PROJECT MANUAL

MARCH 3, 2021

RHODE ISLAND STATE HOUSE
LEAKS REMEDIATION
PHASE 2

SACCOCCIO & ASSOCIATES
ARCHITECTS

1085 PARK AVENUE
CRANSTON, RHODE ISLAND

PROJECT NUMBER 15136-A

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INSTRUCTIONS TO BIDDERS

Note that when the term "Owner" is used in the Construction Document project manual and drawings it indicates the joint oversight of the Rhode Island Department of Administration and the Rhode Island Historical Preservation & Heritage Commission.

ADDITIONAL BID INFORMATION AND REQUIREMENTS

PART 1

A. Due to the extremely sensitive nature of the work of this project, and the specialized skills required for same, the following information should be carefully noted. Also, where documents are indicated as "MUST be submitted," this indicates that failure to include this information with the bid will result in DISQUALIFICATION of the bid.
   1. The Rhode Island State House is an important historical building because of its association with significant historical events and its quality of architecture.
   2. It is important that the successful bidder be familiar with the preservation, rehabilitation, restoration and reconstruction of historic buildings.

B. General Contractor qualifications

   The following items MUST be submitted as attachments to the Bid.
   1. Firm history, indicating number of years in business as a General Contractor.
   2. Résumés of principal(s) of the firm who will be responsible for this project.
   3. Proposed list of sub contractors to be used on this project.
   4. A list of projects successfully completed by the General Contractor's company MUST be submitted with the Bid as stipulated below:

      List a minimum of three (3) projects completed within the previous five (5) years that demonstrate the bidder's experience with historic preservation projects specifically pertaining to restoration and repairs on a historic building dating 100 years old or older.
      The following information is required for each project listed:
      a. Name and address of building.
      b. Age of building (approximate year of original construction.)
      c. Contract price.
      d. Detailed description of scope of work
      e. Date of completion
      f. Name and phone number of architect or design professional associated with the project.
      g. Name and phone number of the owner or owner's representative.

C. Subcontractor qualifications

Due to the importance of the expertise of the subcontractors that will be required to work on this project, the following information MUST be submitted with the Bid:

1. Masonry Subcontractor
   a. Submit firm's name, contact and history, indicating number of years in business.
   b. List a minimum of three (3) projects completed within the previous five (5) years that demonstrate the company's experience with historic preservation projects specifically pertaining to or involving masonry work on a historic building dating 100 years old or older and are skilled in the mortar repointing and the application of the specified restoration mortar for brownstone as described herein.
      The following information is required for each project listed:
      1. Name of building.
      2. Age of building (approximate year of original construction.)
      3. Contract price.
      4. Detailed description of scope of work (must include work with historic masonry mortar replacement)
      5. Date of completion
      6. Name and phone number of the architect or design professional associated with the project.
      7. Name and phone number of the owner or owner's representative.

D. The bidding Contractor's qualifications will be reviewed by the State of Rhode Island Department of Administration and the R.I. Historical Preservation & Heritage Commission. Approval by both of these agencies is required for final contract award. The state reserves the right and sole discretion to determine equivalent or prior experience and the right to reject any or all bids which fail to demonstrate equivalent prior experience. Failure to respond with relevant information to the stated requirements of this Document **WILL** disqualify the Bidder from further consideration as a bidder on this project.

PART 2

A. The bidding Contractor is required to be familiar with the Secretary of the Interior's Standards for the Treatment of Historic Properties listed as follows:

1. PRESERVATION is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction.

2. REHABILITATION is defined as the act or process of making possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features which convey its historical, cultural, or architectural values.

3. RESTORATION is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

4. RECONSTRUCTION is defined as the act or process of depicting, by means of new construction, the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

B. The awarded Contractor will also be required to be familiar with the Secretary of the Interior's Standards for Rehabilitation listed as follows:

1. A property will be used as it was historically, or be given a new use that maximizes the retention of distinctive materials, features, spaces and spatial relationships. Where a treatment and use have not been identified, a property will be protected and, if necessary, stabilized until additional work may be undertaken.
2. The historic character of a property will be retained and preserved. The replacement of intact or repairable historic materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided.
3. Each property will be recognized as a physical record of its time, place and use. Work needed to stabilize, consolidate and conserve existing historic materials and features will be physically and visually compatible, identifiable upon close inspection and properly documented for future research.
4. Changes to a property that have acquired historic significance in their own right will be retained and preserved.
5. Distinctive materials, features, finishes and construction techniques or examples of craftsmanship that characterize a property will be preserved.
6. The existing condition of historic features will be evaluated to determine the appropriate level of intervention needed. Where the severity of deterioration requires repair or limited replacement of a distinctive feature, the new material will match the old in composition, design, color and texture.
7. Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.
8. Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.

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INFORMATION FOR BIDDERS

1. U.S. DEPARTMENT OF THE INTERIOR PRESERVATION BRIEFS

   A. No. 1: Assessing Cleaning and Water-Repellant Treatments for Historic Masonry Buildings

   B. No.2: Repointing Mortar Joints in Historic Masonry Buildings

2. RI AIR POLLUTION CONTROL REGULATION NO. 24: REMOVAL OF LEAD BASED PAINT FROM EXTERIOR SURFACES.

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1 Preservation Briefs

Technical Preservation Services
National Park Service
U.S. Department of the Interior

Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings

Robert C. Mack, FAIA
Anne Grimmer

» Preparing for a Cleaning Project
» Understanding the Building Materials
» Cleaning Methods and Materials
» Planning a Cleaning Project
» Water-Repellent Coatings and Waterproof Coatings
» Summary

Inappropriate cleaning and coating treatments are a major cause of damage to historic masonry buildings. While either or both treatments may be appropriate in some cases, they can be very destructive to historic masonry if they are not selected carefully. Historic masonry, as considered here, includes stone, brick, architectural terra cotta, cast stone, concrete and concrete block. It is frequently cleaned because cleaning is equated with improvement. Cleaning may sometimes be followed by the application of a water-repellent coating. However, unless these procedures are carried out under the guidance and supervision of an architectural conservator, they may result in irrevocable damage to the historic resource.

Ninety years of accumulated dirt and pollutants are being removed from this historic theater using an appropriate chemical cleaner, applied in stages. Photo: Richard Wagner, AIA.

The purpose of this Brief is to provide information on the variety of cleaning methods and materials that are available for use on the *exterior* of historic masonry buildings, and to provide guidance in selecting the most appropriate method or combination of methods. The difference between water-repellent coatings and waterproof coatings is explained, and the purpose of each, the suitability of their application to historic masonry buildings, and the possible consequences of their inappropriate use are discussed.

The Brief is intended to help develop sensitivity to the qualities of historic masonry that makes it so special, and to assist historic building owners and property managers in working cooperatively with architects, architectural conservators, and contractors. Although specifically intended for historic buildings, the information is applicable to all masonry buildings. This publication updates and expands *Preservation Briefs 1: The Cleaning and Waterproof Coating of Masonry Buildings.* The Brief is not meant to be a cleaning manual or a guide for preparing specifications. Rather, it provides general information to raise awareness of the many factors involved in selecting cleaning and water-repellent treatments for historic masonry buildings.

Preparing for a Cleaning Project

Reasons for cleaning. First, it is important to determine whether it is appropriate to clean the masonry. The objective of cleaning a historic masonry building must be considered carefully before arriving at a decision to clean. There are several major reasons for cleaning a historic masonry building: **improve the appearance of the building** by removing unattractive dirt or soiling materials, or non-historic paint from the masonry; **retard deterioration** by removing soiling materials that may be damaging the masonry; or **provide a clean surface** to accurately match repointing mortars or patching compounds, or to conduct a condition survey of the masonry.

Identify what is to be removed. The general nature and source of dirt or soiling material on a building must be identified to remove it in the gentlest means possible--that is, in the most effective, yet least harmful, manner. Soot and smoke, for example, require a different cleaning agent to remove than oil stains or metallic stains. Other common cleaning problems include biological growth such as mold or mildew, and organic matter such as the tendrils left on masonry after removal of ivy.

Consider the historic appearance of the building. If the proposed cleaning is to remove paint, it is important in each case to learn whether or not unpainted masonry is historically appropriate. And, it is necessary to consider why the building was painted. Was it to cover bad repointing or unmatched repairs? Was the building painted to protect soft brick or to conceal deteriorating stone? Or, was painted masonry simply a fashionable treatment in a particular historic period? Many buildings were painted at the time of construction or shortly thereafter; retention of the paint, therefore, may be more appropriate historically than removing it. And, if the building appears to have been painted for a long time, it is also important to think about whether the paint is part of the character of the historic building and if it has acquired significance over time.

Consider the practicalities of cleaning or paint removal. Some gypsum or sulfate crusts may have become integral with the stone and, if cleaning could result in removing some of the stone surface, it may be preferable not to clean. Even where unpainted masonry is appropriate, the retention of the paint may be more practical than removal in terms of long range preservation of the masonry. In some cases, however, removal of the paint may be desirable. For example, the old paint layers may have built up to such an extent that removal is necessary to ensure a sound surface to which the new paint will adhere.

Study the masonry. Although not always necessary, in some instances it can be beneficial to have the coating or paint type, color, and layering on the masonry researched before attempting its removal. Analysis of the nature of the soiling or of the paint to be removed from the masonry, as well as guidance on the appropriate cleaning method, may be provided by professional consultants, including architectural conservators, conservation scientists, and preservation architects. The State Historic Preservation Office (SHPO), local historic district commissions, architectural review boards, and preservation-oriented websites may also be able to supply useful information on masonry cleaning techniques.

Understanding the Building Materials

The decorative trim on this brick builing is architectural terra-cotta intended to simulate the limestone foundation. Photo: NPS files.

The construction of the building must be considered when developing a cleaning program because inappropriate cleaning can have a deleterious effect on the masonry as well as on other building materials. The masonry material or materials must be correctly identified. It is sometimes difficult to distinguish one type of stone from another; for example, certain sandstones can be easily confused with limestones. Or, what appears to be natural stone may not be stone at all, but cast stone or concrete. Historically, cast stone and architectural terra cotta were frequently used in combination with natural stone, especially for trim elements or on upper stories of a building where, from a distance, these substitute materials looked like real stone. Other features on historic buildings that appear to be stone, such as decorative cornices, entablatures and window hoods, may not even be masonry, but metal.

Identify prior treatments. Previous treatments of the building and its surroundings should be researched and building maintenance records should be obtained, if available. Sometimes if streaked or spotty areas do not seem to get cleaner following an initial cleaning, closer inspection and analysis may be warranted. The discoloration may turn out not to be dirt but the remnant of a water-repellent coating applied long ago which has darkened the surface of the masonry over time. Successful removal may require testing several cleaning agents to find something that will dissolve and remove the coating. Complete removal may not always be possible. Repairs may have been stained to match a dirty building, and cleaning may make these differences apparent. De-icing salts used near the building that have dissolved can migrate into the masonry. Cleaning may draw the salts to the surface, where they will appear as efflorescence (a powdery, white substance), which may require a second treatment to be removed. Allowances for dealing with such unknown factors, any of which can be a potential problem, should be included when investigating cleaning methods and materials. Just as more than one kind

of masonry on a historic building may necessitate multiple cleaning approaches, unknown conditions that are encountered may also require additional cleaning treatments.

Any cleaning method should be tested before using it on historic masonry. Photo: NPS files.

Choose the appropriate cleaner. The importance of testing cleaning methods and materials cannot be over emphasized. Applying the wrong cleaning agents to historic masonry can have disastrous results. Acidic cleaners can be extremely damaging to acid-sensitive stones, such as marble and limestone, resulting in etching and dissolution of these stones. Other kinds of masonry can also be damaged by incompatible cleaning agents, or even by cleaning agents that are usually compatible. There are also numerous kinds of sandstone, each with a considerably different geological composition. While an acid-based cleaner may be safely used on some sandstones, others are acid-sensitive and can be severely etched or dissolved by an acid cleaner. Some sandstones contain water-soluble minerals and can be eroded by water cleaning. And, even if the stone type is correctly identified, stones, as well as some bricks, may contain unexpected impurities, such as iron particles, that may react negatively with a particular cleaning agent and result in staining. Thorough understanding of the physical and chemical properties of the masonry will help avoid the inadvertent selection of damaging cleaning agents.

Other building materials also may be affected by the cleaning process. Some chemicals, for example, may have a corrosive effect on paint or glass. The portions of building elements most vulnerable to deterioration may not be visible, such as embedded ends of iron window bars. Other totally unseen items, such as iron cramps or ties which hold the masonry to the structural frame, also may be subject to corrosion from the use of chemicals or even from plain water. The only way to prevent problems in these cases is to study the building construction in detail and evaluate proposed cleaning methods with this information in mind. However, due to the very likely possibility of encountering unknown factors, any cleaning project involving historic masonry should be viewed as unique to that particular building.

Cleaning Methods and Materials

Masonry cleaning methods generally are divided into three major groups: water, chemical, and abrasive. *Water methods* soften the dirt or soiling material and rinse the deposits from the masonry surface. *Chemical cleaners* react with dirt, soiling material or paint to effect their removal, after which the cleaning effluent is rinsed off the masonry surface with water. *Abrasive methods* include blasting with grit, and the use of grinders and sanding discs, all of which mechanically remove the dirt, soiling material or paint (and, usually, some of the masonry surface). Abrasive cleaning is also often followed with a water rinse. *Laser cleaning*, although not discussed here in detail, is another technique that is used sometimes by conservators to clean small areas of historic masonry. It can be quite effective for cleaning limited areas, but it is expensive and generally not practical for most historic masonry cleaning projects.

Although it may seem contrary to common sense, masonry cleaning projects should be carried out starting at the bottom and proceeding to the top of the building always

keeping all surfaces wet below the area being cleaned. The rationale for this approach is based on the principle that dirty water or cleaning effluent dripping from cleaning in progress above will leave streaks on a dirty surface but will not streak a clean surface as long as it is kept wet and rinsed frequently.

Water Cleaning

Water cleaning methods are generally the *gentlest means possible*, and they can be used safely to remove dirt from all types of historic masonry.* There are essentially four kinds of water-based methods: soaking; pressure water washing; water washing supplemented with non-ionic detergent; and steam, or hot-pressurized water cleaning. Once water cleaning has been completed, it is often necessary to follow up with a water rinse to wash off the loosened soiling material from the masonry.

* Water cleaning methods may not be appropriate to use on some badly deteriorated masonry because water may exacerbate the deterioration, or on gypsum or alabaster, which are very soluble in water.

Soaking. Prolonged spraying or misting with water is particularly effective for cleaning limestone and marble. It is also a good method for removing heavy accumulations of soot, sulfate crusts or gypsum crusts that tend to form in protected areas of a building not regularly washed by rain. Water is distributed to lengths of punctured hose or pipe with non-ferrous fittings hung from moveable scaffolding or a swing stage that continuously mists the surface of the masonry with a very fine spray. A timed on-off spray is another approach to using this cleaning technique. After one area has been cleaned, the apparatus is moved on to another. Soaking is often used in combination with water washing and is also followed by a final water rinse. Soaking is a very slow method--it may take several days or a week--but it is a very gentle method to use on historic masonry.

Water Washing. Washing with low-pressure or medium-pressure water is probably one of the most commonly used methods for removing dirt or other pollutant soiling from historic masonry buildings. Starting with a very low pressure (100 psi or below), even using a garden hose, and progressing as needed to slightly higher pressure--generally no higher than 300-400 psi--is always the recommended way to begin. Scrubbing with natural bristle or synthetic bristle brushes--never metal which can abrade the surface and leave metal particles that can stain the masonry--can help in cleaning areas of the masonry that are especially dirty.

Low-to-medium-pressure steam (hot-pressurized water washing) is a gentle method of softening heavy soiling deposits and cleaning historic marble. Photo: NPS files.

Water Washing with Detergents. Non-ionic detergents--which are not the same as soaps--are synthetic organic compounds that are especially effective in removing oily soil. (Examples of some of the numerous proprietary non-ionic detergents include Igepal by GAF, Tergitol by Union Carbide and Triton by Rohm & Haas.) Thus, the addition of a non-ionic detergent, or surfactant, to a low- or medium-pressure water wash can be a useful aid in the cleaning process. (A non-ionic detergent, unlike most household detergents, does not leave a solid, visible residue on the masonry.) Adding a non-ionic detergent and scrubbing with a natural bristle or synthetic bristle brush can facilitate

cleaning textured or intricately carved masonry. This should be followed with a final water rinse.

Steam / Hot-Pressurized Water Cleaning. Steam cleaning is actually low-pressure hot water washing because the steam condenses almost immediately upon leaving the hose. This is a gentle and effective method for cleaning stone and particularly for acid-sensitive stones. Steam can be especially useful in removing built-up soiling deposits and dried-up plant materials, such as ivy disks and tendrils. It can also be an efficient means of cleaning carved stone details and, because it does not generate a lot of liquid water, it can sometimes be appropriate to use for cleaning interior masonry.
Potential hazards of water cleaning. Despite the fact that water-based methods are generally the most gentle, even they can be damaging to historic masonry. Before beginning a water cleaning project, it is important to make sure that all mortar joints are sound and that the building is watertight. Otherwise water can seep through the walls to the interior, resulting in rusting metal anchors and stained and ruined plaster.
Some water supplies may contain traces of iron and copper which may cause masonry to discolor. Adding a chelating or complexing agent to the water, such as EDTA (ethylene diamine tetra-acetic acid), which inactivates other metallic ions, as well as softens minerals and water hardness, will help prevent staining on light-colored masonry.
Any cleaning method involving water should never be done in cold weather or if there is any likelihood of frost or freezing because water within the masonry can freeze, causing spalling and cracking. Since a masonry wall may take over a week to dry after cleaning, no water cleaning should be permitted for several days prior to the first average frost date, or even earlier if local forecasts predict cold weather.
Most important of all, it is imperative to be aware that using water at too high a pressure, a practice common to "power washing" and "water blasting", is very abrasive and can easily etch marble and other soft stones, as well as some types of brick. In addition, the distance of the nozzle from the masonry surface and the type of nozzle, as well as gallons per minute (gpm), are also important variables in a water cleaning process that can have a significant impact on the outcome of the project. This is why it is imperative that the cleaning be closely monitored to ensure that the cleaning operators do not raise the pressure or bring the nozzle too close to the masonry in an effort to "speed up" the process. The appearance of grains of stone or sand in the cleaning effluent on the ground is an indication that the water pressure may be too high.

Chemical Cleaning

Chemical cleaners, generally in the form of proprietary products, are another material frequently used to clean historic masonry. They can remove dirt, as well as paint and other coatings, metallic and plant stains, and graffiti. Chemical cleaners used to remove dirt and soiling include **acids, alkalies** and **organic compounds.** Acidic cleaners, of course, should not be used on masonry that is acid sensitive. Paint removers are **alkaline**, based on **organic solvents** or other chemicals.

Chemical Cleaners to Remove Dirt

Both alkaline and acidic cleaning treatments include the use of water. Both cleaners are also likely to contain surfactants (wetting agents), that facilitate the chemical reaction that removes the dirt. Generally, the masonry is wet first for both types of cleaners, then the chemical cleaner is sprayed on at very low pressure or brushed onto the

surface. The cleaner is left to dwell on the masonry for an amount of time recommended by the product manufacturer or, preferably, determined by testing, and rinsed off with a low- or moderate-pressure cold, or sometimes hot, water wash.
More than one application of the cleaner may be necessary, and it is always a good practice to test the product manufacturer's recommendations concerning dilution rates and dwell times. Because each cleaning situation is unique, dilution rates and dwell times can vary considerably. The masonry surface may be scrubbed lightly with natural or synthetic bristle brushes prior to rinsing. After rinsing, pH strips should be applied to the surface to ensure that the masonry has been neutralized completely.
Acidic Cleaners. Acid-based cleaning products may be used on **non-acid sensitive masonry**, which generally includes: granite, most sandstones, slate, unglazed brick and unglazed architectural terra cotta, cast stone and concrete. Most commercial acidic cleaners are composed primarily of hydrofluoric acid, and often include some phosphoric acid to prevent rust-like stains from developing on the masonry after the cleaning. Acid cleaners are applied to the pre-wet masonry which should be kept wet while the acid is allowed to "work", and then removed with a water wash.
Alkaline Cleaners. Alkaline cleaners should be used on **acid-sensitive** masonry, including: limestone, polished and unpolished marble, calcareous sandstone, glazed brick and glazed architectural terra cotta, and polished granite. (Alkaline cleaners may also be used sometimes on masonry materials that are not acid sensitive--after testing, of course--but they may not be as effective as they are on acid-sensitive masonry.) Alkaline cleaning products consist primarily of two ingredients: a non-ionic detergent or surfactant; and an alkali, such as potassium hydroxide or ammonium hydroxide. Like acidic cleaners, alkaline products are usually applied to pre-wet masonry, allowed to dwell, and then rinsed off with water. (Longer dwell times may be necessary with alkaline cleaners than with acidic cleaners.) Two additional steps are required to remove alkaline cleaners after the initial rinse. First the masonry is given a slightly acidic wash--often with acetic acid--to neutralize it, and then it is rinsed again with water.

Chemical Cleaners to Remove Paint and Other Coatings, Stains and Graffiti

Removing paint and some other coatings, stains and graffiti can best be accomplished with alkaline paint removers, organic solvent paint removers, or other cleaning compounds. The removal of layers of paint from a masonry surface usually involves applying the remover either by brush, roller or spraying, followed by a thorough water wash. As with any chemical cleaning, the manufacturer's recommendations regarding application procedures should always be tested before beginning work.
Alkaline Paint Removers. These are usually of much the same composition as other alkaline cleaners, containing potassium or ammonium hydroxide, or trisodium phosphate. They are used to remove oil, latex and acrylic paints, and are effective for removing multiple layers of paint. Alkaline cleaners may also remove some acrylic water-repellent coatings. As with other alkaline cleaners, both an acidic neutralizing wash and a final water rinse are generally required following the use of alkaline paint removers.
Organic Solvent Paint Removers. The formulation of organic solvent paint removers varies and may include a combination of solvents, including methylene chloride, methanol, acetone, xylene and toluene.
Other Paint Removers and Cleaners. Other cleaning compounds that can be used to remove paint and some painted graffiti from historic masonry include paint removers based on N-methyl-2-pyrrolidone (NMP), or on petroleum-based compounds. Removing

stains, whether they are industrial (smoke, soot, grease or tar), metallic (iron or copper), or biological (plant and fungal) in origin, depends on carefully matching the type of remover to the type of stain. Successful removal of stains from historic masonry often requires the application of a number of different removers before the right one is found. The removal of layers of paint from a masonry surface is usually accomplished by applying the remover either by brush, roller or spraying, followed by a thorough water wash.

Potential hazards of chemical cleaning. Since most chemical cleaning methods involve water, they have many of the potential problems of plain water cleaning. Like water methods, they should not be used in cold weather because of the possibility of freezing. Chemical cleaning should never be undertaken in temperatures below 40 degrees F (4 degrees C), and generally not below 50 degrees F. In addition, many chemical cleaners simply do not work in cold temperatures. Both acidic and alkaline cleaners can be dangerous to cleaning operators, and clearly, there are environmental concerns associated with the use of chemical cleaners.

If not carefully chosen, chemical cleaners can react adversely with many types of masonry. Obviously, acidic cleaners should not be used on acid-sensitive materials; however, it is not always clear exactly what the composition is of any stone or other masonry material. For, this reason, testing the cleaner on an inconspicuous spot on the building is always necessary. While certain acid-based cleaners may be appropriate if used as directed on a particular type of masonry, if left too long or if not adequately rinsed from the masonry they can have a negative effect. For example, hydrofluoric acid can etch masonry leaving a hazy residue (whitish deposits of silica or calcium fluoride salts) on the surface. While this efflorescence may usually be removed by a second cleaning--although it is likely to be expensive and time-consuming--**hydrofluoric acid** can also leave calcium fluoride salts or a colloidal silica deposit on masonry which may be impossible to remove. Other acids, particularly **hydrochloric (muriatic) acid**, which is very powerful, should not be used on historic masonry, because it can dissolve lime-based mortar, damage brick and some stones, and leave chloride deposits on the masonry.

Alkaline cleaners can stain sandstones that contain a ferrous compound. Before using an alkaline cleaner on sandstone it is always important to test it, since it may be difficult to know whether a particular sandstone may contain a ferrous compound. Some alkaline cleaners, such as **sodium hydroxide (caustic soda or lye)** and **ammonium bifluoride**, can also damage or leave disfiguring brownish-yellow stains and, in most cases, should not be used on historic masonry. Although alkaline cleaners will not etch a masonry surface as acids can, they are caustic and can burn the surface. In addition, alkaline cleaners can deposit potentially damaging salts in the masonry which can be difficult to rinse thoroughly.

Poulticing to Remove Stains and Graffiti

Graffiti and stains, which have penetrated into the masonry, often are best removed by using a poultice. A poultice consists of an absorbent material or clay powder (such as kaolin or fuller's earth, or even shredded paper or paper towels), mixed with a liquid (a solvent or other remover) to form a paste which is applied to the stain. The poultice is kept moist and left on the stain as long as necessary for it to draw the stain out of the masonry. As it dries, the paste absorbs the staining material so that it is not redeposited on the masonry surface.

The iron stain on this granite post may be removed by applying a commercial rust-removal product in a poultice. Photo: NPS files

Some commercial cleaning products and paint removers are specially formulated as a paste or gel that will cling to a vertical surface and remain moist for a longer period of time in order to prolong the action of the chemical on the stain. Pre-mixed poultices are also available as a paste or in powder form needing only the addition of the appropriate liquid. The masonry must be pre-wet before applying an alkaline cleaning agent, but not when using a solvent. Once the stain has been removed, the masonry must be rinsed thoroughly.

Abrasive and Mechanical Cleaning

Generally, abrasive cleaning methods are not appropriate for use on historic masonry buildings. Abrasive cleaning methods are just that--abrasive. Grit blasters, grinders, and sanding discs all operate by abrading the dirt or paint off the surface of the masonry, rather than reacting with the dirt and the masonry which is how water and chemical methods work. Since the abrasives do not differentiate between the dirt and the masonry, they can also remove the outer surface of the masonry at the same time, and result in permanently damaging the masonry. Brick, architectural terra cotta, soft stone, detailed carvings, and polished surfaces, are especially susceptible to physical and aesthetic damage by abrasive methods. Brick and architectural terra cotta are fired products which have a smooth, glazed surface which can be removed by abrasive blasting or grinding. Abrasively-cleaned masonry is damaged aesthetically as well as physically, and it has a rough surface which tends to hold dirt and the roughness will make future cleaning more difficult. Abrasive cleaning processes can also increase the likelihood of subsurface cracking of the masonry. Abrasion of carved details causes a rounding of sharp corners and other loss of delicate features, while abrasion of polished surfaces removes the polished finish of stone.

Mortar joints, especially those with lime mortar, also can be eroded by abrasive or mechanical cleaning. In some cases, the damage may be visual, such as loss of joint detail or increased joint shadows. As mortar joints constitute a significant portion of the masonry surface (up to 20 per cent in a brick wall), this can result in the loss of a considerable amount of the historic fabric. Erosion of the mortar joints may also permit increased water penetration, which will likely necessitate repointing.

Abrasive Blasting. Blasting with abrasive grit or another abrasive material is the most frequently used abrasive method. Sandblasting is most commonly associated with abrasive cleaning. Finely ground silica or glass powder, glass beads, ground garnet, powdered walnut and other ground nut shells, grain hulls, aluminum oxide, plastic particles and even tiny pieces of sponge, are just a few of the other materials that have also been used for abrasive cleaning. Although abrasive blasting is not an appropriate method of cleaning historic masonry, it can be safely used to clean some materials. Finely-powdered walnut shells are commonly used for cleaning monumental bronze sculpture, and skilled conservators clean delicate museum objects and finely detailed, carved stone features with very small, micro-abrasive units using aluminum oxide.

Sandblasting has permanently damaged this brick wall. Photo: NPS files

A number of current approaches to abrasive blasting rely on materials that are not usually thought of as abrasive, and not as commonly associated with traditional abrasive grit cleaning. Some patented abrasive cleaning processes--one dry, one wet--use finely-ground glass powder intended to "erase" or remove dirt and surface soiling only, but not paint or stains. Cleaning with baking soda (sodium bicarbonate) is another patented process. Baking soda blasting is being used in some communities as a means of quick graffiti removal. However, it should not be used on historic masonry which it can easily abrade and can permanently "etch" the graffiti into the stone; it can also leave potentially damaging salts in the stone which cannot be removed. Most of these abrasive grits may be used either dry or wet, although dry grit tends to be used more frequently. Ice particles, or pelletized dry ice (carbon dioxide or CO2), are another medium used as an abrasive cleaner. This is also too abrasive to be used on most historic masonry, but it may have practical application for removing mastics or asphaltic coatings from some substrates.

Some of these processes are promoted as being more environmentally safe and not damaging to historic masonry buildings. However, it must be remembered that they are abrasive and that they "clean" by removing a small portion of the masonry surface, even though it may be only a minuscule portion. The fact that they are essentially abrasive treatments must always be taken into consideration when planning a masonry cleaning project. In general, abrasive methods should not be used to clean historic masonry buildings. In some, very limited instances, highly-controlled, gentle abrasive cleaning may be appropriate on selected, hard-to-clean areas of a historic masonry building if carried out under the watchful supervision of a professional conservator. But, abrasive cleaning should never be used on an entire building.

Grinders and Sanding Disks. Grinding the masonry surface with mechanical grinders and sanding disks is another means of abrasive cleaning that should not be used on historic masonry. Like abrasive blasting, grinders and disks do not really clean masonry but instead grind away and abrasively remove and, thus, damage the masonry surface itself rather than remove just the soiling material.

Planning a Cleaning Project

Once the masonry and soiling material or paint have been identified, and the condition of the masonry has been evaluated, planning for the cleaning project can begin.

Testing cleaning methods. In order to determine the *gentlest means possible*, several cleaning methods or materials may have to be tested prior to selecting the best one to use on the building. Testing should always begin with the gentlest and least invasive method proceeding gradually, if necessary, to more complicated methods, or a combination of methods. All too often simple methods, such as a low-pressure water wash, are not even considered, yet they frequently are effective, safe, and not expensive. Water of slightly higher pressure or with a non-ionic detergent additive also may be effective. It is worth repeating that these methods should always be tested prior to considering harsher methods; they are safer for the building and the environment, often safer for the applicator, and relatively inexpensive.

The level of cleanliness desired also should be determined prior to selection of a cleaning method. Obviously, the intent of cleaning is to remove most of the dirt, soiling material, stains, paint or other coating. A "brand new" appearance, however, may be inappropriate for an older building, and may require an overly harsh cleaning method to be achieved. When undertaking a cleaning project, it is important to be aware that some stains simply may not be removable. It may be wise, therefore, to agree upon a slightly lower level of cleanliness that will serve as the standard for the cleaning project. The precise amount of residual dirt considered acceptable may depend on the type of masonry, the type of soiling and difficulty of total removal, and local environmental conditions.

Cleaning tests should be carried out in an area of sufficient size to give a true indication of their effectiveness. It is preferable to conduct the test in an inconspicuous location on the building so that it will not be obvious if the test is not successful. A test area may be quite small to begin, sometimes as small as six square inches, and gradually may be increased in size as the most appropriate methods and cleaning agents are determined. Eventually the test area may be expanded to a square yard or more, and it should include several masonry units and mortar joints. It should be remembered that a single building may have several types of masonry and that even similar materials may have different surface finishes. Each material and different finish should be tested separately. Cleaning tests should be evaluated only after the masonry has dried completely. *The results of the tests may indicate that several methods of cleaning should be used on a single building.*

When feasible, test areas should be allowed to weather for an extended period of time prior to final evaluation. A waiting period of a full year would be ideal in order to expose the test patch to a full range of seasons. If this is not possible, the test patch should weather for at least a month or two. For any building which is considered historically important, the delay is insignificant compared to the potential damage and disfigurement which may result from using an incompletely tested method. *The successfully cleaned test patch should be protected as it will serve as a standard against which the entire cleaning project will be measured.*

Environmental considerations. The potential effect of any method proposed for cleaning historic masonry should be evaluated carefully. Chemical cleaners and paint removers may damage trees, shrubs, grass, and plants. A plan must be provided for environmentally safe removal and disposal of the cleaning materials and the rinsing effluent before beginning the cleaning project. Authorities from the local regulatory agency--usually under the jurisdiction of the federal or state Environmental Protection Agency (EPA)--should be consulted prior to beginning a cleaning project, especially if it involves anything more than plain water washing. This advance planning will ensure that the cleaning effluent or run-off, which is the combination of the cleaning agent and the substance removed from the masonry, is handled and disposed of in an environmentally sound and legal manner. Some alkaline and acidic cleaners can be neutralized so that

they can be safely discharged into storm sewers. However, most solvent-based cleaners cannot be neutralized and are categorized as pollutants, and must be disposed of by a licensed transport, storage and disposal facility. Thus, it is always advisable to consult with the appropriate agencies before starting to clean to ensure that the project progresses smoothly and is not interrupted by a stop-work order because a required permit was not obtained in advance.

Vinyl guttering or polyethylene-lined troughs placed around the perimeter of the base of the building can serve to catch chemical cleaning waste as it is rinsed off the building. This will reduce the amount of chemicals entering and polluting the soil, and also will keep the cleaning waste contained until it can be removed safely. Some patented cleaning systems have developed special equipment to facilitate the containment and later disposal of cleaning waste.

Concern over the release of volatile organic compounds (VOCs) into the air has resulted in the manufacture of new, more environmentally responsible cleaners and paint removers, while some materials traditionally used in cleaning may no longer be available for these same reasons. Other health and safety concerns have created additional cleaning challenges, such as lead paint removal, which is likely to require special removal and disposal techniques.

Cleaning can also cause damage to non-masonry materials on a building, including glass, metal and wood. Thus, it is usually necessary to cover windows and doors, and other features that may be vulnerable to chemical cleaners. They should be covered with plastic or polyethylene, or a masking agent that is applied as a liquid which dries to form a thin protective film on glass, and is easily peeled off after the cleaning is finished. Wind drift, for example, can also damage other property by carrying cleaning chemicals onto nearby automobiles, resulting in etching of the glass or spotting of the paint finish. Similarly, airborne dust can enter surrounding buildings, and excess water can collect in nearby yards and basements.

The lower floors of this historic brick and architectural terra-cotta building have been covered during chemical cleaning to protect pedestrians and vehicular traffic from potentially harmful overspray. Photo: NPS files.

Safety considerations. Possible health dangers of each method selected for the cleaning project must be considered before selecting a cleaning method to avoid harm to the cleaning applicators, and the necessary precautions must be taken. The precautions listed in Material Safety Data Sheets (MSDS) that are provided with chemical products should always be followed. Protective clothing, respirators, hearing and face shields, and gloves must be provided to workers to be worn at all times. Acidic and alkaline chemical cleaners in both liquid and vapor forms can also cause serious injury to passers-by. It may be necessary to schedule cleaning at night or weekends if the building is located in a busy urban area to reduce the potential danger of chemical overspray to pedestrians. Cleaning during non-business hours will allow HVAC systems to be turned off and vents to be covered to prevent dangerous chemical fumes from entering the building which will also ensure the safety of the building's occupants. Abrasive and mechanical methods produce dust which can pose a serious health hazard, particularly if the abrasive or the masonry contains silica.

Water-Repellent Coatings and Waterproof Coatings

To begin with, it is important to understand that waterproof coatings and water-repellent coatings are not the same. Although these terms are frequently interchanged and commonly confused with one another, they are completely different materials. **Water-repellent coatings**--often referred to incorrectly as "sealers", but which do not or should not "seal"--are intended to keep liquid water from penetrating the surface but to allow water vapor to enter and leave, or pass through, the surface of the masonry. Water-repellent coatings are generally transparent, or clear, although once applied some may darken or discolor certain types of masonry while others may give it a glossy or shiny appearance. **Waterproof coatings** seal the surface from liquid water and from water vapor. They are usually opaque, or pigmented, and include bituminous coatings and some elastomeric paints and coatings.

Water-Repellent Coatings

Water-repellent coatings are formulated to be vapor permeable, or "breathable". They do not seal the surface completely to water vapor so it can enter the masonry wall as well as leave the wall. While the first water-repellent coatings to be developed were primarily acrylic or silicone resins in organic solvents, now most water-repellent coatings are water-based and formulated from modified siloxanes, silanes and other alkoxysilanes, or metallic stearates. While some of these products are shipped from the factory ready to use, other water-borne water repellents must be diluted at the job site. Unlike earlier water-repellent coatings which tended to form a "film" on the masonry surface, modern water-repellent coatings actually penetrate into the masonry substrate slightly and, generally, are almost invisible if properly applied to the masonry. They are also more vapor permeable than the old coatings, yet they still reduce the vapor permeability of the masonry. Once inside the wall, water vapor can condense at cold spots producing liquid water which, unlike water vapor, cannot escape through a water-repellent coating. The liquid water within the wall, whether from condensation, leaking gutters, or other sources, can cause considerable damage.

This clear coating has failed and is pulling off pieces of the stone as it peels. Photo: NPS files

Water-repellent coatings are not consolidants. Although modern water-repellents may penetrate slightly beneath the masonry surface, instead of just "sitting" on top of it, they do not perform the same function as a consolidant which is to "consolidate" and replace lost binder to strengthen deteriorating masonry. Even after many years of laboratory study and testing, few consolidants have proven very effective. The composition of fired products such as brick and architectural terra cotta, as well as many types of building stone, does not lend itself to consolidation.

Some modern water-repellent coatings which contain a binder intended to replace the natural binders in stone that have been lost through weathering and natural erosion are described in product literature as both a water repellent and a consolidant The fact that the newer water-repellent coatings penetrate beneath the masonry surface instead of just forming a layer on top of the surface may indeed convey at least some consolidating properties to certain stones. However, a water-repellent coating cannot be considered a

consolidant. In some instances, a water-repellent or "preservative" coating, if applied to already damaged or spalling stone, may form a surface crust which, if it fails, may exacerbate the deterioration by pulling off even more of the stone.

Is a Water-Repellent Treatment Necessary?

Water-repellent coatings are frequently applied to historic masonry buildings for the wrong reason. They also are often applied without an understanding of what they are and what they are intended to do. And these coatings can be very difficult, if not impossible, to remove from the masonry if they fail or become discolored. Most importantly, the application of water-repellent coatings to historic masonry is usually unnecessary.

Most historic masonry buildings, unless they are painted, have survived for decades without a water-repellent coating and, thus, probably do not need one now. Water penetration to the interior of a masonry building is seldom due to porous masonry, but results from poor or deferred maintenance. Leaking roofs, clogged or deteriorated gutters and downspouts, missing mortar, or cracks and open joints around door and window openings are almost always the cause of moisture-related problems in a historic masonry building. **If historic masonry buildings are kept watertight and in good repair, water-repellent coatings should not be necessary.**

Rising damp (capillary moisture pulled up from the ground), or condensation can also be a source of excess moisture in masonry buildings. A water-repellent coating will not solve this problem either and, in fact, may be likely to exacerbate it. Furthermore, a water-repellent coating should never be applied to a damp wall. Moisture in the wall would reduce the ability of a coating to adhere to the masonry and to penetrate below the surface. But, if it did adhere, it would hold the moisture inside the masonry because, although a water-repellent coating is permeable to water vapor, liquid water cannot pass through it. In the case of rising damp, a coating may force the moisture to go even higher in the wall because it can slow down evaporation, and thereby retain the moisture in the wall.

Excessive moisture in masonry walls may carry waterborne soluble salts from the masonry units themselves or from the mortar through the walls. If the water is permitted to come to the surface, the salts may appear on the masonry surface as efflorescence (a whitish powder) upon evaporation. However, the salts can be potentially dangerous if they remain in the masonry and crystallize beneath the surface as subflorescence. Subflorescence eventually may cause the surface of the masonry to spall, particularly if a water-repellent coating has been applied which tends to reduce the flow of moisture out from the subsurface of the masonry. Although many of the newer water-repellent products are more breathable than their predecessors, they can be especially damaging if applied to masonry that contains salts, because they limit the flow of moisture through masonry.

When a Water-Repellent Coating May be Appropriate

There are some instances when a water-repellent coating may be considered appropriate to use on a historic masonry building. Soft, incompletely fired brick from the 18th-and early-19th centuries may have become so porous that paint or some type of coating is needed to protect it from further deterioration or dissolution. When a masonry building has been neglected for a long period of time, necessary repairs may be required in order to make it watertight. If, following a reasonable period of time after the building has

been made watertight and has dried out completely, moisture appears actually to be penetrating through the repointed and repaired masonry walls, then the application of a water-repellent coating may be considered *in selected areas only.* This decision should be made in consultation with an architectural conservator. And, if such a treatment is undertaken, it should not be applied to the entire exterior of the building.

Anti-graffiti or barrier coatings are another type of clear coating--although barrier coatings can also be pigmented--that may be applied to exterior masonry, but they are not formulated primarily as water repellents. The purpose of these coatings is to make it harder for graffiti to stick to a masonry surface and, thus, easier to clean. But, like water-repellent coatings, in most cases the application of anti-graffiti coatings is generally not recommended for historic masonry buildings. These coatings are often quite shiny which can greatly alter the appearance of a historic masonry surface, and they are not always effective. Generally, other ways of discouraging graffiti, such as improved lighting, can be more effective than a coating. However, the application of anti-graffiti coatings may be appropriate in some instances on vulnerable areas of historic masonry buildings which are frequent targets of graffiti that are located in out-of-the-way places where constant surveillance is not possible.

Improper cleaning methods may have been responsible for the formation of efflorescence on this brick. Photo: NPS files.

Some water-repellent coatings are recommended by product manufacturers as a means of keeping dirt and pollutants or biological growth from collecting on the surface of masonry buildings and, thus, reducing the need for frequent cleaning. While this at times may be true, in some cases a coating may actually retain dirt more than uncoated masonry. Generally, the application of a water-repellent coating is not recommended on a historic masonry building as a means of preventing biological growth. Some water-repellent coatings may actually encourage biological growth on a masonry wall. Biological growth on masonry buildings has traditionally been kept at bay through regularly-scheduled cleaning as part of a maintenance plan. Simple cleaning of the masonry with low-pressure water using a natural- or synthetic-bristled scrub brush can be very effective if done on a regular basis. Commercial products are also available which can be sprayed on masonry to remove biological growth.

In most instances, a water-repellent coating is not necessary if a building is watertight. The application of a water-repellent coating is not a recommended treatment for historic masonry buildings unless there is a specific problem which it may help solve. If the problem occurs on only part of the building, it is best to treat only that area rather than an entire building. Extreme exposures such as parapets, for example, or portions of the building subject to driving rain can be treated more effectively and less expensively than the entire building. Water-repellent coatings are not permanent and must be reapplied periodically although, if they are truly invisible, it can be difficult to know when they are no longer providing the intended protection.

Testing a water-repellent coating by applying it in one small area may not be helpful in determining its suitability for the building because a limited test area does not allow an adequate evaluation of a treatment. Since water may enter and leave through the surrounding untreated areas, there is no way to tell if the coated test area is "breathable." But trying a coating in a small area may help to determine whether the coating is visible on the surface or if it will otherwise change the appearance of the masonry.

Waterproof Coatings

In theory, waterproof coatings usually do not cause problems as long as they exclude all water from the masonry. If water does enter the wall from the ground or from the inside of a building, the coating can intensify the damage because the water will not be able to escape. During cold weather this water in the wall can freeze causing serious mechanical disruption, such as spalling.
In addition, the water eventually will get out by the path of least resistance. If this path is toward the interior, damage to interior finishes can result; if it is toward the exterior, it can lead to damage to the masonry caused by built-up water pressure.
In most instances, waterproof coatings should not be applied to historic masonry. The possible exception to this might be the application of a waterproof coating to below-grade exterior foundation walls as a last resort to stop water infiltration on interior basement walls. **Generally, however, waterproof coatings, which include *elastomeric paints*, should almost never be applied above grade to historic masonry buildings.**

Summary

A well-planned cleaning project is an essential step in preserving, rehabilitating or restoring a historic masonry building. Proper cleaning methods and coating treatments, when determined necessary for the preservation of the masonry, can enhance the aesthetic character as well as the structural stability of a historic building. Removing years of accumulated dirt, pollutant crusts, stains, graffiti or paint, if done with appropriate caution, can extend the life and longevity of the historic resource. Cleaning that is carelessly or insensitively prescribed or carried out by inexperienced workers can have the opposite of the intended effect. It may scar the masonry permanently, and may actually result in hastening deterioration by introducing harmful residual chemicals and salts into the masonry or causing surface loss. Using the wrong cleaning method or using the right method incorrectly, applying the wrong kind of coating or applying a coating that is not needed can result in serious damage, both physically and aesthetically, to a historic masonry building. Cleaning a historic masonry building should always be done using the gentlest means possible that will clean, but not damage the building. It should always be taken into consideration before applying a water-repellent coating or a waterproof coating to a historic masonry building whether it is really necessary and whether it is in the best interest of preserving the building.

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Acknowledgements

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The original version of *Preservation Brief 1: The Cleaning and Waterproof Coating of Masonry Buildings was written* by Robert C. Mack, AIA. It inaugurated the Preservation Briefs series when it was published in 1975.
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Home page logo: Approriate cleaning of historic masonry. Photo: NPS files.

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2 Preservation Briefs

Technical Preservation Services
National Park Service
U.S. Department of the Interior

Repointing Mortar Joints in Historic Masonry Buildings

Robert C. Mack, FAIA, and John P. Speweik

» Historical Background
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» Properties of Mortar
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A NOTE TO OUR USERS: The web versions of the **Preservation Briefs** differ somewhat from the printed versions. Many illustrations are new, captions are simplified, illustrations are typically in color rather than black and white, and some complex charts have been omitted.

Masonry--brick, stone, terra-cotta, and concrete block--is found on nearly every historic building. Structures with all-masonry exteriors come to mind immediately, but most other buildings at least have masonry foundations or chimneys. Although generally considered "permanent," masonry is subject to deterioration, especially at the mortar joints. Repointing, also known simply as "pointing"or--somewhat inaccurately--"tuck pointing"*, is the process of removing deteriorated mortar from the joints of a masonry wall and replacing it with new mortar. Properly done, repointing restores the visual and physical integrity of the masonry. Improperly done, repointing not only detracts from the appearance of the building, but may also cause physical damage to the masonry units themselves.

The purpose of this Brief is to provide general guidance on appropriate materials and methods for repointing historic masonry buildings and it is intended to benefit building owners, architects, and contractors. The Brief should serve as a guide to prepare specifications for repointing historic masonry buildings. It should also help develop

sensitivity to the particular needs of historic masonry, and to assist historic building owners in working cooperatively with architects, architectural conservators and historic preservation consultants, and contractors. Although specifically intended for historic buildings, the guidance is appropriate for other masonry buildings as well. This publication updates *Preservation Briefs 2: Repointing Mortar Joints in Historic Brick Buildings* to include all types of historic unit masonry. The scope of the earlier Brief has also been expanded to acknowledge that the many buildings constructed in the first half of the 20th century are now historic and eligible for listing in the National Register of Historic Places, and that they may have been originally constructed with portland cement mortar.

**Tuckpointing technically describes a primarily decorative application of a raised mortar joint or lime putty joint on top of flush mortar joints.*

Historical Background

Mortar consisting primarily of lime and sand has been used as an integral part of masonry structures for thousands of years. Up until about the mid-19th century, lime or quicklime (sometimes called lump lime) was delivered to construction sites, where it had to be slaked, or combined with water. Mixing with water caused it to boil and resulted in a wet lime putty that was left to mature in a pit or wooden box for several weeks, up to a year. Traditional mortar was made from lime putty, or slaked lime, combined with local sand, generally in a ratio of 1 part lime putty to 3 parts sand by volume. Often other ingredients, such as crushed marine shells (another source of lime), brick dust, clay, natural cements, pigments, and even animal hair were also added to mortar, but the basic formulation for lime putty and sand mortar remained unchanged for centuries until the advent of portland cement or its forerunner, Roman cement, a natural, hydraulic cement.

Portland cement was patented in Great Britain in 1824. It was named after the stone from Portland in Dorset which it resembled when hard. This is a fast-curing, hydraulic cement which hardens under water. Portland cement was first manufactured in the United States in 1872, although it was imported before this date. But it was not in common use throughout the country until the early 20th century. Up until the turn of the century portland cement was considered primarily an additive, or "minor ingredient" to help accelerate mortar set time. By the 1930s, however, most masons used a mix of equal parts portland cement and lime putty. Thus, the mortar found in masonry structures built between 1873 and 1930 can range from pure lime and sand mixes to a wide variety of lime, portland cement, and sand combinations.

In the 1930s more new mortar products intended to hasten and simplify masons' work were introduced in the U.S. These included **masonry cement**, a premixed, bagged mortar which is a combination of portland cement and ground limestone, and **hydrated lime**, machine-slaked lime that eliminated the necessity of slaking quicklime into putty at the site.

Identifying the Problem Before Repointing

The decision to repoint is most often related to some obvious sign of deterioration, such as disintegrating mortar, cracks in mortar joints, loose bricks or stones, damp walls, or damaged plasterwork. It is, however, erroneous to assume that repointing alone will solve deficiencies that result from other problems. The root cause of the deterioration--leaking roofs or gutters, differential settlement of the building, capillary action causing rising damp, or extreme weather exposure--should always be dealt with prior to beginning work.

Without appropriate repairs to eliminate the source of the problem, mortar deterioration will continue and any repointing will have been a waste of time and money.

Masons practice using lime putty mortar to repair historic marble. Photo: NPS files.

Use of Consultants. Because there are so many possible causes for deterioration in historic buildings, it may be desirable to retain a consultant, such as a historic architect or architectural conservator, to analyze the building. In addition to determining the most appropriate solutions to the problems, a consultant can prepare specifications which reflect the particular requirements of each job and can provide oversight of the work in progress. Referrals to preservation consultants frequently can be obtained from State Historic Preservation Offices, the American Institute for Conservation of Historic and Artistic Works (AIC), the Association for Preservation Technology (APT), and local chapters of the American Institute of Architects (AIA).

Finding an Appropriate Mortar Match

Preliminary research is necessary to ensure that the proposed repointing work is both physically and visually appropriate to the building. Analysis of unweathered portions of the historic mortar to which the new mortar will be matched can suggest appropriate mixes for the repointing mortar so that it will not damage the building because it is excessively strong or vapor impermeable.

This late 19th century granite has recently been repointed with the joint profile and mortar color carefully matched to the original. Photo: NPS files.

Examination and analysis of the masonry units--brick, stone or terra cotta--and the techniques used in the original construction will assist in maintaining the building's historic appearance. A simple, non-technical, evaluation of the masonry units and mortar can provide information concerning the relative strength and permeability of each--critical factors in selecting the repointing mortar--while a visual analysis of the historic mortar can provide the information necessary for developing the new mortar mix and application techniques.

Although not crucial to a successful repointing project, for projects involving properties of special historic significance, a mortar analysis by a qualified laboratory can be useful by providing information on the original ingredients. However, there are limitations with such an analysis, and replacement mortar specifications should not be based solely on laboratory analysis. Analysis requires interpretation, and there are important factors which affect the condition and performance of the mortar that cannot be established through laboratory analysis. These may include: the original water content, rate of curing, weather conditions during original construction, the method of mixing and placing the mortar, and the cleanliness and condition of the sand. *The most useful information that can come out of laboratory analysis is the identification of sand by gradation and color.* This allows the color and the texture of the mortar to be matched with some accuracy because sand is the largest ingredient by volume.

In creating a repointing mortar that is compatible with the masonry units, the objective is to achieve one that matches the historic mortar as closely as possible, so that the new material can coexist with the old in a sympathetic, supportive and, if necessary, sacrificial capacity. The exact physical and chemical properties of the historic mortar are not of major significance as long as the new mortar conforms to the following criteria:

- The new mortar must match the historic mortar in **color, texture and tooling.** (If a laboratory analysis is undertaken, it may be possible to match the binder components and their proportions with the historic mortar, if those materials are available.)
- The **sand must match the sand** in the historic mortar. (The color and texture of the new mortar will usually fall into place if the sand is matched successfully.)
- The new mortar must have **greater vapor permeability** and be **softer** (measured in compressive strength) than the masonry units.
- The new mortar must be **as vapor permeable** and **as soft or softer** (measured in compressive strength) than the historic mortar. (Softness or hardness is not necessarily an indication of permeability; old, hard lime mortars can still retain high permeability.)

This mortar is the proper consistency for repointing historic brick. Photo: John P. Speweik.

Mortar Analysis

Methods for analyzing mortars can be divided into two broad categories: **wet chemical** and **instrumental.** Many laboratories that analyze historic mortars use a simple **wet-chemical** method called acid digestion, whereby a sample of the mortar is crushed and then mixed with a dilute acid. The acid dissolves all the carbonate-containing minerals not only in the binder, but also in the aggregate (such as oyster shells, coral sands, or other carbonate-based materials), as well as any other acid-soluble materials. The sand and fine-grained acid-insoluble material is left behind. There are several variations on the simple acid digestion test. One involves collecting the carbon dioxide gas given off as the carbonate is digested by the acid; based on the gas volume the carbnate content of the mortar can be accurately determined (Jedrzejewska, 1960). Simple acid digestion methods are rapid, inexpensive, and easy to perform, but the information they provide about the original composition of a mortar is limited to the color and texture of the sand. The gas collection method provides more information about the binder than a simple acid digestion test.

Instrumental analysis methods that have been used to evaluate mortars include polarized light or thin-section microscopy, scanning electron microscopy, atomic absorption spectroscopy, X-ray diffraction, and differential thermal analysis. All instrumental methods require not only expensive, specialized equipment, but also highly-trained experienced analysts. However, instrumental methods can provide much more information about a mortar. Thin-section microscopy is probably the most commonly used instrumental method. Examination of thin slices of a mortar in transmitted light is often used to supplement acid digestion methods, particularly to look for carbonate-based aggregate. For example, the new ASTM test method, ASTM C 1324-96 "Test Method for Examination and Analysis of Hardened Mortars" which was designed specifically for the analysis of modern lime-cement and masonry cement mortars, combines a complex series of wet chemical analyses with thin-section microscopy.

The drawback of most mortar analysis methods is that mortar samples of known composition have not been analyzed in order to evaluate the method. Historic mortars were not prepared to narrowly defined specifications from materials of uniform quality; they contain a wide array of locally derived materials combined at the discretion of the mason. While a particular method might be able to accurately determine the original proportions of a lime-cement-sand mortar prepared from modern materials, the usefulness of that method for evaluating historic mortars is questionable unless it has been tested against mortars prepared from materials more commonly used in the past. **Lorraine Schnabel.**

Properties of Mortar

Mortars for repointing should be softer or more permeable than the masonry units and

no harder or more impermeable than the historic mortar to prevent damage to the masonry units. It is a common error to assume that hardness or high strength is a measure of appropriateness, particularly for lime-based historic mortars. Stresses within a wall caused by expansion, contraction, moisture migration, or settlement must be accommodated in some manner; in a masonry wall, these stresses should be relieved by the mortar rather than by the masonry units. A mortar that is stronger in compressive strength than the masonry units will not "give," thus causing stresses to be relieved through the masonry units--resulting in permanent damage to the masonry, such as cracking and spalling, that cannot be repaired easily.

While stresses can also break the bond between the mortar and the masonry units, permitting water to penetrate the resulting hairline cracks, this is easier to correct in the joint through repointing than if the break occurs in the masonry units.

This early 19th century building is being repointed with lime mortar. Photo: Travis McDonald.

Permeability, or rate of vapor transmission, is also critical. High lime mortars are more permeable than denser cement mortars. Historically, mortar acted as a bedding material--not unlike an expansion joint--rather than a "glue" for the masonry units, and moisture was able to migrate through the mortar joints rather than the masonry units. When moisture evaporates from the masonry it deposits any soluble salts either on the surface as *efflorescence* or below the surface as *subflorescence.* While salts deposited on the surface of masonry units are usually relatively harmless, salt crystallization within a masonry unit creates pressure that can cause parts ofthe outer surface to spall off or delaminate. If the mortar does not permitmoisture or moisture vapor to migrate out of the wall and evaporate, theresult will be damage to the masonry units.

Components of Mortar

Sand. Sand is the largest component of mortar and the material that gives mortar its distinctive color, texture and cohesiveness. Sand must be free of impurities, such as salts or clay. The three key characteristics of sand are: particle shape, gradation and void ratios.

When viewed under a magnifying glass or low-power microscope, particles of sand generally have either rounded edges, such as found in beach and river sand, or sharp, angular edges, found in crushed or manufactured sand. For repointing mortar, rounded or natural sand is preferred for two reasons. It is usually similar to the sand in the historic mortar and provides a better visual match. It also has better working qualities or plasticity and can thus be forced into the joint more easily, forming a good contact with the remaining historic mortar and the surface of the adjacent masonry units. Although manufactured sand is frequently more readily available, it is usually possible to locate a supply of rounded sand.

The gradation of the sand (particle size distribution) plays a very important role in the durability and cohesive properties of a mortar. Mortar must have a certain percentage of large to small particle sizes in order to deliver the optimum performance. Acceptable guidelines on particle size distribution may be found in ASTM C 144 (American Society for Testing and Materials). However, in actuality, since neither historic nor modern sands are always in compliance with ASTM C 144, matching the same particle appearance and gradation usually requires sieving the sand.

A scoop of sand contains many small voids between the individual grains. A mortar that performs well fills all these small voids with binder (cement/lime combination or mix) in a balanced manner. Well-graded sand generally has a 30 per cent void ratio by volume. Thus, 30 per cent binder by volume generally should be used, unless the historic mortar had a different binder: aggregate ratio. This represents the 1:3 binder to sand ratios often seen in mortar specifications.

For repointing, sand generally should conform to ASTM C 144 to assure proper gradation and freedom from impurities; some variation may be necessary to match the original size and gradation. Sand color and texture also should match the original as closely as possible to provide the proper color match without other additives.

Lime. Mortar formulations prior to the late-19th century used lime as the primary binding material. Lime is derived from heating limestone at high temperatures which burns off the carbon dioxide, and turns the limestone into quicklime. There are three types of limestone--calcium, magnesium, and dolomitic--differentiated by the different levels of magnesium carbonate they contain which impart specific qualities to mortar. Historically, calcium lime was used for mortar rather than the dolomitic lime (calcium magnesium carbonate) most often used today. But it is also important to keep in mind the fact that the historic limes, and other components of mortar, varied a great deal because they were natural, as opposed to modern lime which is manufactured and, therefore, standardized. Because some of the kinds of lime, as well as other components of mortar, that were used historically are no longer readily available, even when a conscious effort is made to replicate a "historic" mix, this may not be achievable due to the differences between modern and historic materials.

Caulking was inappropriately used here in place of mortar on the top of the wall. As a result, it has not been durable. Photo: NPS files.

Lime, itself, when mixed with water into a paste is very plastic and creamy. It will remain workable and soft indefinitely, if stored in a sealed container. Lime (calcium hydroxide) hardens by carbonation absorbing carbon dioxide primarily from the air, converting itself to calcium carbonate. Once a lime and sand mortar is mixed and placed in a wall, it begins the process of carbonation. If lime mortar is left to dry too rapidly, carbonation of the mortar will be reduced, resulting in poor adhesion and poor durability. In addition, lime mortar is slightly water soluble and thus is able to re-seal any hairline cracks that may develop during the life of the mortar. Lime mortar is soft, porous, and changes little in volume during temperature fluctuations thus making it a good choice for historic buildings. *Because of these*

qualities, high calcium lime mortar may be considered for many repointing projects, not just those involving historic buildings.

For repointing, lime should conform to ASTM C 207, Type S, or Type SA, Hydrated Lime for Masonry Purposes. This machine-slaked lime is designed to assure high plasticity and water retention. The use of quicklime which must be slaked and soaked by hand may have advantages over hydrated lime in some restoration projects if time and money allow.

Lime putty. Lime putty is slaked lime that has a putty or paste-like consistency. It should conform to ASTM C 5. Mortar can be mixed using lime putty according to ASTM C 270 property or proportion specification.

Portland cement. More recent, 20th-century mortar has used portland cement as a primary binding material. A straight portland cement and sand mortar is extremely hard, resists the movement of water, shrinks upon setting, and undergoes relatively large thermal movements. When mixed with water, portland cement forms a harsh, stiff paste that is quite unworkable, becoming hard very quickly. (Unlike lime, portland cement will harden regardless of weather conditions and does not require wetting and drying cycles.) Some portland cement assists the workability and plasticity of the mortar without adversely affecting the finished project; it also provides early strength to the mortar and speeds setting. Thus, it may be appropriate to add some portland cement to an essentially lime-based mortar even when repointing relatively soft 18th or 19th century brick under some circumstances when a slightly harder mortar is required. The more portland cement that is added to a mortar formulation the harder it becomes--and the faster the initial set.

For repointing, portland cement should conform to ASTM C 150. White, non- staining portland cement may provide a better color match for some historic mortars than the more commonly available grey portland cement. But, it should not be assumed, however, that white portland cement is always appropriate for all historic buildings, since the original mortar may have been mixed with grey cement. The cement should not have more than 0.60 per cent alkali to help avoid efflorescence.

Masonry cement. Masonry cement is a preblended mortar mix commonly found at hardware and home repair stores. It is designed to produce mortars with a compressive strength of 750 psi or higher when mixed with sand and water at the job site. It may contain hydrated lime, but it always contains a large amount of portland cement, as well as ground limestone and other workability agents, including air-entraining agents. Because masonry cements are not required to contain hydrated lime, and generally do not contain lime, they produce high strength mortars that can damage historic masonry. *For this reason, they generally are not recommended for use on historic masonry buildings.*

Lime mortar (pre-blended). Hydrated lime mortars, and pre-blended lime putty mortars with or without a matched sand are commercially available. Custom mortars are also available with color. In most instances, pre-blended lime mortars containing sand may not provide an exact match; however, if the project calls for total repointing, a pre-blended lime mortar may be worth considering as long as the mortar is compatible in strength with the masonry. If the project involves only selected, "spot" repointing, then

it may be better to carry out a mortar analysis which can provide a custom pre-blended lime mortar with a matching sand. In either case, if a preblended lime mortar is to be used, it should contain Type S or SA hydrated lime conforming to ASTM C 207.

Water. Water should be potable--clean and free from acids, alkalis, or other dissolved organic materials.

Other Components

Historic components. In addition to the color of the sand, the texture of the mortar is of critical importance in duplicating historic mortar. Most mortars dating from the mid-19th century on--with some exceptions--have a fairly homogeneous texture and color. Some earlier mortars are not as uniformly textured and may contain lumps of partially burned lime or "dirty lime", shell (which often provided a source of lime, particularly in coastal areas), natural cements, pieces of clay, lampblack or other pigments, or even animal hair. The visual characteristics of these mortars can be duplicated through the use of similar materials in the repointing mortar.

Replicating such unique or individual mortars will require writing new specifications for each project. If possible, suggested sources for special materials should be included. For example, crushed oyster shells can be obtained in a variety of sizes from poultry supply dealers.

Pigments. Some historic mortars, particularly in the late 19th century, were tinted to match or contrast with the brick or stone. Red pigments, sometimes in the form of brick dust, as well as brown, and black pigments were commonly used. Modern pigments are available which can be added to the mortar at the job site, but they should not exceed 10 per cent by weight of the portland cement in the mix, and carbon black should be limited to 2 per cent. Only synthetic mineral oxides, which are alkali-proof and sun-fast, should be used to prevent bleaching and fading.

Modern components. Admixtures are used to create specific characteristics in mortar, and whether they should be used will depend upon the individual project. *Air entraining agents*, for example, help the mortar to resist freeze-thaw damage in northern climates. *Accelerators* are used to reduce mortar freezing prior to setting while *retarders* help to extend the mortar life in hot climates. Selection of admixtures should be made by the architect or architectural conservator as part of the specifications, not something routinely added by the masons.

Generally, modern chemical additives are unnecessary and may, in fact, have detrimental effects in historic masonry projects. The use of antifreeze compounds is not recommended. They are not very effective with high lime mortars and may introduce salts, which may cause efflorescence later. A better practice is to warm the sand and water, and to protect the completed work from freezing. No definitive study has determined whether air-entraining additives should be used to resist frost action and enhance plasticity, but in areas of extreme exposure requiring high-strength mortars with lower permeability, air-entrainment of 10-16 percent may be desirable (see formula for "severe weather exposure" in **Mortar Type and Mix**). Bonding agents are not a substitute for proper joint preparation, and they should generally be avoided. If the joint is properly prepared, there will be a good bond between the new mortar and the

adjacent surfaces. In addition, a bonding agent is difficult to remove if smeared on a masonry surface.

Mortar Type and Mix

Mortars for repointing projects, especially those involving historic buildings, typically are custom mixed in order to ensure the proper physical and visual qualities. These materials can be combined in varying proportions to create a mortar with the desired performance and durability. The actual specification of a particular mortar type should take into consideration all of the factors affecting the life of the building including: current site conditions, present condition of the masonry, function of the new mortar, degree of weather exposure, and skill of the mason.

Here, a hammer and chisel are being correctly used to prepare a joint for repointing. Photo: John P. Speweik.

Thus, no two repointing projects are exactly the same. Modern materials specified for use in repointing mortar should conform to specifications of the American Society for Testing and Materials (ASTM) or comparable federal specifications, and the resulting mortar should conform to ASTM C 270, Mortar for Unit Masonry.

Specifying the proportions for the repointing mortar for a specific job is not as difficult as it might seem. Five mortar types, each with a corresponding recommended mix, have been established by ASTM to distinguish high strength mortar from soft flexible mortars. The ASTM designated them in decreasing order of approximate general strength as Type M (2,500 psi), Type S (1,800 psi), Type N (750 psi), Type O (350 psi) and Type K (75 psi). (The letters identifying the types are from the words MASON WORK using every other letter.) Type K has the highest lime content of the mixes that contain portland cement, although it is seldom used today, except for some historic preservation projects. The designation "L" in the accompanying chart identifies a straight lime and sand mix. Specifying the appropriate ASTM mortar by proportion of ingredients, will ensure the desired physical properties. Unless specified otherwise, measurements or proportions for mortar mixes are always given in the following order: cement-lime-sand. Thus, a Type K mix, for example, would be referred to as 1-3-10, or 1 part cement to 3 parts lime to 10 parts sand. Other requirements to create the desired visual qualities should be included in the specifications.

The strength of a mortar can vary. If mixed with higher amounts of portland cement, a harder mortar is obtained. The more lime that is added, the softer and more plastic the mortar becomes, increasing its workability. A mortar strong in compressive strength might be desirable for a hard stone (such as granite) pier holding up a bridge deck, whereas a softer, more permeable lime mortar would be preferable for a historic wall of soft brick. Masonry deterioration caused by salt deposition results when the mortar is less permeable than the masonry unit. A strong mortar is still more permeable than hard, dense stone. However, in a wall constructed of soft bricks where the masonry unit itself has a relatively high permeability or vapor transmission rate, a soft, high lime mortar is necessary to retain sufficient permeability.

Budgeting and Scheduling

Repointing is both expensive and time consuming due to the extent of handwork and special materials required. It is preferable to repoint only those areas that require work rather than an entire wall, as is often specified. But, if 25 to 50 per cent or more of a wall needs to be repointed, repointing the entire wall may be more cost effective than spot repointing.

Total repointing may also be more sensible when access is difficult, requiring the erection of expensive scaffolding (unless the majority of the mortar is sound and unlikely to require replacement in the foreseeable future). Each project requires judgement based on a variety of factors. Recognizing this at the outset will help to prevent many jobs from becoming prohibitively expensive.

When repairing this stone wall, the mason matched the raised profile of the original tuckpointing. Photo: NPS files.

In scheduling, seasonal aspects need to be considered first. Generally speaking, wall temperatures between 40 and 95 degrees F (8 and 38 degrees C) will prevent freezing or excessive evaporation of the water in the mortar. Ideally, repointing should be done in shade, away from strong sunlight in order to slow the drying process, especially during hot weather. If necessary, shade can be provided for large-scale projects with appropriate modifications to scaffolding.

The relationship of repointing to other work proposed on the building must also be recognized. For example, if paint removal or cleaning is anticipated, and if the mortar joints are basically sound and need only selective repointing, it is generally better to postpone repointing until after completion of these activities. However, if the mortar has eroded badly, allowing moisture to penetrate deeply into the wall, repointing should be accomplished before cleaning. Related work, such as structural or roof repairs, should be scheduled so that they do not interfere with repointing and so that all work can take maximum advantage of erected scaffolding.

Building managers also must recognize the difficulties that a repointing project can create.

A mechanical grinder improperly used to cut out the horizontal joint and incompatible repointing have seriously damaged the 19th century brick. Photo: NPS files.

The process is time consuming, and scaffolding may need to remain in place for an extended period of time. The joint preparation process can be quite noisy and can generate large quantities of dust which must be controlled, especially at air intakes to protect human health, and also where it might damage operating machinery. Entrances may be blocked from time to time making access difficult for both building tenants and visitors. Clearly, building managers will need to coordinate the repointing work with other events at the site.

Contractor Selection

The ideal way to select a contractor is to ask knowledgeable owners of recently repointed historic buildings for recommendations. Qualified contractors then can provide lists of other repointing projects for inspection. More commonly, however, the contractor for a repointing project is selected through a competitive bidding process over which the client or consultant has only limited control. In this situation it is important to ensure that the specifications stipulate that masons must have a minimum of five years' experience with repointing historic masonry buildings to be eligible to bid on the project. Contracts are awarded to the lowest responsible bidder, and bidders who have performed poorly on other projects usually can be eliminated from consideration on this basis, even if they have the lowest prices.

The contract documents should call for unit prices as well as a base bid. Unit pricing forces the contractor to determine in advance what the cost addition or reduction will be for work which varies from the scope of the base bid. If, for example, the contractor has fifty linear feet less of stone repointing than indicated on the contract documents but thirty linear feet more of brick repointing, it will be easy to determine the final price for the work. Note that each type of work--brick repointing, stone repointing, or similar items--will have its own unit price. The unit price also should reflect quantities; one linear foot of pointing in five different spots will be more expensive than five contiguous linear feet.

Execution of the Work

Test Panels. These panels are prepared by the contractor using the same techniques that will be used on the remainder of the project. Several panel locations--preferably not on the front or other highly visible location of the building--may be necessary to include all types of masonry, joint styles, mortar colors, and other problems likely to be encountered on the job.

If cleaning tests, for example, are also to be undertaken, they should be carried out in the same location. Usually a 3 foot by 3 foot area is sufficient for brickwork, while a somewhat larger area may be required for stonework. These panels establish an acceptable standard of work and serve as a benchmark for evaluating and accepting subsequent work on the building.

Unskilled repointing has negatively impacted the character of this late-19th century building. Photo: NPS files.

Joint Preparation. Old mortar should be removed to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "popouts." For most brick joints, this will require removal of the mortar to a depth of approximately ½ to 1 inch; for stone masonry with wide joints, mortar may need to be removed to a depth of several inches. Any loose or disintegrated mortar beyond this minimum depth also should be removed.

Although some damage may be inevitable, careful joint preparation can help limit damage to masonry units. The traditional manner of removing old mortar is through the use of hand chisels and mash hammers. Though labor-intensive, in most instances this method poses the least threat for damage to historic masonry units and produces the best final product.

The most common method of removing mortar, however, is through the use of power saws or grinders. The use of power tools by unskilled masons can be disastrous for historic masonry, particularly soft brick. Using power saws on walls with thin joints, such as most brick walls, almost always will result in damage to the masonry units by breaking the edges and by overcutting on the head, or vertical joints.

However, small pneumatically-powered chisels generally can be used safely and effectively to remove mortar on historic buildings as long as the masons maintain appropriate control over the equipment. Under certain circumstances, thin diamond-bladed grinders may be used to cut out *horizontal* joints only on hard portland cement mortar common to most early-20th century masonry buildings. Usually, automatic tools most successfully remove old mortar without damaging the masonry units when they are used in combination with hand tools in preparation for repointing. Where horizontal joints are uniform and fairly wide, it may be possible to use a power masonry saw to assist the removal of mortar, such as by cutting along the middle of the joint; final mortar removal from the sides of the joints still should be done with a hand chisel and hammer. Caulking cutters with diamond blades can sometimes be used successfully to cut out joints without damaging the masonry. Caulking cutters are slow; they do not rotate, but vibrate at very high speeds, thus minimizing the possibility of damage to masonry units. Although mechanical tools may be safely used in limited circumstances to cut out horizontal joints in preparation for repointing, they should never be used on vertical joints because of the danger of slipping and cutting into the brick above or below the vertical joint. Using power tools to remove mortar without damaging the surrounding masonry units also necessitates highly skilled masons experienced in working on historic masonry buildings. Contractors should demonstrate proficiency with power tools before their use is approved.

Using any of these power tools may also be more acceptable on hard stone, such as quartzite or granite, than on terra cotta with its glass-like glaze, or on soft brick or stone. The test panel should determine the acceptability of power tools. If power tools are to be permitted, the contractor should establish a quality control program to account for worker fatigue and similar variables.

Mortar should be removed cleanly from the masonry units, leaving square corners at the back of the cut. Before filling, the joints should be rinsed with a jet of water to remove all loose particles and dust. At the time of filling, the joints should be damp, but with no standing water present. For masonry walls--limestone, sandstone and common brick--that are extremely absorbent, it is recommended that a continual mist of water be applied for a few hours before repointing begins.

Mortar Preparation. Mortar components should be measured and mixed carefully to assure the uniformity of visual and physical characteristics. Dry ingredients are measured by volume and thoroughly mixed before the addition of any water. Sand must be added in a damp, loose condition to avoid over sanding. Repointing mortar is typically pre-hydrated by adding water so it will just hold together, thus allowing it to stand for a period of time before the final water is added. Half the water should be added, followed by mixing for approximately 5 minutes. The remaining water should then be added in small portions until a mortar of the desired consistency is reached. The total volume of water necessary may vary from batch to batch, depending on weather conditions. It is important to keep the water to a minimum for two reasons: first, a drier mortar is cleaner to work with, and it can be compacted tightly into the joints; second, with no excess water to evaporate, the mortar cures without shrinkage cracks. Mortar should be used within approximately 30 minutes of final mixing, and "retempering," or adding more water, should not be permitted.

Using Lime Putty to Make Mortar. Mortar made with lime putty and sand, sometimes referred to as roughage or course stuff, should be measured by volume, and may require slightly different proportions from those used with hydrated lime. No additional water is usually needed to achieve a workable consistency because enough water is already contained in the putty. Sand is proportioned first, followed by the lime putty, then mixed for five minutes or until all the sand is thoroughly coated with the lime putty. But mixing, in the familiar sense of turning over with a hoe, sometimes may not be sufficient if the best possible performance is to be obtained from a lime putty mortar. Although the old practice of chopping, beating and ramming the mortar has largely been forgotten, recent field work has confirmed that lime putty and sand rammed and beaten with a wooden mallet or ax handle, interspersed by chopping with a hoe, can significantly improve workability and performance. The intensity of this action increases the overall lime/sand contact and removes any surplus water by compacting the other ingredients. It may also be advantageous for larger projects to use a mortar pan mill for mixing. Mortar pan mills which have a long tradition in Europe produce a superior lime putty mortar not attainable with today's modern paddle and drum type mixers.

For larger repointing projects the lime putty and sand can be mixed together ahead of time and stored indefinitely, on or off site, which eliminates the need for piles of sand on the job site. This mixture, which resembles damp brown sugar, must be protected from the air in sealed containers with a wet piece of burlap over the top or sealed in a large plastic bag to prevent evaporation and premature carbonation. The lime putty and sand mixture can be recombined into a workable plastic state months later with no additional

water.

If portland cement is specified in a lime putty and sand mortar--Type O (1:2:9) or Type K (1:3:11)--the portland cement should first be mixed into a slurry paste before adding it to the lime putty and sand. Not only will this ensure that the portland cement is evenly distributed throughout the mixture, but if dry portland cement is added to wet ingredients it tends to "ball up," jeopardizing dispersion. (Usually water must be added to the lime putty and sand anyway once the portland cement is introduced.) Any color pigments should be added at this stage and mixed for a full five minutes. The mortar should be used within 30 minutes to 1½ hours and it should not be retempered. Once portland cement has been added the mortar can no longer be stored.

Filling the Joint. Where existing mortar has been removed to a depth of greater than 1 inch, these deeper areas should be filled first, compacting the new mortar in several layers. The back of the entire joint should be filled successively by applying approximately 1/4 inch of mortar, packing it well into the back corners. This application may extend along the wall for several feet. As soon as the mortar has reached thumb-print hardness, another 1/4 inch layer of mortar--approximately the same thickness--may be applied. Several layers will be needed to fill the joint flush with the outer surface of the masonry. It is important to allow each layer time to harden before the next layer is applied; most of the mortar shrinkage occurs during the hardening process and layering thus minimizes overall shrinkage.

When the final layer of mortar is thumb-print hard, the joint should be tooled to match the historic joint. Proper timing of the tooling is important for uniform color and appearance. If tooled when too soft, the color will be lighter than expected, and hairline cracks may occur; if tooled when too hard, there may be dark streaks called "tool burning," and good closure of the mortar against the masonry units will not be achieved.

If the old bricks or stones have worn, rounded edges, it is best to recess the final mortar slightly from the face of the masonry. This treatment will help avoid a joint which is visually wider than the actual joint; it also will avoid creation of a large, thin featheredge which is easily damaged, thus admitting water. After tooling, excess mortar can be removed from the edge of the joint by brushing with a natural bristle or nylon brush. Metal bristle brushes should never be used on historic masonry.

Curing Conditions. The preliminary hardening of high-lime content mortars--those mortars that contain more lime by volume than portland cement, i.e., Type O (1:2:9), Type K (1:3:11), and straight lime/sand, Type "L" (0:1:3)--takes place fairly rapidly as water in the mix is lost to the porous surface of the masonry and through evaporation. A high lime mortar (especially Type "L") left to dry out too rapidly can result in chalking, poor adhesion, and poor durability. Periodic wetting of the repointed area after the mortar joints are thumb-print hard and have been finish tooled may significantly accelerate the carbonation process. When feasible, misting using a hand sprayer with a fine nozzle can be simple to do for a day or two after repointing. Local conditions will dictate the frequency of wetting, but initially it may be as often as every hour and gradually reduced to every three or four hours. Walls should be covered with burlap for the first three days after repointing. (Plastic may be used, but it should be tented out and not placed directly against the wall.) This helps keep the walls damp and protects them from direct sunlight. Once carbonation of the lime has begun, it will continue for many years and the lime will gain strength as it reverts back to calcium carbonate within

the wall.

***Aging* the Mortar.** Even with the best efforts at matching the existing mortar color, texture, and materials, there will usually be a visible difference between the old and new work, partly because the new mortar has been matched to the unweathered portions of the historic mortar. Another reason for a slight mismatch may be that the sand is more exposed in old mortar due to the slight erosion of the lime or cement. Although spot repointing is generally preferable and some color difference should be acceptable, if the difference between old and new mortar is too extreme, it may be advisable in some instances to repoint an entire area of a wall, or an entire feature such as a bay, to minimize the difference between the old and the new mortar. If the mortars have been properly matched, usually the best way to deal with surface color differences is to let the mortars age naturally. Other treatments to overcome these differences, including cleaning the non-repointed areas or staining the new mortar, should be carefully tested prior to implementation.

This 18th century pediment and surrounding wall exhibit distinctively different mortar joints. Photo: NPS files.

Staining the new mortar to achieve a better color match is generally not recommended, but it may be appropriate in some instances. Although staining may provide an initial match, the old and new mortars may weather at different rates, leading to visual differences after a few seasons. In addition, the mixtures used to stain the mortar may be harmful to the masonry; for example, they may introduce salts into the masonry which can lead to efflorescence.

Cleaning the Repointed Masonry. If repointing work is carefully executed, there will be little need for cleaning other than to remove the small amount of mortar from the edge of the joint following tooling. This can be done with a stiff natural bristle or nylon brush after the mortar has dried, but before it is initially set (1-2 hours). Mortar that has hardened can usually be removed with a wooden paddle or, if necessary, a chisel.

Further cleaning is best accomplished with plain water and natural bristle or nylon brushes. If chemicals must be used, they should be selected with extreme caution. Improper cleaning can lead to deterioration of the masonry units, deterioration of the mortar, mortar smear, and efflorescence. New mortar joints are especially susceptible to damage because they do not become fully cured for several months. Chemical cleaners, particularly acids, should never be used on dry masonry. The masonry should always be completely soaked once with water before chemicals are applied. After cleaning, the walls should be flushed again with plain water to remove all traces of the chemicals.

Several precautions should be taken if a freshly repointed masonry wall is to be cleaned. First, the mortar should be fully hardened before cleaning. Thirty days is usually sufficient, depending on weather and exposure; as mentioned previously, the mortar will continue to cure even after it has hardened. Test panels should be prepared to evaluate the effects of different cleaning methods. Generally, on newly repointed masonry walls, only very low pressure (100 psi) water washing supplemented by stiff natural bristle or nylon brushes should be used, except on glazed or polished surfaces, where only soft

cloths should be used.**

New construction "bloom" or efflorescence occasionally appears within the first few months of repointing and usually disappears through the normal process of weathering. If the efflorescence is not removed by natural processes, the safest way to remove it is by dry brushing with stiff natural or nylon bristle brushes followed by wet brushing. Hydrochloric (muriatic) acid, is generally ineffective, and it should not be used to remove efflorescence. It may liberate additional salts, which, in turn, can lead to more efflorescence.

Surface Grouting is sometimes suggested as an alternative to repointing brick buildings, in particular. This process involves the application of a thin coat of cement-based grout to the mortar joints and the mortar/brick interface. To be effective, the grout must extend slightly onto the face of the masonry units, thus widening the joint visually. The change in the joint appearance can alter the historic character of the structure to an unacceptable degree. In addition, although masking of the bricks is intended to keep the grout off the remainder of the face of the bricks, some level of residue, called "veiling," will inevitably remain. Surface grouting cannot substitute for the more extensive work of repointing, and it is not a recommended treatment for historic masonry.

***Additional information on masonry cleaning is presented in Preservation Briefs 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings, Robert C. Mack, FAIA, and Anne Grimmer, Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior, 2000; and Keeping it Clean: Removing Exterior Dirt, Paint, Stains & Graffiti from Historic Masonry Buildings, Anne E. Grimmer, Washington, D.C.: Technical Preservation Services, National Park Service, U.S. Department of the Interior, 1988.*

Visually Examining the Mortar and the Masonry Units

A simple *in situ* comparison will help determine the hardness and condition of the mortar and the masonry units. Begin by scraping the mortar with a screwdriver, and gradually tapping harder with a cold chisel and mason's hammer. Masonry units can be tested in the same way beginning, even more gently, by scraping with a fingernail. This relative analysis which is derived from the 10-point hardness scale used to describe minerals, provides a good starting point for selection of an appropriate mortar. It is described more fully in "The Russack System for Brick & Mortar Description" referenced in **Selected Reading** at the end of this Brief.

Mortar samples should be chosen carefully, and picked from a variety of locations on the building to find unweathered mortar, if possible. Portions of the building may have been repointed in the past while other areas may be subject to conditions causing unusual deterioration. There may be several colors of mortar dating from different construction periods or sand used from different sources during the initial construction. Any of these situations can give false readings to the visual or physical characteristics required for the new mortar. Variations should be noted which may require developing more than one mix.

1) Remove with a chisel and hammer three or four unweathered samples of the mortar to be matched from several locations on the building. (Set the largest sample aside--this will be used later for comparison with the repointing mortar). Removing a full representation of samples will allow selection of a "mean" or average mortar sample.

2) Mash the remaining samples with a wooden mallet, or hammer if necessary, until they are separated into their constituent parts. There should be a good handful of the material.

3) Examine the powdered portion--the lime and/or cement matrix of the mortar. Most particularly, note the color. There is a tendency to think of historic mortars as having white binders, but grey portland cement was available by the last quarter of the 19th century, and traditional limes were also sometimes grey. Thus, in some instances, the natural color of the historic binder may be grey, rather than white. The mortar may also have been tinted to create a colored mortar, and this color should be identified at this point.

4) Carefully blow away the powdery material (the lime and/or cement matrix which bound the mortar together).

5) With a low power (10 power) magnifying glass, examine the remaining sand and other materials such as lumps of lime or shell.

6) Note and record the wide range of color as well as the varying sizes of the individual grains of sand, impurities, or other materials.

Other Factors to Consider

Color. Regardless of the color of the binder or colored additives, the sand is the primary material that gives mortar its color. A surprising variety of colors of sand may be found in a single sample of historic mortar, and the different sizes of the grains of sand or other materials, such as incompletely ground lime or cement, play an important role in the texture of the repointing mortar. Therefore, when specifying sand for repointing mortar, it may be necessary to obtain sand from several sources and to combine or screen them in order to approximate the range of sand colors and grain sizes in the historic mortar sample.

Pointing Style. Close examination of the historic masonry wall and the techniques used in the original construction will assist in maintaining the visual qualities of the building. Pointing styles and the methods of producing them should be examined. It is important to look at both the horizontal and the vertical joints to determine the order in which they were tooled and whether they were the same style. Some late-19th and early-20th century buildings, for example, have horizontal joints that were raked back while the vertical joints were finished flush and stained to match the bricks, thus creating the illusion of horizontal bands. Pointing styles may also differ from one facade to another; front walls often received greater attention to mortar detailing than side and rear walls. **Tuckpointing** is not true repointing but the application of a raised joint or lime putty joint on top of flush mortar joints. **Penciling** is a purely decorative, painted surface treatment over a mortar joint, often in a contrasting color.

Masonry Units. The masonry units should also be examined so that any replacement units will match the historic masonry. Within a wall there may be a wide range of colors, textures, and sizes, particularly with hand-made brick or rough-cut, locally-quarried stone. Replacement units should blend in with the full range of masonry units rather than a single brick or stone.

Matching Color and Texture of the Repointing Mortar

New mortar should match the unweathered interior portions of the historic mortar. The simplest way to check the match is to make a small sample of the proposed mix and allow it to cure at a temperature of approximately 70 degrees F for about a week, or it can be baked in an oven to speed up the curing; this sample is then broken open and the surface is compared with the surface of the largest "saved" sample of historic mortar.

If a proper color match cannot be achieved through the use of natural sand or colored aggregates like crushed marble or brick dust, it may be necessary to use a modern mortar pigment.

During the early stages of the project, it should be determined how closely the new mortar should match the historic mortar. Will "quite close" be sufficient, or is "exactly" expected? The specifications should state this clearly so that the contractor has a reasonable idea how much time and expense will be required to develop an acceptable match.

The same judgment will be necessary in matching replacement terra cotta, stone or brick. If there is a known source for replacements, this should be included in the specifications. If a source cannot be determined prior to the bidding process, the specifications should include an estimated price for the replacement materials with the final price based on the actual cost to the contractor.

Mortar Types (Measured by volume)			
Designation	Cement	Hydrated Lime or Lime Putty	Sand
M	1	1/4	3 - 3 3/4
S	1	1/2	4 - 4 1/2
N	1	1	5 - 6
O	1	2	8 - 9
K	1	3	10 - 12
"L"	0	1	2 1/4 - 3

Suggested Mortar Types for Different Exposures			
	Exposure		
Masonry Material	Sheltered	Moderate	Severe

Very durable: granite, hard-cored brick, etc.	O	N	S
Moderately durable: limestone, durable stone, molded brick	K	O	N
Minimally durable: soft hand-made brick	"L"	K	O

Summary

For the Owner/Administrator. The owner or administrator of a historic building should remember that repointing is likely to be a lengthy and expensive process. First, there must be adequate time for evaluation of the building and investigation into the cause of problems. Then, there will be time needed for preparation of the contract documents. The work itself is precise, time-consuming and noisy, and scaffolding may cover the face of the building for some time. Therefore, the owner must carefully plan the work to avoid problems. Schedules for both repointing and other activities will thus require careful coordination to avoid unanticipated conflicts. The owner must avoid the tendency to rush the work or cut corners if the historic building is to retain its visual integrity and the job is to be durable.

For the Architect/Consultant. Because the primary role of the consultant is to ensure the life of the building, a knowledge of historic construction techniques and the special problems found in older buildings is essential. The consultant must assist the owner in planning for logistical problems relating to research and construction. It is the consultant's responsibility to determine the cause of the mortar deterioration and ensure that it is corrected before the masonry is repointed. The consultant must also be prepared to spend more time in project inspections than is customary in modern construction.

For the Masons. Successful repointing depends on the masons themselves. Experienced masons understand the special requirements for work on historic buildings and the added time and expense they require. The entire masonry crew must be willing and able to perform the work in conformance with the specifications, even when the specifications may not be in conformance with standard practice. At the same time, the masons should not hesitate to question the specifications if it appears that the work specified would damage the building.

Conclusion

A good repointing job is meant to last, at least 30 years, and preferably 50- 100 years. Shortcuts and poor craftsmanship result not only in diminishing the historic character of a building, but also in a job that looks bad, and will require future repointing sooner than if the work had been done correctly. The mortar joint in a historic masonry building has often been called a wall's "first line of defense." Good repointing practices guarantee the long life of the mortar joint, the wall, and the historic structure. Although careful maintenance will help preserve the freshly repointed mortar joints, it is important to

remember that mortar joints are intended to be sacrificial and will probably require repointing some time in the future. Nevertheless, if the historic mortar joints proved durable for many years, then careful repointing should have an equally long life, ultimately contributing to the preservation of the entire building.

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Useful Addresses

Brick Institute of America
11490 Commerce Park Drive
Reston, VA 22091

National Lime Association
200 N. Glebe Road, Suite 800
Arlington, VA 22203

Portland Cement Association
5420 Old Orchard Road
Skokie, IL 60077

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Washington, D.C. October, 1998

Home page logo: Soft mortar for repointing. Photo: John P. Speweik.

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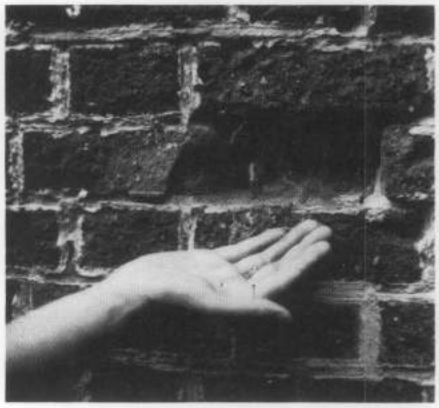
6 PRESERVATION BRIEFS



Dangers of Abrasive Cleaning to Historic Buildings

Anne E. Grimmer

U.S. Department of the Interior
National Park Service
Cultural Resources

Heritage Preservation Services

"The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials shall not be undertaken."—The Secretary of the Interior's "Standards for Historic Preservation Projects."

Abrasive cleaning methods are responsible for causing a great deal of damage to historic building materials. To prevent indiscriminate use of these potentially harmful techniques, this brief has been prepared to explain abrasive cleaning methods, how they can be physically and aesthetically destructive to historic building materials, and why they generally are not acceptable preservation treatments for historic structures. There are alternative, less harsh means of cleaning and removing paint and stains from historic buildings. However, careful testing should preceed general cleaning to assure that the method selected will not have an adverse effect on the building materials. A historic building is irreplaceable, and should be cleaned using only the "gentlest means possible" to best preserve it.

What is Abrasive Cleaning?

Abrasive cleaning methods include all techniques that physically abrade the building surface to remove soils, discolorations or coatings. Such techniques involve the use of certain *materials* which impact or abrade the surface under pressure, or abrasive *tools and equipment*. Sand, because it is readily available, is probably the most commonly used type of grit material. However, any of the following materials may be substituted for sand, and all can be classified as abrasive substances: ground slag or volcanic ash, crushed (pulverized) walnut or almond shells, rice husks, ground corncobs, ground coconut shells, crushed eggshells, silica flour, synthetic particles, glass beads and micro-balloons. Even *water* under pressure can be an abrasive substance. Tools and equipment that are abrasive to historic building materials include wire brushes, rotary wheels, power sanding disks and belt sanders.

The use of water in combination with grit may also be classified as an abrasive cleaning method. Depending on the manner in which it is applied, water *may* soften the impact of the grit, but water that is too highly pressurized can be very abrasive. There are basically two different methods which can be referred to as "wet grit," and it is important to differentiate between the two. One technique involves the addition of a stream of water to a regular sandblasting nozzle. This is done primarily to cut down dust, and has very little, if any, effect on reducing the aggressiveness, or cutting action of the grit particles. With the second technique, a very small amount of grit is added to a pressurized water stream. This method may be controlled by regulating the amount of grit fed into the water stream, as well as the pressure of the water.

Why Are Abrasive Cleaning Methods Used?

Usually, an abrasive cleaning method is selected as an expeditious means of quickly removing years of dirt accumulation, unsightly stains, or deteriorating building fabric or finishes, such as stucco or paint. The fact that sandblasting is one of the best known and most readily available building cleaning treatments is probably the major reason for its frequent use.

Many mid-19th century brick buildings were painted immediately or soon after completion to protect poor quality brick or to imitate another material, such as stone. Sometimes brick buildings were painted in an effort to produce what was considered a more harmonious relationship between a building and its natural surroundings. By the 1870s, brick buildings

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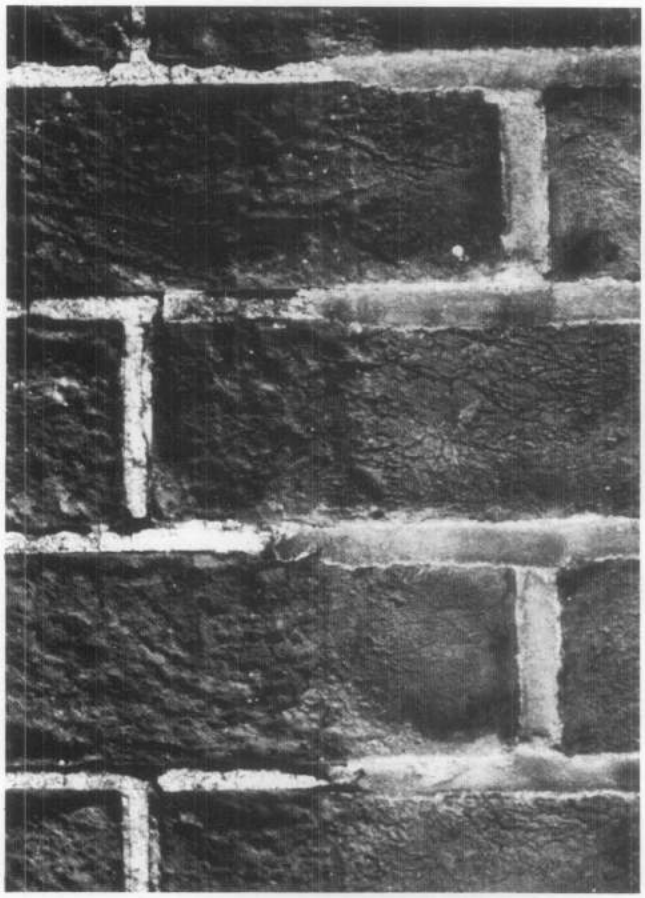
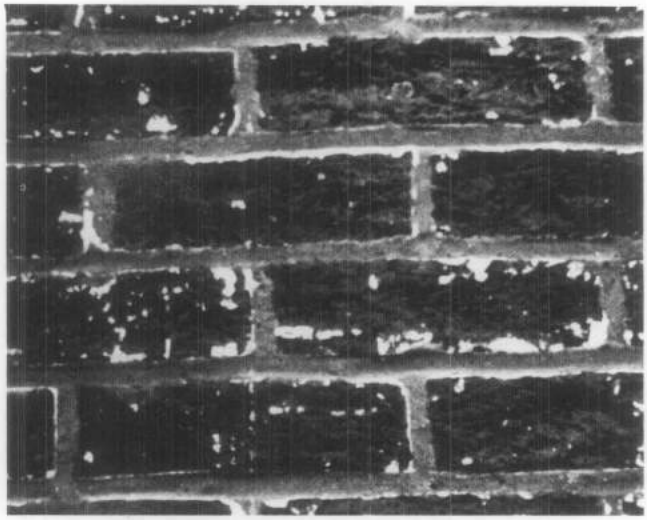


Abrasively Cleaned vs. Untouched Brick. *Two brick rowhouses with a common façade provide an excellent point of comparison when only one of the houses has been sandblasted. It is clear that abrasive blasting, by removing the outer surface, has left the brickwork on the left rough and pitted, while that on the right still exhibits an undamaged and relatively smooth surface. Note that the abrasive cleaning has also removed a considerable portion of the mortar from the joints of the brick on the left side, which will require repointing.*



Abrading the Surface without Removing the Paint. *Even though the entire outer surface layer of the brick has been sandblasted off, spots of paint still cling to the masonry. Sandblasting or other similarly abrasive methods are not always a successful means of removing paint.*

were often left unpainted as mechanization in the brick industry brought a cheaper pressed brick and fashion decreed a sudden preference for dark colors. However, it was still customary to paint brick of poorer quality for the additional protection the paint afforded.

It is a common 20th-century misconception that all historic masonry buildings were initially unpainted. If the intent of a modern restoration is to return a building to its original appearance, removal of the paint not only may be historically inaccurate, but also harmful. Many older buildings were painted or stuccoed at some point to correct recurring maintenance problems caused by faulty construction techniques, to hide alterations, or in an attempt to solve moisture problems. If this is the case, removal of paint or stucco may cause these problems to reoccur.

Another reason for paint removal, particularly in rehabilitation projects, is to give the building a "new image" in response to contemporary design trends and to attract investors or tenants. Thus, it is necessary to consider the purpose of the intended cleaning. While it is clearly important to remove unsightly stains, heavy encrustations of dirt, peeling paint or other surface coatings, it may not be equally desirable to remove paint from a building which originally was painted. Many historic buildings which show only a slight amount of soil or discoloration are much better left as they are. A thin layer of soil is more often protective of the building fabric than it is harmful, and seldom detracts from the building's architectural and/or historic character. Too thorough cleaning of a historic building may not only sacrifice some of the building's character, but also, misguided cleaning efforts can cause a great deal of damage to historic building fabric. Unless there are stains, graffiti or dirt and pollution deposits which are destroying the building fabric, it is generally preferable to do as little cleaning as possible, or to repaint where necessary. It is important to remember that a historic building does not have to look as if it were newly constructed to be an attractive or successful restoration or rehabilitation project. For a more thorough explanation of the philosophy of cleaning historic buildings see Preservation Briefs: No. 1 "The Cleaning and Waterproof Coating of Masonry Buildings," by Robert C. Mack, AIA.

Problems of Abrasive Cleaning

The crux of the problem is that abrasive cleaning is just that—abrasive. An abrasively cleaned historic structure may be physically as well as aesthetically damaged. Abrasive methods "clean" by eroding dirt or paint, but at the same time they also tend to erode the surface of the building material. In this way, abrasive cleaning is destructive and causes irreversible harm to the historic building fabric. If the fabric is brick, abrasive methods remove the hard, outer protective surface, and therefore make the brick more susceptible to rapid weathering and deterioration. Grit blasting may also increase the water permeability of a brick wall. The impact of the grit particles tends to erode the bond between the mortar and the brick, leaving cracks or enlarging existing cracks where water can enter. Some types of stone develop a protective patina or "quarry crust" parallel to the worked surface (created by the movement of moisture towards the outer edge), which also may be damaged by abrasive cleaning. The rate at which the material subsequently weathers depends on the quality of the inner surface that is exposed.

Abrasive cleaning can destroy, or substantially diminish, decorative detailing on buildings such as a molded brickwork or architectural terra-cotta, ornamental carving on wood or stone, and evidence of historic craft techniques, such as tool marks and other surface textures. In addition, perfectly sound and/or "tooled" mortar joints can be worn away by abrasive techniques. This not only results in the loss of historic craft detailing but also requires repointing, a step involving con-

siderable time, skill and expense, and which might not have been necessary had a gentler method been chosen. Erosion and pitting of the building material by abrasive cleaning creates a greater surface area on which dirt and pollutants collect. In this sense, the building fabric "attracts" more dirt, and will require more frequent cleaning in the future.

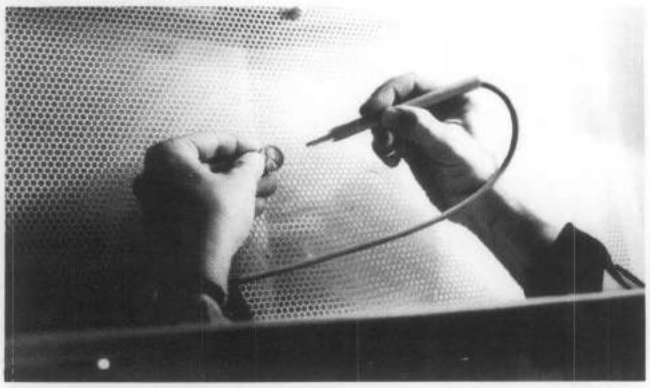
In addition to causing physical and aesthetic harm to the historic fabric, there are several adverse environmental effects of dry abrasive cleaning methods. Because of the friction caused by the abrasive medium hitting the building fabric, these techniques usually create a considerable amount of dust, which is unhealthy, particularly to the operators of the abrasive equipment. It further pollutes the environment around the job site, and deposits dust on neighboring buildings, parked vehicles and nearby trees and shrubbery. Some adjacent materials not intended for abrasive treatment such as wood or glass, may also be damaged because the equipment may be difficult to regulate.

Wet grit methods, while eliminating dust, deposit a messy slurry on the ground or other objects surrounding the base of the building. In colder climates where there is the threat of frost, any wet cleaning process applied to historic masonry structures must be done in warm weather, allowing ample time for the wall to dry out thoroughly before cold weather sets in. Water which remains and freezes in cracks and openings of the masonry surface eventually may lead to spalling. High-pressure wet cleaning may force an inordinate amount of water into the walls, affecting interior materials such as plaster or joist ends, as well as metal building components within the walls.

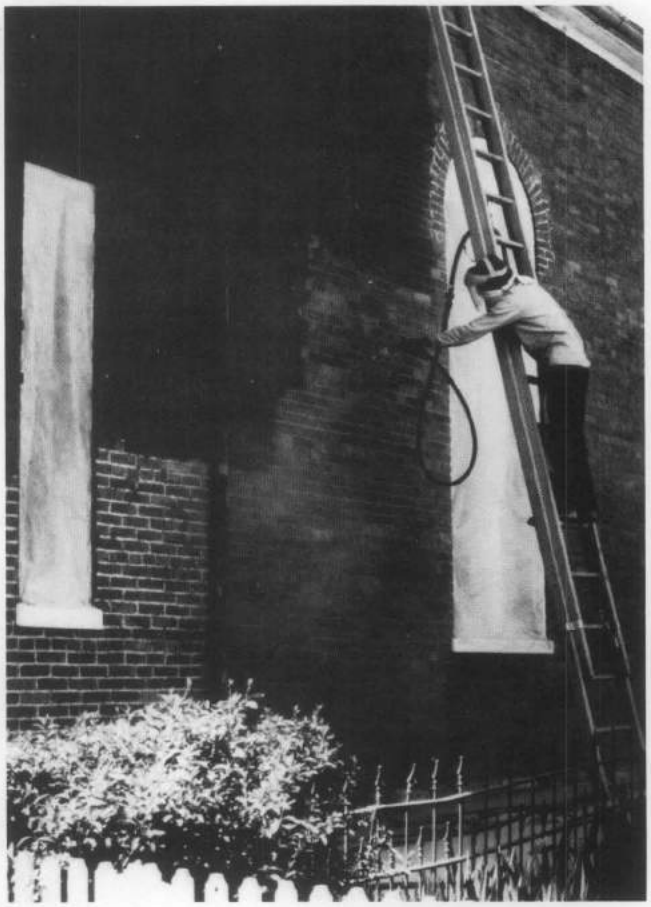
Variable Factors

The greatest problem in developing practical guidelines for cleaning any historic building is the large number of variable and unpredictable factors involved. Because these variables make each cleaning project unique, it is difficult to establish specific standards at this time. This is particularly true of abrasive cleaning methods because their inherent potential for causing damage is multiplied by the following factors:

— the type and condition of the material being cleaned;
— the size and sharpness of the grit particles or the mechanical equipment;
— the pressure with which the abrasive grit or equipment is applied to the building surface;
— the skill and care of the operator; and
— the constancy of the pressure on all surfaces during the cleaning process.



Micro-Abrasive Cleaning. *This small, pencil-sized micro-abrasive unit is used by some museum conservators to clean small objects. This particular micro-abrasive unit is operated within the confines of a box (approximately 2 cubic feet of space), but a similar and slightly larger unit may be used for cleaning larger pieces of sculpture, or areas of architectural detailing on a building. Even a pressure cleaning unit this small is capable of eroding a surface, and must be carefully controlled.*



"Line Drop." *Even though the operator of the sandblasting equipment is standing on a ladder to reach the higher sections of the wall, it is still almost impossible to have total control over the pressure. The pressure of the sand hitting the lower portion of the wall will still be greater than that above, because of the "line drop" in the distance from the pressure source to the nozzle. (Hugh Miller)*

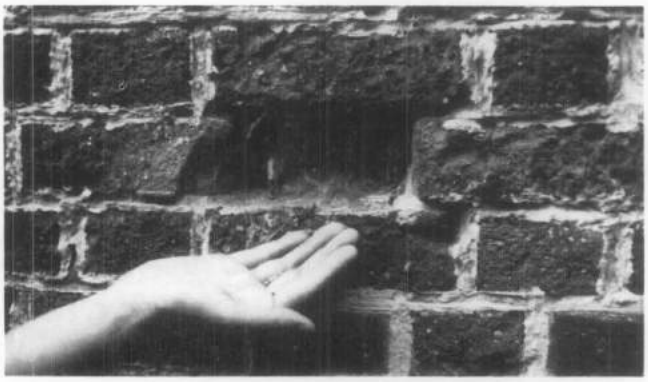
Pressure: The damaging effects of most of the variable factors involved in abrasive cleaning are self evident. However, the matter of pressure requires further explanation. In cleaning specifications, pressure is generally abbreviated as "psi" (pounds per square inch), which technically refers to the "tip" pressure, or the amount of pressure at the nozzle of the blasting apparatus. Sometimes "psig," or pressure at the gauge (which may be many feet away, at the other end of the hose), is used in place of "psi." These terms are often incorrectly used interchangeably.

Despite the apparent care taken by most architects and building cleaning contractors to prepare specifications for pressure cleaning which will not cause harm to the delicate fabric of a historic building, it is very difficult to ensure that the same amount of pressure is applied to all parts of the building. For example, if the operator of the pressure equipment stands on the ground while cleaning a two-story structure, the amount of force reaching the first story will be greater than that hitting the second story, even if the operator stands on scaffolding or in a cherry picker, because of the "line drop" in the distance from the pressure source to the nozzle. Although technically it may be possible to prepare cleaning specifications with tight controls that would eliminate all but a small margin of error, it may not be easy to find professional cleaning firms willing to work under such restrictive conditions. The fact is that many professional building cleaning firms do not really understand the extreme delicacy of historic building fabric, and how it differs from modern construction materials. Consequently, they may ac-

cept building cleaning projects for which they have no experience.

The amount of pressure used in any kind of cleaning treatment which involves pressure, whether it is dry or wet grit, chemicals or just plain water, is crucial to the outcome of the cleaning project. Unfortunately, no standards have been established for determining the correct pressure for cleaning each of the many historic building materials which would not cause harm. The considerable discrepancy between the way the building cleaning industry and architectural conservators define "high" and "low" pressure cleaning plays a significant role in the difficulty of creating standards.

Nonhistoric/Industrial: A representative of the building cleaning industry might consider "high" pressure *water* cleaning to be anything over 5,000 psi, or even as high as 10,000 to 15,000 psi! Water under this much pressure may be necessary to clean industrial structures or machinery, but would destroy most historic building materials. Industrial *chemical* cleaning commonly utilizes pressures between 1,000 and 2,500 psi.



Spalling Brick. *This soft, early 19th-century brick was sandblasted in the 1960s; consequently, severe spalling has resulted. Some bricks have almost totally disintegrated, and will eventually have to be replaced. (Robert S. Gamble)*

Historic: By contrast, conscientious dry or wet abrasive cleaning of a historic structure would be conducted within the range of 20 to 100 psi at a range of 3 to 12 inches. Cleaning at this low pressure requires the use of a very fine 00 or 0 mesh grit forced through a nozzle with a ¼ inch opening. A similar, even more delicate method being adopted by architectural conservators uses a micro-abrasive grit on small, hard-to-clean areas of carved, cut or molded ornament on a building façade. Originally developed by museum conservators for cleaning sculpture, this technique may employ glass beads, micro-balloons, or another type of micro-abrasive gently powered at approximately 40 psi by a very small, almost pencil-like pressure instrument. Although a slightly larger pressure instrument may be used on historic buildings, this technique still has limited practical applicability on a large scale building cleaning project because of the cost and the relatively few technicians competent to handle the task. In general, architectural conservators have determined that only through very controlled conditions can most historic building material be abrasively cleaned of soil or paint without measurable damage to the surface or profile of the substrate.

Yet some professional cleaning companies which sepcialize in cleaning historic masonry buildings use chemicals and water at a pressure of approximately 1,500 psi, while other cleaning firms recommend lower pressures ranging from 200 to 800 psi for a similar project. An architectural conservator might decide, *after testing*, that some historic structures could be cleaned properly using a moderate pressure (200–600 psi), or even a high pressure (600–1800 psi) water rinse. However, cleaning historic buildings under such high pressure should be considered an exception rather than the rule, and would require *very careful* testing and supervision to assure that the historic surface materials could withstand the pressure without gouging, pitting or loosening.

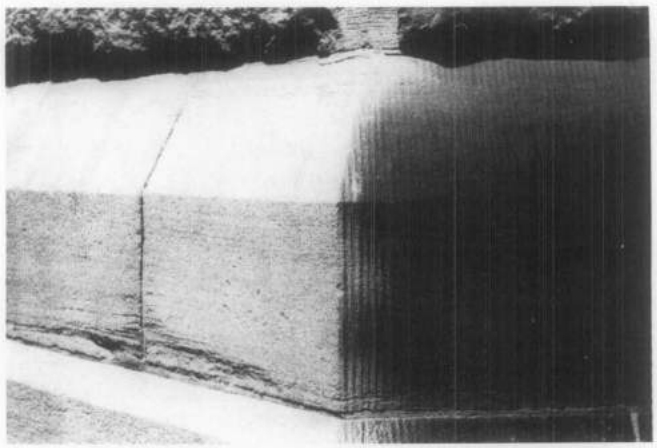
These differences in the amount of pressure used by commercial or industrial building cleaners and architectural conservators point to one of the main problems in using abrasive means to clean historic buildings: misunderstanding of the potentially fragile nature of historic building materials. There is no one cleaning formula or pressure suitable for all situations. Decisions regarding the proper cleaning process for historic structures can be made only after careful analysis of the building fabric, and testing.

How Building Materials React to Abrasive Cleaning Methods

Brick and Architectural Terra-Cotta: Abrasive blasting does not affect all building materials to the same degree. Such techniques quite logically cause greater damage to softer and more porous materials, such as brick or architectural terra-cotta. When these materials are cleaned abrasively, the hard, outer layer (closest to the heat of the kiln) is eroded, leaving the soft, inner core exposed and susceptible to accelerated weathering. Glazed architectural terra-cotta and ceramic veneer have a baked-on glaze which is also easily damaged by abrasive cleaning. Glazed architectual terra-cotta was designed for easy maintenance, and generally can be cleaned using detergent and water; but chemicals or steam may be needed to remove more persistent stains. Large areas of brick or architectural terra-cotta which have been painted are best left painted, or repainted if necessary.

Plaster and Stucco: Plaster and stucco are types of masonry finish materials that are softer than brick or terra-cotta; if treated abrasively these materials will simply disintegrate. Indeed, when plaster or stucco is treated abrasively it is usually with the intention of removing the plaster or stucco from whatever base material or substrate it is covering. Obviously, such abrasive techniques should not be applied to clean sound plaster or stuccoed walls, or decorative plaster wall surfaces.

Building Stones: Building stones are cut from the three main categories of natural rock: dense, igneous rock such as granite; sandy, sedimentary rock such as limestone or sandstone; and crystalline, metamorphic rock such as marble. As op-

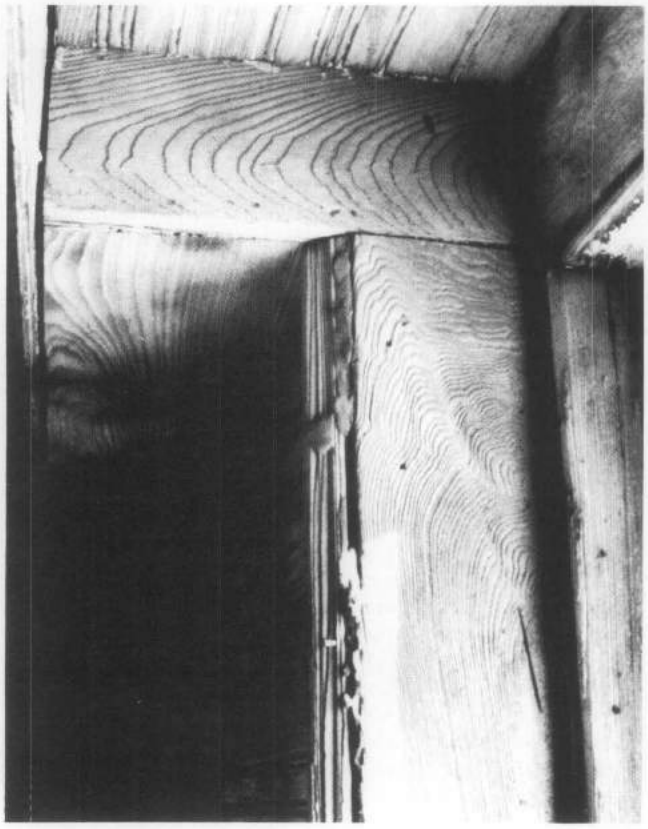


Abrasive Cleaning of Tooled Granite. *Even this carefully controlled "wet grit" blasting has erased vertical tooling marks in the cut granite blocks on the left. Not only has the tooling been destroyed, but the damaged stone surface is now more susceptible to accelerated weathering.*

posed to kiln-dried masonry materials such as brick and architectural terra-cotta, building stones are generally homogeneous in character at the time of a building's construction. However, as the stone is exposed to weathering and environmental pollutants, the surface may become friable, or may develop a protective skin or patina. These outer surfaces are very susceptible to damage by abrasive or improper chemical cleaning.

Building stones are frequently cut into ashlar blocks or "dressed" with tool marks that give the building surface a specific texture and contribute to its historic character as much as ornately carved decorative stonework. Such detailing is easily damaged by abrasive cleaning techniques; the pattern of tooling or cutting is erased, and the crisp lines of moldings or carving are worn or pitted.

Occasionally, it may be possible to clean small areas of rough-cut granite, limestone or sandstone having a heavy dirt encrustation by using the "wet grit" method, whereby a small amount of abrasive material is injected into a controlled, pressurized water stream. However, this technique requires very careful supervision in order to prevent damage to the stone. Polished or honed marble or granite should *never* be treated abrasively, as the abrasion would remove the finish in much the way glass would be etched or "frosted" by such a process. It is generally preferable to underclean, as too strong a cleaning procedure will erode the stone, exposing a new and increased surface area to collect atmospheric moisture and dirt. Removing paint, stains or graffiti from most types of stone may be accomplished by a chemical treatment carefully selected to best handle the removal of the particular type of paint or stain without damaging the stone. (See section on the "Gentlest Means Possible")



Abrasive Cleaning of Wood. *This wooden windowsill, molding and paneling have been sandblasted to remove layers of paint in the rehabilitation of this commercial building. Not only is some paint still embedded in cracks and crevices of the woodwork, but more importantly, grit blasting has actually eroded the summer wood, in effect raising the grain, and resulting in a rough surface.*

Wood: Most types of wood used for buildings are soft, fibrous and porous, and are particularly susceptible to damage by abrasive cleaning. Because the summer wood between the lines of the grain is softer than the grain itself, it will be worn away by abrasive blasting or power tools, leaving an uneven surface with the grain raised and often frayed or "fuzzy." Once this has occurred, it is almost impossible to achieve a smooth surface again except by extensive hand sanding, which is expensive and will quickly negate any costs saved earlier by sandblasting. Such harsh cleaning treatment also obliterates historic tool marks, fine carving and detailing, which precludes its use on any interior or exterior woodwork which has been hand planed, milled or carved.

Metals: Like stone, metals are another group of building materials which vary considerably in hardness and durability. Softer metals which are used architecturally, such as tin, zinc, lead, copper or aluminum, generally should not be cleaned abrasively as the process deforms and destroys the original surface texture and appearance, as well as the acquired patina. Much applied architectural metal work used on historic buildings—tin, zinc, lead and copper—is often quite thin and soft, and therefore susceptible to denting and pitting. Galvanized sheet metal is especially vulnerable, as abrasive treatment would wear away the protective galvanized layer.

In the late 19th and early 20th centuries, these metals were often cut, pressed or otherwise shaped from sheets of metal into a wide variety of practical uses such as roofs, gutters and flashing, and façade ornamentation such as cornices, friezes, dormers, panels, cupolas, oriel windows, etc. The architecture of the 1920s and 1930s made use of metals such as chrome, nickel alloys, aluminum and stainless steel in decorative exterior panels, window frames, and doorways. Harsh abrasive blasting would destroy the original surface finish of most of these metals, and would increase the possiblity of corrosion.

However, conservation specialists are now employing a sensitive technique of glass bead peening to clean some of the harder metals, in particular large bronze outdoor sculpture. Very fine (75–125 micron) glass beads are used at a low pressure of 60 to 80 psi. Because these glass beads are completely spherical, ther are no sharp edges to cut the surface of the metal. After cleaning, these statues undergo a lengthy process of polishing. Coatings are applied which protect the surface from corrosion, but they must be renewed every 3 to 5 years. A similarly delicate cleaning technique employing glass beads has been used in Europe to clean historic masonry structures without causing damage. But at this time the process has not been tested sufficiently in the United States to recommend it as a building conservation measure.

Sometimes a very fine *smooth* sand is used at a low pressure to clean or remove paint and corrosion from copper flashing and other metal building components. Restoration architects recently found that a mixture of crushed walnut shells and copper slag at a pressure of approximately 200 psi was the only way to remove corrosion successfully from a mid-19th century terne-coated iron roof. Metal cleaned in this manner must be painted immediately to prevent rapid recurrence of corrosion. It is thought that these methods "work harden" the surface by compressing the outer layer, and actually may be good for the surface of the metal. But the extremely complex nature and the time required by such processes make it very expensive and impractical for large-scale use at this time.

Cast and wrought iron architectural elements may be gently sandblasted or abrasively cleaned using a wire brush to remove layers of paint, rust and corrosion. Sandblasting was, in fact, developed originally as an efficient maintenance procedure for engineering and industrial structures and heavy machinery—iron and steel bridges, machine tool frames, engine frames, and railroad rolling stock—in order to clean and prepare them for repainting. Because iron is hard, its surface,

which is naturally somewhat uneven, will not be noticeably damaged by controlled abrasion. Such treatment will, however, result in a small amount of pitting. But this slight abrasion creates a good surface for paint, since the iron must be repainted immediately to prevent corrosion. Any abrasive cleaning of metal building components will also remove the caulking from joints and around other openings. Such areas must be recaulked quickly to prevent moisture from entering and rusting the metal, or causing deterioration of other building fabric inside the structure.

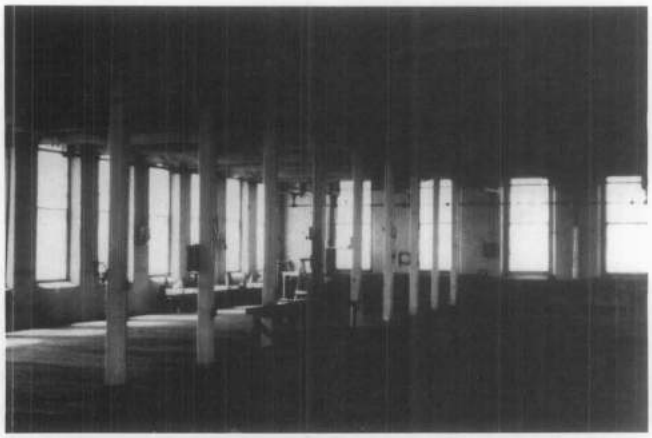
When is Abrasive Cleaning Permissible?

For the most part, abrasive cleaning is destructive to historic building materials. A limited number of special cases have been explained when it may be appropriate, if supervised by a skilled conservator, to use a delicate abrasive technique on some historic building materials. The type of "wet grit" cleaning which involves a small amount of grit injected into a stream of low pressure water may be used on small areas of stone masonry (i.e., rough cut limestone, sandstone or unpolished granite), where milder cleaning methods have not been totally successful in removing harmful deposits of dirt and pollutants. Such areas may include stone window sills, the tops of cornices or column capitals, or other detailed areas of the façade.

This is still an abrasive technique, and without proper caution in handling, it can be *just as harmful to the building surface as any other abrasive cleaning method.* Thus, the decision to use this type of "wet grit" process should be made only after consultation with an experienced building conservator. Remember that *it is very time consuming and expensive to use any abrasive technique on a historic building in such a manner that it does not cause harm to the often fragile and friable building materials.*

At this time, and only under certain circumstances, abrasive cleaning methods may be used in the rehabilitation of interior spaces of warehouse or industrial buildings for contemporary uses.

Interior spaces of factories or warehouse structures in which the masonry or plaster surfaces do not have significant design, detailing, tooling or finish, and in which wooden architectural features are not finished, molded, beaded or worked by hand, may be cleaned abrasively in order to remove layers of paint and industrial discolorations such as smoke, soot, etc. It is expected after such treatment that brick surfaces will be rough and pitted, and wood will be somewhat frayed or "fuzzy" with raised wood grain. These nonsignificant surfaces will be damaged and have a roughened texture, but because they are interior elements, they will not be subject to further deterioration caused by weathering.



Permissible Abrasive Cleaning. *In accordance with the Secretary of the Interior's* Guidelines for Rehabilitation Projects, *it may be acceptable to use abrasive techniques to clean an industrial interior space such as that illustrated here, because the masonry surfaces* do not *have significant design, detailing, tooling or finish, and the wooden architectural features are not finished, molded, beaded or worked by hand.*

Historic Interiors that Should Not Be Cleaned Abrasively

Those instances (generally industrial and some commercial properties), when it may be acceptable to use an abrasive treatment on the interior of historic structures have been described. But for the majority of historic buildings, the Secretary of the Interior's *Guidelines for Rehabilitation* do not recommend "changing the texture of exposed wooden architectural features (including structural members) and masonry surfaces through sandblasting or use of other abrasive techniques to remove paint, discolorations and plaster. . . ."

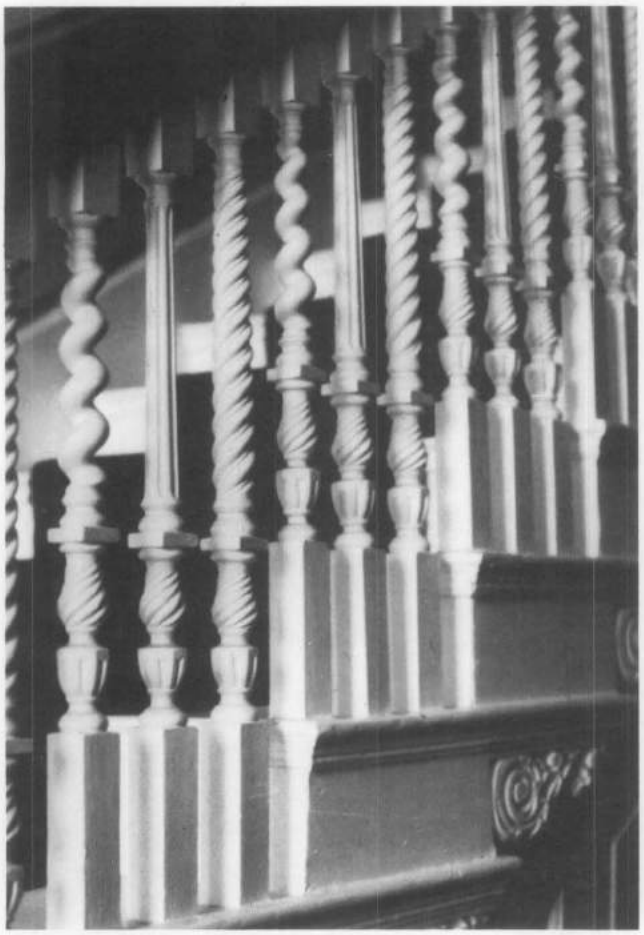
Thus, it is not acceptable to clean abrasively interiors of historic residential and commercial properties which have *finished* interior spaces featuring milled woodwork such as doors, window and door moldings, wainscoting, stair balustrades and mantelpieces. Even the most modest historic *house* interior, although it may not feature elaborate detailing, contains plaster and woodwork that is architecturally significant to the original design and function of the house. Abrasive cleaning of such an interior would be destructive to the historic integrity of the building.

Abrasive cleaning is also impractical. Rough surfaces of abrasively cleaned wooden elements are hard to keep clean. It is also difficult to seal, paint or maintain these surfaces which can be splintery and a problem to the building's occupants. The force of abrasive blasting may cause grit particles to lodge in cracks of wooden elements, which will be a nuisance as the grit is loosened by vibrations and gradually sifts out. Removal of plaster will reduce the thermal and insulating value of the walls. Interior brick is usually softer than exterior brick, and generally of a poorer quality. Removing surface plaster from such brick by abrasive means often exposes gaping mortar joints and mismatched or repaired brickwork which was never intended to show. The resulting bare brick wall may require repointing, often difficult to match. It also may be necessary to apply a transparent surface coating (or sealer) in order to prevent the mortar and brick from "dusting." However, a sealer may not only change the color of the brick, but may also compound any existing moisture problems by restricting the normal evaporation of water vapor from the masonry surface.

"Gentlest Means Possible"

There are alternative means of removing dirt, stains and paint from historic building surfaces that can be recommended as more efficient and less destructive than abrasive techniques. The "gentlest means possible" of removing dirt from a building surface can be achieved by using a low-pressure water wash, scrubbing areas of more persistent grime with a natural bristle (never metal) brush. Steam cleaning can also be used effectively to clean some historic building fabric. Low-pressure water or steam will soften the dirt and cause the deposits to rise to the surface, where they can be washed away.

A third cleaning technique which may be recommended to remove dirt, as well as stains, graffiti or paint, involves the use of commerically available chemical cleaners or paint removers, which, when applied to masonry, loosen or dissolve the dirt or stains. These cleaning agents may be used in combination with water or steam, followed by a clear water wash to remove the residue of dirt and the chemical cleaners from the masonry. A natural bristle brush may also facilitate this type of chemically assisted cleaning, particularly in areas of heavy dirt deposits or stains, and a wooden scraper can be



Do not Abrasively Clean these Interiors. *Most historic residential and some commercial interior spaces contain finished plaster and wooden elements such as this stair balustrade and paneling which contribute to the historic and architectural character of the structure. Such interiors should not be subjected to abrasive techniques for the purpose of removing paint, dirt, discoloration or plaster.*

useful in removing thick encrustations of soot. A limewash or absorbent talc, whiting or clay poultice with a solvent can be used effectively to draw out salts or stains from the surface of the selected areas of a building façade. It is almost impossible to remove paint from masonry surfaces without causing some damage to the masonry, and it is best to leave the surfaces as they are or repaint them if necessary.

Some physicists are experimenting with the use of pulsed laser beams and xenon flash lamps for cleaning historic masonry surfaces. At this time it is a slow, expensive cleaning method, but its initial success indicates that it may have an increasingly important role in the future.

There are many chemical paint removers which, when applied to painted wood, soften and dissolve the paint so that it can be scraped off by hand. Peeling paint can be removed from wood by hand scraping and sanding. Particularly thick layers of paint may be softened with a heat gun or heat plate, providing appropriate precautions are taken, and the paint film scraped off by hand. Too much heat applied to the same spot can burn the wood, and the fumes caused by burning paint are dangerous to inhale, and can be explosive. Furthermore, the hot air from heat guns can start fires in the building cavity. Thus, adequate ventilation is important when using a heat gun or heat plate, as well as when using a chemical stripper. A torch or open flame should never be used.

Preparations for Cleaning: It cannot be overemphasized that all of these cleaning methods must be approached with caution. When using any of these procedures which involve water or other liquid cleaning agents on masonry, it is imperative that *all* openings be tightly covered, and all cracks or joints be well pointed in order to avoid the danger of water penetrating the building's facade, a circumstance which might result in serious moisture related problems such as efflorescence and/or subflorescence. Any time water is used on masonry as a cleaning agent, either in its pure state or in combination with chemical cleaners, it is very important that the work be done in warm weather when there is no danger of frost for several months. Otherwise water which has penetrated the masonry may freeze, eventually causing the surface of the building to crack and spall, which may create another conservation problem more serious to the health of the building than dirt.

Each kind of masonry has a unique composition and reacts differently with various chemical cleaning substances. Water and/or chemicals may interact with minerals in stone and cause new types of stains to leach out to the surface immediately, or more gradually in a delayed reaction. What may be a safe and effective cleaner for certain stain on one type of stone, may leave unattractive discolorations on another stone, or totally dissolve a third type.

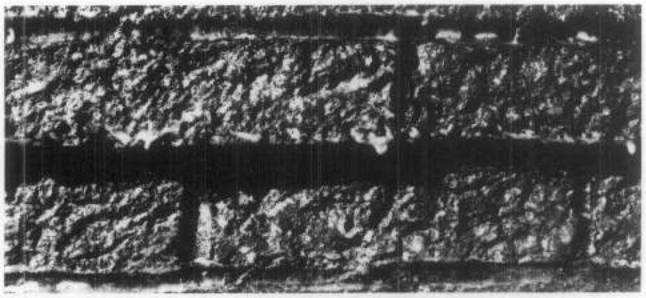
Testing: Cleaning historic building materials, particularly masonry, is a technically complex subject, and thus, should never be done without expert consultation and testing. No cleaning project should be undertaken without first applying the intended cleaning agent to a representative test patch area in an inconspicuous location on the building surface. The test patch or patches should be allowed to weather for a period of time, preferably through a complete seasonal cycle, in order to determine that the cleaned area will not be adversely affected by wet or freezing weather or any by-products of the cleaning process.

Mitigating the Effects of Abrasive Cleaning

There are certain restoration measures which can be adopted to help preserve a historic building exterior which has been damaged by abrasive methods. Wood that has been sandblasted will exhibit a frayed or "fuzzed" surface, or a harder wood will have an exaggerated raised grain. The only way to remove this rough surface or to smooth the grain is by laborious sanding. Sandblasted wood, unless it has been extensively sanded, serves as a dustcatcher, will weather faster, and will present a continuing and ever worsening maintenance problem. Such wood, after sanding, should be painted or given a clear surface coating to protect the wood, and allow for somewhat easier maintenance.

There are few successful preservative treatments that may be applied to grit-blasted exterior masonry. Harder, denser stone may have suffered only a loss of crisp edges or tool marks, or other indications of craft technique. If the stone has a compact and uniform composition, it should continue to weather with little additional deterioration. But some types of sandstone, marble and limestone will weather at an accelerated rate once their protective "quarry crust" or patina has been removed.

Softer types of masonry, particularly brick and architectural terra-cotta, are the most likely to require some remedial treatment if they have been abrasively cleaned. Old brick, being essentially a soft, baked clay product, is greatly susceptible to increased deterioration when its hard, outer skin is removed through abrasive techniques. This problem can be minimized by painting the brick. An alternative is to treat it with a clear sealer or surface coating but this will give the masonry a glossy or shiny look. It is usually preferable to paint the brick rather than to apply a transparent sealer since



Hazards of Sandblasting and Surface Coating. *In order to "protect" this heavily sandblasted brick, a clear surface coating or sealer was applied. Because the air temperature was too cold at the time of application, the sealer failed to dry properly, dripping in places, and giving the brick surface a cloudy appearance.*

sealers reduce the transpiration of moisture, allowing salts to crystallize as subflorescence that eventually spalls the brick. If a brick surface has been so extensively damaged by abrasive cleaning and weathering that spalling has already begun, it may be necessary to cover the walls with stucco, if it will adhere.

Of course, the application of paint, a clear surface coating (sealer), or stucco to deteriorating masonry means that the historical appearance will be sacrificed in an attempt to conserve the historic building materials. However, the original color and texture will have been changed already by the abrasive treatment. At this point it is more important to try to preserve the brick, and there is little choice but to protect it from "dusting" or spalling too rapidly. As a last resort, in the case of severely spalling brick, there may be no option but to replace the brick—a difficult, expensive (particularly if custom-made reproduction brick is used), and lengthy process. As described earlier, sandblasted interior brick work, while not subject to change of weather, may require the application of a transparent surface coating or painting as a maintenance procedure to contain loose mortar and brick dust. (See Preservation Briefs: No. 1 for a more thorough discussion of coatings.)

Metals, other than cast or wrought iron, that have been pitted and dented by harsh abrasive blasting usually cannot be smoothed out. Although fillers may be satisfactory for smoothing a painted surface, exposed metal that has been damaged usually will have to be replaced.

Summary

Sandblasting or other abrasive methods of cleaning or paint removal are by their nature destructive to historic building materials and should not be used on historic buildings except in a few well-monitored instances. There are exceptions when certain types of abrasive cleaning may be permissible, but only if conducted by a trained conservator, and if cleaning is necessary for the preservation of the historic structure.

There is no one formula that will be suitable for cleaning all historic building surfaces. Although there are many commerical cleaning products and methods available, it is impossible to state definitively which of these will be the most effective without causing harm to the building fabric. It is often difficult to identify ingredients or their proportions contained in cleaning products; consequently it is hard to predict how a product will react to the building materials to be cleaned. Similar uncertanities affect the outcome of other cleaning methods as they are applied to historic building materials. Further advances in understanding the complex nature of the many variables of the cleaning techniques may someday provide a better and simpler solution to the problems. But until that time, the process of cleaning historic buildings must be approached with caution through trial and error.

It is important to remember that historic building materials are neither indestructible, nor are they renewable. They must be treated in a responsible manner, which may mean little or no cleaning at all if they are to be preserved for future generations to enjoy. If it is in the best interest of the building to clean it, then it should be done "using the gentlest means possible."

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STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

AIR POLLUTION CONTROL REGULATION NO. 24

REMOVAL OF LEAD BASED PAINT FROM EXTERIOR SURFACES

Effective 27 April 1993

Last Amended 19 July 2007

AUTHORITY: These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35.

RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES

AIR POLLUTION CONTROL REGULATION NO. 24

REMOVAL OF LEAD BASED PAINT FROM EXTERIOR SURFACES

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RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR RESOURCES
AIR POLLUTION CONTROL REGULATION NO. 24

REMOVAL OF LEAD BASED PAINT FROM EXTERIOR SURFACES

24.1 Definitions

Unless otherwise expressly defined in this section, the terms used in this regulation shall be defined by reference to the Rhode Island Air Pollution Control General Definitions Regulation. As used in this regulation, the following terms shall, where the context permits, be construed as follows:

24.1.1 **"Abrasive blasting"** means the procedure of removing paint from a surface by forcefully applying an abrasive material to the paint containing surface.

24.1.2 **"HEPA" or "high efficiency particulate air"** means a filter capable of filtering out particles of 0.3 microns or greater from a body of air at 99.97 percent efficiency or greater.

24.1.3 **"Hydroblasting"** means any abrasive blasting using high pressure liquid as the propelling force.

24.1.4 **"Impenetrable material"** means a material that will not allow any spent abrasives, paint, dust and/or other debris, including all residues generated by wet paint removal operations, to penetrate through it.

24.1.5 **"Lead-based substance"** means any paint or other surface coating material containing more than 0.05 percent lead by weight calculated as lead metal in the dried solid.

25.1.6 **"Lead based paint"** means any surface coating material that contains more than 0.05 percent lead by weight calculated as lead metal in the dried solid.

24.1.7 **"Mechanical paint removal"** means the use of any force, including but not limited to manual, mechanical, electrical or other power, applied to a device to remove paint from a surface.

24.1.8 **"Paint"** means any surface coating material.

24.1.9 **"Paint stripper"** means any chemical and/or caustic substance applied to a surface for the purpose of removing paint.

24.1.10 **"Representative sample"** means a sample of any paint, including a sample of each layer of paint which is on a structure, that may and/or will be removed from a structure.

24.1..11 **"Sandblasting"** means abrasive blasting.

24.1.12 **"Vacuum blasting"** means any abrasive blasting in which the spent abrasive, paint, dust and/or other debris are immediately collected by a vacuum device.

24.1.13 **"Wet abrasive blasting"** means any abrasive blasting using compressed air as the propelling force in combination with water to contain the spent abrasive, paint, particulate, dust and/or other debris generated by the operations.

24.2 Applicability and Exemptions

24.2.1 Applicability

The provisions of this regulation shall apply to all persons engaging in the removal of a lead based substance from exterior surfaces of buildings and/or other structures, unless exempted below.

24.2.2 Exemptions

Removal of paint, that is not a lead based substance, from a surface shall be exempted from this regulation. To qualify for this exemption, a representative sample of any paint, which is to be removed from any surface, must be tested prior to the initiation of paint removal and must contain no more than 0.05% lead by weight calculated as lead metal in the dried solid. The person performing the paint removal operation is responsible for determining if lead paint is present on the structure. Paint removal operations which are exempt from the requirements of this regulation must comply with the requirements of Air Pollution Control Regulation No. 5 "Fugitive Dust".

24.3 Notification requirements

24.3.1 The following persons shall be notified in writing, by the person conducting the removal operation, at least five days prior to the beginning of any lead paint

removal from the exterior surface of any structure:

(a) adults residing in the structure from which the lead paint is being removed and/or residing within 50 feet of the structure from which lead paint is being removed, and

(b) the owner, agent, and/or property manager of the structure from which the lead paint is being removed and/or of any building located within 50 feet of the structure from which lead paint is being removed, and

(c) the owner, agent or manager of any business or organization located in the structure from which the lead paint is being removed and/or within 50 feet of the structure from which lead paint is being removed, and

(d) the principal of every school and the chief administrative officer of every school within 50 feet of the structure from which lead paint is being removed.

24.3.2 The notification shall include, at a minimum, the following information:

(a) the location of the structure from which the lead paint is to be removed,

(b) the expected start and completion dates for the lead paint removal project,

(c) the lead paint removal procedure to be used, and

(d) the name, address and telephone number of the individual or company responsible for the lead paint removal.

24.3.3 In addition, the notification shall include the following statement: "The paint which will be removed from this structure contains lead. Exposure to lead is unhealthful, particularly to young children. Contact the Department of Environmental Management, Office of Air Resources, at 222-2808 for more information."

24.3.4 Any and all parties identified in section 24.3.1 must be notified in writing of any changes in the information included in the original notice.

24.4 Requirements for Preparation of Work Area:

24.4.1 The following procedures must be followed prior to the initiation of lead paint

removal from any exterior surfaces of buildings:

(a) Remove or cover with an impenetrable material all toys, play equipment and furnishings within a minimum of 50 feet, and/or any other distance which spent abrasive, paint, particulate, dust and/or other debris generated by the removal operations may travel, from a surface from which lead based paint is being removed.

(b) Place an impenetrable material on the ground, at the paint removal worksite, to keep any and all spent abrasive, paint, particulate, dust and/or other debris generated by the paint removal operation from being deposited on the ground. If a wet removal system is to be used, procedures must be employed to contain any and all residues generated by the wet abrasive blasting operations.

(c) The ground sheeting must be attached to ground by staking, weighing down or any other method to insure that it remains in place during the paint removal operation.

(d) If abrasive blasting, machine sanding or machine scraping is to be employed, close all doors and windows on the walls to be blasted or sanded and securely seal them from the outside. Air conditioning units on these and adjacent walls must be turned off and covered.

(e) Erect vertical containment shrouds if there is visible movement of abrasive material, paint, dust and/or other debris beyond ground sheeting.

(f) If a wet removal procedure is to be used, a system must be in place prior to initiation of the removal which allows liquid waste to be collected from the ground containment and placed into appropriate containers for proper disposal.

24.4.2 Site preparation for exterior paint removal from structures other than buildings must be adequate to prevent spent abrasive material, paint, particulate, dust and/or other debris from being deposited on the ground or in water or travelling offsite. Prior to removing paint from structures other than buildings, the person performing the paint removal work and/or the contractor responsible for the removal operation must submit a plan, that describes the procedure to be employed, to the Office of Air Resources for approval. The paint removal operation must not be initiated until written approval is issued by the Department.

24.5 Requirements for Removal of Lead Paint Using Heat Based Methods

24.5.1 Open flame burning shall not be used to remove paint from exterior surfaces.

24.5.2 Heat guns and/or any other device used for removal of paint from exterior surfaces must be operated such that the temperature of the gun and/or other device does not exceed 1000°F.

24.6 Requirements for Removal of Lead Paint Using Chemical Based Methods

24.6.1 Flammable paint strippers and paint strippers containing methylene chloride shall not be used to remove paint from exterior surfaces.

24.6.2 Non-flammable paint strippers which do not contain methylene chloride may be used for the removal of exterior paint provided that the manufacturers instructions for use of the paint stripper are followed.

24.7 Requirements for Removal of Lead Paint Using Mechanical Methods

24.7.1 Machine sanding and/or machine scraping shall be allowed only if the unit is controlled by a HEPA vacuum unit which immediately collects any and all spent abrasive, paint, particulate, dust and/or other debris generated by the operations. The sanding and/or scraping disk must not be wider than the direct surface upon which it is being applied.

24.7.2 Exterior surfaces must be misted with water prior to manual scraping. Dry scraping is not allowed.

24.8 Requirements for Removal of Lead Paint Using Abrasive Blasting

24.8.1 Dry abrasive blasting shall be allowed only if any and all spent abrasive, paint, particulate, dust and/or other debris generated by the blasting is immediately collected by a HEPA vacuum unit. Any person using a vacuum blast system must comply with the manufacturers' guidelines when using the system.

24.8.2 Hydroblasting or wet abrasive blasting may be used for exterior lead paint removal provided that a vertical containment system is employed that prevents any and all fallout generated by the operation from travelling beyond the ground containment. Additionally any and all liquid waste generated by the operation must be adequately contained and handled in accordance with applicable waste disposal regulations.

24.9 Alternative Procedures for Removal of Paint Containing Lead

24.9.1 The Department may, on a case by case basis, allow an alternative procedure

for removing paint containing lead provided that the person who uses this procedure shall submit to the Office of Air Resources, in writing, a description of the procedure which demonstrates to the satisfaction of the Department that the proposed alternative provides an equivalent control efficiency to the methods which are contained in sections 24.5, 24.6, 24.7 and 24.8. Use of an alternative procedure shall not begin until a written approval is issued by the Department.

24.10 Requirements for Site Cleanup

24.10.1 At the end of each workday, the following procedures must be followed:

(a) If a dry removal procedure was used, spray any and all spent abrasive, paint, particulate, dust and/or other debris present on ground sheeting and/or other containments with a fine mist of water and collect the residue and place it in an appropriate container.

(b) Visually inspect all areas, including areas that extend beyond the sheeted area, to determine whether any spent abrasive, paint, particulate, dust and/or other debris has escaped containment. If any spent abrasive, paint, particulate, dust and/or other debris generated by the lead paint removal operation is observed it must be collected and placed in single 6-mil or double 4-mil plastic bags or another appropriate container.

(c) If bags are used they must not be overloaded. Bags must be securely sealed and stored in such a way that they are not easily accessible to the public.

(d) Liquid waste must be collected and stored in appropriate containers. Containers must be securely sealed and stored in a manner such that they are not easily accessible to the public.

(e) Plastic sheets used for exterior containments, such as ground sheeting and vertical shrouds, must be removed and stored in a manner such that they are not easily accessible to the public.

24.10.2 At the completion of a lead paint removal project, or at the time when all lead paint that is to be removed from a structure has been removed, the following procedures must be implemented:

(a) Spray the ground sheeting as specified in section 24.10.1(a). Any and all residue must be collected and placed in an appropriate container. Ground sheeting should then be folded from the ends to the middle and placed into single 6-mil or double 4-mil plastic bags

for disposal.

(b) Collect any and all liquid waste in appropriate containers.

(c) As specified in section 24.10.1(b) the area must be inspected for any spent abrasive, paint, particulate, dust and/or other debris which may have escaped containment and any and all such debris must be collected and placed in single 6-mil or double 4-mil plastic bags or an appropriate container.

(d) Any and all bags and containers must be securely sealed. Removal and disposal must be in accordance with applicable solid and hazardous waste regulations.

24.11 General Provisions

24.11.1 Purpose

The purpose of this regulation is to specify appropriate procedures for the removal of lead based paint from exterior surfaces.

24.11.2 Authority

These regulations are authorized pursuant to R.I. Gen. Laws § 42-17.1-2(s) and 23-23, as amended, and have been promulgated pursuant to the procedures set forth in the R.I. Administrative Procedures Act, R.I. Gen. Laws Chapter 42-35

24.11.3 Application

The terms and provisions of this regulation shall be liberally construed to permit the Department to effectuate the purposes of state law, goals and policies.

24.11.4 Severability

If any provision of this regulation or the application thereof to any person or circumstance, is held invalid by a court of competent jurisdiction, the validity of the remainder of the regulation shall not be affected thereby.

24.11.5 Effective Date

The foregoing regulation, "Removal of Lead Based Paint from Exterior Surfaces", as amended, after due notice, is hereby adopted and filed with the Secretary of State this _____ day of _____, 20___ to become effective twenty (20) days thereafter, in accordance with the provisions of Chapters 23-23, 42-35, 42-17.1, 42-17.6, of the General Laws of Rhode Island of 1956, as amended.

W. Michael Sullivan, PhD., Director
Department of Environmental Management

Notice Given on: February 21, 2007

Public Hearing held: March 23, 2007

Filing Date: June 29, 2007

Effective Date: July 19, 2007

DOCUMENT 00 45 13

CONTRACTOR'S QUALIFICATION STATEMENT

AIA Document A305, Contractor's Qualification Statement - Electronic Format, 1986 Edition, is included, following this page, as an integral part of the Bid documents, for use in evaluating the qualifications of Contractors.

The numerical low bidder will be required to complete and submit this form for evaluation.

END OF DOCUMENT

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AIA® Document A305™ – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO:

ADDRESS:

SUBMITTED BY:

NAME:

ADDRESS:

PRINCIPAL OFFICE:

[ ] Corporation

[ ] Partnership

[ ] Individual

[ ] Joint Venture

[ ] Other

NAME OF PROJECT: *(if applicable)*

State House Stair and Stone Wall Repair / DOT Building Exterior Masonry and Stair Repair

TYPE OF WORK: *(file separate form for each Classification of Work)*

[ ] General Construction

[ ] HVAC

[ ] Electrical

[ ] Plumbing

[ ] Other: *(Specify)*

§ 1 ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor?

§ 1.2 How many years has your organization been in business under its present business name?

§ 1.2.1 Under what other or former names has your organization operated?

§ 1.3 If your organization is a corporation, answer the following:

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

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

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.

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User Notes: (1768049777)

§ **1.3.1** Date of incorporation:
§ **1.3.2** State of incorporation:
§ **1.3.3** President's name:
§ **1.3.4** Vice-president's name(s)

§ **1.3.5** Secretary's name:
§ **1.3.6** Treasurer's name:

§ **1.4** If your organization is a partnership, answer the following:
§ **1.4.1** Date of organization:
§ **1.4.2** Type of partnership (if applicable):
§ **1.4.3** Name(s) of general partner(s)

§ **1.5** If your organization is individually owned, answer the following:
§ **1.5.1** Date of organization:
§ **1.5.2** Name of owner:

§ **1.6** If the form of your organization is other than those listed above, describe it and name the principals:

§ 2 LICENSING

§ **2.1** List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

§ **2.2** List jurisdictions in which your organization's partnership or trade name is filed.

§ 3 EXPERIENCE

§ **3.1** List the categories of work that your organization normally performs with its own forces.

§ **3.2** Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)
§ **3.2.1** Has your organization ever failed to complete any work awarded to it?

§ **3.2.2** Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

§ **3.2.3** Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

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(1768049777)

§ **3.3** Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

§ **3.4** On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

§ **3.4.1** State total worth of work in progress and under contract:

§ **3.5** On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

§ **3.5.1** State average annual amount of construction work performed during the past five years:

§ **3.6** On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

§ 4 REFERENCES

§ **4.1** Trade References:

§ **4.2** Bank References:

§ **4.3** Surety:

§ **4.3.1** Name of bonding company:

§ **4.3.2** Name and address of agent:

§ 5 FINANCING

§ **5.1** Financial Statement.

§ **5.1.1** Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

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Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ **5.1.2** Name and address of firm preparing attached financial statement, and date thereof:

§ **5.1.3** Is the attached financial statement for the identical organization named on page one?

§ **5.1.4** If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

§ **5.2** Will the organization whose financial statement is attached act as guarantor of the contract for construction?

§ 6 SIGNATURE

§ **6.1** Dated at this day of

Name of Organization:

By:

Title:

§ **6.2**

M being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this day of

Notary Public:

My Commission Expires:

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DOCUMENT 00 52 13

AGREEMENT FORM

AIA Document A104 Standard Abbreviated Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum - 2017 Edition, and as amended, forms the basis of Contract between the Owner and Contractor, and is included, following this page, as an integral part of the Bid documents. Provisions that are not amended or supplemented remain in full force and effect.

END OF DOCUMENT

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II. **Agencies are responsible to ensure proper use of the appropriate AIA contract template(s) on State public works projects.**

DRAFT

AIA® Document A104™ - 2017

Standard Abbreviated Form of Agreement Between Owner and Contractor

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

AGREEMENT made as of the «_» day of «_» in the year «2021»
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address, telephone and facsimile numbers, and website)

«**State of Rhode Island, acting by and through the Department of Administration, Division of Purchases, on behalf of the User Agency**»
«**One Capitol Hill, Second Floor**»
«**Providence, Rhode Island 02908-5855**»
«**401.578.8100 (telephone); 401.574.8387 (facsimile)**»
«**www.ridop.ri.gov**»

on behalf of the User Agency:
(Name, legal status, address, telephone and facsimile numbers, and website)

« R.I. State House, Division of Purchases on behalf of the User Agency»
«82 Smith Street»
«Providence RI 02908»
«Tel. 401 574-8100»
Fax. 401 574-8387
«www.purchasing.ri.gov»

and the Contractor:
(Name, legal status, address, telephone and facsimile numbers, and website)

« »
« »
« »

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

« Rhode Island State House Leaks Remediation Phase 2»
«82 Smith Street, Providence, RI 02908»
«Phase 2 Leak Repair in various areas.»

The Design Agent:
(Name, legal status, address, telephone and facsimile numbers, and website)

« Saccoccio & Associates Architects»
«1085 Park Ave, Cranston, RI 02910»
«Tel. 401 942-7970 »
«Fax. 401 942-7975»
«www.sa-architects.com »

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The Owner and Contractor agree as follows.

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User Notes: A104- 2017 template revision date 9/10/19 (1852003406)

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EXHIBIT A DETERMINATION OF THE COST OF THE WORK

ARTICLE 1 THE WORK OF THIS CONTRACT

The Contractor shall execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. No part of the Work shall be performed by Subcontractors without the Owner's prior written consent.

DRAFT

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ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The date of commencement of the Work shall be the later of: (i) the issuance of the Purchase Order by the Owner; and (ii) the date set forth in a notice to proceed issued by the User Agency.

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

§ 2.3 Substantial Completion

§ 2.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check the appropriate box and complete the necessary information.)

[« X »] Not later than « 180 » (« One hundred and eighty ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 2.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date
« Base Bid »	One hundred eighty calendar days from date of commencement of the work

§ 2.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 2.3, liquidated damages, if any, shall be assessed as set forth in Section 3.5.

ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[« X »] Stipulated Sum, in accordance with Section 3.2 below

[« »] Cost of the Work plus the Contractor's Fee, in accordance with Section 3.3 below

[« »] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 3.4 below

(Based on the selection above, complete Section 3.2, 3.3 or 3.4 below.)

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

§ 3.2.1 The Stipulated Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« Alternate 1 (Schedule: Construction start for Alternate No. 1 is July 1, 2022 with a Substantial Completion date of September 28, 2022 and Final Completion by October 12, 2022.)»

§ 3.2.2 Unit prices, if any, are specified in the Bid Proposal Form and include all costs, including without limitation, labor, materials, services, regulatory compliance, overhead, and profit necessary for the completion of the Work. Unit prices shall be used for both additions to, and deletions from the Work.

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§ 3.2.3 Allowances, if any, are specified in the Bid Proposal Form and are included in the Contract Sum.

§ 3.3 Cost of the Work Plus Contractor's Fee

§ 3.3.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.3.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

« »

§ 3.4 Cost of the Work Plus Contractor's Fee With a Guaranteed Maximum Price

§ 3.4.1 The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.

§ 3.4.2 The Contractor's Fee:
(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)

« »

§ 3.4.3 Guaranteed Maximum Price

§ 3.4.3.1 The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed « » ($ «_»), subject to additions and deductions by changes in the Work as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.
(Insert specific provisions if the Contractor is to participate in any savings.)

« »

§ 3.4.3.2 The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 3.4.3.3 Unit Prices, if any, are specified in the Bid Proposal Form and include all costs, including without limitation, labor, materials, services, regulatory compliance, overhead, and profit necessary for the completion of the Work. Unit prices shall be used for both additions to, and deletions from the Work.

§ 3.4.3.4 Allowances, if any, are specified in the Bid Proposal Form and are included in the Guaranteed Maximum Price.

§ 3.4.3.5 Assumptions, if any, on which the Guaranteed Maximum Price is based:

« »

§ 3.4.3.6 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes or equipment, all of which, if required, shall be incorporated by Change Order.

§ 3.4.3.7 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 3.4.3.5. The Owner shall promptly furnish such revised Contract Documents

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to the Contractor. The Contractor shall notify the Owner and Design Agent of any inconsistencies between the agreed-upon assumptions contained in Section 3.4.3.5 and the revised Contract Documents.

§ 3.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

«**.1** In the event that there is one date for Substantial Completion of the Work, the Contractor shall pay the Owner the sum stipulated in this Section 3.5.1 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work is substantially complete: $_____ .

.2 In the event that the Project is scheduled to be completed in phases, and there is more than one date for Substantial Completion of the Work, the Contractor shall pay the Owner an aggregate amount equal to the sums stipulated in this Section 3.5.2 as liquidated damages, and not as a penalty, for each calendar day of delay until the Work for each phase is substantially complete:

Phase	Liquidated Damages Sum
Base Bid	$300
Alternate 1	$300

.3 The Owner and the Contractor have reasonably determined the sums set forth in this Section 3.5 to be a fair estimate of the Owner' actual damages which are difficult to ascertain in the event of delay.»

ARTICLE 4 PAYMENT

§ 4.1 Progress Payments

§ 4.1.1 Based upon Applications for Payment submitted to the Design Agent by the Contractor and Certificates for Payment issued by the Design Agent and approved by the Owner in writing, the Owner shall make progress payments, less retainage, on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

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

§ 4.1.3 The Owner shall make payment of the certified amount to the Contractor not later than the 30th working day following written approval by the Owner.

§ 4.1.4 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold retainage from the payment otherwise due as follows: five (5%) percent.

§ 4.1.4.1 Deleted.

§ 4.1.5 Payments due and unpaid under the Contract shall bear interest from the date payment is due in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 et seq.

§ 4.1.6 Within 10 working days of receipt of any progress payment from the Owner, the Contractor must pay its Subcontractors the full amount included for each such Subcontractor within the Contractor's Application for Payment.

§ 4.2 Final Payment

§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, less the amount withheld pursuant to Section 4.1.4.1, shall be made by the Owner to the Contractor when:

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the Contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a Guaranteed Maximum Price;

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.3 a final Certificate for Payment has been issued by the Design Agent and approved in writing by the Owner, and in accordance with Section 15.7.1.

.4 the Contractor has submitted its final waiver of lien and final waivers of lien from all of its Subcontractors and suppliers in a form acceptable to the Owner; and

.5 the Contractor has submitted to the Owner all close-out documents, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents.

§ 4.2.2 The Owner's final payment to the Contractor shall be made no later than 30 working days after the issuance of the Design Agent's final Certificate for Payment and written approval by the Owner.

§ 4.3 The Owner shall have the right to deduct from any payments due to the Contractor the amount of any unpaid obligations owed to the State of Rhode Island by the Contractor, including without limitation, any and all unpaid taxes, the amount of any claim against the Contractor arising out of this Agreement, or any amount on account of any other reason permitted by applicable law.

§ 4.4 Pursuant to R.I. Gen. Laws § 44-1-6, the Owner shall withhold payment from the Contractor if the Contractor does not maintain a regular place of business in Rhode Island in the amount of three (3%) percent of the Contract Sum until 30 calendar days after Final Completion and compliance by the Contractor with the requirements of such section. The three (3%) percent withheld pursuant to R.I. Gen. Laws § 44-1-6 is not considered retainage which is held pursuant to § 15.4.5.

ARTICLE 5 DISPUTE RESOLUTION

§ 5.1 Initial Decision Maker

Claims shall be referred to the Initial Decision Maker for initial decision. The Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws § 37-2-1 et seq., will serve as the Initial Decision Maker in accordance with the provisions of the State Purchases Act, State of Rhode Island Procurement Regulations, and this Section 5.1. An initial decision shall be required as a condition precedent to binding dispute resolution pursuant to Section 5.3 of any Claim arising prior to the date final payment is due.

§ 5.2 Mediation

For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 5.1, and prior to the implementation of the binding dispute resolution procedures set forth in Section 5.3, the Contractor shall have the option to pursue mediation, exercisable by written notice to the Owner within 30 calendar days of an Initial Decision. In the event of the exercise of such option by the Contractor, the Owner and the Contractor shall attempt to select a mediator, and in the event that the Owner and the Contractor cannot agree on a mediator, either party may apply in writing to the Presiding Justice of the Providence County Superior Court, with a copy to the other, with a request for the court to appoint a mediator, and the costs of the mediator shall be borne equally by both parties.

§ 5.3 Binding Dispute Resolution

For any Claim not resolved by the Initial Decision Maker procedures set forth in Section 6.1, or mediation at the option of the Contractor pursuant to Section 5.2, the method of binding dispute resolution shall be determined in accordance with the provisions of the "Public Works Arbitration Act," R.I. Gen. Laws §§ 37-16-1 et seq.

ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS

§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A104™–2017, Standard Abbreviated Form of Agreement Between Owner and Contractor, as modified by the Owner.

§ 6.1.2 Deleted.

§ 6.1.3 Deleted.

§ 6.1.4 The Specifications: The Specifications are included in the Solicitation and are available on the Division of Purchases website at www.ridop.ri.gov.

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§ 6.1.5 The Drawings: The Drawings are included in the Solicitation and are available on the Division of Purchases website at www.ridop.ri.gov.

§ 6.1.6 The Addenda, if any, issued pursuant to the Solicitation form a part of the Solicitation and are available on the Division of Purchases website at www.ridopri.gov.

§ 6.1.7 Additional documents, if any, forming part of the Contract Documents:
.1 Supplementary Conditions and other Conditions of the Contract, including State of Rhode Island General Conditions of Purchase Regulation
.2 Other documents listed below:
(List here any additional documents that are intended to form part of the Contract Documents.)

.1 The Solicitation, issued by the Owner, including without limitation, the Invitation to Bid, the Instructions to Bidders, the Specifications and Drawings, any Addenda, and the Bid Checklist.

.2 The Bid Proposal, including without limitation, the Bid Form and the Bidder Certification Cover Form.

.3 The Purchase Order issued by the Owner.

§ 6.2 This Agreement and the Contract Documents are subject to, and governed by, the laws of the State of Rhode Island, including all procurement statutes and regulations (available at www.ridop.ri.gov), and applicable federal and local law, all of which are fully incorporated into this Agreement by this reference.

§ 6.3 In the event of any conflicts or discrepancies among the Contract Documents, the provisions of the Contract Documents will be interpreted in the following order of priority set forth in Rhode Island Procurement Regulation 220-RICR-30-00-13.4(B).

§ 6.4 In the event of any conflict between or among the Contract Documents, or any Contract Documents and any provision of the Rhode Island General Laws and/or the State of Rhode Island Procurement Regulations, the Rhode Island General Laws and the State of Rhode Island Procurement Regulations shall control.

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 The Contract Documents

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary Conditions, if any, and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Design Agent. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor; provided, however, the User Agency is a disclosed third-party beneficiary of this Agreement and shall have all of the rights and benefits hereunder to which such a party is entitled.

§ 7.3 The Work

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

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§ 7.4 Instruments of Service

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

§ 7.5 Ownership and use of Drawings, Specifications and Other Instruments of Service

§ 7.5.1 The Design Agent and the Design Agent's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Design Agent or Design Agent's consultants' reserved rights.

§ 7.5.2 The Owner has a nonexclusive perpetual license to use the Design Agent's Instruments of Service, including electronic or digital documents, solely and exclusively for purposes of constructing, using, maintaining, altering, and adding to the Project, and shall have and retain all rights to use and reproduce them for the production and maintenance of the Work described therein, provided that the Owner substantially performs its obligations under this Agreement, including prompt payment of all sums due. The Design Agent shall obtain similar nonexclusive licenses from the Design Agent's consultants consistent with this Agreement. These Instruments of Service shall be conveyed to the Owner in their original operative, editable, electronic form in order to allow the Owner's integration of the data into the Owner's or User Agency's facilities management database. The license granted under this section permits the Owner to authorize the Contractor, Subcontractors, Sub-subcontractors, and suppliers, as well as the Owner's consultants and separate contractors, to reproduce applicable portions of the Instruments of Service, solely and exclusively for use in performing services or construction for the Project. If the Design Agent rightfully terminates this Agreement for cause as provided in Section 20.2, the license granted in this Section 7.5.2 shall terminate. The Contractor, Subcontractors, Sub-subcontractors and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to the protocols established pursuant to Sections 7.6 and 7.7, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Design Agent, and the Design Agent's consultants.

§ 7.6 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form.

§ 7.7 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

§ 7.8 Severability

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

§ 7.9 Notice

§ 7.9.1 Where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission.

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§ 7.9.2 Claims by either the Owner or Contractor must be initiated by written notice to the other party as set forth in § 7.9.1. Claims by either party must be initiated within 21 working days after occurrence of the event giving rise to such Claim or within 21 working days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 7.10 Relationship of the Parties

Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Design Agent and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of skilled workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.

ARTICLE 8 OWNER

§ 8.1 Information and Services Required of the Owner

§ 8.1.1 Deleted.

§ 8.1.2 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.3 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.4 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments, and charges required for the construction, use, or occupancy of permanent structures, or for permanent changes in existing facilities.

§ 8.2 Owner's Right to Stop the Work

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

§ 8.3 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a 10 working-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to any other remedies the Owner may have, correct such default or neglect. The Design Agent may, pursuant to Section 15.4.3, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including the Owner's expenses and compensation for the Design Agent's additional services made necessary by such default, neglect, or failure. If the Contractor disagrees with the actions of the Owner or the Design Agent, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 21.

ARTICLE 9 CONTRACTOR

§ 9.1 Review of Contract Documents and Field Conditions by Contractor

§ 9.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.2, shall take field measurements of any existing

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conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Design Agent and the Owner any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Design Agent or the Owner may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

§ 9.1.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Design Agent and the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Design Agent or the Owner may require.

§ 9.2 Supervision and Construction Procedures

§ 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

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

§ 9.3 Labor and Materials

§ 9.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 9.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Design Agent and in accordance with a Modification.

§ 9.4 Warranty

The Contractor warrants to the Owner and Design Agent that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage. All other warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 15.6.3.

§ 9.5 Taxes

The State of Rhode Island is exempt from payment of any federal or state excise, transportation, or sales tax. The Rhode Island Department of Administration Division of Purchases will furnish Exemption Certificates upon request. The Contractor shall pay any other sales, consumer, use, and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

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

§ 9.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as other permits, fees, licenses, and inspections by government agencies necessary for proper

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execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 9.6.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 Allowances

The Contract Sum includes all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Contractor's costs for unloading and handling at the site, labor, installation, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowance.

§ 9.8 Contractor's Construction Schedules

§ 9.8.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Design Agent's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 9.8.2 The Contractor shall perform the Work in general accordance with the most recent schedule submitted to the Owner and Design Agent.

§ 9.9 Submittals

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Design Agent Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Design Agent reasonable time for review. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and the Design Agent that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements, and field construction criteria related thereto, or will do so; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.9.3 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents or unless the Contractor needs to provide such services in order to carry out the Contractor's own responsibilities. If professional design services or certifications by a design professional are specifically required, the Owner and the Design Agent will specify the performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional. If no criteria are specified, the design shall comply with applicable codes and ordinances. Each Party shall be entitled to rely upon the information provided by the other Party. The Design Agent will review and approve or take other appropriate action on submittals for the limited purpose of checking for conformance with information provided and the design concept expressed in the Contract Documents. The Design Agent's review of Shop Drawings, Product Data, Samples, and similar submittals shall be for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. In performing such review, the Design Agent will approve, or take other appropriate action upon, the Contractor's Shop Drawings, Product Data, Samples, and similar submittals.

§ 9.10 Use of Site

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

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§ 9.11 Cutting and Patching
The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

§ 9.12 Cleaning Up
The Contractor shall keep the site and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract Documents. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus material from and about the Project.

§ 9.13 Access to Work
The Contractor shall provide the Owner and Design Agent with access to the Work in preparation and progress wherever located.

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

§ 9.15 Indemnification
§ 9.15.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, the User Agency and the State of Rhode Island in accordance with Rhode Island Procurement Regulation 220-RICR-30-00-13.21.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 9.15.3 Without limiting the generality of the foregoing, the defense and indemnity set forth in this Section 9.15 includes, without limitation, all judgments, liabilities, damages, losses, claims, demands, and actions on account of bodily injury, death, or property loss to a person or entity indemnified hereunder or any other persons or entities, whether based upon statutory (including, without limitation, workers compensation), contractual, tort, or other liability of any person or entity so indemnified.

§ 9.15.4 The remedies set forth herein shall not deprive any person indemnified hereunder of any other indemnity action, right, or remedy otherwise available to any such person or entity at common law or otherwise.

§ 9.15.5 The Contractor will include the indemnity set forth in this Section 9.15, without modification, in each Subcontract with any Subcontractor.

§ 9.15.6 Notwithstanding any other language in the Contract Documents to the contrary, the indemnity hereunder shall survive Final Completion of the Work and final payment under the Agreement and shall survive any termination of the Agreement.

ARTICLE 10 DESIGN AGENT
§ 10.1 The Design Agent will provide administration of the Contract as described in the Contract Documents. The Design Agent will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

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§ 10.2 Duties, responsibilities, and limitations of authority of the Design Agent as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, the Contractor, and the Design Agent. Consent shall not be unreasonably withheld.

§ 10.3 The Design Agent and its subconsultants will visit the site at intervals appropriate to the stage of the construction to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general, if the Work observed is being performed in compliance with the Contract Documents and in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Design Agent will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Design Agent will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 10.4 On the basis of the site visits, the Design Agent will keep the Owner and the User Agency informed about the progress and quality of the portion of the Work completed, and promptly report in writing to the Owner and the User Agency (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Design Agent will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Design Agent will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 10.5 Based on the Design Agent's evaluations of the Work and of the Contractor's Applications for Payment, the Design Agent will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 10.6 The Design Agent has the authority and the responsibility to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.7 The Design Agent will review and approve or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 10.8 The Design Agent will interpret matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or the Contractor. The State Purchasing Agent appointed pursuant to the provisions of the "State Purchases Act," R.I. Gen. Laws §§ 37-2-1 et seq., will make initial decisions on all claims, disputes, and other matters in question between the Owner and the Contractor, and the Design Agent will assist the State Purchasing Agent in such decisions pursuant to the provisions of Article 5. The Design Agent will not be liable for results of any interpretations rendered reasonably in the Design Agent's professional judgment and in good faith.

§ 10.9 Deleted.

ARTICLE 11 SUBCONTRACTORS

§ 11.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.

§ 11.2 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Design Agent of the Subcontractors or suppliers proposed for each of the portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Design Agent has made written objection within 14 working days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

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§ 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and the Design Agent, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 12.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 12.2 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a Separate Contractor because of delays, improperly timed activities, or defective construction of the Contractor.

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor, and Design Agent, or by written Construction Change Directive signed by the Owner and the Design Agent. Upon issuance of the Change Order or Construction Change Directive, the Contractor shall proceed promptly with such changes in the Work, unless otherwise provided in the Change Order or Construction Change Directive.

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and the Design Agent, by the Contractor's cost of labor, material, equipment, and overhead and profit as set forth in Section 13.6. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Design Agent will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for Payment. When the Owner and the Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Design Agent will prepare a Change Order.

§ 13.3 The Design Agent, with the prior written approval of the Owner, will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Contractor. The Contractor shall carry out such written orders promptly. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Design Agent and shall not proceed to implement the change in the Work.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and the Contractor; provided that the Contractor provides notice to the Owner and the Design Agent promptly and before conditions are disturbed.

§ 13.5 Subsequent to the approval by the Owner of a Change Order as provided in this Article 13, whether such Change Order changes the Contract Sum or Contract Time or both, no additional claim related to such Change Order will be considered by the Owner. Any change, once incorporated into a Change Order, is all inclusive, and includes all factors that could have been considered at the time of the Change Order such as Project impact or schedule "ripple" effect.

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§ 13.6 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

.1 For the Contractor, for work performed by the Contractor's own forces, an amount not to exceed ten (10%) percent of the cost.

.2 For the Contractor, for work performed by the Contractor's Subcontractors, an amount not to exceed five (5%) percent of the amount due to the Subcontractors.

.3 For each Subcontractor, for work performed by the Subcontractor's own forces, an amount not to exceed ten (10%) percent of the cost.

.4 Where the Work represents both additions and deletions and results in a net increase, the allowable overhead and profit shall be in accordance with this Section 13.6, but in no event shall the amount exceed fifteen (15%) percent of the net increase in the cost of the Work.

§ 13.7 All proposals with an aggregate cost equal to or in excess of $500.00 shall be accompanied by a detailed itemization of costs, including labor, materials (quantities and prices), and Subcontracts, in a form acceptable to the Owner. In no event will a change order request reflecting an aggregate cost equal to or in excess of $500.00 be approved without such itemization.

ARTICLE 14 TIME

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

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

§ 14.3 Deleted.

§ 14.4 The date of Substantial Completion is the date certified by the Design Agent in accordance with Section 15.6.3.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) changes ordered in the Work; (2) by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control; or (3) by other causes that the Contractor asserts, and the Design Agent determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Design Agent may determine, subject to the provisions of Article 21. The sole remedy against the Owner for delays shall be the allowance of additional time for completion of the Work.

§ 14.5.1 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of calendar days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 14.5.2 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 Schedule of Values

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price pursuant to Section 3.2 or 3.4, the Contractor shall submit a schedule of values to the Design Agent before the first Application for Payment, allocating the entire Stipulated Sum or Guaranteed Maximum Price to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy required by the Design Agent. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

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§ 15.1.2 The allocation of the Stipulated Sum or Guaranteed Maximum Price under this Section 15.1 shall not constitute a separate stipulated sum or guaranteed maximum price for each individual line item in the schedule of values.

§ 15.2 Control Estimate

§ 15.2.1 Where the Contract Sum is the Cost of the Work, plus the Contractor's Fee without a Guaranteed Maximum Price pursuant to Section 3.3, the Contractor shall prepare and submit to the Owner a Control Estimate within 14 calendar days of executing this Agreement. The Control Estimate shall include the estimated Cost of the Work plus the Contractor's Fee.

§ 15.2.2 The Control Estimate shall include:

.1 the documents enumerated in Article 6, including all Modifications thereto;

.2 a list of the assumptions made by the Contractor in the preparation of the Control Estimate to supplement the information provided by the Owner and contained in the Contract Documents;

.3 a statement of the estimated Cost of the Work organized by trade categories or systems and the Contractor's Fee;

.4 a project schedule upon which the Control Estimate is based, indicating proposed Subcontractors, activity sequences and durations, milestone dates for receipt and approval of pertinent information, schedule of shop drawings and samples, procurement and delivery of materials or equipment the Owner's occupancy requirements, and the date of Substantial Completion; and

.5 a list of any contingency amounts included in the Control Estimate for further development of design and construction.

§ 15.2.3 When the Control Estimate is acceptable to the Owner and the Design Agent, the Owner shall acknowledge it in writing. The Owner's acceptance of the Control Estimate does not imply that the Control Estimate constitutes a Guaranteed Maximum Price.

§ 15.2.4 The Contractor shall develop and implement a detailed system of cost control that will provide the Owner and the Design Agent with timely information as to the anticipated total Cost of the Work. The cost control system shall compare the Control Estimate with the actual cost for activities in progress and estimates for uncompleted tasks and proposed changes. This information shall be reported to the Owner, in writing, no later than the Contractor's first Application for Payment and shall be revised and submitted with each Application for Payment.

§ 15.2.5 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in the Control Estimate. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and the Design Agent of any inconsistencies between the Control Estimate and the revised Contract Documents.

§ 15.3 Applications for Payment

§ 15.3.1 At least 10 working days before the date established for each progress payment, the Contractor shall submit to the Design Agent and the Owner for approval an itemized Application for Payment prepared in accordance with the schedule of values for completed portions of the Work. The application shall be notarized, if required; be supported by all data substantiating the Contractor's right to payment that the Owner or the Design Agent require; shall reflect retainage if provided for in the Contract Documents; and include any revised cost control information required by Section 15.2.4. All Applications for Payment for Change Orders must be accompanied by a Notice of Change in Purchase Order issued by the Owner, and if directed by the Owner, by the User Agency. Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 15.3.2 With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.

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§ 15.3.3 Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

§ 15.3.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests. The Contractor shall immediately satisfy any lien, claim, or encumbrance against the site where the Project is located and indemnify the Owner from and against all resulting costs and expenses, including without limitation, attorneys' fees.

§ 15.4 Certificates for Payment

§ 15.4.1 The Design Agent will, within 7 working days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Design Agent determines is properly due, or notify the Contractor and Owner of the Design Agent reasons for withholding certification in whole or in part as provided in Section 15.4.3.

§ 15.4.2 The issuance of a Certificate for Payment will constitute a representation by the Design Agent to the Owner, based on the Design Agent's evaluations of the Work and the data in the Application for Payment, that, to the best of the Design Agent's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Design Agent. However, the issuance of a Certificate for Payment will not be a representation that the Design Agent has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 15.4.3 The Design Agent will withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Design Agent's opinion the representations to the Owner required by Section 15.4.2 cannot be made. If the Design Agent is unable to certify payment in the amount of the Application, the Design Agent will notify the Contractor and Owner as provided in Section 15.4.1. If the Contractor and the Design Agent cannot agree on a revised amount, the Design Agent will promptly issue a Certificate for Payment for the amount for which the Design Agent is able to make such representations to the Owner. The Design Agent will also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Design Agent's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of:

.1 defective Work not remedied;

.2 third-party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

.5 damage to the Owner or a Separate Contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or

.7 failure to carry out the Work in accordance with the Contract Documents; or

.8 any other failure to comply with the obligations of the Contractor under the Contract Documents.

§ 15.4.4 When either party disputes the Design Agent's decision regarding a Certificate for Payment under Section 15.4.3, in whole or in part, that party may submit a Claim in accordance with Article 21.

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§ 15.4.5 The amount of five (5%) percent shall be retained by the Owner through the date of Substantial completion of the Work and then after the date of Substantial Completion of the Work in accordance with R.I. Gen. Laws § 37-12-10.1

§ 15.4.6 The Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Design Agent and the Design Agent will reflect such payment on the next Certificate for Payment.

§ 15.5 Progress Payments

§ 15.5.1 The Contractor shall pay each Subcontractor, no later than 10 working days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in a similar manner.

§ 15.5.2 Neither the Owner nor the Design Agent shall have an obligation to pay or see to the payment of money to a Subcontractor or supplier except as may otherwise be required by law.

§ 15.5.3 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 15.5.4 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor.

§ 15.6 Substantial Completion

§ 15.6.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

§ 15.6.3 Upon receipt of the Contractor's list, the Design Agent will make an inspection to determine whether the Work or designated portion thereof is substantially complete. When the Design Agent determines that the Work or designated portion thereof is substantially complete, the Design Agent will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion; establish responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate.

§ 15.6.4 The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment less the amount of five (5%) percent to be retained by the Owner in accordance with Section 15.4.5. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 15.7 Final Completion and Final Payment

§ 15.7.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Design Agent will promptly make such inspection and, when the Design Agent finds the Work acceptable under the Contract Documents and the Contract fully performed, the Design Agent will promptly issue a final Certificate for Payment stating that to the best of the Design Agent's knowledge, information and belief, and on the basis of the Design Agent's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the

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Contractor and noted in the final Certificate is due and payable. The Design Agent's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.7.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 15.7.2 Final payment shall not become due until the Contractor has delivered to the Owner: (i) all close-out documents, including without limitation, all as-built plans, warranties, manuals, and other materials set forth in the Contract Documents; and (ii) a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.7.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from:

- **.1** liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

§ 15.7.5 From the final payment, the Owner may withhold, as retainage, the amount provided in Section 15.4.5.

§ 15.7.6 Final Completion means that point in time when the Design Agent has issued the final Certificate for Payment, the Owner has confirmed to the Contractor in writing that the Work has achieved Final Completion, the Contractor has completed all punch list items, and the Contractor has provided all close-out documents required by the Contract Documents.

§ 15.7.7 Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work.

§ 15.8 Interest

No interest shall be due or payable on account of any payment due or unpaid under the Contract Documents except in accordance with the provisions of "Prompt Payment by Department of Administration," R.I. Gen. Laws §§ 42-11.1-1 et seq.

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

§ 16.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

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

The Contractor shall comply with, and give notices required by, applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of governmental authorities bearing on safety of persons and property and their protection from damage, injury, or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3. The Contractor may make a claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Design Agent or by anyone for whose acts either of them may be liable, and not

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attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

§ 16.1.4 When use or storage of explosives, or other hazardous materials, substances or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the User Agency and the Owner reasonable advance written notice.

§ 16.2 Hazardous Materials and Substances

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Design Agent of the condition. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and the Contractor. By Change Order, the Contract Time shall be extended appropriately, and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 16.2.2 Subject to the limits of liability set forth in R. I. Gen. Laws § 9311, et seq., the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Design Agent, Design Agent's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 16.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor, subject to the limits of liability set forth in R. I. Gen. Laws § 9311, et seq., for all cost and expense thereby incurred.

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 Contractor's Insurance

§ 17.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Solicitation or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the insurance required by the Solicitation and this Agreement from an insurance company or insurance companies lawfully authorized to issue insurance in the State of Rhode Island. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 18.4.

§ 17.1.2 Deleted.

§ 17.1.3 Deleted.

§ 17.1.4 Deleted.

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§ 17.1.10 Deleted.

§ 17.1.11 The Contractor shall disclose to the Owner any deductible or self- insured retentions applicable to any insurance required to be provided by the Contractor.

§ 17.1.12 Deleted.

§ 17.1.13 Within 3 working days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by this Section 17.1, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 17.1.14 Deleted.

§ 17.2 Deleted.

§ 17.2.1 Deleted.

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§ 17.3 Performance Bond and Payment Bond

§ 17.3.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Solicitation.

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

ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Design Agent or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed, or completed. Costs of correcting such rejected Work, including additional testing and

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inspections, the cost of uncovering and replacement, and compensation for the Design Agent's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Final Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.6.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition.

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

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

§ 18.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18.

§ 18.6 Upon request by the Owner or the User Agency, and prior to the expiration of one-year period from the date of Final Completion, the Design Agent will conduct, and the Contractor, without additional compensation, shall attend a minimum of 2 meetings with the Owner and the User Agency to review the facility operations and performance.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 Assignment of Contract

This Agreement shall be binding on the Contractor and its successors and assigns; provided, however, that the Contractor may not assign its rights nor delegate its responsibilities under this Agreement without the Owner's prior written consent.

§ 19.2 Governing Law

This Agreement and the Contract Documents are subject to, and governed by, the laws of the State of Rhode Island, including all procurement statutes and regulations (available at www.ridop.ri.gov), and applicable federal and local law, all of which are fully incorporated into this Agreement by this reference.

§ 19.3 Tests and Inspections

Tests, inspections, and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of governmental authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate governmental authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Design Agent timely notice of when and where tests and inspections are to be made so that the Design Agent may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

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

§ 19.4 The Owner's representative:
(Name, title, address, email address and other information for the preferred methods of contact)

« **Simidele Mabray**
Project Manager »
«Department of Administration »
«Division of Capital Asset Management and Maintenance»

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«1 Capitol Hill»
«Providence, RI 02908-5853»
Tel: (401) 222 3913
Cell: (401) 626 1585
Simidele.Mabray@doa.ri.gov

§ 19.5 The Contractor's representative:
(Name, title, address, email address and other information for the preferred methods of contact)

« »
« »
« »
« »
« »
« »

§ 19.6 The Design Agent's representative:
(Name, title, address, email address, and other information for the preferred methods of contact)

« Steve Guglielmo »
Principal
Saccoccio & Associates, Architects
1085 Park Avenue
Cranston. RI 02910
Tel.: 401-942-7970
Fax.: 401-942-7975»
«steve@sa-architects.com»

§ 19.7 Neither the Owner's nor the Contractor's nor the Design Agent's representative shall be changed without 10 working days' prior notice to the other parties.

§ 19.8 The Contractor represents and warrants to the Owner, in addition to any other representations and warranties of the Contractor elsewhere in the Contract Documents:

.1 The Contractor and its Subcontractors are each financially solvent, able to pay their debts as they mature, and possess sufficient working capital to perform their obligations under the Contract Documents.
.2 The Contractor and its Subcontractors are each able to furnish the tools, materials, equipment, and labor required to complete the Project as required under the Contract Documents.
.3 The Contractor and each Subcontractor are authorized to do business in the State of Rhode Island and are properly licensed by all necessary governmental authorities having jurisdictions over them and over the Work and the Project.
.4 The execution of this Agreement and its performance is within its duly authorized powers;
.5 The Contractor has visited the site of the Project, familiarized itself with the local and special conditions under which the Work is to be performed, and correlated its observations with the requirements of the Contract Documents.
.6 The Contractor possesses the requisite level of experience and expertise in the business administration, construction, and superintendence of projects of the size, complexity, and nature of the Project, and it will perform the Work with the care, skill, and diligence of a contractor possessing such experience and expertise.

§ 19.8.1 The representations and warranties of the Contractor in this Section 19.8 and elsewhere in the Contract Documents will survive the execution and delivery of this Agreement, any termination of this Agreement, and the Final Completion of the Work.

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§ 19.9 The Owner is the State of Rhode Island, acting by and through its Department of Administration, Division of Purchases, and therefore, pursuant to the provisions of R.I. Gen. Laws § 34-28-31, mechanics liens may not be placed against the Project**.**

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 Termination by the Contractor

If the Design Agent fails to certify payment as provided in Section 15.4.1 for a period of 30 working days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 working days, the Contractor may, upon 7 additional working days' notice to the Owner and the Design Agent, terminate the Contract and recover from the Owner payment for Work executed.

§ 20.2 Termination by the Owner for Cause

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

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

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

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a governmental authority;

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents; or

.5 cancels or the Contractor or the Owner receives notice of cancellation of nonrenewal of any insurance required under the Contract Documents.

§ 20.2.2 When any of the reasons described in Section 20.2.1 exists, the Owner, upon certification by the Design Agent that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor 7 working days' notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 20.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Design Agent's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Design Agent, upon application, and this obligation for payment shall survive termination of the Contract.

§ 20.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Owner shall pay the Contractor for Work executed; and costs incurred by reason of such termination, including costs attributable to termination of Subcontracts.

§ 20.4 The Contract may also be terminated by the Owner: (i) in the event of the unavailability of appropriated funds; (ii) in the absence of a determination of continued need; or (iii) as otherwise provided in the State of Rhode Island General Conditions of Purchase Regulation or other applicable law.

§ 20.5 The Work may be suspended by the Owner as provided in the State of Rhode Island General Conditions of Purchase Regulation or other applicable law.

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1 Deleted.

§ 21.2 Deleted.

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§ 21.10 Continuing Contract Performance
Pending final resolution of a Claim, except as otherwise agreed in writing, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 21.11 Waiver of Claims for Consequential Damages
The Contractor waives claims against the Owner for consequential damages arising out of or relating to this Contract. This waiver includes:

.1 Deleted.

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This waiver is applicable, without limitation, to all consequential damages due to the Contractor's termination in accordance with Article 20. Nothing contained in this Section 21.11 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

The person signing for the Contractor represents that he or she has been duly authorized to execute this Agreement on behalf of the Contractor.

This Agreement is entered into as of the day and year first written above; provided, however, that this Agreement shall not become a valid, binding, and enforceable contract unless and until the Owner shall have issued a Purchase Order.

«**THE STATE OF RHODE ISLAND, acting by and through its Department of Administration, Division of Purchases**»		« »
OWNER *(Signature)*		***CONTRACTOR*** *(Signature)*
«Mike Mitchell » « Deputy Purchasing Agent »		« »« »
(Printed name and title)		*(Printed name and title)*

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SECTION 00 52 19

SUPPLEMENTARY CONDITIONS TO THE AGREEMENT
(AIA Document A104)

PART 1 - GENERAL

The following supplements modify the AIA Document A104, Standard Abbreviated Form of Agreement Between Owner and Contractor, 2017 Edition. Where a portion of the Agreement is modified or deleted by these Supplementary Conditions, the unaltered portions of the Agreement shall remain in effect.

PART 2 - ARTICLES

ARTICLE 19…MISCELLANEOUS PROVISIONS

Add the following to Article 19

19.10 EQUAL OPPORTUNITY

19.10.1 The Contractor shall maintain policies of employment as follows:

19.10.1.1 The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, sexual preference or national origins. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, sexual preference, or national origin.

Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.

19.10.1.2 The Contractor and the Contractor's Subcontractors shall in all solicitations or advertisements for employees placed by them or on their behalf; state that all qualified applicants will receive considerations for employment without regard to race, religion, color, sex, sexual, or national origin.

19.10.1.3 The Contractor shall be a signatory to the requirements of the Rhode Island Equal Employment Office.

The Contractor must provide to the Owner the approved records that the Contractor, all subcontractors and their associates and individual that visit the project site, have passed a (State) Rhode Island Bureau of Criminal Identification (BCI) check before entry onto the site and an equivalent State criminal identification check in the State they reside.

19.11 PREVAILING WAGE SCALES ON PUBLIC WORKS PROJECTS

19.11.1 Prevailing Wages shall be paid in accordance with Chapter 37-13 et seq. of the General Laws of Rhode Island, as amended and in accordance with the Rules and Regulations of the Department of Labor. Violators are subject to and responsible for all penalties, fines, and adjustments in wage and benefit payments as prescribed in Chapter 37-13 of the Rhode Island General Laws entitled "Labor and Payment of Debts by Contractors." This law shall be considered incorporated herein as if attached and written in full. Specific attention is called to Chapter 37-13-8 regarding the requirement that that "*each contractor awarded a public works contract after July 1, 2007 shall contact the department of labor and training on or before July first of each year, for the duration of such contract to ascertain the prevailing wage rate of wages on a hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done each year and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee every July first.*"

19.11.2 The wage rates as ascertained by the Department of Labor shall apply. Information concerning wage rates prevailing in the construction industry in Rhode Island may be obtained from the Office of the State Department of Labor, 1511 Pontiac Avenue, Cranston, Rhode Island and are also available by accessing the following web site, http://www.purchasing.ri.gov. Under no condition shall the wages paid, be less than those designated in the general classification and the base bids shall be prepared taking into consideration the requirement for the annual adjustments.

19.11.3 The Contractor shall meet all the requirements prescribed by the State Labor Laws and regulation, issued by the Rhode Island Department of Labor, pertaining to Public Works Projects General Laws of Rhode Island. The laws are hereby made part of this Project as if attached and written in full. These laws include, but are not limited to:

1. Weekly payment of employees;
2. Provisions applicable to Public Works Contracts;
3. Payment of Prevailing Wages;
4. Posting of Prevailing Wage Rates and;
5. Overtime Compensation

It is the contractor's responsibility to use the current prevailing wage table. The table may be obtained at the RI Division of Purchases Home Page at www.purchasing.ri.gov .

19.12 SHUTDOWNS

While every effort should be made to minimize disruptions to communications, data, mechanical and/or electrical shutdowns affecting the existing operations and facilities at the Work Site and on campus with the work, the following criteria has been established in the event shutdowns are required to carry out the work scope of the project and/or in the event of emergency conditions.

The Contractor shall make provisions to assure that closure and/or disruption to roadways, driveways, sidewalks and other site access is minimized and scheduled well in advance if partial closure is required. Partial closure will be requested in writing by the Contractor and approved in writing by the Owner. At no time shall site access be permitted to be fully closed. The Contractor shall assure that traffic flow is

maximized during peak hours of operation at the facility and at roadways affecting not only access to the site but the community as well. When traffic on these roadways is disrupted, the Contractor shall provide Police protection to assure public safety and movement of traffic as part of the base bid costs.

Additionally, these conditions shall be used with regards to dealing with Public Ways such as streets and sidewalks and adjacent businesses as they may be affected by the project. It is the Contractors responsibility to provide and pay for all permits, temporary facilities, police protection, and details required to carry out the project scope. A detailed accounting and plan of the work to be performed during the shutdown shall be provided that includes the reason and duration of the shutdown, and any operations that will be affected by the shutdown. Plans shall be prepared by the Contractor and submitted to the Architect and Owner for review and then submitted to the appropriate authorities such as but not limited to State, State and Local Police, State and Local Public Works, Local Fire Departments and other agencies having jurisdiction.

Furthermore, the Contractor shall work with the Owner in maintaining the integrity of all systems at the Work Site because the State House is open and occupied 24 hours a day, seven days a week. The Contractor must coordinate and minimize any and all shutdowns of building systems as follows:

1. Assure that the Owner is provided with proper notice when making shutdowns and pay any fees as may be required and make any accommodations necessary to maintain operations and employee and resident comfort.
2. Ensure that the building's operations can continue in a secure manner and employee and resident comfort is maintained 24 hours a day, seven days a week.

The Contractor shall clearly define through the submittal process (before an exposure to disruptions in services can be triggered) complete and comprehensive protocols and procedures which will establish the notification procedure and specific details for permanent and/or temporary conditions to be implemented by the Contractor and accommodations for building operations and employee comfort. The submittals shall be provided to the Owner and Architect for the Owner's approval and at minimum defines a procedure for the following:

001-Pre-notification Scheduled shutdowns (a minimum of not less than seven (7) calendar days notification for disruptions and shut downs to issues such as but not limited to the following:

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water
Roadways
Driveways
Parking
Employee and Public Entrances and Egress
Building Spaces
Handicap parking and handicap front building access

All costs associated with these activities and accommodations for maintaining building operations and employee comfort are considered part of the Base Bid and Base Project Schedule.

The protocol submitted to the Owner and Architect shall establish the Contractor's written notification procedure and the Contractor's plans on making either permanent work around solutions and/or temporary solutions to assure that the facility and/or facilities continue with productive and a safe business operations as usual, unless otherwise approved in writing by the Owner.

002- It is understood that certain circumstances and conditions sometimes require disruptions and shut downs that were planned for, however may not have had the precise timing pre-planned, schedule acceleration has impacted the timing, extraordinary circumstances dictate that the work be performed out of sequence to allow the Project to continue. These disruptions/ shut downs shall be permitted with proper notification and in accordance the protocols established by the Contractor as approved by the Owner provided notification is provided within seven (7) days of the scheduled work and as long as accommodations are provided for continued building operations and maintaining employee comfort. All costs associated with these activities are considered part of the Base Bid and Base Project Schedule.

Illustrative examples include but are not limited to:

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water
Roadways
Driveways
Parking
Employee and Public Entrances and Egress
Building Spaces
Handicap parking and handicap front building access

The Owner reserves the right to reject and/or request modification to these disruptions/ shut down requests, if it is determined that the request cannot be carried out in a manner that protects the interest of the Owner. In the event the request is rejected and/or otherwise modified the Contractor shall not be compensated for additional costs and/ or provided additional time for the Project provided the modification and timing is for just cause.

003- A protocol for Emergency and/or Accidental Shutdowns that require an Immediate Response Action shall be established for the Project.

The Contractor shall clearly provide details as to how they intent to minimize and/or otherwise correct or make alternate provisions to minimize the impact of the disruption to the Owner for issues pertaining to items such as but not limited to…

Power
Data
Communications
Mechanical Systems
Fire Protection
Emergency Egress as may be required
Water

Roadways
Driveways
Parking
Employee and Public Entrances and Egress
Building Spaces

The costs for Emergency and/or Accidental disruptions and/or shut downs shall be the Contractors.

004- The Contractor acknowledges that any and all cost borne by the Owner and Architect due to shutdowns of systems due to poor planning by the Contractor shall be paid for by the Contractor and shall be appropriately deducted by a deductive change order affecting the next payment requisition.

Additionally, the Contractor shall not be eligible for time extensions due to rejection of a shutdown, rejected for failure to comply with this section or due to poor planning by the Contractor.

006- Perform any duties required by Owner when making a shut down.

007- Provide appropriate fire watch during shutdowns which may affect fire alarm and or sprinklers system operations.

008- Duration of shutdowns shall be kept to a minimum.

009- All systems shall be returned to normal operating conditions at end of work day, unless otherwise planned and provided for and approved by the Owner in writing.

19.13 ZERO PUNCH LIST ITEM OBJECTIVES

The Contractor shall promptly correct conditions pointed out as being deficient at the time of the discovery and notification of such conditions and shall not defer the correction of work to the punch list or close-out phases of the project. Upon notification of deficient Work the Contractor shall take action to correct the existing Work and not continue with new/additional Work in the manner that has been identified as being deficient. Deviation from this project approach shall be grounds for a Stop Work Order on the Project and the Owner and Architect will not be responsible for delays and/or additional costs due to the Stop Work Order.

All punch list and deficient work shall be performed by workmen skilled in the trade of the item damaged or improperly installed and in no cases shall repair work be performed by anyone other than the original installing Contractor without the written approval of the Owner and/or Architect, unless said Contractor is determined incompetent to continue such work at which time the Contractor will submit an alternative Contractor to the Owner in writing for approval at no additional costs to the Owner.

19.14 ADDITIONAL CONTRACT DOCUMENTS

Additional Consultant Reports included are to be considered part of the Contract Documents as Reference Materials. Consultant reports are complementary. They are as follows:

- None other than those included in the Drawings and Project Manual.

19.15 QUANTITY OF DRAWINGS AND SPECIFICATIONS DUE THE CONTRACTOR

The Owner shall furnish to the Contractor one (1) electronic file which includes drawings in CAD format for the purposes of producing As Built Documents.

19.16 ENERGY REBATES

When dealing with the utilities and other vendors in which the Owner is eligible for Energy Rebates or other forms of rebates, credits, discounts and etc., the Contractor shall assure that all applications are filled out and executed in a manner that rebate checks, credits and or/other forms of reimbursement are paid directly to the Owner with no exception unless otherwise noted and/or approved in writing.

19.17 LIQUIDATED DAMAGES

Damages are defined and delineated in the Bid Form

19.18 SPECIAL WARRANTIES, WARRANTY RESPONSE TIME, SERVICE CONTRACTS

The Contractor shall provide and pay for all the requirements outlined in this section (19.18) as part of the Project Base Bid.

Service Contracts will be captured in the Project Schedule of Values. The costs associated with the Service Contract Work will not be subject to retainage, and will be billed quarterly for the duration of the Service Contract period, unless otherwise approved in writing by the Owner.

Warranty Provisions:

As prescribed in AIA Document A104-2017 as amended by the Contract Agreement the Contractor shall provide a minimum of a **two (2) year** warranty period on all systems, repairs, materials and workmanship incorporated in the project. Systems, repairs, materials and workmanship that has been prescribed as having warranties for periods greater than **two (2) years** by the individual specification sections shall be carried at the warranty period prescribed by that individual reference provided a minimum of **two (2) years** are provided in all aspects of the warranty/guarantee provisions.

Additionally, as prescribed in AIA Document A104-2017 as amended by the Contract Agreement, the **two (2) year** period for correction of work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of Work[1].

Furthermore as provided in AIA Document A104-2017 as amended by the Contract Agreement states upon completion of any Work under or pursuant to Paragraph 12.2 that **the two (2) year** correction period in connection with the Work requiring correction shall be renewed and recommence. The obligations shall cover any repairs and replacement to any part of the Work or other property that is damaged by the defective Work and Work impacted by such corrective action.

The Contractor is hereby notified that no warranty period of less than **two (2) years** is acceptable on the project and any and all contradictions to this **two (2) year** period in the individual specification sections shall be considered edited to read **two (2) years** in the event those specification sections indicate

[1] Punch List Completion and Acceptance

otherwise with the exception of those items that provide warranty/guarantee periods that are prescribed for a period of greater than **two (2) years**. Those periods shall remain for the period that has been prescribed, as greater than **two (2) years** as published and established in the Contract Documents.

Response Time Pertaining to Warranty Work:

The Contractor shall be prepared to respond to various warranty claims in accordance with the following schedule.

Schedule One, One Hour Response*:

The Contractor will respond to the Owner's request for service and have **qualified personnel on site** for:

- Significant[2] wall, and other building envelope system leaks (weather or non-weather related),
- Blockage of drainage systems
- Water infiltration resulting in total or partial failure of heating, cooling, and/or ventilation systems,
- Water infiltration resulting in total or partial loss of electrical power not related to service provider,
- Water infiltration resulting in partial or total loss of security systems, including but not limited to video surveillance, scanners, locking and arming of security systems and building locking,
- Water infiltration resulting in partial or total loss of data and telecommunications not related to service provider,
- Or, water infiltration resulting in any other failure of systems that could potentially cause significant damage to property and/or person.

Within One (1) Hour [twenty four hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365, 366)] of initial attempt to notify the Contractor, or applicable assigned/approved Subcontractor or Designee of the Contractor of the emergency condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with

[2] "Significant" is defined as "Causing or Creating Damage and/or Danger to any of the Building Systems, Finishes, and/or Occupants."

answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Two, Four Hour Response:

The Contractor will respond to and have **qualified personnel on site** for:

- Minor, roof, wall, window and other envelope areas of the Work or caused by the Work (weather or non-weather related),
- Minor blockage of drainage systems and mechanical system leaks in the Work or caused by the Work.

Within Four (4) Hours [twenty four hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365, 366)] of initial attempt to notify the Contractor, or applicable assigned/approved Subcontractor or Designee of the Contractor of the emergency condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Three, Twenty Four Hour Response:

The Contractor will respond to and have **qualified personnel on site** for:

ALL OTHER EMERGENCY TYPE CLAIMS that present safety issues, discomfort, and/or otherwise affects the well-being of the building occupants within Twenty Four (24) hours [twenty four hours a day seven days a week three hundred sixty five days or three hundred sixty six days a year, (24x7x365,366)] of initial attempt to notify the Contractor of the building condition.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services

rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Schedule Four, Ten Day Response:

The Contractor will respond to and have **qualified personnel on site** for:

GENERAL WARRANTY CLAIMS within Ten calendar (10) days of the initial attempt to notify the Contractor of the need for action.

Failure to respond within this prescribed period allows the Owner to obtain services by others to stabilize and/or correct the failed system to protect the building, equipment, and/or occupants. Should correction by others be necessary due to the failure of the Contractor to respond in accordance with the time prescribed herein, the Owner reserves the right to charge the Contractor for all services rendered to correct the condition including but not limited to direct fees, administrative fees and Work associated with cleanup and disposal of damaged materials. Work performed by others does not cancel or render applicable existing and/or extended warranties by the Contractor null and void as this work has been performed by others as the Contractor failed to respond to the warranty claim in accordance with the appropriate times prescribed herein.

Telephonic Communication will be the prime means of notification followed by written communication.

The "Initial Attempt to Notify the Contractor" for a response action to Warranty Claims shall be defined as the initial call placed to the Contractors Legal Place of Business, messages left with answering services, answering machines, electronic voice mail systems, messages with staff answering call at the place of business, messages with secretaries, calls placed to pagers, mobile phones and etc. E-Mails shall not be considered appropriate notification.

Service and Mandatory Contract Requirements:

The Work shall be carried out by the Contractor or Sub-Contractors that provided and installed the original systems, assemblies, components, and etc. unless otherwise approved in writing by the Owner and Architect, or the regulatory requirements mandate another source of service. In such instances **where the service company has to be other than the original installing Contractor**, the firm proposed by the Contractor shall be submitted to the Owner for approval. The Owner reserves the right to reject a proposed Service Provider if it is determined to be in the best interest of the Owner to do so, and a new provider shall be submitted to the Owner for consideration at no additional cost to the Owner. All service

companies shall be licensed to perform services in the State of Rhode Island and be in good standing with any and all regulatory agency(s) governing their licenses and/or trade.

The relation of Service Provider shall be established by a service contract established by the Service Provider between the Contractor, the Service Provider, and the building end user (appropriate name and contacts will be provided to the Contractor) as applicable which clearly outlines services to be provided. Payments for services shall be made to the Service Provider by the Contractor.

The Service Provider shall make all arrangements for the scheduling and timing of any and all preventative, predictive, and scheduled maintenance service calls, testing, seasonal system closure and startup and other requirements through the Rhode Island Department of Behavioral Healthcare, Developmental Disabilities and Hospitals responsible for oversight (manager contact information will be submitted to the Contractor) and/or persons designated by the Owner. It shall be the responsibility of the Contractor through its Service Provider to assure that timely and on schedule maintenance takes place in accordance with all system requirements.

The following systems, as applicable to this project, shall be fully covered by programs that allow for legally prescribed testing, services, adjustments and etc. required to continue operations of the building system, in full compliance with any and all local, state, federal and miscellaneous requirements for continuous and uninterrupted building operations.

PREVENTATIVE, PREDICTIVE, SCHEDULED and REGULATORY
The following categories will require Service Contracts for those items provided per contract
None

19.19 TECHNICAL EXPERTISE AND QUALITY EXPECTATIONS

The Contractor is herein advised that it is the Owner's intent to assure that all persons working on the project provide workmanship to the highest degree of all standards applicable in the industries in which they practice.

As such the Contractor is hereby notified that the selection of their project management teams, sub-contractors and their project management teams are fully compatible, properly trained and licensed and have a track record in performing work in strict accordance with the required degree of quality to assure a fully functional facility on opening day. It shall be noted that access to the building is limited and systems are critical and opportunity to perform corrective work is extremely limited and disruptive to the facilities operation.

19.20 INDOOR AIR QUALITY PROGRAM

It is the Owners goal on this project to be proactive in maintaining the environmental comfort of the facility for the workers, visitors, staff, and future occupants.

As it is a known fact, many short and long-term Indoor Air Quality (IAQ) issues with occupied buildings during construction work are a result of poor construction practices, the Contractor shall submit to the Owner and Architect an IAQ Management Plan prior to the start of construction. This plan shall address procedures and programs to be carried out during **ALL phases** of construction beginning on day one and continued through the punch list and final completion phases of Work including initial occupancy as required and anticipated in the Construction Milestone Schedule. All costs associated with the development of the IAQ Management Plan, implementing the plan, performing, and supervising the work necessary to meet the objective of the IAQ Management Plan, and services required to enforce and monitor the program shall be part of the Base Bid provided by the Contractor.

The following areas and procedures have been identified and shall be incorporated in the plan, in addition to those items that have been identified in throughout the technical sections of the agreement and those areas otherwise customarily established in an IAQ Management Plan for new, existing, and occupied construction through organizations such as but not limited to the Sheet Metal And Air Conditioning Contractors National Association (SMACNA), and the United States Environmental Protection Agency (EPA).

General Concerns during Construction and Post Partial Occupancy are illustrated below and shall be addressed as part of the Indoor Air Quality Program:

- Maintain overall cleanliness of the job site and frequent housekeeping in all areas to eliminate dust and other debris during the Work.
- Assure that all products (i.e. flashing, masonry, drywall, insulation, and etc.) are not installed prior to proper weather protection, and are fully protected from any sources of moisture throughout the entire construction process including receipt of the product.
- Promptly and thoroughly clean spills of materials that can be absorbed into the building substrate. Document areas, of such spills in the record drawings.
- Accelerate emissions of wet products by using high ventilation.
- Do not unnecessarily cut materials that create dust and other fine debris once the finish process has commenced in a specific area.
- Use dust recovery systems to minimize dust.
- No smoking shall be permitted on the project site.
- Properly dispose of food throughout the construction process at all times. Do not allow food or beverages to accumulate at any time and under no circumstances shall food and drink be permitted to be disposed of on the roof, in walls and other building cavities.
- Protect ducts from construction dust and debris. Keep ducts clean at all times.

- Establish a complete physical enclosure to any construction zone and or/ activity to protect any finished work when addressing punch lists and/or other corrective work.

- Seal all return ducts to insure that contaminants do not enter the HVAC system.

- Insure that exhausted contaminants do not re-enter the building through open windows or the air intake of the HVAC system.

19.21 NOISE CONTROL

- The Contractor shall provide methods, means, and facilities to minimize noise produced by the Construction operations.

- All requests to Work outside the delineated hours shall be submitted to the Architect in writing a minimum of one (1) calendar week (168 hours) in advance. The Architect and Owner reserves the right to reject such requests and rejection of request does not entitle the Contractor to an extension of Contract time and/or additional funds, unless those dates were clearly scheduled in the original Project Schedule.

Work required and/or directed outside the hours and conditions prescribed above to meet the scheduled project deadlines are subject to all the conditions prescribed within this section.

19.22 DUST CONTROL

- The Contractor shall execute the Work by methods to minimize raising dust from construction operations on a continuous basis and provide effective dust control on a continuous and as needed basis as Work progresses. This is a critical requirement and shall be appropriately budgeted for as enforcement of this requirement is essential.

- The Contractor shall provide positive means to prevent significant amounts of air-borne dust from dispersing into the atmosphere.

- The Contractor shall fully comply with all applicable sections of the latest version of the Clean Air Act as enforced by the Environmental Protection Agency, The Rhode Island Department of Environmental Management, the Rhode Island Department of Health, OSHA, and any other agencies involved in its enforcement. Additionally the Contractor shall fully comply with rules, regulations, laws, and standards governed at the state and local level that are related to the Clean Air Act and/or are otherwise extensions of the enforcement of the Clean Air Act. These acts are considered to be part of this Contract as if written in full and attached herein. The Contractor is responsible for and shall plan accordingly for any and all costs associated with the enforcement of these requirements.

19.23 PEST CONTROL

The Contractor shall provide methods, means, and facilities to prevent pests and insects from entering any buildings in areas of construction.

19.24 NOTICE OF TECHNOLOGY USE FOR DOCUMENTS

Contractors are here-in notified that the Project Team utilizes E-Mail, and Software to process RFI's, Payment Requisitions, Submittals and other critical project documents. As such the Contractor shall be prepared to utilize these methods of posting various documents through E-Mail and utilizing software such as but not limited to Microsoft Office, Adobe Acrobat, and AutoDesk AutoCAD.

19.25 TESTING

INSTRUCTIONS FOR TECHNICAL INSPECTIONS:

The Owner shall direct the Contractor as to the firm or firms to be used for testing in each of the categories identified in the schedule below. The Owner shall pay for these testing services. Scheduling and other arrangements for testing shall be arranged through the Contractor with the Written Approval of the Owners on Site Representative and/or Architect and costs for coordination and administration of testing shall be part of the Contractors Base Bid.

Costs associated with testing for areas of construction, overall monitoring and/or system installations that are **NOT** identified in the following schedule that require testing, certification and/or other forms of quality control including testing prescribed as part of product application procedures and confirmation, specialized systems testing, and additional quality control related to paint; grout; air quality testing; water quality testing, noise/acoustics; shall be carried as part of the Base Bid Cost by the Contractor as a Contractor Cost, **regardless of the specifications direction to carry the cost otherwise**.

The Following Testing Services will be paid for by the Owner as delineated in the schedule that follows the exceptions noted below:

- Retesting being performed as a result of the Contractors failure to properly perform or execute the original work.
- Retesting required due to failure of original test.
- Required retesting to reconfirm or otherwise determine course of action required for remediation of a system or assembly not meeting the specifications or other prescribed and/or required standard (s).
- Testing associated with the progress of rework as may be required to bring a system or systems into compliance with the applicable standards.
- Testing confirming that corrective action has been performed properly.
- Additional costs for testing premiums required due to the Contractors failure to properly schedule or otherwise have a system or assembly tested at the appropriate time.

IDENTIFIED TESTING CATEGORY
Paid for by the Owner

The Contractor shall note that while the Owner is paying for the following tests, that the Contractor and Contractors' Subcontractors are obligated under the Base Bid to provide all required documentation, and certifications required to support the Owner and Architect required as part of the Special Inspections Chapter 17 of the Rhode Island State Building Code (RISBC). These documents are required to achieve the Certificate of Occupancy for the Facility and the timeliness of the documents are critical and all the costs associated with the administration, scheduling and procurement of required documents to support the Owner and Architect are part of the Contractors Base Bid Cost. Additionally, this work effort includes providing the Contractors Statement of Responsibility as required by the RISBC.

- All Structural Tests and Special Inspections required of IBC Chapter 17
- All testing required of the Technical Specifications Division 01 through Division 32
- Concrete slabs foundations & footings
- Site concrete sidewalks, slabs and paving.
- Structural Steel
- Masonry Construction
- Compaction Testing below Footings, Slabs, Exterior sidewalks, slabs and bituminous paving

19.26 ON SITE WATER USE

In preparing the cost of the Project the Contractor shall take notice that on site water (provided by Providence Water Supply) can be made available. In the event the system is not used as intended and/or otherwise abused, the Owner will terminate the service at the expense of the Contractor. The Contractor may also choose to provide water from an off-site source.

The Contractor shall make provisions to provide water to be used in all construction operations, including but not limited to masonry work, concrete, temporary fire protection, construction housekeeping operations including rinsing of vehicles and concrete trucks, all dust control, drinking water for construction team members, testing of systems and any and all other operations requiring water. All costs associated with providing and maintaining the required on-site and/or off-site water shall be included as part of the Base Bid Costs for the Project.

19.27 FIELD REPORTS/ACTIONS

The Contractor acknowledges that action items outlined in field reports prepared by the Project Architect, Project Engineer and the Owner's Project Manager that call out or otherwise identify deficiencies in construction and/or other project requirements shall be corrected as noted. Field reports delineating issues shall be considered part of the project document path and if the Contractor disagrees with the noted reported deficiency, the Contractor shall promptly document such disagreement for review by the Architect and Owner and the Owner's Project Manager.

19.28 LOADING

Do not load any part of the Work involved in this Contract, during construction, with a load greater than that calculated to carry with safety. Should any accidents or damage occur through any violation of this requirement, the Contractor shall be held responsible under his Contract and Bond. When, in the opinion of the Architect, portions of the structure appear to be overloaded, it shall be the Contractor's

responsibility to prove otherwise, or the Contractor shall follow the instructions of the Architect in connection with reduction of the loads.

19.29 WORKING CONDITIONS

The Contractor must confer with the Owner and coordinate the Work of the project so as to ensure visitor, staff, residents, and building occupants environmental comfort, and that the building's visitors, staff and occupant activities can continue during the 24 hour per day, seven day per week building operations, especially as required in sections 19.12, 19.20, 19.21, 19.22, 19.23. The Contractor must coordinate the Work in accordance with visitor, staff, resident, and occupant operations.

END OF SECTION

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DOCUMENT 00 65 19.16

WAIVER OF LIEN FORM

The Waiver of Lien Form is included, following this page, as an integral part of the Contract documents. A copy with completed information must be submitted with the second and each succeeding Application for Payment.

WAIVER OF LIEN FORM
Material or Labor

Construction Project Title: _____

General Contractor: _____

Subcontractor/Supplier: _____

General Contractor's previous Application No: _____

General Contractor's previous Application Date: _____

Schedule of Values Line Item No.: _____

DESCRIPTION OF WORK Heading: _____

Total payment Received to Date:
$ _____

The undersigned Representative of the above Subcontractor/Supplier has been contracted by the above General Contractor to furnish materials, or labor, or both, as included in the approved Schedule of Values under the Line Item No., and DESCRIPTION OF WORK heading indicated above, for the Construction Project listed above.

The undersigned acknowledges receipt of payment, under this Line Item No., and DESCRIPTION OF WORK heading, and hereby waives and releases any and all lien, or claim or right to lien, on the Construction Project listed above, and premises, under the statutes of the State of Rhode Island, relating to Mechanics Liens, on account of materials, or labor, or both, furnished, or which may be furnished, by the undersigned to, or on account of, the above numbered and dated Application and Certificate for Payment.

Signed this month of _____ day of _____, 20___.

_____
(signature)

_____
(company/firm name)

END OF DOCUMENT

DOCUMENT 00 65 19.18

AFFIDAVIT OF GENERAL CONTRACTOR THAT ALL SUBCONTRACTORS. SUPPLIERS AND LABORERS HAVE BEEN PAID AND HOLD HARMLESS CLAUSE

The affidavit is included, following this page, as an integral part of the bid documents, for submittal with all applications for payment.

DOCUMENT 00815

AFFIDAVIT OF GENERAL CONTRACTOR
THAT ALL SUBCONTRACTORS. SUPPLIERS AND LABORERS
HAVE BEEN PAID: AND HOLD HARMLESS CLAUSE

To: State of Rhode Island

The undersigned hereby deposes, says and makes affidavit under oath that he/she is _____ of _____ and further certifies that as of today's date all monies previously advanced pursuant to requisitions of the Contractor in connection with the Project known as Rhode Island State House Leak Remediation – Phase 2 have been paid to or are being held for and will be paid to the subcontractors, laborers, or suppliers: that there are no further amounts owing to the knowledge of the undersigned other than as set forth in the current requisition, a copy of which is attached hereto, and that only materials, fixtures, and equipment to which undersigned has absolute title have been used in the project. Further, the undersigned HEREBY HOLDS HARMLESS THE State of Rhode Island, AND ALL COMMITTEES, BOARDS, DEPARTMENTS AND AGENCIES THEREUNDER, AND AGREES TO INDEMNIFY SAME FOR ANY ACTION OR SUIT BROUGHT BY ANY SUBCONTRACTOR, LABORER, OR SUPPLIER FOR THE PAYMENT OF ANY SUMS DUE RELATIVE TO The AFORESAID PROJECT. Said Hold Harmless Clause and Indemnification shall cause the undersigned to shield the State of Rhode Island and all committees boards, departments and agencies from all attachments, chattel mortgages, and all liens, whatsoever, sought by subcontractors, laborers and/or suppliers for collection of monies allegedly due said parties for work performed on the aforesaid Project.

On the _____ day of _____, 20___, before me appeared_____, where upon oath said property executed the foregoing Affidavit as their free act and deed.

NOTARY

My commission expires:

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Contract description.

B. "Owner" Definition

C. Contractor's use of site and premises.

D. Owner occupancy.

E. Hazardous Material Suspicion

F. Definitions

E. Covid-19 Safety and Health Protocol

1.02 CONTRACT DESCRIPTION

A. Work of the Project includes the work noted below:
Masonry mortar restoration, repair and cleaning.
New doors and frames.
Installation of new marble pavers.
Investigation and cleaning of existing storm drain lines within building.

B. Perform the Work of the Contract under a stipulated sum Contract with the Owner in accordance with the Conditions of Contract.

C. The Work of the Contract is identified in the Project Manual and on the Drawings.

1.03 "OWNER" DEFINITION

A. Note that when the term "Owner" is used in the Construction Document project manual and drawings it indicates the joint oversight of the Rhode Island Department of Administration and the Rhode Island Historical Preservation & Heritage Commission.

1.04 CONTRACTOR'S USE OF SITE

A. Limit use of the site and premises to allow:
1. Owner occupancy throughout construction.
2. Use of the site and premises by the public.

B. Construction Personnel Conduct
   1. The following conduct by construction personnel will not be tolerated on the Owner's property, violators may be ejected from the site.
      a. NO SMOKING is allowed on job site and within 100 feet of any building entrance.
      b. No drugs or alcohol are allowed
      c. No firearms or weapons are allowed.
      d. No foul language will be tolerated.
      e. No fighting. All involved will be subject to being removed from the site.

1.05 OWNER OCCUPANCY

A. The Owner will occupy the site and premises during the entire period of construction.

B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner's operations.

C. Schedule the Work to accommodate Owner occupancy.

D. Do not obstruct roadways, sidewalks, or other public ways. Provide necessary signage and barriers to direct pedestrians around work areas.

E. All entrances into the buildings must remain open and clear during the times the public and employees are present.

1.06 HAZARDOUS MATERIAL SUSPICION

A. If, during the course of construction, the Contractor suspects a material to contain asbestos, all work involving the material is to be stopped and the Architect notified immediately of the suspicion. Until the material is confirmed to be safe or tested and determined to be an asbestos containing material, the Contractor is to assume it contains asbestos and is to avoid contact. Upon notification of its composition the Architect will determine the course of action and inform the Contractor accordingly.

1.07 DEFINITIONS

A. Basic Contract definitions are included below.

   1. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

   2. "Directed": A command or instruction by Architect. . Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

   3. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

   4. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having

jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

5. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

6. "lnstall": Operations at Project site including unloading, temporarily storing, unpacking, disposing of packaging, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

7. "Provide": Furnish and install, complete, in place, and ready for the intended use.

8. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings.

1.08 COVID-19 SAFETY AND HEALTH PROTOCOL

A. The Contractor and all employees working on-site are to follow the operating procedures in accordance with the current safety and health guidelines issued by the Centers for Disease Control and Prevention (CDC), OSHA, RI Department of Health, and local agencies for preventing the spread of the COVID-19 infection.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Schedule of values.

B. Applications for payment.

C. Sales Tax Exemption

D. Change procedures.

E. Defect assessment.

F. Unit prices.

1.02 SCHEDULE OF VALUES

A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet

B. Submit Schedule of Values in duplicate, one copyrighted original and one copy, within fifteen (15) days after date of receipt of a Purchase Order from RI State Department of Administration, Division of Purchases.

C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance.

D. Include in each line item, the amount of Allowances specified in Section 01 21 00, if occurring. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

E. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.03 APPLICATIONS FOR PAYMENT

A. Submit each application on an original copyrighted AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, accompanied by three copies.
   1. Individually sign and notarize, and emboss with notary's official seal, the original and each of the three copies.
   2. Applications not including original copyrighted AIA G702, and G703 Forms, will be rejected, and returned for resubmittal.

3. Applications not properly signed and notarized will be rejected, and returned for resubmittal.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Provide one copy of the updated construction schedule with each Application for Payment submission.
   1. Provide a statement signed by the Contractor's firm principal certifying that there are no unidentified outstanding claims for delay.

D. Include with each monthly Application for Payment, following the first application, one copy of the Certified Monthly Payroll Record for the previous month's pay period.

E. Payment Period: Submit at intervals stipulated in the Agreement.

F. Submit with transmittal letter as specified for Submittals in Section 01 33 00.

G. Beginning with the second Application for Payment, Contractor's right to payment must be substantiated by documenting, on a copy of the Waiver of Lien Form included in Document 00 65 19.16 - Waiver of Lien Form in this Project Manual, that payment monies due, less retainage not exceeding ten percent, have been paid in full to subcontractor and suppliers for work, materials, or rental of equipment billed for under specific line item numbers in the immediately preceding application.

H. Substantiating Data: When the Architect requires substantiating information, submit data justifying dollar amounts in question. Include the following with the Application for Payment :
   1. Current construction photographs specified in Section 01 33 00.
   2. Record Documents as specified in Section 01 78 00, for review by the Owner which will be returned to the Contractor.
   3. Affidavits attesting to off-site stored products.
   4. Construction progress schedules, revised and current as specified in Section 01 33 00.

1.06 SALES TAX EXEMPTION

A. Owner is exempt from sales tax on products permanently incorporated in Work of the Project.
   1. Obtain sales tax exemption certificate number from Owner.
   2. Place exemption certificate number on invoice for materials incorporated in the Work of the Project.
   3. Furnish copies of invoices to Owner.
   4. Upon completion of Work, file a notarized statement with Owner that all purchases made under exemption certificate were entitled to be exempt.
   5. Pay legally assessed penalties for improper use of exemption certificate number.

1.04 CHANGE PROCEDURES

A. Submittals: Submit name of the individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710

C. The Architect may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within fifteen (15) days.

D. The Contractor may propose changes by submitting a request for change to the Architect, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation, and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 60 00.

E. Stipulated Sum Change Order: Based on Proposal Request, and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by Architect.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work that are not pre-determined, execute the Work under a Construction Change Directive. Changes in the Contract Sum or Contract Time will be computed as specified for a Time and Material Change Order.

G. Construction Change Directive: Architect may issue a directive, on AIA Form G713 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in the Contract Sum or Contract Time. Promptly execute the change.

H. Time and Material Change Order: Submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract. The Architect will determine the change allowable in the Contract Sum and Contract Time as provided in the Contract Documents.

I. Maintain detailed records of work done on a Time and Material basis. Provide full information required for an evaluation of the proposed changes, and to substantiate costs for the changes in the Work.

J. Document each quotation for a change in cost or time with sufficient data to allow an evaluation of the quotation. Provide detailed breakdown of costs and estimates for labor and materials including a detailed breakdown for subcontractor's or vendor's Work. Include copies of written quotations from subcontractors or vendors.

K. Change Order Forms: AIA G701 Change Order.

L. Execution of Change Orders: The Architect will issue Change Orders for signatures of the parties as provided in the Conditions of the Contract.

M. Correlation Of Contractor Submittals:
   1. Promptly revise the Schedule of Values and the Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

2. Promptly revise progress schedules to reflect any change in the Contract Time, revise sub-schedules to adjust times for any other items of work affected by the change, and resubmit.
3. Promptly enter changes in the Project Record Documents.

N. Change Order Overhead and Profit

1. When determining the total cost for a Change Order, the Contractor, Subcontractor and Sub-subcontractor is allowed the following maximum amounts for the combined overhead and profit to be added to the sum amount.

   a. For the Contractor, for Work performed by the Contractor's own forces, 10 percent of the cost.

   b. For the Contractor, for Work performed by the Contractor's Subcontractor, 5 percent of the amount due the Subcontractor.

   c. For each Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, 10 percent of the cost.

   d. For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors,
   5 percent of the amount due the Sub-subcontractor.

   e. Overhead and profit is to include the Contractor's project management and supervisory costs, all administrative expenses and personnel, change estimate preparation, mobilization, setup & break-down, meetings, all safety related costs, cleanup costs and storage costs pertaining to the changes in the work.

   f. In order to facilitate checking of quotations for extras or credits, all proposals shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Where major cost items are Subcontracts, they shall be itemized also. In no case will a change involving over $500.00 be approved without such itemization.

1.05 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

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

C. The defective Work may remain, but the unit sum will be adjusted to a new sum at the discretion of the Architect.

D. The defective Work will be partially repaired to the instructions of the Architect, and the unit sum will be adjusted to a new sum at the discretion of the Architect.

E. The individual Specification Sections may modify these options or may identify a specific formula or percentage sum reduction.

F. The authority of the Architect to assess the defect and identify a payment adjustment is final.

G. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.06 UNIT PRICES

A. Authority: Measurement methods are delineated in the individual specification Sections.

B. Measurement methods delineated in the individual specification Sections complement the criteria of this section. In case of conflict, the requirements of the individual specification Section govern.

C. Take measurements and compute quantities. The Architect will verify measurements and quantities.

D. Unit Quantities: The quantities and measurements indicated in the Bid Form are for contract purposes only. The quantities and measurements supplied or placed in the Work shall determine payment.
1. When the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum contracted.
2. When the actual Work requires a 25 percent or greater change in quantity than those quantities indicated, the Owner or Contractor may claim for a Contract Price adjustment.

E. Payment Includes: Full compensation for required labor, products, tools, equipment, plant and facilities, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

F. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect multiplied by the unit sum for Work which is incorporated in or made necessary by the Work.

G. Measurement of Quantities:
1. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year.
2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
3. Metering Devices: Inspected, tested and certified by the applicable State department within the past year.
4. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
5. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
6. Measurement by Area: Measured by square dimension using mean length and width or radius.

7. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
8. Stipulated Sum Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

H. See Bid Form for schedule of Unit Prices.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 21 00

ALLOWANCES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Allowances.

1.02 ALLOWANCES

A. Costs Included in Allowances: Cost of product to Contractor or Subcontractor, labor for installation and finishing, less applicable trade discounts; delivery to site, and applicable taxes

B. Costs Not Included in Allowances But Included in the Contract Sum: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage.

C. Architect Responsibilities:
1. Consult with Contractor for consideration and selection of products, suppliers, and installers.
2. Select products in consultation with Owner and transmit decision to Contractor.
3. Prepare Change Order.

D. Contractor Responsibilities:
1. Assist Architect in selection of products, suppliers and installers.
2. Obtain proposals from suppliers and installers and offer recommendations.
3. On notification of selection by Architect, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

F. At closeout of Contract, funds remaining in Allowances will be credited to Owner by Change Order.

G. Allowance Schedule:
Include the stipulated Allowance amounts as indicated.

Allowance No. 1: Unforeseen Conditions: City-Side Balcony

Include in the Base Bid the sum of **twenty thousand dollars ($ 20,000.00)** for repairs to the existing masonry, mortar and storm drain system on the City-side balcony as required due to unforeseen conditions.

Allowance No. 2: Unforeseen Conditions: Northwest Terrace

Include in the Base Bid the sum of **twenty thousand dollars ($ 20,000.00)** for repairs to the existing Northwest terrace as required due to unforeseen conditions.

Allowance No. 3: Unforeseen Conditions: North Balconies

Include in the Base Bid the sum of **two thousand dollars ($ 2,000.00)** for repairs to the existing wood window sills and perimeter sealant as required due to unforeseen conditions.

Allowance No. 4: Unforeseen Conditions: Northeast and Southwest Tourelles

Include in the Base Bid the sum of **forty thousand dollars ($ 40,000.00)** for repairs to the existing Northeast and Southwest tourelles as required due to unforeseen conditions.

Allowance No. 5: Unforeseen Conditions: Northwest and Southeast Tourelles

Include in Alternate No. 1 the sum of **forty thousand dollars ($ 40,000.00)** for repairs to the existing Northwest and Southeast tourelles as required due to unforeseen conditions.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 22 00

ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Alternates.

1.02 ALTERNATES

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

B. The Bidder offers to: (i) perform the work described in these Alternates as selected by the State in the order of priority specified below, based on the availability of funds and the best interest of the State; and (ii) increase or reduce the Base Bid Price by the amount for each Alternate selected.

C. Coordinate related work and modify surrounding work as required.

D. Schedule of Alternates:

1. **Alternate No. 1: Northwest and Southeast Tourelle Repairs:**
This Alternate contemplates the addition to the Base Bid all work associated with repairs to the existing Northwest and Southeast tourelles as shown on drawings A1.0 & A1.1. (Alternate No. 1 price includes Allowance No. 5, Bonds and Addenda.)

(**NOTE**: Work on this Alternate cannot begin until after **July 1, 2022** with Substantial completion by September 30, 2022 and Final Completion by October 14, 2022.)

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 31 00

ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

1.02 COORDINATION AND PROJECT CONDITIONS

A. Coordinate the scheduling, submittals, and the Work of the various Sections of the Project Manual to ensure an efficient and orderly sequence of the installation of interdependent construction elements with provisions for accommodating the items installed later.

B. Verify that the utility requirements and characteristics of the operating equipment are compatible with the building utilities. Coordinate the Work of the various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate the completion and clean up of the Work of the separate Sections in preparation for Substantial Completion.

D. After the Owner's occupancy of the premises, coordinate access to the site for correction of the defective Work and the Work not in accordance with the Contract Documents, to minimize disruption of the Owner's activities.

1.03 PRECONSTRUCTION MEETING

A. The Architect will schedule a meeting after a Purchase Order is issued to the Contractor by the RI State Department of Administration, Division of Purchases.

B. Attendance Required: Owner, Architect, and Contractor.

C. Agenda:
1. Execution of the Owner-Contractor Agreement.
2. Submission of the executed bonds and insurance certificates.
3. Distribution of the Contract Documents.
4. Submission of a list of Subcontractors, a list of products, schedule of values, and a progress schedule.
5. Designation of the personnel representing the parties in the Contract, and the Architect.

6. The procedures and processing of the field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Record the minutes and distribute copies within two days after the meeting to the participants, with two copies to the Architect, the Owner, the participants, and those affected by the decisions made.

1.04 SITE MOBILIZATION MEETING

A. The Architect will schedule a meeting at the Project site prior to the Contractor's occupancy.

B. Attendance Required: The Owner, Architect, Special Consultants, and, Contractor, the Contractor's Superintendent, and major Subcontractors.

C. Agenda:
1. Use of the premises by the Owner and the Contractor.
2. The Owner's requirements and occupancy.
3. Construction facilities and controls provided by the Owner.
4. Temporary utilities provided by the Owner.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining the record documents.
11. Requirements for start-up of the equipment.
12. Inspection and acceptance of the equipment put into service during the construction period.

D. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

1.05 PROGRESS MEETINGS

A. Schedule and administer the meetings throughout the progress of the Work at maximum bi-weekly (14 day) intervals.

B. Make arrangements for the meetings, prepare the agenda with copies for the participants, and preside at the meetings.

C. Attendance Required: The job superintendent, major subcontractors and suppliers, the Owner, Architect, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review the minutes of previous meetings.
2. Review of the Work progress.
3. Field observations, problems, and decisions.
4. Identification of the problems which impede the planned progress.
5. Review of the submittals schedule and status of the submittals.

6. Review of the off-site fabrication and delivery schedules.
7. Maintenance of the progress schedule.
8. Corrective measures to regain the projected schedules.
9. Planned progress during the succeeding work period.
10. Coordination of the projected progress.
11. Maintenance of the quality and work standards.
12. Effect of the proposed changes on the progress schedule and coordination.
13. Other business relating to the Work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

1.06 PREINSTALLATION MEETING

A. When required in the individual specification Sections, convene a preinstallation meeting at the site prior to commencing the Work of the Section.

B. Require attendance of the parties directly affecting, or affected by, the Work of the specific Section.

C. Notify the Architect four days in advance of the meeting date.

D. Prepare an agenda and preside at the meeting:
1. Review the conditions of installation, preparation and installation procedures.
2. Review coordination with the related work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Architect, Owner, participants, and those affected by the decisions made.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Shop drawings.

F. Samples.

G. Design data.

H. Test reports.

I. Certificates.

J. Manufacturer's instructions.

K. Manufacturer's field reports.

1.02 SUBMITTAL PROCEDURES

A. Master List Submittal:
   1. Submit a master list of the required submittals with a proposed date for each item to be submitted.
   2. Show the date submittal was sent, days since submittal was sent, status of submittal, date submittal was received in return, and any date associated with resubmittals.
   3. Up date master list with each submission and response.
   4. Issue copy of master list at least monthly to the Architect.

B. Transmit each submittal with a transmittal form.

C. Sequentially number the transmittal form. Mark the revised submittals with the original number and a sequential alphabetic suffix.

D. Identify the Project, Contractor, subcontractor and supplier; the pertinent drawing and detail number, and the specification Section number, appropriate to the submittal.

E. Apply a Contractor's stamp, signed or initialed, certifying that the review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of the information is in accordance with the requirements of the Work and the Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to the Architect at their business address. Coordinate the submission of related items.

G. For each submittal for review, allow fifteen (15) days excluding the delivery time to and from the Contractor.

H. Identify the variations from the Contract Documents and the Product or system limitations that may be detrimental to a successful performance of the completed Work.

I. Allow space on the submittals for the Contractor's and the Architect's review stamps.

J. When revised for resubmission, identify the changes made since the previous submission.

K. Distribute copies of the reviewed submittals as appropriate. Instruct the parties to promptly report an inability to comply with the Contract requirements.

L. Submittals not requested will not be recognized or processed.

M. Submittals Prepared Using Copyrighted AIA Forms:
   1. Use only original copyrighted forms for the first typed copy of each submission. Do not use unauthorized duplications of copyrighted forms for the first typed copy.
   2. Proceed to reproduce one or more copies of the first typed copy as may be required.
   3. Copyrighted forms are those printed forms purchasable through an authorized outlet, or reproduced electronically under license from the AIA Electronic Document Service.

N. The Contractor will compensate the Architect and all consulting Engineers for services performed reviewing submittals beyond the original review and two follow-up reviews of the same product, material, sample or assembly. The compensation will be made through a credit change order that will reduce the total contract amount.

1.03 CONSTRUCTION PROGRESS SCHEDULES

A. Submit preliminary outline Schedules within fifteen (15) days after the date of receipt of a Purchase Order from the State of Rhode Island Department of Administration, Division of Purchases for coordination with the Owner's requirements. After a review, submit detailed schedules within fifteen (15) days modified to accommodate the revisions recommended by the Architect.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of the reviewed schedules to the Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct the recipients to promptly report, in writing, the problems anticipated by the projections indicated in the schedules.

E. Submit a computer generated horizontal bar chart with a separate line for each major portion of the Work or operation, or section of the Work, identifying the first workday of each week.

F. Show a complete sequence of construction by activity, identifying the Work of separate stages and other logically grouped activities. Indicate the early and late start, the early and late finish, float dates, and the duration.

G. Indicate an estimated percentage of completion for each item of the Work at each submission.

H. Provide a separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished Products and Products identified under Allowances, if any, and the dates reviewed submittals will be required from the Architect. Indicate the decision dates for selection of the finishes.

I. Indicate the delivery dates for Owner furnished Products, and for Products identified under Allowances.

J. Revisions to Schedules:
   1. Indicate the progress of each activity to the date of submittal, and the projected completion date of each activity.
   2. Identify the activities modified since the previous submittal, major changes in the scope, and other identifiable changes.
   3. Provide a narrative report to define the problem areas, the anticipated delays, and impact on the Schedule. Report the corrective action taken, or proposed, and its effect including the effect of changes on the schedules of separate contractors.

1.04 PROPOSED PRODUCTS LIST

A. Within fifteen (15) days after the date of receipt of a Purchase Order from the State of Rhode Island Department of Administration, Division of Purchases, submit a list of major products proposed for use, with the name of the manufacturer, the trade name, and the model number of each product.

B. For the products specified only by reference standards, give the manufacturer, trade name, model or catalog designation, and reference standards.

C. With each product listed, indicate the submittal requirements specified to be adhered to, and an indication of relevant "long-lead-time" information, when appropriate.

1.05 PRODUCT DATA

A. Product Data: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Provide copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Submit the number of copies that the Contractor requires, plus three copies the Architect will retain.

C. Mark each copy to identify the applicable products, models, options, and other data. Supplement the manufacturers' standard data to provide the information specific to this Project.

D. Indicate the product utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

E. After a review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01 78 00.

1.06 SHOP DRAWINGS

A. Shop Drawings: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Indicate the special utility and electrical characteristics, the utility connection requirements, and the location of utility outlets for service for functional equipment and appliances.

C. Submit the number of copies that the Contractor requires, plus three copies the Architect will retain.

1.07 SAMPLES

A. Samples: Submit to the Architect for review for the limited purpose of checking for conformance with the information given and the design concept expressed in the Contract Documents. Produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

B. Samples For Selection as Specified in Product Sections:
   1. Submit to the Architect for aesthetic, color, or finish selection.
   2. Submit samples of the finishes, indicating colors, texture, and patterns for the Architect's selection.
   3. After review, produce duplicates and distribute in accordance with the SUBMITTAL PROCEDURES article and for the record documents purposes described in Section 01 78 00.

C. Submit samples to illustrate the functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate the sample submittals for interfacing Work.

D. Include identification on each sample, with the full Project information.

E. Submit the number of samples specified in the individual specification Sections; the Architect will retain one sample.

F. Reviewed samples, which may be used in the Work, are indicated in the individual specification Sections.

G. Samples will not be used for testing purposes unless they are specifically stated to be in the specification Section.

1.08 DESIGN DATA

A. Submit for the Architect's knowledge as contract administrator.

B. Submit for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.09 TEST REPORTS

A. Submit for the Architect's knowledge as contract administrator.

B. Submit test reports for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

1.10 CERTIFICATES

A. When specified in the individual specification Sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to the Architect, in the quantities specified for the Product Data.

B. Indicate that the material or product conforms to or exceeds the specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on the material or product, but must be acceptable to the Architect.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in the individual specification Sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to the Architect for delivery to the Owner in the quantities specified for Product Data.

B. Indicate the special procedures, and the perimeter conditions requiring special attention, and the special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect's benefit as contract administrator.

B. Submit the report in duplicate within thirty (30) days of observation to the Architect for information.

C. Submit for information for the limited purpose of assessing conformance with the information given and the design concept expressed in the Contract Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Quality control and control of installation.

B. Verification of Credentials and Licenses.

C. Tolerances

D. References.

E. Mock-up requirements.

F. Manufacturers' field services.

G. Safety Awareness Policy

H. Product Substitutions

1.02 QUALITY CONTROL AND CONTROL OF INSTALLATION

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

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

C. When the manufacturers' instructions conflict with the Contract Documents, request a clarification from the Architect before proceeding.

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

E. Perform the Work by persons qualified to produce the required and specified quality.

F. Verify that field measurements are as indicated on the Shop Drawings or as instructed by the manufacturer.

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

H. Field measurements
   1. Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication scheduled with construction progress to avoid construction delays.

I. The Contractor, by approving and submitting Shop Drawings, Product Data, Samples, and similar submittals thereby represent that they have determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted Shop Drawings, Product Data, Samples, or similar submittals and verification of compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, Samples, and similar submittals the Architect shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

1.03 VERIFICATION OF CREDENTIALS AND LICENSES

A. All persons employed on the project site must have appropriate and current credentials and licenses in their possession, at the project site, for the work they are performing.

B. Be forewarned that state resident inspectors will be checking for verification of credentials and licenses of both union and non-union persons, in their onsite inspections.

C. State resident inspectors will also be reviewing Contractor's Certified Monthly Payroll Records for conformance with RI State Prevailing Wage Rate requirements.

D. Those persons without the appropriate credentials and licenses will be subject to dismissal from the project site.

1.04 TOLERANCES

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

B. Comply with the manufacturers' tolerances. When the manufacturers' tolerances conflict with the Contract Documents, request a clarification from the Architect before proceeding.

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

1.05 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by the date of issue current on the date of the Contract Documents, except where a specific date is established by code.

C. Obtain copies of the standards where required by the product specification Sections.

D. When the specified reference standards conflict with the Contract Documents, request a clarification from the Architect before proceeding.

E. Neither the contractual relationships, duties, nor responsibilities of the parties in the Contract, nor those of the Architect, shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

1.06 MOCK-UP REQUIREMENTS

A. Assemble and erect the specified items with the specified attachment and anchorage devices, flashing, seals, and finishes.

B. Accepted mock-ups shall be a comparison standard for the remaining Work.

C. Where the mock-up has been accepted by the Architect and is specified in the product specification Sections to be removed, remove the mock-up and clear the area when directed to do so by the Architect.

1.07 MANUFACTURERS' FIELD SERVICES

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

B. Submit the qualifications of the observer to the Architect thirty (30) days in advance of the required observations. The Observer is subject to approval by the Architect.

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

D. Refer to Section 01330 - SUBMITTAL PROCEDURES, MANUFACTURERS' FIELD REPORTS article.

1.08 SAFETY AWARENESS POLICY

A. In accordance with Rhode Island General Laws, Title 28, S28-20-35 5.1 Safety awareness program required. (Effective January 1, 2002.) all contractors who bid on municipal and state construction projects with a total project cost of One Hundred Thousand Dollars ($100,000.00) or more, shall have an OSHA “ten hour safety construction program” for their on-site employees. The training shall utilize instructors trained by the Occupational Safety Health Administration, using OSHA approved curriculum. Graduates shall receive a card from the U. S. Department of Labor Occupational Safety and Health Administration certifying the successful completion of the training course. The director of the Rhode Island Department of Labor and Training shall promulgate rules, regulations and penalties to enforce provisions of this section.

B. The Contractor is required to conform to all applicable OSHA requirements on this project.

1.09 PRODUCT SUBSTITUTIONS

A. After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the General Requirement. (Division 1 of the Specifications).

B. By making requests for substitutions the Contractor:
1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
2. represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
3. certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
4. will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

C. The product substitution will be considered equal to the item so named or described if, in the opinion of the Architect:

1. it is least equal in quality, durability, appearance, strength and design;
2. it performs at least equally the function imposed by the general design for the work;
3. it conforms substantially, even with deviations, to the detailed requirements for the items as indicated by the specifications.

Any structural or mechanical changes made necessary to accommodate substituted equipment will be at the expense of the Contractor or Subcontractor responsible for the work item.

D. The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Architect will require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. Provide a side-by-side list comparing all component criteria, and critical test results for Architect to determine equality. All such data shall be furnished at the Contractor's expense. This provision shall not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor's expense.

E. If the Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval, and shall request written approval of the deviation from the requirements of the Contract Documents.

F. In requesting approval of deviations or substitutions, the Contractor shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a

quality of result at least equal to that otherwise attainable. If, in the opinion of the Architect, the evidence presented by the Contractor does not provide as sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation without further investigation.

G. The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

H. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Architect, unless such substitution was made at the written request or direction of the Architect.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not used.

END OF SECTION

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary water service.
   3. Temporary sanitary facilities.

B. Construction Facilities:
   1. Temporary Storage
   2. Temporary scaffolding
   3. Hoisting
   4. Vehicular access.
   5. Parking.
   6. Progress cleaning and waste removal.

C. Temporary Controls:
   1. Dust control.
   2. Pollution control.
   3. Barriers
   4. Enclosures and Fencing
   5. Security

1.02 TEMPORARY ELECTRICITY

A. The Owner will pay the cost of energy used. Exercise measures to conserve energy. Utilize the Owner's existing power service. Complement the existing power service capacity and characteristics as required for construction operations.

B. Permanent convenience receptacles may be utilized during construction.

1.03 TEMPORARY WATER SERVICE

A. The Owner will pay the cost of temporary water. Exercise measures to conserve energy. Utilize the Owner's existing water system, extend and supplement with temporary devices as needed to maintain the specified conditions for construction operations.

1.04 TEMPORARY SANITARY FACILITIES

A. The existing sanitary facilities designated by the Owner may be used during construction operations. Maintain daily in a clean and sanitary condition.

B. At the end of construction, return the facilities to the same or better condition as the original condition.

1.05 TEMPORARY STORAGE

A. Storage Areas, Trailers and Sheds: Size to the storage requirements for the products of the individual Sections, allowing for access and orderly provision for the maintenance and for the inspection of Products to the requirements of Section 01 60 00.

B. Existing building spaces may be used for storage in locations designated by the Owner.

C. Removal: At the completion of the Work remove all trailers, debris and materials. Restore the areas to original condition.

1.06 TEMPORARY SCAFFOLDING

A. Contractor is to provide temporary scaffolding as necessary for construction purposes. Working from ladders will not be allowed.

B. The scaffolding is to be braced properly, assembled and installed as required to meet all OSHA requirements.

C. Remove from the site all scaffolding, associated bracing and supports upon completion of construction. Repair all surfaces and site to original condition including all landscaping, grass and hardscape.

D. Scaffolding must allow for unimpeded entry and egress from the building at all times when it is occupied by employees or the public.

E. Scaffolding on roof surface and around the perimeter of the building will be allowed if proper protection of the building is accomplished and approved by the Owner & Architect. Method of transporting all equipment to the rooftop is the Contractor's responsibility and must be reviewed and approved by the Owner. There is very limited access through the building to the rooftop.
The building surfaces are to be thoroughly protected from damage due to construction to the Owner's satisfaction. Any damages to the existing building due to construction are the Contractor's responsibility and shall be restored to original condition to the Owner's satisfaction.
The Contractor is responsible to adhere to all OSHA requirements.

1.07 HOISTING

A. Contractor is responsible for all hoisting required to facilitate, serve, stock, clean, and complete the Work. Include all costs for Operating Engines, fuel, delivery and removal, mobilization, staging, protection of grades and surfaces, and equipment. All surfaces damaged by hoisting equipment or crane are to be cleaned and repaired to match original condition. All damaged grass is to receive loam and seed to match existing. Confirm exact locations of hoisting equipment with Owner.

B. Elevator Use: The existing passenger elevators may be used by the Contractor to carefully move smaller materials, supplies, tools, etc.

1.08 VEHICULAR ACCESS

A. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.

B. Provide and maintain access to fire hydrants and control valves free of obstructions.

1.09 PARKING

A. It is the Contractor's responsibility to arrange for (and pay for, if necessary) construction personnel parking.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

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

B. Collect and remove waste materials, debris, and rubbish from the site periodically, weekly, or daily, as necessary to prevent an on-site accumulation of waste material, debris, and rubbish, and dispose off-site.

C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 DUST CONTROL

A. Execute the Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.12 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by the construction operations.

B. Restrictions on Noise:
1. Use equipment with well-maintained mufflers.
2. Use the least noisy techniques practical.
3. Schedule noisy activities when ambient background noise level is highest.
4. Turn off all unneeded and idling equipment and engines.
5. Locate noise sources as far as practical from noise sensitive locations.
6. Orient noise sources away from noise sensitive locations

1.13 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent the contamination of soil, water, and the atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.

1.14 BARRIERS

A. Provide barriers to prevent unauthorized entry to the construction areas and to protect existing facilities and adjacent properties from damage from the construction operations, or demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.15 ENCLOSURES AND FENCING

A. Commercial grade chain link fence.
Provide a six (6) foot high fence around the exterior construction areas in locations approved by the Architect and Owner; equip with vehicular and pedestrian gates with locks. Provide one set of keys to all gates to the owner.

1.16 SECURITY

A. Security Program:
1. Protect the Work and the existing premises from theft, vandalism, and unauthorized entry.
2. Initiate the program at the mobilization.
3. Maintain the program throughout the construction period until Owner occupancy.

B. Entry Control:
1. Restrict the entrance of persons and vehicles into the Project site.
2. Allow entrance only to authorized persons with the proper identification.
3. Maintain a log of workers and visitors and make available to the Owner on request.
4. Coordinate the access of the Owner's personnel to the site in coordination with the Owner's security forces.

PART-2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.02 PRODUCTS

A. Products: Means new material, machinery, components, fixtures, or systems forming the Work; but does not include the machinery or equipment used for the preparation, fabrication, conveying, or erection of the Work. Products may include the existing materials or components required or specified for reuse.

B. Furnish products of qualified manufacturers suitable for the intended use. Furnish products of each type by a single manufacturer unless specified otherwise.

C. Do not use materials and equipment removed from the existing premises, except as specifically permitted by the Contract Documents.

D. Furnish interchangeable components of the same manufacturer for the components being replaced.

1.03 PRODUCT DELIVERY REQUIREMENTS

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

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

C. Provide equipment and personnel to handle the products by methods to prevent soiling, disfigurement, or damage.

1.04 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect the products in accordance with the manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.

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

E. Provide bonded off-site storage and protection when the site does not permit on-site storage or protection.

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

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

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

1.05 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

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

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

1.06 PRODUCT SUBSTITUTION PROCEDURES

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

B. Substitutions may be considered only when a product becomes no longer in production following the date of receipt of the Purchase Order for this Contract. Submit certification both that specified product was carried in Bid, and is no longer obtainable.

C. Document each request with complete data substantiating the compliance of a proposed Substitution with the Contract Documents.

D. A request constitutes a representation that the Bidder:
   1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the Substitution as for the specified Product.
   3. Will coordinate the installation and make changes to other Work that may be required for the Work to be complete with no additional cost to the Owner.

4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will reimburse the Owner and the Architect for review or redesign services associated with re-approval by the authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on the Shop Drawing or Product Data submittals, without a separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure, if permitted following Contract award:
1. Submit three copies of a request for Substitution for consideration, no later than 20 working days following date of receipt of the Purchase Order for this Contract. Limit each request to one proposed Substitution.
2. Submit the Shop Drawings, Product Data, and the certified test results attesting to the proposed product equivalence. The burden of proof is on the proposer.
3. The Architect will notify the Contractor in writing of a decision to accept or reject the request.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 70 00

EXECUTION REQUIREMENTS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Examination.

B. Preparation.

C. Protection of adjacent construction.

D. Cutting and patching.

E. Special procedures.

F. Progress cleaning and waste removal.

G. Final cleaning.

H. Protecting Installed Construction.

1.02 EXAMINATION

A. Acceptance of Conditions:
1. Verify that the existing applicable site conditions, substrates, or substrate surfaces are acceptable or meet the specific requirements of the individual specifications Sections, for subsequent Work to proceed.
2. Verify that the existing substrate is capable of structural support or attachment of new Work being applied or attached.
3. Examine and verify specific conditions described in the individual specifications Sections.
4. Verify that utility services are available, of the correct characteristics, and in the correct locations.
5. Beginning of new Work, that relies upon the quality and proper execution of the Work of a preceding trade, means acceptance of that preceding Work as appropriate for the proper execution of subsequent Work.
6. Acceptance of preceding Work that can be shown later to have adversely affected proper performance of new Work may result in removal and repeat performance of all Work involved at no cost to the Owner.

1.03 PREPARATION

A. Clean substrate surfaces prior to applying the next material or substance.

B. Seal cracks or openings of the substrate prior to applying the next material or substance.

C. Apply a manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

D. Prior to the application, installation, or erection of any products and product components, perform any other preparatory operations, or surface or substrate modifications, as may be specified or directed by the product manufacturers.

1.04 PROTECTION OF ADJACENT CONSTRUCTION

A. Protect the existing adjacent properties and provide special protection where specified in the individual Specification Sections.

B. Provide sealed protective coverings over all existing windows & frames, doors & frames, and wood trim.

C. Repair adjacent properties damaged by the construction operations to the original condition to the satisfaction of the Owner.

1.05 CUTTING AND PATCHING

A. Employ the original, or skilled and experienced installer to perform cutting and patching.

B. Submit a written request in advance of the cutting or altering elements which affect:
1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of the element.
4. Visual qualities of sight-exposed elements.
5. Existing construction, or the Work of separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete the Work, and to:
1. Fit the several parts together, to integrate with the other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in the elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods that will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

E. Cut masonry, concrete, and other rigid materials using a masonry saw or core drill.

F. Restore the Work with new Products in accordance with the requirements of Contract Documents.

G. Fit Work tight to the pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Refinish surfaces to match the adjacent finishes. For continuous surfaces refinish to nearest intersection; for an assembly refinish the entire unit.

I. Identify any hazardous substance or conditions exposed during the Work to the Architect for a decision or remedy.

1.06 SPECIAL PROCEDURES

A. Materials: As specified in the product Sections; match the existing with new products, or salvaged products as appropriate, for patching and extending work.

B. Employ a skilled and experienced installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to the alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace the materials as specified for finished Work.

E. Remove the debris and abandoned items from the area and from concealed spaces.

F. Prepare the surface and remove surface finishes to provide the installation of new Work and finishes,

G. Close the openings in exterior surfaces to protect the existing Work from the weather and extremes of temperature and humidity.

H. Remove, cut, and patch the Work in a manner to minimize damage and to provide a means of restoring products and finishes to the original or specified condition.

I. Where new Work abuts or aligns with the existing, provide a smooth and even transition. Patch the Work to match the existing adjacent Work in texture and appearance.

J. When finished surfaces are cut so that a smooth transition with the new Work is not possible, terminate the existing surface along a straight line at a natural line of division and submit a recommendation to the Architect for review.

K. Where a change of plane of 1/4 inch or more occurs, submit a recommendation for providing a smooth transition to the Architect for review.

L. Patch or replace the portions of existing surfaces which are damaged, or showing other imperfections.

M. Finish surfaces as specified in the individual product Sections or as indicated on the Drawings.

1.07 PROGRESS CLEANING AND WASTE REMOVAL

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

B. Sweep and vacuum clean the interior areas prior to the start of surface finishing, and continue cleaning to eliminate dust.

C. Collect and remove the waste materials, debris, and rubbish from the site periodically or weekly and dispose of off-site.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.08 FINAL CLEANING

A. Execute final cleaning of areas affected by the Work prior to the final project assessment.

B. Clean the exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean the equipment and fixtures to a sanitary condition using cleaning materials appropriate to the surface and material being cleaned.

D. Clean the debris from roofs, gutters, downspouts, and drainage systems.

E. Clean the site; sweep the paved areas, rake clean the landscaped surfaces.

F. Remove the waste and surplus materials, rubbish, and the construction facilities from the site.

1.09 PROTECTING INSTALLED CONSTRUCTION

A. Protect the installed Work and provide special protection where specified in the individual specification sections.

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

C. Repair or replace the installed Work damaged by construction operations, as directed by the Architect.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 74 19

WASTE MATERIALS MANAGEMENT AND RECYCLING

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 WASTE MANAGEMENT GOALS FOR THE PROJECT

A. The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as feasible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing overall packaging and poor quantity estimating.

B. Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse or recycling. Waste disposal in landfills or incinerators shall be minimized. On new construction projects this means careful recycling of job site waste, on demolition projects this also means careful removal for salvage.

1.3 SUMMARY:

A. This Section includes required salvage and recycling of the following waste materials and applies to all such listed waste materials produced during the course of this Contract:
   1. Concrete, Masonry, and Other Inert Fill Material: Concrete, brick, rock, clean soil not intended for other on-site use, broken up asphalt pavement containing no ABC stone, clay, concrete, or other contaminants, and other inert material.
   2. Metals: Metal scrap including iron, steel, copper, brass, and aluminum.
   3. Untreated Wood: Unpainted, untreated dimensional lumber, plywood, oriented strand board, masonite, particleboard, and wood shipping pallets.
   4. Cardboard: Clean, corrugated cardboard such as used for packaging, etc.
   5. Paper: Discarded office refuse such as unwanted files, correspondence, etc.
   6. Plastic Buckets: Containers for various liquid and semi-solid or viscous construction materials and compounds.
   7. Beverage Containers: Aluminum, glass, and plastic containers.
   8. Other Mixed Construction and Demolition Waste: Solid waste resulting solely from construction, remodeling, repair, or demolition operations on pavement, buildings, or other structures exclusive of waste materials listed herewith.
   9. Materials to be salvaged if possible:
      a. Dimensioned Lumber and Heavy Timbers.
      b. Structural Steel.
      c. Brick and block.
      d. Electric Equipment and Light Fixtures.

B. Non-Recyclable Waste: Collect and segregate non-recyclable waste for delivery to a permitted landfill site.

1. Mixed Solid Waste: Solid waste usually collected as a municipal service, exclusive of waste materials listed above.

C. Hazardous Waste: Contact Architect upon discovery of any hazardous waste.

1.4 DEFINITIONS:

A. Waste Materials are defined as large and small pieces of the materials indicated which are excess to the contract requirements and generally include materials which are to be salvaged from existing construction and items of trimmings, cuttings and damaged goods resulting from new installations, which can not be effectively used in the Work.

1.5 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with all applicable requirements of the federal, state or local authorities concerning Management of Construction, Demolition, Land Clearing, Inert, and Yard Trash Debris

B. Disposal Sites, Recyclers, and Waste Materials Processors: Use only facilities properly permitted by the State and by local authorities where applicable.

C. Provide on-site instruction on appropriate separation, handling, recycling, and salvaging methods to be used by all parties at the appropriate stages of the work at the site. Include waste management and recycling discussion in pre-fabrication meetings with subcontractors and fabricators. Also include discussion of waste management and recycling in regular job meetings and job safety meetings conducted during the course of work at the site.

1.6 STORAGE AND HANDLING:

A. Site Storage: Remove all indicated recyclable materials from the work location to approved containers daily. Failure to remove waste materials will be considered cause for withholding payment and termination of Contract.

B. Position covered containers for recyclable waste materials at a designated location on the Project Site. Select a location for the recyclable materials containers separated from that of general waste and rubbish containers. Provide separate collection containers for a minimum of the following materials:
1. Untreated lumber.
2. Paper, paper products, and cardboard.
3. Plastics.
4. Metals.
5. Glass.
6. Other salvageable materials.

C. Change out loaded containers for empty ones as demand requires, but not less than weekly.

D. Handling: Deposit all indicated recyclable materials in the containers in a clean (no mud, adhesives, solvents, petroleum contamination), debris-free condition. Do not deposit contaminated materials into the containers until such time as such materials have been cleaned.

E. If the contamination chemically combines with the material so that it can not be cleaned, do not deposit into the recycle containers. Comply disposal with all legal and regulatory requirements.

1.7 PROJECT/SITE CONDITIONS:

A. Environmental Requirements: Transport recyclable waste materials from the Work Area to the recycle containers and carefully deposit in the containers without excess noise and interference with other activities, in a manner to minimize noise and dust. Reclose container covers immediately after materials are deposited.
1. Do not place recyclable waste materials on the ground adjacent to a container.

B. Existing Conditions: Coordinate with "Instructions to Bidders" and "Supplementary Conditions".

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 WASTE MANAGEMENT:

A. Source Separation: Separate, store, protect, and handle at the project site all identified recyclable and salvageable waste products to prevent contamination of materials and maximize recyclability and salvageability of materials.

B. Arrange for the regular collection, transport from the site, and delivery to respective approved recycling centers of indicated recyclable waste materials. Maintain records accessible to the Architect for verification of construction waste materials recycling.

C. Delivery Receipts: Arrange for timely pickups from the site or deliveries to approved recycling facilities of designated waste materials to keep construction site clear and prevent contamination of recyclable materials. Keep and maintain records of all deliveries to recycling facilities and all pickups of waste materials at the site by others as specified above.

3.2 RECYCLABLE WASTE MATERIALS HANDLING:

A. General: The following paragraphs supplement handling requirements for various materials identified for classification and recycling listed in Part 1 "Summary" article above.

B. Paper: Classify and handle waste paper goods as follows:
1. Bond Paper: As generally found in the construction offices and used for specifications, correspondence, copiers, printers and FAX machines. Collect in a separate container at each workstation and deposit loose in the appropriate recycle container daily.
2. Newsprint: Newspapers and tabloid style advertising. Collect in a single location and deposit daily in the appropriate recycle container.
3. Prints (drawings): Set up a single location for collection. Roll together to minimize space. Deposit daily in the appropriate recycle container.

C. Packaging materials:
1. Cardboard and paperboard cartons and boxes: Knock-down, fold flat and deposit in the appropriate recycle container.
2. Paper packing materials (separators, stiffeners, etc.) shall be placed in the same container.

3. Newsprint, used as packing (shredded or whole), shall be deposited in the recyclable container for newsprint.
4. Plastic (polystyrene peanuts and other shapes) shall be deposited in the recyclable container for plastics.
5. Metal and plastic banding materials shall be deposited in the appropriate container.

D. Metals: Cut all items to lengths and sizes to fit within the container provided, when necessary. Where there is sufficient quantity of a specific recyclable waste item (for example; salvaged metal roofing or duct work), make special arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up. Coordinate all special arrangements with the Architect.

E. Plastics: Collect recyclable plastics (polystyrene and others specifically marked for recycling) daily from work areas and deposit in designated containers.

F. Other Items: Where recyclability classification of any given waste material is unclear, verify with the Architect.

END OF SECTION

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Closeout procedures.

B. Quality assurance.

C. Owner's Manuals

D. Materials and finishes manuals.

E. Equipment and systems manuals

F. Spare parts and maintenance materials.

G. Product warranties and product bonds.

H. Project Record documents.

K. Project close out inspections – Punch List

1.02 CLOSEOUT PROCEDURES

A. Submit a written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with the Contract Documents and is ready for the Architect's review.

B. Provide submittals to Architect that are required by the governing or other authorities, including the following closeout documents:
1. AIA Document G706 - Contractor's Affidavit of Payment of Debts and Claims, 1994 Edition.
2. AIA Document G706A - Contractor's Affidavit of Release of Liens, 1994 Edition.
3. AIA Document G707 - Consent of Surety to Final payment, 1994 Edition.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. The Owner will occupy all portions of the building as specified in Section 01 11 00.

1.03 QUALITY ASSURANCE

A. Employ personnel assembling submittals experienced with the described products.

1.04 OWNER'S MANUALS

A. Submit the data for Operations and Maintenance, Materials and Finishes, and Equipment and Systems Manuals bound in 8-1/2 x 11 inch text pages, in maximum 2 inch size, D side three - ring commercial quality binders with durable cleanable plastic covers.

B. Prepare binder covers with the printed title of the manual, title of the project, and the subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with the text; fold the larger drawings to the size of the text pages.

E. Submit two copies of the completed volumes for review. They will be reviewed and returned with the Architect's comments. Revise the content of the manuals as required prior to final submission.

F. Submit two sets of revised final volumes in final form.

1.05 MATERIALS AND FINISHES MANUALS

A. Instruction for Care and Maintenance: include manufacturer's instructions for cleaning agents and methods, precautions against detrimental agents and methods, and a recommended schedule for cleaning and maintenance.

B. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

C. Include Material Safety Data Sheets (MSDS) for all applicable products. These are required to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. MSDS's include information such as physical data (melting point, boiling point, flash point etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill/leak procedures.

D. Additional Requirements: As specified in the individual product specification Sections.

E. Include a listing in the Table of Contents for design data, with a tabbed flysheet and a space for the insertion of data.

1.06 EQUIPMENT AND SYSTEMS MANUALS

A. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit documents within 10 days after acceptance.

B. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting and checking instructions.

C. Additional Requirements: As specified in the individual product specification Sections.

D. Include a listing in the Table of Contents.

1.07 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in the quantities specified in the individual specification Sections.

B. Deliver to the Project site and place in a location as directed by the Owner; obtain a receipt prior to final payment.

1.08 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by the responsible subcontractors, suppliers, and manufacturers, within 10 days after the completion of the applicable item of work.

B. Execute and assemble the transferable warranty documents and bonds from the subcontractors, suppliers, and manufacturers.

C. Verify that the documents are in the proper form, contain full information, and are notarized.

D. Co-execute the submittals when required.

E. Submit two copies in D side three ring binders with a durable plastic cover.

F. Submit prior to the final Application for Payment.

G. Time of Submittals:
1. For equipment or component parts of equipment put into service during construction with the Owner's permission, submit the documents within 10 days after acceptance.
2. Make other submittals within 10 days after the Date of Substantial Completion, prior to the final Application for Payment.
3. For items of Work for which acceptance is delayed beyond the Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty or bond period.

1.09 PROJECT RECORD DOCUMENTS

A. Maintain on the site one set of the following record documents; record actual revisions of the Work for all trades:
   1. Construction Drawings.
   2. Project Manual.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instructions for assembly, installation, and adjusting.

B. Ensure the entries are complete and accurate, enabling future reference by the Owner.

C. Store the record documents separate from the documents used for construction.

D. Record information concurrent with the construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product Section description of the actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Construction Drawings and Shop Drawings: Legibly mark each item to record the actual construction including:
   1. Measured depths of foundations in relation to the first floor datum.
   2. Measured horizontal and vertical locations of the underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in the construction.
   4. Field changes of dimension and detail.
   5. Details not on the original Contract drawings.

G. Legibly marked Project Manual, and legibly marked Record Construction Drawings and Shop Drawings shall constitute the Project Record Documents in paper form. All documents are to be full size matching the size of the original documents.
   Record Construction Drawings are to be printed full size and be properly bound and stapled together with a binder strip.

H. At completion of the Work of the Contract, the Architect will furnish the Contractor with an electronic copy of the construction drawings in AutoCad format, and the Project Manual content in Adobe Acrobat PDF format.

I. Transfer the information from the Project Record Documents in paper form onto the electronic documents (in Adobe Acrobat PDF format on a CD or DVD ROM disc or USB Flash Drive) and return to the Architect along with the Project Record Documents in paper form. Provide two copies of both.

J. The Architect will review the Project Record Documents and compare them for accuracy, and if necessary return them to the Contractor for final correction. At the time of final submission, submit a claim for the final Application for Payment.

K. No review or receipt of record of Project Record Documents by the Architect or the Owner shall be interpreted as a waiver of any deviation from the Contract Documents or Shop Drawings , or in any way relieve the Contractor from responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents

L. Update the on-site Project Record Documents on a regular basis. Monthly payments will not be processed if Project Record Documents are not maintained up to date.

1.10 PROJECT CLOSE OUT INSPECTIONS - PUNCH LIST

A. When the work has reached such a point of completion that the building or buildings, equipment, apparatus or phase of construction or any part thereof required by the Owner for occupancy or use can be so occupied and used for the purpose intended, the Contractor, prior to notification to the Architect, shall make a preliminary inspection of the Work to insure that all requirements of the Contract have been met and the Work is substantially complete and is acceptable.
Upon such notification, the Owner or the Architect and the consulting Engineers shall make detailed inspection of the Work to insure that all requirements of the Contract have been met and the Work is complete and is acceptable.

B. Within ten (10) calendar days of notification, the Architect and the consulting Engineers will perform the inspection and a copy of the report of the inspection shall be furnished to the Contractor so that the Contractor may proceed without delay with any part of the Work found to be incomplete or defective. The Contractor shall complete the items listed within thirty (30) calendar days and notify the Owner and Architect

C. When the items appearing on the report of inspection have been completed or corrected, the contractor shall so advise the Owner and the Architect. After receipt of this notification, the Owner or the Architect and consulting Engineers shall reinspect and inform the Contractor of any remaining items.

A copy of the report of the final inspection containing all remaining contract exceptions, omissions and incompletions shall be furnished to the Contractor within seven (7) calendar days of notification.

D. The Contractor shall within fourteen (14) calendar days complete the items listed on the inspection report and provide notification of completion and all remaining contract exception, omissions and incompletions from the Contractor, the Owner and the Architect and consulting Engineers will reinspect the Work to verify completion of the exception items appearing on the report of final inspection.

Upon completion of reinspections, the Architect will prepare a certificate of final acceptance or will furnish to the Contractor a copy of the report of the Architect's reinspection detailing Work that is incomplete or obligations that have been fulfilled but are required for final acceptance.

The Contractor shall compensate the Architect and all consulting Engineers for services performed on Punch List inspections beyond the original inspection and two reinspections of the same area through a credit change order reducing the total contract amount.

E. Upon Substantial Completion of the Work, the Contractor will be paid all retainage, less one hundred fifty percent (150%) of the value attributable to "punch list" work. As items on the punch list are completed, the Contractor will be paid one hundred fifty percent (150%) of their value at the next progress payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. All material, labor and equipment required for demolition and removal of existing structures and items as shown on the drawings and as may be required to permit the proper installation of any new work.

1.02 QUALITY ASSURANCE

A. Perform work in accordance with all applicable local and state Codes.

1.03 SEQUENCING

A. Coordinate with the occupancy of the owner under provisions of Section 01 11 00.

B. Avoid interference with the use of and passage to and from adjacent buildings and facilities.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 PREPARATION

A. Inspection

1. The contractor shall inspect the entire site, premises and all objects designated to be removed and those to be preserved.
2. Locate all existing utility lines and determine the requirements for their protection or abandonment.

B. Notification

1. Notify the owner at least two full working days prior to commencing the work of this section.

C. Verification

1. Prior to commencing the work of this section, verify with the owner and the Architect all objects to be removed and all objects to be preserved.

D. Protection

1. Protect all objects and utilities designated to remain as required. Active utilities shall not be interrupted.
2. Provide shoring and bracing for the support of existing structures, that are to remain in place, where necessary to prevent collapse of structures.
3. Dust control shall be as necessary to prevent the spread of dust and flying particles of during performance of the work of this section. Provide taped fire resistant polyethylene dust barriers as required. Thoroughly moisten all surfaces as required.
4. The contractor shall be responsible to repair or replace all items designated to remain that are damaged due the surrounding demolition.

3.02 CLEANING

A. Clean work under provisions of Section 01 70 00.

B. Remove all debris and trash from the site on a daily basis and dispose of in accordance with all local and state Codes.

C. All removed items scheduled to be retained shall be given to the owner for their use.

D. Burning at the site will not be permitted.

3.03 SCHEDULE

A. Finishes

1. Remove all finishes as indicated on the drawings and as required by new construction. Repair or replace substrate damaged by removals.

B. Masonry

1. Assume all masonry is reinforced.
2. Remove all masonry or mortar as indicated on the drawings and as required by new construction
3. Remove reinforcing flush with surfaces scheduled to remain.

END OF SECTION

SECTION 04 01 40

STONE MASONRY CLEANING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This specification provides guidance for cleaning historic stone masonry materials, including the removal of soiling, staining, and biogrowth.

B. All work described herein and related work must conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties.

C. The Contractor shall provide all labor, material, equipment, and operations required to complete the work indicated herein.

1.02 RELATED SECTIONS

A. Section 04 03 05 - Mortar Repointing

1.03 DEFINITIONS

A. Atmospheric Soiling: The dust, aerosols, and particulate matter deposited from the air directly on the material surface. Particulates can result from vehicle exhaust, sea salts and other contaminants.

B. Biological soiling: Discolorations that include biological growth (biogrowth) and biological deposits. Biogrowth includes microorganisms, including lichens, bacteria, algae, fungi, and molds that discolor the material surface. Factors influencing biogrowth include exposure, orientation, position, and the material's surface texture. Deposited material, such as bird droppings, aphid "honey dew," and others, are considered biological soiling.

C. Chemical Cleaning: Cleaning methods that involve applying a substance to the material that interacts with the material and any discoloration on the surface.

D. Cleaning Test Patch: A small unobtrusive area in which the Contractor tests a particular cleaning method. Several cleaning test patches are usually performed side by side to directly compare methods.

E. Physical Cleaning: Physical cleaning methods generally involve the removal of material from the surface using abrasive methods. Physical methods include pressure washing at low and medium pressures, and mechanical or manual brushing.

F. Staining: a penetrating discoloration or soiled spot found on the material.

1.04 REFERENCES

A. Masonry cleaning shall conform to National Park Service's *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*, 1992. National Park Service. 28 July 2009.

B. Where applicable, techniques employed for treatment shall be as outlined in the following *Preservation Briefs*, published by the National Park Service:
   1. Mack, Robert C. and Grimmer, Anne E. *Preservation Brief No. 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings*. National Park Service. 2000. 30 July 2009.
   2. Grimmer, Anne E. *Preservation Brief No. 6: Dangers of Abrasive Cleaning to Historic Buildings*. National Park Service. 1979. 28 July 2009.

C. Grimmer, Anne E. *Keeping it Clean: Removing Exterior Dirt, Paint, Stains and Graffiti from Historic Masonry Buildings*. Darby, Pennsylvania: Diane Publishing Co., 1992.

1.05 SUBMITTALS

A. Submit a detailed schedule of the areas to be cleaned, including an assessment of the problem surfaces, and proposed masonry procedures, application methods, dwell times, etc., for approval once cleaning test panels are completed and approved.

B. Submit the manufacturer's product literature for all cleaning products. Product literature shall include specification data, Material Safety Data Sheets, and instructions for storage, handling, and use.

1.06 QUALITY ASSURANCE

A. The Contractor performing the work described in this Section shall have a minimum of seven (7) years experience in masonry cleaning and restoration and shall have successfully completed at least three projects of similar scope within the previous five years. They shall demonstrate a working knowledge of *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings*.

1.07 MOCK-UP/TEST PANELS

A. The Contractor, at locations designated by the Architect, shall prepare test panels not to exceed 25 square feet per sample demonstrating the cleaning method on inconspicuous areas, preferably conducted by the operator undertaking the final work.

B. More than one test panel may be required for approval. If necessary, the Contractor shall prepare at least four (4) test panels of each type without further compensation. Approved test panels shall become part of the work and shall serve as the quality standard for all similar work.

C. Let the test panels dry 3 to 7 days before inspection.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Deliver restoration cleaning and testing materials and products to the project site in manufacturer's or distributor's packaging, undamaged, complete with application instructions and Material Safety Data Sheets

C. Store restoration cleaning and testing materials and products within the temperature range recommended by the manufacturer and away from direct sunlight. Handle all materials according to manufacturer's instructions.

C. Collect and dispose of waste material, packaging, debris, and effluent associated with the masonry cleaning work in accordance with local, state, and federal environmental regulations.

1.10 PROJECT / SITE CONDITIONS

A. The work of this Section shall be executed only when the air and surface temperatures are 40 degrees Fahrenheit and rising or less than 90 degrees F and falling. Minimum temperature for masonry cleaning shall be 50 degrees F and above for at least two hours after completion and above freezing for at least 24 hours after completion. Work shall not commence when snow, or below-freezing temperatures are expected within the next 24 hours. All surfaces shall be free of frost, and ice.

B. The Contractor is responsible for protecting existing adjacent materials during the execution of the work and shall provide all necessary protection and follow all necessary work procedures to avoid damage to existing material assemblies not a part of the work of this Section.
At a minimum, the Contractor shall:
1. Protect woodwork, glass, and metal adjacent to masonry areas to be cleaned from overspray and possible water damage from cleaning operations. Cover all window openings with waterproof plastic to prevent leakage to the building interior.
2. Protect surrounding lawns and vegetation from runoff during cleaning operations.
3. Access work areas from the exterior only. Under no circumstances are hoses to be run through the building during cleaning operations.

C. The Contractor shall erect waterproof enclosures around areas where cleaning operations are in progress to protect nearby property and passers-by from overspray of cleaning chemicals or rinse water.

D. The Contractor shall coordinate masonry cleaning operations with the other trades involved in exterior and interior restoration work, including but not limited to, masonry restoration, and painting.

PART 2 - PRODUCTS

2.01 MASONRY CLEANING

A. Investigations and Method selection:
1. Identification of material types, surface and substrate conditions, previous treatments, and the nature, cause and pattern of the soiling type for each area shall be determined. **The Contractor is to use the gentlest method possible to remove the soiling without damaging the substrate material.**
2. The Contractor shall conduct cleaning test panels in unobtrusive locations on the masonry to be cleaned. The purpose of the test panel is to determine the gentlest, most effective method to remove soiling from the masonry. Cleaning methods are generally tested side by side.
3. The method of cleaning and the level of clean shall be discussed with and approved by the Architect and Owner.
   The Contractor shall protect adjacent materials, installed non-masonry materials, and openings.

B. Cleaning methods: Cleaning shall be undertaken through the mildest, least abrasive method approved by the Owner and Architect.
1. The following methods are gentlest and should be considered first, in sequence:
   a. Nebulous spraying with soft brushing of heavily soiled areas.
   b. Pressure water washing
   c. Chemical Cleaning
2. Nebulous Sprays: Application of intermittent mist spray under low pressure to dampen surface. Dirt is removed through differences in drying rates of the soiling and substrate. Swelling of the soiling generally loosens its attachment to the substrate. Scrub heavily soiled areas with soft brushes. Optimal water pressure, time cycles, and duration of the cleaning technique are to be determined during preparation of cleaning test patches.
3. Pressure water washing: Washing the surface with low to medium jet pressure, 200-400 pounds per square inch (psi) at 3-5 gallons per minute (gpm) using a 45 degree fan type nozzle. Optimal water pressure and wand distance are to be determined during preparation of cleaning test patches. Note that most commercial pressure washing systems operate at significantly higher pressures than those recommended. Use of a pressure regulator to reduce pressures may be needed. Minimum distance is 24 inches between the nozzle tip and the masonry surface.
4. Chemical Cleaning:
   Biological Growth Remover: BioWash by ProSoCo (or approved equal)

C. Water used for cleaning of historic masonry shall be potable and free of injurious amounts of oil, soluble salts, alkali, acids, and other impurities that might stain or otherwise damage masonry.

D. Equipment for masonry cleaning:
1. Pipes and hoses used for water cleaning shall be plastic or other similar material that is not subject to corrosion, which can cause discoloration and staining of surfaces being cleaned.

2. Natural bristle brushes shall be used for scrubbing. Metal bristle brushes are not to be used.

2.02 STONE PROPERTIES AFFECTING CLEANING

A. Calcitic Stone (Limestone, Marble and some Sandstones): Marble, limestone and some sandstones are acid sensitive. Acids can cause etching and dissolution of the stones and should not be used for their cleaning.

PART 3 - EXECUTION

3.01 GENERAL

A. The initial cleaning test patches shall be undertaken by the Contractor and reviewed by the Architect and Owner to determine the mildest cleaning method to be used once cleaning test patches are approved. Cleaning mock-ups will be prepared by the Contractor, and reviewed by the Architect and Owner.

B. Contractor shall submit testing schedule and a cleaning schedule, including the methods and materials to be used.

C. The Contractor shall protect all adjacent materials from spray.

D. Masonry cleaning shall be completed prior to masonry repointing and repairs. The Contractor shall remove and store light fixtures, downspouts, and other appurtenances to ensure full access to wall surfaces, unless otherwise noted by the Architect. Anchor holes and penetrations from appurtenances must be temporarily filled with removable sealant or protected with cover plates.

3.02 MASONRY CLEANING

A. Surface Preparation for Cleaning
1. Examine the surfaces to be cleaned prior to commencing cleaning operations.
2. Window and door openings shall be protected from leakage and damage from cleaning solutions by plastic sheeting or another waterproof membrane.

B. NEBULOUS SPRAY WATER MIST CLEANING: First method to use.
1. A water misting apparatus is to be built to suit the size of the masonry to be cleaned. Generally, the nebulous spray misting system consists of PVC pipe and fittings, flexible mist-type spray heads spaced based on cleaning needs, and a timed shutoff valve for on/off cycling. The nebulous spray misting system is suspended as required to clean all specified areas. Conditions that can be varied and must be controlled include:
   a. available water pressure delivered to the system,
   b. volume of water delivered from each sprayer,
   c. nozzle shape,
   d. droplet size,
   e. distance from surface, and
   f. duration of on/off cycles.
2. Cleaning conditions with the nebulous spray system shall be optimized prior to cleaning

the masonry surface. Intervals for wet / dry cycles vary widely based on the cleaning action desired. Cycles can be as short as three seconds on and 40 seconds off, to as long as four hours on and four hours off. For bidding purposes assume a cycle of 5 minutes on and 15 minutes off for a period of 48 hours. Upon review of the testing, this cycle may change. It will be determined by the length of time necessary to wet the surface sufficiently to loosen the soiled areas to an acceptable level that allows light scrubbing of the most heavily soiled areas. It is generally recommended to start from the top of the masonry structure and work downward.

3. During misting, the nozzles are to be adjusted to apply a heavier mist on the most concentrated soiled areas and crevices. Natural bristle brushes are to be used to aid in the removal of heavily soiled areas and cleaning high relief decoration. These areas are to be hand scrubbed at a time when it has been determined the water has sufficiently softened the soiling to a point that the scrubbing will be the most effective.
4. Final rinsing of each section shall consist of a low pressure wash, not to exceed 200 - 300 psi. Rinse surfaces from top to bottom using a 45 degree fan-tip nozzle. Maintain a minimum distance of 24 inches between the nozzle tip and the masonry surface. Use the lowest possible pressure to achieve desired results.

3.03. PRESSURE WATER WASHING: Second Method to use if necessary.

A. Additional pressure washing may be necessary over the entire area.
Prior to proceeding with this method to use on the entire area to be cleaned review with Architect and Owner.
This cleaning will incorporate a low pressure wash, not to exceed 200 - 300 psi. Rinse surfaces from top to bottom using a 45 degree fan-tip nozzle. Maintain a minimum distance of 24 inches between the nozzle tip and the masonry surface. Use the lowest possible pressure to achieve desired results.

3.04 CHEMICAL CLEANING: Third Method to use if necessary.

A. Chemical cleaning will be the last method to consider using a biological growth removing chemical used in strict accordance with the manufacturer's instructions.

B. Working from the bottom to the top, apply generously to dry surface until surface is thoroughly wet. Leave on the surface for 2–3 minutes. If needed, apply more to keep the surface wet. Mist treated surfaces with water and gently scrub with a non-metallic, short-fibered scrub brush to loosen biological soiling. Working from the bottom to the top, rinse thoroughly with clean water. Use the power washing method described in paragraph 3.03 above for the rinsing.

C. All surfaces inadvertently coated with the cleaner chemicals are to be immediately and thoroughly washed and cleaned as required.

3.05 CLEANING

A. Clean up premises under provisions of Section 01 70 00.

3.06 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01 70 00.

END OF SECTION

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SECTION 04 03 05

MORTAR REPOINTING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. All labor and materials for the repointing and of the existing mortar.

1.02 REFERENCES

A. American Society for testing materials (ASTM)

B. U.S. Department of the Interior Preservation Brief No.2.

1.03 QUALIFICATIONS

A. Company specializing in historical repointing of masonry with minimum experience as outlined in Document Section 00 21 15 – Instructions to Bidders of this Project Manual for a masonry subcontractor.

1.04 QUALITY ASSURANCE/TEST REQUIREMENTS

A. Mortar Samples: Prepare, install, and finish each sample joint repair according to the specifications. All samples must be applied to masonry on the building. Prepare samples in an area where they will be exposed to the same conditions as will be present on the building during curing. Allow samples to cure at least three days (or longer, if possible) before obtaining Architect and Owner's approval for color match. Mortar colors will continue to lighten as they cure and are exposed to the weather, so samples should be installed as far in advance as possible.

B. Mock-Up: Install at the project site, a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Architect and Owner's acceptance of finish color, texture, pattern and workmanship standards. Comply with Division 1 Quality Control (Mock-Up Requirements) Section.
   1. Maintenance: Maintain mock-up during construction for workmanship comparison.
   2. Incorporation: Mock-up may be incorporated into final construction.

C. Preinstallation Meeting: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product data: Submit manufacturers' technical data and Materials Safety Data Sheet for each product specified or proposed for use including recommendations for their application and use.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.

B. Protect materials during storage and construction. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Protect persons, motor vehicles, site furniture and landscaping, all non-masonry building surfaces (including but not limited to window glass and frames, wood trim, roof and flashing, doors and related fixtures, all metals, fittings and equipment of the building and building site.)
   1. In the event of damage, make all repairs and replacements necessary to restore items to their preconstruction condition and to the approval of the Architect at no additional cost to the Owner.

B. Protect all intake vent and grills, windows and doors from dust, water spray, fumes or chemicals. Protect interior from dust.

C. Mortar work may be carried out only when air temperatures are 45°F and above and will remain at that temperature or above for not less than 7 days after completion of clean-up. Prevent mortar, adhesives or grout from staining surrounding masonry. Remove any spill immediately. Protect sills, ledges and other protection from mortar droppings by coating with sand. No spills shall be permitted to remain at the end of each work day.

D. No mortar work will be allowed in wet weather or when rain is predicted within two days unless work is protected within waterproof enclosures.

E. Cover work at the end of each day and whenever work is not in progress. Extend waterproof covers securely over work area.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Naturally hydraulic lime, NHL 3.5. Imported by Virginia Lime Works and manufactured by St. Astier's Lime, France or accepted equal.

B. Mortar Aggregate. Well-graded sharp bagged mason's mortar sand, ASTM C 144, further modified by the requirement that the aggregate match to the sample of the original mortar aggregate. Original mortar is to be taken from within the wall, surface mortars are not original. Contractor is responsible to obtain separated (extracted from mortar by acid digestion) aggregate sample from the mortar as part of the work of this contract to determine match.

C. Water shall be clean and free from deleterious materials. Only potable water may be used.

D. Excess Mortar solvent if approved for use by Architect: Hydroclean 455, EaCo Chem NMD 80. SureKlean 600 is not acceptable. Concentration shall be minimum necessary to remove excess mortar at joint perimeters.

PART 3 - EXECUTION

3.01 REPOINTING MASONRY

A. Cut out and repoint **all** mortar joints in the areas indicated on the drawings.

B. Notify Architect of unforeseen detrimental conditions including loose masonry units, rotted wood, rusted metal, and other deteriorated items.

C. Joint preparation.

1. Cut and remove mortar from joints back to a depth of at least one (1) inch or to sound mortar, whichever is greater.
   All loose material shall be washed from the joints using a water hose. Joints shall be wetted before the new mortar is applied.

2. Joint cutting: Single blade power operated rotary saws providing a single cut down the middle of the joint may be used upon written acceptance of the Architect and Owner of satisfactory completion of mock-up installation of joint cutting technique by each mechanic who will be cutting joints. Power cutting will not be permitted at ends of head joints, inside corners, and at other locations where it is determined that power cutting is likely to result in damage to the stone due to overcutting.
   The cutting out and removal of mortar must not result in the widening of any joints.

3.04 JOINT MORTAR AND REPOINTING

A. Mortar preparation and mixing.

1. The hydraulic lime and sand shall be carefully measured and well mixed together dry. Mortar shall be mixed in small batches so that it will be used within one hour after preparation. Prehydrate pointing mortar as follows: thoroughly mix together all ingredients except water, then mix again adding only enough water to produce a damp unworkable mix which will retain its form when pressed in a ball. After 1-2 hours, add sufficient water to bring mortar to proper consistency, somewhat drier than conventional setting mortar. Additionally follow all recommendations of lime supplier; in event of conflict between specification and manufacturer's written recommendations, manufacturer's recommendation shall prevail.
   Color to be white as to match existing clean mortar to the satisfaction of the Architect and Owner.

B. Mortar Proportions
   1. Repointing and Setting mortar:
      1 Part by volume Moderately Hydraulic Lime, NHL 3.5.
      2.5 Parts volume mortar sand, measured as damp, loose sand. If bagged sand is used diminish sand volume by equivalent proportion.

C. Joint filling. Mortar should be packed in thin layers, not exceeding 1/2". Compact and allow each layer to become thumbprint hard before installation of new lift. No mortar shall extend onto the face of the units. Joint to be tooled with the finish detail to be determined by the Owner and Architect. All joints shall be kept as narrow as possible.

D. Damp Cure mortar. Mist face mortar for at least 24 hours after tooling. In windy or hot weather, review cure procedures with the Architect to ensure that the mortar does not cure excessively fast.

E. Clean-up. Excess mortar should be removed from the surface before it sets using a bristle brush or by rubbing the surface with burlap or clean sand. Dried mortar may be removed with chemical mortar remover by written permission of the Architect.

F. Any joints that develop hairline cracking, become unbonded, are friable after seven day cure period, or are otherwise defective in the opinion of the Architect, shall be cut out and repointed at no cost to the Owner.

G. All joints are to be filled and finished by the end of the work day. No open joints are to be allowed overnight or during inclement weather.

3.02 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or fiber brushes, and clean water, spray applied at low pressure. Do not use metal scrapers or brushes.

B. Protect or avoid all wood surfaces. Wood surfaces and other non-masonry surfaces are to be carefully handwashed and rinsed to remove all soiling. Clean glass to a smudge-free polish on the exterior.

C. Sweep and rake adjacent pavement and grounds to remove mortar and debris. Where necessary, power wash pavement surfaces to remove mortar, dust, dirt, and stains.

D. If any non-masonry surfaces are damaged due to cleaning work, the Contractor is responsible to repair the material to its original condition to the approved by the Owner and Architect.

END OF SECTION

SECTION 04 03 15

STONE CRACK REPAIR

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. All labor and materials for the repair of cracks no larger than 1/8" in width in existing stone masonry

1.02 QUALIFICATIONS

A. Company specializing in historical repair of masonry with minimum experience as outlined in Document Section 00 21 15 – Supplement to the Instructions to Bidders of this Project Manual.

1.03 QUALITY ASSURANCE/TEST REQUIREMENTS

A. Prepare, install, and finish each sample crack repair according to the specifications. All samples must be applied to masonry on the building. Prepare samples in an area where they will be exposed to the same conditions as will be present on the building during curing. Allow samples to cure at least three days (or longer, if possible) before obtaining Architect and Owner's approval.

B. Mock-Up: Install at the project site, a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Architect and Owner's acceptance of finish color, texture and workmanship standards. Comply with Division 1 Quality Control (Mock-Up Requirements) Section.
   1. Maintenance: Maintain mock-up during construction for workmanship comparison.
   2. Incorporation: Mock-up may be incorporated into final construction.

C. Preinstallation Meeting: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product data: Submit manufacturers' technical data and Materials Safety Data Sheet for each product specified or proposed for use including recommendations for their application and use.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.

B. Protect materials during storage and construction. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Protect persons, motor vehicles, site furniture and landscaping, all non-masonry building surfaces (including but not limited to window glass and frames, wood trim, roof and flashing, doors and related fixtures, all metals, fittings and equipment of the building and building site.)
   1. In the event of damage, make all repairs and replacements necessary to restore items to their preconstruction condition and to the approval of the Architect at no additional cost to the Owner.

B. Work may be carried out only when air temperatures are 45° F and above and will remain at that temperature or above for not less than 48 hours after completion.

C. Prevent adhesives from staining surrounding masonry. Remove any spill immediately.

D. No work will be allowed in wet weather or when rain is predicted within 48 hours unless work is protected within waterproof enclosures.

E. Cover work at the end of each day and whenever work is not in progress. Extend waterproof covers securely over work area.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Dispersed Hydrated Lime Injection Mortar (DHL-IM): Injection mortar made of dispersed hydrated lime putty and filler. Designed to repair cavities and cracks no larger than 1/8" in width.
   Product:
   DHL-IM, Dispersed Hydrated Lime Injection Mortar: Manufactured by U.S. Heritage Group, Inc., 3516 N. Kostner Street, Chicago, Illinois 60641 Phone: 773/ 286.2100 Fax: 773/ 286.1852

B. Dispersed Hydrated Lime Spachtel: To be used to cap and finish cracks between 1/8 inch and 1/4 inch wide.
   Product:
   Dispersed Hydrated Lime DLS Spachtel: Manufactured by U.S. Heritage Group, Inc., 3516 N. Kostner Street, Chicago, Illinois 60641 Phone: 773/ 286.2100 Fax: 773/ 286.1852

C. Substitutions: Under provisions of Section 01 60 00.

2.02 TECHNICAL INFORMATION

A. Dispersed Hydrated Lime Injection Mortar
   1. Compressive Strength (28 days) 725 – 1450 psi
   2. Bond Strength: 43 – 72 psi

3. Flexural Strength: 290 – 797 psi
4. Modulus of Elasticity: 5.8X10^(5) – 1.3X10^(6) psi
5. Porosity: 24 – 35%
6. Absorption: 14 – 25%
7. Linear Coefficient of Thermal Expansion: 6.2 – 6.4X10^(-6)/F°

B. Dispersed Hydrated Lime Spachtel
1. Compressive Strength (28 days) 725 – 1595 psi
2. Bond Strength: 29 - 87 psi
3. Flexural Strength: 493 - 870 psi
4. Modulus of Elasticity: 1.0X10^(6) psi
5. Porosity: 25 – 37 %
6. Absorption: 12 – 26 %
7. Linear Coefficient of Thermal Expansion: 6.56X10^(-6)/F°

PART 3 - EXECUTION

3.01 CRACK REPAIR EXECUTION

A. Workmanship
1. Do not use any additives, such as bonding agents, accelerators, or retardants in the material.
2. Review with existing masonry prior to ordering material to ensure proper color matching.
3. Follow all manufacturer recommendations for preparation, mixing, installation, finishing, etc.

B. Preparation for Repairs
1. Keep all materials from staining adjacent intact masonry surfaces.
2. Clean all dust from surface and pores of the substrate, using clean water and a scrub brush. Flush out crack with clean water in order to remove small particles.
3. Pre-wet the stone with distilled water to prevent the substrate from drawing moisture out of the repair too quickly.

C. Mixing
1. The material may have settled during storage and shipping. Shake container or mix prior to use to ensure full distribution of lime particulate within the mix.
2. DHL-IM may be diluted with distilled water up to 5% by weight to penetrate smaller cracks and voids.

D. Application of Repair Materials
1. Install material by means of a packer or injection tool after pre-wetting with distilled water. Typical syringe size 0,08-0,25mm.
2. Diluted material may be brush applied to very fine cracks.
3. DHL-IM has no working time, use immediately. To prevent from drying any unused material should remain in a closed container.
4. Fill injection syringe with mixed DHL-IM.
5. Insert syringe into crack until tip of the needle reaches the back of the crack.

6. Inject DHL-IM into the crack, slowly removing the syringe as material fills the back of the crack.
7. When syringe is empty refill it and reinsert it into the crack at its previous depth then continue to fill the crack with DHL-IM.
8. Continue to fill the crack until the DHL-IM has reached a depth of 1/4”from the surface of the stone.
9. Cap crack using the Dispersed Hydrated Lime Spachtel as required to finish crack repair level with the existing stone surface. Color to match existing. Verify at site.

E. Curing Procedure
1. Air and object temperature should not drop below 42°F and exceed 90° F during curing. Full curing time is dependent on temperature and relative humidity; typical curing timeframe is 48 hours.

F. Clean Up
1. Remove surface smears and residue from the stone immediately with a damp cloth, avoiding contact with repaired area.
2. Remove material from tools and mixing equipment with water immediately after use. DHL-IM is difficult to remove after it has set.

END OF SECTION

SECTION 04 43 16

MARBLE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The work to be done under this section includes all labor and materials required for the furnishing, setting in place and completion of all marble work shown or called for on the drawings and/or specifications.

1.02 PERFORMANCE REQUIREMENTS

A. All marble and the installation of marble shall conform to Marble Institute of America Standards.

B. Stone Abrasion Resistance: Minimum value of 10, based on testing according to ASTM C 241 or ASTM C 1353, unless a higher value is required by the referenced building stone standard.

1.03 SUBMITTALS

A. Submit shop drawings and 12" x 12" samples under provisions of Section 01 30 00.

B. Shop drawings shall show all plan layout, bedding, bonding, jointing, and anchoring details.

C. Product Data: For the following:
1. Each variety of stone. Include data on physical properties required by referenced ASTM standards.
2. Stone accessories and other manufactured products.

D. Samples for Verification: For each stone type indicated, in sets of samples not less than 12 inches square. Include three or more samples in each set and show the full range of variations in appearance characteristics expected in completed Work. Marble should show full color range, veining, finish and quality.

1.04 QUALITY ASSURANCE

A. Masonry Restoration Contractor Qualifications: See Contractor's Qualification Statement required with the Bid.

B. Fabricator Qualifications: Shop that employs skilled workers who fabricate stone paving similar to those indicated for this project and whose products have a record of successful in-service performance.

C. Source Limitations for Stone: Obtain each variety of stone, from a quarry with resources to provide materials of consistent quality in appearance and physical properties.

D. Marble
   1. Prior to fabrication of all the pavers provide a 3’-0” x 1’-7-1/2” x 2” thick slab showing finish, full range of colors, veining and inclusions for review and approval based on the approved sample. This full size sample, if approved, can be installed as part of the project.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 60 00.

B. Any piece of marble showing flaws or imperfections upon receipt, shall be rejected and replaced at the Architect's and Owner’s discretion.

C. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.

D. Store stone on pallets with nonstaining separators and nonstaining, waterproof covers. Ventilate under covers to prevent condensation.

E. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

F. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

G. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain 50 degrees F. or higher during and 24 hours after installation.

B. Cold-Weather Requirements for Stone Paving:
   1. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds.
   2. Protect stone paving against freezing when atmospheric temperature is 40 deg F and falling. Heat materials to provide mortar and grout temperatures between 40 and 120 deg F.
   3. Provide the following protection for completed portions of work for 24 hours after installation when mean daily air temperature is as indicated:
      a. Below 40 deg F, cover with weather-resistant membrane.
      b. Below 25 deg F, cover with insulating blankets.
      c. Below 20 deg F, provide enclosure and temporary heat to maintain temperature above 32 deg F.

C. Hot-Weather Requirements for Stone Paving: Protect stone paving when temperature and humidity conditions produce excessive evaporation of setting beds and grout. Provide

artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and above.

1.06 FIELD MEASUREMENTS

A. Verify all dimensions in the field prior to fabrication.

1.07 WARRANTY

A. Warranty: Include coverage for defective material.

PART 2 - PRODUCTS

2.01 SOURCE OF MATERIAL

A. All marble shall be obtained from a quarry having adequate capacity and facilities to meet the specified requirements. Cutting and finishing shall be done by a firm equipped to process the material promptly on order and in strict accord with specifications. The firm must be approved by the Architect and Owner.

2.02 MATERIALS

A. Marble Pavers
1. Marble Type A - Marble pavers around the perimeter are White Georgia by Polycor Georgia Marble Company quarried from Marble Hill, Georgia.
Pavers are 2 inches thick.
Surface finish is to be honed.
2. Marble Type B - Marble pavers in the field are Tennessee Pink Marble quarried by the Tennessee Marble Company, Friendsville, Tennessee.
Pavers are 2 inches thick.
Surface finish is to be honed.
3. Marble is to be free of cracks, seams or starts which may impair its structural integrity or function. All new marble is to match the existing marble pavers as close as possible in quality meeting the following requirements:
a. Finish: The finish shall match the original as closely as possible. Samples of a fine abrasive finish shall be prepared for approval by the Architect and Owner. The finish on all walking surfaces shall be slip resistant.
b. Veining: Vein direction shall match existing.
c. Color: Color shall match original as closely as possible. Samples demonstrating range of color, amount of veining present, and presence of features (such as mica) that may affect the color and appearance of the stone, shall be prepared for approval by the Architect and Owner.
d. Cut: Match existing stone.
e. Imperfections/fissures: Imperfections and or fissures in the stone will not be permitted unless each one of the following can be demonstrated:
1. The imperfection/fissure does not extend thru the stone.
2. The imperfection/fissure is minor in extent and magnitude.
3. The imperfection/fissure can be concealed by adjacent stones through the normal assembly process.

4. The Architect and Owner will review each stone paver to confirm it is acceptable to be used on this project.

B. Mortar: See specification section 04 03 05 for Mortar Repointing for mortar pointing specifications.

C. Membrane to be Mel-Rol LM Liquid-applied Waterproofing Membrane (or equal)

PART 3 - EXECUTION

3.01 INSTALLER

A. Installation company must specialize in historical installation of marble with minimum experience as outlined in Document Section 00 21 15 of this Project Manual.

3.02 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts condition of existing substrate.

3.03 PREPARATION

A. Protect surrounding work from damage or disfiguration.

3.04 INSTALLATION

A. Setting: Before being set, all marble shall be clean and free of ice and frost. Each piece shall be carefully bedded in a full and solid bearing. Particular care shall be exercised to equalize joint openings and eliminate the need for redressing of exposed surfaces. Exposed surfaces shall be kept free of mortar at all times.
Bedding to be a sand base, sheet membrane and protection board. Pavers are set on top of protection board with dry pack cement.

B. Pointing: Except where otherwise specified, all joints, previously raked, shall be brushed clean and pointed with mortar to a flat cut joint. When thumbprint hard, the joints and beds shall be tooled to match the existing.

3.05 CLEANING

A. After being pointed, the stone shall be carefully cleaned, removing all dirt, excess mortar, stains and other defacements.

B. Natural bristle brushes are to be used for cleaning. Metal bristle brushes, acid or other solutions which may cause discoloration are expressly prohibited.

END OF SECTION

SECTION 06 03 20

WOOD RESTORATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

B. See Section 09 91 00 - Painting

1.2 SUMMARY

A. Furnish all labor, materials, tools, equipment and services necessary and reasonably incidental to restore existing wood to sound condition as indicated on the Drawings

B. Work detailed and scheduled includes, but is not limited to the following:
1. Restore existing woodwork as described herein.
2. Prepare restored woodwork for priming and painting and apply paint.

1.3 SEQUENCING AND SCHEDULING

A. Coordination of Work: The coordination of wood restoration with other proposed work must be considered and coordinated.

1.4 HISTORICAL BUILDING

A. Project work involves the preservation of a historically significant building. The building and its character-defining elements shall be treated respectfully. Existing conditions are to be carefully respected and no material or element shall be removed or disfigured unless specifically indicated on the Drawings, specified herein, or directed by the Architect.

B. The State of Rhode Island Historical Preservation and Heritage Commission will be overseeing and approving all aspects of this project to assure a high level of quality for the restoration of this important building.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturer's product literature and product specifications for all products.

C. Submit small sample of epoxy consolidated decayed wood and a small cast disk of epoxy patch to the Architect for approval prior to application.

D. Submit manufacturer's Material Safety Data Sheet (MSDS)

E. Submit full scale profiles and/or templates of moldings to be reproduced for approval. Samples of the existing moldings must be included in the submittal.

1.6 QUALITY ASSURANCE

A. Wood restoration shall be by craftsmen having a minimum of five (5) years experience in the repair of historic wood using the methods described herein and who supply references demonstrating a record of successful performance.

B. Determine the type of wood used in the existing work and understand its properties. Pine for instance is much softer than oak; therefore, special care should be taken on the pine elements so as not to damage or obscure any detail. All replaced wood shall be with in-kind species.

1.7 REGULATORY/SAFETY REQUIREMENTS

A. All existing paint is assumed to be lead-based paint. Conform to local, State and Federal codes and regulations for the protection of workers and the handling and disposal of the lead containing paint residue from window and trim pieces. Adhere to RI Air Pollution Control Regulation No. 24: Removal of Lead Based Paint from Exterior Surfaces.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 1 60 00.

B. Protect materials from the weather. Store materials a minimum of six (6) inches above ground on framework or blocking and protect with waterproof covering allowing for adequate air circulation and ventilation. Do not store materials in damp portions of the building

C. Deliver epoxies in manufacturer's original, unopened containers and store inside at room temperature or as recommended by the manufacturer.

D. Do not use epoxies that have exceeded manufacturer's shelf life, or that have frozen since manufactured.

E. Follow safety precautions of epoxy as defined by manufacturer or product associations or OSHA. Observe good housekeeping practices when working with epoxies.

F. Flammable solvents may not be stored in or brought within twenty (20) feet of the historic structure.

1.9 PROJECT CONDITIONS

A. Epoxy applications are to be performed in favorable weather conditions as defined by 5.1 5.4 of ASTM C962-81.

B. Do not perform wood consolidation and epoxy repair work when air temperature is below 60 F.

C. Wood to be consolidated must be dry and have a moisture content below 20% by weight. Protect area from moisture until epoxy has completely cured.

D. Epoxy consolidant and epoxy patching material must be within a temperature range of 50º to 90º F at the time of application. Wood within 3 inches of the consolidation and patching area must be within the temperature range of 45º-90º F at the time of application. Area consolidated and/or patched must not be subjected to freezing temperatures within 24 hours of application. Shade the mixing and application areas from direct sunlight. Provide shade to application area for a minimum of 8 hours following consolidation and/or patching of the affected area.

E. Following application leave all areas free and clean of epoxy. Discard unused epoxy, containers, tools, and towels in accordance with local, state, and federal Environmental Protection Agency regulations.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Epoxy Wood Consolidant: Low viscosity two-part penetrating epoxy resin wood consolidant, which has regular and proven use for consolidation applications in decayed wood and which is slow curing (3 to 5 days) to allow for maximum penetration and successive applications. When fully cured the epoxy must be more flexible than wood.

Manufacturers:
1. LiquidWood by Abatron, Inc., 5501 95th Ave., Kenosha, WI 53144, Tel: 262-653-2000
2. Sika Corporation, 201 Polito Ave., Lyndhurst, NJ 07071, Tel: 201-933-8800
3. DAP, 855 N. Third St., P.O. Box 277, Dayton, OH 45401-0277
4. Substitutions under provisions of Section 01 60 00.

B. Epoxy Patching Material: Non-structural, flexible, epoxy system for filling cavities, voids and surface imperfections in wood. When fully cured epoxy must be more flexible than wood.
Manufacturers:
1. WoodEpox by Abatron, Inc., 5501 95th Ave., Kenosha, WI 53144, Tel: 262-653-2000
2. Substitutions under provisions of Section 01 60 00.

C. Products for Preparation of Existing Wood for Painting:
1. Sandpaper: Garnet, 60 to 120 grade
2. Tools:
   a. Paint scrapers, putty knives, and electric vibrating sanders
   b. The use of orbital and belt sanders is <u>not</u> allowed

D. Paint stripper: Water based stripper, 100% biodegradable, zero VOC, and ph neutral.
1. Smart Strip Pro by Dumond Chemicals, Inc. 1501 Broadway, New York, NY 10036 Tel: 212-869-6350
2. Substitutions under provisions of Section 01 60 00.

E. Paint: See section 09 91 00 for paint specifications.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine surfaces and conditions to which this work is to be attached or applied and notify Contractor if conditions or surfaces exist which are detrimental to the proper installation of the work. In most cases deteriorated wood must be removed before the affected area can be accurately defined. Actual parameters for epoxy consolidation may vary for each situation. Verify conditions and proposed treatment with the Architect and Owner.

B. Starting on the Work will imply acceptance of the surfaces and conditions to perform the Work as specified.

3.3 GENERAL REPAIR OF EXISTING WOODWORK IN LOCATIONS AS INDICATED ON THE DRAWINGS.

A. The Contractor is to thoroughly protect all existing surrounding materials completely from damage resulting from spilled chemicals, paint or abrasive materials resulting from all remaining work required to be conducted on site.

B. Remove rotted and/or deteriorated wood from all components noted on the drawings to be restored. The Contractor is to inspect the areas noted on the drawings and identify the extent of the existing wood that is sufficiently rotted or deteriorated to warrant removal and replacement. Review with the Owner and Architect prior to proceeding with the work to confirm the extent of the area to be repaired.

C. Where wood elements longer than 6” are completely rotted and beyond consolidation repair, replace the element with a scarf, Dutchman or other repair, well-connected to the original material. New wood shall match the original in species, configuration and appearance. Treat all cuts of new wood with two coats of wood preservative prior to installation. All new replacement moldings, trim, etc. are to match the original precisely with a perfectly replicated profile.

D. After repairs have been completed, prepare wood for reinstallation and finishing.
Strip all paint from the wood using the specified paint stripper in accordance with manufacturer’s instructions and cautions. Do not use heat removal method and the use of rotary disk or belt sanders will not be permitted. Hand sand as required to achieve a finished smooth surface. Clean surfaces of dust.

E. Follow the grain of the wood in all sanding.

F. Reset all exposed nail heads and treat with rust-inhibiting primer. Penatrol or equal is to be added to the primer to aid in preventing oxidation of old nail heads.

3.4 EPOXY CONSOLIDATION REPAIRS

A. Where damaged/deteriorated wood elements can be repaired through consolidation, rebuild wood by using epoxy wood consolidant followed by the replacement of missing material (under 6” in length) using epoxy patching material. Use consolidant and patching material in strict accordance with manufacturer’s instructions. The final patch must match the plane and shape of the adjoining

material. Keep epoxy consolidant and epoxy patching material out of direct sunlight and at temperatures above 60º F. until fully cured.

B. All loose and soft wood decay must be removed prior to application of epoxy consolidant. Attempt to remove decay down to solid wood. Verify standard for performance with the Architect and Owner. 1/8" diameter holes may be drilled into the affected area approximately 1 1/2" apart for better epoxy penetration. Remove all loose wood fragments and blow out dust.

C. Protect decayed area from moisture until consolidant has been applied and has completely set. Wood to be consolidated must be dry and have a moisture content of less than 20% to within three (3) inches of the area to be repaired.

D. Protect horizontal surfaces from epoxy damage, spills, and drips.

E. Epoxy consolidant may be applied by pouring, brushing, or by spraying. Power spraying is preferred to maximize penetration and coverage of hard to reach areas. Adhere to manufacturer's instructions and cautions.

F. Apply liberally to prepared decay area. Do not allow consolidant to touch adjacent areas, materials, or building components. Repeat application four (4) to six (6) times or until surfaces will accept no more epoxy. Allow approximately one hour between applications to minimize run-off and wasting of product.

G. Keep epoxy consolidant out of direct sunlight and at temperatures above 60 F until fully cured.

3.5 PAINTING APPLICATION, GENERAL

A. Apply primer and paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied:
   1. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
   2. Provide finish coats that are compatible with primers used.

B. 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. 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. 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.

C. Application Procedures: Apply paints and coatings by brush. Use of spray painting equipment or rollers is not allowed. Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.

3.6 PROTECTION AND CLEANING

A. Before, during, and after installation and repair, protect finishes and surfaces of materials in place. Do not remove protection until final cleaning operations.

END OF SECTION

SECTION 06 10 53

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Wood framing.

B. Preservative treatment.

1.02 REFERENCES

A. FS TT-W-571: Wood Preservation: Treating Practices.

B. PS 20 - American Softwood Lumber Standard.

C. NFPA - National Design Specification for Wood Construction.

1.03 QUALITY ASSURANCE

A. Rough Carpentry Lumber: Visible grade stamp, of agency certified by National Forest Products Association (NFPA).

1.04 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00.

B. Indicate fabrication, anchorage requirements and jointing.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products under provision of Section 01 60 00.

B. Do not deliver shop fabricated carpentry items until site conditions are adequate to receive the work. Protect items from weather while in transit.

C. Store indoors, in ventilated areas with a constant, minimum temperature of 60 degrees F, maximum relative humidity of 25 to 55 percent.

PART 2 - PRODUCTS

2.01 ROUGH CARPENTRY MATERIALS

A. Lumber: PS 20; graded in accordance with established Grading rules; maximum moisture content of 19 percent; of following species and grades:
1. Non-structural Light Framing: Stress group B; construction grade.

2. Blocking: Hem-Fir, standard grade.

B. Nails, Spikes and Staples: Galvanized for exterior locations, high humidity locations and treated wood; plain finish for other interior locations; size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; sized to suit application; galvanized for exterior locations, high humidity locations and treated wood plain finish for other interior locations.

D. Fasteners: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolts or power activated type for anchorage to steel.

2.02 WOOD TREATMENT

A. Wood preservative used to treat the wood materials shall be alkaline copper quaternary (ACQ).

B. Treat wood materials requiring pressure impregnated preservatives to FS TT-W-571, Table 3.

C. Deliver treated materials cut to required sizes. Minimize field cutting.

D. Re-dry wood after pressure treatment to maximum 19 percent moisture content.

E. Use stainless steel fasteners where installed in the preservative treated wood.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Carefully lay out, cut, fit and rout all framing, blocking and other items of carpentry in such a manner as to minimize shrinkage and insure stability. Perform all carpentry work required for building in work of other trades and work to the details indicated and as required by field conditions.

B. Install wood nailers true to lines and levels. Do not deviate from true alignment more than 1/4 inch.

C. Construct members of continuous pieces of longest possible lengths.

D. Rough carpentry shall consist of the installation of blocking, nailers, furring, studding, and such other items of rough carpentry as may be required for proper construction and to complete the work. Absence of illustration, detail or specification will not relieve the Contractor from responsibility or carrying out the work.

E. Mechanical equipment clearances: Members shall be framed to allow for passage of pipes or ducts as required to avoid cutting of structural members. No members shall be cut, notched or bored for the passage of such pipes without permission of the Architect, and all members damaged by cutting shall be reinforced as directed by the Architect.

F. Pressure preservative treated lumber: All wood in direct contact with concrete, masonry, soil or gravel shall be pressure preservative treated wood, ground contact grade with a 40 year warranty. Wood shall be free from large or loose knots, shakes, checks and warpage. Apply, at site, two coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber, in accordance with AWPA M4. Allow preservative to cure prior to placing members.

G. Furring and Grounds: Shall be minimum l" x 3" strips, as shown on drawings or as required to match the condition, spaced maximum l6" on center and continuous at all vertical edges of framed openings. Furring shall be secured to concrete, brick or masonry units by power driven fasteners. Face of furring and grounds shall form a true, even plane for installation of materials thereon. Species shall be Fir or Southern Pine, at Contractor's option and preservative treated.

H. Studs: Studs shall be no less than 2"x4", spaced not over l6 inches on center, unless otherwise shown. Studs shall be doubled around all openings. Corners shall be thoroughly spiked together and made solid. All bearing partitions shall be provided with double top and bottom plates. Partitions shall have one row of horizontal bridging for the full width of studding, cut in and securely nailed. Studs shall be framed as shown or required for the proper installation of trim, plumbing, and other work to be concealed. Studding shall be installed for the support of all fixtures and accessories as required.

I. Lumber and other rough work shall be properly framed closely fitted, accurately set to the required lines and levels and rigidly secured in place.
Studs shall be sized to give true surfaces for finish.
Nailing and spiking shall be done in a thorough manner with nails of ample size, spikes larger than 20d being used where practicable.
Special framing or construction, not explicitly shown on drawings or specified, shall be provided as required to complete the work in the best and most workmanlike manner.

3.02 SITE TREATMENT OF WOOD

A. Seal site-sawn ends of preservative treated wood. Allow preservative to cure prior to placing members.

END OF SECTION

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SECTION 07 14 16

COLD-FLUID APPLIED WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Application of single-component, cold-applied, liquid waterproofing membrane.

1.02 REFERENCES

A. ASTM D412-98a(2002)e1 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers -Tension.

B. ASTM E96-00e1 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.

C. ASTM C836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

1.03 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Submit manufacturer's product data and application instructions.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Store adhesives and primers at temperatures of 40° F (5° C) and above to facilitate handling.

D. Do not store at temperatures above 90° F (32° C) for extended periods.

E. Protect materials during handling and application to prevent damage or contamination.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply membrane when air, material, or surface temperatures are expected to fall below 30° F (-1° C) within four hours of completed application.

C. Do not apply membrane if rainfall is forecast or imminent within 12 hours.

D. Do not apply to frozen concrete.

E. Membrane can be applied to green concrete.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Web Site www.wrmeadows.com.

B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. MEL-ROL LM Waterproofing System by W.R. Meadows.

B. Waterproofing Membrane: single-component, polymer-modified, cold-applied, liquid waterproofing membrane.
   1. Waterproofing membrane shall have the following properties as determined by laboratory testing:
      a. Color: Black
      b. Solids: 70%
      c. Total Cure Time: 16-24 hours
      d. Shore “00” Hardness, ASTM C836: Passes
      e. Adhesion to Concrete, ASTM C836: Exceeds
      f. Low Temperature Flex and Crack Bridging, ASTM C836: Passes
      g. Stability, ASTM C836: Exceeds
      h. Elongation, ASTM D412: 1500%
      i. Water Absorption, ASTM D1970: 0.7%
      j. Water Vapor Transmission, ASTM E96 (Method B): 0.03 perms

2.03 ACCESSORIES

A. Protection board, 1/2” thick minimum. The protection board must be compatible with liquid membrane. Verify with membrane manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.

C. Do not apply waterproofing to surfaces unacceptable to manufacturer.

D. Concrete surfaces must be clean, relatively smooth, and free of standing water.

E. Patch all holes and voids and smooth out any surface misalignments with a concrete patching material.

F. Remove and patch all concrete form ties.

G. Apply primer coat of membrane diluted 4:1 with water if necessary to reduce blistering on concrete surfaces at a coverage rate of 100-150 $ft.^2$/U.S. gal (13.9 m^2/3.78 L) by spraying or rolling.

H. Allow primer coat to dry before proceeding to membrane application.

3.03 APPLICATION

A. Apply waterproofing membrane system in accordance with manufacturer's instructions.

B. Thoroughly mechanically mix membrane prior to application.

C. Apply membrane by spray, roller, or brush at a minimum coverage rate of 20-25 $ft.^2$/U.S. gal (1.9-2.3 m^2/3.78L) providing a thickness of 60 wet mils.

D. Frequently inspect surface area with a wet mil gauge to ensure consistent thickness.

E. Work material into any fluted rib forming indentations.

F. Cured thickness of membrane should be 45 mils dry.

G. Avoid use of products that contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

3.04 PROTECTION

A. Cover entire surface of membrane with protection board prior to installation of dry pack cement.

END OF SECTION

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SECTION 07 21 16

FIBERGLASS BLANKET INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 WORK INCLUDED

A. Fiberglass blanket insulation.

1.03 REFERENCES

A. FS HH-I-521 - Insulation Blankets, Thermal (Mineral Fiber, for Ambient Temperatures).

1.04 SUBMITTALS

A. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.05 REGULATORY REQUIREMENTS

A. Conform to all applicable Federal, State and local codes and laws.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
1. Owens Corning
2. Johns Manville
3. CertainTeed

B. Basis of Design: Owens Corning

C. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Blanket Insulation: Must meet ASTM C-665 as noted below:
1. Unfaced insulation
   a. Owens Corning Un-faced Type I (Blankets without membrane coverings)

2. Blanket insulation to be formaldehyde – free and include a minimum of 20% Post Consumer material and 5% Pre-Consumer recycled material.

3. Thermal Resistance Value (R-Value)
   a. Thickness or R-Value as indicated on drawings.

4. Per ASTM-E-84 the maximum flame-spread and smoke-developed indexes are to be 25 and 50, respectively. Must pass ASTM E 136 for combustion characteristics.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify adjacent materials are dry and ready to receive installation.

B. Verify mechanical and electrical services within walls have been installed and tested.

3.02 INSTALLATION

A. Install batt insulation in accordance with manufacturer's instructions.

B. Install batt insulation in spaces without gaps or voids.

C. Trim insulation neatly to fit spaces.

3.03 CLEANING

A. Clean under provisions of Section 01 70 00.

END OF SECTION

SECTION 07 92 13

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Urethane joint sealants.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.4 SUBMITTALS

A. Submit under provisions of Section 0133 00.

B. Product Data: For each joint-sealant product indicated.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

G. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
   1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
   2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

C. Deliver, store, protect and handle products to site under provisions of Section 0160 00.

1.6 PROJECT CONDITIONS

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

1.7 WARRANTY

A. Warranty Period: Two years from date of Substantial Completion. Provide under the provisions of Section 0178 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers as listed below

B. Substitutions: Under provisions of Section 0160 00.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full standard range.

2.3 JOINT SEALANTS

A. Single-Component, polyurethane-based, non-sag elastomeric sealant. Meets Federal Specification TT-S-00230C, Type II, Class A. Meets ASTM C-920, Type S, Grade NS, Class 35, use T, NT, O, M, G, I, A.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Pecora Corporation; DynatrolI-XL.
      b. Sika Corporation, Construction Products Division; Sikaflex - 1a.
      c. Tremco Incorporated; Dymonic

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings Rods: ASTM C 1330, Type C, Closed Cell, provide backing rods of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.5 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

B. Clean under provisions of Section 0170 00.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
    1. Joint Locations:
        a. Control and expansion joints in unit and stone masonry.
        b. Control and expansion joints on exposed interior surfaces of exterior walls.
        c. Perimeter joints of exterior openings where indicated.
        d. Perimeter joints between wall surfaces and frames of doors and windows.
        e. Openings around all penetrations through partitions.
        f. Other joints as indicated.
    2. Urethane Joint Sealant: Multicomponent, nonsag, Class 25.
    3. Joint-Sealant Color: As selected by Architect from manufacturer's full standard range.

END OF SECTION

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SECTION 08 12 13

STEEL DOOR FRAMES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Steel door frames.

1.02 RELATED WORK

A. Section 08 13 13 - Steel Doors

B. Section 08 71 00 - Hardware

C. Section 09 91 00 - Painting: Field painting of frames.

1.03 REFERENCES

A. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

B. ANSI/SDI-100 - Standard Steel Doors and Frames

C. SDI-105 - Recommended Erection Instructions for Steel Frames.

D. ASTM - E152 - Methods of fire tests of door assemblies.

E. NFPA 252 - Fire tests of door assemblies.

F. UL 10B - Fire Tests of door assemblies.

1.04 QUALITY ASSURANCE

A. Conform to requirements of the DHI, SDI-100, SDI-105, NFPA 252 ASTM E152 and UL10B.

1.05 REGULATORY REQUIREMENTS

A. Conform to State Building Code and State Fire Code for fire rated frames.

1.06 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.07 DELIVERY, STORAGE AND PROTECTION

A. Protect products under provisions of Section 01 60 00.

B. Protect frames with resilient packaging sealed with heat shrunk plastic.

C. Break seal on-site to permit ventilation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Steelcraft

B. Other acceptable manufacturers offering equivalent products.

1. Ceco Door
2. De La Fontaine

C. Substitutions: Under provisions of Section 01 60 00.

2.02 METAL FRAMES

A. TYPES

1. Frames: Steelcraft Model F14-4 (14 gage galvanized steel with 2" face for 1-3/4" doors)

B. FABRICATION

1. All frames in new partitions shall be furnished as a welded unit with mitered corners. Miter and entire connection is to be continuous fully welded. Welds are ground and finished smooth.
2. Knocked-down field assembly frames may only be used at existing drywall and interior masonry partitions.
3. Fabricate frames with hardware reinforcement plates welded in place as required to coordinate with hardware schedule. Provide mortar guard boxes, 22 gage.
4. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.
5. Prepare frame for silencers. Provide three single rubber silencers for single doors on strike side, and two single silencers on frame head at double doors without mullions.
6. Frames shall be furnished with a minimum of six wall anchors and two base anchors of manufacturer's standard design. Jamb anchors shall be as required to coordinate with the adjacent wall construction.
7. Provide a temporary spreader bar securely fastened to the bottom of each frame.

2.04 FINISH

A. After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities.

B. Frames shall be thoroughly cleaned and phosphatized.

C. All surfaces exposed to view shall receive a factory applied single coat of rust inhibiting prime paint baked-on in accordance with ANSI A224,1.

D. The finish coats of paint shall be field applied by others in accordance with the painting section of these specifications.

E. Where wall anchors utilizing exposed screw heads are used to install door frames, the exposed screws are to be covered with epoxy resin filler (Bondo or equal) and sanded smooth to match flush with the surrounding face.

PART 3 - EXECUTION

3.01 INSTALLATION OF FRAMES

A. Install frames in accordance with SDI-105

B. Install the frames plumb, rigid, and in true alignment and fasten them so as to retain their position.

3.02 CLEANING

A. Clean in accordance with Section 01 70 00.

END OF SECTION

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SECTION 08 13 13

STEEL DOORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Steel doors.

1.02 RELATED WORK

A. Section 08 12 13 - Steel Door Frames

B. Section 08 71 00 – Door Hardware

C. Section 08 71 50 – Weatherstripping

D. Section 09 91 00 - Painting: Field painting of doors and frames.

1.03 REFERENCES

A. DHI - Door Hardware Institute: The Installation of commercial steel doors and steel frames, insulated steel doors in wood frames and builder's hardware.

B. ANSI/SDI-100 - Standard Steel Doors and Frames

1.04 QUALITY ASSURANCE

A. Conform to requirements of SDI-100.

1.05 REGULATORY REQUIREMENTS

A. Conform to State Building Code and State Fire Code.

1.06 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 31 00.

B. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing.

C. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.07 DELIVERY, STORAGE AND PROTECTION

A. Protect products under provisions of Section 01 60 00.

B. Protect doors with resilient packaging sealed with heat shrunk plastic.

C. Break seal on-site to permit ventilation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Steelcraft

B. Other acceptable manufacturers offering equivalent products.
1. Ceco Door
2. De La Fontaine

C. Substitutions: Under provisions of Section 01 60 00.

2.02 HOLLOW METAL DOORS

A. TYPES

1. Doors: SDI Grade III, extra heavy duty, Model 2 (seamless and 16 gage) (Steelcraft LW door series)

B. MATERIALS

1. Doors:
   a. Faces: 16 gage, A60 galvannealed steel in accordance with ASTM A525. (A60 coating is .6 oz. of zinc per square foot of steel total coverage)
   b. Channels to be 16 gage and perimeter welded to panels.
   c. Core shall be foamed-in-place polyurethane insulation, "R" factor 11.1, compression strength 3600 PSI.
   d. Top cap required.

C. FABRICATION

1. All doors shall be custom made, of the types and sizes shown on approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Inverted end channel on bottom welded to both face sheets. Door thickness shall be 1-3/4" unless noted otherwise.

2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radius for the gage of metal used.

3. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door seam. All such welds shall be ground and smoothed to make them invisible and provide a smooth flush surface.

4. The vertical edge profiles on single acting swing doors shall be beveled 1/8" in 2".

5. All hardware furnished by the hardware contractor for single-acting doors shall be designed for beveled edges as specified above.

6. Hardware reinforcements:
   a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware in accordance with the approved hardware schedule and templates provided by the hardware contractor. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation-such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates only: all drilling and tapping shall be done by the installer.
   b. Minimum gages for hardware reinforcing plates shall be as follows:
      1. Hinge and pivot reinforcements 8 gage.
      2. Concealed or surface mounted closers - 14 gage.
      3. Lock face, flush bolts and all other surface mounted hardware - 16 gage.

2.04 FINISH

A. After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities.

B. Doors shall be thoroughly cleaned and phosphatized.

C. All surfaces exposed to view shall receive a factory applied single coat of rust inhibiting prime paint baked-on in accordance with ANSI A224,1.

D. The finish coats of paint shall be field applied by others in accordance with the painting section of these specifications.

PART 3 - EXECUTION

3.01 INSTALLATION OF DOORS

A. Install doors in accordance with DHI.

B. Install doors plumb and in true alignment in a prepared opening and fasten them to achieve the maximum operational effectiveness and appearance.

3.02 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

A. Adjust hardware for smooth and balanced door movement.

B. Clean in accordance with Section 01 70 00.

END OF SECTION

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SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Cylinders specified for doors in other sections.
3. Electromechanical door hardware, power supplies, back-ups and surge protection.

C. Related Sections:

1. Section 08 12 13 - Steel Door Frames
2. Section 08 13 13 - Steel Doors

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes. Submit under provisions of Section 01 33 00.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.
      b. Manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for door hardware.
      g. Door and frame sizes and materials.
   4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Operating and Maintenance Manuals: Provide manufacturer’s operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

D. Warranties and Maintenance: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard builders hardware 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.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.

E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:

1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. Where indicated to comply with accessibility requirements, comply with the State Building Code and the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:

a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
b. Door Closers: Comply with the following maximum opening-force requirements indicated:
1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

3. NFPA 101: Comply with the following for means of egress doors:

a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

b. Thresholds: Not more than 1/2 inch high.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.

3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, arrange for manufacturers' representatives to hold a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

C. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

D. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Field verify all dimensions and locations prior to shop drawing submittal.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturers, agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner, this includes all labor required to repair or replace product. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
1. Ten years for extra heavy duty cylindrical (bored) locks and latches.
2. Five years for exit hardware.
3. Ten years for manual door closers.

1.8 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3.

a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements.
The hardware schedule is based on the following manufacturers:
1. Locks, passage & privacy sets-Sargent
2. Exit devices - Sargent
3. Continuous hinge - Roton by Hager Hinge Co.

B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in AIA Document A701 – Instructions To Bidders and Division 01, Section 01 60 00, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges, full mortise unless otherwise indicated.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’-0”: provide 4-1/2” x 4-1/2” standard hinges.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Provide continuous gear hinges.
   b. Interior Doors: Standard weight, steel, 5 knuckle, ball bearing hinges unless Hardware Sets indicate heavy weight.

4. Acceptable Manufacturers:

   a. Bommer Industries (BO).
   b. Hager Companies (HA).
   c. Ives (IV).
   d. McKinney Products (MK).
   e. Stanley Hardware (ST).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 certified continuous geared hinge with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Provide concealed flush mount (with or without inset), full surface, or half surface, in standard and heavy duty models, as specified in the Hardware Sets. Concealed continuous hinges to be U.L. listed for use on up to and including 90 minute rated door installations and U.L. listed for windstorm components where applicable. Factory cut hinges for door size.

1. Acceptable Manufacturers:

   a. Roton by Hager Hinge Co. (RO)

b. Bommer Industries (BO).
c. Ives (IV).
d. McKinney Products (MK).
e. Pemko Manufacturing (PE).
f. Stanley Hardware (ST).
g. Select Hinges (SH)

2.3 CYLINDERS AND KEYING

A. Locks shall be keyed as directed by the Owner and Architect.

B. Supply two keys for each lock

C. Provide all keys of nickel silvermetal only.

D. Hardware consultant shall meet with owner/architect to determine specific keying requirements and functions of locks.

2.4 MECHANICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified cylindrical (bored) locksets **and be tested by an independent third party testing agency to meet a minimum of 10 million cycle tests** furnished in the functions as specified in the Hardware Sets. Lock chassis fabricated of heavy gauge steel, zinc dichromate plated, with through-bolted application. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt. Locks are to be non-handed and fully field reversible.

1. Locksets to incorporate a free-wheeling lever design with a lifetime warranty against lever sag and spring breakage on all locking functions.

2. Acceptable Manufacturers:

a. Corbin Russwin Hardware (RU) – CL3300 Series.
b. Sargent Manufacturing (SA) – 10 Line.
c. Schlage (SC) – ND Series.

3. Lever shall be "L" and L Rose or equal from acceptable manufacturers.

4. Cylinders: Sargent high security interchangeable core 6-pin or equal.

5. Tactile warning - Levers shall be KNURLED or MILLED at doors leading into all hazardous locations (ie. electric rooms, mechanical rooms, elevator machine rooms). Do not use abrasive coating or applied tape in lieu of knurling or milling.

2.5 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with keyed cylinder dogging to hold the pushbar and latch in a retracted position.

4. Flush End Caps: Provide heavy weight impact resistant flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty trim with cold forged escutcheons, beveled edges, and four threaded studs for thru-bolts.
   a. Lock Trim Design: As indicated in Hardware Sets, provide design to match that of the specified locksets. Provided free-wheeling type trim.
   b. Where function of exit device requires a cylinder, provide an interchangeable core type keyed cylinder (Rim or Mortise) as specified.

6. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.

7. Rail Sizing: Provide exit device rails factory sized for proper door width application.

8. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

9. Lever handle design shall be Sargent type "L" or equal.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets **and be tested by an independent third party testing agency to meet a minimum of 10 million cycle tests**. Mounting rails to be formed from smooth stainless steel, brass or bronze architectural materials no less than 0.072" thick, with push rails a minimum of 0.062" thickness. Painted or aluminum metal rails are not acceptable. Exit device latch to be investment cast stainless steel, pullman type, with deadlock feature.

1. Acceptable Manufacturers:

   a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.
   c. Von Duprin (VD) - 35A/98/99 XP Series.
   d. Precision Apex 2000 Series.

2.6 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C and UBC 7-2 for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   a. Closers shall not be installed on exterior or corridor side of doors; where possible, install the closers on door for optimum aesthetics. Provide drop plates or other accessories as required for proper mounting.

5. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for a complete installation.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers **and be tested by an independent third party testing agency to meet a minimum of 5 million cycle tests**, with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units and high impact, non-corrosive plastic covers standard.

1. Acceptable Manufacturers:

   a. Corbin Russwin Hardware (RU) - DC7500 Series.
   b. LCN Closers (LC) - 4040XP Series.
   c. Sargent Manufacturing (SA) - 351 Series.
   d. Norton Door Controls (NO) - 7500 Series.

2.7 DOOR SILENCERS

A. All new interior metal door frames shall be provided with door silencers, 3 per single door and 2 for pair of doors.

2.8 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.9 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Hardware in General: US26D Dull Chrome

E. Exit Devices, flat goods - US32D - Satin Stainless Steel

F. Continuous hinges - clear anodized aluminum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Clean work under provisions of 01 70 00.

B. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

C. Clean adjacent surfaces soiled by door hardware installation.

D. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

3.9 COMPLETE HARDWARE INSTALLATION

A. The following schedule listings cover typical openings. The Contractor shall be responsible for complete examination of the drawings and shall furnish all hardware required. Any hardware necessary but not specifically mentioned herein shall be of the like quality, weight, design and finish as similar openings or items specified herein.

B. Provide silencers on all new metal frames. Three on single leaf door frames, two on pairs of doors and four on double egress.

3.10 HARDWARE SCHEDULE:

<u>HW-1 Exterior Single Egress Doors - with Outside Key & Lever</u>

1 Roton Hinge 780-111 HD
1 Exit Device 8804-ETL
1 Closer with Cush-n-stop

HW-2 Interior Single Doors with Office Lock and Closer

Butts
1 Lockset 10G05 (Tactile warning)
1 Closer
3 Silencers

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SECTION 08 71 50

WEATHERSTRIPPING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The furnishing and installation of all door weatherstripping, sound and smoke proofing.

1.02 RELATED SECTIONS

A. 08 12 13 - Steel Door Frames

B. 08 13 13 - Steel doors

1.03 DESIGN REQUIREMENTS

A. All work not shown or specified but required to complete the installation shall be provided.

B. Provide and install weatherstripping on all new exterior doors.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop drawings: Indicate various styles with model numbers and manufacturer.

C. Provide samples if asked for by Architect.

1.05 QUALIFICATIONS

A. Installer: Products specified under this section shall be installed by competent tradesmen experienced in this work.

1.06 REGULATORY REQUIREMENTS

A. Work shall satisfy requirements of government agencies having jurisdiction.

B. All thresholds to comply with the state building code and ANSI A117.1.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

1.08 FIELD MEASUREMENTS

A. Field verify all dimensions prior to installation.

1.09 WARRANTY

A. Provide one year warranty under provisions of Section 01 78 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Pemko

B. Other acceptable manufacturers offering equivalent products.
1. Accurate Metal Weatherstrip Co., Inc.
2. Zero International, Inc.

C. Substitutions: Under provisions of Section 01600.

2.02 MATERIALS

A. Outswinging metal doors with metal jamb. (State House Doors 1 and 2)

1. Head and jambs: 316APK
2. Sweep: 315PW
3. Threshold: 252 X 226AFGV (thermal break)

B. Metal doors with metal jamb. (State House Door 3)

1. Head and jambs: 316APK
2. Threshold: 252 X 226AFGV (thermal break)

PART 3 - EXECUTION

3.01 INSTALLATION

A. Weatherstripping shall be applied in accordance with manufacturers specifications. Thresholds shall be set in elastic cement and held in place with rawl plugs and aluminum screws.

3.02 DISSIMILAR MATERIALS

A. Where aluminum surfaces come in contact with metals other than stainless steel, zinc, white bronze or other metals compatible with aluminum, aluminum surfaces shall be kept from direct contact with such parts by (a) painting the dissimilar metal with a coating of heavy bodied bituminous paint, (b) a good quality caulking placed between aluminum and dissimilar metal, or (c) a non-absorptive tape of gasket.

3.03 ADJUSTMENTS

A. Adjust weatherstripping as required to provide proper weatherproofing.

B. Gaskets and/or caulking shall be provided as required for a proper installation.

3.04 CLEANING

A. Clean work under provisions of Section 01 70 00.

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SECTION 09 24 00

PORTLAND CEMENT PLASTER

PART 1- GENERAL

1.01 SUMMARY

A. Section Includes: Work includes all labor, materials, and equipment necessary to install all aspects of a portland cement plaster assembly.

B. Related Sections

1. 07 92 13 – Joint Sealant

1.02 REFERENCES

A. ASTM C150 – Portland Cement

B. ASTM C847 – Standard Specification for Metal Lath

C. ASTM C1032 - Woven Wire Plaster Base

D. ASTM C933 - Welded Wire Lath

E. ASTM C144/C897 – Aggregate for Job-Mixed Portland Cement-Based Plaster

F. ASTM C926 – Application of Portland Cement-Based Plaster

G. ASTM C1063 – Installation of Lathing and Furring for Portland Cement Based Plaster

H. PCA (Portland Cement Association) – Plaster (Stucco) Manual

I. SMA (Stucco Manufacturers Association) Details and Technical Bulletins

1.03 ASSEMBLY DESCRIPTION

A. General: Portland cement plaster over masonry with lath, scratch, brown coat, and a finish coat. Nominal thickness is 3/4 to one inch.

B. Application Methods: The plaster may be applied by hand tools but must be applied with sufficient pressure to adhere to the substrate.

C. Masonry and concrete shall be sound, free of coatings, cured minimum 28 days.

D. Thickness of plaster are considered maximum nominal measurements.

1.04 SUBMITTALS

A. Product Data: All product data sheets, evaluation reports, details, and warranty information that pertain to the project in accordance with Section 01 33 00 Submittal Procedures.

B. Samples: Submitted upon request.

C. Samples of the finish coat shall be of an adequate size as required to represent each color and texture to be utilized on the project and produced using the same techniques and tools required to complete the project. No sample shall be less than 12” by 12”.

D. Retain approved samples at the construction site throughout the application process.

1.05 QUALITY ASSURANCE

A. Plastering Contractor: Shall specialize in lath and plaster contracting with documented experience of at least 5 years in business. Follow published SMA recommendations or provide certificates to demonstrate knowledge in stucco.

B. On-Site Mock-Ups: Produced upon request.

1. Mock-up shall represent construction using the same quality/techniques to be utilized on the project.

2. Retain approved mock-up at job site throughout the application process. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver all materials to the construction site in their original, unopened packaging with labels intact.

B. Inspection: Inspect the materials upon delivery to assure that specified products have been received. Report defects or discrepancies to the responsible party according to the construction documents; do not use reported material for application.

C. Storage: Store all products per manufacturer's recommendations. Generally, store materials in a cool, dry location; away from direct contact with the ground and/or concrete; out of direct sunlight; and protect from weather and other damage.

1.07 PROJECT CONDITIONS

A. Environmental Requirements: Follow product manufacturer's recommendations for environmental conditions and surface preparation.

B. Temperatures: Before, during and following the application of the portland cement plaster, the ambient and surface temperatures must remain above 40 degrees F (4 C) for a minimum period of 24 hours. Protect stucco from uneven and excessive evaporation, especially during hot, dry and/or windy weather. Protect the portland cement plaster from freezing for a period of not less than 24-hours after set has occurred.

C. Substrates: Prior to installation, inspect the wall for surface contamination, bond breakers, or other defects that may adversely affect the performance of the materials, and shall be free of foreign matter. Do not apply the portland cement plaster to substrates with temperatures less than 40 degrees F (4 C) or that contain frost or ice.

D. Inclement Weather: Protect applied material from harmful effects until cured or dry.

E. Existing Conditions: Contractor shall walk the project prior to starting work and notify the architect of any deficiencies that will negatively impact the plaster coating.

1.08 SEQUENCING AND SCHEDULING

A. Sequencing: Coordinate the installation of the lath and portland cement plaster with all other construction trades. To reduce stucco cracking, insure the concrete/masonry substrate is cured a minimum of 28 days and not saturated prior to plastering.

B. Plastering contractor shall request and attend a pre-installation meeting with general contractor and architect to advise architect of any control/expansion joint layout concerns.

C. Staffing: Provide sufficient manpower and proper supervision to ensure continuous operation, free of cold joints, scaffolding lines, curing, variations in texture, etc.

1.09 WARRANTY

A. Warranty: Submit documentation on all products. At completion of work, contractor shall provide a written warranty documentation for the assembly and products used.

B. Warranty Length: Shall start at the time of substantial completion. Provide 2 year warranty for the specified product under the provisions of Section 01 78 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:
1. Quikrete/Specmix
2. Conproco
3. BMI/SIKA
4. STO Corp.

B. Lath and Trim Accessories
1. Stockton Products
2. Structa Wire
3. Fry Reglet

C. Substitutions: Under provisions of Section 01 60 00.

2.02 SCRATCH AND BROWN COAT (BASECOAT)

A. Cement: A portland cement complying with ASTM C150.

B. Sand:
1. Field mixes shall comply with ASTM C-926 and must have sand that is clean and free from deleterious amounts of loam, clay, silt, soluble salts and organic matter. Sampling and testing shall comply with ASTM C144 or C897.
2. An "engineered performance mix" by an SMA manufacturer is acceptable with appropriate approvals (ICC ES, IAPMO or Interek report) .

C. Water: Clean and potable without foreign matter.

D. K-88 Admix by Conproco (or equal) to promote curing, increase bond, increase durability and water resistance.

2.03 LATH

A. Welded Wire: Nominal No. 17 gauge 1 ½ by 1 ½ inch opening, galvanized steel complying with ASTM C933.

2.04 ACCESSORIES

A. Fasteners: Nails, staples, or screws used to rigidly secure lath and associated accessories shall be corrosion-resistant and meet the minimum requirements of ASTM C1063.

B. Corner Aid: Minimum 26-gauge thick; expanded flanges shaped to permit complete embedding in plaster; minimum 2 in. wide; Square-edge style; use unless otherwise indicated.

C. Strip Mesh: Metal Lath, 3.4 lb/yd^2 expanded metal; 6 in. wide x 18 in. long.

D. Casing Bead: Minimum 26-gauge thick; thickness governed by plaster thickness; maximum possible lengths; expanded metal flanges, with square edges.

E. Drip Screed: Minimum 26-gauge thick, depth governed by plaster thickness, minimum 3-1/2 in. high flange, maximum possible lengths.

F. Control and Expansion Joints: Depth to conform to plaster thickness; use maximum practical lengths.

G. Control Joints: One-piece-type, folded pair of unperforated screeds in M-shaped configuration; removable protective tape on plaster face of control joint.

H. Expansion Joints: Two-piece-type formed to produce a slip-joint.

2.05 FINISHES

A. Portland cement-based blended stucco finish:

SPEC MIX Colored Finish Coat Preblended Stucco (or equal)

B. Color and Texture: Color and finish texture will be selected by the Architect from company standards.

2.06 MIXES

A. Portland Cement Plaster Basecoats:

1. Prescriptive Method: Ratios and Mix Design shall be per ASTM C926. Contractor shall select one of the following mixes (sand is per combined volume of cements), lime is cement:

a.	Portland Cement	1 part
	Masonry Cement	1 part
	Sand	3 ½ to 4 ½ parts per Cement
	Fibers	Maximum 3 oz per batch
b.	Portland Cement	1 part
	Lime (type S)	¼ to ½ part
	Sand	3 to 4 parts per cement & Lime
	Fibers	Maximum 3 oz per batch

B. Finish Coats: Mixing and tinting instructions are contained in the appropriate product data sheets by the Manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to the application of the portland cement plaster basecoat the plastering contractor shall ensure that:

B. Surface and site conditions are ready to receive work.

C. Grounds and Blocking: Verify that the items within the walls for other sections of work have been installed.

D. Notify architect/owner of any defects that may impact the finished assembly. Proceed as directed.

E. Substrates:

1. Acceptable substrates must be sound, secure and suitable for lath and plaster.

2. Substrates and adjacent materials must be dry and clean. Substrate surface must be flat, free of protrusions or planar irregularities greater than ¼-nch in 10-feet (6mm in 3m).

F. Flashings/Sealant joints: All flashing or sealant joints around windows, at deck attachments, utility penetrations, roof lines, etc. and all kick-out flashing must be properly installed prior to application of portland cement plaster.

3.02 PREPARATION

A. Substrate: inspect all work prior to starting lath and plastering. Notify architect of any issues impacting performance, proceed as directed.

B. Surrounding Areas: Protect surfaces near the work of this section from damage, disfiguration, and overspray. Mask off all dissimilar materials.

3.03 INSTALLATION, GENERAL

A. General Installation: Refer to ASTM C926, ASTM C1063, and/or the appropriate manufacturer's product data sheet for additional installation requirements and recommendations of the SMA.

3.04 INSTALLING LATH/TRIMS

A. General: Installed per ASTM C1063 or per Architect's direction. Trims shall be full length and installed plumb/level to within 1/8 inch in eight (8) feet.

B. Trims shall be attached per the trim manufacturer's instructions; Do not exceed 24 inches on center spacing.

C. Apply lath per manufacturers recommendations. Laps shall occur at horizontal and vertical joints. Fasteners shall engage lath and have minimum 50 pound pull out value. Attach lath along grout joints for un-grouted masonry. Spacing should be approximately 1 fastener per square foot.

D. Lath shall lap solid flange of accessories by more than 75%.

E. Control Joints: Provide four vertical joints equally spaced around dome.

F. Do not mix lath products on same wall.

G. Do not use rib lath on walls

H. Use wire nose corner for cement finish and may be wire tied to lath.

I. All trims shall be securely fastened to prevent movement or shifting during plastering.

3.05 INSTALLING PORTLAND CEMENT PLASTER

A. Per ASTM C926, apply portland cement plaster by hand-troweling to a nominal thickness of 3/8-inch (9.5mm) for scratch coat. Apply a second coat to a nominal thickness of 3/8-inch (9.5 mm) brown coat. Total basecoat shall be a nominal 3/4 inch thickness for lath and 1/2 inch for direct application to masonry substrates.

B. Scratch coat shall substantially cover the lath. Score in a horizontal pattern.

C. Apply brown coat to fill and complete basecoat. Rod to a flat plane. Do not apply to frozen or soft scratch coat. When excess moisture leaves brown coat, hard float to provide densification per ATSM.

D. Moist Curing: Provide sufficient moisture by fog or moist curing to permit proper hydration of the cementitious materials. The length of time and most effective procedure for curing will depend on climatic and job conditions. Refer to SMA curing guidelines.

3.06 INSTALLING FINISH COAT

A. General: Mix and apply per manufacturer's product data sheet.

B. Do not apply to soft, contaminated or frozen basecoat.

C. Avoid applying to excessively hot walls.

D. Verification: Verify the desired color, material and texture to match the approved sample and/or mock-up prior to installation.

E. Avoid scaffold lines and cold joints

F. Fog coat as needed to blend color variations

G. Finish coat shall be free of eye catching imperfections.

3.07 CLEANING/PATCHING/TOLERANCE

A. Cleaning: Remove all materials used, overspray from adjacent surfaces, and all protective masking.

B. Patch and repair as needed, including but not limited to fog coating, imperfections and blisters.

C. Cracks shall be repaired per the most current SMA Crack Policy (Technical Bulletin 4)

D. The basecoat of plaster shall be in tolerance: Not to exceed 1/4 inch in ten (10) feet

E. Eye catching variations in color or texture pattern will not be accepted.

3.08 PROTECTION

A. Protection: Protect applied material from inclement weather until dry and prevent it from freezing for a minimum of 24-hours after set and/or until dry. Refer to manufacturer's product data sheet for additional requirements.

END OF SECTION

SECTION 09 29 00

DRYWALL

PART 1 - GENERAL

1.01 SCOPE: Provide all necessary materials for construction of drywall systems.

1.02 RELATED SECTIONS:
1. Division 06 Carpentry Section for wood framing, blocking and furring.
2. Division 09 Painting Section for paint applied to gypsum board surfaces.

1.03 DELIVERY AND STORAGE OF MATERIALS:

A. Deliver, store, and handle under provision of Section 0160 00.

B. All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Stack gypsum panels flat to prevent sagging.

1.04 ENVIRONMENTAL CONDITIONS:

A. In cold weather and during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55 degrees to 70 degrees F. Adequate ventilation shall be provided to carry off excess moisture.

B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit product data on all materials and accessories.

PART 2 - PRODUCTS

2.01 MATERIALS: See drawing for size and location of materials.

A. Faceboards - 48" wide SHEETROCK Brand Mold Tough (Firecode Type X) Gypsum Panels (UL Type SCX), lengths as required.
Thickness to be as indicated on drawings. If not indicated on drawings, board to be 5/8” thick.

B. Fasteners - USG Screws: 3/8" Type S, pan head: 3/8", 1/2" Type S-12, pan head; 5/8" Type S-12 low-profile head; 1",1-1/4", 1-5/8", 1-7/8", 2-1/4" Type S, bugle head; 1", 1-5/8", 2-1/4" Type S or S-12, trim head; 1-1/2" Type G, bugle head; 1-1/4" Type W, bugle head; 1`-1/4" annular ring drywall nail.

C. USG Trim No. (200-A)(401)(402)(P-1)(801-A)(801-B).

D. USG Corner Bead - (No. 103 DUR-A-BEAD) (No. 104 DUR-A-BEAD)(No.800) Metal Corner Reinforcement.

E. Joint Treatment (select a United States Gypsum Company Joint System)
Standard Gypsum = Joint Treatment: Sheetrock Brand All Purpose Joint Compound.
Provide a Level 4 gypsum board finish.

PART 3 - EXECUTION

3.01 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:
1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Gypsum Panel Attachment: For single-layer non-rated panel application, space screws 16" o.c. in field and along abutting end joints.

3.02 ACCESSORY APPLICATION

A. JOINT SYSTEM: Finish all face panel joints and internal angles with a United States Gypsum Company Joint System installed according to manufacturer's directions. Spot exposed fastened on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

B. CORNER BEAD: Reinforce all vertical and horizontal exterior corners with corner bead fastened with 9/16" galvanized staples 9" o.c on both flanges along entire length of bead.

C. METAL TRIM: Where assembly terminates against masonry or other dissimilar material, apply metal trim over panel edge and fasten with 9/16" galvanized staples 9" o.c.

D. SCREWS: Power drive at least 3/8" from edges or ends of panel to provide uniform dimple 1/32" deep.

3.03 CLEANING

A. Clean project under provisions of Section 0170 00.

END OF SECTION

SECTION 09 51 23

ACOUSTICAL CEILING SYSTEMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The furnishing and installation of acoustical and suspension ceiling systems.

1.02 REFERENCES

A. Federal Specification SS-S-118B acoustical tile and panel properties.

B. AMA 1-11 - Sound transmission

C. ASTM C423 - Sound absorption

D. ASTM C635 - Metal suspension system properties

E. ASTM C636 - Acoustical ceiling system installation procedures

F. UL - Underwriters Laboratories, Inc.

1.03 SYSTEM DESCRIPTION

A. Acoustical material and suspension systems, including all necessary hangers, hanger wires, grillage, splines, and supporting hardware, shall be furnished and installed as required to create a completed ceiling system.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Include manufacturer's specifications of materials and installation instructions.

C. Samples: Submit two 6" x 12" samples of panels and two of the metal suspension system.

D. Test reports: Submit data indicating the following ratings:
NRC (Noise reduction coefficient)
CAC (Ceiling Attenuation Class)
Light reflectance.
Flame spread
Smoke developed

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01 78 00.

B. Submit cleaning and maintenance data including procedures for stain removal and cleaning.

1.06 QUALITY CONTROL

A. Work shall be performed in accordance with Section 01 45 00.

1.07 QUALIFICATIONS

A. Installer: Company specializing in installing suspended acoustical ceilings with minimum of three years documented experience.

1.08 REGULATORY REQUIREMENTS

A. Conform to the manufacturer's recommendations to achieve the fire resistive ratings as listed by Underwriters Laboratories, Inc. (Class A)

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.

B. Storage shall be in building, closed to the weather with temperatures ranging from 60°F to 85°F at not more than 70% relative humidity.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Do not install acoustical ceiling system when building. Interior temperature is below 60°F, above 90°F or above 70% relative humidity.

B. These conditions shall be maintained 24 hours prior to, during and after installation.

1.11 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on drawings. Any inconsistencies shall be reported to the architect prior to installation.

1.12 SEQUENCING

A. Installation of panels may commence only after an inspection of all electrical, mechanical and plumbing work has been completed.

1.13 WARRANTY

A. Provide 10 year warranty for the standard acoustical ceiling system under provisions of Section 01 78 00.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acoustical panels and suspension system

1. Armstrong
2. Other acceptable manufacturers offering equivalent products.
   a. USG
   b. Certainteed

B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Acoustical Panels
1. Type "ACT"
   a. Fine Fissured (model no. 1733: 24"x48") Angled Tegular
      1. Water felted mineral fiber panel with white vinyl paint finish.
      2. 5/8” thick
      3. Light reflectance = 0.85
      4. Flame spread = 25 or less
      5. Smoke developed = 50 or less
      6. Class A fire rating per ASTM E1264
      7. NRC = 0.55
      8. CAC = 35
      9. Total recycled content: minimum 50%

B. Suspension Systems
1. Exposed Grid
   a. Prelude XL with aluminum cap
      1. Hot dipped galvanized steel with white, factory painted aluminum cap.
      2. Intermediate duty main runners and cross tees with 15/16" flange face.
      3. Wall angles shall be straight edge and corner caps shall be of same materials and finish.
      4. Suspend with galvanized steel wire.
      5. Total recycled content: minimum 25%

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that all components in the ceiling plenum are installed. The building shall be in proper condition to receive the acoustical materials and suspension system before any of the material shall be installed. The acoustical material shall be installed under conditions of normal occupancy. All wet work shall be completed, dry, and the building fully enclosed.

3.02 PROTECTION

A. Protect existing elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Install all acoustical materials and suspension systems in strict accordance with the manufacturer's instructions.

B. Main runners shall be installed on 24 inch centers and suspended by hanger wire spaced not more than 48 inches on center along the main runners.

C. Cross tees shall be 24 inches in length and shall be spaced 48 inches on center along the main runner to form 2'x4' modules as scheduled on the drawings.

D. Install wall moldings at intersection of suspended ceiling and all vertical surfaces.

E. Miter corners where wall moldings intersect or install corner caps.

F. The acoustical panels shall not be used to support any other materials except fiberglass batt insulation installed in the thickness, density and manner specified by the manufacturer.

3.05 CLEANING

A. Clean under provisions of Section 01 70 00.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.02 WORK INCLUDES

A. Installation of resilient flooring and accessories as indicated.

1.03 RELATED SECTIONS

A. Section 09 29 00 - Drywall

1.04 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.05 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Provide product data on specified products, describing physical and performance characteristics sizes, patterns and colors available.

C. Submit samples under provisions of Section 01 33 00.

D. Submit 6 inch long samples of base material for each color specified.

E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of Section 01 78 00.

B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-finishing.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle work to site under provision of Section 01 60 00.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.

B. Maintain minimum 70 degrees F air temperature at flooring installation areas for three days prior to, during, and 24 hours after installation of materials.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Vinyl base
Subject to compliance with requirements of this Specification Section, provide products listed herein from the following:
1. Basis of Design: Johnsonite/Tarkett
2. Other acceptable manufacturers offering equivalent products.
   a. Flexco
   b. Roppe

B. Substitutions: Under provisions of Section 01 60 00.

2.02 MATERIALS

A. Vinyl base: 4" high x rolled length, 1/8" thick with ribbed back. Seams will only be allowed on walls longer than 40'.

2.03 COLORS SELECTION

A. All colors shall be selected by the Architect from the manufacturer's standard color selections.

2.04 ACCESSORIES

A. Primers and Adhesives: Low VOC and waterproof; types recommended by flooring manufacturer for specific materials and as required to maintain product warranty.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft., and are ready to receive work.

B. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with filler.

B. Vacuum clean substrate.

3.03 INSTALLATION - BASE MATERIAL

A. Fit joints tight and vertical.

B. Miter internal corners. At external corners, use premolded units. At exposed ends use premolded units.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

E. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

F. Provide coved base at all hard surface flooring and straight base at all carpet.

3.04 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean surfaces in accordance with manufacturer's instructions.

END OF SECTION

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SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Related Documents:
The Drawings and general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 Requirements, apply to the work in this Section.

1.01 SECTION INCLUDES

A. Finish painting and priming of all items exposed and identified to receive a finish.

1.02 RELATED SECTIONS

A. Surfaces scheduled or indicated to be painted.
B. Touch up of shop coats provided under other sections unless specifically included in that section.
C. Examine the specifications for the various other trades and become thoroughly familiar with all their provisions regarding what they are painting. All exposed-to-view surfaces that are left unfinished by the requirements of other specifications shall be painted or finished as a part of this work.

1.03 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

C. Federal Specifications

1.04 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

B. The term "paint" as used herein includes enamels, paint, emulsions, varnishes, stains, sealers and other coatings whether used as prime, intermediate or finish coats.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer's technical data sheet and Material Safety Data Sheets (MSDS) for each scheduled coating, giving the descriptive data, curing time, mixing, thinning and application instructions. Provide certification that paint was formulated within lead or mercury.

C. Submit manufacturer's fan deck of color chips for selection of colors by the Architect.

D. Samples

1. At the request of the Architect, prepare and submit paint samples on the materials he requires for approval.
2. Prepare and submit stained wood samples on the type and quality of wood specified for use on the project as requested by the Architect.

E. Submit a list of all interior paints and coatings used in the project that are addressed by the Green Seal Standard GS-11 and state the Volatile Organic Compounds (VOC) content for each product.

1.06 QUALIFICATIONS

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with five years experience.
B. Applicator: Company specializing in commercial painting and finishing with 3 years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame/fuel/smoke rating requirements for finishes.

1.08 FIELD SAMPLES

A. At the request of the Architect, provide field sample panel, one complete surface of each color scheme illustrating special coating, color, texture, finish and workmanship.

B. Locate where directed by the Architect.

C. If approved, sample area will serve as a minimum standard for Work throughout the building. Accepted sample may remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and protect products under provisions of Section 01 60 00.

B. Deliver all paint materials to the job site ready mixed and in their original containers with all labels intact and legible at time of use.

C. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.

D. Use all means necessary to insure the safe storage and use of paint materials.

E. All soiled or used rags, waste and trash must be disposed off site every night and every precaution taken to avoid the danger of fire.

F. All materials must be stored at above freezing temperature.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent.

C. Application Temperature for Paints: 50 degrees F minimum, and 95 degrees F maximum.

D. Provide lighting level of 80 ft. candles measured mid-height at substrate surface.

E. Do not apply paint to areas where dust is being generated.

1.11 COORDINATION

A. Coordinate work under provisions of Section 01 31 00.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

A. Subject to compliance with requirements of this Specification Section, provide products listed herein from one of the following:
   1. Exterior Paint:
      a. Sherwin Williams
      b. Pittsburgh Paint
      c. Benjamin Moore Paint

   2. Interior Paint:
      a. Sherwin Williams
      b. Pittsburgh Paint
      c. Benjamin Moore Paint

B. Substitutions: Under provisions of Section 01 60 00.

2.02 COMPATIBILITY:

A. All paint materials and equipment shall be compatible in use; finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.

B. Thinners, when used, shall be only those thinners recommended for that purpose by the manufacturer of the material to be thinned.

2.03 MIXING AND TINTING:

A. Accomplish job mixing and tinting only when acceptable to the Architect. Mix only in mixing pails placed in suitable sized non-ferrous or oxide resistant metal pans.

B. Tints and all other additives or thinners shall be used only as recommended by the manufacturer of the paint and as approved by the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. In the event of discrepancy, immediately notify the Architect.

C. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION:

A. General

1. Prior to all surface preparation and painting operations, completely mask, remove or otherwise adequately protect all hardware, accessories, machined surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not schedule to receive paint.
2. Remove all existing loose, flaking and poor condition paint by scraping and then sanding surface. Sand as required to feather edges of remaining paint.
3. Spot prime all exposed nails and other metals that are to be painted with emulsion paints, using a primer recommended by the manufacturer of the coating system.
4. Surface to be painted shall be thoroughly clean and dry. All concrete and masonry work shall be completely cured.
5. All items concealing surfaces to be painted that are readily detachable shall be removed for the painting of said surface. Reinstall upon completion of space.
6. Surfaces in spaces above suspended ceilings and chases are not required to be painted unless otherwise indicated.
7. Provide minimum of one coat of primer and minimum of two coats of finish paint. The shop priming coat, as occurring, shall substitute for the field applied primer coat.
8. Complete coverage is required. Provide additional coats to areas that do not show complete coverage.

B. Preparation of wood surfaces:

1. Clean all wood surfaces until they are free from dirt, oil, and all other foreign substance.
2. Smooth all finished wood surfaces exposed to view, using the proper sandpaper.
3. Where so required, use varying degrees of coarseness in sandpaper to produce uniformly textured and unmarred wood surfaces.

4. On small, dry, seasoned knots, thoroughly scrape and clean the surface and apply one coat of good quality knot-sealer before application of the priming coat.
5. On large, open, unseasoned knots, scrape off all pitch and thoroughly clean the area, followed by an application of one coat of good quality knot-sealer.
6. Back prime all wood mouldings and trim.
7. Fill nail holes, cracks, open joints and other defects with oil based putty after priming coat has dried. Color to match finish color.

C. Preparation of metal surfaces:

1. Galvanized Metal

   a. Clean all surfaces thoroughly with solvent until they are completely free from dirt, oil and grease.
   b. Thoroughly treat the cleaned surface with phosphoric acid etch.
   c. Remove all excess etching solution and allow to dry completely before application of paint.
   d. Prepare surface in accordance with recommendations of directions of manufacturer of rust-inhibitive primer.
   e. New galvanized metal is to be allowed to weather 6 months prior to coating. If weathering is not possible, clean with solvents per manufacturer's instructions, and verify test patch adhesion with Architect.

2. Other Metals

   a. Thoroughly clean all surfaces until they are completely free from dust, dirt, oil, loose rust and grease.
   b. All shop-primed surfaces that have been marred or abraded shall be wire-brushed and touched up with the same material as the shop coat prior to painting of surfaces.

D. Preparation of Gypsum Wallboard

1. All surfaces must be thoroughly clean and joint treatment dry.
2. Steel corner beads shall be spot primed before water based paint is applied.
3. Do not apply solvent based coatings directly over unpainted wallboard.

E. Preparation of Plaster Surfaces

1. All holes and cracks in plaster surfaces shall be filled with patching plaster before painting.
2. Before painting plaster, the surfaces shall be tested with a moisture-testing device. Paint or sealer shall not be applied on plaster when the moisture content exceeds 5.5 percent. Test sufficient areas in each space as often as necessary to determine the proper moisture content for painting.

3.03 APPLICATION

A. General

1. Apply all paint in accordance with manufacturer's instructions.
2. Do not apply the initial coating until moisture-meter reading of the surface is within limits recommended by the paint materials manufacturer.
3. Allow sufficient drying time between coats in accordance with manufacturer's recommendations.
4. Oil base and Oleo resinous solvent type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or less of adhesion of the undercoat.
5. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
6. Sand, dust, and clean between coats to remove all defects visible to the unaided eye from a distance of five feet.
7. Finished surfaces shall be free from runs, drops, ridges, waves, laps, sags and unnecessary brush marks.
8. Slightly vary the color of succeeding coats.
9. Primer and intermediate coats shall be tinted to approximately the tint of finish coats.
10. Damaged painting shall be retouched before applying the succeeding coat.
11. Do not apply additional coats until completed coat has been inspected and approved by the Architect.
12. Only inspected and approved coats of paint will be considered in determining the number of coats applied.
13. Edges of paint abutting other materials or colors shall be clean and sharp with no overlapping.
14. Refinish entire wall where portion of finish has been damaged or is not acceptable.
15. Refinish all woodwork that has been removed and reset.
16. Colors will be selected by Architect from manufacturer’s full color palette.
17. Unlimited number of different colors allowed per project. Multiple colors are allowed per room. Opposite sides of door frames, window frames and doors may be painted different colors at Architect’s discretion. Number of colors is to be determined by Architect and included in a color schedule that will be assembled after submittal of color sample fantex by the General Contractor prior to commencement of work.
18. All steel door frames are to be painted using a brush or roller and back-brushed.

3.04 CLEANING

A. Prevent accidental spilling of paint materials and, in event of such spill, immediately remove all spilled material, the waste of equipment used to clean up the spill, and wash the surfaces to their original undamaged condition.

B. After completion of the painting work, all glass shall be cleaned on both sides by professional window cleaners. The use of acid solution or water containing caustic soaps will not be permitted. The edge of compound shall not be disturbed by scrapers. Upon completion of contract, the glass shall be left whole, free of any defacements or rattle and shall be clean on both sides.

C. Prior to final inspection visually inspect all surfaces and remove all paint and traces of paint from surfaces not scheduled to be painted.

D. Paint storage space shall be thoroughly cleaned following the completion of all work.

E. All waste materials shall be disposed of properly and in accordance with all Federal, State, and Local regulations. Do not dispose of waste materials in the building sanitary waste system.

3.05 WASTE MANAGEMENT

A. Set aside extra paint for future color matches. All paint unused by the Contractor is to be delivered to the Owner in sealed containers.

B. Close and tightly seal all partly used paint and finish containers and store in a well-ventilated, safe area at moderate temperature.

C. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal.

3.06 PAINTING SCHEDULE

A. Exterior: Based on Sherwin Williams Paints.

1. Galvanized Metal (designated to be painted)
Satin Finish

1st Coat:	S-W Pro Industrial Pro-Cryl Universal Primer, B66-1300 Series (5-10 mils wet, 2-4 mils dry)
2nd & 3rd Coats:	S-W All Surface Enamel, A11 Series (4 mils wet, 1.6 mils dry per coat)

2. Exterior plaster ceiling in tourelles
Satin Finish

1st Coat	S-W Loxon Concrete and Masonry Primer
2nd & 3rd Coats	S-W SuperPaint Exterior Latex (4 mils wet, 1.6 mils dry per coat)

3. Wood

1st Coat:	S-W A-100 Exterior Fast Dry Alkyd Wood Primer (4 mils wet, 2.2 mils dry)
2nd & 3rd Coats:	S-W Resilience Latex Satin K43 Series (4 mils wet, 1.52 mils dry per coat)

B. Interior: Based on Sherwin Williams Paints.

1. METAL
   Semi-gloss Finish
   1st Coat: S-W ProCryl Universal Primer, B66-310 Series (110 g/L) (2-4 mils dry)
   2nd & 3rd Coats: S-W Pro Industrial DTM Acrylic Semi-gloss B66-1150 Series (6.0 mils wet, 2.5mils dry)

2. WOOD - (Walls, Trim,)
   Satin Finish
   1st Coat: S-W Premium Wall & Wood Primer B28 Series (4 mils wet, 1.3 mils dry per coat)
   2nd & 3rd Coats: S-W ProMar 200 Zero VOC Latex Eg-Shel B20-2600 Series (4 mils wet,1.7 mils dry per coat)

3. DRYWALL - (Walls, Gypsum Board, etc.)
   Satin Finish
   1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry).
   2nd & 3rd Coats: S-W ProMar 200 Zero VOC Latex Eg-Shel B20-2600 Series (4 mils wet,1.7 mils dry per coat)

4. MASONRY (brick)
   Satin Finish
   1st Coat S-W Loxon Concrete and Masonry Primer
   2nd & 3rd Coats: S-W SuperPaint Interior Acrylic Latex (4 mils wet,1.5 mils dry per coat)

END OF SECTION