



rosstarrant architects

# Franklin-Simpson High School Baseball & Softball Improvements

Simpson County Board of Education  
Franklin, Kentucky

RTA 25001  
BG 25-278

## Project Manual

Volume 2 of 2  
May 2025

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FOR  
Franklin-Simpson High School Baseball & Softball Improvements**

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**SECTION 012400  
GEOTECHNICAL DATA**

**PART 1 GENERAL**

**1.01 GEOTECHNICAL REPORT**

- A. A geotechnical exploration of the site was conducted by Solid Ground Consulting Engineers, dated March 24, 2025.
  - 1. A digital copy may be requested of the Architect.
- B. The report of the geotechnical exploration is appended hereto for reference only and is not a part of the Contract Documents. The boring layout and log of borings is appended to the set of contract drawings. No warranty of content or accuracy is expressed or implied. Neither the Owner nor the Architect will be responsible for interpretations or conclusions drawn from this report by the Contractor. This data is made available solely for the convenience of the Contractor.

**END OF SECTION**



## REPORT OF GEOTECHNICAL EXPLORATION



### **Proposed Simpson County Baseball and Softball Improvements**

Franklin, Simpson County, Kentucky

Prepared for: Simpson County Board of Education

430 South College Street

Franklin, Kentucky

March 24, 2025

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## **APPENDICES**

### **Appendix A BORING LOGS**

### **Appendix B LAB RESULTS**



March 24, 2025

Simpson County Board of Education  
430 South College Street  
Franklin, Kentucky 42134

c/o Ms. Sarah Siekkinen  
Ross Tarrant Architects

Subject: **Report of Geotechnical Exploration  
Proposed Simpson County Baseball and Softball Improvements  
Franklin, Simpson County, Kentucky  
Solid Ground Project No.: 25-157**

Ms. Siekkinen,

Solid Ground Consulting Engineers (Solid Ground) is pleased to present our Report of Geotechnical Exploration. This report is for the proposed Simpson County Baseball and Softball Field Improvements project located in Franklin, Kentucky. The geotechnical exploration was conducted in general accordance with the scope of work agreed upon in Solid Ground Proposal No: 103025, dated February 6, 2025.

This report contains our findings and recommendations for the referenced project detailed above. Once completed, it is recommended that Solid Ground have the opportunity to review plans and specifications. In addition, it is recommended that Solid Ground be retained to perform observations during earthwork, foundations, and slab-on-grade construction. Solid Ground will not be held responsible for interpretations and field observations made by others.

We appreciate the opportunity to provide our consulting services to you. We look forward to working with you on this and future projects.

Sincerely,

**SOLID GROUND CONSULTING ENGINEERS,**



Beck Smith, PE  
Senior Engineer  
Kentucky License Number 37415

Nathaniel O'Leary M.S., GIT  
Staff Geologist

## **1.0 Executive Summary**

Solid Ground Consulting Engineers performed a geotechnical exploration in support of the proposed Simpson County Baseball and Softball Field Improvements located at 400 South College Street, Franklin, Simpson County, Kentucky. The approximate coordinates of the site are 36.717063°N, - 86.584959°W.

### **1.1 Summary of Findings**

Solid Ground conducted a total of twelve (12) soil test borings, all were located within the approximate development boundaries.

Soil overburden generally consisted of a layer of topsoil underlain by natural soils described as Lean Clay (CL) and Fat Clay (CH) with varying amounts of silty, sand, gravel, and chert fragments to boring termination/auger refusal depths. Eleven (11) of the borings were terminated at a depth of 16.5 feet. The remaining boring encountered auger refusal at a depth of 6.5 feet.

## **2.0 Project Information**

### **2.1 Purpose and Scope of Services**

The purpose of this subsurface exploration was to prepare recommendations for design and construction of foundations and floor slabs for the proposed development. Our scope of work included the following:

- A discussion of site surface conditions.
- A discussion of subsurface conditions encountered as well as a discussion of the published geologic conditions at the site including frost penetration depth.
- A summary of field and laboratory testing results including a brief review of our test procedures.
- Boring logs and laboratory tests will be summarized in the report and listed in the appendix.
- A discussion of specific geotechnical conditions and concerns which may affect the design or construction of the project.
- General recommendations for site preparation and construction of compacted fills including use of alternative construction practices.
- Groundwater management recommendations.

- Liquefaction potential and mitigation recommendations.
- Recommendations for slab and granular subbase.
- Recommendations for foundation design including bearing capacity.
- Anticipated total and differential settlement.
- A recommendation for seismic site class according to International Building Code which was adopted by the 2018 Kentucky Building Code (KBC).
- A brief review of our test procedures and the results of all testing conducted.

## 2.2 Project Description

It is our understanding that the project will consist of converting the baseball and softball fields to artificial turf and constructing new dugouts for the baseball field. There will also be associated earthwork, subdrainage, and utility construction. The approximate site location is depicted below in Figure 1.

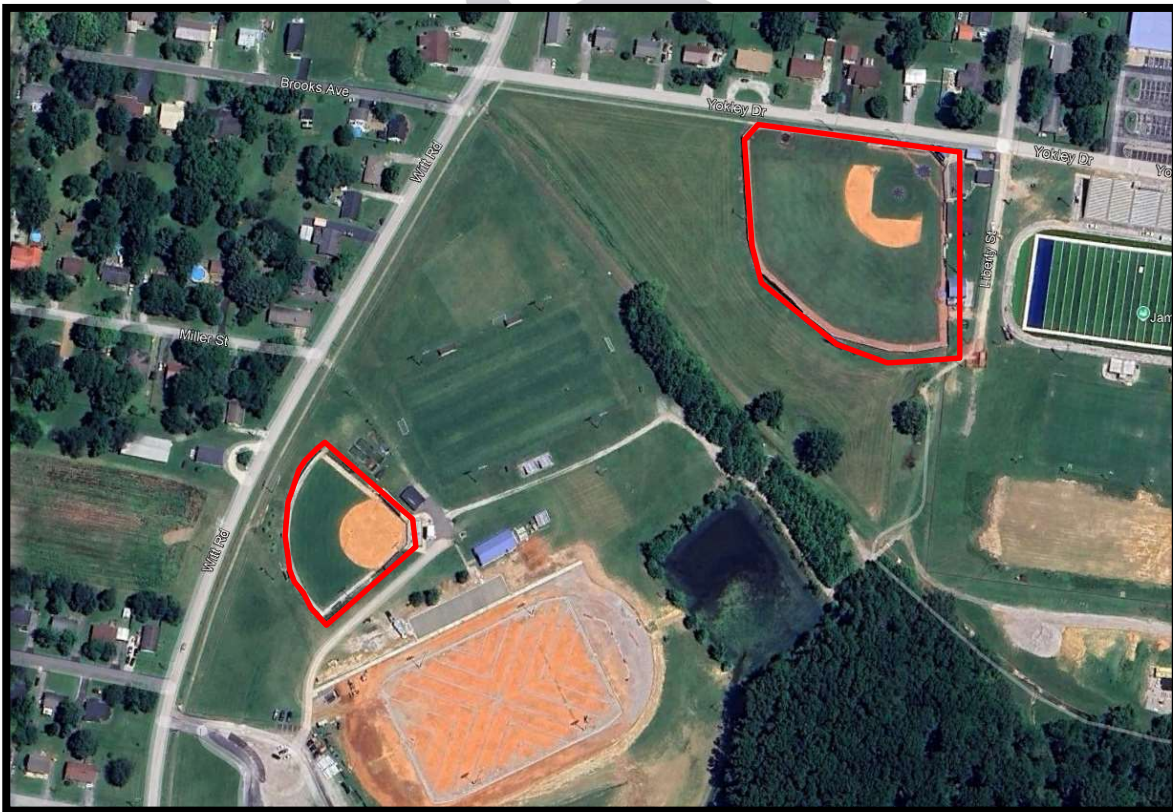


Figure 1: Approximate Site Location

## **2.3 Site Conditions**

Solid Ground personnel visited the site throughout the geotechnical exploration, to observe existing conditions, to help interpret the subsurface data, and to detect conditions which could affect recommendations.

The site is located at 400 South College Street, Franklin, Simpson County, Kentucky. The site currently consists of natural grass.

## **2.4 Structural Loading Information**

Structural loading information is still in the design process at the time of this report. There is an anticipated maximum column loading of 30 kips and wall loads of 3 kips per linear foot. Slabs are anticipated to have maximum loads not exceeding 150 psf.

## **2.5 Site Grading and Topography**

Based on existing topography, site grading is anticipated to be minor.

## **3.0 Subsurface Findings and Encountered Conditions**

### **3.1 Review of Previous Site Development and Historical Information**

Based on review of historical maps provided by the United States Geological Survey (USGS) (Figures 2 & 3) and historical imagery provided by Google Earth (Figures 4 & 5), it appears the site is relatively unchanged in recent years, other than the construction of the softball field sometime between 1998 and 2004.

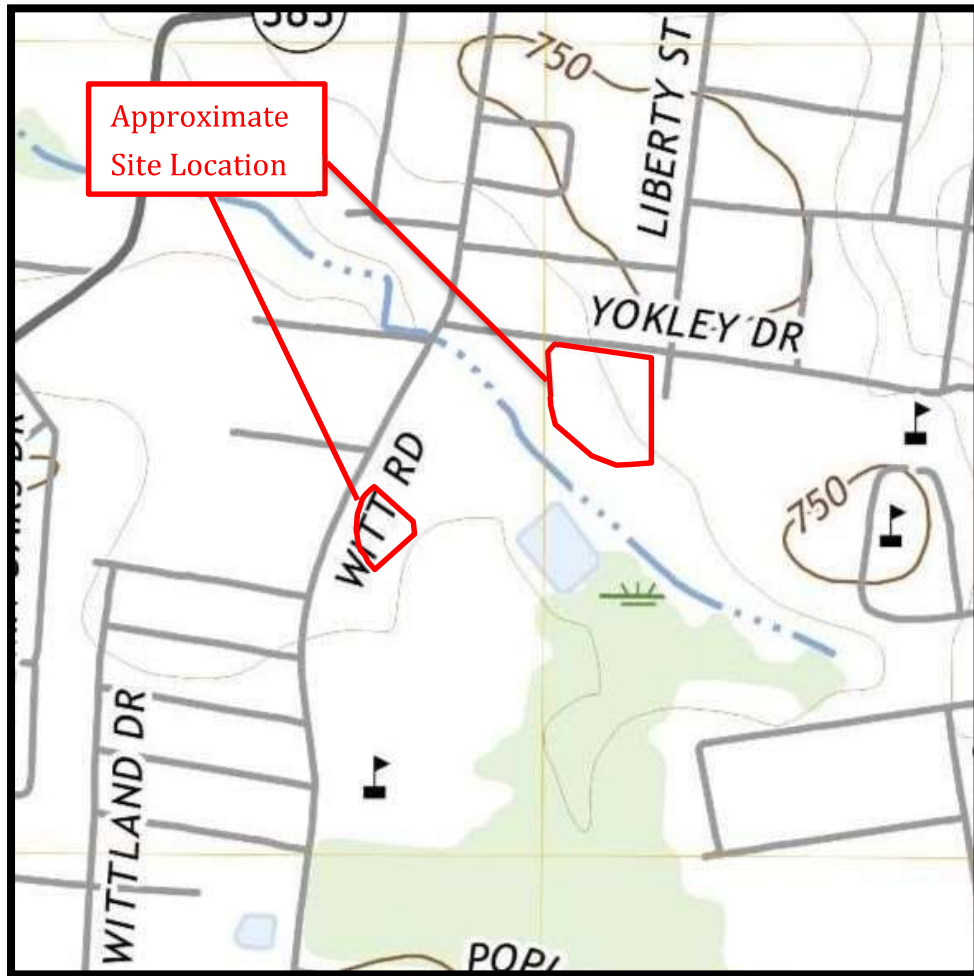


Figure 2: 2022 USGS Topographic Map of Franklin Quadrangle

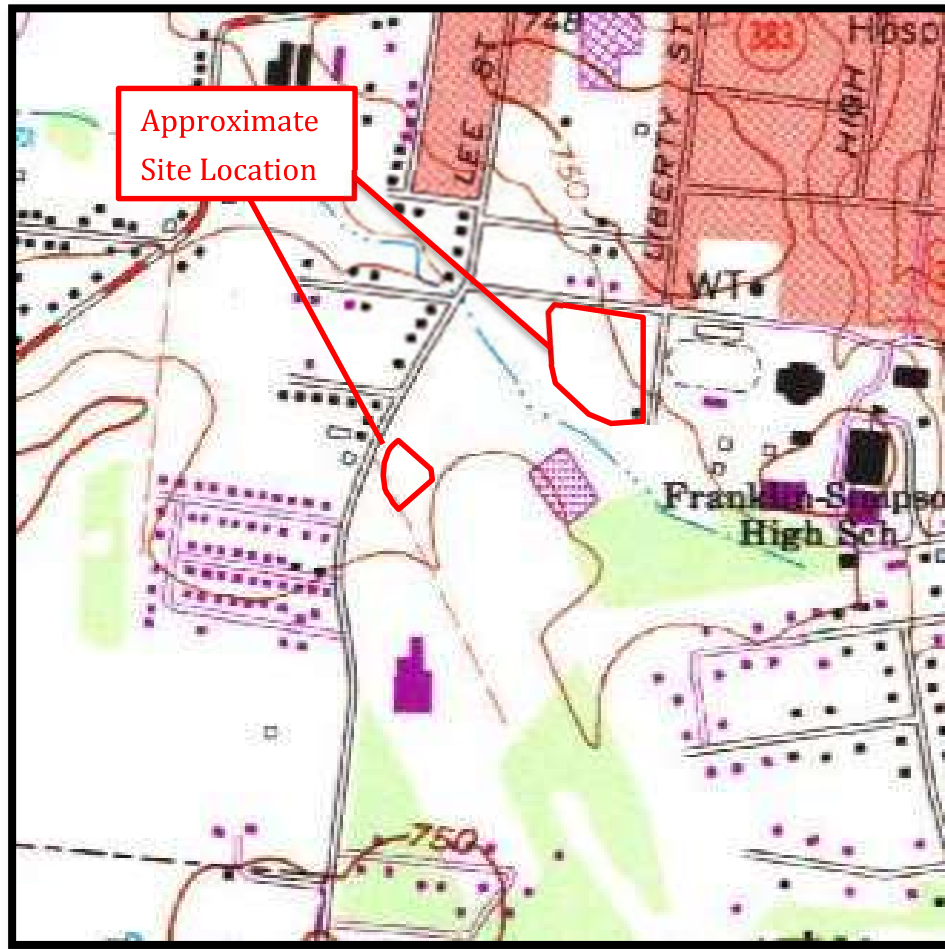


Figure 3: 1968 USGS Topographic Map of Franklin Quadrangle

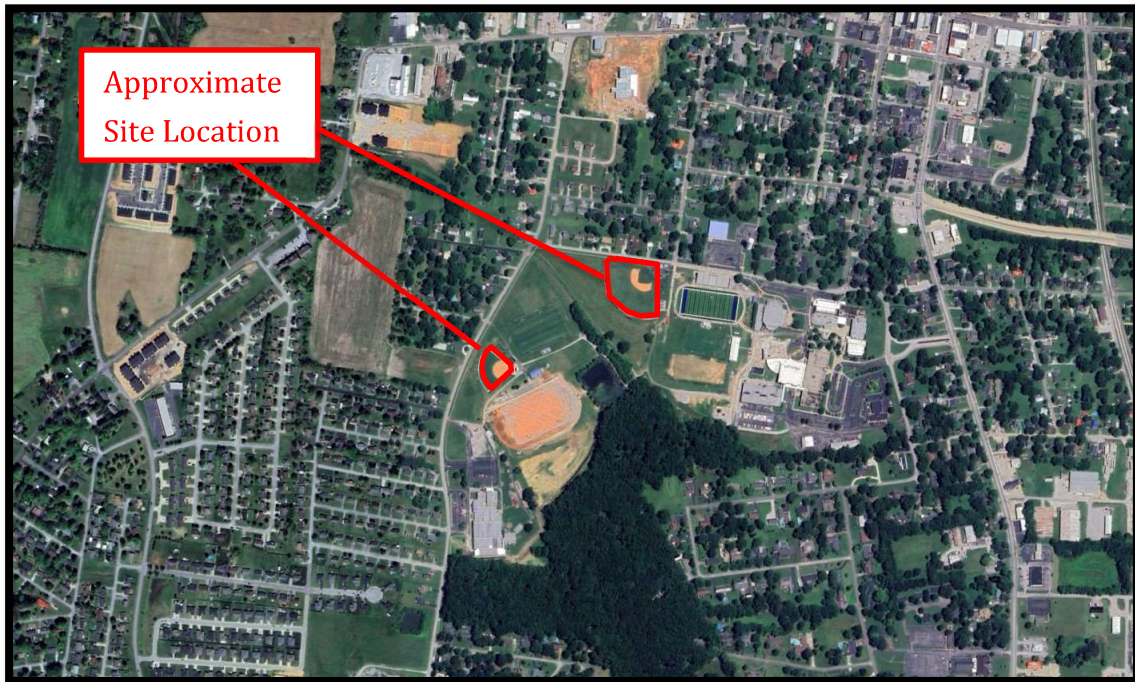


Figure 4: 2023 Google Earth Imagery

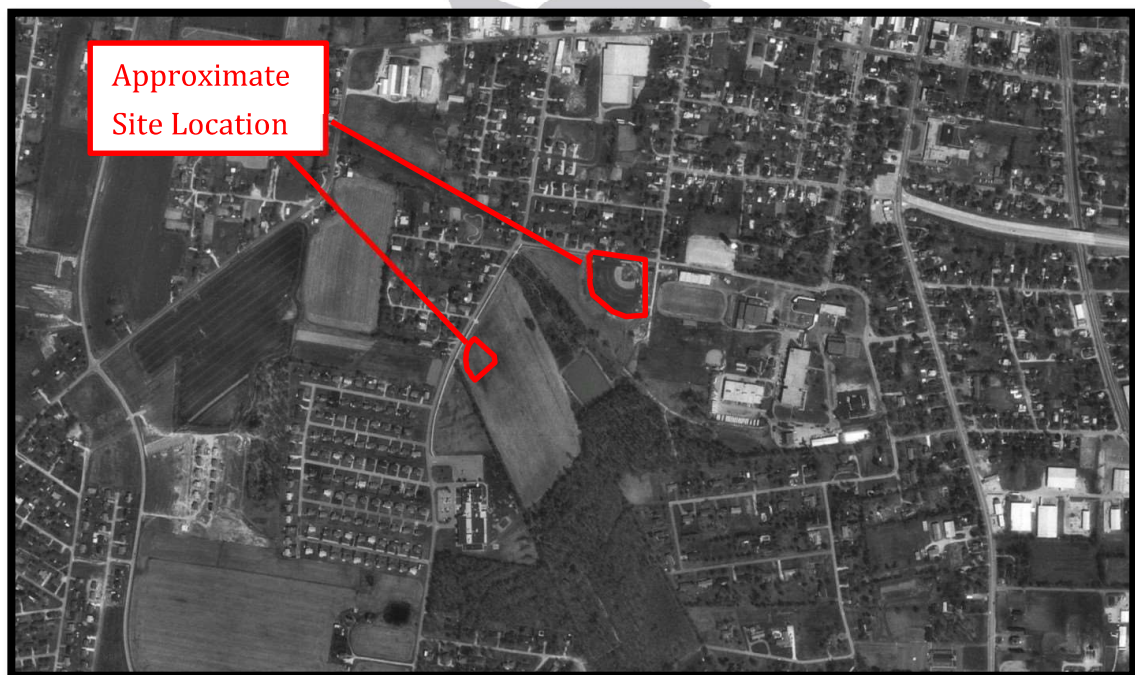
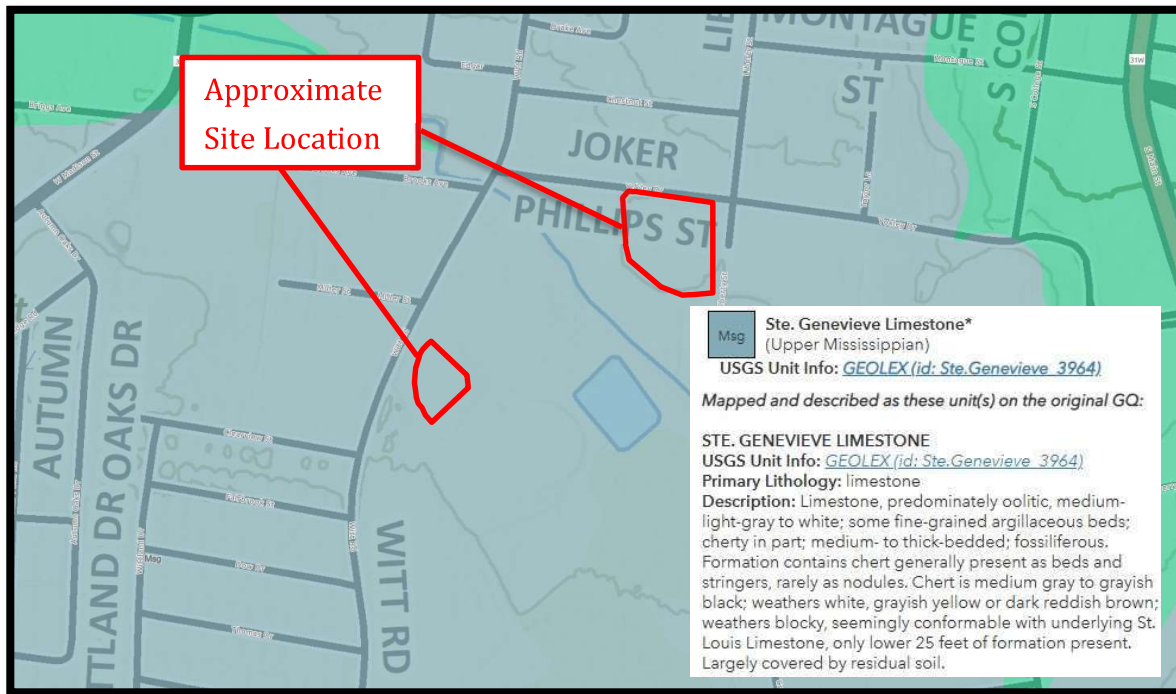


Figure 5: 1998 Google Earth Imagery

### 3.2 Published Geologic Information

Geologic information was referenced from the Kentucky Geological Survey (KGS), geologic maps of the Franklin Quadrangle, Simpson County, Kentucky (Figure 6). The site is underlain by Saint Genevieve Limestone. Locally, the unit is described as limestone that is primarily oolitic, Upper Mississippian in age.



**Figure 6: KGS Geologic Mapping**

The KGS mapping (Figure 7) indicates that the underlying rock unit has intense karst potential, with zero mapped sinkholes within vicinity of the site (Figure 7). Solid Ground should be contacted if any karst activity is encountered in construction for remediation recommendations.

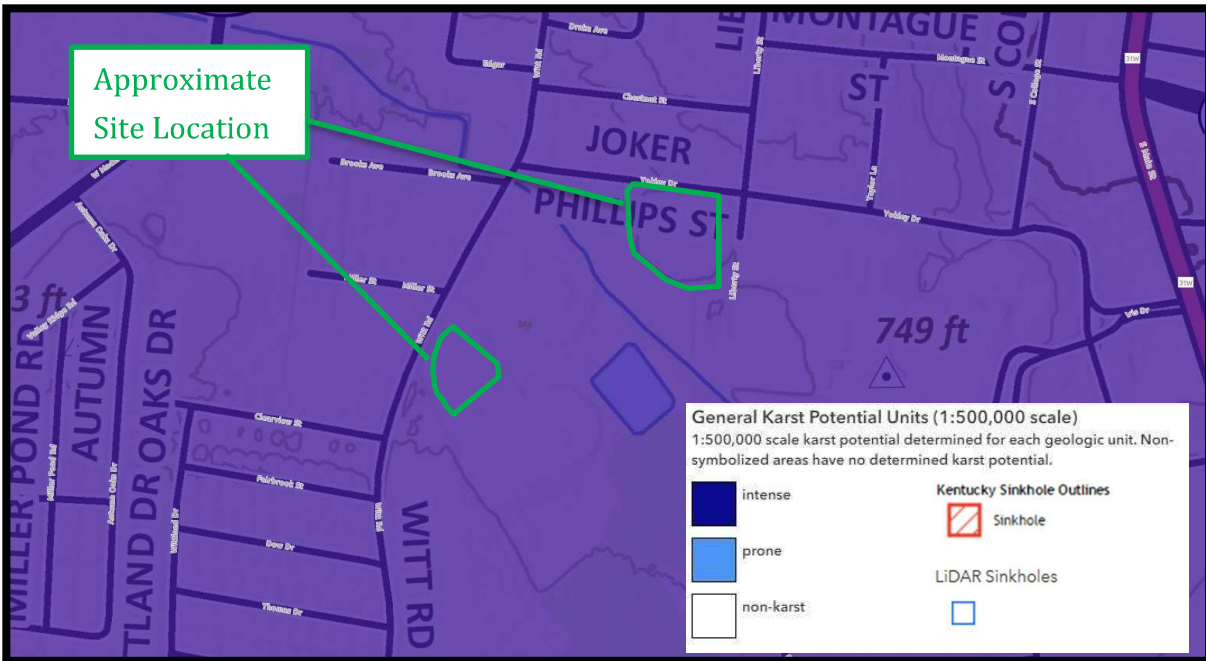


Figure 7: KGS Karst Potential Mapping

### 3.3 Subsurface Exploration Program

Solid Ground conducted a total of twelve (12) soil test borings, all being located within the approximate development boundaries. Borings were located as close to the proposed development as site conditions allowed.

Boring surface elevations were estimated using ArcGIS utilizing LiDAR data. Therefore, the boring locations and surface elevations should be considered approximate. It should be noted that the subsurface conditions will vary between borings and the representative profile is based upon the borings drilled during the field operations. Boring locations are shown in Figure 8 below.



Figure 8: Approximate Boring Locations: Baseball Field

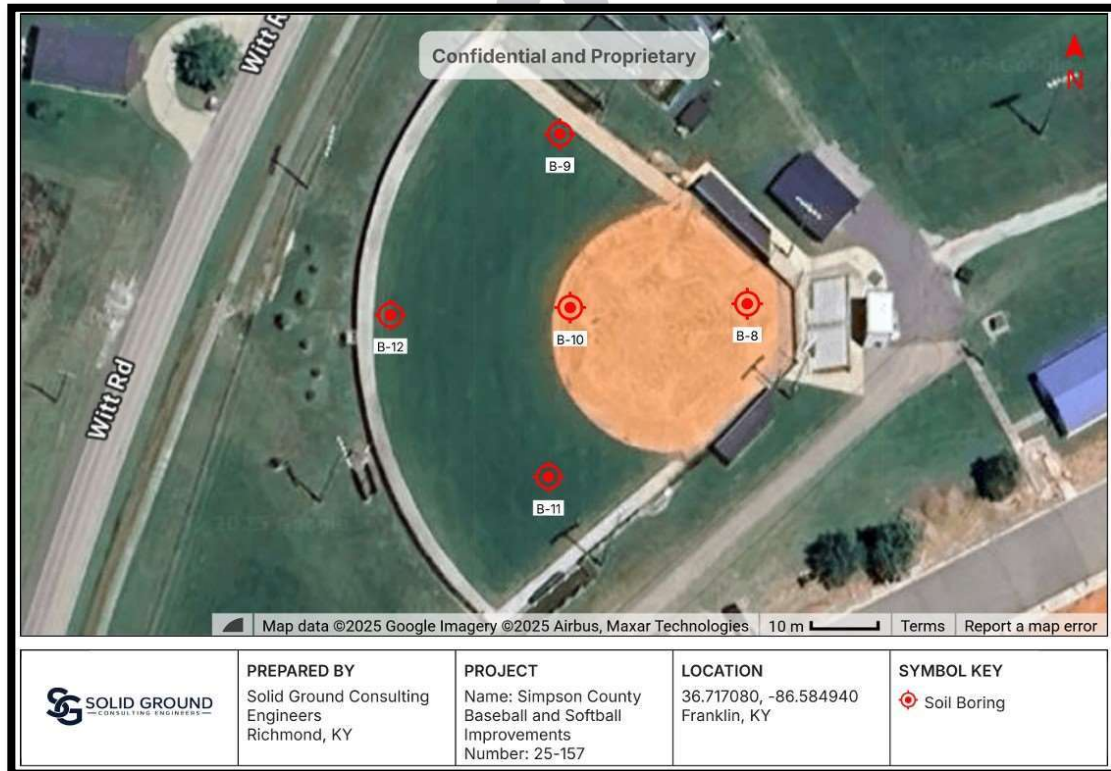


Figure 9: Approximate Boring Locations: Softball Field

### 3.4 Subsurface Conditions

The soil samples were classified by Solid Ground personnel according to the Unified Soil Classification System (USCS ASTM D2488; USCS ASTM 2487 for select samples). A description of each soil layer is as follows.

***Surficial Materials*** - The borings encountered a surficial layer of topsoil (4 inches). It should be noted that thicknesses of these materials may vary across the site. The thicknesses presented in this report should be considered approximate.

***Natural Soils*** - The borings encountered natural soils underlying the surficial materials layer described as Lean Clay (CL) and Fat Clay (CH) with varying amounts of silty, sand, gravel, and chert fragments to boring termination/auger refusal depths. The SPT N-values ranged from 2 to 50+ blows per foot, with a consistency of very soft to hard.

***Boring Termination/Auger Refusal*** - Eleven (11) of the borings were terminated at a depth of 16.5 feet. The remaining boring encountered auger refusal at a depth of 6.5 feet.

Detailed descriptions and strength characteristics are included on the boring logs in Appendix A.

***Groundwater*** - Groundwater was encountered in two (2) of the borings at depths of 7.5 feet (B-7) and 13.4 feet (B-5). Free groundwater levels fluctuate with seasonal weather conditions and may vary. Therefore, the borings may not be representative of the actual free water levels. To achieve an accurate measurement of free groundwater levels, water wells or piezometers should be installed.

Solid Ground should be contacted if groundwater is encountered during earthwork operations. Please note, the groundwater table can fluctuate significantly which could have an impact on the subsurface soils. Tables 1 to 3 summarize our findings.

**Table 1: Boring Summary**

Boring Number	Approximate Surface Elevation (ft)	Boring Termination Depth (ft)	Final Elevation (ft)
B-1	741.1	16.5	724.6
B-2	742.7	16.5	726.2
B-3	740.5	16.5	724.0
B-4	741.9	16.5	725.4
B-5	741.2	16.5	724.7
B-6	741.2	16.5	724.7
B-7	740.7	16.5	724.2
B-8	739.0	16.5	722.5
B-9	737.5	6.5*	731.5
B-10	738.7	16.5	722.2
B-11	738.9	16.5	722.4
B-12	738.0	16.5	721.5

#### **4.0 Geotechnical Concerns and Considerations**

Based on the results of the subsurface exploration and experience with similar projects, we believe the project site is generally suitable for the proposed development. However, some concerns exist with the subsurface conditions as discussed below.

##### **4.1 Surficial Materials**

Based on the information gathered from the soil borings, the site has a surficial layer of topsoil (4 inches). These thicknesses are representative of conditions encountered at the boring locations only, thickness and aerial extent of the strata may vary across the site. Construction plans should adequately address stripping and the disposal of these materials prior to earthwork operations. Topsoil should only be used as fill in landscaping areas.

##### **4.2 Construction in Cut/Fill Areas**

Cut areas have the potential to be overcut, disturbing the in-situ soils to depths below proposed finished grade. Areas to receive fill are stripped of topsoil and

are also sometimes disturbed to depths deeper than intended. Both cut and fill areas should be proof rolled prior to construction. Soft, loose, or wet areas should be identified and remediated in accordance with the recommendations provided in the “5.1 Earthwork” section of this report.

#### **4.3 Construction During Wet Conditions**

It is understood that potential development could occur during wet conditions. Based on experience with construction projects during wet conditions, subgrade remediation is often required. In addition, delays of earthwork/foundation operations could occur. Clays swell and silts break down when high moisture conditions are present. To stabilize the subgrade materials, drying and recompacting could be required. During wet conditions, the on-site materials may become saturated and are unable to dry in a timely manner.

Typically, remediation methods consist of undercutting soft and/or saturated soils, moisture conditioning, and recompacting or replacing with a granular stone that is “capped” with dense graded aggregate (DGA). The extent and depth of the undercut is on a case-by-case basis depending on the soil conditions. We recommend contracting Solid Ground to observe earthwork operations and foundation and slab-on-grade construction. In addition, we recommend that the earthwork contractor and the design team adequately budget for remediation repairs.

#### **4.4 Preliminary Liquefaction Potential and Settlement**

Liquefaction is the phenomenon where saturated soils develop high pore-water pressures during seismic shaking and lose their strength characteristics. This phenomenon generally occurs in areas of high seismicity where groundwater is shallow. Liquefaction can produce excessive settlement, ground rupture, lateral spreading, or failure of shallow spread foundations.

Three conditions are generally required for liquefaction to occur:

1. The soil must be saturated (relatively shallow groundwater)
2. The soil must be loosely packed (low density)
3. Ground shaking of sufficient intensity must occur to function as a trigger mechanism.

Based on our recommendations for the foundations, the soils should be considered to have low to moderate liquefaction potential.

#### **4.5 Site and Foundation Drainage**

Experience has shown that the onsite materials are prone to degradation during wet periods of the year and/or under heavy traffic. Surface and ground water should be controlled while the subgrade fill materials are exposed and use only enough compactive effort to achieve stability and job site requirements for compaction. In addition, it is recommended that foundation concrete, or a concrete bearing medium, be placed the same day that foundation excavation is performed.

The final grade should be sloped away from the structure and pavements a minimum of two percent to promote positive drainage. Roof drains and foundation drains should be installed and should discharge surface runoff away from the structure to provide positive site drainage. It should be noted that drainage should be designed and constructed without impacting neighboring properties. Drainage design is beyond our scope of work.

It is imperative that dewatering be maintained during construction and after development. If positive dewatering methods are not continually applied and maintained, the potential of remedial subgrade measures and long-term settlement is greatly increased.

We anticipate that the primary concern and difficulty during construction will be properly dewatering the site. The contractor should observe the site and understand this report. Drainage design is beyond our scope of services, but Solid Ground can provide drainage design for additional negotiated fees.

#### **4.6 Underground Utilities**

Design and Construction plans should adequately address the concern of potential settlement of underground utilities. Please note, all excavations should adhere to applicable codes such as OSHA.

#### **4.7 Soil Compaction Equipment**

The soil compaction equipment should be selected by the type of fill anticipated for the site. We anticipate utilizing a sheepfoot roller at this site for the on-site materials and a smooth drum roller for dense graded aggregate fill.

#### **4.8 Off Site Borrow Material**

There is a possibility fill material may be required to achieve proposed grading. Offsite borrow material could be required. Construction plans should include this consideration as well as ensure the offsite borrow material meets the recommendations detailed in this report.

#### **4.9 Soil Plasticity**

Some of the subsurface soils were classified as lean clay and fat clay. These soils can have high plasticity characteristics and be subject to volume changes with fluctuations in moisture content. The near surface on-site material is not considered highly plastic. Care should still be taken to mitigate subgrade degradation and reduce subgrade remediation. Therefore, we recommend minimal mitigation efforts consisting of the following:

- Improved site drainage to minimize exposure of these soils to moisture fluctuations, especially near building foundations and slab on grade.
- Minimize exposure of these soils to excessive wetting or drying.
- Deepen soil supported footings past the seasonal moisture change zone.

#### **4.10 Development within a Karst Region**

Solution activity in areas underlain by limestone generally results from a slow process of dissolving the underlying rock units by surface runoff or rainwater. Sinkholes at the ground surface are caused from either a general raveling failure within the soil unit or by rock collapse. Either phenomenon typically result in depressions at the ground surface, which, if large enough, can be identified on topographic maps. In addition to the natural causes of sinkhole development previously discussed, sinkholes may form as a result from water leaking from subsurface piping and drainage systems such as buried water and sewer pipes, septic lateral fields, and roof drains beneath the building and floor slabs.

As previously stated, the Kentucky Geological Survey rates the site with an intense potential for karst development. It is not possible to remove all risk associated with construction over known sinkholes or in karst areas. Our experience indicates that the limestone formations mapped underlying the site pose a high risk for solution activity and sinkhole formation. The natural rising and lowering of the ground water table and surface water migration downward

through the subsurface soils can create the risk of continued soil migration into solution voids in the underlying limestone.

There is some potential for sinkholes to be encountered during construction, especially in cut areas. Solid Ground should be contacted if a solution feature or other karst features are encountered during construction. Repair methods of sinkholes and other karst features exist. When sinkholes are encountered, the common practice is to excavate the soil from within the solution feature down to hard bedrock. The two most common methods of remediation are a concrete plug or an inverted filter. The repair method will be dependent upon several factors. Therefore, Solid Ground should be contacted to provide a repair method.

We believe the risk with this development is no greater than for similar developments in the area. To further reduce the risk of unidentified sinkholes at the site would require the implementation of more sophisticated and expensive geotechnical exploration methods including borings on a tightly spaced grid or geophysical methods. However, this approach is considered expensive and is likely cost prohibitive for this stage of the project.

#### **4.11 Soft Soils**

Some soft soils were encountered in borings within the proposed development area. These soils may require subgrade remediation including undercutting and replacement utilizing structural fill as discussed in section 5.1.2 of this report.

#### **4.12 Silty Material**

Silty material was encountered within the borings. Silty material is prone to breaking down under high moisture and repeated traffic. Care should be taken to not allow water to pond on the site and to reduce the construction traffic across the building pad and paving areas.

#### **4.13 Shallow Refusal**

Boring B-9 encountered auger refusal at a depth of 6.5 feet and the remaining borings were terminated at a depth of 16.5 feet. The cause of the auger refusal is unknown. Boulders, cobbles, or a utility line are likely the cause but cannot be confirmed/ ruled out Boulders may require excavation during foundation work, utility installation, and slab construction, depending on the finished floor and grade elevations. We anticipate the need for pneumatic hammers to remove the

boulders. Construction plans should address the method of rock removal and determine whether rock will need to be hauled off-site or used as fill material.

## **5.0 Confirmation-Dependent Recommendations**

The following recommendations are based on the information gathered and subsurface conditions encountered during this limited exploration. We have developed these recommendations under the assumption that our sampling performed on the site accurately portrays conditions that are not immediately visible due to earth, rock, water, or time. It should be noted that Solid Ground cannot be held liable for fill placed or performance of the subgrade without observations to confirm that conditions in the field are consistent with inferences from the samples we obtained. **It is recommended to retain Solid Ground to observe proof rolling of the building pads and pavement areas, prior to and during fill placement.**

It is recommended to retain Solid Ground to perform construction materials testing and special inspection for the duration of construction to both maintain speed of construction and overall project costs. Please note, if earthwork construction begins during wet weather conditions there is a possibility that the schedule will be prolonged and extensive remediation, or a more robust geotechnical recommendation will be required.

### **5.1 Earthwork**

#### **5.1.1 Site Preparation**

- Topsoil and other surficial materials should be stripped to prepare the site for construction.
  - In-place density testing should be performed to check that the previously recommended compaction criteria have been achieved.
  - Fill placement should be monitored on a full-time basis by Solid Ground during site grading.
  - Fill placement should extend to a minimum of 10 feet beyond the dugouts and fields footprints.
- After stripping and cutting operations, **the subgrade should be evaluated by Solid Ground by proof rolling methods with a fully loaded dump truck.**
- Possible remediation methods may be required if the subgrade and site soils are exposed to wet weather conditions.
- The pads may require stabilization prior to new fill placement or slab-on-grade construction. Solid Ground should be consulted to assist in

selecting the most appropriate method for site conditions. These methods may consist of any or combination of the following:

- Tensar geogrid reinforcement.
- “Walking” No. 2 stone into the soft subgrade.
- Application of compacted DGA stone.

### 5.1.2 Structural Fill Placement

We anticipate fill placement to be minor. Backfill materials for structural fill placement may consist of soil or durable crushed stone. The following steps are recommended for fill placement. **The onsite soils are expected to meet the requirements for structural fill. Off-site borrow material is not anticipated but cannot be ruled out without a review of the site grading plan.**

Structural fill material is defined as the following:

- Inorganic natural soil with maximum particle sizes of 3 inches.
- Liquid Limit of no greater than 50 percent and Plasticity Index no greater than 30 percent.
- Fill should be virtually free of organic material.
- Solid Ground should observe the material to confirm the soils meet applicable standards for structural fill.
- Other sources of structural fill should be verified by Solid Ground.
  - If other sources of structural fill are anticipated, Solid Ground should collect a bulk sample for Standard Proctor testing.

The following are recommendations for placement of soil structural fill:

- Structural fill should be placed in no greater than 8-inch-thick layers.
- Structural fill should be compacted to at least 98 percent of the soil's maximum dry density as determined by the Standard Proctor Compaction test (ASTM D698).
- The moisture content of the fill material should be maintained within 2 percent (above or below) of its Standard Proctor optimum moisture content depending on the results of the Proctor tests.
- In-place density testing should be performed to check that the previously recommended compaction criteria have been achieved.
- Fill placement should be monitored on a full-time basis during site grading.

- Fill placement should extend to a minimum of 10 feet beyond the building footprints.

### 5.1.3 Protection of Earthwork

Common earthwork construction practices can leave soils exposed for long periods of time while work is performed in other areas of a site. Care should be taken during the earthwork phase to protect soils from degradation caused by sunlight, wind, precipitation, and other factors. Solid Ground recommends that any exposed soil be protected by straw, seeding, rock, or other methods if the area the soil is in will be left unattended for more than three days. Any soil left unattended or unprotected for more than three days should be re-evaluated prior to continuation of work.

## 5.2 Dugout Foundations

### 5.2.1 Discussion

Once grading operations are to be initiated the building pad should be thoroughly proof rolled with a loaded truck, any soft or unstable areas should be stabilized prior to new fill placement in accordance with Section 5.1 of this report. Solid Ground should be onsite during the proof rolling.

Based on the subsurface conditions encountered, information gathered during this exploration, and past knowledge of the site's development, we recommend that foundations be designed as shallow spread footings bearing on stiff or better in-situ material. If the dugouts are sunken into the ground, sump and pump should be considered in the design.

**We recommend the use of a maximum net allowable bearing pressure of 1,500 PSF (pounds per square foot) for foundations bearing on these materials. We anticipate localized remediation of soft near surface soils to achieve the allowable bearing pressure.**

A detailed settlement analysis was beyond the scope of this report. Based on the assumed structural loads, the available site grading information, the recommended bearing pressure, knowledge of the site's development, and empirical correlation for the subsurface conditions encountered beneath the proposed structure, we estimate the total settlements of the foundation to be about one inch or less. Differential settlements are estimated to be about 1/2 inch or less.

Once the design is finalized, we recommend allowing Solid Ground the opportunity to review the plans and specifications.

### 5.2.2 Construction Considerations

The following typical construction considerations are recommended:

- Column footings and strip footings should be at least 24 inches wide and 12 inches thick.
- All exterior footing bottoms should be **at least 24 inches below the lowest adjacent exterior grade for protection against frost penetration and plasticity of the soil.**
- Clean the foundation bearing area so it is nearly level and is free of ponded water and loose material.
- Dewatering methods may be necessary if the foundation excavation takes place during wet weather.
- Solid Ground should be on site while the foundation construction is performed.
- Dynamic Cone Penetrometer (DCP) testing should be performed on each spread footing and every 20 feet within each strip footing as a check on the soil bearing capacity.
- Once fill operations are completed and foundation excavations begin, it is important that the foundation excavations be protected from wet weather conditions by placement of concrete or bearing medium immediately after. Please note, providing positive site drainage is critical to the performance of the foundations.
- There is a possibility that during foundation excavations that perched water may be encountered. If perched water is encountered, it is recommended to dewater the site. This may be achieved by constructing “bleeders” or trenches from the site to an area with lower elevation and allow water to be gravity directed away from site.

### 5.3 Slab-on-Grade

We assume that the slab-on-grade will be utilized for light loads of up to 150 pounds per square foot maximum. If this assumption is incorrect, Solid Ground should be contacted to modify recommendations.

- It should be noted that if the site soils are exposed to wet weather conditions or continuous construction traffic, the soils have potential to

degrade and will lose their strength. This could require a more robust subgrade improvement design.

- It is imperative that dewatering be continuous and construction traffic be controlled away from the building pad.
- It should be noted that the means and methods of construction that will be performed by others will heavily dictate the suitability and sustainability of the site conditions and building service life during and after construction.

The following recommendations should be followed:

- Solid Ground should observe the finished subgrade once grading is completed. If excessive pumping and/or rutting is observed remediation may be required. Typical remediation methods consist of undercutting the unsuitable soil and placing recompacted soil or granular material.
- If construction is to take place during wet periods of the year, there is a potential that remediation methods will be required to stabilize the soil subgrade. Solid Ground should be consulted to assist in selecting the most appropriate method for site conditions. These methods may consist of any or combination of the following:
  - Tensar geogrid reinforcement.
  - “Walking” No. 2 stone into the soft subgrade.
  - Application of consolidated No. 57 stone.
- It is imperative that quality control be performed specifically for the slab-on-grade to ensure that moisture contents, as well as compaction efforts, are within optimum.
- It is recommended that the floor slab be constructed with an open graded stone base of a minimum of **6 inches** in thickness. The floor slab should be constructed with a minimum of **4 inches** of reinforced concrete.
- A subgrade modulus,  $k$ , of 60 pounds per cubic inch (PCI) for design of the floor slab supported by granular material.
- Control joints should be placed per the most recent ACI standards and guidance.
- The floor slab should be fully ground-supported. This will reduce the possibility of cracking and displacement of the floor slab due to differential settlement.

***It is recommended to perform proof rolling prior to placing stone to serve as the slab working base, and again immediately prior to constructing the slab.***

## 5.4 Seismic Site Classification

The Seismic Site Classification assumes that shallow spread and strip footings will be utilized. This classification is based on the seismic standards and design values from the 2009 NEHRP Recommended Seismic Provisions and the 2010 ASCE-7 Standard. Based on the results of our exploration and the geology of the area, we assign a site seismic classification of “D”.

## 5.5 Plan Review

To better ensure conformance of the final design documents with the recommendations contained in this report, and to better comply with the building department’s requirements, Solid Ground should review the completed project plans prior to construction. The plans should be made available for our review as soon as possible after completion so that we can better assist in keeping your project schedule on track.

We recommend that the following project-specific note be added to the architectural, structural, and civil plans: “The geotechnical aspects of the project, including site grading, utility and foundation excavations, slab on grade construction, placement and compaction of engineered fill, installation of site drainage should be performed in accordance with the recommendations of the *“Geotechnical Report prepared by Solid Ground Consulting Engineers, dated March 24, 2025.”*”

## 5.6 Construction Monitoring and Observations

Based on experience; in order to obtain the Certificate of Occupancy for this development, you will be required to directly contract a qualified and certified inspection firm to provide special inspection items consisting of observing the following:

- Foundation Construction
- Concrete Placement
- Reinforcement Placement
- Masonry Construction
- Steel Construction

**It is advantageous to the owner to contract with Solid Ground to provide construction monitoring and observations for this project.** Some of those benefits are as follows:

- As the Geotechnical Engineer of Record (GEO R) for this project, we will provide confirmation that subsurface conditions exposed during construction are substantially the same as those interpolated from our limited subsurface exploration, on which the analysis and design were based.
- The recommendations in this report are based on limited subsurface information. The nature and extent of variation across the site may not become evident until construction. If variations are then exposed, it will be necessary to re-evaluate our recommendations. If subsurface conditions differ from those anticipated, we as the GEO R will provide recommendations if deemed necessary.

### **6.0 Report Limitations**

This report has been prepared for the exclusive use of Simpson County Board of Education, Ross Tarrant Architects, and Sarah Siekkinen for specific application to the project site. Our recommendations have been prepared using generally accepted standards of geotechnical engineering practice in the Commonwealth of Kentucky. No other warranty is expressed or implied.

The recommendations provided are based on the subsurface information and other findings obtained by Solid Ground as well as information provided by you. If there are revisions to the plans for this project or if subsurface conditions detailed in this report are encountered during construction that are different than our exploration, we should be notified immediately to modify the foundation recommendations if deemed necessary. We cannot be held responsible for the impact of those conditions on the project if those impacts are not made known to us.

The scope of services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials. 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.

### **7.0 Associated Geotechnical Risks**

The analytical tools which are used by the geotechnical engineer in this area are generally empirical and must be used in conjunction with professional engineering judgment and experience. Therefore, the recommendations presented in this geotechnical exploration should not be considered risk-free

and are not a guarantee that the proposed structure will perform as planned. The engineering recommendations presented in this are based on the information gathered during the subsurface exploration, information provided by you and experience with similar projects.



## APPENDICES

APPENDIX A - BORING LOGS

APPENDIX B - LAB RESULTS












# Soil Boring: B-1



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71756, -86.58485
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab	
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)	
			Surface Elevation	741.1'						
			Visual Classification and Remarks							
	740		<b>Topsoil</b> 0.3							
			<b>Silty Lean Clay</b> , firm, moist, orangish brown, gray mottling (CL)  5': firm to stiff, moist to wet		2.5 ft		3-3-4	7	20.8	
5						5 ft		3-5-5	10	20.5
	735									
			<b>Fat Clay</b> , moist, orangish brown, red and gray mottling, trace sand, very stiff (CH)  10.0		7.5 ft		4-8-9	17	22.2	
10						10 ft		5-8-8	16	21.2
	730									
			<b>Fat Clay with Gravel (chert)</b> , very stiff, moist, reddish brown, orange and gray mottling (CH)  15': stiff		15 ft		4-6-6	12		
	725									
								16.5		

Boring terminated at 16.5'

## Graphics Legend

	CH		CL
	Topsoil		SS - Small Split Spoon

## Water Levels

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	-	

# Soil Boring: B-2



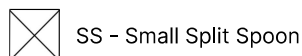
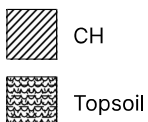
**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71746, -86.58439
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

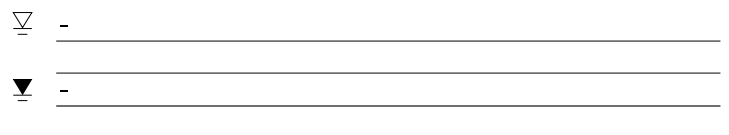
Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	
			Surface Elevation	742.7'					Moisture Content (%)
			Visual Classification and Remarks						
			<b>Topsoil</b>	0.3					
			<b>Silty Fat Clay with Sand</b> , stiff, moist, reddish brown, orange mottling (CH)		2.5 ft				
	740						5-6-8	14	21.4
				5.0	5 ft				
			<b>Fat Clay</b> , stiff, moist, reddish brown, trace sand, orange mottling (CH)				5-7-10	17	25.9
	735				7.5 ft				
			7.5': some sand, little gravel/chert, gray mottling				3-5-1	6	23.8
					10 ft				
			10': stiff				4-5-6	11	
	730								
				15.0	15 ft		4-4-6	10	
			<b>Fat Clay with Gravel (chert)</b> , firm to stiff, moist, reddish brown, trace sand, orange mottling (CH)	16.5					

Boring terminated at 16.5'

## Graphics Legend



## Water Levels



# Soil Boring: B-3



**Project:** Simpson County Baseball and Softball Improvements  
**Location:** Franklin, KY  
**Project Number:** 25-157

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71737, -86.58527
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	
			Surface Elevation	740.5'					Moisture Content (%)
			Visual Classification and Remarks						
	740		<b>Topsoil</b>	0.3					
			<b>Silty Lean Clay</b> , soft, moist to wet, brownish gray (CL)		2.5 ft		WOH-2-2	4	20.6
5	735		5': soft to firm, red mottling, trace gravel		5 ft		2-2-3	5	
			7.5': orangish brown, moist, stiff, little gravel		7.5 ft		5-6-6	12	
10	730		<b>Silty Fat Clay</b> , firm, moist, orangish brown, gray mottling (CH)		10 ft		3-3-4	7	22.6
15	725		<b>Silty Fat Clay with Gravel (chert)</b> , very stiff, moist to wet, orangish brown (CH)		15 ft		6-13-8	21	25.4
			Boring terminated at 16.5'		16.5				

## Graphics Legend

	CH		CL
	Topsoil		SS - Small Split Spoon

## Water Levels

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	-	

# Soil Boring: B-4



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71725, -86.58467
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab	
			Tooling	3-1/4" Hollow	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Atterberg Limits (LL-PL-PI)	Moisture Content (%)
			Surface Elevation	Stem Auger						
Visual Classification and Remarks										
			<b>Topsoil</b>	0.3						
	740		<b>Silty Lean Clay</b> , soft, wet, grayish brown (CL)		2.5 ft					
							3-2-2	4	30-17-13	26.5
5			5.0': firm, moist to wet, orangish brown, gray mottling		5 ft					
	735			7.5			2-3-4	7		
					7.5 ft					
			<b>Silty Lean Clay with Gravel (chert)</b> , firm, moist, orangish brown, little sand, red mottling (CL)				4-5-6	11		
10				10.0	10 ft					
	730		<b>Fat Clay with Gravel</b> , stiff to very stiff, moist, reddish brown, orange and gray mottling, little sand (CH)				5-7-8	15		22.5
15			15': stiff, orange and black mottling		15 ft					
				16.5			4-4-9	13		35.2

Boring terminated at 16.5'

## Graphics Legend

	Topsoil		CL
	CH		SS - Small Split Spoon

## Water Levels






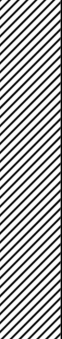

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# Soil Boring: B-5



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71705, -86.58427
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab			
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	% Fines	Atterberg Limits (LL-PL-PI)	Moisture Content (%)	
			Surface Elevation	741.2'								
Visual Classification and Remarks												
	740		Topsoil	0.3								
			Silty Lean Clay, soft, wet, grayish brown, little gravel (CL)		2.5 ft		WOH-WOH-2	2				28.2
5			5.0': moist, red mottling, little chert		5 ft		2-4-4	8	88.3	34-20-14	21.0	
	735				7.5	7.5 ft		5-8-7	15			
				Fat Clay, stiff to very stiff, moist, orangish brown, gray and red mottling, little sand (CH)		10 ft		7-10-11	21			22.4
10	730	10': very stiff										

## Graphics Legend

At Time of Drilling (ATD)	CH
Topsoil	SS - Small Split Spoon
CL	

## Water Levels





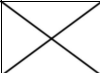



Water encountered @ 13.4'	
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# Soil Boring: B-6



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71694, -86.58508
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples			Lab	
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
			Surface Elevation	741.2'					
Visual Classification and Remarks									
— 740    5  735       10  730       15  725			<b>Topsoil</b>	0.3					
			<b>Silty Lean Clay with Gravel (chert)</b> , firm, moist, orangish brown, gray mottling (CL)    5': soft, brownish gray, moist to wet	2.5 ft		6-4-3	7	19.2	
	5 ft								
					2-2-2	4			
	7.5 ft								
					WOH-2-3	5	31.7		
			<b>Fat Clay</b> , stiff, moist, orangish brown, little chert, trace sand (CH)	10 ft		3-5-6	11		
	15 ft								
					6-6-13	19			
				<b>Fat Clay with Gravel (chert)</b> , very stiff, moist, orangish brown, little sand, gray mottling (CH)	16.5				

Boring terminated at 16.5'

## Graphics Legend

	Topsoil		CH
	CL		SS - Small Split Spoon

## Water Levels

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	-	
	-	

# Soil Boring: B-7



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/10/2025	Date Completed: 03/10/2025	Coordinates: 36.71677, -86.58453
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
			Surface Elevation	740.7'					
Visual Classification and Remarks									
<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><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Boring terminated at 16.5'

## Graphics Legend

At Time of Drilling (ATD)	Topsoil
CH	SS - Small Split Spoon
CL	






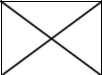

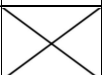
## Water Levels

Water encountered @ 7.6'	
-	

# Soil Boring: B-8

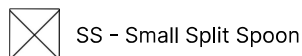
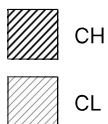
**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/12/2025	Date Completed: 03/12/2025	Coordinates: 36.71562, -86.5876
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	



Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
			Surface Elevation	739'					
			Visual Classification and Remarks						
			<b>Topsoil</b>	0.3					
			<b>Silty Lean Clay</b> , soft, moist, light brown, some sand (CL)		2.5 ft				
	735						2-1-2	3	23.3
5			5': some gravel/chert, very stiff		5 ft				
							7-11-13	24	
				7.5	7.5 ft				
	730		<b>Silty Fat Clay with Gravel (chert)</b> , hard, moist, orangish brown, gray mottling, some sand (CH)				11-17-15	32	18.5
10			10': very stiff, black and gray mottling		10 ft				
							7-9-11	20	
	725								
15				15.0	15 ft				
			<b>Fat Clay with Gravel (chert)</b> , firm, moist, orangish brown, little sand, gray mottling (CH)				3-3-3	6	
				16.5					

Boring terminated at 16.5'

## Graphics Legend



## Water Levels


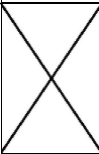

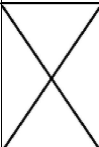
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# Soil Boring: B-9



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/12/2025	Date Completed: 03/12/2025	Coordinates: 36.71585, -86.58792
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 6.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
			Surface Elevation	737.5'					
			Visual Classification and Remarks						
5	735		Topsoil	0.3	2.5 ft		9-9-10	19	21.3
		Silty Lean Clay, very stiff, moist, orangish brown, gray mottling, little sand (CL)							
			Silty Fat Clay with Sand, hard, moist, orangish brown, some chert/gravel (CH)	5.0	5 ft		15-19-19	38	17.3
				6.5					

Auger refusal at 6.5'

## Graphics Legend



## Water Levels





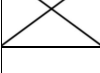



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▼	-

# Soil Boring: B-10



**Project:** Simpson County Baseball and Softball Improvements  
**Location:** Franklin, KY  
**Project Number:** 25-157

Date Started: 03/12/2025	Date Completed: 03/12/2025	Coordinates: 36.71562, -86.5879
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab		
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	% Fines	Atterberg Limits (LL-PL-PI)	Moisture Content (%)
			Surface Elevation	738.7'							
Visual Classification and Remarks											
			<b>Topsoil</b>	0.3							
			<b>Gravelly Lean Clay</b> , very stiff, moist, orangish brown, little sand, gray mottling (CL)  5': black streaks, gray and black mottling								
	735			2.5 ft		7-7-10	17	72	31-19-12	18.9	
5				5 ft		9-11-12	23				
				7.5 ft		7-8-8	16				
	730			10 ft		5-6-7	13			18.9	
10			<b>Silty Fat Clay</b> , stiff, moist, orangish brown, some sand, trace gravel, gray mottling (CH)								
	725			15 ft		6-8-10	18				
15											
			<b>Fat Clay with Gravel (chert)</b> , very stiff, moist to wet, orangish brown, trace sand, black and gray mottling (CH)	15.0							
				16.5							

Boring terminated at 16.5'

## Graphics Legend

	CL		CH
	Topsoil		SS - Small Split Spoon

## Water Levels

	-	
	-	
	-	

# Soil Boring: B-11



**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/12/2025	Date Completed: 03/12/2025	Coordinates: 36.71539, -86.58793
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-value	
			Surface Elevation	738.9'					Moisture Content (%)
			Visual Classification and Remarks						
			<b>Topsoil</b>	0.3					
			<b>Silty Lean Clay</b> , very stiff, moist, orangish brown, red and gray mottling, little chert, trace sand (CL)		2.5 ft				
	735						6-10-16	26	19.0
5				5.0	5 ft				
			<b>Lean Clay with Gravel (chert)</b> , hard, moist, orangish brown, gray mottling, trace sand (CL)				15-19-50/0.4'	69	
					7.5 ft				
	730		7.5': stiff, some sand				8-6-6	12	16.2
10				10.0	10 ft				
			<b>Fat Clay</b> , stiff, moist, orangish brown, gray mottling, some sand (CH)				4-5-6	11	
	725								
15					15 ft				
			15': firm, no mottling	16.5			3-4-5	9	

Boring terminated at 16.5'

## Graphics Legend



CL



CH



Topsoil



SS - Small Split Spoon

## Water Levels



-










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# Soil Boring: B-12



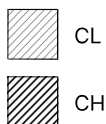
**Project: Simpson County Baseball and Softball Improvements**  
**Location: Franklin, KY**  
**Project Number: 25-157**

Date Started: 03/12/2025	Date Completed: 03/12/2025	Coordinates: 36.71561, -86.5882
Location Accuracy: Estimated from Google Maps	Client Name: Simpson County Board of Education	Hammer Type: Auto
Method: Auger	Depth: 16.5'	

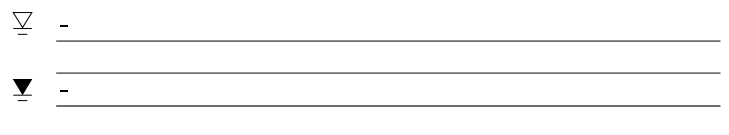
Depth (ft)	Elevation (ft)	Graphic Log	Rig Type	Mobile B-25	Samples				Lab
			Tooling	3-1/4" Hollow Stem Auger	Depth of Sample (ft)	Sample Graphic	Blow Counts	Uncorrected N-Value	Moisture Content (%)
			Surface Elevation	738'					
Visual Classification and Remarks									
			Topsoil	0.3					
	735		Gravelly (chert) Lean Clay, very stiff, moist, orangish brown, trace sand (CL)  5': very stiff to hard, gray mottling  7.5': stiff to very stiff, gray and black mottling						
				2.5 ft		8-13-12	25	14.9	
5				5 ft					
						13-16-14	30	16.2	
	730			7.5 ft					
				10.0	10 ft				
	725		Fat Clay, stiff, moist, orangish brown, little gravel/chert, little sand, gray and black mottling (CH)  15': moist to wet, soft to firm			5-5-6	11		
15				15 ft		3-3-2	5	28.7	
				16.5					

Boring terminated at 16.5'

## Graphics Legend



## Water Levels





Distribution:

Report:

## REPORT OF ATTERBERG LIMIT TESTING - ASTM D4318

Project Name FS Baseball & Softball Project # 25-157

Sample # B4 Depth 2.5'-4.0'

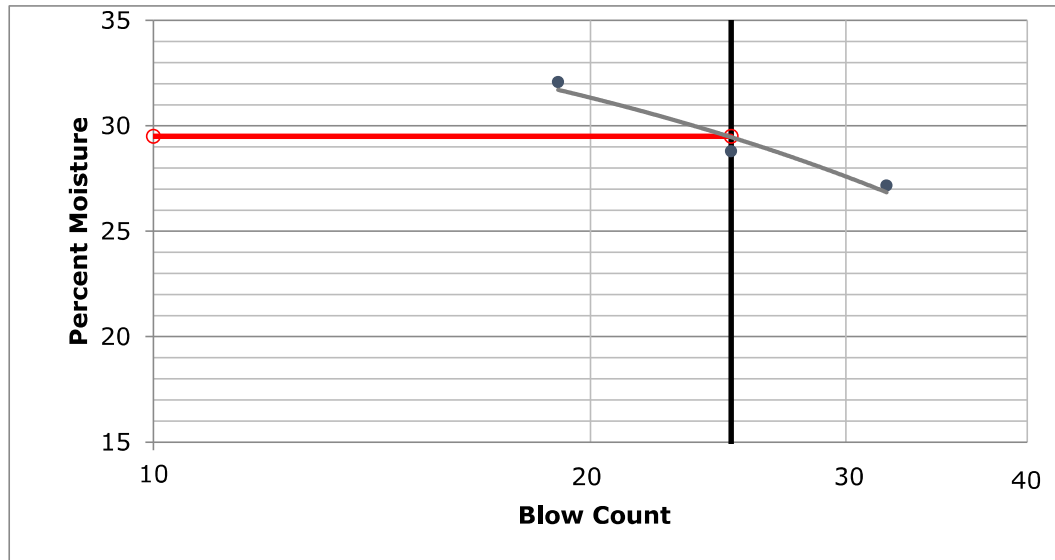
Soil Description Grayish Brown LEAN CLAY Prep. Method DRY

Date Sample Received 3/12/2025 Date Tested 3/19/2025

### LIQUID LIMIT

Run Number	1	2	3	4	5	6
Tare Number	3	32	126			
Tare + Wet Soil	23.8	22.3	20.7			
Tare + Dry Soil	21.6	20.4	19.0			
Weight of Water	2.2	1.9	1.7			
Weight of Tare	13.5	13.8	13.7			
Weight of Dry Soil	8.1	6.6	5.3			
Water Content	27.2	28.8	32.1			
Number of Blows	32	25	19			

Liquid limit test was performed using manual device and metal grooving tool



LL 30

PL 17

PI 13

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CHART

CL

Minus #200

88.8

USCS

LEAN CLAY (CL)

### PLASTIC LIMIT

Run Number	1	2	3	4	5	Natural Moisture
Tare Number	147	233				
Tare + Wet Soil	19.2	19.9				
Tare + Dry Soil	18.4	19.0				
Weight of Water	0.8	0.9				
Weight of Tare	13.7	13.8				
Weight of Dry Soil	4.7	5.2				
Water Content	17.0	17.3				
Plastic Limit	<u>17.2</u>					

Plastic limit test specimens were hand rolled



Distribution:

## Report of Percent Passing No. 200 Sieve ASTM D1140

Project Name FS Baseball & Softball Project # 25-157

Sample # B4 Depth 2.5'-4.0'

Soil Description Grayish Brown LEAN CLAY Method A or B B

Date Sample Received 3/12/2025 Date Tested 3/19/2025

Boring/Sample No.	B4					
Depth (From-To)	2.5'-4.0'					

### #200 DATA

Tare Number	LRP					
Wet Soil + Tare, g	1090.7					
Dry Soil + Tare, g	727.6					
Wt. of Tare	692.3					
Wt. of Dry Soil, g	35.3					
Soak Time, hours	24					

### % MOISTURE DATA

Tare Number	122	48				
Wet Soil + Tare, g	70.3	70.2				
Dry Soil + Tare, g	58.6	58.2				
Wt of Water	11.7	12.0				
Wt of Tare	13.9	13.5				
Wt. of Dry Soil, g	44.7	44.7				
% Moisture	26.2	26.8				

### CALCULATIONS

Dry Wt. Before, g	314.92					
Dry Wt. After, g	35.30					
% Retained	11.2					
% Passing	88.8					



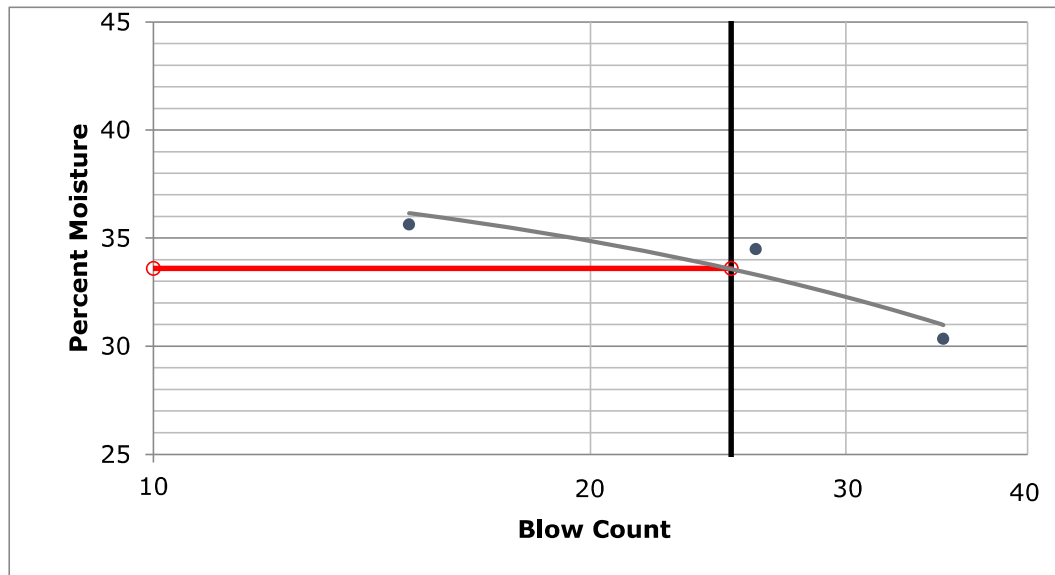
Distribution:

Report:

**REPORT OF ATTERBERG LIMIT TESTING - ASTM D4318**Project Name FS Baseball & SoftballProject # 25-157Sample # B5Depth 5.0'-6.5'Soil Description Grayish Brown LEAN CLAYPrep. Method DRYDate Sample Received 3/12/2025Date Tested 3/19/2025**LIQUID LIMIT**

Run Number	1	2	3	4	5	6
Tare Number	28	21	11			
Tare + Wet Soil	25.5	21.9	25.7			
Tare + Dry Soil	22.8	19.9	22.6			
Weight of Water	2.7	2.0	3.1			
Weight of Tare	13.9	14.1	13.9			
Weight of Dry Soil	8.9	5.8	8.7			
Water Content	30.3	34.5	35.6			
Number of Blows	35	26	15			

Liquid limit test was performed using manual device and metal grooving tool

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PLASTICITY  
CHARTCL

Minus #200

88.3

USCS

LEAN CLAY (CL)**PLASTIC LIMIT**

Run Number	1	2	3	4	5	Natural Moisture
Tare Number	15	25				
Tare + Wet Soil	22.8	21.6				
Tare + Dry Soil	21.3	20.3				
Weight of Water	1.5	1.3				
Weight of Tare	13.5	13.8				
Weight of Dry Soil	7.8	6.5				
Water Content	19.2	20.0				
Plastic Limit	19.6					

Plastic limit test specimens were hand rolled



Distribution:

## Report of Percent Passing No. 200 Sieve ASTM D1140

Project Name FS Baseball & Softball Project # 25-157Sample # B5 Depth 5.0'-6.5'Soil Description Grayish Brown LEAN CLAY Method A or B BDate Sample Received 3/12/2025 Date Tested 3/19/2025

Boring/Sample No.	B5					
Depth (From-To)	5.0'-6.5'					

### #200 DATA

Tare Number	LRP					
Wet Soil + Tare, g	834.9					
Dry Soil + Tare, g	472.2					
Wt. of Tare	433.3					
Wt. of Dry Soil, g	38.9					
Soak Time, hours	24					

### % MOISTURE DATA

Tare Number	54	11				
Wet Soil + Tare, g	70.1	71.1				
Dry Soil + Tare, g	60.5	61.0				
Wt of Water	9.6	10.1				
Wt of Tare	13.8	13.9				
Wt. of Dry Soil, g	46.7	47.1				
% Moisture	20.6	21.4				

### CALCULATIONS

Dry Wt. Before, g	331.90					
Dry Wt. After, g	38.90					
% Retained	11.7					
% Passing	88.3					



Distribution:

Report:

## REPORT OF ATTERBERG LIMIT TESTING - ASTM D4318

Project Name FS Baseball & Softball Project # 25-157

Sample # B10 Depth 2.5'-4.0'

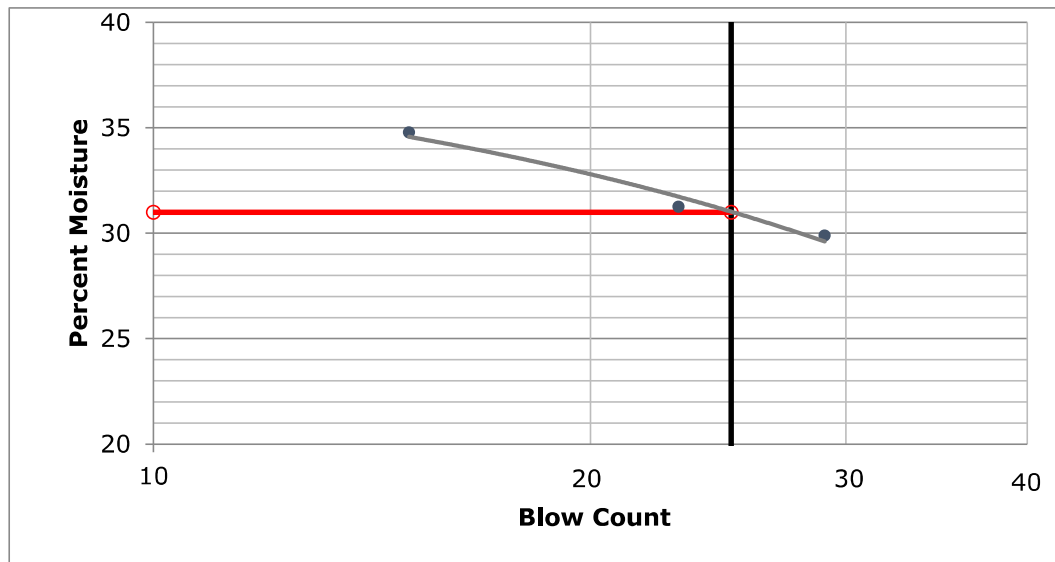
Soil Description Orangish Brown Gravelly LEAN CLAY Prep. Method DRY

Date Sample Received 3/12/2025 Date Tested 3/19/2025

### LIQUID LIMIT

Run Number	1	2	3	4	5	6
Tare Number	2	10	13			
Tare + Wet Soil	25.1	19.8	20.0			
Tare + Dry Soil	22.5	18.3	18.4			
Weight of Water	2.6	1.5	1.6			
Weight of Tare	13.8	13.5	13.8			
Weight of Dry Soil	8.7	4.8	4.6			
Water Content	29.9	31.3	34.8			
Number of Blows	29	23	15			

Liquid limit test was performed using manual device and metal grooving tool



LL 31

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PI 12

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CL

Minus #200

72.0

USCS

Gravelly  
LEAN CLAY (CL)

### PLASTIC LIMIT

Run Number	1	2	3	4	5	Natural Moisture
Tare Number	38	188				
Tare + Wet Soil	24.8	22.5				
Tare + Dry Soil	23.0	21.1				
Weight of Water	1.8	1.4				
Weight of Tare	13.5	13.6				
Weight of Dry Soil	9.5	7.5				
Water Content	18.9	18.7				
Plastic Limit	18.8					

Plastic limit test specimens were hand rolled



Distribution:

## Report of Percent Passing No. 200 Sieve ASTM D1140

Project Name FS Baseball & Softball

Project # 25-157

Sample # B10

Depth 2.5'-4.0'

Soil Description Orangish Brown Gravelly LEAN CLAY

Method A or B B

Date Sample Received 3/12/2025

Date Tested 3/19/2025

Boring/Sample No.	B10					
Depth (From-To)	2.5'-4.0'					

### #200 DATA

Tare Number	LRP					
Wet Soil + Tare, g	837.2					
Dry Soil + Tare, g	531.3					
Wt. of Tare	436.9					
Wt. of Dry Soil, g	94.4					
Soak Time, hours	24					

### % MOISTURE DATA

Tare Number	12	31				
Wet Soil + Tare, g	72.0	70.3				
Dry Soil + Tare, g	62.8	61.2				
Wt of Water	9.2	9.1				
Wt of Tare	13.7	13.6				
Wt. of Dry Soil, g	49.1	47.6				
% Moisture	18.7	19.1				

### CALCULATIONS

Dry Wt. Before, g	336.59					
Dry Wt. After, g	94.40					
% Retained	28.0					
% Passing	72.0					

**Natural Moisture Content Determination (ASTM D2216)**

Project Name: FS Baseball & Softball  
Project Number: 25-157

Date: 3/19/2025  
Page: 1 of 1

Boring Number	Sample Depth (ft)	Can ID Number	Can Weight	Wet Weight + Can	Dry Weight + Can	Moisture %
B1	2.5-4.0	43	13.5	68.6	58.9	21.4
		35	13.5	70.0	60.5	20.2
B1	5.0-6.5	129	13.8	69.8	60.4	20.2
		42	13.7	69.8	60.1	20.9
B1	7.5-9.0	21	13.9	69.3	59.7	21.0
		18	13.8	69.5	58.9	23.5
B1	10.0-11.5	56	13.5	68.6	58.4	22.7
		15	13.5	70.5	61.1	19.7
B2	2.5-4.0	119	13.8	71.3	61.0	21.8
		8	13.6	70.1	60.3	21.0
B2	5.0-6.5	5	13.7	68.8	57.4	26.1
		145	13.4	69.6	58.1	25.7
B2	7.5-9.0	20	13.5	70.8	60.7	21.4
		114	13.8	70.1	58.4	26.2
B3	2.5-4.0	17	13.6	72.4	62.9	19.3
		14	13.9	70.1	60.0	21.9
B3	10.0-11.5	48	13.5	69.7	60.1	20.6
		55	13.9	69.5	58.5	24.7
B3	15.0-16.5	44	13.9	70.0	57.9	27.5
		128	13.8	70.5	59.8	23.3
B4	2.5-4.0	122	13.9	70.3	58.6	26.2
		48	13.5	70.2	58.2	26.8
B4	10.0-11.5	37	13.4	72.0	61.7	21.3
		29	13.8	70.1	59.3	23.7
B4	15.0-16.5	38	13.4	69.7	54.7	36.3
		15	13.9	68.1	54.3	34.2
B5	2.5-4.0	49	13.4	69.2	56.4	29.8
		3	13.5	70.9	58.8	26.7
B5	5.0-6.5	54	13.8	70.1	60.5	20.6
		11	13.9	71.1	61.0	21.4
B5	10.0-11.5	131	13.6	70.9	60.2	23.0
		7	13.5	70.2	60.0	21.9
B6	2.5-4.0	2	13.8	70.2	60.8	20.0
		22	13.5	71	62.1	18.3
B6	7.5-9.0	50	13.7	72.8	58.9	30.8
		45	13.5	70.7	56.6	32.7

B7	2.5-4.0	19	13.8	70.8	59.2	25.6
		100	13.9	68.9	57.4	26.4
B7	7.5-9.0	133	13.4	69.9	59.0	23.9
		6	13.6	70.4	59.8	22.9
B7	15.0-16.5	139	13.6	70.8	60.3	22.5
		41	13.4	71	59.3	25.5
B8	2.5-4.0	4	13.9	69.1	58.5	23.77
		12	13.5	71.4	60.6	22.93
B8	7.5-9.0	142	13.5	70.2	61.2	18.87
		3	13.8	71.2	62.4	18.11
B9	2.5-4.0	116	13.9	70.7	60.8	21.11
		60	13.8	69.9	60.0	21.43
B9	5.0-6.5	113	13.7	69.6	61.5	16.95
		54	13.4	72.9	64.0	17.59
B10	2.5-4.0	12	13.7	72	62.8	18.74
		31	13.6	70.3	61.2	19.12
B10	5.0-6.5	26	13.8	70.8	63.2	15.38
		188	13.5	71	63.1	15.93
B10	10.0-11.5	27	13.8	70.9	61.6	19.46
		108	13.5	70.7	61.8	18.43
B11	2.5-4.0	33	13.3	70.6	61.6	18.63
		30	13.5	70.7	61.4	19.42
B11	7.5-9.0	16	13.8	69.2	61.6	15.90
		34	13.4	68.3	60.5	16.56
B12	2.5-4.0	53	13.4	69.9	63.9	11.88
		36	13.9	71.3	62.6	17.86
B12	5.0-6.5	34	13.5	70	61.9	16.74
		51	13.9	72.5	64.6	15.58
B12	15.0-16.5	24	13.4	69.3	56.4	30.00
		9	13.8	71.6	59.2	27.31

## **SECTION 015713 TEMPORARY EROSION AND SEDIMENT CONTROL**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 311000 - Site Clearing: Limits on clearing; disposition of vegetative clearing debris.
- B. Section 312200 - Grading: Temporary and permanent grade changes for erosion control.
- C. Section 321123 - Aggregate Base Course: Temporary and permanent roadways.
- D. Section 329219 - Seeding: Permanent turf for erosion control.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.
- B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).
- C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.
- D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.
- E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.
- F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).
- G. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.
- H. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.
- I. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service; 2009.

#### **1.04 PERFORMANCE REQUIREMENTS**

- A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.
- B. Also comply with all more stringent requirements of State of Kentucky Erosion and Sedimentation Control Manual.
- C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

- D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
  - 1. Obtain and pay for permits and provide security required by authority having jurisdiction.
  - 2. Owner will withhold payment to Contractor equivalent to all fines resulting from non-compliance with applicable regulations.
- E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
  - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
  - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  - 1. Control movement of sediment and soil from temporary stockpiles of soil.
  - 2. Prevent development of ruts due to equipment and vehicular traffic.
  - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  - 1. Prevent windblown soil from leaving the project site.
  - 2. Prevent tracking of mud onto public roads outside site.
  - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
  - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- K. Open Water: Prevent standing water that could become stagnant.
- L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

#### **1.05 SUBMITTALS**

- A. See Division 1 for submittal procedures.
- B. Erosion and Sedimentation Control Plan:
  - 1. Submit within 2 weeks after Notice to Proceed.

2. Include:
    - a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
    - b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
    - c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
    - d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
    - e. Other information required by law.
    - f. Format required by law is acceptable, provided any additional information specified is also included.
  3. Obtain the approval of the Plan by authorities having jurisdiction.
  4. Obtain the approval of the Plan by Owner.
- C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.
- E. Maintenance Instructions: Provide instructions covering inspection and maintenance for temporary measures used during construction and temporary measures that must remain after Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Mulch: Use one of the following:
1. Straw. Do not use hay.
  2. Wood waste, chips, or bark.
  3. Erosion control matting or netting.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- C. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
  2. Permittivity:  $0.05 \text{ sec}^{-1}$ , minimum, when tested in accordance with ASTM D4491.
  3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
  4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
  5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
  6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533.
  7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
  8. Manufacturers: subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
    - a. TenCate: [www.tencate.com/#sle](http://www.tencate.com/#sle).
    - b. North American Green: [www.nagreen.com/#sle](http://www.nagreen.com/#sle).
    - c. Propex Geosynthetics: [www.geotextile.com/#sle](http://www.geotextile.com/#sle).

- D. Silt Fence Posts: One of the following, minimum 5 feet long:
  - 1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.
  - 2. Hardwood, 2 by 2 inches in cross section.
- E. Gravel: See Section 321123 for aggregate.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

### **3.02 PREPARATION**

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

### **3.03 SCOPE OF PREVENTIVE MEASURES**

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
  - 1. Width: As required; 20 feet, minimum.
  - 2. Length: 50 feet, minimum.
  - 3. Provide at each construction entrance from public right-of-way.
  - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences.
  - 1. Provide linear sediment barriers:
    - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
    - b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
    - c. Along the toe of cut slopes and fill slopes.
    - d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
    - e. Across the entrances to culverts that receive runoff from disturbed areas.
  - 2. Space sediment barriers with the following maximum slope length upslope from barrier:
    - a. Slope of Less Than 2 Percent: 100 feet..
    - b. Slope Between 2 and 5 Percent: 75 feet.
    - c. Slope Between 5 and 10 Percent: 50 feet.
    - d. Slope Between 10 and 20 Percent: 25 feet.
    - e. Slope Over 20 Percent: 15 feet.
- D. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- E. Crushed Stone Silt Checks: Stone check dams located along drainage swales and above headwalls. Silt checks are to be installed as required to reduce the sediment load of the runoff to local, State and Federal requirements. Construction is to be in accordance with the contract documents and KTC requirements.
- F. Soil Stockpiles: Protect using one of the following measures:
  - 1. Cover with polyethylene film, secured by placing soil on outer edges.
  - 2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw; do not use hay.
- G. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.

1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.
- H. Temporary Seeding: Use where temporary vegetated cover is required.

### 3.04 INSTALLATION

- A. Traffic-Bearing Aggregate Surface:
1. Excavate minimum of 6 inches.
  2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
  3. Place and compact at least 6 inches of 1 1/2 to 3 1/2 inch diameter stone.
- B. Silt Fences:
1. Store and handle fabric in accordance with ASTM D4873.
  2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
  3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
  4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
  5. Install with top of fabric at nominal height and embedment as specified.
  6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
  7. Fasten fabric to wood posts using one of the following:
    - a. Four nails per post with 3/4 inch diameter flat or button head, 1 inch long, and 14 gage, 0.083 inch shank diameter.
    - b. Five staples per post with at least 17 gage, 0.0453 inch wire, 3/4 inch crown width and 1/2 inch long legs.
  8. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
  9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.
- C. Mulching Over Large Areas:
1. Dry Straw: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.
  2. Wood Waste: Apply 6 to 9 tons per acre.
  3. Erosion Control Matting: Comply with manufacturer's instructions.
- D. Mulching Over Small and Medium Areas:
1. Dry Straw: Apply 4 to 6 inches depth.
  2. Wood Waste: Apply 2 to 3 inches depth.
  3. Erosion Control Matting: Comply with manufacturer's instructions.
- E. Temporary Seeding:
1. When hydraulic seeder is used, seedbed preparation is not required.
  2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
  3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
  4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
  5. Incorporate fertilizer into soil before seeding.
  6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.

7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

### **3.05 MAINTENANCE**

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Silt Fences:
  1. Promptly replace fabric that deteriorates unless need for fence has passed.
  2. Remove silt deposits that exceed one-third of the height of the fence.
  3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Stone Silt Checks: Remove accumulated sediment when it reaches 1/3 of the height of the check.
- E. Clean out temporary sediment control structures weekly and relocate soil on site.
- F. Place sediment in appropriate locations on site; do not remove from site.

### **3.06 CLEAN UP**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

### **END OF SECTION**

**SECTION 024100  
BUILDING DEMOLITION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Building demolition including but not limited to; dugouts.
- B. Demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.
- D. Additional items to be demolished as indicated on the drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 015713 - Temporary Erosion and Sediment Control.
- B. Section 311000 - Site Clearing: Vegetation and existing debris removal.
- C. Section 312200 - Grading: Topsoil removal.
- D. Divisions 21 through 28 Sections for demolishing or relocating of site mechanical and electrical items.

**1.03 REFERENCES**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

**1.04 DEFINITIONS**

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.
- B. Remove and salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in locations indicated.
- D. Existing to remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

**1.05 MATERIALS OWNERSHIP**

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

**1.06 SUBMITTALS**

- A. Site Plan: Showing:
  - 1. Areas for temporary construction and field offices.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
  - 2. Identify demolition firm and submit qualifications.
  - 3. Include a summary of safety procedures.
  - 4. Interruption of utility services.
  - 5. Locations of temporary protection and means of egress.
  - 6. Coordination of Owner's continuing occupancy of adjacent buildings and partial use of premises.

- C. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed location, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- D. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by building demolition operations. Submit before work begins.
- E. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

#### **1.07 QUALITY ASSURANCE**

- A. Conference: Conduct conference at Project site to comply with requirements in Division 1 sections. Review methods and procedures related to building demolition including, but not limited to, the following:
  - 1. Inspect and discuss condition of construction to be demolished.
  - 2. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review and finalize protection requirements.

#### **1.08 PROJECT CONDITIONS**

- A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practical.
- B. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- C. Storage or sale of removed items or materials on-site is not permitted.

#### **1.09 HAZARDOUS MATERIALS**

- A. Hazardous Materials: It is not expected that hazardous material will be encountered in the work.
  - 1. If material suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

### **PART 3 EXECUTION**

#### **3.01 SCOPE**

- A. Remove the entire building designated \_\_\_\_\_.
- B. Building to be demolished will be vacated and their use discontinued before start of Work.
- C. Owner will occupy another building immediately adjacent to demolition area. Conduct building demolition so Owner's operations will not be disrupted.
  - 1. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
  - 2. Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.
    - a. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from authorities having jurisdiction.
- D. Remove other items indicated, for salvage and relocation.

**3.02 EXAMINATION**

- A. Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are the same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Architect.
- E. Survey the condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

**3.03 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Use of explosives is not permitted.
  - 3. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch during flame-cutting operations.
    - a. Maintain adequate ventilation when using cutting torches.
  - 4. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the lower level.
  - 5. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 6. Provide, erect, and maintain temporary barriers and security devices.
    - a. Comply with requirements in Division 1 Temporary Facilities and Controls.
  - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 8. Do not close or obstruct roadways or sidewalks without permit.
  - 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  - 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
- D. Locate building demolition equipment and remove debris and materials so as to not impose excessive loads on supporting walls, floors or framing.
- E. Below-Grade Construction:
  - 1. Remove below-grade construction, including foundation walls and footings completely.
- F. Site Restoration:

1. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.
- G. Removed and salvaged items: Comply with the following:
  1. Contractor to remove, salvage and store the following items for re-installation in the project:
    - a. Ornamental gate.
  2. Protect items from damage during transport and storage.

### **3.04 EXISTING UTILITIES**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.
  1. Refer to Divisions 21 through 28 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

### **3.05 SELECTIVE DEMOLITION FOR ADJACENT STRUCTURES TO REMAIN**

- A. Drawings showing existing construction and utilities are based on field observation and existing record documents only.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
- C. Remove existing work as indicated and as required to accomplish new work.
  1. Concrete: Cut concrete full depth at junctures with construction indicated to remain, using power-driven saw, then remove concrete between saw cuts.
  2. Masonry: Cut masonry at junctures with construction indicated to remain, using power-driven saw, then remove masonry between saw cuts.
  3. Concrete Slabs-on Grade: Saw-cut perimeter of area to be demolished at junctures with construction indicated to remain, then break up and remove.
  4. Steel: Dismantle field connections without bending or damaging steel members. Do not use flame cutting torches unless otherwise authorized.
    - a. steel trusses and joists as whole units without dismantling them further.
  5. Remove items indicated on drawings.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
- E. Protect existing work to remain.
  1. Prevent movement of structure; provide shoring and bracing if necessary.

2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.

### **3.06 DEBRIS AND WASTE REMOVAL**

- A. Except for items or materials indicated to be salvaged and reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
  1. Do not allow demolished materials to accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Transport demolished materials from Owner's property and legally dispose of them..
- C. Transport demolished materials approved for fill and dispose of at designated spoils areas on Owner's property.
- D. Do not burn demolished materials on site.
- E. Leave site in clean condition, ready for subsequent work.
- F. Clean up spillage and wind-blown debris from public and private lands.
- G. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations.

**END OF SECTION 024100**

**SECTION 033000****CAST-IN-PLACE CONCRETE****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
  - 1. Section 321313 "Concrete Paving" for site construction applications.

**1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.
  - 1. Concrete mix designs must be submitted a minimum of 15 days prior to the start of the work for engineer approval prior to the placement of concrete. Any adjustments in approved mix designs including changes in admixtures must be submitted in writing to the engineer and testing laboratory for approval prior to use. All mix design submittals shall clearly indicate the use and location of the particular mix.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.
  - 1. The Contractor shall neither use nor reproduce any part of the Design Drawings as part of the Shop Drawings.
  - 2. At least one copy of each approved shop drawings shall be kept available in the Contractor's field office. Drawings not bearing "Reviewed – No Exceptions" or "Reviewed – Exceptions Noted" stamps by the Engineer shall not be kept on the job site.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Material certificates.
- B. Material test reports.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

**1.5 PRECONSTRUCTION TESTING**

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

**1.6 FIELD CONDITIONS**

- A. Cold-Weather Placement: Comply with ACI 306.1.
  - 1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301.

**PART 2 - PRODUCTS****2.1 CONCRETE, GENERAL**

- A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301.
  - 2. ACI 117.

**2.2 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

**2.3 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

**2.4 CONCRETE MATERIALS**

- A. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I or Type III,.
  2. Fly Ash: ASTM C 618, Class F or C.
  3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
1. Maximum Coarse-Aggregate Size: Not to be larger than one-fifth of the narrowest dimension between sides of forms, one-third the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Air-Entraining Admixture: ASTM C 260/C 260M.
- D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- E. Water: ASTM C 94/C 94M and potable.

## **2.5 WATERSTOPS**

- A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

## **2.6 VAPOR RETARDERS**

- A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum water-vapor permeance of 0.01 perms. Include manufacturer's recommended adhesive or pressure-sensitive tape.

## **2.7 CURING MATERIALS**

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

## 2.8 RELATED MATERIALS

- A. Joint Filler:
  - 1. Expansion joint fillers shall extend the full depth of slab or joint and be of the thickness shown on the drawings. Filler shall be asphalt-impregnated fiberboard conforming to ASTM D1751 for interior work and self-expanding cork board conforming to ASTM D1752 for exterior work.
  - 2. Control joints shall be filled with field molded sealant or filler.
  - 3. Isolation joint fillers shall consist of 1/8 inch wide strips of neoprene, synthetic rubber, or approved substitute, extending the full depth of the slab.
- B. Porous Fill:
  - 1. Porous fill under concrete slabs-on-grade shall consist of clean crushed rock, crushed or uncrushed gravel, or other similar free flowing material of such size as will pass a 1" screen with not more than 5 percent passing a No. 4 screen. Porous fill shall contain no earth, clay, or any foreign substances.

## 2.9 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

## 2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Normal-Weight Concrete:
  - 1. Minimum Compressive Strength: 4000 psi at 28 days.
    - a.  $f'_c = 4500$  psi @ 28 days - all exposed exterior concrete flat work (i.e., slabs, equipment pads, etc.).
    - b.  $f'_c = 4000$  psi @ 28 days - all interior concrete (i.e. footings, pedestals, retaining walls, concrete in Insulated Concrete Forms [ICF], etc.).
    - c.  $f'_c = 4000$  psi @ 28 days - all interior slabs on grade
    - d.  $f'_c = 4000$  psi @ 28 days - all concrete fill over metal deck.
  - 2. Maximum W/C Ratio: 0.50.
  - 3. Slump Limit: 4 inches (8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture), plus or minus 1 inch.
  - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
  - 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

## 2.11 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

**2.12 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

**PART 3 - EXECUTION****3.1 FORMWORK INSTALLATION**

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

**3.2 EMBEDDED ITEM INSTALLATION**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

**3.3 VAPOR-RETARDER INSTALLATION**

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

**3.4 STEEL REINFORCEMENT INSTALLATION**

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

**3.5 JOINTS**

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Vertical Construction Joints: Joints shall be located within the central third of the span. Any concrete spilling over or through the bulkhead shall be removed at the completion of the pour. All surfaces of the concrete shall have reinforcing extending through the joint. Where not otherwise shown on drawings, provide #4 bars at 12 inch o.c. x 4'-6' long.
  2. Horizontal Joints: Horizontal construction joints other than those shown on the drawings will not be permitted unless approved by the Architect.
  3. Joint Preparation: Forms shall be removed in time to permit roughening of construction joints of structural members by chipping and wire brushing to remove all loose and foreign material. The joints shall be dampened and the specified bonding compound applied. New concrete shall be placed after the rewettable bonding compound has dried or while the bonding grout or epoxy adhesive is still tacky. The anti-corrosive epoxy cementitious adhesive has a 20-hour open time.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated, or where not specifically shown, provide at maximum 15 feet or 36 times slab thickness, whichever is smaller, for slab on grade. Joints must be aligned and continuous. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Cut joints within 12 hours after finishing. Joints shall be filled with the specified epoxy joint filler once contraction has occurred.
- D. Construction Joints in Slabs-on-Grade: Butt joint with dowels shall be provided. For details, refer to typical joint construction detail on the drawings.
- E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

### **3.6 WATERSTOP INSTALLATION**

- A. Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions.

### **3.7 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

- E. Slabs on Grade: Place concrete slabs on grade by the long strip cast method. Refer to ACI 302 and 360 for recommended methods of placement. Maximum outside diameter of pipe or conduit placed in slabs on grade shall be limited to one-third the thickness of the slab. The minimum concrete cover top and bottom shall be one-third the thickness of the slab. Separate parallel pipes to permit concreting between and below them.
- F. Rainy Weather Placement: Concrete shall not be placed during rain. Sufficient coverings shall be provided and kept on hand for protection during rainstorms. Prior to placing concrete, wind speed and dew point shall be monitored and recorded to control plastic shrinkage cracking. The guidelines of CACI 318, ACI 305R, and ACI 306R as applicable, shall be followed. The contractor, at a minimum, shall provide wind screens as required to minimize this condition.

### **3.8 FINISHING FORMED SURFACES**

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where exposed to public view:
  - 1. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### **3.9 FINISHING FLOORS AND SLABS**

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
  - 1. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  2. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.
1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

### 3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures, for a minimum of 7 days. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
  3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

- a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.11 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. With prior approval of the Engineer, as to method and procedure, all repairs of defective areas shall conform to ACI 301, Section 5.3.7.

### **3.12 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

**END OF SECTION 033000**

**SECTION 042000**  
**UNIT MASONRY - NON-LOADBEARING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flashings.
- B. Accessories.
- C. Installation of embedded items not specified in this section.
- D. Products installed, but not furnished, under this Section include the following:
  - 1. Steel lintels for unit masonry, furnished under Division 5 Section "Structural Steel Framing".
  - 2. Hollow-metal frames in unit masonry openings, furnished under Division 8 Section " Steel Doors and Frames".
  - 3. Wood nailers and blocking built into unit masonry are specified in Division 6 " Rough Carpentry".

**1.02 RELATED REQUIREMENTS**

- A. Section 042200 - Concrete Unit Masonry - Loadbearing; Loadbearing CMU, reinforcing and etc.
- B. Section 061000 - Rough Carpentry: Nailing strips built into masonry.
- C. Section 079005 - Joint Sealers: Backing rod and sealant at control and expansion joints.
- D. Section 081113 - Hollow Metal Doors and Frames: Frame anchoring requirements.

**1.03 REFERENCE STANDARDS**

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.
- C. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- F. ASTM C56 - Standard Specification for Structural Clay Nonloadbearing Tile; 2013.
- G. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- H. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- I. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- J. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.
- K. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- M. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- N. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.

- O. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- P. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- Q. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout; 2009.
- R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.
- S. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- T. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.
- U. BIA Technical Notes No. 7 - Water Penetration Resistance - Design and Detailing; 2005.
- V. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- W. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.
- X. ASTM E 119 - Standard Test Methods for Fire tests of Building Construction and materials.
- Y. Brick Industry Association: Technical Notes on Brick Construction; Current Edition.
- Z. IMIABC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.
- AA. IMIABC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.
- AB. UL (FRD) - Fire Resistance Directory; current edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings" and adhere to the following specifics regarding masonry pre-installation conference guidelines.
  - 1. The General Contractor/Construction Manager should organize and hold a meeting with the Owner, Architect, General Contractor/Construction Manager, site superintendent, masonry company owner, masonry foreman, all bricklayers, carriers and any other personnel from the masonry company that will be working at the project site. Also include testing and inspection agency representative, installers of doors, installers of steel, joist and deck, installers of mechanical, electrical and plumbing items, installers of other work in and around the masonry that must precede or follow masonry work.
  - 2. Review foreseeable methods and procedures related to masonry work, including but not necessarily limited to the following:
    - a. Sample and Mock-up Wall Sections:
      - 1) Size and Location
      - 2) Products and Detail required
      - 3) Protection Methods of Sample and Mock-up Wall Sections
      - 4) Approval Authority and Notification
    - b. Site Inspection:
      - 1) Identity of Responsible Person
      - 2) Frequency of Inspection
    - c. Materials:
      - 1) Storage & Protection
      - 2) Delivery Process
    - d. Submittals:
      - 1) Product Certification

- 2) Shop Drawing Requirements
- 3) Review MEP penetration coordination drawings.
- 4) Time Expectation
- 5) Testing and Inspection Requirements
- e. Construction Means and Methods:
  - 1) Hot & Cold Weather Protection
  - 2) Protection of Work in Process
  - 3) Material Handling Process
  - 4) Cleaning Process
- f. Schedule:
  - 1) Product Availability
  - 2) Review of Associated Trades Responsibility
- g. Project Closeout:
  - 1) Punch List Procedure
- 3. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

### 1.05 FIELD REQUIREMENTS

- A. Protection of Masonry: During construction, cover tops of walls, projections and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
  - 2. Where one wythe of multiwythe masonry is completed in advance of other wythes, secure cover a of 24 inches down face next to unobstructed wythe and hold cover in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over wall surface.
  - 2. Protect sills, ledges and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 and as specified herein.
  - 1. Cold Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
  - 2. Hot Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
    - a. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.
  - 3. Cold Weather Construction: When the ambient temperature is within the limits indicated, perform the following construction procedures. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature

ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10 F.

- a. 40 F to 32 F:
  - 1) Do not lay units having a temperature below 20 F.
  - 2) Heat existing foundation and masonry surfaces (of new or existing work) to receive new or continuing masonry work to above freezing.
  - 3) Mortar: Heat sand or mixing water to produce mortar temperature between 40 F and 120 F at time of mixing, maintain temperature of mortar on boards above freezing.
  - 4) Grout: Grout does not require heated materials, unless the temperature of materials is below 32F.
  - 5) Do not heat water or aggregates above 140 F.
  - 6) 32 F to 25 F:
    - (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40 F and 120 F; maintain temperature of mortar on boards above freezing.
    - (b) Grout: Heat grout materials to produce grout temperature between 70 F and 120 F. Maintain grout above 70 F until used in masonry.
  - 7) 25 F to 20 F:
    - (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40 F and 120 F; maintain temperature of mortar on boards above freezing.
    - (b) Grout: Heat grout materials to produce grout temperature between 40 F and 120 F. Maintain grout above freezing until used in masonry. Heat masonry units to 40 F prior to grouting.
    - (c) Heat both sides of walls under construction to 40 F.
    - (d) Use windbreaks or enclosures when wind is in excess of 15 mph.
  - 8) 20 F and below:
    - (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40 F and 120 F.
    - (b) Grout: Heat grout materials to produce grout temperature between 70 F and 120 F. Maintain grout above 70 F until used in masonry.
    - (c) Masonry Units: heat masonry units to 40 F.
    - (d) Provide enclosure and auxiliary heat on both sides of walls under construction to maintain temperatures within the enclosures above 32 F for a period until mortar sets and water is evaporated from mix to a point that mortar will not spall or lose effective strength due to freezing.
4. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
  - a. 40 F to 25 F: Completely cover masonry with weather-resistant membrane for at least 24 hours after construction. Extend coverage time period to 48 hours for grouted masonry.
  - b. 25 F to 20 F: Completely cover masonry with weather-resistive insulating blankets or provide enclosure and heat for 24 hours after construction to prevent freezing. Extend coverage time period to 48 hours for grouted masonry. Install wind breaks when wind velocity exceeds 15 mph.
  - c. 20 F and below: Provide enclosure and heat to maintain temperatures above 32 F within the enclosure for 24 hours after construction. Extend coverage time period to 48 hours for grouted masonry.

## 1.06 SUBMITTALS

- A. Product Data: Provide data for masonry accessories.

**1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

**PART 2 PRODUCTS****2.01 FLASHINGS**

- A. Concealed Flashing: For flashing not exposed to the exterior, use the following, unless otherwise indicated:
  - 1. Single Wythe Drainage System: System of CMU cell flashing pans and interlocking CMU web covers made from High-Density polyethylene incorporating chemical stabilizers that prevent UV degradation. Cell flashing pans have integral weep spouts that are designed to be built into mortar bed joints and weep collected moisture to the exterior of CMU walls and that extend into the cell to prevent clogging of mortar.
    - a. Product: Subject to compliance with requirements, provide BlockFlash by Mortar Net USA 1-800-664-6638. [www.mortarnet.com](http://www.mortarnet.com)

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

**3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

**3.03 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.

**3.04 PLACING AND BONDING**

- A. Lay hollow masonry units with face shell bedding on head and bed joints.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- G. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- H. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

**3.05 MASONRY THROUGH-WALL FLASHINGS**

- A. Whether or not specifically indicated, install masonry through wall flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

**3.06 LINTELS**

- A. Refer to structural drawings for lintel sizes and additional requirements.

**3.07 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Form expansion joint as detailed on drawings.

**3.08 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

- D. Do not build into masonry construction organic materials that are subject to deterioration.

### 3.09 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- H. Maximum Variation for exposed head joints thickness: 1/8 inch.
- I. Maximum Variation for vertical alignment of exposed head joints: 1/4 inch in 10 feet.
- J. Maximum Variation for exposed bed joints thickness: 1/8 inch.
- K. Maximum Variation for conspicuous horizontal lines: 1/4 inch in 20 feet.
- L. Maximum Variation for conspicuous vertical lines: 1/4 inch in 20 feet

### 3.10 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### 3.11 REPAIRING AND POINTING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. prepare joints for sealant application.
- C. Damaged or chipped concrete masonry units that do not meet the requirements of ASTM C90 for the concrete masonry unit should not be installed. Repair chips, cracks, and other surface damage when visible as viewed in normal lighting conditions at 20 feet. If units incur damage during installation or by other trades, patching of the units shall be with materials compatible with the concrete mix provided in the concrete masonry unit. Provide a finished patch surface texture similar in texture to the concrete masonry unit face being repaired. Do not provide a smooth texture that will result in highlighting the patch when the final paint coats have cured. Patching and repair should be undetectable. Masonry patching by the general contractor, gypsum drywall, painting, or other subcontractor with an incompatible repair product will not be approved.

### 3.12 IN-PROGRESS CLEANING

- A. Remove excess mortar and mortar droppings. Clean masonry work as the work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Replace defective mortar. Match adjacent work.

**3.13 FINAL CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations. Remove large mortar particles by hand with wooden paddles.
- E. Test cleaning methods on mock-up wall panel; leave one half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with final cleaning of masonry.
- F. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
- G. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
- H. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces. Dry brush walls at the end of each day's work and after final pointing to remove mortar spots and droppings.

**3.14 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION 042000**

**SECTION 042200 - CONCRETE UNIT MASONRY - LOADBEARING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
  - 1. Concrete masonry units (CMU's) in load-bearing walls.
    - a. All CMU walls tagged and scheduled on structural drawings are considered "load-bearing walls."
  - 2. Steel reinforcing bars.
- B. Related Sections:
  - 1. Section 042000 "Unit Masonry" for flashing, repairing, pointing, and cleaning requirements.

**1.2 PRECONSTRUCTION TESTING**

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
  - 1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C140 for compressive strength.
  - 2. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
- C. Samples: For each type and color of exposed masonry unit and colored mortar.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each type and size of product indicated. For masonry units include material test reports substantiating compliance with requirements.
- B. Mix Designs: For each type of grout. Include description of type and proportions of ingredients.
  - 1. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

**1.5 QUALITY ASSURANCE**

- A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

- B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

## **1.6 PROJECT CONDITIONS**

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **PART 2 - PRODUCTS**

### **2.1 MASONRY UNITS, GENERAL**

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

### **2.2 CONCRETE MASONRY UNITS**

- A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
- B. CMUs: ASTM C90.
  - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3,750 psi.
  - 2. Density Classification: Medium-weight.

### **2.3 MASONRY LINTELS**

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from lintel block CMUs with reinforcing bars placed as indicated and filled with coarse grout.

### **2.4 MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: ASTM C 144.
  - 1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
  - 2. White-Mortar Aggregates: Natural white sand or crushed white stone.

3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- D. Aggregate for Grout: ASTM C 404.
- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Euclid Chemical Company (The); Accelguard 80.
    - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
    - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
- F. Water: Potable.

## 2.5 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A615 or ASTM A996, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A951.
1. Interior Walls: Mill- galvanized, carbon steel.
  2. Exterior Walls: Hot-dip galvanized, carbon steel.
  3. Wire Size for Side Rods: 0.187-inch diameter.
  4. Wire Size for Cross Rods: 0.187-inch diameter.
  5. Wire Size for Veneer Ties: 0.187-inch diameter.
  6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
  7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

## 2.6 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82; with ASTM A153, Class B-2 coating.
  2. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.
  3. Steel Plates, Shapes, and Bars: ASTM A36.
- B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
  2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch diameter, hot-dip galvanized steel wire.

- C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
  - 1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 1.05-inch- thick, steel sheet, galvanized after fabrication.
  - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch diameter, hot-dip galvanized steel wire.
  - 3. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.075-inch- thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.
- D. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
  - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153.
- F. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

## **2.7 MISCELLANEOUS MASONRY ACCESSORIES**

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene, urethane or PVC.
- B. Preformed Control-Joint Gaskets: Made from PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

## **2.8 MORTAR AND GROUT MIXES**

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. For exterior masonry, use portland cement-lime mortar.
  - 3. For reinforced masonry, use portland cement-lime mortar.
  - 4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  - 1. For masonry below grade or in contact with earth, use Type S.
  - 2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
  - 3. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
  - 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  - 2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for a 28-day compressive strength not less than 3000 psi.
  - 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143.

### **PART 3 - EXECUTION**

#### **3.1 TOLERANCES**

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
  - 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
  - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
  - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
  - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

### 3.2 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### 3.3 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
  1. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

### 3.4 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
  - 1. Space reinforcement not more than 16 inches o.c.
  - 2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

### 3.5 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  - 1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  - 2. Limit height of vertical grout pours to not more than 60 inches.

### 3.6 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 2 special inspections according to the "International Building Code."
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

### **3.7 PARGING**

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

### **3.8 REPAIRING, POINTING, AND CLEANING**

- A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
  2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

### **3.9 MASONRY WASTE DISPOSAL**

- A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
  1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 042200**

**SECTION 051200****STRUCTURAL STEEL FRAMING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes structural steel and grout. The work covered by this Section shall include all labor, material, equipment, permits, engineering and other services necessary for the fabrication and installation of structural steel and related work, complete, in accordance with the drawings and as specified herein.

**1.2 DEFINITIONS**

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

**1.3 PERFORMANCE REQUIREMENTS**

- A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated and AISC 360.

**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components. The Contractor shall produce and submit Shop and Erection Drawings for the fabrication and erection of the Structural Steel and is responsible for the transfer of information from the Contract Documents into accurate and complete Shop and Erection Drawings and the development of accurate, detailed dimensional information to provide for the fit-up of parts in the field. The Contractor shall neither use nor reproduce any part of the Contract Documents as part of the Shop or Erection Drawings. Submitted shop drawings shall include layouts and details for each member showing the steel type and grade, size, connections, cuts, copes, holes, bolts, welds, surface treatments (cleaning, shop paint, etc.) and provisions for the connection of other work. Steel type, grade and size for all attached elements shall also be shown.

**1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and Fabricator.
- B. Welding certificates.
- C. Mill test reports for structural steel, including chemical and physical properties.
- D. Source quality-control reports.

- E. Field quality-control and special inspection reports.

## **1.6 QUALITY ASSURANCE**

- A. Fabricator Qualifications: The Fabricator shall have 10 years of comparable experience in installations of this type and shall employ labor and supervisory personnel familiar with the type of installation, experienced in fabrication and erection of structural steel for projects of similar size and complexity. At the time of bid the Fabricator shall be AISC certified to the Standard for Steel Building Structures (STD) and must submit proof of these qualifications. The Fabricator's qualifications shall be subject to review by the Design Professionals and Owner.
  - 1. Fabricators without AISC Certification will be responsible to pay all costs associated for a third party inspector to monitor the work in their shop. Prior approval of the third party inspector is required by the architect and engineer.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. The Installer shall have 10 years of successful experience erecting structural steel for structures of this type and complexity in the region of the project.
- C. The Contractor's Engineer(s) shall be qualified to perform the type of work required by the project. The Engineer(s) shall be a Licensed Structural Engineer(s) in the State of the project. The Contractor's Engineer(s) shall have 10 years of experience being in responsible charge of work of this nature. The proposed Engineer(s) shall be subject to approval of Design Professionals and Owner.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- E. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 360.
  - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- F. Preinstallation Conference: Conduct conference at Project site.

## **PART 2 - PRODUCTS**

### **2.1 STRUCTURAL-STEEL MATERIALS**

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- E. Welding Electrodes: Comply with AWS requirements.

## 2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
- B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
  - 1. Finish: Hot-dip zinc coating.
- C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
- D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- E. Unheaded Anchor Rods: ASTM F 1554, Grade 55, weldable.
  - 1. Configuration: Straight.
  - 2. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- F. Headed Anchor Rods: ASTM F 1554, Grade 55, weldable, straight.
  - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- G. Threaded Rods: ASTM A 36/A 36M.
  - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

## 2.3 PRIMER

- A. Primer: SSPC-Paint 25, Type II, zinc oxide, alkyd, linseed oil primer.

## 2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. Grout shall also conform to Corps of Engineers specification for non-shrink grout, CRD-C621-83.
  - 1. Twenty-eight day compressive strength as determined by grout cube tests shall be:
    - a. 6,000 psi for supporting concrete 3000 psi and less;
    - b. 8,000 psi for supporting concrete greater than 3000 psi and less than or equal to 4000 psi;
    - c. 10,000 psi for supporting concrete greater than 4000 psi.
- B. In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout shall achieve 95% bearing contact under a 48"x48" base plate when placed at a fluid consistency.

**2.5 FABRICATION**

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
- B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

**2.6 SHOP CONNECTIONS**

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

**2.7 SHOP PRIMING**

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
  - 2. Surfaces to be field welded.
  - 3. Surfaces of high-strength bolted, slip-critical connections.
  - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
  - 5. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. SSPC-SP 2, "Hand Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

**2.8 SOURCE QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
  2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
  3. Ultrasonic Inspection: ASTM E 164.
  4. Radiographic Inspection: ASTM E 94.
- E. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 ERECTION**

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Baseplates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  1. Set plates for structural members on wedges, shims, or setting nuts as required.
  2. Weld plate washers to top of baseplate.
  3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

### **3.3 FIELD CONNECTIONS**

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

**3.4 TEMPORARY SUPPORT OF STRUCTURAL STEEL FRAME**

- A. The structure as shown on the Contract Documents is designed to withstand the design loads only when all structural elements are installed and fully connected. The contractor shall be responsible for the analysis of all components and assemblies for stresses and displacements that may be imposed by fabrication, shipping, handling, erection, temporary conditions, construction loads, etc. The analysis of such shall be performed by the Contractor's Engineer.

**3.5 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Verify structural-steel materials and inspect steel frame joint details.
  2. Verify weld materials and inspect welds.
  3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.

**END OF SECTION 051200**

## **SECTION 061000 ROUGH CARPENTRY**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Structural dimension lumber framing.
- B. Structural roof framing.
- C. Sheathing.
- D. Miscellaneous framing and sheathing.
- E. Communications and electrical room mounting boards.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 099000 - Painting: Painting of exposed wood members.

#### **1.03 REFERENCE STANDARDS**

- A. AF & PA - National Design Specification for Wood Construction. Include supplements.
- B. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.
- C. APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels (Form E445); 2001.
- D. ASTM D2559 - Standard Specification for Adhesives
- E. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.
- F. PS 1 - Structural Plywood; 2009.
- G. PS 20 - American Softwood Lumber Standard; 2010.
- H. SPIB (GR) - Grading Rules; 2014.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide technical data on wood preservative materials and application instructions.
- B. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
  - 2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for

the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

- B. Lumber fabricated from old growth timber is not permitted.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

## **2.02 DIMENSION LUMBER**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Structural Framing: For structural framing: 2 to 4 inches thick, 7 inches wide and wider, provide the following grade and species:
  - 1. Southern Pine graded under SPIB rules.
  - 2. No. "1" grade.
- C. Sizes: Nominal sizes as indicated on drawings, S4S.
- D. Moisture Content: S-dry or MC19.

## **2.03 MISCELLANEOUS LUMBER**

- A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: "Standard" grade light framing size lumber of any species or board-size lumber as required. "Standard" grade boards per WWSA rules or "No. 2 Boards" per SPIB rules.

## **2.04 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS**

- A. General: Where construction panels are indicated for the following concealed type of applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.
- B. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108
- C. Trademark: Furnish construction panels that are factory-marked with APA trademark evidencing compliance with grade requirements.
- D. Roof Sheathing: APA Rated Sheathing.
  - 1. Exposure Durability Classification: Exterior 1, Structural 1.
  - 2. Span Rating: As required to suit rafter/joist spacing indicated.

## **2.05 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacturer.
  - 1. Where rough carpentry is exposed to weather, in ground contact, in contact with preservative treated lumber, or humidity, provide fasteners with hot dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.
  - 2. Nails, Wire, Brads, and Staples: FS FF-N-105.

3. Power Driven Fasteners: National Evaluation Report NER-272.
4. Wood Screws: ANSI B18.6.1.
5. Screws to Cold-Formed Metal Framing: Corrosion-resistant coated, self drilling, self threading steel drill screws with low-profile head.
6. Lag Bolts: ANSI B18.2.1.
7. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

## **2.06 METAL FRAMING ANCHORS**

- A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
  1. Current Evaluation/Research Reports: Provide products for which model code evaluation/research reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with the building code in effect for this project.
  2. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by qualified independent testing laboratory.
- B. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G185 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (Commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.
  1. Use galvanized steel framing anchors for rough carpentry exposed to weather, in ground contact, in contact with preservative treated lumber, or in area of high relative humidity, and where indicated.

## **2.07 CONSTRUCTION PANELS**

- A. Roof Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
  1. Span Rating: 24/0.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

## **2.08 ACCESSORIES**

- A. Fasteners and Anchors:
  1. For treated lumber and roof sheathing, use hot-dip galvanized nails, screws, fasteners, and etc. with a minimum coating of G-185 (1.85 oz.) of zinc per square foot of surface area per ASTM A153. Contractor option to use stainless steel nails, screws, fasteners, and etc. in type 304 or 316. Do not use a mix of galvanized and stainless steel products.
    - a. Acceptable hot-dip galvanized products are:
      - 1) Simpson Zmax.
      - 2) USP Structural Connector Triple Zinc.

## **2.09 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
  1. Kiln dry plywood after treatment to maximum moisture content of 19 percent.

2. Treat plywood in contact with roofing.
3. Treat plywood in contact with masonry or concrete.
4. Treat plywood less than 18 inches above grade.
5. Treat plywood in other locations as indicated.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- E. Countersink nail heads on exposed carpentry work and fill holes.
- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finishing work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

### **3.02 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Install solid wood grounds, nailers, blocking, and sleepers as required for support of wall and ceiling mounted items.
  1. Plywood strips and/or metal strapping will not be accepted as suitable blocking material.
- B. Where ceiling-mounting is indicated, provide solid wood blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

### **3.04 WOOD FRAMING, GENERAL**

- A. Framing Standard: Comply with N.F.P.A. "Manual for House Framing," unless otherwise indicated.
- B. Install framing members of size and spacing indicated.
- C. Anchor and nail as shown, and to comply with the following:
  1. National Evaluation Report No. NER-272 for pneumatic or mechanical driven staples, P-nails, and allied fasteners.
  2. Published requirements of manufacturer of metal framing anchors.

3. Recommended Nailing Schedule of referenced framing standard and with N.F.P.A. "National Design Specification for Wood Construction."
4. Table No. II - Recommended Nailing Schedule of the Uniform Building Code.
5. Table 2304.9.1 of the Kentucky Building Code.
6. Table 2306.1 Fastening Schedule of the Standard Building code.

D. Do not splice structural members between supports.

### **3.05 RAFTER FRAMING**

- A. Rafters: Notch to fit exterior wall plates and use special metal framing anchors.
- B. Install special framing as shown for eaves, overhangs and similar conditions, if any.

### **3.06 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD**

- A. Coordinate curb installation with installation of decking and support of deck openings.

### **3.07 INSTALLATION OF CONSTRUCTION PANELS**

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  1. Nail panels to framing; staples are not permitted.
- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  3. Install adjacent boards without gaps.

### **3.08 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.09 CLEANING**

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION 061000**

**SECTION 064100**  
**INTERIOR ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SECTION INCLUDES**

- A. This Section includes the following:
  - 1. Bat Racks
  - 2. Helemt Storage
  - 3. Dugout benches

**1.03 RELATED REQUIREMENTS**

- A. Section 013000 - Administrative Requirements - Submittal procedures.
- B. Section 054000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- C. Section 061000 - Rough Carpentry: Building framing and sheathing.
- D. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.

**1.04 DEFINITIONS**

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

**1.05 REFERENCE STANDARDS**

- A. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**1.06 SUBMITTALS**

- A. Product Data: For each type of product indicated including cabinet hardware and accessories and finishing materials and processes.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- D. Shop Drawings: Show fabrication and installation details for institutional casework. Include plans, elevations, sections, details, and attachments to other Work.
- E. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
  - 1. Color selections for composite materials
  - 2. Paint Selections Fan Deck
- F. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

**1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Source Limitations: Obtain institutional casework through one source from a single manufacturer.
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards," Section 1600.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

**1.09 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
  - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

**1.10 COORDINATION**

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware legend specified in Division 8 Section "Door Hardware (Keyed by Naming Products) " to fabricator of architectural woodwork; coordinate Shop drawings and fabrication with hardware requirements.

**1.11 SEQUENCING AND SCHEDULING**

- A. Coordinate the work with all sections referencing this section.

**1.12 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  - 1. Delamination of components or other failures of glue bond
  - 2. Warping of components.
  - 3. Failure of operating hardware.

4. Deterioration of finishes.

B. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 WOODWORK FABRICATORS**

- A. All manufacturing technic and components must comply with the contract specifications. The designer's selections will not be limited to those plastic laminate selections which are the standards of the casework manufacturer. The plastic laminate selections will be made from the laminate manufacturer(s) full range of colors, patterns and finishes.
- B. Multiple manufacturers of work of this section will not be accepted. Subject to compliance with requirements, interior architectural woodwork by one of the following include :
1. Leininger Cabinets.
  2. Louisville Lumber.
  3. Riverside Mill.
  4. Morgan Smith Industries.
  5. Caseworks of Kentucky, Inc.
  6. Custom Creations, Inc.
  7. LSI Corporation, Inc.
  8. Cabinets & Countertops, Inc.
  9. Reynolds & Poyle, Inc.
  10. Cumberland Manufacturing
  11. Kentucky Mill & Casework
  12. Wood Concepts
  13. Accents in Wood, Inc.
  14. Cowart & Company.
  15. Southern Cabinetry, Inc.
  16. Stevens Industries, Inc.
  17. Action Outfitters.
  18. Smith's Laminating.
  19. Corman & Associate's, Inc.
  20. Euronique, Inc.
  21. America's Finest Woodworking Team.
  22. US Millwork.
  23. Kentucky Caseworks.
  24. SSC Casework & Millwork.
  25. Stidham Cabinets.
  26. Diversified Woodworking.
  27. Tate Ornamental.
  28. Interior Wood Specialties.
  29. Custom cabinetry companies whose products meet or exceed the project specifications as approved by written addendum.

### **2.02 MATERIALS**

- A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: (insert wood species), plain sawn or sliced.
- C. Wood Species for Opaque Finish: Any closed-grain hardwood.
- D. Wood Products: Comply with the following:
1. Hardboard: AHA A135.4.
  2. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
  3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
5. Hardwood Plywood and Face Veneers: HPVA HP-1.
6. Exposed Plywood: Hardwood plywood, selected for compatible color and grain. Grade AA exposed faces at least 1/50 inch (0.5 mm) thick, and Grade J crossbands. Provide both faces of same species.
7. Semiexposed Plywood: Hardwood plywood of same species as exposed plywood. Semiexposed backs of plywood with exposed faces shall be same species as faces. Grade B faces and Grade J crossbands.

### **2.03 INSTALLATION MATERIALS**

- A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

### **2.04 FABRICATION, GENERAL**

- A. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
  1. Seal edges of openings in countertops with a coat of varnish.

### **2.05 BAT RACKS**

- A. Basis of Design: AAOCO Blackjack Bat Rack
- B. Size: 17-1/4" Tall X 44-1/2" Wide X 12" Deep. Holds 21 Bats
- C. Color: Selected from manufacturer's standards.
- D. Logo: Provide Owner's logo
- E. Style: Angled bat style

### **2.06 HELMET RACKS**

- A. Basis of Design: AALCO Athletic Equipment 24H-4
- B. Color: Two Tone

### **2.07 DUGOUT BENCHES**

- A. Description: Refer to E, F, & H/1A2.0 and P, Q, and T/1A2.1. The benches shall be constructed of pressure treated lumber and Trexboard decking material. Provide a minimum of two 1/2" lag bolts at all attachment points of the framing. Trex material shall be select composite decking. Size shall be 1"

square edge, 82" x 5.5" x 12" and 16'. Install Trex per all manufacturer's directions for concealed attachment.

## **2.08 FINISH FOR WOOD CASEWORK**

- A. Preparation: Sand lumber and plywood for institutional casework construction before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.
- B. Wood Colors and Finishes: Match Architect's samples.
- C. Staining: Remove fibers and dust and apply wash-coat sealer and stain to exposed and semiexposed surfaces as required to provide uniform color and to match approved samples.
- D. Finishing Closed-Grain Woods: Apply manufacturer's standard two-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Sand and wipe clean between applications of sealer and topcoat. Topcoat may be omitted on concealed surfaces.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

### **3.02 INSTALLATION**

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.
- C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Refer to Division 9 Sections for final finishing of installed architectural woodwork.
- G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 60 inches long, except when shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
  - 1. Fill gaps, if any, between top of base and wall with plastic wood filler, and sand smooth, and finish same as wood base if finished.
  - 2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.
- H. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim or otherwise indicated.

1. Install flush paneling with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal varification from a true plane.
- I. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

### **3.03 ADJUSTING AND CLEANING**

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

**END OF SECTION**

## **SECTION 071300 UNDERSLAB SHEET WATERPROOFING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Underslab sheet membrane vapor barrier.
  - 1. Vapor barrier is to be installed beneath the entire interior area of first floor new concrete slab construction.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 079005 - Joint Sealers: Sealant for joints in substrates.
- B. Section 312323 - Fill.
- C. Section 334600 - Subdrainage.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).
- B. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2014.
- C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2012.
- D. ASTM D1709 - Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.
- F. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).
- G. ASTM E 1643 - Standard Specification For Installation of Plastic Water Vapor Retarder Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- H. ASTM E 1745 - Standard Specification For Plastic Water Vapor Retarder Used in Contact with Soil or Granular Fill Under Concrete Slabs - Class A.
- I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, with interim updates.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide data for vapor barrier and sheet waterproofing membranes, tape, sealants and other system components.
- B. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing and vapor barrier for compliance with requirements, based on testing of current waterproofing formulations.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- D. Source Limitations: Obtain products through one source from a single manufacturer.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver liquid and sheet material to Project site in original packages with seals unbroken, labeled with manufacturers name, product brand name and type, date of manufacture, and directions for storing and mixing other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.
- C. Remove and replace liquid materials that cannot be applied within thief stated shelf life.
- D. Store sheets and rolls according to manufacturers written instructions.
- E. Protect stored materials from direct sunlight.

#### **1.07 FIELD CONDITIONS**

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.
- B. Do not apply to a damp or wet substrate.
- C. Do not apply in snow, rain, fog or mist.

#### **1.08 WARRANTY**

- A. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

### **PART 2 PRODUCTS**

#### **2.01 MEMBRANE MATERIALS**

- A. CLEAR, OR WHITE, POLYETHYLENE SHEET PLASTIC WILL NOT BE ACCEPTED UNDER ANY CIRCUMSTANCES.
- B. Manufacturers
  - 1. Underslab Vapor Barrier: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
    - a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      - 1) W.R. Meadows, Inc. - Perminator 15 mil - Class A.
    - b. Products by other manufacturers may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect.
      - 1) Floor Seal Technology, Inc. TruBarrier 15 mil: [www.floorseal.com](http://www.floorseal.com)
      - 2) Insulation Solutions, Inc; Viper II 15 mil: [www.insulationsolutions.com](http://www.insulationsolutions.com)
      - 3) Inteplast Group: Barrier Bac IntePlus XF VB-350: [www.barrierbac.com](http://www.barrierbac.com)
      - 4) Raven Industries; VaporBlock 15 mil: [www.ravenefd.com](http://www.ravenefd.com)
      - 5) Stego Industries LLC; Stego Wrap 15 mil: [www.stegoindustries.com](http://www.stegoindustries.com)
      - 6) Tex-Trude, LP: Xtreme 15 mil: [www.tex-trude.com](http://www.tex-trude.com)
      - 7) W.R. Meadows; Perminator 15 mil: [www.wrmeadows.com](http://www.wrmeadows.com)
- C. Product Requirements
  - 1. Vapor Barrier: 15 mil vapor retarder.
    - a. Vapor transmission rate: 0.018 or less.

- b. Puncture resistance: ASTM D1709, Minimum 4000 grams.
- D. Materials
  - 1. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
    - a. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
  - 2. Joint Sealing Compounds: Low-viscosity, two component, asphalt-modified sealer. All protrusions (pipes, etc.) Shall have a premolded collar surround to be sealed in place.
  - 3. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
- C. Verify items that penetrate surfaces to receive waterproofing are securely installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Protect adjacent surfaces from damage not designated to receive waterproofing.
- B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.
- E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

### **3.03 INSTALLATION - VAPOR BARRIER**

- A. Install vapor barrier in accordance with manufacturer's instructions.
- B. Roll out membrane, and minimize wrinkles and bubbles.
- C. Membrane to cover entire pour area.
- D. All vapor barrier joint/seams, both lateral and butt, are to be overlapped minimum 6 inches and taped using minimum 4 inch wide tape provided by the manufacturer.
  - 1. Tape area of adhesion to be free from dust, dirt and moisture to allow maximum adhesion of tape.
- E. Vapor barrier is to be turned up on all vertical foundation walls the full thickness of the concrete slab on grade. Adhere to the walls with an adhesive provided by the manufacturer of the waterproofing sheet.
- F. Per manufacturers requirements create collars, made from the vapor barrier material, to seal around all pipe, duct, rebar and conduit/wire penetrations. Tape collars completely.
- G. In the event that the vapor barrier is damaged during or after installation, repairs must be made. Cut a piece of vapor barrier material large enough to cover the damage by a minimum overlap of 6 inch in all directions. Clean all adhesive areas and tape.

**3.04 PROTECTION**

- A. Do not permit traffic over unprotected or uncovered membrane.

**END OF SECTION 071300**

**SECTION 074213  
METAL WALL PANELS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Manufactured metal panels for soffits, trim and accessory components.

**1.02 RELATED REQUIREMENTS**

- A. Section 061000 - Rough Carpentry: Supporting wood construction.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

**1.04 DESIGN REQUIREMENTS**

- A. Maximum Allowable Deflection of Panel: 1/180 of span.
- B. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.

**1.05 SUBMITTALS**

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Storage and handling requirements and recommendations.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.
- C. Selection Samples: For each panel system specified, submit color chips representing manufacturer's full range of available colors and patterns. Submit actual samples not photo reproductions.
- D. Warranty Information: Submit specified manufacturer's 20 year finish warranty.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefabricated material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

**1.08 WARRANTY**

- A. Manufacturer's Warranty: Correct defective work within a 20 year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

- B. Finish Warranty: Manufacturer's 20-year finish warranty stating products to be free of corrosion, checking, crazing, chalking, discoloring, fading, oxidation, and that exposed finish surface will not peel, crack, chip, or spall.
  - 1. Excessive color change/fading greater than 5 NBS (Hunter) units and passing 5000 hrs per ASTM D 2249-85, ASTM D 2244 and ASTM D 822-85 respectively.
  - 2. Chalking shall not be less than a rating of No. 8 per ASTM D 659 and ASTM D 4214.
  - 3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
- B. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
  - 1. Soffit Type: DMI FP10.
- C. Products by other manufacturers may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect.
  - 1. ATAS International, Inc : [www.atas.com](http://www.atas.com).
  - 2. Berridge: [www.berridge.com](http://www.berridge.com)
  - 3. Nucor IPG/Centria: [www.centria.com](http://www.centria.com)
  - 4. DMI: [www.dmimetals.com](http://www.dmimetals.com)
  - 5. Holcim Elevate (formerly Firestone Building Products LLC): [www.holcimelevate.com](http://www.holcimelevate.com)
  - 6. Innovative Metals Co. : [www.imetco.com](http://www.imetco.com)
  - 7. Cornerstone Building Brands/MBCI: [www.mbc.com](http://www.mbc.com)
  - 8. Petersen Aluminum Corporation/A Carlisle Company: [www.pac-clad.com](http://www.pac-clad.com).

### **2.02 MANUFACTURED PANELS**

- A. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- B. Anchors: Galvanized steel.
- C. All exterior flashing and trim shall be fabricated in the same material, gauge, finish and color as the exterior profile, unless otherwise indicated.

### **2.03 SOFFIT PANELS**

- A. Preformed Metal Soffit Panels: Pre-finished, perforated, 20 gage; .032 ga. aluminum:
  - 1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
    - a. DMI - FP10
  - 2. Panels to have concealed fasteners.
  - 3. Profile to be flush, 12" wide.
  - 4. Panels to be vented. Refer to drawings for vented panel locations.
  - 5. Color: Selected by Architect.

### **2.04 MATERIALS AND FINISHES: PANEL, TRIM AND VISIBLE ACCESSORIES**

- A. Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
- B. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color as selected by Architect from manufacturer's standard colors.

- C. Panel Back Coating: Panel manufacturer's standard polyester wash coat.

## **2.05 ACCESSORIES**

- A. Sealants:
  - 1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
  - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

## **2.06 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.
- C. Form panels for flush seams.
- D. Panels: Provide factory fabricated panels and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
  - 1. Panels to be manufactured on a fixed base, multi-station roll former with a minimum of 26 stations.
  - 2. Coil to be tension leveled prior to being received by the panel manufacturer.
  - 3. Metal coil to be tension leveled by the panel manufacturer prior to the start of panel fabrication.
- E. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that building framing members are ready to receive panels.

### **3.02 INSTALLATION**

- A. Install panels on soffits in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Locate joints over supports.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

### **3.03 TOLERANCES**

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

### **3.04 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.  
**END OF SECTION 074213**

## **SECTION 075400 THERMOPLASTIC MEMBRANE ROOFING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fully adhered PVC membrane roofing system.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 061000 - Rough Carpentry: Roof sheathing, blocking, parapet sheathing.
- B. Section 077123 - Manufactured Gutters and Downspouts: Gutters and Downspouts.

#### **1.03 DEFINITIONS**

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

#### **1.04 REFERENCE STANDARDS**

- A. ASCE/SEI 7-10 - Minimum Design Loads for Buildings and Other Structures: Wind design.
- B. ASTM C728 - Standard Specification for Perlite Thermal Insulation Board; 2013.
- C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- E. ASTM D6630 - Standard Guide for Low Slope Insulated Roof Membrane Assembly; current edition.
- F. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim update
- G. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.
- H. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.
- I. UL 580 - Tests for Uplift Resistance of Roof Assemblies ; current edition.
- J. UL 1897 - Uplift Tests for Roof Covering Systems; current edition.

#### **1.05 PERFORMANCE REQUIREMENTS**

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. ASCE 7-10: Provide thermoplastic membrane, base flashings, and component materials that meet the wind design requirements as a part of a roofing system, as applicable.
  - 1. Refer to the structural drawings for wind speeds, building exposure, and building risk category.
- D. UL Listing: Provide thermoplastic sheet roofing system and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.

1. Provide roof-covering materials bearing UL Classification Marking on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.
  2. Provide thermoplastic sheet roofing system that has been tested in accordance with UL 580 or UL 1897.
- E. Insulation Fire-Performance Characteristics: Provide insulation materials that are identical to materials whose fire-performance characteristics have been determined for the assemblies of which the insulation materials are a part, per test method listed below, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
1. Surface Burning Characteristics: ASTM E 84.
  2. Fire Resistance Ratings: ASTM E 119.
- F. All material, the installation thereof shall meet or exceed the minimum criteria of the Kentucky State Building Code.

#### **1.06 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
1. Base flashings and membrane terminations.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
1. A copy of the unexecuted roofing warranty is to be submitted for review.
- E. Inspection: Letter from the proposed primary roofing materials manufacturer confirming that the final inspection will be performed by a trained, technical representative. Sales personnel or agents will not be considered eligible to perform final inspection.
- F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.
- G. Wind Uplift Design: Provide wind uplift calculation that include wind uplift performance tested per ASCE 7-10 Envelope Procedure. Calculations to include:
1. Minimum Design Wind-Resistance Loads: Include field of roof, perimeter, and corner uplift pressures for each applicable roof area.
  2. Fastener pattern, spacing, and/or enhanced adhesive requirements.
  3. Additional wind uplift safety factors required by the building area, size or shape, and manufacturers requirements to meet the specified warranty requirements.
- H. Manufacturer certificate, located at the end of this Section, to be submitted within 24 hours of the bid, for the proposed PVC roof system confirming that the PVC roof system installer is approved to install the proposed PVC roof system and all additional components required for the complete roof system will be included in the warranty.

#### **1.07 QUALITY ASSURANCE**

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Manufacturer Qualifications:
1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

2. Obtain primary products, including each type of roofing sheet, bitumen, membrane flashings, and vapor retarder (if any), from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.
  3. Roof membrane manufacturer is to have an indemnity arrangement with the selected lightweight insulating concrete manufacturer to meet the special project full system roof warranty as specified.
- C. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing that is required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's products; and who is eligible to receive the project specific full system roofing manufacturer's warranty as specified. A minimum of five (5) years experience with the manufacturer and the specified system is required.
1. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman on job site during times that PVC sheet roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this Project. A minimum of four (4) years experience with the manufacturer and the specified system is required.
- D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.
- E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
  2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.
- F. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "General Requirements." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
    - a. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
    - b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - c. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
    - d. Manufacturer's technical representative to be on site during first day of installation.

#### **1.08 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.
- B. Review preparation and installation procedures and coordinating and scheduling required with related work.
- C. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at project site. Meet with Installer (Roofer), installers of substrate construction (roof decks) and other work adjoining roof system including penetrating work and roof accessories, Architect, Owner, and representatives of other entities directly concerned with performance of roofing system including (as applicable) Owner's insurers and test agencies. This meeting must be attended by the on site Foreman overseeing the work.

1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule. Review requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.
  2. Discuss roofing system protection requirements for construction period extending beyond roofing installation. Discuss possible need for temporary roofing.
  3. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
- D. Preapplication Roofing Conference: Approximately 2 weeks before scheduled commencement of sheet roofing installation and associated work, meet at Project site with Installer, installer of each component of associated work, installers of roof drains, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, test agencies, and governing authorities.
1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
  2. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
    - a. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
    - b. Review structural loading limitations of steel deck and inspect deck for loss of flatness and for required mechanical fastening.
    - c. Review roofing system requirements (drawings, specifications, and other contract documents).
    - d. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
    - e. Review required submittals, both completed and yet to be completed.
    - f. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
    - g. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - h. Review required inspection, testing, certifying, and material usage accounting procedures.
    - i. Review temporary protection requirements for roofing system during and after installation.
    - j. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
    - k. Review of roof observation and repair procedures after roofing installation.
  3. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

**1.09 COMPLETION MEETING**

- A. A meeting shall be held at the completion of the project and attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the Manufacturer's representative. The Contractor shall complete all punch list items and acquire Manufacturer's warranty for final submittal to Architect.

**1.10 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

**1.11 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

**1.12 WARRANTY**

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. One executed copy of all warranties must be submitted to the Architect and Owner.
- B. Special Project Full System Warranty:
  - 1. The entire installation from the deck up, including but not limited to insulation, fasteners, roofing membranes, edge metals, counter flashing, base flashings and other components of the membrane roofing system, shall be warranted against defects in material and workmanship as evidenced by leaks, flashing membrane deterioration, blisters, splits, etc., as required to maintain roofing system in a watertight condition for the period stated below starting from the date of final acceptance by the Owner. Should leak occur, the Manufacturer shall repair or replace the roof materials as required, to provide a watertight condition, at its own expense, with no dollar limit (NDL) or prorated amount. The warranty shall cover fully and completely the entire roofing system and the requirements as specified herein. Particularly warranty shall not include language releasing manufacturer of responsibility if not installed by approved roofing Contractor or in accordance with manufacturer's specifications, or materials not specifically made by the manufacturer. It is the manufacturer's responsibility to know by whom and how roofing was installed to eliminate this. The guarantee is for a complete system and shall not be limited by any previous work accomplished on the roof prior to this contract and elected to remain as a part of the system herein specified:
    - a. Total Systems Warranty shall be for a period of twenty (20) years NDL from the date of substantial completion.
    - b. This warranty shall be jointly signed by the Manufacturer of the primary roofing material and the authorized installer.

- c. Repairs and replacements required because of events beyond the Contractor's/Installer's/ Manufacturer's control and beyond the limits specified herein shall be completed by the Contractor/Installer and paid for by the Owner.
  - 2. It is the responsibility of the installing contractor to ensure that the selected edge metals, counter flashing, drip edges, expansion joints and other components that comprise the membrane roofing system are to be warranted as part of the membrane roof system.
- C. Installer shall provide a typed certificate stating the following:
  - 1. Type of roof.
  - 2. Installer.
  - 3. Installer's address and telephone number.
  - 4. Manufacturer
  - 5. Manufacturer's address and telephone number.
  - 6. Who to contact in case of roof failure.
  - 7. Warranty period with beginning and ending dates. Certificate shall be framed and bolted (not hung) on the wall as directed by Architect. Copies of certificate shall be included with manufacturer's written warranty and submitted to Architect.
  - 8. Any representative who inspects roof must copy all inspection reports to the office of RossTarrant Architects, Inc. for the life of the roof.
- D. Warranty Work: All warranty and/or maintenance work shall be documented by the individual performing the work with before and after pictures of the work and a detailed breakdown of cost. Submit to the Owner and the Architect. Time spent by the Architect for manufacturer warranty problems shall be billed to the manufacturer.
- E. Recommended Maintenance: In addition to the guarantee, the Contractor shall furnish to the Owner the Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.
  - 1. Arrange for a meeting of the Owner, Architect, Manufacturer, and Installer to review procedure for general maintenance by the Owner that will not void warranty, as well as procedure for reporting roof problems, maintenance, and/or warranty problems to manufacturer.
  - 2. All warranty and/or maintenance work shall be documented by the individual performing the work with before and after pictures of the work and detailed breakdown of cost. Submit to Owner and Architect time spent by Architect for manufacturer's warranty problems shall be billed to the manufacturer.
- F. Contractor's Warranty: Roofing Contractor shall provide a written two (2) year warranty for materials and workmanship commencing with the date of substantial completion. The warranty shall cover all labor and all material necessary to maintain complete water tightness, including that required to repair and all roof leaks and water infiltration through the roof, flashings, and wall copings in any configuration including standing water at no additional cost to the Owner.

## **PART 2 PRODUCTS**

### **2.01 PVC SHEET ROOFING MEMBRANE**

- A. Manufacturer: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
  - 1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, aesthetics, and formulations of the following:
    - a. Roof Field: Sarnafil SikaPlan by Sika Sarnafil, Inc.: [www.usa.sarnafil.sika.com](http://www.usa.sarnafil.sika.com)
    - b. Flashings: Sarnafil SikaPlan in conjunction with loose felt sheet.
  - 2. Alternate Roof Membrane Basis of Design: Seaman Corporation: FiberTite 60 mil-SM-FB
  - 3. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect:

- a. Carlisle SynTec: Sure-Flex 60 Mil: [www.carlisle-syntec.com](http://www.carlisle-syntec.com)
  - b. Seaman Corporation: FiberTite 60 mil-SM-FB
  - c. Holcim Group/Elevate (formerly Firestone Building Products Company): [www.holcimelevate.com](http://www.holcimelevate.com).
  - d. Johns-Manville: JM PVC SD 60 Mil: [www.jm.com](http://www.jm.com)
  - e. GAF/Siplast: [www.siplast.com](http://www.siplast.com)
  - f. Sika Sarnafil, Inc.: [www.usa.sarnafil.sika.com](http://www.usa.sarnafil.sika.com)
  - g. Soprema: [www.soprema.us.com](http://www.soprema.us.com)
  - h. Versico Roofing Systems; a division of Carlisle Construction Materials: [www.versico.com](http://www.versico.com)
- B. Due to differences in roofing manufacturer standards for membrane reinforcement provisions for fiberglass and polyester are included. Reinforcements listed below are acceptable and manufacturers are to provide their standard of one listed below:
- 1. Basis of Design: PVC sheet ASTM D 4434, Type II, Grade 1, fiberglass reinforced for fully adhered installation.
  - 2. Basis of Design: PVC Sheet ASTM D4434, Type III, Grade 1, polyester fiber reinforced for fully adhered installation.
  - 3. Alternate Basis of Design: Sheet ASTM D6754, polyester fiber reinforced for fully adhered installation.
- C. Thickness: Specified thickness 60 mils NOMINAL thickness as required to meet the specified warranty period.
- D. Basis of Design: Exposed Face Color for Field of Roof: White.
- 1. Alternate Basis of Design: Exposed Face Color for Field of Roof: Off-White.

## 2.02 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Roof Membrane and Flashing Bonding Adhesive: Manufacturer's standard water or solvent-based bonding adhesive for field membrane, and solvent-based bonding adhesive for base flashings.
- 1. Solvent-Based Properties and Characteristics
    - a. High strength solvent based contact adhesive allowing bonding to porous and non-porous substrates.
    - b. Base: Synthetic rubber.
    - c. Solids: 24.2%
    - d. Flash Point: 16 degrees F closed cup
    - e. Brookfield Viscosity: 2700 Centipoises
      - 1) Acceptable products, compatible with manufacturers roof membrane and installation system:
        - (a) Carlisle - Sure-Flex PVC Bonding Adhesive
        - (b) JM - PVC Membrane Adhesive - Solvent Based
        - (c) Sika Sarnafil - Sarnacol 2170
  - 2. Water-Based Properties and Characteristics:
    - a. Acceptable products, compatible with manufacturers roof membrane and installation system:
      - 1) Sika Sarnafil - Sarnacol 2121
      - 2) JM - PVC Membrane Adhesive - Water Based
  - 3. RossTarrant Architects will not accept any membrane or field flashing adhesives other than the solvent-based or water-based adhesives described in this specification. Single or multi-component low-rise foams, urethanes, or any other type of single or multi-component adhesives will not be substituted or accepted.
- C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

- D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
  - 1. Provide "Sarnastop," or equivalent, termination bar at areas where parapet walls occur.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470/ASCE 7-10, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- F. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.
- G. Roof Edge/Drip Edge Flashing: Manufacturers standard 24 gauge metal clad with 30 mil PVC coating for heat welding to meet warranty requirements.
  - 1. Color: White

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
  - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify deck surfaces are dry and free of snow or ice.
  - 4. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

### **3.02 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flash and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### **3.03 FULLY ADHERED ROOFING MEMBRANE INSTALLATION**

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
  - 1. Install sheet according to ASTM D 5036.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesives: Roofing Installer and Roofing Membrane Manufacturer to determine appropriate adhesive material to be used on project based on; project type, substrate type, time of year of installation, average daily temperatures forecasted during installation, and other factors, as determined by the roof membrane manufacturer to maintain the specified warranty. No additional compensation will be considered, or due, the roofing contractor if the roof membrane manufacturer requires the type of bonding adhesive, originally bid, to be changed due to project type, environmental and/or temperature factors, to maintain the specified warranty. Either adhesive listed below is acceptable for use:

1. Solvent-Based Bonding Adhesive: Apply solvent-based bonding adhesive to substrate and/or roof membrane at rate required by the roof membrane manufacturer. Apply and allow first coat of solvent based bonding adhesive to dry. Apply second coat of solvent based adhesive and install roof membrane. Solvent-based bonding adhesive applied in a bead or ribbon pattern to the substrate and/or membrane will not be accepted. Do not apply bonding adhesive to splice area of roofing membrane to be heat welded.
  2. Water-Based Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by the roof membrane manufacturer. Apply single coat, or as required by roof membrane manufacturer, of water-based bonding adhesive and install roof membrane. Water-based bonding adhesive applied in a bead or ribbon pattern to the substrate and/or membrane will not be accepted. Do not apply bonding adhesive to splice area of roofing membrane to be heat welded.
- D. RossTarrant Architects will not accept any membrane or field flashing adhesives other than the solvent-based or water-based adhesives described in this specification. Single or multi-component low-rise foams, urethanes, or any other type of single or multi-component adhesives will not be substituted or accepted.

### **3.04 BASE FLASHING INSTALLATION**

- A. Install sheet flashing and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashing into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashes and mechanically anchor to substrate through termination bars.

### **3.05 FIELD QUALITY CONTROL**

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  1. Notify Architect or Owner seven days in advance of date and time of inspection.
- B. Final Roof Inspection Report: After final roof inspection is completed one copy of the final report (hardcopy or digital format) shall be provided to the General Contractor/Construction Manager, Architect, and Roofing Installer.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### **3.06 PROTECTING AND CLEANING**

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION 075400**

**SECTION 075400.01****THERMOPLASTIC MEMBRANE ROOFING SYSTEM MANUFACTURER'S CERTIFICATION****PART 1 GENERAL****1.01 THERMOPLASTIC MEMBRANE ROOFING SYSTEM MANUFACTURER'S CERTIFICATION**

This certification must be completed and submitted as outlined in the Supplemental Instructions to Bidders. Failure to submit this completed certification may be cause for rejection of the bidder's proposal.

- A. This certification must be completed and submitted within 24 hours after bids are received.

Date Submitted: \_\_\_\_\_

Name & Address of Roofing Systems Manufacturer:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Name & Address of Roofing Systems Installer:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I certify that \_\_\_\_\_ (Name of Roofing Installer) is an approved applicator of our roofing systems, and upon completion of this project, providing all terms and conditions for the manufacturer's guarantee are met, we will provide a no-dollar-limit 20-year manufacturer's guarantee for the roof.

I certify that \_\_\_\_\_ (Name of Roofing Installer) has selected additional components required for the completion of the specified roofing system(s); coping, fascia, reglets, drip edges, expansion joints, etc., that will meet the warranty requirements and be included in the no-dollar-limit 20-year manufacturer's guarantee for the roof.

Signed: \_\_\_\_\_ Title: \_\_\_\_\_

(Roofing Systems Manufacturer)

**END OF SECTION 075400.01**

## **SECTION 077123 MANUFACTURED GUTTERS AND DOWNSPOUTS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Manufactured, Pre-finished galvanized steel or aluminum:
  - 1. gutters and downspouts
  - 2. Contractors option to provide either pre-finished aluminum, or pre-finished steel manufactured products.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 334993 - Downspout Boots.

#### **1.03 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.
- C. Product shall be listed in the current Factory Mutual Research Corporation Approval Guide approved for FM 1-90.

#### **1.05 SUBMITTALS**

- A. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
- B. Product Data: Provide data on prefabricated components.
- C. Selection Samples: For each item with a paint finish specified, submit color chips representing manufacturer's full range of available colors. Submit actual samples not photo reproductions.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

#### **1.07 WARRANTY**

- A. Finish Warranty: Manufacturer's 20-year finish warranty stating products to be free of corrosion, checking, crazing, chalking, discoloring, fading, oxidation, and that exposed finish surface will not peel, crack, chip, or spall.
  - 1. Excessive color change/fading greater than 5 NBS (Hunter) units and passing 5000 hrs per ASTM D 2249-85, ASTM D 2244 and ASTM D 822-85 respectively.

2. Chalking shall not be less than a rating of No. 8 per ASTM D 659 and ASTM D 4214.
3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
  1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, aesthetics, and formulations of the following:
    - a. Carlisle Companies, Inc./Metal-Era, Inc.: Seal-Tite Gutter System; Profile IG-2.
    - b. Carlisle Companies, Inc./Metal-Era, Inc.: Seal-Tite Closed Face Industrial Downspout
  2. Prefinished Formed-Aluminum Gutters, Downspouts, Conductor Heads, Scuppers:
    - a. DMI: [www.dmimetals.com](http://www.dmimetals.com)
    - b. Carlisle Companies, Inc./W.P. Hickman Co.: [www.wph.com](http://www.wph.com)
    - c. Carlisle Companies, Inc./Metal-Era, Inc.: [www.metalera.com](http://www.metalera.com)
      - 1) Private labeled components manufactured by Metal-Era:
        - (a) Johns Manville
        - (b) Siplast
        - (c) Holcim/Elevate (formerly Firestone Building Products)
        - (d) Soprema

### **2.02 MATERIALS**

- A. Pre-Finished Galvanized Steel Sheet: ASTM A 653/A 653M, with G90/Z275 zinc coating gauge inch as indicated below:
  1. Downspouts: 24 gauge.
  2. Gutters: 24 gauge.
- B. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M); gauge inch as indicated below:
  1. Downspouts: 0.050 inch.
  2. Gutters: 0.050 inch.

### **2.03 COMPONENTS**

- A. Gutters: SMACNA rectangular style profile.
  1. Manufacture in uniform section lengths not exceeding 12 feet, with matching corner units, ends, outlet tubes, and other accessories.
  2. Corners: Factory mitered and continuously welded.
- B. Downspouts: SMACNA Rectangular profile.
  1. Manufacture in uniform section lengths not exceeding 12 feet, with matching corner units, ends, outlet tubes, and other accessories.
  2. Provide with factory fabricated mitered elbows where spilling to grade, or into downspout boot.
- C. Gutter and Downspout Anchors and Supports:
  1. Gutter Supports: Straps and Hangers. 1 inch wide, 0.050 inch thick internal aluminum strap at 30 inch on center at top of gutter. Alternate location with 1 inch wide 0.125 inch thick external hanger at bottom location 30 inch on center for support of gutter.
    - a. Basis of Design: Metal-Era Seal-Tite IG-2 Industrial Gutter Support Bracket
  2. Downspout Supports: Straps. Provide three anchor straps per 10 foot section.
    - a. Basis of Design: Metal-Era Style 1 Downspout Wall Bracket.
- D. Fasteners: Galvanized steel, with soft neoprene washers.

**2.04 ACCESSORIES**

- A. Wire Ball Downspout Strainer: Provide a wire ball downspout strainer at every downspout location.

**2.05 FABRICATION**

- A. Roofing Contractor/Local Fabricator shop or field fabricated/broken gutters and downspouts will not be accepted.
- B. Form gutters and downspouts of profiles and size indicated.
- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- E. Hem exposed edges of metal.
- F. Fabricate gutter and downspout accessories; seal watertight.

**2.06 FINISHES**

- A. All exposed to view roof components specified above to have the following finish.
  - 1. All items to be the same color unless specifically noted.
- B. Finishes: Due to differences in manufacturer finishing standards, or base metal used, provisions for clear and/or color anodized, and painted material is included. All finishes are acceptable and manufacturers are to provide their standard of ONE listed below.
  - 1. High-Performance Organic Finish (2-coat Fluoropolymer): AA-C12C40R1X (Chemical Finish): cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.
    - a. Color to be selected from manufacturers standard color chart. Minimum twenty colors.
    - b. The following components to be painted; gutter and downspout.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

**3.02 PREPARATION**

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

**3.03 INSTALLATION**

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Slope gutters 1/8 inch per foot, 1 percent minimum.
- C. Provide expansion joints for gutter runs exceeding 40 feet.
- D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

- E. Connect downspouts to downspout boots above grade. Grout connection watertight.
- F. Refer to Section 334993 for downspout boots and splashblocks.
- G. Refer to site drainage drawings for downspout boot and splashblock locations.

**END OF SECTION 077123**

## **SECTION 079005 JOINT SEALERS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Sealants and joint backing.
- B. Precompressed foam sealers.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 321373 - Pavement Joint Sealants: Exterior sealants for horizontal pavements and surfaces.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- B. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

#### **1.04 SUBMITTALS**

- A. Product Data: Provide data indicating sealant chemical characteristics.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

#### **1.06 PROJECT CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

#### **1.07 SEQUENCING AND SCHEDULING**

- A. Coordinate the work with all sections referencing this section.

#### **1.08 WARRANTY**

- A. Correct defective work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
  - 1. Silicone, Polyurethane and Acrylic Sealants:
    - a. Dow Corning: [www.dowcorning.com](http://www.dowcorning.com)

- b. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - c. Henkel Corp./GE Silicones: [www.gesealants.com](http://www.gesealants.com).
  - d. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - e. BASF Construction Chemicals-Building Systems: [www.chemrex.com](http://www.chemrex.com).
  - f. Tremco Global Sealants; Product : [www.tremcosealants.com](http://www.tremcosealants.com).
  - g. Sika Construction: [www.sikaconstruction.com](http://www.sikaconstruction.com)
  - h. Soudal Inc.: [www.soudalusa.com](http://www.soudalusa.com)
- B. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
- 1. Preformed Compressible Foam Sealers:
    - a. EMSEAL Joint Systems, Ltd: [www.emseal.com](http://www.emseal.com).
    - b. Sandell Manufacturing Company, Inc: [www.sandellmfg.com](http://www.sandellmfg.com).
    - c. Dayton Superior Corporation: [www.daytonsuperior.com](http://www.daytonsuperior.com).
    - d. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).
    - e. Sika Construction: [www.sikaconstruction.com](http://www.sikaconstruction.com)
    - f. Soudal Inc.: [www.soudalusa.com](http://www.soudalusa.com)

## 2.02 SEALANTS

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than 250 g/L where applied within the waterproofing envelope.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Other exterior joints for which no other sealant is indicated.
- C. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
  - 1. Face color: Match exterior masonry veneer.
  - 2. Size as required to provide weathertight seal when installed.
  - 3. Provide product recommended by manufacturer for traffic-bearing use.
  - 4. Applications: Use for:
    - a. Exterior wall expansion joints.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Applications: Use for:
    - a. Interior wall and ceiling control joints.
    - b. Joints between door and window frames and wall and floor surfaces.
      - 1) Color at intersection of door frame bottom and resilient, sealed or coated flooring to match door frame color.
    - c. Other interior joints for which no other type of sealant is indicated.
- E. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
  - 1. Approved by manufacturer for wide joints up to 1-1/2 inches.
  - 2. Color: Standard colors matching finished surfaces.
  - 3. Applications: Use for:
    - a. Expansion joints in floors.

## 2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  - 2. Type for Joints Subject to Pedestrian Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
  - 5. Manufacturers:
    - a. ADFAST Corporation: [www.adfastcorp.com/#sle](http://www.adfastcorp.com/#sle).
    - b. Nomaco, Inc: [www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - c.
- D. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

### 3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

### 3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
  - 1. Minimum 1/4 inch, continuous, sealant bead, both sides, of top stud runner and structure and bottom stud track and floor.
  - 2. Minimum 1/4 inch, continuous, sealant bead, around all openings, penetrations, and partition intersections.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.

- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.
- I. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- J. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

#### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

#### **3.05 PROTECTION**

- A. Protect sealants until cured.

**END OF SECTION 079005**

## **SECTION 081113 HOLLOW METAL DOORS AND FRAMES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 061000 - Rough Carpentry: Shims.
- B. Section 099000 - Painting: Field painting.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (R2011).
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames; 2012.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- K. ASTM A924 - Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.
- L. ASTM A 1008/A 1008M - Standard Specification for Steel, sheet, Cold rolled, Carbon, High Strength Low-Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened and Bake Hardenable.
- M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- N. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- O. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- P. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

- Q. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- R. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- S. NAAMM HMMA 820 TN01 - Grouting Hollow Metal Frames
- T. NAAMM HMMA 820 TN03 - Guidelines for Glazing of Hollow Metal Transom, Sidelight and Windows.
- U. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- V. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- W. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- X. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- Y. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- Z. SDI 111 - Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.
- AA. UL (BMD) - Building Materials Directory; current edition.
- AB. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- AC. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
  - 1. Provide hollow metal frames from SDI Certified manufacturer.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Steel Doors and Frames: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include;
  - 1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:

- a. Steelcraft B-Series full flush, steel stiffened doors.
2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect:
  - a. Curries, an Assa Abloy Group company: [www.assaabloydss.com](http://www.assaabloydss.com).
  - b. Custom Metal Products: [www.custommetalproductsnc.com](http://www.custommetalproductsnc.com)
  - c. De La Fontaine Industries: [www.delafontaine.com](http://www.delafontaine.com)
  - d. Mesker, dormakaba Group: [www.meskeropeningsgroup.com/#sle](http://www.meskeropeningsgroup.com/#sle).
  - e. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - f. Ceco Door Products an Assa Abloy Group company: [www.cecodoor.com](http://www.cecodoor.com).
  - g. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - h. Metal Products Inc. (MPI): [www.metalproductsinc.com](http://www.metalproductsinc.com)
  - i. Pioneer Industries : [www.pioneerindustries.com](http://www.pioneerindustries.com)

## 2.02 DESIGN CRITERIA

- A. Requirements for Hollow Metal Doors and Frames:
  1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
  2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  3. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

## 2.03 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
  1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 1, full flush.
    - a. Level 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
    - e. Door Face Texture: Smooth.
    - f. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
    - g. Primer: Factory applied baked-on rust inhibiting primer paint in accordance with ANSI A250.10-2011.
  2. Core: Vertical steel stiffeners, 20 gage, spaced not to exceed six inches apart, welded to face sheet and bonded to opposite face. Fill between stiffeners with manufacturers standard extruded polystyrene insulation or batt insulation.
    - a. Insulating Value: U-value of 0.61, when tested in accordance with ASTM C1363.
      - 1) If polystyrene provided - Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
  3. Door Thickness: 1-3/4 inch, nominal.
  4. Top and Bottom Closures : Close top and bottom edges of doors flush as an integral part of the door construction or by the addition of 14 gage, metallic-coated steel channels with channel webs placed even with top and bottom edges.
    - a. Provide top cap to protect against weather.
    - b. Bottom closure is not required on doors with concealed automatic door bottoms. Provide manufacturers standard door bottom.
  5. Door Edges: Full height, standard visible edge seam.
  6. Door Edge Profile: Beveled, both sides, hinge and lock edges.

7. Door Undercut: Manufacturer's standard, compatible with threshold configuration specified in section 087100.
8. Hinge and Hardware Prep: Manufacturers standard reinforcing per ANSI A250.8-2017. Provide concealed reinforcement for closers and mortise locks.
9. Weatherstripping: Refer to Section 087100.

## **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
  1. Comply with the requirements of grade specified for corresponding door, except:
    - a. Frames for Exterior Hollow Metal Doors: Comply with frame requirements specified in ANSI A250.8 Level 3 Doors: 14 gage frames.
    - b. Frames for Interior Wood and Hollow Metal Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage.
  2. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
  3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
  4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- C. Exterior Door Frames: Face welded type for CMU/masonry wall types.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
  2. Finish: Factory primed, for field finishing.
  3. Wall Attachment: Lock-in masonry "T". Minimum three anchors per jamb.
  4. Weatherstripping: Separate, see Section 087100.

## **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  1. Fire-Rated Frames: Comply with fire rating requirements indicated.
  2. When temperature conditions necessitate the use of anti-freezing agents in the mortar and frame is grouted solid, the inside of the frame shall be coated per manufacturer recommendations.
  3. Back coating to be installed at factory by frame manufacturer or field applied.

## **2.06 ACCESSORIES**

- A. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Cold Weather Application: Frame installer to coat inside of frames that will be installed in masonry and filled with grout with anti-freeze additives prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Touch up damaged factory finishes.

### **3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION 081113**

**DOOR HARDWARE SPECIFICATION**

Provide non-electrified items and work and materials as indicated below.  
 Submittals to comply with current AIA MasterSpec requirements. Key the cylinder as directed by Owner; provide three change keys per cylinder.  
 Provide items by allowable manufacturers as indicated below:

Hinges:	Hager, Select, Ives
Key Cylinders:	Best SFIC (no substitute)
Locksets:	Best (no substitute)
Closers	LCN, Norton, Sargent
Kick Plates:	Trimco, Hager, Ives (must be countersunk for screws and beveled all four sides)
Seals, thresholds:	National Guard Products, Legacy Manufacturing, Reese

**Hardware Set 01, Door 101**

(1) Continuous Hinge	SL24HD	628	SEL
(1) Storeroom Lock	93K7D-15D-S3	626	BES
(1) SFIC Cylinder Core		626	BES
(1) Closer, w/Spring Stop/Ho	4040XP SHCUSH	689	LCN
(1) Closer Spacer	51875-52250		LEG

Note 1: Do not cut top jamb seal for closer arm bracket. Lower the closer on the door and mount closer shoe to jamb seal. Use spacer for 5<sup>th</sup> closer screw.

(1) Kick Plate	KO050 8 x 2LDW x CS x B4E	630	TRI
(1) Lock Guard, Cylindrical Lock	1082-6S	630	TRI
(1) Overhead Rain Drip	5241	628	LEG
(1) Cat H Jamb Seal Set	5924	628	LEG
(1) Panic Threshold	356MA x RCE	628	LEG

Note 1: 3/8" door undercut required for proper mating of door bottom with seal integral to threshold.

## SECTION 099000 PAINTING

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

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

#### 1.02 RELATED REQUIREMENTS

- A. Section 015721 - Indoor Air Quality Management
- B. Section 055000 - Metal Fabrications: Shop-primed items
- C. Section 090050 - Finish Legend

#### 1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency
- B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications
- C. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials
- D. GreenSeal GS-11 - Paints

#### 1.04 SUMMARY

- A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces including field-applied dry-erase coatings and surface preparation and primer.
  - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. VOC data: Submit Green Seal GS-11 and/or GC-03 compliance documents and description of the basis for compliance.
- C. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.
- D. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
  - 1. All exposed to view (from the ground) flashing are to be furnished prefinished where available. If items are not available prefinished, they are to be painted. Coordinate with Contractor on these items.
  - 2. Exposed copper piping shall receive a painting system.
  - 3. **It shall be the full responsibility of the painter to verify all paint, types to determine if paint(s) system specified are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by painter/manufacturer based on testing and field experience. All existing painted surfaces shall be tested to ensure product compatibility and to ensure that the paint bonds will not fail.**
  - 4. Painting shall include field painting pre-finished grilles, registers and diffusers located on gypsum board ceilings and soffits, which are to receive an accent paint color.
  - 5. Exterior items to receive a painting system include but are not limited to the following:
    - a. Refer to Drawings for additional information

- b. Fixed access ladders
  - c. Lintels
- E. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Finished metal surfaces include the following:
    - a. Anodized aluminum
    - b. Stainless steel
    - c. Chromium plate
    - d. Bronze and brass
  - 2. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- F. Related Sections include the following:
  - 1. Division 5 Section "Metal Fabrications" for shop priming ferrous metal
  - 2. Division 8 Section "Steel Doors and Frames" for factory priming steel doors and frames

## 1.05 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
  - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
  - 3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
  - 4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

## 1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.
- C. Manufacturer's Instructions: Indicate special surface preparation procedures.
- D. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- E. VOC Content: Determine VOC (Volatile Organic Compound) content of solvent borne and waterborne paints and related coatings in accordance with EPA Method 24 or ASTM D3960.
- F. Product Data: For each paint system indicated. Include primers.
  - 1. When proposing another manufacturers product other than product specified, a complete cross-reference list must be included with the submittal. Shop drawings will be automatically returned if the list is not included.
  - 2. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
  - 3. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- G. Samples for Initial Selection: For each type of finish-coat material indicated.
  - 1. After color selection, Architect will furnish color chips for surfaces to be coated.
  - 2. The painter is required to submit drawdowns of each paint color for review of color and sheen match.

**1.07 QUALITY ASSURANCE**

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name or title of material
  - 2. Product description (generic classification or binder type)
  - 3. Manufacturer's stock number and date of manufacture
  - 4. Contents by volume, for pigment and vehicle constituents
  - 5. Thinning instructions
  - 6. Application instructions
  - 7. Color name and number
  - 8. VOC content
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.
  - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

**1.09 PROJECT CONDITIONS**

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- B. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
  - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
- C. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

**1.10 EXTRA MATERIALS**

- A. See Section 016000 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.
- C. Label each container with color in addition to the manufacturer's label.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.
- B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles or approved equivalent as manufactured by one of the following manufacturers.

- C. Paint Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. ICI Paints & Devoe High Performance Coatings (ICI)
  - 2. Sherwin-Williams Co. (Sherwin-Williams)
  - 3. Coronado Paint Company (Coronado)
  - 4. PPG Paints, Inc. (Pittsburgh & Porter Paints)
  - 5. Farrell Calhoun Paint
- D. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements.
  - 1. Interior paint: Comply with GS-11
  - 2. Exterior paint: Comply with GS-11

## 2.02 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  - 1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

## 2.03 PAINTS AND COATINGS - GENERAL

- A. Toxicity/IEQ: Comply with applicable regulations regarding toxic and hazardous materials, and as specified. Paints and coatings applied on site shall comply with the following VOC content limits:
  - 1. Interior paint: Comply with GS-11
  - 2. Exterior paint: Comply with GS-11
  - 3. Flat: 50 g/L
  - 4. Non-flat: 150 g/L
  - 5. Anti-corrosive & anti-rust: 250 g/L
  - 6. Clear wood finishes, varnish: 350 g/L
  - 7. Clear wood finishes, lacquer: 550 g/L
- B. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- C. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- D. Chemical Content: The following compounds are prohibited:
  - 1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings)
  - 2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium,

isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride

## 2.04 PAINT SYSTEMS - EXTERIOR

- A. Exterior Primers:
  - 1. Exterior Concrete and Masonry Primer: Factory formulated alkali resistant acrylic latex primer for exterior application
    - a. Sherwin-Williams Loxon Concrete & Masonry Primer LX02W0050 VOC 99 g/l 3.2 mils. DFT
    - b. PPG Industries Perma-Crete Int/Ext Alkalie Resistant Primer 4-603 VOC < 100 g/l Farrell Calhoun 697 100% Acrylic Bonding Masonry Primer/Stain Killer
    - c. Benjamin Moore & Co. Products
      - 1) Concrete and Masonry, N068 Super Spec Masonry High Build Primer
  - 2. Exterior Ferrous Metal Primer: Factory formulated rust inhibitive metal primer for exterior application.
    - a. Sherwin-Williams Pro-Industrial Pro-Cryl Universal acrylic primer B66-310 series VOC less than 100 g/l 2.0-4.0 mils. DFT  
Farrell Calhoun Tuff-Boy 5-56 100% Acrylic All Purpose Metal Primer/Finish Coat
    - b. PPG Industries Pitt-Tech Plus Int/Ext DTM Industrial Primer 90-912 series VOC < 100 g/l
    - c. Benjamin Moore & Co. Products
      - 1) Ferrous Metal, P06 Alkyd Metal Primer
  - 3. Exterior Galvanized Metal Primer: Factory formulated galvanized metal primer for exterior application.
    - a. Sherwin-Williams Pro-Industrial Pro-Cryl Universal acrylic Primer B66-310 series VOC less than 100 g/l 2.0-4.0 mils DFT
    - b. PPG Industries Pitt-Tech Plus Int/Ext DTM Industrial Primer 90-912 series VOC < 100 g/l  
Farrell Calhoun Tuff-Boy 5-56 100% Acrylic All Purpose Metal Primer/Finish Coat
    - c. Benjamin Moore & Co. Products
      - 1) Galvanized Metal, P04 Acrylic Metal Primer
  - 4. Exterior Wood Primer: Factory formulated wood primer for exterior application.
    - a. Sherwin-Williams Exterior Latex Wood Primer, B42W08141 Series
    - b. Farrell Calhoun 235 Int/Ext 100% Acrylic Latex Undercoater
- B. Block Fillers:
  - 1. Concrete Block & Masonry Surfacers.
    - a. Sherwin Williams Pro Industrial Heavy Duty Block Filler, B42W00150 Series
    - b. PPG Industries Perma-Crete Acrylic Latex (low temperature cure) Filler 4-100
    - c. Benjamin Moore & Co. Products
      - 1) Concrete Block & Masonry Surfacers, 206 Super Spec Hi-Build Block Filler
    - d. Farrell Calhoun 470 Int/Ext Latex Masonry Block Filler
- C. Exterior Finish Coats:
  - 1. Exterior Semigloss Acrylic Enamel: Factory formulated semigloss waterborne acrylic latex enamel for exterior application.
    - a. Sherwin-Williams Exterior Super Paint Latex Satin A89 Series VOC 114 g/l 1.44 mils DFT
    - b. PPG Industries Speedhide Exterior 100% Acrylic Semi-Gloss 6-900XI series VOC < 50 g/l
    - c. Farrell Calhoun Durashield 3400 Line 100% Acrylic Exterior Semi-Gloss
    - d. Exterior Semigloss Acrylic Semigloss, N449 Ultra Spec Exterior Gloss Finish
    - e. Benjamin Moore & Co. Products

- 1) Exterior Semigloss Acrylic Semigloss, N449 Ultra Spec Exterior Gloss Finish
- D. Exterior Finish Coats - Metal: Factory formulated water based alkyd urethane enamel:
1. Sherwin Williams; Pro-Industrial Waterbased Alkyd Urethane B53-1050 series, gloss (B53-1150 semi-gloss, B53-1250 low sheen) VOC 50 g/l <0.42 lb/gal, wet mils 4.0 - 5.0, dry mils 1.4 - 1.7
  2. PPG Industries Speedhide Exterior 100% Acrylic Semi-Gloss 6-900XI series VOC < 50 g/l
  3. Farrell Calhoun Rust-Knox II DTM 2042 Line Int/Ext Satin Primer/Finish
- E. Exterior Finish Coats - Wood: Factory formulating latex semi-gloss for exterior application:
1. Sherwin-Williams Exterior Super Paint Latex Satin A89 Series VOC 114 g/l 1.44
  2. PPG Industries Sunproof 72-100 Series, VOC 50 g/l, 4.0 - 5.3 wet mils 1.6 - 2.2 dry mils
  3. Farrell Calhoun Durashield 3400 Line 100% Acrylic Exterior Semi-Gloss
- F. Exterior Galvanized Metal shall receive two finish coats over a primer. Primer-PPG Porter Paint Pitt-Tech Plus Int/Ext DTM Industrial Primer 90-912 series or approved equal. Top Coats-PPG Porter Paint Speedhide Exterior 100% Acrylic semi-gloss 6-900XI Series or approval equal.

## 2.05 PAINT SYSTEMS - INTERIOR

- A. Interior Primers:
1. Interior Glazed Block Bonding Primer: Factory-formulated extreme bond primer
    - a. Sherwin Williams; Extreme bond interior/exterior bonding primer B51W00150
    - b. PPG Industries; PPG 17-921XI seal grip universal primer
    - c. Farrell Calhoun XIM UMA Primer-Sealer-Bonder
- B. Interior Finish Coats:
1. Interior Semigloss Acrylic Enamel: Factory formulated semigloss acrylic latex enamel for interior application
    - a. Sherwin-Williams Promar 200 Zero VOC Interior Latex Semi-gloss B31W2600 Series 0 g/l 1.6 mils DFT. If using above product for trim areas, this is the more durable product.
    - b. PPG Industries Speedhide Zero Interior Latex Semi-Gloss 6-4510 series Zero VOC
    - c. Farrell Calhoun 600Line 100% Acrylic Interior Semi-Gloss Latex Enamel
    - d. Benjamin Moore & Co. Products
      - 1) Interior Semigloss Acrylic Enamel, N539 Ultra Spec 500 Interior Semigloss
- C. Interior Concrete Floor Finish:
- D. Interior Concrete Floor Sealer (SC1) -
1. PPG Industries Perma-Crete 4-6200 Plex-Seal WB interior/exterior clean sealer
  2. Sherwin-Williams H&C Concrete Wet Look Water Based
- E. All walls, Gypsum board ceilings, metal deck, structural elements, conduit, all unfinished surfaces exposed after construction is complete shall receive a paint system unless noted otherwise.
- F. All unfinished exterior surfaces including concrete block, steel lintels, etc. will receive a paint system. Refer to the specifications for additional information.

## 2.06 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler
- C. Fastener Head Cover Material: Latex filler

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Test existing finishes for lead before sanding, scraping, or removing. If lead is present, conform to procedures applicable when hazardous or contaminated materials are discovered.
- B. Substrate: Install formaldehyde-free MDF, particle board, or straw particle board.
- C. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
  - 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
  - 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- D. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.
- E. Indoor Air Quality: Provide temporary ventilation during work of this section.
- F. Waste Management: As specified in Section 01351 - Waste Management and as follows:
  - 1. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product. Close and seal all partially used containers of paint to maintain quality as necessary for reuse.

### 3.02 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
  - 2. **Required Surface Preparation:**
    - a. **Step 1 - Dust wall and other surfaces to receive paint by working down with a dust mop, static duster, or feather duster.**
    - b. **Step 2 - Clean surface with a mild detergent using a sponge or soft cloth. Avoid using cleaners containing alcohol on latex paint, as alcohol can dissolve and damage the paint film.**
    - c. **Step 3 - Wash surfaces from the bottom up to avoid water running down the wall over the dirt.**
    - d. **Step 4 - Rinse out the sponge in clean water until the cleaning solution is removed. Use the cleaned sponge to thoroughly rinse the washed area. Residual cleaner will interfere with adhesion of paint applied subsequently.**
    - e. **Step 5 - Use a soft cloth or towel to blot excess water off the paint film.**
    - f. **Refer to Item C below for additional requirements.**
- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
  - 1. Provide barrier coats over incompatible primers or remove and reprime.

2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
    - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
    - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
    - c. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
  3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
    - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
    - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
    - c. If transparent finish is required, backprime with spar varnish.
    - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
    - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery. Revise first subparagraph and associated subparagraphs below to suit Project.
  4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
    - a. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
  5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

### 3.03 APPLICATION

- A. Paint Strippers: Compounds that do not contain methylene chloride tend to be slower-acting than conventional paint strippers and may take from one hour to overnight to work. Comply with manufacturer's recommendations for application.

- B. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
  2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
  3. Provide finish coats that are compatible with primers used.
  4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
  5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
  7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
  8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer over metal surfaces that have been shop primed and touchup painted.
  3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. Electrical items to be painted include, but are not limited to, the following: List below contains electrical items that are usually field painted. Add other items to suit Project.
1. Switchgear.
  2. Panelboards.
  3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- G. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat

primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

- H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
  - 1. Provide satin finish for final coats.
- J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

### **3.04 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT**

- A. Refer to Section 220553 and Section 260553 for schedule of color coding of equipment, duct work, piping, and conduit.
- B. Paint shop-primed equipment, where indicated.
- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Finish equipment, piping, conduit, and exposed duct work in utility areas in colors according to the color coding scheme indicated.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.05 INDOOR AIR QUALITY**

- A. Wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.
- B. Maximize ventilation during application and drying.
- C. Isolate area of application from rest of building.
- D. Vacate space for as long as possible after application. Wait a minimum of 48 hours before occupying freshly painted rooms.

### **3.06 CLEANING**

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
  - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

### **3.07 PROTECTION**

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
  - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.