CONTRACT EXECUTION FORM

CONTRACT NO. 13-094X

This Agreement made this 3rd day of October, 2013, between the New Jersey Transit Corporation, hereinafter referred to as NJ TRANSIT, and John O'Hara Company, Incorporated hereinafter referred to as the Contractor.

WITNESSETH:

Whereas, the said Contractor, for and in consideration of the payments hereinafter specified and agreed to be made by NJ TRANSIT, hereby covenants and agrees to furnish and deliver all materials and to do and perform all work and labor required to complete the Restoration of Hoboken Terminal Main Waiting Room (including the Vendor Retail Areas) and the Replacement of Sewage Pump Stations 4 & 5 Project Hoboken, New Jersey within 60 and 110 consecutive calendar days, respectively, from the issuance of the official notice to proceed, in strict and entire conformity with the specifications for the project, which said specifications are as follows and are hereby made a part of this Contract as fully and with the same effect as if the same had been set forth at length in the body of this Contract:

Bidders Proposal
Performance / Payment Bond
Non-Collusion Affidavit
New Jersey Prevailing Wage Determination
Federal Prevailing Wage Determination
Prevailing Wage Affidavit
Ineligible Contractors Certificate
Disclosure of Investment Activities In Iran
Affidavit of Compliance
Federal EEO Provisions for Construction Contracts
State EEO Provisions for Construction Contracts
Certification for Contracts, Grants, Loans and Cooperative Agreements
Buy America Certificate
DBE Provisions
General Provisions/Instructions To Bidders
Special Provisions
Technical Provisions
Addendums: Three (3)

The Contractor agrees to make payment of all proper charges for labor and materials required in the aforementioned work.

It is also agreed and understood that the acceptance by the Contractor of the final payment by NJ TRANSIT shall be considered as a release in full of all claims against the Executive Director and NJ TRANSIT out of, or by reason of, the work done and materials furnished under this Contract.

In consideration of the premises, NJ TRANSIT hereby agrees to pay to the Contractor for the said work when completed in accordance with the said specifications, the sum of $1,899,997.00. It is understood that payments shall be the total of the unit prices written in this Contract for the work actually done.

In Witness Whereof, the Contracting Officer of NJ TRANSIT has signed this instrument and caused it to be attested, and the Contractor has caused this instrument to be signed by its President *and attested by its* Controller *the day and year first written.*

ATTEST:

NEW JERSEY TRANSIT CORPORATION

By: _____
Contracting Officer

ATTEST:

CONTRACTOR

_____
Name: Thomas Eutota

By: _____
Name: JOHN O'HARA

Title: Controller

Title: PRESIDENT

The above Contract has been reviewed and approved as to form only.

JOHN J. HOFFMAN
ACTING ATTORNEY GENERAL OF NEW JERSEY

By: _____
Deputy Attorney General

10/3/13

New Jersey Transit

Hoboken Terminal

Waiting Room Restoration

Technical Specifications

CONFORMED

October 14, 2013

Prepared by: STV Incorporated

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Section 02 30 00 - Microbial Remediation Project Specification

Part 1 – General

1.1 Project Description

A. The work addressed in the following specification refers to individual work areas within NJ Transit's Hoboken Terminal's **Main Waiting Room**. This specification represents the procedures used during the remediation activities conducted in these areas and is based on procedures contained within the following references:

- ANSI/IICRC S500 - *Standard and Reference Guide for Professional Water Restoration*
- ANSI/IICRC S520 – *Standard and Reference Guide for Professional Mold Remediation*.
- Federal Emergency Management Agency (FEMA) – *Initial Restoration for Flooded Buildings*, Nov 2005.
- The American Industrial Hygiene Association (AIHA) - *Bioaersols, Assessment and Control*.
- United States Environmental Protection Agency (US EPA) - *Mold Remediation in Schools and Commercial Buildings.*
- New York City Department of Health and Mental Hygiene's (NYC DOHMH) *Guidelines on Assessment and Remediation of Fungi in Indoor Environments*.

1.2 Background

A. The NJ Transit Hoboken Terminal was impacted by Category 3 flood water during Superstorm Sandy. This resulted in approximately 5 to 6 feet of Category 3 water entering the ground floor areas throughout the entire building. Category 3 water (Black Water) is defined as being grossly contaminated and can contain pathogenic, toxigenic, or other harmful agents.

B. All first floor areas are considered Condition 3 Areas (indoor environments contaminated with the presence of actual mold and bacterial growth. Actual growth includes growth that is active or dormant, visible or hidden) and Condition 2 Areas (an indoor environment which is primarily contaminated with settled spores that were dispersed directly or indirectly from a Condition 3 area, and which may have traces of actual growth).

C. This specification focuses on water restoration and microbial remediation of existing furnishing/fixtures (benches, information kiosks, shoe-shine stand, news stand façade panels, door units, window units, etc.) and other historical elements inside the Main Waiting Room, as well as the masonry surfaces (walls & floor) within the Main Waiting Room. The purpose of this specification is to return furnishings/fixtures to Condition 1 (normal microbial ecology) status: an indoor environment that may have settled microbial growth, microbial fragments or traces of actual growth whose identity, location and quantities are reflective of a normal microbial ecology in a similar indoor environment.

1.3 Minimum Scope of Work

A. The following minimum scope of work is to be completed. Additions or deletions from this scope of work may be made by written change order based up on conditions encountered during rehabilitation.

1. Wooden furnishing/fixtures & other historical elements – Isolate the wooden historical elements within negative pressure enclosures. Conduct gross surface decontamination, then carefully dismantle existing benches, information kiosks, shoe-shine stand, and news stand façade panels (as necessary) to facilitate access to surface areas in need of microbial remediation (exposed and concealed) in order to fully clean, sanitize, disinfect and dry them.

   Please Note: Dis-assembly of the historical wood components associated with this project is intended to facilitate access to the surface areas in need of microbial remediation and is not associated with historical wood restoration. The Remediation Contractor is instructed to remove wooden elements associated with the existing bench assemblies, information kiosks, shoe shine platform/seating, and news stand facade panels to the degree necessary to allow for full surface area (inner and outer) decontamination and subsequent protection/storage. Re-installation of the historical wooden elements (post area clearance) is the responsibility of General Contractor (GC) and will be completed at a later date.

2. In-Place Surfaces – clean and decontaminate to remove settled microbial growth and mitigate impacts of salt water intrusion including terrazzo floor and stone, wooden door and window assemblies and miscellaneous metal stair and wall features up to and including the first (mid) stone cornice ledge.

B. Staffing

1. Remediation Contractor(s): To be determined

2. NJ Transit Project Manager:

3. Consultant – Matrix New World Engineering: Gavin Gilmore, Project Manager

C. General Work Procedures

Phase I

1. Erect and establish the temporary painted plywood partitions required to facilitate access to the existing Men's Restroom via the Main Waiting Room Entry and North Vestibule areas; and access to the existing Women's Restroom via the East Entry Vestibule as shown on Mold Remediation Drawing H.0.1. **The Remediation Contractor is to submit a construction detail for the proposed plywood partition construction to the GC and NJ Transit for review and approval prior to mobilization.**

2. Isolate the restroom access areas (tunnels) within negative pressure enclosures as detailed on the remediation drawing. Prepare, dis-assemble (as–needed), remediate, and clean these areas **prior to** all other Main Waiting Room remediation efforts in accordance with the Phase II and Phase III protocols described herein. Upon completion, post-remediation verification and satisfactory release criteria, these areas shall be isolated and maintained by the Remediation Contractor throughout the project and shall be dedicated for NJ Transit passenger's usage.

Phase II

1. Isolate the bench assemblies within a negative pressure enclosure as detailed on the remediation drawing. The existing temporary enclosure panels and framing shall be visually examined prior to disposal for visible mold growth and/or staining.

2. The existing bench assemblies are to be carefully dismantled to the extent necessary to allow for full surface area access, cleaned of all contaminant and disinfected in accordance with the project specifications. The Remediation Contractor is to coordinate the dismantling and protection of all historical bench components during the Phase III remediation.

3. Dismantle (to the extent necessary to access and clean contaminated surface areas) the existing historical bench assemblies in coordination with the other trades (carpentry, electrical, mechanical, etc.). All dismantling/decontamination procedures are to employ wet pre-cleaning methods, HEPA air filtration spore/dust capture and proper worker PPE.

4. Remove and dispose of porous and semi-porous building materials including fiberglass (high density) panel insulation and fiberglass pipe insulation associated with the bench convection heating units.

5. The existing convection heating units have been inspected and characterized as items that will not be salvaged and/or restored as part of this project. The Remediation Contractor is instructed to properly remove and dispose of each heating unit as construction debris. Coordinate all disconnect location and methods with the GC, NJ Transit and Mechanical Contractor (as applicable) for this project.

6. The remaining circulatory metal piping shall be wiped clean of all visible dirt, sediment and/or dust to remove any remnant contamination.

7. Isolate the remaining wooden historical components including existing information kiosks, news stand façade panels, shoeshine stand, doors, and window units within negative pressure enclosures as detailed on the remediation drawing. The existing temporary enclosure panels and framing shall be visually examined prior to disposal for visible mold growth and/or staining.

8. The remaining wooden historical **information kiosks, news stand façade panels, and shoeshine stand (only)** components are to be carefully dismantled to the extent necessary to allow for full surface area access, cleaned of all contaminant and disinfected in accordance with the project specifications. The Remediation Contractor is to coordinate the dismantling and protection of all wooden historical components during the Phase III remediation.

9. Prior to negative pressure enclosure clearance and break-down; carefully clean and decontaminate historical wooden door, door frame/jamb/transom, window sash, and window frame/transom assemblies **in-place**. Permit disinfecting solution adequate dwell time to air dry prior to subsequent component protection.

10. Inspect the work areas upon completion and prior to final cleaning.

11. After inspection, proceed with final cleaning inside the containment/work areas. Final cleaning shall be in accordance with the project specifications.

Phase III

1. Upon completion and clearance of the Main Waiting Room wooden historical fabric decontamination areas and in accordance with the project schedule and specifications, the Remediation Contractor is to coordinate with the GC and NJ Transit the full extent and limits of the mold/bacteria remediation. Decontamination of the existing stone elevations is to extend from the wall to floor joint up to and including the first cornice ledge. The Remediation Contractor is to clean, decontaminate and protect all existing communication cable. **Remediation efforts associated with the Phase III wall decontamination portion of this contract is to occur within the previously utilized negative pressure enclosure work areas while maintaining a negative pressure differential to the outside air.**

2. Additional architectural elements that are to remain intact are to be cleaned and decontaminated in-place in accordance with the project specifications. These elements include but may not be limited to existing sconce light fixtures, door and window transoms, ticket counter window/frames, telephone bank, and stair treads/risers, and railing.

3. Inspect the work areas upon completion and prior to final cleaning.

4. After inspection, proceed with final cleaning. Final cleaning shall be in accordance with the project specifications.

5. Subsequent to the completion of the negative pressure enclosure(s) break-down; clean and disinfect the entire floor area within the Main Waiting Room. Permit disinfecting solution adequate dwell time to air dry. **The Remediation Contractor is to employ general area filtration (scrubbing) during floor cleaning efforts.**

Storage Note

1. Upon completion of the historical wood component(s) decontamination and prior to removal from the negative pressure enclosures, the Remediation Contractor is instructed to wrap and properly label all historical components with one layer minimum 6-mil poly for storage/protection.

D. Additional Work Area Preparation

1. Erection of the regulated remediation work areas and negative pressure enclosures including the maintenance of negative pressure to control air pressure in relation to the exterior of the containment. Critical barriers made from two layers of fire-resistant 6-mil plastic sheeting must be placed over all airflow pathways into the Main Waiting Room area including existing window and door openings prior to component removal. Appropriate airlocks and decontamination areas will be provided at the entrance/exit to the negative pressure enclosures. Warning signs indicating “Restricted Area, Authorized Personnel Only” must be posted at the entrance to the regulated remediation work areas.

2. Provide personnel decontamination area in accordance with 29 Code of Federal Regulations (CFR) 1926.65 (k).

3. Air filtration devices (AFD) must be used to create appropriate air current differentials between negative pressure enclosures and adjacent areas. Use the AFDs to create a pressure differential in the work area of at least -5 Pascal's (-0.02 inches of water) in relation to the adjacent areas and/or a minimum of 4 air changes per hour. The Remediation Contractor will provide the Consultant with a written calculation that demonstrates that the number of AFDs utilized by the Remediation Contractor will provide the specified pressure differential and/or air changes per hour. In addition, AFDs are to be installed and maintained outside the negative pressure enclosures in order to filter (scrub) the outside air adjacent to the historical component dis-assembly and general area clean.

4. The Remediation Contractor will utilize a micro-manometer to monitor the negative pressure within the negative pressure enclosures. The Remediation Contractor will provide the Consultant with daily reports from the micro-manometers. Failure to continuously maintain the specified negative pressure will be a non-conforming activity and will result in the Remediation Contractor correcting the condition, including HEPA vacuuming and wiping adjacent areas. The Remediation Contractor will be responsible for such cleaning as their sole expense.

E. Disassembly - Furnishing/Fixtures & Other Historical Elements

1. Surface clean with damp cloth and/or HEPA vacuum.

2. Working in teams of two or more proceed with the minimal disassembly required to fully access surface areas in need of microbial remediation. During disassembly light mist and HEPA vacuum exposed surfaces to minimize release of bioaerosols and dust.

F. Detailed Cleaning Procedures - Furnishing/Fixtures & Other Historical Elements

1. All work to be done inside the negative pressure enclosures.

2. As appropriate, remove visible microbial growth from individual pieces using a combination of HEPA vacuuming, damp wiping, manual brushing and/or use of sanding equipment fitted with HEPA filtered exhausts. Use care so as to not damage wood to a degree which would prevent future historical restoration or re-installation.

3. Following satisfactory removal of visible contamination, apply an approved disinfectant/sanitizer to all surfaces according to the manufactures recommendations. ***Remediation Contractor to submit proposed disinfectant/sanitizer to Consultant for review and approval prior to initial use.***

4. HEPA vacuum and damp wipe each piece one additional time prior to removal from the negative pressure enclosure.

5. At end of each day mop and/or HEPA vacuum floor to prevent accumulation of dust and debris.

G. Detailed Cleaning Procedures – In-Place Stone/Metal/Wood Surfaces

1. HEPA Vacuum and damp wipe surfaces and apply an approved disinfectant/sanitizer to remove settle mold and/or bacteria according to the manufactures instructions. ***Remediation Contractor to utilize the previously tested Safe N' Easy Limestone Cleaner (manufactured by Dumond Chemicals, Inc.) or submit an alternate proposed disinfectant/sanitizer to Consultant for review and approval prior to initial use.***

2. Properly pre-clean then protect/seal all openings in stone to metal joints prior to wet cleaning activities that my permit water/cleaning solution to infiltrate behind the electrical lighting sconce fixtures.

3. Clean stone elements to remove corrosive elements left behind due to salt water intrusion. Apply and remove selected product accruing to manufacturer's instructions. ***Remediation Contractor to utilize the previously tested Safe N' East Efflorescence Remover (manufactured by Dumond Chemical, Inc.) or submit alternate proposed products and methods to GC for review and approval prior to initial use.***

Note: prior to initial application of disinfectant/sanitizer and salt/corrosion cleaner a test shall be conducted in a small area to ensure the materials are compatible with existing building elements and will not discolor or mar the finishes.

H. Removal and Disposal of Contaminated Items

1. The Remediation Contractor will be responsible for removing potentially contaminated materials from the work areas without spreading the potential contamination outside of the containments. Such materials should be covered and/or double bagged appropriately to meet this performance requirement. Disposal of potentially contaminated materials away from the project site is the responsibility of the Remediation Contractor.

I. Personal Protective Equipment (PPE)

1. Gloves - All workers who are employed in the mixing, preparation, and/or application of detergents will wear gloves that are chemically compatible with the detergent material. Workers participating in activities that present laceration hazards (i.e., component dis-assembly) must wear cut-resistant gloves. For all other work activities, workers will wear disposable fluid-resistant gloves.

2. Eye Protection - Eye protection must be worn at all times in the work areas. The selected eyewear must be capable of protecting workers from flying solid objects and liquid splashes, and the use of eyewear must comply with 29 CFR 1910.133, Eye and Face Protection, and ANSI Z87.1 - 1989.

3. Protective Suit - All workers in the work areas must wear disposable full body coveralls, head covers, and boot covers; or approved equivalent disposable protective suits, during active cleaning. The suits must be supplied in sizes to properly fit each individual worker. The wrists, ankles and other openings in the disposable suit must be secured utilizing duct tape or other suitable means. Protective suits do not need to be worn during the set-up and final cleaning phases. If necessary, the Remediation Contractor will provide protective suits to the Project Manager, Consultant and Visitors.

4. Respirators - All workers and individuals entering the work areas during disassembly/cleaning activities must be provided with full-face or half-face air purifying respiratory protection in accordance with 29 CFR 1910.134. All persons entering the work area during remediation must be medically cleared to wear a respirator, fit-tested and trained on the proper use of the selected respiratory protection. P100 filters will be used for protection from potential exposure to microbes; respirators with combination P100/Acid Gas/Organic Vapor cartridges will be used if needed for protection during the spraying of bleach, sodium hypochlorite, or other cleaning detergents.

J. Removal and Disposal of PPE and Contaminated Equipment

1. Prior to leaving the containments, workers will HEPA vacuum PPE and shoes.

2. Gloves and protective suits must be removed before the worker leaves the containments via the airlocks. These disposable items must be placed in sealed plastic bags and disposed of by the Remediation Contractor in accordance with federal and local regulations.

3. Protective eyewear and respirators should be removed outside the work areas and shall be immediately washed with a detergent solution and thoroughly dried.

4. At the conclusion of the remediation any equipment used in the remediation process (utility knives, saws, negative air machines, crowbars, etc.) shall be washed with detergent immediately after leaving the work areas.

5. Filters from HEPA vacuums, scouring pads, sponges, negative air machine filters, negative air machine pre-filters and the other items that cannot be decontaminated shall be assumed to be contaminated and shall be disposed.

K. Cleaning and Drying of Remaining Surfaces Prior to Disassembly of Negative Pressure Enclosure

1. Initial Cleaning – Initial cleaning shall include use of pressure washers, scrub brushes, detergent solutions and water as necessary to remove settled debris from remaining building surfaces. Water from cleaning process shall be collected for proper disposal. ***Remediation Contractor to submit proposed detergent to Consultant for review and approval prior to initial use.***

2. Application of Sanitizer – Following initial cleaning and removal of debris a disinfectant/sanitizer solution shall be applied to exposed building surfaces. Application shall follow all manufacturers' directions regarding solution concentrations and minimum contact time. ***Remediation Contractor to submit proposed disinfectant/sanitizer to Consultant for review and approval prior to initial use.***

3. Final Cleaning Minimum cleaning procedures are:

- ✓ HEPA vacuum surface
- ✓ Damp wipe surface with water and mild detergent
- ✓ Allow to dry
- ✓ HEPA vacuum surface

L. In addition to the AFDs used to create work area depressurization, a minimum of two additional AFDs (re-circulating AFD) shall be used in the work areas to “scrub” work area air to remove residual airborne bioaerosols. The re-circulating AFDs will operate for 24 hours after completion of work

M. Post-Remediation Evaluation (by Remediation Contractor)

1. Post-remediation evaluation will be conducted by the Remediation Contractor to determine whether or not remediation has been completed. This evaluation involves implementing internal quality control procedures. It can include visual inspection, olfactory evaluation, laser particle counting and moisture measurements. Remediated structures and systems can be considered clean when contamination, un-restorable contaminated materials and debris have been removed, and surfaces are visibly free of dust. The term "visibly" can include direct and indirect observation (e.g., using a white or black towel to wipe a surface to observe for cleanliness). Also, remediated areas should be free of malodors associated with microorganisms. At that point, it is probable that structural components and systems have been returned to Condition 1. The evaluation can also include moisture measurements and the use of a laser particle counter. If visible mold, dust or debris has not been removed, malodors are present or initial cleaning is questionable, repeating the cleaning process may be warranted.

2. Post-Remediation Verification (by Consultant)

A combination of air and surface samples may be collected and analyzed. In addition a visual inspection and moisture evaluation of the work area will be conducted.

Release Criteria

The Remediation Contractor’s remediation work is considered complete when:

a. The work area is visibly clean.

b. Wiping of remaining surfaces with a damp cloth does not reveal the presence of any visible particulate, dust, or debris on the surface of the cloth.

c. Area moisture is controlled, visible water and water stains are not present within the work areas.

d. Remaining building materials are dry, as demonstrated by moisture meter readings of materials inside the containment being within 5% of moisture meter readings from undamaged material outside of the containment.

e. Particle counts inside each work areas are equal to or less than particle counts in the surrounding non-work areas.

If the conditions are not met, then the decontamination is incomplete and re-cleaning is necessary. The Remediation Contractor will also be responsible for all costs associated with collection of a second or subsequent round(s) cleaning.

A CHLOR*TEST™, or equivalent test, will be performed on stone surfaces. Cleaning will be considered complete when test results from previously submerged surfaces as equal to results from similar areas which were not submerged.

3. Worker Training

All workers must be trained in accordance with applicable sections of Title 29, Parts 1910 and 1926 of the Occupational Safety and Health Administration's Code of Federal Regulations. Training must include awareness of microbial hazards, use personal protective equipment, and proper personal hygiene practices. ***The Remediation Contractor will provide the Consultant with documentation supporting applicable training for their employees.***

4. Confidentiality and Non-Disclosure

The Remediation Contractor hereby acknowledges that it shall maintain the information set forth herein and any information pertaining to the work being conducted as confidential information and that it shall maintain such confidential information in strict confidence, not to disclose same to any other party or entity or use same in any manner except for purposes of performing its obligations under this Work Plan.

Except as required by Governmental Authorities or Governmental Requirements, Remediation Contractor shall not disclose any information related to their work or this Work Plan to any third party without obtaining the prior written consent of GC.

5. Acknowledgement

Signatures below indicate that the above information has been reviewed and accepted by all parties.

Company	Printed Name	Signature	Date
NJ Transit			
Remediation Contractor – (To be Determined)			
Consultant – Matrix New World Engineering, Inc.			

SECTION 040140.92 INTERIOR MASONRY RESTORATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. The Contractor shall furnish all labor, materials and equipment and perform all operations necessary for the restoration of the limestone and marble in the Waiting Room of the Hoboken Terminal as indicated in the Contract Drawings or specified herein as directed by the Architect.

B. The work of this Section consists of but is not limited to:

1. Removal of any efflorescence that remains or has reappeared on the surface of the stone after initial cleaning.

2. Removal of deteriorated limestone and replacement with Dutchmen units. Larger Dutchman will require fabrication and pinning of units. New masonry is to match historic material in color, texture, finish and profile.

3. Removal and replacement of cracked or spalled marble.

4. Honing and polishing of rough marble surfaces.

5. Patching of cracks in limestone.

6. Remove damaged limestone patches and replace with new patches that match the surrounding masonry in color, texture, and finish.

7. Repoint open joints in limestone with mortar that matches existing in color, texture and profile.

8. Re-grout all open joints in marble with grout that matches existing in color, texture and profile

1.2 REFERENCED SECTIONS:

A. Section 005700 Ornamental Metal Restoration

B. Section 060140.91 Architectural Woodwork Restoration

C. Section 090120.91 Plaster Repair and Restoration

D. Section 090160.91 Terrazzo Floor Restoration

1.3 REFERENCES:

A. Materials and methods shall conform to the “Secretary of the Interior’s Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings,” 1995.

B. ASTM - American Society of Testing and Materials

C. ILIA – Indiana Limestone Institute of America

D. Portland Cement Association

E. ANSI A41.1 Building Code Requirements for Masonry (ANSI)

F. Manufacturer's printed recommendations

1.4 JOB CONDITIONS:

A. Protect masonry materials during storage and construction from wetting by rain, snow, seepage or ground water and from soilage or interior-mixture with earth or other materials.

B. Protect all adjacent areas from damage during the work of this Section using approved means of physical protection.

1.5 QUALITY CONTROL:

A. All masonry restoration shall be done by a qualified Restoration Contractor (heretofore referred to as "Contractor") with experience working with historic masonry. The Contractor must have a minimum of five (5) years' experience working with historic masonry. The Contractor must demonstrate three (3) projects similar in scope and type to the required work in the New York / New Jersey region involving facilities designated as Landmarks by Local government, or buildings listed on the National or State Register of Historic Places.

B. Contractor shall maintain a steady work crew consisting of skilled mechanics who are experienced with the materials and methods specified, and are familiar with the design requirements. Contractor shall maintain a full-time Forman who fluently speaks, reads and writes English. Contractor shall confirm that all workers understand the job's requirements. Mechanics shall be fully supervised to ensure that the work is accomplished to meet or exceed the highest standards of the trade.

C. Architect shall be given regular access to the Contractor's scaffolding or work site so that he/she may inspect work being performed.

D. Contractor shall replace at no additional expense to the Owner all broken, lost or damaged materials during the masonry restoration.

E. Work is to be performed on a daily basis without interruption unless directed otherwise by the Architect.

F. Obtain materials for masonry restoration from a single source for each type of material required to ensure match in quality, color, texture and pattern.

G. In acceptance or rejection of the work of this Section, no allowances shall be made for lack of skill on the part of the mechanics.

H. All procedures shall be done in accordance with done in accordance with regulations, safety standards and requirements of all federal, state and local authorities having jurisdiction over the work including, but not limited to, the applicable stands for protecting the public and control of pollutants and debris, and O.S.H.A. regulations for the protection of all workers and the public.

I. Materials shall be used only at the manufacturer's recommended temperature tolerances.

1.6 SUBMITTALS:

A. Submit qualification data and references for firms and persons specified in Section 1.5 “Quality Assurance” to demonstrate their capabilities and experience.

B. Contractor shall submit a work plan including detailed description of how the work of this Section will be accomplished. This should include products to be used, methods and equipment for masonry restoration, etc. In addition, a quality control program shall be submitted which will include provisions for supervising performance when cutting horizontal joints with a mechanical grinder and preventing damage due to worker fatigue.

C. Provide written descriptions, drawings and diagrams outlining proposed methods and procedures for protection of personnel, the public and the existing construction during the work of this Section.

D. Contractor shall submit copies of the manufacturer’s technical data for each product indicated or proposed for use, including recommendations for their application and use. Include test reports and certificates that verify the product’s compliance with the specification’s requirements. One complete set of product literature and MSDS shall be placed in a 3-ring, loose-leaf binder and shall be present on the job site at all times for the reference of the Architect.

E. Shop Drawing:

1. **Submit complete shop drawings** of all cut stone work, including those for the large limestone Dutchmen. These drawings when viewed together shall show all details of bedding, bonding, jointing, anchoring and other essential aspects of the work. In addition the finish, dimensions and setting number of each piece of stone shall be shown.

2. The Contractor shall be responsible for all field measurements in the preparation of setting drawings fully defining the conditions for the installation of all stone masonry and Dutchmen repairs.

3. The cut stone fabricator shall prepare all shop drawings, fully defining the conditions for fabrication, finishing and fastening all cut stone and Dutchmen.

4. Show intended application method and configuration of limestone and marble patching, including dimensions, profiles and tooling.

F. Samples:

1. Submit three (3) samples of Indiana Limestone to be used for Dutchmen. New material must match existing in color, texture, finish and profile.

2. Submit three (3) samples of marble to be used for replacement. New marble must match existing in color, texture, vein pattern, finish and profile.

3. Submit three (3) composite patching samples matching the existing limestone and marble. Sample size shall be a minimum of 2” X 2”. Such sample must be approved by the Architect after proper curing and finishing prior to the start of composite patch repairs. All work shall conform to the approved samples

4. All masonry pins and anchoring devices.

5. Repointing mortar for limestone

    a. Provide cured samples of mortar in the form of 6 inch long by 1/2 inch long wide sample strips of mortar set in aluminum or plastic channels.

6. Grout for marble:

    a. Provide cured samples of grout in the form of 6 inch long by 1/2 inch long wide sample strips of grout set in aluminum or plastic channels.

7. Provide a sample (Minimum 50 grams) of each aggregate to be used in each mortar and grout.

G. If alternate methods and materials to those specified are proposed for any phase of the work, provide written description. Provide evidence of successful use on comparable projects and demonstrate its effectiveness for use on this project.

H. Mock-ups:

1. Prior to executing work, provide in-place mock-ups for the Architect's approval. Resubmit panels until the Architect is fully satisfied. Mock-ups shall be prepared by the Contractor using the same workmen, methods and materials that will be employed for the remainder of the work. Upon approval, the mock-ups will remain the standards of work throughout the job. The approved mock-ups shall be retained, undisturbed and suitably marked, throughout construction. Mock-ups may be incorporated into the finished work, when so approved by the Architect.

2. No mock-ups shall be made until the methods and locations are approved by the Architect.

3. Architect will be present during the creation of all mock-ups. Do not proceed with the work unless the Architect is present. Notify the Architect not less than forty-eight (48) hours in advance of masonry restoration mock-ups.

4. Provide protection for adjacent surfaces during the mock-up phase.

5. Mock-ups of repair work shall match the original in all respects, including color, texture, finish, dimensions, coursing, evenness of surface, quality of work, achievement of desired sheen/appearance, bond type, etc.

6. The mock-ups are as follows:

    a. Removal of deteriorated limestone to sound stone.
    b. Installation of limestone Dutchman requiring pins
    c. Removal of damaged limestone patch
    d. Installation of new limestone patch
    e. Removal of damaged marble unit at base
    f. Installation of new marble unit at base
    g. Grinding smooth and polishing of one marble unit.
    h. Repair of three (3) linear feet of crack on the walls
    i. Pointing sample, including raking and re-pointing six (6) linear feet.
    j. Grouting sample, including raking and re-grouting six (6) linear feet.
    k. Efflorescent removal four (4) square feet (if required).

1.7 COORDINATION:

A. Prior to commencing the work of this Section, a meeting must be scheduled at the jobsite to discuss conformance with the requirements of specifications and job site conditions. Representatives of the Contractor, Architect and other parties involved in the scope of this work shall attend the meeting.

B. The Contractor shall coordinate his or her work with that of all other trades related to the successful completion of the work of this section.

C. The work of this Section is not to commence until the cleaning of the waiting room has been completed.

1.8 DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered to the job site in factory-sealed containers clearly labeled as to product, manufacturer, color, and other pertinent characteristics.

B. All materials for use in the work of this Section shall be stored under environmental conditions recommended by the manufacturer. Materials should be kept dry (includes protection from liquid moisture and water vapor), well-ventilated and free of foreign matter.

C. Arrangement shall be made with the Owner's representative to store equipment and materials in designated areas. The Owner or Architect shall not be responsible for damaged or stolen materials or equipment left on the premises by the Contractor.

PART 2 - PRODUCTS

2.1 TOOLS:

A. Contractor shall furnish all materials and equipment necessary to accomplish all aspects of the work in this Section.

B. Hand tools shall be used for removal of deteriorated stone and squaring off of openings for Dutchmen and patches.

C. Scaling back of limestone may be accomplished using an electric hand sander with diamond abrasive sanding pads.

D. Drill, grinder or orbital sander and required pads/accessories for honing and polishing of the marble.

E. Use of other power saws, power chisels, or any other power tools will not be permitted without prior written approval of tool types and locations by the Architect.

2.2 MATERIALS:

A. New Limestone:

1. New limestone is to match historic materials in color, texture, finish and profile.

B. New Marble:

1. New marble is to match existing in color, veining pattern, finish and profile.

C. Dutchmen

1. Dutchmen shall be made from replacement stone approved by the Architect. The stone shall match the existing material to be repaired.

2. All new stone shall be of standard grade, free of cracks, seams, or starts which may impair its structural integrity or function. Inherent color variations characteristic of the quarry from which it is obtained may be acceptable if consistent with the existing stone which is being matched. The Architect shall determine the acceptability of this variation. Texture and finish shall be approved by the Architect as shown on the samples against the stone to be matched.

3. Stone replication elements shall be fabricated to match existing stone in appearance including color, texture, profile and surface finish.

4. Dutchmen shall be appropriately sized to fit the openings they will fill. Joints should measure no more than 3/8".

5. Prior to the installation of any Dutchmen, the Architect will review them for soundness and sizing.

6. Holes for anchors shall be diamond cored.

D. Dutchmen Anchors and Accessories

1. Provide anchors of type and size required to support Dutchmen. Anchors shall be stainless steel, AISI Type 302 or 304.

2. Provide hardwood or plastic shims, non-staining to stone, sized to suit joint thickness and bed depths of Dutchmen.

3. Rods/Pins: Stainless steel threaded rods sized for each type of repair for Dutchmen and reattachment of pieces where necessary. Anchors and pins shall be AISI type 302 or 304 stainless steel. Pins shall meet ASTM A167, a minimum of 1/4 inch in diameter and in lengths as required.

E. Adhesives

1. Akepox 5000, epoxy based stone adhesive, UV stable, knife grade by Akemi.

2. Sikadur 31, Hi-Mod Gel and manufactured by Sika.

3. Flexi-weld 520T Epoxy Adhesive" as manufactured by Edison Coatings, Inc. Plainville, CT.

4. Pre-approved equal.

F. Limestone Patching Mix and Components

1. Use custom patching mix that is tinted to match the existing limestone.

2. Jahn M70 Limestone/Sandstone/Brownstone Repair Mortar as manufactured by Cathedral Stone.

a. Only installers with certification from Cathedral Stone can purchase or install Jahn Repair Mortars.

3. Pre-approved Equal.

G. Marble Patching Mix and Components:

1. Use patching mix that is tinted to match existing marble.

2. Marble Filler 1000 S Neutral manufactured by AKEMI.

3. Akemi Colouring Paste manufactured by AKEMI.

4. Pre-approved equal patching composite patching mix.

H. Masonry Crack Repairs

1. For hairline cracks up to 1/8 inch in width, acceptable products include:
   a. PumpX53iL Pumpable injection grout manufactured by Edison Coatings, Inc., Plainville, CT.
   b. Injection Grout 101G as manufactured by U.S. Heritage Group, Chicago, IL.
   c. Jahn M30 #32 Micro Injection Grout as manufactured by Cathedral Stone.
   d. Equal when approved in advance by the Architect.

2. For cracks greater than or equal to 1/8 inch in width, acceptable products include:
   a. Jahn M40 Crack and Void Injection Grout as manufactured by Cathedral Stone.
   b. Injection Grout 101G as manufactured by U.S. Heritage Group, Chicago, IL.
   c. PumpX53iL Pumpable injection grout manufactured by Edison Coatings, Inc., Plainville, CT.
   d. Equal when approved in advance by the Architect.

3. **If Jahn patching material is used, all installers must be certified Jahn installers.**

4. Injection shall be by disposable syringe, acceptable products include:
   a. Monoject Non-Sterile Disposable Syringe without needle #79-4215 Supplied by PGC Scientifics (www.pgcsci.com)
   b. Air-Tite Brand 30cc Luer Lock Syringe #3 supplied by Air-Tite Products Co., Inc. (www.air-tite-shop.com).
   c. Pre-approved equal.

5. Syringe needles shall be used as necessary for injecting grout into cracks. Needles shall be lengths as required and shall be supplied by a veterinary supply company such as:
   a. Air-Tite Products Co., Inc. (www.air-tite-shop.com)
   b. Pre-approved equal.

6. Ports and cracks shall be sealed during injection grouting using a non-staining, water based clay.

7. Capping Mortars shall be custom colored to match the limestone or marble. Approved products include:

a. Jahn M125 Thin Set Mortar as manufactured by Jahn International and supplied by Cathedral Stone.
b. Equivalent product when approved in advance by the Architect.

I. Pointing and Bedding Mortars
1. Mortar for pointing stone units shall be custom colored, lime based mortar. Acceptable pointing mortars include:
a. Jahn M110 Historic Pointing Mortar as manufactured by Jahn International and supplied by Cathedral Stone products.
b. High Lime Hydrate Mortar – Restoration Mortar as manufactured by U.S. Heritage Group.
c. Pre-approved equal.

J. Grout

1. Provide a cement acrylic grout with color added to match the color of the original marble grout.

K. Efflorescence Removal
1. Poultice of inert clay materials Fuller's earth, kaolin or Stand Off Poultice Powder (as manufactured by ProSoCo) and Water.

2. Safe N' Easy Efflorescence Remover as manufactured by Dumond.

3. Ef-Fortless, as manufactured by Eaco Chem.

4. Pre-approved equal.

5. Natural stiff bristle brushes.

PART 3 - EXECUTION

3.1 INSPECTION:

A. The Contractor shall examine substrates and conditions under which this work is to be performed and notify the Architect in writing of conditions detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected. Commencement of work indicates that Contractor accepts substrate and conditions.

B. Review the amount and extent of work to be accomplished and review areas with the Architect prior to the execution of Work.

C. Correct any conditions that are detrimental to the successful completion of the work. Sequencing of work should be scheduled to ensure that completed work will match existing.

3.2 EFFLORESCENCE REMOVAL (WHERE REQUIRED):

A. For light areas of efflorescent salts that re-appear after abrasive cleaning of the Waiting Room, remove with a dry brush or vacuum.

B. For heavier areas of efflorescent, use poultice or chemical agent. Pre-soak to saturate the wall, apply chemical agent according to the manufacturer's direction, then thoroughly rinse. Test the cleaned area with pH strips until the area rinsed has a pH equal to the rinse water.

C. For Poultice application:

1. Mix water and dry clay powder together. Add clay and water until a wet paste consistency is achieved. The poultice must be as wet as possible, but still able to cling to a vertical surface without slumping.

2. Apply the clay poultice to the affected masonry using a brush, spatula, trowel, or low-pressure spray equipment to a thickness of at least ¼-inch.

3. Cover the poultice with plastic for at least 12 hours. Secure the edges of the plastic with tape to prevent the poultice from prematurely drying out.

4. After 12 hours, remove the plastic and allow the poultice to completely dry.

5. Remove the dry poultice using plastic or wooden scrapers, taking care not to scratch the masonry surface. Rinse the residual clay material using low-pressurized water and soft-bristled brushes. The pressure washer must be equipped with a fan-tipped nozzle and water pressures must not to exceed 250psi.

6. Reapply if necessary.

3.3 DUTCHMEN REPAIRS:

A. Dutchman repairs can vary in overall size, but shall not under any circumstance be less than two (2) inches thick. Replacement stone shall be carefully cut and selected to be sound and in good condition, free of defects, cracks, breaks, or other observable defects. The surface of the replacement stone shall be dressed to resemble the appearance, tooling and texture of the adjoining stone by an approved method. All surface dressing of Dutchman repair shall be done before the Dutchman is set.

B. Dutchmen shall be fastened with stainless pins and anchors as necessary, designed to facilitate mechanical locking and to prevent possible slippage of the stone. The fasteners shall be positioned without weakening the stone in any way.

C. Preparation:

1. Using hand held tools or if approved, power tools, remove unsound or damaged stone taking great care not to abrade or mar adjacent masonry surfaces or edges

2. Square-up voids, leaving a sound and level bed on which to place Dutchman.

3. Remaining masonry surface shall be cleaned and all loose material shall be rinsed with water to remove all dust and debris.

D. Pinning Dutchmen: Large Dutchman units should be repaired and reattached using stainless steel pins and epoxy adhesive. Where possible, blind pinning should be employed.

1. Pre-drill pin holes into the Dutchmen units to be re-set and into the limestone substrate. The pin holes shall be no greater than 1/8 inch larger than the diameter of the pins. Recess the pins a minimum of ¾ inch beneath the surface of the stone.

2. Coat the inside of each hole and the surface of each pin with the specified epoxy.

3. Insert epoxy-coated pin into hole and counter sink pin a minimum of 1/2 inch beneath the surface of the stone.

4. After the pin has been set and the epoxy has cured, fill the pin holes with the specified composite patching mortar. The patch area shall exactly replicate the color, texture, reflectance and original profile of the stone.

E. Setting Dutchmen:

1. Rinse Dutchman before setting; do not install dirty or dusty stone. Dampen joint and surrounding stone surfaces prior to placing mortar.

2. Use water soaked hardwood or plastic shims to stabilize stone Dutchmen in proper alignment while mortar is setting. Make sure that sufficient shim material is placed to avoid point loading the stone as this may squeeze freshly applied mortar out of joints.

3. Set stone Dutchman to existing masonry with approved epoxy accurately and in accordance with the approved setting drawings. A thin layer of epoxy shall be applied to stone to within 1/4 inch of its edges. Do not allow epoxy to spread out over exposed edges.

4. The thickness of joints in all masonry will be uniform and shall match those in the adjacent work in which the unit replacement or Dutchman is being installed. In no case shall the joint exceed ¼ inch.

5. Patching of defects in the Dutchman shall not be permitted. Chips and stains on surfaces shall be redressed, cleaned or replaced with new stone. No acid leaching agent shall be permitted.

6. Fill joints between units, pacing mortar tightly. Verify proper horizontal and vertical alignment before bedding mortar sets.

7. Remove shims only after mortar has set. Do not disrupt bond.

8. Tool final layer of mortar to match pre-approved joint profile.

F. Protect all adjacent materials during Dutchman repairs. Once epoxy materials have set remove any epoxy, grout or patching material accidentally splashed onto adjacent surfaces. Remove set epoxy adhesive with acetone. Any damage to stone or materials to remain resulting from Dutchman repairs shall be restored to the full satisfaction of the Architect at no additional cost.

G. The face of all Dutchman repairs shall be cleaned following the completion of all setting work. Clean patch material splashes, smears, etc. by vigorously brushing with stiff natural- bristle brushes and potable water. If necessary, clean white sand may be added to the water.

H. Any work judged to be defective by the Architect shall be removed and reset at no cost.

3.4 MARBLE REPLACEMENT OR RESTORATION

A. By hand, carefully remove damaged marble units as outlined on Contract Drawings.

B. Provide new units to match adjoining units as intended and install with fresh grout, pointed to eliminate evidence of replacement.

C. At North Vestibule and East Elevation locations:
   1. Hone or grind the surface of the marble until an even surface has been achieved. This will require the removal of more of the marble surface at the top of the slabs than the damaged bottom.
      a. Avoid creating an uneven surface with valleys and hills.
   2. Using finer and finer grits, polish the marble slab until the sheen is identical to the historic finish found on undamaged marble units.

3.5 MASONRY COMPOSITE PATCHING MATERIAL

A. Preparing void: Where required remove existing composite patch and all unsound stone. Existing patches shall be removed using hand tools and chisels or other approved method that will not damage, abrade or break the stone, its edges or surrounding elements.

B. Using a toothed chisel, even up the sides and back of the void, creating a minimum depth of ¼ inch below the surface where possible. Dovetail walls of void to form key for patching. Do not install patch repairs that have a feathered edge. Incorrect installation will cause repairs to fail prematurely.

C. Surfaces to receive patching material must be sound and free of all dust, dirt, grease, laitance and/or any other coating or foreign substance which may prevent property adhesion. Remove all loose particles with water and brush from void. If necessary, use a vacuum cleaner to produce a dust-free surface.

D. If using Jahn patching materials, follow the manufacturer's instructions for application, tooling, moistening and curing. If Jahn patching material is used, all installers must be certified Jahn installers.

E. Moisten the substrate using clean water; do not allow water to pool in voids. Jahn Mortar or approved equal should be applied to a glistening wet surface on vertical applications and a well dampened surface, with no pooling water on horizontal applications. If the surface is allowed to dry out before applying the product, this step must be repeated.

F. Jahn mortar should be mixed with water to the consistency of wet putty. Apply the Jahn mortar to the glistening web substrate approximately 1/8 inch thick.

G. Patching materials are to be applied as per manufacturer's instructions. Deeper voids are to be filled in lifts. Follow manufacturer's instructions for curing, moistening and tooling.

H. The restored areas shall match the original contours and detail of the limestone units.

I. Unacceptable patches will be removed and replaced as directed by the Architect. Unacceptable conditions include, but are not limited to:

   1. Separation of the patch from the sound stone at the edges of the patch.

   2. Hairline cracking of the patch.

   3. Feathered patches.

4. White hazing or other discoloration of the patch.

J. Additional Mechanical Bond for Patches at Arrises:

1. If the composite patch is located at an arris of the masonry unit, drill pin holes into the masonry unit to be patched. The pin holes shall be no greater than 1/16 inch larger than the diameter of the pin. Recess the pins a minimum of ¾ inch beneath the surface of the stone.

2. Coat the inside of each hold and the surface of each pin with the specified epoxy.

3. Insert epoxy-coated pin into hole and insert pin a minimum of ½ inch beneath the surface of the stone.

4. After the pin has been set and the epoxy has cured apply patching mortar. Anchor must be covered with a minimum of ¾ inch of patching material.

3.6 MASONRY CRACK REPAIR

A. Cracks narrower than 1/8 inch shall be filled with injectable grout.

1. Preparation:
   a. Lateral cracks shall have a series of injection ports, which shall measure ¼ inch in diameter and shall be spaced as required. Injection pots shall be drilled in a downward direction along the length of the crack.
   b. Moisten the interior of the crack immediately prior to injection by flushing with water. Repeat this step if the surface becomes dry before grout is injected.

2. Mixing:
   a. Precautions should be taken while mixing grouting materials. Safety goggles, dust mask and gloves should be worn.
   b. No more material than can be used in 30 minutes shall be mixed at any one time. Material that has exceeded its pot life shall be discarded.
   c. Follow manufacturer's product literature for proportions of injection grout and water. Mix for a minimum of three (3) minutes.

3. Injection Procedure:
   a. Seal ports and lower portions of crack using non-staining, water-based clay. Add new clay prior to grout being injected into higher injection ports.
   b. Lateral cracks shall be filled from the lowest injection port continuing until it flows freely from this port. Where necessary, insert stainless steel rods after some grout has been injected. Tap to remove voids or air pockets. Inject grout into the next highest port and proceed in the same fashion. Clean up overflow immediately.
   c. When the grout has set and is thoroughly dried, the entry ports and crack surfaces shall be patched with composite patch material matching the color, texture and reflectance of the surrounding sandstone. The patching material shall be level with the adjacent masonry.

B. Cracks equal to or wider than 1/8 inch shall be routed and filled with grout and subsequently patched with approved composite patching material to match the color, texture and level of the surrounding clean masonry.

1. Routing and Filling of Cracks:
   a. Cracks and fractures of masonry surfaces shall be filled with grout mortar. The crack shall be cut to a depth of 3/4 inch and a width of 1/8 inch. The crack shall be thoroughly cleaned, brushed with mortar slurry coat and filled with a grout mortar. The surface shall be finished with the approved composite patching material matching the profile, color and texture of the adjacent cleaned masonry

C. All repaired cracks shall be flush with the face of the masonry. All entry ports and crack surfaces shall be subsequently patched with approved composite patching mortar to match the color, texture and level of surrounding clean masonry

D. **If using Jahn grouting materials, follow the manufacturer's instructions for application, tooling, moistening, and curing. If Jahn patching material is used, all installers must be certified Jahn installers**.

3.7 JOINT RAKING AND PREPRATION

A. Carefully document original joint profiles and widths prior to all raking activities.

B. Rake out mortar and grout from joints to depths equal to 2 ½ times their widths, but not less than ½ inch to expose sound, un-deteriorated mortar or grout. Remove mortar or grout to provide reveals with square backs and to expose masonry for contact with pointing materials Brush, vacuum or flush joints to remove all dirt and loose debris.

C. Cut out old mortar or grout by hand with chisel and mallet. Power operated, rotary hand-held saws and grinders will be permitted with the approval of the Architect, for use on the horizontal joints if the Contractor can demonstrate the ability of the operators to use tools without damaging the masonry. If masonry damage is caused by power tools, only chisels and mallets will be permitted for the remainder of the project.

D. Do not break or mar edges of masonry units or widen joints. Replace in kind all masonry units which become damaged.

3.8 POINTING LIMESTONE

A. Rinse limestone joint surfaces with fresh water to remove all dust and loose mortar particles. Time application of rinsing so that at time of pointing excess water has evaporated or run off, and joint surfaces are damp, but free of standing water.

B. Apply first layer of pointing mortar to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch. Compact each layer thoroughly and allow to become thumbprint-hard before applying next layer.

C. After joints have been filled to a uniform depth, place pointing material in three steps. Each of the first and second steps should fill approximately 2/5 of joint depth and the third step the remaining 1/5th. Fully compact mortar at each step and allow to become thumbprint-hard before applying next step. Take care not to spread mortar over edges onto exposed masonry surfaces or to feather edge the mortar.

D. When mortar is thumbprint-hard, tool joints to match original appearance of joints and approved mock-ups. Remove excess mortar from edges of joints by brushing.

E. Cure mortar by maintaining a damp condition for not less than 72 hours.

F. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or Tampico bristle brushes and clean water. The use of metal scrapers o brushes will not be permitted.

3.9 GROUTING MARBLE

A. Cleanse the marble with clean water and rinse thoroughly.

B. Remove excess rinse water.

C. Hand-apply grout, using a float held at a 30-45 degree angle. Fill all voids completely.

D. Hold the float at a 60 degree angle and run it back over the area to remove the excess grout from the marble surface.

E. Allow the grout to dry for about 15 minutes, then wash excess grout from the surface of the marble using a damp sponge. Using a circular motion will help loosen any grout that has dried on the marble base.

F. Let grout sit overnight. When the grout is dry, polish the marble base with a clean, dry cotton rag.

3.10 CLEAN UP

A. Remove protective materials from adjacent surfaces.

B. Upon completion of work, clean all surfaces of any debris, mortar droppings, construction materials, etc.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Interior Masonry Restoration" covered by this section shall be included in the Division lump sum item for "Interior Masonry Restoration in Division 4".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 05700 – ORNAMENTAL METAL RESTORATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Work of this section shall include but is not limited to the protection and restoration of the bronze-clad windows, cast iron, brass, and bronze ornament as noted on the Contract Drawings.

B. Restoration of the metals may include but is not limited to:

1. Replacement of missing or damaged fasteners for all metals.

2. Coating removal from cast iron elements.

3. Corrosion removal from all metals.

4. Cleaning and refinishing of ALL brass and bronze (windows, rails, frames, telephones, hardware, decorative items, fountains and signage) in the Contract Limits.

5. Cleaning and repainting cast iron at stair stringers as noted on Contract Drawings.

1.2 REFERENCED SECTIONS:

A. Section 040140.92 Interior Masonry Restoration

B. Section 060140.91 Architectural Woodwork Restoration

1.3 REFERENCES:

A. Materials and work shall conform to the latest editions of reference specifications listed below, specified herein and to all applicable codes and requirements of local authorities having jurisdiction, whichever is more stringent.

1. The National Association of Architectural Metal Manufacturers (NAAMM).

2. American Society for Testing and Materials (ASTM).

3. SSPC-PA 1 “Painting Application Specification,” Steel Structures Painting Council – “Shop, Field and Maintenance Painting, Steel Structures Painting Manual,” Vol. 2.

4. National Park Service Preservation Briefs: “The Maintenance and Repair of Architectural Cast Iron,” Preservation Brief #27, Preservation Assistance Division, NPS, 1991.

5. *Metals in America’s Historic Buildings: Uses and Preservation Treatments* published by the U.S. Department of the Interior, National Park Service, Preservation Assistance Division.

6. Materials shall conform to governing regulations regarding the content of volatile organic compounds.

1.4 JOB CONDITIONS:

A. All chemical materials shall be safe in use and shall not violate City, State or Federal environmental safety regulations.

B. Perform all work of this Section in accordance with all City, State and Federal regulations regarding the transportation, storing, handling, application, removal and disposal of the products involved.

C. Confirm surface temperature of iron surfaces prior to painting or installation of filler compounds. Do not paint or use filler compounds if surface temperature falls below or rises above that recommended by the painting manufacturer.

D. Materials shall only be used at the manufacturer's recommended temperature allowances as outlined in the manufacturer's product data sheets.

1.5 QUALITY CONTROL:

A. Ornamental Metals Restoration Specialist: The Contractor or Subcontractor who shall perform the work specified in this section must be regularly engaged in Architectural Metals Restoration, including cast iron restoration. The Contractor/Subcontractor must demonstrate that, within the last five (5) consecutive years, he or she has successfully performed and completed in a timely fashion at least three (3) projects similar in scope and type to the required work, involving facilities designated as landmarks. For actual metal work, use only skilled metal workers who are completely familiar with the requirements for this work.

B. The Contractor or Subcontractor shall maintain a steady work crew consisting of skilled craftspeople who are experienced with the materials and methods specified and familiar with the design requirements, and a foreman who has acceptable experience in metal restoration. The Contractor or Subcontractor shall confirm that all workers under his/her direction fully understand the requirements of the job. The Contractor/Subcontractor shall allow for inspection of all work areas by Resident Engineer following completion of the work.

C. The Architect reserves the right to visit the facilities of the Subcontractor at any time when the work is in progress. All shop and field materials and workmanship shall be subject to inspection by the Architect and his representatives at all times. Such inspections do not relieve the Contractor from obligations to provide materials conforming to all requirements of the Contract Documents.

D. Contractor shall replace all broken, lost, stolen and damaged cast iron and associated metal work resulting from repair, removal, transportation, cleaning or storing at no expense to the Owner.

E. In acceptance or rejection of this work, no account shall be taken for incompetence on the part of the contractor.

F. Confirm specified dry mil thickness of applied primer with standard equipment recognized by the industry for determining the thickness of painted coatings.

1.6 SUBMITTALS:

A. Product Data: Submit all Manufacturers' technical data for all products to be used in this project. Submittal shall include instructions for use, application and all MSDSs.

B. Restoration Program. Submit a written program for each phase of the restoration process including protection of the surrounding materials on the building and the site during operations. Describe in detail materials, methods and equipment to be used for each phase of the restoration work.

C. If alternate methods and materials to those specified are proposed for any phase of the metal restoration work, provide a written description. Provide evidence of successful use on comparable projects and demonstrate its effectiveness for use on this project.

D. Shop Drawings

1. Shop Drawings shall be complete submissions for approval.

2. Where applicable, verify field dimensions and include them on shop drawings showing exact locations of bronze or brass elements as well as shapes and dimensions for pieces requiring replacement.

3. Provide reproducible copies of approved shop drawings for owner's use.

4. Shop drawings required within two weeks for review by Architect.

E. Containment and disposal plans for coating removal in accordance with all applicable codes for lead abatement, if required.

F. Coating removal plan for any abrasive media blasting on cast iron, including:

1. Detailed work plan describing abrasive coating removal equipment, proposed blasting media, proposed psi, method of containment, and collection.

2. Work Samples of proposed blasting media.

3. Manufacturer's data on blasting equipment and blasting media.

G. Mock-ups

1. Complete one (1) mock-up of the corrosion removal and cleaning for bronze. The mock-up if approved can be incorporated into the finished work. If the mock-up is not approved, a new mock-up will be produced until it is approved by the Architect or Architect's Representative.

2. Complete one (1) mock-up of the corrosion removal and cleaning for brass. The mock-up if approved can be incorporated into the finished work. If the mock-up is not approved, a new mock-up will be produced until it is approved by the Architect or Architect's Representative.

3. Complete one (1) cast iron coating removal test consisting of 2-3 paint removal products and methods to determine the most successful product or method for removal of painted coating. Products and methods may consist of chemical paint removers or abrasive cleaners. Submit list of products and methods to Architect prior to testing.

4. Complete one (1) mock-up of the coating and corrosion removal for cast-iron. The mock-up, if approved can be incorporated into the finished work. If the mock-up is

not approved, a new mock-up will be produced until it is approved by the Architect or Architect's Representative.

5. Produce a mock-up of the wax finish over the antiqued bronze finish. The mock-up if approved can be incorporated into the finished work. If the mock-up is not approved, a new mock-up will be produced until it is approved by the Architect or Architect's Representative.

6. No test panels shall be made until the methods and locations are approved by the Architect or the Architect's Representative.

7. The Architect or the Architect's Representative will be present during the creation of all test panels and mock-ups. Do not proceed with the work unless the Architect or Representative is present. Notify the Architect not less than forty-eight (48) hours in advance.

8. All procedures, dwell times, and materials are subject to modification by the Architect or the Architect's Representative during the testing process. The Architect or the Architect's Representative shall choose products to be used for cleaning based on the results of the test panels. Modifications of sequence, chemical dilution, substitute reagents, and equivalent procedures shall be executed at no additional cost to the Owner or impact to the schedule.

9. Repeat demonstrations and testing procedures until the Architect's or the Architect's Representative's requirements are satisfied.

10. Allow waiting period of duration indicated, but not less than seven (7) calendar days, after completion of sample cleaning to permit study of sample panels for negative reactions.

11. After the completion of the testing phase, and before general cleaning begins, prepare mock-up panels in the station, as indicated, where directed by the Architect or the Architect's Representative. Obtain the Architect's or the Architect's Representative's written acceptance of visual qualities before proceeding with the work.

1.7 SAMPLES:

A. Submit bronze coupon with proposed restoration bronze finish. Bronze in bronze coupon submitted is to match the existing bronze.

B. Submit samples of replacement bronze hardware, anchors and fasteners. Profile of fasteners must match original. No ferrous metals are to be used.

C. Submit samples and color cards of cast iron finish color matching existing finish.

D. Tagging: Samples shall be tagged with the name of the project and referenced specification.

E. Two weeks from date received shall be allowed for thorough examination of the samples by the Architect.

F. Not returnable: Samples are not returnable, nor included in quantities listed for a project.

PART 2 - PRODUCTS

2.1 PRODUCT QUALITY:

A. All materials, accessories, and other related fixture parts shall be new and free from defects which in any manner may impair their character, appearance, strength, durability or function. They shall be effectively protected from any damage or injury from the time of fabrication to the time of delivery and until final acceptance of work.

B. All products used in the Work of this Section shall be the highest available quality.

2.2 CLEANING PRODUCTS:

A. Solvents: Use the lowest toxicity solvent possible.

1. Denatured Alcohol: E.Z. Alcohol, Pure 180 proof denatured alcohol, as manufactured by E.E. Zimmerman Co., Pittsburgh, PA 15238, or approved equal.

2. Mineral Spirits: As manufactured by Ashland Chemical, Inc., Carteret. NJ. Or approved equal.

3. Paint Thinner: 100% petroleum distillate, mineral spirits, Recordsol Paint Thinner, as manufactured by Recochem Inc., Montreal, Quebec, or approved equal.

4. Turpentine: Pure gum spirits of turpentine meeting requirements of ASTM D-13.

B. Coating Removal:

1. Dumond Peel Away 7

2. Dumond SmartStrip Pro

3. Prosoco SafStrip

4. Prosoco SafStrip 8

5. Cathedral Stone MasonRE S-301

6. Pre-approved equal.

C. Detergent: pH neutral detergent such as Orvus WA Paste, or approved equal.

D. Water for cleaning shall be clean, potable, and free of oils, acids, alkalis, salts and other organic matter.

E. Wax: microcrystalline wax.

F. Surface pH meter or pH testing strips available from Talas Online (www.talasonline.com), or approved equal.

2.3 TOOLS:

A. Wood scrapers.

B. Felt pads.

C. Super Fine bronze steel wool, #0000

D. Soft natural-bristle brushes.

E. Clean, soft lint free cloths.

F. Vacuum with HEPA filter.

2.4 ABRASIVE CLEANING EQUIPMENT:

A. Cast iron corrosion removal equipment

1. Sandblasting machine capable of achieving and maintaining a constant pressure. Pressures used shall be those approved during the mock-up phase.

2. Abrasive necessary to achieve the approved sandblasted finish.

2.5 PAINT

A. Primer: At minimum, an alkyd rust-inhibitive primer, Tnemec Series 10 or approved equal should be used. Two coats must be applied. A high performance zinc rich primer could also be used but it requires a cleaner surface.

B. Finish Coat: Alkyd enamel, urethane or approved equal. The Contractor shall provide color to match existing finish color as per approved color samples.

PART 3 - EXECUTION

3.1 GENERAL:

A A thorough and careful inspection must be made of the bronze before the work is started. Any defects or anomalies must be brought to the attention of the Architect and Owner prior to the commencement of the work.

B. Provide products as indicated.

C Ensure substrates are in suitable condition to receive the Work of this Section. Protect adjacent materials and surfaces from damage during the Work of this Section.

3.2 CHEMICAL PAINT REMOVAL PROCEDURES

A. General:

1. Comply with all Federal, state, and local VOC regulations.

2. Where any manufacturer listed makes more than one grade of each material specified, use the highest grade of each type whether or not the material is mentioned by trade name in these specifications.

3. Follow manufacturer's instructions regarding preparation of surfaces, mixing, applying, drying, etc. In case of conflict with this specification, the manufacturer's specifications govern.

B. Apply paint remover in accordance with manufacturer's directions. Use application methods best suited for the type of material being applied: gel, paste or liquid.

C. Apply gel, paste, semi-paste or liquid to dry surfaces 1/8" to 1/4" thick, using a corrosion resistant, plastic trowels or non-metallic brushes. Work paint remover well into crevices. Ensure that the paint remover is applied in an even coat.

D. Allow remover to remain on the surface for time specified by manufacturer or until all paint is dissolved; whichever is the least amount of time. Do not leave surfaces until it dries. If surfaces are left unattended, prevent pedestrians from contact with the remover.

E. If remover dries on the surface, mist the surface with water and allow chemical to remain on the surface another 15 minutes until softened. If leaving on the surface for several hours, a light polyethylene film or other moisture resistant material can be used to cover the remover on the surfaces. Press the polyethylene film against the remover so that it adheres. Tape or seal the edges of the polyethylene film.

F. Carefully remove the chemical remover and dissolved paint coatings by lifting, making sure the substrate is not scraped or gouged. A plastic scraper must be used. Corrosion resistant tools can only be used for this removal. No metal is to be used. Remove as much residue from surfaces as possible.

G. If small amounts of residue or paint remain, reapply chemical following the manufacturer's instructions.

H. Multiple applications of the paint remover may be required to remove all of the paint coatings.

I. Allow treated surfaces to thoroughly dry. Before applying any new surface coating, check cleaned surfaces again with pH strips that have a range from 1-14. to ensure that surfaces are neutral.

J. The Architect must certify that the surfaces treated as the work of this section have been adequately cleaned and neutralized, prior to final acceptance of this work.

K. Waste Disposal:

1. Solid, liquid or semi-solid wastes generated through the use of a paint remover or stripper may be defined for Federal Standards under EPA's Resource Conservation and Recovery Act (RCRA) of 1976 as "solid waste". The waste is classified "hazardous" if it is determined to be corrosive, toxic, or both. All current Federal, state, and local regulations must be stringently followed regarding containment, transportation, and disposal of hazardous waste.

2. Contractor shall obtain and maintain all applicable permits for this job.

3.3 ABRASIVE PAINT AND CORROSION REMOVAL PROCEDURES

A. General:

1. Operate machinery in accordance with manufacturer's recommendations and approved mock-up.

2. Provide suitable containment to protect pedestrians as well as adjacent materials from blasting media and paint.

B. Following abrasive cleaning, remove all residual loose paint, corrosion, and scale from ironwork to remain in place with wire brushes. Sand smooth using vacuums on the sanders to contain paint dust. Take all other necessary precautions to avoid releasing lead dust into the air.

3.4 BRONZE AND BRASS CLEANING:

A. Clean all bronze and brass surfaces using pH neutral detergent, felt pads and super-fine steel wool, and clean water to remove all corrosion product and residues from the surface of the bronze. Surface should have uniform, smooth appearance free from abrasions or discoloration in accordance with approved Mockups.

B. Dry surfaces using clean cloths and protect surfaces to maintain dry conditions until surfaces can be finished with protective wax coating. Surface must be clean and dry prior to application of wax coating.

3.5 REPLACEMENT OF MISSING OR DAMAGED ELEMENTS:

A. Fabricated elements must match the existing elements in size, shape, and finish.

B. Remove damaged elements taking care not to damage adjacent materials.

C. Cut new elements or trim to fit.

D. Attach new elements securely with approved anchors or fasteners.

3.6 REPAIR OF DAMAGED BRONZE-CLAD WINDOWS

A. For severely deteriorated or missing elements, replace the deteriorated metal with new metal to match the original profile.

1. If the wooden substrate is significantly deteriorated, replace the wooden element with seasoned lumber, matching the dimensions of the original.

2. If portions of the wooden substrate are slightly to moderately deteriorated, remove areas of damaged or spongy wood and replace with a Dutchman in accordance with specification 060140.91 Architectural Woodwork Restoration.

3. Affix the new sheet metal to the wooden substrate, replicating the original joints and seams.

3.7 APPLICATION OF HOT-WAX COATING:

A. Hot wax all bronze and brass surfaces with a microcrystalline wax for a protective coating. Thoroughly coat surface until the coating is even and well-adhered. Gently buff surface, dry coat, and re-buff.

3.8 FIELD PAINTING

A. General:

1. No painting shall be done when the air is dust-laden or when weather and temperature conditions are unsuitable. Exterior painting shall not be done in damp or rainy weather, nor when the temperature is below 50° F or above 80° F.

2. All work shall be done in a workmanlike manner and by skilled mechanics. All paint shall be evenly spread, smoothly flowed on, and shall be free from defects. No paint shall be applied until preceding coat is thoroughly dry and hard. Finish surfaces shall be uniform.

3. In general and unless otherwise specified, exterior oil paints shall be allowed to dry at least 72 hours between coats.

4. Paint and finish materials shall be free from skins, lumps and foreign matter when used, and pigmented fillers and other materials shall be kept well stirred while materials are being applied.

B. Surface Preparation: Thoroughly clean and dry all metal surfaces before applying primer. Prepare metal surfaces as follows:

1. Abrasive blast all metal to SSPC SP-6 “Commercial Blast Cleaning” Standard. Remove all dust and grease and prime immediately.

2. In areas where abrasive blasting is not practical, the Contractor may use power tool cleaning with precautions taken to ensure that no lead dust is released into public spaces. The Contractor is to notify the Architect and the Architect’s approval prior to proceeding
   a. Prepare metal for painting to SSPC SP-11 “Hand Tool Cleaning” standard, remove all dust and prime immediately.

C. Finish coatings: All primer coatings must be dry and clean prior to application of finish coatings.

D. Remove all corrosion and touch up with two coats of primer prior to applying two coats of paint.

3.9 SITE CLEAN UP

A. Keep the site clean and remove all debris to ensure clean painted surfaces.

B. As needed, use natural bristle brush with water. Use of muriatic acid or any acid-based masonry cleaners is prohibited.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Ornamental Metal Restoration" covered by this section shall be included in the Division lump sum item for "Ornamental Metal Restoration in Division 5".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 060140.94 – ARCHITECTURAL WOODWORK RESTORATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Work of this section shall include but is not limited to the protection and restoration of the wood benches as noted on the Conditions Drawings, and restoration of wood finishes at the former newsstand, and at all doors and windows, as indicated.

B. Restoration of the woodwork may include but is not limited to Dutchman repairs, scratch and crack repairs, finish restoration, and material replication and replacement, as noted on Contract Drawings.

1.2 RELATED SECTIONS:

A. Section 08 71 00 - Finishing Hardware

1.3 CITED STANDARDS:

A. The Quality Standards, latest edition of the Architectural Woodwork Institute (AWI) shall apply to the work of this section. Except as otherwise indicated, provide "Premium Grade" work as defined in the above–referenced standard for all Architectural woodwork.

B. All work shall comply with the United States Secretary of the Interior Standards for Rehabilitation and guidelines for Rehabilitating Historic Buildings, unless otherwise stated.

1.4 QUALITY CONTROL:

A. Restoration Specialist: The Contractor who will perform the work specified in this section must, within the last five (5) consecutive years, have successfully completed in a timely fashion at least three (3) projects similar in scope and type to the required work, involving facilities determined by the Architect to be of landmark quality and/or historically significant.

B. Field Supervised Construction: Contractor shall notify Architect before beginning work. Obtain the Architect's approval of the installation of restored woodwork, before proceeding with the work.

C. Materials shall conform to the latest edition of reference specifications applicable and specified herein and to applicable codes and requirements of local authorities having jurisdiction.

1. Materials shall conform to governing regulations regarding the content of volatile organic compounds (VOC).
2. Finishing materials and work shall conform to the Painting and Decorating Contractors of America (PDCA).
3. The Contractor shall comply with relevant ASTM Standards for all materials.
4. All wood restoration procedures shall be done in accordance with regulations, safety standards and in requirements of all federal, state and local authorities having jurisdiction over the work including but not limited to the applicable standards for protecting the public and control of pollutants and OSHA regulations for the protection of workers and the public.

D. Mechanics: Contractor shall maintain a steady work crew consisting of skilled craftspeople that are experienced with the materials and methods specified. The Contractor shall confirm that all workers understand the job's requirements.

E. Foreperson shall be present on site daily, and whenever work is being performed.

1.5 SUBMITTALS:

A. Qualification Data: Submit qualification data, specified in "Quality Assurance" Article, that demonstrate the firm's and individual's capabilities and experience. Include a list of at least three (3) wood restoration projects completed in a timely fashion in landmark quality buildings. List project names, addresses, names of Owner's Representative and Owner, and telephone number of contact person for each project. Submit this information with the bid. Bidders shall visit the site and make themselves familiar with job conditions.

B. Product Literature: Submit three (3) copies of manufacturer's latest published technical data including, installation instructions and general recommendations for each specified material and fabricated product. Include test reports and certificates substantiating the product's compliance with the specified requirements. Obtain approval before materials are delivered to the site.

C. Methods of Protection: Prior to commencing the protection and restoration, the Contractor shall submit a written description of proposed materials and methods of protection for preventing damage to any adjacent material or finish during the protection, removal, restoration and installation of the woodwork.

D. Method of Restoration: The Contractor shall submit a written description of proposed method for restoring each area of woodwork.

E. Submit three (3) samples of new wood for repairs with and without restored finish for each area of refinishing as shown on drawings. Provide full range of color to be found in final finished product.

F. Timely submission shop drawings shall be submitted in reproducible form for all woodwork and shall be received no later than sixty days after award of Contract.

G. Shop Drawings

1. The Contractor shall submit complete shop drawings of all architectural woodwork to the Architect for approval. The Drawings shall include dimensioned elevations and sections as well as full size details of all typical members and joinery, types of materials, and shall show hardware and methods of securing and fastening members to adjacent work.
2. Shop drawings shall clearly indicate any deviation from designs or details of the existing woodwork.
3. All dimensional information contained in the drawings, whether numerical, tabular, or graphic is provided only for the information of the Contractor, and is not guaranteed. Contractor shall verify all measurements in the field.
4. Drawings shall clearly show proposed modification and alterations of salvaged woodwork to be completed prior to reinstallation.

H. Schedule: The Contractor shall submit a schedule of work to the Architect. The schedule shall show all salvaged woodwork, and include finishes, wood types, locations, dimensions, and types of repair or replacement of each element prior to reinstallation. The schedule shall indicate the time of completion of each task.

1.6 MOCK-UPS:

A. Prepare one mockup at area(s) designated by Architect for each repair and replication type indicated in this Section unless otherwise indicated.

B. Wood Putty Repairs: Provide three (3) samples of tinted wood putty for each type of wood finish.

C. Finish Restoration: Prepare three (3) samples using materials and methods specified for each type of finish. The new finish shall match the original in color, transparency, and reflectance quality. Following any revisions requested by Architect, the approved sample shall form a quality standard for all further work.

D. All finish mock-ups will be a minimum of 1'-0" x 1'-0" except where specifically approved by the Architect.

E. Mock–ups must be approved by Architect before the work may proceed. Provide additional sample panels, as may be required by Architect. The approved panels shall not be removed until so directed by Architect.

F. No work will be accepted until it conforms in every respect to the finished sample.

G. Protect mockups for the duration of the job. Samples and mockups submitted which are approved by Architect shall remain as a record at the worksite until the work is completed and approved by the Architect.

H. Mock-ups may be incorporated into the finished work.

1.7 MATERIAL DELIVERY, STORAGE AND PROTECTION:

A. All materials salvaged from the Site shall be stored to insure protection from loss, theft, or damage by the elements.

B. Salvaged, repaired woodwork shall not be delivered to the site until ready to be installed.

C. No kiln-dried materials shall be placed in the building unless the building is sufficiently dry.

D. Deliver packaged material in original unbroken packages with the manufacturer's name, brand and material standard indicated plainly thereon.

E. Store and handle all material in a manner as to prevent damage by water or water vapor.

F. Replace all broken, lost and damaged adjacent material resulting from repair, removal, cleaning, and finishing of all woodwork under this section at no expense to the Owner.

G. All Subcontractors are bound by the same requirements as the Contractor. Subcontractors shall not begin work unless approved by the Architect.

H. Take all necessary precautions to protect all persons (whether engaged in the work of this Section or not) from all hazards of any kind associated with the work of this Section.

I. Take all necessary precautions to protect all property and materials (whether subject to the work of this Section or not) from any harm or damage associated with the work of this Section.

J. Perform all work of this Section in accordance with all Federal, State, and local regulations regarding the transportation, storing, handling, application, removal and disposal of the products involved.

K. Take all necessary precautions to prevent fire and spread of fire.

PART 2 - PRODUCTS

2.1 BASIC REQUIREMENTS:

A. The grades of all materials under this section shall be as defined by the rules of the recognized association of lumber manufacturers producing the materials specified. Wood for millwork shall conform to, or exceed, the requirements of "Premium Grade, Class 1 " as established by Quality Standards or the Architectural Woodwork Institute (AWI) and shall be provided in the cuts and figure required to match existing wood. Where conflicts occur between these standards and this Specification, the more stringent requirement shall govern in each case.

B. Lumber and finished woodwork throughout shall be of sound stock, thoroughly seasoned, free from all knots, and if new, kiln–dried to a moisture content not exceeding 6–11% for millwork.

C. Work that is to be finished shall be free from defects or blemishes on surfaces exposed to view that will show after the finish coat of varnish or paint is applied. Any materials which are in any way defective and do not meet specifications for quality and grade, or are otherwise not in proper condition, shall be rejected.

2.2 CLEANING MATERIALS:

A. Cleaning Pads: Scotch–Guard Red Pads, or approved equal.

B. Cleaning Pads: 0000 steel wool, clean and free of contaminants and corrosion.

C. Clean, lintless cotton rags and cheesecloth.

2.3 PUTTIES, ADHESIVES, AND FASTENERS:

A. Fillers for holes and losses in wood: Pigmented oil base putty formulated specifically for use on wood. Provide "Color Putty." Mix different colors of putty to match color of finished wood.

B. All glues shall be non–staining waterproof wood glues as manufactured by 3M Company, Pittsburgh Plate Glass Company, Borden Company, or approved equal.

C. Provide all new screws to match existing.

D. Provide new nails and brads to match existing

2.4 FINISH MATERIALS:

A. Solvents

1. Denatured Alcohol: E.Z. Denatured Alcohol, as manufactured by E.E. Zimmerman Co., Pittsburgh, PA 15238, or approved equal.
2. Mineral Spirits: complying with ASTM D3257 - 06(2012) and ASTM D235 - 02(2012).
3. Paint Thinner: 100% petroleum distillate, mineral spirits, Recordsol Paint Thinner, as manufactured by Recochem Inc., Montreal, Quebec, or approved equal.
4. Turpentine: Pure gum spirits of turpentine meeting requirements of ASTM D-13.

B. The Contractor shall match the existing varnish colors for the benches using varnish available from Sherwin-Williams Co., or approved equal, as per approved mockup.

PART 3 - EXECUTION

3.1 GENERAL:

A. Field Conditions

1. Take all necessary field measurements and verify all installation conditions prior to ordering and fabrication of material.
2. Existing Conditions and Documents: The Contractor shall visit the site and shall examine the drawings and specifications for the material of the various surfaces and the extent of repair work and finishes.
3. Coordinate work with other trades as required during salvage and restoration operations.

B. Remove and label existing hardware and fixtures.

1. Remove all extraneous nails, staples, bolts, hooks, etc. from woodwork. Fill resulting holes, gouges and indentations, and sand smooth with approved filler material.

3.2 RESTORATION METHODS:

A. Coating Removal:

1. Remove existing polyurethane finish to bare wood using denatured alcohol and fine steel wool.
2. Prior to refinishing, remove all dust and residue from the surfaces using a vacuum and clean rags.

B. Crack and hole filling:

1. Replace all missing or otherwise defective wood in kind unless approved by Architect. Finished woodwork shall be fully intact and structurally sound.
2. Patch holes, indentations gouges, etc. using wax crayon touch up stick for holes less than 1/16" X 1/16" and wood filler for holes between 1/16” and 1" wide and 1/2" deep. For holes larger than 1" X 1" X 1/2" deep, use Dutchman repairs.

C. Replacement and reattaching of missing or loose trim elements

1. Fabricate all new woodwork in the areas designated on the Drawings.
2. New woodwork shall match the original wood species, grain and profile, as specified.
3. Attach elements with waterproof adhesive and secure with clamps until dry.
4. Finish the new woodwork to match the proposed finish on the original woodwork and millwork.

3.3 Dutchman Repairs

A. Repair deteriorated, split, or missing wood with Dutchman repairs where indicated on drawings. Use the following procedure for Dutchman repairs:

1. Neatly cut out defective materials and enough sound wood to bond Dutchman to sound substrate. Form a prismatic void in existing wood with square corners and edges. Cut Dutchman to exactly fit void, with exposed portion matching original profile of woodwork, and grain of Dutchman parallel to original wood grain direction.
2. Secure Dutchman with waterproof adhesive and clamp in place until glue is set.
3. Where it is necessary to cut off an end of a component and install Dutchman, use a diagonal scarf joint for end–to–end joints.

B. Sand to smooth surface.

3.4 REFINISHING

A. General:

1. All surfaces shall be properly prepared to receive clear finishes, including thorough cleaning of all grime, grease, dirt, loose material and other substances that may interfere with proper adhesion of finish. All surfaces to be finished shall be dry. Allow several days for the wood surfaces to dry after stripping procedures.
2. The starting of the work under this section will be construed as acceptance of such surfaces as being satisfactory, and any defects to his work resulting from such accepted surface will be corrected by the Contractor at his own expense.
3. Remove all imperfections in the previous coat before the subsequent coat is applied.
4. Provide protection sufficient to protect adjacent work and materials.

C. Refinishing:

1. Apply a minimum of 2 layers of approved varnish in accordance with approved mockups.

3.5 HARDWARE REPLACEMENT

A. Replace all existing hardware – see Section 08 71 00.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Plaster Repair & Restoration" covered by this section shall be included in the Division lump sum item for "Architectural Woodwork Restoration in Division 6".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 08 71 10 – FINISHING HARDWARE

PART 1.00 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.02 WORK INCLUDED

A. Work of this Section includes all labor, materials, equipment and services necessary to furnish and install all the finish hardware as shown on the drawings and specified herein.

B. Consultation with Architect and the Owner.

1.03 RELATED WORK

A. Architectural Woodwork Restoration (wood doors, frames & glazing) - Section 06 01 40

B. Electrical- Section 16000

1.04 QUALITY ASSURANCE

A. Hardware shall be suitable and adapted for its required use and shall fit its designated location. Should any hardware as shown, specified or required fail to meet the intended requirements or require modification to suit or fit the designated location, determine the correction or modification necessary and notify the Architect in ample time to avoid delay in the manufacture and delivery of hardware.

B. For fire rated openings provide hardware complying with NFPA Standard No. 80 requirements of authorities having jurisdiction.

C. Barrier Free Requirements: Maximum pressure applied to the latch area to open exterior doors shall not exceed fifteen (15) pounds. Interior doors which have a self-closing feature shall require pressure not to exceed eight (8.5) pounds.

D. Hardware Supplier Qualifications: The Hardware Supplier shall have been regularly engaged in the sale and distribution of Finish Hardware for projects of comparable scope and size for a minimum of 5 years. The Hardware Supplier shall have an AHC of the Door and Hardware Institute on staff who will be responsible for overseeing the scheduling, detailing, ordering, and coordinating of Finish Hardware, and shall be available for consultation with the Architect, at no additional cost to the Owner, during progress of construction. The Hardware Supplier shall be a direct factory authorized distributor for all finish hardware items being furnished in accordance with this Specification.

1.05 SUBMITTALS

A. Before any finish hardware is ordered or purchased, submit catalog cuts and a complete Hardware Schedule of Finish Hardware. Each item listed in the Hardware Schedule shall be identifiable with respect to manufacture, brand, catalog number, material, and finish.

B. Where submission differs from Schedule given herein, use different color or other means of identification to bring change to the attention of the Architect.

C. Hardware Supplier to provide all product information, wiring diagrams, and electrical data to the Electrical Contractor.

D. Samples: Submit samples as requested by Architect. Do not proceed with installation until samples have been approved. Approved samples may be installed in the work after substantial completion of work. Samples shall include one (1) each of the following samples:

1. Hinge (each type)

2. Surface Closer

3. Lockset

4. Overhead Stop

6. Push-Pull Plates

7. Finish Sample of all other hardware

1.06 PRODUCT HANDLING

A. Pack finish hardware in approved manufacturer's containers, complete with trimmings, bolts, screws, washers, etc., as required for application and securement. Each container shall bear a suitable label which shall state the quantity and kind of contents of said container, as well as identifying marks relating to the approved Hardware Schedule and its location in the project.

B. Knobs, handles, pulls and other items of finish hardware with easily damaged finishes shall be individually wrapped before placing in containers and with sufficient sheet cloth or cotton-backed paper which shall be adequately tied with heavy strings; all as necessary to protect the finishes.

C. Finish hardware shall be delivered, as directed, to the building site or the factories of the various fabricators of metal work to which such hardware is to be applied. Deliver hardware in the order required and in ample time to permit application at the building, or fabricators' shops, within the time required for the completion of the building.

1.07 JOB CONDITIONS

A. Field Service: The hardware supplier shall assign a competent representative, acceptable to the Architect, to be at the jobsite each time a major shipment of finish hardware is received. Such representative shall assist in "checking in" these shipments and shall secure a receipt covering the contents of each shipment. In addition, such representative shall be available for immediate call to the jobsite when, in the opinion of the Architect, his presence is necessary.

B. Templates: Promptly following approval of the Hardware Schedule by the Architect, furnish and deliver template information, to the fabricators, of items to which finish hardware is to be applied.

1. Such deliveries shall be made in ample time to avoid delays in such work of said fabricators. Provide drawings, schedules and detailed information to other trades as necessary for them to accommodate and prepare their work to receive the finish hardware.

C. Cooperation and Coordination

1. Cooperate and coordinate work with that of other trades supplying materials or performing work in contact with, connecting to, underlying, or overlaying the work of this Section.

2. Provide complete data of requirements for work of this Section to those other trades whose work is affected by or dependent upon the work of this Section.

3. Furnish all items to be built into other work in ample time to avoid delaying the progress of such work.

4. Examine all drawings covering the work of this Section and refer to all other drawings, including mechanical and electrical drawings, which may affect the work of this Section or require coordination by this trade.

D. Existing Conditions: Hardware Supplier shall verify all existing conditions in the field to ensure compatibility with hardware specified in the Hardware Sets herein. Any discrepancies between existing field conditions and hardware specified shall be brought to the attention of the Architect immediately. Hardware Supplier shall not order any hardware until all discrepancies are rectified and written approval is granted by the Architect. Note: all existing doors are min. 2” thick.

PART 2.00 - PRODUCTS

2.01 GENERAL

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware are indicated herein. Products are identified by using appropriate hardware designation numbers.

B. Manufacturers are listed for each hardware type required. Provide either the product designated, or approved equal.

C. Proprietary Products: References to specific proprietary products are used to establish minimum standards of utility and quality. Other materials may be considered by the Architect in accordance with the provisions of these specifications.

D. Notwithstanding anything to the contrary in this specification or the drawings, the finish hardware shall conform to the requirements of governmental authorities having jurisdiction and such requirements shall be followed as if specifically set forth in this specification.

E. Finish hardware shall conform to the applicable requirements of the American Insurance Association, and the National Board of Fire Underwriters' Laboratories, Inc., and other local authorities having jurisdiction, and each such item shall bear a label or mark of the Underwriters' Laboratories, Inc., indicating its conformity with such requirements for use in connection with its specified location.

F. Finish hardware shall be uniform in color and finish and free from imperfections affecting its appearance, function, operation and serviceability. Such hardware shall be suited and adapted to its required use and shall fit its respective location.

G. Where the finished shape or size of members receiving finish hardware are such as to prevent or render unsuitable the use of the specific types or sizes of such hardware, suitable types or sizes shall be furnished, having as nearly as practicable the same function, operation and quality as the specified hardware.

H. Bolts, screws and other fastenings required for the application of the finished hardware shall be of size and type to fit requirements and shall be of the same material and finish as the exposed parts of such hardware which they adjoin. Exposed screws and bolts shall have countersunk oval heads and bolts shall be provided with cap nuts. Countersunk part of screw and bolt holes shall be finished smoothly

without sharp edges and form a firm seal for such screw and bolt heads. Full threaded wood screws shall be furnished for all wood applications.

2.02 PRODUCTS AND MANUFACTURERS

A. The following are acceptable manufacturers, unless specifically indicated in the Hardware Sets. Underlined Manufacturers are those whose products are indicated in the hardware sets. Acceptable substitutions require the written approval of the Architect 10 days prior to the Bid date. Catalog cut sheets, physical samples, and a statement from the manufacturer showing compliance with the original items specified must be submitted along with the substitution request. No substitutions will be considered after the award of the Contract.

LOCKSETS, LATCHSETS, & DEADLOCKS: Yale Security Inc.

EXIT DEVICES: Yale Security Inc.

CLOSERS: Norton, Yale Security Inc., or LCN

PUSH AND PULL BARS, PROTECTION PLATES: Rockwood

STOPS: Rockwood

OVERHEAD STOPS: Yale Security Inc. or Rixson

SILENCERS: Rockwood

SADDLES & GASKETING: National Guard Products or Pemko

ELECTROMAGNETIC EGRESS SYSTEMS & ACCESSORIES: Securitron

ELECTRICAL MODIFICATIONS: ACSI

2.03 SPECIFIC ITEMS

A. Closers

1. Unless otherwise indicated, closers shall not be visible on the public side of doors. Closers opening into public spaces shall be provided with parallel arms and brackets to suit.

2. Closers shall be sized in accordance with the accepted manufacturer's standards to suit height, width, and weight of door and draft conditions.

B. Locking and Latching Devices

1. Mechanical: Provide types, functions, as specified. Coordinate with Owners keying requirements.

C. Keys and Keying

1. Establish New Removable Core Security Cylinder Grand Master Key system for this project. Allow for 100% expansion. For the protection of the owner, all cylinders shall be keyed at the factory where permanent records shall be established and maintained. This Grand Master Key system shall be comprised of interchangeable core security cylinders on all locksets and exit devices.

2. Provide Temporary Construction Cores.

3. All masterkeys shall be identified with a registry number, and shall not be stamped with MASTER or letter M.

4. All keys shall be stamped “DO NOT DUPLICATE”.

5. Furnish:

2	Grand Masterkeys
5	Masterkeys each section
5	Control Keys
3	Keys per lockset
100	Key Blanks

6. All keying shall be thoroughly checked with the Architect and Owner. Final keying requirements shall be submitted in writing, for final approval by the Owner and/or Architect.

7. Provide a key control system including envelope, labels, tags with self-locking key clips, receipt forms, 2-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by the system manufacturer, with capacity for 150% of the number of locks required for the project. Provide complete cross index system set up by the key control manufacturer and/or Hardware Supplier and place keys on markers and hooks in the cabinet, as determined by the final approved key schedule.

D. Stops: Provide stops to limit the degree of opening, but in no case shall the door open less than 90 degrees. Stops help to prevent damage to adjacent walls, columns, equipment, the door or its hardware.

1. Overhead Closers/Stops

a. Size overhead closers/stops to suit door width, height, weight and draft condition.

b. Overhead stops shall have stainless steel tracks with a built-in shock absorber.

c. Overhead Holder shall be tri-packed for Stop, Hold-open, and Friction Hold Open Functions.

E. Pushes and Pulls: Provide concealed fasteners where practical. Where exposed fasteners are required provide flush type finished to match push or pull.

F. Flush Bolts: Provide top and bottom extension type flush bolts, mounted twelve (12) inches and seventy-two (72) inches respectively from the bottom of scheduled doors. Provide each bottom flush bolt with a dustproof strike.

G. Kickplates: Kickplates for push side of door to be 2” less door width. Kickplates on pull side of door to be 1 ½” less door width.

H. Silencers: Provide silencers for all non-gasketed and non-weatherstripped frames. Provide three (3) for each single swing door and two (2) for each pair of doors.

2.04 FINISHES

A. Provide finish hardware with the following finishes unless otherwise shown:

1. Surface Closers: 605 (Polished Brass)
2. Locksets: 605
   a. Exit Devices: 605
3. Stops: 605
4. Pushes, Pulls, Kick Plates, Mop Plates, Armor Plates, Protective Covers: 605

PART 3.00 - EXECUTION

3.01 GENERAL

A. Make periodic checks during construction in order to ascertain that the finish hardware furnished has been installed correctly. After completion of all construction work, adjust finish hardware to work properly; test all keys and adjust as required for smooth, free operation.

B. All electrical connections shall be concealed (without exposed wiring or conduit) inasmuch as possible without causing visible or structural damage to surrounding historic fabric. Coordinate all door hardware preparation with restoration efforts.

3.02 INSTALLATION

A. Mount hardware in locations recommended by the Door and Hardware Institute unless otherwise indicated.

B. Use the templates provided by hardware item manufacturer.

C. Conform to ANSI 117.1 for positioning requirements for the handicapped.

D. Clean adjacent surfaces soiled by hardware installation.

E. Prior to Final Inspection make final check and adjustment of all hardware, clean operating items as necessary to restore proper function and finish of hardware.

3.02 HARDWARE SETS (see Door Schedule on drawings for Door Heights, Widths, Thicknesses and Finishes).

HW Set 1
D04, D05

2 ea	Closer	UNI-75-SDST-0	605E	Norton
2 ea	Pull	134 x 70C	605	Rockwood
4 ea	Push Bar	51	605	Rockwood
4 ea	Kickplates	10”	605	Rockwood
2 ea	Overhead Stop	6 Series	605E	Rixson
2 ea	Door Sweep	200SBR	605	NGP
2 ea	Silencers	609	Grey	Rockwood
1 ea	Saddle	Existing to remain	--	

HW Set 2
D08

2 ea	Closer	UNI-75-SDST-0	605E	Norton

1 ea	Flush Bolt	557	605	Rockwood
1 ea	Bolt	630	605	Rockwood
1 ea	Dummy Set	HA x FN8771FLDT	605	
1 ea	Lockset	HA x FN8705FL	605	Yale
2 ea	Overhead Holders	6 Series	605E	Rixson
4 ea	Kickplate	10”	605	Rockwood
2 ea	Silencers	608	Grey	Rockwood
1 ea	Saddle	Existing to remain	--	

HW Set 3

D09

1 ea	Closer	UNI-75-SDST-0	605	Norton
1 ea	Lockset	HA x FN8707FL	605	Yale
1 ea	Overhead Holders	6 Series	605E	Rixon
2 ea	Kickplate	10”	605	Rockwood
2 ea	Silencers	608	Grey	Rockwood
1 ea	Saddle	Existing to remain	--	

HW Set 4

D10

1 ea	Closer	4400	605E	Yale
1 ea	Lockset	HA x FN8705FL	605	Yale
1 ea	Overhead Holder	6 Series	605E	Rixson
1 ea	Kickplate	10”	605	Rockwood
3 ea	Silencers	608	Grey	Rockwood

HW Set 5

D17

2 ea	Closer	4400	605E	Yale
2 ea	Flush Bolt	557	605	Rockwood
1 ea	Dummy Set	HA x FN8771FLDT	605	Yale
1 ea	Lockset	HA x FN8705FL	605	Yale
2 ea	Overhead Holders	6 Series	605E	Rixson
4 ea	Kickplate	10”	605	Rockwood
2 ea	Silencers	608	Grey	Rockwood
1 ea	Saddle	Marble by Other	--	

3.03 ELECTRICAL HARDWARE SETS

HW Set E1

D01, D02

2 ea	Closers	UNI-75-SDST-0	605E	Norton
2 ea	Exit Device	XX-V-LBR	605	Monarch
2 ea	Electrical Mod.	VR-1500-AE-LM-	--	ACSI
1 ea	Pull	134 x 70C	605	Rockwood
1 ea	Pull	134 x 70C x Cyl. Prep	605	Rockwood
2 ea	Magnet Strike & Lock	SAM w. SMLS & SMSS	605	Securitron
2 ea	Overhead Holder	6 Series	605E	Rixson
1 ea	Threshold	426BR	605	NGP
1 ea	Weatherstrip	116NDKB	DKB	NGP
2 ea	Door Sweep	200SBR	605	NGP

1 ea	Seals	120SBR	605	NGP
4 ea	Kickplate	10”	605	Rockwood
1 ea	Card Reader	By NJT	--	
1 ea	Key Switch	MKA	605	Securitron
1 ea	Cylinder for MKA	To Suit	605	Yale
1 ea	Cylinder for Exit	To Suit	605	Yale
1 ea	Power Supply	BPS-24-1 x TM-8 x B-24-4	--	Securitron
1 ea	Wiring Diagram	By Hardware Supplier	--	

Operation: Egress all times by pressing Exit Device or by Fire Release system if activated. Entrance by card reader or key, when station is closed. Electromagnetic locks must remain de-energized (open from exterior) while station is open. Power supply to be mounted in a concealed location in the adjacent room. Coordinate voltage and electrical with DIVISION 16 Electrical.

HW Set E2

D03

1 ea	Electrified Hinge	BB5005-600-T-1108	605	Bommer/ACSI
1 ea	Closer	4400 (pull side)	605E	Yale
1 ea	Lockset	HA x FN8708FL	605	Yale
1 ea	Lock Electrification	1510C-AE-LM-8708	--	ACSI
1 ea	Magnet	SAM-SC	--	Securitron
2 ea	Kickplates	10”	605	Rockwood
1 ea	Threshold	425BR	605	NGP
1 ea	Power Supply	BPS-24-1 x TM-8 x B-24-4	--	Securitron
1 ea	Card Reader	By NJT	--	
3 ea	Silencers	608	Grey	Rockwood
1 ea	Wiring Diagram	By Hardware Supplier		

Operation: Entrance by Card reader or Key. Egress by lockset all times. Power supply to be mounted in a concealed location in the Ticket Office. Coordinate voltage and electrical with DIVISION 16 Electrical.

HW Set E3

D11, D12, D13, D14, D15, D16

2 ea	Closers	UNI-75-SDST-0	605	Norton
2 ea	Exit Device	XX-V-LBR	605	Monarch
2 ea	Electrical Mod.	VR-1500-AE-LM-1500	--	ACSI
2 ea	Pull	50	605	Rockwood
2 ea	Magnet Strike & Lock	SAM	605	Securitron
2 ea	Overhead Holder	6 Series	605E	Rixson
1 ea	Threshold	426BR	605	NGP
2 ea	Weatherstrip	116NDKB	DKB	NGP
2 ea	Door Sweep	200SBR	605	NGP
2 ea	Seals	120SBR	605	NGP
4 ea	Kickplate	10”	605	Rockwood
1 ea	Card Reader	By NJT	--	
1 ea	Key Switch	MKA	605	Securitron
1 ea	Cylinder for MKA	To Suit	605	Yale
1 ea	Cylinder for Exit	To Suit	605	Yale
1 ea	Power Supply	BPS-24-1 x TM-8 x B-24-4	--	Securitron
1 ea	Wiring Diagram	By Hardware Supplier	--	

Operation: Egress all times by pressing Exit Device or by Fire Release system if activated. Entrance by card reader or key, when station is closed. Electromagnetic locks must remain de-energized (**open from exterior**) while station is open. Power supply to be mounted in a concealed location in the adjacent room. Coordinate voltage and electrical with DIVISION 16 Electrical.

HW Set E4 (non electrified)

D19, D20, D21, D22

1 ea	Closers	4400	605	Yale
1 ea	Exit Device	1500	605	Yale
1 ea	Pull	134 x 70C	605	Rockwood
1 ea	Pull	134 x 70C x Cyl. Prep	605	Rockwood
1 ea	Threshold	426BR	605	NGP
1 ea	Weatherstrip	116NDKB	DKB	NGP
1 ea	Door Sweep	200SBR	605	NGP
1 ea	Seals	120SBR	605	NGP
2 ea	Kickplate	10”	605	Rockwood

SECTION 090120.91 PLASTER REPAIR AND REPLICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. The work of this Section consists of providing all labor, materials and equipment and services to complete the following plaster repairs on the contract drawings of the Waiting Room of the Hoboken Terminal.

1. Repair of flat plaster damaged by flood waters in the North and East Vestibules.

2. Repair of molded plaster in the North and East Vestibules

3. Replication of plaster ornament.

4. Contractor shall inspect all flat and molded plaster surfaces to determine any defects prior to the installation of this contract. Any such defects shall be reported to the Architect prior to beginning the work of this section.

5. Painting of new and existing plaster surfaces

1.2 REFERENCED SECTIONS:

A. Section 040140.92 Interior Masonry Restoration

B. Section 060140.91 Architectural Woodwork Restoration

C. Section 05700 Ornamental Metalwork Restoration

D. Section 090160.91 Terrazzo Floor Restoration

1.3 REFERENCES:

A. All work will conform to ASTM-C842, the Application of Interior Gypsum Plaster.

B. ASTM C5- Quicklime for Structural Purposes; Current Edition

C. ASTM C28 – Gypsum Plasters; current Edition.

D. ASTM C35 – Inorganic Aggregates for Use in Gypsum Plaster; Current Edition

E. ASTM C206 – Finishing Hydrated Lime; Current Edition

F. ASTM C207 – Hydrated Lime for Masonry Purposes; Current Edition

G. ASTM C631 – Bonding Compounds for Interior Plastering; Current Edition

H. ASTM C841 – Installation of Interior Lathing and Furring, Current Edition

I. ASTM C847 – Metal Lath, Current Edition

J. See “Repairing Historic Flat Plaster Walls and Ceilings,” Preservation Brief #21, Preservation Assistance Division, NPS, 1989.

K. See “Preserving Historic Ornamental Plaster,” Preservation Brief #23, Preservation Assistance Division, NPS, 1990.

L. Secretary of the Interior’s Standards. All work shall comply with the United States Secretary of the Interior Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings, unless indicated otherwise.

1.4 JOB CONDITIONS:

A. Quantity and Location: The Contractor and the Architect shall review all of the areas mentioned to confirm quantities and location of plaster repairs.

B. Only apply paint to dry clean surfaces, when the relative humidity exceeds 85%. No not paint damp surfaces or in the direct sun.

1.5 QUALITY CONTROL:

A. Mechanics shall be highly skilled in the art and craft of plastering, both flat and ornamental, with the work of this section to the highest standard for such work. No allowances will be made for the lack of skill of the mechanics.

B. All replication work shall be performed by a plaster ornament Fabricator with experience in ornamental plaster fabrication and replication. The Fabricator must have a minimum of five (5) years of experience and adequate facilities and capacity to furnish the quality, size and quantity of units required. Fabricator must demonstrate three projects similar in scope and type to the required work in the New York / New Jersey region involving facilities designated as Landmarks by local government, or building listed on the National or State Register of Historic Places.

C. Installation and restoration shall be performed by a Contractor specializing in plaster installation with experience in ornamental plaster installation. The Contractor must have a minimum of five (5) years of experience working with historic plaster.. Contractor must demonstrate three projects similar in scope and type to the required work in the New York / New Jersey region involving facilities designated as Landmarks by local government, or building listed on the National or State Register of Historic Places.

D. Contractor shall maintain a steady work crew consisting of skill mechanics who are experienced with the materials and methods specified, and are familiar with the design requirements. Contractor shall maintain a full-time Foreperson who fluently speaks, reads and writes English. Contractor shall confirm that all workers understand the job’s requirement. Mechanics shall be fully supervised to ensure that the work is accomplished to meet or exceed the highest standards of the trade.

E. Work is to be performed on a daily basis without interruption unless directed otherwise by the Architect.

F. In acceptance or rejection of the work of this Section, no allowances shall be made for lack of skill on the part of the craftspersons or mechanics.

G. All new plaster work shall match the original in all respects, including profile, texture, dimensions, etc.

H. Obtain materials for plaster replication and installation from a single source to ensure a match in quality, color and texture.

I. Materials shall be used only at the manufacturer's recommended temperature allowances. Installation work may only be performed as long as the ambient temperature remains above 40 degrees Fahrenheit and below 80 degrees Fahrenheit and will remain so for the next 48 hours.

J. Allowable Tolerances

1. All new plaster repairs shall exactly match and continue existing edges and contours of plasterwork. Repairs shall be true and flat in connection with adjacent plaster and match the curved profile of the adjacent material where applicable. Visual irregularities shall be corrected in all cases. Ridges, ledges, and irregularities in the work shall be cause for the work to be rejected by the Architect. Contractor shall remove rejected work and provide new plasterwork complying with requirements of this section at no additional cost to the owner. Do not exceed 1/8" in 8'-0" for bow or warp of surface or for plumb or level.

1.6 SUBMITTALS:

A. Contractor qualification data: Submit qualification data and references for firms and persons specified in Section 1.5 "Quality Assurance" to demonstrate their capabilities and experience. Bidders shall visit the site and make themselves familiar with the site conditions.

B. Contractor shall submit a work plan including detailed descriptions of how the work of this Section will be accomplished. This should include products to be used, methods for mold making, methods for replication, methods for installation, etc.

C. Provide written descriptions, drawings and diagrams outlining proposed methods and procedures for protection of personnel, the public, and the existing construction during the work of this Section.

D. Contractor shall submit copies of the manufacturer's technical data for handling, storage and application of each product used in plaster replication and installation, including the manufacturer's recommendations for application and use. Include test reports and certificates that verify the product's compliance with the specification's requirements.

E. Shop Drawings:

1. Contractor shall submit complete shop drawings showing the dimensions, layout, sections and ornate details, where applicable, of all plaster replication. Drawings shall also show cross section of plaster profile.

2. All drawings when viewed together, shall show all details of the profile, bonding, anchoring (if necessary and all other essential aspects of the work.

F. If alternate methods and materials to those specified are proposed for any phase of the restoration work, provide written description. Provide evidence of successful use on comparable projects and demonstrate its effectiveness for use on this project.

G. Mock-ups:

1. Prior to executing work, provide in-place mock-up panels for the Architect's approval. Resubmit panels until the Architect is fully satisfied. Mock-up panels shall be prepared by the Contractor using the same workmen, methods and materials that will be employed for the remainder of the work. At the discretion of

the Architect, mock-ups shall be prepared in the presence of the Architect. Mock-ups shall be approved for texture, and profile.

2. At an area of the site where approved by the Architect, Contractor shall provide a minimum of two samples of flat plaster panels.

3. At an area of the site where approved by the architect, Contractor shall provide a minimum of two samples of decorative molding panels.

4. These samples panels shall be large enough to demonstrate range of treatments needed for flat surfaces and molded areas.

5. Contractor shall protect approved mock-up panels for the duration of the work. Mock-ups may be part of the Work, and may be incorporated into the finished work when so approved by the Architect.

6. Revise sample panels as necessary to secure this approval.

7. Mock-ups will serve as a standard for the acceptance or rejection for the work of this Section.

8. Once plaster has cured, prepare a mock-up for each paint finish required at a location selected by the Architect. Each painting sample to be not less than two (2) square feet in size.

H. Provide methods of protecting the stone walls, terrazzo floors and any additional materials in the space during the plaster work.

1.7 COORDINATION:

A. At least three weeks prior to commencing the work of this Section, a meeting must be scheduled at the jobsite to discuss conformance with the requirements of specifications and job site conditions. Representatives of the Fabricator, Contractor, Architect and other parties involved in the scope of this work shall attend the meeting.

B. Contractor shall coordinate his or her work with that of other trades related to the successful completion of the work of this Section. Contractor shall not proceed with aspects of this work that require completion of other trades until all such work of other trades is completed.

C. Field Supervised Construction: The Fabricator shall notify the Architect before beginning plaster ornament replication. Obtain the Architect's approval before proceeding with replication. Contractor shall also notify Architect before beginning plaster installation. Obtain Architects' approval before proceeding with the installation.

1.8 PROTECTION:

A. Protect all adjacent areas from damage during the work of this Section using approved means of physical protection.

B. Protect all adjacent surfaces and projections from all dropping materials. Use canvas or polyethylene covers, if necessary, and remove all unwanted material that comes in contact with any historic material immediately so as not to cause staining.

1.9 EXTRA STOCK:

A. Upon completion of this portion of the work deliver to Hoboken Terminal an extra stock of paint equalizing approximately 10% of each color and gloss used in each coating material used with all such extra stock tightly sealed in clearly labeled containers.

1.10 DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered to the job site in factory-sealed containers clearly labeled as to product, manufacturer, color, and other pertinent characteristics.

B. All materials for use in the work of this Section shall be stored under environmental conditions recommended by the manufacturer. Materials should be kept dry (includes protection from liquid moisture and water vapor), well-ventilated and free of foreign matter.

C. Arrangement shall be made with the Architect to store equipment and materials in designated areas. The Architect shall not be responsible for damaged or stolen materials or equipment left on the premises by the Contractor.

D. All vessels shall have tight fitting covers. At no time shall vessels containing chemicals be carried to working levels when vessels are open.

E. Transport, lift, and handle new plaster units with care, avoiding excessive stress and preventing damage; use appropriate equipment and methods.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. General

1. Grade and Quality: Materials shall conform to requirements of this Section and shall be new, free from defects, and of recent manufacture.
   a. Where any manufacturer makes more than one grade of each material specified, use highest grade and quality of each material, whether or not material is mentioned by trade name in these specifications.
   b. Where products specified by name and number are not available, furnish products equal to original specifications, as approved by Architect or Architect's Representative at no additional cost to the Owner.

2. Ready-Mixed Products: Wherever a ready-mixed product is specified for use, containers shall bear labels giving exact formula of the mixture. The formula shall be guaranteed by the manufacturer, and the product shall be subject to chemical analysis by the Architect's Representative or designated others, at Contractor's expense.

3. Manufacturer's Instructions: Comply with material manufacturer's instructions for use of products (including surface preparation, mixing, applying, drying, etc.). In case of conflict with requirements of this Section, the more stringent requirements shall govern.

4. ASTM Standards: All materials shall comply with relevant ASTM standards.

B. Plaster

1. U.S. Gypsum, National Gypsum Company or Approved Equal. Gypsum plaster shall comply with ASTM-C28. Neat plaster for hand application of scratch coat over metal lath shall contain not less than 0.01 percent by weight of synthetic or vegetable fibers or not less than 0.02 percent by weight of mineral fibers.

2. Hydrated Lime: pressure hydrated, shall comply with ASTM-C206.

3. Molding Plaster: white, shall comply with ASTM-C28.

4. Patching Plaster: white, shall comply with ASTM-C28.

C. Plaster Mixes

1. Procedures:
   a. Proportion and measure the materials for each batch of plaster accurately.
   b. Prepare batches in quantity for complete use within a maximum of one hour after mixing, and to set up within a maximum of four hours.
   c. Do not re-temper or use partially set plaster.
   d. Do not use frozen, caked, or lumpy material, but remove such material from the job site immediately.
   e. Withhold 10% of the required water until the mixing cycle is nearly completed, then add water as needed to achieve the required consistency.
   f. Gypsum scratch coat: One part fibered Gypsum, neat plaster, 2 parts sand by weight.
   g. Gypsum brown coat: one part gypsum plaster, three parts sand by weight.
   h. Gypsum finish: 1/16” to 1/8” neat (no lime) hard white coat (similar to U.S. Gypsum diamond finish), or approved equal.
   i. Patching plaster: follow manufacturer’s directions.
   j. Flame Spread Index shall be less than 75 when tested in accordance with ASTM E84.

D. Lath

1. Galvanized expandable diamond mesh metal lath and galvanized nails, type and size as determined by size of repair.

E. Water

1. Provide water which is potable and free from all substances that would be deleterious to gypsum plaster.

F. Sand

1. Shall comply with ASTM-C35.

G. Fiber

1. Non-staining, alkali resistant synthetic or vegetable or mineral product not more than 2” long, clean and free from foreign material.

H. Retarding Agents

1. The use of retarding agents in plaster mixes will not be permitted.

I. Bonding Agents

1. If bonding agent is used it shall comply with ASTM-C631 and be a material producing a permanent bond and not affected by freezing, heat, acids, alkalis, dampness and producing no discoloration to finished plaster surfaces.

2. Approved bonding agent:

a. Bulldog Grip PL Premium polyurethane adhesive, as manufactured by LePage/Henkle
b. Plasterweld as manufactured by Larsen Products Corp. or approved equal.

J. Other Materials

1. Spackling Compound: DAP/Bondex Spackling Paste as manufactured by DAP, Inc. or approved equal.
2. Provide other materials not specifically described but required for a complete and proper installation, as selected by the Fabricator or Contractor, subject to the approval of the Architect.

K. Paint:

1. Provide the best quality “Architectural” grade painting products for all required painting made by Benjamin Moore, Sherwin Williams or approved manufacturing equal. Comply with the number of coats and required minimum mil thickness as specified by the manufacturer.

2. Paint underside of stair plaster finishes in the same color and gloss as the existing finish.

PART 3 - EXECUTION

3.1 TEMPORARY PROTECTION:

A. Cover adjacent surfaces and adjacent decorative features with protective sheeting to contain any fragments and dust during removal and preparation and to contain plaster droppings during the application of respective base, brown and finish coats.

3.2 INSPECTION:

A. The Contractor shall examine substrates and conditions under which this work is to be performed and notify the Architect in writing of conditions detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected. Commencement of work indicates that Contractor accepts substrate and conditions.

B. Correct any conditions that are detrimental to the successful completion of the work. Sequencing of work should be scheduled to ensure that completed work will match existing.
C. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for repair and restoration of the plaster

3.3 SUBSTRATE PREPARATION:

A. Preparing void: Carefully remove all soft, broken, loose, delaminated, non-adhering, or flaking plaster back to lath or to solid, sound adjacent plaster, making clean and sharp locations due to the degree of repair necessary. Ensure that remaining plaster is completely bonded to substrate.

B. Damaged Lath: All damaged or deteriorated lath shall be removed and replaced with galvanized metal diamond edges, beveled inward to provide mechanical.

C. Securing Lath:
   1. Space fasteners not more than 6” apart.
   2. Attach lath to supports with fasteners appropriate to rigidly secure lath.
   3. Do not continue lath across expansion or control joints.
   4. Lap diamond mesh lath in a minimum of 1” at all sides.

3.4 PLASTER RESTORATION WORK, GENERAL:

A. General: Replicate, repair, and restore plasterwork in locations indicated on Drawings, as required to repair surfaces damaged for installation of other work, and as directed by the Architect.

B. Supports: Repair or replace supports and lath as required to provide sound, secure, well-anchored surfaces for receiving plaster.

C. Plaster thicknesses: Thicknesses indicated shall be considered minimum. In each location, provide thickness required to provide plumb and square wall surfaces and level ceiling surfaces and to provide surfaces flush with adjacent surfaces.

D. Building In: Build in work of others and do all cutting and patching plaster in this connection. Where abutting other built-in materials plaster shall be finished tightly against them and be neatly trimmed.

E. Execute plaster repairs edge to edge in long strips or large areas for each separate coat. Where breaks are necessary lap new work over adjoining work.

F. Bring finished plaster surface to a true plane. When complete, surface shall be clean and free from blisters, pits, discoloration, cracks, or other defects. In all cases plasterwork is to be delivered clean and perfect in every respect.

G. Provide all repairs to existing plaster surfaces to provide sound, smooth, even surfaces matching adjacent surfaces. Reattach loose plaster, fill holes, cracks, gouges, spalls and other imperfections.

3.5 APPLICATION

A. General:

   1. Schedule application of plaster to preceded application of other finishes which could be damaged by operations incidental to plastering.

   2. Apply the appropriate thickness for each specific application according to the National Plasterer’s Association Guidelines.

3. Each new plaster layer should be lapped or stepped over old plaster layers so that the old and new are evenly joined.

B. Two-Coat Application (Base Coat and Finish Coat):

1. Apply the base coat with sufficient material and force to cover the substrate and to form a good bond and good keys in the lath.

2. Double back with the same plaster mix.

3. Bring base coat out to grounds prior to plaster set up.

4. Smooth off plaster to form a true and level surface.

5. Lightly cross rake or hatch, leaving texture adequate to promote a solid bond with the finish coat.

C. Three-Coat Application (Base Coat, Brown Coat and Finish Coat):

1. Apply the base coat with sufficient material and force to cover the substrate and to form a good bond, or key as appropriate.

2. Cross rake or hatch to provide a surface sufficiently rough to receive second coat (brown coat), and allow to dry.

3. Set screeds prior to application of the brown coat.
4. Apply the brown coat, bring the surface up to the ground, and flatten to a true surface using a straight edge or two handled float, but without applying water.

5. Lightly cross rake or hatch, leaving sufficient texture to promote sound bond with the finish coat.

D. Finish-Coat Application:

1. General:
   a. Apply finish coat to base plaster coats, which have set up and are partially dry.
   b. Where base coats are more than partially dry, dampen the base coats by misting with water.

2. Trowel Finish:
   a. Apply the finish coat with sufficient material and force to secure a sound bond.
   b. Fill out to a true, flat and even surface.
   c. When the finish coat has begun to set, trowel with clean water to a smooth finish which is free from surface defects and irregularities.
   d. Finish flat plaster true and even within a tolerance of 1 in 500 maximum variation from true flatness, leaving the finish surface without tool marks and other blemishes.

E. Gypsum Plaster Finish Coat on Existing Base Coats:

1. Apply bonding agent to existing base coat and then apply finish coat as specified above.

3.6 WARRANTY

A. One (1) year manufacturer's warranty for all materials supplied, effective from date of receipt of materials. Product will conform to samples and drawings approved by the Architect. Any defects in workmanship will be correct or replaced at the discretion of the Architect and at no cost to Owner of impact to the schedule.

3.7 PAINTING

A. Cover adjacent surfaces and adjacent decorative features with protective sheeting, drop clothes or masking to protect all surfaces not requiring painting.

B. Ensure all new and existing plaster surfaces are clean and ready to receive a finish free of all dust, grease, oil, dirt or other foreign matter, as required by manufacture's surface preparation specifications.

C. Materials Preparation:

1. Mix and prepare paint materials in strict accordance with the manufacturer's recommendations.

2. When materials are not in use, store in tightly covered containers.

3. Maintain containers used in storage, mixing and application of paint in a clean condition free from foreign materials and residue.

C. Stir paint before application and at frequent intervals during application to produce a mixture of uniform density.

D. Paint Application:

1. Apply in accordance with manufacturer's directions. Use methods best suited for the type of material being applied.

2. Perform all painting in a professional manner with skilled mechanics.

3. Keep paint free from skins, lumps and foreign matter. Keep pigment fillers and other materials well stirred while material is being applied.

4. Apply paint in a smooth, even film, free from runs, sags, brush marks, laps, spotting or other surface imperfections. Finish surfaces shall be uniform.

5. Before subsequent coats are applied, remove all painted surfaces which exhibit blisters or other imperfections.

6. Apply primers to surfaces that have been cleaned, pre-treated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

7. Do not apply subsequent coats of paint until the preceding coat is completely dry. Allow longer drying time of recommended by the manufacturer or dependent upon humidity.

8. Apply the first top cot within two weeks after application of the primer and apply the second top coat within two weeks after application of the first top coat.

E. Each coat must be inspected and approved by the Architect before application of the subsequent coat and no credit for such coat shall be given. Recoat work in question at no additional expense to owner.

F. No work will be accepted until it conforms in every respect to the approved test sample.

G. At no additional expense to Owner, apply additional coats when undercoats or other conditions show through the final coat of paint.

H. The final coat of paint shall exhibit a uniform finish, color and appearance. Work which does not conform to this standard will be rejected.

3.8 CLEAN UP

A. Upon completion of all other work of this Section, inspect all plaster surfaces and correct conditions which do not meet specified requirements.

B. Remove protective materials and plaster materials from adjacent surfaces.

C. Clean all areas of plaster droppings and splatter restoring affected areas to clean and neat conditions.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Plaster Repair & Restoration" covered by this section shall be included in the Division lump sum item for "Plaster Repair & Restoration in Division 9".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 090160.91 – TERRAZZO FLOOR RESTORATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. The work of this Section consists of providing all labor, materials and equipment and services to complete the following terrazzo tile floor repairs in the waiting room of the Hoboken Terminal.

1. Repair of Terrazzo Floors, including but not limited to:
   a. Cleaning terrazzo floors in the work areas.
   b. Patching damaged terrazzo tiles
   c. Replacing missing tile
   d. Replacing damaged brass divider strips
   e. Sealing all terrazzo floors in the work areas.

1.2 REFERENCED SECTIONS:

A.	Section 040140.92	Interior Masonry Restoration
B.	Section 05700	Ornamental Metal Restoration
C.	Section 060140.91	Architectural Wood Restoration
D.	Section 090120.91	Plaster Repair and Replication

1.3 REFERENCES:

A. Comply with the specifications and recommendations of the NTMA (National Terrazzo and Mosaic Association.

B. General Service Administrations (GSA) Preservation Note 43, Restoring and Maintaining Terrazzo Flooring

C. ASTM C150 – Standard Specification for Portland Cement

D. ASTM C33 – Standard Specification for Concrete Aggregates

E. ASTM C241 – Standard Test Methods for Abrasion Resistance

1.4 JOB CONDITIONS:

A. Quantity and Location: The Contractor and the Architect shall review all of the areas mentioned to confirm quantities and location of terrazzo floor repairs

1.5 QUALITY CONTROL:

A. Work shall be performed by a Contractor specializing in the fabrication and repair of terrazzo floors. The Contractor must have a minimum of five (5) years of experience. Contractor must demonstrate three projects similar in scope and type to the required work in the New York / New Jersey region involving facilities designated as Landmarks by local government, or building listed on the National or State Register of Historic Places

B. Mechanics shall be highly skilled in the art and necessary crafts of terrazzo floor repair, with the work of this Section to the highest standard for such work. No allowances will be made for the lack of skill of mechanics.

C. All work shall be carried out in accordance with the standards of the National Terrazzo and Mosaic Association, Inc., except where indicated in these specifications.

D. Contractor should be a member of The National Terrazzo and Mosaic Association, Inc., or certified by that organization as qualified to perform the work of this Section in accordance with the specified requirements.

1.6 SUBMITTALS:

A. Submit materials list of all items to be provide under this Section.

B. Product literature and manufacturer's recommendations for all materials proposed to be provided for this Section.

C. Samples
1. Three samples of replacement pre-cast terrazzo tile required, size to match existing.

2. Provide cured samples of terrazzo patching repair mix, not less than 12" square.

3. Sample of the replacement brass dividing strip for the joint.

D. If alternate methods and materials to those specified are proposed for any phase of the restoration work, provide written description. Provide evidence of successful use on comparable projects and demonstrate its effectiveness for use on this project.

E. Mock-ups: At an area on the site where approved by the architect, provide a mock-up terrazzo floor repair panel. The mock-ups may be part of the Work, and may be incorporated into the finished work, when so approved by the Architect. Revise as necessary to secure the Architect's approval. The mock-up panels, when approved by the Architect will be used as the standard for all terrazzo floor repairs as the basis for acceptance or rejection of the Work. Mock-ups are to include:

1. Patching repair sample

2. Brass dividing strip replacement

1.7 COORDINATION:

A. Delay grinding, sealing and finishing until heavy trade work is completed and construction traffic through the area is restricted

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS:

A. Provide a commercially prepared product formulated especially for cleaning terrazzo floors, having a pH of between 7-10, free from crystallizing salts or water soluble alkaline salts, biodegradable, and phosphate free.

2.2 SEALING MATERIALS:

A. Provide a commercially prepared sealer formulated especially for sealing terrazzo, having a pH between 7-10, not discoloring or yellowing, providing a slip-resistant surface with a flash-point of 95 degrees Fahrenheit minimum in accordance with ASTM D56.

2.3 PATCHING MATERIALS:

A. Portland Cement: shall comply with ASTM C50, Type I, white.

B. Sand: shall comply with ASTM C33 for fine aggregates.

C. Marble Chips: Provide in conformance with MTMA standards and with the following attributes:
   1. Shall comply with ASTM C241 with HA10 minimum, and with 24-hour absorption rate of not more than 0.75%.
   2. Provide chips containing no deleterious or foreign matter, and with dust content less than 1% by weight.
   3. Label bags legibly with correct name and size of chips.
   4. Colors and gradation of aggregates sizes as required to match original existing intact materials and patterns. Original plans often contain the exact terrazzo mix.
   5. Aggregate colors should be matched after cleaning or taken from the interior of core samples depending upon the scope of work.

D. Colorants: Provide alkali-resistant non-fading color pigments as appropriate to each particular terrazzo mixture required.

E. Curing Compound: Liquid-membrane-forming compound, ASTM C309, Type I.

F. Reinforcement: Provide 16 gage 2” by 2” galvanized welded wire fabric which complies with ASTM A185.

2.4 REPLACEMENT TILE:

A. Provide replacement pre-cast terrazzo tile that matches the existing in color, aggregate, texture and size.

B. Surface of new tile is to match that of undamaged historic tiles.

2.5 EQUIPMENT:

A. Plastic sheeting.

B. Grinding stones: fine grit emery stones manufactured specifically for restorative type grinding and surfacing of terrazzo surfaces (#40 and #80 grit stones).

C. Power saw.

D. Hand tools:
   1. Trowel

2. Chisel

3. Hand Grinder

E. Resurfacing Screens: a fine grit screen manufactured specifically for restorative type grinding and resurfacing terrazzo surfaces.

2.5 BRASS JOINT STRIPS:

A. Brass joint strips to match existing in size, shape and color.

PART 3 - EXECUTION

3.1 TEMPORARY PROTECTION:

A Cover adjacent surfaces and adjacent decorative features with protective sheeting to contain any fragments and dust during removal and preparation and to contain materials during their application.

3.2 INSPECTION:

A. The Contractor shall examine substrates and conditions under which this work is to be performed and notify the Construction Manager in writing of conditions detrimental to the proper completion of the work. Do not proceed until unsatisfactory conditions are corrected. Commencement of work indicates that Contractor accepts substrate and conditions.

B. Correct any conditions that are detrimental to the successful completion of the work. Sequencing of work should be scheduled to ensure that completed work will match existing.

C. Perform a thorough examination of the existing conditions. Perform any necessary tests on an inconspicuous surface to determine the current conditions and appropriate steps and materials necessary for replication and replacement of select areas of existing terrazzo surface.

3.3 PATCHING DAMAGED TILES:

A. Surface Preparation.
1. With a power saw or hand tools, cut around the area to be patched. The perimeter of the area to be patched should have vertical sides that are perpendicular to the horizontal surface. Do not feather the edge of the void. If the patch is larger than an inch square, slightly undercut this edge. Remove all loose and deteriorated terrazzo.

2. Clean surface of debris and any obstructing material. Saturate void with water to prevent quick surface drying. Ensure that water penetrates into the surface in order to achieve a proper bond.

3. Apply a cement paste and work into the surface. Do not allow cement paste to dry before placing terrazzo composition.

B. Application:
1. Mix two parts blended marble chips with one part Portland cement and coloring pigment. Add enough water to make this mix plastic.

2. Apply this mixture to the prepared void, making sure it is applied to the wet cement paste preparation layer. Work the patching material into the void ensuring intimate contact to all areas including sides of the void.

3. Seed additional marble chips of the same blend over the patch, as required to establish a uniform coverage.

4. Compact patch, remove all excess water and cement from the surface.

5. Cover the patch with paper or polyethylene sheeting to prevent quick hydration. Cure until topping develops sufficient strength to prevent lifting or pulling of terrazzo chips during grinding.

6. Sand surface with a hand sander or small grinding tool, using fine grit stones to achieve desired finish.
   a. Use a #40 or finer grit stone for the initial grinding, exposing the marble chips. Follow with a fine #80 grit stone.

7. Thoroughly rinse surface with clean, clear water.

8. Remove excess rinse water and machine or hand apply grout using identical Portland cement color and pigments as used in topping taking care to fill all voids completely.

9. Cover grouted surface with paper or polyethylene for at least 72 hours.

10. Final polish with a #80 or finer grit stone. Care should be taken to limit grinding and polishing to a small distance beyond the perimeter of the patch.

11. Produce a finished terrazzo surface showing a percentage of marble chips equal to that of the existing terrazzo surface.

12. Seal patch with a penetrating type terrazzo sealer per section 3.6.

3.4 REPLACING CRACKED, HEAVILY DAMAGED OR MISSING TILES:

A. Using a diamond tipped blade, but around all damaged tiles to at least the depth of the tile.

B. Remove the tile and setting bed.

C. Clean the resultant void of all loose material, dust, and debris; and dampen the surface.

D. Replace brass dividing strips to match existing.

E. Mix and apply a sand-cement mortar into which the new tile will be added.

F. Apply a slurry to the void and fit the tile into it. Ensure the new tile is level with the surrounding terrazzo. Made any adjustments by gently knocking the tile using a rubber mallet.

3.5 REPLACEMENT OF BRASS JOINT STRIPS

A. Replace missing brass dividing strip to match existing.

B. If replacing dividing strip in an area where the surrounding terrazzo is sound, set the strip in epoxy.

3.6 SEALING TERRAZZO

A. Ensure the surface to be sealed is dry, and free of dirt and debris.

B. Apply the sealer according to the manufacturer's recommendations.

C. Ensure that and even, streak-free finish is achieved.

D. Allow the sealer to cure as per the manufacturer's recommendations prior to receiving traffic.

3.7 ADJUSTING / CLEANING:

A. Upon completion of all other work of this Section, inspect all terrazzo surfaces and correct conditions which do not meet the specified requirements.

B. Remove protective materials from adjacent surfaces.

C. Upon completion of the sealing process, provide adequate protection to prevent damage to the finished terrazzo surfaces until acceptance of the Work.

D. Clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.

E. Provide terrazzo surfaces free from cracks, chips and other surface defects.

END OF SECTION

Hoboken Terminal and Yard Complex
HURRICANE SANDY RECOVERY PROGRAM
EJECTOR PUMP STATIONS 4 AND 5
CONFORMED

14 OCTOBER 2013

PREPARED BY:

STV INCORPORATED
225 PARK AVENUE SOUTH
NEW YORK, NY 10003

DRAWING LIST

GENERAL

1 G0.01 COVER AND DRAWING LIST

ARCHITECTURAL

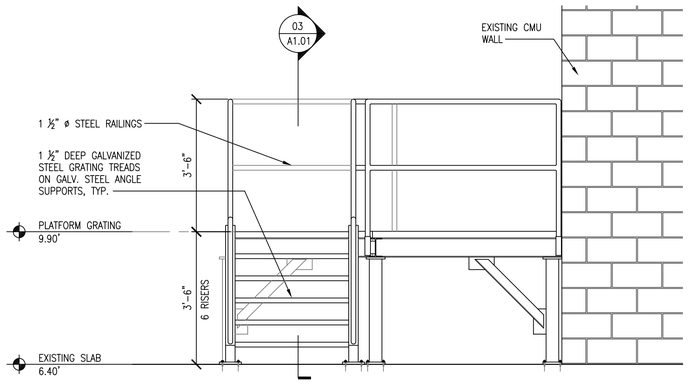
2 A1.01 ELECTRICAL SERVICE PLATFORM CONFIGURATION

PLUMBING

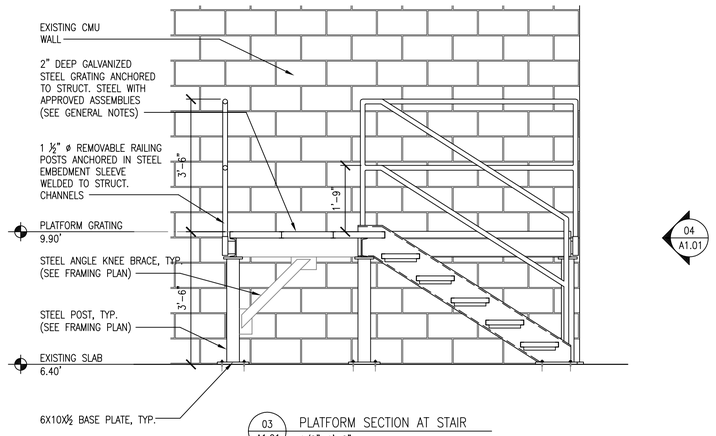
3 P0.01 PLUMBING NOTES AND SYMBOLS LEGEND
4 P2.01 PLUMBING SITE PLAN
5 P4.01 PLUMBING EQUIPMENT SCHEDULE AND DETAILS

ELECTRICAL

6 E0.01 ELECTRICAL SYMBOLS, ABBREVIATIONS AND GENERAL NOTES
7 E1.01 ELECTRICAL SITE DEMOLITION PLAN – SEWAGE EJECTOR STATION #P4
8 E1.02 ELECTRICAL SITE DEMOLITION PLAN – SEWAGE EJECTOR STATION #P5
9 E2.01 ELECTRICAL POWER PLAN – SEWAGE EJECTOR STATION #P4
10 E2.02 ELECTRICAL POWER PLAN – SEWAGE EJECTOR STATION #P5
11 E4.01 ELECTRICAL PANEL SCHEDULES AND DETAILS
12 E4.02 ELECTRICAL DETAILS



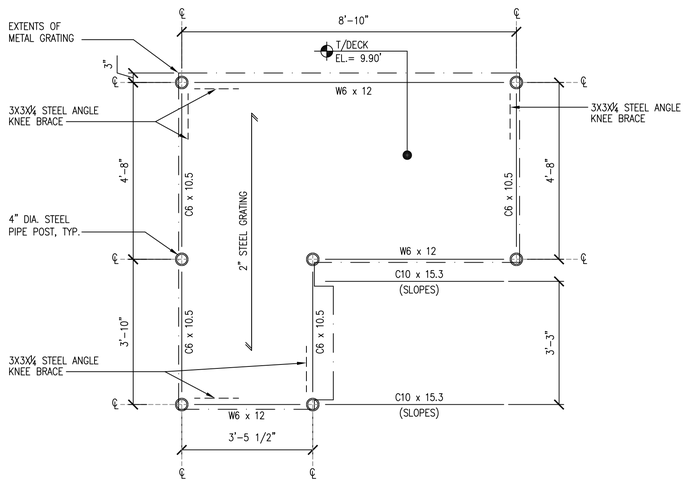
04 A1.01 PLATFORM NORTH ELEVATION
1/2"=1'-0"



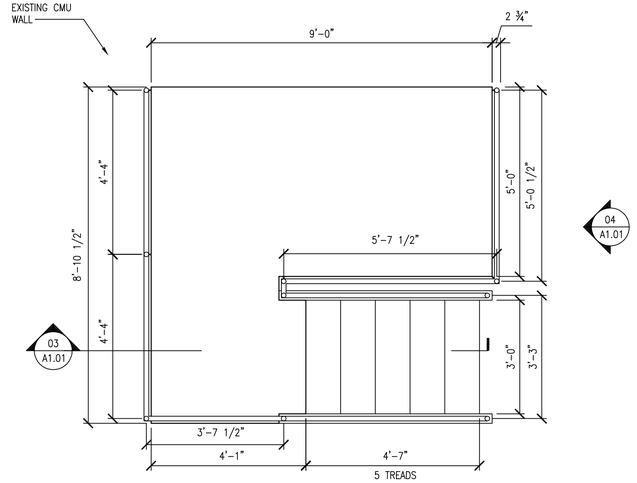
03 A1.01 PLATFORM SECTION AT STAIR
1/2"=1'-0"

GENERAL NOTES:

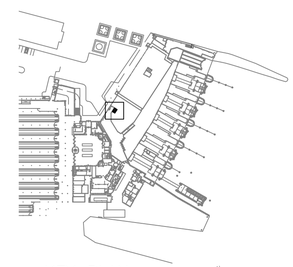
1. ALL STRUCTURAL STEEL TO BE PAINTED WITH:
   A. 1 COAT MOORE IMC ACRYLIC METAL PRIMER (M04) OR EQUAL
   B. 2 COATS MOORE URETHANE ALKYD GLOSS ENAMEL (Z22) OR EQUAL
   – TOTAL DFT NOT LESS THAN: 4.0 MILS
2. PLATFORM GRATING SYSTEM TO BE McNICHOLS QUALITY GW 200 WELDED BAR GRATING OR EQUIVALENT
3. BOLTS: ASTM A325; ¾" DIA. MINIMUM; 2 BOLTS PER CONNECTION. ANCHOR BOLTS IN BASE PLATES TO USE HILTI HIT HY200 ADHESIVE SYSTEM; ⅝" ø WITH STANDARD EMBEDMENT
4. WELDS: USE E70 ELECTRODES; 3/16"MINIMUM FILLET WELDS – 2 SIDED; 2 INCHES IN LENGTH MINIMUM
5. PLATES AND ANGLES: 3/16" MINIMUM THICKNESS
6. ALL STEEL WORK SHALL COMPLY WITH THE AISC MANUAL OF STEEL CONSTRUCTION, 13TH EDITION
7. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36, MIN.
8. PROVIDE BOLTED OR WELDED CONNECTION BETWEEN KNEE BRACE AND POSTS, KNEE BRACE AND BEAMS, BEAMS AND POSTS, AND STAIR STRINGERS TO BEAMS
9. PROVIDE WELDED CONNECTION BETWEEN POSTS AND BASE PLATES AND BETWEEN POSTS AND CAP PLATES
10. DESIGN CRITERIA:
    – PLATFORM LIVE LOAD: 100 #/SF
    – RAILING LOADS: 50 #/LF, 200 #/POST
11. CONNECT STEEL POSTS AND STRINGERS TO CONCRETE SLAB WITH ⅝" ø EXPANSION OR ADHESIVE ANCHORS WITH 3 ½" EMBEDMENT (MINIMUM 2 ANCHORS PER CONNECTION)



02 A1.01 PLATFORM FRAMING PLAN
1/2"=1'-0"



01 A1.01 PLATFORM PLAN
1/2"=1'-0"



KEY PLAN
NO SCALE

NJ TRANSIT

STV Incorporated
225 Park Avenue South
New York, New York 10003

No.	REVISIONS	DATE:

DESIGNED: A. DUNHAM
DRAWN: A. DUNHAM
CHECKED: A. THOMPSON
APPROVED: B. JABBONSKY

HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
SERVICE PLATFORM
CONFIGURATION, NOTES
AND FRAMING PLAN

SCALE: 1/2" = 1'–0"
FILE NAME: A1.01_EP.DWG
DRAWING No.: A1.01
REV: –
DATE: OCT. 14, 2013

CONTRACT No. 13–006C
ISSUE CONFORMED
SHEET No. 2 OF 12

LIST OF SYMBOLS

———————	EXISTING PIPING TO REMAIN
—— —— ——	EXISTING UNDERGROUND SANITARY TO BE REPLACED – S
—— —— ——	SANITARY UNDERGROUND – S
——— S ———	SANITARY ABOVE GROUND – S
——— PD ———	PUMP DISCHARGE –PD
———o	PIPE UP OR RISE
———⊃	PIPE DN OR DROP
———⌋	CAP
◎	CLEAN OUT DECK PLATE – CODP
◒	NEW CONNECTION

PIPING MATERIAL	
INTERIOR PUMP DISCHARGE	GALVANIZED STEEL PIPE SCHEDULE 40 GROOVE PIPE. VICTAULIC FITTING IN CONJUNCTION WITH GROOVE PIPE.
GRAVITY SEWER PIPE	PVC SEWER PIPE, STANDARD DIMENSION RATIO (SDR) OF 35 (ASTM D 3034) WITH INTEGRAL WALL BELL AND SPIGOT JOINTS CONFORMING TO ASTM D 3212

PLUMBING GENERAL NOTES:

1. COMPLY WITH APPLICABLE PORTIONS OF THE NATIONAL STANDARD PLUMBING CODE 2009 IN ACCORDANCE WITH ALL APPLICABLE FEDERAL AND STATE REGULATIONS. WHERE REQUIREMENTS FOR PRODUCTS, MATERIALS, EQUIPMENT, METHODS AND OTHER PORTION OF THE WORK SPECIFIED HEREIN EXCEED MINIMUM REQUIREMENTS OF CONSTRUCTION CODE, CONTRACTOR SHALL COMPLY WITH SUCH REQUIREMENTS SPECIFIED HEREIN, UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE ENGINEER.
2. CONTRACTOR SHALL CHECK AND VERIFY THE EXACT LOCATION OF ALL PIPE PENETRATIONS AND MAKE CERTAIN THERE ARE NO OBSTRUCTIONS AND INTERFERENCES.
3. CONTRACTOR SHALL FURNISH AND MOUNT STARTERS AND CONTROL DEVICES FOR ALL EQUIPMENT SUPPLIED. REFER TO ELECTRICAL SPECIFICATIONS FOR MOTORS AND CONTROL EQUIPMENT. ALL ELECTRICAL EQUIPMENT SHALL BE PROVIDED WITH 6P NEMA RATED ENCLOSURE .
4. CONTRACTOR SHALL REFER TO AND COORDINATE WITH ELECTRICAL DRAWING AND WORK ENSURING NO PIPE IS RUN DIRECTLY ABOVE NOR WITHIN THREE FEET OF ELECTRICAL PANELS.
5. PIPING SUPPORT AND HANGER SPACING SHALL BE AS PER NJ TRANSIT STANDARDS
6. TO ENSURE CONTINUOUS OPERATION, MAKE ALL NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. ALL COSTS RESULTING FROM TEMPORARY SHUTDOWNS SHALL BE BORNE BY THIS CONTRACTOR.
7. CONTRACTOR SHALL TO VERIFY INVERT ELEVATIONS PRIOR TO PLACING MATERIAL ORDER AND SUBMIT A VERIFICATION REPORT OF THESE ELEVATIONS
8. ALL DISCHARGE PIPING ABOVE SUMP COVER SHALL BE INSULATED AS REQUIRED

LIST OF ABBREVIATIONS

BLDG	BUILDING
CFS	CUBIC FEET/SECOND
CL OR ℄	CENTER LINE
CO	CLEANOUT
CODP	CLEANOUT DECK PLATE
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUED
DN	PIPE DOWN THRU FLOOR
DROP	PIPE DROPPING BETWEEN FLOORS
DWG	DRAWING
EL	ELEVATION
ELEC	ELECTRIC
GAL	GALLON
GPM	GALLON PER MINUTE
INV EL	INVERT ELEVATION
NTS	NOT TO SCALE
PD	PUMP DISCHARGE
PLBG	PLUMBING
S, SAN	SANITARY
SPEC	SPECIFICATIONS
SQ FT	SQUARE FEET
STR	STRAINER
TYP	TYPICAL
UP	PIPE RISING THRU FLOOR
V	VENT

PLUMBING DEMOLITION NOTES

I. GENERAL

1. IT IS THE PURPOSE OF THIS SECTION TO OUTLINE TO THE PLUMBING CONTRACTOR THE GENERAL SCOPE OF THE REMOVAL WORK.
2. THE PLUMBING CONTRACTOR SHALL VISIT THE SITE AND EXAMINE CAREFULLY THE EXISTING CONDITIONS TO BECOME FAMILIAR WITH THEM AND DIFFICULTIES THAT WILL EFFECT THE EXECUTION OF THIS WORK. THE CONTRACTOR SHALL PERFORM THIS, PRIOR TO THE SUBMISSION OF HIS PROPOSAL. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORSEEN SUCH AN EXAMINATION HAS BEEN MADE.

II. SCOPE OF WORK

1. ALL EXISTING PUMPS WITH ALL RELATED PIPING, ELECTRICAL PANELS, WIRING, CONTROL, INDICATED TO BE REPLACED SHALL BE REMOVED. PUMP DISCHARGE PIPING SHALL BE REMOVED TO THE POINT OF DISCHARGE WITHIN THE DRY OR WET PITS.
2. EXACT SIZES AND LOCATIONS OF ALL EXISTING PIPING SHALL BE VERIFIED ON THE JOB SITE.
3. NO REMOVED EXISTING PIPING SHALL BE REUSED UNLESS OTHERWISE INDICATED.
4. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, PRIOR TO INSTALLATION, COMPLETE LAYOUT DRAWINGS INDICATING ALL PIPING SIZING.
5. TO ENSURE CONTINUOUS OPERATION, MAKE ALL NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. ALL COSTS RESULTING FROM TEMPORARY SHUTDOWNS SHALL BE BORNE BY THIS CONTRACTOR.
6. CONTRACTOR SHALL SUBMIT SHUTDOWN SCHEDULE TO THE CONSTRUCTION MANAGER FOR NEW JERSEY TRANSIT (NJT) APPROVAL PRIOR TO PERFORMING THE WORK.
7. ALL EQUIPMENT, PIPING, ETC. TO BE REMOVED, SHALL BE DISPOSED OF, RELOCATED, TURNED OVER TO THE OWNER, OR SALVAGED AS DIRECTED.
8. PROVIDE INTERIM WORK, IF REQUIRED, FOR CONTINUED UNINTERRUPTED SERVICE WHERE EXTENDED SHUTDOWN IS REQUIRED.
9. THE EXISTING SYSTEMS SHALL BE LEFT IN PERFECT WORKING ORDER UPON COMPLETION OF DEMOLITION. AT COMPLETION OF THE WORK, THOROUGHLY CLEAN PREMISES. REMOVE TOOLS, DEBRIS, ETC.
10. ALL THE OPENINGS SHALL BE PROPERLY PATCHED, SEALED, AND FIRESTOPPED TO MAINTAIN THE ORIGINAL INTEGRITY OF THE PARTITION'S OR FLOORS FIRE RATING.
11. ANY PIPE NOT SPECIFICALLY LABELED TO BE REMOVED SHALL REMAIN.

NJTRANSIT

STV Incorporated
225 Park Avenue South
New York, New York 10003

No.	REVISIONS	DATE:

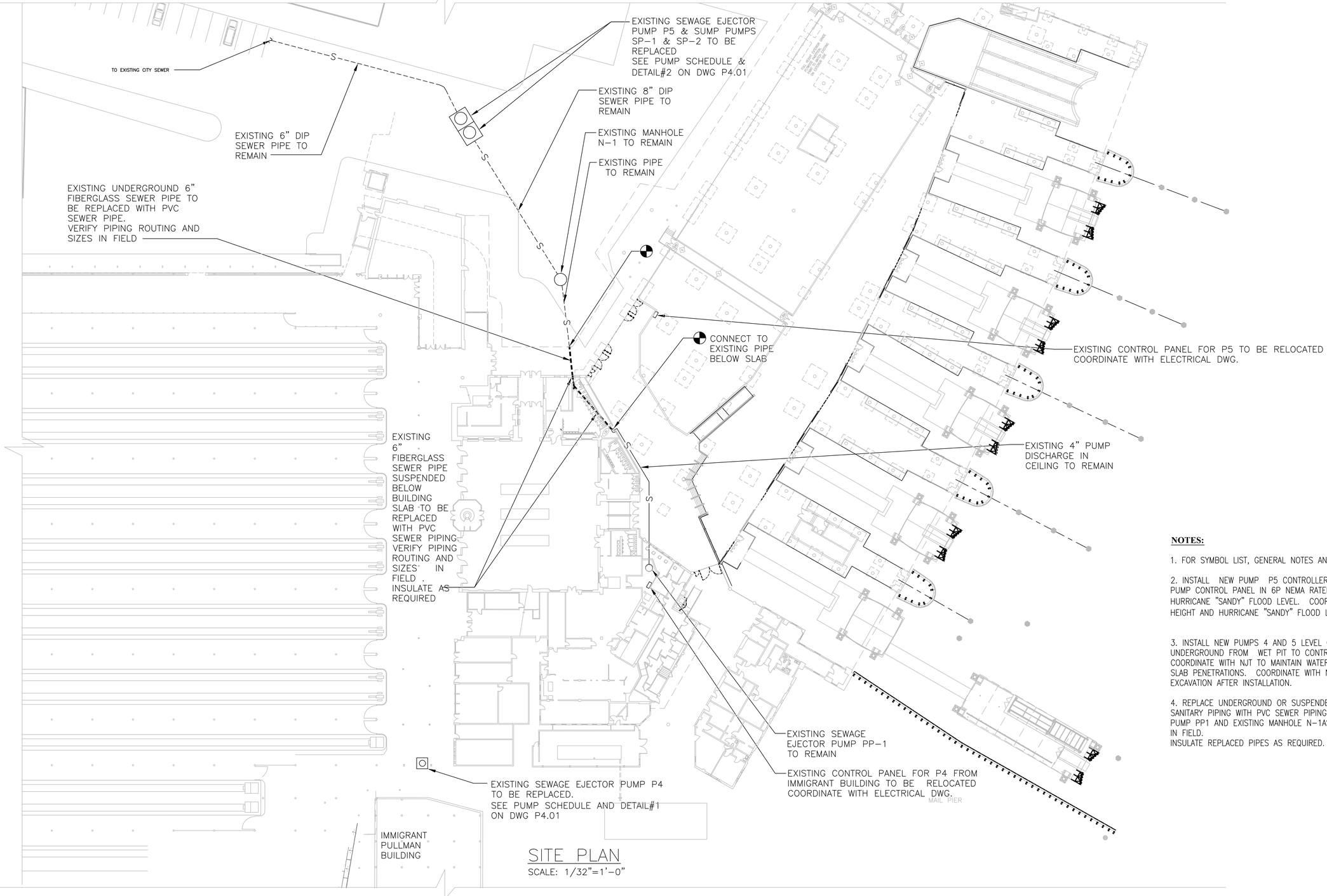
DESIGNED: R. KARLSTEIN
DRAWN: A. DOROGOKUPETS
CHECKED: J. PERISE
APPROVED: J. PERISE

HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

PLUMBING
NOTES & SYMBOLS

SCALE: NTS
FILE NAME: P0.01.dwg
DRAWING No.: P0.01
REV: –
DATE: OCT. 14, 2013

CONTRACT No. 13–006C
ISSUE CONFORMED
SHEET No. 3 OF 12



SITE PLAN

SCALE: 1/32"=1'-0"

NOTES:

1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING P0.01.

2. INSTALL NEW PUMP P5 CONTROLLER IN LOCATION SHOWN. PROVIDE PUMP CONTROL PANEL IN 6P NEMA RATED ENCLOSURE AND INSTALL HIGHER THAN HURRICANE "SANDY" FLOOD LEVEL. COORDINATE CONTROL PANEL INSTALLATION HEIGHT AND HURRICANE "SANDY" FLOOD LEVEL WITH NJ TRANSIT.

3. INSTALL NEW PUMPS 4 AND 5 LEVEL CONTROL AND RUN ALARM WIRING UNDERGROUND FROM WET PIT TO CONTROL PANEL WITHIN BUILDING . COORDINATE WITH NJT TO MAINTAIN WATERPROOFING INTEGRITY FOR WALL AND SLAB PENETRATIONS. COORDINATE WITH NJ TRANSIT FOR COVERING THE EXCAVATION AFTER INSTALLATION.

4. REPLACE UNDERGROUND OR SUSPENDED BELOW BUILDING SLAB PORTIONS OF SANITARY PIPING WITH PVC SEWER PIPING BETWEEN EXISTING SEWAGE EJECTOR PUMP PP1 AND EXISTING MANHOLE N-1AS SHOWN. VERIFY ROUTING AND SIZE IN FIELD.
INSULATE REPLACED PIPES AS REQUIRED.

NJ TRANSIT

STV Incorporated
225 Park Avenue South
New York, New York 10003

DATE:	REVISIONS	No.

DESIGNED: R. KARLSTEIN
DRAWN: A. DOROGOKUPETS
CHECKED: J. PERISE
APPROVED: J. PERISE

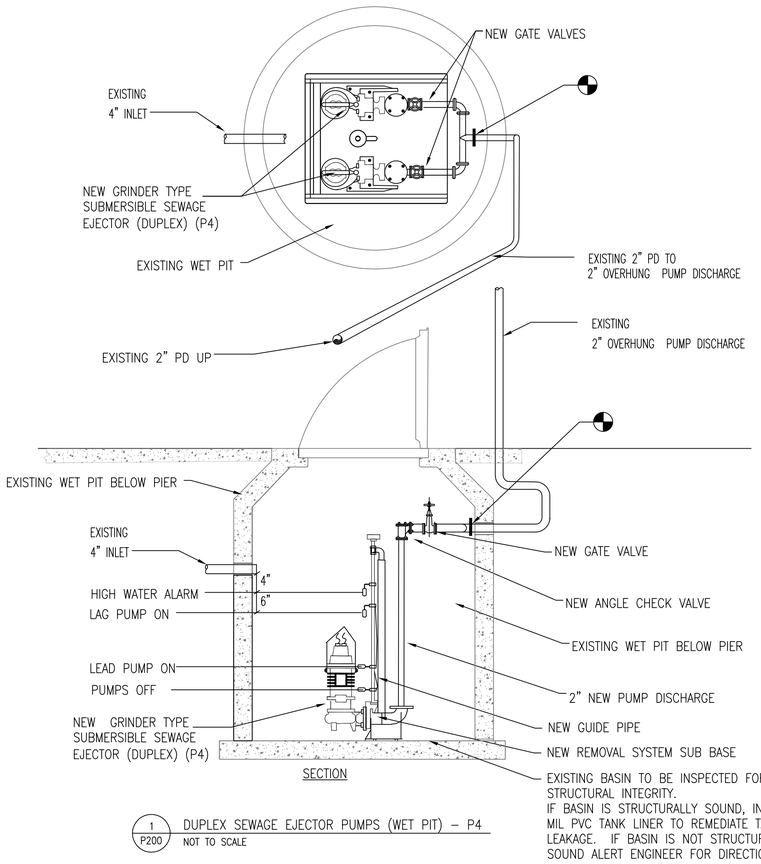
N

HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

PLUMBING
SITE PLAN

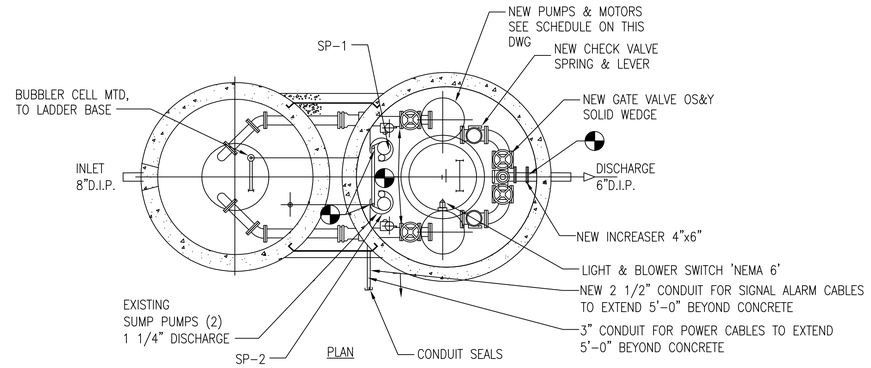
SCALE: 1/32"=1'-0"
FILE NAME: P-2.01.DWG
DRAWING No.: P2.01
REV: -
DATE: OCT. 14, 2013

CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 4 OF 12

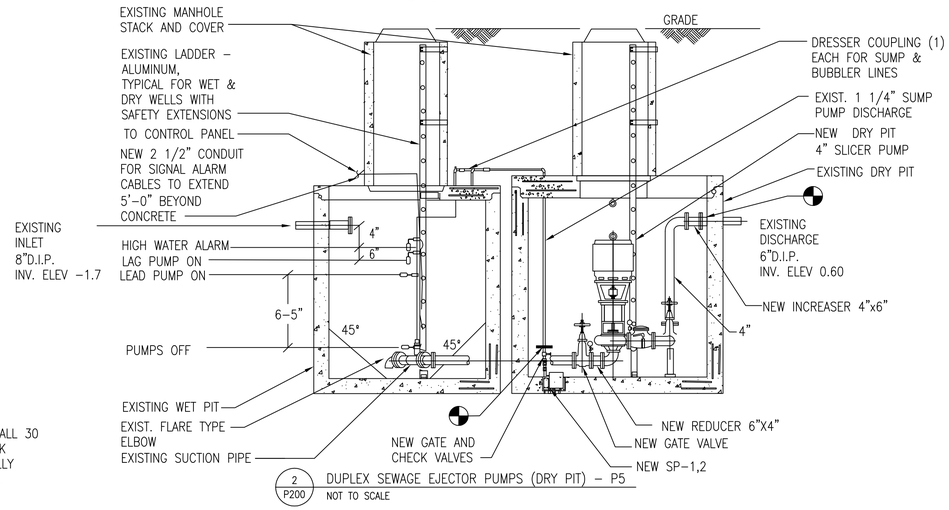


SECTION

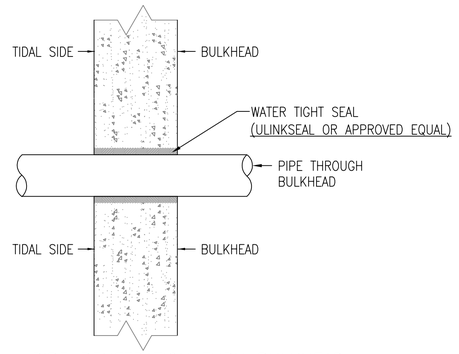
1 / P200 DUPLEX SEWAGE EJECTOR PUMPS (WET PIT) – P4
NOT TO SCALE



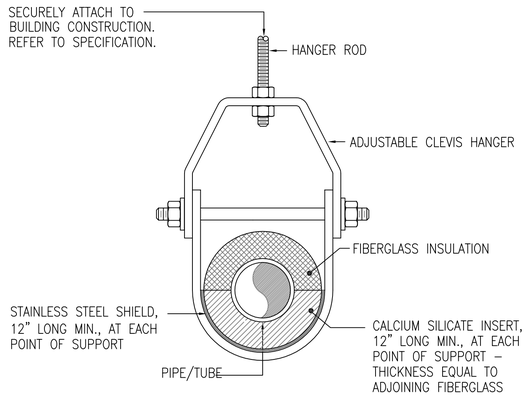
PLAN



2 / P200 DUPLEX SEWAGE EJECTOR PUMPS (DRY PIT) – P5
NOT TO SCALE



PIPE PENETRATION THRU BULKHEAD
NOT TO SCALE



ADJUSTABLE CLEVIS PIPE SUPPORT – STAINLESS STEEL
FOR INSULATED PIPING/TUBING LARGER THAN 1"
NOT TO SCALE

NOTES:
1. SEE ELECTRICAL PLAN FOR LOCATION OF CONTROL PANEL
2. ALL CONDUIT AND PIPE THROUGH VAULT WALLS SHALL BE CAST IN PLACE
3. CONTRACTOR TO PROVIDE COMPLETE WIRING DIAGRAM FOR ALL PUMP ELEMENTS.
4. VERIFY VOLTAGE DROP FOR LONG RUN OF CONTROL WIRING.
5. CONTROL WIRING SHALL BE PROVIDED BY MANUFACTURER TO BE INSTALLED BY ELECTRICAL CONTRACTOR. COORDINATE WITH ELECTRICAL CONTRACTOR LENGTH OF CONTROL WIRING.

PUMP SCHEDULE

EQUIPMENT/ LOCATION	QTY	EACH PUMP GPM	FT TDH	MOTOR DATA HP	RPM	PHASE	CYCLE	VOLTS	REMARKS
LIFT STATION SLICER TYPE SUBMERSIBLE SEWAGE EJECTOR (DUPLEX) (P4) LOCATION : WET PIT	2	55*	45*	5.0	1750	3	60	208	1. WEIL SUBMERSIBLE 2-INCH GRINDER PUMP MODEL 2516, 2. PROVIDE PUMP CONTROLLER AND STARTER WITH NEMA-6P ENCLOSURE. 3. PROVIDE PUMP WITH LIQUID LEVEL CONTROL WEIL PUMP COMPANY No8232B AND STARTER 4. PROVIDE PUMP WITH "QUICK -REMOVE" FITTINGS MODEL 2613 AND CHECK/ISOLATION VALVES. 5. * PUMP CAPACITY (GPM) AND TOTAL DYNAMIC HEAD (TDH) HAVE BEEN RECEIVED FROM ENGINEERING MAINTENANCE PERSONNEL OR BASED ON EXISTING DRAWINGS AND FIELD SURVEY 6. FURNISH AND INSTALL NEW CHECK AND ISOLATION VALVE MODEL 2616 FOR EACH PUMP
LIFT STATION SLICER TYPE SEWAGE EJECTOR (DUPLEX) (P5) LOCATION : DRY PIT	2	385*	20*	7.5	1750	3	60	208	1. WEIL DRY PIT 4-INCH SLICER PUMP MODEL 2836SUB , 2. PROVIDE PUMP CONTROLLER AND STARTER WITH NEMA-6P ENCLOSURE. 3. PROVIDE PUMP WITH LIQUID LEVEL CONTROL WEIL PUMP COMPANY No8232B AND STARTER 4. PROVIDE PUMP WITH SUBMERSIBLE MOTOR SUITABLE FOR NORMAL OPERATION IN AIR 5. * PUMP CAPACITY (GPM) AND TOTAL DYNAMIC HEAD (TDH) HAVE BEEN RECEIVED FROM ENGINEERING MAINTENANCE PERSONNEL OR BASED ON EXISTING DRAWINGS AND FIELD SURVEY 6. FURNISH AND INSTALL NEW CHECK AND GATE VALVE FOR EACH PUMP
SUBMERSIBLE SUMP PUMPS SP-1,2 LOCATION : DRY PIT	2	25	20	1/3	1750	1	60	115	1. WEIL 1 1/4" INCH DISCHARGE PUMP MODEL 1409-525, 2. PROVIDE WITH 8224 MODULE WITCH SHALL HAVE A PUMP TEST BUTTON AND GREEN LIGHT TO INDICATE POWER TO PUMP MOTOR.

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HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

PLUMBING
EQUIPMENT SCHEDULE
AND DETAILS

SCALE: NO SCALE
FILE NAME: P-4.01.dwg
DRAWING No.: P4.01
REV.: -
DATE: OCT. 14, 2013

CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 5 OF 12

SYMBOL LIST

	CIRCUIT BREAKER
WP	UNFUSED DISCONNECT SWITCH 3 POLE 30A, 600V U.O.N. WP – WEATHER PROOF
WP	FUSED DISCONNECT SWITCH 3 POLE, 600V – FUSE SIZE AS INDICATED ON DRAWINGS WP – WEATHER PROOF
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	PVC COATED RGS EXPOSED CONDUIT (REFER TO SPECIFICATION)
—P— P—	PVC COATED RGS CONDUIT FOR POWER IN–SLAB OR UNDERGROUND
—C— C—	PVC COATED RGS CONDUIT FOR LOW VOLTAGE IN–SLAB OR UNDERGROUND
J	JUNCTION BOX
PB	PULLBOX

EXISTING SYMBOLS

	EXISTING FEEDERS AND EQUIPMENT TO BE DISCONNECTED AND REMOVED
	EXISTING FEEDERS AND EQUIPMENT TO BE DISCONNECTED AND REMOVED
R	EXISTING TO BE REMOVED
ER	EXISTING TO REMAIN
ETR	EXISTING TO BE RELOCATED
RL	RELOCATED

ABBREVIATIONS

A, AMP	AMPERES
AC	ALTERNATING CURRENT
AF	FUSE AMPS
AFF	ABOVE FINISHED FLOOR
ARCH	ARCHITECTURAL
AS	SWITCH AMPS
AT	TRIP AMPS
AWG	AMERICAN WIRE GAUGE
CB, BKR, C/B	CIRCUIT BREAKER
CKT	CIRCUIT
C, CND	CONDUIT
DISC. SW.	DISCONNECT SWITCH
DWG	DRAWING
G, GND, GRD	GROUND
GALV	GALVANIZED
GFI	GROUND FAULT INTERRUPTER
HP	HORSEPOWER
J, JB	JUNCTION BOX
NTS	NOT TO SCALE
PB	PULL BOX
RGS	RIGID GALVANIZED STEEL
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLTS
W	WATTS
WP	WEATHERPROOF

GENERAL NOTES:

1. INSTALLATION OF ELECTRICAL EQUIPMENT INCLUDING RACEWAYS, PANELS AND JUNCTION BOXES ARE SHOWN DIAGRAMMATICALLY. COORDINATE ALL WORK WITH OTHER TRADES TO AVOID INTERFERENCES.
2. ALL BUILDING PENETRATIONS SHALL BE SEALED WITH AN APPROVED NON–CORROSIVE COMPRESSION RING SEALING FITTING AND FIRE RATED SEAL AS APPLICABLE.
3. PROVIDE CORROSION PROTECTED EQUIPMENT FOR THE SEWAGE EJECTOR PUMP PROJECT.
4. PROVIDE GASKETED CAST–TYPE JUNCTION/OUTLET BOX ENCLOSURES FOR ALL WIRING DEVICES AND AT JUNCTION/SPLICE LOCATIONS.
5. INSTALL NYLON PULLCORDS IN ALL SPARE CONDUITS.
6. GROUNDING CONTINUITY OF THE ELECTRICAL SYSTEM SHALL BE MAINTAINED THROUGHOUT THE FACILITY. PROVIDE SEPARATE GROUND CONDUCTORS COMPLETE WITH ALL REQUIRED ACCESSORIES FOR CONNECTION AND BONDING THE RACEWAYS & ENCLOSURES INSTALLED. USE BOLTED PRESSURE CLAMPS FOR TERMINATIONS OF EQUIPMENT GROUNDING CONDUCTORS.
7. DO NOT SCALE ELECTRICAL DRAWINGS. UTILIZE ARCHITECTURAL DRAWINGS FOR SCALING.
8. UTILIZE WET LOCATION CONDUCTOR TYPE: XHHW–2 IN CONDUIT.
9. CONDUIT TYPE SHALL BE PVC COATED RIGID METAL CONDUIT INSTALLED FOR THE SEWAGE EJECTOR PROJECT.
10. PROVIDE CONDUIT SEALING BUSHINGS FOR ALL CONDUIT CONNECTIONS TO ALL EQUIPMENT.

CONSTRUCTION NOTES:

C1. MINIMIZE THE VISUAL IMPACT OF EXPOSED RACEWAYS AND CABLES BY CAREFUL SELECTION OF ROUTING. SELECT THE ROUTING IN CONCERT WITH THE ARCHITECTURAL DESIGN OF THE BUILDING.

C2. COORDINATE THE ELECTRICAL WORK WITH THE WORK OF OTHER TRADES.

C3. FOR POWER CONNECTIONS, USE PVC COATED RGS CONDUIT.

C4. POWER WIRING SHALL BE TYPE XHHW–2.

C5. FOR CONDUIT CONNECTIONS TO ALL EQUIPMENT, UTILIZE CONDUIT SEALING BUSHINGS AND WATERTIGHT HUBS.

C6. UTILIZE FLOOD–SEAL CABLE END CAPS BY HOMMAC/THOMAS & BETTS OR APPROVED EQUAL.

C7. PROVIDE COMPATIBLE LUGS IN DISCONNECT SWITCHES, CIRCUIT BREAKERS ETC. TO ACCOMMODATE OVERSIZED FEEDERS DUE TO VOLTAGE DROP.

C8. APPLICABLE CODES:

A. NJAC 5:23–3.16 ELECTRICAL SUBCODE OF THE UNIFORM CONSTRUCTION CODE.

B. NEC 2011

REMOVALS NOTES:

R1. EXISTING CONDITIONS INDICATED ON THE CONTRACT DRAWINGS ARE BASED ON FIELD OBSERVATIONS AND EXISTING RECORD DRAWINGS. VERIFY EXISTING CONDITIONS IN THE FIELD.

R2. NOTES AND GRAPHICAL REPRESENTATIONS ON THE CONTRACT DRAWINGS SHALL NOT LIMIT THE EXTENT OF THE REMOVALS REQUIRED. PERFORM REMOVALS NECESSARY TO ACHIEVE THE DESIGN INTENT. COORDINATE THE EXTENT OF REMOVALS WITH THE OTHER TRADES, AND NJT.

R3. FOR EQUIPMENT AND WIRING DEVICES THAT WILL BE REMOVED, DE–ENERGIZE AND DISCONNECT. REMOVE CONDUITS AND WIRING BACK TO THE SOURCE.

R4. FOR EQUIPMENT THAT WILL BE TEMPORARILY REMOVED AND REINSTALLED, DE–ENERGIZE AND DISCONNECT EQUIPMENT. REMOVE EXISTING CONDUITS AND WIRING AND PREPARE FOR RECONNECTION BY NEW CONDUITS AND WIRING AS INDICATED ON THE CONSTRUCTION DRAWINGS.

R5. UNLESS OTHERWISE INDICATED, TAKE REMOVED MATERIALS FROM THE SITE AND DISPOSE OF IN ACCORDANCE WITH APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS.

R6. UNLESS OTHERWISE INDICATED, EXISTING SERVICES, SYSTEMS, AND WIRING SERVING EXISTING AREAS OUTSIDE OF THE AREA OF CONSTRUCTION SHALL REMAIN OR SHALL BE RELOCATED AS REQUIRED TO MAINTAIN OPERATION OF EXISTING SYSTEMS AND AVOID CONFLICT WITH CONSTRUCTION.

R7. WHERE EQUIPMENT AND WIRING ARE REQUIRED TO REMAIN IN SERVICE, BUT INTERFERE WITH THE ALTERATIONS, RELOCATE AND RECONNECT USING MATERIALS AND STANDARDS OF THIS CONTRACT.

R8. USE CAUTION TO PREVENT DAMAGE TO ARCHITECTURAL SURFACES AND MATERIALS THAT ARE TO REMAIN. REPAIR OR REPLACE DAMAGED ITEMS.

R9. PROPERLY IDENTIFY THE WORK AFTER REMOVALS. UPDATE PANELBOARD SCHEDULES TO REFLECT CIRCUIT REMOVALS.

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HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
SYMBOLS, ABBREVIATIONS
AND
GENERAL NOTES

SCALE: AS SHOWN
FILE NAME: E0.01.DWG
DRAWING No.: E0.01
REV: –
DATE: OCT. 14, 2013

CONTRACT No. 13–006C
ISSUE CONFORMED
SHEET No. 6 OF 12

EXISTING PLATFORM TO REMAIN

EXISTING INCLINE PANELBOARDS ON PLATFORM TO REMAIN

ER ER ER ER

ER

EXISTING PULL-BOX IN CEILING TO REMAIN

EXISTING SEWAGE EJECTOR #P4

SEE NOTE #2

ER

IN-SLAB FEED TO THE EJECTOR PUMP(S) (SEE NOTE #3) (TO BE ABANDONED)

IMMIGRANT PULLMAN BUILDING

R R R

EXISTING SEWAGE EJECTOR CONTROL STATION #4 AND POWER FEED (TO BE REMOVED)

NOTES:

1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING E0.01.
2. PRIOR TO PULLING EXISTING WIRING FEED TRACE POWER TO THE PANEL FEEDING THE EXISTING EJECTOR PUMP(S). TURN THE CIRCUIT BREAKER IN THE 'OFF' POSITION. ASSIGN EXISTING BREAKER FEEDING SEWAGE EJECTOR #4 AS SPARE.
3. PULL EXISTING WIRING TO THE POWER SOURCE. CAP AND SEAL CONDUIT WITH FLOOD-SEAL DUCT PLUGS AND ABANDON CONDUIT IN THE MANHOLE.
4. FOR NEW POWER FEED TO SEWAGE EJECTOR PUMP #P4 AND ASSOCIATED CONTROL PANEL, SEE DRAWING E2.01.

#P4

KEY PLAN
NO SCALE

01 / E1.01 SITE ELECTRICAL DEMOLITION PLAN SEP#4
1/8"=1'-0"

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HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
SITE DEMOLITION PLAN
SEWAGE EJECTOR
STATION #P4

SCALE: AS SHOWN
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CONTRACT No. 13-006C
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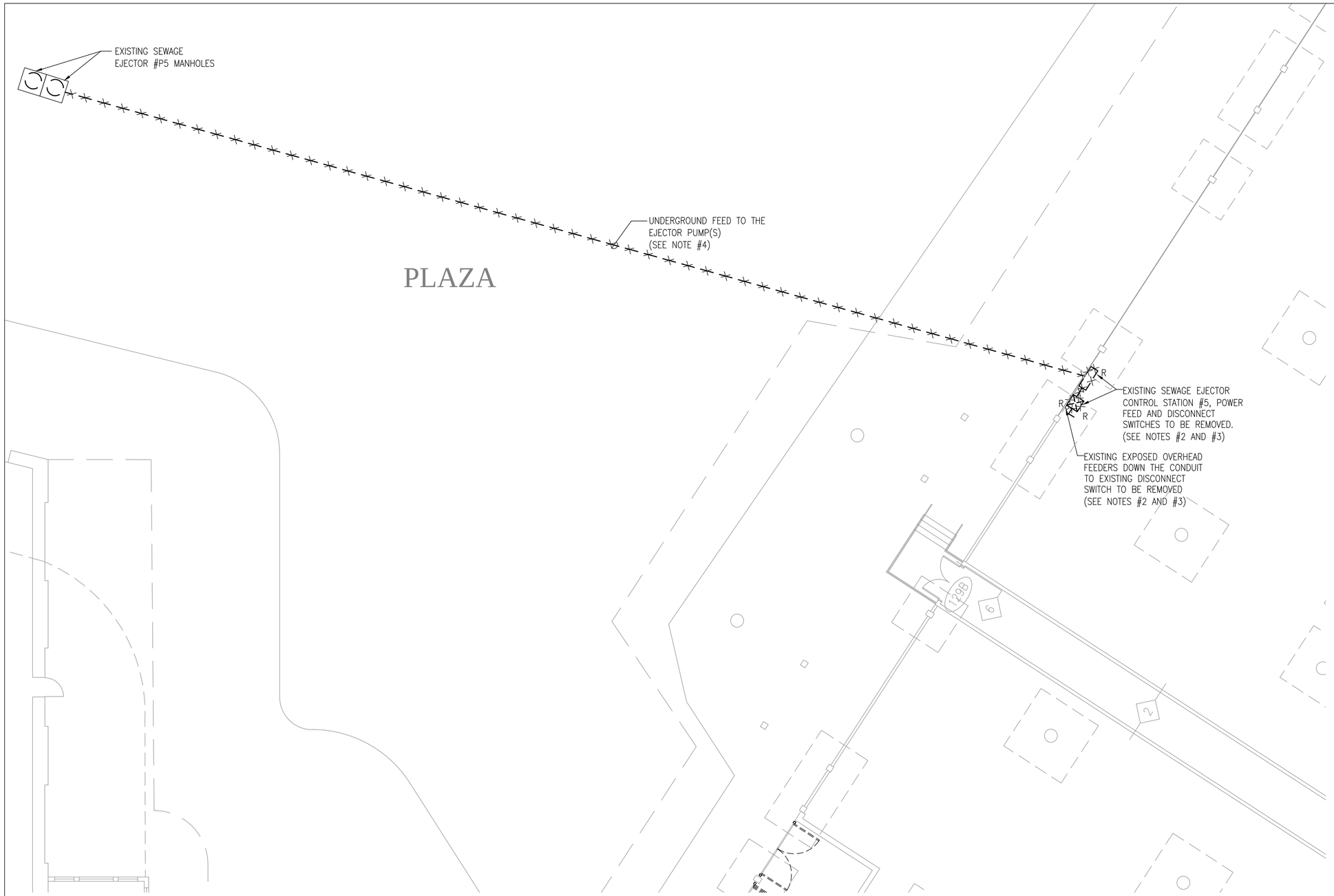
SHEET No. 7 OF 12

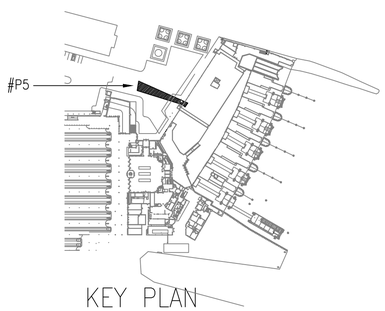


NOTES:

1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING E0.01.
2. PRIOR TO REMOVING EXISTING WIRING FEEDS AND UNDERGROUND CONDUITS, TRACE THE POWER TO THE PANEL FEEDING THE EXISTING EJECTOR PUMP(S). TURN THE CIRCUIT BREAKER IS IN THE 'OFF' POSITION. REASSIGN EXISTING BREAKER FEEDING SEWAGE EJECTOR #P5 AS SPARE.
3. PULL AND REMOVE EXISTING WIRING FEEDS FROM THE EXISTING EJECTOR PUMP #P5 IN THE MANHOLE IN THE PLAZA TO THE PANEL SOURCE.
4. EXISTING ELECTRICAL DUCTBANK TO EXISTING SEWAGE EJECTOR #P5 TO BE REMOVED. COORDINATE WITH NJ TRANSIT FOR REMOVING AND SALVAGING HEXAGONAL PAVERS AND STONE COBBLESTONES. EXCAVATE, SAW-CUT THE ASPHALT AND REMOVE UNDERGROUND CONDUIT AND ASSOCIATED WIRING. PRECAUTION MUST BE TAKEN DURING EXCAVATION TO NOT DAMAGE OTHER UNDERGROUND UTILITIES.
5. FOR NEW POWER FEED TO SEWAGE EJECTOR PUMP #P5 AND ASSOCIATED CONTROL PANEL, SEE DRAWING E2.01.

01 / E1.02 SITE ELECTRICAL DEMOLITION PLAN SEP#5

1/8"=1'-0"



KEY PLAN

NO SCALE

NJ TRANSIT

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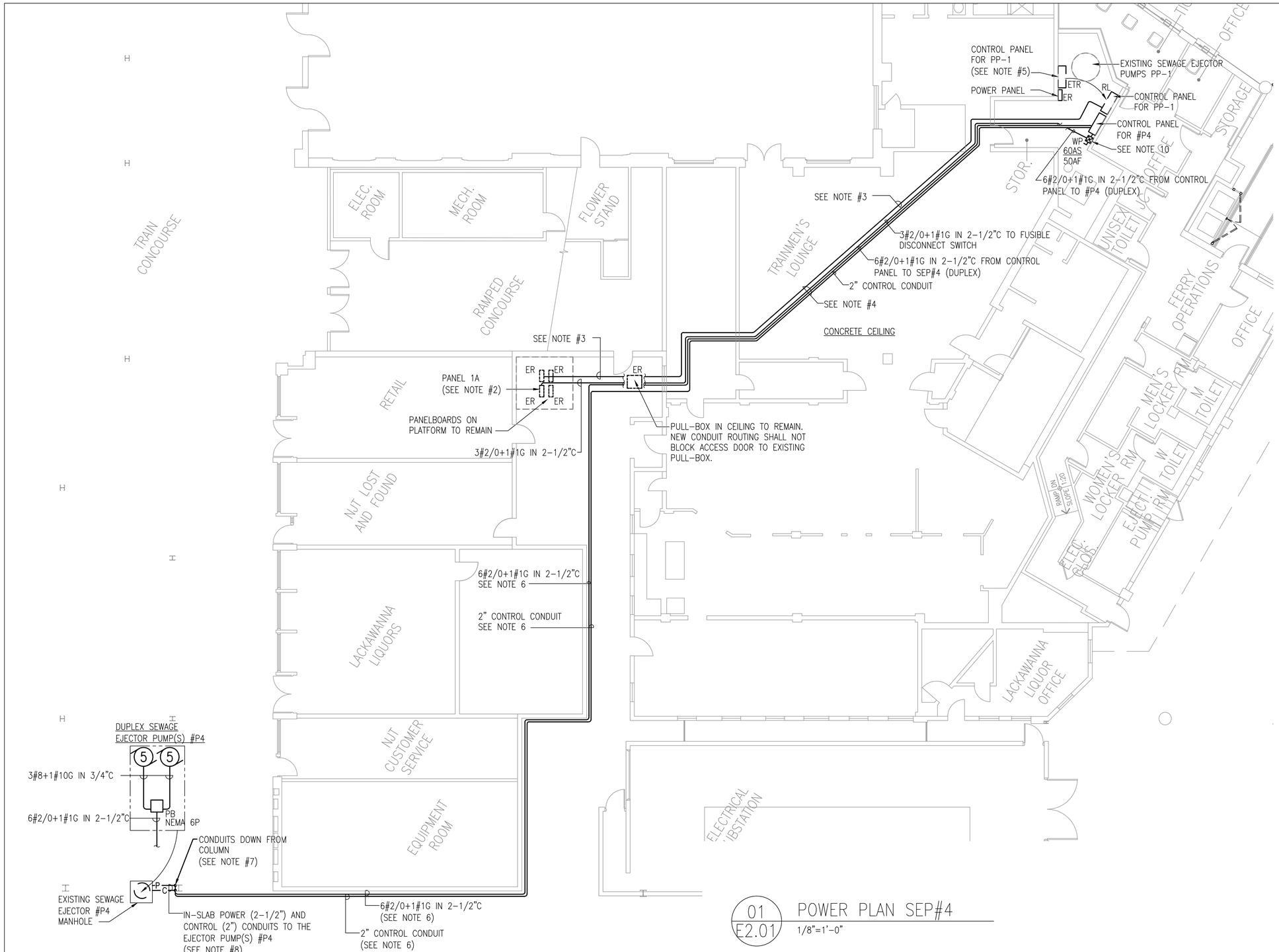
HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
SITE DEMOLITION PLAN
SEWAGE EJECTOR
STATION #P5

SCALE: AS SHOWN
FILE NAME: E1.02.DWG
DRAWING No.: E1.02 REV: –
DATE: OCT. 14, 2013

CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 8 OF 12

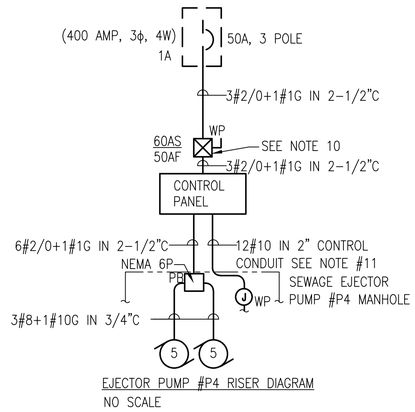


01 E2.01 POWER PLAN SEP#4

1/8"=1'-0"

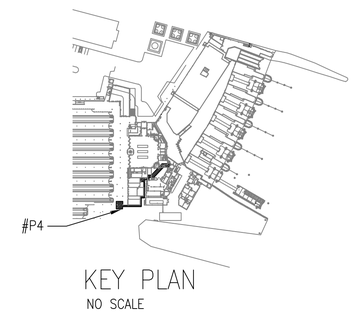
NOTES:

1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING E0.01.
2. PROVIDE (1) 50AMP, COMPATIBLE, 3 POLE BREAKER IN AVAILABLE SPACE IN EXISTING PANEL '1A' TO FEED NEW PUMP P#4. LUGS SHALL BE COMPATIBLE FOR FEEDERS.
3. RUN NEW WIRING IN NEW CONDUIT FOR FEED TO EXISTING RELOCATED CONTROL PANEL PP-1 AS SHOWN. PROVIDE INTERFACE/SPLICE BOXES TO EXTEND POWER FEEDER (3#6 & 1#10G IN 1"C) AND CONTROL WIRING (10#12 IN 1"C) TO NEW LOCATION TO MATCH EXISTING
4. RUN CONDUIT ABOVE CONCRETE CEILING. CONDUIT ROUTING IS DIAGRAMMATIC AND IS SHOWN FOR REFERENCE ONLY. COORDINATE EXACT ROUTING AND PROVIDE ALL NECESSARY SUPPORTING EQUIPMENT BUT NOT LIMITED TO JUNCTION BOXES, PULL BOXES ETC.
5. RELOCATE EXISTING CONTROL PANEL PP-1. NEW LOCATION IN SAME ROOM. EXTEND WIRING AND CONDUIT FOR PP-1 TO NEW LOCATION. CONDUIT AND WIRING SIZE TO MATCH EXISTING.
6. RUN CONDUITS HIGH UP IN THE CEILING ALONG THE WALL IN THE CORRIDOR TO THE COLUMN IN THE TRAIN CONCOURSE AS SHOWN.
7. RUN CONDUITS DOWN ALONG THE COLUMN INTO THE SLAB 18" BELOW FINISHED FLOOR (FIELD COORDINATE). (PROVIDE PULL BOX AS REQUIRED).
8. RUN CONDUITS IN-SLAB TO THE EXISTING MANHOLE TO FEED THE DUPLEX SEWAGE EJECTOR PUMPS #P4. SEE EJECTOR PUMP #P4 RISER DIAGRAM BELOW.
9. PROVIDE COMPATIBLE LUGS IN PANELBOARDS, DISCONNECT SWITCHES ETC. TO ACCOMMODATE OVERSIZED FEEDERS FOR VOLTAGE DROP.
10. TAG AND LOCK-OUT STARTER DURING SERVICING OF EJECTOR PUMP. (FOR NJ TRANSIT PERSONNEL)
11. CONFIRM CONTROL WIRING REQUIREMENTS PER MANUFACTURER SHOP DRAWINGS.



EJECTOR PUMP #P4 RISER DIAGRAM

NO SCALE



KEY PLAN

NO SCALE

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HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
POWER PLAN
SEWAGE EJECTOR
STATION #P4

SCALE: AS SHOWN
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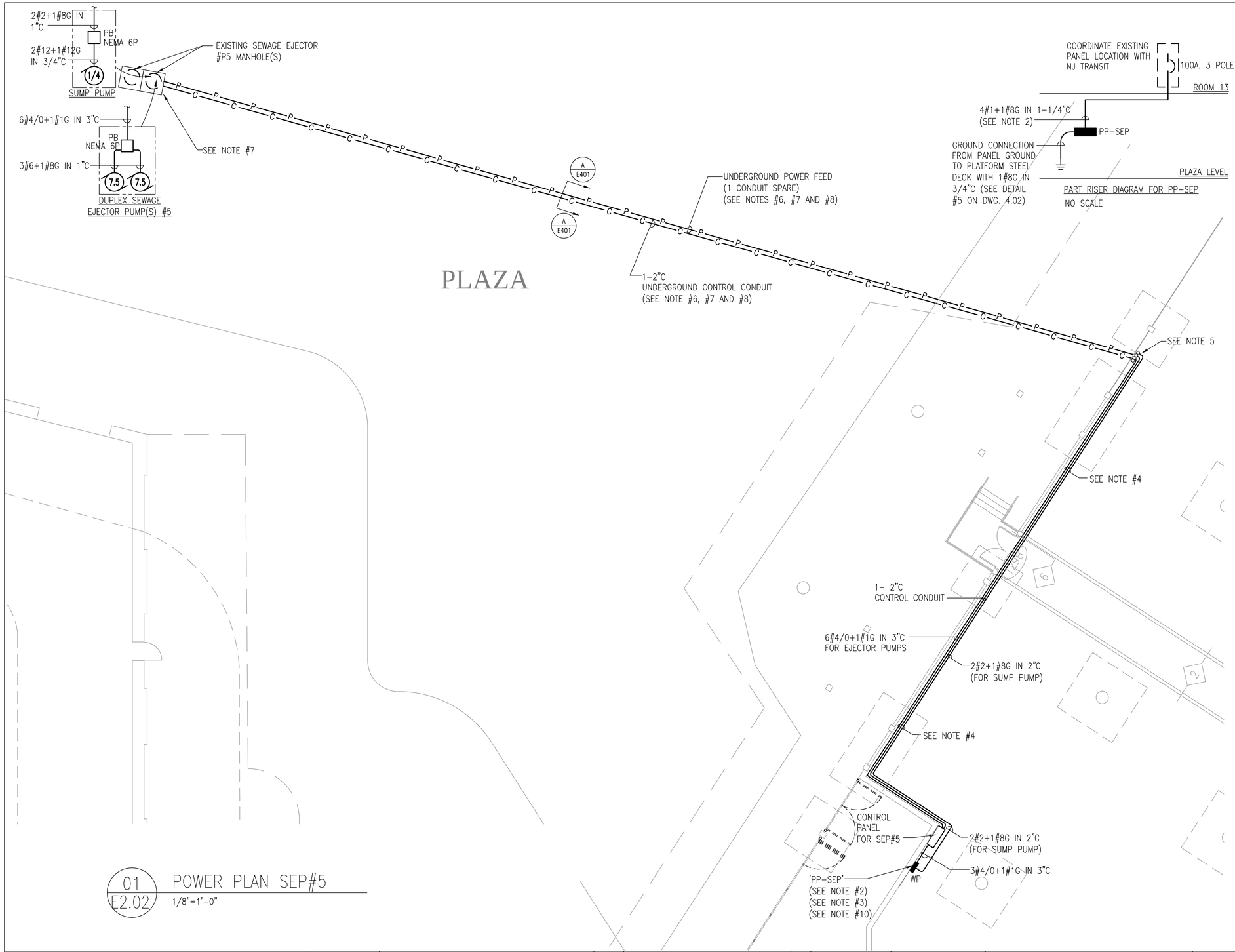
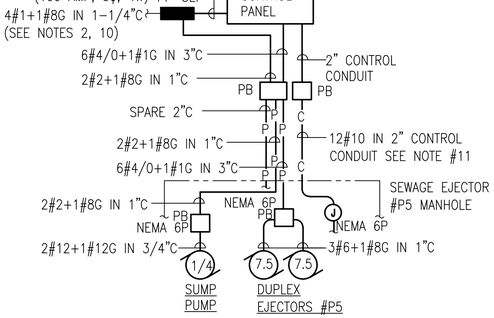


01 E2.02 POWER PLAN SEP#5

1/8"=1'-0"

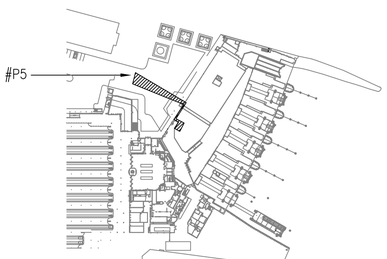
NOTES:

1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING E0.01.
2. INSTALL A NEW 100 AMP PANEL 'PP-SEP', 120/208 VOLTS, 3ϕ, 4 WIRE IN LOCATION SHOWN. INSTALL A NEW COMPATIBLE 100 AMP, 3 POLE BREAKER IN AVAILABLE SPARE BREAKER LOCATION IN PANEL IN ROOM 13 (COORDINATE WITH NJ TRANSIT). FEED PANEL 'PP-SEP' FROM NEW 100 AMP, 3-POLE BREAKER IN PANEL IN ROOM 13 WITH 4#1+1#8G IN 1-1/4"C (APPROXIMATELY 200 FEET). COORDINATE ROUTING WITH NJ TRANSIT.
3. FOR PANEL SCHEDULES, SEE DRAWING E4.01.
4. RUN CONDUITS HIGH UP IN THE CEILING ALONG THE WALL TO CLEAR ALL DOORS. CONDUIT ROUTING IS DIAGRAMMATIC AND IS SHOWN FOR REFERENCE ONLY. COORDINATE EXACT ROUTING AND PROVIDE ALL NECESSARY SUPPORTING EQUIPMENT BUT NOT LIMITED TO JUNCTION BOXES, PULL BOXES, ETC.
5. RUN CONDUITS DOWN ALONG THE WALL TO LOCATION WHERE CONDUITS WILL TRANSITION TO RUN UNDERGROUND TO FEED THE NEW SEWAGE EJECTOR PUMPS#5. COORDINATE WITH NJT TO MAINTAIN WATERPROOFING INTEGRITY FOR WALL AND SLAB PENETRATIONS. SEE DETAIL #B ON DRAWING E4.01
6. RUN UNDERGROUND CONDUITS AT THE SAME DEPTH AS THE EXISTING CONDUIT THAT WAS REMOVED DURING DEMOLITION. SEE DUCTBANK SECTION A ON DWG. E4.01
7. RUN CONDUITS UNDERGROUND TO THE EXISTING MANHOLE TO FEED THE DUPLEX SEWAGE EJECTOR PUMPS #P5. SEE EJECTOR PUMP#5 RISER DIAGRAM BELOW.
8. COORDINATE WITH NJ TRANSIT FOR REINSTALLING HEXAGONAL PAVERS AND STONE COBBLESTONES, THAT WERE REMOVED DURING EXCAVATION, AFTER INSTALLATION OF CONDUITS IN DUCTBANK AND BACKFILLING THE EXCAVATION. REPLACE WITH NEW MATCHING HEXAGONAL PAVERS AND STONE COBBLESTONES THAT WERE DAMAGED DURING REMOVAL.
9. PROVIDE COMPATIBLE LUGS IN PANELBOARDS, DISCONNECT SWITCHES ETC. TO ACCOMMODATE OVERSIZED FEEDERS DUE TO VOLTAGE DROP.
10. TAG AND LOCK-OUT BREAKERS DURING SERVICING OF EJECTOR PUMP. (FOR NJ TRANSIT PERSONNEL).
11. CONFIRM CONTROL WIRING REQUIREMENTS PER MANUFACTURER SHOP DRAWINGS.



EJECTOR PUMP#5 RISER DIAGRAM

NO SCALE



KEY PLAN

NO SCALE

NJ TRANSIT

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HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
POWER PLAN
SEWAGE EJECTOR
STATION #P5

SCALE: AS SHOWN
FILE NAME: E2.02.DWG
DRAWING No.: E2.02
REV: -
DATE: OCT. 14, 2013

CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 10 OF 12

NOTES:

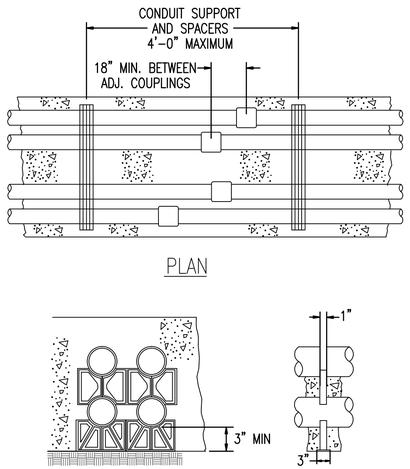
1. FOR SYMBOL LIST, GENERAL NOTES AND ABBREVIATIONS SEE DRAWING E0.01.
2. PROVIDE WATERTIGHT HUBS TO MAINTAIN SEALED CONNECTIONS BETWEEN ELECTRICAL EQUIPMENT AND CONDUITS.

PANEL SCHEDULE

LOCATION: WALL ALONG BRICK LANE ALLEY — 120/208V, 3 PHASE, 4 WIRE & GND BUS — DESIGNATION: PP-SEP
MOUNTING: SURFACE — (NEW) — MAIN BUS: 100A
SHORT CIRCUIT RATING: 22K — MAIN CIRCUIT BREAKER: 100A

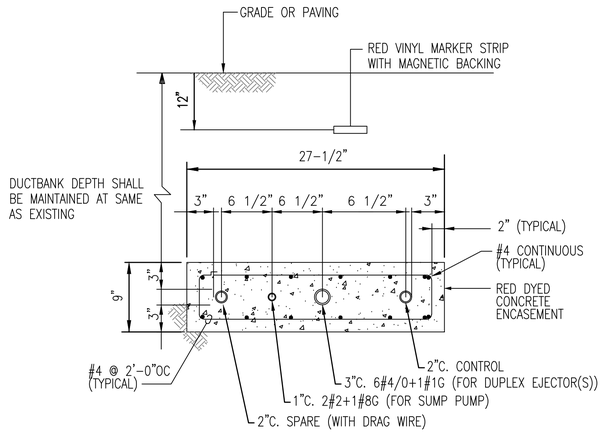
	SERVICE TO:	VA øA	VA øB	VA øC	AT	P	NO	A B C	NO	P	AT	VA øA	VA øB	VA øC	SERVICE TO:
		7260					1		2	1	20	700			SUMP PUMP (1/4 HP)
*	DUPLEX EJECTORS #P5 (7.5HP)		7260		70	3	3		4	1	20		–		SPARE
				7260			5		6	1	20			–	SPARE
	SPARE	–			20	1	7		8	1	20	–			SPARE
	SPARE		–		20	1	9		10	1	20		–		SPARE
	SPARE			–	20	1	11		12	1	20			–	SPARE
	SPARE	–			20	1	7		8	1	20	–			SPARE
	SPARE		–		20	1	9		10	1	20		–		SPARE
	SPARE			–	20	1	11		12	1	20			–	SPARE
	VA	øA= 7960						øB= 7260					øC= 7260		
	TOTAL VA= 22,480														

'*' PROVIDE COMPATIBLE LUGS FOR WIRING FEED TO DUPLEX EJECTORS.

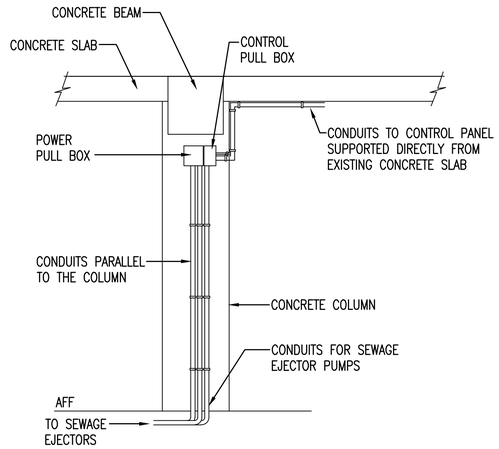


PLAN

DUCT BANK DETAILS – TYPICAL ARRANGEMENT
NTS



A / E401 DUCTBANK SECTION
NTS



B / E401 CONDUIT FEED TO EJECTOR PUMPS
NTS

NJ TRANSIT

STV Incorporated
225 Park Avenue South
New York, New York 10003

No.	REVISIONS	DATE:

DESIGNED: N. THACKER
DRAWN: N. THACKER
CHECKED: F. TAMAYO
APPROVED: B. JABBONSKY

HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

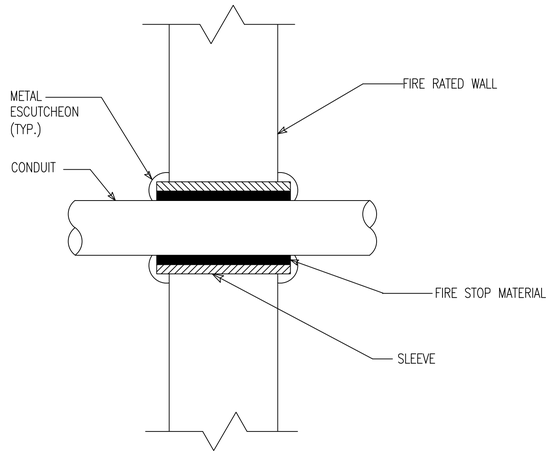
ELECTRICAL
PANEL SCHEDULES AND
DETAILS I

SCALE: NO SCALE
FILE NAME: E4.01.DWG
DRAWING No.: E4.01 REV: –
DATE: OCT. 14, 2013

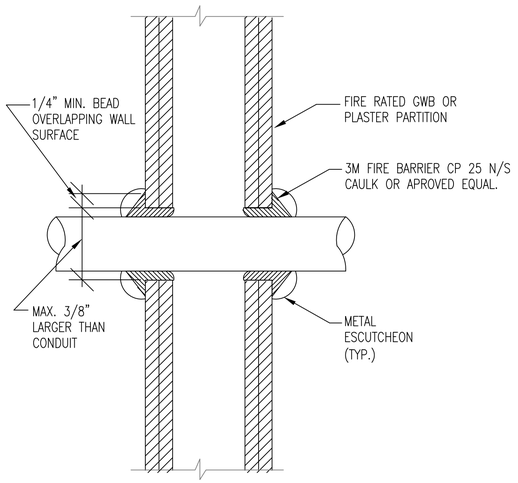
CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 11 OF 12

NOTES:

1. USE THIS DETAIL WHERE CONDUITS PASS THRU FIRE RATED WALL.
2. WHERE CONDUITS PASS THRU FOUNDATION WALLS, FLOOR SLAB ON EARTH, ROOF, CONCRETE BEAM, BRICK WALL, OR WATER PROOF FLOORS, USE PIPE SLEEVES.



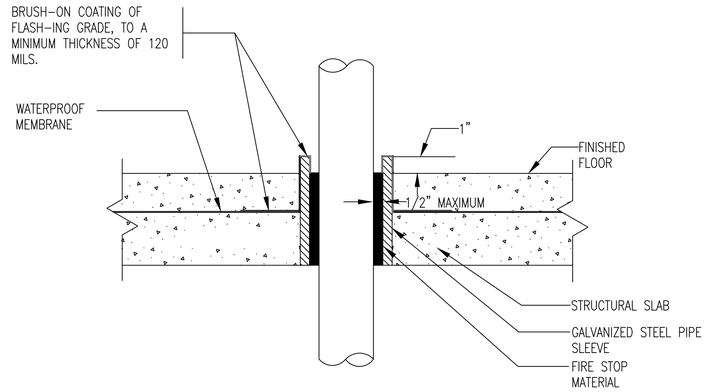
DETAIL #1 — CONDUIT PENETRATION
CONDUIT PENETRATION THRU FIRE RATED WALL — NOT TO SCALE



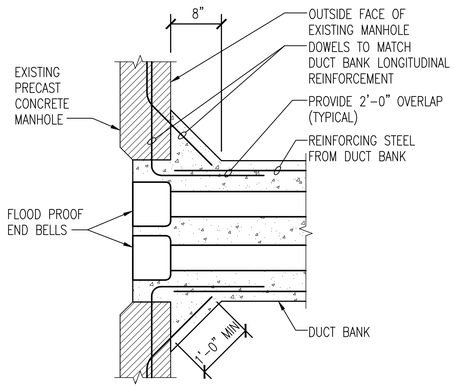
DETAIL #2 — CONDUIT PENETRATION IN
FIRE RATED GWB OR PLASTER PARTITION — NOT TO SCALE

NOTES:

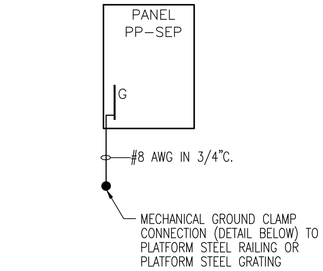
USE THIS DETAIL WHERE CONDUITS PENETRATE A WATERPROOF SLAB.

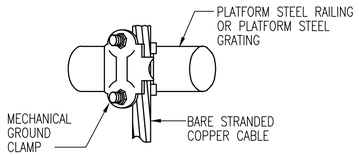


DETAIL #3 — CONDUIT PENETRATION
WATERPROOF SLAB



DETAIL #4 — DUCT BANK TERMINATION INTO A MANHOLE
NOT TO SCALE





DETAIL #5 — GROUNDING FOR PLATFORM STEEL FRAME
NOT TO SCALE

NJ TRANSIT

STV Incorporated
225 Park Avenue South
New York, New York 10003

No.	REVISIONS	DATE:

DESIGNED: N. THACKER
DRAWN: N. THACKER
CHECKED: F. TAMAYO
APPROVED: B. JABBONSKY

HOBOKEN TERMINAL
REPLACEMENT OF PUMPS
FOR EJECTOR STATIONS 4 & 5

ELECTRICAL
DETAILS II

SCALE: NO SCALE
FILE NAME: E4.02.DWG
DRAWING No.: E4.02
REV: –
DATE: OCT. 14, 2013

CONTRACT No. 13-006C
ISSUE CONFORMED
SHEET No. 12 OF 12

NJ Transit

Contract No. 13-006C

Conformed
Technical Specifications

For the

Replacement of Pumps
For Ejector Stations 4 and 5

STV Incorporated
October 14, 2013

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SECTION 15411 - INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. The Work includes the providing of non-conducting insulation, including accessories, on the following piping and apparatus.

1. All drainage, soil, waste piping which is exposed to freezing due to location in exterior walls of building, within building in areas subject to freezing or other causes whether or not indicated on plans.

Note: Exposed supply and waste connections under plumbing fixtures shall not be covered unless such fixture are exposed within areas subject to freezing.

1.2 SUBMITTALS:

A. Product Data

Submit manufacturer's product data for insulation materials, adhesives, mastics and cements. Include installation details for valves, fittings, pipes and all other item to be insulated. No material shall be delivered to the site prior to being approved.

B. Schedule listing items to be insulated, description of insulation and finishing procedures.

C. Samples

Each type of insulation, including facing, jacket and fittings.

D. Certificates from the manufacturer stating compliance with the following:

Insulation, finishing facings or jackets, adhesives, mastics and cements are asbestos free and all materials installed have composite fire and smoke hazard ratings.

1.3 QUALITY ASSURANCE:

A. Regulatory Requirements

All insulation, vapor barriers, as well as the adhesives and finishing facings or jackets used herewith shall have a flame spread rating not over 25 without evidence of continued progressive combustion, and shall have a smoke developed rating not higher than 50.

B. Asbestos Prohibition

All products provided under this Section shall be asbestos free.

C. Installer's Qualifications

Firm with at least three years successful installation experience on projects with the piping and mechanical equipment insulation similar to that required for this Project.

1.4 DELIVERY, STORAGE AND HANDLING:

A. Protect insulation against dirt, water, chemical and mechanical damage. Remove damaged insulation from project site.

B. Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp, or label, affixed showing fire hazard ratings of the products and brand.

C. Store insulation in original wrappings and protect from weather and construction traffic.

1.5 TEMPERATURE REQUIREMENT:

A. Apply adhesive, sealers, coating, and all other items and accessories at the proper temperature as recommended by the manufacturer. If ambient conditions are not acceptable, provide temporary heat as required for proper installation without any delay to the Project completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Insulation, fiberglass fitting cloth, bands and casings, manufactured by Certain-Teed Corp., Johns Manville, Owens-Corning Fiberglass Corp., Knauf Fiber Glass or Armstrong World Industries, Inc., complying with the requirements of the specifications will be approved. Adhesives manufactured by Benjamin Foster Co., Epolux Manufacturing Corp., or Insul-Coustic (Division of Birma Products Corp.), complying with the requirements of the specifications will be approved. Pre-molded fiberglass fittings as manufactured by Hamfab Inc., complying with the requirements of the specification will be approved.

2.2 MATERIALS:

A. All piping insulation shall be one-piece molded sectional fiberglass having a nominal 4-pound density. Its thermal conductivity shall not exceed 0.23 at 75 degrees F. mean temperature. It shall be suitable for use on piping up to 370 degrees F.

B. Insulation and accessories for valves, fittings, etc. for drainage piping shall include the following:

1. One pound density fiberglass blanket.

2. Segments of pipe insulation.

3. Pre-molded fiberglass fittings.

4. No. 20 gage galvanized steel annealed wire.

5. Insulating cement.

6. In lieu of using coated pre-molded fittings for insulating fittings, valves etc., Zeston premolded 20-mil thick, high impact ultraviolet-resistant one piece PVC fitting

covers and precut Hi-Lo-Temp insulation inserts as manufactured by Manville are acceptable.

C. Insulation and accessories for water meters shall include the following:

1. 1.5 pound density fiberglass blanket.

2. 2" hexagonal galvanized mesh wire.

3. Insulating cement.

D. Jacket and accessories over insulation on valves, fittings, etc. for hot water piping shall include the following:

1. Fiberglass fitting cloth which shall be 20 X 20 yarns per inch fiberglass mesh.

2. Lagging adhesive shall be Epolux No. 336, Foster 30-36.

E. Jacket and accessories over insulation for cold water piping**,** drainage and vent piping shall include the following:

1. White kraft paper outer surface bonded to aluminum foil and reinforced with fiberglass yarn.

2. Insulation adhesive.

3. Aluminum casing, .016" thick.

F. Jacket and accessories over insulation on valves and fittings for drainage and vent piping and over valves, fittings, water meters for cold water piping shall include the following:

1. Glass cloth.

2. Vapor barrier coating shall be Epolux No. 660, Foster 30-35.

G. Special protection at all points of support shall include the following:

1. Rigid calcium silicate pipe insulation having a minimum twelve (12) pound density. Blocks shall be 1-1\2" thick.

2. Galvanized metal shields as manufactured by Carpenter & Paterson, Fig. 265 P or Grinnell Fig. 167. Shields shall be 18 gage for pipe sizes up to and including 5" and 16 gage for larger sizes.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

A. Insulation shall be installed only after tests of the piping systems have been successfully completed.

B. Insulation shall be installed in a smooth, clean, workmanlike manner. Joints shall be tight and finished smooth, with a continuous unbroken vapor seal.

C. All surfaces to be insulated shall be dry and free of loose scale, dirt, oil or water when insulation is applied.

D. Insulation shall be applied in such a manner that air circulation within the insulation or between the insulation and the pipe shall be avoided.

E. Surface imperfections in the insulation, such as chipped edges, small joints or cracks and small voids or holes not over one inch square shall be filled with like material or with insulating cement.

F. Paper laminated jackets shall be permanently treated to retain its flame spread and smoke developed rating. Chemicals used for treating paper jacket laminates shall not be water soluble and shall be unaffected by water and humidity.

G. Valves shall be insulated up to the packing unit.

H. The use of pipe insulation having a "self-sealing" lap and "self-sealing" lap strips also is acceptable.

I. Unions shall not be insulated.

J. Fire Seal Application: Where pipes pass through fire walls, fire partitions, fire rated pipe chase walls or floors above grade, insulation shall be interrupted and a fire seal shall be provided as specified for this project.

K. All necessary insulating material not specified shall be as recommended by the manufacturer of the insulation.

3.2 INSTALLATION:

A. Insulation and Protection at Points of Support

1. Install inserts made from rigid calcium silicate pipe insulation, in lieu of pipe insulation specified above, at all points of support. Inserts shall be not less than 12" long and of thickness equal to adjoining insulation. A jacket shall be installed over the insert with longitudinal laps and butt strips for circumferential joints smoothly secured with insulation adhesive. Jacket shall provide vapor barrier where required.

2. Install galvanized steel shields between supports and inserts. Shields shall be formed to fit the insulation and shall extend up to the center line of the pipe and of the length specified for the inserts. Supports shall not pierce the insulation and all vapor barriers shall be unbroken and continuous.

B. Insulation and Protection of Piping Exposed to Freezing Temperatures (Sanitary)

Piping to be frost proofed (heat traced) shall be insulated with two layers of preformed polyisocyanurate closed cell insulation with a k-factor of 0.19 at 75°F mean temperature and factory applied Polyvinylidene Chloride (PVDC) vapor retarder film for use in the sanitary, domestic water supply and fire protection service lines. Rigid-foam insulation available in 2.0 lb/ft^3 and 24 psi compressive strength average value for parallel to rise (thickness), the equal to Trymer 2000 with Saran Vapor Retarder at thicknesses of 1.5" or less by The Dow Chemical Company insulation. Thickness of each layer shall be 1" thick for pipe sizes up to and including 2" and 1-1/2" thick for larger pipe sizes. The outer layer shall be jacketed as specified for cold water piping in Paragraph 3.2 B of this Section. The final insulation shall be protected with not lighter than 0.016" aluminum casing. Where this piping is installed within a furred enclosure or room the casing shall be omitted. All water and waste piping in raised floor shall have electric heat tracing cable installed on the piping prior to piping being covered by insulation, see Electrical Specifications Division 16.

3.3 PROTECTION AND REPLACEMENT:

A. Replace insulation damaged during construction which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection

Insulation worker shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.4 PAINTING:

A. Insulation on all piping and fittings in Boiler Room, Mechanical Equipment Rooms, Fan Rooms, etc. on all pressure tanks shall be given two (2) coats of latex fire retardant paint. Color of paint shall be light gray.

B. Insulation on all piping in finished spaces shall be given two (2) coats of latex fire retardant paint, the color of which shall match the adjacent surroundings. Fire retardant paint shall be Chessman-Elliot Co., Glidden, or PPG Industries.

C. For additional materials and method of painting, refer to the Painting section of the project specifications.

3.5 LABELING:

A. After the finished coat of paint has been applied to the insulation, this contractor shall do all pipeline identification labeling as specified in Section 15422 - "Tags, Charts and Identification."

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT:

A. Payment for "Insulation" covered by this section shall be included in the Division 15 lump sum item for "All Work in Division 15".

END OF SECTION

SECTION 15413 - PUMPING EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Provide all electrical motor-driven pumps and appurtenances as indicated on the Drawings and as specified herein.

1.2 SUBMITTALS:

A. Manufacturer's installation and operation instructions, catalog sheets, specifications, and maintenance manuals for each item specified.

B. Shop Drawings.

1. Cuts of each pump, indicating parts and materials.

2. Motor data.

3. Cuts of each control panel and components

4. Wiring Diagrams

5. Cuts of each sewage ejector pumping system.

C. Submit all the videotapes produced during the training. All tapes shall be labeled and turned over to the Owner within forty-eight (48) hours of training. Obtain receipt from the Owner that the tapes have been received.

1.3 QUALITY ASSURANCE:

A. Pumping apparatus manufacturers

Minimum 5 years experience in the manufacture of products of type and quality specified.

B. Each control panel must have UL label and panel wiring shall comply with the latest Electrical Code.

PART 2 - PRODUCTS

2.1 MOTORS:

A. Provide motors and motor starters in accordance and in compliance of the requirements of the Motors, Control Equipment and Circuitry specifications for this project.

2.2 PUMPS-GENERAL:

A. Pumps shall be of the type called for in this Specifications and the Drawings. Shop Drawings of pumps must be submitted for approval before installation.

B. The casing for pumps shall be of close-grained cast iron for bronze fitted pumps or bronze on all bronze pumps. The waterways must have large cross-section areas with smooth turns so that the water will pass through at a low velocity without shock. Suitable openings shall be provided for the suction gauge, discharge gauge, air vent and cock. Openings shall be tapped and plugged.

C. Unless otherwise specified, the shaft shall be of the best grade of 18-8 stainless steel and of ample size to transmit safely the maximum amount of power required. Shaft shall be provided with ample keyway and key to accurately hold the impeller in place. The impeller shall be secured to the shaft using a nut and locking washer. The impeller shall be hydraulically balanced for all pressures and shall be of bronze, hand finished on the inside, machine turned and polished on the outside, dynamically balanced at all speeds, and with liberal keyway to fasten to shaft. Coupling shall be flanged and of the flexible type with pin and rubber bushing construction. That portion of the shaft passing through the pump casing and stuffing boxes shall be encased in a bronze sleeve, securely fastened to the shaft.

D. A name-plate showing the serial number, discharge GPM and Head of each pump shall be attached to the respective pump. The necessary wiring and controlling devices will be furnished and installed complete under the Electrical Division, unless otherwise specified.

E. Certified test curves of the pumps to be installed shall be provided for all pumps.

2.3 SLICER TYPE SEWAGE EJECTOR FOR DRY PIT INSTALLATION

A. The impeller shall be multi-vane semi-open type capable of passing 2 1/2" solids, shall be constructed of cast iron, accurately machined to the proper diameter and be statically and dynamically balanced. Pump shall not require the use of wear rings to insure proper operation. There shall be a renewable rotating cutter bar, constructed from Heavy 440 stainless steel bar stock, securely attached to the inlet of the impeller with a stationary cutter bar attached to the pump inlet. These blades shall be hardened to a 58 Rockwell C hardness. Pump shall incorporate a mechanical seal system with faces of solid silicon carbide. The pump casing shall be constructed of ASTM A48-83, Class 30, close grained cast iron. The one piece volute shall consist of smooth contoured surfaces and fluid passages

B. The submersible pump motors shall be suitable for normal operation in air or submerged in water. Pump motors shall have 25’ of submersible power cord. Motors shall be housed in a NEMA-6, water tight cast iron shell with extended cooling rings and shall be of the air filled design for maximum efficiency. Windings shall have class F insulation. Each pump shall be meet all new US Government and California requirements prohibiting oil filled pump motors. Oil filled motors will not be acceptable. Motor and bell shall be designed as a terminal box and separated from the motor shell by a combination bearing support and inspection plate that shall permit viewing and access to the motor from the top side of the unit. Pumps shall be furnished with an upper and lower permanently lubricated double seal ball bearing having a L-10 rating. Motors using sleeve type bearings in either position will not be acceptable. Motors shall be of the design that are warranted without the need of moisture sensing electrodes, and shall be rated for use with C-20 overload heaters. The mating surfaces between the motor end bell, motor shell, and seal housing shall be sealed by means of Buna-N O-rings. Motor shaft shall be 300 series stainless steel with key way for positive positioning of the impeller. Pump shall incorporate a double mechanical seal system. The seal assembly shall be housed in a seal chamber filled with biodegradable food grade oil. The upper seal faces shall be carbon against Ni-Resist with the lower seal faces of solid silicon carbide.

C. Liquid level controller shall be designed for controlling a Duplex pumping system and shall be of the tethered design consisting of: (4) single pole differential float switches, each sealed in a corrosion resistant polypropylene float, (4) corrosion resistant switch brackets for attaching switches to suspension rod, (1) galvanized steel suspension rod, and a wall mounted suspension plate. Each switch shall be provided with a extended 200 foot long power cable. System utilizing a free hanging float suspended from the float power cords will not be acceptable. The entire unit switch mounting assembly shall be furnished by the pump manufacturer. Upon increasing liquid level in the wet well the LEAD PUMP ON level sensor will start the lead pump & will pump down until the PUMPS OFF level sensor is deactivated. If the water level continues to rise, for whatever reason, the LAG PUMP ON level sensor will start the lag pump and will pump together with the lead pump until the PUMPS OFF level sensor is deactivated. Pumps will be automatically alternated on every pumping cycle. The HIGH WATER ALARM level sensor shall activate the high water alarm circuit and can be placed below the LAG PUMP ON sensor to notify operating personnel of a LEAD PUMP failure.

There shall be furnished for remote mounting indoors, a submersible duplex pump control panel arranged for wall mounting and be furnished in a NEMA-6P submersible enclosure containing: 2-Motor circuit breakers, 2-magnetic starters with O.L. protection and resets, 2-test-off-auto selector switches, 2-red pump running lights, 2- auxiliary “pump running” status contacts, 1-control circuit transformer, 1- Electric lead lag alternator, (1) auxiliary high level alarm contact and a numbered and wired terminal strip.
Enclosure shall have no operators on the exterior and NPT tappings for (1) Main power supply, (2) Motor power cables, (4) float switch cables and (1) Auxiliary contact wiring for BMS connection.

2.4 GRINDER TYPE SUBMERSIBLE SEWAGE EJECTOR

A. The pump shall include a grinder assembly located on the suction side of the pump impeller. The cutter shall be capable of grinding all materials normally found in domestic sewage. The cutter and shredding ring assembly macerates solids into a slurry and discharges to the pump impeller. The cutter and shredding ring shall be made form 17-4PH super hard corrosion resistant stainless steel This assembly shall leave no exposed shaft to permit packing of solids. The shredding ring shall be field reversible to provide new cutting edges to double the life.
The impeller shall be multi vane, open type and shall be made of bronze and accurately machined to the proper diameter. All impellers are to be statically and dynamically balanced.

B. Motors shall be airfilled, housed in a water tight cast iron shell with extended cooling rings and shall be of the air filled design for maximum efficiency. Windings shall have class F insulation. Each pump shall be meet all new US Government and California requirements prohibiting oil filled pump motors. Oil filled motors will not be acceptable. Motor end bell shall be designed as a terminal box and separated from the motor shell by a combination bearing support and inspection plate that shall permit viewing and access to the motor from the top side of the unit. Pumps shall be furnished with an upper and lower permanently lubricated double seal ball bearing having a L-10 rating. Motors using sleeve type bearings in either position will not be acceptable. Motors shall be of the design that are warranted without the need of moisture sensing electrodes, and shall be rated for use with C-20 overload heaters. The mating surfaces between the motor end bell, motor shell, and seal housing shall be sealed by means of Buna-N O-rings. Motor shaft shall be 300 series stainless steel with key way for positive positioning of the impeller. Pump shall incorporate a double mechanical seal system. The seal assembly shall be housed in a seal chamber filled with biodegradable food grade oil. The upper seal faces shall be carbon against Ni-Resist with the lower seal faces of solid silicon carbide.

C. Liquid level controller shall be designed for controlling a Duplex pumping system and shall be of the tethered design consisting of: (4) single pole differential float switches, each sealed in a corrosion resistant polypropylene float, (4) corrosion resistant switch brackets for attaching switches to suspension rod, (1) galvanized steel suspension rod, and a wall mounted suspension plate. Each switch shall be provided with a extended 200 foot long power cable. System utilizing a free hanging float suspended from the float power cords will not be acceptable. The entire unit switch mounting assembly shall be furnished by the pump manufacturer. Upon increasing liquid level in the wet well the LEAD PUMP ON level sensor will start the lead pump & will pump down until the PUMPS OFF level sensor is deactivated. If the water level continues to rise, for whatever reason, the LAG PUMP ON level sensor will start the lag pump and will pump together with the lead pump until the PUMPS OFF level sensor is deactivated. Pumps will be automatically alternated on every pumping cycle. The HIGH WATER ALARM level sensor shall activate the high water alarm circuit and can be placed below the LAG PUMP ON sensor to notify operating personnel of a LEAD PUMP failure.

There shall be furnished for remote mounting indoors, a submersible duplex pump control panel arranged for wall mounting and be furnished in a NEMA-6P submersible enclosure containing: 2-Motor circuit breakers,lockable in the off position, 2-magnetic starters with O.L. protection and resets, 2-test-off-auto selector switches, 2-red pump running lights, 2- auxiliary “pump running” status contacts, 1-control circuit transformer, 1- Electric lead lag alternator, (1) auxiliary high level alarm contact and a numbered and wired terminal strip.
Enclosure shall have no operators on the exterior and NPT tappings for (1) Main power supply, (2) Motor power cables, (4) float switch cables and (1) Auxiliary contact wiring for BMS connection.

2.4 SUBMERSIBLE SUMP PUMP

A. The impeller shall be capable of passing 1/2" solids and shall be constructed of bronze and accurately machined to the proper diameter and be statically and dynamically balanced, and shall not require the use of wear rings to insure proper operation.
B. Motor shall be housed in a water tight cast iron shell, air –filled, and hermetically sealed. Motor shaft shall be 300 series stainless steel with key way for positive positioning of the impeller.
C. Pump shall be provided with Diaphragm level control switch Pump shall be wired to module with pump test button and green light indicates power to pump motor. All electrical equipment shall be furnished in NEMA-6P enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install all pumping apparatus as detailed on the Drawings, or as specified herein, or as recommended by the respective Manufacturer, to be completely operable for its intended use.

B. The Contractor shall have the pump supplier verify the depth of the ejector so that proper length of shaft shall be supplied.

3.2 DEMONSTRATION:

A. The service of a factory trained representative shall be made available on the job site for

start-up and for instructing the Custodian (or building manager) and staff in the operation and maintenance of each system installation. A minimum of two visits is required.

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT:

The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 15422 - TAGS AND IDENTIFICATION

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Work of this Section includes the following:

1. Tags
2. Pipeline Identification
3. Charts and Frames

1.2 SUBMITTALS:

A. Samples

Submit samples of tags and identification markers for each different type of service. Samples shall be submitted and approved before installation.

PART 2 - PRODUCTS

2.1 TAGS:

A. All controlling valves on domestic hot water, hot water circulation, and cold water supply piping throughout the building, except those at fixtures, shall be furnished with heavy brass tags 2" in diameter, with numbers and the words Dom. H.W., Dom. H.W. Circ., or Dom. C.W. thereon. The numbers and letters shall be of the block type, indented and filled with durable black compound. The letters shall be 1/4" high and the numbers shall be 1/2" high. The tags on circulation (Circ) pipe valves shall be numbered the same as the hot water valve controlling the riser or branch to which the circulation pipe is connected. Gas valves shall be tagged with “GAS” and the appropriate numeral.

B. Each standpipe riser control valve shall be conspicuously marked with the number assigned to it on the riser diagram for the standpipe system. The marking shall be in white figures, 1-1/2" high, on a 2" square engraved anodized aluminum tag with a red background.

C. Tags shall be as manufactured by Seton Nameplate Corp., New Haven, Connecticut**;** or by EMED Co., Inc. Buffalo, NY.

2.2 CHARTS AND FRAMES

A. The numbers on valves for hot, circ., cold and gas shall be arranged in the following manner:

In ground floor commencing with	No. 1
In the first floor commencing with	No. 100

B. The number of each and every valve throughout the building shall be plainly typed on approved heavy paper. Opposite each number shall be set the location of the valve bearing that number, also the fixture or fixtures controlled by that valve. The charts shall be framed in an approved glazed frame. The frames shall be made of 1" wide oak picture molding with wood back, and shall be finished with natural color varnish with screw-eyes and wire for

hanging same, and shall be submitted for approval before installation. Charts shall be mounted where directed in the ground floor mechanical equipment room.

2.3 PIPELINE IDENTIFICATION:

A. Identification shall be in accordance with "Scheme for Identification of Piping System ANSI A13.1" and OSHA safety color regulation.

B. Markers shall be snap-on type as manufactured by Seton Nameplate Corp., New Haven, Conn., (Setmark System**);** or by EMED Co., Inc. Buffalo, NY. Markers shall completely encircle the pipe with a substantial overlap. No adhesive shall be used. They shall be manufactured of U.L. approved, self-extinguishing plastic. When the pipe including insulation (if any) is 6" diameter and larger, markers shall be strap on type.

C. Provide identification for piping, and equipment.

D. Pipe shall be lettered in accordance with the schedule below. Lettering shall be located at the supply side of each valve and branch connection and at intervals of not over 20'(10' on fire lines) at each side of a wall penetration, on straight runs of pipe. Provide flow arrows for all piping at each marker. Adjacent to the legend, stencil the size of the pipe. Background and letter colors are as follows: Yellow with black letters, green with white letters, blue with white letters and red with white letters.

STENCIL SCHEDULE

Service	**Stencil Designation**	**Background Color**
Cold Water	**Domestic Cold Water**	**Green**
Storm	**Storm Drain**	**Green**
Soil and Waste Piping	**Sanitary Drain**	**Green**
Vent Piping	**Sanitary Vent**	**Green**
Gas Piping	**Gas**	**Yellow**

E. All machinery, equipment, tanks, pumps, and other apparatus shall be fitted with engraved plastic name plates with adhesive backs, Seton Co. “Setonply” or approved equal. Wording shall be submitted for approval.

2.4 ACCESSORIES:

A. Accessories for attaching tags to their respective hot, valves shall include solid brass jack chain and solid brass S-Hooks.

B. Jack chains and S-hooks shall be as manufactured by Seton Nameplate Corp., New Haven, Connecticut**;** or by EMED Co., Inc. Buffalo, NY.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Attach solid brass tags to their respective hot, circ., cold and gas valves with jack chain and S-Hooks.

B. Attach anodized aluminum tags securely to the respective standpipe riser control valve with jack chain and S-hooks.

C. Hang the charts and frames where directed, as follows:

1. One (1) in the ground floor Mechanical Equipment Room

2. One (1) in N.J. Transits Office

3. One (1) in Attic

PART 4 – MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT:

A. Payment for "Tags and Identification" covered by this section shall be included in the Division 15 lump sum item for "All Work in Division 15".

END OF SECTION

SECTION 16010 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Basic electrical requirements applicable to the Work.

1.2 REFERENCED SECTIONS:

(None referenced)

1.3 CITED STANDARDS:

A. American Society for Testing and Materials (ASTM):

E814 Standard Method of Fire Tests of Through-Penetration Fire Stops

B. Factory Mutual Research Corporation (FM):

Approval Guide

C. InterNational Electrical Testing Association (NETA):

Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems

D. National Electrical Contractors Association (NECA):

1 Standard Practices for Good Workmanship in Electrical Contracting

E. National Electrical Manufacturers Association (NEMA):

250 Enclosures for Electrical Equipment (1000 Volts Maximum)

F. National Fire Protection Association (NFPA):

70 National Electrical Code (NEC)

G. Underwriters Laboratories, Inc. (UL):

1479 Fire Tests of Through-Penetration Firestops

Fire Resistance Directory

1.4 NOTED RESTRICTIONS:

A. All "hot" connections shall be made by NJ Transit.

B. Do not interrupt services or systems unless authorized by NJ Transit Electrical personnel.

C. The Contractor shall be held to have examined the site and to have compared it with the Drawings and Specifications, and deemed to have been satisfied as to the conditions existing at the site, as relating to the actual conditions of the site at the time estimating the Work, the storage and handling of materials, and all other matters as may be incidental to the Work under the Contract, before bidding, and no allowance will subsequently be made to the Contractor by reason of any error due to the Contractor's neglect to comply with the requirements of this clause.

D. The Contractor shall remove, relocate, replace, adjust or adapt, all existing conduit, wiring and other electric equipment or apparatus, as required, to provide a complete installation.

The Work shall include, providing all materials, all necessary extensions, connections, cuttings, repairing, adapting and other Work incidental thereto, together with such temporary connections as may be required to maintain service pending the completion of the permanent Work. All Work shall be left in good working order, and in a condition equal to the adjacent new or existing Work.

F. Dark Grey PVC – Coated rigid galvanized steel conduit and fittings shall be provided for Hoboken Terminal Replacement of Pumps for Ejector Stations 4 and 5.

1.5 QUALITY CONTROL:

A. Comply with the requirements of Division 1.

1.6 SUBMITTALS:

A. Comply with the requirements of Division 1.

B. Product data for each specified product.

C. Coordination drawings in accordance with the requirements of Division 1.

1.7 DELIVERABLES:

(None Listed)

PART 2 - PRODUCTS

2.1 GENERAL:

A. Equipment, materials, and accessories shall be furnished as necessary to complete the Work.

B. Products and materials shall comply with the requirements of the cited standards.

C. Products and materials shall be suitable for the intended application, with regard to rating, listing, and labeling.

D. Conduits to be concealed in concrete or other parts of the existing structure shall be of the corrosion resistant type and shall be installed in suitable chases and openings cut by the Contractor as directed by the Engineer. Such conduits shall be properly protected and supported, to prevent their becoming injured or choked with cement during the restoration of surfaces. Concrete shall conform to and shall be mixed and placed as specified herein elsewhere. No PVC conduits are permitted. Use reinforced fiberglass conduit where corrosion resistance is required.

E. Products and materials shall be new, and of recent manufacture.

2.2 CONCRETE BASES:

A. Forms and reinforcing: As specified in Division 3.

B. Concrete: 3,000 psi, 28-day compressive strength as specified in Division 3.

2.3 PROTECTIVE COATINGS:

A. Factory-applied and field-applied protective coatings shall protect materials and equipment from rust and corrosion damage.

B. Protective coatings shall be suitable for the atmospheric conditions encountered.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 WORK PRACTICES:

A. General work practices for electrical construction shall be in accordance with NECA 1.

3.3 PENETRATION OF WATERPROOF CONSTRUCTION:

A. Minimize penetration of waterproof construction, including roofs, pits and vaults, exterior walls and interior waterproof construction. Where such penetrations are necessary, provide curbs, sleeves, shields, flashing, fittings and caulking to make penetrations watertight.

B. Where cables pass through bushings or where cables are installed in floor ducts, immediately after the cables have been installed, the ends of the bushings or ducts will be thoroughly caulked with oakum, using wooden tools with rounded edge, and sealed with Johns-Manville Corp. “Duxseal” waterproof compound or approved equal. Paint the compound with one coat of insulating paint. Arrange the sealing compound so that it will not be dislodged by accumulated water pressure.

3.4 PENETRATION OF FLOORS AND WALLS:

A. Maintain the fire resistance rating of floors and walls.

B. Provide fire stop products that are FM approved, listed in the UL Fire Resistance Directory under categories XHCR and XHEZ, and conform to ASTM E814 and UL 1479. The fire stop system shall have an F-rating of not less than the rating of the wall or floor penetrated.

3.5 EQUIPMENT ENCLOSURES:

A. Provide equipment enclosures to suit the application and environmental conditions encountered.

B. Conform to NEMA 250, unless otherwise indicated.

C. Definitions of dry, damp, and wet locations shall be as stated in the National Electrical Code.

D. Provide NEMA 1 enclosures in dry locations, NEMA 12 enclosures in damp locations, and NEMA 4X stainless steel enclosures in wet locations.

3.6 SUPPORTS, HANGERS AND FOUNDATIONS:

A. Provide supports, hangers, braces, attachments and foundations required for the Work. Support and set work without placing strains on the materials, equipment, or the building structure.

3.7 INSTALLATION:

A. Install and connect equipment and devices in accordance with manufacturers' recommendations and applicable requirements of NFPA 70 (National Electrical Code) and NECA 1.

B. Provide matching receptacles for equipment having cord and plug connections. Install strain-relief grips and clamps for cord connections.

C. Clean and touch-up protected surfaces that become scratched, marred or otherwise damaged.

D. No tie-ins to or work in the vicinity of existing services shall proceed without advance notification and release by NJ Transit.

E. Do not interrupt services of systems unless authorized by NJ Transit Electrical personnel.

3.8 FIELD TESTING AND ADJUSTMENTS PRIOR TO ACCEPTANCE TESTING:

A. Unless otherwise indicated, perform the following inspections and tests on each system, equipment item, and product:

1. Check wiring for continuity, shorts, and grounds.

2. Check the setting of protective devices.

3. Perform insulation tests using a motor-driven "Megger" tester.

4. Energize and operate lighting fixtures, switches, and outlets. Verify correct operation.

5. Actuate safety devices. Verify correct operation.

B. Clean, adjust and test equipment and systems in accordance with the manufacturer's instructions prior to initial operation. Do not operate equipment unless proper safety devices and controls are operational. Provide maintenance and service for equipment that is operated during construction and protect the equipment.

3.9 ACCEPTANCE TESTING:

A. Unless otherwise indicated, perform acceptance testing in accordance with applicable sections of the "Acceptance Testing Specifications for Electric Power Distribution equipment and Systems". The referenced publication is copyright by the InterNational Electrical Testing Association (NETA), P.O. Box 687, 106 Stone Street, Morrison, CO 80465. Where NETA testing specifications are not applicable, perform acceptance testing in accordance with the manufacturer's recommendations.

B. Perform acceptance testing in the presence of NJ Transit Electrical personnel.

3.10 INSPECTION:

A. Work will be inspected by the State of New Jersey Department of Community Affairs as the Authority Having Jurisdiction (AHJ). Coordinate with the AHJ.

B. Obtain and pay for permits, certificates, and inspection fees.

3.11 ASBESTOS-CONTAINING AND LEAD-CONTAINING MATERIALS:

A. Unless otherwise indicated, do not disturb materials which may contain asbestos or perform work in the presence of friable materials which may contain asbestos. Report the presence of suspect materials.

B. Take precautions when drilling through or removing existing paint, finishes, and glazed tiles. Treat these materials as if they contain lead. Contain dust, dirt, debris, and paint particles within the immediate work area and do not track into adjacent areas. Clean up daily. Dispose of dust, dirt, debris, and paint particles in accordance with local, state, and federal laws, codes, and regulations.

PART 4 - COMPENSATION

4.1 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16110 - RACEWAYS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for raceways, fittings and accessories.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16170 Grounding

C. Section 16190 Supports

1.3 CITED STANDARDS:

A. American National Standards Institute (ANSI):

C177 Test for Thermal Conductivity of Materials by Means of the Guarded Hot Plate

C80.1Rigid Steel Conduit, Zinc Coated

B. National Electrical Contractors Association (NECA):

101 Standard for Installing Steel Conduit (Rigid)

C. National Electrical Manufacturers Association (NEMA):

FB1 Fittings, Cast Metal Boxes and Conduit Bodies for Conduit and Cable Assemblies

RNI Polyvinyl Choride (PVC) Externally Coated Galvanized Rigid Steel Conduit

TC3 Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing

D. Underwriters Laboratories Inc. (UL):

6 Rigid Metal Conduit

360 Liquid-Tight Flexible Steel Conduit

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

B. Shop drawings showing routing of raceways, indicating locations of pullboxes and associated equipment, for control and power wiring.

1.7 DELIVERABLES:

(None listed)

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Allied Tube and Conduit, O-Z/Gedney, Carlon Riser-Gard, Triangle Wire and Cable, Inc., Wheatland Tube Co., The Wiremold Co. Chatsworth, B-Line, Thomas and Betts, or approved equal.

2.2 RACEWAYS:

A. Coated rigid metal conduit (Type RMC): PVC-coated rigid galvanized steel conduit, hot-dip galvanized outside and inside with 40 mil thick coating confirming to NEMA RN1 dark grey color to confirm with architect.

B. Rigid metal conduit (Type RMC): Rigid galvanized steel conduit, hot-dip galvanized outside and inside, conforming to ANSI C80.1 and UL 6.

C. Liquidtight flexible metal conduit (type LFMC): Hot-dip galvanized spiral wound steel construction, coated with a liquidtight jacket of flexible polyvinyl chloride, conforming to UL 360.

D. Size raceways for the quantity and size of conductors, thickness and type of insulation, 3/4-inch nominal trade size minimum.

2.3 FITTINGS AND ACCESSORIES:

A. Conduit bodies: Malleable iron with cadmium or galvanized finish, conforming to NEMA FB1.

B. Couplings for rigid galvanized steel conduits: Galvanized threaded steel or malleable iron.

C. Locknuts and grounding locknuts: Galvanized steel or malleable iron.

D. Three-piece conduit couplings for rigid galvanized steel conduits: Galvanized steel or malleable iron.

E. Liquidtight connectors for liquidtight flexible metal conduits: Malleable iron with O-ring seal.

F. Conduitt expansion/contraction fittings: Longitudinal gland-type, with external bonding jumpers, O-Z/Gedney type AX, or approved equal.

G. Conduit deflection/expansion fittings: External bonding jumpers, O-Z/Gedney type DX, or approved equal.

H. Insulated bushings: Malleable iron with thermoset plastic inner lining.

I. Drag lines: ¼-inch polypropylene utility rope.

J. PVC-coated conduit bodies and fittings: Rigid metallic with 40-mil PVC coating.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 RACEWAY SCHEDULE:

A. Provide PVC coated rigid conduits for Hoboken Terminal Replacement of Pumps for Ejector Stations 4 and 5.

B. Provide short lengths of liquidtight flexible metal conduit in damp or wet locations for final termination to equipment subject to vibration or requiring adjustment.

3.3 INSTALLATION:

A. Comply with the requirements of Section 16010.

B. Install conduits in accordance with manufacturer's instructions and NECA 101.

C. Cut off conduit ends square. Ream conduit ends and clean off burrs.

D. Terminate conduits in boxes and cabinets using two locknuts and an insulated bushing. In damp or wet locations, use a watertight hub with an insulated throat.

E. Install conduit runs with no more than 100 feet or three 90° bends between pull points. Install conduit runs horizontal or vertical, and parallel or perpendicular to walls.

F. Ground conduits in accordance with Section 16170.

G. Provide supports in accordance with Section 16190. Support conduit systems at intervals not greater than 5 feet and within 18 inches of each conduit fitting, box, or cabinet.

H. Provide fire stopping in accordance with Section 16010.

I. Install draglines in empty conduits.

J. Install expansion fittings where conduits cross building expansion joints and every 400 feet on straight runs.

K. Provide drain fittings at the low point of conduit runs.

L. Touch-up PVC coated conduits and fittings marred by tool scratches.

M. The PVC coated electric rigid metal conduit system shall include necessary PVC coated fittings, boxes and covers to form a complete encapsulated system.

PART 4 - COMPENSATION

4.1 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16123 - WIRING

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. Requirements for wiring.

1.02 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16195 Electrical Identification

C. Section 16170 Grounding

1.03 CITED STANDARDS:

A. National Electrical Manufacturers Association (NEMA):

WC70 Nonshielded Power Cables Rated 2000 Volts or Less.

B. Underwriters Laboratories Inc. (UL):

44 Thermoset-Insulated Wires and Cables

1.04 NOTED RESTRICTIONS:

(None noted)

1.05 QUALITY CONTROL:

(None listed)

1.06 SUBMITTALS:

A. Product data.

1.07 DELIVERABLES:

(None listed)

PART 2 - PRODUCTS

2.01 GENERAL:

A. Building Wire: American Insulated Wire Corp., Rome Cable Corp., Southwire Co., or approved equal.

B. Insulated spring wire connectors: Buchanan Construction Products B-CAP, Ideal Industries, Inc. WING-NUTS or WIRE-NUTS, 3M Scotchlok Y, R, G, B, Thomas & Betts Co. FREESPRING, or approved equal.

C. Insulated crimp connectors: Buchanan Construction Products pressure connectors, Ideal Industries, Inc. crimp connectors, Thomas & Betts Co. STA-KON connectors, or approved equal.

D. Uninsulated crimp connectors: Burndy Corp. Hydent, Thomas & Betts Co. compression connectors, or approved equal.

E. Gutter taps: Burndy Corp. Polytap KPU-C, Risertap UCU-C, H-Crimpit YE, Dossert Mfg. Co. GTC, O-Z/Gedney Co. PMX or PT, with covers PMXC or PTC, or approved equal.

F. Terminals: Burndy Corp. nylon insulated terminals, Ideal Industries RN or SN, Thomas & Betts Co. STA-KON nylon self-insulated terminals, or approved equal.

G. Lugs: Burndy Corp. Hylug YA, YA-L, YA-2LH, Ideal Industries SL cable connectors, Thomas & Betts Co. 54930, 54850, or approved equal.

H. Vinyl electrical tape: 3M Scotch No. 88, Plymouth/Bishop 85CW Premium, or approved equal.

I. Rubber electrical tape: 3M Scotch No. 23, Plymouth/Bishop W963 Plysafe, or approved equal.

J. Moisture sealing tape: 3M Scotch No. 2200, 2210, Plymouth/Bishop 4000 Plyseal-V, or approved equal.

K. Electrical filler tape: 3M Scotchfill, Plymouth/Bishop 125, or approved equal.

L. Color coding tape: 3M Scotch No. 35, Plymouth/Bishop 37, or approved equal.

M. Resin splice kits: 3M Scotchcast No. 82A, 82-B1, 90-B1, or shall be 3M Scotchcast Resin Pressure Splicing Method, or approved equal.

N. Heat-shrinkable splices: Electronized Chemicals Corp Insultite, Raychem Corp. Thermofit WCS, Thomas & Betts Co. SHRINK-KON insulators, or approved equal.

2.02 WIRING FOR LIGHT AND BRANCH CIRCUITS:

A. Minimum wire size: #12 AWG.

B. Building wire #12 AWG and larger: Compressed concentric stranded copper conductors with 600 volt type XHHW-2 insulation conforming to UL44.

PART 3 - EXECUTION

3.01 GENERAL:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.02 SIZING:

A. Size wire so that the operating temperature will not exceed that designated for the type of insulated conductor used with respect to type of circuit, wiring method employed, or number of conductors.

B. Size wire for maximum voltage drop of 3% on lighting and power branch circuits.

3.03 INSTALLATION:

A. Comply with the requirements of Section 16010.

B. Install wiring in raceways after the raceway system is completed, cleaned, and all work that may damage wiring has been completed.

C. Install conductors with 600 volt type XHHW-2 insulation throughout the Hoboken Terminal Replacement of Pumps for Ejector Stations 4 and 5.

D. Pull conductors using UL listed wire pulling lubricant and ¼-inch polypropylene dragline.

E. Arrange conductors in groups of three phases and neutral (if used) in wireways and large pullboxes.

F. Install branch circuits including switch legs if indicated or required.

G. Install grounding conductors in accordance with Section 16170.

H. Single-phase branch circuits of different phases may be installed as multiwire branch circuits having a common neutral conductor, except that lighting branch circuits shall not share a common neutral with receptacle branch circuits.

I. Install no more than one three-phase circuit or three single-phase circuits in each raceway, unless otherwise indicated.

J. Install splices only in accessible junction boxes.

K. Color-code all wiring in accordance with Section 16195.

3.04 SPLICES AND TERMINATIONS:

A. Make splices, taps, and terminations to carry the full capacity of conductors without perceptible temperature rise.

B. In dry locations, splice conductors #8 AWG and smaller using insulated spring wire connectors or insulated crimp connectors. Twist wires together before installing insulated spring wire connectors.

C. In wet locations, make splices using uninsulated crimp connectors, and insulate with resin splice kits or heat-shrinkable splices.

D. For conductors #10 AWG and smaller, use terminals to connect to equipment designed for use with terminals.

E. For conductors #8 AWG and larger, use lugs to connect to flat busbars, or to equipment designed for use with lugs.

PART 4 - COMPENSATION

4.01 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16130 - BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for outlet, junction and pull boxes.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16190 Supports

1.3 CITED STANDARDS:

A. National Electrical Manufacturers Association (NEMA):

0S1 Sheet Steel Outlet Boxes, Device Boxes, Covers and Box Supports

250 Enclosures for Electrical Equipment (1000 Volts Maximum)

B. Underwriters Laboratories Inc.(UL):

50 Enclosures for Electrical Equipment

514A,B Metallic Outlet Boxes and Fittings

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

B. Shop drawings for custom boxes.

1.7 DELIVERABLES:

(None listed)

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Raco, Steel City, Crouse-Hinds, Hoffman Engineering Company, Hubbell, Inc., or approved equal.

2.2 OUTLET BOXES:

A. Size to accommodate devices and wiring.

B. Outlet boxes and accessories: Suitable for their location and intended use, conform to NEMA 0S1, UL 50, and UL 514 A, B.

C. For damp or wet locations: Corrosion-Resistant cast metal type with threaded hubs and 1/8 inch rubber gasket between box and cover.

D. Industry standard NEMA 6, 6P (IP67, IP68) Rate D submersible enclosures.

2.3 JUNCTION BOXES AND PULL BOXES:

A. Sizes of junction and pull boxes shall provide sufficient space for pulling, racking, or splicing.

B. Junction boxes, pull boxes, and accessories: Suitable for their location and intended use; conform to NEMA 250.

C. Boxes with any dimension greater than 12 inches shall have hinged covers. Boxes with any dimension greater than 36 inches shall have sectional hinged covers.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 INSTALLATION:

A. Comply with the requirements of Section 16010.

B. Install outlet, junction, and pull boxes in accordance with manufacturer’s instructions, where shown on Contract Drawings and as required, plumb, square and level.

C. Locations on Contract Drawings are approximate unless dimensioned.

D. Install outlet boxes at locations and mounting heights suitable for the application. Install switch boxes on the strike side of doors.

E. Provide supports in accordance with Section 16190.

F. In damp or wet locations, install watertight conduit hubs on junction and pull boxes.

G. Provide internal barriers where more than one phase of a three-phase system will be installed in an outlet box.

H. Support boxes independently of the raceway system.

I. Provide separate boxes for wiring of different voltages.

J. In submersible locations, install submersible pull boxes and enclosures.

PART 4 - COMPENSATION

4.1 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16170 - GROUNDING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for system and equipment grounding and bonding.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16123 Wiring

1.3 CITED STANDARDS:

A. Institute of Electrical and Electronic Engineers (IEEE):

81 Guide for Measuring Earth Resistance, Ground Impedance, and Earth Surface Potentials of a Ground System

B. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE):

C2 National Electrical Safety Code

C. American National Standards Institute/National Fire Protection Association (ANSI/NFPA):

70 National Electrical Code

D. American National Standards Institute/Underwriters Laboratories, Inc (ANSI/UL):

467 Grounding and Bonding Equipment

486A Wire Connectors and Soldering Lugs for Use with Copper Conductors

E. American Society for Testing and Materials (ASTM):

B3 Standard Specification for Soft or Annealed Copper Wire

B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

B33 Standard Specification for Tinned Soft or Annealed Copper Wire for Electrical Purposes

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data with installation recommendations.

B. Procedures and equipment for testing resistances and electrical continuity.

1.7 DELIVERABLES:

A. Acceptance test report certifying that ground resistance and electrical continuity.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Erico; FCI; Ilsco; O-Z/Gedney; Thomas and Betts, or approved equal.

B. Grounding systems, conductors, components, and installation methods shall conform to IEEE 81, ANSI/IEEE C2, ANSI/IEEE 837, ANSI/NFPA 70, ANSI/UL 467, ANSI/UL 486A, ASTM B3, ASTM B9, ASTM B33, as appropriate.

2.2 GROUNDING CONDUCTORS:

A. Size of conductors shall be as required by the National Electrical Code.

B. Material: Copper, bare or insulated, solid or stranded, tinned or untinned, as indicated.

C. Equipment grounding conductors: 600 volt green color insulation. #10 AWG may be solid or stranded. #8 AWG and larger shall be stranded.

G. Ground bus: Bare, annealed copper bars of rectangular cross section, with insulators

2.3 CONNECTORS, LUGS, AND TERMINALS:

A. Copper, suitable for the intended use. Conforming to the requirements of Section 16123 where used on equipment grounding conductors.

B. Bolted connectors: Bolted-pressure type connectors, or compression type.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 GENERAL:

A. Ground and bond non current-carrying metallic parts.

3.3 APPLICATION:

A. Use insulated copper equipment grounding conductors for feeders and branch circuits, except that where circuits rated 600 volts or less with run lengths of 300 feet or less are run in RGS conduit, the conduit may serve as the equipment grounding conductor.

B. Use bolted pressure clamps for terminations of equipment grounding conductors.

3.5 INSTALLATION:

A. Comply with the requirements of Section 16010 and National Electrical Code Article 250.

B. Metal raceways: Make all metal raceways electrically and mechanically continuous. Install bonding jumpers at expansion joints.

C. Equipment grounding conductors: Run insulated equipment grounding conductors with the circuit conductors of feeders and branch circuits.

D. Bonding straps and jumpers: Install bonding straps and jumpers so that vibration by equipment is not transmitted to rigidly mounted equipment. Install straps in locations accessible for maintenance.

3.6 CONNECTIONS:

A. General: Make connections so that the possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.

2. Make connections with clean, bare metal at points of contact.

3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Equipment Grounding Conductor Terminations: For #8 AWG and larger, use pressure-type grounding lugs. For #10 AWG and smaller, grounding conductors may be terminated with winged pressure-type connectors.

C. Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors unless otherwise indicated.

D. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

3.7 ACCEPTANCE TESTING:

(None Noted)

PART 4 - COMPENSATION

4.1 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16190 - SUPPORTS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for supports for electrical work.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

1.3 CITED STANDARDS:

A. American Society for Testing and Materials (ASTM):

A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

A283 Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars

A307 Carbon Steel Bolts and Nuts

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

1.7 DELIVERABLES:

(None listed)

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Appleton Electric Co., B-Line Systems, Inc., Hilti, Inc., O-Z/ Gedney, Thomas & Betts, Unistrut Corp., Versabar Corp., or approved equal.

B. Products for use in damp or wet locations, or in contact with concrete, shall be hot-dip galvanized in accordance with ASTM A123, and shall be 40 mil PVC coated.

2.2 SUPPORTS:

A. Anchors and fasteners for:

1. Concrete surfaces: Self-drilling anchors or expansion anchors.

2. Solid masonry walls: Expansion anchors or preset inserts.

B. Steel channels: Galvanized, roll-formed from minimum 12-gauge steel, conforming to ASTM A283, Thomas & Betts Superstrut, or approved equal.

C. Bolts, nuts, screws, and washers: Type, grade, and class required for the application. Hot-dip galvanized in accordance with ASTM A153.

1. Bolts and nuts: Hex-type in inch sizes, conforming to ASTM A307.

D. PVC coated street, hangers and clamps; right angle beam clamps and U-bolts shall be specially formed and sized to snugly fit the outside diameter of the PVC coated conduit. Support products such as ferrous strut, beam clamps, pipe straps, clamp back spacers, conduit clamp hangers and all thread rods shall have a minimum 15 mil PVC coating by the manufacturer of the electric rigid metal conduit and system components.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

D. Verify locations of installed supports before concrete is poured.

3.2 INSTALLATION:

A. Comply with the requirements of Section 16010.

B. Install supports in accordance with manufacturer's instructions. Do not exceed the manufacturer's recommended loads.

C. Install supports with sufficient rigidity to prevent vibration and movement, or loads from being imposed on electrical equipment.

D. Provide supplementary supports where required.

E. Provide supports for electrical work separate from supports for other work.

F. Install junction and pull boxes with four anchors, minimum. Install spacers to provide clearance from the supporting surface.

G. Do not drill or puncture structural steel, or cantilever a load off structural steel.

PART 4 - COMPENSATION

4.1 MEASUREMENT AND PAYMENT:

A. The work under this section will not be measured or paid for separately, but the cost hereof shall be included in the Division lump sum bid.

END OF SECTION

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for electrical identification.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

1.3 CITED STANDARDS:

A. Occupational Safety and Health Administration (OSHA):

29 CFR 1910 Safety and Health Standards

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

B. Sample of each product.

1.7 DELIVERABLES:

(None listed)

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Tech. Products, Inc., Brady USA, Inc., Ideal Industries, Inc., National Band and Tag Co., or approved equal.

2.2 IDENTIFICATION PRODUCTS:

A. Color coded plastic tape: Self-adhesive, flame-retardant, weather-resistant, vinyl electrical tape, minimum 7 mils thick by 3/4 inches wide, of the color specified.

B. Cable and wire markers: Vinyl cloth marking labels.

C. Conduit markers: Pressure-sensitive polyester markers with black letters on orange background, sized to fit conduit.

D. Plastic signs: Self-adhesive or pressure-sensitive, pre-printed, flexible vinyl for operation instructions or warnings, sized for adequate visibility, with suitable wording for each application.

E. OSHA standard "DANGER" signs: Baked enamel aluminum; red, black and white graphics; 14 inches by 10 inches, with suitable wording for each application.

F. Plastic nameplates: Three-layer, laminated melamine with engraved black letters on white background, unless otherwise indicated, with beveled edges, peel-and-press adhesive backing, and small mounting holes for stainless steel fasteners.

G. Lettering and graphics: As required for operation and maintenance of systems and equipment.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 APPLICATION:

A. Comply with the requirements of Section 16010.

B. Apply color-coded plastic tape to identify conductors of lighting and power circuits. The color-coding shall be consistent with established practice at the Hoboken Terminal Replacement of Pumps for Ejector Stations 4 and 5.

C. Apply cable and wire markers on conductors in boxes, enclosures, or cabinets, where more than one circuit is present.

D. Apply conduit markers on conduits run exposed and above hung ceilings. Indicate service. The conduit identification shall be consistent with established practice at the facility.

E. Apply self-adhesive plastic signs on electrical equipment enclosures to warn unauthorized personnel.

F. Apply danger signs where required by OSHA. Apply appropriate danger signs on electrical equipment enclosures, cabinets, and boxes. Indicate the voltage level present.

G. Apply plastic nameplates on electrical equipment including junction boxes and pull boxes identifying the equipment or function.

1. Attach nameplates to the outside of enclosures with small-size stainless steel screws in addition to the adhesive backing.

2. In offices and public areas, attach nameplates to the inside of equipment enclosure doors with adhesive backing only.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Electrical Identification" covered by this section shall be included in the Division 16 lump sum item for "All Other Work in Division 16".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 16440 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for enclosed switches and circuit breakers.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16170 Grounding

C. Section 16190 Supports

D. Section 16195 Electrical Identification

1.3 CITED STANDARDS:

A. National Electrical Manufacturers Association (NEMA):

250 Enclosures for Electrical Equipment (1000 Volts Maximum)

AB 1 Molded Case Circuit Breakers

KS 1 Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)

B. Underwriters Laboratories Inc. (UL):

98 Enclosed and Dead-Front Switches

198 E Class R Fuses

489 Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

1.7 DELIVERABLES:

A. Acceptance test report.

B. Maintenance manual.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Manufacturers: Cutler-Hammer, General Electric Co., Siemens Energy and Automation, Square-D Co., or approved equal.

B. Fuse manufacturers: Bussman, Gould Shawmut, Littelfuse, or approved equal.

C. Equipment ratings shall be as indicated.

2.2 SWITCHES AND FUSES:

A. Non-fusible switches: Heavy-duty, quick-make, quick-break, load interrupter type, with externally-operable handle, conforming to NEMA KS1 and UL98. Interlocked to prevent opening the front cover with switch in the ON position. Handle lockable in the OFF and ON positions.

B. Fusible switches: Similar to non-fusible switches; accommodate Class R fuses, unless otherwise indicated.

C. Fuses: Rated 600 amps and less, conforming to UL 198E and the requirements of Section 16180. Voltage rating of 250 VAC or 600 VAC to suit the application.

2.3 ENCLOSURES:

A. In accordance with UL 489, with ground lug welded to the box. Conform to NEMA 250 and the requirements of Section 16010.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 APPLICATION:

A. Provide horsepower-rated switches to suit the application where switches are used on motor circuits.

3.3 INSTALLATION:

A. Conform to the requirements of Section 16010.

B. Install enclosed switches and circuit breakers in accordance with manufacturer's instructions, plumb, square and level.

C. Install Class RK-1 fuses in fusible switches, except where circuits are subject to temporary motor overloads or high inrush currents, use Class RK-5.

D. Provide watertight conduit hubs in damp or wet locations.

E. Provide an auxiliary contact where required for interlocking.

F. Provide grounding in accordance with Section 16170.

G. Provide supports in accordance with Section 16190.

H. Provide nameplates in accordance with Section 16195.

3.4 FIELD TESTING AND ADJUSTMENTS PRIOR TO ACCEPTANCE TESTING:

A. Perform inspections and tests in accordance with the requirements of Section 16010.

3.5 ACCEPTANCE TESTING:

A. Perform acceptance testing in accordance with Section 16010. Deliver a test report.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Enclosed Switches and Circuit Breakers" covered by this section shall be included in the Division 16 lump sum item for "All Other Work in Division 16".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Requirements for lighting, and power distribution panelboards.

1.2 REFERENCED SECTIONS:

A. Section 16010 Basic Electrical Requirements

B. Section 16190 Supports

C. Section 16195 Electrical Identification

1.3 CITED STANDARDS:

A. American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE):

C62.11 Metal-Oxide Surge Arresters for Alternating Current Power Circuits

C62.41 Surge Voltages in Low-Voltage AC Power Circuits

C62.45 Guide on Circuit Testing for Equipment Connected to Low-Voltage AC Power Circuits

B. National Electrical Manufacturers Association (NEMA):

AB 1 Molded Case Circuit Breakers

LS 1 Low Voltage Surge Protection Devices

PB 1 Panelboards

PB 1.1 General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less

C. Underwriters Laboratories Inc. (UL):

50 Enclosures for Electrical Equipment

67 Panelboards

489 Molded Case Circuit Breakers, Molded Case Switches, and Circuit Breaker Enclosures

1449 Transient Voltage Surge Suppressors

1.4 NOTED RESTRICTIONS:

(None noted)

1.5 QUALITY CONTROL:

(None listed)

1.6 SUBMITTALS:

A. Product data for each specified product.

B. Shop drawings showing front and side elevations with dimensions; conduit entrance locations; nameplate legends; location of busbars for phases, neutral and ground; busbar material; electrical characteristics, location and type of main.

1.7 DELIVERABLES:

A. Acceptance test reports.

B. Maintenance manual.

PART 2 - PRODUCTS

2.1 GENERAL:

A. Panelboard manufacturers: Cutler-Hammer, General Electric Co., Siemens Energy and Automation, Square-D Co., or approved equal. All panelboards shall be the products of one manufacturer.

B. Panelboard ratings as indicated.

C. Conform to NEMA PB1, UL 67 and UL 489.

D. Panelboards marked with UL listed Short Circuit Current Rating (SCCR) not less than the maximum short circuit current available at the line terminals.

2.2 PANELBOARD CONSTRUCTION:

A. Plated copper busbars of sufficient cross-sectional area to meet UL 67 temperature rise requirements. Include a neutral bus and equipment ground bus.

B. Bus shall have sequentially phased branch circuit connectors suitable for bolt-on circuit breakers.

C. Field-convertible interior for top or bottom incoming feed. Vertically mounted main breaker or main lugs only, as indicated. Main lug interiors field-convertible to main breaker.

D. Dead-front interior construction with pre-formed twistouts covering unused mounting spaces.

E. Flush-mounted panelboards shall have interior leveling provisions.

2.3 MAIN CIRCUIT BREAKER:

A. Thermal-magnetic molded-case, bolt-on type, conforming to NEMA AB1, UL 489, and the requirements of Section 16180.

2.4 BRANCH CIRCUIT BREAKERS:

A. Thermal-magnetic molded-case, bolt-on type, conforming to NEMA AB1, UL 489, and the requirements of Section 16180.

B. UL listed with continuous current ratings, interrupting ratings, and number of poles indicated.

2.5 NEMA 1 ENCLOSURES:

A. Galvanized steel conforming to UL 50.

B. Removable endwalls with knockouts located on one end and welded interior mounting studs.

2.6 NEMA 1 TRIM FRONTS:

A. Meet strength and rigidity requirements of UL 50; painted ANSI 61 to provide uniform coating of edges and surfaces.

B. Hinged one-piece with door: flush or surface mounting, as indicated.

C. Concealed door hinges and trim screws; front not removable with the door locked.

D. Cylindrical tumbler type lock with catch and spring-loaded stainless steel door pull. Provide two keys with each lock.

E. Clear plastic directory cardholder mounted on the inside of door.

2.7 NEMA 12 ENCLOSURES:

A. Galvanized steel conforming to UL 50.

B. Doors gasketed.

C. Cylindrical tumbler-type lock and two additional trunk latches.

D. Clear plastic directory cardholder mounted on the inside of door.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Transmit submittals and deliverables required by this Section.

B. Furnish products as indicated.

C. Ensure substrates are in suitable condition to receive the work of this Section.

3.2 INSTALLATION:

A. Comply with the requirements of Section 16010.

B. Install panelboards in accordance with the manufacturer's instructions and NEMA PB1.1, plumb square and level.

C. Provide grounding in accordance with Section 16170.

D. Provide supports in accordance with Section 16190.

E. Provide nameplates in accordance with Section 16195.

F. Measure steady state load currents at each panelboard feeder. Rearrange branch circuits to balance the phase loads within 10%. Maintain proper phasing for multiwire branch circuits.

G. Type and insert the panelboard circuit directory.

3.3 FIELD TESTING AND ADJUSTMENTS PRIOR TO ACCEPTANCE TESTING:

A. Perform inspections and tests in accordance with the requirements of Section 16010.

3.4 ACCEPTANCE TESTING:

A. Perform acceptance testing in accordance with Section 16010. Deliver a test report.

PART 4 - COMPENSATION

4.1 PAYMENT

A. Payment for "Panelboards" covered by this section shall be included in the Division 16 lump sum item for "All Other Work in Division 16".

4.2 MEASUREMENT

A. All work required to complete the specific tasks in this section shall not be measured.

END OF SECTION