Liquidated Damages, if applicable, compensation for the Construction Manager's and the Architect's services and expenses made necessary thereby, and other damages and expenses incurred by the Owner, including reasonable attorney's fees, exceeds the costs of completing the Work, including compensation for the Owner's, the Construction Manager's and the Architect's services made necessary thereby, such excess will be paid to the Contractor or Surety, as directed by the Surety. If such costs exceed the unpaid Contract balance, the Contractor must pay the difference to the Owner upon written demand. This obligation for payment survives termination of the Contract.

§ 14.2.8 In completing the Work following termination for cause, the Owner is not required to solicit competitive bids or to award completion work to the lowest bidder, but may obtain such completion work and related services on the basis of sole source procurement and negotiated compensation.

§ 14.2.9 If the Contractor files for protection, or a petition is filed against it, under the Bankruptcy laws, and the Contractor wishes to affirm the Contract, Contractor shall immediately file with the Bankruptcy Court a motion to affirm the Contract and shall provide satisfactory evidence to Owner and to the Court of its ability to cure all present defaults and its ability to timely and successfully complete the Work. If Contractor does not make such an immediate filing, Contractor accepts that Owner shall petition the Bankruptcy Court to lift the Automatic Stay and permit Owner to terminate the Contract.

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§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of termination, the Contractor must:

.1 Cease operations as directed by the Owner in the notice and, if required by the Owner, participate in an inspection of the Work with the Owner, Construction Manager and the Architect to record the extent of completion thereof, to identify the Work remaining to be completed or corrected, and to determine what temporary facilities, tools, equipment and construction machinery are to remain at the Site pending completion of the Work;

.2 Complete or correct the items directed by the Owner, and take actions necessary, or that the Owner may direct, for the protection and preservation of any stored materials and equipment and completed Work;

.3 Unless otherwise directed by the Owner, remove its tools, equipment and construction machinery from the Site, and

.4 Except as directed by the Owner, terminate all existing subcontracts and purchase orders related to the Work and enter into no further subcontracts or purchase orders therefor.

§ 14.4.3 Following written notice from the Owner of termination, the Owner may:

.1 Take possession of the Site and of all facilities, tools, construction equipment and machinery thereon owned or rented by the Contractor that the Owner elects to utilize in completing the Work;

.2 Accept assignment of subcontracts and purchase orders; and

.3 Complete the Work by whatever reasonable method the Owner may deem expedient.

§ 14.4.4 In case of termination for the Owner's convenience, the Contractor will be entitled to compensation only for the following items:

.1 Payment for acceptable Work performed up to the date of termination;

.2 The costs of preservation and protection of the Work if requested to do so by the Owner;

.3 The cost of terminating the following contracts including:

a. Purchased materials but only if not returnable and provided to the Owner, or the restocking or return charge, if any, if returnable at the Owner's written election;

b. Equipment rental contracts if not terminable at no cost but not to exceed an amount equal to thirty (30) days rental;

c. Documented transportation costs associated with removing Contractor-owned equipment;

d. Documented demobilization and close-out costs; and

e. Overhead and profit on the foregoing not to exceed ten percent (10%).

.4 The Contractor will not be compensated for the cost of any idled employees unless the employee is under a written employment contract entitling the employee to continued employment after termination of the Contract and the employee cannot be assigned to other work provided that in all events the Contractor's costs must be limited to thirty (30) days of employment costs from the date of the notice of termination. The Contractor is not entitled to any other costs or compensation (including lost or expected profit, uncompensated overhead or related expenses, or the cost of preparing and documenting its compensable expenses under this Section 14.4.4) as a consequence of the Owner's termination of the Contract for convenience. The Contractor conclusively and irrevocably waives its right to any other compensation or damages (compensatory or punitive) arising from termination of the Contract. If the Owner and the Contractor are unable to agree upon the amounts specified in this subsection, the Contractor may submit a Claim as provided in Article 15. The Claim must be limited to resolution of the amounts specified in Subsections 14.4.4.1, 14.4.4.2, 14.4.4.3 and 14.4.4.4 of this Subsection

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14.4.4. No other cost, damages or expenses may be claimed or paid to the Contractor or considered as part of the Claim, the same being hereby conclusively and irrevocably waived by the Contractor. Any such Claim must be delivered to the Owner within thirty (30) days of the termination of the Contract and must contain a written statement setting forth the specific reasons and supporting calculations and documentation as to the amounts the Contractor claims to be entitled to under this Subsection as a result of the termination of the Contract.

§ 14.4.5 The Contractor's obligations surviving final payment under the Contract, including without limitation those with respect to insurance, indemnification, and correction of Work that has been completed at the time of termination, remains effective notwithstanding termination for convenience of the Owner.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. Claim is a written demand or assertion by the Contractor seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The responsibility to substantiate Claims shall rest with the Contractor. Nothing contained herein in this Subsection is intended to apply to or in any way limit the Owner's right to make claims related to or arising out of this Contract.

§ 15.1.2 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the time period specified by applicable law.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor must be initiated by written notice to the Owner, the Construction Manager and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within fourteen (14) days after occurrence of the event giving rise to such Claim or within fourteen (14) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. As a condition to making a Claim for additional costs, the Contractor shall maintain and produce accurate records to substantiate all additional costs actually incurred. If a Claim for actual costs is approved, the Owner shall pay the Contractor actual costs incurred, plus either (a) ten percent (10%) for overhead and profit for work performed by the Contractor, or (b) five percent (5%) overhead and profit for work performed by a Subcontractor, as applicable.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by local

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weather data substantiating that: (a) the weather experienced at the project site was abnormal and unusually severe during the pendency of the Project, meaning the weather was more severe than the adverse weather anticipated at the Project location during any given month of the Project based on historic weather data; (b) the unusually severe weather actually caused a delay in the critical path of the Project schedule, meaning the weather delayed completion of a portion of the Work that must have been completed at the time the weather event occurred in order for the Project to timely proceed; and (c) the delay must have been beyond the control and without the fault or negligence of the Contractor.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

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§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.3 Claims and Mediation

§ 15.3.1 Claims by the Contractor must be initiated by written notice to the Owner, the Construction Manager, and the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within fourteen (14) days after the occurrence of the event giving rise to such Claim or within fourteen (14) days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. As a condition to making a Claim for additional costs, the Contractor shall maintain and produce accurate records to substantiate all additional costs actually incurred. If a Claim for actual costs is approved, the Owner shall pay the Contractor actual costs incurred, plus a ten percent (10%) fee for overhead and profit.

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§ 15.3.2 The parties shall endeavor in good faith to resolve claims, disputes and other matters in question between them by mutual agreement and may, by mutual agreement and in their discretion, submit same to non-binding mediation (mediation) which shall be in accordance with Iowa Code Chapter 679C unless otherwise agreed to by the parties. Requests for mediation shall be given in writing to the other party to this Agreement. If the Owner and Contractor are unable to mutually agree upon a mediator in writing within sixty (60) days of receiving the written request for mediation, either party may then institute legal or equitable proceedings. Mediation shall be voluntary only and shall not be a prerequisite to litigation or other means of dispute resolution.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Litigation

Any legal claim brought under this Agreement shall be filed in the Iowa District Court in and for the County in which the Project is located, unless otherwise mutually agreed to by the parties.

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SECTION 01 10 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Description of construction delivered under multiple prime contracts.
2. Restrictions that affect construction operations.
3. Use of buildings, premises and site.

1.2 GENERAL SUMMARY OF WORK AND ADDITIONAL DEFINITIONS

A. Owner: Fairfield Community School District

B. Project Location: Fairfield, Iowa

C. General Scope: Project consists of Construction Activities required for the Fairfield Community School Districts existing school building renovation and addition for the middle school expansion project as described within the scope of the Contract Documents.

1. Work Included: Provide labor, materials, articles, equipment, incidentals, items, tools, services, supplies, methods, operations, skills in such quantities as may be necessary to complete Project within intent of Contract Documents.
2. Singular notations shall be considered plural where plural application is reasonably inferable. Mention or indication of extent of work under work division or specification section is done only for convenience of Contractor and shall not be construed as describing all work required under that Division or Section.

D. Construction Contract: Construction will be accomplished under multiple Prime Contracts.

E. Construction Limits: Except as specifically indicated or as may be necessary to complete the Work under the Contract, activities of the Contract shall be limited to within the limits designated on Drawings.

1.3 SUBCONTRACTORS

A. Do not award work to Subcontractor without prior approval of the CM. Approval will not be given until Contractor submits List of Subcontractors containing such information as the CM may require concerning the proposed Subcontractor and scope of subcontract. (Refer to Section 01 33 00 - Submittals).

1.4 USE BY OWNER

A. Owner reserves the right to let other contracts in connection with this Project or in connection with existing buildings. This Contractor must afford other contractors' reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly connect and coordinate the contractor's work with theirs.

B. Owner reserves the right to jointly occupy the premises with Contractor in performance of Owner's duties and functions. Owner also reserves the right to: enter into the Project and premises; make installations of materials and equipment at appropriate times as the Work progresses; install equipment, furniture and furnishings when spaces are at appropriate stages of completion. Coordinate work with Owner and cooperate with Owner to minimize undue interferences.

C. If any part, unit, phase, or the entire Project is substantially complete or ready for occupancy, Owner may, upon notice to Contractor, and without prejudice to rights of Owner or Contractors, enter into and make use of work that is substantially complete.

1.5 MAINTAINING SERVICES AND FUNCTIONS

A. General: It is essential that full Owner's services and functions are maintained throughout construction period, with minimum disturbance and disruption to Owner's operations. Contractor and Subcontractors shall be aware of these requirements and objectives. Contractor must conduct work and develop a detailed schedule to meet these requirements and objectives.

B. Work at Occupied Facilities: After Owner's occupancy (full or partial) of Project or unit, stage, phase or area, work remaining to be accomplished in the occupied spaces shall be done in cooperation with, and approval by, Owner and scheduled in advance with Owner. In general, work in occupied spaces shall be done when the space is not in use, such as after hours in administrative areas or public spaces when public use hours are over for the day, unless specifically approved by Owner. Where necessary, overtime shall be used if work cannot reasonably be accomplished during normal work periods, at no extra cost to Owner. Perform work in occupied areas in a manner and at such time as will not significantly interfere with, hamper or inconvenience Owner's program or functions.

1.6 OTHER BONDS, PERMITS, FEES

A. The overall Building Permit will be paid for the by the CM.

B. Provide and pay for bonds, fees, permits, and connection fees that may be required by the City and other jurisdictions having authority. This shall also include connecting/tapping permits and fees required by municipalities to directly accomplish work under the assigned bid package scope. Additional, specific trade permit, connections, right-of-way, and excavation permits & fees shall be paid for by contractor installing a utility.

C. Request proper authorities to apply for permits and fees for sewer availability charge (SAC) and water availability charge (WAC). Owner will pay sewer and water availability charges, if any. (TAP) fees are the responsibility of the contractor performing the work.

1.7 WARRANTIES

A. In the event of conflict, inconsistency, or difference between a warranty issued by a supplier or contractor and terms of specifications, Owner, if it becomes necessary to enforce terms and provisions of warranty or specifications, may elect to enforce either submitted warranty or specifications.

1.8 ELECTRONIC FILES

A. Upon request, copies of electronic files in Architect’s current file format, including applicable layers, for each issue (bid packages, construction packages, addenda, etc.) will be provided via e-mail at Architect’s option to Contractor (preparation charges will apply, see applicable Terms and Conditions forms in spec section 013300). 3D models will NOT be available to contractors:

1. Civil Site 2D CAD Plans
2. Architectural 2D CAD

B. Architect, Owner, and CM provide no warranties express or implied with respect to electronic files, including but not limited to, Spear in type warranties, warranties of

merchantability and/or fitness for a particular purpose. Please provide the applicable Terms and Conditions with a list of drawing files requested.

1.9 COPIES OF DRAWINGS AND SPECIFICATIONS

A. Contractor will be provided with a reasonable number of printed sets (2 sets) of Drawings and Specifications free of charge. Sets will be provided only to Prime Contractors, who shall distribute to Subcontractors as Prime Contractor deems proper. Use one set for the on-site set to record changes as Record Set. It will be the prime contractor's responsibility to update the drawings with supplement information and RFI's throughout the project and all costs associated with updating the documents.

1.10 SAFETY

A. Appoint a responsible employee to act as Safety Director (fire and accident or separate individuals for each) whose duty it shall be to prevent accidents and minimize fire hazards and to enforce safety precautions. Safety Director shall develop procedures and regulations to guide Contractor, subcontractors and workers. With particular respect to existing buildings, facilities, and Owner's staff, Safety Director shall consult with and be guided by directions of Owner.

B. Compliance: Contractor and Subcontractors shall conform to and abide by requirements of Safety Director.

C. Inspection: Safety Director shall periodically inspect spaces of work under this Contract and operations of Contractor and shall promptly remove or correct hazards.

1.11 SCHEDULE REQUIRMENTS

A. Reference the construction schedule provided under section 01 43 00.

PART 2 – SCOPE OF WORK

2.1 SUMMARY

A. This section generally summarizes the work, exclusions, and special considerations as a guide to aid in the assignment of work. If a conflict regarding assignment of work exists between the drawings and specifications and this description, the Scope of Work will take precedence.
B. Contractor shall be responsible for identifying, and bringing to the attention of the CM, potential conflicts in scheduling or the interface with the work of others.
C. Unless specifically stated otherwise, incidental work required to accomplish the work of each Bid Package shall be included in the Bid for that package. This would include, but not be limited to, temporary facilities, protection of the work, security of equipment, etc.
D. Assignment of work by specification section does not exclude the applicability of other specification sections. Specification sections not assigned to a Bid Package may be cross-referenced and do establish a standard of quality for applicable work within any other Bid Package.
E. Each Contractor shall be responsible protect, repair and/or replace all items of the Project damaged as a result of its operations, included but not limited to: SWPPP protections, seeding/sod, subgrade ruts from vehicles, equipment, or deliveries, scratches in finishes, temporary covers, temporary enclosures, etc.
F. Each Contractor shall protect (or maintain existing protection measures) any finished or in place work and furnishings previously completed by other bid packages, contractors, or owner provided. This includes but not limited to: heavy craft paper, plastic sheeting, and hardened barriers.
G. Each Contractor shall complete the mockup construction and participate in testing and evaluation per the drawings and specifications as it pertains to their scopes of work in their

bid packages.

H. Each Contractor shall coordinate with and assist the Building Enclosure Commissioning (Resource LLC) and Mechanical Commissioning Providers (DLR Group) to coordinate and complete the work outlined in the specifications.

2.2 BID PACKAGES

A. Separate Contracts: The owner reserves the right and fully intends to enter into separate contracts for work to be completed for this project. The Bid Packages are as follows:

Bid Package #	Description
01	Sitework, Site Utilities, Site Paving & Seeding

B. Construction Procedures: The CM will not bid or perform any work on any of the Bid Packages.

C. Points of Clarification: Although the following clarifications assign work to particular Bid Packages, it is the responsibility of the Bidder to review all Bid Documents to ascertain the total scope of work under each Bid Package. Each statement or requirement in the Specification Section assigned to the Bid Package is a directive to the applicable Contractor, unless responsibility is specifically assigned to others.

D. General Notes:

1. Cutting and Patching: Each bid package is responsible for their own concrete and/or block cutting/coring for utilities through walls and floors unless otherwise noted. Provide patching to match existing and sleeves as required. Fire stopping to be by each trade for penetrations by their scope of work.
2. All contractors are responsible for keeping their tools, equipment, and materials neat and organized. All contractors are to participate in a daily cleaning program. There will be one day each week dedicated to a composite cleanup where everyone on site will participate.

E. Bid Package Summary of Work:

1. **Bid Package #01 – Sitework, Site Utilities, Site Paving, Seeding, & Electrical/ Telecom**
   a. Generally covered by specification sections and supplementary conditions as follows:
      1. Division 00
      2. Division 01
      3. Section 02 01 01 – Special Provisions
      4. Section 02 01 02 – Storm Water Pollution Prevention Plan
      5. Section 02 01 03 – Iowa SUDAS Specifications
         - Section 2010 – Earthwork, Subgrade, and Subbase
         - Section 3010 – Trench Excavation and Backfill
         - Section 4020 – Storm Sewers
         - Section 4030 – Pipe Culverts
         - Section 4040 – Subdrains and Footing Drain Collectors
         - Section 6010 – Structures For Sanitary and Storm Sewers
         - Section 7010 – Portland Cement Concrete Pavement
         - Section 7030 – Sidewalks, Shared Use Paths, and Driveways
         - Section 7040 – Pavement Rehabilitation
         - Section 8030 – Temporary Traffic Control
         - Section 9010 – Seeding
         - Section 9040 – Erosion and Sediment Control\
         - Section 9060 – Chain Link Fence
         - Section 11010 – Construction Survey
         - Section 11020 – Mobilization

6. Section 26 05 33 Raceways and Boxes

b. Specific Inclusions: The work in this Bid Package shall include, but not be limited to, the following:
   1. Alternates affecting this bid package: N/A
   2. Provide all required submittals for this bid package within 10 days after award of contract. The submittal process for this project will be critical to meet the schedule.
   3. Reference the geotechnical report (section 00 31 00) and abide by all requirements as defined.
   4. Reference all Drawings, including but not limited to architectural, structural, plumbing, mechanical, electrical, etc. No cost claims will be accepted for work which can be inferred from the Contract Documents
   5. Participation in the daily cleaning program as outlined in Section 01 51 00 Part 1.8 Cleaning during Construction.
   6. Compliance with OSHA guidelines, Site Safety Policy, and the Excavation Safety Standard.
   7. Include all mobilizations required to perform work in this Bid Package for phase 1, July 28, 2026-October 7, 2026, and Phase 2 March 15-March 19, 2027.
   8. As-built drawings are to be submitted within 2 weeks of final installation.
   9. Provide for a private utility locates to locate utilities not located by One Call prior to any demolition, grading, and excavation work.
   10. Provide all hoisting and equipment to complete work for this Bid Package.
   11. All testing or special inspections required to be scheduled and coordinated with CM and testing completed by Owner's testing agency.
   12. This contractor shall be solely responsible for verification that the work in this BP has been installed in accordance with the contract documents.
   13. Provide any specific trade, right-of-way, excavations, and utility tapping fees, permits, and special inspections as required by the City of Fairfield to complete this scope of work. This includes payment for such permits or tapping fees as required by the City of Fairfield.
   14. Provide surveying, staking, layout, lines, elevations and levels for all scope of work in this bid package. CM will provide (4) control points on the site for reference.
   15. Provide and maintain all SWPP plan measures. Contractors shall provide inspections including logbook and maintenance while working on site. Once demobilized, inspection logbook shall be turned over to CM for inspections and contractor shall return to site as needed to maintain the SWPPP measures.
   16. If SWPPP control is removed or damaged by this bid package it is the responsibility of this bid package to replace as was installed.
   17. Provide, inspect, maintain, and document erosion control in accordance with plan until final completion of this work. Remove SWPPP measures once they are no longer required. Return to site to maintain as directed by CM and turn over log to CM upon demobilization when work is finalized.
   18. Provide and maintain temporary laydown area and roads as required to perform the work.
   19. This Bid package must provide any temporary barricades, granular fill, and traffic control to ensure the full operation of the temporary bus loop until the completion of phase 2.
   20. Remove tree stumps at the locations shown on the drawings.
   21. Remove all paving at the location shown on the drawings.
   22. Remove all chain link fencing as shown on the drawings.
   23. Strip and stockpile topsoil. Topsoil will need to be temporarily seeded and protected from erosion to meet SWPP plan for stockpiles. No topsoil shall be hauled offsite without specific approval from the owner and/or CM.

24. Provide all site excavations, mass grading, cuts, and fills.
25. All spoils from mass grading are to be hauled offsite.
26. Provide granular material under pavements and sidewalks as indicated on plans graded to +/- 0.1' with a net balance provided.
27. Provide moisture conditioning including, but not limited to, adding water, discing/scarifying, etc.
28. Provide water as required for conditioning/reconditioning or compaction of soils, and for dust control.
29. Provide all subdrains as shown on the drawings.
30. Provide all intakes as shown on the drawings.
31. Provide all storm sewer as shown on the drawings.
32. Re-spreading and backfilling with topsoil.
33. Provide for final grading of topsoil.
34. Provide for all seeding, compost, fertilizer, and landscape edgings & borders.
35. Reseed areas where turf & grasses are not established.
36. If erosion controls & erosion mats are needed to establish turf & grasses then it is the responsibility to provide them with this bid package.
37. Note civil and architectural drawings for extent of removals but not limited to CD & AD pages. (IE: SOG, Foundations, Structure, Roofing, etc.)
38. State and Local Permits for structure removals.
39. Coordinate with CM concerning demolition items that must be reused/reinstalled at a later date.
40. Multiple phases of tie-into existing bus loop.
41. Provide final grading of granular material under walks and paving when pavement is on granular base. Granular material is provided by Bid Package 1 to +/- 0.1' with a net balance.
42. Provide final grading of soil material under walks and paving when pavement is on soil base. Granular material is provided by Bid Package 1 to +/- 0.1' with a net balance.
43. Provide edge forms, reinforcing, placing, finishing of concrete paving and sidewalks.
44. Provide fill material, as specified on the design drawing, to the top of paving for the phase 3 area. This fill is to be separated from the modified subbase with a fabric to prevent contamination of the modified Subbase and allow easier removal during the future bid issuance.
45. Install all chain link fencing as shown on the drawings.
46. Provide all Concrete paving included in Phase 1 and 2. Phase 3 will be addressed in a future bid package.
47. Provide all concrete sidewalks. Including the temporary sidewalk shown on the drawings.
48. Provide for the rapid schedule of Phase 2 during the 2027 Spring Break, March 15-March 19. Reference the schedule in section 01 43 00
49. Provide for an M-mixture concrete for phase 2 to allow the school to have bus traffic on the completed bus loop starting after the 2027 spring break, March 22, 2027.
50. Saw cutting and joint sealing of concrete paving and walks.
51. Include excavation, forming, concrete placing, pumping, conveying equipment including hoses, temporary ramps, and labor to operate.
52. Provide pavement striping and site signage as indicated and not limited to the following: stop signs, no parking, speed limit, bus stop, cross walk, handicap. Include pavement striping and markings on exterior concrete basketball court / play area as shown on the drawings.
53. Provide detectable warning panels at pedestrian curb ramps, as indicated.
54. Excess concrete shall be disposed of off-site.
55. Schedule coordination of work with CM before proceeding with work.
56. Provide and install the Conduit pathways for future work as shown on the

drawings.

57. Provide and install the handholds as shown on the drawings
58. Disconnect and reconnect existing fiber and telecommunications lines to the existing middle school. These lines need to be reinstalled and operational by August 18, 2026.
59. This contractor shall be solely responsible for verification that the work in this BP has been installed in accordance with the contract documents.
60. This contractor shall establish and maintain a concrete truck wash down area during concrete operations. Coordinate this area with the jobsite's SWPP program. Area shall be cleaned up and hauled off at the completion of this contractor's scope of work.
61. Provide barricades to the west and east ends of phase 1 after substantial completion to prevent unwanted traffic until the completion of phase 2.
62. Maintain SWPP until Bid Issue 2, anticipated start date of March 2027. This bid package is to turn over all records to the new bid package carrying the SWPP responsibility. This is to be coordinated with the CM.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Alternates.

B. Procedures for pricing Alternates.

1.02 ACCEPTANCE OF ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1.03 SCHEDULE OF ALTERNATES

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 29 00
PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Procedural requirements for processing the following:
   1. Schedule of Values.
   2. Cash flow projections for the project.
   3. Unit Prices (if any).
   4. Payment applications.
   5. Payments at substantial completion
   6. Payment at final completion.
   7. Identification of substitutions and alternatives in payment requests.
   8. Accounting of Change Order amounts and allowances, and similar cost and payout related requirements.

1.2 SCHEDULE OF VALUES

A. General:
   1. Prepare the Schedule of Values, as required by General Conditions, in coordination with the preparation of the progress schedule.
   2. Correlate the line items of the Schedule of Values with other administrative schedules and forms required for the work, including the following:
      a. Progress schedule.
      b. Payment request form.
      c. Listing of subcontractors.
      d. Schedule of alternates.
      e. Listing of products and principal suppliers and fabricators.
      f. Schedule of submittals.
   3. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports.
   4. A breakdown of principal subcontract amounts will be required (several line items).
   5. At Contractor's option, values may be rounded off to nearest whole dollar, but total must equal the Contract Sum.
   6. Submit 3 copies of Schedule of Values to Construction Manager.

B. Time Coordination:
   1. In the coordination of initial submittals and other administrative "start-up" activities, submit the Schedule of Values to the Construction Manager no later than 7 days before the initial payment request is to be submitted.

1.3 PAYMENT REQUESTS

A. General:
   1. Except as otherwise indicated in the Contract Documents, comply with the procedures and requirements of the General Conditions, including the submittal of supporting documentation and waivers or releases of lien.
   2. Refer to General Conditions for requirements concerning "retainage" by Owner on payment.
   3. Except as otherwise indicated, sequence of progress payments shall be made on a regular basis, and each must be consistent with previous applications and payments.

B. Payment Application Times:

1. The period of construction work covered by each payment request is the period indicated in the Supplementary Conditions.

C. Application Preparation:
   1. Payment Application Forms: AIA Document G732-2009 (formerly G702/CMa-1992 Application and Certificate for Payment, Construction Manager as Adviser Edition) and G703-1992 Continuation Sheet.
   2. Except as otherwise indicated, complete every entry provided for on the form, including the notarization and execution by authorized persons.
   3. Incomplete applications shall be returned by the Construction Manager without action.
   4. Entries must match current data of both the Schedule of Values and Progress Schedule and Report.
   5. Listing must include amounts of Change Orders approved prior to the last day of the "period of construction" of the application.

D. Initial Payment Application: The following must be received by the Construction Manager prior to submittal of the first payment application.
   1. Listing of subcontractors and principal suppliers and fabricators.
   2. Schedule of values.
   3. Progress schedule.
   4. Schedule of submittals.

E. Application at Time of Substantial Completion:
   1. Following the issuance of the Architect's "Certificate of Substantial Completion", and also, in part as applicable to prior certificates on portions of completed work as designated, a "special" payment application may be prepared and submitted by the Contractor.
   2. The principal administrative actions and submittals which must precede or coincide with such special applications are specified in the General Condition, and elsewhere in the Contract Documents.

F. Final Payment Application:
   1. The administrative actions and submittals which must proceed or coincide with submittal of the final payment application can be summarized as follows, but not necessarily limited to these:
      a. Completion of project closeout requirements.
      b. Completion of items specified for payment application at time of substantial completion (regardless of whether such application was made).
      c. Assurance, satisfactory to Construction Manager, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.
      d. Transmittal of required project construction records to Construction Manager.
      e. Proof, satisfactory to Construction Manager, that taxes, fees and similar obligations of the Contractor have been paid.
      f. Removal of temporary facilities, services, surplus materials, rubbish and similar provisions.
      g. Change over of door locks and other Contractor access to Owner's property.
      h. Consent of Surety for Final Payment.

G. Application Transmittal:
   1. Submit four executed copies of each payment application, include one copy with completed waivers of lien and similar attachments.
   2. Transmit each copy with a transmittal form listing those attachments, and recording appropriate information related to the application in a manner acceptable to the Construction Manager.
   3. Transmit to Construction Manager to ensure receipt within 24 hours.

PART 2-PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

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SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Coordination of Work of Contract from beginning of construction activity through Project closeout and warranty periods.

B. Related Sections:
   1. General Conditions.
   2. Section 00 10 00 - Summary of Work.
   3. Section 01 33 00 - Submittal Procedures.
   4. Section 01 51 00 - Construction Facilities and Temporary Controls.
   6. Section 01 73 29 - Cutting and Patching.
   7. Section 01 78 00 - Closeout Submittals.
   8. Section 01 32 16 - Progress Schedules and Reports.

1.2 SUBMITTALS

A. Coordination Drawings: Submit in accordance with Section 01 33 00, and as specified herein.

1.3 COORDINATION SCHEDULING

A. Schedule Coordination: Special coordination and cooperation efforts are required for certain interrelated phases of the work, such as:
   1. Sequencing of work.
   2. Construction of temporary spaces and facilities;
   3. Removals and relocations of existing services and facilities;
   4. Ceiling work; connecting the Owner's equipment;
   5. Installation of and connections to new utilities;
   6. Providing and maintaining temporary heat and other temporary facilities; and similar work.

B. Coordinate scheduling, work activities, submittals, including deferred approvals (if any), Owner's separate contracts (if any), Owner’s material/product direct purchase (if any), and work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

C. Coordinate sequence of Work to accommodate any Owner's separate contracts and Owner Occupancy as specified in Section 00 10 00.

D. General: The nature of the Project makes it imperative that the Contractor and all subcontractors coordinate their work and cooperate with each other and the CM as the agent of the Owner from the start of the Project to completion.
   1. The CM shall establish the overall schedule for the progress of the Project, the sequence of completion and general use of the site.

E. Notice: Give adequate and timely notice of various work phases and operations which will affect the work of, or will require installations or other action by others.
   1. After timely notification by the CM of the need to accomplish a particular phase or element of the Work, the Contractors shall, within a reasonable time, perform their work as not to delay or impede others or the progress of the Project.

F. Set up control procedures so that approved schedules are adhered to. Contractor's responsibility is to properly notify the CM of anticipated and actual time delays.
   1. Refer to General Conditions.

G. Contractor's job superintendent shall be on the job continuously during the execution of the work of the contract. This includes supervision of subcontractors.
   1. Refer to General Conditions.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Not used.

PART 3 EXECUTION

3.1 COORDINATION/ENGINEERING DRAWINGS:

A. Prepare and submit complete 1/4 inch = 1 foot 0 inches coordination drawings, including plans, sections, details, etc., indicating the complete layout and all mechanical and electrical equipment in all areas and within the ceiling spaces for new and existing conditions, including bottom of duct, pipe, conduit and elevations.

B. Each of these Contractors shall be responsible to ensure that all relevant mechanical and electrical equipment, piping, conduit, ceiling hangers, etc., is shown and will fit.

C. Conflicts shall be resolved by the Contractors, CM and Architect.
   1. Submit completed and fully coordinated drawings and provide six (6) copies to the CM, together with Contractor’s comments indicating possible areas of conflict for review prior to start of construction.

D. Contractor is responsible for providing all vertical sections through floors showing structural physical restraints, architectural restraints, plenum spaces and all other physical obstructions that may affect the work.
   1. Provide for integration of the work, including work first shown in detail on shop drawings or product data.
   2. Show sequencing and relationship of separate units of work which must interface in a restricted manner to fit in the space provided, or function as indicated.
   3. Coordination drawings are considered shop drawings and must be definitive in nature.

E. Electronic reproduction or photo reproduction of Architectural drawings will not be acceptable.

F. At completion of work, all coordination drawings shall be submitted together with record drawings of general, mechanical, electrical, plumbing and fire protection trades in accordance with Section 01 33 00 – Submittal Procedures.

G. Review of Coordination/Engineering Drawings is for design intent only and shall not relieve the Contractor from overall responsibility for coordination of all work performed pursuant to the Contract, or from any other requirements of the Contract.

3.2 EQUIPMENT COORDINATION

A. Install equipment in accordance with manufacturer's recommendations and instructions.
   1. Refer to Section 01 64 00 - Owner-Furnished Products.

B. Equipment Coordination: With respect to mechanical and electrical features of Contractor and Owner supplied equipment, complete data must be exchanged directly between the Contractor and those vendors and subcontractors involved as the progress of the Project requires.
   1. The person requesting the information shall advise when it will be required.
   2. Examine Owner's existing equipment and determine the rough-in data. Owner will furnish data for equipment purchased by Owner. Owner will disconnect equipment and relocate to new space for connections by Contractor.
   3. Consult Owner to verify status of rough-in data.
   4. If rough-in details are not available at the time service systems are being installed, postpone final rough-in until data is available.

C. Subcontractors for casework and equipment are expressly required to provide large scale layout drawings for casework and equipment showing the required rough-in locations of all services (dimensioned from building features) service characteristics, and locations of studs where the location is critical to mounting or otherwise installing equipment and casework.
   1. Furnish sizes and spacing required for mechanical and electrical cutouts, and a complete brochure of fittings, sinks, outlets, or other information to provide complete data on the items and accessories being furnished.

D. In the event of incorrect, incomplete, delayed or improperly identified information, the entity causing the delay or error shall be responsible and pay for any modifications or replacements necessary to provide a correct, proper and new installation, including relocations required.

E. Services: Rough-in sleeves for waste and other services passing through the floor shall be installed prior to pouring the floors if data is available.
   1. Core drilling for holes may be done to facilitate job progress or to more accurately locate holes with permission of the Architect, without additional reimbursement.

F. Sleeves are required at core drilled holes. Where permission is obtained to omit sleeve, drill hole one inch larger than the outside diameter of the pipe or conduit, or one inch larger than outside diameter of insulation, where insulated.
   1. Refer to Section 01 73 24 - Anchorage and Sleeving.

3.3 FIELD DIMENSIONS FOR CASEWORK AND EQUIPMENT

A. Accurate field dimensions are required in ample time to permit fabrication of casework and equipment for delivery and installation in accordance with the schedule.
   1. To obtain dimensions and to prevent fabrication delay, cooperate in completing work phases to accommodate the schedule.

B. Be responsible for obtaining correct field dimensions and informing the various fabricators before start of construction.
   1. Refer to Section 01 64 00 - Owner Furnished Equipment.

3.4 MEETINGS

A. Pre-Construction Meeting: After award of contract, at time designated by the CM, the Contractors shall attend a Pre-Construction Meeting.

1. Procedures to be followed, critical work sequencing, coordination efforts and similar matters will be reviewed.

B. Progress Meetings: During construction, periodic site meetings will be held with the Contractors and major Subcontractors.
   1. These meetings will be held weekly and may be held more frequently if job progress and needs indicate.
   2. Contractors and major Subcontractors shall have one or more responsible representatives in attendance.

3.5 COORDINATION OF SPACE

A. Coordinate use of Project space and sequence of installation of mechanical and electrical work which is indicated diagrammatically on Drawings.
   1. Follow routings shown for pipes, ducts, and conduits as closely as practicable, with due allowance for available physical space; make runs parallel with lines of building.

   2. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

B. In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

C. Off-Site Fabrication: Off-site fabrication is encouraged as much as possible and deliveries scheduled so materials and equipment can be installed immediately after delivery.
   1. Alert and advise others of the need to hold deliveries until they are notified the materials are required on the site.

D. Notice: Give adequate and timely notice of various work phases and operations which will affect the work of, or will require installations or other action by others.
   1. After timely notification by the Contractor of the need to accomplish a particular phase or element of the Work, the Contractor shall, within a reasonable time, perform their work as not to delay or impede others or the progress of the Project.

E. Coordination of phases of the work: Special coordination and cooperation efforts are required for certain interrelated phases of the work, such as:
   1. Sequencing of remodeling work; construction of temporary spaces and facilities; removals and relocations of existing services and facilities; ceiling work; connecting the Owner's equipment; installation of and connections to new utilities; connections to existing buildings; demolition work; providing and maintaining temporary heat and other temporary facilities; and similar work.

3.6 LABELS, NAMEPLATES AND TRADEMARKS

A. Provide permanent nameplate on each item of service-connected or power-operated equipment. Locate nameplate on easily accessible surface.
   1. Nameplate shall indicate manufacturer, model number, serial number, capacity, speed, electrical characteristics and similar essential operating data.

B. UL fire rating labels and other labels which must be visible after installation shall be located on inconspicuous surfaces.
   1. Other labels and trademarks shall be located on concealed surfaces or shall be removable without damaging surfaces.
   2. Do not permanently attach or imprint labels or trademarks on surfaces which will be exposed to view in occupied spaces.

C. Do not paint, deface or conceal required nameplates or labels.

3.7 COORDINATION OF CLOSEOUT PROCEDURES

A. Coordinate completion and cleanup of work of separate trades in preparation for Owner occupancy.

B. After Owner occupancy of premises, coordinate access to site by various trades for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

C. Assemble and coordinate closeout submittals specified in Section 01 77 00.

END OF SECTION

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SECTION 01 31 50.1
SITE SAFETY POLICY

1. GENERAL SAFETY AND HEALTH PROVISIONS

1.1. All contractors assume the responsibility for complying with 29 CFR 1926, OSHA Standards for the Construction Industry for their portion of the work, including any portion of their work which is subcontracted.

1.2. Each contractor shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury. Contractors shall maintain records of all employees' safety training.

1.3. The use of any machinery, tool, material or equipment which is not in compliance with any applicable OSHA requirement is prohibited. Such machine, tool, material or equipment shall either be immediately repaired, identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from the job site.

1.4. In order to maintain the highest levels of safety, the Construction Manager (CM) will conduct and document at least one weekly job site safety audit. Safety observations will be made during all work activities. Contractor site management will be notified of identified hazards or unsafe behavior. Failure to correct the identified hazards or unsafe behavior will result in the following:

1.4.1. 1st repeat - A letter being sent to the contractor's main office requesting follow up; any individual not complying with the Site Safety Policy can be removed for the job site at the CM's request.

1.4.2. 2nd repeat - A letter to the owner recommending that all pay requests be withheld until the contractor corrects all identified hazards and unsafe behavior observed and has provided details of the corrective action in writing.

1.4.3. 3rd repeat - A letter to the owner recommending a 3-day contract termination notice be issued to the contractor.

1.5. Accident Reporting

1.5.1. All employees shall be instructed to report all injuries or damage to equipment or property to their Supervisor immediately. Supervisors shall contact the Owner's Representative as soon as practical once they have been notified of an employee injury. The supervisor shall report:

1.5.1.1. Name of injured employee

1.5.1.2. Accident location

1.5.1.3. Witnesses, if any

1.5.1.4. Nature of injury

1.5.2. All accidents that result in injury to workers, regardless of their nature, shall be investigated and reported. Written accident investigation reports shall be submitted to the CM. If the contractor does not have their own form, they shall use an Accident Investigation form which can be provided by the CM.

1.5.3. Each contractor shall have emergency contact information posted on-site. As a minimum, it will include emergency numbers, the name and phone number for a doctor and hospital designated for treatment by the Company.

1.5.4. Contractor supervisors, managers, directors and officers shall participate in incident analysis as requested by the CM.

1.6. All contractors shall provide and maintain a first-aid kit on site for employee use.

1.7. Work areas must be kept clean and free from hazards. Housekeeping shall be conducted at the end of each shift or more frequently as requested by the CM.

1.8. AM/FM Radios, CD players, MP3 players, DVD players and similar audio-visual equipment with or without ear buds are prohibited on site.

1.9. Prior to taking any photos on site, each contractor shall get approval from the Owner.

1.10. Tobacco is prohibited on all jobsite grounds, including the use of E and Vape type cigarettes.

1.11. Contractors shall provide an adequate supply of drinking water for all of their employees. Disposable drinking cups shall be provided for the employees and a trash receptacle for the disposable drinking cups shall be provided by the contractor.

1.12. The CM shall provide toilet facilities for contractor employees.

1.13. Contractor employees are prohibited from using the owner's lavatory/bathroom, eating or drinking facilities unless directed otherwise.

1.14. Contractors shall maintain a copy of all Safety Data Sheets (SDS) for all applicable chemicals brought on site. Contractors are responsible for employee training in accordance with 29 CFR 1926.59, Hazard Communication.

1.15. All contractor employees must attend a jobsite safety orientation and sign an attendance sheet prior to starting work onsite. Orientations will be scheduled by the CM.

2. PERSONAL PROTECTIVE EQUIPMENT

2.1. Basic PPE requirements shall be in accordance with 29 CFR 1926 Subpart E and contract documents.

2.2. Dress Code - All employees shall wear a minimum of 3" sleeve on shirts. Sleeveless shirts and tank tops are prohibited. Employees shall wear long pants made of denim or equivalent material; shorts are prohibited. All clothing shall be free of large holes and offensive language or illustrations. Type 2 Hi-vis clothing to be worn while construction equipment is operating, bright or "Hi-Vis" (ex: safety orange or green) for all other activities. The CM has the sole discretion to determine if clothing meets the requirements of this rule.

2.3. The worksite requirements are 100% use of hard hats, safety glasses and appropriate work boots, no sneakers or sandals. Appropriate gloves are to be worn for assigned work activity and materials to be handled. Full-face shields are required when operating chop saws or similar power tools. Hard hats shall meet ANSI standards, no backwards hard hats or ball caps under hard hats; they must be free of offensive language or illustrations. The CM has the sole discretion to determine if PPE meets the requirements of this rule.

2.4. Safety glasses and hard hats will be issued to contractor employees who do not have them at the beginning of the shift. The contractor shall be charged $25 for each pair of safety glasses

and $50 for each hard hat issued to their employee(s). Once issued, safety glasses and hard hats cannot be turned in for credit.

2.5. Additional PPE requirements may be required based on the hazards present when performing a specific task. The CM may identify additional PPE requirements as necessary for OSHA compliance.

3. FIRE PREVENTION AND PROTECTION

3.1. Basic Fire Prevention and Protection requirements shall be in accordance with 29 CFR 1926 Subpart F and contract documents. Each contractor shall provide the number and type of fire extinguishers appropriate for their type of work activity. After the building is enclosed the General Construction/Trades Contractor will provide according to the standard.

3.2. A Hot Work Permit shall be submitted by the contractor to and approved by the CM for any activity or operation which produces a source of ignition (spark or flame). Such activities include but are not limited to:

- 3.2.1. Gas welding and cutting
- 3.2.2. Electric arc welding
- 3.2.3. Heating torches and other open flames
- 3.2.4. Soldering
- 3.2.5. Thawing
- 3.2.6. Portable heaters (electric or gas)
- 3.2.7. Tar pots or kettles
- 3.2.8. For any work involving flame, or high heat, producing equipment used in any area of moderate fire exposure.
- 3.2.9. For any work involving flame, or high heat, producing equipment used in any area of high fire exposure.

3.3. The following fire prevention actions shall be completed before hot work begins:

- 3.3.1. Combustibles shall be moved at least 35 feet from the hot work operation. If combustibles cannot be moved, they shall be protected by fire blankets.
- 3.3.2. Flammable liquids shall be removed from the area or totally isolated from the vicinity of the hot work operation.
- 3.3.3. Floor wall and other openings shall be closed or covered; this includes floor drains.
- 3.3.4. Combustible dust shall be cleaned from the vicinity of the hot work operations.
- 3.3.5. Where surrounding floors are of combustible construction, they shall be protected by fire blankets.

3.4. Disabling existing fire or smoke detection equipment is prohibited except by a certified contractor in coordination with the CM.

3.5. Disabling existing fire suppression equipment (sprinklers) is prohibited except by a certified contractor in coordination with the CM.

3.6. Fire watches shall be required whenever:

- 3.6.1. Hot work is performed in locations where other than a minor fire might develop.
- 3.6.2. Hot work is performed inside of or any portion of the existing buildings.
- 3.6.3. Appreciable combustible materials are closer than 25’ to the point of operation.
- 3.6.4. There are wall or floor openings within 35 ft of the point of operation.

3.7. When required, Fire Watches shall be maintained for at least 30 minutes after completion of the hot work to look out for any smoldering or other fire.

3.8. The Contractor shall coordinate flammable storage area locations with the CM. Flammable Storage Areas shall be fenced in with orange snow fence. Signage for flammable storage area and no smoking shall be placed on all four sides of the fence.

3.9. Oxygen and other incompatible materials shall not be stored within 25 feet of the flammable storage area.

4. SIGNS, SIGNAL AND BARRICADES

4.1. Basic sign, signal and barricade requirements shall be in accordance with 29 CFR 1926 Subpart G and contract documents. The Contractor shall provide the number and type of signs, signals and barricades appropriate for their type of work.

5. MATERIAL HANDLING, STORAGE, USE AND DISPOSAL

5.1. Basic Material Handling requirements shall be in accordance with 29 CFR 1926 Subpart H and contract documents.

5.2. No material shall be stored within 6 feet of an access or egress of the existing building.

5.3. All lay down areas and staging areas shall be approved by the CM. All Material Handling Equipment (MHE) operators shall be trained and/or certified on the equipment they operate in accordance with applicable OSHA standards.

5.4. Rigging equipment shall be used only for it's intended use and shall not be loaded in excess of its rated capacity.

5.5. Free rigging from fork lift tines is prohibited unless the contractor has written approval from the rigging and forklift manufacturer.

5.6. Contractor must follow all EPA, DNR and other applicable regulations relating to the handling and disposal of all hazardous or other regulated material and waste.

6. TOOLS - HAND AND POWER

6.1. Basic Material Handling requirements shall be in accordance with 29 CFR 1926 Subpart I and contract documents.

6.2. The contractor shall not restrict the operation of, remove or otherwise disable the guard or other safety device on any tool.

6.3. The T-handle must be installed on all ½" or larger portable drills.

6.4. All pneumatic hose line connections must be secured with cotter pins and whip lines or equivalent.

6.5. Air used for cleaning shall be regulated, by the user, to a maximum of 30 psig.

6.6. Hand tools shall be kept in good condition - sharp, clean, oiled, dressed. Damaged or defective tools shall be taken out of service and tagged "DO NOT USE" until properly repaired, removed from job or disposed of.

7. WELDING AND CUTTING

7.1. Basic Welding and Cutting requirements shall be in accordance with 29 CFR 1926 Subpart J and contract documents.

7.2. Prior to starting any welding or cutting operation, a Hot Work Permit shall be completed and approved as described in Section F, Fire Protection and Prevention

7.3. All welding equipment shall be inspected daily prior to use. Damaged or defective equipment shall be taken out of service and tagged “DO NOT USE” until repaired.

7.4. A minimum one 10 lb. ABC rated fire extinguisher shall be readily accessible (within 25 feet of travel distance) to all welding and cutting operations.

7.5. Arc welding and cutting operations shall be shielded by noncombustible or flameproof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

7.6. Spark containment shall be utilized during all welding, burning and grinding operations. Spark containment may include laying fire blankets, placing barricades, totally enclosing the spark producing operation, or by the use of a fire watch. Employees working around or below the welding, burning or grinding operation shall be protected from falling or flying sparks

7.7. Areas where welding or cutting operations are performed shall be monitored for 30 minutes after the last welding or cutting operation to check for smoldering or fires which may have gone undetected during the welding or cutting operation. All welding and cutting must be completed 30 minutes prior to the end of a shift.

7.8. All oxygen and acetylene equipment shall have a check valve between the torch and the regulator.

7.9. Acetylene shall not be adjusted above 15 psig.

8. ELECTRICAL SAFETY

8.1. Basic Electrical Safety requirements shall be in accordance with 29 CFR 1926 Subpart K and contract documents.

8.2. All temporary 120 VAC outlets on the job site shall be protected by GFCI.

8.3. All temporary electrical installations, including temporary lighting shall meet the requirements of latest edition of NFPA 70 National Electric Code.

8.4. All electrical work shall be performed in accordance with NFPA 70E, Electrical Safety Related Work Practices.

8.5. All extension cords shall have a permanent and continuous path to ground. They shall be rated for hard or extra hard usage and shall be a rated S, SJO, SJT, SJTO, SO, ST and STO. Cords shall be inspected daily; damaged or defective cords will be tagged “DO NOT USE” and removed from use for repair, removed from job or disposed of.

8.6. All electrical equipment shall be listed and labeled as to its intended use and purpose. Electrical equipment shall only be used in accordance with its listing and labeling.

9. SCAFFOLDS

9.1. Basic Scaffold Safety requirements shall be in accordance with 29 CFR 1926 Subpart L and contract documents.

9.2. Rolling scaffolding shall have all wheels locked when personnel are aloft. Moving rolling scaffold with personnel on board is prohibited.

9.3. Ladders rungs shall not be used to support scaffold planking.

9.4. Contractor employees must know the capacity of the scaffold they are working on and must not exceed the rated capacity of the scaffolding.

10. FALL PROTECTION

10.1. Basic Fall Protection requirements shall be in accordance with 29 CFR 1926 Subpart M and contract documents.

10.2. 100% Fall Protection at 6 feet is required.

10.3. At the CM's request the contractor shall provide a Site-Specific Fall Protection Plan which contains all the details and requirements in Appendix E to Subpart M. When required, the contractor shall not start work until the Site-Specific Fall Protection Plan has been reviewed and approved by the Owner's and the contractor employees have been trained on the Site Specific Fall Protection Plan. Documentation of the training must be available on site.

11. HELICOPTERS, HOISTS, ELEVATORS AND CONVEYORS

11.1. Basic requirements for Helicopters, Hoists, Elevators and Conveyors shall be in accordance with 29 CFR 1926 Subpart N and contract documents.

11.2. Contractors shall operate and maintain elevators and hoisting equipment in accordance with equipment manufacturer's specifications and limitations applicable to its operation.

12. MOTOR VEHICLES AND MECHANIZED EQUIPMENT

12.1. Basic requirements for Motor Vehicles and Mechanized Equipment shall be in accordance with 29 CFR 1926 Subpart O and contract documents.

12.2. The use of seat belts is mandatory in all motor vehicles and mechanized equipment.

12.3. A minimum of a 2 lb ABC rated fire extinguisher shall be maintained in all mechanized equipment.

12.4. All bi-directional equipment with an obstructed view to the rear shall be equipped with a back-up alarm.

12.5. Contractors who track mud or other debris onto public roadways and walkways shall be responsible for the immediate clean-up of the roadway(s).

12.6. Motor vehicles and mechanized equipment shall not be left unattended while engines are running.

13. EXCAVATIONS

13.1. Basic requirements for Excavations shall be in accordance with 29 CFR 1926 Subpart P and contract documents.

13.2. The excavating contractor shall be responsible for obtaining underground utility locates prior to the start of excavation operations. Underground locates must be updated every 20 days.

13.3. A Competent Person shall daily evaluate the soil and document the inspection to assure proper sloping, benching or protective systems and egress are in place for the safety of personnel in and around the excavation.

14. CONCRETE AND MASONRY CONSTRUCTION

14.1. Basic requirements for Concrete and Masonry shall be in accordance with 29 CFR 1926 Subpart Q and contract documents.

14.2. Employees should wear appropriate clothing, boots and gloves to avoid contact with skin of hands and feet while working with concrete.

14.3. When concrete is being pumped, employees on the discharge end of the hose shall be provided with and wear a full-face shield.

14.4. Power trowels must be equipped with “dead man” switch.

14.5. A Limited Access Zone (LAZ) shall be established in accordance with Subpart Q, whenever a masonry wall is being constructed.

14.6. Temporary bracing shall be provided in accordance with Subpart Q for all masonry walls over 8 feet high. Temporary bracing shall meet the design requirements detailed in the Standard Practice for Bracing Masonry Walls Under Construction developed by the Council for Masonry Wall Bracing, July 1999. Temporary bracing may be omitted if approved in writing by the Project Engineer of Record.

14.7. An independent testing agency shall confirm the concrete has met a minimum of 75% of its design strength based on cylinder testing and that there were no field modifications to any anchor bolts. If there was a field modification to any of the anchor bolts, the contractor shall acknowledge the modification and provide approval for the modification by the Project Engineer of Record.

15. STEEL ERECTION

15.1. Basic Fall Protection requirements shall be in accordance with 29 CFR 1926 Subpart R and contract documents.

15.2. The contractor shall provide a Site-Specific Steel Erection and Fall Protection Plan which contains all the details and requirements in Appendix A to Subpart R.

15.3. The contractor shall not start work until the Site-Specific Steel Erection and Fall Protection Plan has been reviewed and approved by the CM and the contractor employees have been trained on the Site Specific Erection and Fall Protection Plan. Documentation of the training must be available on site.

15.4. The contractor shall not begin erection until they receive written approval to begin erection from the CM.

16. DEMOLITION

16.1. Basic Demolition requirements shall be in accordance with 29 CFR 1926 Subpart T and contract documents.

17. POWER TRANSMISSION AND DISTRIBUTION

17.1. Basic Power Transmission and Distribution requirements shall be in accordance with 29 CFR 1926 Subpart V and contract documents.

18. ROLLOVER PROTECTIVE STUCTURES; OVERHEAD PROTECTION

18.1. Basic requirements for Rollover Protective Structures and Overhead Protection shall be in accordance with 29 CFR 1926 Subpart W and contract documents.

19. STAIRWAYS AND LADDERS

19.1. Basic requirements for stairways and ladders shall be in accordance with 29 CFR 1926 Subpart X and contract documents.

19.2. Stepladders must be set level on all four feet, with spreaders locked in place. Do not use as a straight ladder.

19.3. When stepladders are used close to the edge of an elevated platform, roof or floor opening, and when location requirements so specify, they must be tied off.

19.4. All trailers and other temporary field facilities that employees must access that have a change of elevation of 19” or more shall have a temporary stairway installed.

20. TOXIC AND HAZARDOUS SUBSTANCES

20.1. Basic requirements for Toxic and Hazardous Substances shall be in accordance with 29 CFR 1926 Subpart Z and contract documents.

20.2. Contractors must have approval prior to bringing and hazardous or toxic substances listed in Subpart Z on site or prior to disturbing any of these substances if found on site.

21. CRANES AND DERRICKS

21.1. Basic requirements for Cranes and Derricks in construction shall be in accordance with 29 CFR 1926 Subpart CC and contract documents.

21.2. Contractors will only use trained and qualified operators and riggers as per the standard and will supply any documentation including but not limited to operator training documents and maintenance records as requested by the CM.

21.3. Contractor will operate crane within the manufacturer’s specifications during all activities.

21.4. Contractor will assure the ground conditions have the ability to support the equipment and the equipment will not be assembled or used unless the ground conditions are firm, drained and grade is adequate for use.

21.5. No part of the crane, support equipment or rigging will be within 20 feet of a power line during operations, assembly or disassembly; unless power line in question is verified to be de-energized.

21.6. Critical lifts are lifts that exceed 75% of the rated crane capacity or multi crane lifts; they must have the CM approval before the lifting activity. Lifts greater than 95% of the load capacity in any configuration are NOT permitted.

This is not intended to be an all-inclusive list of health, safety or environmental regulations and is intended to be an overview for the health and safety of each person on the jobsite. Any changes or deviations from this policy must have prior written permission from the CM safety department.

END OF SECTION

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Excavation Safety Policy

1. Purpose

1.1. To assist with compliance of the OSHA Excavation and Trenching Standard and reduce or eliminate the injury potential of excavation hazards.

2. Scope

2.1. This section of the Safety and Health Program describes requirements for trenching and excavation safety for any trench or excavation that employees may enter on Carl A. Nelson and Company (CANCO) Projects.

3. Definitions

3.1. **Benching (Benching system)**: A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

3.2. **Cave-in**: The separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

3.3. **Competent person**: One who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

3.4. **Excavation**: Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

3.5. **Face or side**: The vertical or inclined earth surfaces formed as a result of excavation work.

3.6. **Failure**: The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

3.7. **Hazardous atmosphere**: An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

3.8. **Locate**: The act of identifying underground utilities and their path through an excavation by marking the surface with paint, flags or "whiskers" which are color coded by the type of utility being identified.

3.9. **Potholing**: Also known as daylighting is a term used to describe the process of hand digging or vacuum digging one or more small scale holes to positively locate a utility or other underground item.

3.10. **Shield (Shield system)**: A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

3.11. **Sloping (Sloping system)**: A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle

of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

3.12. **Stable rock**: A natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

3.13. **Surface Encumbrances**: Those things on top of the ground that could pose a hazard to employees in an excavation. Examples include: sidewalks, slabs on grade, electrical transformers or similar equipment, trees, telephone poles, above ground gas tanks, other items on the surface that could fall into or pour into an excavation.

3.14. **Structural ramp**: A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock is not considered structural ramps.

3.15. **Support system**: A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

3.16. **Tolerance Zone**: The approximate location of an underground utility facility defines as a strip of land at least 3 feet wide but not wider than the width of the underground utility plus 18 inches on either side of the utility based on the markings made by the locator or the owner or operator of the facility.

3.17. **Trench (Trench excavation)**: A narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

3.18. **Utilities**: Refer to the set of services consumed by the public: electricity, natural gas, water, communication lines and sewage. Steam, processing lines and other systems associated with our customers' processes are also considered utilities.

4. Responsibilities

4.1. Director of Safety

4.1.1. To verify compliance with this policy on a periodic basis.

4.1.2. To periodically review the implementation of this policy.

4.1.3. To update this policy as regulatory bodies or company needs arise.

4.2. Site Superintendent

4.2.1. To assure that all site employees are trained in excavation awareness in accordance with CANCO training requirements.

4.2.2. To enforce disciplinary action for violations of this policy.

5. Implementation

5.1. Utilities Locating

5.1.1. Prior to any excavation work, utilities must be located to prevent hitting or damaging any live utilities in the area. Making any excavations without first having made reasonable attempts to have a utility locate performed, a site inspection and a review of existing drawings will result in disciplinary action up to and including termination of employment (employees) or contract termination (subcontractors).

5.1.2. Each excavating contractor is required to request their own utility locate. Locates cannot be shared between contractors. A locate that is more than 2 weeks old and where no excavation

operations have been started, is classified as expired. A new locate shall be called in when an original locate has expired.

5.1.3. A minimum of forty-eight (48) hours or longer (check local codes) prior to starting an excavation, the local One Call service or private utility owner shall be contacted and a utility locate shall be completed. 811 has been established as a National One Call number. When you dial 811, it is supposed to contact you with the responsible locator within your area code. Prior to the locate activity the area of excavation must be marked with white paint or a meet must be scheduled to identify excavation area to the utility locate company or utility owner.

5.1.4. Utilities must be marked according to following color codes:

5.1.4.1. Communication/fiber optic lines will be denoted with ***orange*** flags or paint.

5.1.4.2. Power/electrical lines will be denoted with ***red*** flags or paint.

5.1.4.3. Water lines will be denoted with ***blue*** flags or paint.

5.1.4.4. Gas lines will be denoted with ***yellow*** flags or paint.

5.1.4.5. Sewer lines will be denoted with ***green*** flags or paint.

5.1.4.6. Reclaimed or landscaping water will be denoted with ***purple*** flags or paint.

5.1.4.7. Proposed excavations will be denoted with white flags or paint.

5.1.4.8. Survey marking will be denoted with ***pink*** flags or paint.

5.2. If possible, the foreman or operator of the excavation crew should meet with the public or private utility locate personnel to review the locate results.

5.3. In addition to locates, the CANCO site supervisor shall conduct a site inspection and review existing drawings, if any. The site inspection shall consist of identifying gas meters, sanitary sewer clean outs, manholes, or any other visible evidence of underground utilities which may not be located or show on existing drawings. A review of existing drawings shall also be conducted to anticipate the location of underground utilities.

5.4. One call locator typically will not locate privately owned utilities. Therefore, private utilities shall be located and marked by the private owner of the facilities. If CANCO is required by contract to locate and mark private underground utilities, we shall obtain drawings of underground utilities from the owner and utilize these in the locating and marking process. In cases where we are required by contract to locate and mark utilities owned by others, we shall limit our responsibility by contract to only those underground utilities that are shown on existing drawings provided by the owner of the utility.

5.5. When digging within 10 feet of marked and buried underground electrical lines, the excavator shall be treated the same as if it were operating within 10 feet of an overhead power line. To minimize the possibility of electrical shock, employees shall not be allowed within 10 feet of the excavating equipment.

5.6. Determining the Exact Location of Underground Utilities

5.6.1. Determining Exact Location Utilities Marked in the Tolerance Zone - All utilities in the Tolerance Zone shall be located by air/water-vacuum excavation or by hand.

5.6.2. Determining the Exact Location by Hand

5.6.2.1. In the case of a parallel utility, a pilot trench shall be hand dug and perpendicular to the utility marking the width of the tolerance zone. A pilot trench shall be repeated every 10 feet along the length of the trench being excavated. The pilot trench shall be as deep as necessary until the marked utility(s) has been exposed or 1'-0" below the planned excavation depth.

5.6.2.2. In the case of a crossing utility, a pilot trench shall be hand dug perpendicular to the utility marking the width of the tolerance zone. A pilot trench shall be as long as the width of the underground utility plus 1- 1/2 feet on either side of the utility centered on the markings. The pilot trench shall be as deep as necessary until the marked utility(s) has been exposed or 1'-0" below the planned excavation depth.

5.6.3. Machine Digging inside of Tolerance Zones - Procedures for machine digging excavations in the tolerance zone are listed below:

5.6.3.1. The marked utility(s) shall be exposed by hand or water/air vacuum.

5.6.3.2. The excavation bucket shall either not have teeth or shall have a flat plate installed over the teeth to create a smooth cutting surface.

5.6.3.3. In the case of a crossing utility, machine excavation shall not extend deeper than 1 foot above what has been hand or air-vacuum excavated.

5.6.3.4. In the case of a parallel utility, machine excavation may be made between the pilot trenches but shall be no deeper than 1 foot above what has been hand or air-vacuum excavated in the pilot trenches.

5.6.3.5. Machine excavations shall not be made within 1 foot of exposed crossing underground utilities or within 12" of parallel exposed underground utilities.

5.6.4. Unknown Utilities in the Tolerance Zone - If at any time during excavation operations a utility is encountered that was not identified during the locate and is not identified on site drawings, the following procedures shall be followed:

5.6.4.1. Every attempt shall be made to identify the utility and contact the facility owner or owner of the utility to see if the utility is still in service.

5.6.4.2. If the utility is undamaged and its status cannot be determined, it shall be treated as a live utility and procedures in 3. and 4. above shall apply.

5.6.4.3. If the utility is damaged, its status shall be determined. If it is an abandoned utility, excavation operations may proceed and the utility shall be removed or shored up so as not to present a hazard to employees. If the utility is live, the owner shall be contacted for repair and the utility shall be de-energized and shored up inside the excavation so as not to be a hazard to employees.

5.6.4.4. Never drill or cut into an unknown utility to try to determine its content of status. To do so will result in disciplinary action up to and including termination of employment (employees) or contract termination (subcontractors).

5.6.5. Driving Piles or Stakes and Drilling Holes - Piles or stakes shall not be driven or holes drilled in the ground in the Tolerance Zone until the underground facilities have been physically located. Once physically located, piles shall not be driven or holes drilled in the ground within 6" of exposed underground utilities. The procedure for physically locating unknown utilities in the Tolerance Zone shall be as specified above.

5.7. Required Actions at Given Trench and Excavation Depths

5.7.1. 4 Feet or Deeper:

5.7.1.1. Proper access must be established for any worker who enters into the trench/excavation. This could be a ladder, stair or ramp.

5.7.1.2. Maximum lateral travel distance to an access/egress point is 25 feet.

5.7.2. A confined space assessment must be conducted by a Competent Person to include air monitoring to determine whether or not entrants require ventilation, and protective equipment. NOTE: this assessment is only necessary for excavations made in soil that is

suspect for atmospheric or other contaminants (ex. A previously existing landfill, chemical plant, etc.)

5.7.3. 5 Feet or Deeper:

5.7.3.1. Cave-in protection is required. NOTE: if the Competent Person notices signs of cave-in potential before 5 feet depth, a protective system must be utilized as well. Cave-in protection systems include sloping, benching, shielding and shoring.

5.7.3.2. Stable Rock does not require cave in protection, but must be thoroughly inspected to ensure compliance.

5.7.4. 6 Feet or Deeper:

5.7.4.1. Fall Protection and/or Perimeter Protection is Required.

5.7.4.2. Anyone who will cross over an excavation or trench that is 6 feet or more in depth must be protected from falls. A common practice would be to guardrail a crossover ramp. Trenches or excavations 6 feet or more in depth that have edges which cannot be readily seen due to sudden drop-offs, excessive plant growth or other obstructions require barricades, guardrails or another system that warns others of the fall hazard.

5.7.4.3. Anyone who must approach or inspect an excavation or trench that is 6 feet or more in depth with vertical or near vertical sides must be protected by perimeter protection or positive personal fall protection.

5.8. Competent Persons

5.8.1. A Competent Person must be on site at all times when workers are reasonably anticipated to be working within excavations/trenches. Subcontractor Competent Persons' identities and qualifications must be revealed ahead of time to CANCO's site management team and their photos will be taken and posted in the site office.

5.9. Barricades

5.9.1. All excavation and trenches must be barricaded at the end of the day. A visual barricade of caution tape, rope with flagging, or equivalent may be used for excavations less than 6' in depth. Excavations that are greater than or equal to 6' in depth shall be barricaded by both a visual and physical barricade. (i.e. Chain link, orange fence, standard guardrail, Jersey barrier.)

5.10. Excavation and Trenching Hazards

5.10.1. The following list of potential hazards must be evaluated and acted upon by a Competent Person before workers are allowed to enter:

5.10.1.1. Cave-in hazards

5.10.1.2. Access and egress problems

5.10.1.3. Water seeping, running into or pre-existing in the soil

5.10.1.4. Vibration sources that could make the soil unstable

5.10.1.5. Underground utilities

5.10.1.6. Undermining of structures above and/or nearby the excavation

5.10.1.7. Struck-by hazards from falling and/or rolling rocks and debris above

5.10.1.8. Confined space issues, including hazardous atmospheres and chemical exposures

5.11. Corrective and Preventative Measures for Excavation and Trench Hazards

5.11.1. Cave-ins will be prevented or shielded to ensure workers do not become buried or struck by falling objects. The Competent Person will perform the following duties:

5.11.2. Testing the soil of the excavation or trench or pre-determining the soil to be Class C, therefore requiring the highest burden of protection under OSHA law. Once the soil type has been determined, the protective system options can be reviewed.

NOTE: Competent Persons may NOT classify soil as Class A or stable rock without the pre-approval of the Safety Director or designee.

5.11.3. Determine the appropriate cave-in protective system based on soil type and existing or predictable hazards within or around the excavation. All cave-in protection systems must meet OSHA standard requirements.

NOTE: A Registered Professional Engineer must be utilized for the protective system design for any excavation or trench that exceeds 20 feet in depth.

5.11.4. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. Where the Competent Person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

5.11.4.1. An inspection shall be conducted by the Competent Person prior to the start of work and as needed throughout the shift.

5.11.4.2. Inspections shall also be made after every rainstorm or other hazard increasing occurrence.

5.11.4.3. These inspections are only required when employee exposure can be reasonably anticipated.

5.11.5. Proper access and egress is required for any excavation/trench that is 4 feet or deeper. The access methods must comply with OSHA requirements and shall not be placed in a manner that would create greater than a 25 foot of lateral travel distance for the entrants.

5.11.6. Employees cannot work in excavations or trenches that contain water unless they are properly protected. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

5.11.7. If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

5.11.8. If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require appropriate inspections by a Competent Person as conditions change.

5.11.9. Employees exposed to public vehicular traffic or mobile construction equipment shall be provided with, and shall wear ANSI Class II warning vests at a minimum. Other suitable garments such as shirts and jackets are acceptable provided, they meet the minimum ANSI standard.

5.11.10. Concrete barricades/Jersey barriers/K-rail, should be used whenever possible to separate employees from vehicular traffic.

5.11.11. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

5.11.12. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with adequate protection for the operator during loading and unloading operations.

5.11.13. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

5.11.14. Excavations/trenches that are exposed to excessive vibration may require additional safeguards for appropriate protection.

5.11.15. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

5.11.16. Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

5.11.16.1. A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

5.11.16.2. The excavation is in stable rock; or

5.11.16.3. A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

5.11.16.4. A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

5.11.17. Sidewalks, pavements and structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

5.11.18. Employees shall be protected from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of:

5.11.18.1. Scaling to remove loose material;

5.11.18.2. Installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

5.11.19. Falling or rolling debris protection shall be provided by:

5.11.19.1. Placing and keeping such materials or equipment at least 2 feet from the edge of excavations,

5.11.19.2. Use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or a combination of both if necessary.

5.11.20. The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

5.11.20.1. Contractors must use the proper procedures and amount of notice time as required by state and local laws.

5.12. Soils Testing

5.12.1. The classification of soil shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a Competent Person using tests approved by the OSHA regulations. Both visual and manual analyses shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the soil:

5.12.1.1. In a layered soil system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

5.12.1.2. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

5.12.2. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material. Things to look for are as follows:

5.12.2.1. The range of particle sizes and the relative amounts of the particle sizes.

5.12.2.1.1. Soil that is primarily composed of fine-grained material is usually cohesive material.

5.12.2.1.2. Soil composed primarily of coarse-grained sand or gravel is granular material and not cohesive.

5.12.2.2. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

5.12.2.3. Crack-like openings such as tension cracks in the face of the excavation and spalling.

5.12.2.4. Existing utility and other underground structures, and previously disturbed soil.

5.12.2.5. Layered systems that slope toward the excavation and show evidence of previous shifting.

5.12.2.6. Surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

5.12.2.7. Sources of vibration that may affect the stability of the excavation face.

5.12.3. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly. Examples of some manual tests are as follows:

5.12.3.1. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two-inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.

5.12.3.2. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered un-fissured.

5.12.3.3. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. The more easily or difficult the thumb penetrates, the weaker or stronger the soil's cohesiveness.

5.12.3.4. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shear vane. Multiple samples must be taken from different areas of the excavation's spoils pile and their sum averaged.

5.12.4. The Competent Person bears the burden of proof for any soils classification. Written documentation must be used to back this up. REMEMBER: Competent Persons may NOT classify soil as Class A or stable rock without the pre-approval of the Director of Safety and Health or designee.

5.13. Cave-In Protection: Sloping, Benching and Shielding

5.13.1. The maximum allowable slope for excavations/trenches based on soil type is as follows:

5.13.1.1. Stable rock = vertical (90º)

5.13.1.2. Type A = 3/4:1 (53º)

5.13.1.3. Type B = 1:1 (45º)

5.13.1.4. Type C = 1½:1 (34º)

6. Attachments

6.1. Excavations Made in Type A Soil

6.2. Excavations Made in Type B Soil

6.3. Excavations Made in Type C Soil

6.4. Excavations Made in Layered Soil

6.5. Excavation Checklist

6.6. Excavation Visual

CARL A. NELSON & CO. NELSON
Design-Builder | Construction Manager | General Contractor

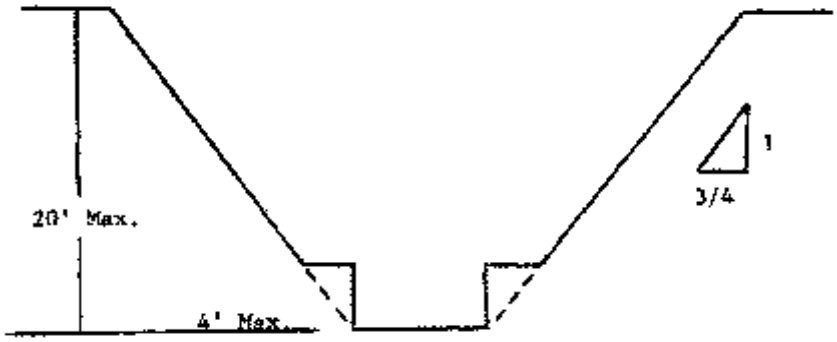
Excavations made in Type A Soil

All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of ¾:1.

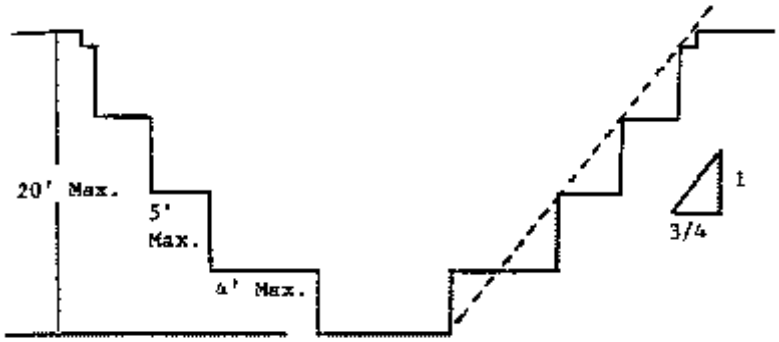


All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:

SIMPLE BENCH

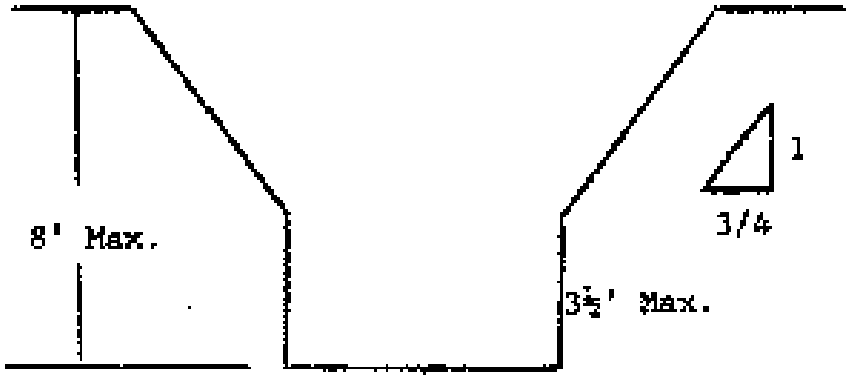


MULTIPLE BENCH



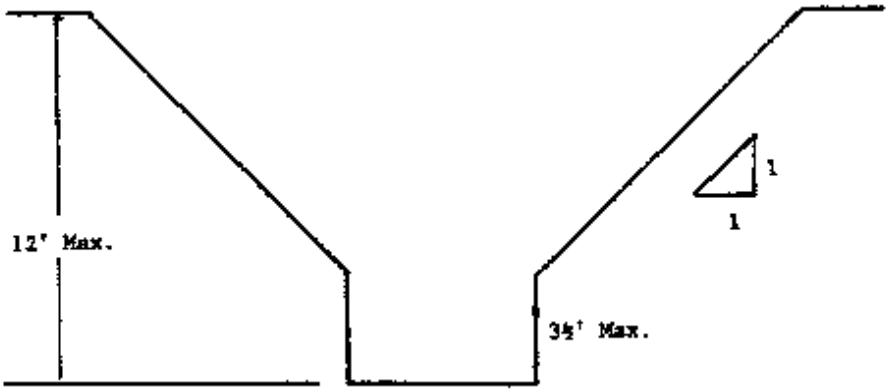
All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3½ feet.

UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH



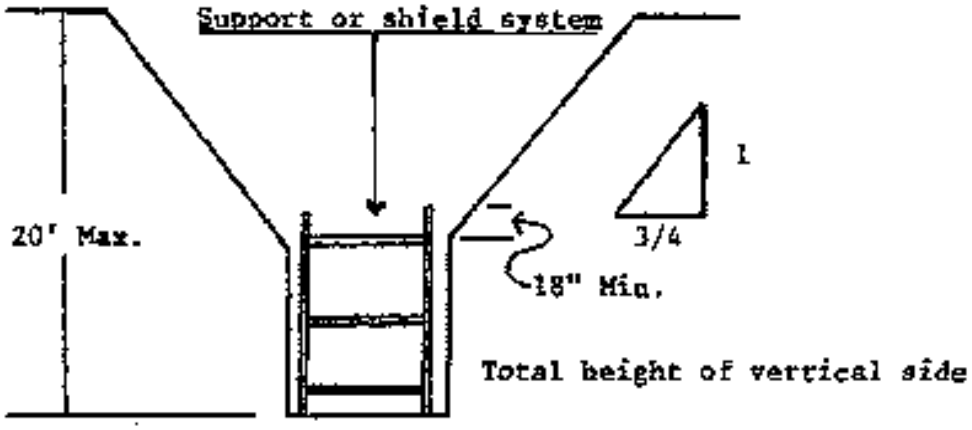
All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet.

UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH



All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION



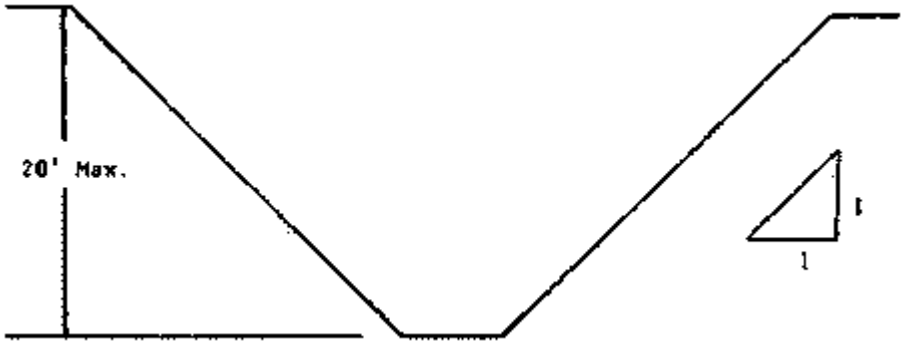
All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with the other options permitted under 1926.652(b).

CARL A. NELSON & CO. NELSON
Design-Builder | Construction Manager | General Contractor

Excavations Made in Type B Soil

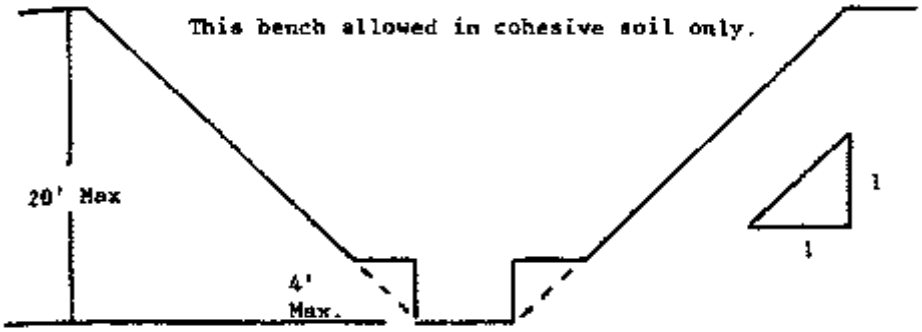
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.

SIMPLE SLOPE

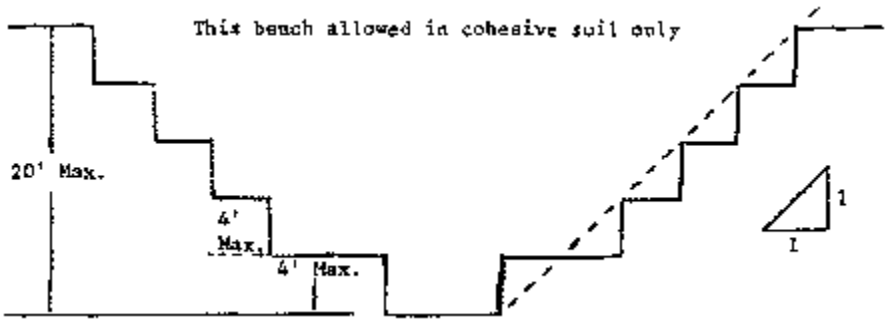


All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

SINGLE BENCH

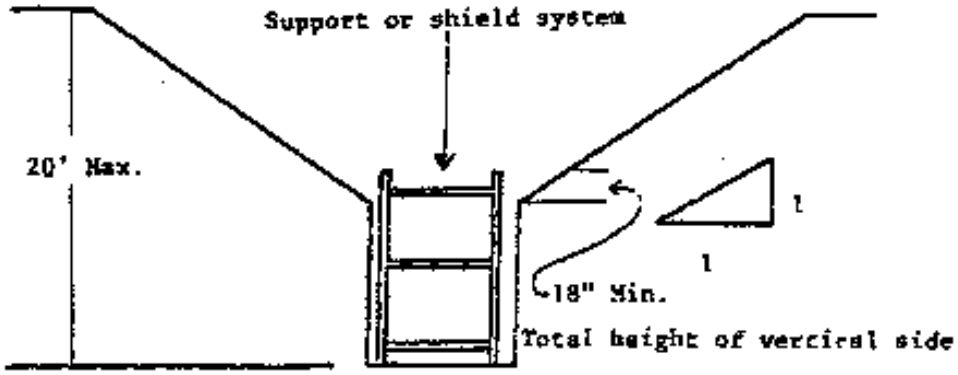


MULTIPLE BENCH



All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1.

VERTICALLY SIDED LOWER PORTION



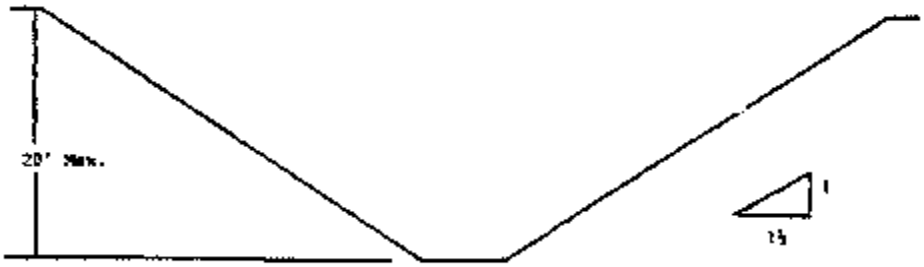
All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

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Excavations Made in Type C Soil

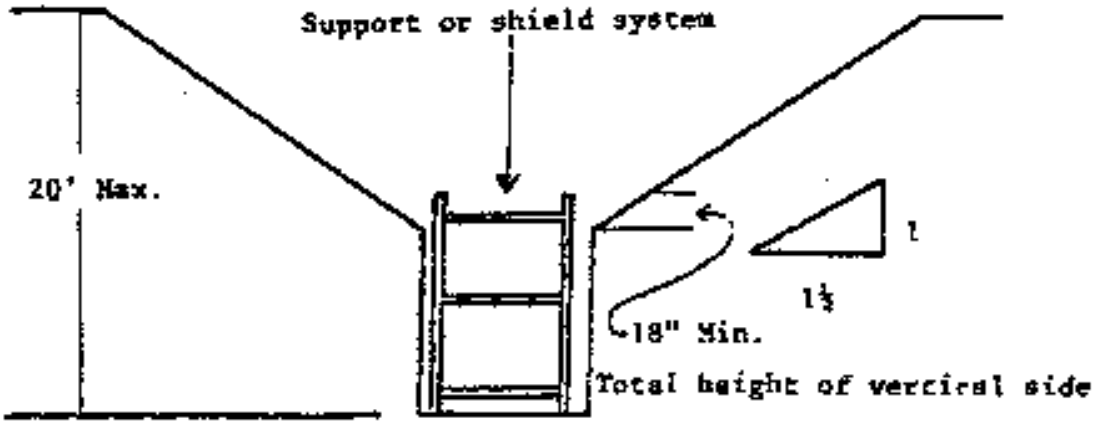
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1. Benching is not permitted in Type C soil.

SIMPLE SLOPE



All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.

VERTICAL SIDED LOWER PORTION



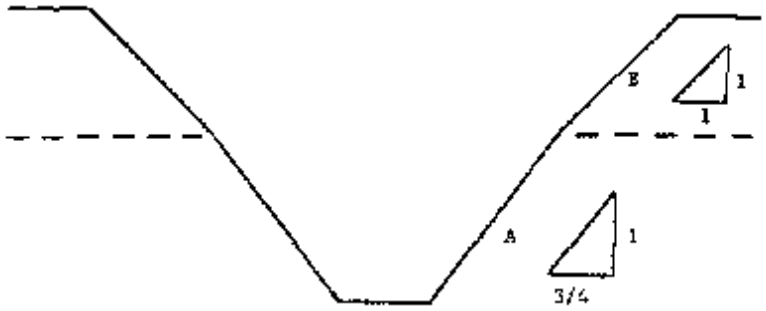
All other sloped excavations shall be in accordance with the other options permitted in 1926.652(b).

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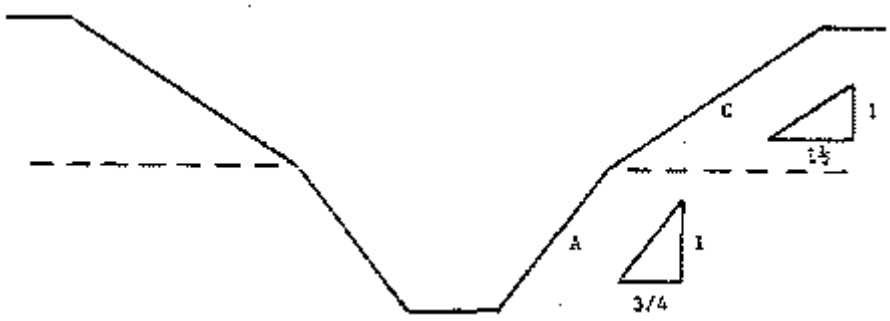
Excavations Made in Layered Soils

All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

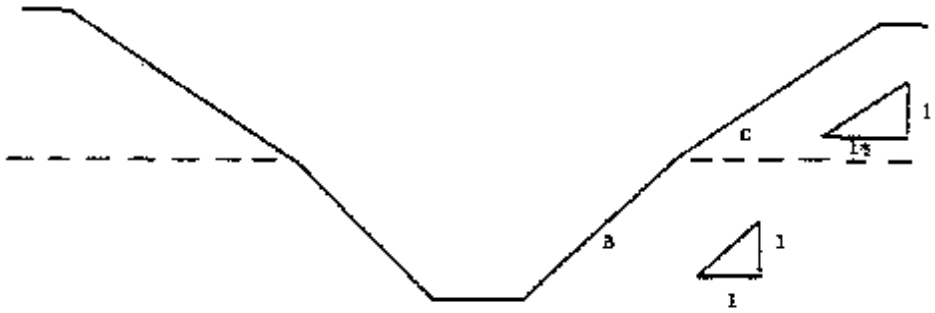
B OVER A



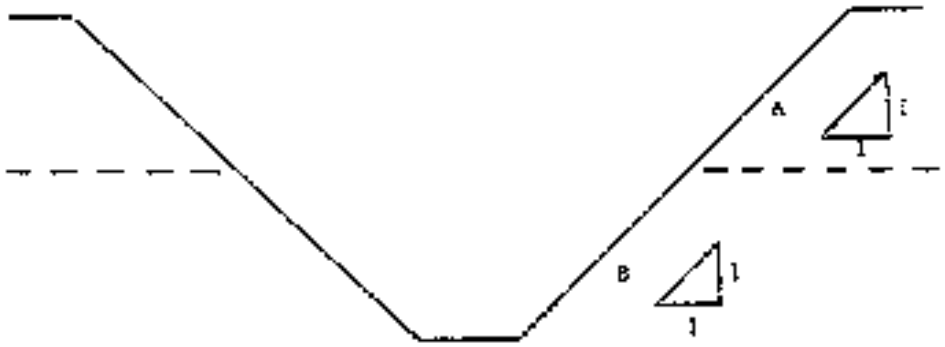
C OVER A



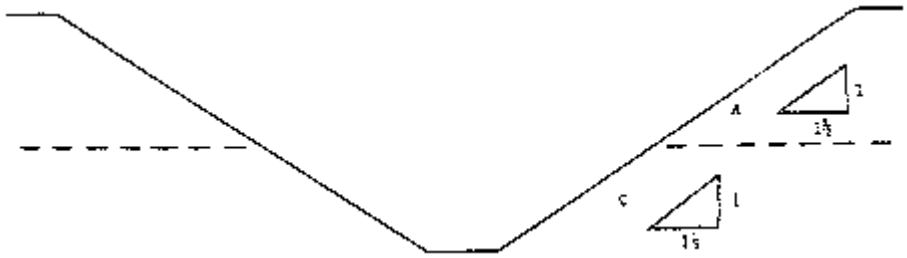
C OVER B


C
1
1½
B
1
1

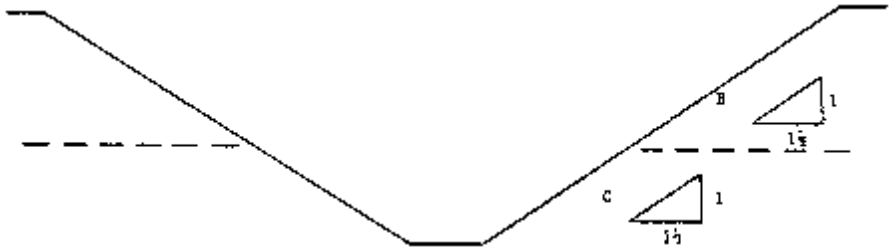
A OVER B



A OVER C



B OVER C



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Design-Builder | Construction Manager | General Contractor

Excavation Daily Checklist

Initial Inspection

Date:_____ Job Name:_____ Job #:_____ Time: _____

Competent Person Name:_____ Signature:_____

Current Weather Conditions:_____ Excavation Location: _____

Width & Depth of Excavation:_____W_____D _____

All underground utilities, Public & Private, located & marked? ☐ Yes ☐ No

Soil Classification

Soil has Been Classified as: ☐ Stable Rock ☐ A Soil
Condition: ☐ Dry ☐ Moist ☐ Wet ☐ Saturated ☐B ☐ C ☐Submerged

Manual Test(s) Performed by Competent Person (check all that apply)

☐ Sedimentation (Jar) Test ☐ Thumb Penetration ☐ Ribbon Test
☐ 2" Strand Test ☐ Penetrometer or Shear vane ☐ Dry Strength

Inspector Visual Tests Checklist

Are particulate sizes Fine grained (cohesive) or Coarse grained	☐ F	☐ C	☐ N/A
Does excavated material stay in clumps?	☐ Yes	☐ No	☐ N/A
Is water standing, seeping or running into the excavation?	☐ Yes	☐ No	☐ N/A
Is there layered soils system in excavation?	☐ Yes	☐ No	☐ N/A
Has the soil been previously disturbed (utilities, backfill, etc.)?	☐ Yes	☐ No	☐ N/A
Are areas of the excavation fissured, cracked, have vertical spalls or	☐ Yes	☐ No	☐ N/A
Are sources of vibration present that could affect stability?	☐ Yes	☐ No	☐ N/A

Safety Systems for Known Hazards

Were confined space hazards found during the inspection? ☐ Yes ☐ No ☐ N/A
If so, what protective systems have been utilized?
☐air monitor ☐ ventilation ☐ respirators ☐ rescue equip. ☐other_____

Is cave-in protection required (5' or deeper) or needed? ☐ Yes ☐ No ☐ N/A
If so, which cave-in protection system(s) will be utilized?
☐ sloping ☐ shielding (trench box) ☐ shoring ☐ other_____

Safety Inspection Items

Proper barricades, cones, warning vests or other devices in use?	☐ Yes	☐ No	☐ N/A
When 4' or deeper, ladders in place with travel distance < or = 25'?	☐ Yes	☐ No	☐ N/A
Spoils piles at least 2' from edge and appear stable?	☐ Yes	☐ No	☐ N/A
Adjoining buildings or structures are adequately supported?	☐ Yes	☐ No	☐ N/A
Walkways to or around excavation 6' or deeper have fall protection?	☐ Yes	☐ No	☐ N/A
Has Competent Person inspected excavation prior to worker entry?	☐ Yes	☐ No	☐ N/A
Cave-in protection systems designed, installed and used properly?	☐ Yes	☐ No	☐ N/A

2nd inspection time:_____3rd inspection time: _____

NOTE: Only a Registered Professional Engineer can design protective systems for excavations deeper than 20 feet.

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Design-Builder | Construction Manager | General Contractor

Excavation **Visual-Manual Soil Tests**

Testing
When making a site soil classification, the competent person conducts both visual and manual tests. Factors to examine are:

- **Soil particle size –** Usually there is a mixture of sizes. The percentage of sand to silt and clay determines the soil type.
- **Grain size –** If a grain of soil is larger than a #2 pencil lead, it is classified as gravel. If it is smaller, but can be seen by the unaided eye, it is classified as sand. Clay and silt particle cannot be seen without the use of a microscope. A general statement is the larger the grain size the less stable the soil.
- Soil that clumps and holds together when dug out is most likely to be clay or silt.
- Cracks in walls of the excavation, with material spilling off (slabs of soil falling off the sides) indicate Type B or C soil.
- Standing water or water seeping out of the bottom or trench walls automatically classifies the soil as Type C.
- Layered soil adjacent to roadways or buildings, disturbed soil, or soil exposed to a source of vibration, requires a soil classification to be made by a registered professional engineer.

Manual Testing
Protective system requirements are based on the results of testing. **Never** enter an unprotected excavation to obtain a soil sample. Take the soil sample from freshly dug material in the spoil pile. The tests should be done as soon as possible to preserve the sample's natural moisture.

Dry Strength
If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broke with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

Thread test (plasticity)
This determines whether a sample is cohesive. Rolla sample of the soil between the palms of your hands to about one-eighth inch diameter thread at least several inches long.

Place the rolled soil thread on a flat surface and pick up by one end. If the sample holds together for two inches without breaking, it is considered cohesive.

Ribbon Test
This is another test for cohesiveness and is used as a back-up test for the thread test. Roll a representative soil sample into a cylinder about three-fourths inch in diameter and several inches in length. Then squeeze this sample between thumb and forefinger into a flat unbroken ribbon one-fourth to one-eighth inch thick, which is allowed to fall freely over the fingers. If the ribbon does not break off before several inches are squeezed out, the soil is considered cohesive.

Thumb Penetration Test
The thumb penetration test estimates the unconfined compressive strength of cohesive soils and is based on testing described in the American Society for Testing and Materials (ASTM) standard D2488. Take a soil sample collected from a freshly dug soil clump from the spoil pile. Press your thumb against the sample. If the sample is readily indented by your thumb but penetration can be done by using great effort, then the spoil is classified as Type A. If penetration occurs to the base of the thumb nail and is accomplished with moderate difficulty, then it is Type B. If the sample can be penetrated easily several inches by the thumb, and if it can be molded by light finger pressure, then the soil is Type C. Drying the sample can greatly influence the results of this test. Perform this test immediately after taking the sample.

Mechanical Devices
Mechanical devices for determining soil type include the pocket penetrometer and hand-operated vane shear penetrometer. Operation of the device and interpretation of the results are found in the manual or literature furnished by the manufacturer of these devices. For a complete discussion of soils and testing, refer to the *29 CFR 1926 Subpart P, Appendix A.*

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures for submittals.

B. Related Sections:
   1. General Conditions: General Requirements.
   2. Section 01 10 00 - Summary of Work.
   3. Section 01 31 00 - Project Management and Coordination.
   4. Section 01 33 00f – Third Party User Agreement for Electronic Data
   5. Section 01 77 00 - Closeout Procedures.
   6. Section 01 78 00 - Closeout Submittals.

1.2 SUBMITTAL SCHEDULE

A. Prepare and submit "Submittal Schedule" within 10 days after award of Contract, and prior to execution of Contract. Include following information.
   1. Specification Section Number.
   2. Type of submittal required.
   3. Estimated time for submittal.

B. Coordinate, organize and plan submittal schedule so submittals are sent with appropriate time allowed for review and so submittals do not accumulate into unreasonably large groups.

C. Some submittals may require additional time for routing and review including, but not limited to, following:
   1. Unreasonably large groups of submittals.

1.3 TRANSMITTAL FORM

A. Send submittals with "Submittal Transmittal Form" completely filled out with appropriate information. Submittals shall be sent to CM. CM will forward onto Architect

B. Submittals sent without properly completed "Submittal Transmittal Form" may be considered incomplete and marked "Not Accepted" and returned without review.

C. Send separate transmittal forms for each Section and separate transmittals for each type listed:
   1. Shop Drawings.
   2. Product Data.
   3. Samples.

D. If shop drawings, samples or product data describe the same product or item, send submittals together under same transmittal otherwise send each type submittal under separate transmittals.

1.4 SUBMITTAL ACCEPTANCE

A. Refer to General Conditions for scope of submittal review and acceptance.

B. Maintain copies of "Accepted" and "Conditionally Accepted" submittals with record set per Section 01 78 00.

C. "Accepted" submittals have no exceptions noted. One set of accepted submittals will be returned to Contractor. Make appropriate copies for use and distribution.

D. "Conditionally Accepted" submittals have exceptions noted but resubmission is not required. Make appropriate copies for use and distribution.

E. "Not Accepted" submittals are incomplete and/or need corrections. Complete and/or correct and resubmit until final acceptance is obtained.

F. "Not Reviewed" means submittals were not required or were provided for information only.

1.5 CONTRACTOR'S PLAN OF OPERATION

A. Submit at Pre-Construction Conference. See Section 01 31 00.

B. Outline in writing approach to meeting schedule for completing Work.

C. Plan to include, but not limited to, following:
1. Sequence of Work.
2. Construction Schedule.
3. Schedule of Submittals.
4. Schedule of Temporary Utilities.
5. Staging requirements/street permits.
6. Normal work hours.
7. Parking exceptions
8. Material delivery coordination.
9. Name of person to be liaison to adjacent property Owners.
10. Name of duly authorized representative with whom business may be conducted in connection with administration of Contract.
11. Name of duly authorized superintendent written notices may be given in accordance with Conditions of the Contract.
12. Labor and equipment availability
13. List of Subcontractors
14. Names of contact persons with Owner, Architect and Contractor
15. Proposed schedule of Progress Meetings in accordance with Section 01 31 00 and schedule of submittals per Section 01 33 10 and payment requests per Section 01 29 00 and other reports required by Contract Documents.

1.6 COORDINATION

A. Send submittals in logical groups of related items including but not limited to the following groups:
1. Submittal schedule, list of materials, list of subcontractors, schedule of values
2. Doors, frames and hardware.
3. Glass and curtain wall system.
4. Closeout submittals: Refer to Section 01 78 00.

B. Architect's Digital Data Files: Electronic digital data PDF files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.

1. Architect will furnish Contractor one set of digital data PDF drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.

2. Upon request, copies of electronic CAD files in Architect’s current file format, including applicable layers, for each issue (bid packages, construction packages, addenda, etc.) will be provided via e-mail at Architect’s option to Contractor

(preparation charges will apply and shall be paid for by the contractor requesting). 3D models will NOT be available.

3. Architectural 2D CAD Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect/Construction Manager reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow ten (10) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect/Construction Manager will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow five (5) days for review of each resubmittal.

E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).

2. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's/Construction Manager's action stamp.

1.7 DISTRIBUTION

A. Contractor is responsible for duplication and distribution of accepted submittals including shop drawings. Exchange directly with subcontractors and others involved, not through Owner or Architect.

B. Provide and exchange submittals as needed to coordinate Work.

C. Provide copies to Owner if Owner requests copies during construction. Otherwise, Owner will receive accepted submittals as part of Record Set submitted during project closeout.

1.8 SHOP DRAWINGS

A. Use of Architect's Drawings: Do not reproduce Architect's drawings (whether CADD files, electronic files, hard copy drawings or other publication method) to serve as shop drawings until Architect's written permission is received and then only under following conditions.

B. Drawings that include unnecessary information will be marked "Not Reviewed" or "Not Accepted" and returned.

C. Shop drawings submitted without requested information and without Contractor's approval will not be reviewed and will be returned to Contractor marked "Not Accepted."

D. Drawings Submittal Requirements:
1. Submit electronic copy of each drawing unless otherwise specified.
2. Provide additional copies for other contractors for purposes of information and coordination.
3. Number in submittal sequence.
4. Include contractor's stamp of approval, as evidence that drawings are approved in accordance with General Conditions except that field dimensions must be verified prior to approval and submittal.
5. Show field verified dimensions on final shop drawings and identify verified dimensions.
6. Show actual adjacent construction and how each item coordinates with other contractors, subcontractors, trades and suppliers.
7. Drawings must be clear, sharp and readable quality acceptable to Architect/Engineer.
8. Provide clear space on each drawing of not less than 40 square inches for Architect's stamp.
9. Transmit shop drawings, product data, and other appropriate electronically.

E. Maintain accepted shop drawings as part of "Record Set." See Section 01 78 00.

1.9 PRODUCT DATA AND EQUIPMENT BROCHURES

A. Provide multiple originals of brochures, cuts, etc., if they are multi-page bound catalogs which would be difficult to photocopy or if they are intended to illustrate color or other appearance characteristics which cannot be adequately represented by photocopies.

B. Photocopies of original brochures are acceptable except as specified above. Photo copies

must be clear and readable. Unreadable or unclear photocopies will be returned "Not Accepted."

C. Provide layout drawings where necessary for field use or as required by Architect.

D. Number of Copies of Product Data:
   1. Submit electronically unless otherwise specified.
   2. Submit additional copies required for 2 Owner's manuals per Section 01 78 00.
   3. Additional copies for other contractors for purposes of information and coordination.
   4. Number in submittal sequence.
   5. Include contractor's stamp of approval, as evidence that drawings are approved in accordance with General Conditions (including field dimensions).
   6. Indicate field verified information as applicable.
   7. Provide clear space of not less than 40 square inches for Architect's stamp.

E. Provide an index of each page in submittal with space for notes and acceptance stamps.

F. Warranties:
   1. Where warranty is indicated, submit manufacturers' sample warranty with shop drawings.
   2. Submit actual executed warranties or guarantees per Section 01 77 00 and 01 78 00.

1.10 SAMPLES

A. Deliver samples of materials, equipment, assemblies and components as required by specifications to Construction Manager with delivery costs prepaid. At Architect's/Engineer's direction, remove samples after approval.
   1. Provide samples representative of actual product including finishes and other specified characteristics.
   2. Indicate type of construction and quality proposed for installation in Project.

B. Number Samples:
   1. Submit a minimum of 3 samples unless otherwise specified.
      a. One set of samples to be retained by Architect, one by CM, and one returned to the Contractor.
   2. Provide additional samples for other contractors for purposes of information and coordination.

C. Maintain record samples of accepted samples with other record documents at project site.

1.11 LIST OF MATERIALS

A. Submit within 10 days after award of Contract and prior to purchase.

B. Submit electronic copies of complete list of materials, products, and equipment proposed to be used to Architect/Engineer for acceptance.

C. Do not order materials or equipment until proposed list of materials is accepted.

D. Materials and equipment are subject to Architect's and Owner's acceptance.

E. Arrange list in order of specification sections and in form indicated by Architect/Engineer.
   1. Items listed shall fully conform to project requirements and specifications.
   2. Specifically identify each material, product or equipment item by manufacturer, brand and model and other identifying designations including those where only 1 material or product is specified.
   3. Name products specified by reference standards, described by performance requirements and descriptive language.
   4. Do not list "as specified."

F. Where 2 or more makes or kinds of items are named in specifications (or additional names are listed in an addendum), state which particular make or kind of each item is to be provided.

G. If list is not received within 10 days, mechanical and electrical equipment under Divisions 21, 22, 23, 25, 26, 27, 28, 40, 41, 42, 43, 44, 45, and 48 will be as scheduled.

1.12 LIST OF SUBCONTRACTORS

A. Submit within 10 days after award of Contract, and prior to execution of Contract.

B. Submit with List of Materials.

C. Submit electronic copies of a complete list.

D. Do not execute subcontracts until proposed list of subcontractors is accepted by CM and Owner.

E. List to include the following information.
   1. Description of work proposed to be done by subcontract.
   2. Names of subcontractors and major material suppliers proposed to perform portions of Work.
   3. Names of sub-subcontractors.
   4. Include proposed sub-subcontractors for other trades as requested by Architect and Engineers.

F. Proposed subcontractors or sub-subcontractors (and material supplier installers) shall be established, reputable firms of recognized standing with a record of successful and satisfactory past performance with type work and/or items proposed to be provided or installed by them.
   1. Only those subcontractors (and sub-subcontractor when appropriate) who CM and Owner have no reasonable objection to shall be used on Work.

G. Reasonable objection may arise when, in opinion of CM or Owner, there exists a rational belief that proposed subcontractor, sub-subcontractor or material supplier:
   1. Cannot provide materials, equipment, facilities or other products as specified or required by Contract Documents;
   2. Cannot provide labor and skill necessary to accomplish part of Work for which they are proposed, including but not limited to quality of work;
   3. Lacks adequate and appropriate experience for that part of Work proposed, including materials or methods required;
   4. Has previously failed to perform in timely or satisfactory manner, including in cooperation and in necessary services after project completion;
   5. Proposes deviations in materials or methods that are unacceptable to Architect or Owner, such as proposing materials or products that were not specified or not listed in addenda;
   6. Cannot satisfactorily perform part of Work for which contractor is proposed, within time schedule, due to size of organization or existing work load.
   7. Cannot demonstrate ability through quality of representative work to perform part of Work for which contractor is being considered;
   8. Of questionable integrity;
   9. Shows evidence of similar considerations bearing on possibility of unsatisfactory performance.

H. If Owner or CM has a reasonable objection to person or entity proposed by Contractor to do portion of Work, Contractor must submit substitute to whom neither Owner nor CM has reasonable objection; no increase in Contract Sum shall be allowed as a result of such substitution.

I. After acceptance of proposed list, no change of subcontractor, sub-subcontractor or supplier not objected to by CM or Owner, shall be made, except for cause acceptable to CM and Owner.
   1. In event of a proposed change, submit reasons for change, in writing, along with alternate proposed subcontractor, sub-subcontractor or material supplier.
   2. Proposed change is subject to conditions of this Article and requirements of General Conditions.

1.13 CLOSE-OUT SUBMITTALS

A. Submit documents specified under Section 01 77 00 and 01 78 00.

B. Submit 3 hard copies and 1 electronic copy of operating instructions and maintenance manuals to CM at time of CM's instructions. Electronic copy shall be of the original document (scanned or faxed copies will not be accepted).

1.14 OTHER SUBMITTALS

A. Provide other required submittals as specified.

PART 2 PRODUCTS

2.1 SUBMITTAL PROCEDURES

1. Electronic Submittal Procedures

   1. Summary:

      a. Shop drawing and product data submittals shall be transmitted to Architect/Construction Manager in electronic (PDF) format using Submittal Exchange, a website service designed specifically for transmitting submittals between construction team members.
      b. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
      c. The electronic submittal process is not intended for color samples, color charts, or physical material samples.

   2. Procedures:

      a. Submittal Preparation – Contractor may use any or all of the following options:

         1. Subcontractors and Suppliers provide electronic (PDF) submittals to Contractor via the Submittal Exchange website.
         2. Subcontractors and Suppliers provide paper submittals to General Contractor who electronically scans and converts to PDF format.
         3. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.

      b. Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.

c. Contractor shall transmit each submittal to Architect using the Submittal Exchange website, www.submittalexchange.com.
d. Architect/Engineer/Construction Manager review comments will be made available on the Submittal Exchange for downloading. Contractor will receive email notice of complete review.
e. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
f. Submit paper copies of reviewed submittals at project closeout for record purposes for all mechanical and electrical equipment in accordance with Section 017800 "Closeout Submittals."

3. Costs:

a. Owner/Construction Manager will provide the full cost of Submittal Exchange project subscription as part of the project.
b. At Contractor's option, training is available from Submittal Exchange use of website and PDF submittals. Contact Submittal Exchange at 1-800-714-0024. Any training cost will need to be included in bidders bid if training is needed by bidder.
c. Internet Service and Equipment Requirements:

1. Email address and Internet access at Contractor's main office.
2. Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Submit Product Data before or concurrent with Samples.
4. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
3. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

a. Generic description of Sample.
b. Product name and name of manufacturer.
c. Sample source.
d. Number and title of applicable Specification Section.
e. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one (1) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."

F. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a

design professional is specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."

C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S/CONSTRUCTION MANAGER'S ACTION

A. Action Submittals: Architect/Construction Manager will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect/Construction Manager will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as required.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect/Construction Manager will forward each submittal to appropriate party.

C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

D. Submittals not required by the Contract Documents may be returned by the Architect without action.

PART 4 - ATTACHMENTS TO THIS SPECIFICATION SECTION:

1. FEH Design "Terms and Conditions for Use of Electronic Files"
2. French Reniker, "Release Agreement for Electronic Files"

END OF SECTION

SECTION 01 33 00A
CAD FILE TRANSFER AGREEMENT

CAD FILE TRANSFER TO CONTRACTOR AGREEMENT

Dear *Contractor requesting Files*:

At your request, FEH DESIGN may provide electronic files for your convenience and use in the preparation of shop drawings related to **Fairfield Middle School Expansion, Bid Issuance No. 1 Bus Loop**, subject to the following terms and conditions:

Our electronic files are generated with **AutoDesk** software. FEH DESIGN makes no representation as to the compatibility of these files with your hardware or your software. Please advise FEH DESIGN of the desired AutoCAD version you are requesting.

Data contained on these electronic files are part of our instruments of service and shall not be used by you for any purpose other than as a convenience in the preparation of the shop drawings for the referenced project. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to FEH DESIGN. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against FEH DESIGN, our officers, directors, employees, agents or sub-consultants that may arise out of or in connection with your use of these electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold FEH DESIGN harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs arising out of or resulting from your use of these electronic files.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. FEH DESIGN makes no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the signed or sealed hard-copy construction documents, the signed or sealed hard-copy shall govern. You are responsible for determining if any conflict exists. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

1. Please note that FEH DESIGN does not assure that the electronic model represents all the following changes:
    a. Addendum Items
    b. Architectural Supplemental Information (ASI)
    c. Request For Information (RFI)
    d. Change Orders
    e. Alternate Bid Items
    f. Other post Bidding Constractual Modifications that alter, change or clarify the scope of work.
2. Only the following CAD files are available through FEH DESIGN.
    a. Architectural
    b. Structural
3. Civil, Electrical, Fire Protection, Landscaping, Mechanical, Plumbing, and Technology files must be obtained directly from the engineer of record.

Because information presented on the electronic files can be modified, unintentionally or otherwise, FEH DESIGN reserves the right to remove all indicia of ownership and/or involvement from each electronic display.

FEH DESIGN will furnish you electronic files of the following drawing sheets:

List of Contractor Requested Drawings _____

AutoCAD version (ie. AutoCAD 2013, etc.) _____

A service fee of $**150.00** (**one** hundred fifty dollars) per sheet shall be remitted to FEH DESIGN prior to delivery of the electronic files.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by FEH DESIGN, and we make no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall FEH DESIGN be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

(*Contractor name and title)*	*(Officer or Legally Responsible Party)*
(Company)	*(Title)*
(Address)	*(Date)*
(Email Address)	

END OF SECTION

SECTION 01 42 00
REFERENCES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Reference to standards and codes.

B. Related Sections:
   1. General Conditions.
   2. Section 016210 - Product Options and Substitution Requirements.

1.2 DEFINITIONS

A. "Approved": The term "approved," when used to convey Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

B. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Architect, requested by Architect, and similar phrases.

C. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

D. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

E. "Furnish": The term "furnish" means to supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

F. "Install": The term "install" describes operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

G. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

H. "Installer": An installer is the Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

I. The term "experienced," when used with an entity, means having successfully completed a minimum of 5 previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

J. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.

K. "Project site" is the space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 APPLICABLE GOVERNING STANDARDS

A. Code Overview: See Code Plans

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
   1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

   2. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, bear all costs and damages arising there from.

D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
   1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

E. Certificate: For products specified in accordance with a Federal Specification, ASTM Standard, American National Standards Institute or similar association standards, upon request by Architect, the Contractor must provide an acceptable affidavit by independent testing laboratory, or other source approved by the Architect, certifying that product furnished for this Project complies with the particular standard specifications.
   1. Where necessary, requested or specified, supporting test data shall be submitted to substantiate compliance. The manufacturer is subject to Architect's acceptance.

F. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

G. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web

site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(202) 862-5100
AAADM	American Association of Automatic Door Manufacturers www.taol.com/aaadm	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AAN	American Association of Nurserymen (See ANLA)	
AASHTO	American Association of State Highway and Transportation Officials www.aashto.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 429-5155
ACI	American Concrete Institute/ACI International www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
ADC	Air Diffusion Council	(312) 201-0101
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AFPA	American Forest & Paper Association (See AF&PA)	
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AHA	American Hardboard Association www.ahardbd.org	(847) 934-8800
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955

AI	Asphalt Institute www.asphaltinstitute.org	(606) 288-4960
AIA	American Institute of Architects (The) www.aiaonline.org	(202) 626-7300
AISC	American Institute of Steel Construction, Inc. www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction	(303) 792-9559
ALA	American Laminators Association (See LMA)	
ALCA	Associated Landscape Contractors of America www.alca.org	(800) 395-2522 (703) 736-9666
ALSC	American Lumber Standard Committee	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen) www.anla.org	(202) 789-2900
ANSI	American National Standards Institute www.ansi.org	(212) 642-4900
AOSA	Association of Official Seed Analysts www.zianet.com/AOSA	(402) 476-3852
APA	APA-The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(941) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ASCA	Architectural Spray Coaters Association www.ascassoc.com	(856) 848-6120
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers	(800) 527-4723

	www.ashrae.org	(404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	American Society for Testing and Materials www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industries International) www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (See WCMA)	
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(817) 326-6300
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 661-4261
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CCFSS	Center for Cold-Formed Steel Structures www.umr.edu/~ccfss	(573) 341-4471
CDA	Copper Development Association Inc. www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association (The)	(613) 230-9263

	www.canelect.ca	
CFFA	Chemical Fabrics & Film Association, Inc. www.taol.com/cffa	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 412-0900
CGSB	Canadian General Standards Board www.pwgsc.gc.ca/cgsb	(819) 956-0425
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.com (under construction)	(301) 596-2584
CPA	Composite Panel Association (Formerly: National Particleboard Association) www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association Division of Plastics Pipe Institute www.cppa-info.org	(800) 510-2772 (419) 241-2221
CRI	Carpet and Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) Division of Canadian Standards Association www.iasapprovals.org	(216) 524-4990
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 462-8961
CTI	Cooling Tower Institute www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA/TIA	Electronic Industries Alliance/Telecommunications Industry Association www.eia.org	(703) 907-7500

EIMA	EIFS Industry Members Association www.eifsfacts.com	(800) 294-3462 (770) 968-7945
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
FCI	Fluid Controls Institute www.fluidcontrolsinstitute.org	(216) 241-7333
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System (See FMG)	
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmglobal.com	(401) 275-3000
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association) www.glasswebsite.com/gana	(785) 271-0208
GRI	Geosynthetic Research Institute www.drexel.edu/gri	(610) 522-8440
GTA	Glass Tempering Division of Glass Association of North America (See GANA)	
HI	Hydraulic Institute	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute Division of Gas Appliance Manufacturers Association www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association Division of National Association of Architectural Metal Manufacturers (See NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc.	(410) 838-6550
IAS	International Approval Services (See CSA International)	
ICEA	Insulated Cable Engineers Association, Inc.	(508) 394-4424

	www.icea.net	
ICRI	International Concrete Repair Institute	(703) 450-0116
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America (The) www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 938-7444
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
IRI	HSB Industrial Risk Insurers www.industrialrisk.com	(800) 520-7300 (860) 520-7300
ITS	Intertek Testing Services www.itsglobal.com	(800) 345-3851 (607) 753-6711
IWS	Insect Screening Weavers Association (Now defunct)	
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LGSI	Light Gage Structural Institute www.loseke.com	(972) 625-4560
LMA	Laminating Materials Association (Formerly: ALA - American Laminators Association) www.lma.org	(201) 664-2700
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (847) 577-7200
LSGA	Laminated Safety Glass Association (See GANA)	
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association	(312) 644-6610
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(614) 228-6194

ML/SFA	Metal Lath/Steel Framing Association (See SSMA)	
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry, Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NAAMM	North American Association of Mirror Manufacturers (See GANA)	
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(281) 228-6200
NAIMA	North American Insulation Manufacturers Association (The) www.naima.org	(703) 684-0084
NAMI	National Accreditation and Management Institute, Inc.	(304) 258-5100
NAPM	National Association of Photographic Manufacturers (See PIMA)	
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(414) 248-9094
NCTA	National Cable Television Association www.ncta.com	(202) 775-3669
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.electricnet.com/neta	(303) 697-8441
NFPA	National Fire Protection Association	(800) 344-3555

	www.nfpa.org	(617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-6372
NGA	National Glass Association www.glass.org	(703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NPA	National Particleboard Association (See CPA)	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(301) 587-1400
NSA	National Stone Association www.aggregates.org	(800) 342-1415 (202) 342-1100
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NTMA	National Terrazzo & Mosaic Association (The) www.ntma.com	(800) 323-9736 (703) 779-1022
NWWDA	National Wood Window and Door Association (See WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (508) 230-3516
PGI	PVC Geomembrane Institute/Technology Program University of Illinois-Urbana Champaign //pgi-tp.ce.uiuc.edu	(217) 333-3929
PIMA	Photographic & Imaging Manufacturers Association (Formerly: NAPM - National Association of Photographic Manufacturers) www.pima.net	(914) 698-7603

RCSC	Research Council on Structural Connections c/o AISC www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute	(Contact by mail only)
RIS	Redwood Inspection Service Division of the California Redwood Association www.calredwood.org	(888) 225-7339 (415) 382-0662
RMA	Rubber Manufacturers Association www.rma.org	(800) 220-7620 (202) 682-4800
SAE	SAE International www.sae.org	(724) 776-4841 (724) 776-4960 (publications)
SDI	Steel Deck Institute www.sdi.org	(847) 462-1930
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabfurn.com	(843) 689-6878
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 938-7444
SIGMA	Sealed Insulating Glass Manufacturers Association www.sigmaonline.org/sigma	(312) 644-6610
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPI	The Society of the Plastics Industry, Inc. www.plasticsindustry.org	(202) 974-5200
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPI/SPFD	The Society of the Plastics Industry, Inc. Spray Polyurethane Foam Division (See SPI)	
SPRI	SPRI (Single Ply Roofing Institute) www.spri.org	(781) 444-0242

SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association) www.ssma.com	(312) 456-5590
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(800) 837-8303 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TPI	Truss Plate Institute	(608) 833-5900
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 705-9898
UFAC	Upholstered Furniture Action Council www.ufac.org	(336) 885-5065
UL	Underwriters Laboratories Inc. www.ul.com	(800) 704-4050 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association //members.aol.com/unibell	(972) 243-3902
USG	United States Gypsum Company A Subsidiary of USG Corporation www.usg.com	(800) 874-4968 (312) 606-4000
USITT	United States Institute for Theatre Technology, Inc. www.culturenet.ca/usitt	(800) 938-7488 (315) 463-6463
USP	U.S. Pharmacopeia www.usp.org	(800) 822-8772 (301) 881-0666
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Formerly: AWCMA - American Window Covering Manufacturers Association)	(212) 661-4261

	www.windowcoverings.org	
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WIC	Woodwork Institute of California www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

H. Abbreviations and Acronyms for Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. www.bocai.org	(708) 799-2300
CABO	Council of American Building Officials (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials (The) www.iapmo.org	(909) 595-8449
ICBO	International Conference of Building Officials www.icbo.org	(800) 284-4406 (562) 699-0541
ICC	International Code Council (Formerly: CABO - Council of American Building Officials) www.intlcode.org	(703) 931-4533
SBCCI	Southern Building Code Congress International, Inc. www.sbcci.org	(205) 591-1853

I. Abbreviations and Acronyms for Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers CRD Standards	(601) 634-2355
CFR	Code of Federal Regulations www.access.gpo.gov/nara/cfr	(202) 512-1800
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 \ (301) 504-0990

DOC	Department of Commerce www.doc.gov	(202) 482-2000
DOD DOD	Department of Defense Specifications and Standards //astimage.daps.dla.mil/online	(215) 697-6257
EPA	Environmental Protection Agency www.epa.gov	(202) 260-2090
FAA	Federal Aviation Administration Department of Transportation www.faa.gov	(202) 366-4000
FCC	Federal Communications Commission www.fcc.gov	(202) 418-0190
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
FED-STD	Federal Standard (See FS)	
FS	Federal Specification (Available from DOD, GSA, and NIBS)	
FTMS	Federal Test Method Standard (See FS)	
GSA	General Services Administration www.gsa.gov (Federal Specifications)	(202) 708-5082 (202) 619-8925

END OF SECTION

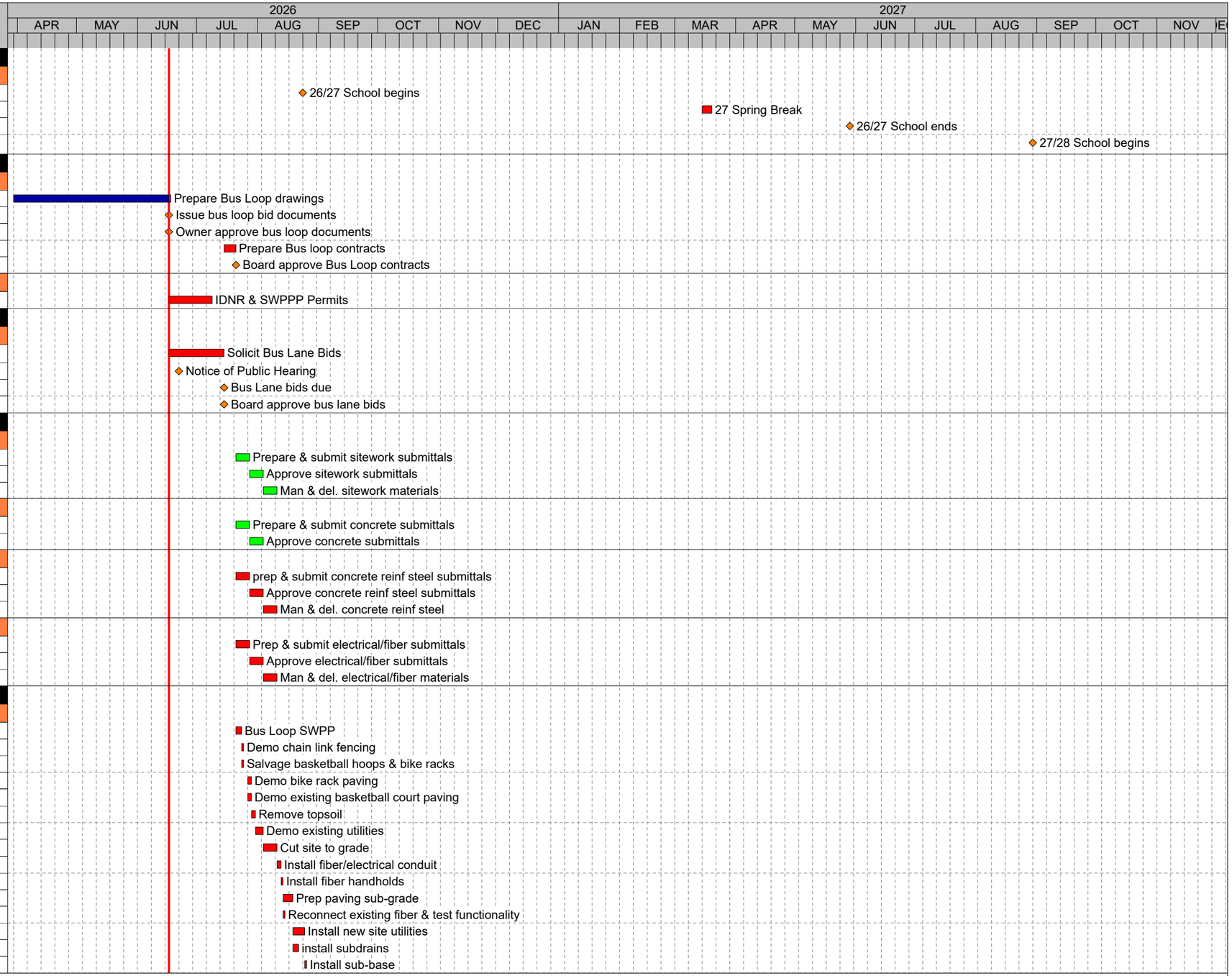
SECTION 01 43 00.1
Project Schedule

1.01 Project Schedule attached to this specifications section.

A. The project schedule is included and part of the project contract documents.

END OF SECTION

ID	Description	Work Days	Early Start	Early Finish
School Calender				
School calendar				
1311	26/27 School begins	0	24AUG26 *	
1301	27 Spring Break	5	15MAR27 *	19MAR27
1221	26/27 School ends	0		28MAY27 *
1291	27/28 School begins	0	30AUG27 *	
Pre-Construction				
Bus Loop				
1361	Prepare Bus Loop drawings	50	30MAR26 A	17JUN26
1411	Issue bus loop bid documents	0	17JUN26	
1421	Owner approve bus loop documents	0	17JUN26	
1371	Prepare Bus loop contracts	4	15JUL26	20JUL26
1381	Board approve Bus Loop contracts	0		20JUL26
Permits				
1984	IDNR & SWPPP Permits	15	17JUN26	08JUL26
Bidding				
Bus Loop				
1231	Solicit Bus Lane Bids	19	17JUN26	14JUL26
1241	Notice of Public Hearing	0	22JUN26 *	
1341	Bus Lane bids due	0		14JUL26
1351	Board approve bus lane bids	0		14JUL26
Procurement				
Sitework Submitals				
1630	Prepare & submit sitework submittals	5	21JUL26	27JUL26
1640	Approve sitework submittals	5	28JUL26	03AUG26
1650	Man & del. sitework materials	5	04AUG26	10AUG26
Concrete submittals				
1540	Prepare & submit concrete submittals	5	21JUL26	27JUL26
1700	Approve concrete submittals	5	28JUL26	03AUG26
Concrete Reinforcement Submittals				
1530	prep & submit concrete reinf steel submittals	5	21JUL26	27JUL26
1680	Approve concrete reinf steel submittals	5	28JUL26	03AUG26
1690	Man & del. concrete reinf steel	5	04AUG26	10AUG26
Electrical/Telecom Submittals				
1710	Prep & submit electrical/fiber submittals	5	21JUL26	27JUL26
1720	Approve electrical/fiber submittals	5	28JUL26	03AUG26
1730	Man & del. electrical/fiber materials	5	04AUG26	10AUG26
Construction				
Phase 1				
1490	Bus Loop SWPP	3	21JUL26	23JUL26
1814	Demo chain link fencing	1	24JUL26	24JUL26
1824	Salvage basketball hoops & bike racks	1	24JUL26	24JUL26
1500	Demo bike rack paving	2	27JUL26	28JUL26
1834	Demo existing basketball court paving	2	27JUL26	28JUL26
1510	Remove topsoil	2	29JUL26	30JUL26
1844	Demo existing utilities	2	31JUL26	03AUG26
1854	Cut site to grade	5	04AUG26	10AUG26
2034	Install fiber/electrical conduit	2	11AUG26	12AUG26
2044	Install fiber handholds	1	13AUG26	13AUG26
1874	Prep paving sub-grade	3	14AUG26	18AUG26
2054	Reconnect existing fiber & test functionality	1	14AUG26	14AUG26
1864	Install new site utilities	4	19AUG26	24AUG26
1884	install subdrains	3	19AUG26	21AUG26
1520	Install sub-base	1	25AUG26	25AUG26



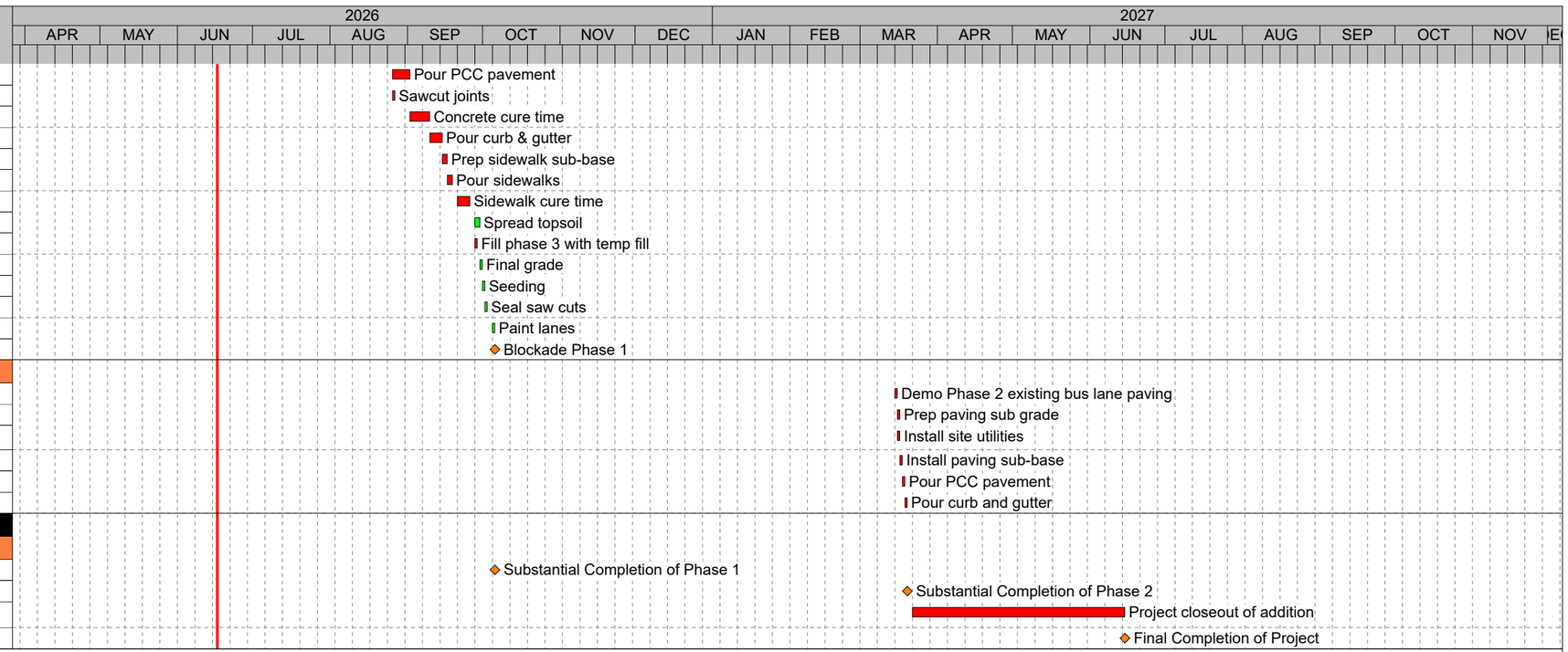
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Fairfield Community School District
FCSD Bus Loop
Bid Issuance No. 1 - Bus Loop Project Bid Schedule

- Early bar
- Progress bar
- Critical bar
- Summary bar
- Start milestone point
- Finish milestone point

ID	Description	Work Days	Early Start	Early Finish
1894	Pour PCC pavement	5	26AUG26	01SEP26
1924	Sawcut joints	1	26AUG26	26AUG26
1934	Concrete cure time	5	02SEP26	09SEP26
1904	Pour curb & gutter	3	10SEP26	14SEP26
1550	Prep sidewalk sub-base	2	15SEP26	16SEP26
1914	Pour sidewalks	2	17SEP26	18SEP26
1974	Sidewalk cure time	5	21SEP26	25SEP26
1994	Spread topsoil	2	28SEP26	29SEP26
2024	Fill phase 3 with temp fill	1	28SEP26	28SEP26
1954	Final grade	1	30SEP26	30SEP26
1964	Seeding	1	01OCT26	01OCT26
1944	Seal saw cuts	1	02OCT26	02OCT26
2014	Paint lanes	1	05OCT26	05OCT26
2004	Blockade Phase 1	0		05OCT26
Phase 2				
1360	Demo Phase 2 existing bus lane paving	1	15MAR27	15MAR27
1300	Prep paving sub grade	1	16MAR27	16MAR27
1310	Install site utilities	1	16MAR27	16MAR27
1320	Install paving sub-base	1	17MAR27	17MAR27
1330	Pour PCC pavement	1	18MAR27	18MAR27
1350	Pour curb and gutter	1	19MAR27	19MAR27
Closeout				
Closeout				
1514	Substantial Completion of Phase 1	0		05OCT26
1544	Substantial Completion of Phase 2	0		19MAR27
1524	Project closeout of addition	60	22MAR27	14JUN27
1534	Final Completion of Project	0		14JUN27



Company name	Carl A. Nelson & Co.
Data date	17JUN26
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Fairfield Community School District
FCSD Bus Loop
Bid Issuance No. 1 - Bus Loop Project Bid Schedule

- Early bar
- Progress bar
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- Start milestone point
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SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures to measure and report the quality and performance of construction.

B. Related Sections:
   1. Refer to the General Conditions for general requirements, and technical specifications for specific testing requirements and methods.
   2. Section 01 33 00 - Submittal Procedures.
   3. Section 01 40 01 – Structural Testing and Special Inspections.

1.2 REFERENCES

A. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

B. ASTM E329 – Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

1.3 QUALIFICATIONS OF TESTING AGENCY

A. "Approved independent testing laboratory" shall mean an independent testing agency acceptable to the Owner and the Architect and possessing the professional qualifications and equipment to perform the specified tests and to evaluate and report the results.

1.4 QUALITY ASSURANCE

A. Comply with requirements of ASTM E329 and ASTM D3740.

B. Laboratory shall maintain a full-time registered Engineer on staff to review services.

C. Laboratory authorized to operate in State in which Project is located.

D. Testing equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to either NBS Standards or accepted values of natural physical constants.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 TESTING AND SPECIAL TESTING

A. Unless otherwise provided in the specifications, provide all materials, samples, mock-ups or assemblies for all tests specified in various sections of specifications, or as directed by the Architect, and pay shipping costs of such samples to laboratory or other testing location and

facility.
1. Unless specified otherwise, all tests shall be made by an approved independent testing laboratory and reports provided to CM and Architect.

B. Tests shall be provided and accomplished in accordance with the standard used as the reference for the particular material or product, unless other test methods or criteria are specified.

C. In the absence of a referenced standard, tests shall be accomplished in accordance with applicable ASTM Standards or Test Methods, current at the date of the Contract Documents.

3.2 PAYMENT FOR TESTS

A. Except for the types of tests specified as being paid for by the Owner, the cost of other tests shall be paid by the Contractor. Tests to be paid for by the Owner will be paid directly to the testing laboratory by the Owner.

B. The Owner will not pay for tests to determine if a proposed material will initially meet the specified requirements, which will include but not be limited to, analysis of paving aggregate, paving mix designs, and similar tests.

C. In general, it is intended the Owner will pay for those field tests to determine the quality of materials and quality of installation at site. The following is the list of the type of tests the Owner will pay for, where tests are specified or later determined as necessary:

- concrete compressive strength
- concrete air entrainment
- soil compaction
- structural steel field welds
- structural steel field bolting
- welding or brazing of piping
- paving samples
- unit masonry sampled from site
- mortar samples
- fireproofing samples
- waterproofing/roofing samples

3.3 TESTS TO DEMONSTRATE QUALIFICATION

A. In addition to tests specified, should the Contractor propose a product, material, method or assembly that is of unknown or questionable quality to the Architect, the Architect may require and order suitable tests to establish a basis for acceptance or rejection.
1. Such tests will be paid for by the Contractor, or by the Subcontractor requesting approval. "Standard" test reports on "similar" material will not be acceptable.

B. The Owner and Architect reserve the right to require certification or other proof that the material, assembly, equipment, system or other product furnished or proposed to be furnished, for this Project is in compliance with any test or standard called for.
1. The certificate shall be signed by a representative of the independent testing laboratory.

C. Any tests required to qualify the Contractor or any workmen for any phase of the work, and any test of a method, system or equipment that may be required by specification or law to qualify the item for use, shall be made or taken without additional reimbursement.

D. If exploratory work is required to determine the cause of defects, the cost of such work shall be borne by the Contractor responsible for such work if the work is found, in the judgment of

the CM to be defective.

1. If the Contractor responsible for the work is adjudged by the Architect to be not at fault, exploratory testing will be paid by the Owner.

3.4 INSPECTIONS

A. Should the specifications, Architect's instruction, laws, codes, ordinances or any public authority require any work to be inspected or approved, give timely notice of its readiness for inspection and a reasonable date fixed for such inspection. If any work requiring inspection should be covered up without approval or consent of the approving agency, it must be uncovered for examination at Contractor's expense.

3.5 CERTIFICATES

A. Except for test reports provided and signed by approved independent testing laboratories, all certificates required by the specification shall be signed by an authorized official of the firm providing the certificate, with the signature notarized, when such certificates by the producer are acceptable to the Architect.

3.6 RETEST RESPONSIBILITY

A. Where results of required inspections, tests or similar prove unsatisfactory and do not indicate compliance of related work with requirements of the contract documents, then retests are responsibility of Contractor, regardless of whether original test was Contractor's responsibility.

B. Retesting of work revised or replaced by Contractor is Contractor's responsibility, where required tests were performed on original work.

END OF SECTION

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SECTION 01 51 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Procedures:

1. Contractor shall leave clean all tires of vehicles prior to leaving project site and entering public roadways. Any mud tracked onto the owners paving or city streets shall be immediately cleaned by the Contractor.
2. No vehicles or equipment with oil leaks, fuel leaks, or other contaminates will be allowed on site.
3. All construction support and staging areas shall be in areas designated by the CM.
4. Hard hats, safety glasses, long pants, high visibility shirts with sleeves, and OSHA approved work boots are required at all times. Clothing with objectionable language or symbolism will not be permitted.
5. All visitors to the project site must have a legitimate purpose connected with the construction activity and have specific approval of the CM.
6. Parking areas for construction workers will be designated by the CM. Vehicles that stain any pavement will not be allowed on site.

1.2 PROJECT IDENTIFICATION AND CONSTRUCTION SIGNS

A. Size and Layout.

1. The CM will provide a project sign.
2. The CM will provide identification signs and No Trespassing signs around the perimeter of the site.
3. Each Contractor is responsible for furnishing signs specific to the safety at the work site (i.e., caution, warning, danger, etc.).
4. No other signs will be permitted at the site unless approved by the CM.

1.3 SITE ACCESS

A. Site access and egress shall be as designated by the CM. See section 1.14.

1.4 TEMPORARY UTILITIES

A. Temporary Electricity and Lighting

1. Due to the scope of this project, there will not be any temporary utilities provided. All temporary utilities required to perform the work need to be provided by the contractor.
2. Each contractor shall provide lighting for exterior work as needed.

B. Temporary Phone Service

1. Temporary phone service shall be provided for and paid for by Contractor requiring the service.

C. Temporary Water

1. A hose bib adjacent to the building or at the nearest existing city hydrants and will be designated for supplying water during construction work.
2. Drinking water and wash facilities shall be provided for and paid for by Contractor requiring .

D. Temporary Fire Protection

1. The contractor requiring fire extinguishers shall provide an adequate number of temporary fire extinguishers placed around the work area. Activities requiring fire extinguishers in the immediate area or fire watch personnel shall be provide by the contractor performing the work.

E. Temporary Sanitary Facilities
1. The Owner/CM will arrange for and pay for temporary toilet units including installation, service, maintenance, and removal.

1.5 TEMPORARY PROTECTION

A. Each Contractor shall provide temporary coverings and/or enclosures to protect materials and finishes provided under their own Contract from damaging conditions, including damaging conditions caused by other trades.
B. Work damaged by inadequate protection from damaging conditions shall be repaired or replaced as directed and approved by CM and Architect at no cost to Owner.

1.6 REMOVAL

A. All existing conditions on and off the immediate project site which are disturbed due to the Contractor's activities must be repaired to equal or better condition, as determined and approved by CM.
B. Clean and repair any damage caused by installation or use of construction facilities and temporary controls. Cleaning and repair shall be acceptable to the CM.

1.7 TRAFFIC BARRICADES

A. Barricades and/or other traffic directing devices shall be provided by Contractor requiring same.

1.8 CLEANING DURING CONSTRUCTION

A. Dumpsters will be provided by the Owner/CM. Dumpster facilities shall not be used for disposal of concrete or masonry debris or rubble.
B. All Contractors shall execute daily cleaning to keep the work, the site, the building, and adjacent properties free from accumulation of waste materials, rubbish, and windblown debris resulting from construction operations.
C. A clean worksite is required. Each Contractor working on site shall participate in the daily composite cleanup program. Floors shall be swept clean. Dust shall be contained. During finishing stages of the project, surfaces shall be wiped down. Participation shall be allocated to each Contractor, or Subcontractor, based on the proportional number of workers at the site.

1.9 SECURITY

A. Contractor is responsible for security of its own equipment, materials, and property.

1.10 DUST CONTROL

A. Contractor shall execute work by methods to eliminate raising dust from construction operations. Contractors shall provide their owner sweeping compound and vacuums.
B. Temporary dust partitions shall be installed by contractor requiring same.

1.11 SNOW REMOVAL

A. Snow removal will be provided by the Owner/CM for access roads and parking.
B. Snow removal for individual work areas shall be provided by Contractor requiring same.

1.12 FUEL STORAGE

A. The CM will designate a specific area for fuel storage. All fuel shall be contained in accordance with all current laws, codes, requirements, and authorities having jurisdiction.

1.13 WORKING HOURS

A. Normal working hours begin at 7:00 AM Monday through Friday.
B. Normal working hours end at 3:30 PM Monday through Friday.
C. Working hours that fall outside the normal project working hours shall be approved by the CM.

1.14 TEMPORARY ACCESS ROADS & LAYDOWN AREAS

A. Temporary access roads and laydown area are to be provided and maintained by bid package #1. Multiple bid packages shall maintain them, reference Summary Section 01 10 00.

END OF SECTION

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SECTION 01 62 10
PRODUCT OPTIONS AND SUBSTITUTION REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Procedures, requirements and limitations for considering substitutions.
   2. Criteria for selecting product options and substitutions.

1.2 SUBMITTALS

A. Submit requests for substitution in writing to Architect at least seven work days prior to bid date and hour. Requests received after this time will not be considered.

B. Clearly define and describe proposed substitute product including following items:
   1. Fully completed Section 01 62 11 Substitution Request Form.
      a. 01 62 11.1 Substitution Request Form – During Bidding.
      b. 01 62 11.2 Substitution Request Form – During Construction.
   2. Manufacturer's printed information supporting claim that proposed product meets specified requirements. Provide following as applicable:
      a. Literature
      b. Specifications
      c. Drawings
      d. Cuts
      e. Performance data
      f. List of reference projects of similar size, value and complexity
      g. Model numbers
      h. Other information necessary to completely describe item.
   3. Provide a point-by-point comparison between key features of specified Basis of Design item and proposed substitution.
   4. Provide submitted materials marked with Article and Paragraph references from Specification using highlighter, marker and flags on pages to facilitate review and show that substitution meets specified requirements.
   5. Provide a letter indicating requestor has reviewed Contract Documents and examined site (if needed) and that proposed substitution meets specified requirements.

C. Accepted substitutions will be published in writing. No information or indication of acceptance will be provided by means other than written Addenda during bidding or Architect’s written construction administration document following bidding. Refer to “Limitations on Substitutions after Bids or During Construction" in this Section.

D. Bid and construct according to Contract Documents unless approval of substitution is provided in writing.

E. Architect is not obligated to state reasons for rejecting substitution.

1.3 DEFINITIONS

A. "Product" means material, equipment, assembly, system, manufacturer, brand, trade name, element, item or similar as applicable.
   1. Provide new products free from defects and deficiencies unless otherwise noted.

2. Provide components and accessories necessary for a complete system by same manufacturer unless otherwise specified.

B. Terms such as “approved substitute”, "equal to", "accepted by", "approved by", or other synonymous terms mean that acceptance of proposed product is subject to approval by Architect after submittal requirements are met. Architect’s decision is final and binding.

C. Available Manufacturer’s: See below.

D. Except where "no substitutions" or "same as existing" “match existing” are noted, term "or approved substitute" is implied throughout, subject to prior approval conditions specified including where the term available manufacturer’s is included.

PART 2 MATERIALS

2.1 PRODUCTS

A. Architect and Owner reserve right to accept or reject proposed product. Should a proposed product be unable to meet requirements to satisfaction of Architect, product shall not be used. No additional compensation will be allowed for required Work resulting from use of product accepted by Addendum.

B. Use only one brand, manufacturer, source or type for like products unless otherwise approved or specified. Contractor is obligated to do so unless otherwise approved in writing.

C. Provide pricing based on products listed in Contract Documents. Contract award is based on use of specified products or substitutions approved prior to bidding or pricing.
1. By execution of Contract, Contractor agrees and understands Work will be accomplished with products specified or accepted by substitution.

D. Basis of Design Products:
1. Reference to “Basis of Design” and a named specific product or manufacturer is intended to establish criteria for use of that product and manufacturer based on those products published information whether or not those criteria are explicitly stated in Specifications.
2. Criteria may establish higher performance requirement than specified reference or performance standards. Such reference is intended to establish minimum level of quality, standard of design, function, appearance, type, strength, durability, construction, efficiency, sound level, finish, appearance, availability, service and similar characteristics determined necessary for Project.
3. Specification criteria including basis of design products are considered as a whole.
4. Other products or manufacturers listed meet features, performance, appearance and other criteria established by that product or manufacturer even if product must be customized to meet those criteria.
5. When other products are listed in a Section those products may be used if they meet entire specification criteria including criteria implied by product listed as basis of design. Meeting some requirements but not meeting criteria established by basis of design product does not qualify as meeting specified requirements.
6. Products or manufacturers accepted for substitution will be acceptable provided they fully comply with requirements and match basic and essential criteria of product used for basis of specification or design, including level of fabrication quality, as determined by Architect.

E. Reference Standards for Products:

1. When references to Federal Specification, ASTM Standard, American National Standards Institute (ANSI) or similar association standards are listed for product quality, provide an acceptable affidavit certifying that proposed substitution for this Project meets with same standard.
2. Submit supporting test data to substantiate compliance.

F. Substitute products shall:
1. Be available in same range of colors, textures, dimensions, gauges, types, and finishes as specified product.
2. Be equal to specified item in strength, durability, efficiency, serviceability, ease and cost of maintenance.
3. Be compatible with building design
4. Not necessitate design modifications.
5. Not impose additional work or require changes in work of Prime Contractor, or other Subcontractor, vendor, or materials supplier.
6. Not add cost to Owner.
7. Be similar in essential fabrication features.

G. Contractor, supplier or manufacturer providing accepted substitute product shall bear cost of required modifications to spaces, services, utilities and other features as result of accepting substitute products, including but not limited to:
1. Larger capacity mechanical or electrical service, devices or utilities resulting from acceptance of product for bidding purposes.
2. Modification to pipes, conduits, ducts, and controls for conveying, distributing, and controlling those services or utilities.
3. Modification to insulation, wrappings, coatings, or other integral features of lines or items conveying those lines.

H. Timely Placement of Product Orders: Place product orders in a timely manner, within ten days after acceptance of submitted list of materials.

2.2 LIMITATIONS ON SUBSTITUTIONS AFTER BIDS OR DURING CONSTRUCTION

A. Intent is to limit unnecessary substitutions after bids. Changes will not be allowed to accepted list of products, except when specified or accepted product subsequently is determined as not meeting requirements of Contract Documents or product becomes unavailable, and then only under following conditions:
1. Orders were placed in timely manner as required after list of materials is accepted. No excuse or proposed substitution will be considered for products due to unavailability unless proof is submitted that firm orders were placed in a timely manner.
2. Reason for unavailability is beyond control of Contractor: prolonged strikes or lockouts which will delay Project to an extent unacceptable to Owner, bankruptcy, discontinuance of a product, delays or Acts of God or other similar reasons.
3. Request for substitution is submitted in writing within 10 days after date Contractor becomes aware product does not comply with specifications or has become unavailable, accompanied by supporting evidence.
4. No extra cost to Owner.
5. Substitution does not compromise design intent or quality required.
6. Substitute product is acceptable to Owner and Architect.
7. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
8. Requested substitution does not require revisions to Contract Documents.

9. Requested substitution is consistent with the Contract Documents and will produce intended and indicated results.
10. Substitution request is fully documented and properly submitted.
11. Requested substitution will not adversely affect Contractor's Construction Schedule.
12. Requested substitution has received necessary approvals of authorities having jurisdiction.
13. Requested substitution is compatible with other portions of Work.
14. Requested substitution has been coordinated with other portions of Work.
15. Requested substitution provides specified warranty.
16. If requested substitution involves more than one trade, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to installers involved.

PART 3 EXECUTION

Not Used.

END OF SECTION

SUBSTITUTION REQUEST

(During the Bidding Phase)

Project: Fairfield Community School District

Fairfield MS Expansion - Bid Issuance No. 1 Bus Loop

To: _____

Re: _____

Substitution Request Number: _____

From: _____

Date: _____

A/E Project Number: 2022221.02

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

Q Substitution approved - Make submittals in accordance with Specification Section 01330.

Q Substitution approved as noted - Make submittals in accordance with Specification Section 01330.

Q Substitution rejected - Use specified materials.

Q Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SUBSTITUTION REQUEST

(During the Construction Phase)

Project: Fairfield Community School District

Fairfield MS Expansion - Bid Issuance No. 1 Bus Loop

To: _____

Re: _____

Substitution Request Number: _____

From: _____

Date: _____

A/E Project Number: 2022221.02

Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

Q Substitution approved - Make submittals in accordance with Specification Section 01330.

Q Substitution approved as noted - Make submittals in accordance with Specification Section 01330.

Q Substitution rejected - Use specified materials.

Q Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SECTION 01 64 00
OWNER FURNISHED PRODUCTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. On-Site transport and installation of Owner furnished equipment, noted “OFCI” (Owner Furnished and Contractor Installed), on Drawings and Schedules.
   2. Rough-in and Coordination of Other Equipment, noted "OFOI” (Owner Furnished and Owner Installed), "OFVI" (Owner Furnished and Vendor Installed).

B. Related Sections:
   1. Divisions 10, 11, 12, 14, 21, 22, 23, 25, 26, 27, 28, 40, 41, 42, 43, 44, 45, and 48 - Connection to building services ("OFCI" equipment).
   2. Section 01 10 00 - Summary of Work.

C. Related Work:
   1. Furnishing of equipment, transport to Owner's storage, inspection, unloading, unpacking, storage, testing and adjustments.
   2. Disconnections, removal, refurbishment, and transport of existing equipment to installation locations.
   3. Instructions and shop drawings for installation, assembly and connection of both new and existing equipment.
   4. Connection of equipment to mechanical and electrical building services ("OFOI" and "OFVI" equipment).
   5. Testing and adjustments.

PART 2 PRODUCTS

2.1 CONTRACTOR-FURNISHED MATERIALS

A. Provide labor, tools, devices and methods required for assembly and installation of equipment.

2.2 OWNER FURNISHED EQUIPMENT

A. Equipment will be delivered to Owner's storage by party having title or custody.
   1. In addition to items themselves, installation and assembly instructions, shop drawings, templates, accessories will be delivered to Contractor in order that Contractor may proceed with work of installing.

B. Delivery of equipment, installation instructions, shop drawings, templates, and accessories will be in accordance with schedules as established by Owner.

PART 3 EXECUTION

3.1 INSTALLATION OF NEW OWNER FURNISHED EQUIPMENT

A. For installation of new equipment furnished by Owner and installed by Contractor, Owner will deliver equipment to Project, uncrate or unpack, assemble, clean and otherwise make equipment ready for installation and connection.
   1. Owner will deliver equipment to particular room in which it is to be installed and Contractor will set in place and make final connections.
   2. Owner will assume responsibility for damage found during unpacking and for damage which may occur in moving equipment, and will assume responsibility for caring for

accessories or other loose items.

3. Owner will remove debris from unpacking, uncrating or assembly work. Final connections shall be made by Contractor for particular trades involved.

4. Owner's Responsibilities:
   a. Arrange for and deliver necessary shop drawings, product data, samples, manufacturer's instructions, and certificates to Contractor.
   b. Deliver supplier's bill of materials to Contractor.
   c. Arrange and pay for delivery to site in accordance with Progress Schedule.
   d. Inspect deliveries jointly with Contractor.
   e. Submit claims for transportation damage.
   f. Arrange for replacement of damaged, defective, or missing items.
   g. Arrange for manufacturer's field services; arrange for and deliver manufacturer's warranties and bonds to Contractor.

B. Refer to Equipment Schedule as indicated on drawings.

3.2 INSTALLATION BY CONTRACTOR

A. Contractor Installation: Work consists of transporting equipment to installation locations, setting in place, building in, leveling and attachment to building construction.
   1. Cleaning: After installation and prior to acceptance of installation by Owner, clean surfaces, wash and polish as appropriate.

B. Leave ready for connection to mechanical and electrical building services, and for testing and adjustments by vendor or Owner; Contractor has option to be present during testing
   1. Contractor's Responsibilities:
      a. Designate submittals and delivery date for each Product in the Progress Schedule.
      b. Review shop drawings, product data, samples, and other submittals. Submit to Architect with notification of discrepancies or problems anticipated in use of product.
      c. Receive and unload Products at site.
      d. Inspect deliveries jointly with Owner, record shortages, damaged or defective items.
      e. Handle products at site, including uncrating and storage.
      f. Protect Products from damage and from exposure to elements.
      g. Assemble, install, connect, adjust and finish products.
      h. Provide installation inspections required by public authorities.
      i. Repair or replace items damaged by Contractor.

C. Owner and Vendor Installation: Verify service and installation requirements with responsible party and furnish rough-ins, supporting construction and other requirements to enable responsible party to properly install equipment.

END OF SECTION

SECTION 01 66 00
PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART I - GENERAL

1.1 GENERAL STORAGE

A. Store and handle products immediately on delivery in accordance with the manufacturer's printed instructions, with seals and labels intact and legible, and protect until installed in the work.

B. Arrange storage in a manner to provide easy access for inspection.

1.2 ENCLOSED STORAGE

A. Store products subject to damage by the elements in substantial weathertight enclosures.

B. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

C. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

1.3 EXTERIOR STORAGE

A. Provide substantial platforms, blocking or skids to support fabricated products above the ground to prevent soiling or staining.

B. Cover products which are subject to discoloration or deterioration from exposure to the elements with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

Provide surface drainage to prevent flow or ponding of rainwater.

Prevent mixing of refuse or chemically injurious materials or liquids.

1.4 MAINTENANCE OF STORAGE

A. Maintain a periodic system of inspections of stored products on a scheduled basis to assure that:
1. Condition of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on a continuing basis.
3. Surfaces of products exposed to elements are not adversely affected.
4. Note: Any weathering of products, coatings and finishes is NOT acceptable under requirements of the Contract Documents.

B. Have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on the exterior of the package, for mechanical and electrical equipment which requires servicing during long term storage.
1. Comply with the manufacturer's instructions on a scheduled basis.
2. Connect space heaters which are part of the electrical equipment and operate continuously until equipment is placed in service.

1.5 PROTECTION AFTER INSTALLATION

A. Provide substantial coverings to protect installed products from damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

D. Cover projections, wall corners, jambs, sills and soffits of openings, in areas used for traffic and passage of products in subsequent work.

E. Protect finished floors and stairs from dirt and damage.

F. In other areas subject to foot traffic, secure heavy paper, sheet goods on the materials in place.

G. For movement of heavy products, lay planking or similar materials in place.

H. Waterproofed and roofing surfaces:
   1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.
   2. When some activity must take place in order to carry out the Contract, obtain recommendations of the installer for protection of surface.
   3. Install recommended protection and remove on completion of that activity.
   4. Restrict the use of adjacent unprotected areas.

I. Prohibit traffic of any kind across planted lawn and landscaped areas.

1.6 PRODUCT HANDLING

A. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

B. Provide additional protection during handling as necessary to prevent scraping, marring, or otherwise damaging products or surrounding spaces.

C. Handle products by using methods that will prevent bending or over stressing.

D. Lift heavy components only at designated lifting points.

PART 2 - PRODUCTS
Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 01 71 23
FIELD ENGINEERING

PART 1 -GENERAL

1.01 WORK INCLUDED

A. Contractors are to provide such field engineering services as are required for the proper completion of the Work, including, but not necessarily limited to:
   1. Establishing and maintaining lines and levels;
   2. Designing shores, forms and similar items provided by the Contractor as part of its means and methods of construction.
   3. Employing a licensed land surveyor to establish and maintain all lines and levels necessary for the location and construction of the Work. Tolerances for anchor bolts and reinforcing for columns are critical. Employ a program to ensure that the surveyor coordinates this activity. Submit a program to the CM for review prior to commencing work.
   4. Verifying the dimensions and levels shown on the Drawings with existing dimensions and levels and notifying the CM of any discrepancies before proceeding with the Work.

B. Related Work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Additional requirements for field engineering also may be described in other Sections of these Specifications.

1.02 OWNER'S RESPONSIBILITIES

A. Construction Monuments: The CM/Owner will provide four *(4)* control points for the Prime Contractor's work.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Locate and protect owner provided control points before starting work on the Jobsite as shown on the Drawings.

B. Preserve permanent control points during the progress of the Work. Do not change or relocate control points or items of the Work without specific approval from the CM.

C . Promptly advise the CM when a control point is lost or destroyed, or requires relocation because of other changes in the Work:

   1. Upon direction of the CM, require the field engineer to replace reference stakes or markers, and
   2. Locate such replacements according to the original survey control.

D. Establish line and levels, locate and layout, by instrumentation:

   1. Building foundation, column locations, and floor elevations.
   2. Controlling lines and levels required for mechanical and electrical trades.

1.04 SUBMITTALS

A. Comply with the pertinent provisions of Section 01 30 00, Submittals.

B. Submit to the CM for review:

1. Data demonstrating the qualifications of the persons proposed to be engaged for field engineering services.
2. Documentation verifying the accuracy of field engineering work.
3. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance or non-conformance with requirements of the Contract Documents.

C. Maintain a complete, accurate log of all control and survey work as it progresses.

1.05 QUALITY ASSURANCE

A. Use adequate numbers of licensed, skilled professionals and workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

PART 2 - PRODUCTS
NOT USED

PART 3 – EXECUTION

END OF SECTION

SECTION 01 73 24
ANCHORAGE AND SLEEVING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:
   1. General Procedural Requirements.
   2. Installation of proper anchorage devices to securely fasten hang, mount, anchor, and support all work.
   3. Rough-in and installation of Equipment.

1.2 TESTING

A. Under supervision of an independent testing laboratory paid by for by the Owner, 5 percent of anchors shall be field loaded above anticipated loads to insure their adequacy.
   1. Drilled-in expansion anchors, which have the same hole size as the bolt size, such as "Kwik-Bolt" or "Wej-It" or "Thunderstud" by Universal Fastenings will be permitted provided:
      a. There is no spalling around the holes,
      b. The holes are neatly drilled and approved test reports indicate adequate shear and pullout strength with ample safety factor.

PART 2 - PRODUCTS

2.1 TYPES OF ANCHORAGE AND SLEEVING DEVICES

A. New Materials: As specified in individual Sections, or as herein specified.

B. Existing Materials: Match existing products and work for anchoring and sleeving unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine substrate and conditions under which anchorage and sleeving work is to be performed. Do not proceed with work until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Methods and devices, as well as location, may be subject to Owner Representative's approval and shall not impair, violate or alter structure, water integrity or aesthetic value of the Work. Sleeve existing pipes indicated.

B. In general, provide bolts and shields for anchorage to solid materials, toggle bolts into hollow construction or through bolts and washers where necessary, unless otherwise shown or specified.

C. Provide sleeves for all pipes, ducts and similar features that pass-through walls, slabs, concrete joists, beams or girders, concrete columns or concrete bridging, whether specifically indicated or not.

D. Provide adequate backing for all fastenings and supports to prevent deflection or undue

stresses. For concrete, anchorage devices shall generally be cast in, not drilled in later, unless otherwise specified in individual section of work.

3.3 ANCHORS

A. Furnish and install proper anchorage devices to securely fasten, hang, mount, anchor, and support work substantially.

B. Wood plugs into solid materials, toggle bolting to lath and plaster, or bolting into shields at hollow units will not be acceptable.

C. Shot and Drilled Anchors: At concrete, shot or drilled-in anchor devices will be permitted where casting in may be difficult to coordinate, provided they will not damage the concrete or cause any spalling around the anchor.

D. Shot anchors will not be permitted in bottoms of joists, in post-tensioned slabs where cable location is unknown, in slabs 4 inches or less in thickness, nor where spalling may result.

E. Any shot anchors at concrete joists shall be at the side of the joist, above centerline, located to avoid reinforcing steel. Verify shot anchors at composite decking with the Owner's Representative.

3.4 SLEEVES

A. Sleeves shall be of new material, cut square, reamed. Sheet metal sleeves may be used only where specifically approved.
   1. At all concrete penetrations, sleeves shall be uncoated or galvanized pipe, not less than Schedule 40 steel pipe.
   2. At exposed or concealed masonry walls, sleeves shall be the same as for concrete penetrations.

B. Unless otherwise called for, sleeves passing through walls, slabs, beams, bridging, columns, shall be 1/2 inch greater in inside diameter than external diameter of pipe passing through sleeves, or the insulation diameter.
   1. Pipe insulation shall be continuous through the sleeves.

C. Unless otherwise called for, sleeves through walls shall extend full thickness of wall and be cut flush with finished surface; sleeves through exterior building walls, above or below grade, shall extend full thickness of wall and be cut flush with finished surfaces; sleeves through floor slabs for exposed piping shall extend not less than 1/2 inch above finished floor.

D. Sleeve Spacing: Where sleeves occur in rows or clusters, a minimum of 4 inches of concrete shall be left between sleeves and if the normal spacing of reinforcing bars cannot be maintained, or are interrupted because of sleeve size or cluster location, extra reinforcing shall be provided by the Contractor as directed by the Owner's Representative. In no case shall sleeves impair the structural capability of the Work.

E. Sleeves at Core Drilled Holes: The sleeves shall provide a good fit to core drilled hole and shall be set in place with a full coating of epoxy adhesive to insure remaining in place and a good seal between the hole and the sleeve. Do not core drill post-tensioned slabs.

F. Sealing of Sleeves: As pipe, conduit or other feature is installed through a sleeve, it shall be wedged to keep in the center of the sleeve, with wedges held 1" back from end of sleeve. Pipe, conduit or other features through walls or other vertical surfaces, shall be caulked at the top in all cases, and at the bottom where exposed in a finished space.

G. Fire Stop Sealing Penetrations Through Roof and Floor Slabs; Fire and Smoke Rated Walls or Partitions; and Shafts and Cable Tray Penetrations: Provide the space between the sleeve and pipe or duct with a fire stop system. Unless otherwise indicated, all firestopping work shall be provided by Contractor necessitating the penetrating element and shall be installed in accordance with Section 078400 - Firestopping of these specifications.

3.5 EQUIPMENT LAYOUTS, ROUGH-IN AND INSTALLATION

A. Unless specifically noted, equipment shall be installed in accordance with the manufacturer's recommendations and instructions.

B. Full layout data and rough-in data is to be provided by the Contractor or subcontractor supplying the equipment, to others requiring the data, in sufficient time to facilitate proper and accurate rough-in.
   1. For existing equipment of the Owner, the Contractor must examine the equipment and determine the rough-in data. For equipment to be purchased by the Owner, the Owner will arrange to have the data furnished to the Contractor.
   2. If rough-in details are not available at the time service systems are being installed, the final rough in shall be postponed until the data is available. At all times prior to roughing-in for equipment by Owner, consult with the Owner to verify the status of rough-in data.

C. Floor Sleeves: For waste and other services passing through the floor, if rough-in data is available, it is the intent that the rough-in sleeves generally, shall be installed prior to pouring the floors.
   1. With the permission of the Owner's Representative, core drilling for other holes (even if data is available) may be done to facilitate job progress or to more accurately locate the holes, with such core drilling done without additional reimbursement.
   2. If layout information for rough-in sleeving for equipment provided under the construction Contract is not available at the time sleeving through the floor must be accomplished, core drilling later shall be employed, at no additional reimbursement.

D. Core Drilled Holes: At core drilled holes, the specified sleeves will generally be required, unless otherwise indicated. Where omission of a sleeve is approved, the hole shall be drilled approximately one inch larger than the outside diameter of the insulation, where insulated. When the pipe is installed, hold down centering wedges one inch minimum below the floor line. The opening shall be sealed.

END OF SECTION

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SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A Section Includes:
1. Closeout procedures.
2. Systems and equipment testing.
3. Instructions to Owner.
4. Clean-up.

B. Related Sections:
1. Section 01 31 00 – Project Management and Coordination.
2. Section 01 32 16 – Construction Progress Schedule.
3. Section 01 51 00 – Temporary Utilities.
4. Section 01 52 00 – Construction Facilities.
5. Section 01 78 00 – Closeout Submittals.

1.2 SUBSTANTIAL COMPLETION AND OWNER OCCUPANCY

A. Owner has urgent need to occupy Project to commence its intended use.

B. Plan an efficient, orderly and coordinated completion process including organizing, scheduling and coordinating the following:
1. Work of contractor's own forces.
2. Work of subcontractors.
3. Establish firm commitments for on-time completion
4. Owner's needs for accommodations and time to occupy project during closeout per schedule of Substantial Completion and final completion.

C. After Substantial Completion expedite completion of remaining work in an organized, efficient manner that maintains quality standards. Perform such work according to following requirements:
1. Scheduled work in advance with CM.
2. Perform Work in occupied spaces when space is not in use, such as after hours in administrative areas or public spaces when public use hours are over for the day, unless otherwise approved by the CM.
3. When necessary, use overtime to accomplish work not able to be completed during normal work hours at no extra cost to the Owner.
4. Perform Work in occupied areas in a manner and at such time as will not significantly interfere with, hamper or inconvenience Owner's program or functions.

1.3 PROJECT CLOSEOUT

A. Insurance: Refer to General Conditions.
1. Upon completion of work and written acceptance by Owner, provide a Certificate of Insurance indicating specified Completed Operations insurance will be provided a minimum of one year after Owner's acceptance of entire Project.
2. Specified Property Insurance shall be maintained until final acceptance by Owner of entire Project.

B. Supplemental Agreements: Resolve supplemental agreements prior to final payment, including adjustment of allowances.

C. Consent of Surety: Refer to General Conditions – obtain consent of surety prior to reduction in retained percentage and prior to final payment.

D. Broken Glass: Repair.

E. Guarantees - Warranties: Refer to General Conditions for general guarantee requirements.
   1. In addition to general guarantee, provide written guarantees specified in technical sections of Specifications per Section 01 78 00.

F. Test Reports and Certificates: Refer to Section 01 78 00.

G. Retention of Records: Retain records required by law and good business practice.

H. Record Set of Drawings:
   1. Refer to General Conditions and Section 01 78 00.
   2. Deliver record set to CM upon Final Completion of Project.
   3. Review set with Architect to clarify or explain changes that may be necessary.

I. Temporary Utilities:
   1. Refer to Section 01 51 00.
   2. Remove temporary facilities and utilities as job progress permits.
   3. Read meters at times specified for transfer of services cost to Owner for light/power.

J. Sanitary Facilities:
   1. Refer to Section 01 52 00.
   2. Remove temporary fixtures and restore rooms as specified.

K. Temporary Facilities:
   1. Remove as work progresses and facilities are no longer needed at time acceptable to Architect.
   2. Prior to final payment, remove temporary sheds, offices, fences (including perimeter fence), barricades, surplus materials, debris and other material or items not part of Project.

L. Extra Materials: Refer to Section 01 78 00

M. Construction Cores and Keys:
   1. At time of Substantial Completion, just prior to occupancy, replace construction cores and install permanent cores in locks.
   2. Thereafter, access to spaces will be provided by the Owner.

N. Identification of Equipment:
   1. Prior to Substantial Completion, provide identification tags or plates, or other identification means, as specified under Technical Sections of Specifications, such as at valves, panelboards and similar items.
   2. Apply directions on plates for circuit data and similar information.

1.4 SYSTEMS AND EQUIPMENT TESTING

A. Test equipment and systems to demonstrate each system and piece of equipment is installed and operating properly.

B. Provide a written record of tests and results per Section 01 78 00.

C. After operation and testing of systems, instruct Owner's representatives with Architect's representative present.

1.5 INSTRUCTIONS TO OWNER

A. Provide instructions before final payment is made. Submit evidence that

instruction/maintenance manuals were delivered to and were acceptable to Owner/CM.

B. Requirements herein supplement specific requirements provided under individual specification sections.

C. Collect information and data so complete manuals are provided in sufficient time to permit review prior to time for final payment. Refer also to Section 01 78 00.

D. Provide qualified representatives of Contractor or subcontractors to give explanations and instructions.

E. Provide instruction manuals per Section 01 78 00 to be used and reviewed during instructions.

F. Thoroughly and properly instruct the Owner in use, operation, care and maintenance of Project, especially various systems and equipment installed under Contract. Give instructions methodically and carefully. Cover various phases of work and in sufficient detail so Owner fully understands entire Project.

G. Orient and familiarize designated Owner Representatives with locations, methods, materials, uses and operation of systems and equipment, as well as specialized materials installed under Contract.

H. Instruct and demonstrate to the Owner regarding full use, sequence or function and similar information to fully acquaint Owner in proper use, care and control of equipment, systems and devices installed under Contract.

I. Precautionary Measures and Dangers of Misuse.
   1. Specifically explain precautions and dangers of misuse.
   2. Establish specific and agreed upon periods of time with the Owner, adequate to thoroughly present pertinent information.
   3. Owner will record length of time and number of days spent on these instructions.

J. Refer to Section 01 31 00 for additional information and data for maintenance manual such as
coordination drawings.

K. Information Not Required:
   1. Normal and routine cleaning of normal floor and wall finishes.
   2. Maintenance of light fixtures.
   3. Cleaning of radiation covers.
   4. Hardware maintenance.
   5. Other similar housekeeping matters.

1.6 CLEAN-UP

A. Refer to General Conditions for cleaning requirements during construction.

B. Clean materials and equipment. Remove (haul away) debris, cartons, crates, surplus materials.

C. Maintain work neat and orderly.

D. Definitions
   1. Thorough Cleaning:
      a. Thorough cleaning required unless otherwise specified.
      b. Remove dust, dirt, debris, laitance, grease, oil, stains, discolorations, droppings, markings, and other soil or foreign matter or substance.

c. Remove labels except labels specifically designated to remain as part of listed, rated or labeled item.
d. Use appropriate methods such as sweeping, scrubbing, mopping, washing, dusting vacuuming so surface is completely clean and streak free.

2. Broom Clean: Remove visible dirt or dust from surface with a new, high quality, clean broom by thoroughly and properly sweeping or brooming so no dust or dirt is visible on surface.

E. Each Contractor shall perform general "final" cleaning prior to inspection for Substantial Completion and occupancy. The intent is for this to be a composite effort of all trades working on the site. Each contractor shall participate, participation will be based on the number of workers at the site during the finishing stages of the project. Plan, organize and coordinate cleaning to avoid working in spaces once cleaned. Coordinate timely cleaning with CM especially for cleaning of glass.

F. Clean entire Project. Each Contractor is responsible for final clean up of the work.
1. Cleaning required under each Section.
2. Remove accumulated dust, dirt and debris. Wipe down all surfaces.
3. Materials, equipment or other items.
4. Glass - both sides, interior and exterior, and mirrors.
5. Infection Control Area Clean Up:
a. Vacuum clean above ceiling, pipes, and ventilation ducts after construction is completed.
b. Check ventilation filters for breaks or leaks.
c. Use damp mopping for dust control.
d. Minimize traffic between construction area and patient control areas.
e. Obtain Owner/CM approval of cleaned area before proceeding.

G. Electrical Contractor Cleaning: Includes but is not limited to:
1. Normally occupied areas, service areas, passages and corridors and similar spaces.
2. Interiors of cabinets, panelboards and other equipment.
3. Wipe down of surfaces, cleaning of lights and devices.
4. Other work under contract needing cleaning.

H. Mechanical Contractor Cleaning: Includes but is not limited to:
1. Remove filters used during construction and install permanent new filters.
2. Ductwork.
3. Fixtures and fittings.
4. Insides of convectors.
5. Unit heaters or similar units
6. Radiation.
7. Piping and equipment in equipment rooms.
8. Wipe down of surfaces.
9. Other work under contract needing cleaning.

I. "Broom Clean" is allowed in following areas:
1. Tunnels, shafts, air shafts and air plenums not constructed of ductwork.
2. Similar areas.
3. Floors in equipment rooms (including rooms such as electrical equipment rooms).
a. Except also wash floors and apply final coat of sealer if specified.

J. Floors (including concrete) must be free of stains and discoloration

K. Hardware: Adjust and polish as needed

L. Perform other cleaning as required to turn over to Owner Project in new, well-maintained condition, ready for full use and occupancy.

M. Clean areas made dirty by work done after Substantial Completion so building is clean as specified prior to Final Completion. This final cleaning shall be a composite participation by all trades working at the site during the finishing stages of the project.

1.7 FINAL ACCEPTANCE AND FINAL PAYMENT

A. Final payment will not be made until final acceptance inspection, completion of punch list items and final sign-off by Owner, CM, and Architect.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout submittals.
   2. Warranties and guarantees.
   3. Test reports and certificates.
   4. Extra materials.
   5. Maintenance manuals.
   6. Record drawings and specifications.

B. Related Sections:
   1. Section 01 33 00 - Submittal Procedures.
   2. Section 01 77 00 - Closeout Procedures.

1.2 WARRANTIES AND GUARANTEES

A. Provide written guarantees specified in technical sections of Specifications.

B. Where guarantee terms are included in Specifications or a specific guarantee is referenced, submit guarantee in specified form.

C. Submit guarantees prior to final payment.

D. Submit a checklist of required guarantees, by section numbers.

1.3 TEST REPORTS AND CERTIFICATES

A. Provide test reports and certificates required in technical sections prior to final payment.

B. Provide a written record of systems and equipment testing and results.

C. Provide a check list of required reports and certificates, by Specifications sections.

1.4 EXTRA MATERIALS

A. Prior to final completion, deliver extra materials specified in various technical sections.

B. Do not allow materials to "collect" in various parts of Project. Deliver to CM/Owner together.

C. Obtain receipt for specified extra materials. Without such evidence of delivery, no credit will be given for fulfilling specified requirements.

D. Provide a checklist of specified extra materials.

1.5 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Coordinate submittals from Section 01 33 00 that will be needed to fulfill following requirements.

B. Provide operating instruction data and maintenance manuals in accordance with Section 01 77 00 Closeout Procedures.

C. Organize information by classes or types of equipment and systems as follows:
   1. Manual shall consist of neatly edited and typed instruction manuals (in hard cover, indexed, loose-leaf notebook) to explain use, function and control of equipment, materials and systems. Printed information shall include:
      a. Warranties and guarantees.
      b. Common errors made, which will "abuse" equipment or system
      c. Use, function and control of equipment and systems
      d. Clean installation data and pamphlets (not to be left at equipment but included in manuals)
      e. Instructions and explanations.
      f. Cleaning instructions.
      g. Wiring and piping diagrams.
      h. Various types of maintenance procedures.
      i. Lubrication data and schedules.
      j. Maintenance materials to be used.
      k. Maintenance information.
      l. Maintenance instructions with frequency.
      m. Other maintenance information.
      n. Adjustment and repair data.
      o. Parts list with numbers and recommended parts for Owner's stock.
      p. Names, addresses, and telephone numbers parts distributor.
      q. Names, addresses, and telephone numbers of appropriate service organizations for various items and equipment.
   2. Manuals shall include systems and equipment as, but not limited to following information:
      a. Heating plant
      b. Heating and ventilating equipment
      c. Fan units
      d. Air conditioning
      e. Controls for mechanical systems
      f. Alarm systems
      g. Electrical distribution systems
      h. Operating equipment of general construction
      i. Mechanical and electrical work
      j. Elevators
      k. Kitchen equipment
      l. Operable partitions
      m. Power operated doors
      n. Other similar systems and equipment.

1.6 RECORD SET OF DRAWINGS AND SPECIFICATIONS

A. Provide record set of Drawings and Specifications to CM at completion of Contract.
   1. Refer to General Conditions for general requirements.
   2. Refer to Section 01 33 00 - Submittal Procedures for posted (updated) job site contract documents.

B. During construction, maintain clean set of Drawings and Specifications for sole purpose of recording changes to Contract.

C. Mark record set methodically as work progresses, clearly and neatly, in color.

D. Include information cut and pasted into appropriate location of documents to reference

change, adjustment, or clarification. Type of information to be recorded on record set includes but is not limited to:

1. Addendum items sent during bidding
2. Changes, deviations or revisions made, except minor or non-critical dimensions, including those made by Change Order or Supplementary Instructions.
3. Accepted submittals including shop drawings, product data and samples.
4. Omissions, including work omitted by accepted alternates.
5. Dimensioned locations of major or main utility lines, such as main conduit runs, piping mains and similar work.
6. Locations of control valves.
7. Additions to the work.
8. Changes in significant details.
9. Changed footing or other elevations.
10. Locations of electrical home run boxes, including circuit numbers and panel designations for each box.
11. Coordination drawings.
12. Changes in locations of panelboards, outlets, drains, piping, openings, dampers and similar features.
13. Other similar data.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

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SECTION 02 01 01
SPECIAL PROVISIONS

PART 1 GENERAL

1.01 All work shall be constructed in accordance with the 2026 edition of the Iowa Statewide Urban Design and Specifications (SUDAS).

1.02 There will be no unit measurement of individual bid items. All costs shall be included in the Contract Lump Sum price.

PART 2 REQUIRED SUBMITTALS

2.01 Shop drawings shall be submitted for the following items:

A. Intakes.

2.02 Material certifications shall be submitted for at least the following items:

A. Porous backfill.
B. Trench foundation.
C. Granular backfill.
D. Granular stabilization.
E. Modified subbase.
F. Portland cement concrete (cement, aggregates, and admixtures).
G. PCC plant charge ticket (SUDAS Section 7010 3.01 A.3.c. delivered to the site with each truckload).
H. Reinforcing steel.
I. Fertilizer, seed, and mulch.
J. Curing compound.
K. Detectable warning panels.
L. Filter socks.
M. Silt fence.

2.03 Catalog information shall be submitted for the following items:

A. Storm sewer pipe and fittings.
B. Storm sewer fabric sock.
C. Longitudinal subdrain pipe and fittings.
D. Castings, frames, and adjusting rings.
E. CMP aprons and guards.
F. Manhole joint sealant.
G. Subdrain outlet sections.

PART 3 SUDAS SECTION 2010 – EARTHWORK, SUBGRADE, AND SUBBASE

3.01 SUDAS Section 2010 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

3.02 SUDAS Section 2010 1.08 E. Measurement of Class 10 excavation includes a 20% shrinkage factor.

	Raw Excavation (C.Y.)	Raw Fill (C.Y.)	Compacted Fill (C.Y.)	Waste (C.Y.)
Class 10	1605	7	8	1,598

3.03 The raw excavation above does not include excavation for subdrains or pipes.

3.04 Removals and excess excavation shall become the property of the Contractor and shall be disposed of off the project site in a manner complying with local ordinances, state law, and the regulations of the Iowa DNR.

3.05 Any excavation waste shall become property of the Contractor.

3.06 Type A compaction shall be used on the project.

3.07 Depth of the subgrade preparation shall be at least 6 inches below the top of the subgrade. Subgrade preparation shall extend 3 feet beyond the back of the curb.

3.08 Modified subbase shall extend 3 feet beyond the back of the curb. Compaction of the modified subbase material shall be accomplished with a vibratory steel drum roller. The roller shall make a minimum of six passes over the entire surface of the modified subbase material. Additional passes shall be made, if necessary, to obtain stability of the material.

PART 4 SUDAS SECTION 3010 – TRENCH EXCAVATION AND BACKFILL

4.01 SUDAS Section 3010 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

4.02 SUDAS Section 3010 3.05 A.1. Use Class F-3 for the storm sewer bedding.

4.03 SUDAS Section 3010 3.05 E. Use Class 1 bedding/backfill material for final trench backfill material under paved roads for all storm sewer.

4.04 SUDAS Section 3010 3.06 A. The Contractor is responsible for trench compaction testing for storm sewer.

PART 5 SECTION 4020 – STORM SEWERS

5.01 SUDAS Section 4020 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

5.02 Any storm sewer or subdrain shall be connected to the storm sewer pipe with premanufactured tees. All bends in the storm sewer shall be made with premanufactured bends.

5.03 Where the HDPE storm sewer is used as a longitudinal subdrain, the pipe shall be perforated as defined in AASHTO M330, Class 1 perforations. All perforated storm sewer pipe shall be wrapped with a fabric sock to prevent the migration of soil into the storm sewer. The fabric sock shall be a pre-manufactured knitted polyester sock with a minimum thickness of 24.0 mils and a minimum water flow rate of 300 gal/min/sq.ft. as provided by ADS Pipe, or equivalent. The backfill material shall be porous, similar to the subdrains.

PART 6 SUDAS SECTION 4040 – SUBDRAINS

6.01 SUDAS Section 4040 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

6.02 SUDAS Section 4040 2.02. Type 1 Case A shall be used.

6.03 SUDAS Section 4040 2.05. The subdrain outlet shall be double-walled HDPE pipe or PVC.

6.04 See drawings for locations of subdrains.

PART 7 SECTION 7010 – PORTLAND CEMENT CONCRETE PAVEMENT

7.01 SUDAS Section 7010 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

7.02 SUDAS Section 7010 1.08 A.3. Reinforcing steel and cold weather protection is considered incidental to the project.

7.03 SUDAS Section 7010 2.01. Longitudinal and transverse reinforcing steel may be plain or epoxy-coated bars meeting the requirements of ASTM A 615, Grade 40 or higher. Tie bars shall be epoxy-coated.

7.04 SUDAS Section 7010 2.02. Class C or M mix shall be used for Phase 1 of the project as shown on the drawings. Class M mix shall be used for Phase 2 of the project as shown on the drawings.

7.05 SUDAS Section 7010. Class 3 durability coarse aggregates shall be used on the project. The aggregate shall not contain more than 1% chert.

7.06 SUDAS Section 7010 3.05. Concrete test cylinders shall be used to monitor the strength of the concrete being placed on this project. The Contractor shall furnish test cylinder molds and make three test cylinders from approximately each half-day pour. The Contractor shall care for and deliver the cylinders to a materials testing laboratory directed by a professional engineer licensed in Iowa to perform such work. The Contractor shall pay for the cylinder strength tests.

7.07 SUDAS Section 7010 3.05. The Contractor may, at the Contractor's option, use a maturity meter to monitor the strength of the concrete, as described in Iowa DOT Section 2301.03.U and Iowa DOT Materials I.M. 383 with the following conditions:

A. The pavement may be opened to a light pickup pulling a tar kettle if the maturity testing shows adequate strength and the pavement has been in place for at least 84 hours.

B. The pavement may be opened to other vehicles if the maturity testing shows adequate strength, the pavement has been in place for at least 108 hours, and the joints have been sealed.

7.08 The pavement surface shall be finished with a broom or a burlap drag finish.

7.09 SUDAS Section 7010 3.02 K. All pavement joints shall be sawed ¼-inch wide as per Details C and D-2 in Figure 7010.101. All joints shall be sealed.

PART 8 SUDAS SECTION 7030 – SIDEWALKS, SHARED USE PATHS, AND DRIVEWAYS

8.01 SUDAS Section 7030 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

8.02 Detectable warning panels shall be cast iron as described in Iowa DOT Section 4171. The warning panels shall be red in color.

8.03 Class C concrete shall be used for sidewalks. Class 3 durability coarse aggregates shall be used on the project. The aggregate shall not contain more than 1% chert.

8.04 Jointing shall be as specified above in Part 7.08, except the joints do not need to be sealed.

PART 9 SUDAS SECTION 7040 – PAVEMENT REHABILITATION

9.01 SUDAS Section 7040 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

PART 10 SUDAS SECTION 8030 – TEMPORARY TRAFFIC CONTROL

10.01 SUDAS Section 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

10.02 Refer to the drawings for the staging plan.

10.03 Phase 1 shall be completed by October 7, 2026.

10.04 The existing bus lane pavement shall not be removed until March 13, 2027

10.05 Phase 2 shall be constructed between March 13, 2027 and March 21, 2027

PART 11 SUDAS SECTION 9010 – SEEDING

11.01 SUDAS Section 9010 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

11.02 SUDAS Section 9010 2.08. Use Type 1 (Permanent Lawn Mixture) seed all turfed areas disturbed by the construction shall be seeded and mulched.

11.03 SUDAS Section 9010 3.10. If the seeding does not grow uniformly or it is not as dense and lush as the adjacent undisturbed grassy areas, the Contractor shall be responsible for re-seeding, fertilizing, and mulching until the disturbed areas are restored to equal or better condition as the adjacent areas.

PART 12 SUDAS SECTION 9040 – EROSION AND SEDIMENT CONTROL

12.01 SUDAS Section 9040 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

12.02 SUDAS Section 9040 1.08 A.2.c. Maintenance of sediment control is considered incidental to the project.

12.03 SUDAS Section 9040 1.08 A.2. Remove paragraph d.

12.04 The filter sock and silt fence will remain in place until the Owner or the Engineer has determined that it is no longer needed.

PART 13 SUDAS SECTION 9060 – CHAIN LINK FENCE

13.01 SUDAS Section 9060 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

PART 14 SUDAS SECTION 11,010 – CONSTRUCTION SURVEY

14.01 SUDAS Section 11,010 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

14.02 SUDAS Section 11,010 1.08A. The contractor is responsible for the construction survey.

PART 15 SUDAS SECTION 11,020 – MOBILIZATION

15.01 SUDAS Section 11,020 1.08. There will be no unit measurement of individual bid items. All costs shall be included in the project Lump Sum price.

END OF SECTION

SECTION 02 01 02
STORM WATER POLLUTION PREVENTION PLAN

PART 1 GENERAL CONDITIONS

1.01 All contractors/subcontractors shall conduct their operations in a manner that minimizes erosion and prevents sediment from leaving the site. The contractors shall be responsible for compliance with and implementation of the Storm Water Pollution Prevention Plan (SWPPP) for their entire contract. This responsibility shall be further shared with subcontractors whose work is a source of potential pollution as defined in the SWPPP.

1.02 In the event of a conflict between these requirements and Storm Water Pollution Control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations will apply.

1.03 The Contractor will hold the Owner harmless from any and all claims of any type, including but not limited to damages to adjoining public or private property, fines from regulatory agencies, including reasonable attorney fees incurred to the Owner resulting from failure to comply with this SWPPP. Further, if the Contractor fails to take necessary steps to promptly remove earth sedimentation or debris which moves onto adjoining public or private property, the Owner may remove such items and deduct the cost of the removal from amounts due to the Contractor.

1.04 This SWPPP does not relieve the Contractor of their responsibility to meet the project specifications or maintain the safety of the site.

1.05 The Prime Contractor shall be responsible for compliance with and implementation of the SWPPP. Payment for inspecting and reporting the requirements of the SWPPP shall be included in the project Lump Sump price. Failure to comply with the SWPPP, including maintenance of the required documentation, shall be grounds for withholding or delaying payments to the Contractor.

PART 2 SITE DESCRIPTION

2.01 This SWPPP is for the construction of a bus lane located at the Fairfield Middle School, 404 W Fillmore Road in Fairfield, Jefferson County, Iowa. It is located in the SE ¼ of Section 35, Township 72N, Range 10W.

2.02 This SWPPP covers approximately 14.0 acres, with an estimated 4.0 acres being disturbed.

2.03 Predominant soils in the area include Belinda silt loam, Pershing silt loam, Pershing silty clay, and Weller silty clay. The predeveloped runoff curve number is 79. The runoff curve number of the developed areas after completion will be 85.

2.04 The storm water will leave the construction areas from one (1) point source through intakes and storm sewer. Runoff from this work will flow into an unnamed tributary to Cedar Creek.

2.05 Refer to the drawings for the location of typical slopes, ditch grades, and major structural and non-structural controls.

PART 3 POTENTIAL SOURCES OF POLLUTION

3.01 Site sources of pollution generated as a result of this project relate primarily to soil and sediment, which may be transported as the result of a rainfall event. Sediment controls are described in Part 5 of this SWPPP. This SWPPP also describes controls for other non-sediment operations. Other controls are described in Part 6.

PART 4 SITE SEQUENCE

4.01 Install perimeter controls, as described in Part 5, before the land-disturbing activity occurs. Do not remove temporary perimeter controls until after all upstream areas are finally stabilized as determined by the Owner.

4.02 Do not disturb an area until it is necessary for construction to proceed.

4.03 Time construction activities as needed to limit the impact of seasonal climate changes or weather events.

4.04 Erosion control for intakes shall be installed immediately after the intake has been installed. Every effort shall be made by the Contractor to keep dirt and debris out of the intake and connecting storm sewer.

4.05 Discharge from trench dewatering is prohibited unless the discharge is protected by adequate erosion control measures.

4.06 As topsoil is stripped and stockpiled, filter socks shall be constructed around the pile and seeded.

4.07 As areas are brought to grade, additional control measures shall be installed to control storm water discharge:

A. Stabilizing crop seeding, fertilizing, and mulching shall be completed as the disturbed areas are constructed. If construction activity is not planned to occur in a disturbed area for at least 14 days, the area shall be stabilized by seeding and/or mulching immediately.

B. If the construction site has become drought-stricken or recently received such high amounts of rain that seeding with field equipment is impossible and initiating vegetative stabilization immediately is unfeasible, the Contractor shall contact the Iowa DNR Stormwater Coordinator for recommendations of alternative stabilization measures to be implemented.

C. As areas reach their final grade, they shall be permanently fertilized, seeded, and mulched.

D. As outlets are completed, outlet protection shall be placed.

E. Inlet protection shall be placed at intakes as they are completed.

PART 5 DESCRIPTION OF SEDIMENT CONTROLS

5.01 All control measures shall be placed as shown on the drawings or described in the project specifications and this SWPPP.

5.02 Filter socks shall be placed in accordance with SUDAS Figure 9040.102 in all areas where runoff leaves the site. The Contractor is required to maintain the filter socks. Maintenance includes keeping them in proper working order, cleaning, repairing, or replacing them throughout the contract period. The filter sock shall be removed when the Owner agrees that permanent seeding has been established.

5.03 Rolled erosion control product (RECP) may be installed in the bottoms of steep ditches, at the toes of steep slopes, and in areas highly subject to rill erosion. The RECP shall be in accordance with SUDAS 9040.2 and placed in accordance with SUDAS Figures 9040.103 and 9040.104.

5.04 Topsoil thickness shall be preserved on the construction site. After soil-disturbing activities have been completed, a topsoil thickness of at least as thick prior to construction shall be established on all areas of the site designated to receive topsoil, but not less than 6 inches.

5.05 After construction is completed, the areas that are not covered by granular surfacing or pavement shall be fertilized, seeded, and mulched. The seeded area shall be monitored, and remedial action shall be taken until the vegetation is well established. The remedial action could include repairing eroded areas and reseeding, mowing, and spraying to control weeds, watering to encourage growth, and reseeding and mulching areas that do not otherwise develop. After the seeding is established, the filter socks shall be removed. The area disturbed during removal of the filter socks shall be graded smooth, seeded, and mulched, and monitored and maintained until the seeding is established.

5.06 During construction, measures shall be taken to eliminate off-site tracking of sediment by construction vehicles. Off-site tracking shall be eliminated by not leaving the site when the surface is wet and muddy or cleaning the vehicles prior to leaving the site. All sediment deposited on paved roadways shall be removed, not washed into the storm sewer.

5.07 During construction, measures shall be taken to minimize dust. The working area and haul roads shall be watered and/or surfaced with granular material or pavement to minimize dust. The

Contractor shall be responsible for any and all methods used for dust control to avoid nuisance complaints as defined in the Iowa Code Section 567, and to prevent visible emissions beyond the project limits.

5.08 As work progresses, additional erosion control items may be required as determined by the Engineer after field investigations. These may be items such as sediment basins, earth dikes, ditch checks, bale checks, rock outlets, etc. Payment for other control measures shall be paid for as extra work.

5.09 For additional guidelines on erosion control measures, refer to the following documents:

A. SUDAS Section 9040. It is available in electronic form at: http://www.iowasudas.org/manuals/specs/div9/9040.pdf.

B. Iowa DOT, Series 2023, as amended by General Supplemental Specifications GS-23003 dated October 15, 2024. They are available in electronic form at:

https://erl.iowadot.gov/.

C. The Iowa Construction Site Erosion Control Manual is provided by the Iowa Department of Natural Resources. It is in electronic form at: http://www.ctre.iastate.edu/erosion/manuals/const_erosion.pdf.

PART 6 DESCRIPTION OF CONTROLS (OTHER POLLUTANTS)

6.01 During the course of construction, it is possible that situations may arise where other pollutants (not sediment) will be encountered. When such situations occur, they shall be handled according to all applicable federal, state, and local regulations in effect at the time.

6.02 Disposal of unused construction materials and construction material wastes shall comply with applicable state and local waste disposal, sanitary sewer, or septic system regulations. In the event of a conflict with other governmental laws, rules and regulations, the more restrictive laws, rules, or regulations shall apply.

6.03 Hazardous waste materials shall be disposed of in accordance with applicable local, state, and/or federal regulations. Equipment refueling and maintenance operations shall be carried out in such a manner to prevent any spills, uncontrolled loss, or contamination of the soil and groundwater. Potentially hazardous materials shall be used with great care to prevent spillage. Additional information on the management of hazardous materials is included in Part 7.04.

6.04 Management of onsite materials shall be as described in Part 7.

6.05 The Contractor shall provide and maintain adequate sanitary facilities for the use of the employees and subcontractors. These facilities shall be located away from storm water inlets and shall conform to federal, state, or local sanitary requirements.

PART 7 MATERIALS MANAGEMENT

7.01 Materials or substances expected to be present onsite during construction:

A. Cementitious materials

B. Pipe

C. Steel

D. Wood

E. Cleaning solvents

F. Engineering fabric

G. Construction wastes

H. Fertilizers

I. Fuel and other petroleum-based materials required for equipment operation.

J. Other construction materials typically associated with work of this type.

7.02 The following is a list of practices which shall be used onsite to minimize spills or accidental exposure of materials and substances to storm water runoff:

A. An effort shall be made to store only enough products required to complete the job onsite.

B. All materials stored on site shall be kept neat and orderly and in their appropriate containers. If available, products shall be kept under a roof or other enclosure.

C. Materials shall be kept in their original containers with the original manufacturer's label.

D. Substances shall not be mixed with one another unless recommended by the manufacturer.

E. Manufacturer's recommendations for proper use and disposal shall be followed.

F. The job site superintendent shall be responsible for daily inspections to ensure proper use and disposal of materials.

G. Hazardous Products

1. Products shall be kept in their original containers with the original manufacturer's label.
2. The original labels and material safety data sheets shall be kept for each of the materials as they contain important product information.
3. Disposal of any excess product shall be done in a manner, which follows all manufacturers', federal, local, and state-recommended methods for proper disposal.

7.03 Product Specific Practices: The following is a list of potential sources of pollution and specific practices to reduce pollutant discharges from materials or sources expected to be present during construction.

A. Petroleum Storage Tanks -

1. All onsite vehicles shall be inspected and monitored for leaks and receive preventative maintenance to reduce the chance of leakage.
2. Steps shall be taken to eliminate contaminants from storage tanks from entering the soil. Any petroleum storage tanks kept onsite shall be located with an impervious surface between the tank and the ground.

B. Concrete Wastes –

1. Concrete trucks shall be allowed to washout or discharge excess concrete only in specifically designated areas which have been prepared to minimize contact between the concrete and storm water discharge from the site.
2. The hardened product from the concrete washout areas shall be disposed of as other non-hazardous waste materials or may be broken up and used on the site for other appropriate uses.

C. Solid and Construction Wastes – All trash and construction debris shall be kept consolidated and properly disposed of as necessary. No construction waste materials shall be buried on site. The waste material must be consolidated in a location where contact with storm water discharge is minimized. The Contractor shall walk the site at least weekly to pick-up trash and debris.

D. Fertilizers - Fertilizers shall be applied in the amounts necessary to meet specified application rates. It shall be worked into soil to minimize contact with storm water.

7.04 Hazardous Substance Spill Prevention and Response:

A. The Contractor is responsible for training all personnel in the proper handling and cleanup of spilled materials. No spilled hazardous materials or wastes will be allowed to come into contact with storm water discharges. If contact does occur, the storm water discharge shall be contained on site until appropriate measures in compliance with all federal, state, and local regulations are followed to dispose of the hazardous substance.

B. As used in this context, environmental laws mean the Federal Comprehensive Environment Response, Compensation and Liability Act, 42 U.S.C. Sections 9601-9657; the Hazardous

Materials Transportation Act of 1975, 40 U.S.C. Sections 6901-6987, Chapter 455B of the Code of Iowa; or any other federal, state, or local statute law, ordinance, code, rule, regulation, order, decree, or regulation relating to or imposing liability or standards of conduct concerning any hazardous, toxic, or dangerous waste, substance or material as now shall be in effect.

C. In the event of a spill, the following procedures shall be followed:
   1. All spills shall be cleaned up immediately following discovery.
   2. The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with the hazardous substance.
   3. Spill of toxic or hazardous material shall be reported to the appropriate state or local governmental agency and to the project manager, regardless of the size of the spill.

D. In the event the construction site has a release of hazardous substance in an amount which exceeds a reportable quantity as defined in Chapter 455B of the Code of Iowa, then the permittee shall:
   1. Notify the Iowa Department of Natural Resources (DNR) at (515) 725-8694 and notify the local police department or the office of the sheriff of the affected county of the occurrence of a hazardous condition as soon as possible but not later than six hours after the onset of the hazardous condition or discovery of the hazardous condition.
   2. Submit a written report to the Iowa DNR within 30 days of the verbal report and contain the following information:
      a. The exact location of the hazardous condition; the time and date of onset or discovery of the hazardous condition.
      b. The name of the material, the manufacturer's name and the volume of each material involved in the hazardous condition in addition to contaminants within the material if they by themselves could cause a hazardous condition.
      c. The medium (land, water or air) in which the hazardous condition occurred or exists.
      d. The name, address and telephone number of the party responsible for the hazardous condition.
      e. The time and date of the verbal report to the department of the hazardous condition.
      f. The weather conditions at the time of the hazardous condition onset or discovery.
      g. The name, mailing address and telephone number of the person reporting the hazardous condition.
      h. The name and telephone number of the person closest to the scene of the hazardous condition who can be contacted for further information and action.
      i. Any other information, such as the circumstances leading to the hazardous condition, visible effects, and containment measures taken that may assist in proper evaluation by the department.
   3. Modify the SWPPP accordingly within 5 days of the spill.
   4. The CFR requires at least a verbal report to the National Response Center (800-424-8802) for all spills which affect streams or wetlands. A written report is required for spills over 1,000 gallons.
   5. All spills, regardless of size, shall be reported to the project owner.

PART 8 INSPECTION & MAINTENANCE

8.01 All documents related to the storm water discharge permit shall be kept on site at all times and must be presented to the Iowa DNR or EPA upon request. The documents include but are not limited to

the SWPPP, Notice of Intent, Proof of Publication, Storm Water Discharge Certification Statement (Co-Permitee Certification Statement), daily weather records, project inspection diary, and erosion control plan drawings.

8.02 The project area and control devices shall be inspected jointly by the Contractor and Owner's representative every seven (7) calendar days. Inspections shall continue until the site is stabilized as determined by the Owner, including throughout winter shutdown. The findings and any action taken as a result of the inspections shall be recorded on the inspection report. The inspections must include the following:

A. Inspect disturbed areas and areas used for storage for evidence of pollutants leaving the site and/or entering the drainage system.

B. Inspect filter socks for depth of sediment, tears, fabric securely attached to stakes, and stakes firmly in the ground.

C. Inspect erosion and sediment control measures identified in the SWPPP to ensure they are functioning correctly.

D. Inspect sediment basins for depth of sediment.

E. Inspect diversion dikes for any breaches.

F. Inspect seeding for bare spots, washouts, and healthy growth.

G. Inspect city streets for off-site tracking.

H. Inspect the intakes and culverts for sediment discharge.

I. Inspect site for trash and debris.

8.03 The Contractor shall be responsible for selecting a "qualified" inspector to conduct the inspections. "Qualified" is defined as a person knowledgeable in the principles and practices of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity.

8.04 Maintain all temporary and permanent erosion control measures in good working order by cleaning, repairing, replacement, and sediment removal throughout the permit period. Any necessary repairs shall be initiated as soon as practicable after the inspection. If the Contractor or Owner determines that making changes less than three (3) calendar days after the inspection is impracticable, the Contractor or Owner shall document the reasons for the delay and indicate an estimated date by which changes will be made. These may include:

A. Built-up sediment shall be removed from silt barriers or the barrier replaced when it has reached ½ the height of the barrier.

B. Built-up sediment shall be removed from sediment basins when it reaches 50% of the design capacity or at the end of the project.

C. Accumulation of earth, silt, or debris on adjoining properties or roads shall be minimized. Remove any accumulation of earth, silt, or debris immediately and take remedial action for prevention.

D. Weather information.

E. Location of sediment/pollution discharge.

F. Minor spills or potentially hazardous materials shall be cleaned up by removing and disposing of contaminated soils properly. Major spills shall be reported in accordance with Section 455B.386 of the Code of Iowa, with cleanup procedures dependent on the severity of the spill.

PART 9 RECORDS *(A supply of forms adequate for the project will be provided to the Contractor at the Preconstruction Conference.)*

9.01 The Contractor inspecting the control measures must prepare inspection reports of the pollution control measures. The reports shall:

A. Summarize the scope of the inspection.

B. Provide the name(s) and qualifications of personnel making the inspection.

C. Include the date(s) of the inspection.

D. Identify any control measures that have failed, need maintenance, or need additional measures.

E. Identify what actions will be taken to modify pollution control practices and who is responsible for corrective actions.

9.02 Inspection reports must contain the following certification statement:

> ***Inspection Report Certification Statement***
>
> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

9.03 The Contractor must also keep record of the dates each control measure was installed, when major grading activities occur in a particular area, when construction activities cease in an area, and when an area is stabilized.

9.04 Daily weather conditions shall also be recorded.

9.05 This SWPPP shall be revised as construction progresses to reflect current responsibilities, operations, and findings.

A. The SWPPP shall be revised due to any deficiencies in the plan or changes in conditions noted during an inspection.

B. The SWPPP shall be revised whenever there is a change in design, construction, operation, or maintenance which has a significant effect on storm water discharge.

C. The Contractor shall maintain records of major construction operations start and ending dates and various phases of the work.

D. The SWPPP shall be modified within three (3) calendar days of a hazardous condition, describing the release, the date of release, and the circumstances leading to the release. Steps to prevent the reoccurrence of such releases will be identified and implemented in a plan revision.

9.06 A copy of the records required in this section shall be returned to the Owner upon final stabilization.

PART 10 FINAL STABILIZATION AND DISCONTINUATION

10.01 The storm water discharge from a construction activity is no longer considered to be a discharge subject to the storm water permit requirements when the final stabilization has been reached and temporary erosion and sediment controls have been removed. A permittee must submit a Notice of Discontinuation (NOD) to inform the Iowa DNR that storm water discharge no longer needs to be covered by the general permit.

10.02 Final stabilization shall be considered the point at which all soil-disturbing activities are complete, and a uniform perennial vegetative cover with a density of 70% for unpaved areas has been established. The vegetative cover shall be sufficient to preclude erosion for the entire disturbed area of the permitted project.

10.03 The NOD shall be mailed to the following address:

Storm Water Coordinator
Iowa Department of Natural Resources
502 East 9th Street
Des Moines, IA 50319-0034

PART 11 CERTIFICATION

11.01 All contractors and subcontractors who deal with or have an impact on storm water pollution issues shall sign the Co-Permittee Certification statement prior to conducting any land-disturbing work on the project. Prime contractors are required to submit the signed certificate with their signed contract to the Engineer.

11.02 The storm water discharge certification statements are:

I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site as part of this certification.

Further, by my signature, I understand that I am becoming a co-permittee, along with the owner(s) and other contractors and subcontractors signing such certifications, to the Iowa Department of Natural Resources NPDES General Permit No. 2 for "Storm Water Discharge Associated with Industrial Activity for Construction Activities" at the identified site. As a co-permittee, I understand that I, and my company, are legally required under the Clean Water Act and the Code of Iowa, to ensure compliance with the terms and conditions of the storm water pollution prevention plan developed under this NPDES permit and the terms of this NPDES permit.

11.03 It is the Prime Contractor's responsibility to obtain and provide signed certificates for the subcontractors to the Owner. Co-Permittee Certifications are not required for subcontractors who do not disturb a significant amount of soil (i.e., construction survey, material suppliers, and traffic control).

END OF SECTION

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EARTHWORK, SUBGRADE, AND SUBBASE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Clearing and Grubbing

B. Earthwork, Excavation, and Embankment Construction

C. Subgrade Preparation

D. Subbase Construction

E. Topsoil

1.02 DESCRIPTION OF WORK

Excavate and construct embankments, subgrades, and subbases.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

Submit results of Standard Proctor and in-place density tests on compactions when required.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

If impractical, or if scheduling does not allow the removal of utilities before excavation, work around the utilities.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Clearing and Grubbing by Units: The quantity of clearing and grubbing will be the quantity, in units, shown in the contract documents.

1. Measurement:

a. Trees 6 inches in diameter or greater will be counted and the circumference will be measured at a height of 18 inches above the ground. The diameter will be calculated by measuring the circumference to the nearest inch and dividing by 3.14. See Table 2010.01 for identification of units per tree for clearing, grubbing, and clearing and grubbing.

b. Stumps 6 inches in diameter or greater will be counted and the diameter, in inches, calculated by determining the average diameter at cutoff. See Table 2010.01 for identification of units per stump for grubbing.

1.08 MEASUREMENT AND PAYMENT (Continued)

c. Logs and down timber 6 inches in diameter or greater will be measured at a point 18 inches from the end of the log with greatest diameter or 18 inches from the base of the tree for down timber for clearing.
d. Hedge rows will be measured in linear feet and converted to units using a rate of 30 units per 100 linear feet of hedge row.
e. Brush will be measured in square feet and converted to units by using a rate of 0.8 units per 100 square feet of brush.
f. Growing corn will be measured in square feet and converted to units by using a rate of 0.2 units per 100 square feet of growing corn.
g. Vegetation removal will not be measured for payment.
h. Field fence removal, included in clearing and grubbing, will be measured in stations and converted to units at a rate of 6.0 units per station of fence.

For each tree or stump counted as identified in Items a, b, and c, units will be determined as identified in the following table:

Table 2010.01: Tabulation of Units for Removal of Trees and Stumps

Size Diameter	Unit		
	Clearing	Grubbing	Clearing and Grubbing
Over 6 in. to 9 in. incl.	1.1	2.8	3.9
Over 9 in. to 12 in. incl.	1.9	4.8	6.7
Over 12 in. to 15 in. incl.	2.8	6.6	9.4
Over 15 in. to 18 in. incl.	4.7	8.8	13.5
Over 18 in. to 24 in. incl.	8.4	13.6	22.0
Over 24 in. to 30 in. incl.	11.4	17.6	29.0
Over 30 in. to 36 in. incl.	22.0	28.0	50.0
Over 36 in. to 42 in. incl.	30.0	50.0	80.0
Over 42 in. to 48 in. incl.	40.0	80.0	120.0
Over 48 in. to 60 in. incl.	60.0	100.0	160.0
Over 60 in. to 72 in. incl.	80.0	120.0	200.0
Over 72 in.	120.0	160.0	280.0

2. **Payment:** Payment will be at the unit price per unit.

3. **Includes:** Unit price includes, but is not limited to, placement of backfill in area where roots have been removed, and removal and disposal of all materials.

B. Clearing and Grubbing by Area:

1. **Measurement:** Measurement will be the plan quantities for the total area of clearing and grubbing. If the limits for this item are not shown in the contract documents, they will be calculated from a need line or right-of-way line as indicated in the project plans.

2. **Payment:** Payment will be at the unit price per acre.

3. **Includes:** Unit price includes, but is not limited to, removal and disposal of all materials and placement of backfill in area where roots have been removed.

C. Clearing and Grubbing by Lump Sum:

1. **Measurement:** Lump sum item; no measurement will be made.

2. **Payment:** Payment will be the contract lump sum price.

3. **Includes:** Lump sum price includes, but is not limited to, removing and disposing all materials and furnishing and placing backfill material in area where roots have been removed.

1.08 MEASUREMENT AND PAYMENT (Continued)

D. Topsoil:

1. On-site Topsoil:

a. Measurement: Measurement will be in cubic yards and will be computed on the basis of a uniform 8 inch finished thickness, or as specified.

b. Payment:

1) Payment will be at the unit price per cubic yard.
2) Topsoil salvaged from excavated areas and paid as topsoil will not be included in excavation quantities for which payment is made.
3) Overhaul will not be paid.

c. Includes: Unit price includes but is not limited to, stripping and stockpiling topsoil; preparing the topsoil placement area by tillage or ripping; re-spreading the topsoil; additional tillage to address compaction during placement; and removal of clods, roots, stones, and other undesirable materials.

2. Compost-amended Topsoil:

a. Measurement: Measurement will be the same as for on-site topsoil.

b. Payment: Payment will be the unit price per cubic yard. Overhaul will not be paid.

c. Includes: Unit price includes but is not limited to, preparing the placement area by tillage or ripping and furnishing, transporting, placing, and incorporating compost.

3. Off-site Topsoil:

a. Measurement: Measurement will be in cubic yards and will be computed on the basis of a uniform 8 inch thickness, or as specified.

b. Payment: Payment will be at the unit price per cubic yard. Overhaul will not be paid.

c. Includes: Unit price includes, but is not limited to, preparing the placement area by tillage or ripping; furnishing, transporting, and spreading the off-site topsoil; completing tillage to address compaction during placement; and removal of clods, roots, stones, and other undesirable materials.

E. Class 10, Class 12, or Class 13 Excavation:

1. Measurement:

a. Measurement for Class 10, Class 12, and Class 13 material excavated from the project site and borrow areas will be the plan quantity in cubic yards, without final field measurement. Adjustments may be made to the plan quantities if agreed to by both the Engineer and the Contractor.

b. If either the Contractor or the Engineer desires actual measurements rather than using contract document quantities, that party must provide written notice to the other party prior to starting work.

1) If actual measurements are used, use cross-section surveys by the Engineer before and after work for the basis of computing the cubic yards of excavation. The extra survey cost will be paid by the party requesting the survey.
2) When the Engineer determines it is impractical to make cross-section surveys, use the truck count method, with a shrinkage factor, resulting in volume per truck type and size determined by the Engineer. Unless otherwise specified, use a shrinkage factor of 1.35 for Class 10 and Class 13 excavation. No shrinkage factor will be used for Class 12.

2. Payment:

a. Payment will be at the unit price per cubic yard.

b. Payment will not be made for excavation work done prior to the staking and, if necessary, cross-sectioning.

1.08 MEASUREMENT AND PAYMENT (Continued)

3. Includes, but is not limited to:
a. Site preparation for, and the construction of, embankment, fills, shoulder backfill, and backfill behind curbs.
b. Overhaul.
c. Finishing the soil surface, including roadways, shoulders, behind curbs, side ditches, slopes, and borrow pits.
d. Repair or replacement of any fences that have been unnecessarily damaged or removed.

4. Does not include: Stripping, salvaging, and spreading 8 inches of topsoil, unless otherwise specified in the contract documents.

F. Below Grade Excavation (Core Out): If unsuitable or unstable soil is encountered below the 12 inches of subgrade, measurement and payment for removal and replacement of such materials is as follows:

1. Measurement: Will be measured and paid as extra work, unless otherwise specified in the contract documents.

2. Payment: To be considered for payment, the Engineer must order the removal and replacement of the material. Payment will be considered only in previously undisturbed areas and not in existing embankments or following proof rolling operations.

3. Includes: Payment includes, but is not limited to, equipment, tools, labor, disposal of unsuitable materials, dewatering, drying, furnishing, and placement of foundation materials as required by the Engineer, compaction and finishing of the excavated area, and all incidental work as may be required.

G. Subgrade Preparation:

1. Measurement: The area of the proposed pavement under which the subgrade preparation is performed, plus 2 feet on each side, will be measured in square yards.

2. Payment: Payment will be at the unit price per square yard.

3. Includes: Work includes, but is not limited to, excavating, manipulating, replacing, compacting, and trimming to the proper grade.

H. Granular Stabilization:

1. Measurement: Measurement will be in tons for the quantity of granular stabilization material required to replace unstable subgrade material removed. Measurement will be based on the scale tickets for the material delivered and incorporated into the project.

2. Payment: Payment will be at the unit price per ton for the quantity of granular stabilization material furnished and placed. Payment is in addition to subgrade preparation and use of other foundation options.

3. Includes: Unit price includes, but is not limited to, removal and disposal of unstable material and furnishing, hauling, placing, and compacting granular stabilization material.

1.08 MEASUREMENT AND PAYMENT (Continued)

I. Subgrade Treatment:

1. Measurement: The area of the proposed pavement under which each type of subgrade treatment is provided, plus 2 feet on each side, will be measured in square yards.

2. Payment:
a. Payment will be at the unit price per square yard for each type of subgrade treatment used.
b. Payment is in addition to subgrade preparation.

3. Includes: Work includes, but is not limited to, furnishing, placing, and incorporating the subgrade treatment material [cement, asphalt, fly ash, lime, geogrid (type), or geotextiles].

J. Subbase:

1. Measurement: The area of the proposed pavement under which each type and thickness of subbase is provided, plus 2 feet on each side, will be measured in square yards.

2. Payment: Payment will be at the unit price per square yard for each type and thickness of subbase.

3. Includes: Work includes, but is not limited to, furnishing, placing, compacting, and trimming to the proper grade.

K. Removals:

1. Structures:
a. Measurement: Each structure to be removed will be counted.
b. Payment: Payment will be at the unit price for each specified structure removed.
c. Includes: Unit price includes, but is not limited to, removal and disposal of structures.

2. Culverts:
a. Known Box Culverts:
1) Measurement: Each type and size of box culvert removed will be measured in linear feet from end to end along the centerline of the flowline.
2) Payment: Payment will be at the unit price per linear foot for each type and size of box culvert removed.
3) Includes: Unit price includes, but is not limited to, removal and disposal of box culverts.
b. Unknown Box Culverts: Removal of unknown box culverts will be measured and paid as extra work.
c. Known Pipe Culverts:
1) Measurement: Each type and size of pipe culvert removed will be measured in linear feet from end to end at the flowline.
2) Payment: Payment will be at the unit price per linear foot for each type and size of pipe culvert removed.
3) Includes: Unit price includes, but is not limited to, removal and disposal of pipe culverts.
d. Unknown Pipe Culverts: Removal of unknown pipe culverts will be measured and paid as extra work.

1.08 MEASUREMENT AND PAYMENT (Continued)

3. Pipes and Conduits:

a. Known Pipes and Conduits:

1) Measurement: Each type and size of pipe and conduit removed will be measured in linear feet from end to end.

2) Payment: Payment will be at the unit price per linear foot for each type and size of pipe and conduit removed.

3) Includes: Unit price includes, but is not limited to, removal, disposal, and plugging, if specified, of pipes and conduits.

4) Abandoned Private Utilities: Removal of all private utility lines is the responsibility of the respective utility agency, and will not be measured or paid.

b. Unknown Pipes and Conduits: Removal of unknown pipes and conduits will be measured and paid as extra work.

4. Pavement: Comply with Section 7040.

L. Filling and Plugging of Pipe Culverts, Pipes, and Conduits:

1. Known Pipe Culverts, Pipes, and Conduits:

a. Measurement: Each type and size of pipe culvert, pipe, and conduit filled and plugged will be measured in linear feet from end to end.

b. Payment: Payment will be at the unit price per linear foot for each type and size of pipe culvert, pipe, and conduit filled and plugged.

c. Includes: Unit price includes, but is not limited to, furnishing and installing the plug and the flowable mortar as designated by the Engineer.

d. Abandoned Private Utilities: Filling and plugging of all private utility lines is the responsibility of the respective utility agency, and will not be measured or paid.

2. Unknown pipe culverts, pipes, and conduits: Filling and plugging of unknown pipe culverts, pipes, and conduits will be measured and paid as extra work.

M. Compaction Testing:

1. The Contractor will not be responsible for compaction testing or payment unless otherwise specified in the contract documents.

2. If the contract documents specify that the Contractor is responsible for compaction testing, performed by an independent testing laboratory hired by the Contractor, measurement and payment will be as follows:
   a. Measurement: Lump sum item; no measurement will be made.
   b. Payment: Payment will be the contract lump sum price.

3. The Contractor will be responsible for payments associated with all retesting resulting from failure of initial tests.

PART 2 - PRODUCTS

2.01 TOPSOIL

Use suitable topsoil of uniform quality, free from hard clods, roots, sod, stiff clay, hard pan, stones larger than 1 inch (1/2 inch for turfgrass seeding), lime cement, ash, slag, concrete, tar residue, tarred paper, boards, chips, sticks, or any undesirable material.

Use on-site topsoil, unless compost-amended or off-site topsoil is specified.

A. On-site Topsoil: On-site topsoil material is material excavated from the top 12 inches of the site. Use of on-site topsoil material is subject to the Engineer's approval.

B. Compost-amended On-site Topsoil: Amend low-quality on-site topsoil, not meeting the requirements specified for off-site topsoil, with a minimum of 1 inch of compost for every 3 inches of topsoil. Use compost meeting the requirements of mulch for pneumatic seeding in Section 9010, 2.07.

C. Off-site Topsoil: Contains at least 3% organic matter, according to ASTM D 2974, has a high degree of fertility, is free of herbicides that prohibit plant growth, has a pH level between 6.0 and 8.0, and meets the following mechanical analysis requirements:

Sieve	Percent Passing
1"	100
1/2"	95* to 97*
1/4"	40 to 60
No. 100	40 to 60
No. 200	10 to 30

* 100% for turfgrass

The Engineer will approve the source of off-site topsoil. Surface soils from ditch bottoms, drained ponds, and eroded areas, or soils that are supporting growth of noxious weeds or other undesirable vegetation, will not be accepted. The Engineer will determine if testing is necessary. The Contractor will be responsible for payment of the testing if the off-site topsoil does not meet the above requirements. If the testing verifies the off-site topsoil does meet the above requirements, payment for the testing will be the responsibility of the Jurisdiction.

2.02 EXCAVATION MATERIALS

All project site and borrow excavation will be classified as Class 10, Class 12, or Class 13 as defined below, and as indicated in the contract documents.

A. Class 10 Excavation:

1. Class 10 excavation includes all normal soil such as loam, silt, gumbo, peat, clay, soft shale, sand, and gravel. It includes fragmentary rock handled in the manner normal to this class of excavation.

2. Includes any combination of the above described materials and any other material not classified as Class 12 or Class 13.

2.02 EXCAVATION MATERIALS (Continued)

B. Class 12 Excavation:

1. Material deposits so firmly cemented together that they cannot be removed without continuous use of pneumatic tools or blasting.

2. Class 12 excavation includes the actual measured volume of granite, trap, quartzite, chert, limestone, sandstone, hard shale, or slate in natural ledges or displaced masses.

3. Also includes the estimated or measured volume of rock fragments or boulders that occur on the surface or in subsurface deposits mixed with soil, sand, or gravel when their size, number, or location prevents them from being handled in a manner normal to Class 10 excavation.

C. Class 13 Excavation:

1. Class 13 excavation includes all materials listed under the definitions of Classes 10 and 12, and any other material encountered, regardless of its nature.

2. This classification covers work commonly referred to as "unclassified excavation."

3. The contract documents will specify the limits for Class 13 excavation. Excavation within these limits will not be classified as Class 10 or Class 12 excavation.

D. Unsuitable or Unstable Materials:

1. Material encountered during excavation above or below grade that does not meet the suitable soil requirements in Section 2010, 2.03.

2. Rubbish and debris, including trees, stumps, waste construction materials, scrap metals, and other materials that cannot be buried or used for backfill or topsoil.

3. Moisture content does not determine suitability of materials.

E. Borrow: Unless otherwise provided in the contract documents, when the quantity of fill material required is not available within the limits of the project cross-sections or specific borrow areas as indicated, the Contractor should make up the deficiency from borrow areas provided by the Engineer, or furnish equivalent material from other borrow areas.

2.03 SUITABLE EMBANKMENT MATERIALS

Meet the following requirements for all soils provided for the construction of embankments:

A. Density of 95 pcf or greater according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density).

B. AASHTO M 145 group index of less than 30.

C. Liquid limit (LL) less than 50.

D. Soils not meeting these requirements are considered unsuitable soils, regardless of classification.

E. For soils to be placed below water, use clean granular material.

2.04 FOUNDATION MATERIALS

A. Select Subgrade Materials:

1. All soils required for select subgrade materials must be approved by the Engineer. Approval of materials and their use will be based on AASHTO M 145.
   a. Cohesive soils must meet all of the following requirements:
      1) 45% or less silt size fraction.
      2) Density of 110 pcf or greater according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density).
      3) Plasticity index greater than 10.
      4) A-6 or A-7-6 soils of glacial origin.
   b. Granular soils must meet all of the following requirements:
      1) Density of 110 pcf or greater according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density).
      2) 15% or less silt and clay.
      3) Plasticity index of 3 or less.
      4) A-1, A-2, or A-3 (0).

2. Crushed stone, crushed PCC, crushed composite pavement, or RAP; mixtures of gravel, sand, and soil; or uniformly-blended combinations of the above; as approved by the Engineer.

3. The Engineer may authorize a change in select subgrade materials subject to materials available locally at time of construction.

B. Granular Stabilization Materials:

1. Clean, crushed stone or crushed concrete, with the following gradation:

Sieve	Percent Passing
2 1/2”	100
2”	90 to 100
1 1/2”	35 to 70
1”	0 to 20
1/2”	0 to 5

2. The Engineer may authorize a change in gradation, subject to materials available locally at time of construction.

C. Subgrade Treatment:

1. Cement: Comply with Section 7010, 2.01, A.

2. Asphalt: Comply with AASHTO M 140.

3. Fly ash: Provide Class C meeting the requirements of ASTM C 618 with a minimum of 22% CaO; the Loss of Ignition requirements in Table 1 will not apply. Approval of source required.

4. Lime: Hydrated lime should meet requirements of ASTM C 207, Type N or AASHTO M 216, and others.

2.04 FOUNDATION MATERIALS (Continued)

5. Geogrid:

a. Rectangular or Square: Use an integrally-formed grid structure manufactured of a stress-resistant polypropylene material. Use Type 1 geogrid, unless Type 2 is specified. Meet the following minimum physical properties:

Table 2010.02: Geogrid (Rectangular or Square)

Property	Test Method	Units	Type 1[1]	Type 2
Aperture stability modulus at 20 kg-cm	Kinney[2] - 01	kg-cm/deg	3.2	6.5
Minimum true initial modulus in use				
Machine direction (MD)	ASTM D 6637	lb/ft	15,080	32,890
Cross machine direction (CMD)			20,560	44,725
Tensile strength, 2% strain				
MD	ASTM D 6637	lb/ft	270	410
CMD			380	590
Junction efficiency	GRI-GG2-87	%	93	93
Flexural rigidity	ASTM D 1388	mg-cm	250,000	750,000
Aperture size				
Minimum	N/A	in.	0.5	0.5
Maximum			2.0	2.0

[1] Geogrids meeting the requirements of Iowa DOT Article 4196.01, B and Materials I.M. 496.01 will be acceptable.
[2] Dr. Thomas C. Kinney, P.E. and US Army Corps of Engineers.

b. Multiaxial: Use punched and drawn polypropylene that is oriented in three substantially equilateral directions. Meet the following minimum physical properties:

Table 2010.03: Geogrid (Multiaxial)[1]

Property	Test Method	Units	Type 3	Type 4
Resistance to loss of load capacity				
Chemical resistance	EPA 9090 Immersion	%	100	100
Ultra-violet light and weathering (500 hrs)	ASTM D 4355	%	80	80
Junction efficiency	GRI-GG2-87 GRI-GG1-87	% of ultimate tensile strength	93	93
Radial stiffness (min.)	ASTM D 6637	lb/ft @ 0.5% strain	15,000	20,000
Rib pitch				
Continuous parallel rib pitch[2]	N/A	in.	3.2	3.2
Mid-rib depth[2]	N/A	in.	0.04-0.06	0.05-0.08
Mid-rib width[2]	N/A	in.	0.035-0.045	0.047-0.055
Node thickness	N/A	in.	0.11	0.13
Rib aspect ratio[3]	N/A	in.	> 1.0	> 1.0

[1] Values shown are minimum average roll values according to ASTM D 4759, unless indicated otherwise.
[2] Nominal dimensions.
[3] Ratio of the mid-rib depth to the mid-rib width.

6. Geotextiles: Use a woven or non-woven permeable fabric, manufactured of polymer fibers, meeting the requirements of Iowa DOT Article 4196.01, B, 5.

2.04 FOUNDATION MATERIALS (Continued)

D. Subbase:

1. Special Backfill:
   a. Comply with Iowa DOT Specifications Section 4132. The quality requirements of Iowa DOT Materials I.M. 210 for recycled pavements are waived.
   b. The Engineer may authorize a change in gradation subject to materials available locally at time of construction.

2. Granular Subbase:
   a. Comply with Iowa DOT Specifications Section 4121.
   b. The Engineer may authorize a change in gradation subject to materials available locally at time of construction.

3. Modified Subbase:
   a. Comply with Iowa DOT Specifications Section 4123.
   b. The Engineer may authorize a change in gradation, subject to materials available locally at time of construction.

PART 3 - EXECUTION

3.01 CLEARING AND GRUBBING

A. Notification: Notify the Engineer prior to start of clearing and grubbing activities.

B. Tree Cutting:

1. **October 1 through March 31:** No restrictions on tree cutting.

2. **April 1 through September 30:** Cut trees only after authorized by the Engineer and upon receiving a copy of the Determination of Effect indicating no affect to threatened or endangered species is expected within the work area.

C. Removal: Remove the following items:

1. Trees and stumps, including roots, to a depth of at least 12 inches. Place backfill to fill the hole.

2. Logs and downed timber.

3. Hedge rows, brush, field fence, and agricultural products.

4. Vegetation and rubbish.

5. Other objectionable materials.

D. Disposal: Dispose of material from clearing and grubbing according to Iowa Administrative Code 567-23.2 and must meet local ordinances. If burning is not allowed, proceed as follows:

1. Process by chipping logs, downed timber, or brush for mulching material; or salvage logs and downed timber for firewood.

2. Other vegetation, including corn stubble, may be disked into the existing soil if approved by the Engineer.

3. Haul vegetative materials from clearing and grubbing that are not handled on the project to a yard waste disposal site.

4. Remove field fence and other non-vegetative materials from the project.

3.02 TOPSOIL

Prior to placement of all types of topsoil, finish excavation and embankment work according to the specified grades and cross-sections considering topsoil requirements; grade and slope all surfaces to drain away from buildings and prevent ponding. Conform to the grading plan within ± 2 inches. Till or rip constructed surface to a minimum depth of 4 inches to reduce compaction prior to topsoil placement.

A. On-Site Topsoil:

1. **Stripping and Salvaging:**
   a. Mow all weeds, grass, and growing crops or other herbaceous vegetation close to the ground and remove from the site. Shred sod by shallow plowing or blading and thorough disking. Thoroughly shred to allow the soil to be easily spread in a thin layer over areas to be covered. If allowed by the Engineer, herbicides may be applied, and vegetation may be incorporated into the topsoil.

3.02 TOPSOIL (Continued)

b. Remove an adequate amount of topsoil from the upper 12 inches of existing on-site topsoil to allow finish grading with a finished grade of 8 inches of salvaged topsoil. The topsoil may be moved directly to an area where it is to be used, or may be stockpiled for future use.

2. Spreading and Finish Grading:

a. Place topsoil at least 8 inches deep; smooth and finished grade according to the contract documents.

b. After finish grading the topsoil, till surface to a minimum depth of 4 inches. Remove clods, lumps, roots, litter, other undesirable material, or stones larger than 1 inch (1/2 inch for turfgrass).

B. Compost Amended Topsoil: Furnish and spread compost a uniform thickness blended according to Section 2010, 2.01. Incorporate compost into underlying soil. Grade the compost amended soil. Till area a minimum depth of 4 inches to loosen surface from compaction during placement. Remove clods and stones and other undesirable materials.

C. Off-site Topsoil: Transport and spread 8 inches of approved off-site topsoil, unless otherwise specified. Grade and till the area a minimum depth of 4 inches to loosen surface from compaction during placement. Remove clods, lumps, roots, litter, other undesirable material, or stones larger than 1 inch (1/2 inch for turfgrass).

3.03 EXCAVATION

A. Notification: Notify the Engineer prior to start of excavation activities.

B. Pavement Removal:

1. Cut surface pavement to full depth as required, and at designated removal lines.

2. Remove all pavement materials.
   a. If specified in the contract documents or allowed by the Engineer, process for re-use.
   b. Dispose of excess material as follows:
      1) Use as unsuitable soil according to this section.
      2) If specified in the contract documents, deliver and stockpile at a site designated by the Engineer.
      3) Otherwise, properly dispose of off-site.

3. Remove pavement material broken or damaged by the Contractor beyond designated removal lines to new line designated by the Engineer, and replaced at the Contractor′s expense.

4. Protect subgrade beneath existing pavement removal areas.

C. Excavation: Perform Class 10, 12, or 13 grading, as specified in the contract documents, to the prescribed grade.

D. Shaping of Borrows:

1. Ensure that borrow areas provided by the Contractor are regular in cross-section to allow accurate measurement.

2. Ensure that care is taken to blend to natural land forms and avoid unnecessary damage to the land.

3. Do not divert natural drainage of surface water onto adjoining owners, and be diligent in draining the surface water in its natural course or channel.

3.03 EXCAVATION (Continued)

4. Complete excavation in a way consistent with the existing natural drainage conditions.

E. Drainage:

1. Provide temporary drainage facilities to prevent damage to public or private interests when necessary to interrupt natural drainage or flow of artificial drains.

2. Restore original drainage as soon as work allows.

3. The Contractor is responsible for damage resulting from their neglect to provide erosion control or artificial drainage.

F. Unsuitable or Unstable Materials:

1. Remove unsuitable or unstable materials to a depth specified in the contract documents, or as directed by the Engineer.

2. The Engineer will determine the need for and type of backfill material, including select soil or granular subbase.

3. Remove all soft areas. Replace with approved materials.

4. If subbase materials are used, provide weight tickets at the time of delivery.

5. Dispose of unsuitable or unstable materials according to the requirements in this section.

G. Removal of Boulders: Remove all boulders with a minimum diameter of 6 inches.

H. Rock Excavation:

1. When excavation to the subgrade elevation results in a surface consisting of loose or solid rock:
   a. Excavate 1 foot below the finished subgrade elevation.
   b. Construct subgrade with suitable material.
   c. Conduct operations so the Engineer is given the opportunity to measure cross-section before placement of subgrade material.

2. When pre-splitting of rock cuts is necessary, the limits of the area and the procedure used will be subject to the approval of the Engineer.

3. Dispose of rocks and boulders 6 inches in diameter and greater off-site.

I. Removal or Filling of Pipe Culverts, Pipes, and Conduits: Remove, plug, and/or fill with flowable mortar, as directed by the Engineer.

3.04 EMBANKMENT CONSTRUCTION

A. Notification: Notify the Engineer prior to start of embankment activities.

B. Site Preparation:

1. Remove all ground cover from the area.

2. When an embankment is placed on or against an existing slope that is steeper than 3:1 and is more than 10 feet high, cut the slope into steps as the construction of the new embankment progresses. The steps should ensure that all sod or other potential sliding surfaces are removed. Cut each step or series of steps to approximate horizontal planes which have vertical slope dimensions of at least 3 feet.

3.04 EMBANKMENT CONSTRUCTION (Continued)

C. Depositing Embankment Material:

1. Except for rock fills and granular blankets, deposit embankment material in horizontal layers no greater than 8 inches in loose thickness. Do not incorporate vegetative materials in embankments. If some otherwise suitable soil contains small amounts of vegetative materials, such soils may be deposited outside of the shoulder line, within the outer 3 feet of the embankment.

2. When the width at the attained height is 30 feet or more, divide the area upon which the layer is to be placed into separate and distinct dump areas, having widths of at least 15 feet. If hauling equipment is operated within a dump area, cover the area with at least one passage of a tandem-axle disk, or two passages with a single-axle disk, prior to compaction.

3. Keep hauling equipment off dump areas of embankments 36 feet or more in width during compaction operations. Within 36 feet of a bridge or other limiting structure, or where the width of the embankment is less than 36 feet at the attained height, empty hauling units may travel on the dump area during compaction operations, as necessary to pass loaded hauling units. If the design width of the embankment is less than 30 feet at the attained height, hauling units will be allowed to travel through areas where compaction operations are in progress. When any hauling equipment is allowed to pass through compaction operations, do not require water, disking, and compacting equipment to deviate from their intended paths.

4. Deposit the material over the dump area as a separate and distinct operation. If the material, as deposited, contains an average of more than one lump per square yard, large enough to have at least one dimension greater than 12 inches, cover the area by at least one passage of a tandem-axle disk, or two passages of a single-axle disk. Use a disk that is designed and operated to cut and stir to the full depth of the layer.

5. After depositing and disking, if required, smooth the material to a uniform depth with a suitable motor patrol, bulldozer, or self-propelled sheepsfoot-type roller with a blade attachment. In addition to the initial smoothing operation, continue this smoothing and leveling of the lift during compaction, as necessary to provide a surface area free from ruts and other objectionable irregularities.

   Use the self-propelled sheepsfoot-type roller (meeting the requirements of Iowa DOT Article 2001.05) under the following conditions:
   a. Leveling must be done according to the prescribed rolling pattern.
   b. Compaction should be the primary function of the unit.
   c. Prevent spinning of the power drums.
   d. When, in the opinion of the Engineer, the unit cannot satisfactorily accomplish both leveling and rolling, use a separate dozer or motor patrol for the leveling operation prior to initiation of compaction.
   e. For embankments constructed primarily of sand or other granular material, the Contractor may substitute a pneumatic-tired roller meeting the requirements of Iowa DOT Article 2001.05.

6. Keep the outer portion of an embankment lower than its center, and wherever construction will be suspended for a period during which rain is likely to occur, roughen the surface to prevent erosion. This can be done by tracking, disking, or scarifying. Stones 6 inches and smaller in diameter may be placed in embankments, but distributed to avoid pockets. No stones larger than 3 inches may be placed within 1 foot of the finished subgrade elevation.

3.04 EMBANKMENT CONSTRUCTION (Continued)

D. Compaction with Moisture and Density Control: Compact with moisture and density control, unless Type A compaction is specified in the contract documents. See Section 2010, 3.09 for moisture and density requirements.

E. Type A Compaction: When Type A compaction is specified in the contract documents, compact as follows:

1. After the surface layer has been smoothed, and before material for the next layer is deposited on it, compact the layer with at least one passage of the sheepsfoot-type roller per inch of loose thickness of the layer, until the roller is supported entirely on its feet. The roller will be considered to be supported entirely on its feet when the tamping feet penetrate no more than 3 inches into an 8 inch lift or layer being compacted.

2. Determine if moisture content of the material is excessive or suitable for satisfactory compaction.
   a. Start rolling operations immediately after the smoothing operation, or delay them, and instead aerate the material in preparation for rolling.
   b. Perform aeration and compaction operations without unnecessary delay.
   c. Rolling operations made prior to any aeration operations for a lift will not be counted as any of the required coverages.

3. If the material is dry to the extent that it will not likely be satisfactorily compacted by rolling, moisten the material.
   a. The Engineer may order the material to be moistened uniformly before it is compacted.
   b. The Engineer may authorize the use of water in the final finishing of the roadbed.
   c. Delays from the ordering of moistening or drying will be at the Contractor's expense.

4. The Contractor may substitute compaction with moisture and density control for Type A Compaction, providing all testing as required, at the Contractor's expense.

3.05 USE OF UNSUITABLE SOILS

Unsuitable soils are not allowed in the right-of-way, unless otherwise specified in the contract documents or allowed by the Engineer.

3.06 SUBGRADE PREPARATION

Shape and consolidate subgrade in preparation for the placement of pavement.

A. Uniform Composition: Provide uniform composition of at least 12 inches below top of subgrade under new paving or subbase, plus 2 feet on each side. Use select subgrade materials unless granular stabilization materials or subgrade treatment is specified.

1. Subgrade Compaction in Fill Sections:
   a. Follow the compaction with moisture and density control requirements in Section 2010, 3.04.
   b. Construct in two 6 inch lifts.

2. Subgrade Compaction in Cut Sections:
   a. Excavate and stockpile the top 6 inches of subgrade.
   b. Scarify, mix, and re-compact the next 6 inches of subgrade.
   c. Replace, mix, and compact the top 6 inches of subgrade.
   d. Follow the compaction with moisture and density control requirements in Section 2010, 3.09.

3.06 SUBGRADE PREPARATION (Continued)

3. Remove stones over 3 inches from subgrade.

4. Construct to elevation and cross-section such that, after rolling, surface will be above required subgrade elevation.

B. Subgrade Stability:

1. Perform proof rolling no more than 7 days prior to paving operations with a truck loaded as approved by the Engineer using either:
   a. A single axle or tandem truck fully loaded with rock or soil to the top of the truck's sideboards; or
   b. A single axle truck loaded with a rear axle weight of 13,500 pounds and total vehicle weight of 20,000 pounds or a tandem axle truck loaded with rear axle weight of 34,000 pounds and a total weight of 46,000 pounds. Verify axle and truck weights by tickets from a certified scale.

2. Operate trucks at less than 10 mph. Make multiple passes for every lane. The subgrade will be considered to be unstable if, under the operation of the loaded truck, the surface shows yielding (soil wave in front of the loaded tires) or rutting of more than 2 inches, measured from the top to the bottom of the rut at the outside edges.

3. If soft or yielding areas are located, remove unstable materials and replace with suitable foundation materials as approved by the Engineer, meeting Section 2010, 2.04. Compact subgrade materials in cut sections as required by the Engineer. If stabilization material is used, place and compact as required for subbase.

4. If more than 7 days pass, unsuitable material was replaced, or if rain occurs before the paving operation begins, perform proof rolling again unless waived by the Engineer.

C. Final Subgrade: Complete final subgrade by excavation to grade by use of steel-shod template supported on side forms, support rollers, or by use of an automatically-controlled subgrade excavating machine.

D. Subgrade Check: Check subgrade elevation and grade by method approved by Engineer prior to paving.

E. Ruts: If ruts or other objectionable irregularities form in subgrade during construction, re-shape and re-roll subgrade before placing pavement. Fill ruts or other depressions with material similar to other subgrade material, and compact.

3.07 SUBGRADE TREATMENT

A. Lime, Cement, Fly Ash, or Asphalt:

1. Incorporate the subgrade treatment material uniformly during subgrade preparation to the depth and rate specified in the contract documents.

2. Place subgrade treatment in the areas specified in the contract documents for the width of the pavement, plus 2 feet on each side.

B. Geogrid or Geotextiles:

1. Install according to manufacturer's recommendations, on top of the prepared subgrade.

2. Place in the areas specified in the contract documents for the width of the pavement, plus 2 feet on each side.

3.08 SUBBASE

A. Subgrade: Compact subgrade and shape smooth before subbase material is placed.

B. Construction: Construct the specified type of subbase to the specified depth, plus 2 feet outside the pavement area.

C. Moisture and Density: Compact subbase and provide testing according to Section 2010, 3.09.

D. Final Elevation:

1. Trim to the design elevation and shape to the final template with an automatically-controlled trimming machine. Excess material may be salvaged and spread for use on any other approved project location or operation.

2. Conform to the design profile and cross-section to the extent that no point is higher than the designated elevation, and no point is lower than 0.05 foot below the design elevation.

3. Ensure that the top 1 inch of the subbase is uniformly moist prior to paving.

4. Do not allow hauling equipment and other traffic on completed subbase.

3.09 FIELD QUALITY CONTROL

A. Compaction Testing: If it is specified in the contract documents that the Contractor will conduct compaction testing, use the services of an independent testing laboratory approved by the Engineer.

B. Moisture Content and Density:

1. Ensure that moisture content falls within a range of optimum moisture to 4% above optimum moisture.

2. Compact cohesive soils to no less than 95% of maximum Standard Proctor Density; and cohesionless soils to no less than 70% of Relative Density.

C. Testing:

1. Lab Test: Determine laboratory density of material according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density) or ASTM D 4253 and ASTM D 4254 (Maximum and Minimum Index Density for Cohesionless Soils). Provide at least one analysis for each material type used unless provided by the Engineer.

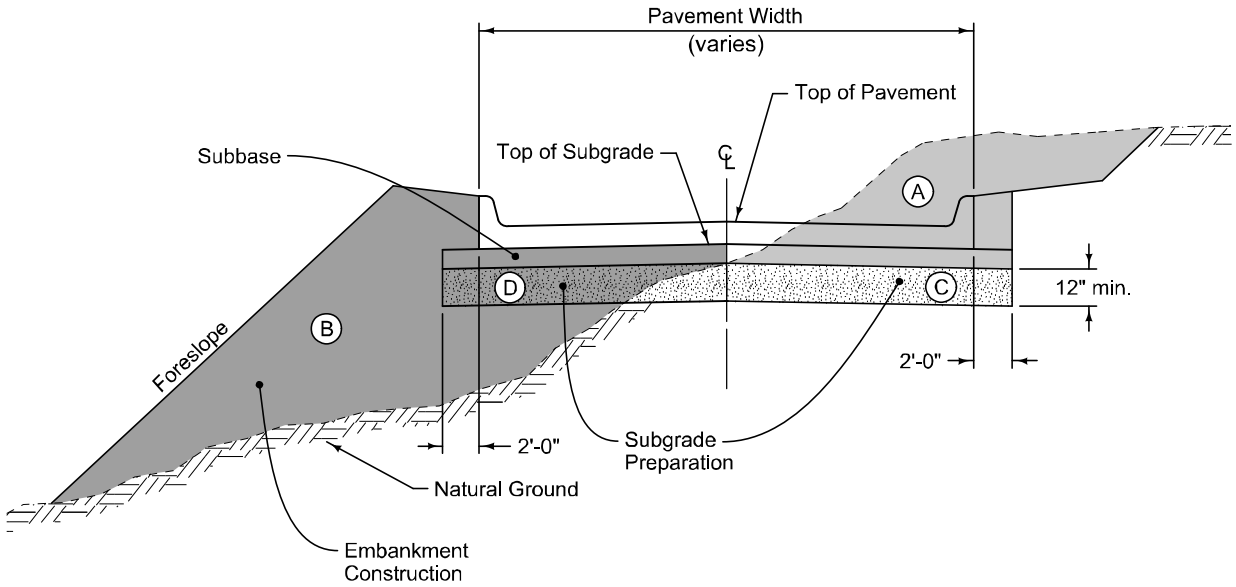
2. Field Test:
   a. Perform in-place field density and moisture testing according to ASTM D 6938 (nuclear) or ASTM D 1556 (sand cone) and ASTM D 2216 (moisture content).
   b. Frequency:
      1) Urban Section: Provide one test per lift per 150 feet. If section is less than 300 feet, perform at least two tests per lift.
      2) Rural Section: Provide one test for each 500 cubic yards of material placed, with at least two tests per lift.

3. Test only locations selected by the Engineer.

4. The Engineer may require additional testing if noncompliance or change in conditions occur.

D. Test Failure: Rework, recompact, and retest as necessary until required compaction is achieved.

END OF SECTION



1. Embankment Construction: Compact with moisture and density control unless Type A Compaction is specified. Comply with Section 2010, 3.04.
2. Subgrade Preparation: Construct subgrade according to Section 2010, 3.06.
3. Subbase Construction: Construct subbase according to Section 2010, 3.08.

Key

- Excavation
- Fill
- Subgrade preparation

Type of Work	Area	Payment Method
Excavation	(A)	Excavation
Fill	(B)	Included in Excavation or Borrow
Subgrade Preparation	(C) & (D)	Subgrade Preparation

FIGURE 2010.102 | SHEET 1 OF 1

SUDAS

REVISION 1 10-21-14

2010.102

SHEET 1 of 1

SUDAS Standard Specifications

DESIGNATION OF ROADWAY EARTHWORK ITEMS

TRENCH EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Trench Excavation for Pipe Systems

B. Trench Foundation Stabilization

C. Pipe Bedding and Backfill

1.02 DESCRIPTION OF WORK

A. Excavate trench for pipe installation.

B. Stabilize trench and install pipe bedding materials.

C. Place backfill material in trench.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Gradation reports for bedding materials.

B. Results of required testing.

C. Dewatering plan.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. General: The following items are incidental to the underground utility being installed and will not be paid for separately:

1. Standard trench excavation.
2. Removal and disposal of excess backfill material resulting from pipe installation.
3. Removal of abandoned private utilities encountered during trench excavation.
4. Furnishing and placing granular bedding material.
5. Placing and compacting backfill material.
6. Dewatering including, but not limited to, all equipment such as generators, pumps, rock for sump pits, discharge piping, and any extra excavation needed to facilitate dewatering according to stormwater regulations, as applicable.
7. Sheeting, shoring, and bracing.
8. Adjusting the moisture content of excavated backfill material to the range specified for placement and compaction.
9. Temporary support for existing water, sewer, gas, telephone, electric, and other utilities or services that cross the trench.

B. Rock Excavation:

1. Measurement: Measurement will be by cubic yards of rock removed.

2. Payment: Payment will be at the unit price per cubic yard for the quantity of rock removed.

3. Includes: Unit price includes, but is not limited to, furnishing the equipment and labor to break up, remove, and properly dispose of rock encountered in the trench.

C. Trench Foundation:

1. Measurement: Measurement will be in tons for the quantity of stabilization material required to replace material removed by over-excavation. Measurement will be based on the scale tickets for the material delivered and incorporated into the project. Trench foundation required to correct unauthorized over-excavation will not be measured.

2. Payment: Payment will be at the unit price per ton for the quantity of stabilization material furnished and placed.

3. Includes: Unit price includes, but is not limited to, removal and disposal of over-excavated material required to stabilize trench foundation; and furnishing, hauling, and placing stabilization material.

1.08 MEASUREMENT AND PAYMENT (Continued)

D. Removal, Disposal, and Replacement of Unsuitable Backfill Material:

1. **Measurement:** Measurement will be in cubic yards for the quantity of backfill material required to replace unsuitable backfill material removed during standard trench excavation. Measurement will be based on compacted material in place.

2. **Payment:** Payment will be at the unit price per cubic yard for the quantity of the suitable replacement backfill material furnished.

3. **Includes:** Unit price includes, but is not limited to, removal, hauling, and disposal costs of the unsuitable material and the furnishing, hauling, and placing of the suitable replacement backfill material. Unit price does not include landfill costs for contaminated materials.

E. Special Pipe Embedment or Encasement:

1. **Measurement:** Measurement will be by the linear foot along the centerline of pipe for each type of special embedment or encasement.

2. **Payment:** Payment will be at the unit price per linear foot for each type of special pipe embedment or encasement.

3. **Includes:** Unit price includes, but is not limited to, furnishing and placing all required special pipe embedment or encasement materials.

F. PCC Pipe Support Over Existing Utility:

1. **Measurement:** Measurement will be by each location.

2. **Payment:** Payment will be at the unit price for each pipe support.

3. **Includes:** Unit price includes, but is not limited to, furnishing and placing PCC pipe supports and associated materials.

G. Reinforced PCC Beam Utility Line Support:

1. **Measurement:** Measurement will be by each location.

2. **Payment:** Payment will be at the unit price for each reinforced PCC beam utility line support.

3. **Includes:** Unit price includes, but is not limited to, furnishing and placing reinforced PCC beam utility line support and associated materials.

H. Trench Compaction Testing: If the contract documents specify that the Contractor is responsible for trench compaction testing, measurement and payment will be as follows.

1. **Measurement:** Lump sum item; no measurement will be made.

2. **Payment:** Payment will be at the lump sum price for trench compaction testing.

3. **Includes:** Lump sum price includes, but is not limited to, all payments associated with retesting resulting from failure of initial tests.

PART 2 - PRODUCTS

2.01 MATERIALS EXCAVATED FROM A TRENCH

A. Standard Trench Excavation: All materials encountered during trench excavation, except rock and over-excavation.

1. **Suitable Backfill Material:** Class II, Class III, Class IVA, or Class IVB as defined in Section 3010, 2.03.

2. **Unsuitable Backfill Material:** Includes, but is not limited to, the following materials:
   a. Soils not classified as suitable backfill material, as defined in Section 3010, 2.03.
   b. Individual stones or concrete chunks larger than 6 inches and averaging more than one per each cubic foot of soil.
   c. Frozen materials.
   d. Stumps, logs, branches, and brush.
   e. Trash, metal, or construction waste.
   f. Soil in clumps or clods larger than 6 inches, and without sufficient fine materials to fill voids during placement.
   g. Environmentally contaminated soils.
   h. Materials removed as rock excavation or over-excavation.

3. **Topsoil:** Class V material. Comply with Section 3010, 2.04.

B. Rock Excavation: Boulders or sedimentary deposits that cannot be removed in trenches without continuous use of pneumatic tools or blasting.

C. Over-excavation: Excavation of unsuitable or unstable material in trenches below the pipe zone, comply with Figure 3010.101.

2.02 BEDDING MATERIAL

A. Class I Material:

1. Crushed stone complying with the following gradation:

Sieve	Percent Passing
1 1/2”	100
1”	95 to 100
1/2"	25 to 60
No. 4	0 to 10
No. 8	0 to 5

2. The Engineer may allow the use of gravel or authorize a change in gradation subject to materials available locally at the time of construction.

3. The Engineer may authorize the use of crushed PCC for pipe sizes up to 12 inches.

4. Use aggregates having a percentage of wear, Grading A or B, not exceeding 50%, determined according to AASHTO T 96.

2.03 BACKFILL MATERIAL

A. Class II Material: Manufactured and non-manufactured open-graded (clean) or dense-graded (clean) processed aggregate, clean sand, or coarse-grained natural soils (clean) with little or no fines. Class II materials are further described in Table 3010.01.

Table 3010.01: Class II Materials

Type	Soil Group Symbol ASTM D 2487	Description	Percentage Passing Sieve Sizes		
			1 1/2 in.	No. 4	No. 200
Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines.	100%	< 50% of "Coarse Fraction"	< 5%
	GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines.			
	SW	Well-graded sands and gravelly sands; little or no fines.		> 50% of "Coarse Fraction"	
	SP	Poorly-graded sands and gravelly sands; little or no fines.			
Coarse-Grained Soils, borderline clean to with fines	e.g. GW-GC, SP-SM	Sands and gravels that are borderline between clean and with fines.	100%	Varies	5% to 12%

B. Class III Material:

1. Natural coarse-grained soils with fines. Class III materials are further described in Table 3010.02.

2. Do not use where water condition in trench may cause instability.

Table 3010.02: Class III Material

Table	Soil Group Symbol ASTM D 2487	Description
Coarse-Grained Soils, with fines	GM	Silty gravels, gravel-sand-silt mixtures.
	GC	Clayey gravels, gravel-sand-clay mixtures.
	SM	Silty sands, sand-silt mixtures.
	SC	Clayey sands, sand-clay mixtures.

C. Class IVA Material:

1. Natural fine-grained inorganic soils. Class IVA materials are further described in Table 3010.03.

2. The Engineer will determine if material is not suitable for use as backfill material under deep fills, surface applied wheel loads, heavy vibratory compactors, tampers, or other conditions.

3. Do not use where water conditions in trench may cause instability.

4. Material is suitable for use in dry trench conditions only.

2.03 BACKFILL MATERIAL (Continued)

Table 3010.03: Class IVA Material

Type	Soil Group Symbol ASTM D 2487	Description
Fine-Grained Soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clay, lean clay.

D. Class IVB Material:

1. Natural fine-grained inorganic (high elastic silts and plastic clays - fat clay) with a liquid limit greater than 50%. Class IVA materials are further described in Table 3010.04.

2. When approved by the Engineer, material may be used as final trench backfill in a dry trench.

3. Do not use in the pipe embedment zone.

Table 3010.04: Class IVB Material

Type	Soil Group Symbol ASTM D 2487	Description
Fine-Grained Soils (inorganic)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	CH	Inorganic clays of high plasticity, fat clays.

2.04 TOPSOIL

A. Class V Material:

1. Organic soils. Class V materials are further described in Table 3010.05.

2. Use only as topsoil outside of the pavement, unless otherwise specified or allowed by the Engineer.

3. Do not use in the pipe embedment zone.

Table 3010.05: Class V Material

Type	Soil Group Symbol ASTM D 2487	Description
Organic Soils (unsuitable for backfill)	OL	Organic silts and organic silty clays of low plasticity.
	OH	Organic clays of medium to high plasticity, organic silts.
Highly Organic (unsuitable for backfill)	PT	Peat and other high organic soils.

2.05 STABILIZATION (FOUNDATION) MATERIALS

A. Clean 2 1/2 inch crushed stone with the following gradation:

Table 3010.06: Stabilization Materials

Sieve	Percent Passing
2 1/2”	100
2”	90 to 100
1 1/2”	35 to 70
1”	0 to 20
1/2”	0 to 5

B. If specified, meet Iowa DOT Section 4128 for Gradation No. 13a screened over a 1 inch screen or the Engineer may authorize a change in gradation depending on materials available locally at time of construction.

C. Crushed concrete may be used, if approved by the Engineer, if it is within ± 5% of the gradation for each size of material.

2.06 SPECIAL PIPE EMBEDMENT AND ENCASEMENT MATERIAL

A. Concrete Cradle, Arch, or Encasement: Use Iowa DOT Class C concrete.

B. Flowable Mortar: Comply with Iowa DOT Article 2506.02.

C. CLSM:

1. Approximate quantities per cubic yard:
   a. Cement: 50 pounds
   b. Fly ash: 250 pounds
   c. Fine aggregate: 2,910 pounds
   d. Water: 60 gallons

2. A compressive strength of at least 50 psi compressive strength at 28 calendar days can be expected.

3. Comply with material requirements of Iowa DOT Article 2506.02.

D. Foamed Cellular Concrete:

1. If specified or approved by the Engineer, foamed cellular concrete may be substituted for flowable mortar.

2. Comply with Iowa DOT Article 2506.02.

3. Submit mix design to the Engineer. Include base cement slurry mix per cubic yard, expansion factor from the foaming agent, and wet density.

PART 3 - EXECUTION

3.01 TRENCH EXCAVATION

A. Notify the Engineer prior to the start of excavation activities.

B. Remove topsoil to a minimum depth of 12 inches and stockpile.

C. Excavate trench to required elevations and dimensions. Comply with Figure 3010.101.

1. Protect existing facilities, trees, and shrubs during trench excavation.

2. Place excavated material away from trench.

3. Grade spoil piles to drain. Do not allow spoil piles to obstruct drainage.

D. Unsuitable Backfill Material:

1. If unsuitable backfill material is encountered, notify the Engineer.

2. Remove rock, rubbish, boulders, debris, and other unsuitable backfill materials at least 6 inches below and on each side of the pipe.

3. Keep unsuitable backfill material separated from suitable backfill material and topsoil.

4. Restore trench to design dimensions using bedding or stabilization material.

3.02 ROCK OR UNSTABLE SOILS IN TRENCH BOTTOM

A. Notify the Engineer prior to over-excavation.

B. The Engineer will determine the need for over-excavation and trench foundation stabilization prior to installation of pipes and structures.

C. Comply with Figure 3010.101 for over-excavation of rock and wet or soft foundations.

3.03 TRENCH PROTECTION

A. Install adequate trench protection (sheeting, shoring, and bracing) to prevent ground movement or damage to adjacent structures, pipelines, and utilities.

B. Move trench boxes carefully to avoid disturbing pipe, bedding, or trench wall.

3.04 DEWATERING

A. Maintain water levels below the bottom of trench excavation.

B. Perform the dewatering operation according to the dewatering plan approved by the Engineer. The dewatering plan may be modified to meet actual field conditions, with approval of the Engineer.

C. Ensure operation of the dewatering system does not damage adjoining structures and facilities. Cease dewatering operations and notify the Engineer if damage is observed.

D. Discharged Water:

1. Do not discharge water into sanitary sewers.

2. Discharging water into storm sewers requires Engineer's approval.

3.04 DEWATERING (Continued)

3. Obtain permission of adjacent property owner prior to discharging water onto their property.

4. Maintain and control water discharge as necessary to prevent a safety hazard for vehicular and pedestrian traffic.

5. Direct water discharge away from electrical facilities or equipment.

6. Use dewatering equipment that will minimize disturbance from noise and fumes.

7. Protect discharge points from erosion. Provide sediment control for sediment contaminated water discharged directly from trench.

3.05 PIPE BEDDING AND BACKFILL

A. General: Comply with Figures 3010.101, 3010.102, 3010.103, 3010.104, and 3010.105, as appropriate.

1. Bedding and backfill used for pipe installation will depend on:
   a. Type of installation (water main, sanitary sewer gravity main, sanitary sewer force main, or storm sewer).
   b. Pipe material.
   c. Depth of bury.
   d. Pipe diameter.

2. After pipe installation, place remaining bedding material and immediately place backfill in trench.

3. Adjust the moisture content of excessively wet, but otherwise suitable, backfill material by spreading, turning, aerating, and otherwise working material as necessary to achieve required moisture range.

4. Adjust the moisture content of excessively dry, but otherwise suitable, backfill material by adding water, then turning, mixing, and otherwise blending the water uniformly throughout the material until the required moisture range is achieved.

5. Hydraulic compaction (flooding with water) is not allowed unless authorized by the Engineer.

6. Special Pipe Embedment and Encasement Materials:
   a. If specified, use concrete, flowable mortar, CLSM, or foamed cellular concrete as a substitute for pipe bedding, haunch support, or primary and secondary backfill.
   b. Secure pipe against displacement or flotation prior to placing special pipe embedment and encasement material.
   c. Place Class IV clay material for a waterstop and compacted to 90% of Standard Proctor Density. Obtain required compaction within a soil moisture range of optimum moisture to 4% above optimum moisture content. If trench stabilization material is used, extend waterstop through stabilization material to the bottom of the trench.

B. Pipe Bedding:

1. Granular Material:
   a. Class I granular bedding material is required for all gravity mains. Use when specified for pressure pipes.
   b. Comply with Figures 3010.101, 3010.102, 3010.103, 3010.104, and 3010.105.

3.05 PIPE BEDDING AND BACKFILL (Continued)

c. Place bedding material in the bottom of the trench in lifts no greater than 6 inches thick. Consolidate and moderately compact bedding material.
d. Shape bedding material to evenly support pipe at the proper line and grade, with full contact under the bottom of the pipe. Excavate for pipe bells.
e. Install pipe and system components.
f. Place, consolidate, and moderately compact additional bedding material adjacent to the pipe to a depth equal to 1/6 the outside diameter of the pipe.

2. Suitable Backfill Material:
a. Only use with pressure pipe. Comply with Figure 3010.104.
b. Use suitable backfill material to shape trench bottom to evenly support pipe at the proper line and grade, with full contact under the bottom of the pipe. Excavate for pipe bells.

C. Haunch Support: Place from the top of the pipe bedding to the springline of the pipe.

1. Granular Material:
a. Place Class I material in lifts no greater than 6 inches thick.
b. Consolidate and moderately compact by slicing with a shovel or using other approved techniques.

2. Suitable Backfill Material:
a. Place in lifts no greater than 6 inches thick.
b. For Class II backfill material, consolidate and moderately compact by slicing with a shovel or using other approved techniques.
c. For Class III and Class IVA backfill materials, compact to at least 90% of Standard Proctor Density. Obtain required compaction within a soil moisture range of optimum moisture to 4% above optimum moisture content.

D. Primary and Secondary Backfill:

1. General:
a. For primary backfill, place from the springline of the pipe to the top of the pipe.
b. For secondary backfill, place from the top of the pipe to 1 foot above the top of the pipe.

2. Granular Material:
a. Place in lifts no greater than 6 inches thick.
b. Compact to at least 65% relative density.

3. Suitable Backfill Material:
a. Place in lifts no greater than 6 inches thick.
b. For Class II backfill material, compact to at least 65% relative density.
c. For Class III and Class IVA backfill materials, compact to at least 95% of Standard Proctor Density. Obtain required compaction within a soil moisture range of optimum moisture to 4% above optimum moisture content.

E. Final Trench Backfill:

1. Place suitable backfill material from 1 foot above the top of the pipe to the top of the trench.
a. Use no more than 8 inch thick lifts for backfill areas more than 3 feet below the bottom of pavement.
b. Use no more than 6 inch thick lifts for backfill areas less than or equal to 3 feet below the bottom of pavement.

3.05 PIPE BEDDING AND BACKFILL (Continued)

2. Place backfill material after recording locations of connections and appurtenances or at the Engineer's direction.

3. Class I and Class II Backfill Material:
   a. Compact to at least 65% relative density within right-of-way.
   b. Compact to at least 50% relative density outside right-of-way.

4. Class III and Class IVA Backfill Material:
   a. Compact to at least 95% of Standard Proctor Density within right-of-way.
   b. Compact to at least 90% of Standard Proctor Density outside right-of-way.
   c. Obtain required compaction within a soil moisture range of optimum moisture to 4% above optimum moisture content.

5. In areas to remain unpaved, terminate backfill material 8 inches below finished grade. Use topsoil for the final 8 inches above trench backfill material.

6. Terminate backfill material at subgrade elevation in areas to be paved.

3.06 TRENCH COMPACTION TESTING

A. General: When trench compaction testing is specified in the contract documents as the Contractor's responsibility, provide testing of trench backfill material using the services of an independent testing laboratory approved by the Engineer.

B. Soil Testing:

1. Cohesive Soils:
   a. Determine moisture-density relationships by ASTM D 698 (Standard Proctor). Perform at least one test for each type of cohesive soil used.
   b. Determine in-place density and moisture content. Use ASTM D 1556 (sand-cone method) and ASTM D 2216 (laboratory moisture content), or use ASTM D 6938 (nuclear methods for density and moisture content).

2. Cohesionless Soils:
   a. Determine maximum and minimum index density and calculate relative density using ASTM D 4253 and ASTM D 4254.
   b. For Class I granular bedding material, determine gradation according to ASTM C 136.

C. Field Testing:

1. Testing Frequency and Locations: Perform testing of the final trench backfill, beginning at a depth of 2 feet above the top of the pipe, as follows:
   a. Coordinate the timing of testing with the Engineer.
   b. The Engineer will determine the location of testing.
   c. For each 2 vertical feet of consolidated fill, provide tests at a maximum horizontal spacing of 200 feet and at all street crossings.
   d. Additional testing may be required by the Engineer in the event of non-compliance or if conditions change.
   e. If necessary, excavate to the depth and size as required by the Engineer to allow compaction tests. Place backfill material and recompact.

2. Test Failure and Retesting: Rework, recompact, and retest as necessary until specified compaction and moisture content is achieved in all areas of the trench. In the event of failed tests, the Engineer may require retesting as deemed necessary.

END OF SECTION

Refer to the contract documents for specific material and placement requirements.

(1) Required only when specified in the contract documents or when directed by the Engineer.

Key

OD = Outside diameter of pipe

D = Inside diameter of pipe

TW = Trench width at top of pipe

d = Depth of bedding material below pipe

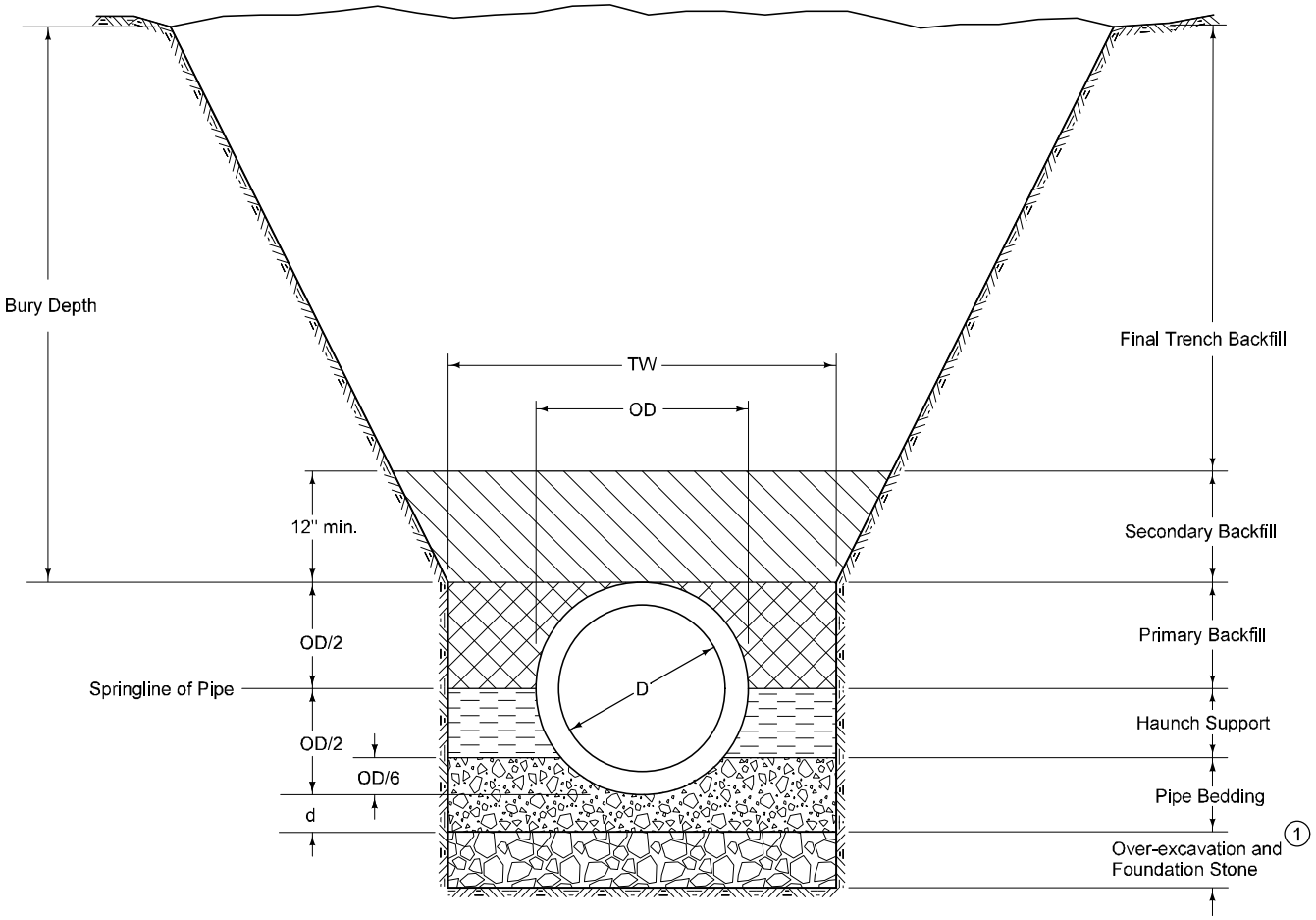


FIGURE 3010.101 | SHEET 1 OF 1

SUDAS | IOWADOT | REVISION 1 04-17-18

FIGURE 3010.101 | STANDARD ROAD PLAN | SW-101 | SHEET 1 of 1

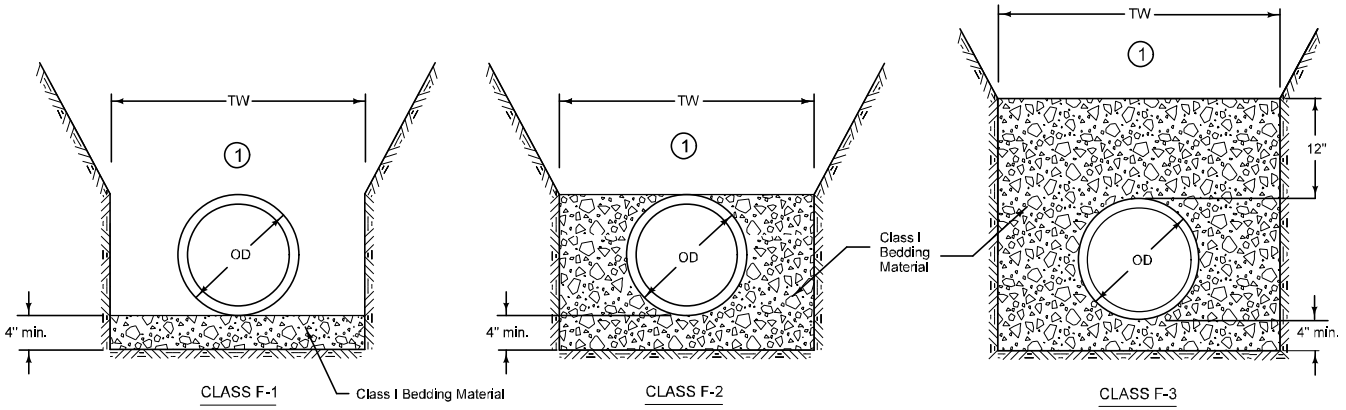
REVISIONS: Replaced Iowa DOT and SUDAS logos.

Paul D. Wigant, SUDAS DIRECTOR | Brian Smith, DESIGN METHODS ENGINEER

TRENCH BEDDING AND BACKFILL ZONES

DO NOT USE ON PRIMARY ROADWAYS

BEDDING CLASSES



1. Place remainder of bedding and backfill materials as specified in the contract documents.
2. Minimum depth of bury 12 inches or as specified by the manufacturer.

ALLOWABLE BEDDING CLASSES

PIPE MATERIAL	STORM SEWER	SANITARY SEWER
Ductile Iron	F-1, F-2, F-3	F-1, F-2, F-3
HDPE	F-2, F-3	Not allowed
Polypropylene	F-2, F-3	F-3
PVC	F-2, F-3	F-3

Key

OD = Outside diameter of pipe

TW = Trench width at top of pipe:
Min. = OD+18 inches OR 1.25xOD+12 inches
(whichever is greater)

ALLOWABLE BURY DEPTH (2)

PVC PIPE

Pipe Diameter (in)	ASTM D 3034			ASTM F 679	ASTM F 949	ASTM F 1803	ASTM D 2680
	Solid Wall			Solid Wall	Corrug. Exterior	Closed Profile	Composite (Truss Type)
	SDR 23.5	SDR 26	SDR 35	SDR 35			
8	30'	28'	24'	---	24'	---	32'
10	30'	28'	24'	---	24'	---	32'
12	30'	28'	24'	---	24'	---	32'
15	30'	28'	24'	---	24'	---	32'
18	---	---	---	24'	24'	---	---
21	---	---	---	24'	24'	24'	---
24	---	---	---	24'	24'	24'	---
27	---	---	---	24'	---	24'	---
30	---	---	---	24'	24'	24'	---
33	---	---	---	24'	---	---	---
36	---	---	---	24'	24'	24'	---
42	---	---	---	24'	---	24'	---
48	---	---	---	24'	---	24'	---
54	---	---	---	---	---	24'	---
60	---	---	---	---	---	24'	---

DUCTILE IRON, AWWA C151, CLASS 52

Pipe Diameter (in)	Class F-1 Bedding	Class F-2 Bedding	Class F-3 Bedding
4	40'	40'	40'
6	40'	40'	40'
8	40'	40'	40'
10	40'	40'	40'
12	37'	40'	40'
14	31'	40'	40'
16	28'	37'	40'
18	25'	34'	40'
20	23'	32'	40'
24	20'	29'	38'
30	18'	23'	31'
36	18'	22'	30'
42	17'	21'	29'
48	16'	19'	27'
54	16'	19'	27'

HDPE PIPE

Pipe Diameter (in)	AASHTO M 294
12	8'
15	9'
18	9'
24	9'
30	9'
36	9'
42	8'
48	8'
54	8'
60	8'

POLYPROPYLENE PIPE

Pipe Diameter (in)	ASTM F 2764
12	24'
15	25'
18	22'
24	20'
30	22'
36	21'
42	22'
48	23'
54	21'
60	21'

FIGURE 3010.103 | SHEET 1 OF 1

SUDAS | IOWADOT | REVISION 4 04-20-21

FIGURE 3010.103 | STANDARD ROAD PLAN | SW-103 | SHEET 1 of 1

REVISIONS: Added note DO NOT USE ON PRIMARY ROADWAYS.

Paul D. Wigand, SUDAS DIRECTOR | DESIGN METHODS ENGINEER

FLEXIBLE GRAVITY PIPE TRENCH BEDDING

STORM SEWERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Storm Sewers

B. Abandonment of Storm Sewers

1.02 DESCRIPTION OF WORK

A. Construct storm sewers.

B. Abandon storm sewers.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Storm Sewer:

1. Trenched:

a. Measurement: Each type and size of pipe installed in a trench will be measured in linear feet along the centerline of the pipe from center of intake or manhole to center of intake or manhole. Where the end of the pipe discharges to a ditch or waterway, measurement will be to the end of the pipe, exclusive of aprons. Lengths of elbows and tees will be included in the length of pipe measured.

b. Payment: Payment will be made at the unit price per linear foot for each type and size of pipe.

c. Includes: Unit price includes, but is not limited to, trench excavation; dewatering; furnishing and installing pipe; furnishing, placing, and compacting bedding and backfill material; joint wrapping; wyes and other fittings; pipe joints; pipe connections; testing; and inspection.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. Trenchless:

a. Measurement: Each type and size of pipe installed by trenchless methods will be measured in linear feet along the centerline of the pipe.

b. Payment: Payment will be made at the unit price per linear foot for each type and size of pipe.

c. Includes: Unit price includes, but is not limited to, furnishing and installing pipe; trenchless installation materials and equipment; pit excavation; dewatering; placing and compacting backfill material; pipe connections; testing; and inspection.

B. Storm Sewer with Casing Pipe:

1. Trenched:

a. Measurement: Each type and size of pipe installed with a casing pipe in a trench will be measured in linear feet along the centerline of the casing pipe from end of casing to end of casing.

b. Payment: Payment will be made at the unit price per linear foot for each type and size of pipe.

c. Includes: Unit price includes, but is not limited to, furnishing and installing both carrier pipe and casing pipe; trench excavation; dewatering; furnishing, placing, and compacting bedding and backfill material; furnishing and installing annular space fill material; casing spacers; pipe connections; testing; and inspection.

2. Trenchless:

a. Measurement: Each type and size of pipe installed by trenchless methods with a casing pipe will be measured in linear feet along the centerline of the casing pipe from end of casing to end of casing.

b. Payment: Payment will be made at the unit price per linear foot for each type and size of carrier pipe.

c. Includes: Unit price includes, but is not limited to, furnishing and installing both carrier pipe and casing pipe; trenchless installation materials and equipment; pit excavation; dewatering; placing and compacting backfill material; casing spacers; furnishing and installing annular space fill material; pipe connections; testing; and inspection.

C. Linear Trench Drain:

1. Measurement: Measurement will be in linear feet from end to end.

2. Payment: Payment will be at the unit price per linear feet of linear trench drain installed.

3. Includes: Price includes, but is not limited to, furnishing and installing the linear trench drain including all appurtenances; furnishing and placement of PCC transition; furnishing, excavation, and backfill of discharge pipe; connection to manhole or intake, if required; installation of apron, if required.

D. Removal of Storm Sewer:

1. Measurement: Each type and size of pipe removed will be measured in linear feet from end to end.

2. Payment: Payment will be made at the unit price per linear foot for each type and size of pipe removed.

3. Includes: Unit price includes, but is not limited to, removal, disposal, and capping (if specified) of pipe; and furnishing, placing, and compacting backfill material.

1.08 MEASUREMENT AND PAYMENT (Continued)

E. Connection to Existing Manhole or Intake: Comply with Section 6010, 1.08, G.

F. Storm Sewer Abandonment, Plug:

1. **Measurement:** Each plug will be counted.

2. **Payment:** Payment will be made at the unit price for each plug installed.

3. **Includes:** Unit price includes, but is not limited to, trench excavation (if necessary), cutting pipe (if required), furnishing and placing plug materials, and placing and compacting backfill material.

G. Storm Sewer Abandonment, Fill and Plug:

1. **Measurement:** Each size of storm sewer to be abandoned by filling and plugging will be measured in linear feet.

2. **Payment:** Payment will be at the unit price per linear foot for each size of pipe filled and plugged.

3. **Includes:** Unit price includes but is not limited to, trench excavation (if necessary), cutting pipe (if required), furnishing and placing pipe fill material, furnishing and placing plug materials, and placing and compacting backfill material.

H. Aprons: Comply with Section 4030 for pipe aprons, apron footings, and apron guards.

PART 2 - PRODUCTS

2.01 STORM SEWERS

A. Reinforced Concrete Pipe (RCP):

1. Comply with ASTM C 76.

2. Minimum Class III, Wall B (Iowa DOT Class 2000D).

3. Use tongue and groove joints wrapped with engineering fabric, unless a rubber O-ring or profile gasket complying with ASTM C 443 is specified.

B. Reinforced Concrete Arch Pipe (RCAP):

1. Comply with ASTM C 506.

2. Minimum Class A-III (Iowa DOT Class 2000D).

3. Use tongue and groove joints wrapped with engineering fabric, unless a rubber O-ring or profile gasket complying with ASTM C 443 is specified.

C. Reinforced Concrete Elliptical Pipe (RCEP):

1. Comply with ASTM C 507.

2. Minimum Class HE III (Iowa DOT Class 2000D) or Class VE III (Iowa DOT Class 2000D).

3. Use tongue and groove joints wrapped with engineering fabric, unless a rubber O-ring or profile gasket complying with ASTM C 443 is specified.

D. Reinforced Concrete Low Head Pressure Pipe (RCPP):

1. Comply with ASTM C 361; minimum Class C 25.

2. Use tongue and groove joints. Comply with ASTM C 361 for rubber O-rings or profile gaskets.

E. Polyvinyl Chloride Pipe (PVC):

1. Use pipe complying with the following:
   a. Types of PVC pipes:
      1) Corrugated exterior, smooth interior, ASTM F 949.
      2) Solid wall, ASTM D 3034 or ASTM F 679.
      3) Closed profile, ASTM F 1803.
      4) Composite, ASTM D 2680.
   b. PVC plastic meeting ASTM D 1784, Cell Classification 12454.
   c. Minimum pipe stiffness of 46 psi.
   d. Integral bell and spigot joints with elastomeric seals according to ASTM D 3212 and ASTM F 477.

2. Use of this pipe material requires specific approval by the Engineer.

2.01 STORM SEWERS (Continued)

F. High Density Polyethylene Pipe (HDPE):

1. Use pipe complying with the following:
   a. AASHTO M 294, Type S corrugated exterior and smooth interior.
   b. Minimum pipe stiffness at 5% deflection according to ASTM D 2412.
   c. Integral bell and spigot joints with elastomeric seals complying with ASTM F 477.
   d. Maximum 5% deflection of the average inside diameter by testing after installation according to Section 4060, 3.04.

2. Use of this pipe material requires specific approval by the Engineer.

G. Corrugated Metal Pipe (CMP):

1. Use pipe complying with the following:
   a. AASHTO M 36, Type I.
   b. Zinc coating complying with AASHTO M 218.
   c. Corrugated steel circular section with annular or helical corrugations.
   d. Gage of pipe according to Iowa DOT Standard Road Plan DR-104 or as specified in the contract documents.
   e. Coupling bands with annular or helical corrugations to match pipe ends.

2. Use of this pipe material requires specific approval by the Engineer.

H. Spiral Rib Pipe:

1. Use pipe complying with the following:
   a. ASTM A 760 Type 1R.
   b. Corrugation profile of 3/4 inch by 3/4 inch by 7 1/2 inches.
   c. Type 2 aluminized steel complying with ASTM A 929.
   d. Minimum thickness of 0.064 inch. Use gage of pipe according to manufacturer's requirements.
   e. Coupling bands complying with manufacturer's recommendations.

2. Use of this pipe material requires specific approval by the Engineer.

I. Coated Corrugated Metal Pipe:

1. Use in corrosive soil or effluent conditions, or where specified in the contract documents or required by the Engineer.

2. Comply with AASHTO M 274. Use gage of pipe according to Iowa DOT Standard Road Plan DR-104 or as specified in the contract documents.

3. Use of this pipe material requires specific approval by the Engineer.

J. Corrugated Metal Arch Pipe (CMAP):

1. Use pipe complying with the following:
   a. AASHTO M 36, Type II.
   b. Zinc coating complying with AASHTO M 218.
   c. Corrugated steel Type I pipe reformed into a pipe-arch having an approximately flat bottom.
   d. Coupling bands with annular corrugations or helical corrugations to match pipe ends.
   e. Gage of pipe according to Iowa DOT Standard Road Plan DR-104.

2. Use of this pipe material requires specific approval by the Engineer.

2.01 STORM SEWERS (Continued)

K. Spiral Rib Arch Pipe:

1. Use pipe complying with the following:
   a. ASTM A 760 Type IIR.
   b. Corrugation profile of 3/4 inch by 3/4 inch by 7 1/2 inch.
   c. Type 2 aluminized steel complying with ASTM A 929.
   d. Minimum thickness of 0.064 inch. Use gage of pipe complying with manufacturer's requirements.
   e. Coupling bands complying with the manufacturer's recommendations.

2. Use of this pipe material requires specific approval by the Engineer.

L. Polypropylene Pipe:

1. Comply with the following for 12 inch to 30 inch pipe:
   a. Double walled pipe meeting ASTM F 2764.
   b. Minimum pipe stiffness per ASTM D 2412, 46 psi.
   c. Integral bell and spigot joint complying with ASTM D 3212 and ASTM F 477.

2. Comply with the following for 30 inch to 60 inch pipe:
   a. Triple walled pipe meeting ASTM F 2764.
   b. Minimum pipe stiffness per ASTM D 2412, 46 psi.
   c. Integral bell and spigot joint complying with ASTM D 3212 and ASTM F 477.

3. Use of this pipe material requires specific approval by the Engineer.

M. Bituminous Joint Primer: Material intended for use in priming concrete joints. Comply with the requirements of ASTM D 41.

N. Engineering Fabric: Comply with Iowa DOT Article 4196.01.

O. Non-Shrink Grout: Comply with Iowa DOT Materials I.M. 491.13.

2.02 LINEAR TRENCH DRAIN

Comply with approved manufacturer's requirements and Iowa DOT Materials I.M. 449 (MAPLE), as well as complying with Figure 6010.521. Provide certification indicating continuous trench drain meets AASHTO M 306 for 40,000 pound proof load.

2.03 CASING PIPE

Comply with Section 3020, 2.02 for casing pipe requirements.

2.04 PIPE APRONS

Comply with the requirements of Section 4020, 2.01 and Section 4030, 2.01 for the pipe material of which the apron is constructed. Supply concrete pipe aprons according to Figure 4030.222 and Figure 4030.223. Supply CMP pipe aprons according to Figure 4030.225.

2.05 APRON FOOTINGS

Comply with the requirements of Section 6010 for reinforcing steel and structural concrete used in apron footings.

2.06 APRON GUARD

Use smooth or deformed steel bars, ASTM A 615, Grade 40 or Grade 60, or merchant quality, in the construction of the apron guard. Hot dip galvanize the apron guard according to ASTM A 123.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify measurements at site; make necessary field measurements to accurately determine pipe makeup lengths or closures.

B. Examine site conditions to ensure construction operations do not pose hazards to adjacent structures or facilities.

3.02 PIPE INSTALLATION

A. General:

1. Clean pipe interior and joints prior to lowering into trench. Keep pipe clean during construction.

2. Begin at the lowest point in the line. Lay groove or bell end pointing upstream unless otherwise specified.

3. Place pipe with lifting holes at the top of the pipe and fill lift hole with non-shrink grout or manufactured plugs.

4. Assemble joints as specified by the pipe manufacturer.

5. Use a saw to cut ends of pipe flush with inside wall of manholes, intakes, and structures. Do not use hammer or other means to break pipe.

6. Provide manholes and intakes as specified in the contract documents.

7. Use watertight stopper, plug, or other approved means to protect the exposed upstream ends of the pipe and prevent soil sediment from entering the storm sewer system.

B. Trenched:

1. Excavate trench and provide pipe bedding and backfill material as specified in Section 3010.

2. Prepare trench bottom to design line and grade so that only minor movement of the pipe is necessary after installation.

3. Lay pipe to design line and grade. Set field grades to invert of pipe.

4. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.

5. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.

6. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

C. Trenchless: Comply with Section 3020.

3.03 STORM SEWER INSTALLED WITHIN A CASING PIPE

Comply with Section 3020, 3.04 for installation of storm sewer within casing pipe.

3.04 LINEAR TRENCH DRAIN

A. Install according to the manufacturer's requirements and the contract documents.

B. Use duct tape or wood block to prevent intrusion of concrete during installation and paving.

C. Connect to existing intake or manhole according to Section 6010, 3.05 or discharge to an open drainageway/ditch.

3.05 PIPE JOINTING

A. General:

1. Clean joint surfaces to remove soil or foreign material prior to jointing pipe.

2. Assemble joints according to pipe manufacturer's recommendations. Use equipment that does not apply damaging forces to pipe joints.

B. Reinforced Concrete Pipe (RCP), Reinforced Concrete Arch Pipe (RCAP), and Reinforced Concrete Elliptical Pipe (RCEP):

1. Comply with Figure 4020.211 for pipe joint wrapping. Secure engineering fabric in place to prevent displacement while placing backfill material.

2. If a rubber O-ring or profile gasket is specified for RCP, coat the rubber gasket and joint with soap-based lubricant immediately prior to closing the joint.

3. Place pipe such that joint openings on the outside or inside of the pipe do not exceed 1/2 inch.

C. Reinforced Concrete Low Head Pressure Pipe (RCPP); Polyvinyl Chloride Pipe (PVC) and Corrugated PVC Pipe; Polypropylene Pipe; and High Density Polyethylene Pipe (HDPE): Coat gasket and joint with soap-based lubricant immediately prior to closing the joint.

D. Corrugated Metal Pipe (CMP) and Corrugated Metal Arch Pipe (CMAP): Lap coupling bands to form a tightly closed joint upon installation.

E. Connections between Dissimilar Pipes:

1. Use manufactured adapters or couplings approved by the Engineer.

2. Where adapters or couplings are not available, the Engineer may authorize use of a concrete collar as shown in Figure 4020.211.

3.06 APRONS

A. Install pipe aprons where specified in the contract documents. Use the same installation methods as used on the pipe to which the apron is being attached. Dewater area as necessary to prevent installing the apron in water or on saturated soil or bedding. Do not allow water to rise around the apron prior to backfilling the area.

B. Install apron footings where specified in the contract documents. Construct according to Section 6010 and the contract documents. Dewater area as necessary to prevent installing the apron footing in water or on saturated soil or bedding. Do not allow water to rise around the apron footing prior to backfilling the area.

3.06 APRONS (Continued)

C. Anchor the last three concrete pipe sections and the apron together with two pipe connections per joint. Comply with Iowa DOT Standard Road Plan DR-121.

D. Attach corrugated metal aprons to the pipe with a manufacturer's approved bolt, weld, or clamp to fasten directly to the pipe.

E. Install apron guard where specified in the contract documents. Construct according to Figure 4030.224 or 4030.225. Repair any damage to the galvanized coating that occurs due to storage, handling, or installation.

3.07 TOLERANCES

The following tolerances apply to utilities installed by open trench construction. For trenchless construction, comply with Section 3020.

A. Do not allow horizontal and vertical alignment to vary from design line and grade at any structure by more than 1% of the inside diameter of the pipe or 1/4 inch, whichever is larger.

B. Do not allow the horizontal alignment of the pipe to vary from design line at any point along the pipe by more than 1% of the inside diameter of the pipe.

C. Low spots holding water exceeding the following depths for each pipe size will be considered unacceptable and must be removed and reinstalled to proper grade.

Pipe Diameter	Maximum Low Spot Depth
8"	1/2"
10"	1/2"
12"	3/4"
15"	3/4"
18" and Larger	5% of Pipe Diameter*

* Measured to the nearest 1/2"

3.08 CONFLICTS

A. Horizontal Separation of Gravity Storm Sewers from Water Mains: Separate storm sewers and water mains by at least 10 feet measured edge to edge unless it is impossible to do so. When not possible to maintain a 10 feet horizontal separation, maintain a minimum separation of 3 feet and utilize one of the following within 10 feet measured edge to edge:

1. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.

2. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.

3. Construct storm sewer pipe of water main materials.

4. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

B. Separation of Storm Sewer Force Mains from Water Mains: Separate storm sewer force mains and water mains by a horizontal distance of at least 10 feet unless:

1. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 5010, 2.01 and

2. The sewer force main is laid at least 4 linear feet from the water main.

3.08 CONFLICTS (Continued)

C. Vertical Separation of Storm Sewers and Water Main Crossovers:

1. Vertically separate storm sewers from water mains by at least 18 inches measured between the outside edges of the water main and the storm sewer. Maintain the maximum feasible separation distance in all cases. Ensure the sewer and water pipes are adequately supported. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

2. When impossible to maintain an 18 inch vertical separation when the water main crosses over the storm sewer, maintain a minimum vertical separation of 6 inches and utilize one of the following within 10 feet measured edge-to-edge centered on the crossing:
   a. Construct the water main of ductile iron pipe with gaskets impermeable to hydrocarbons.
   b. Enclose the water main in a watertight casing pipe with evenly spaced annular gap and watertight end seals.
   c. Construct storm sewer pipe of water main materials.
   d. Construct storm sewers of reinforced concrete pipe with gaskets manufactured according to ASTM C 443.

3.09 STORM SEWER ABANDONMENT

A. Plug:

1. Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.

2. Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches, or one-half the pipe diameter, whichever is greater.

B. Fill:

1. Prior to filling the sewer, the Engineer will verify the sewer line is not in use.

2. If specified in the contract documents, fill the line to be abandoned with flowable mortar, foamed cellular concrete, or CLSM (comply with Section 3010) by gravity flow or pumping.

3. Batching, mixing, and placing may be started when temperature is 34°F and rising. Cease mixing and placing when temperature is 38°F or less and falling.

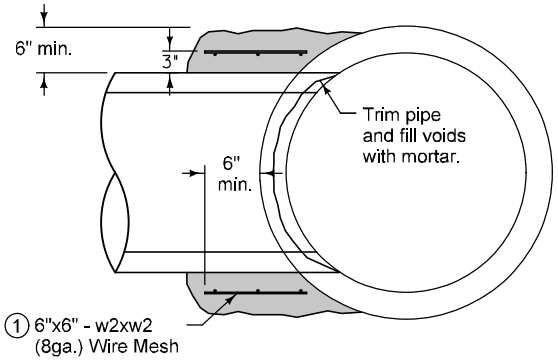
3.10 CONNECTION TO EXISTING MANHOLE OR INTAKE

Comply with Section 6010, 3.05.

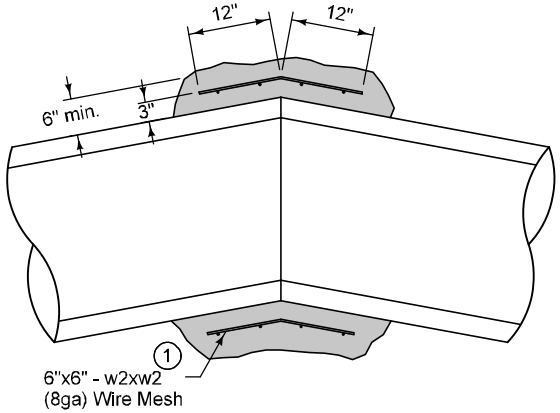
3.11 CLEANING, INSPECTION, AND TESTING

Clean, inspect, and test according to Section 4060.

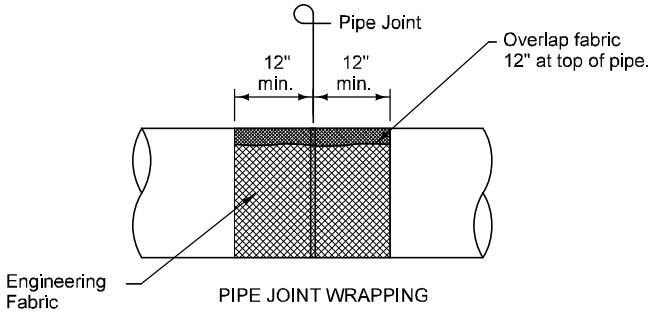
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TYPE PC-1 CONCONCRETE COLLAR CONNECTION

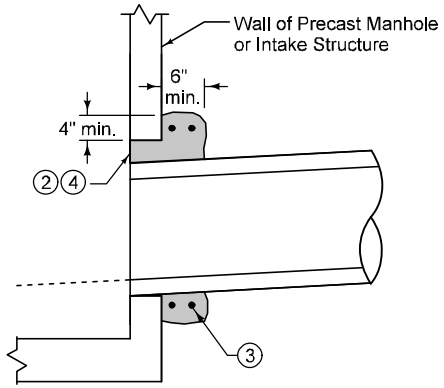


TYPE PC-2 CONCRETE COLLAR CONNECTION

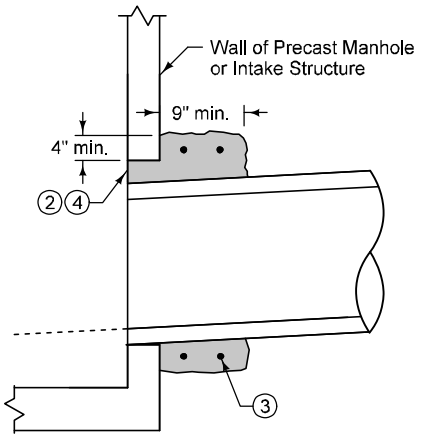


PIPE JOINT WRAPPING

PIPE TO PIPE CONNECTION



CONCRETE COLLAR FOR PIPES 12" AND SMALLER



CONCRETE COLLAR FOR PIPES GREATER THAN 12"

PIPE TO STRUCTURE CONNECTION

1. Lap ends of wire mesh a minimum of 6 inches.
2. Concrete collar is required when annular space between the outside of the pipe and the wall of the structure is 2 inches or greater.
3. Provide two #4 hoop bars in concrete collar. Lap bars a minimum of 6 inches.
4. Trowel concrete flush with inside wall of structure.

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FIGURE 4020.211 | STANDARD ROAD PLAN | SW-211 | SHEET 1 of 1

REVISIONS: Removed 'Invert' callout on Pipe to Structure View. Retitled and replaced old Iowa DOT and SUDAS logos with new logos.

Paul D. Wigand, SUDAS DIRECTOR — Brian Smith, DESIGN METHODS ENGINEER

STORM SEWER PIPE CONNECTIONS

FIGURE 4020.211 | SHEET 1 OF 1

PIPE CULVERTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pipe Culverts

B. Pipe Aprons and Beveled Ends

C. Footings for Concrete Pipe Aprons

D. Pipe Apron Guards

1.02 DESCRIPTION OF WORK

Construct pipe culverts, beveled ends, pipe aprons, and associated appurtenances.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Pipe Culverts:

1. Trenched:

a. Measurement: Each type and size of pipe installed in a trench will be measured in linear feet from end of pipe to end of pipe along the centerline of pipe, exclusive of aprons. Lengths of elbows and tees will be included in length of pipe measured.

b. Payment: Payment will be made at the unit price of each type and size of pipe.

c. Includes: Unit price includes, but is not limited to, trench excavation; dewatering; furnishing and installing pipe; furnishing, placing, and compacting bedding and backfill material; connectors; testing; and inspection.

2. Trenchless:

a. Measurement: Each type and size of pipe installed by trenchless methods will be measured in linear feet along the centerline of the casing pipe.

b. Payment: Payment will be made at the unit price for each type and size of pipe.

c. Includes: Unit price includes, but is not limited to, furnishing and installing pipe; trenchless installation materials and equipment; pit excavation, dewatering, and placing and compacting backfill material; pipe connections; testing; and inspection.

1.08 MEASUREMENT AND PAYMENT (Continued)

B. Pipe Aprons:

1. **Measurement:** Each type and size of pipe apron will be counted.

2. **Payment:** Payment will be made at the unit price for each type and size of pipe apron.

3. **Includes:** Unit price includes, but is not limited to, trench excavation; dewatering; furnishing and installing the apron; furnishing, placing, and compacting bedding and backfill material; connectors; and other appurtenances.

C. Footings for Concrete Pipe Aprons:

1. **Measurement:** Each type and size of footing installed on a concrete pipe apron will be counted.

2. **Payment:** Payment will be made at the unit price for each type and size of footing.

3. **Includes:** Unit price includes, but is not limited to, excavation; dewatering; reinforcing steel; concrete; furnishing, placing and compacting bedding and backfill material.

D. Pipe Apron Guards:

1. **Measurement:** Each type and size of pipe apron guard will be counted.

2. **Payment:** Payment will be made at the unit price for each type and size of pipe apron guard.

3. **Includes:** Unit price includes, but is not limited to, furnishing and installing the apron guard and repairing any damage to the apron from the installation process.

PART 2 - PRODUCTS

2.01 PIPE CULVERTS

A. Roadway Pipe Culverts: All storm sewer pipe materials specified for use in right-of-way in Section 4020 may be used within right-of-way as a roadway pipe culvert.

B. Entrance Pipe Culverts: The following pipe culvert types described in Section 4020 may be used within right-of-way as entrance pipe culverts:

1. Reinforced Concrete Pipe (RCP).
2. Reinforced Concrete Arch Pipe (RCAP).
3. Reinforced Concrete Elliptical Pipe (RCEP).
4. Reinforced Concrete Low Head Pressure Pipe (RCPP).
5. Corrugated Metal Pipe (CMP).
6. Spiral Rib Pipe.
7. Coated Corrugated Metal Pipe.
8. Corrugated Metal Arch Pipe.

C. Structural Plate Culverts: Structural plate culverts may be used in the right-of-way as roadway or entrance pipe culverts.

1. Use a galvanized steel structural plate complying with AASHTO M 167.
2. Use bolts and nuts complying with ASTM A 449 and galvanized per ASTM A 153, Class C.
3. Assemble the structure according to the manufacturer's recommendations. Tighten the bolts using an applied torque of between 100 and 300 foot-pounds.
4. Install the structure according to the contract documents, the manufacturer′s recommendations, and AASHTO Standard Specifications for Highway Bridges, Division II, Section 26.
5. Conform the gage of the structure to Iowa DOT Standard Road Plan DR-104 or as specified in the contract documents.

D. Aluminum Structural Plate Culverts: Aluminum structural plate culverts may be used in the right-of-way as roadway or entrance pipe culverts.

1. Comply with AASHTO M 219.
2. Use a corrugation profile of 9 inches by 2 1/2 inches.
3. Use aluminum complying with ASTM B 209.
4. Use a minimum thickness of 0.100 inch. Gage of structure complying with manufacturer's requirements.
5. Use bolts and nuts meeting ASTM A 307 or ASTM A 449 and galvanize per ASTM A 153.

2.01 PIPE CULVERTS (Continued)

6. Assemble the structure according to the manufacturer's recommendations. Tighten the bolts using an applied torque of between 100 and 300 foot-pounds.

7. Install the structure according to the contract documents, the manufacturer's recommendations, and AASHTO Standard Specifications for Highway Bridges, Division II, Section 26.

8. Meet or exceed the AASHTO Standard Specifications for Highway Bridges, Division I, Section 12.8 for HS 20 loading.

2.02 PIPE APRONS

Comply with the requirements of Section 4020, 2.01 and Section 4030, 2.01 for the pipe material of which the apron is constructed. Supply concrete pipe aprons according to Figure 4030.222 and Figure 4030.223. Supply CMP pipe aprons according to Figure 4030.225.

2.03 APRON FOOTINGS

Comply with the requirements of Figure 4030.221 and Section 6010 for reinforcing steel and structural concrete used in apron footings.

2.04 APRON GUARD

Use smooth or deformed steel bars, ASTM A 615, Grade 40 or merchant quality, in the construction of the apron guard. Hot dip galvanize the apron guard according to ASTM A 123.

PART 3 - EXECUTION

3.01 PIPE CULVERT INSTALLATION

A. Trenched:

1. Install pipe in a trench per Section 4020.

2. For culvert pipe installed in embankment, pipe may be installed at the Contractor's option per the contract documents and the following Iowa DOT Specifications sections:
   a. Reinforced Concrete Pipe (circular, arched, and elliptical): Section 2416.
   b. Corrugated Metal and Corrugated Plastic Pipe: Section 2417.
   c. Structural Plate Culverts: Section 2420.

B. Trenchless: For trenchless installations, comply with Section 3020.

3.02 APRONS

A. Install pipe aprons where specified in the contract documents. Use the same installation methods as used on the pipe to which the apron is being attached. Dewater area as necessary to prevent installing the apron in water or on saturated soil or bedding. Do not allow water to rise around the apron prior to backfilling the area.

B. Install apron footings where specified. Construct per Section 6010 and the contract documents. Dewater area as necessary to prevent installing the apron footing in water or on saturated soil or bedding. Do not allow water to rise around the apron footing prior to backfilling the area.

C. Anchor the last three concrete pipe sections and the apron together with two pipe connections per joint. Comply with Iowa DOT Standard Road Plan DR-121.

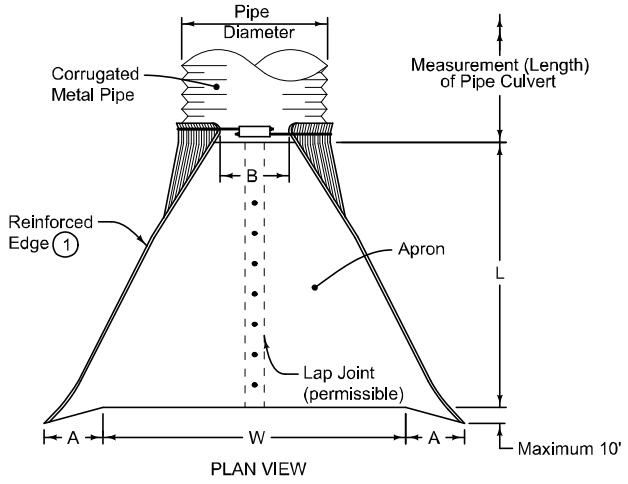
D. Attach corrugated metal aprons to the culvert pipe with a manufacturer's approved bolt, weld, or clamp to fasten directly to the culvert.

E. Install apron guard where specified. Construct according to Figure 4030.224 or 4030.225. Repair any damage to the galvanized coating that occurs due to storage, handling, or installation.

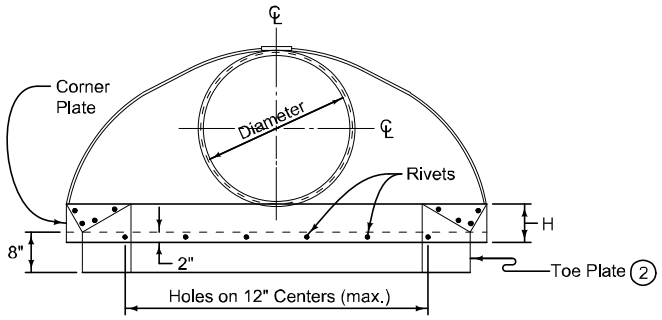
3.03 CLEANING, INSPECTION, AND TESTING

Clean, inspect, and test culverts per Section 4060.

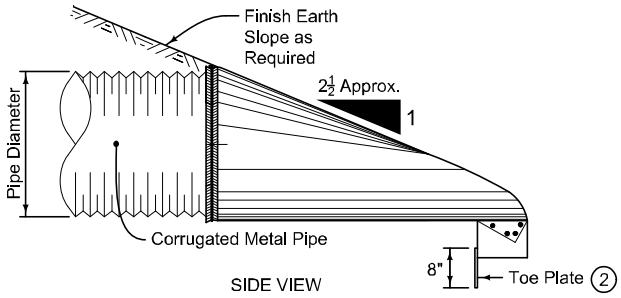
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PLAN VIEW

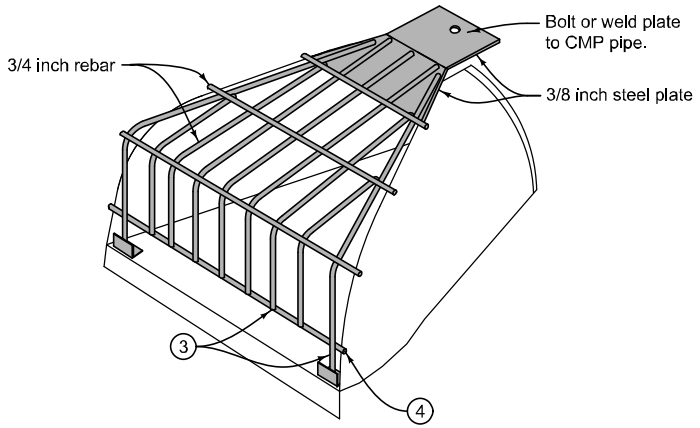


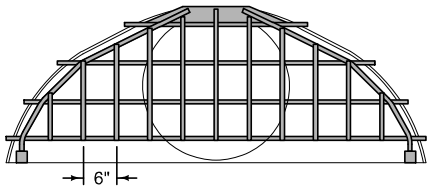
END VIEW



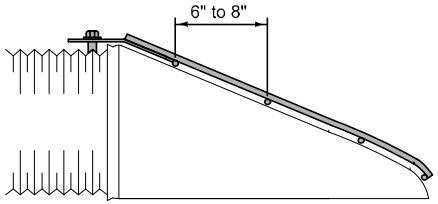
SIDE VIEW

METAL PIPE APRON





END VIEW



SIDE VIEW

METAL APRONS GUARD

1. On sizes 60 inches and larger, supplement the reinforced edge with a galvanized stiffener angle attached with bolts.
2. Install a galvanized toe plate (of the same gage metal as apron) on all aprons 24 inch diameter and larger.
3. Hold inside bars up 3 inches off bottom of apron. Extend outside bars to bottom of apron and attach to 2 inch by 2 inch by 1/4 inch steel angle.
4. When specified, extend bottom cross bar through apron.

DIMENSIONS					
PIPE DIAM.	A (±1")	B MAX.	H (±1")	L (±1½")	W (±2")
6"	4½"	1"	3"	8¾"	12"
8"	5⅞"	3"	4"	14¼"	16"
10"	7½"	6"	6"	21"	24"
12"	4¾"	6"	6"	21"	24"
15"	6"	8"	6"	26"	30"
18"	7"	9"	6"	31"	36"
21"	8¼"	11"	6"	36"	42"
24"	9½"	12"	6"	42"	48"
30"	12"	15"	7½"	52½"	60"
36"	14"	18"	9"	63"	72"
42"	16"	21"	10½"	73½"	84"
48"	18"	27"	12"	84"	90"
54"	18"	30"	12"	84"	102"
60"	18"	33"	12"	87"	114"
66"	18"	36"	12"	87"	120"
72"	18"	39"	12"	87"	126"
78"	18"	42"	12"	87"	132"
84"	18"	45"	12"	87"	138"
90"	24"	37"	11"	87"	144"
96"	25"	35"	12"	87"	150"

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New 10-18-16

4030.225

SHEET 1 of 1

SUDAS Standard Specifications

METAL PIPE APRONS
AND APRON GUARDS

FIGURE 4030.225

SHEET 1 OF 1

SUBDRAINS AND FOOTING DRAIN COLLECTORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Subdrains

B. Subdrain Cleanouts and Outlets

C. Footing Drain Collectors

D. Storm Sewer Service and Connections

1.02 DESCRIPTION OF WORK

A. Construct subdrains, subdrain cleanouts and outlets, and footing drain collectors.

B. Construct storm sewer service and connections.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Subdrains:

1. **Measurement:** Each type and size of pipe installed will be measured in linear feet from end of pipe to end of pipe along the centerline of pipe, exclusive of outlets. Lengths of elbows and tees will be included in length of pipe measured.

2. **Payment:** Payment will be made at the unit price of each type and size of pipe.

3. **Includes:** Unit price includes, but is not limited to, trench excavation, furnishing and placing bedding and backfill material, engineering fabric (when specified), connectors, and elbows and tees.

1.08 MEASUREMENT AND PAYMENT (Continued)

B. Footing Drain Collectors:

1. **Measurement:** Each type and size of pipe will be measured in linear feet along centerline of pipe from end of pipe to end of pipe.

2. **Payment:** Payment will be made at the unit price for each type and size of pipe.

3. **Includes:** Unit price includes, but is not limited to, trench excavation, pipe, wyes, tap, fittings, and furnishing and placing bedding and backfill material.

C. Subdrain or Footing Drain Cleanouts:

1. **Subdrain Cleanouts:**
   a. **Measurement:** Each type and size of subdrain cleanout will be counted.
   b. **Payment:** Payment for each cleanout will be made at the unit price for each type and size of subdrain cleanout.
   c. **Includes:** Unit price includes, but is not limited to, trench excavation; furnishing cleanout and lid; and furnishing, placing, and compacting bedding and backfill material.

2. **Footing Drain Cleanouts:**
   a. **Measurement:** Each type and size of footing drain cleanout will be counted.
   b. **Payment:** Payment for each cleanout will be made at the unit price for each type and size of footing drain cleanout.
   c. **Includes:** Unit price includes, but is not limited to, trench excavation; furnishing cleanout and lid; and furnishing, placing, and compacting bedding and backfill material.

D. Subdrain or Footing Drain Outlets and Connections:

1. **Subdrain Outlets and Connections:**
   a. **Measurement:** Each type and size of outlet or connection to a structure will be counted.
   b. **Payment:** Payment for each outlet or connection to a structure will be made at the unit price for each type and size installed.
   c. **Includes:** Unit price includes, but is not limited to, pipe, non-shrink grout, coupling bands, and rodent guards for pipes 6 inches or smaller.

2. **Footing Drain Outlets and Connections:**
   a. **Measurement:** Each type and size of outlet or connection to a structure will be counted.
   b. **Payment:** Payment for each outlet or connection to a structure will be made at the unit price for each type and size installed.
   c. **Includes:** Unit price includes, but is not limited to, pipe, non-shrink grout, coupling bands, and rodent guards for pipes 6 inches or smaller.

E. Storm Sewer Service Stub: The storm sewer service stub is the portion of the storm sewer service from the footing drain collector or storm sewer to a point 10 feet outside of the right-of-way or as specified in the contract documents.

1. **Measurement:** Each type and size of pipe will be measured in linear feet along centerline of pipe from the centerline of storm sewer or footing drain collector to 10 feet outside of the right-of-way.

2. **Payment:** Payment will be made at the unit price per linear foot for each type and size of storm sewer service stub.

3. **Includes:** Unit price includes, but is not limited to, trench excavation, furnishing bedding material, placing bedding and backfill material, tap, fittings, and plugs.

PART 2 - PRODUCTS

2.01 FOOTING DRAIN COLLECTORS

A. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):

1. Comply with ASTM D 3034, minimum thickness SDR 35, 46 psi minimum pipe stiffness.
2. Use PVC plastic conforming to ASTM D 1784, Cell Classification 12454.
3. Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.

B. Corrugated Polyvinyl Chloride Pipe and Fittings (Corrugated PVC):

1. Use corrugated exterior, smooth interior, PVC.
2. Comply with ASTM F 949, minimum pipe stiffness, 46 psi.
3. Use PVC plastic complying with ASTM D 1784, Cell Classification 12454.
4. Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.

C. High Density Polyethylene Pipe and Fittings (HDPE):

1. AASHTO M 252 or M 294, Type S corrugated exterior and smooth interior.
2. Integral bell and spigot joints with O-ring rubber gasket meeting ASTM F 477.

D. Reinforced Concrete Pipe (RCP): Comply with Section 4020, 2.01.

2.02 TYPE 1 SUBDRAINS (LONGITUDINAL SUBDRAIN)

A. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):

1. Comply with Section 4040, 2.01, A.
2. Slot subdrain pipe according to ASTM F 949 or perforate with four rows of 1/4 inch to 3/8 inch diameter holes along the bottom of the pipe.

B. Corrugated Polyvinyl Chloride Pipe and Fittings (Corrugated PVC):

1. Comply with Section 4040, 2.01, B.
2. Slot subdrain pipe according to ASTM F 949.

C. High Density Polyethylene Pipe and Fittings (HDPE):

1. Comply with Section 4040, 2.01, C.
2. Slot or perforate according to AASHTO M 252, Type SP.

2.02 TYPE 1 SUBDRAINS (LONGITUDINAL SUBDRAIN) (Continued)

D. Corrugated Polyethylene Tubing and Fittings (Corrugated PE):

1. Comply with AASHTO M 252, Type C, corrugated interior and exterior.
2. Use only fittings supplied or recommended by pipe manufacturer for soil tight service.
3. Slot or perforate according to AASHTO M 252, Type CP.

2.03 TYPE 2 SUBDRAINS (COMBINATION SUBDRAIN/FOOTING DRAIN COLLECTOR)

A. Use materials complying with Section 4040, 2.01.

B. Perforate all pipe per the following requirements:

1. Solid Wall PVC Pipe: Comply with ASTM F 949 or perforate with four rows of 1/4 inch to 3/8 inch diameter holes along the bottom of the pipe.
2. Corrugated PVC Pipe: Comply with ASTM F 949.
3. HDPE Pipe: Comply with AASHTO M 252 or M 294, Type CP or Type SP.

2.04 POROUS BACKFILL MATERIAL

A. Crushed Stone or Processed Gravel: Comply with Iowa DOT Article 4109.02, Gradation No. 29 in the Aggregate Gradation Table and the quality requirements of Iowa DOT Section 4131.

B. Pea Gravel: Comply with Iowa DOT Article 4109.02, Gradation No. 20 or No. 21 in the Aggregate Gradation Table and the quality requirements of Iowa DOT Section 4131.

2.05 SUBDRAIN OUTLETS

A. Corrugated Metal Pipe (CMP):

1. Comply with AASHTO M 36, Type 1.
2. Zinc coating complying with AASHTO M 218.
3. Use a corrugated steel circular section with annular or helical corrugation.
4. Minimum thickness of 0.052 inch.

B. Corrugated HDPE:

1. Comply with Section 4040, 2.01.
2. Pipe to be double-walled.

C. PVC: Comply with Section 4040, 2.01.

D. Coupling Bands: Match annular or helical corrugations on coupling bands to pipe ends.

E. Rodent Guard: Mild steel meeting ASTM A 36 with hot-dip galvanized coating applied following welding and fabrication. Comply with Iowa DOT Materials I.M. 443.01 and Figure 4040.233. Required for 4 inch or 6 inch subdrains.

2.06 SUBDRAIN OR FOOTING DRAIN CLEANOUTS

A. Type A-1 or A-2 Cleanouts:

1. Use solid wall PVC riser pipe and fittings of the same diameter (maximum 8 inch) as the adjacent subdrain or footing drain pipe. Comply with Figure 4040.232.

2. Use a light duty (HS-20 loading) cast iron casting for Type A-1 cleanouts. When a PVC cap is used on top of the cleanout, drive a 1 foot length of reinforcing steel into the ground immediately adjacent to the cleanout to allow future location.

B. Type B Cleanouts: Comply with Figure 4040.232. Use 24 inch diameter riser for subdrain 8 inches or smaller. Use 30 inch diameter riser for 10 inch and 12 inch subdrains.

1. Reinforced Concrete: Use Class III RCP complying with Section 4020, 2.01.

2. Polyvinyl Chloride:
a. Comply with ASTM D 1784, Cell Classification 12454 for PVC plastic.
b. Conform to ASTM D 3212 for joints.
c. Comply with ASTM F 477 for flexible elastomeric.

3. Concrete: Comply with Section 6010 for structural concrete for base and invert shaping.

4. Castings: Use a light duty (HS-20 loading) cast iron casting complying with Section 6010, 2.10 or a ductile iron casting meeting ASTM A 536.

2.07 ENGINEERING FABRIC

Use fabric complying with Iowa DOT Article 4196.01.

2.08 STORM SEWER SERVICE STUBS

Use materials complying with Section 4040, 2.01.

PART 3 - EXECUTION

3.01 SUBDRAINS

A. Install Type 1 or Type 2 subdrain where specified in the contract documents. Comply with Figure 4040.231.

1. Excavate trench and provide pipe bedding and backfill as shown on the figures. Install engineering fabric if specified in the contract documents.

2. Begin subdrain installation at the outlet and continue upgrade.

3. Lay subdrain pipe to the proper line and grade. Place pipe with the perforations down.

4. If concrete pipe is specified for Type 2 subdrains, wrap exterior of each joint with engineering fabric and do not use joint sealant.

5. Place porous backfill material over installed pipe in layers no more than 6 inches thick. Thoroughly tamp each layer with mechanical tampers.

6. Restore pavement subbase material, shoulder material, or ground above subdrain trench as applicable.

B. Provide cleanouts where specified in the contract documents. Comply with Figure 4040.232.

C. Provide outlets where specified in the contract documents.

1. Comply with Figure 4040.233 for outlets to structures.

2. Install a rodent guard on all subdrain outlet pipes 6 inches and smaller.

3.02 FOOTING DRAIN COLLECTORS

A. Install footing drain collectors according to Section 3010.

B. If specified, install engineering fabric.

C. Provide cleanouts and connections where specified in the contract documents.

1. Connect footing drain sewer collectors to storm sewer manhole or intake.

2. Provide fabricated or preformed wye or tee service fitting for each platted lot or building.

D. Provide manholes, where specified, according to Section 6010.

3.03 FOOTING DRAIN SERVICE STUBS

A. Provide footing drain service stubs at locations specified in the contract documents.

B. Install wye or tee for each service connection.

1. For new storm sewer and footing drain collector construction, except RCP sewers, install wye or tee fittings according to the manufacturer's requirements.

2. For existing storm sewers, existing footing drain collectors, and all RCP sewers, saw or drill a neat hole in main and install preformed saddle wyes or tees according to the manufacturer's requirements.

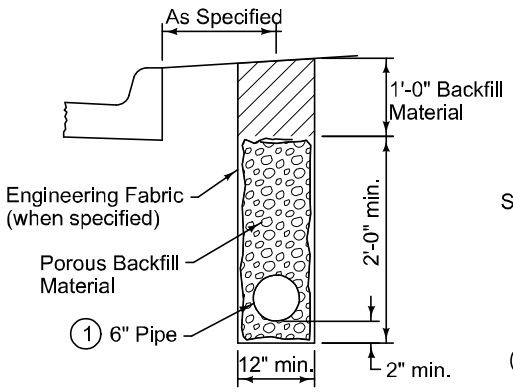
3.03 FOOTING DRAIN SERVICE STUBS (Continued)

C. Install footing drain service stub to a location 10 feet beyond the right-of-way line or as specified in the contract documents.

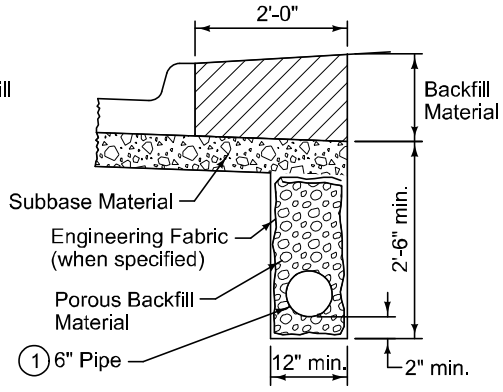
1. For undeveloped properties, place a watertight stopper or plug in the end of the storm sewer service.

2. For reconnection of existing service pipe to new sewer service pipe, use a manufactured flexible connection.

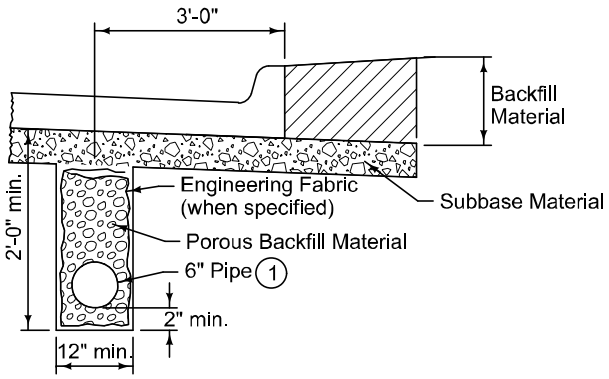
END OF SECTION



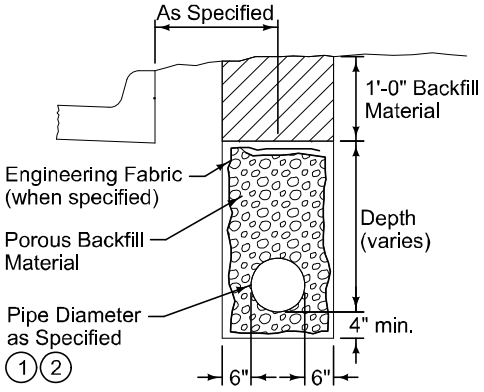
CASE A
TYPE 1



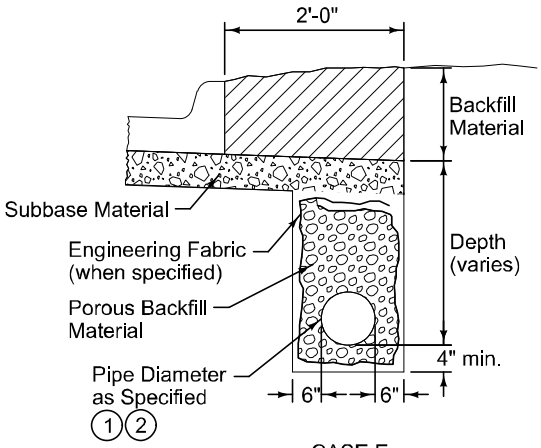
CASE B
TYPE 1



CASE C
TYPE 1



CASE D
TYPE 2



CASE E
TYPE 2

Type 1 installation is for longitudinal subdrain only. Type 2 installation is for combination subdrain/footing drain collectors.

1. Place perforations down for all installations.
2. When concrete pipe is specified, wrap pipe joints with engineering fabric. Do not apply joint sealant. Comply with Figure 4020.211

SUDAS

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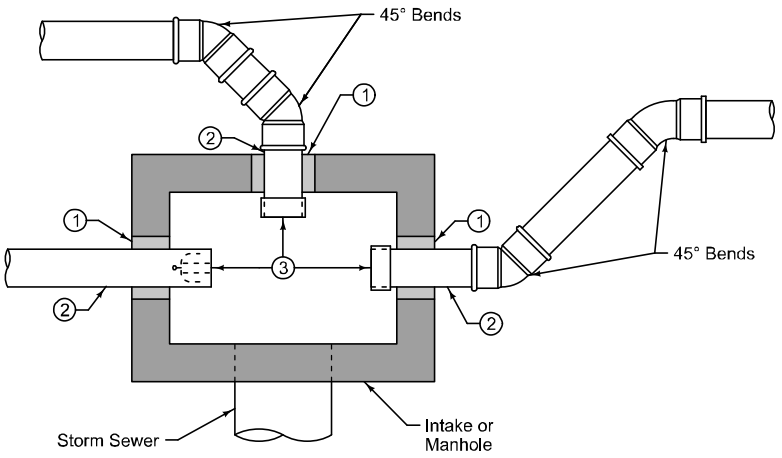
4040.231

SHEET 1 of 1

SUDAS Standard Specifications

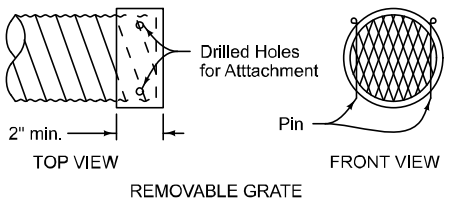
SUBDRAINS

FIGURE 4040.231 | SHEET 1 OF 1

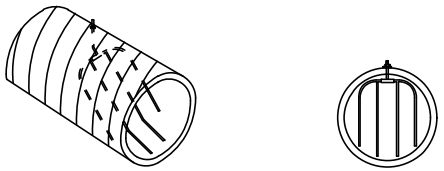


PLAN VIEW

OUTLET INTO STRUCTURE

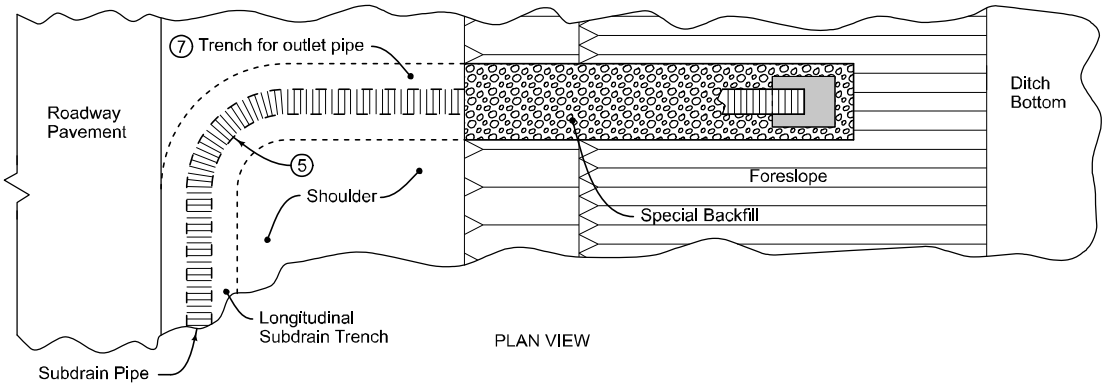


REMOVABLE GRATE

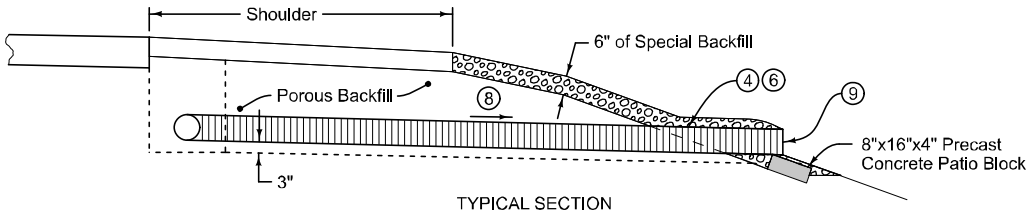


REMOVABLE FORK (9)

RODENT GUARD DETAILS



PLAN VIEW



TYPICAL SECTION

SUBDRAIN OUTLET TO DITCH

Transverse and backslope subdrains require only single outlets. Install double outlet pipes on all longitudinal subdrain systems, except at the beginning and end of the system. At these locations, install a single outlet pipe.

1. Fill annular space with non-shrink grout.
2. Outlets through intake walls to be CMP; corrugated, double-walled HDPE; or PVC.
3. Extend outlet pipe into structure as required to install removable rodent guard.
4. Construct subdrain outlet to ditch with the same type and size of pipe as used for the subdrain.
5. Provide a minimum 1 foot radius for all bends or use two 45° fittings
6. If a CMP outlet is specified in the contract documents, construct the final 10 to 12 feet of the subdrain outlet to ditch with CMP 2 inches larger than the subdrain pipe. Connect pipes with a manufactured coupler or concrete collar.
7. Provide a minimum trench width of 12 inches for a single outlet and 24 inches for a double outlet.
8. Provide a 6 inch minimum drop in elevation between longitudinal subdrain and outlet.
9. For subdrain outlet to ditch, only use fork type rodent guard.

FIGURE 4040.233

SHEET 1 OF 1

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SHEET 1 of 1

SUDAS Standard Specifications

SUBDRAIN OUTLETS

STRUCTURES FOR SANITARY AND STORM SEWERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Manholes and Intakes for Storm Sewers

B. Manholes for Sanitary Sewers

C. Adjustment of Existing Manholes and Intakes

D. Connection to Existing Manholes and Intakes

E. Removal of Manholes and Intakes

F. Special Structures for Storm Sewers

G. Excavation and Backfill of Structures

1.02 DESCRIPTION OF WORK

A. Construct sanitary and storm sewer manholes to provide access to sewer systems for maintenance and cleaning purposes.

B. Construct storm sewer intakes for collection of surface water and conveyance to the storm sewer system.

C. Modify existing manholes and intakes as necessitated by other improvements adjacent to the manholes or intakes.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Shop drawings of steel reinforcement, showing sizes, lengths, bends, and counts, if required.

B. Concrete mix design, if required by Engineer.

C. Shop drawing schedule of new manholes and/or intakes showing total depth, relative elevations of all connecting sanitary or storm sewer lines, all drops, and orientation of connecting lines.

D. Results of required testing.

E. Catalog cuts of iron castings and sewer line connection gaskets.

F. Gradation and soil classification reports for structure bedding and backfill materials.

G. Dewatering plan.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Store reinforcing steel only on pallets or lagging.

B. Follow the aggregate storage and concrete transport requirements in Iowa DOT Article 2301.02, C.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

A. Do not place concrete when stormy or inclement weather will prevent good quality work.

B. Cold weather placement is restricted per Iowa DOT Article 2403.03, F.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Manhole:

1. **Measurement:** Each type and size of manhole will be counted.

2. **Payment:** Payment will be at the unit price for each type and size of manhole.

3. **Includes:** Unit price includes, but is not limited to, excavation; furnishing and installing pipe; lining (if specified); furnishing, placing, and compacting bedding and backfill material; base; structural concrete; reinforcing steel; precast units (if used); concrete fillets; pipe connections; infiltration barriers (sanitary sewer manholes only); castings; and adjustment rings.

B. Intake:

1. **Measurement:** Each type and size of intake will be counted.

2. **Payment:** Payment will be at the unit price for each type and size of intake.

3. **Includes:** Unit price includes, but is not limited to, excavation; furnishing and installing pipe; furnishing, placing, and compacting bedding and backfill material; base; structural concrete; reinforcing steel; precast units (if used); concrete fillets; pipe connections; castings; adjustment rings; and the insert/boxout.

C. Drop Connection:

1. **Internal Drop Connection:**
   a. **Measurement:** Each size of internal drop connection will be counted.
   b. **Payment:** Payment will be at the unit price for each size of internal drop connection.
   c. **Includes:** Unit price includes, but is not limited to, cutting the hole and installing a flexible watertight connector, providing and installing the receiving bowl, flexible coupler between the bowl and the drop pipe, the PVC drop pipe, pipe brackets and bolts, the bottom elbow, repair of fillet if required, and a splash guard if required.

2. **External Drop Connection:**
   a. **Measurement:** Each size of external drop connection will be counted.
   b. **Payment:** Payment will be at the unit price for each size of external drop connection.
   c. **Includes:** Unit price includes, but is not limited to, the connection to the manhole and all pipe; fittings; concrete encasement; and furnishing, placing, and compacting bedding and backfill material.

1.08 MEASUREMENT AND PAYMENT (Continued)

D. Casting Extension Rings:

1. **Measurement:** Each casting extension ring will be counted.

2. **Payment:** Payment will be at the unit price for each casting extension ring.

3. **Includes:** Unit price includes, but is not limited to, furnishing and installing each casting extension ring and reinstalling the casting lid.

E. Manhole or Intake Adjustment, Minor:

1. **Manhole Adjustment, Minor:**
   a. **Measurement:** Each existing manhole adjusted to finished grade by addition or removal of adjustment rings or adjustment of adjustable casting will be counted.
   b. **Payment:** Payment will be made at the unit price for each minor manhole adjustment.
   c. **Includes:** Unit price includes, but is not limited to, removing existing casting and existing adjustment rings, furnishing and installing adjustment rings, furnishing and installing new casting, and installing new infiltration barrier (sanitary sewer manholes only).

2. **Intake Adjustment, Minor:**
   a. **Measurement:** Each existing intake adjusted to finished grade by addition or removal of adjustment rings or adjustment of adjustable casting will be counted.
   b. **Payment:** Payment will be made at the unit price for each minor intake adjustment.
   c. **Includes:** Unit price includes, but is not limited to, removing existing casting and existing adjustment rings, furnishing and installing adjustment rings, and furnishing and installing new casting.

F. Manhole or Intake Adjustment, Major:

1. **Manhole Adjustment, Major:**
   a. **Measurement:** Each existing manhole adjusted to grade by addition or removal of riser, cone or flat top sections, or the exchange of existing riser sections with sections having different vertical dimensions will be counted.
   b. **Payment:** Payment will be at the unit price for each major adjustment.
   c. **Includes:** Unit price includes, but is not limited to, removal of existing casting, adjustment rings, top sections, and risers; excavation; concrete and reinforcing steel or precast sections; furnishing and installing new casting; installing new infiltration barrier (sanitary sewer manholes only); placing backfill material; and compaction.

2. **Intake Adjustment, Major:**
   a. **Measurement:** Each existing intake adjusted to grade by addition or removal of riser, cone or flat top sections, or the exchange of existing riser sections with sections having different vertical dimensions will be counted.
   b. **Payment:** Payment will be at the unit price for each major adjustment.
   c. **Includes:** Unit price includes, but is not limited to, removal of existing casting, adjustment rings, top sections, and risers; excavation; concrete and reinforcing steel or precast sections; furnishing and installing new casting; placing backfill material; and compaction.

1.08 MEASUREMENT AND PAYMENT (Continued)

G. Connection to Existing Manhole or Intake:

1. Connection to Existing Manhole:
- **a. Measurement:** Each connection made to an existing manhole will be counted.
- **b. Payment:** Payment will be made at the unit price for each sewer connection.
- **c. Includes:** Unit price includes, but is not limited to, coring or cutting into the existing manhole, removal of existing fillet, pipe connections, replacement of fillet, grout, and waterstop (when required).

2. Connection to Existing Intake:
- **a. Measurement:** Each connection made to an existing intake will be counted.
- **b. Payment:** Payment will be made at the unit price for each sewer connection.
- **c. Includes:** Unit price includes, but is not limited to, coring or cutting into the existing intake, removal of existing fillet, pipe connections, replacement of fillet, grout, and waterstop (when required).

H. Remove Manhole or Intake:

1. Remove Manhole:
- **a. Measurement:** Each manhole removed will be counted.
- **b. Payment:** Payment will be made at the unit price for each manhole.
- **c. Includes:** Unit price includes, but is not limited to, removal of casting, concrete, and reinforcement; plugging pipes; filling remaining structure with flowable mortar; and placing compacted fill over structure to finished grade.

2. Remove Intake:
- **a. Measurement:** Each intake removed will be counted.
- **b. Payment:** Payment will be made at the unit price for each intake.
- **c. Includes:** Unit price includes, but is not limited to, removal of casting, concrete, and reinforcement; plugging pipes; filling remaining structure with flowable mortar; and placing compacted fill over structure to finished grade.

PART 2 - PRODUCTS

2.01 MANHOLE AND INTAKE TYPES

Table 6010.01: Manhole and Intake Types

	Figure No.	Type	Description
Sanitary Sewer Manholes	6010.301	SW-301	Circular Sanitary Sewer Manhole
	6010.302	SW-302	Rectangular Sanitary Sewer Manhole
	6010.303	SW-303	Sanitary Sewer Manhole Over Existing Sewer
	6010.304	SW-304	Rectangular Base/Circular Top Sanitary Sewer Manhole
	6010.305	SW-305	Tee-section Sanitary Sewer Manhole
Storm Sewer Manholes	6010.401	SW-401	Circular Storm Sewer Manhole
	6010.402	SW-402	Rectangular Storm Sewer Manhole
	6010.403	SW-403	Deep Well Rectangular Storm Sewer Manhole
	6010.404	SW-404	Rectangular Base/Circular Top Storm Sewer Manhole
	6010.405	SW-405	Tee-section Storm Sewer Manhole
	6010.406	SW-406	Shallow Rectangular Storm Sewer Manhole
Intakes	6010.501	SW-501	Single Grate Intake
	6010.502	SW-502	Circular Single Grate Intake
	6010.503	SW-503	Single Grate Intake with Manhole
	6010.504	SW-504	Single Grate Intake with Flush-top Manhole
	6010.505	SW-505	Double Grate Intake
	6010.506	SW-506	Double Grate Intake with Manhole
	6010.507	SW-507	Single Open-throat Intake, Small Box
	6010.508	SW-508	Single Open-throat Intake, Large Box
	6010.509	SW-509	Double Open-throat Intake, Small Box
	6010.510	SW-510	Double Open-throat Intake, Large Box
	6010.511	SW-511	Rectangular Area Intake
	6010.512	SW-512	Circular Area Intake
	6010.513	SW-513	Open-sided Area Intake
	6010.515	SW-515	Triple Rectangular Area Intake
	6010.541	SW-541	Open-Throat Curb Intake Under Pavement
	6010.542	SW-542	Extension Unit for Open-Throat Curb Intake Under Pavement
	6010.545	SW-545	Single Open-Throat Curb Intake with Extended Opening

2.02 PRECAST

Comply with ASTM C 478 (circular) and ASTM C 913 (rectangular).

2.03 CAST-IN-PLACE

A. Concrete: Use Class C concrete. Comply with the following Iowa DOT Specifications and Materials I.M.s.

1. Iowa DOT Specifications Sections:

a. 2403 – Structural Concrete
b. 4101 – Portland Cement
c. 4102 – Water for Concrete and Mortar
d. 4103 – Liquid Admixtures for Portland Cement Concrete
e. 4104 – Burlap for Curing Concrete
f. 4106 – Plastic Film and Insulating Covers for Curing Concrete
g. 4108 – Supplementary Cementitious Materials
h. 4109 – Aggregate Gradations
i. 4110 – Fine Aggregate for Portland Cement Concrete
j. 4115 – Coarse Aggregate for Portland Cement Concrete

2.03 CAST-IN-PLACE (Continued)

2. Iowa DOT Materials I.M.s:
a. 316 – Flexural Strength of Concrete
b. 318 – Air Content of Freshly Mixed Concrete by Pressure
c. 403 – Chemical Admixtures for Concrete
d. 528 – Structural Concrete Plant Inspection
e. 529 – Portland Cement Concrete Proportions
f. 534 – Mobile Mixture Inspection

B. Reinforcement: Comply with Iowa DOT Section 4151 for epoxy coated reinforcement.

2.04 NON-SHRINK GROUT

Comply with Iowa DOT Materials I.M. 491.13.

2.05 PRECAST RISER JOINTS

A. Joint Ends:

1. Use tongue and groove ends.

2. If cast-in-place base is used, provide bottom riser with square bottom edge.

B. Joint Sealant:

1. Sanitary Sewers:
a. Rubber O-ring or Profile Gasket: Flexible joint, complying with ASTM C 443.
b. Bituminous Jointing Material: Use a cold-applied mastic sewer joint sealing compound recommended by the manufacturer for the intended use and approved by the Engineer. Comply with ASTM C 990.
c. Butyl Sealant Wrap: Comply with ASTM C 877.

2. Storm Sewers: All joint sealants used on sanitary sewers may also be used for storm sewers. The following may also be used.
a. Rubber Rope Gasket Jointing Material: Comply with ASTM C 990.
b. Engineering Fabric Wrap: If specified in the contract documents, supply engineering fabric wrap complying with Iowa DOT Article 4196.01, B.

2.06 MANHOLE OR INTAKE TOP

A. Capable of supporting HS-20 loading.

B. Use eccentric cone on sanitary sewer manholes unless otherwise specified or allowed.

2.07 BASE

A. Sanitary Sewer Manhole:

1. Circular Manhole: Integral base and lower riser section according to ASTM C 478.

2. All Other Manholes: Use precast or cast-in-place concrete base.

B. Storm Sewer Manhole: Use precast or cast-in-place concrete base.

C. Intake: Use precast or cast-in-place concrete base.

2.08 PIPE CONNECTIONS

A. Flexible, Watertight Gasket: Comply with ASTM C 923.

B. Non-Shrink Grout: Comply with Section 6010, 2.04.

C. Waterstop: Provide elastomeric gasket that surrounds pipe and attaches with stainless steel bands and is designed to stop the movement of water along the interface between a pipe and a surrounding concrete collar.

D. Concrete Collar: Comply with Section 6010, 2.02 and 2.03.

2.09 MANHOLE OR INTAKE ADJUSTMENT RINGS (Grade Rings)

A. Use one of the following materials for grade adjustments of manhole or intake frame and cover assemblies:

1. Reinforced Concrete Adjustment Rings: Comply with ASTM C 478. Provide rings free from cracks, voids, and other defects.

2. High Density Polyethylene Adjustment Rings: Comply with ASTM D 1248 for recycled plastic.
   a. Test and certify material properties by the methods in the following table.

Table 6010.02: Test Methods

Property	Test Method	Acceptable Value
Melt Flow Index	ASTM D 1238	0.30 to 30 g/10 min.
Density	ASTM D 792	0.94 to 0.98 g/cm^3
Tensile Strength	ASTM D 638	2,000 to 5,000 lb/in^2

   b. Do not use polyethylene grade adjustment rings when they are exposed to heat shrink infiltration barriers.
   c. When used in a single configuration, provide tapered adjustment ring with thickness that varies from 1/2 inch to 3 inches.
   d. Install adjustment rings on clean, flat surfaces according to the manufacturer's recommendations. Comply with ASTM D 36 with minimum 350°F softening point for butyl rubber sealant.

3. Expanded Polypropylene Adjustment Rings: Comply with ASTM D 4819 for expanded polypropylene when tested according to ASTM D 3575.
   a. Use adhesive meeting ASTM C 920, Type S, Grade N5, Class 25.
   b. Provide finish rings with grooves on the lower surface and flat upper surface.
   c. If a heat shrinkable infiltration barrier is used, ensure surface temperature does not exceed 300° during installation process.

B. Ensure the inside diameter of the adjustment ring is not less than the inside diameter of the manhole frame or not less than the inside dimension of the intake grate opening.

2.10 CASTINGS (Ring, Cover, Grate, and Extensions)

A. Gray Cast Iron: AASHTO M 306.

B. Ductile Iron: ASTM A 536, Grade 80-55-06 or 70-50-05.

2.10 CASTINGS (Ring, Cover, Grate, and Extensions) (Continued)

C. Composite: AASHTO M 306.

1. Hardware: Attach lid to frame with 316 stainless steel hardware.

2. Slip Resistance: Greater than 0.6 when tested according to ASTM C 1028.

3. Ultraviolet Resistance: Meet ASTM G 154 Cycle 1 for a minimum of 1,000 hours.

4. Detection: Must be detectable using standard detection equipment.

D. Load Capacity: Standard duty unless otherwise shown on the casting figures.

1. Standard Duty: Casting certified for 40,000 pound proof-load according to AASHTO M 306.

2. Light Duty: Casting certified according to requirements of AASHTO M 306 for a 16,000 pound proof-load (HS-20). 40,000 pound proof-load is not required.

E. Casting Types:

1. Manholes: The following table lists the manhole casting types.

Table 6010.03: Manhole Casting Types

	Figure No.	Casting Type	Number of Pieces	Ring/ Cover	Bolted Frame	Bolted Cover (Floodable)	Gasket
Sanitary Sewer	6010.601	SW-601, A	2	Fixed	Yes	No	Yes[1]
	6010.601	SW-601, B	3	Adjustable	No	No	Yes[1]
	6010.601	SW-601, C	2	Fixed	Yes	Yes	Yes[1]
	6010.601	SW-601, D	3	Adjustable	No	Yes	Yes[1]
Storm Sewer	6010.602	SW-602, E[2]	2	Fixed	Yes	No	No
	6010.602	SW-602, F[2]	3	Adjustable	No	No	No
	6010.602	SW-602, G[2]	2	Fixed	No	No	No

[1] Machine bearing surfaces required.

[2] Storm sewer casting may include environmental symbols and/or messages such as “DUMP NO WASTE, DRAINS TO RIVER.”

2. Intakes:

a. Comply with Figures 6010.602, 6010.603, 6010.604, and the contract documents.

b. Castings may include environmental symbols and/or messages such as “DUMP NO WASTE, DRAINS TO RIVER.”

3. Manhole Casting Extension Ring:

a. Match the dimensions of the existing ring and cover with an allowable diameter tolerance of -1/4 inch for the frame ridge and +1/4 inch for the cover recess.

b. Provide extension ring with height as required to raise the top of the casting to make it level or no more than 1/4 inch below the finished pavement surface. Maximum ring height is 3 inches.

2.11 ADDITIONAL MATERIALS FOR SANITARY SEWER MANHOLES

A. Infiltration Barrier:

1. External Chimney Seal:

a. Rubber Sleeve and Extension:

1) Corrugated; minimum thickness of 3/16 inches, according to ASTM C 923.
2) Minimum allowable vertical expansion of at least 2 inches.

b. Compression Bands:

1) One-piece band assembly to compress sleeve or extension against manhole and casting surfaces.
2) 16 gauge ASTM C 923, Type 304 stainless steel, minimum 1 inch width, minimum adjustment range of 4 inches more than the manhole outside diameter.
3) For standard two-piece castings, shape top band to lock sleeve to manhole frame's base flange. For three-piece adjustable castings, shape top band to lock sleeve to upper piece of adjustable frame.
4) Stainless steel fasteners complying with ASTM F 593 and 594, Type 304.

2. Internal Chimney Seal:

a. Rubber Sleeve and Extension:

1) Double pleated, minimum thickness 1/8 inch thick, according to ASTM C 923.
2) Minimum allowable vertical expansion of at least 2 inches.
3) Integrally formed expansion band recess top and bottom with multiple sealing fins.

b. Expansion Bands:

1) One-piece band assembly to compress sleeve or extension against manhole and casting surfaces to make a watertight seal.
2) 16 gauge ASTM C 923, Type 304 stainless steel, minimum 1 inch width, minimum adjustment range of 2 inches more than the manhole inside diameter.
3) Positive stainless steel locking mechanism permanently securing the band in its expanded position after tightening.

3. Molded Shield:

a. Barrier Shield:

1) Medium density polyethylene, according to ASTM D 1248.
2) Certified for 40,000 pound proof-load according to AASHTO M 306.
3) Diameter to match cone section and internal dimension of casting.

b. Sealant: Butyl material meeting ASTM C 990.

4. Heat Shrink Sleeve: Heat-shrinkable wrap around sleeve designed for protection of buried and exposed sanitary sewer manholes. Do not use with polyethylene adjustment rings.

a. Primer: Compatible with concrete, ductile and cast iron, and sleeve material.

b. Sleeve and Backing:

Property	Standard	Value
Water Absorption	ASTM D 570	0.05% maximum
Low Temperature Flexibility	ASTM D 2671	-40° F
Tensile Strength	ASTM D 638	2,900 psi minimum
Elongation	ASTM D 638	600% minimum
Hardness	ASTM D 2240	Shore D: 46
Shrink Factor	---	40% minimum
Thickness	---	0.1 inch minimum

c. Adhesive: Softening point of 212° F maximum meeting ASTM E 28.

2.11 ADDITIONAL MATERIALS FOR SANITARY SEWER MANHOLES (Continued)

B. Riser Section Coating:

1. Exterior: When exterior waterproof coating is specified, provide bituminous or coal tar coating.

2. Interior: When interior manhole lining is specified, provide lining according to Section 4010, 2.01 (lined, reinforced concrete pipe).

2.12 CONCRETE FILLET

A. Cast-in-place Base: Provide a cast-in-place concrete fillet with concrete complying with the requirements of Section 6010, 2.03.

B. Precast Base Section:

1. For sanitary sewers, provide a precast concrete fillet, unless otherwise allowed by the Engineer. Comply with Section 6010, 3.01.

2. For storm sewers, provide a cast-in-place concrete fillet with concrete complying with the requirements of Section 6010, 2.03.

2.13 STEPS

A. Depths:

1. For manholes and intakes less than 20 feet deep, do not install steps unless otherwise specified in the contract documents.

2. For manholes and intakes deeper than 20 feet, install steps to meet OSHA regulations.

B. Requirements:

1. ASTM C 478.

2. Manufacture using polypropylene encased steel.

3. Uniformly space steps at 12 to 16 inches.

4. Align with vertical side of eccentric top section.

5. Place first step no more than 36 inches from top of casting.

2.14 PRECAST CONCRETE TEE

A. Tee and Eccentric Reducers: ASTM C 478.

B. Composite Tee: Comply with Figure 6010.305. May be substituted for pipe diameters less than 48 inches.

2.15 CASTING ANCHOR BOLTS AND WASHERS

A. Material: Stainless steel or hot-dipped galvanized.

B. Diameter: Provide bolts and washers 1/8 inch smaller than hole or slot in the casting frame, but no less than 1/2 inch diameter.

C. Bolt Length: As required to pass through adjustment rings and into manhole or intake structure to embedment depth recommended by anchor manufacturer.

2.16 DROP CONNECTION

A. Internal:

1. Receiving Bowl: Marine grade fiberglass meeting ASTM D 790, ASTM D 638, and ASTM D 2583 with non-magnetic stainless steel anchor bolts meeting the manufacturer's recommendation.

2. Flexible Coupler: Provide flexible couple matching the size of the receiving bowl and the drop pipe.

3. Drop Pipe and Bottom Elbow: Provide drop pipe an equivalent diameter of the influent pipe. Limit pipe size to maintain space available for maintenance activities. Provide solid wall SDR 35 PVC pipe and elbow complying with Section 4010, 2.01, A or Schedule 40 PVC pipe and elbow complying with ASTM D 1785.

4. Pipe Brackets: ASTM A 240, Type 304 or Type 316 stainless steel with stainless steel nuts and bolts.

B. External:

1. Pipe and Fittings: Comply with Section 4010, 2.01, G for ductile iron pipe and fittings.

2. Concrete Encasement: Comply with Section 7010, 2.02.

3. Embedment Material: Comply with Section 3010, 2.02, A or 2.06 for backfill material from the top of the elbow to the bottom of the sewer main.

2.17 EXCAVATION AND BACKFILL MATERIAL

Comply with Section 3010 for bedding and backfill materials.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS FOR INSTALLATION OF MANHOLES AND INTAKES

A. Excavation: Excavate according to Section 3010.

B. Subgrade Preparation:

1. **Cut Sections (Undisturbed Soil):** Prepare subgrade to accurate elevation required to place subbase.

2. **Fill Sections:** Compact to 95% of maximum Standard Proctor Density and hand grade to accurate elevation required to place subbase, or install stabilization material as directed by the Engineer.

3. **Unstable Soil:** Install stabilization material as directed by the Engineer.

C. Subbase: Install 8 inch thick pad of Class I bedding material a minimum of 12 inches outside footprint of the structure.

D. Installation of Manhole or Intake Structure: When necessary, adjust wall height and depth of base to provide a minimum of 48 inches between form grade elevation and top of base. Form walls and construction joints for cast-in-place intakes or install precast intake boxes to ensure intake lids are set to match the longitudinal slope of the adjacent street unless otherwise specified in the contract documents.

1. **Cast-in-place:** Comply with Section 6010, 3.02.

2. **Precast:** Comply with Section 6010, 3.03.

E. Pipes: Install and bed pipes and connect to manhole or intake. Install pipe flush with inside wall of structure. Place bedding and pipe embedment material according to Section 3010.

1. **Cast-in-place Structures:**
   a. **Storm:** Form structure walls around pipe.
   b. **Sanitary:** Form or core circular opening and install flexible, watertight gasket according to Section 6010, 2.08. Keep void between pipe and manhole section free of debris and concrete.

2. **Precast Storm Sewer Manholes or Intakes:** If annular space between pipe and structure is less than 2 inches, fill with non-shrink grout. If annular space is 2 inches or greater, construct a concrete collar around the pipe according to Section 6010, 3.05.

3. **Precast Sanitary Sewer Manholes:** Connect to structure with flexible, watertight gasket according to Section 6010, 2.08. Keep void between pipe and manhole section free of debris and concrete.

4. **Sanitary Sewer Manholes on Existing Pipe:** Install waterstop according to Section 6010, 2.08.

F. Joint Sealant:

1. **Sanitary Sewer Manholes:**
   a. Install rubber O-ring or profile gasket (precast structures).
   b. Apply bituminous jointing material or butyl sealant wrap to exterior of all sanitary sewer manhole joints.

3.01 GENERAL REQUIREMENTS FOR INSTALLATION OF MANHOLES AND INTAKES (Continued)

2. Storm Sewer Manhole and Intakes:
a. Apply bituminous jointing material or install rubber rope gasket.
b. If indicated in the contract documents, apply engineering fabric wrap to joints.

G. Fillet:

1. Construct manhole or intake fillet up to one-half of pipe diameter to produce a smooth half-pipe shape between pipe inverts.

2. Slope fillet top toward pipe 1/2 inch per foot perpendicular to flow line.

3. For sanitary sewer, keep void between pipe and structure wall free of debris and concrete.

4. For precast fillets, remove any projections and repair any voids to provide a hydraulically smooth channel between ends of pipes.

H. Top Sections: Install manhole eccentric cone or flat top section or install intake top.

I. Adjustment Ring(s):

1. Bed each concrete ring with bituminous jointing material in trowelable or rope form.

2. Bed each polyethylene or expanded polypropylene ring with manufacturer's approved product and according to manufacturer's recommended installation procedure.

3. Construct manholes and intakes with the following adjustment ring stack heights:
a. Minimum: 4 inches for new manholes and intakes. No minimum for rehabilitation projects.
b. Maximum: 12 inches for new manholes and intakes; 16 inches for existing manholes and intakes.

4. For greater adjustment, modify lower riser section(s).

J. Casting:

1. Install the type of casting specified in the contract documents and adjust to proper grade.

2. Where a manhole or intake is to be in a paved area, adjust the casting to match the slope of the finished surface.

3. Three-piece Castings:
a. Attach the frame to the structure with four anchor bolts.
b. Set initial position of movable portion of the casting in the center of the adjustment range.
c. Remove height-adjustment bolts or mechanism after the paving is completed.

3.01 GENERAL REQUIREMENTS FOR INSTALLATION OF MANHOLES AND INTAKES (Continued)

K. Infiltration Barrier: Install on sanitary sewer manholes.

1. Internal or External Chimney Seal:

a. Do not use external chimney seal if seal will be permanently exposed to sunlight.
b. Extend seal 3 inches below the lowest adjustment ring.
c. Extend seal to 2 inches above the flange of the casting for a standard two-piece casting, or 2 inches above the top of the base section of the casting for an adjustable three-piece casting.
d. Use multiple seals, if necessary.
e. Install compression bands (external chimney seal) or expansion bands (internal chimney seal) to lock the rubber sleeve or extension into place and to provide a positive watertight seal. Once tightened, lock the bands into place. Use only manufacturer recommended installation tools and sealants.

2. Molded Shield:

a. Clean surface of structure cone section.
b. Apply sealant to the top surface of the cone section. Use sufficient sealant to accommodate flaws in the surface of the cone section.
c. Cut molded shield to height by adding the dimensions of the adjustment rings and casting height. Be sure not to interfere with seating of the lid into the casting frame.
d. Seat the molded shield against the sealant on the cone section.
e. Add adjustment rings and casting to meet final grade.

3. Heat Shrink Sleeve:

a. Ensure all surfaces are clean, dry, and free of foreign objects and sharp edges.
b. Warm the surface to drive off any moisture.
c. Cut sleeve to required length per manufacturer's requirements.
d. Apply primer to manhole and casting surface.
e. Place sleeve according to manufacturer's requirements.
f. Apply heat to the sleeve, smooth out wrinkles, and remove trapped air.
g. Cut the sleeve at the casting gussets. Reheat to place the sleeve onto the casting.
h. Trim off any excess material.

L. Backfill and Compaction:

1. Place suitable backfill material after concrete in structure has reached at least 3,000 psi compressive strength or 550 psi flexural strength. If concrete strength is not determined, place backfill at least 14 calendar days after initial concrete placement.

2. Place backfill material simultaneously on all sides of walls and structures so the fill is kept at approximately the same elevation at all times.

3. Compact the 3 feet closest to all walls using pneumatic or hand tampers only. Ensure proper and uniform compaction of backfill around structure.

3.02 ADDITIONAL REQUIREMENTS FOR CAST-IN-PLACE CONCRETE STRUCTURES

A. Forms:

1. Comply with Iowa DOT Article 2403.03, B.

2. Form all cast-in-place manholes and intakes on both the inside and the outside face above the base. Do not form against excavated earthen surface.

3.02 ADDITIONAL REQUIREMENTS FOR CAST-IN-PLACE CONCRETE STRUCTURES (Continued)

B. Reinforcing Steel:

1. Comply with Iowa DOT Section 2404.

2. Lap bars a minimum of 36 diameters, unless otherwise specified in the contract documents.

3. Provide a minimum of 3 inches of clearance for structure bases and 2 inches of clearance for walls and tops.

C. Concrete Mixing:

1. Comply with Iowa DOT Article 2403.02, D.

2. When using ready-mixed concrete, comply with ASTM C 94.

D. Concrete Placing:

1. Comply with Iowa DOT Article 2403.03, C.

2. Do not place concrete when the air temperature is less than 40°F without the approval of the Engineer. When placement of concrete below 40°F is allowed, comply with Iowa DOT Article 2403.03, F.

3. Place concrete continuously in each section until complete. Do not allow more than 30 minutes to elapse between depositing adjacent layers of concrete within each section.

4. Comply with Iowa DOT Article 2403.03, D for concrete vibration.

5. Form 1 1/2 inch by 3 inch keyed construction joints at locations shown in the contract documents.

6. Provide a broom finish on portions of structure that are to become part of exposed pavement.

E. Stripping and Cleaning:

1. Remove forms for manhole and intake walls and tops according to Iowa DOT Article 2403.03, M. References to culverts include all sanitary and storm structures. When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used in determining concrete strength of structure tops.

2. Finish surfaces according to Iowa DOT Article 2403.03, P. Give exposed surfaces a Class 2 finish.

F. Curing:

1. Comply with Iowa DOT Article 2403.03, E.

2. For surfaces visible to the public, use only curing compounds complying with ASTM C 309, Type 1-D or Type 2.

3.02 ADDITIONAL REQUIREMENTS FOR CAST-IN-PLACE CONCRETE STRUCTURES (Continued)

G. Exterior Loading:

1. Restrict exterior loads on concrete according to Iowa DOT Article 2403.03, N.

2. When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used.

H. Repairs: After visual inspection of the completed manhole or intake, repair honeycomb areas, visible leaks, tie holes, or other damaged areas. Remove concrete webs or protrusions.

I. Concrete Testing: The Engineer will conduct testing.

3.03 ADDITIONAL REQUIREMENTS FOR PRECAST CONCRETE STRUCTURES

A. Substitutions: If approved by the Engineer, precast structures may be substituted for designated cast-in-place structures. Comply with the requirements of Section 6010, 3.02 or Iowa DOT Materials I.M. 445.

B. Cast-in-place Base:

1. Comply with Section 6010, 3.02 for placement of concrete.

2. Ensure proper vertical and horizontal alignment of base riser section.

C. Precast Base or Base with Integral Riser Section: Place base or base with integral riser section and ensure proper vertical and horizontal alignment.

D. Additional Riser Sections: Install additional riser sections as required.

E. Lift Holes: Install rubber plug in lift holes. Cover plug and hole with non-shrink grout.

3.04 ADJUSTMENT OF EXISTING MANHOLE OR INTAKE

A. Casting Extension Rings:

1. Install casting extension rings only when specified in the contract documents, and only in conjunction with pavement overlays.

2. Install according to the manufacturer's recommendation and adjust for proper alignment.

B. Minor Adjustment (Adding or Removing Adjustment Rings):

1. Remove casting.

2. Modify adjustment ring stack height by one of the following methods:
   a. Add adjustment rings as necessary to adjust existing manhole or intake to finished pavement grade or finished topsoil grade, to a maximum ring stack height of 16 inches. Bed each concrete ring with bituminous jointing material. Bed each polyethylene ring with manufacturer's approved product.
   b. Remove one or more adjustment rings, as appropriate, to reduce casting elevation.

3. Install new casting on modified adjustment ring stack. Existing casting may be reinstalled when specified in the contract documents.

3.04 ADJUSTMENT OF EXISTING MANHOLE OR INTAKE (Continued)

4. Replace infiltration barrier for sanitary sewer manhole using only new materials.

C. Major Adjustment (Adding, Removing, or Modifying Riser or Cone Section): When adjustment is greater than can be accomplished through adding or removing adjustment rings, a major adjustment will be required.

1. Remove casting.

2. Remove top.

3. Remove and replace or modify existing riser section and/or top section according to the method approved by the Engineer.

4. Install new frame and cover or grate. Existing casting may be reinstalled when specified in the contract documents.

5. Replace infiltration barrier for sanitary sewer manhole using only new materials.

3.05 CONNECTION TO EXISTING MANHOLE OR INTAKE

A. General:

1. Remove existing fillet as necessary to install pipe at required elevation and develop hydraulic channel.

2. Insert pipe into structure and trim end flush with inside wall of structure.

3. Install replacement fillet as necessary.

4. Place backfill material according to Section 3010.

B. Concrete Collar:

1. For new pipes 12 inches or smaller, install two number 4 steel reinforcing hoops in collar around pipe. Pour concrete collar around pipe/structure junction to a minimum thickness and width of 6 inches, providing a minimum of 4 inches of concrete extending beyond the pipe opening.

2. For new pipes larger than 12 inches, install two number 4 steel reinforcing hoops in collar around pipe. Pour concrete collar around pipe/structure junction to minimum thickness and width of 9 inches, providing a minimum of 4 inches of concrete extending beyond the pipe opening.

C. Sanitary Sewer:

1. General:
   a. Core new openings in existing manholes unless otherwise specified in the contract documents.
   b. Divert flow as necessary. Obtain approval of the diversion plan from the Engineer. Maintain sanitary sewer service at all times unless otherwise specified in the contract documents.

2. Cored Opening:
   a. Insert flexible watertight connector into new opening.
   b. Install and tighten internal expansion sleeve to hold flexible connector in place.
   c. Insert pipe through flexible connector and tighten external compression ring.
   d. Do not install grout or concrete collar for cored opening with flexible connector.

3.05 CONNECTION TO EXISTING MANHOLE OR INTAKE (Continued)

3. Cut and Chipped Opening (Knock-out): Use only when specified or allowed.
a. Saw opening to approximate dimensions with a masonry saw. Saw to depth sufficient to sever reinforcing steel.
b. Remove concrete and expand opening to a diameter at least 6 inches larger than the outside diameter of the new pipe.
c. Cut off all reinforcing steel protruding from the structure wall.
d. Install waterstop around new pipe centered within structure wall.
e. Fill opening between structure and pipe with non-shrink grout.
f. Construct concrete collar around pipe and exterior manhole opening.
g. Provide pipe joint, non-shear coupling, or other approved flexible coupling within 2 feet of structure wall to allow for differential settlement between the new sewer and the structure.

D. Storm Sewer:

1. Cut and Chipped Opening:
a. Use for pipe sizes 12 inches in diameter or larger.
b. Saw opening to approximate dimensions with a masonry saw. Saw to depth sufficient to sever reinforcing steel.
c. Remove concrete and expand opening to a diameter at no more than 4 inches larger than the outside diameter of the new pipe.
d. Leave a minimum of 6 inches of manhole or intake wall above and on the sides of the pipe.
e. Cut off all reinforcing steel protruding from the structure wall.

2. Cored Opening:
a. Core new openings in existing manholes or intakes for all pipes less than 12 inches in diameter.
b. Opening to be no greater than 2 inches larger than the outside diameter of the pipe.
c. Leave a minimum of 6 inches of manhole or intake wall above and on the sides of the pipe.

3. Fill Opening: Fill opening between manhole or intake wall and outside of pipe with non-shrink grout or construct a concrete collar around the pipe according to Section 6010, 3.05, B.

3.06 DROP CONNECTION TO SANITARY SEWER MANHOLE

A. Internal:

1. Core opening in existing manhole wall and install flexible watertight connector.

2. Cut incoming pipe so a maximum of 2 inches extends into the manhole.

3. Allow 1 inch clearance between bottom of incoming pipe and top of the receiving bowl. Connect receiving bowl to manhole with stainless steel anchor bolts as recommended by the manufacturer.

4. Install flexible coupler connecting the receiving bowl and the drop pipe.

5. Mount drop pipe on the side of the manhole with stainless steel brackets spaced a maximum of 4 feet apart. Provide a minimum of two brackets per pipe segment.

6. Remove existing concrete fillet as required to accommodate bottom elbow.

3.06 DROP CONNECTION TO SANITARY SEWER MANHOLE (Continued)

7. Install elbow at bottom of drop pipe to match concrete fillet and create a smooth flow transition. Align elbow so discharge is directed at outlet pipe or at 45 degrees to manhole flow.

8. Repair fillet according to Section 6010, 3.01, G.

9. Comply with Figure 6010.308.

B. External:

1. Core opening in existing manhole wall and install flexible watertight connector, if required.

2. Install ductile iron pipe and fittings according to Section 5010, 3.01 and 3.02.

3. Place concrete from the base of the manhole to the top of the elbow.

4. Comply with Section 3010, 3.05 for bedding and backfill of the external drop piping.

5. Comply with Figure 6010.307.

3.07 REMOVAL OF MANHOLE OR INTAKE

A. Unless otherwise specified, remove the entire structure to a minimum of 10 feet below top of subgrade in paved areas or 10 feet below finished grade in other areas.

B. Pipes:

1. Contact the Engineer to verify the sewer line is not in use.

2. Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches, or one-half the pipe diameter, whichever is greater.

3. If specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM (comply with Section 3010) by gravity flow or pumping.

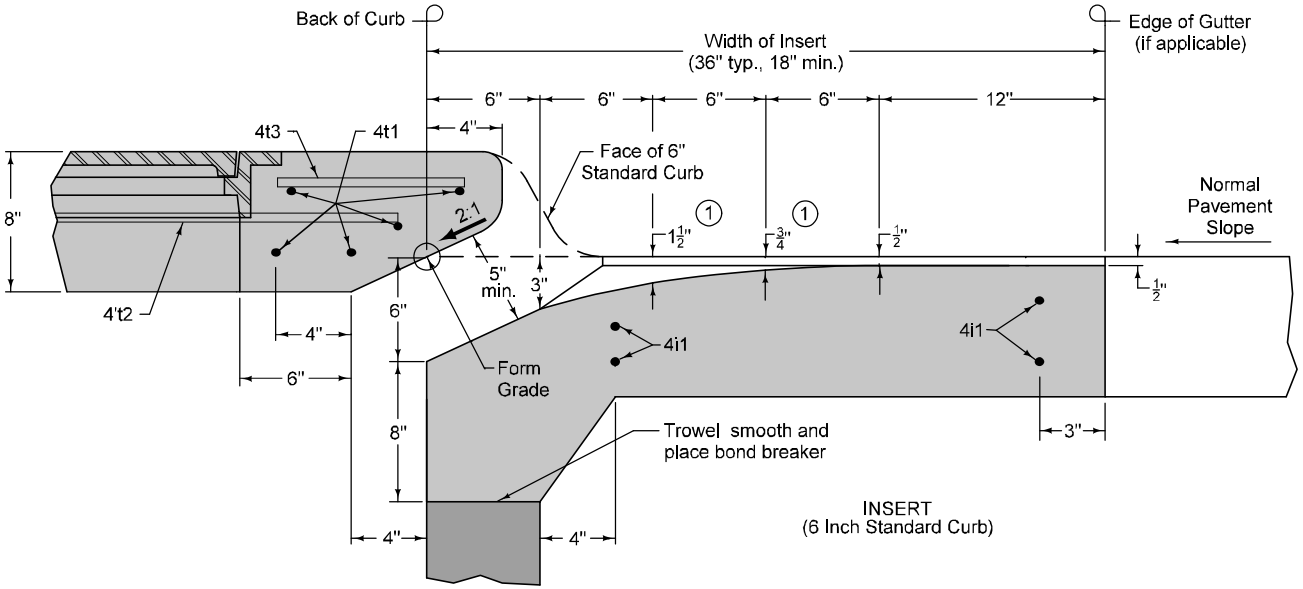
C. Fill remaining structure using flowable mortar.

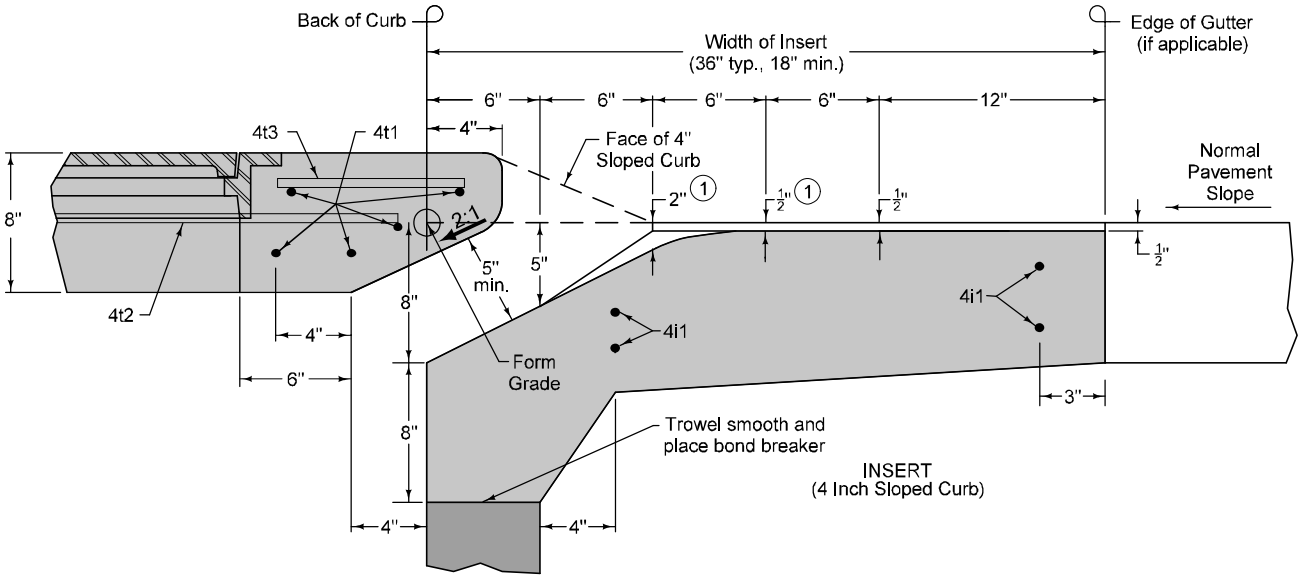
D. Place compacted backfill over remaining structure as required for embankment or compacted backfill.

3.08 CLEANING, INSPECTION, AND TESTING

Clean, inspect, and test structures according to Section 6030.

END OF SECTION





① Insert shaping may be modified for insert widths less than 36 inches. For an 18 inch insert, reduce dimensions indicated by ½ inch.

FIGURE 6010.507 SHEET 1OF 2

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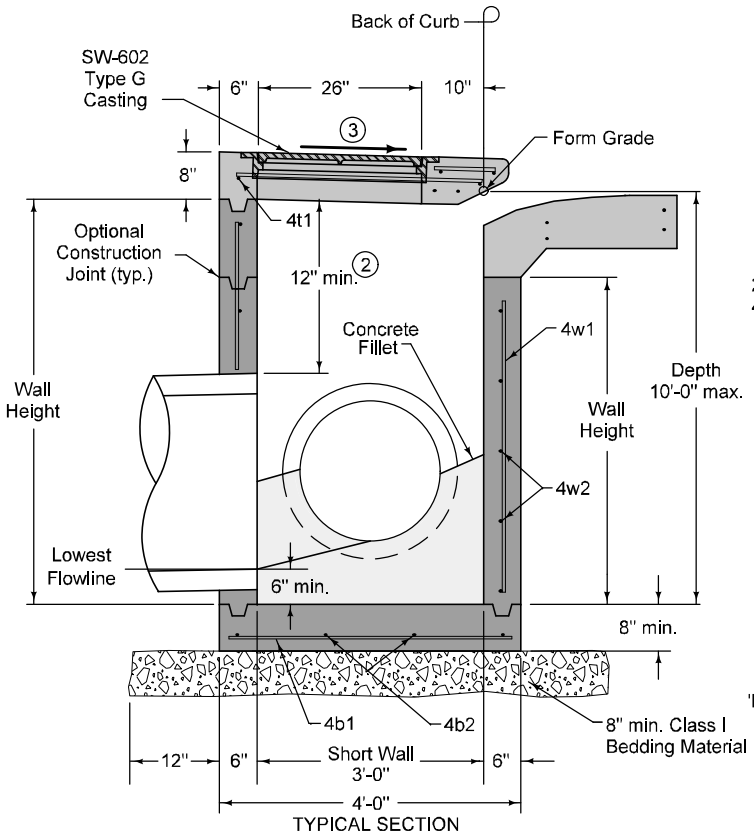
FIGURE 6010.507 | STANDARD ROAD PLAN | SW-507 | SHEET 1 of 2

REVISIONS: Added Class I Bedding Material and changed maximum box out length to 17'.

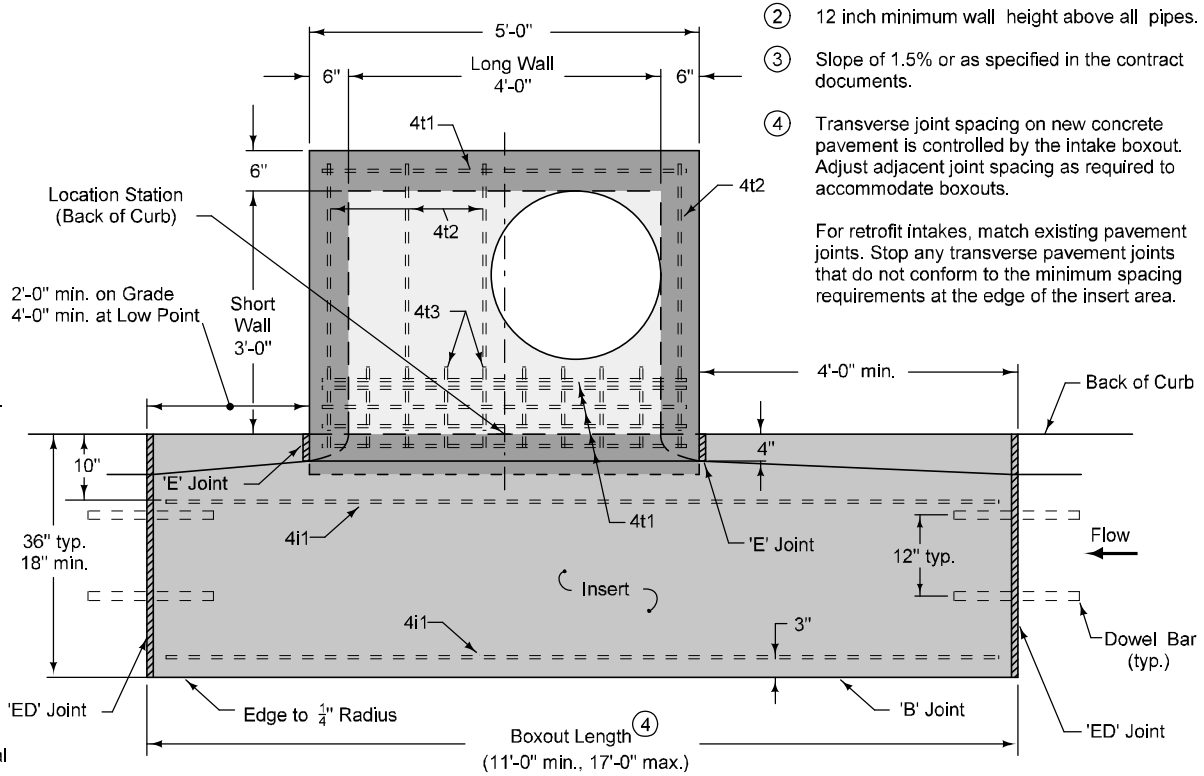
Paul D. Wigand
SUDAS DIRECTOR

DESIGN METHODS ENGINEER

SINGLE OPEN-THROAT CURB INTAKE, SMALL BOX



TYPICAL SECTION



PLAN

2 12 inch minimum wall height above all pipes.

3 Slope of 1.5% or as specified in the contract documents.

4 Transverse joint spacing on new concrete pavement is controlled by the intake boxout. Adjust adjacent joint spacing as required to accommodate boxouts.

For retrofit intakes, match existing pavement joints. Stop any transverse pavement joints that do not conform to the minimum spacing requirements at the edge of the insert area.

MAXIMUM PIPE DIAMETERS		
Pipe Location	Precast Structure	Cast-in-place Structure
Short Wall	24"	30"
Long Wall	30"	36"

REINFORCING BAR LIST						
Mark	Size	Location	Shape	Count	Length	Spacing
4t1	4	Top	——	6	4'-8"	See Insert
4t2	4	Top	——	4	3'-6"	12"
4t3	4	Top	——	10	10"	6"
4b1	4	Base	——	6	3'-6"	1 1"
4b2	4	Base	——	5	4'-6"	10"
4i1	4	Insert	——	4	Boxout Length minus 8"	See Plan
4w1	4	Walls	——	14	Wall Height minus 4"	14"
4w2	4	Long Walls	——	Varies	4'-8"	12"
4w3	4	Short Walls	——	Varies	3'-8"	12"

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FIGURE 6010.507 | STANDARD ROAD PLAN | SW-507 | SHEET 2 of 2

REVISIONS: Added Class I Bedding Material and changed maximum box out length to 17'.

Paul D. Wigand
SUDAS DIRECTOR

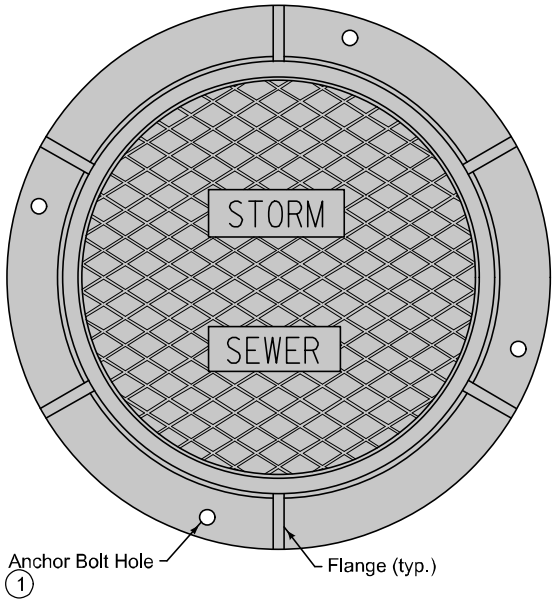
DESIGN METHODS ENGINEER

SINGLE OPEN-THROAT CURB INTAKE, SMALL BOX

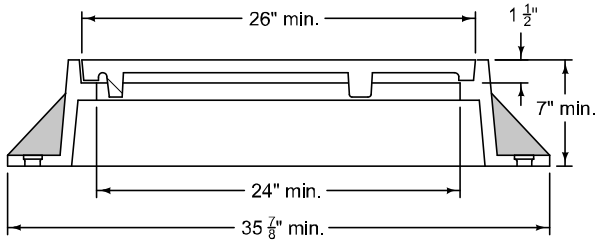
FIGURE 6010.507 SHEET 2 OF 2

TYPE E

Two-piece fixed casting



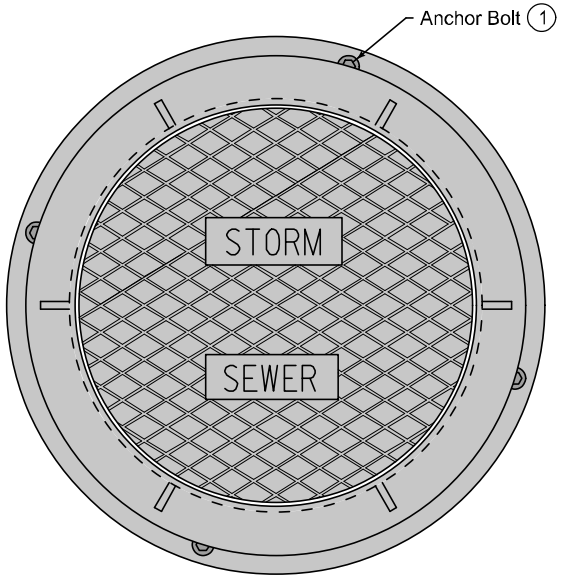
PLAN



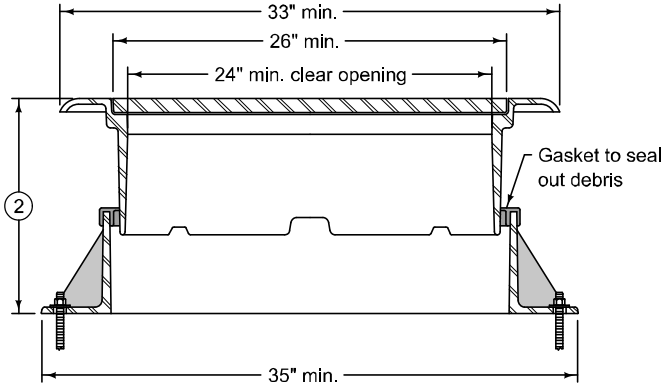
TYPICAL SECTION

TYPE F: HMA

Three-piece floating casting for use in HMA paving



PLAN



TYPICAL SECTION

Frame Notes:
Size, spacing, and number of lugs and flanges may vary.

Cover Notes:
Roughness pattern and text style may vary.
Minimum one pickhole.

(1) Anchor the lower frame of all three-piece castings to the manhole structure. When specified in the contract documents, anchor the frame of two-piece castings to the manhole structure. If casting frame does not include anchor holes or slots, drill four 7/8 inch diameter holes, equally spaced around the frame.

(2) Casting height varies. Minimum adjustment range of 4 inches.

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FIGURE 6010.602	STANDARD ROAD PLAN	SW-602	SHEET 1 of 3

REVISIONS: Add option for 3-piece HMA casting

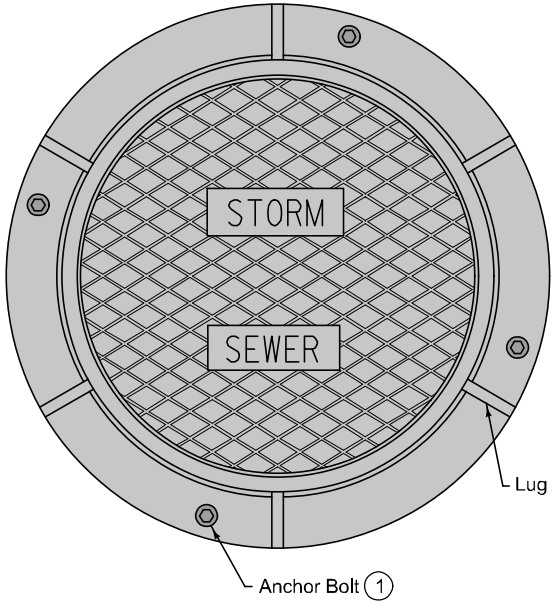
Paul D. Wigand, SUDAS DIRECTOR — DESIGN METHODS ENGINEER

CASTINGS FOR STORM SEWER MANHOLES

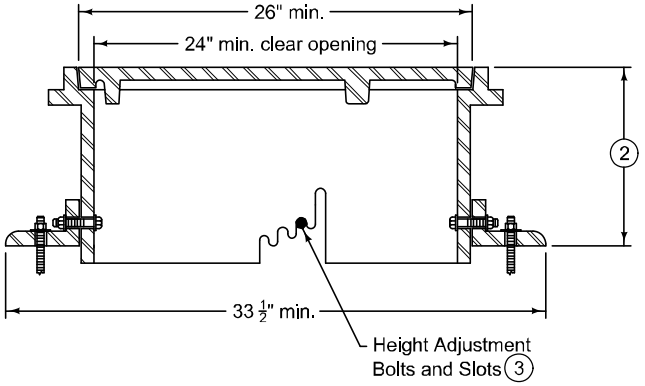
FIGURE 6010.602 | SHEET 1 OF 3

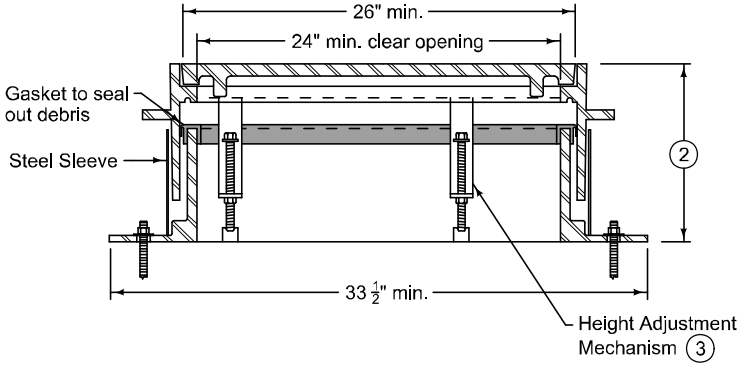
TYPE F: PCC

Three-piece floating casting for use in PCC paving and PCC boxouts



PLAN





TYPICAL SECTION (4)

Frame Notes:
Size, spacing, and number of lugs and flanges may vary.

Cover Notes:
Roughness pattern and text style may vary.
Minimum one pickhole.

(1) Anchor the lower frame of all three-piece castings to the manhole structure. When specified in the contract documents, anchor the frame of two-piece castings to the manhole structure. If casting frame does not include anchor holes or slots, drill four 7/8 inch diameter holes, equally spaced around the frame.

(2) Casting height varies. Minimum adjustment range of 4 inches.

(3) Set casting at proper grade using the adjustment slots or adjustment mechanism. Remove bolts or mechanism upon completion of paving.

(4) Height adjustment method may vary; two options are shown.

SUDAS	IOWADOT	REVISION 4	04-21-20
FIGURE 6010.602	STANDARD ROAD PLAN	SW-602	SHEET 2 of 3

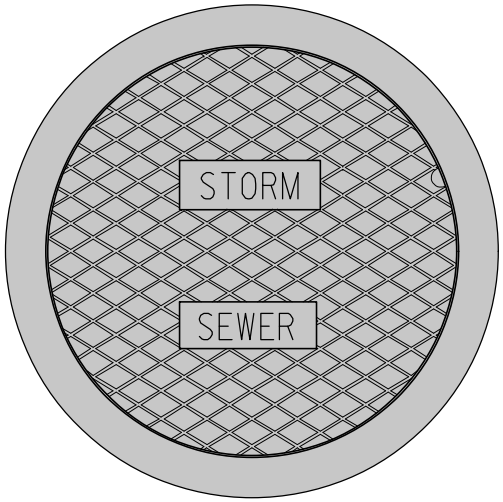
REVISIONS: Add option for 3-piece HMA casting

Paul D. Wigant — SUDAS DIRECTOR
DESIGN METHODS ENGINEER

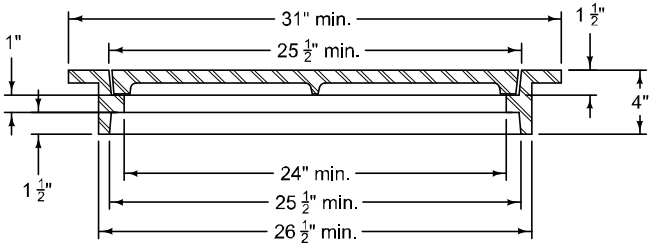
CASTINGS FOR STORM SEWER MANHOLES

FIGURE 6010.602 | SHEET 2 OF 3

TYPE G
Two piece fixed casting



PLAN



TYPICAL SECTION

Cover Notes:
Roughness pattern and text style may vary.
Minimum one pickhole.

FIGURE 6010.602 | SHEET 3 OF 3

SUDAS | IOWADOT | REVISION 4 04-21-20

FIGURE 6010.602 | STANDARD ROAD PLAN | SW-602 | SHEET 3 of 3

REVISIONS: Add option for 3-piece HMA casting

Paul D. Wigand, SUDAS DIRECTOR | DESIGN METHODS ENGINEER

CASTINGS FOR STORM SEWER MANHOLES

PORTLAND CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pavement

B. Curb and Gutter

1.02 DESCRIPTION OF WORK

Includes the requirements for the construction of full depth PCC pavement and curb and gutter.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Two weeks prior to commencing any PCC pavement placement, submit a paving mix design for each different source of aggregate to be used for review and approval by the Engineer. Submit mixes or mix designs approved by the Iowa Department of Transportation or an independent testing laboratory.

B. Maturity curves for paving mixes and maturity reading results.

C. Submit all testing and certifications according to Section 7010, 3.07.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, HANDLING, AND SALVAGING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Aggregate Storage: Comply with Iowa DOT Article 2301.02, C.

B. Cement and Fly Ash: Comply with Iowa DOT Article 2301.02, C.

C. Admixtures: Store in suitable weather tight enclosures which will preserve quality.

D. Reinforcing Steel: Store off ground on timbers or other supports.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

Complete elements of the work that can affect line and grade in advance of other open cut construction unless noted on plans.

1.07 SPECIAL REQUIREMENTS

None

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. PCC Pavement:

1. **Measurement:** Measurement will be in square yards for each different thickness of PCC pavement. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price per square yard for each thickness of PCC pavement.

3. **Includes:** Unit price includes, but is not limited to, final trimming of subgrade or subbase, integral curb, bars and reinforcement, joints and sealing, surface curing and pavement protection (excluding cold weather protection; see Section 7010, 1.08, N), safety fencing, concrete for rigid headers, boxouts for fixtures, pavement smoothness testing, and quality control for stringless paving.

B. Air Content Deficiency:

1. **Measurement:** Measurement will be in square yards for each different thickness of PCC pavement subject to a unit price reduction for air content deficiency according to Section 7010, 3.07.

2. **Payment:** Payment will be at the reduced unit price according to Table 7010.03 for each thickness of PCC pavement. If there is an air content deficiency on a privately contracted roadway project, the Jurisdiction ultimately accepting ownership of the roadway will receive the penalty payment prior to acceptance of the work.

C. Pavement Smoothness Deficiency:

1. **Measurement:** Measurement will be in square yards for each different thickness of PCC pavement subject to a unit price reduction for pavement smoothness according to Section 7010, 3.07.

2. **Payment:** Payment will be at the reduced unit price according to Table 7010.04 for each thickness of PCC pavement. If there is a pavement smoothness deficiency on a privately contracted roadway project, the Jurisdiction ultimately accepting ownership of the roadway will receive the penalty payment prior to acceptance of the work.

D. PCC Pavement Thickness Deficiency:

1. **Measurement:** Measurement will be in square yards for each different thickness of PCC pavement that has deficient pavement thickness as determined in Table 7010.05.

2. **Payment:** Payment will be at the percentage of the unit price indicated in Table 7010.05 for each different thickness of PCC pavement. If there is a pavement thickness deficiency on a privately contracted roadway project, the Jurisdiction ultimately accepting ownership of the roadway will receive the penalty payment prior to acceptance of the work.

E. Curb and Gutter:

1. **Measurement:** Measurement will be in linear feet measured along the face of the curb for each different width and thickness of curb and gutter.

2. **Payment:** Payment will be at the unit price per linear feet of curb and gutter.

3. **Includes:** Unit price includes, but is not limited to, final subgrade/subbase preparation, bars and reinforcement, joints and sealing, surface curing and pavement protection (excluding cold weather protection; see Section 7010, 1.08, N), and boxouts for fixtures.

1.08 MEASUREMENT AND PAYMENT (Continued)

F. Beam Curb:

1. **Measurement:** Measurement will be in linear feet measured along the face of the curb.

2. **Payment:** Payment will be at the unit price per linear feet of beam curb.

3. **Includes:** Unit price includes, but is not limited to, final subgrade/subbase preparation, bars and reinforcement, joints and sealing, surface curing and pavement protection (excluding cold weather protection; see Section 7010, 1.08, N), and boxouts for fixtures.

G. Concrete Median:

1. **Measurement:** Measurement will be in square yards of concrete median. When the curb is integral with the pavement, the width will be measured from back of curb to back of curb.

2. **Payment:** Payment will be at the unit price per square yard of concrete median.

3. **Includes:** Unit price includes, but is not limited to, final subgrade/subbase preparation, bars and reinforcement, joints and sealing, surface curing and pavement protection (excluding cold weather protection; see Section 7010, 1.08, N), and boxouts for fixtures.

H. PCC Railroad Crossing Approach:

1. **Measurement:** Measurement will be in square yards of railroad crossing approach.

2. **Payment:** Payment will be at the unit price per square yard of railroad crossing approach.

3. **Includes:** Unit price includes, but is not limited to, excavation for modified subbase and subdrain, furnishing and installing subdrain, furnishing and installing subdrain outlet or connection to storm sewer, furnishing and installing porous backfill material, furnishing and placing modified subbase material, furnishing and installing reinforcing steel and tie bars, furnishing and placing concrete, furnishing, placing, and compacting asphalt.

I. PCC Pavement Samples and Testing:

1. **Measurement:** Lump sum item; no measurement will be made.

2. **Payment:** Payment will be at the lump sum price for PCC pavement samples and testing.

3. **Includes:** Lump sum price includes, but is not limited to, certified plant inspection, pavement thickness cores, pavement smoothness measurement (when required by the contract documents), and maturity testing.

J. Granular Surfacing: Comply with Section 7030 for granular surfacing material placed at intersecting roads, driveways, and turnouts.

K. PCC Pavement Widening:

1. **Measurement:** Measurement will be in square yards for each different thickness of PCC pavement widening. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement widening area.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. **Payment:** Payment will be at the unit price per square yard for each thickness of PCC pavement widening.

3. **Includes:** Unit price includes, but is not limited to, final subgrade/subbase preparation, integral curb, bars and reinforcement, joints and sealing, surface curing and pavement protection (excluding cold weather protection; see Section 7010, 1.08, N), safety fencing, concrete for rigid headers, boxouts for fixtures, and pavement smoothness.

L. Pavement Removal: Comply with Section 7040.

M. Fixture Adjustment: Comply with Section 6010 for adjustment of manholes and intakes and Section 5020 for adjustment of water valves and fire hydrants.

N. PCC Cold Weather Protection:

1. **Measurement:** When cold weather protection is required and authorized by the Engineer, measurement will be in square yards of the area of PCC pavement to be protected. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price of $2.50 per square yard. Payment will be limited to protection necessary only within the contract period and with prior authorization of the work by the Engineer. No price modifications will be made for quantity underruns or overruns for this item. Cold weather protection necessary after the completion date, after all calendar days have passed, or after all working days have been used is incidental to the work regardless if a quantity was included in the contract.

3. **Includes:** Unit price includes, but is not limited to, all labor, materials, and equipment to install and remove all required protection.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement: Meet the requirements of Iowa DOT Section 4101 and Materials I.M. 401, including Type I and Type II cements and blended hydraulic cements Type 1P, Type 1S, Type 1T, and Type 1L.

B. Supplementary Cementitious Materials (SCM):

1. **Fly Ash:** Comply with Iowa DOT Section 4108.

2. **Ground Granulated Blast Furnace Slag (GGBFS):** Comply with Iowa DOT Section 4108.

3. **Limestone:** Comply with Iowa DOT Materials I.M. 401.

C. Fine Aggregate for Concrete:

1. Meet the requirements of Iowa DOT Section 4110 and Materials I.M. 409, Source Approvals for Aggregates.

2. Comply with the following gradation:

Sieve Size	Percent Passing
3/8”	100
No. 4	90 to 100
No. 8	70 to 100
No. 30	10 to 60
No. 200	0 to 1.5
Iowa DOT Article 4109.02, Gradation No. 1 in the Aggregate Gradation Table.	

3. The Engineer may authorize a change in gradation, subject to materials available locally at the time of construction.

D. Coarse Aggregate for Concrete:

1. Crushed stone particles with Class 2 durability complying with Iowa DOT Section 4115 and Materials I.M. 409, Source Approvals for Aggregates.

2. Comply with one of the following gradations:

Sieve Size	Gradation No. 3 Percent Passing	Gradation No. 4 Percent Passing	Gradation No. 5 Percent Passing
1 1/2”	100	100	-----
1”	95 to 100	50 to 100	100
3/4”	-----	30 to 100	90 to 100
1/2”	25 to 60	20 to 75	-----
3/8”	-----	5 to 55	20 to 55
No. 4	0 to 10	0 to 10	0 to 10
No. 8	0 to 5	0 to 5	0 to 5
No. 200	0 to 1.5	0 to 1.5	0 to 1.5
Iowa DOT Article 4109.02, Gradation No. 3, 4, and 5 in the Aggregate Gradation Table.			

3. The Engineer may authorize a change in gradation, subject to materials available locally at the time of construction.

2.01 MATERIALS (Continued)

E. Intermediate Aggregate for Concrete: Use if specified in contract documents.

1. Meet the requirements of Iowa DOT Section 4112 and Materials I.M. 409, Source Approvals for Aggregates.

2. For crushed limestone or dolomite, meet the durability class required for the coarse aggregate. When gravel durability is lower than the coarse aggregate durability requirements, pea gravel is not to exceed 15% of the total aggregate mix.

3. Comply with the following aggregate gradation:

Sieve Size	Percent Passing
1/2”	95 to 100
3/8”	-----
No. 4	-----
No. 8	0 to 10
Iowa DOT Article 4109.02, Gradation No. 2 in the Aggregate Gradation Table	

4. The Engineer may authorize a change in gradation subject to materials locally available at the time of construction.

F. Water Requirements: Comply with Iowa DOT Section 4102. Potable water obtained from a municipal supply, suitable for drinking, may be accepted without testing.

G. Admixtures: Meet Iowa DOT Materials I.M. 403 and the requirements for the liquid admixtures shown below. Other admixtures may be used subject to the approval of the Engineer.

1. Air Entrainment Admixture: Comply with Iowa DOT Section 4103.

2. Retarding and Water Reducing Admixtures: Comply with Iowa DOT Section 4103.

3. Accelerating admixtures (calcium chloride): Comply with Iowa DOT Article 2529.02.

H. Bars: Comply with Iowa DOT Section 4151 for metallic tie bars and dowel bars or Iowa DOT Section 4156 for glass fiber reinforced polymer dowel bars. Meet the tie bar requirements for bar mats. All metallic bars must be epoxy coated.

I. Expansion Tubes: Comply with Iowa DOT Section 4191.

J. Metal Keyways: Comply with Iowa DOT Section 4191.

K. Supports for Bars: Comply with Iowa DOT Materials I.M. 451.01.

L. Joint Fillers and Sealers:

1. Joint Sealers: Comply with Iowa DOT Article 4136.02.

2. Preformed Expansion Joint Fillers and Sealers: Use the following types of preformed materials for filling expansion joints that comply with Iowa DOT Article 4136.03. When the type is not specified, use a resilient filler.

- Resilient filler
- Flexible foam expansion joint filler
- Tire buffings expansion joint filler
- Elastomeric joint seals

2.01 MATERIALS (Continued)

M. Liquid Curing Compound: Comply with Iowa DOT Section 4105.

N. Covering:

1. Burlap: Comply with Iowa DOT Section 4104.

2. Plastic Film: Comply with Iowa DOT Section 4106.

3. Insulating Cover: Comply with Iowa DOT Section 4106.

O. Grout Systems: Use polymer grouts that comply with Iowa DOT Materials I.M. 491.11.

2.02 CONCRETE MIXES

A. Mix Design:

1. Comply with Iowa DOT Class C or Class M mix meeting the requirements of Materials I.M. 529. If higher durability mixes are specified, use C-SUD or CV-SUD mixes.

2. Ensure compatibility of all material combinations. If the concrete materials are not producing a workable concrete mixture, a change in the material may be required. Changes will be at no additional cost to the Contracting Authority.

B. Consistency and Workability:

1. Slump:
a. Use an amount of mixing water that will produce workable concrete of uniform consistency. Unless specifically modified by the Engineer, ensure slump, measured according to Iowa DOT Materials I.M. 317, is no less than 1/2 inch or no more than 2 1/2 inches for machine finish and no less than 1/2 inch and no more than 4 inches for hand finish. When a water reducing admixture is used, the maximum slump may be increased to 5 inches.
b. If it is not possible to produce concrete having the required consistency without exceeding the maximum allowable water to cement ratio specified, the cement content may be increased or water reducing admixture may be added. Obtain the Engineer's approval. Do not exceed the maximum water to cement ratio. Additional cement or water reducer will be added with no additional cost to the Contracting Authority.
c. The basic absolute volume of water per unit volume of concrete is based on average conditions. If material characteristics require that the total quantity of water used to secure the required consistency reduces the batch yield (computed on the basis of absolute volumes of the batch quantities used) by more than 2.0%, the Engineer may adjust the proportions to correct the yield. This adjustment will not be a basis for adjustment of the contract unit price.

2. Air Content: Use an approved air entraining agent.
a. For machine-placed pavement, use a target air content of 8% with a tolerance of plus or minus 2% when measured on the grade just prior to consolidation, as determined by Iowa DOT Materials I.M. 318. The target air content may be adjusted by the Engineer based on random tests of the consolidated concrete behind the paving machine. These additional tests will be used to consider the need for a target value change and will not be used in the acceptance decision.
b. For hand-placed pavement, use a target content for hand finish of 7% with a tolerance of plus or minus 1.5% when measured on the grade and just prior to consolidation, as determined by Iowa DOT Materials I.M. 318.

2.02 CONCRETE MIXES (Continued)

C. Use of Fly Ash and Ground Granulated Blast Furnace Slag (GGBFS) as Supplementary Cementitious Materials:

1. Mix proportions for the various mixes using fly ash and GGBFS are included in Iowa DOT Materials I.M. 529. The maximum allowable fly ash substitution rate is 20%. Do not use a GGBFS substitution rate of more than 35% by weight (mass). The total supplementary cementitious material substitution rate is not to exceed 40%.

2. If C-SUD or CV-SUD mixes are specified, the maximum allowable Class F fly ash substitution rate is 25% and the maximum Class C fly ash substitution rate is 35%. The maximum combination rate is 20% Class C fly ash and 20% GGBFS.

3. When Type IP, IT, or IS cement is used in the concrete mixture, only fly ash substitution will be allowed. Between October 16 and March 15, use of Type IL cement with fly ash and GGBFS or Type IP, IS, or IT cement with fly ash will be allowed only when maturity method is used to determine time of opening. Transport, store, haul, and batch fly ash and GGBFS in such a manner to keep it dry.

PART 3 - EXECUTION

3.01 EQUIPMENT

A. Batching and Mixing Equipment:

1. General:

a. Weighing and Proportioning Equipment: Comply with Iowa DOT Article 2001.20.

b. Mixing Equipment: Comply with Iowa DOT Article 2001.21.

c. Material Bins: Involves any structure in which materials are stored. Each part of any bin, including foundations and supports, must be adequate to withstand any stress to which it might be subjected to while in use.

2. Batching:

a. Ensure the batching plant is Iowa DOT calibrated and approved. Provide copy of current calibrations and approvals.

b. Coordinate the batch plant operation and batch trucks with the paving operation in order to ensure a steady supply of materials.

c. Operate the batch plant and trucks to minimize dust, noise, or truck nuisances.

3. Mixing:

a. Construction or Stationary Mixer:

1) Ensure the concrete is uniform in composition and consistency. If this condition is not produced because of the size of the batch, the size of the batch may be reduced or the mixing time increased, or both, until this result is obtained. If non-uniform, corrective action must be taken.

2) Ensure the methods of delivering and handling the concrete are such that objectionable segregation or damage to the concrete will not occur, and they will facilitate placing with a minimum of handling.

b. Ready Mixed Concrete:

1) Ensure the concrete is uniform in composition and consistency. If non-uniform, concrete producers must take corrective action.

2) Ready mixed concrete is defined as concrete proportioned in a central plant and mixed in a stationary mixer for transportation in trucks without agitation, proportioned at a central plant, and only partially mixed in a stationary mixer for transportation and finish mixing in a transit mixer, or proportioned at a central plant, and then mixed in a transit mixer prior to or during transit.

3) When necessary to add additional mixing water at the site of placement, mix the batch at least an additional 30 revolutions of the drum at mixing speed.

4) Ensure each vehicle in which concrete will be delivered is capable of discharging concrete having a slump not over 2 inches at an overall rate for its entire load of not less than 1.25 cubic yards per minute. Ensure the concrete is delivered at a rate sufficient to maintain a sustained rate of progress of not less than 100 feet per hour for the width and depth of pavement to be placed.

c. All Methods: Identify each truck load by a plant charge ticket showing plant name, contractor, project data, quantity, class, time batched, and water added at site.

B. Concrete Delivery Equipment:

1. General:

a. In handling concrete from the mixer to the place of deposit, take care to avoid segregation.

b. When concrete is deposited through a chute, slope the chute to allow concrete to flow slowly without segregation. Place the delivery point of the chute as close as possible to the point of deposit. Keep chutes and spouts clean. Thoroughly flush them with water before and after each run. Discharge the water outside the paving area in an approved concrete washout area.

c. Provide alternate plan for concrete delivery in event of equipment failure.

d. Take concrete samples from material placed on the subgrade or subbase.

3.01 EQUIPMENT (Continued)

2. Concrete Transfer Equipment:

a. Utilize placers, conveyors, buckets, or buggies designed specifically for transporting concrete.
b. Do not allow concrete to free fall into or out of transfer equipment.
c. Meet the requirements of Section 7010, 2.02, B, 2 for air entrainment of the concrete mix and testing for compliance.

3. Concrete Pumps:

a. Do not pump concrete through aluminum conduit or tubing.
b. Use the concrete pump to deliver the material as close to horizontal as possible, keep restrictions and drops to a minimum, and avoid free fall.
c. Meet the requirements of Section 7010, 2.02, B, 2 for air entrainment of the concrete mix and testing for compliance.
d. Sample the first load after pumping a minimum of 3 cubic yards. Sample after each significant change in boom angle.
e. Sample before and after the pump to determine if any changes in the slump and other significant mixture characteristics occur.
f. When sampling at the end of the placement line, take care to ensure that the sample is representative of the concrete being placed from the pipeline. Note: Changes to the placement rate or boom configuration can result in changes in the concrete properties. Typically, the vertical position of the boom results in the greatest potential for air loss while the horizontal position of the boom has the least potential. Location of pumping equipment should be determined so that it is possible to maintain a consistent, low boom angle as much as possible during placement.
g. If air test shows that air entrainment is outside of the allowed range, follow procedure as outlined in Section 7010, 3.07, B.
h. Leaks in the line or pump hydraulics, which would allow air to be added to the concrete, are prohibited.

C. Concrete Placement Equipment:

1. Consolidating and Finishing Equipment:

a. Use a paving machine that meets all of the following:
   1) Is designed for the specific purpose of placing, consolidating, and finishing concrete pavement.
   2) Develops vertical edges on the pavement.
   3) Is self propelled and equipped with a means for spreading the concrete to a uniform depth before it enters the throat.
   4) Vibrates the concrete to the full width and depth being placed in a single passage. Use vibrating tubes or arms working in the concrete or a vibrating pan operating on the surface of the concrete.
   5) Produces a surface reasonably free of voids and tears.
   6) When the paver is operated on previously placed concrete, prevent damage to the pavement surface.
   7) For slip form pavers, use a paver equipped with automatic horizontal and vertical grade controls.
b. Hand methods utilizing air screeds and vibrating screeds may be used for short pavement runs, cul-de-sacs, driveways, and some intersections.
c. When allowed by the Engineer, use stringless paving equipment capable of providing the same accuracy necessary to comply with the requirements of Section 7010.
d. Use a laser guided screed that meets all of the following:
   1) Designed for the specific purpose of placing and finishing of concrete pavement using a 3-dimensional surface model.
   2) All equipment for laser guided screed, including the guidance system, will meet the project design model tolerances.

3.01 EQUIPMENT (Continued)

3) Will provide consolidation to full width and full depth of concrete placement. Provide intermediate consolidation by using external hand held vibrators.
4) Produces a surface reasonably free of voids and tears.
5) Provide boom-style screed (drive-in screeds are not allowed) with an auger boom, placement head (water spray mechanism not allowed), guidance equipment, and software to produce 3-dimensional surface.
6) Produces pavement smoothness as specified in Section 7010, 3.07, C.

2. Vibrators for Machine Paving:

a. Consolidate, with a single pass of an approved internal or surface vibrator, the full width and depth of concrete requiring a finishing machine. Operate internal vibrators within a frequency range of 4,000 to 8,000 vibrations per minute. The Engineer may authorize the minimum vibration frequency to be lowered to 3,500 vibrations per minute for particular sections of paving, such as superelevations. Operate surface vibrators within a frequency range of 3,500 to 6,000 vibrations per minute.
b. Avoid operating vibrators in a manner to cause a separation of the mix ingredients, either a downward displacement of large aggregate particles or an accumulation of laitance on the surface of the concrete. When forward motion of the paver is reduced, vibrator frequency may need to be reduced to avoid separation of the mix.
c. If a vibrator fails to operate within the specifications, repair or change the vibrator before the paving begins:
   - The following day, or
   - The same day if the continuous paving that day is stopped at a header or at the end of a session.
d. If two adjacent vibrators fail to operate within the specifications, stop the paving operation and repair or replace the vibrators.
e. Stop vibrators whenever forward motion of the paver is stopped.
f. Set the internal vibrator penetration depth into the concrete pavement to mid slab or as deep as possible while passing above reinforcing steel. Provide an operating position locking device so that no part of the vibrating unit can be lowered to the extent that it will come in contact with reinforcing steel or tie bars while paving.
g. Do not exceed the manufacturer's recommendations for vibrator horizontal spacing. Do not exceed 16 inches from center to center.
h. Mount the longitudinal axis of the vibrator body approximately parallel to the direction of paving. Tilt the trailing end of each vibrator downward to a slope of 10 to 30 degrees below horizontal.
i. Use vibrators that meet or exceed the following specifications at the manufacturer's design frequency of 10,000 vpm:
   1) Amplitude (peak to peak) 0.070 inches.
   2) Centrifugal force 1,200 pounds.

3. Vibrators for Hand Methods: Use a vibration rate between 3,500 to 6,000 vibrations per minute, and use an amplitude sufficient to be perceptible on the surface of the concrete more than 12 inches from the vibrating unit.

4. Hand Finishing Equipment: Provide all finishing tools necessary for proper finishing of the concrete including straightedges for checking and correcting finished concrete surfaces.

5. Forms:

a. Rigid Forms: Steel, minimum thickness of 5 gage, height at least equal to design thickness of pavement with base width at least 6 inches.
   1) Minimum section length of 10 feet, joint connections designed to allow horizontal and vertical adjustment with locking device to hold abutting sections firmly in alignment.
   2) Bracing, support, and staking must prevent deflection or movement of forms.

3.01 EQUIPMENT (Continued)

b. Flexible Forms: Use steel or wood flexible forms for curves with a radius less than 100 feet.
1) Bracing, support, and staking must prevent deflection or movement of forms.
2) Ensure that forms used to shape back of curbs at returns have height at least equal to design thickness of pavement and curb height.
3) Forms must be free from scale and surface irregularities.

6. Curing Equipment: Use pressure sprayer capable of applying a continuous uniform film of curing compound. Use equipment with a shield if wind conditions do not allow proper coverage

7. Concrete Saws: Use power operated concrete saws capable of cutting hardened concrete neatly.

8. Joint Sealing Equipment: Use equipment capable of cleaning the joint and heating and installing sealant in joints according to manufacturer's recommendations.

3.02 PAVEMENT CONSTRUCTION

A. Removal of Pavement: Comply with Section 7040, 3.02.

B. Final Subgrade/Subbase Preparation:

1. General:
a. Meet the requirements of Section 2010 for subgrade construction, subgrade treatment, and subbase construction.
b. Trim the subgrade or subbase to the final grade for placement of concrete.
c. Unless otherwise ordered by the Engineer, the subgrade or subbase, at time of placing concrete for concrete pavement, must be in a uniformly moist but not muddy condition to a depth of not less than 1 inch.

2. Subgrade and Subbase Loading:
a. Travel of concrete delivery trucks on a subgrade or subbase must be approved by the Engineer. In such cases, watering of the subgrade or subbase must be limited to just ahead of the paving machine.
b. Enter and exit from side streets to minimize repetitive loading on the subgrade or subbase by concrete trucks.
c. Do not allow loads in excess of the legal axle load on the completed subgrade or subbase.
d. Partially loaded trucks may be required.
e. If subgrade or subbase failure occurs, coordinate the repair with the Engineer.

3. Paving Suspended:
a. Suspend the paving operation where subgrade or subbase stability has been lost.
b. Do not place concrete on a subgrade or subbase that has become unstable, bears ruts or tire marks of equipment, or that is excessively softened by rain until such subgrade or subbase has been reconsolidated and reshaped to correct the objectionable condition.
c. If necessary, scarify to a minimum depth of 6 inches, aerating, and recompacting at no additional cost to the Contracting Authority. Meet the compaction requirements of Section 2010, 3.06.

4. Maintenance of Subgrade or Subbase: Maintain the completed subgrade or subbase during subsequent construction activities.

3.02 PAVEMENT CONSTRUCTION (Continued)

C. Surface Fixture Adjustment:

1. Adjust manhole frames and other fixtures within area to be paved to conform to finished surface. Comply with Section 6010, 3.04 for manhole adjustments and Section 5020, 3.04 for water fixture adjustments.

2. Clean outside of fixture to depth of pavement before concrete placement.

3. Construct boxouts where allowed for later adjustment of fixtures. See Figure 7010.103 for the size and shape of the boxout.

D. Setting of Forms: When forms are used, meet the following requirements.

1. Ensure forms have sufficient strength to support paving operations being used.

2. Set base of forms at or below subgrade elevation with top of forms at pavement surface elevation. With Engineer approval, extra height forms may be used to shape the back of integral curb and edge of pavement; set base at or below subgrade elevation with top of form at top of curb elevation.

3. Place and secure forms to required grade and alignment. Do not vary the top face of the form from a true plane by more than 1/8 inch in 10 feet, and do not vary the vertical face from a true plane by more than 1/4 inch in 10 feet.

4. If the soil supporting the forms is softened by rain or standing water so that the forms are inadequately supported, or if voids occur under the forms, remove forms. Rework subgrade to proper elevation and density, and reinstall forms.

5. Ensure forms are free of latent concrete and coated with release agent before concrete is placed.

E. Bar and Reinforcement Placement: Ensure bars are clean, straight, free from distortion and rust, and are firmly secured in position as specified in the contract documents. Place all bars in approved storage to prevent damage; do not distribute along the work site except as needed to avoid delay in paving.

1. Tie Bars:

a. Place bars prior to vibration. For slip form paving, tie bars may be installed after vibration, provided the concrete is consolidated around the bars. Bars may be supported by approved chairs or may be placed in position by a machine or method approved by the Engineer.

b. Use approved continuous bolsters with runners to support reinforcement for bridge approach sections. Place the supports transversely across the approach and space them longitudinally no greater than 4 feet. For double reinforced approach sections the top layer of reinforcing may be chaired off the bottom layer of reinforcing using approved continuous high chairs with runners, provided they are positioned directly above the continuous bolsters with runners supporting the bottom layer of reinforcing. Hold epoxy coated reinforcing steel in place with epoxy or plastic coated bar supports and epoxy or plastic coated tie wires.

2. Dowel Bar Assemblies:

a. When dowel bar assemblies are required in the contract documents, accurately place these assemblies as shown. To prevent their movement during subsequent concrete paving operations, securely stake or fasten to the base to line and grade.

b. Do not use assemblies that are damaged prior to placement. If assemblies are damaged after placement, replace prior to paving. Ensure horizontal and vertical alignment of the load transfer bars does not exceed 1/4 inch from parallel to line and grade. Place each assembly so the bars are in a horizontal plane at T/2 ± 1/2 inch.

3.02 PAVEMENT CONSTRUCTION (Continued)

c. Check the placement of each assembly and the position of the bars within the assembly using a suitable template or other device approved by the Engineer. If the assembly is found to be placed outside of the above tolerances, correct the placement.
d. Cutting the tie wires of the load transfer assemblies is optional.

3. Bar Mats for Reinforced Pavement:

a. When reinforced pavement is specified, assemble bar mats accordingly and firmly fastened together at all bar intersections.
b. Place, secure, latch, and tie bar mats for a continuous mat as specified in the contract documents. Displacement during concrete placement operations is not allowed.
c. Use chairs to ensure proper placement of bar mats.

4. Tie Bars and Dowel Bars in Existing Pavement:

a. When anchoring in existing concrete, use a grout system according to the manufacturer's instructions. Obtain the Engineer's approval for the grout system.
b. For horizontal installations, use either a pressure injection system with mechanical proportioning and mixing, or use encapsulated chemical anchors. Install as follows:
   1) Ensure drilled holes to receive the grout match the dimensions and spacing specified in the contract documents. When not specified in the contract documents, the maximum nominal diameter of the hole must be 1/8 inch larger than the outside diameter of the dowel or bar, or as recommended by the manufacturer. Drill holes for tie bars and dowel bars into the face of the existing pavement at midpoint. To ensure proper horizontal alignment, do not allow any hole misalignments to exceed 1/4 inch in the vertical or horizontal plane. Clean the hole with compressed air immediately prior to placing the grout.
   2) Use a polymer grout to secure the dowels in the existing pavement. Inject the grout into the rear of the hole with pressure. Use sufficient grout so that when the bar to be grouted is placed in position, excess grout will be forced out the front of the hole. Rotate the bar during the insertion process to ensure complete coating with the grouting material. Hand proportioning and mixing is not allowed.
   3) If using grout with approved encapsulated anchors, install according to the manufacturer's recommendations.
   4) Use horizontal installation procedures for vertical or angled installations; however, pourable grouts may be used. Pourable grouts must be mechanically mixed.

F. Concrete Pavement Placement:

1. Use paving machine for all uniform width pavements 8 1/2 feet or more in width and 250 feet or more in length, unless alternate methods are approved by the Engineer. Screeds and laser guided screeds may be used on short pavement runs up to 250 feet.

2. Place, consolidate, and finish the concrete to the full depth and width conforming to the specified crown and cross-section in a single operation.

3. Keep a uniform pile of concrete in front of the paving machine, up to a maximum of 6 to 8 inches above the design surface elevation. Distribute and spread the concrete as soon as placed. A mechanical concrete spreader may be used.

4. Deposit the concrete upon the in-place bars keeping segregation to a minimum.
5. Use shovels, not rakes, to do necessary hand spreading and spading.

6. Do not allow the edges of pavement, including all longitudinal construction joints, to deviate from the line shown on the plans by more than 1/2 inch at any point.

7. If the paving machine operates on adjacent pavement, protect pavement from damage.

3.02 PAVEMENT CONSTRUCTION (Continued)

8. When placing by hand methods, consolidate the concrete by using vibrating units. Use a definite system or pattern in the operation of the vibrator so the full width of concrete in each linear foot of lane will receive adequate and uniform consolidation. The system and methods of vibrating is subject to approval of the Engineer. Do not use vibrating equipment as a tool for moving concrete laterally.

9. Stringless Paving:
   a. Provide an electronic file identifying x, y, and z coordinates for curbs and pavement edges, as well as pavement centerline based on project alignments and elevations.
   b. Location and elevation of the finished slab should be verified against grade check hubs at 25 foot intervals for the first 100 feet of each days run and at critical locations, such as intakes and through intersections where grades may be flat. The Engineer may waive these requirements if experience has shown compliance with the design elevations.
   c. Record each verification check and submit to the Engineer.
   d. At the beginning of paving operations on the project or after each modification to the paving machine, verify the paving equipment is calibrated per the manufacturer's recommendations.

G. Integral Curbs: Integral curbs are placed with the pavement in a single paving machine operation; however, hand methods may be allowed for radius, returns, and sections of curb and gutter 100 feet or less in length or in other special sections where mechanical equipment cannot be used.

1. Pave, edge, protect, saw, and cure curb in same manner as pavement.

2. Finish curb as rapidly as finishing operations on pavement permit. Maximum distance behind paving machine is 100 feet.

3. Complete final finish on curbs by hand methods, including the use of a 6 foot straightedge.

4. Check surfaces of curb and gutter with 10 foot straightedge; correct variations greater than 1/8 inch. Ensure top of curb slopes to street when Class A sidewalk will be constructed adjacent to the curb.

5. For drop curb at driveways and where sidewalks intersect streets, use forms to shape the backs of such curbs.

6. When using hand methods for building curb, the following additional requirements will apply:
   a. Remove free water, latency, dust, leaves, or other foreign matter from the slab prior to placing concrete for curb.
   b. Use freshly mixed concrete; do not store concrete in receptacles at side of pavement for use in curb at a later time; do not use concrete requiring retempering.
   c. Consolidate curb concrete to obtain adequate bond with the pavement slab and to eliminate honeycomb in the curb. Avoid disturbing the alignment of forms or the gutter flow line.

H. PCC Railroad Crossing Approach: Construct according to Section 7010 and Figure 7010.903. Construct asphalt section according to the full depth patch requirements of Section 7040.

I. Finishing:

1. Grade and Crown: Promptly after concrete has been placed and vibrated, strike off the surface to the true section by the screed. Finish the surface true to crown and grade.

3.02 PAVEMENT CONSTRUCTION (Continued)

2. Watering the Surface: The practice of lubricating the pavement surface by sprinkling water by spray, brush, or other methods to afford greater ease in finishing operation is not allowed.

3. Floats: Finish surface with wood or magnesium floats; finish from both sides simultaneously if pavement is placed to full width with one pass of paving machine.

4. Straightedging:

a. After the longitudinal floating has been completed and the excess water has been removed, and while the concrete is still plastic, test the pavement surface for trueness.
b. Immediately fill any depressions found with freshly mixed concrete, struck off, consolidated, and refinished.
c. Check surface longitudinally while concrete is still plastic; correct any surface deviations greater than 1/8 inch in 10 feet.

5. Surface Treatment:

a. Drag Surface Treatment: Unless otherwise specified, texture the finished surface with an artificial turf or burlap drag treatment.

1) Pull the artificial turf or burlap drag longitudinally over the finished surface to produce a tight, uniform, textured surface, and round the edges in a workmanlike manner.
2) Remove the artificial turf or burlap drag from the pavement surface at regular intervals and clean with water to remove accumulated concrete from the fabric in order to maintain a consistent finished texture.
3) When the desired texture is not attained, the Engineer may require the final finish be a broom finish.

b. Surface Tining: When surface tining is specified, use a longitudinal tining. Under special circumstances, when specified in the contract documents, transverse tining may be required.

1) Longitudinal:

a) Complete longitudinal surface tining using a machine with a wire broom or comb. For small or irregular areas, or during equipment breakdown, hand methods may be used. Use a broom or comb with a single row of tines 1/8 inch (+/- 1/64 inch) in width and uniformly spaced at 3/4 inch intervals. The depth of the grooves must be a minimum of 1/8 inch to a maximum of 3/16 inch in the plastic concrete.
b) Use equipment with horizontal and vertical string line controls to ensure straight grooves.
c) Conduct this operation at such time and in such manner that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets.
d) At longitudinal joints, leave a 2 to 3 inch wide strip of pavement surface (centered along the joint) that is not grooved for the length of the joint.

2) Transverse:

a) If transverse surface tining is required or allowed, use a machine with a wire broom or comb. For small or irregular areas, or during equipment breakdown, hand methods may be used. Use a broom or comb with a single row of tines 1/8 inch (+/- 1/64 inch) in width and randomly spaced from 3/8 inch to 1 5/8 inch with no more than 50% of the spacing exceeding 1 inch. The depth of the grooves must be a minimum of 1/8 inch to a maximum of approximately 3/16 inch in the plastic concrete.
b) Conduct this operation at such time and in such manner that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets.

3.02 PAVEMENT CONSTRUCTION (Continued)

c) Where abutting pavement is to be placed, the tining should extend as close to the edge as possible without damaging the edge.
d) If abutting pavement is not to be placed, do not tine the 6 inch area nearest the edge or 1 foot from the face of the curb.

6. Edge Finish: Before the concrete has taken its initial set, finish all edges of the pavement with an 1/8 inch radius edging tool.

7. Honeycomb Repair: When paving without forms, fill any honeycombed area immediately with freshly mixed concrete and work into the slab prior to initial set and the application of curing. Failure to do so may prompt the Engineer to declare the work defective and cause it to be removed and replaced at no additional cost to the Contracting Authority.

J. Surface Curing:

1. Apply liquid curing compound in a fine spray to form a continuous, uniform film on the horizontal surface and vertical edges of pavement, curbs, and back of curbs immediately after surface moisture has disappeared, but no later than 30 minutes after finishing. With approval of the Engineer, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties to ensure acceptable macrotexture is achieved.
   a. Use a white pigment liquid curing compound for concrete not receiving an asphalt overlay. When specified in the contract documents, use a linseed oil solution.
   b. Use a dark-colored curing compound for concrete receiving an asphalt overlay.

2. Apply compound with power sprayer; rate of application not less than 15 square yards per gallon (0.067 gallon per square yard); do not dilute compound. For concrete receiving an asphalt overlay, use a minimum rate for dark-colored cure of 12.5 square yards per gallon (0.08 gallon per square yards).

3. Ensure liquid curing materials are well agitated in the supply drum or tank immediately before transfer to the sprayer. Keep curing materials well agitated during application.

4. Hand operated sprayers may be used for small and irregular areas.

5. If forms are used, apply to pavement edges and back of curbs within 30 minutes after forms are removed.

6. If, due to other operations, the coating is damaged within 72 hours after being applied, immediately re-coat the affected areas. Coating of the sawed surface with curing compound will not be allowed on joints that are to be sealed. When pavement is opened to traffic prior to 72 hours after application of the curing coating, a re-coating will not be required.

K. Construction of Joints:

1. General:
   a. Construct joints of the type, dimensions, and at the locations specified in the contract documents. See the 7010 figures.
   b. Place longitudinal joints coincident with or parallel to the pavement centerline.
   c. Place all transverse joints at right angles to the centerline and extend the full width of the pavement.
   d. Place all joints perpendicular to the finished grade of the pavement and do not allow the alignment across the joint to vary from a straight line by more than 1 inch.
   e. Exercise care in placing, consolidating, and finishing the concrete at all joints.

2. Saw Joints:
   a. Mark joint locations with a string line before sawing.
   b. Begin transverse joint sawing as soon as the concrete has hardened sufficiently to allow sawing without raveling or moving of aggregate. Saw joints before uncontrolled cracking takes place.

3.02 PAVEMENT CONSTRUCTION (Continued)

c. Saw all joints in a single cutting operation for a specific joint. Make saw cuts true to line and to the dimensions specified in the contract documents.
d. Discontinue sawing a joint if a crack develops ahead of the saw.
e. Saw longitudinal joints within 24 hours of the concrete being placed.
f. If necessary, continue the sawing operations both day and night.
g. The concrete must be capable of supporting the sawing operations to allow the use of an early green concrete saw.
h. Repair or replace pavement with uncontrolled or random cracking at no additional cost to the Contracting Authority. Use repair methods approved by the Engineer. Repair or replace at the direction of the Engineer.
i. Use wet sawing for dust control when specified in the contract documents.
j. Where boxouts occur in pavement, construct joints as shown on Figures 7010.103 and 7010.904.

3. Construction Joints:

a. Place longitudinal and transverse construction joints where specified in the contract documents, at boxouts, and at headers.
b. Locate and place forms for boxouts on grade prior to paving as shown on Figures 7010.103 and 7010.904.
c. Construct a Days Work (DW) or a Rigid Tie (RT) transverse construction joint no closer than 5 feet of an existing or planned transverse contraction joint. Construct the DW or RT transverse construction joint if concrete placement is delayed for more than 30 minutes, at planned pavement gaps, or at the end of each day.
d. Finish the edges of the pavement at construction joints with a 1/8 inch radius edging tool.

4. Expansion Joints:

a. Install expansion joints as specified in the contract documents.
b. Prevent movement of or damage to joint assembly when placing concrete; set joint material low enough to clear the finish machine.
c. Construct double width expansion joint in curb over expansion joint in pavement. The backside of the joint must be clear of concrete.
d. Align the expansion joint straight and true. After the mechanical finishing equipment has passed over the joint, check the joint for movement. If movement in excess of 1/2 inch has occurred, immediately correct the installation to its intended position.
e. If joint fillers are assembled in sections, or if joints as a whole are constructed in sections, do not allow offsets between adjacent fillers.
f. Where more than one section is used in a joint, securely lace or clip the sections together.
g. Supplemental vibration equipment is required for proper consolidation of the concrete.
h. After the surface finishing has been completed, finish the edge of the joint with a 1/8 inch edging tool.

L. Joint Sealing:

1. Timing:

a. Unless otherwise allowed or approved by the Engineer, before any portion of the pavement is opened to the Contractor's equipment or to general traffic, clean and seal joints that require sealing.
b. The Engineer may limit the wheel loads and axle loads of equipment operating on the pavement during this operation, if prior to the age and strength specified in Section 7010, 3.05. Additional tests to determine the pavement strength may be required.

3.02 PAVEMENT CONSTRUCTION (Continued)

2. Cleaning:

a. For those joints that are not to be sealed, cleaning is not required.

b. Within 3 hours after a joint has been wet sawed to the finished dimension, flush the wet sawing residue away from the sawed faces using a high pressure water blast operating with a minimum pressure of 1,000 pounds per square inch. Within 3 hours after a joint has been dry sawed to the finished dimension, blow the dry sawing residue from the joint using air compressors that provide moisture and oil free compressed air.

c. Immediately prior to installation of sealant, clean joints with an air blast. Do not perform sealing until visual examination verifies the joint surfaces appear dry, in addition to being clear of dust and contamination.

3. Sealing:

a. Prepare and install joint sealer in the joint and to the proper level specified in the contract documents and as recommended by the manufacturer.

b. Heat hot-poured sealers in a thermostatically controlled heating kettle; heat the material to the temperature required for use, but not above that recommended by the manufacturer. After sealing, remove excess sealer from the pavement surface.

c. Seal joints the same day they are cleaned. Apply sealant only when the joint surfaces appear dry by visual examination.

d. Place joint sealer only when the pavement and ambient air temperatures are 40°F or above. When near this minimum, additional air blasting or drying time, or both, may be necessary to ensure a satisfactory bond to the joint faces. When this sealer cannot be properly placed due to late fall work, submit a joint construction plan and sealing details to the Engineer for approval before commencing paving. Delay the cleaning, sealing, and, if required, resawing of joints until the following spring. This delay requires the Engineer's approval.

e. When surface correction is required, repair seals damaged from the corrective work. Joint preparation, cleaning, and sealing may be delayed until after corrective work, provided the pavement is not opened to traffic before corrective work is performed.

M. Pavement Backfill: Following slipform paving operations, place backfill material along the pavement within 48 hours of pavement attaining opening strength or as directed by the Engineer to prevent flow of water and any subsequent damage caused by undermining of the pavement. Prior to placement of full backfill material, construct check dams or other protection as appropriate to ensure no damage to the subgrade and/or subbase occurs.

N. Form Removal:

1. Timing:

a. Remove forms after the initial set of the concrete has taken place.

b. Remove stakes and forms with care to prevent cracking, spalling, or over stressing concrete. If damage does occur, repairs will be made as required by the Engineer.

2. Honeycomb Repair:

a. When the forms are removed, fill honeycombs with mortar composed of 1 part cement and 2 parts fine aggregate by weight.

b. If the honeycombing is to the degree and nature that it is considered by the Engineer as defective work, remove and replace at no additional cost to the Contracting Authority.

3. Paving Protection: In the area adjacent to the curbs and pavement edge, immediately place backfill after the forms are removed. Construct dams or other protection to ensure that no saturation or erosion of the subgrade under or near the pavement occurs. This may include check dams, pumping, etc.

3.03 CURB AND GUTTER CONSTRUCTION (See Figure 7010.102)

A. Complete the construction of curb and gutter separate from pavement in the same manner as for pavement in Section 7010, 3.02.

B. Use a paving machine for curb and gutter. For curb and gutter sections less than 250 feet, hand finish methods may be used.

3.04 PAVEMENT PROTECTION

A. Weather Conditions: Do not place concrete when stormy or inclement weather or temperature prevents good workmanship. Temperature restrictions and protection requirements may be modified by the Engineer under unusual conditions.

1. Cold Weather:

a. Paving: Do not place aggregates containing frozen lumps, and do not place concrete on a frozen subgrade or subbase. Take all necessary actions to prevent the pavement from freezing.

1) Concrete mixing and placement may be started, if weather conditions are favorable, when the air temperature is at least 34ºF and rising. At the time of placement, concrete must have a temperature of at least 40ºF.
2) Stop mixing and placing when the air temperature is 38ºF or less and falling or if the temperature stops rising and does not reach 38ºF.

b. Protection: Prior to applying protection, cure all concrete pavement and curb/gutters, including exposed edges of the pavement and curb. In addition, protect concrete less than 36 hours old as follows:

Night Temperature Forecast	Type of Protection[1]
35°F to 32°F	One layer of burlap for concrete.
31°F to 25°F	Two layers of burlap or one layer of plastic on one layer of burlap.
Below 25°F	Four layers of burlap between layers of 4 mil plastic or equivalent commercial insulating material approved by the Engineer.

[1] Keep protection in place until one of the following conditions is met:
a. The pavement is 5 calendar days old.
b. Opening strength is attained.
c. Forecasted low temperatures exceed 35°F for the next 48 hours.
d. Forecasted high temperatures exceed 55°F for the next 24 hours and subgrade temperatures are above 40°F.

1) Shut down paving operations in time to comply with protection requirements outlined above. During cold weather, allow more time for finishing and protection. Perform all finishing and covering operations prior to darkness. Temperature restrictions and protection requirements may be modified by the Engineer.
2) Equivalent commercial insulating material approved by the Engineer may be used. This material must be waterproof and have a minimum R value of 1.0. If initial set has not yet occurred, place a layer of burlap on top of concrete prior to placing insulating blankets.
3) Use a method of protection and materials that will maintain the concrete temperature above 40°F.

3.04 PAVEMENT PROTECTION (Continued)

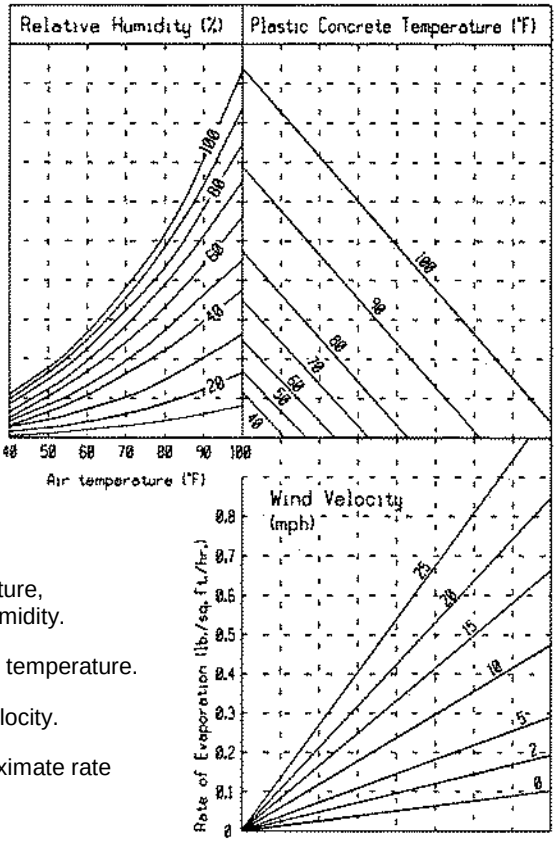
2. Hot Weather: Hot weather condition is defined as any combination of the following conditions that tend to impair the quality of plastic concrete by accelerating the rate of moisture loss and rate of cement hydration causing thermal shrinkage and resulting in plastic shrinkage cracking:

- High Ambient Temperature
- High Concrete Temperature
- Low Relative Humidity
- High Wind Velocity
- Solar Radiation

a. General:
   1) During hot weather conditions, the Engineer may restrict concrete placement to early morning or evening hours.
   2) During hot weather conditions, advise the Engineer of the results of the theoretical evaporation rate throughout paving operations.

b. Determine the Theoretical Rate of Evaporation: Use the following chart and the National Weather Service's predicted maximum air temperature, relative humidity, and maximum steady wind velocity without gusts, for the date and the location of the paving pour.

Theoretical Rate of Evaporation Chart



To Use this Chart:

1. Enter with air temperature, move up to relative humidity.
2. Move right to concrete temperature.
3. Move down to wind velocity.
4. Move left , read approximate rate of evaporation

c. If the evaporation rate exceeds 0.1 pounds per square foot per hour but is less than 0.3 pounds per square foot per hour, provide the following concrete evaporation protection.
   1) Immediately apply an approved evaporation retarder to the concrete pavement and curbs or increase the surface cure application to 1.5 times the standard specified rate.

3.04 PAVEMENT PROTECTION (Continued)

2) Take special precautions to ensure that the forms and subgrade are sufficiently moist or protected to avoid lowering the water content at the pavement/subgrade interface. In hot weather conditions, moisten the subgrade the evening before operations.
3) Ensure that the time between placing and curing is minimized and eliminate delays.
4) Moisten concrete aggregates that are dry and absorptive.
5) Use a fog spray to raise the relative humidity of the ambient air if there is a delay in immediately applying the curing compound.
6) Minimize solar heat by shading, wetting, or covering concrete chutes or other equipment that comes in contact with plastic concrete.

d. If the evaporation rate is 0.3 pounds per square foot per hour or greater, discontinue placement of concrete.

3. Rain Protection:

a. Have materials available, near the work site, for proper protection of the edges and surface of concrete. Protective material may consist of sheets of burlap or plastic film. Also have planks or other material with suitable stakes that can be used as temporary forms available.
b. If initial set has not occurred, take every precaution necessary to protect the surface texture of the concrete.
c. If so determined by the Engineer, failure to properly protect concrete will constitute cause for removal and replacement of defective pavement.

B. Night Conditions: Perform all finishing and covering operations prior to darkness (half an hour after sunset). Do not commence construction until half an hour before sunrise. Do not place or finish concrete under artificial light, unless approved by the Engineer.

C. Protection from Traffic:

1. General:

a. Protect the new pavement and its appurtenances from traffic, both public and that caused by the Contractor's own employees and agents, at no additional cost to the Contracting Authority. This includes the erection and maintenance of warning signs, lights, barricades, watchmen to direct traffic, and pavement bridges or crossovers.
b. Do not operate equipment with metal tracks, metal bucket blades, or metal motor patrol blades directly on new paving. Do not unload soil or granular materials, including base rock for storage and future reloading directly onto new paving.

2. End of Day's Run:

a. At the end of each day's run and at all side streets, erect and maintain safety barriers and fencing as necessary to protect the pavement from damage.
b. Install safety fences within 1 hour of the completion of finishing and curing operations. Leave fences in place and maintained until the concrete has attained the minimum strength or age.
c. Intermediate safety fences may be required for the purpose of opening the pavement for access to a side road, side street, or entrance.

3. Repair of Damages: At the discretion of the Engineer, and at no additional cost to the Contracting Authority, repair or replace any part of the pavement damaged by traffic or other causes occurring prior to final acceptance of the pavement.

3.05 USE OF PAVEMENT

Time for opening pavement for use is determined by maturity method complying with Iowa DOT Materials I.M. 383 or age and test results. The minimum age and test results needed for opening are shown in Table 7010.01.

Table 7010.01: Minimum Age and Tested Strength of Pavement Before Opening

Class of Mix	Type of Cement	Minimum Age For Opening[1]	Minimum Compressive Strength (psi)	Minimum Flexural Strength Center Point (psi)
C	Type I	7 Days[2]	3,000	500
M	Type I	48 Hours	3,000	500

[1] Opening without testing only allowed upon approval of Engineer
[2] Five calendar days for concrete 9 inches thick or more. If maturity testing is used to determine opening, minimum flexural strength may be lowered to 350 psi if approved by the Engineer.

3.06 TRANSPORTATION RESTRICTIONS

A. Do not use concrete transported with continuous agitation when the cement has been in contact with the aggregate more than 90 minutes before it is placed. With the approval of the Engineer, an approved retarding admixture may be used at the rates required in Iowa DOT Materials I.M. 403.

B. Do not use concrete transported without continuous agitation if the period elapsed between the time the concrete is mixed and the time it is placed is greater than 30 minutes. With the approval of the Engineer, an approved retarding admixture may be used at the rates required in Iowa DOT Materials I.M. 403 and the mixed-to-placed time may be extended.

C. Ensure the methods of delivering and handling the concrete are such that objectionable segregation or damage to the concrete will not occur, and concrete placing will occur with a minimum of rehandling.

D. Thoroughly clean the truck compartment in which concrete is transported and flush with water to ensure that hardened concrete will not accumulate. Discharge the flushing water from the truck compartment to the designated discharge point before it is charged with the next batch.

3.07 QUALITY CONTROL

A. Testing: Provide the following material certifications and testing required to be performed by Supplier or Contractor.

Table 7010.02: Material Certifications and Testing

Material or Construction Item	Tests	Applicable Standard[1]	Methods of Acceptance of Sampling and Testing	Field Sampling and Testing	
				Frequency (minimum)	Responsible Party
Fine Aggregates	Gradation	I.M. 302, 306, 336	Cert. Plant Insp.[2]	1/250 CY or min 1/day	Supplier/ Contractor
	Moisture	I.M. 308, 527	Cert. Plant Insp.[2]	1 per 1/2 day	
	Specific Gravity	I.M. 307	Cert. Plant Insp.[2]	1/250 CY or min 1/day	
	Quality	I.M. 209	Approved Source	Prior to use	
Coarse Aggregates	Gradation	I.M. 302, 306, 336	Cert. Plant Insp.[2]	1/250 CY or min 1/day	
	Moisture	I.M. 308, 527	Cert. Plant Insp.[2]	1 per 1/2 day	
	Specific Gravity	I.M. 307	Cert. Plant Insp.[2]	1/250 CY or min 1/day	
	Quality	I.M. 209	Approved Source	Prior to use	
Portland Cement	Quality	I.M. 401	Approved Source	Prior to use	
Fly Ash	Quality	I.M. 491.17	Approved Source	Prior to use	
GGBFS	Quality	I.M. 491.14	Approved Source	Prior to use	
Curing Compound	Quality	Iowa DOT Section 4105	Approved Source	Prior to use	
Joint Sealer	Quality	I.M. 436.01	Approved Source	Prior to use	
Epoxy Dowel Bars and Assemblies	Quality	I.M. 451.03B	Approved Source	Prior to use	
Tie Bars	Quality	I.M. 451	Approved Source	Prior to use	
Plastic Concrete	Air Content	I.M 318, 327	Field Test	1/200 CY or min. 1/day	Engineer
	Slump	I.M. 317	Field Test	1/200 CY or min. 1/day	
	Cylinders	I.M. 315	Field Test	Set of 3/500 CY or two sets/day	
	Beams	I.M. 316, 327, 328	Field Test	Set of 3/500 CY or two sets/day	
	Thickness	----------	Field Test	1/200 CY	
Hardened Concrete	Smoothness	SUDAS 7010, 3.07	Field Test - Straightedge	Project length	
	Smoothness	SUDAS 7010, 3.07	Field Test - Inertial Profiler	Project length	Contractor
	Thickness	SUDAS 7010, 3.07	Field Test	1 core/1000 SY or 3 cores/project	
	Strength	I.M. 383	Maturity Tests[3]	Prior to placement	

[1] Refers to the Iowa DOT Materials I.M.s, Iowa DOT Standard Specifications, or SUDAS Standard Specifications.
[2] Certified plant inspection per Iowa DOT Materials I.M. 527.
[3] The Contractor is responsible for developing the maturity curve for the specified mix, taking maturity readings, and delivering a copy of the results to the Engineer.

B. Air Content:

1. Air content of the concrete will be evaluated according to Iowa DOT Materials I.M. 318 and 327.

3.07 QUALITY CONTROL (Continued)

2. When a test result is outside the tolerance for the target air content, the contractor will be notified immediately. An air test will then be immediately run behind the paver to aid in identifying the limits of the non-complying air. A test result between 5% and 8% behind the paver will be considered complying. This test will represent all concrete from the back of the paver back to the last documented complying test. Make immediate adjustments to the mix production and placement process to bring the air content back within tolerance. Do not use succeeding loads below the lower target air content tolerance by more than 0.5%. Each subsequent load will be tested until air content is within tolerance for two consecutive loads. For all incorporated, non-complying concrete that is out of tolerance, the Engineer will determine if removal and replacement is required or if a price adjustment, according to Table 7010.03, will be applied.

Table 7010.03: Concrete Air Content Price Adjustments

Air Content Range			% Payment of Unit Price
Minimum		**Maximum**	
1.1*	and	below	0%
0.6	to	1.0*	50%
0.1	to	0.5*	75%
Low air tolerance limit			100%
Target			100%
High air tolerance limit			100%
0.1	to	0.5**	95%
0.6	to	1.0**	85%
1.1	to	1.5**	75%
1.6	to	2.0**	60%
2.1**	and	above	0%

*Air content deviation below the acceptable limits
** Air content deviation above the acceptable limits

C. Pavement Smoothness: Evaluate pavement smoothness for all PCC pavement and overlay surfaces.

1. Straightedge: The Engineer will check PCC pavement surfaces with a 10 foot straightedge placed parallel to the centerline. Areas showing high spots of more than 1/4 of an inch in 10 feet will be marked. Complete surface corrections according to the following procedures to an elevation where the area or spot will not show surface deviations in excess of 1/8 inch when tested with a 10 foot straightedge.

a. Complete surface corrections by diamond grinding, placing a PCC overlay, or replacement.
b. Use grinding and texturing equipment complying with Iowa DOT Section 2532. Use a minimum 36 inch wide cutting head, unless a 24 inch cutting head is necessary due space limitations.
c. Perform surface correction parallel to lane lines or edge lines as directed by the Engineer. Make each pass parallel to the previous pass. Ensure the ground surface is of a uniform texture.
d. Do not allow adjacent passes to overlap more than 1 inch or have a vertical difference of 1/8 inch as measured from bottom of groove to bottom of groove.
e. Begin and end smoothness corrections at lines normal to the pavement lanes lines or edge lines within any one corrected area. Proceed from the centerline or lane line toward the pavement edge to maintain pavement cross slope.

Surface corrections will be completed at the direction of the Engineer with no additional cost to the Contracting Authority.

3.07 QUALITY CONTROL (Continued)

2. Inertial Profilers:

a. If specified in the contract documents, comply with Iowa DOT Section 2317 and Materials I.M. 341, Appendix A to measure pavement smoothness with an inertial profiler and start appropriate corrective measures, if necessary; the engineer will determine the corrective measures to be taken. No incentive for pavement smoothness will be made.

b. Evaluate according to the smoothness requirements of Table 7010.04 and make surface corrections and/or price reductions. Surface corrections will be completed with no additional cost to the Contracting Authority. No incentive for pavement smoothness will be made.

c. Smoothness measurements will be suspended for structures and through intersections.

Table 7010.04: Smoothness Adjustment/Correction

Segment Speed	Mean Roughness Index (inches per mile)	Pay Factor
Greater than 45 mph	< 200	100%
	200 to 250	-$15.00/foot/lane or grind[1]
	≥ 250	Grind[1]
Less than or equal to 45 mph	< 250	100%
	250 to 300	-$15.00/foot/lane or grind[2]
	≥ 300	Grind[2]

[1] Correct to below 200 inches per mile
[2] Correct to below 250 inches per mile

D. Pavement Thickness:

1. At locations determined by the Engineer, cut samples from the pavement by drilling with a core bit that will provide samples with a 4 inch outside diameter. Restore the surface by tamping low slump concrete into the hole, finishing, and texturing. The Engineer will witness the core drilling, identify, and take possession of the cores. The Engineer will determine the core locations, measure the cores, and determine the thickness index according to Iowa DOT Materials I.M. 346 and 347, except as modified as follows:
   a. For regular or irregular shaped areas, use a lot size of 1,000 square yards. Include remnants less than 500 square yards in the last lot and remnants greater than 500 square yards in a separate lot. Take a minimum of three cores per project.
   b. For any core with a deficiency greater than 0.15 inch, take two additional cores in that pavement lot and use the average of the three cores.

2. If approved by the Engineer, take non-destructive measurements to determine the pavement thickness and the thickness index for each section.
   a. Use Magnetic Imaging Tomography (MIT) Scan T2 or T3 gauge to perform thickness measurements.
   b. Use 24 gauge commercial steel as targets that are 11.81 inches in diameter with G90 coating meeting ASTM A 653.
   c. The Engineer will determine the location of each lot, the random location of each metal target, and the random thickness measuring scheme for each section using an Iowa DOT developed spreadsheet. Immediately prior to paving, the Engineer will place the target or observe the contractor place the target. The program will randomly determine which targets to measure.

3.07 QUALITY CONTROL (Continued)

1) For regular or irregular areas, the section will be divided longitudinally into 1,000 square yard lots. One target will be located in each lot based on the spreadsheet selection. Beginning with the first station at +00, place a target from the edge of the pavement halfway between dowel baskets, if applicable. If the +00 station falls on a basket, move the target location ahead halfway between the dowel baskets. A minimum of 10 targets will be tested. If a target location falls on a bridge or in an approach section, it will be eliminated.
2) The transverse location of the targets will be randomly determined by the spreadsheet. The random locations will be 4 feet from edge of pavement, left or right. Place targets in the center of the pavement panel to prevent interference by the steel in the joints. For ease of measuring, plates may be placed 18 inches from the edge if there is no tie steel or a work bridge is not available.

d. Follow the manufacturer's instructions for operating the thickness gauge. It is important to avoid testing close to any steel including vehicles, equipment, steel toed shoes as well as tie bars, dowel bars and baskets, and manhole covers. When wearing steel toed shoes, always keep both toes at least 2 feet from the gauge during the test. Three repeat readings will be taken. The readings should all be within 0.15 inch of each other.
e. Evaluate each section according to Iowa DOT Materials I.M. 346.
f. The Engineer will perform quality assurance testing at a minimum of one random test per seven plate locations, using one of the following methods.
   1) Probe during paving operations according to Iowa DOT Materials I.M. 396. Plates may be moved to 18 inches from the edge of the pavement to allow easier testing.
   2) Survey, to a minimum of 0.005 foot, on the plate prior to paving and on top of the pavement directly over the plate after placement to determine an accurate thickness verification.
   3) MIT gauge according to Iowa DOT Materials I.M. 346. Use a different gauge than the one used by the contractor on the project.
g. Include all MIT Scan measurements and quality assurance measurements for calculation of pavement thickness. The final pavement thickness will be determined by one of the following:
   1) If all the quality assurance measurements are within ±0.25 inch of the MIT Scan measurements, the MIT Scan measurements will be considered validated. The Engineer will determine final thickness based on the average MIT Scan measurements.
   2) If at any one location, the quality assurance measurements are greater than ±0.25 inch difference from the MIT Scan measurements, core at the plate location and 2 feet away from the plate location. If the core at the plate location indicates that it has moved during placement, use the core thickness from the core taken 2 feet away as the pavement thickness. The Engineer will replace the MIT Scan thickness at the location with the core thickness taken 2 feet away along with the average MIT Scan measurements as final pavement thickness.
   3) If all of the quality assurance measurements are greater than ±0.25 inch difference from the MIT Scan measurements, the Engineer will randomly select a minimum of 10 random locations, at 2 feet from the plate location, for coring by the Contractor. The Engineer will use the average core thickness, tested according to Iowa DOT Materials I.M. 346, to determine final pavement thickness.

3.07 QUALITY CONTROL (Continued)

h. If any measurement is deficient from T by 0.5 inch or more, the measurement should be rechecked to confirm the reading and the equipment. If the repeat measurement is also 0.5 inch or more below T, mark the location directly over the target. Drill a 4.0 inch diameter core at that location. If the core length confirms the pavement is deficient by 0.5 inch or more, drill a core 60 feet in each direction longitudinally at the same transverse location from the deficient core. Drilling will be continued at 60 feet intervals until a core is obtained that is not deficient. Interpolate between this core and the adjacent core to determine the limits of the deficient area. These additional cores are to be used to define the deficient area and will not be used in the thickness index calculation. When an obstruction, such as a bridge, intersection, previous work, etc., prevents drilling a core at the required 60 feet interval in either direction longitudinally, continue the balance of the distance on the other side of the obstruction.

3. Coring of pavement or other work for thickness determination may be waived by mutual agreement for sections of the same design thickness less than 2,500 square yards.

4. Based on the thickness index determined by the Engineer, the pavement payment will be as shown in Tables 7010.05 and 7010.06.

5. If the thickness index deficiency is greater than 0.51 for pavements thinner than 9 inches or 0.91 for pavements 9 inches or thicker, the Engineer will study the extent and severity of the deficiency of the pavement areas. The Engineer will require one of the following based on a review on the level of deficiency, the amount of the payment penalty, and the estimated reduction in the design life of the deficient pavement:
   a. Removal and replacement of the deficient areas with pavement complying with the contract documents at no additional cost to the Contracting Authority.
   b. Completion of an agreement that provides a combination of an extended guarantee period and payment penalty and allows the deficient pavement to be left in place.

Table 7010.05: Pay Factor for PCC Pavement for Design Thickness less than 9"

Thickness Index Range	Percent Payment
More than 0 to -0.15	100
-0.16 to -0.25	95
-0.26 to -0.50	85
-0.51 or less	As determined by the Engineer

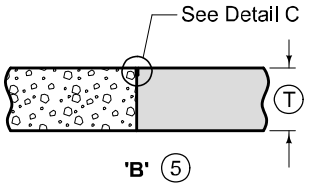
3.07 QUALITY CONTROL (Continued)

Table 7010.06: Pay Factor for PCC Pavement for Design Thickness 9" or Greater

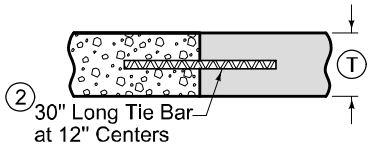
Thickness Index Range	Percent Payment
More than 0.00 to -0.15	100
-0.16 to -0.20	99
-0.21 to -0.25	98
-0.26 to -0.30	97
-0.31 to -0.35	96
-0.36 to -0.40	95
-0.41 to -0.45	94
-0.46 to -0.50	93
-0.51 to -0.55	92
-0.56 to -0.60	91
-0.61 to -0.65	90
-0.66 to -0.70	89
-0.71 to -0.75	88
-0.76 to -0.80	87
-0.81 to -0.85	86
-0.86 to -0.90	85
-0.91 or less	As determined by the Engineer

E. Defects or Deficiencies: Remove and replace or repair pavement containing excessive cracks, fractures, spalls, or other defects at no additional cost to the Contracting Authority. The method of replacement or repair will be determined by the Engineer.

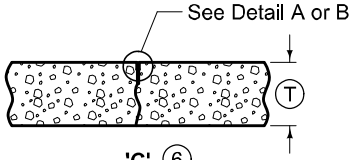
END OF SECTION



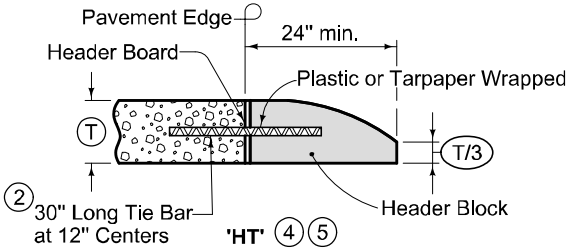
'B' (5)
PLAIN JOINT
(Abutting Pavement Slabs)



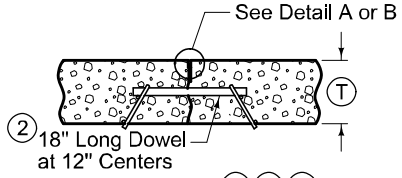
'DW' (3)(4)(7)
DAY'S WORK JOINT(Non-working)



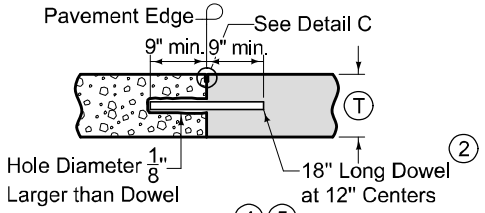
'C' (6)
CONTRACTION JOINT



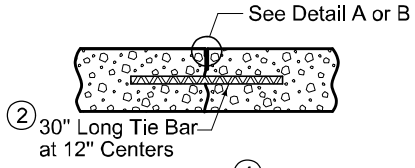
'HT' (4)(5)
HEADER JOINT
(End Rigid Pavement)



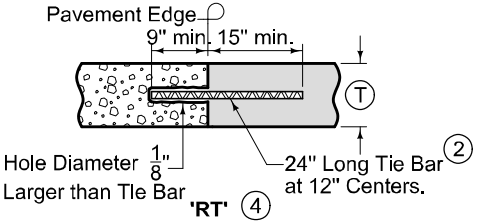
'CD' (1)(4)(6)
DOWELED CONTRACTION JOINT



'RD' (4)(5)
ABUTTING PAVEMENT JOINT

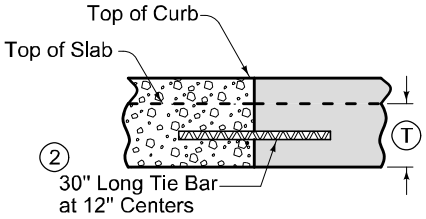


'CT' (4)
TIED CONTRACTION JOINT

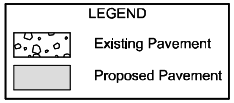


'RT' (4)
ABUTTING PAVEMENT JOINT
RIGID TIE

1. See dowel assemblies for fabrication details.
2. See Bar Size Table for Contraction Joints on Sheet 2.
3. Locate 'DW' joint at a mid-panel location between future 'C' or 'CD' joints. Place no closer than 5 feet to a 'C' or 'CD' joint.
4. Place bars within the limits shown under dowel assemblies.
5. Edge with 1/8 inch tool for length of joint. For HT joint, remove header block and board when second slab is placed.
6. Unless specified otherwise, use 'CD' transverse contraction joints in mainline pavement when (T) is greater or equal to 8 inches. Use 'C' joints when (T) is less than 8 inches.
7. 'RT' joint may be used in lieu of 'DW' joint at the end of the days work. Remove any pavement damaged due to the drilling at no additional cost to the Contracting Authority.



'DW - CG' (3)(4)
DAY'S WORK JOINT
CURB AND GUTTER UNIT



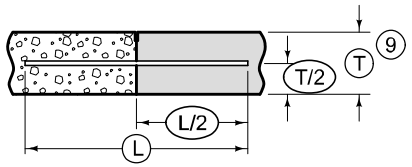
TRANSVERSE CONTRACTION JOINTS

FIGURE 7010.101 SHEET 1 OF 8

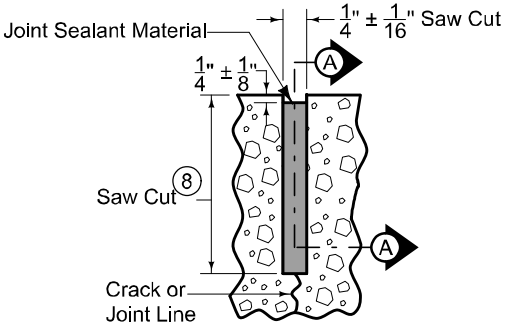
SUDAS	INTERIM	REVISION 13 01-01-26
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101 SHEET 1 of 8

REVISIONS: Updated SUDAS and IDOT Logo.

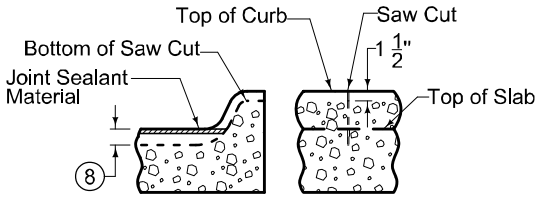
SUDAS DIRECTOR — DESIGN METHODS ENGINEER



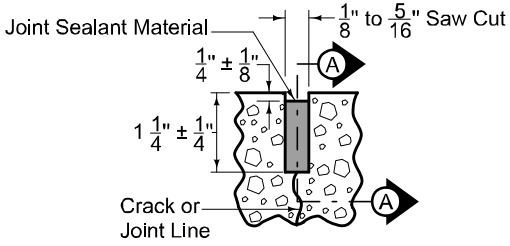
BAR PLACEMENT
(Applies to all joints unless otherwise detailed.)



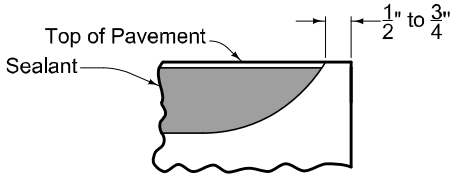
DETAIL A
(Saw cut formed by conventional concrete sawing equipment.)



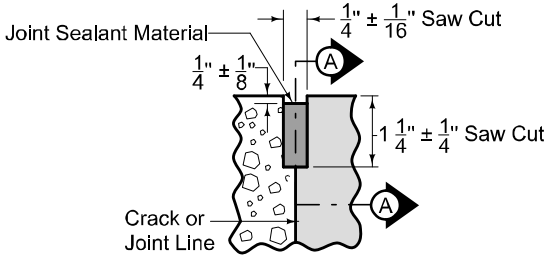
'C' JOINT IN CURB
(Match 'CT', 'CD', or 'C' joint in pavement.)



DETAIL B
(Saw cut formed by approved early concrete sawing equipment.)



SECTION A-A
(Detail at Edge of Pavement)

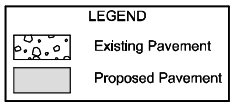


DETAIL C

⑧ Saw 'CD' joint to a depth of T/3 ± 1/4"; saw 'C' joint to a depth of T/4 ± 1/4".

⑨ When tying into old pavement, Ⓣ represents the depth of sound PCC.

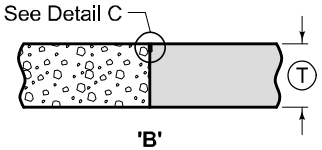
BAR SIZE TABLE FOR CONTRACTION JOINTS				
Ⓣ	Solid Dowel Diameter	Tubular Dowel Diameter	Elliptical	Tie Bar Size
< 8"	3/4"	7/8"	N/A	#6
≥ 8" but < 10"	1 1/4"	1 3/8"	Small	#10
≥ 10"	1 1/2"	1 5/8"	Medium	#11
Tubular and Elliptical Dowel Bars will not be allowed for RD joints.				



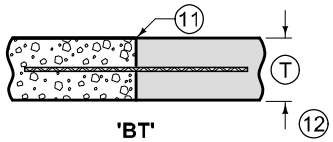
SUDAS | INTERIM | REVISION 13 01-01-26
FIGURE 7010.101 | STANDARD ROAD PLAN | PV-101 | SHEET 2 of 8
REVISIONS: Updated SUDAS and IDOT Logo.
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

TRANSVERSE CONTRACTION JOINTS

FIGURE 7010.101 SHEET 2 OF 8

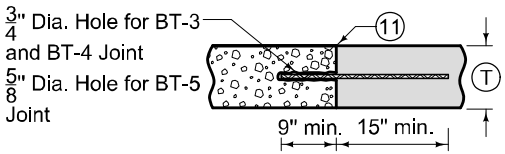


'B'
PLAIN JOINT
(Abutting Pavement Slabs)



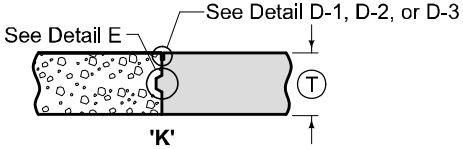
'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE

T	Joint	Bars	Bar Length and Spacing
< 8"	'BT-1'	#4	36" Long at 30" Centers
		#5	30" Long at 30" Centers
≥ 8"	'BT-2'	#5	36" Long at 30" Centers
	'BT-6'	#5	36" Long at 15" Centers

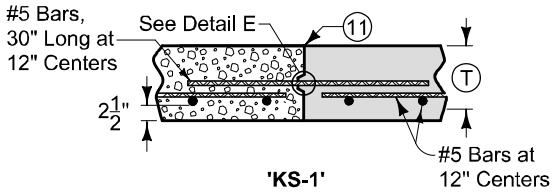


'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE (Drilled)

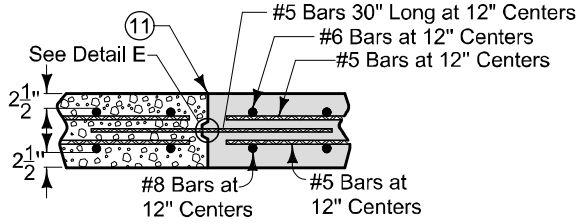
T	Joint	Bars	Bar Length and Spacing
< 8"	'BT-5'	#4	24" Long at 30" Centers
≥ 8"	'BT-3'	#5	24" Long at 30" Centers
	'BT-4'		24" Long at 15" Centers



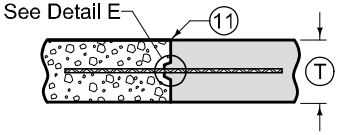
'K'
KEYED JOINT FOR ADJACENT SLABS
(Where T is 8" or more)



'KS-1'
[Single Reinforced Pavement (Bridge Approach)]



'KS-2'
[Double Reinforced Pavement (Bridge Approach)]



'KT' (10)(12)
ABUTTING PAVEMENT JOINT - KEYWAY TIE

T	Joint	Bars	Bar Length and Spacing
< 8"	'KT-1'	#4	30" Long at 30" Centers
≥ 8"	'KT-2'	#5	30" Long at 30" Centers
	'KT-3'		30" Long at 15" Centers

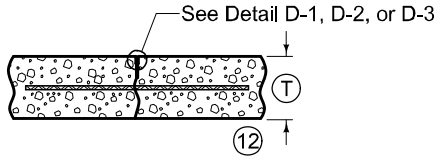
LONGITUDINAL CONTRACTION

(10) Bar supports may be necessary for fixed form paving to ensure the bar remains in a horizontal position in the plastic concrete.

(11) Sawing or sealing of joint not required.

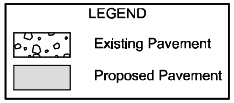
(12) The following joints are interchangeable, subject to the pouring sequence:
'L-1', 'BT-1', and 'KT-1'
'L-2', 'BT-2', and 'KT-2'
'L-3', 'BT-6', and 'KT-3'

KT joints should not be used when DOT is contracting authority.



'L'
CONTRACTION JOINT

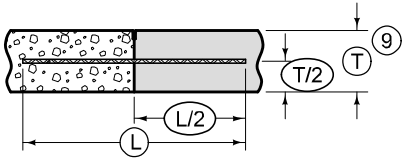
T	Joint	Bars	Bar Length and Spacing
< 8"	'L-1'	#4	36" Long at 30" Centers
≥ 8"	'L-2'	#5	36" Long at 30" Centers
	'L-3'		36" Long at 15" Centers



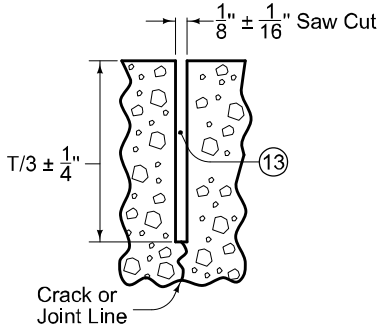
SUDAS
INTERIM
REVISION 13 01-01-26
FIGURE 7010.101
STANDARD ROAD PLAN
PV-101
SHEET 3 of 8
REVISIONS: Updated SUDAS and IDOT Logo.
SUDAS DIRECTOR
DESIGN METHODS ENGINEER

JOINTS

FIGURE 7010.101
SHEET 3 OF 8



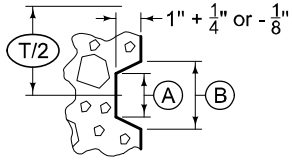
TIE BAR PLACEMENT
(Applies to all joints unless otherwise detailed.)



DETAIL D-1
(Required when specified in the contract documents.)

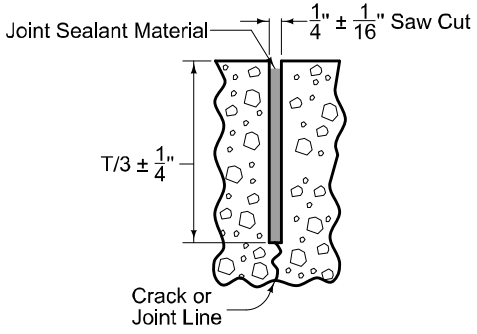
⑨ When tying into old pavement, Ⓣ represents the depth of sound PCC.

⑬ Sealant or cleaning not required.

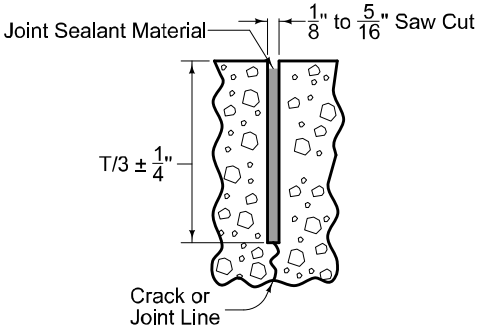


DETAIL E

KEYWAY DIMENSIONS			
Keyway Type	Pavement Thickness Ⓣ	Ⓐ	Ⓑ
Standard	8" or greater	1 3/4"	2 3/4"
Narrow	Less than 8"	1"	2"



DETAIL D-2
(Required when the Department of Transportation is not the Contracting Authority, or when specified in the contract documents)



DETAIL D-3
(Required when the Department of Transportation is the Contracting Authority, or when specified in the contract documents)

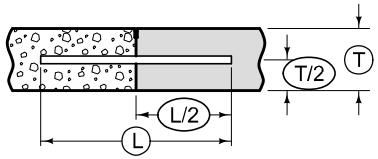
LEGEND
Existing Pavement
Proposed Pavement

SUDAS
FIGURE 7010.101
INTERIM
STANDARD ROAD PLAN
REVISION 13 01-01-26
PV-101
SHEET 4 of 8
REVISIONS: Updated SUDAS and IDOT Logo.
SUDAS DIRECTOR
DESIGN METHODS ENGINEER

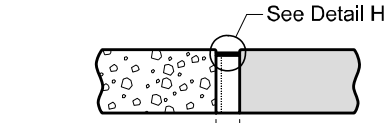
LONGITUDINAL CONTRACTION

JOINTS

FIGURE 7010.101
SHEET 4 OF 8

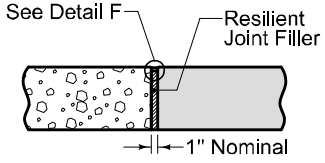


DOWEL PLACEMENT
(Applies to all joints unless otherwise detailed.)

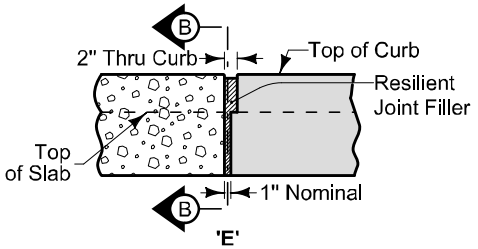


'CF' JOINT

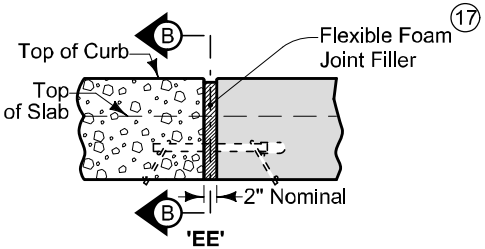
TYPE	WIDTH
CF-1	2"
CF-2	$2\frac{1}{2}$"
CF-3	3"
CF-4	$3\frac{1}{2}$"



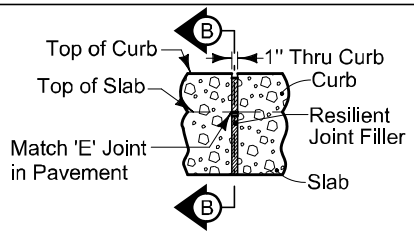
'E'
1" EXPANSION JOINT



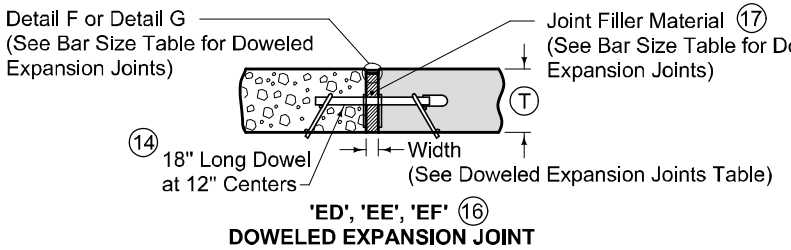
'E'
JOINT IN CURB
(View at Back of Curb)



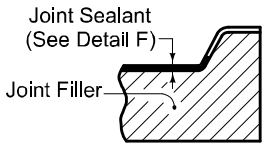
'EE'
JOINT IN CURB
(View at Back of Curb)



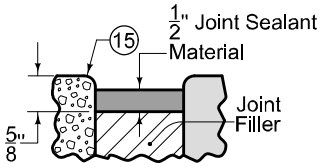
'ES'
JOINT IN CURB
(View at Back of Curb)



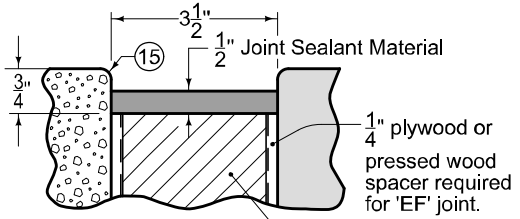
'ED', 'EE', 'EF' 16
DOWELED EXPANSION JOINT



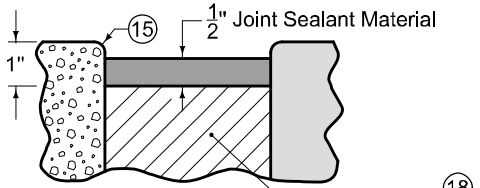
SECTION B-B



DETAIL F



DETAIL G



DETAIL H

EXPANSION

14 See Bar Size Table for Doweled Expansion Joints.

15 Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.

16 See Dowel Assemblies for fabrication details and placement limits. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.

17 Predrill or preform holes in joint material for appropriate dowel size.

18 Compact tire buffings by spading with a square-nose shovel.

DOWELED EXPANSION JOINTS		
TYPE	WIDTH	FILLER MATERIAL 17
ED	1"	Resilient (Detail F)
EE	2"	Flexible Foam (Detail F)
EF	$3\frac{1}{2}$"	Flexible Foam (Detail G)

BAR SIZE TABLE FOR DOWELED EXPANSION JOINTS			
T	< 8"	≥ 8" but < 10"	≥ 10"
Dowel Diameter	$\frac{3}{4}$"	$1\frac{1}{4}$"	$1\frac{1}{2}$"
Tubular, GFRP, and Elliptical Dowel Bars will not be allowed for expansion joints.			

LEGEND
Existing Pavement
Proposed Pavement

SUDAS
INTERIM
REVISION 13 01-01-26
FIGURE 7010.101
STANDARD ROAD PLAN
PV-101
SHEET 5 of 8

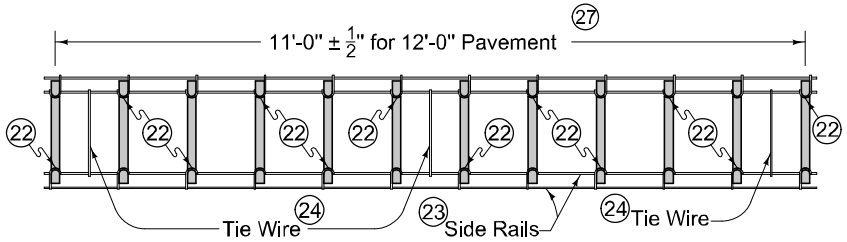
REVISIONS: Updated SUDAS and IDOT Logo.

SUDAS DIRECTOR
DESIGN METHODS ENGINEER

JOINTS

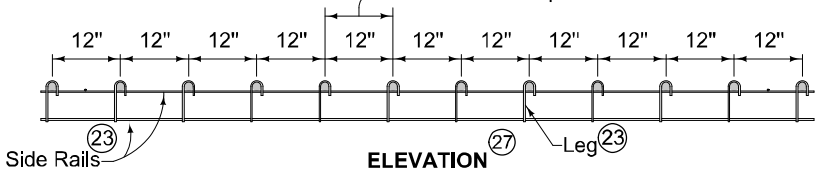
FIGURE 7010.101
SHEET 5 OF 8

CONTRACTION JOINTS

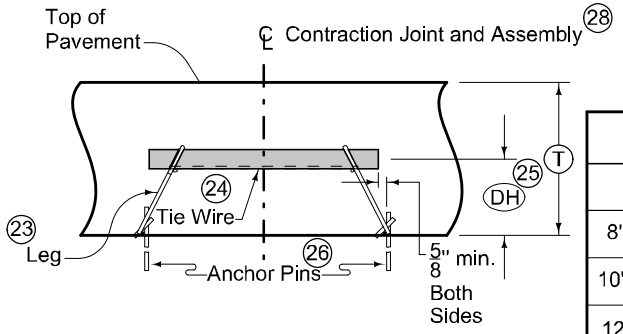


PLAN

Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$" allowable tolerance.



ELEVATION



LONGITUDINAL SECTION

DOWEL HEIGHT AND DIAMETER FOR DOWELED CONTRACTION JOINTS				
(T)	(DH)(25)	Diameter (Solid)	Diameter (Tubular)	Elliptical
8" to 9 1/2"	4 1/4"	1 1/4"	1 3/8"	Small
10" to 11 1/2"	5 1/4"	1 1/2"	1 5/8"	Medium
12" to 13"	6 1/4"	1 1/2"	1 5/8"	Medium
Tubular, Elliptical Dowel Bars will not be allowed for RD joints.				

DOWEL ASSEMBLIES (19)(20)(21)

(19) Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

(20) Use wires with a minimum tensile strength of 50 ksi.

(21) Details apply to both transverse contraction and expansion joints.

(22) Weld alternately throughout.

(23) 0.306 inch diameter wire. Wire sizes shown are the minimum required.

(24) Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

(25) Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

(26) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

(27) If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

(28) Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

FIGURE 7010.101 | SHEET 6 OF 8

SUDAS | INTERIM | REVISION 13 01-01-26

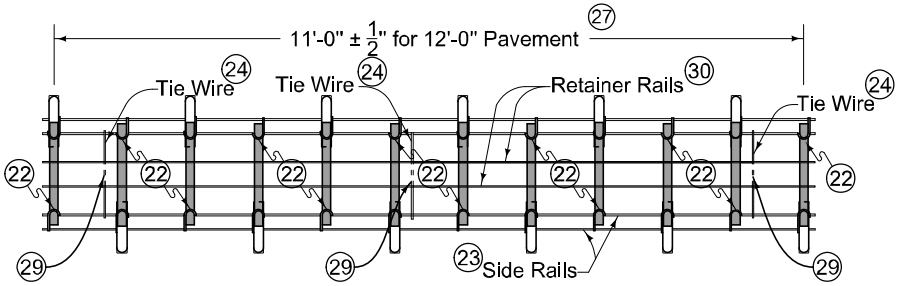
FIGURE 7010.101 | STANDARD ROAD PLAN | PV-101 | SHEET 6 of 8

REVISIONS: Updated SUDAS and IDOT Logo.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

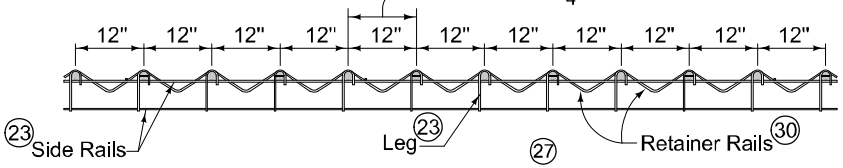
JOINTS

EXPANSION JOINTS

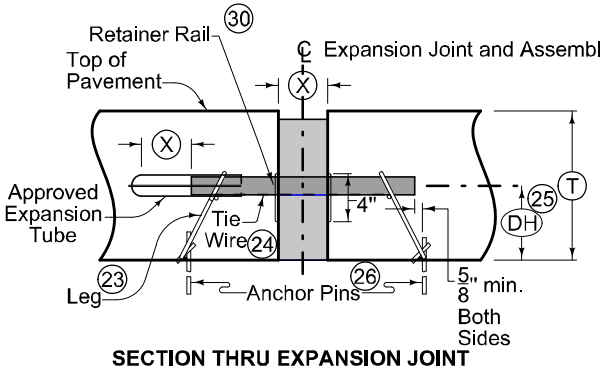


PLAN

Spaces between dowel bars are nominal dimensions with a 1/4" allowable tolerance.



ELEVATION



SECTION THRU EXPANSION JOINT

JOINT OPENING AND EXPANSION TUBE EXTENSION		
Joint Type	(X)	Minimum Tube Length
"ED"	1"	6"
"EE"	2"	7"
"EF"	3 1/2"	9"

DOWEL HEIGHT AND DIAMETER FOR DOWELED EXPANSION JOINTS		
(T)	(DH) (25)	Diameter
8" to 9 1/2"	4 1/4"	1 1/4"
10" to 11 1/2"	5 1/4"	1 1/2"
12" to 13"	6 1/4"	1 1/2"
Tubular, GFRP, and Elliptical Dowel Bars will not be allowed for expansion joints.		

DOWEL ASSEMBLIES (19) (20) (21)

(19) Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

(20) Use wires with a minimum tensile strength of 50 ksi.

(21) Details apply to both transverse contraction and expansion joints.

(22) Weld alternately throughout.

(23) 0.306 inch diameter wire. Wire sizes shown are the minimum required.

(24) Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

(25) Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

(26) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

(27) If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

(28) Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

(29) Clip and remove center portion of tie during field assembly.

(30) 1/4 inch diameter wire.

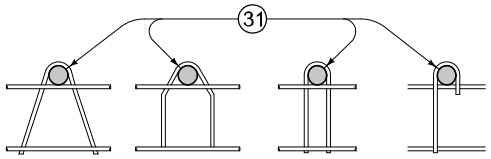
SUDAS	INTERIM	REVISION 13 01-01-26
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101
		SHEET 7 of 8

REVISIONS: Updated SUDAS and IDOT Logo.

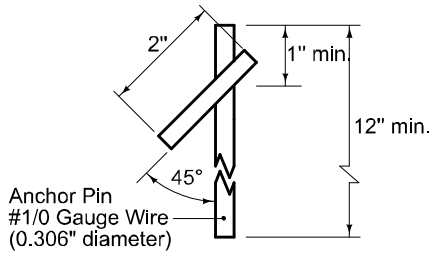
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

JOINTS

FIGURE 7010.101 | SHEET 7 OF 8



OPTIONAL LEG SHAPES



ANCHOR PIN

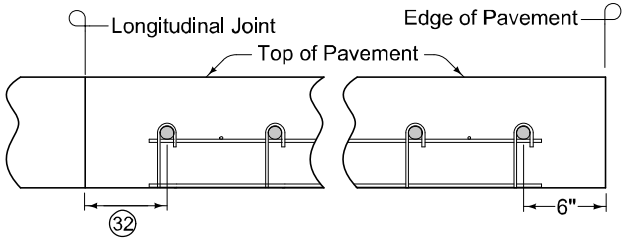
19 Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

20 Use wires with a minimum tensile strength of 50 ksi.

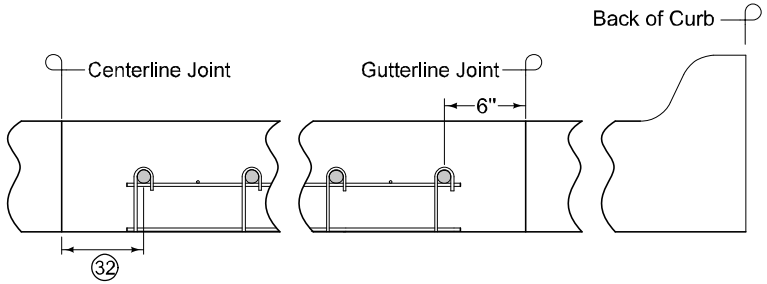
21 Details apply to both transverse contraction and expansion joints.

31 Diameter of bend around dowel is dowel diameter + 1/8 to 3/16 inches.

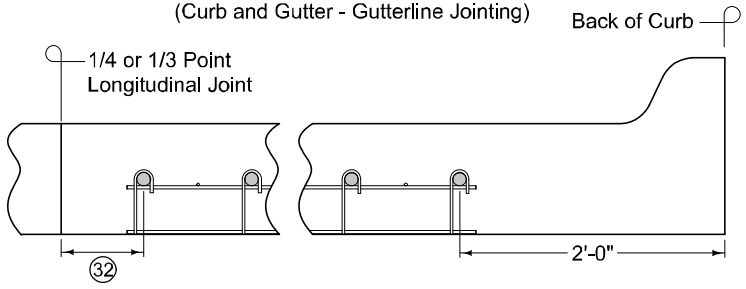
32 For uniform lane widths: 3 to 6 inches. For taper and variable width pavements: 3 to 12 inches.



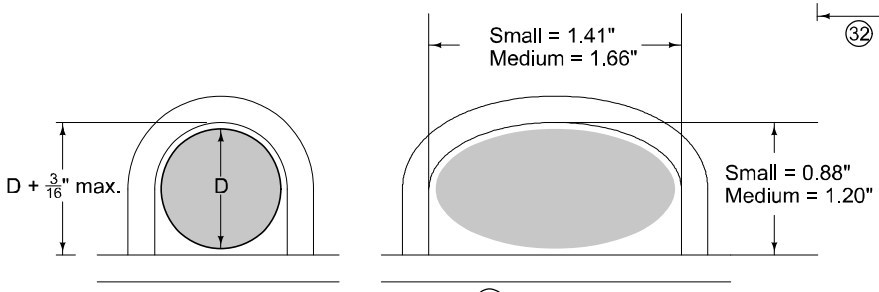
PLACEMENT LIMITS
(Rural Section)



PLACEMENT LIMITS
(Curb and Gutter - Gutterline Jointing)



PLACEMENT LIMITS
(Curb and Gutter - 1/4 or 1/3 Point Jointing)



BEND AROUND DOWEL 31

DOWEL ASSEMBLIES 19 20 21

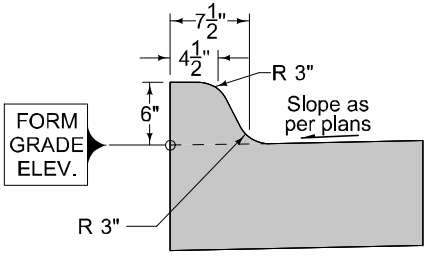
FIGURE 7010.101 | SHEET 8 OF 8

SUDAS	INTERIM	REVISION 13 01-01-26
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101 SHEET 8 of 8

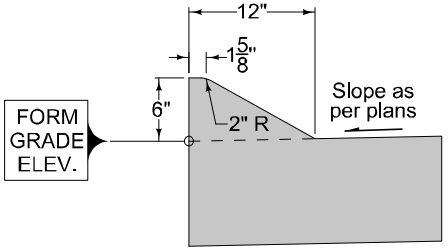
REVISIONS: Updated SUDAS and IDOT Logo.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

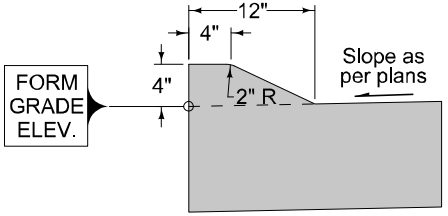
JOINTS



6" STANDARD CURB



6" SLOPED CURB



4" SLOPED CURB

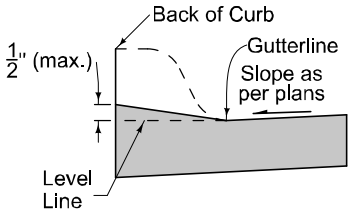
For joint details, see **PV-101**.

① 6 inch Standard Curb, 6 inch Sloped Curb, or 4 inch Sloped Curb as specified.

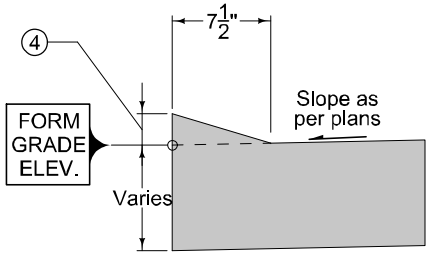
② ⅛ inch if Proposed Pavement is HMA. No elevation difference if Proposed Pavement is PCC.

③ 'BT' , 'KT', or 'L' joint if Proposed Pavement is PCC. 'B' joint if Proposed Pavement is HMA.

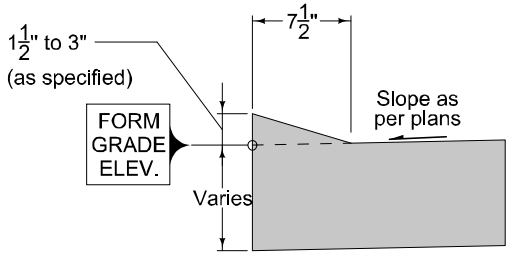
④ 0 to 2 inches for residential entrances. 1½ to 3 inches for industrial or commercial entrances.



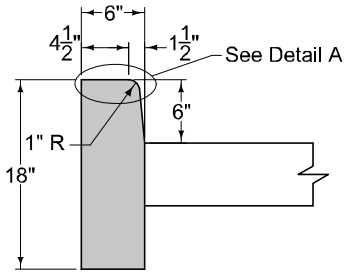
DROP CURB AT SIDEWALK



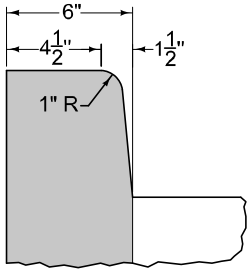
DRIVEWAY DROP CURB (IowaDepartment of Transportation is not the Contracting Authority)



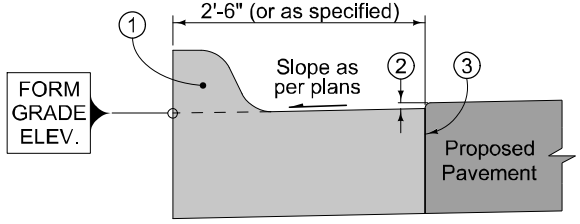
DRIVEWAY DROP CURB (Iowa Department of Transportation is the Contracting Authority)



BEAM CURB*
*For short replacement sections, match existing curb profile



DETAIL A



CURB AND GUTTER UNIT

FIGURE 7010.102

SHEET 1 OF 2

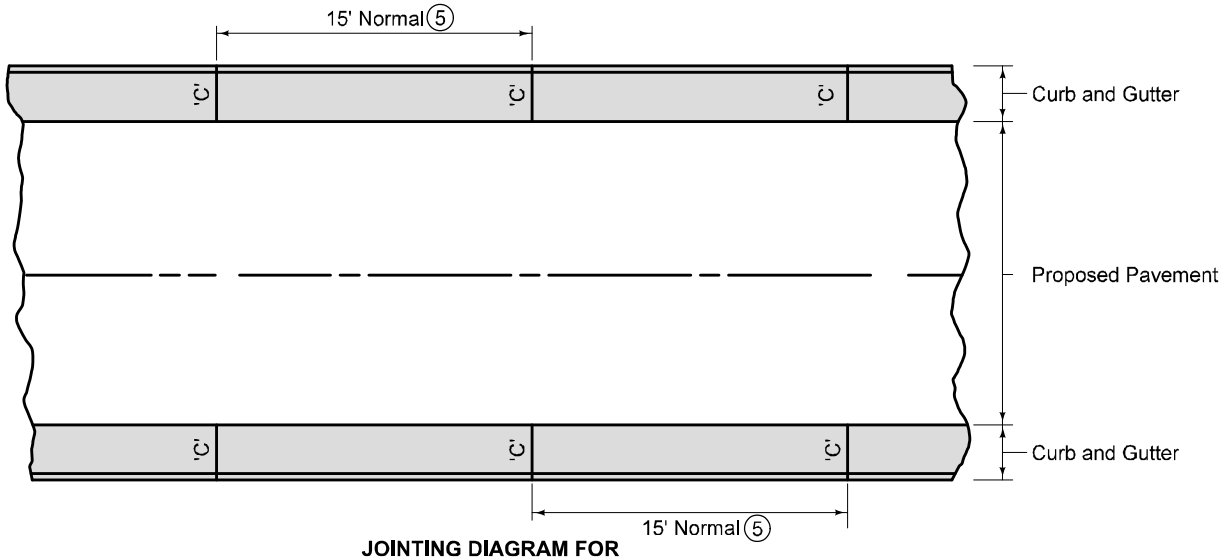
SUDAS | IOWADOT | REVISION 5 04-21-20

FIGURE 7010.102 | STANDARD ROAD PLAN | PV-102 | SHEET 1 of 2

REVISIONS: Split DRIVEWAY DROP CURB detail into two details. Added new circle note 4 on Sheet 1. Renumbered circle note on Sheet 5.

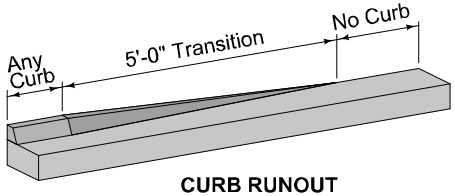
Paul D. Wigand, SUDAS DIRECTOR | DESIGN METHODS ENGINEER

PCC CURB DETAILS

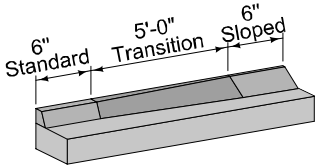


JOINTING DIAGRAM FOR CURB AND GUTTER UNIT

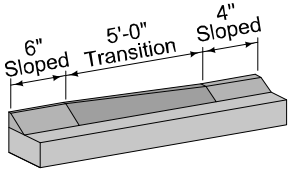
(5) If proposed pavement is PCC, match joint spacing for proposed pavement. Place 'E' joints in curb and gutter section where expansion joints are to be placed in proposed pavement.



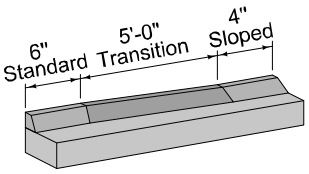
CURB RUNOUT FOR ALL CURBS



CURB TRANSITION FROM 6" STANDARD TO 6" SLOPED



CURB TRANSITION FROM 6" SLOPED TO 4" SLOPED



CURB TRANSITION FROM 6" STANDARD TO 4" SLOPED

FIGURE 7010.102 | SHEET 2 OF 2

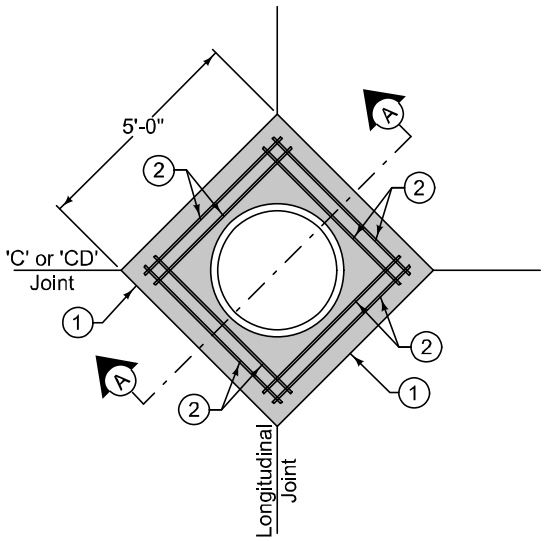
SUDAS | IOWADOT | REVISION 5 04-21-20

FIGURE 7010.102 | STANDARD ROAD PLAN | PV-102 | SHEET 2 of 2

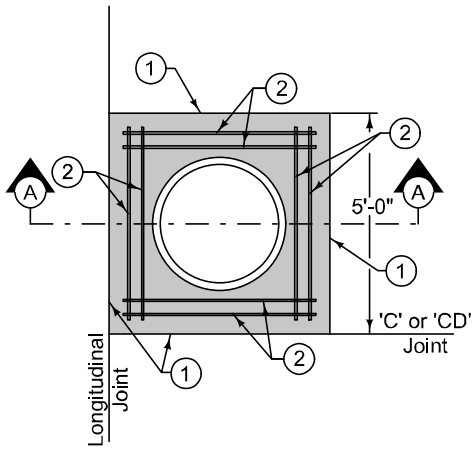
REVISIONS: Split DRIVEWAY DROP CURB detail into two details. Added new circle note 4 on Sheet 1. Renumbered circle note on Sheet 5.

Paul D. Wigand, SUDAS DIRECTOR | DESIGN METHODS ENGINEER

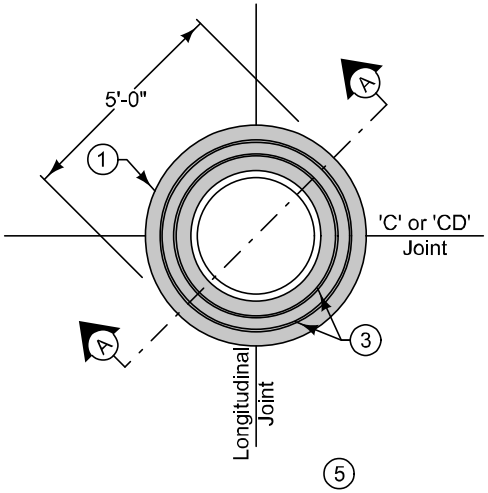
PCC CURB DETAILS



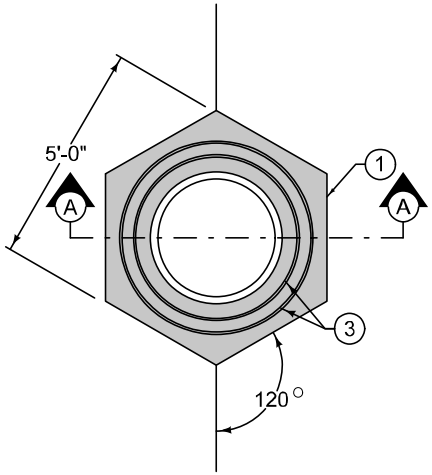
AT JOINT INTERSECTION



OFFSET AT JOINT INTERSECTION



CIRCULAR (5)



AT A SINGLE JOINT

Construct boxout with Class C concrete or match pavement class. Minimum 2 inches clear on reinforcement. Minimum 12 inches of concrete between outside of casting and nearest joint. Center casting within boxout area if possible.

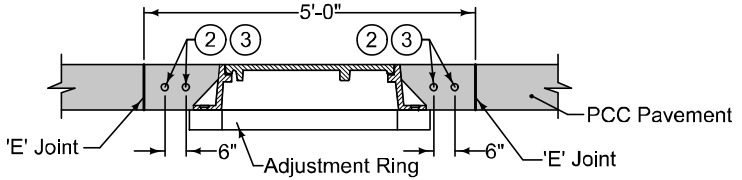
(1) 'KT-1', 'KT-2', 'BT-1', or 'BT-2' joint if three-piece floating casting (SW 601 Type B and D or SW-602 Type F) is used. 'E' joint if two-piece fixed casting (SW 601 Type A and C or SW-602 Type E) is used.

(2) 4 foot 8 inch (typ.) #4 bar. Place at mid-slab.

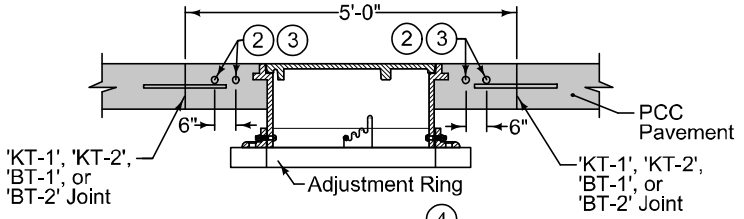
(3) #4 hoops (variable length). Place at mid-slab.

(4) No boxout is required for three-piece floating castings (SW 601 Type B and D or SW-602 Type F). If a boxout is used with a three-piece casting, construct as detailed in Section A-A for three-piece floating casting.

(5) If a circular boxout is cut and extracted after PCC construction, a 'B' joint may be substituted for the 'E' joint if approved by the Engineer.



SECTION A-A
(For two-piece fixed casting)



SECTION A-A (4)
(For three-piece floating casting)

SUDAS	IOWADOT	REVISION 2 04-19-22
FIGURE 7010.103	STANDARD ROAD PLAN	PV-103 SHEET 1 of 1

REVISIONS: Added note 5.

Paul D. Wigand, SUDAS DIRECTOR — Scott Nicholson, DESIGN METHODS ENGINEER

MANHOLE BOXOUTS IN PCC PAVEMENT

FIGURE 7010.103 | SHEET 1 OF 1

SIDEWALKS, SHARED USE PATHS, AND DRIVEWAYS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of Sidewalks, Shared Use Paths, and Driveways

B. Installation of Sidewalks, Shared Use Paths, and Driveways

1.02 DESCRIPTION OF WORK

A. Remove existing sidewalks, shared use paths, and driveways.

B. Install shared use paths.

C. Install sidewalk.

D. Install driveway.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. PCC mix design.

B. Asphalt mix design.

C. Brick source, absorption, compressive strength; samples of brick showing texture and color.

D. Submit type and color of detectable warnings.

E. Results of required testing.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Portland Cement Concrete: See Section 7010.

B. Asphalt: See Section 7020.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Removal of Sidewalk, Shared Use Path, or Driveway:

1. **Removal of Sidewalk:**
   a. **Measurement:** Measurement will be in square yards for the area of sidewalk removed.
   b. **Payment:** Payment will be at the unit price per square yard for the area of sidewalk removal.
   c. **Includes:** Unit price includes, but is not limited to, sawing, hauling, and disposal of materials removed.

2. **Removal of Shared Use Path:**
   a. **Measurement:** Measurement will be in square yards for the area of shared use path removed.
   b. **Payment:** Payment will be at the unit price per square yard for the area of shared use path removal.
   c. **Includes:** Unit price includes, but is not limited to, sawing, hauling, and disposal of materials removed.

3. **Removal of Driveway:**
   a. **Measurement:** Measurement will be in square yards for the area of driveway removed.
   b. **Payment:** Payment will be at the unit price per square yard for the area of driveway removal.
   c. **Includes:** Unit price includes, but is not limited to, sawing, hauling, and disposal of materials removed.

B. Removal of Curb:

1. **Measurement:** Measurement will be in linear feet for removal of curb by grinding or sawing, measured along the back of curb.

2. **Payment:** Payment will be at the unit price per linear foot for the removal of curb.

3. **Includes:** Unit price includes, but is not limited to, hauling and disposal of materials removed.

C. Shared Use Paths:

1. **Measurement:** Each type and thickness of shared use paths will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price per square yard for each type and thickness of shared use path.

3. **Includes:** Unit price includes, but is not limited to, subgrade preparation, jointing, sampling, slope and smoothness testing and correction, and testing.

D. Special Subgrade Preparation for Shared Use Paths:

1. **Measurement:** Measurement will be in square yards for special subgrade preparation. Measured area will include 2 feet outside of the pavement on either side of the path.

2. **Payment:** Payment will be at the unit price per square yard for the area of special subgrade preparation.

3. **Includes:** Unit price includes, but is not limited to, water required to bring subgrade moisture content to within the required limits.

1.08 MEASUREMENT AND PAYMENT (Continued)

E. PCC Sidewalk:

1. **Measurement:** Each thickness of PCC sidewalk will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price per square yard for each thickness of PCC sidewalk.

3. **Includes:** Unit price includes, but is not limited to, minor grade adjustments at driveways and other intersections, subgrade preparation, formwork, additional thickness at thickened edges, jointing, sampling, slope and smoothness testing and correction, and testing.

F. Brick/Paver Sidewalk with Pavement Base:

1. **Measurement:** Measurement will be in square yards for the area of brick/paver sidewalk placed on a pavement base. The area of pavement base will not be measured separately.

2. **Payment:** Payment will be at the unit price per square yard for the area of brick/paver sidewalk.

3. **Includes:** Unit price includes, but is not limited to, subgrade preparation, pavement base, setting bed, neoprene asphalt adhesive for asphalt setting bed, setting the bricks/pavers, installing weep holes and associated materials, and sand/cement joint filler.

G. Detectable Warnings:

1. **Measurement:** Measurement will be in square feet for the area of detectable warnings installed. Paved area beneath detectable warnings will be measured with sidewalk or shared use path item.

2. **Payment:** Payment will be at the unit price per square foot for the area of detectable warnings installed.

3. **Includes:** Unit price includes, but is not limited to, steel bar supports and manufactured detectable warning panels.

H. Driveways:

1. **Paved Driveways:**
   a. **Measurement:** Each type and thickness will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.
   b. **Payment:** Payment will be at the unit price for each type and thickness of driveway.
   c. **Includes:** Unit price includes, but is not limited to, excavation, subgrade preparation, jointing, sampling, and testing.

2. **Granular Surfacing for Driveways by Square Yards:**
   a. **Measurement:** Measurement will be in square yards for the thickness of granular surfacing placed.
   b. **Payment:** Payment will be at the unit price per square yard for each thickness of granular surfacing placed.
   c. **Includes:** Unit price includes, but is not limited to, excavation and preparation of subgrade.

1.08 MEASUREMENT AND PAYMENT (Continued)

3. Granular Surfacing for Driveways by Tons:

a. Measurement: Measurement will be in tons for the thickness of granular surfacing placed.

b. Payment: Payment will be at the unit price per ton for each thickness of granular surfacing placed.

c. Includes: Unit price includes, but is not limited to, excavation and preparation of subgrade.

I. Sidewalk, Shared Use Path, and Driveway Assurance Testing:

1. Sidewalk Assurance Testing:

a. The Contractor will not be responsible for concrete compression or asphalt density testing unless otherwise specified in the contract documents.

b. If the contract documents specify that the Contractor is responsible for concrete compression and asphalt density testing, performed by an independent testing laboratory hired by the Contractor, measurement and payment will be as follows:

1) Measurement: Lump sum item; no measurement will be made.

2) Payment: Payment will be at the contract lump sum price.

c. The Contractor will be responsible for payments associated with all retesting resulting from failure of initial tests.

2. Shared Use Path Assurance Testing:

a. The Contractor will not be responsible for concrete compression or asphalt density testing unless otherwise specified in the contract documents.

b. If the contract documents specify that the Contractor is responsible for concrete compression and asphalt density testing, performed by an independent testing laboratory hired by the Contractor, measurement and payment will be as follows:

1) Measurement: Lump sum item; no measurement will be made.

2) Payment: Payment will be at the contract lump sum price.

c. The Contractor will be responsible for payments associated with all retesting resulting from failure of initial tests.

3. Driveway Assurance Testing:

a. The Contractor will not be responsible for concrete compression or asphalt density testing unless otherwise specified in the contract documents.

b. If the contract documents specify that the Contractor is responsible for concrete compression and asphalt density testing, performed by an independent testing laboratory hired by the Contractor, measurement and payment will be as follows:

1) Measurement: Lump sum item; no measurement will be made.

2) Payment: Payment will be at the contract lump sum price.

c. The Contractor will be responsible for payments associated with all retesting resulting from failure of initial tests.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT CONCRETE

A. Use Class A or C concrete for sidewalks and driveways and Class C for shared use paths with materials complying with Section 7010. Use coarse aggregate of Class 2 durability or better.

B. Comply with the following for PCC mixes for sidewalks, shared use paths, and driveways unless otherwise approved by the Engineer.

Table 7030.01: PCC Mixes

	Machine Finish	Hand Finish
Type of Concrete	Class A or C	Class A or C
Slump Minimum	1/2 in.	1/2 in.
Slump Maximum	2 1/2 in.	4 in.
Percent Air Content		
• Target	7%	7%
• Minimum	6%	6%
• Maximum	8 1/2%	8 1/2%

2.02 ASPHALT

Comply with Section 7020 for mix design.

A. Use Low Traffic (LT), 1/2 inch or 3/8 inch mix.

B. For shared use paths adjacent to pavement that also functions as the pavement shoulder, use Low Traffic (LT), 1/2 inch mix.

C. Use asphalt binder complying with Section 7020 with a performance grade of PG 58-28S or 58-34S.

2.03 BRICKS/PAVERS

A. Clay Bricks: Use 8 inch by 4 inch by 2 1/4 inch thick clay paving bricks with straight edges or a maximum chamfer of 1/8 inch manufactured to comply with ASTM C 902, Class SX, Type I. Color selection and surface texture as approved by the Engineer.

B. Concrete Pavers: Supply as specified in the contract documents. Use pavers with straight edges or a maximum chamfer of 1/8 inch.

2.04 SETTING BED FOR BRICKS/PAVERS

A. Asphalt:

1. Mixture: Proportion mix using 7% asphalt binder and 93% fine aggregate. Apportion each ton in the approximate ratio of 145 pounds asphalt binder to 1,855 pounds sand. Maintain mix temperature at approximately 250°F during placement.

2. Asphalt Binder: Use asphalt binder complying with Section 7020 with a performance grade of PG 58-28 or 64-22.

3. Fine Aggregate: Use clean, hard sand with durable particles free from adherent coating, lumps of clay, alkali salts, and organic matter. Use sand that is uniformly graded from coarse to fine with all passing the No. 4 sieve and meeting AASHTO T 27.

2.04 SETTING BED FOR BRICKS/PAVERS (CONTINUED)

B. Pre-mixed High Performance Cold Mix: If allowed, substitute a pre-mixed high performance cold mix product for the asphalt setting bed generally meeting the asphalt mixture requirements noted above.

C. Sand: Use clean, hand sand free from deleterious materials. Use sand meeting ASTM C 33 that is uniformly graded with all passing the No. 4 sieve and 3% or less passing the No. 200 sieve.

2.05 NEOPRENE MODIFIED ASPHALT ADHESIVE FOR BRICKS/PAVERS

A. Mastic (Asphalt Adhesive):

Solids (Base):	74% to 76%
Pounds per Gallon:	8 to 8 1/2 pounds
Solvent:	Mineral spirits with a flash point above 100° F

B. Base (2% Neoprene, 10% Asbestos-free Fiber, 88% Asphalt):

Melting Point:	200° F minimum according to ASTM D 36
Penetration:	23 to 27 according to ASTM D 5
Ductility:	1250 mm minimum according to ASTM D 113 @ 25° C, and a rate of 50 mm/minute

2.06 BRICK/PAVER JOINT FILLER

Dry sand-cement mixture consisting of one part masonry cement complying with ASTM C 91 and three parts sand complying with ASTM C 144 and passing the No. 16 sieve. Provide colored cement as specified in the contract documents.

2.07 DETECTABLE WARNINGS

Use manufactured detectable warning panels with a non-slip surface and raised truncated domes. Comply with the Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (also known as PROWAG) for contrast and dimension requirements. Also comply with Iowa DOT Materials I.M. 411.

2.08 GRANULAR DRIVEWAY SURFACING

Class A crushed stone or Class C gravel complying with Iowa DOT Section 2315.

2.09 ISOLATION AND EXPANSION JOINT SEALANT

Use a polyurethane, self-leveling sealant complying with ASTM C 920. Application temperature range of 40 to 120°F. Minimum elongation 700%.

PART 3 - EXECUTION

3.01 REMOVALS

A. Remove sidewalks, shared use paths, driveways, bricks, and curbs to the removal limits specified in the contract documents.

B. Saw pavement full depth in straight lines to the specified removal limits.

C. Remove to the specified removal limits without damage to adjacent property, trees, utilities, or pavement that are to remain in place.

D. Salvage and stockpile all bricks removed.

E. Grind or saw existing curbs at locations specified in the contract documents to install sidewalks, shared use paths, and driveways.

F. Dispose of rubble and debris resulting from removal operations.

3.02 SUBGRADE PREPARATION

A. Shared Use Paths:

1. Subgrade Preparation: Comply with Iowa DOT Section 2109.

2. Special Subgrade Preparation:
a. Construct subgrade to final elevation.
b. Scarify and mix the top 6 inches of subgrade material to a width equal to that of the proposed pavement, plus 2 feet on each side.
c. Compact loose subgrade material with Type A compaction complying with Section 2010.
d. Proof roll compacted subgrade according to Section 2010.

B. Sidewalks and Driveways:

1. Remove all vegetation and roots from ground surface.

2. Construct grade to final subgrade elevation.
a. Cut area: Remove all material that will be displaced by the sidewalk.
b. Fill area: Scarify the surface to be covered with embankment to a depth of at least 6 inches and compact. Construct embankment in lifts of 6 inches or less and compact each lift. Tamp surface with a mechanical tamper until firm and unyielding.

3. Remove all soft, spongy, or yielding spots and fill the void with suitable backfill material.

3.03 ADJUSTMENT OF FIXTURES

A. Adjust fixtures to conform to the finished pavement surface. Cooperate and coordinate with the utility agency to ensure proper fixture adjustment.

B. Comply with Sections 5020, 6010, or 8010 as appropriate.

3.04 PCC SIDEWALKS, SHARED USE PATHS, AND DRIVEWAYS

Construct sidewalks and shared use paths to the line and running slope specified in the contract documents. Unless otherwise specified in the contract documents, the maximum cross slope is 2.0%, target cross slope is 1.5%, and minimum cross slope is 1.0%.

A. Form Setting: Comply with Section 7010 with the following additional requirements and exceptions.

1. Slip form paving equipment may be allowed in lieu of setting forms, if approved by the Engineer.

2. Wood forms are allowed.

3. Use of an automated subgrade trimmer is not required.

4. Set forms true to line and grade and hold them rigidly in place by stakes placed outside the forms and flush with or below the top edge of the forms.

5. Measure or stake as required to construct project elements. If either of the following is met and construction survey is not a bid item, the Contracting Authority will verify that form work complies with the design requirements:
   a. The tolerance between the design running slope and the maximum allowable running slope is less than 1.0%.
   b. The tolerance between the design cross slope of the sidewalk, turning space, or shared use path and the maximum allowable cross slope is less than 0.5%.

   If adequate tolerances are contained in the design, the Contracting Authority will not verify the form work for the construction of sidewalks or shared use paths. If field adjustments cause changes that will bring the facility into the range of tolerances shown above, notify the Engineer prior to construction.

B. Concrete Pavement Placement:

1. Shared Use Paths: Comply with Section 7010.

2. Sidewalk:
   a. Maintain moist subgrade in front of paving operation
   b. Deposit concrete on the subgrade as required to minimize rehandling to prevent segregation.
   c. Hand spread with shovels, not rakes.
   d. Place concrete as required to slightly overfill the space between the forms.
   e. For thicknesses less than 5 inches, consolidate by knifing with hand tools. When thickness is 5 inches or greater, consolidate with hand or mechanical vibrators meeting Section 7010, 3.01, C, 3. Smooth by use of a straightedge.
   f. Do not contaminate freshly mixed concrete with earth or other foreign materials.

3. Driveways: Comply with Figures 7030.101 and 7030.102 and Section 7010. The use of a paving machine is not required.

C. Finishing:

1. Shared Use Paths and Driveways:
   a. Comply with Section 7010.
   b. Provide a burlap drag or broom finish.

3.04 PCC SIDEWALKS, SHARED USE PATHS, AND DRIVEWAYS (Continued)

2. Sidewalks:
a. Use a wood float to depress the large aggregate and create a dense surface.
b. Allow concrete to set until all shine has disappeared from the surface.
c. Smooth with a metal trowel until surface is free from defects and blemishes.
d. Construct joints by sawing or by using a jointer or groover tool.
e. Finish edges of sidewalk or driveway with an edging tool having a radius of approximately 1/2 inch. Ensure tool marks do not appear on the finished surface.
f. Brush with a soft broom at right angles to the side forms to provide a non-skid surface.

D. Curing: Cure according to Section 7010.

E. Form Removal: Comply with Section 7010.

F. Jointing:

1. Construction Joints:
a. Locate construction joints to provide uniform joint spacing.
b. Place a construction joint at the close of each day's work or when depositing of concrete is stopped for 45 minutes or more.
c. Form construction joint by using a header board. Set perpendicular to the surface and at right angles to the centerline.

2. Transverse Contraction Joints:
a. Shared Use Paths:
1) Space transverse joints equal to the width of the shared use path, or as specified in the contract documents.
2) Saw contraction joints according to Section 7010.
b. Sidewalks and Driveways:
1) Space sidewalk contraction joints equal to the width of the sidewalk.
2) Space driveway contraction joints so panel length does not exceed 12 feet.
3) Form transverse contraction joints to a depth of 1 1/4 inches with a pointed trowel or jointing tool. In lieu of forming, joints may be sawed within 12 hours of placement with a 1/8 inch blade saw to a depth of 1/3 the pavement thickness. Use a straightedge if joints are sawed with a hand-held saw.

3. Longitudinal Contraction Joints:
a. Shared Use Paths and Sidewalks: Saw joint to 1/8 inch wide and to a depth of 1/3 the pavement thickness.
b. Driveways:
1) Space longitudinal contraction joints so panel width does not exceed 12 feet.
2) Form longitudinal contraction joints to a depth of 1 1/4 inches with a pointed trowel or jointing tool. In lieu of forming, joints may be sawed with a 1/8 inch blade saw to a depth of 1/3 the pavement thickness. Use a straightedge if joints are sawed with a hand-held saw.

4. Isolation Joints:
a. Install isolation joints where sidewalks, shared use paths, or driveways abut roadway pavement, parking lots, buildings, and structures.
b. For a sidewalk constructed with a driveway, install an isolation joint on the property side of the sidewalk and a 'C' or 'E' joint on the street side of the sidewalk.
c. Install a 1/2 inch or 3/4 inch thick strip of preformed resilient joint material, according to Section 7010, to the full depth of concrete. Trim any isolation joint material protruding above the finished work to the level of the abutting concrete.
d. If the isolation joint is to be sealed, place the preformed material 1/2 inch below the level of the abutting concrete.

3.04 PCC SIDEWALKS, SHARED USE PATHS, AND DRIVEWAYS (Continued)

5. Joint Sealing:

a. Do not seal construction or contraction joints in sidewalks, shared use paths, or driveways.

b. If sealing of expansion or isolation joints is specified in the contract documents, trim preformed joint material to a depth of 1/2 inch below the concrete surface. Ensure the joint is clean and dry. Install joint sealant per manufacturer's recommendations.

3.05 ASPHALT SHARED USE PATHS AND DRIVEWAYS

Construct sidewalks and shared use paths to the line and running slope specified in the contract documents. Unless otherwise specified in the contract documents, the maximum cross slope is 2.0%, target cross slope is 1.5%, and minimum cross slope is 1.0%. Comply with Section 7020.

3.06 BRICK/PAVER SIDEWALKS WITH A PAVEMENT BASE

A. General:

1. Comply with Figure 7030.203.

2. Use a cross-section and patterns as specified in the contract documents or approved by the Engineer.

3. Do not use broken bricks or materials with stained faces in the paving areas.

4. Construct the concrete base to comply with PCC sidewalk construction specifications.

B. Setting Bed:

1. Place 3/4 inch depth control bars on the base to serve as guides for the striking board. Shim depth control bars as necessary to adjust bedding thickness and to ensure the top surface of pavers will be at the required finished grade.

2. Place bedding material between the parallel depth control bars. Pull striking board over bars several times. After each pass, spread fresh bedding material over low or porous spots to produce a smooth and even setting bed. After placing and smoothing each section, advance depth control bars to next section. After removal of depth control bars and shims, carefully fill any depressions that remain.

3. While still hot, roll the asphalt setting bed with a power roller to a nominal depth of 3/4 inch.

4. Ensure the joints in the concrete base do not project through the asphalt setting bed.

5. Apply neoprene modified asphalt adhesive over the top surface of the cooled asphalt setting bed with notched trowel with serration not exceeding 1/16 inch. Allow adhesive to dry to the touch before placing pavers.

C. Weep Holes:

1. Install 2 inch diameter, 12 inch long, PVC pipe even with the top of the asphalt setting bed at the locations identified on the plans.

2. Fill pipe with 3/4 inch clean rock and cover weep hole with engineering fabric.

3. Install minimum of 12 inch deep and 12 inch wide reservoir of clean 3/4 inch rock around the pipe below the PCC sidewalk base or extend the rock reservoir to the pavement subdrain.

3.06 BRICK/PAVER SIDEWALKS WITH A PAVEMENT BASE (Continued)

D. Bricks/Pavers:

1. Place the bricks/pavers by hand in straight courses with hand tight joints and uniform top surface.

2. Sweep dry joint filler into joints until the joints are completely filled.

3. Fog surface lightly with water to cure cement.

4. Clean any cement stains from bricks/pavers surface. Remove stains from other concrete surfaces.

E. Protection: Protect newly laid bricks/pavers at all times using panels of plywood. Panels can be advanced as work progresses; however, keep the plywood protection in areas that will be subjected to movement of materials, workers, and equipment. Take precautions in order to avoid depressions and protect brick/paver alignment until cured and ready for pedestrian or vehicle traffic.

3.07 DETECTABLE WARNING INSTALLATION

Set detectable warning panels in fresh concrete according to the manufacturer's recommendations and Figure 7030.210.

3.08 SLOPE AND SMOOTHNESS TESTING

A. Slope for Sidewalks, Curb Ramps, Turning Spaces, and Shared Use Paths:

1. Complete slope measurements and documentation according to Iowa DOT Materials I.M. 363.

2. At no additional cost to the Contracting Authority, remove and replace all sections not meeting PROWAG requirements as detailed on Figure 7030.204.

B. Smoothness for Shared Use Paths and Driveways:

1. Check finished surface with a 10 foot straightedge placed parallel to the centerline. Mark areas showing high spots of more than 1/4 of an inch in 10 feet.

2. If directed by the Engineer, correct marked areas by grinding down with an approved grinding tool to an elevation where the area will not show deviations in excess of 1/8 inch.

3.09 GRANULAR DRIVEWAY SURFACING

Comply with Iowa DOT Section 2315.

3.10 CLEANING

A. Remove all litter and construction materials or tools immediately after the end of the curing period.

B. Remove excess dirt from the site.

C. Broom clean completed sidewalks, shared use paths, and driveways.

3.11 MATERIAL TESTING

A. General: When testing is specified in the contract documents as the Contractor's responsibility, provide testing using the services of an independent testing laboratory approved by the Engineer.

B. Concrete Compression Tests: When the concrete volume placed on a single day exceeds 20 cubic yards, comply with the following test requirements. When deficiencies are encountered, comply with Section 7010, 3.07, E.

1. Prepare at least two test cylinders per day.

2. If the concrete volume placed on a single day exceeds 200 cubic yards, prepare two test cylinders for each 200 cubic yards placed.

3. Provide 7 and 28 calendar day tests according to ASTM C 39. Minimum compressive strength is 2,000 psi at 7 days and 4,000 psi at 28 days.

C. Asphalt Density and Thickness Tests: When the area of asphalt placed on a single day exceeds 100 square yards, comply with the following test requirement. When deficiencies are encountered, comply with Section 7020, 3.04, A.

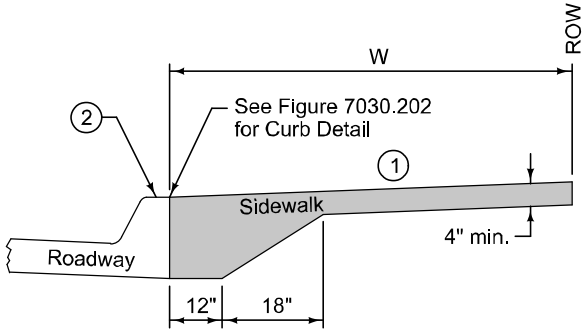
1. Prepare at least two cores per day.

2. If the area of asphalt placed on a single day exceeds 2,000 square yards, prepare two cores for each 2,000 square yards placed.

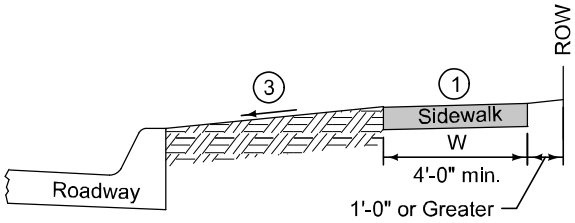
3.12 SIDEWALK AND CURB RAMP COMPLIANCE

Compliance with cross slopes and grades, as well as all other elements, for sidewalks and curb ramps is crucial. If the construction cannot be completed as specified in the contract documents, it may be necessary to adjust slopes within the accepted legal limitations. Contact the Engineer prior to placement of the concrete if changes from the values specified in the contract documents are being made.

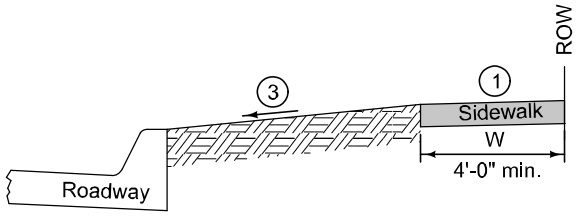
END OF SECTION



CLASS A SIDEWALK
(Sidewalk extends from back of curb to ROW)



CLASS B SIDEWALK



CLASS C SIDEWALK

(1) Target cross slope of 1.5% with a maximum cross slope of 2.0% (including sidewalk through driveway).

(2) Ensure top of curb slopes to street for drainage.

(3) Parking Slopes:
If parking width is less than 10 feet wide, slope at ¼ inch per foot.

If parking width is 10 feet wide and greater, slope at ½ inch per foot.

Special grade may be specified in the contract documents.

W = Sidewalk width as specified in the contract documents.

FIGURE 7030.201 | SHEET 1 OF 1

SUDAS

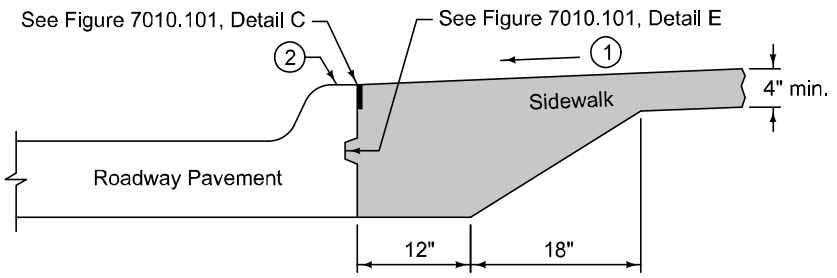
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7030.201

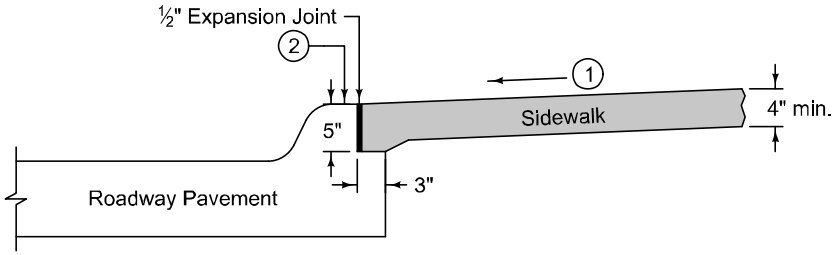
SHEET 1 of 1

SUDAS Standard Specifications

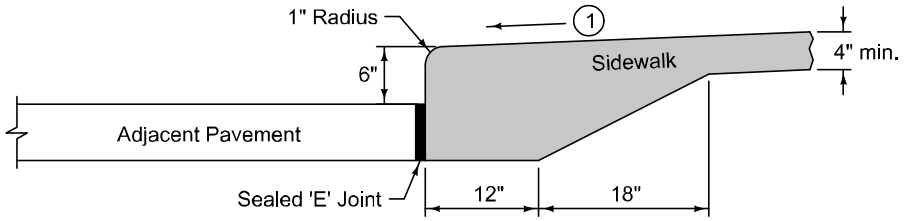
CLASSES OF SIDEWALKS



DETAIL 1



DETAIL 2



DETAIL 3

For new sidewalk with new curb and gutter, comply with Detail 1 or Detail 2. Comply with Detail 3 for new sidewalk adjacent to existing pavement or when specified in the contract documents.

(1) Target cross slope of 1.5% with a maximum cross slope of 2.0%.

(2) Ensure top of curb slopes to street for drainage.

FIGURE 7030.202

SHEET 1 OF 1

SUDAS

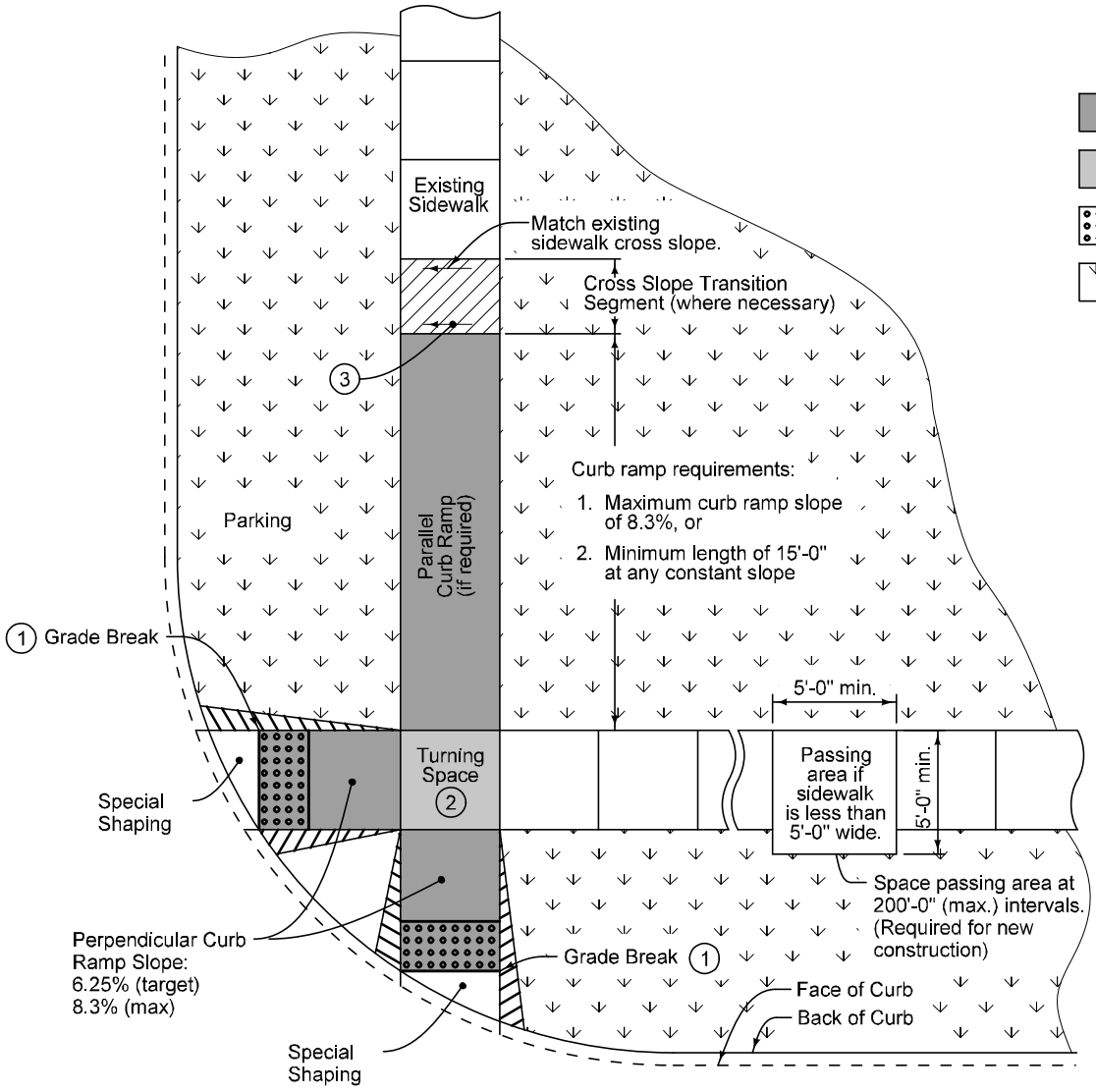
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7030.202

SHEET 1 of 1

SUDAS Standard Specifications

CURB DETAILS FOR CLASS A SIDEWALK



Key

- Curb Ramp
- Turning Space
- Detectable Warning
- Grass

1. Match pedestrian street crossing slope, or flatter.
2. Minimum 4 feet by 4 feet. Target cross slope of 1.5% with a maximum cross slope of 2.0%.
3. Target cross slope of 1.5% with a maximum cross slope of 2.0%.

FIGURE 7030.204 | SHEET 1 OF 1

SUDAS

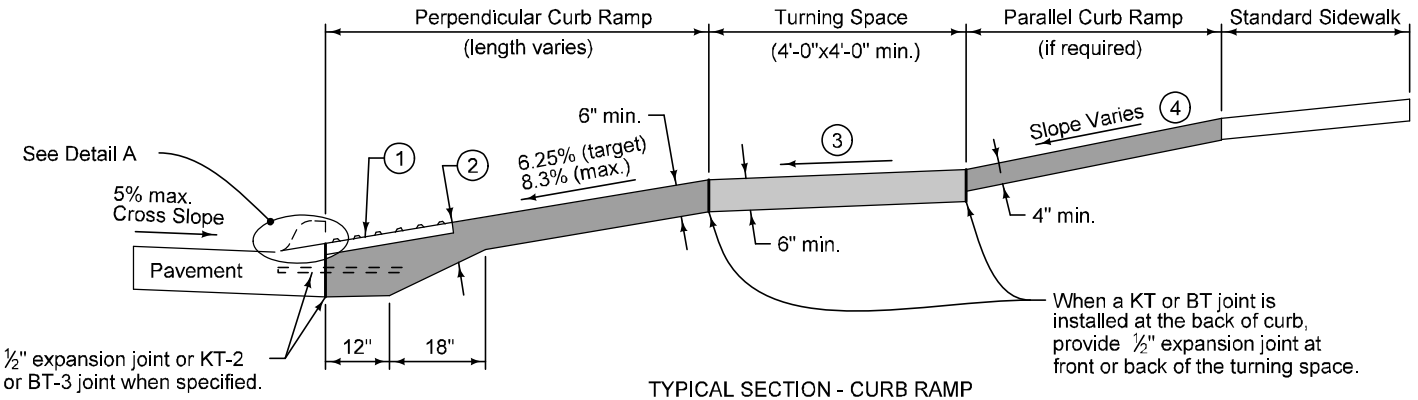
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7030.204

SHEET 1 of 1

SUDAS Standard Specifications

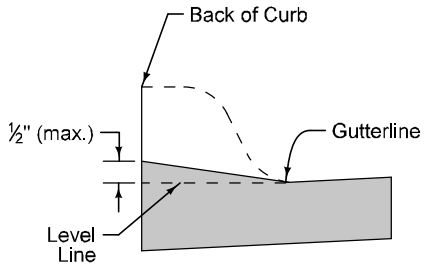
GENERAL FEATURES OF AN ACCESSIBLE SIDEWALK



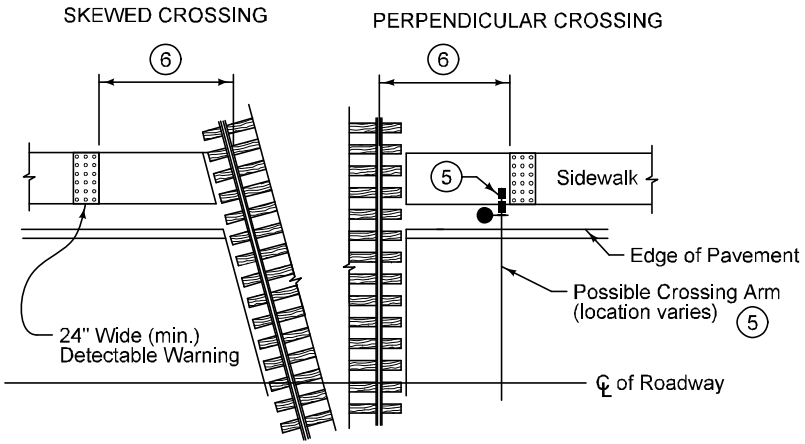
TYPICAL SECTION - CURB RAMP

Key

- Curb Ramp
- Turning Space
- Detectable warning



DETAIL A



DETECTABLE WARNING LOCATION AT RAILROAD CROSSING

1. Provide a minimum 2 foot width of detectable warning surfaces in the direction of pedestrian travel across the full width of the curb ramp or turning space, exclusive of curbs or flares.
2. Provide a minimum of 6 inches of concrete below the detectable warning panel.
3. Minimum 4 feet by 4 feet. Target cross slope of 1.5% with a maximum cross slope of 2.0%.
4. If normal sidewalk elevation cannot be achieved with the perpendicular ramp between the street and landing due to limited ramp length, provide a parallel ramp to make up the elevation difference between the landing and the standard sidewalk.

   The length of the parallel ramp is not required to exceed 15 feet, regardless of the resulting slope. Do not exceed 8.3% slope for parallel ramps shorter than 15 feet.
5. If crossing gate conflicts with location of detectable warning or if pedestrian crossing gate is provided, place detectable warning panel in advance of the crossing gate.
6. Locate front edge of detectable warning panel 12 to 15 feet from centerline of nearest rail. Orient truncated domes parallel to the direction of pedestrian travel.

FIGURE 7030.205 | SHEET 1 OF 1

SUDAS

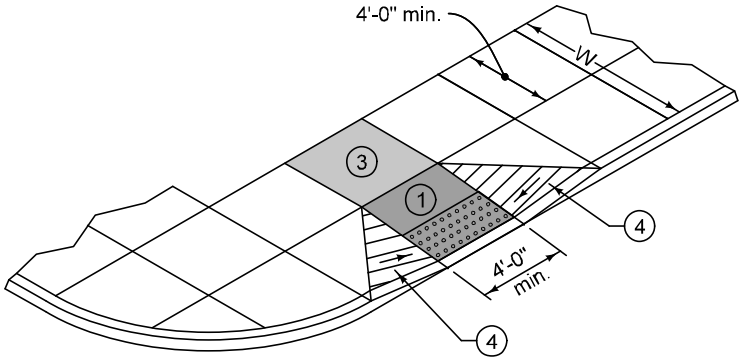
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7030.205

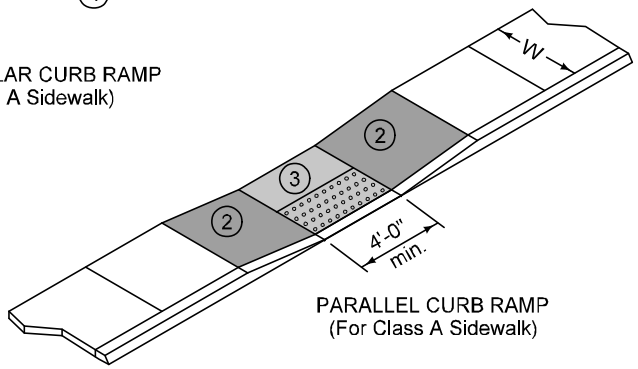
SHEET 1 of 1

SUDAS Standard Specifications

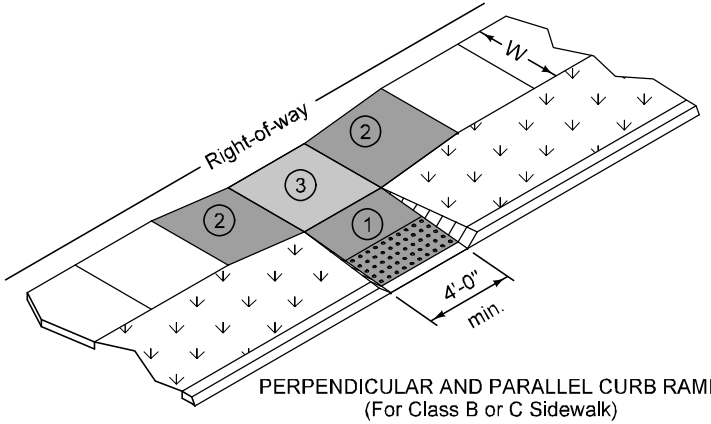
GENERAL SIDEWALK AND CURB RAMP DETAILS



PERPENDICULAR CURB RAMP
(For Class A Sidewalk)



PARALLEL CURB RAMP
(For Class A Sidewalk)



PERPENDICULAR AND PARALLEL CURB RAMP
(For Class B or C Sidewalk)

Key

- Curb Ramp
- Turning Space
- Detectable Warning

(1) Perpendicular Curb Ramp: Target running slope of 6.25% with maximum running slope of 8.3%. Match pedestrian street crossing cross slope at back of curb. At mid-block crossings, cross slope may exceed 2.0% to match roadway grade.

(2) Parallel Curb Ramp: Target cross slope of 1.5% with a maximum cross slope of 2.0%. The length of the parallel ramp is not required to exceed 15 feet, regardless of resulting slope. Do not exceed 8.3% slope for parallel ramps shorter than 15 feet.

(3) Turning Space: Target slope of 1.5%, with a maximum slope perpendicular to the travel directions of 2.0%. At mid-block crossings, cross slope of landing may exceed 2.0% to match roadway grade. Minimum 4 feet by 4 feet.

(4) Flare (10:1 max.) required if ramp is contiguous with sidewalk.

FIGURE 7030.206 | SHEET 1 OF 1

SUDAS

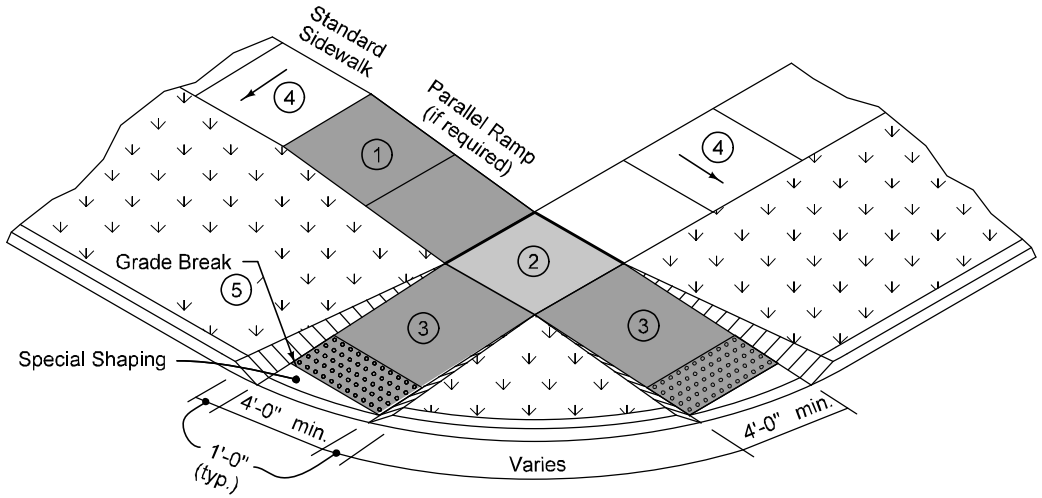
REVISION
New 10-16-12

7030.206

SHEET 1 of 1

SUDAS Standard Specifications

CURB RAMPS OUTSIDE OF INTERSECTION RADIUS



1. Parallel Curb Ramp: If normal sidewalk elevation cannot be achieved with the perpendicular ramp between the street and landing due to limited ramp length, provide a parallel ramp to make up the elevation difference between the landing and the standard sidewalk.

   The length of the parallel ramp is not required to exceed 15 feet, regardless of the resulting slope. Do not exceed 8.3% slope for parallel ramps shorter than 15 feet.

2. Turning Space: Target slope of 1.5% with maximum slope perpendicular to the travel directions of 2.0%. Minimum 4 feet by 4 feet.

3. Perpendicular Curb Ramp: Target running slope of 6.25% with maximum running slope of 8.3%.

4. Target cross slope of 1.5% with a maximum cross slope of 2.0%.

5. Match pedestrian street crossing cross slope or flatter.

Key

- Curb Ramp
- Turning Space
- Detectable warning
- Grass

SUDAS

REVISION
New 10-16-12

7030.207

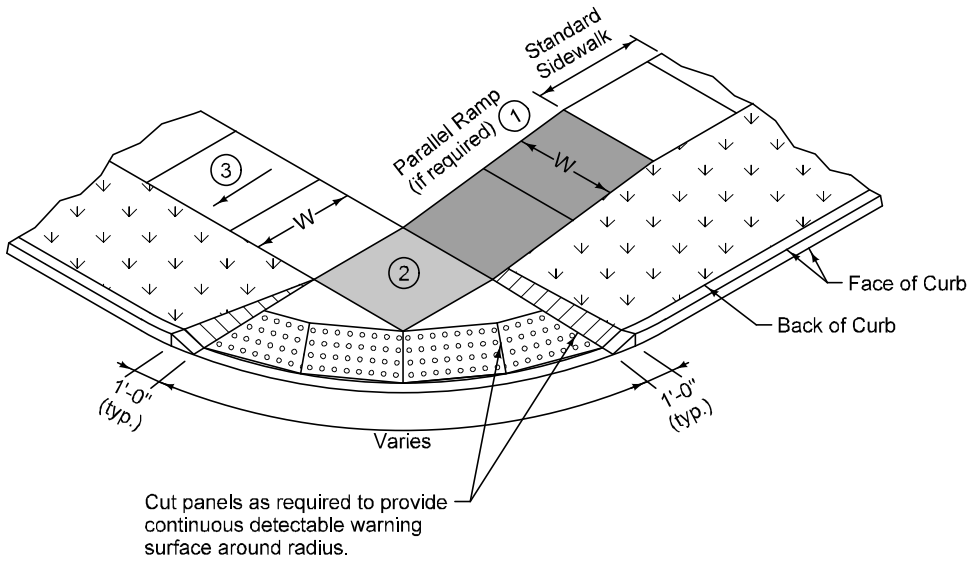
SHEET 1 of 1

SUDAS Standard Specifications

CURB RAMP FOR
CLASS B OR C SIDEWALK

FIGURE 7030.207

SHEET 1 OF 1



1. Parallel Curb Ramp: If normal sidewalk elevation cannot be achieved with the perpendicular ramp between the street and landing due to limited ramp length, provide a parallel ramp to make up the elevation difference between the landing and the standard sidewalk.

   The length of the parallel ramp is not required to exceed 15 feet, regardless of the resulting slope. Do not exceed 8.3% slope for parallel ramps shorter than 15 feet.

2. Turning Space: Target slope of 1.5% with maximum slope perpendicular to the direction of travel of 2.0%. Minimum 4 feet by 4 feet.

3. Target cross slope of 1.5% with a maximum cross slope of 2.0%.

Key

- Curb Ramp
- Turning Space
- Detectable warning
- Grass

SUDAS

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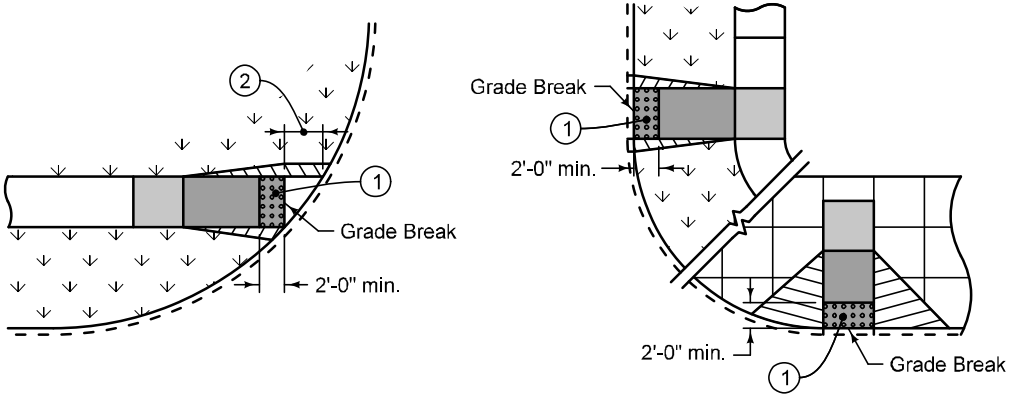
7030.208

SHEET 1 of 1

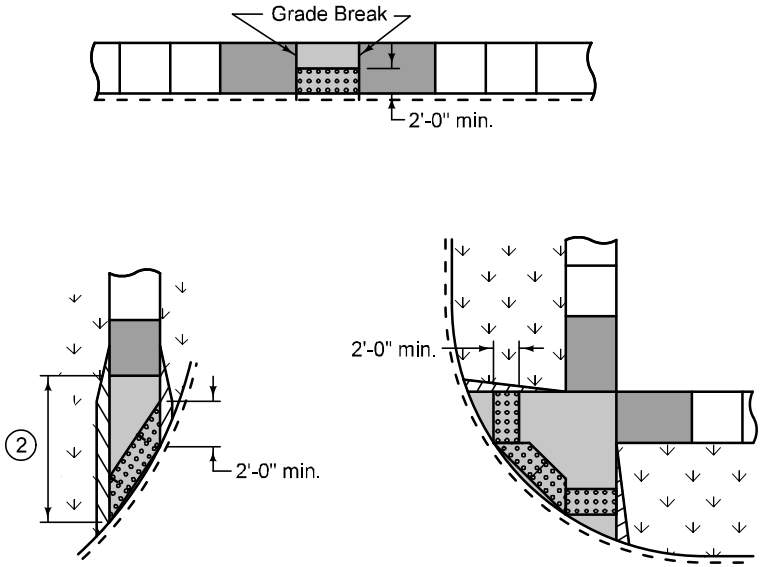
SUDAS Standard Specifications

ALTERNATIVE CURB RAMP FOR CLASS B OR C SIDEWALK

FIGURE 7030.208 | SHEET 1 OF 1



PERPENDICULAR RAMPS



PARALLEL RAMPS

Provide a minimum 2 foot width of detectable warning surfaces in the direction of pedestrian travel across the full width of the curb ramp or turning space, exclusive of curbs or flares.

(1) When detectable warning is located on curb ramp surface, orient domes in the direction of pedestrian travel.

(2) When the distance between the grade break and the back of curb is less than 5 feet, place detectable warning surface at the bottom of the curb ramp.

Where one corner of the curb ramp is more than 5 feet from the back of curb, construct curb ramp as a parallel curb ramp. Move grade break back as required to place detectable warning on turning space at the back of curb.

Key

- Curb Ramp
- Turning Space
- Detectable Warning

SUDAS

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New	10-16-12

7030.210

SHEET 1 of 1

SUDAS Standard Specifications

DETECTABLE WARNING PLACEMENT

FIGURE 7030.210

SHEET 1 OF 1

PAVEMENT REHABILITATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Full and Partial Depth PCC Patches

B. Full and Partial Depth Asphalt Patches

C. Full Depth Composite Patches

D. Diamond Grinding

E. Milling

F. Cleaning and Filling Joints and Cracks

G. Curb and Gutter Replacement

H. Dowel Bar Retrofit

I. Core Hole Cutting and Replacement

1.02 DESCRIPTION OF WORK

A. Construct full depth PCC, asphalt, and composite patches.

B. Construct partial depth PCC and asphalt patches.

C. Grind existing PCC pavement surface for profile improvement using a diamond grinder.

D. Mill the surface of asphalt or PCC pavement to improve the surface profile and cross-section in preparation for resurfacing.

E. Clean and fill longitudinal and transverse joints and random cracks in PCC and asphalt pavement.

F. Remove existing pavement and curb and gutter.

G. Install epoxy coated dowel bars on transverse joints and cracks.

H. Cutting and replacement of pavement cores.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. PCC mix design.

B. Asphalt mix design.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, HANDLING, AND SALVAGING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. PCC: See Section 7010.

B. Asphalt: See Section 7020

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Full Depth Patches:

1. **Measurement:** Measurement will be in square yards for each type and thickness of full depth patch. Patches less than 2 square yards in area will be considered 2 square yards.

2. **Payment:** Payment will be made at the unit price per square yard for each type and thickness of full depth patch.

3. **Includes:** Unit price includes, but is not limited to, sawing, removing, and disposing of existing pavement and reinforcing; restoring the subgrade; furnishing and installing tie bars and dowel bars; furnishing and placing the patch material, including the asphalt binder and tack coat; forming and constructing integral curb; surface curing and pavement protection; joint sawing and filling; and placing backfill and restoring disturbed surfaces.

B. Subbase Over-excavation:

1. **Measurement:** Measurement will be in tons of subbase material placed for authorized over-excavation.

2. **Payment:** Payment will be made at the unit price per ton of subbase material.

3. **Includes:** Unit price includes, but is not limited to, removal of existing subbase or subgrade, disposal of materials removed, furnishing and placing subbase material, and any additional excavation required for subbase placement.

C. Partial Depth Patches:

1. **Measurement:** Measurement will be in square feet for each type of partial depth patch. Patches less than 1 square foot in area will be considered 1 square foot.

2. **Payment:** Payment will be made at the unit price per square foot for each type of partial depth patch.

3. **Includes:** Unit price includes, but is not limited to, sawing, removing, and disposing of existing pavement; furnishing tack coat or bonding agent; furnishing and placing the patch material; curing; joint filling (PCC patches only); placing backfill; and restoring disturbed surfaces.

1.08 MEASUREMENT AND PAYMENT (Continued)

4. **Extra Payment:** When partial depth patches are constructed to full depth at the direction of the Engineer, payment will be at 2 times the unit price per square foot for each type of partial depth patch.

D. Crack and Joint Cleaning and Filling, Hot Pour:

1. **Measurement:** Measurement will be in linear feet measured along the cracks or joints.

2. **Payment:** Payment will be made at the unit price per linear foot of crack and joint cleaning and filling.

3. **Includes:** Unit price includes, but is not limited to, furnishing crack and joint filler material and routing, sawing, cleaning, and filling joints or cracks.

E. Crack Cleaning and Filling, Emulsion:

1. **Crack Cleaning and Filling, Emulsion:**
   a. **Measurement:** Measurement will be in linear feet measured along the cracks. Map cracked areas will not be measured.
   b. **Payment:** Payment will be made at the unit price per linear foot of crack cleaning and filling.
   c. **Includes:** Unit price includes, but is not limited to, furnishing emulsified crack filler material, cleaning cracks, placing soil sterilant, and filling cracks.

2. **Asphalt for Crack Filling:**
   a. **Measurement:** Measurement will be in tons of asphalt used for filling cracks greater than 1 inch. Quantity will be based upon scale tickets. Mixture not used in the work will be deducted based upon scaled weights.
   b. **Payment:** Payment will be made at the unit price per ton for asphalt used in filling cracks over 1 inch.
   c. **Includes:** Unit price includes, but is not limited to, cleaning, applying tack coat, and furnishing and placing asphalt for crack filling.

F. Diamond Grinding:

1. **Measurement:** Measurement will be in square yards for the area of diamond grinding.

2. **Payment:** Payment will be made at the unit price per square yard of diamond grinding.

3. **Includes:** Unit price includes, but is not limited to, diamond grinding pavement, testing for smoothness according to the contract documents, and removal of slurry and residue from the project site.

G. Milling:

1. **Measurement:** Measurement will be in square yards for the area of milling.

2. **Payment:** Payment will be made at the unit price per square yard of milling.

3. **Includes:** Unit price includes, but is not limited to, milling pavement; furnishing water; and salvaging, stockpiling, and removing cuttings and debris.

1.08 MEASUREMENT AND PAYMENT (Continued)

H. Pavement Removal:

1. **Measurement:** Measurement will be in square yards. No deduction in area will be made for manholes, storm sewer intakes, valve boxes, or other structures less than 2 square yards in area. Pavement removal for patching is included as part of the patching item and will not be measured separately.

2. **Payment:** Payment will be made at the unit price per square yard.

3. **Includes:** Unit price includes, but is not limited to, sawing, breaking, removing, and disposing of existing pavement and reinforcing steel.

I. Curb and Gutter Removal:

1. **Measurement:** Measurement will be in linear feet measured along the back of curb.

2. **Payment:** Payment will be made at the unit price per linear foot of curb and gutter removed.

3. **Includes:** Unit price includes, but is not limited to, sawing, breaking, removing, and disposing of existing curb and gutter.

J. Dowel Bar Retrofit:

1. **Measurement:** Each size of dowel bars satisfactorily placed will be counted.

2. **Payment:** Payment will be made at the contract unit price for each size of dowel bar.

3. **Includes:** Unit price includes, but is not limited to, cutting the slots, preparing the slots, placing and grouting the bars, and curing the surface.

K. Core Hole Cutting and Replacement:

1. **Measurement:** Measurement will be by count of the number of core holes replaced.

2. **Payment:** Payment will be made at the contract unit price per core hole replaced.

3. **Includes:** Unit price includes but is not limited to, cutting the core hole, vacuum excavation, furnishing and placing backfill material and pavement, or replacing the pavement core using waterproof bonding material, if specified.

L. Sampling and Testing: Required sampling and testing for pavement repair and rehabilitation work is incidental to other project costs and will not be paid for separately.

PART 2 - PRODUCTS

2.01 MATERIALS

A. PCC:

1. **Standard Patching:** Use Class C mix complying with Section 7010. Comply with Iowa DOT Materials I.M. 401. Construct all patches as standard patches unless otherwise specified in the contract documents.

2. **High Early Strength Patching:** Use Class M mix complying with Section 7010. Do not use calcium chloride unless otherwise specified in the contract documents.

3. **Partial Depth Patching:** Use a coarse aggregate in concrete mix complying with Iowa DOT Article 4109.02, Gradation No. 5 in the Aggregate Gradation Table.

B. Asphalt: Provide a minimum Low Traffic (LT) mixture complying with Section 7020, unless otherwise specified in the contract documents. Provide mixture with an asphalt binder meeting or exceeding PG 58-28S.

C. Crack and Joint Filler Material:

1. **Hot Pour Crack and Joint Filler:** Comply with Iowa DOT Section 4136.

2. **Emulsified Asphalt Crack Filler:** Provide CRS-2 or CRS-2P emulsions complying with Iowa DOT Section 4140.

3. **Asphalt for Filling Cracks:**
   a. Provide a 3/4 inch, 1/2 inch, or 3/8 inch asphalt mixture complying with Section 7020, or a similar mixture from a commercial source subject to approval from the Engineer.
   b. Upon approval of the Engineer, a high performance bituminous cold premix may be used, depending on the availability of the specified asphalt.

4. **Blotting Material:** Provide sand complying with Iowa DOT Sections 4124 or 4125, or similar sand approved by the Engineer.

5. **Soil Sterilant:** Provide soil sterilant as specified in the contract documents.

D. Primer or Tack Coat Bitumen: Comply with Iowa DOT Article 2303.02.

E. Epoxy for Bonding Dowel and Tie Bars: Comply with Iowa DOT Materials I.M. 491.11.

F. Tie Bars and Dowel Bars: Provide epoxy coated bars complying with Iowa DOT Section 4151 or glass fiber reinforced polymer bars complying with Iowa DOT Section 4156.

G. Subbase Material: Unless otherwise specified in the contract documents, use modified subbase complying with Section 2010.

H. Liquid Curing Compound: Comply with Iowa DOT Section 4105.

I. Sand-cement Grout: Provide a sand-cement grout mixture with a ratio of one part water to one part sand and two parts cement.

J. Preformed Compression Relief Material: Provide 1/4 inch polystyrene, 1/4 inch polyethylene, 1/4 inch Styrofoam, or 3/16 inch waxed coated cardboard.

2.01 MATERIALS (Continued)

K. Epoxy Coated Dowel Bars: Comply with Figure 7010.101 and Iowa DOT Section 4151 for the length and diameter specified. Uniformly coat dowel bars with approved bond breaker according to Iowa DOT Article 4151.02, B. Include tight fitting nonmetallic end caps that allow a minimum of 1/4 inch movement at each end.

L. Dowel Chairs: Prevent movement of the dowel bar during grout placement with epoxy coated or nonmetallic dowel chair devices which provide a minimum clearance of 1/2 inch between the bottom of the bar and the surface upon which the bar is placed and also between the bar and the end walls of the slot.

M. Caulking Filler: Any commercial caulk designed as a concrete sealant that is compatible with the grout material being used.

N. Foam Core Inserts: Provide 3/8 inch ± 1/8 inch thick closed cell foam core board filler faced with film, foil, or poster board material on both sides.

O. Rapid Set Patch Material:

1. Provide a shrinkage compensated rapid set patch material meeting Iowa DOT Materials I.M. 491.20 and the following strength requirements:
   - 3 hour minimum compressive strength of 3,000 psi according to ASTM C 39.
   - 24 hour minimum compressive strength of 5,000 psi according to ASTM C 39.

2. Use grout material from packaged bags or proportioned on site from bulk cementitious materials.
   a. Extend packaged bags with pea gravel, proportioned and mixed according to the manufacturer's recommendations. Fine aggregate additions and water in excess of the manufacturer's recommendations are not allowed.
   b. Use bulk cementitious materials equivalent in composition to the cementitious materials used in packaged bags and proportioned with fine aggregate and water and extended with pea gravel to produce a mixture equivalent to the packaged bag mix meeting the manufacturer's recommendations. Water in excess of the manufacturer's recommendations is not allowed.
      c. Supply fine aggregates meeting Iowa DOT Section 4110.

3. Provide pea gravel with a minimum Class 2 durability meeting the requirements of Iowa DOT Article 4112.03, B and Article 4109.02, Gradation No. 9 in the Aggregate Gradation Table.

4. Use water meeting the requirements of Iowa DOT Section 4102. Potable water obtained from a municipal supply, suitable for drinking, may be accepted without testing.

P. Backfill Material:

1. CLSM or foamed cellular concrete, per Section 3010, 2.06, if required by the Jurisdiction.

2. Class I granular material meeting Section 3010, 2.02, A or pea gravel complying with Iowa DOT Article 4109.02, Gradation No. 21.

Q. Waterproof Bonding Material: Meet ASTM C 928 with a minimum bond strength of 1,500 psi at one day and 2,000 psi at 7 days. Carry an AASHTO H-25 truck load within 1 hour when temperature is 50° F.

PART 3 - EXECUTION

3.01 GENERAL

A. Conduct all operations to minimize inconvenience to traffic. Confine operations to one traffic lane, unless the road is to be closed to traffic. Minor encroachment into the adjacent lane, such as for sawing and installing forms, will be acceptable with the use of a flagger according to MUTCD.

B. Do not remove pavement for either full depth or partial depth patching unless the patch can be completed before the end of the working day.

C. Construct full depth and partial depth patches to the dimensions specified in the contract documents or as marked by the Engineer in the field. Construct all full depth patches to full panel width.

D. Make saw cuts parallel or perpendicular to the centerline.

E. Remove and dispose of materials not designated for salvage.

F. Restore the area outside the pavement by placing and compacting backfill material, placing topsoil, and sodding or seeding as specified in the contract documents.

G. For pavement patches in areas removed to determine utility locations, replace pavement according to Figures 7040.101, 7040.102, 7040.103, and 7040.107 as directed by the Jurisdiction.

3.02 FULL DEPTH PATCHING

A. Pavement Removal:

1. Saw pavement to full depth at the edges of the patch. A second saw cut, 2 inches inside the initial saw cut, may be required to prevent damage to adjacent pavement.

2. Do not damage pavement that is to remain. Do not use heavy equipment adjacent to new concrete until the opening strength is achieved.

B. Restoring Subgrade or Subbase:

1. Excavate 2 inches below the bottom of the existing pavement. If more than 2 inches is excavated, place and compact new subbase material as required to bring the subbase to a level 2 inches below the bottom of the existing pavement. Correct unauthorized over-excavation at no additional cost to the Contracting Authority.

2. Compact the exposed subgrade or subbase by a minimum of four complete passes with a plate-type vibratory compactor with a minimum force rating of 3,500 pounds.

3. When unstable material or excessive moisture is encountered, the Engineer may order removal and replacement of the unstable material.
   a. Remove existing unstable subgrade or subbase, or both, to the depth directed by the Engineer.
   b. Place and compact new subbase material as required to bring the subbase to a level 2 inches below the bottom of the existing pavement.

C. Placing PCC Patches:

1. Equipment: Comply with Iowa DOT Article 2301.03, A, specifications on equipment for standard concrete pavement.

3.02 FULL DEPTH PATCHING (Continued)

2. **Tie Bars and Dowel Bars:** Comply with Section 7010 and the figures in Sections 7010 and 7040.
   a. When there is a common line between two adjacent patches, a bent bar may be placed in a keyway and later straightened.
   b. Coat dowel bars extending into the patch area with a bond breaker. Do not coat tie bars.

3. **Forms:** Comply with Section 7010, 3.02, D, as well as the following.
   a. Use forms on all exposed edges and along the centerline for patches that extend into an adjacent lane, unless full pavement width patches are constructed.
   b. Rigid wood forms may be used in lieu of steel.

4. **Placing, Consolidation, and Finishing the Concrete:**
   a. Moisten the subbase or subgrade.
   b. Except for preplanned joints, place the patch continuously until the patch is completed.
   c. When a delay of 45 minutes cannot be avoided, construct a day's work ('DW') joint.
   d. Carefully place concrete into the patch area to avoid segregation; spread into place and consolidate with a mechanical vibrator. Place full lane width patches over 25 feet in length with a suitable finishing machine that has at least one vibrating screed. Avoid excessive vibrating.
   e. Finish patches per Section 7010, 3.02, I.
   f. For joints with tie bars, tool the edge. For joints with dowel bars, saw to a depth of approximately 1 1/8 inch, leaving an opening of at least 3/8 inch in width to provide a reservoir for joint filler.
   g. Texture the patch to match the adjacent surface.

5. **Curing:** Comply with Section 7010, 3.02, J. Cure the concrete, including exposed vertical edges, immediately after the concrete has been finished and the surface water has evaporated.

6. **Joints:** Construct and fill joints according to Section 7010, 3.02. Place joints at locations specified in the contract documents.

7. **Pavement Protection:** Comply with Section 7010, 3.04.

8. **Use of Pavement:** Comply with opening strength requirements of Section 7010, 3.05. Maturity testing is not required.

D. Placing Asphalt Patches:

1. Use equipment complying with Iowa DOT Article 2303.03. Use of a paving machine is not required.

2. Apply tack coat to the vertical edges of the remaining pavement at a rate of 0.10 to 0.15 gallons per square yard.

3. Place asphalt patch mixture in lifts that will not exceed 3 inches in thickness after compaction, with the top lift not exceeding 2 inches in thickness when compacted.

4. Compact each lift while hot by rolling or compacting with a vibratory compactor. Subsequent lifts may be placed as soon as the preceding lift has been properly compacted.

3.02 FULL DEPTH PATCHING (Continued)

5. Smooth the final lift with a steel-tired finish roller. Ensure the final compacted surface is level with, or no more than 1/8 inch above, the adjacent pavement and has a smooth riding surface. If the patch becomes distorted for any reason, smooth the surface by blading, scraping, grinding, filling, or other approved means.

6. Do not extend patch material beyond the edge of the existing pavement; remove patch material that extends outside the patch limits.

7. Do not open to traffic until the mixture has cooled sufficiently to provide stability.

3.03 PARTIAL DEPTH PATCHING

A. Pavement Removal:

1. Ensure all patches are square or rectangular in shape.

2. For removal by the saw and chip method, cut at the designated removal limits to a minimum depth of 2 inches and a maximum depth of T/2 or the top of the dowels in PCC pavement. For PCC patches, taper the sides of the removal area 30 to 60 degrees from vertical using a pneumatic hammer to eliminate the polished face.

3. Using a 15 pound maximum size pneumatic hammer, remove the deteriorated pavement down to sound pavement. A 30 pound pneumatic hammer may be used if it does not result in damage to the patch area and edges.

4. In lieu of sawing and removal with a pneumatic hammer, the designated patch area may be milled to the prescribed depth. Milling equipment must provide tapered edges 30 to 60 degrees from vertical for PCC patches. Chip out secondary spalling resulting from milling at no additional cost to the Contracting Authority.

5. Remove pavement to the appropriate depth. Do not damage steel reinforcement during the removal process on PCC pavements. Damaged steel will be the responsibility of the contractor. If the end of a dowel bar is exposed, cut and remove the bar. Place duct tape, form oil, grease or use other method approved by the Engineer as a bond breaker on dowels not removed. If the required depth to sound pavement exceeds the maximum T/2 removal depth, construct a full depth patch.

B. PCC Patch Placement:

1. Clean removal area by sandblasting or water blasting, followed by airblasting, until the area is clean and dry. Ensure the compressed air used for cleaning is oil and moisture free. Place concrete the same day as cleaning.

2. Install preformed compression relief material in joints or cracks or tool the joint in the plastic concrete. Use material equal in width to the adjacent joint or crack at the patch boundary. For wide openings, use multiple thicknesses. Compression relief material is to extend at a minimum of 1/4 inch below the bottom of the patch so as to completely separate all patching material on both sides and 3 inches beyond the patch boundaries. If tooling of the joint is specified, complete a relief saw cut to the full depth of the patch plus 1/4 inch as soon as the concrete has reached proper set.

3. Thoroughly coat the bottom and sides of the patch area with a cement grout immediately prior to placement of concrete. Do not allow grout to set prior to placement of concrete. Remove grout set by sandblasting and reapply.

3.03 PARTIAL DEPTH PATCHING (Continued)

4. Deposit concrete in the patch; finish patch from the center outward. Ensure concrete does not infiltrate into existing cracks or joints.

5. Apply joint filler material to expansion joints. At the interface between the patch and the slab, apply sand-cement grout to fill and seal the edge. Position the grout so 1 inch is over the surrounding pavement and 3 inches are over the patch.

6. Texture the patch similar to the adjacent surface.

7. Cure patch according to Section 7040, 3.02.

8. Fill joints according to Section 7040, 3.06. Complete filling within 5 calendar days after patch is placed.

C. Asphalt Patch Placement:

1. Clean removal area by airblasting until the area is clean and dry. Ensure the compressed air used for cleaning is moisture free.

2. Cover the entire removal area with tack coat at a rate of 0.10 to 0.15 gallons per square yard.

3. Place asphalt patch mixture in lifts that will not exceed 3 inches in thickness after compaction, with the top lift not exceeding 2 inches in thickness when compacted.

4. Compact each lift while hot by rolling with an adequately weighted pneumatic tire roller or by tamping with a mechanical tamper. Succeeding lifts may be placed as soon as the preceding lift has been properly compacted.

5. Smooth the final lift with a steel-tired finish roller. Ensure the final compacted surface is level with, or no more than 1/8 inch above, the adjacent pavement and has a smooth riding surface. If the patch becomes distorted for any reason, smooth the surface by blading, scraping, grinding, filling, or other approved means.

6. Do not open to traffic until the mixture has cooled sufficiently to provide stability.

3.04 DIAMOND GRINDING

A. Use equipment complying with Iowa DOT Article 2532.03, A.

B. Grind and texture the entire surface of the pavement parallel to the centerline until the pavement surface on both sides of transverse joints and all cracks are in the same plane with no greater than 1/16 inch difference between adjacent sides of joints and cracks and the pavement surface meets the required smoothness. Feather grind into existing structures such as manholes and water valves in a manner that eliminates abrupt edges or drops and provides a uniform texture.

C. Ensure the ground surface is of uniform texture. In each lane, ensure at least 95% of the area in each 100 foot section has a newly textured surface. Depressed pavement areas due to subsidence or other localized causes and areas containing feathering due to pavement structures will be exempted from texturing requirements.

D. Except at joints and cracks, ensure grinding depth does not exceed 1/2 inch. At joints and cracks, ensure grinding depth does not exceed 3/4 inch.

3.04 DIAMOND GRINDING (Continued)

E. For multiple passes, ensure overlaps do not exceed 1 inch. Begin at the crown of the roadway, proceeding toward the pavement edge with each subsequent pass. Ensure each subsequent pass is at least as deep as the previous pass in order to provide transverse drainage. All passes are to begin and end at the same station location. Ensure no unground areas are left between passes. For grinding adjacent to an unground turn lane or other pavement surface, feather smoothly from the edge of the ground surface to the unground surface leaving no more than a 1/8 inch ridge. If street surface to be ground includes a curb and gutter section, extend grinding to within 4 inches of the curb face and feather to provide proper drainage.

F. Assemble and adjust the grinding head as necessary during the project to produce the following tolerances on pavements with the indicated coarse aggregates. Both the distance between grooves and the texture depth must be within the specified range to be in compliance. Assemble the grinding head to produce the tolerances indicated below for the type of coarse aggregate in the pavement.

	Crushed Stone	Gravel/Quartzite
Width of Land Area Between Grooves*	0.090” to 0.110”	0.080” to 0.095”
Texture Depth**	Target of 1/8” with average between 1/16” and 3/16”	

*Based on an average of a minimum of ten measurements across the ground width for one pass.
**Based on an average of a minimum of six measurements across the ground width for one pass.

G. Prior to enforcement of the tolerances listed above, a test area 300 feet long and the width of the grinding head will be allowed for a new head that has been restacked, provided a surface texture in reasonable conformance with the specifications, as determined by the Engineer, is being produced.

H. Ensure the transverse slope of the ground pavement is uniform to a degree that there are no depressions or misalignment of slope greater than 1/4 inch in 12 feet when tested by string line or straightedge placed perpendicular to the centerline.

I. Continuously remove all slurry or residue resulting from the grinding operations with a well-maintained vacuum system and remove from the project limits. Ensure residue from grinding operations does not flow across lanes occupied by public traffic or into gutters, storm sewers, ditches, or other drainage facilities.

J. Measure smoothness with a 10-foot straightedge. Regrind high spots to ensure no surface deviations greater than 1/8 inch remain. When profilograph testing is specified in the contract documents, comply with Iowa DOT Materials I.M. 341 and the following requirements:

1. Prior to performing any grinding work, provide a control profilogram for each lane and/or segment over 50 feet in length that is to be ground. Ensure pavement is relatively clean and free of debris prior to establishing the control profilogram.

2. Ensure each segment of the finished ground surface has a final profile index less than or equal to 35% of the control profilogram trace or 22 inches per mile, whichever is greater, and does not include any bumps exeeding 1/2 inch in 25 feet.

3. Depressed pavement areas due to subsidence or other localized causes and areas where the maximum cut restricts further grinding will be excluded from testing with the profilograph when approved by the Engineer.

K. Recheck smoothness following any regrinding activities to ensure compliance with the above requirements.

3.05 MILLING

A. Use equipment complying with Iowa DOT Article 2531.03, A.

B. Mill the entire pavement area designated to the depth specified in the contract documents. Mill in straight lines. Make sufficient passes, or cuts, such that all irregularities or high spots are eliminated.

C. Control milling operations to provide a surface that is true within a nominal tolerance of 1/4 inch and 1/4 inch at longitudinal joints where adjacent passes meet. The profile may be inspected by checking with a 10 foot surface checker placed parallel to the centerline. Correct variations greater than 1/4 inch.

D. Load cuttings directly into dump trucks and remove the remaining small cuttings and debris from the street. Sweep the scarified surface with a rotary broom before opening to traffic. Unless otherwise specified in the contract documents, all materials removed are property of the Contractor.

E. Do not operate metal tracked equipment on streets, other than those being milled.

F. Ensure excessive dust does not become airborne during construction. Additional water may be required at any time for dust control.

G. Mill around manholes and utility valves. Correct any damage to manholes or valves by the milling operation at no additional cost to the Contracting Authority.

H. Do not leave a vertical drop of more than 2 inches at the centerline or lane line overnight. Taper the ends of milled sections subject to traffic to provide a uniform and gradual transition.

3.06 CRACK AND JOINT CLEANING AND FILLING, HOT POUR

A. General:

1. Use equipment complying with Iowa DOT Articles 2541.03 (asphalt) and 2542.03 (PCC).

2. Rout or saw joints and cracks with an average opening of 3/8 inch or less to provide a minimum sealant reservoir of 3/8 inch wide by a nominal 1/2 inch deep.

B. Crack and Joint Cleaning:

1. Clean cracks or joints of existing joint filler material, backer rod, vegetation, dirt, and other foreign material.

2. Clean joints or cracks by air blasting or by other methods as necessary to remove debris.

3. If specified in the contract documents, clean wet sawn joints with high pressure water immediately after sawing to remove residue produced by the sawing operation.

4. When cleaned joints or cracks are contaminated before being filled, clean them again before filling.

C. Crack and Joint Filling:

1. Ensure cracks and joints are dry prior to placement of filler material.

3.06 CRACK AND JOINT CLEANING AND FILLING, HOT POUR (Continued)

2. Heat, handle, and apply joint filler material to the proper level as specified in the contract documents and as recommended by the manufacturer.
   a. PCC Pavement: Do not overfill joint or crack with filler material. Immediately remove filler material placed on the pavement surface.
   b. Asphalt Pavement: Slightly overfill the entire crack reservoir with filler material. Smooth with a narrow V-shaped squeegee immediately after placement of the filler material to within 1/2 inch on each side of the crack edge.

3. Place joint filler material when the pavement and ambient air temperatures are 40°F or higher. When near this minimum, additional air blasting or drying time, or both, may be necessary to ensure a satisfactory bond to the joint surfaces.

4. Lanes may be opened to traffic only after the filler material has set sufficiently so it will not pick up under traffic. Blotting material may be applied to the filler material, but only after the surface has set to avoid penetration of the blotting material into the filler material.

3.07 CRACK CLEANING AND FILLING, EMULSION

Use emulsified asphalt for filling cracks in asphalt surfaces only. Do not use on PCC pavements.

A. General:

1. Clean cracks with either high pressure air or water equipment. Do not use water when freezing temperatures exist or are forecasted.

2. Ensure vegetation is removed from cracks. Alternative cleaning methods may be necessary to remove vegetation.

3. When specified in the contract documents, apply a soil sterilant in crack prior to placing the filler material.

4. For filling cracks, use a hand operated wand or pouring pot, capable of placing the filler material into the crack and filling to the adjacent surface. Use a spout or nozzle small enough to place the filler material into the crack without soiling the adjacent surface.

5. Immediately after placement of the filler material, tightly spread the emulsion using a 2 inch, or less, V-shaped rubber-edged squeegee. Take proper measures to hold the filler in place and prevent runout at edge of pavement or at low areas.

B. Cracks Wider Than 1 inch:

1. Clean the cracks of loose and spalled material, sand, and other foreign debris to a depth of 3 inches using high pressure water.

2. When specified in the contract documents, utilize additional methods to clean cracks of old crack filler.

3. Blow the cleaned cracks free of water with high pressure air.

4. Lightly apply a tack coat to the crack surfaces.

3.07 CRACK CLEANING AND FILLING, EMULSION (Continued)

5. Fill the cracks with asphalt.
   a. Ensure mix is warm and pliable when placed.
   b. Rod and tamp the mix into place level with the adjacent surface.
   c. Place mixture prior to filling cracks with emulsion.

6. Place a thin application of emulsion over the asphalt and tightly spread with a squeegee.

C. Cracks 1/4 inch to 1 inch in Width:

1. Clean the cracks of loose and spalled material, sand, and other foreign debris with high pressure air or high pressure water. Clean crack down to sound material, but a depth greater than 3 inches will not be required.

2. When specified in the contract documents, utilize additional methods to clean cracks of old crack filler.

3. Fill cracks with emulsion filler material.

D. Cracks Less Than 1/4 inch in Width:

1. Clean sufficiently to remove sand and other foreign debris.

2. Fill cracks with emulsion filler material.

E. Map-cracked (Alligator) Areas:

1. Cover area with emulsion filler material.

2. Spread emulsion over area with squeegee, working emulsion into cracks. Provide a thin, smooth application.

3. Promptly cover the filler material with a light application of blotter material.

3.08 PAVEMENT REMOVAL

A. Saw full depth at pavement removal limits.

B. Extend pavement removal limits to existing joint lines as directed by the Engineer.

C. Protect existing pavement, beyond removal limits, from damage. Remove to a new saw line and replace, at no additional cost to the Contracting Authority, all concrete broken or damaged beyond the removal limits designated by the Engineer.

3.09 CURB AND GUTTER REMOVAL

A. Saw longitudinally along the existing gutter joint or at a location directed by Engineer. Saw transversely at the curb and gutter removal limits.

B. Remove existing curb and gutter without damaging the existing pavement to remain.

3.10 DOWEL BAR RETROFIT

A. Cutting and Preparing Slots:

1. Cut slots to the required width and depth with gang saw capable of cutting a minimum of three slots in each wheel path simultaneously. Multiple cuts in each slot may be required.

2. Use 30 pound maximum pneumatic hammers operated at a 45 degree angle or less to remove concrete from the slots. Prevent damage to surrounding concrete. Smooth and level the bottom of the slots with a lightweight bush hammer.

3. Sandblast or waterblast to clean exposed surfaces of slot and fill transverse contraction joint on the bottom and sides of the slot with caulking filler.

B. Placing Dowel Bars:

1. Set dowel bars at the depth shown on the plans with chair devices.

2. Ensure dowel bars are parallel to the centerline of the pavements and to the pavement surface.

3. Place dowel bars within 1/4 inch of required alignment.

4. Center dowel bars over transverse joints or cracks so a minimum of 6 inches extends into adjacent panel.

5. Cut foam core material and place at center of dowel bar so the material is flush with the pavement surface or slightly recessed and in line with the joint or crack. Maintain foam core material in vertical position, tight to the slot edges during grout placement.

C. Grouting:

1. Thoroughly moisten all surfaces of the slot immediately prior to filling with grout. Remove any excess water with compressed air.

2. Produce grout with a portable mixer and place immediately after mixing and before grout has attained initial set. Do not retemper grout with water.

3. Place grout according to manufacturer's recommendations. Consolidate with hand held vibrator. If pavement is to be diamond ground place grout 1/8 inch higher than surrounding pavement. Place grout flush if the pavement is not to be ground.

4. Thoroughly coat grout with white pigment curing compound immediately after placement.

D. Re-establish Joints or Cracks: After grout has attained sufficient strength, re-establish joint or crack above the foam core insert within 8 hours of grout placement by means of sawing. If foam board is visible, sawing is not required.

3.11 CORE HOLE CUTTING AND REPLACEMENT

A. Cutting Core:

1. Place a temporary mark on the pavement core and adjacent pavement if the core is to be reinstalled. Maximum diameter is 12 inches.

2. Utilize a diamond bit with the vertical alignment of core hole saw perpendicular to the horizon. Include a center core hole or another mechanism to extract the core without damage.

3. Cut the full depth of the existing pavement. Protect core from damage if it is expected to be re-used.

4. Vacuum or hydro excavate to expose the buried infrastructure. Maintain vertical sides.

B. Backfill: Place backfill using suitable native soil compacted to 95% Standard Proctor Density according to Section 3010, granular material compacted to 65% Relative Density, CLSM, or foamed cellular concrete to the elevation required in Figure 7040.107.

C. Pavement Core Replacement: Comply with Figure 7040.107 and the following.

1. If allowed by the Jurisdiction, replace pavement core utilizing waterproof bonding material. Mix and place bonding material according to the manufacturer's recommendations to fill the annular space around the core and the original slab. Ensure reinstalled core is in its original orientation and is flush and level with the adjacent pavement. Remove excess bonding material.

2. For PCC pavement install rebar pins and place low slump concrete to match elevation of existing pavement.

3. For asphalt pavements, use standard traffic surface, 1/2 inch mix, and PG 58-28S binder. Maximum lift thickness is 2 inches. If allowed by the Engineer, replace core with low slump concrete or pre-mixed high performance cold mix generally meeting the asphalt mixture noted above. Match elevation of existing pavement.

END OF SECTION

TEMPORARY TRAFFIC CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Traffic Control Devices

B. Installation

C. Maintenance

D. Quality Control

1.02 DESCRIPTION OF WORK

This part of the specifications includes materials, equipment, and procedures for traffic control during construction. Furnish, erect, operate, maintain, move, and remove all traffic control devices required. Comply with the current edition of the MUTCD as adopted by the Iowa DOT.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Submit a traffic control plan for review and approval prior to installation.

B. Submit proposed modifications to the traffic control plan for review and approval prior to making changes.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, HANDLING, AND SALVAGING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

A. When a bid item for Temporary Traffic Control is included on the proposal form, comply with this section for measurement and payment

B. When the proposal form does not include a bid item for temporary traffic control, all costs incurred by the contractor for temporary traffic control are incidental to other work and will not be paid for separately.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Temporary Traffic Control:

1. Measurement: Lump sum item; no measurement will be made.

2. Payment: Payment will be at the lump sum price for temporary traffic control. Proportional payments will be made equal to the percentage of the dollar amount paid on the original contract amount.

3. Includes: Lump sum price includes, but is not limited to, installation, maintenance, and removal of temporary traffic control; total roadway closures with installation and removal of detour signing as shown in the contract documents; removal and reinstallation or covering of permanent traffic control devices that conflict with the temporary traffic control plan; monitoring and documenting traffic control conditions; and flaggers or automated flagger assistance devices (AFAD). When required in the contract documents, the following are also included in traffic control unless a separate bid item is provided: portable dynamic message signs, temporary barrier rail, temporary flood lighting, and pilot cars.

PART 2 - PRODUCTS

2.01 GENERAL

Use products and materials complying with Part 6 of the MUTCD.

2.02 SIGNS

A. Material: Sheet aluminum, galvanized steel, plywood, or flexible roll-up material complying with Iowa DOT Article 4186.02.

B. Size and Type:

1. **Regulatory Signs:** As indicated in the contract documents or recommended in the MUTCD.
2. **Sidewalk Signs:** Minimum size 12 inch by 24 inch.
3. **Warning Signs:** Comply with Table 8030.01.

Table 8030.01: Warning Signs

Speed Limit (mph)	Minimum Sign Size	Minimum Uppercase Letter Size	Minimum Plaque Size
< 25	30” x 30”	4”	18” x 18”
25 - 35	36” x 36”	5”	18” x 24”
>35	48” x 48”	7”	24” x 30”

C. Retroreflective Sheeting: Comply with Iowa DOT Article 4186.03.

D. Posts:

1. **Wood Posts:** Comply with Iowa DOT Section 4164.
2. **U-Shaped Rail Steel Posts:** 3.0 pounds per foot.
3. **Perforated Square Steel Tube Posts:** 2 1/4 or 2 1/2 inch square 12 gage perforated steel tubing.

E. Portable Sign Stands: Crashworthy per the test and evaluation criteria of National Cooperative Highway Research Program (NCHRP) Report 350 or Manual on Assessing Safety Hardware (MASH). Must be stable in windy conditions.

2.03 CHANNELIZING DEVICES

Channelizing devices include cones, channelizers, tubular markers, vertical panels, drums, and barricades. Crashworthy per the test and evaluation criteria of NCHRP 350 or MASH-16.

A. Retroreflective Sheeting: Comply with Iowa DOT Article 4186.03.

B. Cones: Minimum height of 18 inches for daytime and speed less than or equal to 35 mph. Minimum height of 28 inches with retroreflective bands for nighttime or speed greater than 35 mph.

C. Channelizers: 42 inch height with retroreflective bands and 16 pound base.

D. Tubular Markers: Minimum diameter 2 inches with retroreflective bands. Minimum height 18 inches for daytime and speed less than or equal to 35 mph. Minimum height 28 inches for nighttime or speed greater than 35 mph.

2.03 CHANNELIZING DEVICES (Continued)

E. Vertical Panels: Minimum height 36 inches with 8 to 12 inch panel width and 24 inch minimum panel height.

F. Drums: Minimum width 18 inches. Minimum height 36 inches.

G. Barricades: Minimum rail length 2 feet for Type I or Type II barricades. Minimum rail length 4 feet for Type III barricades. Minimum height of top rail for Type I and Type II equals 3 feet and minimum height to top rail of a Type III is 5 feet.

2.04 MISCELLANEOUS PRODUCTS

A. Orange Mesh Safety Fence: Comply with Iowa DOT Article 4188.03.

B. Temporary Barrier Rail: Unless otherwise specified, use precast concrete units. Comply with Iowa DOT Standard Road Plan BA-401.

2.05 EQUIPMENT

A. Warning Lights:

1. For nighttime installation, provide Type A warning lights visible to both directions of traffic.

2. For 24 hour installations, provide Type B warning lights.

B. Arrow Boards: When required, provide Type A, B, or C arrow boards operating in sequential chevron mode.

C. Portable Dynamic Message Signs: Comply with Iowa DOT Article 4188.07.

D. Pilot Cars: Pickup trucks or automobiles with G20-4 signs reading: PILOT CAR - FOLLOW ME. Mount two signs on each vehicle, visible from both directions of traffic. Mount signs with bottom of signs at least 1 foot above the top of the vehicle's roof.

E. Vehicle Warning Lights: Supply amber, high-intensity rotating, flashing, oscillating, or strobe light.

2.06 FLAGGERS

A. General: Comply with the current Iowa DOT Flagger's Handbook for flagger operations, equipment, and apparel.

B. Lighting: Provide auxiliary lighting at flagger stations when nighttime flagging is required.

C. Training: For other than short time, emergency, or relief assignment of flaggers, provide flagger training to include the following:

1. Issuing a copy of the current Iowa DOT Flagger's Handbook to and review by each flagger.

2. Presentation of the current Iowa Professional Flagging Video to each flagger.

3. Issuing a flagger training card to each flagger, to be carried at all times and shown upon request. Include the following information on training card:
   a. Employee name
   b. Date of training
   c. Name of instructor
   d. Expiration date of December 31 of the year following the training date

2.06 FLAGGERS (Continued)

D. Automated Flagger Assistance Device (AFAD):

1. AFADs may be used for flagging operations.

2. Ensure all AFADs meet the current requirements of the MUTCD Section 6E.04 and 6E.06.
   a. Use RED/YELLOW lens type AFADs as per MUTCD Section 6E.06
   b. Comply with crashworthiness requirements of Iowa DOT Article 4188.01, B.
   c. If using AFADs on primary roadways, comply with Iowa DOT Article 4188.11 for remote communication capabilities.

3. Ensure AFAD is operated by trained flaggers who have been instructed how to use the project-specific AFAD. Ensure trained flaggers are available to step in as manual flaggers in case of an AFAD malfunction.

4. Place AFADs where flagger stations are shown on the project plans. Ensure AFADs are clearly visible to approaching traffic, and if used at night, illuminated as flagger stations.

5. Ensure flagger operating an AFAD has direct line of sight to the AFAD location and an unobstructed view of approaching traffic. The use of a camera to monitor the AFAD and/or the approaching traffic is not allowed in lieu of a manual flagger.

6. Ensure flaggers do not perform other duties while operating AFADs and do not leave AFADs unattended at any time while they are in use. Ensure pilot car drivers do not operate AFADs.

7. A single flagger is allowed to operate two AFADs if the following requirements are met:
   a. The flagger has unobstructed view of both AFADs,
   b. The flagger has unobstructed view of both directions of approaching traffic, and/or
   c. The distance between AFAD locations is not greater than 1,000 feet.

8. Immediately replace AFADs with manual flaggers in the event of malfunction.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install temporary traffic control devices according to the Section 8030 figures and Part 6 of the MUTCD.

B. Sign Posts: For durations more than 3 consecutive calendar days, mount the signs on fixed posts. For durations 3 consecutive calendar days or less, mount the signs on fixed posts or movable skids.

C. Temporary Barrier Rail: Place at locations specified in the contract documents. Tie and anchor units as shown on Iowa DOT Standard Road Plan BA-401.

D. Sandbags: Use sandbags to anchor all traffic control devices subject to movement by wind. Do not place sandbags on tops of barricades, drums, or vertical panels.

E. Conflicting Signs: Cover or remove signs with messages conflicting with temporary traffic control as approved or directed by the Engineer.

F. Modifications: Submit proposed traffic control plan modifications to the Engineer for review and approval prior to making changes.

3.02 MAINTENANCE

A. General: Promptly repair, replace, reposition, or clean traffic control devices, as needed, or as directed by the Engineer.

B. Non-working Hours: At the end of working hours, remove, cover, or turn down traffic control devices intended for working hours only.

3.03 QUALITY CONTROL

A. Traffic Control Technician: Maintain a traffic control technician on staff, responsible for the Contractor's traffic control quality control program, that has attended and passed the exam in one of the following classes:

1. ATSSA Traffic Control Technician
2. IMSA Work Zone Traffic Control
3. Minnesota DOT Traffic Control Supervisor
4. Texas Engineering Extension Service Work Zone Traffic Control

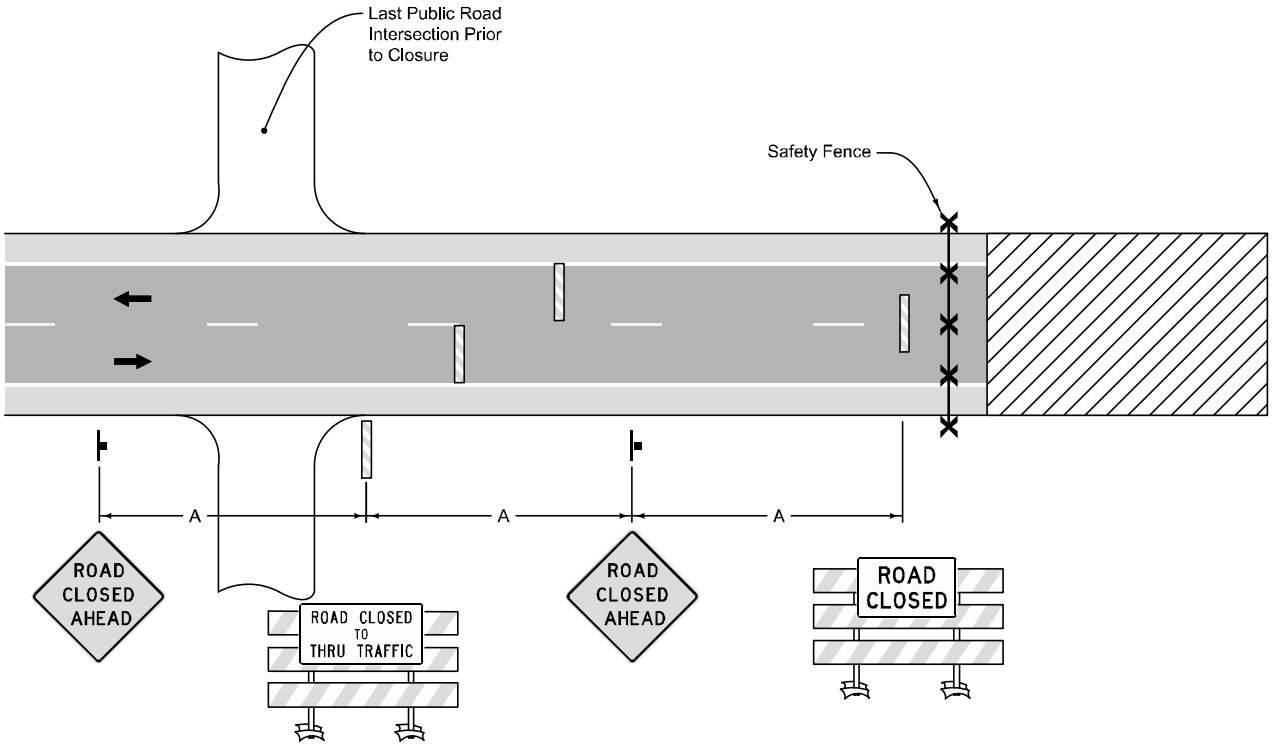
B. Monitoring and Documentation: Provide 24 hour mobile phone number for the traffic control technician. On a daily basis, perform the following quality control work associated with monitoring and documenting traffic control conditions.

1. Review all traffic control operations for compliance with the contract documents.
2. Monitor traffic operations and submit proposed traffic control plan changes to the Engineer for approval.
3. Coordinate all changes to the traffic control plan.
4. Coordinate all traffic control operations, including those of subcontractors and suppliers.

3.03 QUALITY CONTROL (Continued)

5. Maintain a traffic control diary to be submitted at the end of the project or as requested by the Engineer, with the following information:
   a. Listing and locating traffic control used each day, referenced to appropriate plan sheet or standard.
   b. All reviews of traffic control devices and operations, whether satisfactory or unsatisfactory, and corrections made.
   c. Approved changes to traffic control specified in the contract documents.
   d. Incidentals affecting the efficiency and safety of traffic.
   e. A list of trained flaggers used.

END OF SECTION



When distance "A" is less than 500 feet, place the barricade with the ROAD CLOSED TO THRU TRAFFIC sign in the middle of the traffic lane approaching the work area. The barricade may be omitted if the distance to the work area is less than 250 feet.

Maintain safety fence closures to prevent unauthorized vehicles from passing through.

Place staggered Type III barricades in the roadway after the last public road intersection prior to the closure.

If local traffic is allowed to pass a Type III barricade, retroreflective sheeting is required on both sides of the barricade.

Refer to Figure 8030.101 for symbol key and sign spacing.

FIGURE 8030.116

SHEET 1 OF 1

SUDAS

REVISION
New 10-17-17

8030.116

SHEET 1 of 1

SUDAS Standard Specifications

STREET OR ROAD CLOSURE

SEEDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Certification of Products

B. Acceptance and Warranty

C. Seed Types and Mixes

D. Equipment

E. Application of Seed

1.02 DESCRIPTION OF WORK

Includes the requirements for seedbed preparation; furnishing, applying, and covering the seed; and compaction of the seedbed.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Submit certification of products to the Engineer prior to seed placement:

1. Seed: Submit a laboratory analysis for all seeds, specifying the purity and germination. Provide a lot number on all submittals and labeling. Ensure lot number is the same on all records pertaining to a particular seed. Provide 48 hours notice prior to mixing the seed and give the Engineer an opportunity to witness the seed mixing. Submit a mechanically printed seed tag from a seed conditioner or grower approved by the Iowa Crop Improvement Association or other state's equivalent association/agency.

2. Fertilizer: Submit certification of the fertilizer analysis with scale weight and statement of guaranteed analysis. Submit from a certified fertilizer dealer, a mechanically printed commercial fertilizer label, or bill of lading. Comply with the inspection and acceptance requirements of Iowa DOT Materials I.M. 469.03.

3. Wood Cellulose Fiber Mulch: Submit certification of the degradable wood cellulose fiber mulch ingredients with applicable use and rate, and the water retention capacity by manufacturer or supplier.

4. Wood Excelsior Mulch: Bale wood excelsior and determine the mass (weight). Use the mass of the material, furnished by the manufacturer, to determine the rate of application.

5. Straw Mulch: Certify weight. Furnish a list of the number of bales and a corresponding ticket from an approved scale for the mulch material to be used on the project.

6. Compost: Submit certification of composted organics analysis with U.S. Compost Council's Seal of Testing Assurance (STA), recommended rates of application, and manufacturer's estimated cubic yards per ton.

7. Inoculant: Furnish information from inoculant packaging.

8. Tackifier: Submit certification of the tackifier ingredients, recommended rates of application, and expiration date.

B. Submit written instructions recommending procedures for maintenance of seeded areas.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Deliver packaged materials in original, unopened, and undamaged containers. Do not mix or blend materials except in the presence of the Engineer.

B. Deliver, handle, and store all materials according to product recommendations, and protect from loss, damage, and deterioration.

C. Materials not meeting these requirements will be rejected.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Coordinate the seeding schedule with all other work on the project. Notify the Engineer at least three calendar days prior to the start of seeding operations.

B. After all land-disturbing activities are complete and the seedbed has been approved by the Engineer, perform seeding operations.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Conventional Seeding:

1. Seeding:
- **a. Measurement:** Measurement will be in acres for each type of seed.
- **b. Payment:** Payment will be in unit price per acre for each type of seed.
- **c. Includes:** Unit price includes, but is not limited to, removal of rock and other debris from the area; repairing rills and washes; preparing the seedbed; furnishing and placing seed, including any treatment required; furnishing and placing fertilizer and mulch; and furnishing water and other care during the care period, unless these items are bid separately.

2. Fertilizing:
- **a. Measurement:** Measurement will be in acres of fertilizer.
- **b. Payment:** Payment will be at unit price per acre of fertilizer.
- **c. Includes:** Unit price includes, but is not limited to, furnishing, applying, and incorporating fertilizer to the area to be seeded.

3. Mulching:
- **a. Measurement:** Measurement will be in acres of mulch.
- **b. Payment:** Payment will be in unit price per acre of mulch.
- **c. Includes:** Unit price includes, but is not limited to, furnishing, applying, and incorporating mulch to the area to be seeded.

1.08 MEASUREMENT AND PAYMENT (Continued)

B. Seeding, Fertilizing, and Mulching for Hydraulic Seeding:

1. **Measurement:** Measurement will be in acres for each type of seed.

2. **Payment:** Payment will be in unit price per acre for each type of seed.

3. **Includes:** Unit price includes, but is not limited to, removal of rock and other debris from the area; repairing rills and washes; preparing the seedbed; furnishing and placing seed, including any treatment required; furnishing and placing fertilizer and mulch; and furnishing water and other care during the care period, unless these items are bid separately.

C. Seeding, Fertilizing, and Mulching for Pneumatic Seeding:

1. **Measurement:** Measurement will be in acres for each type of seed.

2. **Payment:** Payment will be in unit price per acre for each type of seed.

3. **Includes:** Unit price includes, but is not limited to, removal of rock and other debris from the area; repairing rills and washes; preparing the seedbed; furnishing and placing seed, including any treatment required; furnishing and placing fertilizer and mulch; and furnishing water and other care during the care period, unless these items are bid separately.

D. Watering:

1. **Measurement:** Measurement will be by metering of water applied. If metering is not available, measurement will be by counting the loads from a transporting tank of known volume and gauging the contents of the transporting truck for partial loads.

2. **Payment:** Payment will be at the unit price per 1,000 gallons (MGAL) of water used.

3. **Includes:** Unit price includes, but is not limited to, water, pumps, meters, equipment, water tanker/container, transportation, hoses, and sprinklers.

E. Warranty:

1. **Measurement:** Lump sum item; no measurement will be made.

2. **Payment:** Payment will be at the lump sum price for the warranty.

3. **Includes:** Lump sum price includes, but is not limited to, all work required to correct any defects in the original placement of the seeding for the period of time designated.

PART 2 - PRODUCTS

2.01 SEED

A. General:

1. Provide fresh, clean, new crop, certified seed complying with tolerance for germination and purity and free of poa annua, bent grass, and noxious weed seed. Furnish all seeds, including grass, legume, forbs, and cereal crop seeds, from an established seed dealer or certified seed grower. All materials and suppliers are to follow Iowa Seed Law and Iowa Department of Agriculture and Land Stewardship regulations, and be labeled accordingly.
   a. Provide turfgrass with a certified “blue tag” or "gold tag."
   b. Provide native grass and forbs that are source-identified as G0-Iowa certified "yellow tag," when available. If G0-Iowa certified "yellow tag" sourced seed is unavailable, or is only available from a single source, a substitution may be approved by the Engineer.

2. Mix seed to the specified proportions by weight. Use methods approved by the Engineer.

B. Seed Quality: Ensure the seed provided meets or exceeds the minimum requirements of purity and germination stated on an independent certificate of seed analysis document according to the Association of Official Seed Analysis (AOSA) rules. The seed certification tag and seed analysis document provided must be from the same lot number as shown on the seed tag. Ensure the date of test results is no greater than 9 months from the seed application date. Approval of all seed for use will be based on the accumulated total of Pure Live Seed (PLS) for each phase of work. PLS is obtained by multiplying purity times germination. PLS shall not be less than the accumulated total of the PLS specified.

If the seed does not comply with minimum requirements for purity and germination and such seed cannot be obtained, the Engineer may approve use of the seed on a basis of PLS or may authorize a suitable substitution for the seed specified.

C. Requirements on Containers:

1. Seed: Provide seed with a tag on each container. Ensure the seed analysis on the label is mechanically printed.

2. Mulch: When packaged, provide mulch in new labeled containers.

3. Tackifier: Provide tackifier packaged in new labeled containers.

4. Inoculant: Use inoculant that has a manufacturer’s container, indicating the specific legume seed to be inoculated and the expiration date. All inoculant must meet requirements of the Iowa Seed Law. Follow precautions specified on the product label.

5. Sticking Agent: Use a commercial sticking agent recommended by the manufacturer of the inoculant. For quantities less than 50 pounds, the sticking agent need not be a commercial agent, but requires approval by the Engineer. Apply sticking agent separately prior to application of inoculant. Follow safety precautions specified on the product label.

2.01 SEED (Continued)

Table 9010.01: Domestic Grasses

Common Name	Scientific Name	Purity (%)	Germination (%)
Bluegrass, Kentucky	Poa pratensis	85	80
Brome, smooth-LINCOLN	Bromus inermis	90	85
Fescue, creeping, red	Festuca rubra	98	85
Fescue, tall, FAWN	Festuca arundinacea-FAWN	98	85
Orchardgrass	Dactylis glomerata	90	90
Red top	Agrostis alba	92	85
Ryegrass, perennial	Lolium perenne	95	90
Wildrye, Canada	Elymus Canadensis	95	85
Wildrye, Russian	Psathyrostachys junceus	95	85

Table 9010.02: Legumes

Common Name	Scientific Name	Purity (%)	Germination (%)
Alfalfa, RANGER/VERNAL	Medicago sativa	99	90*
Alfalfa, travois	Medicoa spp.	99	90*
Clover, Alsike	Trifolium hybridum	99	90*
Clover, red, medium	Trifolium pratense	99	90*
Clover, white	Trifolium repens	98	90*
Hairy vetch	Vicia villosa	96	85*
Lespedeza, Korean	Lespedeza stipulacea	98	80*

* Includes hard seed.

Table 9010.03: Stabilizing Crop

Common Name	Scientific Name	Purity (%)	Germination (%)
Oats	Avena sativa	97	90
Rye	Secale cereale	97	90
Sudangrass, PIPER	Sorghum vulgare var. sudanese	98	85

2.01 SEED (Continued)

Table 9010.04: Native Grasses

Common Name	Scientific Name
Big bluestem*	Andropogon gerardii
Blue grama	Bouteloua gracilis
Blue-joint grass	Calamagrostis Canadensis
Bottlebrush sedge	Carex hystericina
Buffalograss*	Buchloe dactyloides
Common rush	Juncus effusus
Fowl bluegrass	Poa palustris
Fowl manna grass	Glyceria striata
Fox sedge	Carex vulpinoidea
Green bulrush	Scirpus atrovirens
Hairy wood chess	Bromus purgans
Indiangrass*	Sorghastrum nutans
Intermediate wheatgrass	Agropyron intermedium
Little bluestem*	Andropogon scoparius
Prairie dropseed	Sporobolus heterolepis
Reed manna grass	Glyceria grandis
Rice cutgrass	Leersia oryzoides
Rye grass, annual	Lolium italicum
Sand bluestem*	Andropogon gerardii, var. paucipilus
Sand dropseed	Sporobolus cryptandrus
Sand lovegrass	Eragrostis trichodes
Sideoats grama*	Bouteloua curtipendula
Slender wheatgrass	Agropyron trachycaulum, var. unilaterale
Spike rush	Eleocharis palustris
Softstem bulrush	Schoenoplectus tabernaemontani
Switchgrass*	Panicum virgatum
Tussock sedge	Carex stricta
Virginia wild-rye	Elymus virginicus
Weeping lovegrass	Eragrostis curvula
Western wheatgrass*	Agropyron smithii
Wool grass	Scirpus cyperinus

2.01 SEED (Continued)

Table 9010.05: Forbs

Common Name	Scientific Name
Black-eyed Susan	Rudbeckia hirta
Blue-flag iris	Iris virginica-shrevii
Boneset	Eupatorium perfoliatum
Canadian anemone	Anemone canadensis
Common mountainmint	Pycnanthemum virginianum
Common rush	Juncus effusus
Fowl manna grass	Glyceria striata
Golden Alexanders	Zizia aurea
Great blue lobelia	Lobelia siphilitica
Grey-headed coneflower	Ratibida pinnata
Heath aster	Symphyotrichum ericoides
Ironweed	Veronia faxciculate
Joe-pye weed	Eupatorium maculatum
Meadow blazingstar	Liatris ligulistylis
Milkweed, butterfly	Asclepias tuberosa
Milkweed, swamp	Asclepias incarnata
New England aster	Symphyotrichum novae-angliae
Ohio spiderwort	Tradescantia ohiensis
Oxeye sunflower	Heliopsis helianthoides
Pale purple coneflower	Echinacea pallida
Partridge pea	Chamaecrista fasciculate
Prairie blazing star	Liatris pycnostachya
Purple prairie clover	Dalea purpurea
Rattlesnake master	Eryngium yuccifolium
Reed manna grass	Glyceria grandis
Rice cutgrass	Leersia oryzoides
Showy goldenrod	Solidago speciosa
Showy tic-trefoil	Desmodium canadense
Stiff goldenrod	Solidago rigida
Swamp aster	Aster puniceus
White wild indigo	Baptisia alba
Wild bergamot	Monarda fistulosa

2.02 SEED MIXTURES AND SEEDING DATES

See the contract documents for the specified seed mixture. If a mixture is not specified, use the following. The Contractor may submit a modification of the mixture for the Engineer's consideration.

A. Type 1 (Permanent Lawn Mixture): Used for residential and commercial turf site, fertilized, and typically mowed. Use between March 1 and May 31 and between August 10 and September 30.

Table 9010.06: Type 1 Seed Mixture[1]

Common Name	Application Rate lb/acre
Creeping red fescue	25
Turf-type perennial ryegrass[2]	20
Turf-type perennial ryegrass[2]	20
Kentucky bluegrass cultivar[3]	65
Kentucky bluegrass cultivar[3]	65
Kentucky bluegrass cultivar[3]	65

[1] A commercial mixture may be used if it contains a high percentage of similar bluegrasses; it may or may not contain creeping red fescue.
[2] Choose two different cultivars of turf-type perennial ryegrass, at 20 lbs/acre each.
[3] Choose three different cultivars of Kentucky bluegrass, at 65 lbs/acre each.

B. Type 2 (Permanent Cool Season Mixture for Slopes and Ditches): Not typically mowed. Reaches a maximum height of 2 to 3 feet, low fertility requirements, grows in the spring and fall, and can go dormant in the summer. Use between March 1 and May 31 and between August 10 and September 30.

Table 9010.07: Type 2 Seed Mixture

Common Name	Application Rate lb/acre
Tall fescue[1]	100
Kentucky bluegrass	20
Ryegrass, perennial[2]	75

[1] Use endophyte free cultivars including Fawn, K-31, or a combination.
[2] Use cultivars including Linn, Amazon, Noriea, or Nui, or a combination.

C. Type 3 (Permanent Warm-Season Slope and Ditch Mixture): Not typically mowed. Reaches a height of 5 to 6 feet, stays green throughout summer, and responds well to being burned in spring; no fertilizer. Use between March 1 and June 30.

Table 9010.08: Type 3 Seed Mixture

Common Name	Application Rate lb/acre
Big bluestem*	3 PLS
Grain rye	40
Indiangrass*	4 PLS
Little bluestem*	3 PLS
Oats	16
Sideoats grama*	5 PLS
Switchgrass*	1 PLS

* Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.

2.02 SEED MIXTURES AND SEEDING DATES (Continued)

D. Type 4 (Urban Temporary Erosion Control Mixture): Short lived (6 to 8 months) mix for erosion control.

Table 9010.09: Type 4 Seed Mixture

Common Name	Application Rate lb/acre
SPRING - March 1 - May 20	
Annual ryegrass	40
Oats*	65
SUMMER - May 21 - August 14	
Annual ryegrass	50
Oats*	95
FALL - August 15 - September 30	
Annual Ryegrass	40
Grain rye	65

* Engineer may delete for previously established urban areas.

E. Type 5 (Rural Temporary Erosion Control Mixture): Short lived mix for erosion control.

Table 9010.10: Type 5 Seed Mixture

Common Name	Application lb/acre
March 1 - October 31	
Canada wildrye	5 PLS/acre
Grain rye	50
Oats	50
November 1 - February 28 (or 29)	
Canada wildrye	7 PLS/acre
Grain rye	62
Oats	62

Seed does not need to be certified Source Identified Class (Yellow Tag).

F. Type 6 (Salt-resistant Mixture): Use for grass medians and areas immediately back of curb on streets subject to regular salt applications for winter de-icing. Apply between March 1 and May 31 and between August 10 and September 30.

Table 9010.11: Type 6 Seed Mixture

Common Name	Application Rate lb/acre	Purity (%)	Germination (%)
Blue chip Kentucky bluegrass	37.5	90	85
Fults alkali grass	75	98	85
Hard fescue	50	95	85
Nublue Kentucky bluegrass	37.5	90	85
Sheeps fescue	50	90	85

2.02 SEED MIXTURES AND SEEDING DATES (Continued)

G. Wetland Seeding: Between April 1 and June 30, use the following seed mixture for wetland grass seeding areas.

Table 9010.12: Wetland Grass Seed Mixture

Common Name	Scientific Name	PLS** (per ac)
Arrowhead	Sagittaria latifolia	4 oz
Big bluestem*	Andropogon gerardii	1 lb
Bluejoint grass	Calamagrostis	1 oz
Blue vervain	Verbena Hastata	1 oz
Boneset	Eupatorium perfoliatum	1 oz
Broom sedge	Carex scoparia	2 oz
Dark green bulrush*	Scirpus atrovirens	1 oz
Fox sedge*	Carex vulpinoidea	4 oz
New England aster*	Symphyotrichum novae-angliae	2 oz
Nodding bur marigold	Bidens cernua	8 oz
Porcupine sedge	Carex hystericina	8 oz
Prairie cordgrass	Spartina pectinata	1 lb
Rice cutgrass	Leersia oryzoides	4 oz
Sneezeweed	Helenium autumnale	2 oz
Softstem bulrush	Schoenoplectus tabernaemontani	8 oz
Spike rush	Eleocharis palustris	4 oz
Swamp milkweed*	Asclepias incarnata	1 lb
Switchgrass*	Panicum virgatum	8 oz
Tussock sedge	Carex stricta	2 oz
Virginia wild-rye*	Elymus virginicus	5 lbs
Water plantain	Alisma plantago-aquatica	4 oz

* Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.
** Seeding rates for wetland grasses are given as PLS. Either the germination test or Tetrazolium (TZ) test is acceptable to determine PLS for native species.

2.02 SEED MIXTURES AND SEEDING DATES (Continued)

H. Native Grass and Forbs (Wildflower) Seeding: Between April 1 and June 30, use the following seed mixture for areas designated for native grass and wildflower seeding.

Table 9010.13: Native Grass and Forbs (Wildflower) Seeding Mixture

Common Name	Scientific Name	Application Rate**
GRASSES		**lb/acre**
Big bluestem*	Andropogon gerardii	1.0
Canada wild rye	Elymus Canadensis	1.5
Indiangrass*	Sorghastrum nutans	1.0
Little bluestem*	Schizachyrium scorparium	2.0
Sideoats grama*	Bouteloua curtipendula	2.5
Switchgrass*	Panicum virgatum	0.5
FORBS (WILDFLOWERS)		**oz/acre**
Black-eyed Susan	Rudbeckia hirta	3.0
Butterfly milkweed	Asclepias tuberosa	4.0
Canadian anemone	Anemone canadensis	0.5
Common mountainmint	Pycnanthemum virginianum	0.25
Golden Alexanders	Zizia aurea	8.0
Grey-headed coneflower	Ratibida pinnata	2.75
Heath aster	Symphyotrichum ericoides	0.25
Ironweed	Veronia faxciculate	3.0
New England aster	Symphyotrichum novae-angliae	1.25
Ohio spiderwort	Tradescantia ohiensis	7.0
Oxeye sunflower	Heliopsis helianthoides	12.0
Pale purple coneflower	Echinacea pallida	15.0
Partridge pea	Chamaecrista fasciculate	32.0
Prairie blazing star	Liatris pycnostachya	4.5
Purple prairie clover	Dalea purpurea	2.5
Rattlesnake master	Eryngium yuccifolium	1.75
Showy goldenrod	Solidago speciosa	0.50
Stiff goldenrod	Solidago rigida	1.0
Swamp milkweed	Asclepias incarnata	4.0
White wild indigo	Baptisia alba	2.0
Wild bergamot	Monarda fistulosa	1.25
NURSE CROP		**lb/acre**
Oats (spring seeding - April 1 to June 30)		32
Winter wheat (dormant/frost seeding - November 1 to March 31)		25

* Furnish seed certified as Source Identified Class (Yellow Tag) Source G0-Iowa.

** Seeding rates for native grass and forb species are given as PLS. Either the germination test or Tetrazolium (TZ) test is acceptable to determine PLS for native species.

2.03 FERTILIZER

Use fertilizer of the grade, type, and form specified that complies with rules of the Iowa Department of Agriculture and Land Stewardship and the following requirements:

A. Grade: Identify the grade of fertilizer according to the percent nitrogen (N), percent of available phosphoric acid (P_2O_5), and percent water soluble potassium (K_2O), in that order, and base approval on that identification.

The Contractor may substitute other fertilizer containing analysis percentages different from those specified, provided that the minimum amounts of actual nitrogen, phosphate, and potash per acre are supplied, and that in no case does the total amount per acre of the three fertilizer elements be exceeded by 30% of the following minimum amounts.

1. **For Conventional Seeding, Permanent:** Apply a 6-24-24 commercial fertilizer or the equivalent units of nitrogen, phosphate, and potash at the rate of 300 pounds per acre.

2. **For Conventional Seeding, Temporary:** Apply commercial fertilizer to all seeded areas at the rate of 250 pounds per acre of 13-13-13 (or equivalent) for rural mixes and 300 pounds per acre of 6-24-24 (or equivalent) for urban mixes, unless otherwise specified in the contract documents.

3. **For Hydraulic Seeding:** Apply fertilizer in combination with seeding by a hydraulic seeder and as specified in Iowa DOT Article 2601.03, B. Apply a commercial fertilizer or the equivalent units of nitrogen, phosphate, and potash at the rate specified for the type of seeding being applied.

4. **For Pneumatic Seeding:** Based on the compost nutrient analysis, supply any additional commercial fertilizer necessary to meet the 13-13-13 units of nitrogen, phosphate, and potash at the rate of 450 pounds per acre as the compost is applied.

B. Type: Use fertilizer that can be uniformly distributed by the application equipment. Furnish fertilizer either as separate ingredients or in chemically-combined form.

2.04 STICKING AGENT

A. Use a sticking agent that is a commercial material recommended by the manufacturer to improve adhesion of inoculant to the seed. For small quantities less than 50 pounds, the sticking agent need not be a commercial agent, but it must be approved by the Engineer and must be applied separately, prior to application of inoculant.

B. Follow safety precautions specified on the product label. A sticking agent is not required if a liquid formulation of inoculant is used.

2.05 INOCULANT FOR LEGUMES

An inoculant is a culture of bacteria specifically formulated for each legume seed (alfalfa, clovers, lespedesa, and hairy vetch). Ensure the manufacturer's container indicates the specific legume seed to be inoculated and the expiration date. Use inoculant that meets the requirements of the Iowa Seed Law. Follow the safety precautions specified on the product label.

2.06 WATER

Use water that is free of any substance harmful to seed germination or plant growth.

2.07 MULCH

A. For Conventional Seeding:

1. Material used as mulch may consist of the following:
   a. Dry cereal straw (oats, wheat, barley, or rye)
   b. Prairie hay
   c. Wood excelsior composed of wood fibers, at least 8 inches long, based on an average of 100 fibers, and approximately 0.024 inch thick and 0.031 inch wide. The fibers must be cut from green wood and be reasonably free of seeds or other viable plant material.

2. Do not use other hay (bromegrass, timothy, orchard grass, alfalfa, or clover).

3. All material used as mulch must be free from all noxious weed, seed-bearing stalks, or roots and will be inspected and approved by the Engineer prior to its use.

4. The Contractor may use other materials, subject to the approval of the Engineer.

B. For Hydraulic Seeding:

1. Wood Cellulose:
   a. Use material that is a natural or cooked cellulose fiber processed from whole wood chips, or a combination of up to 50% of cellulose fiber produced from whole wood chips, recycled fiber from sawdust, or recycled paper (by volume).
   b. Product contains a colloidal polysaccharide tackifier adhered to the fiber to prevent separation during shipment and avoid chemical co-agglomeration during mixing.
   c. Form a homogeneous slurry of material, tackifier, and water.
   d. Use a slurry that can be applied with standard hydraulic mulching equipment.
   e. Dye the slurry green to facilitate visual metering during application.
   f. Do not use materials that have growth or germination-inhibiting factors or any toxic effect on plant or animal life when combined with seed or fertilizer.

2. Bonded Fiber Matrix (BFM):
   a. Manufactured to be applied hydraulically.
   b. Dyed to facilitate visual metering.
   c. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.
   d. Meet the following requirements:
      1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1.
      2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
      3) Hydraulic mulch that is completely photo-degradable or biodegradable.
      4) Have a rainfall event (R-factor) of $140 < R$ according to ASTM D 6459.
      5) Have a cover factor of $C \leq 0.03$ according to ASTM D 6459.
      6) Vegetation Establishment of 400% minimum according to ASTM D 7322.
      7) Water Holding Capacity 600% minimum according to ASTM D 7367.

3. Mechanically-Bonded Fiber Matrix (MBFM):
   a. Manufactured to be applied hydraulically.
   b. Dyed to facilitate visual metering.
   c. All components pre-packaged by manufacturer to ensure material performance and compliance. Field mixing of additives or any components will not be allowed.

2.07 MULCH (Continued)

d. Meet the following requirements:
   1) Contain non-toxic tackifiers that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil according to ASTM D 7101 and EPA 2021.0-1.
   2) Contain no germination or growth inhibiting factors and do not form a water-resistant crust that can inhibit plant growth.
   3) Hydraulic mulch that is completely photo-degradable or biodegradable.
   4) Have a rainfall event (R-factor) of 162 < R according to ASTM D 6459.
   5) Have a cover factor of C ≤ 0.01 according to ASTM D 6459.
   6) Vegetation establishment of 500% minimum according to ASTM D 7322.
   7) Water holding capacity of 700% minimum according to ASTM D 7367.

C. For Pneumatic Seeding: Use compost meeting the following requirements.

1. Derived from a well-decomposed source of organic matter.

2. Produced using an aerobic composting process, meeting Code of Federal Regulations (CFR) 503 for time, temperature, and heavy metal concentrations.

3. No visible admixture of refuse or other physical contaminants, nor any material toxic to plant growth.

4. Certified by the U.S. Composting Council's Seal of Testing Assurance (STA) program.

5. Conforms to chemical, physical, and biological parameters of AASHTO R 52, with the following additional requirements:
   a. Follow U.S. Composting Council's TMECC guidelines for all testing.
   b. Organic Matter Content: 30% minimum.
   c. pH: between 6.0 and 8.0.
   d. Maturity (growth screening): Minimum 90% emergence for all compost to be vegetated.
   e. Particle Size:

Sieve Size	Percent Passing*
2"	100
1"	90-100
3/4"	65-100
3/8"	0-75

*6 inch maximum particle length.

PART 3 - EXECUTION

3.01 EQUIPMENT

A. Aerial Equipment: When aerial application of seed and fertilizer is specified, use aerial equipment capable of providing a uniform distribution of seed and fertilizer on the specified area.

B. Compost Blower: A compost blower is pneumatic equipment to blow compost over the desired area. It may be equipped with a supplemental seed injection system. Use equipment with sufficient power to cover the required area without driving on the prepared seedbed.

C. Cultipacker: Use a pull-type cultipacker with individual rollers or wheels. Cultipackers with sprocket-type spacers between the wheels may be used. The cultipacker must produce a corrugated surface on the area being compacted. Operate the cultipacker separately from all other operations, and do not attach the cultipacker to the seeder or disk, unless combined cultipacker seeder is manufactured to operate as a unit. Make provisions for addition of weight.

D. Disk: When preparing a seedbed on ground having heavy vegetation, use a disk with cutaway blades. Make provisions for the addition of weight to obtain proper cutting depth.

E. Drop Seeder: Use one piece of equipment containing pulverizer rollers in front of the seed tubes, ground driven seed meters, maximum seed tube spacing of 3 inches delivering seed between the pulverizer rollers and packer wheels, and packer wheels that press and firmly pack seed into the soil.

F. Endgate Cyclone Seeders: Endgate cyclone seeders must be suitably mounted. Movement must be provided by mechanical means. The seed drops through an adjustable flow regulator onto a rotating, power driven, horizontal disk or fan.

G. Expanded Mesh Roller: Use equipment that is an open grid type or a cultipacker type, modified by covering with expanded metal mesh.

H. Field Tiller: Use equipment designed for the preparation of the seedbed to the degree specified.

I. Gravity Seeders: Gravity seeders must provide agitation of the seed, have an adjustable gate opening, and uniformly distribute seed on the prepared seedbed. Use a seed hopper equipped with baffle plates spaced no more than 2 feet apart. The baffle plates must extend from the agitator shaft to within approximately 2 inches of the top of the seed hopper. Wind guards are required to facilitate seeding when moderate wind conditions exist and when ordered by the Engineer. Place wind guards in front or in back (or both) of the seed outlet and extend them to near the ground line. This seeder may be used for application of fertilizer.

J. Hand Cyclone Seeders: Hand cyclone seeders are carried by the person dispensing seed. The seed drops through an adjustable flow regulator onto a rotating, hand driven, horizontal disk or fan.

K. Hydraulic Seeder: Use hydraulic seeding equipment with a pump rated at no less than 100 gallons per minute. Inoculant, seed, and fertilizer may be applied in a single operation. The equipment must have a suitable working pressure and a nozzle adapted to the type of work. Supply tanks must have a means of agitation. Calibrate tanks and provide them with a calibration stick or other approved device to indicate the volume used or remaining in the tank.

L. Mowers: Use mowers that are rotary, flail, disk, or sickle type. Do not use mowers that bunch or windrow the mowed material.

3.01 EQUIPMENT (Continued)

M. Mulch Anchoring Equipment: Use mulch anchoring equipment designed to anchor straw or hay mulch into soil by means of dull blades or disks. It should have flat blades or disks, may have cutaway edges and must be spaced at approximately 8 inch intervals. The mulch anchoring equipment must be pulled by mechanical means and weigh approximately 1,000 pounds. When directed by the Engineer, increase the weight by addition of ballast.

N. Native Grass Seed Drill: Use a native grass seed drill designed to provide uniform distribution of native grass and wildflower seeds. Provide separate seed boxes to apply both small seeds as well as fluffy bearded seeds. If a no-till attachment is specified, use an attachment of the same manufacturer as the drill.

O. Pneumatic Seeder: Use an air blown system with sufficient power and hose to reach 300 feet.

P. Pulverizer: Use equipment designed to break up compacted soil to prepare a seedbed.

Q. Rotary Tiller: Use equipment with rotary-type blades designed for the preparation of seedbed to the degree specified.

R. Slit Seeder: Use a gas, diesel or electric powered mechanical slit seeder that is capable of cutting vertical grooves a maximum of 1/4 inch deep into the soil with a maximum horizontal blade spacing of 3 inches, deposits metered seed directly after the formation of the vertical grooves, and contains packer wheels that press and firmly pack seed into the soil.

S. Slope Harrow: Use a slope harrow, consisting of a rolling weight attached by heavy chain to a tractor. The chain must be of suitable length, with picks attached, and a means of rotating the picks as the rolling weight is pulled in a direction parallel to the movement of the tractor.

T. Spike Tooth Harrow: Use equipment designed to provide adjustment of the spike teeth to level the ground, or to be used as specified by the Engineer.

U. Straw Mulching Machine: Use a machine to uniformly apply mulch material over the desired area without excessive pulverization. Excessive pulverization is the general absence of straw longer than 6 inches after distribution.

3.02 AREA OF SEEDING

Place seed only in the areas specified in the contract documents. Repair damaged areas that are disturbed outside the contract limits at the expense of the Contractor. Do not disturb areas having a satisfactory growth of desirable grasses or legumes.

3.03 FINISH GRADING AND TOPSOIL

See Section 2010 for finish grading and topsoil placement.

3.04 CONVENTIONAL SEEDING

A. Order of Operations: 1) fertilizing, 2) seedbed preparation, 3) seed preparation/application, and 4) mulching.

B. Fertilizing:

1. Apply fertilizer immediately prior to seedbed preparation. Incorporate the fertilizer into the top 2 to 3 inches of topsoil during the seedbed preparation. Equipment that results in ruts or excessive compaction will not be allowed.

2. Do not apply fertilizer with native grass, wildflower, or wetland seeding.

3.04 CONVENTIONAL SEEDING (Continued)

C. Seedbed Preparation, Permanent:

1. Limit preparation of seedbed to areas that will be seeded immediately upon completion.

2. Work areas accessible to field equipment to a depth of no less than 3 inches. Use mechanical rotary tillage equipment for the preparation of seedbed on earth shoulders, urban or raised medians, and rest areas. Prepare by hand areas inaccessible to field machinery, to a depth of no less than 2 inches. Use care that the entire width of the shoulder and areas around headwalls, wingwalls, flumes, and other structures are prepared in the manner specified. Where weed growth has developed extensively, they may be disked into the ground. If weed growth develops sufficiently to interfere with proper seedbed preparation, mow the weeds and remove them from the project at no additional cost to the Contracting Authority.

   Use crawler type or dual-wheeled tractors for seedbed preparation. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross-section. Harrow ridging in excess of 4 inches due to operation of tillage equipment prior to rolling with the cultipacker. Roll the area with no less than one pass of the cultipacker prior to permanent seeding.

3. Shape and fine grade to remove rills or gullies, water pockets, undesirable vegetation, and irregularities to provide a smooth, firm, and even surface true to grade and cross-section. For Type 1 (lawn seeding), prepare to a fine texture and without soil lumps. Coordinate preparation of all ditches designated for special ditch control with the seedbed preparation. Till parallel to the contours.

4. Smooth the seedbed with a cultivator-type tillage tool having a rake bar or a rock rake. Pick up and remove all debris, such as rocks, stones, concrete larger than 2 inches (1/2 inch maximum for lawn seeding), or roots and other objectionable material that will interfere with the seeding operation. A spring tooth cultivator may be used in lieu of a rock picker. Remove the rock by hand after each use of the cultivator; repeat the process until the soil is relatively free of rock as determined by the Engineer.

5. Choose equipment to minimize soil compaction. Operate equipment in a manner to minimize displacement of soil and disturbance of the design cross-section. Roll the area with at least one pass of the cultipacker. Remove ruts that develop during the sequence of operations before subsequent operations are performed. This must be completed just prior to seeding and the work approved by the Engineer before the seeding application.

D. Seedbed Preparation, Temporary: Till the soil to a minimum depth of 5 inches with a disk, harrow, or field cultivator.

E. Seeding:

1. Seed Preparation:

a. Thoroughly mix all seed specified for the contract prior to placing the seed in the seed hopper. Provide 48 hours notice prior to mixing the seed, and give the Engineer an opportunity to witness the seed mixing. The mixing of a certified blue tag seed mix at an approved (by Iowa Crop Improvement Association) seed conditioner's facility need not be witnessed.

b. Treat all legume seed with a commercial sticking agent to be applied prior to application of inoculant, or as a mixture when the sticking agent is compatible with other materials. A sticking agent is not required if a liquid formulation of inoculant is used. Use mechanical mixing equipment to apply sticking agent and inoculant on seed quantities over 50 pounds.

3.04 CONVENTIONAL SEEDING (Continued)

c. Inoculate all legumes with a standard product humus culture before being mixed with other seeds for sowing.
d. Inoculate all legumes with a standard culture at the rate specified by the manufacturer of the inoculant according to Iowa DOT Article 4169.04. Do not expose inoculated seed to direct sunlight for more than 30 minutes. Re-inoculate seed that is not sown within 8 hours after inoculation prior to use. Pre-inoculated seed with manufacturer's recommended protective coating may be used in lieu of seed with Contractor-applied inoculant.
e. When the gravity or cyclone seeder is used for application of seed, inoculate legume seed according to the manufacturer's recommended procedures, before mixing with other grass seeds for sowing. Furnish and apply inoculant.

2. Seed Application, Permanent:
a. Prior to seeding, the seedbed will be inspected and approved by the Engineer. Use methods and procedures consistent with equipment manufacturer's recommendations; however, do not operate ground-driven equipment at speeds greater than 10 mph.
b. On all areas accessible to machinery, sow seed with a gravity seeder, endgate cyclone seeder, or seed drill.
c. On areas inaccessible to field machinery, the use of hand-operated cyclone seeders will be allowed, but no other hand-seeding methods will be accepted.
d. The application of grass and legume seed with hand seeders on early spring work must be performed as separate operations. No mixing of the two types of seed will be allowed.
e. All seeded areas will have one pass with a roller or cultipacker to firm the soil.

3. Seed Application, Temporary:
a. On areas accessible to field machinery, sow seed with an endgate cyclone seeder.
b. On areas inaccessible to field machinery, the use of hand-operated cyclone seeders will be allowed, but no other hand-operated seeding methods will be accepted.
c. Cover the seed and fertilizer by lightly tilling the seeded area with a disk, rigid harrow, spring tooth harrow, or field cultivator.

4. Seeding Outside of the Specified Seeding Dates: With the agreement of the Engineer and at the full responsibility of the Contractor, seeding operations for all seed types may be conducted outside the specified seeding dates. Should the seeded areas require reseeding, it must be done as specified and at no additional cost to the Contracting Authority.

a. Dormant Seeding: When winter dormant seeding is allowed or specified by the Jurisdiction, complete it when air temperatures are consistently below 40°F and prior to December 25 of a given year. Dormant seeding is not allowed on snow.
1) Prepare the seedbed before the ground freezes.
2) To ensure protection of the seed, apply on a frosty morning or before a predicted snow.
3) Seeding may be done by hand or with seeding equipment.
4) For hydraulic seeding, apply the fertilizer at no more than 0.5 pounds nitrogen per 1000 square feet, followed by the seed.

b. Frost Seeding (Overseeding):
1) Complete frost seeding, also referred to as overseeding, in the spring when the ground is friable from frost action (February 1 to April 1).
2) Frost seeding is not allowed on more than 1 inch of snow.
3) Seeding can be done with a hand-operated cyclone seeder or other equipment.
4) Seedbed preparation will not be required provided the ground is friable from frost action.

3.04 CONVENTIONAL SEEDING (Continued)

F. Mulching:

1. Mulch all conventionally seeded areas the same day the seed is sown. Uniformly distribute the mulch over the required areas at a rate of 1.5 tons/acre for dry cereal straw, or native grass straw. Prairie hay is not suitable for Type 1 (lawn seeding).

2. Work the mulch into the soil with mulch anchoring equipment designed to anchor the mulch into the soil by means of dull blades or disks with a minimum of two passes. Operate equipment in a manner to minimize displacement of the soil and disturbance of the design cross-section.

3. Do not operate mulch-blowing equipment on slopes steeper than 2.5 to 1 or on slopes that may rut. Use attachments to apply mulch without traversing slopes.

4. Do not mulch when wind velocities exceed 15 mph.

3.05 HYDRAULIC SEEDING

A. Order of Operations:

1. Seedbed preparation

2. Seed application, fertilizing, and mulching

B. Seedbed Preparation: Follow seedbed preparation for conventional seeding in Section 9010, 3.04.

C. Seed Preparation: Inoculant, in the quantities specified above, may be applied directly into the supply tank with seed, water, and other material.

D. Seed Application, Fertilizing, and Mulching:

1. Application Process:
   a. Combination: Place all material, seed, fertilizer, mulch, and tackifier (if applicable) in hydraulic mulching equipment specifically manufactured for hydraulic seeding.
   b. Separate: At the Contractor's option and at no additional cost to the Contracting Authority, the hydraulic seeding, fertilizing, and mulching may be undertaken separately. If hydraulic seeding is done separately, add 50 pounds of wood cellulose fiber complying with Section 9010, 2.07, B as a tracer for each 500 gallons of water in the hydraulic seeder tank. If operations are undertaken separately, complete fertilizing and mulching application within 24 hours of completing seeding work. Do not separate the applications if inclement weather is forecasted within 24 hours of the scheduled application period.

2. Ensure the hydraulic equipment, pump, and application process do not damage or crack seeds.

3. Mix materials with fresh potable water using a combination of both recirculation through the equipment's pump, and mechanical agitation to form a homogeneous slurry.

4. Apply mixture within 1 hour after seed and fertilizer are placed in the hydraulic seeder.

5. If necessary, dampen dry, dusty soil, to prevent balling of the material during application.

3.05 HYDRAULIC SEEDING (Continued)

6. Apply the slurry evenly over all specified areas at component material rates specified.
   a. Wood Cellulose Mulch:
      1) Mulch: Minimum 3,000 lb/acre dry weight.
      2) Tackifier: Minimum 50 lb/acre.
   b. Bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.
   c. Mechanically-bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.

7. Retain and count empty bags of mulch to ensure final application rate.

8. Hydromulching may be done over conventional seeding and/or fertilizing, if approved by the Engineer.

E. Native Grass, Wildflower, and Wetland Grass Seeding: Hydraulic seeding of native grasses, wildflowers, and wetland grasses is allowed only if approved by the Engineer. If allowed, increase specific seed rates by 25%. Do not apply fertilizer.

3.06 PNEUMATIC SEEDING

A. Order of Operations: 1) seedbed preparation, 2) seed preparation, and 3) seed application.

B. Seedbed Preparation: Follow seedbed preparation for conventional seeding in Section 9010, 3.04.

C. Seed Preparation: Follow seed preparation for conventional seeding in Section 9010, 3.04. Pre-inoculate seed in the quantities specified above prior to placing in the seed equipment.

D. Seed Application:

1. Place all material, seed, fertilizer, and compost in equipment with a calibrated seeder attachment specifically designed for pneumatic seeding. Do not apply fertilizer with native grass, wildflower, or wetland seeding.

2. Apply compost to a 1 inch minimum depth on all designated disturbed areas. Apply the compost with a pneumatic (air blower) system with sufficient power and hose to reach 300 feet. Driving on the soil to apply compost will not be allowed.

3. Inject seed and fertilizer into the top 1/4 inch to 1/2 inch of compost during application with a calibrated seed injector at the specified rate. Do not inject native grasses and forbs more than 1/4 inch.

3.07 WATERING

A. Provide water, equipment, transportation, water tanker, hoses, and sprinklers.

B. Use enough water to keep the soil and mulch moist to a depth of 1 inch and ensure growth of the seed. For turfgrass seeding areas, sufficiently water to keep the soil moist for a minimum of 21 days. If natural rainfall is adequate to keep the soil and mulch moist, artificial watering may not be needed.

3.08 RE-SEEDING

A. When all work related to seeding, fertilizing, and/or mulching has been completed on an area, and is washed out or damaged, re-seed, fertilize, and/or mulch the area at the contract unit price(s) when so ordered by the Engineer.

B. When work related to seeding, fertilizing, and/or mulching has not been completed in an area and is washed out or damaged, re-seed, fertilize, and/or mulch the area as necessary at no additional cost to the Contracting Authority.

3.09 CLEAN UP

All work related to clean up throughout the project and upon completion is the responsibility of the Contractor, at no additional cost to the Contracting Authority.

A. Remove all excess materials, debris, and equipment upon completion of work.

B. Clean all paved surfaces open for public use at the end of each day and prior to forecasted precipitation.

C. Repair any damage resulting from seeding operations.

D. Remove hydraulic slurry and other excess debris related to seeding operations from buildings, landscaping, mulch, pavement, signs, sign posts, and any other areas not specified for application, at the end of each day.

3.10 ACCEPTANCE AND WARRANTY

A. Acceptance:

1. Guarantee in writing that all work has been completed as specified and provide the date that all activities were completed. When a warranty is a separately-bid item, this also establishes the beginning of the warranty period.

2. Acceptance will occur, provided seeded areas are in a live, healthy, growing, and well-established condition without eroded areas, bare spots, weeds, undesirable grasses, disease, or insects.
   a. Projects without a separately-bid warranty will be accepted no sooner than 60 days from the date that all activities were completed.
   b. When a warranty is established as a bid item and the warranty period exceeds 60 days, projects may be accepted after all specified work, excluding the warranty, is satisfactorily completed, and a supplemental contract for the warranty is executed according to the Code of Iowa Section 573.27.

B. Warranty:

1. Required only when established as a bid item by the Engineer.

2. The warranty is to guarantee completed seeding areas for a maximum period of twelve months.

3. During the warranty period, correct and reseed any defects in the seeded areas and grass stand, such as weedy areas, eroded areas, and bare spots, until all affected areas are accepted by the Engineer.

4. Replace or repair to original condition, all damages to property resulting from the seeding operation or from the remedying of defects, at the Contractor’s expense.

5. Replacement costs are the Contractor’s responsibility, except for those resulting from loss or damage due to occupancy of the project in any part, vandalism, civil disobedience, acts of neglect on the part of others, physical damage by animals, vehicles, fire, or losses due to curtailment of water by local authority, or by "Acts of God.”

END OF SECTION

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. NPDES General Permit No. 2

B. Stormwater Pollution Prevention Plan (SWPPP)

C. Erosion Control Measures

D. Velocity and Flow Control Measures

E. Sediment Control Measures

F. Application/Installation of Measures

G. Removal/Replacement of Measures

1.02 DESCRIPTION OF WORK

A. Furnish all materials; install, construct, maintain, and remove specified erosion control devices; at locations specified in the contract documents, or where specified by the Engineer.

B. Complete the required construction work on this project, while minimizing soil erosion and controlling water pollution. Maintain these features as specified, from initial construction stages to final completion of the project.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Upon request, provide copies of all records and documentation related to compliance with the Iowa DNR NPDES Permit.

B. For grid-tied concrete block mat, submit all manufacturer details, recommendations, and installation instructions for approval.

C. For manufactured track-out devices, submit a copy of shop drawings and installation instructions per the manufacturer.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Implement erosion and sediment control measures at the appropriate time(s).

B. Coordinate construction to minimize damage to erosion and sediment control devices.

1.07 SPECIAL REQUIREMENTS

A. Permit:

1. When applicable, comply with the requirements of the Iowa Department of Natural Resources, *NPDES (National Pollutant Discharge Elimination System) General Permit No. 2 for Stormwater Discharge Associated with Industrial Activity for Construction Activities*, and the Stormwater Pollution Prevention Plan.

2. For projects covered under the Iowa DNR General Permit No. 2, sign on as a co-permittee with the owner and any other contractors or subcontractors.

3. When applicable, comply with the local jurisdiction's permitting requirements.

B. Protection of Property: Prevent accumulation of soil, sediment, or debris from project site onto adjoining public or private property. Remove any accumulation of soil or debris immediately, and take remedial actions for prevention.

C. Permit Compliance: When applicable, conduct all operations in compliance with the Iowa DNR NPDES General Permit No. 2. Labor, equipment, or materials not included as a bid item, but necessary to prevent stormwater contamination from construction related sources, are considered incidental. Incidental work related to compliance with the permit may include, but is not limited to: hazardous materials protection, fuel containment, waste disposal, and providing employee sanitary facilities.

D. Project Staging: Replacing erosion and sediment control practices that are damaged or removed by the contractor in a manner that is inconsistent with the current project staging or SWPPP is the Contractor's responsibility and will be at the Contractor's expense.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Stormwater Pollution Prevention Plan (SWPPP):

1. Preparation:
- **a. Measurement:** Lump sum item; no measurement will be made.
- **b. Payment:** Payment will be at the lump sum price for SWPPP preparation.
- **c. Includes:** Lump sum price includes, but is not limited to, development of a SWPPP by the Contractor meeting local and state agency requirements, filing the required public notices, filing a Notice of Intent for coverage of the project under the Iowa DNR NPDES General Permit No. 2, and payment of associated NPDES permit fees.
- **d. Other:** Item will be paid for upon approval of the SWPPP by the Engineer, and after the Notice of Intent has been filed by the Contractor.

2. Management:
- **a. Measurement:** Lump sum item; no measurement will be made.
- **b. Payment:** Payment will be at the lump sum price for SWPPP management.
- **c. Includes:** Lump sum price includes all work required to comply with the administrative provisions of the Iowa DNR NPDES General Permit No. 2; including record keeping, documentation, updating the SWPPP, filing the Notice of Discontinuation, etc. Item also includes weekly inspections required to satisfy the provisions of General Permit No. 2, unless otherwise specified in the contract documents.
- **d. Does Not Include:** Unit price does not include installation or maintenance of erosion and sediment control practices.
- **e. Other:** The Engineer may make partial payments based on estimates of the project completion. Final payment will be made when the site reaches final stabilization and the Notice of Discontinuation is filed.

1.08 MEASUREMENT AND PAYMENT (Continued)

B. Compost Blankets:

1. **Measurement:** Measurement will be in square feet for each thickness of compost blanket.

2. **Payment:** Payment will be at the unit price per square foot for each thickness of compost blanket.

3. **Includes:** Unit price includes, but is not limited to, furnishing and spreading compost over the designated area.

C. Filter Berms:

1. **Measurement:** Measurement will be in linear feet for each size of filter berm, measured longitudinally along the top of the berm.

2. **Payment:** Payment will be at the unit price per linear foot for each size of berm.

3. **Includes:** Unit price include, but is not limited to, furnishing material and constructing the filter berm, including vegetation if specified.

D. Filter Socks:

1. **Installation:**
   a. **Measurement:** Measurement will be in linear feet for each size of filter sock.
   b. **Payment:** Payment will be at the unit price per linear foot for each size of filter sock.
   c. **Includes:** Unit price includes, but is not limited to, anchoring stakes.

2. **Removal:**
   a. **Measurement:** Measurement will be in linear feet of filter sock removed.
   b. **Payment:** Payment will be at the unit price per linear foot of filter sock removed.
   c. **Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of filter socks and accumulated sediment.

E. Temporary Rolled Erosion Control Products (RECP):

1. **Measurement:** Measurement will be in square yards, based on the width specified in the contract documents and actual measured length, for each type of temporary RECP.
   a. Areas of RECP buried in trenches or covered by overlaps along seams will not be measured.
   b. For each blanket check installed, the Engineer will add 4 feet of length to the measured quantity.

2. **Payment:** Payment will be at the unit price per square yard for each type of temporary RECP.

3. **Includes:** Unit price includes, but is not limited to, excavation, staples, anchoring devices, and material for anchoring slots.

F. Wattles:

1. **Installation:**
   a. **Measurement:** Measurement will be in linear feet for each type and size of wattle.
   b. **Payment:** Payment will be at the unit price per linear foot for each type and size of wattle.
   c. **Includes:** Unit price includes, but is not limited to, anchoring stakes.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. Removal:
- **a. Measurement:** Measurement will be in linear feet of wattle removed.
- **b. Payment:** Payment will be at the unit price per linear foot of wattle removed.
- **c. Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of wattle and accumulated sediment.

G. Check Dams:

1. Rock Check Dams:
- **a. Measurement:** Measurement will be in ton of stone installed.
- **b. Payment:** Payment will be at the unit price per ton of stone installed.
- **c. Includes:** Unit price includes, but is not limited to, engineering fabric.

2. Manufactured Check Dams:
- **a. Installation:**
  - **1) Measurement:** Measurement will be in linear feet for each type and size of manufactured check dam.
  - **2) Payment:** Payment will be at the unit price per linear foot for each type and size of manufactured check dam.
  - **3) Includes:** Unit price includes, but is not limited to, anchoring stakes.
- **b. Removal:**
  - **1) Measurement:** Measurement will be in linear feet for each type of manufactured check dam removed.
  - **2) Payment:** Payment will be at the unit price per linear foot for each type of manufactured check dam removed.
  - **3) Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of manufactured check dam and accumulated sediment.

3. Fiber Logs: Filter sock and wattles utilized for check dams will be measured and paid for according to 9040, 1.08, D and 9040, 1.08 F respectively.

H. Temporary Earth Diversion Berms:

1. Measurement: Measurement will be in linear feet for each type and size of temporary earth diversion berm.

2. Payment: Payment will be at the unit price per linear foot of temporary earth diversion berm.

3. Includes: Unit price includes, but is not limited to, removal of the berm upon completion of the project.

I. Level Spreaders:

1. Measurement: Measurement will be in linear feet of level spreaders.

2. Payment: Payment will be at the unit price per linear foot of level spreader.

3. Includes: Unit price includes, but is not limited to, maintaining the spreader during the period of construction and removal upon completion of the project, unless otherwise specified in the contract documents.

1.08 MEASUREMENT AND PAYMENT (Continued)

J. Rip Rap:

1. **Measurement:** Measurement will be in tons for each type of rip rap.

2. **Payment:** Payment will be at the unit price per ton of rip rap.

3. **Includes:** Unit price includes, but is not limited to, engineering fabric.

K. Temporary Pipe Slope Drains:

1. **Measurement:** Measurement will be in linear feet for each type and size of temporary pipe slope drain, measured from end of apron to end of apron.

2. **Payment:** Payment will be at the unit price per linear foot for each type and size of pipe.

3. **Includes:** Unit price includes, but is not limited to, excavation, furnishing and installing pipe and pipe aprons, grading, and removal of the slope drain upon completion of the project.

L. Temporary Sediment Basin:

1. **Outlet Structure:**
   a. **Measurement:** Each size of temporary sediment basin outlet structure will be counted.
   b. **Payment:** Payment will be at the unit price for each temporary sediment basin outlet structure.
   c. **Includes:** Unit price includes, but is not limited to, concrete base, dewatering device, anti-vortex device, outlet pipe, and anti-seep collars (if specified).
   d. **Does Not Include:** Unit price does not include earthwork required for construction of the temporary sediment basin.

2. **Removal of Sediment:**
   a. **Measurement:** Each occurrence of sediment removal will be counted.
   b. **Payment:** Payment will be at the unit price for each occurrence of sediment removal.
   c. **Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.

3. **Removal of Outlet Structure:**
   a. **Measurement:** Each temporary sediment basin outlet structure removed will be counted.
   b. **Payment:** Payment will be at the unit price for each temporary sediment basin outlet structure removed.
   c. **Includes:** Unit price includes, but is not limited to, dewatering and off-site disposal of the outlet structure, concrete base, emergency spillway, and accumulated sediment.
   d. **Does Not Include:** Unit price does not include earthwork required to remove the temporary sediment basin and restoration of the area to finished grade.

M. Sediment Trap Outlet:

1. **Installation:**
   a. **Measurement:** Measurement will be in tons of crushed stone placed.
   b. **Payment:** Payment will be at the unit price per ton of crushed stone.
   c. **Includes:** Unit price includes, but is not limited to, engineering fabric.
   d. **Does Not Include:** Unit price does not include earthwork required for construction of the sediment trap.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. Removal of Sediment:
- **a. Measurement:** Each occurrence of sediment removal will be counted.
- **b. Payment:** Payment will be at the unit price for each occurrence of sediment removal.
- **c. Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.

3. Removal of Device:
- **a. Measurement:** Each sediment trap outlet removed will be counted.
- **b. Payment:** Payment will be at the unit price for each sediment trap outlet removed.
- **c. Includes:** Unit price includes, but is not limited to, dewatering and off-site disposal of sediment trap outlet and accumulated sediment.
- **d. Does Not Include:** Unit price does not include earthwork required to remove the sediment trap outlet and restoration of the area to finished grade.

N. Silt Fence or Silt Fence Ditch Check:

1. Installation:
- **a. Measurement:** Measurement will be in linear feet of silt fence or silt fence ditch check.
- **b. Payment:** Payment will be at the unit price per linear foot of silt fence or silt fence ditch check.
- **c. Includes:** Unit price includes, but is not limited to, anchoring posts.

2. Removal of Sediment:
- **a. Measurement:** Each occurrence of sediment removal will be counted.
- **b. Payment:** Payment will be at the unit price for each occurrence of sediment removal.
- **c. Includes:** Unit price includes, but is not limited to, dewatering and removal and off-site disposal of accumulated sediment.

3. Removal of Device:
- **a. Measurement:** Measurement will be in linear feet of silt fence removed.
- **b. Payment:** Payment will be at the unit price per linear foot of silt fence removed.
- **c. Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of fence, posts, and accumulated sediment.

O. Stabilized Construction Exit:

1. Track-out Control by Square Yard:
- **a. Measurement:** Measurement will be in square yards of material or manufactured track-out pad placed.
- **b. Payment:** Payment will be at the unit price per square yard of material or manufactured track-out pad placed.
- **c. Includes:** Unit price includes, but is not limited to, subgrade stabilization fabric, removal and disposal of accumulated sediment, and removal and disposal of track-out control stone and manufactured pad.

2. Track-out Control by Ton:
- **a. Measurement:** Measurement will be in tons of material placed.
- **b. Payment:** Payment will be at the unit price per ton of material placed.
- **c. Includes:** Unit price includes, but is not limited to, subgrade stabilization fabric.

1.08 MEASUREMENT AND PAYMENT (Continued)

P. Dust Control:

1. Water for Dust Control:
- **a. Measurement:** Measurement will be by metering of water applied to haul roads and other areas to control dust. If metering is not available, measurement will be by counting the loads from a transporting tank of known volume and gauging the contents of the transporting truck for partial loads.
- **b. Payment:** Payment will be at the unit price per 1,000 gallons of water used.
- **c. Includes:** Unit price includes, but is not limited to, furnishing, transporting, and distributing water to the haul road.

2. Dust Control Product:
- **a. Measurement:** Measurement will be in square yards of the treated area.
- **b. Payment:** Payment will be at the unit price per square yard of product applied.
- **c. Includes:** Unit price include, but is not limited to, furnishing and incorporating the dust control product.

Q. Erosion Control Mulching:

1. Conventional Mulching:
- **a. Measurement:** Measurement will be in acres of conventional mulch.
- **b. Payment:** Payment will be at the unit price per acre of conventional mulch.
- **c. Includes:** Unit price includes, but is not limited to, furnishing and incorporating mulch in the area designated in the contract documents.

2. Hydromulching:
- **a. Measurement:** Measurement will be in acres for each type of hydromulch.
- **b. Payment:** Payment will be at the unit price per acre for each type of hydromulch.
- **c. Includes:** Unit price includes, but is not limited to, furnishing mulch and tackifier (if applicable), providing equipment specific to hydromulching, and applying the mulch to the specified area.

R. Turf Reinforcement Mats (TRM):

1. Measurement: Measurement will be in square yards for each type of turf reinforcement mat.

2. Payment: Payment will be at the unit price per square yard for each type of turf reinforcement mat.

3. Includes: Unit price includes, but is not limited to, excavation, staples, anchoring devices, and material for anchoring slots.

S. *Intentionally left blank*

T. Inlet Protection Device:

1. Installation:
- **a. Measurement:** Each type of inlet protection device will be counted.
- **b. Payment:** Payment will be at the unit price for each inlet protection device.
- **c. Includes:** Unit price includes, but is not limited to, removal of the device upon completion of the project.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. Maintenance:
- **a. Measurement:** Each inlet protection device maintenance occurrence will be counted.
- **b. Payment:** Payment will be at the unit price for each inlet protection device maintenance occurrence.
- **c. Includes:** Unit price includes, but is not limited to, removal and off-site disposal of accumulated sediment.

U. Flow Transition Mat:

1. Measurement: Measurement will be in square feet of flow transition mat.

2. Payment: Payment will be at the unit price per square foot of flow transition mat.

3. Includes: Unit price includes, but is not limited to, anchoring devices.

V. End of Season Temporary Erosion Control:

1. Measurement: Measurement will be in acres of end of season temporary erosion control applied.

2. Payment: Payment will be at the unit price per acre for end of season temporary erosion control.

3. Includes: Unit price includes, but is not limited to, furnishing, placing, and maintaining the end of season temporary erosion control throughout the winter season.

W. Linear Erosion Control:

When linear erosion control is specified, select an appropriate erosion control practice for use as perimeter control, inlet protection, slope length reduction, or flow diversion. Allowable linear erosion control practices include filter socks, wattles, or silt fence as described in Section 9040.

1. Installation:
- **a. Measurement:** Measurement will be in linear feet of linear erosion control installed. No distinction will be made between practices.
- **b. Payment:** Payment will be at the unit price per linear foot for linear erosion control.
- **c. Includes:** Unit price includes, but is not limited to, anchoring posts and anchoring stakes.

2. Removal:
- **a. Measurement:** Measurement will be in linear feet of linear erosion control removed. No distinction will be made between practices.
- **b. Payment:** Payment will be at the unit price per linear foot of linear erosion control removed.
- **c. Includes:** Unit price includes, but is not limited to, restoration of the area to finished grade and off-site disposal of fence, filter socks, wattles, anchoring posts, anchoring stakes, and accumulated sediment.

1.08 MEASUREMENT AND PAYMENT (Continued)

X. Grid-Tied Concrete Block Mat (GTCBM):

1. Grid Tied Concrete Block Mat:

a. Measurement: Measurement will be the plan quantity in square yards of the finished surface of GTCBM. Areas of GTCBM placed in edge trenches, anchor trenches, or overlapped at mat seams will not be measured.

b. Payment: Payment will be at the unit price per square yard of grid-tied concrete block mat installed.

c. Includes: Unit price includes, but is not limited to, anchor trenches, underlayments, ground anchors, ties, and splicing.

2. GTCBM Concrete Anchor Trench:

a. Measurement: Measurement will be in linear feet of GTCBM concrete anchor trench.

b. Payment: Payment will be at the unit price per linear foot of GTCBM concrete anchor trench.

c. Includes: Unit price includes, but is not limited to, excavation, concrete, and installation.

PART 2 - PRODUCTS

2.01 COMPOST BLANKETS

Comply with Section 9010, 2.07, C for compost material requirements for compost blankets.

2.02 COMPOST BLANKET TACKIFIER

A. Use a biodegradable, organic binding agent or polyacrylamide that can be mixed with, or injected into, compost as it is placed, which is not detrimental to the establishment of vegetation.

B. Use in compost blankets when specified in the contract documents.

C. Apply at the rate recommended by the manufacturer.

2.03 FILTER MATERIAL

Material for use in filter socks and other areas, as specified in the contract documents.

A. Use material derived from wood, bark, or other, non-toxic vegetative feedstocks.

B. Use material with no visible admixture of refuse or other physical contaminants, nor any material toxic to plant growth.

C. Use material meeting the following particle sizes:

Table 9040.01: Filter Material Size

Sieve Size	Percent Passing[1]
2”	100
1”	90-100
3/8”	0-30

[1] The target flow rate of in-place material is 10 gal/min/lf. The Engineer may approve use of alternate materials meeting the target flow rate.

2.04 SLASH MULCH

Material for use in filter berms, and other areas as specified in the contract documents, to slow, filter, and divert stormwater runoff.

A. Raw wood slash from hard or soft timber harvested during clearing and grubbing operations within the project area.

B. Product of a mechanical chipper, hammermill, or tub grinder.

C. Maximum length of individual pieces shall not exceed 20 inches.

D. Maximum width of individual pieces shall not exceed 2 inches.

2.05 FILTER SOCK

A. For slope and sediment control applications, use a continuous, tubular, knitted, mesh netting with 3/8 inch openings, constructed of 5 mil thickness, photodegradable HDPE.

B. For inlet protection, use a continuous, tubular, knitted, mesh netting with 3/8 inch openings, constructed of 500 denier polypropylene.

C. Use 1 inch by 2 inch (minimum) hardwood stakes or stakes of equivalent strength.

2.06 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP)

Use temporary rolled erosion control products that are classified and have material properties according to the Erosion Control Technology Council's (ECTC) guidelines as follows:

A. Material Classification:

1. **RECP Type 1 (Ultra Short-term):** Functional longevity of 3 months and classified as follows:
   - **a. RECP Type 1.A:** Mulch control netting or open weave textile consisting of a photodegradable synthetic mesh or woven biodegradable natural fiber netting.
   - **b. RECP Type 1.B:** Netless rolled erosion control blankets, consisting of natural and/or polymer fibers, mechanically interlocked and/or chemically adhered together to form a RECP.
   - **c. RECP Type 1.C:** Single-net erosion control blankets consisting of processed degradable natural and/or polymer fibers, mechanically bound together by a single rapidly-degrading, synthetic or natural fiber netting.
   - **d. RECP Type 1.D:** Double-net erosion control blankets, consisting of processed degradable natural and/or polymer fibers, mechanically bound together between two rapidly-degrading, synthetic or natural fiber nettings.

2. **RECP Type 2 (Short-term):** Functional longevity of 12 months and classified as follows:
   - **a. RECP Type 2.A:** Netting or open weave textile consisting of a photodegradable synthetic mesh or woven biodegradable natural fiber netting.
   - **b. RECP Type 2.B:** Netless rolled erosion control blankets, consisting of natural and/or polymer fibers, mechanically interlocked and/or chemically adhered together to form a RECP.
   - **c. RECP Type 2.C:** Single-net erosion control blankets and open weave textiles, consisting of an erosion control blanket composed of processed degradable natural or polymer fibers, mechanically bound together by a single degradable synthetic or natural fiber netting.
   - **d. RECP Type 2.D:** Double-net erosion control blanket, consisting of processed degradable natural and/or polymer fibers, mechanically bound together between two degradable synthetic or natural fiber nettings.

3. **RECP Type 3 (Extended Term):** Functional longevity of 24 months and classified as follows:
   - **a. RECP Type 3.A:** Open weave textiles consisting of a slow-degrading synthetic mesh or woven natural fiber netting.
   - **b. RECP Type 3.B:** Erosion control blankets consisting of processed slow-degrading natural or polymer fibers, mechanically bound together between two slow-degrading synthetic or natural fiber nettings to form a continuous matrix.

2.06 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)

4. **RECP Type 4 (Long Term):** Functional longevity of 36 months and classified as follows:
   a. **RECP Type 4.A:** Open weave textiles consisting of processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix.
   b. **RECP Type 4.B:** Erosion control blankets consisting of processed slow degrading natural or polymer fibers mechanically bound together between 2 slow degrading synthetic or natural fiber nettings to form a continuous matrix.

B. Properties and Performance:

1. Testing performed according to the ECTC's Testing Procedures for Rolled Erosion Control Products. Verify manufacturer's test results by independent testing.

2. Material properties meeting the ECTC Standard Specifications for Rolled Erosion Control Products are summarized as follows:

Table 9040.02: Rolled Erosion Control Products

Type	Shear Stress[2] (lbs/ft^2)	Max. Slope[3] (H:V)	Material Thickness (in)	C Factor[4]	Tensile Strength	
					MD[5] (lbs/ft)	TD[5] (lbs/ft)
1.A[1]	≥ 1.0	5:1	≥ 0.03	≤ 0.10	≥ 125	≥ 10
1.B	≥ 1.0	3:1	≥ 0.30	≤ 0.10	≥ 125	≥ 10
1.C	≥ 1.5	3:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 60	≥ 20
1.D	≥ 1.75	2:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 75	≥ 40
2.A[a]	≥ 1.0	5:1	≥ 0.03	≤ 0.10	≥ 125	≥ 10
2.B	≥ 1.0	3:1	≥ 0.30	≤ 0.10	≥ 125	≥ 10
2.C	≥ 1.5	3:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 60	≥ 20
2.D	≥ 1.75	2:1	≥ 0.25 - ≤ 0.50	≤ 0.10	≥ 75	≥ 40
3.A	≥ 2.0	2:1	≥ 0.20 - ≤ 0.40	≤ 0.05	≥ 100	≥ 40
3.B	≥ 2.0	1.5:1	≥ 0.25 - ≤ 0.50	≤ 0.05	≥ 100	≥ 40
4.A	≥ 2.25	1:1	≥ 0.20 - ≤ 0.40	≤ 0.05	≥ 100	≥ 40
4.B	≥ 2.25	1:1	≥ 0.25 - ≤ 0.50	≤ 0.05	≥ 100	≥ 40

[1] C Factor and permissible shear stress for Types 1.A and 2.A mulch control netting must be obtained with netting used in conjunction with pre-applied mulch material.
[2] Required minimum shear stress RECP (unvegetated) can sustain without physical damage or excess erosion (≥ 0.5 in soil loss) during a 30 minute flow event in large-scale performance testing, ASTM D 6460 or equivalent test acceptable to the Engineer.
[3] This value represents the maximum gradient on which the product should be utilized for rainfall/slope application.
[4] Maximum C Factor from standardized large-scale rainfall performance testing, ASTM D 6459 or equivalent test acceptable to the Engineer.
[5] Machine direction and transverse direction (cross-machine direction).

C. RECP Anchors: Stakes or staples as recommended by manufacturer, with a minimum length of 6 inches.

2.07 WATTLES

A. Netting: Open weave, degradable netting. Nominal diameter of 9 inches, or as specified.

B. Fill Material: Straw, wood excelsior, coir, or other natural materials approved by the Engineer.

C. Stakes: 1 inch by 1 inch (minimum) wooden stakes, or stakes of equivalent strength.

2.08 CHECK DAMS (DITCH CHECK)

A. Synthetic Permeable Check Dam (HDPE):

1. Ditch Berm:
a. Installed height of 9 to10 inches.
b. Manufactured check dam constructed from sheets of perforated, UV-stabilized HDPE.
c. Perforations of 30 to 40% open area.

2. RECP for Permeable Check Dam (when specified): RECP Type 4, 4 feet wide.

3. Anchors: As recommended by the manufacturer.

B. Triangular Foam Check Dam: Triangular-shaped device with a height of 8 to 10 inches and a base of 16 to 20 inches.

1. Inner Support Material: Urethane foam.

2. Outer Cover: Woven geotextile material shaped to fit around the inner support material, extending 2 to 3 feet beyond the bottom edge of the triangular-shaped inner support.

3. RECP for Triangular Foam Check Dam: RECP Type 4, 4 feet wide.

C. Rock Check Dam:

1. Aggregate: Erosion stone complying with Iowa DOT Article 4130.04.

2. Engineering Fabric: Comply with Section 9040, 2.22.

D. Fiber Log: Provide filter sock complying with 9040, 2.05 or wattle complying with 9040, 2.07.

E. RECP Blanket Pillow Check: Utilize standard RECP specified for ditch or swale lining to form RECP blanket pillow check.

F. Rock/Sand Bags:

1. Bags:
a. Woven polypropylene fabric sewn together with double stitching.
b. Overall size of at least 14 inches by 26 inches.
c. Minimum grab strength of 90 pounds per ASTM D 4632.
d. UV stability of 70% per ASTM D4355

2. Aggregate: Clean 1 inch nominal crushed stone or gravel.

2.09 LEVEL SPREADERS

A. Provide 2 inch by 8 inch (minimum) pressure-treated timber of the length specified.

B. Use timbers that are relatively straight and have a minimum length of 5 feet each.

2.10 RIP RAP

A. Class A Revetment: Comply with Iowa DOT Section 4130.

B. Class B Revetment: Comply with Iowa DOT Section 4130.

C. Class D and E Revetment: Comply with Iowa DOT Section 4130.

D. Erosion Stone: Comply with Iowa DOT Section 4130.

2.11 TEMPORARY PIPE SLOPE DRAINS

A. PVC, HDPE, and metal pipes as specified in Section 4020, 2.01.

B. HDPE, Type C (corrugated interior).

C. All pipes listed are allowed for use within the right-of-way.

2.12 TEMPORARY SEDIMENT BASIN OUTLET STRUCTURES

A. Base: Class C concrete unless otherwise specified in the contract documents.

B. Riser: CMP complying with Section 4020; diameter as specified in the contract documents.

C. Dewatering Device:

1. Drill holes in the riser of the number, diameter, and at the elevation specified in the contract documents.

2. 1/4 inch by 1/4 inch or 1/2 inch by 1/2 inch wire mesh for hardware cloth.

D. Barrel: CMP complying with Section 4020; diameter as specified in the contract documents.

E. Anti-Vortex Device: CMP complying with Section 4020; diameter according to Figure 9040.116 and riser diameter as specified in the contract documents.

F. Anti-Seep Collar:

1. Manufactured anti-seep collar constructed of Corrugated metal, HDPE, or gum rubber.

2. Size according to manufacturer's recommendations. Ensure overall collar width and height is at least 3 feet larger than outlet pipe's nominal diameter.

G. Sediment Baffle: Provide silt fence complying with Section 9040, 2.14.

2.13 SEDIMENT TRAPS

A. Erosion Stone: Comply with Section 9040, 2.10.

B. Engineering Fabric: Comply with Section 9040, 2.22.

2.14 SILT FENCE

A. Fabric: Comply with Iowa DOT Article 4196.01.

B. Posts: 4 foot minimum steel (T-section) weighing at least 1.25 pounds per foot, exclusive of anchor plate. Painted posts are not required.

C. Fastener: Wire or plastic ties with a minimum tensile strength of 50 pounds.

2.15 STABILIZED CONSTRUCTION EXIT

A. Stone Exit: Comply with Iowa DOT Section 4122, Gradation 13, Macadam crushed stone.

B. Subgrade Stabilization Material: Use woven, UV-stabilized geotextile with a minimum tensile strength of 135 lb/ft.

C. Manufactured Track-out Pad:

1. Must be approved by the Engineer.
2. Provide a manufactured device intended to reduce track-out of sediment by flexing and vibrating tires as vehicles pass across the surface.
3. Capable of supporting anticipated construction vehicle and equipment loads per manufacturer's recommendations.

2.16 DUST CONTROL

A. Water: Use potable water or water from a source approved by the engineer.

B. Calcium Chloride: Comply with Iowa DOT Article 4194.01.

C. Lignosulfonate (Tree Sap): Use a commercially-available product with known lignin content.

D. Soapstock (Soybean Oil):

1. Use a commercially-available, undiluted, soybean oil soapstock emulsion.
2. Comply with manufacturer's recommendations for storage, transportation, temperature, and application equipment requirements.

2.17 EROSION CONTROL MULCH

A. Conventional Mulch:

1. Use dry cereal straw (oats, wheat, barley, or rye) or native grass straw.
2. Use material that is free of noxious weeds, seed-bearing stalks, or roots, and will be inspected and approved by the Engineer prior to use.
3. Other materials, subject to the approval of the Engineer, may be used.

2.17 EROSION CONTROL MULCH (Continued)

B. Hydromulch:

1. **Wood Cellulose Mulch:** Comply with Section 9010, 2.07.
2. **Bonded Fiber Matrix (BFM):** Comply with Section 9010, 2.07.
3. **Mechanically Bonded Fiber Matrix (MBFM):** See Section 9010, 2.07.

2.18 TURF REINFORCEMENT MATS (TRM)

A. Material Classification:

1. **Type 5.A, 5.B, 5.C, 5.D, and 5.E Turf Reinforcement Mat:** Composed of UV-stabilized non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements processed into a permanent, three dimensional matrix that may be supplemented with degradable components.
2. **Type 5.F High Performance Turf Reinforcement Mat:** A product composed of UV-stabilized, non-degradable, synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three dimensional matrix.

B. Properties and Performance: Meet the minimum material and performance requirements contained in the following table:

Table 9040.03: Turf Reinforcement Mats

Property		Test Method	Type					
			5.A	5.B	5.C	5.D	5.E	5.F
Material	Tensile Strength (MD)	ASTM D 6818	≥ 150 lbs/ft^2	≥ 175 lbs/ft^2	≥ 200 lbs/ft^2	≥ 325 lbs/ft^2	≥ 1,500 lbs/ft^2	≥ 3,000 lbs/ft^2
	Tensile Strength (TD)	ASTM D 6818	≥ 150 lbs/ft^2	≥ 175 lbs/ft^2	≥ 200 lbs/ft^2	≥ 225 lbs/ft^2	≥ 1,500 lbs/ft^2	≥ 3,000 lbs/ft^2
	Material Mass / Unit Area	ASTM D 6566	≥ 8.0 oz./yd^2	≥ 8.0 oz./yd^2	≥ 8.0 oz./yd^2	≥ 8.0 oz./yd^2	≥ 8.0 oz./yd^2	≥ 8.0 oz./yd^2
	Thickness	ASTM D 6525	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in	≥ 0.25 in
	UV Stability	ASTM D 4355	80% @ 500 hrs	80% @ 500 hrs	80% @ 1,000 hrs	80% @ 1,000 hrs	90% @ 1,000 hrs	80% @ 3,000 hrs
Performance	Slope Application Max. Gradient (H:V)	N/A	1:1	1:1	0.5:1	0.5:1	0.5:1	0.5:1
	Unvegetated Shear Stress[4]	ASTM D 6460	≥ 2.0 lb/ft^2	≥ 2.0 lb/ft^2	≥ 2.0 lb/ft^2	≥ 2.0 lb/ft^2	≥ 2.0 lb/ft^2	≥ 2.0 lb/ft^2
	Vegetated Shear Stress	ASTM D 6460	≥ 6.0 lb/ft^2	≥ 8.0 lb/ft^2	≥ 10.0 lb/ft^2	≥ 12.0 lb/ft^2	≥ 12.0 lb/ft^2	≥ 14.0 lb/ft^2
	Seedling Emergence	ASTM D 7322	≥ 250%	≥ 250%	≥ 250%	≥ 250%	≥ 250%	≥ 250%

Refer to the ECTC Specifications for details of testing requirements and assumptions.

2.19 INLET PROTECTION

A. Drop-in Intake Protection:

1. Use a manufactured device that is inserted into the intake and is capable of trapping or filtering sediment from runoff prior to entering the storm sewer.

2. All components must be contained entirely below the surface of the intake grate.

3. Incorporate means of emergency outflow to prevent flooding if plugged with sediment.

B. Surface-applied Intake Protection:

1. Use devices or filter socks, placed around or over the intake, that are capable of trapping or filtering sediment from runoff prior to entering the storm sewer.

2. Do not allow the device to completely block or plug the intake, preventing inflow.

2.20 FLOW TRANSITION MATS

Comply with the following and Iowa DOT Materials I.M. 469.10.

A. Mat: Constructed of 85% minimum UV resistant material with a maximum ground cover of 80%. Meet the requirements of Table 9040.04.

Table 9040.04: Flow Transition Mats

Property	Test Method	Value
Mass/Unit Area (max.)	ASTM D 6566	3 lbs/SF
Minimum Thickness	ASTM D 6525	0.4 inch
Maximum Thickness	ASTM D 6525	1 inch
Wide Width Tensile Strength	ASTM D 6818	2,500 lbs/ft
Minimum Percent Open Area	ASTM D 6567 Calculated	20%
UV Stability	ASTM D 4355	85%
Manning's n	Calculated	0.039

B. Anchoring Devices:

1. Furnish bullet tip style anchors made of a metal alloy attached to a wire rope.

2. Anchors capable of withstanding a minimum 300 pounds (136 kg) of pull out resistance in cohesive soils.

3. Wire rope a minimum of 30 inches (762 mm) in length with a minimum breaking strength of at least 300 pounds (136 kg).

4. The top washer a minimum of 3 inches (76 mm) in diameter and constructed of a UV resistant plastic.

5. Each anchor equipped to allow the retightening of the anchor when deemed necessary by the Engineer.

2.21 Grid Tied Concrete Block Mat

Grid tied concrete block mat is manufactured from individual concrete blocks that are cast integrally with a geogrid to form an erosion control mat. The resulting mat is supplied and transported in a rolled form.

A. Blocks:

1. Manufacture blocks with concrete complying with the cement requirements of ASTM C 150 and the aggregate requirements of ASTM C 33.

2. Minimum compressive strength of 5,000 psi at 28 days.

3. Furnish blocks that have a minimum weight of 3 pounds per block. Do not allow completed mat weight to exceed 10 pounds per square foot.

4. Ensure blocks have a flat-top pyramid shape with a nominal base of 6.5 inches by 6.5 inches and a height between 2.25 and 2.5 inches.

5. Place blocks no further than 1.5 inches apart.

6. Ensure missing concrete due to chipping or cracking does not exceed 15% of the average concrete unit weight.

B. Grid:

1. Open-knitted fabric composed of high tenacity, multifilament polypropylene yarns knitted and coated tension to form a stable grid structure. Comply with the material requirements of Table 9040.05.

2. Embed the grid within the base of each of the concrete blocks.

3. When mats will be installed adjacent to each other:
   a. Extend the geogrid 12 inches beyond one long edge of the mat to allow for overlap with the adjacent mat.
   b. Extend the geogrid 12 inches beyond one end of the roll to allow for overlap with an abutting mat.

Table 9040.05: Grid Tied Concrete Block Mat Grid Properties

Property[1]	Test Method	Value
Aperture Size	Measured Length	1.4 to 1.9 inches
Ultimate Tensile Strength	ASTM D 6637	2,055 lb/ft
Elongation at Break	ASTM D 6637	6% (max.)
Tensile Strength @ 2%	ASTM D 6637	822 lb/ft (min.)
Tensile Strength @ 5%	ASTM D 6637	1,640 lb/ft (min.)
Tensile Modulus @ 2%	ASTM D 6637	41,000 lb/ft (min.)
Tensile Modulus @5%	ASTM D 6637	32,800 lb/ft (min.)

[1] All values apply to both the machine direction and cross machine direction.

2.21 Grid Tied Concrete Block Mat (Continued)

C. Underlayment Materials:

1. Use a Type 2D or 3B RECP base layer composed of curled wood excelsior.

2. If required by the manufacturer, provide five-pick leno weave polypropylene netting top layer to add strength and support to the underlying RECP.

3. Depending on the site conditions, additional or alternative underlayment materials may be specified in the contract documents.

4. The underlayments may be attached to the GTCBM during manufacture.

5. When GTCBM will be installed adjacent to each other:
   a. Extend the RECP underlayment 6 inches beyond one long edge of the mat to allow for overlap with the adjacent mat.
   b. Extend the RECP underlayment 6 inches beyond one end of the roll to allow for overlap with an abutting mat.

D. Anchors and Ties:

1. U-Anchors: Provide No. 3 deformed bars shaped in a “U” with 18 inch long legs.

2. Ties: Provide 20 inch long, type 304 stainless steel zip ties with a minimum tensile strength of 250 pounds.

E. Performance: Comply with the minimum requirements of Table 9040.07 when tested with a backing material on a non-vegetated surface. Verify performance with full-scale laboratory testing performed by an independent third-party testing facility.

Table 9040.07: Grid Tied Concrete Block Mat Performance

Property	Test Method	Bed Slope	Value
Shear Stress	ASTM D 6460	10% & 20%	18 lb/ft^2
Velocity	ASTM D 6460	10% & 20%	30 ft/sec

2.22 ENGINEERING FABRIC

Comply with Iowa DOT Article 4196.01, B, 3.

PART 3 - EXECUTION

3.01 SWPPP PREPARATION

A. Prepare a SWPPP according to the requirements of the Iowa DNR NPDES General Permit No. 2.

B. Ensure that controls utilized in the SWPPP conform to the type and quantity of erosion and sediment controls specified in the contract documents.

C. Submit the completed SWPPP to the Engineer for review and approval prior to filing the Notice of Intent.

D. Upon approval of the Engineer, file public notices, as required by the NPDES General Permit No. 2.

E. File the Notice of Intent and fee, as required by the NPDES General Permit No. 2.

3.02 SWPPP MANAGEMENT

Coordinate and carry out all requirements of Iowa DNR NPDES General Permit No. 2 and any local ordinance requirements, including:

A. Update the SWPPP according to the requirements of the NPDES General Permit No. 2.

B. Revise the SWPPP and implement changes, as necessary, to prevent sediment or hazardous materials from being transported off the site.

C. Submit all SWPPP revisions to the Engineer for review and approval.

D. Perform and maintain records of weekly erosion and sediment control site inspections, unless otherwise specified in the contract documents.

E. Maintain records of transfer of responsibility under the NPDES General Permit No. 2.

F. Retain all records on-site, or as required by the NPDES General Permit No. 2.

G. After final stabilization, file a Notice of Discontinuation, according to the NPDES General Permit No. 2.

H. Provide all records and documentation to the Engineer upon completion of the project. Retain a copy of all records for the period required under the Permit.

I. Continue to perform the work required under this item throughout the duration of the project, and until final stabilization is achieved and a Notice of Discontinuation is filed.

3.03 EROSION AND SEDIMENT CONTROL INSPECTION

A. Perform inspections according to and at frequency required by the Iowa DNR NPDES General Permit No. 2.

B. Schedule necessary maintenance or improvements for items included in the contract documents.

C. Notify the Engineer immediately of situations requiring attention beyond that provided for in the contract documents.

D. Provide copies of the inspection reports to the Engineer.

3.04 EQUIPMENT

Comply with Iowa DOT Article 2601.03.

3.05 COMPOST BLANKETS (Figure 9040.101)

A. Loosen the ground surface to a minimum depth of 1 inch.

B. Evenly spread compost, as specified in the contract documents, or as directed by the Engineer.

C. Divert concentrated flows away from the slope.

D. Do not operate heavy equipment over the compost blanket after placement, or throughout the required period of protection.

E. Inspect the ground under the blanket at regular intervals for signs of erosion.

3.06 FILTER BERMS (Figure 9040.102)

A. Install filter berm along the contour of the slope and perpendicular to sheet flow as specified in the contract documents, or as directed by the Engineer.

B. Turn the beginning and ends of the filter berm installation uphill to create a “J” shape at each end to prevent runoff from flowing around the end of the berm.

C. For slopes that receive runoff from above, place a filter berm at the top of the slope to control the velocity and spread flow.

D. Ditch Checks:

1. When filter berms are allowed for ditch checks, extend the berm up the side slopes of the ditch to prevent flow from bypassing around the edges of the berm.

2. Ensure the bottom of the berm on the slope is higher in elevation than the top of the berm in the middle of the ditch.

3. Construct standard filter berm with a base of 5 to 7 feet and minimum height of 24 inches.

4. Construct compact filter berm with a base of 3 to 5 feet and minimum height of 18 inches.

E. Replace the berm when sediment accumulation reaches one-half of the height of the berm.

3.07 FILTER SOCKS (Figure 9040.102)

A. Installation:

1. Fill mesh filter sock with filler material to the size and length specified in the contract documents.

2. Place the filter sock along the contour as specified in the contract documents, or as directed by the Engineer.

3. Construct a “J-hook” at each end of a continuous run of filter sock, by turning the end of the sock uphill, as necessary to prevent runoff from flowing around the ends when water behind the sock ponds up to a level even with the top of the sock.

3.07 FILTER SOCKS (Continued)

4. Drive stakes into the ground at a maximum spacing of 10 feet, and as required to secure the sock and prevent movement.

5. Repair or replace non-functioning filter socks that allow water to flow under the sock, are torn, or are otherwise damaged, due to inadequate installation.

6. Remove filter material from damaged socks that are located along streambanks, around intakes, in ditches, or in other locations where the material may be carried to surface waters.

B. Removal: When specified in the contract documents, or as directed by the Engineer; remove the filter sock upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Upon completion of the project, completely remove socks and filter material that are located along streambanks, around intakes, in ditches, or in other locations where the filter material may be carried to surface waters if the sock degrades and/or tears.

2. Slice the sock longitudinally. Remove and dispose of the filter sock material and stakes.

3. Spread the filter material and accumulated sediment to match finished grade and to ensure proper drainage.

4. If the site has been brought to finished grade and prepared for permanent seeding, spread and incorporate the filter material into the surface by tilling, or as required to break up any large particles and provide a finished surface suitable for permanent seeding.

C. Replacement:

1. When accumulated sediment reaches a level one-half the height of the sock, or when the sock becomes clogged with sediment and no longer allows runoff to flow through, remove the sock as described above, and replace according to the installation instructions above.

2. At the Engineer's option, the existing filter sock and accumulated sediment may be left in place, and a new filter sock installed up-slope from the existing filter sock.

3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Figures 9040.103 and 9040.104)

Install temporary RECPs according to the manufacturer's published installation recommendations, subject to the following minimum requirements:

A. Anchor Trenches, Seams, and Terminal Ends:

1. Upslope Anchor Trenches:
a. Excavate a 6 inch by 6 inch trench along the top of the slope.
b. Extend the upslope terminal end of the RECP 3 feet past the anchor trench.
c. Use staples at 1 foot centers to fasten the RECP to the bottom of the trench.
d. Backfill and compact the trench.
e. Apply seed and fertilizer to the trench surface if seeding is specified.
f. Fold top end of RECP over compacted trench and secure upslope terminal end with a single row of staples on 1 foot centers.

2. Adjacent Seams:
a. Overlap edges of adjacent RECPs by 2 to 4 inches.
b. Install a sufficient number of staples to prevent seam or abutted rolls from separating.

3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)

3. Consecutive Rolls (End Lap):
a. Shingle and overlap consecutive rolls 2 to 6 inches in the direction of flow.
b. Secure staples through seam at 1 foot intervals.

4. Intermediate Anchor Trench:
a. Excavate a 6 inch by 6 inch trench.
b. Use staples at 1 foot centers to fasten the RECP to the bottom of the trench.
c. Fold the RECP over upslope material and backfill and compact the trench.
d. Apply seed and fertilizer to the trench surface if seeding is specified.
f. Continue rolling material downslope over the trench.

5. Staple Check: Install two rows of staggered stakes or staples 4 inches on center and 4 inches apart.

6. RECP Blanket Check:
a. For use in conjunction with an RECP blanket lined channel.
b. During RECP blanket installation, gather a 4 foot section of the blanket.
c. Fold the blanket back upon itself, with the overlap pointing in the downhill direction, shingle style, to form a shallow, 2 foot long, check dam.
d. Secure blanket check with long staples or wood stakes spaced at 12 inch intervals.

7. Terminal End Anchor Trench:
a. Excavate a 6-inch by 6-inch trench.
b. Extend the terminal end of the RECP 3 feet past the anchor trench.
c. Use staples at 1-foot centers to fasten the RECP to the bottom of the trench.
d. Backfill and compact the trench.
e. Apply seed and fertilizer to the trench surface if seeding is specified.
f. Fold the remaining end of the RECP over the compacted trench and secure the terminal end of the RECP with staples on 1 foot centers.

B. Slope Application:

1. Grade and smooth surface. Remove all rocks, clods, vegetation, or other obstructions that will prevent direct contact between the RECP and the soil surface.

2. When specified, prepare seedbed and place seed and fertilizer according to Section 9010 prior to placing RECP.

3. Install anchor trench at top of slope.

4. Unroll the RECP down or horizontally across the slope.

5. Securely fasten RECP to the soil with staples according to the density and pattern recommended by the manufacturer with a minimum rate of 1.3 staples per square yard within the body of the blanket.

6. Place consecutive blankets down the slope end-over-end, shingle style.

7. Overlap ends of consecutive rolls and secure with staples.

8. Overlap edges of adjacent rolls and secure with staples.

9. Anchor the terminal end of the RECP with an anchor trench or staple check slot.

3.08 TEMPORARY ROLLED EROSION CONTROL PRODUCTS (RECP) (Continued)

C. Channel/Ditch Application:

1. When specified, prepare seedbed and place seed and fertilizer according to Section 9010, prior to placing RECP.
2. Construct an anchor trench at the beginning of the channel across its entire width.
3. Position adjacent rolls in the anchor slot and overlap.
4. Unroll RECP downstream.
5. Follow the manufacturer's recommendations for the installation of intermediate anchor trenches or staple checks at intervals along the channel.
6. Construct consecutive roll lap at end of roll and beginning of new roll.
7. Terminate installation at downstream end with an anchor trench or staple check.
8. Install anchors in a regular pattern over entire area covered according to manufacturer's published recommendations (minimum 1.7 anchors per square yard). Significantly higher anchor rates and longer staples may be necessary in sandy, loose, or wet soils and in severe applications.

3.09 WATTLES (Figure 9040.105)

A. Installation:

1. Construct a shallow trench, 2 to 4 inches deep, matching the width and contour of the wattle.
2. Install wattle along contour of slope.
3. Turn ends of wattle uphill to prevent water from flowing around ends.
4. Place and compact excavated soil against the wattle, on the uphill side.
5. Drive stakes through the center of the wattle, into the ground at a maximum spacing of 4 feet along the length of the wattle, and as needed to secure the wattle and prevent movement.
6. Abut ends of adjacent wattles tightly. Wrap joint with a 36 inch wide section of silt fence and secure with stakes.

B. Removal: When specified in the contract documents, or as directed by the Engineer, remove the wattle upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Completely remove the wattle netting, filler material, and stakes.
2. Spread the accumulated sediment to match finished grade and to ensure proper drainage.
3. When allowed by the Engineer, the wattle netting may be sliced open and the filler material spread out over the ground. Removal of netting and stakes and spreading of sediment is still required.

3.09 WATTLES (Continued)

C. Replacement:

1. When accumulated sediment reaches a level one-half the height of the wattle, or when the wattle becomes clogged with sediment and no longer allows runoff to flow through, remove the wattle as described above, and replace according to the installation instructions above.

2. At the Engineer's option, the existing wattle and accumulated sediment may be left in place, and a new wattle installed up-slope from the existing wattle.

3.10 CHECK DAMS (Figure 9040.106)

A. Synthetic Permeable Check Dam (HDPE):

1. Install according to the manufacturer's recommendations.

2. When specified in the contract documents, provide an RECP under the check dam, installed according to the manufacturer's recommendations.

B. Triangular Foam Check Dam:

1. Install according to the manufacturer's recommendations.

2. When specified in the contract documents, provide an RECP under the check dam, installed according to the manufacturer's recommendations.

C. Rock Check Dam: Construct according to Figure 9040.107.

D. Fiber Log:

1. When specified in the contract documents, install fiber log check dam over RECP blanket.

2. Install fiber log across ditch or swale perpendicular to flow in a crescent shape with the ends facing upstream.

3. Install fiber log so the center section is one log diameter lower than the ends.

4. Space stakes at 1 foot intervals. Place two stakes at a 45 degree angle to the surface in a crisscross pattern with the fiber log in-between.

F. Rock/Sand Bag:

1. Fill bags only three-fourths full of rock to reduce gaps in the check dam.

2. Stack bags forming a check dam with a height of 1.5 to 2 feet and side slopes 2:1.

3. Tightly abut and overlap rock bags to prevent flow between bag joints.

4. Extend bags up the side slopes of the ditch to prevent flow from bypassing around the edges of the check dam.

3.10 CHECK DAMS (Continued)

G. Removal: When specified in the contract documents, or as directed by the Engineer, remove check dams upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.

1. Remove the check dam and dispose of materials, or salvage to the contractor.

2. Remove the accumulated sediment or spread to match finished grade; ensure proper drainage.

3. Stabilize the area disturbed by removal operations.

3.11 TEMPORARY EARTH DIVERSION BERMS (Figure 9040.108)

A. Ensure positive drainage along the diversion toward the outlet area.

B. Adequately compact fill to prevent failures or seepage.

C. Outlet the diversion to undisturbed and/or stabilized areas only.

D. Stabilize the surface of the earth diversion with temporary erosion control seeding, as specified in Section 9010.

3.12 LEVEL SPREADERS (Figure 9040.109)

A. Butt multiple timbers together, as necessary to provide the required length.

B. Ensure the spreader is installed level in all directions. Adjust as necessary during construction to maintain spreader in a level condition.

C. Excavate a depression behind the spreader to the depth specified in the contract documents. The depression may be over-excavated up to 1 foot to provide an area for sediment accumulation.

D. Grade as required to prevent flow around the ends of spreader.

E. Remove the accumulated sediment from the depression when the depth is reduced below that specified in the contract documents.

3.13 RIP RAP (Figures 9040.110 and 9040.111)

Install rip rap (revetment stone or erosion stone) as shown on Figures 9040.110 and 9040.111.

3.14 TEMPORARY PIPE SLOPE DRAINS (Figure 9040.112)

A. Place slope drain on undisturbed soil or well compacted fill.

B. Carefully compact cohesive soils around inlet ends of the drain in 6 inch lifts.

C. Discharge slope drain to a stable outlet or to a sediment retention device.

3.15 TEMPORARY SEDIMENT BASIN (Figures 9040.113 and 9040.114)

A. Basin Construction:

1. Construct the storage area to the size and elevations specified in the contract documents.

2. Stabilize the side slopes and internal surfaces of the temporary sediment basin.

3. When specified in the contract documents, install internal baffles to enhance sediment capture. Refer to Figure 9040.117.

B. Outlet Structure:

1. **Concrete Base:** Construct the concrete base and anchor riser section, as shown on Figure 9040.115.

2. **Dewatering Device**:
   a. Drill holes in the riser section. The number, diameter, and configuration will be specified in the contract documents.
   b. Wrap the perforated section of the riser pipe with metal hardware cloth.

3. **Anti-vortex Device:** If required by the contract documents, firmly attach the cylinder to the top of the riser by welding or other means. Comply with Figure 9040.116.

C. Anti-Seep Collar:

1. Provide anti-seep collars at locations shown in the contract documents.

2. Install according to the collar manufacturer's recommendations.

3. Place backfill material and compact over-excavation areas to a minimum of 95% Standard Proctor Density per Section 3010.

3.16 SEDIMENT TRAPS (Figure 9040.118)

A. Construct the storage area to the size and elevations specified in the contract documents.

B. Stabilize the side slopes and internal surfaces of the sediment trap.

C. When specified in the contract documents, install internal baffles to enhance sediment capture. Refer to Figure 9040.117.

3.17 SILT FENCES (Figure 9040.119)

A. Installation:

1. Install material along the contour of the ground, as specified in the contract documents, or as directed by the Engineer.

2. Install silt fence with a mechanical soil slicing machine that creates a slit in the ground while simultaneously installing the fabric. The trenching method may be used when situations will not allow soil slicing, as determined by the Engineer.

3. Construct a "J-hook" at each end of a continuous run of silt fence, by turning the end of the silt fence uphill, as necessary to prevent runoff from flowing around ends when water behind the fence ponds to a level even with the top of the fence.

3.17 SILT FENCES (Continued)

4. Insert 12 inches of fabric to a minimum depth of 6 inches (fabric may be folded below the ground line).

5. Compact installation by driving along each side of the silt fence, or by other means, as necessary to adequately secure the fabric in the ground, to prevent pullout and water flow under the fence.

6. Drive steel posts into the ground alongside the silt fence, to a minimum depth of 20 inches, unless otherwise specified by the Engineer. Space posts as shown on Figure 9040.119 or as required to adequately support silt fence.

B. Maintenance: Repair or replace non-functioning silt fence that allows water to flow under the fence, is torn, or is otherwise damaged, due to inadequate installation, at no additional cost to the Contracting Authority.

C. Removal:

1. Remove the silt fence upon final stabilization of the project area, or according to the staging indicated in the SWPPP.

2. Remove and dispose of silt fence and posts.

3. Remove sediment or spread to match finished grade; ensure proper drainage.

4. Stabilize the area disturbed by removal operations.

D. Replacement:

1. When accumulated sediment reaches a level one-half the height of the fence, remove the silt fence as described above, and replace according to the installation instructions above.

2. At the Engineer's option, the existing silt fence and accumulated sediment may be left in place, and a new silt fence installed up-slope from the existing silt fence.

3. When allowed by the Engineer, the existing silt fence may be left in place and the accumulated sediment removed to the original ground line and within 6 inches of the silt fence. Carefully inspect the existing silt fence for structural integrity and signs of undermining. Make any necessary repairs.

3.18 STABILIZED CONSTRUCTION EXIT (Figure 9040.120)

A. Install a stabilized construction exit at all locations where construction traffic leaving the site presents the potential for sediment track-out.

B. Remove vegetation and excavate soft soils from entrance area. Thoroughly compact subgrade prior to placing stone or manufactured pad.

C. Install culvert under entrance if necessary to maintain drainage.

D. Grade entrance to prevent runoff from flowing onto street. Direct all runoff from entrance to a sediment retention device.

E. When specified, install subgrade stabilization fabric prior to placing crushed stone or manufactured track-out pad.

3.18 STABILIZED CONSTRUCTION EXIT (Continued)

F. For stone track-out control, install a layer of crushed stone to the thickness (6 inches minimum) and dimensions specified in the contract documents.

G. For manufactured track-out pad, install according to manufacturer's recommendations and Figure 9040.120. If soil conditions are poor, provide aggregate base, geotextile, or geogrid as recommended by the manufacturer.

H. Remove the accumulated sediment and install new stone or clean manufactured device, as required to prevent track-out.

3.19 DUST CONTROL

A. Water: Apply frequent light watering to ground surface, as required to control dust.

B. Calcium Chloride: Apply according to Iowa DOT Section 2314.

C. Lignosulfonate (Tree Sap):

1. Loosen the top 1 to 2 inches of the roadway surface.
2. Apply solution with a 50% residual concentration, at a rate of 0.50 gal/yd^2, to deliver a 25% residual. For diluted solutions, increase the application rate, as required, to deliver an equivalent 25% residual.
3. Allow product to penetrate through the loosened material.
4. Tight-blade road surface.

D. Soapstock (Soybean Oil):

1. Loosen the top 1 to 2 inches of the roadway surface.
2. Apply undiluted soapstock at a rate of 0.70 gal/yd^2.
3. Allow product to penetrate through the loosened material.
4. Tight-blade road surface.

3.20 EROSION CONTROL MULCHING

A. Conventional Mulching:

1. Use conventional mulching when the surface cannot be stabilized by seeding, due to season or ground conditions.
2. Uniformly distribute mulch over the required areas, at a rate of 2 tons/acre for dry cereal straw, or 2.5 tons/acre for prairie hay.
3. Work the mulch into the soil with a mulch tucker, designed to anchor the mulch into the soil, by means of dull blades or disks.

3.20 EROSION CONTROL MULCHING (Continued)

B. Hydromulching:

1. Place mulch and tackifier (if applicable) in equipment specifically manufactured for hydraulic mulching.

2. Mix materials with fresh, potable water using a combination of re-circulation through the equipment's pump and mechanical agitation to form a homogeneous slurry.

3. If necessary, dampen any dry, dusty soil as required to prevent balling of the material during application.

4. Apply hydromulch in multiple layers from opposing directions, where possible.

5. Apply the slurry evenly over all specified areas, at the minimum component material rates specified:
   a. Wood Cellulose Mulch:
      1) Mulch: Minimum 3,000 lb/acre dry weight.
      2) Tackifier: Minimum 50 lb/acre.
   b. Bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.
   c. Mechanically Bonded Fiber Matrix: Minimum 3,000 lb/acre dry weight.

6. Retain and count empty bags of mulch to ensure final application rate.

3.21 TURF REINFORCEMENT MATS

Install according to the manufacturer's published installation literature for the product specified and application (slope or channel).

3.22 INLET PROTECTION

A. Install inlet protection devices according to the manufacturer's recommendations.

B. Remove the accumulated sediment, as required to maintain the inlet protection device in working order. Remove any accumulated sediment from streets open to traffic if it encroaches into the traveled roadway.

3.23 FLOW TRANSITION MATS

Install according to the manufacturer's published recommendations.

3.24 GRID TIED CONCRETE BLOCK MAT

Install according to the GTCBM supplier's recommendations, details, and the following:

A. Installation Practices:

1. **Standard Anchor Trench:** Excavate an 18 inch deep vertical trench. Bury 18 inches, or three blocks, of the mat in the trench, backfill, and compact.

2. **Edge Trench:** Excavate a 12 inch trench at a 45 degree angle to the surface. Bury 12 inches, or two blocks, of the mat in the trench, backfill, and compact.

3.24 GRID TIED CONCRETE BLOCK MAT (Continued)

3. Leading and Ending Anchor Trench:
a. Excavate an 18 inch deep vertical trench. Bury 18 inches, or three blocks, of the mat in the trench, backfill, and compact.
b. Install U-anchors at 2 foot increments perpendicular to flow directly behind the first exposed block.

4. Seams: Supply GTCBM in lengths and widths that minimize seams to the extent possible. Where required, construct seams as follows:
a. Standard Seams: Seams in channels parallel with the direction of flow and all seams on slopes that are not exposed to concentrated flow:
1) Extend geogrid 12 inches and RECP 6 inches under the adjacent mat.
2) Secure seam with U-anchors at 2 foot increments directly behind the first row of blocks on the adjacent mat. Alternatively, secure adjacent mats with zip ties at 1 foot intervals. Encompass at least 3 cords of each mat with zip ties.
b. Overlap Seams: Where seams are perpendicular to flow in a channel:
1) Install upstream mat and flip trailing edge back 24 inches.
2) Excavate 2.25 inches of soil 18 inches from the trailing end of the upstream mat.
3) Place the leading edge of the downstream mat into the shallow trench. Backfill and tamp soil into the mat filling voids between blocks. Place seed over the soil.
4) Flip the end of the upstream mat over the soil-covered and seeded area.
5) Secure overlap with U-anchors at 2 foot increments directly behind the first block of the up-channel mat. Alternatively, secure overlap with zip ties at 1 foot intervals. Encompass at least 3 cords of each mat with zip ties.

5. Concrete GTCBM Trench: Where GTCBM is installed at a culvert or storm pipe outlet, construct a concrete GTCBM trench to secure the end of the mat and prevent undermining of the outlet.
a. Excavate an 18 inch wide by 18 inch deep trench at the end of the pipe apron.
b. Install 36 inches of GTCBM in trench with 18 inches flat along the bottom of the trench and 18 inches extending vertically up the wall of the trench to the top of the surface of the channel.
c. Backfill channel with Class C concrete.
d. If a concrete footing is specified for the apron, and a cast-in-place footing is provided, the concrete GTCBM trench may be combined with the footing by extending 36 inches of GTCBM into the footing in lieu of constructing a separate trench.

B. General Site Preparation:

1. Complete final grading and restore topsoil if previously stripped.

2. Ensure ground surface is smooth and free of rocks, clods, roots, or debris.

3. Perform seedbed preparation and apply seed according to Section 9010 prior to placement of the GTCBM.

C. Slopes:

1. Construct an anchor trench at the top and bottom of the slope.

2. Begin the installation at the top of the slope.

3. Unroll GTCBM down the slope to the bottom anchor trench.

3.24 GRID TIED CONCRETE BLOCK MAT (Continued)

4. If slope length exceeds the allowable length of GTCBM roll, install subsequent mats end to end with a standard seam.

5. Install adjacent rolls and splice with a standard seam.

D. Channels:

1. GTCBM Perpendicular to Flow:

a. Place mats continuously across the width of the channel, including side slopes, without any seams parallel to the direction of flow.
b. Begin installation downstream and move up the channel.
c. Place the first mat across the channel.
d. Install an ending anchor trench at the terminal end of the downstream mat.
e. Install subsequent mats upstream, splicing each abutting mat with a standard seam.
f. Construct a leading anchor trench at the upstream end of the installation or a concrete GTCBM trench if specified.

2. GTCBM Parallel to Flow:

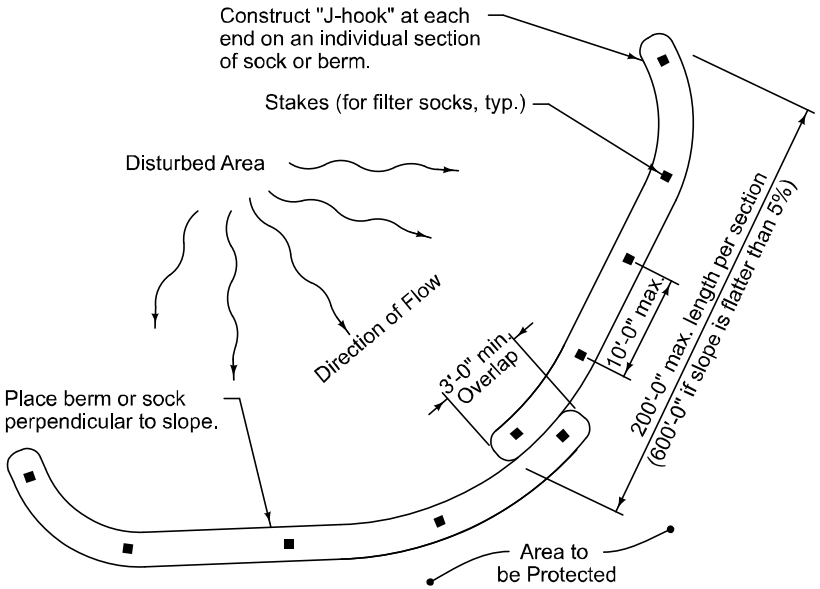
a. Begin at the upstream end of the installation, utilizing multiple mats as necessary to achieve the width specified in the contract documents.
b. Construct a leading anchor trench at the upstream end of the installation or a concrete GTCBM trench if specified.

c. Unroll mats downstream, securing parallel edges with standard seams.
d. If installation length requires multiple rolls of GTCBM, join ends of subsequent mats together with an overlap seam.
e. Install an ending anchor trench at the terminal end of the downstream mat.

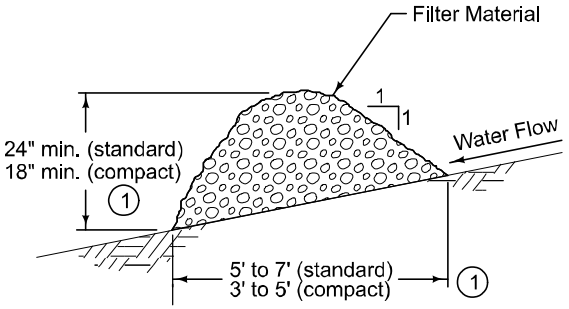
3.25 TEMPORARY EROSION CONTROL SEEDING

Comply with Section 9010.

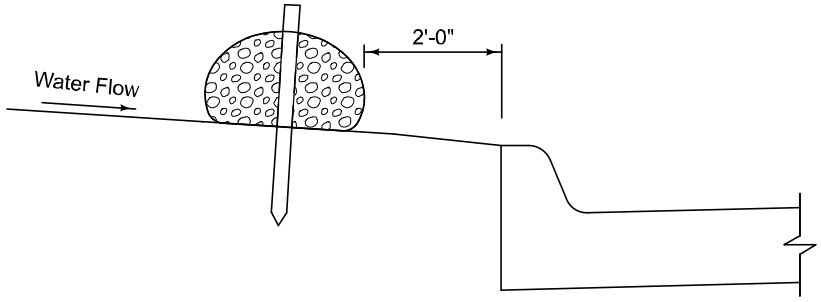
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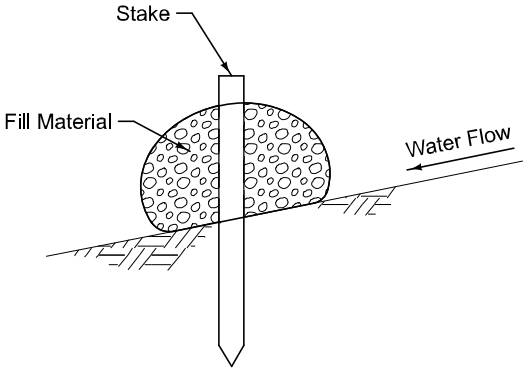
PLAN VIEW OF SLOPE
(for sediment and slope control)



FILTER BERM



SECTION VIEW AT STREET
(for perimeter control along street)



FILTER SOCK

Berm shown is typical for slopes flatter than 3:1. For steeper slopes, increase berm size as directed by the Engineer.

Place berm in uncompacted windrow perpendicular to the slope at locations specified in the contract documents.

Filter sock diameter as specified in the contract documents.

(1) Filter berm size (standard or compact) as specified in the contract documents.

TYPICAL PLACEMENT OF BERM OR SOCK

FIGURE 9040.102

SHEET 1 OF 1

SUDAS

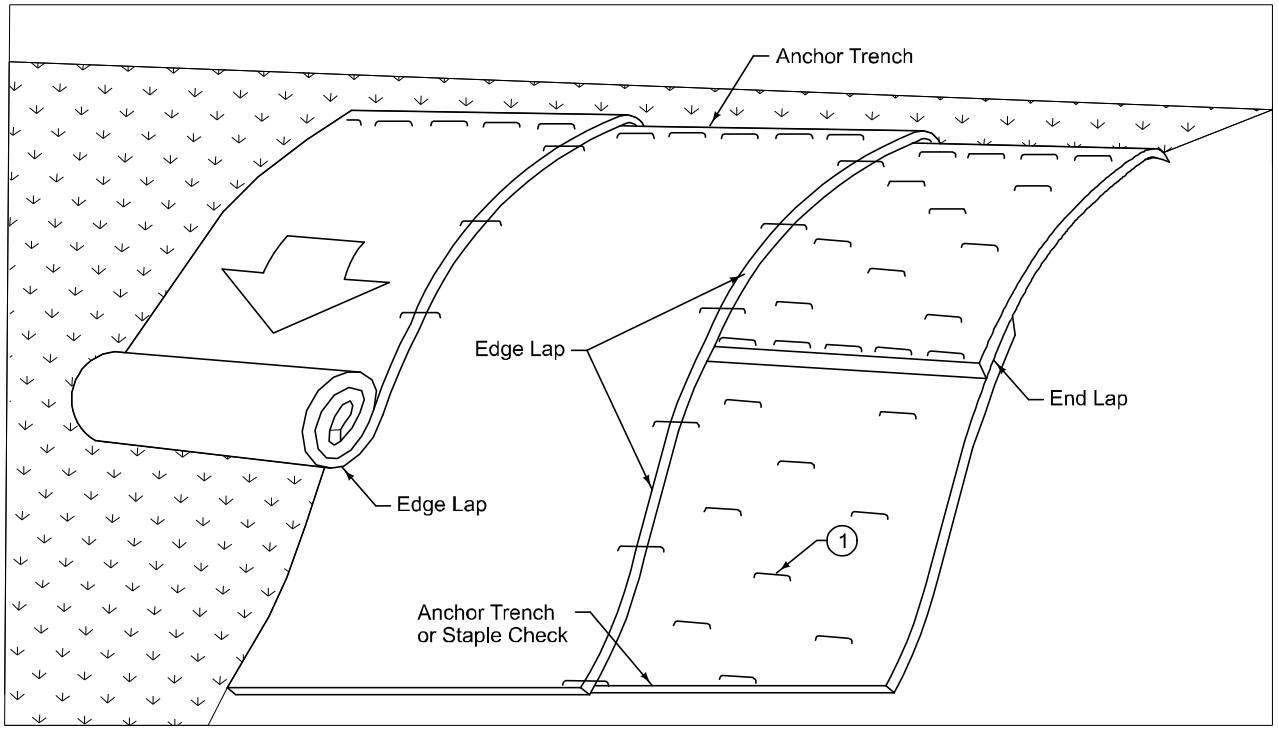
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9040.102

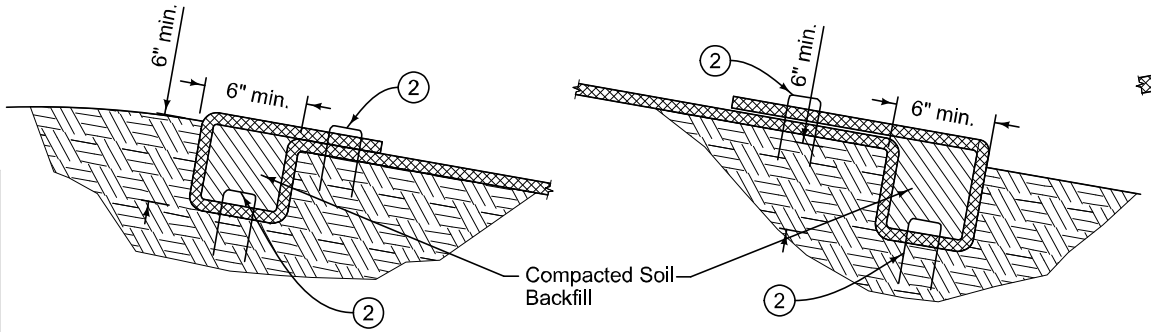
SHEET 1 of 1

SUDAS Standard Specifications

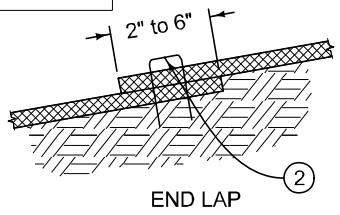
FILTER BERM AND FILTER SOCK



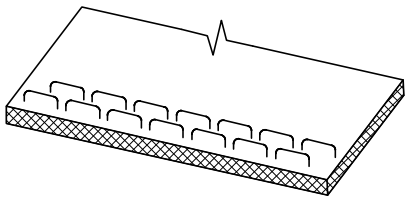
1. Secure blanket to ground according to manufacturer's recommended anchoring pattern and anchor density (minimum 1.3 anchors per square yard).
2. Install staples at 1 foot on center.



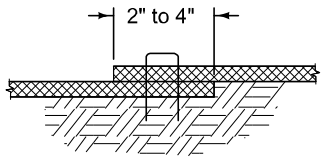
UPSLOPE AND TERMINAL END ANCHOR TRENCH



END LAP



STAPLE CHECK
(Two rows of staples at 4" on center and staggered 4" apart)



EDGE LAP
(4'-0" min. anchor spacing)

FIGURE 9040.103

SHEET 1 OF 1

SUDAS

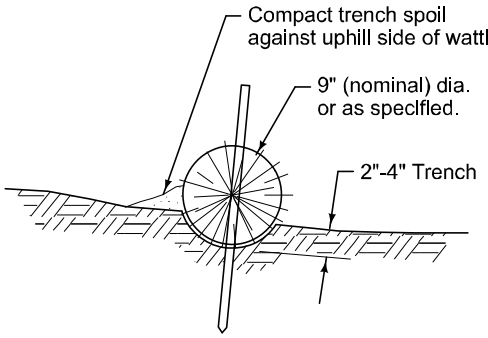
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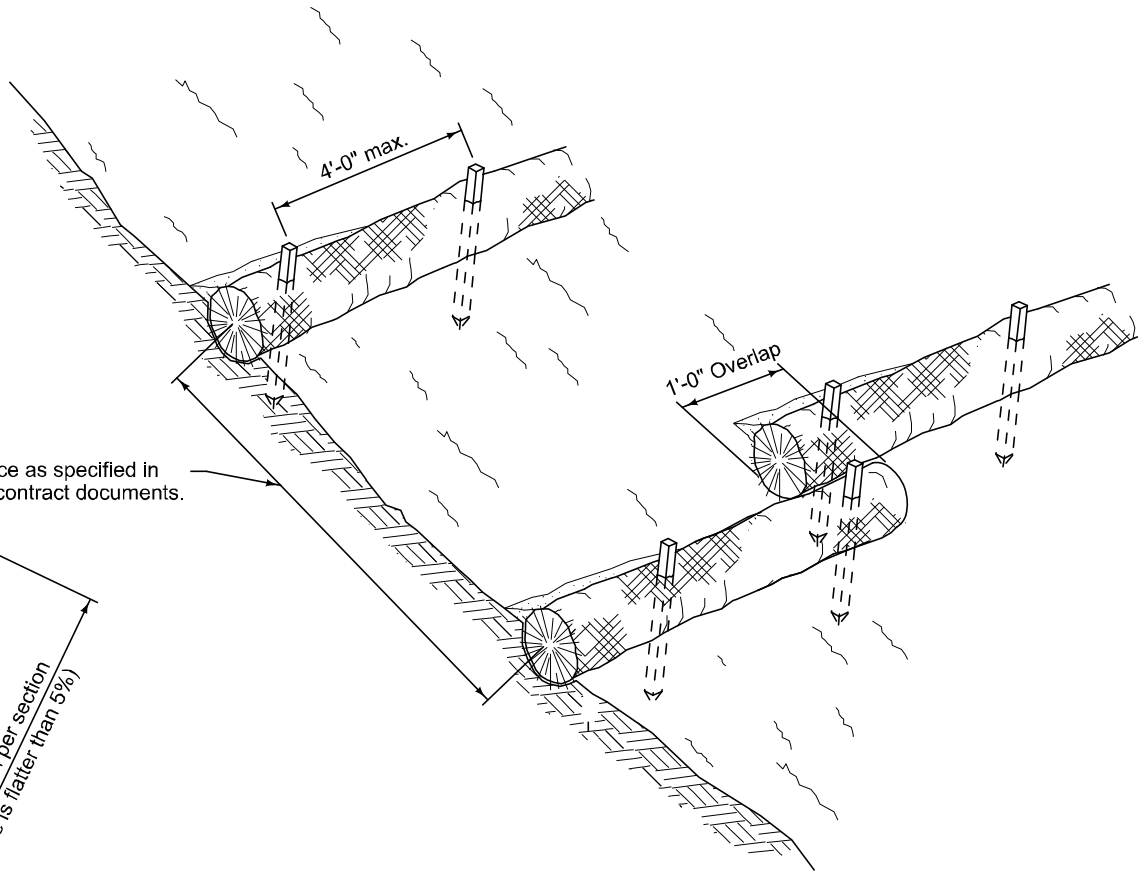
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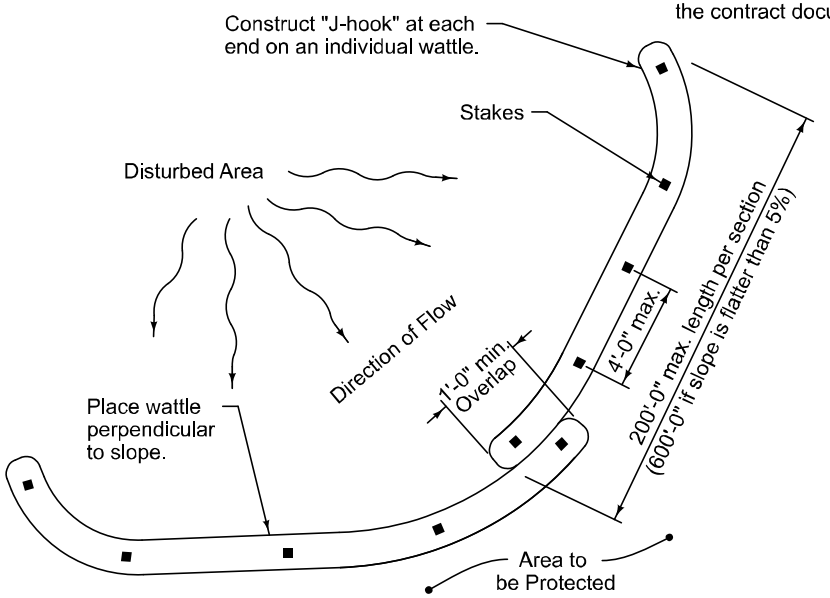
SHEET 1 of 1

SUDAS Standard Specifications

ROLLED EROSION CONTROL PRODUCT (RECP) INSTALLATION ON SLOPES







PLAN VIEW OF SLOPE
(for sediment and slope control)

FIGURE 9040.105 | SHEET 1 OF 1

SUDAS

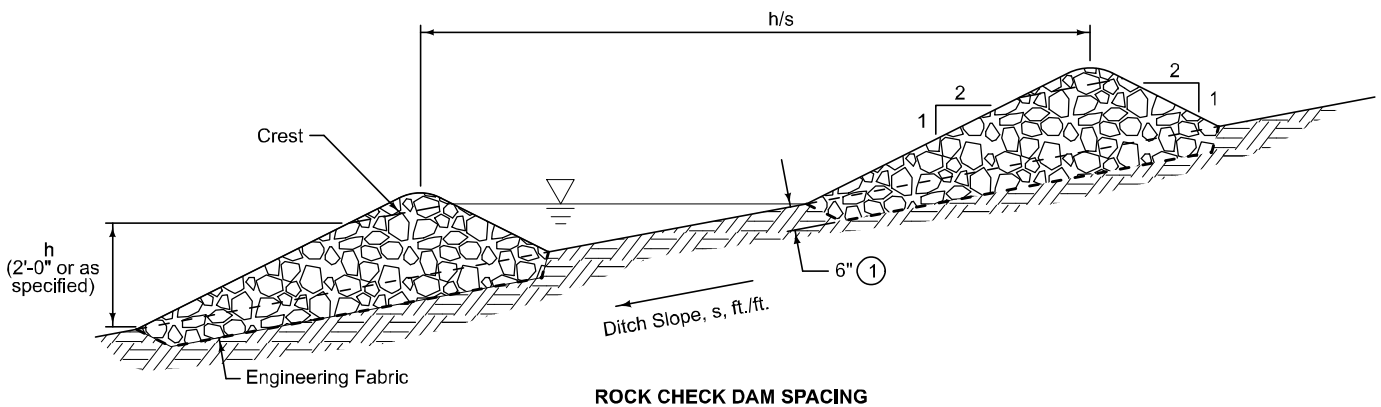
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SHEET 1 of 1

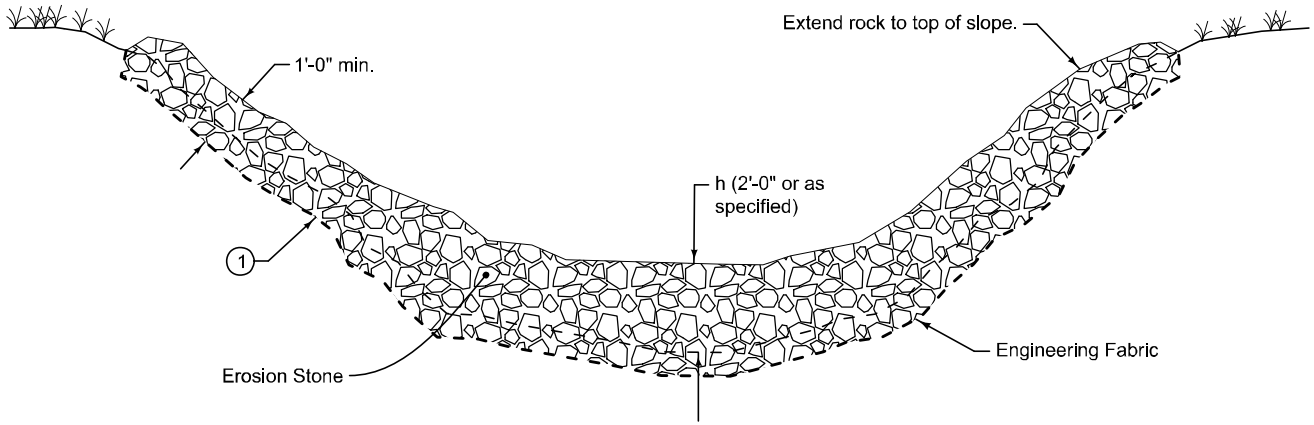
SUDAS Standard Specifications

WATTLE



ROCK CHECK DAM SPACING

(1) Key rock check dam into bottom and sides of the channel a minimum of 6 inches.



ROCK CHECK DAM SECTION

FIGURE 9040.107

SHEET 1 OF 1

SUDAS

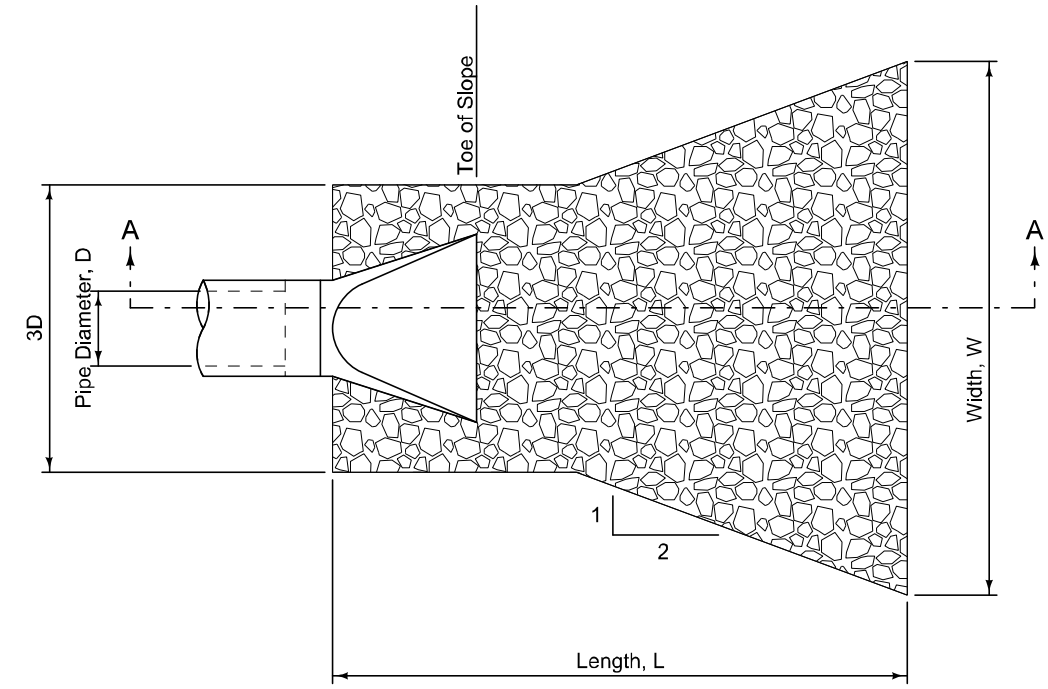
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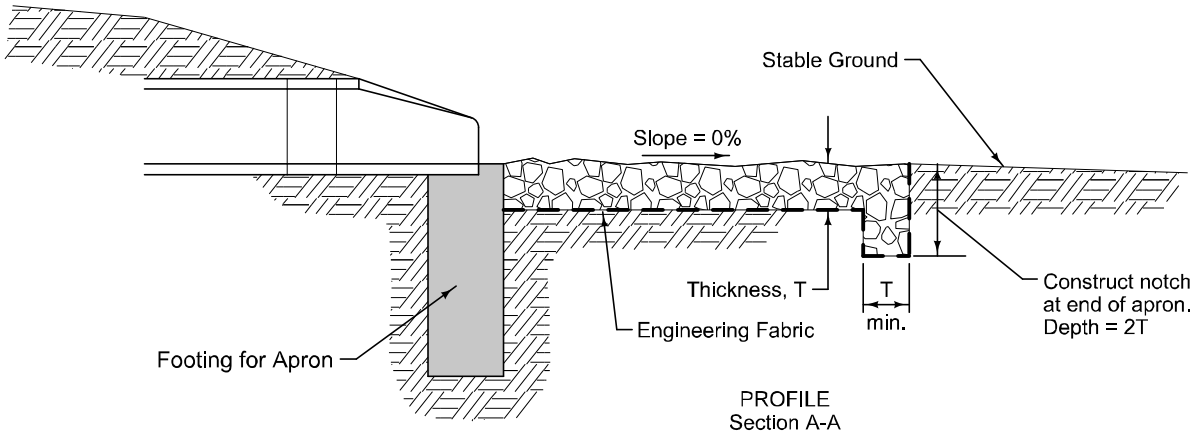
SHEET 1 of 1

SUDAS Standard Specifications

ROCK CHECK DAM



PLAN



PROFILE
Section A-A

FIGURE 9040.110 | SHEET 1 OF 1

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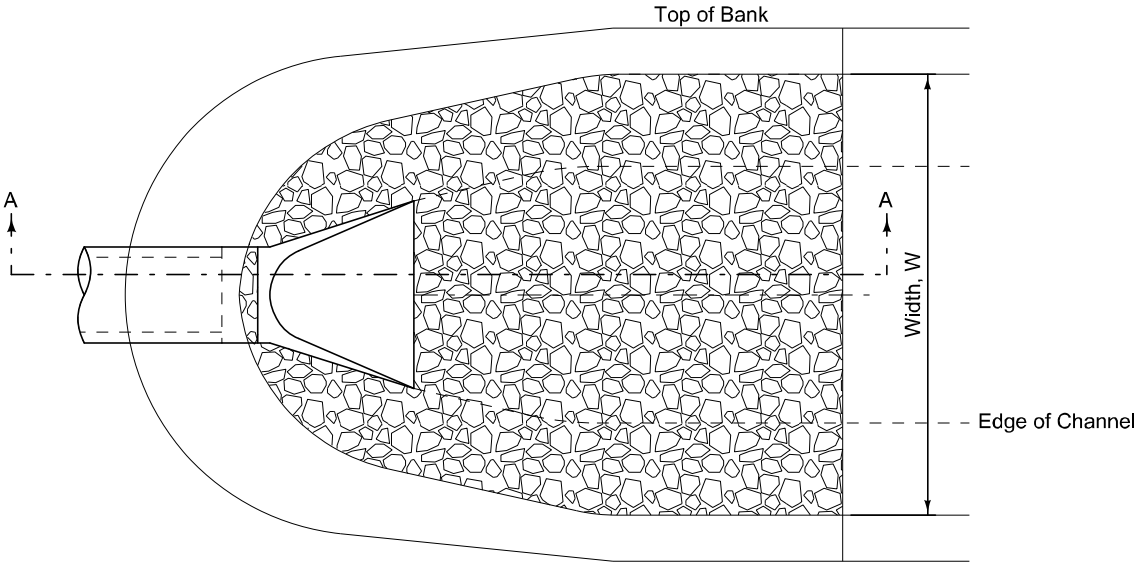
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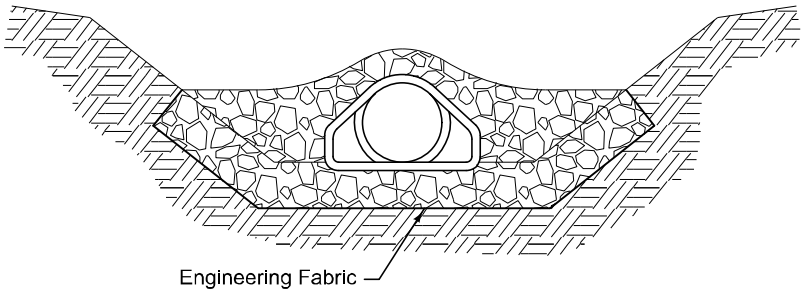
SHEET 1 of 1

SUDAS Standard Specifications

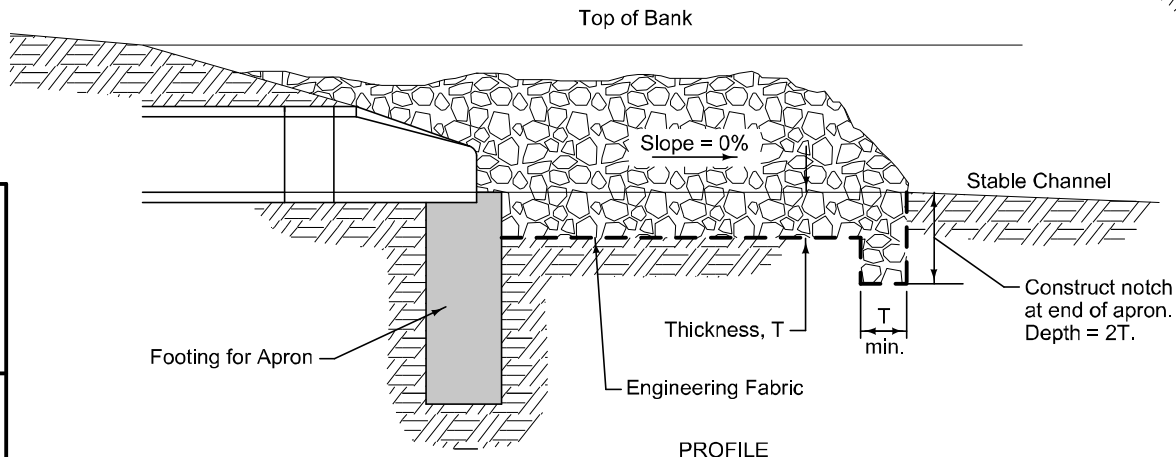
RIP RAP FOR PIPE OUTLET
ONTO FLAT GROUND



PLAN



CROSS-SECTION



PROFILE
Section A-A

FIGURE 9040.111

SHEET 1 OF 1

SUDAS

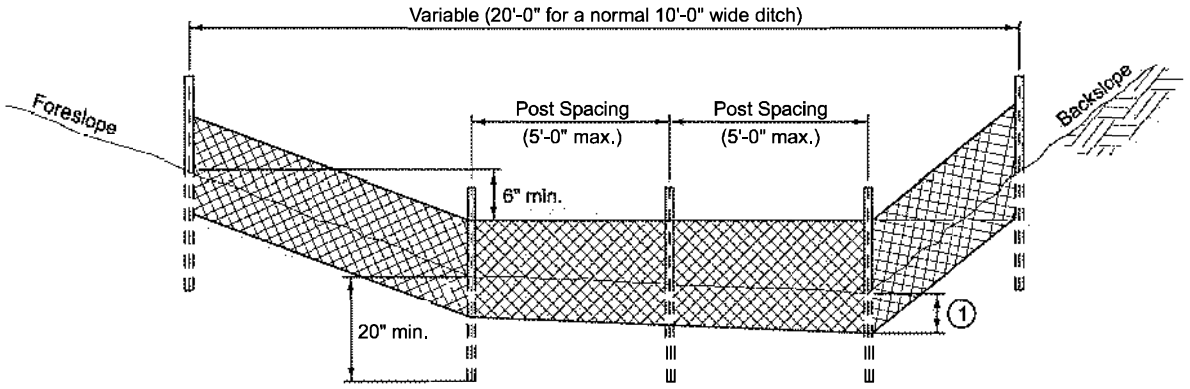
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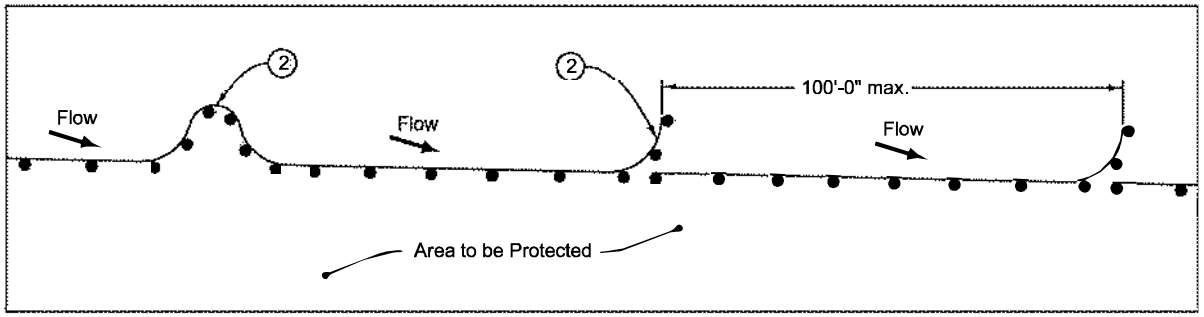
SHEET 1 of 1

SUDAS Standard Specifications

RIP RAP APRON FOR PIPE
OUTLET INTO CHANNEL



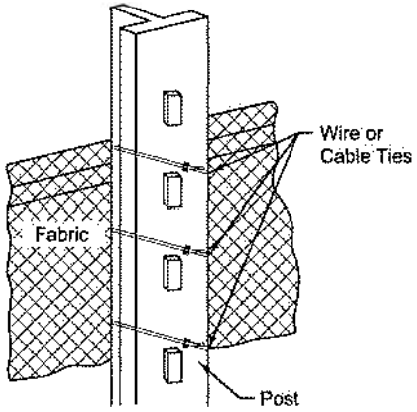
TYPICAL SILT FENCE DITCH CHECK



TYPICAL SILT FENCE INSTALLATION FOR PERIMITER CONTROL

1. Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).

2. Install silt fence for perimiter control with a maximum run length of 100 feet. At the downstream end of each run, turn the silt fence up the slope for 20 feet as shown to construct a 'J-Hook' to contain runoff. At the contractor's option, the silt fence may terminate and restart at the J-hook or may be installed continuously through the J-hook.



ATTACHMENT TO POST

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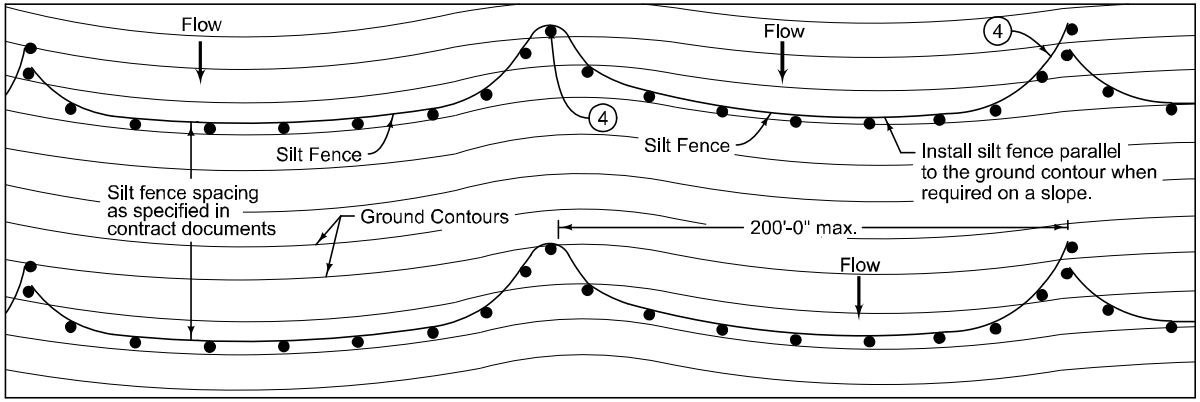
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SHEET 1 of 2

SUDAS Standard Specifications

SILT FENCE

SHEET 1 OF 2

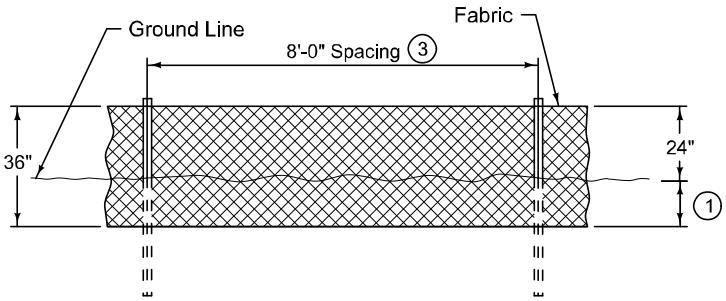


TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES
(Plan View)

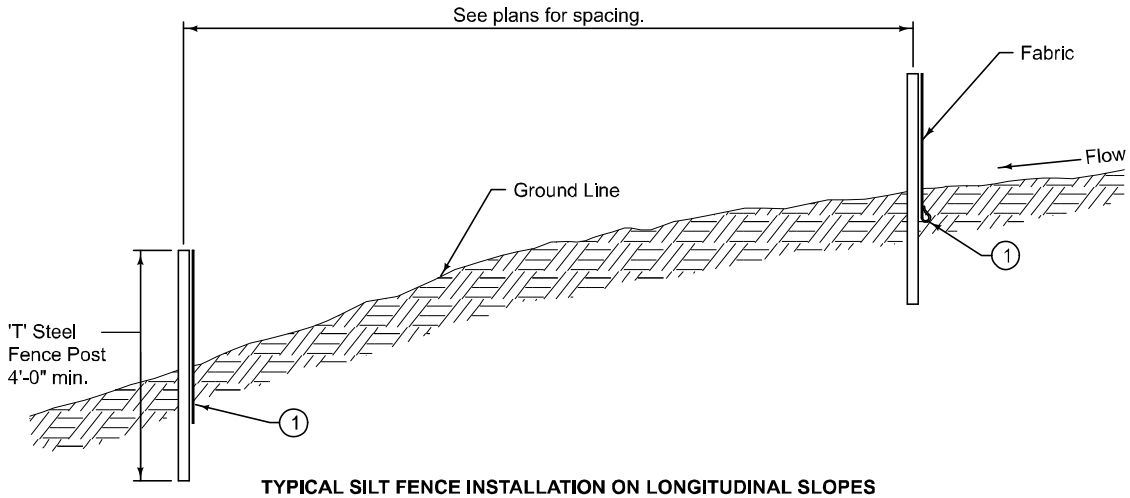
(1) Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).

(3) Reduce post spacing to 5 feet at water concentration areas, or as required to adequately support fence.

(4) Place silt fence continuously along a constant elevation for a maximum run of 200 feet. At the end of each run, construct a 'J-Hook' to contain runoff by turning the silt fence up the slope for a length of 20 feet as shown. At the contractor's option, the silt fence may terminate and restart at the J-hook or may be installed continuously through the J-hook.



DETAILS OF SILT FENCE ON LONGITUDINAL SLOPES



TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES
(Profile View)

FIGURE 9040.119 | SHEET 2 OF 2

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9040.119

SHEET 2 of 2

SUDAS Standard Specifications

SILT FENCE

CHAIN LINK FENCE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Chain Link Fence

B. Removal and Reinstallation of Existing Fence

C. Temporary Fence

1.02 DESCRIPTION OF WORK

A. Installation of chain link fence.

B. Removal and reinstallation of existing fences.

C. Installation and removal of temporary fence.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Materials and color samples for vinyl-coated fence fabric.

B. Upon request, submit certification that products supplied comply with identified specifications.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

Provide chain link fencing and gates as completed units, constructed by a single source, including necessary erection accessories, fittings, and fastenings.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Chain Link Fence:

1. **Residential:**
   - **a. Measurement:** Measurement will be in linear feet for each type and height of fence, measured along the bottom of the fence fabric, excluding the length of gates.
   - **b. Payment:** Payment will be at the unit price per linear foot for each type and height of fence installed.
   - **c. Includes:** Unit price includes, but is not limited to, posts, fabric, rails, fittings, ties, PVC coating (if specified in the contract documents), excavation of post holes, and concrete encasement of posts.

1.08 MEASUREMENT AND PAYMENT (Continued)

2. Commercial:

a. Measurement: Measurement will be in linear feet for each type and height of fence, measured along the bottom of the fence fabric, excluding the length of gates.

b. Payment: Payment will be at the unit price per linear foot for each type and height of fence installed.

c. Includes: Unit price includes, but is not limited to, posts, fabric, rails, braces, truss rods, ties, tension wire, tension bands, tension bars, grounds, fittings, PVC coating (if specified in the contract documents), excavation of post holes, and concrete encasement of posts.

B. Gates:

1. Measurement: Each type, height, and span of gate will be counted.

2. Payment: Payment will be at the unit price for each type, height, and span of gate.

3. Includes: Unit price includes, but is not limited to, gate rails, fabric, stretcher bars, braces, vertical stay, hinges, latches, keepers, drop bar lock, center gate stop, and barbed wire (if specified in the contract documents).

C. Barbed Wire:

1. Measurement: Measurement will be in linear feet for the length of fence to which barbed wire is applied, measured along the top of fence.

2. Payment: Payment will be at the unit price per linear foot of barbed wire.

3. Includes: Unit price includes, but is not limited to, furnishing and installing all necessary strands of barbed wire, anchors, and barbed wire supporting arms.

D. Removal and Reinstallation of Existing Fence:

1. Measurement: Measurement will be in linear feet for each type and size of fence removed and reinstalled, measured along the bottom of the fence fabric, including length of gates.

2. Payment: Payment will be at the unit price per linear foot for each size and type of fence removed and reinstalled.

3. Includes: Unit price includes, but is not limited to, removing vegetation; removing all fence fabric, appurtenances, posts, and gates; removal of concrete encasement from posts; storage of the removed fencing materials to prevent damage; reinstallation of the posts, gates, and fabric, including all appurtenances; and replacement of any fence parts that are not able to be salvaged and reinstalled. Replace items damaged from Contractor's operations with new materials, at no additional cost to the Contracting Authority.

E. Removal of Fence:

1. Measurement: Measurement will be in linear feet of fence removed, measured along the bottom of fence fabric, including length of gates.

2. Payment: Payment will be at the unit price per linear foot of fence removed.

3. Includes: Unit price includes, but is not limited to, off-site disposal of fence (including posts, concrete encasement of posts, gates, grounds, and barbed wire) and placing and compacting backfill material in post holes.

1.08 MEASUREMENT AND PAYMENT (Continued)

F. Temporary Fence:

1. **Measurement:** Measurement will be in linear feet for each type and height of temporary fence, measured along the bottom of the fence fabric, excluding the length of gates.

2. **Payment:** Payment will be at the unit price per linear foot for each type and height of temporary fence.

3. **Includes:** Unit price includes, but is not limited to, furnishing, installing, and removing posts, fabric, ties, and fittings.

PART 2 - PRODUCTS

2.01 FABRIC

A. General: Provide fence fabric manufactured from wire meeting the requirements of ASTM A 817. Use No. 9 gauge wire woven in a 2 inch mesh. Construct knuckled selvedge at the top and bottom of the fabric.

B. Zinc-coated Fabric: Comply with ASTM A 392.

1. Wire Coated Prior to Weaving: Use Type II, Class 5 zinc coating per ASTM A 817.

2. Fabric Coated After Weaving: Use Class 2 coating per ASTM A 392.

C Aluminum-coated Fabric: Meet the requirements of ASTM A 491. Coat wire prior to weaving fabric per ASTM A 817, Type I coating.

D. PVC-coated Fabric: Comply with ASTM F 668, Class 2b.

1. Apply PVC coating to zinc or aluminum-coated wire prior to weaving fabric.

2. PVC coating color as specified in the contract documents, complying with ASTM F 934.

2.02 POSTS, RAILS, AND BRACES

A. Standard weight (Schedule 40) pipe complying with ASTM F 1083.

1. Galvanize pipe inside and out.

2. Unless otherwise specified in the contract documents, provide the following nominal sizes for the respective uses:

Post Use	**Fence Height**		
	48” and under (nominal diameter)	48” to 96” (nominal diameter)	Greater than 96” (nominal diameter)
Line Post	2”	2 1/2"	3”
Terminal Post*	2 1/2"	3”	4”
Top/intermediate Rail Braces	1 1/4"	1 1/4"	1 1/4"
Gate Post	Refer to contract documents and ASTM F 900		
*Includes corner, angle, end, and pull posts.			

B. Pipe meeting the requirements of ASTM F 1043, Group 1A (Type A coating) or Group 1C (Type B coating). Use nominal sizes specified in ASTM F 1043.

C. When PVC-coated fence is specified in the contract documents, coat all posts, rails, and braces with a PVC-coated finish according to ASTM F 1043.

1. Zinc-coated post per ASTM F 1083 prior to application of PVC coating.

2. Color as specified in the contract documents, complying with ASTM F 934.

D. Ensure all posts, rails, and braces provided for a given section of fence have similar coatings and shapes.

E. Provide caps for all posts. Comply with ASTM F 626.

2.03 FITTINGS

A. Comply with ASTM F 626.

B. Provide attachments to connect braces to posts by fittings that will hold both post and brace rigidly.

C. Provide 3/8 inch diameter round steel diagonal tension rods with an appropriate commercial means for tightening. Provide a locknut or other device to hold the tightening device in place.

D. Provide a suitable sleeve or coupling device, recommended by the manufacturer, to connect sections of top rail and provide for expansion and contraction.

E. Use stretcher (tension) bars of the size specified in ASTM F 626 with suitable bands for attaching fabric to corner, end, or gate posts.

2.04 TIE WIRE AND TENSION WIRE

A. Tie Wire: Provide tie wires for chain link fence that are the size and type the manufacturer recommends, but no smaller than No. 9 diameter for post ties or No. 12 diameter for rail and brace ties. Comply with ASTM F 626.

B. Tension Wire: Comply with ASTM A 824, with Type I or Type II (Class 3) coating per ASTM A 817.

2.05 BARBED WIRE SUPPORTING ARMS

A. Comply with ASTM F 626 for type of arm configuration specified in the contract documents, as listed below:
   1. Type I: Single slanted arm for three barbed wire strands.
   2. Type II: Single vertical arm for three barbed wire strands.
   3. Type III: V-shaped arm for six barbed wire strands.
   4. Type IV: A-shaped arm for five barbed wire strands.

B. Anchor arms to line, end, corner, and pull posts

2.06 BARBED WIRE

Comply with ASTM A 121, design number 12-4-5-14R, Type A or Type Z (Class 3) coating.

2.07 GATES

A. Provide the type, height, and width of gates as specified in the contract documents.

B. Comply with ASTM F 900.

C. Provide coating on gate, gate posts, and fabric as required for adjacent fence.

2.08 CONCRETE

Provide concrete materials complying with Section 6010.

2.09 ELECTRICAL GROUND

A. Ground Rod: 5/8 inch diameter, 8 foot long copper-clad rod.

B. Ground Wire: No. 6 AWG bare copper wire.

PART 3 - EXECUTION

3.01 CHAIN LINK FENCE INSTALLATION

A. General: Comply with ASTM F 567, except as modified herein. Construct fence at the location and height specified in the contract documents.

B. Posts:

1. Post Location:
a. Place posts in the line of the fence with equal spacing not to exceed 10 feet on center.
b. Set terminal (end, corner, and gate) posts at the beginning and end of each continuous length of fence and at abrupt changes in vertical and horizontal alignments. Place pull posts so that no more than 300 linear feet of fence is constructed with only line posts.

2. Post Setting:
a. Dig or drill post holes to the dimensions specified in the contract documents.
b. Set posts in concrete. Ensure all posts are set plumb in a vertical position.
c. Form top of concrete footing so it extends 1 inch above grade and is sloped to direct water away from the post. To prevent frost heave, ensure footing is a uniform size to full depth without flare at the top of grade.
d. Install posts no less than 24 hours prior to installation of fabric.
e. Set terminal, corner, angle, pull, and gate posts with the required brace-post assembly as specified in the contract documents.

C. Rails:

1. Top Rail: Pass the top rail through the base of the line post caps to form a continuous brace from end to end of each stretch of fence. Join rail sections with sleeve, swedge end, or coupling device to allow for expansion and contraction. Securely fasten the top rail to the terminal posts with pressed steel connectors.

2. Intermediate Rail: Securely fasten the intermediate rail between all line posts and terminal posts with pressed steel fasteners. Intermediate rail is required only on fences 8 feet tall and taller.

D. Braces:

1. Securely fasten braces to the post by means of malleable iron or pressed steel connections; then truss from the line post back to the end, gate, or corner post.

2. Tighten the diagonal tension rod (truss rod) to produce proper tension.

E. Fabric:

1. Install fabric on the outside of the posts from the area being fenced or on the roadway side of the posts.

2. Secure one end of the fabric by a stretcher bar inserted in the final link of the fabric. Pull fabric taut with bottom selvedge, 2 inches above grade, before making attachment elsewhere.

3. Tighten and secure each end of each run of chain link fabric by a stretcher bar inserted in the final link of the fabric. Secure stretcher bar to the end post by tension bands equally spaced no more than 15 inches apart.

4. Attach fence fabric securely to the braces, top rail, tension wire, and all intermediate posts with wire ties or bands at intervals of no more than 12 inches.

3.01 CHAIN LINK FENCE INSTALLATION (Continued)

F. Bottom Tension Wire:

1. Install bottom tension wire on fence 5 feet high and taller.

2. Stretch bottom tension wire taut from terminal post to terminal post and securely fasten to each intermediate post within the bottom 6 inches of fabric.

G. Barbed Wire (When Specified):

1. Install 3 parallel wires on each barbed wire supporting arm on the outside of the area being secured, unless otherwise specified in the contract documents.

2. Pull wires taut, without kinks or twists, for tension.

H. Gates: Install gates as specified in the contract documents.

I. Electrical Grounds:

1. Install electrical grounds as specified in the contract documents at the following locations:
   a) Where a primary electrical transmission line (not a secondary feeder line for individual service) passes over the fence. Also install the ground on the fence at a distance of 25 to 50 feet in each direction from the crossing.
   b) Where the fence is adjacent to and within 50 feet of a primary electrical transmission line, install the ground at 500 foot maximum intervals.
   c) In at least one location on each applicable straight section of fence.

2. Drive ground rod vertically until the top is 6 inches below the ground surface.

3. Clamp ground wire to the rod and to the fence in such a manner that each element of the fence is grounded.

3.02 REMOVAL OF EXISTING FENCE

Remove all fences, including posts and footings, within work areas unless otherwise specified in the contract documents. Remove fence to first line post beyond construction limits. Replace items damaged from Contractor's operations with new materials, at no additional cost to the Contracting Authority.

3.03 TEMPORARY FENCE

A. Furnish and install chain link fence fabric, posts, ties, and other materials for the height specified in the contract documents.

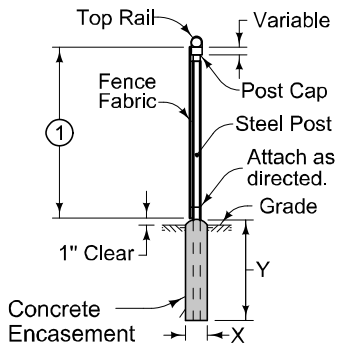
B. Install according to permanent fence installation specifications, with the following exceptions:

1. Drive posts into the ground. Do not set posts in concrete except at corner or temporary gate posts.

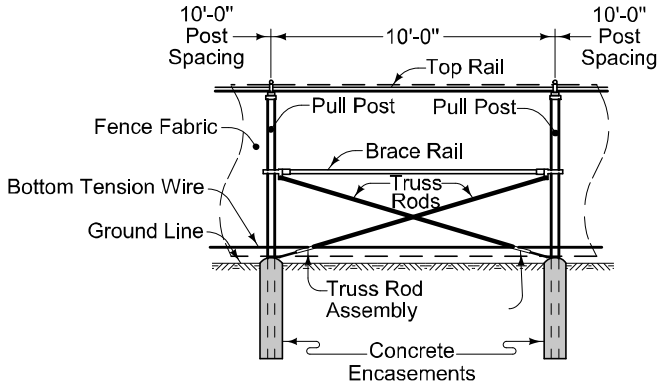
2. Top rail, tension wire, and bracing will not be required.

C. Remove temporary fence and materials when no longer necessary. Place suitable backfill material in post holes. Fence materials will remain the property of the Contractor and removed from the site.

END OF SECTION



POST INSTALLATION



PULL POST INSTALLATION

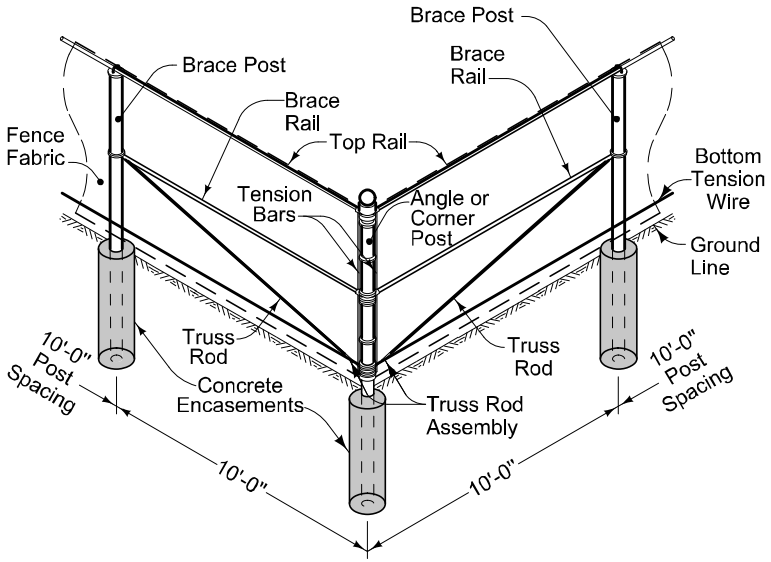
Place fence fabric on roadway side of post. For certain curves, stream crossings, or other locations, the Contractor has the option to place fabric on the side of the post away from the roadway.

Residential chain link fence does not include braces, truss rod assembly, tension wire, tension bar, tension band, or grounds

(1) Fabric width as specified in the contract documents.

(2) For fence heights greater than 8 feet, the depth of the fence post footing is 3 feet plus 3 inches for each 1 foot in height over 8 feet.

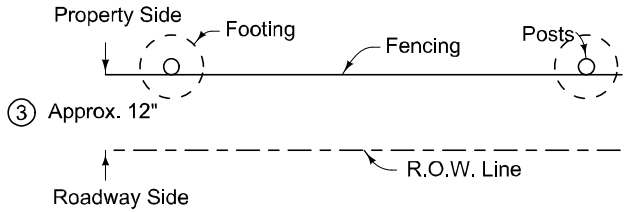
(3) Install the fence on the roadway side of the right-of-way when specified in the contract documents.



ANGLE OR CORNER POST INSTALLATION

FENCE POST FOOTING DEPTH AND DIAMETER

USE IN FENCE	FENCE HEIGHT					
	4'-0" and less		Over 4'-0" to 8'-0"		Over 8'-0"	
	X	Y	X	Y	X	Y
Line and Brace Posts	0'-8"	3'-0"	0'-10"	3'-0"	1'-0"	(2)
Terminal Post*	0'-10"	3'-0"	1'-0"	3'-0"	1'-4"	(2)
*Includes corner, angle, end, and pull posts.						



PLAN OF FENCE

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REVISION 1 2024

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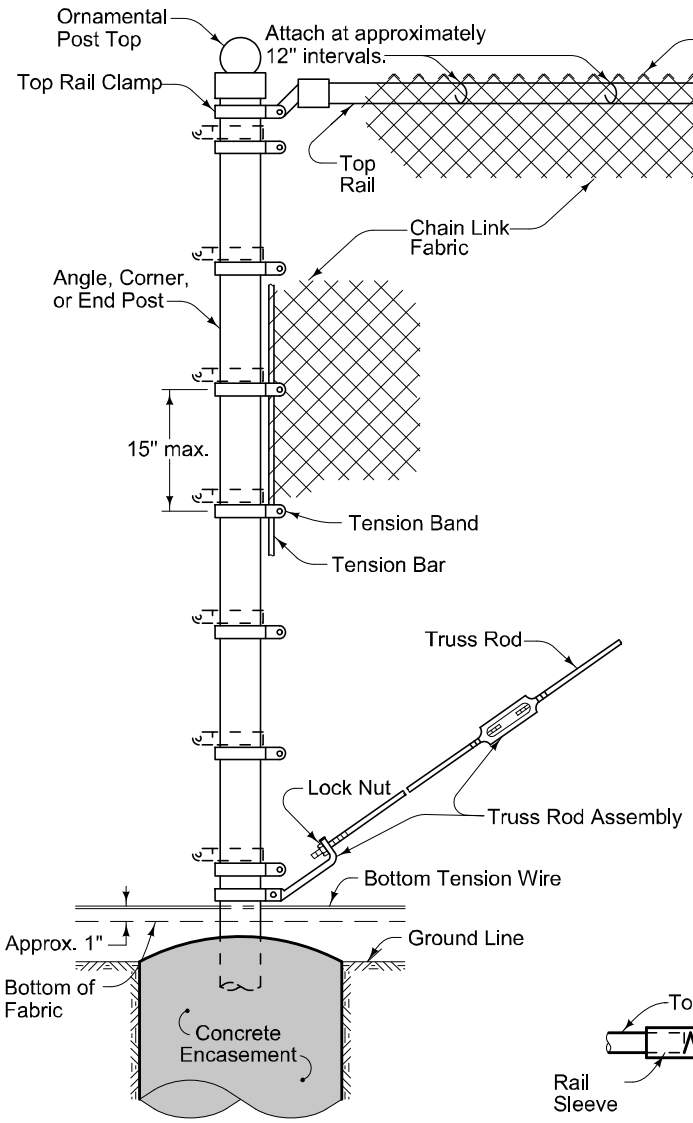
SHEET 1 of 2

SUDAS Standard Specifications

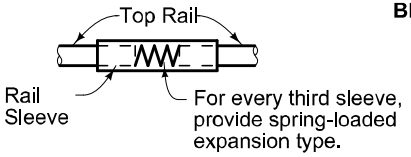
CHAIN LINK FENCE

FIGURE 9060.101

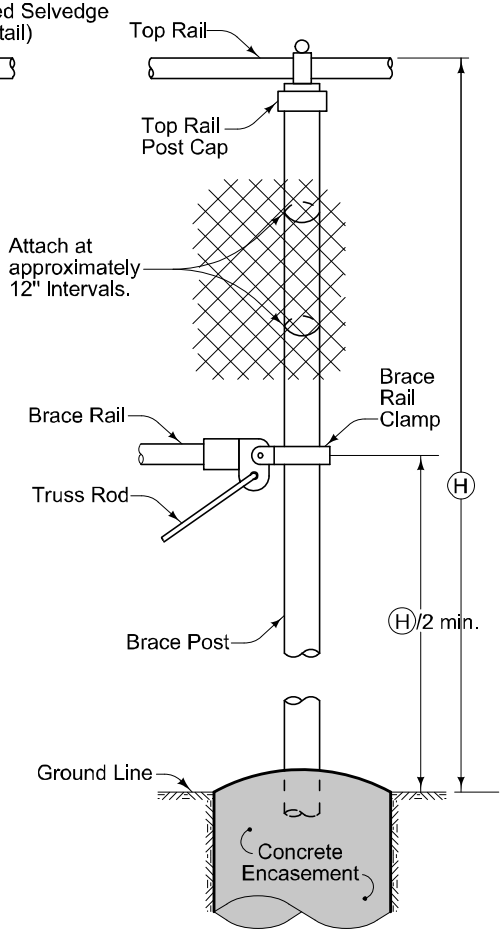
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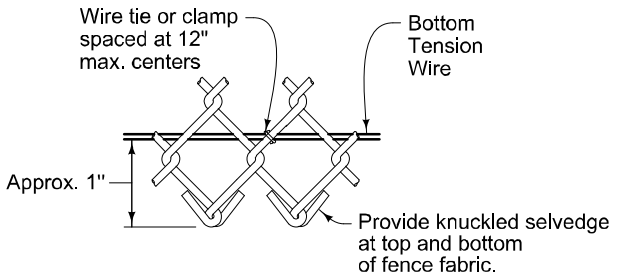
ANGLE, CORNER, OR END POST ASSEMBLY



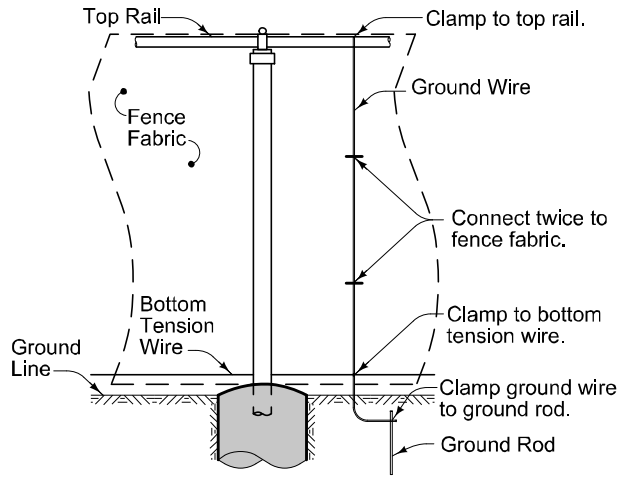
RAIL SLEEVE



BRACE POST ASSEMBLY



BOTTOM TENSION WIRE AND KNUCKLED SELVEDGE



GROUND ROD INSTALLATION

FIGURE 9060.101

SHEET 2 OF 2

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SUDAS Standard Specifications

CHAIN LINK FENCE

CONSTRUCTION SURVEY

PART 1 - GENERAL

1.01 SECTION INCLUDES

Construction survey includes personnel, equipment, and supplies required for, but not limited to, the following:

A. Construction Survey:

1. Project Control
2. Grading
3. Bridges, Structural Walls, and Reinforced Box Culverts
4. Pipe Culverts
5. Sanitary and Storm Sewers
6. Water Mains
7. Paving
8. Replacement of Disturbed Monuments
9. Additional Items Included in the Contract Documents

B. Monument Preservation and Replacement

1.02 DESCRIPTION OF WORK

Construction survey and staking necessary for construction of the project as shown in the contract documents.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants, as well as the following:

A. Documentation: Format the survey work documentation in a manner acceptable to the Engineer. Ensure documentation is sufficient to prove means and methods used to transfer design intent to construction stakes. Check tie-ins with existing roadways, structures, and utilities prior to staking; notify the Engineer if discrepancies are found.

1. Benchmarks: Submit descriptions and elevations of new permanent benchmarks. Establish benchmarks on existing durable fixtures not subject to frost action or disturbance.

2. Staking Records: Upon request, submit all field books, computer-aided design and drafting (CADD) files, digital log files, etc.

3. Monument Preservation and Replacement: If the contract documents include a bid item for monument preservation and replacement, submit copies of all documents developed for compliance with the requirements of Iowa Code Section 355 and Iowa Administrative Code 193C to the Engineer.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

A. Qualifications:

1. Perform construction survey directly by or under responsible charge of a Professional Engineer or Professional Land Surveyor licensed in the State of Iowa.

2. Reset disturbed monuments with new monuments under the responsible charge of a Professional Land Surveyor licensed in the state of Iowa.

B. Obtain Engineer's approval when interpolating grades or using cross-sections to obtain alignments and elevations.

C. The Jurisdiction will provide benchmarks, right-of-way corners, and primary control points from the original survey in the contract documents. Roadway alignment data will be provided as required for construction.

D. If the contract documents do not include a bid item for monument preservation and replacement, the Contracting Authority will be responsible for replacing disturbed monuments located within the project area and not noted for protection.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Construction Survey: If the contract documents specify that the Contractor is responsible for construction survey, measurement and payment will be as follows.

1. Measurement: Lump sum item; no measurement will be made.

2. Payment: Payment will be at the lump sum price for construction survey.

3. Includes: Lump sum price includes, but is not limited to, the costs of resetting project control points, re-staking, and any additional staking requested beyond the requirements of this section.

1.08 MEASUREMENT AND PAYMENT (Continued)

B. Monument Preservation and Replacement: If the contract documents specify the Contractor is responsible for replacing monuments, measurement and payment will be as follows.

1. Measurement: Lump sum item; no measurement will be made.

2. Payment: Payment will be at the lump sum price for replacement of disturbed monuments.

3. Includes: Lump sum price includes, but is not limited to, property research and documentation, locating monuments prior to construction, replacement of disturbed monuments, and preparation and filing of the monument preservation certificate.

PART 2 - PRODUCTS

2.01 HUBS

Provide hardwood, metal, or plastic stakes of sufficient size and length to prevent stake movement due to adjacent construction activity.

2.02 LATH

Provide wood lath that is approximately 3/8 inch thick by 1 1/2 inches wide by 48 inches long.

PART 3 - EXECUTION

3.01 EQUIPMENT

A. Utilize survey equipment with a level of accuracy appropriate for the type of work being staked.

B. Do not use GPS equipment for staking the vertical elements of paving hubs, bridges, structural walls, or reinforced box culverts.

3.02 PROJECT CONTROL

Provide all horizontal and vertical control data to the Jurisdiction at the completion of each phase of the construction survey work activity.

A. Primary Monuments: Primary survey monuments are established by the Jurisdiction prior to project construction.

1. Replace primary monuments disturbed by construction.

2. Reference a minimum of three ties to durable objects (trees, fence posts, station marks, etc.) in the description of the new monument.

B. Secondary Monuments: Secondary control points are established by the Contractor or Contractor's Surveyor during construction to facilitate staking or instrument calibration.

1. Place in locations likely to survive construction.

2. Reference to the primary monuments with a resulting error radius not to exceed 0.10 feet.

3. Replace any points disturbed during construction. Points do not need to be replaced after construction.

C. Benchmarks: Utilize the benchmarks shown in the contract documents to establish all other vertical control on the project site.

1. Establish new permanent vertical control benchmarks on new structures (bridges, reinforced box culverts), fire hydrants, or power poles located in the project limits.

2. Identify permanent benchmarks.

3. Transfer elevations from construction plan benchmarks to new permanent benchmarks using a digital level or a three-wire leveling method.

4. Record descriptions and elevations of new permanent benchmarks.

D. Property Limits: If specified, mark all construction easements, permanent easements, and rights-of-way with flagged lath at 100 feet intervals on tangents; at the PC and PT of curves; at 25 feet intervals on curves; and at all angle points.

3.03 CONSTRUCTION STAKING

For each construction operation specified in the contract documents, provide stakes as follows. If approved by the Engineer, staking frequency may be modified as long as the level of accuracy appropriate for the type of work is achieved.

A. Grading:

1. Conventional Grading:

a. Set slope stakes left and right (nails or wood hubs) at 100 foot intervals, or less if needed, for all embankment or roadway excavation. Mark slope stakes with wooden lath depicting station, offset, and elevation reference (cut or fill) to all pertinent breaks in the slope.

b. In lieu of slope stakes, set a 100 foot grid with lath over project limits for mass grading with cut or fill marked for finished grade elevation. Finished grade refers to the finished surface of construction (top of paving for paved areas, top of black dirt for unpaved areas).

c. For paved areas, in addition to the 100 foot grid, set lath at appropriate offsets around the perimeter at 50 foot intervals, high and low points, and points of inflection. Mark lath with cut or fill to finished grade (top of paving).

d. For building pads, set lath at appropriate offsets for building corners or gridlines. Provide a semi-permanent benchmark, consisting of a 2 foot wooden hub or rebar, set to the same elevation as the proposed finished floor elevation.

e. Set finished grade stakes (blue tops) at 100 foot intervals at both edges of paving and along centerline for roadways, and in a 100 foot grid in parking areas. Mark blue tops with a stake chaser or similar method.

2. GPS Machine-Controlled Grading:

a. Establish GPS control points consisting of a minimum of 5 semi-permanent points located around the perimeter of the site. Points may be established horizontally using GPS, but transfer elevations of said points from an original benchmark located in the construction documents using a total station or level.

b. Provide grade check stakes at an approximate spacing of 300 feet on roadways.

c. Provide approximately 20 grade control check stakes for building pad and parking areas.

B. Bridges, Structural Walls, and Reinforced Concrete Box Culverts:

1. Provide appropriate offsets for centerline of abutments, piers, back of parapets, face of walls, etc.

2. Provide stakes consisting of a tacked wooden hub with a lath. Clearly mark offset distance and referenced line identification: centerline roadway, abutment, pier, etc.

3. Clearly mark height of cut or fill to a pre-determined elevation reference: flowline, top of wall, top of footing, etc. For structural walls, provide elevation reference to either top of wall or top of footing. Do not reference off of bottom of wall.

4. Set a minimum of two semi-permanent benchmarks, consisting of a 2 foot wooden hub or rebar, for each structure. Transfer elevation to benchmarks from construction plan benchmarks using a total station or level.

3.03 CONSTRUCTION STAKING (Continued)

5. Perform an independent check of all the above stakes. Independent check can be performed by an independent survey crew or by arbitrary verification of the location of the stakes as placed in the field.
   a. For an arbitrary verification, survey stakes and control points in an arbitrary coordinate system and then rotate digitally into the design file to verify accuracy with the contract documents.
   b. Notify Contractor of any discrepancies within 24 hours of placing the stakes for each structure.

C. Pipe Culverts:

1. Place stakes for offsets to ends of pipe, labeled with offset distance, and cut or fill to proposed flowline of the new culvert.

2. Place stakes for all bends in the pipe alignment. Provide two offset stakes, one along each pipe segment bearing, at bends to accurately place bend location.

3. For culverts over 100 feet in length, set offset stakes 50 feet and 100 feet from end of pipe and every 100 feet thereafter. Label stakes with offset distance and elevation reference to the flowline of the proposed pipe.

D. Sanitary and Storm Sewers:

1. Place stakes for all manholes, intakes, cleanouts, and other structures associated with new sewer.

2. Provide offset stake for each structure set at 10 to 15 feet. Offset may be increased for deep sewers.

3. For back of curb intakes, set two offset stakes along the curb alignment to properly align the new grate. Stakes may also be offset perpendicular to the curb alignment as required to avoid conflicts with the proposed storm sewer.

4. Place stakes for all bends in the pipe alignment. Provide two offset stakes, one along each pipe segment bearing, at bends to accurately place bend location.

5. For pipe sections over 100 feet in length, set offset stakes 50 feet and 100 feet from end of pipe and every 100 feet thereafter. Label stakes with offset distance and elevation reference to the flowline of the proposed pipe.

E. Water Mains:

1. Place stakes for proposed water main on line (no offset) at 100 foot intervals. Label stakes as centerline of water main with elevation reference to the top of the proposed pipe to ensure sufficient depth is achieved.

2. Place stakes for all hydrants, valves, bends, tees, and other appurtenances with appropriate offsets. Label stakes with offset distance and elevation reference to proposed finished grade adjacent to the hydrant, valve, bend, tee, or other appurtenance.

3. Place stakes at all crossings of storm sewers and sanitary sewers. Label stakes with top of pipe elevations at the crossing for water mains and sewer mains to ensure proper depth and vertical separation.

3.03 CONSTRUCTION STAKING (Continued)

F. Paving:

1. Conventional Paving:

a. Set paving hubs at appropriate offsets around perimeter of paved areas. Place hubs at grade breaks (high and low points), points of horizontal deflection (bends), and 25 foot intervals in between. Label stakes with offset distance and elevation reference to the top of paving.

b. For paving areas wider than 60 feet, set paving hubs at appropriate offsets on 25 foot intervals along interior bays or drive lanes. Label stakes with offset distance and elevation reference to the top of paving.

c. Place stakes for curb drop locations for sidewalk ramps and driveways. Set hubs on both sides of the drop curb at the bottom of the drop to ensure the appropriate width of curb opening is achieved. Label stakes with offset distance and elevation reference to top of paving.

d. Place stakes for sidewalks and trails on one side only at appropriate offsets. Place stakes at 50 foot intervals in straight and level sections and 25 foot intervals for horizontal or vertical curves. Label stakes with offset distance and elevation reference to the top of paving.

2. Stringless Paving:

a. When stringless paving is used, set additional control points on each side of the pavement, as necessary, to meet the manufacturer's requirements for the equipment used. Furnish x, y, and z coordinates and station offset information for each point. Points may be established horizontally using GPS, but transfer elevations of said points from an original benchmark located in the construction documents using a total station or level.

b. Provide grade check paving hubs at appropriate offsets around the perimeter of the paved areas. Location and elevation of the finished slab should be verified against grade check hubs at 25 foot intervals for the first 100 feet of each days run and at critical locations, such as intakes and through intersections where grades may be flat. The Engineer may waive these requirements if experience has shown compliance with the design elevations.

c. Place stakes for curb drop locations for sidewalk ramps and driveways. Set hubs on both sides of the drop curb at the bottom of the drop to ensure the appropriate width of curb opening is achieved. Label stakes with offset distance and elevation reference to top of paving.

d. Provide grade check stakes for sidewalks and shared use paths at appropriate offset on one side only. Provide grade check stakes for sidewalks and shared use paths at a maximum interval spacing of 100 feet.

3.04 MONUMENT PRESERVATION AND REPLACEMENT

Comply with the requirements of Iowa Code Section 355 and the Iowa Administrative Code Section 193C for the replacement of all disturbed monuments within the project area.

END OF SECTION

MOBILIZATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

Project Mobilization

1.02 DESCRIPTION OF WORK

Mobilization includes preparatory work, operations performed, or costs incurred prior to beginning work on the various items on the project site.

1.03 SUBMITTALS

Comply with Division 1 - General Provisions and Covenants.

1.04 SUBSTITUTIONS

Comply with Division 1 - General Provisions and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Comply with Division 1 - General Provisions and Covenants.

1.06 SCHEDULING AND CONFLICTS

Comply with Division 1 - General Provisions and Covenants.

1.07 SPECIAL REQUIREMENTS

A. When a bid item for mobilization is included on the proposal form, comply with this section for measurement and payment.

B. When the proposal form does not include a bid item for mobilization, all costs incurred by the contractor for mobilization are incidental to other work and no separate payment will be made.

1.08 MEASUREMENT AND PAYMENT (NOT USED)

A. Mobilization:

1. Measurement: Lump sum item; no measurement will be made.

2. Payment:
a. When 5% of the original contract amount has been completed, 25% of the contract price for mobilization will be paid.
b. When 10% of the original contract amount has been completed, 50% of the contract price for mobilization will be paid.
c. When 50% of the original contract amount has been completed, 100% of the contract price for mobilization will be paid.

3. Includes: The unit price for mobilization may include the following.
a. The movement of personnel, equipment, and supplies to the project site.
b. The establishment of offices, buildings, and other facilities necessary for the project.
c. Bonding, permits, or other expenses incurred prior to construction.

PART 2 - PRODUCTS

None.

PART 3 - EXECUTION

None.

END OF SECTION

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SECTION 260533

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SCOPE

A. PERFORM ALL WORK REQUIRED TO PROVIDE AND INSTALL THE FOLLOWING CONDUITS, SURFACE RACEWAYS, MULTI-OUTLET ASSEMBLIES, AUXILIARY GUTTERS, WALL DUCT, AND BOXES FOR ELECTRICAL SYSTEMS INCLUDING WALL AND CEILING OUTLET BOXES, FLOOR BOXES, AND JUNCTION BOXES.

1.2 REFERENCES

A. APPLICABLE PROVISIONS OF DIVISION 1 GOVERN WORK UNDER THIS SECTION.

PART 2 - PRODUCTS

2.1 RIGID NONMETALLIC CONDUIT AND FITTINGS

A. CONDUIT: SCHEDULE 40 PVC MINIMUM, LISTED, SUNLIGHT RESISTANT, RATED FOR 90° C CONDUCTORS.

B. FITTINGS AND CONDUIT BODIES: NEMA TC 2, LISTED.

2.2 HIGH DENSITY POLYETHYLENE

A. MINIMUM SIZE: TWO (2) INCH, UNLESS NOTED OTHERWISE

B. ACCEPTABLE MANUFACTURERS

1. CARLON

2. CHEVRON PHILLIPS CHEMICAL COMPANY

3. APPROVED EQUAL

C. MATERIALS USED FOR THE MANUFACTURE OF POLYETHYLENE PIPE AND FITTINGS SHALL BE EXTRA HIGH MOLECULAR WEIGHT, HIGH-DENSITY POLYETHYLENE RESIN. THE MATERIAL SHALL BE LISTED BY PPI (PLASTIC PIPE INSTITUTE).

D. THE PIPE SHALL CONTAIN NO RECYCLED COMPOUND EXCEPT THAT GENERATED IN THE MANUFACTURER'S OWN PLANT FROM RESIN OF THE SAME RAW MATERIAL, INCLUDING BOTH THE BASE RESIN AND COEXTRUDED RESIN. THE PIPE SHALL BE HOMOGENEOUS THROUGHOUT AND FREE OF VISIBLE CRACKS, HOLES, VOIDS, FOREIGN INCLUSIONS, OR OTHER DEFECTS THAT MAY AFFECT THE WALL INTEGRITY.

2.3 HDPE FITTINGS AND CONDUIT BODIES:

A. DIRECTIONAL BORE AND PLOW TYPE INSTALLATION: ELECTROFUSION OR UNIVERSAL ALUMINUM THREADED COUPLINGS. TENSILE STRENGTH OF COUPLED PIPE MUST BE GREATER THAN 2,000 LBS.

B. FOR ALL OTHER TYPE OF INSTALLATION: COUPLER MUST PROVIDE A WATERTIGHT CONNECTION. THE TENSILE STRENGTH OF COUPLED PIPE MUST BE GREATER THAN 1,000 LBS.

C. E-LOC TYPE COUPLINGS ARE NOT ACCEPTABLE IN ANY SITUATIONS.

2.4 PULL AND JUNCTION BOXES

A. PULL BOXES AND JUNCTION BOXES SHALL BE MINIMUM 4 INCH SQUARE BY 2 1/8TH INCHES DEEP FOR USE WITH 1 INCH CONDUIT AND SMALLER. ON CONDUIT SYSTEMS USING 1 1/4 INCH CONDUIT OR LARGER, PULL AND JUNCTION BOXES SHALL BE SIZED PER NEC BUT NOT LESS THAN 4 11/16 INCH SQUARE.

B. FOR TELECOMMUNICATION, FIBER OPTIC, SECURITY, AND OTHER LOW VOLTAGE CABLE INSTALLATIONS THE NEC BOX SIZE REQUIREMENTS SHALL APPLY. ALL BOXES, USED ON TELECOMMUNICATION, SECURITY, OTHER LOW VOLTAGE AND FIBER OPTIC SYSTEMS WITH CONDUITS OF 1 1/4" AND LARGER, SHALL BE SIZED PER THE NEC CONDUIT REQUIREMENTS. FOR DETERMINING BOX SIZE, THE CONDUIT IS THE DETERMINING FACTOR NOT THE WIRE SIZE.

C. SHEET METAL BOXES: CODE GAUGE GALVANIZED STEEL, SCREW COVERS, FLANGED AND SPOT WELDED JOINTS AND CORNERS.

D. SHEET METAL BOXES LARGER THAN TWENTY-FOUR (24) INCHES IN ANY DIMENSION SHALL HAVE A HINGED COVER OR A CHAIN INSTALLED BETWEEN BOX AND COVER.

E. CAST METAL BOXES FOR OUTDOOR AND WET LOCATION INSTALLATIONS: TYPE 4 AND TYPE 6, FLAT-FLANGED, SURFACE-MOUNTED JUNCTION BOX, UL LISTED AS RAINTIGHT. GALVANIZED CAST IRON OR ALUMINUM BOX AND COVER WITH GROUND FLANGE, NEOPRENE GASKET, AND STAINLESS STEEL COVER SCREWS.

F. FIBERGLASS OR CONCRETE HANDHOLES:

1. WITH WEATHERPROOF COVER OF NON-SKID FINISH SHALL BE USED FOR UNDERGROUND INSTALLATIONS.

2. SIZE, TYPE, WEIGHT RATING, AND LABELING SHALL BE AS NOTED ON THE DRAWINGS.

G. THE USE OF BOX EXTENSION RINGS IS DISCOURAGED. IF THEY MUST BE USED ONLY ONE RING PER BOX IS ALLOWED AND WIRING MUST EXTEND A MINIMUM OF 6" BEYOND THE FRONT EDGE OF THE EXTENSION RING.

2.5 GENERAL

A. ALL STEEL FITTINGS AND CONDUIT BODIES SHALL BE GALVANIZED.

B. NO CAST METAL OR SPLIT-GLAND TYPE FITTINGS PERMITTED.

C. MOGUL-TYPE CONDULETS LARGER THAN TWO INCHES (2") NOT PERMITTED EXCEPT AS APPROVED OR DETAILED.

D. ALL CONDULET COVERS MUST BE FASTENED TO THE CONDULET BODY WITH SCREWS AND BE OF THE SAME MANUFACTURE.

E. WIREWAYS, GUTTERS AND C-CONDULETS SHALL NOT BE USED IN LIEU OF PULL BOXES AND CONDULETS.

F. ALL BOXES SHALL BE OF SUFFICIENT SIZE TO PROVIDE FREE SPACE FOR ALL CONDUCTORS ENCLOSED IN THE BOX AND SHALL COMPLY WITH NEC REQUIREMENTS.

PART 3 - EXECUTION

3.1 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

A. SIZE POWER CONDUCTOR RACEWAYS FOR CONDUCTOR TYPE INSTALLED. CONDUIT SIZE SHALL BE 1/2 INCH MINIMUM EXCEPT ALL HOMERUN CONDUITS SHALL BE 3/4", OR AS SPECIFIED ELSEWHERE. CAUTION: PER THE NEC, THE ALLOWABLE CONDUCTOR AMPACITY IS REDUCED WHEN MORE THAN THREE (3) CURRENT-CARRYING CONDUCTORS ARE INSTALLED IN A RACEWAY. CONTRACTOR MUST TAKE THE NEC AMPACITY ADJUSTMENT FACTORS INTO ACCOUNT WHEN SIZING THE RACEWAY AND WIRING SYSTEM.

B. SIZE CONDUIT FOR ALL OTHER WIRING, INCLUDING BUT NOT LIMITED TO DATA, CONTROL, SECURITY, FIRE ALARM, TELECOMMUNICATIONS, SIGNAL, VIDEO, ETC. SHALL BE SIZED PER NUMBER OF CONDUCTORS PULLED AND THEIR CROSS-SECTION. 40% FILL SHALL BE MAXIMUM FOR ALL NEW CONDUIT FILLS.

C. GROUP CONDUIT IN PARALLEL RUNS WHERE PRACTICAL AND USE CONDUIT RACK (LAY-IN ADJUSTABLE HANGERS) CONSTRUCTED OF STEEL CHANNEL WITH CONDUIT STRAPS OR CLAMPS. PROVIDE SPACE FOR 25 PERCENT ADDITIONAL CONDUIT.

D. DO NOT FASTEN CONDUIT WITH WIRE OR PERFORATED PIPE STRAPS. BEFORE CONDUCTORS ARE PULLED, REMOVE ALL WIRE USED FOR TEMPORARY CONDUIT SUPPORT DURING CONSTRUCTION.

E. SUPPORT AND FASTEN METAL CONDUIT AT A MAXIMUM OF EIGHT (8) FEET ON CENTER.

F. SUPPORTS SHALL BE INDEPENDENT OF THE INSTALLATIONS OF OTHER TRADES, E.G. CEILING SUPPORT WIRES, HVAC PIPES, OTHER CONDUITS, ETC., UNLESS SO APPROVED OR DETAILED.

G. IN GENERAL, ALL CONDUITS SHALL BE CONCEALED EXCEPT WHERE NOTED ON THE DRAWINGS OR APPROVED BY THE ARCHITECT/ENGINEER. CONTRACTOR

SHALL VERIFY WITH ARCHITECT/ENGINEER ALL SURFACE CONDUIT INSTALLATIONS EXCEPT IN MECHANICAL, ELECTRICAL OR UTILITY ROOMS THAT ARE NOT OCCUPIED SPACES.

H. CHANGES IN DIRECTION SHALL BE MADE WITH SYMMETRICAL BENDS, CAST STEEL BOXES, STAMPED METAL BOXES OR CAST STEEL CONDUIT BODIES.

I. FOR INDOOR CONDUITS, NO CONTINUOUS CONDUIT RUN SHALL EXCEED 100 FEET WITHOUT A JUNCTION BOX.

3.2 CONDUIT INSTALLATION

A. GROUND AND BOND CONDUIT.

B. CUT CONDUIT SQUARE; DE-BURR CUT ENDS.

C. CONDUIT SHALL NOT BE FASTENED TO THE CORRUGATED METAL ROOF DECK. MAINTAIN A MINIMUM SIX (6) INCH SEPARATION FROM THE ROOF DECK TO CONDUITS.

D. BRING CONDUIT TO THE SHOULDER OF FITTINGS AND COUPLINGS AND FASTEN SECURELY.

E. USE CONDUIT HUBS FOR FASTENING CONDUIT TO CAST BOXES. USE SEALING LOCKNUTS OR CONDUIT HUBS FOR FASTENING CONDUIT TO SHEET METAL BOXES IN DAMP OR WET LOCATIONS.

F. ALL CONDUIT TERMINATIONS (EXCEPT FOR TERMINATIONS INTO CONDUIT BODIES) SHALL USE CONDUIT HUBS, OR CONNECTORS WITH ONE (1) LOCKNUT, OR SHALL USE DOUBLE LOCKNUTS (ONE (1) EACH SIDE OF BOX WALL) AND INSULATED BUSHING. PROVIDE BUSHINGS FOR THE ENDS OF ALL CONDUIT NOT TERMINATED IN BOX WALLS. REFER TO SECTION 260526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS FOR GROUNDING BUSHING REQUIREMENTS.

G. INSTALL NO MORE THAN THE EQUIVALENT OF FOUR (4) 90 DEGREE BENDS BETWEEN BOXES.

H. USE HYDRAULIC ONE (1)-SHOT CONDUIT BENDER OR FACTORY ELBOWS FOR BENDS IN CONDUIT LARGER THAN TWO (2) INCH SIZE UNLESS SWEEP ELBOWS ARE REQUIRED.

I. CONDUIT SHALL BE BENT ACCORDING TO MANUFACTURERS' RECOMMENDATIONS. TORCHES OR OPEN FLAME SHALL NOT BE USED TO AID IN BEND OF PVC CONDUIT.

J. USE SUITABLE CONDUIT CAPS OR OTHER APPROVED SEALS TO PROTECT INSTALLED CONDUIT AGAINST ENTRANCE OF DIRT AND MOISTURE.

K. PROVIDE 1/8 INCH NYLON PULL STRING IN EMPTY CONDUIT, EXCEPT SLEEVES AND NIPPLES.

L. INSTALL EXPANSION-DEFLECTION JOINTS WHERE CONDUIT CROSSES BUILDING EXPANSION JOINTS. NOTE: EXPANSION-DEFLECTION JOINTS ARE NOT REQUIRED WHERE CONDUIT CROSSES BUILDING CONTROL JOINTS IF THE CONTROL JOINT DOES NOT ACT AS AN EXPANSION JOINT. INSTALL EXPANSION FITTING IN PVC CONDUIT RUNS AS RECOMMENDED BY THE MANUFACTURER.

M. AVOID MOISTURE TRAPS WHERE POSSIBLE. WHERE MOISTURE TRAPS ARE UNAVOIDABLE, PROVIDE JUNCTION BOXES WITH DRAIN FITTINGS AT CONDUIT LOW POINTS.

N. CONDUIT IS NOT PERMITTED IN ANY SLAB TOPPING OF TWO INCHES OR LESS. CONSULT STRUCTURAL ENGINEER FOR APPROVAL OF CONDUIT INSTALLED IN TOPPING SLABS GREATER THAN TWO INCHES.

O. MAXIMUM SIZE CONDUIT IN SLABS ABOVE GRADE: 3/4 INCH. DO NOT ROUTE CONDUITS TO CROSS EACH OTHER IN SLABS ABOVE GRADE.

P. PVC CONDUIT SHALL TRANSITION TO GALVANIZED RIGID METAL CONDUIT BEFORE IT ENTERS A CONCRETE POLE BASE, FOUNDATION, WALL (WHERE EXPOSED) OR UP THROUGH A CONCRETE FLOOR.

Q. ALL CONDUIT INSTALLED UNDERGROUND (EXTERIOR TO BUILDING) SHALL BE BURIED A MINIMUM OF 24" BELOW FINISHED GRADE, WHETHER OR NOT THE CONDUIT IS CONCRETE ENCASED.

1. ALL UNDERGROUND CONDUITS SHALL BE INSTALLED WITH "DANGER – BURIED ELECTRICAL CONDUIT" RED FLAGGING TAPE 6-INCHES ABOVE CONDUIT. TAPE SHALL BE CONTINUOUS ALONG THE CONDUIT RUN.

2. TRACER WIRE SHALL BE INSTALLED ON ALL EXTERIOR ELECTRICAL UTILITIES. TRACE WIRE TO BE FOURTEEN (14) GAUGE MINIMUM SOLID COPPER WITH THERMOPLASTIC INSULATION RECOMMENDED FOR DIRECT BURIAL. WIRE CONNECTORS TO BE 3M DBR, OR APPROVED EQUAL, AND SHALL BE WATERTIGHT TO PROVIDE ELECTRICAL CONTINUITY. INSTALL TRACE WIRE IN THE SAME TRENCH WITH THE CONDUIT DURING INSTALLATION AND SECURE TO CONDUIT AS REQUIRED TO ENSURE THAT THE WIRE REMAINS ADJACENT TO THE CONDUIT. TRACE WIRE ACCESS POINTS SHALL IN GENERAL BE NO MORE THAN 500' APART.

R. PVC CONDUIT SHALL BE CLEANED WITH SOLVENT, AND DRIED BEFORE APPLICATION OF GLUE. THE TEMPERATURE RATING OF GLUE/CEMENT SHALL MATCH WEATHER CONDITION. APPLY FULL EVEN COAT OF CEMENT/GLUE TO ENTIRE AREA THAT WILL BE INSERTED INTO FITTING. THE ENTIRE INSTALLATION SHALL MEET MANUFACTURERS' RECOMMENDATIONS.

3.3 CONDUIT INSTALLATION SCHEDULE

A. CONDUIT OTHER THAN THAT SPECIFIED BELOW FOR SPECIFIC APPLICATIONS SHALL NOT BE USED.

B. UNDERGROUND INSTALLATIONS: SCHEDULE 40 PVC CONDUIT.

C. DIRECTIONAL BORING: HDPE CONDUIT.

D. UNDER SLAB ON GRADE INSTALLATIONS: SCHEDULE 40 PVC CONDUIT.

3.4 COORDINATION OF BOX LOCATIONS

A. PROVIDE ELECTRICAL BOXES AS SHOWN ON DRAWINGS, AND AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS, AND CODE COMPLIANCE.

B. ELECTRICAL BOX LOCATIONS SHOWN ON CONTRACT DRAWINGS ARE APPROXIMATE UNLESS DIMENSIONED. VERIFY LOCATION OF FLOOR BOXES AND OUTLETS IN OFFICES AND WORK AREAS PRIOR TO ROUGH-IN.

C. NO OUTLET, JUNCTION, OR PULL BOXES SHALL BE LOCATED WHERE IT WILL BE OBSTRUCTED BY OTHER EQUIPMENT, PIPING, LOCKERS, BENCHES, COUNTERS, ETC.

D. BOXES SHALL NOT BE FASTENED TO THE METAL ROOF DECK. MAINTAIN A MINIMUM SIX (6) INCH SEPARATION FROM THE ROOF DECK TO BOXES.

E. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO STUDY DRAWINGS PERTAINING TO OTHER TRADES, TO DISCUSS LOCATION OF OUTLETS WITH WORKMEN INSTALLING OTHER PIPING AND EQUIPMENT AND TO FIT ALL ELECTRICAL OUTLETS TO JOB CONDITIONS.

F. IN CASE OF ANY QUESTION OVER THE LOCATION OF AN OUTLET, THE CONTRACTOR SHALL REFER THE MATTER TO THE ARCHITECT/ENGINEER AND INSTALL OUTLET AS INSTRUCTED BY THE ARCHITECT/ENGINEER.

G. THE PROPER LOCATION OF EACH OUTLET IS CONSIDERED A PART OF THIS CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE PAID TO THE CONTRACTOR FOR MOVING OUTLETS WHICH WERE IMPROPERLY LOCATED.

H. LOCATE AND INSTALL BOXES TO ALLOW ACCESS TO THEM. WHERE INSTALLATION IS INACCESSIBLE, COORDINATE LOCATIONS AND PROVIDE 18 INCH BY 24 INCH ACCESS DOORS.

I. LOCATE AND INSTALL TO MAINTAIN HEADROOM AND TO PRESENT A NEAT APPEARANCE.

J. INSTALL BOXES TO PRESERVE FIRE RESISTANCE RATING OF PARTITIONS AND OTHER ELEMENTS, USING APPROVED MATERIALS AND METHODS.

K. INSTALL BOXES TO PRESERVE ROOM ACOUSTIC RATINGS USING APPROVED MATERIAL AND METHODS AS WELL AS DETAILS PROVIDED BY THE ACOUSTIC CONSULTANT.

L. BOXES MOUNTED IN COMMON WALLS OF ADJACENT ROOMS SHALL BE OFFSET BY AT LEAST ONE STUD SPACE TO MINIMIZE SOUND TRANSFERENCE BETWEEN ROOMS. IF SPACE DOES NOT ALLOW FOR OFFSETTING OF BOXES FOR

ADJACENT ROOMS BY ONE STUD CAVITY, SOUND DAMPENING MATERIAL SUCH AS SOUND BATTING SHALL BE INSTALLED AROUND AND BETWEEN BOXES.

3.5 OUTLET BOX INSTALLATION

A. PROVIDE RECESSED OUTLET BOXES IN FINISHED AREAS; SECURE BOXES TO INTERIOR WALL AND PARTITION STUDS, ACCURATELY POSITIONING TO ALLOW FOR SURFACE FINISH THICKNESS. THE FRONT EDGE OF THE BOX, PLASTER RING, EXTENSION RING, OR LISTED EXTENDER SHALL NOT BE SET BACK OF THE FINISHED WALL SURFACE MORE THAN ¼" IN ACCORDANCE WITH NEC 314.20. USE STAMPED STEEL STUD BRIDGES FOR FLUSH OUTLETS IN HOLLOW STUD WALL, AND ADJUSTABLE STEEL CHANNEL FASTENERS FOR FLUSH CEILING OUTLET BOXES.

B. DO NOT INSTALL BOXES BACK-TO-BACK IN WALLS. PROVIDE MINIMUM 6 INCH SEPARATION, EXCEPT PROVIDE MINIMUM 24 INCH SEPARATION IN ACOUSTIC-RATED WALLS.

C. POWER

1. RECESSED (1/4" MAXIMUM) OUTLET BOXES IN MASONRY, CONCRETE OR TILE CONSTRUCTION SHALL BE MINIMUM 4-INCH SQUARE, WITH DEVICE RINGS. DEVICE COVERS SHALL BE SQUARE-CUT EXCEPT ROUNDED CORNER PLASTER RINGS ARE ALLOWED IN DRYWALL APPLICATIONS. ANGLE CUT PLASTER RINGS ARE NOT PERMITTED. COORDINATE MASONRY CUTTING TO ACHIEVE NEAT OPENINGS FOR BOXES.

D. LOW VOLTAGE

1. RECESSED (1/4" MAXIMUM) OUTLET BOXES IN MASONRY, CONCRETE OR TILE CONSTRUCTION SHALL BE MINIMUM 4-11/16" SQUARE, 2-1/8" DEEP. DEVICE COVERS SHALL BE SQUARE-CUT EXCEPT ROUNDED CORNER PLASTER RINGS ARE ALLOWED IN DRYWALL APPLICATIONS. ANGLE CUT PLASTER RINGS ARE NOT PERMITTED. COORDINATE MASONRY CUTTING TO ACHIEVE NEAT OPENINGS FOR BOXES.

E. PROVIDE KNOCKOUT CLOSURES FOR UNUSED OPENINGS.

F. SUPPORT BOXES INDEPENDENTLY OF CONDUIT EXCEPT FOR CAST BOXES THAT ARE CONNECTED TO TWO (2) RIGID METAL CONDUITS, BOTH SUPPORTED WITHIN TWELVE (12) INCHES OF BOX.

G. USE MULTIPLE-GANG BOXES WHERE MORE THAN ONE DEVICE ARE MOUNTED TOGETHER; DO NOT USE SECTIONAL BOXES. PROVIDE NON-METALLIC BARRIERS TO SEPARATE WIRING OF DIFFERENT VOLTAGE SYSTEMS.

H. INSTALL BOXES IN WALLS WITHOUT DAMAGING WALL INSULATION.

I. COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF OUTLETS MOUNTED ABOVE COUNTERS, BENCHES, AND BACKSPLASHES.

J. CEILING OUTLETS SHALL BE FOUR (4) INCH SQUARE, MINIMUM 2-1/8 INCH DEEP EXCEPT THAT CONCRETE BOXES AND PLATES WILL BE APPROVED WHERE APPLICABLE. POSITION OUTLETS TO LOCATE LUMINAIRES AS SHOWN ON REFLECTED CEILING PLANS.

K. IN INACCESSIBLE CEILING AREAS, POSITION OUTLETS AND JUNCTION BOXES WITHIN 6 INCHES OF RECESSED LUMINAIRE, TO BE ACCESSIBLE THROUGH LUMINAIRE CEILING OPENING.

L. ALIGN WALL-MOUNTED OUTLET BOXES FOR SWITCHES, THERMOSTATS, AND SIMILAR DEVICES.

M. PROVIDE CAST FERROALLOY OR ALUMINUM OUTLET BOXES IN EXTERIOR AND WET LOCATIONS.

N. SURFACE WALL OUTLETS SHALL BE FOUR (4) INCH SQUARE WITH RAISED COVERS FOR ONE (1) AND TWO (2) GANG REQUIREMENTS. FOR THREE (3) GANG OR LARGER REQUIREMENTS, USE GANG BOXES WITH NON-OVERLAPPING COVERS.

END OF SECTION 260533