Project Manual For:

Broadlawns Medical Center

Parking Lot Expansion

1826 Hickman Road
Des Moines, Iowa

VOLUME 1

Volume 1: Divisions 00 – 05
Volume 2: Divisions 26 – 33
10 September 2026

Bishop Engineering
Civil Engineers & Landscape Architect

KCL Engineering
Electrical Engineer

Tometich Engineering, Inc.
Structural Engineer

Project # 240308-1
September 10, 2026

SECTION 00 01 10
TABLE OF CONTENTS

Graham Construction Company	CMa	(GCC)
Bishop Engineering	Civil	(BISH)
Landscape Architect	Landscape	(BISH)
Tometich	Structural	(TOME)
KCL Engineering	Electrical	(KCL)
Allender Butzke Engineers	Geotech	(ALL)

Volume 1: Division 00 thru 05
Volume 2: Division 21 thru 33

VOLUME 1

PROCUREMENT AND CONTRACTING REQUIREMENTS
DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

00 01 10	Table of Contents	GCC
00 01 11	Notice of Public Hearing	GCC
00 01 12	Notice to Bidders	GCC
00 11 00	Project Directory	GCC
00 12 00	Invitation to Bid	GCC
00 20 00	Instruction to Bidders	GCC
00 31 00	Available Project Information	GCC
00 31 00a	Geotechnical Exploration	ALL
00 41 00	Bid Form	GCC
00 42 00	Alternates	GCC
00 50 00	Agreement Form	GCC
00 50 00.01	A132-CMA	GCC
00 60 00	General Conditions	GCC
00 60 00.01	A232-CMA	GCC
00 61 13	Performance Bond	GCC
00 61 16	Payment Bond	GCC
00 70 00	Insurance Requirements	GCC
00 70 00.01	Sample Insurance Certificate	GCC
00 80 00	Bid Package 00 General Requirements	GCC
00 80 01	Bid Package 01 Landscape	GCC
00 80 02	Bid Package 02 Sitework & Underground Utilities	GCC
00 80 03	Bid Package 03 Concrete & Retaining Wall	GCC
00 80 04	Bid Package 04 Electrical	GCC
00 90 00	Existing Hazardous Material Information	GCC

SPECIFICATIONS
DIVISION 01 – GENERAL REQUIREMENTS

01 10 00	Summary	GCC
01 15 20	Bid Schedule	GCC
01 15 20.01	Project Bid Schedule	GCC
01 35 00	Hospital Dust Control Procedures	GCC
01 35 20	Special Procedures	GCC
01 40 00	Quality Requirements	GCC
01 50 00	Construction Facilities and Temporary Controls	GCC
01 52 00	Pay Application & Schedule of Values	GCC
01 52 01	Attachment Pay Application	GCC
01 53 00	Contractors Cost Summary Worksheet	GCC

01 53 00.01	Contractors Cost Summary Worksheet Sample	GCC
01 60 00	Product Requirements	GCC
01 60 01	Substitution Request Form	GCC
01 70 00	Execution and Closeout Requirements	GCC
01 78 00	Closeout Submittals	GCC

DIVISION 03 – CONCRETE

03 10 00	Concrete Forming	TOME
03 20 00	Concrete Reinforcing	TOME
03 30 00	Cast-in-Place Concrete	TOME

DIVISION 05 – METALS

05 52 13	Metal Railings	TOME

END OF VOLUME 1 OF 2

VOLUME 2

DIVISION 26 – ELECTRICAL

26 05 00	Common Work Results for Electrical	KCL
26 05 19	Low-Voltage Electrical Power Conductors and Cables	KCL
26 05 26	Grounding and Bonding for Electrical Systems	KCL
26 05 33.13	Conduit for Electrical Systems	KCL
26 05 33.16	Boxes for Electrical Systems	KCL
26 05 53	Identification for Electrical Systems	KCL
26 09 23	Lighting Control Devices	KCL
26 24 16	Panelboards	KCL
26 27 26	Wiring Devices	KCL
26 56 00	Exterior Lighting	KCL

DIVISION 31 – EARTHWORK

31 10 00	Site Clearing	BISH
31 20 00	Earthwork	BISH
31 23 33	Trenching and Backfill	BISH
31 35 00	Erosion Control	BISH

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 11 23	Aggregate Base Course	BISH
32 13 13	Concrete Paving	BISH
32 13 73	Pavement Joint Sealants	BISH
32 17 23	Pavement Markings	BISH
32 91 19	Landscape Grading	BISH
32 92 19	Seeding	BISH
32 92 19	Turf Seeding	BISH
32 93 00	Trees, Shrubs, Groundcover	BISH

DIVISION 33 – Utilities

33 10 00	Water Utilities	BISH
33 40 00	Storm Sewer and Drainage	BISH
33 49 00	Storm Drainage Structures	BISH

END OF VOLUME 2 OF 2

END OF SECTION

SECTION 00 01 11
NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING
PARKING LOT EXPANSION
BOARD OF TRUSTEES
BROADLAWNS MEDICAL CENTER
DES MOINES, IOWA

Notice is hereby given that a public hearing will be held at 2:00pm on Thursday, September 24th, 2026 in the Jenner Conference Room in Building 1 Room MP107 of the Medical Plaza at Broadlawns Medical Center, Des Moines, Iowa.

DESCRIPTION: Furnish all labor, material and equipment required to accomplish the construction described in the specifications, indicated on the plans, and in accordance with the schedule. The project consists of the construction of an approximately 128,300 square foot parking lot expansion with 234 new parking stalls. The work includes, but is not limited to, excavation and grading, storm drainage structures and piping, underground detention system, concrete paving, joint sealants, pavement striping, signage, retaining wall, landscaping, erosion control, a storm water retention pond and site lighting and electrical.

The public hearing will receive comments on the Parking Lot Expansion. Any individual may file written comments and/or be heard at said hearing.

Bidding Documents may be viewed at the office of the Construction Manager - Graham Construction Company, 421 Grand Ave, Des Moines, IA 50309.

END OF SECTION 00 01 11

SECTION 00 01 12
NOTICE TO BIDDERS

PARKING LOT
EXPANSION BOARD OF
TRUSTEES
BROADLAWNS MEDICAL CENTER
DES MOINES, IOWA

Time and Place for Filing Sealed Proposals. On behalf of the Broadlawns Board of Trustees, sealed proposals for all labor, materials, and equipment for the Bid Packages outlined below will be received by the Construction Manager – Graham Construction at Broadlawns Medical Center (the "Hospital"), Building One, Jenner Conference Room, 1761 Hickman Road, Des Moines, IA on the 24th day of September 2026 from 1:00 PM to 2:00 PM. Bids received after 2:00 PM will not be considered and will be returned to the bidder unopened.

Time and Place Sealed Proposals Will be Opened and Considered. Sealed proposals will be opened at 2:05 PM on the 24th day of September at the Hospital, Building One, Jenner Conference Room, 1761 Hickman Road, Des Moines, IA. . The Broadlawns Board of Trustees has delegated to the Broadlawns Chief Financial Officer the duty of receiving and opening bids, The CFO shall report the results of the bidding with the CFO's recommendations to the Board of Trustees at its next regularly scheduled meeting or at a special meeting called for such purpose.

DESCRIPTION: Furnish all labor, material and equipment required to accomplish the construction described in the specifications, indicated on the plans, and in accordance with the schedule. The project consists of the construction of an approximately 128,300 square foot parking lot expansion with 234 new parking stalls. The work includes, but is not limited to, excavation and grading, storm drainage structures and piping, underground detention system, concrete paving, joint sealants, pavement striping, signage, retaining wall, landscaping, erosion control, a storm water retention pond and site lighting and electrical.

Bids are for:
Bid Package 01 – Landscaping
Bid Package 02 – Sitework & Underground Utilities
Bid Package 03 – Concrete & Retaining Wall
Bid Package 04 – Electrical

Bidding Documents. Bidding documents may be obtained starting September 10th, 2026 from Iowa Reprographics, 3 College Ave, Unit 3, Des Moines, IA 50314 (phone) 515-244-5705, upon deposit of the sum of one hundred dollars ($100.00). This deposit will be refunded upon return of the bidding documents in good condition within thirty days after receipt of bids. MBI bid cards will be accepted. Include a nonrefundable check in the in the amount of twenty dollars ($20.00) for plans to be shipped.

Bidding documents may be examined at:

Graham Construction Company
421 Grand Avenue
Des Moines, IA 50309
515-244-1279

MBI One Source
Online platform

Construction Update Plan Room & ISqFt
4100 Westown Parkway
West Des Moines, IA 50266
515-288-8904

BID SECURITY: Each Bidder shall accompany with its bid a bid security as defined in Iowa Code section 26.8 payable to Broadlawns Medical Center in an amount equal to at least 5%. The bid security may be in the form of a Certified Check, Cashier's Check drawn on an FDIC insured bank in Iowa or on an FDIC insured bank chartered under the laws of the United States, or a certified share draft drawn on a credit union in Iowa or chartered under the laws of the United States, or a bid bond executed by corporationsauthorized to contract as surety in the State of Iowa. The bid bond shall be executed by the Bidder on AIA Bond Document. Bid Security shall be in a separate envelope with the sealed bid and shall be forfeited to the Owner as liquidated damages in the event the bidder fails to enter into a contract and furnish a bond within ten days after his bid has been accepted. No Bidder may withdraw its bid for at least sixty (60) days after the scheduled closing time for the receipt of bids..

The successful Bidder will be required to furnish and pay for satisfactory Performance Bond and Labor and Material Payment Bond in the amount of 100% of the Contract Price. Bond to be issued by a responsible surety approved by the Board of Trustees of Broadlawns Medical Center.

The Notice to Proceed will be issued following acceptance of the executed Contract by the successful Bidder and the requisite Performance Bond and Labor and Material Payment Bond and insurance certificates, and a determination by the OWNER that it has secured permanent financing for the Project. All work for this package shall be completed within the given schedule.

QUALIFICATIONS: Broadlawns Medical Center reserves the right to request qualification forms before issuing documents or before Contract is awarded, and to further reject any or all proposals or to waive technicalities or irregularities.. By virtue of statutory authority, a preference shall be given to products and provisions grown and produced within the State of Iowa and to Iowa domestic labor.

END OF SECTION 00 01 12

SECTION 00 11 00
PROJECT DIRECTORY

Owner:
Broadlawns Medical Center
1801 Hickman Road
Des Moines, IA 50314

Director of Plant Operations:
Adam Shaw
Phone: 515-282-5702
E-Mail: AShaw@broadlawns.org

Project Manager, Plant Operations
Brian Clark
Phone: 515-631-0299
E-Mail: BMClark@broadlawns.org

Bishop Engineering
3501 104th Street
Urbandale, IA 50322
515-276-0467 Office

Civil Engineer
Levi Runciman
Phone: 515-276-0467
E-Mail: lrunciman@bishopengr.com

Landscape Architect
Douglas Rooney
Phone: 771-7118
Email: drooney@bishopengr.com

KCL Engineering
300 4th St
West Des Moines, IA 50265
515-724-7938

Electrical Engineer
Eric Heynen
Phone: 515-300-8092
Email: eheynen@kclengineering.com

Tometich Engineering
10501 Buena Vista Ct
Urbandale, IA 50322
515-280-8022

Structural Engineer
Luke Logan
Phone: 515-280-8022
Email: ljl@tometichengineering.com

Construction Manager:
Graham Construction
421 Grand Avenue
Des Moines, IA 50309

Project Manager (main contact):
Justin Fischer
515-360-3964 Cell Phone
515-244-1279 Office
E-Mail: jfischer@3gcos.com

Project Engineer:
Brittany Larson
515-802-4021 Cell Phone
515-244-1279 Office
E-Mail: blarson@3gcos.com

Project Coordinator:
Kamisha Wallace
515-244-1279 Office
E-Mail: kwallace@3gcos.com

Project Superintendent:
Mark Mathes
515-202-1255 Cell Phone
E-Mail: MMathes@3gcos.com

END OF SECTION 00 11 00

SECTION 00 12 00
INVITATION TO BID

A. Bids will be received from Contractors for the bid packages listed below for the complete construction of the Broadlawns Medical Center Parking Lot Expansion. The owner is Broadlawns Medical Center. The Construction Manager is Graham Construction.

B. Bids will be received for the following Bid Packages:

Bid Package 01 – Landscaping
Bid Package 02 – Sitework & Underground Utilities
Bid Package 03 – Concrete & Retaining Wall
Bid Package 04 – Electrical

C. Sealed bids will be received by the Owner and Construction Manager at Broadlawns Medical Center located at 1761 Hickman Road, Des Moines, IA 50314 in the Jenner Conference Room in Building 1 of the Medical Plaza until 2:00 PM CST on Thursday, September 24th, 2026. Each bid must be enclosed in a separate envelope and shall be marked:

Broadlawns Medical Center – Parking Lot Expansion
Attn: Mr. Proctor Lureman, CEO
Bid Package #(s):
Bid Package Title(s):

D. Bids received after this time will not be accepted.

E. Bids will be opened publicly.

F. **Bidding documents may be obtained from Iowa Reprographics**, 3 College Ave, Unit 3, Des Moines, IA 50314 (phone) 515-244-5705, upon deposit of the sum of one hundred dollars ($100.00). This deposit will be refunded upon return of the bidding documents in good condition within twenty days after receipt of bids. MBI bid cards will be accepted. Include a non-refundable check in the in the amount of twenty dollars ($20.00) for plans to be shipped.

G. A Pre-Bid Meeting will be held at the gravel parking lot of Broadlawns Medical Center across Hickman Rd Wednesday, September 16th, 2026 starting at 10:30 AM CST. In the event of rain, meeting location will be in the Jenner Conference Room MP107 in Building 1. All parties are invited to attend as this will be the only available time to walk the project areas

H. Bidding Documents may be examined at:

Graham Construction Company 421 Grand Avenue Des Moines, IA 50309 515-244-1279	iSqFt Online platform
Construction Update Plan Room 4100 Westown Parkway West Des Moines, IA 50266 515-288-8904	MBI One Source Online platform

I. Partial Sets of documents will not be made available

J. QUESTIONS: Pre-bid Requests for Information are due no later than Tuesday, September 22nd, 2026, at 2:00 PM CST to allow adequate time for the questions to be addressed. Direct all questions, in writing, to the following individuals:

Civil:
Bishop Engineering, Levi Runciman
E-mail: lrunciman@bishopengr.com

Landscape:
Douglas Rooney
E-mail: drooney@bishopengr.com

Structural:
Tometich Engineering Inc., Luke Logan
Email: ljl@tometichengineering.com

Electrical:
KCL Engineering, Eric Heynen
Email: eheynen@kclengineering.com

Bid Package Descriptions, General Conditions, etc.:
Graham Construction, Justin Fischer
E-mail: jfischer@3gcos.com

K. BID SECURITY: Each bid shall be accompanied by bid security payable to Broadlawns Medical Center **in an amount equal to at least 5% of the highest total amount including Add Alternates**. The bid security may be in the form of cash, a certified check, a cashier's check or a bid bond executed by corporations authorized to contract as surety in the state of Iowa. The bid bond shall be executed by the bidder on Iowa Guide 31 or AIA Document 310. The bid security shall be in a separate envelope from the sealed bid and shall be forfeited to the Owner in the event the bidder fails to enter into a contract and furnish a bond within ten days after his bid has been accepted. No qualified bid will be accepted.

END OF SECTION 00 12 00

SECTION 00 20 00
INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINITIONS

1.1 Bidding documents include the bidding requirements and the contract documents. The bidding requirements include the advertisement or invitation to bid, instructions to bidders, the bid form, other sample bidding and contract forms and the contract documents including addenda issued prior to receipt of bids.

1.2 The contract documents for the work consist of the Owner/Contractor agreement, the conditions of the contract (general and supplementary conditions), the drawings, the specifications and all addenda issued prior to and all modifications issued after execution of contract.

1.3 Definitions set forth in AIA document A232 - 2009 "General Conditions of the Contract for Construction" Construction Manager – Adviser Edition, or in other contract documents applicable to the bidding documents.

ARTICLE 2 - BIDDER'S REPRESENTATIONS

2.1 The bidder by making a bid represents that the bidder has read and understands the bidding documents and the bid is made in accordance with those documents.

2.2 The bidder has read and understands the bidding documents or contract documents, to the extent that such documentation relates to the work for which the bid is submitted.

2.3 The bidder has visited the site, become familiar with local conditions under which the work is to be performed and has correlated the bidder's personal observations with the requirements of the contract documents.

2.4 The bid is based upon the materials, equipment and systems required by the bidding documents without exception.

ARTICLE 3 - BIDDING DOCUMENTS

3.1 Copies

A. **Complete sets of the bidding documents may be obtained from Iowa Reprographics, 3 College Ave, Unit 3, Des Moines, IA 50314 (phone) 515-244-5705,** for the deposit sum indicated in the Invitation to Bid. The deposit will be refunded to plan holders who return the bidding documents in good condition within 20 days after receipt of bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A bidder receiving a contract award may retain the bidding documents and his deposit will be refunded. Successful subcontractors and material suppliers may retain their bidding documents and their deposit will be refunded if the Construction Manager receives written notification within the 30 calendar day period following receipt of bids.

B. Bidders shall use complete sets of bidding documents in preparing bids. Neither the Owner nor the Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of bidding documents. No partial sets will be issued.

C. In making copies of the bidding documents available on the above terms, the Owner and the Architect do so only for the purpose of obtaining bids on the work and do not confer a license or grant permission for any other use of the bidding documents.

3.2 Interpretation or correction of bidding documents

A. The bidder shall carefully study and compare the bidding documents with each other, and with other work being concurrently or presently under construction to the extent that it relates to the work for which the bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

B. Bidders and sub-bidders requiring clarification or interpretation of the bidding documents shall make a written request which shall reach the Architect at least nine calendar days prior to the date for receipt of bids.

C. Interpretations, corrections and changes of the bidding documents will be made by addendum. Interpretations, corrections and changes the bidding documents made in any other manner will not be binding and bidders shall not rely upon them.

3.3 Substitutions

A. The materials, products and equipment described in the bidding documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. If the Architect or Construction Manager approves a proposed substitution prior to receipt of bids, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

3.4 Addenda

A. Addenda will be mailed or delivered to all who are known by the Construction Manager to have a complete set of bidding documents.

B. Copies of Addenda will be made available for inspection wherever bidding documents are on file for that purpose.

C. No Addenda will be issued later than four (4) days prior to the date for receipt of bids except: (1) an Addendum withdrawing the request for bids; (2) an Addendum which includes postponement of the date for receipt of bids; or (3) an Addendum issued after receipt of bids and prior to execution of the contract.

D. Each bidder shall ascertain prior to submitting a bid that he has received all Addendums issued, and the bidder shall acknowledge their receipt in the proper location on the bid form.

ARTICLE 4 - BIDDING PROCEDURES

4.1 Form and style of bids

A. Submit bids in duplicate on forms identical to the form included with the bidding documents.

B. Submit a copy of the Bid Package Description for each portion of the work included in the Bid. Fill in all blanks on the Bid Package Description by typewriter or manually by ink. All unit prices requested shall be submitted.

C. Fill in all blanks on the bid form by typewriter or manually in ink.

D. Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.

E. Interlineations, alterations or erasures shall be initialed by the signer of the bid.

F. All requested alternates shall be bid. If no change in the base bid is required, enter "No Change". If the alternate does not pertain to your bid package enter “Not Applicable”. Bids may be rejected if alternate pricing is not included.

G. Where two or more bids for designated portions of the work have been requested, the bidder may state the bidder's refusal to accept award of less than the combination of bids stipulated by the bidder.

H. Each copy of the bid shall include the legal name of the bidder and a statement that the bidder is a sole proprietor, a partnership, a corporation or some other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the bidder to a contract. A bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A bid submitted by an agent shall have a current power of attorney attached certifying the agent’s authority to bind the bidder.

4.2 Bid Security

A. Each bid shall be accompanied by a bid security in the amount of 5% of the base bid and in the form of surety bond, cashier’s check, cash or certified check pledging that the bidder will enter into a contract with the Owner on the items stated in his bid and will, if required, furnish bonds covering the faithful performance of the contract and the payment of all obligations arising there under. Should the bidder refuse to enter into such contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

B. Surety bond shall be written on AIA Document A310-2010 “Bid Bond” and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of power of attorney.

C. The Owner will have the right to retain the bid security of bidders to whom an award is being considered until either:

1. the contract has been executed and bonds have been furnished
2. the specified time has elapsed so that bids may be withdrawn
3. all bids have been rejected

4.3 Submission of bids

A. All copies of the bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the bids and shall be identified with the project name, bid package number, the bidder's name and address. If the bid is sent by mail the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face of the envelope. Include the project name, bid package number and bid package title.

B. Bids shall be deposited at the designated location prior to the time and date for receipt of bids.

C. The bidder shall assume full responsibility for timely delivery at the location designated for receipt of bids.

D. Oral, telephonic, or telegraphic Bids are invalid and will not receive consideration.

4.4 Modification or withdrawal of bid

A. A bid may not be modified, withdrawn or canceled by the bidder after the stipulated time and date designated for the receipt of bids, and each bidder so agrees in submitting his bid.

B. Prior to the time and date designated for receipt of bids, a bid submitted may be modified or withdrawn by notice to the party receiving bids at the place designated for receipt of bids. Such notice shall be in writing over the signature of the bidder or by telegram; if by telegram, written confirmation over the signature of the bidder shall be mailed .and postmarked on or before the date and time set for receipt of bids, and it shall be so worded as not to reveal the amount of the original bid.

C. Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these instructions to bidders.

D. Bid security shall be in an amount sufficient for the bid as modified or resubmitted.

ARTICLE 5 - CONSIDERATION OF BIDS

5.1 Opening of bids

A. The properly identified bids received on time will be opened publicly. An abstract of the information may, at the discretion of Owner, be made available to the bidders within a reasonable time.

5.2 Rejection of bids

A. The Owner will have the right to reject any or all bids.

5.3 Acceptance of bid (award)

A. It is the intent of the Owner to award a contract to the lowest responsible bidder provided the bid has been submitted in accordance with the requirements of the bidding documents and does not exceed the funds available. The Owner will have the right to waive informalities or irregularities in a bid received and to accept the bid which, in his judgment, is in his own best interest.

B. The Owner will have the right to accept alternates in any order or combination and to determine the low bidder on the basis of the sum of the base bid and the alternates accepted.

ARTICLE 6 - POST BID INFORMATION

6.1 Submittals

A. The bidder shall, within seven days of notification of selection for the award of a contract for the work, submit the following information to the Construction Manager

1. A designation of the work to be performed by the bidder with the bidder's own forces;

2. The proprietary names and the suppliers or principal items or systems of materials and equipment proposed for the work;

3. A list of names of the subcontractors or other persons or entities proposed for the principal portions of the work.

B. The bidder will be required to establish to the satisfaction of the Construction Manager and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the work described in the bidding documents.

C. Prior to the award of the contract, the Construction Manager will notify the bidder in writing if either the Owner or the Construction Manger, after due investigation, has reasonable objection to any such proposed person or entity. If the Owner or Construction Manager has reasonable objection to such proposed person or entity, the bidder may, at the bidder's option:

1. Withdraw the bid.

2. Submit an acceptable substitute person or entity with an adjustment in the bid price to cover the difference in cost occasioned by such substitution.

D. The Owner may accept the adjusted bid or price may disqualify the bidder.

ARTICLE 7- PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7 .1 Bond requirements

A. The bidder shall furnish bonds covering the faithful performance of contract and the payment of all obligations arising there under. Bonds may be secured through the bidder's usual sources. The cost furnishing of such bonds shall be included in the bid.

B. If the Owner requires that bonds be obtained from other than the bidder's usual source, all change in cost will be adjusted as provided in the contract documents.

7.2 The time of delivery and form of bonds

A. The bidder shall deliver the required bonds to the Construction Manager not later than three days following the date of execution of the contract. If the work is to be commenced prior thereto in a response to a letter of intent, the bidder shall, prior to commencement of the work, submit evidence satisfactory to the Construction Manager that such bonds will be furnished and delivered.

B. The bonds shall be written on AIA Document A312-2010 “Performance Bond and Payment Bond.” Both bonds shall be written in the amount of the contract sum.

C. The bonds shall be dated on or after the date of the contract.

D. The bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix a current and certified copy of the power of attorney.

END OF SECTION 00 20 00

SECTION 00 31 00
AVAILABLE PROJECT INFORMATION

PART 1 GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of Contract Documents, as follows:

B. Geotechnical Reports:

1. Allender Butzke Engineers Geotechnical Exploration Report dated June 16th, 2026; reports following this section.

C. Copies have been included in this project manual, immediately following this section.

D. These reports identify properties of below grade conditions and offer recommendations for the design of foundations, prepared primarily for the use of Design Professional.

E. The recommendations described shall not be construed as requirements of this Contract, unless specifically referenced in Contract Documents.

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 00 31 00

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

JUNE 16, 2026 **PN 261252**

GEOTECHNICAL EXPLORATION

BROADLAWNS PARKING LOT
HICKMAN ROAD AND 18TH STREET
DES MOINES, IOWA

PERFORMED FOR

BROADLAWNS MEDICAL CENTER
1801 HICKMAN ROAD
DES MOINES, IOWA

3660 109TH STREET • URBANDALE, IOWA 50322 • PHONE 515-252-1885 • FAX 515-252-1888

ALLENDER BUTZKE ENGINEERS INC.
GEOTECHNICAL • ENVIRONMENTAL • CONSTRUCTION Q. C.

June 16, 2026

Broadlawns Medical Center
1801 Hickman Road
Des Moines, Iowa
Attn: Mr. Brian Clark

RE: Geotechnical Exploration
Broadlawns Parking Lot
Hickman Road and 18th Street
Des Moines, Iowa
PN 261252

Dear Mr. Clark:

As authorized by you, Allender Butzke Engineers Inc. (ABE) has completed the geotechnical exploration for the above referenced project. The geotechnical exploration was conducted to evaluate physical characteristics of subsurface conditions with respect to design and construction of this project. The enclosed report summarizes the project characteristics as we understand them, presents the findings of the borings and laboratory tests, discusses the observed subsurface conditions, and provides geotechnical engineering recommendations for this project.

We appreciate the opportunity to provide our geotechnical engineering services for this project. If you have any questions or need further assistance, please contact us at your convenience. We are also staffed and equipped to provide construction testing and inspection services on this project as well as environmental site assessments.

Respectfully submitted,
ALLENDER BUTZKE ENGINEERS INC.

Seth Hansen, P.E.
Project Engineer

Stacy G. Brocka, P.E.
Principal Engineer



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

6/16/26

Seth A. Hansen, P.E. License Number 26401 Date

My license renewal date is December 31, 2027.

Pages covered by this seal: All Pages.

1 Email Above
1 Email Tometich Engineering; Attn: Luke Logan, P.E.
1 Email Bishop Engineering; Attn: Levi Runciman, P.E.

GEOTECHNICAL EXPLORATION

BROADLAWNS PARKING LOT
HICKMAN ROAD AND 18TH STREET
DES MOINES, IOWA

PN 261252

TABLE OF CONTENTS

PROJECT INFORMATION **1**

FIELD EXPLORATION **2**

SUBSURFACE CONDITIONS **2**
- Soil Profile 2
- Groundwater Level Observations 3

ANALYSIS AND RECOMMENDATIONS **3**
- Existing Fill 3
- Moderately Expansive Soils 5
- Site Preparation and Grading 5
- Lateral Earth Pressures 7
- Preliminary Retaining Wall Foundation Design 9
  - *Cast-in-place Concrete Wall* *9*
  - *Modular Block Gravity Wall* *10*
  - *General* *10*
- Subsurface Pavement Drainage 10
- Pavement Subgrade Preparation 11
- Pavement Thicknesses 12
- Frost Heave 13

GENERAL **14**

APPENDIX
- Boring Log Description/Legend
- Profile of Borings (A-1)
- Boring Logs
- Site Plan

GEOTECHNICAL EXPLORATION

BROADLAWNS PARKING LOT
HICKMAN ROAD AND 18TH STREET
DES MOINES, IOWA

PN 261252

June 16, 2026

PROJECT INFORMATION

Broadlawns Medical Center, with design assistance from Tometich Engineering and Bishop Engineering, is planning the construction of a new parking lot. The parking lot is planned south of their existing facility between Hickman Road and Francis Drive. The site layout plan prepared by Bishop Engineering is shown in the following Figure No. 1.

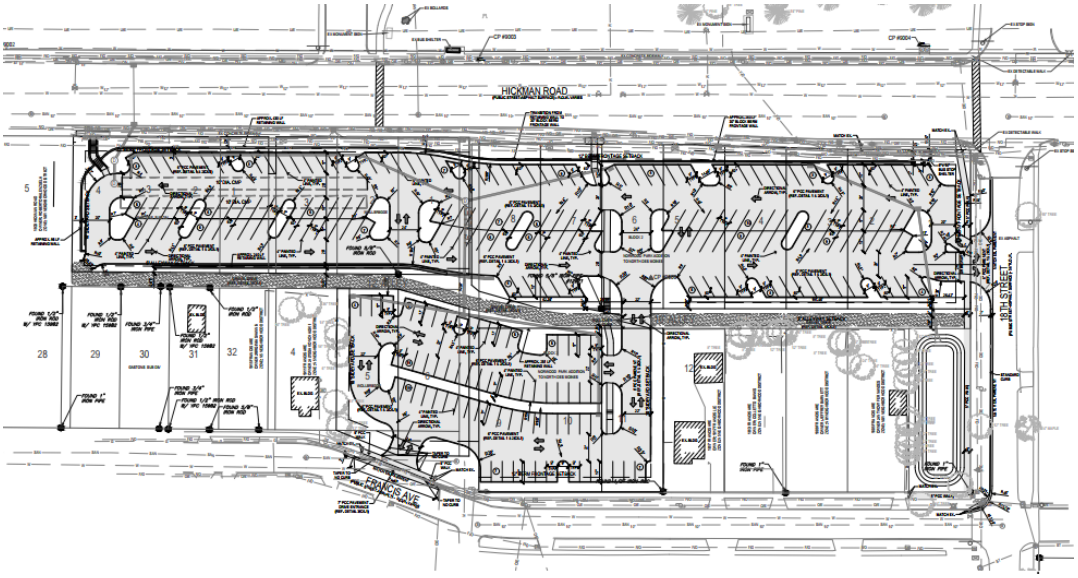


Figure No. 1 – Site Layout Plan Prepared by Bishop

Existing grades at the site gently slope from the south to the north. An existing gravel alley and rock surfaced vehicle parking lot are present at the site. Based on the Grading Plan we anticipate new fill thicknesses on the order of 8 may be necessary in the NW corner of the site and up to 6 feet of cut west central portion of the site. Cut depths on the order of 4 feet or less are planned for the detention basin in the SE corner of the site. Two retaining walls are planned at the site. Based on the grading plan we anticipate the walls will have exposed heights on the order of 6

to 8 feet. We understand cast-in-place concrete walls or modular block gravity walls are being considered.

FIELD EXPLORATION

Nine soil borings were conducted at this site to depths between 15 and 18.6 feet below existing grades on May 18, 2026. Approximate locations of the borings are shown on the enclosed Site Plan. Boring locations and ground surface elevations were determined by ABE using GPS survey equipment. The boring surface elevations, indicated on the enclosed Boring Logs, were Iowa Real-Time Network (RTN) derived. Methods of drilling, sampling, standard laboratory testing, and classifying of subsurface materials are discussed in the Boring Log Description/Legend pages of the Appendix.

SUBSURFACE CONDITIONS

Soil Profile

Detailed descriptions of soils encountered by this exploration are provided on the Boring Logs enclosed in the Appendix. The Profile of Borings (Plate A-1) presented in the Appendix depicts the relative deposit elevations in the borings. Following is a discussion of the subsurface materials encountered in the borings. Unless otherwise indicated, the depths of soil stratum and groundwater levels are referenced from below existing grade at the individual boring locations at the time of drilling.

Boring Nos. 1, 5, 6, and 8 were conducted near the footprints of former dwellings which we assume may have had basements. These borings encountered fill consisting of fat clay (CH) and lean to fat clay (CL-CH) soils to depths between 4 and 7 feet. Boring Nos. 2, 3, 4, and 7 were conducted outside of former dwellings and encountered thin (1 to 2.5 feet) existing fill consisting of similar soils over natural soils typical to this area of Des Moines. The fill appeared to be moist and stiff. Crushed limestone was present at the ground surface in Boring No. 5 extending to a depth of 9 inches.

Fill soils were underlain by a combination of sandy lean to fat clay (CL-CH) Wisconsinan glacial till, lean to fat clay (CL-CH) B-horizon loess, and lean clay (CL) loess soils. These soil types were generally stiff and moist and extended to depths between 9 and 12 feet. Boring Nos. 2, 3, and 7 terminated in loess near depths of 15 feet.

Fat clay (CH) paleosol and sandy fat clay CH) Pre-Illinoian glacial till were encountered underlying the B-horizon loess in Boring No. 1, 4, and 8, and the loess in Boring No. 5. The paleosol and Pre-Illinoian glacial till were moist and stiff to very stiff.

Weathered bedrock consisting of clay shale underlaid the overburden soils in Boring Nos. 8 and 9 below depths of 12 and 9 feet, respectively. The weathered shale generally became harder and drier with increasing depth. A one-foot-thick coal layer was encountered in Boring No. 9 between depths of 14.5 and 15.5 feet. Boring Nos. 8 and 9 terminated dense to very dense shale near depths of 15 and 18.6 feet.

Groundwater Level Observations

The borings were monitored during and shortly after drilling operations to detect moisture seepage and groundwater accumulation. The results of our groundwater level observations are noted on the Boring Logs enclosed in the Appendix.

During drilling operations, moisture seepage was noted between depths of 10 and 13.5 feet below existing grades in Boring Nos. 3, 4, 5, and 9. Groundwater accumulation was observed between depths of 7 and 13 feet below existing grades in Boring Nos. 3, 5, and 9 shortly after the completion of drilling operations. No groundwater accumulation was observed in the remaining borings. These short-term groundwater levels are not necessarily a true indication of the groundwater table. Long-term observations would be necessary to accurately define the groundwater variations at this site.

In this area, it is common to encounter a perched groundwater table within the loess present above the denser less permeable paleosol. Fluctuation of groundwater levels can occur due to seasonal variations in the amount of rainfall, surface drainage, subsurface drainage, site topography, irrigation practices, and ground cover (pavement or vegetation).

ANALYSIS AND RECOMMENDATIONS

Existing Fill

Historical photos indicate there were at least 5 former dwelling along Francis Ave and at least 10 dwellings along Hickman Road as shown in the following Figure No. 2. Other various structures were also located on these properties. Boring Nos. 1, 5, 6, and 8 were conducted near the footprints of former dwellings which we assume may have had basements. These borings encountered fill consisting of fat clay (CH) and lean to fat clay (CL-CH) soils to depths between

4 and 7 feet. Based on these tested locations it appears the basements, if present, were backfilled with soil. However, other unsuitable materials may be encountered in other unexplored areas of the site. The fill where tested appears to be moderately compacted. We recommend further exploring the areas near the former dwellings early on during site preparation with hand probing, proof rolls, and possibly test pits with an excavator. If unsuitable soils are encountered during this process, they should be over-excavated and replaced with suitable engineered compacted fill.



Figure No. 2 – 2007-2010 Aerial Photo

Boring Nos. 2, 3, 4, and 7 were conducted outside of former dwellings and encountered thin (1 to 2.5 feet) existing fill over natural soils typical to this area of Des Moines. Based on grading concepts we anticipate the majority of the thin fill sections will be removed/reworked during site grading.

We recommend extensive geotechnical probing, proof roll testing, and observations be conducted by an ABE geotechnical engineer during construction to further note suitability and support capability of the existing soils beneath proposed structures. If any deficient zones are encountered within the fill or other soils, we recommend that an over-excavation and backfill procedure be implemented. It should be recognized that test probing is intended to reduce the frequency of inadvertently constructing over deficient soils, but because of the methods and practical extent (3 feet) of hand probing, not all deficient zones may be detected and corrected, especially in the lower portions of fill, which would still leave the owner accepting the risk of less desirable performance.

Moderately Expansive Soils

The lean to fat clay (CL-CH) portions of the fill, Wisconsinan glacial till, and B-horizon loess encountered in the upper 5 to 12 feet are moderately plastic and considered moderately expansive. These soils are subject to moderate volumetric change with changes in soil moisture content which can cause movement and distress to lightly loaded floor slabs and pavements. The most severe problems occur where higher clay content soils (CL-CH) are in a natural state of low moisture or are highly compacted at moisture contents near or below optimum moisture content on a relatively incompressible base. Subsequent moisture content increases below the floor slab or pavement after construction then cause the moderately expansive soils to swell appreciably. If the moisture content does not fluctuate much, then the soil swelling and heave will be minor.

Typical pavement movements due to moderately expansive soils (CL-CH) are similar to movements that pavements commonly experience from frost heave. Considering that proposed pavements will be subject to frost heave movements, the risk of movement due to moderately expansive soils may be acceptable to the owner. If the owner chooses to accept the risk of possible future movements, we recommend pavements be supported on 12 inches or more of prepared compacted subgrade further discussed in the *Pavement Subgrade Preparation* section of this report. Subgrade condition and moisture content should be maintained until the slabs or pavements are placed. If the soil is allowed to dry prior to slab or pavement placement, the risk of future slab movement would then increase.

If the owner prefers to take a more proactive approach to reduce pavement movement due to expansive soils, pavements could bear on 1 foot or more of low plasticity cohesive (Liquid Limit of 45 or less and Plasticity Index of 23 or less), chemically stabilized on-site plastic soils, or cohesionless soils, such as drained crushed rock similar to Iowa DOT 4123 Modified Subbase.

The deeper fat clay (CH) paleosol, Pre-Illinoian glacial till, and weathered shale are also considered expansive; however, based on boring information and our understanding of grading concepts for the site, the highly plastic soils (CH) are expected to remain several feet below pavement subgrade.

Site Preparation and Grading

Prior to the placing of pavements on this site, or before any fill is placed, the organic and loose materials in addition to all vegetation must be stripped. We expect that a minimum stripping depth of 6 inches will be required. The stripping depths may vary due to localized variations in vegetation cover and subgrade stability. The strippings could be used for landscaping purposes in non-critical areas where support for foundations, floor slabs, and pavements is not required. The

subgrade should then be proof-rolled to delineate zones of soft soils present near the surface which may require additional removal or compaction. As discussed in the *Existing Fill* section, we recommend the area near former dwellings be further explored during site preparation to further evaluate suitability of fill soils.

We recommend that cohesive or cohesionless soils, free of rubble and organics, be used as compacted fill. Inorganic existing soil such as the lean clay (CL) loess and lean to fat clay (CL-CH) B-horizon loess and Wisconsinan glacial till would be suitable soil types for general fill applications. Fat clay (CH) soils should not be used within 1 foot of pavements.

The following Table A lists recommended minimum compaction requirements for cohesive and cohesionless fill materials in specific applications. For cohesive soils, moisture contents within a range of -1 to +4 percent of the material's optimum moisture content are necessary to achieve the desired fill qualities. Soil compacted closer to its optimum moisture content will exhibit greater stability under repeated construction traffic.

TABLE A
RECOMMENDED DEGREE OF COMPACTION GUIDELINES

Construction Application	Standard Proctor (ASTM D698) Cohesive Soil	Standard Proctor (ASTM D698) Cohesionless Soil	*Relative Density (D4253 & D4254) Cohesionless Soil
Class 1	95%	98%	70%
Class 2	90%	93%	45%
Class 3	85%	88%	20%

Class 1 - Subgrade for building foundations, slabs-on-grade, pavements and other critical backfill areas.
Class 2 - Backfill adjacent to structures not supporting other structures - Minor subsidence possible.
Class 3 - Backfill in non-critical areas - Moderate subsidence possible.

*Use Relative Density technique (ASTM D4253 & D4254) where Standard Proctor technique (ASTM D698) does not result in a definable maximum dry density and optimum moisture content.

The on-site soils can be excavated utilizing conventional excavation equipment. Granular soils can generally be suitably compacted with vibratory compaction equipment whereas cohesive soils are more suitable for compaction with sheepsfoot or pneumatic type compactors. Care should be exercised in properly backfilling and compacting all trenches, especially utility trenches under or adjacent to the pavement. Loosely compacted or sand backfilled trenches can collect surface water and inadvertently direct it to the pavement subgrade and cause softening of the soil as well as increasing frost heave potential.

At the time of this geotechnical exploration, moisture contents of the existing fill, Wisconsinan glacial till, B-horizon loess, and loess deposits were generally near or slightly above the recommended moisture content range for compaction. Depending upon precipitation levels prior to and during construction, adjustment of soil moisture content may be required in order to lower or raise the moisture to within the recommended moisture content range. Controlled wetting and discing may be necessary to raise soil moisture content of dry soils. Discing and aeration is generally the most economical method to lower soil moisture content, if climatic conditions allow. Chemical modification (drying) of very moist soils with Portland cement or quicklime can be accomplished if construction scheduling does not permit field drying. Common chemical modification methods may not be reactive when temperatures are near or below 40° Fahrenheit if grading or fill placement at the site will be conducted during colder weather.

Lateral Earth Pressures

Walls constructed to retain soil should be designed to accommodate unbalanced lateral earth pressures. Estimated lateral earth pressures for cohesive and cohesionless (granular) backfill are presented in the following Table B. Active earth pressure design assumes that the wall can rotate and deflect at the top. If the wall is rigidly fixed, higher lateral earth pressures will develop against the wall and at-rest pressure parameters should be used for design. Increased earth pressures can also develop from restricted soil drainage, surcharge loads adjacent to the wall, and compaction of the adjacent backfill. Expansive materials (CH), either natural or backfill, should not be within 3 feet of below grade walls.

A coefficient of sliding friction value of 0.3 may be used for Portland cement concrete on a cohesive subgrade. This ultimate value assumes no safety factor and design with this ultimate value should include a minimum factor of safety of 1.5.

TABLE B
LATERAL EARTH PRESSURE PARAMETERS

Condition	Cohesive Soil (non-expansive clay)	Cohesionless Soil (Sand)	Cohesionless Soil (Crushed Rock)
Assumed Backfill Characteristics			
Approximate Total Density	130 pcf	120 pcf	130 pcf
Approximate Friction Angle	15° - 20°	30° - 35°	40° - 45°
Active Pressure Coefficient, K_a	0.5	0.3	0.2
At-Rest Pressure Coefficient, K_o	0.7	0.5	0.3
Passive Pressure Coefficient, K_p	2	3.3	5.2
Estimated Lateral Earth Pressure[1] (Equivalent Fluid Pressures)			
Active – Drained	65 pcf	35 pcf	25 pcf
Active - Undrained[2]	95 pcf	80 pcf	75 pcf
At-Rest – Drained	90 pcf	60 pcf	40 pcf
At-Rest - Undrained[2]	110 pcf	90 pcf	85 pcf
Passive – Drained	260 pcf	400 pcf	670 pcf
Passive - Undrained[3]	135 pcf	190 pcf	350 pcf

1) Assumes no safety factor, negligible wall friction, vertical wall, level backfill, zero surcharge loads and ignores cohesion shear strength.
2) Combined buoyant backfill unit weight and hydrostatic (water @ 62.4 pcf) loading.
3) Excludes hydrostatic loading.

Cohesionless (granular) backfill lateral earth pressure parameters may be used where granular backfill is installed behind the subsurface wall in accordance with the following Figure No. 3. The granular backfill should have a minimum width of 2 feet and be wide enough to accommodate the back slope limit line of 2:1 (vertical to horizontal) or flatter. The area between the required minimum zone of granular material and the actual limits of excavation may be backfilled with either cohesive or granular soils.

Walls retaining fine-grained soils, and subjected to seasonally depressed temperatures, may be subject to long-term accumulative movement due to soil creep and freeze-thaw action. It is desirable to use free draining granular backfill behind such walls to reduce this movement. We recommend that a chimney of clean granular material (similar to Iowa DOT Specification 4131) be placed directly against the back of these walls and that the chimney be connected to a drain system. An acceptable drain system may be constructed using perforated pipe encased in clean granular material and sloped to sumps or storm drains.

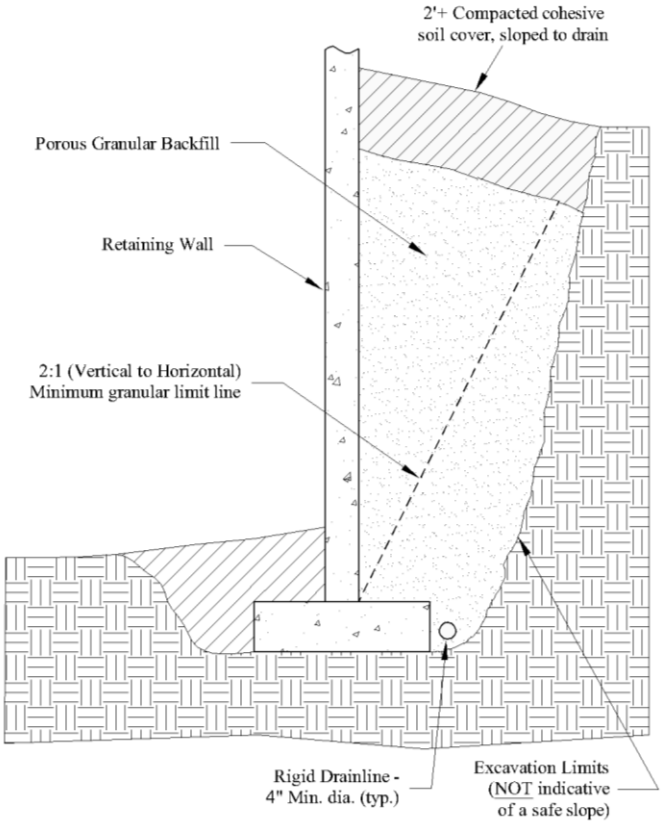


Figure No. 3 – Lateral Earth Pressures Example Section

Preliminary Retaining Wall Foundation Design

Two retaining walls are planned at this site. Details of the walls were not available at the time of this geotechnical report however we understand a cast-in-place concrete wall or large block (Recon block or Redi Rock block) wall may be used. We request to review plans for the walls when available to evaluate compatibility with our geotechnical recommendations. Additional soil parameters can be provided as plans develop.

Cast-in-place Concrete Wall

In our opinion, a cast-in-place concrete wall with frost-depth footings, bearing on the stiff natural soils, further tested and evaluated existing fill, and newly placed engineered compacted fill could provide a maximum net allowable bearing pressure of 2,000 pounds per square foot. We estimate long-term total settlement due to structural loads will be less than 1 inch and differential settlement may be on the order of ½ of the total settlement when foundations bear on newly placed engineered compacted fill and suitable natural soils.

Continuous foundations should be adequately reinforced to limit deflections caused by non-uniform soil support characteristics. All exterior foundations and foundations in unheated areas should be placed a minimum of 3.5 feet below final grade to provide protection against frost penetration and reduce movements associated with changes in soil moisture content. The on-site cohesive soils and newly placed cohesive fill would be suitable for trench foundations. Footing excavations should be kept free of water accumulation to prevent softening of subgrade soils.

Modular Block Gravity Wall

We understand that a modular block gravity wall (Redi-Rock or equivalent) is being considered for the proposed retaining walls. The wall which will be designed by others should follow appropriate design methodologies, which may include but not limited to, AASHTO LRFD Bridge Design Specifications, FHWA-NHI-10-24 Volume I, FHWA-NHI-10-25 Volume II, etc. We can provide additional soil parameters as needed as plans develop.

General

Observations and test probing of the foundation subgrade soils should be conducted by an ABE geotechnical engineer to determine that the soils are compatible with the design criteria. If zones of soft or otherwise unsuitable soils are encountered at foundation level, we recommend that footings be extended to bear on firmer soils or an over-excavation and compacted backfill procedure be implemented. Over-excavations should extend 9 inches laterally in each direction beyond the foundation edges for each foot of over-excavation depth.

Subsurface Pavement Drainage

In our opinion subsurface pavement drainage would not be necessary in areas of fill but would be beneficial for extending the life of pavements in deeper cut areas where the natural very moist loess soils are encountered. Subsurface drainage is also recommended if a granular subbase is utilized beneath the pavement. Figure No. 4 depicts the approximate areas where cut depths of 2 feet or more are planned.

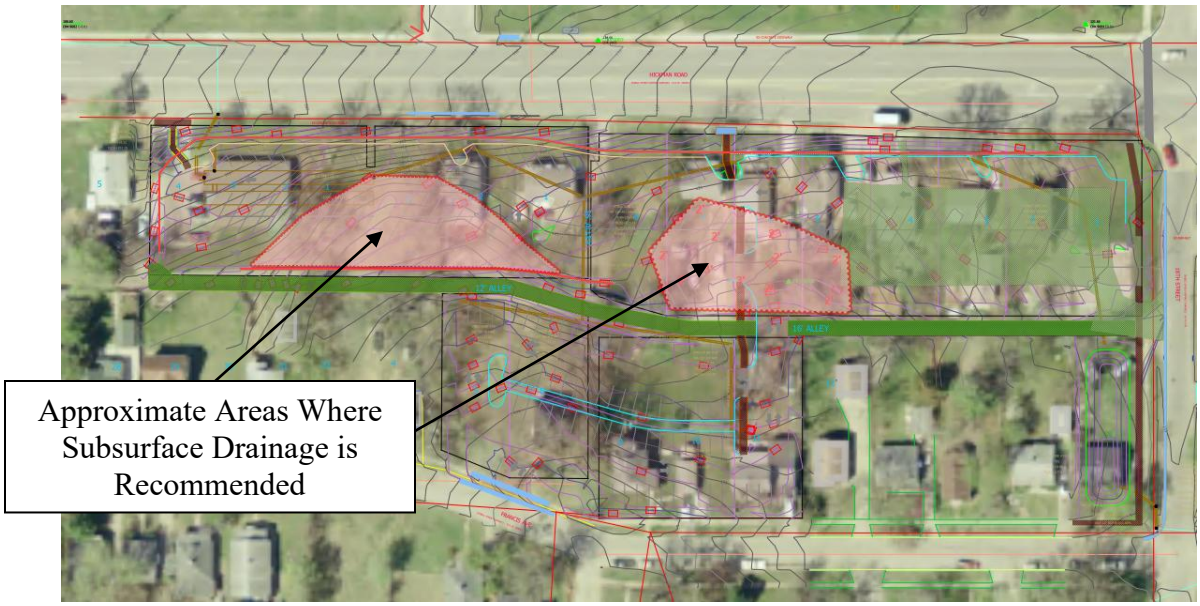


Figure No. 4 – Approximate Areas Where Subsurface Pavement Drainage is Recommended

The permeable subbase should be hydraulically connected to the free draining granular backfill (similar to Iowa DOT Specification 4131) in the subsurface drains. Subsurface drainage may be accomplished with the installation of drainlines similar to the Iowa DOT detail DR-303 or Iowa SUDAS Figure 4040.231. In areas of deeper cut, longitudinal subdrains could be installed along the curbs on either one or both sides of service and access drives. In parking areas, subdrains should be spaced approximately 50 to 75 feet center to center and may be constructed to daylight or be connected to gravity flow storm drains capable of handling the discharge. We are available to review the subdrain layout design, once the final grading plan becomes available, which can be modified at time of construction to accommodate site specific variations in the soil profile and if seepage zones become evident.

Pavement Subgrade Preparation

Uniform subgrade support is critical in pavement performance. As discussed in the *Existing Fill* section of this report, there is risk of settlement and cracking associated with constructing new pavements over existing fill encountered at this site. The risk of pavement settlement and cracking may be acceptable to the owner for economic reasons, as pavements are more easily repaired than footings and floor slabs.

If the owner chooses to accept the risk of future pavement settlement by constructing new pavements over existing fill, we recommend proof-rolling and technical observations be conducted by an ABE geotechnical engineer during subgrade preparation. As a minimum, we recommend

that the prepared subgrade depth be at least 1 foot deep after fine grading or trimming and extend 2 feet beyond the edge of the pavements. The recommended 1 foot of compacted subgrade may necessitate undercutting and reworking soils in cut areas. Subgrade preparation to 1 foot depths for some soil types may not be suitable under repeated heavy construction vehicle loads and may require stabilization to greater depths.

Subgrade preparation should be completed shortly before paving operations commence and is to be maintained in suitable condition until paved. Damages caused by construction traffic or deterioration due to adverse weather are to be repaired prior to paving.

Depending upon conditions encountered at the time of construction, it may be necessary to moisture condition existing soils to achieve the recommended moisture content range of -1 to +4 percent of optimum moisture content. Soils compacted closer to optimum moisture content will exhibit greater stability under construction traffic loading. Suitable cohesive soil compacted to a minimum of 95 percent of maximum dry density determined by ASTM D698 would provide a design support capability equivalent to a CBR value of 3 or a modulus of subgrade reaction value of 100 pounds per cubic inch. Subgrade compaction, moisture content and depth should be tested by an ABE representative.

Pavement Thicknesses

Either rigid (Portland cement concrete, PCC) or flexible (hot mix asphalt, HMA) pavement types could be constructed on the prepared cohesive subgrade. The following Table C summarizes alternate pavement thicknesses for typical lightly-loaded, moderately-loaded and heavily-loaded paved areas. If a minimum 6-inch-thick crushed rock base (such as Iowa DOT 4123 Modified Subbase) with drains is constructed on the compacted subgrade to support the pavement, the recommended thicknesses of PCC or HMA pavement may be reduced by ½ and 1 inch, respectively. However, we recommend the lightly-loaded 5-inch-thick PCC pavement section not be reduced. A more specific pavement evaluation can be provided if traffic volume and loading information is available.

TABLE C
TYPICAL PAVEMENT THICKNESSES

Traffic Volume	Rigid: PCC [1]	Flexible: HMA [2]
Lightly-Loaded [3]	5" [4]	6"
Moderately-Loaded	6"	7"
Heavily-Loaded [5]	7"	8"

1) PCC - Flexural strength of 550 psi
2) Type A HMA - Structural coefficient of 0.44/inch
3) Automobile and 1 to 2 trucks average daily traffic
4) Thickness reduction due to crushed rock subbase does not apply
5) Entrances, delivery areas, dumpster areas or other areas of heavier truck traffic (25 trucks or less per day)

The above pavement thicknesses shown in Table C are considered to be typical and would require periodic maintenance. This maintenance would consist of sealing cracks/joints and replacement of isolated distressed areas. Thicker pavement sections would reduce maintenance and increase the pavement service life. Likewise, thinner sections would be expected to have a shorter service life that still may satisfy particular project needs but may require more maintenance. Other criteria which influence pavement service life include surface drainage, subsurface drainage, paving material quality, reinforcement, and joint design. Construction procedures involving placement, finishing, curing, jointing and weather protection can significantly impact pavement performance.

Frost Heave

Key elements contributing to frost heave including freezing temperatures, available water, and fine-grained frost susceptible soils are generally present at sites in Iowa. As a result, frost heave problems are generally common (and most noticeable) in pavements or sidewalks adjacent to non-frost susceptible elements such as manholes, light poles, and exterior doors or frost protected stoops. Frost heave can cause pavement cracks to develop parallel to and several feet from curbs. This generally occurs where cleared paved areas exposed to freezing temperatures heave more than adjoining paved areas insulated by piled snow. Areas cleared of snow not exposed to periodic sunshine during the winter, such as under canopies, on the north shaded side of buildings and other shaded areas may experience more frost heave than other sunshine exposed areas. Sometimes it is not readily apparent why frost heave problems occur at one location and not at another seemingly similar location.

While it is appropriate to implement measures to reduce frost heave such as insulation, replacing frost susceptible soils with less frost susceptible soils, void forms, sealing cracks/joints to reduce surface water infiltration, or drainage improvements (surface and subsurface), these measures may simply move the frost heave problem to a different location where preventative measures have not been implemented. Having a smooth transition between heaved and non-heaved areas is desirable, but may be difficult and/or costly to accomplish. We are available to consult with you to discuss options for your consideration to reduce frost heave potential on this project.

GENERAL

The analyses and recommendations in this report are based in part upon the data obtained from the soil borings performed at the indicated locations and from any other information discussed in this report. This report does not reflect any variations which may occur between borings or across the site. The nature and extent of such variations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

It is recommended that the geotechnical engineer be provided the opportunity to review the plans and specifications so that comments can be made regarding the interpretation and implementation of our geotechnical recommendations in the design and specifications. It is further recommended that the geotechnical engineer be retained for testing and observation during earthwork and foundation construction phases to help determine that the design requirements are fulfilled.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranty, expressed or implied, is made. In the event that any changes in the nature, design or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed, and the conclusions of this report modified or verified in writing by the geotechnical engineer.

The scope of our service was not intended to include any environmental assessment or exploration for the presence of hazardous or toxic materials in the soil, surface water, groundwater, or air on, below or adjacent to this site.

APPENDIX

BORING LOG DESCRIPTION/LEGEND

The material types encountered during the drilling operations were recorded on field logs. The profile represented on the Boring Log is based on final classification performed by a geotechnical engineer using the field logs, laboratory observation and testing. The material stratigraphy demarcation lines shown on the Boring Logs indicate changes in soil characteristics, however, actual soil changes or variations may occur as a gradual transition. Soil profile discussion, Log Boring information, water levels and recommendations presented in this report are based upon measured depths below ground levels existing at time of the field exploration, unless otherwise specified.

DRILLING AND SAMPLING

The borings were conducted with either a truck or all-terrain rotary drill rig using the drilling methods indicated on each Boring Log. Soil sampling and/or in-situ testing such as Shelby Tube (ST), split-spoon (SS), drive cone (DC), or core (C) was conducted at depth intervals which were selected in consideration of the characteristics of the proposed construction. Generally undisturbed soil samples are taken at 5 foot depth intervals or change in soil types. Disturbed soil samples from the auger, either jar size or bulk size samples, may be taken at intermediate intervals for the purpose of soil classification or laboratory testing. Borings conducted for soil classification only, will show no designation of sampling although disturbed sampling is performed. Soil samples obtained in the field were identified and sealed for transportation to the laboratory for performance of pertinent physical testing and engineering classification.

Drilling Methods

CFA - Continuous Flight Auger: 4, 6, or 8-inch diameter (ASTM D1452).
RD - Rotary Drilling: Using drilling fluid in cased or uncased boring (ASTM D2113).
HSA - Hollow Stem Auger: 6 or 8-inch diameter, continuous flight auger remains in boring with soil removed from the hollow stem through which undisturbed sampling is conducted.
HA - Hand Auger: 4-inch or less diameter.

Sample Types

ST - Shelby Tube: Thin-walled tube samples of cohesive soils (ASTM D1587).
SS - Split Spoon with 140 lb. manual hammer: Standard penetration test and split-barrel samples (ASTM D1586).
SSA - Split Spoon with 140 lb. automatic hammer: Standard penetration test and split-barrel samples (ASTM D1586).
DC - Drive Cone: Dynamic in-place testing of soil using a 2-inch diameter cone with a 60 degree point driven into the soil for continuous 1-foot intervals in the same manner as Split Spoon, no sample is obtained.
C - Core: Sampling hard soil or bedrock with a diamond core barrel in a rotary drill boring (ASTM D2113).
SPT - Standard Penetration Test: Number of blows required to drive sampler (split spoon or drive cone) into the soil with a 140-pound weight dropping a distance of 30-inches (ASTM D1586), number of blows recorded for each 6-inch interval in an 18-inch (or more) penetration depth, values shown are for each 6-inch interval (if series of number sets are shown) or a total of the last two 6-inch intervals (if only one number is shown) which is commonly referred to as "N" in blows per foot. High resistance is indicated by a high number of blows for a lesser penetration depth listed in inches.
BS - Bulk Sample: Disturbed.
CPT - Cone Penetration Test: Quasi-static in-place testing of soils using a 60 degree cone and friction sleeve which are steadily pushed into the soil and measure skin friction and end bearing (ASTM D3441).

STANDARD LABORATORY TESTING

Representative undisturbed soil samples obtained by the Shelby Tube sampler were tested for moisture content (ASTM D2216), density (dry) and unconfined compressive strength (ASTM D2166) in the laboratory. Results of these tests appear on the respective Boring Logs. Additional soil testing including particle size analysis (ASTM D422 or D6913 and D7928) and Atterberg Limits (ASTM D4318) may be conducted, if necessary, to define in more detail pertinent soil characteristics for classification in accordance with the Unified Soil Classification System. Specialized laboratory tests (if conducted) to determine pertinent soil characteristics are discussed in the "Laboratory Testing" section of the report.

WATER LEVEL MEASUREMENT

Water levels indicated on the Boring Logs are the levels measured in the borings at the times indicated. In pervious soils, the indicated levels may reflect the location of groundwater. In low permeability soils, the accurate determination of groundwater levels is not possible with short term observations.

BORING LOG DESCRIPTION/LEGEND

(page 2 of 3)

DESCRIPTIVE SOIL CLASSIFICATION

Soil description is based on the Unified Classification System as outlined in ASTM Designations D-2487 and D-2488. This classification is primarily based upon visual and apparent physical soil characteristics, comparison with other soil samples, and our experience with the soil. Additional laboratory testing may be conducted, if necessary to define in more detail pertinent soil characteristics. The Unified Soil Classification group symbol shown on the boring logs corresponds with the group names listed below. The description includes soil constituents, moisture conditions, color and any other appropriate descriptive terms.

Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name	Group Symbol	Group Name
GW	Well-Graded Gravel	SW	Well-Graded Sand	CL	Lean Clay	CH	Fat Clay
GP	Poorly-Graded Gravel	SP	Poorly-Graded Sand	ML	Silt	MH	Elastic Silt
GM	Silty Gravel	SM	Silty Sand	OL	Organic Clay Organic Silt	OH	Organic Clay Organic Silt
GC	Clayey Gravel	SC	Clayey Sand			PT	Peat

RELATIVE PROPORTIONS			GRAIN SIZE TERMINOLOGY	
Descriptive Term(s) (Of components also present in sample)	Sand and Gravel % of Dry Weight	Fines % of Dry Weight	Major Component of Sample	Size Range
Trace	<15	<5	Cobbles	12 in. to 3 in. (300mm to 75mm)
With	15-30	5-12	Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Modifier	>30	>12	Sand	#4 to #200 sieve (4.75mm to 0.074mm)
			Silt or Clay	Passing #200 sieve (.074 mm)

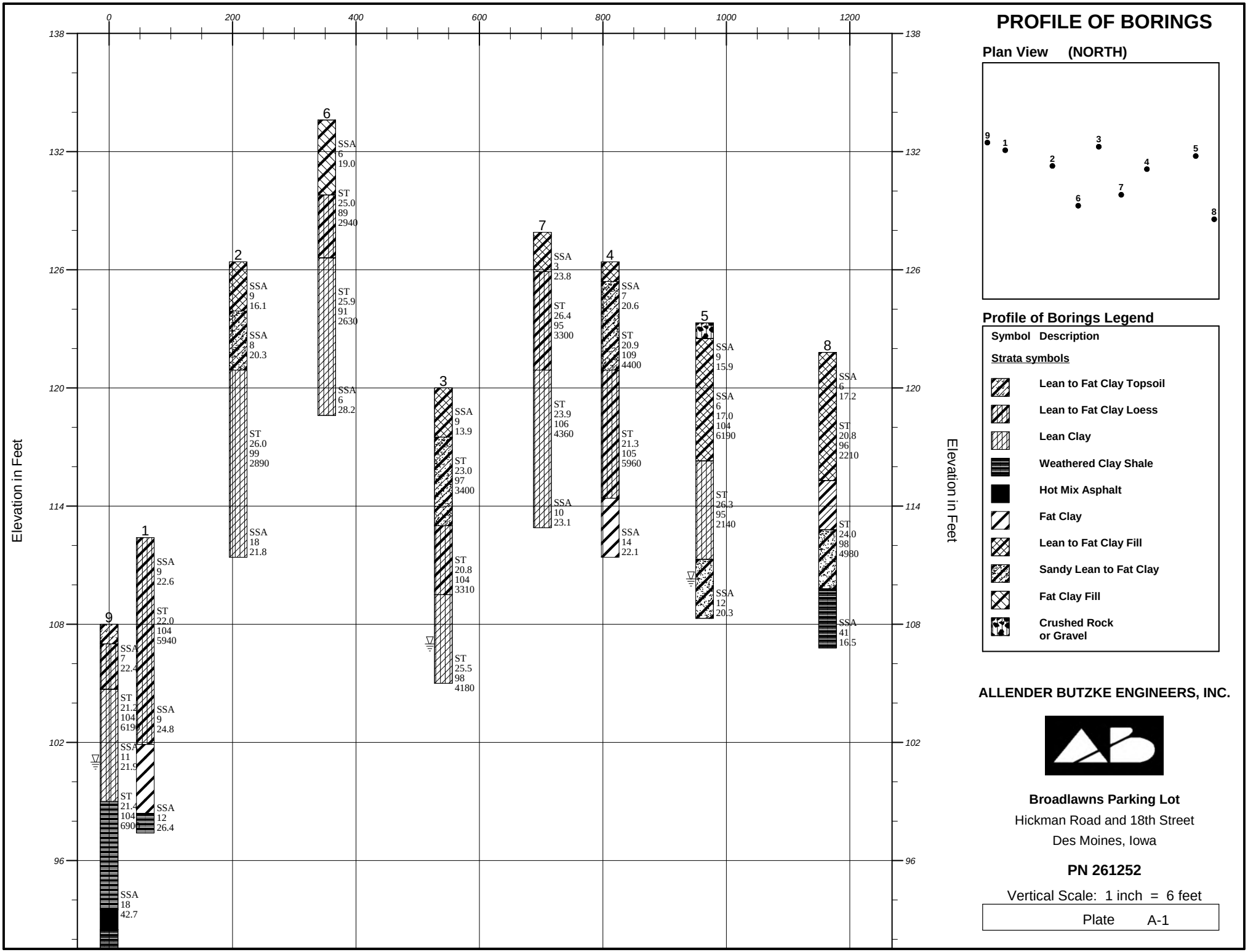
CONSISTENCY OF FINE-GRAINED SOILS			RELATIVE DENSITY OF COARSE-GRAINED SOILS	
Unconfined Compressive Strength, Qu, psf	Consistency	SPT, bpf	SPT, bpf	Relative Density
< 500	Very Soft	0-2	0-4	Very Loose
500-1,000	Soft	2-4	4-10	Loose
1,000-2,000	Medium Stiff	4-8	10-30	Medium Dense
2,000-4,000	Stiff	8-15	30-50	Dense
4,000-8,000	Very Stiff	15-30	50-80	Very Dense
8,000-16,000	Hard	30-100	80+	Extremely Dense
> 16,000	Very Hard	>100		

BORING LOG DESCRIPTION/LEGEND

ABBREVIATIONS

COMMONLY USED ABBREVIATIONS	
ft. or ' - feet	elev. - Elevation
in. or " - inches	% - Percent
psf - pounds per square foot	No. - Number
plf - pound per lineal foot	TB - Test Boring
pcf - pounds per cubic feet	N - blow count (SPT, bpf)
kip - 1000 pounds	USCS - Unified Soil Classification System
ksf - 1000 pounds per square foot	LL - Liquid Limit
klf - 1000 pounds per lineal foot	PL - Plastic Limit
tsf - tons per square foot	PI - Plasticity Index
bpf - blows per foot (SPT, N)	WOH - Weight of Hammer

PROFILE OF BORINGS



Plan View (NORTH)

Profile of Borings Legend

Symbol	Description
	Strata symbols
	Lean to Fat Clay Topsoil
	Lean to Fat Clay Loess
	Lean Clay
	Weathered Clay Shale
	Hot Mix Asphalt
	Fat Clay
	Lean to Fat Clay Fill
	Sandy Lean to Fat Clay
	Fat Clay Fill
	Crushed Rock or Gravel

ALLENDER BUTZKE ENGINEERS, INC.

Broadlawns Parking Lot

Hickman Road and 18th Street

Des Moines, Iowa

PN 261252

Vertical Scale: 1 inch = 6 feet

Plate A-1

BORING LOG NO. 1 **NORTHING 588384.0** **EASTING 1601126.8** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **112.4'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
112	0							Brown lean to fat clay, moist		CL-CH		
		4	SSA	9	22.6							
	4	1	ST		22.0	104	5940	Brown-gray after 3.5'				
108								**B-HORIZON LOESS**				
	8											
104		2	SSA	9	24.8							10.5
								Brown fat clay, moist		CH		101.9
	12							**PALEOSOL**				
100												14
		3	SSA	12	26.4			Brown-gray clay shale, moist		CH		98.4
								WEATHERED BEDROCK				15
	16							End of Boring				97.4
96												
	20											
92												
	24											
88												
	28											
84												

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 2 **NORTHING 588336.3** **EASTING 1601269.5** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **126.4'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							Brown and dark brown lean to fat clay, trace gravel, moist		CL-CH		
		4	SSA	9	16.1			**FILL**				2.5
124								Dark brown sandy lean to fat clay, trace gravel, moist		CL-CH		123.9
	4	1	SSA	8	20.3			**WISCONSINAN GLACIAL TILL**				5.5
120								Brown-gray lean clay, moist		CL		120.9
	8	2	ST		26.0	99	2890	**LOESS**				
116	12											
112		3	SSA	18	21.8							15
	16							End of Boring				111.4
108	20											
104	24											
100	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 3 **NORTHING 588394.5** **EASTING 1601409.9** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **120.0'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
120	0							Dark brown and brown mixed sandy lean to fat clay, trace gravel and glass, damp **FILL**		CL-CH		2.5
		4	SSA	9	13.9							
116	4	1	ST		23.0	97	3400	Brown sandy lean to fat clay, trace gravel, moist **WISCONSINAN GLACIAL TILL**		CL-CH		117.5 / 7
112	8	2	ST		20.8	104	3310	Brown-gray lean to fat clay, moist **B-HORIZON LOESS**		CL-CH		113 / 10.5
108	12	3	ST		25.5	98	4180	Brown-gray lean clay, damp **LOESS** Moisture seepage near 13.5'		CL	▽	109.5 / 15
104	16							End of Boring				105
100	20											
96	24											
92	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **13** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 4 **NORTHING 588326.7** **EASTING 1601555.5** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **126.4'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							Dark brown and brown mixed sandy lean to fat clay, trace gravel and glass, damp		CL-CH		1
		4	SSA	7	20.6			**FILL**		CL-CH		125.4
124								Brown sandy lean to fat clay, trace gravel, moist				
								WISCONSINAN GLACIAL TILL				
	4	1	ST		20.9	109	4400					5.5
120								Brown-gray lean to fat clay, moist		CL-CH		120.9
	8											
		2	ST		21.3	105	5960	**B-HORIZON LOESS**				
116								Very moist after 10.5'				
								Moisture seepage near 11'				12
	12							Dark gray fat clay, moist		CH		114.4
								PALEOSOL				
112		3	SSA	14	22.1							15
								End of Boring				111.4
	16											
108												
	20											
104												
	24											
100												
	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 5 **NORTHING 588366.3** **EASTING 1601703.2** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **123.3'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							**CRUSHED LIMESTONE (9"+/-)**				0.8
		4	SSA	9	15.9			Dark brown, brown, and gray mixed sandy lean to fat clay, moist		CL-CH		122.5
120	4	1	SSA	6	17.0	104	6190	**FILL**				7
116	8	2	ST		26.3	95	2140	Brown-gray lean clay, damp **LOESS**		CL		116.3
112	12	3	SSA	12	20.3			Brown-gray sandy fat clay, trace gravel, moist **PRE-ILLINOIAN GLACIAL TILL**		CH	▽	111.3 / 15
108	16							End of Boring				108.3
104	20											
100	24											
96	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **13** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 6 **NORTHING 588216.0** **EASTING 1601347.6** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **133.6'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							Very dark gray fat clay, trace brick and gravel, moist		CH		
132		4	SSA	6	19.0			**FILL**				3.8
	4	1	ST		25.0	89	2940	Brown lean to fat clay, moist		CL-CH		129.8
128								**B-HORIZON LOESS**				7
	8	2	ST		25.9	91	2630	Brown-gray lean clay, moist to very moist		CL		126.6
124								**LOESS**				
	12											
120		3	SSA	6	28.2							15
	16							End of Boring				118.6
116												
	20											
112												
	24											
108												
	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.

BORING LOG NO. 7 **NORTHING 588249.2** **EASTING 1601477.7** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **127.9'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							Dark brown and brown mixed lean to fat clay, moist **FILL**		CL-CH		2
		4	SSA	3	23.8							
124	4	1	ST		26.4	95	3300	Brown lean to fat clay, moist **B-HORIZON LOESS**		CL-CH		125.9 / 7
120	8	2	ST		23.9	106	4360	Brown-gray lean clay, moist **LOESS**		CL		120.9 / 15
116	12	3	SSA	10	23.1							
112	16							End of Boring				112.9
108	20											
104	24											
100	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 8 **NORTHING 588175.1** **EASTING 1601759.1** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **121.8'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **15**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
	0							Dark brown and brown mixed sandy lean to fat clay, trace gravel, moist		CL-CH		
120		4	SSA	6	17.2			**FILL**				
	4	1	ST		20.8	96	2210					6.5
116								Brown lean to fat clay, moist		CL-CH		115.3
	8							**B-HORIZON LOESS**				
		2	ST		24.0	98	4980					9
112								Brown sandy fat clay, damp		CH		112.8
	12							**PRE-ILLINOIAN GLACIAL TILL**				
												12
108								Brown silty shale, damp		CH		109.8
		3	SSA	41	16.5			**WEATHERED BEDROCK**				
												15
	16							End of Boring				106.8
104												
	20											
100												
	24											
96												
	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **Dry** ft. _____ ft. _____ ft.

ALLENDER BUTZKE ENGINEERS, INC.
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BORING LOG NO. 9 **NORTHING 588407.0** **EASTING 1601072.8** Project No.: **261252**

Project: **Broadlawns Parking Lot**
Hickman Road and 18th Street
Des Moines, Iowa

Client: **Broadlawns Medical Center**
1801 Hickman Road
Des Moines, Iowa

Surface Elevation: **108.0'**
Datum: **Iowa RTN Derived**

Date Drilled: **5/18/2026**
Drilling Depth, ft.: **18.6**

Drilling Method: **4" CFA**
Page: **1** of **1**

Elevation ft.	Depth ft.	Sample No.	Type	SPT bpf	Moisture Content, %	Dry Density pcf	Unconfined Compressive Strength psf	Material Description*	Graphic Log	USCS	Water Level	Depth / Elevation ft.
108	0							Dark brown lean to fat clay, trace organics, damp		CL-CH		1
								TOPSOIL				
		5	SSA	7	22.4			Brown lean to fat clay, moist		CL-CH		107
								B-HORIZON LOESS				
												3.3
104	4	1	ST		21.2	104	6190	Brown-gray lean clay, moist		CL		104.7
								LOESS				
		6	SSA	11	21.9						▽	
100	8											
		2	ST		21.4	104	6900					9
								Brown-gray clay shale, moist		CH		99
96	12											
		3	SSA	18	42.7			**WEATHERED BEDROCK**				
								Coal layer between 14.5 and 15.5 feet				
92	16											
								Very moist after 17'				
												18.5
		4	SSA	50/1.5"	8.3			Gray clay shale, damp				89.5
								BEDROCK				18.6
88	20							End of Boring				89.4
84	24											
80	28											

*The stratification lines represent the approximate boundary lines between material types: in-situ, the transition may be gradual.

Water Level Observation
Time: at completion _____ hrs. _____ days
Depth to water: **7** ft. ▽ _____ ft. ▼ _____ ft. ▼

ALLENDER BUTZKE ENGINEERS, INC.
Geotechnical | Environmental | Construction Q.C.



Plan is intended to show the approximate boring locations only.

Base Plan Polk County 2023 Aerial

ALLENDER BUTZKE ENGINEERS INC.
3660 109th Street
Urbandale, IA 50322

Broadlawns Parking Lot
Hickman Road and 18th Street
Des Moines, Iowa

PN 261252

Site Plan



Plan is intended to show the approximate boring locations only.

Base Plan Polk County 2023 Aerial

ALLENDER BUTZKE ENGINEERS INC.
3660 109th Street
Urbandale, IA 50322

Broadlawns Parking Lot
Hickman Road and 18th Street
Des Moines, Iowa

PN 261252

Site Plan

NOTES

SECTION 00 41 00
BID FORM - STIPULATED SUM

PROJECT: Broadlawns Medical Center – Parking Lot Expansion

BID TO: Broadlawns Medical Center
1801 Hickman Road
Des Moines, IA 50314
Attention: Mr. Proctor Lureman

BID FROM:

_____	_____
Bidder's Company Name	Telephone Number
_____	_____
Date of Proposal	Fax Number
_____	_____
Contact Person	E-mail Address

*******ATTACH A COPY OF THE BID PACKAGE DESCRIPTION(S) TO THIS BID*******

BID FOR: Contract work for the Broadlawns Medical Parking Lot Expansion project as shown in Bidding Documents Dated: September 10th, 2026.

BID PLACE: Bids are to be submitted to Graham Construction on behalf of Mr. Proctor Lureman, Broadlawns Medical Center.

Bids will be received between the hours of 01:00 PM and 2:00 PM CST.

BIDS SHALL BE DELIVERED TO: Broadlawns Medical Center – Medical Plaza
Jenner Conference Room, Building 1 Room MP107
1761 Hickman Road
Des Moines, IA 50314

Hand deliver bids to the address listed above.

BID DATE: Bids are due on Thursday, the 24th of September 2026.

BID TIME: Bids are due no later than 2:00 PM CST.

1. The undersigned BIDDER agrees, if the Bid is accepted, to enter into an agreement with OWNER, in the form included in the Bidding Documents, to perform and furnish the Work as specified or indicated in the Bidding Documents for the Bid Price and within the Bid Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

2. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

    A. This Bid will remain subject to acceptance for 60 days after the day of Bid opening;

B. To the extent permitted by law, the Owner has the right to accept or reject this Bid, including alternate bids, and to waive minor informalities in the bidding;

C. BIDDER accepts the provisions of the Instructions and Supplementary Instructions to Bidders regarding disposition of Bid Security;

D. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within 10 days after the date of Owner's Notice of Award;

E. BIDDER has examined copies of all the Bidding Documents;

F. BIDDER has visited the site and become familiar with the general, local and site conditions;

G. BIDDER is familiar with federal, state, and local laws and regulations;

H. BIDDER has correlated the information known to BIDDER, information and observations obtained from visits to the site, reports and drawings identified in the Bidding Documents and additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents;

I. This Bid is genuine and not made in the interest of or on behalf of an undisclosed person, firm or corporation and is not submitted in conformity with an agreement or rules of a group, association, organization or corporation; BIDDER has not directly or indirectly induced or solicited another Bidder to submit a false or sham Bid; BIDDER has not solicited or induced a person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself an advantage over another BIDDER or over OWNER.

J. Qualified Bids will not be accepted.

K. This project is sales tax exempt. The owner will issue an exemption certificate for the purchase or use of building materials, supplies, and equipment that will be used in the performance of the construction contract.

L. Combined bids will not be accepted. Bidders may bid more than one Package.

3. BIDDER has received the following Addenda. Receipt of which is hereby acknowledged;

Addendum No. ___ Dated _____ Addendum No. ___ Dated _____

4. BIDDER hereby acknowledges that sales tax has not been included in the bid values listed below.

5. BIDDER will complete the work for the Bid Package(s) listed below in accordance with the Contract Documents (all bids will be Prime Contract bids to include all labor, material, shop drawings, superintendence, project management, delivery, unloading, tools, equipment, rigging, cleaning, adjusting, etc. to complete the work):

Bid Pkg	Bid Package Title	Written Bid Amount	Numerical Bid Amount
00	General Requirements	INCLUDED BY REFERENCE TO BE PART OF ALL BID PACKAGES	INCLUDED
01	Landscape		$
02	Sitework & Underground Utilities		$

03	Concrete & Retaining Wall		$
04	Electrical		$
Alt 1	Deduct for Modifications to Alleyway (Alternate No. 1)		$

6. ALTERNATES – refer to Specification Section 00 4200 for descriptions. If the items below are left blank it will be considered "No Change" and zero dollars if the alternate is accepted.

A. Alternate No. 1 – Deduct for Modifications to Alleyway

BP #01: ADD / DEDUCT _____ Dollars $_____
(circle one)

BP #02: ADD / DEDUCT _____ Dollars $_____
(circle one)

BP #03: ADD / DEDUCT _____ Dollars $_____
(circle one)

BP #04: ADD / DEDUCT _____ Dollars $_____
(circle one)

B. Note: If any Alternates are accepted by the owner, the owner reserves the right to reject and remove any other bid packages and their scopes entirely from the project scope.

7. BIDDER agrees that all Work will be substantially complete per the schedule as outlined in Specification Section 01 15 20 & 01 15 20.01.

8. BID FORM SIGNATURE(S):

SUBMITTED: _____, 20_____
(Date)

BY: _____
(Bidder - print the full name of your firm)

_____
(Signature and *printed* name of person authorized to sign) (Title)

END OF SECTION 00 41 00

SECTION 00 42 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Definition of Alternate.

B. Coordination of Work.

C. Submission procedures.

D. Schedule and description of alternates.

1.02 DEFINITION

A. An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

1.03 GENERAL

A. The proposal price for each Alternate shall cover all Work listed in, incidental to or reasonably implied in connection with the subject and nature of the Alternate such as miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not specifically mentioned as part of the Alternate. No revisions in Alternate proposals, if accepted, will be allowed by reason of the failure of the Contractor to include all items of Work incidental to or reasonably implied by the description of each Alternate bid.

B. The provisions of the Base Bid Specifications apply to all items of labor, materials, workmanship, installation, etc., in connection with the Alternate bids, except as may be specifically shown or noted to the contrary.

C. Work contained in additive Alternate bids which follow is not included in Base Bid, but only in the Alternate bids.

D. In Alternate bids for different makes of equipment, the alternate equipment must conform to the specified requirements and characteristics and must fit within the available space.

1.04 COORDINATION

A. Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the Project.

1.05 SUBMISSION REQUIREMENTS

A. Submit Alternates identifying the effect on adjacent or related components.

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

C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.06 SCHEDULE OF ALTERNATES

A. Alternate No. 1 – Deduct for Modifications to Alleyway

Based on city confirmation, vacation, conveyance and purchase of alleyway, the retaining wall may require less overall height, and the western portion of the alleyway will not need to be gravel. Provide credit for not placing 6” Class A roadstone on west side of the alley, pouring the retaining wall at a lower height and shorter length at the alleyway, reduced guardrail length in that section, and reduced length in subdrain. Provide cost for additional shrubbery and topsoil in area wall will not be poured.

B. Voluntary Alternates

Voluntary Alternates may not be provided. Thorough description must be provided with costs outlined for each alternate described.

END OF SECTION 00 42 00

SECTION 00 50 00
AGREEMENT FORM

ARTICLE 1 – AGREEMENT FORM

1. AIA Document A132/CMa Standard Form of Agreement Between Owner and Contractor, 2009 Construction Manager as Adviser Edition, is bound within this project manual as part of the Contract Documents. This is the final modified agreement to be used for the parties.

   Modified AIA A132/CMa Contract Attached

END OF SECTION 00 50 00

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 Twenty-first day of August in the year Two Thousand Twenty-Six
(In words, indicate day, month, and year.)

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

Broadlawns Medical Center Parking Lot Expansion
1826 Hickman Rd
Des Moines, IA 50314

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

Broadlawns Medical Center
1801 Hickman Rd
Des Moines, IA 50314

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

To be determined by Public bid.

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 copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

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 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 shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, 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. 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.

§ 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. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ 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 false work and other temporary structures, and 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. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ 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 Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ 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.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against

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direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[ ] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

[ ] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

[ ] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

[ ] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

[ ] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

[ ] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

[ ] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

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§ A.2.5 Other Optional Insurance.
The Owner shall purchase and maintain the insurance selected below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[ ] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

[ ] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	**Limits**

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS
§ A.3.1 General
§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates 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. 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 as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ 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 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 Owner's general 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 from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(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.)

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§ 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 One Million Dollars and Zero Cents ($ 1,000,000.00) each occurrence, Two Million Dollars and Zero Cents ($ 2,000,000.00) general aggregate, and Two Million Dollars and Zero Cents ($ 2,000,000.00) 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 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.

§ 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.

.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 One Million Dollars and Zero Cents ($ 1,000,000.00) 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.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for 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 at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than One Million Dollars and Zero Cents ($ 1,000,000.00) each accident, One Million Dollars and Zero Cents ($ 1,000,000.00) each employee, and One Million Dollars and Zero Cents ($ 1,000,000.00) 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

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Professional Liability insurance covering performance of the professional services, with policy limits of not less than Three Million Dollars and Zero Cents ($ 3,000,000.00) per claim and Three Million Dollars and Zero Cents ($ 3,000,000.00) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than Three Million Dollars and Zero Cents ($ 3,000,000.00) per claim and Three Million Dollars and Zero Cents ($ 3,000,000.00) 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 Three Million Dollars and Zero Cents ($ 3,000,000.00) per claim and Three Million Dollars and Zero Cents ($ 3,000,000.00) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than Zero Dollars and Zero Cents ($ 0.00) per claim and Zero Dollars and Zero Cents ($ 0.00) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than Zero Dollars and Zero Cents ($ 0.00) per claim and Zero Dollars and Zero Cents ($ 0.00) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

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

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[ ] **§ A.3.3.2.1** If there is only one Contractor performing the Work on the Project, property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

[ ] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than ($)

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per claim and ($) in the aggregate, for Work within fifty (50) feet of railroad property.

[ ] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than ($) per claim and ($) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[ ] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[ ] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

[ ] **§ A.3.3.2.6 Other Insurance**

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	**Limits**

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, 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)**
Payment Bond	Written in the amount of the contract sum
Performance Bond	Written in the amount of the contract sum

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.

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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NOTICE OF AWARD

TO: _____
_____
_____
_____
_____

PROJECT Description: _____
_____
_____

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____ , 20____, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of $_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR's Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to Graham Construction.

Dated this _____day of _____, 20____.

_____
Graham Construction

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

By: _____,

the _____ day of _____, 20_____.

By: _____

Title: _____

SECTION 00 60 00
GENERAL CONDITIONS

ARTICLE 1 – GENERAL CONDITIONS

1 AIA Document A232/CMa General Conditions of the Contract for Construction, 2009 Construction Manager as Adviser Edition, is the General Conditions between the Owner and the Contractor, is bound within this project manual as part of the Contract Documents.

Modified AIA A232/CMa General Conditions Attached

END OF SECTION 00 60 00

SECTION 00 70 00
INSURANCE REQUIREMENTS

ARTICLE 1 – SAMPLE INSURANCE CERTIFICATE

1. The Owner has determined the minimum insurance requirements during the execution of this agreement. See the sample insurance certificate for limits, waiver of subrogation, & additional insured requirements.

2. Attached sample insurance certificate will be Exhibit E in the AIA Document A132 Agreement.

END OF SECTION 00 70 00

SECTION 00 90 00
EXISTING HAZARDOUS MATERIAL INFORMATION

ARTICLE 1 – EXISTING HAZARDOUS MATERIAL

1.1 Existing Hazardous Material Information

A. Document 00 12 00 "Invitation to Bid" for the Bidder's responsibilities for examination of Project site and existing conditions. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. No asbestos inspection report for this project was prepared by Iowa Environmental Services Inc. for the Broadlawns Medical Center Parking Lot Addition. Asbestos is presumed to have been previously abated in years past. If any suspect material is encountered during the course of construction contact the Construction Manager immediately.

C. No inspections or reports are available for lead, PCB (Polychlorinate Biphenyl), existing mold and mildew, or other potential Hazardous materials.

D. Related Requirements:

1. Document 00 12 00 "Invitation to Bid" for the Bidder's responsibilities for examination of Project site and existing conditions.

END OF SECTION 00 90 00

SECTION 01 10 00
SUMMARY

PART 1 GENERAL

1.01 PROJECT

A. Project Name: 240308-1 Parking Lot Expansion.

B. Owner's Name: Broadlawns Medical Center.

C. Civil Engineer: Bishop Engineering.

D. Construction Manager: Graham Construction Company.

E. Structural Engineer: Tometich Engineering.

F. Electrical Engineer: KCL Engineering

G. The project consists of the construction of an approximately 128,300 square foot parking lot expansion with 234 new parking stalls. The work includes, but is not limited to, excavation and grading, storm drainage structures and piping, underground detention system, concrete paving, joint sealants, pavement striping, signage, retaining wall, landscaping, erosion control, a storm water retention pond and site lighting and electrical.

1.02 CONTRACT DESCRIPTION

A. Contract Type: Multiple prime contracts, each based on a Stipulated Price, Publicly Bid as described in Document 00 01 11.

B. Estimated Construction Budget: $4,000,000.

C. Construction Commencement: October 19th, 2026.

D. Substantial Completion: July 7th, 2026.

E. Final Completion: July 7th, 2026.

1.03 DESCRIPTION OF ALTERATIONS WORK

A. Scope of demolition and removal work is indicated on drawings and specified in Section 02 41 00.

B. Scope of alterations work is indicated on drawings.

1.04 WORK BY OWNER

A. Owner will award a contract for supply and installation of pole mounted cameras which will commence on a date to be determined later.

1. Cut sheets for planned equipment will be available to the contractors during construction.
2. Final utility connections shall be performed under this Contract.

B. Items noted NIC (Not in Contract) will be supplied and installed by Owner (OFOI) after Substantial Completion. Some items include:

1. Pole mounted cameras.
2. Exterior Signage.

1.05 OWNER-FURNISHED ITEMS

A. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.

C. The Owner will arrange and pay for delivery of Owner-furnished items in accordance with the Contractor's Construction Schedule, and will inspect deliveries for damage.

D. If Owner-furnished items are damaged, defective or missing, the Owner will arrange for replacement. The Owner will also arrange for manufacturer's field services, and the delivery of manufacturer's warranties and bonds to the Contractor.

E. The Contractor is responsible for designating the delivery dates of Owner furnished items in the Contractor's Construction Schedule and for receiving, unloading and handling Owner- furnished items at the site.

F. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements, and to repair or replace items damaged as a result of his operations.

1.06 OWNER OCCUPANCY

A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.

B. Owner intends to occupy the Project upon Substantial Completion.

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy.

1.07 CONTRACTOR USE OF SITE AND PREMISES

A. Construction Operations: Limited to areas noted on Drawings.

1. Locate and conduct construction activities in ways that will limit disturbance to site.

B. Arrange use of site and premises to allow:

1. Owner occupancy.
2. Work by Others.
3. Work by Owner.
4. Use of site and premises by the public.

C. Provide access to and from site as required by law and by Owner:

1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
2. Do not obstruct roadways, sidewalks, or other public ways without permit.

D. Time Restrictions:

1. Limit conduct of especially noisy work to hours as coordinated with the Owner.

E. Utility Outages and Shutdown:

1. Limit disruption of utility services to hours the building is unoccupied.
2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

1.08 WORK SEQUENCE

A. Coordinate construction schedule and operations with Design Professional.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 10 00

SECTION 01 15 20
PROJECT BID SCHEDULE

A. The following is the project bid schedule. Each Contractor shall review the schedule carefully and include in their bid any shift premiums or overtime required to complete their work in the duration shown. Work that is not completed on schedule may be completed by the Owner or Owner's Agents by whatever means necessary and the cost for such work will be subtracted from the Contractors contract sum.

B. The project bid schedule is intended to show general flow of work. It is not intended to show all activities or durations as that detail will be developed with contractor input upon award.

C. Each prime contractor should note the project is expected to be staffed at a minimum of Monday through Friday 7:00 a.m. to 4:00 p.m. of each week while performing the scope of work relevant to their contract. A minimum of one representative from each company must be on site during that time. Contractor acknowledges working in the hospital environment will likely require off hour work to minimize the impact to the hospital and has included those costs in their bid.

D. Deliveries will be coordinated off hours to minimize the impact to hospital operations. These deliveries will be outside the typical work hours noted above.

E. Any schedule delays will need to be documented within 10 business days of the delay. The Owner may elect to allow additional time. If allowed, this will be at no additional cost to the Owner.

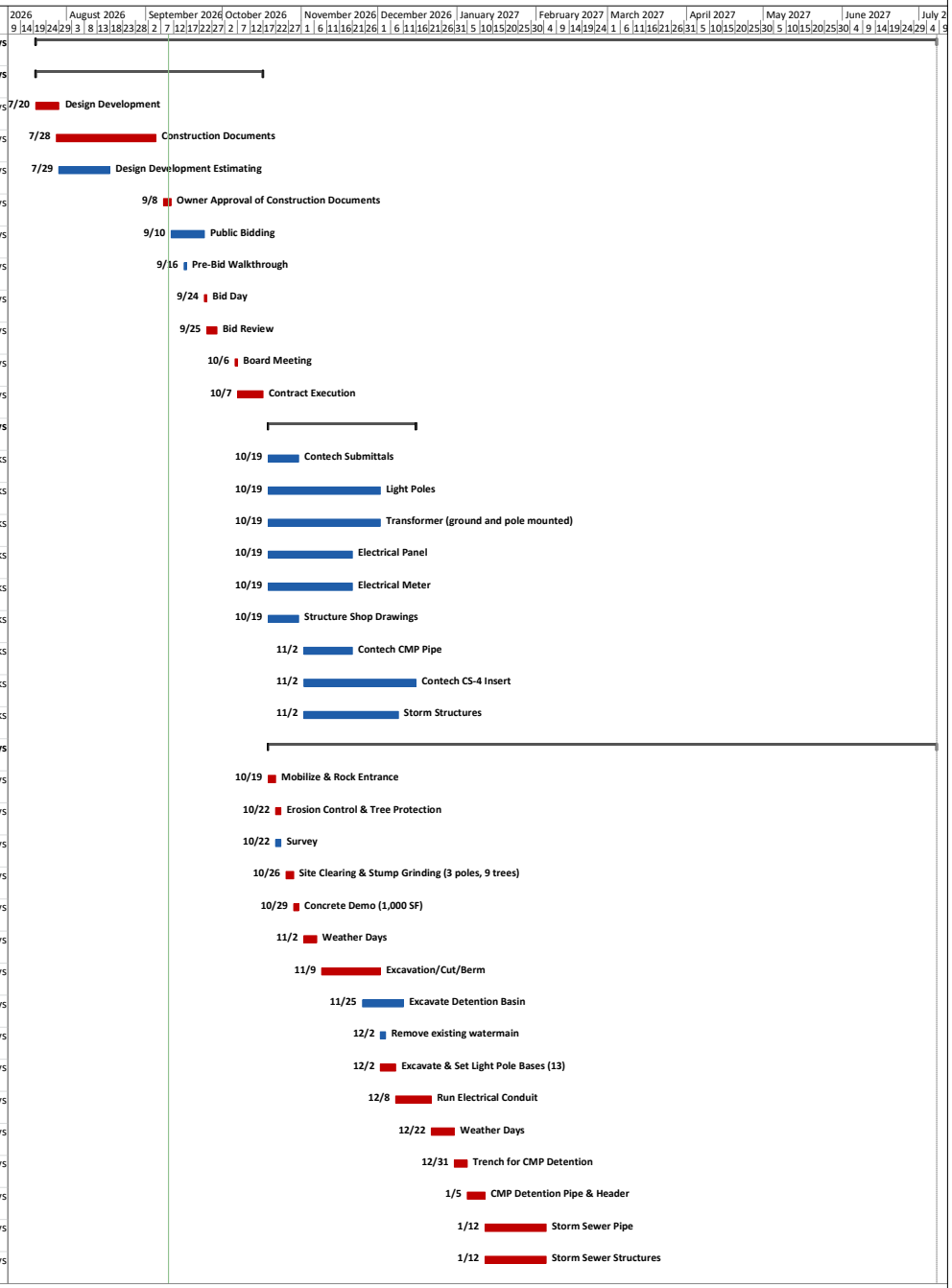
END OF SECTION 01 15 20

SEE ATTAHCMENT:
SECTION 01 15 20.01 – PROJECT BID SCHEDULE

Parking Lot Expansion

Preliminary Schedule
Issued Thu 9/10/26
UPDATED

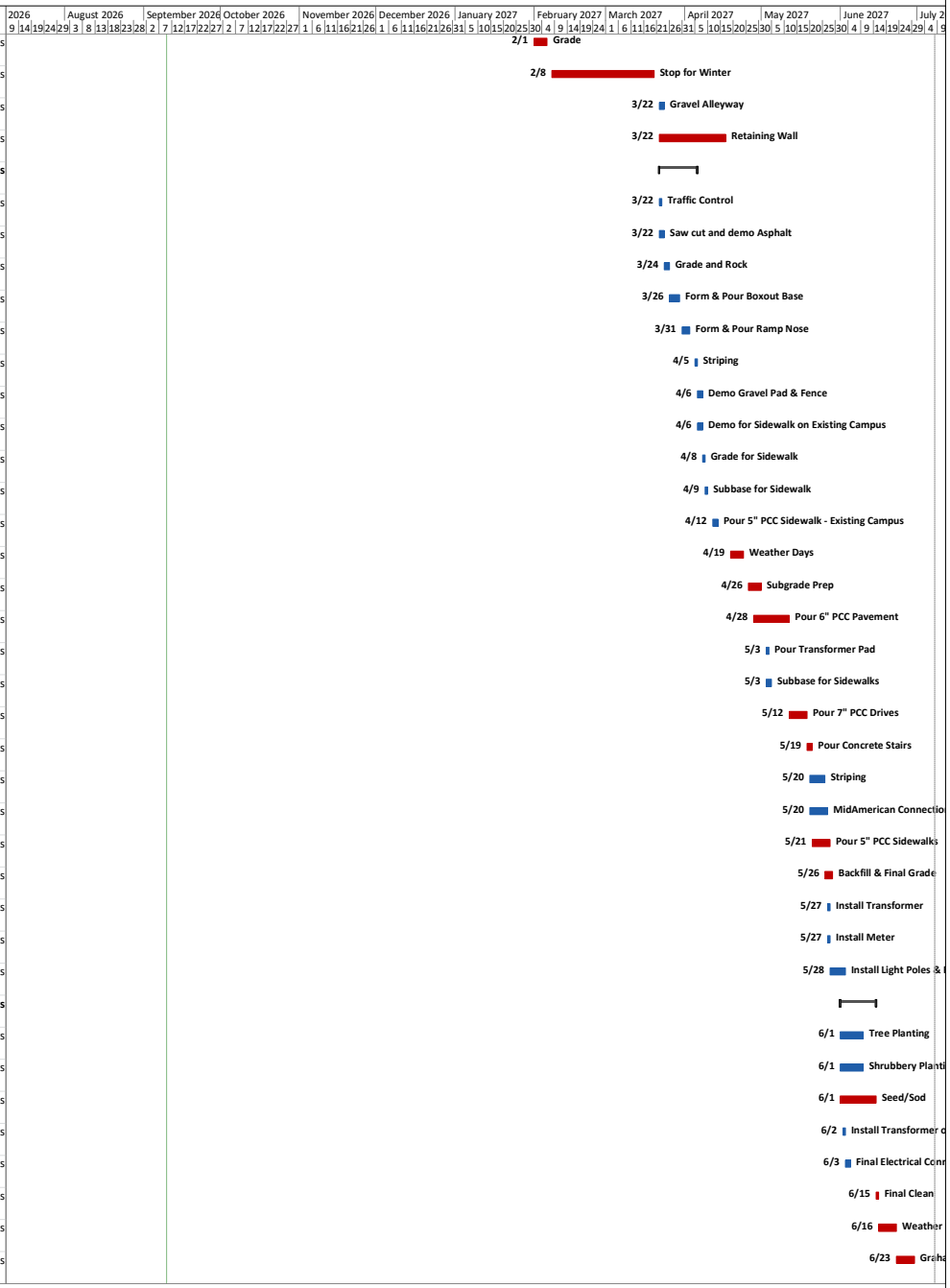
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Total Slack
1	**BMC Parking Lot Expansion**	**246 days**	**Mon 7/20/26**	**Wed 7/7/27**			**0 days**
2	**Drawings/Permitting**	**64 days**	**Mon 7/20/26**	**Fri 10/16/26**			**0 days**
3	Design Development	7 days	Mon 7/20/26	Tue 7/28/26		5,4FS-1 day	0 days
4	Construction Documents	29 days	Tue 7/28/26	Fri 9/4/26	3FS-1 day	6	0 days
5	Design Development Estimating	14 days	Wed 7/29/26	Mon 8/17/26	3		225 days
6	Owner Approval of Construction Documents	3 days	Tue 9/8/26	Thu 9/10/26	4	7	0 days
7	Public Bidding	13 edays	Thu 9/10/26	Wed 9/23/26	6	9,8SS+3 days	0.63 edays
8	Pre-Bid Walkthrough	1 day	Wed 9/16/26	Wed 9/16/26	7SS+3 days		204 days
9	Bid Day	1 day	Thu 9/24/26	Thu 9/24/26	7	10	0 days
10	Bid Review	2 days	Fri 9/25/26	Mon 9/28/26	9	11FS+5 days	0 days
11	Board Meeting	1 day	Tue 10/6/26	Tue 10/6/26	10FS+5 days	12	0 days
12	Contract Execution	8 days	Wed 10/7/26	Fri 10/16/26	11	15,16,17,18,24,19,14	0 days
13	**Material Procurement/Submittals**	**40 days**	**Mon 10/19/26**	**Tue 12/15/26**			**21 days**
14	Contech Submittals	2 wks	Mon 10/19/26	Fri 10/30/26	12	20,21	5.2 wks
15	Light Poles	6 wks	Mon 10/19/26	Tue 12/1/26	12		30.4 wks
16	Transformer (ground and pole mounted)	6 wks	Mon 10/19/26	Tue 12/1/26	12		30.4 wks
17	Electrical Panel	5 wks	Mon 10/19/26	Fri 11/20/26	12		31.4 wks
18	Electrical Meter	5 wks	Mon 10/19/26	Fri 11/20/26	12		31.4 wks
19	Structure Shop Drawings	2 wks	Mon 10/19/26	Fri 10/30/26	12	22	4.2 wks
20	Contech CMP Pipe	3 wks	Mon 11/2/26	Fri 11/20/26	14	38	5.2 wks
21	Contech CS-4 Insert	6 wks	Mon 11/2/26	Tue 12/15/26	14		28.4 wks
22	Storm Structures	5 wks	Mon 11/2/26	Tue 12/8/26	19	40	4.2 wks
23	**Construction**	**182 days**	**Mon 10/19/26**	**Wed 7/7/27**			**0 days**
24	Mobilize & Rock Entrance	3 days	Mon 10/19/26	Wed 10/21/26	12	25	0 days
25	Erosion Control & Tree Protection	2 days	Thu 10/22/26	Fri 10/23/26	24	27,26SS	0 days
26	Survey	2 days	Thu 10/22/26	Fri 10/23/26	25SS		177 days
27	Site Clearing & Stump Grinding (3 poles, 9 trees)	3 days	Mon 10/26/26	Wed 10/28/26	25	29	0 days
29	Concrete Demo (1,000 SF)	2 days	Thu 10/29/26	Fri 10/30/26	27	31,30	0 days
30	Weather Days	5 days	Mon 11/2/26	Fri 11/6/26	29	31	0 days
31	Excavation/Cut/Berm	15 days	Mon 11/9/26	Tue 12/1/26	29,30	32FS-3 days,33,34	0 days
32	Excavate Detention Basin	10 days	Wed 11/25/26	Thu 12/10/26	31FS-3 days	37	12 days
33	Remove existing watermain	2 days	Wed 12/2/26	Thu 12/3/26	31		150 days
34	Excavate & Set Light Pole Bases (13)	4 days	Wed 12/2/26	Mon 12/7/26	31	35	0 days
35	Run Electrical Conduit	10 days	Tue 12/8/26	Mon 12/21/26	34	41,36	0 days
36	Weather Days	5 days	Tue 12/22/26	Wed 12/30/26	35	37	0 days
37	Trench for CMP Detention	2 days	Thu 12/31/26	Mon 1/4/27	32,36	38	0 days
38	CMP Detention Pipe & Header	5 days	Tue 1/5/27	Mon 1/11/27	37,20	39	0 days
39	Storm Sewer Pipe	18 days	Tue 1/12/27	Thu 2/4/27	38	40SS	0 days
40	Storm Sewer Structures	18 days	Tue 1/12/27	Thu 2/4/27	39SS,22	41FF+1 day	0 days



Parking Lot Expansion

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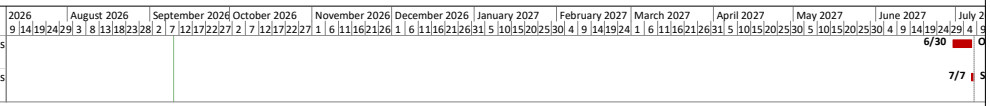
ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Total Slack
41	Grade	5 days	Mon 2/1/27	Fri 2/5/27	35,40FF+1 day	42	0 days
42	**Stop for Winter**	**30 days**	**Mon 2/8/27**	**Fri 3/19/27**	41	44,46,43	0 days
43	Gravel Alleyway	2 days	Mon 3/22/27	Tue 3/23/27	42		75 days
44	Retaining Wall	20 days	Mon 3/22/27	Fri 4/16/27	42	57FS-2 days,52	0 days
45	**Ramped Median**	**11 days**	**Mon 3/22/27**	**Mon 4/5/27**			**60 days**
46	Traffic Control	1 day	Mon 3/22/27	Mon 3/22/27	42	47SS	60 days
47	Saw cut and demo Asphalt	2 days	Mon 3/22/27	Tue 3/23/27	46SS	48	60 days
48	Grade and Rock	2 days	Wed 3/24/27	Thu 3/25/27	47	49	60 days
49	Form & Pour Boxout Base	2 days	Fri 3/26/27	Mon 3/29/27	48	50FS+1 day	60 days
50	Form & Pour Ramp Nose	3 days	Wed 3/31/27	Fri 4/2/27	49FS+1 day	51	60 days
51	Striping	1 day	Mon 4/5/27	Mon 4/5/27	50	53	60 days
28	Demo Gravel Pad & Fence	2 days	Tue 4/6/27	Wed 4/7/27	53SS		64 days
53	Demo for Sidewalk on Existing Campus	2 days	Tue 4/6/27	Wed 4/7/27	51	54,28SS	60 days
54	Grade for Sidewalk	1 day	Thu 4/8/27	Thu 4/8/27	53	55	60 days
55	Subbase for Sidewalk	1 day	Fri 4/9/27	Fri 4/9/27	54	56	60 days
56	Pour 5" PCC Sidewalk - Existing Campus	2 days	Mon 4/12/27	Tue 4/13/27	55		60 days
52	Weather Days	5 days	Mon 4/19/27	Fri 4/23/27	44	57	0 days
57	Subgrade Prep	5 days	Mon 4/26/27	Fri 4/30/27	44FS-2 days,52	58SS+2 days,59,60	0 days
58	Pour 6" PCC Pavement	10 days	Wed 4/28/27	Tue 5/11/27	57SS+2 days	61,63FS+6 days	0 days
59	Pour Transformer Pad	1 day	Mon 5/3/27	Mon 5/3/27	57		46 days
60	Subbase for Sidewalks	2 days	Mon 5/3/27	Tue 5/4/27	57	62	10 days
61	Pour 7" PCC Drives	5 days	Wed 5/12/27	Tue 5/18/27	58	67FS+1 day,65,62	0 days
62	Pour Concrete Stairs	2 days	Wed 5/19/27	Thu 5/20/27	60,61	65	0 days
63	Striping	4 days	Thu 5/20/27	Tue 5/25/27	58FS+6 days	64SS	23 days
64	MidAmerican Connection	5 days	Thu 5/20/27	Wed 5/26/27	63SS	67	23 days
65	Pour 5" PCC Sidewalks	5 days	Fri 5/21/27	Thu 5/27/27	62,61	66FS-2 days	0 days
66	Backfill & Final Grade	3 days	Wed 5/26/27	Fri 5/28/27	65FS-2 days	73,71,72	0 days
67	Install Transformer	1 day	Thu 5/27/27	Thu 5/27/27	61FS+1 day,64	68FF,69	23 days
68	Install Meter	1 day	Thu 5/27/27	Thu 5/27/27	67FF		28 days
69	Install Light Poles & Fixtures	3 days	Fri 5/28/27	Wed 6/2/27	67	74FF,75	23 days
70	**Landscaping**	**10 days**	**Tue 6/1/27**	**Mon 6/14/27**			**0 days**
71	Tree Planting	7 days	Tue 6/1/27	Wed 6/9/27	66		20 days
72	Shrubbery Plantings	7 days	Tue 6/1/27	Wed 6/9/27	66		20 days
73	Seed/Sod	10 days	Tue 6/1/27	Mon 6/14/27	66	76	0 days
74	Install Transformer on Pole	1 day	Wed 6/2/27	Wed 6/2/27	69FF		25 days
75	Final Electrical Connections	2 days	Thu 6/3/27	Fri 6/4/27	69		23 days
76	Final Clean	1 day	Tue 6/15/27	Tue 6/15/27	73	77	0 days
77	Weather Days	5 days	Wed 6/16/27	Tue 6/22/27	76	78	0 days
78	Graham Punch	5 days	Wed 6/23/27	Tue 6/29/27	77	79	0 days



Parking Lot Expansion

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UPDATED

ID	Task Name	Duration	Start	Finish	Predecessors	Successors	Total Slack
79	OAC Punch	5 days	Wed 6/30/27	Tue 7/6/27	78	80	0 days
80	Substantial Completion	1 day	Wed 7/7/27	Wed 7/7/27	79		0 days



SECTION 01 35 00
HOSPITAL DUST CONTROL PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. The hospital facilities are and will be acutely sensitive to dust and associated contaminants. The following processes are required for the work:

1. Protection to the Building operations from the migration of contaminants out of construction areas and into active portions of the facility.

2. Design, labor, materials, equipment, and incidental expense necessary to accomplish the intent of these specifications.

3. Special Ductwork Requirements.

4. HVAC filter changes.

B. Related Sections:

1. Section 01 3520 – SPECIAL PROJECT PROCEDURES.

C. Systems:

1. The type of barrier required will vary with the space being adjacent to the work area, though all barriers shall be kept tight for the purpose intended.

2. Operations including movement of materials outside the work area but inside the facility are subject to dust control requirements as directed by Owner.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Construction separators, partitions exposed to public view or fire-rated partitions specified elsewhere.

B. For other locations, materials generally used:

1. Wood Standard Frames.

2. Polyethylene Film: 6 mil, reinforced.

3. Pressure Sensitive Poly-Film for joining film.

4. Caulking or compressible foam seals for joints around perimeter of partition.

5. Plywood: ½” CD minimum for wainscot and temporary doors.

6. Studs: Wood or metal.

C. Equipment:

1. Minimum: collection device with bag filter and particle separator.

2. Other: As required to comply with requirements of the Section.

D. Filters

1. For Permanent Air Handling Equipment: As specified under Division 15.

2. Return Air Intakes: Media type filters, acceptable to Architect and Owner.

3. Supply Air Discharges: As specified under Division 15.

PART 3 – EXECUTION

3.03 DESIGN

A. The Contractor shall bear responsibility of all design of the barriers and source dust control. Barrier design source dust control is subject to Owner review and approval and subsequent correction and resubmission, if required.

B. All materials and equipment selected are subject to Owner's approval and only general types are included herein for reference.

C. Collect dust as produced by work.

D. Vent air from area to prevent dust from entering occupied portions of building and HVAC system.

3.02 ERECTION

A. The barriers shall be quickly and neatly prepared before other work is performed on the project.

B. All barriers shall be immediately repaired when damaged by the Contractor's personnel, and the cost of such repairs shall be borne by the Contractor.

C. Upon completion of the project, remove all barriers from premises and restore the area to its original condition.

3.03 FILTER CHANGES

A. HVAC Contractor: Responsible to keep all filters changed for both temporary and permanent equipment and openings.

B. Normal Schedule Changes: Change filters at not less than the following intervals:

1. Permanent Air Handling Equipment: Monthly

2. Return Air Intakes: Weekly

3. Supply Air Discharges: Monthly

4. Other Locations: As required to safeguard cleanliness of HVAC system.

C. Unscheduled Changes: In addition to schedule changes, provide additional filter changes when filters become sufficiently dirty to prevent efficient equipment operation or jeopardize the cleanliness of ductwork.

D. Costs: cost of filter changes borne as follows:

1. HVAC Contractor: All costs associated with normal schedule changes.

2. General Contractor: Unscheduled changes, as an indicator that his efforts of local source dust control are inadequate.

E. Contractor's Option: At areas where equipment does not service area outside the construction zone, filter changes shall be as required to maintain equipment and ductwork cleanliness achieved by the criteria above. Architect reserves the right to require inspection ports be installed at no additional cost; if he believes the Contractor is not achieving the desired result.

1. Cleanliness Failure:

A. Ductwork: As described above.

B. Equipment: As desired by the Architect at no increased cost to Owner.

3.04 PROTECTION, MAINTENANCE AND REMOVAL

A. Protect all existing elements in work area from damage and dust.

B. Maintain all dust control devised and measures in effective condition.

C. Remove all control devices and materials at completion of job or when required for completion of work. Earlier removal subject to approval of Architect.

END OF SECTION 01 35 00

SECTION 01 35 20
SPECIAL PROJECT PROCEDURES

PART1 – GENERAL

1.01 SECTION INCLUDES

SPECIAL NOTE: This specification section will be used for any work that must be performed after the owner takes occupancy of the building, and all work performed within or near the existing hospital.

A. Procedures for Work in an Operational Hospital.

1.02 GENERAL

A. The existing hospital is a fully functioning facility. During construction of the new work and all renovation, no interruption of services offered by the Hospitals is permitted. Consult and carefully schedule with the Owner to comply with this requirement. The Owner will cooperate within reason, but the need to provide full, uninterrupted medical care will supersede any construction aspect.

B. Owner may direct Contractor to cease work where Contractor's operations interrupt hospital functions.

C. Contractors Requests to Owner: All Contractor request to be given to Construction Manager in writing with advance notice not less than the following:

1. Power Shut-down or Life Support: 15 working days; see ELECTRIC SHUT-DOWN/LIFE below.

2. All others: 72 hours

1.03 PROCEDURE IN OPERATIONAL HOSPITAL

A. The Hospital must remain in operation at all times. Where the Hospital vacates to allow work in an area, services and utilities may be cut as long as the continuity of the service does not affect other areas. Access must be maintained to all other areas in a safe and sanitary manner. Compliance with good safety practice is to be exercised at all times. Work shall be done in a manner so as to protect patients, visitors, employees and equipment. Safe equipment only shall be used, and used in a safe manner. Unsafe conditions such as obstacles in corridors, improperly made connections, unstable piling of materials, loose material overhead tripping and hazards shall be avoided.

B. Conduct: Contractor and workmen under his control to be quiet and non-offensive.

1. Radios are prohibited.

2. Contractor's employees must stay in assigned area at job site and not visit other areas unless authorized to do so by an Owner's Representative. Eating areas will be designated for contractor's use.

3. Soliciting, selling of any merchandise or distribution of any literature for any cause is strictly forbidden.

4. Gambling, intoxicating liquor, or drugs in any form are forbidden at all times.

5. Use of Owner's telephone is strictly forbidden.

6. Contractor is to designate a hospital where personnel are to be treated in the event of an injury.

7. Contractor parking to be in approved staging areas or off site. No parking in Hospital parking lots allowed with out permission of Construction Manager.

C. Dress Code:

1. Required Apparel: Shirt, long pants, shoes with laces: all suitably clean. **All workers on-site must be wearing a company shirt displaying their company name / logo at all times. Contractors must provide and pay for the shirts for their workers.**

2. Not permitted: Offensive graphics or messages on clothing, short pants, tank tops, sandals, open toed shoes, bare torso, and bare feet.

3. Safety glasses and hard hats are to be worn as needed. The Contractor shall also provide personal protective equipment when necessary.

D. No utilities or services may interrupt without full consent of and prior scheduling with the Contractor. All functions of existing building must be maintained at all times unless specific written permission is obtained from the Owner. Critical functions include, but are not limited to:

1. Exits.

2. Utilities.

3. Service functions including access for refilling existing oxygen tank.

4. Public access to building during normal business hours.

5. Fire department access.

6. Fire protection/detection systems.

E. Noxious Fumes/Odors: Provide special filtering or direct exhaust to exterior for processes involving strong odors, fumes, or VOC's which may be either offensive or detrimental to patients.

1. Advise Owner in advance of work for determination of filter/exhaust requirements.

2. Cautions:

a. Exterior work near fresh air intakes subject to special filtering requirements.

b. Interior exhaust must not be recycled into fresh air intakes without special filtering requirements.

1.04 EXISTING FACILITIES

A. Existing elevators, telephone, vending machines, cafeteria, or other facilities are not permitted to be used by Contractor or his employees and Subcontractors without Owner permission.

B. Existing toilets: Contractors and Subcontractors cannot use hospital bathrooms without Owner permission, See Section 01 5000 – Construction Facilities and Controls.

C. Construction materials, toolboxes, etc., shall not enter elevators occupied by patients.

D. Every effort shall be made to prevent dust, dirt, mud, etc. from being tracked down corridors and stairways, etc.

E. Due caution shall be taken when pushing carts through corridors, to prevent injury to patients, visitors, or employees.

1.08 NOISE AND SAFETY

A. Construction noise limited to Normal Working Hours. Construction Manager & Owner can have any contractor stop work that is disrupting the patients or staff of the hospital until this is resolved. No additional payments will be allowed due to contractor's compliance with above restrictions.

B. In no instance may a corridor be blocked nor its clear width reduced either to less than 4'-0" or to less than the minimum exit required in accordance with the Uniform Building Code, whichever is greater.

C. No live electrical wiring may be left exposed, including temporary lighting in areas of public or staff access.

1.09 NO SMOKING POLICY

A. Smoking on Hospital property is prohibited.

1.07 WORKING HOURS

A. Normal hours: Perform work between the following hours, Monday through Friday: 7:00am to 4:30pm

B. Non-Normal hours: Should the Contractor be unable to schedule his work within normal working hours as it would negatively impact the ongoing operation of the hospital, they may request the Construction Manager in writing, to permit work to be performed during non-normal hours. Submit schedule of hours, days, and location of request work.

1.08 ELECTRICAL SHUT-DOWN/LIFE SUPPORT

A. Advanced Notice Required: Contractor to request, minimum 15 working days in advance. Owner's permission to shut down any electric power, medical gasses or other life-support systems to occupied portions of the building. Request to be in writing and indicate area(s) affected, time and date shut-down requested to commence, and anticipated duration of shut-down. Approved time and date may be during non-normal working hours.

B. No additional payments will be allowed due to contractor's compliance with above restrictions.

1.09 JOINT COMMISSION REQUIRMENTS

A. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires the Owner to comply with the "Interim Life Safety Measures", Appendix "E" of 1996 Accreditation Manual for Hospitals listed below. Each Contractor is also required to comply with this requirement and cooperate with the Owner so as not to place the Owner in violation of these requirements.

B. Interim Life Safety Measures (ILSM) are a series of 11 administrative actions required to be taken to temporarily compensate for the hazards posed by existing Life Safety Code (LSC) deficiencies or construction activities.

C. Implementation of (ILSM) is required in or adjacent to all construction areas and applies to all personnel, including construction workers.

D. Interim Life Safety Measures (ILSM):

1. Ensure exits provide free and unobstructed egress. Personnel shall receive training if alternative exists must be designated.

2. Ensure free and unobstructed access to emergency departments/services and for emergency forces.

3. Ensure fire alarm, detection, and suppression systems are not impaired. A temporary, but equivalent, system shall be provided when any fire system is impaired. Temporary systems must be inspected and tested monthly.

4. Ensure temporary construction partitions are smoke tight and built of noncombustible materials.

5. Provide additional fire fighting equipment and use training for personnel.

6. Prohibit smoking in and /or adjacent to all construction areas.

7. Develop and enforce storage, housekeeping, and debris removal policies and procedures that reduce the flammable and combustible fire load to the lowest level necessary for daily operations.

8. Conduct a minimum of two fire drills per shift per quarter.

9. Increase hazard surveillance of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field offices.

10. Training personnel when structural or compartmentation features of fire safety are compromised.

11. Conduct organization-wide safety education programs to ensure awareness of any LSC deficiencies, construction hazards, and these ISLM.

E. Questions concerning the implementation and use of ISLM should be directed through the Owner and to the Department of Plant and Technology Management at the Joint Commission.

1.10 JCAHO SAFETY CHECKLIST

A. Each Contractor/Sub-Contractor to complete the Joint Commission Safety Checklist (attached to end of this Section) form weekly and return it to Construction Manager for their record. Contractor to stay in compliance with this Check List at all times; however, where the Construction Documents, codes, or other applicable ordinances conflict, the more stringent requirement shall apply.

B. No additional payments will be allowed due to contractor’s compliance with above restrictions

1.11 PROJECT CATEGORY MATRIX

A. Each Contractor/Sub-Contractor to follow the recommended Infection Control Precautions (attached to end of this Section).

B. Each item will be evaluated with the Owner’s Infection Control personnel to determine effective and practical applications based on this project.

C. No additional payments will be allowed due to contractor’s compliance with above restrictions

1.12 CLEAN-UP AND MATERIAL MOVING

A. Keep working area as clean as possible at all times. Do not allow refuse and debris to accumulate. Pile materials neatly and safely, at a safe distance from hot piping, and off roadways and walkways. Do not leave tools or materials on steps, walkways, platforms, or elevated equipment or pipes. Remove lumber with protruding nails to safe area and remove or bend nails over. All refuse and debris must be removed from work area by contractor each day and disposed of in a legal duping site, approved by Owner.

B. Each Trade Contractor and their subcontractors shall do their own clean-up and haul debris away, dumpster to be paid for by each contractor, move materials that are in the way of construction, and repair and replace damage they do.

C. If the above work is not accomplished in a reasonable length of time, the Construction Manger will do the required work. Cost of the work will be charged to the Trade Contractor. After all Trade Contractors have debris removed during construction in compliance with the above, remaining clean up shall be performed by each contractor.

D. Each Contractor shall do all cleaning of finish surfaces relative to their work prior to acceptance of their work. Each Contractor shall comply with all special cleaning instructions contained in the Section 01780.

END OF SECTION 01 35 20

SEE ATTACHMENTS:

“A” JOINT COMMISION SAFETY CHECKLIST
“B” PROJECT CATEGORY MATRIX
“C” RECOMMENDED INFECTION CONTROL PRECAUTIONS

JOINT COMMISSION SAFETY CHECKLIST
ATTACHMENT A

		IN COMPLIANCE YES	*NO
1.	Ensure required with the project limits. Provide free and unobstructed egress.	_____	_____
2.	Contractor shall ensure his work does not obstruct access to emergency department/services and/or access for emergency forces.	_____	_____
3.	Contractor shall ensure his work does not impair fire alarm detection and/or fire suppression systems without a temporary, but equivalent, system provided. Temporary systems shall be inspected on a regular basis by Contractor if the system is implemented because of worked involved in this project.	_____	_____
4.	Contractor shall ensure temporary construction partitions are smoke tight and constructed of non-combustible material.	_____	_____
5.	Contractor shall enforce the Hospital's (Owner's) smoking procedures with his employees and subcontractors. Smoking shall be prohibited in or adjacent to all construction areas.	_____	_____
6.	Contractor shall develop and enforce policies and procedures for storage of materials and removal of debris that shall reduce the flammable and combustible fore load to the lowest level necessary for daily operations. The policy shall be submitted to the Hospital (owner) in written form for his review and approval.	_____	_____
7.	Contractor shall participate in fire drills.	_____	_____
8.	Contractor has notified Owner before structural or compartmentalization features of fire safety are compromised.	_____	_____

*If any of the above are answered "NO", indicated why; also state what corrective action will be taken to be in compliance and when it will be in compliance.

_____

_____

I, _____, representing _____
(Print Name)

hereby certifies that my response to the above statements are true and accurate to the best of my knowledge.

_____ _____
(Sign) (Date)

PROJECT CATEGORY MATRIX
ATTACHMENT B

	Low Risk Areas Offices, Support areas, Lobbies,	**Medium Risk Areas** Non-invasive patient care, Cardiology, PT/OT, Radiology, Nuclear Medicine, Endoscopy, Food Service areas	**High Risk Areas:** Special Care Areas, ER. LDR, Nurseries, Peds, Pharmacy, Recovery rooms, Outpatient Surgery, Laboratory	**Extreme Risk Areas** Areas with Immuno-compromised Patients, Transplant Area, Cardiac Cath Lab, OR's ICU's Isolation Rooms, Sterile Supply areas, Burn Unit, Negative Pressure Isolation Room, Oncology, Medical Units (if occupied during construction)
Inspection and noninvasive activities: Inspections above ceiling, minor repair, painting or wall covering (no patching), Minor electrical or plumbing work or similar work with little or no drilling, cutting, or other dust-raising activity. Normal maintenance activity.	**Category 1 precautions**	**Category 2 precautions**	**Category 2 precautions**	**Category 3 precautions**
Small Scale Projects of short duration that create minimal dust: Installation of electrical and computer cabling, Opening into chases and concealed spaces, cutting plaster and drywall, sanding and other dust making/ activity within a room or other controlled area.	**Category 1 precautions**	**Category 2 precautions**	**Category 3 precautions**	**Category 3 Precautions**
Larger Scale Projects that produce a moderate to high amount of dust or requires demolition or removal of any fixed building components or assemblies: Removing floor coverings, sanding walls, wall demolition and construction, minor duct work or electrical work above ceilings, major cabling work.	**Category 1 precautions**	**Category 2 precautions**	**Category 3 precautions**	**Category 4 precautions**
Major Renovation and Construction: Major demolition of areas, particularly those open to patient care, work on HVAC Systems, new construction	**Category 2 precautions**	**Category 3 precautions**	**Category 4 precautions**	**Category 5 precautions**

RECOMMENDED INFECTION CONTROL PRECAUTIONS BY CATEGORY
ATTACHMENT C

CATEGORY 1:

	Protect patient care areas from activity, or enclose work area (close doors). Replace ceiling tiles promptly.
	Minimize dust and dirt, clean or have area cleaned when done, and when dust or dirt builds up. Vacuum with HEPA post-filter type vacuum, and/or damp mop areas when work complete.

CATEGORY 2:

	Protect patient care areas from activity by closing doors, or enclosing area with plastic or equivalent. Replace ceiling tiles prior to removal of enclosures.
	Use water spray mist to minimize dust when opening ceilings, and conducting activities that will cause dust or dirt to be airborne.
	HVAC System: - filter return air - Close off HVAC system openings (exhaust and supply) with plastic or equivalent. - utilize a "clean air machine." or powered HEPA filters in exhaust path, or exhaust directly to outside
	Use dust mats at entrances. Wet mops areas during and after construction to remove and control dust and dirt with suitable cleaning agents. Use HEPA filters on vacuums used in area for cleanup. Wipe down all horizontal surfaces (except floor and ceiling) with suitable disinfectant at conclusion of job.
	Control of Debris: use covered container to remove debris through internal hospital paths.

At Job Completion:

	Replace all ceiling tile, or re-close ceiling.
	Wipe down all horizontal surfaces (except floor and ceiling). Wet mop or extract floor with disinfectant approved by Infection Control. If appropriate, vacuum all areas with HEPA Post-filters on vacuum.
	Clean HVAC system as closure being removed, and operate system for 24 hrs prior to final cleaning of job.
	Maintain all enclosures practical until post-job cleaning complete. Use vacuum with post-HEPA filters during removal of barriers, as practical.

CATEGORY 3

	Isolate the HVAC systems in area where work is being performed to prevent contamination of the duct system. Maintain negative air pressure within the construction site if possible. Utilize HEPA-equipped air filtration units as necessary.
	Provide necessary construction separations. Enclose work areas prior to any demolition work or opening any walls or ceilings as practical.
	Debris must be removed in covered containers. The debris removal containers should be vacuumed or wet-wiped prior to removal from the site.

At Job Completion:

	Maintain barriers in place as much as practical until final cleaning is complete. Removal of barrier materials should be accompanied by vacuuming using a vacuum with HEPA-filtered post-filters.
	Clean HVAC system as closure being removed, and operate system for 24 hrs prior to final cleaning of job and removal of barriers (to the extent practical based on the system.
	Site must be thoroughly cleaned, by damp-wiping all horizontal surfaces with disinfectants approved by Infection Control.

CATEGORY 4

	Use all CATEGORY 3 precautions, plus:
	Isolate HVAC System and seal with at least plastic and tape. Where pressure may exist, use sheet metal or similar rigid materials in addition of plastic and tape, to minimize accidental movement of air in ductwork. Isolate the ductwork as close to the construction barrier as practical.
	Seal all holes, penetrations, and openings in the construction barriers and walls which are part of the construction separation with appropriate materials. Hole in fire rated separations must be equivalent in fire rating. Other holes

	must be sealed with tape and plastic, or similar materials which are strong enough to withstand the pressure differential without leakage.
	If practical, create a construction ante-room where all clothing, tools, equipment, and other materials being removed are vacuumed or wet-wiped prior to being taken off site through the hospital patient care areas. Cart wheels should also be cleaned. Any person who has dust, dirt, or materials on their clothing must vacuum it prior to leaving the ante-room areas. The ante-room will be wet mopped frequently (several times a day in usual construction activity), or similar methods will be used to satisfy the Infection Control staff.
	If practical, personnel working in the area must either change clothing prior to leaving the job site, or use shoe covers, and cover clothing prior to leaving the area.

At Job Completion

	Maintain barriers in place until final cleaning is complete. Removal of barrier materials must be accompanied by vacuuming using a vacuum with HEPA-filtered post-filters. Air pressure should be maintained negative to patient care areas during final cleanup.
	Clean HVAC system as closure being removed, and operate system for 24 hrs prior to final cleaning of job and removal of barriers. If necessary allow the HVAC to blow into the site with the clean air machine catching the output of the supply, and the machine feeding the air to the returns.
	Site must be thoroughly cleaned, by damp-wiping all horizontal surfaces with disinfectants approved by Infection Control.

CATEGORY 5

	Use all CATEGORY 4 precautions, plus:
	As practical, use a “Clean-Air” machine, both to recirculate air in the job site to reduce airborne dust, and to exhaust air from the job site, to maintain a pressure negative to the air outside the job site, so leakage will be into the job site. The same machine may be used for both purposes, if it has suitable capacity.
	As practical, use a two chamber “air-lock” or similar method to assure no open path exists from the job site into patient care areas at any time. Wet-wipe down all materials and containers being removed from the site with appropriate disinfectant, in the air-lock, to assure no dust leaves the site. The clean lock must be mopped frequently and not allowed to become dirty. It should be as clean as a patient care area. Enclosed carts may be loaded from the dirty to the clean side of the airlock (if outside doors are closed, and other precautions followed to assure airborne dust cannot escape the worksite.
	As practical, all materials removed from the site during work activity must be either wet-wiped, or placed in containers which can be wet-wiped prior to removal. This includes debris removed through the hospital routing, and other materials removed from the site.

At Job Completion

	Maintain barriers in place as much as practical until final cleaning is complete, and site inspected by Infection Control. Removal of barrier materials should be accompanied by vacuuming using a vacuum with HEPA-filtered post-filters.
	Clean HVAC system as closure being removed, and operate system for 24 hrs prior to final cleaning of job and removal of barriers. If necessary allow the HVAC to blow into the site with the clean air machine catching the output of the supply, and the machine feeding the air to the returns. The Clean Air Machine HEPA should be replaced or examined to assure it is working appropriately, and pre-filter replaced prior to the final air system cleaning, so dust from the system can be visually evaluated.
	Site must be thoroughly cleaned, by damp-wiping all horizontal surfaces with disinfectants approved by Infection Control.

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals.

B. References and standards.

C. Control of installation.

D. Mock-ups.

E. Tolerances.

F. Manufacturers' field services.

G. Defect Assessment.

1.02 RELATED REQUIREMENTS

A. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.

B. Section 01 30 00 - Administrative Requirements: Submittal procedures.

C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Design Data: Submit for Design Professional's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

C. Test Reports: After each test/inspection, promptly submit two copies of report to Design Professional and to Contractor.

1. Include:

    a. Date issued.
    b. Project title and number.
    c. Name of inspector.
    d. Date and time of sampling or inspection.
    e. Identification of product and specifications section.
    f. Location in the Project.
    g. Type of test/inspection.
    h. Date of test/inspection.
    i. Results of test/inspection.
    j. Compliance with Contract Documents.

k. When requested by Design Professional, provide interpretation of results.

l. Test report submittals are for Design Professional's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Design Professional, in quantities specified for Product Data.

1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

2. Certificates may be recent or previous test results on material or product, but must be acceptable to Design Professional

1.04 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Design Professional before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Design Professional shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Owner will employ and pay for services of an independent testing agency to perform specified testing and inspection.

B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Design Professional before proceeding.

D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Design Professional will use to judge the Work.

C. Notify Design Professional fifteen (15) working days in advance of dates and times when mock-ups will be constructed.

D. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.

E. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

F. Obtain Design Professional's approval of mock-ups before starting work, fabrication, or construction.

G. Design Professional will use accepted mock-ups as a comparison standard for the remaining Work.

H. Where mock-up has been accepted by Design Professional and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock- up and clear area when directed to do so by Design Professional.

I. Where possible salvage and recycle the demolished mock-up materials.

3.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Design Professional before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Testing Agency Duties:

1. Provide qualified personnel at site. Cooperate with Design Professional and Contractor in performance of services.

2. Perform specified sampling and testing of products in accordance with specified standards.

3. Ascertain compliance of materials and mixes with requirements of Contract Documents.

4. Promptly notify Design Professional and Contractor of observed irregularities or non-compliance of Work or products.

5. Perform additional tests and inspections required by Design Professional.

6. Submit reports of all tests/inspections specified.

C. Limits on Testing/Inspection Agency Authority:

1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.

2. Agency may not approve or accept any portion of the Work.

3. Agency may not assume any duties of Contractor.

4. Agency has no authority to stop the Work.

D. Contractor Responsibilities:

1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.

2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

3. Provide incidental labor and facilities:

a. To provide access to Work to be tested/inspected.

b. To obtain and handle samples at the site or at source of Products to be tested/inspected.

c. To facilitate tests/inspections.

d. To provide storage and curing of test samples.

4. Notify Design Professional and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.

5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Design Professional.

F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. If, in the opinion of Design Professional, it is not practical to remove and replace the work, Design Professional will direct an appropriate remedy or adjust payment.

3.07 MOCK-UP SCHEDULE

A. Section 12 32 00 - Manufactured Wood Casework: Upper cabinet with glove and paper towel accessories.

END OF SECTION 01 40 00

SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, heat, water and sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control.

C. Construction Facilities: Parking, progress cleaning, project signage, and temporary barricades.

1.02 GENERAL

A. Install temporary facilities and utilities in conformance with State and Local Codes and requirements.

B. Obtain and pay for required applications, permits and inspections.

C. Early Service: Any Contractor requiring temporary service before it can be provided as specified, or whose requirements with respect to a particular service differ from the service specified shall provide such service as suits his needs, at his own expense, and in a manner satisfactory to the Construction Manager.

D. Maintenance: Temporary facilities and utilities are to be maintained and kept in good operating condition. Maintenance men necessary to perform this work shall be provided in accordance with requirements. Maintenance time will include normal working hours for all trades and start up and shut down overtime as required.

E. Removals: Subject to approval of Construction Manager, contractor providing temporary facilities or services shall remove same when no longer required or when their function is replaced by authorized use of permanent facilities. Other removal time may be directed by Construction Manager.

F. Disclaimer: Specific administrative and procedural minimum actions are specified in this section, as extension of provisions in General Conditions and other contract documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication by Architect, Engineer or Construction Manager that such temporary activity is not required for successful completion of the work and compliance with requirements of contract documents. Provisions of this section are applicable to, but not by way of limitation, utility services, construction facilities, security/protection provisions, and support facilities.

1.03 TEMPORARY SANITARY FACILITIES

A. The Construction Manager will provide temporary sanitary facilities for use by contractors. The use of hospital facilities is prohibited.

1.04 TEMPORARY HEAT

A. General Responsibilities: Temporary heating responsibilities and equipment types relate to the extent of site pad and work performed as follows:

1. Installation, connection, operation, and maintenance of temporary heating devices to be performed by tradesmen proficient in the skills required and meet requirements of applicable regulator agencies.

2. Temperature Requirements:

    a. All Trades: provide the range of temperatures required for temporary heat, so the temperature as recommended by the manufacturer of the material concerned is maintained while such materials as mentioned above are stored or being installed, and for the length of time recommended following installation. In those portions of the site where work is in progress or completed, it must be protected from freezing if subject to damage there from.

1.05 TEMPORARY LIGHT AND POWER

A. Each Trade Contractor: Provide light and power for his own construction field office.

B. Electrical Trade Contractor:

1. Provide temporary light and power distribution for construction purposes for all trades including the cost of running temporary service from the utility supply. The temporary lighting and power system shall comply with all applicable OSHA regulations.

    a. Temporary power to be sufficient to operate all "light tools" and equipment (electric arc welders excluded) and permanent building equipment.

    b. Additional temporary power required by other trades to be furnished, at their cost, up to the power available.

C. Electrical work shall confirm to requirements of the National Electrical Code and all federal, state and local requirements. The Electrical Contractor shall obtain and pay for applications, permits and inspection pertaining to this work.

D. Each trade shall provide and pay for its own extensions for lights or power tools beyond the receptacle outlets provided above.

E. The electrical requirements for all temporary heating and ventilating systems shall be connected directly to the project temporary power system until the primary service is installed.

F. Temporary work shall be installed in such a manner as not to interfere with the permanent construction.

1.06 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction area, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition. Provide barricades and covered walkways as required by governing authorities for public rights-of-way and for public access to existing building.

B. Provide protection for plant life designated to remain. Replace damaged plant life.

C. Protect no-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

C. Provide temporary drainage trenches, drains, sumps, pumps, or other items required to afford satisfactory working conditions for the execution, completion and protection of the work. Water shall be diverted to or shall be pumped into existing sewerage systems or ditches and shall not be allowed to run onto ground surface area.

D. Provide all shoring and bracing required for safety and proper execution of the work. Remove the items when the work is completed.

1.08 PROTECTION OF INSTALLED WORK

A. Protect installed work and provide special protection to protect work by other contractors.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.

C. Protect finished slabs, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects by protecting with durable sheet materials.

D. Prohibit traffic or storage on finished slabs, stairs, and other surfaces. When traffic or activity is necessary, obtain recommendation for protection from material manufacturer.

E. Prohibit traffic from landscaped areas.

1.09 WEATHER PROTECTION

A. Protect work and existing or adjacent property against weather, to maintain their work, materials, apparatus and fixtures free from injury or damage in accordance with the General conditions during the entire construction period. Work likely to be damaged shall be covered or protected at the end of each day's work. Work damaged by failure to provide weather protection all be removed and replaced with new work at the contractor's expense.

B. Remove all snow and ice as may be required for proper protection and execution of the work and protect and safety of the public.

1.10 SECURITY

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, and theft.

B. Coordinate with Owner's security program.

C. Require all workers on Project to govern themselves under same rules and regulations as employees of Broadlawns Medical Center, who will concurrently occupy premises.

D. A property pass, properly approved by the CEO, COO, or Facilities Manager must be secured to remove any non-personal articles. Packages, lunch boxes, clothing may be inspected by Security as employee leaves.

1.11 ACCESS TO SITE

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Fire lanes and aisles to fire fighting equipment shall be left unobstructed at all times.

E. Material is never to be piled in front of fire equipment, fire doors, or hydrants.

1.12 PARKING

A. Parking for Contractor's firm owned vehicles is limited, in number and location, to parking areas designated by the Construction Manager. No parking or obstructing egress to and from Parking Areas will be allowed. Intent is to use the existing gravel pad for contractor parking for as long as possible.

B. Parking of private vehicles of workers shall be in an area allocated by Construction Manager.

C. Traffic and parking regulations of Owner are applicable and violators are subject to fines for infractions.

1.13 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Remove waste materials, debris, and rubbish from site daily.

E. Carts, trucks, etc. used to transport materials shall be loaded in a safe manner. Materials shall not protrude beyond the sides of conveyance used.

F. Materials shall not be thrown or dropped from scaffolds or other overhead areas.

G. Gasoline or other highly flammable liquids shall not be brought inside facilities.

H. Spills of any materials creating hazards shall be cleaned up immediately.

1.14 HAUL ROUTES

A. Haul routes shall be designated by Owner and Construction Manager.

B. Confine construction traffic to designated route.

C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

D. Contractor is responsible for keeping all public streets and owner occupied paving clean.

PART 2 PRODUCTS

2.01 TEMPORARY FIELD OFFICES

A. General:

1. Construction: Offices to be weather-tight, heated, air-conditioned, lighted, and doors with locks.

2. Expenses:

a. Construction Manager: All expenses in connection with his or Architect's Field Offices, including the installation costs and use of telephones, heat, air-conditioning, light, water and janitor service shall be paid for by the Construction Manager and will be fully reimbursed by the Owner.

b. Prime Contractors: All expenses associated with their offices including utility installation costs shall be included in their bid.

c. Toll Costs: All long-distance calls to be paid for by party placing call including Architect, Owner's representative, and contractors.

3. Field Offices shall be maintained until final acceptance and then be removed by the responsible party, no later than fifteen (15) days after acceptance of project, unless the Construction Manager orders or approves earlier removal.

B. Construction Manager shall provide temporary field office for his use and for job meetings.

C. Each Prime Trade Contractor: To keep a complete set of drawings, and specifications kept marked up to date with revision, Addenda, as-built drawings, and all permits and approved shop drawings on file. Each Prime Contractor is also responsible to ensure their field personnel have the same information on the jobsite.

PART 3 EXECUTION

3.01 USE OF PERMANENT SYSTEMS AND FACILITIES

A. Obtain written agreement with Owner, establishing start of warranties and conditions of use:

1. Systems complete, with utility connections and safety devices.

2. Automatic controls operational.

3. Replace items damaged during temporary service use.

3.02 TOOL AND EQUIPMENT USE ON HOSPITAL PROPERTY

A. Use of power-actuated tools is limited and shall not be used unless authorized by the Owner's Representative.

B. All tools and equipment must conform to OSHA Safety Code and State Codes. All contractors' equipment must be removed upon completion of the job.

C. Before any hot work is started in an area of the facilities, a fire permit must be obtained from the Owner:

1. All welding.

2. Torch cutting.

3. Soldering.

4. Melting of metals.

5. Any operation where open flames or sparks are present.

D. Necessary precaution and protection is to be exercised to prevent fires and damage from falling sparks from welding and cutting operations. This must be done before the Owner's Safety Department okay will be given for any hot work.

3.03 CLEAN-UP AND MATERIAL MOVING

A. Keep working area as clean as possible at all times. Do not allow refuse and debris to accumulate. All refuse and debris must be removed form work area by contractor each day and disposed of in a legal dumping site.

B. Each Trade Contractor and their subcontractors shall do their own clean-up, move materials that are in the way of construction, and repair and replace damage they do.

C. If the above work is not accomplished in a reasonable length of time, the Construction Manager will do the required work. Cost of the work will be charged to the Trade Contractor.

D. Each Contractor shall do all cleaning of finish surfaces relative to their work prior to acceptance of their work. Each Contractor shall comply with all special cleaning instructions contained in the Specification.

END OF SECTION 01 50 00

SECTION 01 52 00
PAY APPLICATION AND SCHEDULE OF VALUES

A. All pay requests shall be submitted on form AIA G702/CMA *Application and Certification for Payment*.

B. All Applications for Payment shall have a schedule of values submitted on form AIA G703. Include breakdown of costs for all components, systems, and types of work. Provide a labor, material and equipment breakdown for each item.

C. Submit a proposed Schedule of Values to the Construction Manger for review and approval within 15 business day from receipt of a notice of award. The Schedule of Values shall separate the cost of the work into identifiable sections for use in determining the percentage complete for each pay application. Separate lines on the Schedule of Values shall be provided for all divisions of work; labor, material, equipment, and major components.

D. In the Schedule of Values, have one item labeled closeout. This line item will be worth 3% of the bid package. This line item is not part of the 3% retainage. This will be used to track progress of turning in warranties, O&M's, extra materials, and other closeout documentation. Owner training and as-built drawings will be exempt from this line item. No partial payment is made on this line item until all items have been approved.

E. The Schedule of Values shall be broken down into the following areas as per Section 01 5201.

F. Pay Applications shall be submitted to the Construction Manger by the 22nd day of the month and shall only include work complete for the same month. False or inaccurate pay applications will be rejected.

G. Billing for stored materials is allowed, see the attached instructions.

INSTRUCTIONS FOR BILLING FOR STORED MATERIALS

If materials are stored at the construction site, they are not considered stored materials. The Owner and/or Construction Manager are not responsible to provide storage locations for project materials, tools, or equipment.

If materials are stored at a location other than the construction site, they are considered stored materials, and in order to invoice for such materials the following documentation is required:

1. A completed bill of sale signed by a company representative. A sample is attached.
2. A certificate of insurance equal to or in excess of the value of the stored materials being invoiced that clearly identifies insurance coverage includes the storage location where materials are being stored; the Owner shall be listed as an additional insured. Any and all insurance premiums and deductibles will be paid by contractor.
3. Digital photos of the stored materials, with the materials clearly marked "sold to '*Broadlawns Medical Center*".
4. Notify the Construction Manager by the 18th day of the month to allow the Construction Manager and/or Owner to inspect and take photos of the stored materials prior to the review process, if they so desire.
5. Copies of material invoices from the contractor's supplier. The contractor can bill for the invoiced cost of the stored materials. All overhead and profit shall be billed for after material is delivered to the jobsite.

Bill of Sale for Offsite Stored Materials
Broadlawns Medical Center
Des Moines, Iowa

Contractor / Vendor Name & Address:_____
_____

Name and Address of Storage Location:_____
_____

Contractor/Vendor for and in consideration of the partial payment to be made by *"Broadlawns Medical Center"* under the existing contract agreement hereby sells to *"Broadlawns Medical Center"* the personal property described in the attached invoice and as itemized: (attach additional sheets if required)

Item Description Quantity Value
_____
_____
_____
_____
_____

Contractor / Vendor shall clearly label all stored materials sold to the Owner, and shall be clearly marked in the provided digital photos. All stored materials shall be stockpiled separate from other materials, and shall not co-mingle with stock or stored materials for other projects.

The Owner and Construction Manager shall have free access to the storage location for inspection of all stored materials. The Owner may take possession of, obtain, remove, sell, or discard of any and all stored materials at any time, at their sole discretion.

Executed on this _____ day of _____ 20__.

_____
Contractor / Vendor Signature

By:_____

Title:_____

Address:_____

_____

END OF SECTION 01 52 00

SECTION 01 52 01
ATTACHMENT PAY APPLICATION

ATTACHMENT AS CALLED OUT IN THE SUPPLEMENTARY CONDITIONS

All Pay Applications will be required to have schedule of values and also have the following costs broken out on the schedule of values; this will include all change orders.

EARTHWORK

SITE CLEARING
TOPSOIL
EXCAVATION AND GRADING
OVER EXCAVATION
BACKFILL
SUBGRADE PREP, 12”
SUBBASE, 6”
CLASS A ROADSTONE, 6” (Alt)
TEMPORARY ROCK ENTRANCE, CLEAN LIMESTONE 1”
CLEAN LIMESTONE BACKFILL, 1”
SWPPP MONITORING
EROSION & SEDIMENT CONTROL
TREE PROTECTION

CONCRETE

SELECTIVE SITE DEMOLITION
CAST-IN-PLACE
CONCRETE STAIRS
BOLLARD BASE
ELECTRICAL EQUIPMENT PADS/FOOTINGS
EXPANSION JOINT
SEALANT

EXTERIOR IMPROVEMENTS

SELECTIVE SITE DEMOLITION
DRIVEWAY, 7” PCC
CONCRETE PAVEMENT, 6” PCC
SIDEWALK, 5” PCC
CURB & GUTTER, 7” THICK, 6” RISER
JOINT SEALANT
DETECTABLE WARNING
RAISED CONCRETE MEDIAN
PAVEMENT MARKINGS & SYMBOLS
TRAFFIC SIGNAGE
SPREAD FOOTINGS
FILTER FABRIC
RETAINING WALL, CAST-IN-PLACE

METALS

PIPE AND TUBE RAILINGS

SITE UTILITY WORK

STORM SEWER, N-12 12”
STORM SEWER, RCP 12”
STORM SEWER, RCP 15”
STORM SEWER, RCP 18”
STORM SEWER, RCP 24”
STORM SEWER, RCP 36”
DETENTION BASIN, CMP 10’ DIAM
STORM SEWER, RCP FES & FOOTING 12”
STORM SEWER, RCP FES & FOOTING 18”
INTAKE, SW-501, CAST-IN-PLACE
STORM MANHOLE, SW-401 48”
MINOR ADJUSTMENTS
CASCADE CYLINDER INSERT
HYDRONDYNAMIC SEPARATOR STRUCTURE
HYDRODYNAMIC SEPARATOR OUTLET w/WEIR WALL
STORM STRUCTURE CASTINGS
CONNECTION TO EXISTING STRUCTURES
REMOVAL AND CAP OF EXISTING WATERMAIN
REMOVAL AND ABANDONMENT OF WATER SERVICES

LANDSCAPE

DECIDUOUS TREES
EVERGREEN TREES
ORNAMENTAL TREES
SHRUBS
GRASSES (SEED AND SOD)
MULCH
MAINTENANCE/WATERING

SITE ELECTRIC

CONDUITS FROM STREET TO TRANSFORMER AND METER
POWER FROM TRANSFORMER TO PANELS
LED LIGHT POLES
PRECAST LIGHT POLE BASES
ILLUMINATED BOLLARDS
PANELBOARDS
TRANSFORMER, GROUND
TRANSFORMER, POLE MOUNTED
UTILITY METER CONNECTION

RACEWAY
RECEPTACLES
GROUNDING AND BONDING
BORING
TEMPORARY POWER

LOW VOLTAGE

DATA CABLING
HANDHOLES

END OF SECTION 01 52 01

SECTION 01 53 00
CONTRACTORS COST SUMMARY WORKSHEET

A. The following is a copy of the Contractor's Cost Summary Worksheet. Each Contractor shall complete this form and submit it with proper supporting documentation for all cost changes.

B. The allowance for overhead and profit combined, included in the total cost shall be based on the amounts stated below:

1. For the Contractor; for added work performed by the Contractor's own forced, 15 percent of the cost up to $10,000 total change order cost including mark-up, 10 percent from $10,000 to $50,000, 5 percent above $50,000; for deleted work performed by the Contractor's own forces, 5 percent of the cost.

2. For the Contractor, for added or deleted work performed by the contractor's Subcontractor, 5 percent of the amount due the Subcontractor.

3. For each Subcontractor or Sub-subcontractor involved; for added work performed by that subcontractor's own forces, 15 percent of the cost up to $10,000 total change order cost including mark-up, 10 percent from $10,000 to $50,000, 5 percent above $50,000; for deleted work performed by that Subcontractor's own forces, 5 percent of the cost.

4. For each Subcontractor, for added or deleted work performed by the Subcontractor's Sub-subcontractors, 5 percent of the amount due the Subcontractor.

5. In order to facilitate the checking of quotations for extras or credit, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials, and Subcontracts. Labor and materials shall be itemized in the manner described above. Where major cost items are Subcontract, they shall be itemized also. In no case will a change involving over $250.00 be approved without such itemization.

   Reference Cost Summary Sheet Example in Section 01 53 00.01

END OF SECTION 01 53 00

GRAHAM construction co.

Building what's important.™

Contractor's Cost Summary

Project: _____ Reference: _____

Contractor: _____ Date: _____

This form, itemized accountings and appropriate supporting data must be attached to any Claim or Change Proposal.

(Only fill in applicable line items)

1. Labor *(including benefits) $_____
2. Materials * $_____
3. (Subtotal of lines 1 & 2) $_____
4. Overhead & Profit (% of line 3) $_____
5. Premium Time on Contract Work $_____
6. Major Construction Equipment* $_____
7. Subcontractor's name & cost: (Attached summaries & breakdowns)

   a. _____ $_____
   b. _____ $_____
   c. _____ $_____
   d. _____ $_____
   e. _____ $_____
   f. _____ $_____
   g. _____ $_____
   h. _____ $_____

8. Total Sub. Cost (total of lines 7a thru 7h) $_____
9. Contractor's O & P Sub's. Work (% of line 8) $_____
10. (Subtotal of lines 3,4,5,6,8 and 9) $_____
11. Bond _____% & Insurance _____% (if required) = _____% of line 10 $_____
12. Total Cost (total of line 10 and 11) $_____

(if this is Sub's Summary, Contractor to include the amount of line 12 on line 7 of their Cost Summary)

13. Adjustment in Contract Time (calendar days): _____ (Add) (Deduct).

(Providing supportive data substantiating claim for additional days).

***Attach breakdown of itemized accounting and supporting data.**

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

D. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.

1. See Section 01 10 00 for list of items required to be salvaged for reuse and relocation.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Where other criteria are met, Contractor shall give preference to products that:

1. Are extracted, harvested, and/or manufactured closer to the location of the project.

2. Have longer documented life span under normal use.

3. Result in less construction waste.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

D. "Similar and equivalent to" indicates an example product that meets specifications. This example is not considered a 'named' product.

E. "Basis of Design" indicates applicable characteristics of named product were used to design systems. "Similar and equal to" is implied unless otherwise indicated. When provision for substitution is stated, submit a request for any manufacturer or product not named.

F. "Approved Equal" with a provision for substitutions: Contractor may submit a request for substitution for any manufacturer not named. The example is considered a 'named' product. The allowance for substitutions does not warrant that a substitution is known or exists.

2.04 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

C. Record delivery date and time in Contractor As-Built Document Set.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Substitutions of products, materials, equipment, or methods of construction will not be

considered except in the following instances:

1. The specified item cannot be provided within the Contract time (substitutions will not be considered if this is the result of the Contractor's failure to pursue the work in a timely manner).

2. The requested substitution offers the Owner a substantial savings in cost, time, or energy conservation.

3. The specified item cannot be installed due to incompatibility with other materials, failure to comply with applicable codes, etc

C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

D. A request for substitution constitutes a representation that the submitter:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.

2. Will provide the same warranty for the substitution as for the specified product.

3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.

4. Waives claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse the Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents. Substitution Submittal Procedure:

1. Submit six copies of request for substitution for consideration. Limit each request to one proposed substitution.

2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.

3. The Architect/Engineer will notify Trade Contractor in writing of decision to accept or reject request.

4. Identify product by Contractor Specification Section and article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.

5. List similar projects using product, dates of installation, and names and phone numbers of Architect and Owner.

6. Give itemized comparison of proposed substitution with specified product, listing quality and performance variations, and reference to Specification Section and article number.

7. Give cost data comparing proposed substitution with specified product, and amount of net change to Contract price.

8. List nearest availability of maintenance services and replacement materials.

9. State effect of substitution on construction schedule, and changes required in other work or products.

F. Acceptance of a substitute manufacturer does not waive or alter any specified product requirement.

3.02 OWNER-SUPPLIED PRODUCTS

A. See Section 01 10 00 - Summary for identification of Owner-supplied products.

3.03 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

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

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

G. Comply with manufacturer's warranty conditions, if any.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

I. Prevent contact with material that may cause corrosion, discoloration, or staining.

J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 60 00

SECTION 01 60 01
SUBSTITUTION REQUEST FORM

We hereby submit for your consideration the following product instead of the specified item for the following project:

PROJECT TITLE _____ PROJECT NO. _____

DRAWING NO. _____ DRAWING TITLE _____

SPEC. SECTION SPEC. TITLE PARAGRAPH SPECIFIED ITEM

_____ _____ _____ _____

Proposed Substitution:_____

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit, with request, all necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

Substitutions of the materials and equipment described in the Contract Documents will be considered during the bidding period upon receipt or a written request to the Architect for approval up to three (3) days before receipt of bids. Verbal or written requests without the completed Substitution Request Form will not be considered.

CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The undersigned states that the function, appearance, and quality are equivalent or superior to the specified item.

Submitted by:

_____

Signature

_____

Firm

_____

Address

_____ _____ _____

Telephone Email Date

Signature shall be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

Fill in Blanks Below:

A. Does the substitution affect dimensions shown on Drawings? Yes No

If yes, clearly indicate changes:

_____

_____

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes No

If no, fully explain:

_____

_____

C. What effect does substitution have on other Contracts or other trades?

_____

_____

D. What effect does substitution have on construction schedule?

_____

_____

E. Manufacturer's warranties of the proposed and specified items are:

_____ Same _____ Different (Explain on Attachment)

F. Reason for Request:

_____

_____

G. Itemized comparison of specified item(s) with the proposed substitution.

List significant variations:

_____

_____

H. Accurate cost data comparing proposed substitution with product specified:

_____

_____

I. Designation of maintenance services and sources:

_____

_____

J. Does the proposed substitution meet BABAA requirements? Yes No N/A

(ATTACH ADDITIONAL SHEETS IF REQUIRED)

For Use by Design Professional:

_____ Recommended _____ Recommended as Noted

_____ Not Recommended _____ Received Too Late

Signed By _____

Date _____

For Use by Owner's Representative or Owner:

_____ Approved _____ Approved as Noted

_____ Not Approved _____ Approved Too Late

Signed By _____

Date _____

END OF SECTION

SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.

C. Pre-installation meetings.

D. Cutting and patching.

E. Cleaning and protection.

F. Starting of systems and equipment.

G. Demonstration and instruction of Owner personnel.

H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

I. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 10 00 - Summary: Limitations on working in existing building; continued occupancy; work sequence.

B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.

C. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties.

1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 SUBMITTALS

A. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate Contractor.
   6. Include in request:
      a. Identification of Project.
      b. Location and description of affected work.
      c. Necessity for cutting or alteration.
      d. Description of proposed work and products to be used.
      e. Effect on work of Owner or separate Contractor.
      f. Written permission of affected separate Contractor. Date and time work will be executed.

B. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 PROJECT CONDITIONS

A. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

B. Noise Control: Provide methods, means, and facilities to minimize noise produced by

construction operations.

1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.

C. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

A. See Section 01 10 00 for occupancy-related requirements.

B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Notify affected utility companies and comply with their requirements.

D. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

E. Coordinate space requirements, supports, and installation of electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes and conduit as closely as practicable. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

F. In finished areas except as otherwise indicated, conceal pipes and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of work of separate sections.

H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site

prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Design Professional five days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review conditions of examination, preparation and installation procedures.
   2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Design Professional, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.

B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Design Professional before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Verify that abandoned services serve only abandoned facilities.
   2. Remove abandoned pipe, conduits, and equipment, back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

C. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

D. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
   1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Design Professional.
   2. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Design Professional review and request instructions.

E. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

F. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ skilled and experienced installers to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work tightly to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Broom and clean areas prior to start of surface finishing, and continue cleaning to eliminate dust.

C. Collect and remove waste materials, debris, and trash/rubbish from site weekly and dispose off-site; do not burn or bury.

3.08 PROTECTION OF EXISTING AND INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.

F. Prohibit traffic from landscaped areas.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 SYSTEM STARTUP

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

C. Verify that wiring and support components for equipment are complete and tested.

D. Execute start-up under supervision of applicable Contractor personnel in accordance with manufacturers' instructions.

E. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.10 DEMONSTRATION AND INSTRUCTION

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.11 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances.

D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on electrical equipment.

E. Clean debris from storm drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Design Professional and Owner.

B. Accompany Contractor and/or Owner on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Design Professional when work is considered ready for Design Professional's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Design Professional's Substantial Completion inspection.

E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Design Professional's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Design Professional.

F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

G. Notify Design Professional when work is considered finally complete and ready for Design Professional's Substantial Completion final inspection.

H. Complete items of work determined by Design Professional listed in executed Certificate of

Substantial Completion.

3.13 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

SECTION 01 78 00
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

A. Section 00 60 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.

B. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Design Professional with claim for final Application for Payment.

B. Operation and Maintenance Data:

1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Design Professional will review draft and return one copy with comments.

2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.

3. Submit one copy of completed documents 30 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Design Professional comments. Revise content of all documents sets as required prior to final submission.

4. Submit two sets of revised final documents in final form prior to final inspection.

C. Warranties and Bonds:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.

2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed shop drawings, product data, and samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner. Store record documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda and modifications.

E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

2. Field changes of dimension and detail.

3. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.

2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

A. For Each Item of Equipment and Each System:

1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.

3. Include performance curves, with engineering data and tests.

4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed. Include color coded wiring diagrams as installed.

D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

F. Provide servicing and lubrication schedule, and list of lubricants required.

G. Include manufacturer's printed operation and maintenance instructions.

H. Include sequence of operation by controls manufacturer.

I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

J. Provide control diagrams by controls manufacturer as installed.

K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

L. Include test and balancing reports.

M. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Binders: Commercial quality, 8-1/2 by 11-inch three D side ring binders with durable plastic covers; 2-inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

E. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Design Professional, Consultants, Contractor and subcontractors, with names of responsible parties.

F. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

G. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

H. Text: Manufacturer's printed data, or typewritten data on 20-pound paper.

I. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

J. Arrangement of Contents: Organize each volume in parts as follows:

1. Project Directory.

2. Table of Contents, of all volumes, and of this volume.

3. Operation and Maintenance Data: Arranged by system, then by product category.

a. Source data.

b. Product data, shop drawings, and other submittals.

c. Operation and maintenance data.

d. Field quality control data.

e. Original warranties and bonds.

3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION 01 78 00

SECTION 00 80 00

GENERAL REQUIREMENTS

Bid Package 00: General Requirements

The following general provisions ***shall apply to all bid packages***.

1. Plans by Bishop Engineering dated September 10, 2026.

2. Specifications from the Project Manual by Bishop Engineering dated September 10, 2026.

3. Furnish complete all necessary labor, materials, office and field supervision, insurance, tools, equipment, layout, hoisting, rigging, shoring, shop drawings, submittals, permits, licenses and fees necessary to complete the work outlined below. Include all shift pay, overtime, weekend and holiday pay to complete the work in the scheduled durations shown in the project schedule in Specification Section 01 15 20. It is the responsibility of each bid package to monitor schedule and notify the construction manager immediately. Include all cost associated with shifting schedule activities as required to stay on schedule.

4. Work that is not specifically shown, listed or detailed in the Contract Documents, but necessary for a complete system and could be reasonably inferred by the nature of the scope of work shall be included in this bid. In the event there is a contradiction in the plans or specification, request clarification or assume the more costly option.

5. All work in this Bid Package shall be provided in accordance with OSHA regulations and applicable state and local codes. Prior to mobilization to the jobsite, provide proof of all training and certificates required and provide written safety manual and fall protection programs. Sloped excavations and trenches shall meet OSHA requirements. Excavations and trenches are to be fenced off at the end of each working shift.

6. All work to follow Graham safety standards as listed in Graham's safety manual.

7. For all work with corrosive or cementitious material, or as otherwise directed by SDS, provide an eye wash station, capable of providing 15 minutes of continuous flushing.

8. The site will be constructed in multiple phases. Carefully review phasing diagrams and access to the construction area. Contractors will be responsible to coordinate with the Construction Manger to complete phases as required.

9. At no time shall the Hospital be without essential services (electricity—both normal and generator power, gas, water, med gas, etc.). Provide temporary services to keep the Hospital in continuous operation. All interruptions to these services to be coordinated with the Construction Manager. Any shutdown to the existing facility's systems will be complete off-hours and included in this bid package. Coordinate all shutdowns with Construction Manager a minimum of 48 hours in advance.

10. The general construction building permit will be applied for and paid for by the Construction Manager. Each Prime Contractor shall apply for and pay for any and all permits required to complete their specific bid package scope of work.

11. Dress code: Each Prime Contractor, Subcontractor, Sub-Subcontractor, delivery drivers, equipment drivers/ operators, etc. shall ensure that each worker has the following and is worn at all times. The Construction Manager has the right to ease the requirements at their discretion.

a. Hard hat, safety glasses, work boots/shoes meeting OSHA requirements.

b. High visibility vests (or equivalent shirts/coats).

c. Proper PPE for task at hand.

d. Pants (no shorts).

e. Sleeved shirt.

12. Jobsite hours will consist of 7 A.M- 7 P.M Monday-Friday (exception will be holidays). Any other work occurring outside of those times must be coordinated with the Construction Manager.

13. Each Prime Contractor, Subcontractor, Sub-Subcontractor, etc. shall ensure that each worker follows the rules including, but not limited to:

    a. No tobacco products shall be used within the construction area or on hospital property. This includes the use of e-cigarettes, etc.

    b. No weapons are permitted onsite, in vehicles, or on the property of Broadlawns.

14. Take adequate safety precautions to protect patients, visitors, hospital staff and other construction workers as needed or required by OSHA requirements. Coordinate with the Construction Manager and Owner when closing an occupied area for exploratory and/or construction activities.

15. This project will be a WORKSAFE project and will require a consultation meeting with all prime contractors. Monthly safety audits will occur and all corrective action items must be addressed by appropriate contractor within 48 hours.

16. The cost of testing and inspections shall be paid for by the Owner as indicated in the Contract Documents. All testing and inspections shall be called for by each Prime Contractor and shall be coordinated with the Construction Manager. The cost for any re-inspections or return trips due to incomplete work, failed tests or inspections, or lack of scheduling will be the responsibility of that Contractor.

17. The existing hospital will remain in everyday operation. The hospital can request work be shut down at any time for noise, vibration, or any inconvenience to their everyday operation, these types of activities in the hospital may need to be performed during off hours. Coordinate when this work can occur with the Construction Manager. Give adequate notice (minimum of 48 hours) for all shut downs and inconvenient work to the Construction Manager. The use of jackhammers must be approved by the Construction Manager 48 hours in advance of the work.

18. Construction employee/company vehicle parking will only be allowed in areas designated by the Construction Manager.

19. Each contractor shall provide their own power/utilities to storage containers or office trailer. Each trade partner required to provide their own potable and non-potable water.

20. Each Prime Contractor is responsible for providing means (dumpster cart, garbage container, etc.) of transporting their scrap construction material to the dumpster. Any salvaged materials will need to be taken to a location determined by the Construction Manager / Owner.

21. The construction site is limited for materials and equipment. Coordinate material and equipment locations with the Construction Manager. Anything that needs to move out of the construction area

will need to be kept in a staging area directed by the Construction Manager. The cost to move materials needs to be included. Each Prime Contractor is responsible for their own stored materials and equipment.

22. Site Contractor & Concrete Contractor will be allowed one (1) jobsite trailer or Conex box. No other trailers are allowed onsite. Location is to be determined by the Construction Manager/Owner. Each Prime Contractor is responsible for providing temporary power and water to their own construction trailers.

23. Each Prime Contractor shall provide ***daily*** jobsite clean-up for debris and dust generated by the installation of their scope of work. Each Prime Contractor is responsible to transport/haul their construction debris to dumpsters provided by their own bid package. ***Daily*** jobsite clean-up shall consist of all prime contractor's employees cleaning the work area for at least 30 minutes before leaving.

24. Locate and protect all existing underground and overhead utilities to remain. Confirm locations and depths of existing underground utilities as required. This includes both public and private locates.

25. Provide and maintain all barricades required to protect the public and workers. Barricades will remain in place until work by all bid packages is complete. Remove barricades after work is complete. Barricades shall clearly mark and block the hazards present and keep the public and other workers safe from harm.

26. The cost to move materials shall be included. Include receiving all deliveries, unloading, and moving of materials as it relates to each bid package. This includes any equipment needed to accept deliveries, move materials, etc. All deliveries must be coordinated and scheduled with the Construction Manager.

27. Clean streets and roadways to keep them free of dirt, mud and debris generated by this scope of work. Clean daily or more often as site conditions require. Fill any wheel tracks, etc. from deliveries or equipment daily or more frequently if needed.

28. Each Prime Contractor shall provide, maintain, and empty a concrete wash-out container for use of any concrete, grout, mortar, etc. generated by construction activity. The concrete wash-out spoils shall be disposed off-site in a legal manner. Concrete wash out shall be installed and maintained per SWPPP requirements. Coordinate all aspects of the concrete wash-out with Construction Manager. NOTE: Any other means of concrete wash out shall be approved by the Construction Manager 10 days prior to commencement of concrete or other cementitious work.

29. Each Prime Contractor is responsible for protecting their work until acceptance by the owner. Each Prime Contractor is responsible for respecting the work completed by all other Prime Contractors and shall be responsible for replacing anything damaged.

30. All extension cords shall be rolled up and checked for cuts or defects at the end of each workday.

31. Each Prime Contractor is responsible for providing fresh, clean, potable water for their workers and workers of their subcontractors and sub-subcontractors per OSHA requirements.

32. Each Prime Contractor shall provide all layout and surveying as required to complete their scope of work.

33. Include all necessary dewatering as required for the complete installation of work included in your Bid Package.

34. Each bid package is responsible for replacing anything they damage. Patching to repaired immediately after damage occurs. Patching must meet all UL requirements.

35. The Owner has salvage rights to any materials being removed / demolished for the construction of this project. Any materials the Owner does not want to retain will be removed as noted by the Contract Documents or as needed for construction.

36. Each Prime Contractor is responsible to have a minimum of one English speaking supervisor on-site during the duration of the contractor's work.

37. Each Prime Contractor is responsible to supervise any and all subcontractors and suppliers under their contract. If the Construction Manager has to supervise or coordinate a Prime Contractors workers or subcontractors, the Construction Manager will charge $150 per hour.

38. Provide all work per the contract schedule. Durations are not always intended to be cumulative and must be interpreted to the context shown in the schedule. The Subcontractor understands that there will be concurrent work activities taking place that may require additional supervision, manpower, and equipment or material deliveries to accommodate the schedule needs. Provide sufficient labor, material, and equipment to maintain progress in accordance with project schedule. Durations for each activity are to be maintained. Start dates are subject to move due to weather or design delays.

39. Provide construction equipment pad as needed based on construction schedule for any equipment needing special pad or bearing requirements.

40. Each Prime Contractor is responsible for replacing anything damaged or disturbed by their work. Each Prime Contractor shall restore all public and private land disturbed by their bid package to the original condition.

41. Coordinate shop drawings and installation sequencing with other trade contractors. All work shall be installed to provide the maximum benefit to the Owner and allow for full access to equipment requiring maintenance.

42. This project will utilize Last Planner Construction Schedule tools to plan the work, update the schedule, and monitor progress. It is a requirement to provide all paperwork and attend all meetings as requested by the Contractor/Construction Manager. Some of the items included are, but not limited to:

    a. A minimum of one scheduled coordination meeting per phase will be held with the Subcontractor/Prime project managers and foremen. These meetings may last a full day and are mandatory. In this meeting, you will be required to list all activities, assign accurate durations, and work with other contractors to sequence the activities as a group.

    b. Weekly foremen's meetings will be held where weekly work plans (WWP's) will be turned in to the Contractor/Construction Manager for review and the 6-week project schedule will be discussed. Weekly work plans are required to be turned in prior to the weekly meeting so all activities can be compiled into one WWP and distributed at the meeting.

    c. Daily stand-up meetings are a daily progress check and planning session for the following day. These meetings will be held on the project site, foremen for all trades on site are required to be there, and they should take no longer than fifteen minutes per day.

43. Progress meetings will be held twice a month and are mandatory for trades having work starting within the next 6 weeks. The representative at each meeting must have authority to make decisions on schedule, manpower and costs.

44. Procore will be used for maintaining project information. Each contractor shall check Procore at a minimum of twice a week. The cost of Procore is by the Construction Manager. Each prime contractor is responsible to field verify all dimensions prior to fabrication of products.

45. Each Prime Contractor will be responsible for completing two punch lists per phase. One for the Construction Manager and one for the Architect / Owner. Corrections to the Construction Manager punch list must be complete before the Architect / Owner punch list starts.

46. For work occurring outside temporary barricades shown on the phasing plan, each contractor is responsible to provide the construction shown for their scope of work along with temporary construction barriers, negative air machine placement and monitoring, access to their work (remove and replace ceilings, sections of walls etc.) demolition and clean-up. The area in and around the construction should be returned to existing or better condition after the construction is completed.

47. All submittals and shop drawings will be required within 20 days from Notice to Proceed (NTP). *Note: Long lead time items that impact the early portions of the project schedule will be required earlier than the minimum date for all submittals. Efforts must be made to procure materials in order to maintain the project schedule.

48. Controlled access zones are to be flagged off during the process of work around crane counterweights and concrete pump boom radius.

49. All contractor carried allowances must be approved prior to use and must be accompanied by T&M tickets signed by Construction Manager. T&M tickets must be submitted for approval to the Construction Manager within 72 hours, anything after 72 hours will be rejected. All allowances shall be broken out on the AIA pay applications.

50. Each prime contractor is responsible to field verify all dimensions prior to fabrication of products.

51. Safety related observations are to be corrected with 48 hours. All other site observation reports must be corrected within 5 working days or not to alter the schedule, whichever is duration is shorter.

52. Contractor will be responsible to research any existing conditions.

53. All individuals working on site will be required to check-in and review site specific requirements with the Construction Manager.

54. Closeouts are the responsibility of this agreement. Provide all closeouts in a timely manner. All closeouts will be due by dates designated in Procore or 3 months prior to substantial completion, whichever date is earlier. Your payment applications shall include a line item for closeout completion at a value of no less than 3% of the agreement value and you may bill for this upon full completion of your closeouts. This schedule of values line item is not part of any retainage. Owner training and as-builts are exempt from the schedule of values line items, but these are required prior to substantial completion of the project and/or phasing.

55. Contractor to be adequately qualified to perform work in a healthcare environment as outlined below:

a. Contractor has completed (3) similar projects in size, type, and scope in the past (7) years.

    i. Contractor to provide reference list with bid including customer contract information.

b. Contractor will have sufficient manpower to staff the project to meet the project schedule outlined in Specifications.

c. Contractor must have a competent person on site during all times while any direct subcontractors are on site.

d. Field and office management/supervisors must have a minimum of three years of healthcare experience.

e. All supervision and project management must have completed infection control and risk assessment training.

f. Contractor will have an established apprenticeship program. Union labor is not required for public bid hospitals. Apprenticeship is recommended to ensure proper training of employees, however, is not to be considered a decision maker if contractor does not have program in place.

g. All supervision must have a minimum of 10 hours OSHA training.

h. All supervision must have CPR / First Aid Training.

56. Any Prime Contractor that causes a schedule delay will be responsible to make up for any amount of days lost to maintain contract schedule. This may include additional costs incurred by prime contractor that caused the delay, as well as added costs by other prime contractors including but not limited to expedited shipping costs and over time work. Cost may also include additional construction manager general conditions costs as well has any costs incurred by the owner.

57. Prime Contractors responsible for reviewing & including considerations related to their scopes of work as indicated in the soils report (Specification 00 31 00).

END OF SECTION 00 80 00

SECTION 00 80 01

BID PACKAGE 01

Bid Package 1: Landscaping, Seeding, Sodding, Retaining Wall, Site Furnishings

Furnish complete all necessary labor, materials, office and field supervision, insurance, tools, equipment, layout, hoisting, rigging, shop drawings, submittals, permits, licenses and fees necessary to complete the work outlined below. Include all shift pay, overtime, weekend and holiday pay to complete the work in the scheduled durations shown in the project schedule in Specification Section 01 15 20.

This bid package includes, but is not limited to the following scope of work:

A. Bid Package #00 – General Requirements

B. Plans by Bishop Engineering dated September 10, 2026.

C. Specifications from the Project Manual by Bishop Engineering dated September 10, 2026. Including, but not limited to the following sections

a. All Division 00 and 01 specifications
b. 31 20 00 Earthwork (as applies)
c. 31 23 33 Trenching & Backfilling (as applies)
d. 32 91 19 Landscape Grading
e. 32 92 19 Seeding
f. 32 92 19 Turf Seeding
g. 32 93 00 Trees, Shrubs, Groundcover
h. Site Clearing and Grading (SUDAS Standards)
i. Site Utilities (SUDAS Standards)
j. Plant Material and Plantings (SUDAS Standards)
k. City of Des Moines General Supplemental Specifications
l. Iowa DOT Standard Specifications for Highway and Bridge Construction

The below items are further clarifications and/or additional requirements to the above specification sections.

D. DIVISION 01 – GENERAL REQUIREMENTS

1. All work to be completed in accordance with the schedule and phasing included in specification section 01 15 20 and as noted in the Contract Documents. The contractor must include additional mobilizations as needed to meet the schedule and phasing as noted.

2. Furnish and install final grading and spreading of topsoil. Furnish and install all landscaping, seeding, sodding, and site furnishings etc. as indicated in the contract documents.

3. Clean streets and roadways to keep them free of dirt, mud and debris generated by this scope of work. Clean daily or more often as site conditions require. Fill any wheel tracks, etc from deliveries or equipment.

4. Provide daily jobsite clean-up. Haul and place all debris (no plant materials, or soil) in dumpster provided by others.

5. Coordinate with the AHJ, city, state, etc. on work related to the disturbance of any public streets or right of ways. This includes but is not limited to any fine grading, deliveries, or work near street access. Obtain all necessary approvals and permits before commencing work.

6. Provide all required traffic control and barriers for installation of work.

7. Include taking any deliveries related to this Bid Package, and moving materials and clean-up as required. All deliveries must be coordinated and scheduled with the Construction Manager.

8. Each Prime Contractor is responsible to have at minimum on one English speaking supervisor on site during the duration of the Contractor's work.

9. Provide temporary power and water for this scope of work if other permanent or temporary power and water are not readily available at the jobsite.

10. Contractor to provide, set-up and maintain any barricades, signage, traffic control, etc. for work involving closing of streets, drives, sidewalks, etc.. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

11. Material delivery and trucking routes to be coordinated with Construction Manager prior to commencement of work.

12. Include taking any deliveries related to this Bid Package, and moving materials and clean-up as required. All deliveries must be coordinated and scheduled with the Construction Manager.

13. The construction site is limited to materials and equipment. Coordinate material and equipment locations with the Construction Manager. Anything that needs to move out of the construction area will need to be kept in a staging area directed by the construction manager. The cost of moving materials needs to be included. Each prime contractor is responsible for their own stored materials and equipment.

14. Project foreman's meetings will be held weekly at the site and progress coordination meetings will take place bi-weekly with the construction manager and CMC staff. Contractors shall have a representative at each meeting while the contractor is on site or within 4 weeks of starting a task. This representative shall have knowledge of the project and be empowered to make decisions while at the meeting. Absences to be discussed with the construction manager prior to the meeting.

15. Submittal and closeout due dated must be uploaded to Procore prior to the due date. Contractor will be responsible for uploading all RFI's to Procore for review by the Construction Manager.

16. Each bid package is responsible for replacing anything they damage such as site items, etc. that are damaged or compromised by the work of this bid package.

17. Each contractor is responsible to supervise all subcontractors under that specific bid package. Graham will give 24 hours' notice before starting to charge $150/hr. for supervision, preparation, and coordination of the contractor's subs.

A. DIVISION 02 – EXISTING CONDITIONS

1. Locate and protect all existing underground and overhead utilities to remain, both public and private. Pothole existing underground utilities to confirm locations and depths as required. Dig permit to be filled out and signed by Construction Manager prior to work starting.

B. DIVISION 31 – EARTHWORK

1. Restore all public and private land disturbed by the work of this Bid Package to original condition.

2. Provide all surveying, staking, and layout needed for this scope of work.

3. Repair erosion control, temporary roads/access, etc. disturbed by the installation of the work in this Bid Package.

4. Include final grading and adjustment of topsoil prior to placement of sod and seeding. All final grades shall be provided to this bid package to within +/- one inch (+/- 1") of elevations shown on plans. Pick-up and dispose of off-site all rocks over three-quarters of an inch (3/4") in diameter. Coordinate final topsoil depth with AHJ and remove excess spoils.

C. DIVISION 32 – EXTERIOR IMPROVEMENTS

1. Furnish and install all landscaping, including all plants, trees, sod, and seeding as noted in the Contract Documents. This includes soil treatment, fertilizer, mulch, rock, etc.

2. Protect plantings, shrubbery and tree root systems during transportation and storage as necessary to ensure root systems are maintained and in a healthy condition. During storage, heel-in plants with moist mulch or soil; maintain, water and protect from excessive sun, wind and inclement weather conditions.

3. Provide tree planting process and meet with landscaping architect for approval.

4. Landscape edging to be straight and verify correct elevation, proper backfill and bed depth for sod/mulch/rock.

5. Provide watering of plants, trees, sod, and seeding starting at installation date and extending until October 1st, 2027.

6. Contractor shall retain full liability for the health of all plantings, shrubbery, trees, sod, and seeding until final acceptance. Material determined to be damaged or unhealthy by the Construction Manager before final acceptance shall be replaced at the Contractor's full expense.

7. Contractor to include 1 additional mobilization to remove stakes installed for trees and shrubbery. Stakes remain in place for no longer than 1 year from installation.

8. Contractor to provide, set-up and maintain any traffic control necessary for work involving closing of streets, drives, sidewalks, etc.. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

D. UNIT PRICES

1. The Contractor agrees to the following unit/alternate prices, which include all delivery, hoisting, supervision, fringes, equipment, travel time, insurance, taxes, bonds, overhead and profit for the Work if ordered in writing by the Contractor. Provide Unit Prices per Bid Breakdown including all mark-ups:

    a. Provide a list of hourly labor rates for change order work including subcontractors working under the prime contractor. Include overtime rates.

    b. Provide a list of billable tool/equipment rates for change order work including subcontractors.

c. Project Manager: $_____/hr

d. Superintendent: $_____/hr

e. Foreman: $_____/hr

f. Laborer: $_____/hr

g. Planting Material (each type) $_____/EA*

h. Seeding (each type) $_____/SF*

i. Sodding (each type) $_____/SF*

j. Payment & Performance Bonds _____%

*Provide an 'each' unit price for each type of shrubbery, tree, and grass (seed and sod) listed in the Plant Schedule (C5.1).

E. ALTERNATES

1. Provide pricing on Bid Form for all applicable alternates as defined in Specifications.

F. COMPANY INFORMATION:

_____ _____
Bidder's Company Name Telephone Number

_____ _____
Date of Proposal Fax Number

_____ _____
Signature Printed Name

END OF SECTION 00 80 01

SECTION 00 80 02

BID PACKAGE 02

Bid Package 02: Sitework and Underground Utilities

Furnish complete all necessary labor, materials, office and field supervision, insurance, tools, equipment, layout, hoisting, rigging, shoring, shop drawings, submittals, permits, licenses and fees necessary to complete the work outlined below. Include all shift pay, overtime, weekend and holiday pay to complete the work in the scheduled durations shown in the project schedule in Specification Section 01 15 20.

This Bid Package includes, but is not limited to the following scope of work:

A. Bid Package #00 – General Requirements

B. Construction documents by Bishop Engineering dated September 10, 2026.

C. Specifications from the Project Manual by Bishop Engineering dated September 10, 2026. Including, but not limited to the following sections:

   a. All Division 00 and 01 specifications
   b. 31 10 00 Site Clearing
   c. 31 20 00 Earthwork
   d. 31 23 33 Trenching and Backfill
   e. 31 35 00 Erosion and Sediment Controls
   f. 32 11 23 Aggregate Base Course
   g. 33 10 00 Water Utilities
   h. 33 40 00 Storm Sewer and Drainage
   i. 33 49 00 Storm Drainage Structures
   j. Site Clearing and Grading (SUDAS Standards)
   k. Site Utilities (SUDAS Standards)
   l. Temporary Construction Entrance per SUDAS
   m. City of Des Moines General Supplemental Specifications
   n. Iowa DOT Standard Specifications for Highway and Bridge Construction

The below items are further clarifications and/or additional requirements to the above specification sections.

A. DIVISION 01 – GENERAL REQUIREMENTS

1. All work in this Bid Package shall be provided in accordance with OSHA regulations and applicable state and local codes. Provide proof of all training and certificates required and provide written safety and fall protection programs. Sloped excavations and trenches shall meet OSHA requirements. All work to follow Graham safety standards as listed in Graham's safety manual. Excavations and trenches are to be fenced off at the end of each working shift.

2. This project will utilize Last Planner Construction Schedule tools to plan the work, update the schedule, and monitor progress. It is a requirement to provide all paperwork and attend all meetings as requested by the Contractor/Construction Manager. Some of the items included are, but not limited to:

   a. A minimum of one scheduled coordination meeting per phase will be held with the Subcontractor/Prime project managers and foremen. These meetings may last a full day and

are mandatory. In this meeting, you will be required to list all activities, assign accurate durations, and work with other contractors to sequence the activities as a group.

b. Weekly foremen's meetings will be held where weekly work plans (WWP's) will be turned in to the Contractor/Construction Manager for review and the 6-week project schedule will be discussed. Weekly work plans are required to be turned in prior to the weekly meeting so all activities can be compiled into one WWP and distributed at the meeting.

c. Daily stand-up meetings are a daily progress check and planning session for the following day. These meetings will be held on the project site, foremen for all trades on site are required to be there, and they should take no longer than fifteen minutes per day.

3. This bid package shall furnish, install, and maintain the erosion control measures for the entire project duration or until the applicable permit(s) can be closed out. All work must be in compliance with the Iowa Department of Natural Resources and City of Des Moines ordinances. Coordinate all work with the Construction Manager, including final removal and completion. NPDES permit to be retained by owner.

4. SWPPP monitoring will be performed by this Bid Package. Contractor is responsible for a designated qualified person as defined by Iowa DNR to inspect the site at a minimum of once every 7 days AND within 24 hours of a rain event of 0.5 inches or greater. Contractor shall document each inspection in a report with photographs of the current site conditions and any infractions that need corrected. Reports shall be made available within 24 hours of the inspection and physically filed in a dedicated SWPPP binder. Contractor is responsible for updating the on-site SWPPP site map drawings as conditions change and file current version in binder. SWPPP binder is to be stored onsite and updated for documentation weekly. All SWPPP issues are to be corrected within 48 hours after report issued. SWPPP inspections shall begin from initial soil disturbance until final stabilization or until all applicable permit(s) can be closed out.

5. All work to be completed in accordance with the schedule and phasing included in Specification Section 01 15 20 and as noted in the Contract Documents. The contractor must include additional mobilizations as needed to meet the schedule and phasing as noted. Contractor shall proceed with work in any area that becomes available ahead of schedule dates when suitable working conditions permit.

6. Coordinate with the city of Des Moines on work related to the disturbance of any public streets or right of ways. This includes but is not limited to any grading in the right of way; tie in at parking lot entrances, and utility connections. Obtain all necessary approval and permits before commencing work.

7. Material delivery and trucking routes to be coordinated with Construction Manager prior to commencement of work.

8. Include taking any deliveries related to this Bid Package, and moving materials and clean-up as required. All deliveries must be coordinated and scheduled with the Construction Manager.

9. Contractor shall inspect all delivered materials upon receipt and prior to acceptance, installation, or incorporation into the Work. Contractor shall verify that materials are the correct type, size, quantity, and configuration and are free from visible damage or defects. Any damaged, defective, incorrect, or missing materials shall be documented and promptly reported to the Construction Manager and shall be addressed by the Contractor prior to installation.

10. Contractor shall be responsible for proper unloading, handling, storage, and protection of delivered materials until incorporated into the Work. Damage occurring after delivery due to improper handling, storage, or protection shall be the responsibility of the Contractor.

11. Clean streets and roadways to keep them free of dirt, mud and debris generated by this scope of work. Clean daily or more often as site conditions require. Fill any wheel tracks, etc. from deliveries or equipment. Any disruption of the site by this contractor must be regraded and must be kept graded during all work.

12. Provide daily jobsite clean-up. Haul and place all debris (no concrete, no trees, no plant materials, no soils) in dumpster provided by Construction Manager.

13. All testing and inspections shall be coordinated with the Construction Manager and Testing Consultant. The cost of initial testing and inspections will be paid for by the Owner. All re-testing for failed tests due to deficient work shall be paid for by the Contractor.

14. The construction site is limited for materials and equipment. Coordinate material and equipment locations with the Construction Manager. Anything that needs to move out of the construction area will need to be kept in a staging area directed by the Construction Manager. The cost to move materials needs to be included. Each Prime Contractor is responsible for their own stored materials and equipment.

15. The existing Hospital will remain in everyday operation. The Hospital can request work be shut down at any time for noise, vibration, or any inconvenience to their every day operation. Coordinate when this work can occur with the Construction Manager. Give adequate notice for all shut downs and inconvenient work to the Construction Manager.

16. At no time shall the Hospital be without essential services (electricity—both normal and generator power, gas, water, med gas, etc.). Provide temporary services to keep the Hospital in continuous operation. All interruptions to these services to be coordinated with the Construction Manager.

17. Each Prime Contractor is responsible to have at minimum on one English speaking supervisor on site during the duration of the Contractor’s work.

18. Each Prime Contractor is responsible to supervise any and all subcontractors under that specific Bid Package.

19. Provide, maintain and remove any rock, temporary concrete or asphalt paving installed for project phasing as indicated in the contract documents. This shall include removing any curbs as needed for the temporary road or ramping as required. Include installation and removal of fill as required for adequate pavement grade. Include any plating to be done to cover intakes. 3G Companies Dig Permit required prior to any pavement removal.

20. Submittals and closeouts must be uploaded to Procore prior to the due date. Contractor will be responsible for uploading all RFI’s to Procore for review by the Construction Manager.

21. Each contractor is responsible to supervise all subcontractors under that specific bid package. Graham will give 24 hours’ notice before starting to charge $150/hr. for supervision, preparation, and coordination of the contractor’s subs.

22. Bid package shall comply with Construction Manager’s spotter policy for site equipment. All personnel must be certified/trained per the Construction Manager’s safety policy. This includes but not limited to operators, flaggers, spotters, traffic control, etc.

23. Lean scheduling (pull planning) will be utilized on this project. This trade contractor and any subcontractors are required to attend all pull planning meeting to establish schedule, expedite the schedule, and/or to sequence the schedule.

B. DIVISION 02 – EXISTING CONDITIONS

1. Coordinate with Utility Company for removal of light poles.

2. Demo existing gravel lot.

3. Locate and protect all existing underground and overhead utilities to remain, both public and private. Pothole existing underground utilities to confirm locations and depths as required. Dig permit to be filled out and signed by Construction Manager prior to work starting.

4. The Owner has salvage rights to any materials being removed / demolished for the construction of this project. Any materials the Owner does not want to retain will be removed as noted by the Contract Documents or as needed for construction.

5. Contractor shall be responsible to research any existing conditions. This includes locating and/or potholing any private or public utilities prior to starting work. Confirm all utilities have been located. Confirm all utilities requiring deactivation have been deactivated prior to commencing work. This Contractor has visited the site, reviewed and understands the Geo-Technical Data and existing site conditions. Include new locates for work throughout the duration of the project.

6. Include removal of all trees designated for removal as indicated in the Construction Documents. Contractor shall grind tree stumps to a minimum of 12 inches below existing grade, or deeper as required by the City of Des Moines.

7. Contractor shall be responsible for all tree protection requirements as specified in the Construction Documents. Tree protection measures shall be installed prior to commencement of work, maintained throughout the duration of the project and removed at completion at the direction of the Construction Manager. Contractor shall be responsible for damage to protected trees resulting from their operations.

8. Include all site clearing, removal and disposal of all site items and abandoned utilities noted or as needed for other work shown in the Contract Documents. Protect all items, if any, shown to remain. Remove and dispose of all debris to an offsite location per applicable codes and regulations.

C. DIVISION 31 – EARTHWORK

1. Furnish and install underwater detention areas as shown per Contract Documents.

2. All paved areas, including sidewalks, shall be compacted and graded to within +/- one inch (+/- 1”) in preparation for subbase. Coordinate with Concrete bid package on acceptance of grade prior to hand-off. Any prepared subgrade that becomes frozen shall be scarified and re-compacted prior to pavement and sidewalk installation. The paving work shall be provided under a separate Bid Package and will be installed as per the Construction Schedule noted in the contract documents.

3. Include all excavation, trenching, backfill, compaction, bedding materials for piping, dewatering, shoring and temporary safety measures per OSHA requirements required for this Bid Package.

4. Include all necessary dewatering as required for the complete installation of work included in this Bid Package including rerouting any existing drain tile as needed. This includes pumping, removal of mud, muck, etc. out of excavations and replacement of removed material for work of this package.

5. Handle all spoils from the foundation work for building concrete & retaining walls scopes of work. Spoils to be generated after mass grading work & prior to parking lot preparation. Spoils will be stockpiled in location as designated by Construction Manager by other trades for handling and /or haul off of such spoils by this trade.

6. Strip and stockpile topsoil and cut material from all disturbed areas. Strip to remove all vegetative and organic material as directed by the soils engineer and testing agency. Stockpile topsoil onsite in separate locations for re-spread as required by others. Any haul off or import of soil to achieve contract document grades shall by this bid package **AND INCLUDED IN THE BID.** Include 20 additional loads of spoil removal at the direction of the Construction Manager. Location of stockpile to be determined by Construction Manager.

7. Repair erosion control, temporary roads, etc. disturbed by the installation of the work in this Bid Package.

8. Restore all public and private land disturbed by the work of this Bid Package to original condition.

9. Provide all surveying, staking, and layout needed for this scope of work.

10. Include all earthwork, imported fill, export, grading and proof rolling as required.

11. Include all cutting, removal, of any concrete/paving/curbs, and final grading required for the installation. Include any City coordination and costs associated with street closures for work of this bid package. Include cutting and pour back of concrete at driveway connection to existing roadway.

12. Per ABE's Geotechnical Report for pavement, this bid package is to over excavate the pavement slab by a depth of one foot (1') below the entire pavement area and be replaced with properly compacted and moisture condition re-used fill per the contract documents. This will need to extend two feet (2') beyond the edge of pavements. Provide an allowance for imported fill of a depth of 1'-0" and remove low density fill from project site. This will need to extend two feet (2') beyond the edge of pavements. Refer to Page 11-12 of ABE's Geotechnical Report for details. If ABE's Field Engineer does not require the imported soils, the unused portion of the allowance will go back to the owner.

13. Perform all settlement monitoring per ABE's Geotechnical Report and monitoring schedule. Record all findings and submit to Construction Manager as part of the closeout documents.

14. Install subsurface pavement drainage as indicated in ABE's Geotechnical Report.

15. Site pad preparation:

    a. Cut/fill as required to obtain specified subgrade elevation as noted in the Contract Documents.

16. Pick-up and dispose of off-site all rocks and large clumps of earth over 3/4" diameter.

17. Restore all public and private land disturbed by the work of this bid package to original condition.

18. All excavations to be OSHA compliant via trench boxes, benching, or other means. If space constraints are too tight, trench boxes must be used and included in this scope of work.

19. The schedule outlines a pause in work during winter conditions, that will then resume when conditions allow. Upon the resumption of work, this Contractor shall restore site to proper compaction as outlined in the ABE Geotechnical Report.

20. Contractor shall proceed with work in any area that becomes available ahead of schedule dates when suitable working conditions permit. Coordinate access, sequencing, and work activities with the Construction Manager and other Contractors.

D. DIVISION 33 – UTILITIES

1. Furnish and install storm drainage piping and structures as indicated on Contract Documents.

2. Reinforcement for cast-in-place structures shall be epoxy coated per City of Des Moines Supplemental Sepcifications.

3. Excavations greater than 20’ require a design by a registered professional engineer per OSHA 1926 Subpart P Appendix B.

4. Confined space permit and applicable safety measures must be considered when entering a manhole or excavation when air quality is low or potential of atmospheric hazards.

5. Trade Partner must designate one competent person for all trenching and excavation activities and must notify Construction Manager who their competent person is.

6. Provide surveying of all installed site utilities installed by this Bid Package and provide documentation of those surveys with exact utility locations and depths on as-built drawings. Provide locations of buried utilities at 20’ increments. Notify the Construction Manager when existing utilities are found for documentation by others.

7. A concrete wash-out container for use by this Bid Package to be provided by this Bid Package. Concrete wash out to be off-site or on-site concrete wash out container to be emptied off site. Concrete waste cannot be placed in the dumpster provided by the Construction Manager. Any other means of concrete wash out to be approved by Construction Manager.

8. Include cost to close-up and barricade all excavations associated with the work of this Bid Package that are left open overnight. Include all barricades to protect other workers during working hours.

9. Contractor to provide, set-up and maintain any barricades, signage, traffic control, etc. for work involving closing of streets, drives, sidewalks, etc.. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

10. Contractor is responsible for all required field measurements for items in this bid package. Field measurements must be taken in advance to prevent any material/schedule delays.

11. Provide all sub drainage components at perimeter foundation including tile, fabric, drainage mat and fill as shown on the documents. Include all interior SOG sub drainage details.

E. ALLOWANCES

1. Allowances to be tracked by the Construction Manager by signed time & material tickets. Any allowances not used will be credited back to the owner.

    a. Include an additional 10 mobilizations and 200 tons of additional rock to for temporary areas per Construction Manager's direction. Including but not limited to construction entrances, lay down area, parking areas, etc. All temporary rock must be installed on a suitable geofabric for the intended use. This additional rock is not to be used for the locations already shown on the site logistics plan.

    b. Include an allowance for 1 additional proof roll test after winter weather allows work to resume and before handoff to Bid Packages 01 and 03.

    c. Include allowance for the removal of existing fire hydrant. Sequence of removal to be at the discretion of the Construction Manager. Coordinate with Des Moines Water Works (DMWW). DMWW has salvage rights to fire hydrant being removed. In the event that DMWW does not want to retain, fire hydrant will be removed as noted by the Contract Documents or as needed for construction.

F. UNIT PRICES

1. The Contractor agrees to the following unit/alternate prices, which include all delivery, hoisting, supervision, fringes, equipment, travel time, insurance, taxes, bonds, overhead and profit for the Work if ordered in writing by the Contractor. Provide Unit Prices per Bid Breakdown including all mark-ups:

    a. Provide a list of hourly labor rates for change order work including Contractors working under the prime contractor. Include overtime rates.

    b. Provide a list of billable tool/equipment rates for change order work including Contractors.\

    c. Project Manager: $_____/hr

    d. Superintendent: $_____/hr

    e. Foreman: $_____/hr

    f. Laborer: $_____/hr

    g. Survey Crew: $_____/hr

    h. Payment & Performance Bonds _____%

2. Provide a unit cost over excavation/placement and compaction of engineered fill at footings and pavement locations. Include over excavation in bid, unused quantities/dollars will be returned to the owner.

    a. $_____/cu. yd.

2. Provide a unit cost of over excavation/placement and compaction of engineered fill at pavement and Slab-on-grade locations. Include over excavation in bid, unused quantities/dollars will be returned to the owner.

    a. $_____/cu. yd.

3. Provide a unit cost of addition staging rock maintenance as requested. Allowance of 200 tons is to be included within bid.

   a. $_____/tons

G. ALTERNATES

1. Provide pricing on Bid Form for all applicable alternates as defined in Specifications.

   a. Deduct Alternate 2: Removal of scope in Alleyway East

   b. Deduct Alternate 3: Removal of scope in Alleyway West

H. COMPANY INFORMATION:

_____	_____
Bidder's Company Name	Telephone Number
_____	_____
Date of Proposal	Fax Number
_____	_____
Signature	Printed Name

END OF SECTION 00 80 02

SECTION 00 80 03

BID PACKAGE 03

Bid Package 03: Foundations, Slab on Grade, Retaining Wall, & Misc. Concrete

Furnish all necessary labor, materials, office and field supervision, insurance, tools, equipment, layout, hoisting, rigging, shoring, shop drawings, field measurements, submittals, permits, licenses and fees necessary to complete the work outlined below. Include all mobilizations, phasing, shift pay, overtime, weekend and holiday pay to complete the work in the scheduled durations shown in the project schedule in Specification Section 01 15 20.

This Bid Package includes, but is not limited to, the following scope of work:

A. Bid Package #00 – General Requirements

B. Plans by Bishop Engineering dated September 10, 2026.

C. Specifications from the Project Manual by Bishop Engineering dated September 10, 2026. Including, but not limited to the following sections.

a. All Division 00 and 01 specifications
b. 03 10 00 Concrete Forming
c. 03 20 00 Concrete Reinforcement
d. 03 30 00 Cast-in-place Concrete
e. 05 52 13 Metal Railings
f. 31 20 00 Earthwork (as applies)
g. 31 23 33 Trenching and Backfill
h. 32 11 23 Aggregate Base Course
i. 32 13 13 Concrete Paving
j. 32 13 73 Pavement Joint Sealants
k. 32 17 23 Pavement Markings
l. City of Des Moines General Supplemental Specifications
m. Iowa DOT Standard Specifications for Highway and Bridge Construction

The below items are further clarifications and/or additional requirements to the above specification sections.

D. DIVISION 01 – GENERAL REQUIREMENTS

1. All work in this Bid Package shall be provided in accordance with OSHA regulations and applicable state and local codes. Provide proof of all training and certificates required and provide written safety and fall protection programs. Sloped excavations and trenches shall meet OSHA requirements. All work to follow Graham safety standards as listed in Graham's safety manual. Excavations and trenches are to be fenced off at the end of each working shift.

2. This project will utilize Last Planner Construction Schedule tools to plan the work, update the schedule, and monitor progress. It is a requirement to provide all paperwork and attend all meetings as requested by the Contractor/Construction Manager. Some of the items included are, but not limited to:

   a. A minimum of one scheduled coordination meeting per phase will be held with the Contractor/Prime project managers and foremen. These meetings may last a full day and are

mandatory. In this meeting, you will be required to list all activities, assign accurate durations, and work with other contractors to sequence the activities as a group.

b. Weekly foremen's meetings will be held where weekly work plans (WWP's) will be turned in to the Contractor/Construction Manager for review and the 6-week project schedule will be discussed. Weekly work plans are required to be turned in prior to the weekly meeting so all activities can be compiled into one WWP and distributed at the meeting.

c. Daily stand-up meetings are a daily progress check and planning session for the following day. These meetings will be held on the project site, foremen for all trades on site are required to be there, and they should take no longer than fifteen minutes per day.

3. Furnish and install complete systems per specification sections listed above and as indicated in the Contract Documents.

4. Contractor to provide a final pavement clean prior to turnover to the hospital.

5. Remove spoils generated by the work of this Bid Package off-site. Spoils can be stockpiled on site at the discretion of the Construction Manager.

6. All work to be completed in accordance with the schedule and phasing included in Specification Section 01 15 20 and as noted in the Contract Documents. The contractor must include additional mobilizations as needed to meet the schedule and phasing as noted. Contractor shall proceed with work in any area that becomes available ahead of scheduled dates when suitable working conditions permit. Coordinate with the Construction Manager.

7. Coordinate with City of Des Moines on work related to the disturbances of any public streets or right of ways. This includes but is not limited to work in the right of way, tie in at parking lot entrances, and work taking place in streets and roadways. Obtain all necessary approval and permits before commencing work.

8. Contractor to provide, set-up and maintain any traffic control necessary for work involving closing of streets, drives, sidewalks, etc.. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

9. Material delivery and trucking routed to be coordinated with Construction Manager prior to commencement of work.

10. Include taking any deliveries related to this Bid Package, and moving materials and clean-up as required. All deliveries must be coordinated and scheduled with the Construction Manager.

11. Clean streets and roadways to keep them free of dirt, mud and debris generated by this scope of work. Clean daily or more often as site conditions require. Fill any wheel tracks, etc. from deliveries or equipment.

12. Provide daily job-site clean-up. Haul and place all debris (no concrete, no trees, no plant materials, no soils) in dumpster provided by Construction Manager.

13. The construction site is limited for materials and equipment. Coordinate material and equipment locations with the Construction Manager. Anything that needs to move out of the construction area will need to be kept in a staging area directed by the Construction Manager. The cost to move materials needs to be included. Each Prime Contractor is responsible for their own stored materials.

14. Include all necessary dewatering as required for the complete installation of work included in this Bid Package including rerouting any existing drain tile as needed. This includes pumping, removal of mud, muck, etc. out of excavations and replacement of removed material for work of this package.

15. Bid package shall comply with Construction Manager's spotter policy for site equipment. All personnel must be certified/trained per the Construction Manager's safety policy. This includes but not limited to operators, flaggers, spotters, traffic control, etc.

16. Submittal and closeout due dated must be uploaded to Procore prior to the due date. Contractor will be responsible for uploading all RFI's to Procore for review by the Construction Manager.

17. Each contractor is responsible to supervise all subcontractors under that specific bid package. Graham will give 24 hours' notice before starting to charge $150/hr. for supervision, preparation, and coordination of the contractor's subs.

18. Provide any temporary heat, heated enclosures, blankets, ground thawing, and any additives as required for work by this Bid Package to maintain the project schedule.

E. DIVISION 02 – EXISTING CONDITIONS

1. Demo existing concrete as indicated on the construction documents and dispose of all debris to an offsite location per applicable codes and regulations.

2. Contractor shall perform clean saw cuts in a manner to minimize overcutting beyond the limits of removal shown in the Construction Documents. In the event a saw cut extends beyond the limits into an adjacent panel, pavement slab or utility structure, the contractor shall remedy and/or replace to the nearest joint or as directed by the AHJ at no cost to the Owner.

3. In the event that concrete removal or other operations within this scope of work damage existing concrete, this contractor shall replace the damaged concrete to the next joint or as directed by Engineer at no cost to the Owner. Contractor shall notify Construction Manager of any damage to existing concrete immediately.

n. Locate and protect all new and existing underground and overhead utilities to remain, both public and private. Pothole existing underground utilities to confirm locations and depths as required. Dig permit to be filled out and signed by Construction Manager prior to work starting.

4. Contractor shall be responsible to research any existing conditions. This includes locating any private or public utilities prior to starting work. Confirm all utilities have been located. Confirm all utilities requiring deactivation have been deactivated prior to commencing work. This Contractor has visited the site, reviewed and understands the Geo-Technical Data and existing site conditions. All rock excavation and drilling required to complete this scope of work is included.

5. Include full depth saw-cutting and grading at existing pavement to join new paving to existing paving as indicated in the Contract Documents. Shall include a second cut before new paving is placed to remove chipped edges from first cut. Refer to Table 1 of OSHA 1926.1153(c)(1) for required respiratory protection.

F. DIVISION 03 – CONCRETE

1. Furnish and install all concrete stairs as noted in the construction documents. Include steel handrail as needed for the concrete stairs. All reinforcement shall be epoxy coated.

2. Furnish and install all equipment concrete pads as indicated in the Contract Documents. Coordinate with Electrical Scopes. If equipment pads are not shown, then assume the pad shall be 6” larger than the piece of equipment shown on the plans. The equipment pad shall be 5” thick and doweled into the slab on grade or deck.

3. Furnish and install all bases for bollards and footings for electrical equipment as indicated in the Construction Documents. Include all required reinforcement. Provide chamfer on all exposed edges of concrete. Coordinate with Electrical Contractor for placement; conduit and sleeves provided by Bid Package 04.

4. Provide all surveying, staking and layout as required to complete this scope of work.

G. DIVISION 05 – METALS

1. Furnish and install guardrail, anchors and anchor plates for retaining wall as indicated in the construction documents. Anchors to wall are to be drilled and epoxied in.

H. DIVISION 31 – EARTHWORK

1. Provide all fine grading below paving of sub-base. Site will be provided at plus or minus 0.1’. Provide 6” of sub-base under all paving as required to meet specification. Coordinate with sitework contractor on acceptance of grade prior to concrete prep.

2. Slope subgrade and slab on grade to drains as outlined on the drawings. The required thickness for the slab on grade must be maintained.

3. Include all excavation, trenching, backfill, compaction, bedding materials for piping, dewatering, shoring and temporary fencing required for this Bid Package.

4. Per ABE’s Geotechnical Report for pavement, this bid package is to over excavate the retaining wall footings by a depth of one foot (1’) below the entire pavement area and be replaced with properly compacted and moisture condition re-used fill per the contract documents. This will need to extend two feet (2’) beyond the edge of pavements. Provide an allowance for imported fill of a depth of one foot (1’) and remove low density fill from project site. This will need to extend two feet (2’) beyond the edge of pavements. Refer to Page 11-12 of ABE’s Geotechnical Report for details. If ABE’s Field Engineer does not require the imported soils, the unused portion of the allowance will go back to the owner.

5. Provide any excavation (including but not limited to footings, foundations and backfill) as indicated in the contract documents associated with this Bid Package. A Dig Permit is required for any excavation onsite.

6. Contractor is responsible for any removal of any spoils generated by this Bid Package.

7. Prior to placement of the concrete slab and slab on grade, furnish, place and compact 12 inches of subgrade in 2-6” lifts as indicated on the Contract Documents. Work around and protect underground rough-ins provided by other trades.

I. DIVISION 32 – EXTERIOR IMPROVEMENTS

1. Furnish and install all concrete foundation, slab on grade and work as indicated in the Contract Documents. Include excavation, formwork, bracing, staking, layout, vapor retarders, geofoam, reinforcing steel, concrete, epoxy, grout, rigid insulation at foundation, backfill, compaction, etc, to install the work complete. Removal of any spoils generated by this scope of work.

2. Furnish and install all paving, sidewalks, curbs work as indicated in the contract documents. Include excavation, formwork, bracing, staking, layout, vapor retarders, geofoam, reinforcing steel, concrete, epoxy, grout, rigid insulation at foundation, backfill, compaction, etc., to install the work complete. Removal of any spoils generated by this scope of work.

3. Contractor to confirm that all new paving is flush with existing paving and drive lanes. Install reinforcement in existing paving prior to tie-in.

4. Provide all saw-cutting as required per the contract documents.

5. Furnish and install all reinforcement including welded wire fabric and any macro/microfibers, dosage rate to be confirmed with Engineer and Manufacturer. All reinforcement must be inspected. Coordinate with the Construction Manager.

6. Furnish, install, and maintain OSHA approved rebar caps at all exposed rebar until integrated into the final construction.

7. Miscellaneous embeds and anchor bolts provided and installed by Bid Package.

8. Furnish and install retaining wall according to contract documents. This includes excavation, forming, pouring, reinforcement and backfill. Provide references as indicated for prior experience with retaining walls at the time of bid.

9. Coordinate with Bid Package 02 for any necessary penetrations through retaining wall. Sleeves to be provided by others. Core drilling penetrations will not be permitted.

10. Contractor shall attend Special Inspection and Testing Program Review meeting prior to construction. Coordinate with third party inspectors for all required testing and inspections per the program.

11. Furnish and install all footings and foundations associated with the retaining walls. This includes excavation, forming, pouring, reinforcement and backfilling to return to existing grade.

12. Review pages 9&10 of ABE’s Geotechnical report regarding the foundation design of the retaining walls.

13. Clean-up concrete debris, splatter, etc. outside of all formed material. Upon completion all concrete shall be scraped and broom cleaned. Contractor to provide final clean of all paved surfaces prior to punch list to be scheduled with Construction Manager.

14. Provide proper elevations per the contract documents. Third party testing will be required 24 hours after slabs poured.

15. A minimum of 1/8” per 10’ at proper elevations at slopes is required slope to drains.

16. Slope all concrete where indicated flat on contract documents to have at least 1/8” per foot. Bid Package to confirm all drains are indicated on the drawings. Coordinate concrete sloping around all drains with sitework package and Construction Manager.

17. Furnish and install compacted granular sub-base as specified in the Contract Documents under all footings, slabs, stairs, etc.

18. Contractor shall coordinate with all other trades and Construction Manager prior to installing work to verify that all sleeves, embeds, underground and site utilities and other work is completed.

Contractor will not be compensated for re-work due to failure to coordinate and verify with Construction Manager.

19. Furnish and install all necessary temporary bracing to support interior foundation retaining walls during backfill operations, which occur prior to lateral support slabs being placed to accommodate adjacent footing installation per the schedule. Provide engineered calculations as may be required to support bracing member sizes, spacing and anchorage.

20. Form all slab depressions in all slab on grade or elevated areas. Coordinate with Civil & MEP documents in addition to information shown on the structural documents. Confirm depth of finishes with Contractor for depressions made to receive flooring finishes.

21. Monitor concrete placement and adjust/maintain positioning of reinforcing during pours.

22. Rub, fill, grind, and patch as necessary to prepare surfaces for specified finishes or as necessary to achieve specified tolerances. Patch all exposed form tie holes immediately following stripping operations.

23. All SW-501 and SW-511 intakes shall include boxout conforming to SUDAS Figure SW-514. Include all labor, material, equipment, reinforcement, and jointing required to construct the boxout.

24. This Bid Package shall furnish and install all truncated domes required per the construction documents.

25. Furnish and install all reinforcement including welded wire fabric, rebar, epoxy bars, fiber reinforcement, CMU starter bars, etc. All reinforcement must be inspected.

26. This Bid Package is required to drill any holes in existing foundations or concrete for the embedment of new bars. Coordinate with the Construction Manager when this work is to be performed. This work may need to be performed off hours to reduce noise disruptions to the hospital.

27. Slope subgrade and slab on grade to drains as outlined on the drawings. The required thickness for the slab on grade or slab on deck must be maintained. Coordinate concrete sloping around all floor drains, cleanouts, and floor sink locations with Mechanical / Plumbing Bid Package and Construction Manager. Testing will be performed on sloped floors to verify positive drainage. If sloping is not maintained removal and replacement will be required at no additional costs.

28. Comply with elevations in specification related to flatness and levelness of slabs.

29. A concrete wash-out pit will be provided, maintained, and removed by this Bid Package. All concrete washout material is to be deposited in this location by this Bid Package. Any other means of concrete wash out to be approved by the Construction Manager. Concrete wash out to be maintained per SWPPP requirements, coordinate with the Construction Manager.

30. This Bid Package is responsible to schedule all inspections and test for each pour. Notify the Contraction Manager of pour dates.

31. Contractor to provide all pavement markings and permanent traffic signage as shown on the contract documents and required by local city/state guidelines. Contractor to provide warranty of all pavement markings for a year past substantial completion of the project. Power to required traffic signs to be provided by others. Coordinate electrical work with Bid Package 04.

32. Provide barricades to separate work from public sidewalks, paving, etc.. Barricades will remain in place until work by all Bid Packages in complete. Remove barricades after work is complete. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

33. Contractor to provide joint sealing and installation of salt barrier spray-on.

34. Contractor to include all jointing material, layout and equipment required to install jointing systems in accordance with the jointing details as outlined in the construction documents.

35. Coordinate locations for control joint in retaining wall with the Owner. Maximum distance along retaining wall without a control joint not to exceed twenty feet (20').

J. ALLOWANCES

1. Allowances to be tracked by the Construction Manager by signed time & material tickets. Any allowances not used will be credited back to the owner.

    a. Provide a unit cost of over excavation/placement and compaction of engineered fill at foundations for retaining wall. Over excavation/placement shall extend nine inches (9") laterally beyond edge of footing in all directions for every one foot (1') of over excavation depth. Include over excavation in bid, unused quantities/dollars will be returned to the owner.

        i. $_____/cu. yd.

K. UNIT PRICES

1. The Contractor agrees to the following unit/alternate prices, which include all delivery, hoisting, supervision, fringes, equipment, travel time, insurance, taxes, bonds, overhead and profit for the Work if ordered in writing by the Contractor. Provide Unit Prices per Bid Breakdown including all mark-ups:

    a. Provide unit prices for the following items:

    b. Provide a list of hourly labor rates for change order work including Contractors working under the prime contractor. Include overtime rates.

    c. Provide a list of billable tool/equipment rates for change order work including Contractors.

    d. Project Manager: $_____/hr

    e. Superintendent: $_____/hr

    f. Foreman: $_____/hr

    g. Laborer: $_____/hr

    h. 7" PCC Drives $_____/sf

    i. 6" PCC Pavement $_____/sf

    j. 5" PCC Sidewalk $_____/sf

k. Curb & Gutter $_____/LF

l. Payment & Performance Bonds _____%

L. ALTERNATES

1. Provide pricing on Bid Form for all applicable alternates as defined in Specifications.

M. COMPANY INFORMATION

_____	_____
Bidder's Company Name	Telephone Number
_____	_____
Date of Proposal	Fax Number
_____	_____
Signature	Printed Name

END OF SECTION 00 80 03

SECTION 00 80 04

BID PACKAGE 04

Bid Package 04: Electrical, Telecommunication, Fire Alarm, Security

Furnish complete all necessary labor, materials, office and field supervision, insurance, tools, equipment, layout, hoisting, rigging, shoring, shop drawings, submittals, permits, licenses and fees necessary to complete the work outlined below. Include all shift pay, overtime, weekend and holiday pay to complete the work in the scheduled durations shown in the project schedule in Specification Section 01 15 20.

This Bid Package includes, but is not limited to the following scope of work:

A. Bid Package #00 – General Requirements

B. Plans by Bishop Engineering dated September 10, 2026.

C. Specifications from the Project Manual by Bishop Engineering dated September 10, 2026. Including, but not limited to the following sections:

a. All Division 00 and 01 specifications
b. 31 23 33 Trenching and Backfilling
c. All Division 26 – Electrical

The below items are further clarifications and/or additional requirements to the above specification sections.

D. DIVISION 01 – GENERAL REQUIREMENTS

1. Furnish and install complete electrical, telecommunications, and electronic safety and security systems per specification sections listed above and as indicated in the Contract Documents for a complete and fully functional system. Contractor is responsible for reviewing Architectural, Structural, Mechanical, Medical Equipment, and Civil drawing sheets for coordination and any electrical items not identified on the MEP drawing sheets.

2. Contractor is responsible for all required field measurements for items in this Bid Package. Field measurements must be taken in advance to prevent any material/schedule delays.

3. Obtain and pay for all permits associated with the electrical, telecommunications, electronic safety, fire alarm, and security systems. General Building permit will be obtained by the Construction Manager. This package will coordinate all inspections necessary for this scope of work to be communicated 24 hours in advance with the Construction Manager.

4. Furnish, install, maintain and remove temporary electrical power panels at a minimum of 2 locations during construction as located by the construction manager. Temporary power locations must be coordinated with Construction manager for location. The temporary power panels to be equipped with 4 quad GFCI outlets. Each duplex outlet to be on a dedicated circuit. All temporary power panels must comply with OSHA standards. Temporary power will be required throughout all phases of construction and may need to be altered through the course of construction to maintain adequate power for use.

5. This Contractor and main subcontractors will be required to sit in and participate in up to 4 coordination meetings (above and beyond regularly scheduled progress meetings) to coordinate with the city and Mid-American.

6. All building systems shutdowns need to be coordinated with the Construction Manager and the Owner. Provide, at a minimum, 48-hour notice to the construction manager for any shutdowns. Shutdowns may require off hours work depending on affected systems.

7. All work to be completed in accordance with the schedule and phasing included in Specification Section 01 15 20 and as noted in the Contract Documents. The contractor must include additional mobilizations as needed to meet the schedule and phasing as noted. Contractor shall proceed with work in any area that becomes available ahead of schedule dates when suitable working conditions permit.

8. Material delivery and trucking routes to be coordinated with Construction Manager prior to commencement of work.

9. Include taking any deliveries related to this Bid Package, and moving materials and clean-up as required. All deliveries must be coordinated and scheduled with the Construction Manager.

10. Contractor shall be responsible for proper unloading, handling, storage, and protection of delivered materials until incorporated into the Work. Damage occurring after delivery due to improper handling, storage, or protection shall be the responsibility of the Contractor.

11. Clean streets and roadways to keep them free of dirt, mud and debris generated by this scope of work. Clean daily or more often as site conditions require. Fill any wheel tracks, etc. from deliveries or equipment. Any disruption of the site by this contractor must be regraded and must be kept graded during all work.

12. Provide daily jobsite clean-up. Haul and place all debris (no concrete, no trees, no plant materials, no soils) in dumpster provided by Construction Manager.

13. Provide electronic coordination drawings, shop drawings and as-built drawings as required for this project. Drawings to be sent to the Construction Manager and fire suppression, plumbing and mechanical contractors for coordination

14. Provide sizing requirements to concrete contractor for all concrete equipment pads needed for transformer. Pad to be poured by concrete contractor.

15. Submittal and closeout due dated must be uploaded to Procore prior to the due date. Contractor will be responsible for uploading all RFI’s to Procore for review by the Construction Manager.

16. This Bid Package to provide multiple mobilizations to meet the project schedule for all programming.

17. Each contractor is responsible to supervise all subcontractors under that specific bid package. Graham will give 24 hours’ notice before starting to charge $150/hr. for supervision, preparation, and coordination of the contractor’s subs.

18. Each Prime Contractor is responsible to have at minimum on one English speaking supervisor on site during the duration of the Contractor’s work.

19. Lean scheduling (pull planning) will be utilized on this project. This trade contractor and any subcontractors are required to attend all pull planning meeting to establish schedule, expedite the schedule, and/or to sequence the schedule.

E. DIVISION 02 – EXISTING CONDITIONS

1. Contractor and major subcontractors will sit in pre-demolition conferences to review what services will be affected during and after demolition process occurs. Contingency plans will be developed with the Construction Manager for potential issues that could occur during and after demolition and phasing.

2. Demolition Areas:

    a. Provide demolition of existing electrical and low voltage as shown on the Contract Documents. This shall include removal of electrical and low voltage whether shown or not on the Contract Documents, that need to be removed for other demolition shown on the plans such as removing a wall, removing a piece of equipment, etc.

    b. Interior concrete removal and replacement, not shown on the contract documents but needed to install work for This Bid Package, shall be included by This Bid Package.

    c. Remove any disconnected/demolition items (wire, conduit, cable, etc.) completely from the areas of the building scheduled to remain.

    d. Reroute any essential services required to keep the occupied areas operational.

    e. Provide complete demolition of all electrical systems per plans and specifications. Any items not specifically shown or listed in the contract documents but are required to be removed for this contractor's or other trade's work or as required by code shall be included.

    f. Provide all electrical demolition, disconnection of power, phone, and data as required for project demolition and construction. Coordinate work with other trades demolition contractors and Construction Manager. Label phone and data lines that are staying to identify where they go.

    g. Remove any abandoned electrical conduit as needed.

3. Locate and protect all existing underground and overhead utilities to remain, both public and private. Pothole existing underground utilities to confirm locations and depths as required. Dig permit to be filled out and signed by Construction Manager prior to work starting.

4. The owner shall have first salvage rights to all items removed. If owner refuses salvage, contractor is responsible for disposal.

F. DIVISION 07 – THERMAL AND MOISTURE PROTECTION

1. Any penetrations at the existing and new slabs, footings, bollard bases, pavement or sidewalk made by this Bid Package need to be sealed watertight and/or fire stopped as required.

G. DIVISION 26 – ELECTRICAL

1. Electrical contractor to include but not limited to core drilling, concrete cutting, etc., as required to complete their scope of work. Contractor to remove material/debris from jobsite per SWPPP regulations.

2. Furnish and install all site electrical, such as lighting, light poles, light fixtures, power for signs, etc. as indicated in the Contract Documents. Include furnish and install concrete pole bases with steel reinforcement for all exterior light fixtures. Include excavation, backfill, and site patching to match existing for all site work required by this Bid Package.

3. Provide all surveying, staking, and layout needed for this scope of work.

4. Where existing electrical conduits serve circuits to be demolished and not reused, remove conductors. Existing back boxes and conduits remaining may be reused depending on location. If back boxes and conduit are not reused remove and patch surface to match existing. At locations where new electrical is to be installed in existing pavement, this package provides patching and finishing to match existing.

5. Lighting control system manufacturer shall provide 1-day additional on-site system training to site personnel at the conclusion of each construction phase.

6. The Contractor shall coordinate with Owner for OFCI/OFOI equipment install. Contractor shall furnish and install all pathways, wiring, connections and terminations for all OFCI/OFOI equipment to ensure a fully operational and complete system.

7. The Contractor shall coordinate with the utility companies for UPUI/UPCI equipment for install. Contractor shall furnish and install all pathways, wiring, connections and terminations for all UPUI/UPCI equipment to ensure a fully operational and complete system.

8. This Bid Package to furnish and install all illuminated bollards as indicated in construction documents. Include all pathways, wiring and terminations to ensure a fully operational and complete system. Concrete contractor to furnish and install reinforced footings. Coordinate with concrete contractor on install.

9. This Bid Package to provide any necessary sleeves required for their scope of work. Must provide sizing to the concrete contractor prior to their work starting.

10. Contractor to provide, set-up and maintain any traffic control necessary for work involving closing of streets, drives, sidewalks, etc.. Include cost for required permits by the City of Des Moines. Contractor must file for permits in a timely manner as to not impede schedule.

H. DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

1. This contractor shall coordinate and install all electrical and low voltage pathways, cabling and terminations required for electrical and security systems to ensure a fully operations and complete system. Coordinate with Owner and Owner Vendor on OFCI/OFOI devices.

2. This Bid Package to furnish and install tier 22 handholes as indicated in construction documents. Include all excavation, backfill, pathways, wiring, and connection to panel with pull string for future use by Owner.

I. DIVISION 31 – EARTHWORK

1. This Bid Package to provide any trenching, boring, excavation, backfill and site patching associated with this Bid Package. Contractor to remove any spoils generated by their scope of work and return the site to existing grade. Coordinate work with other Contractors on site.

2. Coordinate with City of Des Moines and Iowa DOT for all boring operations under Hickman Road.

3. Provide all surveying, staking, and layout needed for this scope of work.

J. UNIT PRICES

1. The Contractor agrees to the following unit/alternate prices, which include all delivery, hoisting, supervision, fringes, equipment, travel time, insurance, taxes, bonds, overhead and profit for the Work if ordered in writing by the Contractor. Provide Unit Prices per Bid Breakdown including all mark-ups:

    a. Provide a list of hourly labor rates for change order work including subcontractors working under the prime contractor. Include overtime rates.

    b. Provide a list of billable tool/equipment rates for change order work including subcontractors.

    c. Project Manager: $_____/hr

    d. Superintendent: $_____/hr

    e. Foreman: $_____/hr

    f. Laborer: $_____/hr

    g. Tier 22 Handhole $_____/ea*
    *Include raceway and wiring to panel

    h. Payment & Performance Bonds _____%

K. ALTERNATES

1. Provide pricing on Bid Form for all applicable alternates as defined in Specifications.

L. COMPANY INFORMATION:

_____ _____
Bidder's Company Name Telephone Number

_____ _____
Date of Proposal Fax Number

_____ _____
Signature Printed Name

END OF SECTION 00 80 04

SECTION 03 10 00
CONCRETE FORMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.

B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute.

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute.

D. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on void form materials .

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

1. Maintain one copy of standards on project site.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347, ACI 301, and ACI 318.

2.02 FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.03 FORMWORK ACCESSORIES

A. Form Ties: Snap-off type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

C. Form Release Agent: Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding of concrete finish coatings, or affect color characteristics of concrete finish coatings.

D. Corners: Chamfered, rigid plastic or wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.

E. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

F. Flashing Reglets: Galvanized steel, 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork

G. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

H. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

I. Waterstops: Preformed mineral colloid strips, 3/4 inch thick, moisture expanding

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Provide chamfer strips on external corners of beams, joists, and columns.

D. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

F. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless more stringent tolerances are required within the Contract Documents.

3.08 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

C. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories.

B. Section 03 3000 - Cast-in-Place Concrete.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

B. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel or galvanized components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4/D1.4M.

C. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

D. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Comply with structural drawings for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete retaining walls.

B. Joint devices associated with concrete work.

C. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 1000 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 2000 - Concrete Reinforcing.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary; 2025.

B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.

D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

E. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.

F. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.

G. ACI PRC-308 - Curing of Concrete—Guide; 2026.

H. ACI SPEC-301 - Specifications for Concrete Construction; 2020.

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.

K. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.

L. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2017.

M. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2022.

N. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.

O. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).

1.04 SUBMITTALS

A. Mix Design: Submit proposed concrete mix design.

1. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.

2. Indicate proposed mix design complies with admixture manufacturer's written recommendations.

3. Indicate proposed mix design complies with expansive component manufacturer's written recommendations.

B. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type I - Normal Portland type.

1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

1. Acquire aggregates for entire project from same source.

C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

A. Water reducing admixtures (plasticizers and super plasticizers) may be used when included in approved concrete mix design

B. Do not use chemicals or materials containing calcium clhloride, salt or antifreeze agents

C. Aire Entrainment Admixture: ASTM C260

2.05 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.

2.06 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Notify not less than 24 hours prior to commencement of placement operations.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.04 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Compressive Strength Tests: ASTM C 39/C 39M.

1. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure five standard cylinder specimens for each composite sample - fifth cylinder will be held in reserve.
2. Test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
3. Obtain test samples for every 50 cu yd or less of each class of concrete placed.
4. A compressive-strength test shall be the average compressive strength from all specimens obtained from same composite sample and tested at age indicated.

E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.07 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

END OF SECTION

SECTION 05 52 13
METAL RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall Railing with wire cable infill

B. Stair and ramp guardrails with cable infill

C. Wall mounted and guardrail mounted handrails.

1.02 RELATED SECTIONS

A. Section 03 3000 - Cast-In-Place Concrete

1.03 REFERENCES

A. ANSI A1264.1 - Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems.

B. ASTM A 492 - Standard Specification for Stainless Steel Rope Wire

1.04 DESIGN / PERFORMANCE REQUIREMENTS

A. Comply with requirements of building authorities having jurisdiction in Project location and the following:

1. Handrail Standard: ANSI A1264.1

B. Structural Performance: Fabricate and install handrails, guardrails, and railing systems to withstand loadings required by applicable building and safety codes but not less than the following:

1. Design Loads: Design to the following requirements. Concentrated and uniform loading need not be applied simultaneously.
2. Uniform load: 50 pounds per foot applied at the top in any direction.
3. Concentrated load: 200 pounds applied at the top in any direction.

1.05 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Details of material and construction.
3. Storage and handling requirements and recommendations.
4. Installation methods and requirements.

B. Shop Drawings: Submit shop drawings for fabrication and installation of metal railings. Include plans, elevations and detail sections. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages and accessory items.

C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened, properly labeled, original packaging until ready for installation.

B. Store components to avoid damage from moisture, abrasion, and other construction activities.

C. Keep handling to a minimum. Exercise caution to avoid damage to factory applied finishes.

1.07 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent

interruption of construction progress.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Field Measurements: Take measurements of actual dimensions where necessary for fit without gaps. Indicate measurements on shop drawings.

PART 2 PRODUCTS

2.01 PIPE CABLE RAILING

A. Horizontal Pipe Rail

1. Pipe: 1-1/2-inch Schedule 40 pipe with 1.9 inch outside diameter runs between posts.

B. Guard Rail Posts:

1. 1/4 Steel plate, see design drawings.
2. Each post to have pre-drilled holes, spaced 3 inches on center, to accommodate fittings or support the cable.
3. Height:
   a. As indicated on the drawings
   b. As indicated on the Drawings

C. Base: As indicated on the Drawings.

2.02 CABLES AND CABLE HARDWARE

A. Cables.

1. Material: 1 x 19 Type 316 stainless steel strand.
2. Finish: PVC coated.
3. Diameter: 3/16-inch diameter cable with a minimum breaking strength of 4000 pounds.
   a. Orientation:Horizontal.
   b. Slope parallel to stair pitch.
4. Cut to length with stainless steel factory attached connectors
5. Spacing: 3 inches on center.

B. Cable Hardware Components.

1. Material: Stainless steel, ASTM A276 and A479, SAE/AMS QQ-S-763, Type 316.
2. Type: Hardware substantially concealed inside end posts where practical.
3. Type: Swaged Tensioned Fittings.

2.03 HANDRAIL

A. Pipe: 1-1/2-inch Schedule 40 pipe with 1.9 inch outside diameter.

B. Handrail to run continuously throughout the whole length of handrail system.

C. Mount to wall, railing, or other structure by utilizing mounting posts.

D. Handrail will be installed at a height of 34 – 38 inches above surface.

E. Clearance of a minimum 1 ½” shall exist between the wall or post surface and the handrail.

F. Top and bottoms of handrail sections that stop at a landing, the handrail shall extend 12 in horizontally beyond the top riser and 12 in. horizontally beyond the bottom tread.

G. Handrail shall be continuous, without interruption by newel posts or other

obstructions.

H. Handrails shall return to a wall, guard or walking surface

2.04 FINISH

A. Steel components to be galvanized, blast cleaned, primed and painted with high performance exterior coating.

2.05 FABRICATION

A. Tolerances: Verify dimensions on site prior to shop fabrication for proper connection to building structure or substrate.

B. Components or railing sections shall be fabricated to exact measurements specified through Drawings and field dimensions.

C. Tension all cables in the guard rail system to a minimum of 250 pounds.

D. Fabricate railing system to meet step railing requirements; riser and tread dimensions of the steps.

E. Provide components required for anchorage of framing. Fabricate anchors and related components of material and finish as required, or as specifically noted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Fully review the supporting structure and substrate to verify a structurally sound base for anchoring railing system.

B. If substrate preparation is the responsibility of another installer, notify of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and inline, accurately fitted, free of distortion or defects and securely anchored to building structure and/or substrate.

C. Provide grounds, clips, backing materials, adhesives, brackets, anchors, and accessories necessary for a complete installation.

D. Bolt Mounting: Anchor through base plates to concrete substrate.

E. Expansion Joints: Provide expansion joints for spans in excess of 40 feet. Construct joints by using a termination post ‘back-to-back’.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Project Manual For:

Broadlawns Medical Center

Parking Lot Expansion

1826 Hickman Road
Des Moines, Iowa

VOLUME 2

Volume 1: Divisions 00 – 05
Volume 2: Divisions 26 – 33
10 September 2026

Bishop Engineering
Civil Engineers & Landscape Architect

KCL Engineering
Electrical Engineer

Tometich Engineering, Inc.
Structural Engineer

Project # 240308-1
September 10, 2026

SECTION 26 05 00
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Basic Requirements
   2. Detailed Requirements
   3. Facilitation of New Services
   4. Coordination
   5. Quality Assurance
   6. Codes, Ordinances, & Permits
   7. Common requirements for electrical installation
   8. Excavating & Backfilling

1.03 SUBMITTALS

A. Shop Drawings:
   1. Submit shop drawings, wiring diagrams, and descriptive literature on all equipment furnished in this contract. Contractor shall “approve” shop drawings as specified in Division 1 prior to submitting to Engineer for approval. Shop drawing submittals shall comply with Division 1 requirements.

B. Warranty: Submit a written warranty statement detailing all system and equipment warranties. Warranty shall be signed by Submittals are not required for this Section.

C. Operation & Maintenance Instructions:
   1. Refer to Division 1 for submittal and training requirements.
   2. Furnish approved operation and maintenance instruction booklets covering each listed item of equipment installed under this contract. These booklets shall provide complete instructions on the proper operation, use and periodic maintenance, together with the source of replacement parts and service for the item of equipment covered.
   3. Operation and maintenance manuals shall include copies of test reports, acceptance certificates and warranty information.
   4. In addition to the foregoing, the Contractor shall demonstrate to the Owner's designated personnel the use of the systems listed herein and shall furnish three (3) typewritten copies of a general operation procedure. Include locations and functions of switches, circuit breakers, fuses, etc.
   5. After final acceptance of all work and occupancy of the building, the Contractor shall have on the job, a qualified representative to make final adjustments of electrical systems and to instruct the Owner's representative in operating procedures, adjustment, and maintenance of system components, and to acquaint the Owner's representative with locations and functions of circuit breakers, fuses, switches, control devices, etc.

D. Record Drawings:
   1. Refer to Division 1 for submittal requirements.
   2. The Architect/Engineer will furnish one (1) set of blue line prints of the building floor plan for the Contractor's use in making a record layout of actual locations of equipment, devices, routing of conduits and locations of pull boxes for the following facilities:
      a. Electrical feeders to substations and branch circuit panels
      b. All branch circuit wiring
      c. Voice/data conduit system
      d. Empty conduits for use by others

3. The information shall be neatly marked and the prints delivered to the Architect.

E. Contractor's Warranty:
   1. All work shall be warranted to be free of defects and to function properly for one year from the date of final acceptance or beneficial occupancy, whichever shall occur first. Defects appearing within the warranty period shall be repaired to the satisfaction of the Architect/Engineer. Refer to Division 1 for additional requirements.
   2. The warranty shall not obligate the Contractor for failure resulting from accident or from improper operation or care on the part of the Owner.
   3. Warranty for drivers and LEDs shall be as follows: Warranty failure shall be deemed to have occurred when 10% or more of the population of drivers or LED boards have failed. Should this occur, it is necessary that the Owner (or Contractor prior to substantial completion) make timely notification of the Architect/Engineer to facilitate a warranty claim with the manufacturer(s). Any extended warranties offered by Manufacturers shall not be preempted by this warranty.

1.04 FACILITATION OF NEW UTILITY SERVICES

A. Stake all necessary lot lines, lot corners, and building footprints prior to commencement of installations associated with new utility services. Locate and stake all underground facilities such as storm and sanitary sewer, water lines, irrigation systems, underground electric, underground communications, grease traps, mechanical/piping systems, etc. All locates and information from site surveys shall be made available at no cost to each utility company that is providing new and/or relocated services.

B. Electric Utility Company: The Contractor shall initiate contact with the electric utility company and coordinate the installation of a new electric service. The Owner shall pay for permanent utility service from the utility company. The Contractor shall coordinate the extent to which the utility company provides service installations and shall include in this Contract any and all scope of work that is regarded by the utility company as Owner/Contactor provided, which shall include all labor and materials as specified by the utility company.
   1. Electric Utility Company: Midamerican Energy
      a. Contact Person: Mackenzie Foster
   2. Coordinate electrical service connections to all components furnished by the electric utility company.
   3. Coordinate installation and connections of exterior utilities and services, including provisions for electricity metering components.
   4. Comply with requirements of the authorities having jurisdiction, including local, state, and federal regulations.
   5. Comply with requirements specified by the electric utility company, including, but not limited to, the following:
      a. Provide level grade for transformer pad. Maintain 10-foot minimum clearance from front of pad.
      b. Install an oil-containment structure (mote) around the utility transformer. Oil containment is mandated under federal regulations and typically consists of a trench (which surrounds the transformer pad) lined with an appropriate filter fabric and filled with 2-inch river rock. Trench dimensions are determined based on the amount of oil the transformer contains.
      c. Furnish and install all secondary service conductors and ductbank from transformer to main service disconnect. Install secondary ducts at least 30 inches below finished grade and a maximum of 36 inches. Coordinate exact requirements with utility company.
      d. Install metering instrument transformers sized and furnished by utility company. Furnish and install meter test switch. Furnish and install electric meter setting, applicable sockets, conduit, cabinets, and wiring according to electric utility company's specifications.

1.05 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:
   1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
   2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
   3. To allow right of way for piping and conduit installed at required slope.
   4. So connecting raceways, cables, and wireways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

1.06 CODES, ORDINANCES, & PERMITS

A. All governmental codes and ordinances that are applicable and in effect at the time and location of this work are hereby referenced as an integral part of the specification to establish minimum standards of design detail, materials, and workmanship. Extra payment will not be allowed for work or changes required by local code enforcement authorities and/or utility companies. This is not to preclude the establishment of non-conflicting higher standards as may be specified herein and/or indicated on the drawings. In case of conflict between any of the standards established herein and a governmental code or ordinance, refer to the Architect/Engineer and obtain instructions before proceeding with the work involved.

B. Apply for, obtain, and pay for required permits and certificates of inspection

C. Particular attention is directed to:
   1. National Electrical Code
   2. Local electric wiring ordinances
   3. IEEE standards association

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. In all Division 26 Part 2 articles where titles introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified or prior approved product substitution. No product manufacturer will be accepted after this bid unless approved through a contractual change or written acceptance by Engineer. See “Substitutions” article herein.

2.02 PROPRIETARY REFERENCES

A. Except where there is indication to the contrary, the intent of this specification is to be open to all brand names and suppliers that offer equipment that complies with the stated requirements of capacity, function, quality configuration, size, shape, and operating characteristics that are compatible with the design objectives of the system and interfacing equipment.

B. Stated requirements are minimum in the case of unit output and maximum in the case of input requirements.

C. The perceived operational limitations and maintenance requirements as well as the availability of suitable maintenance support will be evaluated in comparison to competing equipment as an important factor in deciding if an item of equipment is acceptable or not acceptable.

D. The product manufacturers listed are manufacturers that are believed to be producers of like equipment or materials and locally represented, with service capability and otherwise meeting the requirements of the contract documents. Reference to a brand name is not to be construed as a representation that the named supplier actually has available the equipment or materials that meet the detailed requirements of the contract documents.

E. Details of construction, control, or operation that are proprietary and not significant to the Owner's utilization of the equipment will not be used as a basis for qualifying or disqualifying any equipment.

2.03 SUBSTITUTIONS

A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Engineer at least 10 days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Engineer's decision of approval or disapproval of a proposed substitution shall be final. Refer to Division 1 for additional requirements.

C. If the Engineer approves a proposed substitution prior to receipt of bids, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

D. No substitutions will be considered after the contract award unless specifically provided in the contract documents.

2.04 UL LABEL

A. All materials, devices, etc. installed under this contract shall bear the UL label, or be UL listed as applicable except those specified items not covered by existing UL Standards.

PART 3 EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Examine the site and all the drawings before proceeding with the layout and installation of this work. Verify all door swings and clearances to cabinets, etc. before locating switch and outlet boxes. Locate conduits, boxes, etc., essentially as shown on the drawings, but in exact layout determined on the job to suit actual conditions. Locate work so it does not interfere with access to service for any equipment. Confer and cooperate with other trades on the job so all parts will be installed in proper relationship. Precise location of parts to coordinate with other work is the responsibility of the Contractor.

B. Obtain and follow manufacturer's installation instructions in the installation of all electrical equipment. Observe all restrictions imposed by the equipment manufacturer, UL label, NEC, or other applicable code in regard to setting; anchoring; hanging; clearances; electric, magnetic or thermal separation; shielding; weather and moisture protection. In case of conflict between the specifications herein and instructions or code governing the installation, notify the Architect/Engineer and receive his instructions before proceeding.

C. Arrange exposed work as closely as practicable to wall or ceiling surfaces and in accurate alignment with exposed features of structure and/or trim. Locate concealed work so fittings, connectors, and other projections will clear surfaces. Where the option of more than one material is given, selection shall be confined to those which may be properly installed.

D. Install all work in a neat and workmanlike manner by workmen thoroughly qualified in the trade or duties they are to perform. Rough work will be rejected.

E. The Contractor is responsible for correct size and location of chases, slots, and openings require and will be liable for any cutting or patching made necessary by his failure to make proper arrangements in this respect.

F. Maintain a competent full-time superintendent on the job to oversee and coordinate work with other trades, receive instructions from the Architect/Engineer, make layout of work to suit actual conditions, and to satisfy requirements of the drawings, specifications, and good workmanship.

3.02 EXCAVATING & BACKFILLING

A. Provide excavating and backfilling necessary for installation of this work.

B. Dig trenches to proper depth, graded for fall and to give solid bearing for each length of conduit or wire. Underground conduit or wire shall not be covered until inspected and the installation approved.

C. Trenches under the building and under concrete slabs around the building shall be backfilled with mechanically tamped sand to level with surrounding earth. Dirt backfill shall not be used for these trenches.

D. Before starting any excavation, use every reasonable means (examination of drawings, check with local utility companies and completed site work, local inquiry and check of surface indications) to determine the presence of underground piping, wiring, etc. in the area to be excavated. If such are, or are suspected to be existing, obtain instructions from the Architect/Engineer before proceeding.

E. Refer to Division 31 for additional excavating, trenching and backfilling requirements.

F. Contractor shall verify, smooth or refill and reseed any settlement areas or mounded areas of trenching after one winter.

END OF SECTION

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SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire

B. Wiring connectors

C. Electrical tape

D. Oxide inhibiting compound

E. Wire pulling lubricant

1.02 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70/ICEA S-95-658.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.

H. Conductor Material:
   1. Provide copper conductors except where aluminum conductors are specifically indicated or permitted for substitution. Conductor sizes indicated are based on copper unless specifically indicated as aluminum. Conductors designated with the abbreviation "AL" indicate aluminum.
      a. Substitution of aluminum conductors for copper is permitted only for the following:
         1) Feeders: Copper conductors size #4 AWG and larger.
      b. Where aluminum conductors are substituted for copper, comply with the following:
         1) Size aluminum conductors to provide, when compared to copper sizes indicated, equivalent or greater ampacity and equivalent or less voltage drop.
         2) Increase size of raceways, boxes, wiring gutters, enclosures, etc. as required to accommodate aluminum conductors.

2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Aluminum Conductors (only where specifically indicated or permitted for substitution): AA-8000 series aluminum alloy conductors recognized by ASTM B800 and compact stranded in accordance with ASTM B801 unless otherwise indicated.

I. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid.
b. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.
2. Aluminum Building Wire (only where specifically indicated or permitted for substitution): Type XHHW-2.

2.04 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

2.05 ACCESSORIES

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Electrical Tape:
1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.

D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.

PART 3 EXECUTION

3.01 INSTALLATION

A. Circuiting Requirements:
1. Unless dimensioned, circuit routing indicated is diagrammatic.
2. When circuit destination is indicated without specific routing, determine exact routing required.
3. Arrange circuiting to minimize splices.
4. Maintain separation of wiring for emergency systems in accordance with NFPA 70.

5. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Install aluminum conductors in accordance with NECA 104.

E. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

G. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

H. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Connections for Aluminum Conductors: Fill connectors with oxide inhibiting compound where not pre-filled by manufacturer.

I. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

J. Insulate ends of spare conductors using vinyl insulating electrical tape.

K. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

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SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding.

C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2025.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
   2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.

b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

2. Ground Rod Electrode(s):
   a. Provide two electrodes unless otherwise indicated or required.
   b. Space electrodes not less than 10 feet from each other and any other ground electrode.
   c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
3. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.

F. Service-Supplied System Grounding:
   1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
   2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
   5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
   6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

H. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.

D. Ground Rod Electrodes:
   1. Comply with NEMA GR 1.
   2. Material: Copper-bonded (copper-clad) steel.
   3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.
   1. Outdoor Installations: Unless otherwise indicated, install with top of rod 2 inches below finished grade.
   2. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

D. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
   3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

F. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

G. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
   1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.

H. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
      a. Applications:
         1) Underground connections(except at test wells and as otherwise indicated.
         2) Connections to structural steel.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
      a. Applications:
         1) Pipe and equipment grounding conductor terminations.

I. Identify grounding and bonding system components in accordance with Section 26 05 53.

3.02 GROUNDING AT THE SERVICE:

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.03 FIELD QUALITY CONTROL

A. Tests and Inspection: After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
   1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions
   2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
      a. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
      b. Perform tests by fall-of-potential method according to IEEE 81.
   3. Prepare dimensioned drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
      a. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.
   4. Prepare test and inspection reports. Report measured ground resistances that exceed the following values:
      a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
      b. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
   5. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.
   6. Grounding system will be considered defective if it does not pass tests and inspections.

END OF SECTION

SECTION 26 05 33.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Intermediate metal conduit (IMC).

C. Rigid polyvinyl chloride (PVC) conduit.

D. Conduit fittings.

1.02 RELATED REQUIREMENTS

A. Section 26 05 33.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.

B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.

C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.

F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.

G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.

I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.

J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

M. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

N. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

O. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

P. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use rigid PVC conduit.
   2. Exterior, Direct-Buried: Use rigid PVC conduit.
   3. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.

D. Exposed, Exterior: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

E. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).

2.02 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

B. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install intermediate metal conduit (IMC) in accordance with NECA 101.

E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

G. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.

2. When conduit destination is indicated without specific routing, determine exact routing required.
3. Conceal all conduits unless specifically indicated to be exposed.
4. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
5. Arrange conduit to provide no more than the equivalent of three 90 degree bends between pull points.
6. arrange stub-ups so curved portions of bends are not visible above finished slab.

H. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Support conduits within 12 inches of connected enclosure.

I. Connections and Terminations:
1. Use approved conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Terminate threaded conduits in boxes and enclosures using threaded hubs for dry locations and raintight hubs for wet locations.
5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
7. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

K. Underground Installation:
1. Provide trenching and backfilling in accordance with Section 31 23 16 and Section 31 23 23.
2. Provide underground warning tape in accordance with Section 26 05 53 along entire conduit length.

3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
    1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
    2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
    3. Where conduits are subject to earth movement by settlement or frost.

M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
    1. Where conduits pass from outdoors into conditioned interior spaces.
    2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
    3. Where conduits penetrate coolers or freezers.

N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

END OF SECTION

SECTION 26 05 33.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Underground boxes/enclosures.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   2. Use suitable concrete type boxes where flush-mounted in concrete.
   3. Use suitable masonry type boxes where flush-mounted in masonry walls.
   4. Use raised covers suitable for the type of wall construction and device configuration where required.
   5. Use shallow boxes where required by the type of wall construction.
   6. Do not use "through-wall" boxes designed for access from both sides of wall.
   7. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
   8. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
   9. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
   10. Minimum Box Size, Unless Otherwise Indicated:
       a. 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size
   11. Wall Plates: Comply with Section 26 27 26.

C. Underground Boxes/Enclosures:
   1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
   2. Size: As shown on drawings
   3. Provide logo on cover to indicate type of service.
   4. Cover Finish: Nonskid finish shall have minimum coeficcient of friction of .50.
   5. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
   6. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

E. Box Locations:
   1. Unless dimensioned, box locations indicated are approximate.

F. Install boxes plumb and level.

G. Underground Boxes/Enclosures:
   1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
   2. Unless otherwise indicated, install enclosure on gravel base, minimum 6 inches deep.Grade base from 1/2-inch sieve to No4 sieve and compact to same density as adjacent undisturbed earth.
   3. Flush-mount enclosures located in concrete or paved areas.
   4. Mount enclosures located in landscaped areas with top at 1 inch above finished grade.
   5. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.
   6. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

H. Close unused box openings.

I. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

J. Provide grounding and bonding in accordance with Section 26 05 26.

K. Identify boxes in accordance with Section 26 05 53.

END OF SECTION

SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Underground warning tape.

F. Warning signs and labels.

1.02 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2027.

E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.

B. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components. Provide unique identification for all branch loads served.
      a. Panelboards:
         1) Use typewritten circuit directory in location provided by panelboard manufacturer to identify load(s) served for panelboards with a door. Identify spares and spaces.
   2. For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces. Service Equipment:
      a. Use identification nameplate to identify each service disconnecting means.
   3. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
      a. Service equipment.
   4. Arc Flash Hazard Warning Labels: Use warning labels meeting the requirements of NFPA 70 to identify arc flash hazards.
      a. Minimum Size: 3.5 by 5 inches.
      b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
      c. Service Equipment: Include the following information in accordance with NFPA 70.
         1) Nominal system voltage.
         2) Available fault current.
         3) Clearing time of service overcurrent protective device(s).

4) Date label applied.

C. Identification for Conductors and Cables:
1. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
a. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
1) Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.

D. Identification for Boxes:
1. Use voltage markers to identify highest voltage present.
2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
a. For exposed boxes in public areas, use only identification labels.
3. Use warning labels to identify electrical hazards for boxes containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

E. Identification for Devices:
1. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.
2. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
1. Materials:
a. Outdoor Locations: Use stainless steel or aluminum nameplates suitable for exterior use.
2. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
3. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
a. Use only for indoor locations.
2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1.5 inches by 3 inches.
2. Legend:
a. System designation where applicable:
1) Emergency Power System: Identify with text "EMERGENCY".
2) Fire Alarm System: Identify with text "FIRE ALARM".
b. Equipment designation or other approved description.
c. Other information as indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
a. System Designation: 1/2 inch.
b. Equipment Designation: 1/2 inch.
c. Other Information: 1/4 inch.
5. Color:
a. Normal Power System: White text on black background.

D. Format for Receptacle Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

2.03 VOLTAGE MARKERS

A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.

B. Minimum Size:
1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.
3. Markers for Junction Boxes: 1/2 by 2 1/4 inches.

C. Legend:
1. Markers for Voltage Identification: Highest voltage present.
2. Markers for System Identification:
a. Emergency Power System: Text "EMERGENCY".

D. Color: Black text on orange background unless otherwise indicated.

2.04 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
1. Materials:
a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
3. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:
1. Materials: Use factory pre-printed or machine-printed self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, drawings, shop drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout project.

C. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
1. Surface-Mounted Equipment: Enclosure front.
2. Flush-Mounted Equipment: Enclosure front.
3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.

4. Elevated Equipment: Legible from the floor or working platform.
5. Boxes: Outside face of cover.
6. Conductors and Cables: Legible from the point of access.
7. Devices: Outside face of cover.

D. Install identification products centered, level, and parallel with lines of item being identified.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Unless labels and nameplates are provided with self-adhesive means of attachment, fasten them with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

G. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

H. Secure rigid signs using stainless steel screws.

I. Mark all handwritten text, where permitted, to be neat and legible.

J. Conductors To Be Extended in the Future: Attach write-on tags to conductors and list source.

K. Equipment To Be Labeled:
1. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self-adhesive, engraved, laminated acrylic or melamine label.

END OF SECTION

SECTION 26 09 23
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Time switches.

B. Outdoor photo controls.

1.02 RELATED REQUIREMENTS

A. Section 26 05 29 - Hangers and Supports for Electrical Systems

B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 27 26 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.
   1. Includes finish requirements for wall controls specified in this section.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
   3. Coordinate the placement of photo sensors for daylighting controls with windows, skylights, and luminaires to achieve optimum operation. Coordinate placement with ductwork, piping, equipment, or other potential obstructions to light level measurement installed under other sections or by others.
   4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.04 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
   1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

B. Shop Drawings:
   1. Provide lighting plan indicating location, model number, and orientation of each sensor and associated system component.

C. Operation and Maintenance Data: Include detailed information on device programming and setup.

D. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.06 WARRANTY

A. Provide five year manufacturer warranty for all sensors.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.02 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Refer to drawings and controls schedules for listed manufacturers.

B. Digital Electronic Time Switches:
   1. Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.
   2. Program Capability:
      a. Astronomic Time Switches: Four channel, capable of different schedule for each day of the weekwith additional holiday schedule available to override normal schedule for selected days and field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.
   3. Schedule Capacity: Not less than 16 programmable on/off operations.
   4. Provide automatic daylight savings time and leap year compensation.
   5. Provide power outage backup to retain programming and maintain clock.
   6. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.
   7. Provide remote photocell input.
   8. Input Supply Voltage: As indicated on the drawings.
   9. Output Switch Configuration: As required to control the load indicated on drawings.
   10. Output Switch Contact Ratings: As required to control the load indicated on drawings.
   11. Provide lockable enclosure; environmental type per NEMA EN 10250 as specified for the following installation locations:
      a. Indoor clean, dry locations: Type 1.
      b. Outdoor locations: Type 3R.

2.03 OUTDOOR PHOTO CONTROLS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Refer to drawings and controls schedules for listed manufacturers.

B. Outdoor Photo Controls:
   1. Description: Direct-wired photo control unit with threaded conduit mounting stem _____, listed and labeled as complying with UL 773A.
   2. Housing: Weatherproof, impact resistant polycarbonate.
   3. Photo Sensor: Cadmium sulfide.
   4. Light Level Activation: 1 to 5 footcandles turn-on and 3 to 1 turn-off to turn-on ratio with delayed turn-off.
   5. Voltage: As required to control the load indicated on the drawings.
   6. Failure Mode: Fails to the on position.
   7. Load Rating: As required to control the load indicated on the drawings.
   8. Provide accessory wall-mounting bracket where indicated or as required to complete installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130.

B. Install lighting control devices in accordance with manufacturer's instructions.

C. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

D. Install lighting control devices plumb and level, and held securely in place.

E. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 27 26.

F. Provide required supports in accordance with Section 26 05 29.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Identify lighting control devices in accordance with Section 26 05 53.

I. Outdoor Photo Control Locations:
   1. Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.
   2. Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

J. Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

3.02 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Inspect each lighting control device for damage and defects.

C. Test time switches to verify proper operation.

D. Test outdoor photo controls to verify proper operation, including time delays where applicable.

E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.03 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

C. Adjust time switch settings to achieve desired operation schedule as indicated or as directed by Architect.

D. Adjust external sliding shields on outdoor photo controls under optimum lighting conditions to achieve desired turn-on and turn-off activation as indicated or as directed by Architect.

3.04 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
   3. Location: At project site.

END OF SECTION

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SECTION 26 24 16
PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Power distribution panelboards.

B. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

D. Section 26 05 29 - Hangers and Supports for Electrical Systems.

E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

F. Section 26 43 00 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.

D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

E. NEMA PB 1 - Panelboards; 2011.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.

G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

N. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.

3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Provide manufacturer's standard catalog pages and data sheets
   2. Include wiring diagrams showing all factory and field connections.
   3. Detail bus configuration, current, and voltage ratings.
   4. Short-circuit current rating of panelboards and overcurrent protective devices.
   5. Include evidence of NRTL listing for series rating of installed devices.
   6. Include evidence of NRTL listing for SPD as installed in panelboard.
   7. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
   8. Include documentation of listed series ratings upon request.

B. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Panelboard Keys: Two of each different key.

1.06 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ABB/GE

B. Eaton Corporation

C. Schneider Electric; Square D Products

D. Siemens Industry, Inc

E. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

D. Short Circuit Current Rating:
   1. Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
   2. Panelboards and overcurrent protective devices rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
   3. Panelboards and overcurrent protective devices rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

E. Panelboards Used for Service Entrance:
   1. Listed and labeled as suitable for use as service equipment according to UL 869A and labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protection devices.
   2. Fault Current: Provide field label identifying the maximum available fault current and the date of calculation.

F. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
   1. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

G. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

H. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus, with a suitable lug for each feeder or branch circuit requiring a neutral connection. Equip with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

I. Conductor Terminations: Suitable for use with the conductors to be installed.
   1. Material: Tin-plated aluminum.
   2. Terminations shall allow use of 75 deg C rated conductors without derating.
   3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.
   4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
   5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.

J. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
      b. Outdoor Locations: Type 3R.
      c. Kitchen/Wash-Down areas:. Type 4X

2. Boxes: Galvanized steel unless otherwise indicated.
    a. Provide wiring gutters sized to accommodate the conductors to be installed.
    b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
3. Fronts:
    a. Secured to box with concealed trim clamps.
    b. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
    c. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening and cover all live parts with no exposed hardware.
    d. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat
4. Height: 84 inches maximum.
5. Lockable Doors: All doors lockable with locks keyed alike unless otherwise indicated.

K. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
1. Percentage of future capacity: Five percent.

L. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 43 00, list and label panelboards as a complete assembly including surge protective device.

M. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

N. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.

2.03 POWER DISTRIBUTION PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Circuit Breakers:
1. Provide bolt-on type.
2. Provide thermal magnetic circuit breakers unless otherwise indicated.
3. Provide electronic trip circuit breakers where indicated.

C. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
    a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
        1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
        2) 14,000 rms symmetrical amperes at 480 VAC.

b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

3. Conductor Terminations:
   a. Provide mechanical lugs unless otherwise indicated.
   b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
   a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 250 amperes and larger.
   b. Provide interchangeable trip units where indicated.
5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.

B. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

C. Provide the following circuit breaker types where indicated:
1. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
2. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.

D. Do not use handle ties in lieu of multi-pole circuit breakers.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required support and attachment in accordance with Section 26 05 29.

F. Mount surface-mounted panelboards to steel slotted supports 5/8 inch in depth. Orient steel slotted supports vertically.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

I. Provide minimum of 4 spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling.

J. Provide grounding and bonding in accordance with Section 26 05 26.

K. Install all field-installed branch devices, components, and accessories.

L. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

M. Set field-adjustable circuit breaker tripping function settings as indicated.

N. Provide filler plates to cover unused spaces in panelboards.

O. Identification:
   1. Identify panelboards in compliance with Section 26 05 53 and provide the following:
      a. Identify field-installed conductors, interconnecting wiring, and components; install warning signs.
      b. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
      c. Panelboard Nameplates: Label each panelboard with a nameplate.
      d. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate.
      e. Install warning signs identifying source of remote circuit.

3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1for all main circuit breakers and circuit breakers larger than 100 amperes. Tests listed as optional are not required.

C. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.

D. Test GFCI circuit breakers to verify proper operation.

E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

3.05 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Receptacles.

B. Wall plates.

1.02 QUALITY ASSURANCE

A. Comply with requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. Provide weather resistant GFCI receptacles with specified weatherproof in use covers for receptacles installed outdoors or in damp or wet locations.

2.02 WIRING DEVICE FINISHES

A. Provide wiring device finishes as described below unless otherwise indicated.

B. Wiring Devices, Unless Otherwise Indicated: Gray with stainless steel wall plate, Verification during submittal process.

C. Wiring Devices Connected to Emergency Power: Red with red nylon wall plate factory marked "Emergency".

2.03 MANUFACTURERS:

A. Hubbell Incorporated

B. Leviton Manufacturing Company, Inc

C. Pass & Seymour, a brand of Legrand North America, Inc

D. Eaton(Arrow Hart).

E. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 PRODUCT GRADE:

A. Receptacles: Unless indicated otherwise, Industrial specification grade.

B. Switches: Unless indicated otherwise, Industrial specification grade.

2.05 RECEPTACLES

A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.

B. GFCI Receptacles:
   1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
      a. Provide test and reset buttons of same color as device.
   2. Weather Resistant GFCI Receptacles: duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

2.06 WALL PLATES

A. Wall Plates: Comply with UL 514D.
   1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
   2. Size: Standard.
   3. Screws: Metal with slotted heads finished to match wall plate finish.

B. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

PART 3 EXECUTION

3.01 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130.

B. Install wiring devices in accordance with manufacturer's instructions.

C. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

D. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

E. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

F. Install wiring devices plumb and level with mounting yoke held rigidly in place.

G. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

H. Identify wiring devices in accordance with Section 26 05 53.
   1. Unless instructed differently by Architect, Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.02 FIELD QUALITY CONTROL

A. Test each receptacle to verify operation and proper polarity.
   1. Line voltage: Acceptable range is 105 to 132 V.

B. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
   1. Test for tripping values specified in UL 1436 and UL 943

C. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete

END OF SECTION

SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

B. Poles and accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

B. Section 26 05 29 - Hangers and Supports for Electrical Systems.

C. Section 26 05 33.16 - Boxes for Electrical Systems.

1.03 REFERENCE STANDARDS

A. IES LM-63 - Approved Method: IES Standard File Format for the Electronic Transfer of Photometric Data and Related Information; 2019 (Reaffirmed 2025).

B. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2024.

C. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.

D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.

E. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).

F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 1598 - Luminaires; Current Edition, Including All Revisions.

H. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Include IES LM-79 test report upon request.
   2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IES LM-63 standard format upon request.
   3. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

H. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 POLES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. All Poles:
   1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
   2. Finish: Match luminaire finish, unless otherwise indicated.
   3. Mounting: Install on concrete foundation, height as indicated on the drawings, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 as required for installation of luminaires provided under this section.

B. Install products in accordance with manufacturer's instructions.

C. Install luminaires in accordance with NECA/IESNA 501.

D. Provide required support and attachment in accordance with Section 26 05 29.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Pole-Mounted Luminaires:
   1. Foundation-Mounted Poles:
      a. Provide cast-in-place concrete foundations for poles as indicated per electrical drawing details, in accordance with Section 03 30 00.
         1) Install anchor bolts plumb per template furnished by pole manufacturer.
         2) Position conduits to enter pole shaft.
      b. Install foundations plumb.
      c. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
      d. Tighten anchor bolt nuts to manufacturer's recommended torque.
      e. Install anchor base covers or anchor bolt covers as indicated.
   2. Embedded Poles: Install poles plumb as indicated.
   3. Grounding:
      a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
      b. Provide supplementary ground rod electrode as per electrical drawing details and specified in Section 26 05 26 at each pole bonded to grounding system as indicated.
   4. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Install lamps in each luminaire.

3.02 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.03 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

END OF SECTION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

1.02 SUMMARY:

A. This section includes the following:

1. Protection of existing trees.
2. Removal of Trees and other Vegetation.
3. Clearing and Grubbing.
4. Removing above-grade improvements.
5. Removing below grade improvements.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. Section 31 20 00 Earthwork

1.04 SUBMITTALS

A. General: Submit the following in accordance with Conditions of the Contract and Division 1 Specifications Section.

B. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work.

1.05 PROJECT CONDITIONS:

A. Traffic: Conduct site demolition operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary fencing to protect trees and vegetation as instructed on drawings.

C. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

D. Environmental Controls: Comply with governing regulations pertaining to environmental protection.

1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

E. If unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure both nature and extent of conflict. Submit report to Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

F. Salvageable Improvements: Carefully remove items indicated to be salvaged, and store on owner's premises where indicated or directed.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 DEMOLITION:

A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

3.02 SITE CLEARING:

A. General: Remove trees, shrubs, grass, and other vegetation, improvements or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated.

1. Removal includes digging out and off-site disposing of stumps and roots.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Clearing and Grubbing: Clear sites of trees, shrubs and other vegetation, as indicated on the plans.

1. Completely remove stumps, roots, and other debris protruding through ground surface.
2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil materials, unless further excavation of earthwork is indicated.
    a. Compact fill material in accordance with requirements of Section 31 20 00 Earthwork.

C. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated on drawings.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose of off-site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
2. Burning of removed materials is not permitted on project site.

3.04 CLEAN UP AND REPAIR:

A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections:

1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

SECTION 31 20 00
EARTHWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to work specified in this Section.

1.02 DESCRIPTION OF WORK:

A. Extent of Earthwork is indicated on Drawings.

B. Work includes:

1. Stripping, topsoil stockpiling.
2. Excavation.
3. Fill.
4. Compaction.
5. Preparation of subgrade for walls, parking and drives, and steps and walks.
6. Grading.
7. Topsoil placement.
8. Finish grading.
9. Erosion Control
10. Excludes: Over Excavation and Structural Backfill within building pad. Refer to Structural Specifications and Geotechnical Report.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. Erosion Control: Section 31 35 00.

B. Site Clearing: Section 31 10 00.

C. Landscape Grading, Section 32 91 19.

1.04 QUALITY ASSURANCE:

A. Codes and Standards:

1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
2. The entire installation shall fully comply with all local and state laws and ordinances, and with all established codes applicable thereto.

B. Testing and Inspection Service:

1. Cost of field and laboratory testing will be borne by the Owner. Testing by laboratory approved by the Owner and Engineer.
2. Contractor will cooperate with testing laboratory and geotechnical Engineer in coordinating compaction testing, installation and protection of settlement monitoring devices.

1.05 SUBMITTALS:

A. Testing Reports - Excavating: Submit the following reports directly to the Engineer from the testing services, with copies to the Contractor and the Owner.

1 Test reports on borrow material/lab analysis of fill materials.
2. Verification of each footing subgrade (material and unconfined compressive strength).
3. Field density test reports.
4. One optimum moisture-maximum density curve for each type of soil encountered.

5. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.06 JOB CONDITIONS:

A. Soil Borings:

1. Soil borings have been made for this site and can be found in Geotechnical Report prepared by Allender Butzke (Project No. 261252), dated June 16th, 2026.
2. Test borings and other exploratory operations may be made by Contractor at no cost to Owner with Owner approval.

B. Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
2. Underground utilities shown on the drawings have been taken from existing public records, Owner's records and available as-built drawings and are correct to the best of our knowledge and provided for information only.
3. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities caused by Contractor to the satisfaction of utility owner at no cost to the Project Owner.
4. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
5. Provide minimum of 48-hour notice to Owner and Engineer and receive written notice to proceed before interrupting any utility.
6. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

C. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights.
2. Operate warning lights as recommended by authorities having jurisdiction.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

D. Survey:

1. The topographic survey of the site is provided for informational purposes only. The contractor is responsible for verifying topography of the site prior to construction. No change orders or drawing revisions will be executed or issued for any contractor claims that the survey is wrong. This includes but isn't limited to frost heave or farming activity claims.

PART 2 PRODUCTS

2.01 SOIL MATERIALS/DEFINITIONS:

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CL, ML, CL-ML, GC, GW, GP, GM, ML, SC, SM, SW, and SP.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups MH, CH, OL, OH, PT and any bedrock material.

C. Subbase material (granular fill): Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, natural or crushed sand.

D. Fill materials:

1. The fill material type shall be cohesive, soil having a "CL", "CL-ML" soil classification in accordance with the Unified Soil Classification System and shall have a maximum

laboratory dry density (100%) of 100 pounds per cubic foot or more as determined by ASTM D698 (Standard Proctor).

2. No organic dark colored soils or plastic and potentially expansive soils, such as clay shale, are considered suitable engineered fill materials. Topsoils should be sorted and stockpiled for landscaping purposes. Topsoil materials can also be used for surcharge fill.
3. When fill material includes rock, the maximum rock size acceptable shall be three inches (3"). No large rocks shall be allowed to nest and all voids must be carefully filled with small stones or earth, properly compacted. No large rocks will be permitted within twelve inches (12") of the finished grade.

E. Topsoil: Secure and stockpile from naturally well drained areas during stripping operations; use satisfactory soil materials free of admixture of subsoil, reasonably free from clay lumps, stone or other debris a greater than 3/4" in diameter.

1. Should also comply with all NPDES and Iowa DNR requirements, if these requirements are more stringent that project specifications.

PART 3 EXECUTION

3.01 EXCAVATION:

A. Excavation is unclassified, and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

B. Unauthorized Excavation:

1. Consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer.
2. Unauthorized excavation, as well as remedial work resulting from the unauthorized excavation directed by Engineer shall be at Contractor's expense.
3. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Additional Excavation:

1. When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions. Engineer shall evaluate and advise if bearing material is suitable and shall provide unconfined compressive strength tests.
2. If unsuitable bearing materials are encountered at required elevations, carry excavations deeper and replace excavated material with engineered compacted backfill as directed by engineer in soils/ geotechnical report.
3. Reference Geotechnical/ Soils Report for all possible over excavation.
4. No additional compensation will be provided for grading and pipe installation for the site work unless unsuitable soils are encountered which are not represented in the soils report.
5. It is the intent that if the contractor encounters unsuitable soils within the building envelope (foundation and slab) that the unit prices as seen in the front-end sections 01 22 00 shall apply.

D. Stability of Excavations:

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction.
   a. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
   b. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

E. Dewatering:

1. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

2. Do not allow water to accumulate in excavations.
3. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations.
4. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
5. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas.
6. Do not use trench excavations as temporary drainage ditches.

F. Material Storage:
1. Stockpile satisfactory excavated materials where directed by Trade Contractor and SWPPP Inspector, until required for backfill or fill.
2. Place, grade and shape stockpiles for proper drainage.
3. Locate and retain soil materials away from edge of excavations.
4. Do not store within drip line of trees indicated to remain.
5. Dispose of excess soil material and waste materials as herein specified.

G. Subgrade Preparation: Paving systems (See Soils Report):
1. Provide a minimum 4” aggregate base for exterior pavements with material meeting the specifications for IDOT granular subbase (Section 4121)
2. Provide a minimum 12” compacted depth subgrade (2-6” lifts) for paving, plus fill as required.
3. Scarify, mix and recompact materials to provide uniform composition at least 12" below top of subgrade for paving for full width of subgrade plus 2'-0" on each side of paving.
4. Construct 12" thick uniform subgrade by excavating top 6" of subgrade, scarifying, mixing, and recompacting next 6" of subgrade and then replacing top 6" of subgrade and recompacting.
5. Proof roll existing soils prior to placing fill to determine location of unsuitable bearing materials. Notify Engineer if unsuitable conditions are encountered for direction. Proof roll truck requirements (axles, wheels and weight) per Iowa DOT specifications.
    a. Perform proof rolling with a truck loaded to the maximum tandem axle gross weight of 40,000 pounds. 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), pumping or rutting of more than ½ inch, measured from the top to the bottom of the rut at the outside edges.
6. Compact as per Paragraph 3.02 Compaction requirements.

H. Topsoil Stripping
1. Strip and stockpile a minimum of the top 6” of soil on all disturbed areas. Additional depth of stripping may be necessary as stated in soils report. Final quantity of topsoil stripped shall be adequate to respreads a minimum of 8” in all green, non-paved areas.

3.02 COMPACTION:

A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification indicated below.

B. Compaction Requirements: Compact top 12" of subgrade and each layer of backfill or fill material to not less than the following percentages of maximum density:

Construction Type	Standard Proctor ASTM D698 Cohesive Soils
Building, recreation field subgrade walls, roadway, parking lot and critical backfill area beneath same; e.g. trenches	95%
Backfill adjacent to structures not supporting other structures - minor subsidence possible.	95%
Lawn areas. Non-critical areas - moderate subsidence possible.	85-90%
Upper 12 inches of pavement subgrade.	98%
Within 3 feet below footing bearing level.	98%

*Use relative density technique (ASTM D4253 and D4254) where standard proctor technique (ASTM D698) does not result in a definable maximum dry density and optimum moisture content.

C. Moisture Control and Content:

1. When subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value.
4. The fill material shall be compacted at a moisture content typically within a range of optimum moisture content as determined by ASTM D698 (Standard Proctor). Report has varying moisture content ranges depending on plasticity.

3.03 BACKFILL AND FILL:

A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below.

1. In excavations, use satisfactory excavated or borrow material. Site strippings (per soils report) are not to be used as satisfactory excavated material.
2. Under grassed areas, use satisfactory excavated or borrow material.
3. Under walks and pavements, use subbase material or satisfactory scarified and recompacted subgrade or borrow material, or combination of these.
4. Under steps, use subbase material.
5. Under piping and conduit, use subbase material where subbase is indicated under piping or

conduit; shape to fit bottom 90 degrees of cylinder.

B. Ground Surface Preparation:

1. Clearing area to be filled: All timber, logs, trees, brush and rubbish shall be removed or otherwise acceptably disposed of.
2. Scarifying area to be filled:
   a. All vegetable matter and dark colored organic soil shall be removed from the surface upon which the fill is to be placed (per soils report) and the surface shall be plowed or scarified to a depth of at least 8 inches and until the surface is free from ruts, hummocks or other uneven features which would tend to prevent uniform compaction by the equipment to be used.
   b. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply or where the slope ratio of the original ground is steeper than 5 horizontal to 1 vertical, the bank shall be stepped or benched. Ground slopes which are flatter than 5 to 1 shall be benched when considered necessary by the Engineer.
3. Compaction area to be filled: After the foundation for the fill has been cleared and plowed or scarified, it shall be disked or bladed until it is uniform and free from large clods, brought to within the specified moisture content range and compacted to not less than ninety-five percent (95%) of maximum dry density in accordance with current ASTM D698 (Standard Proctor).

C. Placement and Compaction:

1. Depth and Mixing of Fill Layers: The selected fill material shall be placed in level, uniform layers which, when compacted, shall have a density conforming to a minimum of ninety-five percent (95%) of maximum dry density in accordance with ASTM D698 (Standard Proctor). Each layer shall be thoroughly blade mixed during the spreading to insure uniformity of material in each layer. Compacted layer thickness will be compatible with the demonstrated compatibility of the compaction equipment being used, with a compacted layer thickness of 6" considered typical.
2. Amount of Compaction: After each layer (lift) has been placed, mixed and spread evenly, it shall be thoroughly compacted to a minimum of ninety-eight percent (98%) of the material's maximum dry density as determined by ASTM D698 (Standard Proctor) for areas within 3 feet below building foundation. Grassed areas or areas not supporting buildings or

slabs-on-grade should be compacted to a minimum of ninety-five percent (95%).

3. Compaction of Fill Layer: Compaction equipment shall be of such design to be able to compact the fill to the specified density. Compaction shall be accomplished while the fill material is within the specified moisture content range. Compaction of each layer shall be continuous over its entire area and the compaction equipment shall make sufficient trips to ensure that the required density has been obtained.
4. Compaction of Slopes: Fill slopes shall be compacted. Compacting operations shall be continued until the slopes are stable but not too dense for planting on the slopes. Compacting of the slopes may be done progressively in increments of three to five feet (3' to 5') in fill height or after the fill is brought to its total height.
5. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

3.04 GRADING:

A. General:

1. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas.
2. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Grading Outside Paving Lines:

1. Grade areas to adjacent to paving lines to drain away from structures and to prevent ponding.
2. Finish surfaces free from irregular surface changes, and as follows:
    a. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.
    b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

C. Grading Surface of Fill Under Paving & Recreational Fields (coordinate with field specs):

1. Grade smooth and even, free of voids, compacted as specified, and to required elevation.
2. Provide final grades within a tolerance of 1/2" when tested with a 10' straightedge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.05 EMBANKMENTS:

A. General: Prepare site, place and compact excavated materials to required elevation and cross section.

B. Construction:

1. Construct embankment in horizontal layers not more than 8" in loose thickness.
2. Deposit each layer over full width of embankment as separate and distinct operation.
3. After layer is deposited, smooth to uniform depth by means of suitable motor patrol or bulldozer.
4. Compact layer by rolling with tamping type roller until full weight of roller is supported by tamping feet, but with not less than one pass per inch of loose thickness of layer.
5. Roller will be considered to be supported entirely on its tamping feet when feet do not penetrate more than 3" into material being compacted.
6. If soil is wet so that it will not sufficiently compact by one passing of roller per inch of loose thickness, provide one disking per 2" of loose thickness.
    a. Cut and stir full depth of layer.
    b. Allow interval of no longer than two hours between successive diskings, or as directed by Engineer.
    c. After disking is completed compact layer by specified rolling.
7. If soil is dry so that it will not satisfactorily compact by rolling, moisten material before compaction; manipulate material to secure proper distribution of moisture before compaction.
8. Whenever operations are suspended during periods rain is likely to occur, smooth and compact surface to shed water readily.
9. Compact to not less than 95% maximum dry density with moisture content not more than three percentage points above or below optimum; maximum density determined by ASTM D698 (Standard Procter). Different moisture ranges are possible for varying plasticity.

3.06 TOPSOIL SPREADING:

See Section 32 91 19 Landscape Grading.

3.07 FINISH GRADING:

See Section 32 91 19 Landscape Grading.

3.08 MAINTENANCE:

A. Protection of Graded Areas:

1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
3. Keep public streets clean from soil, soil tracking and debris at all times.

B. Reconditioning Compacted Areas: Where completed graded areas are disturbed by subsequent construction operations, erosion or adverse weather, scarify surface, re-shape and compact to required density prior to further construction.

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.09 EROSION PROTECTION:

See Section 31 35 00 Erosion Control.

3.10 FIELD QUALITY CONTROL:

A. Quality Control Testing During Construction:

1. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
2. Perform field density tests in accordance with ASTM D2922 (nuclear method) or ASTM D1556 (sand cone method), as applicable.
3. Footing Subgrade: For each strata of soil on which footings will be placed, conduct at least one test every 50 lineal feet to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata, when acceptable to Engineer.
4. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 5000 sq. ft. of paved area, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 5000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
5. If, in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

3.11 NATURAL AND ARTIFICIAL DRAINAGE:

A. If necessary during the progress of the work to interrupt the natural drainage of the surface water, Contractor shall provide approved temporary drainage facilities.

B. If necessary to interrupt any field tile drains that might be encountered in this work, the Contractor shall restore or extend drains as necessary. Payment for this work will be on the basis of contract conditions relative to changes in work.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash and debris from site to an approved location, meeting state and local regulations, for disposal by Contractor.

B. All excess excavation shall be removed from the site unless otherwise stated on plans or directed by the owner.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trench excavation for pipe systems, manholes, intakes and other structures.

B. Trench bedding and foundation stabilization.

C. Pipe and structure placement and backfill.

1.02 DESCRIPTION OF WORK

A. Perform all excavations required to complete the work shown on the plans.

B. Prepare trench excavations and shoring for new work, and install the utility lines, structures, and system components, including bedding and foundation stabilization.

C. Complete specified backfill operation.

D. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Results of Proctor and In-Place Density Tests on backfill.

C. Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications or for which submittals have been provided to Engineer and approved for use.

B. Store delivered materials and excavated materials in locations that will not interfere with operations and minimize environmental damage.

C. Grade and shape stockpiles for drainage and protect adjacent areas from runoff. Provide erosion control around stockpiles.

D. Remove unsuitable and excess materials from the site.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:

1. Attend a preconstruction meeting if required by Engineer.
2. Submit plan for construction sequence and schedule prior to commencing construction.

B. Conflict Avoidance:

1. Expose possible conflicts in advance of construction, such as utility lines and drainage structures. Verify elevations and locations of each and verify clearance for proposed construction.
2. Complete other elements of the work that can affect line and grade in advance of other open cut construction unless noted on the plans.
3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown or changed conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts, or other environmental or historic items are encountered.

B. Conform to local, state, and federal requirements.

C. Abandoned Utilities: Remove and dispose of abandoned utility lines including gas mains, water mains, sewer mains, telephone conduits, service lines, etc. required to complete the work. Said work shall be incidental to the project unless otherwise specified.

PART 2 - PRODUCTS

2.01 EXCAVATED MATERIALS

A. Unclassified Excavation: Excavation of all materials encountered, except rock and over-excavation.

B. Rock Excavation: Boulders or sedimentary deposits that cannot be removed without continuous use of pneumatic tools or blasting.

C. Over-excavation: Excavation of soil or rock in trenches below the pipe zone.

D. Suitable Excavated Materials for Backfill:

1. Soil, clay, silt, sand, and gravel with moisture content suitable to achieve required compaction. ASTM D 2321, Class II through IVA (see 2.01, E).
2. Fine-grained soils according to ASTM D 2321 Class IVB (inorganic) (see 2.01, E) may be used in the final backfill upon approval of the Engineer.
3. Adjust moisture content of excessively wet, but otherwise acceptable, material by spreading, turning, aerating, and otherwise working material as necessary to achieve required moisture range.
4. Adjust moisture content of excessively dry, but otherwise acceptable material by adding water, then turning, mixing, and otherwise blending the water uniformly throughout the material until the required moisture range is achieved.
5. Lime or fly ash may be added to soils to produce a suitable backfill material. Uniformly mix soil and additive. Determine Standard Proctor maximum density and optimum moisture content of the modified material. Amount of additive applied is subject to Engineer's approval.

E. Non-Manufactured (Excavated) Backfill Materials: (See Sections 2.03 and 2.04 for manufactured backfill)

Class	Type	Soil Group Symbol D 2487	Description	Percentage Passing Sieve Sizes			Atterberg Limits		Coefficients	
				1½ in. (40 mm)	No. 4 (4.75 mm)	No. 200 (0.075 mm)	LL	PI	Uniformity C_u	Curvature C_c
II	Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines	100 %	‹50% of "Course Fraction"	‹5%	Non Plastic		›4	1 to 3
		GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines.						‹4	‹1 or ›3
		SW	Well-graded sands and		›50% of				›6	1 to 3

			gravelly sands; little or no fines.		“Coarse Fraction”					
		SP	Poorly-graded sands and gravelly sands; little or no fines.						‹6	‹1 or ›3
	Coarse-Grained Soils, borderline clean to w/fines	e.g. GW-GC, SP-SM	Sands and gravels which are borderline between clean and with fines.	100 %	Varies	5% to 12%	Non Plastic		Same as for GW, GP, SW and SP	
III	Coarse-Grained Soils, with Fines	GM	Silty gravels, gravel-sand-silt mixtures.	100 %	‹50% of “Coarse Fraction”	12% to 50%		‹4 or ‹”A” Line		
		GC	Clayey gravels, gravel-sand-clay mixtures.					‹7 and ›”A” Line		
		SM	Silty sands, sand-silt mixtures.		›50% of “Coarse Fraction”			›4 or ‹”A” Line		
		SC	Clayey sands, sand-clay mixtures.					›7 and ›”A” Line		
IVA	Fine-Grained Soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity.	100 %	100%	›50%	‹50	‹4 or ‹”A” Line		
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clay, lean clays.					›7 and ›”A” Line		
IVB (1)	Fine-Grained Soils (inorganic)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.	100 %	100%	›50%	›50	‹”A” Line		
		CH	Inorganic clays of high plasticity, fat clays.					›”A” Line		
V	Organic Soils (Unsuitable for backfill)	OL	Organic silts and organic silty clays of low plasticity.	100 %	100%	›50%	‹50	‹4 or ‹”A” Line		
		OH	Organic Clays of Medium to high plasticity, organic silts.				›50	‹”A” Line		
	Highly Organic (Unsuitable for backfill)	PT	Peat and other high organic soils.							

(1) See section 2.01, F, 2 for restrictive use.

F. Unsuitable Material: Remove unsuitable materials from the site, including, but not limited to, the following:

1. Rock with gradation not meeting the stated gradation for stabilization material.
2. Individual stones or concrete chunks larger than 3 inches, and averaging more than one per each cubic foot of soil.
3. Frozen materials.
4. Stumps, logs, branches, and brush.
5. Trash, metal, or construction waste.
6. Soil in clumps or clods larger than 6 inches, and without sufficient fine materials to fill voids during placement.
7. Unsuitable soils, as defined in Section 2010, 2.03, excluding material used as topsoil.
8. Class V Material (ASTM D 2321), as defined in Section 3010, 2.08.
9. Environmentally-contaminated soils.

G. Replacement of Unsuitable Soils:

1. If the excavated material is determined by the Engineer to be unsuitable and cannot be conditioned so that it becomes suitable, furnish all necessary backfill material.
2. Remove and dispose of unsuitable material from the site.

2.02 STABILIZATION (FOUNDATION) MATERIALS

A. Clean 2-1/2 inch crushed stone or crushed portland cement concrete (PCC) material, with the following gradation:

Sieve	Percent Passing
2-1/2”	100
2”	90 to 100
1-1/2”	35 to 70
1”	0 to 15
1/2”	0 to 5

B. Engineer may authorize a change in gradation subject to materials available locally at time of construction. Subject to the Engineer’s approval, crushed concrete may be used if it is within plus or minus 5% of the gradation for each size of material.

2.03 CLASS I GRANULAR BEDDING AND BACKFILL MATERIAL (Storm Sewers and Sanitary Sewers)

A. Use gravel or crushed stone for granular bedding, 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

Note: Engineer may authorize the use of crushed PCC, for pipe sizes up to 12 inches, or a change in gradation subject to materials available locally at time of construction.

B. Compaction: See Section 3.06.

2.04 CLASS II BACKFILL MATERIAL (Storm Sewers, Sanitary Sewers, and Water Mains)

A. Class II material is 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.

B. Class II material is non-plastic soil less than 1-1/2 inches in size and consists of the following:

SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION	REMARKS SECTION
GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.	Where hydraulic gradient exists check gradation to minimize migration. Clean groups suitable for use as drainage blanket and underdrain.
GP	Poorly graded gravels and gravel sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.	
SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.	
SP	Poorly graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.	

C. Compaction: See Section 3.06.

D. Class II material may be specified in the contract documents by the Engineer between the pipe embedment zone and the top 2 feet of final backfill when the trench is under the pavement.

2.05 CLASS III BACKFILL MATERIAL (Storm Sewer, Sanitary Sewer, and Water Mains)

A. Class III material is natural coarse-grained soils with fines.

B. Class III material follows Section 2.01, G and consists of the following:

SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION	REMARKS SECTION
GM	Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.	Do not use where water condition in trench may cause instability.
GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.	
SM	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.	
SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.	

C. Compaction: See Section 3.06.

2.06 CLASS IVA BACKFILL MATERIAL (Storm Sewer, Sanitary Sewer, and Water Mains)

A. Class IVA material is natural fine grained inorganic soils.

B. Class IVA material follows Section 2.01, G and consists of the following:

SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION	REMARKS SECTION
ML	Inorganic silts, very fine sands, rockflous, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.	Obtain geotechnical evaluation of proposed material. May not be suitable under deep fills, surface
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.	applied wheel loads, and under heavy vibratory compactors and tampers. Do not use where water conditions in trench may cause instability.

C. Compaction: See Section 3010, 3.06.

D. Suitable only in dry trench conditions.

2.07 CLASS IVB BACKFILL MATERIAL (Storm Sewer, Sanitary Sewer and Water Mains)

A. Class IVB material is natural fine-grained inorganic (high elastic silts and plastic clays - fat clay) with a liquid limit greater than 50%.

B. Class IVB material follows Section 3010, 2.01 and consists of the following:

SOIL TYPE	DESCRIPTION OF MATERIAL CLASSIFICATION	REMARKS SECTION
MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.	Not to be used in pipe embedment zone.
CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.	

C. Compaction: See Section 3.06.

D. When approved by the Engineer, Class IVB material may be used as final trench backfill in a dry trench.

E. Do not use in the pipe embedment zone.

2.08 CLASS V BACKFILL MATERIAL (Topsoil)

A. Class V Material is natural highly organic soils with a liquid limit greater than 50%. See Section 2.01.

B. Use Class V Material only as topsoil outside of the pavement, unless otherwise specified or allowed by the Engineer.

C. Do not use Class V Material in the pipe embedment zone.

2.09 BEDDING AND BACKFILL MATERIALS FOR PIPE CULVERTS

A. Bedding:

1. Use minimum Type C embedment.
2. Install water stop or curtain wall at culvert inlet, as specified in the contract documents.

B. Backfill Material:

1. Use all suitable material excavated for pipe culvert work, as specified in Section 2.01, for backfill material.
2. Dry suitable material that has excessive moisture prior to placement.
3. Remove unsuitable material, as specified in Section 2.01, from the project site.

2.10 BEDDING AND BACKFILL MATERIALS FOR SUBDRAINS

A. Drainable Bedding and Backfill Materials Include:
   1. Porous backfill material.
   2. Pea gravel.
   3. Use as shown on the plans or on the detailed drawings.

B. Porous Backfill Material:
   1. Crushed stone or gravel with the following gradation:

Sieve	Percent Passing
3/4"	100
1/2"	95 to 100
3/8"	50 to 100
No. 4	10 to 50
No. 8	0 to 8

Iowa DOT Gradation No. 29.

C. Coarse Aggregate: Use Stabilization Materials, per Section 3010.

D. Pea Gravel: Use commercially available pea gravel.

E. Impervious Bedding: Use least permeable on-site materials.

F. Engineering Fabric: Use Iowa DOT 4196.

2.11 SPECIAL PIPE EMBEDMENT MATERIAL

A. Concrete Supports: Where specified in the contract documents, construct concrete support systems.

B. Concrete Bedding, Arch, or Encasement:
   1. Concrete: commercial, 4,000 psi compressive strength.
   2. Unreinforced, unless otherwise shown on the plans.
   3. Minimum concrete thickness: 6 inches or as shown on the plans.

C. Flowable Mortar:
   1. Approximate quantities per cubic yard:
      a. Cement 100 pounds
      b. Fly ash 300 pounds
      c. Fine aggregate 2,600 pounds
      d. Water, approximate 70 gallons
   2. Compressive strength at 28 days; 100 psi to 200 psi.

D. Controlled Low Strength Material (CLSM):
   1. Approximate quantities per cubic yard:
      a. Cement 50 pounds
      b. Fly ash 250 pounds
      c. Fine aggregate 2910 pounds
      d. Water, approximate 60 gallons
   2. Compressive strength at 28 days 50 psi.

PART 3 - EXECUTION

3.01 PREPARATION

A. When natural soils for Class II, III, and IV backfill material is required as specified in Figure 3010.1, provide written certification from a testing laboratory that the material meets the class specified if so requested by the Engineer.

B. Locate, mark, and protect existing utilities and facilities in the work area.

C. Provide access to utility service locations, such as valves, manholes, and utility poles.

D. Identify owners of utilities on or near the site, and notify them of operations to occur.

E. Protect existing facilities and landscaping features, or replace as shown on the plans.

F. Protect bench marks, control points and land survey monumentation, or replace at Contractor's expense.

3.02 TRENCH EXCAVATION

A. Notify the Engineer prior to the start of excavation activities.

B. Remove and stockpile a minimum of 6” of topsoil for subsequent reuse.

C. Place excavated material away from trench. Grade spoil piles to drain. Do not allow spoil piles to obstruct drainage.

D. Remove rock, rubbish, boulders, debris, and other unsuitable materials at least 6 inches below, and on each side of the pipe. Restore grade using soil suitable for backfill.

E. Correct unauthorized excavation at no cost to Owner, using bedding or stabilization materials.

F. Provide protective fences and barricades around open excavations, appropriate to the surrounding area.

G. Provide weight tickets for stabilization material to the Engineer at the time of delivery.

H. Provide safety fence around open excavations.

I. Trench Excavation for Sanitary Sewers, Storm Sewers, Water Mains, and Pipe Culverts:

1. Maximum and minimum pipe trench width: Min.=Pipe Dia.+1.5’; Max.=1.25*Pipe Dia. or 54”, whichever is greater.
2. Flat trench bottom, conduit bearing directly on trench bottom (not applicable for rock excavation) for water main pipe only with bell hole shaping:
    a. Shape trench bottom to support pipe around 1/4 of perimeter for the full length of the pipe barrel.
    b. Provide bell holes.
3. Trench bottom, conduit supported by bedding material:
    a. Excavate trench as shown on the detailed drawings.
    b. Install bedding material to support the full length of the pipe barrel.
4. Trench depth:
    a. Flow Line plus Pipe Dia/8, or 4” min.
5. Conform all trench operations to current OSHA regulations.

J. Structure Excavation:

1. For concrete structures and parts of structures without footings, 18 inches outside the horizontal projection of the structure.
2. For concrete structures with footings, 18 inches outside the footings.
3. For anchor rods, 12 inches on each side of the rod.
4. For buried anchors, the face of the buried anchor on one side and 24 inches outside the buried anchor on the other face.

3.03 ROCK OR UNSTABLE SOILS IN TRENCH BOTTOM

A. Notify the Engineer prior to over-excavation.

B. Engineer will determine the need for trench bottom stabilization prior to installation of pipes and structures.

C. See Figure 3010.1 for over-excavation of rock and wet or soft foundations.

D. Provide weight tickets for the stabilization material to the Engineer at the time of delivery.

3.04 SHEETING, SHORING, AND BRACING

A. Conform sheeting and bracing of all excavations to the latest state and federal regulations governing safety of workers in the construction industry.

B. Leave in place all temporary sheeting below 2 feet over top of pipe unless sheeting removal plan is approved by Engineer. Conform all trench operations to current OSHA regulations.

C. Move trench boxes carefully to avoid excavated wall displacement or damage.When necessary or required, install adequate sheeting and bracing to prevent ground movement that may cause damage or settlement to adjacent structures, pipelines, and utilities.

D. Any damage due to settlement because of failure to use sheeting or because of inadequate bracing, or through negligence or fault of the Contractor in any other manner, shall be repaired at the Contractor's expense.

E. For sides of trenches in unsuitable, loose, or soft material, shore, sheet, brace, slope, or otherwise support by means of sufficient strength to protect employees working within them.

F. Where excavations are made with vertical sides that require supporting, use sufficient strength for sheeting and bracing to sustain the sides of the excavations and to prevent movement that could in any way injure the work or adjacent structures, or diminish the working space sufficiently to delay the work.

G. Select sheeting and bracing material of sufficient dimensions and strength to adequately support the sides of trenches and excavations, which will not split when driving and will be free of imperfections that may impair its strength or durability.

H. Drive sheeting to true alignment and ensure contact of adjacent pieces.

I. In wet excavation, use grooved sheeting to prevent passage of soil. Fill any voids between sheeting and face of excavation with suitable material.

J. Do not remove sheeting and bracing before the completion of the work, unless otherwise directed by the Engineer.

K. For sheeting left in place, cut off 18 inches for clearance below the bottom of the pavement in streets/highways and 18 inches below the original ground surface, unless otherwise required by the contract documents or the Engineer. Leave in place all temporary sheeting below 2 feet over top of pipe, unless a sheeting removal plan is approved by Engineer.

3.05 DEWATERING

A. Do all work in dry conditions; do not install pipes on excessively wet soil.

B. Perform the dewatering operation according to the dewatering plan submitted to the Engineer. Dewatering operations may be modified from the plan for actual field conditions, with approval of the Engineer.

C. Adequate dewatering is the Contractor's responsibility unless otherwise stated in the contract documents.

D. Install dewatering system appropriate for the soil conditions.

E. Maintain water levels sufficiently below the bottom of trench excavation, (typically 2 feet) to prevent upward seepage.

F. Provide for handling water encountered during construction:

1. Prevent surface water from flowing into excavation. Remove water as it accumulates.
2. Do not use sanitary sewers for disposal of trench water. Discharging water into storm sewers requires Engineer's approval.
3. Do not discharge water onto adjacent 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 and intersections.
6. Use noise and fume reducing dewatering equipment to minimize disturbance.
7. Provide at least two operating pumps for each trench opened in wet ground, and at the same time have one pump in reserve.

G. Place backfill in trenches prior to stopping dewatering operations.

H. Protect trench water discharge points from erosion.

I. Operate dewatering systems to prevent damage to adjoining structures and facilities.

J. Monitor adjoining structures and facilities during dewatering operations. Cease dewatering operations and notify the Engineer if damage is observed.

3.06 PIPE INSTALLATION

A. Pipe Bedding:

1. Shape pipe bed to evenly support pipe at the proper line and grade, with full contact under the bottom of the pipe.
2. Install pipe and system components.
3. Place bedding simultaneously on both sides of the pipe. Correct any pipe displacements before proceeding.
4. Place bedding in lifts no greater than 6 inches thick and consolidate.
5. Concrete encasement: Install where shown on the plans.
6. If required in the contract documents or if approved by the Engineer, flowable mortar or controlled low strength material may be used in lieu of other bedding material types.
7. Secure pipe against displacement or flotation prior to placing flowable mortar or concrete encasement.

B. Haunch Support:

1. Place granular haunch material in lifts no greater than 6 inches thick and consolidate by slicing with a shovel or using other approved techniques.
2. If required in the contract documents, or if approved by the Engineer, concrete, flowable mortar, or controlled low strength material may be used instead of other haunch material types. Secure pipe against displacement or flotation prior to placing flowable mortar, controlled low strength material, or concrete encasement.

C. Primary and Secondary Backfill (Pipe Cover):

1. Place pipe cover material in 6-inch lifts and compact to densities required according to class of material.
2. If required in the contract documents or if approved by the Engineer, flowable mortar or controlled low strength material may be used in lieu of other cover material types. Secure pipe against displacement or flotation prior to placing flowable mortar or concrete encasement.
3. Special pipe support: If required, provide special pipe support as shown on the plans.

D. Final Trench Backfill:

1. Place backfill in the trench immediately after recording locations of connections and appurtenances or at Engineer's direction.
2. Place backfill adjacent to structures immediately after concrete has reached design strength and connecting work has been completed.
3. Allow no more than 100 feet of trench to be open overnight or when work is not in progress except as provided on the plans.
4. Place suitable excavated backfill:
    a. Carefully place backfill over top of pipe and around structures.

b. Compact as required.

5. Compaction:
   a. Within street right-of-way and under pavement, compact each lift to at least 95% of maximum Standard Proctor Density, otherwise compact to at least 90%.
   b. In areas more than 3 feet below pavement structure, place backfill in lifts no thicker than 8 inches.
   c. In areas less than 3 feet below pavement structure, place backfill in lifts no thicker than 6 inches. Terminate backfill at 8 inches below finish grade in areas to remain unpaved, and to subgrade elevation in areas to be paved. Place 8 inches of topsoil in unpaved areas.
   d. When crossing under levees, railroads, and State or Federal highways, comply with the compaction requirements of these jurisdictions, if more stringent than these requirements.
   e. For Vitrified Clay Pipe (VCP), keep all heavy compaction equipment 5 feet above the top of the pipe. In the area less than 5 feet, use hand held compactors. Do not allow the compactor to come in contact with the pipe.
6. Moisture Range: Obtain required compaction within a soil moisture range of minus two percent to plus four percent (-2% to +4%) of optimum moisture content as determined by ASTM D698 (Standard Proctor).
7. Dispose of surplus and unsuitable materials unless otherwise directed by owner.
8. Hydraulic compaction is not allowed unless authorized by the Engineer.

3.07 PIPE INSTALLATION IN CONSTRUCTED EMBANKMENTS

A. Install all pipes in trenches according to Section 3.06. When allowed by the contract documents, pipes may be constructed in embankments as follows:

B. Placing Backfill for Pipes:
   1. Thoroughly tamp backfill under and around the pipe and in layers not to exceed 8 inches for the full length and width of the pipe.
   2. Place backfill and thoroughly tamp around and over the pipe for its full length.
   3. Extend the completed embankment on both sides of the pipe from the original ground line to at least 1 foot above the top of the pipe with a slope as shown in the contract documents. Construct the embankment over the pipe with a width no less than the outside diameter of the pipe and centered over the pipe. If necessary to accommodate construction traffic, increase the height of fill to the nominal diameter of the pipe or 3 feet, whichever is greater.
   4. When pipe are laid wholly or partly in a trench, granular backfill material may be required for backfill. Compact the remainder of the fill to at least 1 foot above the top of the pipe with slopes as outlined above.
   5. If the trench has been cut wide enough to permit use of a roller, after the pipe is bedded, thoroughly tamp the backfill material under and alongside the pipe with a mechanical tamper to the mid-height elevation of the pipe.
   6. The contract documents may require placement of pipe with moisture control. When not required, place roadway pipe after construction of an embankment by methods that will produce results equivalent to those required for construction of the embankment, except that moisture determinations will be waived for placing backfill completed within 48 hours after excavation.
   7. In addition to the normal backfill material requirements, when directed by the Engineer, build such approach fills to provide a roadway 10 feet in width over the pipe with grades no steeper than 10%.

3.08 STRUCTURE BEDDING

A. Bedding for Structures Bearing on Undisturbed Soils:
   1. Shape the bottom to accurate grade and size.
   2. Remove loose material, large clods, stones, and foreign materials.
   3. In unstable soils or rock conditions, see Section 3.03 for stabilization requirements.

B. Bedding for Structures Bearing on Bedding Material:
   1. Over excavate to minimum of 8 inches or as specified in the contract documents.
   2. Place bedding material for structures according to the contract documents. A

3.09 STRUCTURE BACKFILL

A. Removal of Forms and Falsework: See Section 6010, 3.06.

B. Placement of Backfill: Place backfill after structure concrete has reached at least 80% of the design strength and connecting work has been completed, unless otherwise specified. Determine strengths under comparable conditions. If strength is not determined, place backfill after 14 days.

C. Backfill Against Walls and Around Structures:
   1. Where backfill is required on both sides of a concrete wall and around all sides of monolithic structures, proceed with filling operations simultaneously on all sides of walls and structures so the fill is kept at approximately the same elevation at all times. Consider concrete box, arch, and circular culvert monolithic structures.
   2. Compact the 3 feet closest to all walls or wing faces by pneumatic or hand tampers only.

D. Placing Backfill with Excavated Material:
   1. Unless otherwise specified, see Section 3.06, D for suitable excavated materials for backfill.

3.10 OPEN CUT CASING PIPE INSTALLATION

A. Casing Pipe: Install casing pipe according to Section 3.01 to 3.07, as appropriate.

3.11 TRACER SYSTEM

A. Tracer wire shall be provided on all site utilities, including but not limited to:
   1. Telecommunication/copper.
   2. Empty conduits.
   3. Storm
   4. Sanitary.
   5. Gas.
   6. Water.
   7. Exceptions:
      a Straight storm runs with daylight each end do not require tracer wire).
      b Underground electrical lines do not require tracer wire.

B. Tracer wire: Solid, AWG #12, blue insulated, direct bury, Type TWHN. Install in trench attached directly to, parallel with, and centered above or below the utility.

C. Underground splices: Use Scotch cast splicing kits, 3M Company or approved equal.

D. Engineer shall provide specific details for tracer wire termination at each condition. Avoid receptacle boxes on posts in lawn areas (Install receptacle boxes on face of building or in flush ground boxes).

E. Test tracer wire for continuity after installation (see comment under “Specifications - Project Close-Out” above); All tracer wire which fails continuity testing shall be repaired or replaced as required until passing continuity testing. Provide Owner 48 hour notice of this activity.

F. In addition to tracer wire, Contractor shall install underground pipe markers: bright colored

continuously printed plastic ribbon tape, 6” wide by 3.5 mils thick, manufactured for direct burial, with aluminum foil core for location by non-ferric metal detectors and bold lettering identifying buried item. Install 8” to 10” below grade directly above buried utilities.

3.12 FIELD QUALITY CONTROL

A. References:

1. ASTM C 136; Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D 698; Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Moisture Using 5.5 pound (4.54 kg) Rammer and 12 inch (305 mm) Drop. (Standard Proctor Method)
3. ASTM D 1556; Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
4. ASTM D 2216; Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
5. ASTM D 2922 and D 3017; Test Methods for Density of Soil and Soil-Aggregate in Place and Water Content of Soil and Rock by Nuclear Methods (Shallow Depth).
6. ASTM D 4253 and D 4254, Test Methods for Maximum Index Density of Soils using a Vibratory Table and Minimum Index Density of Soils and Calculation of Relative Density.

B. Compaction Testing: Compaction testing of backfill, cooperate and coordinate with an independent testing laboratory selected by the Owner. Cost of initial compaction testing will be paid for by the Owner. Cost of retesting of failed test areas shall be paid for by the Contractor. Refer to Section 014000, 1.5, Test and Inspection Services, and this Section 3.12, G. below for additional requirements.

C. Schedule Testing: Notify the Owner’s Representative and the independent testing laboratory when work is prepared for testing.

D. Soil Testing:

1. Cohesive soils: Determine moisture-density relationships by ASTM D 698 (Standard Proctor). Perform at least one test for each type of cohesive soil used.
2. Cohesive soils: Determine in-place density and moisture content using ASTM D 1556 (sand-cone method) and D 2216 or ASTM D 2922 and D 3017 (nuclear).
3. Non-cohesive soils: Determine maximum and minimum index density and calculate relative density using ASTM D 4253 and D 4254 (cohesionless soils).
4. Gradation: Test according to ASTM C 136.

E. 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:

1. Contractor provided:
   a. Make one test per each 2 vertical feet of consolidated fill at each street crossing.
   b. Make one test per each 2 vertical feet of consolidated fill for each 200 horizontal feet of trench.
   c. Additional testing may be required by Engineer if non-compliance or a change in conditions occur.
   d. Coordinate the timing of testing with the Engineer.
   e. The Engineer will determine the location of testing.
   f. If necessary, excavate to the depth and size as required by the Engineer to allow compaction tests. Place backfill and recompact.
2. Owner provided:
   a. Coordinate the timing of testing with the Engineer.
   b. The Engineer will determine the location of testing.

c. Test frequency will not exceed one test per each 2 vertical feet of consolidated fill for each 200 horizontal feet of trench.

F. Test Failure: Rework, recompact, and retest as necessary until specific compaction is achieved in all areas of the trench.

G. Retesting: In event of failed tests, rework the failed area and retest. Costs of such retesting shall be paid by the Contractor, at no additional cost to the owner.

END OF SECTION

SECTION 31 35 00
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, Owner and City.

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:

Upon request, provide copies of all records and documentation related to compliance with the Iowa DNR NPDES Permit.

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.

Protect Existing Facilities At The Site Against Damage Including The Following:

1. The Contractor shall take precautions to insure that equipment, vehicles, and construction operations do not disturb or damage existing grades, walls, drives, pavement, utilities, plants, lawns, and other facilities.
2. Verify locations and depths of all underground utilities prior to excavation and report any conflicts with new work to the Engineer.
3. Any damage to existing trees or shrubs branches and root systems to remain and be protected shall be repaired and/or pruned by an experienced arborist.
4. Repair, replace, and/or return to original condition any damaged item, without additional compensation.

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.

PART 2 -PRODUCTS

2.01 COMPOST BLANKETS

Comply with Section 32 92 19, Seeding, 2.07, C for compost material requirements for compost blankets.

2.02 COMPOST BLANKET AND FILTER BERM TACKIFIER

A. Use a biodegradable, organic binding agent or polyacrylamide that can be mixed with, or injected into, compost or filter material as it is placed, which is not detrimental to the establishment of vegetation.

B. Use in filter berms or 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, filter berms, 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:

Sieve Size	Percent Passing1
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 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.

2.05 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 or less and classified as follows:
   a. RECP Type 1.A: Mulch control net, 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 and open weave textiles, consisting of processed degradable natural and/or polymer fibers, mechanically bound together by a single rapidly-degrading, synthetic or natural fiber netting, or an open weave textile of processed rapidly-degrading natural or polymer yarns or twines woven into a continuous matrix.
   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 between 3 and 12 months and classified as follows:
   a. RECP Type 2.A: Mulch control net, 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 to form a continuous matrix, or an open weave textile composed of processed degradable natural or polymer yarns or twines woven into a continuous matrix.
   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 between 12 and 24 months and classified as follows:
   a. RECP Type 3.A: Mulch control nets, consisting of a slow-degrading synthetic mesh or woven natural fiber netting.
   b. RECP Type 3.B: Erosion control blankets and open weave textiles, 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, or an open weave textile composed of processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix.
4. RECP Type 4 (Long Term): Functional longevity of 36 months and classified as follows: Erosion control blankets and open weave textiles, 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, or an open weave textile

composed of processed slow-degrading natural or polymer yarns or twines woven into 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 Erosion Control Technology Council's (ECTC) Standard Specifications for Rolled Erosion Control Products as follows:

Classification	Slope Application	Channel Application	Min. Tensile Strength
	Max. Grade*	Permissible Shear Stress	
RECP Type 1.A	5:1 (H:V)	0.25 lb/ft2	5 lb/ft
RECP Type 1.B	4:1 (H:V)	0.50 lb/ft2	5 lb/ft
RECP Type 1.C	3:1 (H:V)	1.50 lb/ft2	50 lb/ft
RECP Type 1.D	2:1 (H:V)	1.75 lb/ft2	75 lb/ft
RECP Type 2.A	5:1 (H:V)	0.25 lb/ft2	5 lb/ft
RECP Type 2.B	4:1 (H:V)	0.50 lb/ft2	5 lb/ft
RECP Type 2.C	3:1 (H:V)	1.50 lb/ft2	50 lb/ft
RECP Type 2.D	2:1 (H:V)	1.75 lb/ft2	75 lb/ft
RECP Type 3.A	5:1 (H:V)	0.25 lb/ft2	25 lb/ft
RECP Type 3.B	1.5:1 (H:V)	2.00 lb/ft2	100 lb/ft
RECP Type 4	1:1 (H:V)	2.25 lb/ft2	125 lb/ft

*Product tested according to ECTC Test Method No. 2 and meeting the ECTC Standard Specifications for "C" factor.

C. RECP Anchors: Stakes or staples as recommended by manufacturer, with a minimum length of 6 inches.

2.06 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.

2.07 CHECK DAMS

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 High Density Polyethylene (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. Length: 7 feet.

C. Rock Check Dam:

1. Aggregate: Erosion stone complying with Iowa DOT Article 4130.04.
2. Engineering Fabric: Comply with Section 2.20.

2.08 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.

2.09 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.

2.10 TEMPORARY PIPE SLOPE DRAINS

A. PVC, HDPE, and metal pipes as specified in Section 33 40 00, Storm Sewer, 2.01.HDPE, Type C (corrugated interior).

B. All pipes listed are allowed for use within the right-of-way.

2.11 SEDIMENT BASIN OUTLET STRUCTURES

A. Base: Class C concrete unless otherwise specified in the contract documents.

B. Riser: CMP complying with Section 33 40 00, Storm Sewer; 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 33 40 00, Storm Sewer; diameter as specified in the contract documents.

E. Anti-Vortex Device: CMP complying with Section 33 40 00, Storm Sewer; diameter and riser diameter as specified in the contract documents.

F. Anti-Seep Collar: Corrugated metal sheet of same material and gage as barrel section.

Size according to plans.

2.12 SEDIMENT TRAPS

A. Erosion Stone: Comply with Section 2.09

B. Engineering Fabric: Comply with Section 2.20.

2.13 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.

2.14 STABILIZED CONSTRUCTION ENTRANCE

A. Entrance Stone: 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.

2.15 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. (Not Used)

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.

2.16 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.

B. Hydromulch:

1. Wood Cellulose Mulch:
   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. Produced from long-strand wood fibers, held together by organic tackifiers and bonding agents that, when dry, become insoluble and non-dispersible.
   b. Upon curing 24 to 48 hours, form a continuous, 100% coverage, flexible, absorbent, erosion-resistant blanket that encourages seed germination.
   c. Manufactured to be applied hydraulically.
   d. Physical Properties:
      i) Fibers: Virgin wood, greater than 88% of total volume.
      ii) Organic Material: Greater than 96% of total volume.
      iii) Tackifier: 8-10%.
      iv) pH: 4.8 minimum.
      v) Moisture Content: 12% +/- 3%.
      vi) Water-holding Capacity: 1.2 gal/lb.
   e. Dyed green to facilitate visual metering.
3. Mechanically Bonded Fiber Matrix (MBFM): See Section 32 92 19, Seeding.
   a. Produced from long-strand wood fibers and crimped, interlocking synthetic fibers.\

b. Within two hours of application, form a continuous, 100% coverage, flexible, absorbent, porous, erosion- resistant blanket that encourages seed germination.Manufactured to be applied hydraulically.

c. Physical Properties:

i) Wood Fibers: 73% minimum.

ii) Tackifier: 10% +/- 1%.

iii) Crimped, Interlocking Synthetic Fibers: 5% +/- 1%.

iv) Moisture Content: 12% +/- 3%.

v) Water holding capacity: 1.2 gal/lb.

vi) Minimum pH: 4.8.

d. Dyed green to facilitate visual metering.

2.17 TURF REINFORCEMENT MATS (TRM)

A. Material Classification:

1. TRM Type 1: Use a TRM that is constructed of a web of mechanically or melt-bonded polymer netting, monofilaments, or fibers that are entangled to form a strong and dimensionally stable mat. Bonding methods include polymer welding, thermal or polymer fusion, or the placement of synthetic fibers between two high-strength, biaxially- oriented nets, mechanically bound by parallel stitching with polyolefin thread. Products may contain a degradable component.
2. TRM Type 2 and 3: Use a TRM that is constructed of a web of mechanically or melt-bonded polymer netting, monofilaments, or fibers that are entangled or woven to form a strong and dimensionally stable mat. Non-woven bonding methods include polymer welding, thermal or polymer fusion, or the placement of fibers between two high- strength, biaxially oriented nets, mechanically bound by parallel stitching with polyolefin thread. Use only components that are 100% synthetic and resistant to biological, chemical, and ultraviolet degradation.
3. TRM Type 4: Use a high performance/survivability TRM that is composed of monofilament yarns woven into a resilient uniform configuration. Use a mat that has a matrix that exhibits very high interlock and reinforcement capacities with both soil and root systems and demonstrate a high tensile modulus. TRMs manufactured from discontinuous or loosely held together by stitched or glued, netting, or composites are not allowed in this category. Use only components that are 100% synthetic and resistant to biological, chemical, and ultraviolet degradation. Use this category when field conditions exist with high loading and/or high survivability requirements.

B. Properties and Performance: Meet the minimum material and performance requirements contained in the following table:

Property1		**Test Method**	**Type 1**	**Type 2**	**Type 3**	**Type 4**
Material	Thickness	ASTM D 6525	0.25 in	0.25 in	0.25 in	0.25 in
	Tensile Strength2	ASTM D 6818	125 lb/ft	240 lb/ft	750 lb/ft	3,000 lb/ft
	UV Resistance3	ASTM D 4355	80% @ 500 hrs	80% @ 1,000 hrs	80% @ 1,000 hrs	90% @ 3,000 hrs
Performance	Maximum Shear Stress4 (Channel Applications)	ASTM D 6460	7 lb/ft2	10 lb/ft2	12 lb/ft2	15 lb/ft2
	Maximum Slope Gradient (Slope Applications)	N/A	1:1 (H:V) or flatter	1:1 (H:V) or flatter	1:1 (H:V) or greater	1:1 (H:V) or greater

1. For TRMs containing degradable components, all values must be obtained on the non-

degradable portion of the matting.

2. Minimum Average Roll Values, machine direction only.
3. Tensile strength of structural components retained after UV exposure.
4. Minimum shear stress that fully-vegetated TRM can sustain without physical damage or excess erosion (0.5 in soil loss) during a 30 minute flow event in large scale testing. Acceptable large scale testing protocol includes ASTM D 6460 or independent testing conducted by the Texas Transportation Institute, Colorado State University, Utah State University, or other approved testing facility. Bench scale testing is not acceptable.

2.18 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.

2.19 FLOW TRANSITION MATS

A. UV-stabilized HDPE plastic sheet with openings for vegetation growth and energy dissipation.

B. Use a nominal sheet size of 4 feet by 4 feet by 1/2 inch.

C. Use duckbill style anchors, as specified by the mat manufacturer.

2.20 ENGINEERING FABRIC

Comply with Iowa DOT Article 4196.01, B (Embankment Erosion Control) and Iowa DOT Materials I.M. 496.01, Appendix G.

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. MidAmerican Energy Environmental Services will provide a Notice of Intent template that must be used

C. Submit the completed SWPPP to the Engineer and MidAmerican Energy Environmental Services 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 and any local ordinance requirements.

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. MidAmerican Energy will hire an approved Inspector to 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, MidAmerican Energy Environmental Services will file a Notice of Discontinuation, according to the NPDES General Permit No. 2 and at the recommendation of the Inspector and local authority.

H. Provide all records and documentation to the Engineer upon completion of the project. MidAmerican Energy will 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. MidAmerican Energy will hire an approved Inspector to 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 that are 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

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

A. Install filter berm along the contour as specified in the contract documents, or as directed by the Engineer.

B. Turn the ends of the filter berm uphill to prevent runoff from flowing around the end of the berm.

C. When a vegetated berm is specified, apply seed to the surface of the berm.

D. Replace the berm when sediment accumulation reaches one-half of the height of the berm.

3.07 FILTER SOCKS

A. Installation:

1. Pneumatically fill mesh filter sock of size and length specified in the contract documents, or as directed by the Engineer. Alternative methods of filling the sock may be allowed upon approval of the Engineer.
2. Fill socks with filter material.
3. Place the filter sock along the contour as specified in the contract documents, or as directed by the Engineer.
4. Place additional filter material or soil from the site, on the upstream side of the sock, in the seam between the tube and the ground.

5. 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.
6. Drive stakes into the ground at a maximum spacing of 10 feet, and as required to secure the sock and prevent movement.
7. 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.
8. 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)

Install temporary RECPs according to the manufacturer’s published installation recommendations, subject to the following minimum requirements:

A. 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 32 92 19, Seeding prior to placing RECP.
3. Install anchor trench at top of slope. Seed and fertilize trench after backfill and compaction, if seeding is specified.
4. Unroll the RECP down or horizontally across the slope.
5. Place consecutive blankets down the slope end-over-end, shingle style.
6. Overlap ends of consecutive rolls a minimum of 3 inches, and install anchors at a maximum spacing of 18 inches along all overlaps.
7. Overlap edges of adjacent rolls a minimum of 2 inches.
8. Install anchors at edge seams between rows.

B. Channel/Ditch Application:

1. When specified, prepare seedbed and place seed and fertilizer according to Section 32 92 19, Seeding, prior to placing RECP.
2. Place end of first roll in the anchor slot at the center of the upstream channel and secure with anchors.
3. Position adjacent rolls in the anchor slot, overlapping adjacent rolls a minimum of 3 inches.
4. Place backfill material in anchor slot and compact. Unroll RECP over compacted slot and secure with anchors.
5. Unroll RECP downstream. Maintain a minimum 3 inch overlap between adjacent rolls. Secure edge lap with anchors.
6. Install intermittent staple check slots every 30 feet.
7. Construct end lap at end of roll and beginning of new roll. Overlap roll ends with upstream RECP on top.
8. Excavate longitudinal trench along both sides of the channel at the outside edges of installation. Place outer edges of RECP into longitudinal slot. Install anchors, place backfill material, and compact.
9. Terminate installation at downstream end with staple check.
10. Install anchors in a regular pattern over entire area covered according to manufacturer's published recommendations (minimum three anchors per square yard).

3.09 WATTLES

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.

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

A. Synthetic Permeable Check Dam (HDPE):

1. Install according to the manufacturer's recommendations.
2. When specified, provide an RECP under the check dam, installed according to the manufacturer's recommendations.

B. Triangular Foam Check Dam: Install according to the manufacturer's recommendations.

C. Rock Check Dam: Construct according to plans.

D. 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 STRUCTURES

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 32 92 19, Seeding.

3.12 LEVEL SPREADERS

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

Install the quantity of rip rap (revetment stone or erosion stone) as specified in the contract documents.

3.14 TEMPORARY PIPE SLOPE DRAINS

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 SEDIMENT BASIN OUTLET STRUCTURES

A. **Concrete Base:** Construct the concrete base and anchor riser section, as shown on plans.

B. Dewatering Device:

1. Drill holes in the riser section. The number, diameter, and configuration will be specified in the contract documents.
2. Wrap the perforated section of the riser pipe with metal hardware cloth.

C. 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 plan details for fabrication.

3.16 ANTI-SEEP COLLAR

A. General: Place backfill material and compact overexcavation areas to a minimum of 95%

Standard Proctor Density per Section 31 23 33 Trenching and Backfilling.

B. Concrete Collar:
   1. Place collars a minimum of 2 feet from pipe joints.
   2. Provide Class C concrete per Section 33 49 00 Storm Drainage Structures.

C. CMP Collar:
   1. Provide collar of same gage as the pipe barrel on which it is used.
   2. Paint or tag unassembled collars to identify matching pairs.
   3. Furnish each collar with two 1/2 inch diameter rods with tank lugs for connecting collars to pipe.
   4. Install collar with corrugations vertical.
   5. Seal the tap between the two half sections and between the pipe and connecting band with a bituminous jointing compound at the time of installation.

3.17 SEDIMENT TRAPS

Construct the storage area to the size and elevations specified in the contract documents.

3.18 SILT FENCES

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.
   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 at 5 feet on-center maximum, 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.

3.19 STABILIZED CONSTRUCTION ENTRANCE

A. Install a stabilized construction entrance 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.

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.

F. Install layer of crushed stone to the thickness (6 inches minimum) and dimensions specified in the contract documents.

G. Remove the accumulated sediment and install new stone, as required to prevent track-out.

3.20 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. (Not Used)

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.

3.21 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.

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: 2,600 lb/acre dry weight. 2) Tackifier: 50 lb/acre.
b. Bonded Fiber Matrix: 3,600 lb/acre dry weight.
c. Mechanically Bonded Fiber Matrix: 3,600 lb/acre dry weight.

6. Retain and count empty bags of mulch to ensure final application rate.

3.22 TURF REINFORCEMENT MATS

Install according to the manufacturer's published installation literature for the product specified and application (slope or channel).

3.23 SURFACE ROUGHENING

A. Directional Tracking:
   1. Do not use on slopes steeper than 3:1.
   2. Operate tracked equipment up and down exposed slope to create ridges perpendicular to the slope.
   3. Continue operation until the entire surface has been tracked.

B. **Grooving/Furrowing:**
   1. May be used on all slopes.
   2. Use rippers, disks, harrows, chisel plows, or other equipment capable of operating on the slope and creating grooves a maximum of 15 inches apart and 3 inches deep.
   3. Operate equipment along the contour of the slope to create grooves that are perpendicular to the slope.
   4. Perform over all exposed slopes as specified.

3.24 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.

3.25 FLOW TRANSITION MATS

Install according to the manufacturer's published recommendations.

3.26 TEMPORARY EROSION CONTROL SEEDING

Comply with Section 32 92 19, Seeding.

END OF SECTION

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base.

1.02 RELATED SECTIONS

A. Section 31 20 00 - Earthwork.

B. Section 32 13 13 - Concrete Paving.

1.03 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials; 2001 (2004).

B. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2000a.

C. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2000.

D. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2002.

E. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 1994(R 2001).

F. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2000.

G. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

H. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.04 SUBMITTALS

A. Materials Sources: Submit name of imported materials source and provide material certifications.

1.05 PROJECT CONDITIONS

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Base Course: Conforming to State of Iowa Highway Department standard 4121 unless otherwise stated in the plans.

2.02 SOURCE QUALITY CONTROL

A. Testing of samples for compliance will be provided before delivery to site.

B. If tests indicate materials do not meet specified requirements, change material and retest at Contractor's expense.

C. Provide materials of each type from same source throughout the work.

D. Upon delivery of 1,000 tons of aggregate to the site prior to spreading of rock, owner’s geotechnical engineer will test gradation of aggregate and verify it meets specification. Contractor must notify owner’s geotechnical engineer with a minimum 4 working day notice.

E. During rock placement, gradation testing compliance will be required every 200 tons of aggregate material delivered to site. Contractor required to coordinate testing with

geotechnical engineer. If aggregate does not pass gradation, contractor responsible for removal and replacement of material as determined by geotechnical engineer and owner.

F. Contractor responsible for any subsequent gradation testing that is required for aggregate that does not pass gradation tests.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Under Paving:

1. Place aggregate base course to a total compacted thickness as specified on site plan.
2. Compact to 95 percent of maximum dry density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

D. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Variation From Design Elevation: Within 1/2 inch (12 mm).

3.05 FIELD QUALITY CONTROL

A. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556.

B. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at Contractor's expense.

D. Contractor shall coordinate work with testing laboratory before proceeding with each phase or stage of work.

3.06 CLEAN-UP

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including Bidding Requirements, General and Supplementary Conditions and Division I Specification Sections, apply to work specified in this Section.

B. Comply with ACI 316 "Recommended Practice for Construction of Concrete Pavements and Concrete Bases" for all work.

1.02 WORK INCLUDED:

Provide all labor, materials, equipment and supervision required to construct concrete pavement, driveways, parking lots, curbs, walks, steps, edging, etc. including:

A. Concrete.

B. Curing and sealing.

C. Contraction and expansion joints and fillers.

D. Vapor barrier.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. Earthwork: Section 31 20 00.

B. Joint Sealant: Section 32 13 73.

1.04 QUALITY ASSURANCE:

A. Cost of field and laboratory testing will be borne by the Owner. Testing by laboratory approved by the Owner. Lab reports shall be simultaneously forwarded to the Owner, Contractor and Engineer.

B. Testing:

1. Slump to be checked in accordance with ASTM C143. One test minimum per hour.
2. Air content measured in accordance with ASTM C231, or C173. One test minimum daily.
3. Strength tests:
    a. Take one set of three (3) cylinders for each one hundred fifty (150) cubic yards or part thereof. Minimum one set of three (3) cylinders per each day's pour.
    b. Each cylinder shall be plainly marked showing cylinder designation (1A, 1B, 1C).
    c. Job cure each cylinder three (3) days.
    d. After three (3) days, send cylinders A and B to the laboratory approved by the Engineer for testing at ages seven (7) days and twenty-eight (28) days. Cylinder C to remain at the job as a "spare" cured under same conditions as concrete in the area from which it was taken.
    e. The date and location of each sample shall be marked on the Contractor’s job set of plans.
    f. Load and core tests shall be required only if cylinder tests indicate concrete does not meet Specifications. Such tests, if deemed advisable by the Engineer, shall be arranged and paid for by the Contractor.
4. Pavement Smoothness: Evaluate pavement smoothness for all PCC pavement surfaces.

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 procedures in

Iowa DOT Section 2316 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. Surface corrections will be completed at the direction of the Engineer with no additional cost to the Owner.

5. Pavement Thickness:
   a. 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:
      i. 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.
      ii. 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.
   b. 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.
   c. Based on the thickness index determined by the Engineer, the pavement payment will be as shown below:

Pay Factor for PCC Pavement Thickness

Thickness Index Range (in.)	Percent Payment
0 to -0.15	100
-0.16 to -0.25	95
-0.26 to -0.50	85
Greater than -0.51	As determined by the Engineer

   d. If the thickness index deficiency is greater than 0.51, the Engineer will study the extent and severity of the deficiency of the pavement areas. The Engineer will require one of the following:
      i. Removal and replacement of the deficient areas with pavement complying with the contract documents at no additional cost to the Owner.
      ii. 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.

1.05 SUBMITTALS:

A. Certification of concrete C-4 design mix with Class 3 durability aggregate by a testing laboratory. Submit prior to placement.

B. Submit plan for construction sequence and schedule prior to commencing construction.

C. Submit jointing plan 10 days prior to paving.

1.06 CODES, PERMITS AND FEES:

A. The entire installation shall fully comply with all local and state laws and ordinances, and with all established codes applicable thereto.

1.07 SITE DISTURBANCES:

A. Take precautions to ensure that equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc.

B. Verify locations and depths of all underground utilities prior to excavation.

C. Repair and/or return to original condition any damage caused by Contractor's negligence at no cost to Owner.

D. Provide temporary barricades and warning lights as required for protection of project work and public safety.

1.08 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. Pavement damaged by inclement weather shall be removed and replaced.

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.

i. 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.

ii. 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 (100 µm) plastic or equivalent commercial insulating material approved by the Engineer.

[1] The protection shall remain 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.

i. 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.

ii. 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.

iii. Use a method of protection and materials that will maintain the concrete temperature above 40°F.

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

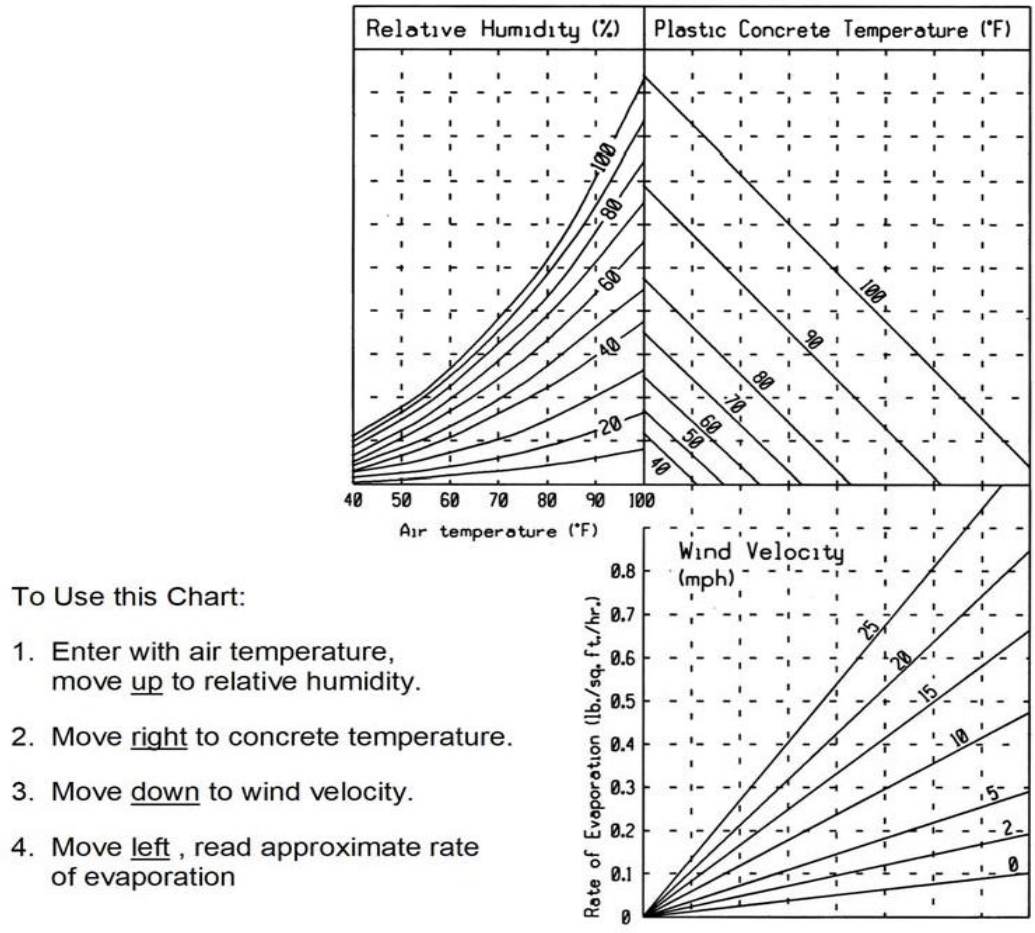
a. General:

i. During hot weather conditions, the Engineer may restrict concrete placement to early morning or evening hours.

ii. 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.

i. 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.

ii. 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.

iii. Ensure that the time between placing and curing is minimized and eliminate delays.

iv. Moisten concrete aggregates that are dry and absorptive.

v. Use a fog spray to raise the relative humidity of the ambient air if there is a delay in immediately applying the curing compound.

vi. 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 or if winds are greater than 25mph, discontinue placement of concrete.

3. Rain Protection:

a. The Contractor shall have available, near the site of the work, materials for proper protection of the edges and surface of concrete. Protective material may consist of sheets of burlap, or plastic film. Planks or other material with suitable stakes that can be used as temporary forms shall also be on hand.

b. If initial set has not occurred, contractor shall take every precaution necessary to protect the surface texture of the concrete.

c. Failure to properly protect concrete shall constitute cause for removal and replacement of defective pavement, if so determined 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 Owner. 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 Owner, repair or replace any part of the pavement damaged by traffic or other causes occurring prior to final acceptance of the pavement.

1.09 USE OF PAVEMENT

Time for opening pavement for use is determined by age and test results from cylinder or beams taken during placement.

	Minimum Age and Tested Strength of Pavement Before Opening			
Class of Mix	Type of Cement	Minimum Age For Opening (1)	Minimum Compressive	Minimum Flexural Strength Center

		Strength (psi)	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.

PART 2 PRODUCTS

2.01 CONCRETE STRENGTH:

A. Concrete mix for exterior slabs and steps:

1. Minimum of 4000 psi compressive strength at twenty-eight (28) days.
2. Minimum air content of 6.0%. To allow for loss during placement, the air content of fresh, un-vibrated concrete shall be 7.0%.
3. Maximum of 15% replacement of cement with fly ash will be permitted.
4. Slump four inches (4") maximum.

2.02 MIXING:

A. Except as otherwise specified, concrete shall be ready-mixed or job-mixed at the Contractor's option, and in accordance with requirements of ACI 318-77. Ready-mixed concrete shall be mixed and delivered to the project in accordance with ASTM C94. Maximum mixing time is one (1) hour.

2.03 PORTLAND CEMENT:

A. ASTM C150, type I.

2.04 SAND:

A. Clean, hard, washed and well graded. Sand shall conform with ASTM C33.

2.05 COARSE AGGREGATE:

A. Aggregate shall conform to ASTM C33. Aggregate for footings and other unexposed concrete may be gravel. Aggregate for exterior concrete and surfaces shall be limestone (max. size 1"). No substitutions will be allowed. Evidence of staining due to impurities will be cause for rejection of work.

2.06 MIXING WATER:

A. Clean and free from oil, acid and injurious amounts of vegetable matter, alkalies and other impurities.

2.07 ADMIXTURES:

A. Air entrainment: 6%, + 1% or -0.5%.

B. Air-entraining agents shall conform to ASTM C260.

C. Calcium Chloride is not to be used. No other admixtures shall be used without the expressed, written consent of the Engineer.

D. A water-reducing agent may be used as deemed necessary, to be in conformance with the latest ASTM requirements.

2.08 EXPANSION JOINT FILLERS:

A. See Specification Section 32 13 73.

2.09 EXPANSION JOINT SEALANT:

A. See Specification Section 32 13 73.

2.01 CURE AND SEAL:

A. Comply with Iowa DOT Section 4105.

1. All colored concrete pavement shall be cured using Iowa DOT 4105.07, Clear Compounds

conforming with AASHTO 148, Type 1-D, Class A.

2. All standard color concrete pavement shall be cured using Iowa DOT 4105.05, White Pigmented Compounds applied at a rate of 0.067 gallons per square yard.

2.02 REINFORCING STEEL MATERIAL:

A. All reinforcing steel shall be epoxy coated and conform with Iowa DOT section 4151.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION:

A. Excavate, fill, compact, grade and prepare subgrade as specified in Earthwork Section 31 20 00.

B. Unless otherwise ordered by the Engineer, the subgrade, at time of placing concrete for Concrete Pavement, shall be in a uniformly moist but not muddy condition to a depth of not less than one inch.

1. Subgrade Loading:
   a. Where concrete trucks must travel on a prepared soil-type subgrade to unload and, as approved by the Engineer, watering of the subgrade must be limited to just ahead of the paving machine.
   b. Repetitive loading on the subgrade by concrete trucks shall be minimized by entering and exiting the subgrade on side streets.
   c. Loads in excess of the legal axle load shall not be allowed on the completed subgrade.
   d. Partially loaded trucks may be required.
   e. If subgrade/subbase failure occurs, the repair shall be coordinated with the Engineer.
2. Paving Suspended:
   a. The paving operation shall be suspended where subgrade stability has been lost.
   b. No concrete shall be placed upon a subgrade which has become unstable, bears ruts or tire marks of Contractor's equipment or which is excessively softened by rain until such subgrade has been reconsolidated and replaned or reshaped to correct the objectionable condition.
   c. If necessary, scarify to a minimum depth of 6 inches, aerating, and recompacting at the Contractor's expense. Recompaction shall meet requirements of Section 31 20 00.
3. Maintenance of Subgrade:
   a. The Contractor is responsible for maintenance of the completed subgrade during subsequent construction activities.
   b. Before allowing hauling equipment to use the completed subgrade, the Contractor must be satisfied as to the effect this hauling equipment may have on the partially completed work.

3.02 SURFACE FIXTURE ADJUSTMENT

A. Adjust manhole frames and other fixtures within area to be paved to conform to finished surface.

B. Clean outside of fixture to depth of pavement before concrete placement.

C. Box out fixtures for later adjustment where allowed. Size and shape of box out for intakes as shown in Standard Drawings.

3.03 FORMS:

A. Set base of forms at or below subgrade elevation with top of forms at pavement surface elevation.

C. Extra height forms with Engineer approval may be used to back up integral curb and paving slab; set base at or below subgrade elevation with top of form at top of curb elevation.

D. Secure forms in place to required grade and alignment.

E. If voids occur under forms, remove forms and rework subgrade to proper elevation and density; reinstall forms.

F. If the soil supporting the form is softened by rain or standing water so that form is inadequately supported, remove forms and rework subgrade to proper elevation and density; reinstall forms.

G. Coat forms with release agent before concrete is placed.

H. Place forms true to alignment and free of latent concrete. Use wood or steel forms adequately staked and braced for all exposed slab edges.

I. Leave forms in place not less than eight (8) hours after concrete is placed. If removal causes damage to concrete, leave forms on as long as necessary to prevent damage. Remove forms with care to prevent cracking, spalling or overstressing concrete.

3.04 REINFORCING PLACEMENT

A. Reinforcing metal shall be clean, straight, free from distortion and rust, and shall be firmly secured in

position as detailed.

B. All reinforcing metal shall be placed in approved storage to prevent damage; do not distribute along the work site except as needed to avoid delay in paving.

C. Place reinforcing steel as shown on the detailed drawings or as specified; support and secure bars by approved chair and wire assemblies; bars to be checked by the Engineer upon notification from the Contractor.

D. Place steel centered in the pavement reasonably in advance of the paving operations.

E. Joint Steel:

1. LONGITUDINAL: All joints shall be constructed of the type, dimensions, and at the locations required by the plans or special provisions. All longitudinal joints in drive lanes shall be L-1 or L-2 joints and have steel, unless specifically specified otherwise on plans. Interior, parking lot joints do not need steel and shall be of type C.
2. TRANSVERSE: All transverse joints shall be either type C or type DW with steel for a day's work joint.
3. Tie bars for all longitudinal joints shall be installed so as to be in the intended position in the completed pavement. Tie bars for all longitudinal joints shall be positioned on chairs and secured against movement with metal stakes during placing and finishing of concrete unless otherwise approved by the Engineer. If approved by the Engineer, bars may be placed in position by a machine or other method. For tie steel that is placed mechanically in plastic concrete, the Engineer may:
    a. Manually check locations and depth of the steel in the plastic concrete behind the slip form paver using the following frequencies:
        i once every 200 lineal feet for tangent roadway sections
        ii in at least three locations within all horizontal curve sections
        iii for each inspection, at least two tie steel locations within a panel
    b. Using a magnetic locator, verify locations of tie steel in hardened concrete every day. Check out- of-tolerance tie steel to identify the extent of the problem for a retrofit correction.
4. The Contractor shall provide adequate means to ensure that the load transfer devices and tie bars are properly secured to maintain correct position and alignment during the placement of concrete.
5. Other tie bars shall be placed in such a manner as to ensure that the bars are located in reasonably close conformity with the specifications.

6. Care should be taken to prevent disturbance or damage of the joint assembly. Bars must be supported by approved chairs or method approved by Engineer.

3.05 JOINTS:

A. The Contractor shall submit a concrete jointing plan to the Owners Representative for approval 10 days prior to the start of paving. Joint design for concrete pavement shall be based on the current Guide for Design and Construction of Concrete Parking Lots published by the American Concrete Institute (ACI 330R-92). It is desired to have joint lines match edges of travel lanes. Joint locations shall be chalked with a string line before sawing.

B. Saw cut control joints. Joints to be 1/8" minimum and 1/4" maximum width. All transverse contraction joints shall be sawed at a maximum spacing of 30T, where T is the thickness of the pavement in feet. In sidewalks, space joints to create square panels unless a maximum spacing of 21T is exceeded, then use rectangular panels, unless shown on the plans. All walks 13' or more in wide shall get a longitudinal centerline L-1 Joint with Steel and square panels.

All joints shall be sawed to a depth shown below.

	Minimum Sawcut Depth	
	Conventional Saw	Early "Green" Saw
Transverse "C" Joint	T/4±1/4"	1 1/4"
Longitudinal Joint	T/3±1/4"	Not Allowed

C. Timing:

1. 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.
2. 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.
3. Discontinue sawing a joint if a crack develops ahead of the saw.
4. Saw longitudinal joints within 24 hours of the concrete being placed.
5. If necessary, continue the sawing operations both day and night.
6. The concrete must be capable of supporting the sawing operations to allow the use of an early green concrete saw.
7. Replace pavement with uncontrolled or random cracking at no additional cost to the Owner. Replace complete panel sections by means used for Full Depth PCC Repair Patches. Thickness of repair shall be original design thickness plus 2 inches. Place RD joints as shown in SUDAS Detail 7040.10 for patch.
8. Use wet sawing for dust control when specified in the contract documents.

D. Round outside edges of sidewalk with edging tool with approximately one quarter-inch (1/4") radius.

E. Round edges of sidewalk or curbs adjacent to expansion joints with edging tool with approximately one-eighth inch (1/8") radius.

F. Construction Joint - and tied joints shall be used at ends of all concrete pours. Bars to extend through joints a minimum of twenty-four (24) bar diameters.

G. Expansion joints (isolation joints) shall be installed in concrete pavement slabs and sidewalks where the concrete meets other structures such as light pole bases, intakes, buildings and all other similar structures. Hold joint material down one-half inch (1/2") and fill with sealant. Also used where sidewalk meets concrete curb.

H. Joints sawed with an early "green" concrete saw shall be washed out prior to sealing. The concrete must be capable of supporting the sawing operations to allow the use of an early green concrete saw.

I. Construction Joints:

1. Longitudinal or transverse construction joints shall be placed between adjacent lanes of concrete and at end-of-day header runs.
2. Manhole boxouts shall be located and placed on grade prior to paving. Manhole boxouts are required for two piece castings for sanitary/storm manholes.
3. The longitudinal construction joints shall be an approved joint type with legs unless machine placed.
4. Transverse construction joints shall employ load transfer devices (Header) and shall be placed whenever concrete placement is delayed for more than 30 minutes.

3.06 CONCRETE PAVEMENT PLACEMENT

A. Set survey control stakes at 25 foot maximum spacing including high and low points. Additional staking may be required by the Engineer.

B. The concrete shall be placed, consolidated, and finished to the widths and depths outlined in the plans.

C. All Type 2 and Type 3 paving sections longer that 100’ in length shall be poured with the slab in a single slip-form paving machine operation. This includes, but not limited to all 10’ wide or greater trails longer than 250 feet in length.

D. The concrete shall be deposited upon the supported reinforcement keeping segregation to a minimum.

E. Concrete shall be deposited to the full depth of the pavement in a single operation.

F. Necessary hand spading and spreading shall be done with shovels and not rakes.

G. Use laser screed for all Type 1 uniform width slabs 8.5 feet or more in width and 250 feet or more in length.

H. When pavement is constructed in separate lanes, the junction line in straight sections shall not deviate from the true line shown on the plans by more than ½ inch at any point and shall be tooled to the radius shown on the plans.

I. Place concrete to full depth in single operation. 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.

J. The concrete shall be distributed and spread as soon as placed. A mechanical concrete spreader may be used.

K. Concrete Screed:

1. The concrete shall then be struck off and screeded by mechanical means.
2. The striking off or screeding shall conform to the crown and cross section shown on the plans.
3. If, in the operation of subgrade or finishing equipment, it is necessary to operate one or both sets of wheels or tracks on previously placed concrete, the wheels or tracks shall be adjusted so that the bearing on the concrete will be not less than 3 inches from the edge of the pavement.
4. When operating with two wheels on the previously placed concrete and two wheels on the form, the form wheels shall be double flanged.
5. All wheels operating on the pavement shall be flangeless and rubber tired. All tracks operating on the pavement shall use rubber, wood, or belting pads.

L. The top of the forms shall be kept clean from accumulations of concrete, and the travel of the finishing machine on the forms shall be maintained true without lift, wobbling, or other variations tending to affect precision of finish.

M. When finishing by hand methods, concrete shall be consolidated by use of vibrating units operating in the concrete. Unless the vibrating apparatus is such that the full width of concrete is consolidated in a single passage, a definite system or pattern shall be used 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 shall be subject to approval the Engineer. Vibrating equipment shall meet the requirements of IDOT Section 2301.07. Vibrating equipment shall, under no circumstances, be used as a tool for moving concrete laterally on the grade.

3.07 FINISHING:

A. Screed, level and float all slabs to true, level and straight lines.

B. Exterior slabs and platforms to be medium hair broom finish, with no coarse aggregate visible, unless otherwise specified on drawings.

C. Tolerances on all surfaces not more than three-sixteenths inch (3/16") in ten foot zero inch (10'-0").

D. Formed surface finish:

1. Remove bulges, fins, form marks and roughness from exposed surfaces by grinding.
2. Subject to Engineer's approval, fill honeycombed and other defective areas by cutting out to solid concrete (minimum depth= 1") with straight edges and at right angles to the surface. Dampen area to be patched, brush on grout of equal parts Portland Cement and sand and follow immediately with patching mortar. Large or objectionable areas will require full removal and replacement at Engineer's discretion.
3. Patching mortar to be not richer than one (1) part Portland Cement to three (3) parts sand. Color of patching mortar shall match the adjacent concrete. (Substitute white Portland Cement for part of the grey cement as needed to provide color match.)
4. Trowel or burlap rub patched areas to match the surrounding concrete area. Clean all walls upon completion.
5. Exposed concrete wall faces and tops to have a uniform smooth rubbed finish. Moisten concrete surfaces and rub with Carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

3.08 SURFACE CURING

A. 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.

1. Use a white pigment liquid curing compound.

B. Apply compound with power sprayer; rate of application not less than 0.067 gallon per square yard (15 square yards per gallon); do not dilute compound.

C. If forms are used, apply to pavement edges and back of curbs within 30 minutes after forms are removed.

D. 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.

E. Hand operated sprayers may be used for small and irregular areas.

G. If forms are used, apply to pavement edges and back of curbs within 30 minutes after forms are removed.

H. 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.

3.09 JOINT SEALING

A. Timing:

1. Unless otherwise provided, before any portion of the pavement is opened to the Contractor's forces or to general traffic, joints that require sealing shall be sealed.
2. 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 1.08 above. Additional tests to determine the modulus of rupture may be required.

B. Cleaning:

1. For those joints that are not to be sealed, cleaning is not required.
2. 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.
3. 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.

C. Sealing:

1. Prepare and install joint sealer in the joint and to the proper level specified in the contract documents and as recommended by the manufacturer.
2. 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.
3. Seal joints the same day they are cleaned. Apply sealant only when the joint surfaces appear dry by visual examination.
4. 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.
5. 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.

3.10 SEPARATE CURB AND GUTTER CONSTRUCTION (FOR USE WITH HMA PAVING AREAS)

A. Construct curb and gutter as shown on drawings.

B. Use paving machine slip-form for curb; curb mule or similar mechanical equipment providing equivalent results.

C. Hand methods shall be allowed for radius, returns, and sections of curb and gutter 75 feet or less in length.

D. When depressed curb at driveways and where sidewalk intersects street, use templates to form backs of such curbs.

E. Form and construct curb by hand only where barrier or depressed curb is required and where small radii or other special sections preclude use of mechanical equipment.

F. Finish curb as rapidly as finishing operations on pavement permit. Maximum distance behind paving machine is 100 feet.

G. Remove free water, latency, dust, leaves, or other foreign matter prior to placing concrete for curb.

H. 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.

I. Vibrate or puddle concrete to secure bond with paving slab and eliminate rock pockets.

J. Secure final finish on curbs by hand method, including 6 foot straightedge or 6 foot slipform.

K. Edge, protect, and cure curb in same manner as pavement.

L. Check surfaces of curb and gutter with 10 foot straightedge; correct variations greater than 1/8 inch; remove and replace curbs having varying cross section.

3.11 DEFECTS OR DEFICIENCIES

A. Pavement containing cracks, fractures, spalls, or other defects, as determined to be unacceptable by Owner/Engineer, shall be removed and replaced at no cost to Owner. Remedy to be determined by Engineer. In lieu of the above, the Owner/Engineer may approve an extended warranty or price adjustment.

B. **Replace pavement with uncontrolled or random cracking at no additional cost to the Owner.** Replace complete panel sections by means used for Full Depth PCC Repair Patches. Thickness of repair shall be original design thickness plus 2 inches. All matches must conform to Iowa SUDAS 2013 Detail 7040.101 for patches.

END OF SECTION

SECTION 32 13 73
PAVEMENT JOINT SEALANTS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.
2. Joints between cement concrete and asphalt pavement.

1.02 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type and color of joint sealant required.

C. Product test reports.

D. Compatibility and Adhesion Test Reports: From sealant manufacturer.

1.03 QUALITY ASSURANCE

A. Preconstruction Compatibility and Adhesion Testing: Submit samples of materials that will contact or affect joint sealants to joint-sealant manufacturers for testing according to ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

1.04 WARRANTY

A. Provide two year warranty from time of substantial completion for polyurethane sealants. Include coverage for installed sealants which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint- sealant manufacturer based on testing and field experience.

1. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Colors of Exposed Joint Sealants: gray, unless selected by Architect from manufacturer's full range.

2.03 POURED JOINT SEALANTS

A. Parking Lot Pavement, Longitudinal and Transverse Joints:

1. Products:

a. Bemac, Div. of McAsphalt; Beram 195/195LM.

b. CRAFCO; ROAD SAVER 231.

c. Koch Pavement Solutions; Koch Product #9030

d. Maxwell Products, Inc.; Elastoflex 71.

e. P.T.Products; DURA FILL 3405 LM.

f. W.R.Meadows; 3405 Modified (Hot Pour)

g. WRM SOF SEAL (2Comp. Cold Pour)

h. Or equal specifically approved by engineer.

B. Expansion Joints in Walks and Parking

2. Products:

a. Sonneborn Products; Sonolastic SL-1. Color gray.

b. Or equal specifically approved by engineer.

2.05 EXPANSION JOINT FILLERS

A. Non-Linear Expansion Joints

1. Polyethylene closed cell foam expansion joint filler. BASF, Sonoflex F.
2. Only allowed at small curved joints, such as bollards or roof drain downspouts.
3. Or equal specifically approved by engineer.

B. Linear Expansion Joints

1. Resilient joint fibrous expansion board joint filler. Formflex Expansion Joint.
2. Or equally specifically approved by engineer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Timing: Unless otherwise provided, before any portion of the pavement is opened to the Contractor's forces or to general traffic, expansion joints and sawn joints shall be sealed.

B. Cleaning:

1. Before sealing joints narrower than 3/8 inch, the residue from sawing shall be cleaned from the crack. Dry sawing residue shall be blown from the joint. Wet sawing residue shall be flushed away by high pressure water blast cleaning.

2 . For joints 3/8 inch wide or wider, sand cleaning shall be used. When the joint surfaces appear dry by visual examination, the upper 3/4 inch of each joint face shall be cleaned by sand blast methods, followed by joint cleaning with air blasting. Air compressor shall provide moisture and oil-free compressed air. The angle of approach of the sand blast nozzle to each vertical face of the reservoir shall be approximately 30 degrees and the sand blast nozzle must have a guide which inserts in the joint and assures positive location and directional control of the nozzle.

3. Joint Sealer:

a. Joint sealer shall be prepared and installed in the joint and to the proper level as shown in the contract documents and as recommended by the manufacturer.

b. Hot-poured sealers shall be heated in a thermostatically controlled heating kettle; the material shall be heated to the temperature required for use, but not above that recommended by the manufacturer. After sealing, excess sealer shall be removed from the pavement surface.

c. Joint sealer shall be placed only when the pavement and ambient air temperatures are 40 degrees Fahrenheit or higher. When near this minimum, additional air blasting or drying time or both may be necessary to assure a satisfactory bond to the joint surfaces.

d. When this sealer cannot be properly placed due to late fall work, the Contractor shall submit a joint construction plan and sealing details to the Jurisdictional Engineer for approval before paving can begin.

e. Joints shall be sealed the same day they are cleaned. Sealing shall be done only when the joint surfaces appear dry by visual examination.

f. Where a curb does not exist, the joint opening at the pavement edges shall be sealed with tape.

g. If surface correction required the joints may need to be recleaned and resealed.

C. Install backer materials to support sealants during application and at position required to produce optimum sealant movement capability. Do not leave gaps between ends of backer materials. Do not stretch, twist, puncture, or tear backer materials. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants at the same time backings are installed to completely fill recesses provided for each joint configuration and to produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pavement Markings.

1.02 DESCRIPTION OF WORK

A. For marking of completed pavement surfaces.

1.03 SUBMITTALS

A. Minimum of two weeks prior to commencing any pavement marking operations, the Contractor shall submit a manufacture's catalogue sheet for each type of pavement marking paint used for review and approval by the Engineer.

1.04 SCHEDULING AND CONFLICTS

A. Construction Sequence:
   1. Submit plan for construction sequence and schedule prior to commencing construction.

B. Conflict Avoidance:
   1. Notify Engineer of conflicts discovered or changes needed to accommodate unknown or changed conditions.

C. Conform to Local, State and Federal Requirements.

1.05 RESTRICTIONS ON OPERATIONS

A. Surface Temperature Restrictions: Pavement markings shall not be placed when the temperature of the pavement surface is less than 40 degrees Fahrenheit, or between October 15th and April 1st.

PART 2 PRODUCTS

2.01 Waterborne Paint

A. The paint shall be capable of being heated and sprayed applied up to a temperature of 140° F without damaging the formulation or serviceability of the paint. The paint shall be free from heavy metals as defined by the U.S. EPA.

B. Pigment Content: The percent pigment by weight of the finished product shall be from 45% to 55% by weight for white and 55% to 58% for yellow paint as tested by ASTM D 3723.

C. Resin Solids shall be composed of 100% acrylic emulsion polymer.

D. Nonvolatile Vehicle: The nonvolatile vehicle shall not be less than 43% by weight for white paint and not less than 45% by weight for yellow paint.

E. Volatile Organic Compounds: Volatile organic compounds shall not exceed 1.25 pounds per gallon excluding water and VOC exempt solids. ASTM D 3960 shall be used to determine the levels of VOCs.

F. Density: The density shall be a minimum of 12 pounds per gallon and the density of the production batches shall not vary more than +/- 0.2 pounds.

G. No-Pick-Up Time: The no-pick-up time for the paint shall be less than 5 minutes.

PART 3 EXECUTION

3.01 CLEANING AND PREPARATION OF PAVEMENT

A. The pavement surface shall be dry and free from dirt, dust, oil and other contaminates which may interfere with the paint from properly bonding to the surface. The clean surface shall be at least 1 inch wider than the anticipated marking. An air blast shall occur immediately prior to the new marking being placed. The air blast is not intended to remove large amounts of dust or dirt, but only a small amount of residue that might be left after the cleaning operation.

3.02 UNIFORM APPLICATION

A. All painted markings shall have uniform thickness and width. The width of the lines shall be as specified with a tolerance of +/- ¼ inch for 4-inch lines and +/- ½ inch for wider lines.

B. The wet film thickness of the paint shall be 14 mils, used at a rate of 305.5 ft. of solid 4” line per gallon of paint.

3.03 TRAFFIC CONTROL

A. Traffic control shall remain in place from the time cleaning operations have started through the completed curing time of the newly applied paint markings.

3.04 MARKING REQUIREMENTS

A. Parking Stalls:
Solid yellow lines, 4 inches wide by length dimensioned on plans and shall be placed for each parking stall as shown in the plans. The spacing shall be nominally 9.5 feet on center, or as otherwise specified on plans.

B. Symbols and Stop Bars:
Symbols, directional arrows, and stop bars shall be painted yellow. Size and shape shall follow the Manual of Uniform Traffic Control Devices. Locations as shown in the plans.

C. Handicap Access Symbols and Aisles:
Symbols, painted yellow, a minimum of 5 feet in height, shall be placed as shown in the plans. Access aisles shall be painted color per plan with a diagonal stripe pattern, lines placed 2 feet apart on center.

D. Loading Zones:
Solid yellow lines 4” wide shall be placed as shown in the plans for loading zones. The lines shall be placed diagonally, spaced 2 feet on center. A solid yellow line shall outline the area on the pavement and on the curb.

END OF SECTION

SECTION 32 91 19

LANDSCAPE GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Final grade topsoil for finish landscaping shown on Landscape Drawings.

1.2 RELATED SECTIONS:

A. EARTHWORK: SECTION 31 20 00

PART 2 PRODUCTS

2.1 MATERIALS:

A. Topsoil: Fertile, friable loam, capable of sustaining vigorous plant growth, from well drained site free from flooding, not in frozen or muddy conditions; reasonably free from subsoil, clay lumps, roots, grass, weeds, stones larger than three-quarter (3/4) inch (19 mm) diameter, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing minimum 4 percent and maximum 20 percent organic matter.

PART 3 EXECUTION

3.1 EXAMINATION:

A. Verify building and trench backfilling has been inspected.

B. Verify subsoil base has been contoured and compacted.

3.2 SUBSOIL PREPARATION:

A. Eliminate uneven areas and low spots.

B. Remove debris, roots, branches, and stones in excess of 1/2 inch (13 mm) in size. Remove subsoil contaminated with petroleum products.

C. Scarify subgrade to depth of 3 inches (75 mm), where topsoil is to be placed. Scarify areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.3 PLACING TOPSOIL:

A. Place topsoil in areas to be seeded or sodded and planted, to thickness as scheduled (Paragraph 3.6).

B. Use topsoil in relatively dry state. Place during dry weather.

C. Fine grade topsoil eliminating rough and low areas. Maintain levels, profiles, and contours of subgrade.

D. Remove roots, weeds, and foreign material while spreading.

E. Manually spread topsoil close to building to prevent damage.

F. Lightly compact placed topsoil.

H. Leave site clean and raked, ready to receive seeding or sodding and landscape planting.

3.4 TOLERANCES:

A. Top of Topsoil: Plus of minus 1/4 inch (6 mm).

3.5 PROTECTION:

A. Protect landscaping and other features remaining as final work.

B. Protect existing structures, walls, sidewalks, and paving.

3.6 IMPORTING TOPSOIL:

A. Use topsoil stockpiled during site stripping for respread.

B. If contractor finds stockpiles have insufficient quantity for respreads requirements, topsoil must be imported to site and included in bid.

3.7 SCHEDULE OF TOPSOIL DEPTHS:

A. The following paragraphs identify compacted topsoil thickness for various locations.
1. Ornamental Grass Planting Beds: Minimum 12 inches
2. Native Plants and Grass Areas: Minimum 8 inches.
3. Shrub Beds: Minimum 8 inches .
4. Turf seeded and sodded Areas: Minimum 8 inches

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including Bidding Requirements, General and Supplementary Conditions and Division I Specification Sections, apply to work specified in this Section.

1.02 WORK INCLUDED:

A. Preparation of seedbed, furnishing and installing fertilizer, seed and mulch, maintenance and guarantee for seeding disturbed areas in accordance with the site plan.

B. Provide all labor, materials, equipment and supervision required to install turf seeding of lawns grass areas.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. EARTHWORK: SECTION 31 20 00 .

B. LANDSCAPE GRADING: SECTION 32 91 19

1.04 DEFINITIONS

A. Finish Grade: Elevation of finished surface of topsoil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing rough grading, or top surface of a fill or backfill immediately beneath topsoil.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product certificates.

C. Planting Schedule: Indicating anticipated planting dates.

1.06 DELIVERY, STORAGE, AND HANDLING

A. If seed is mixed prior to delivery on the site, it shall be tagged showing a guaranteed statement of composition of mixture and percentage of purity and germination of each variety.

B. If seed is to be mixed at the site, it shall be delivered in original containers bearing producers certification of germination and purity.

C. Tags shall show producers or dealers Iowa Permit Number and date of testing; test date shall be no more than 90 days previous to time of use.

D. Fertilizers shall conform to State of Iowa laws and regulations. If delivered in bulk, bills of lading or other labels shall be furnished to Landscape Architect or labels indicating analysis and weight information from each container shall be preserved and furnished to Landscape Architect within twenty-four (24) hours of application.

E. Handling of materials as recommended by manufacturer.

F. Store all packaged materials off ground and protect from moisture.

G. Storage of all materials in locations designated and approved by Owner

1.06 QUALITY ASSURANCE

A. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

1.07 CODES, INSPECTIONS AND PERMITS:

A. The entire installation shall fully comply with all local and State laws and ordinances, and with all established codes applicable thereto.

1.08 SITE DISTURBANCES:

A. Take precautions to insure that equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc.

B. Verify locations and depths of all underground utilities prior to excavation.

C. Repair and/or return to original condition any damage caused by Contractor at no cost to Owner.

1.09 JOB CONDITIONS:

A. Existing Utilities:
   1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during this work.
   2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

3. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Owner and then only after acceptable temporary utility services have been provided.
4. Provide minimum of 48-hour notice to Owner and Landscape Architect and receive written notice to proceed before interrupting any utility.

B. Protection of Persons and Property:
1. Barricade open excavations occurring as part of this work and post with warning lights.
2. Operate warning lights as recommended by authorities having jurisdiction.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by this work.

1.10 LAWN MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than 60 days from date of Substantial Completion and will include:
1. Repair of eroded areas prior to acceptance.
2. Maintenance of a uniform mulch cover until acceptance.
3. Until final acceptance and approval is received, reseed or overseed, using seed mix originally specified, all seeded areas to produce uniformity.

B. Mow lawn as soon as top growth is tall enough to cut. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Mow at 3" or higher.

PART 2 PRODUCTS

2.01 SEED

A. All seed mixes shall be local ecotypes and be locally obtained from:

United Seeds Inc
1800 Dixon Ave Suite A
Des Moines, Iowa 50316
(800) 365-6674

and shall consist of the following:

1. Seed Mix 1: "Super Turf II" Mix
2. Seed Mix 2: "Super Shade" Mix
3. Seed Mix 3: "Low Grow Grass and Wildflower" Mix (see Section 39 92 19.12 – NATIVE SEEDING)

If an equivalent seed manufacturer and mixture is desired, seed must be approved by project engineer:
Bishop Engineering
3501 104th St
Urbandale, IA 50322
515-276-0467
Attn: David Bentz

All equivalent seed must also be Certified Blue Tag Seed.

2.02 PLANTING MATERIALS

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 3/4 inch or larger in any dimension and other extraneous materials harmful to plant growth.
   1. Topsoil Source: Reuse surface soil stockpiled on-site and supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Verify suitability of stockpiled surface soil to produce topsoil.

B. If necessary Inorganic Soil Amendments:
   1. Lime: ASTM C 602, Class T or O, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.
   2. Aluminum Sulfate: Commercial grade, unadulterated.

C. If necessary Organic Soil Amendments
   1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.

D. Fertilizer:
   1. 6-24-24 Fertilizer shall be applied to all Type 1 Seeding areas

E. Mulch:
   1. Hydraulic Mulch: Wood cellulose hydraulic mulch with tackifier shall be applied at a rate of 2500lbs/acre.

PART 3 EXECUTION

3.01 LAWN PREPARATION

F. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   1. Apply Superphosphate fertilizer directly to subgrade before loosening.
   2. Thoroughly blend planting soil mix off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
   3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

G. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
   1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
   2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
   3. Remove stones larger than ¾" inch in any dimension and sticks, roots, trash, and other extraneous matter.
   4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

H. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

I. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

J. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.02 SEEDING/ MULCHING

A. Seeding rates according to United Seed specifications or at rate as specified on Landscape plan, rate on Landscape Plan governs.

B. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.

C. Apply wood cellulose Hydraulic Mulch at rate of 2500 lbs/ acre.

3.02 FERTILIZING

A. Fertilize all seed type I areas with product specified above at rate of 250 lbs/ acre.

3.03 SATISFACTORY LAWNS

A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches.

B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

END OF SECTION

SECTION 32 92 19

TURF SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seeding.

B. Erosion-control material(s).

1.02 RELATED SECTIONS

A. Section 31 10 00 - Site Clearing

B. Section 31 20 00 - Earthwork

C. Section 32 91 19 – Landscape Grading

1.03 REFERENCE STANDARDS

A. Iowa Statewide Urban Design and Specifications (SUDAS) (http://www.iowasudas.org/)

B. American Nursery and Landscape Association (ANLA) "American Standard for Nursery Stock", (ANSI Z60.1-2004)

1.04 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete or top surface of a fill or backfill area before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.05 SUBMITTALS

A. See Section 01 33 23 – Submittals, for submittal procedures.

B. Product Data: For each type of product indicated.
1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.
2. Hydromulch materials and composition.

C. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
1. Certification of each seed mixture. Include identification of source and name and telephone number of supplier.
2. All seed must be **Certified Blue Tag**

D. Qualification Data: For qualified landscape Installer.
i. Installer must have completed 5 similar projects with the last two years. Project information, location, can contact information for the client of each project must be submitted for verification.

E. Product Certificates: For soil amendments and fertilizers, from manufacturer.

F. Material Test Reports: For existing in-place surface soil.

G. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required initial maintenance periods.

H. At the pre-construction meeting, and/or prior to any contract work commencing, submit a written watering plan detailing the equipment to be used, the water source, and the manpower to be used toward meeting the specified watering requirements.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf and meadow establishment.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Two years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
   a. Certified Landscape Technician.
   b. Certified Turfgrass Professional, designated CTP.
   c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
6. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cat ion exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Landscape Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.
   a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
   b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.08 PROJECT CONDITIONS

A. Planting Restrictions: The preferred planting time is during one of the following periods:
1. Spring Planting: April 15 - May 30.
2. Fall Planting: August 15 - September 19.
   If planting can’t happen during these seeding dates for any reason including weather, contractor may plant outside of these dates except where specified otherwise on the detailed plans. If planting occurs outside of these dates, contractor still responsible for meeting all warranty, establishment and final inspection requirements of this section.

1.09 MAINTENANCE SERVICE

A. Begin maintenance immediately after each area is seeded and continue until acceptable seeding is established, but not for less than two (2) years from date of Substantial Completion.

B. To include:
   1. Repair of eroded areas prior to acceptance.
   2. Maintenance of a uniform mulch cover until acceptance.

C. Until final acceptance and approval is received, reseed or overseed, using seed mix originally specified, all seeded areas to produce uniformity.

D. After owner acceptance of the seeded areas, the contractor won't be responsible for maintenance procedures, except under warranty only.

1.10 WARRANTY

A. Provide guaranteed germination as specified for seed in paragraphs 2.1, 2.2, 2.3 and 2.4 this Section.
   1. Warranty period for Seeding: Two (2) years from the date of Substantial Completion.

B. Provide seed emergence.

C. Reseed and remulch bare spots as specified in this Section for original seeding and mulching; maintain these areas as specified until acceptance by Owner.
   1. At the end of the second full growing season, the seeding areas shall be established such that a full stand of the representative seeding mix is alive and in a healthy growing condition.

1.11 FINAL INSPECTION AND ACCEPTANCE:

A. Conditions for seeding acceptance:
   1. Guaranteed germination is achieved.
   2. Grass plants have emerged.
   3. Scattered bare spots do not exceed one (1) square foot in area.
   4. Scattered bare spots do not exceed three percent (3%) of total lawn areas.

B. Upon completion of the work and fulfillment of the requirements of this Section, notify the Owner in writing that the work is ready for final inspection.
   1. The final inspection of the seeded areas shall be at the end of the second full growing season.
   2. Before final acceptance shall be issued, the terms of the warranty maintenance period shall be met.
   3. At six-month intervals, from the time of initial acceptance, the Owner, Engineer, and Contractor will inspect and evaluate the growth and success of the seeding. If, during these intermediate inspections, it is determined that the seeding is more that 25% dead or in an unhealthy or unsightly condition, the Contractor shall reseed the area immediately, or as soon as is allowed during specified planting periods.

C. Request a definite date for final inspection.

D. Notify the Owner five (5) days prior to the requested final inspection date.

E. Reseed and maintain all seeded areas which do not meet the requirements of this Section at the time of final inspection.

F. Replacement work (reseeding, maintenance, etc.) shall be as specified in this Section for original seeding.

G. Replacement work shall be reinspected before acceptance.

H. Furnish detailed written recommended maintenance program to the Owner with a copy to the Construction Manager, prior to final inspection of the seeding.

PART 2 PRODUCTS

2.01 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: See drawings for locations.

Seed Type #1 – <u>Lawn Seeding</u>
Product: Super Turf II LS
Supplier: United Seeds
1800 Dixon Avenue, Suite A
Des Moines, IA 50316
Phone (515) 282-1750
Seeding Rate: 440 lbs / Acre – Must be drill seeded
Mulch Type: Hydromulch required, see notes on plans.

Temp Seeding – <u>Erosion Control Seeding (if needed)</u>
Product: SUDAS Type 5
Supplier: United Seeds (or approved equal)
1800 Dixon Avenue, Suite A
Des Moines, IA 50316
Phone (515) 282-1750
Seeding Rate: 105 lbs / Acre – Must be drill seeded
Mulch Type: Straw Mulch
Installation: Install as required by the SWPPP, DNR, EPA, and City.

Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

2.02 FERTILIZERS

A. See Section 3.03 (A) for preparatory fertilization of the Type 1 Seeding areas.

B. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

C. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

D. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
   1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

E. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.03 PLANTING SOILS

A. Planting Soil: ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

2.04 WATERING

A. Watering is at contractor discretion for all seeded areas. Contractor responsible for providing final product as specified in the acceptance section, 3.06.

2.05 MULCHES

A. Straw Mulch: Only allowed for seed types 3 or temp seeding.

B. Hydro-Mulch:

   a. Place all seed with a grass drill seeder prior to Hydraulic Mulching.

   b. Immediately upon seeding, cover with wood cellulose Hydraulic Mulch at a rate of 2500 lbs / Acre

2.06 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.07 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long. (See Drawings)

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long. (See Drawings)

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
   1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
   2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
   3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
   4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
   1. Protect adjacent and adjoining areas from hydro seeding and hydro mulching overspray.
   2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 TURF AREA PREPARATION

A. For all Type #1 Seeding: Apply pre-plant fertilizer (6-24-24) at a rate of 4.5 lbs. per 1000 SF and incorporate to a depth of 1 to 2 inches. Pre-plant fertilizer should be applied to surface and watered with two (2) passes of an irrigation head. Pre-plant fertilizer should not be applied more than seven (5) days before grassing operations.

B. Limit turf subgrade preparation to areas to be planted.

B. Verify area has been constructed in accordance with Section 31 20 00, 3.11.
   1. Apply fertilizer.

C. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.04 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.05 SEEDING

A. Sow seed with seeding machine. Broadcasting seed is only allowed in areas with extreme slopes exceeding 2:1. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
   1. Do not use wet seed or seed that is moldy or otherwise damaged.

B. Sow seed at rates indicated within this specification.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. During seeding, protect bioretention areas from construction traffic and over compaction.
   1. Repair rutting, over-compaction, clogging, or other damage to bioretention areas to required grades and tolerances at no cost to Owner.

E. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.

F. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

G. straw mulching is not allowed, hydromulch is required.

H. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
   1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
   2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

I. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

3.06 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Landscape Architect:
   1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 95 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.07 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

C. Protect adjacent plant material not intended to receive pesticides or herbicides

3.08 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION

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SECTION 32 93 00

TREES, SHRUBS, AND GROUNDCOVERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including Bidding Requirements, General and Supplementary Conditions and Division I Specification Sections, apply to work specified in this Section.

1.02 WORK INCLUDED:

A. Provide all labor, materials, equipment and supervision required for the installation of all proposed woody and herbaceous nursery stock, and machined moved plant material, mulch and steel edger.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. EARTHWORK: SECTION 31 20 00.

B. LANDSCAPE GRADING: SECTION 32 91 19.

C. SODDING: SECTION 32 92 23.

1.04 AVAILABILTY:

A. Before submitting a bid, the Contractor shall have investigated the sources of supply and satisfied themselves that they can supply the listed plants in the size, variety and quality listed and specified. Failure to take this precaution will not relieve the Contractor from their responsibility for furnishing and installing all plant materials in strict accordance with the Contract Documents without additional cost to the Owner.

1.05 SUBMITTALS

A. Product Samples and Data: For each type of product indicated.

B. Photos of Representative tree at mature foliage.

C. Product certificates.

D. Planting Schedule: Indicating anticipated planting dates.

1.06 QUALITY ASSURANCE:

A. All plant materials, grading, sizes, methods, etc., are to conform to the Standards of the American Association of Nurserymen, Inc., as contained in their current publication "American Standard for Nursery Stock", (ANSI Z60.1). In the event there is a discrepancy between these standards and this Specification, the most restrictive requirement shall govern.

B. All materials described and specified herein shall be subject to acceptance and approval by the Landscape Architect.

C. This acceptance does not waive the right to reject any material after it has been delivered to the site and/or installed.

1.07 DELIVERY, HANDLING AND TEMPORARY STORAGE:

A. Install plant material on the day of delivery to the site; in the event this is not possible, protect that stock not planted.

B. Keep plant material that cannot be planted immediately after delivery in the shade, well protected with soil, wet moss or other acceptable material and well watered.

C. Do not bind plants with wire or rope at any time so as to damage the bark or break branches.

D. Lift and handle plants from the bottom of the ball only.

E. Plants moved with a ball will not be accepted if the ball is cracked, loose or broken before or during planting operations.

F. Deliver fertilizer to site in original, unopened containers, each bearing manufacturer's guaranteed analysis.

G. Store packaged materials off ground and protect from moisture.

1.08 CODES, PERMITS AND FEES:

A. Obtain any necessary permits for this Section of Work and pay any fees required for permits.

B. The entire installation shall fully comply with all local and state laws and ordinances, and with all established codes applicable thereto.

1.09 JOB CONDITIONS:

A. Existing Utilities:
1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during this work.
2. Underground utilities shown on the drawings have been taken from existing public records, Owner's records available as-built drawings and are correct to the best of our knowledge, provided for information only.
3. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult Utility Owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities caused by Contractor's negligence to the satisfaction of Utility Owner at no cost to the Project Owner.
4. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.
5. Provide minimum of 48-hour notice to Engineer and receive written notice to proceed before interrupting any utility.

B. Protection of Persons and Property:
1. Barricade open excavations occurring as part of this work and post with warning lights.
2. Operate warning lights as recommended by authorities having jurisdiction.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by this work.
4. Perform excavation within drip-line of large trees to remain by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

1.10 INITIAL ACCEPTANCE AND APPROVAL:

A. No plants shall be planted until reviewed by the Landscape Architect.

B All materials described and specified herein are subject to inspection and approval by Landscape Architect.

C. Materials may be inspected by the Landscape Architect at source of supply or the Landscape Architect may require the Contractor to submit color slides and/or photographs which illustrate the specified plant material at the source of supply.

D. This inspection does not waive the right to reject any material after it has been delivered to the site and/or installed.

1.11 FINAL INSPECTION:

A. Final inspection of the planting to determine completion of contract work, exclusive of possible replacement of plants, will be made by the Landscape Architect upon completion of the work.

B. Final inspection will not be conducted unless all items of work as outlined in 3. EXECUTION have been completed.

C. Ten (10) days prior to the anticipated date of acceptance submit written notice requesting inspection to Landscape Architect.

D. After final inspection, the Contractor will be notified in writing, by the Landscape Architect, of initial acceptance of inspected work exclusive of the possible replacement of plants and correction of deficiencies in the requirements for completion of the work.

E. Maintain, as specified, areas not acceptable until corrections are completed and reinspection is conducted.

F. If a significant time delay (sixty to ninety days) is encountered, through no fault of the Landscape Contractor, inspection and initial acceptance of a major portion of the plantings may be granted.

G. All plants shall be alive and healthy at the time of final acceptance.

H. Replacement of rejected plants before initial acceptance to meet the terms of initial acceptance shall not be considered a part of the guaranty and replacement requirement of this Specification.

1.12 GUARANTEE, REPLACEMENT AND FINAL ACCEPTANCE:

A. Guarantee plants for the duration of one (1) full year after they are initially accepted as defined herein.

B. Plants shall be alive and in good, healthy and flourishing condition of growth at the end of the guaranty period.

C. At the end of the guaranty period, final acceptance will be made by Landscape Architect upon written notice requesting such acceptance; submit notice to Landscape Architect at least ten (10) business days before the anticipated date of acceptance.

D. Any plant, required under this Contract, that is dead or not in a vigorous, thriving condition, as determined by Landscape Architect at the time of Final Acceptance, will be removed from the site.

E. Plants that are missing at the time of Final Acceptance are to be installed during the specified planting season when weather and site conditions permit.

F. In case of any questions regarding the condition and satisfactory establishment of a rejected plant, the Landscape Contractor may elect to allow such plant to remain through another complete growing season. If at that time the rejected plant is found to be dead, in an unhealthy or badly impaired condition, it shall be replaced.

G. After Initial Acceptance, replace plants (once during or at the end of the guaranty period) that are observed to be dead or in a badly impaired condition.

H. One replacement after initial acceptance shall constitute fulfillment of Contractor's guaranty for the particular plant replaced.

I. Replacement Plants: Plants of the same kind and size as specified in the Plant Schedule; furnished and planted as specified herein.

J. Replacement Plants: Guyed or staked, mulched, wrapped, fertilized, pruned and restored to original condition as originally specified at no cost to Owner.

K. Make all necessary repairs to grades, lawns and paving required because of plant replacements, at no cost to the Owner.

L. Plant Replacement Cost: Borne by Contractor except for possible replacements resulting from removal, loss or damage due to occupancy of project in any part, vandalism, civil disobedience, or acts of neglect on the part of others, physical damage by animals, vehicles, fire, etc., or losses due to curtailment of water by local authority, or to "Acts of God". Floods, tornadoes, wind of hurricane force, and hail are not normal and the damage they do cannot be calculated in a bid.

PART 2 PRODUCTS

2.1 PLANT MATERIALS:

A. Plant Schedule: A list of plant materials is scheduled on the Drawing. In the event of any discrepancy between this schedule and the Plan Drawing showing the plants, the Plan Drawing shall govern.

B. Certification of inspection of plant materials required by Federal, State or other governmental agencies to accompany all shipments to be furnished to the Landscape Architect.

C. Nomenclature: The names of plants required under this Contract conform to those given in the "Standardized Plant Names", 1942 Edition, prepared by the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.

D. Standards: All plant materials, grading, sizes, methods, etc., are to conform to the Standards of the American Association of Nurserymen, Inc., as contained in their current publication "American Standard for Nursery Stock". In the event there is a discrepancy between these standards and this Specification, the most restrictive requirement shall govern.

E. Labeling: Legibly tag all plants as to name and size prior to initial inspection. Tagsa to remain on plant until final acceptance.

F. Species and Variety: True to name as specified. Plants approved as true to name at time of initial acceptance which, during the guaranty period, exhibit characteristics indicating they are not true to name will be replaced at no cost to the Owner.

G. Availability: Before submitting their bid, the Contractor shall have investigated the sources of supply and satisfied themsleves that they can supply the listed plants in the size, variety and quality listed and specified. Failure to take this precaution will not relieve the Contractor from their responsibility for furnishing and installing all plant materials in strict accordance with the Contract Documents without additional cost to the Owner.

H. Quality:
1. Growth habit typical for species and as indicated on the Plant Schedule.
2. Sound, healthy, vigorous and free from insect pests, plant diseases and injuries.
3. One sided plants or plants taken from tightly planted nursery rows will be rejected.
4. Any trees with missing or damaged central leaders will be rejected.

I. Size and Form:
1. Equal or exceed measurements specified in the Plant Schedule.
2. Measured before pruning with branches in normal position. Height and spread specified refers to main body of plant and not from tip to tip of branches or roots.
3. Caliper of trees less than four inches (4") - taken six inches (6") above ground level. Trees four inches (4") and over - measured one foot (1') above ground level.
4. Specified trunk height can be obtained by pruning lower branches of a plant after the plant has been installed; however, pruning to achieve specified trunk height is to occur only after Engineer has inspected plant and directed Contractor as to the amount of pruning required.
5. Where specified by caliper, no one stem of a specific multi-stemmed plant shall be smaller than the caliper size specified.

J. Balled and Burlapped Plants:
1. Designated as "B&B"; dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant.
2. In compliance with CURRENT PUBLICATION “AMERICAN STANDARD FOR NURSERY STOCK.”
3. Balls: Firmly wrapped with burlap or similar biodegradable material and bound with twine, cord, or wire mesh.
4. Where necessary to prevent breaking or cracking of the ball during the process of planting, the ball may be secured to a platform. Broken or loose balls will not be accepted.
5. A container grown plant, in lieu of a "B&B" plant, will be accepted provided it meets specified sizes and complies with CURRENT PUBLICATION “AMERICAN STANDARD FOR NURSERY STOCK.”
6. A machine moved plant, in lieu of a "B&B" plant, will be accepted provided it meets specified sizes and complies with CURRENT PUBLICATION “AMERICAN STANDARD FOR NURSERY STOCK.”

K. Container Grown Plants:
1. Container size as specified in Plant Schedule.
2. In compliance with CURRENT PUBLICATION “AMERICAN STANDARD FOR NURSERY STOCK.”

L. Machine-Moved Plants:
1. Moved with a Vermeer Tree Spade, tree mover or equal with approval of the Engineer.
2. Moved with a full machine of earth.

3. In compliance with CURRENT PUBLICATION “AMERICAN STANDARD FOR NURSERY STOCK.”

2.2 PLANTING SOIL:

A. Soil excavated from planting pits that is similar in nature to topsoil and is determined to be suitable for planting soil shall be thoroughly mixed with one (1) part of peat to five (5) parts of existing soil.

B. Very poor soils of clay, gumbo, gravel, hard-pan, or other soils injurious to plants shall not be used.

C. If quantity of soil excavated from planting pits is not adequate for planting, furnish planting soil consisting of partially decomposed vegetable matter of natural occurrence; black, clean, low in content of mineral or woody material, mildly acid, fertile and friable. Mix with one (1) part of peat to five (5) parts of soil.

D. Dispose of soil excavated from planting hole that is determined not to be of quality required or is not needed to be used for planting soil.

2.3 PEAT:

A. A domestic product consisting of partially decomposed vegetable matter of natural occurrence; black, clean, granulated or shredded.

2.4 FERTILIZER:

A. Similar or equal to Milorganite (6-3-0).

B. Uniform in composition, dry and free flowing.

C. Fertilizer which becomes caked or otherwise damaged making it not suitable for use, will not be accepted.

2.5 MULCH:

A. Type as specified on plans.

B. Depth and locations as shown on drawings.

C. Furnish in bags or bulk.

D. Submit sample for approval by Engineer.

2.6 GEOTEXTILE LANDSCAPE FABRIC :

A. 3.5 oz. spun bond landscape fabric, 100% polyester continuos filaments, thermally bonded manufactured by:
US Fabrics, Inc.
3904 Virginia Ave.
Cincinnati, Ohio 45227
Phone (513) 271-6000
Fax (513) 271-4420
or approved equivalent.

2.7 STAKING, GUYING AND WRAPPING MATERIALS:

A. Stakes: Similar or equal to steel farm fence posts, green vinyl coated or painted black with a rust inhibiting paint. All stakes the same color.

B. Wire: No. 11 gauge pliable galvanized wire.

C. Hose: New green or black 2-ply one-half inch (1/2") diameter reinforced rubber garden hose; all hose the same color.

D. Guying cable: Five-strand, three-sixteenth inch (3/16") diameter, steel cable. Attach wire cable clamps and turnbuckles (galvanized or aluminum).

E. Steel auger type screw anchor with twenty-four inch (24") rod length and three inch (3") plate.

F. Wrapping material: Heavy crinkle crepe tree wrapping paper in strips four to ten inches (4-10") wide.

2.8 METAL EDGING:

A. Steel landscape edging, one-quarter inch (1/4") by four inch (4").

B. Painted black.

C. Similar or equal to "Ryerson" steel landscape edging.

D. For use with rock maintenance edge around building perimeter and adjacent to security fence.

2.9 STONE EDGING:

A. Natural limestone edging – 6” nominal width, 4” nominal depth, 36” lengths.

B. Saw cut end of stone for flush installation against adjacent stone and pave surfaces.

PART 3 - EXECUTION

3.1 COMMENCEMENT DATE:

A. At the earliest possible date site conditions permit.

B. Coordinate with Landscape Architect.

3.2 PLANTING SEASON FOR BARE ROOT PLANTS:

A. Commence as soon as weather and site conditions permit in early Spring.

B. Spring planting season to end on or before May 30.

C. Fall planting season: approximately September 15 to November 1.

3.3 PLANTING SEASON FOR BALLED AND BURLAPPED, CONTAINER GROWN AND MACHINE MOVED PLANTS:

A. Deciduous trees and shrubs: April 1 to June 1 and August 15 to November 1.

B. Evergreen trees and shrubs: April 1 to June 1 and August 15 to October 15.

3.4 PREPARATION:

A. Stake out on the ground the locations of all plants and obtain approval of the Landscape Architect before excavation is begun.

B. Relocate incorrectly located plants at no expense to the Owner.

3.5 EXCAVATION:

A. Excavate the plant pit, centered at the location stake.

B. Planting soil for backfilling shall be kept separate from excavated subsoil.

C. Excavate the plant pit large enough to provide for at least six inches (6") of planting soil backfill around and beneath the root system.

D. Where surface or subsurface conditions prevent digging a plant pit to specified dimensions, obtain approval from Landscape Architect to modify location of pit dimensions.

3.6 DRAINAGE TEST:

A. Randomly select a representative number of shrub plant pits in each shrub planting area and test for drainage prior to planting.

B. Test all tree plant pits for drainage.

C. Fill each selected plant pit with water and let stand for twenty-four (24) hours.

D. Do not proceed with planting where drainage problems are apparent.

E. Report to the Landscape Architect any areas which do not drain within twenty-four (24) hours. A solution will be determined at that time. If additional work is required, the contractor shall submit proposal for this additional work according to the request for proposal.

3.7 PLANTING:

A. Ornamental Grass Beds:
   1. Cultivate bed areas six inches (6") deep and grade smooth immediately before planting groundcover plants.
   2. Before planting, spread commercial fertilizer at the rate of one-eighth (1/8) pound per plant over entire groundcover area, and cultivate into top six inches (6") of soil.
   3. Plant grassesat 18” O.C. unless noted otherwise on the Drawings.
   4. After planting and before mulching, spread weed preventer over plant bed soil surface as per manufacturer's recommendation.
   5. Install mulch to depth of three inches (4") over entire groundcover bed.

B. Balled and Burlapped and Container Grown Plants:
   1. Center the root ball in the plant pit resting on six inches (6") of well tamped planting soil.
   2. Backfill the plant hole with planting soil placed in layers around the root ball.

3. Carefully tamp each layer in place in a manner to avoid injury to roots or ball.
4. When approximately two-thirds (2/3) of the plant hole has been backfilled, fill the hole with water and allow the soil to settle around the roots.
5. Set top of root ball level with the surrounding grade as shown in the Planting Details.
6. Place mulch as indicated in the Plans and Details.
7. Cut cord or wire securing burlap at base of tree.

C. Machine Moved Plants:
1. No machine moved plants are approved for use on this project.

3.8 FERTILIZING B&B AND CONTAINER GROWN PLANTS:

A. Trees and Shrubs: Mix with backfill.

B. Large shade trees: Two (2) pounds per inch of caliper.

C. Small trees: One (1) pound per inch of caliper.

D. Shrubs: One-quarter (1/4) pound per foot height.

E. Evergreens: One-eighth (1/8) pound per foot height or spread.

F. Vines and groundcover: One-eighth (1/8) pound per plant; place in bottom of plant pit.

G. Herbaceous plants: One-eighth (1/8) pound per plant.

3.9 STAKING:

A. Stake evergreen trees eight feet (8') in height and less and deciduous trees having a trunk caliper of three inches (3") or less.

B. Use two (2) stakes driven vertically to depth to provide a firm structure.

C. Attach wire to the stake at a point approximately four feet (4') from the ground and attach to the tree at the same height.

D. Encase the wire in rubber hose to avoid direct contact between wire and bark of tree.

E. Place stakes opposite each other in an east-west direction and drive with a slight tilt away from each at the top so that slight tension can be placed on the wires when attached.

F. All staking material may be salvaged by the Landscape Contractor twelve to eighteen (12-18) months after planting.

3.10 GUYING:

A. Anchor and guy evergreen trees over eight feet (8') in height and deciduous trees having a trunk caliper of more than two and one-half inches (2 1/2") with three (3) guying cables, unless shown otherwise on the Drawings, Plant Schedule or Planting Details.

B. Space three (3) guys equally about each tree.

C. Each guy will consist of three-sixteenth inch (3/16") cable attached to the tree trunk at an angle of thirty (30) to forty-five (45) degrees at about two-thirds (2/3) of the height of the tree and anchored at the ground to earth anchors as specified.

D. Make all cable fastenings with an approved cable clamp and turnbuckle.

E. All guying materials may be salvaged by the Landscape Contractor twelve to eighteen (12-18) months after planting.

3.11 PRUNING AND REPAIR:

A. Prior to initial acceptance, prune all trees and shrubs and repair any injuries.

B. Limit the amount of pruning to the minimum necessary to remove dead or injured branches and twigs.

C. Maintain the natural habit, shape and specified size of the plant.

D. Make all cuts flush; leave no stubs.

E. On all cuts over three-quarters inch (3/4") in diameter and bruises or scars on the bark, trace the injured cambium back to living tissue and remove; smooth and shape wounds so as not to retain water and coat the treated area with an approved antiseptic tree paint.

3.12 MULCH:

A. Install at consistent depth as shown on drawings.

B. Sub-grade surface of areas to receive mulch shall be sloped to drain, smooth and free of ruts and clods.

3.13 CLEAN UP:

A. Remove any soil, peat or similar material that has been brought onto paved areas by planting operations keeping those areas clean at all times.

B. Upon completion of the planting, dispose of all excess soil and stones resulting from the planting operation.

C. Remove all debris, resulting from planting operations, from the site.

3.14 MAINTENANCE:

A. Begin immediately following installation of plants and continue until initial acceptance.

B. Include watering, weeding, cultivating, mulching, removal of dead material, resetting plants to proper grades or upright position and restoration of the planting saucer, and other necessary operations.

C. If any planting is done after lawn preparation, provide proper protection to lawn areas and repair any damage resulting from planting operation promptly at no cost to the Owner.

D. Maintenance after initial acceptance of the planting will be performed by the Owner.

E. Furnish detailed written recommended maintenance program to the Owner with a copy to Engineers, prior to initial acceptance of the various planting areas.

F. Maintenance performed by the Owner in accordance with recommended program will not affect the Landscape Contractor's obligation to guarantee and replace defective plants as herein described.

END OF SECTION

SECTION 33 10 00

WATER UTILITIES

Subparts:
A.WATERMAIN
B. VALVES, HYDRANTS & APPURTENANCES
C. TESTING AND DISINFECTION

A.WATERMAIN

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe.

B. Fittings.

C. Special Fittings.

D. Pipeline Accessories.

1.02 DESCRIPTION OF WORK

A. Construct water mains and building service pipes.

B. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Manufacturer′s instructions for installation for all pipe and fittings utilized.

C. Construction sequencing.

D. Catalog cuts, samples, manufacturer′s data and listing of applicable standards for special, unique or proposed substitute materials if requested by Engineer.

E. Joint restraint system.

F. Project Record Documents.

G. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials required by city code and plumbing code and conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications or for which submittals have been provided to Engineer and approved for use.

B. Store materials in a protected environment, on pallets or lagging.

C. Pipe and fittings contaminated with mud and surface water shall be removed from the site and not used in

construction unless thoroughly cleaned, inspected and approved by Engineer.

D. Handle all materials so as to avoid damage. Replace any damaged materials. Remove damaged materials from the site.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:
1. Attend a preconstruction meeting if required by Engineer.
2. Submit plan for construction sequence prior to commencing construction unless specifically not required by Engineer.

B. Conflict Avoidance:
1. Expose possible conflicts in advance of construction, such as utility lines and drainage structures. Verify elevations of each and verify clearances for proposed construction.
2. Complete elements of the work which can affect line and grade in advance of other open cut construction unless noted on plans.
3. Notify Engineer of any conflicts discovered or any changes needed to accommodate unknown or changed conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state and federal requirements.

1.08 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

B. Water Main Pipe:
1. Measure pipe along the center line of the pipe installed in full accordance with the Plans and Specifications.
2. For water main installed within casing pipe (Section 3020, 1.08) measure the length of casing/carrier pipe, along the centerline of the casing. Payment shall be made for both carrier and casing pipe as a single bid unit for the appropriate method of installation.
3. No payment shall be made for pipe not properly installed.
4. Where a fitting is inserted in a straight section of pipe, include the laying length of the fitting in the direction of a straight section of pipe with the total length of pipe laid to obtain the total length of pipe for payment.
5. Payment will be made at the unit bid price for the quantity of each type of pipe installed in the project in accordance with the Contract Documents.

C. Water Service Stubs and Stop Box: That portion of the water service which is within the Jurisdiction right-of-way from the water main to the stop box. Count each water service stub installed.

D. Fittings:
1. Count fittings by type and size, for those shown on the Bid Schedule.
2. Payment will be made for each type and size of fitting listed in the Bid Schedule and installed in accordance with the Contract Documents at the unit bid price.
3. No separate payment shall be made for fittings not shown as individual items in the Bid Schedule.

E. Pipeline Accessories:
1. Count each pipeline accessory item of each type and size for those accessory items shown on the Bid Schedule.
2. Payment will be made for each type and size of pipeline accessory at the unit bid price.
3. No separate payment shall be made for pipeline accessories not shown as individual items in the Bid Schedule.

F. (Not Used)

G. Incidental Items:
1. Items required for proper completion of the work or required by applicable codes, and whether or not the items are shown in the Plans, but which are not shown in the Bid Schedule, shall be considered

incidental to the contract.

2. Include the cost for incidental items including all required testing and disinfection in the unit bid price for pipe and fittings.

PART 2 PRODUCTS

2.01 WATER MAIN PIPE

A. Polyvinyl Chloride (PVC) Pipe:
   1. Conform to ANSI/AWWA C900 or C905 with gray iron pipe equivalent outside diameters.
   2. Wall Thicknesses:
      a. 4-inch through 24-inch sizes: DR 18.
      b. Sizes over 24-inch: Refer to Plans.
   3. Markings on Pipe:
      a. Name of manufacturer.
      b. Size and class.
      c. Spigot insertion depth gauge.
      d. National Sanitation Foundation (NSF) seal.

B. Ductile Iron Pipe:
   1. Minimum Thickness Class:
      a. 4-inch through 24-inch sizes; Class 52 per ANSI/AWWA C151/A21.51.
      b. Sizes over 24-inches; as shown in the Plans.
   2. Cement-mortar lined, per ANSI/AWWA C104/A21.4 with asphaltic seal coat.
   3. External coating: asphaltic.
   4. Joint Type: Use push-on type, except as otherwise required in the Plans or specifically authorized by Engineer.
      a. Push-on: per ANSI/AWWA C111/A21.11.
      b. Mechanical: per ANSI/AWWA C111/A21.11.
      c. Restrained, buried: Pipe manufacturer's standard field removable system.
      d. Restrained, in structures: Restraining gland, flanged or grooved.
      e. Flanged: ANSI/AWWA C111/A21.11.
      f. Grooved: ANSI/AWWA C606.
      g. Gaskets: Per ANSI/AWWA C111/A21.11.
   5. Markings on Pipe:
      a. Name of manufacturer.
      b. Size and class.
      c. Spigot insertion depth gauge.

2.02 WATER SERVICE PIPE AND APPURTENANCES

A. Controlling Standards: Local plumbing and fire codes.

B. Materials (as allowed by Jurisdiction or specified in contract documents):
   1. Copper Pipe:
      a. Comply with ASTM B 88.
      b. Wall thickness: Type K.
   2. Ductile Iron Pipe: As specified in Section 5010, 2.01. Polyethylene wrap is required.
   3. PVC Pipe: ASTM D 1785, SDR 21, Schedule 80, Type S joints.
   4. Brass Pipe: Red, seamless, per ASTM B 43.
   5. Polyethylene Pipe: Class 200, per AWWA C901.

C. Corporations and Stop Boxes: Contact the Jurisdiction for requirements.

2.03 BOLTS FOR WATER MAIN PIPE AND FITTINGS

A. Corrosion Resistant:
   1. Low alloy steel.
   2. Ductile iron.
   3. Zinc or cadmium plated.
   4. Cor-Blue or approved equal

B. Uncoated Cor-Ten steel bolts are not allowed.

2.04 FITTINGS

A. For Polyvinyl Chloride (PVC) Pipe: Use only ductile iron mechanical joint fittings as specified elsewhere in this Section.

B. For Ductile Iron Pipe:
1. ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53.
2. Joint Type: Mechanical or restrained, as required by Engineer.
3. Cement-mortar lined per ANSI/AWWA C104/A21.4 with asphaltic coating.
4. Restrained Joints:
   a. Restrained Mechanical Joints: Pipe manufacturer's standard field removable system.
   b. Flanged: ANSI/AWWA C110/A21.10:
      1) Nuts: ASTM A 563, Grade A, heavy hex head.
      2) Gaskets: Rubber or approved composition; 0.125-inch thick; full face.
   c. Grooved:
      1) ANSI/AWWA C606.
      2) Face to face dimensions: Equivalent to flanged, ANSI/AWWA C110/A21.10.
5. Wall thickness: ANSI/AWWA C153/A21.53.
6. Gaskets: Per ANSI/AWWA C111/A21.11.

2.05 SPECIAL FITTINGS

A. Flange Adapter:
1. Utilize where noted on drawings to allow for ease of dismantling piping in the future.
2. Body: Ductile iron conforming to the requirements of ASTM A 536.
3. End Rings (Follower Rings): Ductile iron conforming to the requirements of ASTM A 536.
4. Gaskets: New rubber compounded for water service and resistant to permanent set.
5. Bolts and Nuts: High strength, low alloy corrosion resistant steel or carbon steel bolts conforming to the requirements of ASTM A 307.

B. Pipe Coupling:
1. Utilize where noted on drawings to allow for ease of dismantling piping in the future, unless grooved fittings are furnished.
2. Center Sleeve (Center Ring): Steel pipe or tubing conforming to the requirements of ASTM A 53, A 512; or formed carbon steel with a minimum yield of 30,000 psi.
3. End Ring (Follower Ring): Ductile iron conforming to the requirements of ASTM A 536, or steel meeting or exceeding the requirements of ASTM A 576, grade 1010-1020.
4. Gaskets: New rubber compounded for water service and resistant to permanent set.
5. Bolts and Nuts: High strength, low alloy corrosion resistant steel.

C. Restrained Joints (Ductile iron pipe and PVC pipe only):
1. Utilize to restrain mechanical joints at tees, bends, dead ends, or where required by Engineer.
2. Required for pipe sizes greater than 16 inches in diameter.
3. On pipe size 16 inch diameter or smaller, restrained joints are to be used in lieu of or in addition to thrust blocks when specified in the contract documents or by the Engineer.
4. Manufacturer′s standard field removable restraint system.
   a. Suitable for buried service.
   b. Corrosion resistant components.
   c. Joint restraint system to be field installable, field removable and re-installable.
5. Restraint systems involving pipe clamps and connecting rods are not acceptable unless specifically required in the Plans.
6. Joint restraint system approval; in writing from Engineer.
7. Install restrained joints for lengths shown on the plans.

D. Concrete Thrust Blocks:
1. For use with all pipe sizes 16 inch diameter or smaller.
2. On pipe sizes greater than 16 inches, use in lieu of or in addition to restrained joints when specified in the contract documents or by Engineer.
3. Refer to detailed drawings for dimensions and installation of thrust blocks. See Figures 5010.1A, 1B, 1C.
4. Concrete thrust blocks shall be poured in place with a C-4 mix.

2.06 PIPELINE ACCESSORIES

A. Polyethylene Wrap:
   1. Utilize: On all ductile iron pipe and fittings in buried service.
   2. Conform to ANSI/AWWA C105/A21.5.
   3. Minimum thickness: 8 mil.

B. Tracer System: Some of the following equipment may be supplied by some jurisdictions. Check with appropriate jurisdiction for a list of components that will be supplied.
   1. Tracer Wire: #12 solid single copper conductor.
      a. Insulation material: Linear low-density polyethylene (LLDPE) installation suitable for direct burial applications.
      b. Insulation thickness: 0.045 inches, minimum.
   2. Ground Rod: 3/8 inch dia., 60 inch long steel rod uniformly coated with metallically bonded electrolytic copper.
   3. Ground-rod Clamp: High-strength, corrosion-resistant copper alloy.
   4. Splice Kit: Inline resin splice kit with split bolt for 1kV and 5kV. Insulates and seals single conductor and unshielded cable splices for direct bury and submersible applications.
   5. Tracer Wire Test Station (Figure 5010.5):
      a. Two (2) internal terminals with shunt.
      b. 5-foot white plastic triangular post.
      c. Removable top cap with lock.
      d. Three (3) 2-7/8-inch by 14-inch custom-vinyl decals.
      e. Tri-grip anchor.

2.07 GASKETS, SPECIAL

A. Use special pipe gaskets in contaminated soils if so directed by Engineer.

B. Soils contaminated with gasoline; Neoprene or Buna N material.

C. Use special pipe gaskets to handle volatile organic compounds, Nitrile (NBR) or fluoro carbon gaskets.

D. Other soil contaminants; as required by Engineer.

PART 3 EXECUTION

3.01 GENERAL PIPE INSTALLATION

A. Install only approved materials with plumbing code, and City code.

B. Protect pipe joints and valves from damage while handling and storing.

C. Use no deformed, defective, gouged, or otherwise damaged pipe or fittings.

D. Excavate and prepare trench as outlined in Division 3 -Trench Excavation and Backfill.

E. Prepare the trench bottom with sufficient exactness so that only minor movement of the pipe will be necessary after installation.

F. Clean pipe interior prior to placement in the trench.

G. Install pipe with fittings and valves to the lines and grades shown in the plans, with a maximum allowable variation of 3 inches.

H. Provide uniform bearing along the full length of the pipe barrel. Provide bell holes.

I. Clean joint surfaces thoroughly and apply lubricant approved for use with potable water.

J. Make joints according to pipe manufacturer′s recommendations and these specifications.

K. Limit joint deflections to one degree less than pipe manufacturer′s recommended maximum limit.

L. Tighten bolts in a joint evenly around the pipe.

M. Install concrete thrust blocks or joint restraints where shown or required. Refer to Figures 5010.1A, 1B, 1C.

N. Install remaining pipe bedding in accordance with Detailed Drawings using material conforming to these specifications.

O. Do not install pipe in water. Keep trench free of water. Refer to ANSI/AWWA C651 for wet trench installation procedures, if such installation is approved by Engineer.

P. Keep exposed pipe ends closed with rodent-proof end gates at all times when pipe installation is not occurring.

Q. Close ends of installed pipe with water-tight plugs during nights and non-working days.

R. Do not allow any water from the new pipeline to enter existing distribution system piping.

S. Do not locate water service lines under proposed driveway locations.

T. All water main including service lines and 1" lines under football field shall have a minimum of 5.5' bury, as measure to top of pipe.

3.02 ADDITIONAL REQUIREMENTS FOR DUCTILE IRON PIPE INSTALLATION

A. Install in accordance with AWWA C600.

B. Cut pipe perpendicular to pipe barrel. Do not damage cement lining. Bevel cut ends for push-on joints according to AWWA C600.

C. Encase all pipe, valves and fittings with polyethylene wrap. Refer to Detailed Drawings.

D. Refer also to AWWA C600.

3.03 ADDITIONAL REQUIREMENTS FOR PVC PIPE INSTALLATION

A. Cut pipe perpendicular to pipe barrel.

B. Bevel cut end of pipe barrel per pipe manufacturer's recommendation.

C. Refer also to AWWA C605.

3.04 (Not Used)

3.05 POLYETHYLENE ENCASEMENT INSTALLATION

A. Application: All buried ductile iron pipe, fittings, fire hydrants and appurtenances.

B. Install in accordance with AWWA C105.

C. The polyethylene encasement is to prevent contact between the pipe and the bedding material, but need not be airtight or watertight.

D. Secure and repair encasement material using polyethylene tape, or replace as necessary.

3.06 TRACER SYSTEM INSTALLATION

A. Applicability: All buried water main piping.

B. Begin and terminate system at all connections to existing mains.

C. Install wire continuously along lower quadrant of pipe. Do not install wire along bottom of pipe. Attach wire to pipe at midpoint of each pipe length; use two (2) inch wide ten (10) mil thickness polyethylene pressure sensitive tape.

D. Install splices only as authorized by Engineer. Allow Engineer to inspect all below grade splices of tracer wire prior to backfill.

E. Install ground rods adjacent to connections to existing piping and at locations shown on plans or as directed by Engineer.

F. Bring double run of wire to surface at each hydrant location and into tracer wire test station; connect to internal terminals.

G. Location of Tracer Wire Test Station: At each hydrant location, unless directed otherwise in the plans. Verify exact termination locations and method with local jurisdiction prior to proceeding.

H. Final inspection of the tracer system will be conducted at the completion of the project and prior to acceptance by the Owner and/ or City. Verify the electrical continuity of the system. Repair any discontinuities.

3.07 CONFLICTS

A. Provide temporary support for existing gas, telephone, power or other utilities or services that cross trench.

B. Compact backfill under existing utility crossing as specified in Section 3010 - Trench and Backfill or construct utility line supports where indicated on plans or as directed by Engineer.

C. Separate water mains from gravity sewers by horizontal distance of at least 10 feet unless:
1. Bottom of water main is at least 18 inches above top of sewer.
2. Sewer is placed in separate trench or in same trench on bench of undisturbed earth with at least 3 feet separation from water main.

D. Use ductile iron pipe as specified in Section 4010, 2.01 G for gravity sewers with less than 10 feet horizontal distance and bottom of water main less than 18 inches above top of sewer; maintain at least 2 feet linear separation.

E. Where water main or service crosses under gravity sewer or where bottom of water main or service is less than 18 inches above top of sewer:
1. If physical conditions prohibit the separation, the water main may not be placed closer than 6 inches above a sewer or 18 inches below a sewer. The separation distance shall be the maximum feasible in all cases.
2. Use 20 feet length of ductile iron pipe as specified in Section 4010, 2.01 G for gravity sewer centered on water main.
3. The water main and sewer must be adequately supported and have watertight joints (See Figures 3010.4-6).
4. Backfill trench with low permeability soil for 20 feet length centered on crossing.

F. Separate water mains from sanitary sewer force mains by horizontal distance of at least 10 feet unless the force main is constructed of water main materials meeting minimum pressure rating of 200 psi and is installed at least 4 feet horizontally from the water main.

3.08 TRANSITIONS IN PIPING SYSTEMS

A. Where the specified material of piping system entering or exiting a structure changes, the change shall occur at the outside of the structure wall, beyond any wall pipe or wall fitting required, unless otherwise shown or specified.

3.09 STRUCTURE PENETRATIONS

A. Wall Pipes:
1. Install where pipes penetrate and terminate at a wall or floor surface of a concrete structure, or where the pipe protrudes through the concrete wall or floor and the protrusion is otherwise unsupported.
2. Provide a waterstop flange near the center of the embedment length. Waterstop is to be cast integrally with the wall pipe, or fully welded to it around the pipe circumference.

B. Wall Sleeves:
1. Install where a pipe passes through a structure wall.
2. Sleeves in concrete walls are to be supplied with a waterstop collar, fully welded, and shall be cast in

place in the concrete.

3.10 TESTING

A. Test in accordance with Section below regarding Testing.

3.11 FLUSHING

A. Method of flushing is subject to approval of Jurisdiction. Flush in accordance with approved method under the supervision of the Jurisdiction.

B. Disinfection: According to Section below regarding Testing.

3.12 PROTECTION

A. Close pipe ends in trench securely when work is stopped. Install watertight plug in pipe end when work is stopped overnight or for longer periods.

B. VALVES, HYDRANTS & APPURTENANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Butterfly valves.

B. Gate valves.

C. Tapping valve assemblies.

D. Fire hydrant assemblies.

E. Flushing devices (blowoffs).

F. Valve boxes.

G. Incidental items.

1.02 DESCRIPTION OF WORK

A. Install valves, hydrants, and appurtenances for water mains.

B. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Manufacturer's instructions for installation for all valves, hydrants and assemblies.

C. Construction sequencing.

D. Catalog cuts, samples, manufacturer's data and listing of applicable standards for special, unique or proposed substitute materials if requested by Engineer.

E. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications, or for which submittals have been provided to Engineer and approved for use.

B. Store materials in a protected environment, on pallets or lagging.

C. Valves, hydrants and appurtenances contaminated with mud and surface water shall be removed from the site and not used in construction unless thoroughly cleaned, inspected and approved by Owner.

D. Handle all materials so as to avoid damage. Remove from the site and replace any damaged materials.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:
   1. Attend a preconstruction meeting if required by Engineer.
   2. Submit plan for construction sequence prior to commencing construction unless specifically not required by Engineer.

B. Conflict Avoidance:
   1. Expose possible conflicts In advance of construction, such as utility lines and drainage structures. Verify elevations of each and verify clearances for proposed construction.
   2. Complete elements of the work which can affect line and grade in advance of other open cut construction unless noted on plans.
   3. Notify Engineer of any conflicts discovered or any changes needed to accommodate unknown or changed conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state and federal requirements.

1.08 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

B. Butterfly Valve:
   1. Butterfly valve item includes all components attached to the valve or required for its complete installation, including but not limited to underground or above ground operator, square valve operating nut, valve box, valve box extension, extension shaft sufficient to position the valve operating nut within two feet and below the ground surface, hand wheels and incidental items.
   2. Count each butterfly valve of each size installed.
   3. Payment shall be at the unit bid price for each size and type of valve installed.

C. Gate Valve:
   1. Gate valve includes all components attached to the valve or required for its complete installation, including but not limited to underground or above ground operator, square valve operating nut, valve box, valve box extension, extension shaft sufficient to position the valve operating nut within two feet and below the ground surface, hand wheels, and Incidental items.
   2. Count each gate valve of each size installed.
   3. Payment shall be at the unit bid price for each size and type of valve installed.
   4. See subparagraph 1.08.D for payment for valves on fire hydrant leads.

D. Tapping Valve Assembly:
   1. Unit includes tapping sleeve and all other components needed to complete the installation, and for successfully completing of the tap.
   2. Count each tapping valve assembly of each size installed.

E. Fire Hydrant Assembly:
   1. Fire hydrant includes the fire hydrant, with barrel extensions sufficient to achieve proper hydrant bury length of the unit.
   2. Count each fire hydrant installed.
   3. Components to connect the fire hydrant to the water main, including pipe, fittings and auxiliary valve,

except tapping valve assembly if used, shall be considered to be integral parts of the fire hydrant assembly, and no separate or additional payment shall be made therefor.

F. Flushing Device (Blowoff):
1. Each blowoff assembly includes the valve, fittings, and all pipe segments. Pipe used in the blowoff assembly shall not be paid for separately under any other item.
2. Measure each blowoff assembly of each size installed by numerical count.

G. Valve Box:
1. Each valve box shall include the lid and any extensions required extend from the valve to the ground surface.
2. Valve box or extensions shall not be measured separately for payment unless identified separately in the Bid Schedule as a payment item. If so identified, measure each valve box, with extensions, if any, as a unit.

H. Incidental Items:
1. Items required for proper completion of the work or required by applicable codes, and whether or not the items are shown in the Plans, but which are not shown in the Bid Schedule, shall be considered incidental to the contract.
2. No separate payment shall be made for incidental items.

PART 2 PRODUCTS

2.01 VALVES

A. General:
1. Same size as pipeline in which it is installed, unless noted otherwise on drawings.
2. Manufacturer′s name or initial and working pressure cast on valve body.
3. Open when turned counterclockwise for most jurisdictions. If the contractor is not sure of the direction of opening of the valve, the contractor is to contact the Jurisdiction.
4. Factory tested to twice the rated working pressure.
5. Buried service: Mechanical joints, unless noted otherwise on Plans.
6. Service within structure:
    a. Flanged, per ANSI/AWWA C110/A21.10.
    b. Flanges, drilled to conform to ASME/ANSI B16.1 class 125, unless noted otherwise on drawings.
7. All valve operators to be supplied by valve supplier.
8. Bolts for joints: Refer to Section A. Watermain.

B. Butterfly Valves, Buried Service:
1. Type: Rubber seat.
2. Pressure rating: 150 psi working pressure.
3. Bubble- tight at rated pressures with flow in either direction.
4. Comply with: ANSI/AWWA C504 class 150B.
5. Body:
    a. Gray iron per ASTM A 126 class B.
    b. Two trunnions for shaft bearings.
6. Ends:
    a. Flanged, with flange adapters, except as otherwise shown in the Plans.
    b. Flange adapter: Refer to Section 5010.
7. Disc:
    a. Material: Ductile iron ASTM A 536 or gray iron ASTM A 126 class B, with plasma applied nickel-chromium edge or ASTM A 240, Type 316 stainless steel edge.
    b. Connection to shaft: Mechanically fixed stainless steel pins.
8. Shaft:
    a. Material: Stainless steel, ASTM A 240, Type 304.
    b. Turned, ground and polished.
9. Seat:
    a. Material: Synthetic rubber compound.
    b. Simultaneously molded in, vulcanized and bonded to body or mechanically retained.
10. Bearings:
    a. Corrosion resistant non-metallic and self-lubricating, sleeve type.
    b. Bearing load: No greater than 1/5 the compressive strength of the bearing or shaft material.

11. Packing: Self adjusting chevron type.
12. Operator:
    a. Type: Buried service.
    b. Three bolt, minimum, mounting to valve.
    c. Hold valve in any intermediate position between fully open and fully closed without creeping or fluttering.
    d. Equipped with mechanical stop-limiting devices to prevent over-travel of the disc in the open and closed positions.
    e. Fully enclosed, gasketed and grease packed.
    f. Designed to operate the valve under full rated working pressure with a maximum of 80 foot-pounds applied force.
    g. Withstand an input of 450 foot-pounds at extreme operator position without damage.
13. Finish: In accordance with ANSI/AWWA C504.
14. Exposed bolts and hex nuts: Stainless steel.

C. Gate Valves, Buried Service:
1. Type: Non-rising stem, resilient seat.
2. Pressure rating: 200-psi working pressure, minimum.
3. Comply with: ANSI/AWWA C509.
4. Body, Bonnet and Discs: Gray iron per ASTM A 126 class B.
5. Ends: Mechanical connection, except as otherwise shown on the plans.
6. Seat: Field replaceable with stainless steel fasteners.
7. Shaft seals: Double O-rings permanently lubricated between seals. Lubricant certified for use in potable water.
8. Exposed bolts and hex nuts: ASTM A 240, Type 304 stainless steel.
9. Operator: 2-inch square nut.
10. Interior and exterior valve coating shall be minimum 10-mil thick fusion bonded epoxy per AWWA C550.
11. Valve design shall not allow metal-to-metal contact between gate and body.

D. Tapping Valve Assemblies:
1. Valve: Tapping valve conforming to ANSI/AWWA C509.
2. Sleeve:
    a. Minimum 14 gauge.
    b. Stainless steel, ASTM A 240, Type 304.
    c. Working pressure 200 psi.
    d. Must fully surround pipe.
    e. Refer to table for minimum sleeve length
3. Gasket:
    a. To completely surround pipe.
    b. Minimum thickness 0.125 inch.
    c. Material: nitrile rubber.
4. Outlet Flange:
    a. Stainless steel, ASTM A 240, Type 304.
    b. ANSI B16.1, 125 pound pattern.
5. Bolts: Stainless steel, ASTM A 240, Type 304.
6. Minimum sleeve length:

Outlet Flange Size (Inches)	Minimum Sleeve Length (Inches)
4	15
6	15
8	21
10	27
12	30
Sizes over 12 inch	Consult Engineer

7. Consult Engineer for applicability. Use tapping valve assemblies only where approved and authorized or shown on the plans.

2.02 HYDRANTS

General:

1. Per City of Fort Dodge Specifications and Fire Department Requirements.

2.03 APPURTENANCES

A. Flushing Device (Blowoff):

1. Construct according to Detailed Drawings for Temporary or Permanent unit. Refer to Plans for applicable type at each location.
2. Nominal size: Two pipe diameters less than the water main to which it is attached.
3. Locations: Where shown on the Plans.
4. Components: Pipe, gate or butterfly valve, valve box, tee, reducer, thrust block, elbow, pipe cap and miscellaneous fittings, all as specified elsewhere in these Specifications.

B. Valve Box:

1. Applicability: For all buried gate or butterfly valves.
2. Type:
   a. In paved areas; slide type.
   b. In all other areas; screw extension.
3. Material: Gray iron.
4. Cover: Gray iron, labeled "WATER"
5. Wall thickness: 3/16-inch, minimum.
6. Inside diameter: 5-inches, minimum.
7. Length: Adequate to bring top to ground surface.
8. Factory finish: Asphalt coating.
9. Installation to include valve box ring.

C. Incidental Items:

1. Valve Stem Extension: Provide for all buried valves. Raise 2-inch operating nut to within two feet of, but not closer than 6 inches of the surface. Stem diameter per valve manufacturer's recommendations, but not less than 1 inch.
2. Other Items: As required to complete the installation in accordance with the Plans.

PART 3 EXECUTION

3.01 GENERAL

A. Install only approved materials.

B. Install in accordance with the Plans, plumbing code, city code, and the Engineer′s instructions, as appropriate.

C. Test and disinfect all valves, hydrants, and appurtenances as components of the completed water main in accordance with Section 5030.

D. Apply polyethylene wrap to all iron pipe, valves, valve boxes, hydrants and fittings.

E. Set tops of valve boxes to finish grade unless otherwise directed by Engineer.

F. Check the working order of all valves by opening and closing through entire range. Before exercising the valve, check with Jurisdiction on operating requirements.

3.02 FLUSHING DEVICE (BLOWOFF)

A. Install where shown on the plans, in accordance with Figures 5020.2 and 5020.3.
   1. Install gravel backfill.
   2. Install thrust block, bearing on perpendicular excavation face of undisturbed earth.

B. Temporary locations to be used only where approved by Engineer. Temporary blowoff must be removed prior to project completion and acceptance.

3.03 FIRE HYDRANT

A. If auxiliary valve is positioned adjacent to water main, attach it to anchoring tee.

B. If auxiliary valve is positioned away from water main, restrain all joints between valve and water main.

C. Position auxiliary valve at least 15 inches (clearance) away from fire hydrant.

D. Fire Hydrant Depth Setting:
   1. Use adjacent finish grade to determine setting depth.
   2. Nozzle not less than 1′-6" nor more than 1′-11" above grade, measured from centerline of nozzle to grade. Adjust barrel length, or add or remove extensions as required.
   3. If finish grade is not to be obtained during the current project, consult with Jurisdiction Engineer for proper setting dimension.

E. Coordinate installation with tracer wire installation.

F. Refer to Figure 5020.1.

G. Orient fire hydrant nozzles as directed by Jurisdiction Engineer.

C. TESTING AND DISINFECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pressure and leak testing of water system.

B. Disinfection of potable water systems.

1.02 DESCRIPTION OF WORK

A. Test and disinfect water mains, valves, hydrants, and appurtenances.

B. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SCHEDULING

A. Notify Engineer one working day in advance of testing or disinfection operations to coordinate the operations.

B. Engineer or his representative must be in attendance during testing or disinfection.

1.04 REGULATORY REQUIREMENTS

A. Conform to the standards of the Iowa Department of Natural Resources.

1.05 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

A. Testing and inspection of water systems is incidental to construction. Include the costs in the prices bid for pipe and fittings.

PART 2 PRODUCTS

2.01 DISINFECTION AGENT - CHLORINE

A. Meet Requirements:
   1. Calcium Hypochlorite, per ANSI/AWWA B300.
   2. Sodium Hypochlorite, per ANSI/AWWA B300.

B. Chlorine containers must have AWWA stamp.

PART 3 EXECUTION

3.01 SEQUENCE OF OPERATION

A. New Water System Construction: Perform operations in the following sequence:
1. Perform initial flush.
2. Make all service taps.
3. Perform pressure and leak testing.
4. Perform disinfection.
5. Flush after disinfection.

B. Water System Rehabilitation: Perform operations in the following sequence:
1. Perform initial flush.
2. Perform pressure and leak testing.
3. Perform disinfection.
4. Flush after disinfection.
5. Make all service taps.

C. Successfully complete each operation before commencing to the next operation.

D. Jurisdiction will provide reasonable quantities of water for flushing and testing.

3.02 PRESSURE AND LEAK TESTING

A. Remove any debris from within pipe. Clean and swab out pipe if required.

B. Secure any unrestrained pipe ends against uncontrolled movement.

C. Isolate new piping from the existing water system.

D. Fill and flush all new piping with potable water. Ensure that all trapped air is removed.

E. Pressurize the new pipe to the test pressure at the highest point in the isolated system. Do not pressurize to more than five psi over the test pressure at the highest point in the isolated system.

F. Test the completed piping system at 1½ times the system working pressure or 150 psi, whichever is greater, for two hours.

G. Monitor the pressure in the line for a period of not less than two hours.

H. If at any time during the test the pressure drops to five psi below the test pressure, repressurize the pipe by pumping in potable water in sufficient quantity to bring the pressure back to the original test pressure.

I. Accurately measure the amount of water required to repressurize the system to the test pressure.

J. Maximum Allowable Leakage Rate at 150 psi (not applicable at other pressures).

Pipe Diameter (inches)	Maximum Allowable Leakage Rate, (gallons per hour per 1,000 feet of pipe)
4	0.37
6	0.55
8	0.74
10	0.92
12	1.10
14	1.29
16	1.47

18	1.66
20	1.84
24	2.21
30	2.76
36	3.31

Note: For unusual conditions or for water lines shorter than 500 feet, consult Engineer for allowable leakage rate. The following formula shall apply:

$$L = \frac{(S)(D)(P)^{1/2}}{133{,}200}$$

Where:
L = leakage allowable, in gallons per hour.
S = length of pipe test section, in feet.
D = pipe diameter, in inches.
P = average test pressure, psig.

K. If the average measured leakage per hour exceeds the Maximum Allowable Leakage Rate, repair and retest the water line.

L. If the measured pressure loss does not exceed 5 psi the test will be considered acceptable.

M. Repair all visible leaks regardless of the amount of leakage.

3.03 INITIAL FLUSHING

A. Flushing:
1. Flush pipe prior to disinfection using potable water.
2. Use pitot tube to measure flushing velocity.
3. Obtain a minimum flushing velocity of 2.5 feet per second in the pipe to be disinfected.

B. Minimum Flushing Rate:

Pipe Diameter (inches)	Flow Rate for Flushing (gpm)	Pipe Diameter (inches)	Flow Rate for Flushing (gpm)
4	100	16	1,600
6	220	18	2,000
8	390	20	2,500
10	600	24	3,500
12	870	30	5,500
14	1,200	36	8,000

C. Property Protection: Protect public and private property from damage during flushing operations.

3.04 DISINFECTION

A. General:
1. Applicable standard: ANSI/AWWA C651.
2. Disinfect only after satisfactory pressure testing has been completed.
3. Keep piping to be chlorinated isolated from lines in service and from points of use.
4. Coordinate disinfection with Engineer.
5. Engineer will obtain and test water samples.

B. Disinfection:
1. Induce flow of potable water through the pipe.

2. Introduce highly chlorinated water to the pipe at a point within 5 pipe diameters of the pipe's connection to an existing potable system, or within 5 pipe diameters of a closed end, if there is no connection to an existing system.
3. Introduce water containing 25 mg/L free chlorine minimum until the entire new pipe contains 25 mg/L free chlorine minimum.
4. Retain chlorinated water in pipe for at least 24 hours and not more than 48 hours.
5. If test is not successful, repeat disinfection procedure.

3.05 FLUSHING AFTER DISINFECTION IS COMPLETE

A. Maintain isolation of the new pipe from the existing potable water system until test results have been approved, but not less than 24 hours after flushing has been completed.

B. Flush pipe using potable water until chlorine residual equals that of the existing potable water system.

C. Discharge chlorinated water in a safe manner.

D. Disposal of heavily chlorinated water
1. Check with the local sewer department for the conditions of disposal to the sanitary sewer.
2. Chlorine residual of water being disposed will be neutralized by treating with one of the chemicals listed in Table C.1.

Table C.1 Amounts of chemicals required to neutralize various residual chlorine concentrations in 100,000 gal (378.5 m^3) of water*

Residual Chlorine concentration	Sulfur Dioxide (SO_2)		Sodium Bisulfite ($NaHSO_3$)		Sodium Sulfite (Na_2SO_3)		Sodium Thiosulfate ($Na_2S_2O_3 + 5H_2O$)	
Mg / L	*lb*	*(kg)*	*lb*	*(kg)*	*lb*	*(kg)*	*lb*	*Kg*
1	0.8	(.36)	1.2	(.54)	1.4	(.64)	1.2	(.54)
2	1.7	(.77)	2.5	(1.13)	2.9	(1.32)	2.4	(1.09)
10	8.3	(3.76)	12.5	(5.67)	14.6	(6.62)	12.0	(5.44)
50	41.7	(18.91)	62.6	(28.39)	73.0	(33.11)	60.0	(27.22)

* Except for residual chlorine concentration, all amounts are in pounds (kilograms).

3.06 PUTTING WATER MAIN IN SERVICE

A. Obtain Engineer′s approval to put the completed water system in service.

END OF SECTION

SECTION 33 40 00

STORM SEWER AND DRAINAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm Sewers.

B. Subdrains.

C. Footing Drain Sewer Collectors.

D. Storm Sewer Service.

1.02 DESCRIPTION OF WORK

A. Construct storm sewers, subdrains, and footing drain collectors.

B. Construct storm sewer service and connections.

C. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2012, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Manufacturer's instructions for installation of pipe and appurtenances.

C. Construction sequence.

D. Catalog cuts, samples, manufacturer's data, and listing of applicable standards for special, unique, or proposed substitute materials if requested by Engineer.

E. Certification that materials being provided meet the requirements of these specifications or that alternate materials or substitutions have received written approval of the Engineer.

F. Project Record Documents.

G. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications or for which submittals have been provided to Engineer and approved for use.

B. Store materials and handle to avoid damage. Replace any damaged materials. Remove damaged materials from site.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:
   1. Attend a preconstruction meeting if required by Engineer.
   2. Submit plan for construction sequence and schedule prior to commencing construction.

B. Conflict Avoidance:
1. Expose potential conflicts such as utility lines and drainage structures in advance of construction. Verify elevations and locations, and verify clearance for proposed construction.
2. Complete elements of work that can affect line and grade in advance of storm sewer construction unless noted on plans.
3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state and federal requirements.

1.08 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

B. Storm Sewers and Subdrains:
1. Measurement of pipe, except aprons, will be in linear feet along centerline of pipe in place.
2. Measurement of each size and type of pipe installed will be from end of pipe to end of pipe.
3. Payment will be made at the unit bid price for each size and type installed.

C. Incidental Items:
1. Items that are not listed as specific bid items, but are required for proper completion of the work, are incidental to construction. Pipe testing is incidental.
2. Incidental items may or may not be shown on plans.
3. No payment shall be made for incidental items.

PART 2 - PRODUCTS

2.01 STORM SEWERS

A. Reinforced Concrete Pipe (RCP):
1. Conform to ASTM C 76.
2. Minimum Class III, Wall B.
3. Tongue and groove joints.
a. Use cold applied bituminous jointing materials, unless otherwise specified.
b. If specified, use rubber O-ring flexible joint conforming to ASTM C 443.
4. If specified, wrap exterior of each joint with engineering fabric.

E. Polyvinyl Chloride Pipe (PVC):
1. Use pipe conforming to the following:
a. Minimum pipe stiffness of 46 psi.
b. ASTM F 949, corrugated exterior, smooth interior; ASTM D 3034, solid wall PVC; ASTM F 679, solid wall PVC (up to 27 inches).
c. Gasketed integral bell and spigot joints per ASTM D 3212 and ASTM F 477.
2. Do not use in right-of-way.
3. Use only outside of right-of-way in public utility easement areas where no utilities exist or are proposed (running parallel or crossing) or where the trench for the PVC pipe will not be disturbed, and where the Engineer allows.

F. High Density Polyethylene (HDPE): N-12 PIPE: PIPE SHALL BE ADS N-12 MEGA GREEN.
1. Pipe shall consist of smooth interior and annular exterior corrugations.
2. 4- through 10-inch (100 to 250 mm) shall meet ASTM F2648(virgin/recycled material) , Type S.
3. 12- through 60-inch (300 to 1500 mm) shall meet ASTM F2648 (virgin/recycled resins), Type S.
2. Use only fittings supplied or recommended by pipe manufacturer for soil tight service.
3. Only use outside of Public Right of Way where allowed by jurisdiction.

G. Bituminous Jointing Material:

1. Use with RCP, RCAP, and RCEP, unless indicated otherwise on plans.
2. Use a cold applied mastic sewer joint sealing compound recommended by the manufacturer for the intended use and approved by the Engineer. Supply in either rope form or flat type form or suitable for trowel application. Meet the requirements of AASHTO M 198.

H. Bituminous Joint Primer: Meet the requirements of ASTM D 41, which is intended for use in priming concrete pipe joints prior to application of bituminous jointing material.

I. Engineering Fabric**:**
1. Use for wrapping exterior of storm sewer pipe joints where indicated on plans.
2. Use Iowa DOT 4196.01B fabric for use in subsurface drains.

J. Reinforced Concrete Apron:
1. Use where indicated on plans.
2. Use pipe conforming to ASTM C 76.
3. Strength not less than adjoining pipe sections.

K. Apron Guard:
1. Use where indicated on plans.

2.02 SUBDRAINS

A. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):
1. Conform to ASTM D 3034, minimum thickness SDR 35, 46 psi minimum pipe stiffness.
2. PVC plastic according to ASTM D 1784, Cell Classification 12454.
3. Integral bell and spigot type rubber gasket joint conforming to ASTM D 3212 and ASTM F 477.
4. Fabricated or preformed saddle wye or saddle tee for service tap conforming to AASHTO M 252 or M 294.
5. 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. Polyvinyl Chloride Corrugated Pipe and Fittings (Corrugated PVC):
1. Corrugated exterior, smooth interior, PVC.
2. Conform to ASTM F 949, minimum pipe stiffness, 46 psi.
3. PVC plastic according to ASTM D 1784, Cell Classification 12454.
4. Integral bell and spigot type rubber gasket joint conforming to ASTM D 3212 and ASTM F 477.
5. Slot subdrain pipe according to ASTM F 949.

C. Polyethylene Corrugated Tubing (Corrugated PE):
1. Conform to AASHTO M 252, Type C, corrugated interior and exterior or Type S, corrugated exterior, smooth interior.
2. Use only fittings supplied or recommended by pipe manufacturer for soil tight service.
3. Perforated with slots conforming to AASHTO M 252, Type CP, or Type SP.

D. Aggregate Backfill: Conform to State of Iowa Department of Transportation Standard 4131, Porous Backfill Material; Crushed stone or gravel meeting Iowa DOT Gradation No.29.

E. Engineering Fabric: Use fabric conforming to Iowa DOT 4196.01B.

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 LINE AND GRADE

A. Install pipe to line and grade shown on plans. Set field grades to invert of pipes or culverts.

B. Notify Engineer immediately if discrepancies or irregularities are discovered in line or grade shown by grade stakes.

C. Make detailed measurements as required to construct work to line and grade established by line and grade hubs.

D. Batter Boards:
1. Set grade points at 25-feet intervals at convenient offset from centerline of pipe or culvert.
2. Set batter boards as necessary to construct to design line and grade.
3. Provide at least three batter boards at all pipe laying areas during construction as check on accuracy of grades.
4. Check line and grade of each pipe length with grade rod and plumb bob.

E. Laser Beam:
1. Set laser equipment to proper line and grade from line and grade hubs.
2. Check line and grade of laser at 25-feet intervals for first 100 feet and then at 50-feet intervals for each setup.
3. Check line and grade of each pipe length.

F. Correct Misalignment: Correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe at Contractor's expense.

3.03 PIPE INSTALLATION

A. Provide trench excavation, pipe bedding, and backfill as specified in Section 31 23 33.

B. Provide proper facilities for lowering the sections into place without damaging the pipe.

C. Begin at lowest point in line. Lay groove or bell end point upstream unless specifically noted otherwise.

D. Prepare trench bottom to design line and grade so only minor movement of pipe is necessary after installation.

E. Inspect pipe for defects before carefully lowering into trench. Do not install damaged or defective pipe.

F. Clean pipe interior and joints prior to lowering into trench. Keep pipe clean during construction.

G. Do not lay pipe in water or on saturated soil or bedding. Do not allow water to rise in trench around pipe.

H. Place pipe with lifting holes at the top of the pipe and fill lift hole with non-shrink grout or manufactured plugs.

I. Lay pipe to design line and grade.

J. Provide uniform bearing for full pipe barrel length.
1. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.
2. Do not block pipe above bedding.

K. Assemble joints as specified.

L. Protect exposed upstream ends of pipe to prevent soil sediment from entering storm sewer system with the watertight stopper, cap, or plug.

M. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

N. Saw cut ends of pipe at manholes, intakes, and structures. Do not hammer cut or break pipe.

O. Provide manholes and intakes where indicated on plans and as specified.

3.04 PIPE JOINTING

A. Joint Cleaning: Clean joint surfaces with wire brush to remove soil or foreign material prior to jointing pipe.

B. Assemble Joints According to Pipe Manufacturer's Recommendations:
   1. Use equipment that does not apply damaging forces to pipe joints.
   2. Use bar and block or internal or external jointing devices or other methods recommended by pipe manufacturers.

C. RCP, RCAP, and RCEP:
   1. Use cold applied bituminous jointing materials unless otherwise specified.
      a. Apply joint material to entire tongue or to top half of tongue and bottom half of groove, in sufficient quantity to fill joint; close joint between pipes.
      b. Fill remaining voids in joint both inside and outside of pipe with joint material; smooth joint material on inside of pipe 24 inches and larger.
   2. If rubber O ring is specified, coat rubber ring gasket and joint with soap based lubricant immediately prior to closing joint.
   3. If wrapped pipe joint is specified,
      a. Secure engineering fabric in place to prevent displacement during backfill operations.
      b. For combination storm sewer/subdrain or Type II subdrain, do not use joint sealant.
   4. Joint openings on the outside or inside of the pipe that do not exceed 1/8 inch at the bottom and 5/8 inch at the top are acceptable.
   5. Fully encase large joint openings, unless required for camber, with a Type II concrete collar (see Figure 4020.1A). Use Class C structural concrete.

D. RCPP: Coat rubber ring gasket and joint with soap based lubricant immediately prior to closing joint.

E. CMP and CMAP:
   1. Install coupling bands that match ends of pipes.
   2. End of coupling bands must lap or be fabricated to form tightly closed joint upon installation.

F. PVC Pipe and Corrugated PVC Pipe: Coat rubber gasket and joint with soap based lubricant immediately prior to closing joint.

G. High Density Polyethylene (HDPE): Coat rubber gasket and joint with soap based lubricant immediately prior to closing joint.

H. High Density Polyethylene (HDPE): N-12 MONSTER GREEN PIPE:
   1. Fittings shall conform to ASTM F2648.
   2. Joints shall be N12 ST IB (Soil Tight)
      a. Join pipes with bell & spigot joint meeting ATSM F2648.
      b. Soil Tight gaskets shall meet the requirements of ASTM F477.
      c. Gaskets shall be installed by pipe manufacturer and covered with removable wrap to ensure gasket is free of debris.
      d. Joint lubricant available from manufacture shall be used on the gasket and bell during assembly

I. Connections between Dissimilar Pipes:
   1. Use manufactured adapters or couplings approved by Engineer.
   2. Where adapters or couplings are not available, Engineer may authorize use of concrete collar.

3.05 PIPE END SECTIONS

A. Provide reinforced concrete or metal pipe aprons where indicated on plans.

B. Install footings with aprons according to figure, if required.

C. Anchor last three pipe sections and aprons together with two pipe connections per joint.

D. Install apron guard where indicated on plans.

3.06 SUBDRAINS AND TRENCH DRAINS

A. Provide subdrain where indicated on plans.

B. Provide trench drains where indicated on plans.

C. If specified, install engineering fabric.

3.07 FOOTING DRAIN COLLECTOR

A. Install footing drain collector per Section 31 23 33.

B. If specified, install engineering fabric.

C. Provide cleanouts and connections.
   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, if specified.

3.08 STORM SEWER SERVICE STUBS

A. Provide storm sewer service connection and line from storm sewer or footing drain sewer for each platted lot or building as shown on plans.

B. Use fabricated or preformed saddle wye or saddle tee for service tap to storm sewers. Clamp with two stainless steel clamps and install according to the manufacturer′s recommendations.

C. Extend storm sewer service from storm sewer or footing drain collector to 10 feet outside of the right-of-way line or as shown on the plans.

D. Place watertight stopper or plug in end of storm sewer service.

3.09 TOLERANCES

A. Horizontal and vertical alignment of gravity sewer lines shall not vary from design line and grade at any point along the pipe by more than 1% of the inside diameter of the pipe or 1/4 inch, whichever is larger.

B. Tolerance allowed only if design line and grade is sufficient to prevent backslope when tolerance limits are reached.

C. Reverse slope on pipe is prohibited.

3.10 CONFLICTS

A. Provide temporary support for existing water, gas, telephone, power, and other utilities or services that cross trench.

B. Compact backfill under existing utility crossing as specified in 3123 33 or construct utility line supports where indicated on plans or as directed by Engineer.

3.11 STORM SEWER ABANDONMENT

A. When sewers are to be abandoned, standard sewer plugs shall be placed. Prior to placing the plug, ensure the line is not in use. If noted on the plans, fill the line with gravity flow or pump the line full of flowable mortar or controlled low strength material.

3.12 CLEANING

A. Clean all storm sewers by flushing with water and by removing sheeting, bracing, shoring, forms, soil sediment, concrete, or other debris as directed by Engineer prior to final acceptance.

B. Do not discharge soil sediment or debris to drainage channels or existing storm sewer or sanitary sewer systems.

PART 4 - TESTING

4.01 DESCRIPTION OF WORK

A. Test and inspect storm sewers, culverts, footing drain sewers and building storm sewers.

4.02 SCHEDULING

A. Notify Owner’s Representative when installation is complete and ready for testing.

B. Notify Owner’s Representative at least 24 hours prior to performing testing.

C. Owner’s Representative must be present to review testing procedures and to record results.

4.03 TESTING EQUIPMENT

A. Conform with applicable sections of ASTM.

B. Conform to other applicable industry standards and codes.

4.04 VISUAL INSPECTION

A. Check each section of storm sewer by lamping.

B. Light should be visible through section of pipe lamped.

C. Visually inspect each section of pipe.

D. Repair or replace defective pipe or joints or remove and relay pipe not meeting alignment tolerances as directed by Engineer.

4.05 DEFLECTION TESTING

A. Perform deflection tests on all HDPE storm sewer pipe 12" diameter or greater.

B. Perform deflection tests after backfill has been in place at least 30 days and before paving activity takes place or as per appropriate sections of these specifications.

C. Pipe deflection shall not exceed 5% of average inside diameter as established by ASTM Standards.

D. Pull approved 9-arm deflection mandrel through sewer by hand.

E. Approved mandrel must conform to applicable ASTM Standards.

F. Remove and replace pipe exceeding deflection limits.

G. Handle and divert existing flows during deflection testing.

END OF SECTION

SECTION 33 49 00

STORM DRAINAGE STRUCTURES

SUBPARTS:

A. MANHOLES
B. INTAKES
C. CAST-IN-PLACE
D. NYPLOPLAST INTAKE SUBSTITUTES

A. MANHOLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manholes for storm sewers.

B. Adjustment of existing manholes.

C. Connection to existing manholes.

D. Abandonment of manholes.

1.02 DESCRIPTION OF WORK

A. Construct storm sewer manholes, modify existing manholes, and abandon manholes where shown in the Plans.

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop drawings showing compliance with this Specification.

C. Shop drawing schedule of new manholes showing total depth, relative elevations of all connecting sanitary or storm sewer lines, all drops, and orientation of connecting lines.

D. Catalog cuts of iron castings and sewer line connection gaskets.

E. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

C. Precast sections meeting the requirements of ASTM C 478.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications or for which submittals have been provided to Engineer and approved for use.

B. Store and handle materials to avoid damage. Replace any damaged materials. Remove damaged materials from the site.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:
   1. Attend a preconstruction meeting if required by Engineer.
   2. Submit plan for construction sequence and schedule prior to commencing construction.

B. Conflict Avoidance:
1. Expose possible conflicts in advance of construction, such as utility lines and drainage structures. Verify elevations and locations of each and verify clearance for proposed construction.
2. Complete elements of the work which can affect line and grade in advance of other open cut construction unless noted on plans.
3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown or changed conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state, and Federal requirements.

C. Storm Sewer Manholes:
1. Manhole Types:

Type	Description	Main Pipe Size	Typical Depth	Figure No.
SW-401	48" Min. Dia. Short Cone or Flat Top with Poured or Precast Base	See Table 1 for Max. Dia. Pipe	7' Min.	6010.401
SW-402	Precast or Poured-in-Place Box with Precast or Poured-in-Place Base	24" or Greater	8' Max.	6010.402
SW-403	Poured-in-Place Box with Poured-in-Place Base	12" Dia. or Greater	6' - 12'	6010.403
SW-404	Combination 48" Dia. Short Cone with Poured-in-Place Barrel and Poured-in-Place Base	12" Dia. or Greater	12' - 22'	6010.404
SW-405	48" Dia. Short Cone with T-Section	42" Dia. or Greater eccentric reducer required for 42"	8.5' Min.	6010.405

2. Ring and Cover Types:

Type	Ring & Cover	No. of Pieces	Bolted Frame	Bolt Cover	Gasketed	Figure No.
E*	Standard	2	Yes	No	No	
F**	Adjustable	3	No	No	No	
G*	Machined Bearing Surfaces	2	No	No	No	

* Use when placed in earth fill, asphalt pavement, or ACC manhole boxout.
** Use when placed in PCC pavement or PCC manhole boxout.

1.08 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

B. Manhole: For each type and size of manhole required and furnished, measure manhole vertical dimension in feet from the flow line to the top of the ring casting. Payment shall be at the unit bid price for each type and size of manhole properly installed. The unit bid price for manholes shall include all bedding, backfill, compaction and all appurtenances including castings and lids necessary for the proper installation.

PART 2 PRODUCTS

2.01 MANHOLES

A. Placement: Conform to elevations, locations and connection orientations shown on the Plans and detailed drawings.

B. Barrel Diameter, Inside: For sewers up to 24-inch size with two connections use 48 inches diameter barrel or as shown in the contract documents. For larger sewers or more connections, see Plans and detailed drawings.

C. Wall Thickness: See Detailed plans and Iowa SUDAS plans.

D. Top Configuration: Eccentric top except as noted on the Plans or detailed drawings. Total manhole depth 6 feet or more use cone top section. Total manhole depth less than 6 feet use minimum 9" thick flat top.

F. Joints, Barrel: Male and female ends with Mastic seal

G. Concrete: Precast: Comply with ASTM C 478. Cast in place: Refer to Cast-In-Place Storm Sewer Structure Section.

H. Base: Precast manhole: Separate base from riser section; use with precast base or poured base. Cast in place manhole: Use with precast base or poured base.

I. Pipe Connection:
   1. New Storm Sewer Manhole:
      a. Precast manholes: factory fabricated openings.
      b. Poured in place structures: structure wall poured around pipe stub.
   2. Existing Storm Sewer Manhole:
      a. Cored or drilled opening: Provide a flexible, watertight connection that meets and/or exceeds ASTM C 923.
      b. Knock out opening:
         1) Provide a watertight connection (waterstop or other method), meeting the material requirements of ASTM C 923, that is securely attached to the pipe with stainless steel bands or other means.
         2) Grout opening in manhole wall with non-shrink grout.
         3) Pour concrete collar around pipe and outside manhole opening.
         4) Provide flexible pipe joint or flexible connector within 2' of collar.

J. Manhole Steps: None, unless required on the Plans. If required, space steps at 12 to 16 inches, comply with ASTM C 478. Align with vertical side of eccentric cone top section.

2.02 MANHOLE ADJUSTMENT RINGS (Grade rings)

A. All grade adjustments of manhole frame and cover assemblies shall be completed utilizing one of the following:
   1. Reinforced Concrete Grade Adjustment Rings: Comply with ASTM C 478 and be free from cracks, voids and other defects. Concrete rings will be set with asphalt mastic.
   2. High Density Polyethylene Grade Adjustment Rings: Comply with ASTM D 1248 for recycled plastic.
      a. Material properties shall be tested and certified for usage by the following ASTM methods:

Property	Test Method	Acceptable Value
Melt Flow Index	ASTM D 1238	0.3 to 30 g / 10 min.
Density	ASTM D 792	0.94 to 0.98 g / cm^3
Tensile Strength	ASTM D 638	2.00 to 5 x 10^3 lb / in^2

      b. Polyethylene adjusting rings shall not be used when they are exposed to heated hot mix asphalt pavement.
      c. Tapered configuration: When used in a single configuration tapered adjusting ring thickness will range from 0.5 inch to 3.0 inch.
      d. Grade adjustment rings are to be installed on clean flat surfaces according to the manufacturer's recommendations with the proper Butyl Rubber sealant/adhesives.

B. The inside diameter of the adjustment ring shall not be less than the inside diameter of the manhole frame.

C. Manholes shall be constructed with at least two adjustment rings.

D. Maximum height of adjustment ring stack: 12 inches max. for new manholes and 16 inches max. on existing manholes.

2.03 CASTINGS (Ring and Cover)

A. Gray Cast Iron: ASTM A 48, Class 35.

B. Storm Sewer Manhole Ring and Covers:
   1. Grassed areas: Type E.
   2. Paved areas, sidewalks, areas subject to vehicular traffic and sloped surfaces: Type F.
   3. For installation directly into concrete pipe riser manhole, Type G.
   4. Bolt all castings set above grade.
   5. Storm sewer manhole lids shall not be bolted.

2.04 CEMENT MORTAR - Refer to Cast-In-Place Storm Sewer Structure Section.

2.05 REINFORCING STEEL - Refer to Cast-In-Place Storm Sewer Structure Section.

2.06 INVERT:

A. Poured in place concrete. Shape to provide a smooth transition between pipe inverts. Bring manhole invert up to one half of pipe diameter to produce a half pipe shape. Slope invert bench toward pipe 1/4 inch per foot perpendicular to flow line.

PART 3 - EXECUTION

3.01 MANHOLE INSTALLATION

A. Subgrade Preparation:
   1. Undisturbed soil: Hand grade to accurate elevation.
   2. Disturbed soil: Machine compact to 95 percent of Standard Proctor Density and hand grade to accurate elevation or install stabilization material as directed by Engineer.

B. Installation of Poured In Place Base: Bed base riser section in Class C concrete. Assure proper vertical and horizontal alignment of base riser section.

C. Installation of Precast Base with Base Riser: Assure proper vertical and horizontal alignment of base riser section.

D. Additional Risers: Install additional riser sections as required. Grout inside face of joints.

E. Repair: Repair any honeycomb areas or damaged areas as directed by Engineer.

F. Backfill up to pipe grades. Connect and bed pipes using bedding material up to one foot above top of pipes.

G. Install manhole invert. Remove any projections and repair any voids to assure a hydraulically smooth channel between pipe ends.

H. Install manhole top slab or cone.

I. Install manhole adjustment rings. Bed each ring with cold-applied bituminous jointing compound. Do not install more than total ring stack height of 12 inches. For greater adjustment, modify barrel riser section(s).

J. Install manhole ring and cover. Adjust accurately to proper grade. Where manhole is to be in a paved area, adjust slope to match finished surface.

K. Backfill and compact. Refer to Section 31 23 33. Use extra care to assure proper and uniform compaction of backfill around structure.

3.02 MANHOLE TESTING - Refer to Section 33 40 00.

B. INTAKES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Intakes for storm sewers.

B. Special structures for storm sewers.

1.02 DESCRIPTION OF WORK

A. Construct intakes and special structures for storm sewers.

B. Modify existing intakes

C. Abandon intakes.

D. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop drawings showing compliance with this Specification.

C. Schedule of new intakes showing total depth, and relative elevations and orientations of all connecting storm sewer lines.

D. Catalog cuts of iron castings.

E. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications or for which submittals have been provided to Engineer and approved for use.

B. Store and handle materials to avoid damage. Replace any damaged materials. Remove damaged materials from the site.

1.06 SCHEDULING AND CONFLICTS

A. Construction Sequence:
   1. Attend a preconstruction meeting if required by Engineer.
   2. Submit plan for construction sequence and schedule prior to commencing construction.

B. Conflict Avoidance:
   1. Expose possible conflicts in advance of construction, such as utility lines and drainage structures. Verify elevations and locations of each and verify clearance for proposed construction.
   2. Complete elements of the work which can affect line and grade in advance of other open cut construction unless noted on plans.
   3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown or changed conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state, and Federal requirements.

1.08 MEASUREMENT FOR PAYMENT

A. All measurements for payments will be made by the Engineer or authorized representative.

B. Intake: Measure the number of all properly completed intakes. Payment shall be at the unit bid price for each size and type, and shall include all bedding, backfill, compaction, grates and appurtenances for proper

installation.

C. Intake Adjustment: Count each item as a completed individual unit, as identified in the Bid Schedule. Payment shall be at the unit bid price for each adjustment as per plan.

D. Special Structure: Count each item as a completed individual unit, as identified in the Bid Schedule.

PART 2 - PRODUCTS

2.01 INTAKES

A. Conform to elevations, locations and connection orientations shown on the Plans.

B. Intake type; Refer to Plans.

C. Configuration and Dimensions; Refer to Detailed Drawings.

D. Top Configuration:
1. As noted on Detailed Drawings.
2. Number of grate sections; Refer to Plans.

E. Joints, Wall:
1. Precast; Male and female ends, mastic seal.
2. Poured in place; construction joints.

F. Concrete:
1. Precast: Precast concrete intakes constructed in accordance with the requirements of following Cast In Place Section, and with the dimensions and reinforcement shown in standard detailed drawings.
2. Cast in place;
   a. Refer to following Cast-In-Place Section.
   b. Minimum concrete reinforcing cover 2 inches.
   c. Minimum total section thickness; see Standard Detailed Drawings.

G. Base:
1. Separate. Use with base riser section with square bottom edge.
2. Precast may have surface finish block outs on one side only.

H. Pipe Connection:
1. Precast intake; factory fabricated openings.
2. Poured in place structures; structure wall poured around pipe stub.

I. Manhole Steps: None, unless required on the Plans. If required, space steps at 12 to 16 inches, comply with ASTM C 478.

2.02 INTAKE ADJUSTMENT RINGS (Grade rings)

A. All grade adjustments of intake frame and cover assemblies shall be completed utilizing one of the following:
1. Reinforced Concrete Grade Adjustment Rings: Comply with ASTM C 478 and be free from cracks, voids and other defects. Concrete rings will be set with asphalt mastic.
2. High Density Polyethylene Grade Adjustment Rings: Comply with ASTM D 1248 for recycled plastic.
   a. Material properties shall be tested and certified for usage by the following ASTM methods:

Property	Test Method	Acceptable Value
Melt Flow Index	ASTM D 1238	0.3 to 30 g/10 min.
Density	ASTM D 792	0.94 to 0.98 g/cm^3
Tensile Strength	ASTM D 638	2.00 to 5 x 10^3 lb/in^2

   b. Polyethylene adjusting rings shall not be used when they are exposed to heated hot mix

asphalt pavement.

c. Tapered configuration: When used in a single configuration tapered adjusting ring thickness will range from 0.5 inch to 3.0 inch.

d. Grade adjustment rings are to be installed on clean flat surfaces according to the manufacturer's recommendations with the proper Butyl Rubber sealant/adhesives.

B. The inside dimension of the adjustment ring shall not be less than the inside dimension of the intake grate opening.

C. Intakes shall be constructed with at least two adjustment rings.

D. Maximum height of adjustment ring stack: 12 inches for new and existing intakes.

2.03 CASTINGS (Covers and Grates)

A. Gray Cast Iron: ASTM A 48, Class 35.

B. Type: Refer to Detailed Drawings and Plans.

2.04 CEMENT MORTAR - Refer to following Cast In Place Section.

2.05 REINFORCING STEEL - Refer to following Cast In Place Section.

2.06 INVERT

A. Poured in place concrete. Establish a full seal between base and base riser section.

B. Shape to provide a smooth transition between pipe inverts.

C. Bring intake invert up to one half of pipe diameter to produce a half pipe shape.

PART 3 EXECUTION

3.01 INTAKE INSTALLATION

A. Subgrade Preparation:
1. Undisturbed soil: Hand grade to accurate elevation.
2. Disturbed soil: Machine compact to 95 percent of Standard Proctor Density and hand grade to accurate elevation, or install Stabilization Material as directed by Engineer.
3. Unstable soil: Install Stabilization Material as directed by Engineer.

B. Concrete Intakes:
1. Install Stabilization Material if unstable base exists.
2. Install Granular Bedding Material if required by Detailed Drawings.
3. Install base; assure proper vertical and horizontal alignment of base riser section.
4. Install additional riser section as required. Seal all joints.
5. Repair any honeycomb areas or damaged areas.
6. Compact backfill up to connecting pipes.
7. Connect and bed pipes per Section 3010. Grout inside pipe/riser joint.
8. Install intake invert. Remove any projections and repair any voids to assure a hydraulically smooth channel through intake.
9. Install top.
10. Install adjustment rings. Install at least two rings. Bed each ring with cold-applied bituminous jointing compound. Do not install more than total ring stack height of 12 inches. For greater adjustment, modify riser section(s).
11. Install top casting. Adjust accurately to proper line and grade.
12. Backfill and compact. Refer to Section 3010. Use extra care to assure proper and uniform compaction of backfill around structure.

C. Anchoring Castings: All castings not encased in concrete shall be bolted down.

3.02 CONCRETE, REINFORCEMENT, AND PLACEMENT. Refer to Cast In Place Section.

3.03 SPECIAL STRUCTURES

A. Construct in accordance with this Section, as applicable.

B. Refer to Plans for locations, dimensions and special details and provisions.

3.04 ABANDONED INTAKES

A. Remove entire structure to a minimum of 10 feet below subgrade in paved areas or 6 feet below finish grade in other areas.

B. Plug all pipes in structure.

C. Fill remaining structure using flowable mortar.

D. Place compacted earth fill over structure as required for embankment or compacted backfill.

C. CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Structural Portland cement concrete and reinforcing for manholes and intakes for sanitary and storm sewer systems, and other structures such as concrete thrust blocks and sewage air release pits as designated by the Engineer.

1.02 DESCRIPTION OF WORK

A. Construct Portland cement concrete structures for sanitary and storm sewers.

B. Reference is made to the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2001, and all current General Supplemental Specifications and Materials Instructional Memorandum by the term "Iowa DOT Specifications" and/or "Iowa DOT I.M."

1.03 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop drawings of steel reinforcement, showing sizes, lengths, bends, and counts, if required.

C. Concrete mix design, if required by Engineer.

D. Sample test results and certifications.

E. Certification that materials being provided meet the requirements of these specifications or that alternate materials or substitutions have received written approval of the Engineer.

F. Project Record Documents.

G. Upon requests the Contractor will provide Material Certifications to the Engineer.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications and for which submittals have been provided to Engineer and approved for use.

B. Store and handle materials to avoid damage. Store reinforcing steel only on pallets or lagging. Replace any damaged materials. Remove damaged materials from the site.

C. Aggregate storage and concrete transport shall follow Section 7010, 1.05.

1.06 SCHEDULING

A. Construction Sequence:
1. Schedule concrete placement to coordinate with other work, such that trenching, backfilling and other work can proceed in an orderly manner and to provide the greatest protection for new work.

B. Conflict Avoidance:
1. Expose potential conflicts such as utility lines and drainage structures in advance of construction. Verify elevations and locations and verify clearance for proposed construction.
2. Complete elements of work which can affect line and grade in advance of pipe construction unless noted on plans.
3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state, and federal requirements.

C. Restrictions: Restriction on operations shall follow Section 7010, 1.07.

1.08 MEASUREMENT FOR PAYMENT

A. The cost for concrete and reinforcing in the construction of manholes and intakes for storm sewer systems, or other special structures, will not be measured separately but will be considered incidental to intakes and manholes or other concrete structures as described in this specification document, including sampling and testing.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement:
1. ASTM C 150, Type I or Type III when specified.
2. Air entrained per ASTM C 260.
3. Iowa DOT Class C concrete unless otherwise specified in the contract documents.

B. Aggregates:
1. Per ASTM C 33.
2. Coarse and fine aggregate shall follow Section 7010, 2.02.

C. Water: Follow Section 7010 2.02 E

D. Liquid Admixtures for Portland Cement Concrete:
1. Description
   a. Meet requirements of AASHTO M 154 for air entraining mixtures.
   b. Meet requirements of AASHTO M 194 for other liquid admixtures.
   c. Submit tests by a recognized laboratory for Engineer approval.
   d. Admixtures containing more than 1% chloride ions shall not be allowed unless approved by Engineer.
   e. Inspection and acceptance of liquid admixtures will be in accordance with Iowa DOT Materials I.M. 403
2. Air Entraining Admixtures: Provisions shall be made to stir, agitate, or circulate air entraining admixtures prior to use to insure a uniform and homogeneous mixture.
3. Retarding and Water Reducing Admixtures
   a. Shall be compatible with air entraining agent.
   b. Shall be introduced into the mixer after all other ingredients

c. Agitate prior to and during use in accordance with Iowa DOT Materials I.M. 403
d. Dosage rate shall be applied to both cement and fly ash when used.

4. Other Admixtures: Other admixtures may be used with the approval of the Engineer in accordance with the manufacturer's recommendations.

2.02 CONCRETE QUALITY

A. Compressive Strength: Minimum 4,000 psi at 28 days.

B. Water-Cement Ratio: Follow Section 7010, 2.03.

C. Air Content: The intended air entrainment is 6.0%. To allow for loss during placement, the air content of fresh, unvibrated structural concrete shall be 6.5%, as a target value, with a maximum variation of plus or minus 1.0%.

D. Slump: Structural concrete shall be placed with a slump between 1 inch and 3 inches as a target range, allowing a maximum of 4 inches unless specifically modified by the Engineer.

E. Admixtures: Per manufacturer's recommendations.

2.03 REINFORCEMENT

A. Reinforcing Steel:
1. Use deformed bars.
2. Epoxy coated deformed bars apply only when specified.
3. Billet steel; ASTM A 615, Grade 60.
4. Fabricate and bend, per approved submittals or Plans.
5. Fabricate all bars prior to delivery to site unless field bends are required.

B. Wire Fabric:
1. Per ASTM A 185.
2. Size and mesh; as shown on Detailed Drawings or on Plans.
3. Placement; as shown on Detailed Drawings or on Plans.
4. Joints; lap not less than 6 inches.

2.04 CEMENT MORTAR: Mix in the following portions:

A. Portland Cement: Type I; 10 Parts

B. Mortar Sand: 20 Parts

C. Lime, Hydrated: 3/4 to 1 Part

PART 3 EXECUTION

3.01 FORMING

A. All cast in place manholes and structures shall be formed on both the inside and the outside face above the base. No earth excavation next to the proposed manhole shall be used as forming.

B. Use metal or plywood-lined forms for exposed surfaces.

C. Erect and secure forms to true line and grade.

D. Coat forms with non-staining mineral oil before placing reinforcing. Do not apply oil to surfaces to which concrete must be bonded.

E. Use 3/4 inch bevel for exposed corners, unless otherwise required.

3.02 REINFORCING STEEL

A. Remove dirt, scale and other materials that might impair concrete bond.

B. Place reinforcement where shown. Space bars properly and secure in position.

C. Reinforcement for slabs; support with chairs or bolsters. Do not use wood, bricks, stones or other foreign materials.

D. Lap bars 36 diameters, except as otherwise shown.

3.03 MIXING: (IOWA DOT 2403)

A. Provide accurate control for measuring materials.

B. Concrete, as discharged from the mixer, shall be uniform in composition and consistency. Each batch of concrete shall be thoroughly discharged from the mixer before the next batch is introduced. Upon cessation of mixing for any considerable length of tie, the mixer shall be thoroughly cleaned and flushed with water.

C. Ready-Mixed Concrete: conform to ASTM C 94.

3.04 PLACING

A. Clean and dampen forms, reinforcing steel and embedded items.

B. Prevent segregation during placement. Do not allow concrete to fall more than 4 feet from placement chute to final position.

C. Place concrete continuously in each section until complete. Do not allow more than 30 minutes between depositing adjacent layers of concrete within each section.

D. Thoroughly compact, puddle and vibrate concrete into corners and around reinforcing and embedded items. Vibrate sufficiently to work concrete into crevices and around steel. Refer to Iowa DOT 2403.09.

E. Place sections of concrete in a sequence which eliminates the effect of shrinkage to the greatest extent practicable.

F. Concrete shall not be placed when the air temperature is less than 40 degrees Fahrenheit without the approval of the Engineer. Refer to Iowa DOT 2403.11.

3.05 FINISHING

A. Refer to Iowa DOT 2403.21.

B. Use rough form finish to areas not visible to the public.

C. Use smooth form finish for areas visible to the public.

D. Use broomed finish for slabs, except as noted on Plans or Detailed Drawings.

3.06 STRIPPING AND CLEANING

A. Remove forms for manhole and intake walls and tops according to Iowa DOT 2403.18.
   1. References to culverts shall include all sanitary and storm structures.
   2. When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used in determining concrete strength of structure roofs.

B. Chip out and repair any honeycomb areas per direction of Engineer.

C. Break back form ties and fill holes with portland cement mortar.

D. Remove flashing and thin webs.

3.07 CURING

A. Refer to Iowa DOT 2403.10.

B. Apply curing system immediately after finishing or stripping of forms, as applicable.

C. Slabs on grade, visible to the public; use only curing compounds meeting ASTM C 309, Type 1-D or Type 2.

3.08 EXTERIOR LOADING

A. Restrict loads on concrete, other than the load caused by the weight of the concrete itself, according to Iowa DOT Section 2403.19.

B. When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used.

3.09 TESTING

A. Provide required testing by a testing service approved by Engineer, unless such services are provided by Jurisdiction.

B. Review and test proposed mix design when required by Engineer.

C. Obtain production samples of job-delivered concrete mix after any needed water has been added and the concrete remixed.

D. Mold and cure three specimens per ASTM C 31.

E. Strength Testing: Unless otherwise specified in the contract documents strength testing will be the responsibility of the Contractor by a certified testing service.
   1. Test specimens in accordance with ASTM C 39. Test one sample at 7 days for information. Test two samples at 28 days. The acceptance test results shall be the average of the compressive strength of the two specimens tested at 28 days. If one of the 28 day samples manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining sample shall be considered the test result.
   2. Make at least one strength test for each 100 cubic yards or fraction thereof, and at least one test for each structure. When the total quantity is less than 50 cubic yards the strength tests may be waived by the Engineer.

F. Slump Testing: Unless otherwise specified in the contract documents testing will be by the Engineer. Determine slump of concrete sample for each strength test and whenever consistency of concrete mix appears to vary, using ASTM C 143.

G. Air Testing: Unless otherwise specified in the contract documents testing will be by the Engineer. Determine air content of concrete sample for each strength test in accordance with either ASTM C 231, ASTM C 173, or ASTM C 138.

D. NYLOPLAST INTAKES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nyloplast Intake substitutes for certain types of concrete Intakes and vice versa.

1.02 DESCRIPTION OF WORK

A. Nyloplast Structures are allowed to be substituted for Iowa SUDAS SW-501 and SW-512 Intakes. Nyloplast intake substitutions for SW-512 area intakes must be the same size vertical barrel and grate that is called out on plans.

B. No other concrete structures are allowed to have substitutions including other types of intakes and all manholes.

C. Nyloplast Basins can be substituted with SUDAS Pre-Cast Manholes/ Intakes. SW-512 intakes are NOT an approved substitution for Nyloplast structures.

1.03 SUBMITTALS

A. Shop drawings of Nyloplast structure prior to fabrication.

B. Certification that materials being provided meet the requirements of these specifications or that alternate materials or substitutions have received written approval of the Engineer.

C. Project Record Documents.

1.04 SUBSTITUTIONS

A. Use only materials conforming to these specifications unless permitted otherwise by Engineer.

B. Obtain written approval of Engineer for all substitutions prior to use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver only materials that fully conform to these specifications and for which submittals have been provided to Engineer and approved for use.

B. Store and handle materials to avoid damage. Replace any damaged materials. Remove damaged materials from the site.

C. Aggregate storage shall follow Section 7010, 1.05.

1.06 SCHEDULING

A. Construction Sequence:
   1. Schedule intake placement to coordinate with other work, such that trenching, backfilling and other work can proceed in an orderly manner and to provide the greatest protection for new work.

B. Conflict Avoidance:
   1. Expose potential conflicts such as utility lines and drainage structures in advance of construction. Verify elevations and locations and verify clearance for proposed construction.
   2. Complete elements of work which can affect line and grade in advance of pipe construction unless noted on plans.
   3. Notify Engineer of conflicts discovered or changes needed to accommodate unknown conditions.

1.07 SPECIAL REQUIREMENTS

A. Stop Work: Stop work and notify Engineer immediately if contaminated soils, historical artifacts or other environmental or historic items are encountered.

B. Conform to local, state, and federal requirements.

C. Restrictions: Restriction on operations shall follow Section 7010, 1.07.

1.08 MEASUREMENT FOR PAYMENT

A. The cost for granular backfill and intake castings for storm sewer systems, or other special structures, will not be measured separately but will be considered incidental to intakes and manholes.

PART 2 PRODUCTS

2.01 MATERIALS

A. Intake:
   1. PVC Stock Pipe, utilizing a thermo-molding process to reform the pipe stock to the specified configuration.

2. Drainage pipe connection stubs stall be PVC pipe stock and formed to provide watertight connection with the specified pipe system sizes and angles.
3. The raw material used to manufacture the pipe stock that is used to manufacture the main body and pipe stubs shall conform to ASTM D1784 cell class 12454.

B. Joints:
1. Joint tightness shall conform to ASTM D3212 for drain and sewer plastic pip using flexible elastomeric seals.
2. Flexible elastomeric seals shall conform to ASTM F477.
3. The pipe bell spigot sall be joined to the main body of the drain basin or catch basin.

C. SW-512 and A2000 Area Intake Grates for Nyloplast structures:
1. Grates and frames furnished for all Nyloplast intake structures shall be ductile iron and the same size as the intake stack.
2. Intake grates shall be capable of handling H-20 loads for all structures placed into paving. All other structures shall comply with H-10 loading.
3. Metal used in manufacture of the castings shall conform to ASTM A536 grade 70-50-05 ductile iron.
4. Grates shall be natural and contain no paint.

D. SW-501 Intake Grates for Nyloplast structures:
1. The grate, frame and hood assembly shall be ductile iron.
2. The grate, frame and hood shall all be capable of supporting H-20 loading.
3. The hood section will have a solid back and be adjustable by use of three (3) hex head bolts.
4. Metal used in manufacture of the castings shall conform to ASTM A536 grade 70-50-05 ductile iron.
5. Grates shall be natural and contain no paint.

PART 3 EXECUTION

3.01 INSTALLATION

A. All intakes shall be staked by a licensed land surveyor.

B. Intakes shall be placed in accordance with stakes provided by surveyor. In the event of a discrepancy between stakes and plans, contractor shall contact engineer and/ or land surveyor prior to intake placement.

C. Granular backfill for base and intakes shall comply with manufacture recommendations. All backfill material shall conform with IOWA SUDAS backfill specifications for concrete intakes. Sand in NOT a permitted backfill material and backfill shall be Class 2 material defined in ASTM D2321.

D. Intakes shall be designed and placed approximately 12” over height. Upon completion of final grading, Intakes shall be cut to the grade as specified on the approved construction plans. If intake stack is either manufactured too short or cut too short in the field, intake shall be completely replaced at contractor/ manufacture’s expense.

E. All intakes installed in paved areas (H-20 loaded structures), a concrete ring shall be poured under and around the grate and frame. The concrete slab must be designed for local soil conditions, traffic loading, among any other applicable design factors.

F. For any other installation considerations such as migration of fines, ground water and soft foundations, refer to ASTM D2321 guidelines.

END OF SECTION