PROJECT MANUAL
NKU NORSE HALL EXTERIOR REPAIRS
HIGHLAND HEIGHTS, KY

APPENDIX #1

April 2020

THP # 20111.00

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DIVISION 02 – EXISTING CONDITIONS

SECTION 024119

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. All labor, material, equipment, special tools and services to complete selective demolition work required for the project, as indicated on the Drawings and in the Specifications, but not limited to:

a. Demolition of selected portions of the building as indicated in the Contract Documents.

b. Demolition and removal from the job site of miscellaneous features as indicated in the Contract Drawings.

c. Removal from the job site and legal disposal of existing debris and accessories as shown on the Drawings.

d. Supply and maintenance of dumpsters to accommodate debris removals.

e. Maintenance of drains to accommodate storm water during demolition.

2. Materials Ownership:

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

b. Storage or sale of removed items or materials on-site will not be permitted.

1.2 REFERENCES AND REGULATORY REQUIREMENTS

A. Conform to applicable laws, ordinances, and the State Building Code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.

B. Comply with ANSI A10.6.

C. Comply with applicable requirements of NFPA Standard No. 241.75 - Safeguarding Building Construction & Demolition Operations.

D. Obtain required permits from authorities.

E. Do not close or obstruct roadways, sidewalks, and hydrants without permits.

F. Do not close or obstruct egress width to any building or site exit.

G. Do not disable or disrupt building fire or life safety systems without three days prior written notice to the Owner.

H. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.

1.3 SUBMITTALS

A. Schedule of selective demolition activities indicating the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.

2. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress.

3. Coordination of Owner's continuing occupancy of the Building.

B. Inventory: After demolition is complete, submit a list of items that have been removed and salvaged for Owner.

C. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by demolition operations. This submittal should be delivered before Work begins.

1.4 QUALITY CONTROL

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project. The firm shall have successfully performed at least three verifiable projects, similar to this project, within the last seven years.

B. Work in this Section shall be under the immediate control of a person (Contractor's superintendent or other designated person) experienced in this type of work. The person identified with immediate control of the work shall have supervised three verifiable projects of similar magnitude and type. Supervising person shall be present during all operations.

C. Pre-Demolition Conference: Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.

2. Review and finalize selective demolition schedule; verify availability of all materials, demolition personnel, equipment, and facilities needed to maintain the schedule.

3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

4. Review areas where existing construction is to remain and requires protection.

D. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

A. Contractor shall coordinate with the Owner for the required access and staging areas needed to accommodate demolition operations at grade areas.

B. The Owner will continue to occupy portions of the Building immediately beneath the selective demolition area. Conduct selective demolition so that the Owner's operations will not be disrupted. Provide not less than 72 hours' notice to the Owner of activities that will temporarily affect the Owner's operations.

C. Demolition Efforts:

1. The Contractor shall collect all debris generated by the demolition process and legally dispose of off the Owner's property. Do not stockpile debris on the deck area. Remove dumpsters containing debris upon filling to capacity or completion of the work.

2. The Owner assumes no responsibility for actual condition of features and components to be selectively demolished.

a. Conditions existing at time of inspection for bidding purpose will be maintained by the Owner as far as practical.

D. Utility Services:

1. Maintain existing utilities required to remain, keep in service, and protect against damage during demolition operations.

2. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction and the Owner. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities and Owner.

3. Disconnect, seal, and remove utilities or services in selective demolition area before starting selective demolition operations.

E. Damages: Promptly repair damages to adjacent construction, on or off site, caused by

demolition operations at no cost to the Owner.

F. Prevent insect and rodent infiltration. If necessary, employ an exterminator and treat entire building in accordance with governing health regulations for rodent and insect control.

G. Hazardous Materials:

1. Notify the Owner if asbestos-containing materials are encountered during demolition.

PART 2 PRODUCTS - (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas intended for demolition and note conditions or defects that will adversely affect the execution and/or quality of the work.

B. Notify Owner in writing of any such conditions or defects. Do not begin work until unsatisfactory conditions are corrected. Failure to notify Owner prior to beginning work constitutes acceptance by Contractor of the surfaces and conditions under which the work is to be performed, and acceptance by Contractor for the performance of the work.

C. Inventory and record the condition of items to be removed and salvaged.

D. Engage a professional demolition engineer to perform an engineering survey of existing conditions of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

E. Verify that hazardous materials have been remedied before proceeding with selective demolition operations.

3.2 PREPARATION

A. Protection:

1. Provide temporary protection during the course of the work to prevent water entry into the building and walls and to maintain the building in a weather tight condition. Ensure that protection is in place and water tight before ending day's work.

2. Be prepared for unexpected weather changes so that temporary protection can be quickly installed.

3. Provide, erect, and maintain temporary barriers and security devices. Prevent spread of dust, odors, and noise to permit continued Owner’s occupancy.

4. Provide protection on existing surfaces and features to remain. Secure protection to prevent wind events from shifting or moving temporary protection. Securement methods shall not penetrate the surfaces or features. Protection shall define the path over which demolished material will be transported.

5. Conduct demolition operations and remove debris to ensure minimum interference with the interior of the Building, roads, streets, walks, adjacent structures, and utilities.

6. Conduct operations with minimum interference to public or private accesses. Maintain protected egress and access at all times.

7. Protect existing landscaping materials, structures, and utilities which are not to be demolished.

3.3 DEMOLITION REQUIREMENTS

A. Coordinate regular removal and replacement of filled dumpsters from the job site during off hours only, unless pre-approved by the Owner in advance.

B. Do not remove any part of the work that will leave the remaining work unstable, until adequate temporary bracing and shoring have been provided, or until permanent bracing or construction is in place. Cease operations immediately if adjacent structures appear to be in danger. Notify Owner and authority having jurisdiction. Do not resume operations until directed.

C. If deteriorated materials, not intended for removal, are encountered during demolition, stop all work in that area and notify the Owner immediately.

D. Demolish and remove existing construction to the extent required and as indicated. Use methods required to complete work within limitations of governing regulations and as follows:

1. Where required, neatly cut materials to be removed. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

2. Remove temporary work.

E. Explosives: The use of explosives will not be permitted.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. General: except for items to be salvaged, etc, remove demolished materials from project site and legally dispose of them in an EPA approved landfill.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.

1. Provide containers or other storage method for controlling recyclable materials until they are removed from Project site.

2. Stockpile processed materials on site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3. Stockpile materials away from demolition area. Do not store within the drip lines of remaining trees.

4. Store components off the ground and protect from the weather.

5. Transport materials off Owner's property and legally dispose of them.

C. Remove from site and legally dispose of debris, rubbish, and other materials resulting from demolition operations.

D. Burning of removed materials will not be permitted on the site.

3.5 PATCHING AND RESTORATION

A. Neatly patch and finish disturbed existing surfaces damaged by demolition.

B. Verify all patch locations, methods, and procedures with Engineer prior to beginning repairs.

3.6 STORM DRAINAGE MAINTENANCE

A. Maintain all drains during construction. Keep free and clear of debris to allow for proper drainage. Construction and construction barriers should not impede normal site drainage.

3.7 CLEANING

A. Clean adjacent floor and wall surfaces to remove dust, dirt, debris, sludge, etc., regardless of existing conditions prior to demolition.

END OF SECTION

DIVISION 03 – CONCRETE

SECTION 030100

CONCRETE REPAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. All labor, material, tools, equipment and services to perform concrete repairs at areas indicated on the Drawings and in the Specifications, including but not limited to:

1. Concrete slab on metal deck repairs.

2. Miscellaneous repairs indicated on the Drawings.

1.2 RELATED SECTIONS

A. Section 071800 – Vehicular Traffic Membrane.

B. Section 079200 – Sealants.

1.3 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 - Specification for Structural Concrete for Buildings.

2. ACI 305R - Hot Weather Concreting.

3. ACI 306R - Cold Weather Concreting.

4. ACI 318 - Building Code Requirements for Reinforced Concrete.

B. American Society for Testing and Materials (ASTM):

1. ASTM A185 - Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.

2. ASTM A615 - Specification for Deformed and Plain-Billet Steel Bars for Concrete Reinforcement.

3. ASTM A775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

4. ASTM C33 - Concrete Aggregates.

5. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.

C. Structural Steel Painting Council (SSPC):

1. Surface Preparation Specification No. 3 (SP3) – Wire Wheel Cleaning.

2. Surface Preparation Specification No. 6 (SP6) – Commercial Blast Cleaning.

D. American Association of State Highway and Transportation Officials (AASHTO): AASHTO M182 - Specifications for Burlap Cloth Made from Jute or Kenaf.

E. Keep a copy of the referenced specifications cited in this section in the on-site field office.

1.4 SUBMITTALS

A. Submit literature for manufactured products, including manufacturer's specifications, test data and installation instructions.

B. Letter stating this Contractor and supplier are familiar with the referenced standards.

C. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.

1.5 QUALITY ASSURANCE

A. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. Concrete that does not conform to the specified requirements, including bond to substrate, strength, finish and tolerances shall be subject to removal and replacement, including necessary preparatory work, at no additional cost to the Owner and without extension to the Contract Time.

C. Contractor shall be responsible for restoration of other components of the Work damaged during placement of concrete or damaged during removal of unsatisfactory concrete.

D. ACI 301, ACI 305R and ACI 306R are a part of the Contract Documents, are incorporated herein as fully as if here set forth and are referred to as General Concreting Requirements.

E. Chloride Ion Limitations: Maximum acid-soluble chloride ion concentration, in hardened concrete shall not exceed .10% by weight of cement.

F. Concrete testing and certification shall be as described in ACI 301, Chapter 16.

1.6 JOB CONDITIONS – SHORING

A. Shoring is incidental to this project and required at all joist hanger and slab repair areas. Provide as many shore posts as needed in order to phase the work. Shores are to be design for a minimum strength of 2000 lbs.

B. Install shores before removing concrete from the structural member that is designated to be shored.

C. Shores must be on-site prior to beginning any concrete demolition work.

1.7 WARRANTY

A. A warranty period of two (2) years shall be provided for concrete work performed under this Section against defects, as determined by the Owner, including but not limited to debonding, excessive cracking and surface scaling.

PART 2 PRODUCTS

2.1 MATERIALS

A. General:

1. Ready mixed materials used for concrete shall be furnished from the same source throughout the project unless otherwise approved by the Owner.

B. Cement:

1. Use ASTM C150, Type I cement unless noted otherwise. Air-entrained cement shall not be used. Air requirements shall be met by separate admixtures.

C. Admixtures:

1. Air-entraining admixtures meeting the requirements of ASTM C260.

2. High range water reducer meeting the requirements of ASTM C494.

3. Calcium chloride, calcium nitrate and thiocyanates are not permitted. Admixtures containing more than 0.05% chloride ions are not permitted.

4. Use approved admixtures in accordance with manufacturer's recommendations.

D. Fine and Coarse Aggregates:

1. Meeting requirements of ASTM C-33.

E. Water:

1. Mixing water shall be potable meeting requirements of ASTM C-94.

F. Pre-packed Concrete Materials:

1. Horizontal Application – Typical Repair Areas (Patch Material Type A):

a. MasterEmaco T 310CI by BASF

b. SikaQuick 1000 by Sika Corp.

c. MasterEmaco T 1060/1061 by BASF

d. Planitop 18 ES by Mapei. (Planitop 18 TG is trowel grade for ramps)

G. Bonding Agent (used for shallow floor patches if the patch is not deep enough for patch anchors; patch material must be placed while epoxy is still wet)

1. Sikadur 32, Hi-Mod LPL by Sika, Inc.

H. Welded Wire Reinforcement:

1. Conforming to ASTM A185.

I. Reinforcing Steel:

1. All reinforcing steel shall have a minimum Fy of 60 ksi.

2. Provide epoxy coated steel where shown on Drawings.

J. Curing Materials:

1. 10 oz. burlap meeting the requirements of AASHTO M-182.

2. Visqueen: 6 mil polyethylene (white).

K. Curing Compound:

1. VOCOMP-25 by W.R. Meadows.

2. MasterKure CC 1315WB by BASF

3. Liquid membrane forming curing compound shall conform to the requirements of ASTM C1315, Type 1, Class A and have data from an independent laboratory indicating a maximum moisture loss of 0.40 grams per square cm. when applied at a coverage rate of 300 square feet per gallon.

L. Form Lumber:

1. New fire-retardant material, grade and size to adequately form, support and brace concrete and to provide finishes that match adjacent surfaces.

M. Epoxy Grout:

1. Sikadur 32, Hi-Mod LPL epoxy mixed with silica sand.

N. Patch Anchors:

1. Stainless steel spikes by Powers Rawl.

PART 3 EXECUTION

3.1 GENERAL

A. Prior to the start of work, the Contractor shall survey areas to receive repair concrete to determine locations and approximate quantity of material.

B. Prior to start of excavations, perform an on-site review of the work areas with the Owner. Provide a minimum of 2 working days' notice prior to the requested review day.

C. Prior to performing operations such as jack hammer work, the Contractor shall make a careful and thorough survey of the underside of the level on which he intends to work and shall remove all loose soffit concrete which may fall as a result of those operations. The Contractor shall also be responsible for posting all signs and erecting all barricades as necessary to prevent pedestrians and vehicles from entering the area below hazardous work.

D. During concrete removal work, Contractor shall not damage existing mild steel reinforcement. Mild steel reinforcement that is damaged by the Contractor, as determined by the Owner, shall have a new reinforcing bar the same size as the damaged bar lapped to each side of the damaged area. Lap lengths shall be determined by ACI 318. Cost of new reinforcing bar, concrete removal and patching for lap length shall be borne by the Contractor.

E. It is intended that the existing reinforcement steel exposed during the work shall remain in place (unless noted on Drawing for removal) and undamaged during removal of the unsatisfactory concrete. Tie loose reinforcement bars in place in an approved manner prior to placing patch mix. If the reinforcement is deteriorated, as determined by the Owner, the Owner may direct that it be replaced and spliced in accordance with ACI splice and development requirements for reinforcement bars. Additional concrete removal may be required to expose undamaged reinforcing. If required, compensation will be made in accordance with the established Unit Prices.

F. Concrete placement for patches or overlays on sloping surfaces shall begin on the low elevation end and proceed upwards to the high elevation end.

G. Control joints to be either tooled or sawed into concrete slab. Confirm control joint pattern with Owner prior a minimum of 24 hours prior to placement of concrete. Tooled joints are to be cut while concrete is wet. Sawed joints to be cut within 6 hours of slab placement before slab begins to crack.

3.2 PROTECTION

A. Contractor shall protect all open excavations, and reinforcing therein, from damage

due to mechanical disturbance, weather conditions or other causes.

B. Contractor shall protect occupied areas below the work area during all phases of the work including removal, preparation and placement of materials.

C. Provide barricades to close areas immediately below the work area. Coordinate the time closing of required areas with the Owner.

3.3 SHALLOW AND FULL DEPTH FLOOR REPAIR PROCEDURE

A. Refer to the Drawings for repair details. Contractor shall sound the concrete deck using chain drag method and hammer survey to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner's representative.

B. Before removal of floor concrete within a Work Area, the Contractor and the Owner's representative will record the area bounded by the paint marks. Take measurements to the nearest inch in such a way that results in a total plan area at each location.

C. Contractor and Owner's representative shall affix their signatures to each measurement sheet completed, attesting to the agreed-upon accuracy of the measurements. Furnish copies of measurement sheets to both parties for their records.

D. Sum and calculate the total repair area to yield total square feet. Measurements are the sole basis for calculation of final payment. Base unit price on the area of the repair and the depths indicated on the repair details.

E. Remove floor concrete within the Work Area by conventional chipping methods.

F. Conventional Chipping Method:

1. Sawcut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of sawcuts shall be 3/4 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.

2. Perform concrete removal with no larger than 18 pound chipping hammers.

3. Begin concrete removal at the center of the removal area and work towards the sawcut perimeter. Maintain vertical sawcut edge at perimeter. Re-saw if necessary, to maintain required edge.

4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.

G. The surface of the sound, exposed concrete shall be relatively flat with 1/4" amplitude over the repair area for new concrete patches and overlays. Contractor

is responsible for ensuring that the final concrete repair area is sound.

H. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

I. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.

J. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.

K. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.

L. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate or allow coating to puddle in low areas of excavation.

M. Thoroughly saturate all concrete surfaces to be in contact with new concrete as necessary to provide a saturated surface dry condition.

N. Just prior to concrete placement blow-down area with oil-free compressed air to remove standing and puddled water.

O. Place Patch Material Type A in the excavations. Vibrate new patch material to ensure consolidation in maximum-depth areas and at the excavation's perimeter. Screed material flush with adjacent surfaces and finish with a float or light trowel.

P. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.

Q. Cure Patch Material Type A in accordance with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. All excavations shall be inspected and approved prior to placing concrete. The Contractor shall notify the Owner 2 working days in advance of required inspection.

B. Notify the Owner at least 2 working days prior to placing concrete.

C. Acceptance of Structure:

1. Acceptance of Structure shall be in accordance with ACI 301 Chapter 18.

2. Contractor shall bear all costs of correcting rejected work, including the cost of Owner's services thereby made necessary.

3.5 CLEANING

A. Empty containers shall be removed from the Garage at the end of each working day. Cloths soiled with adhesive materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage of disposal of flammable materials. Comply with health, fire and environmental regulations.

B. All spilled materials shall be completely removed from hardware, adjacent floor areas, metal work, etc. Remove spilled coating by approved methods.

C. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation of adhesive materials installations.

D. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dust, dirt and debris.

END OF SECTION

DIVISION 05 – METALS

SECTION 051200

STRUCTURAL STEEL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 SUMMARY

A. Section includes all labor, materials, equipment, special tools and services to complete Structural Steel and Other Steel work required for the Project, as herein specified, and as indicated on the Drawings, including but not limited to:

1. All Structural Steel indicated, including design of connections not shown on the Drawings.
2. All accessories, attachments, anchors and rough hardware for structural steel work. Accessories include anchor bolts, embed plates, deck support angles, etc.
3. All Other Steel indicated on the Structural Drawings is included under this Section.
4. High performance coating where shown on the Drawings.
5. Quality control, testing and inspection specified to be performed by the Contractor.
6. Coordination with related and adjacent work shown on the Drawings.

B. The Contract Documents do not differentiate between fabrication and erection work. Should fabrication and erection be performed by separate contractors, the fabricator is responsible for the scope of work of erector and is responsible for resolution of any disputes that may arise.

1.3 REFERENCES

A. Comply with the provisions of the following codes, specifications and standards; use the latest edition unless date is indicated. Modifications in this specification, when in conflict with the referenced codes, specifications and standards, shall take precedence.

1. “Kentucky Building Code” (KBC).
2. American Institute of Steel Construction (AISC) ANSI/AISC 303-16: "Code of Standard Practice for Steel Buildings and Bridges," June 15, 2016, as modified by the project drawings and this specification; and modifications in Part 4 at the end of this section.
3. ANSI/AISC 360-16: "Specification for Structural Steel Buildings" and including the "Commentary on the Specification for Structural Steel Buildings", July 7, 2016.
4. Research Council on Structural Connections (RCSC): "Specification for Structural Joints using High-Strength Bolts", August 1, 2014.
5. ASTM International (ASTM) Specifications and references as noted in this Section.

6. American Welding Society (AWS) D1.1/D1.1M-2010: "Structural Welding Code – Steel."
7. ASTM A6/A6M-17: "Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling ".
8. International Code Council Evaluation Service (ICC-ES) AC193: "Acceptance Criteria for Mechanical Anchors in Concrete Elements".
9. ICC-ES AC308: "Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements".
10. American Galvanizer's Association (AGA) Recommendations and Suggested Specifications for Hot-Dip Galvanizing.
11. OSHA Regulations, current edition.

1.4 QUALIFICATIONS

A. Contractor must have a minimum of 5 years of successful experience in the type of work required and submit with his Bid evidence of qualifications required herein.

B. Steel Fabricator:

1. 10 years of successful experience in the fabrication of structural steel.
2. Completion of 5 projects of similar size and complexity within the last 5 years. Submit a list of projects and their locations. Each project listed is to have at least 70 percent of the steel quantity of the work being bid.
3. Steel fabricator must have an established in-house quality control program for shop drawing production, material tracking, material inspection, welder certification, weld quality, and fabrication accuracy. Fabricator shall be registered and approved per Section 1704.2.5 of the Building Code, and submit required certificate of compliance. Failure to meet these qualifications will require additional inspections prescribed in Building Code Chapter 17 to be performed by the Owner's inspection agency at the Contractor's expense.

C. Steel Erector:

1. 5 years of successful experience in the erection of structural steel.
2. Submit a list of 6 similar completed projects; include key personnel, and equipment.

1.5 SUBMITTALS

A. The Contractor shall review submittals for compliance with the Contract Documents, accuracy, dimensions, fit-up, construct-ability, and coordination with other work. The structural engineer's review will be for general intent of strength and serviceability only.

B. Submit for record with Bid evidence of Contractor's, Fabricator's and Erector's qualifications.

C. Submit for record evidence of Steel Fabricator's and Erector's quality control programs, procedures and certifications showing conformance with Chapter 17 of the Building Code.

D. Submit detailed drawings, include:

1. Complete details and schedules for fabrication and shop assembly of all members.
2. Complete details, schedules, procedures and diagrams for field erection.
3. Layout and installation drawings for all anchor bolts and other items to be embedded in concrete or masonry work by others. Drawings shall dimension the locations of all embedded items noting pertinent tolerances for the installation.

E. Prior to fabrication, submit for record two copies of producer's or manufacturer's specifications and installation instructions for the following items. Include laboratory test reports and other data for evidence as required to show compliance with these specifications (including specified standards). Indicate by transmittal form that copies of each applicable instruction have been distributed to fabricators, installers and erectors.

1. Structural steel: Submit the mill report for each heat of steel used prior to the start of fabrication. Mill reports shall show chemical analysis to include C, Mn, Cr, Mo, V, Ni, Cu and full mechanical properties of the structural steel provided. For unsatisfactory mill test report, retest or reject steel.
2. High-strength bolts, including nuts and washers: Submit certification of inspection test report for each production lot indicating proof load, tensile strength and hardness of high strength bolts. For unsatisfactory test reports, retest or reject bolts.
3. Welding materials and procedures: Submit written welding procedures for all welding on the project, both shop and field. Procedures for complete penetration welds shall include test records to verify the heat-affected zone and show that parent metal for the test meets the grade specified for the project. Welding sequence and procedures are to minimize the effect of weld shrinkage, residual stresses, and to maintain erection tolerances.
4. Mechanical and adhesive anchors, include manufacturer’s evaluation reports (ESR) and specific project locations and conditions where proposed for use.
5. Hot-dip galvanizing and surface preparation procedures

F. During fabrication and construction, Contractor shall submit quality control, inspection and test reports immediately to the Owner's representative and inspector, with a copy to the structural engineer within one week. Include:

1. Welder certification for shop and field welders.
2. Welding, fabrication and erection inspection reports.
3. Welding verification inspection and test reports for all shop and field welds.
4. Bolt and anchor tests and installation reports.
5. Contractor’s weekly inspection report summary.

G. Submit record drawings of the erected steel members to the Owner’s representative.

H. Submittals for record, informational submittals, compliance reports and inspection reports will not be reviewed or returned.

1.6 QUALITY CONTROL

A. Personnel performing the work shall have experience relevant to anticipated conditions, materials, installation requirements and all special techniques involved.

Contractor shall have an experienced foreman or superintendent who will be present while work is performed.

B. The Contractor is responsible for and shall perform quality control, testing and inspection of all work as required by the Contract Documents, referenced codes, specifications and standards. Contractor shall employ qualified inspectors to perform inspections, tests and quality control daily. Submit reports weekly.

C. The Contractor shall reject and replace work that is not in conformance.

D. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure". All welding shall be performed by operators who are qualified for the types of welds used. Verify each operator's qualifications with Owner's inspector prior to using in production.

1. Welders shall retake qualification test if, as determined by the Owner's representative, there is a reasonable doubt as to the proficiency of the welder. If the welder does not requalify he/she shall not perform welding on this project.
2. The Contractor shall pay all costs associated with welder qualification.

E. Qualify mechanical fasteners, mechanical anchors, adhesive anchors and installation processes in accordance with manufacturer's engineering reports and code recognized approval procedure. Installers shall be certified by the manufacturer or an independent organization. Verify each installer's qualifications with the Owner's inspector prior to using in production.

F. Source quality control: All materials shall be Identifiable. Unidentifiable materials shall be tested or rejected.

1. Materials delivered with certificate are classified as Identifiable; those without certificates are classified as Unidentifiable.
2. Test material not identifiable by heat number and mill test, or another acceptable manufacturer's identification per ASTM A370-17. Testing to be performed by Contractor's testing agency as follows:
   a. Structural shapes and plates: From coupons taken from material; one tensile test and one bend test per 5 tons of each shape.
   b. High strength bolts: Each lot of 100 bolts; tensile tests on 2 bolts in full size and one tensile test on a ½" diameter machined specimen.
   c. Other materials: Test as directed.

G. The Contractor shall arrange for review by the Owner's inspection agency. The Contractor shall not rely on the Owner's inspector for the Contractor's quality control. Contractor shall furnish Owner's inspector with the following:

1. One complete set of fabrication and erection drawings.
2. Material bills and mill test reports.
3. Information regarding time, place of rolling and shipment of materials to shop.
4. If requested, representative sample pieces for testing.
5. Full and ample means and assistance for testing materials.
6. Complete set of welding procedures.
7. Welder qualifications.

8. All manufacturers' installation instructions.
9. Anchor installer qualifications.
10. AISC fabricator certification documents QA/QC manual and most recent AISC audit.
11. AISC erector certification documents QA/QC manual and most recent AISC audit.
12. Qualifications for Contractor's quality control personnel and independent testing agency.
13. Reports for all quality control, tests and inspection by Contractor.

H. Structural inspections required by Chapter 17 of the Building Code shall be performed by an approved inspector retained by the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Material storage: Protect structural steel members and packaged materials from corrosion and deterioration. Store off ground and pitched to drain off water.

B. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

C. Deliver welding electrodes to job in unbroken packages bearing name of manufacturer. Special handling for electrodes is required per AWS. Provide and use an oven for electrodes requiring continuous drying prior to use.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural steel:

1. Wide flange shapes: ASTM A992 (Fy 50ksi).
2. Steel pipes: ASTM A53, Type E or S, Grade B (Fy 35ksi). Spiral Pipe is not permitted.
3. Hollow structural sections (HSS): ASTM A500, Grade B (Round Fy 42ksi; Square and rectangular Fy 46ksi).
4. Other rolled shapes, plates and bars: ASTM A36 (Fy 36ksi) unless noted otherwise.
5. Plates and bars noted Grade 50: ASTM A572 (Fy 50ksi).
6. All steel to be welded shall conform to chemical and metallurgical limitations specified in AWS D1.1 and D1.3.
7. Special care shall be used to select plate and rolled sections free from internal laminations. The Contractor shall assure compliance with provisions for lamination inspection.

B. Threaded fasteners:

1. Anchor rods: ASTM F1554, Fy 36ksi, minimum. Supply all anchor rods with two heavy-hex nuts, one nut to be used for base plate leveling, unless otherwise shown.

2. Structural bolts: ASTM A325 heavy-hex structural bolts, heavy-hex nuts and hardened washers, quenched and tempered type 1 medium-carbon steel. Use tension control assemblies conforming to ASTM F1852 everywhere access permits. For all bolts unless noted otherwise.
3. Where access prevents the use of a tension control bolt, install bolt(s) with load indicator washer conforming to ASTM F959, in accordance with "Specification for Structural Joints Using High-Strength Bolts" (12-31-09), paragraph 8.2.4, and mark bolt(s) for inspection. Load indicator washers shall be self-indicating to allow visual observation, and provided with 1 or more additional flat washers, based on hole type, as required by the manufacturer.

C. Welding electrodes:

1. Use electrodes as required by AISC "Specification for Structural Steel Buildings" and the AWS Code. As minimum use E70 XX electrodes, low hydrogen.

D. Expansion Anchors – Stud Type:

1. Stud type with wedge meeting requirements of Federal Specification A-A 1923A, Hot dipped galvanized.
2. Basis of Design: Kwik Bolt TZ Expansion Anchor by Hilti.

E. Adhesive Anchors

1. Injectable adhesive shall be used for installation of steel reinforcing dowels or threaded anchor rods into new or existing solid base materials, such as concrete, grout, stone or solid masonry. Only injection tools and static mixing nozzles as recommended by manufacturer shall be used.
2. Basis of Design: HIT HY 200 Injection Adhesive Anchors by Hilti.
3. Threaded fasteners to be hot dipped galvanized.

F. Galvanizing: ASTM A123. Galvanize bolts and washers connecting galvanized members per ASTM A153, Class C. Touch up with galvanizing repair compound.

G. Galvanizing repair: Zinc rich galvanize repair compound containing 90% minimum zinc by weight in the dried film. Comply with DOD-P-21035 or The Society for Protective Coatings, Paint Specifications No. 20 (SSPC-PS 20).

2.2 FABRICATION

A. The fabricator shall track materials, assemble, inspect and test the work under supervision of qualified quality control personnel, who shall ensure conformance with established written procedures to meet the design requirements. Inspector shall make written daily reports of progress, deviations, deficiencies and corrections, and confirm work is satisfactory. Submit reports weekly.

B. General:

1. Fabricate items of structural steel in accordance with this specification, the referenced codes and standards, the contract design drawings and the final reviewed shop drawings.

2. Detail and fabricate steel to allow for erection in compliance with OSHA regulations. Complete detailing for compliance, including modification of details shown on the contract drawings where required.
3. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
4. Where finishing is required, complete the assembly, including connections and welding of units, before start of finishing operations.
5. Furnish main steel members in one piece without splicing unless otherwise shown or approved.
6. All exterior hollow steel members shall be completely sealed air tight with welded plates.
7. Provide holes for drainage in any exterior members that will collect and hold water, either during construction or in final structure.
8. Seams in hollow structural shapes shall be oriented away from public view.
9. Plates that are subjected to axial tension shall be oriented with the roll direction as shown on the Drawings. Where not shown, orient the roll direction nominally parallel to the direction of primary tensile stress in the plate.

C. Connections:

1. Provide welded shop connections unless otherwise shown.
2. Provide bolted field connections unless otherwise shown.
3. Provide high-strength bolts for all bolted connections.
4. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
5. Comply with AWS D1.1 Code for procedures, preheat, appearance and quality of welds, including methods used in correcting welding work. Assemble and weld built-up sections by methods that will produce true alignment of axis without warp.

D. Provisions: Provide holes, weld nuts, welded studs, etc., required for securing other work to structural steel and for the passage of other work through steel framing members as required.

2.3 FINISHING

A. All steel to be galvanized steel unless noted otherwise.

1. Clean steel to be coated of foreign substances per ASTM D7396. Power tool clean all welds and adjacent areas to remove flux and splatter before coating.
2. Provide 2.3-oz./sf zinc coating per ASTM A123

PART 3 EXECUTION

3.1 EXAMINATION

A. Establish permanent benchmarks, in addition to those provided, as needed for accurate erection of structural steel.

B. Field survey and measure all existing conditions prior to preparation of shop drawings.

C. Check elevations of concrete bearing surfaces and locations of anchor bolts and similar devices before fabrication work and report dimensional discrepancies to the Owner's representative. Do not proceed with fabrication until corrections have been made or until compensating adjustments to structural steel have been approved by the Owner's structural engineer.

D. Furnish templates and detailed setting drawings as needed to ensure accurate positions of anchors.

E. Verify positions of anchor bolts before fabrication of steel. Report deviations from design locations and submit written recommendations for corrections.

F. Notify the Owner's representative in writing of conditions that would hinder proper and timely installation, or impair performance of finished work.

3.2 INSPECTION BY CONTRACTOR

A. Quality control, testing and inspection by Contractor for fabrication and erection shall conform to requirements of the Contract Documents, referenced codes, specifications and standards; and the following:

1. Inspection by Contractor shall be at Contractor's expense, by a testing agency or qualified inspector other than that employed by Owner, and shall be performed before Owner's inspection of material involved.
2. Contractor shall submit weekly written inspection report summaries to the Owner's representative, inspector, and structural engineer. In general, these reports shall:
    a. Verify that welders are certified.
    b. Confirm use of qualified welding procedures and:
        1) Welding equipment is used per manufacturer's recommendations.
        2) Proper use of drying oven and preheating.
        3) Fit-up and structural steel compliance with the specified dimensional standard.
        4) Proper use of run-out plates.
    c. Inspect every weld for quality and conformance. Systematically record welds, include:
        1) Location and type of weld.
        2) Weather conditions during welding.
        3) Identification marks of welders.
    d. Include bolts, anchors and other items.
    e. Report all defects and deficiencies.
    f. Report and describe how corrections were made.
3. Acceptance criteria used for the inspection of welds shall be as specified in AWS D1.1.

B. Visually inspect all material for defects before and after cleaning. Material with visible defects shall be rejected.

C. Fillet welds: Inspect all (100%) shop and field fillet welds visually for proper size, quality of weld and placement per reviewed shop drawings. Inspect 5% of a mix of field and shop welds by magnetic particle method, ASTM 109.

D. High strength bolted connections: At beginning of bolting operations, verify bolt installation techniques and test bolts in field conditions for proper pretension per manufacturer's requirements. Retest when changes in bolt lots, lubrication and weather exposure conditions occur. Inspect all bolted connections for bolt size, quantity, type, and tension.

E. Mechanical and adhesive anchors: Verify installers are certified and materials are used in conformance with manufacturer's recommendations. Observe hole preparation and installation technique at all anchors as work progresses. Proof test 5% of all anchors in each condition, distributed throughout the project, and at least 1 anchor in each steel framing connection. Amount of testing shall be increased if failures occur.

3.3 INSPECTION BY OWNER

A. The Owner will engage an independent inspection agency to perform shop and field verification inspection services in accordance with referenced standards. The Contractor shall schedule and coordinate inspections.

1. The Owner will pay costs of initial inspection.
2. Material that fails inspection shall be corrected by Contractor and re-inspected until satisfactory results are achieved.
3. The Contractor shall pay costs incurred by Owner's inspection agency, and/or engineer for re-inspection of corrections made because of failed initial tests.
4. Inspection may be performed in shop or field.
5. Contractor shall perform all necessary preparatory work for inspection such as cleaning, marking and removal of back-up bars, if needed, without additional costs.
6. Acceptance criteria used for the inspection of welds shall be as specified in AWS D1.1.

B. Inspections do not relieve Contractor of responsibility for contract compliance. The Owner's representative shall have the right to inspect or test work and reject faulty materials of workmanship at any time before final acceptance.

C. General:

1. Review Contractor's quality control program.
2. Review Contractor's fabrication and erection inspection reports for compliance with the requirements of AWS D1.1 and Inspection by Contractor, above.
3. Verify welder's certifications.
4. Provide required verification inspections.
5. Record types and locations of all defects discovered, report such discoveries to Contractor, and record corrections performed. Reports will be made not less than weekly to the Owner's representative.

D. Fillet welds: Twenty percent (20%) of the field-placed fillet welds shall be visually inspected. Five percent (5%) of shop-placed welds shall be visually inspected to verify fabrication quality control. Inspector is to verify placement of welds per reviewed show drawings, as well as proper size and quality of weld.

E. High strength bolted connections:

1. Observe Contractor's testing and installation techniques meet manufacturer requirements.
2. Visually inspect all bolted connections for bolt size, quantity, type, and tension.

F. Mechanical and adhesive anchors: Verify installer certification. As work progresses, observe installation for conformance with manufacturer's recommendations and witness Contractor's proof testing.

G. Remedies: Defective material shall be removed and replaced by the Contractor unless corrective procedures are permitted by the engineer. Corrections shall be tested at Contractor's expense until satisfactory results are achieved.

3.4 OXYGEN (FLAME) CUTTING

A. Manual oxygen cutting shall be done in the shop only and only with a mechanically guided torch. Alternatively, an unguided torch may be used provided the cut is not within 0.5 inches, of the finished dimension and the final removal is completed by chipping or grinding to produce a surface quality equal to that of the base metal at cut edges.

B. Control process to prevent excessive hardening of edges of steel where material is to be welded or is subject to axial tension.

C. Clean and repair all cut edges by welding and/or grinding to remove all gouges, cuts, burrs, and jags to meet the requirements of AWS D1.1.

D. Re-entrant cuts shall have as large a radius as possible without over cutting.

E. The use of oxygen-cut holes for bolted connections is not permitted under any circumstances. Violation will be cause for the rejection of any pieces in which oxygen cut bolt holes exist.

F. Oxygen cutting of structural steel in the field is not allowed except with the written consent and approval of the Owner's structural engineer.

3.5 BASE PLATES AND ANCHORS

A. Furnish anchor rods, and other items built into cast-in-place concrete or unit masonry to appropriate installer, together with template and detailed setting drawings required to assure accurate positioning of the items.

B. Templates, furnished by the Contractor for all anchor rods, shall be used to set the anchors. Templates shall be fabricated from steel plate, minimum thickness 1/8". The installer is to check carefully the setting of the bolts to the proper position prior to placement of concrete. Anchor bolts shall have nuts and washers. Damaged threads shall be repaired or re-cut to permit full tightening of nuts.

C. Anchors, embed plates and other items shall not be welded to reinforcing steel.

D. Base plates supported on concrete, whether shop attached or shipped loose, shall be furnished with and set upon leveling nuts. Base plates shall have holes for bleeding off air during grouting.

E. Setting base plates;

1. Prior to setting, clean existing and new concrete surfaces and roughen with bush hammer to improve bond. Clean the bottom surface of the base plates. Chip out any areas required to set shear lugs, making sure that the reinforcing steel is not damaged.
2. Tighten anchor bolts after the base plates have been positioned and leveled. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the base plate.

3.6 BOLTS

A. Assemble joint using drifts to obtain correct alignment.

B. Fit bolts. Use hardened washers under the turned part. Lubricate bolts to prevent nuts seizing on the bolts. Lubricate with a liquid high-pressure lubricant and apply only to the outstanding threads after the bolts have been inserted through the steel work, taking care to prevent lubricant getting between the plies of the joint.

C. Tighten bolts sufficiently in an appropriate sequence to bring joint surfaces into uniformly close contact.

D. Pretension all high strength bolts to the appropriate levels using tension control bolts or load indicator washers.

E. Mark each bolted connection when all bolts in the connection are prestensioned. Do not touch-up paint or cover until bolts have been inspected. The inspector shall mark connections that have been inspected.

3.7 MECHANICAL AND ADHESIVE ANCHORS

A. Post-installed anchors into concrete shall only be used as shown in the structural details, and only as submitted and reviewed. They shall not be used where cast-in-place anchors are required.

B. Adhesive anchoring shall not be used in overhead or upward conditions. Adhesive anchors in near horizontal positions shall use a hybrid adhesive.

C. Anchors shall be ICC-ES approved with current ESR for cracked concrete, zinc coat unless noted otherwise, galvanize, sherardized or use stainless steel where exposed to weather.

D. Anchor size, type, embedment depth into concrete, edge distances and spacing are crucial, and shall be as indicated on the structural drawings.

E. The Contractor shall arrange for a representative of the manufacturer to provide onsite installation training for their products. Adhesive anchor installers shall also be certified by a recognized program, such as by ACI and CRSI. Submit documentation of training

and certification of personnel prior to performing such work. Provide copy to the Owner's inspector.

F. Holes into concrete must not interfere with reinforcing bars. The Contractor shall review the structural drawings and use ferro-scan, chipping or other means to locate reinforcing bars in the area. Space holes to fit around rebar and fabricate fixture to match.

G. Install in strict accordance with the manufacturer's ESR, written instructions and recommendations. Holes in concrete shall be the proper size and thoroughly cleaned with all dust removed. Drill holes using a hollow bit and functioning vacuum system, then brush and blowout with compressed air.

H. Install into dry concrete in clean, dust free holes using method and procedure that meets manufacturer's recommendations including temperature range, humidity, installation time and cure time. Follow the manufacturer's printed installation instructions. Instructions must be included in the anchor packaging.

I. Provide standard size holes in the fastened steel element (1/16" larger than anchor diameter). Mark and drill all holes in the concrete before setting steel. Some anchors may be set after steel is in place to allow some alignment. Do not oversize holes. Use washers beneath nuts.

J. Contractor shall perform quality control, inspect and test anchors.

K. When exposed to view in the final structure, bolts shall be of a length that will extend entirely through but not more than ¼-inch beyond the nuts unless otherwise shown on the drawings.

3.8 WELDING (APPLIES TO BOTH SHOP AND FIELD WELDS)

A. Weld using only qualified and approved AWS procedures. Use drying oven for electrodes and preheat steel per AWS requirements.

B. Weld in manner to prevent warping or distortion of finished product. Use jigs that will not restrain piece from moving during welding or cooling after welding. Sequence weld passes at a joint to prevent excessive heat build-up or cause shrinkage cracks to form. Adequately peen and brush joint after successive passes to prevent slag inclusions, open pockets, and inadequate fusion.

C. Provisions shall be made in detailing of lengths of members for dimensional changes as a result of shrinkage stresses so as to provide required finished dimension.

D. During assembling and welding, hold components with adequate clamps or other means to keep parts straight, accurately aligned and positioned, and in close contact. Plan sequence of field welding to minimize locked-in stresses and distortion.

E. Provide adequate screening from wind for field welding.

F. Cut out defective welds or parts of welds with a chisel or air arc, and re-weld.

G. Tack welds and temporary welds made in material that will be subject to tension or architecturally exposed shall be removed and ground smooth.

H. Fillet weld sizes shall comply with the minimum requirements of the AWS D1.1 Code regardless of smaller sizes being noted on the contract design drawings.

I. Where structural steel members are to remain exposed in the finished work, welds exposed to view shall be uniform and smooth. Penetration welds shall not project more than 1/16” above the adjacent surfaces where exposed to view. Grind welds if necessary to meet this provision.

J. Remove run-off tabs and grind surfaces smooth where the tabs interfere with architectural treatment or are exposed to view in the final structure. Remove backup bars where exposed to public view in the completed structure.

K. All exposed to public view or to weather welds shall be continuous. In the event that an intermittent weld is specified, provide seal welds between.

L. Heavy sections and those weldments having a high degree of restraint must be welded in a sequence with the proper preheat such that no permanent distortion occurs. Submit a welding sequence for review for these types of connections.

3.9 ERECTION

A. Comply with this specification, the referenced codes and standards, the contract design drawings, and the final shop drawings. Comply with requirements of governing authorities, including requirements for work above public streets and sidewalks.

B. Provide all temporary shoring and bracing members as required, with connections of sufficient strength to bear imposed loads, including all construction loads and Building Code wind loads. Comply with FM bulletin I-7:

1. The structural steel framework is "non-self-supporting" and therefore requires temporary support bracing. Do not remove temporary support members and connections until the structure is complete and functioning as the designed unit. The unit is complete when all structural steel and metal deck is completed, and supporting concrete is placed and cured.
2. Members and connections shown and reviewed via the shop drawing process are analyzed only for loads due to the final structure. Loads imposed on the connections and members during the erection process, and safety of erection of same, shall be responsibility of the structural steel Contractor.

C. Provide temporary planking and working platforms as needed for the work. Provide temporary guards on the steel frame at the perimeter of each floor and all floor and roof openings.

D. Field assembly:

1. Set structural frames accurately to the lines and elevations indicated. Align and adjust the various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces that will be in

permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignments.

2. Level and plumb individual members of the structure within specified AISC tolerances, unless more restrictive tolerances are specified on the drawings.
3. Splice members only where shown or specified.
4. On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth.
5. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignments and the removal of paint on surfaces adjacent to field welds.
6. Do not enlarge unfair holes in members by burning or by use of drift pins except in secondary bracing members. Ream holes that must be enlarged to admit bolts. Where a hole is required to be enlarged by more than 3/32-inch ream to and use the next larger bolt size.
7. Do not use gas cutting torches in the field for correcting fabrication errors, except on secondary members that are not under stress. Finish gas-cut sections equal to a sheared appearance.

3.10 CLEANING

A. Following erection, clean all steel work of mud and dirt accumulated during erection. Thoroughly clean and remove dirt, debris, oil, water, and other foreign material from steel and leave ready for painting or fireproofing.

B. Field, coat all damaged and abraded areas of galvanized steel with galvanizing repair compound applied per manufacturer's instructions.

C. Field prime paint all welded, damaged and abraded areas and previously unprimed steel at welds, slip critical connections, etc. with same material used for shop painting.

PART 4 ADDITIONAL REQUIREMENTS

4.1 MODIFICATIONS TO THE AISC CODE OF STANDARD PRACTICE

A. Modifications to the AISC Code of Standard Practice are described throughout the Contract Documents and within this Section. Requirements of the Contract Documents that modify or conflict with referenced standards shall take precedence over the standard. Where a numbered paragraph is noted below, the requirements of said paragraph in the AISC “Code of Standard Practice for Steel Buildings and Bridges”, June 15, 2016, and its Commentary are deleted and the requirements noted herein shall apply.

1.4.1 Contract documents for structural work shall be issued as printed or printable contract documents. Requirements shall be the plain text and drawings printed on the documents. Digital information in any electronic file or model shall not be used in lieu of or for augmentation of the printed contract documents.

1.8.1 (a) Steel Contractor shall provide, install and remove any shoring necessary for the installation of new structural steel.

1.8.3 Fabricator shall survey and determine existing dimensions and elevations required for structural steel work or arrange for field verification through the GC or CM, with no additional cost to the Owner.

3.1 (j) Dimensions and elevations for structural steel may require coordination with architectural components, mechanical requirements, and existing conditions and may not be completely shown on the structural drawings.

3.1.1.1 Connections shall be as indicated in the design documents with engineering design and detailing of all parts, copes, stiffeners and welds completed by the Fabricator using option 2 and option 3.

3.1.1.2 Should connection configurations differing from the design documents be needed, Fabricator shall propose and submit details prior to shop drawing preparation. The submittal shall clearly define the location of all connections submitted for review. See Section 4.2.3.

3.1.1.3 If additional information or clarifications regarding connections is desired, the Fabricator shall contact the structural engineer of record.

3.1.2.1 Connection design shall account for concentrated forces using option 3B. Even if reinforcement details and quantities are not shown on the design documents, reinforcement may be required by connection design and shall be included in the work and bid.

3.5 Revisions to Design Drawings and Specifications

Revisions are addressed in Section 9.3

4.2.4 Legibility of Drawings

Drawings shall be clearly legible and drawn to an identifiable scale that is appropriate to clearly convey the information, but not less than 1/8” to the foot, unless a smaller scale is approved by the Owner’s representative.

4.4 Review of Shop Drawings

Shop drawings shall be made by the Contractor and shall be submitted for review. The engineer will endeavor to complete their review of shop drawing submittals within 14 days of engineer's receipt of submittals for those shop drawings deemed critical; other shop drawings, 28 days. Shop drawings shall be returned noted: "No exceptions noted," or "Exceptions noted," or "Exceptions noted, revise and resubmit." Fabrication of material prior to the receipt of shop drawings for that material noted "No exceptions noted" or "Exceptions noted" shall be at the Contractor's risk.

4.4.1 Review of shop drawings does not relieve the Contractor of the responsibility for accuracy of detail dimensions; the general fit-up of parts to be assembled in the field; the ability to erect the material; the adequacy of any members or connections designed by the Contractor; or the Contractor's safety measures.

4.4.2 Any notations made on the shop drawings or answers to a Request For Information (RFI) do not authorize additional compensation for the Contractor without the issuance of a formal change order.

4.5 Fabrication and/or Erection Drawings Not Furnished by the Fabricator

Fabrication and erection drawings shall be made by the Fabricator or his subcontractor and shall be the responsibility of the Fabricator.

9.3.1 Revisions to the structural steel requirements are made by issuance of new documents, reissuance of existing documents, answers to RFIs, or by annotation of shop or erection drawings.

9.3.2 A revision to the contract price is made by formal change order.

END OF SECTION

DIVISION 06 – WOOD REPAIRS

SECTION 06 11 20

WOOD FRAMING AND SHEATHING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Structural floor framing.
2. Preservative treatment of wood.
3. Fire retardant treatment of wood.

B. Related Sections:

1. Section 030100 – Concrete Repairs.
2. Section 051200 – Structural Steel.

1.3 REFERENCES

A. Kentucky Building Code (OBC).

B. American Forest & Paper Association:

1. National Design Specification for Wood Construction.
2. ASD/LRFD Manual for Engineered Wood Construction.

C. American Wood Protection Association.

1. AWPA U1 – User Specification for Treaded Wood.

D. APA – The Engineered Wood Association:

1. Plywood Design Specification.

E. National Lumber Grades Authority:

1. NLGA – Standard Grading Rules for Canadian Lumber.

F. US Department of Commerce:

1. DOC PS1 – Structural Plywood.
2. DOC PS 2 – Performance Standard for Wood-based Structural-use Panels.
3. DOC PS 20 – American Softwood Lumber Standard.

G. West Coast Lumber Inspection Bureau:

1. WCLIB – Standard No. 17 Grading Rules for West Coast Lumber.

H. Western Wood Products Association:

1. WWPA – Western Lumber Grading Rules 2011.

I. American Lumber Standard Committee Incorporated (ALSC).

1.4 SUBMITTALS

A. Product Data:

1. Submit manufacturer's data sheets for connection hardware, including allowable loads for each component.
2. Submit product data on wood preservative material.
3. Submit product data for fire retardant treatment from the chemical treatment manufacturer and certification from the treating plant that the treated materials comply with the manufacturer's requirements. Include research/evaluation reports showing compliance with the building code.
4. For wood products receiving a waterborne treatment, include statement that the moisture content of treated materials was reduced to specified levels before shipment to the Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

A. Each piece of lumber shall be marked with the grade stamp of the lumber grading agency.

1. The lumber grading agency shall be certified by ALSC.

B. Each piece of sheathing shall be stamped with the APA trademark indicating the panel grade, thickness, span rating, exposure classification, mill lumber, and Product Standard.

C. In lieu of grade stamping exposed to view lumber submit manufacturer's certification that the exposed lumber meets or exceeds the specified requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber and sheathing with spacers placed between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Dimension lumber shall be Spruce-Pine-Fir or Hem-Fir of the grade indicated on the drawings with maximum 19 percent moisture content.

B. Factory mark each piece of lumber with the grade stamp of the grading agency.

1. For exposed lumber indicated to receive a stained or natural finish, place the grade stamp on the back or end of the member.

C. Where nominal sizes are indicated provide actual sizes per DOC PS 20 for the specified moisture content. Where actual sizes are given they are minimum dressed sizes for dry lumber.

D. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 ACCESSORIES

A. Fasteners and Anchors:

1. Fasteners and anchors to be hot-dipped galvanized steel for high humidity locations, stainless steel for exterior and treated wood locations, unfinished steel elsewhere.
   a. Fasteners for stainless steel framing connectors shall be stainless steel.
   b. Fasteners for galvanized framing connectors shall be hot-dipped galvanized.
2. Nails and staples – ASTM F1667.
3. Wood screws – ASME B18.6.1.
4. Lag bolts – ASME B18.2.1.
5. Bolts – Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and flat washers.
6. Preset anchor bolts in concrete or grouted masonry – ASTM A36.
7. Afterset threaded anchor bolts in concrete – Titen HD manufactured by Simpson Strong-Tie.
8. Adhesive for afterset anchors in concrete – Acrylic-Tie (AT) manufactured by Simpson Strong-Tie.
9. Steel strap anchors – Galvanized anchors manufactured by Simpson Strong-Tie.

B. Structural Framing Connectors:

1. Interior – Hot-dipped galvanized steel, sized to suit framing conditions, manufactured by Simpson Strong-Tie.
2. Exterior – Stainless steel, sized to suit framing conditions, manufactured by Simpson Strong-Ties. For conditions where stainless steel is not available provide connectors with G185 hot-dipped galvanized finish per ASTM A653.

C. Sill Gaskets: FoamSealR by Owens Corning.

D. Termite Shield: Minimum 26 gage galvanized sheet steel.

E. Subfloor Glue: Adhesive conforming to APA Performance Specification AFG-01 or ASTM D3498.

2.3 FACTORY WOOD PRESERVATIVE TREATMENT

A. Wood Preservative Pressure Treatment: Waterborne treatment complying with the building code, AWPA standards and the following use categories.

1. Exterior construction above ground - UC3B.
2. Wood in contact with ground – UC4A.
3. All sill plates – UC2.

B. Moisture content of the treated materials after treatment shall adhere to the lumber grade requirements.

C. Each piece of treated wood shall have a factory applied quality mark by an ALSC accredited inspection agency.

2.4 FIRE RETARDANT TREATED MATERIALS

A. Provide materials that comply with the building code, AWPA standards and the following use categories:

1. Above ground interior construction – UCFA.

2. Above ground exterior construction – UCFB.

B. Moisture content of the treated materials after treatment shall adhere to the lumber grade requirements.

C. Each piece of treated wood shall have a factory applied quality mark by an ALSC accredited inspection agency.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural members level, plumb, and in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain the structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

C. Place horizontal members, crown side up.

D. Construct frame members full length without splices.

E. Do not cut or bore structural members for the passage of ducts or pipes without approval.

F. Spiking and nailing not indicated or specified otherwise shall be in accordance with the Fastening Schedule (Table 2304.9.1) in the Building Code.

G. Spikes, nails and bolts shall be drawn up tight.

H. Set sills with continuous and solid bearing and anchor to the foundation as indicated. Where sizes and spacing of anchor bolts are not indicated, provide not less than 5/8” diameter bolts at all corners and splices and space at a maximum of 6 feet o.c. between corner bolts. Provide at least two bolts for each sill member. Bolts shall have plate washers and nuts and shall be galvanized in exterior walls.

I. Provide metal hangers for joists and beams framing into the sides of headers, beams or girders.

J. Provide double joists under partitions running parallel with floor joists and at openings where joists are cut and framed. Double, space for clearance, block apart 4 feet o.c., rigidly frame, and spike together joists under partitions that are to receive vertical ducts, pipes and conduits.

K. Place full width continuous sill flashings under exterior walls. Lap flashing joint 4 inches.

L. Place sill gasket directly on sill flashing. Puncture gasket clean and fit tight to protruding anchor bolts.

3.2 TOLERANCES

A. Framing Members: ¼ inch from indicated position, maximum.

B. Surface Flatness of Floor: ¼ inch in 10 feet maximum and ½ inch in 30 feet maximum.

3.3 WASTE REMOVAL

A. Remove from site and legally dispose of waste materials resulting from or caused by work of this section.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 071800

PEDESTRIAN TRAFFIC MEMBRANE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Medium duty vehicular traffic membrane system – Type A.

1.2 RELATED SECTIONS

A. Section 030100 – Concrete Repairs.

B. Section 079200 – Sealants.

1.3 DEFINITIONS

A. The term "manufacturer's recommendations”, or variations thereon it shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."

1.4 SUBMITTALS

A. Joint and Several Warranty Form meeting the requirements of Article 1.8.

B. Skid Resistance Addenda Form to Joint and Several Warranty meeting the requirements of Articles 1.8 and 3.4.

C. Bond Test Addenda Form to Joint and Several Warranty meeting the requirements of Articles 1.8 and 3.4.

D. Literature for all manufactured products, including manufacturer's specifications, test data and installation instructions or applicator's manual.

E. 12" x 12" samples of each membrane system to be used. Sample shall be applied to plywood or similar rigid material.

F. 1/4-lb. (±) sample of aggregate type intended to be used. Provide two (2) samples, one sent to THP for record, and other sample sent to Membrane Manufacturer for laboratory testing and sieve analysis.

G. Letter from Membrane Manufacturer stating sample aggregate was received, tested and reviewed, and is approved for use for the specified system and jobsite conditions. Letter shall include the following information:

1. Sieve or partical size analysis.

2. Grain Shape.

3. Hardness (Moh’s Scale)

4. Moisture Content (ASTM C-566)
5. Specific Gravity (ASTM C-128)
6. Bulk Density (ASTM C-29)
7. Chemical Analysis

H. If requested, copy of letter of approval per Article 1.5 Paragraph B.

I. If requested, resume per Article 1.5 Paragraph C.

J. If requested, letters of Certification per Article 1.5 Paragraphs E, F, and G.

K. Safety Data Sheets on all materials which are classified as hazardous materials.

L. Maintenance manuals with the following information.

1. Project name.
2. Project location.
3. Date.
4. Owner's name.
5. Coating system(s).
6. Drawings indicating the coating systems and their location in the structure.
7. Schematic drawing of each membrane type identifying each element of the membrane system by dry film thickness and manufacturer's reference number or name.
8. Recommendations for routine care and maintenance.
9. List of three (3) approved Contractors nearest the project location authorized to perform repairs.
10. Identify common causes of damage and instructions for temporary patching until permanent repair can be made.
11. Upon completion of the Work and prior to final payment, provide a fully executed warranty.

1.5 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration

(OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The membrane applicator shall be approved by the manufacturer and shall have been an approved manufacturer's applicator for the membrane products, as identified on the subcontractor supplemental proposal form, for a minimum of three consecutive years. If requested, the contractor shall provide written confirmation from the manufacturer within three calendar days of the request.

C. The membrane applicator and its superintendent shall meet the following minimum requirements:

1. Installed the approved membrane materials as identified on the Bid Form in a traffic membrane system in three previous similar projects. Each of the three projects shall have been a minimum of 20,000 square feet in size.

2. Installed the approved membrane materials as identified on the Bid Form in a traffic membrane system currently in use within the last two years.

D. Conform to the Field Quality Control requirements in Part 3 of this Section.

E. Membrane manufacturer to certify that aggregate specified is acceptable for use in the membrane system.

F. Membrane manufacturer to certify that sealants in contact with membrane are compatible with membrane system.

G. Membrane manufacturer to certify that substrate surfaces in contact with any component of the vehicular traffic membrane are compatible.

H. Field Samples:

1. Prior to beginning surface preparation, prepare a sample area in the initial phase work area for the project to be used as the minimum standard of acceptability for cleanliness and surface texture to be achieved throughout the work. The area shall be at least 400 sq. ft. Size and location shall be as directed by the Engineer. The standard shall be jointly reviewed and approved by both the Engineer and the Manufacturer relative to Article 3.2 paragraph B.4 prior to start of full scale surface preparation work. The approved standard shall remain uncoated until all surface preparation work is completed.

2. After approval, the sample area shall be covered with 6 mil thick plastic sheets. Edges shall be continuously taped, as well as splices, and the perimeter shall be weighted down. The sample area shall be kept covered unless viewing is needed for comparative purposes or until final preparation for membrane application. Contractor shall monitor the area to insure the integrity of the covering. Neither foot nor vehicular traffic shall be allowed on the covering unless additional protective measures are taken to protect the cleanliness of the sample area.

I. Manufacturer’s Representation:

1. For installation of membrane materials, a technically competent employee of the membrane manufacturer, approved by the Engineer and not associated with the installation crew, shall be on site before and during the installation of the membrane system during the first Work Area plus one additional Work Area which reflects changing environmental conditions, if requested by the Engineer.

2. Application of the membrane shall not begin until the manufacturer’s technician has approved the cleanliness and surface texture of the substrate.

3. The technician shall remain on site for the length of time necessary to observe the installation of the total membrane system.

4. The technician shall review all Contract application techniques and procedures and shall advise the Contractor when, where and as required to obtain Specification compliance.

5. The Contractor and the membrane Manufacturer shall comply with the terms set forth in items 1 through 4 above at no additional cost to the Owner.

J. An employee of the applicator who has been trained by the membrane manufacturer on the installation of the approved membrane system shall be present during all applications of the membrane system.

K. Within twenty-four hours of application of membrane materials submit log required by Article 3.4 Paragraph F to Engineer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material's name, date of manufacture and lot number.

B. Only those materials being used during any one work shift may be stored in the current work area. Materials being used for shift work shall be uniformly distributed throughout the intended work area so as to not overload or otherwise distress the structural system. All other materials, if stored on site, shall be stored at the designated staging area.

C. Coating materials shall be kept sealed when not in use.

D. Storage and handling of materials shall conform to the manufacturer's requirements and the requirements of the applicable environmental protection and safety regulatory agencies.

E. Storage areas shall be heated or cooled as required to maintain the temperatures within the range recommended by the coating manufacturer.

F. The handling and use of toxic or flammable solvents shall conform to the requirements of the applicable safety regulatory agencies, recommended by the

manufacturer.

1.7 WARRANTY

A. Completed installation shall be warranted jointly and severally on a single document by manufacturer and applicator against defects of materials and workmanship. The length of the warranty period shall not be less than (5) years from the date of substantial completion of the Project.

B. Manufacturer and installer shall further warrant the skid resistance and bond strength of the installed systems. The test may be measured at any single location, and shall meet the specified criteria in Part 3, Article 3.4. The length of the warranty period shall not be less than five (5) years from the date of substantial completion of the Project.

C. Warranty documents shall not require the signature of the Owner to be effective, shall not limit the Owner's legal remedies otherwise allowed per the project contract, and shall not limit the venue of any potential legal jurisdiction.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Lymtal International

B. Neogard Corporation

C. Sika Corporation

2.2 MATERIALS

A. Medium Duty Vehicular Traffic Membrane System (Type A):

1. Iso-flex 760 Aliphatic System by Lymtal International, comprised of:

a. Primer

- Iso-Flex Epoxy SF, Primer 750, or Primer 757.
- Apply at manufacturer's recommended application rate.

b. Base Coat

- Iso-Flex 750 Base Coat
- Apply at 40 mils dry film thickness.

c. Top Coat

- Iso-Flex 760 Aliphatic Top Coat
- Apply at 18 mils dry film thickness.
- Aggregate seeded and back rolled to provide slip resistant surface.

d. Aggregate
- Unimin 12/20 by US Silica, either Ottawa, MN or Voca, Texas.
- Install at membrane manufacturer's maximum application rate.
- Uniformly distributed with no bare spots.

2. FC System by Neogard Corporation, comprised of:

a. Primer
- Neogard 7760/7761 VOC
- Apply at manufacturer's recommended application rate.

b. Base Coat
- Neogard FC7500/FC7960
- Apply at 40 mils dry film thickness.

c. Top Coat
- Neogard FC7540/FC7964
- Apply at 18 mils dry film thickness.
- Aggregate seeded and back rolled to provide slip resistant surface.

d. Aggregate
- 12/20 silica by Carmeuse Industrial Sands, Brady, Texas
- Install at membrane manufacturer's maximum application rate.
- Uniformly distributed with no bare spots.

3. Sikalastic Traffic System by Sika Corporation, comprised of:

a. Primer
- Sikalastic FTP Lo-VOC Primer or MT Primer.
- Apply at manufacturer's recommended application rate.

b. Base Coat
- Sikalastic 720 Base Coat
- Apply at 40 mils dry film thickness.

c. Top Coat
- Sikalastic 745 Aliphatic Top Coat
- Apply at 18 mils dry film thickness.
- Aggregate seeded and back rolled to provide slip resistant surface.

d. Aggregate
- Unimin 12/20 by US Silica, either Ottawa, MN or Voca, Texas.

- Install at membrane manufacturer's maximum application rate.
- Uniformly distributed with no bare spots.

B. Vapor Barrier:

1. Lymtal Systems:

a. One or two step systems, with or without aggregate, as recommended by the manufacturer.

2. Neogard Systems:

a. One or two step systems, with or without aggregate, as recommended by the manufacturer.

3. Sika Systems:

a. One or two step systems, with or without aggregate, as recommended by the manufacturer.

C. Individual steps of any systems inclusive of greater than 5 percent solvents by either weight or volume calculations shall require monitoring by a licensed industrial hygienist for fumes and odors within work areas, at open air intakes within 200 ft. of work areas, and inside occupied spaces adjacent to work areas. Credentials of licensed hygienist and a monitoring plan must be approved by the Engineer in advance of the start of any membrane work.

D. Membrane color shall be manufacturer's standard gray, unless otherwise indicated in the Documents.

E. Intermediate coat and lock coat materials shall be U.V. stable.

PART 3 EXECUTIONS

3.1 EXAMINATION

A. Contractor and membrane manufacturer shall jointly review existing substrates (original concrete, past or new concrete repairs or overlays, past membrane or coating systems) to ensure compatibility with the specified membrane system. Submit in writing any materials which may cause membrane adhesion to substrate less than normally anticipated or other compatibility or performance difficulties. Failure to review and identify deleterious products/materials, and if failure of the membrane is a result of adhesion difficulties or chemical or physical incompatibilities with substrate materials, the Contractor and Manufacturer shall be responsible for all costs related to correcting the deficient Work. Manufacturer is bound to meet the above noted responsibilities equally with the Contractor regardless of the provisions of other agreements.

B. Inspect deck surface for any visibly distressed concrete. If encountered, chain drag area to determine extent of distressed or delaminated area and repair as indicated

on the Drawings, and Specification Section 030100.

C. Examine areas for slab cracks to be routed and sealed.

3.2 PREPARATION

A. Protection:

1. Erect barriers and barricades to protect adjoining areas from dirt, steel shot and debris generated from this work. Refer to Section 015600.

2. Cover exposed drain grates during shotblasting/grinding operations. Recoat with approved rust inhibitive or galvanizing paint grates damaged by blasting operations. Similarly protect and recoat if necessary other, in place metal elements. Drains to be functional during non-working hours and during periods of inclement weather.

3. Cover exposed drain grates to protect from membrane material. Drains to be functional during non-working hours and during periods of inclement weather. Do not allow membrane material to enter drain piping system.

B. Concrete (General):

1. Preparation and cleaning procedures shall be in strict accordance with this Specification, unless more stringent requirements are recommended by the system manufacturer.

2. Surface must be dry. New concrete shall be at least 28 days old and proven dry via mat tests, to be considered for membrane system installation without installation of a vapor barrier. Review manufacturer requirements relative to site conditions in advance of performing the work.

3. Surfaces shall be free from all traces of dirt, salt, grease, oil, asphalt, laitance, curing compounds, paint stripes, coatings and other foreign materials. Use manufacturer approved degreasing agents if necessary.

4. Concrete surfaces shall be cleaned using shotblast equipment (with integral vacuum process) to achieve standard of cleanliness per Article 1.5 Paragraph G. The size of shot and travel speed of the equipment shall be chosen to provide a uniformly clean surface and profile; basis for bid must be two perpendicular normal speed passes, or one slow speed pass.

5. Areas which cannot be adequately cleaned by shotblasting shall be cleaned by grinding with accompanying vacuum procedures.

6. Surfaces that become contaminated by dirt or moisture after initial shotblasting or grinding, shall be cleaned again by shotblasting or grinding to manufacturer’s requirements at no additional cost to the Owner.

7. Minimum standard of acceptability applies to all surfaces intended to receive membrane regardless of surface preparation procedure or process.

8. The use of acids in surface preparation procedures and techniques is prohibited.

9. After completion of shotblasting/grinding, and prior to application of membrane materials, repair all scaled, freeze-thaw damaged and loose, pop-out areas, cracks and all damage made apparent by the shotblasting/grinding procedures, in a manner approved by the Engineer. Such repair work shall be part of the Base Bid without unit price adjustment. Areas requiring patching will be subject to re-shotblast or re-grinding where a patch exceeds one (1) square foot in area.

10. Grind all high spots or transition grind all depressions per details, and clean to manufacturer's requirements.

3.3 INSTALLATION

A. General:

1. Install materials in strict accordance with all safety and weather conditions required by product literature and Local, State and Federal regulations.

2. Fumes and dust shall be controlled to prevent harmful or undesirable effects in surrounding areas. All potential avenues for penetration of fumes or dust into surrounding occupied areas shall be sealed prior to the start of the work.

3. All exposed membrane edges and termination details shall be taped to provide straight, neat edges.

   (Flag this requirement in both prebid and preconstruction meetings if aesthetics of completed system is important. Other wise most contractors will just use 4" roller along base of vertical surface, without taping.)

4. Install base coat membrane materials on concrete surfaces only when concrete temperature has stabilized or is falling. Do not install base coat membrane on concrete surfaces when surface temperature is rising.

5. Install membrane materials only if the temperature of the surfaces to be coated is 5 degrees or higher than the dew point temperature measured at the job site.

B. Sealants - Refer to Section 079200.

C. Membrane:

1. Where necessary to locally level surfaces and after approval by Owner, install membrane leveling materials in depressed areas. Refer to Part 2, Article 2.2 Paragraph G.

2. Install detail coat 4" wide by 20 mil thick (dry film thickness) over properly primed cracks, caulked joints, joints between concrete pours, or leveling repairs, junctures and other locations in the membrane area which is a

deviation from the nominal membrane plane, except where otherwise indicated by the Specifications or Drawings.

3. The membrane system shall turn up 4" at all vertical surfaces unless shown otherwise on the drawings. Detail coat is required at all turn-ups to vertical surfaces. Detail coat at turn-ups shall be the same as the detail coat required by Part 3, Article 3.3 Paragraph C.1.

4. Contractor shall ensure the specified/recommended application rates of all components of the membrane system. Base coat(s), intermediate coat, and lock coat of each application of the membrane system shall be distributed onto the deck by calibrated, notched squeegees. Squeegees showing signs of wear shall be discarded.

5. Contractor shall ensure specified/recommended application rates of liquid products on vertical or sloped surfaces by the use of non-sag grade materials or by multiple applications of material over previous applications which are fully cured.

6. Each fluid-applied component of the membrane system shall be back-rolled to properly distribute materials across the deck and eliminate squeegee marks.

7. Use of power rollers either to distribute the membrane system or to backroll squeegee marks shall not be permitted.

8. No vehicular traffic shall be allowed on membrane areas for at least 48 hours after completion of membrane installation. Provide extended cure time with no vehicular traffic exposure if temperatures fall below 50°F.

3.4 FIELD QUALITY CONTROL

A. Bond Test:

1. Bond tests of the installed membrane systems may be performed by the Engineer during and after the membrane work on this project. Tests shall be conducted using a calibrated instrument which measures in-place bond strength by applying a direct axial pull on a 3 inch diameter steel disk epoxied to the completed membrane top surface.

2. A membrane phase for the purpose of bond testing is an area of base coat installed in a single work shift. If examined, a membrane phase will be tested at (3) locations per phase no sooner than 10 days after completion of the entire membrane system and no sooner than 14 days if temperatures fall below 40°F for two or more days. Contractor shall assume a total of 4 test locations in the Base Bid.

3. The acceptance criteria for initial tests of a Phase shall average bond strength of 200 psi for all locations, with no single location testing below 150 psi. Any Phase failing to meet the initial acceptance criteria may be retested at a later date by the Engineer. Retests of Phase shall include at least 4 separate test

locations not sooner than 14 days after the initial tests. The acceptance criteria for retests of a Phase shall average bond strength of 200 psi for all locations, with no single location testing below 175 psi.

4. Any Phase failing to meet the initial test and retest acceptance criteria shall be considered "deficient" and shall be cause for the Contractor to execute or provide one of the following remedies:

   a. Extend Standard Guarantee to include an additional 5 years (for a total of 10 years) on membrane system intercoat bond and bond to the concrete for the "deficient" areas.

   b. Removal and replacement of the "deficient" area, including all necessary preparatory work and Engineering costs to coordinate and observe the work, at no additional cost to the Owner.

5. Any additional bond testing requested by the Contractor to limit the extent of the "deficient" area(s) as determined by initial tests and retests as defined above shall be paid for by the Contractor.

6. Contractor shall include as part of his proposal the costs of repairing all test locations.

B. Skid Test:

1. Prior to any membrane preparation work and after membrane installation, the Engineer may conduct tests to determine values of the static coefficient of friction between the coated and uncoated floor surfaces and the neoprene base of the Engineer's test equipment.

2. Determination of the coefficient of friction will consist of a series of individual tests for each surface type. The initial coefficient of friction is defined as the average of the tests performed on the concrete surfaces prior to membrane preparatory work. The final coefficient of friction is defined as the averages of the tests performed on each type of completed membrane system surface.

3. The final, average static coefficient of friction shall be a minimum of 0.85 under wet and dry conditions and equal to or greater than 110% of the initial coefficient of friction. No individual test area shall have a coefficient less than 0.80 or 95% of the initial coefficient of friction. Any membrane system that does not conform, as determined by the Engineer, to the specified acceptance criteria shall be subject to rework, upgrading or replacement of the deficient areas, including necessary preparatory work, at no additional cost to the Owner.

C. The Engineer may direct the Contractor to make test cuts in the membrane for testing purposes. Tests cuts shall be 2" x 2" and will be in partially-completed or fully-completed membrane. A maximum of 3 total tests per separate installation phase may be made. Contractor shall include as part of his Proposal the costs of taking test cuts as and where directed by the Engineer and the costs of patching

test cut areas.

D. The Engineer will periodically monitor application rates of the membrane system individual components and will notify job foremen of discrepancies noted.

E. The Contractor shall keep at the site and maintain in proper condition an adequate number (at least one per application crew) of wet film thickness gages and shall continuously use such to ensure the specified thickness of each membrane coat is uniformly maintained. The periodic monitoring of application rates per Article 3.4 Paragraph D shall not relieve the Contractor of the responsibility of verifying specified coating thickness.

F. Contractor shall provide information required by Part 3, Article 3.6.

3.5 CLEANING

A. Empty containers shall be removed from the project work areas at the end of each working day. Cloths soiled with coating that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health, fire and environmental regulations.

B. All spilled coating material shall be completely removed from hardware, adjacent floor areas, metal work, etc. Remove spilled coating by approved methods.

C. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation for membrane application.

D. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dirt and debris.

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3.6 MEMBRANE APPLICATION LOG FORM EXAMPLE

DAILY MEMBRANE APPLICATION LOG

Project:

Date: Time Start Time End

Work Area
(Give Description)

Membrane Materials Applied
Type and Quantity

Crew Size Size of Area Materials Applied
(in Square Feet)

Temperature Data (°F)

	Start				End
Deck					
Air					
Relative Humidity (%)					
Dewpoint					

Note: Contractor shall estimate quarter points in time between the start and end of membrane application. Record air and deck temperatures at those times.

Superintendent's Signature:

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 079200

SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cove joint and construction joint sealant.

1.2 RELATED SECTIONS

A. Section 030100 – Concrete Repairs.

B. Section 071800 – Vehicular Traffic Membrane.

1.3 DEFINITIONS

A. Where the term "manufacturer's recommendations," or variations thereon, are found in this Specification, it shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."

1.4 SUBMITTALS

A. Copies of literature for all manufactured products, including manufacturer's specifications, test data and installation instructions or applicator's manual.

B. Letter per Paragraph 1.5.B.

C. Resume of contractor superintendent or employee per Paragraph 1.5.D.

D. Manufacturer's certification per Paragraph 1.5.F.

E. Proof samples of sealants intended to be installed per Paragraph 1.5.G.

F. If requested, Field samples of sealants installed on site per Paragraph 1.5.H.

G. Material Safety Data Sheets on all materials which are classified as hazardous materials.

H. Upon completion of the Work and prior to final payment, provide written recommendations for routine care and maintenance. Provide list of three Contractors nearest the project location who are qualified to perform repairs to the sealants. Identify common causes of damage and include instructions for temporary patching until permanent repair can be made by qualified personnel.

I. Upon completion of the Work and prior to final payment, provide a fully executed warranty.

1.5 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, excerpt in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

B. The sealant installer must be acceptable to the manufacturer. Provide written confirmation that the intended sealant installer is acceptable to the manufacturer.

C. The Contractor shall review locations where joint sealant work is specified and shall submit in writing existing conditions and newly specified details which would cause sealant material to fail. Failure to review existing conditions or identify details or procedures which will cause failure of sealant material to perform as specified, the Contractor shall become responsible for all costs relating to correcting the deficient work, including all direct and indirect costs to the Owner.

D. The Contractor's superintendent, or another technically competent employee of the Contractor approved by the Owner and Manufacturer, shall be on site and supervise installation of all sealant on this project. Sealant identified as being installed not under the direct supervision of this person shall be subject to removal and replacement, at the direction of the Owner. This person identified for supervision of the work shall have supervised at least three prior projects of similar magnitude and type.

E. The Owner may, at his discretion, choose to remove up to a six-inch length of sealant in locations at a time after installation and initial curing of sealant to verify installation as specified. The Contractor shall include in his Bid the costs to repair one such location for each 100 ft. of sealant installation. If inspections of these locations by the Owner reveal deficient installation of sealant, the Owner may remove additional sealant to further quantify the length of deficient sealant. The Contractor shall repair all deficient locations of sealant found by the Owner at no additional cost and no extension of time for the work.

F. Sealant materials shall be certified to be compatible by the manufacturer for use with the membrane system.

G. Proof Samples of all sealant materials used on the job site shall be prepared in advance of the work by the Contractor and submitted to the Owner for purposes of testing and examination. Samples shall be manufactured with a unit of material from the first batch intended for use on the project. Samples (4 total) shall be at least 2-inch x 2-inch square and 1/2-inch-thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location of preparation.

H. Mock-ups:

1. Sealant foreman and crew assigned to project to complete all mock-ups listed.

   a. The Owner may, at his discretion, direct the Contractor to prepare and submit Field Samples of sealant materials used on the job site during the work. Samples shall be manufactured on site, from a unit of material from the same batch in use that day. Samples (2 total) shall be at least 2-inch x 2-inch square and 1/2-inch-thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location on the project where the sealants represented in the samples were installed. Up to three sets of Field Samples may be requested on this project in the Base Bid.

2. Control, Isolation, and Cover Joints:

   a. Demonstrative removal and cleaning technique.

   b. Demonstrate backer rod installation.

   c. Demonstrate sealant installation and tooling technique.

3. Preformed silicone strip installation:

   a. Demonstrative stone cleaning and preparation technique.

   b. Demonstrate installation and tooling technique.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material's name, date of manufacture and lot number.

B. Only those materials being used during any one work shift may be stored in the Work area. Coordinate location of storage area with the Owner.

C. Sealant materials shall be kept sealed when not in use.

D. Storage and handling of materials shall conform to the requirements of the applicable safety regulatory agencies.

E. Storage areas shall be heated or cooled as required for maintaining the product temperatures within the range recommended by the manufacturer.

1.7 PROJECT CONDITIONS

A. Install sealant materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.

B. Fumes and debris shall be controlled to prevent harmful or undesirable effects in surrounding areas.

C. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.8 SEQUENCING

A. Install sealants after any required concrete repairs.

B. Install sealants after adequate cure of concrete repairs. Confirm required cure time with sealant manufacturer.

C. Install all sealants prior to installation of membrane systems.

1.9 WARRANTY

A. New exposed sealant work shall be warranted for a period of five (5) years against defects due to installation or material deficiencies, including but not limited to excessive softness, excessive entrapped air in cured cross sections, disbonding, cohesive failure, leakage and ultraviolet exposure degradation.

B. Sealant work under membrane systems shall be warranted as part of and included in the membrane system guarantee. Refer to Section 071800.

C. All required testing and quality assurance operations necessary to furnish the warranty are Contractor and manufacturer's responsibility.

PART 2 PRODUCTS

2.1 CRACK AND JOINT SEALANTS

A. Multi-component, unmodified, polyurethane. Approved products manufacturers include:

1. Sika 2c NS-TG/SL by Sika Corp.

2. Dymeric 240FC by Tremco, Inc.

3. Isoflex 880/881 by Lymtal International.

B. Minimum compression or extension of 25% of the nominal joint width without adhesive or cohesive failure.

C. Primer(s) as recommended by sealant manufacturer for each substrate.

D. Sealants in areas to be coated with membrane per Section 071800 shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.

E. Cove sealants shall be gun grade (non-sag).

F. Backer Rod or Bond Breaker Tape: Backer Rod shall be closed-cell, polyethylene

in sizes to maintain 25 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approval for each intended application location is obtained from the Owner. Alternative use of bond breaker tape in size appropriate for the width of joint and approved for use by the sealant manufacturer will be allowed on a case-by-case basis.

G. For joint edge repairs refer to Specification Section 030100.

PART 3 EXECUTIONS

3.1 GENERAL

A. Remove existing sealants in joint cavities, coves and other locations and clean surfaces to remove residue. Rout any new joint cavities scheduled for new sealant. Grind and vacuum clean all joint cavities, coves and other locations scheduled for new sealant as required by the sealant manufacturer within 24 hours of sealant installation.

B. Primer shall be used for all sealant installations regardless of manufacturer's requirements, unless a letter from the manufacturer states use of a primer is detrimental. Allow primer to cure per manufacturer's recommendation prior to sealant installation.

C. Joint cavities that become contaminated by dirt or moisture after initial preparation, shall be cleaned again at no additional cost to the Owner.

D. Modify the depth of existing joints by additional routing or positioning of backer rod to maintain a width to depth ratio of 2 to 1 unless otherwise noted on the drawings. At no location is the sealant width allowed to exceed 1-1/2".

E. In areas indicated on the Drawings or otherwise directed by the Owner, remove existing failed and deteriorated sealant, all existing cove sealants and existing sealants to be covered by urethane traffic membrane.

F. Reinstall new sealant where existing sealant is removed. Refer to Article 3.2 for new sealant installation requirements in membrane areas and Article 3.3 for repair sealant requirements.

G. Where necessary, square up joint edges and execute repairs with epoxy repair mortar in accordance with manufacturer's recommendations.

H. Rout cracks per details in surfaces at locations directed by the Owner.

I. Rout joints per details.

3.2 NEW SEALANT

A. Refer to Article 3.1 for joint cavity preparation requirements.

B. Clean joint cavity and apply primer as recommended by the sealant manufacturer.

C. Install backer rod or bond-breaker tape where required. Vary size of backer rod if

necessary, based on field conditions per Article 2.1.F or Article 2.2.F.

D. Install sealant as indicated in details on the Drawings.

3.3 MISCELLANEOUS SEALANTS

A. Install miscellaneous sealants around drains, pipe penetrations in floors, and elsewhere. Install per Article 3.2 and as indicated on the Drawings.

3.4 CLEAN-UP

A. During the progress of the Work, remove from the project all discarded coating materials, rubbish, cans and rags.

B. All sealant material and drops shall be completely removed from hardware, adjacent floor areas, metal work, etc., and the premises shall be left clean and in orderly condition.

C. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dirt and debris. This includes removal of all debris from pipes, etc., which resulted from work specified herein.

D. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation for sealant installation. Refer to Section 321723.

E. Empty containers shall be removed from the garage at the end of each working day. All cloths soiled with coating that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

DIVISION 9 – FINISHES

SECTION 099100

HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. All labor, material, equipment, special tools and services required to clean and/or prepare surfaces and apply new coatings, as required by the Drawings and this Specification, including but not limited to the following:

   a. Complete cleaning, surface preparation, primer installation where necessary and new coating on steel and metal surfaces.

   b. Surface preparation, priming, and coating or finishing of metal handrails, stairs, and steel columns as indicated on drawings.

   c. Temporary protection of doors, windows, roof areas, and interior spaces during construction.

   d. Provide access to work area for Owner representative or Engineer.

B. Related Sections:

1. Section 030100 – Concrete Repairs.

2. Section 055000 – Miscellaneous Metals.

1.2 REFERENCES

A. ASTM D 16 – Terminology Related to Paint, Varnish, Lacquer, and Related Products.

B. The Society for Protective Coatings (SSPC): SSPC-SP 1 – Solvent Cleaning.

C. The Society for Protective Coatings (SSPC): SSPC-SP 2 – Hand Tool Cleaning.

D. The Society for Protective Coatings (SSPC): SSPC-SP 3 – Power Tool Cleaning.

E. The Society for Protective Coatings (SSPC): SSPC-SP 6/NACE 3 – Commercial Blast Cleaning.

F. The Society for Protective Coatings (SSPC): SSPC-SP 13/NACE 6 – Surface Preparation of Concrete.

1.3 DEFINITIONS

A. "Coating" as used herein means all paint systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

B. “Dry Film Thickness” as used herein means the thickness of a coat in a fully cured state measured in mils (1/1000 inch).

C. “Well-adhered” as used herein means materials that cannot be removed by lifting with a dull putty knife.

1.4 SUBMITTALS

A. Submit manufacturer's technical information including coating label analyses and application instructions.

B. Submit complete line of manufacturer’s color samples for each product.

C. Letter of approval per Paragraph 1.5.A.

D. Prior project experience per Paragraph 1.5.B.

E. Name and resume of persons per Paragraph 1.5.C.

F. Manufacturer’s sample warranty.

1.5 QUALITY ASSURANCE

A. The contractor shall be a certified installer by the manufacturer.

B. The contractor shall be approved by the manufacturer and shall have no less than (5) years experience in performance of similar work in size and complexity.

C. All work under this Section shall be under the immediate control of the Contractor's superintendent(s) experienced in this type of work. The person(s) shall have supervised three prior projects of similar magnitude and type, and shall be present during all operations. This person(s) shall be approved by the Owner.

D. Regulatory Requirements:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

E. Mock-Up:

1. Provide mockup of coating preparation and coating system for review by Owner and Engineer. Maintain approved mock-ups during the job as reference for minimal standard of acceptance and quality of coating application.

F. Pre-installation meeting.

G. Provide access to work area for Owner representative or Engineer to inspect quality of work, progress, unit price items and field conditions. Access to be completed during normal working hours. If access requires mechanical equipment (man-lift, swing stage, etc.), provide necessary operators.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.

2. Fed. Spec. number, if applicable.

3. Manufacturer's stock number and date of manufacture.

4. Manufacturer's name.

5. Contents by volume, for major pigment and vehicle constituents.

6. Thinning instructions.

7. Application instructions.

8. Color name and number.

B. Storage and Protection:

1. Protect materials in a dry place, off ground and under cover to protect them from moisture and other damage.

2. Do not use materials showing evidence of water or other damage.

3. Storage and handling of materials shall conform to the requirements of the applicable safety regulatory agencies.

4. Storage areas shall be heated or cooled as required to maintain the temperatures within the range recommended by the manufacturer.

1.7 PROTECTION

A. Place coating or solvent soaked rags, waste, or other materials which might constitute a fire hazard in metal containers and remove from premises at the close of each day's work.

B. Protect the work of all other trades against damage, marking or injury by suitable covering during the progress of the coating and finishing work. Repair any damage done.

C. Protect and filter debris and chemicals from entering storm drains. Direct water runoff from all cleaning processes to the filtration system before allowing it to enter the storm

drain system.

D. During all cleaning operations, coordinate drain protection with the local municipality.

1.8 PROJECT CONDITIONS

A. Environmental requirements:

1. Install coating materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.

2. Fumes and dust shall be controlled to prevent harmful or undesirable effects in surrounding areas. Do not allow fumes, dirt, dust or debris to enter building.

3. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

4. Apply water base coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 Deg. F. (10 Deg. C.) and 90 Deg. F. (32 Deg. C.), unless otherwise permitted by coating manufacturer's printed instructions.

5. Apply solvent-thinned coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 Deg. F. (7 Deg. C.) and 95 Deg. F. (35 Deg. C.), unless otherwise permitted by coating manufacturer's printed instructions.

6. Do not apply coating in snow, rain, fog or mist; or when relative humidity exceeds 85 percent or to damp or wet surfaces unless otherwise permitted by coating manufacturer's printed instructions.

7. Apply coating to surfaces that are cured and dry per manufacturer’s tolerances.

1.9 SEQUENCE

A. Prior to beginning coating preparation complete all steel, concrete, and sealant repairs including curing periods.

1.10 WARRANTY

A. Coating System Warranty:

1. The applicator shall furnish a (5) year warranty to the Owner for all types of new coating installed. New coating work shall be warranted against defects due to installation, including but not limited to debonding and inadequate preparation.

a. All required testing and quality assurance operations necessary to furnish warranty are Contractor and manufacturer’s responsibility.

2. The manufacturer shall furnish a (5) year warranty to the Owner for all types of new coating installed. New coating work shall be warranted against material defects, including but not limited to debonding, cohesive failure, cracking, and ultra violet exposure degradation.

    a. All required testing and quality assurance operations necessary to furnish warranty are Contractor and manufacturer's responsibility.

1.11 MAINTENANCE

A. Extra Materials

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sherwin Williams.

B. Tnemec Company.

2.2 MATERIALS

A. No lead-based products are permitted.

B. Use no thinners other than those specified by manufacturer.

C. Use only paints and coatings that are compatible with concrete and previously coated surfaces.

D. Use only primers and undercoats that are suitable for each surface to be covered and that are compatible with finish coating required.

E. Notify Engineer in writing of any anticipated problems in using coating systems specified on existing substrates.

F. Provide cleaners for removal of loose paint, dirt, and pollutants; which are compatible with all primers, intermediate coats, and finish coat. Thoroughly rinse all clean agents before applying primer or finish coats. Pre-approve cleaning agents with paint manufacturer.

G. All products must be provided by a single manufacturer.

2.3 MATERIALS AND PROCEDURES

A. General Cleaning Requirements:

1. All existing garage area drains shall be clear and protected prior to beginning any work.

2. All biological growth must be removed prior to coating.

3. All efflorescence, lime run, and surface contaminants should be removed prior to

application of new coating.

4. If previously coated, existing coating must be adhered to the substrate per the manufacturer's requirements. Manufacturer shall approve the surface preparation and existing conditions before the contractor applies coating to ensure the product warranty will be honored.

B. Exterior Ferrous Metal for New Steel: materials and procedures are listed in order of process/application. Apply per manufacturers recommendations.

1. Surface Preparation:

a. SSPC-SP1 Solvent Cleaning.

2. Approved manufacturer's systems:

a. Sherwin Williams:

1) Primer: One (1) Coat: Macropoxy 646 FC; 3.0 to 4.0 mils DFT.

2) Finish Coats: Two (2) Coats: HiSolids Polyurethane, 2.0 to 3.0 mils DFT per coat.

b. Tnemec:

1) Primer: One (1) Coats: Series N27 S.T. Epoxy; 4.0 to 6.0 mils DFT.

2) Finish Coats: Two (2) Coats: Endura-Shield Series 1074/1075; 2.0 to 3.0 mils DFT per coat.

C. Previously Coated or Rusted Exterior Metal: materials and procedures are listed in order of process/application. Apply per manufacturers recommendations.

1. Surface Preparation:

a. SSPC-SP3 Power Tool Clean to remove all loose mill scale, loose rust, and other foreign matter.

b. SSPC-SP1 Solvent Clean to remove all visible oil, grease, soil, and other contaminants.

2. Approved coating systems:

a. Sherwin Williams:

1) Primer: One (1) Coat Macropoxy 646 FC - 4.0 to 6.0 mils DFT.

2) Polyurethane Finish Coat: Two (2) Coats: HiSolids Polyurethane – 2.0 to 4.0 mils DFT.

3) Acrylic Finish Coat: Two (2) Coats: Shercryl HPA – 2.0 to 4.0 mils DFT.

b. Tnemec:

1) Primer: One (1) Coat: Chembuild Series 135; 4.0 to 6.0 mils DFT.

2) Polyurethane Finish Coat: Two (2) Coats: Endura-Shield Series 1074/1075; 2.0 to 4.0 mils DFT.

3) Acrylic Finish Coat: Two (2) Coats: Endura-Tone Series 1028; – 2.0 to 4.0 mils DFT.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces intended to receive coatings and note conditions or defects that will adversely affect the execution and/or quality of the work.

B. Starting of cleaning and coating work will be construed as applicator's acceptance of surfaces and conditions within any particular area.

C. Notify Owner in writing of any such conditions or defects. Do not begin work until unsatisfactory conditions are corrected. Failure to notify Owner prior to beginning work constitutes acceptance by Contractor of the surfaces and conditions under which the work is to be performed, and acceptance by Contractor for the performance of the work.

3.2 PREPARATION

A. Protection

1. Provide adequate protection of all surrounding surfaces not intended to receive coating from damage due to preparation, cleaning or coating procedures. Repair damage at no cost to the Owner.

2. Program coating so that construction dirt, dust, and debris will not fall onto wet, newly coated surfaces.

3. When toxic or flammable solvents are used, the coating contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

4. Provide the necessary protection to contain all dust, dirt, debris and coating chips within work area. Do not allow to migrate into building interior spaces or storm drain system.

5. Provide "Wet Paint" signs as required to protect newly coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.

B. Surface Preparation

1. Perform preparation and cleaning procedures in accordance with coating manufacturer's instructions and as herein specified, for each particular substrate condition.

2. Remove all surface contamination such as chalk, loose coating, mill scale dirt, foreign matter, rust, rust stains, mold, mildew, mortar, efflorescence, weld splatter and slag, and sealers from surfaces to be coated.

3. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-coated, or provide surface-applied protection prior to surface preparation and coating operations. Remove, if necessary, for complete coating of items and adjacent surfaces. Following completion of coating of each space or area, reinstall removed items.

4. Prepare hair line cracks (1/64” or less) per manufacturer’s instructions. Reference the Details to repair cracks larger than 1/64”.

5. Do not field coat the following work:

a. Sealant Joints

b. Prefinished and natural finished items including but not limited to prefinished equipment, acoustic materials, finished mechanical and electrical equipment such as light fixtures and grilles.

c. Non-ferrous metal surfaces including aluminum, stainless steel, chromium plate, copper, and tern coated stainless steel except where noted coated.

d. Operating parts and labels.

C. MATERIALS PREPARATION

1. Mix and prepare coating materials in accordance with manufacturer's directions.

2. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using. Continuously agitate zinc-rich primers.

3. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of coating in a clean condition, free of foreign materials and residue.

3.3 APPLICATION

A. General:

1. Apply coating in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

2. Apply additional coats when undercoats, stains, or other conditions show through final coat of coating, until coating film is of uniform finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

3. Generally, coating surfaces behind movable equipment same as similar exposed surfaces. Coating surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

4. Do not coat over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable coating film.

B. Scheduling Coating:

1. All caulking and sealants shall be in place and thoroughly cured prior to application of coatings.

2. Apply first-coat material to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

3. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until coating has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of coating does not cause lifting or loss of adhesion of the undercoat.

4. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate to establish a total dry film thickness as indicated.

C. Application:

1. Apply prime coat of materials which is required to be coated or finished, and which has not been prime coated by others.

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

3. Pigmented (Opaque) Finishes: Complete cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.

4. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish, or recoat work not in compliance with specified requirements.

3.4 CLEANING

A. During progress of work, remove from site discarded coating materials, rubbish, cans, and rags at end of each work day.

B. Upon completion of coating work, clean window glass and other coating-spattered surfaces. Remove spattered coating by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.5 SCHEDULES

A. Coating colors shall be as indicated below:

1. Color to be selected by Owner.

END OF SECTION