



ADDENDUM #1

SANDY HOOK WATER DISTRICT 2019 WATER SYSTEM IMPROVEMENTS CONTRACT 12 – NEW WATER TREATMENT PLANT & IMPROVEMENTS BE Project # 19003

BID DATE: THURSDAY, JUNE 2, 2022 – 2:00 pm (Local Time)

This Addendum #1 and its noted revisions and attachments to the Drawings and Specifications shall supplement, amend, and become a part of the Bidding Documents, Contract Documents, Drawings, and Specifications. All Bids and Construction Contracts shall be based on these modifications and issued Drawings, Specifications, and all Addendum.

All Bids must be made on the required Bid Forms and include all of Section 004XXX series documents and must be fully completed and executed with original signatures and corporate seals. All Bid Bonds must be original forms and accompanied by the required certificates, original signatures, and seals. Any Bids without original documents, or a conditional or qualified Bid, will not be accepted.

REVISIONS AND ATTACHMENTS

General

ITEM AD1-1 See the attached pages of questions and request for information (RFI) submitted for clarifications and/or the responses to the questions.

ITEM AD1-2 See the attached On-Site Sewage Disposal Systems Site Evaluation for the septic system to be installed for the project. The site evaluation has been conducted for the treatment plant site. The Contractor shall be responsible for obtaining all plumbing permits and final approval for the septic system from the local health department.

SPECIFICATIONS

ITEM AD1-3 SECTION 005200 – AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT

ITEM AD1-4 SECTION 099700 – SPECIAL COATINGS

Replace the existing specification Section 099700 with the attached specification in its entirety.

ITEM AD1-5 SECTION 099713 – STEEL COATINGS

Replace the existing specification Section 099713 with the attached specification in its entirety.

ITEM AD1-6 SECTION 463344 – CHEMICAL FEED SYSTEM AND METERING - SKID MOUNTED PACKAGE

Delete Paragraph 2.04 CHEMICAL TRANSFER PUMPS in its entirety.

ITEM AD1-7 SECTION 466121 - VERTICAL PRESSURE FILTER SYSTEM, Paragraph 2.07, INSTRUMENTATION

Paragraph 2.07, B., 2. shall be revised to read as follows:

The electromagnetic flow meter equipment shall be as specified in SECTION 255100 - INTEGRATED AUTOMATION CONTROL OF FACILITY SCADA AND INSTRUMENTATION EQUIPMENT, Paragraph 2.03 – Component Specifications, sub-paragraph H.1.c.

ITEM AD1-8 SECTION 466121 - VERTICAL PRESSURE FILTER SYSTEM, Paragraph 2.06, VALVES

Paragraph 2.06, B. shall be revised to read that all filter function valves shall be lugged style butterfly valves in lieu of wafer style.

ITEM AD1-9 SECTION 463300 – LIQUID CHEMICAL FEED EQUIPMENT, PIPING, STORAGE AND APPURTENANCES

Add the following paragraphs:

2.08 Diaphragm Seals

A. Purpose - To protect instruments or gauges from the process medium. Diaphragm seals shall be used on instruments or gauges installed on chemical feed piping.

B. Operating Principal - A flexible diaphragm separates process medium and instrument element. Space on instrument side of diaphragm to be completely filled with a suitable silicone or instrument oil. The process pressure is

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transmitted by the liquid filled system to the instrument element.

C. Functional:

1. Filling Screw - Include on all units.
2. Pressure Limits - 1,000 psi.
3. Flushing Connection - Include on all units.
4. Capillary tubing as required.

D. Physical:

1. Top Housing - 316L stainless steel.
2. Diaphragm - Tantalum.
3. Exposed Surfaces - 316 stainless steel.
4. Bolts, Nuts and Plugs - 18-8 stainless steel or 316 stainless steel.
5. Capillary - 1/4-in stainless steel armor shielded.
6. Teflon O-rings.

E. Diaphragm Seal

1. Thread attached.
2. Welded metal diaphragm above 15 psi.
3. Clamped Viton for below 15 psi and vacuum 4.
- Exposed Surfaces - 316 stainless steel.
5. Continuous duty

F. Manufacturer:

1. Ashcroft Type 200 or Engineer approved equal

2.09 Ultrasonic Chemical Flow Meter

A. Purpose - To accurately measure the liquid chemical feed with flow rate readings as low as 10 mL/min. Flow meters shall be installed on the following chemical feed systems.

1. Potassium Permanganate
2. Aquadene
3. Fluoride

B. Functional:

1. Meter Mount Display
2. Flow Rang – 10 – 5000 mL/min
3. Data Output – 4-20 mA, Fully Configurable
4. Capillary tubing as required.

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C. Manufacturer:

Blue-White MS6 or Engineer approved equal

ITEM AD1-10 SECTION 255100 - INTEGRATED AUTOMATION CONTROL OF FACILITY SCADA AND INSTRUMENTATION EQUIPMENT

Revise the INPUT/OUTPUT TABLES on page 255100-16 to read as follows:

I/O DESCRIPTION	I/O TYPE	I/O SOURCE	WIRING REQUIREMENTS
Chemical Feed Flow – Pot. Perm. (mL/min)	AI-25	New Flow Meter	18 Gauge 2-Con. Shielded Cable (DCV)
Chemical Feed Flow – Aquadene	AI-26	New Flow Meter	18 Gauge 2-Con. Shielded Cable (DCV)

(mL/min)			
Chemical Feed Flow – Fluoride (mL/min)	AI-27	New Flow Meter	18 Gauge 2-Con. Shielded Cable (DCV)
Spares	AI-28 thru 31	Spares	

ITEM AD1-11 SECTION 255100 - INTEGRATED AUTOMATION CONTROL OF FACILITY SCADA AND INSTRUMENTATION EQUIPMENT

Add the following to Paragraph 2.03 – Component Specifications, sub-paragraph J., 1.

- d. Limit switches shall be of the proximity type, NEMA 4X, hermetically sealed, brass epoxy coated, suitable for submergence, UL and CSA listed, limit switch arms or snap action form C contacts, SO-4 conductor cable. The limit switch shall be manufactured by Square D or engineer approved equal.

ITEM AD1-12 SECTION 263213 – ENGINE GENERATORS Add the attached

specification Section 263213 in its entirety.

ITEM AD1-13 SECTION 263213 – ENGINE GENERATORS Add the following paragraph to

Section 263213, Paragraph 2.8, E.

- E. The sound attenuated enclosure shall be capable of reducing the sound pressure level of the generator to no more than 87.5 dBA at 3 feet and 70 dBA at 50 feet while running at full load.

ITEM AD1-14 SECTION 263600 – TRANSFER SWITCHES

Add the attached specification Section 263600 in its entirety.

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DRAWINGS

ITEM AD1-15 SHEET EU-1.2

For exact requirements of the normal power primary service conduits, coordinate with the local utility company. Refer to Bid Set plan G-0-01 for the electrical utility serving this district.

ITEM AD1-16 SHEET E-6.1

The normal power service lateral from the new utility padmount transformer shall read as follows:

“Install (3) parallel runs of (4) # 400 MCM in 3.5” sch 40 PVC conduits buried 36” below finished grade, from the automatic transfer switch (ATS) and stub-up into the secondary compartment of the transformer.”

The emergency power service lateral from the new emergency power generator set shall read as follows:

“Install (2) parallel runs of (4) # 500 MCM in 3.5” sch 40 PVC conduits buried 36” below finished grade, from the automatic transfer switch (ATS) and stub-up into the terminal landing compartment of the generator set.”

ITEM AD1-17 SHEET E-6.1

The normal power service lateral from the new utility padmount transformer to the Automatic Transfer Switch (ATS) shall not require a grounding conductor prior to the main service ground point to be established at the service equipment (ATS for this project). The “FEEDER SCHEDULE” located on sheet E-7.1 lists a 1000A, 4W feeder conductor as requiring a grounding conductor. This feeder schedule is intended for branch feeder definitions after the main service ground point, which requires the grounding conductor.

The emergency power service lateral from the new emergency power generator set to the Automatic Transfer Switch (ATS) shall require one # 1/0 equipment grounding conductor per parallel run since the main service point for the emergency power system is at the generator main circuit breaker.

The Automatic Transfer Switch (ATS) shall be 4 pole type as specified in Electrical Specification Section 263600 as issued as part of this addendum.

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ITEM AD1-18 SHEET E-7.1

For Main Panel “MP”, provide a 1000-amp main circuit breaker in lieu of main lugs only. The Amps Interrupting Capacity (AIC) shall be no less than 25K AIC with fully rated breakers.

ITEM AD1-19 SHEET M-1-01 – TRENCH DRAINS

The floor trench drains in Rooms 101, 103, 104, & 105 shall be 4-inch internal width precast PowerDrain S100K with removable industrial traffic ductile iron grating, sloping channels, and catch basins as manufactured by ACO Drain, Mentor, Ohio, www.acoswm.com, or engineer approved equal.

ITEM AD1-20 SHEET C-1-05 – DECHLORINATION BASIN

The dechlorination basin on the lagoon discharge piping shall be the Compact Bio-Dynamic LF Series dry chemical tablet feeder Model ITR 4000S for direct burial as manufactured by Norweco, Norwalk, Ohio www.norweco.com, or engineer approved equal.

ITEM AD1-21 MISCELLANEOUS DRAWINGS

See the attached drawings for changes, modifications, additions,

**ISSUED FOR THIS ADDENDUM
DRAWING and/or ATTACHMENTS**

QUESTIONS & REQUEST FOR INFORMATION SUBMITTED FOR CLARIFICATIONS
ON-SITE SEWAGE DISPOSAL SYSTEMS SITE EVALUATION FOR SEPTIC
SYSTEM SECTION 005200 – AGREEMENT BETWEEN OWNER AND
CONTRACTOR FOR CONSTRUCTION CONTRACT

SECTION 099700 – SPECIAL COATINGS

SECTION 099713 – STEEL COATINGS

SECTION 263213 – ENGINE GENERATORS

SECTION 263600 – TRANSFER SWITCHES

DRAWING AD1-1 THRU AD1-16 - REVISIONS TO VARIOUS DRAWINGS

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May 16, 2022

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ADDENDUM #1

**SANDY HOOK WATER DISTRICT
2019 WATER SYSTEM IMPROVEMENTS
CONTRACT 12 – NEW WATER TREATMENT PLANT & IMPROVEMENTS
BE Project # 19003**

QUESTIONS & REQUEST FOR INFORMATION SUBMITTED FOR CLARIFICATIONS

These responses and Addendum #1 along with its noted revisions and attachments to the Drawings and Specifications shall supplement, amend, and become a part of the Bidding Documents, Contract Documents, Drawings, and Specifications. All Bids and Construction Contracts shall be based on these modifications and issued Drawings, Specifications, and all Addendum.

1. Is it possible to visit the Sandy Hook WTP Site? If so, who is the contact to access the site? **Please contact the following: Kevin Winkleman, Superintendent, Office**
Phone: 606-738-6282, Cell Phone: 606-359-0010 e-mail:
shwd.kevin.winkleman@gmail.com

2. Sheet C-1-02 calls the backwash from the Building to the Backwash Lagoon as 10" PVC. Drawing C-1-05 calls the same line as 8" Backwash Piping. Which size is correct? **The correct size is 10-inch. See Addendum #1 for clarification.**
3. Sheet C-1-05 there are three dark items just west of the building where the RAW water lines enter. Are those three items gate valves? **Yes, there shall be three (3) 6-inch gate valves installed prior to the raw water lines entering the building. See Addendum #1 for clarification.**
4. Plan Sheet SD-0-02 shows a pavement detail that has 12" of stone and 6" of asphalt. Site Plan C-1-03 indicates the road surface is "crushed stone surface". Can you clarify? **See the revised pavement detail in Addendum #1. This detail is for the access entrance from Howards Creek Road. The pavement surface for the WTP site is crushed stone.**
5. Note 8 on Detail 1 on M-1-02 indicates a 6" potable water line to the water distribution system. The 6" potable water does not show on the site plans. Where is the tie-in to the water distribution system? **See Addendum #1 for approximate location of existing 6-inch water main for the connection to the water main from the high service pump room.**
6. Keynote 5 on M-1-06 states all piping shall be schedule 80 PVC unless otherwise noted. Does that note apply to all underground piping. If not, can you identify the class piping

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required for the various types of piping? **The keynote applies to the detail indicated for the chemical feed rooms. It does not apply to underground piping. See Addendum #1 for clarification on the various piping materials and classifications.**

7. The Contract 12 Specifications has an "Agreement between owner and contractor for construction contract" for Contract 13 (005200-1 to 005200-7). Could a construction contract for Contract 12 be provided? I am trying to figure out the liquidated damages for Contract 12. **See Addendum #1 for revised Agreement for Contract #12.**
8. On sheet EU1.2, the primary service is listed as (3) 3" schedule 40 PVC while on sheet E6.1, the primary service is listed as (2) 4" schedule 40 PVC. Which is correct? **For exact requirements of the normal power primary service conduits, coordinate with the local utility company. Refer to Sheet G-0-01 for the electrical utility serving this area.**
9. On sheet E6.1, the Utility and Generator feeders have conflicting statements. The Utility states, "install (3) parallel runs of (4) #400 kcmil in 3.5" schedule 40 PVC conduit from the ATS to the terminal compartment of the generator and pad mount transformer." While the Generator states, "install (2) parallel runs of (4) #500 kcmil in 3.5" schedule 40 PVC conduit from the ATS to the terminal compartments of the generator and pad mount transformer." Which is correct? Sheet E7.1 feeder schedule calls for 1000/3 (4W): 3 runs of (4) #500 kcmil/phase, (1) #2 awg ground in 3.5" conduit. **See Addendum #1 for additional clarifications. For Sheet E-6.1, the normal power service lateral from the new utility padmount transformer shall read as follows:**

"Install (3) parallel runs of (4) # 400 MCM in 3.5" sch 40 PVC conduits buried 36" below finished grade, from the automatic transfer switch (ATS)

and stub-up into the secondary compartment of the transformer.”

and for Sheet E-6.1, the emergency power service lateral from the new emergency power generator set shall read as follows:

“Install (2) parallel runs of (4) # 500 MCM in 3.5” sch 40 PVC conduits buried 36” below finished grade, from the automatic transfer switch (ATS) and stub-up into the terminal landing compartment of the generator set.”

10. Should the generator feed have a grounding conductor installed? **See Addendum #1. The normal power service lateral from the new utility padmount transformer to the Automatic Transfer Switch (ATS) shall not require a grounding conductor prior to the main service ground point to be established at the service equipment (ATS for this project).**
11. On sheet E5.1, the 30 amp fuses shown for the 3 – 40Hp High Service Pumps should be 80 amps. **See Addendum #1 for clarifications.**
12. Will the Emergency Stop Switch for the 500kW Generator be located on the weatherproof enclosure? **Yes, see Addendum #1.**

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13. Will there be any required Heat Tracing on this project? **No, there is no requirement for heat tracing on this project.**
14. Where is the location of the Loss of Head Panel and Sensors? **The Loss of Head Panel is located between the pressure vessel. See Detail 3/M-1-05, General Note Item 17 on Sheet M-1-05.**
15. I am planning to bid the chemical feed portion of the Sandy Hook project. I am hoping to get a clarification on section 46 33 44 – 2.04 Transfer Pumps. Section 2.04.B calls for the ability for 3’ suction list. After 2.04.G there is bold letters that state pump shall be March TE-5.5C-MD. This pump doesn’t have the ability to pull a lift. Can you clarify which is correct? **The chemical transfer pump shall be eliminated due to a different fluoride feed system being installed. Delete this portion of the specifications.**
16. We believe that the substantial completion time should be extended from 12 months to 18 months due to equipment and PEMB lead times. **The substantial completion time of 365 calendar days shall remain. The completion date will not change at this time; however, due to circumstances beyond the control of the Owner, Engineer, or Contractor, this will be taken into consideration once the actual delivery dates are established for all critical items.**
17. We ask that the bid date be pushed 1 week to June 9th, allowing for more time to put together a complete and accurate project estimate. **The bid date shall remain at Thursday, June 2,2022.**
18. Will the field instrumentations require conduit system with pull strings only or will the electrical contractor be responsible for installation of conduit and the digital and analog wiring? **It shall be the Contractor’s responsibility to clearly delineate and define what will be provided and will not be provided and/or services performed by the SCADA Integrator or electrical sub-contractor. All items**

necessary to make a complete and functioning installation as shown in the Contract Documents and described in the Specifications shall be provided by the Contractor.

19. Specification 331413.2.03, 2.04, 2.05 provide specifications for various pvc pipes. However, we find no pipe schedule to clarify where the different pipes are to be used. Will one be provided or are these contractor's options? **See Addendum #1 for pipe schedule.**
20. It is presumed that all pressurized water lines are to be restrained, but we find no restraint specifications for restraint of the buried pvc pipe. Can we rely on the manufacturers recommendations? **Specification Section 331413 Water Distribution Piping sections 2.04 and 2.06 calls out the types of jointing allowed for PVC pipe. All buried fittings must be Ductile Iron Mechanical Joint with proper thrust blocking as shown on standard detail sheet SD-0-04. All Mechanical Joint Fittings shall be wrapped in plastic wrap and grip rings used on all fittings per the note shown for the Concrete Thrust Block Detail.**

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21. Are bell restraints required for the buried PVC Pipe? **See Response to Comment 20 above**
22. Spec 331413.2.03 appears to only allow the more expensive C110 DI fittings for the PVC Pipe. Will C153 compact fittings be allowed for the PVC pipe similar to the DIP? **Compact fittings may be used in lieu of standard fittings for buried PVC and shall conform to ANSI/AWWA C153/A21.53 for piping 12 inches and smaller. Compact fittings shall not be used for piping larger than 12 inches.**
23. DWG's C-01-03 show any valves on the WTP influent lines as well as to the clearwell tanks. None have call outs. There are both MJ butterfly and MJ gate valve specifications in Spec. 331420. Are all the buried valves shown on the referenced dwg's to be gate valves? If not, which are butterfly valves? **All buried valves shown on the plans shall be Gate Valves. See Addendum #1 for clarification.**
24. Spec 466121 indicates that filter face piping will be provided by the filter manufacturer to the limits shown on the plans. However, we see no delineation of these limits. Will a dwg with these limits be provided? **See Addendum #1 for revised drawing reflecting the limits of the filter face piping from the manufacturer provided to the Engineer during the design phase. It shall be the Contractor's responsibility to clearly delineate and define what will be provided and will not be provided and/or services performed by any equipment manufacturer or sub-contractor. All items necessary to make a complete and functioning installation as shown in the Contract Documents and described in the Specifications shall be provided by the Contractor.**
25. Specification 333216 includes pumps for the Septic Tank. Drawing C-3-02 Note 1 states that pumps, controls, etc are not required in the septic tank. Please clarify. **Delete Note 1. The septic tank shall include pumps and controls for the domestic sanitary waste.**
26. In Detail 3 on M1-07 what is the item on the 6" piping that has a pressure gauge & switch? **The items are pressure gauges and pressure switches typically installed**

on the suction side and discharge side of pumps and air release valves typically installed at the high points of piping.

27. On C-102 there are two items in the finished water piping run near the clearwells that have a box drawn around them. What are these two items? **The two items are 10-inch gate valves in a concrete precast vault with SCADA equipment. See Addendum #1 for clarification.**
28. Sheet C-1-05 indicates a De-chlorination Basin. Specification 331413-3.09 indicates that De-chlorination is accomplished via a metering pump. Can you provide more detail as to the size and installation of the metering pump. No electrical service is shown. Is electrical power required? **See Addendum #1 for specifications on the dechlorination basin.**
29. In the Architectural Plans there is one hoist shown in the High Service and Backwash Pump Area. On Detail 1/M-1-02 there are two shown. If there is more than one could

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you please provide an OH crane schedule. Also, could a model number be provided for the preferred Gorble GLC Series OH crane. Please clarify. **There is only one overhead crane system shown on Detail 1/M-1-02. The crane system includes a telescoping bridge similar to the general arrangement drawing attached.**

30. Can you provide details and specifications for the trench drains? **See Addendum #1 for specifications.**
31. Can you provide pipe sizes for the pipes connected to the trench drains? **All piping connecting the trench drains shall be 6-inch PVC. See Addendum #1 for clarification.**
32. Note 1 Sheet M-1-05 states to run the 2" line from the ARV's on the filters to floors drains. Note 2 on Plan Sheet M-1-03 states to run the piping through the exterior wall. Which note is correct? **The note referenced on Sheet M-1-05 is correct. See Addendum #1 for clarification.**
33. On Sheet M-1-05 Detail 3 there is a rectangular symbol with a heavy dark line running through it. The symbol is just left and below the site glass. What does that symbol represent? **The symbol represents the filter to waste orifice plate to be provided by the manufacturer. See Addendum #1 for detail.**
34. Can the distribution pipe at the tie-in location be shut down for the tie-in or must it be hot tapped? **See Addendum #1 for location of the connection. The connection shall be a wet-tap connection.**
35. In the left hand detail on C-1-08 there is a bold line for a sanitary sewer running from the building to a septic tank. Is that sewer part of this project? **No, that line is an existing sanitary line to the existing septic tank near Well #5.**
36. Detail 4 on M-1-06 there is a gap between flanges at the 3" air inlet and the 3" tee. Is there a 3" electrically operated BFV at that location? **Yes, there is a 3" electrically operated BFV at that location. See Addendum #1 for clarification.**
37. Site drawings C-1-02 & C-1-05 call for a 2" PVC Holding Tank Discharge. Plan Sheet C-3-02 indicates the discharge line is 4". Which size is correct? **The correct size is 2-**

inch . See Addendum #1 for clarification.

38. The Holding Tank Discharge runs to the Filter Lagoon but drawings do not show how it terminates there. Where does the discharge terminate? **The holding tank discharge piping shall terminate through the lagoon basin wall of the west basin. See Addendum #1 for location.**

39. Are there any details for the propane tank pad? **See Addendum #1 for details on the propane tank pad.**

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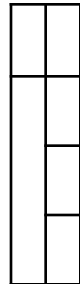
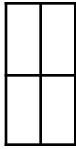
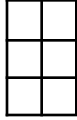
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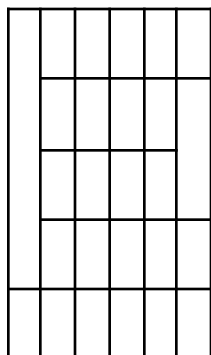
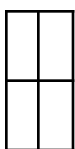
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CABINET FOR HEALTH SERVICES
DEPARTMENT FOR PUBLIC HEALTH
ON SITE SEWAGE DISPOSAL SYSTEMS
SITE EVALUATION

Elliott
County

0135
Application No.

Owner's Name Sandy Hook Water District

Lot Address 200 Howards Ct

Applicant's Name Brian Lovins

Address _____

Evaluation Factors	Proposed System Area	Alternative Area 1	
1. Topography (slope %)	3-5%		
2. Landscape Position	convex, to slope	Option 1 shown below	
3. Soil Texture and Group	0-24" SL GII 24-42" SL GIII		
4. Soil Structure	0-24" GRAN 24-42" BLOCKY		
5. Internal Soil Drainage	no mottles to 42"		
6. Soil Depth (in.)	no rock to 42"		
7. Restrictive Horizons (in.)	no restrictions to 42"		
8. Available Space	100%		
9. Overall Site Classification	S PS U		S PS U
10. Soil Series (if available)			

S = SUITABLE PS = PROVISIONALLY SUITABLE U = UNSUITABLE

11. List site and/or system modifications or alternatives required for site approval and the specific area selected for system installation:
 * 1500 gallon two-compartment tank pump in second compartment, alarm must be audible and visible, must also be on separate circuit than pump, licensed electrician must hook up pump + must also have riser + man hole cover.

* regular flow D-Box
 * options for lateral lines:
 1) 4' of 3' wide conc. rock beds installed @ 2'
 2) 2' of 4' wide conc. rock beds installed @ 2'
 3) 2' of 5' wide conc. rock beds installed @ 2'

setbacks → 10' from building, 10' from utility easements, property lines & driveway, & 25' from creek.



Kentucky

Phone No.

District

DFS-319 (REV. 3 97)

CABINET FOR HEALTH AND FAMILY SERVICES
DEPARTMENT FOR PUBLIC HEALTH

ONSITE SEWAGE DISPOSAL SYSTEMS APPLICATION FOR SITE EVALUATION

013 Application No.

08/1/2020 Date Received

Elliot County

TO BE COMPLETED BY APPLICANT

Owner's Name (if Different)

Applicant's Name Present Address

City State Zip Code

Location of Property 0 1 wa

Subdivision

Dimensions of Lot

lv. rick

ME

Septic System Installation

Process Gateway District Health

Department

Fee: \$300 (includes both site evaluation and permit)

*Payment must be in form of CHECK or MONEY ORDER ONLY

--make checks to "GDHD"

Step One: Site Evaluation

- A site evaluation consists of your counties' Health Environmentalist coming out to your property and doing an evaluation of the proposed area you're thinking you would like to install your system. To do a site evaluation your environmentalist will need a pit dug (by backhoe or by hand) that is 4 feet deep and at least 2-feet-wide in the area where you want to install your system. Temporary electric is released to stick/stone built homes at this time (NO TEMPORARY RELEASE IS GRANTED TO MOBILE OR CAMPER HOMES). (site evaluation fee is \$150)

Step Two: Who will install your system?

- It is recommended to get a Certified Installer to install your system. The Environmentalist will have a list of installers from each county and their contact information!
- You also have an option of doing a homeowner's installation but you will have to pass the Certified Installer's exam with a 70%. There is no fee for the exam. Ask the Environmentalist for more information.

Step Three: Obtaining the Permit to install the system.

- 🏠 To obtain a permit to install the septic system, a Pre-Permit Drawing must be approved by the Environmentalist. The drawing must consist of a proposed system layout based on the site evaluation. It should include the placement of your tank, distribution box, leach lines and grade shots. Upon approval of the drawing the permit can be issued to install the system. (permit fee is \$150)

Step Four: Final Inspection

- 🏠 Once the permit is pulled and the system is completely installed, a final inspection will need to be scheduled with the Environmentalist. The system needs to stay completely uncovered until the final inspection is completed and the system is approved; unless otherwise granted by the Environmentalist. Permanent electric is released at this time.

*** Electric Releases***

- 🏠 If building a home, you will receive a Temporary Electric release after the completion of the site evaluation.
- 🏠 ALL Permanent Electric releases will be given after the completion of the Final Inspection and system is approved.
- 🏠 Mobile Homes and RV's/Campers will receive Permanent Electric Release once Final Inspection is completed and system is approved.

Gateway District Health Department

42 Treadway
P.O. Box 555
Owingsville, KY 40360

Phone: 606-674-6396 **Fax:** 606-674-3071

Public Health Director Board of Health Chair Greg Brewer Bobby Rogers,
Judge Executive [Email: GregoryD.Brewer@ky.gov](mailto:GregoryD.Brewer@ky.gov) PO Box 39
Owingsville, KY 40360 **Local Health Centers**

Bath County
68 Oberline Street
P.O. Box 537
Owingsville, KY 40360

Phone: 606-674-2731 **Fax:**
606-674-9646 **Environmental:**
606-674-2731

606-768-2153

Elliott County

109 David Blair Blvd.

P.O. Box 762

Sandy Hook, KY 41171 **Phone:**

606-738-5205 **Fax:**

606-738-6530

Morgan County

493 Riverside Drive

West Liberty, KY 41472 **Phone:**

606-743-3744 **Fax:**

606-743-3750

Rowan County

730 West Main Street

Morehead, KY 40351 **Phone:**

606-784-8954 **Fax:**

606-783-1443

Menifee County

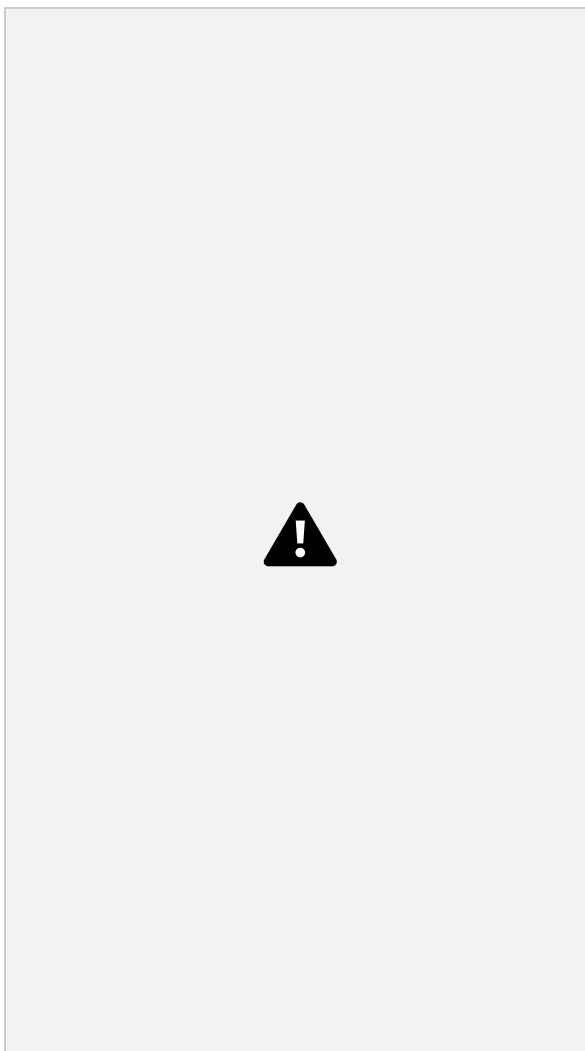
US 460 East

P.O. Box 106

Frenchburg, KY 40322

Phone: 606-768-2151 **Fax:**

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)**



Endorsed by

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(703) 684-2882
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American Council of Engineering Companies
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www.acec.org

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AD1-005200-1

AGREEMENT
BETWEEN OWNER AND CONTRACTOR

FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between **Sandy Hook Water District** (“Owner”) and (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

“2019 Water System Improvements, Contract 12 – New Water Treatment Plant and Improvements” for the Sandy Hook Water District, located at 474 Howards Creek Road, Sandy Hook, Kentucky.

Contract 12 - New Water Treatment Plant & Improvements - The program of work for which bids are to be submitted consists of constructing a new approximately 4,600 square feet pre engineered metal building with interior rooms, CMU walls, three bays with overhead doors, chemical feed rooms, MCC electrical room, three high service pumps and two backwash pumps, three 7-foot diameter pressure vessels with control valves and piping, filter media and support gravel, utility and toilet area, overhead crane system, site preparation, concrete backwash lagoons with pre-engineered metal canopy, stream restoration with gabion baskets, two 40,000-gallon above-ground clearwell storage tanks, crushed stone paving, fencing, emergency generator, on-site sewage disposal system with pumps, SCADA computer system, and all associated appurtenances and miscellaneous items, including all other associated electrical, mechanical, and structural work, including all related appurtenances, site clearing, site grading and improvements, connections to existing utilities and other work for a complete installation, as shown on the Drawings and described in the Specifications.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

**2019 WATER SYSTEM IMPROVEMENTS
CONTRACT 12 – NEW WATER TREATMENT PLANT &
IMPROVEMENTS SANDY HOOK WATER DISTRICT
SANDY HOOK, KENTUCKY**

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by **BLUEGRASS ENGINEERING, PLLC, GEORGETOWN, KENTUCKY.**

3.02 The Owner has retained **BLUEGRASS ENGINEERING, PLLC, GEORGETOWN, KENTUCKY** (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities, and have the

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rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract. The Work will be substantially completed within 365 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 395 days after the date when the Contract Times commence to run.

4.02 Contract Times: Days

A. The Work will be substantially completed within the completion time specified after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within **30** days after the date of substantial completion when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner \$1,000.00 per calendar day as liquidated damages for each calendar day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$1,000.00 per calendar day as liquidated damages for each calendar day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4.04 Special Damages

A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for

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Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.

B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted

pursuant to the Contract), until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

- a. percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
- b. percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

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6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of 0.0 percent per annum.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
- B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor’s safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

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- J. Contractor’s entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages 1 to ____, inclusive).
 - 2. Performance bond (pages ____ to ____, inclusive).

3. Payment bond (pages ___ to ___, inclusive).
 4. Other bonds.
 - a. ___ (pages ___ to ___, inclusive).
 5. General Conditions (pages ___ to ___, inclusive).
 6. Supplemental General Conditions to EJCDC Standard General Conditions (pages ___ to ___, inclusive).
 7. Specifications as listed in the table of contents of the Project Manual.
 8. Drawings (not attached but incorporated by reference) consisting of ___ sheets with each sheet bearing the following general title: ___[or] the Drawings listed on the attached sheet index.
 9. Addenda (numbers ___ to ___, inclusive).
 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages ___ to ___, inclusive).
 11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

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10.02 Assignment of Contract

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all

10.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 Contractor's Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 Other Provisions

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process

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such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

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IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on (which is the Effective Date of the Contract).

OWNER: CONTRACTOR:

Sandy Hook Water District

By: By: By:

Title: Title: Title:

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: Attest: Attest:

Title: Title: Title:

Address for giving notices: Address for giving notices: **Sandy Hook Water District**

100 Howards Creek Road

P.O. Box 726

Sandy Hook, Kentucky 41171

License No.:

*(where applicable)
documents authorizing execution of this Agreement.)
NOTE TO USER: Use in those states or other
jurisdictions where applicable or required.*

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other

SECTION 099700

SPECIAL COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Work under this section consists of surface preparation, priming, painting, and finishing work necessary to complete Work indicated or reasonably implied on Drawings.
2. Use high performance coating systems specified in this section to finish components, unless otherwise indicated. Without restricting volume or generality, work to be performed under this section may include, but is not limited to:
 - a. Interior wall and ceiling surfaces
 - b. Interior steel
 - c. Interior concrete floors
 - d. Opening frames and trims
 - e. Exterior concrete and concrete masonry
 - f. Exterior metal items
 - g. Piping, hangers, and supports
 - h. Exposed bare pipes (including color coding)
 - i. Electrical conduit, junction boxes, and other equipment
 - j. Shop-primed items exposed to view, including metal fabrications, equipment, lintels, metal doors and frames, access doors, hangers, and railings not scheduled to receive other finish treatments
 - k. Secondary Chemical Containment areas for chemical storage tanks, chemical totes, and chemical feed pump systems
3. Painting or finishing is not needed for the following:
 - a. Stainless steel piping, stainless steel equipment, stainless steel equipment supports, concrete tank interiors, fiberglass tank baffles, metal grating and stairs, aluminum railings, galvanized structural steel members. Surfaces or materials specifically scheduled or shown on Drawings to remain unfinished.
 - b. Items provided with factory finish.
 - c. Equipment nameplates, fire rating labels, and operating parts of equipment.
4. Materials and products having factory-applied primer shall not be considered factory finished.

B. Related Sections - All Divisions

1.02 REFERENCES

A. Publications listed herein are part of this specification to extent referenced.

B. American National Standards Institute

1. ANSI A13.1 Scheme for the Identification of Piping Systems

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2. ANSI Z535.1 Safety Color Code

C. ASTM International (formerly American Society for Testing and Materials)

1. ASTM D16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products
2. ASTM D4263 - Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
- ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
3. ASTM D4442 - Test Methods for Direct Moisture Content of Wood and Wood-Base Materials

D. National Fire Protection Association

1. NFPA 101 Life Safety Code

E. SSPC: The Society for Protective Coatings (formerly the Steel Structures Painting Council):

1. SSPC SP-1 Specification for Solvent Cleaning
2. SSPC SP-2 Specification for Hand Tool Cleaning
3. SSPC SP-3 Specification for Power Tool Cleaning
4. SSPC SP-5 Specification for White Metal Blast Cleaning
5. SSPC SP-6 Specification for Commercial Blast Cleaning
6. SSPC SP-7 Specification for Brush-Off Blast Cleaning
7. SSPC SP-10 Specification for Near White Metal Blast Cleaning
8. SSPC SP-11 Specification for Power Tool Cleaning to Bare Metal
9. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.
10. SSPC-SP 15 Commercial Grade Power Tool Cleaning
11. SSPC-SP 16 Brush-Off Blast Cleaning of Non-Ferrous Metals
12. SSPC PA-1 Painting Application Specification
13. SSPC PA-2 Paint Thickness Measurement

F. NAF 500-03 - SURFACE PREPARATION STANDARD FOR DUCTILE IRON PIPE AND
FITTINGS IN EXPOSED LOCATIONS RECEIVING SPECIAL EXTERNAL
COATINGS AND/OR SPECIAL INTERNAL LININGS

1.03 DEFINITIONS

- A. Terms 'Paint' or 'Painting' shall in a general sense have reference to sealers, primers, oil, alkyd, latex, polyurethane, epoxy, and enamel type coatings and application of these materials.
- B. Dry Film Thickness (DFT): Thickness, measured in mils, of a coat of paint in cured state.
- C. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 SUBMITTALS

A. Product Data

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1. Submit manufacturer's literature describing products to be provided, giving manufacturer's name, product name, and product line number for each material.
2. Submit technical data sheets for each coating, giving descriptive data, curing times, mixing, thinning, and application requirements.
 - a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin, and pigment.
3. Submit manufacturer's Material Safety Data Sheets (MSDS) and other safety requirements.

B. Shop Drawings

1. Submit a complete list of products proposed for use, including identifying product names and catalog numbers.
 - a. Arrange in same format as Schedule of Paint Finishes below.

b. Include applicable manufacturer's data and recommendations.

C. Samples

1. Selection Samples

a. Submit color charts displaying manufacturer's full range of standard colors for initial selection by Engineer and Owner.

2. Verification Samples

a. Submit 3 samples of each coating and color selected, showing bare, prepared surface and each successive coat.

b. Samples shall be submitted on hardboard or metal as appropriate to coating system. Label samples on back, identifying manufacturer, product name, and color number. c. Sample Size: Not less than 12" x 12" (300 mm x 300 mm)

1.05 QUALITY ASSURANCE

A. Qualifications

1. Provide products from a company specializing in manufacture of high performance coatings with a minimum of 10 years experience.
2. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 2 years successful experience in such application.

a. Maintain, throughout duration of application, a crew of painters who are fully qualified to satisfy specified qualifications.

1. Single Source Responsibility

- a. Materials shall be products of a single manufacturer or items standard with manufacturer of specified coating materials.
- b. Provide secondary materials that are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system.

B. Regulatory Requirements

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1. Conform to applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

C. Pre-Installation Meetings

1. Schedule a conference and inspection to be held on-site before field application of coating systems begins.
2. Conference shall be attended by Contractor, Owner's representative, Engineer, coating applicators, and a representative of coating material manufacturer.
3. Topics to be discussed at meeting shall include:
 - a. A review of Contract Documents and accepted shop drawings shall be made and deviations or differences shall be resolved.
 - b. Review items such as environmental conditions, surface conditions, surface preparation, application procedures, and protection following application.
 - c. Establish which areas on-site will be available for use as storage areas and working area.
4. Pre-construction conference and inspection shall serve to clarify Contract Documents, application requirements and what work should be completed before coating application can begin.

5. Prepare and submit, to parties in attendance, a written report of pre-installation conference. Report shall be submitted with 3 days following conference.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading

1. Deliver products in manufacturer's original unopened containers. Each container shall have manufacturer's label, intact and legible. Containers shall fully identify brand, type, grade, class, and other qualifying information used to describe contents.
2. Include on label for each container:
 - a. Manufacturer's name
 - b. Type of paint
 - c. Manufacturer's stock number
 - d. Color name and number
 - e. Instructions for thinning, where applicable

B. Storage and Protection

1. Store materials in a protected area, away from construction activities. Restrict storage area to paint materials and related equipment.
2. Maintain temperature in area of storage between 40 degrees F (4 degrees C) and 110 degrees F (43 degrees C).
3. Comply with health and fire safety regulations.
4. Remove damaged materials from Site.

1.07 PROJECT CONDITIONS

A. Environmental Requirements

1. Apply coating materials under conditions as follows:

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- a. Air temperature shall not be below 35 degrees F (2 degrees C) or above 110 degrees F (43 degrees C).
- b. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 degrees F (15 degrees C) above dew point and in a rising mode.
- c. Relative humidity shall be no higher than 85%.
 - d. For exterior spray application, wind velocity shall be less than 15 mph.
 - e. Atmosphere shall be relatively free of airborne dust.

1.08 SEQUENCING

A. Coordination

1. Perform work in proper sequence with work of other trades to avoid damage to finished work.
2. Where coatings are scheduled to be applied over shop-applied coatings, coordinate work of such shop applied products to ensure compatibility with field applied coating systems.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. To define requirements for materials, size, and design, this specification lists specific products manufactured by Tnemec Company, Inc. of Kansas City, Missouri, or performance equal. Materials specified herein are cited as minimum standard of quality which will be acceptable:

B. Materials specified herein shall not preclude consideration of equivalent or superior materials. Suggested equivalent materials or other substitutions shall be submitted to Engineer for consideration.

1. Requests for substitution shall include evidence of satisfactory past performance on water and wastewater treatment facilities.
2. Substitutions will not be considered that change number of coats or do not meet specified total dry film thickness.
3. All requests for substitution shall be made 10 days prior to the bid date.
4. Other approved coating manufacturer system, if provided, will be shown in the Bid Schedule as an Alternate Bid Item as an ADD or DEDUCT to overall Base Bid. The Owner will decide which coating system will be accepted.

2.02 ACCESSORIES

A. Coating Application Accessories

1. Provide application accessories as indicated in coating manufacturer's application instructions, including but not limited to cleaning agents, etching agents, cleaning cloths, sanding materials, and clean-up materials.
2. Material not specifically identified, but needed for proper application shall be of a quality not less than specified products.

2.03 SHOP FINISHING

A. Surface Preparation

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1. Clean surfaces of loose scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth, and free from dust and foreign matter that will adversely affect adhesion or appearance.
2. Prior to application of primer, steel surfaces shall be prepared to receive coating system in compliance with manufacturer's recommendations and specifications of SSPC as indicated in Schedule of Coating Systems below.

B. Shop Applied Coatings

1. Steel members shall be provided with one coat of primer as indicated in Schedule of Coating Systems below. Application of first coat shall follow immediately after surface preparation and cleaning and within an eight hour working day. Cleaned areas not receiving first coat within an eight hour period shall be re-cleaned prior to application of first coat.
2. Apply materials at film thickness specified by methods recommended by manufacturer in compliance with SSPC PA-1.
3. Allow each coat of paint to dry thoroughly before applying succeeding coats. 4. Make finish topcoats smooth, uniform in color, and free of laps, runs, dry spray, over spray, and skipped or missed areas.
5. Environmental conditions shall be in compliance with coating manufacturer's printed instructions.

2.04 SOURCE QUALITY CONTROL

A. Testing Laboratory Services

1. Documents

- a. Review Contract Documents and applicable sections of referenced standards.

2. Shop Painting Inspection

- a. Verify cleaning operations to surfaces are to condition specified.
- b. Verify conformance of paint to specification.
- c. Check for thickness of each coating, final thickness, and holidays.
- d. Check touch-up for final finish.

3. Reports

- a. Submit written progress reports describing tests and inspections made and showing action taken to correct non-conforming work. Report uncorrected deviations from Contract Documents.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions

1. Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.

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2. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes until moisture content of surface is below following limits:

- a. Masonry Surfaces: 12% maximum
- b. Vertical Concrete Surfaces: 12% maximum
- c. Horizontal Concrete Surfaces: 8% maximum
- d. Gypsum Board Surfaces: 12% maximum
- e. Wood Surfaces: 15% maximum; in compliance with ASTM D4442

3. Correct conditions detrimental to timely and proper execution of Work.
4. Do not proceed until unsatisfactory conditions have been corrected.
5. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.02 PREPARATION

A. Protection

1. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove empty containers from Site.
2. Place cotton waste, cloths, and hazardous materials in containers, and remove from Site daily.
3. Provide drop cloths, shields, and other protective equipment.
4. Protect elements surrounding work of this section from damage or disfiguration.
5. As Work proceeds, promptly remove spilled, splashed, or splattered materials from surfaces.
6. During application of coating materials, post Wet Paint signs.
7. During application of solvent-based materials, post No Smoking signs.

B. Surface Preparation

1. General Requirements

- a. Prior to application of primer, surfaces shall be prepared to receive specified coating system in compliance with manufacturer's recommendations and specifications of SSPC as indicated in Schedule below.
- b. Clean surfaces of residual deposits of grease, scale, rust, oil, dirt, and other foreign

matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth, and free from dust and foreign matter that will adversely affect adhesion or appearance.

2. Ferrous Metal Surfaces

- a. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, oil, and weathered coating.
- b. For shop primed surfaces, sand and scrape to remove loose and/or weathered primer and rust. Feather edges to make touch-up patches inconspicuous. Field welds and touch-ups shall be prepared to conform to original surface preparation standards as indicated in Schedule of Coating Systems below.
- c. Shop applied prime coatings that are damaged during transportation, construction, extended field exposure and/or installation shall be thoroughly cleaned and touched up in field. Use repair procedures that insure complete protection of adjacent primer. Repair methods and equipment may include wire brushing, hand or power tool cleaning, pressure washing and/or dry air blast cleaning. In order to prevent injury to

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surrounding painted areas, blast cleaning may necessitate use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive to touch-up, item shall be re cleaned and coated or painted.

- d. For surfaces not shop primed, surfaces shall be cleaned in compliance with specifications of SSPC as indicated in Schedule of Coating Systems below.

3. Galvanized Steel Surfaces

- a. Prepare in accordance with SSPC-SP 16.
- b. Sand clean and spot prime abraded areas.

4. Lightweight Metals

- a. Prepare in accordance with SSPC-SP 16.

5. Cast-In-Place and/or Precast Concrete Surfaces: Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.

- a. Allow concrete to cure for not less than 30 days prior to painting.
- b. Remove loose particles with stiff brush.
- c. Remove dirt, scale, efflorescence, powders, laitance, parting compounds, and other foreign matter.
- d. Wash stains caused by weathering or corroding metals with a sodium metasilicate solution after thoroughly wetting with clean, clear water; allow surface to thoroughly dry.
- e. Fill small surface pock marks and air holes with a suitable fill material; Tnemec Series 218 MortarClad or Series 215 Surfacing Epoxy. Thoroughly brush or rub over surface and let dry for not less than 24 hours before paint application.

6. Submerged Concrete (Void-free surface): Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.

- a. Remove oil, grease and contaminants by solvent cleaning.
- b. Brush blast entire surface to remove laitance, form coatings, provide a uniform surface texture in accordance with the ICRI 310.2 CSP required by the manufacturer.
- c. Perform blast cleaning so as to open up voids and bug holes so that holes are concave. Care should be taken to keep aggregate exposures to a minimum.
- d. Fill voids and bugholes up to ¼" with Series 215 Surfacing Epoxy or Series 218 MortarClad.
- e. Voids ¼" in depth up to 4" shall be filled and repaired with Tnemec Series 217 MortarCrete; see application guide for specific surface preparation and installation recommendations.

7. Masonry Surfaces (facing brick or concrete masonry units)

- a. Allow surfaces to cure for not less than 30 days prior to painting.
- b. Remove dirt, loose mortar, scale, efflorescence, or powder.

8. Cement Plaster (stucco)

- a. Allow surfaces to cure for 30 to 60 days prior to painting.
- b. Fill minor isolated hairline cracks with patching plaster and smooth off to match texture of adjacent surfaces.

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- c. Remove dirt, loose material, scale, efflorescence, powder, and other foreign matter. Remove oil and grease by washing with a tri-sodium phosphate solution, rinse with clean, clear water and let thoroughly dry.
- d. For solvent based paints, wash surfaces with a 4% zinc sulphate solution, rinse with clean, clear water, and let thoroughly dry before painting.

9. Moisture Emission Test for Concrete and Masonry

- a. Test substrates for moisture prior to application of coating systems. Test shall be plastic sheet method in compliance with ASTM D4263 and, if necessary, F 1869.

10. Gypsum Wallboard Surfaces:

- a. Fill narrow, shallow cracks and small holes with spackling compound.
- b. Rake deep, wide cracks and deep holes; dampen with clean, clear water and fill with thin layers of joint cement.

11. Copper Surfaces:

- a. Clean surfaces in accordance with SSPC-SP 16.

12. Stainless Steel Surfaces:

- a. Clean surfaces in accordance with SSPC-SP 16.

13. Concrete Floors: Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.

- a. Allow concrete to cure for 30 days prior to painting.
- b. Remove contamination, dirt, dust, and other foreign matter from concrete floors.
- c. Brush-Off-Blast or Vacuum Blast Clean to achieve a uniform surface profile in accordance with the ICRI 310.2 CSP required by the manufacturer...
- d. After surface treatment, keep traffic off surfaces until painting.

14. Wood Surfaces

- a. Sand wood surfaces and edges smooth and even before finishing or painting and between coats. Remove dust after each sanding.
- b. Remove residue from knots, pitch streaks, cracks, open joints, and sappy spots. Knots shall be coated with a pigmented stain sealer prior to painting. Avoid use of shellac as an undercoat.
- c. Countersink nails and fill nail holes, cracks, open joints and other defects with tinted putty or wood filler after priming is dry and before second coat.

15. Insulated Coverings, Canvas or Cotton

- a. Clean using high-pressure air and solvent of type recommended by coating manufacturer.

16. Polyvinyl Chloride (PVC) Pipe

- a. Remove ink markings by wiping down with clean-lint-free cloths saturated denatured alcohol. Thoroughly and uniformly mechanically abrade to provide tooth and anchor.

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3.03 APPLICATION

A. General Requirements

1. Apply coating systems in compliance with manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.
2. Apply primer, intermediate, and finish coats to comply with wet and dry film thickness and spreading rates for each type of material as recommended by manufacturer.
 - a. Application rates in excess of those recommended and fewer numbers of coats than specified shall not be accepted.
3. Number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application.
 - a. Closely adhere to re-coat times recommended by manufacturer. Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during drying phase.
4. Employ only application equipment that is clean, properly adjusted, and in good working order, and of type recommended by coating manufacturer.
5. After surface preparation, interior weld seams shall be brush applied.
6. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.
7. Finish tops, bottoms and edges of doors same as faces of doors.
8. Piping and Conduit Exposed to View
 - a. Finish in compliance with requirements for unprimed ferrous metal items.
 - i) Use colors specified in ANSI Z13.1 and Z535.1 or the Ten States Standards Guide.
 - b. Identification markings will be provided by others.
9. Access Panels, Electrical Panels, and Cover Plates:
 - a. Finish in compliance with requirements for shop-primed ferrous metal items, including doors, door backs and sight-exposed cabinet surfaces, color matching adjacent surfaces unless otherwise indicated; do not allow coatings on identification plates, tags, or markings.

3.04 REPAIR/RESTORATION

- A. At completion of Work, touch-up and restore finishes where damaged.
- B. Defects in Finished Surfaces
 1. When stain, dirt, or undercoats show through final coat, correct defects and cover with additional coats until coating is of uniform finish, color, appearance and coverage. 2. Correct defects visible from a distance of 5 feet. Runs shall not be permitted.
- C. Touch-up of minor damage shall be acceptable where result is not visibly different from surrounding surfaces. Where result is visibly different, either in color, sheen, or texture, recoat entire surface.

3.05 FIELD QUALITY CONTROL

A. Required Inspections and Documentation

1. Documents

- a. Review Contract Documents and applicable sections of referenced standards.

2. Field Painting Inspection:

- a. Verify cleaning operations to surfaces are to condition specified.
- b. Verify conformance of paint to specification.
- c. Check for thickness of each coating, final thickness, and holidays.
- d. Check touch-up for final finish.

3. Reports

- a. Submit written progress reports describing tests and inspections made and showing action taken to correct non-conforming work. Report uncorrected deviations from Contract Documents.

B. Manufacturer's Field Service

1. Coatings manufacturer shall be available to provide on-site inspections, technical assistance, and guidance for application of coating system as needed.

3.06 CLEANING

A. At completion of day's work, remove from Site rubbish and accumulated materials.

B. Clean paint spots and other soiling from prefinished surfaces and surfaces with integral finish. Use solvents which will not damage finished surface.

C. Leave storage area clean and in same condition indicated for equivalent spaces in Project.

3.07 PROTECTION

A. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.

3.08 WASTE MANAGEMENT

A. General Requirements

1. Place materials defined as hazardous or toxic waste in designated containers.
2. Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.
3. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal.
4. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

3.09 SCHEDULE OF COATING SYSTEMS

A. Previously Painted Surfaces (existing facility). NOT USED

B. Carbon Steel (structural steel, miscellaneous metal, tanks, pipes, and equipment)

1. Exterior Steel - Non-Immersion

- a. Shop Surface Preparation: SSPC SP6 Commercial Blast Cleaning to achieve a 1.5 mil angular surface profile.
- b. Shop and Spot Field Primer Coat: Series 91/94-H₂O Hydro-Zinc
 - i) Dry Film Thickness: 2.5 to 3.5 mils
- c. Full Field Intermediate Coat: Series N69-color Hi-Build Epoxoline
 - i) Dry Film Thickness: 3.0 to 5.0 mils
- d. Finish Coat: or Series 1095-color Endura-Shield
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- e. Total Dry Film Thickness: 7.5 to 13.5 mils.

2. Interior Steel - Non-Immersion (moderate chemical and dry exposure) for Structural Steel, pumps, valves, mechanical equipment, etc.)

- a. Shop Surface Preparation: SSPC SP6 Commercial Blast Cleaning to achieve a 1.5 mil angular surface profile.
- b. Shop Primer Coat: Series 91/94-H₂O Hydro-Zinc
 - i) Dry Film Thickness: 2.5 to 3.5 mils
- c. Full Field Prime Coat: Series N69-color Hi-Build Epoxoline
 - i) Dry Film Thickness: 4.0 to 6.0 mils
- d. Finish Coat: Series N69-color Hi-Build Epoxoline
 - i) Dry Film Thickness: 4.0 to 6.0 mils
- e. Total Dry Film Thickness: 10.5 to 15.5 mils.

3. Interior Steel - Immersion – Potable Water - NOT USED

4. Exterior Steel – Immersion, Clarifier Rake arms etc., Non-Potable:

- a. Shop Surface Preparation: SSPC SP10 Near White Blast Cleaning to achieve a 1.5 mil angular surface profile.
- b. OPTIONAL Shop Primer Coat: Series N69 Hi-Build Epoxoline II
 - i) Dry Film Thickness: 3.0 to 5.0 mils
- c. Field Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning or Pressure Wash Shop Primer and sweep blast with a fine abrasive to remove surface contamination and provide tooth and anchor. Clean all failed, damaged or welded areas as per SSPC-SP10 Near White Metal Blast Cleaning. Spot prime with shop primer.
- d. Full Field Prime Coat: Tnemec Series N69 Hi-Build Epoxoline
 - i) Dry Film Thickness: 3.0 to 5.0 mils
- e. Finish Coat: Tnemec Series 142 Epoxoline
 - i) Dry Film Thickness: 12.0 to 16.0 mils
- f. Total Dry Film Thickness: 15.0 to 21.0 mils.

5. Interior or Exterior Steel - Immersion; Non-Potable – NOT USED

Note: For exposures to hydrogen sulfide, sulfuric acid and industrial waste condensates.

- a. Surface Preparation: SSPC-SP5/NACE 1 White Metal Blast Cleaning with a 3.0 mil minimum angular anchor profile.
- b. Primer Coat: Tnemec Series N69 Hi-Build Epoxoline II

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- i) Dry Film Thickness: 3.0 to 5.0 mils
- c. Stripe Coat: Tnemec Series N69 Hi-Build Epoxoline II applied by brush and scrubbed into all weld seams. In addition to weld seams, all edges, corners, bolts, rivets, pits,

- etc. shall receive a stripe coat.
- d. Finish Coat: Tnemec Series G435 Perma-Glaze
 - i) Dry Film Thickness: 30.0 to 40.0 mils in one or two coats.
- e. Total Minimum Dry Film Thickness: 33.0 mils

6. Interior or Exterior Steel - NOT USED

C. Mill Coated Ductile Iron Pipe; Non-Potable

1. Exterior or Interior - Non-Immersion:

- a. Shop Surface Preparation: All external surfaces of ductile iron pipe and fittings shall be delivered to the application facility without asphalt or any other protective lining on the exterior surface. All oils, small deposits of asphalt paint, grease, and soluble deposits should be removed and uniformly abrasive blasted using angular abrasive in accordance with NAPF 500-03-04: External Pipe Surface condition. When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, rust, mold coating and other foreign matter. Any area where rust reappears before application shall be reblasted. The surface shall contain a minimum angular anchor profile of 1.5 mils, Reference NACE RP0287 or ASTM D 4417, Method C.
- b. Shop Primer Coat: Tnemec Series N69-1211 Hi-Build Epoxoline II
 - i) Dry Film Thickness: 4.0-6.0 dry mils
- c. Field Surface Preparation: Clean surfaces as per NAPF-500-03-01. Clean any failed or damaged areas as per NAPF 500-03-03 or NAPF 500-03-04 to provide a 1.5 mil angular anchor profile. Spot prime with N69 Hi-Build Epoxoline II.
- d. Full Field Intermediate Coat: Tnemec Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 3.0 to 5.0 mils
- e. Exterior Finish Coat: Tnemec Series 1095 Endura-Shield
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- f. Interior Finish Coat: Tnemec Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 3.0 to 5.0 mils
- g. Total Minimum Dry Film Thickness: 10.0 mils.

2. Exterior or Interior - Immersion; Potable – NOT USED

D. Galvanized Steel - Pipe, Metal Deck, and Miscellaneous Fabrications

1. Exterior

- a. Surface Preparation: Visible deposits of oil, grease, or other contaminants shall be removed as required by SSPC-SP1. Sweep (Abrasive) Blasting per SSPC-SP16 to achieve a uniform anchor profile (1.0 to 2.0 mils). Galvanized surfaces must be clean, dry, and contaminant free prior to application of coatings.
- b. Spot Primer: Tnemec Series 94-H₂O Hydro-Zinc (Touch-up only)
 - i) Dry Film Thickness: 2.5 to 3.5 mils
- c. Prime Coat: Tnemec Series N69 Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Full Finish Coat: Tnemec Series 1095 Endura-Shield)
 - i) Dry Film Thickness: 2.0 to 3.0 mils

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- e. Total Dry Film Thickness: 4.0 to 6.0 mils

2. Interior

- a. Surface Preparation: Visible deposits of oil, grease, or other contaminants shall be removed as required by SSPC-SP1. Sweep (Abrasive) Blasting per SSPC-SP16 to achieve a uniform anchor profile (1.0 to 2.0 mils). Galvanized surfaces must be clean, dry, and contaminant free prior to application of coatings.

- b. Spot Primer: Tnemec Series 94-H2O Hydro-Zinc (Touch-up only)
 - i) Dry Film Thickness: 2.5 to 3.5 mils
- c. Prime Coat: Tnemec Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Finish Coat: Tnemec Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- e. Total Dry Film Thickness: 4.0 to 6.0 mils

E. Concrete (cast-in-place and/or precast concrete surfaces)

1. Do not paint exterior cast-in-place or precast concrete structures.
2. Interior - Non-Immersion
 - a. Surface Preparation: Allow new cast-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24-hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide an ICRI-CSP 2- 3 surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.
 - b. Filler/Surfacer: Tnemec Series 215 Surfacing Epoxy as needed.
 - c. First Coat: Tnemec Series N69 Hi-Build Epoxoline II
 - i) Dry Film Thickness: 4.0 to 6.0 mils
 - d. Second Coat: Tnemec Series N69 Hi-Build Epoxoline II
 - i). Dry Film Thickness: 4.0 to 6.0 mils
 - e. Total Dry Film Thickness: 8.0 to 12.0 mils.

F. Concrete (Secondary Chemical Containment Pits)

1. Secondary Containment System for Potassium Permanganate, Corrosion Inhibitor (Aquadine) and Sodium Fluorosilicate
 - a. Surface Preparation: Allow new poured-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ

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- a. Surface Preparation: Allow new poured-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride" (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes" (relative humidity should not exceed 80%), or D 4263 "Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method" (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 or greater surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.
- b. Block Filler: Series 215 Surfacing Epoxy for block walls if applicable. c. Primer: Tnemec Series 201 Epoxoprime
 - i) Dry Film Thickness: 6.0 to 8.0 mils
- d. Cant Cove: Tnemec Series 237SC Chembloc mortar blended with additional

- aggregate to provide a cove on all interior corners (90 degree angles).
- e. Base Coat: Tnemec Series 237SC Chembloc mortar
 - i) Dry Film Thickness: 60.0 –80.0 mils.
- f. Fiberglass Reinforcement: While the basecoat is still wet, lay and press the fiberglass reinforcing mat (S211-0215) into the surface. Using a rib roller, backroll fiberglass to remove any air pockets.
- g. Saturant Coat: Tnemec Series 237SC. Once mat is placed, immediately saturate mat with Series 237SC saturant coat (approximately 8.0 to 12.0 mils or 201-301 sq ft/kit) until fiberglass mat is completely wet out.
- h. Finish Coat: Tnemec Series 280 Gray Tneme-Glaze
 - i) Dry Film Thickness: 8.0 to 12.0 mils
- i. Total Dry Film Thickness: 125 mils nominal.

2. Secondary Containment System for Chlorine

- a. Surface Preparation: Allow new poured-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 “Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride” (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 “Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes” (relative humidity should not exceed 80%), or D 4263 “Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method” (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 or greater surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.
- b. Block Filler: Series 215 Surfacing Epoxy for block walls if applicable. c.
Primer: Tnemec Series 201 Epoxoprime
 - ii) Dry Film Thickness: 6.0 to 8.0 mils
- d. Base Coat: Tnemec Series 239SC Chembloc mortar
 - e. Cant Cove: Tnemec Series 239SC Chembloc mortar blended with additional aggregate to provide a cove on all interior corners (90 degree angles)
 - i) Dry Film Thickness: 60.0 –80.0 mils.
 - f. Fiberglass Reinforcement: while the basecoat is still wet, lay and press the fiberglass reinforcing mat (S211-0215) into the surface. Using a rib roller, backroll fiberglass to remove any air pockets.
 - g. Saturant Coat: Tnemec Series 239SC Once mat is placed, immediately saturate

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- mat with Series 239SC saturant coat (approximately 8.0 to 12.0 mils or 201-301 sq ft/kit) until fiberglass mat is completely wet out.
- h. Finish Coat: Tnemec Series 282 Gray Tneme-Glaze
 - i) Dry Film Thickness: 8.0 to 12.0 mils
- i. Total Dry Film Thickness: 125 mils nominal.

3. Pigmented Finish – Not used.

- a. Surface Preparation: Allow new poured-in-place concrete to cure a minimum of 28 days at 75°F (24°C). Verify concrete dryness in accordance with ASTM F 1869 “Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride” (moisture vapor transmission should not exceed three pounds per 1,000 square feet in a 24 hour period), F 2170 “Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes” (relative humidity should not exceed 80%), or D 4263 “Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method” (no moisture present). Prepare concrete surfaces in accordance with NACE No. 6/SSPC SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines.

Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 or greater surface profile. Large cracks, voids and other surface imperfections should be filled with a recommended filler or surfacer.

- b. Block Filler: Series 215 Surfacing Epoxy for block walls if applicable.
- c. Cant Cove: Tnemec Series 215 Surfacing Epoxy blended with additional aggregate to provide a cove on all interior corners (90 degree angles)
- d. Primer: Tnemec Series 251SC Chembloc
 - iii) Dry Film Thickness: 6.0 to 12.0 mils
- e. Base Coat: Tnemec Series 252SC Chembloc mortar
 - i) Dry Film Thickness: 60.0 –80.0 mils.
- f. Fiberglass Reinforcement: While the basecoat is still wet, lay and press the fiberglass reinforcing mat (S211-0215) into the surface. Using a rib roller, backroll fiberglass to remove any air pockets.
- g. Saturant Coat: Tnemec Series 252SC Once mat is placed, immediately saturate mat with Series 239SC saturant coat (approximately 8.0 to 12.0 mils or 201-301 sq ft/kit) until fiberglass mat is completely wet out.
- h. Finish Coat: Tnemec Series 252SC Chembloc
 - i) Dry Film Thickness: 8.0 to 12.0 mils
- i. Total Dry Film Thickness: 125 mils nominal.

4. Pigmented Epoxy: Lab floors

- a. Surface Preparation: SSPC-SP 13/NACE 6 with a surface profile of ICRI CSP 3.
 - First Coat: Tnemec Series 237-color PowerTread
 - i) Dry Film Thickness: 8.0 to 10.0 mils
- c. Second Coat: Tnemec Series 237-color PowerTread
 - i) Dry Film Thickness: 8.0 to 10.0 mils
- d. Total Dry Film Thickness: 16.0 to 20.0 mils

G. Concrete Masonry Unit (CMU)

1. Exterior – Exposed

- a. Surface Preparation: Allow mortar to cure 14 days. Level protrusions and mortar

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spatter. Surface must be clean, dry and free of oil, grease and other contaminants.

- b. Block Filler: Tnemec Series 130 Envirofill
 - i) Dry Film Thickness: Provide a Smooth Pinhole Free Surface (60 to 80 square feet/gallon on porous block)
- c. First Coat: Tnemec Series 156 Enviro-Crete
 - i) Dry Film Thickness: 6.0 to 8.0 mils (100 to 134 square feet/gallon)
- d. Second Coat: Tnemec Series 156-color Enviro-Crete
 - i) Dry Film Thickness: 6.0 to 8.0 mils (100 to 134 square feet/gallon)
- e. Total Dry Film Thickness: 12.0 to 16.0 mils

2. Interior: CMU

- a. Surface Preparation: Allow mortar to cure 28 days. Level protrusions and mortar spatter. Surface must be clean, dry and free of oil, grease and other contaminants.
- b. First Coat: Series 130 Envirofill
 - i) Dry Film Thickness: Provide a Smooth Pinhole Free Surface (60 to 80 square feet/gallon on porous block)
- c. Second Coat: Tnemec Series 280 Tneme-Glaze
 - i) Dry Film Thickness: 4.0 to 8.0 mils
- d. Third Coat: Tnemec Series 297 Enviro-Glaze
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- e. Total Dry Film Thickness: 6.0 to 11.0 mils above block filler.

H. Interior Wall and Ceiling Surfaces

1. Gypsum Wallboard

- a. Surface Preparation: Sand joint compound and feather edges. Surface shall be clean, dry and free of contaminants.
- b. First Coat: Tnemec Series 151-1051 Elastogrip FC
 - i) Dry Film Thickness: 0.7 to 1.5 mils
- c. Second Coat: Tnemec Series 287 Enviro-Pox
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Finish Coat: Tnemec Series 297 Enviro-Glaze
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- e. Total Dry Film Thickness: 5.0 to 7.5 mils

I. Wood

1. Interior or Exterior:

- a. Surface Preparation: Surface shall be clean and dry
- b. First Coat: Tnemec Series 151-1051 Elasto-Grip FC.
 - i) Dry Film Thickness: 0.7 to 1.5 mils
- c. Second Coat: Tnemec Series 1028-Color Enduratone
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Third Coat: Tnemec Series 1028-Color Enduratone
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- e. Total Dry Film Thickness: 5.0 to 7.5 mils

J. PVC Pipe

1. Exterior or Interior

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- a. Surface Preparation: Mechanically abrade to roughen surface and provide 1.0-2.0 mil surface profile. Solvent Clean with a suitable solvent to remove all inked numbers. All surfaces must be clean, dry, and free of contaminants.
- b. First Coat: Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- c. Exterior Finish Coat: Tnemec Series 1095 Endura-Shield
 - i) Dry Film Thickness: 2.0 to 3.0 milsInterior Finish Coat: Tnemec Series N69-color Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Total Dry Film Thickness: 4.0 to 6.0 mils

K. Insulated Pipe

1. Interior

- a. Surface Preparation: Surface shall be clean and dry.
- b. First Coat: Tnemec Series 1026-Color Enduratone
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- c. Second Coat: Tnemec Series 1026-Color Enduratone
 - i) Dry Film Thickness: 2.0 to 3.0 mils
- d. Total Dry Film Thickness: 4.0 to 6.0 mils

L. Fiberglass Reinforced Plastic Pipe

1. Exterior

- a. Surface Preparation: Abrade to roughen surface and provide 1.0-2.0 mil surface

- profile. Solvent Clean with a suitable solvent to remove all inked numbers. All surfaces must be clean, dry, and free of contaminants.
- b. First Coat: Tnemec Series N69 Hi-Build Epoxoline II
 - i) Dry Film Thickness: 2.0 to 3.0 mils
 - c. Second Coat: Tnemec Series 1095 Endura-Shield
 - i) Dry Film Thickness: 2.0 to 3.0 mils
 - d. Total Dry Film Thickness: 4.0 to 6.0 mils

3.10 PIPE IDENTIFICATION AND COLOR CODING

- A. A legend showing the name and contents of each pipe and an arrow showing the direction of flow shall be located on each pipe listed in the Piping Identification Schedule. The legends shall be stenciled on the pipes and shall be located on straight runs and at each valve, piece of equipment, branches, changes in direction, and where pipes pass through walls or floors and as directed by the Engineer. The size and location of the legend shall be in general accordance with American National Standards Institute Scheme for Identification of Piping Systems, A13.1-Latest Revision. Engineer shall select the desired shades of the process piping color. Pumps, meters, etc. associated with the process piping shall also be painted the same color as the lines in which they are a part as selected by the Engineer.
- B. The ANSI standard A13.1 requires that markers shall be located so that they are readily visible to personnel from the point of normal approach.

Pipe Marker Visibility and Size Requirements:

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Outside Diameter of Pipe or Covering	Length of Color Field	Letter Height
3/4 in - 1 1/4 in (19-32 mm)	5 in (127 mm)	1/2 in (13 mm)
1 1/2 in - 2 in (38-51 mm)	8 in (203 mm)	3/4 in (19 mm)
2 1/2 in - 6 in (64-152 mm)	12 in (304 mm)	1 1/4 in (32 mm)
8 in - 10 in (203-254 mm)	24 in (609 mm)	2 1/2 in (64 mm)
10 in (254 mm) or bigger	32 in (812 mm)	3 1/2 in (89 mm)

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- C. Piping Identification Schedule:

PAINT COLORS

PIPE SYSTEM	PIPE COLOR	LETTERS & ARROWS
WATER LINES		
Raw	110GN "Clover" -Olive Green	Black
Settled or Clarified Water	10GN "Aqua Sky"	Black
Finished or Potable	11SF "True Blue" Dark Blue	35GR-Black
City Water (drinking)	11SF "True Blue" Dark Blue	Black

water-hot & cold)		
CHEMICAL LINES		
Alum or Primary Coagulant	04SF Safety Orange	Black
Ammonia	11WH White	Black
Carbon Slurry	35GR - Black	White
Caustic	02SF Yellow w/ 09SFGreen Band	Black
Chlorine (Gas or Solution)	02SF Yellow	Black
Fluoride	25BL Light Blue w/ Red Band	Black
Lime Slurry	37GN Light green	Black
Ozone	02SF Yellow w/ Orange Band	Black
Phosphate Compounds	37GN Light Green w/ Red Band	Black
Polymers or Coagulant Aids	04SF Orange w/ 09SF Green Band	White
Potassium Permanganate	14SF Violet	White
Soda Ash	37GN Light Green w/ Orange Band	Black
Sulfuric Acid	02SF Yellow w/ Red Band	Black
Sulfur Dioxide	37GN Light Green w/ 02SF Yellow Band	Black
WASTE LINES		
Backwash Waste	68BR Light Brown	White
Sludge	15SF Dark Brown	White
Sewer (Sanitary or Other)	33GR Dark Gray	White
OTHER		
Compressed Air	91GN Dark Green	White
Gas	28RD Red	White
Other Lines	32GR Light Gray	White

In situations where two colors do not have sufficient contrast to easily differentiate between them, a six inch band of contrasting color shall be on one of the pipes at approximately 30 inch intervals. The name of the liquid or gas should also be on the pipe. In all cases, direction arrows shall be applied to the pipe indicating the direction of flow.

- END OF SECTION -

SECTION 099713
STEEL COATINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Surface preparation shall consist of near white blast cleaning in accordance with SSPC SP 10 in the interior of the tank, and commercial blast cleaning in accordance with SSPC SP 6 for the exterior of the tank including bracings, catwalks, ladders and other attachments and repairs of all pitting.

1.02 REQUIREMENTS

The Contractor shall furnish all materials, labor, equipment and appliances and shall do all tank surface preparation and field painting as specified herein.

1.03 REFERENCES.0

- A. AWWA D102 (Latest Revisions) Standards.
- B. Kentucky State Board of Health.
- C. U.S. Environmental Protection Agency.
- D. KY Environmental and Public Protection Cabinet.
- E. National Sanitation Foundation (NSF) Standard #61.
- F. ASTM D 16 – Terminology Relating to Paint, Varnish, Lacquer, and Related Products G.
ASTM D 4263 – Indicating Moisture in Concrete by the Plastic Sheet Method
- H. ASTM F 1869 – Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- I. AWWA C 652 – Disinfection of Water Storage Facilities.
- J. AWWA D 102 – Painting Steel Water Storage Tanks.
- K. SSPC-SP 3 – Power Tool Cleaning.
- L. SSPC-SP 6/NACE 3 – Commercial Blast Cleaning.
- M. SSPC-SP 10/NACE 2 – Near White Metal Blast Cleaning.
- N. SSPC-SP 11 – Power Tool Cleaning to Bare Metal.
- O. SSPC-SP 13/NACE 6 – Surface Preparation of Concrete

1.04 SUBMITTAL

- A. Color chips of finish coatings.

- B. Manufacturer's name and number for each product to be used.
- C. Performance data for substitute products.

D. Color Selection Charts.

E. Disinfection Method

1.05 QUALITY CONTROL

A. The Contractor shall do a complete painting job throughout the work in accordance with these Specifications, the paint manufacturer's current surface preparation and application instructions, and with generally accepted practices for work of high quality.

B. All paints and painting materials not specifically specified shall be high-grade products of nationally known manufacturers of established good reputation, and shall be suitable for the intended use. Materials listed in the painting schedule without reference to a specification number, or materials not further described hereinafter, shall be products that have had a minimum of two years' satisfactory field service.

C. All paint shall be applied under favorable conditions by skilled painters to produce smooth even coatings of all interior and exterior surfaces.

D. Contractor to complete Holiday Detection, for all interior surfaces, in accordance with NACE International RPO188. Three copies of the results, noting any deficiencies, shall be transmitted to the Engineer.

E. Manufacturer's Qualifications:

1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
2. Able to demonstrate successful performance on comparable projects.
3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.

F. Applicator's Qualifications:

1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity of this work.
2. Applicator's Personnel: Employ persons trained for application of specified coatings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The paints to be used in the work shall be products of the Tnemec Company Incorporated of North Kansas City, Missouri or an acceptable equivalent product. The types of paint products to be used in the work shall be identified by the manufacturer's name and/or number and brought to the job site in the original sealed containers of the manufacturer. All paints and paint products used on the project shall be from the same manufacturer.

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B. The products of the manufacturers other than those herein named, which are acceptable equivalents to the products specified, may be substituted, except that, insofar as possible, all paints applied to a surface shall be products of one manufacturer. Data showing equivalent performance of each paint product to be substituted for the ones specified shall be submitted in writing to the Engineer for review at least 30 calendar days before the painting is to begin, and no painting shall proceed until the substituted products have been accepted.

- C. All paints and painting materials not particularly specified shall be high-grade products of nationally known manufacturers of established good reputation, and shall be suitable for the intended use. Materials listed in the painting schedule without reference to a specification number, and not further described hereinafter, shall be products that have had a minimum of two years' satisfactory field service.
- D. All paints shall comply with the latest EPA regulations concerning volatile organic compounds (VOC).

2.02 COLORS AND FINISHES

- A. The colors of finish coatings shall be selected by the OWNER from color chips submitted by the Contractor for review. The color selection shall be in the form of a color schedule indicating the colors to be used on the various surfaces. The colors used in the final work shall be in accordance with the color schedule and shall match the selected color chips.
- B. In order to provide contrast between successive coats, each coat shall be of such tint as will distinguish it from preceding coats.

2.03 STORING AND MIXING

All painting materials shall be stored and mixed in a single place. The Contractor shall not use any plumbing fixture or pipe for mixing or for disposal of any refuse material. The Contractor shall carry to his mixing room all water necessary, and shall dump all waste outside of the structure into a suitable receptacle so as not to create hazards or damage. The Contractor will be held responsible for all damage due to his failure to observe these provisions.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. General: Before any surface is painted, it shall be cleaned carefully of all dust, dirt, grease, loose rust, mill scale, old weathered paint unsuitable for top coating, efflorescence, oil, moisture, or other foreign matter and conditions detrimental to coating bond and life. All necessary special preparatory treatment shall then be applied in strict accordance with the paint manufacturer's written instructions. Where required, imperfections and holes in surfaces to be painted shall be filled in an acceptable manner.
- B. Abrasive Blast Cleaning: All shop-primed steel surfaces shall be cleaned by abrasive blasting to near white metal corresponding to SSPC-SP10 "Near White Metal Blasting" prior to applying any paint to the surfaces. An angular surface profile of 1.5 to 2.5 mils shall be achieved on all abrasive blasted surfaces. Abrasive blasted surfaces shall be painted at the end of each working day and not allowed to remain unpainted until the next working day.
- C. All abrasive blasting work to be conducted on areas not previously abrasive blasted which are adjacent to areas that have previously been blasted and painted shall be done in a

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manner so that a minimum of six (6) inches of the painted surface is removed and will receive a fresh coat of paint at the same time as the newly blasted surface. This method shall be used for all interior and exterior surfaces.

- D. Coordination: Surface preparation and painting shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- E. All surface preparation work shall comply with all NSF/ANSI/CAN Standard 61 and all state and local EPA regulations governing lead based paint removal and the levels of lead and silica to which the public can be exposed.

- F. All internal piping in vaults shall be abrasive blasted to SSPC-SP6 Commercial Blast Cleaning to achieve a 1.5 mil angular anchor profile. All areas of damaged shop primer and bare metal on the exterior shall be prepared accordance with this standard and surface profile as well.
- G. All surface areas found to have contamination or loose primer coating, (visible oil, grease or dirt) shall be spot cleaned to remove contaminants as per SSPC-SP1. Failed or damaged coatings shall be prepared as per SSPC-SP10 (Interior) or SSPC-SP6 (exterior) with a 1.5 mil angular surface profile.
- H. All seams above the waterline on the interior of tanks shall be caulked after painting with SikaFlex 1A.
- I. Slag, weld metal accumulation and spatters not removed by the Fabricator, Erector or Installer shall be removed by chipping and/or grinding. All sharp edges shall be peened, ground or otherwise blunted as required by the Engineer. All grinding and finishing of welds, edges, etc. shall be performed prior to solvent cleaning and abrasive blasting. Welds shall be prepared as per NACE Standard SP0178 for all interior and exterior surfaces:
- 1. Butt Welds:** Shall be ground smooth and free of all defects, designation "D".
- 2. Lap Welds:** Shall be ground smooth and blended., designation "D".
- 3. Fillet Welded Tee Joint:** Shall be ground smooth and blended, designation "D".
- J. Pitted areas on the tank shall be repaired by either filling with Tnemec Series 215 Surfacing Epoxy or by welding. Epoxy filler shall be feathered smooth. Filler shall be applied after primer and prior to the application of the finish coat. No protrusions or spatter will be allowed. Pits equal or greater in depth to one-half (1/2) of the steel thickness shall be filled by welding.

3.02 APPLICATION

- A. Paint shall be used and applied as recommended by the manufacturer without being extended or modified, and with particular attention to the correct preparation and condition of surfaces to be painted.
- B. Surfaces which have been cleaned, pretreated, or otherwise prepared for painting shall be painted with the first field coat as soon as practicable after such preparation has been completed, but in any event prior to any deterioration of the prepared surface.
- C. Unless otherwise specified, stainless steel surfaces throughout the work shall not be painted.

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- D. Hardware accessories, machine surfaces, plates, lighting fixtures, and similar items in place prior to surface preparation and painting, and not intended to be painted, shall be removed during painting operations and repositioned upon completion of each area or shall otherwise be protected.
- E. Paints or other finish shall not be applied to wet or damp surfaces, or when the relative humidity exceeds 80% except in accordance with the instructions of the manufacturer. Exterior painting shall not be done during cold, rainy, or frosty weather, or when ambient temperature or painting surface temperature is likely to drop to 40 degrees F. Painting shall not be done unless the painting surface temperature is at least 5 degrees F above the dew point. Temperature requirements of paint manufacturer are to be observed when minimum is greater than 40 degrees F. Painting of surfaces while they are exposed to the sun shall be avoided.
- F. All paint shall be applied under favorable conditions by skilled painters and shall be brushed or

rolled out carefully to a smooth, even coating without runs or sags. Each coat of paint shall be allowed to dry thoroughly, not only on the surface but throughout the thickness of the paint film before the next coat is applied.

- G. Finish surfaces shall be uniform in finish and color, and free from flash spots and brush marks. In all cases, the paint film produced shall be satisfactory in all respects to the Engineer.
- H. Spraying with adequate apparatus may be substituted for brush application of those paints and in those locations for which spraying is suitable.
- I. The Contractor shall not only protect his work at all times, but shall also protect all adjacent work and materials. Upon completion of the work, he shall clean up all paint spots, oil, and stains from floors, glass, hardware, and similar finished items.

3.03 RATES OF APPLICATION

- A. Paint shall be applied so as to obtain the coverage per gallon and the dry film thickness recommended by the manufacturer or as specified herein. The Contractor shall record, in a manner satisfactory to the Engineer, the quantities of paint used for successive coats on the various parts of the work.
- B. If paints are thinned for spraying, the film thickness after application shall be of the same as for unthinned paint applied by brush. Thinning of paint for spraying shall be in accordance with the paint manufacturer's recommendations. Deficiencies in film thickness shall be corrected by the application of another coat of paint. Excessive application rates will not be allowed. The Contractor shall submit to the Engineer, immediately upon completion of the job, certification from the paint manufacturer indicating that the quantity of each coating purchased was sufficient to properly coat all surfaces. Such certification shall make reference to the square footage figures provided to the manufacturer and the Engineer by the Contractor.
- C. The paint applicator shall have available on the project site a paint film thickness measuring device capable of measuring 0-59 mils with accuracy of $\pm 2\% + 0.1$ mil, operating temperature range 5 degrees C to 50 degrees C and meet ASTM B499 and ISO 2178 specifications. Reference SSPC-PA2 as to how thickness readings should be taken.

3.04 PAINT TYPES AND SCHEDULE

The following types of paints shall be used throughout the work on items and surfaces indicated. All paints and painting schedules shall be in accordance with AWWA D102 (latest revisions).

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- A. External Painting: The Contractor shall furnish all materials and labor to paint the external surfaces of the tank that may need to be touched up including, center riser, support legs, bracing, catwalk, ladder, and any and all exterior metal surfaces on or related to the tank. There shall be no paint applied until the pressure washing is complete and approved by the Owner prior to applying new paint. The painting shall conform to the following:
 - 1. Shop Prime Coat: Apply one coat of Tnemec Series 94-H₂O Hydro Zinc or approved equal, to a minimum of 2.5 to 3.5 mils dry thickness.
 - 2. Field Patch and Spot Prime: Apply one coat of Tnemec Series 91/94-H₂O Hydro Zinc or approved equal to a minimum of 2.5 to 3.5 mils dry thickness.
 - 3. Field Intermediate Coat: Apply one coat of Tnemec Series 73 Endura-Shield or approved equal to a minimum of 2.0 to 3.0 mils dry thickness.
 - 4. Field Finish Coat: Apply one coat of Tnemec Series 700 Hydroflon or approved equal to a minimum of 2.0 to 3.0 mils dry thickness.

5. Logos/Graphics: Apply one coat of Tnemec Series 700 Hydroflon or approved equal to a minimum of 2.0 to 3.0 mils dry thickness.

NOTE: THE EXTERIOR NEW COATING SYSTEM APPLIED SHALL HAVE A MINIMUM DRY FILM THICKNESS OF 6.5 MILS

B. Interior Painting: The Contractor shall furnish all materials and labor to paint the interior of the tank and center riser with a 2 or 3 coat zinc/epoxy system. There shall be no paint applied until the abrasive blasting is complete and approved by the Owner prior to applying new paint. The painting shall conform to the following:

1. Shop Prime Coat: Apply one coat of Tnemec Series 94-H₂O Hydro-Zinc or approved equal, to a minimum of 2.5 to 3.5 mils dry thickness. Maximum coverage rates shall not exceed manufacturer's recommendations. Drying time shall be as indicated on the manufacture's product data sheets.
2. Field Touch-Up and Spot Prime: Apply one coat of Tnemec Series 91/94-H₂O Hydro-Zinc. Maximum coverage rates shall not exceed manufacturer's recommendations. Drying time shall be as indicated on the manufacture's product data sheets.
3. Stripe Coat: Tnemec Series N140-1255 applied to by brush and roller and scrubbed all weld seams. In addition to weld seams, all edges, corners, bolts, rivets, pits shall receive a stripe coat.
4. Field Finish Coat: Apply one or two coats of Tnemec Series 21-WH16 "Off White" Epoxoline or approved equal, at a dry film thickness rate of 12.0-16.0 mils. Maximum coverage rates shall not exceed manufacture's recommendations.

NOTE: THE COMBINED COATS SHALL HAVE A MINIMUM DRY THICKNESS OF 14.5 MILS.

NOTE: AS SPECIFIED ABOVE, MINIMUM DFT IS 14.5 MILS. SPOT PRIMING IS MEANT ONLY TO REPAIR DAMAGED AREAS.

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C. Internal Piping (Ductile Iron Pipe Exterior – Non Immersion): The Contractor shall furnish all materials and labor to paint the piping in the valve vaults. There shall be no paint applied until the abrasive blasting is complete and approved by the Owner prior to applying new paint. The painting shall conform to the following:

1. Surface Preparation: Abrasive Blast to NAPF 500-03-04 producing a 1.5 mil profile. Prior to painting make sure all surfaces are clean and dry.
2. First Coat: Apply one coat of Tnemec Series N69 Hi-Build Epoxoline II (mixed 1 to 1, by volume) or approved equal, to a minimum of 5.0 to 8.0 mils dry thickness.
3. Final Finish Coat: Apply one coat of Tnemec Series N69 Hi-Build Epoxoline II (mixed 1 to 1, by volume) or approved equal, to a minimum of 5.0 to 8.0 mils dry thickness.

NOTE: THE COMBINED COATS SHALL HAVE A MINIMUM DRY THICKNESS OF 10.0 MILS.

D. Internal Piping (**SPECIAL COATING AS SHOWN ON DRAWINGS**): The Contractor shall furnish all materials and labor to paint the piping as indicated to receive the special coating to mitigate condensation or sweating of the piping in the designated valve vaults. There shall be no paint applied until the abrasive blasting is complete and approved by the Owner prior to applying new paint. The painting shall conform to the following:

4. Surface Preparation: Abrasive Blast to NAPF 500-03-04 producing a 1.5 mil profile. Prior to painting make sure all surfaces are clean and dry.
5. Prime coating: Tnemec Series 1224-32GR "Gray" Epoxoline WB primer to a dry mil thickness of 4-8 mils before any rust can form..
6. Stripe Coat: Apply one coat Tnemec Series 1224 "Off White" Epoxoline WB to all welds and hard to reach areas using high quality natural or synthetic bristle brush, to a dry film thickness of 3.0 to 5.0 mils.
7. Intermediate Coat: Tnemec 1224 "Off White" Epoxoline to a dry film thickness of 4.0-8.0 mils.
8. Insulative Coat: Tnemec 971 Aerolon at a nominal coat of 50 dry mils per coat. Two (2) or more coats shall be required to achieve the specified thickness.
9. Finish Coat: Tnemec 1028T at a dry film thickness of 2.0-3.0 mils to desired color to identify pipe.

NOTE: THE COMBINED COATS SHALL HAVE A MINIMUM DRY THICKNESS OF 115 MILS.

- E. The total paint system shall be the product of and be applied in accordance with the recommendations of one manufacturer. Alternate paint systems must be pre-approved by engineer. Contractor shall purchase an adequate amount of touch-up paint, if required.

3.05 CURING FOR INTERIOR PAINTED SURFACE

- A. Drying Schedule @ 30.0 mils wet @ 73° F and 50% relative humidity:

To touch1 Hour

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To recoat
 minimum.....2 Hours
 maximum.....18 hours

Immersion (water)12 hours
 To cure24 hours

- B. Rinse potable water tanks with fresh water before filling to remove any traces of solvent thus assuring coating will not impart taste, odor or color.

3.06 STERILIZATION

- A. The tank structure shall be disinfected at the time of testing by chlorination in accordance with AWWA Specification D105, Disinfection of Water Storage Facilities and Kentucky Regulation 401 KAR 6-015.
- B. Disinfection shall not take place until tank sealant is fully cured (5-8 days at 73ED/50% RH) The tank contractor is to drain and clean all tanks after disinfection. The Owner reserves the right to delay testing and disinfection until water supply is adequate for such major usage.
- C. Acceptable forms of chlorine for disinfection shall be:
 - a. Liquid chlorine as specified in Section 3.1 of AWWA D105
 - b. Sodium hypochlorite as specified in Section 3.2 of AWWA D105
 - c. Calcium hypochlorite (HTH) is not acceptable

D. Acceptable methods of chlorination per AWWA D105

- a. Section 4.1.1
- b. Section 4.1.2 Chemical feed pump only (4.1.2.1)
- c. Section 4.3
- d. Section 4.2 is not acceptable

E. The tank may be sterilized during preloading provided that no leaks are found which would require re-work and re-sterilization

F. Disinfection shall be conducted by use of chlorine or chlorine compounds in such amounts as to produce a concentration of 50 ppm and residual of 25 ppm at the end of 24 hours followed by thorough flushing. Bacteriological testing of the water shall be conducted by the State Department of Health. The tank shall not be placed in service until the sample is approved by the Health Department. All results are to be mailed to the Engineer. All costs of sampling, testing and postage shall be borne by the Contractor.

G. All testing and sampling shall be conducted in the presence of the Engineer or his representative.

3.07 GAURANTY

The Contractor, in signing his proposal, guarantees to repair any and all defects due to workmanship, i.e. sags, drips, cracks, separation or unsuitable material which appear in the structures or coating system during the period of three years after the date of acceptance.

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3.08 CLEANUP

All construction material and debris shall be removed from the site upon completion of work.

- END OF SECTION -

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SECTION 263213 - ENGINE GENERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes packaged engine-generator sets for [**emergency**] [**standby**] power supply with the following features:

1. **Diesel** engine.
2. **Unit-mounted** cooling system.
3. **Unit-mounted** control and monitoring.
4. Outdoor enclosure.

B. See Division 26 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.2 SUBMITTALS

- A. Product Data: For each type of packaged engine generator and accessory indicated.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces as defined by the current edition of the International Building Code (IBC). Include the following:
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
 - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Source quality-control test reports.
- E. Field quality-control test reports.
- F. Operation and maintenance data.

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G. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within **200 miles (321 km)** of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for

intended use.

D. Comply with ASME B15.1.

E. Comply with NFPA 37.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110 requirements for emergency power supply system. I.

Comply with UL 2200.

J. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

K. Noise Emission: Comply with **applicable state and local government requirements** for maximum noise level due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation. **See also definition on Plan E-6.1.**

1.4 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: **Minus 15 to plus 40 deg C.**
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to **1000 feet (300 m).**

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

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1. Warranty Period: **1 year** from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide a comparable product by one of the following:
1. Caterpillar; Engine Div.
 2. Generac Power Systems, Inc.
 3. Kohler Co.; Generator Division.

2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
- C. Capacities and Characteristics:
 - 1. Power Output Ratings: Nominal ratings as indicated per plans.
 - 2. Output Connections: Three-phase, **four** wire.
 - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D. Generator-Set Performance:
 - 1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
 - 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
 - 3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
 - 4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
 - 5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.

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- 6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
- 7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
- 8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

- A. Fuel: **Fuel oil, Grade DF-2.**
- B. Rated Engine Speed: 1800 rpm.
- C. Maximum Piston Speed for Four-Cycle Engines: **2250 fpm (11.4 m/s).**
- D. Lubrication System: The following items are mounted on engine or skid:
 - 1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 - 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature.

Unit shall be capable of full flow and is designed to be fail-safe.

3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: Adjustable isochronous, with speed sensing.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

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I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of **10 feet (3 m)** from exhaust discharge after installation is complete shall be **85 dBA** or less.

J. Air-Intake Filter: **Heavy**-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

K. Starting System: **24 V** electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: **As required by NFPA 110, 10 seconds maximum.**
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.
5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.

a. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for **twenty four (24)** hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.

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B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level [1] [2] system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

G. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush mounting type to suit mounting conditions indicated.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

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1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent

adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding. K.

Subtransient Reactance: **12** percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to **100 mph (160 km/h)**. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

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B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.

2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

C. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available. D.

Convenience Outlets: Factory wired, **GFCI**.

2.9 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: **Bridge-bearing neoprene, complying with AASHTO M 251.** 2.

Durometer Rating: **50**

3. Number of Layers: **Three**

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to **1/4-inch- (6-mm-)** thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.

2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.

3. Minimum Additional Travel: 50 percent of required deflection at rated load. 4.

Lateral Stiffness: More than 80 percent of rated vertical stiffness.

5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

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1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115. 2. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with **elastomeric isolator pads** having a minimum deflection of **1 inch (25 mm)** on **4-inch- (100-mm-)** high concrete base. Secure sets to anchor bolts installed in concrete bases.

D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 23 Section "Hydronic Piping."

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

F. Piping installation requirements are specified in Division 23 Sections. Drawings indicate general arrangement of piping and specialties.

G. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

H. Connect engine exhaust pipe to engine with flexible connector.

I. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

J. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

K. Identify system components according to Division 23 Section "Identification for HVAC Piping and Equipment" and Division 26 Section "Identification for Electrical Systems."

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3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection[**(except those indicated to be optional)**] for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test. 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
 - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
 - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
 - c. Verify acceptance of charge for each element of the battery after discharge.
 - d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding **40-inch wg (120 kPa)**. Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Exhaust Emissions Test: Comply with applicable government test criteria. 8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.

10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at **four** locations **on the property line**, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

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E. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

F. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

G. Remove and replace malfunctioning units and **retest** as specified above.

H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

I. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 263213

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SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes automatic transfer switches rated 600 V and less.

1.2 SUBMITTALS

- A. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
- C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - a. The term "withstand" means "the unit will remain in place without separation of any

parts from the device when subjected to the seismic forces specified **by the current edition of the International Building Code (IBC).**

2. Dimensioned Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based. D.

Field quality-control test reports.

E. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 70.
- D. Comply with NFPA 99.

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E. Comply with NFPA 110.

F. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Contactor Transfer Switches:
 - a. Caterpillar; Engine Div.
 - b. Emerson; ASCO Power Technologies, LP.
 - c. Generac Power Systems, Inc.
 - d. Kohler Power Systems; Generator Division.
 - e. Onan/Cummins Power Generation; Industrial Business Group.
 - f. Russelectric, Inc.
 2. Transfer Switches Using Molded-Case Switches or Circuit Breakers:
 - a. Eaton Electrical Inc.; Cutler-Hammer.
 - b. Schneider Electric, Inc.
 - c. Hubbell Industrial Controls, Inc.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system

transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

- B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 - 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
- C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric motor-operated mechanism, mechanically and electrically interlocked in both directions.

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- F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - 1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
 - 2. Switch Action: Double throw; mechanically held in both directions.
 - 3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
- G. Neutral Switching. Where four-pole switches are indicated, provide **overlapping neutral contacts**.
- H. Neutral Terminal: Solid and fully rated, unless otherwise indicated.
- I. Oversize Neutral: Ampacity and switch rating of neutral path through units indicated for oversize neutral shall be double the nominal rating of circuit in which switch is installed.
- J. Battery Charger: For generator starting batteries.
 - 1. Float type rated **10 A**.
 - 2. Ammeter to display charging current.
 - 3. Fused ac inputs and dc outputs.
- K. Enclosures: General-purpose NEMA 250, Type **12**, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
- C. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.

D. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.

E. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase.

F. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated.

G. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer.

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H. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts

down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5- minute cool-down period. Exerciser features include the following:

- a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
- b. Push-button programming control with digital display of settings.
- c. Integral battery operation of time switch when normal control power is not available.

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2.4 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details and per the current edition of the International Building Code (IBC).
- B. Floor-Mounting Switch: Anchor to floor by bolting.
 1. Concrete Bases: **4 inches (100 mm)** high, reinforced, with chamfered edges. Extend base no more than **4 inches (100 mm)** in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Division 26 Section "Hangers and Supports for Electrical Systems."
- C. Identify components according to Division 26 Section "Identification for Electrical Systems." D.
Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.

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3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
 - a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
 5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source. c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
 - f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool down and shutdown.
 6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Remove and replace malfunctioning units and retest as specified above.
- F. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect

significant deviations from normal values. Provide calibration record for device.

TRANSFER SWITCHES 26 36 00 - 6
26 36 00

3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 01 Section "Demonstration and Training."
- B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

FUTURE 50'X72' MAINTENANCE BUILDING
10" BACKWASH PIPING

6" RAW WATER
8" CLEARWELL DRAIN

2" PVC HOLDING
TANK DISCHARGE

20 0 20 40

SCALE: 1"=20'

N2°

Project No.

SANDYHOK 19003

Date 05/2022

Dwg. No. AD1-1



DISTRICT *Serving Our Community*

CONTRACT 12 -

WATER WTP C-1-05
REVISION

W/L
W/L
W/L
W/L

CONNECT TO EX. 6"
PVC WATER MAIN
INSTALL 6" TAPPING
SLEEVE & VALVE

W/L W/L W/L W/L L W/L W/L L W/L W/L L

W/L (4) 10" GATE VALVES & BOX
6" PVC SDR-17
TO DISTRIBUTION
SYSTEM

10" FINISHED WATER

W/L
W/L
L=158.86, R=598.41
Δ=15.2102

BOX
(3) 8" X 6" REDUCER

(3) 6" GATE VALVES &

(2) 10" GATE VALVES W/ PRECAST CONCRETE VALVE VAULT
NEW 57'X81' WTP BUILDING

EL. 712.00 ~~EL. 712.00~~

INSTALL 24 '
SLIDING GATE
20 0 20 40 SCALE: 1"=20'

Project No.



WATER DISTRICT *Serving Our Community*

SANDYHOK 19003
CONTRACT 12 -

1.5" SURFACE COURSE

2.5" BASE COURSE

6" CRUSHED STONE BASE (CSB)

ENTRANCE PAVEMENT DETAIL

NOT TO SCALE
STAPLE
(2 PER BAL

NOTE:

1. ENTRANCE PAVEMENT DETAIL SHALL BE FOR ACCESS FROM HOWARDS CREEK ROAD.
2. WTP SITE PAVEMENT SHALL BE 6-INCHES OF CRUSHED STONE BASE (CSB).

WOOD O
METAL STA
(2 PER BAL

VARIES

Project No.

SANDYHOK 19003

Date 05/2022

Dwg. No. AD1-3



WATER WTP SD-0-02
REVISION

DISTRICT *Serving Our Community*
CONTRACT 12 -

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MIN.
3'-6" 2"

C O RP WC AB C A EL C R R U F RP R T E DP LE M ET ON R R P E M L W OD G R P T LL O A O RP U D EB

Project No.

SANDYHOK19003



WATER

DISTRICT *Serving Our Community*
**CONTRACT 12 -
WTP SD-0-02
REVISION**

Date 05/2022

Dwg. No. AD1-4