PART 1 – GENERAL

1.01 SUMMARY:

A. Extent of Work: The extent and location of the standpipes Work is indicated on the Drawings. The Work includes design detailing and construction of marina fire protection system and dry standpipe system, including pipe, fittings, valves, appurtenances, and fire extinguishers.

1.02 Related Documents: The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this Work as if specified in this section.

A. Related Work Specified Elsewhere:

Section 22 11 16 - Marina Potable Water Systems

Section 33 10 00 - Plumbing for Potable Water Systems

Section 33 11 00 - Water Distribution Systems

1.03 REFERENCES:

B. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63-inch, for Water Distribution

C. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

D. FM (Factory Mutual System) - Factory Mutual Approval Guide

E. NFPA 14 (National Fire Protection Association) - Installation of Standpipe and Hose Systems

F. NFPA 303 (National Fire Protection Association) - Fire Protection Standard for Marinas and Boatyards

F. City of Seattle Standard Plans and Specifications for Road, Bridge and Municipal Construction (most recent edition).

1.04 SYSTEM DESCRIPTION:

G. This Work consists of design and construction of piping, hangers, standpipes, fire extinguishers, and appurtenances for a fire protection system based on performance criteria.

H. Perform work in accordance with International Fire Code (IFC) (most recent edition), Appendix II-C, Marinas, NFPA 14, Factory Mutual (FM) Approval Guide, and City of Seattle requirements. Provide necessary piping, fittings, fire extinguishers,

connections, valves, and other appurtenances for a complete and operable facility.

I. Install a dry line fire protection system from existing driveway through existing bulkhead wall, below access pier, and on floats. Fire protection line shall run as shown on the Drawings. The fire line shall be sized as shown on the Drawings.

J. Coordinate Work of this section with existing access pier, new gangway, and float construction.

K. Provide flexible hose connections for the fire supply line between the bulkhead wall and the float. The length of flexible hose connection shall be sufficient for piping to transition from the fixed structure to the floating structure to accommodate lake level fluctuations and other movement of floats without binding. Flexible hose shall be weighted or otherwise restrained to remain below water level at all times.

L. Fire line shall be mounted external to float system generally as shown on Drawings. Provide necessary connections, fittings, valves, hangers, and appurtenances for a complete and operable system. Provide rigid supports at transition points (such as fire standpipes), so water line and risers are fully supported.

M. Locate 2-1/2-inch fire department standpipes as shown on the Drawings. Locate standpipe to minimize damage to standpipe from moored vessels. Each location on any float shall be no more than 75 feet from a standpipe. Each standpipe riser shall supply a single fire hose connection.

N. Secure fire department standpipe to float. Support and riser pipe capable of withstanding forces and loads anticipated during operation, including a 200-pound force applied perpendicular to the riser at the top of the pipe assembly.

O. Drawings provide schematic layout for piping, services, and fire department connection at driveway. Drawings demonstrate a workable solution for piping layout and fire department standpipe locations acceptable to Owner. Complete design and details for fully functioning systems. Minimize number of joints and fittings. Submit modification of schematic layout as a substitution.

P. Thermal Expansion of Piping System: Polyethylene has a thermal expansion coefficient of 9x10-5 in/in/°F. Provide expansion joints to allow for thermal expansion and contraction of HDPE piping system between rigidly held service appurtenances (such as standpipes and hose bibs). Measures shall provide allowance for expansion and contraction of pipe in a 10 degree Fahrenheit temperature without movement of rigidly held appurtenances.

1.05 SUBMITTALS:

A. Comply with Section 01 33 10 - Submittals.

B. Shop Drawings: Indicate supports, components, accessories, and sizes.

C. Product Data: Submit manufacturer's catalog sheet for equipment, indicating rough-in size, finish, and accessories.

D. Field Test Reports: Indicate compliance with specified performance.

E. Manufacturer's Installation Instructions: Submit with product data.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.06 CLOSEOUT SUBMITTALS:

A. Comply with Section 01 77 19 - Contract Closeout.

B. Operation and Maintenance Data: Submit servicing requirements and test schedule.

1.07 QUALITY ASSURANCE:

A. Perform Work in accordance with 2003 International Fire Code (IFC), Appendix II-C, Marinas, NFPA 14, FM Approval Guide, and City of Seattle requirements.

B. Maintain one copy of each document on site.

1.08 QUALIFICATIONS:

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years' documented experience.

1.09 PRE-INSTALLATION MEETING:

A. Comply with Section 01 31 19 - Project Meetings.

B. Convene minimum one week prior to commencing Work of this section.

1.10 DELIVERY, STORAGE, AND HANDLING:

A. Deliver and store products in shipping packaging until installation.

PART 2 – PRODUCTS

2.01 PIPE AND FITTINGS

A. High Density Polyethylene:

1. Use pipe and fittings from single manufacturer throughout.

2. Pipe and Fittings 4-Inch Diameter and Larger: AWWA C906, outside diameter based, PE3408 material, Pressure Class 200 psi, DR9.

3. UL/FM approved.

4. Markings on Fire Protection Pipe: Identify permanently by co-extruding four equally spaced red stripes into pipe's outside surface. Striping material shall be same material as pipe material except for color. Mark with Factory Mutual diamond logo.

5. Fittings and Joints:

   a. Only stainless steel fittings or thermal butt fusion connections will be allowed below water level. All non-stainless steel metal fittings, if used, shall be located above the water level.

   b. Thermal Butt Fusion: ASTM D3261. Use equipment, procedures, and trained technicians approved by pipe and fitting manufacturer. External and internal beads shall not be removed.

   c. Flanged: Fit Class 150 flange adapters with ANSI Class 125 backup rings. Fit Class 200 flanges adapters with ANSI Class 150 backup rings. Backup ring bore chamfered to provide clearance for flange adapter radius. Connections shall be made using Type 316 stainless steel with Grade 8 stainless steel bolts.

   d. Transition: HDPE/MPT Fused HDPE to 316 stainless steel pipe with iron pipe thread (IPT). Poly-Cam Series 710.

   e. Header Fitting: Fused HDPE mainline pipe to Type 316 stainless steel NPT Female tee with IPT. Poly-Cam Series 412.

B. Steel Pipe (4-inch diameter and smaller):

1. ASTM A53, Hot-Dipped Galvanized inside and out.

2. Above water level fittings: Malleable iron, banded, threaded type. Pressure rating 150 psi. Dimensions per ANSI B16.3. Threading per ANSI B2.1. Material per ASTM A47M, Grade 32510. Galvanized inside and out.

C. Ductile Iron Pipe:

1. Ductile Iron Pipe: Centrifugal cast in 18-foot nominal lengths conforming to AWWA C151; bituminous exterior coating conforming to AWWA C 151; Standard Thickness Class 52.

2. Non-restrained Joints: Rubber gasket, push-on type or mechanical joint (MJ) conforming to AWWA C111.

3. Flange Joints: Conform to ANSI B16.1, Class 125 drilling pattern, gasket neoprene or chlorinated butyl.

4. Pipe Fittings: Shall be Ductile Iron short body, conforming to AWWA C153. Mechanical joint pressure rating 350 psi; flange joint pressure rating 250 psi.

5. Flanged Fittings: Conform to ANSI B16.1, Class 125 drilling pattern, gasket neoprene or chlorinated butyl.

2.02 GASKETS:

A. Gaskets: Section 22 11 16.

2.03 FLEXIBLE HOSE:

A. Suitable for use in marine environment and exposed to sunlight and atmosphere and shall be Ozone and UV resistant.

B. Suitable for transporting fire water per AWWA, NSF, FDA, or USDA.

C. Shall be resistant to kinking or pinching over full range of operation, have integral helical steel wire reinforcement, swaged hose ends and have a listed bending radius suitable to operate with design layout.

D. Pressure rating: 250 psi operating pressure with factor of safety 2 minimum for pipe, fittings, and connections.

E. Operating life: Shall be 25 year minimum.

F. Length as required to accommodate movement.

G. Fitting: Flanges - Type 316 Stainless Steel, pressure rating ANSI Class 150-pound.

H. Hose Grip (Stress Relief): Stainless Steel Woven Wire (type designed to tighten under weight of flexible hose and distribute stress over minimum 2-foot-length of hose).

I. Approved Products:

1. Titan, SW 355

2. Resistoflex, Type TMH

3. Or approved equal.

2.04 DRAIN VALVE:

A. Refer to Section 22 11 16.

2.05 HANGERS:

A. Refer to Section 22 11 16.

2.06 FIRE EXTINGUISHERS:

A. Refer to Section 35 51 13.

2.07 VALVES:

A. Products shall comply with NFPA 14, FM Approval Guide, and City of Seattle Requirements.

2.08 FIRE DEPARTMENT CONNECTION (FDC):

A. Fire Department Connection: Per City of Seattle Standards.

PART 3 – EXECUTION

3.01 EXAMINATION:

A. Verify site conditions.

B. Verify location of point of connection.

C. Verify dock construction is complete and floats are secured.

D. Verify location of domestic water services.

E. Verify spacing between valves, fire hose services, and angle points.

F. Verify ramp location and extent of travel due to lake level fluctuation and other movements.

3.02 PREPARATION:

A. Protect adjacent docks, boats, and improvements from damage.

B. Maintain access to existing docks at all times.

3.03 INSTALLATION:

A. General:

1. The systems shall be complete in all regards and include, but not be limited to, required pipe, fittings, valves, pipe hangers, and appurtenances as necessary for a complete and operable facility.

2. Inspect pipe for defects before it is placed. Clean pipe, fittings, and valves of dirt and foreign material as they are placed. Plug open ends of pipe and

fittings with temporary watertight plug whenever Work is stopped or when water threatens to enter pipe. Keep water from entering pipe.

3. There may be conflicts with existing utilities at certain locations. Locate these utilities to prevent damage and adjust pipe alignment to eliminate conflicts. The Contractor shall be responsible for damages to existing utilities and shall repair damage caused by its activities at Contractor's expense.

4. Perform Work in accordance with NFPA 14, FM Approval Guide, and City of Seattle requirements.

B. Installation of Pipe and Fittings:

1. Comply with Section 22 11 16 for pipe assembly.

2. Install pipe on outside of float as shown on Drawings.

3. Submerge pipe main minimum 6 inches below water.

4. Align pipe to minimize amount of pipe extending beyond edge of float.

5. Secure pipe in place at interval to prevent sagging, support weight of pipe full of water (assuming unsubmerged condition), and to resist buoyancy forces (assuming pipe is empty and submerged).

C. Installation of Pipe on Hangers: Per Section 22 11 16.

D. Connecting Pipe of Different Material: Per Section 22 11 16.

E. Fire Protection Service:

1. Locate fire department standpipes as shown on Drawings.

2. Secure pipe riser to float structure to prevent movement and damage.

F. Drain Valve: Per Section 22 11 16.

G. Flexible Hose Connections: Per Section 22 11 16.

H. Extinguisher Cabinet:

1. Locate cabinets where shown on Drawings, with extinguisher in cabinet.

2. Install plumb and level.

3. Secure base to float.

4. Comply with manufacturer's recommendations.

3.04 FIELD QUALITY CONTROL:

A. Comply with Section 01 45 00 - Contractor's Quality Control.

B. Comply with City of Seattle Requirements.

C. Test the system in accordance with NFPA 14.

D. Test shall be witnessed by Owner and City of Seattle Fire Marshal.

3.05 CLEANING:

A. Clean the system of all debris and excess pipe material.

B. Flush the system per Fire Marshall Requirements.

END OF SECTION