IDENTIFICATION SYSTEMS

1. GENERAL

1.1 Summary

.1 This Section covers the supply and installation of permanent identification nameplates, labels and markers for mechanical and heating, ventilation, and air conditioning (HVAC) equipment, pipework, gates, and valves.

.2 Requirements for the supply and installation of permanent identification nameplates, labels and markers for electrical equipment, panels, process equipment, tanks and instruments are specified further in detailed specification.

1.2 Standards

.1 Canadian General Standards Board (CGSB):

.1 CAN/CGSBA 24.3 – Identification of Piping Systems.

.2 CGSB 1-GP-12 – Standard Paint Colours.

.2 The City of Winnipeg Water and Waste Department (WWD):

.1 WWD Identification Standard.

.2 WWD Painting Colour Standard.

1.3 Submittals

.1 Submit product data in accordance with Section 01300.

.2 Sixty (60) Calendar Days prior to commencing any site commissioning activities submit the following:

.1 A typed copy of Nameplate Schedule for mechanical and HVAC equipment, pipework, valves, electrical equipment, panels, and instruments as identified in the equipment list and the instrument index. Submit a separate schedule for each circuit breaker panel. Include panel or motor control centre (MCC) control devices (e.g., signal conditioners, relays, timers) mounted within the enclosures and not listed on the equipment list but identified on motor control schematics and/or instrument loop diagrams. Submit a separate legend/schedule for each panel and MCC control device. Identify Nameplate Schedule as "Preliminary".

.2 A Marker/Legend Schedule to be provided for all pipework commodities.

.3 A typical engraved sample of nameplates for equipment, instruments, and valves,

.4 Typical pipe marker samples with identification label and directional arrow.

.3 A minimum of forty (40) Business Days prior to equipment checkout completion, submit Nameplate and Marker Schedules and a list of all pipes by commodity and their corresponding painting colour for approval by the Design Builder.

2. PRODUCTS

2.1 Equipment Manufacturer's Nameplates

.1 Provide nameplate on each piece of equipment, factory applied, mechanically fastened with raised or recessed letters.

.2 Provide nameplates made of brass or stainless steel. Select material that is suitable for the material and the environment such that they last as long as the equipment or instrument they are identifying.

.3 Provide ULC or CSA registration plates, as required by respective agency.

.4 Manufacturer’s nameplates to indicate size, equipment model, Manufacturer’s name, serial number, voltage, cycle, phase, power of motors, electrical characteristics, and other pertinent information for any other services connections.

.5 Nameplates to be located so that they are easily read. Do not insulate or paint over nameplates.

.6 Include other information as required by the equipment Specifications.

.7 Install markers as required to mark equipment and items securely and in highly visible locations.

.8 Provide markers that are suitable for the material and the environment such that they last as long as the item they are marking.

2.2 Equipment and Instrumentation - Project Identification Nameplates

.1 Supply and install white lamicoid identification plates, with black lettering, for all equipment and instrumentation installed under this contract. Provide identification plates that are engraved with the unit’s name and equipment number in 12 mm high lettering and electrical characteristics, if applicable, in 6 mm high lettering, as shown in the following example:

ISOLATION SLUICE GATE
SG-Z100

600V/3PH/60HZ

CIRCUITS A101, A102, A103

.2 Submit list of plates for review prior to engraving.

.3 Nameplates should be at least 2 mm thick.

.4 For clarity, the specified nameplates in this specification are in addition to the equipment nameplates provided by the supplier.

2.3 Valves

.1 Provide all valves with a white lamicoid tag, with 12 mm black engraved names and numbers.

.2 If valve tags will be installed greater than 2.4 m above ground level, then increase the font on the tag to 14 mm.

.3 Number valves as directed by the Contract Administrator or as shown on the Drawings.

.4 Attach tags to valves using fasteners. Adhesive mounts are not acceptable.

.5 If fasteners cannot be used to attach a valve tag, then attach the valve tag using a durable stainless-steel chain unless otherwise directed by the Design Builder.

2.4 Piping

.1 For all piping installed under this Contract, use pipe markers designating the pipe service and the direction of flow.

.2 Apply intermittent markings on straight pipe runs, close to all valves, fittings, or junction boxes and adjacent to all changes in direction or where pipes pass through walls or floors.

.3 Adjacent to major valves and where valves are in series at no more than 5 m intervals.

.4 On both sides where piping passes through walls, partitions, and floors.

.5 At point of entry and leaving each pipe chase and/or confined space and piping accessible at each access opening.

.6 At the beginning and end points of each run; and, at each piece of equipment in each run.

.7 For above ground pipework and exposed conduit, provide mechanically attached type background colour markers that are easily removable.

.8 For underground pipework and conduit, provide stretchable polyethylene ribbon or detectable ribbon laid a minimum of 150 mm above the buried pipe. All ribbon to be detectable by standard utility location equipment, or additional tracer wire to be required.

.9 Identification arrows, labels and letters to painted on the pipes. Use white colour paint for arrows and identification marker label on dark colour painted pipes and black colour paint for arrows and identification marker label on light colour painted pipes.

.10 Make direction arrows 150 mm long x 50 mm wide for piping with an outer diameter 75 mm or larger, including insulation. Use 100 mm long x 20 mm wide arrows for smaller diameter piping. Provide double headed arrows where appropriate.

.11 Use block capital letters for names, 50 mm high for piping with an outer diameter 75 mm or larger, including insulation. Use 20 mm high letters for smaller diameters. Identify the pipe commodity using the full names detailed on the Drawings.

.12 Use stainless steel tags for pipes and tubing with an outer diameter 20 mm and smaller.

2.1 Colour Coding

.1 Use a colour coded identification system on the following items:

.1 All piping and valves: Fully paint the piping and the valves in the colour of the system.

.2 Paint the valves on fire protection systems red.

.3 All pumps: paint pumps in the colour identifying the material being pumped.

.4 All motors: paint all motors grey.

.5 Identification of pipes by bands is permitted only if pipe painting is determined non feasible by the Design Builder.

.6 All painting of pipes, valves, motors, pumps, and other equipment shall follow the WWD Paint Colour Standard.

.7 Paint products shall be low VOC (Volatile Organic Compound) or water based wherever possible.

.2 Select identification colours in accordance with the colour scheme specified below:

Commodity	Colour Name	Sherwin Williams Paint Code	Colour
Air High Pressure	Really Teal	SW6489	
Air Low Pressure	Open Air	SW6491	
Air Mixed	Cloudburst	SW6487	
Biosolids, Dewatered	Protégé Bronze	SW6153	
Biosolids, Liquid	Universal Khaki	SW6150	
Centrate, Final	Morning Sun	SW6672	
Centrate, Intermediate	June Day	SW6682	
Citric Acid	Lemon Twist	SW6909	
Condensate	Moonmist	SW9144	
Dewatered Scum	Dark Night	SW6237	
Drain	Armagnac	SW6354	
Exhaust Air	Mindful Gray	SW7016	
Filtrate	Beige	SW2859	
Foul Air	Avocado	SW2861	
Hauled Liquid Waste	Browse Brown	SW6012	
High-Rate Clarification Effluent	Alexandrite	SW0060	
Lubricating Oil	Copper Mountain	SW6356	
Magnesium Chloride	Dockside Blue	SW7601	
Methanol	Gallant Gold	SW6391	
Micro-Sand Makeup	Sequin	SW6394	
Mixed Polymer	Earl Grey	SW7660	
Non-Potable Water	Something Blue	SW6800	
Outside Air	High Reflective White	SW7757	
Phosphorus Recovery Effluent	Veri Berri	SW9069	
Process Gas	Retro Mint	SW9036	

Commodity	Colour Name	Sherwin Williams Paint Code	Colour
Process Overflow	Coral Rose	SW9004	
Process Vent	Extra White	SW7006	
Rain/ Roof Water	Porch Ceiling	SW9063	
Raw Sewage	Sturdy Brown	SW6097	
Refrigerant	Festoon Aqua	SW0019	
Sample	Positive Red	SW6871	
Screenings	Cascades	SW7623	
Seal Water	Watery	SW6478	
Service Air	Shamrock	SW6454	
Sludge High-Rate Clarification	Silver Strand	SW7057	
Sludge, Conditioned	Rock Bottom	SW7062	
Sludge, Dewatered	Attitude Gray	SW7060	
Sludge, Hauled	Magnetic Gray	SW7058	
Sludge, Phosphorus Released	Oak Leaf Brown	SW7054	
Sludge, Screened	Blackberry	SW7577	
Sodium Hydroxide	Brave Purple	SW6823	
Sodium Hypochlorite	Fun Yellow	SW6908	
Steam	Carnival	SW6892	
Struvite	Izmir Purple	SW6825	
Supernatant, Fermenter	Center Stage	SW6920	
Tempered Water	Jaipur Pink	SW6577	
Thickened Waste Activated Sludge	Black Magic	SW6991	

.1 For commodities not listed, submit recommendation for review by the Design Builder and Engineer.

.2 A list of Commodities that are used on this project but not listed in WWD Paint Colour Standard is provided below for the Contractor to recommend painting colour and submit for review and approval:

Commodity	Commodity Symbol
Dewatered Scum	SCD
Drain	DRA
Exhaust Air	EA
Filtrate	FLT
Foul Air	FOA
Mixed Polymer	MP
Non – Potable Water	W2
Outside Air	OA
Process Overflow	PO
Sanitary	SAN
Tempered Water	TW

.3 Identification shall consist of the following:

.1 Coating or banding of pipes and coating of valves to the colour of the medium being conveyed.

.2 Coat non-submerged process equipment to match the colour requirement of the material being processed.

.3 Finish valve handles and similar appurtenances in black.

3. EXECUTION

3.1 Manufacturer's Nameplates

.1 Locate nameplates so that they are easily read. Do not insulate or paint over plates.

3.2 Equipment Identification Nameplates

.1 Attach plates to the equipment with rivets, sheet metal screws, or nuts and bolts, or 2-part epoxy adhesive, in a location approved by the equipment Manufacturer and nameplate manufacturer.

.2 Fasten plates in conspicuous locations. Where plates cannot be mounted on hot or cold surfaces, provide standoffs.

.3 Fastening/ attachment of identification plates shall not compromise the safety and functionality of the equipment.

3.3 Valves

.1 Attach tags to all valves with high durability stainless steel chain or nuts and bolts. Ensure tags are easily accessible from operator location and do not conflict with valve operation.

3.4 Piping

.1 On completion of protective coatings or finish painting, neatly stencil direction flow arrows and the commodity abbreviation on the pipe.

.2 Stencil or attach pipe markers in readily visible locations. Identify piping at the following locations:

.1 At each valve.

.2 On both sides of wall penetrations.

.3 At floor and roof penetrations.

.4 On each leg of branches.

.5 Every 15 m along continuous runs.

END OF SECTION

SUBMITTALS

1. GENERAL

1.1 Summary

.1 Provide reviewed Shop Drawings for informational review by the City a minimum of 28 days prior to installation.

.2 Do not proceed with Work affected by submittal until review is complete by the designer.

.3 Present Shop Drawings, product data and samples in SI Metric units.

.4 Where items or information is not produced in SI Metric units, converted units are acceptable.

.5 Submittals shall be stamped, signed, dated, and identified as to which component of the project they will be used.

.6 Design Builder to notify the City in writing at time of submission, identifying any deviations from the Final Design.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Provide reports and test data required in the Specifications.

1.2 Shop Drawings and Product Data

.1 Provide extended warranty documentation where required.

.2 Design Builder shall provide Shop Drawings for all supplied equipment to the City.

.3 The term "Shop Drawings" means drawings, diagrams, model of equipment, nameplate information, size, weight, dimensions, illustrations, schedules, performance charts, brochures, reports, certified copies of factory testing data including calibration on test equipment, test data required by the Specifications and Design calculations.

.4 Design Builder shall provide to the City for review, all documents, reports, plans, Drawings, Specifications, Design calculations, data, certificates, samples, Shop Drawings, mock-ups, logs, tests, methods, schedules, catalogue cuts and Manufacturer's installation and other instructions, guides and manuals as required by Schedule 18 Technical Requirements, and as required by the City to fully demonstrate that the design and construction complies with the Schedule 18 Technical Requirements.

.5 Shop Drawings are to clearly indicate bill of materials, name plates, colour, tag numbers, model numbers, methods of construction, erection diagrams, connections, explanatory notes, and other information necessary for completion of the Work.

.6 Shop Drawings shall include operation and maintenance information including, trouble shooting guides, spare part requirements, recommended lubricants and maintenance schedule, and explanatory notes that will impact the operation of the equipment.

.7 Provide hydraulic calculations for all water controlling equipment and Manufacturer's certification in accordance with the Hydraulic Institute.

.8 Bearing life and design data, certified by equipment Manufacturer. Provide bearing temperature operating range for the service conditions specified.

.9 All quality assurance and quality control procedures, records, certifications, standard forms, samples, testing results, reports, and personnel and firm qualifications and references.

.10 Provide a list of materials for the specified service. Provide documentation showing material compatibility with process fluid and service specified.

.11 Completed Factory Acceptance Testing, modeling work, installation, performance and commissioning testing and inspection forms.

.12 Shop Drawings shall also clearly indicate internal and external electrical interconnection details, HMI screens, required insulation, conduit and connection details, grounding requirements, control schematics, motor characteristics, electrical enclosure types, rotational direction, motor efficiency, cable entry, and programming.

.13 Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop Drawings must be submitted with the appropriate Specification Sections attached. Notify the Engineer in writing of any deviations in Shop Drawings from the Schedule 18 Technical Requirements.

.14 Examine all Shop Drawings prior to submission for review by the designer to ensure that all necessary requirements have been determined and verified and that each Shop Drawing has been checked and coordinated with the requirements of the Work and the Schedule 18 Technical Requirements. Prior to submission, examination of each Shop Drawing shall be completed by the Design Builder. The Design Builder shall indicate this examination has been completed by stamp, date and signature of the Shop Drawing. Shop Drawings not stamped, signed and dated will be considered incomplete.

.15 Provide reviewed Shop Drawings with reasonable promptness and in an orderly sequence such that they are provided to the City a minimum of 28 days prior to installation.

.16 Any general review by the City, if provided, is only for information purposes and shall not relieve Design Builder of its responsibility for errors or omissions in Shop Drawings or for proper completion of the Work in accordance with Schedule 18 Technical Requirements.

.17 Responsibility for verification and correlation of field dimensions, fabrication processes, techniques of construction, installation and coordination of all parts of the Work rests with the designer.

1.3 Submittals

.1 Shop Drawings will be reviewed by the designer and only the completely reviewed Shop Drawings shall be provided.

.2 Shop Drawings indicating design requirements require the seal of a qualified Professional Engineer, registered in the Province of Manitoba.

.3 Submit Shop Drawings electronically via Design Builder's Document Management System. Make sure all submissions are clear and readable.

.4 Remove information not applicable to the Works in the Shop Drawing.

.5 Any review of Shop Drawings by the City is for sole purpose of ascertaining conformance with general concept.

.1 A review shall not mean that the City approves detail design inherent in Shop Drawings, responsibility for which shall remain with Design Builder, and such review shall not relieve Design Builder of responsibility for errors or omissions in Shop Drawings or of responsibility for meeting the Schedule 18 Technical Requirements.

.2 Without restricting generality of foregoing, the Design Builder is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation.

.6 Identify location where item is to be installed.

.7 Provide an exposure table for equipment identifying the exposure area for each location, room, or space at the Facility.

.8 Vibration testing plans including test equipment, calibration, certificates, location of transducers, operating speed and operating parameters showing machine load.

.9 A copy of the contract mechanical process, electrical and instrumentation drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this Specification Section. If no changes are required, mark all drawings with "No changes required" or provide a statement that no changes are required.

.1 Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.

.10 A copy of this Specification Section with addenda and all referenced Specification Sections with addenda, with each paragraph check-marked to indicate Specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.

.1 If deviations and clarifications from the Specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

.2 Failure to include a copy of the marked-up Specification Sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up Specifications and justifications are submitted in a complete package.

1.4 Samples

.1 Submit for review samples in duplicate as requested in respective Specification Sections to the Owner. Label samples with origin and intended use. Provide access to samples for City upon request.

.2 Provide a general colour scheme to be followed, complete with colour samples.

.3 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 Photographic Documentation

.1 Submit electronic copy of colour digital photography in jpg format, standard resolution, with monthly report.

.2 Project identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: sufficient to show entire project site.

.4 Frequency of photographic documentation: daily.

1.6 Transmittal Procedure

.1 Accompany submissions with transmittal letter containing:

.1 Date.

.2 Project title and work component.

.3 Name of approving Engineer.

.4 Name of Supplier and Manufacturer.

.5 Construction Contractor's name and address.

.6 Provide copy of the Specification Section that describes the product where applicable.

.7 Identification and quantity of each Shop Drawing, product data and sample.

.8 Other pertinent data necessary for Engineer’s review.

.2 Use a separate form for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required. Identify Construction Contract Document, equipment numbers, equipment descriptors, Drawing numbers, and Specification Sections for each submittal and item in each submittal.

.3 Identify submittal documents common to more than one piece of equipment with all the appropriate equipment numbers.

.4 Use a single form for submittals for various items when the items taken together constitute a Manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 Requirements

.1 Provide all mounting details including anchor details, equipment pads, baseplates, steel frame details, expansion joint locations, group type and placement details.

.2 For valves and gates, provide calculation of breakaway lift and thrust forces, stress and gates and deflection under design head, shaft deflection, leakage calculations, and integration details with actuators.

.3 For all pumps provide operating data for pump curves anticipated shaft deflection, service life, operating temperatures, alignment tolerances, NPSH requiring efficiency and discharge characteristics, details of impellors, solid sphere passing capacity, seal details, lubrication requirements and critical speed analysis as required.

.4 For mixing systems, provide all calculations of energy gradient pertinent details illustrating the ability to maintain homogeneity, power requirements, and characteristics of induced flow and self-cleaning characteristics.

.5 For blowers provide all operating data for blower curves including humidity, pressures, operating temperatures, air filter requirements, sensors, silencers, noise levels, pressure relief settings, capacity, inlet pressure requirements, installation tolerances and efficiency.

.6 For electrical components provide electrical rating, panel layouts, enclosure types, wiring diagrams for internal and external areas, inter connection diagrams, control schematics, overloads, cooling requirements, mounting methods, rotational direction.

END OF SECTION

AREA EXPOSURE DESIGNATIONS

1. GENERAL

1.1 Summary

.1 This Section covers area exposures designations for each location, room, area, or space at the Facility.

.2 Use area exposures to specify materials of construction based on the corrosive environment in each space of the Facility.

.3 Designate areas for electrical equipment in accordance with Division 16.

1.2 Definitions

.1 Exposure terminology used in this Section conforms to the definitions following this paragraph. Exposures are listed in order of least to most severe corrosion potential.

.1 Indoor Dry: locations inside a building or other enclosed structure not subjected to wash down and not in contact with a liquid holding or earth retaining wall.

.2 Indoor Wet: locations inside a building or structure that are damp or subject to wash down, or surfaces of structures that are in contact with a liquid holding or earth retaining wall or slab.

.3 Outdoor: unenclosed locations that are not protected from the weather. Design Builder shall familiarize itself with local weather conditions (temperatures, relative humidity and precipitation).

.4 Buried: below grade walls or roofs; locations covered and in contact with earth/soil.

.5 Submerged: locations inside a covered liquid or solids holding structure that are below a plane located 300 mm below the minimum operating level and locations inside an open liquid or solids holding structure that are below the top of wall.

.6 Process Corrosive: locations exposed to high humidity, frequent wash down and dilute corrosive gases from the process stream.

.7 Head Space: locations inside a covered liquid or solids holding structure that are above a plane located 300 mm below the minimum operating level.

.8 Chemical Corrosive: walls, ceilings, floors, trenches, and other surfaces exposed to delivery, storage, transfer, use or containment of corrosive chemicals.

.2 Environmental Conditions: environmental conditions for each exposure are tabulated below:

	Exposure	Environment	Chemical Exposure	Chemical Concentration
(1)	Indoor Dry	Atmospheric, Dry	None	Not Applicable
(2)	Indoor Wet	Atmospheric, Wet	None	Not Applicable
(3)	Outdoor	Atmospheric, Wet	None	Not Applicable

AREA EXPOSURE DESIGNATIONS

	Exposure	Environment	Chemical Exposure	Chemical Concentration
(4)	Buried	Solution	Earth/Soil	Not Applicable
(5)	Submerged	Solution	Various Chemicals	Dilute
(6)	Process Corrosive	Atmospheric, Wet	Hydrogen Sulfide Chlorine Trace Chemicals	>1 parts per million Dilute Dilute
(7)	Head Space	Atmospheric, Wet	Hydrogen Sulfide Other trace gases	>10 parts per million Dilute
(8)	Chemical Corrosive	Solution	Chlorine Polyelectrolyte Sodium Hypochlorite Sodium Hydroxide	To be determined To be determined To be determined To be determined

1.3 Submittals

.1 Submit product data in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Identify the exposure area for each location, room, area, or space at the Facility and provide an area exposure table. Develop the table based on the Corrosion Study as specified in Appendix 18K and other process requirements.

2. PRODUCTS

2.1 Material

.1 Provide construction materials, coating systems, and lining systems consistent with materials requirements specified in individual equipment/material Specification Sections for the exposure assigned in the area exposure table. In the event an area exposure is not designated for a particular location, the area exposure with the most severe corrosion potential from all area exposures for adjacent locations, rooms, areas, or spaces governs.

.2 Where components are assigned multiple area exposures, select the material and coating specified for the area exposure that has the most severe corrosion potential. When components cross, span, or straddle the boundary separating two (2) or more area exposures, select materials specified for the area exposure that has the most severe corrosion potential and is suitable for each area exposure. Where materials change at a boundary between exposures, change the material at the boundary or within the less severe exposure. At material transitions, separate dissimilar metals by a dielectric coupling or other method to eliminate corrosion potential.

3. EXECUTION (NOT USED)

END OF SECTION

PROJECT IDENTIFICATION AND SIGNS

1. GENERAL

1.1 Summary

.1 This Section covers requirements for identification signs for the Project during construction.

1.2 Submittals

.1 Submit a layout sketch of the construction sign with lettering sizes, spacing, and supporting details specified in this section. Identify proposed location(s) for sign installation.

.2 Submit product data in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

2. PRODUCTS

2.1 Performance Criteria

.1 Provide and erect prior to mobilization a two-part Project sign. Support the sign on two (2) 200 mm by 200 mm treated timber posts.

.2 The top sign to be 900 mm by 2400 mm of wood frame and plywood construction with edging, painted with an exterior enamel with exhibit lettering and produced by a professional sign painter. Indicate on the sign the names and logos of the organizations as specified in Schedule 18 Technical Requirements.

.3 The bottom sign to be 900 mm by 2400 mm of wood frame and plywood construction with edging, painted with exhibit lettering of the same style and quality as the top sign. Indicate on the sign the name of the Project, Design Builder’s name, and major subcontractors.

.4 Erect the sign allowing 2000 mm clearance from the lowest sign to the ground.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Maintain sign in good condition for the duration of the Project. Clean periodically.

.3 No other signs or advertisements, other than warning signs, are permitted on site.

.4 Remove construction sign and restore site to clean condition within ten (10) Business Days after the completion of the Operational Advisory Period.

END OF SECTION

FINAL CLEANING

1. GENERAL

1.1 Summary

.1 This Section covers the final site cleaning requirements for the Works.

.2 Use only cleaning materials recommended by the manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 Final Cleaning

.1 In preparation for Substantial Completion of the Project, perform final cleaning.

.2 All electrical and control panels to be free of debris inside and out and vacuumed out.

.3 All concrete surfaces to be free of oil, excess concrete/grout material and other dirt.

.4 All drainage systems (floor, curb, gutter, storm or otherwise) to be clean and free of debris.

.5 Leave watercourses, gutters, and ditches open and clean.

.6 All HVAC ducting to be clean and free of debris.

.7 All wrapping, packaging, crating and temporary labels/tagging to be removed.

.8 Site to be free of any excess building materials or garbage.

.9 Broom clean paved surfaces; rake clean other ground surfaces.

.10 Wipe down and vacuum all equipment and surfaces.

.11 All empty channels, tanks, and sumps to be free of debris and broom cleaned.

.12 Remove any temporary facilities or services not required by City for future use or required by Design Builder to carry out performance period services.

.13 Replace all ventilation filters and electrical cabinet filters.

END OF SECTION

RESTORATION OF IMPROVEMENTS

1. GENERAL

1.1 Summary

.1 This Section covers the requirements for restoration of existing structures, utilities and City facilities impacted during execution of the Project.

1.2 Definitions

.1 Structures and utilities: All types of existing, relocated, and new features within or outside the site including but not limited to City property, non-City property, public roadways, equipment, utilities, chases, buildings, tunnels, landscaping, architectural features, concrete work, channels, piping, duct, foundations of all types, piers of all types, roadway embankments, pumping stations, and bridge structures.

2. PRODUCT (NOT USED)

3. EXECUTION

3.1 General

.1 Take all precautions necessary to protect the integrity and usefulness of existing facilities, structures, and utilities.

.2 If necessary to complete the Works, remove existing structures, including curbs, gutters, pipelines, and utility poles. Rebuild the structures and utilities thus returned to the condition as found or better.

.3 Repair existing structures and utilities which may be damaged as a result of construction of the Facility. Restore to equal or better condition.

3.2 Roads Streets and Walkways

.1 Unless otherwise specified, re-surface and bring to the original grade and section roads, streets, and walkways in which the surface is removed, broken, or damaged, or in which the ground has caved or settled during the completion of the Project.

.2 Design Builder to remove temporary off-site signage such as truck routing.

.3 Trim back edges of pavement far enough to provide clean, solid, vertical faces and keep free of loose materials before resurfacing material is placed.

.4 Cut all paved surfaces with a pavement saw.

.5 Conform to the paving requirements in accordance with Section 02741.

3.3 Surface Improvements

.1 Protect and replace existing guard posts, barricades, light posts, signs, and fences if damaged. Restore to equal or better condition.

3.4 Other Restoration

.1 Re-finish surfaces to provide an even finish. Refinish continuous surfaces to the nearest intersection. Re-finish entire assemblies. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and new works is evident in finished surfaces.

.2 Restore existing underground structures and utilities that are to remain part of the Facility including but not limited to concrete-embedded piping, conduits, and other utilities.

.3 Make restorations with new materials and appropriate methods as specified for new works of similar nature to the existing work; if not specified, use the more stringent of recommended practice of manufacturer or good industry practice.

END OF SECTION