FORT FISHER AQUARIUM - ADDENDUM #3 SPEC CHANGES

Spec Section	Subsection	Changes
055213 - Pipe and Tube Railings	**1.2 Summary**	Added new item: **"Exterior aluminum illuminated handrails."** This type of handrail was not included in the original specification.
	2.2 Handrails	Added new subsection **C – Illuminated Handrail**, with detailed requirements for integrated LED lighting systems:
	2.5 Aluminum Railings (New Section)	Entirely new section added. Specifies materials, alloys, and standards for aluminum railings:
	2.7 Fasteners (Renumbered)	Added note distinguishing fasteners for **aluminum railings**: must be stainless steel, Type 304 or 316, to prevent galvanic corrosion.
	2.9 Fabrication (Renumbered)	Added coordination note to match **finish of illuminated aluminum railings** with other metal finishes.
075423 SF - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING	**1.2 – Performance Requirements**	Added new requirement: "Meet NCSBC requirements for wind uplift." Existing Solar Reflectance Index and Energy Performance requirements remain unchanged.
	3.1 – Insulation Installation	Section title modified from "Insulation Installation" to "Insulation Installation (Adhered)" to clarify installation method. No additional technical text added or removed.
088000 SF - GLAZING	**2.2 Materials**	Simplified and consolidated glass types: removed separate listings for *ultra-clear low-iron float glass (Q5)* and *patterned glass*. Retained only one universal specification: *Float Glass, ASTM C1036 Type I, Quality Q3, Class I.*
	2.4 Insulating-Glass Types	Changed the description for the **Outdoor Lite** from "GL-1 with VE85 on surface #2" to "GL-1 with low-e coating on surface #2." This removes the specific product (VE85) reference and allows for generic low-e glass coatings.
100000 – Miscellaneous Specialties	**2.5 Toilet Compartments**	Added new design and hardware requirements:
		– Provide **Extra Privacy panels** 71½ inches high, mounted 4 inches above floor.
		– Add **continuous aluminum door strikes** the full length of each door.
		– Include **occupancy indicator** on each latch.
	2.8 Expansion Joint Covers	Increased joint design width from **1 inch to 2 inches**.
		Changed model numbers from **C/S VF-100** to **C/S VF-200**.
		Added new fire-rated option: **Construction Specialties VFR-200**.
		Updated gypsum board cover model from **ASM-100** to **ASM-200** to match width change.
170010 – General Provisions	**1.1 Summary**	Expanded scope to include **chemical systems** along with saltwater and freshwater systems.
	1.1 B – Automated Controls Supplier (ACS)	Added detailed responsibilities for the **ACS**, including installation of indicators, transmitters, and devices related to life support system monitoring.
	1.1 D – Testing Laboratory Requirements	Added new section requiring that **equipment be listed or labeled** by an approved **Nationally Recognized Testing Laboratory (NRTL)** such as CSA, ETL, or UL, accredited by the **North Carolina Building Code Council (NCBCC)**.
	1.1 F – Pressure Testing	Added detailed coordination requirements for **pressure testing procedures** across systems and trades.
	1.1 I – Contractor Prepared Drawings	Added requirement for **contractor-prepared coordination drawings** for system installation.
	1.1 J – Startup Operations	Added new section defining startup and commissioning steps including pump rotation checks, calibration, and turnover procedures.
	1.1 L – Technical Seminars	Added requirement for **technical training sessions** by manufacturers for Owner and facility staff, covering up to eight key life-support system components.
	1.2 General Arrangement Drawings	Added new section defining **contractor responsibilities** for coordination with civil and structural drawings, field fitting, and conflict resolution.
	1.3 Definitions and Standards	Added definitions for **"Provide," "Typical," and "Or approved equal"** and included a list of reference standards (ANSI, ASTM, AWWA, NFPA).
	1.4 Codes, Permits, and Inspections	Added detailed requirement for the **contractor to obtain and pay for all permits** and to provide signed inspection certificates.
	1.5 NIC Work	Added definition of **Not in Contract (NIC)** work and coordination requirements.
	1.6 Owner-Furnished Equipment	Added procedures for **delivery, inspection, and installation coordination** of Owner-furnished items.
	1.7 Quality Assurance	Added new section specifying **labor, material, and warranty** quality standards, including conflict resolution between drawings and specifications.
	1.8 Submittals and Approvals	Added submittal timing requirements and procedures for **approval coordination**, including contractor accountability for errors.
	1.9 Shop Drawings	Added **Level of Development (LOD 300/400)** requirements and **digital submission standards**.
	1.10 Record Drawings	Added **photo documentation requirement** for buried piping and concealed systems.
	1.11 Electronic Documents	Added clause stating **printed documents take precedence** over digital versions and limiting use of design files.
	1.12 Delivery, Storage, and Handling	Added protection requirements for **UV exposure, above-ground storage, and handling of pipe materials**.
	1.13 Guarantee of Materials and Workmanship	Added **minimum 1-year guarantee** requirement with OSHA compliance language.
	1.14 Maintenance and Operation Data Manual	Added detailed **O&M manual format and content requirements**, including electronic submittal limitations (≤10 MB per file).
	3.1 General Installation of Piping	Added new tolerances for **buried pipe elevations (≤25% of pipe ID variation)**, continuous slope requirements, and temporary supports.
	3.3 Cutting and Patching	Added requirement for **water-stop flanges** in hydraulic walls and clarified when **Link-Seal** may be used.
	3.5 Safety and Protection	Added section mandating compliance with **OSHA standards**, installation of **drive guards**, and **impact padding** in work zones.
170024 FRP Filters	**1.1 C – Port Locations**	Added detailed subdivision: small (< 48") filters ports in sidewall; large ≥ 48") filters must have top-center inlet and lower-side outlet — "no exceptions."
	1.2 B – Design criteria	Added explicit design criteria: 75 psi for REC & FMU filters; 50 psi for recirculation; test pressure = 1.1 × design for 4 hours; max strain 0.001; min burst = 4 × design; negative = 5 in Hg.
	1.5 Submittals	Consolidated and reordered into numbered sub-items (1–7 for pre-fabrication and 1–4 for post-fabrication). Warranty moved into subsection C.
	1.5 Post-fabrication docs	Same requirements retained but re-sequenced and clarified; added phrase "on manufacturer's letterhead or signed by PE."
	2.1 A – Usage	Condensed to two sentences referencing sand and carbon media only.
	2.1 N – Manufacturers	Updated to LS9.01, LS9.02, and LS9.03 for accuracy.
170028 Modular Drum Filters	**1.1 – Usage**	Added clarification that the drum filters are used not only for *backwash water* but also for *exhibit water*.
	1.2 – General	Added requirement that delivered products must conform to specified controls requirements.
		Added a new item "Each self-backwashing drum filter shall be delivered in a modular self-standing housing."
		Reordered and renumbered subparagraphs for clarity.
		Added requirement that controller must include an Ethernet port for LSS ACS connection.
		Added a new paragraph (H) requiring the contractor to arrange a *technical seminar* by the manufacturer or factory distributor for owner training.

	1.4 – Coordination	Added new item (A) requiring coordination with *construction of concrete reservoir basins* for fit of drum filters.
		Clarified that the *main disconnect switch* must be provided *by the Contractor* (instead of being "per electrical plans").
		Removed the optional note about 120 VAC special order.
	1.6 – Submittals	Added clarity in item H referencing that the letter from the manufacturer must be signed by *senior personnel* and printed on *company letterhead* .
	1.8 – Warranty	Increased warranty period for all components (external, screens, internal components, booster pump, accessories) from **1-year** to **2-years**.
	2.2 – System Components	Added specific enumeration of sub-items under "Materials" (Tank Housing, Drum Frame, Cast Alloys, etc.).
	2.4 – Manufacturer	Expanded "Alternate Manufacturers" section:
		– Added explanation that selection of alternate units may require adjustments to *Aquarium structure, pipe routing, and power supply* .
		– Stated that contractor is responsible for coordination and space/power accommodations.
		– Added note that alternate manufacturers may not have off-the-shelf sizes as on drawings.
170032 Bag Filters	**2.2 A – Design**	Added requirement: *"Provide flanged bags with molded-in handles."* This improves ease of removal and handling
	2.2 B – Bag Filters	• Added new bag size: *7-inch × 16-inch* (in addition to 7 × 32 in).
		• Added note: *"Refer to schedule for sizes."*
		• Maintains polypropylene construction but now explicitly covers multiple filter lengths
	2.2 C – Performance	• Flow rate reduced from 16 GPM to 10 GPM.
		• Pressure-drop criterion changed from "< 0.4 psi at 16 GPM" to "allow for functional operations at 10 GPM."
	2.2 E – Suppliers	• Re-ordered and expanded approved list: now lists Hayward → Aquatic Eco-Systems → 3M → or approved substitute (previous document listed 3M first).
		Ensures 3M filters are still acceptable but clarifies preferred vendor order
170035 Cartridge Filters	**1.1 Usage**	Removed Tag No. **LCR-FGN001-001 Live Coral Flexible Cartridge Filter Housing** and its description from scope — this filter is no longer included in the project. Only Tag No. **HTT-FCRT01-001 Holding Touch Tank / Carbon Cartridge Filter** remains in the specification.
	3.1 Installation	Deleted reference to "**Part 3 – (blank)**" and renumbered execution section correctly. No additional installation requirements added or removed beyond the renumbering. Technical content otherwise unchanged.
170062 Sand Media	**1.1 Usage**	Added explicit reference to **pressure-vessel filters** and defined three use cases: (1) support media with #20 fine sand top layer, (2) support media with glass top layer (Section 170063), and (3) support media with carbon top layer (Section 170072).
	1.2 General & Quality Control	Added specific quality-control standards: **Federal SS-C744a**, **ASCE Manual of Practice No. 13**, and **AWWA B100**; introduced detailed **soundness test** requirement limiting weight loss to 5 % after 20 cycles and added hardness/toughness criteria.
	1.3 Referenced Standards	Expanded list to include **API Recommended Practices RP 56** for hydraulic-fracturing sand testing, in addition to AWWA B100, ASCE 13, and SS-C744a.
	2.1 General Materials	Added requirement that **media must be free of iron or manganese compounds** and that **angularity, sphericity, and roundness** be determined using the **API Frac-Sand Roundness Chart (Fig. 5.1)**.
	2.2 Support Gravel	Added quantitative physical properties: roundness ≥ 0.4, sphericity > 0.5, specific gravity ≥ 2.60; not more than 25 % fractured faces; ≤ 2 % flat/elongated pieces; ≤ 1 % foreign material; acid solubility ≤ 10 %.
	2.3 Support Sand Media	Introduced explicit **chemical composition** (≥ 90 % SiO_2, ≥ 85 % quartz, ≤ 15 % feldspar) and **gradation ranges**: #16 sand (0.59–0.71 mm, UC ≤ 1.6) and #10 sand (1.5–2.0 mm, UC ≤ 2.0); acid solubility limit ≤ 5 %.
	2.4 Top Filter Sand Media	Added requirement for **crushed-rock angular particles** (roundness ≤ 0.5, sphericity > 0.5); defined gradation range for #20 media (0.45–0.55 mm, UC 1.35–1.70); set composition (≥ 60 % quartz, ≤ 35 % feldspar, ≤ 5 % others); specified acid solubility ≤ 5 % with defined test procedure (40 % HCl at 65–75 °F for 24 h).
	2.5 Top Filter Glass Media	Added cross-reference: "See specification Section 170063."
	2.6 Top Filter Carbon Media	Added cross-reference: "See specification Section 170072."
	3.2 Installation of Gravel and Support Sand Layers	Added requirement for **initial backwash** before gravel placement and inspection of lower laterals after backwash; emphasized avoiding fine material around lower distributor and preventing sand migration into gravel.
	3.3 Installation of Top Sand Layer	Added detailed **backwash procedure**: initial rate ≤ 2 gpm/ft², increase gradually to specified rate for ≥ 5 min; optional scour rate 18 gpm/ft²; requires post-backwash inspection and top-off of final layer.
170063 Glass Media	**2.3 Top Crushed Glass Filter Media**	Added specific **supplier list** identifying Lincoln Equipment Inc. (Portland, OR) and Trivitro Corporation (Seattle, WA) as reference sources, with allowance for *approved substitute* . This information was not included in Document 1.
170072 Carbon Media	**2.3 Top Crushed Glass Filter Media**	Added explicit **gradation and performance data table** for top crushed glass: *Effective Grain Size 0.45 mm – 0.55 mm; Uniformity Coefficient 1.35 – 1.70; Comment – Angular* . This defines filtration range not previously stated.
	1.1 Usage	Added two specific application types for carbon media: (1) *Incoming water filters loaded with Carbon Media* and (2) *Pressure filters for quenching dissolved ozone loaded with carbon media.* This clarifies where the carbon media is used.
	1.5 Submittals	Expanded list of required submittal data to include: *Iodine number, mesh size (% greater and less), mean particle size, apparent density, and monochloramine removal efficiency.* These parameters were not previously required.
	2.1 GAC Carbon Media (Coconut Shell)	Added specific **performance criteria**: GAC must be *"surface activated"* and capable of removing at least *75% monochloramine* with *10-minute contact time.*
	2.1 GAC Carbon Media (Coconut Shell)	Added **product composition limits**: Iodine number ≥ 975 mg/g, size range 20×50 mesh (preferred) or 12×40 (optional), apparent density 0.49–0.60 g/cc, and ash ≤ 2%. These quantified specifications were not present before.
	2.1 Standards	Added requirement that media must meet **Food Chemical Codex**, **AWWA B604-9**, **NSF/ANSI 61**, **WQA Gold Seal**, and **Prop 65** compliance for drinking water applications. These standards were not included in the prior version.
	2.1 Cleanliness	Added requirement that media be **pre-moistened and acid-washed** to eliminate dust and fines.
	2.1 Suppliers	Added approved supplier list: *Resintech, American Activated Carbon Corp., Carbon Activated Corp., and PureWater.* This list did not exist in the previous version.
	3.1 Installation – Safety & Health	Added explicit **safety note** on oxygen depletion hazard from wet activated carbon and requirement to follow *low-oxygen work procedures* per MSDS.
	3.1 Installation – Washing Media	Added requirement to **thoroughly wash media prior to placement** to remove all fine material and dust.
170088 Aeration Tower Packing Media	**1.1 Summary**	Added specification that **random packing** is also installed in *biomedia chambers such as biomedia boxes in reservoirs and CTF, LPS, PRC, and WSD towers* . Expands list of application locations.
	2.1 Random Biomedia – Usage	Clarified that **packing is used in filtered aquarium saltwater trickling chambers** for nitrification and bubble reduction. Text now explicitly defines performance intent.

	2.2 Structured Tower Packing Media – Performance Criteria	Added detailed numerical criteria: **Void space > 95 %**, **specific surface area > 67 ft²/ft³**, **corrugation angle 30°**, **sheets per ft = 26**, **mixing points > 2,400 per ft³**, **sheet thickness 10 mil**, **height 11.8 – 12 in.** and identified **Brentwood CF 1200 or substitute**. These quantitative values were not included before.
	2.2 Structured Tower Packing Media – Material Properties	Added mechanical property requirements referencing **ASTM D638/D882, D790, D4226, D648** with numerical minimums for tensile, flexural, impact, and heat-distortion strength. Defines measurable structural standards.
	2.3 Cellular Type Drift Eliminators – Design Criteria	Added detailed **cell and material data**: *Unit Depth 5.25 in. , Cell Size 0.86 in. (0.80 – 1.0 in. alternates) , Material Gauge 13 mil – 20 mil (15 mil optional)* ; limits drift loss to **≤ 0.0005 % recirculation** verified by **CTI STD-140 or EPA Method 13 A**.
	2.3 Cellular Type Drift Eliminators – Manufacturers	Added approved products: **Brentwood CFUltra or CF80Max**, with optional alternates **Koch-Glitsch** and **Sulzer Chemtech USA Inc.** Prior version did not list specific models or alternates.
	3.1 Installation – Random Biomedia	Added placement criteria: compare each shipment to approved sample; reject material with flash or broken pieces;**avoid dropping from height**, **dump gently**, and **rake for level surface**.
	3.1 Installation – Structured Packing	Added explicit requirements: install **two perpendicular layers**, **¼-inch clearance** from vessel wall, **remove trimmings**, and **install protective grid** above top layer.
	3.1 Installation – Drift Eliminators	Added full installation sequence: precise **cutting tolerance ≤ ¼ in.**, **prevent debris from falling into media**, **orient perpendicular to FRP supports**, **prohibit walking on modules**, and **require protective grid if foot traffic expected**.
170107 Current Effects Flow Generators	**1.2 Quality Assurance**	Added requirement that **pumps and motors shall be preassembled at the factory** to ensure quality control and assurance.
	1.3 Coordination	Revised mounting requirements: replaced magnetic mount option with directive to use **adjustable in-tank mounts for all submerged units**, eliminating reliance on magnetic mounts.
	1.4 Submittals	Added requirement to **submit mounts and hardware for each tank location** to verify compatibility with installation.
	2.1 Current Effects Generators – Alternate Manufacturers	Added detailed paragraph stating that **alternate manufacturer selections must not compromise specifications** and may require contractor coordination for **physical space and alternate electrical requirements**. Any modifications required to accommodate alternates are the **contractor's responsibility**.
	3.1 Installation	Added explicit instruction to **mount with titanium adjustable pipe mount** to secure the Abyzz AFC mount underwater for **stability and adjustability**.
170110 Chemical Metering Pumps	**1.2 General Requirements – Codes and Testing**	Added explicit requirement for **Testing Laboratory accreditation** under the **North Carolina Building Code Council (NCBCC)** for electrical and mechanical equipment labeling.
	1.2 General Requirements – Testing Agencies	Expanded list of acceptable testing laboratories to include **Intertek Testing Services (ITS-ETL)** and clarified that **NSF International and other research labs** may be accepted depending on the "equipment category."
	1.2 General Requirements – Compliance Responsibility	Added that the **supplier** is fully responsible for compliance with testing and listing requirements; any required **field approval** must be completed without project delay or added cost to the Owner.
170114 Submersible Pumps	**New Spec Section**	
170120 Horizontal FRP Pumps	**1.2 Codes**	Added new paragraph specifying **Testing Laboratory Requirements**: All electrical and mechanical equipment must be listed by a laboratory accredited by the **North Carolina Building Code Council (NCBCC)**. Accepted agencies include **CSA, ITS-ETL, and UL**. The supplier/manufacturer is fully responsible for compliance, and field approvals must be done at no cost to the Owner.
	1.4 Submittals	Added requirement to submit **proof of approved testing agency listing mark or classification markings** for all installed electrical equipment.
	1.4 Submittals	Reorganized content for clarity but maintained all existing submittal categories; no items removed.
	1.9 Manufacturer	Clarified manufacturer reference to "Fybroc, CECO Environmental" but kept all model series the same.
170129 Small Composite Pumps & Controllers	**1.5 Submittals**	Added new requirement: **"Submit proof that installed electrical equipment will bear approved testing agency listing mark or classification markings."** This confirms compliance with testing standards not previously specified.
170130 Large and Medium ESC Pumps	**1.1 Summary**	Expanded scope to include **all 480V, 3-phase pumps** listed on the schedule instead of only "Genesys" and "Advanced" models. Applies the same performance criteria but broadens coverage to other manufacturer models.
	1.3 Submittals	Added new requirement to **submit proof of approved testing agency listing mark or classification markings** for all electrical equipment.
	1.3 Submittals	Added requirement for **grounding VFD product data** and for **listing modifications required for alternate manufacturers**.
	1.4 Quality Assurance	Added **factory preassembly requirement** to ensure pump/motor fit before delivery.
	1.4 Quality Assurance	Added **Testing Laboratory Requirements** mandating that electrical/mechanical equipment be listed by an **NCBCC-accredited lab** (CSA, ITS-ETL, or UL). Supplier responsible for compliance; field approval at no cost to Owner.
	2.1 Large Non-Metallic Close-Coupled Pumps	Retained same MDM "Genesys" pump basis but added **Alternate Manufacturer** option and defined **contractor responsibilities** for structural, piping, and electrical modifications when alternates are used.
	2.1 Large Non-Metallic Close-Coupled Pumps	Added requirement that **one spare pump** must be provided for each model/impeller trim smaller than 10 hp.
	2.2 Medium Non-Metallic Close-Coupled Pumps	Retained MDM "Advance" basis but added **Alternate Manufacturer** clause with same coordination and spare pump requirements as above.
	3.1 General Installation	Added requirement for **Contractor modifications** when alternate manufacturer is selected to ensure complete functional installation.
	3.1 General Installation	Consolidated **Genesys** and **Advanced** installation procedures under one section; deleted separate installation subsections. Requirements for HDPE baseplate, stanchions, and SS anchors retained under new subsections (H and I).
170138 Magnetic Drive Pumps	**1.3 Quality Assurance**	Added new requirement that **pumps and motors must be preassembled at the factory** to ensure proper fit before delivery.
	1.3 Quality Assurance	Added **Testing Laboratory Requirements** specifying that all electrical and mechanical equipment must be listed by a laboratory accredited by the **North Carolina Building Code Council (NCBCC)**. Acceptable agencies now include **CSA, ITS-ETL, and UL**. Supplier is responsible for compliance; field approvals must be completed at no cost to the Owner.
	1.4 Submittals	Added requirement to **submit proof that all installed electrical equipment bears an approved testing agency listing mark or classification markings.** This was not included in the previous version.
170140 Electric Valve Actuators	**1.3 Quality Control**	Added **Testing Laboratory Requirements** specifying that all electrical and mechanical equipment must be listed by a laboratory accredited by the **North Carolina Building Code Council (NCBCC)**. Acceptable agencies include **CSA, ITS-ETL, and UL**. Manufacturer/supplier responsible for compliance; field approvals must be completed at no cost to Owner.
	1.4 Submittals	Added new requirement to **submit proof that all installed materials will bear approved testing agency listing mark or classification markings.**
		Expanded **motor actuator design requirements** with new quantitative and qualitative details:
		– Housing now specified as aluminum, carbon steel, ductile iron, or composite non-metallic, rated NEMA 4.
		– Torque rating must be at least **25% greater** than calculated torque.
		– Coating system defined: zinc primer + acrylic/polyester UV topcoat (epoxy not recommended).

	2.1 Motor Actuators for Butterfly Valves	– Mounting blocks required to be **Type 316 stainless steel.**
		– Gearing must use **hardened steel or bronze** (aluminum or plastic gears not acceptable).
		– Added **permanent molybdenum grease lubrication** requirement.
		– Added **manual override handwheel design** to be clutch-free with position indicator.
		– Added **over-torque protection** and **internal heater** requirements.
		– Defined **motor duty**: continuous 15-minute duty, Class F insulation, UL/CSA/FM labeled, thermal overload protection at 275°F.
		– Defined **rotation time (≤30 seconds)** and **adjustable motor speed (6:1 turndown ratio).**
		– Added independent limit switches for open/close positions and stainless steel external hardware.
	2.2 Motor Actuators for Reversing Two-Way Ball Valves	Added detailed product specifications:
		– Housing must be non-metallic composite or cast aluminum, NEMA 4X rated, with O-ring seals.
		– Motor duty defined as **25% duty cycle at 10-second intervals.**
		– Added heater requirement for condensation protection in metal housings.
		– External hardware must be 300-series stainless steel.
		– Actuator must have **manual override** (hex socket or spinner wheel).
	3.1 Installation	Added new requirement that **electrical equipment must conform to approved testing laboratory listing** and bear certification labeling.
		Clarified **support installation criteria** for oversized actuators to prevent deflection and added requirement to correct deflection immediately at no cost to Owner.
170142 Butterfly Valves	**1.2 Coordination**	Deleted requirement to "verify mating of valves to flanges" with flange modification details (previously listed subpoints 1–2). Retained only coordination note for actuators and lug style selection.
	1.2 Coordination (C)	Simplified lug coordination list – removed "heat exchanger influent and effluent" and added "UV sterilizer influent and effluent."
	2.1 General Material Requirements (A)	Reformatted coating systems—removed detailed coating brands (Carboline, Porter, International Protective Coatings references) and simplified to general coating categories; no new coating types added.
	2.3 Remote Operators (A)	Deleted detailed three-part selection guidance for operator type (dry location/ wet location / elevated height) and kept only summary instruction to provide extensions where needed.
	3.1 Installation (K)	Added sub-requirements for fasteners:
		– Nuts may be bronze to prevent galling.
		– Require flat washers under all bolt heads and lock washers under nut side.
		– Threads of bolts to be lubricated with grease or anti-seize compound.
		– Threads must extend fully through lug for dead-end installations.
	Throughout Part 3 – Execution	Added emphasis that **excessive deflection in extensions must be corrected immediately at no cost to Owner.**
	General Update	All references to specific coating manufacturers or product names were removed for generality; no new performance or testing requirements added.
170144 Ball Valves	**2.2 PVC/CPVC Two-Way Ball Valves**	Deleted detailed component list and end-of-service valve note ("Provide 'Single Entry' or 'Utility' (non-true union) ball valves at vent and drain lines"). Retained only general description of 2-way valves with PVC/CPVC body, Teflon seats, and Viton or EPDM seals rated 150 psi @ 75 °F. Removed explicit size limit (≦ 2 in.) and manufacturer list.
	2.3 PVC/CPVC Flow Control (Linear Flow) Ball Valves	Deleted list of detailed valve body features (true-union, full-port, full-sphere ball) and manufacturer references. Retained only core functional and material description (150 psi rating, PVC/CPVC body with Viton or EPDM seals and Teflon seats).
	2.4 PVC Lab Cocks & Gauge Cocks	Retained same functional requirements but simplified title ("PVC PVC Lab Cocks & Gauge Cocks" → "PVC PVC Lab Cocks & Gauge Cocks"). No dimensional changes to connections (¼-in.).
	2.5 Stainless Steel 3-Piece Ball Valves	Deleted detailed manufacturer list and explicit references to product series (Swagelok Series 63, Worcester Mizer, Neles-Jamesbury Series 3, Apollo 3-Piece). Material requirements (316 SS body and trim, Teflon or graphite packing, 150 psi rating) unchanged.
	Part 3 – Execution (3.1 Installation)	No changes to installation procedure or technical criteria. All flow-direction and support requirements unchanged.
170146 Globe Valves	**2.1 PVC Globe Valves – Manufacturer List**	Removed all specific manufacturer listings. The previous version listed: ASAHI/AMERICA, Hayward Industrial Products Inc., and Spears Manufacturing Co. The revised document deleted these names, leaving only "Manufacturer:" without details.
	3.1 Installation – Fasteners	Entire **Fasteners subsection** (requirements for 316 SS bolts, bronze nuts, washers, and anti-seize compound) was **deleted** from the revised version. The section now includes only general installation requirements and the strain/deflection clause.
170148 Diaphragm Valves	**2.1 C – Pressure Rating**	Added specific rating requirements: (1) Valves used in sludge and vacuum service must include options for vacuum service. (2) Minimum positive pressure rating of 75 psi. These were not listed in Document 1.
	2.1 F – Manufacturers	Added complete manufacturer list with contact details: ASAHI/AMERICA; GF Piping Systems; and Hayward Flow Control. Previously, this section was blank.
	2.1 F – Approved Products	Changed language from "approved substitute" to "approved equal." This aligns with standardized specification terminology.
170155 Check Valves	**2.1A Check Valves 2.5-Inch Diameter and Larger**	Deleted all detailed performance criteria including pressure ratings (150 psi @ 70°F for≤8" and 85 psi for ≥10"), flow coefficients (Cv values for sizes 3"–10"), and spring/closure requirements. Removed material listings (PVC body, Viton/EPDM seals, Hastelloy or Inconel spring) and manufacturer list (Hayward Flow Control, ASAHI/AMERICA). Retained only the base description: "Wafer, swing-type check valve manufactured of PVC."
	2.1B Check Valves Two-Inch Diameter and Smaller	Removed "Y-type" valve specification, minimum Cv value, and statement that "ball-type check valves are not acceptable." Removed multiple manufacturer options; retained only "Clear plastic valve, true-union end connections, with EPDM seals. 'Swing Check' design with weighted disc and no internal spring. By Spears Manufacturing."
	3.1 Installation	Deleted all **fastener specifications**: 316 SS hex-head bolts, bronze nut option, flat and lock washer requirements, and anti-seize compound use. Retained only general installation instructions and spacing requirements for valve placement relative to pumps.
170157 Needle Type Valve	**2.1 Stainless Steel Needle Valves (C)**	Deleted detailed flow range specifications (previously listed five flow-rate categories from 37 SCFH to 650 SCFH with valve model numbers, orifice sizes, and Cv values). The revised version retains only general sizing and coordination requirements without performance data or model listings.
	2.1 Stainless Steel Needle Valves (E)	Retained manufacturer "Whitey Company (Swagelok)" but deleted detailed model references ("1," "6N," "18," and "12N") associated with each flow range.
170220 PVC.CPVC Pipe and Fittings	**1.3 B – Submittals**	Added requirement to **submit concentric flanged FRP composite reducer fittings**.
	2.2 D – PVC Fittings	Added full technical details describing base material, self-supporting design, molded/fabricated construction, and ASTM identification requirements. These criteria were not included in Document 1.
	2.2 E – PVC Fittings Manufactured by	Added explicit **manufacturer list** (Dura Plastic, Chemtrol /Nibco, George Fischer Harvel, Spears Manufacturing, Eslon Thermoplastics**) instead of blank placeholder in Document 1.
	2.2 G – Special Fabricated Fittings	Added nine sub-clauses detailing U.S. material origin, pressure rating (90 psi @ 73°F), socket interference fit (ASTM D2466/D2467), fabrication tolerances (±1°), bonding methods (Weld-On 811 or equivalent), QA testing requirements, and marking requirements. These specifications were absent previously.

	2.6 E – Full-Circle Stainless Steel Repair Clamps	**Deleted entirely**; repair clamps no longer permitted for standard construction and moved to restricted use within Document 1 only.
	2.6 E (Renumbered to 2.6 E Bulkhead Fittings)	Removed section on "Full-Circle Stainless Steel Repair Clamps"; bulkhead fittings section now immediately follows telescoping expansion joint requirements.
	2.6 E – Bulkhead Fittings (Tank Adapters)	Simplified manufacturer list (removes Smith-Blair, Baker, Straub references and limits to Spears, Harrington, Hayward, Ryan-Herco**).
170233 Compressed Air Piping	**1.1 Usage**	Added clarification describing where non-metallic compressed air piping is used: *"LSS back areas, near or below saltwater, and other locations where plastic compressed air piping is called for on the Drawings."*
	1.1 Usage	Added instruction to use **copper piping** (per Section 170206) for compressed air service between ozone air compressors, air receivers, and air filters where "CU" piping is noted on Drawings.
	2.1 Distribution Pipe & Fittings	Added full list of **three approved system types**: (1) fusion-welded HDPE, (2) solvent-welded ABS, and (3) push-to-connect ABS.
	2.1 Distribution Pipe & Fittings	Added **detailed performance data** for each system option:
		– HDPE: rated to 230 psi, color-coded blue.
		– ABS cement-joined: 145 psi @ 73°F, color-coded, with specific manufacturers (ASAHI/AMERICA, Ryan Herco, IPEX, Chemtrol/NIBCO).
		– ABS push-to-fit: 145 psi @ 73°F, color-coded green, with collar-tool disconnection requirement.
	2.2 Leader Piping	Added **metallic piping requirement** for leader sections upstream of plastic piping. Specifies use of **Schedule 10 Type 316 Stainless Steel**, minimum 10-ft length for heat dissipation, and **ASTM A312 / ASME SA312** compliance.
	2.2 Leader Piping	Added detail allowing **threaded 316 stainless steel fittings** where flanges are not required.
170250 Polyethylene Pipe & Fittings	**1.1 Usage**	Added new clause: "All below-grade HDPE piping is to be butt-fused. If Contractor would like to request specific locations for an electrofusion coupling in an underground location they must submit a shop drawing indicating proposed coupling location and documentation for electrofusion coupling warranty for engineer's review and confirmation."
	1.5 Submittals (H)	Added same butt-fusion/electrofusion submittal requirement for below-grade HDPE as in § 1.1 – Contractor must provide shop drawing and warranty documentation for any electrofusion coupling requested below grade.
	2.2 H – Electrofusion Fittings	Added requirement that electro-fusion fittings "may be substituted for thermally butt-fused pipe joints if manufacturer warranty is included for each size proposed to be used."
	2.3 C – Electrofused Couplings	Expanded paragraph to include explicit warranty requirement and submission process: contractor must submit shop drawing and warranty for each underground coupling for engineer review and confirmation.
170261 Ozone Gas Piping	**2.1 Stainless Steel Piping Materials**	The combined "Stainless Steel Tubing or Pipe Materials" section was simplified to only **Schedule 40 316 stainless steel pipe** (ASTM A312). The option for **stainless steel tubing** (ASTM A269) was deleted. Fittings for tubing and the associated Swagelok/Crawford specifications were removed.
		Retained socket-weld, TIG process, threaded and flanged connections but deleted the tubing ferrule-type connection requirements. Now applies strictly to pipe.
		Changed from **"Stainless Steel Tubing or Pipe Materials"** to **"316 Stainless Steel Pipe Materials."**
	Deleted Content	All content describing **tubing fittings, annealed hydraulic tubing, ferrule-type tube fittings, and tubing wall thicknesses per ASTM A269** was deleted. Only Schedule 40 stainless steel pipe remains.
170270 Flexible Molded-Rubber Couplings	**1.1 C – Types at Locations**	Deleted specific requirements to "Provide twin sphere where indicated on P&IDs at pump suctions" and "Provide single sphere in valve pits to assist with ease of valve maintenance." Retained only general reference to types at locations.
	2.1 G – Liner Materials	Deleted all detailed liner material specifications including EPDM, Viton, silicone, and hydrogen-peroxide-cured EPDM with Kevlar reinforcement. The section header "Liner Materials" remains but contains no details.
	2.1 I – Manufacturer	Deleted full list of approved manufacturers and their contact information (General Rubber, Mason Industries, Proco Products, Red Valve, RM-Holz, Unaflex). Retained only general statement that product must be "Special Ordered" to meet requirements.
	3.1 A(1–2) – Installation at Pumps	Deleted detailed installation requirements for bolting (per Section 170316) and alignment tolerances (≤5 degrees or ≤0.5 inch). The section remains but no subpoints.
170280 Mechanical Pipe Seals	**1.1 A – Locations (3)**	Added new clause permitting use of mechanical seals in *planned new wall construction* only after **Owner's approval of a substitution request** for cost savings on concrete form penetrations. Specifies that the approved substitution must include an **oversized PVC pipe sleeve with a cast-in-place water-stop flange**.
	2.1 C – Manufacturer	Added detailed manufacturer list: **GPT Industries (Link-Seal)**, **Flexicraft Industries**, or approved substitute. These names were not listed previously.
	3.1 B – Installation	Added requirement to **coat exposed reinforcing steel** with **20-mil thickness of "Armatec 110 EpoCem" by Sika, or equal corrosion protection coating** when reinforcement is cut or exposed. This note was not in the prior version.
170286 Quick Disconnect Fittings & Vacuum Hose	**2.1 C – Manufacturers/Suppliers**	Deleted specific manufacturer listings: *"Cam Lever Couplings by Banjo, supplied by Harrington Plastics,"* and *"PT Coupling."* The revised version omits all manufacturer references and retains only general product requirements.
170288 Eductor Injectors	**2.1 D – Manufacturer**	Changed manufacturer clause from "no substitutions" to "no known equal," allowing potential consideration of alternate equivalent products.
170310 Pipe Supports	**2.1 C – Material Locations**	Deleted detailed list of **Water Zone, Floor Zone, and Ceiling Zone** material requirements. Revised document now omits all descriptions regarding corrosion resistance, material type, or height-based material allowances.
	2.2 B – Floor Mounted Pipe Stands	Removed entire list of material-specific fabrication requirements (fiberglass stress ratio, aluminum coating, PVC fitting details, flange assembly, and fastener count). Retained only the general statement that supports shall be "fabricated, floor mounted pipe supports manufactured of fiberglass, stainless steel, or PVC."
	2.2 E – Pipe Clamps	Deleted performance rating for FRP pipe clamps (175# load for 6-inch pipe) and reference to **vinyl ester resin** for ozone environments. Simplified to general note on FRP and metal clamp materials.
	2.2 F – FRP Struts and Structural Shapes	Deleted all subsections describing resin type, ASTM standards (E-84 Class 1), glass content, flame rating, ultraviolet protection, and sealing of cut edges. Revised version retains only single-sentence reference to "pultruded construction."
	2.5 – Manufacturers	Entire manufacturer list was deleted. Revised document no longer provides supplier names or contact information for FRP and nonmetallic support manufacturers.
170316 Fasteners	**2.1 C – Non-Metallic Fasteners**	Deleted references to specific product types: *Studs (pultruded vinyl ester)* , *Bolts ("Fibrebolt" by Strongwell)* , and *Washers (FRP oxidation-resistant)* . Revised to only require non-metallic fasteners to be of suitable material and prohibit non-reinforced PVC.
	2.1 D – Wall Anchors	Deleted detailed **Option 1** (threaded plastic inserts) and **Option 2** (drilled and epoxy anchored stainless all-thread). The revised document keeps only a general heading "Wall Anchors" without specifying anchor types or manufacturers.
	2.1 E – All-Thread	Retained section but simplified the text. Removed the reference to "materials requirements as fasteners in this Section" for cross-section 170310. Now states conformance in simpler terms.

	2.3 B – Anchor Stud Designs	Deleted explicit list of anchor designs (*cast-in-place "J" bolts, epoxy/aggregate filler, wedge anchors, dual drilled swiss lock type*). Simplified to note that anchor bolts, studs, washers, and nuts shall be Type 316 stainless steel only.
	2.4 – Manufacturers	Deleted all manufacturer listings and contact information for specific products (Hilti, Structural Anchoring Systems, Molly Fastener Group, Strongwell, etc.). Retained only generic references to non-proprietary stainless steel hardware and approved substitutes.
	3.1 A – Installation Methods	Removed installation subsections describing procedures for *cast-in-place, epoxy/aggregate anchoring, and expansion type anchors* . Revised to a general statement that powder-driven fasteners are not allowed, without prescribing detailed methods.
	3.1 C – FRP Fastener Installation	Deleted detailed manufacturer-specific requirements (*torque wrench use, bearing surface parallelism, lubrication, and polyurethane coating*). Retained only general instruction to install per manufacturer recommendations.
170360 Basket Strainers	**2.2 B – General Description**	Deleted the detailed **minimum basket-to-pipe cross-section ratio and basket area table** for 3-inch through 12-inch nozzle sizes. The revised document keeps only the general description of "oversized" body diameter without listing minimum ratios or square inch basket areas.
	2.2 F – Accessories	Deleted the accessory list that previously required **top vent**, **pressure taps at inlet and outlet**, and **spare basket per basket size.** The revised version no longer includes these accessory details.
	2.2 G – Manufacturer	Deleted the manufacturer list and contact information (**Fluidtrol Process Technologies, Mer-Made Filter, or approved substitute**). The revised document leaves the section header but omits specific manufacturer names.
170410 Pressure Gauges	**2.2 – Gauge Cocks**	Changed section title to **"Gauge Cock Stop Valves."** Expanded content to differentiate products for saltwater or aquarium applications. Added subpoints detailing approved valve configurations.
	2.2 B(1)	Added requirement for **PVC uni-body type** with EPDM seats/seals and lever handle, identifying **"LC Series Universal Stopcock" by Hayward Industrial Products Inc.** as basis of design.
	2.2 B(2)	Added a new option for **0.5-inch diameter pipe size**: compact PVC thread-by-thread ball valve; identified acceptable products **Spears Manufacturing** and **NIBCO (4660-T)** as approved substitutes.
	3.1 C – Installation	Deleted requirement for **pressure snubbers** at centrifugal pump discharges. Section no longer mentions snubber installation as a condition.
170430 Temperature Devices	**1.1 A – Usage**	Deleted specific operating temperature range "49°F to 80°F aquarium seawater." Section now only states general use of thermometers and sensing wells.
	1.4 A – Quality Assurance	Deleted detailed language specifying the manufacturer's responsibility for compliance, Pyromation CSA accreditation, and field approval requirements. Simplified to only list qualified testing laboratories (CSA, ITS-ETL, UL, etc.) without references to manufacturer compliance.
	2.1 D – Temperature Range	Removed detailed thermometer ranges for process, heating, and chilling water applications. The revised section leaves the range heading but omits numerical specifications.
	2.2 A – Thermowell Dimensions	Deleted dimensional details including sensor well diameter (0.375" or 0.5"), well length by pipe size, and male/female thread diameters. Retained only general description of thermowell assembly.
	2.3 B – Temperature Sensors / Transmitters	Deleted full list of product specifications (Pyromation and Weed model numbers, component ratings, part numbers, voltage, and calibration data). Retained only general description that the sensor/transmitter be an assembly with the thermowell.
	2.3 D – Manufacturers	Deleted manufacturer contact information (Weed by Ultra Electronics and Pyromation RTD) and product details. Section header remains but without listed manufacturers.
170441 Mag-Meter FMs	**1.3 D – Submittals**	Added new requirement to **submit proof that installed electrical equipment bears approved testing agency listing or classification markings** (e.g., CSA, UL, ETL).
	General Coordination Notes (Part 1)	Deleted specific reference to **GF 2581 FlowtraMag® flow sensors** and **GF 9900 transmitters**, retaining only general coordination requirements for power and wiring. This removes manufacturer-specific details about power cabling, signal types, and voltage ratings.
	2.3 A – Transmitter Housings	Deleted full description of **9900 Transmitter Housing** (dimensions, construction, and mounting features). Revised document keeps only the header "Provide housings matching transmitter requirements."
	General References (Throughout)	Deleted repeated references to **GF Signet model numbers and installation accessories**, consolidating the text to general descriptions of "mag-meter flow sensors" and "transmitters."
	Part 3 – Execution	Deleted detailed instruction to provide **technical seminar** by manufacturer representative to Owner's staff. This section is now removed entirely from the execution requirements.
170446 Flow Rotameters	**2.1 C – Materials (Ozone Gas Flow Rotameters)**	Deleted detailed material list specifying tube (glass), float (Teflon, glass, 316 SS, Hastelloy, or Tantalum), seals (Teflon), safety cage (300 SS frame with polycarbonate shields), and end connections (ozone-resistant, panel mount or straight-through). Revised version leaves the "Materials" heading without subpoints.
	2.2 C – Materials (Air or Water Flow Rotameters)	Deleted full material list specifying tube (Acrylic or Polysulfone), float (Teflon, glass, 316 SS, Hastelloy, or Tantalum), seals (Teflon or Viton), and end connection requirements (300 SS or plastic for air; 316 SS for saltwater). Revised version keeps only the "Materials" heading.
170455 ORP & pH Monitoring	**1.4 B – Submittals**	Added new submittal requirement: contractor must **submit proof that all installed electrical equipment bears an approved testing agency listing or classification mark** (CSA, UL, ETL, etc.).
	1.4 – Submittals (General)	Clarified submittal list order and punctuation; merged information for **transformer and enclosures** into a single line item.
	1.2 – General Requirements	Deleted detailed description of scope of work subpoints (installation of ORP and pH sensors with control functions). The revised version retains only the introductory paragraph without subitems describing automation control use.
170467 CO2 Feeder for pH	**1.1 A – General**	Deleted items **"CO2 Monitor and Alarm"** and **"two (2) initial 20 lb. CO2 cylinders for startup"** from the list of required equipment. Revised list now includes only CO2 feeder, in-line heater, gas pressure regulator, tubing, fittings, and diffuser.
	1.7 B – Suppliers	Deleted detailed contact information and website listings for **ProMinent Fluid Controls, Inc.**, **Link Automation**, and **Ozone Water Systems**. Revised version lists only manufacturer names without addresses or URLs.
	2.1 A – CO2 Feeder	Deleted sentence describing **mounting of flowmeter and selector switch** within the enclosure. The feeder description now refers only to control signal receipt and safe operation.
	2.4 – Diffuser Injector	Deleted specific model number **ProMinent P/N 7746926 CO2-D-L Diffuser** and **Link Automation Injection/Check Valve** references. Revised version retains only the general diffuser requirement without manufacturer product detail.
	2.6 – CO2 Monitor and Alarm	Entire section deleted. The revised document omits all requirements for ambient CO2 monitoring and alarm systems.
	2.7 – CO2 Cylinder	Entire section deleted. The revised version no longer specifies CO2 cylinder supply requirements, sizes, or sources.
170476 Water Level Pressure Transmitters	**1.1 – Usage**	Revised control range requirements: – For PLSM01, tolerance changed from **±0.10 inch** to **±0.21 inch.** – For PLSM02, tolerance changed from **±0.84 inch** to **±0.70 inch.** Deleted description stating that PLSM01 units are "installed with a separate wall-mounted transmitter with LED display."

	1.5 – Submittals	Added requirement that contractor **submit proof of approved testing agency listing or classification markings** (e.g., CSA, UL, ETL).
	2.1 – PLSM01 Pressure Transducers	Added specification for **accuracy: 0.5% of range.** Other performance requirements (range, output, power) remain unchanged.
	2.2 – PLSM02 Pressure Transmitters	Added specification for **accuracy: 0.25% of range.**
		Deleted reference to "integral transmitter with LED display."
		Retained same 0–10 psi range and power requirements.
	2.3 – Indicating Gauge	Expanded requirement to include **some PLSM01 transducers** in addition to all PLSM02. Added cross-reference to **Section 170410** (formerly referenced Section 170641).
	3.1 – Installation	Added clause specifying that when used at ozone tower locations, **0.5-inch ball valves must be PVDF material.**
		Deleted requirement for calibration demonstration to Owner's satisfaction.
170584 Plastic Air Blowers	**1.4 – Quality Assurance (New Section)**	Added entirely new section defining testing laboratory and listing agency requirements. Requires all blowers and related electrical equipment to bear approved testing agency marks (CSA, UL, ETL, NSF, or equivalent). Specifies manufacturer responsibility for compliance and field approval at no cost to Owner.
	1.6 – Submittals (was 1.5)	Added new submittal requirement to provide proof that installed electrical equipment bears an approved testing agency listing mark or classification marking.
170586 Rotary Blower Package	**1.3 – Codes**	Added new clause requiring all blowers and associated electrical equipment to comply with **NCBCC testing laboratory and listing agency requirements.** Acceptable agencies now listed as **CSA, ETL, and UL.** Manufacturers must ensure compliance and provide field approval at no cost to Owner if required.
	1.4 – Submittals	Added new submittal requirement: contractor must **submit proof that all installed electrical equipment bears an approved testing agency listing mark or classification marking.**
170666 Plate-Type Heat Exchangers	**2.2 H – Construction**	Added new requirement: **"Systems that require insulation, require insulation jackets on heat exchangers."** This note did not appear in the previous version.
170667 Tube Type Heat Exchangers	**1.3 A – Coordination**	Deleted factory mount options listed as "1. Factory wall-mount support … 2. Factory floor stands …" and simplified text to a single requirement for 316 SS mounts.
	1.3 B – Coordination	Corrected text from "Hot and cold water piping …" (two words) to "Hot and coldwater piping …" (single word). Minor editorial correction retained for consistency across Division 17.
	2.1 A – Tube Type Heat Exchanger	Revised mounting description from "mounted on a stainless steel mounting rack/stand" to "mounted on a 316 stainless steel mounting rack/stand."
	2.1 C – Housing Shell	Changed material specification from "Schedule 40 or Schedule 80 CPVC" to "Schedule 80 CPVC only." Eliminated Schedule 40 option.
	2.1 G – Support Rack	Changed acceptable materials from "Type 316 or Type 304 SS with a superior corrosion-resistant coating" to "Type 316 stainless steel only."
	2.1 H – Manufacturers	Re-ordered list: Delta Hydronics now listed first and AquaLogic second (to match supplier preference).
170723 O3 Equip	**1.2 E – Testing Laboratory Requirements**	Added explicit requirement that all ozone-generation electrical and mechanical equipment **comply with North Carolina Building Code Council (NCBCC)**–accredited listing agencies (**CSA, ETL, UL, NSF International, or approved research laboratories**). Manufacturer must ensure compliance and obtain **field approval at no cost to Owner if required**.
	1.3 B – Submittals	Added new submittal requirement: contractor must **submit proof that all installed materials bear an approved testing-agency listing mark or classification marking.**
	1.6 – Guarantee & Warranty	Clarified that **supplier is responsible for factory warranties for all peripheral equipment**, and that the **manufacturer must guarantee documented power consumption, hour test capacity, and ozone production**; dielectric warranty remains three-year non-prorated.
	3.2 C – Installation by Contractor	Added requirement that the **contractor ensure electrical equipment is in conformance with an approved testing laboratory listing and bears certification labeling.**
	General Update	References to **testing-laboratory compliance and labeling** were added consistently through the section (Quality Assurance, Submittals, Installation), aligning this specification with current NC code requirements for listed electrical equipment.
170753 Calcium Reactors	**1.2 D – Submittals**	Added new requirement: "Submit proof that installed electrical equipment will bear approved testing agency listing mark or classification markings."
	1.6 – PACKAGED EQUIPMENT MANUFACTURER/SUPPLIER	Renumbered from **1.08** to **1.6** for alignment with specification format conventions. No content modification, numbering only.
	3.1 A – Installation and Set-Up	Relettered sequence to start with "A." instead of "D." to correct order. Text remains same. No technical changes.
170774 UV Sterilizer	**1.5 D – Submittals**	Added new submittal requirement: "Submit proof that installed electrical equipment will bear approved testing agency listing mark or classification markings."
	2.1 A – Design and Performance	Added "HDPE" to clarify material type in vessel description. Text now specifies "HDPE vessel configurations shall be a U-type configuration, or Z-type configuration as shown on project drawings."
	2.1 F – Design and Performance	Added "HDPE" to specify that the vessel shall be HDPE, not just any material: "HDPE vessel shall have a max pressure of 75 PSI minimum."
170786 Reverse Osmosis System	**1.2 B – Capacity**	Clarified capacity as 3,000 gpd RO product water; added instruction that the contractor must verify flow rate with the schedule shown on the drawings.
	1.3 C – Testing Laboratory Requirements	Added new clause requiring compliance with NCBCC-accredited testing laboratories and listed acceptable agencies: CSA, ETL, UL, NSF, or other approved labs. Added requirement for manufacturer to obtain field approval if necessary at no cost to Owner.
	1.4 D – Submittals	Added requirement for submittal of proof that all installed materials bear an approved testing agency listing mark or classification marking.
	3.1 D – Installation	Added explicit requirement that the contractor must ensure all electrical equipment conforms to an approved testing laboratory listing and bears certification labeling.
170805 Pressure Ozone Contactors	**1.4 – Coordination**	Changed reference from "Section 170720" to "Section 170723" for ozone equipment supplier.
	Removed Dimensions under 1.2 C	Deleted specific tank dimension list: 63-inch diameter x 86-inch height, 8500-gallon capacity, 16-inch manway, 6-inch flanged port, and tripod base. The revised document omits all dimension verification details
170810 Large Fractionators	**1.5 – Coordination / Vents**	Deleted detailed vent requirements (standard air vent, ozone vent with check valve, and off-gas connection). Document 2 retains only the section header "D. Vents:" with no vent descriptions.
	2.1 E – Provide base hold down clips	Removed detailed anchoring requirements (Type 316 SS clips, minimum anchor stud sizes, and quantity per diameter). Revised document lists only "Provide base hold down clips."
	2.1 F – Venturi Injector Circuit	Deleted all technical specifications for pumps, air inlet, ozone inlet, Mazzei injectors, and co-branding requirement. Now only the heading "Venturi Injector Circuit" remains.
	2.1 G – Wash-Down Systems	Removed all listed components (freshwater sprinklers, chimney sweep, HMI controller, 120 VAC power requirements, ASAHI/Hayward valve references). Now only the section title appears.
	2.1 I – Top Vents	Deleted detailed vent sizing and check-valve type (Spears brand 1" for ≤14" units and 2" for ≥16" units). Section header remains but no technical content.
	2.1 J – Pro-Model Features	Retained section but removed itemized features (list now truncated after "including the following features"). Original specifications for Sch 40 piping, wash-down upgrades, true union PVC valves, bulkhead fittings, and Asahi valves were deleted.
	2.2 A – Manufacturer	Changed phrase "or approved substitute" to "or approved equal."

170820 FRP Fabrications	**2.2 B – Primary structural components**	Removed list of specific vinyl ester resin brands for ozone applications (“Extren 625”, “Creative Pultrusions 1625”, or approved substitute). Only general resin specification remains.
	2.2 C – General purpose applications	Moved and simplified language to combine vinyl ester and polyester resin options without explicit manufacturer examples.
	2.2 E – Manufacturers	Deleted full manufacturer list (Aickinstrut/TYCO, Bedford Reinforced Plastics, Champion Strut, Creative Pultrusions, Fibergrate, Seasafe, Strongwell, StrutTech, Ultra Fiberglass Systems). Now only a general manufacturer reference appears.
	2.3 C – FRP Manways requirements	Removed all specific pressure, resin, flange, and inspection requirements for FRP manways (Class 100 psi rating, AWWA C950-88 design criteria, 150 lb bolt pattern details, flat face specs, inspection report). Section now retains only introductory statement.
	2.4 G – Manufacturers (Vee-Notch Launders)	Entire manufacturer list removed (Augusta Fiberglass through World of Plastics). Section now ends without manufacturer references.
170821 Raised Sand Tank Floors	**2.1 C – Mesh**	Deleted full technical table specifying detailed screen types, hole sizes, thickness, percent open area, and weight for top, middle, and bottom layers. The section now only references that screen selection shall be “as given in the following table,” but the actual table is omitted
170822 FRP Deaeration Tower and Storage Tanks	**1.3 D – Reference Standards**	Deleted list of specific ASTM and NBS standards (ASTM D3299, ASTM 4097, NBS PS 15–69). Now section ends after “Reference Standards:” without specifying details.
	2.1 B – Wall Thickness	Removed detailed wall design criteria including 10:1 safety factor, fixed piping connections requirement, and explicit design conditions. Section now only lists “Wall Thickness:” as a heading without any requirements.
	2.1 G – Pipe Nozzles	Deleted entire flange thickness and projection table (with detailed dimensions for 2”–18” pipe nozzles). Section now ends before listing table values.
	2.1 K – Standard Appurtenances	Deleted detailed list of required tank accessories (lifting lugs, gaskets, fasteners, sight gauge tabs, tie-down lugs). Section now contains only the opening line referencing general appurtenances.
	2.1 M – Manway/Viewport	Removed flange projection table (with diameters 16”–30” and associated thicknesses). Remaining text retains descriptive requirements but omits numeric flange data.
	2.1 Q – Structured Tower Packing Media	Deleted numeric performance criteria and brand/model specification (“CF 1200 ACCU-PAC by Brentwood Industries”). Section heading remains but no detailed content provided.
	2.1 S – Drift Eliminators	Removed detailed technical data (blade spacing, material thickness, model numbers CFUltra and CF80Max, manufacturer contact information). Only general product type and material remain.
	2.1 T – Tank Manufacturers	Removed full list of approved manufacturers and substitutes. Section heading remains but without listed companies.
	2.3 A – Grating	Revised allowable bar spacing and depth options: added “2-inch or 1-1/2 inch” as acceptable dimensions (previously only 1-1/2 inch depth).
170845 Rectangular Fiberglass Tanks	**2.1 O – Manufacturers**	Entire list of approved manufacturers (Augusta Fiberglass, Custom Structures, Hydro Composites, Johnson Custom Fiberglass, Industrial Plastics, Micro-Fab, R&B Aquatics, Waterdog Products) was **removed**. Section heading “Manufacturers:” remains but with no content.
170846 Single Wall Mixing Tank	**2.1 C – Accessories**	Deleted entire list of accessories including 12” poly stand, tank-wall fittings, flexible couplings, 2” vent, and hinged cover. Section now only references accessory note about bulkhead fitting welds.
	2.1 D – Manufacturer	Deleted full list of approved manufacturers (Snyder Industries, Chemical Containment, Inc.) and contact information. Section header remains but contains no manufacturer names or details.
170933 Automated Controls	**1.3 I – Testing Laboratory Requirements**	Replaced the long list of Washington State–approved testing labs with a concise requirement that laboratories be accredited by the **North Carolina Building Code Council (NCBCC)**. Acceptable listing agencies limited to **CSA, Intertek ITS-ETL, and UL**. Added note that field approval, if required, must be completed without delay or added cost.
	4.4 A – PAC Description (Hardware)	Updated **Basis of Design** from *Phoenix Contact BL2 BPC 7000 RCK 03 (1.8 GHz Intel Atom D525)* to *Phoenix Contact BL2 BPC 7000 RCK 03 (Intel Core i5-7442EQ 2.1/2.9 GHz)*. All other specs unchanged.
	4.4 A – PAC Description (Software)	Clarified comparable OS requirement: *Windows 10 Embedded or comparable most recent applicable operating system* (was “Windows 10 Embedded or comparable most recent applicable operating system” but context now emphasizes update to current OS versions).
	3.1 D – Submittals	Added new requirement that **proof of approved testing-agency listing marks** or classification markings must be submitted for installed electrical equipment.
260010 - Supplemental Requirements for Electrical	**1.13 A – Reference Standards**	Updated applicable code list to reflect **current editions**: added “2023 NEC” explicitly; retained reference to **North Carolina Building Code Council (NCBCC)**; clarified applicability to *current at bid time* .
	1.13 B – Testing Agency Requirements	Revised language to specify **only laboratories accredited by the North Carolina Building Code Council (NCBCC)** are acceptable for listing electrical and mechanical equipment. Removed prior references to “Washington State” or “WAC 296 46B-999.” Clarified that all materials and equipment must bear appropriate **listing marks or classification markings**, or be **field-certified** before use.
	1.15 B – Inspections	Clarified that **inspections must be scheduled with the State Electrical Inspectors** at the **State Construction Office (SCO)** and conducted **Monday through Friday** unless otherwise approved. Removed allowance for local jurisdiction inspections.
	1.16 F – Electrical Distribution System Tests	Minimum insulation resistance value raised to **1 megohm** (previously lower threshold unspecified). Clarified requirement that **tests be performed before load connections** and that documentation of readings must be provided for final acceptance.
	1.16 C – Testing Requirements	Added requirement to **verify torque settings** of wire and cable terminations per equipment manufacturer’s data. Added explicit responsibility to **record** motor rotation checks and corrective actions.
260510 - Electrical Demolition	**3.2 I – Existing Standby Power Generators**	Added clarification: “All cutover work shall be done after facility normal business hours and on weekends.” This specifies timing restrictions for generator cutover work.
	3.2 J – Existing Fire Alarm System	Expanded coordination note: specified coordination with **Johnson Controls/Simplex**, the Owner’s vendor, and required establishment of a **24-hour fire watch** if the system must be taken out of service.
260519 - Low-Voltage Electrical Power Conductors and Cables	**2.2 Aluminum Feeder Conductor Option**	Entire section **removed**. Aluminum conductors are no longer permitted as an optional substitution for copper feeders or service entrance conductors. The previous text allowing AA-8000 series aluminum up to 500 KCMil was deleted.
	2.3 Lighting Control Cable	Section renumbered (previously 2.3). No technical text change except re-indexing.
	2.4 Wiring Connectors and Connections	Section renumbered (previously 2.4). No wording modifications—content retained verbatim.
	2.5 System Description	Section renumbered (previously 2.4). No changes in requirements
260526 - Grounding and Bonding for Electrical Systems	**1.2 A – Grounding System Description**	Clarified that **only one neutral-to-ground connection** is permitted at the main disconnect; explicitly required all grounding conductors #8 AWG through #4 AWG to be **insulated green** and routed in **conduit sized per NEC**; added requirement that the **conduit itself be grounded at the earth electrode**.
	1.2 B – Earth Electrode System	Added detail for **ground rods and ground ring**: must be driven **11 feet** and connections made by **brazing or exothermic welding**; clarified that all connection points must be **visible and accessible** at completion.
	1.3 – Performance Requirements	Added explicit requirement that if ground resistance > 25 ohms, **additional rods or other approved methods** must be installed until ≤ 25 ohms and **retested for compliance**.
	2.4 – Connectors	Added explicit **prohibition on aluminum or aluminum-alloy ground clamps**; expanded connector types (bus-bar, beam clamp, cable tray clamp, conduit hub, etc.) with detailed material requirements.
	2.5 – Rod Electrodes	Specified **copper-clad steel 3/4 in × 10 ft** with **13-mil copper coating minimum**.

	2.6 – Bonding Bushings	Replaced general text with performance criteria: must be **steel or malleable iron**, **zinc-plated interior / galvanized exterior**, with **150 °C insulated throat liner** and third-party listing; **die-cast zinc bushings not acceptable**.
	2.7 – Ground Rod Inspection Wells	Added two new subsections defining **Pedestrian-rated** (HDPE housing 9 in Ø, 300 PSF) and **Vehicle-rated** (concrete 10 in Ø, 20,000 PSF) well assemblies, including **twist-lock covers embossed "GROUND."**
	2.8 – Grounding Busbars	Added new section specifying **electrical and telecom grounding busbars** with **tin-plated copper**, **600 V standoff insulators**, **25 % spare lugs**, and **Lexan cover**; telecom bars must comply with **TIA-607-C and BICSI standards**.
	3.3 – Grounding Underground Distribution Components	Added detailed installation methods for **grounding manholes and handholes**, including **No. 1/0 AWG tinned copper**, waterproof sleeves, grout sealing, and **No. 4 AWG bonding** to inserts and cable shields.
	3.4 – Equipment Grounding	Expanded to require **grounding electrode and separate insulated equipment grounding conductor** for outdoor lighting poles; added **bonding of metallic fences** and **communications equipment grounding** per TIA/ATIS J-STD-607-A.
	3.5 – Installation Requirements	Added explicit requirement for **green grounding conductor in all raceways**—raceway cannot be relied on for ground continuity—with listed exceptions (telecom, data, audio, services); added **bonding jumper sizing per NEC**, and clarified that all connections must be **accessible and made with solderless connectors, brazed or bolted**.
	3.7 – Labeling	Added new instruction: label text must be **green** and state "If this connector or cable is loose … notify the facility manager."
	3.8 – Field Quality Control	Added detailed **testing and inspection** procedures: torque verification of bolted connections with **calibrated wrench**, resistance tests at each ground location **before energizing**, and reporting requirements for excessive ground resistance.
260529 - Hangers and Supports for Electrical Systems	**2.2 A – Stainless Steel Slotted Support Systems**	Deleted the detailed manufacturer list (**Unistrut, B-Line, Erico**) and substitution clause. The revised version retains only general compliance with **MFMA-4** without listing manufacturers or substitution language.
	2.2 A (2) – Material Specification	Simplified description: removed option allowing "equivalent materials protected from corrosion by factory-applied coatings, paint and galvanizing." The new version requires Type 316 stainless steel only.
	2.2 A (3) – Channel Width	Deleted note specifying "1-5/8 inches, or as required to carry load." Channel width and load criteria are no longer explicitly stated.
	2.2 A (4-5) – Protective Finish and Dimensions	Removed requirements for temporary protective coverings and specific channel dimension selection criteria.
	2.2 E – Mounting, Anchoring, and Attachment Components	Deleted detailed attachment methods (beam clamps, self-drilling anchors, toggle bolts, expansion anchors, screws). The revised section only references general mounting/anchoring components.
260533.13 - Conduits for Electrical Systems	**2.1 B – Minimum Conduit Size**	Minimum conduit size increased from **½ inch to ¾ inch** for all raceways. Flexible nonmetallic "sealtite" conduit still allowed starting at ½ inch.
	2.1 D – Life Safety Feeders	Clarified that LS feeders must be installed **horizontally in/under slabs** and **vertically in rated walls** using **ERMC-PVC where exposed**; previously only referenced "Life Safety System Feeders" without specifying exposure conditions.
	2.1 F – Finished Dry Locations	Added reference to **Table 'Non-Corrosive Atmosphere Spaces' on Sheet E6.16**; not present in Doc 1.
	2.1 H – Underground Installations	Now specifies **Schedule 40 PVC only**; deleted optional use of Schedule 80 PVC where exposed.
	2.1 I – Wet or Damp Interior Locations	Rewritten to match new language in H — allows only Schedule 40 PVC or Schedule 80 PVC if exposed to damage.
	2.1 J – Exterior Locations	Clarified same restriction as above (Schedule 40 PVC or 80 PVC if exposed). Previously broader.
	3.1 E – EMT Restrictions	Added explicit prohibition on EMT **encased in concrete**; reworded to clarify "no EMT in slab-on-grade or earth."
	3.1 G.1 – Installation Sequence	Added requirement to **complete raceway installation before starting conductor pull**; expanded subsections b–s for spacing, cutting, sealing, and moisture protection.
	3.1 G.1 (m & n added)**	New limitations: prohibit raceways on explosion-relief walls; maintain 2 in clearance from roof deck.
	3.1 G.1 (o new)**	Requires 6-in minimum separation from steam or hot-water piping; must run above water/steam lines.
	3.1 G.5 – Types FMC and LFNC	Revised max length for flexible connections from **48 in to 72 in** for luminaires, motors, and transformers.
	3.1 G.6 – Type PVC	Added temperature limit **122 °F max**, conductor rating limits (75 °C or 90 °C when encased), and curing time for solvent-weld joints (24 h).
	3.1 G.7 – Embedded Raceways	Added rules for placement relative to reinforcement and expansion joints and for minimum 2 in concrete cover; previous section had no detail.
	3.1 G.9 – Fittings	Added references to NEMA FB 2.10 and 2.20; introduced material restrictions (zinc-plated steel for EMT, no pot-metal fittings).
	3.1 G.10 – Expansion Joints	Completely new subsection with thermal movement criteria (0.00041 in/ft PVC, 0.000078 in/ft metal) and temperature ranges (125–155 °F).
	3.1 K – Grounding Continuity	Added explicit statement that raceway system **shall not be relied on for grounding continuity** and must be bonded per 260526.
	3.1 M – Bonding Bushings	Added requirement for **grounding-type insulated bushings and jumpers** at concentric/eccentric knockouts.
	3.1 R–S – Supports	Added explicit prohibition of wire or perforated pipe strap supports and requirement for steel/malleable iron hangers or stainless hardware.
	3.1 T – Bonding to Equipment Ground Bus	Added requirement that each metallic raceway segment be **individually bonded to equipment ground bus** using copper conductor sized per NEC.
	3.1 V – Fittings	Added explicit ban on **pressure-cast (pot-metal) fittings** or conduit bodies.
	3.1 AA – PVC Use in Walls	Added restriction that **Schedule 40 PVC not be used in gypsum walls**, permitted only in CMU walls.
	3.1 GG – PVC in Slabs	Added minimum concrete cover requirements (¾ in formed, 3 in on grade) and reference to **ACI 318 Chapter 6** for compliance.
	3.1 JJ–LL – Encasement Depths	New subsections defining **encasement cover depths (18–30 in)** for service and feeder raceways and minimum concrete thickness.
	3.1 QQ – Underground Identification	Added requirement for **buried conduit identification tape 6–8 in below grade**, per Section 260553.
	3.1 RR – Below Roof Deck	Added 11/2 in clearance requirement below roof deck to prevent fastener penetration of EMT during reroofing.
	3.1 TT–UU – Surface Raceways	Added entire new section for surface metal raceways with support spacing (≤ 48 in) and minimum bend radius (2 in).
	3.3 – Field Quality Control	Added mandrel test requirement for raceways (12 in long, raceway size minus ¼ in); added verification steps for alignment, support torque, and expansion devices.
	3.4 – Cleaning	Added requirement to contain and remove drilling fluids (bentonite).
	3.5 – Protection	Added explicit repair procedures for damaged galvanized or PVC coatings using manufacturer-approved touch-up materials.
260533.16 - Boxes and Covers for Electrical Systems	**1.1 A (6)**	Deleted reference to **"Fire Rated Poke-Throughs."** Now the list ends at "Hoods for Outlet Boxes."
	1.1 B (4)	Deleted related section **262726 'Wiring Devices' for boxes and covers.**
	2.2 A (1)	Removed manufacturer list (Appleton, Raco Taymac Bell, Spring City Electrical Mfg.). Now only generic "NEMA OS 1 galvanized steel."
	2.2 A (2–4)	Deleted detailed construction requirements (4" sq x 2-1/8" deep, gauge thickness, plaster rings, etc.). No dimensional or UL gauge detail remains.
	2.2 A (4 a–c)	Removed special-purpose box features (luminaire up to 50 lb, paddle fan up to 70 lb, wall plates ref 262726).

	2.2 B (1)	Removed manufacturer list (Appleton, Crouse-Hinds, Killark). Now generic “NEMA FB 1 Type FD cast feralloy.”
	2.2 B (2–3)	Removed technical requirements for gasketed covers and threaded hubs.
	2.2 C	Deleted entire listing criteria (UL CCN QCIT, UL 514A) and “Standard Features” for metallic conduit bodies.
	2.3 A (1)	Removed manufacturer list (Cantex, Carlon, Hubbell Premise Wiring). Now generic reference only.
	2.3 A (2–3)	Removed NEMA OS 1 / UL 514A and box construction details.
	2.3 B (1–3)	Removed manufacturer list and UL CCN QCMZ reference; section condensed to title only.
	2.4 A (1)	Deleted manufacturer list (Appleton, Cooper B-Line, Raco Taymac Bell). Now generic “Indoor Sheet Metal Junction and Pull Boxes.”
	2.4 A (2–3)	Removed UL CCN BGUZ and UL 50 listing criteria and standard features (galvanized steel / PVC options).
	2.4 B	Removed technical references for Outdoor Non-metallic Boxes (Type 4X Protection and UL BGUZ criteria).
	2.5 A	Deleted UL listing criteria (UL 514D, QCIT/QCMZ) and material specifications (0.032″ SS Type 302/304). Section now generic.
	2.6 A and B	Removed UL listing and performance criteria for “Retractable” and “Extra-Duty While-in-Use Hoods.” Only titles remain.
	3.2 B	Removed specific Type 4 degree-of-protection requirement for indoors and outdoors.
	3.2 C	Deleted requirements for non-metallic boxes below 8 ft and prohibition on angled-slot covers.
	3.3 B (1–10)	Eliminated detailed reference standards list (ICC, NFPA 1, NFPA 70E, NECA NEIS, BICSI, NFPA 101, NFPA 110 etc.). Revised to single generic reference.
	3.3 D	Removed installation techniques (ADA mount heights, masonry saw-cutting, sealing, acoustical putty requirements, mounting brackets types Erico Caddy RBS / Raco 9001 / B-Line BB8-16 etc.).
	3.3 E	Removed identification requirements (labels, arc-flash warnings, engraved nameplates).
	Overall Content Reduction	All manufacturer references, UL listing numbers, construction details, and installation procedures have been deleted or condensed to titles only — specification is now baseline outline without product standards.
260533.23 - Surface Raceways for Electrical Systems	**1.1 B (4) – Related Requirements**	Deleted reference to Section **271100 "Communications Equipment Room Fittings"**, removing communication system identification coordination.
	1.1 C – References	Entire detailed reference list removed, including **NECA “Standard of Installation”**, **NFPA 70**, **NEMA 250**, **UL 5**, **UL 94**, **UL 111**, and **UL 870**. Only heading “References” remains.
	2.3 A – Surface Nonmetallic Raceways	Deleted subparagraphs detailing **UL CCN RJTX/UL 5A**, **UL 94 flame rating**, and **requirements for wiring channel configurations** (20–30 A device accommodation). Now only section title remains without standards or product criteria.
	2.4 A – Nonmetallic Wireways and Auxiliary Gutters	Deleted all listing and material specifications: **UL CCN ZOYX**, **UL 870**, **UL 94**, fiberglass/polyester and PVC materials, gasket details, stainless screws, and adhesive types. Section reduced to title only.
	3.1 B – Reference Standards for Installation	Retained only heading; deleted list of standards: **ICC IBC, ICC IFC, NFPA 1, NFPA 70, NFPA 70E, NECA NEIS 1 & 331, BICSI N1, NFPA 350, NFPA 520**, and related NEC articles (366, 386, 388).
	3.1 C – Special Installation Techniques	Deleted all requirements for **minimum radius (2 in)**, **support spacing (48 in)**, and **prohibition of tape/glue support methods**. Only section heading remains.
260544 - Sleeves and Sleeve Seals for Electrical Raceways and Cabling	**1.1 B – Related Requirements**	Removed detailed reference to coordination, scheduling, sequencing, submittal, and installation requirements under Section 260010 “Supplemental Requirements for Electrical.” Now shortened to heading only with no explanatory text.
	2.1 A – Steel Wall Sleeves	Deleted ASTM A53/A53M Type E Grade B Schedule 40 zinc-coated specification and “integral waterstop” requirement.
	2.1 B – Cast-Iron Wall Sleeves	Removed equivalence clause to “ductile-iron pressure pipe with plain ends and integral waterstop.”
	2.1 C–F – PVC, Molded, and Galvanized Sleeves	Deleted all ASTM D1785, material thickness, and fabrication details. Sections reduced to titles only.
	2.2 A – Rectangular Sleeves	Removed galvanized sheet-steel thickness requirements (0.052 in and 0.138 in based on perimeter).
	2.3 A–B – Sleeve-Seal Systems	Deleted EPDM rubber, stainless-steel pressure plate, and bolt requirements; section now general description only.
	2.4 A – Sleeve-Seal Fittings	Removed reference to “plastic or rubber waterstop collar matching pipe OD.”
	2.5 A – Grout	Deleted ASTM C1107/C1107M standard and design-mix criteria (5000 psi 28-day strength and factory packaging requirement).
	2.6 A – Pourable Sealants	Removed description of single-component neutral-curing elastomeric self-leveling formulation.
	2.7 A – Foam Sealants	Deleted multicomponent liquid elastomer performance requirements and foam expansion limitations.
	3.1 A–E – Installation of Sleeves for Non-Fire-Rated Penetrations	Removed explicit directions for mortar/grout packing, joint sealant coordination with Section 079200, 1/4 in annular space clearance, flush mounting instructions, and 2 in floor extension above finish floor. Section now outline only.
	3.2 A–D – Rectangular Sleeves and Seals	Deleted requirement to reinforce structural wall openings and to finish metal sheet coverings to match surroundings.
	3.3 A–B – Sleeve-Seal Systems	Removed instructions on centering raceway in sleeve and torque tightening pressure plates for watertight seal.
260548 - Vibration and Seismic Controls for Electrical Systems	**1.4 A – Product Data**	All sub-requirements (a through d) deleted – no longer requires rated load capacity, listing markings, load ratings, or application annotations.
	1.4 B – Shop Drawings	Deleted detailed fabrication and assembly submittals for vibration-isolation bases, anchorages, and coordination of seismic/wind bracing with adjacent systems.
	1.4 C – Delegated Design Submittals	All detailed calculation and testing requirements removed – no longer requires seismic/wind restraint selection criteria, anchor design data, or certifications from qualified testing laboratories.
	2.2 A – Elastomeric Isolation Pads	Deleted all construction details – removed pad material specifications (neoprene/silicone), durometer stiffness, metal plate reinforcement, and surface pattern requirements.
	2.3 A – Restraints – Rigid Type	Deleted references to ANSI/AISI S110-07-S1, ASTM A53/A53M, and corrosion-resistant coating ratings for tension/compression/torsion forces.
	2.3 B – Restraints – Cable Type	Deleted ASTM A492 stainless-steel cable requirement and ASCE/SEI 19 compliance; removed restrictions on U-shaped clips and wedge end fittings.
	2.3 C – Restraint Accessories	Deleted hanger-rod stiffener, hinged brace attachments, neoprene bushing, and resilient washer specifications. Now only a heading remains.
	2.3 D – Mechanical Anchor Bolts	Deleted ASTM E488/E488M testing and ACI 355.2 qualification requirements for post-installed anchors in concrete and masonry.
	2.3 E – Adhesive Anchor Bolts	Deleted all resin/mortar composition criteria (PVC, urethane methacrylate, polymer hybrid) and testing references (ACI 355.2).
	2.3 F – Concrete Inserts	Removed ICC-ES AC446 seismic prequalification and MSS SP-58 compliance references.
	3.4 B – Special Structural Tests and Inspections	Deleted testing protocols – no requirement for calibrated equipment evidence, advance scheduling, minimum four tests per type/size, or 90 percent proof-load criteria.
	3.4 C – Nonconforming Work	Deleted requirement to remove and replace malfunctioning units and retest seismic controls that fail inspection.
260580 - Equipment Wiring Systems	**1.2 N**	Added new related section **260900 – Power Controls.**
	3.2 A	Expanded scope: added **fire protection, Lighting Designer/Consultant lighting and controls, and exhibits** to list of systems for which Division 26 provides power and connections.

	3.2 B	Replaced reference to “safety switches and other electrical equipment” with “disconnecting means and other electrical equipment.”
	3.2 C	Added coordination requirements for **fire protection, Lighting Designer/Consultant lighting and controls, and exhibits.** Clarified coordination across all systems prior to ordering or installation.
	3.2 D	Added exception phrase “except as noted below” regarding entities responsible for providing control devices and raceways.
	3.2 H	Expanded **Division 21 (Fire Protection)** section: • Added new subsections specifying Division 26 shall furnish and install **fusible safety switches** for air compressors. • Added provision requiring Division 26 to provide **power for Division 21 water reservoir alarm/control panels**. • Added coordination requirements with **Division 21 Contractor** and referenced **Fire Protection drawings** and Division 21 specifications.
	3.2 M (new)	Added new section **“Lighting Designer/Consultant’s Lighting Fixtures and Controls.”** Specifies that Division 26 shall provide power, installation, and testing per Sections **260900, 260923, and 265101** and coordinate with Lighting Designer/Consultant.
	3.2 N (new)	Added new section **A/V Systems Equipment.** Requires Division 26 to provide boxes, raceways, and power for **Owner-provided A/V Systems** and coordinate with Owner’s vendor.
	3.2 O (new)	Added new section **Existing Paging System Extensions.** Division 26 to provide power and raceways for extensions to existing paging systems, coordinated with Owner’s vendor.
	3.2 P (new)	Added new section **Existing CCTV Camera System Extensions.** Division 26 to provide boxes, raceways, and power for CCTV system extensions, coordinated with Owner’s vendor.
	3.2 Q (new)	Added new section **Existing Access Control System Extensions.** Division 26 to provide boxes, raceways, and power for access control system extensions, coordinated with Owner’s vendor.
260900 - Power Controls	**2.1 A – Acceptable Manufacturer**	The manufacturer’s contact information has been updated to remove the fax number and web URL was reformatted with secure link protocol.
	2.2 A – Power Control Enclosures	Minor editorial corrections to product description: “Echo Relay Panel Mains Feed (ERP)” retained but added clarification “Control-oriented power center” and standardized description to match current ETC product catalog.
	2.2 A.9 – Standards Compliance	Expanded to explicitly list compliance with **UL508**, **UL67**, **UL924**, and **ANSI E1.31 streaming ACN**. These were previously partially referenced; now fully enumerated and aligned with ETC product listings.
	3.1 B – Examination	Clarified contractor’s responsibility: added that “If substrate preparation is by another installer, notify Architect **in writing** of any unsatisfactory conditions prior to proceeding.” This was previously stated less formally.
	3.4 A – Field Inspection	Revised to specify that field inspections must be coordinated “**in accordance with appropriate sections in Division 01**” rather than “as required by Division 01.” Clarifies procedural responsibility.
	3.5 B – Cleaning and Protection	Expanded to include explicit requirement to “**Touch-up, repair, or replace damaged products before Substantial Completion.**” Previously only referenced cleaning.
260923 - Lighting Control Devices	**2.2 A – Time Switch Manufacturers**	Manufacturer list retained but clarified ordering: Eaton, Intermatic, Leviton. No other alternates added. Updated labeling guidance for UL WGZR compliance remains unchanged.
	2.3 A – Wall-Switch Occupancy Sensor Manufacturers	No change to technical performance, but manufacturer listing reformatted; product performance values (coverage 900 sq ft, PIR + ultrasonic dual tech, adjustable delay 1–15 min) confirmed and retained.
	2.4 A – Emergency Lighting Controls	Added explicit requirement that listed products be investigated per **UL 1008** under **UL CCN WPWR**, clarifying previous reference ambiguity.
	3.1 F – Examination (Verification Step)	Reworded verification statement to require confirmation that branch-circuit wiring installation is **completed, tested, and ready** prior to device connection (was “installed and ready”).
	3.3 C – Special Installation Techniques	Clarified coordination wording to include **partition assemblies** explicitly in list of elements sharing ceiling space; requirement unchanged otherwise.
	3.3 D – Interfaces with Other Work	Revised to specify **Section 260534** for outlet-box coordination (reference added). Added ADA note “All wiring devices shall be installed at heights as required by the A.D.A.”
	3.5 A – Adjusting (Occupancy Adjustments)	Expanded service window description: clarified “two visits to the Project site during other-than-normal occupancy hours.” No change to scope but increased scheduling detail.
260943 - Network Lighting Controls	**1.2 Related Sections**	Added new related section reference **260923 – Lighting Control Devices**; previously only referenced 265100 – Interior Fixtures.
	1.4 D	Clarified contractor coordination: electrical subcontractor must now provide each manufacturer **complete control device information** (expanded emphasis on cross-coordination).
	1.5 Reference Standards	Updated standard dates and added new reference **UL 1598C – LED Retrofit Luminaire Conversion Kits**; clarified inclusion of all “current editions, including revisions.”
	1.6 A.1	Expanded control unit description to include **Artnet** in addition to sACN, DMX, and 0–10V; clarified ability to handle both wired and wireless field devices.
	1.6 A.4	Added network communication requirement via **separate VLAN** for lighting data distribution to reduce data collisions and latency.
	1.6 A.6	Added protocol requirement that **wireless communication only allowed when DMX is not available and must still be DMX-controlled.** Strengthened hierarchy of protocol preference.
	1.6 A.15–18	Added new integration interfaces: **Audio Visual Equipment, BACnet, Tridium Niagara, and Energy Dashboard.**
	1.7 B	Added requirement for **Pre-Wire Meeting** including review of sensor layouts with manufacturer and possible relocation based on site conditions.
	1.7 B.5	Introduced reference to **Lighting Control Manufacturer Sensor Layout and Tuning Service** (new coordination requirement).
	1.10 F	Expanded code compliance requirements to include both **FCC and IC** compliance; previously referenced only UL and NEC.
	1.11 B	Revised environmental conditions for field devices to include **condensing humidity (0–100% RH) rating for damp locations**.
	1.13 A–B	Expanded manufacturer warranty to include **Platinum Enhanced Warranty (Lutron LSC-E8P)** with detailed coverage tiers for Years 1–8.
	2.1 A–F	Updated manufacturer list: added **Athena by Lutron**, **Pharos**, and **Obsidian Control Systems**; revised allowed sensor manufacturers to include **ENCELIUM Sensors by OSRAM SYLVANIA** and **PLC Multipoint**.
	2.2 D–E	Clarified acceptance of **non-proprietary DMX** and **0–10V/DALI drivers**, emphasizing cross-system compatibility.
	2.2 E	Added requirement for UL 924-listed devices to handle **120V/277V/347V/480V loads.**
	2.2 H	Rewrote lighting control software section to require **native, web-based graphical interface** with drag-and-drop programming and prohibit third-party linked graphics or spreadsheets.
	2.2 I	Added requirement for **3-D and multi-floor graphical visualization**, real-time feedback, and vector-based zoom/pan/tilt controls.
	2.2 L	Expanded daylight harvesting controls to include **open-loop and closed-loop averaging**, harmonized operation between multiple users, and reduced photo sensor quantity through shared inputs.

	2.2 N	Added detailed **Emergency Mode** specification requiring single-point interface with building emergency system.
	2.2 BB	Added limit stating system must control up to **20A load per group of luminaires.**
	2.2 DD–FF	Added new features: **Astronomical Clock**, **Auto-configuration for reconfigurable spaces**, and **Circadian color emulation (daylight cycle).**
	2.2 HH	Added **BAS interface** capability via **BACnet/IP or Tridium Niagara AX**, specifying feedback of lighting and sensor data to mechanical systems.
	2.2 II	Added **A/V system integration** requirement via **TCP/IP**, expanding interoperability with presentation systems.
262213 - Low-Voltage Distribution Transformers	**1.6 Delivery, Storage, and Handling – Item B**	Removed the second paragraph requiring repackaging of transformers after inspection; inspection clause simplified to note visible shipping damage only.
	3.2 Installation – Item A	Deleted sub-paragraphs referencing coordination of wall-mounted and structure-hanging supports; installation statement simplified to one line directing level and plumb installation with wall brackets fabricated — technical requirement unchanged.
	3.2 Installation – Items B and C	Deleted detailed guidance for constructing concrete bases, anchor-bolt inserts, and vibration-pad dimensions; retained general requirement to install level and plumb on vibration-dampening supports.
	3.2 Installation – Items D through G	Removed trapeze-mount, stacking-frame, and specific Korfund pad references; replaced with single general statement requiring vibration isolation and manufacturer-recommended anchorage.
	3.3 Connections	No change to wiring method or torque values, but minor edit: conduit minimum length kept (2 ft) – clarified "for connection to transformer case" → "to transformer enclosure" for clarity (no performance impact).
	3.5 Adjusting	Deleted requirement for "Output Settings Report" submission; adjustment criteria for voltage taps retained.
262726 - Wiring Devices	**1.3 Related Sections**	Added Section 260010 "Supplemental Requirements for Electrical" to related sections list.
	2.5 USB Receptacles – Description	Updated USB receptacle specification: changed from "Type A and C, 5A, 5V USB charging ports" to specify both Type A and C included for dual compatibility. Clarified that receptacles must maintain 5A total output, 5V regulated, not per-port.
	2.5 USB Receptacles – Device Face and Body	Added requirement for red devices and plates where noted; previously not mentioned.
	2.8 Cord Reels – Description	Updated cord specification from 35 feet to 45 feet of 12/3 Type SJOW cord. Added requirement for GFCI duplex receptacles in pendant outlet box. Clarified cord to include twist-lock plug connection.
	3.3 Installation	Added specific instruction to mount receptacles horizontally over counters and backsplashes; previously this was not stated explicitly.
	3.4 Interface with Other Products – Item B	Added explicit reference that "All wiring devices shall be installed at heights as required by the ADA."
	3.4 Interface with Other Products – Items C–F	Clarified mounting heights for switches (48"), receptacles (18"), and dimmers (48"); standardized text to include both inch and metric equivalents.
262813 - Fuses	**1.1 Summary – Related Requirements**	Added reference to **Section 260010 "Supplemental Requirements for Electrical."** This coordination reference was not present in Document 1.
	1.2 Action Submittals – Item B	Clarified that coordination curves and current-limitation charts must be provided **both in electronic format suitable for coordination software and in PDF**; electronic file requirement added.
	1.2 Action Submittals – Item B.6	Added explicit requirement to include **fuse sizes for elevator feeders and elevator disconnect switches.**
	2.1 Performance Requirements – Item D	Added explicit line identifying "**Third-party testing agency Listed**" requirement—new compliance verification note.
	2.1 Performance Requirements – Circuit Type Table	Added 200 kA interrupting-rating values for **each fuse class** (L, RK1/J, RK5). Previously ratings were general; now explicitly specified.
	2.1 Performance Requirements – Item E	Added permission for **Class K5 fuses** where fault current ≤ 50 kA—new design flexibility.
	2.2 Nonrenewable Cartridge Fuses – All Subsections	Added manufacturer lists (Bussmann/Eaton, Littelfuse, Mersen USA) and **UL listing criteria references** for each fuse class (J, L, RK1, RK5). Document 1 did not include manufacturer or UL category detail.
	2.2 Class L Fuse	Interrupting-rating increased from 200 kA to **300 kA (sym)**. Added requirement for **bolt-on terminals.**
	2.3 Spare-Fuse Cabinet	Added requirement for **15 percent spare-capacity minimum** and **beige baked-enamel finish.**
	2.4 Maintenance Material Items	Revised spare-fuse quantity from "10 percent of quantity installed" to clarify **minimum of three of each size and type.**
	3.2 Installation of Fuses – Item B	Added expanded list of **reference installation standards** (IBC, IFC, NFPA 1, 70, 70B, 70E, 350, NEIS 1, 402, 420). This list was new.
	3.2 Installation of Fuses – Item C	Added requirement to provide **open-fuse indicator fuses or covers with indication.**
	3.2 Installation of Fuses – Item F	Added coordination requirements to verify **fuse ratings vs. equipment nameplate limits** and **arc-flash/coordination-study results.**
	3.2 Installation of Fuses – Identification	Added label requirement for **"SPARE FUSES" legend in 1½-inch-high letters on cabinet door.**
262913.03 - Manual and Magnetic Motor Controllers	**1.2 Summary – Related Requirements**	Added reference to **Section 262813 "Fuses."**
	1.5 Informational Submittals	Added explicit requirement for **seismic qualification data** from manufacturer, including anchorage provisions and center-of-gravity data.
	1.9 Field Conditions	Defined **ambient operating range (23 °F – 104 °F)** and **altitude limit (≤ 6600 ft)** for continuous operation.
	2.2 Manual Motor Controllers	Added full manufacturer list (ABB, Eaton, Siemens, Square D) and overload-relay specifications (Class 10 bimetallic, ambient compensated type). Added **red pilot-light requirement** for each controller.
	2.3 Enclosed Full-Voltage Magnetic Motor Controllers	Added detailed requirements for **UL 508 and UL 60947-4-1 compliance**, **NEMA ICS 2 Class A**, encapsulated contactor coils, thermal overload relays (Class 10), and **automatic resetting feature**.
	2.4 Combination Full-Voltage Magnetic Motor Controllers	Added Class II ground-fault protection per UL 1053; added **digital RS-485 Modbus communication module** with monitoring of current, voltage, and energy (kWh). Added disconnecting-means options (fusible, non-fusible, MCP, MCCB) with padlockable handles.
	2.5 Enclosures	Defined **NEMA 250 Type 4X** rating; added requirement for compliance with NEMA ICS 6 construction and UL 1203 for classified locations.
	2.6 Accessories	Added **NEMA ICS 5 compliance** for control circuit/pilot devices and clarified heavy-duty/oil-tight requirements.
	2.7 Identification	Added detailed **arc-flash label requirements** per Sections 260573 and 260553 including label size, orange header, and required data fields (voltage, incident energy, category, etc.).
	3.2 Installation	Added compliance with **Section 260548.16 "Seismic Controls for Electrical Systems"** and maintained minimum NFPA 70 clearances.
	3.4 Field Quality Control	Added **infrared inspection** procedures per NFPA 70B and NETA ATS including 60-day and 11-month follow-up scans, detailed reporting items, and temperature sensitivity criteria.
	3.5 System Function Tests	Added requirement for verifying **interlock safety, alarm, and indicating devices** as part of complete functional testing.
262923 - Variable-Frequency Motor Controllers	**1.1 Summary – Related Requirements**	Added reference to Section 262813 "Fuses."
	1.4 Informational Submittals	Added requirement for **Seismic Qualification Data**: manufacturer must provide center of gravity, anchorage details, and certification based on tested anchorage.
	1.4 Informational Submittals – Item E	Added new **Harmonic Analysis Report** requirement per IEEE 519.
	1.9 Project Conditions	Revised environmental limits: added NEMA 4X sealed enclosure requirement for outdoor locations; altitude limit changed from 3300 ft to **100 ft** for standard operation.
	1.10 Warranty	Extended warranty period from **one year to five years** from date of Final Acceptance.

	2.1 Manufacturers	Added Eaton to approved list; reorganized manufacturer names for consistency.
	2.2 System Description	Added requirement for compliance with **NEMA ICS 61800-2** and expanded NEMA ICS 7 reference.
	2.2.C VFC Description	Clarified that units must be **NRTL listed and labeled as a complete unit**; added integrated short-circuit current withstand rating requirement.
	2.2.F Unit Operating Requirements	Revised minimum efficiency to **96% at full load** and minimum short-circuit withstand rating to **22 kA**. Added power factor and overload capability requirements.
	2.2.J Self-Protection	Added surge suppression per **UL 1449 Type 1 or Type 2 SPD**, added critical frequency rejection, phase-loss, reverse-phase, and motor-overtemperature protections.
	2.2.K Automatic Reset	Added specific requirement for **three restart attempts** with adjustable delay between attempts.
	2.2.M Bidirectional Autospeed Search	Added this as a new capability for motors to resume rotation in either direction.
	2.2.P Integral Disconnecting Means	Changed to require **fusible switch with padlockable handle** per NEMA KS 1. Added auxiliary contact operation sequence details.
	2.3 Performance Requirements	Added new **Seismic Performance** section: testing per ASCE/SEI 7 and ICC-ES AC156; defined "withstand" operational requirements after seismic events.
	2.4 Controls and Indication	Expanded control interfaces: added real-time clock, fault log, multi-level access security, multiple digital/analog input/output configurations, and **PID control interface** for dual feedback.
	2.4.H DDC Interface	Added requirement for **ASHRAE 135** (BACnet) communication compatibility with DDC systems.
	2.5 Line Conditioning and Filtering	Added total harmonic distortion (THD(V)) limit ≤ **5%**, new **output reactor** requirement for cable runs >75 ft.
	2.6 Bypass Systems	Added detailed requirements for **two-contactor-style bypass**, isolation switch, manual/automatic transfer logic, overload integration, and damper/end-of-travel feedback.
	2.7 Enclosures	Revised to require **NEMA 4X** for both indoor and outdoor locations; added **plenum rating per UL 1995**.
	2.8 Accessories	Added new accessories: phase-failure/reversal protection, space heaters with NC contacts, breather/drain assemblies, and **sun shields** for outdoor installations.
	2.9 Source Quality Control	Added factory testing per **NEMA ICS 61800-2** with on-motor verification and inspection report submittals.
	3.2 Installation	Added seismic restraint requirements per **Section 260548**; added references to **Section 260010** for supplemental electrical coordination; clarified VFC to motor conduit distance ≤ 10 ft.
	3.5 Field Quality Control	Added mandatory **infrared thermographic scan** testing 60 days and 11 months after Final Acceptance per NFPA 70B.
	3.7 Adjusting	Added explicit procedure for circuit-breaker trip settings (6–8x FLA, 11x for premium motors); referenced **Section 260573 "Power System Studies."**
	3.9 Demonstration	Added requirement for **Owner training** on programming, adjustment, and maintenance.
265000 - Lighting	**1.1 Summary – Related Requirements**	Added reference to Section 260010 "Supplemental Requirements for Electrical."
	1.1 Summary – Scope	Clarified that section includes both *luminaires* and *luminaire fittings* .
	1.3 Action Submittals – Product Data for Luminaires	Added detailed requirements for photometric data certified under NVLAP, construction details, finishes, operating and electrical characteristics, luminaire schedule format, battery and charger data, ballast factor, lumen/CCT/CRI data, photometric test data, and warranty language.
	1.3 Action Submittals – Luminaire Fittings	Added requirement for product listing approval letters from qualified testing agencies, detailed construction data, operating data, and manufacturer warranty sample.
	1.3 Action Submittals – Shop Drawings	Added requirement for drawings and wiring diagrams for custom luminaires, including weights, loads, clearances, and field connections.
	1.4 Informational Submittals	Added manufacturer's published instructions and field report requirements for both field QC support and system startup.
	1.9 Warranty for Batteries	Added explicit extended-warranty periods: **five years for Li-ion and Ni-Cd batteries**, materials only, freight prepaid.
	2.1 Performance Requirements	Added requirement that products be *listed and labeled* per NFPA 70 by qualified laboratories and marked for intended location and application.
	2.2 Surface-Mounted Luminaires	Added UL listing criteria (UL CCN IFAM and IFAW with UL 1598), corrosion-resistant hardware/finish for damp environments, and reference to fixture schedules for manufacturers.
	2.2 Recessed Luminaires	Added source limitation to one manufacturer per type and UL CCN IFAO listing; added standard features including ceiling compatibility (NEMA LE 4) and light-leak prevention.
	2.2 Track-Lighting Systems	Added UL CCN IFFR listing with UL 1574 and compatibility marking requirements.
	2.3 Luminaire Fittings	Added performance requirements for supports (horizontal force = 100 % of weight, vertical = 400 %), plus hook hangers, ASTM A641 wire supports, stainless-steel aircraft cables, steel stems/rods and finishes.
	3.3 Installation – Reference Standards	Added full list of installation standards: ICC IBC, ICC IFC, NFPA 1, NFPA 70, NECA NEIS 1, 331, 500, 501; NFPA 350, 410, 700 NFPA 101; clarified coordination with Architect for conflicts.
	3.3 Installation – Exterior Bollard and In-Ground Luminaires	Added installation on 4 in high concrete bases with conduit cast in place; referenced Section 033000 "Cast-in-Place Concrete."
	3.3 Installation – Corrosion Prevention	Added restrictions on aluminum contact with earth or concrete and requirements for protective wrapping of steel conduits.
	3.3 Installation – Suspended and Ceiling-Grid Mounted Luminaires	Added seismic-restraint requirements (wire or rod with breaking strength > luminaire weight × 3).
	3.4 Field Quality Control – Testing	Added requirement for independent testing agency and factory-authorized service representative to perform tests and submit field QC reports; added photometric measurements for exterior illumination at night.
	3.5 System Startup	Added detailed startup tasks: complete installation checks, burn-in lamps before occupancy, charge batteries 24 hours, and conduct one-hour discharge test.
	3.6 Adjusting	Added requirement to inspect all luminaires during aiming adjustments and replace defective units with manufacturer-authorized parts.
	3.7 Closeout Activities	Added Owner training on adjustment, operation, and maintenance of luminaires and photoelectric controls.
265100 - Architectural Interior Light Fixtures	**1.2 Related Sections**	Added reference to **Section 265000 – Lighting** and **260923 – Lighting Control Devices.**
	1.4 General Requirements	Added explicit requirement for **luminaire supplier coordination with lighting-control manufacturer** for dimming compatibility and system integration.
	1.5 Standards	Added **IES LM-79, LM-80, and TM-30** references; clarified that LED fixtures must meet **DOE Energy Star** and **California Title 24** efficiency criteria.
	1.7 Substitutions	Added condition that alternate manufacturers must provide **IES photometric data, mock-up samples, and UL compliance proof** before approval.
	1.8 Submittals for Review	Added requirement for **electronic submittals with IES and Revit (RFA) files.** Mock-ups must now include photometric measurements verified by Architect.
	1.10 Quality Assurance	Added requirement for **third-party certified installer training and factory-authorized startup technician for complex systems.**
	1.11 Warranties	Extended warranty from **1 year to 5 years for fixtures and drivers.** Added **10-year finish corrosion warranty** for marine-grade locations.
	1.12 Extra Products	Added requirement for Owner-turnover of **10 % extra LED modules and drivers** (minimum one per type).
	2.1 General Requirements	Added compliance with **UL 8750 and IEC 61347** for LED drivers; required **PF ≥ 0.9** and **THD < 20 %.**
	2.1 Mounting Hardware	Added requirement for **316 stainless steel or marine-grade aluminum hardware within 100 ft of saltwater.**
	2.1 Reflector Cones	Increased minimum reflectance requirement to **85 %** (from 83 %); added **PVD coating option** for corrosion control.

	2.1 LED Lighting Systems / Fixtures	Revised minimum CRI from 80 to **90**; added CCT tolerance of ±100 K and lumen-maintenance requirement of **L90 @ 60,000 hrs.**
	2.1 LED Drivers	Added requirements for **0-10 V and DMX/RDM protocol support**, **inrush-current limiting**, and **surge suppression ≥ 10 kV.**
	2.1 Testing	Added factory burn-in period of **24 hours (minimum)** for each fixture prior to shipment.
	2.1 Environmental Rating	Added explicit ratings for IP65 wet and IP68 submersible locations; defined "marine environment" requirements for aquarium spaces.
	2.2 Lighting Fixture Descriptions	Added directive to base all types on **updated Lighting Schedule LT-004**; included driver dimming curve coordination with control system manufacturer.
	3.1 Execution	Added requirement for **factory startup verification report** and **photometric performance validation test before final acceptance.**
	3.1 Wiring	Added **color-coding standardization for DMX and power leads** and requirement for **separate neutrals per dimming circuit.**
	3.3 Field Quality Control	Added mandated **infrared thermographic inspection and functional dimming test** per NFPA 70B.
265200 - Emergency and Exit Lighting	**1.1 Summary**	Removed reference to *LED emergency drivers, lighting inverters, and transfer switching devices* – scope limited to *emergency exit lighting* and *emergency egress lighting units only* .
	2.3 LED Emergency Driver	Entire section **deleted** (manufacturer-installed UL 924 LED emergency battery supply and diagnostics).
	2.4 Exit Lighting Units	Entire section **deleted** (construction, battery, charger, lamp, and housing requirements for exit signs).
	2.5 Transfer Switching Devices	Entire section **deleted** (UL 924 relay devices, voltage ratings, dimmer override, and five-year warranty).
	3.5 Demonstration and Instructions – Testing	Retained existing 90-minute battery test procedure but **removed** cross-reference to State Construction Office submission and deleted requirement to submit test report to SCO (only Architect/Engineer copy remains).
	Overall Product Scope	Revised specification now applies **only to self-contained LED emergency lighting (egress)** fixtures. All references to *exit signs* , *inverters* , *transfer switches* , and *LED emergency drivers* were removed.
	Cross-References	Removed Section 260553 (Identification for Electrical Systems) and all references to sections relating to deleted products.
265613 - Lighting Poles and Standards	**1.3.B.4**	Requirement for foundation construction details **no longer specifies signed/sealed structural calculations by a licensed professional engineer**.
	2.1.E.1	**Wind load parameters removed:** "Basic Wind Speed: 150 mph," "Wind Importance Factor: 1.0," "Minimum Design Life: 25 years," and "Velocity Conversion Factor: 1.3."
	2.1.H	Detailed finish quality control text removed (protective coverings, sample variance tolerances).
	2.2.A	**Mounting provision type** removed — no longer specifies "butt flange for bolted mounting or breakaway support."
	2.2.D	Material compatibility details for fasteners simplified; **galvanizing and galvanic action notes deleted.**
	2.2.F	Full description of **clear-anodic finish (AA-M32C22A41)** deleted; finish standard now references only NAAMM guidelines generally.
	2.2.G	**Powder coat finish section reduced** – removed detailed surface prep and curing specs (SSPC, AAMA 2604 thickness, and color specification).
	2.4.A–C	Retained anchor bolt, nut, and washer standards; **deleted galvanizing references (ASTM A153 Class C)** and bent rod specification.
	2.5.A	Submittal list reduced – **removed requirements for construction details, weights, design loads, and pole foundation certificates.**
	3.3.C.1–3	Deleted detailed torque tightening, seismic resistance, grout filling, drain hole, and base cover installation instructions.
	3.4.B	Conduit corrosion protection simplified – **removed specific wrapping thickness and overlap (0.010" tape, 50% overlap).**
	3.5.A.1	Grounding revised – **removed note that grounding electrode be installed unless otherwise indicated.**
	3.7.B	Field testing simplified – **inspection for nicks, dents, and scratches removed; system function testing retained.**
271100 - Communications Equipment Room Fittings	**1.1 Summary – Products Installed, but Not Furnished**	Added explicit cross-reference to **Section 260010 "Supplemental Requirements for Electrical"** for shared definitions, submittals, and testing requirements.
	2.1 Communications-Circuit Accessories – Performance Criteria	Added detailed **UL listing references** (UL 1863 and UL 467 for communications circuits; UL 1977 and UL 467 for A/V and data circuits) and clarified **NFPA 70** listing requirement.
	2.1 UL DUXR – 66-Style or 110-Style Cross-Connect Frame	Added requirement that frames **match Owner's existing equipment** and be sourced from a single manufacturer.
	2.1 UL DUXR – Patch Panel	Added detailed **mounting types (equipment or wall rack), modular configuration, EMI compatibility (unshielded), and labeling provisions**; also required 25 % spare port capacity and Cat 6 cable compatibility.
	3.1 Preparation – Shop Drawings	Added complete list of required coordination items (equipment rack clearances, bonding busbar locations, luminaires, controls, and power receptacle coordination).
	3.3 Installation of Bonding for Communications – Reference Standards	Added **BICSI N3** as governing standard for bonding and grounding of communications systems.
	3.3 Installation of Bonding – Special Techniques	Added explicit installation rules: horizontal busbar mounting height (12 in above floor), no stacking conductors under one bolt, minimum bend radius (10× conductor diameter), maximum bend (90 °), and support spacing (36 in max).
	3.4 Field Quality Control for Bonding of Communications	Added specific test procedures: two-point bonding resistance tests (max 100 mΩ), earth resistance limit (5 Ω to ground), and ground-loop current test (max 1 A). Referenced **BICSI N1** test process.
	3.4 Field Quality Control – Nonconforming Work	Added requirement to **remove and replace** any defective bonding connections and retest until compliance is achieved.
323300 - Site Furnishings	**2.6 REMOVABLE STANCHIONS – Frame and Finish specifications**	Changed from **"Frame: Stainless Steel; Finish: Satin"** to **"Frame: Powdercoat; Color: Black."** All other dimensional requirements remain the same.