PART 1 GENERAL

1.1 DESCRIPTION

A. General: Provide gas systems in accordance with the Contract Documents.

1.2 REFERENCE STANDARDS

A. Comply with applicable provisions and recommendations of the following Codes:
1. 2010 California Code of Regulations, Title 24 (California Building Standards Code)
2. California Plumbing Code 2010
3. Local Code and Amendments
4. PG&E Requirements
5. NFPA 54-2009, National Fuel Gas Code

B. Provide gas systems in accordance with the intent of the Contract Documents. Install all gas services meter rigs, regulators, etc., in accordance with the provisions of gas serving company and obtain all necessary approvals.

C. Make arrangements to provide gas service into the building. Ascertain what materials and/or labor will be provided by the local utility company and/or other City authority and pay any fee in conjunction therewith.

D. Gas service contract limit line as indicated on the Drawings.

1.3 RELATED DOCUMENTS

A. Section 22 05 01: Plumbing General Provisions

B. Section 23 09 00: Building Management System (BMS)

PART 2 PRODUCTS

2.1 BELOW GRADE PIPING AND FITTINGS

A. Piping: Polyethylene piping, with heat fusion weld joints, Type II, ASTM D 2513, ASTM D 2683, ASTM D 3261, PE 2406, where approved by local gas company standards.

1.	1 inch NTS	SDR 12.5
2.	1.25 inch NTS	SDR 13.9
3.	1.25 inch IPS	SDR 10
4.	2 inches IPS	SDR 11
5.	3 inches IPS	SDR 11.5
6.	4 inches IPS	SDR 11.5
7.	6 inches IPS	SDR 11.5
8.	8 inches IPS	SDR 11.5
9.	10 inches IPS	SDR 11.0

B. Transition Fittings: Steel to polyethylene pipe transition couplings and risers shall conform to ASTM D 2513 & D 2683 and ANSI B31.8 and DOT 192.121, ANSI B1.20, where applicable and meet design, material and construction standards of gas service company. Provide all accessories and fittings required for complete installation at building gas riser location available from Perfection Corporation, or Continental Industries.

C. Tracer Wire: Single conductor with green coating and minimum size No. 12 AWG stranded copper.

D. Buried Pipe Tape: 2 inches wide, safety yellow color code, heavy gauge 0.035-inch, detectable aluminum film including following text: “CAUTION Gas line buried below”.
1. Acceptable manufacturers/products include:
   a. Seton Name Plate Company
   b. EMED Co., Inc., Buffalo, New York

c. Enterprises, Inc., Waterloo, Michigan
d. “Magnetec” by Thor Enterprises, Inc., Waterloo, Michigan

E. Underground at Service Entrance: Same as Above-ground covered with a flexible polymer film with coal tar and synthetic elastomeric coating of 36-mil thickness or extruded high-density polyethylene factory applied coating of 30 mil thickness. Wrap fittings with 10-mil polyethylene tape, ANSI A21.5, double layer, half-lapped. Minimum dielectric strength exceeding 12kV. Use compatible primer below polymer film or polyethylene tape.

2.2 ABOVE GRADE PIPING AND FITTING MATERIALS

2.3 GAS PIPING

A. Furnish and install a gas piping system for various gas appliances as indicated on the Drawings and as specified herein.

B. All gas piping shall be Schedule 40 black steel ASTM A 53 seamless or continuous weld as manufactured in the United States by Laclede, LTV, U.S. Steel, Wheatland or approved equal. Pipe thickness shall be in accordance with ANSI B36.10, latest edition. All gas piping shall be welded construction, except in certain locations where required for servicing and for sizes 4” IPS and smaller as specified herein. Screwed fittings will be permitted in lieu of welded connection for sizes 4” IPS and smaller. Screwed joints must be accessible for repair, if necessary. Screwed fittings will not be permitted in furred ceilings or chases.

C. All pipe materials shall be tested as set forth in ASTM Standards.

D. All pipe fittings shall be of materials as follows:
1. All welding fittings shall be factory made and shall be used full line size, as specified herein in Paragraph 2.02 F.1. for each and every tee, branch, elbow, etc., with reducers after fittings, if required.
2. All screw fittings shall be Grinnell or approved equal, Class 150, malleable iron. Screw joints shall be made up with LACO, Rector-Seal, WKM “Key-Tite” or approved equal pipe joint compound. Screw threads shall be in accordance with American Pipe Thread Standards.

E. Provide a gas valve to each piece of equipment and where indicated. Valves 2” and smaller shall be AGA or UL approved. Valves 2-1/2” and larger shall be certified by the manufacturer to be suitable for natural gas service. Valves shall be furnished with handle. Valves shall be acceptable to local authorities having jurisdiction.

F. Provide automatically actuated gas system isolation valves for kitchen equipment isolation as required by NFPA codes and the jurisdiction having authority. ANSI 221.21 automatic gas valves shall have an electric actuator connected to the appliance automatic shutdown system.

G. Install vent piping for gas pressure regulators and gas trains, extend outside building, and vent to atmosphere. Terminate vents with turned-down, reducing-elbow fittings with corrosion-resistant insect screens in large end.

H. All underground gas piping shall be of the same metals and meet the same working pressure requirements specified herein, except that it shall be coated and protected as follows:
1. All underground gas pipe shall have all exterior surface coated with Republic Steel Corporation’s X-Tru-Coat high density polyethylene extruded coating.
2. The protective coating shall be factory applied with a fluid mastic undercoat. The polyethylene coating shall be minimum of 0.040 inches thick. Protective coating may be factory applied by Standard Pipe Protection Division of General Steel Industries, Inc.
3. Field welds, joints and fittings shall be protected with mastic undercoat and by wrapping with at least two (2) layers (half lap) of “X-Tru-Tape” installed as recommended by the manufacturer or with Raychem “Thermofit” heat shrinkable pipe sleeves applied as recommended by the manufacturer.

I. Furnish and install an A-53 Schedule 10 black steel containment pipe to completely enclose the gas pipe below concrete slabs on grade and throughout all chases and concealed areas of the building if required by

local code or the authorities having jurisdiction. This sleeve shall be vented to atmosphere at the top of the building. Pipe shall be manufactured by one of the manufacturers listed for gas piping.

J. Before backfilling, all underground piping, fittings, joints and valves shall be electrically tested for location of possible defects in the protective coating. All breaks in the coating shall be covered with The Tapecoat Company, Inc., "Tapecoat SP" or approved equal, applied as recommended by the manufacturer.

2.4 GAS METER BY LOCAL UTILITY CO

2.5 MISCELLANEOUS

A. Vent Cap:
1. 3/4-inch to 1-inch pipe size: Aluminum body, built-in drip edge for rain and painter protection, full size venting sized to compensate for effective screen opening, stainless steel screen; similar to "Blo-Vent" by UPSCO.
2. 2-inch pipe size: 180-degree return bend steel end with 0.23 gauge stainless steel 12-inch by 12-inch mesh screen on outlet; "2-inch Return Bend" by UPSCO.
3. 1.25-inch to 4-inch pipe size: Iron body, 90-degree elbow with standard pipe thread with 12-inch by 12-inch mesh stainless steel screen on outlet; "Gas Vent" by UPSCO.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install piping without pockets, with drips at low points, and with valves at each outlet.

B. Use right and left nipples. Do not use bushings, unions and compression couplings.

C. Gas piping within the building below grade is to be run in casings or conduits and to be properly vented at both ends.

D. Gas piping run in plenum spaces, regardless of size to be welded and shall be run in a two-hour enclosure. No valves shall be installed in plenum spaces.

E. Provide dielectric union between buried steel gas piping using listed isolation fitting.

3.2 APPLICATION

A. Manual shut-off valves used on piping systems shall be as indicated for pipe sizes in PART 2.

B. Over-Pressurization Relief Valve: Provide capacity in valve for full relief capacity when pressure regulator fails in widest position and include vent pipe rising 7 feet-0 inches above grade.

C. Provide earthquake valve before gas line enters building and downstream of service exterior shut-off valve. Installation shall be in compliance with utility guidelines and not installed upstream of the gas meter or regulator unless approved by local utility company.

3.3 TESTING AND ADJUSTMENTS

A. Test the gas piping system by means of an air pump and mercury gauge to a pressure equal to the maintenance of a column of mercury 12 inches high for a period of 10 minutes. Conduct the test in the presence of all required inspectors.

B. Test under air pressure to 60 to 80 pounds per square inch for minimum one hour duration. Measure natural gas system test pressure with a water manometer or an equivalent device calibrated in increments not greater than 0.1 inch water column. System shall not be approved until it can be demonstrated that there is no measurable loss of test pressure during the test period.

C. Submit all test reports, witnessed by City Inspectors, to the Project Manager.

END OF SECTION