DESIGN STANDARD 13 14 26

WATER FEATURE DESIGN

1.01 GENERAL

A. Intent of Standard: This Design Standard provides criteria for determining the requirements for Park Water Features and their control systems, as well as guidelines for developing their design and construction specifications, all in accordance with industry-accepted operation and maintenance practices and standards observed by the Seattle Department of Parks and Recreation (SPR). It also delineates the responsibilities of the Designer in developing the design and overseeing its construction.

B. Design Mission: When included in the scope of work, SPR's goal is to provide water features consistent with public expectations and commitments made by SPR in terms of function, appearance, and operation. Important objectives include water conservation, maintainability, reduced chemical use, and the health, safety and welfare of the general public.

C. Designer Qualifications: Individuals participating in the design of park water features shall either have or be under the direct supervision of an individual who has the following qualifications and credentials:

- Demonstrated knowledge of Health Department regulations regarding proposed water feature.
- Demonstrate prior experience in the design of at least three water features of similar size and nature.
- Demonstrate ability to forecast accurate maintenance/cost implications for functioning feature by providing examples of previous estimates of similar nature and scope.

D. Design Product: The design product shall include the following elements, as applicable in the Design contract:

1. **Water Feature Concept Plan:** A complete description of all water features provided in the design, including site condition assessment (e.g., soils analysis, sewer utilities, surrounding trees/vegetation, etc.), schematics of proposed water supply and drainage provisions, identification of all electro/mechanical apparatus involved in the design (filter systems, tanks, pumps, controls, etc.), and sketch(es) depicting how the feature(s) will appear, all in accordance with the scope of work established by the Designer's contract or agreement with SPR.
2. **Maintenance & Utility Impact Report:** The Water Feature Concept Plan shall be accompanied by a Maintenance Utility Impact Report that quantifies expectations in terms of water usage, power consumption, and operations/maintenance costs for the proposed concept(s). This report shall be prepared using the format and applicable labor and utility rates provided by SPR at the request of the Designer, such request being made at the time the report is prepared.

3. **Health Permit Application Package:** A complete package of all forms, documents, analyses, tests, and reports as may be required to obtain all necessary permits for both the construction and operation of the complete and functional water feature(s).

4. **Drawing Set:** A complete set of drawings showing all site preparation, demolition, installation, system components, and instructions necessary for successful construction of the approved water feature(s). SPR Standard Details as listed in Section 1.02 shall be utilized to the extent possible.

5. **Independent Design Review:** Unless specifically waived by the Park Engineer, the Designer shall cooperate with a third party consultant, which shall be retained by SPR to review the proposed water feature design(s) at the 65% design completion level. This review shall be submitted to the Park Engineer and shall include but not be limited to site condition assessment, utility impact study (including power and water consumption), and general design critique as appropriate for a value engineering assessment.

6. **Final Technical Specifications:** The Designer shall complete all relevant SPR template technical specifications, including but not limited to those listed in Section 1.02.A.1, to the extent required to properly coordinate with the approved Water Feature(s) and the design drawings, as needed for inclusion as part of the final Construction Contract Documents. Alternatively, the Designer may prepare his own set of complete, detailed technical specifications for the water feature, provided that all elements or components in such that are common to the SPR template technical specifications are also consistent with the SPR template.

   Text within the template specifications that is intended to be edited by the Designer is generally identified by use of highlighted red bold font or similar special formatting. Such items usually entail making choices about what type of equipment is needed for the conditions and requirements particular to the subject project. Other than appropriate finalization of these specially-identified areas in the template specification, the Designer shall not make any changes (add, delete, or alter) to the template specification unless specifically approved by the Park Engineer, through the project's technical review process.

7. **Water Feature Commissioning:** The Designer shall be responsible for coordinating all testing and commissioning activities as needed to complete the installation of the water feature and verify that it is functioning properly for every operating condition. Such activities must be successfully carried out prior to SPR granting substantial completion of the water feature construction. The commissioning activities shall be carried out in the presence of appropriate SPR engineering, maintenance, operations, and aquatics personnel, and shall confirm that the water feature is operating at the optimum level anticipated by the design, including aspects such as water use and predicted power consumption, and that any controlling software and/or electrical/mechanical control components have been correctly and completely programmed and installed. A Washington State Water Recreation Facility operating permit shall be secured by the Designer as part of the commissioning.

8. **As-Built Drawings:** The Designer shall submit a complete as-built drawing set within 10 calendar days of substantial completion, developed in accordance with the process outlined below. The Designer shall verify that the Construction Contract Project Manual

is completed in a manner that contractually obligates the Contractor to follow this process.

a. The Contractor shall keep a current working set of drawings with all as-built changes or actual conditions as work proceeds, to be submitted to Designer at substantial completion of irrigation system installation.

b. The Contractor shall arrange for surveying services to locate all piping and equipment with trenches open as system is constructed, with survey data properly recorded into field books.

c. The Contractor shall perform all required tests, audits, etc. with adequate notice as detailed in the specifications.

d. The Designer shall interpret and incorporate field information into a scaled AutoCAD drawing (utilizing same scale as contract documents) and provide to the Park Engineer prior to close-out of project.

e. The Designer shall prepare Mylar record drawings ("as-builts") with contractor's and SPR surveyor's information included, and CD(s) containing electronic AutoCAD and Adobe .pdf drawings with that same information, to be submitted to the Owner along with all other required information, manuals, etc.

1.02 GOVERNING DESIGN STANDARDS

A. Federal, State, County, and Municipal Standards: The Water Feature(s) shall be in complete compliance with all applicable federal, state, county, and municipal standards, including but not limited to the Department of Ecology (DOE), Washington State Department of Health, American Society of Mechanical Engineers (ASME), Consumer Product Safety Commission (CPSC), Americans with Disabilities Act (ADA), Architectural Barriers Act (ABA), and the Seattle Municipal Code (SMC). Specific sections of such standards include but are not limited to:

- SMC 10.12 Water Recreation Facility Code
- ADA/ABA Chapter 10 Recreation Facilities

B. Accepted Standards: All materials, components, hardware, fixtures, and any other items associated with the design shall be in accordance with approved standards, details, and technical specifications provided in the SPR documents referenced below. The Designer shall demonstrate to the Engineer that all specifications relevant to the project have been included into the Construction Contract Documents.

1. **SPR's Technical Specifications:** Because water features can consist of a wide variety of configurations, there is no single template technical specification that completely describes relevant technical specifications for any given single feature. However, certain components of a water feature can be contained in a number of templates, including but not limited to those listed below. The Designer has the option of modifying the available template specifications to the extent needed for describing the water feature, or creating a stand-alone technical section specifically for that water feature. If the stand-alone option is utilized, the Designer is responsible to verify that all technical

specifications are consistent with Parks standards and that there are no contradicting requirements contained in other sections of the Construction Contract Documents.

- 33 34 00 Storm Sewer Utilities
- 33 30 00 Sanitary Sewerage Utilities
- 33 11 00 Water Distribution Systems
- 26 00 00 Electrical

2. **SPR's Standard Details & Plans:** Whenever possible, water features should utilize SPR Standard Details for components that are not necessarily unique to the water feature (i.e., valves, control panels, etc.). Such components shall be provided and installed in accordance with Standard Detail Drawings. Such details shall be used as provided by SPR (without alterations) and shall be included in the Contract Documents. Potential components, include, but are not limited to, the following:
   - 32 84 00.13 Standard POC Diagram
   - 32 84 13.13 Irrigation Trenches
   - 32 84 19.16 Large PRV-DCVA in TA-25 Vault
   - 32 84 19.13 Small PRV-DCVA in #2 Meter Box
   - 32 84 19.19 Large PRV-only in TA-25 Vault
   - 32 84 19.23 Large DCVA-only in TA-25 Vault
   - 32 84 19.26 PRV-RPBA in Hot Box
   - 32 84 23.13 Quick Coupler Valve
   - 32 84 23.23-26 Gate Valves
   - 32 84 23.29-36 Isolation Valves
   - 32 84 29.13 Master Valve-Flow Sensor
   - 32 84 29.16-29 Automatic Control Valve Assemblies
   - 33 11 00 Water Main Trench & Bedding Sections

C. Exceptions: In general, all aspects of the design shall be in accordance with the accepted standards cited in Section 1.02.B. However, the Designer has the added responsibility to expand upon these documents as required, dictated and/or warranted by the approved Water Feature Concept Plan and/or considerations that include, but are not limited to, the following:

- As directed by the Park Engineer as a result of SPR's Technical Review process;
- Special conditions pertaining to the project and/or site;
- Environmental considerations and constraints;
- The integrity of the proposed design;
- The health, safety, and welfare of the general public;
- Adherence to Uniform Plumbing Code (UPC) requirements;
- Adherence to Seattle Public Utilities requirements (e.g. backflow device testing);

- Adherence to other applicable codes or legal standards.

1.03 DESIGN GUIDELINES

The following guidelines apply to all water feature designs to the extent practicable:

A. Water Feature Main Shut-off Valve: All water features shall be equipped with a main shut-off valve at the point of connection, just after the meter, in order to be able to manually shut down the system to perform maintenance activities or for winterization purposes.

B. Recirculating Versus Direct Drain Systems: In general, any new water feature capable of utilizing an overall water volume greater than 300 cubic feet per day shall be provided with a water recirculation and treatment system unless otherwise specified.

C. Drains: All water features shall drain to the sanitary sewer system, in accordance with the City NPDES requirements and SMC. All water features shall have dual drain systems as needed to prevent entrapment of objects or body parts. Gratings shall be installed over all drains in accordance with applicable safety standards and guidelines.

D. Water Quality: As required by the Health Department, water features intended for human water contact shall be designed to maintain water quality in accordance with Chapter 246-262 WAC, Recreational Water Contact Facilities. Water features not intended for human water contact shall be designed to maintain water clarity thru mechanical filtering or other acceptable means. Unless otherwise specified in the scope of work, all recirculating water systems shall be provided with ultraviolet (UV) sterilization systems.

E. Sustainability: Water features shall be designed with sustainability and energy conservation in mind, with consideration given to water recirculation and/or reuse and minimization of power consumption through energy conservation features such as programmable controllers. Water collection and circulation systems shall be water tight and capable of maintaining water retention for the life of the feature. If feasible, the designer is encouraged to consider the potential use of “gray water” resulting from the water feature for irrigation or other non-potable purposes, and propose such use for Parks’ consideration to incorporate within the scope of the project.

F. Maintainability: Operating component parts shall be commonly available on the open market and have a good track record of reliability. The system design shall provide for efficient winterization of the system to protect it from freezing. Water storage tanks shall have an automatic recharging system to maintain a constant storage capacity and have an overflow capability to prevent flooding.

G. Location: Unless specifically approved by the Park Engineer, water features shall not be located within 25 feet of sand-containing features.

H. Safety: For water contact features, walking surfaces shall be non-skid surfacing. For features not intended for water contact, a horizontal or vertical deterrent such as fencing, shrub beds, or a railing shall be installed.

I. Mechanical Equipment Enclosures: Enclosures housing supporting equipment shall be weather tight but vented and provide adequate space for easy access to mechanical and electrical components requiring maintenance. Provide easy access to and into the enclosure and do not create a "confined space" situation.

J. Operating Equipment and Chemical Storage: Secure, weather tight, vented space will be provided for the storage of pool sanitation supplies and equipment for locations with recirculated water.

K. Control Systems: Remote operation capability is required for all recirculating and/or powered systems. Control components shall be Siemens Energy Management Control System (EMCS). Control systems must support operation usage/procedures consistent with current Parks Best Maintenance Practices (BMPs).

L. Piping: No PVC or galvanized pipe shall be allowed in any water feature application. Copper and brass piping and fixtures are preferred for pipe sizes up to 4". Pipe sizes 4" and above may be ductile iron. No HDPE piping shall be allowed inside buildings or structures. High-pressure rated HDPE pipe is acceptable for pressurized exterior use, and any HDPE piping is acceptable for use in gravity drainage applications.

1.04 WATER FEATURE TYPE-SPECIFIC REQUIREMENTS

The following categories of construction are considered Water Features, and shall be designed in accordance with the standard engineering practices to provide the intended function and in accordance with all applicable local, state, and federal health department regulations. Special considerations shall be incorporated in the design as indicated below.

A. Decorative Fountains: Unless otherwise specified by SPR, decorative fountains are not intended for interactive public use. All fountains shall be recirculating unless otherwise directed by the Park Engineer. The fountain design shall include physical barriers to discourage unauthorized entry, enhance public safety, and prevent individuals from falling or tripping into fountain basins/structures. Fountains will be treated with a level of disinfection to reduce bacteria and prevent the growth of algae and moss, but there is not an expectation that they will meet the standard as a Water Recreation Facility as defined by State Law. Fountains are typically operated between April and October of each year.

B. Non-recirculating Wading Pools: Non-recirculating wading pools are no longer acceptable as new water features at Parks facilities. Existing wading pools shall be accessible, free of trip hazards, and should include dual drain systems in accordance with Health Department regulations to prevent entrapment of objects or body parts when draining. Non recirculating outdoor wading pools will be cleaned, filled, and drained daily, supervised by an attendant, and generally be operated from late June through Labor Day, corresponding to the summer break of Seattle Public Schools.

C. Recirculating Wading Pools: Recirculating wading pools may be considered as acceptable new water features at Parks facilities when they can comply with all Health Department and accessibility regulations for design and operation. They shall be accessible, include physical barrier fencing, disinfection systems, dual drains and other features. They may also contain in-

ground, flush mounted spray elements, which if included shall also entail slip-resistant surfacing that is no steeper than 1% slope in any direction. In addition there must be clear documentation of anticipated water and energy consumption and maintenance requirements. Ultra-violet disinfection systems will be required. Recirculating wading pools may be operated over a longer season, generally from May through September.

D. Reflecting/Ornamental Ponds: Reflecting and/or ornamental ponds shall be recirculating unless otherwise directed by the Park Engineer. The design shall include physical barriers to discourage unauthorized entry, enhance public safety, and prevent individuals from falling or tripping into fountain basins/structures. The ponds shall be free of trip hazards. Unless plants are included as a part of this system, reflecting ponds will generally be treated with a level of disinfection to reduce bacteria and prevent the growth of algae and moss, but there is not an expectation that they will meet the standard as a Water Recreation Facility as defined by State Law.

E. Waterfalls: Artificial waterfalls shall be recirculating unless part of a natural creek or stream flow.

F. Ornamental Streams: Ornamental streams shall be recirculating unless part of a natural creek or stream flow.

G. Interactive Non-Recirculating Water Spray Play Areas: Non-recirculating water spray areas are generally not acceptable. Unless otherwise specified by the Park Engineer, all interactive water spray play areas shall be recirculating. Non-recirculating systems may be considered for approval by the Park Engineer if the Designer can demonstrate that water volume utilization will not exceed an annual total of 20,000 cubic feet (150,000 gallons) under normal operation. Unless otherwise specified by the Park Engineer, non-recirculating interactive water spray play areas shall be direct drain systems with dual drains, draining into the sanitary sewer system. Spray features shall be provided with tamper-proof manual controls that prevent continuous discharge, and non-recirculating nozzles shall be provided with the lowest gallon per minute flow rate practicable for the spray application. They may contain in-ground, flush mounted spray elements and shall be surfaced with slip-resistant surfacing that is no steeper than 1% slope in any direction. If the water spray play elements include above grade structures, slip-resistant, resilient safety surfacing is required. No detergents or other agents that create foam and/or bubbles shall be utilized. Non-recirculating water play areas are generally operated from Memorial Day to Labor Day.

H. Interactive Recirculating Water Spray Play Areas: Recirculating water spray play areas may be considered as acceptable new water features at Parks facilities when they can comply with all Health Department regulations for design and operation including disinfection systems, dual drains and other features. In addition there must be clear documentation of anticipated water and energy consumption and maintenance requirements. Recirculating basin and drain systems shall be designed to collect all water spray practicable. Ultra-violet disinfection systems are required. They may contain in-ground, flush mounted spray elements and shall be surfaced with slip-resistant surfacing that is no steeper than 1% slope in any direction. If the water spray play elements include above grade structures, slip-resistant, resilient safety surfacing is required. Unless otherwise directed by the Park Engineer, interactive water spray

play areas shall have overflow drains connected to the sanitary sewer system. Recirculating water spray play areas may be operated from April 15 to October 15.

I. **Fish/Plant Ponds:** Fish and plant ponds using potable water shall be recirculating unless part of a natural creek or stream flow. Supply and recirculated water shall be filtered and disinfected utilizing ozone or ultraviolet disinfection system.

J. **Natural Streams:** Natural streams are defined as a channel or system of natural flows, emanating from a spring or drainage basin. Natural streams are not considered true water features. The surrounding environment shall be designed to resemble natural wild animal habitat to the extent practicable.

K. **Detention Ponds:** Detention ponds are not considered true water features, and are generally not available for public access. The surrounding environment shall be designed to resemble natural wildlife habitat wetland to the extent practicable.