

To: Prime contractors and all others to whom drawings and specifications have been issued. This addendum document is being issued before the date for receiving bids. Modifications described herein shall be incorporated into the construction set, and each modifies the original construction set as noted below. All other provisions of the Drawings and Specifications shall remain unchanged. If any discrepancies between this narrative document and the revision drawings are found, consult architect for clarification. It supplements and modifies them as follows:

A. General Notes, Clarifications

1. See attached Pre-Bid Meeting Agenda
2. See attached Pre-Bid Meeting Minutes.
3. See attached Pre-Bid Meeting Sign-In sheet.
4. See attached Geotechnical Report.
5. See narrative below and attached approved substitution requests, specifications, and drawings for more information.
6. **Additional questions have been received that are not included with the Bid Addendum A response. All questions still requiring a response will be addressed in a forthcoming addendum.**

B. Bidder Questions:

1. Question 01: Please provide a copy of the Geotechnical Report for this project.
 - a. MBI Response: Please see the attached Geotechnical Report.
2. Question 02: Retaining Walls: Details for structural and non-structural retaining walls are shown on Sheet C101. However, I see no specifications or reference for manufacturers of approved walls, if engineered shop drawings will be required, etc. Please provide adequate information on retaining walls to properly bid the project.
 - a. MBI Response: Please see attached specification section 32 32 23 Segmented Retaining Wall, Part 2 Products, 2.01 Manufacturers.
3. Question 03: Asphalt Paving: I assume the requirements for asphalt paving are to meet GDOT requirements (Type "E" Wearing Surface and Type "C" for Asphalt Binder). Please confirm.
 - a. MBI Response: Please see attached revised sheet C101 and specification section 32 10 00, Part 2 Products, 2.2 Type 6.
4. Question 04: Asphalt Paving: What is the specification requirement for Mineral Aggregate Base at paving areas (Sheet C101)?
 - a. MBI Response: Please see attached specification section 32 10 00, Part 2 Products, 2.2 Type 6.
5. Question 05: Could you please provide a storefront spec for this project?

- a. MBI Response: Storefront windows are not included in the project. Please see attached specification section 08 51 13 Aluminum Windows.
- 6. Question 06: Please note: Fire Protection, Mechanical and Plumbing drawings are issued with engineer stamp for State of Tennessee. I believe you will need the engineer stamp to be registered in Georgia on these drawings.
 - a. MBI Response: Upon completion of the bid period, MBI will resubmit all MPFP drawings currently issued with a State of Tennessee professional engineer's stamp to the Georgia State Fire Marshal's office and to the local AHJ with the appropriate State of Georgia professional engineer's stamp.
- 7. Question 07: Drawing C004 shows 4" thermoplastic striping at the asphalt paving in the parking area. Thermoplastic striping is more expensive than regular parking lot striping and is normally only used on state/county roads.
 - a. MBI Response: Thermoplastic striping shall be used at the handicap stalls. Refer to spec section 32 10 00, Part 2 Products, 2.1J - Lane Marking Paint for standard parking stalls.
- 8. Question 08: Please verify type of pendant sprinklers throughout the new space. The institutional type sprinklers should be required in at least the areas that house the inmates, but nothing is listed that way in the specifications. Please provide clarification.
 - a. MBI Response: This facility is an R-2 occupancy, dormitory facility. All fixtures are to be commercially rated, thus, institutional type sprinklers are not required.
- 9. Question 09: Sheet A301 and Elevations 1 and 2 on Sheet A401 show pre-engineered metal canopies; however, there are no specifications for the canopies. Please provide specifications for the canopies.
 - a. MBI Response: Please see attached specification section 10 73 13 Pre-engineered Aluminum Canopy and 10 73 16 Rod Supported Metal Canopies.
- 10. Question 10: There is a 6" Header Curb Detail, and it seems to not be what we are used to seeing. The Current detail for that type of curb worried it not by stable enough and once you backfill that curb it might collapse. We have detail of these should below the paving to give it more stability when we backfill.
 - a. MBI Response: Please see the attached revised sheet C101.A for new detail.
- 11. Question 11: Is the Contractor able to use that grassed area in the back of the parking lot where the addition is going for laydown / Storage on site?
 - a. MBI Response: Contractor has access to public areas of the site, and shall utilize areas immediately adjacent to the construction area for laydown and storage. Final locations to be reviewed and confirmed with ownership.
- 12. Question 12: We got asked the questions about Fencing. Is there a detail of the fence and gates needed for this project?

- a. MBI Response: Contractor to provide details and final fencing layout to be reviewed by Owner/Architect during construction administration. Please refer to architectural and civil drawings/specification sections for approximate locations and fencing types.
- 13. Question 13: The specifications advised the General Contractors is to provide the number of calendar days for the project. There are also liquidated damages of 500 dollars a day. Will a total number of calendar days be provided to all GC's by the owner/architect prior to submission?
 - a. MBI Response: Per the bid form, bidders are to provide the number of consecutive calendar days within which construction shall be completed. Should construction take longer than the number of calendar days approved per the bid of the lowest qualified bidder, liquidated damages will be implemented.
- 14. Question 14: Is the chainlink fence material at the retaining wall to be priced as black vinyl or galvanized? What is the material specification and size of the fence at the northeast parking lot curb to the building corner?
 - a. MBI Response: Please refer to attached specification section 32 31 13 for chain link fence information.
- 15. Question 15: Please confirm that this project does not require Davis Bacon or Prevailing Wage pay requirements.
 - a. MBI Response: Davis Bacon or Prevailing Wage pay are not required for this project.

C. Specifications:

The attached Bid Addendum A specifications shall supersede previously issued specifications and include the following:

- 1. Section 00 00 01 Table of Contents
 - a. Modified specification sections.
 - b. Removed reference to Specification Section 10 14 19 Dimensional Letter Signage not included in original bid documents.
 - c. Removed Reference to Specification Section 10 73 13 Awnings not included in original bid documents.
 - d. Removed reference to Specification Section 26 05 36 Cable Trays for Electrical Systems not included in original bid documents.
 - e. Modified Specification Section number for 26 05 43 Underground Ducts and Raceways for Electrical Systems to reflect correct section number.
- 2. Section 08 51 13 Aluminum Windows
 - a. Specification section added in its entirety.
- 3. Section 10 57 13 Closet and Utility Shelving
 - a. Specification section removed in its entirety.
- 4. Section 10 73 13 Pre-Engineered Aluminum Canopy
 - a. Specification section added in its entirety.
- 5. Section 10 73 16 Rod-Supported Metal Canopy
 - a. Specification Section added in its entirety.
- 6. Section 21 05 53 Identification for Fire-Suppression Piping and Equipment

- a. Specification Section added in its entirety.
- 7. Section 21 12 13 Wet-Pipe Sprinkler Systems
 - a. Specification Section added in its entirety.
- 8. Section 21 13 00 Fire Protection
 - a. Specification Section added in its entirety.
- 9. Section 31 20 00 Earthwork
 - a. Specification Section added in its entirety.
- 10. Section 31 25 00 Slope and Erosion Control
 - a. Specification Section added in its entirety.
- 11. Section 31 37 00 Riprap
 - a. Specification Section added in its entirety.
- 12. Section 32 10 00 New and Replacement Paving
 - a. Specification Section added in its entirety.
- 13. Section 32 31 13 Chain Link Fences & Gates
 - a. Specification Section added in its entirety. Section previously noted on 00 01 00 Table of Contents but not included in original bid documents.
- 14. Section 32 32 23 Segmented Retaining Wall
 - a. Specification Section added in its entirety.

D. Drawings:

The attached Bid Addendum A drawings shall supersede previously issued drawings and include the following:

- 1. Sheet G000
 - a. Modified Drawing List.
- 2. Sheet C004
 - a. Modified parking lane paint callouts.
- 3. Sheet C101
 - a. Added Concrete Curb Detail to sheet.
- 4. Sheet M703
 - a. Modified Detail 1/M703 "Building Automation System Architecture".

END OF BID ADDENDUM A

PROJECT: Catoosa County Jail Expansion

DATE: Wednesday, June 24th, 2026

TIME: 2:00PM – 3:00PM

MBI COMM. NO.: 241125-000-02

PRE-BID MEETING AGENDA:

1. Introductions & Sign In
2. Note to Meeting Participants
 - a. Anything covered during this pre-bid meeting or during the bidding process is not official unless it is part of the meeting minutes of the pre-bid meeting or issued in writing as an addendum.
 - b. RFIs and any additional questions will be answered in Bid Addendum A on Friday, June 26th, 2026. Any questions left unanswered or asked from Friday, June 26th 2026, until Friday, July 10th 2026 at 12:00 PM, will be included in Bid Addendum B.
3. Bid Date Information
 - a. Where: Catoosa County Government, 800 Lafayette Street, Ringgold, GA 30736
 - b. When: Thursday, July 23th, 2026
 - c. Time: 2:00pm Local Time
 - d. Any questions about time and location?
4. Permitting
 - a. Georgia State Fire Marshals Office has approved the drawings and specs.
 - b. Catoosa County plans reviewer is undergoing a local permit review.
 - c. After a Notice to Proceed is issued, the Contractor may retrieve the building permit and pay the required fees at the Catoosa County Building Inspector's Office.
5. Contractor Requirements (Spec Sections 00 21 13 & 00 22 13)
 - a. Bid Bond
 - b. Performance and Payment Bonds
 - c. Insurance(s)
6. Liquidated Damages
7. Bid Form Review
 - a. Contractors are responsible for understanding any allowances.
 - i. Allowance No. 1: Emergency Responder Communications Enhancement System (ERCES)
 - b. Contractors must indicate the number of consecutive calendar days for construction.
8. Project Scope
 - a. New Construction & Associated Site Work
 - i. Please review all documents for project scope; the new facility is a commercially rated dormitory.
 - b. Staging Areas and Building Access
 - i. The Catoosa County Jail & Sheriff's Office will remain open and fully operational during construction. The Contractor shall coordinate all staging areas, site, and building access with the Owner. The Contractor must always maintain the required means of egress, and all means of protection are the sole responsibility of the Contractor.
9. Questions/Comments

- a. Any questions that may arise following the pre-bid meeting shall be submitted as an RFI and emailed to Tom Horvath at thomash@mbicompanies.com. Questions via phone will not be accepted.
- 10. Project Site Walkthrough

Prepared by: Sydney Ellen Sullivan
MBI Companies Inc.

PROJECT: Catoosa County Jail Expansion (CCJE 2024-04)

DATE: June 24th, 2026

TIME: 2:00 PM – 3:00 PM

MBI COMM. NO.: 241125-000-02

MEMBERS PRESENT: SEE ATTACHED LIST

MEETING MINUTES:

All information provided as part of these meeting minutes shall be deemed “for information only” and shall be confirmed per the bid documents as well as all associated documentation.

1. Introduction & Sign In

- a. All participants were instructed to sign in.
- b. Members of the MBI project team were introduced: Jerry Isaksen as the Architect of Record, Tom Horvath as MBI project manager and Sydney Ellen Sullivan as MBI project administrator.
- c. It was explained that the Catoosa County Jail Expansion project was bid last year and a commission bid review required a scope change to meet budget.
- a. It was noted that anything covered during this pre-bid meeting or during the bidding process is not official unless it is part of the meeting minutes of the pre-bid meeting or issued in writing as an addendum.

2. Regarding RFI Information

- a. The bid period schedule was reviewed, and the following dates were presented:
 - i. Bid Addendum A – June 26th, 2026
 - ii. Last day for bidder RFIs to be submitted – July 10th, 2026 at 12:00pm (noon).
 - iii. Bid Addendum B – July 17th, 2026

3. Regarding Bid Date Information

- a. All attending parties were instructed to review the “Instructions to Bidders” specification for the formal procedure to register as an official bidder so they may receive updates directly from MBI regarding addendum postings.
- b. Bids are to be dropped off In Person.
 - i. Where: Catoosa County Government: 800 Lafayette Street, Ringgold, GA 30736
 - ii. When: Thursday, July 23rd, 2026
 - iii. Time: 2:00 PM Local Time
 - iv. To Whom: Project Administrator of Catoosa County.
- c. Bids will be opened publicly and read aloud.

4. Permitting

- a. Georgia State Fire Marshals Office has approved the drawings and specs.
- b. Catoosa County plans reviewer is undergoing a local permit review.
- c. After a Notice to Proceed is issued, the Contractor may retrieve the building permit and pay the required fees at the Catoosa County Building Inspector’s Office.

5. Contractor Requirements

- a. Contractors were advised to read through the bid documents to find the information therein. Emphasis was placed on sections 00 21 13 – A701 Instructions to Bidders, and 00 22 13 – Supplementary Instructions to Bidders.
 - i. Specifically indicated were the requirements of contractors to understand bid bond, performance bond and payment bond, and insurance(s) information.

6. Liquidated Damages

- a. Contractors were advised to read through the bid documents to find the information therein.
 - i. Liquidated Damages will be issued under the conditions described in the bid documents.

7. Bid Form Review (Refer to the “Instructions to Bidders” and all associated bid documents for additional and confirmation of information).

- a. Contractors were advised to read through the bid documents to find the information therein.
- b. The allowance of Emergency Responder Communications Enhancement System (ERCES) was discussed.
 - i. The question of “is the ERCES for just the addition?” was asked. MBI affirmed that the ERCES is only for the addition and not for any existing facilities.
- c. It was requested that a grace period be introduced to produce the List of Subcontractors and Affidavit of Non-collusion for Subcontractors. Catoosa County Project Administrator responded that these documents may be accepted later than the day of the bid opening. However, the documents need to be submitted before notice to proceed is formalized.
 - i. The CC Project Administrator stated that the Bid should include an expected delivery date of the List of Subcontractors and Affidavit of Non-collusion for Subcontractors if they are not be included within the Bid.
 - ii. This does not change the requirement to produce a Bid Bond at time of bid.

8. Project Scope

- a. The Catoosa County Jail Expansion is no a longer medium detention facility, but a commercially rated dormitory facility. It is an R-2 occupancy, and there are no detention rated construction systems or assemblies.
- b. During construction, the Catoosa County Sheriff’s Office and all existing facilities will remain fully operational. Construction areas and personnel must respect these operations.

9. Questions/Comments

- a. If any questions are generated after this Pre-bid meeting, send them as an RFI to Tom Horvath via email. Phone calls will not be accepted for questions or substitution requests.
- b. If a contractor wishes to be added to the Bidders list, they will need to call Tom Horvath at (423) 756-5046. A phone call is required.
- c. Contractor asked about 01 31 00 1.07B, which states that the contractor is required to use an online software for project management, “are the four listed the only products allowed?”

- i. The response is that a contractor can request a substitution with their preferred software for Architect review.
- d. Contractor asked about BIM coordination, "are contractors required to create a BIM model and conduct clash detection?"
 - i. MBI answered that it is not required for the GC to create and maintain a BIM model.
- e. Contractor asked about temporary fencing the project, "to what extent is temporary construction fencing required?"
 - i. MBI answered that temporary fencing shall be governed by contractor's liability and protection of the site and equipment.
- f. Contractor asked if traffic flow needs to be managed by the contractor's team.
 - i. MBI stated that traffic flow needs to be maintained from both adjacent streets to the existing CCSO facilities. The intent is to consolidate the construction activities to the project site only and not interfere with CCSO activities and access.
- g. Contractor asked for a clarification on construction budget, "is the funding approved for the project?"
 - i. MBI answered that the commission has approved a budget for approximately six (6) million dollars for building and site construction. Contractor OH&P, A/E soft costs, permits and FFE are a few items that are in addition to this budget.
 - ii. FFE was questioned – it was explained that all items that are physically connected/attached to the building are considered under GC scope. This includes the following: casework, countertops, floor-mounted bunks, lockers, and all other items indicated as Contractor Furnished on the drawings.
- h. Contractor asked if the sign in sheet adds a contractor to the bidders list?
 - i. MBI answered – The sign-in sheet only identifies those who attended the non-mandatory, pre-bid meeting. Prospective Bidders must contact our office (per instructions to bidders) to be added to the bidder's list. This provides a means in which we can forward bid information.
- i. It was clarified that this project is not an addition to the existing Catoosa County Sheriff's Office or Jail Facility but is a new building that is separated.
- j. Contractor asked if GCs are responsible for access control?
 - i. MBI answered yes, and all electrical scope is in the documents.
- k. Contractor asked if the building is sprinklered, and if a sprinkler specification section will be provided.
 - i. MBI answered that this specification section will be included in Bid Addenda A.

10. Project Site Walkthrough

- a. Meeting adjourned with invitation for contractors to walk the site.

Reported by: Sydney Ellen Sullivan
 MBI Companies, Inc.



Project: Catoosa County Jail Expansion

Date: 06/24/2026

MBI Comm. No: 241125-000-02

Name

Company Name

Email Address

Phone Number

1	Kieran Craig	Pillar Construction	ccraig@pillarco.com	423-762-4178
2	Chris Byerley	Chazler	chris@chazler.com	423-899-3606
3	REID LEWIS	INTEGRATED BUILDS	RLEWIS@INTEGRATEDBUILDS.com	423-643-8448
4	Thayer Holt	Lawson	Tholt@LawsonElectric.com	423-618-1745
5	Brad Hayen	TRICON	bidding@triconus.com	(706) 639-6787
6	Austin Rogers	ATS Waypoint	austin.rogers@atswaypoint.com	(470)-388-8348
7	Miles Knox	L Squared Con	Miles@L Squared . build	423-637-1075
8	Will Morton	L Squared Con	Will@L Squared . build	423-883-5776
9	Sydney Ellen Sullivan	MBI Companies	sydneyellens@mbicompanies.com	423-756-5046
10	Tom Horvath	MBI Companies	thomash@mbicompanies.com	423-756-5046
11	Jerry Isakson	MBI Companies	jerryi@mbicompanies.com	423-756-5046
12				
13				
14				



Project: Catoosa County Jail Expansion

Date: 06/24/2026

MBI Comm. No: 241125-000-02

	Name	Company Name	Email Address	Phone Number
1	Tyler Mills	Morgan Construction	Tmills@Morganconstruction.com	423-266-6218
2	Wes Bonds	Morgan Construction	Wbonds@Morganconstruction.com	423-266-6218
3	Josh Smith	Catoosa County	josh.smith@CatoosaCountyga.gov	706-965-0551
4	Alex Damron	Smith Built Construction	adamron@smithbuiltcg.com	678-689-4433
5	Zach Travis	Ward Humphrey	Ztravis@ward-humphrey.com	470-812-1500
6	Mike Davis	P&C Construction	mdavis@pc-const.com	423-417-1330
7	Jay Newman	Pointe General Contractors	jnewman@pointegc.com	423.716.3606
8	Robert Roberts	Robert Roberts LLC	ESTIMATING@robertroberts.com	423 551 9555
9	Rob Gary	Tri-State Paving	Robert.Gary@TSPWV.com	423-320-4280
10				
11				
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Project: Catoosa County Jail Expansion

Date: 06/24/2026

MBI Comm. No: 241125-000-02

	Name	Company Name	Email Address	Phone Number
1	Duane York	Lee Company	duane.york@leecompany.com	423-494-6781
2	Jeremiah Pitts	Tricon	jeremiah@triconus.com	423-443-5926
3	Maddie King	Tyson + Associates	maddie@tysoncon.com	706-980-8037
4	Bremen Richards	Tyson + Associates	bremen@tysoncon.com	706-483-3070
5	Nathan Mirabella	Tyson + Associates	nathan@tysoncon.com	423-368-9628
6	Larry Garner	Miles Electric LLC	lgarner@milesselect.com	423-718-4948
7	Brent Collier	J&J Contractors, Inc.	brantz@jjcontractors.com	423-265-3233
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9				
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11				
12				
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October 9, 2024

CTI Engineers, Inc.

1122 Riverfront Parkway
Chattanooga, TN 37402

ATTENTION: Mr. Phillip Schofield
pschofield@ctiengr.com

Subject: **REPORT OF GEOTECHNICAL EXPLORATION**
Catoosa County Sheriff's Office Expansion
5842 US Highway 41
Ringgold, Georgia
UES Project No. A24110.00519

Dear Mr. Schofield:

UES Professional Solutions 19, LLC (UES) is submitting the results of the geotechnical exploration performed for the subject project. The geotechnical exploration was performed in general accordance with the UES Proposal, dated June 17, 2024. The following report presents our recommendations for the proposed expansion at the existing Catoosa County Sheriff's facility in Ringgold, Georgia.

UES sincerely appreciates the opportunity to serve as your geotechnical consultant. Should you have any questions regarding this report, or if we can be of any further assistance, please contact us at your convenience.

Sincerely,
UES Professional Solutions 19, LLC

A handwritten signature in black ink, appearing to read "Chris Birchfield", written over a horizontal line.

Christopher K. Birchfield
Geotechnical Project Manager



Jeremy T. Haley, P.E.
Senior Geotechnical Engineer
GA PE049993

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this geotechnical exploration was to characterize the subsurface conditions for the design and construction of the proposed expansion for Catoosa County Sheriff's Office in Ringgold, Georgia. This report provides recommendations for general site preparation, excavation and fill requirements, foundation recommendations, slab-on-grade construction recommendations, and pavement recommendations for the proposed expansion.

1.2 PROJECT INFORMATION AND SITE DESCRIPTION

Project information, including a preliminary site plan prepared by CTI Engineers, was provided by Mr. Philip Schofield with CTI Engineers. UES understands that a new expansion is planned at the existing Catoosa County Sheriff's Office facility located at 5842 US Highway 41 in Ringgold, Georgia. The expansion will be located to the northwest of the existing building. The property is bordered by US Hwy 41 to the east, by the existing building to the south, by a fueling area to the north, and by wooded parcels to the west. The area for the proposed development currently exists as a relatively level asphalt covered parking area in the southern portions and a grass covered area in the northern portions. The grass covered area also slopes gently upwards from southeast to northwest from the parking areas, with an elevation change on the order of 8 to 10 feet. No grading information has been developed at this time; however, based on the existing grades, we anticipate maximum cuts on the order of 5 to 10 feet or less (especially in the northwestern portion of the site) and maximum fills on the order of 3 to 5 feet or less may be necessary in order to establish suitable grades.

UES understands that the proposed expansion will consist of the construction of a new building and a new parking area. The proposed building will likely have a footprint on the order of approximately 30,000 square feet. Detailed structural information was not available at the time of this report; however, based on our experience with similar construction and the existing structures, we anticipate that the building will likely be single-story concrete masonry unit (CMU) and/or steel-framed construction with



conventional shallow foundations and a concrete slab-on-grade. Detailed structural loading information was not available at the time of this report; however, based on our experience with similar construction, we anticipate maximum column loads will be on the order of 100 kips or less and maximum continuous foundation loads will be on the order of 3 to 5 kips per linear foot (klf) or less. This information is summarized in Table 1 below.

Table 1 – Design Information Summary

Subject	Design Information / Assumptions
Number of Stories	1
Usage	Office Space
Assumed Column Loads	100 kips or less (Full Dead and Factored Live) ¹
Assumed Wall Loads	3 to 5 klf ¹
Finished Floor Elevation	Not available

Note¹: Information is assumed based on experience with similar construction.

Once grading or structural loading information is finalized, then UES should be provided with this updated information and allowed to review and revise the recommendations presented in this report.

1.3 SCOPE OF STUDY

This geotechnical exploration involved a site reconnaissance, field drilling, laboratory testing, and engineering analysis. The following sections of this report present discussions of the field exploration, site conditions, and conclusions and recommendations. Following the text of this report, Appendix A presents figures and test boring records. Appendix B presents the laboratory test results.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, subsurface water, or air, on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.



2.0 EXPLORATION AND TESTING PROGRAMS

2.1 FIELD EXPLORATION

The site subsurface conditions were explored with a total of ten (10) soil test borings (B-1 through B-10). Six of the borings (B-1 through B-6) were performed within the proposed structural footprint of the expansion and four of the borings (B-7 through B-10) were performed within the paving areas of the expansion. The boring locations were selected by UES personnel in conjunction with the preliminary site plan prepared by CTI Engineers provided at the time of the exploration. Approximate boring locations are shown on the Boring Location Plan, Figure 3 presented in Appendix A. The boring locations were located and staked in the field by UES personnel. Drilling was performed on September 19, 2024. The depths reference the ground surface elevations at the site that existed at the time of the exploration. The borings were advanced using 3.25-inch inside diameter hollow stem augers (HSA) with an ATV-mounted drill rig. The drill crew worked in general accordance with ASTM D6151 (HSA Drilling). Sampling of overburden soils was accomplished using the standard penetration test procedure (ASTM D1586). The borings were backfilled with soil cuttings before leaving the site. Detailed test boring records are presented in Appendix A.

In split-spoon sampling, a standard 2-inch O.D. split-spoon sampler is driven into the bottom of the boring with a 140-pound hammer falling a distance of 30 inches. The number of blows required to advance the sampler the last 12 inches of the standard 18 inches of total penetration, or the middle 12 inches of continuous sampling, is recorded as the Standard Penetration Resistance (N-value). These N-values are indicated on the boring logs at the testing depth and provide an indication of the relative density of granular materials and strength of cohesive materials.

2.2 LABORATORY TEST PROGRAM

Soil samples collected during drilling were transported to our laboratory for visual classification and laboratory testing. The following laboratory testing was performed on select samples to determine various properties of the soil:



- Atterberg Limits (ASTM D4318): Two (2) Atterberg limits tests were performed for this project. This test helps us to confirm our visual classifications according to the Unified Soil Classification System (USCS). The plastic limit and liquid limit represent the moisture content at which a cohesive soil changes from a semi-solid to a plastic state and from a plastic state to liquid state, respectively.
- Natural Moisture Content (ASTM D2216): Moisture content determinations were performed on forty-five (45) samples for this project. The natural moisture content is defined as the ratio of the weight of water present in the soil to the dry weight of soil.

The test results for the soil samples collected during the field exploration are presented on a Laboratory Summary Sheet, enclosed in Appendix B.



3.0 SUBSURFACE CONDITIONS

3.1 GEOLOGIC CONDITIONS

The project site, and most of northwest Georgia, lies in the Appalachian Valley and Ridge Physiographic Province. The Province is characterized by elongated, northeasterly-trending ridges formed on highly resistant sandstones and shales. Between ridges, broad valleys and rolling hills are formed primarily on less resistant limestones, dolomites and shales.

Published geologic information indicates that the site is underlain by bedrock of the Knox Group, including the Newala Formation, Mascot Dolomite, Kingsport Formation, Longview Dolomite, Chepultepec Dolomite, and Copper Ridge Dolomite. The Newala formation is made up of the Mascot Dolomite and the Kingsport formation and generally consists of siliceous dolomite with minor limestone. The silica is in the form of nodules and lenses of gray to white chert and varies greatly in quantity. The Longview Dolomite formation consists of light gray, fine to coarse crystalline, thin to thick-bedded, siliceous dolomite. Residual soils from the Longview Dolomite typically consist of cherty, silty clays. The Chepultepec Dolomite is primarily a light-colored dolomite with beds of sandstone. This formation is known to exhibit dropouts and collapse activity. Residuum from the Chepultepec often contains a light-colored chert. The Copper Ridge Dolomite consists of light gray, thick-bedded, medium to coarsely crystalline, siliceous dolomite with dense, tough, hard, generally white or yellowish gray, stromatolitic chert. The bedrock of the Knox Group typically weathers to a reddish or orange-brown clay soil with variable quantities of chert gravel and/or chert, silty clays.

Since the underlying bedrock formations contain limestone, the site is susceptible to the typical carbonate hazards of irregular weathering, cave and cavern conditions, and overburden sinkholes. Carbonate rock, while appearing very hard and resistant, is soluble in slightly acidic water. This characteristic, plus differential weathering of the bedrock mass, is responsible for the hazards. Of these hazards, the occurrence of sinkholes is potentially the most damaging to overlying soil supported structures. In Northwest Georgia, sinkholes occur primarily due to differential weathering of the bedrock and “flushing” or “raveling” of overburden soils into the cavities in the bedrock. The loss of solids creates a cavity or



“dome” in the overburden. Growth of the dome over time or excavation over the dome can create a condition in which rapid, local subsidence or collapse of the roof of the dome occurs.

3.2 SEISMIC CONDITIONS

International Building Code, 2018

The project site is located approximately 260 miles from the New Madrid seismic source zone as designated by the United States Geologic Survey. In accordance with the International Building Code (IBC 2018) and ASCE/SEI 7-16, we are providing the following seismic design information. After evaluating the SPT N-value data from the soil test borings and considering the changes to the site and foundation types, it was determined that the subsurface conditions at the site most closely matched the description for “Seismic Site Class D” or “Stiff Soil”. Table 2 provides the spectral response accelerations for both short and 1-second periods, which may be used for design.

Table 2 – Seismic Conditions Summary

Structure	S _s g	S ₁ g	S _{Ds} g	S _{D1} G
Office Expansion	0.521	0.125	0.481	0.196

The short and 1-second period values indicate the structure should be assigned a Seismic Design Category “C” using the published information. The provided values are based on the results of our field exploration and the assumption that the structure will be designed utilizing a Risk Category I, II or III. If these assumptions are incorrect, we should be contacted to reevaluate the seismic design information.

3.3 SUBSURFACE CONDITIONS

The following subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included with this report should be reviewed for specific information at individual boring locations. The depth and thickness of the subsurface



strata indicated on the boring cross-sections were generalized from and interpolated between test locations. The transition between materials will be more or less gradual than indicated and may be abrupt. Information on actual subsurface conditions exists only at the specific boring locations and is relevant to the time the exploration was performed. Variations may occur and should be expected between boring locations. The stratification lines were used for our analytical purposes and, unless specifically stated otherwise, should not be used as the basis for design or construction cost estimates.

3.3.1 Surficial Materials

A surficial layer of asphalt and basetone was encountered in four of the ten borings (B-1, B-2, B-4 and B-5) ranging from 8 to 9 inches in thickness (2 to 3 inches of asphalt and 6 inches of basetone). A surficial layer of topsoil was encountered in the remaining six borings (B-3 and B-6 through B-10) ranging from 2 to 4 inches in thickness. We note the surficial material thickness will vary away from the boring locations, and the contractor should determine a baseline thickness for construction and bidding purposes. Beneath these surficial layers, existing fill soils, and residual soils were encountered to auger refusal or boring termination depths ranging from 5.9 to 44.2 feet.

3.3.2 Existing Fill Soils

Beneath the surficial layers in seven of the ten borings (B-3, B-4, and B-6 through B-10), existing fill soils were encountered to approximate depths ranging from 1.5 to 11 feet below the ground surface. Fill is generally classified as material that has been transported and placed by man. The fill soils generally consisted of dark brown, brown, red brown, gray, dark gray, and red clays with varying amounts of organics, sand, topsoil, rock fragments, and asphalt fragments. The N-value of the fill soils ranged from 2 blows per foot (bpf) to 50 blows per 4 inches of penetration, indicating a consistency of very soft to very hard. The natural moisture contents of the fill soils ranged from 8 to 15 percent. Atterberg limits testing on one select sample of the fill soils revealed a liquid limit (LL) of 29 percent and a plasticity index (PI) of 13 percent. These soils are classified as CL (lean clay) in general accordance with the Unified Soil Classification System.



3.3.3 Residual Soils

Beneath the existing fill soils in seven of the ten borings (B-3, B-4, and B-6 through B-10) and beneath the surficial layers in the remaining three borings (B-1, B-2, and B-5), residual soils were encountered to auger refusal or boring termination depths ranging from 5.9 to 44.2 feet. Residual soils are classified as soils which have been formed in place from weathering of the underlying bedrock. The residual soils generally consisted of brown, dark brown, red brown, red, tan, and gray clays with varying amounts of chert, rock, sand, shale fragments, and black mottling. The N-values of the residuum ranged from 8 blows per foot (bpf) to 50 blows per six inches of penetration, indicating a consistency of firm to very hard. The very hard soils were likely due to encountering heavy amounts of chert fragments or auger refusal during the sample interval. The natural moisture contents of the residuum ranged from 10 to 37 percent. Atterberg limits testing on one select sample of the residuum revealed a liquid limit (LL) of 47 percent and a plasticity index (PI) of 20 percent, respectively. These soils are classified as CL (lean clay) in general accordance with the Unified Soil Classification System.

3.3.4 Subsurface Water

Subsurface water was observed in one of the ten borings (B-6) at a depth of 38 feet at the time of drilling. Subsurface water levels may fluctuate due to seasonal changes in precipitation amounts. Additionally, discontinuous zones of perched water may exist within the overburden and/or at the contact with bedrock. The groundwater information presented in this report is the information that was collected at the time of our field activities.

3.3.5 Auger Refusal Conditions

Auger refusal materials were encountered in four of the ten borings (B-2, B-3, B-4, and B-6) at depths ranging from 5.9 to 44.2 feet during field exploration. Refusal is a designation applied to any material that cannot be penetrated by the power auger. Auger refusal may indicate dense gravel or cobble layers, boulders, rock ledges or pinnacles, or the top of continuous bedrock. A summary of the auger refusal depths encountered in the soil test borings is shown in Table 3 below:



Table 3 – Auger Refusal Summary

Boring No.	Auger Refusal Depth (Feet)
B-2	5.9
B-3	6.5
B-4	11.3
B-6	44.2

Note: Depths reference the existing ground elevations at the time of the exploration.



4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 SITE ASSESSMENT

The results of the field exploration indicate that the site is adaptable for the proposed construction; however, there are some challenges associated with the development of this site. These challenges include the existing fill soils, the potentially difficult excavations, and the underlying karst geology. Once site grading and detailed structural information are finalized for the proposed expansion, UES should be given the opportunity to review this information and adjust any recommendations, if necessary

4.1.1 Existing Fill Soils

Existing fill was encountered in seven of the ten borings (B-3, B-4, and B-6 through B-10) to depths ranging from 1.5 to 11 feet below the ground surface. We are not aware of, nor have we been provided with testing records for the fill. Accordingly, there are certain risks associated with construction on these types of fill. The risk primarily consists of excessive and/or non-uniform settlement caused by extensive zones or pockets of soft, loose, or uncompacted material.

The boring data indicates the fill soils generally consisted of dark brown, brown, red brown, gray, dark gray, and red clays with varying amounts of organics, sand, topsoil, rock fragments, and asphalt fragments. The N-value of the fill soils ranged from 2 bpf to 50 blows over 4 inches of penetration, indicating a consistency of very soft to very hard. Typically, an engineered fill would have N-values in excess of 8 to 10 bpf and would be generally free of deleterious material. Based on our observations of the fill, the fill appears to have been subjected to light to moderate and highly variable compactive efforts and does contain varying amounts of deleterious material in the form of organics and topsoil. Therefore, we do not recommend that the existing fill materials be utilized for structural support of the proposed expansion without further remediation. We recommend that the entirety of the fill soils within the structural footprint, plus approximately 5 feet outside the outermost foundation limit, be removed and replaced with suitable structural soil fill. Based on the existing grades and the fact that the areas containing the deepest fill are located at higher elevations, it is likely that a large majority of these fill soils may be removed during normal grading activities. Based on observations of the existing fill materials, portions of



the fill can be potentially reused as structural fill provided any deleterious material is removed, any moisture conditioning is performed, and it is recompacted per the recommendations presented in subsequent sections of this report. Once grading information is finalized, UES should be allowed to revisit these recommendations to determine if any cost-effective alternatives would better benefit the project.

We anticipate that portions of the existing fill will provide adequate support of the proposed pavements; however, some remediation (i.e. undercut and replacement or soil cement treatment of the subgrade) should be anticipated. It has been our experience that existing fill can change abruptly and may contain isolated pockets of unsuitable materials. As such, we recommend that the existing fill soils be subjected to a detailed proofroll prior to placement of new fill (in fill areas) or at final subgrade elevation (in cut areas) under the supervision of the geotechnical engineer or their qualified representative. Any areas judged to perform unsatisfactory during the proofroll should be remediated at the engineer's discretion. Remedial measures typically include undercutting and replacement with structural soil fill or dense graded aggregate.

4.1.2 Potentially Difficult Excavations

Auger refusal materials were encountered in four of the ten borings (B-2, B-3, B-4, and B-6) at depths ranging from 5.9 to 44.2 feet. We have not yet been provided with a finalized grading plan; however, based on the provided preliminary grading and topographic information, we anticipate that these refusal materials will likely be below any proposed foundation elevations for the proposed structures. However, it is possible that refusal materials may be encountered within utility excavations, especially if excavations are greater than 5 to 10 feet. Although the refusal materials were not further explored, it is possible that the refusals encountered at shallower depths (B-2, B-3, and B-4) were due to heavy amounts of chert fragments rather than the underlying bedrock. Any soil containing heavy amounts of chert fragments or weathered rock may be able to be removed using conventional earthmoving equipment but will likely require additional time and effort. In areas where the rock is not weathered, these auger refusal materials will likely require difficult excavation techniques such as excavators with rock teeth, hammering, or blasting.



4.1.3 Karst Geology

A certain degree of risk with respect to sinkhole formation and subsidence should be considered with any site located within geologic areas underlain by potentially soluble rock units. While a rigorous effort to assess the potential for sinkhole formation on this site was beyond the scope of this evaluation, our borings did not encounter obvious indications of sinkhole development. However, a review of the USGS topographic map of the area did reveal the presence of a couple closed depressions, which may denote past sinkhole activity, to the north, south, and southwest of the project site. Based on these findings and our experience with this formation at other sites, we consider that this site has no greater risk for sinkhole activity than other successfully developed sites in the immediate vicinity of this site.

4.2 SITE PREPARATION

4.2.1 Subgrade

Gravel, topsoil, asphalt, concrete, rock fragments greater than 6 inches, and other debris should be removed from the proposed construction areas. In previously developed areas, it is often common to find buried zones of construction debris. If these materials are encountered, they should be undercut and replaced at the discretion of the geotechnical engineer.

After completion of any stripping operations and any required excavations to reach subgrade level, we recommend that the subgrade be proofrolled with a fully-loaded, tandem-axle dump truck or other pneumatic-tired construction equipment of similar weight. The geotechnical engineer or their qualified representative should observe proofrolling. Areas judged to perform unsatisfactorily should be remediated at the geotechnical engineer's discretion. Typically, remedial options consist of undercutting and replacement with structural soil fill or dense graded aggregate. There is a good likelihood that the upper soils currently covering the site may require some scarifying and drying due to exposure to weather (precipitation and freeze/thaw) for an extended period of time.



4.2.2 Structural Soil Fill

Material considered suitable for use as compacted fill should be clean soil free of organics, wood, trash, asphalt, and other deleterious material, containing no rock fragments greater than 6 inches in any one dimension. Preferably, borrow material to be used as structural soil fill should have a standard Proctor maximum dry density of 90 pounds per cubic foot (pcf) or greater and a plasticity index (PI) of 35 percent or less. All material being used as soil fill should be tested and confirmed by the geotechnical engineer to be in accordance with the project requirements before being placed. Based on limited laboratory testing, we anticipate the on-site soils are suitable for use as structural soil fill, provided that any necessary moisture conditioning is performed, and any deleterious materials are removed. Fine-grained soils are moisture sensitive and can prove difficult to place/compact during wet weather. The grading contractor should be prepared to moisture condition (including scarifying/drying) these soils as conditions warrant. Otherwise, chemical treatment (lime/soil cement) may be needed during extended periods of cooler/wet weather.

Structural fill should be placed in loose, horizontal lifts not exceeding 8 inches in thickness. Each lift should be compacted to at least 95 percent of maximum dry density per the standard Proctor method (ASTM D698) and within the range of minus 2 percent to plus 3 percent of the optimum moisture content. Each lift should be compacted and tested by geotechnical personnel to confirm that the contractor's method is capable of achieving the project requirements before placing any subsequent lifts. Any areas which have become soft or frozen should be removed before additional structural fill is placed. This information is summarized in Table 4 below.

Table 4 – Structural Soil Fill Recommendations

Subject	Property
Maximum Dry Density	90 pcf or greater
Plasticity Index	35% or less
Maximum Particle Size	6 inches
Compaction Standard	Standard Proctor, ASTM D698
Required Compaction	95% of Maximum Dry Density
Moisture Content	-2 to +3% of the soil's optimum moisture content
Lift Thickness	8 inches or less



4.2.3 Compacted Crushed Stone Fill

Compacted crushed stone fill should be Group 1 Aggregates in accordance with Section 815 of the Georgia Department of Transportation specifications. The crushed stone fill should be placed in loose, horizontal lifts not exceeding 10 inches in loose thickness. Each lift should be compacted to at least 98 percent of maximum dry density per the standard Proctor method (ASTM D698). Each lift should be compacted and tested by geotechnical personnel to confirm the contractor's method is capable of achieving the project requirements before placing any subsequent lifts.

4.3 FOUNDATION RECOMMENDATIONS

As previously mentioned, no grading or structural loading information was available at the time of this exploration. Once site grading and structural information are finalized for the proposed development, UES should be given an opportunity to review this information, perform an additional settlement analysis, and adjust any recommendations, if necessary.

4.3.1 Shallow Foundations

Foundations for the proposed structures are anticipated to bear in stiff or better newly placed fill soils, residual soils, or remediated soils. The recommended allowable bearing pressure for design of the foundations is 2,500 pounds per square foot (psf). We recommend that continuous foundations be a minimum of 18 inches wide and isolated spread footings be a minimum of 24 inches wide to reduce the possibility of a localized punching shear failure. All exterior footings should be designed to bear at least 12 inches below finished exterior grade to protect against frost heave.

Foundation subgrade observations should be performed by a UES geotechnical engineer, or their qualified representative, so that the recommendations provided in this report are consistent with the site conditions encountered. This is of elevated importance due to the existing fill soils and the shallow refusals encountered at the project site. A dynamic cone penetrometer (DCP) is commonly utilized to provide information that is compared to the data obtained in the geotechnical report. Where unacceptable materials are encountered, the material should be excavated to stiff, suitable soils or remediated at the geotechnical engineer's direction. Typical remedial measures consist of undercutting, overexcavation, or combinations thereof.



4.3.2 Slabs-on-Grade

For slab-on-grade construction, the site should be prepared as described previously. We recommend that the subgrade be topped with a minimum 4-inch layer of crushed stone (mineral aggregate base or a dense graded aggregate base) in the building area to act as a capillary moisture layer. The subgrade should be proofrolled and approved prior to the placement of the crushed stone. Based on the conditions encountered on this site, we recommend that the floor slabs bearing in soil be designed using a subgrade modulus of 125 pounds per cubic inch (pci). This modulus is based on a 1 foot by 1 foot area and should be adjusted for wider loads.

4.3.3 Settlement

We have estimated the total and differential settlements expected at this site based on the Federal Highways Administration (FHWA) Empirical Settlement Analysis Procedure. This FHWA empirical method allows the use of the SPT N-values in this calculation and includes the type of soil encountered. Based on the conditions encountered in our borings, the assumed structural loading (maximum column loads of 100 kips or less), and the assumption that any remediation is performed as outlined; maximum total settlements of less than 1 inch and maximum differential settlements of less than $\frac{3}{4}$ inches in 40 feet should be expected. If the loads vary greatly from those assumed at the time of this analysis, UES should be contacted to provide updated anticipated settlements and additional recommendations (if necessary).

4.4 PAVEMENT DESIGN RECOMMENDATIONS

Our recommendations are based upon the assumption that the subgrade has been properly prepared as described in previous report sections and that any stone backfill to be used to meet the final subgrade meets the requirements for compacted stone fill.

All paved areas should be constructed with positive drainage to direct water off-site and to minimize surface water seeping into the pavement subgrade. The subgrade should have a minimum slope of 1 percent. In downgrade areas, the base stone should extend through the slope to allow any water entering the base stone a path to exit. For rigid pavements, water-tight seals should also be provided at formed construction and expansion joints.



4.4.1 Flexible Pavement Design

AASHTO flexible pavement design methods have been utilized for pavement recommendations. Our recommendations are based on the assumptions that the subgrade has been properly prepared as described previously. Traffic loading had not been provided at the time this report was prepared; however, we anticipate that the majority of the traffic within the southern parking and drive area will include mainly passenger cars with the occasional heavier delivery trucks. Based on our experience with similar projects with flexible pavement, we recommend the following light duty and medium duty flexible pavement section for the southern parking area:

Table 5 – Flexible Pavement Section Summary

Recommended Thickness (Inches)		
Pavement Materials	Light Duty	Medium Duty
Bituminous Asphalt Surface Mix	1.5	1.5
Bituminous Asphalt Base Mix	2.0	2.5
Compacted Crushed Aggregate Base	6.0	8.0

We recommend a base stone equivalent to a Group 1 Aggregate in accordance with Section 815 of the Georgia Department of Transportation specifications. The bituminous asphalt pavement should be 9.5mm Super Pave as per Section 400 for the surface mix and 19mm Super Pave as per Section 400 for the binder mix. Compaction requirements for the crushed aggregate base and the bituminous asphalt pavement should generally follow Georgia Department of Transportation specifications.

The recommended pavement thickness' presented in this report section are considered typical and minimum for the assumed parameters in the general site area. We understand that budgetary considerations sometimes warrant thinner pavement sections than those presented. However, the client, the owner, and the project designers should be aware that thinner pavement sections may result in increased maintenance costs and lower than anticipated pavement life.



4.4.2 Rigid Pavement Design

If areas could possibly be subjected to heavy vehicle loads, these areas may require the use of rigid pavement. If rigid pavement is required, we recommend the following rigid pavement section:

Table 6 – Rigid Pavement Section Summary

Pavement Materials	Recommended Thickness (Inches)
4,000 psi Type I Concrete	5.0
Compacted Crushed Aggregate Base	6.0

Consideration should be given to adjusting the thickness of the compacted crushed aggregate base to match the total thickness of the adjacent asphalt areas so that the soil subgrade is at the same elevation for both the concrete and medium duty asphalt pavement. Also, consideration should be given to extending the concrete dumpster pad the full length of the garbage truck, so the all the tires of the truck are able to sit on the concrete pad while dumping the dumpster. Concrete should be reinforced with welded wire fabric or reinforcing bars to assist in controlling cracking from drying shrinkage and thermal changes. Sawed or formed control joints should be included for each 225 square feet of area or less (15 feet by 15 feet). Saw cuts should not cut through the welded wire fabric or reinforcing steel and dowels should be utilized at formed and/or cold joints.

4.5 LATERAL EARTH PRESSURES

At this time, we are not aware of any retaining walls or below grade walls; however, we understand this is a possibility since the northwestern portion of the site will likely need to be excavated to reach any proposed grades. Therefore, we are providing equivalent fluid pressures for three backfill conditions for cantilever-type walls. These are 1) active earth pressure for granular backfill (clean sand or gravel), 2) at-rest earth pressure for granular backfill, and 3) at-rest earth pressure for fine-grained (silt or clay) backfill.

Condition 1 - The active earth pressure for granular backfill (free draining) will result in an equivalent fluid pressure of 30 pounds per cubic foot (pcf). If the granular backfill is to develop active earth pressure



conditions, walls must be flexible and/or free to rotate or translate at the top approximately one inch laterally for every 20 feet of wall height.

Condition 2 - The at-rest earth pressure for granular backfill (free draining) will result in an equivalent fluid pressure of 45 pcf. For retaining walls that will not rotate or translate, such as building walls or other walls rigidly connected to structures, at-rest conditions will develop.

Condition 3 - Walls backfilled with fine-grained material (silt or clay) should be designed using the at-rest earth pressure whether restrained at the top, or not. Fine-grained soils typically creep over time which produces additional lateral stresses to the wall. The equivalent fluid pressure for this case is 70 pcf.

In all cases, forces from any expected surcharge loading including sloping backfill should be added to the equivalent fluid pressures. The walls should be properly drained to remove water or hydrostatic pressure should be added to the design pressure. Also, all backfill for the walls should be placed in accordance with the structural fill recommendations described hereinafter.

Table 7 - Earth Pressure Summary

Earth Pressure Condition	Backfill Type	Unit Weight (pcf)	Earth Pressure Coefficient
Active (K_a)	Granular	105	0.271
	On-Site Silts and Clays	120	0.390
At-Rest (K_o)	Granular	105	0.426
	On-Site Silts and Clays	120	0.562
Passive (K_p)	Granular	105	3.690
	On-Site Silts and Clays	120	2.561

Note: In each instance the earth pressure coefficients provided are unfactored.

For rigid, cast-in-place concrete walls, a friction factor of 0.35 between foundation concrete and the bearing soils may be used when evaluating friction. If a stone leveling course is utilized beneath the



foundation, a friction factor of 0.50 between foundation concrete and the dense graded aggregate base may be used when evaluating friction. Also, an ultimate passive earth pressure resistance of well-compacted soil fill can be utilized to resist sliding (in conjunction with friction). However, to limit deformation when relying on passive strength, we recommend using a minimum safety factor of 3.0 applied to the ultimate passive resistance value. Additionally, this is based on the upper 2 feet of soil being neglected during the calculation of passive resistance.



5.0 CONSTRUCTION CONSIDERATIONS

5.1 EXCAVATIONS

Excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. The contractor is usually solely responsible for site safety. This information is provided only as a service and under no circumstances should UES be assumed to be responsible for construction site safety.

As previously mentioned, auger refusal materials were encountered in four of the ten borings (B-2, B-3, B-4, and B-6) at depths ranging from 5.9 to 44.2 feet. We have not yet been provided with a finalized grading plan; however, based on the provided preliminary grading and topographic information, we anticipate that these refusal materials will likely be below any proposed foundation elevations for the proposed structures. However, it is possible that refusal materials may be encountered within utility excavations, especially if excavations are greater than 5 to 10 feet. Although the refusal materials were not further explored, it is possible that the refusals encountered at shallower depths (B-2, B-3, and B-4) were due to heavy amounts of chert fragments rather than the underlying bedrock. Any soil containing heavy amounts of chert fragments or weathered rock may be able to be removed using conventional earthmoving equipment but will likely require additional time and effort. In areas where the rock is not weathered, these auger refusal materials will likely require difficult excavation techniques such as excavators with rock teeth, hammering, or blasting.

5.2 MOISTURE SENSITIVE SOILS

The fine-grained soils encountered at this site will be sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. Construction traffic patterns should be varied to prevent the degradation of previously stable subgrade. In addition, plastic soils which become wet, may be slow to dry and thus significantly retard the progress of grading and compaction activities. We caution if site grading is performed during the wet weather season, methods such as discing and allowing the material to dry will be required to meet the required compaction



recommendations. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather. Climate data for Ringgold, Georgia obtained from Weatherbase indicate in the following table the average monthly precipitation. The average amount of precipitation does not vary much throughout the year. However, December through March is typically the difficult grading period due to the limited drying conditions that exist.

Table 8 – Average Precipitation Summary

Month	Monthly Precipitation Average (Inches)	Month	Monthly Precipitation Average (Inches)
January	5.0	July	4.4
February	4.9	August	3.3
March	5.6	September	4.2
April	4.0	October	3.3
May	3.9	November	4.1
June	3.5	December	4.7

5.3 DRAINAGE AND SURFACE WATER CONCERNS

To reduce the potential for undercut and construction induced sinkholes, water should not be allowed to collect in the foundation excavations, on floor slab areas, or on prepared subgrades of the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, subsurface water, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. The grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.



5.4 SINKHOLE CONSIDERATIONS

There is some inherent risk associated with building on any site underlain by carbonate rock. This risk can be reduced but not eliminated by preparing the site as described in this report. At this site, control of surface water during construction and over the project life will be very important to reduce the potential for sinkhole development. If a sinkhole develops, the appropriate corrective action is dependent on the size and location of the sinkhole. As described herein, UES should be retained to observe site and subgrade preparation activities. If sinkhole conditions are observed, the type of corrective action is most appropriately determined by UES on a case-by-case basis.



6.0 LIMITATIONS

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. This report is for our geotechnical work only, and no environmental assessment efforts have been performed. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, express or implied, is made.

The analyses and recommendations submitted herein are based, in part, upon the data obtained from the exploration. The nature and extent of variations between the borings will not become evident until construction. We recommend that UES be retained to observe the project construction in the field. UES cannot accept responsibility for conditions which deviate from those described in this report if not retained to perform construction observation and testing. If variations appear evident, then we will re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the project are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing. Also, if the scope of the project should change significantly from that described herein, these recommendations may have to be re-evaluated.





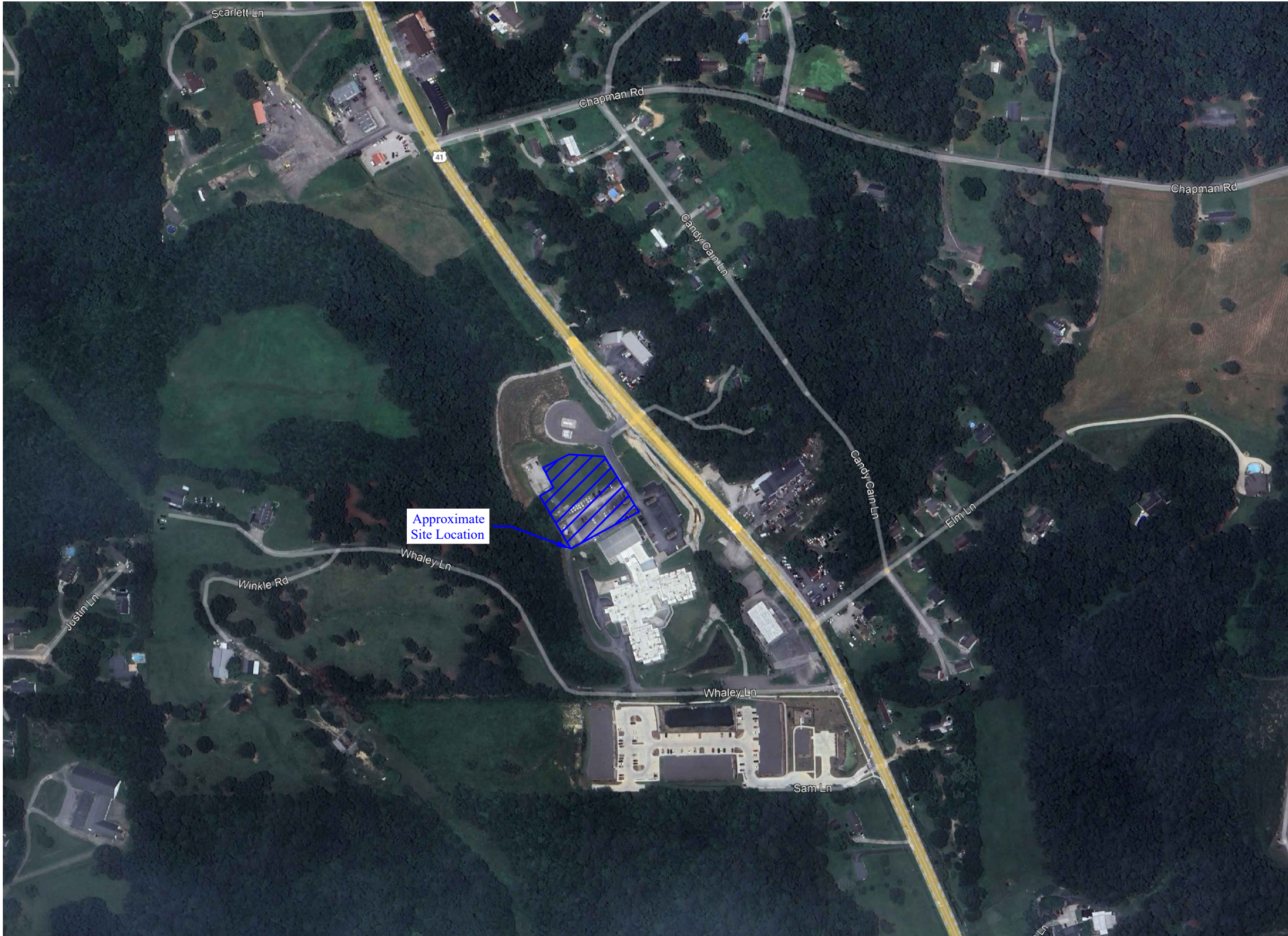
APPENDICES



APPENDIX A

Figures, General Notes, & Boring Logs





NOTES:

1.) BASE MAP PROVIDED BY GOOGLE EARTH PRO (06/30/23).

SITE VICINITY MAP
Catoosa County Sheriff's Office Expansion
Ringgold, Georgia

DRAWN BY:	LM
APPROVED BY:	DKK
SCALE:	NTS
JOB NO:	A24110.00519
DATE:	09/16/2024



FIGURE 1



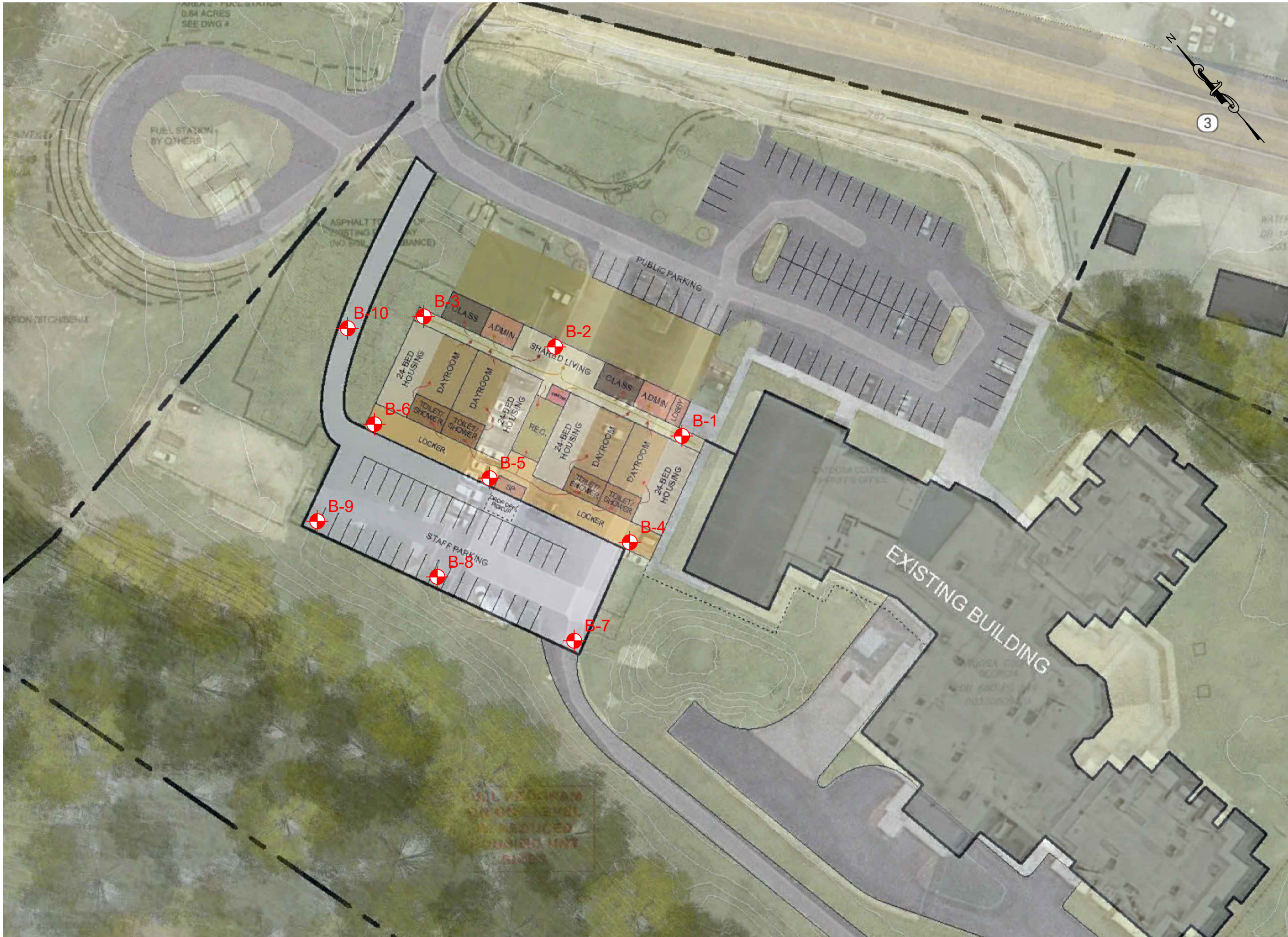
NOTES:
1.) BASE MAP PROVIDED BY USGS TOPOGRAPHIC MAP
(1969) - EAST RIDGE QUADRANGLE (TN-GA).

USGS TOPOGRAPHIC MAP
Catoosa County Sheriff's Office Expansion
Ringgold, Georgia

DRAWN BY:	LM
APPROVED BY:	DKK
SCALE:	NTS
JOB NO:	A24110.00519
DATE:	09/16/2024



FIGURE 2



NOTES:
1.) BORING LOCATIONS ARE SHOWN IN GENERAL ARRANGMENT ONLY.
2.) DO NOT USE BORING LOCATIONS FOR DETERMINATIONS OF DISTANCES OR QUANTITIES.
3.) BASE MAP PROVIDED BY CTI ENGINEERS.

BORING LOCATION PLAN
Catoosa County Sheriff's Office Expansion
Ringgold, Georgia

DRAWN BY:	LAS
APPROVED BY:	DKK
SCALE:	NTS
JOB NO.:	A24110.00519
DATE:	09/16/2024



FIGURE 3

GENERAL NOTES

FINE AND COARSE GRAINED SOIL PROPERTIES

PARTICLE SIZE

BOULDERS:	GREATER THAN 300 mm
COBBLES:	75 mm to 300 mm
GRAVEL:	4.74 mm to 75 mm
COARSE SAND:	2 mm to 4.74 mm
MEDIUM SAND:	0.425 mm to 2 mm
FINE SAND:	0.075 mm to 0.425 mm
SILTS & CLAYS:	LESS THAN 0.075 mm

COARSE GRAINED SOILS (SANDS & GRAVELS)

N-VALUE	RELATIVE DENSITY
0 - 4	VERY LOOSE
5 - 10	LOOSE
11 - 30	MEDIUM DENSE
31 - 50	DENSE
OVER 50	VERY DENSE

FINE GRAINED SOILS (SILTS & CLAYS)

N-VALUE	CONSISTENCY	Qu, PSF
0 - 2	VERY SOFT	0 - 500
3 - 4	SOFT	500 - 1000
5 - 8	FIRM	1000 - 2000
9 - 15	STIFF	2000 - 4000
16 - 30	VERY STIFF	4000 - 8000
OVER 31	HARD	8000 +

STANDARD PENETRATION TEST (ASTM D1586)

THE STANDARD PENETRATION TEST AS DEFINED BY ASTM D1586 IS A METHOD TO OBTAIN A DISTURBED SOIL SAMPLE FOR EXAMINATION AND TESTING AND TO OBTAIN RELATIVE DENSITY AND CONSISTENCY INFORMATION. THE 1.4 INCH I.D./2.0 INCH O.D. SAMPLER IS DRIVEN 3-SIX INCH INCREMENTS WITH A 140 LB. HAMMER FALLING 30 INCHES. THE BLOW COUNTS REQUIRED TO DRIVE THE SAMPLER THE FINAL 2 INCREMENTS ARE ADDED TOGETHER AND DESIGNATED THE N-VALUE. AT TIMES, THE SAMPLER CAN NOT BE DRIVEN THE FULL 18 INCHES. THE FOLLOWING REPRESENTS OUR INTERPRETATION OF THE STANDARD PENETRATION TEST WITH VARIATIONS.

BLOWS/FOOT (N-VALUE)

DESCRIPTION

25.....	25 BLOWS DROVE SAMPLER 12" AFTER INITIAL 6" SEATING
75/10".....	75 BLOWS DROVE SAMPLER 10" AFTER INITIAL 6" SEATING
50/PR.....	PENETRATION REFUSAL OF SAMPLER AFTER INITIAL 6" SEATING

SAMPLING SYMBOLS

ST:	UNDISTURBED SAMPLE
SS:	SPLIT SPOON SAMPLE
CORE:	ROCK CORE SAMPLE
AU:	AUGER OR BAG SAMPLE

SOIL PROPERTY SYMBOLS

N:	STANDARD PENETRATION, BPF
M:	MOISTURE CONTENT %
LL:	LIQUID LIMIT %
PI:	PLASTICITY INDEX %
Qp:	POCKET PENETROMETER VALUE, TSF
Qu:	UNCONFINED COMPRESSIVE STRENGTH, TSF
DUW:	DRY UNIT WEIGHT, PCF

ROCK PROPERTIES

ROCK HARDNESS

ROCK QUALITY DESIGNATION (RQD)

PERCENT	QUALITY
90 TO 100	EXCELLENT
75 TO 90	GOOD
50 TO 75	FAIR
25 TO 50	POOR
0 TO 25	VERY POOR

VERY SOFT:	ROCK DISINTEGRATES OR EASILY COMPRESSES TO TOUCH: CAN BE HARD TO VERY HARD SOIL.
SOFT:	ROCK IS COHERANT BUT BREAKS EASILY TO THUMB PRESSURE AT SHARP EDGES AND CRUMBLES WITH FIRM HAND PRESSURE.
MODERATELY HARD:	SMALL PIECES CAN BE BROKEN OFF ALONG SHARP EDGES BY CONSIDERABLE HARD THUMB PRESSURE: CAN BE BROKEN BY LIGHT HAMMER BLOWS.
HARD:	ROCK CAN NOT BE BROKEN BY THUMB PRESSURE, BUT CAN BE BROKEN BY MODERATE HAMMER BLOWS.
VERY HARD:	ROCK CAN BE BROKEN BY HEAVY HAMMER BLOWS.





SOIL BORING NUMBER: B-1

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 788 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.929994, -85.135078

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 20 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
788						ASPHALT - ASPHALT (2 inches) / BASESTONE (6 inches)					
		X	SS	1		LEAN CLAY (CL) - with chert fragments decreasing with depth - tan, brown, red brown, and gray - very stiff - moist (RESIDUUM)	7-16-14 (30)	31			
785		X	SS	2			6-11-13 (24)	37	47	27	20
5		X	SS	3		LEAN CLAY (CL) - with chert fragments decreasing with depth and trace amounts of sand - tan, brown, and gray - stiff to very stiff - moist (RESIDUUM)	3-4-7 (11)	23			
780		X	SS	4			5-14-9 (23)	37			
10											
775		X	SS	5		FAT CLAY (CH) - with a shale structure - tan, brown, and gray - firm to stiff - moist to very moist (RESIDUUM)	2-3-5 (8)	31			
15											
770		X	SS	6			4-6-8 (14)	35			
20						Boring terminated at 20'					

NOTES:



SOIL BORING NUMBER: B-2

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 788 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930250, -85.135197

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A FINAL BORING DEPTH 5.9

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
788						ASPHALT - ASPHALT (3 inches) / BASESTONE (6 inches)					
		X	SS	1		LEAN CLAY (CL) - with trace amounts of chert fragments - brown, tan, and gray - stiff - very moist (RESIDUUM)	3-5-9 (14)	20			
785											
			SS	2		LEAN CLAY (CL) - with trace amounts sand and chert fragments (LOW RECOVERY) - red, tan, and gray - very hard - moist (RESIDUUM)	50 (50/1")				
5											

Auger refusal at 5.9'

NOTES:



SOIL BORING NUMBER: B-3

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 789 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930423, -85.135391

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ N/A

24 HOURS ▽ N/A FINAL BORING DEPTH 6.5

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
789											
						TOPSOIL - 2 inches					
			SS	1		LEAN CLAY (CL) - with trace amounts of sand and rock fragments - brown and dark gray - very hard - dry (FILL)	11-50 (50/4")	8			
			SS	2		LEAN CLAY (CL) - with trace amounts of sand and chert fragments - brown, tan, and red brown - very hard - dry (RESIDUUM)	50 (50/5")	10			
785											
5											
			SS	3			50 (50/2")				
						Auger refusal at 6.5'					

NOTES:



SOIL BORING NUMBER: B-4

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 788 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.929888, -85.135297

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 11.3

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
788						ASPHALT - ASPHALT (3 inches) / BASESTONE (6 inches)					
			SS	1		LEAN CLAY (CL) - with asphalt fragments and rock fragments - brown - very stiff - dry (FILL)	7-10-19 (29)	13			
						LEAN CLAY (CL) - with chert fragments - red brown, tan, and gray - very stiff to very hard - moist (RESIDUUM)					
785							50 (50/2")				
5			SS	2							
						LEAN CLAY (CL) - with chert fragments and black mottling - tan and gray - very stiff - very moist (RESIDUUM)					
			SS	3			6-10-13 (23)	16			
780											
			SS	4		LEAN CLAY (CL) - with trace amounts of sand, shale fragments, and a shale structure (LOW RECOVERY) - tan and gray - very hard - moist (RESIDUUM)	50 (50/5")				
10											

Auger refusal at 11.3'

NOTES:



SOIL BORING NUMBER: B-5

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 788 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930120, -85.135468

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 20 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
788						ASPHALT - ASPHALT (3 inches) / BASESTONE (6 inches)					
		X	SS	1		LEAN CLAY (CL) - with black mottling and chert fragments - red, tan, and gray - stiff to very stiff - moist to very moist (RESIDUUM)	4-4-8 (12)	16			
785		X	SS	2			6-11-9 (20)	14			
5		X	SS	3		LEAN CLAY (CL) - with black mottling at surface, trace sand at depth, and chert fragments - red, red brown, and gray - stiff to very stiff - moist (RESIDUUM)	3-4-7 (11)	15			
780		X	SS	4			5-12-15 (27)	13			
10											
		X	SS	5		LEAN CLAY (CL) - with black mottling and chert fragments - red brown, brown, tan, and gray - stiff to very stiff - very moist (RESIDUUM)	4-4-9 (13)	14			
775											
15		X	SS	6			5-8-12 (20)	15			
770											
20						Boring terminated at 20'					

NOTES:



SOIL BORING NUMBER: B-6

Page 1 of 3

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 794 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930316, -85.135609

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING 38

24 HOURS N/A FINAL BORING DEPTH 44.2

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
794											
						TOPSOIL - 2 inches					
			SS	1		LEAN CLAY (CL) - with rock fragments - red brown, gray, dark gray, and brown - firm to stiff - very moist (FILL)	3-3-4 (7)	15			
790			SS	2			3-6-6 (12)	14			
5						LEAN CLAY (CL) - with rock fragments - red brown, gray, dark gray, and brown - very soft to soft - very moist (FILL)					
			SS	3			1-1-1 (2)	14	29	16	13
785			SS	4			1-1-2 (3)	15			
10											
						LEAN CLAY (CL) - with chert fragments - red brown, tan, and gray - very stiff to stiff - very moist (RESIDUUM)					
780			SS	5			7-11-19 (30)	13			
15											
775			SS	6			3-4-6 (10)	19			

NOTES:



SOIL BORING NUMBER: B-6

Page 2 of 3

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 794 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930316, -85.135609

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ 38

24 HOURS ▽ N/A FINAL BORING DEPTH 44.2

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
25	770		SS	7		LEAN CLAY (CL) - with chert fragments - red brown, tan, and gray - very stiff to stiff - very moist (RESIDUUM)					
						LEAN CLAY (CL) - with chert fragments - red brown, tan, and gray - very stiff to very hard - very moist (RESIDUUM)	6-11-8 (19)	15			
30	765		SS	8							
							8-14-50 (50/6")	10			
35	760		SS	9		LEAN CLAY (CL) - with a shale structure - red brown, tan, and gray - stiff to very stiff - very moist to wet (RESIDUUM)					
							7-6-8 (14)	16			
	755		SS	10			6-8-9 (17)	15			

NOTES:



SOIL BORING NUMBER: B-6

Page 3 of 3

PROJECT NAME Catoosa County Sheriff's Office Expansion **PROJECT NUMBER** A24110.00519
GROUND ELEVATION 794 feet **PROPOSED ELEVATION** N/A **PROJECT LOCATION** Ringgold, Georgia
DATE DRILLED 09/19/2024 **LATITUDE / LONGITUDE** 34.930316, -85.135609
DRILLING CONTRACTOR Tri-State Drilling, LLC **DRILLING METHOD** Hollow Stem Auger
GROUNDWATER: AT TIME OF DRILLING ▽ 38 **24 HOURS** ▽ N/A **FINAL BORING DEPTH** 44.2

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
750			SS	11		LEAN CLAY (CL) - with a shale structure - red brown, tan, and gray - stiff to very stiff - very moist to wet (RESIDUUM)					
						LEAN CLAY (CL) - with a shale structure - red, brown, and gray - very hard - wet (RESIDUUM)					
						Auger refusal at 44.2'	6-10-50 (50/2")	15			

NOTES:



SOIL BORING NUMBER: B-7

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 789 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.929801, -85.135514

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 10 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
789											
						TOPSOIL - 4 inches					
			SS	1		LEAN CLAY (CL) - with rock fragments and trace amounts of sand - dark brown, brown, and red - very stiff - moist (FILL)	3-13-10 (23)	12			
						LEAN CLAY (CL) - with chert fragments and trace amounts of sand - brown, tan, and gray - very stiff to stiff - moist (RESIDUUM)					
785			SS	2			6-5-9 (14)	16			
5											
			SS	3		LEAN CLAY (CL) - with chert fragments - brown, tan, and gray - hard to very stiff - moist to very moist (RESIDUUM)	12-18-15 (33)	15			
780			SS	4			5-7-13 (20)	12			
10											

Boring terminated at 10'

NOTES:



SOIL BORING NUMBER: B-8

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 790 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930028, -85.135684

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 10 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
790											
						TOPSOIL - 2 inches					
			SS	1		LEAN CLAY (CL) - with rock fragments and trace amounts of sand - dark brown, brown, and red - very stiff - moist (FILL)	11-12-9 (21)	11			
			SS	2		LEAN CLAY (CL) - with chert fragments and trace amounts of sand - brown, tan, red, and gray - very stiff - moist (RESIDUUM)	8-8-9 (17)	20			
5	785		SS	3		LEAN CLAY (CL) - with chert fragments - brown, tan, red, tan, and gray - very stiff - moist (RESIDUUM)	12-8-11 (19)	16			
			SS	4			9-12-12 (24)	20			
10	780										

Boring terminated at 10'

NOTES:



SOIL BORING NUMBER: B-9

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 798 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930230, -85.135831

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 20 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
798											
						TOPSOIL - 2 inches					
		X	SS	1		LEAN CLAY (CL) - with rock fragments - brown, red, and dark brown - stiff - moist to very moist (FILL)	3-5-8 (13)	10			
795											
		X	SS	2			6-5-5 (10)	12			
5											
		X	SS	3		LEAN CLAY (CL) - with trace amounts of chert fragments - red brown, brown, and gray - hard to very stiff - moist (RESIDUUM)	4-18-13 (31)	14			
790											
		X	SS	4			17-11-13 (24)	15			
10											
785						FAT CLAY (CH) - with a shale structure - red brown, brown, and gray - very stiff to stiff - very moist (RESIDUUM)					
		X	SS	5			7-12-7 (19)	28			
15											
780											
		X	SS	6			5-7-7 (14)	34			
20											

Boring terminated at 20'

NOTES:



SOIL BORING NUMBER: B-10

Page 1 of 1

PROJECT NAME Catoosa County Sheriff's Office Expansion

PROJECT NUMBER A24110.00519

GROUND ELEVATION 795 feet PROPOSED ELEVATION N/A

PROJECT LOCATION Ringgold, Georgia

DATE DRILLED 09/19/2024

LATITUDE / LONGITUDE 34.930481, -85.135540

DRILLING CONTRACTOR Tri-State Drilling, LLC

DRILLING METHOD Hollow Stem Auger

GROUNDWATER: AT TIME OF DRILLING ▽ Dry

24 HOURS ▽ N/A

FINAL BORING DEPTH 15 feet

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Type	Sample Number	Graphic Log	MATERIAL DESCRIPTION	Blow Counts (N/Refusal)	Lab			
								Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
795											
						TOPSOIL - 4 inches					
			SS	1		LEAN CLAY (CL) - with rock fragments (LOW RECOVERY) - brown and red - stiff - dry (FILL)	8-7-4 (11)				
						LEAN CLAY (CL) - with trace amounts of organics, trace amounts of sand, and trace amounts of rock fragments - dark brown, red, and gray - firm - moist (FILL)					
			SS	2			3-4-3 (7)	12			
5	790					LEAN CLAY (CL) - with trace amounts of rock fragments (LOW RECOVERY) - dark brown and brown - stiff - moist (FILL)					
			SS	3			3-4-5 (9)				
						LEAN CLAY (CL) - with rock fragments - dark brown and brown - stiff - very moist (FILL)					
			SS	4			3-5-7 (12)	14			
10	785										
						LEAN CLAY (CL) - with chert fragments - red brown, tan, and gray - stiff - dry (RESIDUUM)					
			SS	5			4-4-11 (15)	12			
15	780										

Boring terminated at 15'

NOTES:

APPENDIX B
Laboratory Test Results



5842 US Highway 41
Ringgold, Georgia
A24110.00519
September 30, 2024

LABORATORY SUMMARY SHEET

Boring Number	Sample Number	Depth (feet)	Natural Moisture Content	Atterberg Limits			Soil Type
				LL	PL	PI	
B-1	1	1.0-2.5	30.8%				
	2	3.5-5.0	37.3%				
	3	6.0-7.5	22.8%	47	27	20	CL
	4	8.5-10.0	37.1%				
	5	13.5-15.0	30.5%				
	6	18.5-20.0	31.5%				
B-2	1	1.0-2.5	20.3%				
B-3	1	1.0-2.5	8.0%				
	2	3.5-5.0	10.4%				
B-4	1	1.0-2.5	13.3%				
	3	6.0-7.5	16.0%				
B-5	1	1.0-2.5	15.6%				
	2	3.5-5.0	13.9%				
	3	6.0-7.5	14.6%				
	4	8.5-10.0	12.6%				
	5	13.5-15.0	14.4%				
	6	18.5-20.0	15.1%				
B-6	1	1.0-2.5	14.8%				
	2	3.5-5.0	14.4%				
	3	6.0-7.5	13.8%	29	16	13	CL
	4	8.5-10.0	14.7%				
	5	13.5-15.0	13.1%				
	6	18.5-20.0	18.6%				
	7	23.5-25.0	14.7%				
	8	28.5-30.0	10.0%				
	9	33.5-35.0	15.6%				
	10	38.5-40.0	15.1%				
	11	43.5-45.0	15.1%				
B-7	1	1.0-2.5	12.1%				
	2	3.5-5.0	15.6%				
	3	6.0-7.5	14.8%				
	4	8.5-10.0	12.3%				



5842 US Highway 41
Ringgold, Georgia
A24110.00519
September 30, 2024

LABORATORY SUMMARY SHEET

Boring Number	Sample Number	Depth (feet)	Natural Moisture Content	Atterberg Limits			Soil Type
				LL	PL	PI	
B-8	1	1.0-2.5	10.5%				
	2	3.5-5.0	19.5%				
	3	6.0-7.5	15.6%				
	4	8.5-10.0	19.5%				
B-9	1	1.0-2.5	10.1%				
	2	3.5-5.0	11.6%				
	3	6.0-7.5	14.0%				
	4	8.5-10.0	14.9%				
	5	13.5-15.0	27.5%				
	6	18.5-20.0	33.7%				
B-10	2	3.5-5.0	11.9%				
	4	8.5-10.0	14.0%				
	5	13.5-15.0	12.0%				

To: MBI Companies, Inc. 651 E. Fourth Street, Suite 500 Chattanooga, TN 37403
Attn: Tom Horvath
Specified Item: 03 45 00 Precast Architectural Concrete

Project: Catoosa County Jail Expansion 5842 Highway 41 Ringgold, GA 30736
Proposed Substitute: Cast Stone Institute Certification as equal to PCI Plant Certification (para 1.06.B.2)

1. Reason for proposing this substitution:

2. The following are attached (Mark all that apply):

☒

Complete Description

☒

Laboratory Tests

☐

Information on the availability of
maintenance services and replacement
materials for proposed substitute(s)

☐

Catalog

☒

Spec Data

☒

Names, addresses, and phone numbers
of fabricators and suppliers for proposed
substitute(s)

3. This substitution will have the following effects on dimensions, gauges, weights, etc.:

None

4. This substitution will have the following effects on wiring, piping, ductwork, etc.:

None

5. This substitution will have the following effects on other trades:

None

6. This substitution will have the following effect on construction Schedules:

None

7. The proposed substitute(s) differs from the specified product(s) in quality and performance as follows:

None

8. Manufacturers guarantees for the substitute(s) and the specified product(s) are (check one):

☐

the same

☒

different (if different, explain below)

Better warranty, see attached material data submittal package for details. PCI does not have a standard manufacturer warranty.

9. If the proposed substitution is accepted, it will result in:
☒ **no cost impact** ☐ **a cost increase of** _____
☐ **a cost decrease of** _____
 (If change in cost is indicated, itemization on specified Cost Itemization Form is attached)

10. License fees or royalties are pending on the proposed substitute.
☒ **No** ☐ **Yes** (if yes, explain below)

11. The undersigned or the firm represented shall pay for additional studies, investigations, submittals, redesign, and analysis by the Designer necessitated by this substitution request.

Substitutions must be requested in accordance with applicable Contract requirements. Substitution requests are to be submitted only by General Contractor. Substitute products should not be ordered or installed without written acceptance.

Submitted by: Jim Cormany **Date:** 6/22/26
 Sign here: _____
Name: Jim Cormany, Manufacturer Representative **Telephone:** 803-356-3111
 type or print: _____
for: Bamastone Corporation representing Bassco Caststone
 Name of firm: _____
Address: 121 Drake Hill Drive
 Street address: _____
 and mailing address _____
 if different: _____
 City, State, _____
 and Zip Code: Lexington, SC 29072

Designer's Review Comments:

☒ **Accepted** ☐ **Rejected**
☐ **Accepted as noted** ☐ **Rejected (received too late)**
☐ **Rejected (submittal incomplete)**

Additional comments:

Approved per specifications.

For the Designer: Thomas John Honath
 Signature here: _____

Date: 06/22/2026



Bassco Caststone. 18786 Carters Circle. Elkmont, AL. 35620

Phone: 256-732-2228

Fax: 256-732-2250

www.basscocaststone.com

About Us

Bassco Caststone has been manufacturing quality Cast Stone residentially since 1998 and commercially since 2002. Here at Bassco Caststone we pride ourselves not only on our superior product, but also our second to none customer service. Both of these elements are achieved through our people. Each person in the Bassco Caststone family is exceptionally qualified to handle all aspects related to Cast Stone while keeping the customer's wishes in mind. We strive to efficiently produce the highest quality product on the market while passing off the savings to our customers.

Bassco Caststone has manufactured Cast Stone in the Southeast for over 18 years. Due to exceptional Customer Service and Quality Products, we have developed quality relationships with our customers. We want both teams to win. Our 60,000 Sq. Ft. facility allows us to tackle any size job, commercial or residential. Bassco Caststone will ship NATIONWIDE and has experience shipping overseas as well! For more information or to find out what Bassco Caststone can do for you, please call one of our representatives.





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Products

Vibrant Dry Tamp OR Wet Cast Methods

Bassco Caststone produces a high-quality cast stone that meets and exceeds the requirements of ASTM C-1364, Standard Specification for Architectural Cast Stone. Our product is of high quality because we use only the finest materials to produce our stone and the most up to date curing techniques to guarantee the customer a quality product. We “**Steam**” cure our Cast Stone in state-of-the-art curing chambers which adds a number of benefits. This curing technique increases the strength at an earlier stage, reduces secondary efflorescence, and encourages a more resilient, longer lasting finish. The difference is that our product is entered into a live steam curing chamber **DIRECTLY** after being fabricated. This means that there is NO moisture loss, which in turns creates the highest quality product on the market. Each flip board is an exactly level surface which eliminates fabrication handling damages to the Cast Stone before it is even sets up. The flip is securly attached to the mold during the flip process eliminating the possiblity for interior movement and separation. The next day, the pieces are examined thoroughly under bright light beams allowing our staff to make sure the pieces have not been damaged in the flip process since the piece has not "set" before the flip. Our Computerized Batching Plant measures out the mix ingredients exactly for every mix enabling a greater consistency ensuring you receive the highest quality Cast Stone. These are elements that we have added to go above and beyond the Standards that are required in our industry. This is what you can expect from all elements of Bassco Caststone.



Wet Cast Method- BCS manufactures a Wet Cast Product made to closely match our Vibrant Dry-Tamp Product. This allows us to manufacture both Dry and Wet combination jobs on top of "Dry Only" or "Wet Only". Please see our test results for our Wet Cast products in the following pages of this packet.

BCS rigorously tests our Cast Stone to make sure the customer is receiving the highest quality product in the market. These tests include Compression and Absorption testing every 500 cubic feet, Freeze-Thaw testing, Linear Shrinkage testing and Modulus of Rupture testing (Flexural). On top of that, we have developed a strict quality control program that is one of the best in the Industry. This includes the stone passing 4 checkpoints (size, color, quality and quantity) in order to be sent to the customer. Also, we are a proud member of the Cast Stone Institute and stay very active in the association in order to stay on top of new Industry Standards and Practices.

Bassco Caststone provides Architectural shop drawings that are completed by draftsmen who are well-trained in Computer Aided Design. BCS also has BIM capabilities if required. We expedite the submittal process so there is no lag time waiting for drawings or other submittal information. Once approved, the shop drawings are turned over to one of our production teams, starting with a craftsman that designs and transpires the drawings into future works of art. Bassco Caststone is capable of designing molds to match any architectural design. We strive in producing Cast Stone in the most efficient way possible to make sure we meet the deadline. BCS partners with many different freight companies to assure that your Cast Stone order can get to the jobsite when needed. From 1 pallet LTL shipments to projects requiring many 18 wheeler truck loads, the customer can benefit greatly from our efficiency. We welcome any requests for estimates, just send us a link to your plans!





18786 Carters Circle
Elkmont, AL 35620
(256) 732-2228
Fax: (256) 732-2251

www.basscocaststone.com

Bassco Caststone Job Resume

<u>Job</u>	<u>Architect</u>	<u>Masonry Company/ GC</u>
Gamma Phi Beta Sorority University of Alabama Tuscaloosa, AL	Fitts / Pryor & Morrow Architecture 1606 Paul W. Bryant Drive Tuscaloosa, AL 35401 205-759-5792	WAR Construction 4300 Joe Mallisham Parkway Tuscaloosa, AL 35401
Kappa Delta House University of Alabama Tuscaloosa, AL	Barganier Davis Sims Architects 624 South McDonough Street Montgomery, AL 36104	Harrison Construction & Level Masonry 5870 Charlie Shirley Road, Northport, AL 35473
Williams Brice Football Stadium Site Improvements University of South Carolina Columbia, SC	Wood & Partners Inc. Landscape Architects P.O. Box 23949 Hilton Head Island, SC 29925	Contract Construction & Mac's Masonry P.O. Box 269 Ballentine, SC 29002
Courtyard Marriott Green Hills Nashville, TN	Bounds & Gillespie Architects 7975 Stage Hills Blvd. Suite 4 Memphis, TN 38133-4010 901-377-6603	McMurry Construction 5335 Distriplex Farms Dr. Memphis, TN 38141 901-362-0967
Phillis Wheatley Elementary School New Orleans, LA	Holly & Smith Architects 2302 Magazine Street New Orleans, LA 70130 504-585-1315	Gibbs Construction 5736 Citrus Blvd., Suite 200 New Orleans LA 70123 504-733-4336
USC Alumni Center University of South Carolina Columbia, SC	LS3P Associates LTD. 701-A Lady Street Columbia, SC 29201 803-765-2418	McCrary Construction Co. 522 Lady Street Columbia, SC 29201
U.S. Embassy Compound N'Djamena, Chad, Africa International	United States Dept of State Office of Overseas Bldg Operations Washington, DC	B.L. Harbert International 210 London Pkwy Birmingham, AL 35211 803.799.8100
Hartford Commons Tulsa, OK	Parker Associates 2202 East 49th Street South Suite 200 Tulsa, OK 74105	TDK Construction & Superior Masonry 1610 South Church St., Suite C Murfreesboro, TN 37130

Chapin High School Additions Columbia, SC	Stevens & Wilkinson 1501 Main Street, Suite G01 Columbia, SC 29201 803-765-0320	China Construction of America 700 Saturn Pkwy Columbia, SC 29212 803-771-2777
Mars Hill College Residence Halls Dogwood and Laurel Bldgs. Mars Hill, NC	Padgett & Freeman Architects 30 Choctaw Street Asheville, NC 28801 828-254-1963	H & M Constructors P.O. Box 16589 Asheville, NC 28816 828-254-6145
Hinds Community College Mens and Womens Residence Halls Raymond, MS	JBHM Architects 308 East Pearl Street, Suite 300 Jackson, MS 601-352-2699	Metro Masonry Inc. 1695 Bartlett Road Memphis, TN 38134 901.737.7001
Mableton Elementary School Mableton, GA	Chapman, Griffin, Lanier, Sussenbach Architects 2500 Cumberland Pkwy. Suite 350 Atlanta, GA 30339 404-733-5493	Nix-Fowler Constructors, Inc. 1875 Mitchell Rd. Suite B Mableton, GA 30126 404-691-2414
Chi Omega Sorority Additions Tuscaloosa, AL	Ellis Architects 631 Helen Keller Blvd. Suite 300 Tuscaloosa, AL 35404 205-752-4420	Jones Masonry 1140 Whigham Place Tuscaloosa, AL 35405 205-345-6540
Mercer University Field House Macon, GA 21207	McMillan, Pazdan, Smith Architecture P.O. Box 5331 Spartanburg, SC 29304 864-585-5678	Chris Sheridan & Co. 1572 Schofield St. Macon, GA 31201 478-743-1578
Building On Baldwyn New College Foundation Martinsville, VA 24112	Dewberry Engineers 551 Piney Forest Rd. Danville, VA 24540 434-797-4497	New Atlantic Contracting 2635 Reynolds Rd. Winston-Salem, NC 27106 336-759-7440
Hiesman Dr. Tiger Transit Bus Station Auburn Univeristy Auburn, AL	KPS Group 600 West Peachtree St. Suite 1550 Atlanta, GA 30308	Whatley Construction LLC P.O. Box 137 Opelika, AL 36803 (334) 745-2583
University of the South Sewanee Inn Sewanee, TN	Earl Swensson Associates, Inc. 2100 West End Ave. Suite 1200 Vanderbilt Plaza Nashville, TN 37203 615-329-9445	Burrows Masonry P.O. Box 3055 Florence, AL 35630 256-766-9417
Montevallo Student Housing University of Montevallo Montevallo, AL	Williams Blackstock 2204 1st Ave. South-Suite 200 Birmingham, AL 35233 (205) 252-9811	Action Masonry 3550 North Parkway Cumming, GA 30040 770-886-8683
Ramsay High School 12th Avenue South Birmingham, AL 35205	KPS Group, Inc. 2101 First Ave. North Birmingham, AL 35203	Masonry Arts 2105 3rd. Ave. North Bessemer, AL 35020 205-428-0780
National Center for Explosives Redstone Arsenal, AL	US Army Corps of Engineers Mobile District	Southern Masonry 105 Von Braun Dr. Huntsville, AL 35806

Worthington Federal Bank Memorial Parkway Huntsville, AL	Matheny Goldmon Architects 514 Madison St. Huntsville, AL 35801	Southern Masonry 105 Von Braun Dr. Huntsville, AL 35806
Coast Electric Headquarters 18020 Hwy. 603 Kiln, MS 39556	Usry Architects P.O. Box 2205 Clinton, MS	Rod Cooke Construction 3496 Halls Mill Rd. Mobile, AL 36693
Saraland High School 115 Industrial Parkway Saraland, AL 36571	TAG/ The Architects Group, Inc. 710 Downtowner Blvd. Mobile, AL 36609	Rod Cooke Construction 3496 Halls Mill Rd. Mobile, AL 36693
Primary Care 1385 South Highland Ave. Jackson, TN 38301	Vaughn & Associates 111 Murray Guard Drive Ste. B Jackson, TN 38305 731-664-6180	MG Construction 2522 Bells Hwy Jackson, TN 38305 731-668-5613
Sam Davis Park 203 1st Street Pulaski, TN 38478	Kaatz, Binkley, & Morris Architects 1008 Charlie Daniels Pkwy Mt. Juliet, TN 37122 615-754-5393	Lee Adcock Construction 826 N. Jefferson Street Shelbyville, TN 37160 931-684-1771
Art Circle Public Library 3 East Street Crossville, TN 38555	McCarty, Holsaple, & McCarty 550 West Main St. Ste. 300 Knoxville, TN 37902 865-544-2000	Hickory Construction 124 Kent Place Alcoa, TN 37701 865-983-7856
Volunteer State Bank 323 E. Main Street Hendersonville, TN 37075	Lyle, Cook, & Martin Architects 310 Franklin Street Clarksville, TN 37040 931-552-4771	McPherson&Shaw 147 Maple Row Blvd. Hendersonville, TN 37075 615-822-8020
Limestone County Event Center Athens, AL	Goodwyn, Mills & Cawood Inc. 1102 South 20th Street Birmingham, AL 35205 205-879-4462	Jim Cooper Construction 5004 5th Avenue South Birmingham, AL 35212
First United Methodist Church Restoration 1058 N. Main St. Arab, AL	Bird & Kamback 304A Franklin St. Huntsville, AL 35801	Aderholt Masonry 15830 Hwy. 43 Suite 3 P.O. Box 713 Russellville, AL 35653
Lovett School Runnel Addition 4075 Paces Ferry Rd. NW Atlanta, GA 30327	HGOR 6 Executive Park Dr. Suite 300 Atlanta, GA 30329	Valley Crest LandscapeDevelopment 24151 Ventura Blvd. Calabasas, CA 91302 818-233-8500
Maxwell AFB Entrance Wall Cap Montgomery, AL	CH2MHILL William Wagner State of California	Thomas Construction & Masonry 3600 Mobile Highway Montgomery, AL 36108
Moulton Middle School Addition 364 Main St. Moulton, AL 35650	Goodwyn, Mills & Cawood Inc. 1102 South 20th Street Birmingham, AL 35205 205-879-4462	Aderholt Masonry 15830 Hwy. 43 Suite 3 P.O. Box 713 Russellville, AL 35653
New Band Hall Hinds Community College Jackson, MS	JBHM Architects 308 E. Pearl St. Ste 300 Jackson, MS 39201	Law's Construction P.O. Box 14027 Jackson, MS 39236

Opp Elementary School Highway 331 and Thomas Dr. Opp, AL 36467	Mckee and Associates 631 South Hull St. Montgomery, AL 36104 334-834-9933	Whaley Construction P.O. Box 768 Troy, AL 36081 334-566-4630
Keystone Bank 226 Walnut St. Gadsden, AL 35901	Bill Peters Architects 224 Holmes Ave. Huntsville, AL 35801 256-533-7510	B.D. Welch Construction 120 Industrial Station Rd. Steele, AL 35987 256-442-0774
Pickens County DHR P.O. Box 460 Carrollton, AL 35447	Goodwyn, Mills & Cawood Inc. 44570 Highway 17 Vernon, AL 35592 205-695-9137	Aderholt Masonry 15830 Hwy. 43 Suite 3 P.O. Box 713 Russellville, AL 35653
McCormick Admin. Building (Additions/Renovations) Northwest MS Community College 510 North Panola Senatobia, MS 38668	AERC- Arch & Eng. Resources for Construction 342 W. Valley St. Hernando, MS 38632 662-298-0057	Windham & McDonald Construction 1245 Big Orange Rd. Cordova, TN 38018 901-755-7718
Cullman Police Admin. Building 601 2nd Ave. NE Cullman, AL 35055	Goodwyn, Mills & Cawood Inc. 1102 South 20th Street Birmingham, AL 35205 205-879-4462	Eidson & Associates, Inc 135 Birmingham Street SW Cullman, AL 35055 256-739-0176
Cullman Fire Station #2 West Main Street Cullman, AL 35056	F & O Architects 301 3rd Ave. SE Cullman, AL 35055 256-734-1330	Eidson & Associates, Inc 135 Birmingham Street SW Cullman, AL 35055 256-739-0176
Albertville High School Fine Arts Center 402 E. Mccord Ave. Albertville, AL 35950	Mckee and Associates 631 South Hull St. Montgomery, AL 36104 334-834-9933	Professional Masonry 2505 Pawnee Village Rd. Birmingham, AL 35217
Birmingham Southern College New Sports Stadium & Athletic Fields Phase Two Birmingham, AL	Davis Architects 2301 First Ave. North Suite # 101 Birmingham, AL 35203 205-322-7482 Fax: 205-322-7485	Professional Masonry 2505 Pawnee Village Rd. Birmingham, AL 35217
Meek High School Fieldhouse Addition Arley, AL	Mckee and Associates 631 South Hull St. Montgomery, AL 36104 334-834-9934	Aderholt Masonry 15830 Hwy. 43 Suite 3 P.O. Box 713 Russellville, AL 35653
Centre Middle School US Highway 411 Centre, AL 35960	Mckee and Associates 631 South Hull St. Montgomery, AL 36104 334-834-9934	Boatner Construction Co. 114 Hickman Street Suite A Rainbow City, AL 35906
Albertville High School Girls Gym 402 E. Mccord Ave. Albertville, AL 35950	Mckee and Associates 631 South Hull St. Montgomery, AL 36104 334-834-9933	Carmon Construction Co. 136 East Main St. Albertville, AL 35950

Bassco Cast Stone

Precast Architectural Concrete Standard Specification

Section 03450

Precast Architectural Concrete

This specification provides basic requirements for WET CAST Precast Architectural Concrete.

Materials and processes used for manufacturing Precast vary according to the aggregates locally available to the manufacturers and the processes and techniques used by the manufacturers to obtain the desired appearance and physical properties. Of paramount importance in molding Precast is the need to use a properly proportioned mixture of white and/or grey cements, manufactured or natural sands, carefully selected crushed stone or well graded natural gravel and mineral coloring pigments to achieve the desired appearance while maintaining durable physical properties.

1. PART 1 – GENERAL

1.1. SECTION INCLUDES - Architectural Precast Concrete

- A. Scope - Architectural Precast Concrete shown on architectural drawings and as described in this specification.
 - 1. Manufacturer shall furnish Architectural Precast Concrete covered by this specification.

1.2. RELATED SECTIONS

- A. Section – 01 33 00 – Submittal Procedures.
- B. Section – 03 30 00 – Cast-in-place Concrete
- C. Section – 03 41 00 – Plant Precast Structural Concrete
- D. Section – 04 05 19 – Masonry Anchorage and Reinforcing.
- E. Section – 04 20 20 – Unit Masonry.
- F. Section – 04 72 00 – Cast Stone
- G. Section – 07 90 00 – Joint Protection.

1.3. REFERENCES

- A. ACI 318 – Building Code Requirements for Reinforced Concrete.
- B. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

- C. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Reinforced Concrete.
- D. ASTM C 33 - Standard Specification for Concrete Aggregates.
- E. ASTM C 150 - Standard Specification for Portland Cement.
- F. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volume Method.
- G. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- H. ASTM C 260 - Standard Specification for Air-Entrained Admixtures for Concrete.
- I. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- J. ASTM C 426 - Standard Test Method for Linear Shrinkage of Concrete Masonry Units.
- K. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.
- L. ASTM C 618 - Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- M. ASTM C 666 – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
- N. ASTM C 979 - Standard Specification for Coloring Pigments for Integrally Pigmented Concrete.
- O. ASTM C 989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete.
- P. ASTM C 1116 - Standard Specification for Fiber Reinforced Concrete and Shotcrete.
- Q. ASTM C 1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone.
- R. ASTM C 1195 - Standard Test Method for Absorption of Architectural Cast Stone.
- S. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
- T. ASTM D 2244 - Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- U. Cast Stone Institute® Technical Manual (Current Edition).

1.4. SUBMITTAL PROCEDURES

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Samples: Submit pieces of the Architectural Precast Concrete that are representative of the general range of finish and color proposed to be furnished for the project.

- C. Test results: Submit manufacturers test results of Architectural Precast Concrete previously made by the manufacturer.
- D. Shop Drawings: Submit manufacturers shop drawings including profiles, cross-sections, reinforcement, exposed faces, arrangement of joints (optional for standard or semi-custom installations), anchoring methods, anchors (if required), annotation of stone types and their location.
- E. Warranty: Submit Cast Stone Institute ® Member Limited Warranty.
- F. Certification: Submit valid Cast Stone Institute ® Plant Certification.
- G. Engineering Calculations: Engineering Calculations as required and sealed by a licensed engineer to practice in state of project.

1.6. QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Architectural Precast Concrete shall be produced in a plant certified by either of the following: PCI, APA or Cast Stone Institute®.
 - 2. Manufacturer shall have sufficient plant facilities to produce the shapes, quantities and size of Architectural Precast Concrete required in accordance with the project schedule.
 - 3. Manufacturer shall submit a written list of projects similar in scope and at least three (3) years of age, along with owner, architect and contractor references.
 - 4. Installers Qualifications: Installer shall have a record of at least 5 years of successful installation of Architectural Precast Concrete Units similar to those required by bid documents
- B. Standards: Comply with the requirements of the Cast Stone Institute® Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.
- C. Mock-up (Optional): Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project.
- D. Warranty Period: 10 years.

2. PART 2 - PRODUCTS

2.1. Manufacturers

- A. Acceptable Manufacturer: Bassco Cast Stone, 18786 Carters Circle, Elkmont, AL 35620. Ph: 256-732-2228, Fax 256-732-2250, Website: www.basscocaststone.com, email: davidowen@basscocaststone.com

- B. Substitutions: Not Permitted

2.2 Architectural Precast Concrete

- A. Comply with PCI MNL-117 for fabrication of precast concrete units.
- B. Reinforcement: Comply with PCI MNL-117 and design reinforcement to resist handling, transportation and erection stresses.
- C. Cast In Items: Provide embedded anchors, inserts, steel shapes and lifting devices as shown on approved shop drawings.
- D. Comply with PCI MNL-117 for measuring, mixing, transporting and placing concrete.
- E. Consolidate Precast Concrete complying with PCI MNL-117.
- F. Cure Precast Concrete according to PCI MNL-117.
- G. Physical properties: Provide the following:
 - 1. Compressive Strength - ASTM C 1194: 6,500 psi minimum for products at 28 days.
 - 2. Absorption - ASTM C 1195: 6% maximum by the cold water method
 - 3. Air Content – ASTM C 173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Comply with ACI533R requirements
 - 4. Freeze-thaw – ASTM C 1364: The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
 - 5. Maximum water cement ratio .45 at point of placement
- C. Job site testing – One sample from production units may be selected at random from the field for each 500 cubic feet delivered to the job site.
 - 1. Three field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
 - 2. Three field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 - 3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.

2.2. RAW MATERIALS

- A. Portland cement – Type I or Type III, white and/or grey, ASTM C 150.
- B. Coarse aggregates - Granite, quartz or limestone ASTM C33
- C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
- D. Colors - Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments shall not be used.
- E. Admixtures - Comply with the following:
 - 1. ASTM C 260 for air-entraining admixtures.
 - 2. ASTM C 494/C 495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
 - 3. Other admixtures: Integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
 - 4. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
 - 5. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features.
- F. Water – Potable.
- G. Reinforcing bars:
 - 1. ASTM A 615/A 615M: Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 in.
 - 2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.
- H. Fiber reinforcement (optional): ASTM C 1116
- I. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3. COLOR AND FINISH

- A. Match sample on file in architect's office.
- B. Finish of Exposed Surfaces:
 - 1. Finish shall be smooth finish with uniform color and texture, match sample on file with architect and with minimum bug holes no bigger than 3/8".
 - 2. Shall be free of joint marks and other obvious defects. Corners, including false joints, shall be uniform and straight.

- C. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft. distance.
 - 1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
 - a. Total color difference – not greater than 6 units.
 - b. Total hue difference – not greater than 2 units.
- D. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft. distance.

2.4. REINFORCING

- A. Reinforce the units as required by the drawings and for safe handling and structural stress.
- B. Minimum reinforcing shall be 0.25 percent of the cross section area.
- C. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
- D. Panels, soffits and similar stones greater than 24 in. in one direction shall be reinforced in that direction. Units less than 24 in. in both their length and width dimension shall be non-reinforced unless otherwise specified.

2.6. MANUFACTURING TOLERANCES

- A. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. from approved dimensions.
- B. Length of units shall not deviate by more than length/ 360 or $\pm 1/8$ in., whichever is greater, not to exceed $\pm 1/4$ in.
 - 1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
- C. Warp, bow or twist of units shall not exceed length/ 360 or $\pm 1/8$ in., whichever is greater.
- D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – On formed sides of unit, $1/8$ in., on unformed sides of unit, $3/8$ in. maximum deviation.

2.7. PRODUCTION QUALITY CONTROL

A. Testing.

1. Test compressive strength and absorption from specimens taken from every 500 cubic feet of product produced.
2. Perform tests in accordance ASTM C 1194 and C 1195.
3. Have tests performed by an independent testing laboratory every six months.
4. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.
5. Retain copies of all test reports for a minimum of two years.

2.8. DELIVERY, STORAGE AND HANDLING

- A. Mark production units with the identification marks as shown on the shop drawings.
- B. Package units and protect them from staining or damage during shipping and storage.
- C. Provide an itemized list of product to support the bill of lading.

3. PART 3 EXECUTION

3.1. EXAMINATION

- A. Installing contractor shall check Precast Architectural Concrete materials for fit and finish prior to installation. Unacceptable units shall not be set.

3.2. SETTING TOLERANCES

- A. Comply with PCI MNL-117.
- B. Set stones 1/8 in. or less, within the plane of adjacent units.
- C. Joints, plus - 1/16 in., minus - 1/8 in.

3.3. JOINTING

- A. Joint size:
 1. At stone/brick joints 3/8 in.
 2. At stone/stone joints in vertical position 1/4 in. (3/8 in. optional).
 3. Stone/stone joints exposed on top 3/8 in.

- B. Joint materials:
 - 1. Joint Sealants as specified by Architect.
- C. Location of joints:
 - 1. As shown on shop drawings.
 - 2. At control and expansion joints unless otherwise shown.

3.4. SETTING

- A. Comply with PCI MNL-117.

3.5. JOINT PROTECTION

- A. Comply with requirements of Section 07 90 00.
- B. Prime ends of units, insert properly sized backing rod and install required sealant.

3.6. REPAIR AND CLEANING

- A. Repair chips with touchup materials furnished by manufacturer.
- B. Saturate units to be cleaned prior to applying an approved masonry cleaner.
- C. Consult with manufacturer for appropriate cleaners.

3.7. INSPECTION AND ACCEPTANCE

- A. Inspect finished installation according to Cast Stone Institute ® Technical Bulletin #36.
- B. Do not field apply water repellent until repair, cleaning, inspection and acceptance is completed.

3.8 WATER REPELLENT (Optional)

- A. Apply water repellent in accordance with Cast Stone Institute ® Technical Bulletin #35 or water repellent manufacturer's directions.



Certificate of Excellence

PRESENTED TO

Bassco Cast Stone

*This certifies that the company has met the strict criteria for plant certification
and adheres to the high standards for quality as set forth by the institute.*

Valid March 1, 2026 through March 1, 2027

A handwritten signature in black ink, appearing to read "Troy McCune", is positioned above a horizontal line.

Troy McCune, President



Cast Stone Institute® Member Limited Warranty

THE FOLLOWING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES.

OUTSIDE OF THE EXPRESS TERMS OF THIS DOCUMENT, THERE ARE NO OTHER WARRANTIES BY THE CAST STONE INSTITUTE® MEMBER, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL THE CAST STONE INSTITUTE® MEMBER BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND THE CAST STONE INSTITUTE® MEMBER'S LIABILITY SHALL BE LIMITED TO THE EXPRESS TERMS OF THIS DOCUMENT.

SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE EXCLUSION HEREIN MAY NOT APPLY TO YOU AS THE PURCHASER. THIS WARRANTY

GIVES THE PURCHASER SPECIFIC LEGAL RIGHTS, AND THE PURCHASER MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

(1) Subject to the conditions set forth below, Cast Stone Institute® Member ("CSIM") warrants that its manufactured architectural cast stone (the "Product") will correspond in all material respects with any specification for the Product forming part of a purchase contract (the "Contract") at the time of delivery and will be free from defects in material and workmanship for a period of **ten (10)** years from the date of CSIM's initial delivery of the Product or a part of the Product for the Contract.

(2) CSIM shall be under no liability in respect of any damage or defect in the Product arising from or caused by the following:

- (a) Any drawing, design or specification approved by the purchaser or his representative ("Purchaser");
- (b) Improper storage, handling or installation of the Product;
- (c) Failure to follow industry guidelines published by Cast Stone Institute® ("CSI") Technical Manual regarding design and installation practice;
- (d) Installation of defective or improper Product where CSIM was not notified and did not have the opportunity to provide corrected Product to Purchaser prior to such installation;
- (e) Improper washing, cleaning or sealing methods utilized by Purchaser or Purchaser's use of commercial cleaning or sealing products not approved by CSIM;
- (f) Contact of the Product with paint or other chemicals;

- (g) Settling of the building structure;
- (h) Acts of nature;
- (i) Willful or negligent acts of Purchaser;
- (j) Alteration or repair of the Product without CSIM written approval
- (k) Purchaser's failure to follow CSIM or CSI instructions regarding the Product (whether oral or in writing); or
- (l) Any additional specific exclusion expressed by the CSIM to the Purchaser in writing.

(3) Cast Stone is a masonry product that contains certain natural ingredients. As such, the conditions stated below are considered inherent characteristics of the product, are not considered a cause for rejection pursuant to ASTM C 1364 and are not covered by this Warranty:

- (a) Craze (as defined by CSI Technical Bulletin #32);
- (b) Efflorescence (as defined by CSI Technical Bulletin #33);
- (c) Minor chipping of the Product resulting from transportation, handling or installation that is not obvious under direct daylight illumination from a 20-ft. distance (see CSI Standard Specification 04 72 00);
- (d) Dimensional variations of the Product regarding length, cross-section, warp, bow or twist, location of dowel holes, anchor slots, flashing grooves, false joints and similar features that are within the tolerances set forth in ASTM C 1364 and CSI Standard Specification 04 72 00; or
- (e) Color variations that are within the permissible range set forth in ASTM C 1364.

Any reference in this Warranty to ASTM C 1364, Standard Specification 04 72 00 or CSI Technical Bulletin(s) shall refer to the version of such document existing at the execution date of the Contract for the specific Project in question.

(4) Any claim by the Purchaser which is based on any defect in the quality or condition of the Product or its failure to comply with the Product specifications at the time of delivery shall be submitted in writing to CSIM within five (5) days of the date of delivery, and, where such Product was consigned to a third-party common carrier by CSIM the Purchaser must also comply with that carrier's conditions of carriage regarding notification of loss or damage in transit. If delivery is not refused, and the Purchaser does not notify CSIM accordingly, the Purchaser shall not be entitled to make a claim under this Warranty and CSIM shall have no liability for such defect or failure. Where the claimed defect was not apparent upon reasonable inspection at delivery, Purchaser must notify CSIM in writing within a reasonable time after discovery of the claimed defect or failure.

(5) Where any valid claim in respect to any of the Product is submitted to CSIM in accordance with these conditions, CSIM's obligation shall be limited (at its sole discretion) to:

- (a) Replacing the defective Product (or a part thereof) free of charge;
- (b) Repairing the defective Product (or a part thereof) so that it corresponds in all material respects with the specifications for the same; or
- (c) Refunding to the Purchaser the Contract price of the Product (or a proportionate part of the Contract price).

CSIM's obligation in Section 5(a) above is limited to supplying sufficient Product required to replace the specific pieces subject to the claim and does not include any labor or service costs incurred by Purchaser for the removal and subsequent re-installation of any replacement Product.

CSIM's obligation above is further conditioned upon CSIM's receipt of all monies due from Purchaser for Product delivered under the Contract that is subject to the particular claim in question.

(6) In the event of a claim by Purchaser under this Warranty, Purchaser may be required to submit to CSIM (at the Purchaser's expense) samples and photographs for testing or examination. Purchaser also agrees to allow CSIM and/or its agents reasonable access to the property or project site to make a thorough examination of the Product in question.

(7) In the event CSIM is required to enter into or post a performance surety bond ("Bond") regarding a given Contract, the terms and conditions of the Bond will supersede this Warranty.



Product Safety Data Sheets

Section 1: IDENTIFICATION

1.1 PRODUCT IDENTIFIER

Product Name: Cast Stone
Product Code: ASTM C1364/ 4720

1.2 RECOMMENDED USE OF CHEMICAL AND RESTRICTIONS ON USE

Use: Construction material used in building and hardscape applications.

1.3 DETAILS OF THE SUPPLIER OF THE SAFETY DATA SHEET

Name/Address: Bassco Caststone, 18786 Carters Circle, Elkmont, AL 35620
Telephone Number: 256-732-2228

1.4 EMERGENCY TELEPHONE NUMBER

Emergency Telephone Number: 256-732-2228
Date of Preparation: 5/13/15 Version #: 1.0

Section 2: HAZARD(S) IDENTIFICATION

2.1 CLASSIFICATION OF THE CHEMICAL ACCORDING TO OSHA HAZCOM 2012

Hazard class

Skin irritation 2
Eye irritation 2A
Skin sensitization 1
Carcinogenicity 1A
Specific target organ toxicity - Single exposure 3
Specific target organ toxicity - Repeated exposure 1

2.2 LABEL ELEMENTS ACCORDING TO OSHA HAZCOM 2012

Hazard Pictogram:



Signal Word:

Danger

Hazard Statement:

Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. Respirable dust may contain crystalline silica, known to cause cancer. May cause respiratory irritation. Causes damage to lungs through prolonged or repeated exposure.

Prevention:

Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area. Do not breathe dust.

Response:

If exposed or concerned: Get medical advice/attention. If on skin: Wash with plenty of water. Take off contaminated clothing and wash it before reuse. If skin irritation or rash occurs: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.

Storage:

Not applicable.

Disposal:

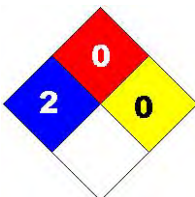
Dispose of unused or unwanted concrete products in accordance with all local, regional, national and international regulations.

2.3 ADDITIONAL INFORMATION

Hazards not otherwise classified: Not applicable.

47 % of the mixture consists of ingredient(s) of unknown acute toxicity.

This product is a hazardous chemical as defined by NOM-018-STPS-2000.

Mexico Classification:

Blue = Health Red = Flammability Yellow = Reactivity White = Special

Hazard Rating: 0 = minimal, 1 = slight, 2 = moderate, 3 = severe, 4 = extreme

WHMIS Classification(s):

Class D2A - Carcinogenicity
Class D2A - Chronic Toxic Effects
Class D2B - Skin/Eye Irritant

WHMIS Hazard Symbols:

WHMIS Signal Word:

WARNING

Comment [NL1]: This is HazCom labeling for Mexico.

Comment [NL2]: This is HazCom labeling for Canada.

Section 3: COMPOSITION/INFORMATION ON INGREDIENTS**3.1 MIXTURES**

Ingredient	UN #	H / F / R / *	CAS No	Wt. %
Coarse aggregate	Not available.	Not available.	Not available.	15 - 60
Portland cement	Not available.	1/0/0	65997-15-1	10 - 30
Ashes (residues)	Not available.	Not available.	68131-74-8	0.1 - 30
Slags, ferrous metal, blast furnace	Not available.	Not available.	65996-69-2	0.1 - 30

Water	Not available.	Not available.	7732-18-5	10 - 30
Silica, crystalline, quartz	Not available.	Not available.	14808-60-7	3 - 7
Ferric oxide	UN1376	1/0/0	1309-37-1	1 - 5
Calcium carbonate	Not available.	1/0/0	1317-65-3	1 - 5
Calcium hydroxide	Not available.	3/0/0	1305-62-0	1 - 5
Silica, amorphous, fumed	Not available.	Not available.	7631-86-9	1 - 5
Admixtures (organic and inorganic)	Not available.	Not available.	Not available.	0.1 - 1

The exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.

* Per NOM-018-STPS-2000

Section 4: FIRST- AID MEASURES

4.1 DESCRIPTION OF THE FIRST AID MEASURE

Eye:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. If eye irritation persists: Get medical advice/attention.
Skin:	If irritation occurs, flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Call a physician if irritation develops and persists.
Inhalation:	If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical advice/attention if you feel unwell.
Ingestion:	Not a normal route of exposure. If swallowed, do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2 MOST IMPORTANT SYMPTOMS AND EFFECTS, BOTH ACUTE AND DELAYED

Eye:	Causes serious eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.
Skin:	Causes skin irritation. Wear gloves when handling product to avoid drying and mechanical abrasion of the skin. May cause sensitization by skin contact.
Inhalation:	Dust may cause respiratory tract irritation.
Ingestion:	Not a normal route of exposure. May result in obstruction and temporary irritation of the digestive tract.

4.3 INDICATION OF ANY IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENTS NEEDED

Note to Physicians:	Symptoms may not appear immediately.
Specific Treatments:	In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

Section 5: FIRE-FIGHTING MEASURES

5.1 FLAMMABILITY

Flammability:	Not flammable by WHMIS/OSHA/NOM-018-STPS-2000 criteria.
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5.2 EXTINGUISHING MEDIA

Suitable Extinguishing Media: Treat for surrounding material.

Unsuitable Extinguishing Media: Not available.

5.3 SPECIAL HAZARDS ARISING FROM THE CHEMICAL

Products of Combustion: May include, and are not limited to: oxides of carbon.

Explosion Data:

Sensitivity to Mechanical Impact: Not available.

Sensitivity to Static Discharge: Not available.

5.4 SPECIAL PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTERS

Keep upwind of fire. Wear full fire fighting turn-out gear (full Bunker gear) and respiratory protection (SCBA).

Section 6: ACCIDENTAL RELEASE MEASURES

6.1 PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

6.2 METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING - UP

Methods for Containment: Pick up large pieces, then place in a suitable container. Do not flush to sewer or allow to enter waterways. Use appropriate Personal Protective Equipment (PPE).

Methods for Cleaning-Up: Vacuum or sweep material and place in a disposal container. Use wet methods, if appropriate, to reduce the generation of dust. Provide ventilation if dust is generated.

Section 7: HANDLING AND STORAGE

7.1 PRECAUTIONS FOR SAFE HANDLING

Handling: Avoid contact with skin and eyes. Good housekeeping is important to prevent accumulation of dust. Avoid generating and breathing dust. Use wet methods, if appropriate, to reduce the generation of dust. The use of compressed air for cleaning clothing, equipment, etc, is not recommended. Handle with care. When using do not eat or drink. (See section 8)

General Hygiene Advice: Launder contaminated clothing before reuse. Wash hands before eating, drinking, or smoking.

7.2 CONDITIONS FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES

Storage: Avoid any dust buildup by frequent cleaning and suitable construction of the storage area. (See section 10)

Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 CONTROL PARAMETERS

Exposure Guidelines

Occupational Exposure Limits		
Ingredient	OSHA-PEL	ACGIH-TLV
Coarse aggregate	Not available.	Not available.
Portland cement	15 mg/m ³ (total); 5 mg/m ³ (resp)	1 mg/m ³ (no asbestos and <1% crystalline silica, respirable fraction)
Ashes (residues)	Not available.	Not available.
Slags, ferrous metal, blast furnace	Not available.	Not available.
Water	Not available.	Not available.
Silica, crystalline, quartz	((10 mg/m ³)/(%SiO ₂ +2) (resp)) ((30 mg/m ³)/(%SiO ₂ +2) (total)) ((250)/(%SiO ₂ +5) mppcf (resp))	0.025 mg/m ³
Ferric oxide	10 mg/m ³	5 mg/m ³ (iron oxide fume; dust as Fe)
Calcium carbonate	15 mg/m ³ (total); 5 mg/m ³ (resp)	10 mg/m ³
Calcium hydroxide	15 mg/m ³ (total); 5 mg/m ³ (resp)	5 mg/m ³
Silica, amorphous, fumed	80 mg/m ³ /%SiO ₂	10 mg/m ³
Admixtures (organic and inorganic)	Not available.	Not available.

8.2 EXPOSURE CONTROLS

Engineering Controls:

When using product, provide local and general exhaust ventilation to keep airborne dust concentrations below exposure limits. Use wet methods, if appropriate, to reduce the generation of dust.

8.3 INDIVIDUAL PROTECTIVE MEASURES

Personal Protective Equipment:

Eye/Face Protection: Safety glasses or goggles are recommended when using product.

Skin Protection:

Hand Protection: Wear suitable gloves.

Body Protection: Wear suitable protective clothing.

Respiratory Protection: A NIOSH approved dust mask or filtering facepiece is recommended in poorly ventilated areas or when permissible exposure limits may be exceeded. Respirators should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134) and ANSI's standard for respiratory protection (Z88.2).

General Health and Safety Measures:

Handle according to established industrial hygiene and safety practices. Do not eat, smoke or drink where material is handled, processed or stored. Wash hands carefully before eating or smoking.

Section 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 INFORMATION ON BASIC PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Fully cured and hydrated concrete.
Color:	Not available.
Odor:	Odorless.
Odor Threshold:	Not available.
Physical State:	Solid.
pH:	Not available.
Melting Point/Freezing Point:	Not available.
Initial Boiling Point and Boiling Range:	Not available.
Flash Point:	Not available.
Evaporation Rate:	Not available.
Flammability:	Not flammable.
Lower Flammability/Explosive Limit:	Not available.
Upper Flammability/Explosive Limit:	Not available.
Vapor Pressure:	Not available.
Vapor Density:	Not available.
Relative Density/Specific Gravity:	Not available.
Solubility:	Insoluble.
Partition coefficient: n-octanol/water:	Not available.
Auto-ignition Temperature:	Not available.
Decomposition Temperature:	Not available.
Viscosity:	Not available.
Oxidizing Properties:	Not available.
Explosive Properties:	Not available.

Section 10: STABILITY AND REACTIVITY

10.1 REACTIVITY

No dangerous reaction known under conditions of normal use.

10.2 CHEMICAL STABILITY

Stable under normal conditions of use.

10.3 POSSIBILITY OF HAZARDOUS REACTIONS

No dangerous reaction known under conditions of normal use.

10.4 CONDITIONS TO AVOID

None known.

10.5 INCOMPATIBLE MATERIALS

None known.

10.6 HAZARDOUS DECOMPOSITION PRODUCTS

None known.

Section 11: TOXICOLOGICAL INFORMATION

11.1 INFORMATION ON TOXICOLOGICAL EFFECTS

Likely Routes of Exposure: Skin contact, eye contact, and inhalation.

Symptoms related to physical/chemical/toxicological characteristics:

Eye: Causes serious eye irritation. Symptoms may include discomfort or pain, excess blinking and tear production, with possible redness and swelling.

Skin: Causes skin irritation. Wear gloves when handling product to avoid drying and mechanical abrasion of the skin. May cause sensitization by skin contact.

Ingestion: Not a normal route of exposure. May result in obstruction and temporary irritation of the digestive tract.

Inhalation: Dust may cause respiratory tract irritation.

Acute Toxicity:

Ingredient	IDLH	LC50	LD50
Coarse aggregate	Not available.	Not available.	Not available.
Portland cement	5000 mg/m ³	Not available.	Not available.
Ashes (residues)	Not available.	Not available.	Oral > 2000 mg/kg, rat
Slags, ferrous metal, blast furnace	Not available.	Not available.	Not available.
Water	Not available.	Inhalation 90000 mg/m ³ /4h, rat	Oral >90000 mg/kg, rat Dermal >90000 mg/kg, rabbit
Silica, crystalline, quartz	Ca [25 mg/m ³ (cristobalite, tridymite); 50 mg/m ³ (quartz, tripoli)]	Not available.	Oral 500 mg/kg, rat
Ferric oxide	2500 mg Fe /m ³	Not available.	Oral >10000 mg/kg, rat
Calcium carbonate	Not available.	Not available.	Oral 6450 mg/kg, rat
Calcium hydroxide	Not available.	Not available.	Oral 7340 mg/kg, rat
Silica, amorphous, fumed	Not available.	Inhalation ≥58.8 mg/l/1h, rat	Oral >5000 mg/kg, rat Dermal >2000 mg/kg, rabbit
Admixtures (organic and inorganic)	Not available.	Not available.	Not available.

Calculated overall Chemical Acute Toxicity Values

LC50 (inhalation)	LD50 (oral)	LD50 (dermal)
> 5 mg/l/4h, rat	> 2000 mg/kg, rat	> 2000 mg/kg, rabbit

Ingredient	Chemical Listed as Carcinogen or Potential Carcinogen (NTP, IARC, OSHA, ACGIH, CP65)*
Coarse aggregate	Not listed.
Portland cement	G-A4
Ashes (residues)	Not listed.
Slags, ferrous metal, blast furnace	Not listed.

Water	Not listed.
Silica, crystalline, quartz	G-A2, I-1, N-1, O, CP65
Ferric oxide	G-A4, I-3
Calcium carbonate	Not listed.
Calcium hydroxide	Not listed.
Silica, amorphous, fumed	I-3
Admixtures (organic and inorganic)	Not listed.

* See Section 15 for more information.

11.2 DELAYED, IMMEDIATE, AND CHRONIC EFFECTS OF SHORT- AND LONG-TERM EXPOSURE

Skin Corrosion/Irritation:	Causes skin irritation.
Serious Eye Damage/Irritation:	Causes serious eye irritation.
Respiratory Sensitization:	Based on available data, the classification criteria are not met.
Skin Sensitization:	May cause an allergic skin reaction.
STOT-Single Exposure:	Dust may cause respiratory tract irritation.
Chronic Health Effects:	
Carcinogenicity:	Respirable dust may contain crystalline silica, known to cause cancer.
Germ Cell Mutagenicity:	Based on available data, the classification criteria are not met.
Reproductive Toxicity:	
Developmental:	Based on available data, the classification criteria are not met.
Teratogenicity:	Based on available data, the classification criteria are not met.
Embryotoxicity:	Based on available data, the classification criteria are not met.
Fertility:	Based on available data, the classification criteria are not met.
STOT-Repeated Exposure:	Causes damage to lungs through prolonged or repeated exposure. Respirable crystalline silica in the form of quartz or cristobalite from occupational sources is listed by the International Agency for Research on Cancer (IARC) and National Toxicology Program (NTP) as a lung carcinogen. Prolonged exposure to respirable crystalline silica has been known to cause silicosis, a lung disease, which may be disabling. While there may be a factor of individual susceptibility to a given exposure to respirable silica dust, the risk of contracting silicosis and the severity of the disease is clearly related to the amount of dust exposure and the length of time (usually years) of exposure.
Aspiration Hazard:	Based on available data, the classification criteria are not met.
Toxicologically Synergistic Materials:	Not available.
Other Information:	Not available.

Section 12: ECOLOGICAL INFORMATION

12.1 ECOTOXICITY

Acute/Chronic Toxicity: No ecological consideration when used according to directions.

12.2 PERSISTENCE AND DEGRADABILITY

Not available.

12.3 BIOACCUMULATIVE POTENTIAL

Bioaccumulation: Not available.

12.4 MOBILITY IN SOIL

Not available.

12.5 OTHER ADVERSE EFFECTS

Not available.

Section 13: DISPOSAL CONSIDERATIONS

13.1 WASTE TREATMENT METHODS

Disposal Method: This material must be disposed of in accordance with all local, state, provincial, and federal regulations.

Other disposal recommendations: Not available.

Section 14: TRANSPORT INFORMATION

14.1 UN NUMBER

DOT	TDG	NOM-004-SCT2-1994
Not regulated.	Not regulated.	Not regulated.

14.2 UN PROPER SHIPPING NAME

DOT	TDG	NOM-004-SCT2-1994
Not applicable.	Not applicable.	Not applicable.

14.3 TRANSPORT HAZARD CLASS (ES)

DOT	TDG	NOM-004-SCT2-1994
Not applicable.	Not applicable.	Not applicable.

14.4 PACKING GROUP

DOT	TDG	NOM-004-SCT2-1994
Not applicable.	Not applicable.	Not applicable.

14.5 ENVIRONMENTAL HAZARDS

Not available.

14.6 TRANSPORT IN BULK ACCORDING TO ANNEX II OF MARPOL 73/78 AND THE IBC CODE

Not available.

14.7 SPECIAL PRECAUTIONS FOR USER

Do not handle until all safety precautions have been read and understood.

Section 15: REGULATORY INFORMATION

15.1 SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS/ LEGISLATIONS SPECIFIC FOR THE CHEMICAL

Canada: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

US: SDS prepared pursuant to the Hazard Communication Standard (CFR29 1910.1200) HazCom 2012

Mexico: SDS prepared pursuant to NOM-018-STPS-2000.

Comment [NL3]: This section should be modified by the user to reflect where products are shipped.

SARA Title III				
Ingredient	Section 302 (EHS) TPQ (lbs.)	Section 304 EHS RQ (lbs.)	CERCLA RQ (lbs.)	Section 313
Coarse aggregate	Not listed.	Not listed.	Not listed.	Not listed.
Portland cement	Not listed.	Not listed.	Not listed.	Not listed.
Ashes (residues)	Not listed.	Not listed.	Not listed.	Not listed.
Slags, ferrous metal, blast furnace	Not listed.	Not listed.	Not listed.	Not listed.
Water	Not listed.	Not listed.	Not listed.	Not listed.
Silica, crystalline, quartz	Not listed.	Not listed.	Not listed.	Not listed.
Ferric oxide	Not listed.	Not listed.	Not listed.	Not listed.
Calcium carbonate	Not listed.	Not listed.	Not listed.	Not listed.
Calcium hydroxide	Not listed.	Not listed.	Not listed.	Not listed.
Silica, amorphous, fumed	Not listed.	Not listed.	Not listed.	Not listed.
Admixtures (organic and inorganic)	Not listed.	Not listed.	Not listed.	Not listed.

State Regulations

California Proposition 65:

This product contains Crystalline Silica, Quartz and may also contain trace amounts of other chemicals known to the State of California to cause cancer, birth defects or other reproductive harm which may be released upon sanding/cutting/grinding/drilling.

Comment [NL4]: This is required for products being shipped to or within California.

Global Inventories:

Ingredient	Canada DSL/NDSL	USA TSCA
Coarse aggregate	Not available.	Not available.
Portland cement	DSL	Yes.
Ashes (residues)	DSL	Yes.
Slags, ferrous metal, blast furnace	DSL	Yes.
Water	DSL	Yes.
Silica, crystalline, quartz	DSL	Yes.
Ferric oxide	DSL	Yes.
Calcium carbonate	NDSL	Yes.
Calcium hydroxide	DSL	Yes.
Silica, amorphous, fumed	DSL	Yes.
Admixtures (organic and inorganic)	Not available.	Not available.

NFPA-National Fire Protection Association:	
Health:	2
Fire:	0
Reactivity:	0
HMIS-Hazardous Materials Identification System:	
Health:	2*
Fire:	0
Physical Hazard:	0

Hazard Rating: 0 = minimal, 1 = slight, 2 = moderate, 3 = severe, 4 = extreme

SOURCE AGENCY CARCINOGEN CLASSIFICATIONS:

CP65 California Proposition 65

OSHA (O) Occupational Safety and Health Administration.

ACGIH (G) American Conference of Governmental Industrial Hygienists.

A1 - Confirmed human carcinogen.

A2 - Suspected human carcinogen.

A3 - Animal carcinogen.

A4 - Not classifiable as a human carcinogen.

A5 - Not suspected as a human carcinogen.

IARC (I) International Agency for Research on Cancer.

1 - The agent (mixture) is carcinogenic to humans.

2A - The agent (mixture) is probably carcinogenic to humans; there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

2B - The agent (mixture) is possibly carcinogenic to humans; there is limited evidence of carcinogenicity in humans in the absence of sufficient evidence of carcinogenicity in experimental animals.

3 - The agent (mixture, exposure circumstance) is not classifiable as to its carcinogenicity to humans.

4 - The agent (mixture, exposure circumstance) is probably not carcinogenic to humans.

NTP (N) National Toxicology Program.

1 - Known to be carcinogens.

2 - Reasonably anticipated to be carcinogens.

Section 16: OTHER INFORMATION

Date of Preparation: 5/13/15

Expiry Date: -

Version: 1.0

Revision Date: -

Disclaimer: We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind. The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for the user's own particular use.

End of Safety Data Sheet



Client: **Bassco Caststone**
 Address: **David Owen**
18786 Carters Circle
Elkmont, AL 35620

Unit Designation and **Architectural Cast Stone**
 Description: **Sample Wet Cast 7-1**

Project Number: **BASCX24001**

Report Date: **August 4, 2025**

Project Name: **Bassco Cast Stone**

Date Received: **July 16, 2025**

Laboratory Number: **212751**

Unit Specification: **ASTM C1364**

Summary of Test Results

ASTM C1194 - Compressive Strength of Architectural Cast Stone

Specimen Cast Date: **7/1/2025**

Date of Compression Testing: **7/29/2025**

Age when Tested: **28** days

ASTM C1195 - Absorption of Architectural Cast Stone

Specimen Cast Date: **7/1/2025**

Test Method: **A, Cold Water Test**

Individual Unit Test Results

Specimen No.	Compressive Strength		Specification
	lbs	psi (gross)	
4	36124	8800	
5	37150	9010	
6	34550	8380	
Average	35941	8730	6500 psi (min.)

Specimen No.	Absorption	Specification
	%	
1	5.6	
2	5.4	
3	5.6	
Average	5.5	6 % (max.)

Dimensions (in)			
Specimen No.	Length	Width	Height
1	2.02	2.02	2.03
2	2.04	2.04	2.04
3	2.04	2.03	2.05
4	2.03	2.02	2.03
5	2.03	2.03	2.04
6	2.03	2.03	2.03

Specimen No.	Density (lb/ft ³)	
	Oven Dry	SSD
1	138.9	146.6
2	139.6	147.1
3	139.1	147.0
Average	139.2	146.9

Specimen No.	Absorption Weights (g)	
	Oven Dry	SSD-Cold Wtr
1	302.68	319.52
2	311.77	328.53
3	310.70	328.18

Remarks: The above samples were tested according to ASTM C1194 and C1195. This set meets the compressive strength and absorption requirements of ASTM C1364.

Joseph Ridgway, PE
 Laboratory Manager



Client: **Basco Caststone**
Address: **David Owen**
18786 Carters Circle
Elkmont, AL 35620

Project No.: **CSINX23001.05**

Report Date: **January 5, 2023**

Project Name: **Bassco Cast Stone**

Date Received: **February 7, 2024**

Unit Specification: **ASTM C666 Procedure A, as modified by**
Section 5.5 of ASTM C1364.

Laboratory No.: **206876**

Specimen Information

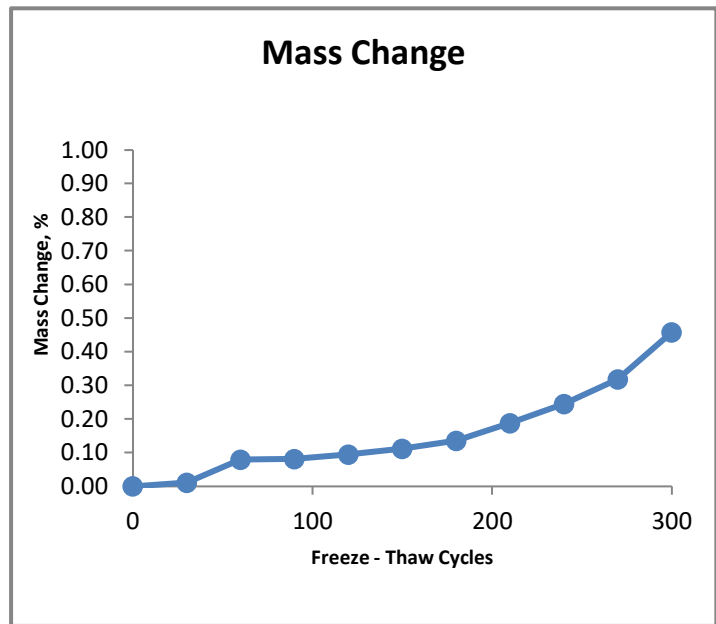
Sample ID: **Wet Cast**

Specimen Cast Date: **February 2, 2024**

Summary of Test Results

Freeze-Thaw Cycles	Mass Change (%)
0	0.0
30	0.0
60	0.1
90	0.1
120	0.1
150	0.1
180	0.1
210	0.2
240	0.2
270	0.3
300	0.5

Values are the Average of Three Samples.



Remarks: One slab of cast stone was reduced to one set of three beams with nominal dimensions of 3" x 4" x 16". This set meets the requirement of 5% maximum mass loss after 300 freeze-thaw cycles.
Photographs of the samples after completion of the tests are attached.

Joseph Ridgway, PE
Laboratory Manager



Client: Basco Caststone
Address: David Owen
18786 Carters Circle
Elkmont, AL 35620

Unit Specification: ASTM C666 Procedure A, as modified by
Section 5.5 of ASTM C1364-19.

Sample ID: Wet Cast

Project No.: CSINX23001.05

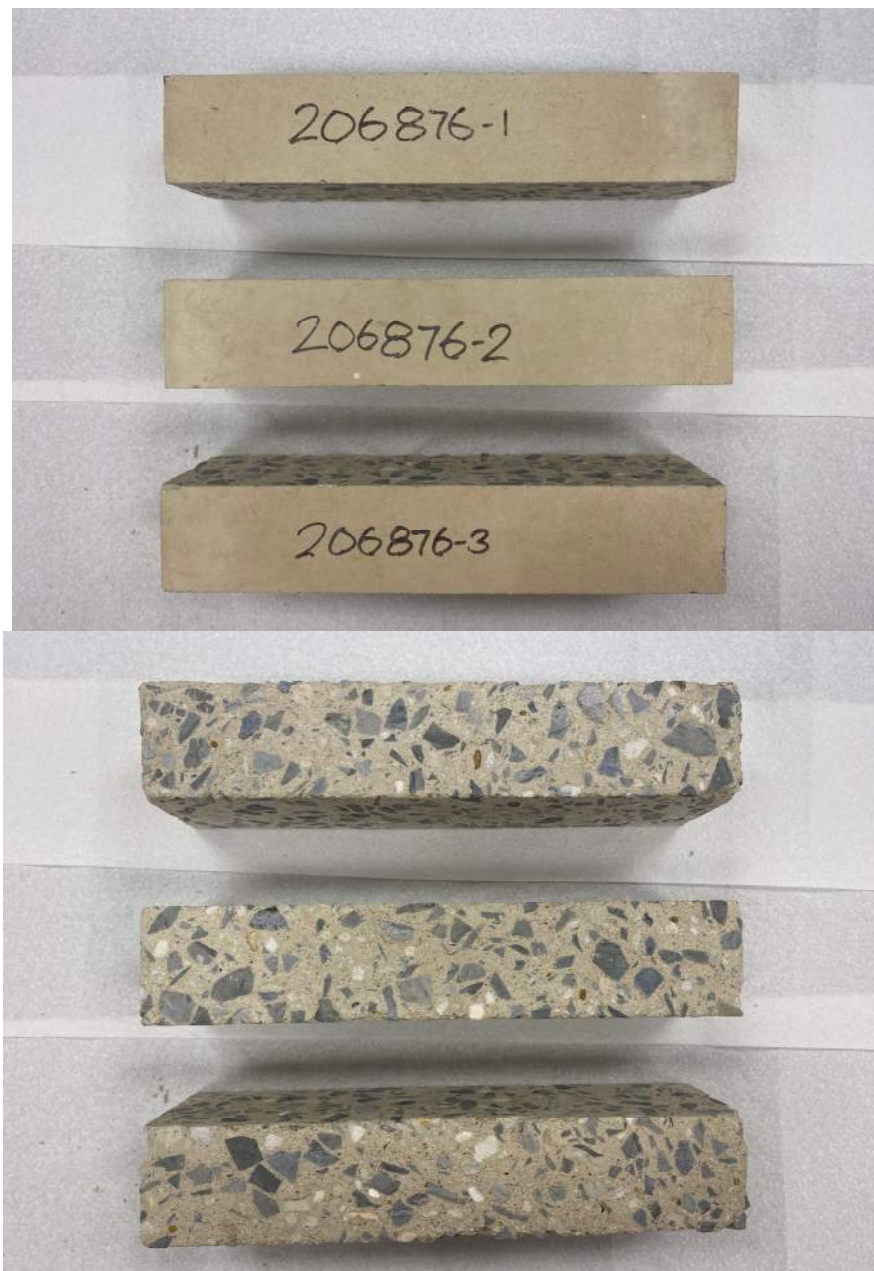
Report Date: January 5, 2023

Project Name: Bassco Cast Stone

Date Received: February 7, 2024

Laboratory No.: 206876

Specimen Cast Date: February 2, 2024



Top Surfaces After 300 F/T Cycles

Bottom Surfaces After 300 F/T Cycles



Client: **Bassco Caststone**
Address: **David Owen**
18786 Carters Circle
Elkmont, AL 35620

Unit Specification: **ASTM C426**

Sample ID: **Wet Cast**

Project No.: **BASCX22001**

Report Date: **April 2, 2024**

Project Name: **Bassco Cast Stone Lab**

Date Received: **February 7, 2024**

Laboratory No.: **206876**

Specimen Cast Date: **January 25, 2024**

Linear Shrinkage				
Days of Drying	Specimen 1 (%)	Specimen 2 (%)	Specimen 3 (%)	Test Result (%)
5	0.000	0.000	0.000	0.000
7	0.024	0.000	0.026	0.025
9	0.031	0.000	0.029	0.030
11	0.031	0.000	0.031	0.031
13	0.034	0.000	0.033	0.034
15	0.040	0.000	0.044	0.042
17	0.043	0.000	0.042	0.042
19	0.040	0.000	0.042	0.041
21	0.038	0.000	0.028	0.033

Mass Change				
Days of Drying	Specimen 1 (g)	Specimen 2 (g)	Specimen 3 (g)	Test Results (%)
0	2323	2383	2396	0.00
5	2225	2282	2299	4.17
7	2216	2273	2290	0.40
9	2211	2267	2284	0.25
11	2210	2261	2283	0.12
13	2210	2260	2282	0.03
15	2209	2260	2281	0.03
17	2209	2260	2281	0.00
19	2207	2258	2279	0.09
21	2207	2258	2278	0.01

At Equilibrium:	Test Age (days)	<u>15</u>
	Linear Shrinkage (%)	<u>0.042</u>
	Mass Change (%)	<u>0.03</u>

Remarks: The specimens were saw cut from one test specimen. This set was tested in accordance with ASTM C426.

Joseph Ridgway, PE
Laboratory Manager



Grace Concrete Products

ADVA® CAST 555

High-range water-reducing admixture

ASTM C494 Type A and F, and ASTM C1017 Type I

Product Description



ADVA® Cast 555 is a high efficiency polycarboxylate-based superplasticizer. ADVA Cast 555 has been formulated to impart maximum desired workability without segregation to concrete, and to achieve high early compressive strength as required by the precast industry. ADVA Cast 555 is optimized for the production of Self-Consolidating Concrete (SCC) in precast/prestressed applications. ADVA Cast 555 is formulated to comply with ASTM C494 as a Type A and F, and ASTM C1017 Type I.

ADVA Cast 555 is supplied as a ready-to-use brown liquid. One gallon weighs approximately 8.90 lbs (one liter weighs approximately 1.07 kg). ADVA Cast 555 contains no intentionally added chlorides.

Uses

ADVA Cast 555 is recommended for use in precast and prestressed production in conventional and SCC applications.

Conventional Concrete Applications of ADVA Cast 555:

- Can produce concrete with extremely high levels of workability without segregation.
- May be used to produce concrete with very low water/cement ratios while maintaining normal levels of workability.
- Ideal for use in precast and prestressed applications where concrete needs to achieve high early strength along with high levels of workability.
- Provides superior concrete surface finish characteristics with reduced bugholing.

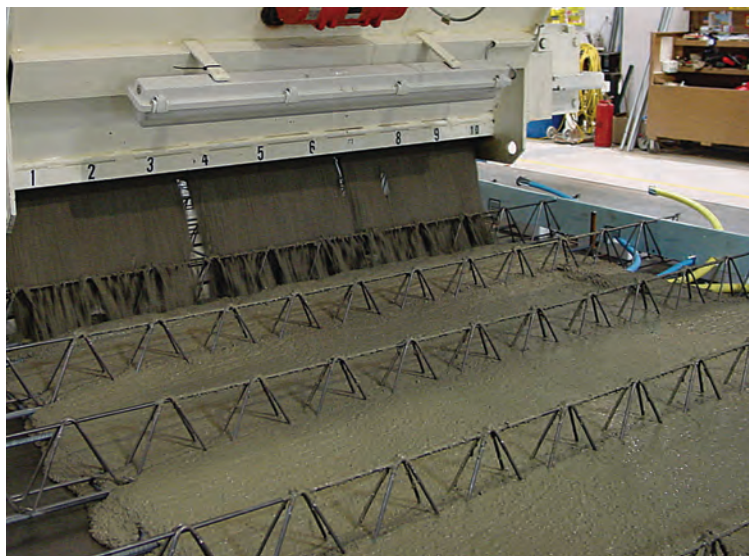
Self-Consolidating Concrete Applications:

SCC produced with ADVA Cast 555 has unique advantages over conventional flowing concrete.

- Lower SCC viscosity — flow properties of SCC are enhanced, reducing SCC viscosity with no change in stability or segregation resistance.

Product Advantages

- Superior air entrainment control
- Excellent concrete cohesiveness even with less than optimum aggregate gradations
- Enhanced tolerance to slight moisture variability
- Consistently produces non-segregating concrete
- Superior finish on cast surfaces
- Enhanced strength development



- Self placement — vibration can be eliminated because SCC is highly flowable and will change shape under its own weight to self level and self consolidate within formwork.
- High cohesion — the window of acceptable mix designs to maintain cohesive SCC's is increased, allowing for the production of SCC that is flowable and yet highly cohesive. Bleeding is significantly reduced.
- No blocking — SCC can pass freely through narrow openings and congested reinforcement without aggregate “blocking” behind obstructions that stop the flow of concrete.

Addition Rates

ADVA Cast 555 is an easy to dispense liquid admixture. Dosage rates can be adjusted to meet a wide spectrum of concrete performance requirements. Addition rates for ADVA Cast 555 can vary with the type of application, but will normally range from 8 to 20 fl oz/100 lbs (540 to 1400 mL/100 kg) of cement. Should conditions require using more than the recommended addition rate, please consult your Grace representative.

For SCC applications, pre-placement testing is recommended to determine the optimum admixture addition rate and mix design. Factors that influence optimum addition rate include other concrete mix components, aggregate gradations, form geometry, and reinforcement configurations. Please consult your local Grace Construction Products representative for assistance with developing mix designs for Self-Consolidating Concrete.

Compatibility with Other Admixtures and Batch Sequencing

ADVA Cast 555 is compatible with most Grace admixtures as long as they are added separately to the concrete mix. However, ADVA products are not recommended for use

in concrete containing naphthalene-based admixtures including Daracem® 19 and Daracem 100, and melamine-based admixtures including Daracem ML 330 and Daracem 65. In general, it is recommended that ADVA Cast 555 be added to the concrete mix near the end of the batch sequence for optimum performance. Different sequencing may be used if local testing shows better performance. Please see Grace Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations. ADVA Cast 555 should not come in contact with any other admixture before or during batching, even if diluted in mix water.

Pretesting of the concrete mix should be performed before use and as conditions and materials change in order to assure compatibility with other admixtures, and to optimize dosage rates, addition times in the batch sequencing and concrete performance. For concrete that requires air entrainment, the use of an ASTM C260 air-entraining agent (such as Daravair® or Darex® product lines) is recommended to provide suitable air void parameters for freeze-thaw resistance. Please consult your Grace representative for guidance.

Packaging & Handling

ADVA Cast 555 is available in bulk, delivered by metered trucks, in 275 gal (1041 L) totes, and 55 gal (210 L) drums. ADVA Cast 555 will freeze at approximately 32°F (0°C) but will return to full functionality after thawing and thorough mechanical agitation.

Dispensing Equipment

A complete line of accurate, automatic dispensing equipment is available.

www.graceconstruction.com

North American Customer Service: 1-877-4AD-MIX1 (1-877-423-6491)

ADVA, the ADVA logo, Daracem, Daravair and Darex are registered trademarks of W. R. Grace & Co.—Conn.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.—Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending.
DCAC-33D Printed in U.S.A. 11/07

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FA/LI/1M

GRACE

DAREX® II AEA Air-entraining admixture

ASTM C260

Product Description

Darex® II AEA is an air-entraining admixture which generates a highly stable air void system for increased protection against damage from freezing and thawing, severe weathering, or de-icer chemicals. Darex II AEA is a complex mixture of organic acid salts in an aqueous solution specifically formulated for use as an air-entraining admixture for concrete and is manufactured under rigid control which provides uniform, predictable performance. It is supplied ready-to-use and does not require pre-mixing with water. Darex II AEA is a dark brown liquid. One gallon weighs 8.7 lbs (1.04 kg/L). Darex II AEA complies to ASTM C260 *Standard Specifications for Air-Entraining Admixtures for Concrete*.

Uses

Darex II AEA is used in ready-mix, block, and concrete products plants to improve air entrainment stability. It is particularly effective in maintaining air content during longer haul times. Darex II AEA performs well in

conventional concrete and is effective in plasticizing mixes and with slag, lightweight, or manufactured aggregates which tend to produce harsh concrete.

Darex II AEA entrains air effectively with microsilica concrete and with fly ash concrete.

Performance

By agitation of concrete mixers, Darex II AEA disperses and generates millions of discrete semi-microscopic bubbles throughout the concrete composite. Once thoroughly mixed, the concrete contains a stable network of bubbles which act much like ball bearings increasing mobility, or plasticity, of the concrete. This aids workability to the mix and permits a reduction of water with no loss of slump. Placeability is improved. Bleeding, segregation and green shrinkage are minimized.

Through the purposeful entrainment of air, Darex II AEA markedly increases the durability of concrete to all exposures.

Product Advantages

- Air stability makes it particularly useful for longer transit times
- Produces excellent air void systems in concretes that are traditionally difficult to air entrain



Addition Rates

There is no standard addition rate for Darex II AEA. The amount to be used will depend upon the amount of air required under job conditions, usually in the range of 4 to 7%. Typical factors which might influence the amount of air entrained are temperature, cement, sand gradation, and use of extra fine materials such as fly ash. Typical Darex II AEA addition rates generally range from ½ to 5 fl oz/100 lbs (30 to 320 mL/100 kg) of cement.

The air-entraining efficiency of Darex II AEA becomes even greater when used with water-reducing and set-retarding agents. This may allow a reduction of up to ⅔ in the amount of Darex II AEA required for the specified air content.

Mix Adjustment

Entrained air results in increased yields with a consequent decrease in the cement content of the placed concrete. This condition calls for a mix adjustment, usually accomplished by reducing the fine aggregate content. This is in addition to the reduction in water content brought about by the increase in plasticity.

Compatibility with Other Admixtures and Batch Sequencing

Darex II AEA is compatible with most Grace admixtures as long as they are added separately to the concrete mix. In general, it is recommended that Darex II AEA be added to the concrete mix near the beginning of the batch sequence for optimum performance, preferably by “dribbling” on the sand. Different sequencing may be used if local testing shows better performance. Please see Grace Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations. Darex II AEA should not be added directly to heated water.

Pretesting of the concrete mix should be performed before use, and as conditions and materials change in order to assure compatibility, and to optimize dosage rates, addition times in the batch sequencing and concrete performance. Please consult your Grace representative for guidance.

Packaging & Handling

Darex II AEA is available in bulk, delivered by metered tank trucks, totes and drums.

Darex II AEA will freeze at about 30°F (-1°C), but its air-entraining properties are completely restored by thawing and thorough mechanical agitation.

Dispensing Equipment

A complete line of accurate dispensing equipment is available. These dispensers can be located to discharge into the water line, the mixer, or on the sand.

Specifications

Concrete shall be air entrained concrete, containing 4 to 7% entrained air. The air contents in the concrete shall be determined by the pressure method (ASTM Designation C231), gravimetric method (ASTM Designation C138) or volume metric method (ASTM Designation C173). The air-entraining admixture shall be Darex II AEA as manufactured by Grace Construction Products, or equal. The air-entraining admixture shall be added at the concrete mixer or batching plant at approximately ½ to 5 fl oz/100 lbs (30 to 320 mL/100 kg) of cement, or in such quantities as to give the specified air contents.

www.graceconstruction.com

North American Customer Service: 1-877-4AD-MIX1 (1-877-423-6491)

Darex is a registered trademark of W. R. Grace & Co.—Conn.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.—Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending.
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FA/LI/1M

GRACE



Bassco Cast Stone. 18786 Carters Circle. Elkmont, AL 35620

Phone: 256-732-2228

Fax: 256-732-2250

www.basscocardstone.com

Bassco Cast Stone Wet Cast Mix Design

Federal White Type I Cement

ASTM C33 Certified Concrete Sand

ASTM C404 & C33 Certified #67 Aggregate

Water (Water/Cement Ratio = 44%)

Grace High Range Water Reducer #555

Grace Darex II Air Entrainer (Target Percentage 6%)

DCS Pigment

Quantities of each are Proprietary Information of Bassco Cast Stone.

Thank You,

David Owen

Office: 256-732-2228

Fax: 256-732-2250

Email: davidowen@basscocardstone.com

www.basscocardstone.com



Proud Member of the Cast Stone Institute

Bassco Cast Stone

Specializing in Architectural Cast Stone

Safety Data Sheet

Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

1 Identification**Product identifier****Trade name:** ADVA Cast 555**SDS ID Number:** 620**Replaces SDS ID Number:** D-06788**Relevant identified uses of the substance or mixture and uses advised against**
Specialty construction product. Not intended for other uses**Details of the supplier of the safety data sheet****Manufacturer/Supplier:**

W.R. Grace & Co. -Conn.
62 Whittemore Avenue
Cambridge, MA 02140 USA

Grace Canada, Inc.
294 Clements Road W.
Ajax, Ontario L1S 3C6 Canada

www.graceconstruction.com**Information department:**

Environmental Health & Safety
USA: +1-617-876-1400 (24 hours)
+1-800-354-5414 (8AM - 5PM) Not functional within Massachusetts
CAN: 1-905-683-8561 (24 hours)

Transport Emergency: Chemtrec +1-800-424-9300 (24 hours)**2 Composition/information on ingredients****Chemical characterization: Mixtures****Hazardous components:** Not applicable.**3 Hazard(s) identification****Classification of the substance or mixture**

The product is not classified according to the Globally Harmonized System (GHS).

GHS label elements Not applicable.**Hazard pictograms** Not applicable.

Not applicable.

NFPA ratings (scale 0 - 4)

Health = 1
Fire = 1
Reactivity = 0

(Cont. on page 2)

USGHS

Safety Data Sheet

Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

Trade name: *ADVA Cast 555*

HMIS-ratings (scale 0 - 4)

(Cont. from page 1)

HEALTH	1	Health = 1
FIRE	1	Flammability = 1
REACTIVITY	0	Reactivity = 0

* 4 First-aid measures

General information:

Get medical advice/attention if you feel unwell.

After inhalation:

Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.

After skin contact:

Immediately wash contaminated skin with soap or mild detergent and water. If this chemical soaks clothing, immediately remove clothing and wash skin.

After eye contact:

Rinse opened eye for several minutes under running water.

Seek immediate medical advice.

After swallowing:

Wash out mouth with water

Do not induce vomiting; immediately call for medical help.

Never give anything by mouth to an unconscious person.

5 Fire-fighting measures

Special hazards arising from the substance or mixture No further relevant information available.

Additional information Collect contaminated fire fighting water separately. It must not enter the sewage system.

* 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

Wear protective equipment. Keep unprotected persons away.

Methods and material for containment and cleaning up:

Contain and/or absorb spill with inert material (i.e. sand, vermiculite) then place in a suitable container.

Sweep up spilled product into receptacles.

Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

USGHS

(Cont. on page 3)

Safety Data Sheet

Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

Trade name: ADVA Cast 555

(Cont. from page 2)

7 Handling and storage

Handling:

Precautions for safe handling

Open and handle receptacle with care.
 Avoid contact with eyes, skin and clothing.
 Do not take internally.
 Practice good personal hygiene to avoid ingestion.
 Use only with adequate ventilation.
 Wash clothing before reuse.
 FOR PROFESSIONAL USE ONLY. KEEP OUT OF CHILDREN'S REACH.

Information about protection against explosions and fires: No special measures required.

Storage:

Information about storage in one common storage facility: No special measures required.

Further information about storage conditions: Keep receptacle tightly sealed.

Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems: No further data; see item 7.

Components with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: The lists that were valid during the creation were used as basis.

Personal protective equipment:

General protective and hygienic measures:

Avoid contact with the eyes and skin.
 The usual precautionary measures for handling chemicals should be followed.

Breathing equipment:

Respiratory protection is not normally required. However, a chemical cartridge respirator with organic vapor cartridge and a prefilter for dusts/mists is required at or above the applicable exposure limits (consult exposure guidelines). If no limits exist, use an approved respirator whenever a vapor or mist is generated or if respiratory irritation occurs. Supplied air respirator (SCBA) is required at exposure levels above the capabilities of a chemical cartridge respirator.

Protection of hands:

Gloves should be worn to prevent skin contact and should be impermeable and resistant to the product. Rubber or other impervious gloves should be worn to prevent skin contact.

Material of gloves

Gloves should be worn to prevent skin contact and should be impermeable and resistant to the product.

Eye protection:



Safety glasses with side shield protection.

(Cont. on page 4)

USGHS

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Reviewed on 04/07/2015

Trade name: ADVA Cast 555

(Cont. from page 3)

Safety glasses with side shields should be worn to prevent contact due to splashing. Under high vapor mist concentrations, tightly sealed goggles should be worn.



A face shield should also be worn if there is potential exposure to splash or spray.

Body protection:

Protective work clothing

Use personal protective equipment as required.

Take off contaminated clothing and wash before reuse.

9 Physical and chemical properties

General Information**Appearance:**

Form:	Liquid
Color:	According to product specification
Odor:	Characteristic
Odour threshold:	Not determined.

pH-value (~): 4

Change in condition

Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	100 °C (212 °F)
Flash point:	101 °C (214 °F)

Flammability (solid, gaseous): Not applicable.

Decomposition temperature: Not determined.

Auto igniting: Product is not selfigniting.

Danger of explosion: Product does not present an explosion hazard.

Explosion limits:

Lower:	Not determined.
Upper:	Not determined.
VOC Content (max):	Not determined.

Vapor pressure: Not determined.

Density: (~) Not determined.

Relative density Not determined.

Vapour density Not determined.

Evaporation rate Not determined.

Solubility in / Miscibility with

Water: Not miscible or difficult to mix.

Partition coefficient (n-octanol/water): Not determined.

Viscosity:

Dynamic: Not determined.

Kinematic: Not determined.

Molecular weight Not applicable.

(Cont. on page 5)

USGHS

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Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

Trade name: ADVA Cast 555

(Cont. from page 4)

Other information

No further relevant information available.

10 Stability and reactivity

Thermal decomposition: No decomposition if used according to specifications.**Possibility of hazardous reactions** No dangerous reactions known.**Incompatible materials:** No further relevant information available.**Hazardous decomposition products:** Carbon monoxide and carbon dioxide**Additional information:** See section 7 for information on handling, storage and conditions to be avoided.

* 11 Toxicological information

Acute toxicity:**Primary irritant effect:****on the skin:** No irritating effect expected**on the eye:** No irritating effect expected**Sensitization:** Sensitization possible through skin contact.**Additional toxicological information:**

When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

Carcinogenic categories**IARC (International Agency for Research on Cancer) Human Carcinogenicity:**
Group 1- Positive, Group 2A- Probable, Group 2B- Possible, Group 3- Not Classifiable

None of the ingredients is listed.

NTP (National Toxicology Program)**K-Known to be carcinogenic, R-May reasonably be anticipated to be carcinogenic**

None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration)

None of the ingredients is listed.

12 Ecological information

Aquatic toxicity: No further relevant information available.**Persistence and degradability** No further relevant information available.**Behavior in environmental systems:****Bioaccumulative potential** No further relevant information available.**Additional ecological information:****General notes:**

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

(Cont. on page 6)

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Safety Data Sheet

Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

Trade name: ADVA Cast 555

(Cont. from page 5)

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

13 Disposal considerations

Waste treatment methods Comply with Federal, State and local regulations.

Recommendation:



Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Uncleaned packagings:

Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number

DOT, ADR, ADN, IMDG, IATA Not applicable.

UN proper shipping name

DOT, ADR, ADN, IMDG, IATA Not applicable.

Transport hazard class(es)

DOT, ADR, ADN, IMDG, IATA
Class Not applicable.

Packing group

DOT, ADR, IMDG, IATA Not applicable.

Environmental hazards:

Marine pollutant: No

Special precautions for user

Not applicable.

Transport/Additional information: Not classified as a dangerous good for transport by road, rail or air.

DOT

Remarks: Not Regulated.

15 Regulatory information

SARA (Superfund Amendments and Reauthorization Act)

Section 302/304 (extremely hazardous substances):

None of the ingredients is listed.

Section 313 Reportable Ingredients (Chemicals present below reporting threshold are exempt):

None of the ingredients is listed.

SARA Section 312/Tier I & II Hazard Categories:

Health Immediate (acute)	Yes
Health Delayed (chronic)	No
Flammable	No
Reactive	No
Pressure	No

(Cont. on page 7)

USGHS

Safety Data Sheet

Printing date 04/07/2015

Version Number 1.3

Reviewed on 04/07/2015

Trade name: ADVA Cast 555

(Cont. from page 6)

North America Chemical Inventory Status

TSCA (Toxic Substances Control Act - United States):

All ingredients are listed or exempt from listing unless otherwise noted below.

CEPA (Canadian DSL):

All ingredients are listed or exempt from listing unless otherwise noted below.

Right to Know Ingredient Disclosure

	Proprietary Polyacrylate Copolymer - NJ801416030
	Proprietary Polycarboxylate - NJ 801415092
	Proprietary Copolymer - NJTSN801416055
7732-18-5	Water

California Proposition 65

Chemicals known to cause cancer:

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

Chemicals known to cause developmental toxicity:

None of the ingredients is listed.

Carcinogenicity Categories

EPA (Environmental Protection Agency)

None of the ingredients is listed.

TLV-ACGIH (THE American Conference of Governmental Industrial Hygienists)**Human Carcinogen - A1 Confirmed, A2 Suspected, A3 Unknown Relevance, A4 Not Classifiable**

None of the ingredients is listed.

NIOSH-Cancer (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

Volatile Organic Compounds (VOC) reported per the Emission Standards.

If no g/L value is provided this product is not subject to above standard.

*

16 Other information

"The data included herein are presented in accordance with various environment, health and safety regulations. It is the responsibility of a recipient of the data to remain currently informed on chemical hazard information, to design and update its own program and to comply with all national, federal, state and local laws and regulations applicable to safety, occupational health, right-to-know and environmental protection."

Date of preparation / last revision 04/07/2015 / 1.2

The first date of preparation 10/11/2006

Number of revision times and the latest revision date 1.3 / 04/07/2015

USGHS

Section 1 - IDENTIFICATIONSupplier/Manufacturer

Federal White Cement
P.O. Box 1609
Woodstock, Ontario
Canada N4S 0A8

Emergency Contact Information

Main Offices: (519) 485-5410
Sales: (800) 265-1806
Fax: (519) 485-5892
Website: www.federalwhitecement.com

Chemical Name and Synonyms

White Portland Cement (CAS #65997-15-1)
(Also known as Hydraulic cement)

Product Name

Federal White Cement
Portland – Type I, Type GU

Chemical Family

Calcium salts.

Formulas

3CaO.SiO ₂	(CAS #12168-85-3)
2CaO.SiO ₂	(CAS #1003-77-2)
3CaO.A1 ₂ O ₂	(CAS #12042-78-3)
4CaO.A1 ₂ O ₃ Fe ₂ O ₃	(CAS #12068-35-8)
CaSO ₂ 2H ₂ O	(CAS #13397-24-5)

Other salts.

Small amounts of MgO, CaO and trace amounts of K₂SO₄ and Na₂SO₄ may also be present.

Section 2 - COMPONENTS Hazardous

Portland cement clinker (CAS #65997-15-1) - approximately 92 -97% by weight

ACGIH TLV-TWA (1996) = 10 mg total dust/m³

OSHA PEL (8-hour TWA) 15 mg total dust/m³

OSHA PEL (8-hour TWA) 5 mg respirable dust/m³

Gypsum (CAS #13397-24-5) - approximately 3.0--5.0% by weight

ACGIH TLV-TWA (1996) = 10 mg total dust/m³

OSHA PEL (8-hourTWA) = 10 mg total dust/m³

OSHA PEL (8-hour TWA) = 5 mg respirable dust/m³

Respirable quartz (CAS #14808-60-7) - approximately 0.01 --0.07% by weight

ACGIH TLV-TWA (1996) = 0.10 mg respirable dust/m³

OSHA PEL (8-hour TWA) = (10 mg respirable dust/m³(percent silica + 2))

NIOSH REL (8-hour TWA) = 0.05 mg respirable dust/m³

Chromates(CAS Various) - approximately 0—0.005% by weight

ACGIH TLV-TWA (1996) = 0.05 mg (Cr)/m³

OSHA PEL (8-hourTWA) = 0.1 mg (CrO3)/m³

Nuisance dust

ACGIH TLV-TWA (1996) = 5 mg respirable dust/m³

ACGIH TLV-TWA (1996) = 10 mg total dust/m³

OSHA PEL (8-hour TWA) = 15 mg total dust/m³

OSHA PEL (8-hour TWA) = 5 mg respirable dust/m³

Trace Ingredients

Trace amounts of naturally occurring chemicals might be detected during chemical analysis. Trace constituents may include up to 0.75% insoluble residue, some of which may be free crystalline silica, calcium oxide (also known as lime or quick lime), magnesium oxide, sodium sulfate, chromium compounds, and nickel compounds.

Section 3 - HAZARD IDENTIFICATIONEmergency Overview

Portland cement is a white powder that poses immediate hazard. A single short-term exposure to the dry powder is not likely to cause serious harm. However, exposure of sufficient duration to wet portland cement can cause serious, potentially irreversible tissue (skin or eye) destruction in the form of chemical (caustic) burns. The same type of tissue destruction can occur if wet or moist areas of the body are exposed for sufficient duration to dry portland cement.

Potential Health Effects**Relevant Routes of Exposure**

Eye contact, skin contact, inhalation, and ingestion.

Effects Resulting from Eye Contact:

Exposure to airborne dust may cause immediate or delayed irritation or inflammation. Eye contact by large amounts of dry powder or splashes of wet portland cement may cause effects ranging from moderate eye irritation to chemical burns or blindness. Such exposures require immediate first aid (See Section 4) and medical attention to prevent significant damage to the eye.

Effects Resulting from Skin Contact:

Discomfort or pain cannot be relied upon to alert a person to hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly with wet cement. Exposed persons may not discomfort until hours after the exposure has ended and significant injury has occurred.

Dry portland cement contacting wet skin or exposure to moist or wet masonry cement may cause more severe skin effects including: thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe damage in the form of (alkali) chemical burns.

Some individuals may exhibit an allergic response upon exposure to portland cement, possibly due to trace elements of chromium. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to their first contact with the product. Other persons may first experience this effect after years of contact with portland cement products.

Effects Resulting from Inhalation:

Portland cement may contain trace amounts of free crystalline silica. Prolonged exposure to respirable free silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease.

Exposure to portland cement may cause irritation to the moist mucous membranes of the nose, throat, and upper respiratory system. It may also leave unpleasant deposits in the nose.

Effects Resulting from Ingestion:

Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Portland cement should not be eaten.

Carcinogenic potential:

Portland cement is not listed as a carcinogen by NTP, OSHA, or IARC. It may however, contain trace amounts of substances listed as carcinogens by these organizations.

Crystalline silica, a contaminate in portland cement, is now classified by IARC as a known human carcinogen (Group I). NTP has characterized respirable silica as "reasonably anticipated to be a] carcinogen".

Medical conditions which may be aggravated by inhalation or dermal exposure:

Pre-existing upper respiratory and lung diseases.

Unusual (hyper) sensitivity to hexavalent (chromium+6) salts.

Section 4 - FIRST AID**Eyes:**

Immediately flush eyes thoroughly with water. Continue flushing for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

Skin:

Wash skin with cool water and pH-neutral soap or mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, or liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

Inhalation of Airborne Dust:

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

Ingestion:

Do not induce vomiting. If conscious, have the victim drink plenty of water, and call a physician immediately.

Section 5-- FIRE AND EXPLOSION DATA

Flash point	None	Lower explosive limit	None
Upper explosive limit	None	Auto ignition temperature	Not Combustible
Extinguishing media	Not Combustible	Special Fire-fighting procedures	None
Hazardous combustion products	None	Unusual fire & explosion hazards	None

Section 6-ACCIDENTAL RELEASE MEASURES

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate protective equipment as described in **Section 8**.

Scrape up wet material and place in an appropriate container. Allow material to "dry" before disposal. Do not attempt to wash masonry cement down drains.

Dispose of waste material according to local, state and federal regulations.

Section 7 - HANDLING AND STORAGE

Keep portland cement dry until used. Normal temperatures and pressure do not affect the material.

Promptly remove dusty clothing or clothing which is wet with cement fluids and launder before reuse. Wash thoroughly after exposure to dust or wet cement mixtures or fluids.

Section 8-- EXPOSURE CONTROLS/PERSONAL PROTECTION**Skin Protection**

Prevention is essential in avoiding potentially severe skin injury. Avoid contact with unhardened portland cement. If contact occurs, properly wash affected area with soap and water. Where prolonged exposure to unhardened portland cement products might occur, wear impervious clothing and gloves to eliminate skin contact. Wear sturdy boots that are impervious to eliminate foot and ankle exposure.

Do not rely on barrier creams. Barrier creams should not be used in place of gloves.

Periodically wash areas contacted by dry portland cement, or by wet cement or concrete fluids, with a pH-neutral soap. Wash again at the end of work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet cement, it should be removed and replaced with clean, dry clothing.

Respiratory Protection:

Avoid actions that cause dust to become airborne. Use local or general ventilation to control exposures below applicable exposure limits

[Respiratory Protection – Cont'd.]

Use NIOSH/MSHA-approved (under 30 CFR 11) or NIOSH-approved (under 42 CFR 84) respirators in poorly ventilated areas, if an applicable exposure limit has been exceeded, or when dust causes discomfort or irritation. (Advisory: Respirators and filters purchased after **June 10, 1998** must be certified under 42 CFR 84).

Ventilation:

Use local exhaust or general dilution ventilation to control exposure within applicable limits.

Eye Protection:

Where potentially subject to splashes or puffs of cement, wear safety glasses with side shields or goggles. In extremely dusty environments and unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with portland cement or fresh cement products.

Section 9-- PHYSICAL AND CHEMICAL PROPERTIES

Appearance	White powder	Odor	No distinct odor
Physical State	Solid (powder)	pH in water	12 to 13
Solubility in water	Slightly soluble (0.1 to 1.0%)	Vapor pressure	Not applicable
Vapor density	Not applicable	Boiling point	Not applicable
Melting point	Not applicable	Specific gravity(H ₂ O=1)	3.10—3.15
Evaporation point	Not applicable		

Section 10--STABILITY AND REACTIVITY**Stability:**

Stable.

Conditions to Avoid:

Unintentional contact with water.

Incompatibility:

Wet portland cement is alkaline. As such it is incompatible with acids, ammonium salts, and phosphorus.

Hazardous Decomposition:

Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide.

Hazardous Polymerization:

Will not occur.

Section 11--TOXICOLOGICAL INFORMATION

For a description of available, more detailed toxicological information, contact the supplier or manufacturer.

Section 12- ECOLOGICAL INFORMATION**Ecotoxicity:**

No recognized unusual toxicity to plants or animals.

Relevant Physical and Chemical Properties:

(See Sections 9 and 10)

Section 13-- DISPOSAL

Dispose of waste material according to local, state and federal regulations. (Since portland cement is stable, uncontaminated material may be saved for future use.).

Dispose of bags in an approved landfill or incinerator.

Section 14- TRANSPORTATION DATA**Hazardous Materials Description/ Proper Shipping Name:**

Portland cement is not hazardous under U.S. Department of Transportation (DOT) regulations.

Hazard Class:

Not applicable.

Identification Number:

Not applicable.

Required Label Text:

Not applicable.

Hazardous Substances/ Reportable Quantities(RQ):

Not applicable.

Section 15-OTHER REGULATORY INFORMATION**Status under USDOL-OSHA & MSHA Hazard Communication Rule 29 CFR 1920.1200:**

Portland cement is considered a hazardous chemical" under this regulation, and should be part of any hazard communication program.

Status under CERCLA/SUPERFUND 40 CFR 117 and 302:

Not listed.

Hazard Category under SARA (Title III).Section.311 and 312:

Portland cement qualifies as a hazardous substance with delayed health effects.

Status under SARA (Title III).Section 313:

Not subject to reporting requirements under Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR Part 372 in concentrations above de minimis levels.

Status under TSCA:

Some substances in portland cement are on the TSCA inventory list.

Status under the Federal Hazardous Substances Act:

Portland cement is a "hazardous substance" subject to statutes promulgated under the subject act.

Status under California Proposition 65:

This product contains up to 0.05% (percent) of chemicals (trace elements) known to the State of California to cause cancer, birth defects, or other reproductive harm. California law requires the manufacturer to give the above warning in the absence of definitive testing to prove that the defined risks do not exist.

Section 16-OTHER INFORMATION**Status under Canadian Environmental Protection Act:**

On DSL List.

Status under WHMIS:

Portland cement is considered a hazardous material under the Hazardous Products Act, as defined by the Controlled Products Regulations (Class E - Corrosive Materials) and is therefore subject to the labeling and MSDS requirements of the Worldwide Hazardous Materials Information System (WHMIS).

ABBREVIATIONS

ACGIH	American Conference of Government Industrial Hygienists
CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
DOT	Department of Transportation
IARC	International Agency for Research
m ³	Cubic Meter
mg	Milligrams
mm	Millimeter
MSHA	Mine Safety and Health Administration

NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
SARA	Superfund Amendments and Reauthorization Act
TLV	Threshold Limit Value
TWA	Time Weighted Average
WHMIS	Workplace Hazardous Material Information System

Prepared by:

Bernard J. Igusky,
Manager Marketing and Technical Services

Approval Date or Revision Date:

April, 2008.

Date of Previous MSDS:

December, 2002.

Other Important Information:

Portland cement should be used by knowledgeable persons. A key to using the product safely requires the user to recognize that portland cement chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while a portland cement product is setting) pose a more severe hazard than does dry portland cement itself.

While the information provided in this material safety data sheet is believed to provide a useful summary of the hazards of portland cement as it is commonly used, the sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY Federal White Cement except that the product shall conform to contracted specifications. The information provided herein was believed by Federal White Cement to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information to comply with all laws and procedures applicable to the safe handling and use of the product, and to determine the suitability of the product for its intended use. Buyer's exclusive remedy shall be for damages and no claim of any kind, whether as to product delivered or nondelivery of product, and whether based on contract, breach of warranty, negligence, or otherwise shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with portland cement to produce portland cement products. Users should review other relevant material safety data sheets before working with this portland cement or working with portland cement products, for example, portland cement concrete.



MAIN OFFICE: 2024 South Lenox Street • Milwaukee, WI 53207 SALES OFFICE: 5409 West Woolworth Avenue • Milwaukee, WI 53218
PHONE: (414) 769-2580 • (800) 657-0737 **FAX:** (414) 769-2585

RE: ASTM C-979 – Standard Specification for Integrally Colored Concrete

Date: 6/20/12

Dynamic Color Solutions, Inc. pigments have been tested and pass ASTM C-979 – Standard Specification for Integrally Colored Concrete. We would be pleased to provide the supporting test documentation upon request.

Please contact us at (800) 657-0737 if you have any questions or need additional information.

Yours Sincerely,
Dynamic Color Solutions, Inc.

Cathy Higgins
Vice President, Sales



M A T E R I A L S A F E T Y D A T A S H E E T

Product Code: 2182-0050-BAG
Product Name: #2182 Brushed Buff 50 lb Bag

Page 1 of 3

HMIS CODES: H F R P
1*1 1 E

SECTION I - MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: Dynamic Color Solutions, Inc.
ADDRESS: 2024 S. Lenox Street
Milwaukee, WI 53207
EMERGENCY PHONE : 414-769-2580
INFORMATION PHONE : 414-769-2580
DATE PRINTED : 10/3/2008
APPROVED BY: Cathy Higgins

SECTION II - HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE mm Hg @ TEMP	WEIGHT PERCENT
* Natural Iron Oxide #548 Ochre	1343-81-3		Range Not Found
Ochre is goethite, a naturally occurring inorganic iron oxide. Components present at levels greater than 1% are: HF2O2 52-63% CAS1310-14-1 SiO2 CrystallineSilica20-29% CAS 14808-60-7 MnO2 1.5-4.0% CAS 1313-13-9 OSHA Hazardous Components Exposure Limts 8 Hrs TWA SiO2 OSHA-PEL 0.1 mg/m3 ACGIH-TLV 0.1 mg/m3 OSHA PEL may vary depending on concentration 29GFR1910.1000 Table Z3			
Limestone;Whiting;Calcium Carbonate	1317-65-3		NON HAZARDOUS
Limestone ACGIH TLV: Total dust 10.0 mg/m3 OSHA Total dust 15 mg/m3 TWA Respirable dust 5 mg/m3 TWA Calcium Carbonate 471-34-1 95-98% Crystalline Silica, 14808-60-7 .8% ACGIH TLV: .01 mg/m3 respirable Magnesium Carbonte 546-93-0 1-2% OSHA PEL: .1 mg/m3 respirable TWA			
Iron Oxide Black	1317-61-9		NON HAZARDOUS
Iron OxideBlack 1317-61-9 99% OSHA PEL 10 mg/mg3 ACGIH TLV mg/m3 LD50Greatr than 24,000 mg/kg(rat-oral) SiliconeDioxideAmorphous (SilicaAmorphous) 112926-00-8 1& max OSHA PEL 6mg/m3 ACHIHTLV 10mg/m3 LC50 1,000 mg/mg3 (Lab Animals Inhalative) OSHA PEL May vary depending on concentration. 29GFR1910.1000 Table Z3			

*** No toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372 are present. ***

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE: N/A
SPECIFIC GRAVITY (H2O=1): 3.1704
VAPOR DENSITY: N/A
EVAPORATION RATE: N/A
COATING V.O.C.: 0.0 lb/gl
MATERIAL V.O.C.: 0.0 lb/gl
SOLUBILITY IN WATER: Insoluble
APPEARANCE (SOLID, LIQUID, GAS) AND ODOR: Solid-Powder, Odorless

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: N/A
METHOD USED: N/A

M A T E R I A L S A F E T Y D A T A S H E E T



M A T E R I A L S A F E T Y D A T A S H E E T

Product Code: 2182-0050-BAG
Product Name: #2182 Brushed Buff 50 lb Bag

Page 3 of 3

Ingestion: If conscious, give large amounts of water to induce vomiting. Get medical attention.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Material can be handled as normal solid waste; scoop up and place in waste container.

WASTE DISPOSAL METHOD

Waste material can be buried in an approved landfill or handled as inert waste in accordance with Federal, State and local environmental regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store dry at ambient temperatures away from food and drink.

OTHER PRECAUTIONS

None

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION

Type 3M or equal; NIOSH, OSHA approved.

VENTILATION

Local exhaust to remove airborne dust.

PROTECTIVE GLOVES

Rubber, cloth or plastic.

EYE PROTECTION

Safety glasses.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

None

WORK/HYGIENIC PRACTICES

In accordance with good industrial hygiene practice, avoid contact with skin, eyes or clothing. Avoid breathing dust. Keep away from food products. Keep containers closed when not in use. Use with adequate ventilation. Wash thoroughly after handling and before eating, drinking, or using any tobacco products.

SECTION IX - DISCLAIMER

The data on this sheet refers only to the specific material designated herein and is accurate to the best knowledge of Dynamic Color Solutions, Inc. It is furnished without warranty, expressed or implied. Dynamic Color Solutions, Inc. assumes no legal responsibility for use of or reliance upon this data.

NORTH ALABAMA SAND & GRAVEL, LLC
P.O. BOX 1045
DECATUR, ALABAMA 35602
DECEMBER 21, 2005
Material Safety Data Sheet
May be used to comply with
OSHA'S Communication Standard
29 CFR 1910.1200. Standard
Must be consulted for specific requirements.
IDENTITY – SILICA SAND & GRAVEL
SECTION I

Manufacturer's Name: North Alabama Sand & Gravel, LLC
Manufacturer's Address: 118 East Moulton Street Suite 2
Decatur, Alabama 35601
Emergency Phone Number: (800) 721-7263

MSDS Table of Contents

1. Chemical Product and Company Identification
2. Composition/Information on Ingredients
3. Hazards Identification
4. First Aid Measures
5. Fire Fighting Measures
6. Accidental Release Measures
7. Handling and Storage
8. Exposure Controls/Personal Protection
9. Physical and Chemical Properties
10. Stability and Reactivity
11. Toxicological Information
12. Ecological Information
13. Disposal Consideration
14. Transport Information
15. Regulatory Information
16. Other Information

Material Safety Data Sheet

NATURAL SAND

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: **Natural Sand Products**
General or Generic ID: **Natural Sand**
Company Name: **North Alabama Sand & Gravel, LLC**
Address: **118 E. Moulton Street, Suite 2, Decatur, Alabama 35601**
Emergency Phone: **(800) 721-SAND**

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s) CAS Number % (by weight)

NATURAL SAND 100.0

Sand is a natural substance and its composition varies considerably depending upon the geographical location of the rock. The main mineral in sand is quartz (CAS Number 14808-60-7). The quartz content varies but is typically in the range of 75-95 percent.

from respiratory and/or heart failure. Symptoms include coughing and difficult breathing which becomes worse with physical activity. Another

form of fibrosis, acute silicosis, can occur with exposures to very high concentrations of respirable silica over a short period of time, sometimes as short as a few months. Symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis is fatal.

Symptoms of Exposure

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include: irritation (nose, throat, airways).

Target Organ Effects

Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans: chronic bronchitis, emphysema, kidney damage.

Developmental Information

There are no data available for assessing risk to the fetus from maternal exposure to this material.

Cancer Information

The International Agency for Research on Cancer (IARC) and the National Toxicology Program have determined that there is sufficient evidence in humans for the carcinogenicity of inhaled crystalline silica in the form of quartz or cristobalite. In addition, IARC has determined that there is sufficient evidence for the carcinogenicity of quartz and cristobalite in experimental animals. Among individuals with silicosis, lung cancer occurs more frequently in those who smoke.

Other Health Effects

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of immunologic disorders and autoimmune diseases such as scleroderma (a disorder manifested by fibrosis of the lungs, skin and other internal organs), systemic lupus erythematosus and sarcoidosis (chronic inflammatory diseases).

Primary Route(s) of Entry

Inhalation, Skin contact, Eye contact.

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

crystalline silica in the form of quartz or cristobalite. In addition, IARC has determined that there is sufficient evidence for the carcinogenicity of quartz and cristobalite in experimental animals. Among individuals with silicosis, lung cancer occurs more frequently in those who smoke.

Other Health Effects

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of immunologic disorders and autoimmune diseases such as scleroderma (a disorder manifested by fibrosis of the lungs, skin and other internal organs), systemic lupus erythematosus and sarcoidosis (chronic inflammatory diseases).

Primary Route(s) of Entry

Inhalation, Skin contact, Eye contact.

4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate

Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing

First aid is not normally required. If symptoms develop, seek medical attention.

Inhalation

If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.

Note to Physicians

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: lung (for example, asthma-like conditions), kidney. Silicosis predisposes the individual to the development of mycobacterial infections including tuberculosis or to fungal infections. This is most likely to occur after the age of 50 and in association with moderate to severe silicosis.

5. FIRE FIGHTING MEASURES**Flash Point**

Not applicable

Explosive Limit

No data

Autoignition Temperature

No data

Hazardous Products of Combustion

No data

Fire and Explosion Hazards

No data

Extinguishing Media

No data

Fire Fighting Instructions

No data

NFPA Rating

Health - 1, Flammability - 1, Reactivity - 0

6. ACCIDENTAL RELEASE MEASURES**Small Spill**

Minimize dust by wetting down spilled material. Sweep up material.

Large Spill

Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Minimize dust by wetting down spilled material. Sweep up spilled material.

7. HANDLING AND STORAGE**Handling**

Minimize dust exposure. Use wet methods to reduce dust exposure.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**Eye Protection**

Wear safety glasses in compliance with OSHA regulations. (Consult your safety representative.)

Skin Protection

Wear normal work clothing covering arms and legs. If manual handling of material occurs, wear gloves to protect skin from cuts and scrapes.

Respiratory Protection

If overexposure occurs, a NIOSH-approved respirator with a particulate filter is advised in absence of proper engineering control.

Engineering Controls

Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).

Exposure Guidelines

Component

NATURAL SAND OR GRAVEL

No exposure limits established

QUARTZ (14808-60-7)

OSHA VPEL 0.100 mg/m³ - TWA respirable dust

ACGIH TLV 0.025 mg/m³ - TWA

9. PHYSICAL AND CHEMICAL PROPERTIES**Boiling Point**

No data

Vapor Pressure

No data

Specific Vapor Density
No data

Specific Gravity
2.619 – 2.63 @ 75° F

Liquid Density
No data

Percent Volatiles
No data

Evaporation Rate
No data

Appearance
Light Colored Sand

State
SOLID

Physical Form
ANGULAR OR ROUND PARTICLES

Color
White

Odor
NONE

pH
No data

10. STABILITY AND REACTIVITY

Hazardous Polymerization
No data

Hazardous Decomposition
No data

Chemical Stability
No data

Incompatibility

Avoid contact with: chlorine trifluoride, fluorine, hydrofluoric acid, manganese trifluoride, oxygen difluoride, strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information

Dispose of in accordance with all applicable local, state and federal regulations.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101

DOT Description:

NON-REGULATED BY D.O.T.

RQ (Reportable Quantity) - 49 CFR 172.101

Not applicable

15. REGULATORY INFORMATION

US Federal Regulations

CERCLA RQ - 40 CFR 302.4(a)

None listed

SARA 302 Components - 40 CFR 355 Appendix A

None

Section 311/312 Hazard Class - 40 CFR 370.2

Immediate(X) Delayed(X) Fire () Reactive () Sudden Release of Pressure ()

SARA 313 Components - 40 CFR 372.65

None

OSHA Process Safety Management 29 CFR 1910

None listed

EPA Accidental Release Prevention 40 CFR 68

None listed

International Regulations

Inventory Status

Not determined

16. OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

Last page

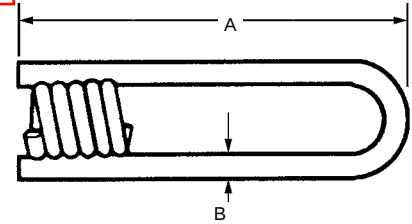
Lifting/Handling Inserts and Accessories



These generic sheets of inserts are only included to show what could potentially be used in precast and cast stone pieces. It does NOT necessarily mean they will be used on this project.

B-16 Straight Coil Loop Insert

Although simple in design and fabrication, the B-16 Straight Coil Loop Insert is highly efficient for lifting and handling precast concrete elements. Standard inserts are shown in the chart. Special inserts for use with larger diameter coil bolts, or with loops having longer lengths and of heavier wire can be furnished, if required, on special order.



B-16 Straight Coil Loop Insert

B-16 Straight Coil Loop Insert Selection Chart							
Bolt Diameter	Insert Length	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	A	B
1/2"	3"	2"	5"	810 lbs.	200 lbs.	3"	0.223"
		3"	5"	1,310 lbs.	325 lbs.		
		5"	10"	1,950 lbs.	1,050 lbs.		
		10"	10"	1,950 lbs.	1,350 lbs.		
1/2" or 3/4"	4"	2"	5"	1,190 lbs.	200 lbs.	4"	0.223"
		3"	5"	1,910 lbs.	325 lbs.		
		5"	10"	1,950 lbs.	1,050 lbs.		
		8"	10"	1,950 lbs.	2,250 lbs.		
1/2" 3/4" or 1"	6"	2"	7"	1,420 lbs.	225 lbs.	6"	0.306"
		3"	7"	2,240 lbs.	425 lbs.		
		5"	7"	3,600 lbs.	775 lbs.		
		12"	12"	3,600 lbs.	3,600 lbs.		

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) length, (5) finish.

Example:

200, B-16 Straight Coil Loop Inserts, 1/2" dia. X 6" long, electro-plated finish.

Safe Working Loads are based on 1/2" setback from face of concrete.

Safe Working Load provides a factor of safety of approximately 4 to 1 in 3,000 psi normal weight concrete.

Note: Dayton Superior does not recommend the use of 1/2" diameter bolts for lifting/handling of precast panels.

B-17 Double Flared Coil Loop Insert

The safe working load of the B-17 Double Flared Coil Loop Insert is greatly increased over that of a B-18 Single Flared Coil Loop. This increase in capacity is achieved by welding a second loop to the same coil. By adding the additional loop, it doubles the cross-sectional area of steel embedded in the concrete and at the same time, increases the area of the shear cone.

The design of the B-17 insert leaves an open space between the two loops, allowing the B-17 insert to "straddle" reinforcing steel or prestressing strands.

Standard sizes are shown in the chart and other sizes are available on special order.

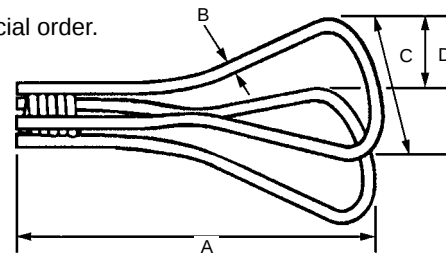
Minimum spacing between inserts is twice the minimum corner distance.

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) length, (5) finish.

Example:

400, B-17 Double Flared Coil Loop Inserts, 1-1/4" dia. X 12-3/8" long, plain finish.



B-17 Double Flared Coil Loop Insert

B-17 Double Flared Coil Loop Insert Selection Chart									
Bolt Diameter	Insert Length	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	A	B	C	D
1" 1-1/4" or 1-1/2"	12-3/8"	5"	15"	4,910 lbs.	2,780 lbs.	12-3/8"	0.375"	5-9/16"	5-9/16"
		9"	15"	9,500 lbs.	6,720 lbs.				
		12"	18"	9,500 lbs.	9,500 lbs.				
		18"	27"	9,500 lbs.	9,500 lbs.				
1" 1-1/4" or 1-1/2"	12-1/2"	5"	15"	4,950 lbs.	2,940 lbs.	12-1/2"	0.440"	5-3/4"	5-3/4"
		9"	15"	9,810 lbs.	7,120 lbs.				
		12"	18"	11,150 lbs.	10,960 lbs.				
		18"	27"	13,500 lbs.	13,500 lbs.				

Safe Working Loads are based on 1/2" setback from face of concrete.

Safe Working Load provides a factor of safety of approximately 4 to 1 in 3,000 psi normal weight concrete.

Lifting/Handling Inserts and Accessories



These generic sheets of inserts are only included to show what could potentially be used in precast and cast stone pieces. It does NOT necessarily mean they will be used on this project.

F-63 Flared Thin Slab Coil Insert

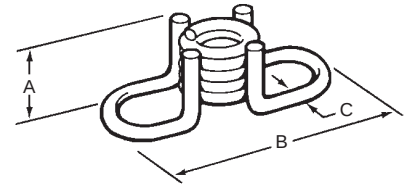
The Dayton Superior F-63 Flared Thin Slab Coil Insert is designed for use in very thin slabs or other conditions where a longer insert cannot be used. Inserts should be set back 1/2" from the surface of the concrete, maintaining at least 3/4" of concrete below the insert. Minimum spacing between inserts is twice the minimum corner distance.

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) height, (5) finish.

Example:

200, F-63 Flared Thin Slab Coil Inserts, 1" dia. x 4-1/2" plain finish.



F-63 Flared Thin Slab Coil Insert

F-63 Flared Thin Slab Coil Insert Selection Chart

Bolt Diameter	Insert Height	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	A	B	C
1/2"	1-3/4"	6"	6"	1,520 lbs.	1,090 lbs.	1-3/4"	4-1/8"	0.223"
3/4"	2-5/16"	8"	8"	2,170 lbs.	1,640 lbs.	2-5/16"	4-7/8"	0.306"
3/4"	3-1/2"	9"	9"	3,570 lbs.	2,600 lbs.	3-1/2"	4-7/8"	0.306"
1"	2-5/16"	8"	8"	2,460 lbs.	1,970 lbs.	2-5/16"	5-1/4"	0.306"
1"	4-1/2"	12"	12"	5,280 lbs.	4,000 lbs.	4-1/2"	5-1/4"	0.306"

Safe Working Load provides a factor of safety of approximately 4 to 1 in 3,000 psi normal weight concrete.

Note: Dayton Superior does not recommend the use of 1/2" diameter bolts for lifting/handling of precast panels.

F-65 Type L Coil Insert

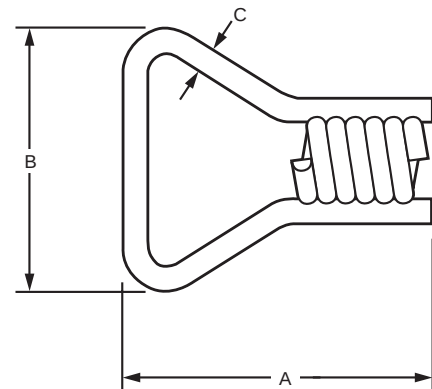
The Dayton Superior F-65 Type L Coil Insert is designed for use in lifting and handling lightweight precast concrete elements. Inserts should be set back 1/2" from the surface of the concrete. Minimum spacing between inserts is twice the minimum corner distance.

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) finish.

Example:

200, F-65, Type L Coil Inserts, 1/2" diameter, plain finish.



F-65 Type L Coil Insert

F-65 Type L Coil Insert Selection Chart

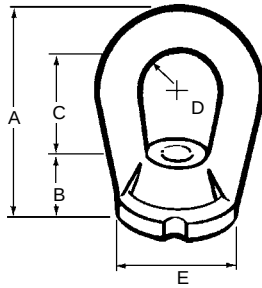
Bolt Diameter	Insert Length	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	A	B	C
1/2"	4"	2-1/2"	10"	1,150 lbs.	530 lbs.	4"	2-3/8"	0.223"
		5"	10"	2,250 lbs.	1,230 lbs.			
		8"	12"	2,250 lbs.	1,980 lbs.			
3/4"	4"	2-1/2"	10"	1,140 lbs.	600 lbs.	4"	3-3/8"	0.306"
		5"	10"	2,630 lbs.	1,400 lbs.			
		8"	12"	3,520 lbs.	2,250 lbs.			

Safe Working Load provides a factor of safety of approximately 4 to 1 in 3,000 psi normal weight concrete.

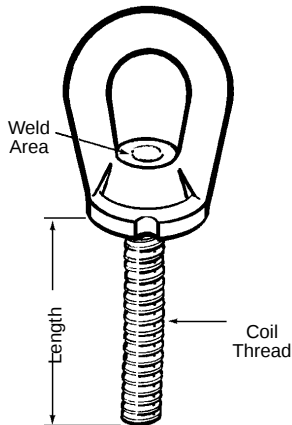
Note: Dayton Superior does not recommend the use of 1/2" diameter bolts for lifting/handling of precast panels.

Lifting/Handling Inserts and Accessories

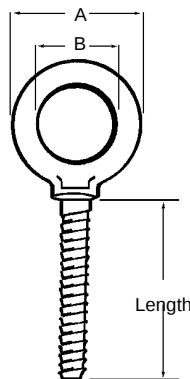
These generic sheets of lifting eyes are only included to show what could potentially be used in precast and cast stone pieces. It does NOT necessarily mean they will be used on this project.



F-48 Eye Nut



F-49 Eye Bolt



F-49-A Eye Bolt

F-48 Eye Nut, F-49 Eye Bolt and F-49-A Eye Bolt

The Dayton Superior F-48 Eye Nut is cast from ductile iron that meets ASTM Standard A-536 Grade 80-55-06. The eye nut is cast with coil threads and is intended to be used with B-12 Coil Rod that has been cut to the proper length. The use of the eye nut will eliminate the need to inventory several different lengths of eye bolts.

To make permanent length eye bolts, it is possible to weld lengths of coil rod to the casting. Since improper welding techniques can result in reduced safe working loads, Dayton Superior recommends that you contact your local welding supply house for proper welding instructions and techniques.

The F-49 Eye Bolt is an F-48 Eye Nut supplied with a specified length of coil rod that has been welded in place. In order to develop the F-49 eye bolt's rated load, the shoulder must be tightened securely against the face of the concrete.

The F-48 Eye Nut and F-49 Eye Bolt are intended for straight tensile loading only; pulling or lifting at an angle drastically reduces the safe working load and is not recommended.

F-48 Eye Nut and F-49 Eye Bolt Selection Chart						
Safe Working Load Tension	Coil Rod Diameter	Dimensions				
		A	B	C	D	E
2,700 lbs.	1/2"	3-1/4"	1"	1"	3/4"	2"
3,600 lbs.	3/4"	3-1/2"	1-1/4"	1"	3/4"	2"
7,200 lbs.	1"	5"	1-1/4"	1-3/4"	1"	3"
10,800 lbs.	1-1/4"	6-1/4"	1-1/2"	2-1/4"	1-1/4"	4"

Safe Working Load provides a factor of safety of approximately 5 to 1.

Note: Dayton Superior does not recommend the use of 1/2" diameter bolts for lifting/handling of precast panels.

To Order:

F-48 Eye Nut: Specify: (1) quantity, (2) name, (3) bolt diameter.

Example:

200, F-48 Eye Nuts, 1" dia. bolt.

To Order:

F-49 or F-49-A Eye Bolts: Specify: (1) quantity, (2) name, (3) bolt diameter, (4) length.

Example:

200, F-49 Eye Bolts, 1" dia. X 12" long.

The F-49-A Eye Bolt is a forged, carbon steel, one piece, shoulder pattern eye bolt.

It is available with 3/4" or 1" diameter coil threads and is stocked in 3-1/2" and 6" lengths. Longer lengths are available on special order.

In order to develop the F-49-A Eye Bolt's rated load, the shoulder must be tightened firmly against the face of the concrete. The eye bolt is intended for straight tensile loading only; pulling or lifting at an angle drastically reduces the safe working load and is not recommended. The F-49-A Eye Bolt meets material requirements of ASTM Standard A-489.

F-49-A Eye Bolt Selection Chart				
Bolt Diameter	Tension Safe Working Load	A	B	Length
3/4"	3,600 lbs.	2-7/8"	1-1/2"	3" or 6"
1"	6,400 lbs.	3-1/2"	1-3/4"	3"

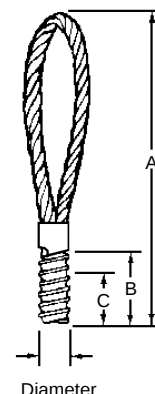
Safe Working Load provides a factor of safety of approximately 5 to 1.

P-21 Wire Rope Loop

The P-21 Dayton Superior Wire Rope Loop provides a fast method for handling precast items. Designed to work with 3/4" and 1" diameter coil inserts under straight tension loads only. Do not use under shear loading conditions, instead, use a swivel lift plate and coil bolt. With proper care, the wire rope loop can be reused. Visual evidence of any deterioration of the wire rope is a safety feature of this product.

Diameter x Type of Thread	Safe Working Load Tension	Loop Dimensions		
		A	B	C
3/4" Coil	5,200 lbs.	8-3/4"	2-1/2"	1-3/4"
1" Coil	8,000 lbs.	12"	3"	2-1/4"

Safe Working Load provides a factor of safety of approximately 5 to 1.



To Order:

Specify:
(1) quantity,
(2) name,
(3) diameter.

P-21 Wire Rope Loop

Lifting/Handling Inserts and Accessories

These generic sheets of coil bolts are only included to show what could potentially be used in precast and cast stone pieces. It does NOT necessarily mean they will be used on this project.

B-14 Coil Bolt

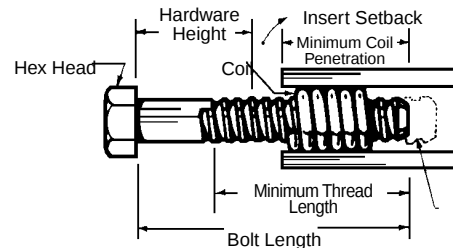
B-14 coil bolts are available in 1/2", 3/4", 1", 1-1/4" and 1-1/2" diameters with integrally formed heads, or fabricated with B-12 Coil Rod and B-25 Hex Nuts securely welded on.

Coil Bolts have fast-acting and self-cleaning threads. They can be reused, but will wear and must be regularly inspected for wear and damage. Keep bolts clean and lubricated at all times.

When determining the overall length of a coil bolt, you must consider:

- Height of hardware and/or formwork "grip".
- Insert Setback.
- Minimum coil penetration

The minimum coil penetration shown in the charts below, apply to all coil products. See page 99 for examples on determining proper bolt length.



To Order:

Specify: (1) quantity, (2) name, (3) diameter, (4) length, (5) type.

Example:

200, B-14 Coil Bolts, 1" dia. X 12" long, forged head.

B-14 Coil Bolts with Integrally Formed Hex Heads (Fabricated from Blanks Meeting ASTM A-307 Grade A)									
1/2" Diameter		3/4" Diameter		1" Diameter		1-1/4" Diameter		1-1/2" Diameter	
Forged Hex Head		Forged Hex Head		Forged Hex Head		Forged Hex Head		Forged Hex Head	
Safe Working Load		Safe Working Load		Safe Working Load		Safe Working Load		Safe Working Load	
Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
3,600 lbs.	2,400 lbs.	8,000 lbs.	5,300 lbs.	14,500 lbs.	9,600 lbs.	20,300 lbs.	13,500 lbs.	29,500 lbs.	19,600 lbs.
Minimum Coil Penetration 2"		Minimum Coil Penetration 2-1/4"		Minimum Coil Penetration 2-1/2"		Minimum Coil Penetration 2-1/2"		Minimum Coil Penetration 3"	
Bolt Length	Minimum Thread Length	Bolt Length	Minimum Thread Length	Bolt Length	Minimum Thread Length	Bolt Length	Minimum Thread Length	Bolt Length	Minimum Thread Length
3"	2-1/4"	3"	2-3/4"	3"	2-3/4"	3"	2-3/4"	—	—
4"	3-1/4"	4"	3-3/4"	4"	3-3/4"	4"	3-3/4"	4"	3-3/4"
5"	4-1/4"	5"	4-3/4"	5"	4-3/4"	5"	4-3/4"	5"	4-3/4"
6"	5"	6"	5-3/4"	6"	5-3/4"	6"	5-3/4"	6"	5-3/4"
Over 6"	5"	Over 6"	5-1/2"	Over 6"	5-1/2"	Over 6"	5-1/2"	Over 6"	5-1/2"

Safe Working Load provides a factor of safety of approximately 5 to 1.

Note: High strength coil bolts with integrally formed heads are available on special order. These bolts are fabricated from blanks meeting ASTM A-325 Standards.

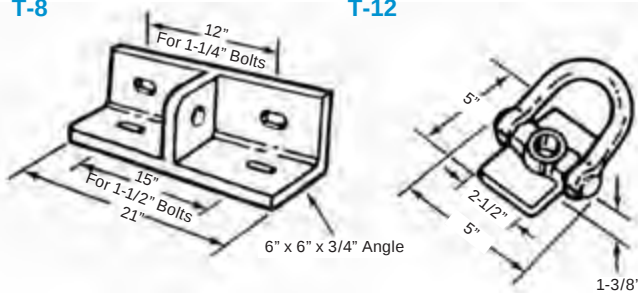
Coil Inserts

These generic sheets of lifting swivel plates are only included to show what could potentially be used in precast and cast stone pieces. It does NOT necessarily mean they will be used on this project.

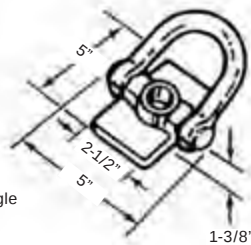
T-8 Lifting Angle

- Designed for use with T-2 Double Pick-Up Inserts.
- Shorter bolts are required than those used with swivel lifting plates, normally 4" lengths.
- May be used for face lifting inserts and also edge lifting inserts when panel thickness exceeds 6".
- Cut washers are required under head of all bolts.
- Made from structural steel angle 6" x 6" x 3/4" x 21" long with 1/2" diameter hole for clevis attachment.
- Safe working load is 18,000 lbs.

T-8



T-12



T-12 Swivel Lift Plate

- Designed for use with single pick-up inserts.
- Can be used for face lifting or edge lifting
- Available for use with 3/4" or 1" diameter bolts.
- Complete unit made of forged steel.
- Safe working loads: 3/4" diameter is 7,200 lbs. and 1" diameter is 9,000 lbs.

Type	Bolt Size	Bearing Plate
T-12	3/4" Diameter	1/2 x 2-1/2 x 5"
T-12	1" Diameter	1/2 x 2-1/2 x 5"

SWL provides a factor of safety of approximately 5 to 1.

Safety Notes

- All plates must have full bearing on flat, smooth surfaces
- Lifting angle and plates must not be used without a bolt fastener of sufficient strength to develop the required loads.
- Lifting angle and plates are to be used only with the bolt diameter for which they were designed. For example use a 3/4" bolt with a 3/4" Swivel Lifting Plate, do not use a 3/4" bolt with a 1", 1-1/4" or 1-1/2" T-12 Swivel Lifting Plate
- All plates must be securely fastened to the slabs.
- For exposed aggregate panels, a grout pad is required too provide for the bearing plate
- Coil bolt penetration must agree with minimums.

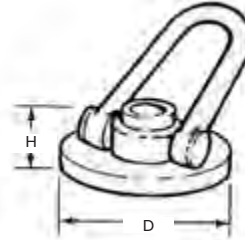
T-26 Double Swivel Lifting Plate

- Designed for use with 1", 1-1/4" and 1-1/2" diameter coil bolts.
- Rotates 360 degrees in horizontal plane and 180 degrees in vertical plane.
- Round bearing plate provides maximum safety when used with any coil bolt lifting system.
- Heavy forged bail is made of hi-strength material.
- Double swivel action allows bail to rotate in direction of applied load.
- Safe working load is 9,000 lbs. for 1" diameter.
- Safe working load is 13,500 for 1-1/4" and 1-1/2" diameter.

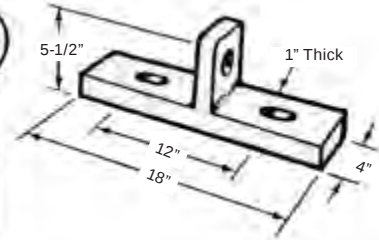
Type	Bolt Size	H	D
T-26	1" Diameter	2"	5"
T-26	1-1/4" or 1-1/2" Diameter	2-3/4"	7"

SWL provides a factor of safety of approximately 5 to 1.

T-26



T-27



T-27 Edge Lifting Plate

- Designed for use with T-3 or T-11 pick-up inserts.
- Made from structural steel plate 1" x 4" x 18" long.
- Cut washers are required under head of all bolts.
- For use with 3/4" or 1" diameter inserts.
- For panels 6" or more in thickness, use T-8.
- Safe working load is 8,800 lbs.

Warning! Never use T-27 with face inserts.

To Order:

T-12 or T-26: (1) Quantity, (2) Type, (3) Size

Example:

24 pcs., T-26 Double Swivel Lifting Plate for 1-1/4" bolts.

To Order:

T-8 or T-27: (1) Quantity, (2) Type, (3) Size

Example:

8 pcs., T-8 Lifting Angles.

Danger! Crane line loads & bails of swivel and double swivel lifting plates must be turned in direction of crane forces before lifting operations begin. Crane line loads must not be allowed to apply sideward loads to bails of Swivel Lifting Plates or Clevis Attachment Plates of Lifting Angle or Lifting Plate, as this condition is dangerous and could lead to failure of hardware.



Heckmann Building Products Inc.

1501 N. 31st Avenue
Melrose Park, IL 60160-2911
800-621-4140 or 708-865-2403 Fax: 708-865-2640
www.heckmannbuildingprods.com

These generic sheets of loose anchors are only included to show what could potentially be used for connections on precast and cast stone pieces. It does NOT necessarily mean BCS has been contracted to design and supply them on this project.

SUBMITTAL SHEET: #152-A L-TYPE STONE HALF-PIN ANCHOR

MADE TO ORDER:

Thickness of Strap: 1/4", 3/16", 1/8", 11 gage, 12 gage, & 16 gage.

Diameter of Pin: 1/4", 3/8", 1/2", 5/8"

Strap Width: 1-1/4" minimum recommended.

Length: Specify length of strap to i.d. of bend and overall length of pin. (Pin is usually 1-1/2" minimum length)

Bend Length: minimum 3/4" recommended (specify i.d. dimension)

Available in Stainless Steel, Hotdip Galvanized After Fabrication, Electro Galvanized After Fabrication, Mill galvanized (16ga - 11ga), or Plain Steel.

Specify Location of Pin from center of pin to end. 1/2" minimum of steel between end of anchor and start of hole is recommended.

Pin is usually welded in place.

Stainless Steel:

Sheet metal anchors and ties: ASTM A 167 AISI Type 304.

Plate and bent bar anchors: ASTM A 666 AISI Type 304.

Wire ties and anchors: ASTM A 580 AISI Type 304.

Hotdip Galvanized:

ASTM A 153 Class B-2: (1.50 oz/ ft²).(0.46kg/m²)

Mill Galvanized:

Sheet metal anchors and ties: ASTM A 653 G60

Wire: ASTM A 641 (0.1 oz/ ft².)

Plain Steel:

Sheet Metal anchors and ties: ASTM A 569, ASTM A 366.

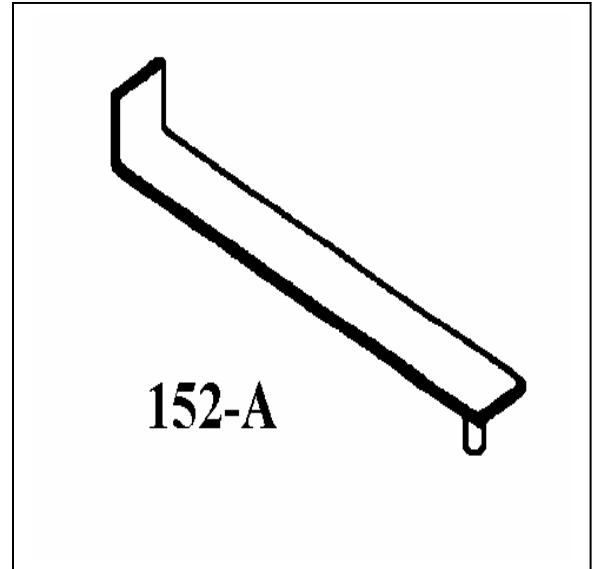
Plates, bars, and shapes: ASTM A 123, ASTM A 36.

Wire: ASTM A 82, ASTM A 82-95a.

Firewall Anchors:

Rolled Strip Zinc Alloy 710.

(Firewall alloy 1/8" and 16 gage only)



Approvals:

Comments:



Heckmann Building Products Inc.

1501 N. 31st Avenue

Melrose Park, IL 60160-2911

800-621-4140 or 708-865-2403 Fax: 708-865-2640

www.heckmannbuildingprods.com

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SUBMITTAL SHEET: #152 L-TYPE PIN ANCHOR

MADE TO ORDER:

Thickness of Strap: 1/4", 3/16", 1/8", 11 gage, 12 gage, & 16 gage.

Diameter of Pin: 1/4", 3/8", 1/2", 5/8"

Strap Width: 1-1/4" minimum recommended.

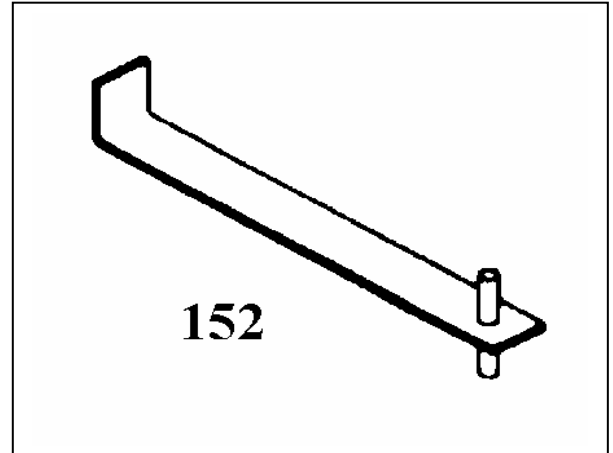
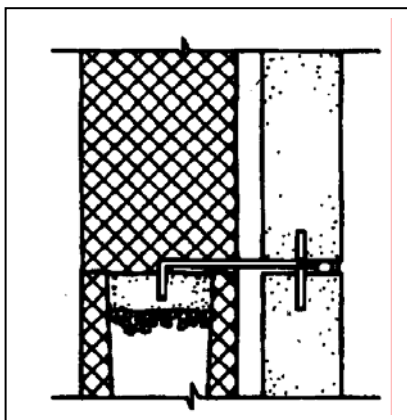
Length: Specify length of strap to i.d. of bend and overall length of pin.

Bend Length: minimum 3/4" recommended (specify i.d. dimension)

Available in Stainless Steel, Hotdip Galvanized After Fabrication, Electro Galvanized After Fabrication, Mill galvanized (16ga - 11ga), or Plain Steel.

Specify Location of Pin from center of pin to end. 1/2" minimum of steel between end of anchor and start of hole is recommended.

Pins are available loose or welded in place.



Stainless Steel:

Sheet metal anchors and ties: ASTM A 167 AISI Type 304.

Plate and bent bar anchors: ASTM A 666 AISI Type 304.

Wire ties and anchors: ASTM A 580 AISI Type 304.

Hotdip Galvanized:

ASTM A 153 Class B-2: (1.50 oz/ ft²)(0.46kg/m²)

Mill Galvanized:

Sheet metal anchors and ties: ASTM A 653 G60

Wire: ASTM A 641 (0.1 oz/ ft².)

Plain Steel:

Sheet Metal anchors and ties: ASTM A 569, ASTM A 366.

Plates, bars, and shapes: ASTM A 123, ASTM A 36.

Wire: ASTM A 82, ASTM A 82-95a.

Firewall Anchors:

Rolled Strip Zinc Alloy 710.

(Firewall alloy 1/8" and 16 gage only)

Approvals:

Comments:



Heckmann Building Products Inc.

1501 N. 31st Avenue

Melrose Park, IL 60160-2911

800-621-4140 or 708-865-2403 Fax: 708-865-2640

www.heckmannbuildingprods.com

These generic sheets of loose anchors are only included to show what could potentially be used for connections on precast and cast stone pieces. It does NOT necessarily mean BCS has been contracted to design and supply them on this project.

SUBMITTAL SHEET: #274 SCREW-ON SPLIT BEND ANCHOR

MADE TO ORDER

Thickness: 3/16", 1/8", 11 gage, 12 gage, & 16 gage.

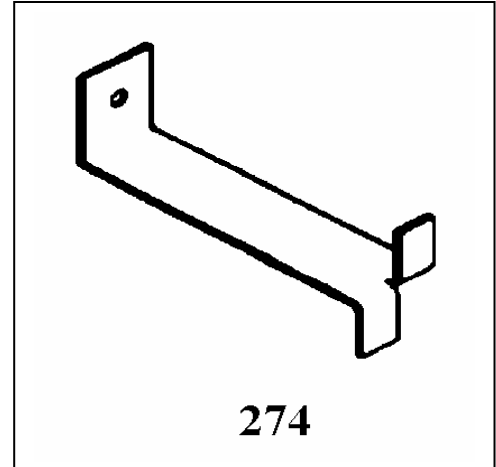
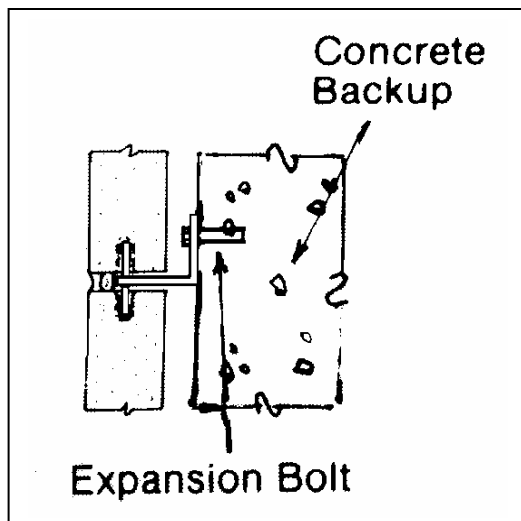
Strap Width: 1-1/4" minimum recommended.
Minimum width for 1/4" thick is 2" wide.

Length: Specify length as the inside dimensions between the bends.

Bend with Hole: 1" minimum recommended.
You should consider the overall length of the anchor and the height of the split bend to make sure there is enough room for the installer to get the screw and tool in place without interference from the split bend. Hole should be minimum of 1/16" larger than your screw size. (3/8" screw will use a 7/16" diameter hole).

Split Bend: Minimum 3/4" recommended (specify as i.d. dimension)

Available in Stainless Steel, Hotdip Galvanized After Fabrication, Electro Galvanized After Fabrication, or Plain Steel. Stainless Steel recommended for any exterior stone application.



Stainless Steel:

Sheet metal anchors and ties: ASTM A 167 AISI Type 304.

Plate and bent bar anchors: ASTM A 666 AISI Type 304.

Wire ties and anchors: ASTM A 580 AISI Type 304.

Hotdip Galvanized:

ASTM A 153 Class B-2: (1.50 oz/ ft²)(0.46kg/m²)

Mill Galvanized:

Sheet metal anchors and ties: ASTM A 653 G60

Wire: ASTM A 641 (0.1 oz/ ft².)

Plain Steel:

Sheet Metal anchors and ties: ASTM A 569, ASTM A 366.

Plates, bars, and shapes: ASTM A 123, ASTM A 36.

Wire: ASTM A 82, ASTM A 82-95a.

Firewall Anchors:

Roller Strip Zinc Alloy 710.

(Firewall alloy 1/8" and 16 gage only)

Approvals:

Comments:



Heckmann Building Products Inc.

1501 N. 31st Avenue
Melrose Park, IL 60160-2911

800-621-4140 or 708-865-2403 Fax: 708-865-2640

These generic sheets of loose anchors are only included to show what could potentially be used for connections on precast and cast stone pieces. It does NOT necessarily mean BCS has been contracted to design and supply them on this project.

SUBMITTAL SHEET: #275 SCREW-ON BENT ANCHOR (Available as a Z-Type #275-Z or a U-Type #275-U)

MADE TO ORDER

Thickness: 3/16", 1/8", 11 gage, 12 gage, & 16 gage.

Strap Width: 1-1/4" minimum recommended.

Length: Specify length as the inside dimensions between the bends.

Bend with Hole: 1" minimum recommended. You should consider the overall length of the anchor and the height of the bend to make sure there is enough room for the installer to get the screw and tool in place without interference from the U-Bend. Hole should be minimum of 1/16" larger than your screw size. (3/8" screw will use a 7/16" diameter hole).

Bend Length: Minimum 3/4" recommended (specify as i.d. dimension)

Available in Stainless Steel, Hotdip Galvanized After Fabrication, Electro Galvanized After Fabrication, or Plain Steel. Stainless Steel recommended for any exterior stone application.

Stainless Steel:

Sheet metal anchors and ties: ASTM A 167 AISI Type 304.

Plate and bent bar anchors: ASTM A 666 AISI Type 304.

Wire ties and anchors: ASTM A 580 AISI Type 304.

Hotdip Galvanized:

ASTM A 153 Class B-2: (1.50 oz/ ft²).(0.46kg/m²)

Mill Galvanized:

Sheet metal anchors and ties: ASTM A 653 G60

Wire: ASTM A 641 (0.1 oz/ ft².)

Plain Steel:

Sheet Metal anchors and ties: ASTM A 569, ASTM A 366.

Plates, bars, and shapes: ASTM A 123, ASTM A 36.

Wire: ASTM A 82, ASTM A 82-95a.

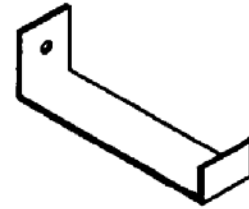
Firewall Anchors:

Rolled Strip Zinc Alloy 710.

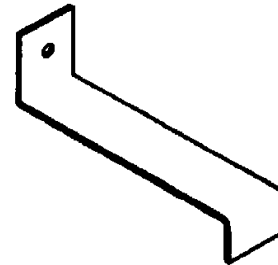
Firewall Anchors:

Rolled Strip Zinc Alloy 710.

(Firewall alloy 1/8" and 16 gage only)



275-U



275-Z

Approvals:

Comments:



Heckmann Building Products Inc.

1501 N. 31st Avenue

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www.heckmannbuildingprods.com

These generic sheets of loose anchors are only included to show what could potentially be used for connections on precast and cast stone pieces. It does NOT necessarily mean BCS has been contracted to design and supply them on this project.

SUBMITTAL SHEET:

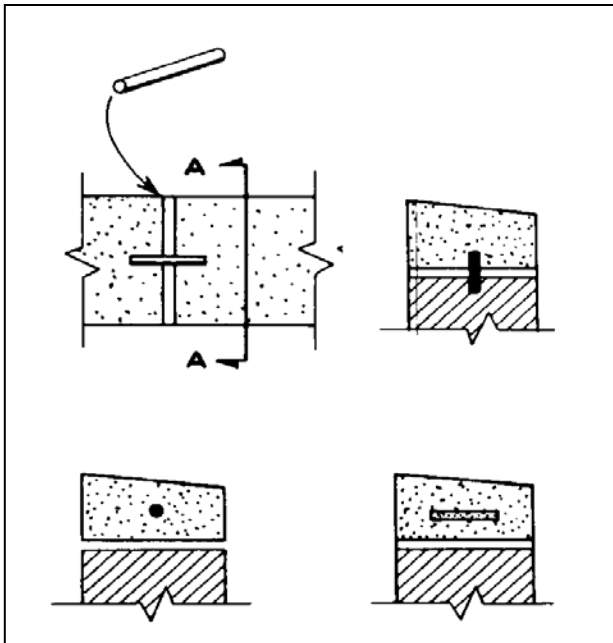
#155 DOWELS

MADE TO ORDER:

Specify Diameter: 1/8", 3/16", 1/4", 3/8", 1/2", 5/8", 3/4", 7/8", 1", 1-1/4", and 1-1/2".

Specify Length: 1" minimum up to 12 feet.

Specify Type of Steel: Stainless Steel, Hotdip Galvanized After Fabrication, Electro Galvanized After Fabrication, Mill Galvanized (3/16" and 1/4" only), or Plain Steel.



155

Stainless Steel:

Sheet metal anchors and ties: ASTM A 167 AISI Type 304.

Plate and bent bar anchors: ASTM A 666 AISI Type 304.

Wire ties and anchors: ASTM A 580 AISI Type 304.

Hotdip Galvanized:

ASTM A 153 Class B-2: (1.50 oz/ ft²)(0.46kg/m²)

Mill Galvanized:

Sheet metal anchors and ties: ASTM A 653 G60

Wire: ASTM A 641 (0.1 oz/ ft²)

Plain Steel:

Sheet Metal anchors and ties: ASTM A 569, ASTM A 366.

Plates, bars, and shapes: ASTM A 123, ASTM A 36.

Wire: ASTM A 82, ASTM A 82-95a.

Firewall Anchors:

Rolled Strip Zinc Alloy 710.

(Firewall alloy 1/8" and 16 gage only)

Approvals:

Comments:



Bassco Cast Stone -Post Installation- Cleaning Products Recommendation Executive Summary

***These generic sheets of Cleaners and Sealers are only included to show what could potentially be used (by others) for cleaning and/or sealing precast and cast stone pieces AFTER Installation has been completed.

Five types of cast stone (dry cast and wet cast) were submitted to AMT Laboratories by PROSOCO, Inc. with a request to determine the most appropriate new construction cleaner. Additionally, color and sheen enhancement, water repellent, graffiti resistant, and stain resistant products suitable for cast stone were evaluated.

The laboratory report (2304-02 PTP Bassco Cast Stone) provides information about the PROSOCO® products tested and descriptions of the test methods. The report includes test results as well as conclusions and recommendations. Recommendations are also provided in the chart below.

Recommendations:

Sample	New Construction Cleaning	Color and Sheen Enhancement	Water Repellency	Graffiti Resistance	Stain Resistance
"Brushed Buff" Cast Stone – Dry Cast	Sure Klean® Light Duty Concrete Cleaner (1:2) or (1:3) OR Sure Klean® Vana Trol® (1:6) or (1:8)	Please refer to pages 12-19 of the report for individual recommendations based on the desired result.	Sure Klean® Weather Seal Siloxane PD OR Sure Klean® Weather Seal Blok-Guard® & Graffiti Control 9 OR Sure Klean® Weather Seal Blok-Guard® & Graffiti Control WB 15	<u>Graffiti Repellents</u> ¹ Sure Klean® Weather Seal Blok-Guard® & Graffiti Control WB 15 OR ² Sure Klean® Weather Seal Blok-Guard® & Graffiti Control 9 <u>Graffiti Removers</u> ¹ Sure Klean® Graffiti Remover OR ² Enviro Klean® SafStrip® 8	<u>Stain Repellents</u> ¹ Sure Klean® Weather Seal Satin Guard WB OR ² Sure Klean® Weather Seal Gloss 'N Guard <u>Maintenance Cleaner</u> Enviro Klean® Klean 'N Release Cleaner
"Pearl White" Cast Stone – Dry Cast					<u>Stain Repellents</u> Sure Klean® Weather Seal Satin Guard WB OR Sure Klean® Weather Seal Gloss 'N Guard <u>Maintenance Cleaner</u> Enviro Klean® Klean 'N Release Cleaner
"Brushed Buff" Cast Stone – Wet Cast					
"Natural Buff" Cast Stone – Wet Cast					
"Pearl White" Cast Stone – Wet Cast					

NOTE: "1" indicates the most effective product and "2" indicates the second most effective product.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate product and procedures for a particular project. See product literature for additional application and product information.



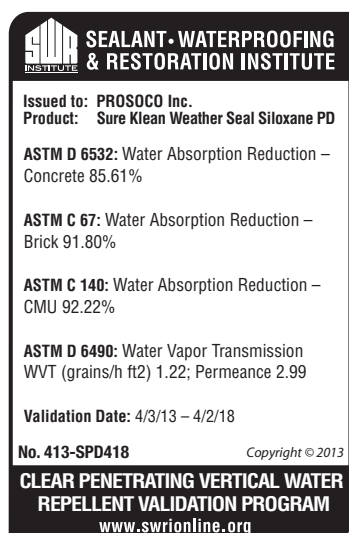
Siloxane PD

Sure Klean® Weather Seal Siloxane PD (predilute) is a ready-to-use, water-based silane/siloxane water repellent for concrete and most masonry and stucco surfaces. Siloxane PD will not impair the natural breathing characteristics of treated surfaces. It helps masonry resist cracking, spalling, staining and other damage related to water intrusion. Low odor and alkaline stable, Siloxane PD is ideal for field and in-plant application.

SAFETY INFORMATION

Always read full label and SDS for precautionary instructions before use. Use appropriate safety equipment and job site controls during application and handling.

24-Hour Emergency Information:
INFOTRAC at 800-535-5053



NOTE: The SWR Institute Validation Program uses standardized testing for validation purposes, including testing on CMU. PROSOCO **does not** recommend the use of Siloxane PD on CMU. Please reference the Substrate Chart on page 2.

ADVANTAGES

- Penetrates deeply for long-lasting protection on vertical or horizontal surfaces.
- Service life is estimated at more than 10 years.
- Treated surfaces “breathe” – does not trap moisture.
- Water-based formula minimizes explosion and fire hazards compared to solvent-based water repellents.
- Easy cleanup with Enviro Klean® 2010 All Surface Cleaner.
- Low odor for safer application to occupied buildings.
- Alkaline stable – suitable for new “green” concrete, 14–28 days old.
- Ready-to-use. No on-site dilution required.

Limitations

- Will not keep water out of cracks, defects or open joints.
- Not recommended for below-grade application.
- Not suitable for application to synthetic resin paints, gypsum, or other non masonry surfaces.

REGULATORY COMPLIANCE

VOC Compliance

Weather Seal Siloxane PD is compliant with the following national, state and district AIM VOC regulations:

- ☒ US Environmental Protection Agency
- ☒ California Air Resources Board SCM Districts
- ☒ South Coast Air Quality Management District
- ☒ Maricopa County, AZ
- ☒ Northeast Ozone Transport Commission

Product Data Sheet Weather Seal Siloxane PD

TYPICAL TECHNICAL DATA

FORM	Cloudy white liquid, odorless
SPECIFIC GRAVITY	0.996
pH	4–5
WT/GAL	8.29 lbs
ACTIVE CONTENT	7%
TOTAL SOLIDS	4% ASTM D 5095
VOC CONTENT	<30 g/L Low Solids Coating
FLASH POINT	>212° F (>100° C) ASTM D 3278
FREEZE POINT	32° F (0° C)
SHELF LIFE	1 year in tightly sealed, unopened container

PREPARATION

Protect people, vehicles, property, plants, windows and all non masonry surfaces from product, splash, residue, fumes and wind drift. Protect and/or divert foot and auto traffic.

Thoroughly clean the surface using the appropriate Sure Klean® or Enviro Klean® product. Clean newly constructed and repointed surfaces before application. Siloxane PD won't impair adhesion of most sealing and caulking compounds. Always test for compatibility.

Though Siloxane PD may be applied to slightly damp surfaces, best performance is achieved on clean, visibly dry and absorbent surfaces. Excessive moisture inhibits penetration, reducing the service life and performance of the treatment.

Window Glass Protection

Protect window glass before use. Sure Klean® Strippable Masking is effective protection for use with this product. If protecting windows is impractical, follow these steps:

1. Clean window glass thoroughly before application to nearby concrete or masonry.
2. Don't use in wind or when air or surface temperatures are hotter than 95°F (35°C).
3. Try to keep Siloxane PD off the glass.
4. After treated surfaces have been protected from water for 6 hours, if product is on window glass, clean as soon as possible with soap and warm water. Alternatively use Enviro Klean® 2010 All Surface Cleaner to remove dried residues within 3–5 days.

Surface and Air Temperatures

Best surface and air temperatures are 40–95°F (4–35°C) during use and for 8 hours after. If freezing conditions exist before application, let masonry thaw. The water carrier may freeze at low temperatures or evaporate in high temperatures. Both conditions impair penetration and results. Cleanup is more difficult from surfaces hotter than 95°F (35°C).

Equipment

Recommended application is by high volume, low-pressure (<50 psi) spray. Fan spray tips are recommended to avoid atomization. Do not atomize/vaporize the material.

For small scale application, or when spray application is not appropriate, product may be applied using brush or roller. Contact Customer Care or your local PROSOCO representative for more information.

Recommended for these substrates. Always test. Coverage is in sq.ft./m. per gallon.

<i>Substrate</i>	<i>Type</i>	<i>Use?</i>	<i>Coverage</i>
Architectural Concrete Block*	Burnished	no	N/A
	Smooth	no	
	Split-faced	no	
	Ribbed	no	
Concrete	Brick*	yes	150–200 sq.ft. 14–19 sq.m.
	Tile	yes	
	Precast Panels♦	yes	
	Pavers	yes	
	Cast-in-place♦	yes	
Fired Clay*	Brick	yes	50–175 sq.ft. 5–16 sq.m.
	Tile	yes	
	Terra Cotta (unglazed)	yes	
	Pavers	yes	
Marble, Travertine, Limestone	Polished	no	N/A
	Unpolished	no	N/A
Granite	Polished	no	N/A
	Unpolished*	no	N/A
Sandstone	Unpolished	yes	75–125 sq.ft. 7–12 sq.m.
Slate	Unpolished*	no	N/A

*Sure Klean® Custom Masonry Sealer is a more appropriate product.

♦See specific application instructions for dense surfaces.

*Stand Off® SLX100® or Weather Seal SL100 may be a more appropriate product.

Always test to ensure desired results.

Coverage estimates depend on surface texture and porosity.

Product Data Sheet

Weather Seal Siloxane PD

Storage and Handling

Keep from freezing. Store in a cool, dry place. Always seal container after dispensing. Do not alter or mix with other chemicals. Published shelf life assumes upright storage of factory-sealed containers in a dry place. Maintain temperature of 45–100°F (7–38°C). Do not double stack pallets. Dispose of unused product and container in accordance with local, state and federal regulations.

APPLICATION

Read “Preparation” and the Safety Data Sheet before use.

ALWAYS TEST a small area of each surface to confirm suitability, coverage rates and desired results before starting overall application. Test with the same equipment, recommended surface preparation and application procedures planned for general application.

Dilution & Mixing

Apply as packaged. Do not dilute or alter.

Application Instructions

For best results, apply “wet-on-wet” to a visibly dry and absorbent surface.

Vertical Surfaces: Sprayer

Saturate from the bottom up, creating a 4–8 inch (15–20 cm) rundown below the spray contact point. Let the first application penetrate for 5–10 minutes. Resaturate. Less will be needed for the second application.

Vertical Surfaces: Brush or Roller

Recommended for small scale application or when spray application is not appropriate.

Contact PROSOCO for more information. Saturate uniformly. Let penetrate for 5–10 minutes. Brush out heavy runs and drips that don’t penetrate.

Horizontal Surfaces

Saturate in a single application. Use enough to keep the surface wet for 2–3 minutes before penetration. Broom out puddles until they soak in.

Dense Surfaces

Apply a single coat. Use enough to completely wet the surface without creating drips, puddles or rundown. Do not over apply. Test for application rate.

Drying Time

Treated surfaces dry to touch in 1 hour. Protect surfaces from rainfall for 6 hours following treatment. Protect from foot and vehicle traffic until visibly dry. Siloxane PD gains its water-repellency properties in 72 hours.

Cleanup

Clean tools, equipment, and over spray with soap and warm water.

Paint Adhesion

Always test to make sure paint sticks to treated surfaces. Improve adhesion before painting by pressure water-rinsing the treated surface, then letting it dry.

Some cementitious coatings, plaster, stucco, etc. may not adhere well to treated surfaces. Install them first and let them thoroughly cure before application. Always test to verify compatibility between Siloxane PD and other proposed surface treatments.

BEST PRACTICES

Surface should be clean, dry and absorbent before application. Clean soiled surfaces with the appropriate Sure Klean® or Enviro Klean® cleaner before application. Call Customer Care toll-free at 800-255-4255 for recommendations.

Recommended application for PROSOCO protective treatments is high volume, low-pressure (<50 psi) spray equipment with a fan-type spray tip and adjustable pressure to avoid atomization of the material. For small scale application, or when spray application is not appropriate, brushes or roller may be used. Contact Customer Care or your local

representative for more information on brush/roller application.

Protect treated surfaces from rain for 6 hours following treatment.

ALWAYS TEST for best coverage rates and to confirm results before overall application. Test using the application instructions included herein. Let the test area dry thoroughly before inspection.

Never go it alone. If you have problems or questions, contact your local PROSOCO distributor or field representative. Or call PROSOCO technical Customer Care, toll-free at 800-255-4255.

Product Data Sheet Weather Seal Siloxane PD

WARRANTY

The information and recommendations made are based on our own research and the research of others, and are believed to be accurate. However, no guarantee of their accuracy is made because we cannot cover every possible application of our products, nor anticipate every variation encountered in masonry surfaces, job conditions and methods used. The purchasers shall make their own tests to determine the suitability of such products for a particular purpose.

PROSOCO, Inc. warrants this product to be free from defects. **Where permitted by law, PROSOCO makes no other warranties with respect to this product, express or implied, including without limitation the implied warranties of merchantability or fitness for particular purpose.** The purchaser shall be responsible to make his own tests to determine the suitability of this product for his particular purpose. PROSOCO's liability shall be limited in all events to supplying sufficient product to re-treat the specific areas to which defective

product has been applied. Acceptance and use of this product absolves PROSOCO from any other liability, from whatever source, including liability for incidental, consequential or resultant damages whether due to breach of warranty, negligence or strict liability. This warranty may not be modified or extended by representatives of PROSOCO, its distributors or dealers.

CUSTOMER CARE

Factory personnel are available for product, environment and job-safety assistance with no obligation. Call 800-255-4255 and ask for Customer Care – technical support.

Factory-trained representatives are established in principal cities throughout the continental United States. Call Customer Care at 800-255-4255, or visit our web site at www.prosoco.com, for the name of the PROSOCO representative in your area.



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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Furnish all labor, material, equipment, and supervision to provide and install aluminum windows in aluminum storefront assemblies in exterior walls.

1.02 RELATED DOCUMENTS

- A. Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.
 - 1. Section 07 92 00 – Joint Sealants.
 - 2. Section 09 91 00 – Painting.

1.03 REFERENCE STANDARDS

- A. AAMA 101 - NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights, 2022
- B. AAMA 603.8-92 - Voluntary Performance Requirements and Test Procedures For Pigmented Organic Coatings on Extruded Aluminum
- C. AAMA 1503-09 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections
- D. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- E. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
- F. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- G. ASTM E 547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference; 2000 (Reapproved 2024).

1.04 SUBMITTALS

- A. Product Data for each type of window required, including:
 - 1. Standard construction details and fabrication methods.
 - 2. Profiles and dimensions of individual components.
 - 3. Data on hardware, accessories, and finishes.
 - 4. Recommendations for maintenance and cleaning exterior surfaces.
- B. Shop Drawings for each type of window required showing:
 - 1. Layout and installation details, including anchors.
 - 2. Typical window unit elevations.
 - 3. Full-size details of typical and composite members.
 - 4. Hardware, including operators
 - 5. Glazing Details
 - 6. Accessories
- C. Samples for color selection.
- D. Certification: Provide certification by a recognized independent testing laboratory or agency certifying that each required type and grade of window complies with performance requirements indicated.

1.05 QUALITY ASSURANCE

- A. Standards: Performance requirements for structural performance, air infiltration, and water penetration for windows are those specified in AAMA 101 for type, grade and performance class of window units required.
- B. Testing: Manufacturer's stock units of each grade of required window shall have been tested by a recognized testing laboratory or agency in accordance with ASTM E 283 for air infiltration, ASTM E 547 for water penetration, and ASTM E 330 for structural performance.
- C. Performance Requirements: Each required window unit shall comply with the following performance requirements.
 - 1. Air Infiltration: Not more than 0.5 cfm per ft. of operable sash joint for an inward test pressure of 1.57 lbf per sq. ft.
 - 2. Water Penetration: At a static pressure of 8.25 pounds per square foot no water penetration as defined in the test method at an inward test pressure of pressure.
 - 3. Structural Performance: No glass breakage, damage to hardware, permanent deformation that would impair operation of the unit, or residual deflection greater than 0.4 percent of the span at a positive (inward) and negative (outward) test pressure of 75 lbf per sq. ft.
- D. Insulating Glass Certification Program: Provide insulating glass units permanently marked with the appropriate certification label of the either the Insulating Glass Certification Council (IGCC) or the Associated Laboratories, Inc. (ALI). Provide the certification label either on spacers or at least one component pane of each unit.
- E. Single Source Responsibility: Provide windows produced by a single fabricator who is capable of indicating prior successful production of units similar to those required.
- F. Note: Windows and storefront system shall be installed by the same installer for single source responsibility.

1.06 DESIGN CONCEPT

- A. The drawings indicate window sizes, profiles, and dimensional requirements and are based on the specific types and models indicated. Window units by other manufacturers having equal performance characteristics may be considered, provided deviations from indicated dimensions and profiles are minor and do not change the design concept or intended performance as judged by the Architect. The burden of proof for equality is on the proposer.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Check actual window openings by accurate field measurement before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.
- B. Coordinate fabrication and installation of aluminum windows with fabrication and installation of aluminum storefront assemblies to assure compatibility.

1.08 WARRANTIES

- A. Windows: Windows furnished shall be certified as fully warranted against any defects in material or workmanship under normal use and service for a period of one (1) year from date of fabrication.
- B. Finish: The pigmented organic finishes on windows and component parts (such as panning, trim, mullions and the like) shall be certified as complying fully with requirements of AAMA 603 for pigmented organic coating and fully warranted against chipping, peeling, cracking and blistering for a period of ten (10) years from date of installation.
- C. Glass: Glass shall be warranted from visual obstruction due to internal moisture for a period of five (5) years on sealed insulated glass units.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Basis of Design: Single hung Model G500 thermally broken, insulated units as manufactured by Peerless Products Inc. All products shall conform to Architectural Aluminum Manufacturers Association Specifications for single hung windows, DH-HC65.
 - 1. Acceptable Manufacturers include:
 - a. Peerless Products, Inc.
 - b. Efco Corporation
 - c. Traco, a Kawneer Company.
 - d. Substitutions: See Section 01 25 00 – Substitution Requirements.

2.02 MATERIALS

- A. Windows shall conform to all AAMA 101 requirements and shall pass with the window sash closed and locked ASTM E 331 water resistance test, ASTM E 330 uniform load structural test, and the AAMA 1503-09 Thermal Transmittance and Condensation Resistance Test.
- B. Window frames and sash members, including fin trim panning system and retainer legs, shall be of 6063-T5 extruded and heat-treated aluminum. Sweep latches shall be of aluminum or stainless steel. All balances shall be heavy duty Block and tackle type. Balances shall be replaceable. Provision shall be made for the use of half screens. Thermal barrier shall be poured-in-place two part polyurethane. Provide an extruded aluminum spring catch at the sill of the lower sash. Depth of frame shall be not less than 4-1/4".
- C. Windows shall be equipped with screens for operating portion. Screen frames shall be extruded aluminum. They shall be easily mounted or removed from inside. Screens shall have 18 x 14 mesh fiberglass in aluminum frames and shall comply fully with AAMA window screen specifications A1.61, 2, 3, 4, 5, 6, and 7.
- D. Panning system shall include all the fasteners and trim sizes necessary for a complete weather tight and secure installation.
- E. All exposed aluminum shall have thermosetting pigmented organic coating meeting AAMA.603 in color selected by the Architect from the manufacturer's standard colors.
- F. Glass shall be 1" insulated glazing.
- G. Weather-stripping material: Silicone-coated woven pile with polypropylene fin center complying with AAMA 701.

2.03 FABRICATION

- A. General: Provide the manufacturer's standard fabrication of units. Comply with indicated standards. Include a complete system for assembly of components and anchorage of window units. Comply with requirements of referenced standards for moisture content of lumber at time of fabrication and for relative humidity conditions in the installation areas.
- B. Fabricate windows to produce units that are reglazable without dismantling sash framing. Provide openings and mortises precut, where possible, to receive hardware and other items.
- C. Each window unit includes sash, frame, stops, sill (including undersill or nosing), exterior casing and moldings, integral mullions and muntins, hardware, and accessories.
- D. Provide weather-stripping at perimeter of each operating sash.
- E. Preglazed Window Units: Except for light sizes in excess of 100 unitted inches, preglaze window units at the shop before delivery, unless preglazing is not available from the fabricator.

- F. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to the project site, to the maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- G. Fabricate window units with an integral concealed low-conductance polyurethane thermal barrier, located between the exterior and the interior of the window, in a manner which eliminates direct metal to metal contact. The thermal break de-bridge spacing must be a minimum of 3/16 inch.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect openings before beginning installation. Verify that the opening is correct and the sill plate is level. Do not proceed with installation of window units until unsatisfactory conditions have been corrected.
 - 1. Masonry surfaces shall be visibly dry, and free of excess mortar, sand, and other construction debris.
 - 2. Metal stud frame walls shall be dry, clean, sound and well-attached, free of voids, and without offsets at joints. Ensure that screw heads are driven flush with surfaces in the opening and within 3 inches of the corner.
 - 3. Coordinate window installation with wall flashings and other built-in components.

3.02 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of window units, hardware, operators, accessories, and other window components.
- B. Set units plumb, level, true to line, flush with outer face of adjacent storefront without warp or rack of frames or sash. Provide proper support and anchor securely in place.
- C. Set sill members in a bed of compound or with joint fillers or gaskets as indicated, to provide weathertight construction.

3.03 ADJUSTING

- A. Adjust operating sash and hardware to provide a tight fit at contact points and weather-stripping, and to provide smooth operation and a weathertight closure. Lubricate hardware and moving parts.

3.04 CLEANING

- A. Clean interior and exterior surfaces promptly after installation. Take care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant, dirt, and other substances.
- B. Clean glass of pre-glazed window units promptly after installation. Wash and polish glass on both faces before Substantial Completion. Comply with manufacturer's recommendations for final cleaning and maintenance. Remove nonpermanent labels from glass surfaces.
- C. Remove and replace glass that has been broken, chipped, cracked, abraded or damaged during the construction period.

3.05 PROTECTION

- A. Protect window units from damage or deterioration until time of substantial completion.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A Furnish all materials, labor, equipment, and supervision necessary to design, fabricate, provide and install pre-engineered, aluminum entry canopies as specified herein and as shown on the drawings.
 - 1. Include storm water collection and drainage to grade.
 - 2. Include accommodation of electrical amenities as indicated on the drawings.

1.02 RELATED DOCUMENTS

- A Applicable provisions of the General Conditions, Supplementary Conditions and Division 01, General Requirements.

Section 03 30 00 – Cast-in-Place Concrete.

1.03 QUALITY ASSURANCE

- A Canopy shall be wholly produced by a recognized manufacturer with at least five years experience in the design and fabrication of extruded aluminum walkway cover systems.
- B Components shall be assembled in shop to greatest extent possible to minimize field assembly.

1.04 FIELD MEASUREMENTS

- A Confirm dimensions prior to preparation of shop drawings when possible.

1.05 SUBMITTALS

- A Submit shop drawings and manufacturer's cut sheets showing structural component locations/positions, material dimensions and details of construction and assembly.
- B Submit drawing showing configuration of canopy installation including column locations and drainage locations.
- C Provide load calculations stamped by a structural engineer licensed in the jurisdiction where the canopy will be erected.

1.06 PERFORMANCE REQUIREMENTS

- A Canopy must conform to local building codes.
- B Comply with specific load requirements established on the structural drawings.
- C Comply with the load requirements of electrical devices indicated on drawings, if any.

PART 2 PRODUCTS

2.01 MATERIALS

- A All materials for canopy shall be provided and assembled by a manufacturer specializing in the production and assembly of a prefinished aluminum canopy structures.
- B Pre-engineered Aluminum Canopy:
 - 1. Basis of Design: Upside Innovations LLC Prefabricated Aluminum Covered Walkway Canop, <https://upsideinnovations.com/>.
 - 2. Substitutions: Section 01 25 00 - Substitution Procedures.

2.02 DESIGN

- A Protective cover shall be all welded extruded aluminum system complete with internal drainage. Non-welded systems are not acceptable. Roll formed deck is not acceptable.
- B Aluminum Decking shall be 3004-H36 aluminum alloy or extruded aluminum 6063 alloy, heat treated to T-6 temper with powder coating.
- C Columns and gutters shall be constructed from extruded aluminum 6061 alloy, heat treated to T-6 temper.
- D Fasteners: Fasteners shall be galvanized steel.
- E Protective Coating: Aluminum columns embedded in concrete shall be protected by clear acrylic.
- F Joint sealant shall be silicone and applied for a watertight seal.
- G Gaskets: Gaskets shall be dry seal santoprene pressure type.
- H Fascia shall be .125 inch prefinished aluminum extruded Fascia panel.
- I System shall accommodate electrical fixtures/devices if shown on the architectural or electrical drawings. Refer to the drawings for device type(s), quantity, location and mounting height/method. Accommodations shall allow for mounting which does not penetrate water-transferring components. Conduit to all devices, whether or not shown on the drawings, shall be fully concealed. The installation of fixtures/devices shall have no effect on the manufacturer's warranty.

2.03 COMPONENTS

- A Columns: Columns shall be square-tube extrusions of size required for configuration shown on the drawings with cutout and internal diverter for drainage where indicated. Circular downspout opening in column not acceptable. Canopy columns must be cut to meet minimum required canopy height, determined by Architect. The maximum space between posts 12' widthwise and 12' lengthwise in direction of travel.
- B Beams: Beams shall be open-top tubular extrusion of size and shape required for configuration shown on drawings, top edges thickened for strength and designed to receive deck members in self-flashing manner. Structural ties shall be installed in tops of all beams.
- C Deck: Deck shall be 3" .032" or 3" .065" extruded aluminum flat soffit self-flashing sections interlocking into a composite unit. Closures at deck ends shall be welded plates.
- D Fascia: Fascia shall be manufacturer's standard shape. Size as required for configuration shown on drawings.
- E Flashing: Flashing shall be .040 aluminum (min.). All thru-wall flashing by others.

2.04 FABRICATION

- A Bent Construction: Beams and columns shall be factory welded with neatly mitered corners into one-piece rigid bents. All welds shall be smooth and uniform using an inert gas shielded arc. Suitable edge preparation shall be performed to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints shall be used when shipping limitations prohibit the shipment of fully welded bents.
- B Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

2.05 FACTORY FINISHING

- A Type: flouropolymer (Kynar) finish, AAMA 605.2, two coat.
- B Color: To be selected from manufacturer's full range (of no less than twenty) colors.

PART 3 EXECUTION

3.01 PREPARATION

- A Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.02 INSTALLATION

- A Installation of canopy shall be performed by approved installers according to approved shop drawings.
- B Erection: Protective cover shall be erected true to line, level and plumb. Aluminum columns embedded in concrete shall be protected by clear acrylic. Downspout columns shall be filled with grout to the discharge level to prevent standing water. Non-draining columns shall have weep holes installed at top of concrete to remove condensation.

3.03 CLEANING

- A All protective cover components shall be cleaned promptly after installation.

3.04 PROTECTION

- A Care shall be taken to protect materials during and after installation.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A Pre-engineered, hanger rod supported aluminum entry canopies.
- B Flashing to supporting wall.
- C Storm water collection and drainage to grade.
- D Accommodation of electrical amenities as indicated on drawings.

1.02 RELATED DOCUMENTS

- A Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.

1.03 QUALITY ASSURANCE

- A Canopy shall be wholly produced by a recognized manufacturer with at least five years experience in the design and fabrication of extruded aluminum walkway cover systems.
- B Components shall be assembled in shop to greatest extent possible to minimize field assembly.

1.04 FIELD MEASUREMENTS

- A Confirm dimensions prior to preparation of shop drawings.

1.05 SUBMITTALS

- A Submit shop drawings and manufacturer's cut sheets showing structural component locations/positions, material dimensions and details of construction and assembly.
- B Submit drawing showing configuration of canopy installation including column locations and drainage locations.
- C Provide load calculations stamped by a structural engineer licensed in the jurisdiction where the canopy will be erected.

1.06 PERFORMANCE REQUIREMENTS

- A Canopy must conform to local building codes.
- B Comply with specific load requirements established for canopies as shown on the drawings.
- C Comply with the load created by electrical devices indicated on drawings, if any.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. System Performance: Provide aluminum canopy system that has been designed, produced, fabricated and installed to withstand normal temperature changes as well as live loading, dead loading and wind loading in compliance with local building code requirements for geographic area in which work is located and as indicated on the drawings.
 - 1. Refer to structural drawings for structural loading criteria including design wind velocity, live load, importance factors, structural requirements for wind forces and stability criteria.

- B. Structure shall be capable of sustaining severe icing, hail, hurricane force winds and supporting a concentrated load such as being walked upon.

2.02 MATERIALS

- A All materials for canopy shall be provided and assembled by a manufacturer specializing in the production and assembly of a prefinished aluminum canopy structures.
- B Subject to compliance with these specifications, basis of design is:
 1. Upside Innovations LLC Prefabricated Aluminum Covered Walkway Canop,
<https://upsideinnovations.com/>.
 2. Substitutions: Section 01 25 00 - Substitution Procedures.

2.03 DESIGN

- A Canopy shall be all welded extruded aluminum system complete with internal drainage. Non-welded systems are not acceptable. Roll formed deck is not acceptable.
- B Aluminum Decking shall be 3004-H36 aluminum alloy or extruded aluminum 6063 alloy, heat treated to T-6 temper with powder coating.
- C Gutters shall be constructed from extruded aluminum 6061 alloy, heat treated to T-6 temper.
- D Fasteners: Fasteners shall be galvanized steel.
- E Joint sealant shall be silicone and applied for a watertight seal.
- F Gaskets: Gaskets shall be dry seal santoprene pressure type.
- G Fascia shall be .125 inch prefinished aluminum extruded aluminum fascia panel.
- H System shall accommodate electrical fixtures/devices if shown on the architectural or electrical drawings. Refer to the drawings for device type(s), quantity, location and mounting height/method. Accommodations shall allow for mounting which does not penetrate water-transferring components. Conduit to all devices, whether or not shown on the drawings, shall be fully concealed. The installation of fixtures/devices shall have no effect on the manufacturer's warranty.

2.04 COMPONENTS

- A Deck: Deck shall be 3" .032" or 3" .065" extruded aluminum flat soffit self-flashing sections interlocking into a composite unit. Closures at deck ends shall be welded plates.
- B Fascia: Fascia shall be manufacturer's standard 8" extruded "J" style, .125" thick minimum. Flashing: Flashing shall be .040 aluminum (min.). All thru-wall flashing by others.
- C Hanger rods and attachment hardware shall be powder coated to match canopy.

2.05 FABRICATION

- A Bent Construction: Beams and columns shall be factory welded with neatly mitered corners into one-piece rigid bents. All welds shall be smooth and uniform using an inert gas shielded arc. Suitable edge preparation shall be performed to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints shall be used when shipping limitations prohibit the shipment of fully welded bents.
- B Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 8" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds

each. Pre-welded or factory-welded connections are not acceptable. Deck shall be assembled with sufficient camber to offset dead load deflection.

- C Concealed drainage: Water shall drain from covered surfaces into integral fascia gutter and directed to the rear for ground level discharge via one or more designated downspouts.

2.06 FACTORY FINISHING

- A Type: Fluoropolymer (Kynar) finish, AAMA 605.2, two coat
- B Color: To be selected from manufacturer's full range (of no less than twenty) colors.

PART 3 EXECUTION

3.01 PREPARATION

- A Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.02 INSTALLATION

- A Installation of canopy shall be performed by approved installers according to approved shop drawings
- B Erection: Protective cover shall be erected true to line, level and plumb. deck framing shall be anchored to filled CMU cells. Hanger rods shall be through bolted to support wall. Install all necessary flashing and sealants as required for a weatherproof connection to supporting construction.

3.03 CLEANING

- A All protective cover components shall be cleaned promptly after installation.

3.04 PROTECTION

- A Care shall be taken to protect materials during and after installation.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes
 - 1. Pipe Labels.

1.03 ACTION SUBMITTALS

- A. Product data: For each type of product.
- B. Equipment-Label schedule: Include a listing of all equipment to be labeled and the proposed content for each label
- C. Valve schedules: Valve numbering scheme

1.04 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each piping system to include in maintenance manuals.

PART 2 PRODUCTS

2.01 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service and showing flow direction.
- B. Pretensioned Pipe Labels: Pre-coiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on drawings; pipe size, and an arrow indicating flow direction.
 - 1. Flow Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 - 2. Lettering Size: At least 1-1/2 inches high.
- D. Pipe-Label Colors:
 - 1. Background Color: Red.
 - 2. Letter Color: White.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.02 LABEL INSTALLATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install or permanently fasten labels on each major item of mechanical equipment.
- D. Locate equipment labels where accessible and visible.
- E. Piping Color-Coding: Painting of piping is specified in Section 09 90 00 "Painting."
- F. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each branch connection excluding short takeoffs. Where flow pattern is not obvious, mark each pipe at branch.
 - 2. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 3. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 4. Near major equipment items and other points of origination and termination.
 - 5. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 6. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 1. Pipes, fittings, and specialties.
 2. Sprinklers

1.03 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.04 SYSTEM DESCRIPTION

- A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply through alarm valve. Water discharges immediately from sprinklers when they are opened. Sprinklers open when he melts fusible link or destroys frangible device. Host connections are included if indicated.

1.05 PERFORMANCE REQUIREMENTS

- A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- B. Sprinkler system design shall be approved by authorities having jurisdiction.
 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 2. Sprinkler Occupancy Hazard Classifications:
 - a. See Plans
 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. See Plans
 4. Maximum Protection Area per Sprinkler:
 - a. All Areas: According to NFPA 13 recommendations unless otherwise indicated.
 5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated.
 - a. See Plans

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 1. Domestic water piping
 2. Natural gas piping
 3. HVAC hydronic piping
 4. Items penetrating finished ceiling include the following:

- a. Lighting Fixtures
 - b. Air outlets and inlets
- D. Qualification Data: For qualified Installer.
- E. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculation if applicable.
- F. Welding Certificates.
- G. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."
- H. Field Quality-Control Reports.
- I. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.
- 1.07 QUALITY ASSURANCE
- A. Installer Qualifications:
 - 1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.
- B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13, "Installation of Sprinkler Systems"
- 1.08 PROJECT CONDITIONS:
- A. Interruption of Existing Sprinkler Service: Do not interrupt sprinkler services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary sprinkler service according to the requirements below:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of sprinkler service.
 - 2. Do not proceed with interruption of sprinkler service without Owner's written permission.

PART 2 PRODUCTS

2.01 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.02 STEEL PIPE AND FITTINGS

- A. Standard Weight, Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining metal.

- B. Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight seamless steel pipe with threaded ends.
- C. Uncoated, Steel Couplings: ASTM A 865, threaded.
- D. Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- E. Malleable-or Ductile-Iron Unions: UL 860.
- F. Cast-Iron Flanges: ASME 16.1, Class 125.
- G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
- H. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
- I. Grooved-Joint, Steel Pipe Appurtenances:
 - 1. Manufacturers: Subject to compliance with requirements, provide products made by one of the following:
 - a. Anvil International, Inc.
 - b. Tyco Fire & Building Products LP.
 - c. Victaulic Company.
 - 2. Pressure Rating: 175-psig minimum.
 - 3. Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
 - 4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.
- J. Steel Pressure-Seal Fittings: UL 213, FM-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Victaulic Company.

2.03 PIPING JOINING MATERIALS

- A. Brazing Filler Materials: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general duty brazing unless otherwise indicated.
- B. Welding Filler Materials: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.04 LISTED FIRE-PROTECTION VALVES

- A. General Requirements:
 - 1. Valves shall be UL listed or FM approved.
 - 2. Minimum Pressure Rating for Standard-Pressure Piping: 175-psig.
- B. Ball Valves:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 2. Basis of Design Product: Subject to compliance with requirements, provide product indicated on drawings or comparable product by one of the following:
 - a. Anvil International, Inc.
 - b. Victaulic Company.
 - 3. Standard: UL 1091 except with ball instead of disc.
 - 4. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
 - 5. Valves NPS 2-1/2: Bronze body with threaded ends.

2.05 SPECIALTY VALVES

- A. General Requirements:

1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide", published by FM Global, listing.
2. Pressure Rating:
 - a. Standard-Pressure Piping Valves: 175-psig minimum
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

2.06 SPRINKLER SPECIALTY PIPE FITTINGS

- A. Branch Outlet Fittings:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil International, Inc.
 - b. Shurjoint Piping Products.
 - c. Tyco Fire & Building Products LP.
 2. Standard: UL 213.
 3. Pressure Rating: 175-psig minimum.
 4. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
 5. Type: Mechanical-T and cross fittings.
 6. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
 7. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
 8. Branch Outlets: Grooved, plain-end pipe, or threaded.

2.07 SPRINKLERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Reliable Automatic Sprinkler Co, Inc.
 2. Tyco Fire & Building Products LP
 3. Viking Corporation.
- B. General Requirements:
 1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global listing.
 2. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
- C. Automatic Sprinklers with Heat-Responsive Element:
 1. Early-Suppression, Fast-Response Applications: UL 1767
 2. Nonresidential Applications: UL 199
 3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- D. Sprinkler Finishes:
 1. Chrome Plated.
 2. Bronze.

2.08 MANUAL CONTROL STATIONS

- A. Description: UL listed or FM approved, hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.09 CONTROL PANELS

- A. Description: Single-area, two-area, or single-area cross-zoned control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves. Panels contain power supply battery charger; standby batteries; field-wiring terminal strip; single-pole, double-throw auxiliary alarm contacts; and rectifier.

1. Panels: UL listed and FM approved when used with thermal detectors and Class A detector circuit wiring. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.
2. Manual Control Stations: Electric Operation, metal enclosure, labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.
3. Manual Control Stations: Hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

PART 3 EXECUTION

3.01 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.02 WATER-SUPPLY CONNECTIONS

- A. Connect sprinkler piping to building's interior water-distribution piping. Comply with requirements for interior piping in section 22 11 16 "Domestic Water Piping".

3.03 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate location and arrangement of piping. Install piping as indicated, as far as practical.
 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
- B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
- C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
- D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- F. Install flanges, flange adapters, or couplings for grooved-end piping, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- G. Install automatic (ball drip) drain valve at each check valve for fire-department connection, to drain piping between fire department connection and check valve. Install drain piping to and spill over floor drain or to outside building.
- H. Install alarm devices in piping systems.
- I. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
- J. Fill sprinkler system piping with water.

3.04 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end constructions.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Threaded Joints: Thread pipe and tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape and thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or fittings with threads that are corroded or damaged.
- G. Steel-Piping, Pressure-Sealed Joints: Join lightwall steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.
- H. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welded operators according to "Quality Assurance" Article.
 - 1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.
- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steep pipe and grooved-end fittings according to AWWA C606 for steep-pipe joints.
- J. Steel-Piping, Rolled-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

3.05 SPRINKLER INSTALLATION

- A. Install sprinklers suspended from ceilings in center of acoustical ceiling panels.
- B. Install sprinklers into flexible, sprinkler hose fittings and install hose into bracket on ceiling grid.

3.06 IDENTIFICATION

- A. Install labeling and pipe markers on piping according to requirements in NFPA 13.

3.07 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler system according to NFPA 13. "Systems Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.

- 5. Coordinate with fire-alarm tests. Operate as required.
- 6. Coordinate with fire-pump tests. Operate as required.
- 7. Verify that equipment hose threads are the same as local fire department equipment.
- C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspections report.

3.08 CLEANING

- A. Clean dirt and remove debris from sprinklers.
- B. Remove and replace sprinklers with paint other than factory finish.

3.09 PIPING SCHEDULE

- A. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- B. Standard-pressure, wet-pipe sprinkler system, NPS 2 and smaller, shall be the following:
 - 1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
 - 2. Standard-weight, black-steel pipe with roll or cut-grooved; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
 - 3. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.

3.10 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
 - 1. Rooms without ceilings: Upright sprinklers.
 - 2. Rooms with Suspended Ceilings: Pendent sprinklers.
- B. Provide sprinkler types in subparagraphs below with the finishes indicated.
 - 1. Upright and pendent sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view.

END OF SECTION

PART 1 GENERAL

1.01 SCOPE

- A. Intent: It is the intent of these specifications to furnish a sprinkler system complete, fully adjusted, and ready for use.
- B. Material and Equipment: Material and equipment have been carefully selected for this project and the Fire Protection Installer is expected to provide all items as closely as possible to the specifications.
- C. Job Coordination: The Sprinkler Installer shall plan his work in advance and shall coordinate all space requirements with the other trades involved. Where conflicts occur, the Sprinkler Installer shall request clarification through the Contractor.
- D. Workmanship: It is the intent of these specifications to provide the best workmanship available. Poor workmanship will be rejected and the work reinstalled when, in the judgment of the Mechanical Engineer, the workmanship is not of the highest quality.
- E. Cleaning: It is the intent of these specifications that all work, including the inside of equipment, be left in a clean condition. All construction dirt shall be removed from material and equipment.
- F. Completeness: It is the intent of these specifications to provide a complete system. Completeness shall mean not only that all material and equipment has been installed properly, but that all material and equipment has been installed and has been adjusted, and that, in the opinion of the Mechanical Engineer all material and equipment is operating as designed.
- G. Adjustment of Controls: This Sprinkler Installer shall provide the personnel and equipment to completely adjust the controls to the satisfaction of the Mechanical Engineer. At the completion of the project, the Sprinkler Installer will arrange a meeting at the job site to allow the Sprinkler Installer to demonstrate the proper operation of the sprinkler controls.
- H. Noise: It is the intent of these specifications to provide a system free from objectionable noise. Any equipment that is generating objectionable noise, in the opinion of the Mechanical Engineer, shall be corrected and other noises shall be dampened as directed.
- I. In the case that there are discrepancies in some part of the drawings then the contractor shall ask the engineer for clarification. If no clarifications are requested then the contractor shall provide and install the largest and the more expensive option depicted on the drawings.

PART 2 PRODUCTS

2.01 SPRINKLER SYSTEM

- A. General
 - 1. Furnish and install a complete hydraulically calculated wet pipe sprinkler system to meet ordinary hazard, group II classification for the project and herein described.
 - 2. All design, layout, work, and materials shall conform with the requirements of the current editions of National Fire Protection Association's Standard for the Installation of Sprinkler Systems (NFPA 13) and Standard for the Installation of Private Fire Service Mains and Their Appurtenances (NFPA 24) and as approved by the Underwriters Association having jurisdiction over this geographical area.
 - 3. All areas of the building which are unheated but are required to be sprinkled by the local or insuring authorities shall have dry systems. System and installation must be complete with all required backflow devices, etc. to meet NFPA 13 and all state and local codes.

B. Shop Drawings

1. Submit shop drawings as required by Mechanical General Conditions. Drawings to be signed by person certified in State of Georgia.
2. This Sprinkler Installer shall submit complete layouts for review, to the Architect, local authorities and Underwriters having jurisdiction prior to submission to the State Fire Marshal. Any requirements of the state or local authorities to meet codes shall be furnished without additional cost to Owners.
3. Particular attention shall be paid to the layout in the coordination of the sprinkler piping and the structural system of beams. Careful coordination shall also be given to avoid changing the ceiling lighting or the ductwork system as shown on the drawings. Where ceilings are installed, all piping shall be installed concealed and all sprinkler heads shall be in the center of the ceiling tiles. All exposed piping shall be noted as such on shop drawings. Any changes in routing in exposed piping shall be approved by Architect prior to installation.

C. Materials and Components

1. Sprinkler Heads: Sprinkler heads shall be automatic and of the conventional (spray) type and shall be listed and approved by a nationally recognized testing laboratory. Sprinkler heads shall be as manufactured by the Grinnel Sprinkler Company or approved substitute and the type as listed below.
 - a. Areas with finished or suspended ceilings shall have Model F972 recessed sprinklers; the two piece design recessed closure will permit removal of suspended ceiling panels without shutting down the sprinkler system. The recessed closure and mounting plate will have a white finish; the pendant will have a chrome finish.
 - b. Areas with open ceilings shall have Model FR-1 fast response sprinklers. The sprinkler will have a chrome plated finish.
 - c. Unfinished areas with no ceilings such as mechanical rooms and storage rooms shall have Model FR-1 or Model F980 sprinklers. The sprinkler will have a natural brass finish.
 - d. Areas with high density or high temperature requirements shall have Model F950 conventional or intermediate level sprinklers as required. Sprinklers will have chrome plated or where required, a corrosion resistant finish.
 - e. Areas that are secure or detention areas shall have institutional quick response extended coverage flush mounted sidewall or pendant tamper proof heads. They shall have be designed for use with concealed piping.
2. Valves: The control valve shall be listed and approved by a nationally recognized testing laboratory. All necessary appurtenances shall be provided at each control valve. Provide U.L. listed valve supervisory switches on all valves where required by code. Switches shall be compatible with fire alarm system.
3. Alarms: Provide water flow alarm on the exterior of the building close to the control valve location. Provide and install U.L. listed water flow alarm switches in branches to each zone and in accordance with local codes. Switches shall be compatible with fire alarm system.
4. Interior Piping Valves and Fittings:
 - a. Sprinkler piping inside the building shall be black steel pipe to meet minimum requirements of NFPA 13. Fittings shall be cast iron, black, screwed, or mechanical grooved joints, except where flanged fittings are required.
 - b. Alarm check valves, O.S. & Y. gate valves, indicator gate valves, ordinary check valves, ball drips, vacuum breakers, pressure relief valves, pressure gauges, angle valves and all other miscellaneous appurtenances shown shall be provided and shall be listed and approved for sprinkler service by a nationally recognized testing laboratory.
 - c. All pipe hangers and hanger spacings shall be in strict accordance with NFPA 13.
 - d. Seismic supports and restraints shall be provided as required by the most stringent of the applicable NFPA code or the governing building code.
 - e. All piping located in secure areas shall be covered with heavy gauge pipe covers and ceiling soffit covers designed for use in prisons.

5. Valve Signs: Properly lettered approved metal signs shall be attached to each control valve and drain valve.
6. Sleeves: Provide steel pipe sleeves for all pipes passing through masonry walls, floors and ceilings. Sleeves shall extend completely through construction and, in case of floors, extend four (4) inches above the floor. Location of sleeves through structural members shall be approved by Structural Engineer before installation.
7. Floor, Wall and Ceiling Escutcheon Plates: Provide for all sprinkler piping passing through floors, walls, and ceilings approved type, one-piece or split-type escutcheon plates. Plates shall be securely anchored in place with set screws or other approved positive means.
8. Provide a U.L. listed fire department connection. The fire department connection shall be cast brass with chrome finish and identified for the service provided.

2.02 OUTSIDE WATER SYSTEM PIPING

- A. The new fire water system piping shall be PVC C-900 U.L. labeled pipe. Piping and installation of system shall meet NFPA 24.
- B. Gate valves shall be designed for a working pressure of not less than 150 pounds per square inch. Valve connections shall be as required for the piping in which they are installed. Valves shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.
- C. The Contractor shall make arrangement with the local utility for connection to the existing water main, installation of the service, detector check valve(s) with meter, valve box and lid, etc. The installation shall be in accordance with the requirements of the local utility and the Contractor shall pay all costs.
- D. Valves smaller than 3" shall be all bronze. Valves 3" and larger shall be iron body, bronze mounted, and shall conform to AWWA Standard C500.
- E. Indicator post for valves: Each valve shown on the drawings with the designation "P.I.V." shall be equipped with indicator post conforming to the requirements of NFPA Standard 24. Operation shall be by wrench. One wrench shall be provided for valve operation. Provide with contacts for supervision by connection to fire alarm system.
- F. Valve boxes shall be cast iron: Cast iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16". The word "WATER" shall be cast in the cover. The boxes shall be of such length as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location.
- G. Fire hydrants shall conform to American Water Works Association Standard C502. Hydrants shall have a 6" bell connection, two 2-1/2" hose connections and one 4-1/2" pumper connection. Outlets shall have fire-hose coupling threads to match local fire department requirements. Working parts shall be bronze. Design, material, and workmanship shall be similar and equal to the latest stock pattern ordinarily produced by the manufacturer. Hydrants shall be coated with electrostatically applied, thermally fused polyester coating. The color shall match existing hydrants. Hydrants shall be dry-barrel type conforming to AWWA Standard C502 with valve opening at least 5" in diameter.
- H. Install a new fire hydrant within 100 feet of the fire department connection. If a fire hydrant presently exists within 100 feet then the new fire hydrant may be omitted.

PART 3 EXECUTION

3.01 INSTALLATION

- A. It is the intention of the specifications and drawings to call for finished work, tested and ready for operation. Wherever the words "Furnish" or "Provide" are used, it shall mean provide and install complete and ready for use. Any apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed by the Fire Protection Installer at his expense. Minor details not usually shown or specified, but necessary for the proper installation and operation, shall be included in the work and in the Contractor's estimate, the same as if herein specified or shown.
- B. All work shall be executed and inspected in accordance with all laws, ordinances, rules and regulations of local authorities having jurisdiction over such work. The Fire Protection Installer shall obtain all permits and pay all fees in connection herewith where required. Should any change in the drawings or specification be required to conform to these ordinances, the installer shall notify the Architect-Engineer at the time of submitting his bid. After entering into the contract, Fire Protection Installer will be held to complete all necessary work to meet local requirements at his expense.
- C. The sprinkler system shall be installed such that spacing of the sprinkler heads in relation to the ceiling shall not exceed that permitted per NFPA Volume 13 for the type of ceiling construction involved or the classification which shall be met.
- D. Fire Protection Installer shall base all measurements, both horizontal and vertical from established bench marks. All work shall agree with these established lines and levels. Fire Protection Installer shall verify all measurements at site; and check the correctness of same as related to the work. Should the Fire Protection Installer discover any discrepancy between actual measurements and those indicated, which prevent following good practice or the intent of the drawings and specification, he shall not proceed with his work until he has received instructions from the Architect-Engineer.
- E. Contractor shall require full cooperation between trades and shall furnish (in writing, with copies to Architect-Engineer) any information necessary to permit the work of all trades to be installed satisfactorily and with least possible interference or delay. Where the work of one Fire Protection Installer will be installed in close proximity to the work of other trades, or where there is evidence that the work of the one will interfere with the work of others, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Architect-Engineer, the Fire Protection Installer shall prepare composite working drawings and section at a suitable scale not less than 1/4" equal to 1'-0" clearly showing how his work is to be installed in relation to the work of other trades. If the Fire Protection Installer installed his work before coordinating with other trades or so as to cause any interference with work of other trades, he shall make necessary changes in his work to correct the condition without extra charge.
- F. Fire Protection Installer shall protect the work and material of all trades from damage by his work or workmen, and shall make good all damage thus caused. Fire Protection Installer shall be responsible for work and equipment until finally inspected, tested, and accepted; protect work against theft, injury, or damage, and carefully store materials and equipment received on site which are not immediately installed. He shall close open ends of work with temporary covers or plugs during construction to prevent entry of obstructive material.
- G. Fire Protection Installer shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery onto the premises of any equipment and apparatus furnished and shall remove same from premises when no longer required.
- H. The Contractor is required under contract stipulations to leave all chases and openings in walls, floors, ceilings, partitions, beams, etc., provided, however, this Fire Protection Installer shall furnish to the Contractor full information as to locations, dimensions, etc., of such chases and openings, including the provision and proper setting of all sleeves and other equipment in advance of construction of the work so as to cause no delay in the work. Should any cutting of walls, floors, ceilings, partitions, etc., be required

for proper installation of the work or apparatus of this Fire Protection Installer due to his failure in giving the Contractor the proper information at the time required, such cutting and restoring of the work to its original condition shall be done at his own expense and in a manner acceptable to the Architect-Engineer. All drilling and patching for anchor bolts, hangers, and other supports shall be subject to the approval of the Architect-Engineer. All refuse and surplus materials incidental to the work of this contract shall be removed by this Fire Protection Installer as the work progresses.

- I. All portions of the system shall be hydrostatically tested. Flushing of underground piping shall be done in accordance with NFPA 13 and 24. On completion of the work, the system shall be tested by full flow. All alarms and other devices shall be tested. All appliances and equipment for testing shall be furnished by the Fire Protection Installer; and all expenses, except for water and electricity used in connection with the tests, shall be defrayed by him. On completion of the tests by the Fire Protection Installer, any defects detected shall be corrected by the Fire Protection Installer at his own expense and additional tests made until the systems are proved satisfactory. The Fire Protection Installer shall submit to the Architect-Engineer a certificate covering materials and tests, similar to that specified in NFPA 13 with a request for formal inspection, at least two (2) working days prior to the date of inspection. At this inspection, any or all of the required tests shall be repeated as directed by the Architect-Engineer.
- J. The Fire Protection Installer shall maintain in good order a set of plans for recording all changes made to the work covered under this section of the specification during the entire job operation. He shall keep the set up to date at all times. At the completion of the work, the set of plans is to be turned over to the Architect-Engineer.

3.02 INSTALLATION OF EXTERIOR FIRE LINES

- A. **Placing and Laying:** Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the water-line materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate couplings and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and re-laid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until jointing is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense, in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored as shown.

3.03 SETTING OF FIRE HYDRANTS AND VALVES AND VALVE BOXES

- A. Fire hydrants shall be located where and installed as shown. Each hydrant shall be connected to the main with a 6" branch line having at least as much cover as the distribution main. Hydrants shall be set plumb with the pumper nozzle facing the roadway and with the center of the lowest outlet not less than 18" above the finished surrounding grade and the operating nut not more than 48" above the finished surrounding grade. Except where approved otherwise, the backfill around hydrants shall be thoroughly compacted to the finished gradeline immediately after installation to obtain beneficial use of the hydrant as soon as practicable. The hydrant shall be set upon a slab of concrete not less than 4" thick and 18" square. Not less than 7 cubic feet of free draining broken stone or gravel shall be placed around and beneath the waste opening of dry barrel hydrants to insure drainage.
- B. Valves and valve boxes shall be installed where shown or specified and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads and streets. Earth fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides of the box, or to the undisturbed trench face if less than 4 feet.

- C. Hydrants and valves after delivery shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and the hydrant or valve shall be fully opened and fully closed to insure that all parts are in working condition.
- D. Service Boxes: Where water lines are located below paved streets having curbs, the boxes shall be installed directly back of the curbs. Where no curbing exists, service boxes shall be installed in accessible locations, beyond the limits of street surfacing, walks and driveways.
- E. Tapped tees and crosses for future connections shall be installed where shown.
- F. Thrust Blocks: Plugs, caps, tees, and bends deflecting 22-1/2 degrees or more, either vertically or horizontally, on water lines 6" in diameter or larger, and fire hydrants shall be provided with thrust blocking, or metal tie rods and clamps or lugs, as directed. Thrust blocking shall be concrete of mix not leaner than 1 cement; 2-1/2 sand, 5 gravel, and having a compressive strength of not less than 2,000 p.s.i. after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps shall be protected by galvanizing or by coating with bituminous paint.

3.04 TESTS FOR EXTERIOR FIRE LINES

- A. Hydrostatic Tests: Where any section of a waterline is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking unless otherwise approved. The method proposed for disposal of waste water from hydrostatic tests and disinfection shall be submitted to the Architect prior to performing hydrostatic tests.
- B. Pressure Test: After the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of water piping shall, unless otherwise specified, be subjected for 2 hours to a hydrostatic pressure test of 200 pounds per square inch. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, valves, and hydrants shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipes, joints, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. All replacement and repair shall be without additional expense to the Owner.

END OF SECTION

SECTION 31 20 00

EARTHWORK

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes earthwork and related operations, including but not limited to clearing and grubbing the construction site; dewatering; excavating all classes of material encountered; pumping, draining, and handling of water encountered in the excavations; handling, storage, transportation, and disposal of all excavated and unsuitable material; construction of fills and embankments; backfilling around structures and pipe; backfilling all trenches and pits; compacting; all sheeting, shoring, and bracing; preparation of subgrades; surfacing and grading; and any other similar, incidental, or appurtenant earthwork operation which may be necessary to properly complete the work.
- B. Provide all services, labor, materials, and equipment required for all earthwork and related operations necessary or convenient to the Contractor for furnishing a complete work as shown on the Drawings or specified in these Contract Documents.

1.2 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best available data and are intended to give reasonable, accurate information about the existing elevations. They are not precise, and the Contractor should satisfy himself as to the exact quantities of excavation and fill required.
- B. Perform earthwork operations in a safe and proper manner taking appropriate precautions against all hazards.
- C. Maintain in good condition at all times all excavated and fill areas for structures, trenches, fills, topsoil areas, embankments, and channels until final acceptance by the Owner. Repair all damage caused by erosion or other construction operations using material of the same type as the damaged materials.
- D. If soil borings are available for the area of this work, they will be on file at the Owner's address where they will be made available for review. This information is made available for such use as Contractor may choose to make of it in the preparation of his bid, but the Owner gives no guarantee, either expressed or implied, that it represents a true or complete cross section of all of the material to be encountered in performing the excavation and earthwork on this project.
- E. Earthwork operations within the rights-of-way of the State Department of Transportation, the County Road Department, and the respective cities shall be conducted in accordance with the requirements and provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence over and supersede the provisions of these Specifications.

- F. Control grading to prevent water running into excavations. Obstruction of surface drainage shall be avoided and a means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Material for backfill or for protection of excavation in public roads from surface drainage shall be neatly placed and kept shaped so as to cause the least possible interference with public travel. Free access must be provided to all fire hydrants, valves, meters, and private drives.
- G. No classification of excavated materials will be made. Excavation and trenching work shall include the removal and subsequent handling of all materials excavated or otherwise removed in performance of the contract work, regardless of the type, character, composition, or condition thereof.
- H. Tests for compaction and density shall be conducted by the Engineer or by an independent testing laboratory selected by him. Costs of compaction tests performed by an independent testing laboratory shall be paid for directly by the Owner and not as a part of this contract. Make all necessary excavations and supply any samples of materials necessary for conducting compaction and density tests. Pay the cost of all retests made necessary by the failure of materials to conform to the requirements of these Contract Documents.
- I. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, "Excavations, Trenching, and Shoring," and Subpart O, "Motor Vehicles, Mechanized Equipment, and Marine Operations," and shall be conducted in a manner acceptable to the Engineer.
- J. It is understood and agreed that a thorough investigation by the Contractor has been made of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains, particularly in areas where construction activities may encounter water-bearing sands and gravels or limestone solution channels. Provide all services, labor, equipment, and materials necessary or convenient for completing the work.

PART 2 - EXECUTION

2.1 INITIAL SITE PREPARATION

- A. Preparatory to beginning construction operations, remove from the site all vegetative growth, trees, brush, stumps, roots, debris, and any other objectionable matter, including fences, buildings, and other structures shown on the Drawings in the construction areas which are designated for removal or which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.
- B. Grub and remove stumps and roots to a depth not less than 5 feet below grade. Fill all holes or cavities which extend below the subgrade elevation of the proposed work with compacted layers of crushed rock or earth backfill conforming to the requirements specified here for backfill. Do not incorporate organic material from clearing operations in excavation backfill or embankment material.

- C. Exercise special precautions for the protection and preservation of trees, cultivated shrubs, sod, fences, buildings, and other structures located in the construction area but not within designated clearing limits as shown on the Drawings or within the limits of embankments, excavations, or proposed structures. Repair or replace any of the aforementioned items damaged by Contractor's operation or construction activities.
- D. Remove and dispose of any excess material resulting from clearing or site preparation operations. Dispose of such materials in a manner acceptable to the Engineer and at an approved location where such materials can be lawfully placed.

2.2 DEWATERING

- A. Provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Dewatering shall be accomplished by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches, provided such ditches are kept open and free-draining at all times. The actual dewatering methods used shall be acceptable to the Engineer.
- B. Do not place concrete or mortar in water nor allow water to rise over newly placed concrete or mortar for at least 24 hours after placement, unless specifically authorized by the Engineer. No concrete structure shall be exposed to unequal hydrostatic forces until the concrete has reached its specified 28-day strength. Do not allow water to rise above bedding during pipe-laying operations. Exercise care to prevent damage to pipelines or structures resulting from flotation, undermining, or scour. Dewatering operations shall commence when ground or surface water is first encountered and shall be continuous until water can safely be allowed to rise in accordance with the provisions of this section. Protect excavations from the entrance of surface water to the extent possible by the use of dikes and/or covers.
- C. Standby pumping equipment shall be on the jobsite. A minimum of 1 standby unit (a minimum of 1 for each 10 in the event well points are used) shall be available for immediate installation should any pumping unit fail. The design and installation of well points or deep wells shall be suitable for the accomplishment of the work. Submit drawings or diagrams on proposed well point or deep well dewatering systems to the Engineer for review.
- D. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with crushed rock at no cost to the Owner.
- E. Dispose of the water from the work in a suitable manner without damage to adjacent property. Conveyance of the water shall not interfere with traffic flow or treatment facilities operation. Do not drain water into work built or under construction without prior consent of the Engineer. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.

- F. Provide sedimentation and desilting basins as necessary or when directed by the Engineer to prevent the entrance of excessive or injurious amounts of sand and silt from surface runoff or dewatering operations into storm drains or receiving waters. The system used for desanding or desilting the water shall be a baffled structure and shall provide not less than 5 minutes detention time and shall be designed to have a "flow-through" velocity not exceeding 0.2 foot per second at the anticipated peak flow. The method of desanding or desilting and the point of disposal shall be subject to the approval of the Engineer.
- G. Dispose of water safely and in accordance with applicable Environmental Protection Agency, U.S. Army Corps of Engineers, and State Water Quality Control Division standards and permits.

2.3 SHEETING, SHORING, AND BRACING

- A. The sides of all excavations shall be sufficiently sheeted, shored, and braced as necessary to prevent slides, cave-ins, settlement, or movement of the banks; to maintain the excavation clear of all obstructions; and to provide safe working conditions. Wood or steel sheeting shall be used in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances.
- B. Correctly assessing the need for sheeting, analyzing the stresses induced, and maintaining regulatory compliances shall be totally the responsibility of the Contractor. Since the Engineer does not dictate or determine the Contractor's sequence or limits of excavation, the Engineer assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for adequate professional structural and geotechnical engineering supervision to assess the need for sheeting and shoring and design same. Results of sheeting and shoring analysis and design shall be submitted to the Engineer on request.
- C. Excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys, shall be sheeted, shored, and braced adequately to prevent undermining beneath or subsequent settlement of such structures or pavements. Underpinning of adjacent structures shall be done when necessary to maintain structures in safe condition. Any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes due to failure or lack of sheeting or bracing, or improper bracing or occurring through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his own expense.
- D. Sheeting, shoring, or bracing materials shall not be left in place unless otherwise specified or shown on the Drawings or ordered by the Engineer in writing. Such materials shall be removed in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Trench sheeting shall be left in place until backfill has been brought to a level 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed. Sheeting for structures shall be left in place until backfill has been brought to a level 12 inches above the top of the bottom footing. It shall then be cut off and the upper portion removed.

- E. All holes and voids left in the work by the removal of sheeting, shoring, or bracing shall be filled and thoroughly compacted.

2.4 EXCAVATION

A. General

1. Excavation shall include the removal of all material from an area necessary for the construction of a pipeline or structure. Excavations shall provide adequate working space and clearances for the work to be performed therein.
2. All material excavated below the bottom of concrete walls, footings, and foundations shall be replaced, by and at the expense of the Contractor, with Class B concrete to the lines and grades shown on the Drawings, except where otherwise shown on the Drawings, specified herein, or authorized by the Engineer.
3. Where quicksand, soft clay, spongy or swampy earth, or other materials unsuitable for subgrade or foundation purposes are encountered below the excavation limits, they shall be removed and disposed of to the level of suitable material. Areas so excavated shall be backfilled with Class B concrete or with compacted layers of crushed rock, sand, or other approved material conforming to the requirements specified herein for backfill to the lines and grades shown on the Drawings.
4. Place barriers at each end of all excavation and at such places as may be necessary along excavations to warn all pedestrian and vehicular traffic of such excavations. Place lights along excavations from sunset each day to sunrise of the next day until the excavations are backfilled. Barricade all excavations in such a manner as to prevent persons from falling or walking into any excavation.

B. Rock Excavation

1. Rock encountered in the process of excavation for structures shall be uncovered and stripped of all loose materials over the entire limits of excavation. Rock encountered for removal in a trench section shall be uncovered for a distance of not less than 50 feet.
2. Excavate rock and large boulders in trenches over the horizontal limits of excavation and to depths as shown on the Drawings.
3. Backfill the space below grade for pipelines to the proper grade with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill. Where pipe sewers are constructed on concrete cradles, excavate rock to the bottom of the cradle as shown on the Drawings.
4. Excavate rock under structures to lines and grades shown on the Drawings. Unless specified otherwise, where rock excavation has been carried below grade, the Contractor shall backfill to grade with Class B concrete at his own expense.
5. Where rock foundation is obtained at grade for over 50 percent of the area of any one structure, the portion of the foundation that is not rock shall be excavated

below grade to reach a satisfactory foundation of rock. The portion below grade shall be backfilled with Class B concrete.

6. Where rock foundation is obtained at grade for less than 50 percent of any one structure and satisfactory rock cannot be found over the remaining area by reasonable additional excavation, the rock shall be removed for a depth of 12 inches below grade and the space below grade shall be backfilled to the proper grade with compacted layers of crushed rock conforming to the requirements specified herein for backfill.
7. Drilling and blasting operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws, and regulations governing blasting and the use of explosives. Conduct rock excavation near existing pipelines or other structures with the utmost care to avoid damage. Promptly repair injury or damage to other structures and properties to the satisfaction of the Owner by the Contractor at his own expense. The Contractor is advised to hire qualified consultants to perform a "preblast survey" in area where damage could occur due to blasting; all expenses for such survey must be borne by the Contractor, and no separate payment for same will be made.
8. Complete rock excavation for all structures and adjacent trenches under this Contract and any other rock excavation directed by the Engineer before construction of any structure is started in the vicinity.

C. Borrow Excavation

1. Wherever the backfill of excavated areas or the placement of embankments or other fills requires specified material not available at the site or material in excess of suitable material available from the authorized excavations, such materials shall be obtained from other sources. This may require the opening of borrow pits at points not immediately accessible from the work. In such cases make suitable arrangements with the property owner and pay all costs incident to the borrowed material including royalties, if any, for the use of the material. Before a borrow pit is opened, the quality and suitability of the material to be obtained therefrom shall be approved by the Engineer.
2. Borrow pits shall be cleared, grubbed, and finish-graded in accordance with the requirements specified herein.

- D. Roadway Excavation. Roadway excavation shall consist of excavation for roadways and parking areas in conformity with lines, grades, cross sections, and dimensions shown on the Drawings. After shaping to line, grade, and cross section, the subgrade shall be rolled until compacted to a depth of at least 6 inches to 100 percent of the maximum density at optimum water content as determined by AASHTO T99, Method A. This operation shall include any reshaping and wetting required to obtain proper compaction. All soft or otherwise unsuitable material shall be removed and replaced with suitable material.

E. Trench Excavation

1. Trench excavation shall consist of the removal of materials necessary for the construction of water, sewer, and other pipelines and all appurtenant facilities including manholes, inlets, outlets, headwalls, collars, concrete saddles, piers, and pipe protection called for on the Drawings.
2. Excavation for pipelines shall be made in open cut unless shown otherwise on the Drawings. Trenches shall be cut true to the lines and grades shown on the Drawings or established by the Engineer on the ground. The banks of trenches shall be cut in vertical, parallel planes equidistant from the pipe centerline. From an elevation 12 inches above the top of the pipe to the bottom of the trench, the horizontal distances between vertical planes for different sizes of pipe shall not exceed those shown on the Drawings. When sheeting is used, the width of the trench shall be considered as the distance between the inside faces of the sheeting. The bottom of the trench shall be cut carefully to the required grade of the pipe except where bedding materials or cradles are shown, in which case the excavation shall extend to the bottom of the bedding or cradles as shown on the Drawings. Minimum pipe cover shall be as shown on the Drawings or specified in these Contract Documents.
3. The use of a motor-powered trenching machine will be permitted, but full responsibility for the preservation, replacement, and/or repair of damage to any existing utility services and private property shall rest with the Contractor.
4. Bell holes for bell and spigot pipe and/or mechanical joint pipe shall be excavated at proper intervals so the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper installation of all joints in the pipe. Bell holes shall not be excavated more than 10 joints ahead of pipe laying. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or granular embedment when the pipe is jointed.
5. Excavation for manholes, outlets, collars, saddles, piers, and other pipeline structures shall conform to the additional requirements specified herein for structural excavation.
6. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.
7. Wherever pipe trenches are excavated below the elevation shown on the Drawings, the Contractor, at his own expense, shall fill the void thus made at the proper grade with Class B concrete or with compacted layers of crushed rock or sand conforming to the requirements specified herein for backfill, unless otherwise specified herein or shown on the Drawings.
8. In all cases where materials are deposited along open trenches, they shall be placed so that no damage will result to the work and/or adjacent property in case of rain or other surface wash.

F. Structural Excavation

1. Structural excavation shall consist of the removal of all materials necessary for the construction of structures, including tanks, foundations, footings, wet wells, dry wells, box culverts, flumes, channels, buildings, and other miscellaneous structures.
2. The bottoms of structural excavations shall be true to the lines and grades shown on the Drawings. Faces of excavations shall not be undercut for extended footings. Except as provided herein for excavation of unsuitable material or rock, where the excavation is carried below the grade elevation shown on the Drawings, the Contractor shall backfill the void thus made to the proper grade with Class B concrete at his own expense.

2.5 BACKFILLING

A. Materials for backfilling shall conform to the following requirements:

1. Select Earth Backfill: Fine, sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete less than 2 inches in maximum dimension except that the maximum particle size shall be $\frac{1}{2}$ inch when used with PVC or other flexible thermoplastic pipe.
2. Common Earth Backfill: Sound, loose earth containing optimum moisture content for compaction to 90 percent of maximum density, free from all wood, vegetable matter, debris, and other objectionable material, and having scattered clods, stones, or broken concrete and pavement less than 6 inches in maximum dimension.
3. Sand: Natural or imported sand conforming to ASTM D 1073.
4. Crushed Rock: Crushed rock conforming to Section 800, Size 7 ($\frac{1}{2}$ -inch to No. 4) of the Georgia Department of Transportation's Standard Specifications - Construction of Transportation Systems (latest edition).
5. Class B Concrete: Class B concrete as specified elsewhere in these Specifications or on the Drawings.

B. General

1. Earth backfill shall be compacted to not less than 90 percent of the maximum density as determined by ASTM D 698 at a moisture content within 3 percentage points, unless otherwise specified herein. Crushed stone and sand shall be compacted to not less than 83 percent of the solid volume density as determined from the bulk specific gravity by AASHTO T-84 and T-85 and the dry weight of the aggregate.
2. Material that is too dry for adequate compaction shall receive a prior admix of sufficient water to secure optimum moisture content. Material having excessive water content shall not be placed at any time.

3. Backfill material required to be compacted shall be placed in horizontal layers not to exceed 6 inches in thickness (before compaction) and compacted in place by ramming, tamping, or rolling, unless otherwise specified herein. Compaction shall be accomplished by power-driven tools and machinery wherever possible. Compaction and consolidation of sand and crushed stone backfill shall be accomplished using vibrating equipment in a manner acceptable to the Engineer.

C. Backfilling Trenches

1. The backfilling of sewers, water, and other pipeline trenches shall be started immediately after the construction of same has been inspected and approved by the Engineer. Select backfill or crushed stone as shown on the Drawings shall be placed in the trench under and on each side of the pipe in 6-inch layers for the full width of the trench and thoroughly and uniformly compacted by ramming and/or tamping to a minimum of 90 percent of the maximum density determined as specified herein. Select earth backfilling or crushed stone as shown on the Drawings shall start above the pipe bedding. Sufficient select backfill or crushed stone as shown on the Drawings shall be placed around the pipe and compacted to provide a cover of not less than 12 inches over the top of the pipe. Mechanical compactors or tampers shall not be used within 12 inches of pipe. Compaction in this area shall be accomplished by hand methods. Sand or specified crushed stone bedding material shall be substituted for select earth backfill when the pipe material is other than ductile iron or when crushed stone trench backfill is required. Backfilling shall proceed simultaneously on both sides of the pipe to prevent lateral displacement.
2. Caution shall be used during backfill operations for PVC or other flexible thermoplastic pipe to prevent pipe deformation. PVC or other flexible thermoplastic pipe shall not be subjected to roller or wheel loads until a minimum of 30 inches of backfill has been placed over the top of the pipe. A hydrohammer shall NOT be used until a minimum depth of 48 inches of backfill has been placed over the top of the pipe.
3. Backfilling of PVC pressure pipe or other flexible thermoplastic pipe (water pipe) shall be as described in Paragraph 1 above.
4. In streets and alleys, across sidewalks and driveways, and at any other places subject to vehicular traffic or other superimposed loads, crushed rock backfill shall be placed and compacted in 12-inch layers from the bottom of the trench upward for the full depth of the trench. Crushed rock backfill shall be compacted by use of a hydrohammer or approved vibratory compactor. The top 6 inches of the finished subgrade shall be equal to not less than 100 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. When field tests show failure to meet the density requirement, the subgrade shall be loosened by diskings, harrowing, or other approved methods to a depth of not less than 6 inches, then reshaped and recompacted as indicated in this paragraph.
5. Trenches under concrete slabs and footings of structures shall be completely backfilled with compacted sand or crushed rock or filled with Class B concrete as shown on the Drawings.

6. All backfilling shall be done in such a manner that the pipe or structure over or against which it is being placed will not be disturbed or injured. Any pipe or structure injured, damaged, or moved from its proper line or grade during backfilling operations shall be removed and repaired to the satisfaction of the Engineer and then rebackfilled.

D. Backfilling Around Structures

1. Backfilling around structures shall consist of common earth backfill placed in 6-inch layers and compacted by tamping to a minimum of 90 percent of the maximum density determined as specified herein for the full depth of the excavation from the bottom to the finished grade. No backfill shall be placed against concrete structures until the concrete has reached its specified 28-day compressive strength. Where practical, compaction of structural backfill shall be accomplished by power-driven tamping equipment.
2. Where crushed rock mats under slabs and foundations are called for on the Drawings, excavate below grade to the depth of the crushed rock mat as shown on the Drawings and install a compacted crushed rock bed. This shall be finished to a true line or plane and even with the subgrade of the concrete foundations, piers, footings, or slabs. Before placing any crushed stone, remove all loose earth or debris. This crushed rock mat shall extend 12 inches beyond all slabs and foundations or to edges of sheet piling.
3. Crushed rock mats 12 inches or less in thickness shall be constructed of compacted layers of crushed rock conforming to Section 800, Size 7 (½-inch to No. 4) of the Georgia Department of Transportation's Standard Specifications - Construction of Transportation Systems (latest edition).
4. Crushed rock mats of thickness greater than 12 inches shall have the top 12 inches constructed of compacted layers of crushed rock as specified above. That portion below the top 12 inches shall be constructed of compacted layers of crushed rock conforming to Section 800, Georgia Department of Transportation Specifications, with a modified gradation of 6 inches to dust as received from the crusher.
5. The use of earth backfill to support footings, foundations, and structures shall not be permitted, unless otherwise shown on the Drawings.

2.6 FILLS AND EMBANKMENTS

- A. Fills and embankments shall consist of all earth fills except backfills in trenches or around structures. Unless special material is specified or shown on the Drawings, material for fills and embankments shall consist of excavated material from structures or of a mixture of such excavated materials and materials borrowed from other sources by the Contractor. All material used for fills and embankments shall be free from wood, vegetable matter, debris, soft or spongy earth or clay, large rock, or other objectionable material and shall be acceptable to the Engineer.
- B. Materials shall be placed in the fill or embankment in successive layers 8 inches or less in thickness before compaction, each layer being approximately horizontal and

extending to the full limit of the required cross section, and shall be compacted over the entire surface to not less than 95 percent of the maximum density as determined by ASTM D 698 at a moisture content of within 3 percentage points of optimum. The process shall be repeated for each layer of material until the fill or embankment conforms to the plan lines, grades, and cross sections. The degree of compaction and moisture content required, the method of tamping, and the equipment used shall be approved by the Engineer.

- C. The area over which the fill or embankment is to be constructed shall first be cleared of all vegetation, debris, and other objectionable material and, if the ground is in a loose, uncompacted condition, it shall be compacted to a minimum 95 percent of maximum density determined as specified herein.
- D. No material shall be placed beyond the sloping lines of embankment unless so ordered by the Engineer. Material allowed to be placed beyond the lines of embankment shown on the Drawings will be compacted as required above unless otherwise authorized by the Engineer.
- E. Material for embankments or roadway fills shall be placed in 6-inch maximum lifts and shall be compacted by rolling with power rollers weighing not less than 10 tons, with sheepsfoot rollers, with vibrating rollers, or with pneumatic tire rollers, as required to accomplish the work. While and as each layer is deposited, water shall be applied in sufficient amount to ensure optimum moisture to secure the compaction specified.
- F. The use of trucks, carryalls, scrapers, tractors, or other heavy hauling equipment shall not be considered as rolling in lieu of rollers, but the traffic of such hauling equipment shall be distributed over the fill in such a manner as to make the use of the compaction afforded thereby as an addition to compaction by the use of rollers.
- G. Wherever a trench passes through a fill or embankment, the fill or embankment material shall be placed as compacted to an elevation 12 inches above the top of the pipe before the trench is excavated.
- H. Subgrades for all roadbeds shall meet the requirements of Subsection 2.5 C.4.

2.7 DISPOSAL OF WASTE AND UNSUITABLE MATERIALS

- A. All materials removed by excavation which are suitable for the purpose shall be used to the extent possible for backfilling pipe trenches, foundations, and footings and for making embankment fills or for such other purposes as may be shown on the Drawings. All materials not used for such purposes shall be considered as waste materials and the disposal thereof shall be made in a manner and at locations approved by the Engineer.
- B. Waste materials shall be spread in uniform layers and neatly leveled and shaped. Spoil banks shall be provided with sufficient and adequate openings to permit surface drainage of adjacent lands.
- C. Unsuitable materials, consisting of wood, vegetable matter, debris, soft or spongy clay, peat, and other objectionable material so designated by the Engineer, shall be removed from the work site and disposed of in a manner and at a location approved by the Engineer.

- D. No unsuitable or waste material shall be dumped on private property unless written permission is furnished by the owner of the property and unless a dumping permit is issued from the local jurisdiction.
- E. The Contractor is responsible for any and all permits and other requirements, such as sediment runoff control necessitated by the disposal of waste material.

2.8 FINAL GRADING

- A. After other earthwork operations have been completed, the sites of all structures, roads, and embankments shall be graded within the limits and to the elevations shown on the Drawings. Grading operations shall be so conducted that materials shall not be removed or loosened beyond the required limits. The finished surfaces shall be left in smooth and uniform planes such as are normally obtainable from the use of hand tools. If Contractor is able to obtain the required degree of evenness by means of mechanical equipment, the use of hand labor methods will not be required. Neatly trim and finish slopes and ditches to slopes shown on the Drawings unless otherwise approved by the Engineer.
- B. Grade and dress all finished ground surfaces to present a surface varying not more than plus or minus 0.10 foot as regards local humps or depressions, unless otherwise specified or shown on the Drawings, and shall be acceptable to the Engineer.

2.9 TOPSOIL

- A. All areas to be planted with trees or shrubs, or with sprigged grass as shown on the plans, shall be prepared by grading to a smooth, even surface to a level 4 inches below the elevation of the finished grade shown on the Drawings. It shall then be brought to a neat and finished grade by the addition of 4 inches of approved topsoil.
- B. Topsoil removed from the construction area may be stockpiled and reused or topsoil may be obtained from approved borrow areas. If obtained from borrow areas, make suitable arrangements with the property owner and pay all costs incident to the borrowed material including royalties.

2.10 SETTLEMENT

- A. The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within 1 year after final acceptance of the work by the Owner.
- B. Make, or cause to be made, all repairs or replacements made necessary by settlement within 30 days after receipt of written notice from the Engineer or Owner.

2.11 DUST CONTROL

- A. The Contractor shall use all means necessary to control dust on and near the work and all off-site borrow areas.
- B. The Contractor shall thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors and concurrent performance of work on the site.

END OF SECTION

SECTION 31 25 00

SLOPE PROTECTION AND EROSION CONTROL

PART 1 - GENERAL

1.1 SCOPE

- A. This section shall consist of temporary control measures as shown in the plans or directed by the Engineer during the life of the Contract to control erosion and water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.
- B. The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features to assure economical, effective, and continuous erosion control throughout the construction and post-construction periods.
- C. All designs will conform to and all work will be performed in accordance with the standards and specifications of the publication entitled "Manual for Erosion and Sediment Control in Georgia."
- D. Implementation and Maintenance. Contractor shall designate one individual to be responsible for implementation and maintenance of erosion and sedimentation controls on 24-hour, everyday basis. Contractor shall furnish the individual's name, address, and 24-hour telephone number. Contractor shall update contact information as necessary.

PART 2 - PRODUCTS

2.1 TEMPORARY BERMS

- A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.
- B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.

2.2 TEMPORARY SLOPE DRAINS

- A. A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod, or other material acceptable to the Engineer that may be used to carry water down slopes to reduce erosion.

2.3 SEDIMENT STRUCTURES

- A. Sediment basins, ponds, and traps are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

2.4 CHECK DAMS

- A. Check dams are barriers composed of logs and poles, large stones, sand bags, or other materials placed across a natural or constructed drainway.
- B. Stone check dams shall not be utilized where the drainage area exceeds 50 acres. Log and pole structures shall not be used where the drainage area exceeds five acres.

2.5 TEMPORARY SEEDING AND MULCHING

- A. Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes, including waste sites and borrow pits, shall be seeded when and where necessary to eliminate erosion.

2.6 BRUSH BARRIERS

- A. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation.
- B. Brush barriers are placed on natural ground at the bottom of fill slopes, where the most likely erodible areas are located, to restrain sedimentation particles.

2.7 BALED HAY OR STRAW CHECKS

- A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing 5 cubic feet or more of material.
- B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation, erosion, or water run-off is a problem.

2.8 TEMPORARY SILT FENCES

- A. Silt fences shall be Type C utilizing woven wire reinforcement attached to posts with filter cloth composed of plastic filter fabric attached to the upstream side of the fence to retain the suspended silt particles in the run-off water. Fence and fabric shall meet the minimum standards set forth in the Department of Transportation, State of Georgia, Standard Specification, current edition.

PART 3 - EXECUTION

3.1 PRECONSTRUCTION CONFERENCE

- A. At the Preconstruction Conference, submit for acceptance the schedule for accomplishment of temporary and permanent erosion control work as applicable for clearing and grubbing, grading, bridges and other structures at watercourses, construction, and paving. Also submit for acceptance the proposed method of erosion control on haul roads and borrow pits and the plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operation have been accepted by the Engineer.

3.2 CONSTRUCTION REQUIREMENTS

- A. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, and the surface of erodible earth material exposed by excavation, borrow, and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, or slope drains, and the use of temporary mulches, mats, seeding, or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the Engineer.
- B. Incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in the accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage; that are needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.
- C. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, erosion control measures may be required between successive construction stages. Preconstruction vegetation ground cover shall not be destroyed, removed, or disturbed more than 20 calendar days prior to grading or earth moving unless approval is granted otherwise.
- D. The Engineer will limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress to keep the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.
- E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 50,000 square feet without prior approval by the Engineer.
- F. The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, and borrow and fill operations as determined by his analysis of project conditions.
- G. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

3.3 CONSTRUCTION MANAGEMENT TECHNIQUES

- A. Clearing and grubbing must be held to the minimum necessary for grading and equipment operation.
- B. Construction must be sequenced to minimize the exposure time of cleared surface area.
- C. Construction must be staged or phased for large projects. Areas of one phase must be stabilized before another phase can be initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
- D. Erosion and sediment control measures must be in place and functional before earth moving operations begin, and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but must be replaced at the end of the work day.
- E. All control measures shall be checked, and repaired as necessary, weekly in dry periods and within 24 hours after any rainfall of 0.5 inch within a 24-hour period. During prolonged rainfall, daily checking and repairing is necessary. The Contractor shall maintain records of checks and repairs.
- F. A specific individual shall be designated to be responsible for erosion and sediment controls on each project site.

3.4 CONSTRUCTION OF STRUCTURES

- A. Temporary Berms. A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at a slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a 10 degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimum disruptions. When practical and until final roadway elevations are approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.
- B. Temporary Slope Drains
 - 1. Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.
 - 2. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.

3. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipaters, sediment basins, or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipater would be dumped rock or a small sediment basin which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

C. Sediment Structures

1. Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet, at the bottom as well as in the ditch lines atop waste sites, and in the ditchlines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.
2. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation backfilled and properly compacted. The existing ground shall be restored to its natural or intended condition.

D. Check Dam

1. Utilize check dams to retard stream flow and catch small sediment loads. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.
2. Key all check dams into the sides and bottom of the channel a minimum depth of 2 feet. A design is not needed for check dams but some typical designs are shown in the standard plans.
3. Do not use stone check dams where the drainage area exceeds 50 acres. Log and pole structures should generally not be used where the drainage area exceeds five acres.

E. Temporary Seeding and Mulching. Perform seeding and mulching in accordance with Section 32 92 19, Seeding.

F. Brush Barriers. Brush barriers shall consist of brush, tree trimmings, shrubs, plants, and other approved refuse from the clearing and grubbing operation. The brush barriers shall be constructed approximately parallel to original ground contour. Each brush barrier shall be compressed to an approximate height of 3 to 5 feet and approximate width of 5 to 10 feet. The embankment shall not be supported by the construction of brush barriers.

G. Baled Hay or Straw Erosion Checks. Hay or straw shall be embedded in the ground 4 to 6 inches to prevent water flowing underneath. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground.

Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. Keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.

H. Temporary Silt Fences

1. Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.
2. Maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the Engineer. The silt accumulation at the fence may be left in place and seeded, removed, etc., as directed by the Engineer. The silt fence becomes the property of the Contractor whenever the fence is removed.

3.5 MAINTENANCE

- A. The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.
- B. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense.
- C. Where the work to be performed is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work shall be paid for at the proper contract prices.

3.6 EROSION CONTROL OUTSIDE PROJECT AREA

- A. Temporary erosion control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites. Bid price in such cases shall include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed.

END OF SECTION

SECTION 31 37 00

RIPRAP

PART 1 - GENERAL

1.1 SCOPE

- A. The work covered by this section includes furnishing all labor, materials, and equipment required to furnish, place, and set rock riprap, concrete block riprap, and sacked sand-cement riprap as shown on the Drawings and/or specified herein.
- B. Riprap shall be placed on slopes of embankments or other surfaces or around structures as protection against the erosive action of water.
- C. A filter blanket course of crushed rock, sand and gravel, or an approved filter fabric shall be placed under the riprap, where shown on the Drawings.

1.2 SUBMITTALS

- A. Provide the Engineer with written evidence in the form of mill test reports or test reports from a qualified testing laboratory that all sands, cements, and filter blanket materials used conform to the applicable requirements of this Specification section.
- B. Furnish representative samples of rock riprap material for classification, gradation, or other tests as the Engineer may direct, when requested by the Engineer.

PART 2 - PRODUCTS

2.1 ROCK RIPRAP

- A. Rock riprap shall be constructed using sound, dense, durable stones or rock fragments, free from cracks, pyrite intrusions, and other structural defects. Stones which will be used with mortar shall be free from dirt, oil, or other material that might prevent good adhesion with the mortar. Stones with a laminated structure shall be avoided. Field stones shall not be used as a source of rock for riprap. Only rock that has been approved by the Engineer shall be used for riprap.
- B. When the crushed aggregate is subjected to 5 alternations of the sodium sulfate soundness test, the weighted percentage of loss shall be not more than 12 percent.
- C. Shape of the stones shall be generally rectangular or cubic. Flat or elongated stones having a small dimension less than 1/3 of the large dimension shall not be used.
- D. At least 50 percent of the stones or rock fragments for plain rock riprap shall weigh 150 pounds or more. The sizes of the stones shall be well graded from the smaller to the larger.

- E. At least 90 percent of the stones or rock fragments for hand-placed rock riprap shall weigh 100 pounds or more and shall be not less than 12 inches long, 12 inches deep, and 8 inches wide.

2.2 FILTER BLANKET MATERIAL

- A. Filter blanket material shall consist of fragments of sound, durable stone or crushed rock, free from disintegrated stone, alkali, salt, vegetable matter, or adherent coating. Aggregate shall be reasonably free from thin or elongated pieces. The percentage of wear of the aggregate as outlined in AASHTO Test No. T-96 shall not exceed 7 percent.
- B. Aggregate shall have the following gradation:

<u>Sieve Size</u>	<u>Total Percent Passing by Weight</u>
1 1/4"	100
1"	95 - 100
3/4"	70 - 100
3/8"	50 - 85
No. 4	33 - 65
No. 10	20 - 45
No. 40	8 - 25
No. 200	0 - 10

- C. Material finer than the No. 10 sieve shall be of such characteristics and gradation that will prevent the mass from setting up or becoming cemented together. Stone or crushed rock may be used, provided the percentage of aggregate passing the No. 100 sieve is less than 10 percent.

PART 3 - EXECUTION

3.1 EQUIPMENT

- A. All equipment necessary for the satisfactory performance of the work shall be on hand and approved by the Engineer before construction will be permitted to begin.
- B. The equipment shall include wooden or metal tamps of sufficient weight and number to properly compact the slopes on which the riprap or slope pavement is to be placed.
- C. Wooden hand tamps, having a tamping face not greater than 1 square foot, and of sufficient weight and number to properly tamp the riprap, shall be furnished when sacked sand-cement is used.
- D. Equipment for mixing cement grout or sand cement shall include a mechanical mixer or, if the Engineer approves hand mixing for cement grout, a watertight mixing platform or mixing box of adequate size.

3.2 PREPARATION OF FOUNDATION

- A. Immediately prior to the construction of riprap, the slopes or ground surface shall be trimmed within reasonably close conformity to the lines and grades indicated on the Drawings or as directed by the Engineer, and shall be thoroughly compacted by the use of hand or mechanical tamps.
- B. On slopes, the bottom of the riprap shall be placed at least 2 feet below the natural ground surface, unless otherwise shown or directed.
- C. No material shall be placed on a frozen or otherwise unsuitable slope.

3.3 PLACEMENT OF FILTER BLANKET

- A. A filter blanket course shall be placed under the riprap on the prepared subgrade, where shown on the Drawings.
- B. Filter blanket shall be placed immediately prior to placement of riprap. Compaction of the filter blanket is not required except where called for on the Drawings.
- C. A synthetic filter fabric may be substituted for the filter blanket course, where specifically permitted by the Engineer. Filter fabric shall be especially designed for use as slope stabilization under riprap and shall be acceptable to the Engineer. Placement of filter fabric shall be in strict conformance with the manufacturer's written instructions and recommendations.

3.4 CONSTRUCTION OF PLAIN ROCK RIPRAP

- A. Plain rock riprap shall be constructed using a crane and clam-shell or other suitable equipment approved by the Engineer, unless otherwise shown or specified. The rock shall be placed as nearly as practicable in final position using powered equipment. If necessary, larger rocks shall be worked up to the surface when the material on the surface does not meet the weight specification or when the voids next to the foundation material are too large.
- B. The quantity of small stones shall be kept as low as possible, sufficient only to fill the voids between the larger stones. Care shall be taken that this small material is well distributed throughout the mass and not allowed to segregate or form pockets of small stone. All bridging shall be broken down. Large interstices, open channels, or voids shall be filled by chinking or otherwise manipulating the stones.
- C. When riprap is to be built on existing riprap, special care shall be taken to provide positive anchorage of the new riprap to the existing riprap.
- D. The finished riprap surface shall in general conform to the slope lines shown on the Drawings. No objectionable, hazardous, or unsightly projections above the general plane surface will be permitted.

3.5 CONSTRUCTION OF HAND-PLACED, PLAIN ROCK RIPRAP

- A. Hand-placed, plain rock riprap shall be constructed upon the prepared foundation by hand placing so that the stones shall be as close together as is practicable in order to

reduce the voids to a minimum. Construction of riprap on sloped surfaces shall begin at the bottom and shall progress upward in approximately horizontal layers.

- B. When rock riprap is constructed in more than one layer, it shall be so placed that it will be thoroughly tied together, with the larger stones protruding from one layer into the other.
- C. The standard depth of rock riprap shall be 12 inches unless otherwise indicated or directed and in no instance shall be less than 10 inches in depth. Rock riprap shall have an average depth for each 25 square feet of surface of not less than the depth indicated on the Drawings or directed by the Engineer, or the standard depth required in these Specifications.
- D. Each stone shall be so placed that the depth will be perpendicular to the surface upon which it is set. The length shall be placed so that it will be against the adjoining stones. The stones shall be placed in such a manner as to stagger all joints as far as it is possible and practicable.
- E. The main stones shall be thoroughly chinked and filled with the smaller stones by throwing them over the surface in any manner that is practicable for the smaller stones to fill the voids. This work shall continue with the progress of the construction. Tamping of the stones will not be required if the stones have been placed in a reasonable and satisfactory manner.
- F. Knapping of the stones will not be required except for stone protruding more than 4 inches above what is considered the normal surface of the stones, in which case these stones shall be broken down to come within 4 inches of the normal surface.

3.6 PROTECTION OF STRUCTURES

- A. All structures shall be carefully protected from damage by equipment or impact of stones or blocks. All damage shall be corrected by the Contractor at his own expense and in a manner acceptable to the Engineer.

END OF SECTION

SECTION 32 10 00

NEW AND REPLACEMENT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes provisions for hot-mixed asphalt paving and mineral aggregate subbase over prepared subgrade for trench width, full pavement width paving, and other areas as shown on the Drawings.
- B. Prepared subgrade is specified in Section 31 20 00, Earthwork.
- C. Proof rolling of prepared subgrade is included in this section.
- D. Saw-cutting of edges of existing pavement is required to minimize subsidence of the pavement into the trench and to minimize the width of pavement replacement.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification sections, apply to this section.

1.3 SUBMITTALS

- A. General. Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Material certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.
- C. Pavement marking plan indicating lane separations and defined parking spaces. Note dedicated handicapped spaces with international graphics symbol.

1.4 SITE CONDITIONS

- A. Weather Limitations. Apply prime and tack coats when ambient temperature is above 50°F (10°C) and when temperature has not been below 35°F (1°C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40°F (4°C) and when base is dry. Base course may be placed when air temperature is above 30°F (-1°C) and rising.
- C. Grade Control. Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General. Use locally available materials and gradations that exhibit a satisfactory record of previous installations.
- B. Coarse Aggregate. Sound, angular crushed stone, crushed gravel, or properly cured crushed blast furnace slag, complying with ASTM D 692-00.
- C. Fine Aggregate. Sharp-edged natural sand or sand prepared from stone, properly cured blast furnace slag, gravel, or combinations thereof, complying with ASTM D 1073-99.
- D. Mineral Filler. Rock or slag dust, hydraulic cement, or other inert material complying with ASTM D 242.
- E. Asphalt Cement. ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.
- F. Prime Coat. Cut-back asphalt type, ASTM D 2027; MC-30, MC-70, or MC-250.
- G. Tack Coat. Emulsified asphalt; ASTM D 977.
- H. Graded Aggregate Subbase (GAB). GAB per Georgia Department of Transportation (GDOT) standard specifications.
- I. Geotextile Fabric. 6 oz/sy, woven, polypropylene fabric; Mirafi, Inc., Type 600x, or equal.
- J. Lane Marking Paint. Alkyd-resin type, ready-mixed complying with AASHTO M 248, Type I.
 - 1. Color: White.
 - 2. Color: Yellow.

2.2 TYPES OF PAVEMENT

- A. Replace all existing pavement in streets, driveways, or parking areas which is removed, destroyed, or damaged by construction of sewage or water works as specified below, **as shown on the Drawings**, or as called for in the Bid Schedule. Unless otherwise shown or specified, all paved surfaces shall be replaced using the applicable pavement replacement Type 1 through 5 as shown on the Drawings. Pavement shown or specified to be replaced for the full width of the street shall be Type 6,7, or 8 as applicable and as shown on the Drawings. Materials, equipment, and construction methods used for paving work shall conform to the Specifications applicable to the particular type required for replacement, repair, or new pavements.
 - 1. Type 1 asphaltic concrete pavement for heavy-duty use shall have a minimum thickness of 3 inches placed in two equal layers. Type 1 pavement shall be composed of plant mix, asphaltic concrete E Mix (12.5 mm) conforming to "Hot Mix Asphaltic Concrete Construction," Section 400 of the GDOT specifications.

2. Type 2 asphaltic concrete pavement for light-duty use shall have a minimum thickness of 2 inches of H Mix (9.5 mm Type I) over 6 inches of compacted GAB to 100 percent of Standard Proctor placed in one layer. Type 2 pavements shall be composed of hot plant mix base Grading "B" conforming to Section 400, "Hot Mix Asphaltic Concrete Construction," GDOT specifications.
3. Type 3 pavement replacement shall consist of 2 inches of asphaltic concrete over a portland cement concrete base and shall be constructed according to the detail shown on the Drawings.
 - a. Replace portland cement concrete base courses with Class "A" concrete in accordance with Section 03 30 00, Cast-In-Place Concrete. The surface of the replaced concrete base course shall be left rough. The slab shall be of depth equivalent to the existing concrete base course, but in no case less than 7 inches thick. Replace expansion joints removed. Concrete base courses shall be reinforced and conform to details shown on the Drawings and applicable specifications of Section 326, "Portland Cement Concrete Subbase," GDOT specifications.
 - b. Asphaltic concrete shall be constructed on one layer and shall be the same as described for Type 2 paving above or Type 8 paving below.
4. Type 4 bituminous penetration pavement shall be a minimum of 1 inch in thickness and shall conform to Section 424, "Bituminous Surface Treatment," GDOT specifications.
5. Type 5 portland cement concrete pavement shall be Class "A" concrete conforming to Section 03 30 00, Cast-In-Place Concrete. The surface finish of the concrete pavement replaced shall conform to that of the existing pavement. The slab shall be of depth equivalent to the existing concrete pavement, but in no case less than 7 inches thick. Replace expansion joints removed. Concrete pavements shall be reinforced and shall conform to details shown on the Drawings and applicable specifications of Section 430, "Portland Cement Concrete Pavement," GDOT specifications.
6. Type 6 asphaltic concrete pavement for heavy-duty use for full street width replacement shall consist of one 2-inch layer of bituminous plant mix base (hot mix), B Mix (19 mm), conforming to Section 400, "Hot Mix Asphaltic Concrete Construction," GDOT specifications; and one 1-inch layer of asphaltic concrete pavement, F Mix (9.5 mm Type II), 100 percent limestone conforming to Section 400, "Hot Mix Asphaltic Concrete Construction," GDOT specifications.
7. Type 7 asphaltic concrete pavement for light-duty use where designated by Engineer for full street width replacement shall consist of one 2-inch layer of E Mix (12.5 mm) conforming to Section 400, "Hot Mix Asphaltic Concrete Construction," GDOT specifications.
8. Type 8 asphaltic concrete pavement for light-duty use where designated by Engineer for full-width replacement shall consist of one 2-inch layer of asphaltic concrete pavement, H Mix (9.5 mm Type I), conforming to Section 400, "Hot Mix Asphaltic Concrete Construction," GDOT specifications.

9. Where sewerage or water lines and appurtenances are constructed in or across unpaved, chert, or crushed stone surfaced streets, roadways, driveways, or parking areas, repair or replace the surface removed or damaged with a minimum of 6 inches of crushed stone in accordance with Section 310, "Graded Aggregate Construction," GDOT specifications.
 10. Temporary paving shall consist of a single application of bituminous surface treatment. The bituminous surface treatment pavement shall conform to Section 424, "Bituminous Surface Treatment," GDOT specifications.
- B. In no case shall paving repair be commenced without prior approval of the Engineer of the type of pavement, the equipment to be used, and the method or procedure to be used. The designation of "light-duty" or "heavy-duty" use as applied to Type 1, Type 2, Type 6, Type 7, or Type 8 pavement replacement shall be determined by the Engineer.
- C. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared, is intact, firm, properly cured, dry, and the tack coat has been applied.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. General. Remove loose material from compacted subgrade surface immediately before applying subbase.
- B. Roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction.
- C. Do not begin paving work until deficient subgrade areas have been corrected and are ready to receive subbase.
- D. Place mineral aggregate subbase and compact in accordance with the applicable GDOT specifications to provide a minimum of 6 inches or as shown on Drawings. Subbase thickness greater than 8 inches shall be placed in two or more layers.
- E. Roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.
- F. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.
- G. Prime Coat. Apply at rate of 0.20 to 0.50 gallon per square yard over compacted subbase. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile components.
- H. Tack Coat. Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gallon per square yard of surface.

- I. Allow to dry until at proper condition to receive paving.
 - J. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.
- 3.2 PLACING MIX
- A. General. Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225°F (107°C). Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.
 - B. Paver Placing. Place in strips not less than 10 feet wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.
 - C. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.
 - D. Joints. Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.
 - E. Curbs. Construct curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust.
 - F. Place curb materials to 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 as soon as material has cooled.
- 3.3 ROLLING
- A. General. Begin rolling when mixture will bear roller weight without excessive displacement.
 - B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
 - C. Breakdown Rolling. Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.
 - D. Second Rolling. Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.
 - E. Finish Rolling. Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory density.

- F. Patching. Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot-mixed asphalt. Compact by rolling to specified surface density and 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.

3.4 TRAFFIC AND LANE MARKINGS

- A. General. Provide traffic and lane markings in all areas where markings have been damaged due to trench width pavement. On full width pavement, provide markings in all areas where markings were present at beginning of project or where markings are designated to be provided on the Drawings.
- B. Cleaning. Sweep and clean surface to eliminate loose material and dust.
- C. Striping. Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and nonbleeding.
- D. Do not apply traffic and lane marking paint until layout and placement have been verified with Engineer.
- E. Apply paint with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates to provide minimum 12 to 15 mils dry thickness.

3.5 WHEEL STOPS

- A. General. Secure wheel stops to hot-mixed asphalt surface with not less than two 3/4-inch-diameter galvanized steel dowels embedded in precast concrete at 1/3 points. Size length of dowel to penetrate at least 1/2 hot-mixed asphalt depth.

3.6 FIELD QUALITY CONTROL

- A. General. Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Engineer.
- B. Thickness. In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:
 - 1. Base Course: Plus or minus 1/2-inch.
 - 2. Surface Course: Plus or minus 1/4-inch.
- C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
 - 1. Base Course Surface: 1/4-inch.

2. Wearing Course Surface: 3/16-inch.
 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4-inch.
- D. Check surface areas at intervals as directed by Engineer.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel chain link fencing.

1.02 RELATED SECTIONS

- A. Applicable provisions of the General Conditions, Supplementary Conditions and Division 1, General Requirements, apply to the work under this section.
 - 1. Section 03 30 00- Cast-in-Place Concrete

1.03 REFERENCES

- A. ASTM International:
 - 1. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
 - 2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A392 – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - 4. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 5. ASTM F567 – Standard Practice for Installation of Chain-Link Fence.
 - 6. ASTM F626 - Standard Specification for Fence Fittings.
 - 7. ASTM F900 – Standard Specification for Industrial and Commercial Steel Swing Gates.
 - 8. ASTM F934 - Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.
 - 9. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework.
 - 10. ASTM F1083 – Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
 - 11. ASTM F1184 - Standard Specification for Industrial and Commercial Horizontal Slide Gates.
 - 12. ASTM F1664 – Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence.
 - 13. ASTM F2200 - Standard Specification for Automated Vehicular Gate Construction.
- B. NEMA – National Electrical Manufacturers Association:
 - 1. NEMA MG1 – Motors and Generators.
 - 2. NEMA 3R – Enclosures.
- C. NFPA – National Fire Protection Association:
 - 1. NFPA 70 – National Electrical Code.
- D. UL – Underwriters Laboratories:
 - 1. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.04 SUBMITTALS

- A. Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data in the form of manufacturer’s technical data, specifications, and installation instructions for fence and gate posts, fabric, gates, and accessories.
- C. Shop drawings showing location of fence gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has at least three (3) years' experience and has completed at least five chain link fence projects with the same material and scope to that indicated for the Project with a successful construction record of in-service performance.
- B. Single-Source Responsibility: Obtain chain link fence, gates, accessories, fittings, and fastenings from a single source.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, deterioration of metals, metal finishes, and other materials beyond normal weathering and/or faulty operation of any gate operators and controls.
 - 2. Warranty Period: 5 (five) years from date of Substantial Completion.

1.07 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the completed structures. Verify dimensions by field measurements.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Fencing shall be galvanized steel chain link fabric on galvanized steel framework equal to Page Chain Link Fencing as manufactured by Page Fence Division or equal by Stateside Steel & Wire, LLC, American Chain Link Fence or Southeastern Wire. Additional alternate manufacturers must be approved by Architect prior to Bidding and provide product equal to or exceeding specified requirements.

2.02 FABRIC

- A. Galvanized Chain Link Fabric:
 - 1. Fabric shall be knuckled on top selvage and twisted on the bottom selvage with 2 inch mesh of 9 gauge (0.148 inch) wire.
 - 2. Fabric shall be finished as follows: ASTM A392, Class 2 zinc-coated (galvanized) after weaving.
- B. Fabric Height: As indicated on drawings. If not indicated, provide height of 8'-0".

2.03 FRAMEWORK

- A. Posts and Other Appurtenances: All posts and other appurtenances used in the construction of this fence shall be Type II round posts; cold-formed, electric-welded steel pipe conforming to heavy industrial requirements of ASTM F1043 for framing, ASTM F1083 for Group IC round pipe, and the following:
 - 1. Group IC, with minimum yield strength of 50,000 psi.
 - 2. Strength Requirement: Heavy Industrial according to ASTM F1043.
 - 3. Post Diameter and Thickness: According to ASTM F1043.
 - a. Top & Intermediate Rail: 1.66 inches. Manufacturer's longest lengths (17 to 21 feet) with swaged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull and end post.
 - c. Line Post: 2.375 inches.
 - d. End, Corner and Pull Post: 2.875 inches.
 - e. Swing Gate Post: According to ASTM F900.
 - 4. Coating for Steel Framing:
 - a. Metallic Coating: Type A, consisting of not less than min. 2.0-oz./sq. ft average zinc coating per ASTM A123/A or 4.0-oz./sq. ft. zinc coating per ASTM A653.
 - b. Polymer coating over metallic coating to provide Vinyl Coated Chain Link Fabric. Color to be selected by Architect from manufacturer's full range, complying with ASTM F934.

- B. Post Spacing: Posts shall be evenly spaced in the line of fence no further apart than 10 feet on center.
- C. Bottom tension wire: Polymer-Coated Steel Wire: 0.177-inch- (4.5-mm-) diameter, tension wire complying with ASTM F1664, Class 2b over Zn-5-Al-MM-alloy-coated steel wire.
 - 1. Color: Color to match fence fabric, complying with ASTM F934.
- D. Tie Wires: 0.166 inch (12-gauge) finish to match fence fabric.
- E. Braces: Brace pipe shall be 1.660 inch o.d. Type II steel pipe, Type C coating inside and outside, weight 1.84 pounds per foot and shall extend from the terminal post to the first adjacent line post. Braces shall fasten to posts by malleable steel fitting.
- F. Tension or Stretcher Bars: Hot dip galvanized steel with a minimum length 2 inches less than the full height of fabric with a minimum cross section of 3/16 inch by 3/4 inch and a minimum of 1.2 oz. of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post.
- G. Tension and Brace Bands: 3/4 inch wide, 11 gauge, minimum hot dip galvanized steel with a minimum of 1.2 oz. of zinc coating per sq. ft.
- H. Post and Line Caps: Provide weathertight closure cap for each post cap with loop to accept top rail.
- I. Top Rail: 1.66 inches in diameter. Manufacturer's longest lengths (17 to 21 feet) with swedged-end or expansion-type coupling, approximately 6 inches long for joining. Provide rail ends or other means for attaching top rail securely to each gate corner, pull and end post.

2.04 MISCELLANEOUS FITTINGS

- A. Furnish all fittings necessary to make a complete installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.03 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F567 and more stringent requirements indicated.
 - 1. Install fencing on established boundary lines inside property line.

3.04 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 3. Concealed Concrete: Top 2 inches (50 mm) below grade to allow covering with surface material unless detailed otherwise on drawings.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more.
- D. Line Posts: Space line posts uniformly at 96 inches (2440 mm) o.c. unless otherwise indicated.
- E. Post Bracing and Intermediate Rails: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
1. Locate horizontal braces at mid-height of fabric 72 inches (1830 mm) or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- F. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- (3.05-mm-) diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches (610 mm) o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
1. Extended along bottom of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches (152 mm) of bottom of fabric and tie to each post with not less than same diameter and type of wire.
- G. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- H. Intermediate Rail: Install and secure to posts with fittings.
- I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1 inch (25.4 mm) between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.
- K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.
- L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Work includes furnishing and installing segmental retaining wall (SRW). Segmental retaining wall to be engineered by the wall manufacturer. Also included is furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the construction drawings.
- B. Walls shall be installed per construction drawings. Contractor shall obtain retaining wall permit from local authority.

1.2 REFERENCE STANDARDS

- A. Segmental Retaining Wall Units
 - 1. ASTM C 1372 - Standard Specification for Segmental Retaining Wall Units
 - 2. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units
- B. Geosynthetic Reinforcement
 - 1. ASTM D 4595 - Tensile Properties of Geotextiles by the Wide-Width Strip Method
 - 2. ASTM D 5262 - Test Method for Evaluating the Unconfined Creep Behavior of Geosynthetics
 - 3. GRI:GG1 - Single Rib Geogrid Tensile Strength
 - 4. GRI:GG5 - Geogrid Pullout
- C. Drainage Pipe
 - 1. ASTM D 1248 - Specification for Corrugated Plastic Pipe
- D. Engineering Design
 - 1. "NCMA Design Manual for Segmental Retaining Walls", Second Edition

1.3 SUBMITTALS

- A. Material Submittals: The Contractor shall submit manufacturers' certifications two weeks prior to start of work stating that the SRW units and geosynthetic reinforcement meet the requirements of Section 2 of this specification.
- B. Design Submittal: The Contractor shall submit two sets of detailed design calculations and final retaining wall plans for approval at least two weeks prior to the beginning of wall construction. All calculations and drawings shall be prepared and sealed by a professional Civil Engineer (P.E.) – (Wall Designer) experienced in SRW design and licensed in the state where the wall is to be built.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Contractor shall check materials upon delivery to assure that specified type and grade of materials have been received and proper color and texture of SRW units have been received.
- B. Contractor shall prevent excessive mud, wet concrete, epoxies, and like materials that may affix themselves, from coming in contact with materials.
- C. Contractor shall store and handle materials in accordance with manufacturer's recommendations.
- D. Contractor shall protect materials from damage. Damaged materials shall not be incorporated into the retaining wall.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: (alternative manufactures may be approved via submittal process)
1. Ridgerock
 2. Versa-Lok Retaining Wall Systems – Standard.
 3. Key-stone
 4. Allan Block
 5. Sequatchie Concrete

2.2 SEGMENTAL RETAINING WALL UNITS

- A. Properties:
1. SRW units shall be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. Color of SRW units shall be as selected by the Architect from the manufacturer's full range of colors.
 2. SRW unit faces shall be of straight geometry.
 3. SRW units (not including aggregate fill in unit voids) shall provide a minimum weight of 105 psf wall face area.
- C. SRW units shall be capable of being erected with the horizontal gap between adjacent units not exceeding 1/8 inches.
- D. SRW units shall be capable of providing overlap of units on each successive course so that walls meeting at corner are interlocked and continuous. SRW units that require corners to be mitered shall not be allowed.
- E. SRW units shall be capable of providing a split face, textured surface for all vertical surfaces that will be exposed after completion of wall, including any exposed sides and backs of units.
- F. SRW units shall be sound and free of cracks or other defects that would interfere with the proper placing of the unit or significantly impair the strength or permanence of the structure. Cracking or excessive chipping will be grounds for rejection. Units showing cracks longer than 1/2" shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.
- G. Concrete used to manufacture SRW units shall have a minimum 28 days compressive strength of 3,000 psi and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C1372. Compressive strength test specimens shall conform to the saw-cut coupon provisions of ASTM C140.
- H. SRW units' molded dimensions shall not differ more than $\pm 1/8$ inch from that specified, in accordance with ASTM C1372.

2.3 GEOSYNTHETIC REINFORCEMENTS

- A. Geosynthetic reinforcement shall consist of geogrids or geotextiles manufactured as a soil reinforcement element. The manufacturers/suppliers of the geosynthetic reinforcement shall have demonstrated construction of similar size and types of segmental retaining walls on previous projects.
- B. The type, strength, and placement location of the reinforcing geosynthetic shall be as determined by the Wall Designer, as shown on the final, P.E. sealed retaining wall plans.

2.4 LEVELING PAD

- A. Material for leveling pad shall consist of compacted sand, gravel, or combination thereof (USCS soil types GP, GW, SP, & SW) and shall be a minimum of 6 inches in depth. Lean concrete with a strength of 200-300 psi and three inches thick maximum may also be used as a leveling pad material. The leveling pad should extend laterally at least a distance of 6 inches from the toe and heel of the lowermost SRW unit.

2.5 DRAINAGE AGGRAGATE

- A. Drainage aggregate shall be angular, clean stone or granular fill meeting the following gradation as determined in accordance with ASTM D422

<u>Sieve Size</u>	<u>Percent Passing</u>
1 inch	100
3/4 inch	75-100
No. 4	0-60
No. 40	0-50
No. 200	0-5

2.6 DRAINAGE PIPING

- A. The drainage collection pipe shall be a perforated or slotted PVC, or corrugated HDPE pipe. The drainage pipe shall be wrapped with a geotextile to function as a filter.
- B. Drainage pipe shall be manufactured in accordance with ASTM D 3034 and/or ASTM D 1248

2.7 REINFORCED (INFILL) SOIL

- A. The reinforced soil material shall be free of debris. Unless otherwise noted on the final, P.E. sealed, retaining wall plans prepared by the Wall Design Engineer, the reinforced material shall consist of the inorganic USCS soil types GP, GW, SW, SP, SM, meeting the following gradation, as determined in accordance with ASTM D422:

<u>Sieve Size</u>	<u>Percent Passing</u>
4 inch	100
No. 4	20-100
No. 40	0-60
No. 200	0-35

- B. The maximum particle size of poorly-graded gravels (GP) (no fines) should not exceed 3/4 inch unless expressly approved by the Wall Design Engineer and the long-term design strength (LTDS) of the geosynthetic is reduced to account for additional installation damage from particles larger than this maximum.
- C. The plasticity of the fine fraction shall be less than 20.

PART 3 - EXECUTION

3.1 SOIL

- A. A geotechnical report for the site is available to the Contractor for use in designing the wall. Any additional information needed by the Contractor or Wall Designer is to be furnished by the Contractor.

3.2 DESIGN

- A. The design analysis for the final, P.E. sealed retaining wall plans prepared by the Wall Designer shall consider the external stability against sliding and overturning, internal stability, and facial stability, of the reinforced soil mass and shall be in accordance with acceptable engineering practice and these specifications. The internal and external stability analysis shall be performed in accordance with the "NCMA Design Manual for Segmental Retaining Walls", using the recommended minimum factors of safety in this manual. External stability analysis for bearing capacity, global stability, and total and differential settlement shall also be the responsibility of the Wall Designer.
- B. While vertical spacing between geogrid layers may vary, it shall not exceed 2.0 feet maximum in the wall design.
- C. The geosynthetic placement in the wall design shall have 100 percent continuous coverage parallel to the wall

face. Gapping between horizontally adjacent layers of geosynthetic (partial coverage) will not be allowed.

3.3 EXAMINATION

- A. Examine areas indicated to receive retaining wall, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 EXCAVATION

- A. Contractor shall excavate to the lines and grades shown on the project grading plans. Contractor shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted infill material, or as directed by the Wall Designer, at the Contractor's expense.
- B. Contractor shall verify location of existing structures and utilities prior to excavation. Contractor shall ensure all surrounding structures are protected from the effects of wall excavation. Excavation support, if required, is the responsibility of the Contractor

3.5 FOUNDATION PREPARATION

- A. Following the excavation, the foundation soil shall be examined by the Geotechnical Engineer to assure actual foundation soil strength meets or exceeds the assumed design bearing strength. Soils not meeting the required strength shall be removed and replaced with infill soils, as directed by the Engineer.
- B. Foundation soil shall be proofrolled and compacted to 95% standard Proctor density and inspected by the Owner's Engineer prior to placement of leveling pad materials.

3.6 LEVELING PAD CONSTRUCTION

- A. Leveling pad shall be placed as shown on the final, P.E. sealed retaining wall plans with a minimum thickness of 6 inches. The leveling pad should extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW unit.
- B. Granular leveling pad material shall be compacted to provide a firm, level bearing surface on which to place the first course of units. Well-graded sand can be used to smooth the top 1/4 to 1/2 inch of the leveling pad. Compaction will be with mechanical plate compactors to achieve 95% of maximum standard Proctor density (ASTM D 698).

3.7 SRW UNIT INSTALLATION

- A. All SRW units shall be installed at the proper elevation and orientation as shown on the final, P.E. sealed wall plans and details or as directed by the Wall Designer. The SRW units shall be installed in general accordance with the manufacturer's recommendations. The specifications and drawings shall govern in any conflict between the two requirements.
- B. First course of SRW units shall be placed on the leveling pad. The units shall be leveled side-to-side, front-to-rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important to ensure accurate and acceptable results. No gaps shall be left between the front of adjacent units. Alignment may be done by means of a string line or offset from base line to the back of the units.
- C. All excess debris shall be cleaned from top of units and the next course of units installed on top of the units below.
- D. Prior to placement of next course, the level and alignment of the units shall be checked and corrected, where needed.

- E. Layout of curves and corners shall be installed in accordance with the wall plan details or in general accordance with SRW manufacturer's installation guidelines. Walls meeting at corners shall be interlocked by overlapping successive courses.
- F. Procedures C. through F. shall be repeated until reaching top of wall units, just below the height of the cap units. Geosynthetic reinforcement, drainage materials, and reinforced backfill shall be placed in sequence with unit installation.

3.8 GEOSYNTHETIC REINFORCEMENT PLACEMENT

- A. All geosynthetic reinforcement shall be installed at the proper elevation and orientation as shown on the final, P.E. sealed retaining wall plan profiles and details, or as directed by the Wall Design Engineer.
- B. At the elevations shown on the final plans, (after the units, drainage material, and backfill have been placed to this elevation) the geosynthetic reinforcement shall be laid horizontally on compacted infill and on top of the concrete SRW units, to within one inch of the front face of the unit below. Embedment of the geosynthetic in the SRW units shall be consistent with SRW manufacturer's recommendations. Correct orientation of the geosynthetic reinforcement shall be verified by the Contractor to be in accordance with the geosynthetic manufacturer's recommendations. The highest strength direction of the geosynthetic must be perpendicular to the wall face.
- C. Geosynthetic reinforcement layers shall be one continuous piece for their entire embedment length. Splicing of the geosynthetic in the design strength direction (perpendicular to the wall face) shall not be permitted. Along the length of the wall, horizontally adjacent sections of geosynthetic reinforcement shall be butted in a manner to assure 100 percent coverage parallel to the wall face.
- D. Tracked construction equipment shall not be operated directly on geosynthetic reinforcement. A minimum of 6 inches of backfill is required prior to operation of tracked vehicles over the geosynthetic. Turning should be kept to a minimum. Rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds (less than 5 mph).
- E. The geosynthetic reinforcement shall be free of wrinkles prior to placement of soil fill. The nominal tension shall be applied to the reinforcement and secured in place with staples, stakes or by hand tensioning until reinforcement is covered by six inches of fill.

3.9 DRAINAGE MATERIALS

- A. Drainage aggregate shall be installed to the line, grades, and sections shown on the final P.E. sealed retaining wall plans. Drainage aggregate shall be placed to the minimum thickness shown on the construction plans between and behind units (a minimum of one cubic foot for each exposed square foot of wall face unless otherwise noted on the final wall plans).
- B. Drainage collection pipes shall be installed to maintain gravity flow of water outside the reinforced soil zone. The drainage collection pipe shall daylight into a storm sewer or along a slope, at an elevation lower than the lowest point of the pipe within the aggregate drain.

3.10 BACKFILL PLACEMENT

- A. The reinforced backfill shall be placed as shown in the final wall plans in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of standard Proctor density (ASTM D 698) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geosynthetic reinforcement and the SRW units.
- B. Only hand-operated compaction equipment shall be allowed within 3 feet of the back of the wall units. Compaction within the 3 feet behind the wall units shall be achieved by at least three (3) passes of a lightweight mechanical tamper, plate, or roller.

- C. At the end of each day's operation, the Contractor shall

slope the last level of backfill away from the wall facing and reinforced backfill to direct water runoff away from the wall face.

- D. At completion of wall construction, backfill shall be placed level with final top of wall elevation. If final grading, paving, landscaping, and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading and drainage shall be provided to ensure water runoff is not directed at the wall nor allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

3.11 SRW CAPS

- A. SRW caps shall be properly aligned and glued to underlying units with SRW Manufacturer's adhesive, a flexible, high-strength concrete adhesive. Rigid adhesive or mortar are not acceptable.
- B. Caps shall overhang the top course of units by 3/4 to 1 inch. Slight variation in overhang is allowed to correct alignment at the top of the wall.

3.12 CONSTRUCTION ADJACENT TO COMPLETED WALL

- A. The Contractor is responsible for ensuring that construction by others adjacent to the wall does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 psf live load shall not be operated within 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the General Contractor to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

END OF SECTION

5842 US-41
RINGGOLD, GA 30736

[illegible]

	CONCRETE BLOCK		CONCRETE IN SECTION		RIGID INSULATION EIFS AS NOTED
	BRICK		SOIL IN SECTION		PLYWOOD
	METAL IN SECTION		CRUSHED STONE		FINISH WOOD
	GYP. BOARD, PLASTER, OR CONCRETE IN SECTION		BATT INSULATION		WOOD FRAMING

PROJECT DESCRIPTION
A NEW 13,500 S.F. WORK RELEASE/DORMITORY FACILITY, INCLUDING SITE IMPROVEMENTS FOR THE CATOOSA COUNTY GOVERNMENT AND CATOOSA COUNTY SHERIFFS OFFICE.

JURISDICTION - STATE
STATE OF GEORGIA
OFFICE OF INSURANCE AND SAFETY FIRE COMMISSIONER
2 M.L.K. JR. DRIVE, SUITE 716
ATLANTA, GA 30324
PHONE NUMBER: (404) 656-2070

STATE MANDATORY DESIGN CODES
2024 INTERNATIONAL BUILDING CODE W/ GEORGIA AMENDMENTS
2024 INTERNATIONAL FIRE CODE
2024 INTERNATIONAL PLUMBING CODE W/ GEORGIA AMENDMENTS
2024 INTERNATIONAL MECHANICAL CODE W/ GEORGIA AMENDMENTS
2018 INTERNATIONAL FUEL CODE W/ GEORGIA AMENDMENTS
NFPA-70 NATIONAL ELECTRICAL CODE, 2023 ED.
2015 INTERNATIONAL ENERGY CONSERVATION CODE W/ GEORGIA SUPPLEMENTS AND AMENDMENTS
NFPA-101 LIFE SAFETY CODE, 2024 ED. W/ GEORGIA AMENDMENTS
2010 ADA STANDARDS FOR ACCESSIBLE DESIGN (FOR TITLE II FACILITIES)

JURISDICTION - LOCAL
CATOOSA COUNTY GOVERNMENT
DEPARTMENT OF BUILDING INSPECTION
184 TIGER TRAIL
RINGGOLD, GA 30736
PHONE NUMBER: (706) 965-4226

LOCAL MANDATORY DESIGN CODES
2024 INTERNATIONAL BUILDING CODE W/ GEORGIA AMENDMENTS
2024 INTERNATIONAL FIRE CODE
2024 INTERNATIONAL PLUMBING CODE W/ GEORGIA AMENDMENTS
2024 INTERNATIONAL MECHANICAL CODE W/ GEORGIA AMENDMENTS
2018 INTERNATIONAL FUEL CODE W/ GEORGIA AMENDMENTS
NFPA-70 NATIONAL ELECTRICAL CODE, 2023 ED. W/ 2026 GEORGIA AMENDMENTS
2015 INTERNATIONAL ENERGY CONSERVATION CODE W/ GEORGIA SUPPLEMENTS AND AMENDMENTS
NFPA-101 LIFE SAFETY CODE, 2024 ED. W/ GEORGIA AMENDMENTS

RESPONDING FIRE DEPARTMENT
FIRE STATION 1: RINGGOLD
5282 EVITT STREET,
RINGGOLD, GA 30736

TYPE OF CONSTRUCTION: TYPE VB (000), SPRINKLED
OCCUPANCY: DORMITORY
NUMBER OF STORIES: ONE (1)

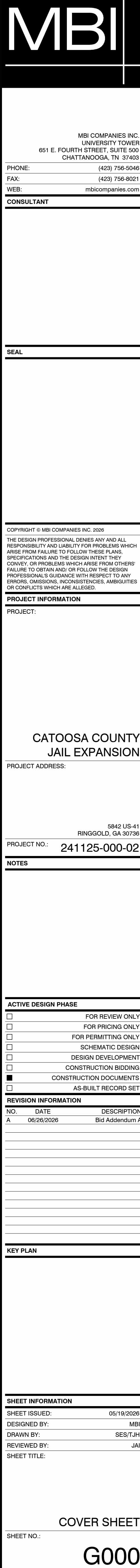
IECC CLIMATE ZONE: 3A (CATOOSA COUNTY, GEORGIA)

OWNER:	MECHANICAL ENGINEER:
CATAOCHA COUNTY GOVERNMENT	MBI COMPANIES INC.
SHERIFF GARY SISK	TROY PERSAUD
800 LAFAYETTE STREET	299 N. WEISBERGER ROAD
RINGGOLD, GA 30752	KNOXVILLE, TN 37919
706-955-2500	865-584-0999
ARCHITECT:	ELECTRICAL ENGINEER:
MARK COMPANIES INC.	MBI COMPANIES INC.
JERRY SAKEN	MARK NEVLIN
651 E. FOURTH STREET, SUITE 500	299 N. WEISBERGER ROAD
CHATTANOOGA, TN 37403	KNOXVILLE, TN 37919
865-584-0999	865-584-0999
STRUCTURAL ENGINEER:	CIVIL ENGINEER:
MBI COMPANIES INC.	CTI ENGINEERS, INC.
NICK DEAL	PHILIP SCHOFIELD
299 N. WEISBERGER ROAD	1122 RIVERFRONT PARKWAY
KNOXVILLE, TN 37919	CHATTANOOGA, TN 37402
865-584-0999	423-267-7613

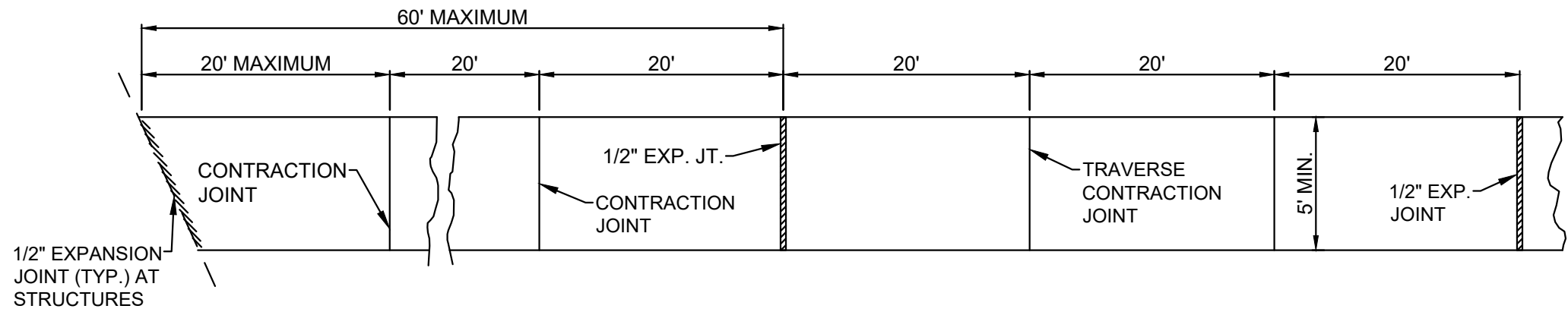
DRAWING TITLE	REV
GENERAL	
G000 COVER SHEET	
G001 GENERAL NOTES AND ACCESSIBILITY DETAILS	
G002 LIFE SAFETY INFORMATION	
CIVIL AND SITE ENGINEERING	
C0001 TITLE SHEET	
C0002 GENERAL NOTES	
C001 EXISTING SITE PLAN	
C002 SITE DEMOLITION PLAN (SHEET 1 OF 2)	
C003 SITE DEMOLITION PLAN (SHEET 2 OF 2)	
C004 PROPOSED SITE PLAN	
C005 GRADING PLAN	
C006 STORMWATER MANAGEMENT PLAN	
C007 UTILITIES PLAN	
C008 MISCELLANEOUS DETAILS (SHEET 1 OF 2)	
C009 MISCELLANEOUS DETAILS (SHEET 2 OF 2)	
C201 UTILITIES DETAILS (SHEET 1 OF 3) PIPE AND VALVE INSTALLATION DETAILS	
C202 UTILITIES DETAILS (SHEET 2 OF 3) THRUST RESTRAINT DETAILS	
C203 UTILITIES DETAILS (SHEET 3 OF 3) SANITARY SEWER DETAILS	
C301 EROSION AND SEDIMENT CONTROL NOTES	
C302 EROSION AND SEDIMENT CONTROL, GSWCC CHECKLIST	
C303 EROSION AND SEDIMENT CONTROL, DRAINAGE MAPS	
C401 EROSION & SEDIMENT CONTROL - INITIAL PHASE	
C402 EROSION & SEDIMENT CONTROL - INTERMEDIATE PHASE	
C501 GRADING PLAN	
C502 EROSION & SEDIMENT CONTROL DETAILS (SHEET 1 OF 4)	
C503 EROSION & SEDIMENT CONTROL DETAILS (SHEET 2 OF 4)	
C504 EROSION & SEDIMENT CONTROL DETAILS (SHEET 3 OF 4)	
C505 EROSION & SEDIMENT CONTROL DETAILS (SHEET 4 OF 4)	
90328 STANDARD CONCRETE CURB & GUTTER CONCRETE CURBS, CONCRETE MEDIANS	
90341 SPECIAL STANDARD CONCRETE SIDEWALK DETAILS CURB CUT (WHEELCHAIR) RAMPS	
L001 LANDSCAPE PLAN	
ARCHITECTURAL	
A103 ARCHITECTURAL SITE PLANS	
A101 NOTED FLOOR PLANS	
A102 DIMENSION FLOOR PLANS	
A201 DOOR SCHEDULE, DOOR/FRAME ELEVATIONS & DETAILS	
A301 ROOF PLAN AND DETAILS	
A302 CANOPY DETAILS	
A401 EXTERIOR ELEVATIONS	
A501 BUILDING SECTIONS	
A502 WALL SECTIONS	
A503 WALL SECTIONS	
A601 ENLARGED PLANS AND DETAILS	
A602 ENLARGED PLANS AND DETAILS	
A603 ENLARGED PLANS AND DETAILS	
A604 ENLARGED PLANS - TYP DORMITORY	
A701 REFLECTED CEILING PLAN AND DETAILS	
INTERIOR DESIGN	
F101 FLOOR FINISH PLAN	
F201 MILLWORK AND DETAILS	
STRUCTURAL ENGINEERING	
S000 STRUCTURAL COVER SHEET	
S001 STRUCTURAL NOTES	
S002 SPECIAL INSPECTIONS	
S003 TYPICAL FOUNDATION AND SLAB ON GRADE DETAILS	
S004 TYPICAL CMU DETAILS	
S005 TYPICAL STEEL AND CFS DETAILS	
S101 FOUNDATION PLAN	
S201 CEILING FRAMING PLAN	
S211 LOW ROOF FRAMING PLAN	
S212 HIGH ROOF FRAMING PLAN	
S401 FRAMING ELEVATIONS	
S501 STRUCTURAL DETAILS	
S601 STRUCTURAL AXONS	

FP001	FIRE PROTECTION LEGENDS, SPECIFICATIONS, AND NOTES
FP101	FLOOR PLAN - FIRE PROTECTION
FP201	FIRE PROTECTION SCHEDULES
FP301	FIRE PROTECTION DETAILS
M001	HVAC LEGENDS AND NOTES
M101	HVAC FLOOR PLAN
M301	HVAC SECTIONS
M501	HVAC DETAILS
M601	HVAC SCHEDULES
M701	HVAC CONTROLS
M702	HVAC CONTROLS
M703	HVAC CONTROLS
P001	PLUMBING LEGEND AND NOTES
P101	COMPOSITE PLUMBING PLANS
P201	COMPOSITE GAS PLAN
P401	EMPLOYEE AREA - ENLARGED PLUMBING PLANS
P402	TOILET, LAUNDRY, MECHANICAL - ENLARGED PLUMBING PLANS
P403	MECHANICAL ROOM - ENLARGED WATER PLAN
P501	PLUMBING DETAILS
P502	PLUMBING DETAILS
P601	PLUMBING SCHEDULES
P901	PLUMBING 3D VIEWS

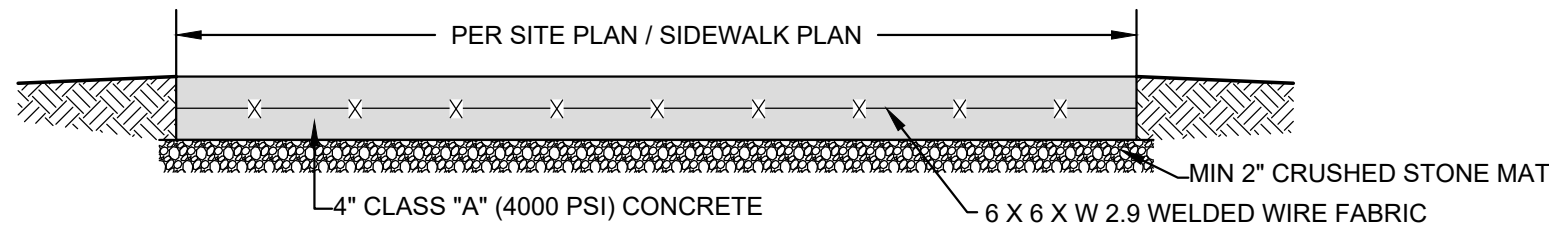
E001	ELECTRICAL LEGEND AND GENERAL NOTES
E01	FLOOR PLAN - POWER & HVAC NOTES
E201	FLOOR PLAN - LIGHTING
E202	CANOPY - LIGHTING
E301	FLOOR PLAN - COMMUNICATIONS, FIRE ALARM, ACCESS CONTROL, & SECURITY
E401	RISER DIAGRAM AND PANELBOARD SCHEDULES
E402	SCHEDULES
ES01	ELECTRICAL DETAILS
ES02	ELECTRICAL DETAILS
ES03	ELECTRICAL DETAILS
ES101	SITE PLAN - ELECTRICAL
ES102	SITE PLAN - PHOTOMETRIC
Grand total: 94	







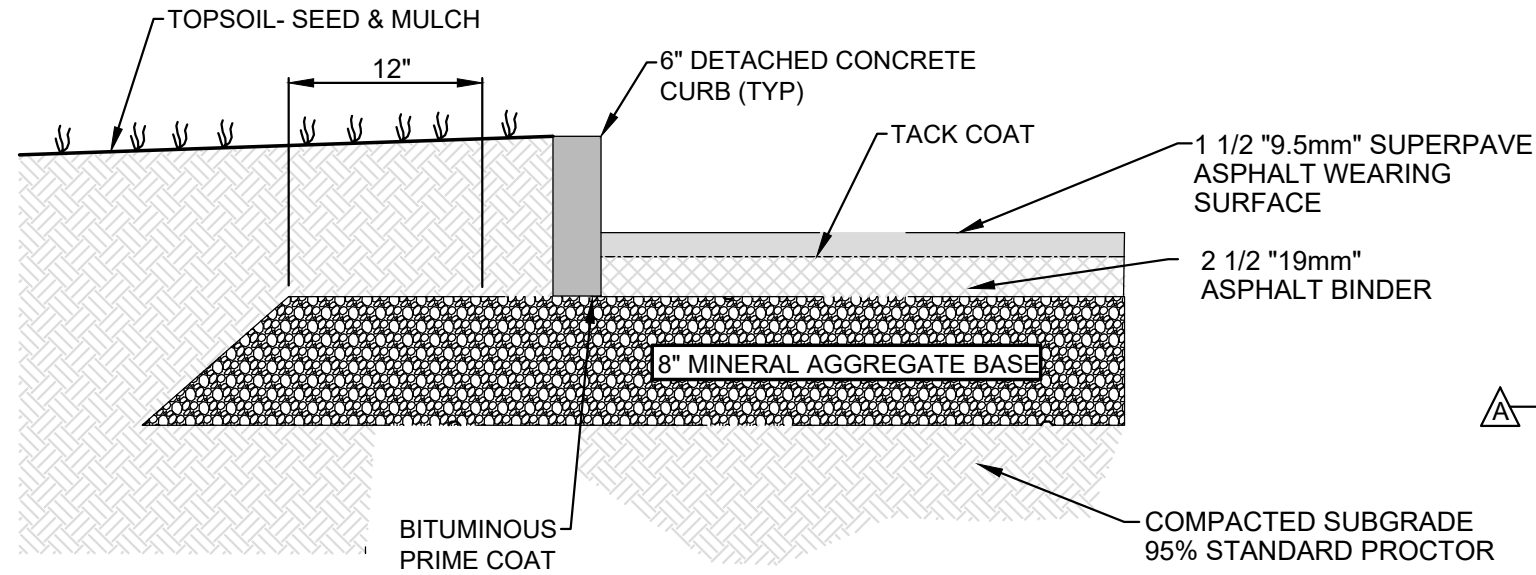
CONCRETE SIDEWALK PLAN
NOT TO SCALE



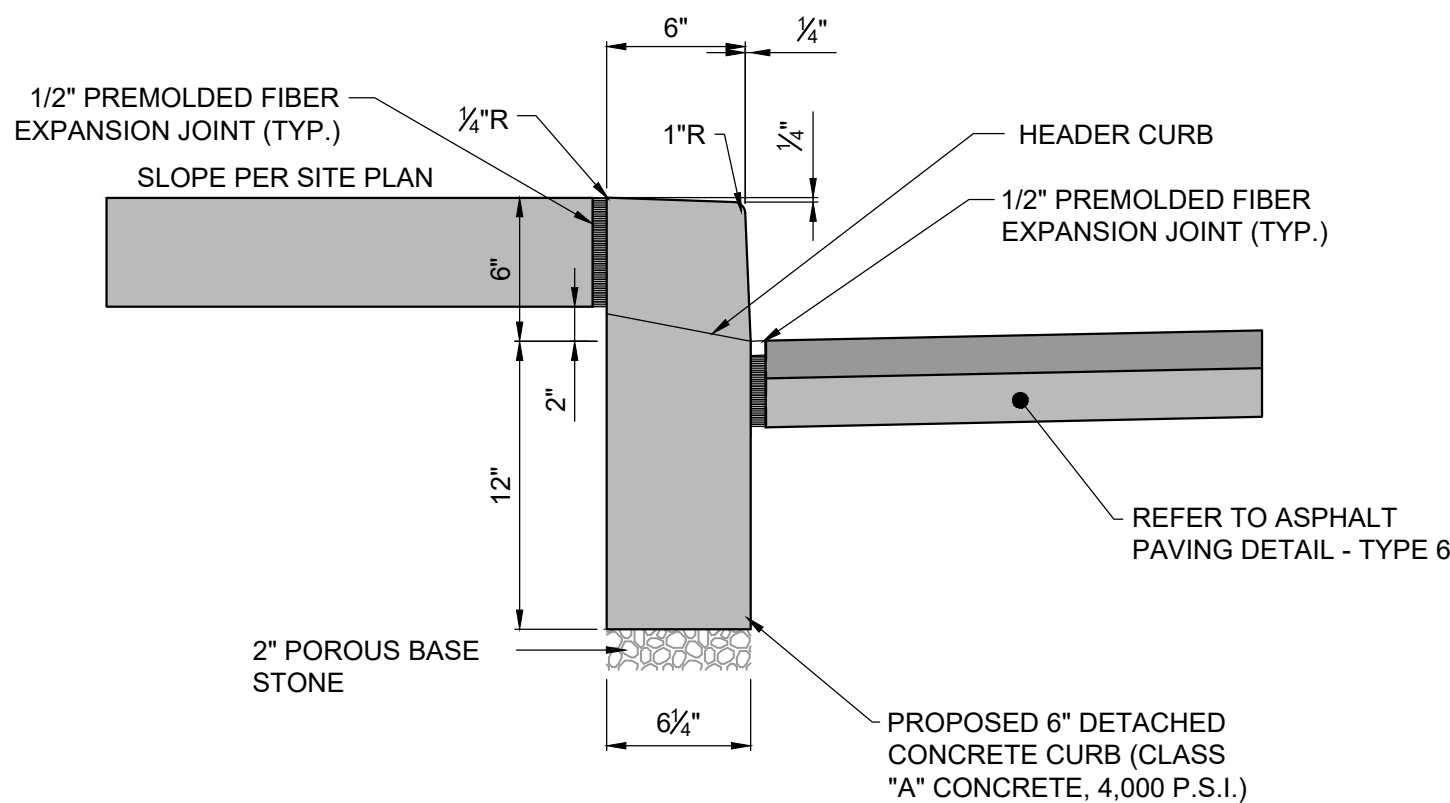
SIDEWALK / CONCRETE SECTION
NOT TO SCALE

SIDEWALK NOTES:

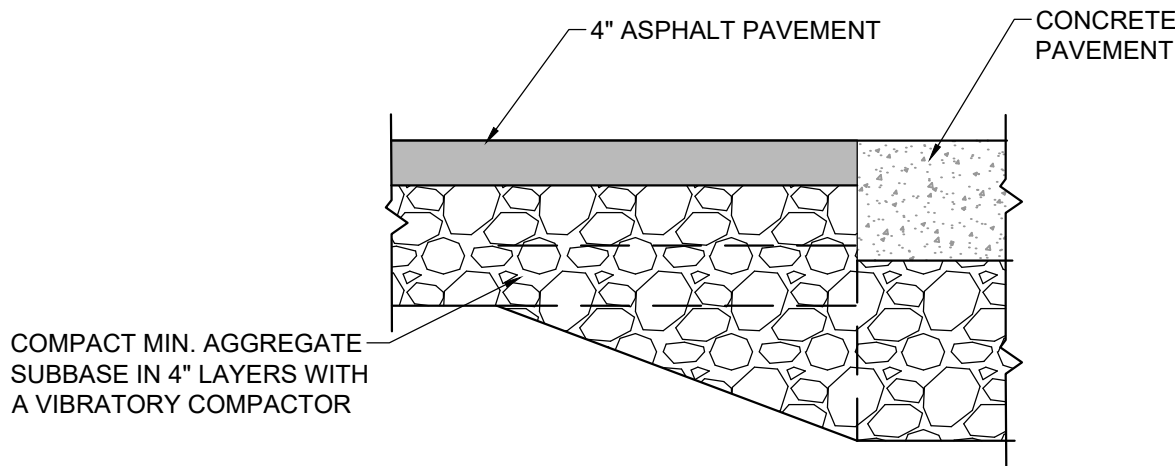
1. CLASS "A" (4,000 PSI) CONCRETE TO BE PLACED 4" THICK AND FINISHED IN ACCORDANCE WITH THE SPECIFICATIONS.
2. TRANSVERSE CONTRACTION JOINTS SHALL BE PLACED AT MAX 20 FT INTERVALS. ALL EDGES TO BE ROUNDED TO 1/4" RADIUS.
3. 1/2" EXPANSION JOINTS TO BE PLACED, WHERE SIDEWALK TIES INTO A STRUCTURE OR TERMINATES AT CURB, RAMPS OR DRIVEWAYS AND AT 60" INTERVALS.
4. TOOLED JOINTS SHALL BE PLACED AT 5 FT INTERVALS.
5. PROVIDE MIN 2" POROUS STONE UNDER SIDEWALK.



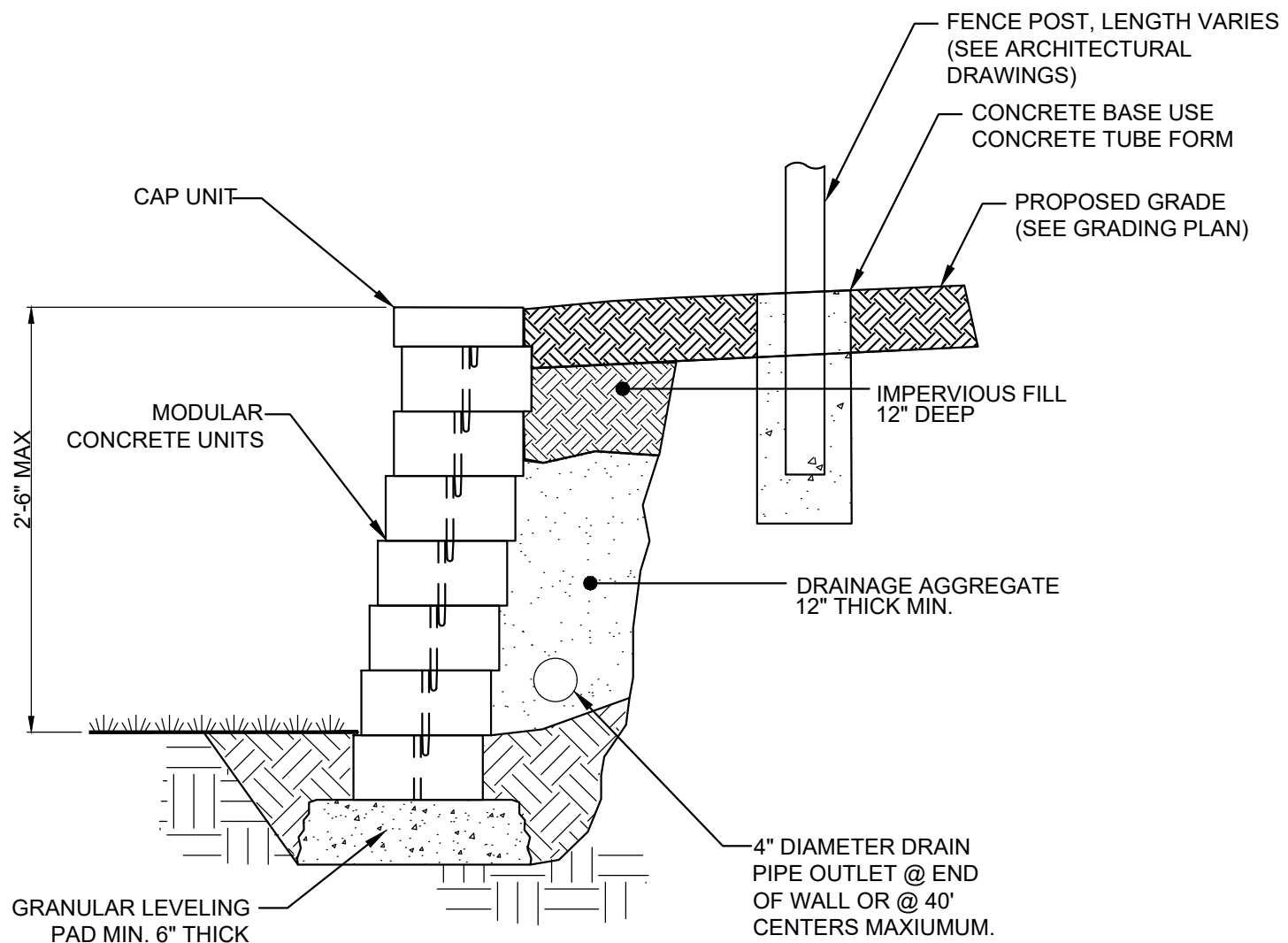
ASPHALT PAVING DETAIL - TYPE 6
NOT TO SCALE



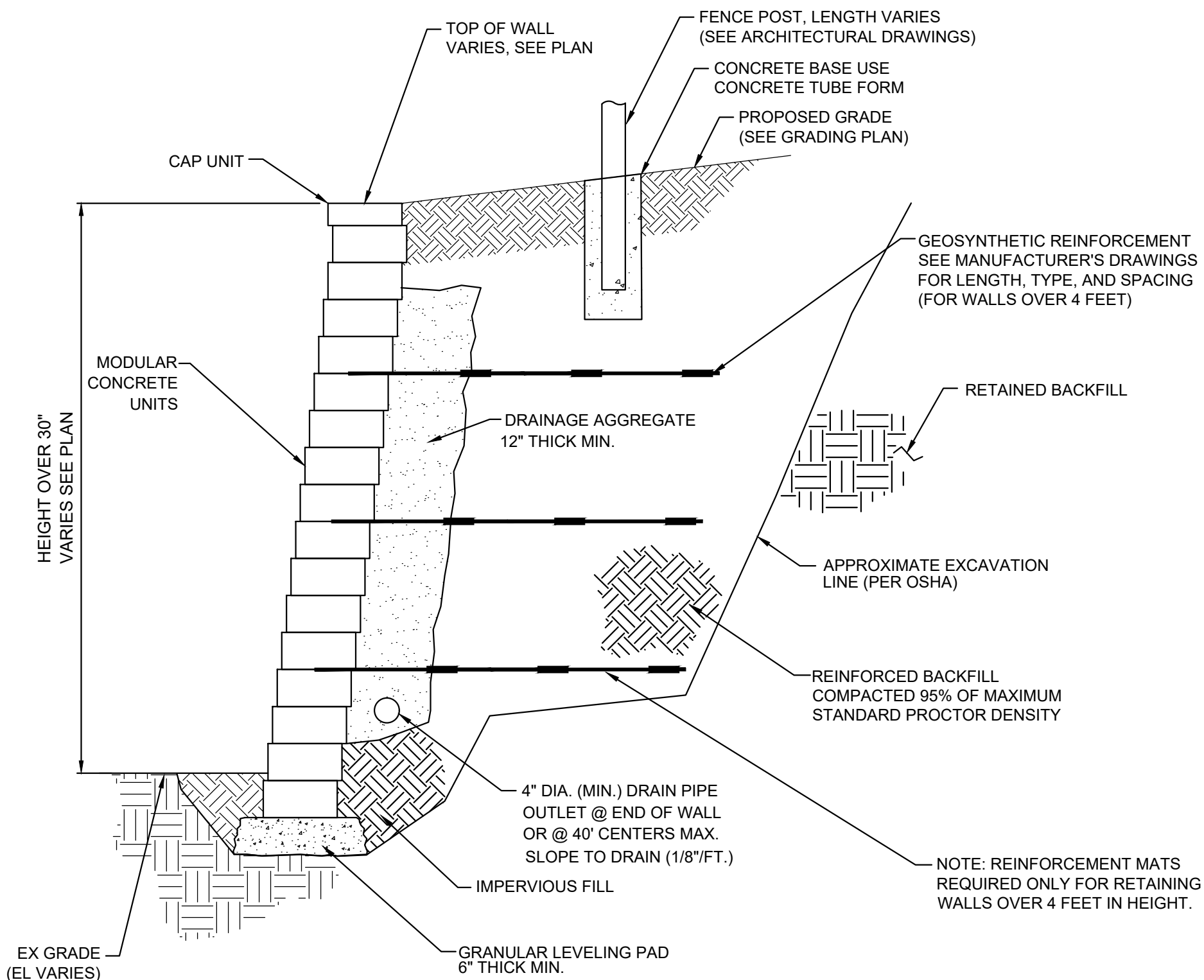
TYPICAL 6" DETACHED CONCRETE CURB
NOT TO SCALE



ASPHALT/CONCRETE PAVEMENT TRANSITION DETAIL
NOT TO SCALE



UNREINFORCED RETAINING WALL
NOT TO SCALE



REINFORCED RETAINING WALL
NOT TO SCALE

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REVISIONS		NO.	
DESCRIPTIONS	DATE	BY	APPD
BID ADDENDUM A	6/26/26	ZWR	PRS

DESIGN	DRAWN	CHECKED	APPROVED
ZWR	ZWR	SAH	PRS

CATOOSA COUNTY, GEORGIA
SHERIFF'S OFFICE EXPANSION

MISCELLANEOUS DETAILS
SHEET 1 OF 2



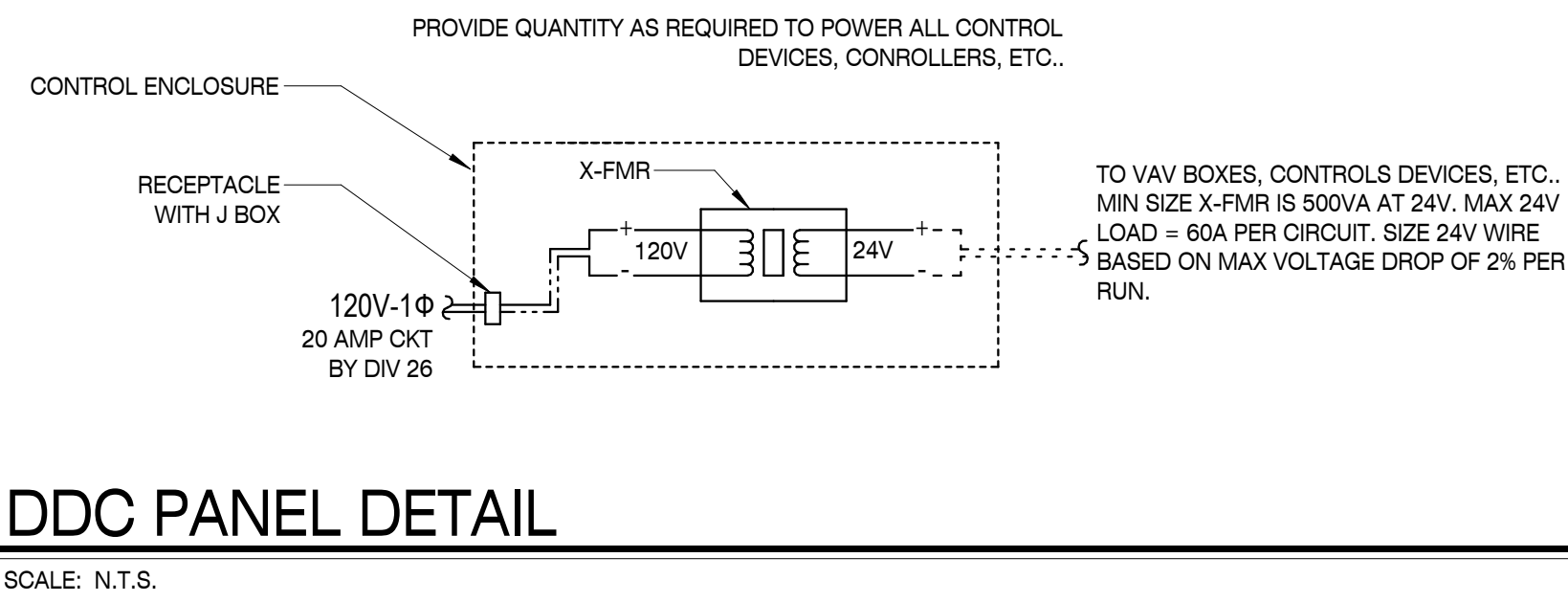
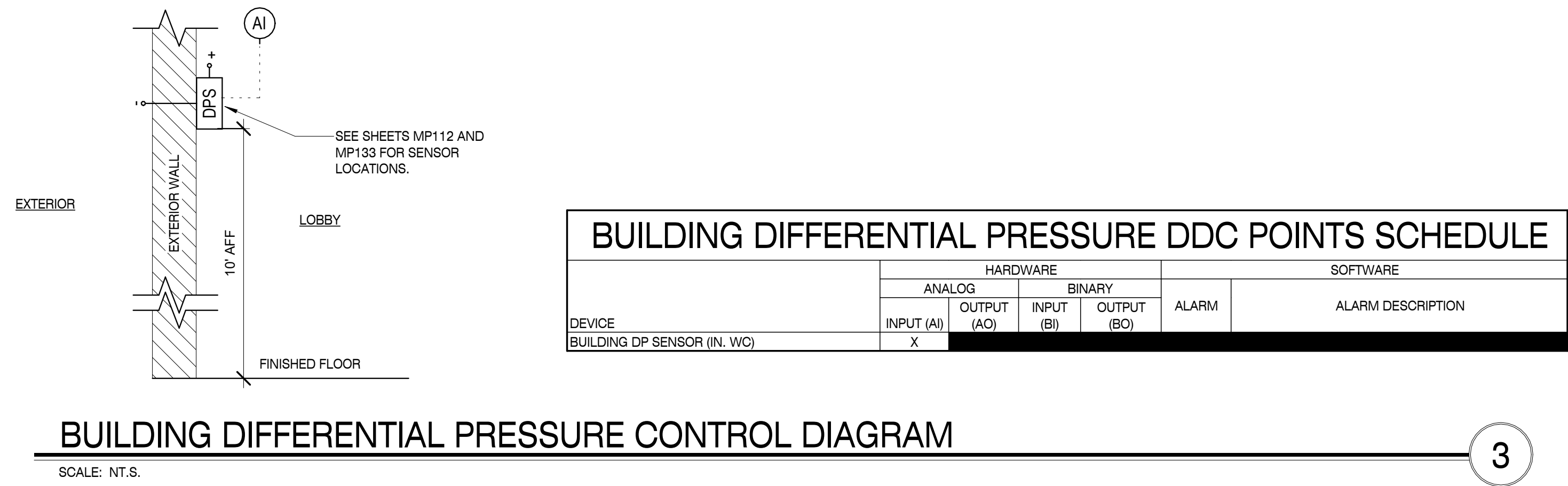
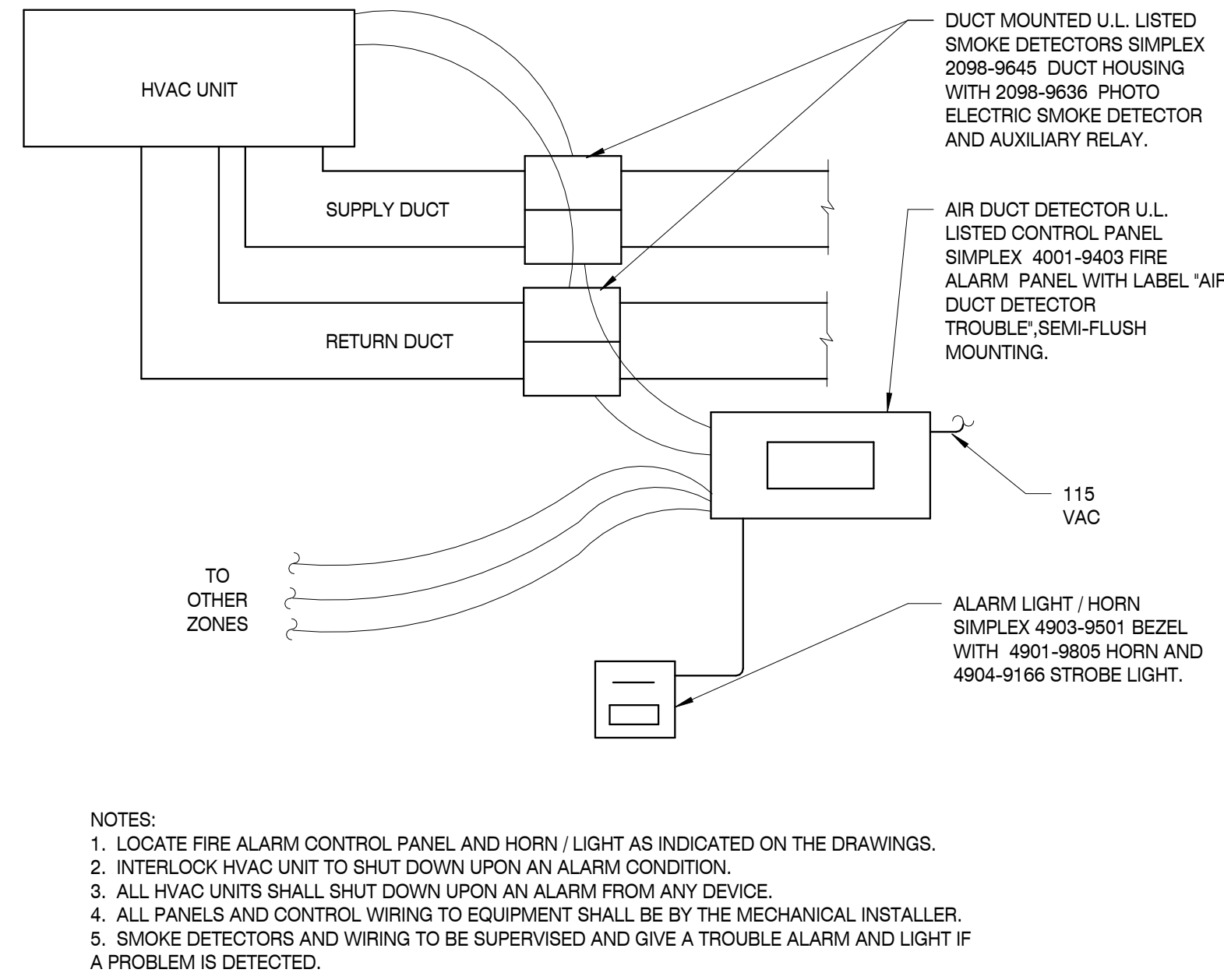
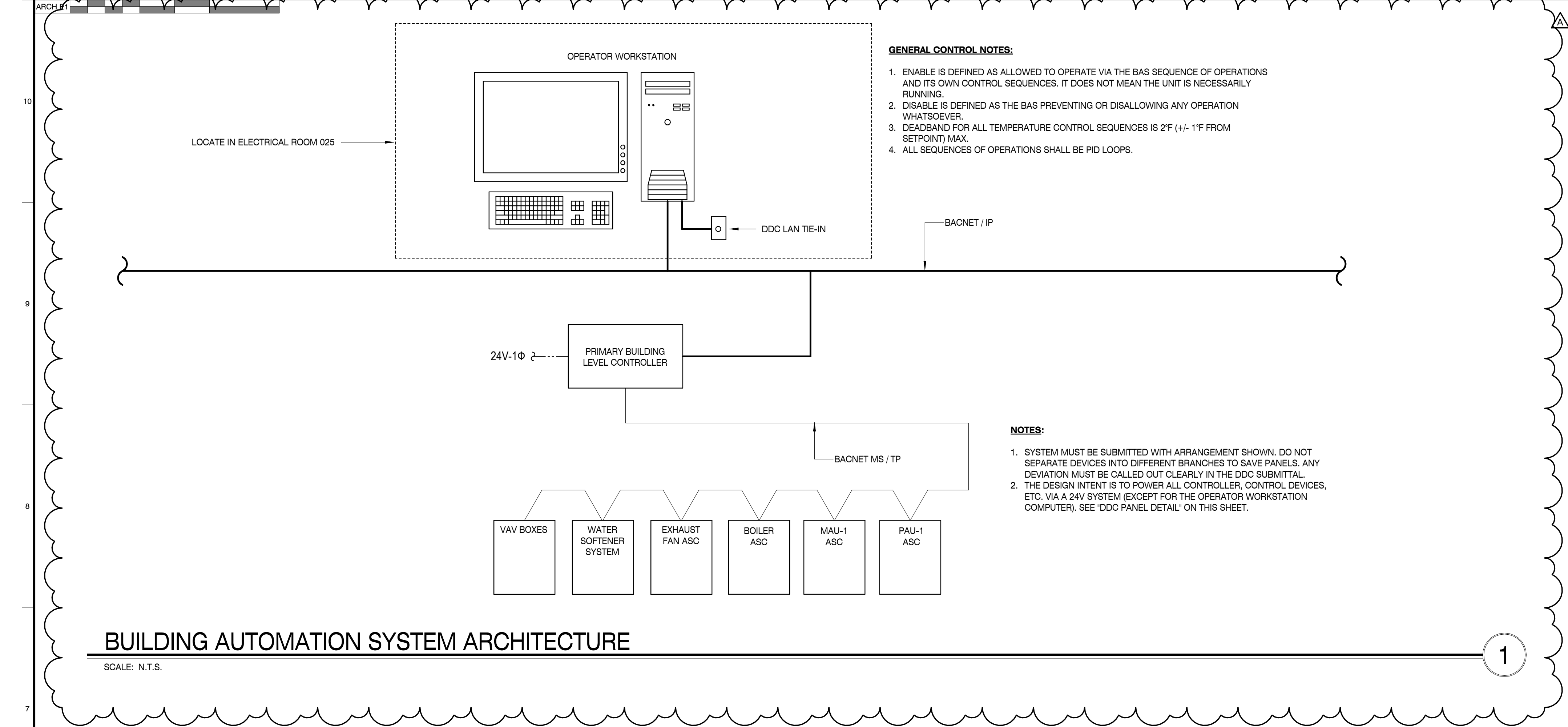
1122 RIVERFRONT PARKWAY
CHATTANOOGA, TN 37402
423-267-7613

JOB NO.
G25024

ISSUE DATE
05/19/2026

DRAWING NO.
C101.A

Autodesk Docs: 241125-000-02, Catoosa County Jail07_241125-02_Mech_1826.rvt
6/26/2026 11:48:25 AM



MBI

MBI COMPANIES INC.
UNIVERSITY TOWER
851 E. FOURTH STREET, SUITE 500
CHATTANOOGA, TN 37403

PHONE: (423) 756-5046
FAX: (423) 756-8021
WEB: mbicompanies.com

CONSULTANT

MECHANICAL ENGINEER:

MBI COMPANIES INC.
299 N. WEISGARBER ROAD
KNOXVILLE, TN 37919

PHONE: (865) 584-0990
FAX: (865) 584-5213
WEB: mbicompanies.com

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PROJECT INFORMATION

PROJECT:

CATOOSA COUNTY
JAIL EXPANSION

PROJECT ADDRESS:

5842 US-41
RINGGOLD, GA 30736

PROJECT NO.: 241125-000-02

NOTES

ACTIVE DESIGN PHASE

☐ FOR REVIEW ONLY
☐ FOR PERMITTING ONLY
☐ SCHEMATIC DESIGN
☐ DESIGN DEVELOPMENT
☐ CONSTRUCTION BIDDING
☒ CONSTRUCTION DOCUMENTS
☐ AS-BUILT RECORD SET

REVISION INFORMATION

NO.	DATE	DESCRIPTION
A	6/26/2026	Bid Addendum A

KEY PLAN

SHEET INFORMATION

SHEET ISSUED: 06/19/2026
DESIGNED BY: DRJ
DRAWN BY: DRJ
REVIEWED BY: TEP
SHEET TITLE:

HVAC CONTROLS

SHEET NO.: M703