PERSIGO WASTE WATER TREATMENT PLANT
Primary Clarifier Repairs
Project Specific Specifications

2145 River Road
Grand Junction, Colorado 81505

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WJE No. 2019.3776

Prepared for:
City of Grand Junction
Public Works
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Grand Junction, Colorado 81501

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END OF SECTION

INSTALLER'S WARRANTY FOR JOINT SEALANT

Sealant Installer: _____

Sealant Installer Address: _____

Owner: _____

Owner Address: _____

Project Address: _____

Building Name: _____

Area of Work: _____

Substantial Completion Date: _____

Warranty Period: _____years

Expiration Date: _____

AND WHEREAS Sealant Installer has contracted, either directly with Owner or indirectly as subcontractor, to warrant said Work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

NOW THEREFORE Sealant Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period it will, at its own cost and expense, make or cause to be made such repairs to or replacement of said Work as are necessary to correct faulty and defective Work and as are necessary to maintain said Work in watertight condition, and warrants against the following.

1. Components of sealant system that do not comply with requirements; that do not remain watertight; that fail in adhesion, cohesion, or general durability; or that deteriorate in a manner not clearly specified by submitted sealant manufacturer's data as an inherent quality of the material for the application indicated, regardless of whether the Work was previously accepted by Owner.
2. Damage by exposure to foreseeable weather; and damage by intrusion of foreseeable wind-borne moisture.

Warranty is made subject to the following terms and conditions:

1. Specifically excluded from Warranty are damages to Work and other parts of the building, and to building contents, caused by:
    a. lightning;
    b. fire;
    c. failure of sealant substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    d. activity adjacent to sealant Work by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner's Representative.
    e. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.
    f. Excessive joint movement caused by structural settlement or errors attributable to design or construction, resulting in stresses in sealant exceeding sealant manufacturer's written specifications for sealant elongation or compression.

2. When Work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Sealant Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Sealant Installer is responsible for damage to Work covered by Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of Work.
4. During Warranty Period, if Owner allows alteration of Work by anyone other than Sealant Installer, including cutting, patching, and maintenance, Warranty shall become null and void on date of said alterations, but only to extent said alterations affect Work covered by Warranty. If Owner engages Sealant Installer to perform said alterations, Warranty shall not become null and void unless Sealant Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate Work, thereby reasonably justifying limitation or termination of Warranty.
5. Owner will promptly notify Sealant Installer of observed, known, or suspected leaks, defects, or deterioration and will afford reasonable opportunity for Sealant Installer to inspect Work and to examine evidence of such leaks, defects, or deterioration. Sealant Installer shall inspect leak, defect, or deterioration within 24 hours of notification.
6. If permanent repair or replacement of warranted condition cannot be made immediately, due to weather conditions, availability of appropriate labor or materials, building occupancy, etc., Sealant Installer must make, or cause to be made, immediate temporary repairs to prevent any further damage, deterioration, or unsafe conditions. Permanent repair or replacement of warranted condition shall be scheduled as soon thereafter as practical, and with Owner's consent and approval.
7. If Owner notifies Sealant Installer of warranted condition that requires immediate attention to prevent potential injury or damage, and Sealant Installer cannot or does not promptly inspect and repair same, either permanently or temporarily, then Owner may make, or cause to be made, such temporary repairs as may be essential and Sealant Installer will reimburse Owner for cost of such repairs. Such action will not relieve Sealant Installer of its obligation to perform any necessary permanent repairs, and Warranty shall remain in full force and effect for remaining portion of its original term.
9. Sealant Installer shall provide equipment, labor, and material required to remedy warranted conditions, including repair or replacement of damage to other work resulting therefrom, and removal and replacement of other work required to access warranted condition. Additional required work will be at Sealant Installer’s sole expense for full term of Warranty. Warranty includes removal and replacement of sealant-backer material and sealant.
10. Warranty is recognized to be only Warranty of Sealant Installer on said Work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of sealant failure. Specifically, Warranty shall not operate to relieve Sealant Installer of responsibility for performance of original Work according to requirements of Contract Documents, regardless of whether Contract was directly with Owner or with Owner’s General Contractor.

IN WITNESS THEREOF, and intending to be legally bound hereby, Sealant Installer has caused this document to be executed by undersigned, duly-authorized officer.

By: _____ Corporate Seal:
(Signature of Sealant Installer)

_____
(Name)

_____
(Date)

Notary Public Seal:

Subscribed and sworn before me this _____day of _____, _____

My commission expires _____

INSTALLER'S WARRANTY FOR COATING

Installer: _____

Address: _____

Owner: _____

Owner Address: _____

Project Address: _____

Building Name: _____

Area of Work: _____

Substantial Completion Date: _____

Warranty Period: ___ years

Expiration Date: _____

We (Applicator) hereby warrant materials and workmanship of Work which we have installed at above-referenced Project for the period noted above from date of substantial completion. We agree to repair or replace coating (material and labor) which fails to remain watertight; or fails in adhesion, cohesion, or general durability; or experiences surface crazing, fading or chalking; or deteriorates in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the application indicated. Warranty does not include deterioration or failure of coating due to failure of substrate prepared according to requirements, formation of new substrate cracks exceeding 1/16 inch in width, fire, or vandalism.

In event of our failure to repair, or make plans for repair of foregoing conditions, and notify Owner of such plans, within seven days after being notified in writing by Owner, we collectively or separately do hereby authorize Owner or his successor in interest to proceed to have said defects repaired and made good at our expense and we will honor and pay costs and charges therefore upon demand.

IN WITNESS THEREOF, and intending to be legally bound hereby, Concrete Installer has caused this document to be executed by undersigned, duly-authorized officer.

By: _____ Corporate Seal:
(Signature of Installer)

_____
(Name)

_____
(Date)

Notary Public Seal:

Subscribed and sworn before me this _____day of _____, _____

My commission expires _____

SECTION 01 00 00

GENERAL

PART 1 GENERAL

1.1 PROJECT SPECIFIC REQUIREMENTS

A. The Standard Specifications for Road and Bridge Construction, as well as the Standard Specifications for Construction of Underground Utilities Water Lines, Sanitary Sewers, Storm Drains, Underdrains and Irrigation Systems do not apply to this project. Any references to those documents in the contract shall be replaced by the requirements of the project specific documents.

B. Standard Details for Construction of Streets, Trails, Storm Drains and Utilities do not apply to this project. Any references to those documents in the contract shall be replaced by the requirements of the project specific documents.

C. Project specific requirements shall take precedence over general conditions or standard documents.

D. Warranty period for specific Work items are intended to supplement the general Contractor's Warranty and Guarantee.

1.2 REFERENCES

A. References to applicable standards shall be the latest edition of each unless otherwise noted.

1.3 DEFINITIONS

A. The definitions here shall supplement, or replace, those found in the City of Grand Junction General Contract Conditions.
   1. As-Built Documents: See Project Record Documents.
   2. Owner: See City.
   3. Project Record Documents: Contract documents marked by the Contractor to identify changes that were made during construction.
   4. Request for Information (also known as RFI): A question or inquiry about the Work submitted by the Contractor for clarification by the Owner or Engineer.

1.4 ADMINISTRATIVE

A. Requests for Information (RFI): Contractor shall submit RFIs to the Engineer for any condition which is believed to be at variance with the Construction Documents, or for situations where it is unclear what the Construction Documents are implementing. RFIs shall be submitted in writing to the Engineer and shall include a location, date requested, date required and indicate which repair item or item(s) are impacted by the request. Allow a minimum of 3 working days for review by Engineer.

B. Maintain at least one copy of each referenced standard, this Project Manual (Specifications), Drawings and/or Figures at the job site. In addition, maintain copies of all site visit reports (SVR) and Sketches (SKs) issued by the Engineer during Construction.

C. Provide a project superintendent at the Site a minimum of eight hours per day during the progress of the Work. The superintendent shall be literate and fluent in English.

D. Photograph existing conditions that are important to the construction or that deviate substantially from the Contract Documents; significant conditions that will be concealed by the Work; finish surfaces that might be misconstrued as damage caused by removal or other Work operations; and immediate follow-up when on-site events result in construction damage or loss. Photographs shall be of sufficient quality as to depict the condition being photographed. Provide photographs to Owner or Engineer upon request, either during project or after completion.

1.5 TEMPORARY FACILITIES AND CONTROLS

A. Contractor to furnish and pay for all temporary facilities and controls listed below which are not explicitly designated as responsibility of Owner.

B. Comply with Owner's limitations and restrictions for Site use and accessibility.
   1. Comply with all security procedures.

C. Project has special requirements for coordinating Work because of the following conditions:
   1. Owner will occupy premises outside of Work area during construction period.
      a. Cooperate with Owner to minimize conflicts and facilitate Owner usage.
      b. Perform Work to avoid interference with Owner's day-to-day operations. Notify Owner's Representative at least 72 hours in advance of activities that will affect Owner's operations.
      c. Maintain vehicular, pedestrian, and emergency and normal access to portions of facility that are in use. Keep entrances and exits clear of stored materials and construction equipment.
      d. Short interruptions in access may be permitted if approved in advance in writing by the Owner's Representative.
      e. Schedule deliveries to minimize interruptions.
      f. Do not disturb Site outside of Work area.
      g. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted and then only after arranging to provide temporary utility services according to requirements indicated.
      h. Notify Owner not less than 7 days in advance of proposed utility interruptions.
      i. Do not proceed with utility interruptions without Owner's written permission.
   2. Residential nature of building and neighborhood.
   3. Office tenant needs.

D. Staging:
   1. Staging areas must be coordinated with Owner prior to mobilization.
   2. Confine materials and equipment to the staging and work areas. Contractor assumes full responsibility for the protection and safekeeping of items stored on site.
   3. Do not unreasonably encumber Site with materials or equipment.
   4. Do not load Project structure with weight that will endanger Project structure.

E. Parking: Construction personnel shall park on-site in areas designated by the Owner's Representative.

F. Water Service: Use of Owner's existing water service will be permitted.
   1. Provide connections and extensions of service as required for construction operations.
   2. Provide additional water as necessary.

G. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel at location designated by Owner's Representative.
   1. Provide disposable supplies, including toilet tissue, paper towels, and paper cups. Maintain adequate supply. Provide covered waste containers for disposal of used material.
   2. Service toilets at least twice weekly.
   3. Provide wash facilities supplied with potable water at convenient locations for personnel who handle materials that require clean up. Supply cleaning compounds appropriate for each type of material handled. Dispose of drainage properly.
      a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.
   4. Comply with public authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

H. Electric Power Service: Use of Owner's existing electric 120V electric outlets will be permitted. Any power requirements above existing 120V outlets will need to be provided.
   1. As necessary, provide additional electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Do not overload Owner's service.
   2. Comply with NECA 200 and NFPA 70.
   3. Maintain temporary service in safe condition and utilize in safe manner.

I. Use of Existing Stairs and Elevators: Use of Owner's existing stairs will be permitted, as long as stairs are cleaned and maintained in condition acceptable to Owner's Representative.
   1. Coordinate daily usage with Owner's Representative and with requirements for facility operations.
   2. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs, and entrance doors and frame, and to maintain means of egress.
   3. At Substantial Completion, restore stairs to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

J. Lighting: Owner will provide existing lighting at existing locations.
   1. Provide additional lighting, as necessary, with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
   2. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

K. Provide insulation or temporary heating as necessary for curing, drying, and protection of installed construction.
   1. Select equipment that will not have harmful effect on completed installations or elements being installed.
   2. Maintain temporary heating on 24-hour basis until no longer needed.
   3. Unless noted otherwise, insulation is considered incidental to construction and will not be paid for separately.
   4. Unless otherwise specified, temporary heating will not be considered part of Work and will be paid as additional Work item. Notify Owner's Representative in advance of need for temporary heating and estimated added cost. Do not proceed with temporary heating until authorized in writing by Owner's Representative.

L. Snow removal: The contractor shall be required to remove snow from the work area.

M. Equipment:
   1. Direct equipment exhaust away from occupied spaces and vent equipment operating within structure to outside.
   2. Operate equipment at noise levels conforming to requirements of city, state, and federal laws and codes, and Owner limitations.

N. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of public authorities having jurisdiction. Construction debris shall be removed in a manner that avoids overloading adjacent structural members.

O. Protection:
   1. Limit access to work areas.
   2. Contractor shall provide protective barriers, fences, etc. to ensure the safety of pedestrians and vehicular traffic during the Work. All barriers and fences shall comply with local, state, and federal regulations and laws.
   3. Provide adequate signage to direct pedestrian and vehicular traffic around the area under construction.
   4. Prevent construction debris and other materials from coming into contact with pedestrians, motor vehicles, building, and other surfaces that could be harmed by such contact.
   5. Existing Drains:
      a. Verify that drains in or near Work area are open and free flowing prior to start of Work.
      b. Lawfully remove construction effluent from Site. Do not allow construction debris to flow into existing drains or sewer systems.
      c. Rout or replace clogged drain lines at completion of Work.
   6. Confine dust, debris and fumes to Work area and prevent from entering areas outside of the Work area.
   7. Protect finished surfaces against damage. Minimize traffic on finished roof surfaces and do not use for material storage.
   8. Contractor shall be responsible for maintaining the water tightness of the areas of the structure being worked on during the course of the work. Providing temporary protection of the existing construction or structure from the weather until removed portions are completely replaced with new construction. The costs of damage and repairs shall be made at no cost to the Owner.
   9. Maintain all protection in operable condition for the full duration of the project.

P. Temporary Fencing:
   1. Tree and Plant Protection: Install temporary fencing located as indicated or outside drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
   2. Site Enclosure Fence: Before construction operations begin, provide Site enclosure fence in manner that will prevent people and animals from easily entering Site except by entrance gates.

Q. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241. Coordinate with Owner's safety team.
   1. Provide portable, UL-rated fire extinguishers with class and extinguishing agent as required by locations and classes of fire exposures.
   2. Prohibit smoking on Site.

3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of public authorities having jurisdiction.
4. Store combustible materials in approved safety containers and enclosures, away from building if possible.
5. Develop and supervise overall fire-prevention and -protection program for personnel at Site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

PART 2 PRODUCTS

2.1 GENERAL

A. The products specified are believed to have properties adequate for successful completion of the Work. If the Contractor has found these products to be unacceptable or has had difficulty using these materials, the Contractor shall notify the Architect/Engineer in writing, and provide a request for substitution of material for which the Contractor has had successful experience.

B. No product substitutions will be allowed unless otherwise noted. Engineer's approval must be obtained for all substitutions prior to being awarded the project. Submit requested substitutions with bid form.

2.2 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Site in original containers and packaging with seals unbroken, labeled with manufacturer’s name, product brand name and type, date of manufacture, lot number, directions for storing, and complete manufacturer’s written instructions.

B. Keep materials dry and do not allow materials to be exposed to moisture during transportation, storage, handling, or installation. Reject and remove from Site new materials which have been exposed to moisture to their detriment.

C. Store and handle materials in accordance with manufacturer’s written instructions, safety requirements, and all applicable laws and regulations. Remove from Site, and replace at no cost to Owner, any materials that are damaged or otherwise negatively affected by not being stored or handled in accordance with manufacturer’s written instructions.

D. Store materials in original, undamaged containers and packaging in clean, dry, location on raised platforms and protected from weather, within temperature range required by manufacturer. Protect stored materials from direct sunlight and sources of ignition. Manufacturer’s standard packaging and covering alone is not considered adequate weather protection.

E. Locate materials in a secure location approved by Owner’s Representative

F. Conspicuously mark damaged or opened containers, containers with contaminated materials, damaged materials, and materials that cannot be used within stated shelf life and remove from Site as soon as possible. Replace discarded materials in a timely manner at no cost to Owner.

G. Limit stored materials on structures so as to preclude damage to materials and structures.

H. Maintain copies of all applicable Safety Data Sheets (SDS) with materials in storage area, such that they are available for ready reference on Site.

PART 3 EXECUTION

3.1 DISCOVERY, FIELD VERIFICATION AND CHANGES IN WORK

A. Contractor shall verify all quantities. Quantities shown are for estimating purposes only.

B. Do not scale drawings. The Contractor shall field verify the existing dimensions and existing conditions prior to starting the work. Dimensions of the new construction shall be adjusted as necessary to fit the existing conditions. The Engineer shall be notified in writing of any significant deviations from the dimensions or conditions shown on these drawings.

C. During rehabilitation work, existing conditions may be encountered which are not known or are at variance with the Contract Documents. Such conditions may interfere with the Work and may consist of damage or deterioration of the substrate or surrounding materials or mislocation of embedded elements such as reinforcing steel, which may interfere with proper execution of the Work. Promptly report to Engineer as a request for information any of these conditions.

3.2 EXAMINATION FOR MATERIAL COMPLIANCE

A. Examine substrates and conditions with Installer and manufacturer's representative, where appropriate, for compliance with requirements and for other conditions affecting installation or performance of the material.
   1. Verify dimensions so that proper installation of material for optimal performance is maintained.
   2. Ensure that work done by other trades is complete.
   3. Verify that areas and conditions under which Work is to be performed permit proper and timely completion of Work.
   4. Notify Engineer in writing of conditions which may adversely affect installation or performance of the material and recommend corrections.
   5. Do not proceed with Work until adverse conditions have been corrected and reviewed by Engineer.
   6. Commencing Work constitutes acceptance of Work surfaces and conditions.

3.3 CLEANING

A. Immediately clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

B. At the end of each workday, broom-clean Site and Work areas and place all items to be discarded in appropriate containers.

C. After completing Work:
   1. Clean all materials resulting from Work that are not intended to be part of the finished Work using appropriate cleaning agents and procedures. Exercise care to avoid damaging surfaces.
   2. Repair at no cost to Owner all items damaged during the Work.
   3. Remove and legally dispose of debris and surplus materials from Site.

3.4 PROTECTION

A. Take precautions to ensure safety of people (including building users, passers-by, and workers) and protection of property (including adjacent building elements, landscaping, and motor vehicles).
   1. Erect temporary protective canopies and walls, as necessary, at walkways and at points of pedestrian and vehicular access that must remain in service during Work.

B. Cover adjacent surfaces with materials that may be damaged.

C. Protect paving and sidewalks, and adjacent building areas from mechanical damage due to scaffolding and other equipment.

D. Prevent dust, debris, coating overspray/spatter, and other construction materials from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

E. Limit access to Work areas.

F. Comply with manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products.

G. Assume responsibility for injury to persons or damage to property due to Work, and remedy at no cost to Owner.

H. Protect from damage, all elements of completed work and original construction to remain.

I. Protect Work during and after completion from contact with contaminating substances and from damage, so materials are without deterioration or damage at time of Substantial Completion.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Contractor's bids shall be based on providing products or methods exactly as specified.

B. For products or methods specified only by reference or performance standards, select a product that meets or exceeds standards according to manufacturer's information. Product selection will be subject to Engineer's approval.

C. For products or methods specified by naming several products or manufacturers, select product and manufacturer named.

D. Where the phrase "or equal" occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this Work by Engineer. The decision of Engineer shall be final.

1.2 SUBSTITUTIONS, CONTRACTOR OPTIONS

A. No substitutions will be considered after Notice of Award except under one or more of the following conditions:
   1. Substitutions for compliance with final interpretations of code requirements or insurance regulations.
   2. Unavailability of specified products or methods, through no fault of Contractor.
   3. Subsequent information discloses inability of specified products or methods to perform properly or to fit in designated space.
   4. Manufacturer/fabricator refusal to certify or guarantee performance of specified products or methods as specified.
   5. When a substitution would be substantially to Owner's best interests.

1.3 SUBSTITUTION REQUIREMENTS

A. Submit four copies of each request for substitution. Include in request:
   1. Complete data substantiating compliance of proposed substitution with Contract Documents.
   2. For products:
      a. Product identification, including manufacturer's name and address.
      b. Manufacturer's literature, including product description; performance and test data, and reference standards; samples; and name and address of similar projects on which product was used and date of installation.
   3. For construction methods:
      a. Detailed description of proposed method.
      b. Drawings illustrating methods.
   4. Itemized comparison of proposed substitution with products or methods specified.
   5. Data relating to changes in construction schedule.
   6. Identify other contracts affected and changes or coordination required.

7. Accurate cost data on proposed substitution in comparison with products or methods specified.

B. In making requests for substitutions, Contractor represents:
   1. They have personally investigated proposed product or method and determined that it is equal or superior to that specified in every respect.
   2. They will provide the same guarantee for substitution as for products or methods specified.
   3. They will coordinate installation of accepted substitutions into Work, making changes for Work to be complete in every respect.
   4. Cost data is complete and includes related costs under their contract, but excludes:
      a. Costs under separate contracts
      b. Engineer's redesign
      c. Administrative costs of Engineer
   5. They will assume full responsibility for all additional costs and expenses for Owner, Engineer, and other Contractors.

C. Substitutions will not be considered when:
   1. They are indicated or implied on Shop Drawings or product data submittals without formal request submitted in accordance with the Specifications.
   2. Acceptance will require substantial revision of Contract Documents.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for submitting shop drawings, product data, samples, and other submittals.

B. Reference the Schedule of Submittals for a summary of required submittals.

1.2 SUBMITTALS

A. General:
   1. Identification: Include a permanent label or title block on the submittal or cover sheet, with the following information.
      a. Project name.
      b. Date.
      c. Names of Engineer, Contractor, subcontractor, manufacturer, supplier, and firm or entity that prepared submittal, as appropriate.
      d. Identification information, such as the number and title of the appropriate Specification section, Drawing number and detail references, location(s) where product is to be installed, or other necessary information.
      e. Label each submittal with Specification section number followed by decimal point and then sequential number (e.g., 06100.01). On resubmittals, include alphabetic suffix after another decimal point (e.g., 06100.01.A).
      f. Provide space approximately 6 by 8 inches on or beside the label or title block for the Contractor's approval stamp and the action stamp of the Engineer.
   2. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
   3. Submit one electronic copy of prints in PDF format. Prints shall have white background and dark lettering and line work. Prints will be returned electronically.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not use reproductions of the Contract Documents or standard printed data.
   1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      a. Dimensions, including notation of those established by field measurement.
      b. Identification of products.
      c. Fabrication and installation drawings.
      d. Roughing-in and setting diagrams.
      e. Shopwork manufacturing instructions.
      f. Templates and patterns.
      g. Schedules.
      h. Notation of coordination requirements.
      i. Relationship to adjoining construction clearly indicated.
      j. Seal and signature of professional Engineer if specified.

2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8 1/2 by 11 inches but no larger than 30 by 42 inches.
3. Submit one electronic copy of prints in PDF format. Prints shall have white background and dark lettering and line work. Prints will be returned electronically.

C. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. Clearly mark each copy of the submittal to show which products and options are applicable. Delete information which is not applicable. Supplement standard information with project-specific information.
   2. Include the following information, as applicable:
      a. Manufacturer's catalog cuts, product specifications, schematic drawings, installation instructions, and written recommendations.
      b. Compliance with referenced standards.
      c. Testing by recognized testing agency.
      d. Include manufacturer's literature including written instructions for evaluating, preparing, and treating substrate.
      e. Technical data including tested physical and performance properties
      f. Mixing and application or placement instructions.
   3. Include temperature ranges for storage and application of materials, and special cold-weather application requirements or limitations.
   4. Include Globally Harmonized System (GHS) Safety Data Sheets or, if not yet available, Material Safety Data Sheets. For information only.

D. Samples: Submit physical samples to illustrate functional and aesthetic characteristics of the product, for review of materials and workmanship, for compatibility with other elements, and for comparison with the actual installed elements.
   1. Samples shall be of sufficient size to show the general visual effect.
   2. Include sets of at least three samples that show the full range of color, pattern, texture, graining, and finish.
   3. Transmit samples that contain multiple, related components, such as accessories, together in one submittal package.
   4. Identification: Attach a label on an unexposed side of each sample that includes the following:
      a. Generic description of sample.
      b. Product name, name of manufacturer, and sample source.
      c. Number and title of appropriate Specification section.
   5. Samples for Initial Selection: Submit two full sets of units or sections of units from the supplier's product line, showing the full range of colors, textures, and patterns available. Engineer will retain one set and return one set with the options selected.
   6. Samples for Verification: Submit full-size units or samples of the size indicated, prepared from the same material to be used for the Work, cured and finished in the manner specified, and physically identical with material or product proposed for use, and that show the full range of color and texture variations expected.
      a. Submit the number of samples required by the Contractor plus one that will be retained by the Engineer. Mark up and retain one returned sample as a Project Record Document.
   7. Maintain approved samples at the Site, available for quality-control comparisons during construction. Samples may be used to determine final acceptance of construction associated with the sample.

E. Delegated Design:
   1. Where required by the Contract Documents, in addition to shop drawings, product data, and other required submittals, submit a statement, signed and sealed by responsible design professional, for each product and system specifically assigned to the Contractor to be designed or certified by a design professional.
      a. Indicate that products and systems comply with performance and design criteria in the Contract Documents.
      b. Include a list of codes, loads, and other factors used in performing these services, and signed and sealed design calculations where required.
      c. Electronic submittals in PDF format are preferred; however, print copies will be accepted. Submit number of prints needed by contractor plus two for retention by the Owner and Engineer.

1.3 SUBMITTAL PROCEDURE

A. Coordinate the preparation and processing of submittals with performance of construction activities.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals requiring concurrent review, and related activities that require sequential activity.
   2. Allow sufficient time for submittal and resubmittal review. Failure to provide sufficient time for submittal and resubmittal reviews will not be a basis for extension of the Contract Time.

B. Review Time:
   1. Allow five working days for the review of each submittal and resubmittal.
   2. Allow additional time if coordination with subsequent submittals is required. The Engineer will advise the Contractor when the submittal being processed must be delayed for coordination.
   3. Time for review shall commence when the Engineer receives the submittal.

C. Contractor Review:
   1. Review each submittal, coordinate with other Work, and check for compliance with the Contract Documents. Verify field dimensions and conditions. Identify variations from the Contract Documents and product or system limitations that may be detrimental to the successful performance of completed Work. Note corrections.
   2. Before submitting to the Engineer, stamp with a uniform approval stamp including the reviewer's name; the date of Contractor's approval; and a statement certifying that the submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
   3. Submittal Log: Maintain submittal log that lists submitted items per specification section. Record dates submitted, dates returned, and disposition of each item based on Engineer's review. Submit final log showing approved materials at Substantial Completion.

D. Transmittal: Package each submittal individually and appropriately for transmittal and handling.

E. Engineer Action:
   1. Engineer will not review submittals that are received from sources other than the Contractor or that do not bear the Contractor's approval stamp, and will return them without action to the Contractor.
   2. Engineer will not return submittals requested for information only.
   3. Engineer will review each submittal for conformance with the design concept of the Project and compliance with the Contract Documents. Engineer will make marks to

indicate corrections or modifications required, and stamp with an action stamp. The action stamp will include the reviewer's name, date of review, and required Contractor action. Contractor actions may include making corrections or modifications to the submittal or resubmitting the submittal, or both.

F. Resubmittals: Make resubmittals in the same form and number of copies as the initial submittal.
   1. Note the date and content of previous submittal.
   2. Note the date and content of the revision in the label or title block and clearly indicate the extent of the revision and changes made.
   3. Resubmit until the Engineer indicates that no resubmittal is required.
      a. No resubmittal is required when submittal is marked "No Exceptions Taken" or "Make Corrections Indicated".

G. Distribution: Furnish copies of the final submittals to the Site file, the record documents file, manufacturers, subcontractors, suppliers, fabricators, installers, public authorities having jurisdiction, and others as necessary for performance of construction activities. Show the distribution on the transmittal forms.

H. Use only the final submittals with the Engineer's action stamp, for construction.
   1. Only items marked "No Exceptions Taken" or "Make Corrections Indicated" shall be used for construction.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for quality assurance and quality control, testing, special inspections and mockups.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated, and do not relieve the Contractor of responsibility for compliance with requirements of the Contract Documents.
   1. Specified tests, inspections, and related actions performed by others do not limit the Contractor's other quality assurance and quality control procedures that facilitate compliance with requirements of the Contract Documents.
   2. Requirements for the Contractor to provide quality assurance and quality control services required by the Engineer, Owner, or public authorities having jurisdiction are not limited by provisions of this Section.

C. Related Sections:
   1. See sections in Divisions 02 through 09, and Drawings sheets for specific test and inspection requirements.

1.2 DEFINITIONS

A. Quality Assurance Services: Activities, actions, and procedures performed before and during the execution of the Work to guard against defects and deficiencies and substantiate that the proposed construction will comply with requirements.

B. Quality Control Services: Tests, inspections, procedures, and related actions during and after the execution of the Work to evaluate that the actual products incorporated into the Work and the completed construction comply with requirements.
   1. Services do not include contract enforcement activities performed by the Engineer, such as observations.

C. Testing Agency (also known as Third Party Testing Agency): Entity responsible for performing specified testing or special inspections in Divisions 02 through 09 and on the Contract Drawings.

D. Special Inspector: A qualified person employed or retained by an approved agency (such as the testing agency), and approved by the building official as having competence necessary to insect a particular type of construction requiring special inspection.

E. Special Inspection: Review of completed work or work in progress performed by the Special Inspector, or where specifically identified, by the Engineer. Items typically required by the governing building code.

1.3 COMPLIANCE CRITERIA

A. General: If compliance with two or more standards is specified and standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.

B. Minimum Quantity or Quality Level: Quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.

C. Refer uncertainties to the Engineer for a decision before proceeding.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 QUALITY CONTROL

A. Reference the Special Inspection Schedule on the Construction Drawings for special inspection requirements for this section.

B. Owner Responsibilities: The Owner will engage a qualified testing agency to perform all special inspections and select testing as explicitly identified in the Contract Documents.
   1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and descriptions of types of testing and inspecting they are engaged to perform.
   2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.

C. Testing Agency/Special Inspector Responsibilities: Cooperate with the Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
   1. Determine location from which test samples will be taken and in which in-situ tests are conducted.
   2. Notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
   3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
   4. Submit a certified written report of each test, inspection, and similar quality control service.
   5. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
   6. Do not perform any duties of the Contractor.

D. Engineer Responsibilities: Engineer may perform some testing on completed on in-process work as noted in the Contract Documents.

E. Tests and inspections not explicitly assigned to the Owner or Engineer, and testing and inspecting requested by the Contractor and not required by the Contract Documents, are the Contractor's

responsibility. Unless otherwise indicated, provide quality control services specified and those required by public authorities having jurisdiction, whether specified or not.

F. Coordination: Coordinate the sequence of activities to accommodate the required quality assurance and quality control services with a minimum of delay and to avoid the necessity of removing and replacing construction to accommodate testing and inspecting.
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.
   2. Notify the testing agency sufficiently in advance of operations to permit assignment of personnel.

G. Associated Services: Cooperate with the Engineer and testing agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Provide the following:
   1. Submittals of concrete mix designs and other materials and products necessary for the testing agency to test and evaluate field work.
   2. Access to the Work.
   3. Incidental labor and facilities necessary to facilitate tests and inspections.
   4. Adequate quantities of representative samples of materials that require testing and inspecting. Assist the testing agency in obtaining samples.
   5. Facilities for storage and field curing of test samples.
   6. Security and protection for samples and for testing and inspecting equipment at Site.

H. Repair and Protection:
   1. On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   2. Provide materials and comply with installation requirements specified in other sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
   3. Protect construction exposed by or for quality control services.
   4. Repair and protection are the Contractor’s responsibility, regardless of assignment of responsibility for quality control services.

END OF SECTION

SECTION 01 70 20

PROJECT CLOSEOUT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Administrative and procedural requirements for contract closeout, including final cleaning; Substantial Completion and final completion procedures.

B. Related Sections:
   1. Divisions 02 through 09 sections for special cleaning and specific closeout requirements for Work in those sections, including warranties.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

A. During Work, maintain one set of Drawings and reviewed shop drawings, Specifications, WJE site visit reports, and product data for recording deviations of as-built construction from design information. Include addenda and Contract modifications.
   1. Accurately document and record changes and modifications as soon as possible after they occur, in understandable manner.
   2. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Record and check markup before enclosing concealed installations.
   3. Include:
      a. Dimensional changes.
      b. Revisions to Drawing details and details not on Drawings.
      c. Changes made by Change Order or Engineer's written orders or direction based on Site Visit Reports or Construction Observation Reports. Note Change Order numbers, Site Visit Report Item numbers or similar identification.
      d. Field records for variable and concealed conditions.
      e. Record information on Work that is shown only schematically or omitted from Drawings.
      f. Actual products and materials used.
         1) Include product data, specifically marked for Project, and cross-referenced to Specifications, Drawings, and Change Orders.
         2) Include names of manufacturer and Installer, and other information necessary to provide record of selections made.

3) Include significant changes in product delivered to Site and changes in manufacturer's written instructions for installation.

4. Mark record document most capable of showing actual physical conditions completely and accurately. Cross-reference on other record documents.
5. Mark record documents with erasable, red-colored media. Use other colors to distinguish between changes for different categories of Work at the same location.

B. Store Record Documents and samples in field apart from Contract Documents used for construction. Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in clean, dry, legible condition, protected from deterioration and loss. Provide access to Record Documents for Engineer's reference during normal working hours.

C. Prepare final document markup in digital format for submission.
1. Incorporate changes and additional information previously marked on record prints. Erase, redraw, and add details and notations where applicable.
2. Refer questions to Engineer for resolution.
3. For new details and drawings, bind new sheets as necessary to appropriate document.
4. Identify and date each Record Drawing. Include names of project, Engineer, and Contractor, and designation "PROJECT RECORD DOCUMENT" in prominent location.
5. Organize PDF information into separate electronic files that correspond to each sheet of Drawings, report or item. Name each file with identification of item contained.

3.2 FINAL CLEANING

A. General: Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations. Return adjacent surfaces and areas to condition existing before Work began.

B. In areas disturbed by construction activities, complete the following cleaning operations before requesting inspection for certification of Substantial Completion. Clean each surface or unit to the condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions. Employ experienced workers or professional cleaners.
1. Remove tools, construction equipment, machinery, and surplus material from Site.
2. Clean Site, yard, and grounds, including landscaped areas, of rubbish, waste materials, litter, and other foreign substances.
   a. Broom clean paved areas. Remove petrochemical spills, stains, and other foreign deposits.
   b. Rake grounds that are neither planted nor paved to smooth, even-textured surface.
3. Clean exposed exterior and interior hard-surfaced finishes to dirt-free condition, free of stains, films, and similar foreign substances. Polish surfaces to achieve specified finish. Avoid disturbing natural weathering of exterior surfaces.
   a. Touchup and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that show evidence of repair or restoration.
      1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
4. Clean and restore transparent and reflective surfaces, such as mirrors and glass in doors and windows, to their original condition. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

5. Remove labels that are not permanent.
6. Clean light fixtures and lamps to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
8. Sweep floors broom clean.
9. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove paint and mortar droppings and other foreign substances.
10. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    a. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
11. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
12. Leave Project clean and ready for reuse.

END OF SECTION

SECTION 02 22 00

EXISTING CONDITIONS ASSESSMENT

PART 1 GENERAL

1.1 SCOPE

A. This Section covers observations of existing conditions made by the Engineer at the site.

1.2 OBSERVATIONS

A. The following figures and captions are provided for reference by the Contractor.

B. Observations of the conditions of the drained Primary Clarifier were made in Clarifier No. 1 (north clarifier) when it was drained and cleaned for concrete investigative work. Even after cleaning, there was a scum or grime layer still present, limiting observations.

C. The surface of the concrete has been eroded within the trough and adjacent to the dome connection nodes.

D. Laboratory review of the concrete indicates that the top 1/4-inch has been weakened by chemical attack within the trough. Below this area, the chemical attack distress is only on the order of 1/16-inch thick.

E. No concrete spalls or delaminations were identified.

F. Macro concrete cracking was noted only at isolated locations.

G. Conditions in Clarifier No. 2 (south clarifier) are presumed to be similar.

H. The observations presented in this section do not eliminate the need for the Contractor to visit the site and confirm existing conditions prior to submitting their bid or commencing with Work.

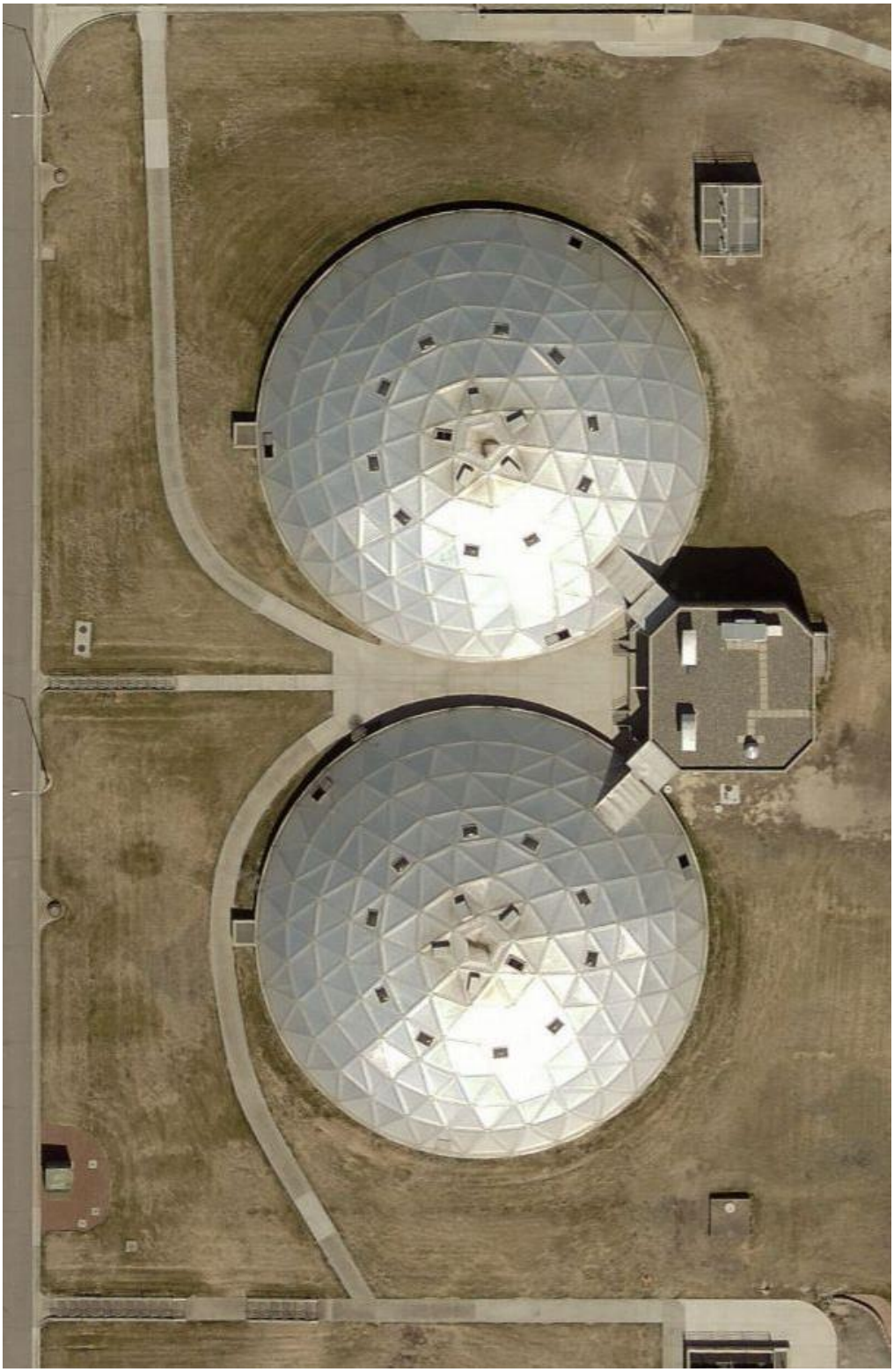

Figure 1. View of Primary Clarifiers from above, north is up (photo from Pictometry, taken 3/26/2018).

Figure 2. View of Primary Clarifiers looking east (photo from Pictometry, taken 3/26/2018).

Figure 3. View of Primary Clarifiers looking south (photo from Pictometry, taken 3/26/2018).

Figure 4. View of Primary Clarifiers looking west (photo from Pictometry, taken 3/26/2018).

Figure 5. View of Primary Clarifiers looking north (photo from Pictometry, taken 3/26/2018).

Figure 6. Clarifier No. 2 as viewed from the east side looking west.

Figure 7. Overall view of clarifier interior.

Figure 8. Overall view of clarifier interior.

Figure 9. Overall view of clarifier interior.

Figure 10. View from catwalk bridge, showing ventilation pipe and dome.

Figure 11. Overall view of clarifier interior.

Figure 12. Interior view of exterior clarifier wall and trough.

Figure 13. Interior view of exterior clarifier wall and trough.

Figure 14. Scum box viewed from below.

Figure 15. Scum box connection to exterior wall of trough.

Figure 16. Scum box drain.

Figure 17. Overall view of weir plate and scum baffle at exterior side of trough.

Figure 18. Close-up view of weir plate to scum baffle connection.

Figure 19. Trough access ladder as viewed from above, standing in entrance enclosure.

Figure 20. Ladder at entry viewed from trough.

Figure 21. Catwalk bridge support pier.

Figure 22. Catwalk bridge and central mechanical equipment.

Figure 23. Sludge pit at center of clarifier adjacent to mechanical equipment.

Figure 24. Scum and bottom screed at base of clarifier.

Figure 25. Bottom screed and blades at exterior wall.

Figure 26. Close-up of bottom screed plate. Blade height will be adjusted by Owner.

Figure 27. Typical depressions in concrete topping.

Figure 28. Overall view of trough and weir plate.

Figure 29. Overall view of trough.

Figure 30. Erosion of concrete surface at trough underneath dome connection nodes.

Figure 31. Typical dome-to-clarifier wall connection node.

Figure 32. Close-up view of underside of dome node connection hardware.

Figure 33. Close-up view of underside of dome node connection hardware.

Figure 34. Close-up view of underside of dome node connection hardware.

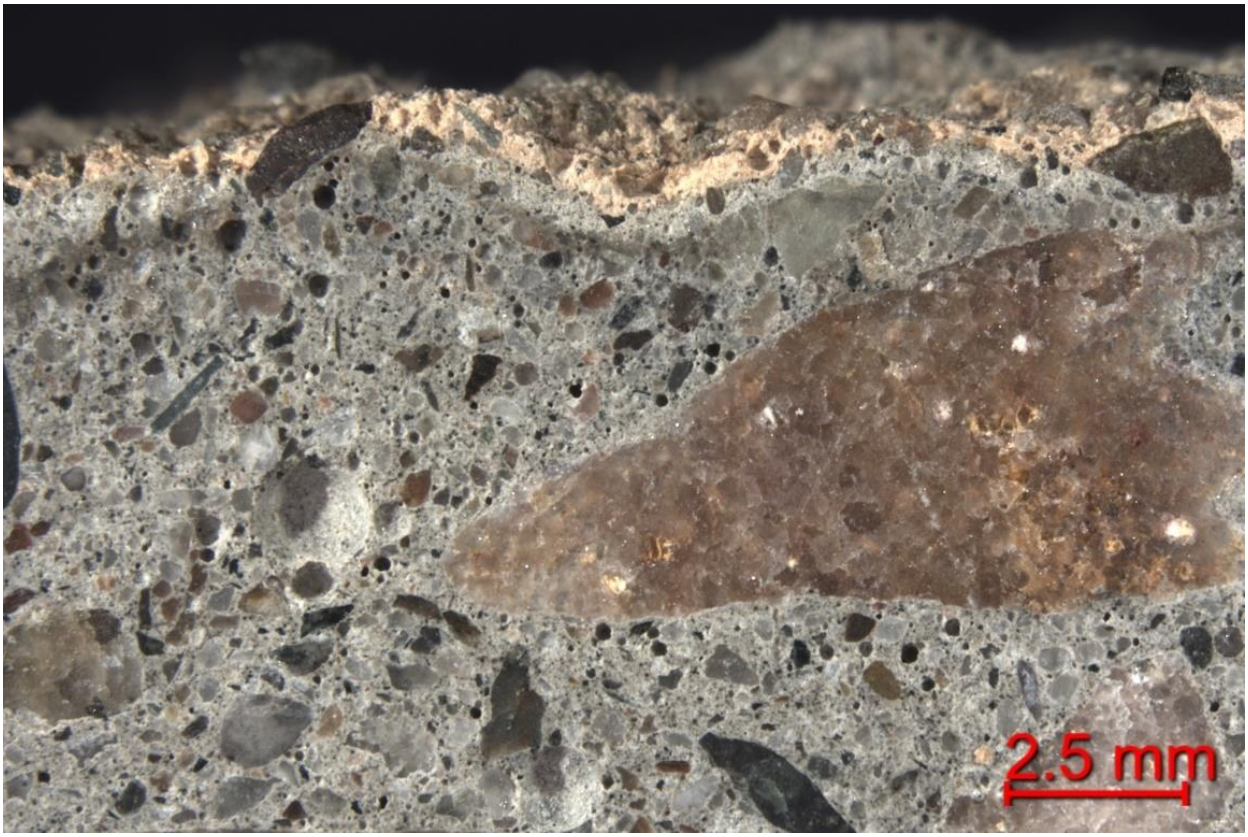

Figure 35. Near surface showing discoloration (Core 1) taken from within trough.

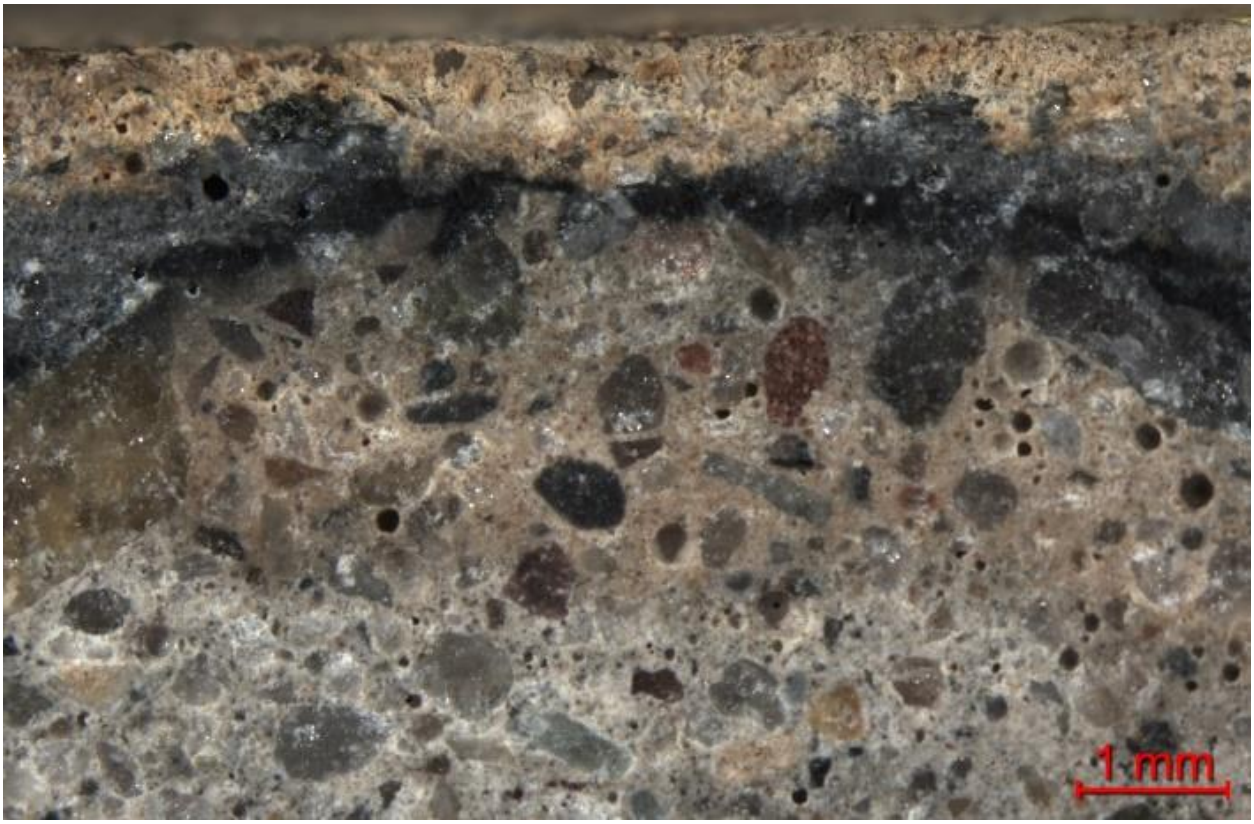

Figure 36. Near surface showing discoloration (Core 3) taken from within lower portion of basin.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, equipment, and supervision to perform all Work necessary for and incidental to selective demolition in preparation for other Work specified in the Contract Documents. Demolition includes the following:
   1. Demolition and removal of existing clarifier domes and clarifier entrance enclosures, and proper termination of mechanical and electrical items connected to the roof.

1.2 REFERENCES

A. American National Standards Institute (ANSI)
   1. ANSI/ASSE A10.6-2006: Safety Requirements for Demolition Operations – American National Standard for Construction and Demolition Operations

B. National Fire Protection Association (NFPA)
   1. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; latest edition

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

C. Remove and salvage: Detach items from existing construction and securely store away from work area.

D. Existing to remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 SUBMITTALS

A. Documentation of existing conditions which might be misconstrued as damage caused by demolition activities.

B. Contractor proposed demolition plan, including minimum setbacks for heavy equipment. Reference Sheet 5.1 and 5.2. See also Section 3.3.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition Work similar in material and extent to that indicated for this Project. Three (3) projects of similar size and scope completed over the previous 5 years.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-demolition Meeting: Prior to demolition of various elements, schedule a meeting at the site with Owner and Engineer to verify areas of demolition and elements to remain.

1.6 PROJECT CONDITIONS

A. Conduct selective demolition so that Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner to the extent practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Owner will remove hazardous materials under a separate contract.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Survey existing dome element and clarifier entrance enclosure conditions for attached items, including conduits and other mechanical equipment.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended functions or designs are encountered, investigate and measure the nature and extent of conflict. Notify and promptly submit a written report to Owner and Engineer.

D. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities. Promptly notify Owner and Engineer if hazards are encountered.

3.2 PROTECTION

A. Protect existing elements from damage including, but not limited to, railings, concrete, and steel members.
   1. Provide temporary controls and barriers.

2. Protect existing surfaces and features that are to remain from damage that could result from selective demolition Work.
3. Damage to existing surfaces and features that are a result of selective demolition shall be repaired to the satisfaction of Owner at no cost to Owner.

3.3 PREPARATION

A. Examine existing conditions of Work, including verifying slopes around the site which may impact access of demolition equipment, and identify elements subject to movement or damage during cutting, patching and selective demolition.

B. After uncovering Work, examine conditions affecting installation of new products or performance of Work.

C. Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walkways, existing utility services, and surrounding site and water.

D. Develop demolition plan which accounts for sequencing of removal and clearly identifies any structural members which are to be cut, and at what time. Plan shall be developed by a licensed Professional Engineer in the State of Colorado and submitted for review. Include:
   1. Drawings including plan, detail and section views as necessary to identify sequence of demolition, location of equipment and debris.
   2. Calculations
   3. Surcharge loading which may impact structure and adjacent structures and/or extensive underground utilities.

3.4 SELECTIVE DEMOLITION

A. General: Demolish and remove existing elements only to the extent required by the Work and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Use hand tools or small power tools designed for sawing, grinding or chipping, not hammering and chopping, to minimize disturbance of adjacent surfaces.
   2. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on structure, adjacent structures, and utilities.
   3. Dispose of demolished items and materials promptly and daily.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 CUTTING

A. Do not cut structural members without coordination with the approved demolition plan.

B. Execute cutting and demolition by methods that will prevent damage to other Work and items to remain, and will provide proper surfaces to receive installation of rebuild and new Work.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project Site and legally dispose of them at the end of each Workday.

B. Do not burn demolished materials.

3.7 CLEAN UP

A. Regulated clean-up procedures are to be followed if any of the site is affected. Contact Owner immediately if the site is disturbed by Work.

B. Clean adjacent sites and buildings of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
   1. Areas immediately adjacent to Clarifiers are landscaped with irrigation. Contractor shall seed any areas of damaged landscaping, and repair all damage to irrigation after completion of the Work.

C. Conduct post-demolition assessment of adjacent structures with Owner and Engineer. Compare with pre-demolition assessment to identify damage.

END OF SECTION

SECTION 05 52 00

ALUMINUM GUARDRAILS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes guardrails, handrails and kick plates along with all necessary mounting and installation hardware.

B. Furnish all labor, materials, tools, equipment, and supervision necessary for installation of aluminum guardrails.

1.2 PRICES

A. Perform work on a cost per linear foot basis.

1.3 REFERENCES

A. Aluminum Association, Inc. (AA):
   1. SAS-30: Specifications for Aluminum Structures

B. Aluminum Welding Society (AWS):
   1. D1.2/D1.2M: Structural Welding Code - Aluminum

C. ASTM International (ASTM), most recent edition:
   1. B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
   2. B211: Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, Wire.
   3. B221: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
   4. B247: Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled Ring Forgings.
   5. B429: Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
   6. E985: Standard Specification for Permanent Metal Railing Systems and Rails for Buildings

D. International Code Council (ICC):
   1. 2018 International Building Code (IBC)

1.4 SUBMITTALS

A. Product Data: Provide product data for all system components indicating compliance with this section.

B. Calculations or Load Tests: Submit test results from ASTM E935 conducted on the manufacturer’s supplied system indicating compliance with required design and performance requirements.

C. Shop Drawings: Shop drawings for fabrication and installation of pipe and tube railings. Include plans, elevations and detail sections. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages and accessory items.

D. Installation Instructions (segmental systems only): Complete procedures for proper installation of the guardrail system, including all necessary components and required steps.

E. Maintenance Data: Submit for finished aluminum components including cleaning materials, methods, and precautions.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS

A. Comply with requirements of building authorities having jurisdiction in Project location and the following:
   1. Handrail Standard: ANSI A1264.1
   2. Occupational Safety and Health Administration - 29 CFR 1910.23 - Guarding floor and wall openings.
   3. 2010 ADA Standards for Accessible Design.

B. Top of guardrail shall be installed at 42 inches above adjacent walking surface and designed to meet the requirements to serve as a handrail, and match the existing handrails present at the stairs in front of the clarifier entrances. At tank perimeter where no walking surface is adjacent, guardrail shall be 42 inches above top of tank.

C. Provide 4-inch-tall kickplate at base of all components adjacent to walking surfaces.

D. All components and connections to the concrete structure shall be designed by an Engineer licensed in the State of Colorado to withstand the effects of gravity loads as well as a live load on handrails and intermediate rails within allowable stress limits in accordance with appropriate material building code as referenced in IBC 2018 (i.e. concrete anchors per ACI 318). Live loads on handrails and intermediate rails shall be:
   1. Uniform load of 50 lbf/ft. applied in any direction.
   2. Concentrated load of 200 lbf applied in any direction.
   3. Uniform and concentrated loads need not be assumed to act concurrently.

E. Load testing to demonstrate compliance of system is acceptable if performed in accordance with ASTM E935 with no failure of any component and no permeant deflection (full rebound of system after removal of loading). System testing shall include connection hardware in similar configuration as to contemplated.

F. Provide expansion joints for horizontal elements as necessary to accommodate thermal movement without distress to the system.

1.6 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation for guardrail installation. Verify dimensions on site prior to shop fabrication for proper connection to structure.

B. Sequence: Coordinate guardrail installation with coating work.

C. Mockup: Install mockup consisting of one section adjacent to Pump Station to verify selection and adequacy of railing system and to set quality standards for installation.

1.7 WARRANTY

A. The completed installation of guardrail system shall be guaranteed jointly and severally by the product Manufacturer and Contractor against defects in material and application, for a period of five (5) years from the completion of the application.

B. Any work proving defective within five (5) years from the date of acceptance shall be corrected at no cost to the Owner.

PART 2 PRODUCTS

2.1 APPROVED PRODUCTS

A. Use one of the following systems, or approved equal:
   1. Series 500 Aluminum Pipe Railing System by Superior Aluminum Products, Inc.
   2. Kee Lite Smooth Railing System by Kee Safety, Inc.
   3. TABCO Aluminum Railing by Tuttle.
   4. Smooth Aluminum Handrail by Modular Railing Systems.

B. Alternate systems must meet the requirements of this Specification and shall not be used without prior approval by Owner and Engineer.

2.2 RAILING MATERIALS

A. Shapes, configurations, and sizes: As shown in the product data.

B. Horizontal Pipe Rail Guard Railing:1.9-inch outer diameter, schedule 40 pipe (inner diameter 1.5 inches)

C. All fasteners shall be in accordance with the railing manufacturer's requirements such that final system meets the design and performance requirements of this section.
   1. Concealed fasteners on all handrails.

D. All components shall be of compatible metals to prevent galvanic corrosion.

E. Do not embed railing in concrete or cementitious materials (grout), use mounting bases only.

2.3 FABRICATION

A. Components or railing sections shall be fabricated at the manufacturing facility in largest practical site delivery sizes.

B. Pipe cuts shall be square and accurate for minimum joint-gap. Cuts shall be clean and free of chamfer, from deburring, nicks and burrs.

C. For railings that are angled horizontally, machine castings shall be incorporated to provide proper angle.

PART 3 EXECUTION

3.1 INSTALLATION

A. Assemble railing sections in accordance with manufacturer's installation instructions, current code requirements, Drawings, and requirements provided in this Specification.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form work true to line and level with accurate angles and surfaces.

D. Do not allow any gaps larger than 4-inches between adjacent guardrails.

E. Securely anchor to structure in accordance with manufacturer's instructions to meet the performance requirements of this Specification.

F. Install all fasteners in accordance with manufacturer's installation instructions and requirements provided in this Specification.

G. Tighten all fasteners so that completed railing is rigid and free of play at joints and component attachments.

H. Install concealed fasteners for interconnecting railing components and for attaching them to other Work, unless exposed fasteners are unavoidable or are standard fastening method for handrail and railing indicated.

I. Provide and install washers as required to allow proper fastener bearing.

J. Install gates and adjust hardware for smooth operation. After installation, test gate. Open and close a minimum of five times. Correct any deficiencies and adjust.

K. Expansion Joints: Provide expansion joints for continuous spans in excess of 40 feet. Construct joints by deleting structural attachment from one end of the spliced joint so that it is free to move in or out of the pipe (longitudinal movement only). If a joint is provided every 30 feet, the width of the gap should allow 1/8 inch expansion for each 40 degrees F of expected temperature rise from material installation temperature. Correct for other lengths.

3.2 ERECTION TOLERANCES

A. Install railings plumb and level, securely fastened, with vertical members plumb.
   1. Maximum variation from plumb: 1/4 inch.
   2. Maximum misalignment from true position: 1/4 inch.
   3. Maximum misalignment between adjacent separated members: 1/8 inch.

END OF SECTION

SECTION 05 53 00

METAL GRATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes new metal gratings at entrance to clarifiers, to replace existing gratings, and to match existing. Includes all necessary mounting and installation hardware.

B. Furnish all labor, materials, tools, equipment, and supervision necessary for installation of new grating.

1.2 PRICES

A. Perform work on a cost per square foot basis.

1.3 SUBMITTALS

A. Product Data: Provide product data for all system components indicating compliance with this section, including gratings, and clips and anchoring devices.

B. Shop Drawings: Detail fabrication and installation of gratings.
   1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 DESIGN AND PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs and walkways including treads and gratings. Include comprehensive engineering analysis by a qualified professional engineer licensed in the state of Colorado, using performance requirements and design criteria indicated.

B. Structural Performance of Gratings: Provide gratings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Walkway and Elevated Platform (Exit Ways): Uniform Load: 100 lbf/sq. ft.
   2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
   3. Uniform and concentrated loads need not be assumed to act concurrently.
   4. Walkway Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
   5. Limit deflection of treads, platforms, and framing members to L/240.

C. Layout Requirements
   1. Layout of walkways shall comply with the following:
      a. OSHA 1910 Subpart D, Walking-Working Surfaces
      b. ANSI/ASSE A1254.1-2007, Safety Requirements for Workplace Walking/Working Surfaces and their Access; Workplace Floor, Wall and Roof Openings; Stairs and Guardrails Systems

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M: Structural Welding Code - Steel
   2. AWS D1.3/D1.3M: Structural Welding Code - Sheet Steel

B. Field Measurements: Take field measurements prior to preparation for guardrail installation. Verify dimensions on site prior to shop fabrication for proper connection to structure.

C. Sequence: Coordinate installation of new grates with coating work.

PART 2 PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Steel Tubing: ASTM A 500 or ASTM A 513.

2.3 FORMED-METAL PLANK GRATINGS

A. Material: Steel sheet, hot-dipped galvanized after fabrication, thickness as required to comply with structural performance requirements.

B. Size and opening layout to match existing.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Brown-Campbell Company; Bar Grating
      b. Fisher & Ludlow, Division of Harris Steel Limited; Tru-Weld Bar Grating.
      c. Grating Pacific; Metal Bar Grating
      d. McNichols; Bar Grating

2.4 FASTENERS

A. General: Provide hot-dipped galvanized steel fasteners. Select fasteners for type, grade, and class as required to meet performance requirements.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.

B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with ASTM A 780.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

B. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.

3.2 INSTALLING METAL PLANK GRATINGS

A. General: Comply with manufacturer's written instructions for installing gratings.

B. Attach non-removable units to supporting members by welding unless otherwise indicated.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and installation of sealant in joints.

1.2 PRICES

A. Include cost of sealant work with coating cost.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Experienced firm that has successfully completed sealant work similar in material, design, and extent to that indicated for Project; that is approved, authorized, or licensed by sealant manufacturer to install sealant; and that is eligible to receive sealant manufacturer's warranty. Must have successful installations of specified materials in local area in use for minimum of five years.
   1. Employ foreman with minimum five years of experience as foreman on similar projects, to be on Site at all times during Work. Do not change foremen during the course of the Project except for reasons beyond the control of the Installer; inform Engineer in advance of any changes.

B. Compatibility Tests: Include sealant and sealers or coatings that may come into contact with sealant following sealant installation.

1.4 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside below 40 degrees F (5 degrees C), or expected to be below 40 degrees F within 12 hours, or are above or below sealant manufacturer's recommended limitations.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.
   5. When joint preparation, which may include cleaning substrate surfaces, removing inclusions, and repairing substrate surfaces have not been performed or performed adequately.

1.5 SUBMITTALS

A. Product Data

B. Field Test Reports

1.6 WARRANTY

A. Manufacturer's Warranty:
   1. Written warranty, signed by sealant manufacturer. Manufacturer's standard form in which sealant manufacturer agrees to furnish the specified joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
   2. Warranty Period: 5 years from date of Substantial Completion.
   3. Defective sealant includes leakage through sealed cracks, debonded sealant, loss of cohesion, or other distress associated with material deficiencies.
   4. Warranty may exclude deterioration or failure of elastomeric joint sealants from the following:
      a. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
      b. Disintegration of joint substrates from natural causes exceeding design specifications.
      c. Mechanical damage caused by individuals, tools, or other outside agents.
      d. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

B. Installer's Warranty:
   1. Completed warranty form signed by sealant Installer. Warranty form included in section 00 65 36.
   2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 ELASTOMERIC JOINT SEALANTS

A. Comply with ASTM C920 and other requirements indicated.

B. Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing on similar projects, mockups and preconstruction testing for Project, and field experience.

C. Select products based on mockups, preconstruction testing, and sealant manufacturer's previous testing and experience.

D. Source Limitations: Obtain each type of joint sealant through one source from single manufacturer.

E. Colors of Exposed Joint Sealants: Selected and approved in writing by Owner's Representative, from sealant manufacturer's full range.

F. For immersion conditions beneath coating system: Non-sag, two-component polyurethane or polysulfide sealant:
   1. Sikaflex-2c NS EZ, by Sika Corporation
   2. Thiokol 2235M, by PolySpec LP.
   3. Approved equal.

2.2 AUXILIARY MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote adhesion of sealants to joint substrates.

C. Backer Rod: Closed cell polyethylene.

D. Bond Breaker: As recommended by sealant manufacturer.

E. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. Remove existing sealant and other foreign material from joints.

B. Repair damaged or deteriorated substrate surfaces according to sealant manufacturer's written instructions, as detailed and as approved by Engineer.

C. Clean joint substrates immediately before installing sealant, to comply with sealant manufacturer's written instructions based on mockups and preconstruction testing.
   1. Remove from substrate foreign material that could interfere with adhesion of sealant, including dirt, dust, existing sealant, oil, grease, and surface coatings.
   2. Provide dry substrate; prevent wetting of substrate prior to sealant installation.
   3. Clean porous substrates, such as concrete, masonry, stone, wood, by brushing, grinding, blast-cleaning, mechanical-abrading, or combination of methods to produce clean, sound substrate capable of developing optimum bond with sealant. Remove laitance and form-release agents from concrete. Remove loose particles remaining after cleaning operations by vacuuming or blowing out joints with oil-free, compressed air.
   4. Clean nonporous surfaces, such as metal, with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of sealant.

3.2 INSTALLATION OF SEALANT

A. General: Comply with these documents and sealant manufacturer's written installation instructions for products and applications indicated, based on mockups and preconstruction testing. Notify Engineer of discrepancies between these documents and manufacturers typical details, written recommendations or instructions. Engineer shall determine which apply.

B. Joint Priming: Prime all porous joint substrates. Prime additional substrates where recommended in writing by sealant manufacturer, based on mockups and preconstruction testing. Apply primer to comply with sealant manufacturer's written instructions.

1. Confine primer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.
2. Limit priming to areas that will be covered with sealant in same day. Unless recommended otherwise by sealant manufacturer, reprime areas exposed for more than 24 hours.

C. Install sealant backer and position to produce cross-sectional shape and proper depth of installed sealant.
1. Use properly-sized backer. Do not use multiple-backer units or braided-backer units to accommodate wide joints.
2. Install backer with device that will provide consistent depth between substrate surface and outer surface of backer.
3. Do not leave gaps between ends of sealant backers.
4. Do not stretch, twist, puncture, or tear sealant backers.
5. Remove wet backers and replace with dry materials.

D. Install bond-breaker tape at back of designated joints.

E. Install sealant immediately after installing backer material; to produce uniform, cross-sectional shape and depth; to directly contact and fully wet joint sides and backer material; and to completely fill recesses in joint configuration.
1. Install sealant flush with surface.
2. Immediately after sealant application and before skinning or curing begins, tool joint with slightly concave surface, compressing sealant into joint to form smooth, uniform sealant bead; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint. Do not use tooling agent.
    a. Remove excess sealant from surfaces adjacent to joints.
    b. Provide concave joint configuration per contract documents and Figure 5A in ASTM C 1193, unless otherwise indicated.

3.3 QUALITY CONTROL

A. At completion of Project, observe installed sealant for damage or deterioration. If damage or deterioration occurs, neatly cut out and remove damaged or deteriorated sealant, prepare and prime surfaces, and install new sealant. Replace sealant immediately so new sealant is indistinguishable from original Work.

B. Field-Adhesion Testing: Contractor to perform the following testing and submit log of test results to Owner and Engineer. Notify Owner of testing schedule and provide access to test locations for Owner/Engineer review Contractor to perform non-destructive and destructive field adhesion tests on sealant in accordance with ASTM C1521
1. Non-destructive testing per ASTM C1521, possible procedures:
    a. Depress center of sealant bead with probing tool to depth of 50 percent of bead width; or
    b. Depress sealant bead near substrate bond-line until it appears visually that sealant is about to fail in cohesive; or
    c. Apply uniform pressure with roller no more than one-half sealant bead in width, to create depression that represents approximately 50 percent of sealant deflection; advance roller along centerline of sealant bead; and note anomalies in sealant performance.
    d. Record anomalies in sealant performance, if failures are adhesive or cohesive, and maximum surface depression as percent of joint or crack width.

e. Perform test every 24 inches for first 100 linear feet of joint or crack; if no test failure is observed, test every 5 feet thereafter.

2. Destructive testing, Method A:
   a. Cut 6-inch-long tail of sealant loose from substrate.
   b. Mark tail 1 inch from adhesive bond.
   c. Grasp tail 1 inch from adhesive bond and pull until tail extends to 2 times published movement capability of sealant. If sealant has not failed, continue pulling to failure.
   d. Record elongation at failure and if failure was adhesive or cohesive.
   e. Observe sealant for complete filling of joint or crack with absence of voids, and for joint or crack configuration in compliance with requirements. Record observations and sealant dimensions
   f. Perform test every 100 feet for first 1,000 linear feet of joints and cracks; if no test failure at 2 times movement capability occurs, test every 400 feet thereafter.
   g. Test reports will include date when sealant was installed, name of person who installed sealant, test date, test location, and whether primer was used.
   h. Immediately after testing, replace failed sealant in test areas. Neatly cut out and remove failed sealant, prepare and prime surfaces, and install new sealant. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
   i. Sealant not evidencing adhesive failure from testing or noncompliance with requirements will be considered satisfactory.

3. If testing determines that sealant has failed adhesively from testing or does not comply with requirements, additional testing will be performed to determine extent of non-conforming sealant. Neatly cut out and remove non-conforming sealant, prepare and prime surfaces, and install new sealant. Perform field adhesion tests on new sealant. Additional testing and replacement of non-conforming sealant shall be at Contractor’s expense.

END OF SECTION

SECTION 09 97 23

IMMERSION-GRADE CONCRETE COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes providing and installing an Immersion-Grade Concrete Coating.

B. Coating is intended to be in contact and immersed in un-treated, and partially treated waste water.

1.2 PRICES

A. Perform work on a cost per square foot basis.

1.3 SUBMITTALS

A. Letter from manufacturer stating that system is appropriate for use in this service environment and the requested warranty can be provided.

B. Product Data.

C. Installation instructions (information only).

D. Installation field logs and reports.

1.4 QUALITY ASSURANCE

A. Pre-installation Meeting:
   1. Conduct meeting at Site.
   2. Review requirements for coating Work, including:
      a. Construction schedule.
      b. Availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      c. Site use, access, staging, and set-up location limitations.
      d. Forecast weather conditions.
      e. Surface preparation and substrate condition and pretreatment.
      f. Application procedures.
      g. Special details and condition of other construction that will affect coating Work.
      h. Testing and inspection requirements.
      i. Temporary protection and repairs of coating Work.

B. Site-Specific Installation Plan: Manufacturer to submit site-specific installation plan for each product to be used. Plan must address temperature (ambient and substrate), humidity, and sunlight exposure conditions specific to the project site, as well as application means and methods and proposed quality control methods.

C. Applicator Qualifications: Experienced firm that has successfully completed coating work with similar materials, design, and extent to that indicated for Project. Must have successful applications of specified materials in local area in use for minimum of five years.

1. Employ foreman with minimum five years of experience as foreman on similar projects, who is fluent in English, to be on Site at all times during Work.

D. Mock-ups: Prior to start of Work or purchase of material, apply a mockup area of at least 250 square feet at location determined by the Engineer, to demonstrate surface preparation, perimeter termination, crack treatment, thickness, texture, color, and standard of workmanship.
   1. Demonstrate surface preparation technique for treating exposed concrete and leveling rough surfaces.
   2. Each consecutive treatment/coating will be layered back 1 foot on the perimeter in a manner that the complete section can be reviewed.
   3. Include a minimum of 1 mock-up of each of the termination details shown on Drawings.
   4. Coordinate testing with the Engineer and have the Engineer or representative present during testing.
   5. Perform wet mil thickness measurements, adhesion pull-off testing (substrate and intercoat), and dry film thickness measurements. See Field Quality Control Testing, Section 3.6. Repair coating damaged as a result of testing.
   6. Adhesion pull-off testing must be performed for each type of substrate and proposed preparation method. Adhesion testing must achieve a minimum of 250 psi. Failure must occur in the concrete substrate.
   7. If Engineer determines mock-up does not comply with requirements, modify mockup or construct new mock-up until mock-up is approved.
   8. Maintain approved mockups in undisturbed condition during Work as standard for judging complete Work.
   9. Approved mockup may become part of completed Work if undisturbed at time of Substantial Completion.

E. Coating Inspector: Owner, at their discretion may retain a coating inspector to inspect the coating work, including performance of destructive and non-destructive testing.
   1. The coating inspector does not have the authority to modify, change or formally interpret the requirements of the Contract Documents as those or the responsibility of the Engineer and/or Owner.
   2. Provide access to all areas of coating work as are required to be provide to the Owner and Engineer.
   3. Work performed by the coating inspector does not relieve the Contractor from performance of any quality assurance or quality control activities outlined herein, or generally required to complete the Work.

1.5 WARRANTY

A. Manufacturer's Warranty:
   1. Written warranty, signed by coating manufacturer, including:
      a. Repair or replace of coating that does not comply with requirements; that fails in adhesion, cohesion, or general durability; that experiences abrasion or tearing failure not due to misuse; that experiences surface crazing, fading or chalking; or that deteriorates in a manner not clearly specified by submitted coating manufacturer's data as an inherent quality of the material for the application indicated.
      b. Warranty Period: 10 years base bid, 5 years alternate bid after Substantial Completion date.

B. Contractor's Warranty:
   1. Written warranty, signed by Applicator, included in section 00 65 36.

2. Warranty Period: 3 years after Substantial Completion date.

PART 2 PRODUCTS

2.1 COATING MATERIALS, GENERAL

A. Material Compatibility: Provide fillers, primers, finish-coat materials, and related materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Coordinate tie-ins and laps with other coatings not specified in this Section per the recommendations of the manufacturer of the coating specified herein. Confirm compatibility of materials prior to installation.

2.2 IMMERSION-GRADE COATING

A. Provide coating specifically intended for immersion exposure to waste water, as recommended by the coating manufacturer.
   1. Must have history of four successfully similar projects installed within the last two to six years.

B. **BASE BID:** Two-component, 100% solids pure polyurea elastomer coating, with manufacturer approved primer suitable for concrete substrate with the following minimum properties.
   1. Surfacing compound: epoxy or modified urethane mortar, as recommended by epoxy primer coating manufacturer.
   2. Primer: epoxy or modified urethane, as recommended by polyurea coating manufacturer.
      a. Tensile Strength (ASTM D412), 4500 psi
      b. Solids by volume: 89 percent or greater at install.
      c. Viscosity: 25 cps or less.
      d. Adhesion to Concrete: 350 psi or greater.
      e. Color: Different than polyurea coating.
      f. Thickness: Dry film thickness (DFT) of 5 to 10 mils. Final thickness based on selected coating manufacturer.
      g. Basis of Design: Raven 175 by Raven Lining Systems.
   3. Polyurea Coating:
      a. Tensile Strength (ASTM D412 or D638): 1,800 psi or greater.
      b. Elongation (ASTM D412 or ASTM D638): 70% or greater.
      c. Hardness, Shore D (ASTM D2240) 40 to 52.
      d. Gel Time: 5 to 20 seconds.
      e. Tack-free Time: 20 to 120 seconds.
      f. Solids by volume: 100 percent.
      g. Adhesion to primer: 350 psi or greater.
      h. Color: Different than primer and finish coat.
      i. Thickness: 100 to 120 mils, DFT. Final thickness based on selected coating manufacturer.
      j. Basis of Design: AquataFlex 506 by Raven Lining Systems.
   4. Finish Coat (Where specified only): Provide aliphatic finish coat recommended by polyurea coating manufacturer.
      a. Will not fade, chalk or degrade when exposed to UV.
      b. Appropriate for waste water service environment.
      c. Adhesion to polyurea: 350 psi or greater.

d. Color: Grey or tan to match concrete surface.
e. Thickness: Dry film thickness (DFT) of 3 to 8 mils. Final thickness based on selected coating manufacturer.

C. **ALTERNATE:** Elastomer immersion grade coating, with manufacturer approved surfacer and primer suitable for concrete substrate with the following minimum properties.
1. Surfacing compound: epoxy or modified urethane mortar, as recommended by epoxy primer coating manufacturer.
2. Primer: epoxy or modified urethane, as recommended by immersion coating manufacturer.
a. Solids by volume: 89 percent or greater.
b. Adhesion to Concrete: 350 psi or greater.
c. Color: Different than liner coating.
d. Thickness: Dry film thickness (DFT) of 5 to 10 mils. Final thickness based on selected coating manufacturer recommendations.
3. Liner Coating:
a. Adhesion to primer: 350 psi or greater.
b. Color: Different than primer and finish coat.
c. Thickness: 60 to 80 mils, DFT. Final thickness based on selected coating manufacturer.
d. Basis of design:
1) CIM 1000 manufactred by C.I.M. Industries Inc.
2) Poly-Cote 115 Elastomer Polyurethane by Sherwin Williams.
4. Finish Coat or Top Coat: Provide aliphatic finish coat recommended by liner coating manufacturer.
a. Will not fade, chalk or degrade when exposed to UV.
b. Approporate for waste water service environment.
c. Adhesion to immersion coating: 350 psi or greater.
d. Color: Grey or tan to closely match concrete surface.
e. Thickness: Dry film thickness (DFT) of 3 to 8 mils. Final thickness based on selected coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions with Applicator and coating manufacturer's representative for compliance with requirements and other conditions affecting application or performance of coating.
1. Ensure that work done by other trades is complete and ready for coating Work.
2. Proceed with coating application only after unsatisfactory conditions have been corrected and surfaces are thoroughly dry.
3. Start of coating application will be construed as Applicator's acceptance of surface conditions.

3.2 SURFACE PREPARATION

A. Cleaning: Before applying coatings or other surface treatments, clean substrates of substances that could impair bond of coating systems. Remove dirt, oil, and grease before cleaning.
1. All mineral build-up on the exposed surfaces of the concrete elements must be removed to expose sound structural concrete.
2. Do not micro-fracture or otherwise damage concrete substrate with removal operations.

3. Schedule cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.

B. All concrete surfaces, existing and repaired areas, shall have been cured a minimum of 14 days prior to coating application. Additional cure may be required if surfaces do not meet moisture requirements in sub-section K, below.

C. Substrate: Clean and prepare substrate according to coating manufacturer's written instructions. Provide clean, dust-free, dry, and sound substrate for coating application.
1. Verify that substrate has cured and aged for minimum time period recommended by coating manufacturer.
2. Remove fins and projections, splatter, and other irregularities which would prevent monolithic, continuous application of coating.
3. Properly patch substrate defects (such as voids, form tie holes, honeycombing, and cracks) with latex-modified concrete or another material acceptable to coating manufacturer and Engineer.
4. Remove grease, oil, asphalt solids, form-release agents, curing compounds, and other contaminants or film-forming coatings that might impair bond of coating. If chemical removal is necessary, rinse with clean water.
5. Clean and prepare surfaces to be coated according to manufacturer's written instructions for particular substrate conditions and as specified.

D. Abrasive blasting: Abrasive blast all surfaces of the existing substrate to remove surface contaminants, such as laitance, sealers, oils, grease, coating, loose surface material, etc., from the concrete surface. Exposed concrete surfaces shall be prepared in accordance with ASTM D4259 and SSPC-SP 13, and shall conform to CSP 3 to 4 as defined in ICRI Guideline No. 310.2R.

E. Bugholes and excessive cavities shall be filled with specified surface filler prior to coating application. The surface of all cured surface fillers shall be abrasively blasted before applying coatings.

F. Follow abrasive blast activities by cleaning with a compressed air jet. Concentrate the air jet at cracks, control and construction joints, and repair perimeter interfaces to ensure that abrasive particles and other contaminants are removed from these crevices.

G. If prepared surfaces become contaminated after first cleaning, they shall be cleaned again at no additional expense to Owner prior to applying the coating.

H. Corner radius cove to be installed prior to coating application.

I. Surfaces other than concrete shall be prepared as required by the coating manufacturer's recommendations for immersion surface.

J. Prepare, treat, rout, and fill joints and cracks in substrates in accordance with coating manufacturer's written recommendations and as indicated in Drawings.

K. Tests: Do not apply primer or high-performance coating to concrete surface unless two or more of the flowing moisture tests confirm appropriate moisture levels for properly prepared substrates:
1. Plastic Sheet Method (ASTM D4263): Pass/Fail. No visible moisture should be present after testing.
2. Relative Humidity Test (ASTM F2170): Less than 90 percent relative humidity at a depth of 1-1/2 inches.

3. Moisture vapor emission rate testing, calcium chloride test (ASTM F1869): Less than 5 pounds per 1,000 square feet per 24 hours.
4. Radio Frequency Test (ASTM F2659): Less than 5 percent moisture.

3.3 APPLICATION

A. General: Prepare and apply materials according to coating manufacturer's written instructions, at recommended rates and coverages.
   1. Test prepared surfaces for alkalinity, moisture, and other conditions as recommended by coating manufacturer.

B. Scheduling Coating: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface contamination or deterioration. Apply primer to concrete surface with brush or roller. If spray is used, backroll primer to achieve a Uniform coating free of holidays or pinholes to minimize outgassing. Apply second coat of primer if needed to obtain a pinhole free finish.

C. Allow primer to cure in accordance with manufacturer's instructions before top coating with the high-performance coating

D. Apply high-performance coating in accordance with manufacturer's instructions and SSPC PA14.
   1. Keep material containers tightly closed until ready for use.
   2. Keep equipment, air supplies, and application surfaces dry and clean
   3. Blend and mix 2-component materials in accordance with manufacturer's instructions

E. Maintain air supply for material spray application free of oil and water in accordance with ASTM D4285.

F. Apply sufficient high-performance coating to achieve final dry film thickness for containment of potable water.

G. Joint Lines:
   1. Prepare for joint lines should rain or other conditions require work stoppage or extended delay.
   2. Install joint lines clean and straight. Install overlap 6-inches minimum to ensure an impervious joint.
   3. Severely abrade with wire brush or sandpaper and apply bonding agent to all areas where the high-performance coating has cured beyond its recoat window

H. Recoating:
   1. Recoat the coating system within the recoat window to obtain maximum interlayer adhesion to build specific thickness.
   2. Immersion Service: Minimize areas to be recoated outside the recoat window, except at joint lines.

3.4 CURING

A. Cure high-performance coating in accordance with manufacturer's instructions.

B. Curing Time: Allow sufficient time for solvents to evaporate from the cured high-performance coating before placing into service or top coating.

3.5 REPAIR PROCEDURE

A. Repairs to coating may become necessary due to exposure or mechanical damage. Perform repairs as specified herein, or as otherwise required by the coating manufacturer.

B. Clean the areas in accordance within accordance with ASTM D4258, using an appropriate and effective detergent, then to abrade the damage area to sound primer, or in the case of damaged primer, to sound substrate in accordance with ASTM D4259.

C. The area immediately adjacent to the repair should also cleaned in accordance with ASTM D4258 and feather-edge abraded in accordance with ASTM D4259 and blended into the repair area; extending into the sound coating 6 inches. Ensure all areas to be coated are contaminant/chemical free.

D. The application of the coating(s) should begin in the repair area and extend into the feather-edged margin, with care being taken to keep the application within the abraded area(s).

3.6 FIELD QUALITY CONTROL

A. Contractor shall record expiration date, batch, and lot number of sealant and coating materials prior to installation.

B. Contractor to maintain a log of weather and substrate conditions (temperature, relative humidity, etc.) and time period of day for each day and area when coating is installed.

C. Contractor to perform the following testing and submit log of test results to Owner and Engineer. Notify Owner of testing schedule and provide access to test locations for Owner/Engineer review.
   1. Perform moisture content testing of prepared surfaces. Tests shall be completed within 8 hours of commencement of coating operation at a frequency not less than one test per 1,000 sq. ft. or one test for each unique structure (wall/slab) of coating application. Retest when moisture conditions in surface have substantially changed, such as after a precipitation event.
   2. Adhesion pull-off testing in accordance with ASTM D7234. Test frequency will be not less than one measurement location (average of three tests) per 1,000 sq. ft. of coating application.
      a. Minimum adhesion of 250 psi with failure at or within substrate.
      b. Repair coating at location of testing in accordance with repair procedure specified above.
   3. Verify dry film thickness of the coating using method and frequency according to ASTM D6132 and SSPC PA9.
      a. Measured dry film thickness must be in accordance with SSPC PA9 Level 2.
      b. If dry film thickness is too thin, apply additional material at no cost to Owner, or perform other remedial action recommended by coating manufacturer or Engineer.
   4. Perform holiday detection at surfaces in accordance with ASTM D4787 and in accordance with manufacturer's instructions. If pinholes or holidays are identified, apply additional material at no cost to Owner, or perform other remedial action recommended by coating manufacturer or Engineer.
   5. Contractor shall reapply coating in areas disturbed by testing.

D. Prepare adhesion test locations to be performed by engineer or coating inspector (grinding and coreing). Repair test locations performed by Engineer or coating inspector.

3.7 CLEANING

A. At end of each workday, clean Site and Work areas and place rubbish, empty cans, rags, and other discarded materials in appropriate containers.

B. After completing coating Work:
   1. Clean spillage and soiling from adjacent surfaces using cleaning agents and procedures recommended by manufacturer of affected surface. Exercise care to avoid scratching or damage to surfaces.
   2. Repair surfaces stained, marred, or otherwise damaged during coating Work.
   3. Clean up debris and surplus materials and remove from Site.

C. Waste Management:
   1. Collect surplus coating materials that cannot be reused and deliver to recycling or disposal facility.
   2. Treat materials that cannot be reused as hazardous waste and dispose of in appropriate manner.

3.8 PROTECTION

A. Protect work of other trades from damage whether being coated or not. Correct damage by cleaning, repairing, replacing, and recoating as approved by Engineer. Leave in an undamaged condition.

B. Provide “Wet Paint” signs to protect newly coated finishes. Remove temporary protective wrappings provided by others to protect their work after completing coating operations.
   1. After construction activities of other trades are complete, touch up and restore damaged or defaced coated surfaces.

END OF SECTION