

PROJECT MANUAL

FOR



Hyde Park Middle School

Bid Package #1

design west | architects

255 South 300 West

Logan, Utah 84321

435.752.7031

Architects Project # 123005

March 14, 2024

Cache County School District

**SECTION 00 0101
PROJECT TITLE PAGE**

PROJECT MANUAL

FOR

**CCSD HYDE PARK MIDDLE SCHOOL
ARCHITECT'S PROJECT NUMBER: 123005**

CACHE COUNTY SCHOOL DISTRICT

**250 W 200 S
HYDE PARK, UTAH84318**

DATE: MAY 2, 2024

PREPARED BY:

DESIGN WEST ARCHITECTS

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**SECTION 00 0102
PROJECT INFORMATION**

PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

- A. Project Name: CCSD Hyde Park Middle School, located at:
250 W 200 S
Hyde Park, Utah 84318.
- B. The Owner, hereinafter referred to as Owner: Cache County School District
- C. Owner's Project Manager: Bruce Parker.
 - 1. Department: Cache County School District.
 - 2. Address: 84 East 2400 North.
 - 3. City, State, Zip: North Logan, UT 84341.
 - 4. Phone/Fax: (435) 752-3925.
 - 5. E-mail: bruce.parker@ccsdut.org.

1.02 NOTICE TO PROSPECTIVE BIDDERS

- A. These documents constitute an Invitation to Bid to and request for qualifications from Sub-Contractors for the construction of the project described below.

1.03 PROJECT DESCRIPTION

- A. Summary Project Description: A new middle school building will be built on a undeveloped lot..
- B. Contract Scope: New Construction on Vacant Site and Site Development.
- C. Contract Terms: Cost plus a fee, with a guaranteed maximum price (GMP).

1.04 PROJECT CONSULTANTS

- A. The Architect, hereinafter referred to as Architect:
 - 1. Address: 255 South 300 West.
 - 2. City, State, Zip: Logan, Utah 84321
 - 3. Phone: (435) 752-7031.

1.05 PROCUREMENT TIMETABLE

- A. Pre-Bid Site Tour: see 00 0104 Notice to Contractors None - N/A.
- B. Last Request for Substitution Due: 3 days prior to due date of bids.
- C. Last Request for Information Due: 3 days prior to due date of bids.
- D. Bid Opening: see 00 0104 Notice to Bidders, None - N/A.
- E. The Owner reserves the right to change the schedule or terminate the entire procurement process at any time.

1.06 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
- B. Documents are available thru DWA Construction.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 00 0102

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**SECTION 00 0103
PROJECT DIRECTORY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Identification of project team members and their contact information.

1.02 OWNER:

- A. Name: Cache County School District
 - 1. Address Line 1: 84 East 2400 North.
 - 2. City: North Logan.
 - 3. State: Utah.
 - 4. Zip Code: 84341.
 - 5. Telephone: (435) 752-3925.
- B. Primary Contact: All correspondence from the CMGC Contractor to the Architect will be direct, with copies to this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
 - 1. Title: Facilities Manager.
 - 2. Name: Bruce Parker.
 - 3. Email: bruce.parker@ccsdut.org.

1.03 CONSULTANTS:

- A. Architect: Design Professional of Record. All correspondence from the CMGC Contractor regarding construction documents authored by Architect's consultants will be through this party, unless alternate arrangements are mutually agreed upon at preconstruction meeting.
 - 1. Company Name: Design West Architects.
 - a. Address Line 1: 255 South 300 West.
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: .
 - e. Telephone: (435) 752-7031.
 - 2. Primary Contact:
 - a. Title: Architect.
 - b. Name: Stephen Williams.
 - c. Email: stephenw@designwestarchitects.com.
- B. Interior Design Consultant:
 - 1. Company Name: Design West Architects.
 - a. Address: 255 South 300 West.
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: 84321.
 - e. Telephone: (435) 752-7031.
 - 2. Primary Contact:
 - a. Title: Interior Designer.
 - b. Name: Tyson Bekker.
 - c. Email: tysonb@designwestarchitects.com.
- C. Civil Engineering Consultant:
 - 1. Company Name: Cache Landmark.
 - a. Address: 95 Golf Course Rd #101
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: 84321.
 - e. Telephone: (435) 713-0099.
 - 2. Primary Contact:

- a. Title: Civil Engineer.
 - b. Name: Lance Anderson.
 - c. Email: lance@cachelandmark.com.
- D. Landscape Architecture Consultant:
- 1. Company Name: Design West Architects.
 - a. Address: 255 South 300 West.
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: 84321.
 - e. Telephone: (435) 752-7031.
 - 2. Primary Contact:
 - a. Title: Landscape Architect.
 - b. Name: Keni Althouse.
 - c. Email: kenia@designwestarchitects.com.
- E. Structural Engineering Consultant:
- 1. Company Name: ARW Engineers - Structural Consultants.
 - a. Address: 1594 Park Circle.
 - b. City: Ogden.
 - c. State: Utah.
 - d. Zip Code: 84404.
 - e. Telephone: (801) 782-6008.
 - 2. Primary Contact:
 - a. Title: Structural Engineer.
 - b. Name: Joshua Blazzard.
 - c. Email: joshb@arwengineers.com.
- F. Mechanical Engineering Consultant - Plumbing:
- 1. Company Name: VBFA.
 - a. Address: 40 W Cache Valley Blvd..
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: 84341.
 - e. Telephone: (801) 478-1087.
 - 2. Primary Contact:
 - a. Title: Mechanical Engineer.
 - b. Name: Jed Jenkins.
 - c. Email: jjenkins@vbfa.com.
- G. Mechanical Engineering Consultant - HVAC:
- 1. Company Name: VBFA.
 - a. Address: 40 W Cache Valley Blvd.
 - b. City: Logan.
 - c. State: Utah.
 - d. Zip Code: 84341.
 - e. Telephone: (801) 478-1087.
 - 2. Primary Contact:
 - a. Title: Mechanical Engineer.
 - b. Name: Jed Jenkins.
 - c. Email: jjenkins@vbfa.com.
- H. Electrical Engineering Consultant:
- 1. Company Name: Envision Engineering.
 - a. Address: 240 East Morris Ave #200.
 - b. City: Salt Lake City.
 - c. State: Utah.

- d. Zip Code: 84115.
- e. Telephone: (801) 534-1130.
- 2. Primary Contact:
 - a. Title: Electrical Engineer.
 - b. Name: Phil Borup.
 - c. Email: pborup@envisioneng.com.
- I. Kitchen Consultant:
 - 1. Company Name: W.S. Reich & Associates.
 - a. Address: 2846 South 4450 West.
 - b. City: Bountiful.
 - c. State: Utah.
 - d. Zip Code: 84010.
 - e. Telephone: (801) 295-4109.
 - 2. Primary Contact:
 - a. Name: Ed Reich.

1.04 CONSTRUCTION MANAGER/GENERAL CONTRACTOR:

- A. Company Name: DWA Construction.
 - 1. Address: 76 W 2400 N.
 - 2. City: Logan.
 - 3. State: Utah.
 - 4. Zip Code: 84341.
 - 5. Telephone: (801) 752-6860.
- B. Primary Contact:
 - 1. Title: Construction Manager.
 - 2. Name: Wayne Anderson.
 - 3. Email: wayne.a@dwaconstruct.com.
 - 4. Project Superintendent
 - 5. Name:
 - 6. Email:

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 0103

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**SECTION 00 0110
TABLE OF CONTENTS - BID PACKAGE #1**

PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

- A. 00 0101 - Project Title Page
- B. 00 0102 - Project Information
- C. 00 0103 - Project Directory
- D. 00 0110 - Table of Contents
- E. 00 0120 - List of Schedules
- F. 00 1113 - Advertisement for Bids
- G. 00 3100 - Available Project Information
- H. 00 3113.16 - Preliminary Construction Schedule
- I. 00 5000 - Contracting Forms and Supplements
- J. 00 6000 - Project Forms
- K. 00 7200 - General Conditions
- L. 00 7300 - Supplementary Conditions
- M. 00 7400 - Supplementary General Conditions

SPECIFICATIONS

2.01 DIVISION 01 -- GENERAL REQUIREMENTS

- A. 01 1000 - Summary
- B. 01 2000 - Price and Payment Procedures
- C. 01 2300 - Alternates
- D. 01 2500 - Substitution Procedures
- E. 01 3000 - Administrative Requirements
- F. 01 3216 - Construction Progress Schedule
- G. 01 4000 - Quality Requirements
- H. 01 4216 - Definitions
- I. 01 4219 - Reference Standards
- J. 01 5000 - Temporary Facilities and Controls
- K. 01 6000 - Product Requirements
- L. 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
- M. 01 7000 - Execution and Closeout Requirements
- N. 01 7800 - Closeout Submittals

2.02 DIVISION 02 -- EXISTING CONDITIONS (NOT USED)

2.03 DIVISION 03 -- CONCRETE

- A. 03 1000 - Concrete Forming and Accessories
- B. 03 2000 - Concrete Reinforcing
- C. 03 3000 - Cast-in-Place Concrete

- 2.04 DIVISION 04 -- MASONRY**
- 2.05 DIVISION 05 -- METALS**
- 2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES**
- 2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION**
 - A. 07 2100 - Thermal Insulation
- 2.08 DIVISION 08 -- OPENINGS**
- 2.09 DIVISION 09 -- FINISHES**
- 2.10 DIVISION 10 -- SPECIALTIES**
- 2.11 DIVISION 11 -- EQUIPMENT**
- 2.12 DIVISION 12 -- FURNISHINGS**
- 2.13 DIVISION 13 -- SPECIAL CONSTRUCTION**
- 2.14 DIVISION 14 -- CONVEYING EQUIPMENT**
- 2.15 DIVISION 21 -- FIRE SUPPRESSION**
- 2.16 DIVISION 22 -- PLUMBING**
- 2.17 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)**
- 2.18 DIVISION 25 -- INTEGRATED AUTOMATION**
- 2.19 DIVISION 26 -- ELECTRICAL**
- 2.20 DIVISION 27 -- COMMUNICATIONS**
- 2.21 DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY**
- 2.22 DIVISION 31 -- EARTHWORK**
 - A. 31 1000 - Site Clearing
 - B. 31 2200 - Site Excavation and Rough Grading
 - C. 31 2300 - Earthwork
 - D. 31 2500 - Temporary Erosion Control
- 2.23 DIVISION 32 -- EXTERIOR IMPROVEMENTS**
 - A. 32 1216 - Asphalt Paving
 - B. 32 1313 - Concrete Paving
 - C. 32 1313 - Concrete Paving - USU Specification
 - D. 32 1373 - Concrete Paving Joint Sealants
 - E. 32 1723 - Pavement Markings
- 2.24 DIVISION 33 -- UTILITIES**
 - A. 33 1100 - Potable Water Systems
 - B. 33 1119 - Fire Suppression Water System
 - C. 33 3100 - Sanitary Sewage Systems
 - D. 33 4100 - Storm Drainage
- 2.25 DIVISION 34 -- TRANSPORTATION**
- 2.26 DIVISION 40 -- PROCESS INTEGRATION**

END OF SECTION 00 0110

**SECTION 00 0120
LIST OF SCHEDULES**

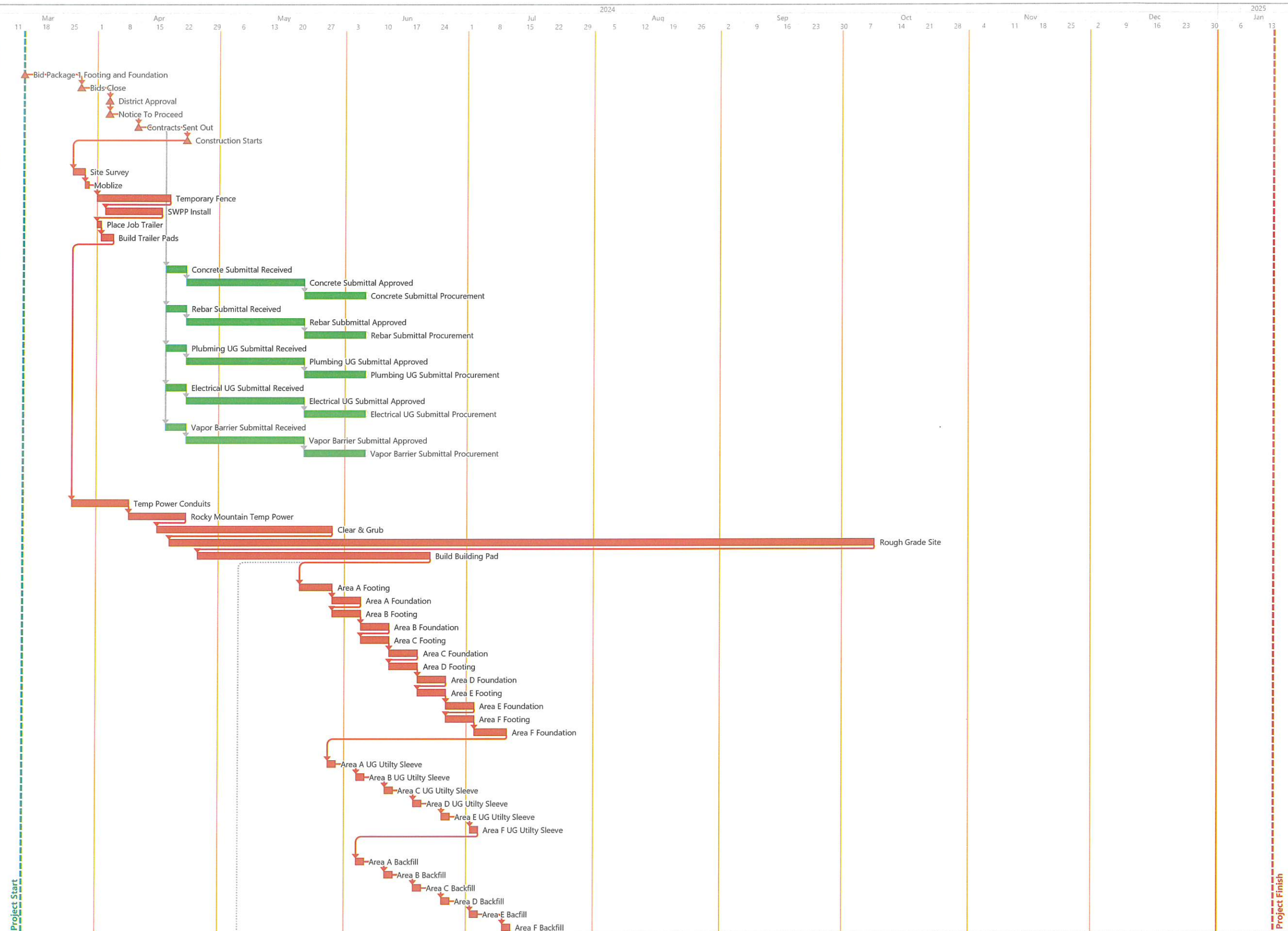
1.01 FRONT END SCHEDULE

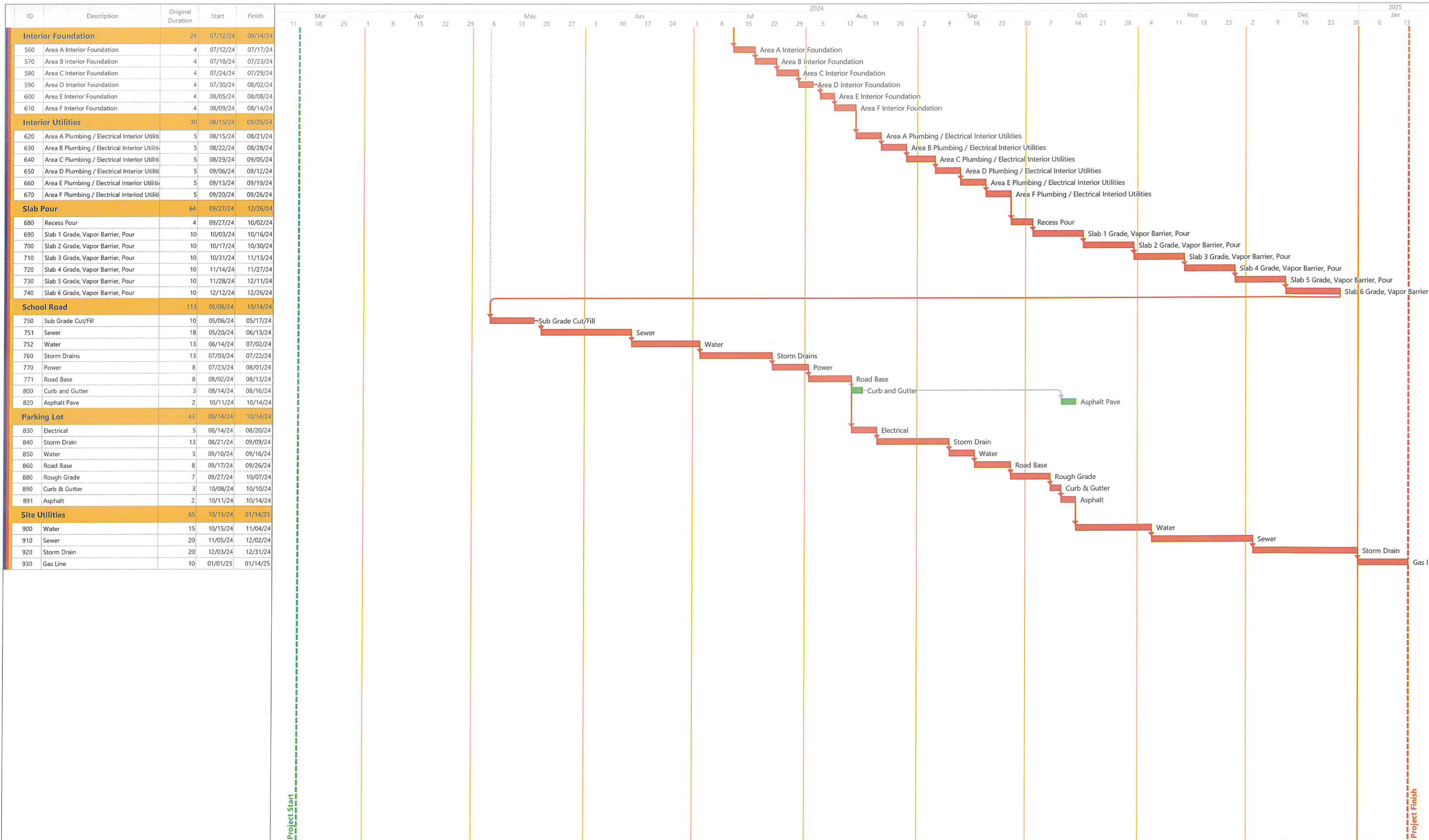
- A. See the attached schedule

END OF SECTION 00 0120

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ID	Description	Original Duration	Start	Finish
Hyde Park Middle School		214	03/14/24	01/14/25
Milestones		27	03/14/24	
10	Bid Package 1 Footing and Foundation	0	03/14/24	
20	Bids Close	0	03/28/24	
30	District Approval	0	04/04/24	
35	Notice To Proceed	0	04/04/24	
40	Contracts Sent Out	0	04/11/24	
50	Construction Starts	0	04/23/24	
Pre Construction		51	03/26/24	06/05/24
60	Site Survey	3	03/26/24	03/28/24
70	Moblize	1	03/29/24	03/29/24
80	Temporary Fence	14	04/01/24	04/18/24
90	SWPP Install	10	04/03/24	04/16/24
100	Place Job Trailer	1	04/01/24	04/01/24
110	Build Trailer Pads	3	04/02/24	04/04/24
Submittals		34	04/18/24	06/05/24
120	Concrete Submittal Received	3	04/18/24	04/22/24
130	Concrete Submittal Approved	21	04/23/24	05/21/24
140	Concrete Submittal Procurement	10	05/22/24	06/05/24
150	Rebar Submittal Received	3	04/18/24	04/22/24
160	Rebar Submittal Approved	21	04/23/24	05/21/24
170	Rebar Submittal Procurement	10	05/22/24	06/05/24
180	Plumbing UG Submittal Received	3	04/18/24	04/22/24
190	Plumbing UG Submittal Approved	21	04/23/24	05/21/24
200	Plumbing UG Submittal Procurement	10	05/22/24	06/05/24
210	Electrical UG Submittal Received	3	04/18/24	04/22/24
220	Electrical UG Submittal Approved	21	04/23/24	05/21/24
230	Electrical UG Submittal Procurement	10	05/22/24	06/05/24
240	Vapor Barrier Submittal Received	3	04/18/24	04/22/24
250	Vapor Barrier Submittal Approved	21	04/23/24	05/21/24
260	Vapor Barrier Submittal Procurement	10	05/22/24	06/05/24
Construction		207	03/26/24	01/14/25
Excavation		138	03/26/24	10/08/24
270	Temp Power Conduits	10	03/26/24	04/08/24
280	Rocky Mountain Temp Power	10	04/09/24	04/22/24
290	Clear & Grub	30	04/16/24	05/28/24
300	Rough Grade Site	120	04/19/24	10/08/24
310	Build Building Pad	40	04/26/24	06/21/24
Premimeter Footings and Foundation		35	05/21/24	07/10/24
320	Area A Footing	5	05/21/24	05/28/24
330	Area A Foundation	5	05/29/24	06/04/24
340	Area B Footing	5	05/29/24	06/04/24
350	Area B Foundation	5	06/05/24	06/11/24
360	Area C Footing	5	06/05/24	06/11/24
370	Area C Foundation	5	06/12/24	06/18/24
380	Area D Footing	5	06/12/24	06/18/24
390	Area D Foundation	5	06/19/24	06/25/24
400	Area E Footing	5	06/19/24	06/25/24
410	Area E Foundation	5	06/26/24	07/02/24
420	Area F Footing	5	06/26/24	07/02/24
430	Area F Foundation	5	07/03/24	07/10/24
UG Utilities Sleeves		27	05/28/24	07/03/24
440	Area A UG Utility Sleeve	2	05/28/24	05/29/24
450	Area B UG Utility Sleeve	2	06/04/24	06/05/24
460	Area C UG Utility Sleeve	2	06/11/24	06/12/24
470	Area D UG Utility Sleeve	2	06/18/24	06/19/24
480	Area E UG Utility Sleeve	2	06/25/24	06/26/24
490	Area F UG Utility Sleeve	2	07/02/24	07/03/24
Back Fill		27	06/04/24	07/11/24
500	Area A Backfill	2	06/04/24	06/05/24
510	Area B Backfill	2	06/11/24	06/12/24
520	Area C Backfill	2	06/18/24	06/19/24
530	Area D Backfill	2	06/25/24	06/26/24
540	Area E Backfill	2	07/02/24	07/03/24
550	Area F Backfill	2	07/10/24	07/11/24





Start Date: 03/14/24
 Finish Date: 01/14/25
 Data Date: 02/22/24
 Run Date: 03/08/24
 Hyde Park Middle School Preliminary V4.ppx
 Page 2A

Cache County School District

**SECTION 00 1113
ADVERTISEMENT FOR BIDS**

SEE THE ATTACHED NOTICE TO BIDDERS

END OF SECTION 00 1113

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SECTION 00010 – ADVERTISEMENT FOR BIDS:

- PROJECT:** Hyde Park Middle School – Footings & Foundation/Site, for Cache County School District. The project is located at 250 W 200 S, Hyde Park, UT 84318.
- DESCRIPTION:** Provide lump sum bids for divisions 02000 through 16000 for Construction phase as per Architectural drawings and specifications. This project will begin April 15, 2024, and will occur through July 3, 2026.
- TIME AND PLACE:** DWA Construction, Inc. will receive contractor and supplier bids for the project at their Corporate Office located at 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 on March 28, 2024 @ 3:00 PM. Faxed or emailed bids will be accepted. Please email bids to dwanate.h@dwaconstruct.com.
- TYPE OF BID:** The package will be bid on using a low bid best Value selection process.
- PRE-BID MEETING:** No pre-bid meeting will be held.
- COMPLETION LIQUIDATED DAMAGE** Liquidated damages will be assessed in the amount of \$1,000.00 for each calendar day that the project is delayed based on the project schedule for each trade. Construction will begin April 15, 2024, and be completed by July 3, 2026.
- BIDDING DOCUMENTS:** Bidding documents will be available March 14, 2024, through the office of **DWA Construction, Inc.**, 76 West 2400 North P.O. Box 3448, Logan, Utah 84323 in accordance with the Instructions to Bidders. Bidders will be limited to one (1) set of documents. These sets **WILL NOT** be available to keep for the duration of the bidding. No partial sets of documents will be issued. Plans will also be available for viewing at our website www.dwaconstruct.com and the following plan rooms:
1. Builders Exchange Plan Rooms
Phone: 775-329-7222 utahplanroom.com
 2. DWA Construction, Inc.: 76 West 2400 North Logan, Utah 84341 Phone: (435) 752-6860 Fax (435) 752-7606
- PERFORMANCE AND PAYMENT:** Upon receipt of a contract exceeding **\$50,000.00**, the successful Contractor shall furnish to the Owner (*at the CM/Owner's option*) a 100 percent Performance and Payment Bond in accordance with the Instructions to Bidders.
- BID BONDS** Bid bonds will be required on all bids exceeding \$250,000.00.
- RIGHT TO REJECT BIDS:** DWA Construction, Inc. and the Owner reserves the right to reject any or all bids and to waive any irregularities in any bid or in the bidding.

END OF SECTION

**SECTION 00 3100
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 Report: Entitled Geotechnical Investigation for the proposed Hyde Park Jr. High School, dated November 12, 2022.
 - 1. Original copy is attached at the end of this section .
 - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
 - 3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 00 3100

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ACache Corp.

Engineering a Firm Foundation

Geotechnical Investigation
for the proposed
Hyde Park Jr. High School
To be located
at the approximate address of
300 South 200 West
Hyde Park, Utah

PREPARED FOR:
CACHE-LANDMARK ENGINEERING, INC.

Care of:

Lance Anderson
95 W Golf Crse Rd #101
Logan, Utah 84321

PREPARED BY:

ACache Corp.
PROJECT NO. 1220008

November 12, 2022

November 12, 2022

Attn. Lance Anderson
Cache-Landmark Engineering, Inc.
95 W Golf Crse Rd #101
Logan, Utah 84321

Subject: **Geotechnical Investigation for the proposed
NORTH LOGAN HIGH SCHOOL
To be located at approximately
300 South 200 West
Hyde Park, Utah**

ACache Corp. Project No. 1220008

Mr. Anderson

It is with great pleasure that ACache Corp. presents this report of our findings for the subject site. It contains the results of our findings and an engineering interpretation of the results with respect to the available project characteristics. Pavement recommendations

Soil samples were obtained during our investigation. Please note that we will store these samples for 30 days after the signed date on this report, at which time they will be discarded unless you request otherwise.

We appreciate the opportunity of working with you on this project and look forward to future projects with you. If you have questions regarding this project, or any other, please do not hesitate to contact us at **(435)-760-3103**.

Sincerely,

A Cache Corp.

Jay E. Apedaile, P.E. M.S.
President



ACache Corp.

Engineering a Firm Foundation

P.O. Box 393 • 89 South 100 East • Mendon, Utah 84325 • www.acachecorp.com
Tele. (435) 760-3103 • Fax (614) 883-9419 • email: acachecorp@yahoo.com

Table of Contents

1.0 GENERAL PROJECT INFORMATION	1
<u>1.1 Project Authorization</u>	1
<u>1.2 Project Purpose and Description</u>	1
2.0 SITE AND SUBSURFACE CONDITIONS	1
<u>2.1 Site Investigation</u>	1
<u>2.2 Laboratory Investigation</u>	2
3.0 FINDINGS	2
<u>3.1 Site Conditions</u>	2
<u>3.2 Surface Drainage</u>	2
<u>3.3 Geology</u>	3
<u>3.4 Soil Profile</u>	3
<u>3.5 Fault and Seismicity</u>	3
<u>3.6 Liquefaction Evaluation</u>	3
<u>3.7 Ground Water</u>	4
<u>3.8 Site Subsurface Variations</u>	4
4.0 RECOMMENDATIONS	4
<u>4.1 Site Preparation and Grading</u>	4
<u>4.2 Foundation Recommendations for Buildings</u>	5
<u>4.3 Lateral Soil Pressures</u>	6
<u>4.4 Drainage</u>	6
<u>4.5 Floor Slabs</u>	6
5.0 GENERAL CONSTRUCTION CONSIDERATIONS	6
<u>5.1 Foundation Excavations</u>	7
<u>5.2 Fill Compaction</u>	7
<u>5.3 Types of Fill</u>	8
5.3.1 Structural Fill: Sub-base (pit-run).....	8
5.3.2 Structural Fill: Roadbase.....	8
5.3.3 Non-Structural Fill.....	8
<u>5.4 Quality Control</u>	8
5.4.1 Field observations.....	8
5.4.2 Fill Compaction.....	9
5.4.3 Concrete Quality.....	9
6.0 LIMITATIONS	9
7.0 REFERENCES	10

APPENDIX

Figure 1: Vicinity Map

Figure 2: Site Map

Figure 3: Symbol Legend

Figures 4-7: Borehole Logs

Figures 8-11: CPT Logs

1.0 GENERAL PROJECT INFORMATION

1.1 Project Authorization

A Cache Corp. (ACC) was retained by Lance Anderson of Cache-Landmark Engineering, Inc. to conduct a Geotechnical Subsurface Investigation for the proposed HYDE PARK JR. HIGH SCHOOL to be located at the approximate address of 300 South 200 West in Hyde Park, Utah (see **Figures 1 and 2** in the Appendix).

1.2 Project Purpose and Description

The purpose of this study was to obtain design level soil information to be used in the design of the proposed structures. Based on the information provided by Cache-Landmark, Inc. the proposed construction will consist of the development of approximately 13 acres for a school buildings, parking lots, playing field and access roads. The proposed school building is a slab on grade two story structure with high ceilinged gymnasiums. Structural loads are anticipated to consist of column loads ranging from 10 to 300 kips, and wall loads ranging from 2.0 to 18 kips per linear foot, for dead plus live loads. Final site grading information was not provided. ACC has assumed that the floor slab of the buildings will be placed at or above the current elevation of the site.

This report and the recommendations here in are based on the available project information. If this information is incorrect, then ACC shall be informed, preferably in writing, so ACC can evaluate the validity of this report.

2.0 SITE AND SUBSURFACE CONDITIONS

2.1 Site Investigation

The site is located in an open fielded area on the west side of 200 West and at 300 South in Hyde Park, Utah (see **Figures 1 and 2** in the Appendix).

The general subsurface conditions at the site of the proposed structures were investigated by pushing 4 Cone Penetrometer Tests (CPT) one of which seismic testing was conducted, to 50-feet or refusal and then drilling 4 boreholes ranging in depth from 12-feet to 17.5-feet below the current site grade. The approximate location of each explored location is shown on **Figure 2** in the Appendix. Soil samples were obtained at significant change of strata and in general accordance with ASTM D-420 and ASTM 2488. The subsurface conditions observed in the field investigation are discussed in Section 3.6 and in the Boring and CPT Logs.

Logs of the boreholes including a description of all soil strata encountered are presented in the Appendix as **Figures 4-7**. Sampling information and other pertinent data and observations are also included in the logs. A legend of the symbols used in the boring logs is presented in the Appendix as **Figure 3**. Logs of the CPT and seismic testing results are presented in the Appendix as **Figures 8-11**.

2.2 Laboratory Investigation

Samples obtained during the field investigation were returned to the laboratory and inspected and classified in accordance with the Unified Soil Classification System (ASTM 2487). Selected laboratory tests were performed on representative soil samples to determine their classification and characteristics with respect to engineering design. The following list indicates typical laboratory tests which may have been conducted on some of the samples retrieved from the site.

<u>Test</u>	<u>Standard</u>	<u>To Determine</u>
Moisture Content	ASTM D 2216	% moisture representative of field conditions
Atterberg Limits	ASTM D 4318	Plasticity and workability
% Pass #200 Sieve	ASTM D 1140	% fines in sample
Dry Density	ASTM D 2937	Dry unit weight representative of field conditions.

The testing results and the soil classifications are illustrated in the Logs contained in the Appendix (**Figures 4-7**).

3.0 FINDINGS

3.1 Site Conditions

At the time of this investigation the site consisted of open agricultural fields with a deep ditch crossing between them from east to west. The ditch had water running through it at the time of the investigation.

3.2 Surface Drainage

Currently, the majority of any surface runoff would drain to the west. The soil conditions appear to be adequate in keeping the surface soils from eroding.

3.3 Geology

The site was mapped by James McCalpin as being formed from lacustrine silt and clay related to the Provo and Bonneville shorelines. It consists of layers of clay, silt and minor fine sands, usually deposited in thick beds in deep and quiet water. The observed soil conditions were consistent to those anticipated on the map.

3.4 Soil Profile

The soil profile at the site was relatively consistent. Topsoil was observe with depths from 8” to as deep as 10” followed by a silty over consolidated clay with minor fine sand in lenses and some sand layers down approximately 20’. From 20’ down to approximately 37’ a softer slightly over consolidated sensitive clay was observed followed by siltier clays with some sand lensed down to approximately 48’ where some dense sands were observed to the full depth investigated (~53’).

For detailed observations of the sub-soils, the location they were observed, the characteristic observed, and any other pertinent information observed in the field or in the laboratory, see the Logs in the Appendix.

3.5 Fault and Seismicity

The site is located in a seismically active region. It is approximately 2.5-miles west of a mapped location of a section of the Utah East Cache Fault scarp, as depicted on the Surficial Geologic Map of the East Cache Fault Zone (James McCalpin, 1989). During the life of the project seismic activity caused by active faults in the area, have the potential of causing moderate to strong shaking. According to the findings of our subsurface investigation (seismic shear wave analysis), and according to the guidelines of the International Building Code (IBC, 2018), we recommend using a Site Class **E** (ASCE 7, Section 20) for the proposed structural design.

3.6 Liquefaction Evaluation

A site specific liquefaction assessment was conducted by obtaining CPT data, and SPT samples for laboratory analysis of the sub-soils to a depth of ~56-feet below the current site grade. Liquefaction potential analysis was conducted following the procedures by Seed and Idriss (1982), Seed, et. Al, (1983; 1985), and Youd and Idriss (1997), using Cone Penetrometer Tests (CPT) and laboratory results. **According to the analysis, the site soils have a very low susceptibility to liquefaction during a large seismic event.**

3.7 Ground Water

Ground water was observed in all of the borings at depths of 7 to 8-feet. It is likely that the groundwater fluctuates some during the year according to rainfall and other climatic and manmade (irrigation) influences. Artesian water pressures that would place water above the ground elevation were observed in the sand observed near 50-feet. It is evident however that ground water has been much deeper at some point in time given the observed desiccated clays. A detailed evaluation of the groundwater is beyond the scope of this investigation.

3.8 Site Subsurface Variations

It is our experience that variations in continuity and nature of subsurface conditions should be anticipated. Due to the nature and depositional characteristics of soils encountered at the site, care should be taken in interpolating or extrapolating subsurface conditions beyond the exploratory borings. Seasonal fluctuations in ground water conditions are likely to occur.

4.0 RECOMMENDATIONS

Recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions observed in the field and laboratory, as well as common engineering practice. Prudence and common engineering practices should be followed in conjunction to the recommendations of this report.

4.1 Site Preparation and Grading

All topsoil, vegetation, unsuitable soils, fill, and any other deleterious materials, should be removed from areas of new construction. This material shall not be used as structural fill. After striping and excavation to the proper subgrade elevation, the exposed subgrade should be proof-rolled with a loaded tandem axle dump truck or similar rubber tired vehicle. Soils that rut, or tend to deflect excessively, should be removed and replaced with properly compacted fill. Proof rolling and removal of pumping material should be witnessed by the geotechnical engineer, or his approved representative. **For best results this should take place during a period of dry weather (May to September), as the observed silts and clays will likely be susceptible to pumping if the moisture content is increased.** The subgrade soils should be compacted to a minimum of 95 percent Modified Proctor maximum laboratory density (ASTM D 1557) at a moisture content ranging from - 2 to +5 percentage point of optimum.

Near the structures no more than 5-feet of soil should be added to the current site grade and effort should be exercised to minimize the extent of large areas of fill as it could induce long term settlement issues.

4.2 Foundation Recommendations for Buildings

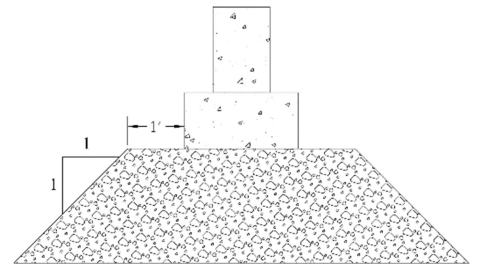
Conventional spot and continuous wall foundations may be used for the support of the proposed structure at the subject site. Based on field and laboratory data an **allowable bearing capacity** may be used for strip and spot foundations as follows:

Strip on native undisturbed 1500 psf.
Strip on 3 feet of structural fill 3000 psf.

Spot on native undisturbed 1500 psf.
Spot on 3 feet of structural fill 3500 psf.

provided the following recommendations are observed:

- Foundations shall be placed on native undisturbed or compacted soils or compacted structural fill (conforming to Sections 5.2 and 5.3).
- Onsite soils shall be examined by a qualified geotechnical engineer from this office, to verify that all topsoil, construction debris, soft spots, and any other deleterious materials have been removed prior to the placement of footings or structural fill.
- Structural fill shall be a well-graded granular soil, free of organics, debris, or other deleterious materials as outlined in Section 5.3.
- Structural fill shall be compacted as outlined in Section 5.3.
- Structural fill shall extend as a minimum 1-foot past the edge of the footing, and then for every 1-foot of fill (vertically) placed below the footing, it shall extend a minimum of 1-foot horizontally.
- Continuous footing width shall be maintained at a minimum of 18 inches.
- Spot footings shall be a minimum of 24 inches in width.
- Exterior footings shall be placed a minimum of 30 inches below final grade, and interior footing shall be placed a minimum of 16 inches below grade for frost protection.



Allowable bearing pressure may be increased by 1/3 for temporary loads such as wind or seismic forces. Foundations designed and constructed in accordance with our recommendations could experience some settlement. If the recommendations provided herein are observed, we estimate settlement should not exceed one inch, with differential settlements on the order of one-half inch. We anticipate approximately 75 percent of initial settlement to take place during construction.

4.3 Lateral Soil Pressures

Lateral soil pressures are dependent on the type of soil present. For the native silts and low plastic clay the following lateral soil pressures shall be used for design:

1. An equivalent fluid pressure of 48 pounds per cubic foot (pcf) for the active case. That is when the structure is allowed to yield, that is to say the structure is allowed to move away from the soil. This requires a minimum movement or rotation at the top of the wall of 0.001H, where "H" is the height of the wall (bottom of footing to top of wall).
2. 68 pcf for the at-rest case. That is when the wall is not allowed to yield.
3. 298 pcf for the passive case. That is when the wall exerts pressure on the soil.
4. A coefficient of friction of 0.30 shall be used for the interface between the native silty clay and the cast-in-place concrete.

4.4 Drainage

For constructability, adequate surface drainage should be provided at the site to minimize any increase in moisture content of the foundation supporting soils during and after construction. Foundation soils shall be protected from any increase in moisture.

For final grade we recommend all areas around the structures be generously sloped to provide drainage away from these areas. We recommend a minimum slope of 6 inches in the first 10 feet away from the structure.

4.5 Floor Slabs

All topsoil and deleterious materials shall be removed (typically about 8 to 10-inches of topsoil at this site). We recommend a minimum of 6 inches of free draining structural fill, free from organic material and debris, be used just below floor slabs as a vapor barrier. If grade is required to be re-established or raised above current grade a structural fill shall be used and placed in accordance with Sections 5.2 and 5.3. **We recommend that this layer be connected to a drain system in multiple locations that would allow any water that could migrate from the aquifer would be drained away and not be allowed to puddle below the floor slab.**

5.0 GENERAL CONSTRUCTION CONSIDERATIONS

The guidelines and recommendations outlined below address the geotechnically related construction considerations for this project.

5.1 Foundation Excavations

All areas that will support foundation loads should be inspected by the geotechnical engineer, or his approved representative, to insure that all loose, soft, or otherwise undesirable material is removed, and that the structure will bear on satisfactory material. This shall occur prior to the placement of any structural fill or concrete. All topsoil shall be removed prior to the placement of foundations or pavements. (We recommend giving this office a few days notice for scheduling.) Any loose or deleterious material should be replaced with a structural fill as outlined in **Sections 5.2 and 5.3**. The existing irrigation ditch will have to be addressed, piped or diverted. Vegetation debris and soft spots will have to be removed and replaced with an approved structural fill.

If unsatisfactory material pockets are encountered in the excavation, the undesirable material should be removed, and the elevation re-established by backfilling. This backfilling can be done with a lean concrete, or a well-compacted structural fill as define in **Section 5.3**.

All structural fill supporting footing loads should be compacted to at least 95 percent of the Modified Proctor Maximum Density (ASTM D 1557), provided the foundation is designed as outlined in **Section 4.2**. Compaction tests should be taken on each lift to insure the required compaction is being achieved.

Foundation excavations shall be protected against any harmful change in condition such as disturbance, rain, and freezing. Surface runoff should be directed away from the excavation and not allowed to pond. Ideally all footing concrete should be poured the same day as the excavation is made. If this is not practical, the foundation excavation should be adequately protected, and foundation placement should take place as soon as possible. For best construction results we recommend that earth work be conducted during the dry months of the year, typically June through September.

Excavation slopes shall maintain a maximum slope of 2 horizontal to 1 vertical. It may be possible to have steeper slopes for temporary excavations. This will depend on the conditions location and precautions taken. Contact our office for further consultation. Otherwise if it is required that slopes are steeper, it is necessary that excavation shoring/bracing be used.

5.2 Fill Compaction

All fill material should be compacted in accordance to the following criteria based on the Modified Proctor Maximum Laboratory Density (ASTM D 1557):

- | | |
|---|-----|
| 1. Structural fill, supporting foundations. | 95% |
| 2. Structural fill, below floor slabs | 94% |
| 3. Backfill of trenches | |
| a. Below foundations | 95% |

b. Below floor slabs	94%
c. Below pavements	94%
d. Others	90%
4. Beneath Pavements	95%

Compaction should be accomplished by placing the fill in a maximum of 8-inch loose lifts, and mechanically compacting each lift to the specified minimum density. Field density tests should be performed on each lift as necessary to insure that compaction is being achieved. As a minimum 33% of all spot footings, and one test for every 50 lineal feet of continuous wall footings shall be tested for each lift.

5.3 Types of Fill

5.3.1 Structural Fill: Sub-base (pit-run)

Well-graded granular soils free of organics, debris, or other deleterious materials are recommended for use as structural fill at this site. We recommend a well-graded sandy gravel material with no less than 5%, and no more than 10% passing the #200 sieve, and no particles greater than 4 inches in maximum dimension. Structural fill shall be compacted at a moisture content ranging from -2 to +6 percentage point of optimum in accordance to the Modified Proctor Maximum Laboratory Density (ASTM D 1557).

5.3.2 Structural Fill: Roadbase

Granular soils free of organics or other deleterious materials and debris. We recommend a sand and fractured gravel material with between 5 and 12 percent passing the #200 sieve, and no particles greater than approximately 1 inch in maximum dimension.

5.3.3 Non-Structural Fill

On-site soils appear to be suitable for non-structural site grading and landscaping fill. All fill material shall be approved by the engineer prior to placement.

5.4 Quality Control

Our recommendations are based on the assumption that adequate quality control testing and observations will be conducted during construction to verify compliance. This may include but is not necessarily limited to the following:

5.4.1 Field observations

Observations during all phases of construction should occur. Observations such as site preparation, foundation excavation, structural fill placement, and concrete placement.

5.4.2 Fill Compaction

Compaction testing is required for all Structural supporting fill materials. Maximum Dry Density (Proctor-ASTM 1557) tests should be requested by the contractor immediately after delivery of any granular fill materials. The maximum density information should then be used for field density tests on each lift as necessary to insure that the required compaction is being achieved.

5.4.3 Concrete Quality

We recommend that freshly mixed concrete be tested in accordance with ASTM designations as follows:

- Slump, Temperature, Unit Weight, and Yield testing should be conducted on every delivery truck (ASTM C 138 and C 143).
- Entrained Air testing should also be conducted on every delivery truck for exposed concrete or concrete placed above the frost line (ASTM C 231).
- Test cylinders should be taken a minimum of every 50 cubic yards. Cylinder compressive strength tests should be conducted at 7 and 28 days from the placement date (ASTM C 31).

6.0 LIMITATIONS

The recommendations submitted in this report were based on evaluating the information obtained from CPT's, borings and site investigation, and the design details furnished by Cache-Landmark Engineering, Inc. for the proposed project. The borehole and CPT data reflects the subsurface condition only at the specific location at the particular time designated on the borehole logs. Soil and ground water conditions may differ from conditions encountered at the actual investigated location. The nature and extent of any variation in the data may not become evident until construction begins. If variations do appear, it may become necessary to re-evaluate the recommendations of this report after we have observed the variation. If ACache Corp. is not notified of changes to the project or variations of the soils, ACache Corp. will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specification, or professional advice contained herein, have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

Once the plans and specifications are more complete, the Geotechnical Engineer shall be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary

recommendations. If ACache Corp. is not retained to perform these functions, ACache Corp. will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of Cache-Landmark Engineering, Inc. for the specific use on the proposed HYDE PARK JR. HIGH SCHOOL to be located at 300 South 200 West in Hyde Park, Utah.

7.0 REFERENCES

ASTM, American Society for Testing and Materials 1997

IBC, International Building Code, 2018 Edition, International Conference of Building Officials, Whittier, CA.

Interior Geological Survey, "Surficial Geologic Map of the East Cache Fault Zone Cache County, Utah, James McCalpin 1989

Seed, H.B., and Idriss, I.M., 1982, "Ground motion and soil liquefaction during earthquakes", Earthquake Engineering Research Institute, Oakland, California, p. 135.

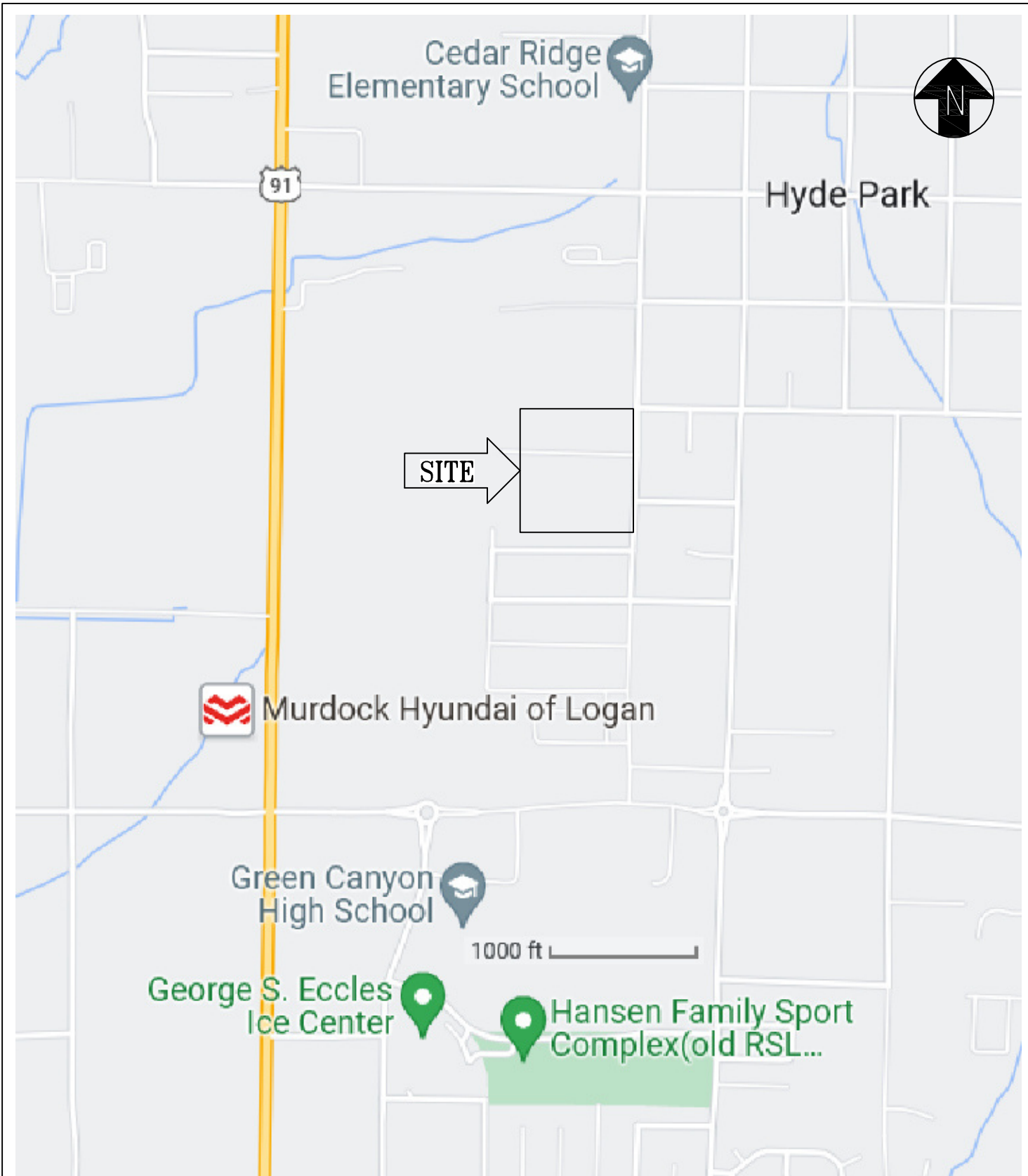
Seed, H.B., and Ibriss, I.M., and Arango, I., 1983, "Evaluation of Liquefaction Potential using field performance data", Journal of Geotechnical Engineering, Vol. 109, No.3, March, 1983, p. 458-483.

Seed, H.B., Tokimatsu, K., Harder, L.F., and Chung, R. M., 1985, "Influence of SPT procedures in soil liquefaction resistance evaluations", Journal of Geotechnical Engineering, Vol. 111, No.12, December, 1985, p. 1425-1445.

Tokimatsu, K., and Seed, H.B., 1987, "Evaluation of settlements in sand due to earthquake shaking", Journal of Geotechnical Engineering, Vol. 113, No.8, August, 1987, p. 861-878.

Youd, T.L., and Idriss, I.M., 1997, Summary report, proceedings of the NCEER workshop on evaluation resistance of soils, Edited by Youd, T.L., and Ibriss, I.M.: Technical Report NCEER-07-0022, December 31, 1997, p.40.

APPENDIX



Google 2022

A Cache Corp.

Engineering a Firm Foundation



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 email: acachecorp@yahoo.com

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Hyde Park Jr. High School

300 South 200 West, Hyde Park, Utah

TITLE: Vicinity Map

SCALE: No Scale

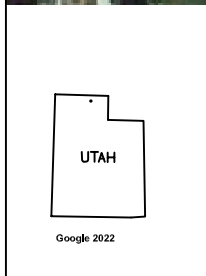
DATE: 11/11/2022

DRAWING NO. 1220008 Figures.dwg

ENGINEER:
J. Apedaile

DRAWN BY:
J. Apedaile

FIGURE 1



A Cache Corp.
Engineering a Firm Foundation

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Hyde Park Jr. High School
300 South 200 West, Hyde Park, Utah

TITLE: Site Map		ENGINEER: J. Apedaile	
SCALE: No Scale		DRAWN BY: J. Apedaile	
DATE: 11/11/2022		FIGURE 2	
DRAWING NO. 1220008 Figures.dwg			

UNIFIED SOIL CLASSIFICATION SYSTEM

FIELD IDENTIFICATION PROCEDURES				GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS		
COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size. (The No. 200 sieve size is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	Well graded gravels, gravel-sand mixtures, little or no fines.		
		GRAVELS WITH FINES (Appreciable amount of fines)	Predominantly one size or a range of sizes with some intermediate sizes missing.			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.	
			CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes.			SW	Well graded sands, gravelly sands, little or no fines.
		SANDS More than half of coarse fraction is smaller than No. 4 sieve size. (For visual classifications, the 1/4" size may be used as equivalent to the No. 4 sieve size.)	GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).			GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
	SANDS WITH FINES (Appreciable amount of fines)		Plastic fines (for identification procedures see CL below).			GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.	
	SANDS WITH FINES (Appreciable amount of fines)		Non-plastic fines (for identification procedures see ML below).			SM	Silty sands, poorly graded sand-silt mixtures.	
			Plastic fines (for identification procedures see CL below).			SC	Clayey sands, poorly graded sand-clay mixtures.	
	IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE							
FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size. (The No. 200 sieve size is about the smallest particle visible to the naked eye)	SILTS AND CLAYS Liquid limit less than 50	DRY STRENGTH (CRUSHING CHARACTERISTICS) None to slight	PLATANCY (REACTION TO SHAKING) Quick to slow	TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT) None		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sand with slight plasticity.	
		Medium to high	None to very slow	Medium			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Slight to medium	Slow	Slight				OL
	SILTS AND CLAYS Liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		High to very high	None	High				CH
		Medium to high	None to very slow	Slight to medium			OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS			Readily identified by color, odor, spongy feel and frequently by fibrous texture.			Pt	Peat and other highly organic soils.	

Boundary classifications: - Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.
 All sieve sizes on this chart are U.S. standard.

GENERAL NOTES

- In general, Unified Soil Classification Designations presented on the logs were evaluated by visual methods only. There fore, actual designations (based on laboratory testing) may differ.
- Lines separating strata on the logs represent approximate boundaries only Actual transitions may be gradual.
- Logs represent general soil conditions observed at the point of exploration on the date indicated.
- No warranty is provided as to the continuity of soil conditions between individual sample locations.

LOG KEY SYMBOLS

FINE - GRAINED SOIL TORVANE POCKET PENETROMETER

CONSISTENCY	SPT (blows/ft)	UNDRAINED SHEAR STRENGTH (tsf)	UNCONFINED COMPRESSIVE STRENGTH (tsf)	FIELD TEST
Very Soft	<2	<0.125	<0.25	Easily penetrated several inches by Thumb. Squeezes through fingers.
Soft	2 - 4	0.125 - 0.25	0.25 - 0.5	Easily penetrated 1 " by Thumb . Molded by light finger pressure.
Medium Stiff	4 - 8	0.25 - 0.5	0.5 - 1.0	Penetrated over 1/2 " by Thumb with moderate effort. Molded by strong finger pressure.
Stiff	8 - 15	0.5 - 1.0	1.0 - 2.0	Indented about 1/2 " by Thumb but penetrated only with great effort
Very Stiff	15 - 30	1.0 - 2.0	2.0 - 4.0	Readily indented by Thumbnail
Hard	>30	>2.0	>4.0	Indented with difficulty by Thumbnail

COARSE - GRAINDE SOIL

APPERT DENSITY	SPT (blows/ft)	RELATIVE DENSITY (%)	FIELD TEST
Very Loose	<4	0 - 15	Easily penetrated with 1/2 " reinforcing rod pushed by hand
Loose	4 - 10	15 - 35	Difficult to penetrated with 1/2 " reinforcing rod pushed by hand
Medium Dense	10 - 30	35 - 65	Easily penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Dense	30 - 50	65 - 85	Difficult to penetrated a foot with 1/2 " reinforcing rod driven with 5-lb hammer
Very Dense	>50	85 - 100	Penetrated only a few inches with 1/2 " reinforcing rod driven with 5-lb hammer

STRATIFICATION

DESCRIPTION	THICKNESS
SEAM	1/16 - 1/2 "
LAYER	1/2 - 12 "
DESCRIPTION	THICKNESS
Occasional	One or less per foot of thickness
Frequent	More than on per foot of thickness

CEMENTATION

DESCRIPTION	DESCRIPTION
Weakly	Crumbles or breaks with handling of slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumbles or breaks with finger pressure

MODIFIERS

DESCRIPTION	%
Trace	<5
Some	5 - 12
With	>12

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible water, usually soil below Water Table

FIGURE 3



BORING LOG

Hyde Park Jr. High School

BORING No. : B-1	JOB No. : 1220008	DATE : 9/28/2022	SHEET 1 OF 1
PROJECT : Hyde Park Jr. High School		SURF. EL. :	BORE DIA. : 8.0" DEPTH : 17'
		WATER EL. :	COORDINATES: Lat: 41.793443 Long: -111.825345
BORING TYPE : 3-1/4" HSA		CAD FILE : 1220008 Figures.dwg	

DEPTH, Ft.	GRAPHIC LOG	SAMPLE	SOIL DESCRIPTION	% FINER No. 200 SIEVE	BLOWS/Ft.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH, TSF		WET/DRY UNIT WT., lb./cu.ft.	
									●	○		
									(OPEN SYMBOLS REPRESENT REMOLDED TESTS.) 1.0 2.0			
			Surface~10": Black clay top soil									
5			10"-14.5': Light brown CLAY (CL); mottlings, calcium deposits, moist to wet below water table, water in small sand lenses, stiff to medium stiff.		11			27				
						21	42	24	22			
10						13			26			
						9	44	25	29			
15			14.5'~17': Light gray clay (CL), slight iron modeling, wet.		7			25				
					8	48	25	35				
			End at 17'									
20												
25												
30												
35												
REMARKS :				REMARKS : Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer								
FIELD ENG.: Jay				WTR DEPTH @ COMPL. : 8.0' on 9/28/22								
				COMPLETION DATE : 9/28/2022								

FIGURE 4



BORING LOG

Hyde Park Jr. High School

BORING No. : B-2	JOB No. : 1220008	DATE : 9/28/2022	SHEET 1 OF 1
PROJECT : Hyde Park Jr. High School		SURF. EL. :	BORE DIA. : 8.0" DEPTH : 14.5'
		WATER EL. :	COORDINATES: Lat: 41.793459 Long: -111.826288
BORING TYPE : 3-1/4" HSA		CAD FILE : 1220008 Figures.dwg	

DEPTH, Ft.	GRAPHIC LOG	SAMPLE	SOIL DESCRIPTION	% FINER No. 200 SIEVE	BLOWS/Ft.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH, TSF		WET/DRY UNIT WT., lb./cu.ft.
									● MINIATURE VANE	○ RESIDUAL MINIATURE VANE	
			Surface~10": Black clay top soil								
5			10"-14.5': Light brown CLAY (CL); mottlings, calcium deposits, moist to wet below water table, water in small sand lenses, stiff to medium stiff.		41			17			
				21	46	23	23				
				16				25			
10				12				28			
15			End at 14.5'		8			28			
20											
25											
30											
35											
REMARKS :				REMARKS : Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer							
FIELD ENG.: Jay				WTR DEPTH @ COMPL. : 7.0' on 9/28/22							
				COMPLETION DATE : 9/28/2022							

FIGURE 5



BORING LOG

Hyde Park Jr. High School

BORING No. : B-3	JOB No. : 1220008	DATE : 9/28/2022	SHEET 1 OF 1
PROJECT : Hyde Park Jr. High School		SURF. EL. :	BORE DIA. : 8.0" DEPTH : 14.5'
		WATER EL. :	COORDINATES: Lat: 41.794193 Long: -111.826587
BORING TYPE : 3-1/4" HSA		CAD FILE : 1220008 Figures.dwg	

DEPTH, Ft.	GRAPHIC LOG	SAMPLE	SOIL DESCRIPTION	% FINER No. 200 SIEVE	BLOWS/Ft.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH, TSF		WET/DRY UNIT WT., lb./cu.ft.
									MINIATURE VANE	RESIDUAL MINIATURE VANE	
			Surface~10": Black clay top soil								
5			10"-14.5': Light brown CLAY (CL); with layers of plastic CLAY (CH) mottlings, calcium deposits, moist to wet below water table, water in small sand lenses, stiff to medium stiff.		19			17			
					17	55	24	31			
					9			31			
10					8	35	22	29			
			End at 12'								
15											
20											
25											
30											
35											
REMARKS :				REMARKS : Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer							
FIELD ENG.: Jay				WTR DEPTH @ COMPL. : 7.0' on 9/28/22							
				COMPLETION DATE : 9/28/2022							

FIGURE 6



BORING LOG

Hyde Park Jr. High School

BORING No. : B-4	JOB No. : 1220008	DATE : 9/28/2022	SHEET 1 OF 1
PROJECT : Hyde Park Jr. High School		SURF. EL. :	BORE DIA. : 8.0" DEPTH : 14.5'
BORING TYPE : 3-1/4" HSA		WATER EL. :	COORDINATES: Lat: 41.794559 Long:-111.826308
CAD FILE : 1220008 Figures.dwg			

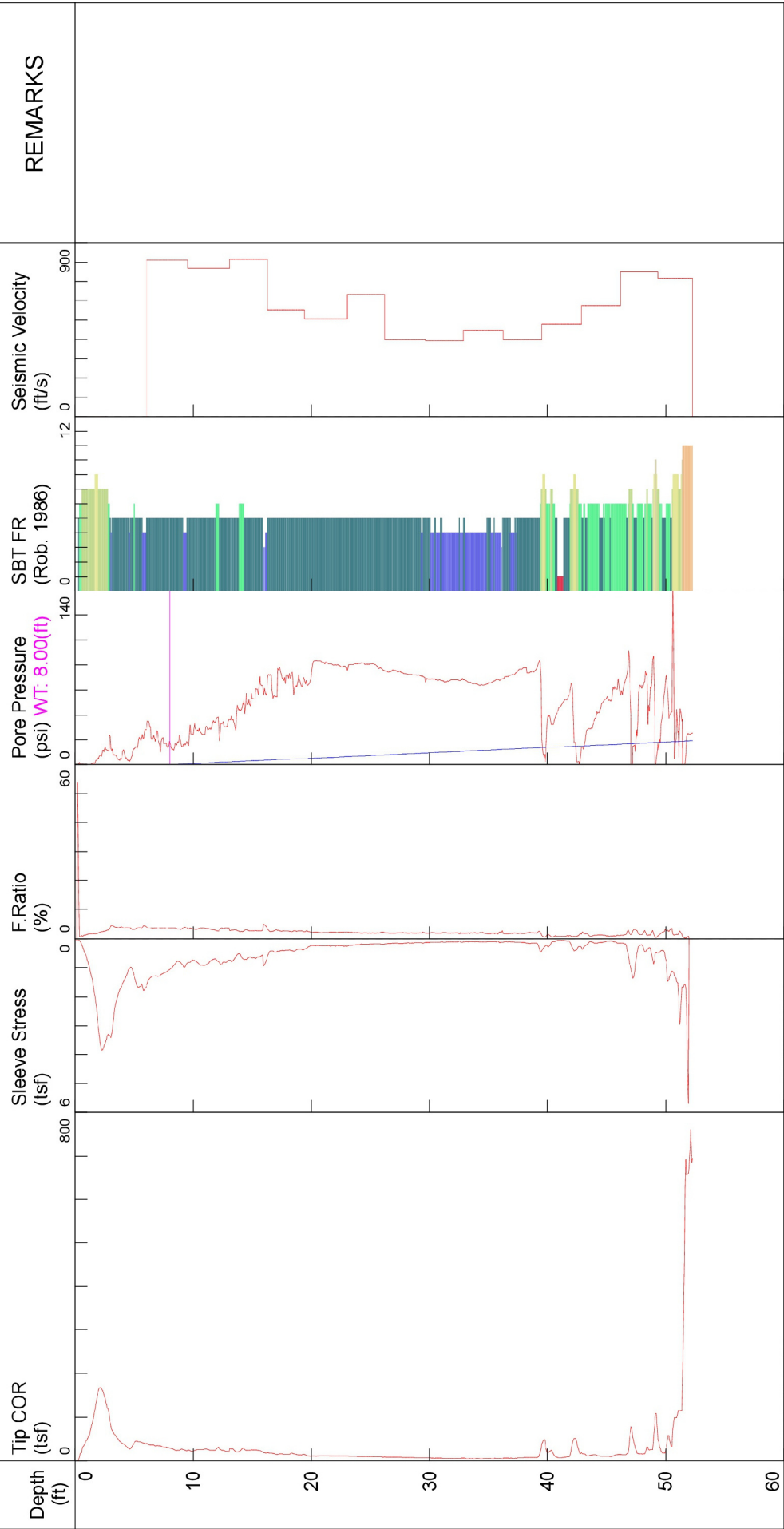
DEPTH, Ft.	GRAPHIC LOG	SAMPLE	SOIL DESCRIPTION	% FINER No. 200 SIEVE	BLOWS/Ft.	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE CONTENT, %	SHEAR STRENGTH, TSF		WET/DRY UNIT WT., lb./cu.ft.
									● MINIATURE VANE	○ RESIDUAL MINIATURE VANE	
			Surface~10": Black clay top soil								
5			10"-14.5': Light brown CLAY (CL); mottlings, calcium deposits, moist to wet below water table, water in small sand lenses, stiff to medium stiff.		31			21			
					17	46	24	24			
10					11			28			
			End at 12'		8			30			
15											
20											
25											
30											
35											
REMARKS :				REMARKS : Blows/Ft. obtained using a Standard Penetration Test (SPT) sampler driven with an automatic hammer							
FIELD ENG.: Jay				WTR DEPTH @ COMPL. : 7.0' on 9/28/22							
				COMPLETION DATE : 9/28/2022							

FIGURE 7

SOUNDING

ACache Corp.
Engineering & Foundation
 TOTAL DEPTH: 52.309 ft
 SITE: CPT-01
 SOUNDING
 COMPANY: VERTEK
 FILENAME: CPT-01.dat

PROBE ID: 4444.190XX
 TEST ID: 22-08-31-01
 PROJECT: CCSD Hyde Park
 LOCATION: Compass Mineral Far West Utah



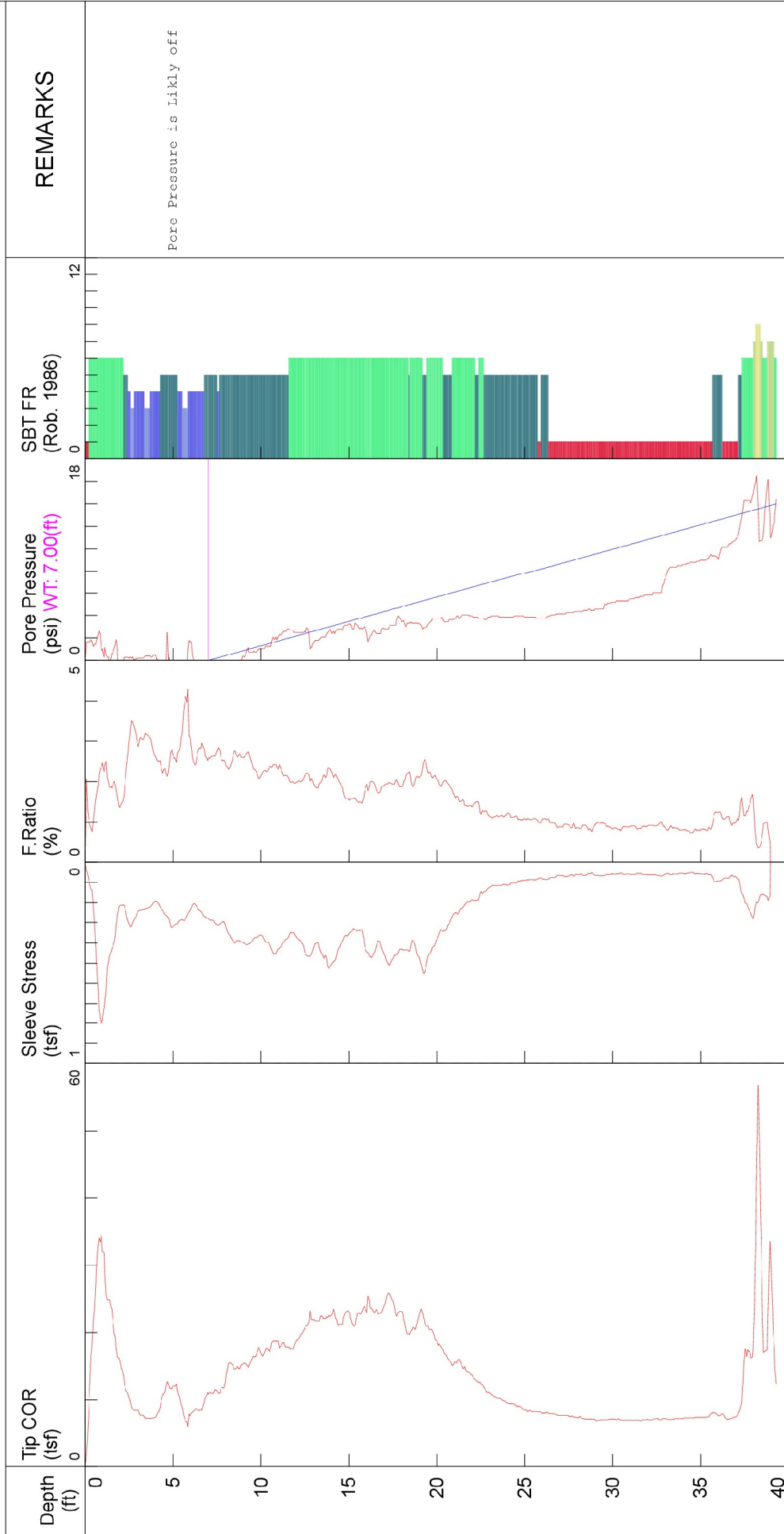
NOTES: Example of notes

- 1 Sensitive fine grained
 - 2 Organic material
 - 3 Clays
 - 4 Silty clay to clay
 - 5 Clayey silt to silty clay
 - 6 Sandy silt to clayey silt
 - 7 Silty sand to sandy silt
 - 8 sand to silty sand
 - 9 Sand
 - 10 Gravelly sand to sand
 - 11 Very stiff fine grained **
 - 12 Sand to clayey sand **
- *SBT: Robertson 1986, **Overconsolidated or Cemented; *SBT/SPT CORRELATION: UBC-1983

SOUNDING

ACache Corp.
 Engineering & Field Investigations
 TOTAL DEPTH: 39.323 ft
 SITE: CPT-02
 SOUNDING
 COMPANY: VERTEK
 FILENAME: CPT-02.dat

PROBE ID: 4444.190XX
 TEST ID: 22-08-31-02
 PROJECT: CCSD Hyde Park
 LOCATION: Hyde Park, Utah



FINAL BASELINE: 0 or N/A

FINAL BASELINE: -0.0387 (tsf)

FINAL BASELINE: -3.55 (tsf)

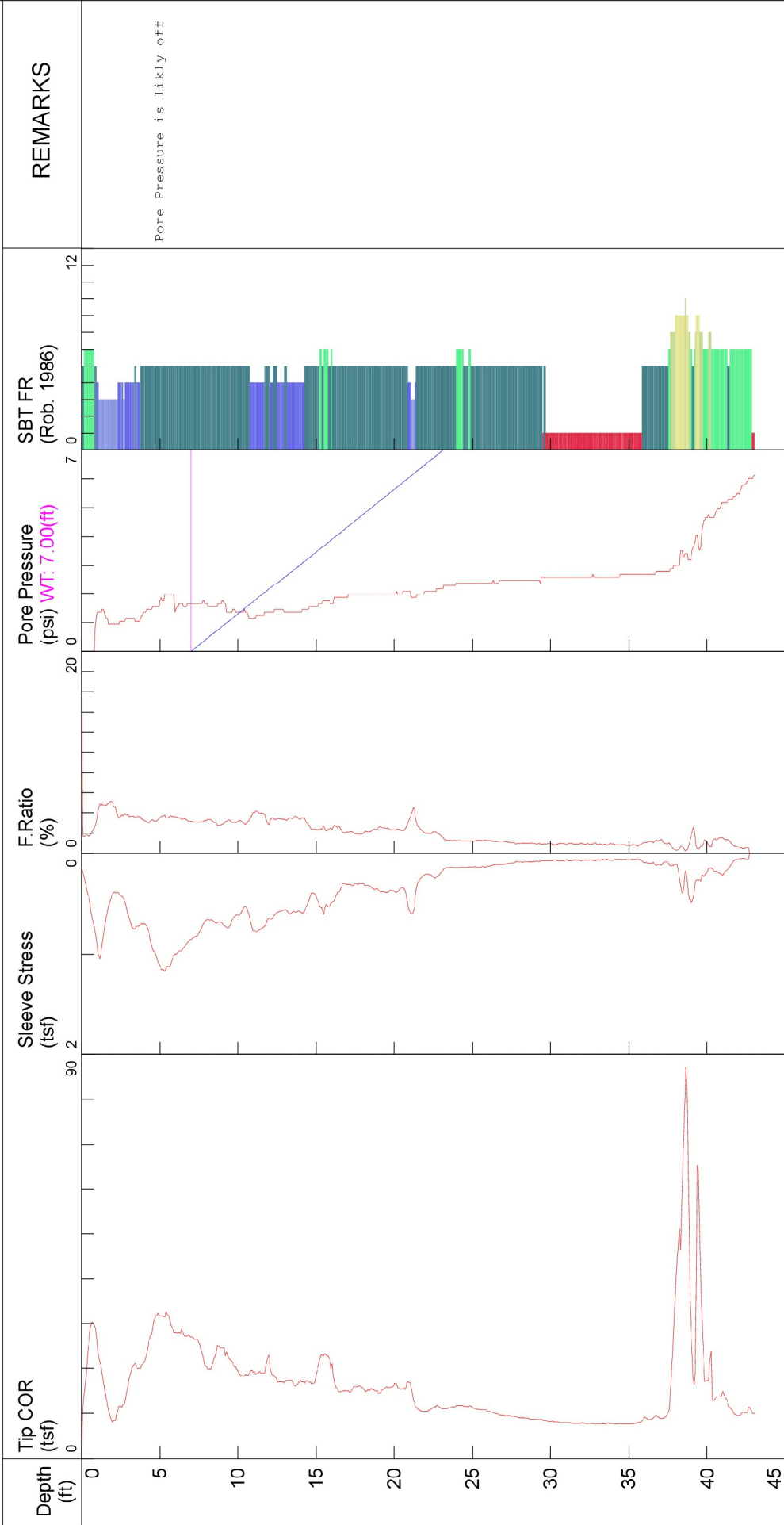
NOTES:: Example of notes

- 1 Sensitive fine grained
 - 2 Organic material
 - 3 Clays
 - 4 Silty clay to clay
 - 5 Clayey silt to silty clay
 - 6 Sandy silt to clayey silt
 - 7 Silty sand to sandy silt
 - 8 sand to silty sand
 - 9 Sand
 - 10 Gravely sand to sand
 - 11 Very stiff fine grained **
 - 12 Sand to clayey sand **
- *SBT: Robertson 1986; **Overconsolidated or Cemented; *SBT/SPT CORRELATION: UBC-1983

SOUNDING

ACache Corp.
 Engineering & Foundation
 TOTAL DEPTH: 43.046 ft
 SITE: CPT-03
 SOUNDING
 COMPANY: VERTEK
 FILENAME: CPT-03.dat

PROBE ID: 4444.190XX
 TEST ID: 22-08-31-03
 PROJECT: CCSD Hyde Park
 LOCATION: Hyde Park, Utah



FINAL BASELINE: -0.714 (psf)

FINAL BASELINE: -0.0381 (tsf)

FINAL BASELINE: 0 or N/A

NOTES: Example of notes

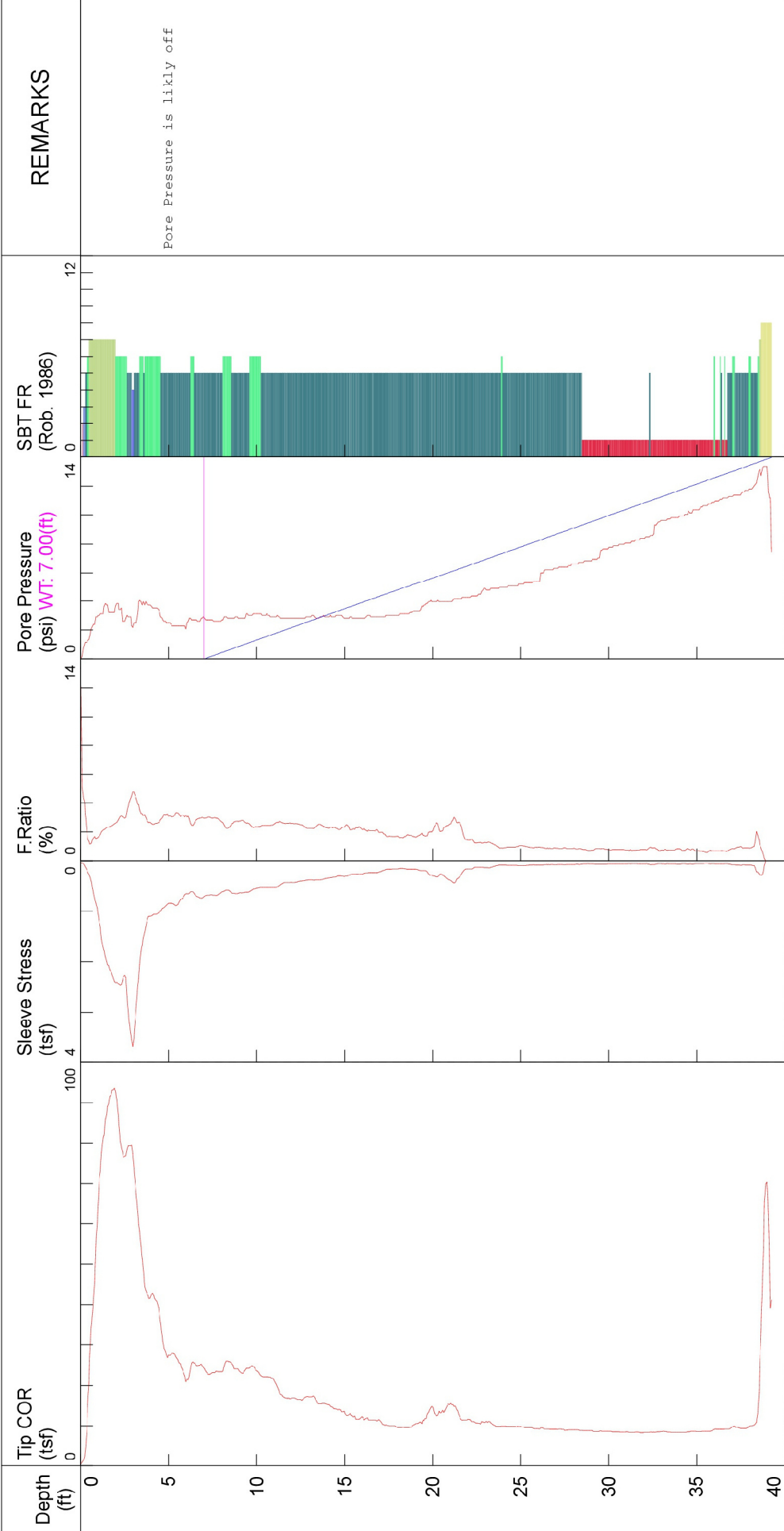
- 1 Sensitive fine grained
 - 2 Organic material
 - 3 Clays
 - 4 Silty clay to clay
 - 5 Clayey silt to silty clay
 - 6 Sandy silt to clayey silt
 - 7 Silty sand to sandy silt
 - 8 sand to silty sand
 - 9 Sand
 - 10 Gravelly sand to sand
 - 11 Very stiff fine grained **
 - 12 Sand to clayey sand **
- *SBT: Robertson 1986; ** Overconsolidated or Cemented; *SBT/SPT CORRELATION: UBC-1983

FIGURE 10

SOUNDING

ACache Corp.
 Engineering & Environmental Foundations
 TOTAL DEPTH: 39.242 ft
 SITE: CPT-04
 SOUNDING
 COMPANY: VERTEK
 FILENAME: CPT-04.dat

PROBE ID: 4444.190XX
 TEST ID: 22-08-31-04
 PROJECT: CCSD Hyde Park
 LOCATION: Hyde Park, Utah



REMARKS: Pore Pressure is likly off

FINAL BASELINE: 0.36 (tsf)
 FINAL BASELINE: -0.0343 (tsf)
 FINAL BASELINE: 0.104 (psi)

NOTES: Example of notes

- 1 Sensitive fine grained
- 2 Organic material
- 3 Clays
- 4 Silty clay to clay
- 5 Clayey silt to silty clay
- 6 Sandy silt to clayey silt
- 7 Silty sand to sandy silt
- 8 sand to silty sand
- 9 Sand
- 10 Gravelly sand to sand
- 11 Very stiff fine grained **
- 12 Sand to clayey sand **

*SBT: Robertson 1986; **Overconsolidated or Cemented; *SBT/SPT CORRELATION: UBC-1983

FIGURE 11

Cache County School District

SECTION 00 4325
SUBSTITUTION REQUEST FORM - DURING PROCUREMENT
SEE ATTACHED DOCUMENT

END OF SECTION 00 4325

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**SECTION 00 5000
CONTRACTING FORMS AND SUPPLEMENTS**

PART 1 GENERAL

1.01 CMGC CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. The Agreement is based on AIA A101-2007.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.

B. Bond Forms:

1. Performance and Payment Bond Form: Subcontract Performance and Payment Bond 00 6000.
2. Labor and Material: Labor and Material PaBond 00 6000

C. Post-Award Certificates and Other Forms:

1. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

D. Clarification and Modification Forms:

1. Request for Interpretation Form: None - N/A.
2. Architect's Supplemental Instructions Form: AIA G710.
3. Request for Proposal Form: N/A.
4. Change Order Form: AIA G701.

E. Closeout Forms:

1. Certificate of Substantial Completion Form: AIA G704.

1.04 REFERENCE STANDARDS

- A. AIA A101-2007 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2007.
- B. AIA G701 - Change Order; 2017.
- C. AIA G702 - Application and Certificate for Payment; 1992.
- D. AIA G703 - Continuation Sheet; 1992.
- E. AIA G704 - Certificate of Substantial Completion; 2017.
- F. AIA G710 - Architect's Supplemental Instructions; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 5000

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**SECTION 00 6000
PROJECT FORMS**

PROJECT FORMS

1.01 BID FORM

A. See attached document

1.02 TAX EXEMPTION CERTIFICATE FORM (TC-721)

A. See attached document

1.03 NEW PAYMENT REQUEST

A. See attached document

1.04 CONDITIONAL WAIVER AND RELEASE

A. See attached document

1.05 FINAL WAIVER AND RELEASE

A. See attached document

END OF SECTION 00 6000

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**SECTION 00 7200
GENERAL CONDITIONS**

FORM OF GENERAL CONDITIONS

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

RELATED REQUIREMENTS

2.01 SECTION 00 7300 - SUPPLEMENTARY CONDITIONS.

2.02 SECTION 01 4216 - DEFINITIONS.

SUPPLEMENTARY CONDITIONS

3.01 REFER TO DOCUMENT 00 7300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO THESE GENERAL CONDITIONS.

END OF SECTION 00 7200

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**SECTION 00 7300
SUPPLEMENTARY CONDITIONS**

PART 1 GENERAL

1.01 SUMMARY

- A. These Supplementary Conditions amend and supplement the General Conditions defined in Document 00 7200 - General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.02 RELATED SECTIONS

- A. Section 00 5000 - Contracting Forms and Supplements.
- B. Section 01 4216 - Definitions.

1.03 REFERENCE STANDARDS

- A. AIA A503 - Guide for Supplementary Conditions, including Amendments to AIA Documents A201, the 2017 Owner-Contractor Agreements, and the 2019 Owner-Construction Manager as Constructor Agreements; 2019.

1.04 MODIFICATIONS TO GENERAL CONDITIONS

- A. ARTICLE 2 OWNER
 - 1. Delete Section 2.3.6 and substitute the following:
 - a. 2.3.6 The Owner shall furnish the Contract Documents to the Contractor in digital format. If the Contractor requires paper documents, the Contractor shall be responsible for the costs of producing such paper documents.
- B. ARTICLE 3 CONTRACTOR
 - 1. Add the following Section 3.2.5 to Section 3.2:
 - a. 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.
 - 2. Add the following to the end of Section 3.4.2:
 - a. 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.
 - 3. Delete Section 3.6 and substitute the following:
 - a. 3.6 The contractor, subcontracts, and suppliers shall not include Utah State sales tax on any construction materials for this project. A tax ID # will be provided for the sole purpose of the purchase of material for this project only.
 - 4. Add Section 3.12.11 to Section 3.12:
 - a. 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and two (2) resubmittals. The Contractor shall reimburse the Owner for amounts paid to the Architect for evaluation of additional resubmittals.
- C. ARTICLE 4 ARCHITECT
 - 1. Add Section 4.2.2.1 to Section 4.2.2:
 - a. 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

2. The following language may be added as Section 4.2.7.1:
 - a. 4.2.7.1 In no case will the Architect's review period on any submittal be less than ten (10) days after receipt of the submittal from the Contractor.

D. ARTICLE 7 CHANGES IN THE WORK

1. Add the following Section 7.1.4 to Section 7.1:
 - a. 7.1.4 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:
 - 1) For the Contractor, for Work performed by the Contractor's own forces, 15 percent overhead and profit of the cost on all self performed work under \$5,000, 10 percent on all work from \$5 - 10,000, and 5 percent on all work over \$10,000.
 - 2) For the Contractor, for Work performed by the Contractor's Subcontractors, 5 percent of the amount due the Subcontractors.
 - 3) For each Subcontractor involved, for Work performed by that Subcontractor's own forces, the percentages to the same as in item 1) above.
 - 4) For each Subcontractor involved, for Work performed by the Subcontractor's Subsubcontractors, 5 percent of the amount due the Sub-subcontractor.
 - 5) Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.
2. Add the following Section 7.1.5 to Section 7.1:
 - a. 7.1.5 In order to facilitate checking of proposals for increases or decreases to the contract sum, 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 prescribed above. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over \$500.00 be approved without such itemization.
3. Delete Section 7.2 and substitute the following:
 - a. 7.2 Change Orders
 - b. 7.2.1 A Change Order is a written instrument signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:
 - 1) The change in the Work;
 - 2) The amount of the adjustment, if any, in the Contract Sum; and
 - 3) The extent of the adjustment, if any, in the Contract Time.
 - c. 7.2.2 Except as otherwise provided in the Contract Documents, the Contractor shall prepare the Change Order form, which may include supporting materials prepared by the Architect, for review and approval by the Owner and Architect.
 - d. 7.2.3 The Owner will pay R.S. Means costs adjusted for Salt Lake City for all change orders.

E. ARTICLE 9 PAYMENTS AND COMPLETION

1. Add the following sentence to Section 9.3.1:
 - a. The form of Application for Payment, duly notarized, shall be AIA Document G702™-1992, Application and Certificate for Payment, supported by AIA Document G703™-1992, Continuation Sheet.
2. Add the following Section 9.8.3.1 to Section 9.8.3:
 - a. 9.8.3.1 The Architect will perform no more than three (3) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections in the amount of \$250.00 or the actual cost of each follow up visit by the Architect or Engineer.
3. Add the following Section 9.10.1.1 to Section 9.10.1:
 - a. 9.10.1.1 The Architect will perform no more than three (3) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

F. ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

1. Add the following Section 10.2.4.1 to Section 10.2.4:

- a. 10.2.4.1 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods, are necessary for execution of the Work, the Contractor shall give the Owner reasonable advance notice.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 00 7300

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**SECTION 00 7400
SUPPLEMENTARY GENERAL CONDITIONS**

PART 1 GENERAL

1.01 RELATED SECTIONS

- A. 00 2113 - CMGC Supplemental Instructions to Bidders
- B. 00 4100 - Bid Forms
- C. 00 5200 - Sample Subcontract Agreement
- D. 00 7200 - General Conditions
- E. Administrative and Procedural Items: Division 1.

1.02 SUPPLEMENTARY CONDITIONS:

- A. Time of Completion:
 - 1. The General Contractor shall begin work upon notice to proceed. The work shall be completed at a later date to be determined.
 - 2. Contractor also agrees to pay liquidated damages in accordance with Supplementary Conditions and Bid Proposal if contractors delay makes the damages applicable.
- B. Liquidated Damages:
 - 1. Time is of the essence. Should the Contractor fail to complete the work within the specified times, or within such additional time as may be allowed by extension, there shall be deducted from any monies due to the Contractor the sum of \$1,000.00 per day, for each and every calendar day beyond the agreed date of substantial completion or extended completion day that the work remains uncompleted in each individual trade contract. Such sum is fixed and agreed upon by the Owner and Contractor (and his surety) as liquidated damages due the Owner by reason of the inconvenience and added costs of administration, engineering and supervision resulting from the Contractor's default, and not as a penalty.
 - 2. Permitting the Contractor to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the Owner of any of his rights under the Contract.

END OF SECTION 00 7400

**SECTION 01 1000
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: CCSD Hyde Park Middle School
- B. Owner's Name: Cache County School District.
- C. Architect's Name: Design West Architects.
- D. The Project consists of the construction of a new school on a vacant undeveloped site..

1.02 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.03 CONTRACTOR USE OF SITE AND PREMISES

- A. 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.

1.04 WORK SEQUENCE

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 1000

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**SECTION 01 2000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Correlation of CMGC Contractor submittals based on changes.

1.02 RELATED REQUIREMENTS

- A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- H. Submit one electronic and three hard-copies of each Application for Payment.

1.05 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in CMGC Contractor 's employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to CMGC Contractor .
- C. For other required changes, Architect will issue a document signed by Owner instructing CMGC Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. CMGC Contractor shall prepare and submit a fixed price quotation within 5 days.
- E. CMGC Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 6000.

- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- G. Substantiation of Costs: Provide full information required for evaluation.
 - 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 - 2. Support each claim for additional costs with additional information:
 - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2000

**SECTION 01 2300
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.

1.02 RELATED REQUIREMENTS

- A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

1.03 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.04 SCHEDULE OF ALTERNATES

- A. Alternate No. 1 -
 - 1. Base Bid Item: No Auxilliary Gym over Area F. Steel decking for future floor to be fully insulated and cricketed to provide drainage as required as shown on A-161 PLAN - ROOF - OVERALL. Base bid scope at the Track Level/Auxilliary Gym Level is as shown on PLAN - LEVEL 02 - AREA E sheets. CMU demising wall on Grid 7 is part of the base bid. Future window blockouts in the Grid 7 CMU wall to be infilled as detailed in the drawings as part of the base bid.
 - 2. Alternate Item: An Auxilliary Gym over Area F, Level 02 of the building; matching the track level of the base bid of Area E. See drawings A-821.0 - A-842 (8 Drawings Inclusive). The scope of this alternate includes but is not limited to the following:
 - a. Additional ICF blocking on grid B.8 between grids 8 and 9, on grid 9 between B.8 and E.2.
 - b. CMU Block walls extend up from base bid walls in the area of the locker rooms, from Level 02 to the height of the parapet walls of base bid Area E main gym to match.
 - c. Steel framing infill between CMU walls from Level 02 base bid framing to the level of parapet walls matching the parapet heights of base bid Area E main gym parapet walls.
 - d. Roof Trusses and roof decking with insulation as specified with cricketing, removing the scope of insulation cricketing and providing a bid for specified insulation and and cricketing (see A-831).
 - e. Steel stud infill per exterior wall types in structural steel frame.
 - f. Batt insulation in stud cavity, with exterior gyp sheathing and 3-1/2" EPS continuous insulation on framed walls and CMU walls.
 - g. Delete demising wall window infills as detailed on base bid.
 - h. Track surface flooring extending into the entire auxilliary gym. For flooring see specification. Gym flooring athletic lines and track lanes to be cut into flooring, colors as specified.
 - i. Fixed 3 row bleacher on the north side of the auxilliary gym. Telescoping 8 row bleacher on the south side of the auxilliary gym.
 - j. Steel roof framing and roof deck and insulation for storage areas between grids 8.7 and 9, from E.2 to B.8, rounding the corner to grid 8 on the north between B.8 and C.2.
 - k. Delete roof drains from base bid, emcompass roof drains for bid alternate. See A-831.
 - l. Provide wall furrings and gyp board covering as per wall types in auxilliary gym, including ultra compact surfacing where shown.
 - m. Provide auxilliary gym scoreboard as specified.
 - n. Provide auxilliary gym basketball standards (6) as specified.

- o. Provide acoustic wall panels and acoustic panels attached to the roof deck as specified.
- p. Provide Air handler Unit for auxilliary gym and planned ductwork.
- q. Provide translucent sandwich panel windows as designed (note: basis of design fiberglass sandwich panel window openings in Grid 7 demising walls can shift to south auxilliary gym wall) Bid Alternate 1 will leave all openings in demising wall fully open.
- r. Provide all finishes and equipment necessary for two single hole restrooms at auxilliary gym level.
- s. Provide electric water cooler with bottle filler.
- t. Provide all mechanical equipment to service storage room and bathroom areas of auxilliary gym.
- u. Extend fire sprinkler lines as required to the auxilliary gym as planned.
- v. Provide lighting and electrical as planned to the auxilliary gym.
- w. Provide exterior finishes as elevated on the auxilliary gym (refer to A-841 and A-842).

PART 2 PRODUCTS

PART 3 EXECUTION - NOT USED

END OF SECTION 01 2300

**SECTION 01 2500
SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by CMGC Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond CMGC Contractor 's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the CMGC Contractor will not be considered.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment 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, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. No specific form is required. CMGC Contractor 's Substitution Request documentation must include the following:
 - a. Project Information:
 - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
 - b. Substitution Request Information:
 - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
 - 2) Indication of whether the substitution is for cause or convenience.
 - 3) Issue date.
 - 4) Description of Substitution.
 - 5) Reason why the specified item cannot be provided.

- 6) Differences between proposed substitution and specified item.
- 7) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
 - 1) Physical characteristics.
 - 2) In-service performance.
 - 3) Expected durability.
 - 4) Visual effect.
 - 5) Warranties.
 - 6) Other salient features and requirements.
 - 7) Include, as appropriate or requested, the following types of documentation:
 - (a) Product Data:
 - (b) Samples.
 - (c) Certificates, test, reports or similar qualification data.
- d. Impact of Substitution:
 - 1) Savings to Owner for accepting substitution.
 - 2) Change to Contract Time due to accepting substitution.
- E. Limit each request to a single proposed substitution item.
 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 1. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than [7] days prior to time required for review and approval by Architect, in order to stay on approved bidding schedule.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 7 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience are not permitted during construction.
- D. Substitutions will not be considered under one or more of the following circumstances:
 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 2. Without a separate written request during the bidding period.
- E. Failure to order product in a timely manner to meet project timeline requirements, does not constitute justification for a substitution. Any additional costs incurred related to obtaining the specified product in an expedited manner, as a result of this failure, will not be approved in Change Orders and are the responsibility of the ordering party.

3.04 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify CMGC Contractor in writing of decision to accept or reject request.
 1. Architect's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION 01 2500

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**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Construction progress schedule.
- G. Progress photographs.
- H. Coordination drawings.
- I. Submittals for review, information, and project closeout.
- J. Number of copies of submittals.
- K. Requests for Interpretation (RFI) procedures.
- L. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Coordination drawings.
 - 9. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 10. Closeout submittals.

1.03 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.

5. Design data.
6. Manufacturer's instructions and field reports.
7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, CMGC Contractor 's correction punchlist, and any other document any participant wishes to make part of the project record.
 2. CMGC Contractor and Architect are required to use this service.
 3. It is CMGC Contractor 's responsibility to submit documents in allowable format.
 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
 1. Procure: www.procure.com.
- C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and CMGC Contractor participating; further training is the responsibility of the user of the service.
- D. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice to Proceed.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. CMGC Contractor .
 4. Invited Sub-Contractors.
- C. Agenda:
 1. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 2. Submission of initial Submittal schedule.
 3. Designation of personnel representing the parties to Contract, None - N/A and <1|A/E|>.

4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 5. Scheduling.
- D. Record minutes and distribute copies within four days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

- A. Project Coordinator will schedule meeting at the Project site prior to CMGC Contractor occupancy.
- B. Attendance Required:
1. CMGC Contractor .
 2. Architect.
 3. CMGC Contractor 's superintendent.
 4. Major subcontractors.
- C. Agenda:
1. Use of premises by Owner and CMGC Contractor .
 2. Owner's requirements.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within four days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum weekly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
1. CMGC Contractor .
 2. Owner.
 3. Architect.
 4. CMGC Contractor 's superintendent.
 5. Major subcontractors.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Coordination of projected progress.
 11. Maintenance of quality and work standards.

12. Effect of proposed changes on progress schedule and coordination.
 13. Other business relating to work.
- E. Record minutes and distribute copies within four days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

3.06 PROGRESS PHOTOGRAPHS

- A. Maintain one set of all photographs at project site for reference; same copies as submitted, identified as such.
- B. Photography Type: Digital; electronic files.
- C. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 1. Delivery Medium: Via email.
 2. File Naming: Include project identification, date and time of view, and view identification.
 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.07 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.08 REQUESTS FOR INTERPRETATION(RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare using an electronic version of the form appended to this section.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.

- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and CMGC Contractor 's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. CMGC Contractor 's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to CMGC Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in CMGC Contractor 's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.09 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Format schedule to allow tracking of status of submittals throughout duration of construction.
 - 2. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 - 3. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

- a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

3.10 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.11 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.12 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
- D. Submit for Owner's benefit during and after project completion.

3.13 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to CMGC Contractor unless specifically so stated.

3.14 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
 2. Sequentially identify each item. For revised submittals use original number and a sequential combination numerical and alphabetical suffix.

3. Identify: Project; CMGC Contractor ; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 4. Apply CMGC Contractor 's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the CMGC Contractor , or without CMGC Contractor 's stamp will not be acknowledged, reviewed, or returned.
 5. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
 6. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the CMGC Contractor .
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 8. Provide space for CMGC Contractor and Architect review stamps.
 9. When revised for resubmission, identify all changes made since previous submission.
 10. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 11. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Submit concurrently with related shop drawing submittal.
 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.15 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At CMGC Contractor 's option, submit corrected item, with review notations acknowledged and incorporated.
 - b. "Approved as Noted, Resubmit for Record", or language with same legal meaning.

2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 1. Items for which no action was taken:
 - a. "Received" - to notify the CMGC Contractor that the submittal has been received for record only.
 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from CMGC Contractor .

END OF SECTION 01 3000

**SECTION 01 4000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Mock-ups.
- G. Tolerances.
- H. Manufacturers' field services.
- I. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 2100 - Allowances: Allowance for payment of testing services.
- B. Section 01 3000 - Administrative Requirements: Submittal procedures.
- C. Section 01 4216 - Definitions.

1.03 REFERENCE STANDARDS

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- B. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- C. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2023.
- D. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2023.
- E. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- F. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect'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 Architect and to CMGC 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 Architect, provide interpretation of results.

2. Test report submittals are for Architect'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 CMGC Contractor or installation/application subcontractor to Architect, 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 Architect.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 1. Submit report in duplicate within 30 days of observation to Architect for information.
 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 2. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

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

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ services of an independent testing agency to perform certain specified testing and inspection; payment for cost of services will be derived from allowance specified in Section 01 2100; see Section 01 2100 and applicable sections for description of services included in allowance.
- B. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- C. CMGC Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.

- D. As indicated in individual specification sections, Owner or CMGC Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- E. Employment of agency in no way relieves CMGC Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- F. CMGC Contractor Employed Agency:
 - 1. Laboratory: Authorized to operate in Utah.
 - 2. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 3. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

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 Architect 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. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- B. Notify Architect and None - N/A Consultant fifteen (15) working days in advance of dates and times when mock-ups will be constructed.
- C. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- D. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- E. Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- F. Where mock-up has been accepted by Architect 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 Architect.

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

3.04 TESTING AND INSPECTION

- A. Testing Agency Duties:

1. Provide qualified personnel at site. Cooperate with Architect and CMGC 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. Perform additional tests and inspections required by Architect.
 5. Submit reports of all tests/inspections specified.
- B. 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 CMGC Contractor .
 4. Agency has no authority to stop the Work.
- C. CMGC 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 Architect 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 CMGC Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by CMGC Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by CMGC 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 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 Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION 01 4000

**SECTION 01 4216
DEFINITIONS**

PART 1 GENERAL

1.01 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 4216

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**SECTION 01 4219
REFERENCE STANDARDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements relating to referenced standards.
- B. Reference standards full title and edition date.

1.02 QUALITY ASSURANCE

- A. For products or 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. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- C. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

PART 2 CONSTRUCTION INDUSTRY ORGANIZATION DOCUMENTS

2.01 AASHTO -- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS

2.02 ACI -- AMERICAN CONCRETE INSTITUTE INTERNATIONAL

- A. ACI SP-66 - ACI Detailing Manual; 2004.

2.03 AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

- A. AISC (MAN) - Steel Construction Manual; 2023.

2.04 ANSI -- AMERICAN NATIONAL STANDARDS INSTITUTE

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- B. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2021.
- C. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2019.
- D. ANSI A118.5 - American National Standard Specifications for Chemical Resistant Furan Mortars and Grouts for Tile Installation; 1999 (Reaffirmed 2021).
- E. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- F. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2014 (Reaffirmed 2019).
- G. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation; 2014 (Reaffirmed 2019).
- H. ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- I. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- J. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.

2.05 ASTM A SERIES -- ASTM INTERNATIONAL

- A. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2018.

- B. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2021a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2022.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023.

2.06 ASTM B SERIES -- ASTM INTERNATIONAL

- A. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2023.
- B. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.

2.07 ASTM C SERIES -- ASTM INTERNATIONAL

- A. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2023.
- B. ASTM C91/C91M - Standard Specification for Masonry Cement; 2023.
- C. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2023.
- D. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2023a.
- E. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- F. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- G. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019a, with Editorial Revision.
- H. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products; 2018 (Reapproved 2023).
- I. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- J. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- K. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- L. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete; 2021.
- M. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015 (Reapproved 2022).
- N. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2023.
- O. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage; 2013 (Reapproved 2019).

2.08 ASTM D SERIES -- ASTM INTERNATIONAL

- A. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing; 2011 (Reapproved 2023).
- B. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017 (Reapproved 2023).
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.

- D. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).
- E. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2022.
- F. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013.
- G. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test); 2008 (Reapproved 2023).
- H. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
- I. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- J. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity; 2015 (Reapproved 2020).
- K. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).
- L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- M. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2018).
- N. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- O. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2018.
- P. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.

2.09 ASTM E SERIES -- ASTM INTERNATIONAL

- A. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2020a.
- B. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.
- C. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- D. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.
- F. ASTM E1677 - Standard Specification for Air Barrier (AB) Material or Assemblies for Low-Rise Framed Building Walls; 2023.
- G. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).
- H. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2018.
- I. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2023b.
- J. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2022.
- K. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023.

2.10 ASTM F SERIES -- ASTM INTERNATIONAL

- A. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- B. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.
- C. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
- D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.
- E. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2022.

2.11 ASTM G SERIES -- ASTM INTERNATIONAL

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- B. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013 (Reapproved 2021).
- C. ASTM G155 - Standard Practice for Operating Xenon Arc Lamp Apparatus for Exposure of Materials; 2021.

2.12 AWS -- AMERICAN WELDING SOCIETY

- A. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- B. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018, with Errata (2022).
- C. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).

2.13 BHMA -- BUILDERS HARDWARE MANUFACTURERS ASSOCIATION

- A. BHMA A156.9 - Cabinet Hardware; 2020.
- B. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.

2.14 CRSI -- CONCRETE REINFORCING STEEL INSTITUTE

- A. CRSI (DA4) - Manual of Standard Practice; 2023.

2.15 FM -- FACTORY MUTUAL GLOBAL

- A. FM (AG) - FM Approval Guide; Current Edition.

2.16 GA -- GYPSUM ASSOCIATION

- A. GA-201 - Using Gypsum Board for Walls & Ceilings; 1990.
- B. GA-214 - Levels of Finish for Gypsum Panel Products; 2021.

2.17 GANA -- GLASS ASSOCIATION OF NORTH AMERICA

- A. GANA (GM) - GANA Glazing Manual; 2022.
- B. GANA (SM) - GANA Sealant Manual; 2008.

2.18 ICC -- INTERNATIONAL CODE COUNCIL, INC.

- A. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- B. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ICC (IMC) - International Mechanical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- F. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

2.19 ITS -- INTERTEK TESTING SERVICES NA, INC.

- A. ITS (DIR) - Directory of Listed Products; Current Edition.

2.20 MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION

- A. MFMA (SPEC) - Guide Specifications for Maple Flooring Systems; current edition.

2.21 NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS

- A. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- B. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- C. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.

2.22 NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

- A. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

2.23 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

- A. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2021.
- B. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.
- C. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2023, with Errata.
- D. NFPA 268 - Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2022.
- E. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- F. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.

2.24 NFRC -- NATIONAL FENESTRATION RATING COUNCIL, INC.

- A. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.
- B. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
- C. NFRC (CPD) - Certified Product Directory - National Fenestration Rating Council; Current Edition.

2.25 PCI -- PRECAST/PRESTRESSED CONCRETE INSTITUTE

- A. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2013.
- B. PCI MNL-120 - PCI Design Handbook; 2017, with Errata (2021).
- C. PCI MNL-122 - Architectural Precast Concrete: Fully Revised Manual Including New Sections, Extensive Updates, and Detailed Specifications to Meet Today's Construction Needs.; 2007.
- D. PCI MNL-123 - Connections Manual: Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
- E. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

2.26 RCSC -- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

- A. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2020.

2.27 SDI -- STEEL DECK INSTITUTE

- A. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

2.28 SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

- A. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

2.29 SSPC -- SOCIETY FOR PROTECTIVE COATINGS

- A. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- B. SSPC-SP 3 - Power Tool Cleaning; 2018.

2.30 TCNA -- TILE COUNCIL OF NORTH AMERICA, INC.

- A. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2023.

2.31 TMS -- THE MASONRY SOCIETY

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2022, with Errata.

2.32 TPI -- TURFGRASS PRODUCERS INTERNATIONAL

- A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

2.33 UL -- UNDERWRITERS LABORATORIES INC.

- A. UL (DIR) - Online Certifications Directory; Current Edition.
- B. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- C. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings; Current Edition, Including All Revisions.
- D. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- E. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

PART 3 UNITED STATES GOVERNMENT AND RELATED AGENCIES DOCUMENTS

3.01 CFR -- CODE OF FEDERAL REGULATIONS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. 29 CFR 1910.23 - Ladders; Current Edition.
- C. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.

3.02 COE -- CORPS OF ENGINEERS, U.S. ARMY

END OF SECTION 01 4219

**SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Waste removal facilities and services.
- G. Project identification sign.

1.02 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B. Provide and pay for all electrical power, lighting, and water required for construction purposes.
- C. Existing facilities with power at the scoreboard be used.
- D. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

1.04 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities located at the job site is not permitted.
- C. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- E. Traffic Controls: Provide during regular school hours and other school events.

1.06 FENCING

- A. Construction: CMGC Contractor 's option.
- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.08 INTERIOR ENCLOSURES

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.09 SECURITY

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

1.10 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.11 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.12 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction indicated on drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 5000

**SECTION 01 6000
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 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Lists of products to be removed from existing building.
- B. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 4000 - Quality Requirements: Product quality monitoring.
- D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Notice to Proceed.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. 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.
- C. 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.
- D. 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 CMGC Contractor ; remove from site.

2.02 NEW PRODUCTS

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

- B. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, CMGC Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
 - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
 - 3. Are extracted, harvested, and/or manufactured closer to the location of the project.
 - 4. Have longer documented life span under normal use.
 - 5. Result in less construction waste. See Section 01 7419

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, substitutions allowed as per each individual section upon approval during bidding process. Contractors may bid on approved manufacturer's products or substitutions approved during bidding; those that are approved in an addendum.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

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 and place in location as directed; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to CMGC Contractor .
 - 2. Arrange and pay for product delivery to site.
 - 3. On delivery, inspect products jointly with CMGC Contractor .
 - 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for manufacturers' warranties, inspections, and service.
- B. CMGC Contractor 's Responsibilities:
 - 1. Review Owner reviewed shop drawings, product data, and samples.
 - 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 3. Handle, store, install and finish products.
 - 4. Repair or replace items damaged after receipt.

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. See Section 01 7419.
- 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 6000

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BID FORM

CCSD Hyde Park Middle School – Footings & Foundation/Site Bid Package #1

This bid form must be completed in its entirety for the bid to be considered.

Company Name: _____

Address: _____

Contractor’s License number: _____

Phone Number: _____ Fax number: _____

Email Address: _____

Name of Contact: _____

BID TO: DWA Construction, Inc.
76 West 2400 North
P.O. Box 3448
Logan, Utah 84323-3448
Phone: 435-752-6860 Fax: 435-752-7606
E-mail: dwanate.h@dwaconstruct.com or dennis@dwaconstruct.com

**PLEASE NOTE that this project is tax exempt – DO NOT include sales tax.
If you are bidding more than one specification section,
Please attach additional breakdown information.**

Acknowledge addendums: (list each separately) ____ / ____ / ____ / ____ / ____ / ____ / ____ / ____ / ____ / ____ / ____.

Base Bid per construction documents, including strip, remove, and stockpile topsoil in designated areas for entire project. This includes the bid alternate areas. Install and construct underground utilities in all areas including the bid alternates.



Bidding Section(s): _____

Base bid: (\$ _____)

Written amount: _____ dollars

BID ALTERNATES:

Deductive Alternate #1: Classroom Wing (8 Classrooms)

Pit run for the classroom wing will be part of the base bid. Earthwork, excavation, backfilling, and compaction, concrete footings, concrete foundation walls, reinforcing for concrete, and underground utilities.

Bidding Section(s): _____

Alt. bid 1: **DEDUCT** (\$ _____)

Written amount: _____ dollars

(In case of discrepancy between the written amount and numerical amount, written amount will govern)

End of Alternates



ADDITIONAL BIDDING REQUIREMENTS:

(Failure to respond where required may result in disqualification of bid)

1. Bids shall be priced lump sum to furnish and / or install all material and / or equipment as required by plans and specifications for a complete installation. This project is tax exempt and tax should not be included.
2. The construction duration portion of this project will be 24 months or less. Material and equipment must be delivered and installed in accordance with the Construction Manager’s schedule. **Please note that the construction schedule is preliminary in nature and is subject to change during the duration of the project.** Liquidated damages are \$1000.00 per day. See Advertisement for Bids.
3. COST OF PAYMENT AND PERFORMANCE BOND: \$_____.
Only bids over \$50,000.00 will require a performance and payment bond at CM/Owner option.
(This amount will be added to the base bid amount if payment and performance bonds are required. If no amount is provided, it will be presumed that the bidder is unable to bond for their work on this project and may be cause for rejection).
4. The Construction Manager and Owner reserve the right to accept or reject any and all proposals or alternates with or without cause for any reason determined to be in the owner’s best interest and to waive any bidding informality or irregularity.
5. The undersigned bidder, having examined the Drawings, Specifications and related documents in their entirety, and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of labor, hereby proposes to complete the work listed above in accordance with the Contract Documents and within the time set forth, at the price stated above and upon the subcontract form included in the Specifications. The above price is to cover all expenses incurred in performing the work required under the Contract Documents.
6. CONTRACTOR’S QUALIFICATION STATEMENT: Upon request the low bidders shall submit AIA Document A305 Contractor’s Qualification Statement. Failure to show a statement satisfactory to the Owner or Construction Manager will be reason to reject the bid as nonresponsive. Past performance on similar projects, the demonstrated ability to complete work on schedule and ability to perform the work on this project to the satisfaction of the Owner and Construction Manager will be a priority.

BY ITS SIGNATURE, BIDDER ACKNOWLEDGES THAT THE BID DOCUMENTS ARE A COMPLETE PACKAGE. BIDDER CERTIFIES IT HAS REVIEWED ALL BID DOCUMENTS TO DETERMINE ITS TOTAL SCOPE OF WORK AND HAVE INCLUDED ALL RELATED COSTS.

Name of Bidder:

Authorized Signature:

Date

Printed name of authorized signature: Contact phone number: _____



Utah State Tax Commission

Exemption Certificate for Governments & Schools
(Sales, Use, Tourism and Motor Vehicle Rental Tax)

TC-721G

Rev. 5/18

Form with fields: Name of institution claiming exemption (purchaser), Telephone Number, Street Address, City, State, ZIP Code, Authorized Signature, Name (please print), Title, Name of Seller or Supplier, Date.

The person signing this certificate MUST check the applicable box showing the basis for which the exemption is being claimed.

Email questions to taxmaster@utah.gov. You may also write or visit the Tax Commission at 210 N 1950 W, Salt Lake City, UT 84134, or call 801-297-2200 or toll free 1-800-662-4335.

DO NOT SEND THIS CERTIFICATE TO THE TAX COMMISSION
Keep it with your records in case of an audit.

UNITED STATES GOVERNMENT OR NATIVE AMERICAN TRIBE
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of essential governmental or tribal functions.
NOTE: Includes sales of tangible personal property to federally chartered credit unions. "Directly" does not include per diem, entity advances, or government reimbursements for employee credit card purchases.

CONSTRUCTION MATERIALS PURCHASED FOR SCHOOLS OR PUBLIC TRANSIT DISTRICTS
I certify the construction materials purchased are on behalf of a public elementary or secondary school, or public transit district. I further certify the purchased construction materials will be installed or converted into real property owned by the school or public transit district.
Name of school or public transit district:
Name of project:

FOREIGN DIPLOMAT
I certify the purchases are authorized by a diplomatic tax exemption card issued by the United States.
Foreign diplomat number:

Construction Materials Purchased for Airports
I certify the construction materials are purchased by, on behalf of, or for the benefit of Salt Lake International Airport, or a new airport owned or operated by a city in Davis, Utah, Washington or Weber County. I further certify the construction materials will be installed or converted into real property owned by and located at the airport.

UTAH LOCAL GOVERNMENTS AND PUBLIC ELEMENTARY AND SECONDARY SCHOOLS
Sales Tax License No.
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of that entity's essential functions. For construction materials, if the purchaser is a Utah local government, these construction materials will be installed or converted into real property by employees of this government entity.
CAUTION: This exemption does not apply to government or educational entities of other states and is not valid for lodging-related purchases.

UTAH STATE GOVERNMENT
Sales Tax License No.
I certify the tangible personal property or services purchased are to be paid directly with funds from the entity noted on this form and will be used in the exercise of its essential functions. For construction materials, they will be installed or converted into real property by employees of this government entity.
CAUTION: This exemption does not apply to other states and is not valid for lodging-related purchases.

HEBER VALLEY HISTORIC RAILROAD
I certify these purchases and sales are by the Heber Valley Historic Railroad Authority or its operators and are related to the operation and maintenance of the Heber Valley Historic Railroad.

To be valid this certificate must be filled in completely, including a check mark in the proper box.

A sales tax license number is required only where indicated.

Please sign, date and, if applicable, include your license or exemption number.

NOTE TO SELLER: Keep this certificate on file since it must be available for audit review.

NOTE TO PURCHASER: Keep a copy of this certificate for your records. You must notify the seller of cancellation, modification, or limitation of the exemption you have claimed.

If you need an accommodation under the Americans with Disabilities Act, email taxada@utah.gov, or call 801-297-3811 or TDD 801-297-2020. Please allow three working days for a response.



PAYMENT REQUEST FORM

Project Name: New Hyde Park Middle School Bid Package 1 Footings, Foundations/Site

Invoice/Payment Application Number: _____

Period Ending Date: _____

STATEMENT OF CONTRACT AMOUNT:

- 1. Original Contract Amount \$ _____
- 2. Approved Change Orders \$ _____
- 3. Adjusted Contract Amount *(Add or Subtract line 2 from line 1)* \$ _____

PROGRESS BILLING:

- 4. Work Completed and Materials Provided on Contract to Date (____% to date) \$ _____
- 5. Less Retention (.5% to date) \$ _____
- 6. Total Work Completed and Materials Provided Less Retention *(Subtract line 5 from line 4)* \$ _____
- 7. Total Previous Application for Payments *(Line 6 from previous application)* \$ _____
- 8. **AMOUNT DUE THIS REQUEST** *(Subtract line 7 from line 6)* \$ _____

LABOR & MATERIALS SUPPLIED THIS MONTH:

- 9. Materials supplied this month \$ _____
- 10. Labor this month \$ _____

Supplier/Subcontractor Lien Releases (DWA provided forms) must be provided prior to distribution of payments.

Waiver & Releases attached to this payment request form? (circle one). Yes No

Name and Amount of Two-Party Checks required on this months draw: _____

Company Name: _____

DWA Utah Conditional Waiver & Release Upon Progress Payment must be attached to this request.

By: _____
(Signature Here)

Print Name: _____

Title: _____

Date: _____



CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT

Property Name: New Hyde Park Middle School Bid Package 1 Footing, Foundation/Site

Property Location: 250 W 200 S, Hyde Park, Utah 84318

Undersigned's Customer: _____

Invoice/Payment Application Number: _____

Payment Amount: \$ _____

Payment Period: _____

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics' Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above described Property once:

1. the undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and
2. the check is paid by the depository institution on which it is drawn.

This waiver and release applies to a progress payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned's Customer which are the subject of the invoice or Payment Application, but only to the extent of the Payment Amount.

This waiver and release does not apply to any retention withheld; any items, modifications, or changes pending approval; disputed items and claims; or items furnished or invoiced after the Payment Period.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from this progress payment promptly to pay in full all the undersigned's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: _____

(Company Name)

By: _____

Its: _____



WAIVER AND RELEASE UPON FINAL PAYMENT

Property Name: New Hyde Park Middle School Bid Package 1 Footings, Foundation/Site

Property Location: 250 W 200 S, Hyde Park, Utah 84318

Undersigned's Customer: DWA CONSTRUCTION INC.

Invoice/Payment Application Number: _____

Payment Amount: _____

To the extent provided below, this document becomes effective to release and the undersigned is considered to waive any notice of lien or right under Utah Code Ann., Title 38, Chapter 1, Mechanics' Liens, or any bond right under Utah Code Ann., Title 14, Contractors Bonds, or Section 63-56-504 related to payment rights the undersigned has on the above-described Property once:

1. the undersigned endorses a check in the above referenced Payment Amount payable to the undersigned; and
2. the check is paid by the depository institution on which it is drawn.

This waiver and release applies to the final payment for the work, materials, equipment, or a combination of work, materials, and equipment furnished by the undersigned to the Property or to the Undersigned's Customer.

The undersigned warrants that the undersigned either has already paid or will use the money the undersigned receives from the final payment promptly to pay in full all the undersigned's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment that are the subject of this waiver and release.

Dated: _____

(Company Name)

By: _____

Its: _____

**SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- E. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

1.05 UTAH ADMINISTRATIVE CODE - R307 ENVIRONMENTAL QUALITY, AIR QUALITY; RULE R307-357. CONSUMER PRODUCTS.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by CMGC Contractor .

END OF SECTION 01 6116

**SECTION 01 7000
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, None - N/A.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including CMGC Contractor 's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- C. Section 01 5000 - Temporary Facilities and Controls: Temporary interior partitions.
- D. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- E. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.
- F. Section 07 8400 - Firestopping.
- G. Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.

1.03 REFERENCE STANDARDS

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

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. 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.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in Utah and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.06 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- D. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- E. 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.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- F. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- G. 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.
 - 2. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.
- H. 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.

1.07 COORDINATION

- A. See Section 01 1000 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. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. 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 mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, 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

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

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 misfabrication.
- 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 Architect four 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 Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. CMGC Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Grid or axis for structures.
 - 2. Building foundation, column locations, ground floor elevations.
- I. Periodically verify layouts by same means.
- J. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. 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.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 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 Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.

3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
 4. Verify that abandoned services serve only abandoned facilities.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove 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.
- F. 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.
- G. 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 Architect.
 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 3. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
 4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. 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 mechanical, 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.

- D. 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.
- E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
- J. 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.

3.08 PROGRESS CLEANING

- 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. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.09 PROTECTION OF 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. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.10 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable CMGC Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 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.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.13 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Replace filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary observation to determine items to be listed for completion or correction in the CMGC Contractor 's Correction Punch List for CMGC Contractor 's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion observation.
- D. Conduct Substantial Completion observation and create Final Correction Punch List containing Architect's and CMGC Contractor 's comprehensive list of items identified to be completed or corrected and submit to Architect.
- E. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

- F. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final observation.
- G. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.15 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. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION 01 7000

**SECTION 01 7800
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 4000 05.1 Sub Bonds: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit an electronic copy of preliminary draft or proposed formats and outlines of contents before start of Work. Architect 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 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit 1 electronic copy and 3 hard sets of revised final documents in final form within 10 days after 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. Addenda.
 - 3. Change Orders and other modifications to the Contract.
 - 4. Reviewed shop drawings, product data, and samples.
 - 5. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. 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:
- 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. 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. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. 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 Architect, Consultants, CMGC 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.

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. Owner to determine the method of submittal delivery; manual in a commercial quality binder, submitted digitally or a combination of both.
- F. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION 01 7800

**SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES**

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 stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 04 2000 - Unit Masonry: Reinforcement for masonry.
- C. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.
- D. Section 05 2100 - Steel Joist Framing: Placement of embedded steel anchors, plates and joist seats in cast-in-place concrete.
- E. Section 05 3100 - Steel Decking: Placement of steel anchors in composite decking.

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 concrete that complies with 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.03 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

3.04 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.

3.05 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 03 1000

**SECTION 03 2000
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 1119 - Insulating Concrete Forming
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 03 4500 - Precast Architectural Concrete: Reinforcement for precast concrete panels.
- D. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

1.03 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI MNL-66 - ACI Detailing Manual; 2020.
- C. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2022.
- F. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2021.
- G. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
- H. CRSI (DA4) - Manual of Standard Practice; 2023.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
- C. 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 components for placement within 1-1/2 inches of weathering surfaces.

2.02 RE-BAR SPLICING:

- A. Coupler Systems: Mechanical devices for splicing reinforcing bars.

1. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.
 2. Comply with ACI CODE-318 steel reinforcing design strength requirements for splices in tension and compression.
- B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for splicing reinforcing bars.
 - C. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.
 - D. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.

2.03 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 Engineer and notification to the 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. Maintain concrete cover around reinforcing as noted on structural drawings.
- E. Comply with applicable code 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.

3.03 SCHEDULES

- A. Reinforcement For Superstructure Framing Members: Deformed bars, unfinished.
- B. Reinforcement For Foundation Wall Framing Members, Slab-on-Grade, and Insulating Concrete Forming Walls: Deformed bars and welded wire reinforcement, galvanized finish.

END OF SECTION 03 2000

**SECTION 03 3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal and replacement of existing concrete
- B. Floors and slabs on grade.
 - 1. Including: Monolithically poured seamless concrete slab (no sawcuts, control, or expansion joints)
- C. Concrete shear walls, foundation walls, and retaining walls.
- D. Concrete reinforcement.
- E. Track curbing
- F. Runways and walk ways
- G. Concrete curing.
- H. Excavation, gravel, and backfill

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- C. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- D. ACI PRC-308 - Guide to External Curing of Concrete; 2016.
- E. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2022.
- G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2023.
- H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2023.
- I. ASTM C857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures; 2019.
- J. ASTM C858 - Standard Specification for Underground Precast Concrete Utility Structures; 2019.
- K. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures; 2020.
- L. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2023.
- M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- N. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2023.
- O. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2023, with Editorial Revision.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

- B. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.
 - 3. Indicate proposed mix design complies with fiber reinforcing manufacturer's written recommendations.
- C. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.
- D. Test Reports: Submit report for each test or series of tests specified.

PART 2 PRODUCTS

2.01 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Type: Deformed billet-steel bars.

2.02 CONCRETE MATERIALS

- A. Fine Aggregate: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
 - 2. Natural sand, manufactured sand, or combination thereof, washed and screened, consisting of hard durable uncoated particles free of deleterious matter and shall be so graded from course to fine as to produce minimum percentage of voids.
 - 3. Test fine aggregate for reactivity in presence of cement alkalis in accordance with ASTM C289
- B. Course Aggregate: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
 - 2. Normal Weight Aggregate: ASTM C33/C33M, gravel or crushed stone suitably washed and screened, and shall consist of hard, durable particles without adherent coatings.
 - 3. Lightweight Aggregate: ASTM C330/C330M, suitably processed, washed and screened, and shall consist of durable particles without adherent coatings.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Precast Concrete Catch Basins: ASTM C858 precast reinforced concrete, designed according to ASTM C857 for structural loading.

2.03 ADMIXTURES

- A. Chemical Admixture: ASTM C260/C260M
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C260/C260M.

2.04 CURING MATERIALS

- A. No curing or Hardening Agents: No curing agents, sealers, or hardener shall be used to aid in curing of concrete. If present these compounds must be removed by shot blasting or scarifying prior to installation of synthetic surface. Chemical curing agents, sealer, or hardeners may have an adverse effect on the adhesion of the synthetic track surface to the concrete base.

2.05 CONCRETE MIX DESIGN

- A. Admixtures: Add acceptable admixtures as recommended in ACI PRC-211.1 and at rates recommended or required by manufacturer.
- B. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
 - 2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
 - 3. Water-Cement Ratio: As indicated on structural drawings..

4. Total Air Content: As indicated on structural drawings.
5. Maximum Slump: 3-1/2 inches at point of placement.
6. No water shall be added at job site.

PART 3 EXECUTION

3.01 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Accurately position and support reinforcement, and secure against displacement.

3.02 PLACING CONCRETE

- A. Place concrete in accordance with ACI PRC-304.
- B. Place 4" minimum concrete over 4 inches of ¾ inch crushed aggregate base course.
- C. Locate and install contraction, construction, isolation, and expansion joints as indicated or required.
- D. Place concrete in a continuous operation within planned joints or sections. Do not add water to adjust slump.
- E. Place pre-cast concrete catch basin as indicated and install according to ASTM C891. Connect to existing drainage system if any. Verify existing conditions and report findings to architect.

3.03 CONCRETE FINISHING

- A. Float surfaces to true planes within a tolerance of 1/4 inch in 10 feet (1:480) and medium-to-fine-textured broom finish.
- B. Tool edges and joints to a radius of 1/4 inch (6 mm)

3.04 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.

3.05 FIELD QUALITY CONTROL

- A. Owner will employ a testing agency to sample concrete, perform tests, and submit test reports during concrete placement. Every concrete truck shall be tested.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.

3.06 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by CMGC Contractor when defective concrete is identified.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.07 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface for at least 14 days.
- B. Hot Weather: ACI 305R
 1. Reduce temperature of mix ingredients or use an admixture appropriate to job conditions when air temperature is over 75 deg. F.

END OF SECTION 03 3000

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**SECTION 07 2100
THERMAL INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 3. Board Edges: Square.
 - 4. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
 - 5. Products:
 - a. DuPont de Nemours, Inc; Styrofoam Brand ____: building.dupont.com/#sle.
 - b. Kingspan Insulation LLC; GreenGuard GG25-LG XPS Insulation Board: www.kingspan.com/#sle.
 - c. Kingspan Insulation LLC; GreenGuard XPS TYPE VI 40 PSI: www.trustgreenguard.com/#sle.
 - d. Owens Corning Corporation; FOAMULAR Type ____ Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

- A. Acoustic Caulk and Outlet Putty Packs: In accordance to Section 09 2116 Gypsum Board Assemblies.
- B. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Adhere 6 inches wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
- B. Apply adhesive to back of boards:
- C. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Butt edges and ends tightly to adjacent boards and protrusions.
- D. Extend boards over expansion joints, unbonded to wall on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for additional requirements.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 07 2100

**SECTION 31 1000
SITE CLEARING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Removing trees and other vegetation.
 - 2. Clearing and grubbing.
 - 3. Topsoil stripping.
 - 4. Removing above-grade site improvements.
 - 5. Disconnecting, capping or sealing, and removing site utilities.
- B. Related Sections include the following:
 - 1. Division 1 Section "Temporary Facilities and Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
 - 2. Division 31 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

- A. Materials indicated to be stockpiled or to remain are the Owner's property. Cleared materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS

- A. Photographs, DVD or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings according to Division 1 Section "Closeout Procedures."
 - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing indicated removal and/or access on property adjoining Owner's property will be obtained by Owner before award of Contract.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Notification: Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Locate and clearly flag trees and vegetation to remain or to be relocated.
- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

- A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
 - 2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.
- B. Do not excavate within drip line of trees, unless otherwise indicated.
- C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 - 1. Cover exposed roots with burlap and water regularly.
 - 2. Temporarily support and protect roots from damage until they are permanently relocated and

- covered with soil.
 - 3. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.
- 1. Employ a qualified arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
 - 2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

3.3 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
- 1. Arrange to shut off indicated utilities with utility companies.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
- 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, asphalt & concrete paving, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
- 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 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.
 - 3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches (450 mm) below exposed subgrade.
 - 4. Use only hand methods for grubbing within drip line of remaining trees.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- 1. Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove sod, grass, asphalt and concrete paving before stripping topsoil.

- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
 - 2. Do not stockpile topsoil within drip line of remaining trees.
 - 3. Dispose of excess topsoil as specified for waste material disposal.
 - 4. Stockpile surplus topsoil and allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.7 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311000

**SECTION 31 22 00
SITE EXCAVATION AND ROUGH GRADING**

PART 1 -GENERAL

1.1 DESCRIPTION

- A. Definitions:
 - 1. Unsuitable material: Debris and/or soil material judged unsuitable by Engineer for support of slabs or other site improvements.
 - 2. Engineer: Soils Engineer employed by Owner, empowered to conduct inspections and make approvals.

1.2 QUALITY ASSURANCE

- A. Compaction density test:
 - 1. Modified Proctor, ASTM-D 1557.
- B. Layout work by Surveyor or Civil Engineer registered in the State of Utah. Identify benchmark to be used in establishing grades.
- C. Owner will hire an independent soils laboratory to conduct in place moisture and density tests.
- D. Tolerances of sub-grade:
 - 1. Unsurfaced areas: Plus/minus 0.20 FT from required elevations.
 - 2. Paved areas: Plus/minus 0.10 FT from required elevations.

1.3 JOB CONDITIONS

- A. Protect existing facilities, utilities (overhead and underground), sidewalks, pavement.
 - 1. Repair damaged items.
 - 2. Notify Owner and make emergency repair as directed.
- B. Protect graded areas against erosion.
 - 1. Re-establish grade where settlement or washing occurs at no extra cost.

PART 2 -PRODUCTS

2.1 MATERIALS

- A. Fill materials:
 - 1. Reasonably free of roots, organic material, trash, frozen matter, and stones larger than 6 IN.
 - 2. Add water to dry material, as required.
 - 3. Allow wet material to dry, as required.
 - 4. Fill can only be obtained on site where removed from excavating and grading.
 - 5. Provide additional off-site borrow or fill as required.
- B. Surplus material:
 - 1. Remove from site.

PART 3 -EXECUTION

3.1 PREPARATION

- A. Layout units, structures, piping, roads, parking areas and walks and establish their elevations.
- B. Perform other layout work required.
- C. Preparation for embankments and fills:
 - 1. Remove topsoil over areas to be cut and filled that was not previously removed by stripping and grubbing.
 - 2. Before fill is started, scarify to a minimum depth of 6 IN under new roads, parking lots, or streets.
 - 3. Bring to optimum moisture content.
 - 4. Compact to a minimum 95 percent.
 - 5. In areas where existing ground surface is steeper than one vertical to four horizontal, bench surface in order to spread fill horizontally so that fill material will bond with existing surface.

3.2 GENERAL

- A. Excavate and grade materials to design elevations.
- B. Excavate and grade site to subgrades of paved and unpaved areas as indicated.
- C. Excavate for miscellaneous footings, slabs, walks and other structures.
- D. Cut and fill as required to bring existing grades to rough grades.
- E. Furnish and place additional approved material required to bring subgrade to proper line and grade.
- F. During construction, shape and drain embankments and excavation.
- G. Maintain ditches and drains to provide drainage.
- H. Provide pumping if required.
- I. Remove unsuitable materials which cannot be compacted as specified and replace with suitable material.
 - 1. Dispose material on site as directed.
 - 2. Dispose material off site as directed.
- J. Remove materials unsuitable to receive fill and replace with suitable material.

3.3 CONSTRUCTION OF EMBANKMENTS AND FILLS

- A. Construct embankments and fills to lines and grades.
- B. Make completed fill correspond to shape of typical cross section or contour indicated regardless of method used to indicate shape, size, and extent of line and grade of work.
- C. Insure that cobbles larger than 4 IN, are not placed in upper 6 IN of fill or embankment.
- D. Place material in lifts, maximum 8 IN loose thickness.
- E. Place layers horizontally and compact each layer to specified density prior to placing additional fill.
- F. Compact using suitable equipment.
 - 1. Control moisture to meet requirements of compaction.
 - 2. Place materials within 3 percent above to 3 percent below optimum moisture content.
- G. Under roadways and parking areas and extending 1 FT beyond proposed curb line measured perpendicular from centerline, compact to 95 percent maximum dry density.
- H. Under walk paving, compact to 95 percent maximum dry density.
- I. For other embankments and fills not listed, compact to 90 percent of maximum dry density.
- J. Under proposed building and structures, compact to density as specified in Section 31 23 00.

END OF SECTION 31 2200

**SECTION 31 2300
EARTHWORK**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for slabs-on-grade.
 - 4. Subbase course for concrete walks and pavements.
 - 5. Base course for asphalt paving.
 - 6. Subsurface drainage backfill for walls and trenches.
 - 7. Excavating and backfilling trenches within building lines.
 - 8. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls."
 - 2. Division 31 Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.

1.3 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations.
 - 1. Bulk Excavation: Excavations more than 10 feet (3 m) in width and pits more than 30 feet (9 m) in either length or width.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 1557 for each on-site or borrow soil material proposed for fill and backfill.

1.5 PROJECT CONDITIONS

- A. Site Information: A Geotechnical Investigation of this site has been prepared. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.
 - 1. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.
- B. No additional monies for exporting or importing of soil.
 - 1. As part of the Construction Documents, Owner may have provided Contractor with a Topographic Survey performed by manual or aerial means. Such Survey was prepared for project design purposes and is provided to the Contractor as a courtesy. It is expressly understood that such survey may not accurately reflect existing topographical conditions and typically will vary from actual conditions by a significant degree. It is the Contractor's responsibility to verify actual existing conditions by whatever means the Contractor deems appropriate. The Contractor shall be responsible for determining their own earthwork quantities and not rely on any estimate prepared by the Owner, its Agents or outside parties. The Contractor is responsible as part of its lump sum bid price for the project, for importing or exporting soils to achieve final sub-grades with suitable soils per the plans and specifications. No additional monies will be allowed beyond the Contractor's Lump Sum Bid Price for the project, for the exporting or importing of soils.

- C. Existing Utilities: 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.
 - 1. 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.
 - 2. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
 - 3. Notify Architect not less than seven (7) days in advance of proposed utility interruptions.
 - 4. Do not proceed with utility interruptions without Architect's written permission.
 - 5. Contact utility-locator service for area where Project is located before excavating.

- D. Utilities to be removed: Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

- E. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
 - 1. Operate warning lights as recommended by authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 4 inches (100 mm) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

- D. Backfill and Fill: Satisfactory soil materials.

- E. Subbase: Naturally or artificially well graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 70 percent passing a 3/4- inch (18-mm) sieve and not more than 25 percent passing a No. 200 (0.075-mm) sieve.

- F. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; conforming to the 1 inch gradation requirements of Section 301 of the UDOT Standard Specification for Road and Bridge Construction.

- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 70 percent passing a 3/4-inch (18-mm) sieve and not more than 25 percent passing a No. 200 (0.075-mm) sieve.

- H. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.
- I. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch (25-mm) sieve and 0 to 5 percent passing a No. 4 (4.75-mm) sieve.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:
- B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- C. Trace Wire: Insulated 10 gage copper, suitable for direct bury.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide 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.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 FT (25 mm). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. If required to not disturb bottom of excavation, excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Excavation for Underground Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.1 FT (25 mm). Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Trench Excavation: Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
 - 2. Trench Clearance: Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 3. Clearance: 12 inches (300 mm) on each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench

- to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches (100 mm) deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
1. Excavate trenches 6 inches (150 mm) deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 TRENCH SUPPORT SYSTEMS

- A. Trench support system shall be suitable for the soil structure, depth of cut, water content of soil, weather conditions, superimposed loads and vibration. Contractor may select one of the following methods of ensuring the safety of workers in the trench, as approved by the Utah State Industrial Commission or its safety inspectors:
1. Sloping the sides of the trench to the angle of repose at which the soil will remain safely at rest.
 2. Shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, or other materials to resist pressures surrounding the excavation.
 3. Using a movable trench box built-up of steel plates and heavy steel frame of sufficient strength to resist the pressures surrounding the excavation

3.9 APPROVAL OF SUBGRADE

- A. Notify Architect when excavations have reached required subgrade.
- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.11 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Inspecting and testing underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.13 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches (450 mm) of bottom of footings; fill with concrete to elevation of bottom of footings.
- C. Provide 4-inch- (100-mm-) thick, concrete-base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway subbase.
- D. Place and compact initial backfill of subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.
 - 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.
- G. Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.14 FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.

3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.15 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.16 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 6 inches (150 mm) of existing subgrade and each layer of backfill or fill material at 95 percent. Compact to 98 percent for fills thicker than 6 feet deep.
 2. Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 95 percent.
 3. Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 90 percent.

3.17 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Lawn or Unpaved Areas: Plus or minus 0.2 FT (25 mm).
 2. Walks: Plus or minus 0.1 FT (25 mm).
 3. Pavements: Plus or minus 0.1 FT (13 mm).
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 0.1 FT (13 mm) when tested with a 10-foot (3-m) straightedge.

3.18 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course on prepared subgrade and as follows:

1. Place base course material over subbase.
 2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
 3. Shape subbase and base to required crown elevations and cross-slope grades.
 4. When thickness of compacted subbase or base course is 6 inches (150 mm) or less, place materials in a single layer.
 5. When thickness of compacted subbase or base course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches (300 mm) wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 DRAINAGE COURSE

- A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
 2. When compacted thickness of drainage course is 6 inches (150 mm) or less, place materials in a single layer.
 3. When compacted thickness of drainage course exceeds 6 inches (150 mm), place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.

3.20 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 1000 sq. ft. (186 sq. m) or less of paved area or building slab, but in no case fewer than three tests.
 2. Foundation Wall/Continuous Footing Backfill: At each compacted backfill layer, at least one test for each 15 linear feet or less of wall length, but no fewer than two tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 40 feet or less of trench length, but no fewer than two tests.
 4. Spot Footings: Minimum of 1 compaction test for each lift for each spot footing.
 5. Sidewalks, Curbs, Gutters, Pads: Minimum of 1 test for each lift for each 40 lineal feet or 1 test

for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.21 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 31 2300

**SECTION 31 2500
EROSION CONTROL**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section covers the work required for erosion control during construction. Any local or State Agency requirements will be considered part of these specifications.
- B. Obtain the National Pollution Discharge Elimination System (NPDES) Permit for storm water discharge associated with construction activity.
- C. Obtain a UPDES Storm Water General Permit for Construction Activities (Permit #UTR100000) or an alternate individual permit. Applications are available online at www.waterquality.utah.gov/UPDES/stormwater.

PART 2 - PRODUCTS

2.1 SILT FENCE

- A. Silt fence shall be a woven fabric that meets the following criteria:

<u>Property</u>	<u>Unit</u>	<u>Test Method</u>	<u>Values</u>
Grab Strength	lbs	ASTMD-4632	90 min
Grab Elongation	%	ASTMD-4632	40 max
Water Flow Rate	gal/min/ft2	ASTMD-4491	15 min
Ultraviolet Stability %		ASTMD-4355	70% min

PART 3 - EXECUTION

3.1 EXECUTION

- A. Silt fence shall be placed in accordance with plans and details. The placement of silt fence and/or bales shall consider drainage paths and intercept drainage prior to leaving the site or entering a storm sewer system. Removal of silt and replacement of silt fence and/or bales shall be on going through the duration of the project to maintain an effective silt removing barrier.
- B. Sediment Basin and/or sinks shall be constructed to dimensions shown on the plans. The basins and/or sinks shall be cleaned as required to maintain specified size and depth.
- C. All temporary grading of drainage channels, slopes or fills shall be in accordance with Division 31 Section "Earthwork".

END OF SECTION 31 2500

**SECTION 32 1216
ASPHALT PAVING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold milling of existing asphalt pavement.
 - 2. Hot-mix asphalt patching.
 - 3. Hot-mix asphalt paving.
 - 4. Hot-mix asphalt overlay.
 - 5. Asphalt curbs.
 - 6. Asphalt traffic-calming devices.
 - 7. Asphalt surface treatments.
- B. Related Requirements:
 - 1. **Section 024119 "Selective Demolition"** for demolition and removal of existing asphalt pavement.
 - 2. Section 312000 "Earth Moving" for subgrade preparation, fill material, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
 - 3. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.
 - 4. Section 321400 "Unit Paving" for bituminous setting bed for pavers.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at site.
- B. Review SECTION 013100 "Project Management and Coordination." for conference participants.
 - 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
 - b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include technical data and tested physical and performance properties.

2. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
 3. Job-Mix Designs: For each job mix proposed for the Work.
- B. LEED Submittals:
1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
- C. Samples for Verification: For the following product, in manufacturer's standard sizes unless otherwise indicated:

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For **[manufacturer] [and] [testing agency]**.
- B. Material Certificates: For each paving material. **[Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.]**
- C. Material Test Reports: For each paving material, by a qualified testing agency.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: **[A paving-mix manufacturer approved by engineer]** .
- B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of MILLVILLE CITY STANDARDS and UDOT for asphalt paving work.
 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 1. Prime Coat: Minimum surface temperature of 60 deg F.
 2. Tack Coat: Minimum surface temperature of 60 deg F.
 3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
 4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: **[ASTM D 1073]** **[or]** **[AASHTO M 29]**, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: **[ASTM D 242/D 242M]** **[or]** **[AASHTO M 17]**, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: AASHTO M 320, **[PG 58-28]**
- B. Asphalt Cement: **[ASTM D 3381/D 3381M for viscosity-graded material]** **[ASTM D 946/D 946M for penetration-graded material]**.
- C. Cutback Prime Coat: ASTM D 2027, medium-curing cutback asphalt, **[MC-30 or MC-70]** **[MC-250]**.
- D. Emulsified Asphalt Prime Coat: **[ASTM D 977]** **[or]** **[AASHTO M 140]** emulsified asphalt, or **[ASTM D 2397]** **[or]** **[AASHTO M 208]** cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- E. Tack Coat: **[ASTM D 977]** **[or]** **[AASHTO M 140]** emulsified asphalt, or **[ASTM D 2397]** **[or]** **[AASHTO M 208]** cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.
- F. Fog Seal: **[ASTM D 977]** **[or]** **[AASHTO M 140]** emulsified asphalt, or **[ASTM D 2397]** **[or]** **[AASHTO M 208]** cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.
- G. Water: Potable.
- H. Undersealing Asphalt: ASTM D 3141/D 3141M; pumping consistency.

2.3 AUXILIARY MATERIALS

- A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled **[tires]** **[asphalt shingles]** **[or]** **[glass]** from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.
- B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

- C. Sand: **[ASTM D 1073]** [or] **[AASHTO M 29]**, Grade No. 2 or No. 3.
- D. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.
- E. Joint Sealant: **[ASTM D 6690]** [or] **[AASHTO M 324]**, **[Type I]** **[Type II or III]** **[Type IV]**, hot-applied, single-component, polymer-modified bituminous sealant.

2.4 MIXES

- A. Recycled Content of Hot-Mix Asphalt: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **[10]** percent or more than **[15]** percent by weight.
 - 1. Surface Course Limit: Recycled content no more than **[10]** percent by weight.
- B. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes **[approved by authorities having jurisdiction] [; designed according to procedures in AI MS-2, "Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types";]** and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - 2. Base Course: 3/4"
 - 3. Surface Course: 1/2"
- C. Emulsified-Asphalt Slurry: ASTM D 3910, **[Type 1]** **[Type 2]** **[Type 3]**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction[, **repeating proof-rolling in direction perpendicular to first direction**]. Limit vehicle speed to 3 mph .
 - 2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.
 - 1. Mill to a depth of **[2 inches]**
 - 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 - 3. Control rate of milling to prevent tearing of existing asphalt course.
 - 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.

5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
6. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
7. Handle milled asphalt material according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."
8. Keep milled pavement surface free of loose material and dust.
9. Do not allow milled materials to accumulate on-site.

3.3 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseal concrete pieces firmly.
 1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseal pieces firmly.
 2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.
- C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.05 to 0.15 gal./sq. yd.
 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.
- E. Placing Patch Material: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.4 REPAIRS

- A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.
 1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.
- B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of **[1/4 inch]**
 1. Clean cracks and joints in existing hot-mix asphalt pavement.
 2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
 3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.5 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
 - 1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.
- C. Cutback Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.
- D. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.
 - 1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
 - 2. Protect primed substrate from damage until ready to receive paving.
- E. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.6 PAVING GEOTEXTILE INSTALLATION

- A. Apply [**tack coat**] [**asphalt binder**] [**asphalt cement**] uniformly to existing pavement surfaces at a rate of 0.20 to 0.30 gal./sq. yd.
- B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches
- C. Protect paving geotextile from traffic and other damage, and place hot-mix asphalt overlay the same day.

3.7 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 - 1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.

2. Place hot-mix asphalt surface course in single lift.
 3. Spread mix at a minimum temperature of 250 deg F
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
 2. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches
 3. Offset transverse joints, in successive courses, a minimum of 24 inches
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints **[using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."]** Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 5. Compact asphalt at joints to a density within 2 percent of specified course density.

3.9 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
1. Complete compaction before mix temperature cools to 185 deg F
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
1. Average Density: 96 percent of reference laboratory density according to **[ASTM D 6927]** **[or]** **[AASHTO T 245]**, but not less than 94 percent or greater than 100 percent.

2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent or greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
 - E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
 - F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
 - G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 - H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.10 ASPHALT CURBS

- A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F
 1. Asphalt Mix: Same as pavement surface-course mix.
- B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.11 ASPHALT TRAFFIC-CALMING DEVICES

- A. Construct hot-mix asphalt speed **[bumps]** **[humps]** **[cushions]** **[and]** **[tables]** over compacted pavement surfaces. Apply a tack coat unless pavement surface is still tacky and free from dust. Spread mix at a minimum temperature of 250 deg F
 1. Tack Coat Application: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.
 2. Asphalt Mix: Same as pavement surface-course mix.
 3. Before installation, mill pavement that will be in contact with bottom of traffic-calming device. Mill to a depth of 1 inch from top of pavement to a clean, rough profile.
- B. Place and compact hot-mix asphalt to cross section indicated, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.12 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 1. Base Course: Plus or minus 1/2 inch
 2. Surface Course: Plus 1/4 inch no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: [**1/4 inch**]
 2. Surface Course: [**1/8 inch**]
 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch
- C. Asphalt Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch of height indicated above pavement surface.

3.13 SURFACE TREATMENTS

- A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.
- B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.
1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: **Owner will engage** a qualified testing agency to perform tests and inspections.
- B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.
- C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- D. Asphalt Traffic-Calming Devices: Finished height of traffic-calming devices above pavement will be measured for compliance with tolerances.
- E. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to [**ASTM D 979**] [**or**] [**AASHTO T 168**].
1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- F. Replace and compact hot-mix asphalt where core tests were taken.
- G. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.15 WASTE HANDLING

- A. General: Handle asphalt-paving waste according to approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 32 1216

**SECTION 321313
CONCRETE PAVING**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Driveways.
 - 2. Roadways.
 - 3. Parking lots.
 - 4. Curbs and gutters.
 - 5. Walks.
- B. Related Sections:
 - 1. **[Section 033000 "Cast-in-Place Concrete"]** for general building applications of concrete.
 - 2. Section 321316 "Decorative Concrete Paving" for stamped concrete other than detectable warnings.
 - 3. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.
- C. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.
- D. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:
 - 1. Exposed Aggregate: **[10-lb]** Sample of each mix.
 - 2. Wheel Stops: **[6 inches long]** showing cross section; with fasteners.

3. Preformed Traffic-Calming Devices: **[6 inches long]** showing cross section; with fasteners.

E. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified **[Installer of detectable warnings]** **[ready-mix concrete manufacturer]** **[and]** **[testing agency]**.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates. **[Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.]**

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.

B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

C. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

- D. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- E. ACI Publications: Comply with ACI 301 unless otherwise indicated.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
 - 2. Build mockups of concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Architect and not less than **[96 inches by 96 inches]**.**[Include full-size detectable warning.]**
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- G. Preinstallation Conference: Conduct conference at **[Millville/ North Logan]**.
 - 1. Review methods and procedures related to concrete paving, including but not limited to, the following:
 - a. Concrete mixture design.
 - b. Quality control of concrete materials and concrete paving construction practices.
 - 2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete paving subcontractor.
 - e. Manufacturer's representative of stamped concrete paving system used for detectable warnings.

1.7 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of **[40 deg F for oil-based materials]** **[55 deg F for water-based materials]**, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. [**Do not use notched and bent forms.**]
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than **[25]** percent.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from [**galvanized**]-steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.
- E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- F. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
- G. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
- H. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 deformed bars; assembled with clips.
- I. Plain-Steel Wire: ASTM A 82/A 82M, [**galvanized**].
- J. Deformed-Steel Wire: ASTM A 496/A 496M.
- K. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, [**plain**] .
- L. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars[; **zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating**]. Cut bars true to length with ends square and free of burrs.
- M. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain-steel bars.

- N. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- O. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- P. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- Q. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.
- R. Zinc Repair Material: ASTM A 780.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
 - 1. Portland Cement: ASTM C 150, **[gray] [white]** portland cement **[Type I] [Type II] [Type I/II] [Type III] [Type V]**.**[Supplement with the following:]**
 - a. Fly Ash: ASTM C 618, **[Class C] [or] [Class F]**.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
 - 2. Blended Hydraulic Cement: ASTM C 595, **[Type IS, portland blast-furnace slag] [Type IP, portland-pozzolan]** cement.
- B. Normal-Weight Aggregates: ASTM C 33, **[Class 4S] [Class 4M] [Class 1N] <Insert class>**, uniformly graded. Provide aggregates from a single source **[with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials]**.
 - 1. Maximum Coarse-Aggregate Size: **[3/4 inch]** nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:
 - 1. Aggregate Sizes: **[1/2 to 3/4 inch]** nominal.
 - 2. Aggregate Source, Shape, and Color:
- D. Water: Potable and complying with ASTM C 94/C 94M.

- E. Air-Entraining Admixture: ASTM C 260.
- F. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- G. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, [**free of carbon black,**] nonfading, and resistant to lime and other alkalis.
 - 1. Manufacturers: Subject to compliance with requirements, [**provide products by one of the following**]:
 - a. ChemMasters.
 - b. Davis Colors.
 - c. Dayton Superior Corporation.
 - d. Elementis Pigments.
 - e. Hoover Color Corporation.
 - f. Lambert Corporation.
 - g. LANXESS Corporation.
 - h. QC Construction Products.
 - i. Scofield, L. M. Company.
 - j. Solomon Colors, Inc.
 - k. Stampcrete International, Ltd.
 - l. SureCrete Design Products.
 - 2. Color: [**As selected by Architect from manufacturer's full range**].

2.4 FIBER REINFORCEMENT

- A. Synthetic Fiber: [**Monofilament**] [**or**] [**fibrillated**] polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, [**1/2 to 1-1/2 inches**] long.
 - 1. Products: Subject to compliance with requirements, [**provide one of the following**]:
 - a. Monofilament Fibers:
 - 1) Axim Italcementi Group, Inc.; FIBRASOL II P.
 - 2) Euclid Chemical Company (The), an RPM company; Fiberstrand 100, Fiberstrand 150.
 - 3) FORTA Corporation; [**FORTA ECONO-MONO**] [**or**] [**FORTA Mighty-Mono**].
 - 4) Grace, W. R. & Co. - Conn.; Grace MicroFiber.
 - 5) Metalcrete Industries; Polystrand 1000.
 - 6) QC Construction Products; QC FIBERS.

b. Fibrillated Fibers:

- 1) Axim Italcementi Group, Inc.; FIBRASOL F.
- 2) Euclid Chemical Company (The), an RPM company; Fiberstrand F.
- 3) FORTA Corporation; [**FORTA Econo-Net**] [or] [**FORTA Super-Net**].
- 4) Grace, W. R. & Co. - Conn.; Grace Fibers.
- 5) Propex Concrete Systems Corp.; Fibermesh 300.

2.5 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, [**Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry**] [or] [**cotton mats**].
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, [**provide one of the following**]:

- a. Axim Italcementi Group, Inc.; Caltexol CIMFILM.
- b. BASF Construction Chemicals, LLC; Confilm.
- c. ChemMasters; Spray-Film.
- d. Conspec by Dayton Superior; Aquafilm.
- e. Dayton Superior Corporation; Sure Film (J-74).
- f. Edoco by Dayton Superior; BurkeFilm.
- g. Euclid Chemical Company (The), an RPM company; Eucobar.
- h. Kaufman Products, Inc.; VaporAid.
- i. Lambert Corporation; LAMBCO Skin.
- j. L&M Construction Chemicals, Inc.; E-CON.
- k. Meadows, W. R., Inc.; EVAPRE.
- l. Metalcrete Industries; Waterhold.
- m. Nox-Crete Products Group; MONOFILM.
- n. Sika Corporation, Inc.; SikaFilm.
- o. SpecChem, LLC; Spec Film.
- p. Symons by Dayton Superior; Finishing Aid.
- q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
- r. Unitex; PRO-FILM.
- s. Vexcon Chemicals Inc.; Certi-Vex EnvioAssist.

- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, [**provide one of the following**]:

- a. Anti-Hydro International, Inc.; A-H Curing Compound #2 DR WB.
- b. ChemMasters; Safe-Cure Clear.
- c. Conspec by Dayton Superior; [**D.O.T. Resin Cure**] [**DSSCC Clear Resin Cure**].

- d. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
 - e. Edoco by Dayton Superior; [**DSSCC Clear Resin Cure**] [**Resin Emulsion Cure V.O.C. (Type I)**].
 - f. Euclid Chemical Company (The), an RPM company; Kurez W VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; AQUA KURE - CLEAR.
 - i. L&M Construction Chemicals, Inc.; L&M CURE R.
 - j. Meadows, W. R., Inc.; 1100-CLEAR SERIES.
 - k. Nox-Crete Products Group; Resin Cure E.
 - l. SpecChem, LLC; PaveCure Rez.
 - m. Symons by Dayton Superior; Resi-Chem Clear.
 - n. Tamms Industries, Inc., Euclid Chemical Company (The); TAMMSCURE WB 30C.
 - o. TK Products, Division of Sierra Corporation; [**TK-2519 WB**] [**TK-2519 DC WB**].
 - p. Vexcon Chemicals Inc.; Certi-Vex Enviocure 100.
- F. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.
- 1. Products: Subject to compliance with requirements, [**provide one of the following**]:
 - a. Anti-Hydro International, Inc.; A-H Curing Compound #2 WP WB.
 - b. ChemMasters; Safe-Cure 2000.
 - c. Conspec by Dayton Superior; [**D.O.T. Resin Cure White**] [**DSSCC White Resin Cure**].
 - d. Dayton Superior Corporation; Day-Chem White Pigmented Cure (J-10-W).
 - e. Edoco by Dayton Superior; Resin Emulsion Cure V.O.C. (Type II).
 - f. Euclid Chemical Company (The), an RPM company; Kurez VOX White Pigmented.
 - g. Kaufman Products, Inc.; Thinfilm 450.
 - h. Lambert Corporation; AQUA KURE - WHITE.
 - i. L&M Construction Chemicals, Inc.; L&M CURE R-2.
 - j. Meadows, W. R., Inc.; 1100-WHITE SERIES.
 - k. SpecChem, LLC; PaveCure Rez White.
 - l. Symons by Dayton Superior; Resi-Chem White.
 - m. Vexcon Chemicals Inc.; Certi-Vex Enviocure White 100.

2.6 RELATED MATERIALS

- A. Joint Fillers: [**ASTM D 1751, asphalt-saturated cellulosic fiber**] [or] [**ASTM D 1752, cork or self-expanding cork**] in preformed strips.
- B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

- D. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
1. **[Types I and II, non-load bearing] [Types IV and V, load bearing]**, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.
1. **Products:** Subject to compliance with requirements, **[provide one of the following]**:
 - a. ChemMasters; Exposee.
 - b. Conspec by Dayton Superior; Delay S.
 - c. Dayton Superior Corporation; Sure Etch (J-73).
 - d. Edoco by Dayton Superior; True Etch Surface Retarder.
 - e. Euclid Chemical Company (The), an RPM company; Surface Retarder Formula S.
 - f. Kaufman Products, Inc.; Expose.
 - g. Meadows, W. R., Inc.; TOP-STOP.
 - h. Metalcrete Industries; Surfard.
 - i. Nox-Crete Products Group; CRETE-NOX TA.
 - j. Scofield, L. M. Company; LITHOTEX Top Surface Retarder.
 - k. Sika Corporation, Inc.; Rugasol-S.
 - l. SpecChem, LLC; Spec Etch.
 - m. TK Products, Division of Sierra Corporation; TK-6000 Concrete Surface Retarder.
 - n. Unitex; TOP-ETCH Surface Retarder.
 - o. Vexcon Chemicals Inc.; Certi-Vex Envioset.
- F. Pigmented Mineral Dry-Shake Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
1. **Products:** Subject to compliance with requirements, **[provide one of the following]**:
 - a. Anti-Hydro International, Inc.; A-H S-Q Hardener.
 - b. BASF Construction Chemicals, LLC; Mastercron.
 - c. ChemMasters; ConColor.
 - d. Conspec by Dayton Superior; Conshake 600 Colortone.
 - e. Dayton Superior Corporation; Quartz Tuff.
 - f. Euclid Chemical Company (The), an RPM company; Surfex.
 - g. Lambert Corporation; COLORHARD.
 - h. L&M Construction Chemicals, Inc.; QUARTZPLATE FF.
 - i. Metalcrete Industries; Floor Quartz.
 - j. Scofield, L. M. Company; LITHOCHROME Color Hardener.
 - k. Southern Color N.A., Inc.; Mosaics Color Hardener.
 - l. Stampcrete International, Ltd.; Color Hardener.
 - m. Symons by Dayton Superior; Hard Top.

2. Color **[As selected by Architect from manufacturer's full range]**

G. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.7 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, **[Type N] [Type F] [Type S]**; colors complying with FS TT-P-1952.

1. Color: **[As indicated]**

B. Pavement-Marking Paint: MPI #32 Alkyd Traffic Marking Paint.

1. Color: **[As indicated]**

C. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than **[45]** minutes.

1. Color: **[As indicated]**

D. Pavement-Marking Paint: MPI #97 Latex Traffic Marking Paint.

1. Color: **[As indicated]**

E. Glass Beads: **[AASHTO M 247, Type 1]**.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): **[4000 psi]**

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: **[0.44]** .

3. Slump Limit: **[5 inches]** , plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: **[5-1/2]** percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.

2. Air Content: **[6]]** percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.

3. Air Content: **[6]** percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to **[0.15]** percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use **[plasticizing and retarding admixture]** in concrete as required for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Cementitious Materials:**[Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:]**
 1. Fly Ash or Pozzolan: 25 percent.
 2. Ground Granulated Blast-Furnace Slag: 50 percent.
 3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- G. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than **[2.0 lb/cu. yd.]**.
- H. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M **[and ASTM C 1116/C 1116M]**. Furnish batch certificates for each batch discharged and used in the Work.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below [**concrete paving**] to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll subbase in one direction[**and repeat in perpendicular direction**]. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of [**1/2 inch**] according to requirements in Section 312000 "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

- F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 - 2. Provide tie bars at sides of paving strips where indicated.
 - 3. Butt Joints: Use **[bonding agent] [epoxy bonding adhesive]** at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 4. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
 - 5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of **[50 feet]** unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows[, **to match jointing of existing adjacent concrete paving**]:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a [1/4-inch] [3/8-inch] radius. Repeat grooving of contraction joints after applying surface finishes.[**Eliminate grooving-tool marks on concrete surfaces.**]
 - a. Tolerance: Ensure that grooved joints are within [3 inches] either way from centers of dowels.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within [3 inches] either way from centers of dowels.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a [1/4-inch] radius. Repeat tooling of edges after applying surface finishes.[**Eliminate edging-tool marks on concrete surfaces.**]

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation[, **steel reinforcement,**] and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface[**and steel reinforcement**] before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies[, **reinforcement,**] or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating [**reinforcement**] [**dowels**] [**and**] joint devices.

- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F , uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms[, **steel reinforcement**,] and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 - 2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 SPECIAL FINISHES

- A. Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in paving surface as follows:
 1. Immediately after float finishing, spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
 2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
 3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
 4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

- B. Seeded Exposed-Aggregate Finish: Immediately after initial floating, spread a single layer of aggregate uniformly on paving surface. Tamp aggregate into plastic concrete and float finish to entirely embed aggregate with mortar cover of 1/16 inch.
 1. Spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
 2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove sheeting when ready to continue finishing operations.
 3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
 4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

- C. Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions and as follows:
 1. Uniformly spread [**40 lb/100 sq. ft.**] of dampened, slip-resistive aggregate over paving surface in two applications. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
 2. Uniformly distribute approximately two-thirds of slip-resistive aggregate over paving surface with mechanical spreader, allow to absorb moisture, and embed by power floating. Follow power floating with a second slip-resistive aggregate application, uniformly distributing remainder of material at right angles to first application to ensure uniform coverage, and embed by power floating.
 3. Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.
 4. After curing, lightly work surface with a steel wire brush or abrasive stone and water to expose nonslip aggregate.

- D. Rock-Salt Finish: After initial **[floating]** **[troweling]** **[brooming]**, uniformly spread rock salt over paving surface at the rate of 5 lb/100 sq. ft..
 - 1. Embed rock salt into plastic concrete with **[magnesium float]** .
 - 2. Cover paving surface with 1-mil- thick polyethylene sheet and remove sheet when concrete has hardened and seven-day curing period has elapsed.
 - 3. After seven-day curing period, saturate concrete with water and broom-sweep surface to dissolve remaining rock salt, thereby leaving pits and holes.

- E. Pigmented Mineral Dry-Shake Hardener Finish: After initial floating, apply dry-shake materials to paving surface according to manufacturer's written instructions and as follows:
 - 1. Uniformly spread dry-shake hardener at a rate of **[100 lb/100 sq. ft.]**, unless greater amount is recommended by manufacturer to match paving color required.
 - 2. Uniformly distribute approximately two-thirds of dry-shake hardener over the concrete surface with mechanical spreader; allow hardener to absorb moisture and embed it by power floating. Follow power floating with a second application of pigmented mineral dry-shake hardener, uniformly distributing remainder of material at right angles to first application to ensure uniform color, and embed hardener by final power floating.
 - 3. After final power floating, apply a hand-trowel finish followed by a broom finish.
 - 4. Cure concrete with curing compound recommended by dry-shake hardener manufacturer. Apply curing compound immediately after final finishing.

3.9 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

- B. Comply with ACI 306.1 for cold-weather protection.

- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

- E. Curing Methods: Cure concrete by **[curing compound]** **[or]** **[a combination of these]** as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed

by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.10 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.11 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of **[28]** days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
 2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

3.12 WHEEL STOPS

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.
- B. Securely attach wheel stops to paving with not less than two **[galvanized-]**steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

3.13 PREFORMED TRAFFIC-CALMING DEVICES

- A. Install preformed speed **[bumps]** in bed of adhesive applied as recommended by manufacturer for heavy traffic.
- B. Securely attach preformed speed **[bumps]** to paving with hardware spaced as recommended by manufacturer for heavy traffic. Recess head of hardware beneath top surface.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: **[Owner will engage]** a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each **[100 cu. yd.]** or **[5000 sq. ft.]** or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
 - 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - 6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

3.15 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

**SECTION 321313-USU Mix
CAST IN PLACE EXTERIOR CONCRETE**

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. Exterior concrete shall be defined as all concrete flatwork (sidewalks, curb, gutter, driveways, paving, landings, aprons, stairs, etc.) that is exposed to exterior freeze/thaw conditions and deicer use. Exterior site walls, retaining walls and substrate slabs shall refer to USU Specification Section 033053 Miscellaneous Cast In Place Concrete.

1.03 PRE-INSTALLATION CONFERENCE:

- A. General Contractor, Sub-Contractor(s), and Ready-Mix supplier shall participate in a pre-installation conference with USU Facilities PD&C to coordinate with users and review the installation schedule. The following items shall also be reviewed:
 - 1. Mix design requirements, including admixtures
 - 2. Requirements for preparation of subgrade
 - 3. Placement, finishing and curing of concrete
 - 4. Hot and cold weather requirements
 - 5. Jointing requirements and joint layout
 - 6. Safety issues

1.04 SUBMITTALS:

- A. Contractor shall submit concrete mix design(s), certifications and all other required product spec sheets to engineer for review prior to any construction. Allow one (1) week for engineering review.
- B. No concrete shall be poured without prior written approval of all submittals.

1.05 AGGREGATE:

- A. General:
 - 1. Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to USU FPD&C that
 - 2. Certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.
- B. Cleanliness:

Cache County School District

1. The concrete supplier shall submit written certification by an independent testing agency
2. Demonstrating that aggregates supplied meet this requirement.
 - a. All fine aggregates shall have a Sand Equivalent (SE) value of not less than 80 according to ASTM D2419 and/or AASHTO T176.
 - b. All coarse aggregates shall have a Cleanliness Value (CV) of not less than 80 according to California Department of Transportation Test 227.
- C. Coarse aggregate:
 1. 1" minus and well-graded crushed aggregate meeting ASTM C33. Aggregate shall be free of deleterious coatings and other materials and/or aggregate types causing pop outs,
 2. Discoloration, staining, alkaline reactions or other defects within the concrete. The concrete supplier shall submit written certification by and independent testing source of aggregate testing and soundness in accordance with ASTM C33 with all concrete mix designs.
- D. Fine aggregate:
 1. Natural sand or blend of natural sand and crushed sand meeting ASTM C33. Crushed sand shall be less than 50% of the total sand by dry weight.

1.06 CEMENT:

- A. Portland Type I or Type II (Do not use Type I-A or II-A).

1.07 POZZOLAN:

- A. No pozzolans (e.g., fly ash, silica fume, slag, etc.) shall be used in the concrete mix without the express written consent of the engineer.

1.08 WATERPROOF CONCRETE ADMIXTURE:

- A. Product generic name: Water-based waterproof concrete admixture.
- B. Product name: Hycrete W502, as manufactured by Hycrete, Inc., 462 Barell Avenue, Carlstadt, New Jersey, 07072, telephone (201) 386-8110. See manufacturer's website www.hycrete.com for further information.
- C. Comply with the manufacturer's instructions and recommendations.

1.09 REINFORCING:

- A. 'RSC15' polyvinyl alcohol (PVA) fibers as manufactured by Nycon at a dosage rate not less than two (2) lbs. per cubic yard or approved equal.
- B. See manufacturer's web site <http://www.nycon.com> for further info.

1.10 COMPRESSIVE STRENGTH:

- A. 4500 psi, minimum at twenty-eight (28) days, using a minimum 6.5-bag mix.

1.11 WATER/CEMENT RATIO:

Cache County School District

- A. 0.44 maximum (total cementitious materials)
- B. No additional water shall be permitted either in transit or on site.

1.12 AIR ENTRAINMENT:

- A. 6.5% (+/- 1.5%), using an air-entraining admixture conforming to ASTM C260.

1.13 SLUMP:

- A. 3" (+/- 1") OR 3"-6" with the addition of a water reducer conforming to ASTM C494 (Type A).

1.14 SURFACE PREPARATION:

- A. Remove all water, debris, dirt clods, etc., from space where concrete is to be placed.
- B. Unless noted otherwise, all exterior concrete flatwork shall be installed with six inches (6") minimum, of washed, crushed gravel beneath it (1" minus).
- C. Gravel shall be well compacted and pre-wetted as per ACI standards prior to concrete installation.

1.15 SPECIAL TECHNIQUES:

- A. Cold Weather Concreting Procedures:
 - 1. General Requirements:
 - a. Although the schedules of building projects may necessitate it, the Installation of exterior concrete flatwork is NOT recommended before April 1st or after October 1st, due to Cache Valley climate.
 - b. Materials and equipment required for heating and protection of concrete shall be
 - 2. Approved and available at project site before beginning cold weather concreting.
 - a. Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including sub-grade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
 - b. Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete
 - 3. Placement. If necessary, re-compact all thawed material.
 - a. Use no frozen materials or materials containing ice.
 - b. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Below 40 deg F (4 deg C):
 - c. Temperature of concrete as placed and maintained shall be 55 deg F (13 deg C) Minimum and 75 deg F (27 deg C) maximum.
 - d. Heat concrete for seventy two (72) hours minimum after placing if regular cement is used; for 48 hours if high early strength cement is used; or longer

- e. If determined necessary by USU FPD&C.: During this period, maintain concrete surface temperature between 55 and 75 deg F (13 and 27 deg C).
 - f. Vent flue gases from combustion heating units to outside of enclosure to prevent carbonation of concrete surface.
 - g. Prevent concrete from drying during heating period. Maintain housing, insulation, covering, and other protection twenty four (24) hours after heat is discontinued.
 - h. After heating period, if temperature falls below 32 deg F (0 deg C), protect concrete from freezing until strength of 2000 psi minimum is achieved.
 - i. Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi minimum is achieved.
4. Requirements When Average twenty four (24) Hour Temperature, midnight to midnight, Is Above 40 deg F (4 deg C), but when temperature falls below 32 deg F (0 deg C):
- a. Protect concrete from freezing for seventy two (72) hours after placing, or until strength of 2000 psi is achieved, whichever is longer.
 - b. Protect flatwork exposed to melting snow or rain during day and freezing during night from freezing until strength of 3500 psi minimum is achieved.
- B. Hot Weather Concreting Procedures:
- 1. Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
 - 2. Cool aggregate and subgrades by sprinkling with water.
 - 3. Avoid cement over 140 deg F (60 deg C).
 - 4. Use cold mixing water or ice.
 - 5. Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.

1.16 FINISHING OF EXTERIOR CONCRETE:

- A. All concrete sidewalks and other flatwork shall have a cross-slope of not greater than 2% but not less than 0.5% toward the curb or street to provide positive drainage.
- B. Use of steel floats/trowels, power screeds and vibrators for the finishing of exterior, air-entrained concrete is not permitted and shall be cause for rejection of any or all work.
- C. Bull floating and/or darbying shall follow promptly after initial screening using magnesium tools only.
- D. No finishing operations shall be performed with bleed water present on the surface of the concrete. Any dusting of cement powder onto the surface to absorb bleed water or the working of bleed water back into the surface of the concrete is not permitted.
- E. All concrete slabs shall be edged according to current ACI standards.

Cache County School District

- F. Sprinkling of water on the surface of the concrete to re-temper it during any finishing process is not permitted.
- G. Trowelling of concrete shall be limited to a single, light pass before final finish using a magnesium trowel only.
- H. All concrete shall have slip resistant finishes. The standard finish, unless noted otherwise, shall be coarse broomed finish - Finishes shall be applied to the surface before the concrete has thoroughly hardened but yet sufficiently hardened to retain the scoring impressions.

1.17 CONCRETE CURING:

- A. Curing procedures shall begin immediately after the final finishing process is complete and the surface sheen is gone.
- B. Contractor shall provide proper curing of concrete by employing initial and final curing methods as indicated in ACI 308R-01.
- C. Final curing shall be achieved by providing and/or installing the following:
 - 1. Moist curing methods that maintain a continuously wet surface such as ponding, sprinkling, plastic sheeting, or wet burlap sheets for a minimum period of 7 days. Moist curing is the curing method of choice for all exterior concrete on USU campus.
 - 2. As an alternate, liquid membrane-forming curing compound(s) conforming to ASTM C-309 or ASTM C-1315, applied according to manufacturer's recommendations and with the following additional requirements:
 - a. Curing agent shall be applied in two (2) applications at right angles to each other to ensure uniform and complete coverage.
 - 3. Curing agent shall contain a fugitive dye or white pigmentation which allows an inspector to see that the agent has been adequately applied.
 - 4. Contractor shall provide evidence of the amount of curing agent used for the project.
 - 5. The use of sprayed curing compounds is NOT recommended before April 1st or after October 1st due to Cache Valley climate.
- D. Contractor shall make every effort to allow concrete to air dry for at least 30 days after the curing process is complete before exposing it to freeze/thaw conditions.

1.18 JOINTS:

- A. All exterior concrete shall have expansion and control joints installed according to current ACI Standards.
- B. Expansion Joints:
 - 1. Joint material shall be Re-Flex rubber expansion joint material as manufactured by the J.D. Russell Company or approved equal. See manufacturer's website www.jdrussellco.com/reflex.html for more information.

Cache County School District

2. Joints shall be sealed using a self-leveling sealer installed as per manufacturer's recommendations. Approved sealers are: Sonolastic SL1, Novalink SL or approved equal.
- C. Control Joints:
1. Joints shall be installed using one of two methods:
 - a. Saw cutting using a beveled blade that provides a 3/8" beveled profile. Straight, unbeveled saw cuts are not allowed. Contractors are encouraged to use this method. See www.cardinalsaws.com for further information.
 - b. Tooled joints that provide a maximum 3/8" radius (rounded) profile.

1.19 COLORED CONCRETE:

- A. N/A

1.20 FIELD TESTS AND INSPECTIONS:

- A. Testing Agency shall provide testing and inspection for concrete as per ASTM C1077.
- B. Testing Agency will sample and test for quality control during placement of concrete as directed by USU FPD&C.
- C. Testing and inspections, if performed, will include the following:
1. Periodic inspection verifying use of required design mix.
 2. Inspection at time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine temperature of concrete.
 3. Inspection of concrete placement for proper application techniques.
 4. Periodic inspection of curing materials and techniques.
 5. Periodic inspection of formwork for configuration, location, and dimensions of concrete member being formed.
 6. Slope of concrete members.
- D. Testing Agency will sample and test during placement of concrete as directed by USU FPD&C and may include the following:
1. Sampling Fresh Concrete: ASTM C172, except as modified for slump to comply with ASTM C94:
 - a. Slump: ASTM C143. Test each time a set of compressive test specimens are made.
 - b. Air Content: ASTM C173. Volumetric method for normal weight concrete each time a set of compression test specimens is made.
 - c. Concrete Temperature: Test each time a set of compressive test specimens is made.

- d. Unit Weight: ASTM C567. Test each time a set of compressive test specimens is made.
- E. Compression Test Specimens: ASTM C31. One (1) set of four (4) standard cylinders for each compressive strength test, unless otherwise directed.
- 1. Compressive Strength Tests: ASTM C39. :
 - a. Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. Yd., but less than 50 cu. Yd. , plus one (1) set for each additional 50 cu. Yd. or fraction thereof.
 - b. One (1) specimen tested at seven (7) days, two (2) specimens tested at twenty eight (28) Days, and one (1) specimen retained in reserve for later testing if required.
 - c. If strength of field-cured cylinders is less than eighty-five (85) percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing in-place concrete.
 - d. Strength level of concrete will be considered satisfactory if averages of sets of three (3) Consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

1.21 PROTECTION:

- A. Protect concrete that has not received its initial set from pedestrian traffic and from precipitation to avoid excess water in the mix and an unsatisfactory surface finish.
- B. Do not allow materials resulting from construction activities, which will affect concrete, to come in contact with concrete slabs.

1.22 WARRANTY:

- A. Contractor shall provide a two-year written guarantee of concrete materials and workmanship commencing on the date of substantial completion to promptly remove and/or repair all defective concrete (i.e., pitting, scaling, flaking, cracking, honeycombing, etc.).

END OF SECTION

**SECTION 321373
CONCRETE PAVING JOINT SEALANTS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cold-applied joint sealants.
 - 2. Hot-applied joint sealants.
 - 3. Cold-applied, fuel-resistant joint sealants.
 - 4. Hot-applied, fuel-resistant joint sealants.
 - 5. Joint-sealant backer materials.
 - 6. Primers.
- B. Related Requirements:
 - 1. Section 079200 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at [...].

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Paving-Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For [Installer] [testing agency].
- B. Product Certificates: For each type of joint sealant and accessory.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[**or are below 40 deg F**].
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 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.

2.2 COLD-APPLIED JOINT SEALANTS

- A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; RoadSaver Silicone.
 - b. Dow Corning Corporation; 888.
 - c. Pecora Corporation; 301 NS.
- B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; RoadSaver Silicone SL.
 - b. Dow Corning Corporation; 890-SL.
 - c. Pecora Corporation; 300 SL.
- C. Multicomponent, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:

- a. Meadows, W.R.,Inc; Pourthane NS.
- D. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Meadows, W.R.,Inc; Pourthane SL.
- E. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Pecora Corporation; **[Dynatred]** **[Dynatrol II-SG]** **[Urexpan NR-200]**.

2.3 HOT-APPLIED JOINT SEALANTS

- A. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; **[Asphalt Rubber Plus]** **[Asphalt Rubber Plus Type 2]** **[RoadSaver 203]** **[RoadSaver 211]** **[RoadSaver 515]**.
 - b. Meadows, W.R.,Inc; **[Sealtight 1190]** **[Sealtight 164]**.
 - c. Right Pointe.
- B. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I or Type II.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; **[RoadSaver 201]** **[RoadSaver 220]** **[RoadSaver 221]** **[RoadSaver 534]**.
 - b. Right Pointe; **[JTS 3405 Parking Lot Sealant 007]** **[JTS 3405 Rubber 009]**.
- C. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I, II, or III.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; RoadSaver 222.
 - b. Meadows, W.R.,Inc; Sealtight 3405.
 - c. Right Pointe; **[JTS 3405 Regular 003]** **[JTS 3405 Rubber 009]**.
- D. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type IV.
 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; RoadSaver 231.
 - b. Meadows, W.R.,Inc; Sealtight 3405M.

2.4 COLD-APPLIED, FUEL-RESISTANT JOINT SEALANTS

- A. Fuel-Resistant, Single-Component, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type S, Grade P, Class 25, for Use T.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. BASF Building Systems; Sonomeric 1.
- B. Fuel-Resistant, Multicomponent, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 12-1/2 or 25, for Use T.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Meadows, W.R., Inc; Sealtight Gardox.
 - b. Pecora Corporation; Urexpam NR-300.

2.5 HOT-APPLIED, FUEL-RESISTANT JOINT SEALANTS

- A. Hot-Applied, Fuel-Resistant, Single-Component Joint Sealants: ASTM D 7116, Type I or Type II.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; **[Superseal 1614A]** **[Superseal 444/777]**.
- B. Hot-Applied, Fuel-Resistant, Single-Component Joint Sealants: ASTM D 7116, Type III.
 - 1. Products: Subject to compliance with requirements, **[provide one of the following]**:
 - a. Crafco Inc; Superseal Low-Mod.

2.6 JOINT-SEALANT BACKER MATERIALS

- A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.
- B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.
- C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.
- D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.7 PRIMERS

- A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
- B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.
- B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.
- C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of joint-sealant backings.
 - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
 - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
 - 1. Place joint sealants so they fully contact joint substrates.
 - 2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
 1. Remove excess joint sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

- A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.
- B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Joints within concrete paving[<PJS-#>].
 1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.
 - b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
 2. Joint Sealant: **[Single-component, self-leveling, silicone joint sealant]**
 3. Joint-Sealant Color: **[Manufacturer's standard]**
- B. Joint-Sealant Application: Joints within concrete paving and between concrete and asphalt paving[<PJS-#>].
 1. Joint Location:
 - a. Joints between concrete and asphalt paving.
 - b. Joints between concrete curbs and asphalt paving.
 - c. Other joints as indicated.
 2. Joint Sealant: **[Hot-applied, single-component joint sealant]** .

3. Joint-Sealant Color: **[Manufacturer's standard]**
- C. Joint-Sealant Application: Fuel-resistant joints within concrete paving[<**PJS-#**>].
1. Joint Location:
 - a. Expansion and isolation joints in concrete paving.
 - b. Contraction joints in concrete paving.
 - c. Other joints as indicated.
 2. Joint Sealant: **[Fuel-resistant, multicomponent, pourable, modified-urethane, elastomeric joint sealant]**
 3. Joint-Sealant Color: **[Manufacturer's standard]**

END OF SECTION 32 1373

**SECTION 321723
PAVEMENT MARKINGS**

PART 1 -GENERAL

1.1 SUBMITTALS

- A. Project information:
 - 1. Manufacturer of listed products.

1.2 JOB CONDITIONS

- A. Do not paint when surface is wet, during wet or damp weather, or when temperature is below 40 deg F.
- B. Do not paint or install markers when surface is wet, during wet or damp weather, or when temperature is below 40 deg F.
- C. Painting Equipment:
 - 1 Self contained, self propelled striping machine.
 - 2 Capable of painting line 4 IN wide with spray nozzle.
 - 3 Paint kept in constant agitation and under pressure.

PART 2 -PRODUCTS

2.1 MATERIALS

- A. Acceptable manufacturers:
 - 1. Paint:
 - a. Base:
 - 1) ICI Paints.
 - b. Optional:
 - 1) Sherwin-Williams.
 - 2. Other manufacturers desiring approval comply with Section 00 26 00.

2.2 PAINT

- A. Non-Reflective Paint:
 - 1 Description: Non-reflective paint conforming to F.S.TT-P-1952B.
 - 2 Base Product: "Traffic Paint, Water Reducible Acrylic," Series 4800 by ICI Paints.

Item	Color	Reflective / Non-Reflective
Parking Stripping	Yellow	Non-Reflective
Traffic Arrows	White	Non-Reflective
Pavement Lettering	White	Non-Reflective
Helipads	Red / White	Non-Reflective
Accessible Symbols	Blue	Non-Reflective
Fire Lanes	Red	Non-Reflective
Paint-out of existing items	Black	Non-Reflective

PART 3 -EXECUTION

3.1 PREPARATION OF SURFACE

- A. Do not paint until a minimum of 5 days has elapsed from time surface is completed or cured.
 - 1. A longer period of time may be required if directed by Architect.
- B. Thoroughly clean surfaces to receive striping or marking.
- C. Assure surface is dry.

3.2 PAINTING

- A. Mark and stripe in accordance with applicable drawings with approved striping machine.
- B. Width of painted lines: 4 IN.
- C. Provide painted accessible symbols in handicapped parking stalls.
- D. Use a guide to form markings true to line and width.
- E. Keep paints thoroughly stirred and of uniform consistency during application.
- F. Do not thin in excess of manufacturer's recommendations.
- G. Use rates of application sufficient to produce complete coverage without voids or thin spots.
 - 1. Minimum Dry Film Thickness: 7mil.
- H. Overpaint unsatisfactory markings as directed by Architect.
- I. Protect marking from traffic until paint has dried to prevent tracking.

3.3 CLEANING UP

- A. Place rags and waste which might constitute a fire hazard in metal containers or destroy at end of each work day.
- B. Remove containers from site.
- C. Remove paint spots or stains on adjacent surfaces.
- D. Leave job clean and acceptable to Architect.

END OF SECTION 32 1723

**SECTION 33 1100
POTABLE WATER SYSTEMS**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes potable water systems work.
- B. Related Sections:
 - 1. Division 31 Section "Earthwork" for excavation and backfill required for potable water systems; not work of this section.
 - 2. Division 3 Sections for concrete work required for potable water systems; not work of this section.
 - 3. Division 22 Section "Potable Water Systems" for interior building systems including interior piping, fixtures, and equipment; not work of this section.

1.3 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of potable water system materials and products.
 - 2. Water Purveyor Compliance: Comply with requirements of Purveyor supplying water to project, obtain required permits and inspections.
 - 3. Local Regulations: Comply with governing regulations and standards of local government having jurisdiction.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for potable water system materials and products.
- B. Maintenance Data: Submit maintenance data and parts list for potable water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approved Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Plastic Line Markers
 - a. Allen Systems Inc.
 - b. Seton Name Plate Corp.
 - c. Equal product as approved by Engineer.

2. Gate Valves:
 - a. Clow Corp; Valve Div.
 - b. Dresser Mfg.; Div. of Dresser Industries.
 - c. Fairbanks Co.
 - d. Kennedy Valve; Div. of ITT Grinnell Valve Co. Inc.
 - e. Stockham Valves and Fittings Inc.
 - f. Waterous Co.

2.2 IDENTIFICATION

- A. Underground-Type Detectable Warning Tape (refer to Specification 31 23 00): Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide blue tape with black printing reading "CAUTION WATER LINE BURIED BELOW".
- B. Nonmetallic Piping Label: If nonmetallic piping is used for water service, provide engraved plastic laminate, label permanently affixed to main electrical meter panel stating "THIS STRUCTURE HAS A NONMETALLIC WATER SERVICE".

2.3 PIPES AND PIPE FITTINGS

- A. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in potable water systems. Where more than one type of materials or products are indicated, selection is Installer's option.
- B. Piping: Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
 1. PVC Pipe: Schedule 40 PVC, ASTM 1785 (1-1/2" to 2" pipe diameter). AWWA Pipe: C-900 class 150 (over 2" pipe diameter).
 - a. Fittings: Schedule 80 PVC fittings ASTM 1785.
 2. Copper Tube: ASTM B 88; type K, soft-annealed temper (for 3/4" to 2" diameter pipe).
 3. Ductile Iron Pipe: AWWA C151, with cement mortar lining complying with AWWA C104; Class 51 unless otherwise indicated.
 - a. Fittings: Ductile-Iron complying with AWWA C110, cement lined, with rubber gaskets conforming to AWWA C111.

2.4 VALVES

- A. Gate Valves: AWWA C509, resilient seated 175 psi working pressure, threaded, flanged, hub, or other end configurations to suit size of valve and piping connection. Provide inside screw type for use with curb valve box, iron body, bronze-mounted, double disc, parallel seat, non-rising stem.

2.5 ACCESSORIES

- A. Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.
 1. Clamps, Straps, and Washers: Steel, ASTM A 506.
 2. Rods: Steel, ASTM A 575.
 3. Rod Couplings: Malleable-iron, ASTM A 197.
 4. Bolts: Steel, ASTM A 307.

5. Cast-Iron Washers: Gray-iron, ASTM A 126.
6. Thrust Blocks: Concrete, 2,500 psi.
7. Yard Hydrants: Non-freeze yard hydrants, 3/4" inlet, 3/4" hose outlet, bronze casing, cast-iron or cast-aluminum casing guard, key-operated, and tapped drain port in valve housing.
8. Valve Pits: Valve pits as indicated, constructed of poured-in-place or precast concrete. Construct of dimensions indicated with manhole access, ladder, and drain. Provide sleeves for pipe entry and exit, provide waterproof sleeve seals.

2.6 METERS

- A. Meters and meter boxes shall be of the local Water District standards having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which potable water system's materials and products are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF IDENTIFICATION

- A. During back-filling/top-soiling of underground potable water piping, install continuous underground-type detectable warning tape (refer to Specification 02300), located directly over buried lines at 6" to 8" below finished grade.

3.3 INSTALLATION OF PIPE AND PIPE FITTINGS

- A. Pipe:
 1. PVC Pipe: Install in accordance with manufacturers recommendations and sand bedding as required by authority having jurisdiction.
 2. Ductile Iron Pipe: Install in accordance with AWWA C600 "standard for installation of ductile-iron water mains and their appurtenances".
 3. Copper Tube: Install in accordance with CDA "Copper Tube Handbook".
- B. Depth of Cover: Provide minimum cover over piping of 12" below average local frost depth or 60" below finished grade, whichever is greater.
- C. Water Main Connection: Arrange and pay for tap in water main, of size and in location as indicated, from water Purveyor.
- D. Water Service Termination: Terminate potable water piping 5'-0" from building foundation in location and invert as indicated. Provide temporary pipe plug for piping extension into building, by work of Division 15.
 1. Mark location with surface marker.
- E. Runs shall be as close as possible to those shown on drawings.
- F. Backfill only after pipe lines have been tested, inspected, and approved by the Architect.

3.4 INSTALLATION OF VALVES

- A. Install valves with stems pointing up. Provide valve box over underground valves.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: The Owner will employ and pay a qualified independent testing agency to perform field quality-control testing services specified in this section. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline 24-hrs. prior to testing, and apply test pressure to stabilize system. Use only potable water.
- C. Hydrostatic Tests: Test at not less than 200 pounds per square inch for 2-hrs.
 - 1. Test fails if leakage exceeds 2-qts per hour per 100 gaskets or joints, irrespective of pipe diameter.
 - 2. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.

3.6 ADJUSTING AND CLEANING

- A. Disinfection of Potable Water System: Flush pipe system with clean potable water until no dirty water appears at point of outlet. Fill system with water-chlorine solution containing at least 50 ppm of chlorine. Valve off system and let stand for 24- hrs minimum. Flush with clean potable water until no chlorine remains in water coming from system.
 - 1. Repeat procedure if contamination is present in bacteriological examination.
- B. Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C652 "Standard for Disinfecting Water Mains".
 - 1. Contractor shall submit written verification to Project Manager stating, Disinfection has been completed in strict compliance with specification for this project and with jurisdiction having authority over water system.

END OF 331100

**SECTION 33 1119
FIRE SUPPRESSION WATER SYSTEM**

PART 1 - GENERAL

1.1 SUMMARY.

- A. Section includes fire water systems.
- B. Related Sections:
 - 1. Division 31 Section "Earthwork" for excavation and backfill required for fire water systems; not work of this section.
 - 2. Refer to fire suppression sections for interior building systems including sprinklers and standpipes; this work is not included in this section.
 - a. Refer to Division 21 Section Fire Suppression. Exterior water piping shall meet all requirements of this section. Test certificates are required.

1.2 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. NFPA Compliance: Install fire water systems in accordance with NFPA 24 "Standard for Installation of Private Fire Service Mains and Their Appurtenances.
- B. Local Fire Department/Marshall Regulations: Comply with governing regulations pertaining to hydrants, including hose unit threading and similar matching of connections.
- C. UL Compliance: Provide fire hydrants that comply with UL 246 "Hydrants for Fire-Protection Service", and are listed by UL.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for fire water system materials and products.
- B. Maintenance Data: Submit maintenance data and parts lists for fire water system materials and products. Include this data, product data, shop drawings, and record drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Acceptable manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - 1. Line Markers:
 - a. Allen Systems Inc.
 - b. Seton Name Plate Corp.
 - c. Equal product as approved by Architect.
 - 2. Pipe Strainers:
 - a. "Automatic" Sprinkler Corp. of America; Div. A-T-O Inc.
 - b. Cleveland Gear Co.; Sub of Vesper Corp.
 - c. Grinnell Fire Protection Systems Co., Inc.

- d. Hersey Products Inc.; Hersey Div.
 - e. Mueller Steam Specialty; Div. of Core Industries Inc.
 - f. Neptune Water Meter Co.
 - g. Rockwell International Corp.; Municipal & Utility Div.
 - h. Rockwood Systems Corp.
 - i. Zurn Industries Inc.; Fluid Handling Div.
3. Detector Meter:
- a. Hersey Products Inc.
4. Gate Valves:
- a. American Valve Mfg. Corp.
 - b. American-Darling Valve; Div. of American Cast Iron Pipe Co.
 - c. Clow Corp.; Valve Div.
 - d. Fairbanks Co.
 - e. Kennedy Valve; Div. of ITT Grinnell Valve Co., Inc.
 - f. Stockham Valves & Fittings Inc.
 - g. United Brass Works Inc.
 - h. United States Pipe and Foundry Co.
 - i. Waterous Co.
5. Check Valves:
- a. American-Darling Valve; Div. of American Cast Iron Pipe Co.
 - b. Clow Corp.; Valve Corp.
 - c. Fairbanks Co.
 - d. Kennedy Valve; Div. of ITT Grinnell Valve Co., Inc.
 - e. Mueller Co.
 - f. Nibco Inc.
 - g. Stockham Valves & Fittings Inc.
 - h. Walworth Co.
 - i. Waterous Co.
6. Fire Hydrants: As approved by authority having jurisdiction.

2.2 PIPES AND PIPE FITTINGS:

- A. Provide materials and products complying with NFPA 24 where applicable. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in fire water piping systems. Where more than one type of materials or products are indicated, selection is Installer's option.
- B. Piping: Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated. Minimum size of Fire Main serving Building Fire sprinkler system on Fire Hydrants shall be 8 inches in diameter.
 - 1. Ductile Iron Pipe: AWWA C151, with cement mortar lining complying with AWWA C104; Class 51 unless otherwise indicated.
 - a. Fittings: Ductile-Iron complying with AWWA C110, cement lined, with rubber gaskets conforming to AWWA C111.
 - 2. PVC Pipe: AWWA C-900, Class 150 unless otherwise indicated.
 - a. Fittings: Schedule 80 PVC fittings complying with ASTM 1785.

2.3 PIPING SPECIALTIES:

- A. Pipe Line Strainers: UL-listed, 175 psi working pressure, Y-type or basket type, with ends to suit piping connections.

2.4 METERS:

- A. Detector-Type Meters: UL-listed, 175 psi working pressure, with disc meter bypass.

2.5 VALVES:

- A. Gate Valves: UL-listed, 175 psi working pressure for 12" and smaller, 150 psi for sizes larger than 12". Threaded, flanged, hub, or other end configurations to suit size of valve and piping connection. Inside screw type for use with indicator post, iron body bronze mounted, non-rising stem, solid wedge disc.
- B. Check Valves: UL-listed, 175 psi working pressure for 2" through 12", 150 psi for sizes larger than 12". Swing type, iron body bronze mounted with metal-to-metal or rubber-faced checks. Threaded, flanged, or hub end, to suit size and piping connections.

2.6 ACCESSORIES:

- A. Anchorages: Provide anchorages for tees, wyes, crosses, plugs, caps, bends, valves, and hydrants. After installation, apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of ferrous anchorages.
- B. Clamps, Straps, and Washers: Steel, ASTM A 506.
- C. Rods: Steel, ASTM A 575.
- D. Rod Couplings: Malleable-iron, ASTM A 197.
- E. Bolts: Steel, ASTM A 307.
- F. Cast-Iron Washers: Gray-iron, ASTM A 126.
- G. Thrust Blocks: Concrete, 2,500 psi.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Identification: During back-filling/top-soiling of underground fire water piping systems, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade.
- B. Pipe and pipe fittings:
 - 1. Ductile-Iron Pipe: Install in accordance with AWWA C600 "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances".
 - 2. PVC Pipe: Install in accordance with manufacturers recommendations and provide pipe bedding as required by authority having jurisdiction.
- C. Piping Specialties:
 - 1. Pipe Line Strainers: Install as indicated, with valved blowoff piped to drain.
- D. Meters: Install as indicated with shutoff valve on either side of meter and valved bypass full line size.

- E. Valves: Provide post indicator for control valves.
 - 1. Shutoff Valves: Install shutoff valve ahead of each hydrant.
- F. Runs shall be as close as possible to those shown on drawings.

3.2 FIELD QUALITY CONTROL:

- A. Testing Agency: The Owner will employ and pay a qualified independent testing agency to perform field quality-control testing services specified in this section. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.
- B. Piping Tests: Conduct piping tests before joints are covered, and after thrust blocks have sufficiently hardened. Fill pipeline with water 24-hrs prior to testing, and apply test pressure to stabilize system.
- C. Hydrostatic Tests: Test at not less than 200 psi for 2-hrs, or at 50 psi above maximum static pressure if it is greater than 150 psi.
 - 1. Test fails if leakage exceeds 2-qts per hour per 100 gaskets or joints irrespective of pipe diameter.
 - 2. Increase pressure in 50 psi increments and inspect each joint between increments. Hold at test pressure for one hour, decrease to 0 psi. Slowly increase again to test pressure and hold for one more hour.
- D. Operating Tests: Open and close all valves and hydrants under system water pressure. Check dry barrel hydrants for proper drainage.
 - 1. For systems with fire pumps, run pumps during operating tests.

3.3 ADJUSTING AND CLEANING:

- A. Flushing: Flush underground mains and lead-in connections to sprinkler risers before connection is made to sprinklers, standpipes, or other fire protection system piping.
 - 1. Flush at flow rate not less than that indicated in NFPA 24, or at hydraulically calculated water demand rate of the system, whichever is greater.
- B. Disinfection of Potable Water System: Flush pipe system with clean potable water until no dirty water appears at point of outlet. Fill system with water-chlorine solution containing at least 50 ppm of chlorine. Valve off system and let stand for 24- hrs minimum. Flush with clean potable water until no chlorine remains in water coming from system.
 - 1. Repeat procedure if contamination is present in bacteriological examination.
- C. Disinfection of Water Mains: Flush and disinfect in accordance with AWWA C652 "Standard for Disinfecting Water Mains".
 - 1. Contractor shall submit written verification to Project Manager stating, Disinfection has been completed in strict compliance with specification for this project and with jurisdiction having authority over water system

END OF SECTION 331119

**SECTION 33 3100
SANITARY SEWAGE SYSTEMS**

PART 1 - GENERAL

1.1 SUMMARY.

- A. Section includes sanitary sewage systems.
- B. Related Sections:
 - 1. Refer to Division 31 section "Earthwork" for excavation and backfill required for sanitary sewage systems; not work of this section.
 - 2. Refer to Division 22 section "Soil and Waste Systems" for interior building systems including drain, waste, and vent piping; not work of this section.

1.2 QUALITY ASSURANCE:

- A. Codes and Standards:
 - 1. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of sanitary sewage system materials and products.
 - 2. Local Regulations: Comply with governing regulations and standards of local government having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Acceptable Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Line Markers:
 - a. Allen Systems, Inc.
 - b. Emed Co., Inc.
 - c. Seton Name Plate Corp.

2.2 IDENTIFICATION:

- A. Underground-Type Detectable Warning Tape (refer to Specification 02300): Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide green tape with black printing reading "CAUTION SEWER LINE BURIED BELOW".

2.3 PIPES AND PIPE FITTINGS:

- A. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
 - 1. Cast-Iron Soil Pipe: ASTM A 74, hub and spigot ends, service weight unless otherwise indicated.
 - a. Fittings: Cast-iron hub and spigot ends, standard strength unless otherwise indicated.

2. Concrete Pipe: ASTM C 14, Class III non-reinforced concrete pipe, unless otherwise indicated.
 - a. Fittings: Concrete, same strength as adjoining pipe, tongue and groove gasketed joints complying with ASTM C 443.
3. Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D 3034, Type PSM, SDR 35.
 - a. Fittings: ASTM 3034, bell and spigot joints.

2.4 SANITARY SEWER MANHOLES:

- A. Provide precast reinforced concrete sanitary manholes as indicated, and complying with ASTM C 478.
 1. Top: Precast concrete, of concentric cone, eccentric cone, or flat slab top type, as indicated.
 2. Base: Precast concrete, with base riser section and separate base slab, or base riser section with integral floor, as indicated.
 3. Steps: Ductile-iron or aluminum, integrally cast into manhole sidewalls.
 4. Frame and Cover: Ductile-iron, 21-3/4" diameter cover, heavy-duty, indented top design, with lettering cast into top reading "SANITARY SEWER".
 5. Pipe Connectors: Resilient, complying with ASTM C 923.

2.5 CLEANOUTS:

- A. Pipe extension to grade with ferrule and countersunk cleanout plug. Round cast-iron access frame over cleanout, with heavy-duty secured scoriated cover with lifting device.

PART 3 - EXECUTION

3.1 INSTALLATION OF IDENTIFICATION:

- A. During back-filling/top-soiling of sanitary sewage systems, install continuous underground-type detectable warning tape, located directly over buried line at 6" to 8" below finished grade.

3.2 INSTALLATION OF PIPE AND FITTINGS:

- A. Install piping in accordance with governing authorities having jurisdiction, except where more stringent requirements are indicated.
 1. Inspect piping before installation to detect apparent defects. Mark defective materials with white paint and promptly remove from site.
 2. Lay piping beginning at low point of system, true to grades and alignment indicated, with unbroken continuity of invert.
 3. Place bell ends or groove ends of piping facing upstream.
 4. Install gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements.
 5. Runs shall be as close as possible to those shown on drawings.
- B. Pipe:
 1. Cast-Iron Pipe: Install in accordance with applicable provisions of CISPI "Cast Iron Soil Pipe and Fittings Handbook".
 2. Concrete Pipe: Install in accordance with applicable provisions of ACPA "Concrete Pipe Installation Manual".
 3. Plastic Pipe: Install in accordance with manufacturer's installation recommendations, and in accordance with ASTM D 2321.
- C. Cleaning Pipe: Clear interior of piping of dirt and other superfluous material as work progresses.

Maintain swab or drag in line and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.
3. Flush lines between manholes if required to remove collected debris.

D. Joint Adapters: Make joints between different types of pipe with standard manufactured adapters and fittings intended for that purpose.

E. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after lines between manholes, or manhole locations, have been installed and approximately 2-ft of backfill is in place, and again at completion of project.
2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects, and reinspect.

3.3 SANITARY MANHOLES:

A. Place precast concrete sections as indicated. Where manholes occur in pavements, set tops of frames and covers flush with finish surface. Elsewhere, set tops 3" above finish surface, unless otherwise indicated.

1. Install in accordance with ASTM C 891.
2. Apply bituminous mastic coating at joints of sections.

3.4 TAP CONNECTIONS:

A. Make connections to existing piping and underground structures, so that finished work will conform as nearly as practicable to requirements specified for new work.

B. Use commercially manufactured wyes for branch connections. Field cutting into piping will not be permitted. Spring wyes into existing line and encase entire wye, plus 6" overlap, with not less than 6" of 4,000 psi 28-day compressive strength concrete.

C. Take care while making tap connections to prevent concrete or debris from entering existing piping or structure. Remove debris, concrete, or other extraneous material which may accumulate.

3.5 BACKFILLING:

A. Conduct backfilling operations of open-cut trenches closely following laying, jointing, and bedding or pipe, and after initial inspection and testing are completed.

3.6 FIELD QUALITY CONTROL:

A. Testing Agency: The Owner will employ and pay a qualified independent testing agency to perform field quality-control testing services specified in this section. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction.

END OF DOCUMENT 33 3100

**SECTION 33 4100
STORM DRAINAGE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes storm drainage outside the building.
- B. Related Sections include the following:
 - 1. Refer to Division-2 Section "Earthwork" for excavation and backfill required for storm drainage systems; not work of this section.
 - 2. Refer to Division-2 sections for concrete work required for storm drainage systems; not work of this section.
 - 3. Refer to Division-22 section "Plumbing Piping" for interior building systems including connections to roof and deck drains; not work of this section.

1.3 PROJECT CONDITIONS

- A. Site Information: Perform site survey, and verify existing utility locations.
- B. Existing Structures: Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

1.4 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Local Regulations: Comply with governing regulations and standards of local City having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Stormwater Disposal Systems:
 - a. Advanced Drainage Systems, Inc.
 - b. Cultec, Inc.

- c. Hancor, Inc.
- d. Infiltrator Systems, Inc.
- e. PSA, Inc.

2.2 PIPES AND FITTINGS

- A. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.
- B. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.
 - 1. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.
- C. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
 - 1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.
- D. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M), Class III, Wall B, for gasketed joints.
 - 1. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
- E. Polyvinyl Chloride (PVC) Sewer Pipe: ASTM D 3034, Type PSM, SDR 35.
 - 1. Fittings: ASTM 3034, bell and spigot joints. 12" diameter and smaller.

2.3 MANHOLES

- A. Provide precast reinforced concrete storm drain manholes as indicated, complying with ASTM C 478.
 - 1. Top: Precast concrete, of concentric cone, eccentric cone, or flat slab top type, as indicated.
 - 2. Base: Precast concrete, with base riser section and separate base slab, or base riser section with integral floor, as indicated.
 - 3. Steps: Ductile-iron or aluminum, integrally cast into manhole sidewalls.
 - 4. Frame and Cover: Ductile-iron, 21-3/4" diameter cover, heavy-duty, indented top design, with lettering cast into top reading "STORM SEWER", conforming to ASTM A-48, unless otherwise specified on the plans.
 - 5. Pipe Connections: Resilient, complying with ASTM C 923.

2.4 CATCH BASINS

- A. Precast or cast in place reinforced concrete catch basins as indicated.
 - 1. Basin: Precast or cast in place reinforced concrete, flat slab top.
 - 2. Frame and Grate: Ductile-iron or galvanized steel grate, heavy-duty, bicycle proof.
 - 3. Pipe Connectors: Resilient, complying with ASTM C 923.

2.5 PIPE OUTLETS

- A. Head Walls: Amcor CP190 Precast Flared End Section or Equivalent.
- B. Riprap Basins: Broken, irregular size and shape, graded stone.
 - 1. Average Size: NSA No. R-5, screen opening 5 inches (127 mm).

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
 - 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.

3.3 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.
- B. PE Pipe and Fittings: As follows:
 - 1. Join pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions.
 - 2. Install according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
- C. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:
 - 1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.

3.4 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Form continuous concrete channels and benches between inlets and outlet.
- C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.
- D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

3.5 CATCH-BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 STORM DRAINAGE OUTLET INSTALLATION

- A. Construct riprap of broken stone, as indicated.
- B. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

3.7 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
- B. Fasten grates to drains if indicated.
- C. Set drain frames and covers with tops flush with pavement surface.

3.8 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Place plug in end of incomplete piping at end of day and when work stops.
 - 3. Flush piping between manholes and other structures to remove collected debris.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 - 1. Submit separate reports for each system inspection.
 - 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Crushed, broken, cracked, or otherwise damaged piping.
 - c. Infiltration: Water leakage into piping.
 - d. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Reinspect and repeat procedure until results are satisfactory.

END OF SECTION 33 4100